BETA Low-Voltage Circuit Protection

Catalog ET B1 · 2009/2010

Answers for industry.

SIEMENS

Related Catalogs

Contents

ALPHA Distribution Boards and Terminal Blocks ET A1
Order No.:
pdf only:
(E86060-K8210-A101-A9-7600)

ALPHA SIMBOX Small Distribution Boards • SIMBOX 63, SIMBOX LC, SIMBOX WP • ALPHA 160 - DIN Wall-Mounted Distribution Boards • ALPHA 400 - DIN Wall-Mounted Distribution Boards • ALPHA 630 - DIN Floor-Mounted Distribution Boards • ALPHA AS Modular Distribution Boards • ALPHA Modular Distribution Boards up to1600 A • ALPHA 400-ZS Meter Cabinets • ALPHA BOX • ALPHA 8HP Molded-Plastic Distribution Systems • Planning and Configuration • ALPHA FIX terminal blocks: Screw Terminals, Terminals with Spring-Loaded Connection, Combination Plug-In Terminals, Plug-In Terminals, Insulation Displacement Terminals, Accessories for Terminal Blocks

ALPHA 400-ZS Meter Cabinets ET A2
Order No.:
Regional catalogs available on request
(available in German only)

Region Z1 • Region Z2 • Region Z3 • Region Z4

BETA Low-Voltage Circuit Protection ET B1
Order No.:
pdf only:
(E86060-K8220-A101-B1-7600)

Protecting: Miniature Circuit Breakers • Residual Current Protective Devices • Low-VoltageFuse Systems • SITOR Semiconductor Fuses • SR60 Busbar Systems • Overvoltage Protection Devices

Switching: Switches and Light Indicators • Switching Devices • Timers • Transformers, Bells and Socket Outlets

Measuring: Three-Phase Measuring Devices • Single-Phase Measuring Devices

Monitoring: Monitoring of Electrical Values • Monitoring of Plants and Devices

GAMMA Building Management Systems ET G1
Order No.:
pdf only:
(E86060-K8230-A101-A9-7600)

Display, Operation • Output Devices • Input Devices • Combination Devices • Lighting • Sun Protection, Anti-glare Protection, Utilization of Daylight • Heating, Cooling, Ventilation, Air-conditioning • Load Management • Safety • Quick-assembly Systems · Gateways, Interface Converters • Physical Sensors • Control and Automation Devices • System Products • System Accessories • Counters • Wave

DELTA Switches and Socket Outlets ET D1
Order No.:
pdf only:
(E86060-K8240-A101-A9-7600)

i-system • DELTA line • DELTA vita • DELTA miro • DELTA profil • DELTA style • DELTA natur • DELTA ambiente • m-system • Surface-Mounting Product Range • Switching/Pushbutton Control/Dimming • Motion Detectors • Shutter/Blind Controls • Room Temperature Controllers • Data and Communication Systems • Remote Control Systems • Smoke Detectors • GAMMA Bus Coupling Unit

The Offline Mall CA 01
Order No.:
E86060-D4001-A510-C7-7600
(DVD)

All products of automation, drives and installation technology, including those in the catalogs listed above.

The Online Mall
Internet:
http://www.siemens.com/automation/mall

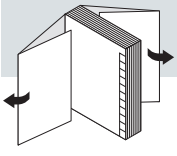
All products of automation, drives and installation technology, including those in the catalogs listed above.

Catalog-PDF
Internet:
http://www.automation.siemens.com/et

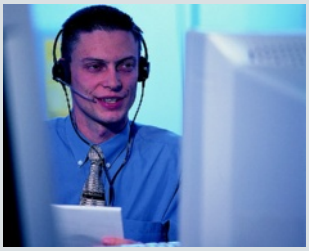
All catalogs for electrical installation technology can be downloaded as PDF files.

Registered trademarks

Further information about electrical installation is available on the Internet at:
http://www.siemens.com/et



Technical Assistance



Expert technical assistance for Low-voltage controls and electrical installation.
Tel: +49 (0) 180 5050 222 *
Fax: +49 (0) 180 5050 223 *
E-Mail:
ad.support@siemens.com

*0.14 /min. from a German landline network, mobile telephone prices may vary

Explanations

DT (delivery time class)

DT	Meaning
►	preferred type
A	two workdays
B	one week
C	three weeks
D	six weeks
X	on request

Preferred types are device types that can be delivered immediately ex works, i.e. they are dispatched within 24 hours.

If ordered in normal quantities, the products are usually delivered within the specified delivery times, calculated from the date we receive your order.

In exceptional cases, delivery times may vary from those specified.

The delivery times are valid ex works from Siemens AG (products ready for dispatch).

Shipping times depend on the destination and the method of shipping. The standard shipping time for Germany is one day.

The delivery time classes specified in the catalog are valid as of 10/2008 and are constantly being optimized. For more up-to-the-minute information, please visit our site at: http://www.siemens.com/automation/mall.

PU (price unit)

The PU column (price unit) specifies the quantity to which the price and weight refer.

PS/P. unit (packaging size/ packaging unit)

The first digit in the PS/P. unit column (packaging size/packaging unit) indicates the minimum order quantity. You can only order this specified quantity or a multiple thereof.

The second digit in the PS/P. unit column (packaging size/packaging unit) specifies the number of units contained in larger packaging (e.g. in a carton). You must order this quantity or a multiple thereof if you want the item to be delivered in a larger packaging quantity. Examples:

PS/P. unit	Significance
1	You can order one item or a multiple thereof.
5	For example, five units are packed in a bag. Because the bags cannot be opened, you can only order a multiple of the quantity contained in the bag: 5, 10, 15, 20 etc.
5/100	One carton contains (for example) 20 bags, each containing 5 units, i.e. a total of 100 units. If only cartons are available for delivery, you need to order a multiple of the carton quantity: 100, 200, 300, etc. Ordering a quantity of 220 units, would produce the following delivery: two cartons, each containing 100 units (= 200 units) and 4 bags, each containing 5 units (= 20 units).

PG (Price Group)

Each product is assigned to a price group.

Weight

The value specified in the Weight column specifies the weight in kg for the quantity specified in the PU column (price unit).

Dimensions

Unless stated otherwise, all dimensions are specified in mm.

BETA Low-Voltage Circuit Protection

Catalog ET B1 · 2009/2010

VDE
VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

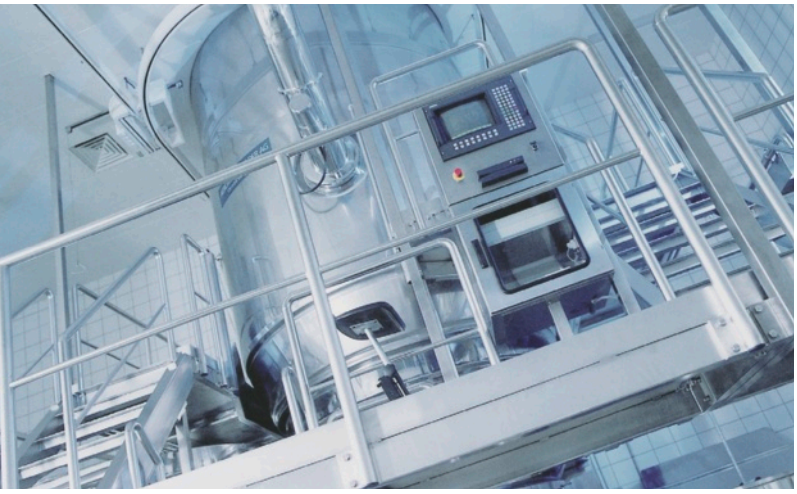
The products and systems listed in this catalog are developed and manufactured using a quality management system certified by VDE and according to EN ISO 9001: 2000.

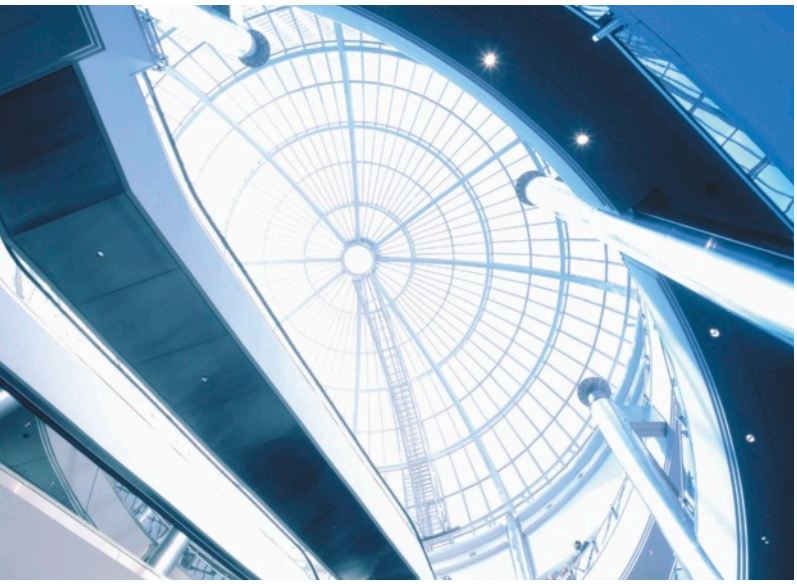
Supersedes:
Catalog ET B1 · 2008
Catalog ET B1 N · April 2008

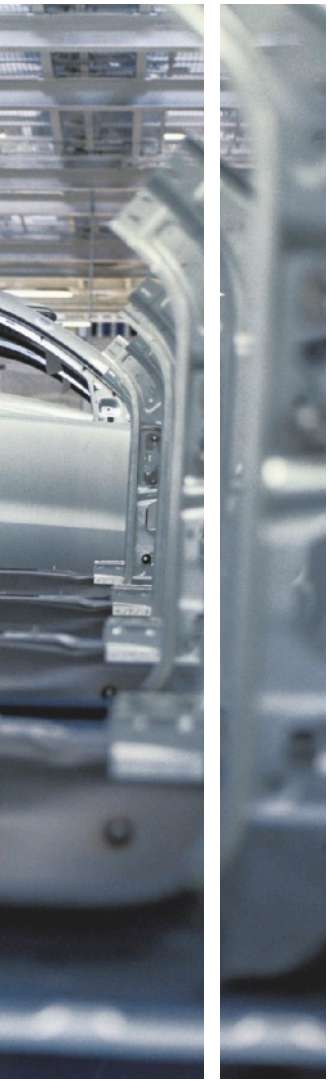
The products in this catalog can also be found in the electronic Catalog CA 01.
Order No.:
E86060-D4001-A510-C7-7600 (DVD)

Contact your local Siemens sales office for further information

Note: A new version of the Characteristic Curves for Catalog ET B1 is planned for January 2009 under the title *Catalog Add-On ET B1*







Answers for Industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

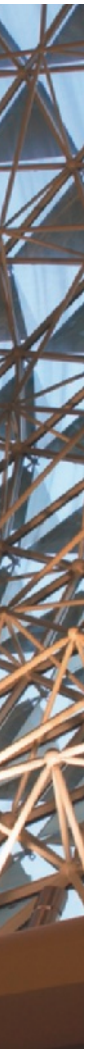
Siemens offers automation, drive and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

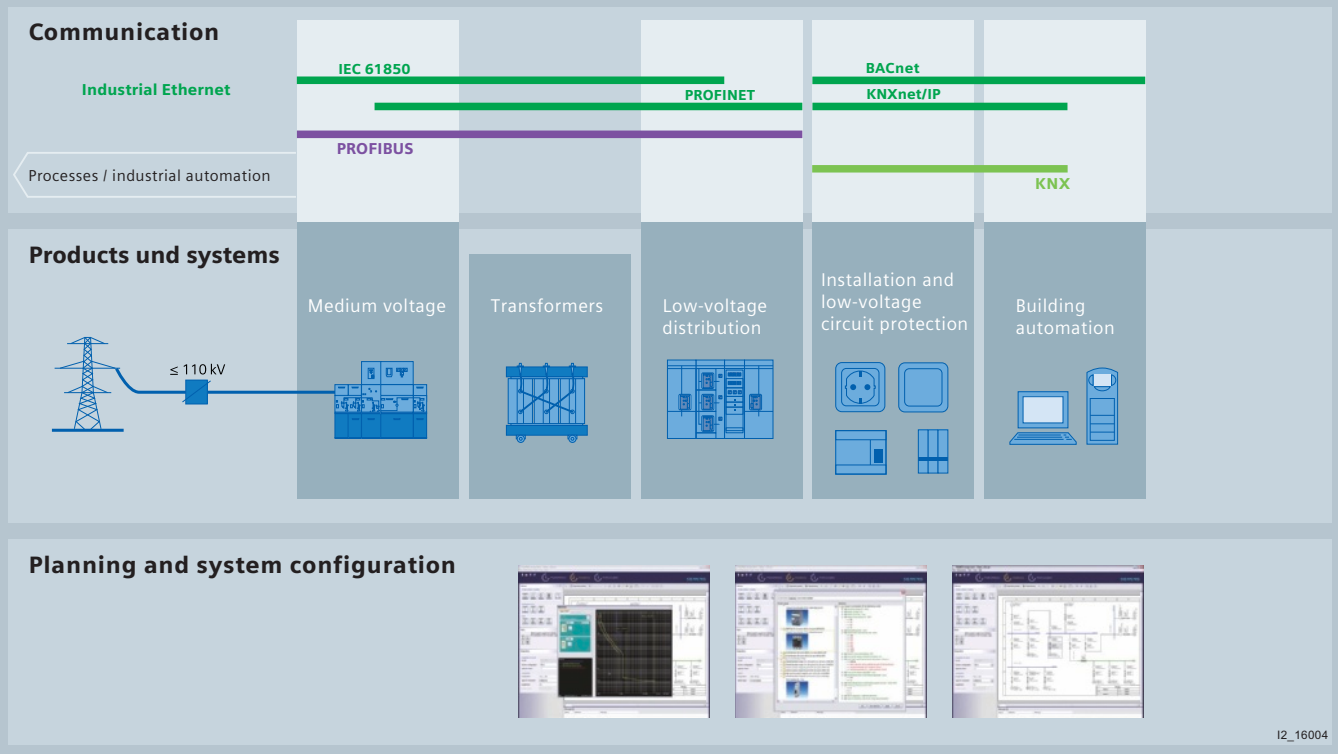
The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

Integrated power distribution from one source.

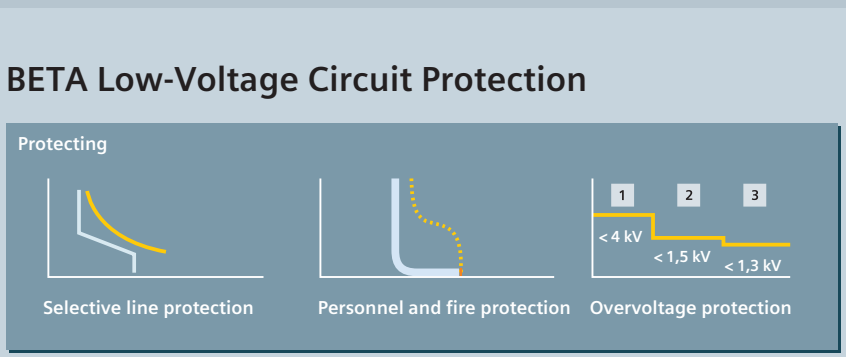
Totally Integrated Power.

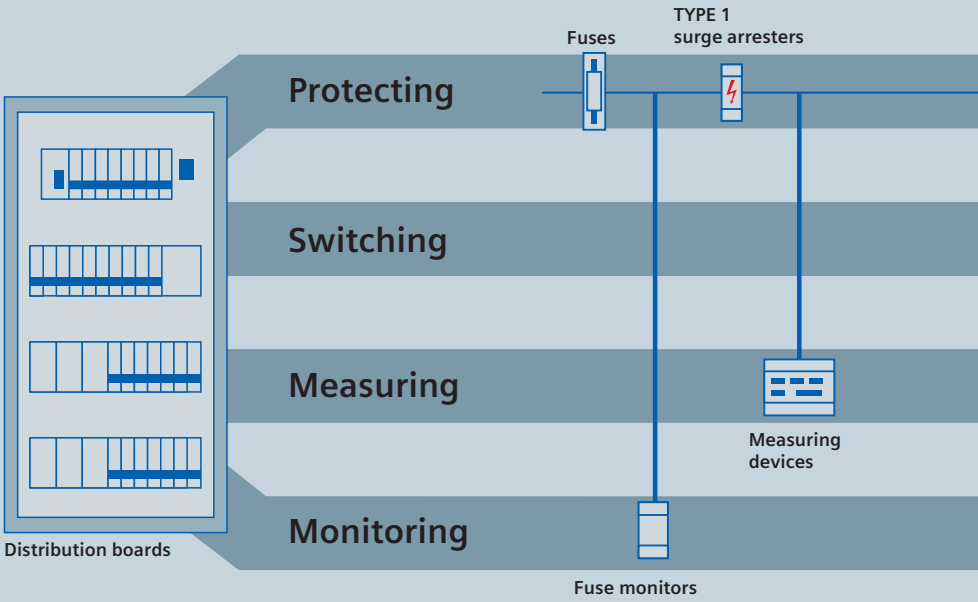




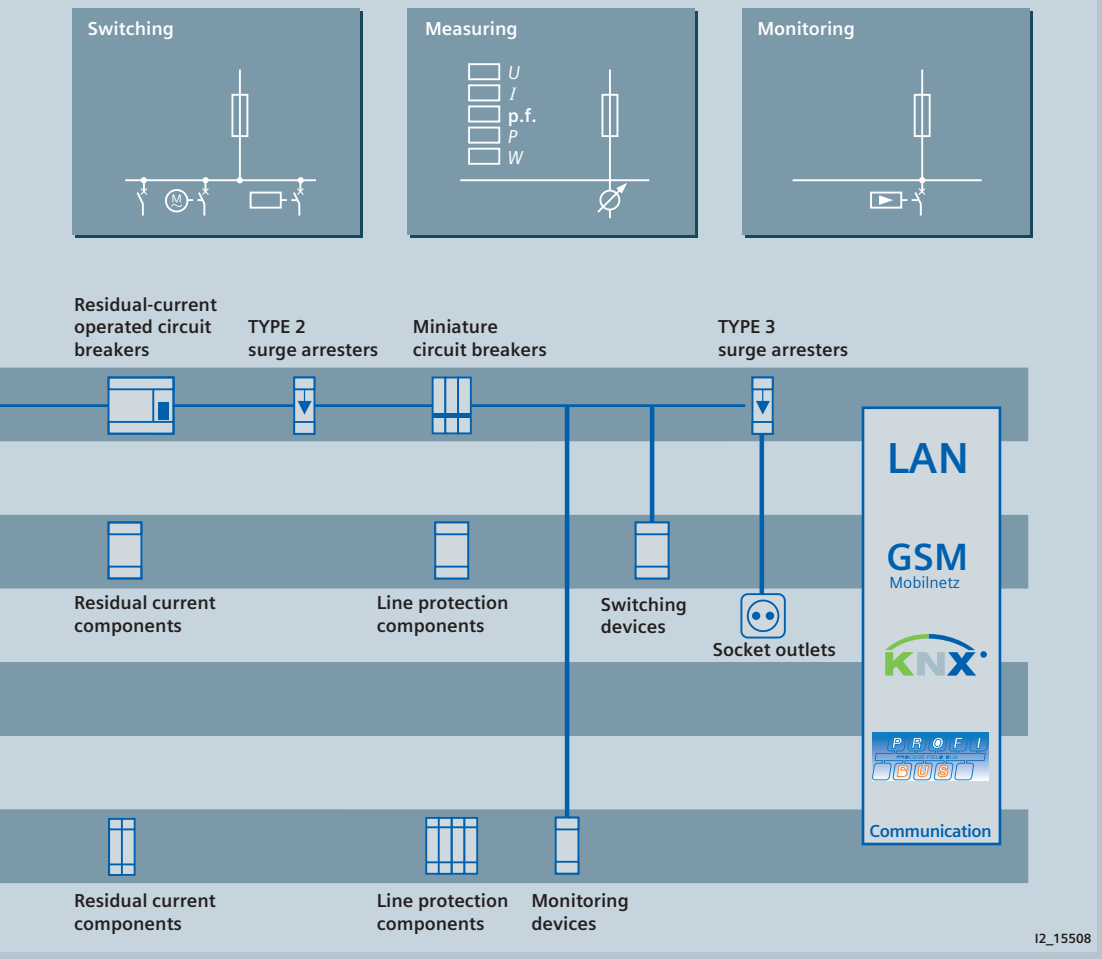
Electrical power distribution in buildings requires integrated solutions. Our response: Totally Integrated Power. This means innovative and integrated, interface-optimized products and systems which have been optimally coordinated and complemented with communication and software modules that link power distribution to building automation or industrial automation. Totally Integrated Power accompanies power distribution projects from one end to the other. From A to Z. From the planning to the building's use: Totally Integrated Power offers significant advantages in every project stage and to everyone involved in the project – the investors, electrical planning engineers, electricians, users and building facility managers.

Our portfolio comprises everything from engineering tools to the matching hardware: from switchgear and distribution systems for medium voltage to transformers, from switching and circuit-protection devices to low-voltage switchgear and busbar trunking systems, as far as to the small distribution board and the wall outlet. It goes without saying that both the medium-voltage switchgear, which requires no maintenance, and the low-voltage switchgear are type-tested, and their busbar connections, too. Comprehensive protection systems ensure the safety of man and machine at any time.





BETA Low-Voltage Circuit Protection – as part of Totally Integrated Power



As an integral part of Totally Integrated Power, we offer a protection concept with an optimally coordinated device range for line protection, personnel protection and fire protection, lightning and overvoltage protection, as well as device and plant protection. Switching, measuring and monitoring devices complete our low-voltage circuit protection.

These functions are performed by miniature circuit breakers, residual current protective devices, fuses and overvoltage protection devices, as well as switching devices, measuring and monitoring devices – all of which are essential for an all-round protection concept.

This comprehensive device range provides an absolute maximum of flexibility in plant design and operational safety – for residential, non-residential and industrial buildings. We are renowned leaders in technology for residual-current operated circuit breakers and have a broad device spectrum of low-voltage fuses, which also covers semiconductor protection.

Our measuring devices help you use electricity efficiently. The remote monitoring of electric measured values for the capacity utilization of a distribution board is essential for the safe and reliable supply of electrical power. Monitoring and switching options on the move from a cell phone using the GSM alarm module further increase the availability of plants. And the monitoring of voltage and switchover to an emergency supply ensures the safety of all those in the building.

This catalog contains all the devices currently available for mounting in distribution boards or similar options for mounting on 35 mm standard mounting rails in switchgear cabinets.

Electrical Installation from A to Z

ALPHA Distribution Boards and Terminal Blocks

The ALPHA range comprises small distribution boards, meter cabinets, distribution boards and molded-plastic distribution boards. The ALPHA FIX terminal blocks meet all your needs for clear and manageable wiring using a full range of connection systems.

BETA Low-Voltage Circuit Protection

Siemens is the only manufacturer to offer an all-round protection concept with an optimally coordinated device range for line protection, personal and fire protection, lightning and overvoltage protection, device and system protection. Switching, measuring and monitoring devices complete the low-voltage circuit protection. Based on an all-round protection concept, our device range offers a complete spectrum of protection devices, such as fuses, miniature circuit breakers, residual current-operated circuit breakers and surge suppressors, as well as switching devices, measuring instruments and monitoring devices.

GAMMA Building Management Systems

Buildings should be energy efficient and easy to adapt quickly and cost-effectively to user requirements. Lighting, sun protection and indoor environment should be achieved in an energy-saving and user-friendly manner, while persons and property are protected against hazards and damage. The tried and tested GAMMA *instabus* building management systems support the flexible networking of electrical devices and functions in buildings over two wires of the bus cable and connection to the systems over KNXnet/IP – thus providing greater efficiency, safety, flexibility and comfort.

DELTA Switches and Socket Outlets

The DELTA switch and socket outlet range combines a wide range of different design interfaces with innovative and safe technology. And because the operator interfaces are simple to interchange, you can enjoy complete safety – even when your taste or the environment changes.

Modern electrical switching and installation technology

These days it's hard to imagine daily life without electricity. Modern electrical switching and installation technology is an essential requirement for ensuring that our use of electricity is safe and user-friendly.

Shaping the future with innovations

Without innovations there can be no progress. That is a well-known fact. And that is why we make every endeavor to continue producing innovations in the area of electrical installation technology, as well as improving existing products and developing new applications. All this with the aim of offering innovative and high-quality products across the whole spectrum of electrical installation technology in order to further increase our competitive edge and open up new market opportunities.

Our factory in Regensburg and our branches worldwide

Siemens has been developing products and innovative solutions for industry and for residential and non-residential buildings since 1883. While production began in Berlin, our production has now been based in Regensburg for the last 60 years. Today, this factory is one of the key international manufacturers of installation technology. We use cutting edge equipment: CAD, simulation and automated laboratory equipment.

We now have more than 17 production sites in Europe, Asia and America – which is the best way to ensure compliance with country-specific standards – and the best way to ensure that our customers enjoy local support.

Industry

Non-residential buildings

Residential buildings

Quality and the Environment

Quality in the context of the environment

Increasing urbanization and a growing global population have meant that it has become one of our key challenges to look after and preserve our natural resources – one we are happy to meet head on.

Acting responsibly

As part of the ecologically responsible and and globally active Siemens Group, we are setting the bar high. Our environmental protection objectives are an integral part of our rigorous quality management.

Even during the development of our products and systems, we take a critical look at their possible effects on the environment. So, without exception, they all comply with the EC Directive RoHS (Restriction of Hazardous Substances). During this development phase, we also lay the foundations for the highest quality: from the very outset, we define reliability requirements and the related quality assurance measures, and these are incorporated into all drafts.

All products and systems are also subject to strict quality specifications during production and testing. We take great care to ensure compliance with these specifications in order to guarantee our customers nothing but the very best quality. Our many certificates bear witness to our success.

Pioneers in recycling

As a founder member of a non-profit association for the active promotion of the environment-friendly recycling of disabled LV HRC fuse links, Siemens takes a pro-active approach to recycling. The aim of the association is to create a voluntary system for the environment-friendly recycling of LV HRC fuse links, which is simple and free for participating collectors. All proceeds are used to support a range of projects in the training and research sector.

Energy saving with BETA devices

Devices with impact: with our BETA low-voltage protective and control devices, we also do everything we can to generate innovations that can help to protect our environment. These include time switches, stairwell and dusk switches. These only switch the consumers on when they are actually needed, thus saving energy. With our measuring devices that can be read over a LAN link, we have produced a very special solution for energy optimization.

Pro-Active environmental protection

It goes without saying that we are certified to ISO 14001 – as are all Siemens premises. Furthermore, as an active member of ZVEI (German Electrical and Electronic Manufacturers' Association), we pro-actively support the protection of the environment with a wide range of measures, such as the development of binding environmental management systems.

In 2006 – following 1995, 1999 and 2002 – our factory in Regensburg was presented with its fourth Environmental Award of the City of Regensburg for its strong commitment to environmental issues. This latest prize was awarded for the fact that we have voluntarily renounced the use of hazardous substances in our products and for our consistent application of this aim in our galvanic processes.


URKUNDE

IN ANERKENNUNG DER LEISTUNGEN
FÜR DEN
UMWELT- UND NATURSCHUTZ

VERLEIHT DIE

STADT REGENSBURG

DER FIRMA

Siemens AG, A&D ET,
Gerätewerk Regensburg

DEN

UMWELTPREIS

REGENSBURG, 24. JULI 2006

HANS SCHAIDINGER
OBERBÜRGERMEISTER

Our Added Extra

Build on a sound basis

With our basic and advanced courses, you can lay the foundations for your business success. In our modern training center in Regensburg you will learn the necessary theoretical and practical essentials from lecturers who are experts in their fields. Dynamic and easy to understand training with multimedia teaching equipment and many practical examples. Available in German and English. If required, we also provide training in-house or in one of our more local Siemens branches.

Our range of training courses covers the whole span of electrical installation. You will get to know our entire portfolio of products and their application. Step-by-step we will familiarize you with the entire spectrum of modern installation options, thus opening up a whole new world of business opportunities.

Oh, and by the way: In 1991, the Training Center was the first certified training center in the world to offer KNX training courses, and is still the only manufacturer training center to offer the whole range of KNX-certified courses in both German and English.

For details of our current range of courses, please visit our Web site at:
http://www.siemens.de/installationstechnik/kurse

Or contact us:
Tel.: +49 (0) 941 790 2950
e-mail: cscet.aud@siemens.com

Comprehensive support

We offer all-round support: if you have any queries regarding our products, the planning of your electrical installation or the availability of technical documentation.

Just give us a call:
Tel.: +49 (0) 180 50 50 222
(0.14 €/minute from a German landline)
Fax: +49 (0) 180 50 50 223
e-mail: ad.support@siemens.com

Installation technology on the net

Visit us on the Internet. Our Web site offers information on all our products – ALPHA Distribution Boards and Terminal Blocks, BETA Low-Voltage Circuit Protection, GAMMA Building Management Systems and DELTA Switches and Socket Outlets, so visit us at:
http://www.siemens.com/e-installation

Software at your Services

A consistent labeling concept for all modular installation devices

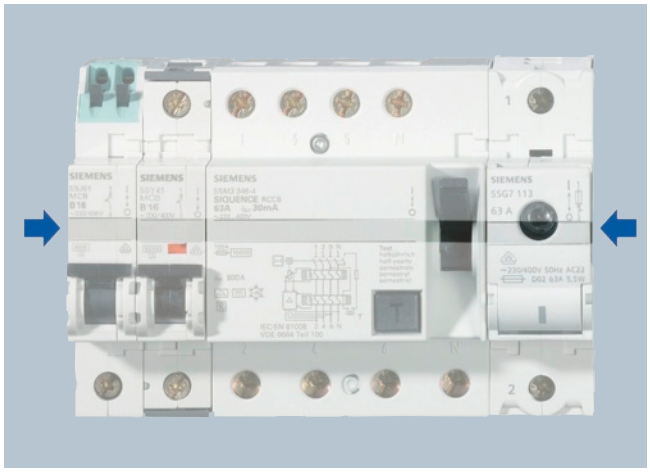
With our Siemens modular installation devices, we have opted for consistent labeling: our labeling system enables the quick and clear-cut labeling of all devices at an indicated and uniform height. The result is a clear and tidy distribution board system that makes a good impression on your customers – using the simplest of means.

The specially developed labeling software from Siemens is particularly easy and user-friendly:

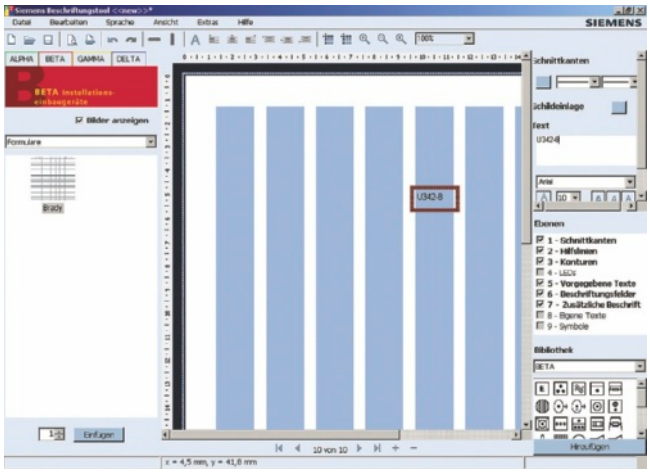
- Ease of use and a uniform appearance due to a unique labeling concept
- The labels are modern and practical: they are durable, simple to apply and can be used with all devices
- The labels are simple to produce using a normal PC and printer
- The program is easy to use and available free of charge on the Internet: http://www.siemens.com/labeling-tool

As well as our modular installation devices, the Siemens labeling concept can also be used for distribution boards, switches and socket outlets.

Our comprehensive labeling concept facilitates the fast execution of any labeling task in the field of installation technology.



A labeling concept for all devices – the labeling fields are at the same height on all devices



The program is quick and easy to use

Enjoy the benefits of the configuration software ALPHA SELECT

Whether you are an installation engineer or a control cabinet engineer – the software ALPHA SELECT® now makes it quicker and easier than ever before to configure distribution boards and meter cabinets together with devices of the BETA Low-Voltage Circuit Protection range.

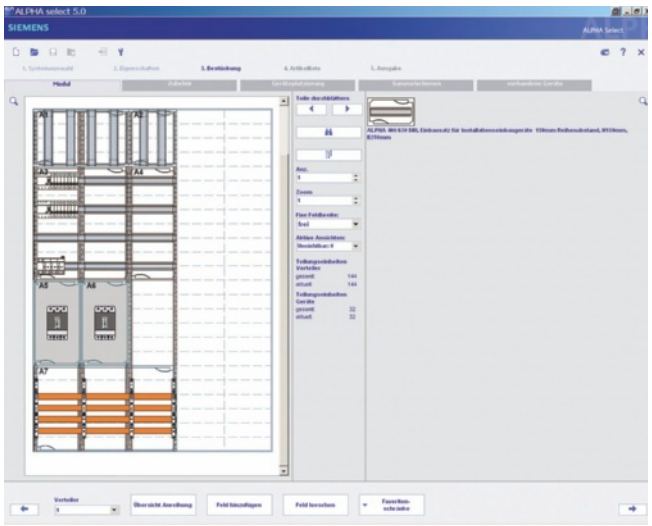
Intuitive functions guide you through the configuration process step-by-step. Collision tests ensure that installation and/or configuration errors in the software are virtually impossible.

ALPHA SELECT covers:

- ALPHA SIMBOX small distribution boards
- ALPHA 400-ZS meter cabinets
- ALPHA distribution boards
- ALPHA 8HP molded-plastic distribution boards
- ALPHA BOX

In addition, you can use the electronic catalogs (EGH selection catalog and CA 01) to select devices from the BETA low-voltage circuit protection range, GAMMA *instabus* products (building management systems) and many other items from the Siemens product range for industry.

Available free of charge at:
http://www.siemens.com/alpha-select

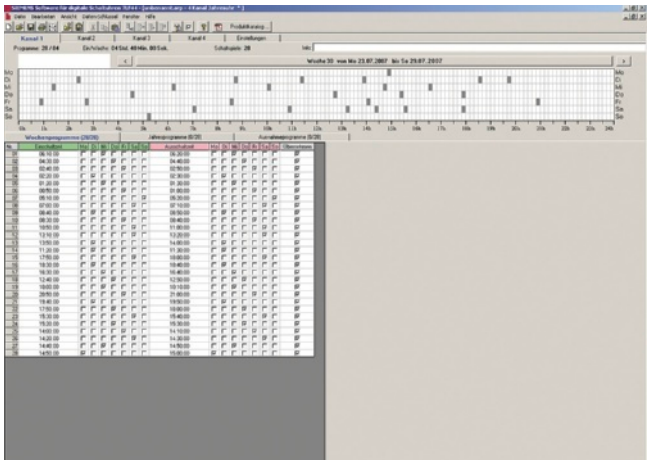


Distribution board equipment, front view

Time switch software

Simple programming of time switches at your PC: This software for creating time switch programs is intuitive and lets you create and archive programs quickly and conveniently at your PC. You require a USB adapter for this, see page 9/6.

You will find further information on the Internet at
http://www.siemens.com/beta



Time switch software

Software for three-phase measuring devices

Regardless of where measurements are taken: thanks to the LAN link, we now offer software that enables all measuring devices to be read out at a central point.

You will find the latest version on the Internet at
http://www.siemens.com/beta

Your Ticket to the World

For European exporters who supply electrical switchgear assemblies and equipment for machines to the USA, it is essential that devices are certified as UL listed or UL recognized - like some of our BETA low-voltage circuit protection devices.

Two organizations – for North America, the "American National Standards Institute" (ANSI), for the rest of the world, the "International Electrical Commission" (IEC) – prepare and publish the pertinent standards for the use of electrical energy and devices.

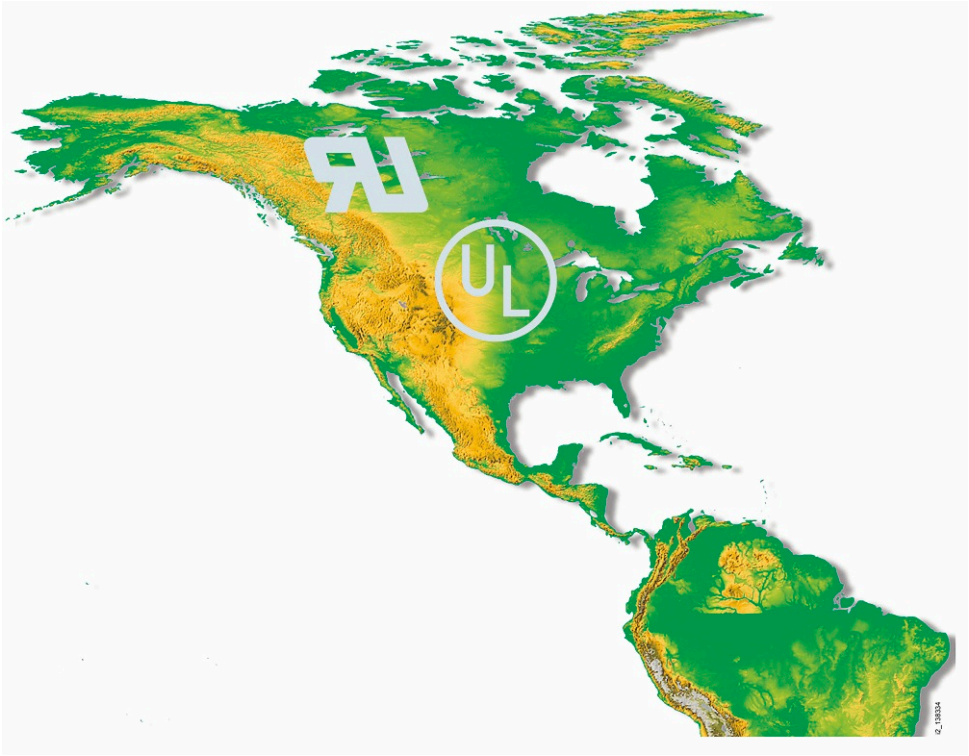
For the ANSI-influenced area, the UL regulations apply (published by Underwriters Laboratories). In other regions, the IEC regulations apply, which are published in Europe as European standards (EN).

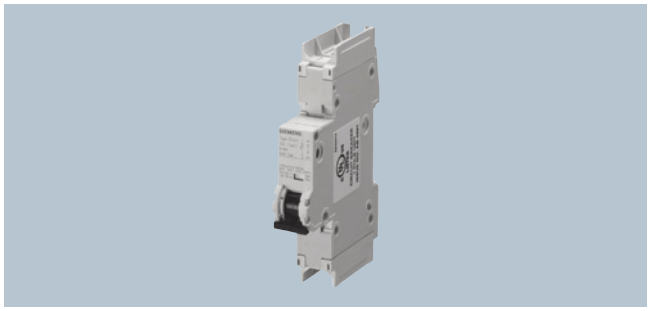
UL (Underwriters Laboratories Inc.) was founded in 1894 and is a product safety certification organization for the United States.

The UL listed and UL recognized mark on devices confirms that the products are UL-approved for their respective applications. This is of particular importance to European exporters of electrical switchgear assemblies for machines who export to the USA, as their products will only be accepted if they meet the relevant UL standards.

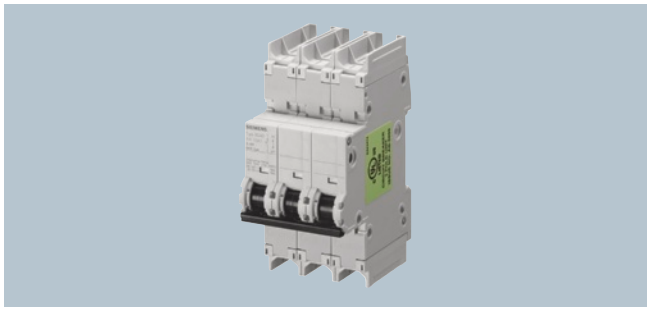
UL 508A "Standard for Industrial Control Panels" describes the design of control cabinets and the implementation of integral components with reference to other pertinent UL standards where applicable. It therefore represents the basic standard for all electrical systems used in North America.

Countless low-voltage controls from the BETA product range comply with UL standards and are therefore suitable for implementation worldwide in both IEC/EN and UL applications within the framework of their specified use.





Miniature circuit breakers for branch circuit protection to UL 489, 1-pole



Miniature circuit breakers for branch circuit protection to UL 489, 3-pole

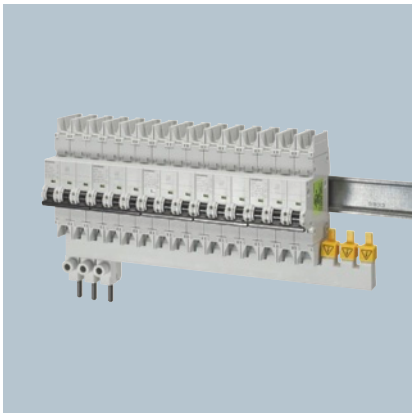
Socket outlets for distribution board mounting to UL 498

Low-voltage circuit protection devices approved to UL standards:

- Miniature circuit breakers for branch circuit protection to UL 489
- Miniature circuit breakers for supplementary protection to UL 1077
- SITOR fuse links to UL 248-13
- Cylindrical fuse holders to UL 512
- Class CC fuse links to UL 248-4
- Class CC fuse holders to UL 512
- LV HRC fuse bases to UL 512
- Insta contactors to UL 508
- Switch disconnectors to UL 508
- Time switches to UL 917
- Time and pulse counters to UL 863
- Socket outlets for distribution board mounting to UL 498

New developments

Miniature circuit breakers to UL and IEC for 480Y/277 V AC → Page 1/46



Busbars and accessories for miniature circuit breakers to UL and IEC → Page 1/48

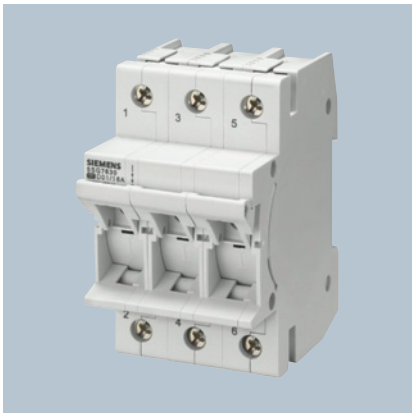
Miniature circuit breakers 1+N in 1 MW with N pole on the left side → Page 1/26

Busbars and accessories for miniature circuit breakers 1+N in 1 MW → Page 1/26

SIQUENCE universal current-sensitive RCCBs, type B, 2-pole → Page 2/10

Expanded type spectrum through selective and super resistant RCCBs → Page 2/7

Expanded type spectrum with selective and super resistant RCBOs → Page 2/25



Existing 5SG7 6 type range now available with load switching capacity AC-22B → Page 3/7

Expanded range of LV HRC products for semiconductor protection over 1000 V → Page 4/9

New components for the SR60 busbar systems
→ Page 5/12

Surge arresters type 2 for photovoltaic applications and IT systems → Page 6/9

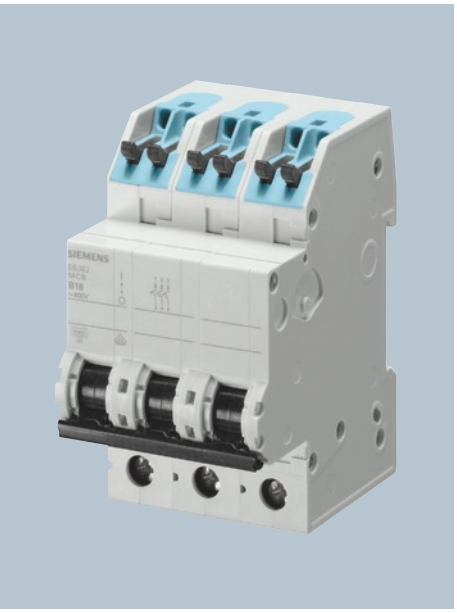
Overvoltage protection for measuring and control technology → Page 6/33

New digital time switches in one MW
→ Page 9/5

Test and signaling panels for switchover devices → Page 13/29

Test and signaling combinations for insulation monitors → Page 13/29

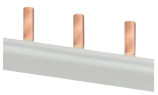
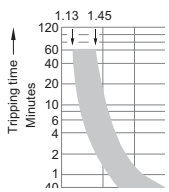
BETA Protecting Miniature Circuit Breakers



BETA Protecting
Miniature Circuit Breakers

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-resid. buildings	Residential buildings	Industry
	**5SP and 5SY miniature circuit breakers**	1/3	For all applications from 0.3 to 125 A with switching capacity 6000, 10 000 or 15 000 A according to EN 60898. Applications for universal current and 0.3 to 63 A with switching capacity of at least 25 kA according to EN 60947-2.	EN 60898 EN 60947-2	✓	✓	✓
	**5SJ6 …-.KS miniature circuit breakers with plug-in terminals**	1/21	For socket outlet and lighting circuits in all building installations. The plug-in terminals offer easy front connection for manual insertion of conductors, which considerably reduces mounting times.	EN 60898	✓	✓	✓
	**5SY6 0 miniature circuit breakers 1+N in 1 MW**	1/24	For socket outlet and lighting circuits in all building installations where a switchable neutral conductor is required. The miniature circuit breaker 1+N saves space in the distribution board.	EN 60898	✓	✓	✓
	**Additional components**	1/28	Auxiliary switches, fault signal contacts, shunt trips, undervoltage releases for higher plant availability, RC units for personal safety and remote controlled mechanisms for remote switching.		✓		✓
	**Busbars**	1/35	Busbars in 10 and 16 mm² save space in the distribution board and time during mounting.		✓	✓	✓
	**5SJ4 miniature circuit breakers to UL and IEC**	1/42	Miniature circuit breakers can be used as "branch circuit protection" and approved for the connection type "same polarity" and "opposite polarity" in the characteristics B and C according to UL489 from 0.3 to 63 A	UL 489	✓	✓	✓
	**SHU, 5SP3 main miniature circuit breakers**	1/50	Voltage-independent and selective main miniature circuit breakers (SHU) according to DIN VDE 0645 in the precounter sector support the downstream miniature circuit breakers with better current limitation.	DIN VDE 0641-21	✓	✓	
	**5SK9 circuit breaker terminals**	1/53	Circuit breaker terminals are used for short-circuit protection or for protection against overload and short-circuits in auxiliary and control circuits downstream of control transformers.				✓
	**Configuration**	1/56	Notes for configuration, expanded technical specifications and certifications.				

Overview

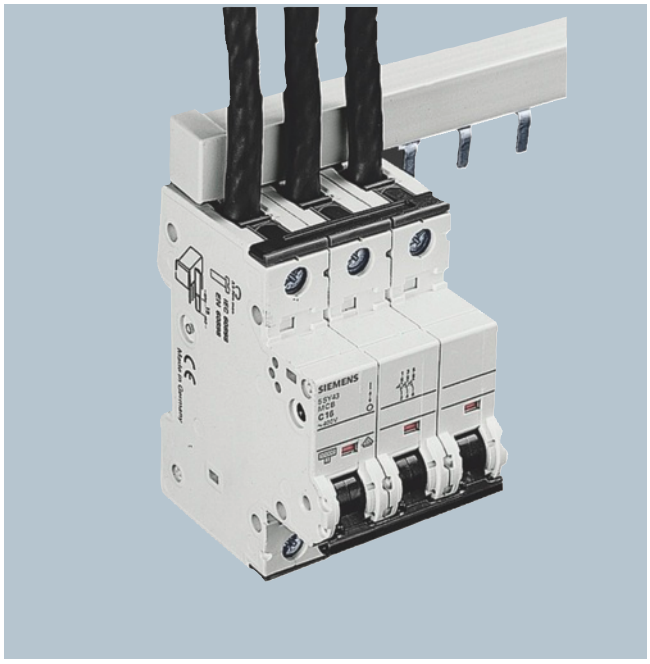
MCBs are used to protect plants in buildings and for industrial applications. The devices can be used as main switches for the disconnection or isolation of plants.

For industrial applications and in plant engineering, miniature circuit breakers can be supplemented with additional components, such as auxiliary switches, fault signal contacts, shunt trips, undervoltage releases, remote controlled mechanisms and RC units.

The devices are approved for worldwide use according to IEC standards for systems up to 250/440 V AC. 60 V DC per pole is permitted in DC systems.

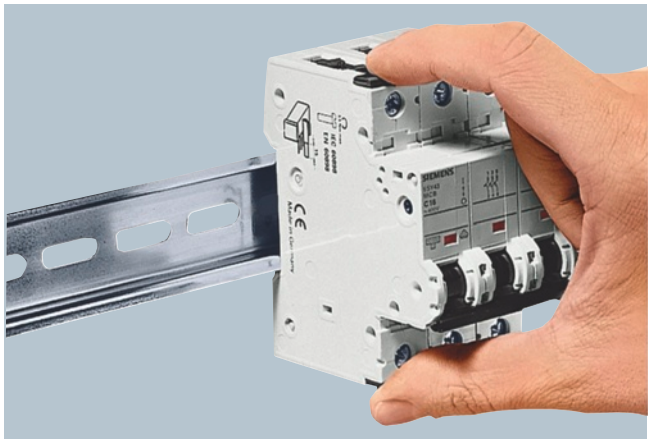
For North America, we also have additional certification to UL 1077 for use as "supplementary protectors" in systems up to 480Y/277 V AC. For use in ship building, the devices have numerous certifications according to shipping classifications BV, DNV, GL and LRS. For further information, please refer to the section "Configuration".

Benefits

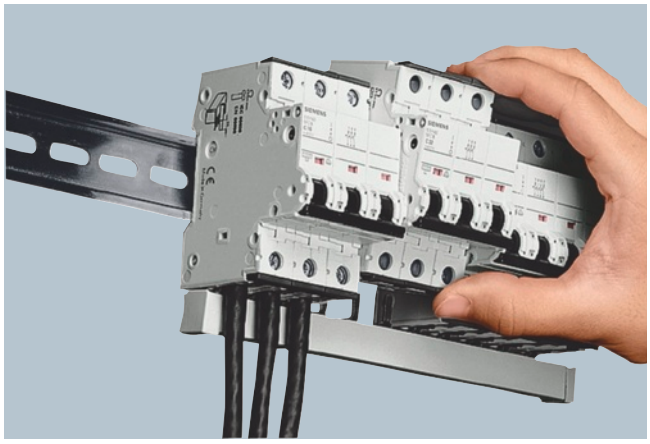


- The infeed can be either from the top or the bottom as the terminals are identical.
- Clear and visible conductor connection in front of the busbars that can be easily checked.
- Large and easily accessible wiring space enables easy insertion of conductor in the terminal.

- Integrated movable terminal covers located at the cable entries ensure the terminals are fully insulated when the screws are tightened.
- The effective touch protection when grasping the device considerably exceeds the requirements of VBG 4/BGV A3.



- Manual snap-on fixing and release systems that require no tools enable fast assembly and disassembly of MCBs.
- Highlighted labeling field on all modular installation devices for uniform, quick and simple labeling.



- The MCBs can be quickly and easily removed from the busbar assembly by hand, e.g. if connections need to be changed.
- Time saving if parts need to be replaced because the busbars no longer need to be freed from the adjacent devices.

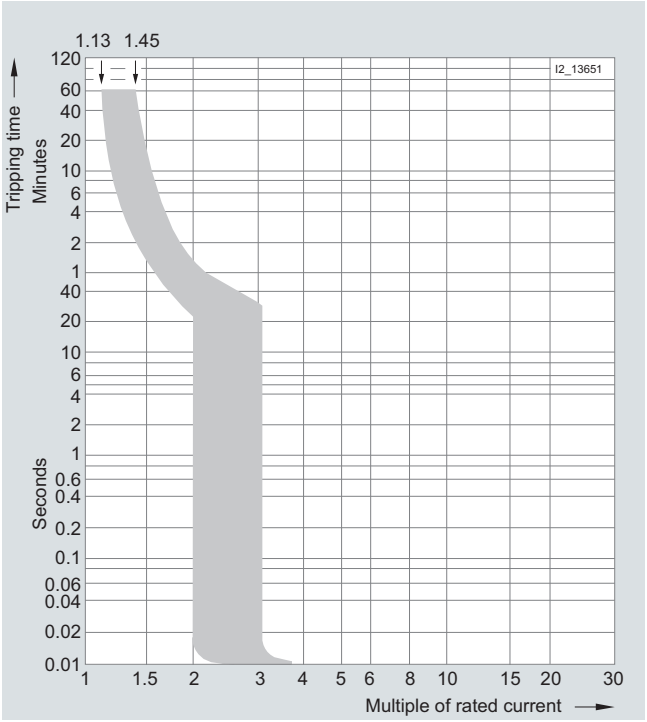
Technical specifications

			5SY6	5SY4	5SY5	5SY7	5SY8	5SP4	5SP5
Standards			EN 60898	EN 60898; EN 60947-2			--	EN 60898; EN 60947-2	
Approved acc. to			EN 60898; UL 1077; CSA C22.2 No.235; UL File No. E 116386		--	EN 60898; UL 1077; CSA C22.2 No.235; UL File No. E 116386			--
Operational voltage	Min.	V AC/DC	24	24	24	24	24	24	24
Acc. to EN 60898 and EN 60947-2	Max.	V DC/pole	60[1)]	60[1)]	220	60[1)]	60[1)]	60[1)]	220
	Max.	V AC	440	440	440	440	440	440	440
Acc. to UL 1077 and CSA C22.2	Max.	V AC	480	480	--	480	480	480	--
No.235		V DC/pole	60	60	--	60	60	60	--
Rated switching capacity									
• I_{cn} acc. to IEC/EN 60898-1		kA AC	6	10	10	15	--	10	3
• I_{cn} acc. to IEC/EN 60898-2		kA DC	--	--	10	--	--	--	10
• I_{cu} acc. to IEC/EN 60947-2		kA AC	--	--	--	--	25	--	--
• Acc. to UL1077 and CSA C22.2 No.235		kA AC	5	5	--	5	5	5	--
Insulation coordination									
• Rated insulation voltage		V AC	250/440						
• Degree of pollution for overvoltage category			3/III						
Touch protection Acc. to EN 50274-1			Yes						
Handle end position, sealable			Yes						
Degree of protection Acc. to EN 60529			IP20, with connected conductors						
CFC and silicone-free			Yes						
Mounting									
• Snap-on fixing system			Yes					--	
• Standard mounting rail and screw fixing			--					Yes	
Terminals									
• Tunnel terminals at both ends			--					Yes	
• Combined terminals at both ends			Yes					--	
• Terminal, solid, stranded or finely stranded, with end sleeve		mm^2	0.75 ... 25						
• Terminal tightening torque		Nm	2.5 ... 3					2.5 ... 3.5	
		lb. in	22 ... 26					22 ... 31	
Conductor cross-sections									
• Solid and stranded		mm^2	0.75 ... 35					0.75 ... 50	
• Finely stranded, with end sleeve		mm^2	0.75 ... 25					0.75 ... 35	
• AWG cables		AWG	14 ... 4					14 ... 2	
Mains connection			Any						
Mounting position			Any						
Service life On average, with rated load		Operations Operations	20000 For 5SY5 at 40 A, 50 A and 63 A 10 000						
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75						
Resistance to climate Acc. to IEC 60068-2-30			6 cycles						
Resistance to vibrations Acc. to IEC 60068-2-6		m/s^2	60 at 10 Hz ... 150 Hz						

[1)] The operational voltage 60 V DC/pole takes into account a battery charging voltage with peak value of 72 V.

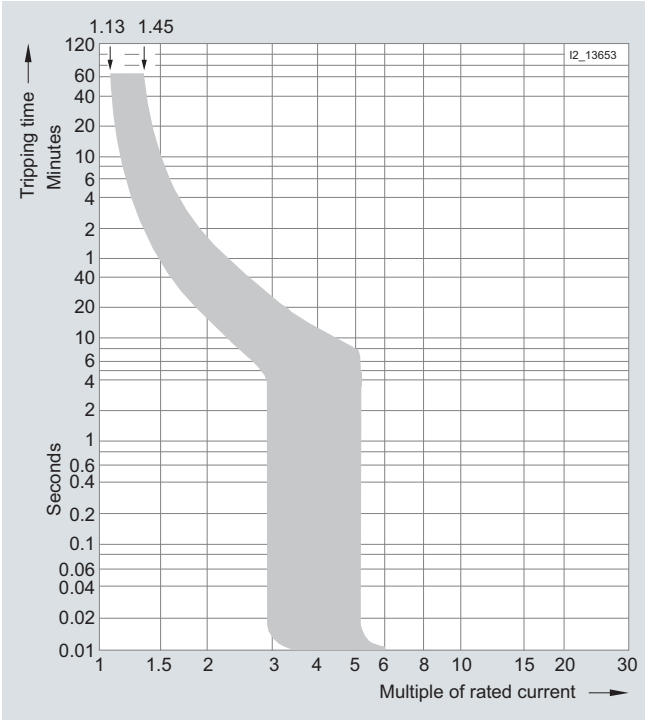
Characteristic curves

Tripping characteristics according to IEC/EN 60898, DIN VDE 0641-11



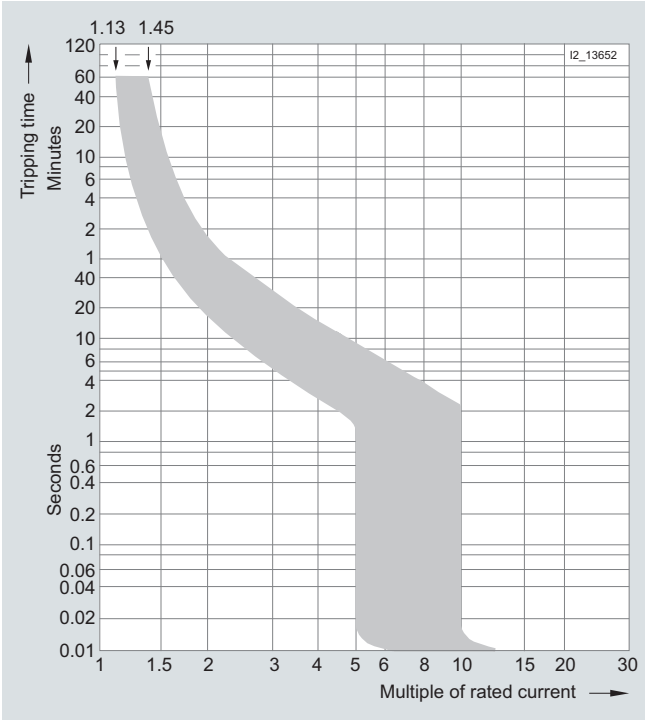
Tripping characteristic A

For limited semiconductor protection, protection of measuring circuits with transformers. Protection of circuits with tripping in 0.4 s according to DIN VDE 0100-410 for long cable lengths.



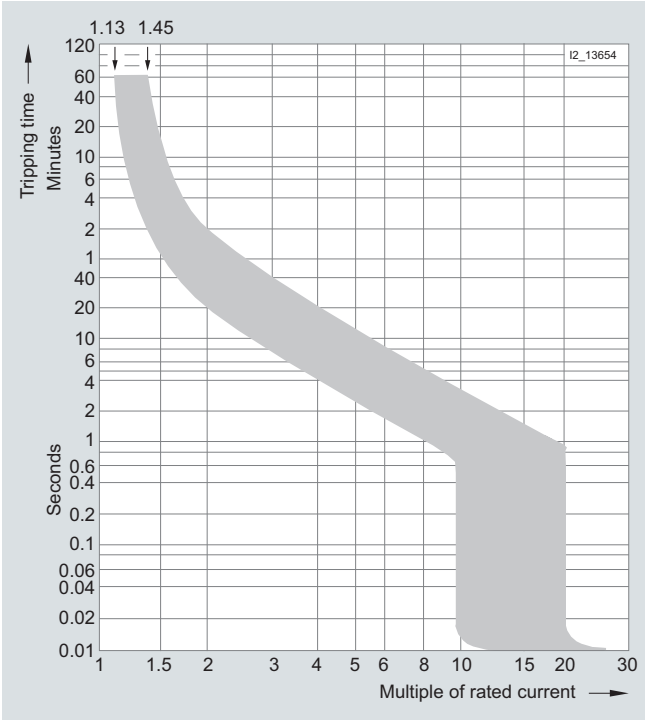
Tripping characteristic B

For universal use in socket outlet and lighting circuits. Proof of personal safety according DIN VDE 0100-410 is not required.



Tripping characteristic C

Particularly advantageous in lamp and motor circuits with higher starting currents.



Tripping characteristic D

For electrical circuits with strong pulse-generating equipment, such as transformers or solenoid valves.

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

Selection and ordering data

6 000 / 3	I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A						Unit(s)	Unit(s)	kg
	MCBs 6000 A								
	1P, 230/400 V AC								
	2	1	B	**5SY6 102-6**		002	1	1	0.165
	4		B	**5SY6 104-6**		002	1	1	0.165
	6		►	**5SY6 106-6**		002	1	1/12	0.165
	10		►	**5SY6 110-6**		002	1	1/12	0.165
	13		A	**5SY6 113-6**		002	1	1/12	0.165
	16		►	**5SY6 116-6**		002	1	1/12	0.165
	20		A	**5SY6 120-6**		002	1	1/12	0.165
	25		A	**5SY6 125-6**		002	1	1/12	0.165
	32		A	**5SY6 132-6**		002	1	1/12	0.165
	40		B	**5SY6 140-6**		002	1	1	0.165
	50		B	**5SY6 150-6**		002	1	1	0.165
	63		B	**5SY6 163-6**		002	1	1	0.165
	1P+N, 230 V AC								
	6	2	A	**5SY6 506-6**		002	1	1	0.330
	10		A	**5SY6 510-6**		002	1	1	0.330
	13		A	**5SY6 513-6**		002	1	1/6	0.330
	16		A	**5SY6 516-6**		002	1	1/6	0.330
	20		B	**5SY6 520-6**		002	1	1	0.330
	25		B	**5SY6 525-6**		002	1	1	0.330
	32		B	**5SY6 532-6**		002	1	1	0.330
	40		C	**5SY6 540-6**		002	1	1	0.330
	50		C	**5SY6 550-6**		002	1	1	0.330
	63		C	**5SY6 563-6**		002	1	1	0.330
	2P, 400 V AC								
	6	2	A	**5SY6 206-6**		002	1	1/6	0.330
	10		A	**5SY6 210-6**		002	1	1/6	0.330
	13		B	**5SY6 213-6**		002	1	1	0.330
	16		A	**5SY6 216-6**		002	1	1/6	0.330
	20		B	**5SY6 220-6**		002	1	1	0.330
	25		B	**5SY6 225-6**		002	1	1	0.330
	32		A	**5SY6 232-6**		002	1	1	0.330
	40		B	**5SY6 240-6**		002	1	1	0.330
	50		C	**5SY6 250-6**		002	1	1	0.330
	63		C	**5SY6 263-6**		002	1	1	0.330
	3P, 400 V AC								
	6	3	A	**5SY6 306-6**		002	1	1	0.495
	10		A	**5SY6 310-6**		002	1	1/4	0.495
	13		B	**5SY6 313-6**		002	1	1	0.495
	16		►	**5SY6 316-6**		002	1	1/4	0.495
	20		A	**5SY6 320-6**		002	1	1	0.495
	25		A	**5SY6 325-6**		002	1	1	0.495
	32		A	**5SY6 332-6**		002	1	1/4	0.495
	40		A	**5SY6 340-6**		002	1	1	0.495
	50		B	**5SY6 350-6**		002	1	1	0.495
	63		B	**5SY6 363-6**		002	1	1	0.495
	3P+N, 400 V AC								
	6	4	B	**5SY6 606-6**		002	1	1	0.660
	10		B	**5SY6 610-6**		002	1	1	0.660
	13		B	**5SY6 613-6**		002	1	1	0.660
	16		A	**5SY6 616-6**		002	1	1	0.660
	20		A	**5SY6 620-6**		002	1	1	0.660
	25		B	**5SY6 625-6**		002	1	1	0.660
	32		B	**5SY6 632-6**		002	1	1	0.660
	40		C	**5SY6 640-6**		002	1	1	0.660
	50		C	**5SY6 650-6**		002	1	1	0.660
	63		C	**5SY6 663-6**		002	1	1	0.660
	4P, 400 V AC								
	6	4	C	**5SY6 406-6**		002	1	1	0.660
	10		B	**5SY6 410-6**		002	1	1	0.660
	13		C	**5SY6 413-6**		002	1	1	0.660
	16		A	**5SY6 416-6**		002	1	1	0.660
	20		A	**5SY6 420-6**		002	1	1	0.660
	25		A	**5SY6 425-6**		002	1	1	0.660
	32		B	**5SY6 432-6**		002	1	1	0.660
	40		B	**5SY6 440-6**		002	1	1	0.660
	50		B	**5SY6 450-6**		002	1	1	0.660
	63		B	**5SY6 463-6**		002	1	1	0.660

*** You can order this quantity or a multiple thereof.**

6 000
3

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 6000 A												
	1P, 230/400 V AC												
	0.3	1	A	**5SY6 114-7**		003	C	**5SY6 114-8**		004	1	1	0.165
	0.5		A	**5SY6 105-7**		003	A	**5SY6 105-8**		004	1	1	0.165
	1		▶	**5SY6 101-7**		003	A	**5SY6 101-8**		004	1	1	0.165
	1.6		A	**5SY6 115-7**		003	C	**5SY6 115-8**		004	1	1	0.147
	2		▶	**5SY6 102-7**		003	A	**5SY6 102-8**		004	1	1/12	0.165
	3		A	**5SY6 103-7**		003	A	**5SY6 103-8**		004	1	1	0.165
	4		▶	**5SY6 104-7**		003	A	**5SY6 104-8**		004	1	1	0.165
	6		▶	**5SY6 106-7**		003	A	**5SY6 106-8**		004	1	1/12	0.165
	8		A	**5SY6 108-7**		003	A	**5SY6 108-8**		004	1	1	0.165
	10		▶	**5SY6 110-7**		003	A	**5SY6 110-8**		004	1	1	0.165
	13		A	**5SY6 113-7**		003	A	**5SY6 113-8**		004	1	1	0.165
	16		▶	**5SY6 116-7**		003	A	**5SY6 116-8**		004	1	1	0.165
	20		▶	**5SY6 120-7**		003	A	**5SY6 120-8**		004	1	1	0.165
	25		▶	**5SY6 125-7**		003	A	**5SY6 125-8**		004	1	1	0.165
	32		▶	**5SY6 132-7**		003	B	**5SY6 132-8**		004	1	1	0.165
	40		A	**5SY6 140-7**		003	B	**5SY6 140-8**		004	1	1	0.165
	50		A	**5SY6 150-7**		003	B	**5SY6 150-8**		004	1	1	0.165
	63		A	**5SY6 163-7**		003	B	**5SY6 163-8**		004	1	1	0.165
	1P+N, 230 V AC												
	0.3	2	B	**5SY6 514-7**		003	C	**5SY6 514-8**		004	1	1	0.330
	0.5		A	**5SY6 505-7**		003	B	**5SY6 505-8**		004	1	1	0.330
	1		A	**5SY6 501-7**		003	C	**5SY6 501-8**		004	1	1	0.330
	1.6		B	**5SY6 515-7**		003	B	**5SY6 515-8**		004	1	1	0.330
	2		A	**5SY6 502-7**		003	B	**5SY6 502-8**		004	1	1	0.330
	3		A	**5SY6 503-7**		003	B	**5SY6 503-8**		004	1	1	0.330
	4		A	**5SY6 504-7**		003	B	**5SY6 504-8**		004	1	1	0.330
	6		A	**5SY6 506-7**		003	A	**5SY6 506-8**		004	1	1	0.330
	8		B	**5SY6 508-7**		003	B	**5SY6 508-8**		004	1	1	0.330
	10		A	**5SY6 510-7**		003	B	**5SY6 510-8**		004	1	1	0.330
	13		A	**5SY6 513-7**		003	C	**5SY6 513-8**		004	1	1	0.330
	16		▶	**5SY6 516-7**		003	A	**5SY6 516-8**		004	1	1	0.330
	20		A	**5SY6 520-7**		003	C	**5SY6 520-8**		004	1	1	0.330
	25		A	**5SY6 525-7**		003	C	**5SY6 525-8**		004	1	1	0.330
	32		A	**5SY6 532-7**		003	C	**5SY6 532-8**		004	1	1	0.330
	40		B	**5SY6 540-7**		003	C	**5SY6 540-8**		004	1	1	0.330
	50		B	**5SY6 550-7**		003	C	**5SY6 550-8**		004	1	1	0.330
	63		B	**5SY6 563-7**		003	C	**5SY6 563-8**		004	1	1	0.330
	2P, 400 V AC												
	0.3	2	B	**5SY6 214-7**		003	B	**5SY6 214-8**		004	1	1	0.330
	0.5		A	**5SY6 205-7**		003	A	**5SY6 205-8**		004	1	1	0.330
	1		A	**5SY6 201-7**		003	A	**5SY6 201-8**		004	1	1	0.330
	1.6		A	**5SY6 215-7**		003	A	**5SY6 215-8**		004	1	1	0.330
	2		▶	**5SY6 202-7**		003	A	**5SY6 202-8**		004	1	1/6	0.330
	3		A	**5SY6 203-7**		003	A	**5SY6 203-8**		004	1	1	0.330
	4		▶	**5SY6 204-7**		003	A	**5SY6 204-8**		004	1	1/6	0.330
	6		▶	**5SY6 206-7**		003	A	**5SY6 206-8**		004	1	1/6	0.330
	8		A	**5SY6 208-7**		003	A	**5SY6 208-8**		004	1	1	0.330
	10		▶	**5SY6 210-7**		003	A	**5SY6 210-8**		004	1	1/6	0.330
	13		A	**5SY6 213-7**		003	B	**5SY6 213-8**		004	1	1	0.330
	16		▶	**5SY6 216-7**		003	A	**5SY6 216-8**		004	1	1	0.330
	20		▶	**5SY6 220-7**		003	A	**5SY6 220-8**		004	1	1	0.330
	25		A	**5SY6 225-7**		003	A	**5SY6 225-8**		004	1	1	0.330
	32		A	**5SY6 232-7**		003	A	**5SY6 232-8**		004	1	1	0.330
	40		A	**5SY6 240-7**		003	B	**5SY6 240-8**		004	1	1	0.330
	50		A	**5SY6 250-7**		003	B	**5SY6 250-8**		004	1	1	0.330
	63		A	**5SY6 263-7**		003	B	**5SY6 263-8**		004	1	1	0.330

*** You can order this quantity or a multiple thereof.**

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

6 000 / 3

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 6000 A												
	3P, 400 V AC												
	0.3	3	C	**5SY6 314-7**		003	C	**5SY6 314-8**		004	1	1	0.495
	0.5		A	**5SY6 305-7**		003	C	**5SY6 305-8**		004	1	1	0.495
	1		A	**5SY6 301-7**		003	A	**5SY6 301-8**		004	1	1	0.495
	1.6		B	**5SY6 315-7**		003	C	**5SY6 315-8**		004	1	1	0.495
	2		A	**5SY6 302-7**		003	A	**5SY6 302-8**		004	1	1	0.495
	3		A	**5SY6 303-7**		003	A	**5SY6 303-8**		004	1	1	0.495
	4		A	**5SY6 304-7**		003	A	**5SY6 304-8**		004	1	1	0.495
	6		▶	**5SY6 306-7**		003	A	**5SY6 306-8**		004	1	1	0.495
	8		A	**5SY6 308-7**		003	B	**5SY6 308-8**		004	1	1	0.495
	10		▶	**5SY6 310-7**		003	A	**5SY6 310-8**		004	1	1	0.495
	13		A	**5SY6 313-7**		003	B	**5SY6 313-8**		004	1	1	0.495
	16		▶	**5SY6 316-7**		003	A	**5SY6 316-8**		004	1	1	0.495
	20		▶	**5SY6 320-7**		003	A	**5SY6 320-8**		004	1	1	0.495
	25		▶	**5SY6 325-7**		003	A	**5SY6 325-8**		004	1	1	0.495
	32		▶	**5SY6 332-7**		003	A	**5SY6 332-8**		004	1	1	0.495
	40		A	**5SY6 340-7**		003	A	**5SY6 340-8**		004	1	1	0.495
	50		A	**5SY6 350-7**		003	A	**5SY6 350-8**		004	1	1	0.495
	63		A	**5SY6 363-7**		003	A	**5SY6 363-8**		004	1	1	0.495
	3P+N, 400 V AC												
	0.3	4	C	**5SY6 614-7**		003	C	**5SY6 614-8**		004	1	1	0.660
	0.5		C	**5SY6 605-7**		003	C	**5SY6 605-8**		004	1	1	0.660
	1		C	**5SY6 601-7**		003	C	**5SY6 601-8**		004	1	1	0.660
	1.6		C	**5SY6 615-7**		003	C	**5SY6 615-8**		004	1	1	0.660
	2		A	**5SY6 602-7**		003	C	**5SY6 602-8**		004	1	1	0.660
	3		C	**5SY6 603-7**		003	C	**5SY6 603-8**		004	1	1	0.660
	4		B	**5SY6 604-7**		003	C	**5SY6 604-8**		004	1	1	0.660
	6		A	**5SY6 606-7**		003	A	**5SY6 606-8**		004	1	1	0.660
	8		C	**5SY6 608-7**		003	C	**5SY6 608-8**		004	1	1	0.660
	10		A	**5SY6 610-7**		003	B	**5SY6 610-8**		004	1	1	0.660
	13		B	**5SY6 613-7**		003	C	**5SY6 613-8**		004	1	1	0.660
	16		▶	**5SY6 616-7**		003	B	**5SY6 616-8**		004	1	1	0.660
	20		A	**5SY6 620-7**		003	B	**5SY6 620-8**		004	1	1	0.660
	25		A	**5SY6 625-7**		003	B	**5SY6 625-8**		004	1	1	0.660
	32		A	**5SY6 632-7**		003	B	**5SY6 632-8**		004	1	1	0.660
	40		A	**5SY6 640-7**		003	B	**5SY6 640-8**		004	1	1	0.660
	50		A	**5SY6 650-7**		003	B	**5SY6 650-8**		004	1	1	0.660
	63		A	**5SY6 663-7**		003	B	**5SY6 663-8**		004	1	1	0.660
	4P, 400 V AC												
	0.3	4	C	**5SY6 414-7**		003	C	**5SY6 414-8**		004	1	1	0.660
	0.5		C	**5SY6 405-7**		003	C	**5SY6 405-8**		004	1	1	0.660
	1		B	**5SY6 401-7**		003	C	**5SY6 401-8**		004	1	1	0.660
	1.6		C	**5SY6 415-7**		003	C	**5SY6 415-8**		004	1	1	0.660
	2		A	**5SY6 402-7**		003	C	**5SY6 402-8**		004	1	1	0.660
	3		B	**5SY6 403-7**		003	C	**5SY6 403-8**		004	1	1	0.660
	4		B	**5SY6 404-7**		003	C	**5SY6 404-8**		004	1	1	0.660
	6		A	**5SY6 406-7**		003	B	**5SY6 406-8**		004	1	1	0.660
	8		B	**5SY6 408-7**		003	C	**5SY6 408-8**		004	1	1	0.660
	10		A	**5SY6 410-7**		003	A	**5SY6 410-8**		004	1	1	0.660
	13		A	**5SY6 413-7**		003	C	**5SY6 413-8**		004	1	1	0.660
	16		▶	**5SY6 416-7**		003	A	**5SY6 416-8**		004	1	1	0.660
	20		A	**5SY6 420-7**		003	A	**5SY6 420-8**		004	1	1	0.660
	25		▶	**5SY6 425-7**		003	A	**5SY6 425-8**		004	1	1	0.660
	32		▶	**5SY6 432-7**		003	A	**5SY6 432-8**		004	1	1	0.660
	40		▶	**5SY6 440-7**		003	A	**5SY6 440-8**		004	1	1	0.660
	50		A	**5SY6 450-7**		003	A	**5SY6 450-8**		004	1	1	0.660
	63		A	**5SY6 463-7**		003	▶	**5SY6 463-8**		004	1	1	0.660

* You can order this quantity or a multiple thereof.

10 000
3

	I_n	MW	DT	Characteristic A Order No.	Price per PU	PG	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 10 000 A												
	1P, 230/400 V AC												
	1	1	A	**5SY4 101-5**		001		**--**			1	1	0.165
	1.6		B	**5SY4 115-5**		001		**--**			1	1	0.165
	2		A	**5SY4 102-5**		001		**--**			1	1	0.165
	3		A	**5SY4 103-5**		001		**--**			1	1	0.165
	4		A	**5SY4 104-5**		001		**--**			1	1/12	0.165
	6		A	**5SY4 106-5**		001	A	**5SY4 106-6**		002	1	1/12	0.165
	8		B	**5SY4 108-5**		001		**--**			1	1	0.165
	10		A	**5SY4 110-5**		001	▶	**5SY4 110-6**		002	1	1/12	0.165
	13		C	**5SY4 113-5**		001	A	**5SY4 113-6**		002	1	1	0.165
	16		A	**5SY4 116-5**		001	▶	**5SY4 116-6**		002	1	1/12	0.165
	20		A	**5SY4 120-5**		001	A	**5SY4 120-6**		002	1	1	0.165
	25		A	**5SY4 125-5**		001	▶	**5SY4 125-6**		002	1	1	0.165
	32		B	**5SY4 132-5**		001	A	**5SY4 132-6**		002	1	1	0.165
	40		B	**5SY4 140-5**		001	B	**5SY4 140-6**		002	1	1	0.165
	50		C	**5SY4 150-5**		001	B	**5SY4 150-6**		002	1	1	0.165
	63		C	**5SY4 163-5**		001	B	**5SY4 163-6**		002	1	1	0.165
	80			**--**			C	**5SY4 180-6**		002	1	1	0.162
	1P+N, 230 V AC												
	1	2	C	**5SY4 501-5**		001		**--**			1	1	0.330
	1.6		B	**5SY4 515-5**		001		**--**			1	1	0.330
	2		B	**5SY4 502-5**		001		**--**			1	1	0.330
	3		C	**5SY4 503-5**		001		**--**			1	1	0.330
	4		B	**5SY4 504-5**		001		**--**			1	1	0.330
	6		C	**5SY4 506-5**		001	A	**5SY4 506-6**		002	1	1	0.330
	8		C	**5SY4 508-5**		001		**--**			1	1	0.330
	10		B	**5SY4 510-5**		001	A	**5SY4 510-6**		002	1	1	0.330
	13		C	**5SY4 513-5**		001	A	**5SY4 513-6**		002	1	1/6	0.330
	16		C	**5SY4 516-5**		001	A	**5SY4 516-6**		002	1	1/6	0.330
	20		C	**5SY4 520-5**		001	B	**5SY4 520-6**		002	1	1	0.330
	25		C	**5SY4 525-5**		001	B	**5SY4 525-6**		002	1	1	0.330
	32		C	**5SY4 532-5**		001	B	**5SY4 532-6**		002	1	1	0.330
	40		C	**5SY4 540-5**		001	C	**5SY4 540-6**		002	1	1	0.330
	50		C	**5SY4 550-5**		001	C	**5SY4 550-6**		002	1	1	0.330
	63		C	**5SY4 563-5**		001	C	**5SY4 563-6**		002	1	1	0.330
	2P, 400 V AC												
	1	2	B	**5SY4 201-5**		001		**--**			1	1	0.330
	1.6		B	**5SY4 215-5**		001		**--**			1	1	0.330
	2		A	**5SY4 202-5**		001		**--**			1	1	0.330
	3		B	**5SY4 203-5**		001		**--**			1	1	0.330
	4		A	**5SY4 204-5**		001		**--**			1	1	0.330
	6		A	**5SY4 206-5**		001	A	**5SY4 206-6**		002	1	1	0.330
	8		C	**5SY4 208-5**		001		**--**			1	1	0.330
	10		A	**5SY4 210-5**		001	A	**5SY4 210-6**		002	1	1/6	0.330
	13		C	**5SY4 213-5**		001	B	**5SY4 213-6**		002	1	1	0.330
	16		A	**5SY4 216-5**		001	▶	**5SY4 216-6**		002	1	1/6	0.330
	20		B	**5SY4 220-5**		001	A	**5SY4 220-6**		002	1	1	0.330
	25		B	**5SY4 225-5**		001	A	**5SY4 225-6**		002	1	1	0.330
	32		A	**5SY4 232-5**		001	B	**5SY4 232-6**		002	1	1	0.330
	40		B	**5SY4 240-5**		001	B	**5SY4 240-6**		002	1	1	0.330
	50		C	**5SY4 250-5**		001	B	**5SY4 250-6**		002	1	1	0.330
	63		C	**5SY4 263-5**		001	B	**5SY4 263-6**		002	1	1	0.330
	80			**--**			C	**5SY4 280-6**		002	1	1	0.324

*** You can order this quantity or a multiple thereof.**

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

10 000 / 3

	I_n	MW	DT	Characteristic A Order No.	Price per PU	PG	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 10 000 A												
	3P, 400 V AC												
	1	3	C	**5SY4 301-5**		001		**--**			1	1	0.495
	1.6		C	**5SY4 315-5**		001		**--**			1	1	0.495
	2		B	**5SY4 302-5**		001		**--**			1	1	0.495
	3		C	**5SY4 303-5**		001		**--**			1	1	0.495
	4		B	**5SY4 304-5**		001		**--**			1	1	0.495
	6		B	**5SY4 306-5**		001	A	**5SY4 306-6**		002	1	1	0.495
	8		C	**5SY4 308-5**		001		**--**			1	1	0.495
	10		B	**5SY4 310-5**		001	▶	**5SY4 310-6**		002	1	1	0.495
	13		C	**5SY4 313-5**		001	B	**5SY4 313-6**		002	1	1	0.495
	16		A	**5SY4 316-5**		001	▶	**5SY4 316-6**		002	1	1/4	0.495
	20		B	**5SY4 320-5**		001	A	**5SY4 320-6**		002	1	1	0.495
	25		B	**5SY4 325-5**		001	A	**5SY4 325-6**		002	1	1	0.495
	32		B	**5SY4 332-5**		001	▶	**5SY4 332-6**		002	1	1/4	0.495
	40		B	**5SY4 340-5**		001	A	**5SY4 340-6**		002	1	1	0.495
	50		B	**5SY4 350-5**		001	A	**5SY4 350-6**		002	1	1	0.495
	63		C	**5SY4 363-5**		001	A	**5SY4 363-6**		002	1	1	0.495
	80			**--**			B	**5SY4 380-6**		002	1	1	0.486
	3P+N, 400 V AC												
	1	4	C	**5SY4 601-5**		001		**--**			1	1	0.660
	1.6		C	**5SY4 615-5**		001		**--**			1	1	0.660
	2		C	**5SY4 602-5**		001		**--**			1	1	0.660
	3		C	**5SY4 603-5**		001		**--**			1	1	0.660
	4		C	**5SY4 604-5**		001		**--**			1	1	0.660
	6		C	**5SY4 606-5**		001	B	**5SY4 606-6**		002	1	1	0.660
	8		C	**5SY4 608-5**		001		**--**			1	1	0.660
	10		C	**5SY4 610-5**		001	B	**5SY4 610-6**		002	1	1	0.660
	13		C	**5SY4 613-5**		001	C	**5SY4 613-6**		002	1	1	0.660
	16		C	**5SY4 616-5**		001	A	**5SY4 616-6**		002	1	1	0.660
	20		C	**5SY4 620-5**		001	B	**5SY4 620-6**		002	1	1	0.660
	25		C	**5SY4 625-5**		001	A	**5SY4 625-6**		002	1	1	0.660
	32		C	**5SY4 632-5**		001	B	**5SY4 632-6**		002	1	1	0.660
	40		C	**5SY4 640-5**		001	C	**5SY4 640-6**		002	1	1	0.660
	50		C	**5SY4 650-5**		001	C	**5SY4 650-6**		002	1	1	0.660
	63		C	**5SY4 663-5**		001	A	**5SY4 663-6**		002	1	1	0.660
	4P, 400 V AC												
	1	4	C	**5SY4 401-5**		001		**--**			1	1	0.660
	1.6		C	**5SY4 415-5**		001		**--**			1	1	0.660
	2		C	**5SY4 402-5**		001		**--**			1	1	0.660
	3		C	**5SY4 403-5**		001		**--**			1	1	0.660
	4		C	**5SY4 404-5**		001		**--**			1	1	0.660
	6		C	**5SY4 406-5**		001	A	**5SY4 406-6**		002	1	1	0.660
	8		C	**5SY4 408-5**		001		**--**			1	1	0.660
	10		C	**5SY4 410-5**		001	B	**5SY4 410-6**		002	1	1	0.660
	13		C	**5SY4 413-5**		001	C	**5SY4 413-6**		002	1	1	0.660
	16		C	**5SY4 416-5**		001	A	**5SY4 416-6**		002	1	1	0.660
	20		C	**5SY4 420-5**		001	C	**5SY4 420-6**		002	1	1	0.660
	25		C	**5SY4 425-5**		001	B	**5SY4 425-6**		002	1	1	0.660
	32		C	**5SY4 432-5**		001	B	**5SY4 432-6**		002	1	1	0.660
	40		C	**5SY4 440-5**		001	B	**5SY4 440-6**		002	1	1	0.660
	50		C	**5SY4 450-5**		001	B	**5SY4 450-6**		002	1	1	0.660
	63		C	**5SY4 463-5**		001	B	**5SY4 463-6**		002	1	1	0.660
	80			**--**			B	**5SY4 480-6**		002	1	1	0.648

* You can order this quantity or a multiple thereof.

10 000
3

I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A										Unit(s)	Unit(s)	kg
MCBs 10 000 A												
1P, 230/400 V AC												
0.3	1	B	**5SY4 114-7**		003	C	**5SY4 114-8**		004	1	1	0.165
0.5		A	**5SY4 105-7**		003	B	**5SY4 105-8**		004	1	1	0.165
1		▶	**5SY4 101-7**		003	A	**5SY4 101-8**		004	1	1	0.165
1.6		A	**5SY4 115-7**		003	B	**5SY4 115-8**		004	1	1	0.165
2		▶	**5SY4 102-7**		003	A	**5SY4 102-8**		004	1	1/12	0.165
3		A	**5SY4 103-7**		003	A	**5SY4 103-8**		004	1	1	0.165
4		▶	**5SY4 104-7**		003	A	**5SY4 104-8**		004	1	1/12	0.165
6		▶	**5SY4 106-7**		003	A	**5SY4 106-8**		004	1	1	0.165
8		A	**5SY4 108-7**		003	A	**5SY4 108-8**		004	1	1	0.165
10		▶	**5SY4 110-7**		003	A	**5SY4 110-8**		004	1	1/12	0.165
13		A	**5SY4 113-7**		003	B	**5SY4 113-8**		004	1	1	0.165
16		▶	**5SY4 116-7**		003	A	**5SY4 116-8**		004	1	1	0.165
20		▶	**5SY4 120-7**		003	A	**5SY4 120-8**		004	1	1	0.165
25		▶	**5SY4 125-7**		003	B	**5SY4 125-8**		004	1	1	0.165
32		▶	**5SY4 132-7**		003	B	**5SY4 132-8**		004	1	1	0.165
40		A	**5SY4 140-7**		003	B	**5SY4 140-8**		004	1	1	0.165
50		A	**5SY4 150-7**		003	B	**5SY4 150-8**		004	1	1	0.165
63		B	**5SY4 163-7**		003	B	**5SY4 163-8**		004	1	1	0.165
80		B	**5SY4 180-7**		003		**--**			1	1	0.161
1P+N, 230 V AC												
0.3	2	C	**5SY4 514-7**		003	C	**5SY4 514-8**		004	1	1	0.330
0.5		B	**5SY4 505-7**		003	C	**5SY4 505-8**		004	1	1	0.330
1		A	**5SY4 501-7**		003	B	**5SY4 501-8**		004	1	1	0.330
1.6		C	**5SY4 515-7**		003	C	**5SY4 515-8**		004	1	1	0.330
2		A	**5SY4 502-7**		003	A	**5SY4 502-8**		004	1	1	0.330
3		A	**5SY4 503-7**		003	B	**5SY4 503-8**		004	1	1	0.330
4		A	**5SY4 504-7**		003	B	**5SY4 504-8**		004	1	1	0.330
6		A	**5SY4 506-7**		003	A	**5SY4 506-8**		004	1	1	0.330
8		B	**5SY4 508-7**		003	C	**5SY4 508-8**		004	1	1	0.330
10		A	**5SY4 510-7**		003	A	**5SY4 510-8**		004	1	1	0.330
13		A	**5SY4 513-7**		003	B	**5SY4 513-8**		004	1	1	0.330
16		A	**5SY4 516-7**		003	A	**5SY4 516-8**		004	1	1	0.330
20		A	**5SY4 520-7**		003	B	**5SY4 520-8**		004	1	1	0.330
25		A	**5SY4 525-7**		003	B	**5SY4 525-8**		004	1	1	0.330
32		A	**5SY4 532-7**		003	B	**5SY4 532-8**		004	1	1	0.330
40		B	**5SY4 540-7**		003	C	**5SY4 540-8**		004	1	1	0.330
50		C	**5SY4 550-7**		003	C	**5SY4 550-8**		004	1	1	0.330
63		C	**5SY4 563-7**		003	C	**5SY4 563-8**		004	1	1	0.330
80		B	**5SY4 580-7**		003		**--**			1	1	0.323
2P, 400 V AC												
0.3	2	A	**5SY4 214-7**		003	B	**5SY4 214-8**		004	1	1	0.330
0.5		A	**5SY4 205-7**		003	A	**5SY4 205-8**		004	1	1	0.330
1		A	**5SY4 201-7**		003	A	**5SY4 201-8**		004	1	1	0.330
1.6		A	**5SY4 215-7**		003	A	**5SY4 215-8**		004	1	1	0.330
2		A	**5SY4 202-7**		003	A	**5SY4 202-8**		004	1	1	0.330
3		A	**5SY4 203-7**		003	A	**5SY4 203-8**		004	1	1	0.330
4		A	**5SY4 204-7**		003	A	**5SY4 204-8**		004	1	1	0.330
6		A	**5SY4 206-7**		003	A	**5SY4 206-8**		004	1	1	0.330
8		A	**5SY4 208-7**		003	A	**5SY4 208-8**		004	1	1	0.330
10		▶	**5SY4 210-7**		003	A	**5SY4 210-8**		004	1	1	0.330
13		A	**5SY4 213-7**		003	A	**5SY4 213-8**		004	1	1	0.330
16		▶	**5SY4 216-7**		003	A	**5SY4 216-8**		004	1	1	0.330
20		A	**5SY4 220-7**		003	A	**5SY4 220-8**		004	1	1	0.330
25		A	**5SY4 225-7**		003	A	**5SY4 225-8**		004	1	1	0.330
32		A	**5SY4 232-7**		003	A	**5SY4 232-8**		004	1	1	0.330
40		A	**5SY4 240-7**		003	A	**5SY4 240-8**		004	1	1	0.330
50		A	**5SY4 250-7**		003	B	**5SY4 250-8**		004	1	1	0.330
63		A	**5SY4 263-7**		003	B	**5SY4 263-8**		004	1	1	0.330
80		B	**5SY4 280-7**		003		**--**			1	1/6	0.323

*** You can order this quantity or a multiple thereof.**

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

10 000 / 3	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 10 000 A												
	3P, 400 V AC												
	0.3	3	C	**5SY4 314-7**		003	C	**5SY4 314-8**		004	1	1	0.495
	0.5		B	**5SY4 305-7**		003	B	**5SY4 305-8**		004	1	1	0.495
	1		A	**5SY4 301-7**		003	A	**5SY4 301-8**		004	1	1	0.495
	1.6		C	**5SY4 315-7**		003	B	**5SY4 315-8**		004	1	1	0.495
	2		A	**5SY4 302-7**		003	A	**5SY4 302-8**		004	1	1	0.495
	3		A	**5SY4 303-7**		003	A	**5SY4 303-8**		004	1	1	0.495
	4		A	**5SY4 304-7**		003	A	**5SY4 304-8**		004	1	1	0.495
	6		▶	**5SY4 306-7**		003	A	**5SY4 306-8**		004	1	1	0.495
	8		A	**5SY4 308-7**		003	B	**5SY4 308-8**		004	1	1	0.495
	10		▶	**5SY4 310-7**		003	A	**5SY4 310-8**		004	1	1	0.495
	13		A	**5SY4 313-7**		003	B	**5SY4 313-8**		004	1	1	0.495
	16		▶	**5SY4 316-7**		003	A	**5SY4 316-8**		004	1	1/4	0.495
	20		▶	**5SY4 320-7**		003	A	**5SY4 320-8**		004	1	1	0.495
	25		▶	**5SY4 325-7**		003	A	**5SY4 325-8**		004	1	1	0.495
	32		▶	**5SY4 332-7**		003	A	**5SY4 332-8**		004	1	1	0.495
	40		A	**5SY4 340-7**		003	A	**5SY4 340-8**		004	1	1	0.495
	50		A	**5SY4 350-7**		003	A	**5SY4 350-8**		004	1	1	0.495
	63		A	**5SY4 363-7**		003	A	**5SY4 363-8**		004	1	1	0.495
	80		B	**5SY4 380-7**		003		**--**			1	1	0.482
	3P+N, 400 V AC												
	0.3	4	C	**5SY4 614-7**		003	C	**5SY4 614-8**		004	1	1	0.660
	0.5		C	**5SY4 605-7**		003	C	**5SY4 605-8**		004	1	1	0.660
	1		C	**5SY4 601-7**		003	C	**5SY4 601-8**		004	1	1	0.660
	1.6		C	**5SY4 615-7**		003	C	**5SY4 615-8**		004	1	1	0.660
	2		B	**5SY4 602-7**		003	C	**5SY4 602-8**		004	1	1	0.660
	3		B	**5SY4 603-7**		003	C	**5SY4 603-8**		004	1	1	0.660
	4		C	**5SY4 604-7**		003	C	**5SY4 604-8**		004	1	1	0.660
	6		B	**5SY4 606-7**		003	C	**5SY4 606-8**		004	1	1	0.660
	8		C	**5SY4 608-7**		003	C	**5SY4 608-8**		004	1	1	0.660
	10		A	**5SY4 610-7**		003	B	**5SY4 610-8**		004	1	1	0.660
	13		B	**5SY4 613-7**		003	C	**5SY4 613-8**		004	1	1	0.660
	16		A	**5SY4 616-7**		003	A	**5SY4 616-8**		004	1	1	0.660
	20		A	**5SY4 620-7**		003	B	**5SY4 620-8**		004	1	1	0.660
	25		A	**5SY4 625-7**		003	A	**5SY4 625-8**		004	1	1	0.660
	32		A	**5SY4 632-7**		003	A	**5SY4 632-8**		004	1	1	0.660
	40		A	**5SY4 640-7**		003	A	**5SY4 640-8**		004	1	1	0.660
	50		B	**5SY4 650-7**		003	A	**5SY4 650-8**		004	1	1	0.660
	63		A	**5SY4 663-7**		003	B	**5SY4 663-8**		004	1	1	0.660
	80		B	**5SY4 680-7**		003		**--**			1	1	0.647
	4P, 400 V AC												
	0.3	4	C	**5SY4 414-7**		003	C	**5SY4 414-8**		004	1	1	0.660
	0.5		C	**5SY4 405-7**		003	C	**5SY4 405-8**		004	1	1	0.660
	1		C	**5SY4 401-7**		003	C	**5SY4 401-8**		004	1	1	0.660
	1.6		C	**5SY4 415-7**		003	C	**5SY4 415-8**		004	1	1	0.660
	2		B	**5SY4 402-7**		003	C	**5SY4 402-8**		004	1	1	0.660
	3		C	**5SY4 403-7**		003	C	**5SY4 403-8**		004	1	1	0.660
	4		B	**5SY4 404-7**		003	C	**5SY4 404-8**		004	1	1	0.660
	6		A	**5SY4 406-7**		003	B	**5SY4 406-8**		004	1	1	0.660
	8		C	**5SY4 408-7**		003	C	**5SY4 408-8**		004	1	1	0.660
	10		A	**5SY4 410-7**		003	A	**5SY4 410-8**		004	1	1	0.660
	13		C	**5SY4 413-7**		003	C	**5SY4 413-8**		004	1	1	0.660
	16		A	**5SY4 416-7**		003	▶	**5SY4 416-8**		004	1	1	0.660
	20		A	**5SY4 420-7**		003	A	**5SY4 420-8**		004	1	1	0.660
	25		A	**5SY4 425-7**		003	A	**5SY4 425-8**		004	1	1	0.660
	32		A	**5SY4 432-7**		003	▶	**5SY4 432-8**		004	1	1	0.660
	40		A	**5SY4 440-7**		003	A	**5SY4 440-8**		004	1	1	0.660
	50		A	**5SY4 450-7**		003	A	**5SY4 450-8**		004	1	1	0.660
	63		A	**5SY4 463-7**		003	A	**5SY4 463-8**		004	1	1	0.660
	80		B	**5SY4 480-7**		003		**--**			1	1	0.647

* You can order this quantity or a multiple thereof.

10 000

I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A						Unit(s)	Unit(s)	kg
MCBs 10 000 A, high current								
1P, 230/400 V AC								
80	1.5	B	**5SP4 180-6**		002	1	1	0.258
100		C	**5SP4 191-6**		002	1	1	0.258
125		B	**5SP4 192-6**		002	1	1	0.258
2P, 400 V AC								
80	3	C	**5SP4 280-6**		002	1	1	0.516
100		C	**5SP4 291-6**		002	1	1	0.516
125		C	**5SP4 292-6**		002	1	1	0.516
3P, 400 V AC								
80	4.5	B	**5SP4 380-6**		002	1	1	0.762
100		B	**5SP4 391-6**		002	1	1	0.762
125		C	**5SP4 392-6**		002	1	1	0.762
4P, 400 V AC								
80	6	B	**5SP4 480-6**		002	1	1	1.032
100		C	**5SP4 491-6**		002	1	1	1.032
125		C	**5SP4 492-6**		002	1	1	1.032

10 000

I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A										Unit(s)	Unit(s)	kg
MCBs 10 000 A, high current												
1P, 230/400 V AC												
80	1.5	A	**5SP4 180-7**		003	B	**5SP4 180-8**		004	1	1	0.258
100		A	**5SP4 191-7**		003	C	**5SP4 191-8**		004	1	1	0.258
125		A	**5SP4 192-7**		003		--			1	1	0.258
2P, 400 V AC												
80	3	A	**5SP4 280-7**		003	C	**5SP4 280-8**		004	1	1	0.516
100		A	**5SP4 291-7**		003	C	**5SP4 291-8**		004	1	1	0.516
125		A	**5SP4 292-7**		003		--			1	1	0.516
3P, 400 V AC												
80	4.5	▶	**5SP4 380-7**		003	A	**5SP4 380-8**		004	1	1	0.762
100		▶	**5SP4 391-7**		003	A	**5SP4 391-8**		004	1	1	0.762
125		A	**5SP4 392-7**		003		--			1	1	0.762
4P, 400 V AC												
80	6	A	**5SP4 480-7**		003	A	**5SP4 480-8**		004	1	1	1.032
100		A	**5SP4 491-7**		003	C	**5SP4 491-8**		004	1	1	1.032
125		A	**5SP4 492-7**		003		--			1	1	1.032

*** You can order this quantity or a multiple thereof.**

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

10 000 / 3

	I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	DT	Characteristic C Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 10 000 A, universal current												
	1P, 230/400 V AC, 220 V DC												
	0.3	1		--			C	**5SY5 114-7**		003	1	1	0.165
	0.5			--			B	**5SY5 105-7**		003	1	1	0.165
	1			--			A	**5SY5 101-7**		003	1	1	0.147
	1.6			--			A	**5SY5 115-7**		003	1	1	0.165
	2		C	**5SY5 102-6**		002	A	**5SY5 102-7**		003	1	1	0.165
	3			--			A	**5SY5 103-7**		003	1	1	0.165
	4		B	**5SY5 104-6**		002	A	**5SY5 104-7**		003	1	1	0.165
	6		A	**5SY5 106-6**		002	▶	**5SY5 106-7**		003	1	1	0.165
	8			--			A	**5SY5 108-7**		003	1	1	0.165
	10		A	**5SY5 110-6**		002	▶	**5SY5 110-7**		003	1	1	0.165
	13		C	**5SY5 113-6**		002	B	**5SY5 113-7**		003	1	1	0.165
	16		A	**5SY5 116-6**		002	A	**5SY5 116-7**		003	1	1	0.165
	20		C	**5SY5 120-6**		002	A	**5SY5 120-7**		003	1	1	0.165
	25		C	**5SY5 125-6**		002	B	**5SY5 125-7**		003	1	1	0.165
	32		C	**5SY5 132-6**		002	B	**5SY5 132-7**		003	1	1	0.165
	40		C	**5SY5 140-6**		002	C	**5SY5 140-7**		003	1	1	0.165
	50		C	**5SY5 150-6**		002	C	**5SY5 150-7**		003	1	1	0.165
	63		C	**5SY5 163-6**		002	C	**5SY5 163-7**		003	1	1	0.165
	80	1.5		--			B	**5SP5 180-7**		003	1	1	0.258
	100			--			B	**5SP5 191-7**		003	1	1	0.258
	125			--			B	**5SP5 192-7**		003	1	1	0.258
	2P, 440 V AC, 440 V DC												
	0.3	2		--			C	**5SY5 214-7**		003	1	1	0.330
	0.5			--			B	**5SY5 205-7**		003	1	1	0.330
	1			--			A	**5SY5 201-7**		003	1	1	0.330
	1.6			--			B	**5SY5 215-7**		003	1	1	0.330
	2			--			▶	**5SY5 202-7**		003	1	1	0.330
	3			--			▶	**5SY5 203-7**		003	1	1	0.330
	4			--			A	**5SY5 204-7**		003	1	1	0.330
	6		A	**5SY5 206-6**		002	▶	**5SY5 206-7**		003	1	1/6	0.330
	8			--			B	**5SY5 208-7**		003	1	1	0.330
	10		A	**5SY5 210-6**		002	▶	**5SY5 210-7**		003	1	1	0.330
	13		C	**5SY5 213-6**		002	B	**5SY5 213-7**		003	1	1	0.330
	16		A	**5SY5 216-6**		002	▶	**5SY5 216-7**		003	1	1	0.330
	20		A	**5SY5 220-6**		002	A	**5SY5 220-7**		003	1	1	0.330
	25		C	**5SY5 225-6**		002	A	**5SY5 225-7**		003	1	1	0.330
	32		B	**5SY5 232-6**		002	B	**5SY5 232-7**		003	1	1	0.330
	40		C	**5SY5 240-6**		002	B	**5SY5 240-7**		003	1	1	0.330
	50		C	**5SY5 250-6**		002	A	**5SY5 250-7**		003	1	1	0.330
	63		C	**5SY5 263-6**		002	A	**5SY5 263-7**		003	1	1	0.330
	80	3		--			B	**5SP5 280-7**		003	1	1	0.516
	100			--			B	**5SP5 291-7**		003	1	1	0.516
	125			--			B	**5SP5 292-7**		003	1	1	0.516

* You can order this quantity or a multiple thereof.

15 000
3

I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A						Unit(s)	Unit(s)	kg
MCBs 15 000 A								
1P, 230/400 V AC								
6	1	►	**5SY7 106-6**		002	1	1	0.165
10		►	**5SY7 110-6**		002	1	1	0.165
13		C	**5SY7 113-6**		002	1	1	0.165
16		►	**5SY7 116-6**		002	1	1	0.165
20		B	**5SY7 120-6**		002	1	1	0.165
25		B	**5SY7 125-6**		002	1	1	0.165
32		B	**5SY7 132-6**		002	1	1	0.165
40		C	**5SY7 140-6**		002	1	1	0.165
50		C	**5SY7 150-6**		002	1	1	0.165
63		C	**5SY7 163-6**		002	1	1	0.165
1P+N, 230 V AC								
6	2	C	**5SY7 506-6**		002	1	1	0.330
10		C	**5SY7 510-6**		002	1	1	0.330
13		C	**5SY7 513-6**		002	1	1	0.330
16		C	**5SY7 516-6**		002	1	1	0.330
20		C	**5SY7 520-6**		002	1	1	0.330
25		C	**5SY7 525-6**		002	1	1	0.330
32		C	**5SY7 532-6**		002	1	1	0.330
40		C	**5SY7 540-6**		002	1	1	0.330
50		C	**5SY7 550-6**		002	1	1	0.330
63		C	**5SY7 563-6**		002	1	1	0.330
2P, 400 V AC								
6	2	B	**5SY7 206-6**		002	1	1	0.330
10		B	**5SY7 210-6**		002	1	1	0.330
13		C	**5SY7 213-6**		002	1	1	0.330
16		B	**5SY7 216-6**		002	1	1	0.330
20		B	**5SY7 220-6**		002	1	1	0.330
25		B	**5SY7 225-6**		002	1	1	0.330
32		C	**5SY7 232-6**		002	1	1	0.330
40		C	**5SY7 240-6**		002	1	1	0.330
50		C	**5SY7 250-6**		002	1	1	0.330
63		C	**5SY7 263-6**		002	1	1	0.330
3P, 400 V AC								
6	3	B	**5SY7 306-6**		002	1	1	0.495
10		B	**5SY7 310-6**		002	1	1	0.495
13		C	**5SY7 313-6**		002	1	1	0.495
16		A	**5SY7 316-6**		002	1	1	0.495
20		B	**5SY7 320-6**		002	1	1	0.495
25		B	**5SY7 325-6**		002	1	1	0.495
32		B	**5SY7 332-6**		002	1	1	0.495
40		B	**5SY7 340-6**		002	1	1	0.495
50		B	**5SY7 350-6**		002	1	1	0.495
63		C	**5SY7 363-6**		002	1	1	0.495
3P+N, 400 V AC								
6	4	C	**5SY7 606-6**		002	1	1	0.660
10		C	**5SY7 610-6**		002	1	1	0.660
13		C	**5SY7 613-6**		002	1	1	0.660
16		C	**5SY7 616-6**		002	1	1	0.660
20		C	**5SY7 620-6**		002	1	1	0.660
25		C	**5SY7 625-6**		002	1	1	0.660
32		C	**5SY7 632-6**		002	1	1	0.660
40		C	**5SY7 640-6**		002	1	1	0.660
50		C	**5SY7 650-6**		002	1	1	0.660
63		C	**5SY7 663-6**		002	1	1	0.660
4P, 400 V AC								
6	4	C	**5SY7 406-6**		002	1	1	0.660
10		B	**5SY7 410-6**		002	1	1	0.660
13		C	**5SY7 413-6**		002	1	1	0.660
16		B	**5SY7 416-6**		002	1	1	0.660
20		B	**5SY7 420-6**		002	1	1	0.660
25		C	**5SY7 425-6**		002	1	1	0.660
32		C	**5SY7 432-6**		002	1	1	0.660
40		C	**5SY7 440-6**		002	1	1	0.660
50		C	**5SY7 450-6**		002	1	1	0.660
63		C	**5SY7 463-6**		002	1	1	0.660






* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

5SP and 5SY miniature circuit breakers

15 000 / 3

I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A										Unit(s)	Unit(s)	kg
MCBs 15 000 A												
1P, 230/400 V AC												
0.3	1	B	**5SY7 114-7**		003	C	**5SY7 114-8**		004	1	1	0.165
0.5		B	**5SY7 105-7**		003	C	**5SY7 105-8**		004	1	1	0.165
1		A	**5SY7 101-7**		003	C	**5SY7 101-8**		004	1	1	0.165
1.6		B	**5SY7 115-7**		003	C	**5SY7 115-8**		004	1	1	0.165
2		▶	**5SY7 102-7**		003	C	**5SY7 102-8**		004	1	1	0.165
3		A	**5SY7 103-7**		003	C	**5SY7 103-8**		004	1	1	0.165
4		A	**5SY7 104-7**		003	B	**5SY7 104-8**		004	1	1	0.165
6		▶	**5SY7 106-7**		003	B	**5SY7 106-8**		004	1	1	0.165
8		B	**5SY7 108-7**		003	C	**5SY7 108-8**		004	1	1	0.165
10		▶	**5SY7 110-7**		003	B	**5SY7 110-8**		004	1	1	0.165
13		B	**5SY7 113-7**		003	C	**5SY7 113-8**		004	1	1	0.165
16		▶	**5SY7 116-7**		003	B	**5SY7 116-8**		004	1	1	0.165
20		A	**5SY7 120-7**		003	C	**5SY7 120-8**		004	1	1	0.165
25		B	**5SY7 125-7**		003	C	**5SY7 125-8**		004	1	1	0.165
32		B	**5SY7 132-7**		003	C	**5SY7 132-8**		004	1	1	0.165
40		B	**5SY7 140-7**		003	C	**5SY7 140-8**		004	1	1	0.165
50		C	**5SY7 150-7**		003	C	**5SY7 150-8**		004	1	1	0.165
63		B	**5SY7 163-7**		003	C	**5SY7 163-8**		004	1	1	0.165
1P+N, 230 V AC												
0.3	2	C	**5SY7 514-7**		003	C	**5SY7 514-8**		004	1	1	0.330
0.5		C	**5SY7 505-7**		003	C	**5SY7 505-8**		004	1	1	0.330
1		B	**5SY7 501-7**		003	C	**5SY7 501-8**		004	1	1	0.330
1.6		C	**5SY7 515-7**		003	C	**5SY7 515-8**		004	1	1	0.330
2		B	**5SY7 502-7**		003	C	**5SY7 502-8**		004	1	1	0.330
3		B	**5SY7 503-7**		003	C	**5SY7 503-8**		004	1	1	0.330
4		B	**5SY7 504-7**		003	B	**5SY7 504-8**		004	1	1	0.330
6		A	**5SY7 506-7**		003	C	**5SY7 506-8**		004	1	1	0.330
8		C	**5SY7 508-7**		003	C	**5SY7 508-8**		004	1	1	0.330
10		A	**5SY7 510-7**		003	C	**5SY7 510-8**		004	1	1	0.330
13		B	**5SY7 513-7**		003	C	**5SY7 513-8**		004	1	1	0.330
16		A	**5SY7 516-7**		003	B	**5SY7 516-8**		004	1	1	0.330
20		B	**5SY7 520-7**		003	C	**5SY7 520-8**		004	1	1	0.330
25		B	**5SY7 525-7**		003	C	**5SY7 525-8**		004	1	1	0.330
32		B	**5SY7 532-7**		003	C	**5SY7 532-8**		004	1	1	0.330
40		C	**5SY7 540-7**		003	C	**5SY7 540-8**		004	1	1	0.330
50		C	**5SY7 550-7**		003	C	**5SY7 550-8**		004	1	1	0.330
63		C	**5SY7 563-7**		003	C	**5SY7 563-8**		004	1	1	0.330
2P, 400 V AC												
0.3	2	C	**5SY7 214-7**		003	C	**5SY7 214-8**		004	1	1	0.330
0.5		B	**5SY7 205-7**		003	C	**5SY7 205-8**		004	1	1	0.330
1		A	**5SY7 201-7**		003	B	**5SY7 201-8**		004	1	1	0.330
1.6		C	**5SY7 215-7**		003	C	**5SY7 215-8**		004	1	1	0.330
2		A	**5SY7 202-7**		003	A	**5SY7 202-8**		004	1	1	0.330
3		A	**5SY7 203-7**		003	B	**5SY7 203-8**		004	1	1	0.330
4		A	**5SY7 204-7**		003	A	**5SY7 204-8**		004	1	1	0.330
6		▶	**5SY7 206-7**		003	A	**5SY7 206-8**		004	1	1	0.330
8		B	**5SY7 208-7**		003	B	**5SY7 208-8**		004	1	1	0.330
10		▶	**5SY7 210-7**		003	A	**5SY7 210-8**		004	1	1	0.330
13		B	**5SY7 213-7**		003	C	**5SY7 213-8**		004	1	1	0.330
16		▶	**5SY7 216-7**		003	A	**5SY7 216-8**		004	1	1	0.330
20		A	**5SY7 220-7**		003	B	**5SY7 220-8**		004	1	1	0.330
25		A	**5SY7 225-7**		003	B	**5SY7 225-8**		004	1	1	0.330
32		A	**5SY7 232-7**		003	C	**5SY7 232-8**		004	1	1	0.330
40		A	**5SY7 240-7**		003	C	**5SY7 240-8**		004	1	1	0.330
50		B	**5SY7 250-7**		003	C	**5SY7 250-8**		004	1	1	0.330
63		B	**5SY7 263-7**		003	C	**5SY7 263-8**		004	1	1	0.330

* You can order this quantity or a multiple thereof.

15 000
3

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 15 000 A												
	3P, 400 V AC												
	0.3	3	C	**5SY7 314-7**		003	C	**5SY7 314-8**		004	1	1	0.495
	0.5		C	**5SY7 305-7**		003	C	**5SY7 305-8**		004	1	1	0.495
	1		C	**5SY7 301-7**		003	C	**5SY7 301-8**		004	1	1	0.495
	1.6		C	**5SY7 315-7**		003	C	**5SY7 315-8**		004	1	1	0.495
	2		B	**5SY7 302-7**		003	C	**5SY7 302-8**		004	1	1	0.495
	3		C	**5SY7 303-7**		003	C	**5SY7 303-8**		004	1	1	0.495
	4		A	**5SY7 304-7**		003	C	**5SY7 304-8**		004	1	1	0.495
	6		A	**5SY7 306-7**		003	C	**5SY7 306-8**		004	1	1	0.495
	8		C	**5SY7 308-7**		003	B	**5SY7 308-8**		004	1	1	0.495
	10		A	**5SY7 310-7**		003	B	**5SY7 310-8**		004	1	1	0.495
	13		B	**5SY7 313-7**		003	C	**5SY7 313-8**		004	1	1	0.495
	16		►	**5SY7 316-7**		003	A	**5SY7 316-8**		004	1	1	0.495
	20		►	**5SY7 320-7**		003	B	**5SY7 320-8**		004	1	1	0.495
	25		►	**5SY7 325-7**		003	A	**5SY7 325-8**		004	1	1	0.495
	32		►	**5SY7 332-7**		003	B	**5SY7 332-8**		004	1	1	0.495
	40		►	**5SY7 340-7**		003	B	**5SY7 340-8**		004	1	1	0.495
	50		►	**5SY7 350-7**		003	B	**5SY7 350-8**		004	1	1	0.495
	63		►	**5SY7 363-7**		003	B	**5SY7 363-8**		004	1	1	0.495
	3P+N, 400 V AC												
	0.3	4	C	**5SY7 614-7**		003	C	**5SY7 614-8**		004	1	1	0.660
	0.5		C	**5SY7 605-7**		003	C	**5SY7 605-8**		004	1	1	0.660
	1		C	**5SY7 601-7**		003	C	**5SY7 601-8**		004	1	1	0.660
	1.6		C	**5SY7 615-7**		003	C	**5SY7 615-8**		004	1	1	0.660
	2		C	**5SY7 602-7**		003	C	**5SY7 602-8**		004	1	1	0.660
	3		C	**5SY7 603-7**		003	C	**5SY7 603-8**		004	1	1	0.660
	4		C	**5SY7 604-7**		003	C	**5SY7 604-8**		004	1	1	0.660
	6		C	**5SY7 606-7**		003	C	**5SY7 606-8**		004	1	1	0.660
	8		C	**5SY7 608-7**		003	C	**5SY7 608-8**		004	1	1	0.660
	10		B	**5SY7 610-7**		003	C	**5SY7 610-8**		004	1	1	0.660
	13		C	**5SY7 613-7**		003	C	**5SY7 613-8**		004	1	1	0.660
	16		A	**5SY7 616-7**		003	C	**5SY7 616-8**		004	1	1	0.660
	20		B	**5SY7 620-7**		003	C	**5SY7 620-8**		004	1	1	0.660
	25		B	**5SY7 625-7**		003	C	**5SY7 625-8**		004	1	1	0.660
	32		B	**5SY7 632-7**		003	C	**5SY7 632-8**		004	1	1	0.660
	40		B	**5SY7 640-7**		003	C	**5SY7 640-8**		004	1	1	0.660
	50		B	**5SY7 650-7**		003	C	**5SY7 650-8**		004	1	1	0.660
	63		B	**5SY7 663-7**		003	C	**5SY7 663-8**		004	1	1	0.660
	4P, 400 V AC												
	0.3	4	C	**5SY7 414-7**		003	C	**5SY7 414-8**		004	1	1	0.660
	0.5		C	**5SY7 405-7**		003	C	**5SY7 405-8**		004	1	1	0.660
	1		C	**5SY7 401-7**		003	C	**5SY7 401-8**		004	1	1	0.660
	1.6		C	**5SY7 415-7**		003	C	**5SY7 415-8**		004	1	1	0.660
	2		C	**5SY7 402-7**		003	C	**5SY7 402-8**		004	1	1	0.660
	3		C	**5SY7 403-7**		003	C	**5SY7 403-8**		004	1	1	0.660
	4		B	**5SY7 404-7**		003	C	**5SY7 404-8**		004	1	1	0.660
	6		B	**5SY7 406-7**		003	C	**5SY7 406-8**		004	1	1	0.660
	8		C	**5SY7 408-7**		003	C	**5SY7 408-8**		004	1	1	0.660
	10		►	**5SY7 410-7**		003	B	**5SY7 410-8**		004	1	1	0.660
	13		C	**5SY7 413-7**		003	C	**5SY7 413-8**		004	1	1	0.660
	16		►	**5SY7 416-7**		003	B	**5SY7 416-8**		004	1	1	0.660
	20		A	**5SY7 420-7**		003	B	**5SY7 420-8**		004	1	1	0.660
	25		►	**5SY7 425-7**		003	B	**5SY7 425-8**		004	1	1	0.660
	32		►	**5SY7 432-7**		003	B	**5SY7 432-8**		004	1	1	0.660
	40		A	**5SY7 440-7**		003	B	**5SY7 440-8**		004	1	1	0.660
	50		A	**5SY7 450-7**		003	B	**5SY7 450-8**		004	1	1	0.660
	63		►	**5SY7 463-7**		003	B	**5SY7 463-8**		004	1	1	0.660

*** You can order this quantity or a multiple thereof.**

5SP and 5SY miniature circuit breakers

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 25 kA												
	1P, 230/400 V AC												
	0.3	1	C	**5SY8 114-7**		003	C	**5SY8 114-8**		004	1	1	0.165
	0.5		C	**5SY8 105-7**		003	C	**5SY8 105-8**		004	1	1	0.165
	1		B	**5SY8 101-7**		003	C	**5SY8 101-8**		004	1	1	0.165
	1.6		C	**5SY8 115-7**		003	C	**5SY8 115-8**		004	1	1	0.165
	2		A	**5SY8 102-7**		003	B	**5SY8 102-8**		004	1	1	0.165
	3		C	**5SY8 103-7**		003	C	**5SY8 103-8**		004	1	1	0.165
	4		B	**5SY8 104-7**		003	C	**5SY8 104-8**		004	1	1	0.165
	6		A	**5SY8 106-7**		003	C	**5SY8 106-8**		004	1	1	0.165
	8		C	**5SY8 108-7**		003	C	**5SY8 108-8**		004	1	1	0.165
	10		A	**5SY8 110-7**		003	C	**5SY8 110-8**		004	1	1	0.165
	13		C	**5SY8 113-7**		003	C	**5SY8 113-8**		004	1	1	0.165
	16		A	**5SY8 116-7**		003	C	**5SY8 116-8**		004	1	1	0.165
	20		A	**5SY8 120-7**		003	C	**5SY8 120-8**		004	1	1	0.165
	25		C	**5SY8 125-7**		003	C	**5SY8 125-8**		004	1	1	0.165
	32		B	**5SY8 132-7**		003	C	**5SY8 132-8**		004	1	1	0.165
	40		C	**5SY8 140-7**		003	C	**5SY8 140-8**		004	1	1	0.165
	50		C	**5SY8 150-7**		003	C	**5SY8 150-8**		004	1	1	0.165
	63		C	**5SY8 163-7**		003	C	**5SY8 163-8**		004	1	1	0.165
	1P+N, 230 V AC												
	0.3	2	C	**5SY8 514-7**		003	C	**5SY8 514-8**		004	1	1	0.330
	0.5		C	**5SY8 505-7**		003	C	**5SY8 505-8**		004	1	1	0.330
	1		C	**5SY8 501-7**		003	C	**5SY8 501-8**		004	1	1	0.330
	1.6		C	**5SY8 515-7**		003	C	**5SY8 515-8**		004	1	1	0.330
	2		C	**5SY8 502-7**		003	C	**5SY8 502-8**		004	1	1	0.330
	3		C	**5SY8 503-7**		003	C	**5SY8 503-8**		004	1	1	0.330
	4		C	**5SY8 504-7**		003	C	**5SY8 504-8**		004	1	1	0.330
	6		B	**5SY8 506-7**		003	C	**5SY8 506-8**		004	1	1	0.330
	8		C	**5SY8 508-7**		003	C	**5SY8 508-8**		004	1	1	0.330
	10		B	**5SY8 510-7**		003	C	**5SY8 510-8**		004	1	1	0.330
	13		C	**5SY8 513-7**		003	C	**5SY8 513-8**		004	1	1	0.330
	16		B	**5SY8 516-7**		003	C	**5SY8 516-8**		004	1	1	0.330
	20		C	**5SY8 520-7**		003	C	**5SY8 520-8**		004	1	1	0.330
	25		C	**5SY8 525-7**		003	C	**5SY8 525-8**		004	1	1	0.330
	32		B	**5SY8 532-7**		003	C	**5SY8 532-8**		004	1	1	0.330
	40		C	**5SY8 540-7**		003	B	**5SY8 540-8**		004	1	1	0.330
	50		B	**5SY8 550-7**		003	B	**5SY8 550-8**		004	1	1	0.330
	63		B	**5SY8 563-7**		003	B	**5SY8 563-8**		004	1	1	0.330
	2P, 400 V AC												
	0.3	2	C	**5SY8 214-7**		003	C	**5SY8 214-8**		004	1	1	0.330
	0.5		C	**5SY8 205-7**		003	C	**5SY8 205-8**		004	1	1	0.330
	1		B	**5SY8 201-7**		003	C	**5SY8 201-8**		004	1	1	0.330
	1.6		C	**5SY8 215-7**		003	C	**5SY8 215-8**		004	1	1	0.330
	2		B	**5SY8 202-7**		003	B	**5SY8 202-8**		004	1	1	0.330
	3		C	**5SY8 203-7**		003	C	**5SY8 203-8**		004	1	1	0.330
	4		A	**5SY8 204-7**		003	C	**5SY8 204-8**		004	1	1	0.330
	6		A	**5SY8 206-7**		003	A	**5SY8 206-8**		004	1	1	0.330
	8		C	**5SY8 208-7**		003	C	**5SY8 208-8**		004	1	1	0.330
	10		A	**5SY8 210-7**		003	B	**5SY8 210-8**		004	1	1	0.330
	13		C	**5SY8 213-7**		003	C	**5SY8 213-8**		004	1	1	0.330
	16		A	**5SY8 216-7**		003	C	**5SY8 216-8**		004	1	1	0.330
	20		B	**5SY8 220-7**		003	C	**5SY8 220-8**		004	1	1	0.330
	25		B	**5SY8 225-7**		003	B	**5SY8 225-8**		004	1	1	0.330
	32		B	**5SY8 232-7**		003	C	**5SY8 232-8**		004	1	1	0.330
	40		C	**5SY8 240-7**		003	C	**5SY8 240-8**		004	1	1	0.330
	50		C	**5SY8 250-7**		003	C	**5SY8 250-8**		004	1	1	0.330
	63		C	**5SY8 263-7**		003	C	**5SY8 263-8**		004	1	1	0.330

* You can order this quantity or a multiple thereof.

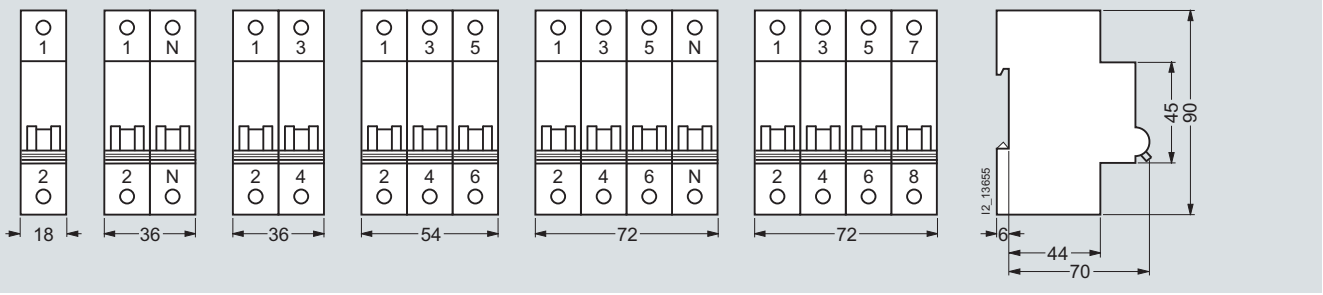
	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	MCBs 25 kA												
	3P, 400 V AC												
	0.3	3	C	**5SY8 314-7**		003	C	**5SY8 314-8**		004	1	1	0.495
	0.5		C	**5SY8 305-7**		003	C	**5SY8 305-8**		004	1	1	0.495
	1		A	**5SY8 301-7**		003	C	**5SY8 301-8**		004	1	1	0.495
	1.6		C	**5SY8 315-7**		003	C	**5SY8 315-8**		004	1	1	0.495
	2		C	**5SY8 302-7**		003	C	**5SY8 302-8**		004	1	1	0.495
	3		C	**5SY8 303-7**		003	C	**5SY8 303-8**		004	1	1	0.495
	4		C	**5SY8 304-7**		003	C	**5SY8 304-8**		004	1	1	0.495
	6		B	**5SY8 306-7**		003	C	**5SY8 306-8**		004	1	1	0.495
	8		C	**5SY8 308-7**		003	C	**5SY8 308-8**		004	1	1	0.495
	10		B	**5SY8 310-7**		003	C	**5SY8 310-8**		004	1	1	0.495
	13		C	**5SY8 313-7**		003	C	**5SY8 313-8**		004	1	1	0.495
	16		A	**5SY8 316-7**		003	C	**5SY8 316-8**		004	1	1	0.495
	20		C	**5SY8 320-7**		003	C	**5SY8 320-8**		004	1	1	0.495
	25		A	**5SY8 325-7**		003	B	**5SY8 325-8**		004	1	1	0.495
	32		A	**5SY8 332-7**		003	B	**5SY8 332-8**		004	1	1	0.495
	40		B	**5SY8 340-7**		003	C	**5SY8 340-8**		004	1	1	0.495
	50		B	**5SY8 350-7**		003	B	**5SY8 350-8**		004	1	1	0.495
	63		B	**5SY8 363-7**		003	C	**5SY8 363-8**		004	1	1	0.495
	3P+N, 400 V AC												
	0.3	4	C	**5SY8 614-7**		003	C	**5SY8 614-8**		004	1	1	0.660
	0.5		C	**5SY8 605-7**		003	C	**5SY8 605-8**		004	1	1	0.660
	1		C	**5SY8 601-7**		003	C	**5SY8 601-8**		004	1	1	0.660
	1.6		C	**5SY8 615-7**		003	C	**5SY8 615-8**		004	1	1	0.660
	2		C	**5SY8 602-7**		003	C	**5SY8 602-8**		004	1	1	0.660
	3		C	**5SY8 603-7**		003	C	**5SY8 603-8**		004	1	1	0.660
	4		C	**5SY8 604-7**		003	C	**5SY8 604-8**		004	1	1	0.660
	6		C	**5SY8 606-7**		003	C	**5SY8 606-8**		004	1	1	0.660
	8		C	**5SY8 608-7**		003	C	**5SY8 608-8**		004	1	1	0.660
	10		C	**5SY8 610-7**		003	C	**5SY8 610-8**		004	1	1	0.660
	13		C	**5SY8 613-7**		003	C	**5SY8 613-8**		004	1	1	0.660
	16		B	**5SY8 616-7**		003	C	**5SY8 616-8**		004	1	1	0.660
	20		C	**5SY8 620-7**		003	C	**5SY8 620-8**		004	1	1	0.660
	25		C	**5SY8 625-7**		003	C	**5SY8 625-8**		004	1	1	0.660
	32		B	**5SY8 632-7**		003	C	**5SY8 632-8**		004	1	1	0.660
	40		C	**5SY8 640-7**		003	C	**5SY8 640-8**		004	1	1	0.660
	50		C	**5SY8 650-7**		003	C	**5SY8 650-8**		004	1	1	0.660
	63		A	**5SY8 663-7**		003	C	**5SY8 663-8**		004	1	1	0.660
	4P, 400 V AC												
	0.3	4	C	**5SY8 414-7**		003	C	**5SY8 414-8**		004	1	1	0.660
	0.5		C	**5SY8 405-7**		003	C	**5SY8 405-8**		004	1	1	0.660
	1		C	**5SY8 401-7**		003	C	**5SY8 401-8**		004	1	1	0.660
	1.6		C	**5SY8 415-7**		003	C	**5SY8 415-8**		004	1	1	0.660
	2		C	**5SY8 402-7**		003	C	**5SY8 402-8**		004	1	1	0.660
	3		C	**5SY8 403-7**		003	C	**5SY8 403-8**		004	1	1	0.660
	4		C	**5SY8 404-7**		003	C	**5SY8 404-8**		004	1	1	0.660
	6		C	**5SY8 406-7**		003	C	**5SY8 406-8**		004	1	1	0.660
	8		C	**5SY8 408-7**		003	C	**5SY8 408-8**		004	1	1	0.660
	10		B	**5SY8 410-7**		003	C	**5SY8 410-8**		004	1	1	0.660
	13		C	**5SY8 413-7**		003	C	**5SY8 413-8**		004	1	1	0.660
	16		A	**5SY8 416-7**		003	C	**5SY8 416-8**		004	1	1	0.660
	20		A	**5SY8 420-7**		003	C	**5SY8 420-8**		004	1	1	0.660
	25		A	**5SY8 425-7**		003	C	**5SY8 425-8**		004	1	1	0.660
	32		A	**5SY8 432-7**		003	C	**5SY8 432-8**		004	1	1	0.660
	40		A	**5SY8 440-7**		003	C	**5SY8 440-8**		004	1	1	0.660
	50		A	**5SY8 450-7**		003	C	**5SY8 450-8**		004	1	1	0.660
	63		A	**5SY8 463-7**		003	C	**5SY8 463-8**		004	1	1	0.660

*** You can order this quantity or a multiple thereof.**

5SP and 5SY miniature circuit breakers

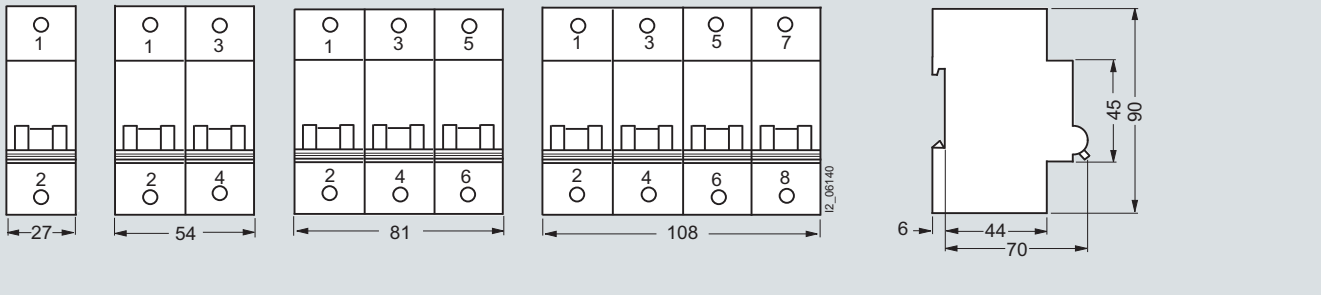
Dimensional drawings

5SY



1P 1P+N 2P 3P 3P+N 4P

5SP



1P 2P 3P 4P

Schematics

5SY6, 5SY4, 5SY7, 5SY8

1P 1P+N 2P 3P 3P+N 4P

5SP4

1P 2P 3P 4P

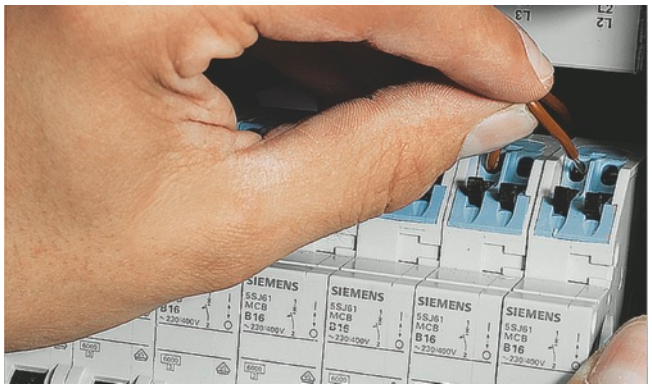
5SY5, 5SP5

1P 2P

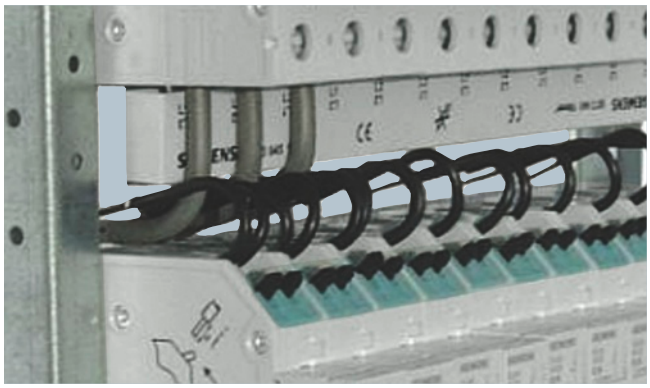
Overview

Miniature circuit breakers with plug-in terminals are used for the protection of socket outlets and lighting circuits with the most common rated currents of 10 to 20 A.

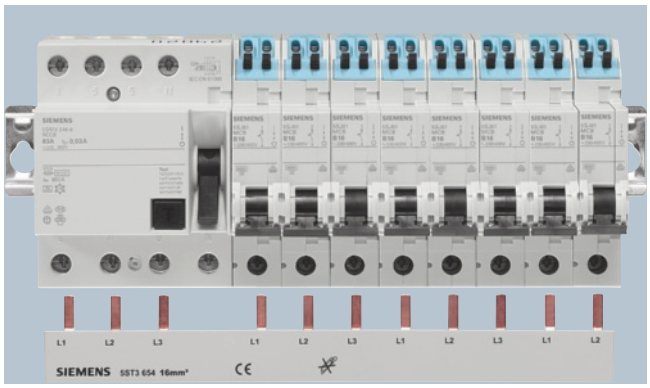
Benefits



- Double, self-contained, screwless outgoing terminals for fast connection of conductors.



- The plug-in terminals offer angled, easily accessible cable entries for manual insertion, which saves mounting time.
- Separate removal of individual conductors requires no tools and ensures high operating safety.
- No end sleeves required for finely stranded conductors. This saves mounting time.



- Conventional pin busbars are used for the incoming terminal. This ensures clear, manageable and convenient access to all connections within the framework of the Siemens connection concept.

5SJ6 ...-.KS miniature circuit breakers with plug-in terminals

Technical specifications

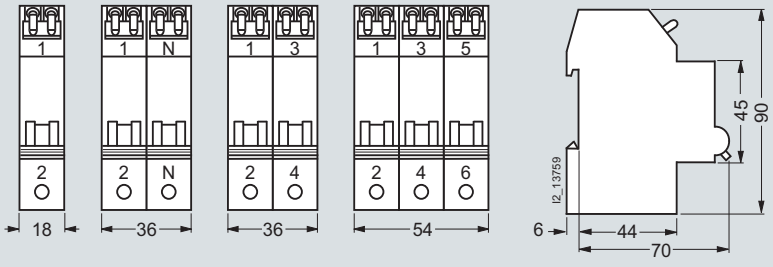
			5SJ6 ...-.KS
Standards **Approved acc. to**			EN 60898 EN 60898
Operational voltage	Min.	V AC/DC	24
	Max.	V AC	400
	Max.	V DC/pole	60
Rated switching capacity	Acc. to EN 60898	kA AC	6
Insulation coordination			
• Rated insulation voltage		V AC	250/440
• Degree of pollution for overvoltage category			2/III
Touch protection	Acc. to DIN VDE 106-100		Yes
Handle end position, sealable			Yes
Degree of protection	Acc. to EN 60529		IP20, with connected conductors
CFC and silicone-free			Yes
Terminals			Screwless terminals on outgoing terminals for 1.5 ... 4 mm^2
Conductor cross-sections			
• Top, plug-in terminals			
- Solid, stranded and finely stranded, without end sleeve		mm^2	1.5 ... 4
- Finely stranded, with end sleeve		mm^2	1.5 ... 2.5
• Bottom, tunnel terminal			
- Solid, stranded or finely stranded, with end sleeve		mm^2	0.75 ... 25
Mounting position			Any
Service life On average, with rated load			20 000 actuations
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75
Resistance to climate	Acc. to IEC 60068-2-30		6 cycles
Resistance to vibrations	Acc. to IEC 60068-2-6	m/s^2	60 at 10 Hz ... 150 Hz

The operational voltage 60 V DC/pole takes into account a battery charging voltage with peak value of 72 V.

Selection and ordering data

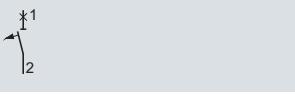
6 000 / 3	I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	DT	Characteristic C Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	Miniature circuit breakers with plug-in terminals												
	1P												
	10	1	B	**5SJ6 110-6KS**		002	B	**5SJ6 110-7KS**		003	1	1	0.111
	13		B	**5SJ6 113-6KS**		002	B	**5SJ6 113-7KS**		003	1	1/12	0.111
	16		A	**5SJ6 116-6KS**		002	B	**5SJ6 116-7KS**		003	1	1	0.111
	20		B	**5SJ6 120-6KS**		002	B	**5SJ6 120-7KS**		003	1	1/12	0.111
	1P+N												
	10	2	B	**5SJ6 510-6KS**		002	B	**5SJ6 510-7KS**		003	1	1/6	0.185
	13		B	**5SJ6 513-6KS**		002	B	**5SJ6 513-7KS**		003	1	1/6	0.185
	16		B	**5SJ6 516-6KS**		002	B	**5SJ6 516-7KS**		003	1	1/6	0.185
	20		B	**5SJ6 520-6KS**		002	B	**5SJ6 520-7KS**		003	1	1/6	0.185
	2P												
	10	2	B	**5SJ6 210-6KS**		002	B	**5SJ6 210-7KS**		003	1	1/6	0.225
	13		B	**5SJ6 213-6KS**		002	B	**5SJ6 213-7KS**		003	1	1/6	0.225
	16		B	**5SJ6 216-6KS**		002	B	**5SJ6 216-7KS**		003	1	1/6	0.225
	20		B	**5SJ6 220-6KS**		002	B	**5SJ6 220-7KS**		003	1	1/6	0.225
	3P												
	10	3	B	**5SJ6 310-6KS**		002	B	**5SJ6 310-7KS**		003	1	1/4	0.345
	13		B	**5SJ6 313-6KS**		002	B	**5SJ6 313-7KS**		003	1	1/4	0.345
	16		B	**5SJ6 316-6KS**		002	B	**5SJ6 316-7KS**		003	1	1/4	0.345
	20		B	**5SJ6 320-6KS**		002	B	**5SJ6 320-7KS**		003	1	1/4	0.345

Dimensional drawings

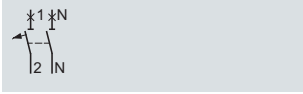


1P 1P+N 2P 3P

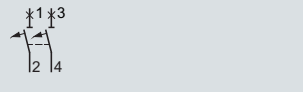
Schematics



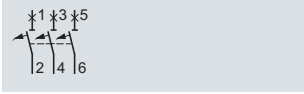
1P



1P+N



2P



3P

* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

5SY6 0 miniature circuit breakers 1+N in 1 MW

Overview

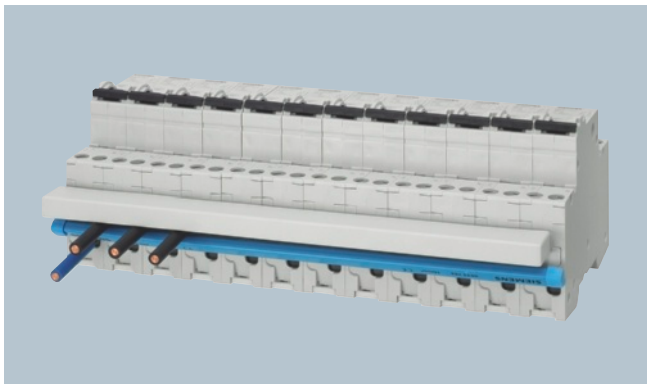
These miniature circuit breakers are used for the protection of plants with switched neutral conductors in distribution boards with little space. They are just a single modular width.

Compact busbars facilitate installation in space saving distribution boards.

The devices are approved for worldwide use according to IEC standards for systems up to 250 V AC. 60 V DC per pole is permitted in DC systems according to IEC standards.

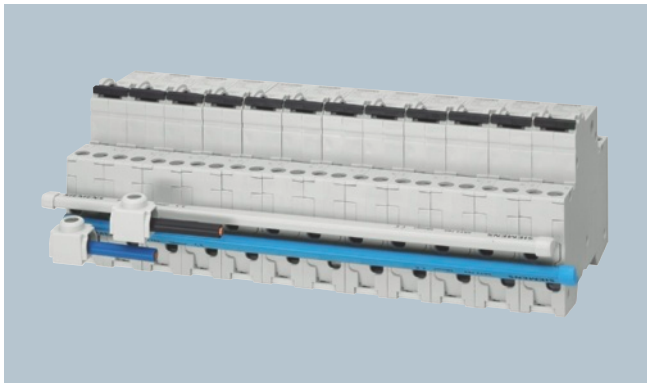
Benefits

- Auxiliary switches and fault signal contacts from the high-capacity range can be freely mounted on these miniature circuit breakers. This increases availability and cuts down on logistics.



- For 3-pole busbars, the 5ST3 6 busbar system is used – a universal system, suitable for all miniature circuit breakers.

- By actuating the latching slide, the miniature circuit breakers can be quickly and easily removed from the assembly.



- The infeed can be implemented either from the top or the bottom. Additional terminals with lateral insertion of conductors facilitate mounting when using large conductor cross-sections.

Technical specifications

			5SY6 0..
Standards **Approved acc. to**			EN 60898 EN 60898
Rated voltage U_n		V AC	230
Operational voltage	Min.	V AC/DC	24
	Max.	V AC	250
	Max.	V DC/pole	60
Rated switching capacity I_{cn} • Acc. to IEC/EN 60898-1		kA AC kA AC	6 6
Insulation coordination • Rated insulation voltage • Degree of pollution for overvoltage category		V AC	 250 3/III
Touch protection	Acc. to EN 50274-1		Yes
Handle end position, sealable			Yes
Degree of protection			IP20, with connected conductors
CFC and silicone-free			Yes
Terminals • Solid and stranded, top and bottom terminal • Finely stranded, with end sleeve, top and bottom terminal		 mm^2 mm^2	 0.75 ... 16 0.75 ... 10
Terminal tightening torque		Nm	2.0
Mains connection			Bottom
Mounting position			Any
Service life On average, with rated load			 20 000 operations
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75
Resistance to climate	Acc. to IEC 60068-2-30		6 cycles
Resistance to vibrations	Acc. to IEC 60068-2-6	m/s^2	60 at 10 ... 150 Hz

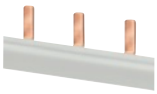
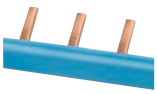
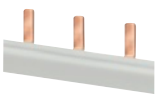
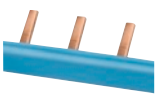
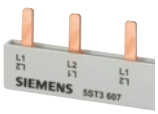
Note:
Internal resistance R_i and power loss P_v of miniature circuit breakers, compact range 1+N in 1 MW, 5SY6 0 see page 1/78.

BETA Protecting
Miniature Circuit Breakers

5SY6 0 miniature circuit breakers 1+N in 1 MW

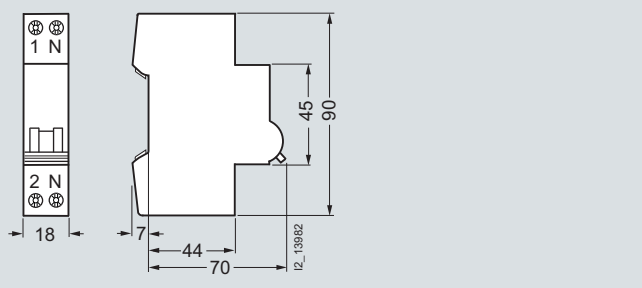
Selection and ordering data

6 000 / 3	I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	DT	Characteristic C Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	**Miniature circuit breakers, compact N pole right 1P+N, 230 V AC**												
	2 NEW	1		--			A	**5SY6 002-7**		003	1	1	0.100
	4 NEW			--			A	**5SY6 004-7**		003	1	1	0.100
	6		A	**5SY6 006-6**		002	A	**5SY6 006-7**		003	1	1	0.100
	8			--			D	**5SY6 008-7**		003	1	1	0.100
	10		A	**5SY6 010-6**		002	A	**5SY6 010-7**		003	1	1	0.100
	13		A	**5SY6 013-6**		002	A	**5SY6 013-7**		003	1	1	0.100
	16		A	**5SY6 016-6**		002	A	**5SY6 016-7**		003	1	1	0.100
	20		A	**5SY6 020-6**		002	A	**5SY6 020-7**		003	1	1	0.100
	25		A	**5SY6 025-6**		002	A	**5SY6 025-7**		003	1	1	0.100
	32		A	**5SY6 032-6**		002	A	**5SY6 032-7**		003	1	1	0.100
	40 NEW		A	**5SY6 040-6**		002	D	**5SY6 040-7**		003	1	1	0.100
	**Miniature circuit breakers, compact N pole left 1P+N, 230 V AC** NEW												
	2	1		--			A	**5SY6 002-7KL**		003	1	1	0.100
	4			--			A	**5SY6 004-7KL**		003	1	1	0.100
	6			--			D	**5SY6 006-7KL**		003	1	1	0.100
	8			--			D	**5SY6 008-7KL**		003	1	1	0.100
	10			--			A	**5SY6 010-7KL**		003	1	1	0.100
	13			--			D	**5SY6 013-7KL**		003	1	1	0.100
	16			--			D	**5SY6 016-7KL**		003	1	1	0.100
	20			--			D	**5SY6 020-7KL**		003	1	1	0.100
	25			--			D	**5SY6 025-7KL**		003	1	1	0.100
	32			--			D	**5SY6 032-7KL**		003	1	1	0.100
	40			--			D	**5SY6 040-7KL**		003	1	1	0.100

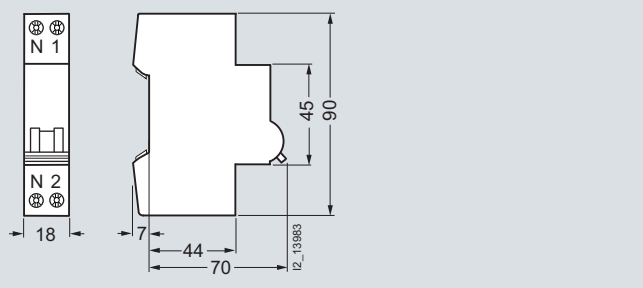
		Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	**5ST3 7 busbar systems, 10 mm², 12 MW, for MCBs 1+N in 1 MW of the compact range, can be cut, with end caps**									
	Single-phase									
	For 12 MCB 1+N, gray	1	216	A	**5ST3 762**		027	1	10	0.029
	For 12 MCB 1+N, blue		216	A	**5ST3 763**		027	1	10	0.029
	**5ST3 7 busbar systems, 10 mm², for MCBs 1+N in 1 MW of the compact range, can be cut, without end caps**									
	Single-phase									
	For MCB 1+N, gray	1	1016	A	**5ST3 764**		027	1	10	0.134
	For MCB 1+N, blue		1016	A	**5ST3 765**		027	1	10	0.134
	**End caps for 5ST3 76 busbars**									
	1 set comprises a right and a left cap									
	Gray			A	**5ST3 766**		027	1 set	10 sets	
	Blue			A	**5ST3 767**		027	1 set	10 sets	
	**5ST3 6 busbar systems, 10 mm², for MCBs fixed lengths, cannot be cut, fully insulated**									
	Three-phase									
	For 2 MCB 3P	1	102	A	**5ST3 613**		027	1	10	0.039
	For 3 MCB 3P		257.5	A	**5ST3 614**		027	1	10	0.060
	For 4 MCB 3P		210	▶	**5ST3 615**		027	1	10	0.076
	**Terminals for 5ST3 76**									
	Side terminals			A	**5ST3 768**		027	1	25	0.011
	For conductors up to 25 mm²									

* You can order this quantity or a multiple thereof.

Dimensional drawings

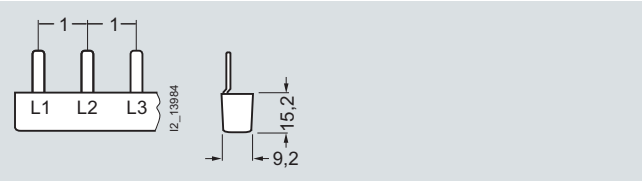


1P+N
N pole right



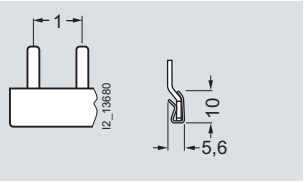
1P+N
N pole left

5ST3 6 pin spacing in MW

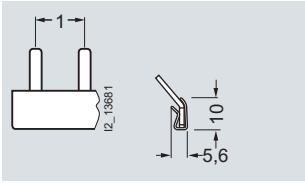


5ST3 613
5ST3 614
5ST3 615

5ST3 7 pin spacing in MW



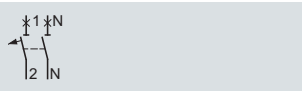
5ST3 762
5ST3 764



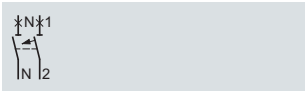
5ST3 763
5ST3 765

Dimensions of side view in mm (approx.).

Schematics



1P+N
N pole right



1P+N
N pole left

Additional components

Overview

Using this mounting concept, all additional 5ST3 components can be combined with miniature circuit breakers of the 5SY, 5SP4 and 5SP5 series.

The auxiliary switch (AS) signals the contact position. In the event of a fault, the fault signal contact (FC) signals the automatic tripping of the miniature circuit breaker and the contact position.

Undervoltage releases are integrated in an EMERGENCY STOP loop, thus ensuring that the miniature circuit breaker trips in the event of an emergency, which in turn ensures disconnection of the control circuit according to EN 60204. In the event that the voltage is interrupted or too low, it also trips, i.e. prevents the miniature circuit breaker from switching on.

Shunt trips are used for the remote tripping of miniature circuit breakers.

Remote controlled mechanisms are used for the remote ON/OFF switching of miniature circuit breakers and the remote ON switching of RC units. Remote controlled mechanisms also enable local manual switching. A blocking function permits maintenance work. In the event that a miniature circuit breaker or RC unit is tripped, an acknowledgment must be carried out prior to switching back on.

For information on RC units, please refer to the section "Residual current protective devices".

Benefits

- Bus systems, such as *instabus* KNX, AS-Interface bus or PROFIBUS, are integrated in the communication over binary inputs and actuators.
- Captive metal brackets on the additional components ensure fast mounting of the devices.

Auxiliary switches (AS)

- Huge range of applications, thanks to additional versions for the switching of small currents and voltages for the control of programmable control systems (PLCs) according to EN 61131-2.

Remote controlled mechanisms (RC)

- The remote controlled mechanism has an operating mode selector switch with the functions: "Locked", "Manual" and "Remote switching". The mechanism can be mechanically latched and locked, which serves to protect personnel during maintenance work.

Technical specifications

			Auxiliary switches		Fault signal contacts
			5ST3 010 5ST3 011 5ST3 012	5ST3 013 5ST3 014 5ST3 015	5ST3 020 5ST3 021 5ST3 022
Standards **Approved acc. to**			EN 62019; UL 1077; CSA C22.2 No. 235 EN 62019; UL 1077; UL File No. E106582; CSA C22.2 No. 235		
Short-circuit protection			B6 miniature circuit breaker, C6 or fuse gG 6 A		
Contact load	Min.		50 mA, 24 V	1 mA/5 V DC	50 mA, 24 V
Contact load	Max.		--	50 mA/30 V DC	--
• 400 V AC, AC-14, NO contact		A	2	--	2
• 230 V AC, AC-14, NO contact		A	6	--	6
• 400 V AC, AC-13, NC contact		A	2	--	2
• 230 V AC, AC-13, NC contact		A	6	--	6
• 220 V DC, DC-13, NO + NC contact		A	1	--	1
• 110 V DC, DC-13, NO + NC contact		A	1	--	1
• 60 V DC, DC-13, NO + NC contact		A	3	--	3
• 24 V DC, DC-13, NO + NC contact		A	6	--	6

			Undervoltage releases	Shunt trips	Remote controlled mechanisms
			5ST3 04.	5ST3 030 5ST3 031	5ST3 050
Standards			EN 60898; EN 60947-1		
Rated voltages U_n		V AC	230	24 ... 48 110 ... 415	230
• Rated frequency f_n		Hz	--	50 ... 60	50 ... 60
		V DC	24, 110	24 ... 48, 110	--
Response limits					
• Acc. to EN 60947-1, 7.2.1.3	Releases		< 0.35 ... 0.7 × U_n	--	--
	Permissible fluctuations of the power supply		0.85 ... 1.1 × U_n	--	--
• Acc. to EN 60947-1, 7.2.1.4			--	0.7 ... 1.1 × U_n	--

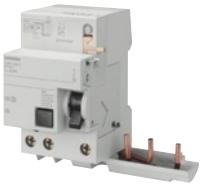
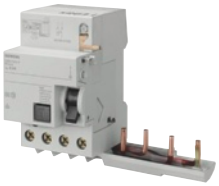
Selection and ordering data

	Rated voltage U_n V	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	Auxiliary switches (AS)								
	For 5SP4 and 5SY miniature circuit breakers								
	1 NO + 1 NC	0.5	►	**5ST3 010**		027	1	1	0.050
	For small output		►	**5ST3 013**		027	1	1	0.050
	2 NO		A	**5ST3 011**		027	1	1	0.050
	For small output		B	**5ST3 014**		027	1	1	0.050
	2 NC		A	**5ST3 012**		027	1	1	0.050
	For small output		B	**5ST3 015**		027	1	1	0.050
	Fault signal contacts (FC)								
	For 5SP4 and 5SY miniature circuit breakers								
	1 NO + 1 NC	0.5	►	**5ST3 020**		027	1	1	0.050
	2 NO		B	**5ST3 021**		027	1	1	0.050
	2 NC		A	**5ST3 022**		027	1	1	0.050
	Undervoltage releases (UR)								
	For 5SP4 and 5SY miniature circuit breakers but not for 5SY6 0..								
	230 AC	1	A	**5ST3 040**		027	1	1	0.115
	110 DC		B	**5ST3 041**		027	1	1	0.115
	24 DC		B	**5ST3 042**		027	1	1	0.115
	230 AC	1	A	**5ST3 043**		027	1	1	0.115
	110 DC		B	**5ST3 044**		027	1	1	0.115
	24 DC		A	**5ST3 045**		027	1	1	0.115
	Shunt trips (ST)								
	For 5SP4 and 5SY miniature circuit breakers but not for 5SY6 0..								
	110 ... 415 AC	1	►	**5ST3 030**		027	1	1	0.098
	24 ... 48 AC/DC	1	►	**5ST3 031**		027	1	1	0.098
	Remote controlled mechanisms (RC)								
	For 5SP4 and 5SY miniature circuit breakers								
	230 AC	3.5	A	**5ST3 050**		027	1	1	0.395

* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

Additional components

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	RC units, type A, instantaneous tripping									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	10	0.3 ... 16	2	B	**5SM2 121-6**		007	1	1	0.180
	30	0.3 ... 40		▶	**5SM2 322-6**		007	1	1	0.170
	300			A	**5SM2 622-6**		007	1	1	0.170
	30	0.3 ... 63		A	**5SM2 325-6**		007	1	1	0.170
	100			B	**5SM2 425-6**		007	1	1	0.170
	300			B	**5SM2 625-6**		007	1	1	0.170
	500			B	**5SM2 725-6**		007	1	1	0.170
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	A	**5SM2 332-6**		007	1	1	0.260
	300			A	**5SM2 632-6**		007	1	1	0.260
	30	0.3 ... 63		B	**5SM2 335-6**		007	1	1	0.260
	100			B	**5SM2 435-6**		007	1	1	0.260
	300			B	**5SM2 635-6**		007	1	1	0.260
	500			B	**5SM2 735-6**		007	1	1	0.260
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	▶	**5SM2 342-6**		007	1	1	0.290
	300			▶	**5SM2 642-6**		007	1	1	0.290
	30	0.3 ... 63		A	**5SM2 345-6**		007	1	1	0.290
	100			B	**5SM2 445-6**		007	1	1	0.290
	300			A	**5SM2 645-6**		007	1	1	0.290
	500			A	**5SM2 745-6**		007	1	1	0.290
	For 5SP4 miniature circuit breakers									
	2P, 125 ... 230 V AC, 50 ... 60 Hz									
	30	80 ... 100	3.5	B	**5SM2 327-6**		007	1	1	0.410
	300			B	**5SM2 627-6**		007	1	1	0.410
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	80 ... 100	5	B	**5SM2 347-6**		007	1	1	0.630
	300			A	**5SM2 647-6**		007	1	1	0.630

* You can order this quantity or a multiple thereof.

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	RC units, type A, super resistant K									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	2	B	**5SM2 322-6KK01**		007	1	1	0.350
	30	0.3 ... 63		B	**5SM2 325-6KK01**		007	1	1	0.350
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	B	**5SM2 332-6KK01**		007	1	1	0.365
	30	0.3 ... 63		B	**5SM2 335-6KK01**		007	1	1	0.365
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	B	**5SM2 342-6KK01**		007	1	1	0.290
	30	0.3 ... 63		B	**5SM2 345-6KK01**		007	1	1	0.290
	RC units, type A, selective S									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 40	2	A	**5SM2 622-8**		007	1	1	0.170
	300	0.3 ... 63		B	**5SM2 625-8**		007	1	1	0.170
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 63	3	B	**5SM2 635-8**		007	1	1	0.260
	500			B	**5SM2 735-8**		007	1	1	0.400
	1000			B	**5SM2 835-8**		007	1	1	0.260
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 63	3	A	**5SM2 645-8**		007	1	1	0.290
	500			A	**5SM2 745-8**		007	1	1	0.400
	1000			A	**5SM2 845-8**		007	1	1	0.290
	For 5SP4 miniature circuit breakers									
	2P; 125 ... 230 V AC, 50 ... 60 Hz									
	300	80 ... 100	3.5	B	**5SM2 627-8**		007	1	1	0.410
	4P; 230 ... 400 V AC, 50 ... 60 Hz									
	300	80 ... 100	5	A	**5SM2 647-8**		007	1	1	0.630
	1000			A	**5SM2 847-8**		007	1	1	0.630

* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

Additional components

	Version	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	**Terminal covers** For 5SP4 and 5SY miniature circuit breakers For additional covering of the screw openings per pole, sealable. In the case of 5SY, also prevents removal of device from the standard mounting rail.		B	**5ST3 800**		027	1	10	0.001
	**Handle locking devices** For 5SP4 and 5SY miniature circuit breakers Sealable, to prevent unwanted manual ON/OFF switching, for padlock with max. 3 mm shackle		A	**5ST3 801**		027	1	1	0.008
	**Padlocks** For 5ST3 801 handle locking device		►	**5ST3 802**		027	1	1	0.027
	Locking devices Comprising 5ST3 801 handle locking device and 5ST3 802 padlock		B	**5ST3 803**		027	1 set	1 set	0.035
	**Spacers** Can be placed on either side of the standard mounting rail, so that two spacers allow for convenient cable routing	0.5	►	**5TG8 240**		027	1	2	0.010
	**Fixing parts** Made of plastic, for use with a mounting plate		B	**5ST2 201**		027	1	1	0.012
	Inscription labels 15 mm × 9 mm, 3 frames à 44 labels, can be mounted on casing collar, white, self-adhesive		B	**5ST2 173**		027	1 set	1 set	0.038

Labeling system

Inscription on self-adhesive labels for a uniform and tidy appearance in electrical power distribution.
The labeling program can be downloaded to your PC free of charge at:

http://www.siemens.com/labeling-tool

Recommended ELAT-3-747 labels for printing out on normal printers can be ordered at:

Brady GmbH
Otto-Hahn-Str. 5-7
D-63222 Langen
Tel: +49 (0) 61 03/75 98-660

* You can order this quantity or a multiple thereof.

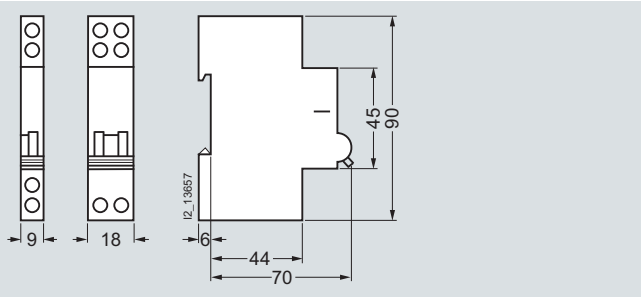
	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
						Unit(s)	Unit(s)	kg
	**Terminal covers, gray** For surface mounting, degree of protection IP40, sealable, with 35 mm standard mounting rail							
	• Up to 2.5 MW	B	**5SW3 004**		008	1	1	0.084
	• Up to 4.5 MW	B	**5SW3 005**		008	1	1	0.114
	**Wall enclosures, gray** For flush mounting, degree of protection IP40, with 35 mm standard mounting rail							
	• Up to 2.5 MW	B	**5SW3 006**		008	1	1/4	0.126
	• Up to 4.5 MW	B	**5SW3 007**		008	1	1	0.147
	**Molded-plastic enclosures, gray** For surface mounting, degree of protection IP54, with 35 mm standard mounting rail, sealable, with transparent hinged lid							
	For 4.5 MW	A	**5SW1 200**		008	1	1	0.450
	**Covers** Can be assembled as mini distribution board, suitable for all devices, cover parts prepared for rail mounting of conventional label caps, comprising:							
	• End plates (for snapping onto standard mounting rail)	A	**5ST2 134**		027	1	10	0.022
	• Angle section (approx. 1 m long)	A	**5ST2 135**		027	1	5	0.330
	• Flat profile (as a cover between the rows of devices length approx. 1 m)	B	**5ST2 136**		027	1	5	0.260

*** You can order this quantity or a multiple thereof.**

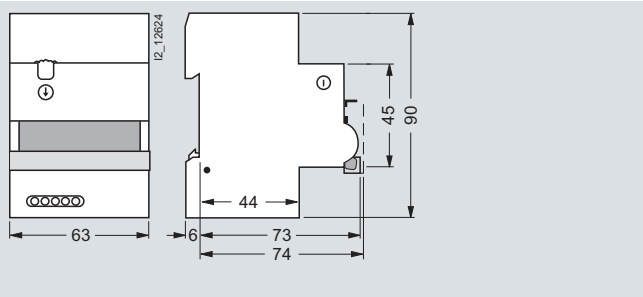
BETA Protecting
Miniature Circuit Breakers

Additional components

Dimensional drawings



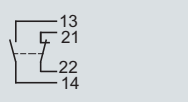
AS UR
FC ST



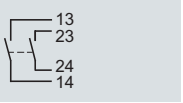
RC

Schematics

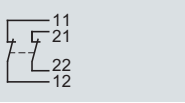
Auxiliary switches (AS)



5ST3 010
5ST3 013

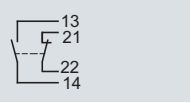


5ST3 011
5ST3 014

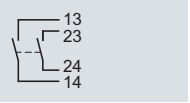


5ST3 012
5ST3 015

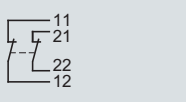
Fault signal contacts (FC)



5ST3 020

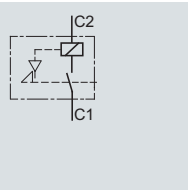


5ST3 021



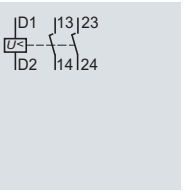
5ST3 022

Shunt trips (ST)

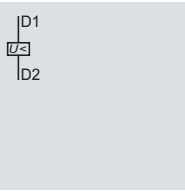


5ST3 030
5ST3 031

Undervoltage releases (UR)

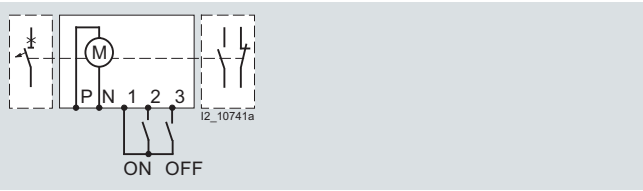


5ST3 040
5ST3 041
5ST3 042



5ST3 043
5ST3 044
5ST3 045

Remote controlled mechanisms (RC)

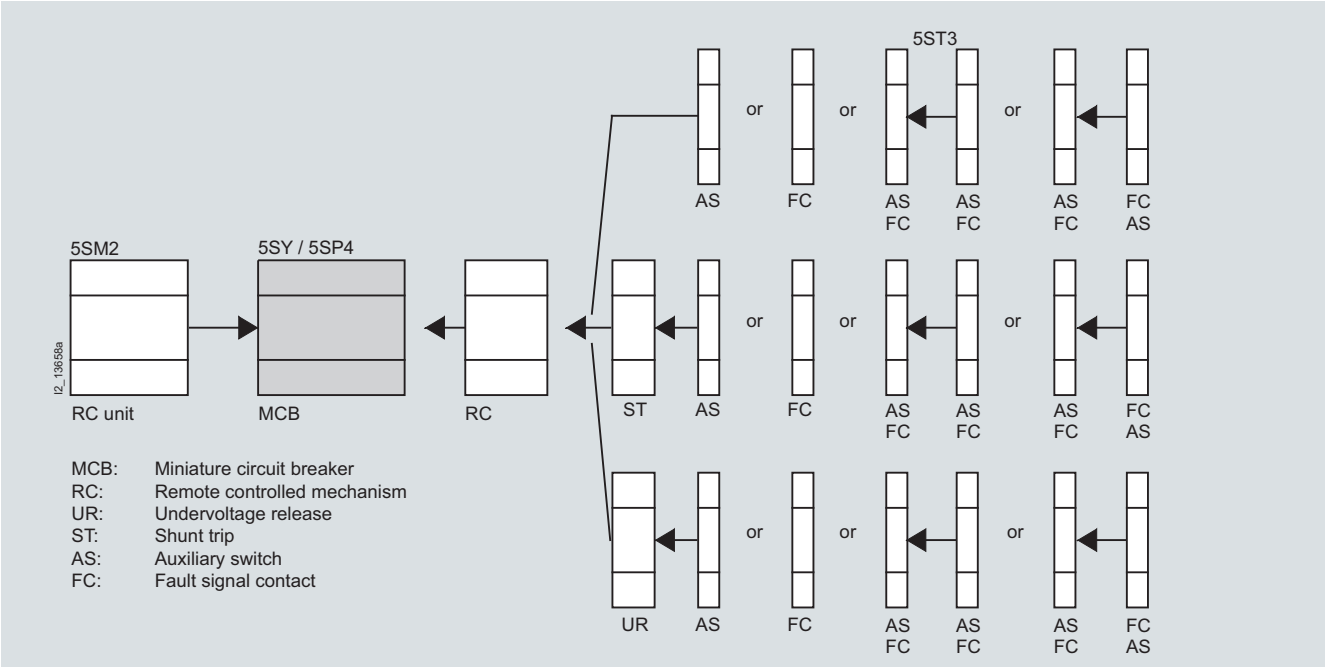


5ST3 050

More information

Using this mounting concept, all additional 5ST3 components can be combined with miniature circuit breakers of the 5SY and 5SP4 series (no RC unit on 5SY5 universal current MCB).

The 5SY6 0.. miniature circuit breakers are only designed for the mounting of auxiliary switches, fault signal contacts and remote controlled mechanisms. The chart shows which additional components can be mounted on either the right or the left.



Overview

The busbar system with pin-type terminals can be used for all 5SJ6 . . .-.KS and 5SY miniature circuit breakers with or without mounted auxiliary switch (AS) or fault signal contact (FC).

Busbars are available in 10 mm^2 and 16 mm^2 versions.

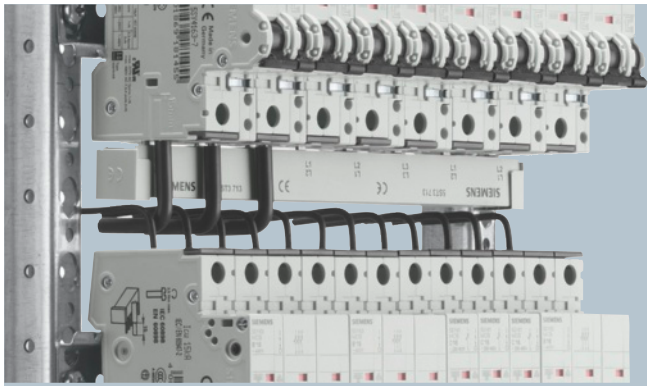
The 5ST3 7 busbar system with busbars that can be cut to any length required.

The extremely flexible 5ST3 6 busbar system with fixed lengths enables installation in any length as the busbars can be overlapped. No further need for time-consuming tasks, such as cutting, cutting to length, deburring, cleaning of cut surfaces and mounting of end caps.

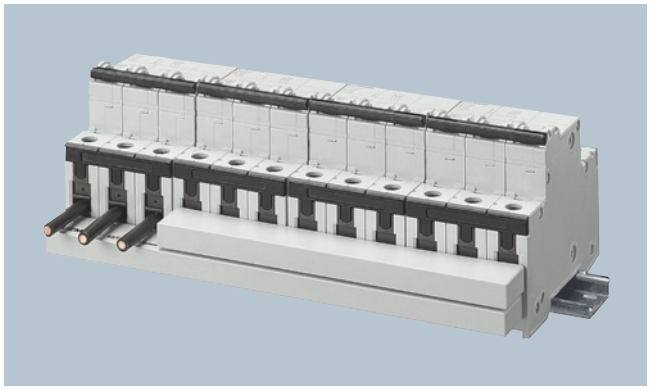
Any free pins on the busbars can be made safe by covering with touch protection.

For further information on bus-mounting miniature circuit breakers with residual current operated circuit breakers, please refer to the chapter "Residual current protective devices".

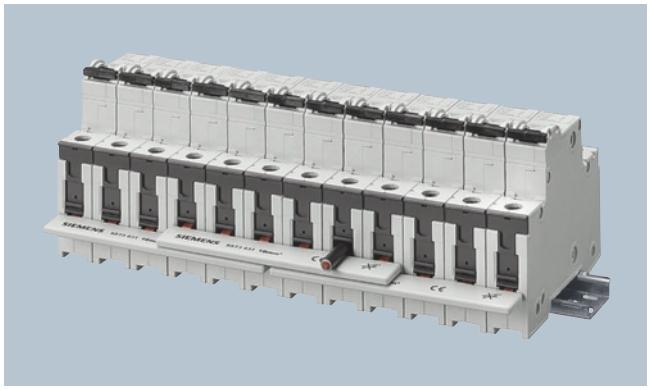
Benefits



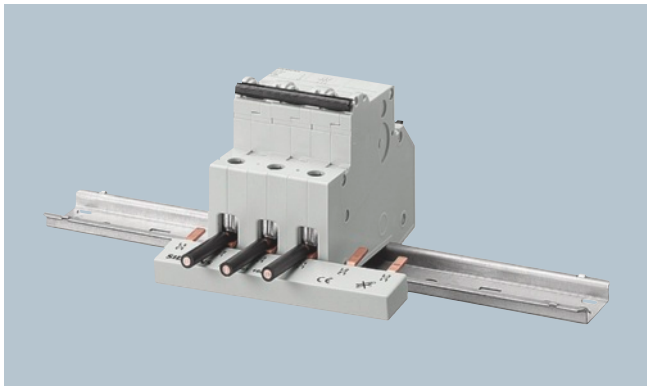
- Between the devices, the busbar, located at the bottom and behind the conductor, provides an optimum wiring space with easy view of the inserted conductor. This enables easy control of connections.



- The ability to overlap the busbar mounting enables a cross-section enlargement of up to 32 mm^2 using the respective components, 10 and 16 mm^2.



- By overlapping the busbars with fixed lengths, it is possible to achieve device combinations with any number of devices.



- The fact that the connection of the conductor is always clearly visible facilitates control and insertion of conductors of all pole types and considerably reduces mounting times.

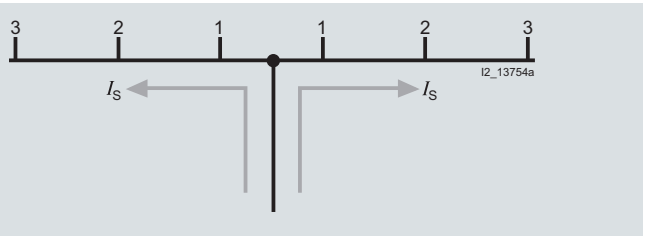
Busbars

Technical specifications

			5ST3
Standards			EN 60439-1 (VDE 0660-500): 2005-01
Busbar material			SF-Cu F 24
Partition material			Plastic, Cycoloy 3600 heat-resistant to more than 90 °C flame-retardant and self-extinguishing, dioxin and halogen-free
Rated operational voltage U_c		V AC	400
Rated current I_n			
• Cross-section 10 mm^2		A	63
• Cross-section 16 mm^2		A	80
Rated impulse withstand voltage U_{imp}		kV	4
Test pulse voltage (1.2/50)		kV	6.2
Rated conditional short-circuit current I_{cc}		kA	25
Resistance to climate			
• Constant atmosphere	Acc. to DIN 50015		23/83; 40/92; 55/20
• Humid heat	Acc. to IEC 60068-2-30		28 cycles
Insulation coordination			
• Overvoltage category			III
• Degree of pollution			2
Maximum busbar current I_S/phase			
• Infeed at the start of the busbar			
- Cross-section 10 mm^2		A	63
- Cross-section 16 mm^2		A	80
• Infeed at the center of the busbar			
- Cross-section 10 mm^2		A	100
- Cross-section 16 mm^2		A	130

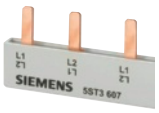
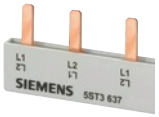
Infeed at the start or end of the busbar

Infeed along the busbar or midpoint infeed



The sum of the output current per branch (1, 2, 3 ... n) must not be greater than the max. busbar current I_S/phase.

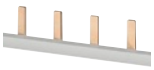
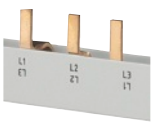
Selection and ordering data

		Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	5ST3 6 busbar systems, 10 mm², for MCB, fixed lengths, cannot be cut, fully insulated									
	Single-phase									
	For 2 MCB 1P	1	33	A	**5ST3 600**		027	1	10	0.005
	For 6 MCB 1P		105	A	**5ST3 601**		027	1	10	0.018
	For 12 MCB 1P		210	A	**5ST3 602**		027	1	10	0.036
	Single-phase, for MCB with AS or FC									
	For 2 MCB 1P	1.5	40	A	**5ST3 603**		027	1	10	0.008
	For 6 MCB 1P		156.5	A	**5ST3 604**		027	1	10	0.024
	For 9 MCB 1P		237	A	**5ST3 605**		027	1	10	0.036
	Two-phase									
	For 2 MCB 2P	1	75.5	A	**5ST3 606**		027	1	10	0.016
	For 3 MCB 2P		105	A	**5ST3 607**		027	1	10	0.024
	For 6 MCB 2P		210	A	**5ST3 608**		027	1	10	0.048
	Three-phase									
	For 2 MCB 3P	1	102	A	**5ST3 613**		027	1	10	0.039
	For 3 MCB 3P		157.5	A	**5ST3 614**		027	1	10	0.060
	For 4 MCB 3P		210	►	**5ST3 615**		027	1	10	0.076
	Three-phase, for MCB with AS or FC									
	For 2 MCB 3P	1+1+1.5	115	A	**5ST3 616**		027	1	10	0.040
	For 4 MCB 3P		237	A	**5ST3 617**		027	1	10	0.080
	For 6 MCB 1P	1.5	125	A	**5ST3 618**		027	1	10	0.044
	For 9 MCB 1P		229	A	**5ST3 620**		027	1	10	0.066
	Four-phase									
	For 2 MCB 4P or 3P+N	1		A	**5ST3 621**		027	1	10	0.051
	For 3 MCB 4P or 3P+N			A	**5ST3 622**		027	1	10	0.078
	For 6 MCB 2P or 1P+N			A	**5ST3 623**		027	1	10	0.078
	Three-phase									
	For 1 RCCB 4P N right And 8 MCB 1P	1	210	A	**5ST3 624**		027	1	10	0.075
	For 1 RCCB 4P N left And 8 MCB 1P	1	192	A	**5ST3 667**		027	1	10	0.061
	5ST3 6 busbars, 16 mm², for MCB, fixed lengths, cannot be cut, fully insulated									
	Single-phase									
	For 2 MCB 1P	1	33	A	**5ST3 630**		027	1	10	0.008
	For 6 MCB 1P		105	A	**5ST3 631**		027	1	10	0.025
	For 12 MCB 1P		210	A	**5ST3 632**		027	1	10	0.048
	Single-phase, for MCB with AS or FC									
	For 2 MCB 1P	1.5	40	A	**5ST3 633**		027	1	10	0.013
	For 6 MCB 1P		156.5	A	**5ST3 634**		027	1	10	0.039
	For 9 MCB 1P		237	A	**5ST3 635**		027	1	10	0.059
	Two-phase									
	For 2 MCB 2P	1	75.5	A	**5ST3 636**		027	1	10	0.024
	For 3 MCB 2P		105	A	**5ST3 637**		027	1	10	0.039
	For 6 MCB 2P		210	A	**5ST3 638**		027	1	10	0.076
	Two-phase, for MCB with AS or FC									
	For 2 MCB 2P	1+1.5	75.5	A	**5ST3 640**		027	1	10	0.026
	For 3 MCB 2P		120.5	A	**5ST3 641**		027	1	10	0.045
	For 5 MCB 2P		210	A	**5ST3 642**		027	1	10	0.084

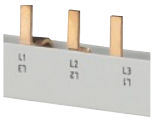
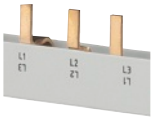
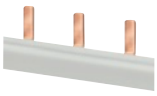
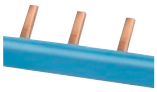
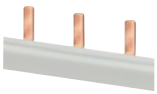
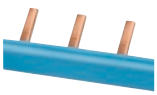
* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

Busbars

		Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	5ST3 6 busbars, 16 mm², for MCB, fixed lengths, cannot be cut, fully insulated									
	Three-phase									
	For 2 MCB 3P	1	102.5	A	**5ST3 643**		027	1	10	0.058
	For 3 MCB 3P		157.5	A	**5ST3 644**		027	1	10	0.083
	For 4 MCB 3P		210	▶	**5ST3 645**		027	1	10	0.110
	Three-phase, for MCB with AS or FC									
	For 2 MCB 3P	1+1+1.5	115	A	**5ST3 646**		027	1	10	0.060
	For 4 MCB 3P		237	A	**5ST3 647**		027	1	10	0.120
	For 6 MCB 1P	1.5	156	A	**5ST3 648**		027	1	10	0.061
	For 9 MCB 1P		245	A	**5ST3 650**		027	1	10	0.093
	5ST3 6 busbars, 16 mm², for MCB, fixed lengths, cannot be cut, fully insulated									
	Four-phase									
	For 2 MCB 4P or 3P+N	1		A	**5ST3 651**		027	1	10	0.080
	For 3 MCB 4P or 3P+N			A	**5ST3 652**		027	1	10	0.116
	For 6 MCB 2P or 1P+N			A	**5ST3 653**		027	1	10	0.116
	Three-phase,									
	For 1 RCCB 4P N right and 8 MCB 1P	1	210	A	**5ST3 654**		027	1	10	0.114
	For 1 RCCB 4P N left and 8 MCB 1P	1	210	A	**5ST3 668**		027	1	10	0.099
	**Touch protection for free terminals**									
	Yellow, RAL 1004			A	**5ST3 655**		027	1	10	0.003
	Range									
	10 mm²									
	20 × 5ST3 613 + 10 × 5ST3 614 + 50 × 5ST3 615 + 50 × 5ST3 655			A	**5ST3 656**		027	1 set	1 set	5.490
	16 mm²									
	20 × 5ST3 643 + 10 × 5ST3 644 + 50 × 5ST3 645 + 50 × 5ST3 655			A	**5ST3 657**		027	1 set	1 set	7.640
	5ST3 7 busbar systems, 10 mm² 12 MW, for MCB, can be cut, with end caps									
	Single-phase, angled									
	For 12 MCB 1P	1	214	A	**5ST3 730**		027	1	1	0.040
	For 9 MCB 1P with AS or FC	1.5		A	**5ST3 732**		027	1	1	0.040
	Two-phase									
	For 6 MCB 2P	1		A	**5ST3 734**		027	1	1	0.060
	For 4 MCB 2P with AS or FC	1+1.5		A	**5ST3 736**		027	1	1	0.060
	Three-phase									
	For 4 MCB 3P	1		▶	**5ST3 738**		027	1	1	0.100
	for 3 MCB 3P with AS or FC	1+1+1.5		A	**5ST3 741**		027	1	1	0.100
	For 3 MCB 1P with AS or FC	1.5		A	**5ST3 743**		027	1	1	0.100
	Four-phase									
	For 3 MCB 4P or 3P+N	1		A	**5ST3 745**		027	1	1	0.150
	5ST3 7 busbar systems, 10 mm² 56 MW, for MCB, can be cut, without end caps									
	Single-phase, angled									
	For MCB 1P	1	1016	A	**5ST3 731**		027	1	1	0.190
	For MCB 1P with AS or FC	1.5		A	**5ST3 733**		027	1	1	0.190
	Two-phase									
	For MCB 2P	1		A	**5ST3 735**		027	1	1	0.290
	For MCB 2P with AS or FC	1.5		A	**5ST3 737**		027	1	1	0.290
	Three-phase									
	For MCB 3P	1		A	**5ST3 740**		027	1	1	0.430
	For MCB 3P with AS or FC	1+1+1.5		A	**5ST3 742**		027	1	1	0.430
	For MCB 1P with AS or FC	1.5		A	**5ST3 744**		027	1	1	0.430
	Four-phase									
	For MCB 4P or 3P+N	1		A	**5ST3 746**		027	1	1	0.700

* You can order this quantity or a multiple thereof.

		Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	**5ST3 7 busbar systems, 16 mm² 12 MW, for MCB, can be cut, with end caps**									
	Single-phase, angled									
	For MCB 1P	1	214	▶	**5ST3 700**		027	1	1	0.040
	For MCB 1P with AS or FC	1.5		A	**5ST3 702**		027	1	1	0.040
	Two-phase									
	For MCB 2P	1		A	**5ST3 704**		027	1	1	0.060
	For MCB 2P with AS or FC	1.5		A	**5ST3 706**		027	1	1	0.060
	Three-phase									
	For MCB 3P	1		▶	**5ST3 708**		027	1	1	0.100
	For MCB 3P with AS or FC	1+1+1.5		A	**5ST3 711**		027	1	1	0.100
	For MCB 1P with AS or FC	1.5		A	**5ST3 713**		027	1	1	0.100
	Four-phase									
	For MCB 4P or 3P+N	1		A	**5ST3 715**		027	1	1	0.150
	**5ST3 7 busbar systems, 16 mm² 56 MW, for MCB, can be cut, without end caps**									
	Single-phase, angled									
	For MCB 1P	1	1016	A	**5ST3 701**		027	1	1	0.190
	For MCB 1P with AS or FC	1.5		A	**5ST3 703**		027	1	1	0.190
	Two-phase									
	For MCB 2P	1		A	**5ST3 705**		027	1	1	0.290
	For MCB 2P with AS or FC	1.5		A	**5ST3 707**		027	1	1	0.290
	Three-phase									
	For MCB 3P	1		▶	**5ST3 710**		027	1	1	0.430
	For MCB 3P with AS or FC	1+1+1.5		A	**5ST3 712**		027	1	1	0.430
	For MCB 1P with AS or FC	1.5		A	**5ST3 714**		027	1	1	0.430
	Four-phase									
	For MCB 4P or 3P+N	1		A	**5ST3 716**		027	1	1	0.700
	**End caps for 5ST3 7, can be cut**									
	For single-phase busbars			▶	**5ST3 748**		027	1	10	0.001
	For two and three-phase busbars			▶	**5ST3 750**		027	1	10	0.001
	For four-phase busbars			▶	**5ST3 718**		027	1	10	0.001
	**5ST3 7 busbar systems, 10 mm², 12 MW, for MCB 1+N in 1 MW of the compact range, can be cut, with end caps**									
	Single-phase									
	For 12 MCB 1+N, gray		216	A	**5ST3 762**		027	1	10	0.029
	For 12 MCB 1+N, blue			A	**5ST3 763**		027	1	10	0.029
	**5ST3 7 busbar systems, 10 mm² 56 MW for MCB 1+N in 1 MW of the compact range, can be cut, without end caps**									
	Single-phase									
	For MCB 1+N, gray		1016	A	**5ST3 764**		027	1	10	0.134
	For MCB 1+N, blue			A	**5ST3 765**		027	1	10	0.134
	**End caps for 5ST3 76**									
	1 set comprises a right and a left cap									
	Gray			A	**5ST3 766**		027	1 set	10 sets	0.001
	Blue			A	**5ST3 767**		027	1 set	10 sets	0.001
	**Terminals for 5ST3 76**									
	Terminal version S For conductors up to 25 mm²			A	**5ST3 768**		027	1	25	0.011

* You can order this quantity or a multiple thereof.

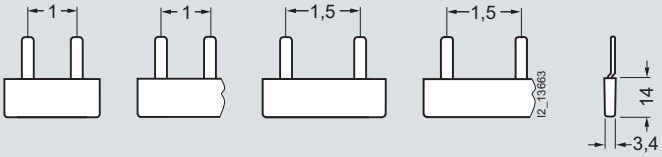
BETA Protecting
Miniature Circuit Breakers

Busbars

Dimensional drawings

5ST3 6
Pin spacing in MW

Dimensions of side view in mm (approx.)

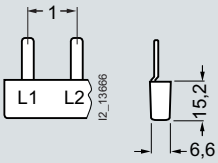


5ST3 600
5ST3 630

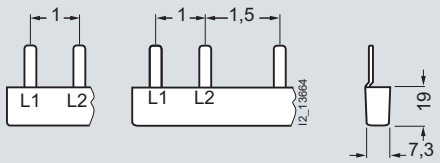
5ST3 601
5ST3 602
5ST3 631
5ST3 632

5ST3 603
5ST3 633

5ST3 604
5ST3 605
5ST3 634
5ST3 635

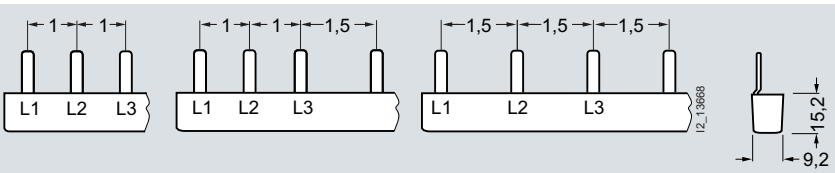


5ST3 606
5ST3 607
5ST3 608



5ST3 636
5ST3 637
5ST3 638

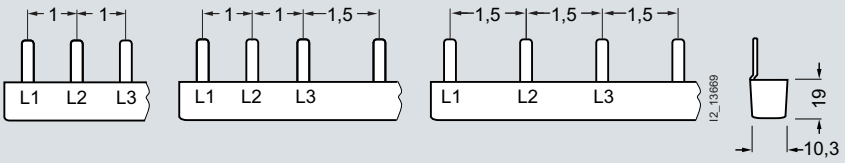
5ST3 640
5ST3 641
5ST3 642



5ST3 613
5ST3 614
5ST3 615
5ST3 667

5ST3 616
5ST3 617

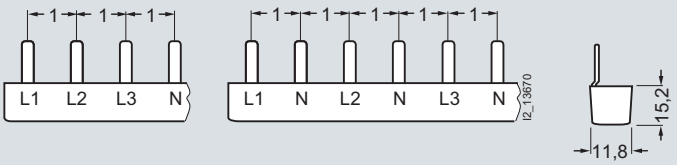
5ST3 618
5ST3 620



5ST3 643
5ST3 644
5ST3 645
5ST3 668

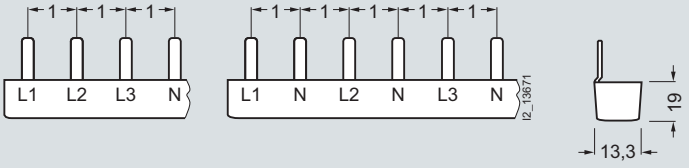
5ST3 646
5ST3 647

5ST3 648
5ST3 650



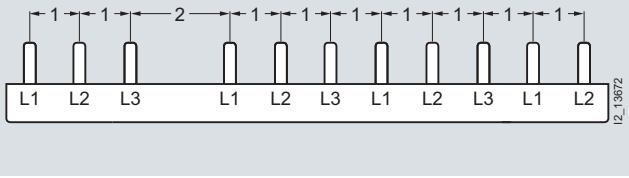
5ST3 621
5ST3 622

5ST3 623

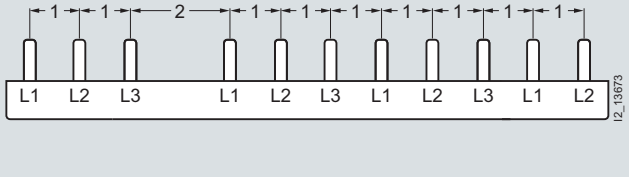


5ST3 651
5ST3 652

5ST3 653



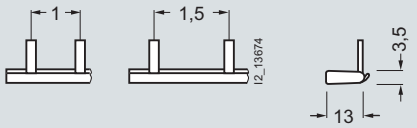
5ST3 624



5ST3 654

5ST3 7
Pin spacing in MW

Dimensions of side view in mm (approx.)

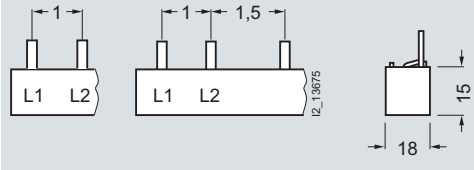


5ST3 700
5ST3 701
5ST3 730
5ST3 731

Single-phase

5ST3 702
5ST3 703
5ST3 732
5ST3 733

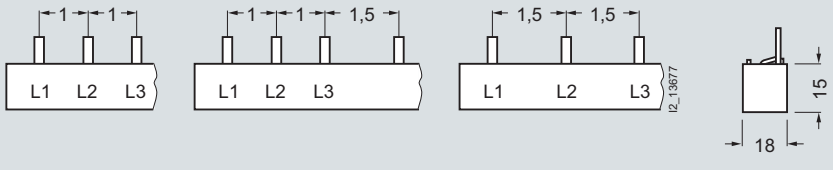
Single-phase



5ST3 704
5ST3 705
5ST3 734
5ST3 735

Two-phase

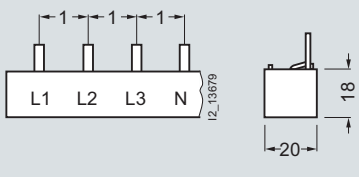
5ST3 706
5ST3 707
5ST3 736
5ST3 737



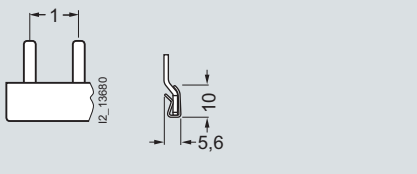
5ST3 708
5ST3 710
5ST3 738
5ST3 740

5ST3 711
5ST3 712
5ST3 741
5ST3 742

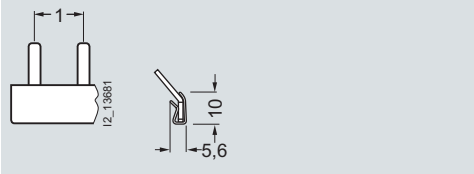
5ST3 713
5ST3 714
5ST3 743
5ST3 744



5ST3 715
5ST3 716
5ST3 745
5ST3 746



5ST3 762
5ST3 764



5ST3 763
5ST3 765

5SJ4 miniature circuit breakers to UL and IEC

Overview

UL standards are used in North America, but also in several other countries. This is of particular importance to European exporters of electrical switchgear equipment for machines who export to the USA, as their products will only be accepted if they meet the relevant UL standards.

A wide range of BETA devices comply with UL standards and are therefore suitable for implementation worldwide in both IEC/EN and UL applications within the framework of their specified use.

Miniature circuit breakers certified to UL 489 permit use as an all-round solution for protection tasks in distribution boards, control cabinets and control systems to UL 508A as "branch protectors". In particular, they are also approved for the protection of electrical circuits in heating, ventilating and cooling systems (HVAC), as well as for DC applications up to 60 V/125 V in the area of telecommunication applications. The busbar system according to UL 489 enables fast and simple installation in the assembly.

This covers a wide range of protection tasks, in residential and non-residential buildings, as well as in industry. The tripping characteristics B, C and D to EN/IEC 60898 have been adapted so that they fall in the permissible tripping range according to UL 489, as well as for applications at 25 °C and 40 °C.

This means that the devices are approved for use according to both standards. The enclosure dimensions of the devices correspond to DIN format. This means that the device series are suitable for universal use worldwide to IEC or UL standards.

The key difference between the three device series is their application in different power supply systems.

- 5SJ4 … -.HG40: 240/120 V AC, 1-pole, "same polarity only",
- 5SJ4 … -.HG41: 240 V AC, 1-, 2- and 3-pole,
- 5SJ4 … -.HG42: 480Y/277 V AC, 1-, 2- and 3-pole.

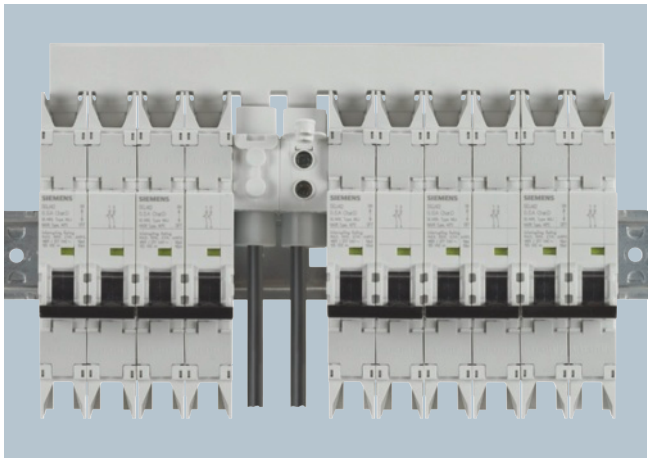
The terminals are suitable for "field wiring". This means that the devices can be installed not only in factory-finished distribution boards and control cabinets, but also on-site in a customer system.

Single, two and three-phase busbars in 3 lengths with 6, 12 or 18 pins are available as accessories for all device series. The infeed is over connection terminals, which are available in two versions, for direct infeed at either the busbar or the miniature circuit breakers. Pins that are not required can be covered with touch protection covers.

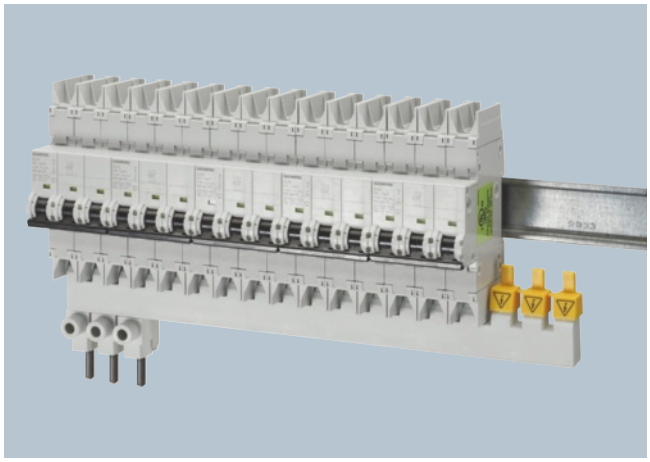
A handle locking device according to UL is also available as a further accessory.

Benefits

- Can be used globally for all applications in residential, non-residential and industrial buildings. This facilitates the planning of plants and enhances export opportunities.
- The devices can be used according to IEC/EN 60898 and UL 489, which means these devices can be installed anywhere in the world.



Bus-mounting with direct infeed at busbars with a conductor cross-section of up to 50 mm^2



Direct infeed at miniature circuit breaker for conductor cross-sections up to 35 mm^2

Technical specifications

			5SJ4 ...-.HG40	5SJ4 ...-.HG41	5SJ4 ...-.HG42
Standards			EN 60898; EN 60947-2; UL 489; CSA C22.2 No. 5-02		
Approved acc. to			UL 489; CSA C22.2 No. 5-02; UL File No. E243414		
Tripping characteristic			B, C, D	C, D	
Operational voltage	Min.	V AC/DC	24		
• Acc. to IEC 60898	Max.	V DC/pole	60		
	Max.	V AC	440		
• Acc. to UL 489 and CSA C22.2 No. 5-02	Max.	V AC	240/120	240	480/277
		V DC/1P	60		
		V DC/2P	--	125	
Rated breaking capacity					
• I_{cn} acc. to IEC 60898-1		kA AC	10		
• Acc. to UL 489 and CSA C22.2 No. 5-02		kA AC	14/10[1)]	14/10[1)]	10[1)]
Insulation coordination					
• Rated insulation voltage		V AC	250	250/440	
• Degree of pollution for overvoltage category			3/III		
Touch protection acc. to EN 50274			Yes		
Handle end position, sealable			Yes		
Degree of protection acc. to EN 60529			IP20, with connected conductors		
CFC and silicone-free			Yes		
Mounting			On standard mounting rail		
Terminals					
• Combined terminals at both ends			Yes		
• Terminal tightening torque		Nm	3.5		
		lb. in	31		
Conductor cross-sections					
• AWG cables		AWG	14 ... 4		
• Solid and stranded		mm^2	0.75 ... 35		
• Finely stranded, with end sleeve		mm^2	0.75 ... 25		
Mains connection			Any		
Mounting position			Any		
Average service life, with rated load			20 000 actuations		
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75		
Resistance to climate acc. to IEC 60068-2-30			6 cycles		
Resistance to vibrations acc. to IEC 60068-2-6		m/s^2	60 at 10 ... 150 Hz		

[1)] For detailed information on rated switching capacity, see page 1/56.

Version		**Busbars**	**Terminals**	
Type		**5ST3 663 5ST3 664 5ST3 665**	**5ST3 666-0HG**	**5ST3 666-2HG**
Standards		UL 489		
Certifications		UL 489; UL File No. E243414		
Operational voltage				
• Acc. to IEC	V AC	690		
• Acc. to UL 489	V AC	480Y/277 and 240		
Rated conditional short-circuit current	kA	15 kA (with NH3 355A gL/gG 500 V)		
• Dielectric strength	kV/mm	30		
• Surge strength	kV	> 9.5		
Rated current up to 40 °C ambient temperature	A	115		
Insulation coordination				
• Degree of pollution		2		
• Overvoltage category		III		
Busbar cross-section (Cu)	mm^2	16		
Infeed		Any		
Conductor cross-sections				
• AWG cables	AWG	--	14 ... 2	14 ... 1
• Solid and stranded	mm^2	--	2.5 ... 35	2.5 ... 50
Terminals				
• Terminal tightening torque	Nm	--	3.3	3.3
	lb. in	--	30	30
Temperature resistance	°C	200 – UL 94-V0/0.4 mm		

BETA Protecting
Miniature Circuit Breakers

5SJ4 miniature circuit breakers to UL and IEC

Selection and ordering data

I_n	MW	DT	Characteristic B Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A						Unit(s)	Unit(s)	kg
Miniature circuit breakers "same polarity only" 1P, 240 V AC								
6	1	B	**5SJ4 106-6HG40**		012	1	1	0.120
10		B	**5SJ4 110-6HG40**		012	1	1	0.120
13		C	**5SJ4 113-6HG40**		012	1	1	0.120
15		C	**5SJ4 118-6HG40**		012	1	1	0.120
16		C	**5SJ4 116-6HG40**		012	1	1	0.120
20		C	**5SJ4 120-6HG40**		012	1	1	0.120
25		C	**5SJ4 125-6HG40**		012	1	1	0.120
30		C	**5SJ4 130-6HG40**		012	1	1	0.120
32		C	**5SJ4 132-6HG40**		012	1	1	0.120
35		C	**5SJ4 135-6HG40**		012	1	1	0.120
40		C	**5SJ4 140-6HG40**		012	1	1	0.120
45		C	**5SJ4 145-6HG40**		012	1	1	0.120
50		C	**5SJ4 150-6HG40**		012	1	1	0.120
60		C	**5SJ4 160-6HG40**		012	1	1	0.120
63		C	**5SJ4 163-6HG40**		012	1	1	0.120

I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
A										Unit(s)	Unit(s)	kg
Miniature circuit breakers "same polarity only" 1P, 240 V AC												
0.3	1	C	**5SJ4 114-7HG40**		012	C	**5SJ4 114-8HG40**		012	1	1	0.120
0.5		C	**5SJ4 105-7HG40**		012	C	**5SJ4 105-8HG40**		012	1	1	0.120
1		B	**5SJ4 101-7HG40**		012	C	**5SJ4 101-8HG40**		012	1	1	0.120
1.6		C	**5SJ4 115-7HG40**		012	C	**5SJ4 115-8HG40**		012	1	1	0.120
2		B	**5SJ4 102-7HG40**		012	C	**5SJ4 102-8HG40**		012	1	1	0.120
3		B	**5SJ4 103-7HG40**		012	C	**5SJ4 103-8HG40**		012	1	1	0.120
4		B	**5SJ4 104-7HG40**		012	C	**5SJ4 104-8HG40**		012	1	1	0.120
5		C	**5SJ4 111-7HG40**		012	C	**5SJ4 111-8HG40**		012	1	1	0.120
6		B	**5SJ4 106-7HG40**		012	C	**5SJ4 106-8HG40**		012	1	1	0.120
8		B	**5SJ4 108-7HG40**		012	C	**5SJ4 108-8HG40**		012	1	1	0.120
10		B	**5SJ4 110-7HG40**		012	C	**5SJ4 110-8HG40**		012	1	1	0.120
13		C	**5SJ4 113-7HG40**		012	C	**5SJ4 113-8HG40**		012	1	1	0.120
15		C	**5SJ4 118-7HG40**		012	C	**5SJ4 118-8HG40**		012	1	1	0.120
16		B	**5SJ4 116-7HG40**		012	C	**5SJ4 116-8HG40**		012	1	1	0.120
20		B	**5SJ4 120-7HG40**		012	C	**5SJ4 120-8HG40**		012	1	1	0.120
25		B	**5SJ4 125-7HG40**		012	C	**5SJ4 125-8HG40**		012	1	1	0.120
30		C	**5SJ4 130-7HG40**		012	C	**5SJ4 130-8HG40**		012	1	1	0.120
32		C	**5SJ4 132-7HG40**		012	C	**5SJ4 132-8HG40**		012	1	1	0.120
35		C	**5SJ4 135-7HG40**		012	C	**5SJ4 135-8HG40**		012	1	1	0.120
40		C	**5SJ4 140-7HG40**		012	C	**5SJ4 140-8HG40**		012	1	1	0.120
45		C	**5SJ4 145-7HG40**		012	C	**5SJ4 145-8HG40**		012	1	1	0.120
50		C	**5SJ4 150-7HG40**		012	C	**5SJ4 150-8HG40**		012	1	1	0.120
60		C	**5SJ4 160-7HG40**		012	C	**5SJ4 160-8HG40**		012	1	1	0.120
63		C	**5SJ4 163-7HG40**		012	C	**5SJ4 163-8HG40**		012	1	1	0.120

* You can order this quantity or a multiple thereof.

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	Miniature circuit breakers 1P, 240 V AC												
	0.3	1	C	**5SJ4 114-7HG41**		012	C	**5SJ4 114-8HG41**		012	1	1	0.155
	0.5		C	**5SJ4 105-7HG41**		012	C	**5SJ4 105-8HG41**		012	1	1	0.155
	1		C	**5SJ4 101-7HG41**		012	C	**5SJ4 101-8HG41**		012	1	1	0.155
	1.6		C	**5SJ4 115-7HG41**		012	C	**5SJ4 115-8HG41**		012	1	1	0.155
	2		C	**5SJ4 102-7HG41**		012	C	**5SJ4 102-8HG41**		012	1	1	0.155
	3		C	**5SJ4 103-7HG41**		012	C	**5SJ4 103-8HG41**		012	1	1	0.155
	4		C	**5SJ4 104-7HG41**		012	C	**5SJ4 104-8HG41**		012	1	1	0.155
	5		C	**5SJ4 111-7HG41**		012	C	**5SJ4 111-8HG41**		012	1	1	0.155
	6		C	**5SJ4 106-7HG41**		012	C	**5SJ4 106-8HG41**		012	1	1	0.155
	8		C	**5SJ4 108-7HG41**		012	C	**5SJ4 108-8HG41**		012	1	1	0.155
	10		C	**5SJ4 110-7HG41**		012	C	**5SJ4 110-8HG41**		012	1	1	0.155
	13		C	**5SJ4 113-7HG41**		012	C	**5SJ4 113-8HG41**		012	1	1	0.155
	15		C	**5SJ4 118-7HG41**		012	C	**5SJ4 118-8HG41**		012	1	1	0.155
	16		C	**5SJ4 116-7HG41**		012	C	**5SJ4 116-8HG41**		012	1	1	0.155
	20		C	**5SJ4 120-7HG41**		012	C	**5SJ4 120-8HG41**		012	1	1	0.155
	25		C	**5SJ4 125-7HG41**		012	C	**5SJ4 125-8HG41**		012	1	1	0.155
	30		C	**5SJ4 130-7HG41**		012	C	**5SJ4 130-8HG41**		012	1	1	0.155
	32		C	**5SJ4 132-7HG41**		012	C	**5SJ4 132-8HG41**		012	1	1	0.155
	35		C	**5SJ4 135-7HG41**		012	C	**5SJ4 135-8HG41**		012	1	1	0.155
	40		C	**5SJ4 140-7HG41**		012	C	**5SJ4 140-8HG41**		012	1	1	0.155
	45		C	**5SJ4 145-7HG41**		012	C	**5SJ4 145-8HG41**		012	1	1	0.155
	50		C	**5SJ4 150-7HG41**		012	C	**5SJ4 150-8HG41**		012	1	1	0.155
	60		C	**5SJ4 160-7HG41**		012	C	**5SJ4 160-8HG41**		012	1	1	0.155
	63		C	**5SJ4 163-7HG41**		012	C	**5SJ4 163-8HG41**		012	1	1	0.155
	Miniature circuit breakers 2P, 240 V AC												
	0.3	2	C	**5SJ4 214-7HG41**		012	C	**5SJ4 214-8HG41**		012	1	1	0.310
	0.5		C	**5SJ4 205-7HG41**		012	C	**5SJ4 205-8HG41**		012	1	1	0.310
	1		C	**5SJ4 201-7HG41**		012	C	**5SJ4 201-8HG41**		012	1	1	0.310
	1.6		C	**5SJ4 215-7HG41**		012	C	**5SJ4 215-8HG41**		012	1	1	0.310
	2		C	**5SJ4 202-7HG41**		012	C	**5SJ4 202-8HG41**		012	1	1	0.310
	3		C	**5SJ4 203-7HG41**		012	C	**5SJ4 203-8HG41**		012	1	1	0.310
	4		C	**5SJ4 204-7HG41**		012	C	**5SJ4 204-8HG41**		012	1	1	0.310
	5		C	**5SJ4 211-7HG41**		012	C	**5SJ4 211-8HG41**		012	1	1	0.310
	6		C	**5SJ4 206-7HG41**		012	C	**5SJ4 206-8HG41**		012	1	1	0.310
	8		C	**5SJ4 208-7HG41**		012	C	**5SJ4 208-8HG41**		012	1	1	0.310
	10		C	**5SJ4 210-7HG41**		012	C	**5SJ4 210-8HG41**		012	1	1	0.310
	13		C	**5SJ4 213-7HG41**		012	C	**5SJ4 213-8HG41**		012	1	1	0.310
	15		C	**5SJ4 218-7HG41**		012	C	**5SJ4 218-8HG41**		012	1	1	0.310
	16		C	**5SJ4 216-7HG41**		012	C	**5SJ4 216-8HG41**		012	1	1	0.310
	20		C	**5SJ4 220-7HG41**		012	C	**5SJ4 220-8HG41**		012	1	1	0.310
	25		C	**5SJ4 225-7HG41**		012	C	**5SJ4 225-8HG41**		012	1	1	0.310
	30		C	**5SJ4 230-7HG41**		012	C	**5SJ4 230-8HG41**		012	1	1	0.310
	32		C	**5SJ4 232-7HG41**		012	C	**5SJ4 232-8HG41**		012	1	1	0.310
	35		C	**5SJ4 235-7HG41**		012	C	**5SJ4 235-8HG41**		012	1	1	0.310
	40		C	**5SJ4 240-7HG41**		012	C	**5SJ4 240-8HG41**		012	1	1	0.310
	45		C	**5SJ4 245-7HG41**		012	C	**5SJ4 245-8HG41**		012	1	1	0.310
	50		C	**5SJ4 250-7HG41**		012	C	**5SJ4 250-8HG41**		012	1	1	0.310
	60		C	**5SJ4 260-7HG41**		012	C	**5SJ4 260-8HG41**		012	1	1	0.310
	63		C	**5SJ4 263-7HG41**		012	C	**5SJ4 263-8HG41**		012	1	1	0.310

* You can order this quantity or a multiple thereof.

BETA Protecting
Miniature Circuit Breakers

5SJ4 miniature circuit breakers to UL and IEC

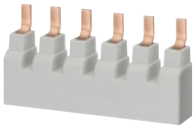
	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	Miniature circuit breakers 3P, 240 V AC												
	0.3	3	C	**5SJ4 314-7HG41**		012	C	**5SJ4 314-8HG41**		012	1	1	0.465
	0.5		C	**5SJ4 305-7HG41**		012	C	**5SJ4 305-8HG41**		012	1	1	0.465
	1		C	**5SJ4 301-7HG41**		012	C	**5SJ4 301-8HG41**		012	1	1	0.465
	1.6		C	**5SJ4 315-7HG41**		012	C	**5SJ4 315-8HG41**		012	1	1	0.465
	2		C	**5SJ4 302-7HG41**		012	C	**5SJ4 302-8HG41**		012	1	1	0.465
	3		C	**5SJ4 303-7HG41**		012	C	**5SJ4 303-8HG41**		012	1	1	0.465
	4		C	**5SJ4 304-7HG41**		012	C	**5SJ4 304-8HG41**		012	1	1	0.465
	5		C	**5SJ4 311-7HG41**		012	C	**5SJ4 311-8HG41**		012	1	1	0.465
	6		C	**5SJ4 306-7HG41**		012	C	**5SJ4 306-8HG41**		012	1	1	0.465
	8		C	**5SJ4 308-7HG41**		012	C	**5SJ4 308-8HG41**		012	1	1	0.465
	10		C	**5SJ4 310-7HG41**		012	C	**5SJ4 310-8HG41**		012	1	1	0.465
	13		C	**5SJ4 313-7HG41**		012	C	**5SJ4 313-8HG41**		012	1	1	0.465
	15		C	**5SJ4 318-7HG41**		012	C	**5SJ4 318-8HG41**		012	1	1	0.465
	16		C	**5SJ4 316-7HG41**		012	C	**5SJ4 316-8HG41**		012	1	1	0.465
	20		C	**5SJ4 320-7HG41**		012	C	**5SJ4 320-8HG41**		012	1	1	0.465
	25		C	**5SJ4 325-7HG41**		012	C	**5SJ4 325-8HG41**		012	1	1	0.465
	30		C	**5SJ4 330-7HG41**		012	C	**5SJ4 330-8HG41**		012	1	1	0.465
	32		C	**5SJ4 332-7HG41**		012	C	**5SJ4 332-8HG41**		012	1	1	0.465
	35		C	**5SJ4 335-7HG41**		012	C	**5SJ4 335-8HG41**		012	1	1	0.465
	40		C	**5SJ4 340-7HG41**		012	C	**5SJ4 340-8HG41**		012	1	1	0.465
	45		C	**5SJ4 345-7HG41**		012	C	**5SJ4 345-8HG41**		012	1	1	0.465
	50		C	**5SJ4 350-7HG41**		012	C	**5SJ4 350-8HG41**		012	1	1	0.465
	60		C	**5SJ4 360-7HG41**		012	C	**5SJ4 360-8HG41**		012	1	1	0.465
	63		C	**5SJ4 363-7HG41**		012	C	**5SJ4 363-8HG41**		012	1	1	0.465
	Miniature circuit breakers 1P, 480Y/277 V AC NEW												
	0.3	1	C	**5SJ4 114-7HG42**		012	C	**5SJ4 114-8HG42**		012	1	1	0.155
	0.5		C	**5SJ4 105-7HG42**		012	C	**5SJ4 105-8HG42**		012	1	1	0.155
	1		C	**5SJ4 101-7HG42**		012	C	**5SJ4 101-8HG42**		012	1	1	0.155
	1.6		C	**5SJ4 115-7HG42**		012	C	**5SJ4 115-8HG42**		012	1	1	0.155
	2		C	**5SJ4 102-7HG42**		012	C	**5SJ4 102-8HG42**		012	1	1	0.155
	3		C	**5SJ4 103-7HG42**		012	C	**5SJ4 103-8HG42**		012	1	1	0.155
	4		C	**5SJ4 104-7HG42**		012	C	**5SJ4 104-8HG42**		012	1	1	0.155
	5		C	**5SJ4 111-7HG42**		012	C	**5SJ4 111-8HG42**		012	1	1	0.155
	6		C	**5SJ4 106-7HG42**		012	C	**5SJ4 106-8HG42**		012	1	1	0.155
	8		C	**5SJ4 108-7HG42**		012	C	**5SJ4 108-8HG42**		012	1	1	0.155
	10		C	**5SJ4 110-7HG42**		012	C	**5SJ4 110-8HG42**		012	1	1	0.155
	13		C	**5SJ4 113-7HG42**		012	C	**5SJ4 113-8HG42**		012	1	1	0.155
	15		C	**5SJ4 118-7HG42**		012	C	**5SJ4 118-8HG42**		012	1	1	0.155
	16		C	**5SJ4 116-7HG42**		012	C	**5SJ4 116-8HG42**		012	1	1	0.155
	20		C	**5SJ4 120-7HG42**		012	C	**5SJ4 120-8HG42**		012	1	1	0.155
	25		C	**5SJ4 125-7HG42**		012	C	**5SJ4 125-8HG42**		012	1	1	0.155
	30		C	**5SJ4 130-7HG42**		012	C	**5SJ4 130-8HG42**		012	1	1	0.155
	32		C	**5SJ4 132-7HG42**		012	C	**5SJ4 132-8HG42**		012	1	1	0.155
	35		C	**5SJ4 135-7HG42**		012		--			1	1	0.155
	40		C	**5SJ4 140-7HG42**		012		--			1	1	0.155

* You can order this quantity or a multiple thereof.

	I_n	MW	DT	Characteristic C Order No.	Price per PU	PG	DT	Characteristic D Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A										Unit(s)	Unit(s)	kg
	Miniature circuit breakers 2P, 480Y/277 V AC		NEW										
	0.3	2	C	**5SJ4 214-7HG42**		012	C	**5SJ4 214-8HG42**		012	1	1	0.310
	0.5		C	**5SJ4 205-7HG42**		012	C	**5SJ4 205-8HG42**		012	1	1	0.310
	1		C	**5SJ4 201-7HG42**		012	C	**5SJ4 201-8HG42**		012	1	1	0.310
	1.6		C	**5SJ4 215-7HG42**		012	C	**5SJ4 215-8HG42**		012	1	1	0.310
	2		C	**5SJ4 202-7HG42**		012	C	**5SJ4 202-8HG42**		012	1	1	0.310
	3		C	**5SJ4 203-7HG42**		012	C	**5SJ4 203-8HG42**		012	1	1	0.310
	4		C	**5SJ4 204-7HG42**		012	C	**5SJ4 204-8HG42**		012	1	1	0.310
	5		C	**5SJ4 211-7HG42**		012	C	**5SJ4 211-8HG42**		012	1	1	0.310
	6		C	**5SJ4 206-7HG42**		012	C	**5SJ4 206-8HG42**		012	1	1	0.310
	8		C	**5SJ4 208-7HG42**		012	C	**5SJ4 208-8HG42**		012	1	1	0.310
	10		C	**5SJ4 210-7HG42**		012	C	**5SJ4 210-8HG42**		012	1	1	0.310
	13		C	**5SJ4 213-7HG42**		012	C	**5SJ4 213-8HG42**		012	1	1	0.310
	15		C	**5SJ4 218-7HG42**		012	C	**5SJ4 218-8HG42**		012	1	1	0.310
	16		C	**5SJ4 216-7HG42**		012	C	**5SJ4 216-8HG42**		012	1	1	0.310
	20		C	**5SJ4 220-7HG42**		012	C	**5SJ4 220-8HG42**		012	1	1	0.310
	25		C	**5SJ4 225-7HG42**		012	C	**5SJ4 225-8HG42**		012	1	1	0.310
	30		C	**5SJ4 230-7HG42**		012	C	**5SJ4 230-8HG42**		012	1	1	0.310
	32		C	**5SJ4 232-7HG42**		012	C	**5SJ4 232-8HG42**		012	1	1	0.310
	35		C	**5SJ4 235-7HG42**		012		**--**			1	1	0.310
	40		C	**5SJ4 240-7HG42**		012		**--**			1	1	0.310
	Miniature circuit breakers 3P, 480Y/277 V AC		NEW										
	0.3	3	C	**5SJ4 314-7HG42**		012	C	**5SJ4 314-8HG42**		012	1	1	0.465
	0.5		C	**5SJ4 305-7HG42**		012	C	**5SJ4 305-8HG42**		012	1	1	0.465
	1		C	**5SJ4 301-7HG42**		012	C	**5SJ4 301-8HG42**		012	1	1	0.465
	1.6		C	**5SJ4 315-7HG42**		012	C	**5SJ4 315-8HG42**		012	1	1	0.465
	2		C	**5SJ4 302-7HG42**		012	C	**5SJ4 302-8HG42**		012	1	1	0.465
	3		C	**5SJ4 303-7HG42**		012	C	**5SJ4 303-8HG42**		012	1	1	0.465
	4		C	**5SJ4 304-7HG42**		012	C	**5SJ4 304-8HG42**		012	1	1	0.465
	5		C	**5SJ4 311-7HG42**		012	C	**5SJ4 311-8HG42**		012	1	1	0.465
	6		C	**5SJ4 306-7HG42**		012	C	**5SJ4 306-8HG42**		012	1	1	0.465
	8		C	**5SJ4 308-7HG42**		012	C	**5SJ4 308-8HG42**		012	1	1	0.465
	10		C	**5SJ4 310-7HG42**		012	C	**5SJ4 310-8HG42**		012	1	1	0.465
	13		C	**5SJ4 313-7HG42**		012	C	**5SJ4 313-8HG42**		012	1	1	0.465
	15		C	**5SJ4 318-7HG42**		012	C	**5SJ4 318-8HG42**		012	1	1	0.465
	16		C	**5SJ4 316-7HG42**		012	C	**5SJ4 316-8HG42**		012	1	1	0.465
	20		C	**5SJ4 320-7HG42**		012	C	**5SJ4 320-8HG42**		012	1	1	0.465
	25		C	**5SJ4 325-7HG42**		012	C	**5SJ4 325-8HG42**		012	1	1	0.465
	30		C	**5SJ4 330-7HG42**		012	C	**5SJ4 330-8HG42**		012	1	1	0.465
	32		C	**5SJ4 332-7HG42**		012	C	**5SJ4 332-8HG42**		012	1	1	0.465
	35		C	**5SJ4 335-7HG42**		012		**--**			1	1	0.465
	40		C	**5SJ4 340-7HG42**		012		**--**			1	1	0.465

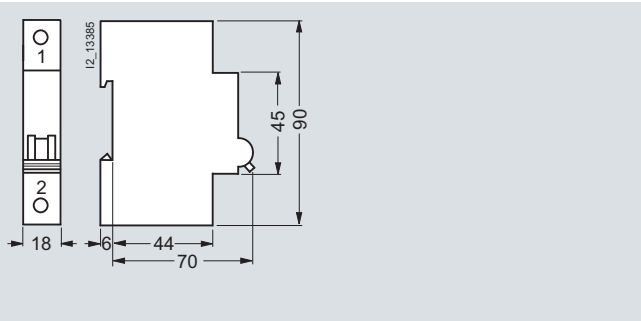
*** You can order this quantity or a multiple thereof.**

Accessories

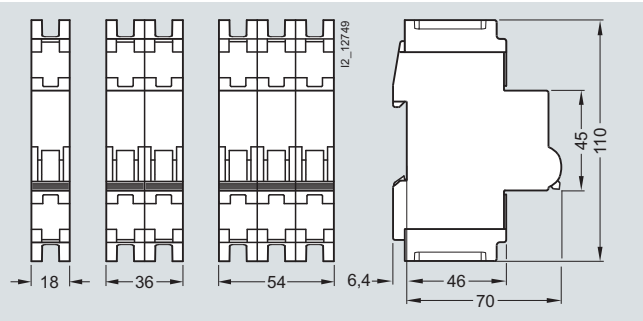
		Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	**Busbars according to UL 489 specially for 5SJ4 … -.HG.. MCB, fixed lengths, cannot be cut**		NEW							
	Single-phase									
	For 6 MCB 1P	1	100	A	**5ST3 663-0HG**		012	1	10	0.056
	For 12 MCB 1P		205	A	**5ST3 663-1HG**		012	1	10	0.112
	For 18 MCB 1P		310	A	**5ST3 663-2HG**		012	1	10	0.170
	Two-phase									
	For 6 MCB 2P	1	100	A	**5ST3 664-0HG**		012	1	10	0.065
	For 12 MCB 2P		205	A	**5ST3 664-1HG**		012	1	10	0.137
	For 18 MCB 2P		310	A	**5ST3 664-2HG**		012	1	10	0.211
	Three-phase									
	For 6 MCB 3P	1	100	A	**5ST3 665-0HG**		012	1	10	0.067
	For 12 MCB 3P		205	A	**5ST3 665-1HG**		012	1	10	0.155
	For 18 MCB 3P		310	A	**5ST3 665-2HG**		012	1	10	0.243
	Terminals according to UL 489 specially for 5SJ4 … -.HG.. miniature circuit breakers		NEW							
	Infeed at the miniature circuit breaker Max. 35 mm^2			A	**5ST3 666-0HG**		012	1	10	0.033
	Infeed at the busbar Max. 50 mm^2			A	**5ST3 666-2HG**		012	1	10	0.034
	**Touch protection covers for busbars according to UL 489**		NEW							
	3 × 1 pin			A	**5ST3 666-1HG**		012	1	10	0.003
	**Handle locking devices according to UL 489** Sealable to prevent unwanted manual ON/OFF switching, for padlock with max. 3 mm shackle			A	**5ST3 801**		027	1	1	0.008
	**Padlocks** For 5ST3 801 handle locking device			▶	**5ST3 802**		027	1	1	0.027

* You can order this quantity or a multiple thereof.

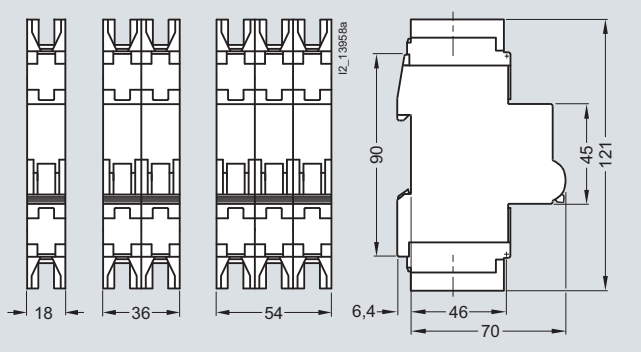
Dimensional drawings



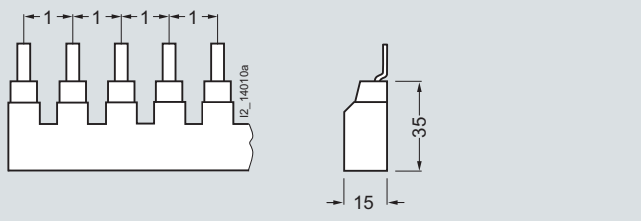
5SJ4 ...-.HG40



5SJ4 ...-.HG41



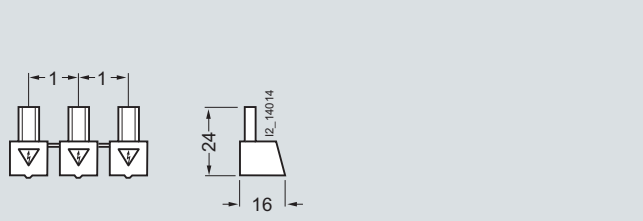
5SJ4 ...-.HG42



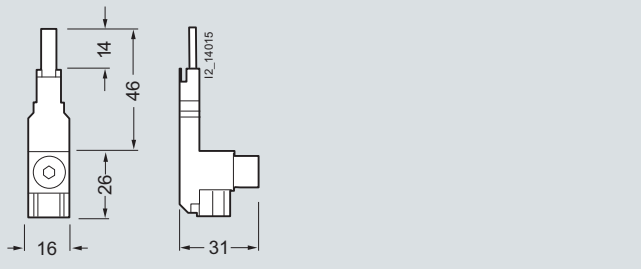
5ST3 663-0HG
5ST3 663-1HG
5ST3 663-2HG

5ST3 664-0HG
5ST3 664-1HG
5ST3 664-2HG

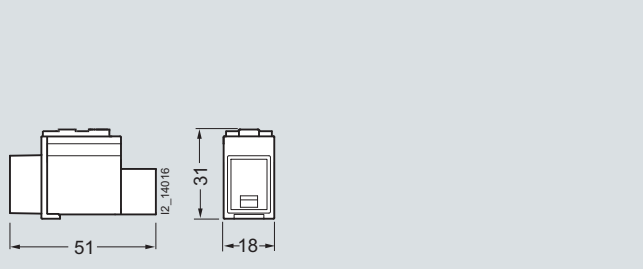
5ST3 665-0HG
5ST3 665-1HG
5ST3 665-2HG



5ST3 666-1HG

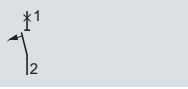


5ST3 666-0HG

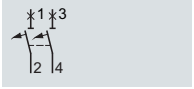


5ST3 666-2HG

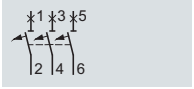
Schematics



5SJ4
1P



2P



3P

BETA Protecting
Miniature Circuit Breakers

SHU, 5SP3 main miniature circuit breakers

Overview

Selective main miniature circuit breakers are used as circuit breakers at meter panels or as group miniature circuit breakers in distribution board applications.

Characteristic E is adapted to the special application requirements for cascade circuits between melting fuses and miniature circuit breakers.

The devices can be screwed onto a mounting plate or attached to a 40 mm busbar by means of an adapter. Using a mounting plate, they can be mounted on a standard mounting rail according to EN 60715.

Benefits

- Improved current limitation characteristics increases plant protection, thanks to the selective main miniature circuit breakers supporting downstream miniature circuit breakers.
- High and safe selectivity between sub-distribution and meter panel ensures a continued power supply to unaffected circuits in the event of a fault, thus improving plant availability.
- The selective main miniature circuit breaker prevents the affected circuit from being reconnected until the fault is eliminated, thus providing greater operating safety.
- No previous knowledge required for operation of the selective main miniature circuit breakers. This ensures fast and safe disconnection and reconnection of loads.
- Meets all the requirements of TAB 2007.

Technical specifications

			5SP3
Standards			DIN VDE 0645
Rated voltage U_n/U_e			
• 1-pole		V AC	230/400
• Multipole		V AC	400
Operational voltage	Min.	V AC	110
	Max.	V AC	440
Rated frequency		Hz	50 ... 60
Rated current I_n/I_e		A	16 ... 100
Rated insulation voltage U_i		V AC	690
Rated switching capacity I_{cn}		A	25000
Insulation coordination			
• Overvoltage category			IV
• Degree of pollution			3
Impulse withstand voltage U_{imp}		kV	6
Impact resistance			30 g, at least 3 impacts, impact duration 11 ms
Resistance to vibrations			2 g, 20 frequency cycles 5 ... 150 ... 15 Hz
Switching position indication			OFF = green, ON = red
Main conductor characteristics	Acc. to EN 60204-1		Yes
Handle end position, sealable			Yes
Device depth		mm	92
Degree of protection			IP20, with connected conductors
Mains connection			Any
Mounting position			Any
Mounting			With accessories on 35-mm standard mounting rail or busbar or screw fixing
Service life on average, with rated load		Operations	20000
Connection			Saddle terminals at both ends
Conductor cross-sections			
• Solid		mm^2	2.5 ... 50
• Stranded		mm^2	2.5 ... 70
• Finely stranded, with end sleeve		mm^2	2.5 ... 50
Storage temperature		°C	-40 ... +70
Ambient temperature		°C	-25 ... +55

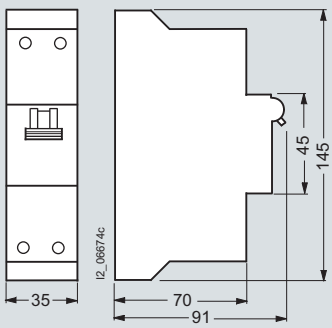
Selection and ordering data

	I_n A	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	Main miniature circuit breakers, 1P								
	16	2	B	**5SP3 716**		005	1	1	0.550
	20		C	**5SP3 720**		005	1	1	0.550
	25		B	**5SP3 725**		005	1	1	0.550
	32		C	**5SP3 732**		005	1	1	0.550
	35		A	**5SP3 735**		005	1	1	0.550
	40		B	**5SP3 740**		005	1	1	0.550
	50		B	**5SP3 750**		005	1	1	0.550
	63		A	**5SP3 763**		005	1	1	0.550
	80		B	**5SP3 780**		005	1	1	0.550
	100		B	**5SP3 791**		005	1	1	0.550
	Main miniature circuit breakers, 3 x 1P								
	Premounted on 5ST1 324 busbar adapter; can be clipped onto busbars (spacing: 40 mm); including three 5ST1 323 transparent operating protective covers								
	16	6	B	**5SP3 716-1**		005	1 set	1 set	1.700
	20		B	**5SP3 720-1**		005	1 set	1 set	1.700
	25		B	**5SP3 725-1**		005	1 set	1 set	1.700
	32		B	**5SP3 732-1**		005	1 set	1 set	1.700
	35		A	**5SP3 735-1**		005	1 set	1 set	1.700
	40		A	**5SP3 740-1**		005	1 set	1 set	1.700
	50		A	**5SP3 750-1**		005	1 set	1 set	1.700
	63		A	**5SP3 763-1**		005	1 set	1 set	1.700
	80		B	**5SP3 780-1**		005	1 set	1 set	1.700
	100		B	**5SP3 791-1**		005	1 set	1 set	1.700
	Busbar adapters								
	Suitable for busbar spacing 40 mm can be equipped with 3 selective main miniature circuit breakers		B	**5ST1 328**		005	1	1	0.234
	Breaker blocking covers								
	To prevent manual off-switching		D	**5ST1 318**		005	1	10	0.001
	Transparent operating protective covers								
	Multiple locking options against accidental and deliberate operation • Padlocks • Phillips screwdrivers • Special wrenches (Antilux) • These can be installed by the operator or the power supply company		B	**5ST1 323**		005	1	3	0.012
	Terminal covers								
	2 units required per contactor Terminal cover in compliance with cladding dimensions according to DIN 43880		B	**5ST1 316**		005	1	6	0.001

* You can order this quantity or a multiple thereof.

SHU, 5SP3 main miniature circuit breakers

Dimensional drawings



5SP3 7

Schematics

1P

Overview

Circuit breaker terminals are used for short-circuit protection or for protection against overloading and short-circuiting in auxiliary and control circuits after control transformers. All terminals are designed for 2 wires. The terminal block labeling accessories are used for inscription.

Benefits

- Integration of line protection switching function in the terminal technology of control cabinets in compact 12 mm design
- Display of switching position or the "Tripped" state for the fast detection of faults
- Switching/isolating function facilitates fault locating
- Device versions with integral auxiliary switch (AS) signal the contact position
- Device versions with floating through-type connection parallel to the switching contacts facilitate line connection.

These devices are listed as "Supplementary Protectors" according to UL 1077 (UL Recognized Components) and CSA 235 (CSA Component Accepted).

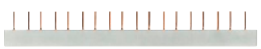
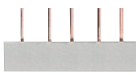
Technical specifications

			5SK9 011-1KK2., 5SK9 011-2KK2.	5SK9 011-4KK2., 5SK9 011-6KK2., 5SK9 011-8KK2.
Standards			DIN VDE 0660-101, IEC/EN 60947-2, UL 1077	
Rated operational voltage	Max.	AC	250 V AC at 50/60 Hz	
		DC	60 V DC	
Operational voltage	Min.	V AC/DC	24	
Power loss	Max.	W	1	
Rated impulse withstand voltage		kV	4	
Degree of pollution	Acc. to EN 60664-1		3	
Rated current of through-type connection		A	16	
Rated operational current of auxiliary switch		A	1	
Mechanical service life		Operations	16 000	
Electrical service life on average, with rated load		Operations	8000	
Polarity with direct current			Any	
Mounting position			Any	
Resistance to vibrations			10 g at ≤ 70 Hz	
Enclosures			With thermoplastic insulating body Screw connection at both ends for 2 conductors each Enclosed on both sides	
Touch protection	Acc. to EN 50274-1		Yes	
Terminal size		mm^2	1.5	2.5
Terminal tightening torque, recommended		Nm	0.8	
Conductor cross-sections				
• Solid		mm^2	1 or 2 × (0.75 ... 1.5)	
• Finely stranded, with end sleeve		mm^2	1 or 2 × (1 ... 2.5)	
• AWG 14-12			Yes	--
• AWG 14			Yes	--
Stripped length		mm	10	

BETA Protecting
Miniature Circuit Breakers

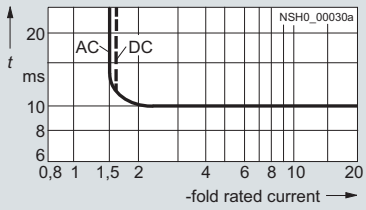
5SK9 circuit breaker terminals

Selection and ordering data

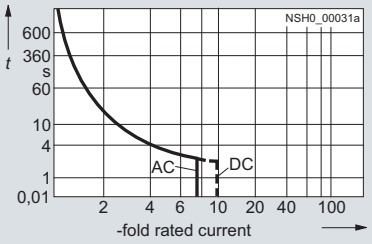
	Version	I_n A	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	**Terminal size 1.5 mm²**								
	With short-circuit release								
		1	A	**5SK9 011-1KK24**		027	1	10	0.053
		2	A	**5SK9 011-1KK25**		027	1	10	0.052
		4	B	**5SK9 011-1KK26**		027	1	10	0.053
		6	A	**5SK9 011-1KK27**		027	1	10	0.053
		10	B	**5SK9 011-1KK28**		027	1	10	0.050
	With overload and short-circuit release								
		1	A	**5SK9 011-2KK24**		027	1	10	0.053
		2	A	**5SK9 011-2KK25**		027	1	10	0.052
		4	A	**5SK9 011-2KK26**		027	1	10	0.053
		6	A	**5SK9 011-2KK27**		027	1	10	0.053
		10	B	**5SK9 011-2KK28**		027	1	10	0.050
	**Terminal size 2.5 mm²**								
	With short-circuit release, auxiliary switch with 1 NO and 1 NC								
		1	B	**5SK9 011-6KK24**		027	1	5	0.096
		2	B	**5SK9 011-6KK25**		027	1	5	0.093
		4	B	**5SK9 011-6KK26**		027	1	5	0.092
		6	B	**5SK9 011-6KK27**		027	1	5	0.093
		10	B	**5SK9 011-6KK28**		027	1	5	0.090
	With overload and short-circuit release, auxiliary switch with 1 NC and through-type connection								
		1	B	**5SK9 011-4KK24**		027	1	5	0.089
		2	A	**5SK9 011-4KK25**		027	1	5	0.092
		4	A	**5SK9 011-4KK26**		027	1	5	0.091
		6	B	**5SK9 011-4KK27**		027	1	5	0.105
		10	B	**5SK9 011-4KK28**		027	1	5	0.088
	With overload and short-circuit release, auxiliary switch with 1 NO and 1 NC								
		0.5	B	**5SK9 011-8KK23**		027	1	5	0.092
		1	A	**5SK9 011-8KK24**		027	1	5	0.092
		2	A	**5SK9 011-8KK25**		027	1	5	0.097
		4	A	**5SK9 011-8KK26**		027	1	5	0.092
		6	A	**5SK9 011-8KK27**		027	1	5	0.090
		10	B	**5SK9 011-8KK28**		027	1	5	0.090
	Feeder terminals Rated uninterrupted current 76 A Connection up to 16 mm²		A	**5ST1 822-7KK00**		027	1	10	0.012
 5ST1 822-7KK02	**Link rails, single-phase** Rated uninterrupted current 65 A		A	**5ST1 822-7KK02**		027	1	20	0.015
	5 connections • Length 104mm • For terminals: 5SK9 011-4KK2., 5SK9 011-6KK2., 5SK9 011-8KK2.								
	9 connections • Length 104 mm • For terminals: 5SK9 011-1KK2., 5SK9 011-2KK2.		A	**5ST1 822-7KK07**		027	1	20	0.013
	10 connections • Length 206 mm • For terminals: 5SK9 011-4KK2., 5SK9 011-6KK2.		A	**5ST1 822-7KK01**		027	1	20	0.031
 5ST1 822-7KK06	18 connections • Length 206 mm • For terminals: 5SK9 011-1KK2., 5SK9 011-2KK2.		A	**5ST1 822-7KK06**		027	1	20	0.036
 5ST1 822-7KK04	**Link rails, two-phase** Rated uninterrupted current 120 A for terminal 5SK9 011-4KK2.								
	5 connections/pole • Length 104 mm		A	**5ST1 822-7KK04**		027	1	10	0.031
	9 connections/pole • Length 206 mm		A	**5ST1 822-7KK03**		027	1	10	0.061

* You can order this quantity or a multiple thereof.

Characteristic curves

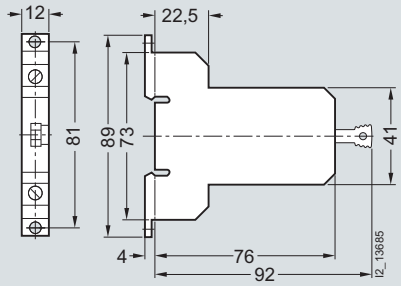


Tripping characteristic of short-circuit releases

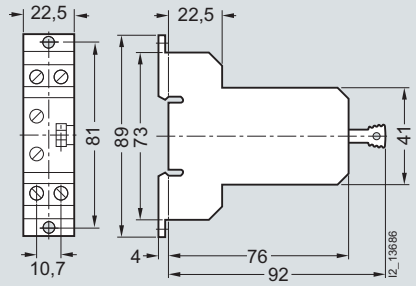


Tripping characteristic of combined overload and short-circuit releases at an ambient temperature of 40 °C

Dimensional drawings

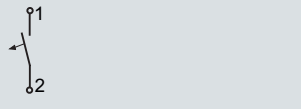


5SK9 011-1KK2.
5SK9 011-2KK2.

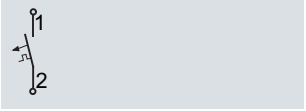


5SK9 011-4KK2.
5SK9 011-6KK2.
5SK9 011-8KK2.

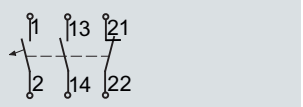
Schematics



5SK9 011-1KK2.

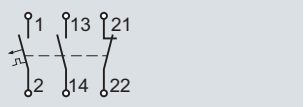


5SK9 011-2KK2.



5SK9 011-6KK2.

5SK9 011-4KK2.



5SK9 011-8KK2.

Configuration

Overview

Approvals	VDE	IMQ		UL	BV	DNV	GL	LRS	CCC
Miniature circuit breakers									
5SY6	✓	✓	✓	--	✓	✓	✓	✓	✓
5SJ4 . . .-.HG	--	--	--	✓	--	--	--	--	--
5SY4	✓	✓	✓	--	✓	✓	✓	✓	✓
5SP4	✓	--	✓	--	--	--	✓	--	✓
5SP5	✓	--	--	--	--	--	--	--	--
5SY5, universal current	✓	--	--	--	--	--	--	--	✓
5SY7	✓	✓	✓	--	✓	✓	✓	✓	✓
5SY8	--	--	✓	--	--	--	--	--	--
Miniature circuit breakers according to UL and IEC									
5SJ6 . . .-.KS	✓	--	--	--	--	--	--	--	--
Miniature circuit breakers 1+N									
5SY6 0..	✓	✓	--	--	--	--	--	--	✓
Main miniature circuit breakers									
5SP3	✓	--	--	--	--	--	--	--	--

Switching capacity

Particular demands are made on miniature circuit breakers with regard to switching capacity.

The values are standardized and are determined according to the test conditions of IEC/EN 60898 or DIN VDE 0641-11.

The values of the rated switching capacity are 6 000 and 10 000.

For other test conditions, different values can be specified that are higher than those of IEC/EN 60898 or DIN VDE 0641-11.

One such standard is IEC/EN 60947-2 or DIN VDE 0660-101 for circuit breakers.

Rated switching capacity

5SP4 and 5SY4, 5SY6, 5SY7 and 5SY8 miniature circuit breakers

		IEC/EN 60898-1		IEC/EN 60947-2	
		1-pole 230 V AC	**2-, 3- and 4-pole** 400 V AC	**1-pole** 230 V AC	**2-, 3- and 4-pole** 400 V AC
	I_n [A]	I_{cn} [kA]	I_{cn} [kA]	I_{cu} [kA]	I_{cu} [kA]
5SY6	0.3 ... 6	6		30	
	8 ... 32	6		15	
	40 ... 63	6		10	
5SY4	0.3 ... 6	10		35	
	8 ... 32	10		20	
	40 ... 63	10		15	
5SY7	0.3 ... 2	15		50	
	3 ... 6	15		40	
	8 ... 10	15		30	
	13 ... 32	15		25	
	40 ... 63	15		20[1)]	
5SY8	0.3 ... 2	--		70	
	3 ... 6	--		50	
	8 ... 10	--		40	
	13 ... 32	--		30	
	40 ... 63	--		25[2)]	
5SP4	80 ... 125	10		20[3)]	

1) D50 and D63: I_{cu} = 15 kA.
2) D50 and D63: I_{cu} = 20 kA.
3) D80 and D100: I_{cu} = 15 kA.

5SP5 and 5SY5 miniature circuit breakers

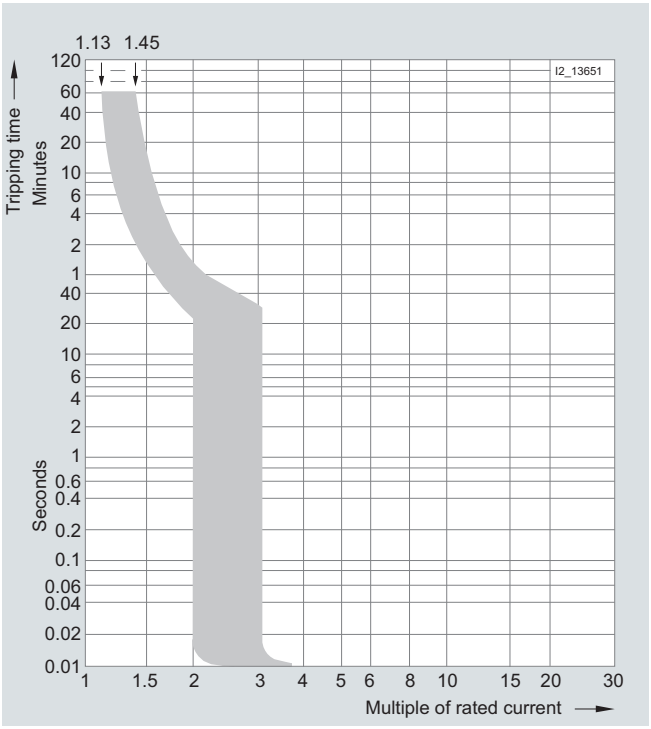
Miniature circuit breakers, universal current		**IEC/EN 60898-2**		**IEC/EN 60898-2**	
		1-pole 230 V AC	**2-pole** 400 V AC	**1-pole** 220 V DC	**2-pole** 440 V DC
	I_n [A]	I_{cn} [kA]	I_{cn} [kA]	I_{cn} [kA]	I_{cn} [kA]
5SY5	0.3 ... 63	10		15	
5SP5	80 ... 125	3		10	

Miniature circuit breakers according to UL and IEC, 5SJ4

Designation	Characteristic	Current A	Rated switching capacity (operational voltage 240 V AC) kA AC	Rated switching capacity (operational voltage 480Y/277 V AC) kA AC
5SJ4 …-.HG40	B	6 ... 63	14	--
	C	0.3 ... 40	14	--
	C	45 ... 63	10	--
	D	0.3 ... 20	14	--
	D	25 ... 63	10	--
5SJ4 …-.HG41	C	0.3 ... 40	14	--
	C	45 ... 63	10	--
	D	0.3 ... 20	14	--
	D	25 ... 63	10	--
5SJ4 …-.HG42	C	0.3 ... 40	14	10
	D	0.3 ... 20	14	10
	D	25 ... 32	10	10

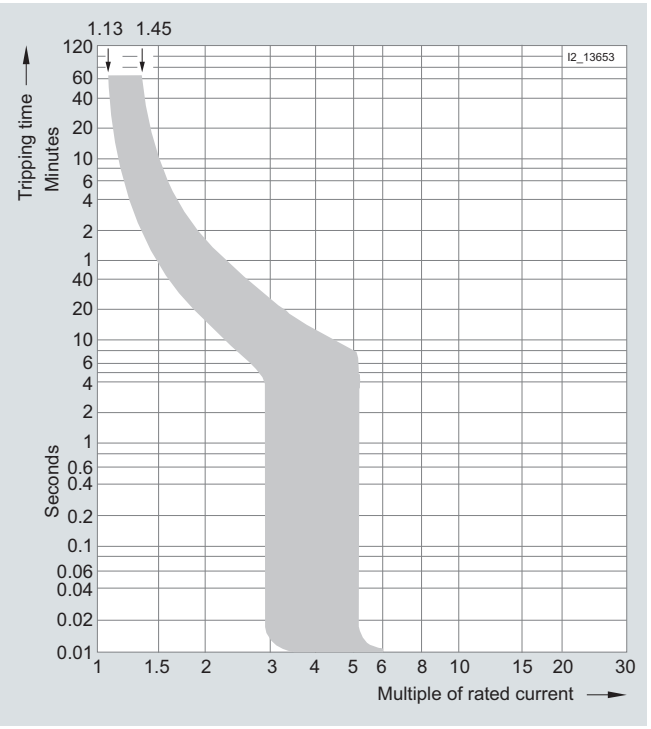
Characteristic curves

Tripping characteristics according to IEC/EN 60898, DIN VDE 0641-11



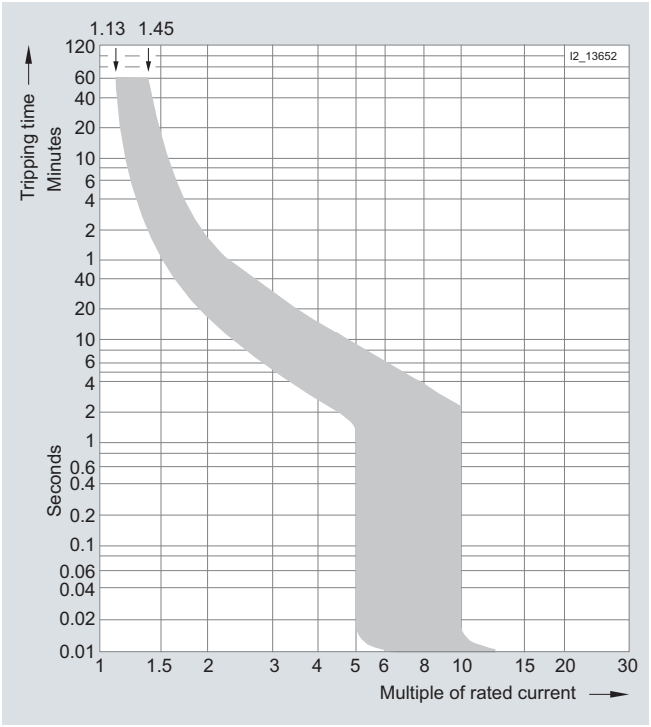
Tripping characteristic A

For limited semiconductor protection, protection of measuring circuits with transformers. Protection of circuits with tripping in 0.4 s according to DIN VDE 0100-410 for long cable lengths.



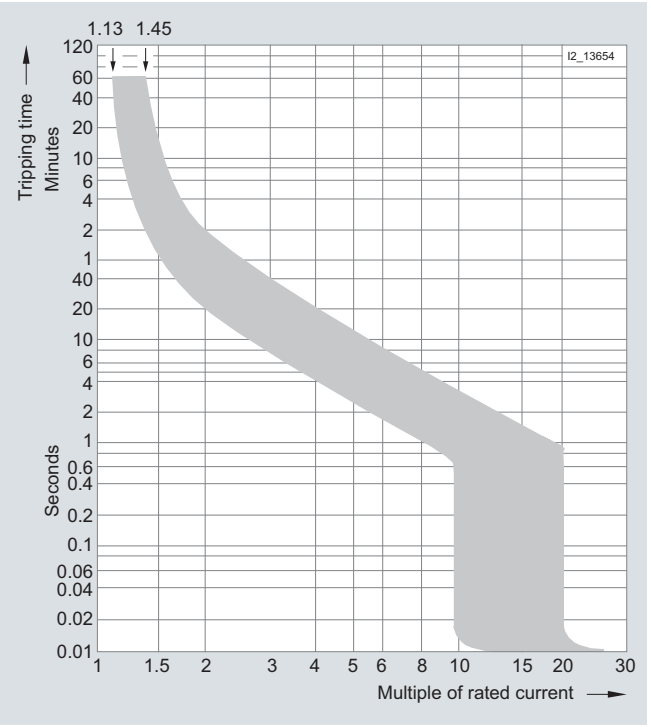
Tripping characteristic B

For universal use in socket outlet and lightingcircuits. Proof of personal safety according to DIN VDE 0100-410 is not required.



Tripping characteristic C

Particularly advantageous in lamp and motor circuits with higher starting currents.



Tripping characteristic D

For electrical circuits with strong pulse-generating equipment, such as transformers or solenoid valves.

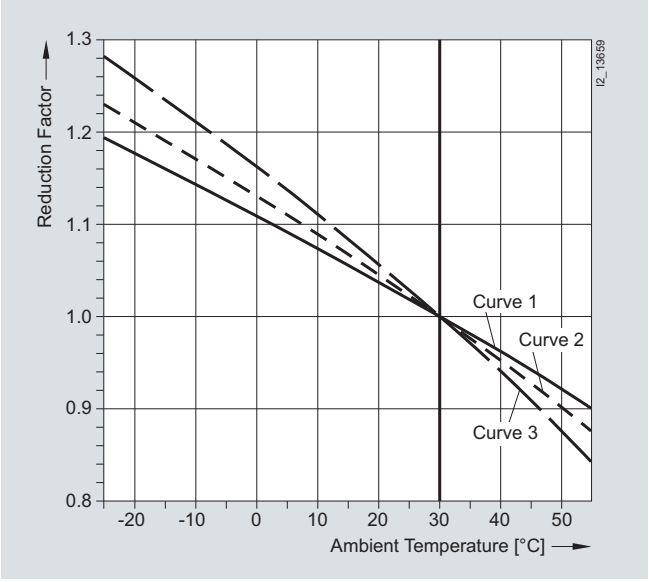
Tripping characteristics

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristic	Standards	Thermal trips Test currents: Limiting Test current I_1	Minimum Test current I_2	Tripping time $I_n \leq 63$ A t	Tripping time $I_n > 63$ A t	Electromagnetic trips Test currents: Hold I_4	Latest Tripping instant I_5	Tripping time t
A		1.13 × I_n		> 1 h	> 2 h	2 × I_n		≥ 0.1 s
			1.45 × I_n	< 1 h	< 2 h		3 × I_n	< 0.1 s
B	IEC/EN 60898, DIN VDE 0641-11	1.13 × I_n		> 1 h	> 2 h	3 × I_n		≥ 0.1 s
			1.45 × I_n	< 1 h	< 2 h		5 × I_n	< 0.1 s
C		1.13 × I_n		> 1 h	> 2 h	5 × I_n		≥ 0.1 s
			1.45 × I_n	< 1 h	< 2 h		10 × I_n	< 0.1 s
D		1.13 × I_n		> 1 h	> 2 h	10 × I_n		≥ 0.1 s
			1.45 × I_n	< 1 h	< 2 h		20 × I_n	< 0.1 s
							(IEC 60898: 50 × I_n)	

Correction factors for rated current at different ambient temperatures

Dependence of permissible continuous load current on ambient temperature.



Curve for correction factor (for curves, see the diagram above)

Rated current (A)		0.3	0.5	1	1.6	2	3	4	6	8	10	13	16	20	25	32	40	50	63
Characteristic	Pole type																		
A	1P/2P	3	3	2	2	2	3	3	3	2	3	2	2	3	2	2	3	2	3
	3P/4P	2	2	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	2
B	1P/2P	--	--	--	--	--	--	--	3	--	3	2	2	3	3	2	3	2	3
	3P/4P	--	--	--	--	--	--	--	2	--	2	1	2	2	1	1	1	1	1
C	1P/2P	3	3	2	2	2	3	3	3	3	3	2	3	3	2	2	3	2	3
	3P/4P	2	2	2	1	2	2	2	2	3	3	2	2	2	2	1	1	1	2
D	1P/2P	3	3	2	2	2	3	3	3	3	3	2	3	3	2	2	3	2	3
	3P/4P	2	2	2	1	2	2	2	2	3	3	2	2	2	2	2	2	1	2

Configuration

Correction factors for rated current in the case of bundling

If more than one electrical circuit is loaded in a series of miniature circuit breakers, the resulting increase in ambient temperature affects the characteristic curve. In this case it is necessary to take into account an additional correction factor specific to the rated current of the MCB.

Number of MCBs	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Correction factors for rated current at different frequencies

The tripping characteristic applies to a frequency of 50 to 60 Hz. In the case of other frequencies, the following correction factors must be taken into account.
In the overrange, the limits of the characteristic curves correspond to the correction factors of the thermal tripping operation. In the case of a short-circuit, the limits of the characteristic curves correspond to the correction factors of the magnetic tripping operation.
In the case of direct voltage, the maximum current values correspond to the frequency of 0 Hz.

Thermal tripping operation

Rated current I_n (A)	**Correction factor for**					
	0 Hz	**16 2/3 Hz**	**50 Hz**	**125 Hz**	**400 Hz**	**1000 Hz**
0.3 ... 10	1	1	1	1	0.99	0.97
1 ... 40	1	1	1	0.98	0.97	0.93
50 ... 63	1	1	1	0.98	0.94	0.86

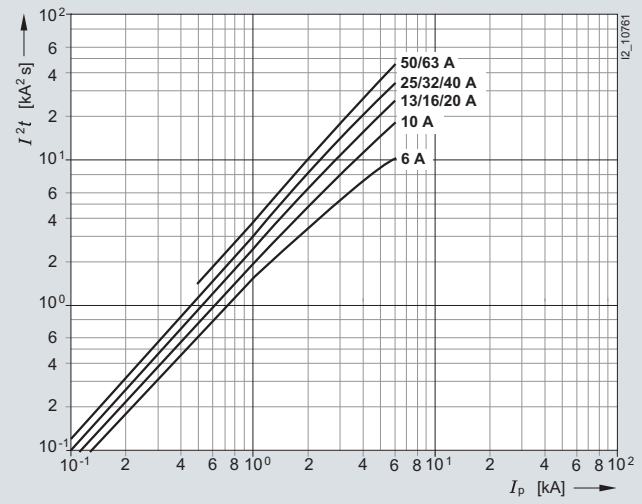
Magnetic tripping operation

Rated current I_n (A)	**Correction factor for**					
	0 Hz	**16 2/3 Hz**	**50 Hz**	**125 Hz**	**400 Hz**	**1000 Hz**
0.3 ... 63	1.2	1	1	1.2	1.4	1.7

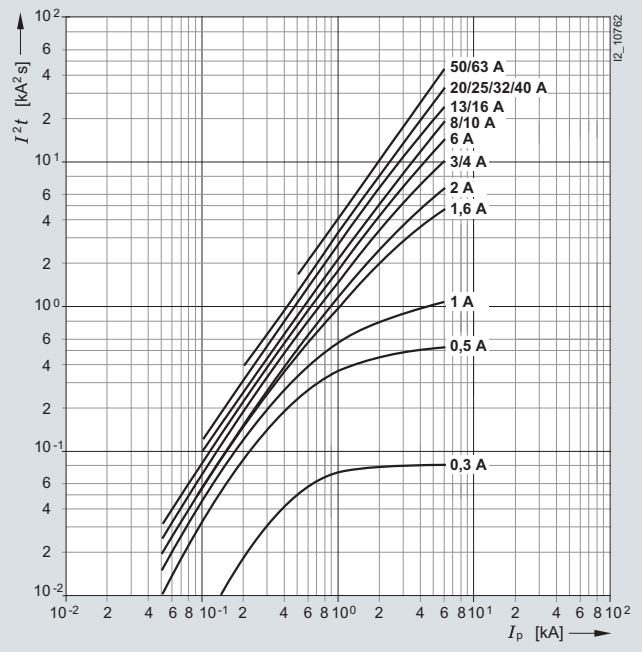
Characteristic curves 5SY6

Let-through I^2t values

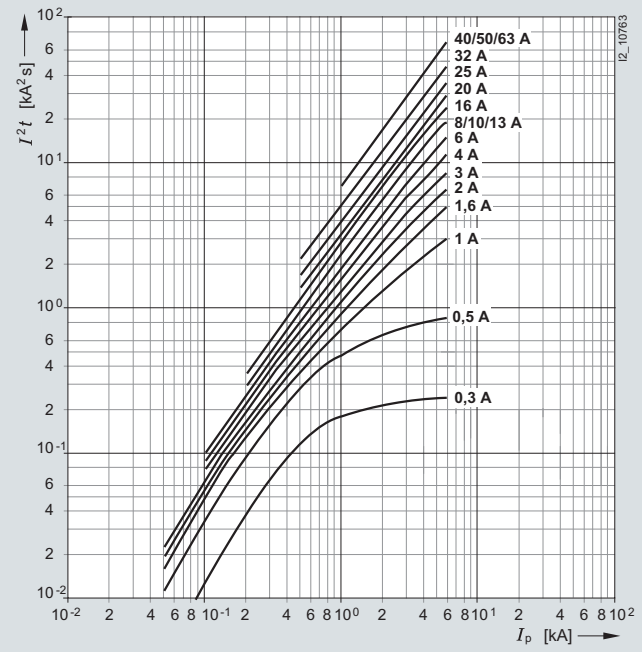
Characteristic B



Characteristic C



Characteristic D

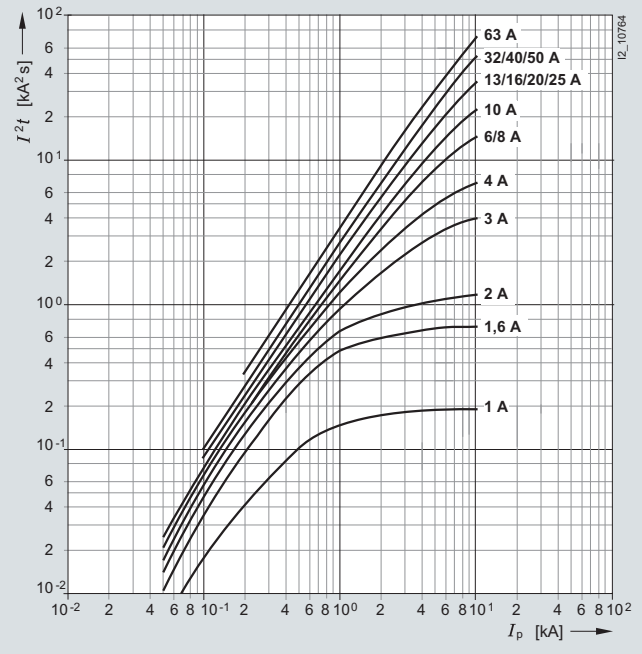


Configuration

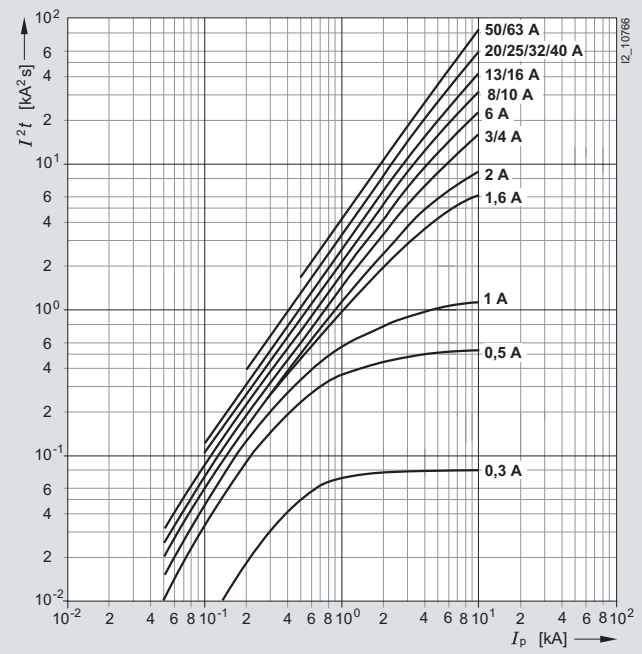
Characteristic curves 5SY4

Let-through I^2t values

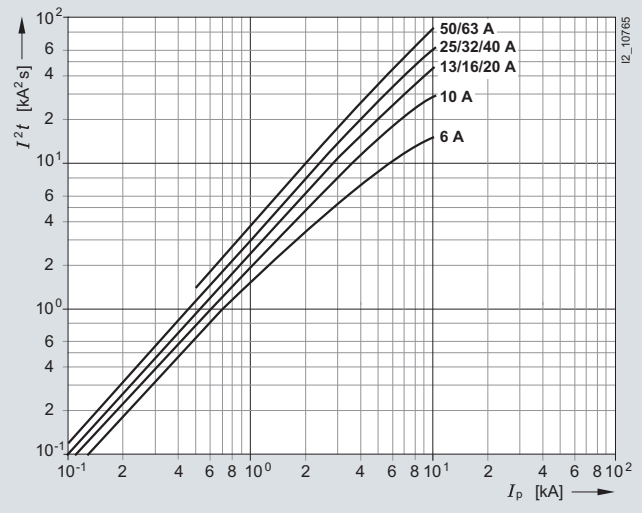
Characteristic A



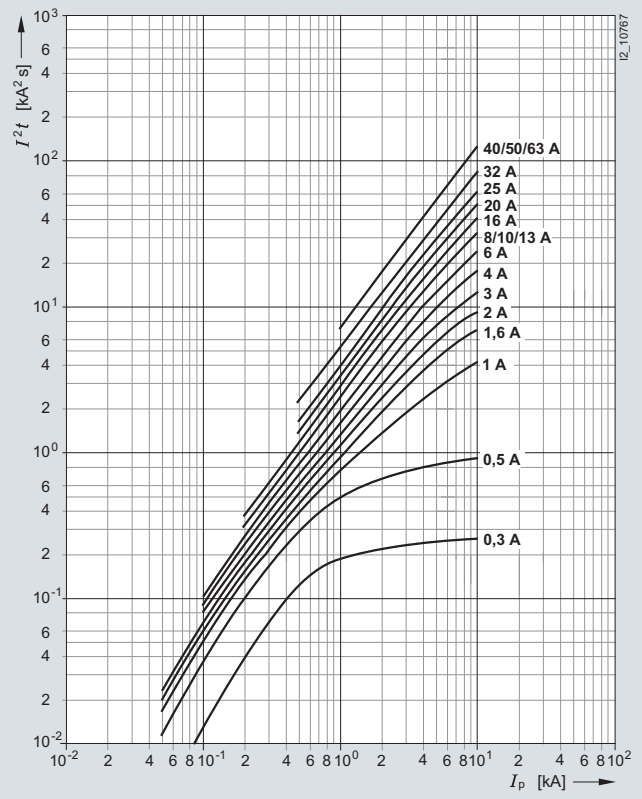
Characteristic C



Characteristic B



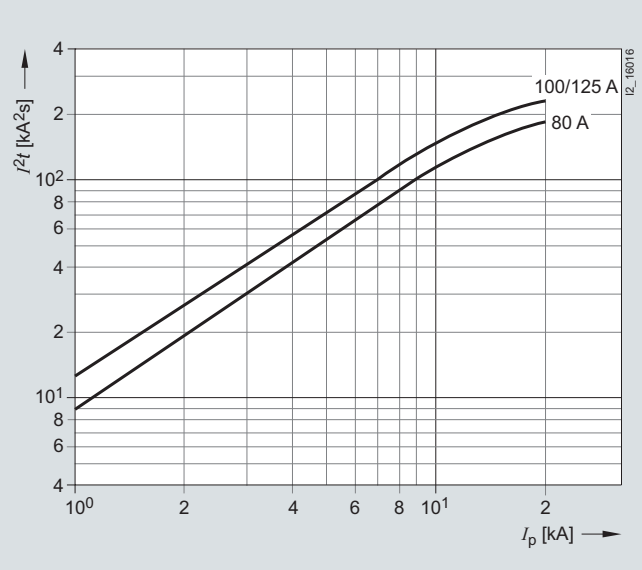
Characteristic D



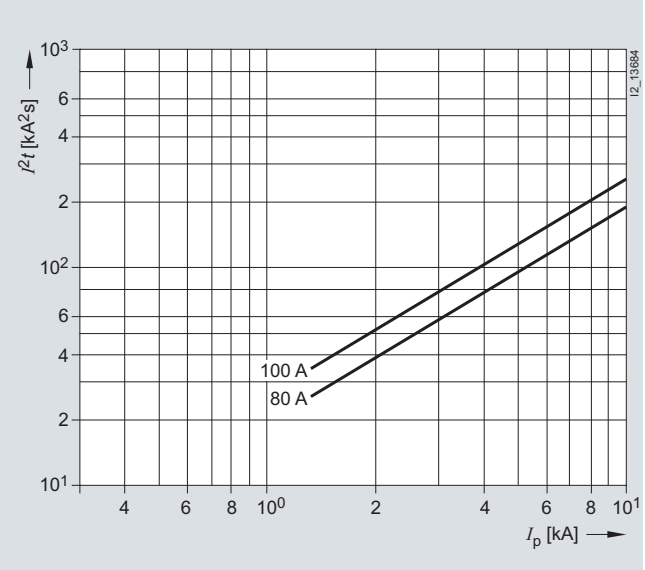
Characteristic curves 5SP4

Let-through I^2t values

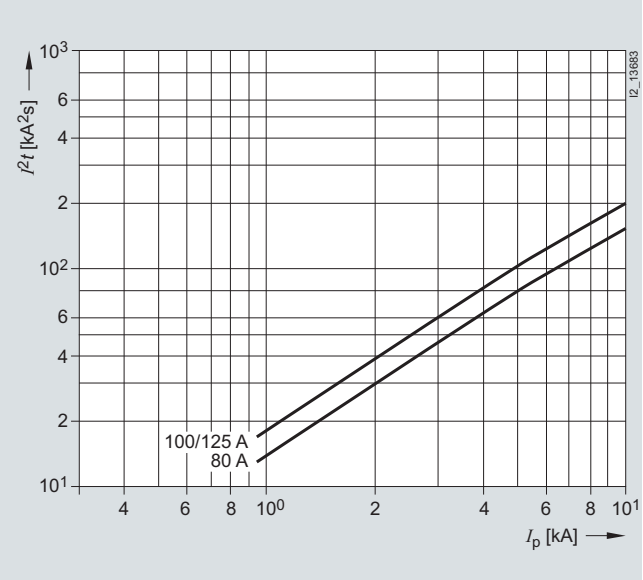
Characteristic B



Characteristic D



Characteristic C

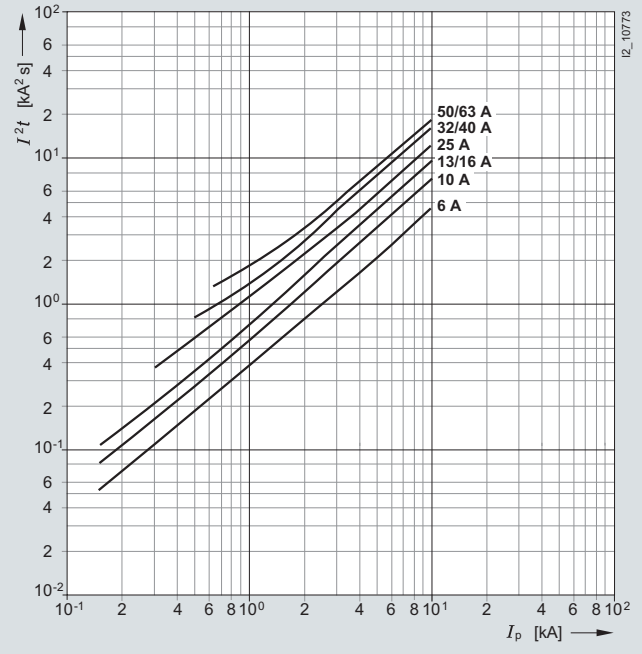


Configuration

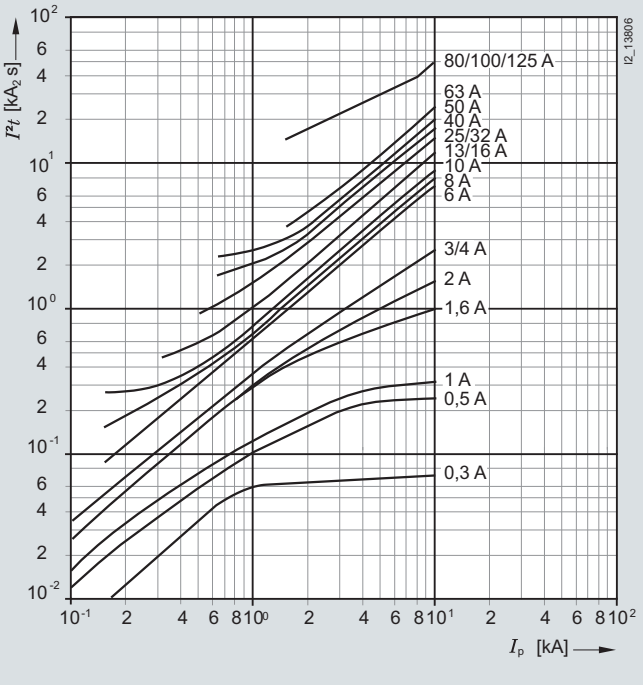
Characteristic curves 5SY5, 5SP5 (characteristic C only)

Let-through I^2t values

Characteristic B



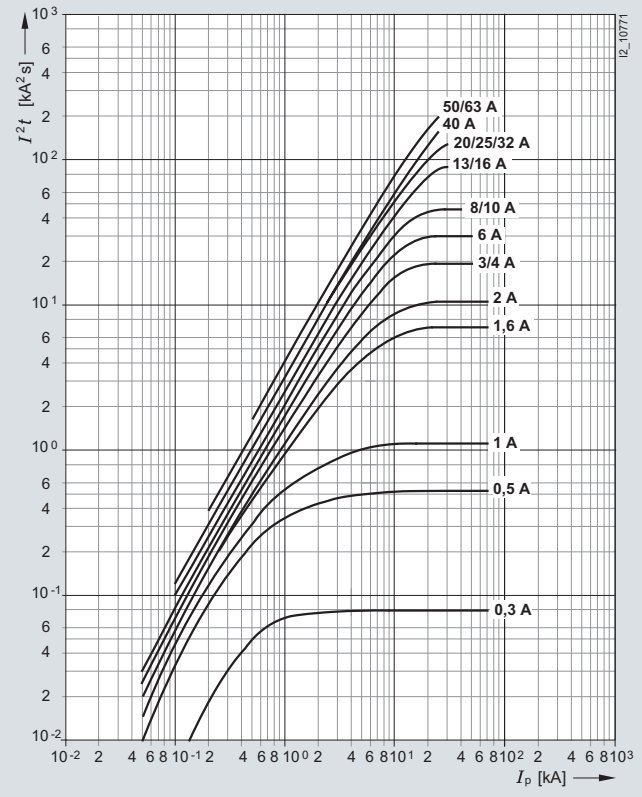
Characteristic C



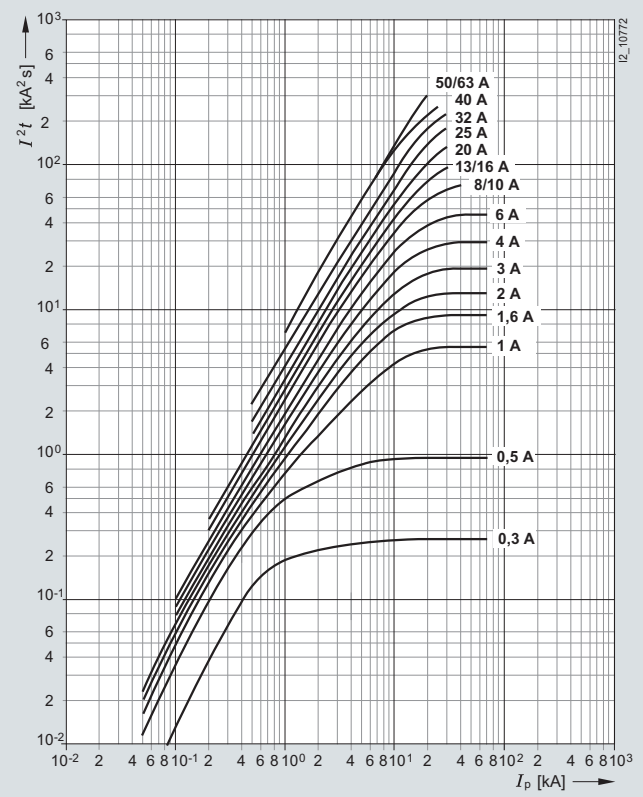
Characteristic curves 5SY8

Let-through I^2t values

Characteristic C



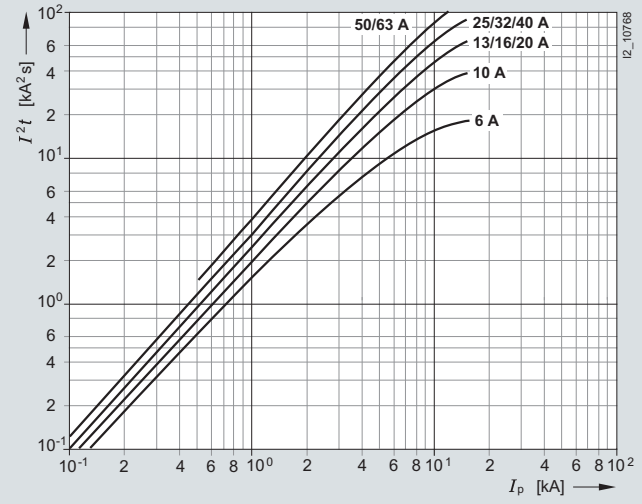
Characteristic D



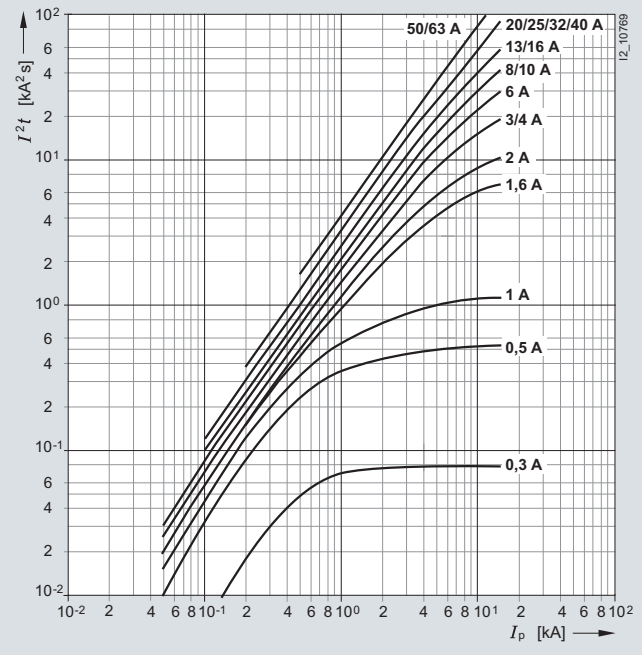
Characteristic curves 5SY7

Let-through I^2t values

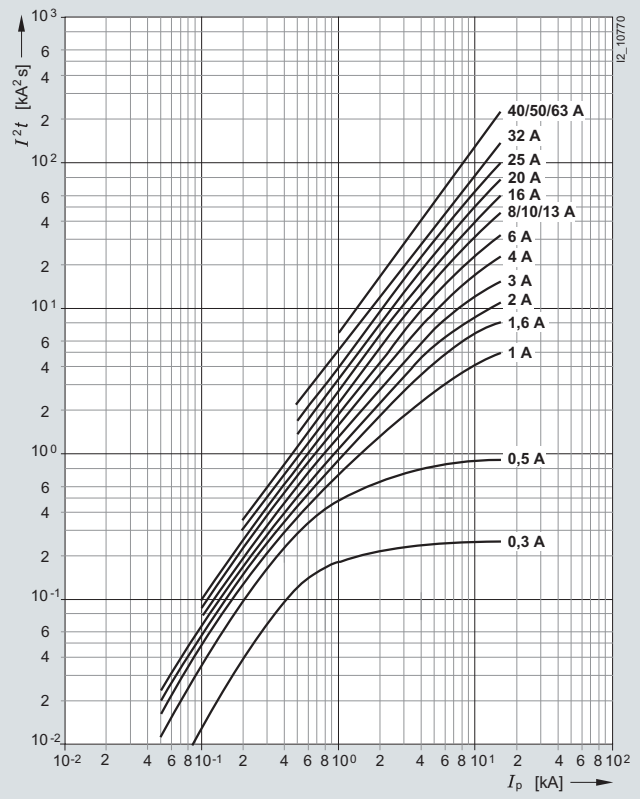
Characteristic B



Characteristic C



Characteristic D

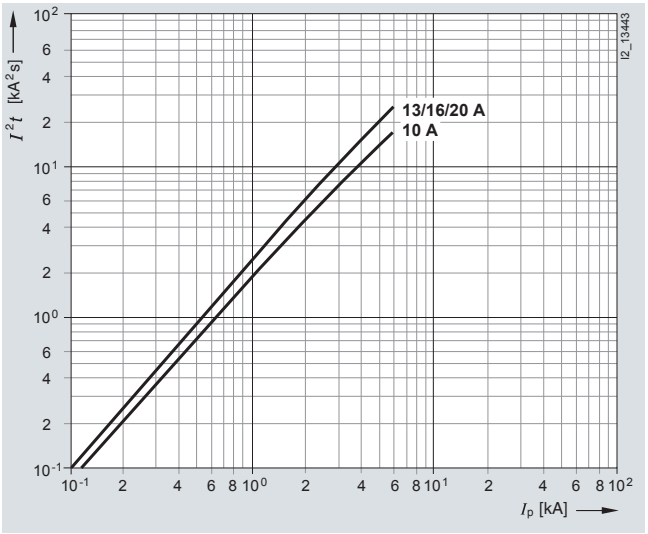


Configuration

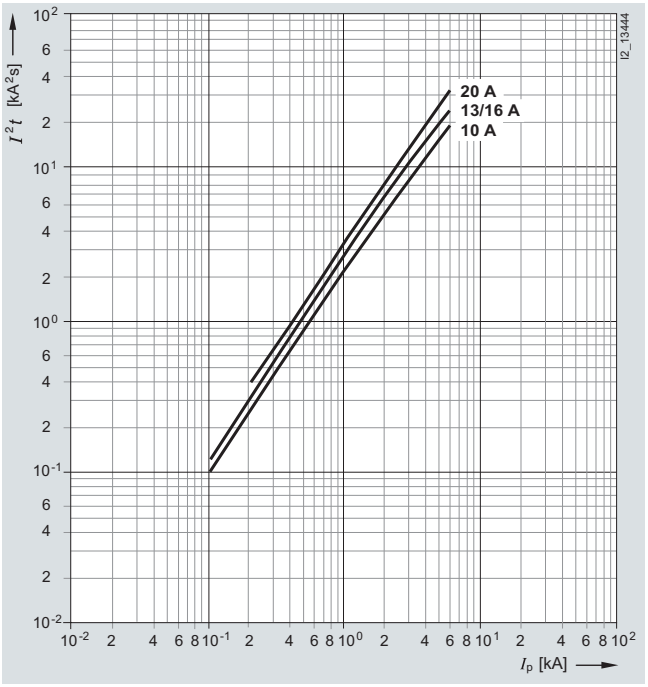
Characteristic curves 5SJ6

Let-through I^2t values

Characteristic B



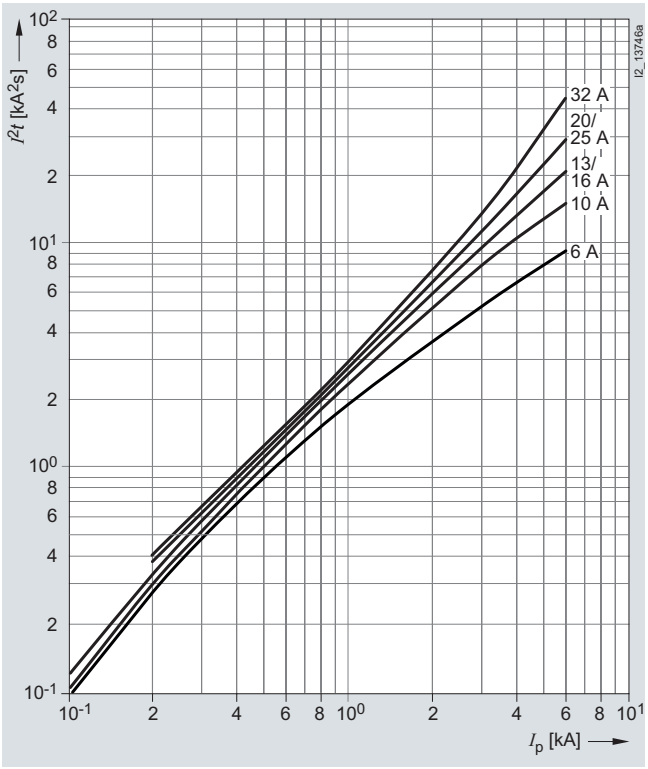
Characteristic C



Characteristic curves 5SY60

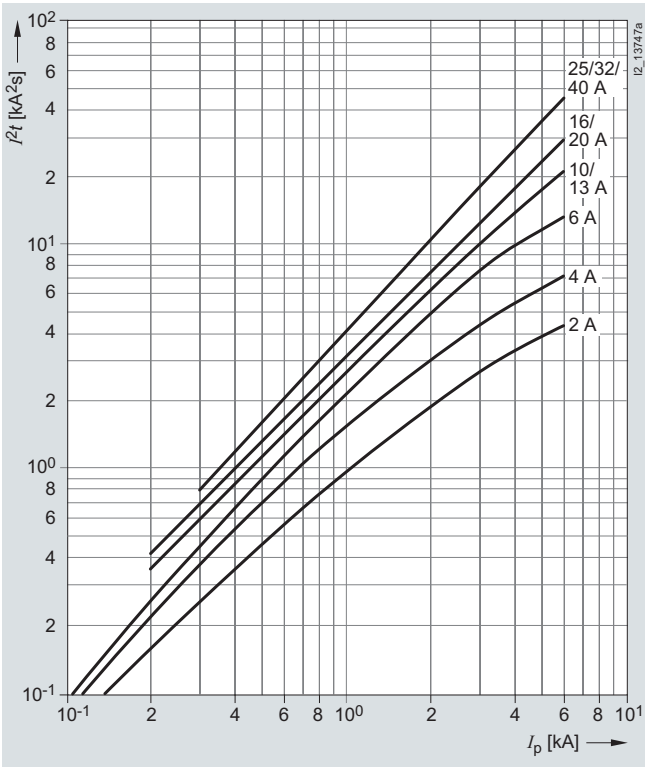
Let-through I^2t values of 5SY6 0...-6 MCB range

Characteristic B



Let-through I^2t values of 5SY6 0...-7 MCB range

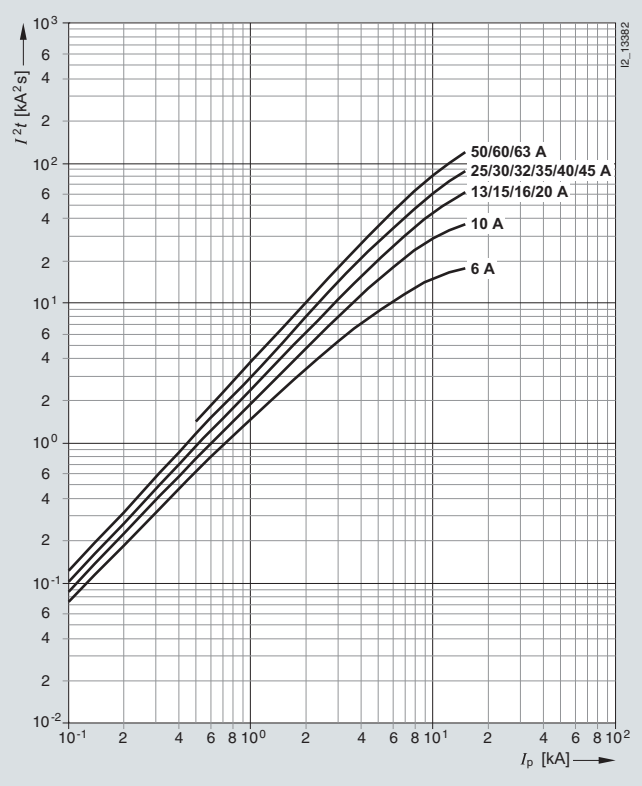
Characteristic C



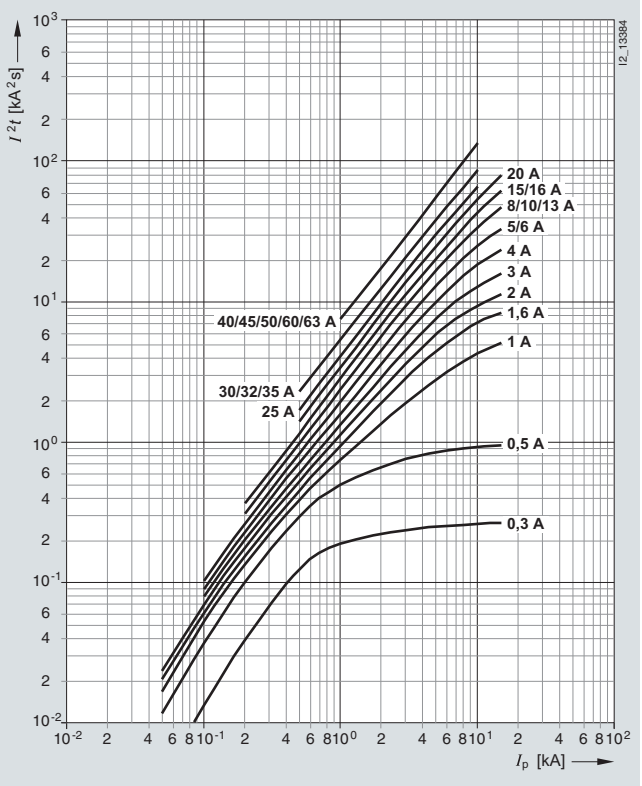
Characteristic curves 5SJ4 . . .-.HG40, 5SJ4 . . .-.HG41, 5SJ4 . . .-.HG42

Let-through I^2t values

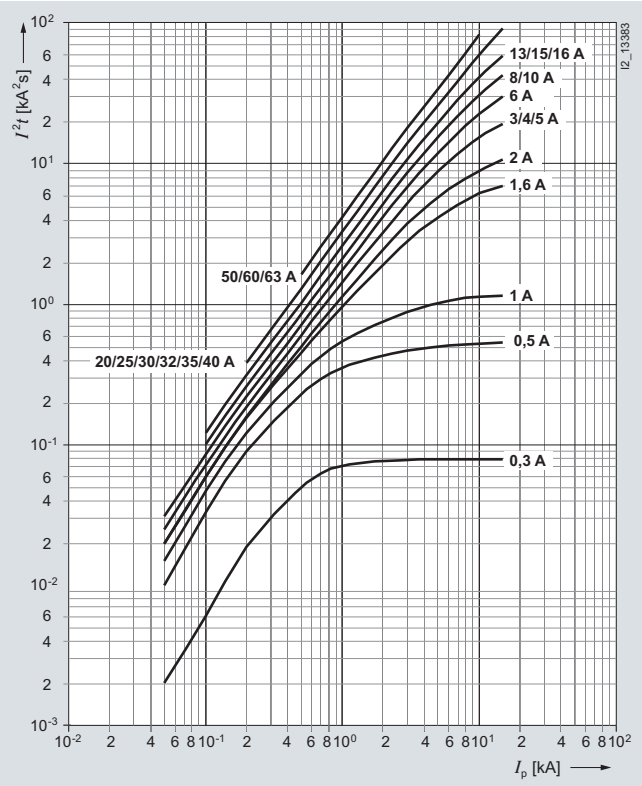
Characteristic B



Characteristic D



Characteristic C



Configuration

Selectivity for miniature circuit breakers/fuses

Distribution systems are usually set up as radial networks. An overcurrent protection device is required for each reduction of the conductor cross-section. This produces a series connection staggered according to rated currents, which should, if possible, be "selective".

Selectivity means that, in the event of a fault, only the protective device that is directly next to the fault in the current path is tripped. This enables current paths in parallel to maintain a power flow.

In the case of miniature circuit breakers with upstream fuses, the selectivity limit depends largely on the current limitation and tripping characteristics of the miniature circuit breaker and the melting I^2t value of the fuse.

This produces different selectivity limits for miniature circuit breakers with different characteristics and rated switching capacity.

The following tables provide information on the short-circuit currents up to which selectivity is still maintained between miniature circuit breakers and upstream fuse according to DIN VDE 0636-21. The values specified in kA are limit values that were determined under unfavorable test conditions. Under normal practical conditions, you can often expect considerably better values, depending on the upstream fuses.

Limit values of selectivity for miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers		**Upstream fuses**							
	I_n [A]	16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A
5SY6									
Characteristic B	6	0.3	0.4	0.7	1.2	3.0	3.2	•	•
	10	--	0.4	0.6	1.0	2.2	3.0	5.0	•
	13	--	--	0.5	1.0	2.2	3.0	5.0	•
	16	--	--	--	1.0	2.0	2.4	4.0	•
	20	--	--	--	--	2.0	2.4	4.0	•
	25	--	--	--	--	--	2.0	3.5	•
	32	--	--	--	--	--	1.7	2.9	•
	40	--	--	--	--	--	--	2.0	4.0
	50	--	--	--	--	--	--	--	4.0
Characteristic C	≤ 2	0.3	0.5	1.2	1.7	•	•	•	•
	3	0.3	0.4	0.8	1.4	4.0	5.0	•	•
	4	0.3	0.4	0.6	1.1	3.0	4.0	•	•
	6	--	0.4	0.6	1.0	2.4	3.2	•	•
	8	--	--	0.5	0.9	1.4	2.6	3.1	•
	10	--	--	0.5	0.9	1.4	2.1	3.1	•
	13	--	--	--	0.8	1.3	2.0	3.0	•
	16	--	--	--	0.8	1.3	2.0	3.0	•
	20	--	--	--	--	1.3	2.0	2.7	•
	25	--	--	--	--	--	2.0	2.4	5.0
	32	--	--	--	--	--	--	2.2	4.0
	40	--	--	--	--	--	--	--	3.5
	50	--	--	--	--	--	--	--	3.0
	63	--	--	--	--	--	--	--	3.0

• ≙ ≥ rated switching capacity 5SY6 according to EN 60898 6 000.

Selectivity for miniature circuit breakers/fuses

In the event of a short-circuit, there is selectivity between the 5SY4, 5SY7, 5SP4 miniature circuit breakers and melting fuses according to DIN VDE 0636-21 up to the specified values in kA.

Limit values of selectivity for miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers	I_n [A]	**Upstream fuses** 16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
5SY4, 5SY7										
Characteristic B, C	6	0.3	0.4	0.8	1.4	3.2	4.5	9.0	•	•
	10	--	0.4	0.7	1.2	2.5	3.5	5.0	•	•
	13	--	--	0.7	1.2	2.5	3.5	5.0	•	•
	16	--	--	--	1.0	2.0	2.8	4.2	9.0	•
	20	--	--	--	1.0	2.0	2.6	4.2	9.0	•
	25	--	--	--	--	1.7	2.2	3.7	7.0	•
	32	--	--	--	--	1.7	2.2	3.7	7.0	•
	40	--	--	--	--	--	1.6	2.2	4.0	6.0
	50	--	--	--	--	--	--	2.2	4.0	6.0
	63	--	--	--	--	--	--	--	3.0	5.0
Characteristic C	≤ 2	0.3	0.5	1.5	2.0	9.0	•	•	•	•
	3	0.3	0.4	1.1	1.6	5.0	6.0	•	•	•
	4	0.3	0.4	0.9	1.4	3.5	5.0	9.0	•	•
	6	--	0.4	0.8	1.4	2.7	4.5	6.0	•	•
	8	--	--	0.6	1.2	2.2	3.5	5.0	7.0	•
	10	--	--	0.5	1.2	2.0	3.0	4.2	7.0	•
	13	--	--	--	1.0	1.6	2.4	3.4	6.0	•
	16	--	--	--	1.0	1.5	2.2	3.0	6.0	•
	20	--	--	--	--	1.3	2.2	3.0	6.0	•
	25	--	--	--	--	--	2.2	2.9	5.0	9.0
	32	--	--	--	--	--	--	2.4	4.0	7.0
	40	--	--	--	--	--	--	2.0	3.5	4.0
	50	--	--	--	--	--	--	--	3.0	4.0
	63	--	--	--	--	--	--	--	3.0	3.5
Characteristic D	≤ 2	0.3	0.4	1.0	1.8	5.0	7.0	•	•	•
	3	0.3	0.4	0.9	1.5	4.0	5.0	8.0	•	•
	4	--	0.4	0.8	1.2	3.0	3.8	5.5	•	•
	6	--	--	0.7	1.1	2.5	3.1	4.4	8.1	•
	8	--	--	--	0.9	2.1	2.5	3.5	6.2	9.3
	10	--	--	--	--	2.1	2.5	3.5	6.2	9.3
	13	--	--	--	--	--	2.5	3.5	6.2	9.3
	16	--	--	--	--	--	2.2	3.1	5.1	7.5
	20	--	--	--	--	--	--	2.7	4.3	6.3
	32	--	--	--	--	--	--	--	4.0	5.5
	40	--	--	--	--	--	--	--	3.5	4.8
	50	--	--	--	--	--	--	--	--	4.0
	63	--	--	--	--	--	--	--	--	--

• ≙ ≥ rated switching capacity 5SY4 according to EN 60898 10 000.

Limit values of selectivity for miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers	I_n [A]	**Upstream fuses** 100 A	125 A	160 A	200 A	224 A	250 A
5SP4							
Characteristic B	80	2.8	3.8	5.7	8.1	•	•
	100	--	3.5	5.2	7.0	•	•
	125	--	--	5.2	7.0	•	•
Characteristic C	80	2.5	3.5	5.1	7.5	9.2	•
	100	--	3.3	4.5	6.5	8.0	•
	125	--	--	4.5	6.5	8.0	•
Characteristic D	80	2.3	3.3	4.6	6.9	8.1	•
	100	--	2.8	4.3	6.2	7.5	9.2

• ≙ ≥ rated switching capacity 5SP4 according to EN 60898 10 000.

Values for 5SY8 on request.

Configuration

Power loss for miniature circuit breakers according to UL and IEC, 5SJ4

Rated current	Characteristic B		Characteristic C		Characteristic D	
I_n A	R_i mΩ	P_v W	R_i mΩ	P_v W	R_i mΩ	P_v W
0.3	--	--	12900	1.2	12600	1.1
0.5	--	--	4900	1.2	4600	1.2
1	--	--	1650	1.7	1480	1.5
1.6	--	--	620	1.6	570	1.5
2	--	--	440	1.8	435	1.8
3	--	--	197	1.8	190	1.7
4	--	--	115	1.8	100	1.6
5	--	--	115	2.9	100	2.5
6	85	3.1	74	2.7	73	2.6
8	--	--	40	2.6	39	2.5
10	16.5	1.7	13.5	1.4	11.9	1.2
13	11.7	2.0	10.2	1.7	10.2	1.7
15	8.5	1.9	7.8	1.8	7.7	1.7
16	8.5	2.2	7.8	2.0	7.7	2.0
20	6.7	2.7	5.5	2.2	5.5	2.2
25	4.3	2.7	4.2	2.6	4.2	2.6
30	3.4	3.1	3.5	3.2	3.0	2.7
32	3.4	3.5	3.5	3.6	3.0	3.1
35	2.8	3.4	2.8	3.4	2.7	3.3
40	2.8	4.5	2.8	4.5	2.5	4.0
45	2.8	5.7	2.7	5.5	2.5	5.1
50	2.1	5.3	2.1	5.0	2.0	5.0
60	1.7	6.1	1.7	6.1	1.7	6.1
63	1.7	6.7	1.7	6.7	1.7	6.7

Selectivity for miniature circuit breakers/circuit breakers

Distribution systems can also be set up without fuses. In such cases, a circuit breaker acts as an upstream protective device. In this case, the selectivity limit depends on the level of peak current Î let through by the miniature circuit breaker and the tripping current of the circuit breaker.

The following tables show the short-circuit current in kA up to which selectivity is guaranteed between miniature circuitbreakers and upstream circuit breaker according to IEC/EN 60947-2 or DIN VDE 0660-101, at 230/400 V AC, 50 Hz.

Limit values of selectivity for miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers				**Upstream circuit breakers**								
				3RV1.1		**3RV1.2**						
	I_n [A]	$I >$[A]	I_{cn} [kA]	10 120 50	12 144 50	8 96 100	10 120 100	12.5 150 100	16 192 50	20 240 50	22 264 50	25 300 50
				Selectivity limits [kA][1]								
5SY4 ...-5												
Characteristic A	2	6	10	0.2	0.2	--	--	0.2	0.2	0.6	1.2	1.5
	10	30	10	--	--	--	--	--	--	0.3	0.5	0.5
	16	48	10	--	--	--	--	--	--	0.3	0.4	0.5
	32	96	10	--	--	--	--	--	--	--	--	--
	40	120	10	--	--	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7 ...-6												
Characteristic B	6	30	6/10/15	0.2	0.2	--	--	0.2	0.2	0.3	0.5	0.5
	10	50	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	13	65	6/10/15	--	--	--	--	--	0.2	0.2	0.4	0.4
	16	80	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	20	100	6/10/15	--	--	--	--	--	--	--	--	0.4
	25	125	6/10/15	--	--	--	--	--	--	--	--	--
	32	160	6/10/15	--	--	--	--	--	--	--	--	--
	40	200	6/10/15	--	--	--	--	--	--	--	--	--
	50	250	6/10/15	--	--	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7 ...-7												
Characteristic C	0.5	5	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1	10	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1.6	16	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	2	20	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	3	30	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	4	40	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	6	60	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	8	80	6/10/15	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4
	10	100	6/10/15	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4
	13	130	6/10/15	--	--	--	--	--	0.2	0.2	0.4	0.4
	16	160	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	20	200	6/10/15	--	--	--	--	--	--	--	--	0.4
	25	250	6/10/15	--	--	--	--	--	--	--	--	--
	32	320	6/10/15	--	--	--	--	--	--	--	--	--
	40	400	6/10/15	--	--	--	--	--	--	--	--	--
	50	500	6/10/15	--	--	--	--	--	--	--	--	--
	63	630	6/10/15	--	--	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7 ...-8												
Characteristic D	2	40	6/10/15	--	--	--	--	0.2	0.2	0.4	0.6	0.6
	6	120	6/10/15	--	--	--	--	--	--	0.3	0.4	0.4
	10	200	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	16	320	6/10/15	--	--	--	--	--	--	--	--	--
	32	640	6/10/15	--	--	--	--	--	--	--	--	--
	40	800	6/10/15	--	--	--	--	--	--	--	--	--
	50	1000	6/10/15	--	--	--	--	--	--	--	--	--

Values for 5SY8 on request.

[1] In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
$I >$ ≙ tripping current.

Configuration

Selectivity for miniature circuit breakers/circuit breakers

In the event of a short-circuit, there is selectivity between miniature circuit breakers and motor starter protectors according to IEC/EN 60947-2 or DIN VDE 0660-101 up to the specified values in kA.

Limit values of selectivity for miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers				**Upstream circuit breakers**						
				3RV1.3						
	I_n [A]	$I>$ [A]	I_{cn} [kA]	16 192 50	20 240 50	25 300 50	32 384 50	40 480 50	45 540 50	50 600 50
				Selectivity limits [kA][1]						
5SY4 ...-5										
Characteristic A	2	6	10	0.2	0.8	1.2	2.5	3	6	6
	10	30	10	0.2	0.4	0.5	0.6	0.8	1	1.2
	16	48	10	--	0.3	0.4	0.6	0.8	0.8	1
	32	96	10	--	--	--	--	0.6	0.8	0.8
	40	120	10	--	--	--	--	--	--	0.8
5SY4, 5SY7...-6										
Characteristic B	6	30	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.2
	10	50	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1.2
	13	65	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1
	16	80	6/10/15	--	0.3	0.4	0.6	0.8	1	1
	20	100	6/10/15	--	--	0.4	0.6	0.8	1	1
	25	125	6/10/15	--	--	--	0.5	0.6	0.8	0.8
	32	160	6/10/15	--	--	--	--	0.6	0.8	0.8
	40	200	6/10/15	--	--	--	--	--	--	0.8
	50	250	6/10/15	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7...-7										
Characteristic C	0.5	5	6/10/15	0.3	0.5	0.6	1	1	1.5	3
	1	10	6/10/15	0.3	0.5	0.6	1	1	1.5	3
	1.6	16	6/10/15	0.3	0.5	0.6	1	1	1.5	3
	2	20	6/10/15	0.3	0.5	0.6	1	1	1.5	3
	3	30	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1
	4	40	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1
	6	60	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1
	8	80	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1
	10	100	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1
	13	130	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1
	16	160	6/10/15	--	0.2	0.4	0.6	0.6	0.8	1
	20	200	6/10/15	--	--	0.4	0.6	0.6	0.8	1
	25	250	6/10/15	--	--	--	0.5	0.6	0.8	0.8
	32	320	6/10/15	--	--	--	--	0.6	0.8	0.8
	40	400	6/10/15	--	--	--	--	--	--	0.8
	50	500	6/10/15	--	--	--	--	--	--	--
	63	630	6/10/15	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7...-8										
Characteristic D	2	40	6/10/15	0.3	0.5	0.6	0.8	1.2	1.5	1.5
	6	120	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1
	10	200	6/10/15	--	0.3	0.4	0.5	0.6	0.8	0.8
	16	320	6/10/15	--	--	--	0.5	0.6	0.6	0.8
	32	640	6/10/15	--	--	--	--	--	0.6	0.6
	40	800	6/10/15	--	--	--	--	--	--	--
	50	1000	6/10/15	--	--	--	--	--	--	--

[1] In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
$I>$ ≙ tripping current.

Selectivity for miniature circuit breakers/circuit breakers

In the event of a short-circuit, there is selectivity between miniature circuit breakers and motor starter protectors according to IEC/EN 60947-2 or DIN VDE 0660-101 up to the specified values in kA.

Limit values of selectivity for miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers				**Upstream circuit breakers**									
				3RV1.4									
	I_n [A]			16	20	25	32	40	50	63	75	90	100
		$I >$[A]		192	240	300	384	480	600	756	900	1080	1140
			I_{cn} [kA]	100	100	100	100	100	100	100	100	100	100
				Selectivity limits [kA][1]									
5SY4 ...-5													
Characteristic A	2	6	10	0.5	0.8	1.5	2.5	3	6/7.5	6/10	6/10	6/10	6/10
	10	30	10	0.3	0.4	0.5	0.6	0.8	1.2	1.5	2.5	3	4
	16	48	10	--	0.3	0.5	0.6	0.6	1	1.5	2	3	3
	32	96	10	--	--	--	--	0.6	0.8	1.5	2	2.5	3
	40	120	10	--	--	--	--	--	0.8	1.2	1.5	2	2
5SY6, 5SY4, 5SY7...-6													
Characteristic B	6	30	6/10/15	0.2	0.4	0.5	0.6	0.8	1.2	2	3	6/10/15	6/10/15
	10	50	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2.5	4	4
	13	65	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	16	80	6/10/15	--	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	20	100	6/10/15	--	--	0.5	0.6	0.8	1	1.5	2	3	3
	25	125	6/10/15	--	--	--	0.5	0.8	0.8	1.5	2	3	3
	32	160	6/10/15	--	--	--	--	0.6	0.8	1.5	2	3	3
	40	200	6/10/15	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
	50	250	6/10/15	--	--	--	--	--	--	1.2	1.5	2.5	2.5
5SY6, 5SY4, 5SY7...-7													
Characteristic C	0.5	5	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1	10	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1.6	16	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	2	20	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	3	30	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	4	40	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	6	60	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	8	80	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	10	100	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	13	130	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	16	160	6/10/15	--	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	20	200	6/10/15	--	--	0.4	0.6	0.6	1	1.5	2	3	3
	25	250	6/10/15	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	320	6/10/15	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
	40	400	6/10/15	--	--	--	--	--	0.6	1	1.5	2	2
	50	500	6/10/15	--	--	--	--	--	--	1	1.2	1.5	2
	63	630	6/10/15	--	--	--	--	--	--	--	--	1.5	1.5
5SY6, 5SY4, 5SY7...-8													
Characteristic D	2	40	6/10/15	0.4	0.5	0.6	0.8	1	1.5	3	4	6/10/15	6/10/15
	6	120	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2.5	3	3
	10	200	6/10/15	--	0.3	0.4	0.5	0.6	0.8	1.5	2	3	3
	16	320	6/10/15	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	640	6/10/15	--	--	--	--	--	0.6	1	1.5	2	2
	40	800	6/10/15	--	--	--	--	--	--	1	1.2	1.5	1.5
	50	1000	6/10/15	--	--	--	--	--	--	1	1.2	1.5	1.5
5SP4...-7													
Characteristic C	80	1600	10	--	--	--	--	--	--	--	--	--	1.2
	100	2000	10	--	--	--	--	--	--	--	--	--	--
5SP4...-8													
Characteristic D	80	1600	10	--	--	--	--	--	--	--	--	--	--
	100	2000	10	--	--	--	--	--	--	--	--	--	--

Values for 5SY8 on request.

[1] In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
$I >$ ≙ tripping current.

BETA Protecting
Miniature Circuit Breakers

Configuration

Selectivity for miniature circuit breakers/circuit breakers

In the event of a short-circuit, there is selectivity between miniature circuit breakers and motor starter protectors according to IEC/EN 60947-2 or DIN VDE 0660-101 up to the specified values in kA.

Limit values of selectivity for miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers				**Upstream circuit breakers**											
				3VL1, TM non-adjustable						**3VL2, TM adjustable**					
	I_n [A]	$I >$[A]	I_{cn} [kA]	50 500 40/70/ 100	63 630 40/70/ 100	80 800 40/70/ 100	100 1000 40/70/ 100	125 1250 40/70/ 100	160 1600 40/70/ 100	50 400 40/70/ 100	63 500 40/70/ 100	80 630 40/70/ 100	100 800 40/70/ 100	125 1000 40/70/ 100	160 1280 40/70/ 100
				Selectivity limits [kA][1]											
5SY6, 5SY4, 5SY7															
Characteristic A	2	6	10	10	10	10	10	10	10	10	10	10	10	10	10
	10	30	10	1.6	4.7	6	10	10	10	2.5	4	4	4.5	4.9	10
	16	48	10	1.4	4.7	6	10	10	10	2.3	3.7	3.7	4.4	5	10
	32	96	10	1.2	3.6	4.6	10	10	10	1.8	3	3	3.5	3.7	6
	40	120	10	1	2.5	3.1	6	10	10	1.5	2	2	2.4	2.7	3.2
Characteristic B	6	30	6/10/15	5.5	5.5	T	T	T	T	2.5	2.5	5.1	7.3	T	T
	10	50	6/10/15	3.1	3.1	6.7	6.7	6.7	6/12/4	2.0	2.0	3.0	3.9	5.0	8.6
	13	65	6/10/15	2.5	2.5	5.0	5.0	5.0	8.0	1.5	1.5	3.1	3.4	4.5	5.8
	16	80	6/10/15	2.5	2.5	4.4	4.4	4.4	7.2	1.5	1.5	2.0	3.1	4.0	5.1
	20	100	6/10/15	2.0	2.0	4.3	4.3	4.3	6.6	1.5	1.5	2.0	2.5	3.9	5.0
	25	125	6/10/15	2.0	2.0	3.9	3.9	3.9	6.1	1.5	1.5	2.0	2.1	3.4	4.6
	32	160	6/10/15	2.0	2.0	3.7	3.7	3.7	5.0	1.5	1.5	2.0	2.1	3.4	4.8
	40	200	6/10/15	2.0	2.0	3.7	3.7	3.7	5.0	1.2	1.2	2.0	2.1	3.3	4.3
	50	250	6/10/15	--	1.5	3.2	3.2	3.2	4.0	--	--	1.5	2.0	2.5	3.6
Characteristic C	0.5	5	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
	1	10	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
	1.5	15	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
	2	20	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
	3	30	6/10/15	3.2	3.2	T	T	T	T	2.5	T	T	T	T	T
	4	40	6/10/15	3.2	3.2	T	T	T	T	2.5	T	T	T	T	T
	6	60	6/10/15	3.2	3.2	7	7	7	6/10/ 13.9	2.5	2.5	5.1	7.3	T	T
	8	80	6/10/15	2.5	2.5	5.4	5.4	5.4	6/9/2	2.3	3.7	3.8	3.9	5.6	8.6
	10	100	6/10/15	2.5	2.5	5.4	5.4	5.4	6/9/2	2.0	2.0	3.0	3.4	5.6	8.6
	13	130	6/10/15	2.5	2.5	4.3	4.3	4.3	7.1	1.5	1.5	2.5	3.4	4.5	5.8
	16	160	6/10/15	2.0	2.5	4.0	4.0	4.0	7.1	1.5	1.5	2.5	3.1	4.0	5.1
	20	200	6/10/15	2.0	2.0	3.7	3.7	3.7	6.3	1.5	1.5	2.0	2.5	3.9	5.0
	25	250	6/10/15	2.0	2.0	3.6	3.6	3.6	5.5	1.5	1.5	2.0	2.5	3.5	4.6
	32	320	6/10/15	2.0	2.0	3.5	3.5	3.5	5.5	1.5	1.5	2.0	2.5	3.4	4.5
	40	400	6/10/15	1.5	1.5	3.3	3.3	3.3	5.1	1.2	1.2	2.0	2.5	3.3	4.3
	50	500	6/10/15	--	1.5	3.1	3.1	3.1	4.0	--	--	1.5	2.5	2.5	3.6
Characteristic D	2	40	6/10/15	2.4	6	6	6	6	6	4.2	6	6	6	6	6
	6	120	6/10/15	1.4	1.4	4.8	5	6	6	2.3	4.1	4.2	4.2	4.3	6
	10	200	6/10/15	1.3	1.3	4.5	5	6	6	1.9	3.7	3.7	3.7	4	6
	16	320	6/10/15	1.1	1.1	3.2	3.2	3.2	4.0	1.7	3.3	3.7	3.3	3.5	4.7
	32	640	6/10/15	--	--	2.3	2.3	2.3	4.0	--	--	--	2.4	2.7	3.7
	40	800	6/10/15	--	--	--	2.1	2.1	3.8	--	--	--	--	1.5	3
	50	1000	6/10/15	--	--	--	--	2.0	2.8	--	--	--	--	--	2.6
5SP4															
Characteristic C	80	800	10	--	--	--	1.0	1.2	2.0	--	--	--	--	1.2	1.5
	100	1000	10	--	--	--	--	1.2	1.5	--	--	--	--	--	1.5
Characteristic D	80	1600	10	--	--	--	--	--	--	--	--	--	--	--	--
	100	1200	10	--	--	--	--	--	--	--	--	--	--	--	--

Values for 5SY8 on request.

T ≙ full selectivity up to rated breaking capacity I_{cn} of the downstream protective device.

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
The selectivity limits for adjustable releases apply to the maximum value,
I_n = rated current. $I >$ ≙ tripping current.

Selectivity for miniature circuit breakers/circuit breakers

In the event of a short-circuit, there is selectivity between miniature circuit breakers and motor starter protectors according to IEC/EN 60947-2 or VDE 0660-101 up to the specified values in kA.

Limit values of selectivity for miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers			**Upstream circuit breakers**											
			3VL3, TM		**3VL4, TM**				**3VL6, ETU**		**3VL7. ETU**	**3VL8, ETU**	**3WN1**	**3WN6**
I_n [A]			200	250	200	250	315	400	315	400 ... 800	400 ... 1250	800 ... 2500	315 ... 6300	315 ... 3200
I >[A]			2000	2500	2000	2500	3150	4000	3200	1575 ... 6400	15000	20000	3780 ... 75600	3780 ... 48000
		I_{cn} [kA]	40 ... 100	40 ... 100	45 ... 100	45 ... 100	45 ... 100	45 ... 100	45 ... 100	45 ... 100	50 ... 100	70/100	65 ... 100	65/75
			Selectivity limits [kA][1]											
5SY6, 5SY4, 5SY7														
Characteristic A														
2	6	10	T	T	T	T	T	T	T	T	T	T	T	T
10	30	10	T	T	T	T	T	T	T	T	T	T	T	T
16	48	10	T	T	T	T	T	T	T	T	T	T	T	T
32	96	10	T	T	T	T	T	T	T	T	T	T	T	T
40	120	10	T	T	T	T	T	T	T	T	T	T	T	T
Characteristic B														
6	30	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
10	50	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
13	65	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
16	80	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
20	100	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
25	125	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
32	160	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
40	200	6/10/15	6	6	6	T	T	T	T	T	T	T	T	T
50	250	6/10/15	6	6	6/10/ 14.1	T	T	T	T	T	T	T	T	T
Characteristic C														
0.5	5	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
1	10	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
1.5	15	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
2	20	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
3	30	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
4	40	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
6	60	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
8	80	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
10	100	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
13	130	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
16	160	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
20	200	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
25	250	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
32	320	6/10/15	6/10/11	T	T	T	T	T	T	T	T	T	T	T
40	400	6/10/15	6/10	T	T	T	T	T	T	T	T	T	T	T
50	500	6/10/15	6/10	T	T	T	T	T	T	6/10/ 14.2	T	T	T	T
Characteristic D														
2	40	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
6	120	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
10	200	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
16	320	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
32	640	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
40	800	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
50	1000	6/10/15	T	T	T	T	T	T	T	T	T	T	T	T
5SP4														
Characteristic C														
80	800	10	3	3	3	3	3	6	8	T	T	T	T	T
100	1000	10	3	3	3	3	3	5	6	T	T	T	T	T
Characteristic D														
80	1600	10	3	3	2.5	3	3	5	6	T	T	T	T	T
100	2000	10	--	2.5	--	3	3	5	6	T	T	T	T	T

Values for 5SY8 on request.

T ≙ full selectivity up to rated breaking capacity I_{cn} of the downstream protective device.

[1] In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
The selectivity limits for adjustable releases apply to the maximum value,
I_n = rated current. I > ≙ tripping current.

Configuration

Selectivity for miniature circuit breakers/miniature circuit breakers

Within narrow limits, miniature circuit breakers also offer selectivity between circuit breakers in a fuseless distribution board. The following table shows the short-circuit current in kA up to which selectivity is still maintained between series-connected miniature circuit breakers at 230 V AC.

This depends on the let-through peak current $\hat{I}$ of the downstream miniature circuit breaker and on the tripping current of the upstream miniature circuit breaker.

Limit values of selectivity for miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers				**Upstream miniature circuit breakers**								
				5SY4 ...-7 Characteristic C					**5SP4 ...-7 Characteristic C**		**5SP4 ...-8 Characteristic D**	
	I_n [A]	$I >$[A]	I_{cn} [kA]	20 200 10	25 250 10	32 320 10	40 400 10	50 500 10	80 800 10	100 1000 10	80 1200 10	100 1500 10
				Selectivity limits [kA][1]								
5SY												
Characteristic B	6	30	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	5
	10	50	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.2	3	4
	13	65	6/10/15	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	16	80	6/10/15	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	20	100	6/10/15	--	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	25	125	6/10/15	--	--	--	0.4	0.4	0.6	1.2	1.5	3
	32	160	6/10/15	--	--	--	0.4	0.4	0.6	1.2	1.5	3
	40	200	6/10/15	--	--	--	--	0.4	0.6	1.2	1.5	2.5
	50	250	6/10/15	--	--	--	--	--	0.6	1	1.5	2.5
Characteristic C	0.5	5	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	T	T
	1	10	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	T	T
	1.5	15	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	T	T
	2	20	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	T	T
	3	30	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	4	40	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	6	60	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	8	80	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	10	100	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	13	130	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	16	160	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	20	200	6/10/15	--	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	25	250	6/10/15	--	--	--	0.3	0.4	0.6	1	1.5	2.5
	32	320	6/10/15	--	--	--	0.3	0.4	0.6	1	1.5	2.5
	40	400	6/10/15	--	--	--	--	--	--	0.8	1.5	2
	50	500	6/10/15	--	--	--	--	--	--	0.8	1.5	2
	63	630	6/10/15	--	--	--	--	--	--	0.8	1.2	1.5

T ≙ full selectivity up to rated breaking capacity I_{cn} of the downstream protective device.

[1] In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
The selectivity limits for adjustable releases apply to the maximum value,
I_n = rated current. $I >$ ≙ tripping current.

Back-up protection miniature circuit breakers/fuses

If the maximum short-circuit current of the miniature circuit breaker at the installation site is unknown, or if the specified rated switching capacity is exceeded, an additional protective device must be connected upstream as back-up protection to prevent overloading of the miniature circuit breaker. This is usually a fuse.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed when using fuses according to DIN VDE 0636-21.

Limit values of back-up protection miniature circuit breakers/fuses in kA

Downstream miniature circuit breakers		Upstream fuses					
	I_n [A]	50 A	63 A	80 A	100 A	125 A	160 A
5SY6							
	0.3 ... 4	No back-up protection required up to 50 kA					
	6	50	50	50	50	50	35
	8	50	50	50	50	50	35
	10	50	50	50	50	50	35
	13	50	50	50	35	35	30
	16	50	50	50	35	30	30
	20	50	50	50	35	25	25
	25	50	50	50	35	30	25
	32	50	50	50	35	30	25
	40	50	50	50	50	25	15
	50	50	50	50	50	25	15
	63	50	50	35	25	25	15
5SY4, 5SY7							
	0.3 ... 6	No back-up protection required					
	8	50	50	50	50	45	45
	10	50	50	50	50	45	45
	13	50	50	50	45	40	35
	16	50	50	50	45	40	35
	20	50	50	50	40	35	30
	25	50	50	50	40	35	30
	32	50	50	50	45	40	30
	40	50	50	50	45	40	30
	50	50	50	50	40	35	25
	63	50	50	45	40	35	25

Test circuit data:

U_p = 250 V
p.f. = 0.3 ... 0.5

Test cycle:

According to EN 60947-2 (0 - C0)

BETA Protecting
Miniature Circuit Breakers

Configuration

Back-up protection miniature circuit breakers/circuit breakers

If miniature circuit breakers are installed in fuseless distribution boards, circuit breakers according to IEC/EN 60947-2 or DIN VDE 0660-101 must be used as back-up protection.

The following tables show the short-circuit currents – in kA – up to which back-up protection is guaranteed when using circuit breakers.

Limit values of back-up protection miniature circuit breakers/circuit breakers in kA

Downstream miniature circuit breakers			Upstream circuit breakers																	
			3VL1 Non-adjustable											3VL2 Adjustable						
	I_n [A]		16	20	25	32	40	50	63	80	100	125	160	50	63	80	100	125	160
	I >[A]		160	200	250	320	400	500	630	800	1000	1250	1600	400	500	630	800	1000	1280
	I_{cu} [kA]		40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/ 70	40/70/ 100	40/70/ 100	40/70/ 100	40/70/ 100	40/70/ 100	40/70/ 100
	I_n [A]	I_{cn} [kA]	Back-up protection up to kA																	
5SY6																				
Characteristic B	0.3 ... 6	6	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic C	8 ... 32	6	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	40 ... 63	6	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
5SY4																				
Characteristic A	0.3 ... 6	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Characteristic B	8 ... 32	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Characteristic C	40 ... 63	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D																				
5SY7																				
Characteristic B	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Characteristic C	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40 ... 63	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic D	0.3 ... 2	15	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	15	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	15	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40	15	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	50 ... 63	15	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
5SY8																				
Characteristic C	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	40 ... 63	25	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Characteristic D	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	40	25	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	50 ... 63	25	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
5SP4																				
Characteristic B	80 ... 125	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic C																				
Characteristic D	80 ... 100	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Downstream miniature circuit breakers			Upstream circuit breakers													
			3VL3		3VL4				3VL5				3VL6	3VL7	3VL8	3WN1/ 3WS1
		I_n [A]	200	250	200	250	315	400	250 ... 315	315 ... 400	400 ... 500	500 ... 630	320 ... 800	400 ... 1250	1600 ... 2000	315 ... 6300
		$I >$[A]	2000	2500	2000	2500	3150	4000	2500 ... 3150	3150 ... 4000	4000 ... 5000	5000 ... 6300	3200 ... 6300	15000	20000	3780 ... 75600
		I_{cn} [kA]	40/70/ 100	40/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	50/70/ 100	70/100	65 ... 100
	I_n [A]	I_{cn} [kA]	Back-up protection up to kA													
5SY6																
Characteristic B	0.3 ... 6	6	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic C	8 ... 32	6	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	40 ... 63	6	20	20	20	20	20	20	20	20	20	20	20	20	20	20
5SY4																
Characteristic A	0.3 ... 6	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Characteristic B	8 ... 32	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Characteristic C	40 ... 63	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D																
5SY7																
Characteristic B	0.3 ... 2	10	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Characteristic C	3 ... 10	10	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40 ... 63	10	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Characteristic D	0.3 ... 2	10	50	50	50	50	50	50	50	50	50	50	50	50	50	50
	3 ... 10	10	45	45	45	45	45	45	45	45	45	45	45	45	45	45
	13 ... 32	10	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	40	10	35	35	35	35	35	35	35	35	35	35	35	35	35	35
	50 ... 63	10	30	30	30	30	30	30	30	30	30	30	30	30	30	30
5SY8																
Characteristic C	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	--	--	--
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	--	--	--
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	--	--	--
	40 ... 63	25	40	40	40	40	40	40	40	40	40	40	40	--	--	--
Characteristic D	0.3 ... 2	25	70	70	70	70	70	70	70	70	70	70	70	--	--	--
	3 ... 6	25	50	50	50	50	50	50	50	50	50	50	50	--	--	--
	8 ... 32	25	45	45	45	45	45	45	45	45	45	45	45	--	--	--
	40	25	40	40	40	40	40	40	40	40	40	40	40	--	--	--
	50 ... 63	25	35	35	35	35	35	35	35	35	35	35	35	--	--	--
5SP4																
Characteristic B Characteristic C	80 ... 125	10	25	25	25	25	25	25	25	25	25	25	25	--	--	--
Characteristic D	80 ... 100	10	20	20	20	20	20	20	20	20	20	20	20	--	--	--

Configuration

Internal resistances and power loss

(Data per pole with I_n)

	I_n [A]	Type A		Type B		Type C		Type D	
		R_1 mΩ	P_v W	R_1 mΩ	P_v W	R_1 mΩ	P_v W	R_1 mΩ	P_v W
5SY6, 5SY4, 5SY7, 5SY8, 5SY5									
	0.3	--	--	--	--	10500	0.9	10200	1
	0.5	--	--	--	--	3400	0.9	3120	0.8
	1	1955	2.0	--	--	1210	1.2	1030	1.0
	1.6	786	2.0	--	--	459	1.2	409	1.1
	2	510	2.0	375	1.5	295	1.2	292	1.2
	3	205	1.9	--	--	137	1.2	131	1.2
	4	134	2.1	91	1.45	81	1.3	73	1.2
	5	--	--	--	--	86	2.1	--	--
	6	58	2.1	55	2.0	44	1.6	43	1.6
	8	27	1.7	--	--	14	0.9	12	0.7
	10	18.1	1.8	13	1.3	10	1.0	8.4	0.8
	13	11.4	1.9	9.5	1.6	8.0	1.4	8.0	1.4
	15	--	--	--	--	6.3	1.4	--	--
	16	8.4	2.2	6.6	1.7	5.9	1.5	5.8	1.5
	20	6.2	2.5	5.2	2.1	4.0	1.6	3.8	1.5
	25	4.6	2.9	3.4	2.2	3.3	2.1	3.0	1.9
	30	--	--	--	--	2.4	2.2	--	--
	32	3	3.1	2.3	2.4	2.4	2.5	1.9	2.0
	35	--	--	--	--	2.0	2.4	--	--
	40	2.2	3.5	2.1	3.4	2.1	3.3	1.8	2.8
	45	--	--	--	--	1.4	2.9	--	--
	50	1.7	4.3	1.5	3.8	1.4	3.5	1.4	3.5
	60	--	--	--	--	1.1	4.1	--	--
	63	1.5	5.9	1.4	5.4	1.1	4.4	1.1	4.4
	80	--	--	1.0	6.4	1.0	6.4	--	--
5SP4, 5SP5									
	80	--	--	1.1	7.0	1.1	6.7	1.1	6.7
	100	--	--	0.8	8.0	0.88	8	0.8	8
	125	--	--	0.7	10.1	0.7	10.9	--	--

Correction factor for power loss

- Direct current and alternating current up to 60 Hz × 1.0
- Alternating current 200 Hz × 1.1
  400 Hz × 1.15
  1100 Hz × 1.3

Internal resistances R_i and power loss P_v of the miniature circuit breaker compact range 1+N in 1 MW, 5SY6 0

(Data per pole with I_n)

Rated current I_n	Characteristic B				Characteristic C			
	Phase-pole		N pole		Phase-pole		N pole	
A	R_i mΩ	P_v W	R_i mΩ	P_v W	R_i mΩ	P_v W	R_i mΩ	P_v W
2	--	--	--	--	290	1161	3.8	15
4	--	--	--	--	110	1766	4.0	64
6	30	1092	4.2	150	26	931	4.3	154
8	--	--	--	--	19.8	1264	3.9	249
10	15	1539	4.1	407	13	1297	4.1	406
13	9.5	1598	4.1	692	9.1	1531	4.4	742
16	8.7	2219	4.0	1018	7.5	1926	3.3	852
20	5.2	2082	1.1	436	5.3	2118	1.2	478
25	3.3	2065	1.3	804	3.0	1906	1.1	674
32	2.6	2625	1.2	1192	2.7	2718	1.3	1310
40	2.3	3619	1.1	1789	2.2	3531	1.1	1820

Personnel safety with miniature circuit breakers

According to DIN VDE 0100-410, in order to protect against dangerous leakage currents in the TN system, the cross-sections of the conductor, or its distance from the protective device, must be dimensioned such that if a fault with negligible impedance (i.e. short circuit) occurs at any point between a phase conductor and a PE conductor, or a connected exposed conductive part, the device automatically trips within the specified times of 0.4 s or 5 s.

This requirement is met through the following condition:

$Z_s \times I_a \leq U_o$

Z_s ≙ Impedance of the fault loop of all electrical circuits
I_a ≙ Current that trips within the specified times
U_o ≙ Voltage against ground

Maximum permissible impedance of fault loop at U_o = 230 V AC for compliance with trip conditions according to DIN VDE 0100-410

I_n [A]	Characteristic A		Characteristic B		Characteristic C		Characteristic D	
	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω
5SY, 5SP								
0.3	--	--	--	--	76.6	153	--	--
0.5	--	--	--	--	46	92	--	92
1.0	76.6	76.6	--	--	23	46	15.3	46
1.6	47.9	47.9	--	--	14.4	28.8	9.6	28.8
2	38.3	38.3	--	--	11.5	23	7.6	23
3	25.5	25.5	--	--	7.7	15.4	5.1	15.4
4	19.1	19.1	--	--	5.8	11.6	3.8	11.6
6	12.7	12.7	7.6	7.6	3.8	7.6	2.5	7.6
8	--	--	--	--	2.8	5.7	1.9	5.7
10	7.6	7.6	4.6	4.6	2.3	4.6	1.1	4.6
13	--	--	--	3.57	1.7	3.4	0.9	3.4
16	4.7	4.7	2.9	2.9	1.4	2.8	0.7	2.8
20	3.8	3.8	2.3	2.3	1.1	2.2	0.5	2.2
25	3.0	3.0	1.8	1.8	0.9	1.8	0.4	1.8
32	2.4	2.4	1.4	1.4	0.7	1.4	0.3	1.4
40	1.9	1.9	1.1	1.1	0.6	1.2	0.28	1.2
50	--	--	0.9	0.9	0.5	1.0	0.23	1.0
63	--	--	0.7	0.7	0.4	0.8	0.2	0.8
80	--	--	--	--	0.3	0.6	0.14	0.6
100	--	--	--	--	0.2	0.4	0.1	0.4
125	--	--	--	--	0.16	0.3	0.1	0.3

At U_o = 240 V AC, $Z_s \times 1.04$ applies.
At U_o = 127 V AC, $Z_s \times 0.55$ applies.

Configuration

Fusing of luminaire circuits

Maximum permissible lamp load of a miniature circuit breaker when operating fluorescent lamps L 18 W, L 36 W, L 38 W, L 58 W.

Maximum number of fluorescent lamps

I_n [A]	Lamps	Electronic ballasts											
		Full switching at 230 V 1 lamp[1]			2 lamps			Group switching at 230 V 1 lamp[2]			2 lamps		
5SY4, 5SY7													
Characteristic		**B**	**C**	**D**	**B**	**C**	**D**	**B**	**C**	**D**	**B**	**C**	**D**
6	L 18 W	17	37	66	17	35	35	66	66	66	35	35	35
	L 36 W	17	37	37	17	19	19	37	37	37	19	19	19
	L 58 W	17	19	19	12	12	12	19	19	19	12	12	12
8	L 18 W	--	50	88	--	47	47	--	88	88	--	--	47
	L 36 W	--	50	50	--	25	25	--	50	50	--	25	25
	L 58 W	--	25	25	--	16	16	--	25	25	--	16	16
10	L 18 W	36	67	111	36	58	58	111	111	111	58	58	58
	L 36 W	36	62	62	32	32	32	62	62	62	32	32	32
	L 58 W	32	32	32	20	20	20	32	32	32	20	20	20
13	L 18 W	44	81	144	44	76	76	144	144	144	76	76	76
	L 36 W	44	81	81	41	41	41	81	81	81	41	41	41
	L 58 W	41	41	41	26	26	26	41	41	41	26	26	26
16	L 18 W	56	100	177	56	94	94	177	177	177	94	94	94
	L 36 W	56	100	100	51	51	51	100	100	100	51	51	51
	L 58 W	51	51	51	32	32	32	51	51	51	32	32	32
20	L 18 W	70	117	222	70	117	117	222	222	222	117	117	117
	L 36 W	70	117	125	64	64	64	125	125	125	64	64	64
	L 58 W	64	64	64	40	40	40	64	64	64	40	40	40
25	L 18 W	85	157	277	85	147	147	277	277	277	147	147	147
	L 36 W	85	156	156	80	80	80	156	156	156	80	80	80
	L 58 W	80	80	80	51	51	51	80	80	80	51	51	51
32	L 18 W	100	144	355	100	144	188	355	355	355	188	188	188
	L 36 W	100	144	200	100	103	103	200	200	200	103	103	103
	L 58 W	100	103	103	65	65	65	103	103	103	65	65	65
40	L 18 W	126	216	444	126	216	235	444	444	444	235	235	235
	L 36 W	126	216	250	126	129	129	250	250	250	129	129	129
	L 58 W	126	129	129	81	81	81	129	129	129	81	81	81
50	L 18 W	180	247	555	180	247	294	555	555	555	294	294	294
	L 36 W	180	247	312	161	161	161	312	312	312	161	161	161
	L 58 W	161	161	161	102	102	102	161	161	161	102	102	102
63	L 18 W	170	340	567	170	340	370	700	700	700	370	370	370
	L 36 W	170	340	393	170	203	203	393	393	393	203	203	203
	L 58 W	170	203	203	128	128	128	203	203	203	128	128	128

[1] All ECGs are turned on simultaneously.

[2] The ECGs are turned on in groups one after the other.

Circuit impedance:
The specified lamp load values apply, taking into account a line impedance of 800 mΩ.
At 400 mΩ, the permissible values are reduced by 10 %.

Reduction factors for miniature circuit breakers for the simultaneously switching on of incandescent lamp load taking into account the rated current of the miniature circuit breaker and the summation operational current of the lamps

	Reduction factor	
	Switching with miniature circuit breaker	Switching with separate switch
5SY, 5SP4		
Characteristic A	0.3	0.35
Characteristic B	0.5	0.6
Characteristic C	1	1
Characteristic D	1	1

Current carrying capacity of miniature circuit breakers with corrected and uncorrected HQ, HQI and NAV lamps (number)

		Lamp power [W]							
		35	70	150	250	400	1000	2000	3500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Corrected lamp current	[A]	0.3	0.5	1	1.5	2	6	5.5	9.8
Inrush peak	[A]	10	18	36	60	70	120	125	220

	I_n [A]	Lamp power [W]							
		35	70	150	250	400	1000	2000	3500
5SY4, 5SY7									
Characteristic B	6	2	1	0	0	0	0	0	0
	10	5	3	1	1	0	0	0	0
	13	7	4	2	1	1	0	0	0
	16	8	5	2	1	1	0	0	0
	20	11	6	3	1	1	1	1	0
	25	13	7	3	2	2	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	28	15	7	4	4	2	2	1
	63	26	14	7	4	3	2	2	1
Characteristic C	6	6	3	1	1	0	0	0	0
	8	8	4	2	1	1	0	0	0
	10	10	6	3	1	1	0	0	0
	13	13	7	3	2	1	1	1	0
	16	16	9	4	2	2	1	1	0
	20	18	10	5	3	2	1	1	0
	25	25	14	7	4	3	2	1	1
	32	22	12	6	3	3	2	1	1
	40	33	18	9	5	4	2	2	1
	50	38	21	10	6	5	3	3	1
	63	53	29	14	9	7	4	4	2
Characteristic D	6	8	4	2	1	1	0	0	0
	8	11	5	3	2	1	0	0	0
	10	14	7	4	2	2	0	0	0
	13	18	9	5	3	2	1	1	0
	16	22	11	6	3	3	1	1	0
	20	28	14	7	4	4	1	1	0
	25	35	17	9	5	5	2	1	1
	32	44	22	12	7	6	2	2	1
	40	56	28	15	9	8	3	2	1
	50	70	35	19	11	10	4	3	2
	63	88	44	24	14	12	4	4	2
5SP4									
Characteristic C	80	76	42	21	12	11	6	6/5	3
	100	98	54	27	16	14	8/7	8/6	4
	125	116	64	32	19	16	9	9/8	5
Characteristic D	80	143/112	80/56	40/31	24/18	20/16	9/6	10/5	5/3
	100	186/140	103/70	51/39	31/23	26/20	11/7	12/6	7/4
	125	186/175	103/87	51/48	31/29	26/25	14/9	15/8	8/5

Different data for corrected/uncorrected lamps.

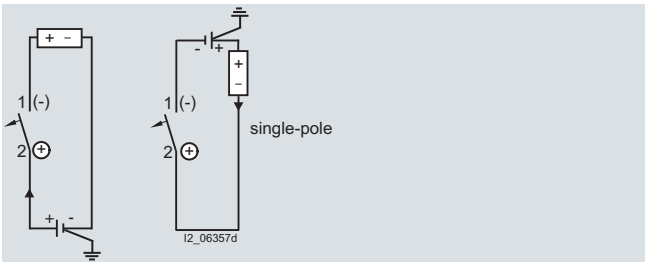
Configuration

Direct current, universal current

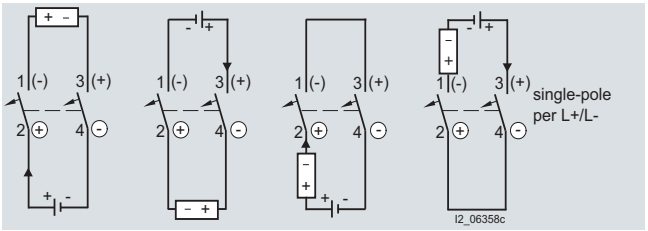
All 1-pole and 2-pole 5SJ, 5SY and 5SP4 miniature circuit breakers can be used in DC systems up to 60 V or 120 V.

For higher voltages, 5SY5 and 5SP5 versions are required. In contrast to to other product ranges, the arcing chamber area of the 5SY5 and 5SP5 are equipped with an additional permanent magnet to support the positive quenching of the electric arc.

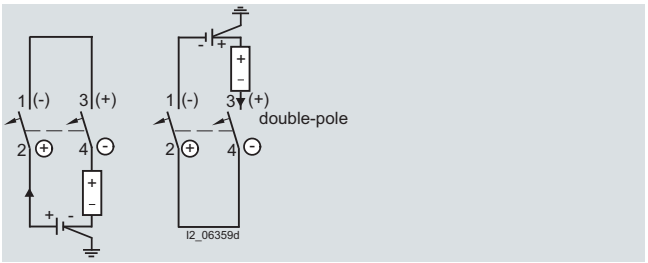
For this reason, the polarity of the switch is coded and must be observed when connecting the conductor.



Up to max. 220 V DC battery voltage



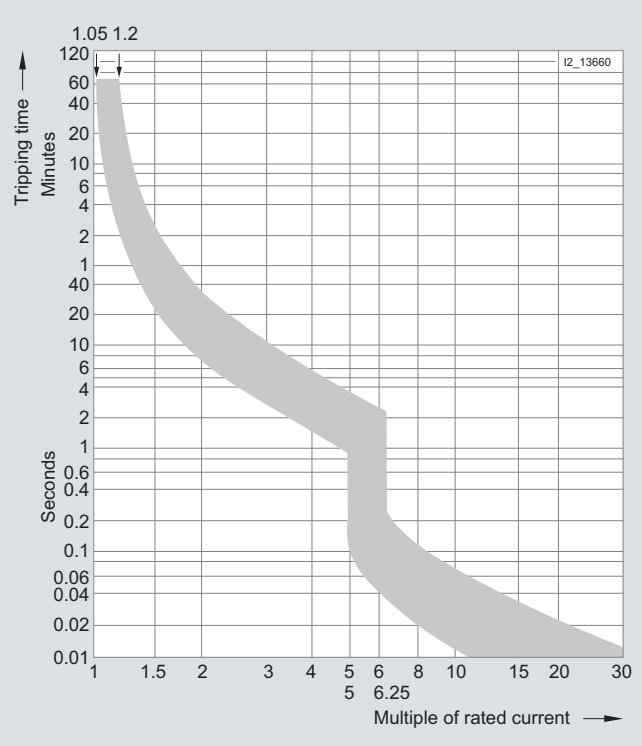
Up to max. 220 V DC battery voltage



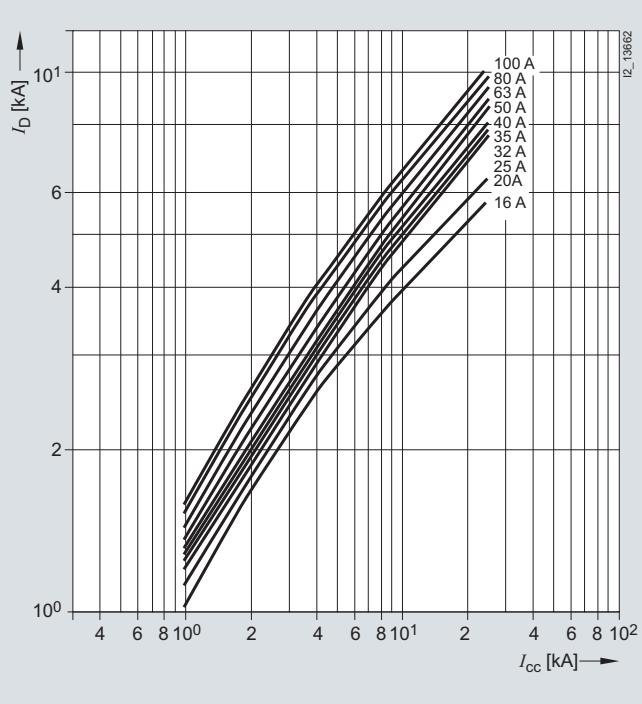
Up to max. 440 V DC battery voltage.

Characteristic curves of 5SP37 selective main miniature circuit breakers

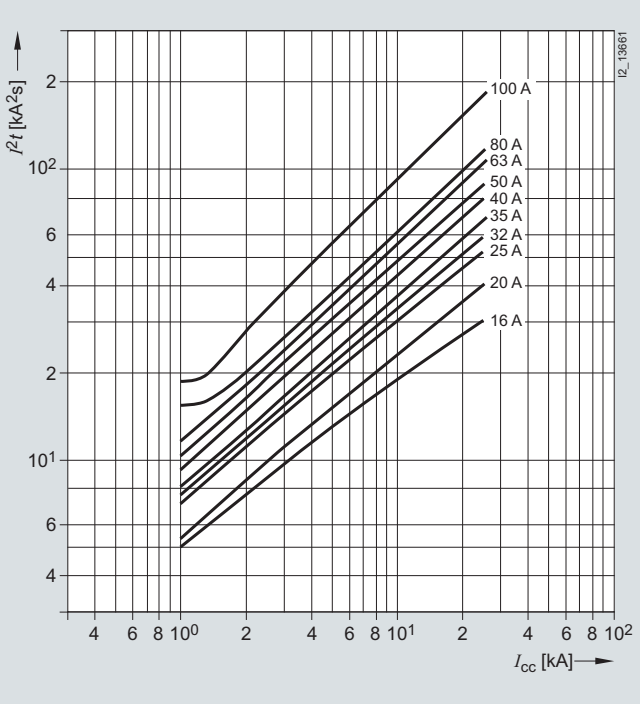
Characteristic E according to DIN VDE 0645



Let-through current



Let-through I^2t value



Configuration

Voltage-independent main miniature circuit breakers (SHU)

Selective main miniature circuit breakers are generally based on the miniature circuit principle of operation of conventional miniature circuit breakers and have a delayed thermal release for overload protection and an electromagnetic fast release with an impact cutout blade for short-circuit protection.

An additional selectivity device is also used that recognizes whether the downstream miniature circuit breaker in the load circuit is capable of dealing with the short circuit on its own. If it detects that this will exceed the capacity of the miniature circuit breaker, the selective main miniature circuit breaker will trip.

Regardless of the rated current of the selective main miniature circuit breaker, this ensures a selectivity for downstream miniature circuit breakers according to IEC/EN 60898, DIN VDE 0641-11, up to its rated switching capacity.

Furthermore, the selective main miniature circuit breaker also offers a back-up protection of up to 25 kA to all downstream miniature circuit breakers.

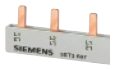
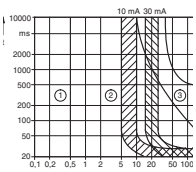
Application examples

Full selectivity up to the rated switching capacity of the downstream miniature circuit breaker.

Selectivity towards upstream fuses up to 2000 A

BETA Protecting Residual Current Protective Devices

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**5SM3 RCCBs, type A**	2/3	Personnel, material and fire protection, as well as protection against direct contact. SIGRES with active condensation protection for use in harsh environments. Super resistant and selective versions	IEC/EN 61008	✓	✓	✓
	**SIQUENCE 5SM3, 5SU1 universal current-sensitive type B**	2/9	SIQUENCE, the technology of universal current-sensitive residual current protective devices	VDE 0664-100 VDE 0664-200	✓		✓
	**Additional components**	2/14	Remote controlled mechanisms, auxiliary switches for all residual current operated circuit breakers. Leakage current measurement device for fault locating and the optimum selection of RCCBs	IEC/EN 62019	✓		✓
	**5SM2 RC units, type A**	2/17	The freely selectable combination of RC units with miniature circuit breakers permits the flexible configuration of RCBO combinations	IEC/EN 61009	✓		✓
	**5SU1 RCBOs, type A**	2/22	The ideal protection combination for all electrical circuits thanks to this compact version offering RCCB and MCB in a single device	IEC/EN 61009	✓	✓	✓
	**Busbars**	2/31	Busbars in 10 and 16 m^2 save space in the distribution board and time during mounting.	--	✓	✓	✓
	**5SM1 and 5SZ9 RCCB socket outlets**	2/34	For retrofitting in existing installations	VDE 0664	✓	✓	✓
	**Accessories**	2/35	Locking devices, covers - everything you need for mounting	--	✓	✓	✓
	**Residual-current operated circuit breakers**	2/36	This section tells you all you need to know about RCCBs in combination with miniature circuit breakers, such as tripping characteristics, selectivity and breaking capacity	--	✓	✓	✓

Overview

RCCBs of type A are used in all systems up to 240/415 V AC. They trip in the event of both sinusoidal AC residual currents and pulsating DC residual currents.

RCCBs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for additional protection against direct contact. RCCBs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel.

Since DIN VDE 0100-410 came into effect in June 2007, all socket outlet current circuits up to 20 A must now also be fitted with residual current protective devices with a rated residual current of max. 30 mA. This also applies to outdoor electrical circuits up to 32 A for the connection of portable equipment.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults. RCCBs with a rated residual current of 100 mA are primarily used outside Europe.

SIGRES

SIGRES RCCBs were developed for use in harsh ambient conditions, such as swimming baths, as protection against chlorine and ozone, in the agricultural sector (ammonia), on building sites and in the chemical industry (nitrogen oxide, sulfur dioxide, solvents), in the food processing industry (hydrogen sulfide) and in unheated rooms (dampness). The patented active condensation protection requires the infeed from below with the RCCBs switched off.

Super resistant K

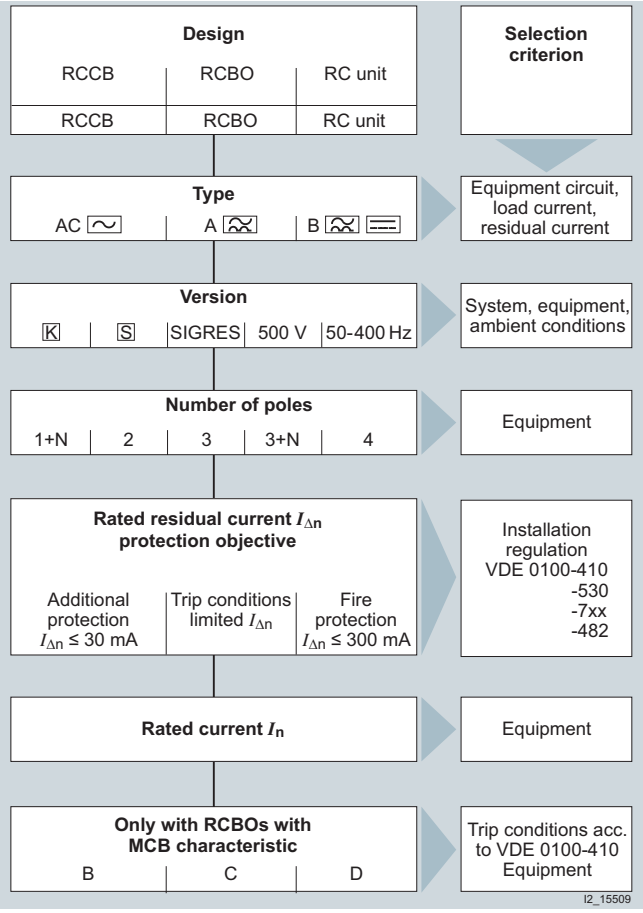
Super resistant (short-time delayed) RCCBs meet the maximum permissible break times for instantaneous devices. However, by implementing a short-time delay they prevent unnecessary trippings, and thus plant faults, when pulse-shaped leakage currents occur – as is the case when capacitors are switched on.

Selective S

Can be used as upstream group switch for selective tripping contrary to a downstream, instantaneous or super resistant RCCB.

Benefits

- Instantaneous RCCBs with the N connection on the left-hand side enable simple bus-mounting with standard pin busbars with miniature circuit breakers installed on the right-hand side
- Instantaneous RCCBs with the N connection on the right-hand side can be bus-mounted with MCBs using a special pin busbar
- Instantaneous devices have a surge current withstand capability with current waveform 8/20 µs of more than 1 kA, super resistant of more than 3 kA and selective of more than 5 kA. This ensures safe operation
- SIGRES has an extremely long service life due to patented active condensation protection and the same dimensions for fast and simple exchange of already installed instantaneous RCCBs
- Super resistant devices increase plant availability, as unnecessary tripping is prevented in systems with short-time glitches
- Selective RCCBs increase plant availability, as in the event of a fault, a staggered tripping time enables the selective tripping of series-connected RCCBs
- Auxiliary switches or remote controlled mechanisms are also available as additional components
- The operating handle and the test button can be locked by means of a handle locking device.



Selection aid for determining a suitable residual current protective device

(Type A)

Technical specifications

			Instantaneous	SIGRES	Super resistant	Selective
Standards			IEC/EN 61008-1 (VDE 0664-10); IEC/EN 61008-2-1 (VDE 0664-11); IEC/EN 61543 (VDE 0664-30)			
Approved acc. to			IEC 61008-1, IEC 61008-2-1; DIN EN 61008-1, DIN EN 61008-2-1			
Surge current withstand capability						
With current waveform 8/20 µs	Acc. to DIN VDE 0432-2	kA	> 1		> 3	> 5
Minimum operational voltage for test function operation		V AC	100			
Terminal conductor cross-sections						
• For 2 MW	At I_n = 16 A, 25 A, 40 A	mm^2	1.0 ... 16			
	At I_n = 100 A, 125 A	mm^2	1.5 ... 50	--	--	--
• For 2.5 MW	At I_n = 63 A, 80 A	mm^2	1.5 ... 25			
• For 4 MW	At I_n = 25 A, 40 A, 63 A, 80 A	mm^2	1.5 ... 25			
	At I_n = 125 A	mm^2	2.5 ... 50	--	--	2.5 ... 50
Terminal tightening torque						
• Up to I_n = 80 A		Nm	2.5 ... 3.0			
• At I_n = 100 A, 125 A		Nm	3.0 ... 3.5	--	--	3.0 ... 3.5
Mains connection			Top or bottom	Bottom	Top or bottom	
Mounting position			Any			
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, with connected conductors			
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe			
Service life	Test cycle according to IEC/EN 61008	Switching cycles	> 10 000			
Storage temperature		°C	-40 ... +75			
Ambient temperature		°C	-25 ... +45, Marked with			
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. humidity)			
CFC and silicone-free			Yes			

Selection and ordering data

	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$	I_n	10 000								
	mA	A	A						Unit(s)	Unit(s)	kg
	RCCBs, type A instantaneous										
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, right										
 Up to 40 A	10	16	63	2	A	**5SM3 111-6**		007	1	1	0.230
	30	16	63	2	A	**5SM3 311-6**		007	1	1	0.230
		25			▶	**5SM3 312-6**		007	1	1	0.230
		40			▶	**5SM3 314-6**		007	1	1	0.230
		63	100	2.5	A	**5SM3 316-6**		007	1	1	0.320
		80			B	**5SM3 317-6**		007	1	1	0.320
		100		2	B	**5SM3 318-6KK**		007	1	1	0.245
		125			B	**5SM3 315-6KK**		007	1	1	0.245
 63 A and 80 A	100	25	63	2	B	**5SM3 412-6**		007	1	1	0.230
		40			B	**5SM3 414-6**		007	1	1	0.230
		63	100	2.5	B	**5SM3 416-6**		007	1	1	0.300
		80			B	**5SM3 417-6**		007	1	1	0.300
		100	125	2	B	**5SM3 418-6KK**		007	1	1	0.245
		125			B	**5SM3 415-6KK**		007	1	1	0.245
	300	25	63	2	A	**5SM3 612-6**		007	1	1	0.210
		40			A	**5SM3 614-6**		007	1	1	0.210
		63	100	2.5	B	**5SM3 616-6**		007	1	1	0.280
		80			B	**5SM3 617-6**		007	1	1	0.280
		100	125	2	B	**5SM3 618-6KK**		007	1	1	0.245
		125			B	**5SM3 615-6KK**		007	1	1	0.245
 100 A and 125 A:	N connection, left										
	10	16	63	2	B	**5SM3 111-6KL**		007	1	1	0.280
	30	16	63	2	B	**5SM3 311-6KL**		007	1	1	0.280
		25			B	**5SM3 312-6KL**		007	1	1	0.280
		40			B	**5SM3 314-6KL**		007	1	1	0.280
		63	100	2.5	B	**5SM3 316-6KL**		007	1	1	0.310
	100	40	63	2	B	**5SM3 414-6KL**		007	1	1	0.280
		63	100	2.5	B	**5SM3 416-6KL**		007	1	1	0.310
	300	25	63	2	B	**5SM3 612-6KL**		007	1	1	0.280
		40			B	**5SM3 614-6KL**		007	1	1	0.280
		63	100	2.5	B	**5SM3 616-6KL**		007	1	1	0.310
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
 Up to 80 A	30	25	100	4	▶	**5SM3 342-6**		007	1	1	0.500
		40			▶	**5SM3 344-6**		007	1	1	0.500
		63			▶	**5SM3 346-6**		007	1	1	0.500
		80			A	**5SM3 347-6**		007	1	1	0.500
		100			▶	**5SM3 348-6**		007	1	1	0.538
		125	125		A	**5SM3 345-6**		007	1	1	0.500
	100	40	100	4	A	**5SM3 444-6**		007	1	1	0.460
		63			A	**5SM3 446-6**		007	1	1	0.460
 100 A and 125 A		100			▶	**5SM3 448-6**		007	1	1	0.538
		125	125		B	**5SM3 445-6**		007	1	1	0.480
	300	25	100	4	A	**5SM3 642-6**		007	1	1	0.440
		40			A	**5SM3 644-6**		007	1	1	0.440
		63			A	**5SM3 646-6**		007	1	1	0.440
		80			A	**5SM3 647-6**		007	1	1	0.440
		100			▶	**5SM3 648-6**		007	1	1	0.538
		125	125		A	**5SM3 645-6**		007	1	1	0.480
	500	25	100	4	B	**5SM3 742-6**		007	1	1	0.440
		40			A	**5SM3 744-6**		007	1	1	0.440
		63			A	**5SM3 746-6**		007	1	1	0.440
		100			▶	**5SM3 748-6**		007	1	1	0.538
		125	125		A	**5SM3 745-6**		007	1	1	0.480

* You can order this quantity or a multiple thereof.

(Type A)

5SM3 RCCBs, type A

	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$	I_n	10 000								
	mA	A	A						Unit(s)	Unit(s)	kg
	RCCBs, type A Instantaneous										
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, left										
	30	25	100	4	B	**5SM3 342-6KL**		007	1	1	0.500
		40			▶	**5SM3 344-6KL**		007	1	1	0.500
		63			B	**5SM3 346-6KL**		007	1	1	0.500
		80			B	**5SM3 347-6KL**		007	1	1	0.500
	300	25	100	4	B	**5SM3 642-6KL**		007	1	1	0.440
		40			B	**5SM3 644-6KL**		007	1	1	0.440
		63			B	**5SM3 646-6KL**		007	1	1	0.440
		80			B	**5SM3 647-6KL**		007	1	1	0.440
	RCCBs, type A Instantaneous, special versions										
	1P+N; 24 ... 125 V AC; 50 ... 60 Hz										
	30	16	63	2	B	**5SM3 311-6KK13**		007	1	1	0.280
	3P+N; 500 V AC; 50 ... 60 Hz										
	30	25	63	4	B	**5SM3 352-6**		007	1	1	0.500
		40			B	**5SM3 354-6**		007	1	1	0.500
		63			B	**5SM3 356-6**		007	1	1	0.500
	300	25	63	4	B	**5SM3 652-6**		007	1	1	0.440
		40			B	**5SM3 654-6**		007	1	1	0.440
		63			B	**5SM3 656-6**		007	1	1	0.440
	3P+N; 230 ... 400 V AC; 50 ... 400 Hz										
	30	25	80	4	B	**5SM3 342-6KK03**		007	1	1	0.500
		40			B	**5SM3 344-6KK03**		007	1	1	0.500
	RCCBs, type A SIGRES instantaneous										
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	30	25	63	2	B	**5SM3 312-6KK12**		007	1	1	0.230
		40			B	**5SM3 314-6KK12**		007	1	1	0.230
		63	100	2.5	B	**5SM3 316-6KK12**		007	1	1	0.320
		80			B	**5SM3 317-6KK12**		007	1	1	0.320
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	30	25	100	4	B	**5SM3 342-6KK12**		007	1	1	0.500
		40			B	**5SM3 344-6KK12**		007	1	1	0.500
		63			B	**5SM3 346-6KK12**		007	1	1	0.500
		80			B	**5SM3 347-6KK12**		007	1	1	0.500
	300	40	100	4	B	**5SM3 644-6KK12**		007	1	1	0.440
		63			B	**5SM3 646-6KK12**		007	1	1	0.440

* You can order this quantity or a multiple thereof.

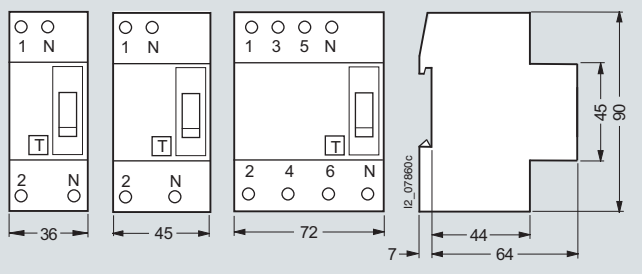
	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$	I_n	10 000								
	mA	A	A						Unit(s)	Unit(s)	kg
	RCCBs, type A SIGRES, selective S										
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	300	63	100	4	B	**5SM3 646-8KK12**		007	1	1	0.440
	RCCBs, type A Super resistant K										
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	30	25	63	2	B	**5SM3 312-6KK01**		007	1	1	0.230
		40			B	**5SM3 314-6KK01**		007	1	1	0.230
		63	100	2.5	B	**5SM3 316-6KK01**		007	1	1	0.320
	300	63	100	2.5	B	**5SM3 616-6KK01**		007	1	1	0.320
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	30	25	100	4	B	**5SM3 342-6KK01**		007	1	1	0.500
		40			B	**5SM3 344-6KK01**		007	1	1	0.500
		63			B	**5SM3 346-6KK01**		007	1	1	0.500
	300	40	100	4	B	**5SM3 644-6KK01**		007	1	1	0.492
		63			B	**5SM3 646-6KK01**		007	1	1	0.491
		80			B	**5SM3 647-6KK01**		007	1	1	0.493
	RCCBs, type A Selective S										
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	100	63	100	2.5	B	**5SM3 416-8**		007	1	1	0.300
	300	40	50	2	B	**5SM3 614-8**		007	1	1	0.250
		63	100	2.5	A	**5SM3 616-8**		007	1	1	0.280
		80	100		B	**5SM3 617-8**		007	1	1	0.320
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	100	40	100	4	B	**5SM3 444-8**		007	1	1	0.460
		63			B	**5SM3 446-8**		007	1	1	0.460
	300	40	100	4	A	**5SM3 644-8**		007	1	1	0.440
		63			A	**5SM3 646-8**		007	1	1	0.440
		125	125		A	**5SM3 645-8**		007	1	1	0.480
	500	125	125	4	B	**5SM3 745-8**		007	1	1	0.480
	1000	63	100	4	A	**5SM3 846-8**		007	1	1	0.515
Up to 80 A	N connection, left										
	300	63	100	4	B	**5SM3 646-8KL**		007	1	1	0.440

* You can order this quantity or a multiple thereof.

(Type A)

Dimensional drawings

RCCB up to 80 A

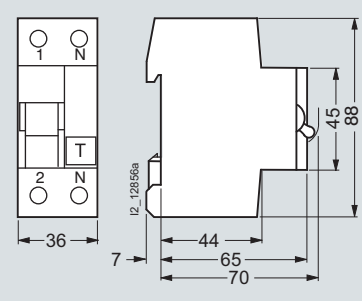


1P+N
2 MW

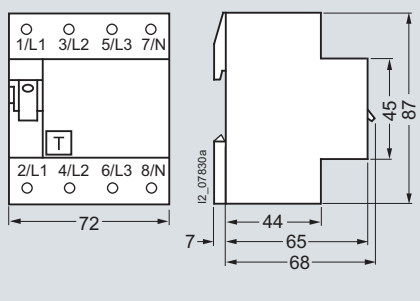
1P+N
2.5 MW

3P+N
4 MW

RCCBs 100 and 125 A

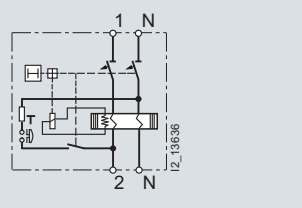


1P+N, 2 MW

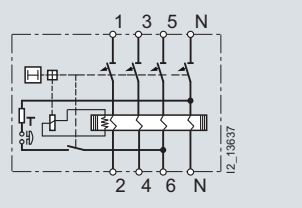


3P+N, 4 MW

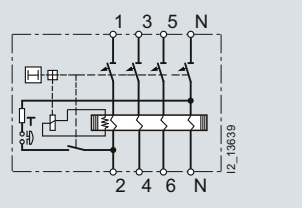
Schematics



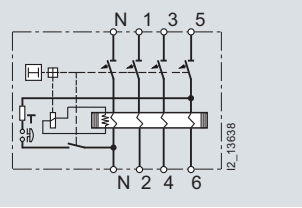
1P+N



3P+N
up to 80 A
N connection, right



3P+N
100 A, 125 A



N connection, left

Note:
The infeed for SIGRES devices must be from below at terminals 2, 4, 6 and N.

Overview

Frequency converters, medical devices and UPS systems are seeing increasing use in industry. Smooth DC residual currents or currents with low residual ripple may occur in the event of faults on these devices.

Type A residual current protective devices are unable to detect these smooth DC residual currents. Furthermore, such smooth DC residual currents make Type A devices increasingly insensitive to AC residual currents and pulsating DC residual currents. If a fault occurs, there is therefore no tripping and the desired protective function is no longer assured.

Universal current-sensitive residual current protective devices of Type B have an additional transformer, which is supplied with a control signal. It is therefore possible to evaluate the change of the transformer's operating range caused by smooth DC residual currents, thus ensuring the desired protective function.

The devices in this series are designed as residual current operated circuit breakers (RCCBs) up to 80 A and as residual current circuit breakers with integral overcurrent protection (RCBOs) for 100 A or 125 A in Characteristics C or D.

Benefits

- Universal current-sensitive residual current protective devices detect not only AC residual currents and pulsating DC residual currents, but also smooth DC residual currents, thus ensuring the desired protective function with all types of residual current
- The tripping characteristic is adapted to the increase of leakage currents at higher frequencies in systems with capacitive impedances and results in increased operating safety.
- The RCBO is a compact device for up to 125 A. It provides not only personnel, property and fire protection but also overload and short-circuit protection for cables. This enables great savings on wiring and installation costs.

Technical specifications

		RCCBs 5SM3		RCBO 5SU1
Standards		IEC/EN 61008-1 (VDE 0664-10); VDE 0664-100; IEC/EN 61543 (VDE 0664-30); IEC 62423		IEC/EN 61009-1 (VDE 0664-20); VDE 0664-200; IEC/EN 61543 (VDE 0664-30); IEC 62423
Versions		1P+N	3P+N	4P
Tripping characteristic		--	--	C, D
Surge current withstand capability with current waveform 8/20 µs acc. to DIN VDE 0432-2				
• Super resistant	kA	> 3	> 3	> 3
• Selective	kA	--	> 5	> 5
Minimum operational voltage for test function operation	V AC	150	150	150
Rated voltages U_n	V AC	230	400	400, 480
Rated frequency	Hz	50 ... 60		
Rated currents I_n	A	16, 25, 40, 63	25, 40, 63, 80	100, 125
Rated residual currents $I_{\Delta n}$	mA	30, 300, 500		
Rated switching capacity				
• I_m	A	800		--
• I_{cn}	kA	--		10
Conductor cross-sections				
• Solid and stranded	mm^2	1.5 ... 25		6 ... 50
• Finely stranded, with end sleeve	mm^2	1.5 ... 16		6 ... 35
Terminal tightening torques for all devices	Nm	2.5 ... 3.0		3.0 ... 3.5
Mains connection		Either top or bottom		
Mounting position		Any		
Degree of protection acc. to EN 60529 (VDE 0470-1)		IP20		
Touch protection acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe		
Service life, electrical and mechanical; (test cycle acc. to regulations)		> 10 000 switching cycles		
Storage temperature	°C	-40 ... +75		
Ambient temperature	°C	-25 ... +45, Marked with -25		
Resistance to climate acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free		Yes		

I^2t characteristic curves, see page 2/28.

(Type B)

2

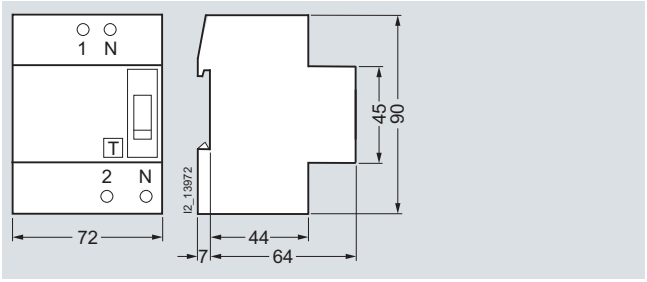
SIQUENCE 5SM3, 5SU1 universal current-sensitive type B

Selection and ordering data

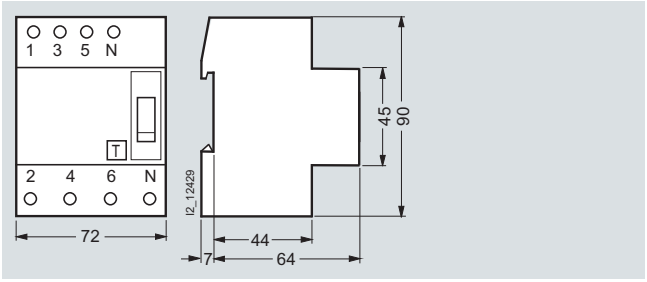
	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$	I_n	10 000								
	mA	A	A						Unit(s)	Unit(s)	kg
	SIQUENCE RCCBs, type B super resistant K										
	1P+N; 230 V AC; 50 ... 60 Hz										
	30	16	100	4	A	**5SM3 321-4**		015	1	1	0.590
		25			A	**5SM3 322-4**		015	1	1	0.590
		40			A	**5SM3 324-4**		015	1	1	0.588
		63			A	**5SM3 326-4**		015	1	1	0.591
	300	16	100	4	A	**5SM3 621-4**		015	1	1	0.600
		25			A	**5SM3 622-4**		015	1	1	0.600
		40			A	**5SM3 624-4**		015	1	1	0.591
		63			A	**5SM3 626-4**		015	1	1	0.586
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	30	25	100	4	A	**5SM3 342-4**		015	1	1	0.600
		40			A	**5SM3 344-4**		015	1	1	0.600
		63			A	**5SM3 346-4**		015	1	1	0.600
		80			B	**5SM3 347-4**		015	1	1	0.600
	300	25	100	4	▶	**5SM3 642-4**		015	1	1	0.520
		40			A	**5SM3 644-4**		015	1	1	0.520
		63			A	**5SM3 646-4**		015	1	1	0.520
		80			B	**5SM3 647-4**		015	1	1	0.520
	500	63	100	4	B	**5SM3 746-4**		015	1	1	0.520
		80			B	**5SM3 747-4**		015	1	1	0.520
	**SIQUENCE RCCBs, type B selective S**										
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	300	63	100	4	B	**5SM3 646-5**		015	1	1	0.520
		80			B	**5SM3 647-5**		015	1	1	0.520
	500	63	100	4	B	**5SM3 746-5**		015	1	1	0.520
		80			B	**5SM3 747-5**		015	1	1	0.520
	**SIQUENCE RCBOs, type B super resistant K, rated switching capacity 10 kA**										
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	30	100		11	B	**5SU1 374-7AK81**		017	1	1	2.050
		125			B	**5SU1 374-7AK82**		017	1	1	2.050
	300	100		11	B	**5SU1 674-7AK81**		017	1	1	2.050
		125			B	**5SU1 674-7AK82**		017	1	1	2.050
	Characteristic D										
	30	100		11	B	**5SU1 374-8AK81**		017	1	1	2.050
	300	100		11	B	**5SU1 674-8AK81**		017	1	1	2.050
	4P; 480 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	100		11	B	**5SU1 674-7CK81**		017	1	1	2.050
		125			B	**5SU1 674-7CK82**		017	1	1	2.050
	**SIQUENCE RCBOs, type B selective S, rated switching capacity 10 kA**										
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	125		11	B	**5SU1 674-7BK82**		017	1	1	1.950
	Characteristic D										
	300	100		11	B	**5SU1 674-8BK81**		017	1	1	1.950

* You can order this quantity or a multiple thereof.

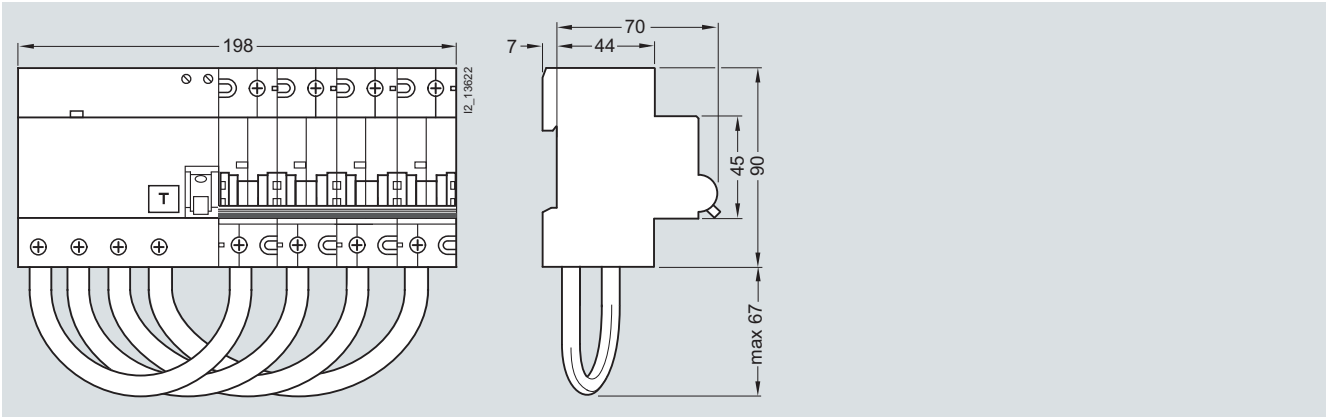
Dimensional drawings



SIQUENCE RCCBs, type B
1P+N, 4 MW

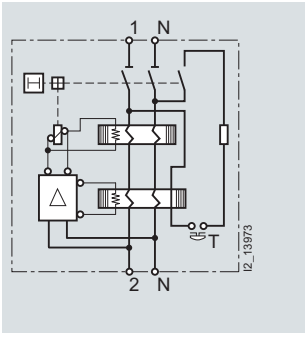


SIQUENCE RCCBs, type B
3P+N, 4 MW

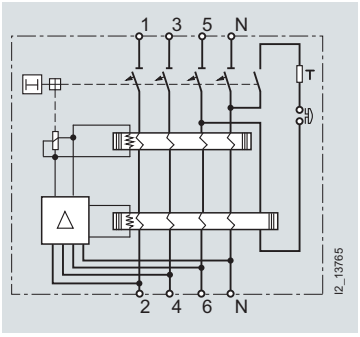


SIQUENCE RCBOs, type B
4P, 11 MW

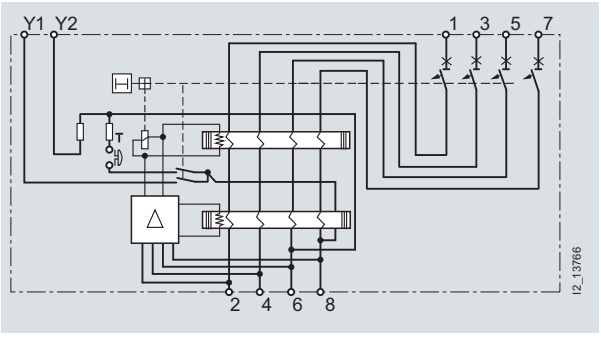
Schematics



SIQUENCE RCCBs, type B
1P+N, 4 MW



SIQUENCE RCCBs, type B
3P+N, 4 MW



SIQUENCE RCBOs, type B
4P, 11 MW

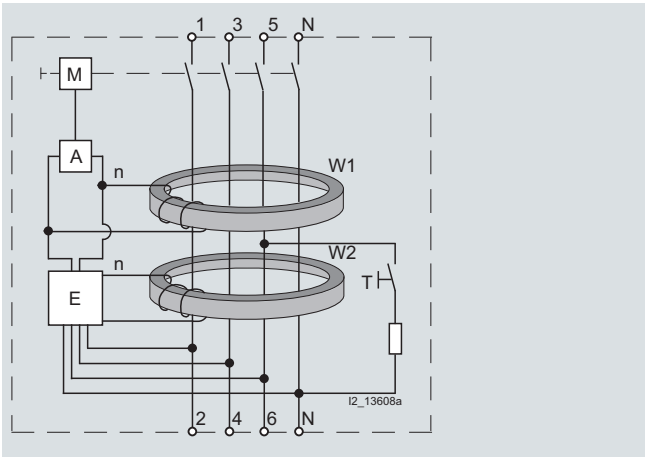
(Type B)

More information

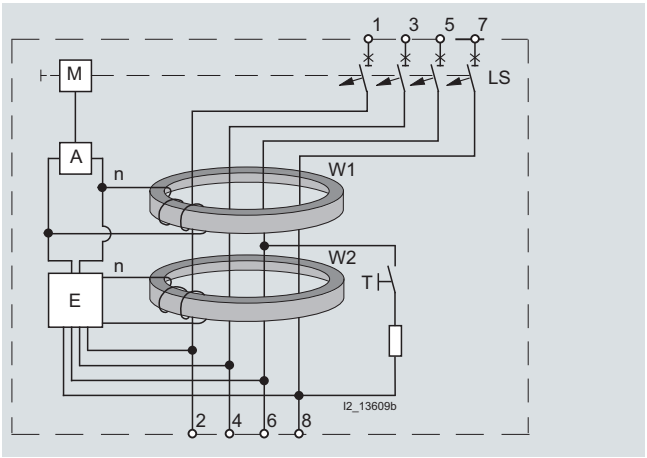
Device setup

Universal current-sensitive protective devices are based on a pulse-current-sensitive circuit-protection device with tripping independent of supply voltage, supplemented with an auxiliary unit for the detection of smooth DC residual currents.
The diagrams below show the basic design.

The summation current transformer W1 monitors the electrical system for AC and pulse current-type residual currents. The summation current transformer W2 detects the smooth DC residual currents and, in the event of a fault, relays the tripping command through electronic unit E to release A, which uses the mechanics to disconnect the circuit.



Design of RCCBs



Design of RCBOs

M	Mechanics of the RCCB
MCB	Miniature circuit breaker component
A	Release
E	Electronics for tripping in the event of smooth DC residual currents
n	Secondary winding
W1	Summation current transformer for detection of sinusoidal residual currents
W2	Summation current transformer for detection of smooth DC residual currents
T	Test equipment

Method of operation

The universal current-sensitive residual current protective devices work independent of the supply voltage compliant with current requirements in Germany for type A according to DIN VDE 0664-100.

A voltage supply is required solely for the detection of smooth DC residual currents by a second transformer. This is implemented over all system cables and is dimensioned so that the electronics still reliably trip even with a voltage reduction to 50 V.

This ensures tripping for smooth DC residual currents, as long as such residual current waveforms can occur, even in the event of faults in the electrical power supply, e.g. an N-conductor break. This means that the pulse-current-sensitive switch part, which trips regardless of line voltage, will still reliably trigger the tripping operation – even in the highly unlikely event that two outer conductors and the neutral conductor fail – if the remaining intact outer conductor presents a fire hazard due to a ground fault.

The residual current protective devices of type B are suitable for use in three-phase current systems upstream of input circuits with rectifiers. They are not intended for use in DC systems and innetworks with operating frequencies other than 50 or 60 Hz.

RCBOs are a combination of an RCCB and a miniature circuit breaker for up to 125 A in a single compact device.

It thus provides not only personnel, property and fire protection but also overload and short-circuit protection for cables. The mechanics of the RCCB act on the tripping unit of the miniature circuit breaker, which disconnects the circuit.

Protective effect at high frequencies

In addition to the described residual current waveforms (AC residual currents, pulsating and smooth DC residual currents), AC residual currents with a wide range of frequencies may also occur on electronic equipment such as rectifiers in frequency converters or computer tomographs a well as at the outgoing terminal of a frequency converter.

Requirements for frequencies up to 2 kHz are defined in the device regulations DIN VDE 0664-100.

To date, only limited statements can be made with regard to the risk of ventricular fibrillations (up to 1 kHz) for frequencies higher than 100 Hz. No reliable statements can be made on any further effects of thermal or electrolytic influence on the human organism.

For this reason, protection against direct contact is only possible for frequencies up to 100 Hz.

For higher frequencies, protection against indirect contact must be implemented under consideration of the frequency response of the residual current protective device, the maximum permissible touch voltages up to 50 V and permissible grounding resistance derived from this information.

Versions

Super resistant [K]
Short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: > 3 kA.

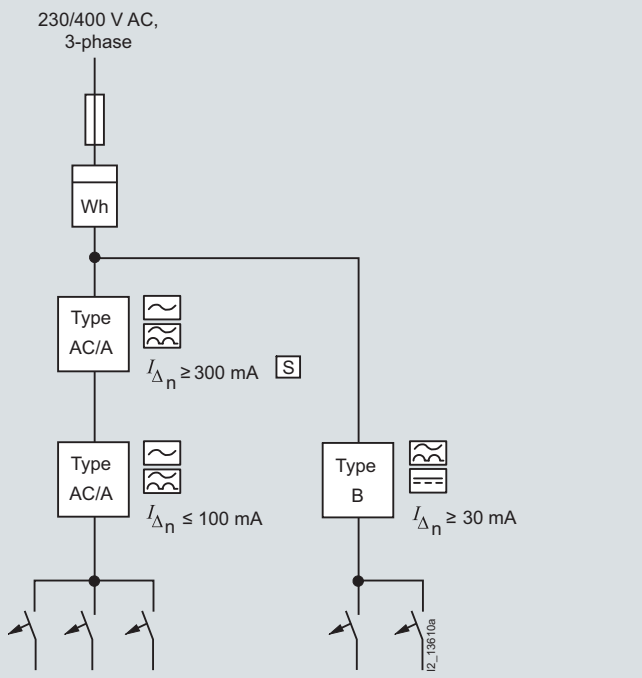
Selective [S]:
Can be used as upstream group switch for selective tripping contrary to a downstream, instantaneous or super resistant RCCB.

Configuration

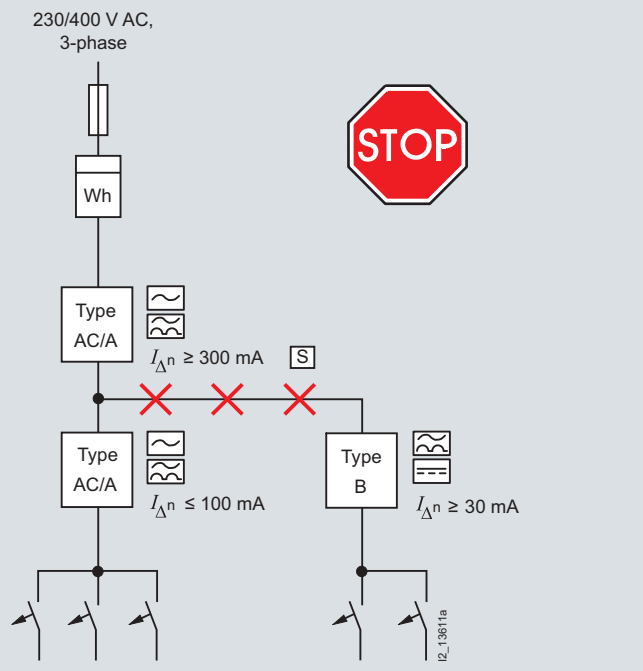
DIN VDE 0100-530 "Selection of protective devices" also describes the configuration of systems with residual current protective devices.

EN 50178 (DIN VDE 0160) "Equipping power installations with electronic equipment" describes, among other things, how to select the type of residual current protective device suitable.

When configuring and installing electrical installations, electrical loads that can generate smooth DC residual currents in the event of a fault must be assigned a separate electrical circuit with a universal current-sensitive residual current protective device (type B).



It is not permitted to branch electrical circuits with these types of electrical loads after pulse-current-sensitive residual current protective devices (type A):



Overview

Auxiliary switches (AS) signal the contact position of the RCCB.

Remote controlled mechanisms are used for the remote ON/OFF switching of RCCBs. They also enable local manual switching. A blocking function permits maintenance work. A tripped RCCB must be acknowledged prior to switching back on.

The leakage current measurement device detects the leakage currents – like the circuit breaker – thus providing a direct statement as to the current loading of the RCCB. It is used to measure leakage currents up to 300 mA. This requires a voltmeter with an internal resistance more than 1 MΩ/V and a measuring range for AC voltages of U_{rms} = 1 mV to 2 V V. For the fault-free operation of an RCCB, the measured leakage current should be no greater than 1/3 of the rated residual current.

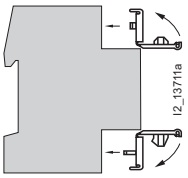
Benefits

- Using captive brackets, the remote controlled mechanism can be attached (or retrofitted) to the right-hand side of the basic device without the need for tools
- Bus systems, such as *instabus* KNX, AS-Interface bus or PROFIBUS, can be integrated in the communication over binary inputs
- The leakage current measurement device enables the systematic selection of the rated residual current, thus preventing the inadvertent tripping of RCCBs.

Technical specifications

		Auxiliary switches (AS) 5SW3 30.	Auxiliary switches (AS) 5SW3 330
Standards		IEC/EN 62019 (VDE 0640)	
Approved acc. to		IEC 62019; EN 62019	
Terminals			
• Conductor cross-section	mm^2	0.75 ... 2.5	
• Tightening torques	Nm	0.6 ... 0.8	
Short-circuit protection		B6 or C6 or gL/gG 6 A fuse	
Min. contact load		50 mA/24 V	
Max. contact load			
• 230 V AC, AC-12	A	6	5
• 230 V AC, AC-14	A	3.6	--
• 220 V DC, DC-12	A	1	0.5

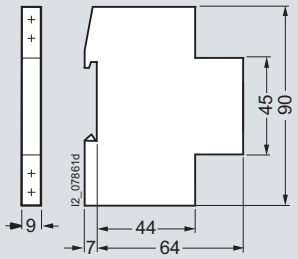
Selection and ordering data

	Version	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	**Auxiliary switches (AS) for 5SM3 RCCBs up to 80 A**								
	1 NO + 1 NC	0.5	▶	**5SW3 300**		008	1	1/10	0.042
	2 NC	0.5	C	**5SW3 301**		008	1	1/10	0.042
	2 NO	0.5	A	**5SW3 302**		008	1	1/10	0.042
	**Auxiliary switches (AS) for 5SM3 RCCBs up to 100 ... 125 A, 3P+N**								
	1 NO + 1 NC	0.5	B	**5SW3 330**		008	1	1	0.040
	**Remote controlled mechanisms (RC) For 5SM3 RCCBs up to 80 A**								
	Rated voltage U_n = 230 V AC	3.5	B	**5ST3 051**		027	1	1	0.395
	**Leakage current measurement devices**								
	Rated voltage U_n = 500 V AC; 50 ... 60 Hz; 4P Rated residual current $I_{\Delta n}$ = 0 ... 300 mA Rated current I_n = 63 A	4	B	**5SM1 930-0**		008	1	1	0.430
	**Covers for connection terminals**								
	For residual current operated circuit breakers up to 80 A, sealable (2 units in plastic bag)								
		2	A	**5SW3 010**		008	1	1/50	0.003
		2.5	A	**5SW3 011**		008	1	1/50	0.004
		4	A	**5SW3 008**		008	1	1/50	0.006
	**Locking devices**								
	For RCCBs up to 80 A, sealable and lockable								
	4.5 mm lock hasp diameter		B	**5SW3 303**		008	1	1	0.008
	**Padlocks**								
	For 5SW3 303 locking device		▶	**5ST3 802**		027	1	1	0.027
	Locking devices with padlock								
	Comprising 5SW3 303 locking device and 5ST3 802 padlock		B	**5SW3 312**		008	1 set	1 set	0.035

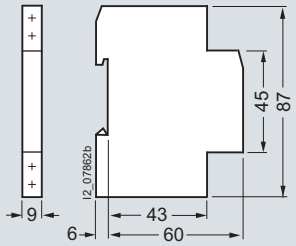
* You can order this quantity or a multiple thereof.

Dimensional drawings

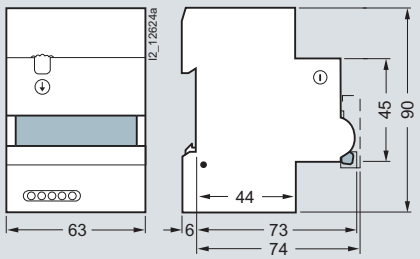
Auxiliary switches (AS)
for RCCBs for 5SM3 up to 80 A



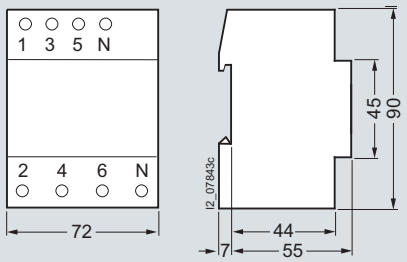
Auxiliary switches (AS)
for RCCBs for 5SM3, 100 A, 125 A, 3P+N



Remote controlled mechanism

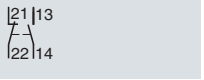


Leakage current measurement device

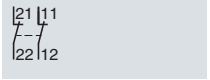


Schematics

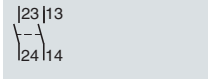
Auxiliary switches (AS)
for RCCBs for 5SM3 up to 80 A



1 NO + 1 NC



2 NC

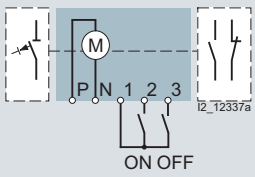


2 NO

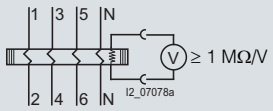
Auxiliary switches (AS)
for RCCBs for 5SM3, 100 A, 125 A, 3P+N

1 NO + 1 NC

Remote controlled mechanism



Leakage current measurement device



More information

Gossen-Metrawatt offers suitable test devices for RCCB function tests and for testing protective measures.

Information is available at:

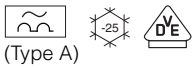
Gossen-Metrawatt GmbH
Thomas-Mann-Str. 16-20
D-90471 Nuremberg

Tel. +49 (0) 9 11/86 02-111

Fax +49 (0) 9 11/86 02-777

http://www.gmc-instruments.com

e-mail: info@gmc-instruments.com



(Type A)

Overview

RC units of type A can be used in all systems up to 240/415 V AC. They trip in the event of both sinusoidal AC fault currents and pulsating DC residual currents.

RCCBs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, and for additional protection against direct contact.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults.

RC units are combined with miniature circuit breakers with characteristics A, B, C and D, provided that these are available in the MCB range. The two components are simply plugged together without the need for any tools.

They then form a combination of RCCB and MCB for personnel, fire and line protection.

Super resistant K

Super resistant (short-time delayed) RC units satisfy the maximum permissible break times for instantaneous devices. However, by implementing a short-time delay they prevent unnecessary trippings, and thus plant faults, when pulse-shaped leakage currents occur – as is the case when capacitors are switched on.

Selective S

Can be used as upstream group switch for selective tripping contrary to a downstream, instantaneous or super resistant RCCB.

The dimensioning of the rated residual current depends on the size of the plant.

Benefits

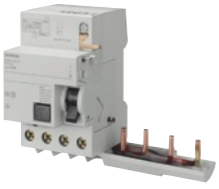
- Our wide variety of RC unit types and comprehensive range of miniature circuit breakers offer a huge spectrum of combinations for all applications
- All devices have surge current withstand capability of more than 1 kA, thus ensuring safe and reliable operation
- All additional components for miniature circuit breakers can be retrofitted on the right-hand side
- All 100 A and 125 A RC units offer external remote tripping over terminals Y1/Y2. This supports implementation of central OFF circuits
- Both components can be simply plugged into each other and secured with captive metal brackets – no tools required. This saves considerable time when mounting.

(Type A)

Technical specifications

			5SM2
Standards			IEC/EN 61009-1 (VDE 0664-20), IEC/EN 61009-2-1 (VDE 0664-21), IEC/EN 61543 (VDE 0664-30)
Approved acc. to			EN 61009-1, EN 61009-2-1; IEC 61009-1, IEC 61009-2-1
Surge current withstand capability			
With current waveform 8/20 µs	Acc. to DIN VDE 0432-2		
• Instantaneous		kA	> 1
• Super resistant		kA	> 3
• Selective		kA	> 5
Minimum operational voltage for test function operation			
• Up to I_n = 63 A, 2 and 3-pole		V AC	195
• Up to I_n = 63 A, 4-pole		V AC	100
• Up to I_n = 80 ... 100 A		V AC	100
Rated voltage U_n		V AC	230 ... 400
Rated frequency f_n		Hz	50 ... 60
Rated currents I_n		A	0.3 ... 16; 0.3 ... 40; 0.3 ... 63; 80 ... 100
Rated residual currents $I_{\Delta n}$		mA	10, 30, 100, 300, 500, 1000
Terminal conductor cross-sections			
• Up to I_n = 63 A		mm^2	1.5 ... 25
• Up to I_n = 80 ... 100 A		mm^2	6.0 ... 50
Terminal tightening torque		Nm	2.5 ... 3.0
Mains connection			Either top or bottom
Mounting position			Any
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, with connected conductors
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe
Service life	Test cycle acc. to DIN/EN 61009		> 10 000 switching cycles
Storage temperature		°C	-40 ... +75
Ambient temperature		°C	-25 ... +45, Marked with -25
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. humidity)
CFC and silicone-free			Yes

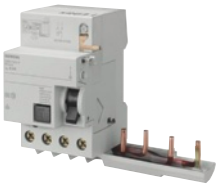
Selection and ordering data

	Rated residual current	Rated current	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A						Unit(s)	Unit(s)	kg
	RC units, type A Instantaneous									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	10	0.3 ... 16	2	B	**5SM2 121-6**		007	1	1	0.180
	30	0.3 ... 40		►	**5SM2 322-6**		007	1	1	0.170
	300			A	**5SM2 622-6**		007	1	1	0.170
	30	0.3 ... 63		A	**5SM2 325-6**		007	1	1	0.170
	100			B	**5SM2 425-6**		007	1	1	0.170
	300			B	**5SM2 625-6**		007	1	1	0.170
	500			B	**5SM2 725-6**		007	1	1	0.170
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	A	**5SM2 332-6**		007	1	1	0.260
	300			A	**5SM2 632-6**		007	1	1	0.260
	30	0.3 ... 63		B	**5SM2 335-6**		007	1	1	0.260
	100			B	**5SM2 435-6**		007	1	1	0.260
	300			B	**5SM2 635-6**		007	1	1	0.260
	500			B	**5SM2 735-6**		007	1	1	0.260
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	►	**5SM2 342-6**		007	1	1	0.290
	300			►	**5SM2 642-6**		007	1	1	0.290
	30	0.3 ... 63		A	**5SM2 345-6**		007	1	1	0.290
	100			B	**5SM2 445-6**		007	1	1	0.290
	300			A	**5SM2 645-6**		007	1	1	0.290
	500			A	**5SM2 745-6**		007	1	1	0.290
	For 5SP4 miniature circuit breakers									
	2P; 125 ... 230 V AC, 50 ... 60 Hz									
	30	80 ... 100	3.5	B	**5SM2 327-6**		007	1	1	0.410
	300			B	**5SM2 627-6**		007	1	1	0.410
	4P; 230 ... 400 V AC, 50 ... 60 Hz									
	30	80 ... 100	5	B	**5SM2 347-6**		007	1	1	0.630
	300			A	**5SM2 647-6**		007	1	1	0.630

* You can order this quantity or a multiple thereof.

(Type A)

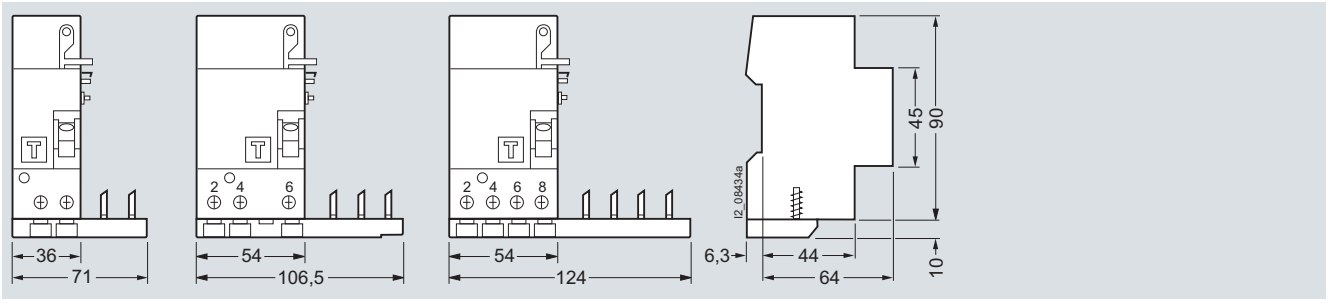
5SM2 RC units, type A

	Rated residual current	Rated current	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A						Unit(s)	Unit(s)	kg
	RC units, type A Super resistant K									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	2	B	**5SM2 322-6KK01**		007	1	1	0.350
	30	0.3 ... 63		B	**5SM2 325-6KK01**		007	1	1	0.350
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	B	**5SM2 332-6KK01**		007	1	1	0.365
	30	0.3 ... 63		B	**5SM2 335-6KK01**		007	1	1	0.365
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	30	0.3 ... 40	3	B	**5SM2 342-6KK01**		007	1	1	0.290
	30	0.3 ... 63		B	**5SM2 345-6KK01**		007	1	1	0.290
	RC units, type A Selective S									
	For 5SY miniature circuit breakers, but not for 5SY5 and 5SY6 0..									
	2P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 40	2	A	**5SM2 622-8**		007	1	1	0.170
	300	0.3 ... 63		B	**5SM2 625-8**		007	1	1	0.170
	3P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 63	3	B	**5SM2 635-8**		007	1	1	0.260
	500			B	**5SM2 735-8**		007	1	1	0.400
	1000			B	**5SM2 835-8**		007	1	1	0.260
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	0.3 ... 63	3	A	**5SM2 645-8**		007	1	1	0.290
	500			A	**5SM2 745-8**		007	1	1	0.400
	1000			A	**5SM2 845-8**		007	1	1	0.290
	For 5SP4 miniature circuit breakers									
	2P; 125 ... 230 V AC, 50 ... 60 Hz									
	300	80 ... 100	3.5	B	**5SM2 627-8**		007	1	1	0.410
	4P; 230 ... 400 V AC, 50 ... 60 Hz									
	300	80 ... 100	5	A	**5SM2 647-8**		007	1	1	0.630
	1000			A	**5SM2 847-8**		007	1	1	0.630

* You can order this quantity or a multiple thereof.

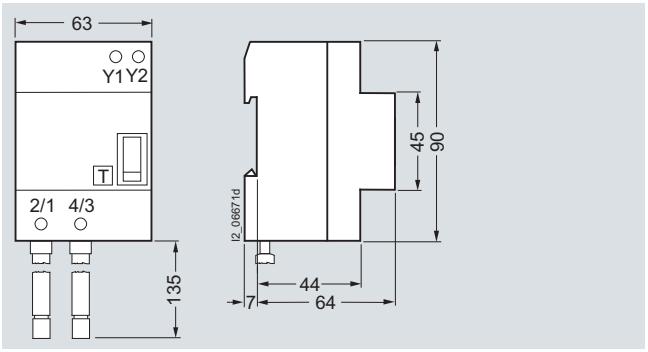
Dimensional drawings

RC units for 5SY

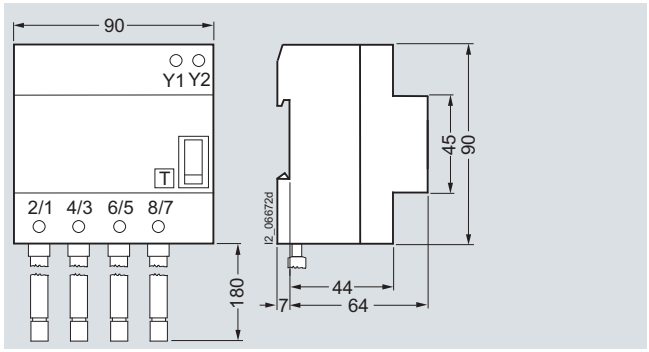


2P 3P 4P

RC units for 5SP4



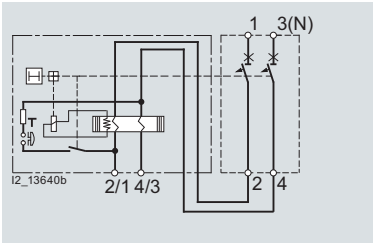
2P



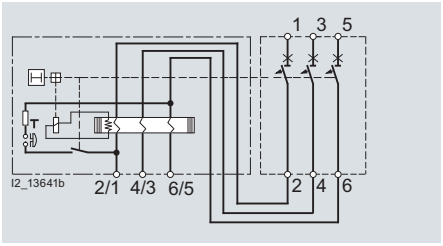
4P

Schematics

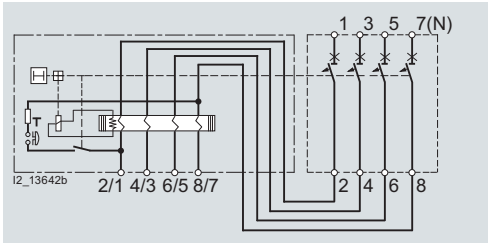
RC units for 5SY



2P

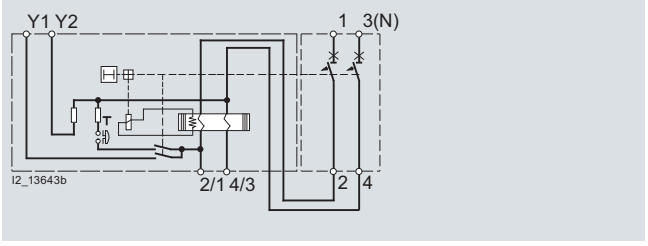


3P

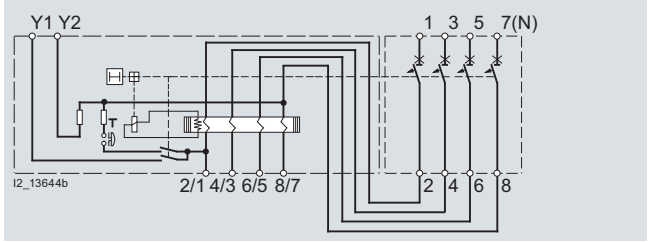


4P

RC units for 5SP4



2P



4P

(Type A)

5SU1 RCBOs, type A

Overview

RCBOs are a combination of an RCCB and a miniature circuit breaker in a compact design for personnel, fire and line protection. For personnel and fire protection, the residual current part of the type A trips in the event of sinusoidal AC residual currents and pulsating DC residual currents.

RCBOs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact. RCBOs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel and the outdoor installations of residential buildings.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults.

The MCB part of the RCBO protects lines against overload and short circuits and is available in characteristics B and C.

Since DIN VDE 0100-410 came into effect in June 2007, all socket outlet current circuits up to 20 A must now also be fitted with residual current protective devices with a rated residual current of max. 30 mA. This also applies to outdoor electrical circuits up to 32 A for the connection of portable equipment.

In order to implement this protection, we recommend the national use of RCBOs with 30 mA.

Assignment to each individual branch circuit helps prevent the unwanted tripping of fault-free circuits induced by the accumulation of operation-related leakage currents or by transient current pulses during switching operations.

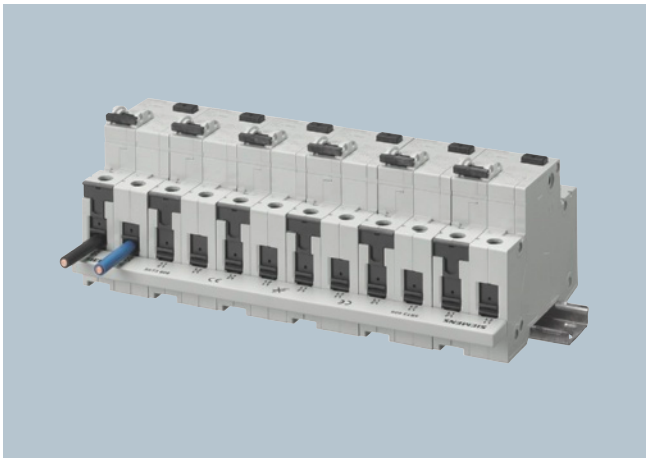
Additional components of the 5SY miniature circuit breakers can be mounted at the side and carry out additional functions.

For further details on additional components, please refer to the chapter "Miniature circuit breakers".

RCBOs comprise one part for fault-current detection and one part for overcurrent detection. They are equipped with a delayed overload/time-dependent thermal release (thermal bimetal) for low overcurrents and with an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used guarantee a long service life and offer a high degree of protection against contact welding.

Benefits



For all versions

- Clear and visible conductor connection in front of the busbars that can be easily checked
- Large and easily accessible wiring space enables easy insertion of conductor in the terminals.
- The surge current withstand capability of more than 1 kA ensures safe and reliable operation
- All additional components for miniature circuit breakers can be retrofitted on the right-hand side.

For all 10 kA versions up to 40 A

- Integrated movable terminal covers located at the cable entries ensure the terminals are fully insulated when the screws are tightened. The effective touch protection when grasping the device considerably exceeds the requirements of BGV A3.
- The RCBOs can be quickly and easily removed from the assembly by hand if connections need to be changed. This saves time if parts need to be replaced because the busbars no longer need to be freed from the adjacent miniature circuit breakers.

For all 125 A versions

- The RCBOs offer external remote tripping over terminals Y1/Y2. This supports implementation of central OFF circuits.

Technical specifications

			Up to 40 A	125 A
Standards			IEC/EN 61009-1 (VDE 0664-10), IEC/EN 61009-2-1 (VDE 0664-11) IEC/EN 61543; VDE 0664-30	
Certifications			IEC 61009-1, IEC 61009-2-1; EN 61009-1, EN 61009-2-1	
Rated voltages U_n		V AC	125 ... 230	400
Rated frequency f_n		Hz	50 ... 60	
Rated currents I_n		A	6, 8, 10, 13, 16, 20, 25, 32, 40	125
Rated residual currents $I_{\Delta n}$		mA	10, 30, 300	30, 300, 1000
Rated switching capacity		kA	6, 10	10
Energy limitation class			3	--
Surge current withstand capability				
With current waveform 8/20 µs	Acc. to DIN VDE 0432-2			
• Instantaneous		kA	> 1	
• Super resistant		kA	> 3	--
• Selective		kA	> 5	
Terminal conductor cross-sections				
• Solid and stranded		mm^2	0.75 ... 35	6 ... 50
• Finely stranded with end sleeve		mm^2	0.75 ... 25	6 ... 35
Terminal tightening torque		Nm	2.5 ... 3.0	3.0 ... 3.5
Mains connection			Top or bottom	
Mounting position			Any	
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, with connected conductors	
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe	
Service life	Test cycle acc. to IEC/EN 61009	Switching cycles	> 10 000	
Storage temperature		°C	-40 ... +75	
Ambient temperature		°C	-25 ... +45, Marked with -25	
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. humidity)	
CFC and silicone-free			Yes	

Selection and ordering data

	Rated residual current $I_{\Delta n}$	Rated current I_n	MW	DT	Tripping characteristic B Order No.	Price per PU	PG	DT	Tripping characteristic C Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mA	A										Unit(s)	Unit(s)	kg
	RCBOs, type A Instantaneous													
	1P+N; 230 V AC; 50 ... 60 Hz													
	6 000													
	3													
	30	6	2	A	**5SU1 356-6KK06**		011	A	**5SU1 356-7KK06**		011	1	1	0.260
		8			**--**			B	**5SU1 356-7KK08**		011	1	1	0.260
		10		A	**5SU1 356-6KK10**		011	►	**5SU1 356-7KK10**		011	1	1	0.260
		13		B	**5SU1 356-6KK13**		011	A	**5SU1 356-7KK13**		011	1	1	0.260
		16		►	**5SU1 356-6KK16**		011	►	**5SU1 356-7KK16**		011	1	1	0.260
		20		B	**5SU1 356-6KK20**		011	B	**5SU1 356-7KK20**		011	1	1	0.260
		25		B	**5SU1 356-6KK25**		011	A	**5SU1 356-7KK25**		011	1	1	0.260
		32		B	**5SU1 356-6KK32**		011	B	**5SU1 356-7KK32**		011	1	1	0.260
		40		B	**5SU1 356-6KK40**		011	B	**5SU1 356-7KK40**		011	1	1	0.260
	300	6	2	B	**5SU1 656-6KK06**		011	B	**5SU1 656-7KK06**		011	1	1	0.260
		10		B	**5SU1 656-6KK10**		011	A	**5SU1 656-7KK10**		011	1	1	0.260
		13		B	**5SU1 656-6KK13**		011	B	**5SU1 656-7KK13**		011	1	1	0.260
		16		B	**5SU1 656-6KK16**		011	A	**5SU1 656-7KK16**		011	1	1	0.260
		20		B	**5SU1 656-6KK20**		011	B	**5SU1 656-7KK20**		011	1	1	0.260
		25		B	**5SU1 656-6KK25**		011	B	**5SU1 656-7KK25**		011	1	1	0.260
		32		B	**5SU1 656-6KK32**		011	B	**5SU1 656-7KK32**		011	1	1	0.260
		40		B	**5SU1 656-6KK40**		011	B	**5SU1 656-7KK40**		011	1	1	0.260

* You can order this quantity or a multiple thereof.

(Type A)

5SU1 RCBOs, type A

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	DT	Tripping characteristic B Order No.	Price per PU	PG	DT	Tripping characteristic C Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit	Weight per PU approx. kg
	RCBOs, type A Instantaneous													
	1P+N; 230 V AC; 50 ... 60 Hz													
	10 000													
	3													
	10	6	2	B	**5SU1 154-6KK06**		011	B	**5SU1 154-7KK06**		011	1	1	0.260
		10		B	**5SU1 154-6KK10**		011	B	**5SU1 154-7KK10**		011	1	1	0.260
		13		B	**5SU1 154-6KK13**		011	B	**5SU1 154-7KK13**		011	1	1	0.260
		16		B	**5SU1 154-6KK16**		011	▶	**5SU1 154-7KK16**		011	1	1	0.260
	30	6	2	B	**5SU1 354-6KK06**		011	▶	**5SU1 354-7KK06**		011	1	1	0.260
		8			**--**			B	**5SU1 354-7KK08**		011	1	1	0.260
		10		B	**5SU1 354-6KK10**		011	▶	**5SU1 354-7KK10**		011	1	1	0.260
		13		B	**5SU1 354-6KK13**		011	B	**5SU1 354-7KK13**		011	1	1	0.260
		16		▶	**5SU1 354-6KK16**		011	▶	**5SU1 354-7KK16**		011	1	1	0.260
		20		B	**5SU1 354-6KK20**		011	B	**5SU1 354-7KK20**		011	1	1	0.260
		25		B	**5SU1 354-6KK25**		011	B	**5SU1 354-7KK25**		011	1	1	0.260
		32		B	**5SU1 354-6KK32**		011	B	**5SU1 354-7KK32**		011	1	1	0.260
		40		B	**5SU1 354-6KK40**		011	B	**5SU1 354-7KK40**		011	1	1	0.260
	300	6	2	B	**5SU1 654-6KK06**		011	B	**5SU1 654-7KK06**		011	1	1	0.260
		10		B	**5SU1 654-6KK10**		011	B	**5SU1 654-7KK10**		011	1	1	0.260
		13		B	**5SU1 654-6KK13**		011	B	**5SU1 654-7KK13**		011	1	1	0.260
		16		B	**5SU1 654-6KK16**		011	B	**5SU1 654-7KK16**		011	1	1	0.260
		20		B	**5SU1 654-6KK20**		011	B	**5SU1 654-7KK20**		011	1	1	0.260
		25		B	**5SU1 654-6KK25**		011	B	**5SU1 654-7KK25**		011	1	1	0.260
		32		B	**5SU1 654-6KK32**		011	B	**5SU1 654-7KK32**		011	1	1	0.260
		40		B	**5SU1 654-6KK40**		011	B	**5SU1 654-7KK40**		011	1	1	0.260
	2P; 230 V AC; 50 ... 60 Hz													
	10 000													
	3													
	30	6	3	B	**5SU1 324-6FA06**		011	B	**5SU1 324-7FA06**		011	1	1	0.403
		10		▶	**5SU1 324-6FA10**		011	▶	**5SU1 324-7FA10**		011	1	1	0.403
		13		B	**5SU1 324-6FA13**		011	B	**5SU1 324-7FA13**		011	1	1	0.403
		16		▶	**5SU1 324-6FA16**		011	▶	**5SU1 324-7FA16**		011	1	1	0.403
		20		B	**5SU1 324-6FA20**		011	B	**5SU1 324-7FA20**		011	1	1	0.403
		25		B	**5SU1 324-6FA25**		011	B	**5SU1 324-7FA25**		011	1	1	0.403
		32		B	**5SU1 324-6FA32**		011	B	**5SU1 324-7FA32**		011	1	1	0.403
		40		B	**5SU1 324-6FA40**		011	B	**5SU1 324-7FA40**		011	1	1	0.403
	2P; 400 V AC; 50 ... 60 Hz													
	10 000													
	30	125	6.5	B	**5SU1 324-6KK82**		011	B	**5SU1 324-7KK82**		011	1	1	0.930
	300	125		B	**5SU1 624-6KK82**		011	B	**5SU1 624-7KK82**		011	1	1	0.930
	4P; 400 V AC; 50 ... 60 Hz													
	10 000													
	30	125	11	B	**5SU1 344-6KK82**		011	B	**5SU1 344-7KK82**		011	1	1	1.900
	300	125		B	**5SU1 644-6KK82**		011	B	**5SU1 644-7KK82**		011	1	1	1.900

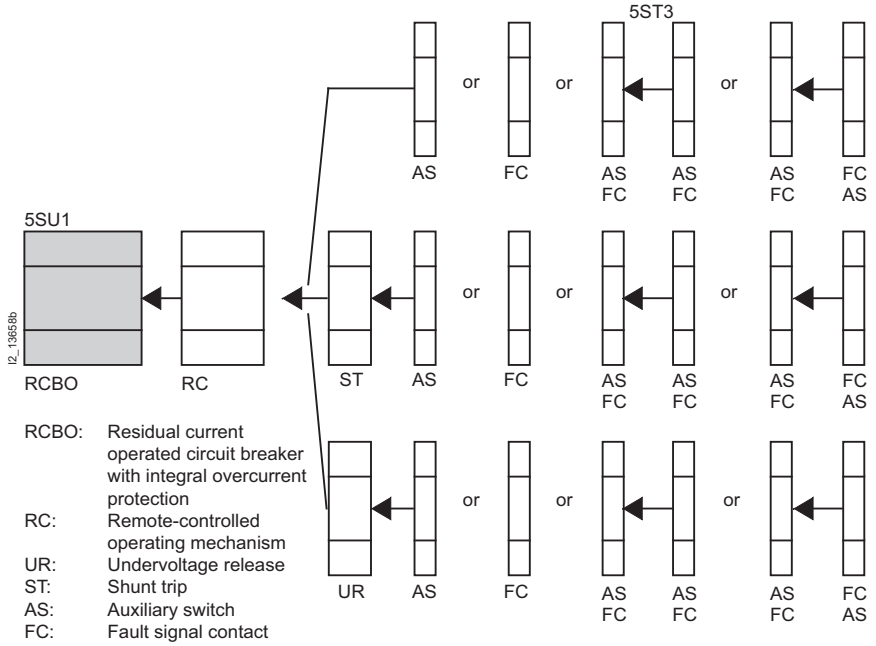
* You can order this quantity or a multiple thereof.

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	DT	Tripping characteristic B Order No.	Price per PU	PG	DT	Tripping characteristic C Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	RCBOs, type A Super resistant K													
	1P+N; 230 V AC; 50 ... 60 Hz 10 000 3													
	30	10	2		--			B	**5SU1 354-7VK10**		011	1	1	0.260
		16			--			B	**5SU1 354-7VK16**		011	1	1	0.260
		20			--			B	**5SU1 354-7VK20**		011	1	1	0.260
		25			--			B	**5SU1 354-7VK25**		011	1	1	0.260
	RCBOs, type A Selective S													
	2P; 400 V AC; 50 ... 60 Hz 10 000													
	300	125	6.5	B	**5SU1 624-6WK82**		011	B	**5SU1 624-7WK82**		011	1	1	0.930
	4P; 400 V AC; 50 ... 60 Hz 10 000													
	300	125	11	B	**5SU1 644-6WK82**		011	B	**5SU1 644-7WK82**		011	1	1	1.900

	Version	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	**Handle couplers for additional components** For mounting the additional components: auxiliary switches, fault signal contacts, shunt trips and undervoltage releases onto 5SU1 RCBOs, you require a handle coupler (1 set = 5 units).	►	**5ST3 805-1**		027	1 set	1 set	0.008

Note:

The same additional components are used for RCBOs as for miniature circuit breakers. See chapter "Miniature Circuit Breakers".

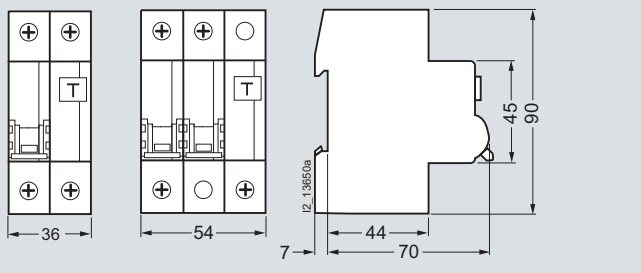


RCBO: Residual current operated circuit breaker with integral overcurrent protection
RC: Remote-controlled operating mechanism
UR: Undervoltage release
ST: Shunt trip
AS: Auxiliary switch
FC: Fault signal contact

* You can order this quantity or a multiple thereof.

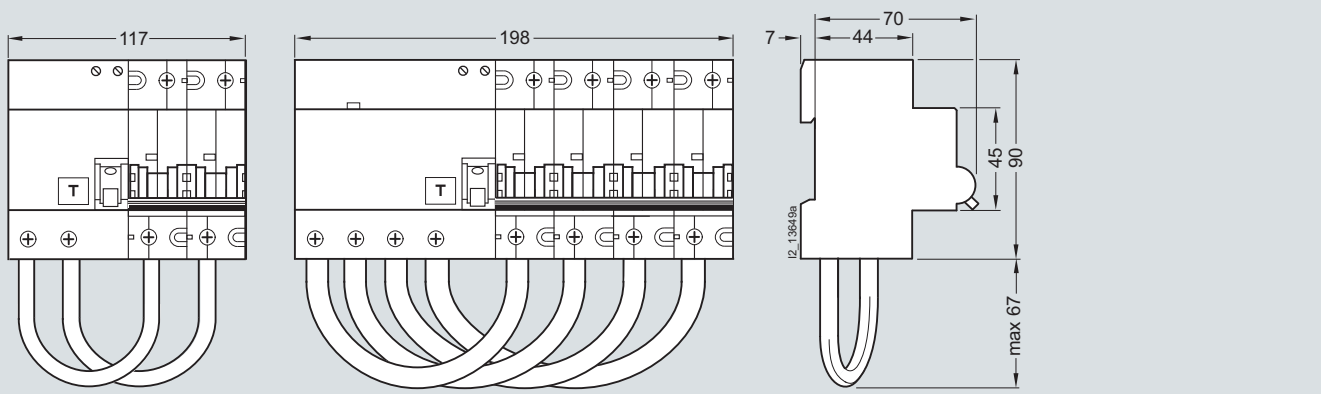
(Type A)

Dimensional drawings



1P+N,
up to 40 A

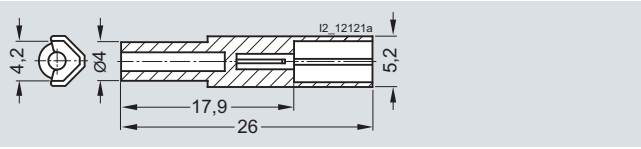
2P,
up to 40 A



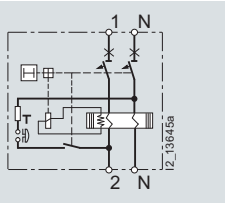
2P,
125 A

4P,
125 A

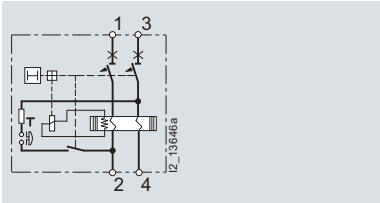
Handle coupler



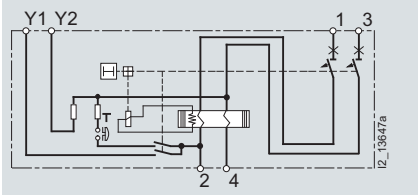
Schematics



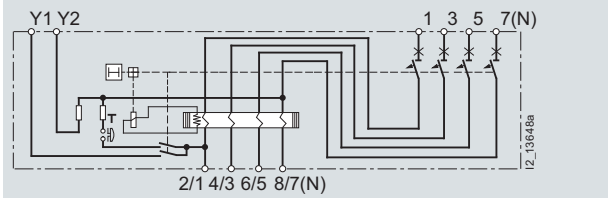
1P+N,
up to 40 A



2P,
up to 40 A



2P,
125 A

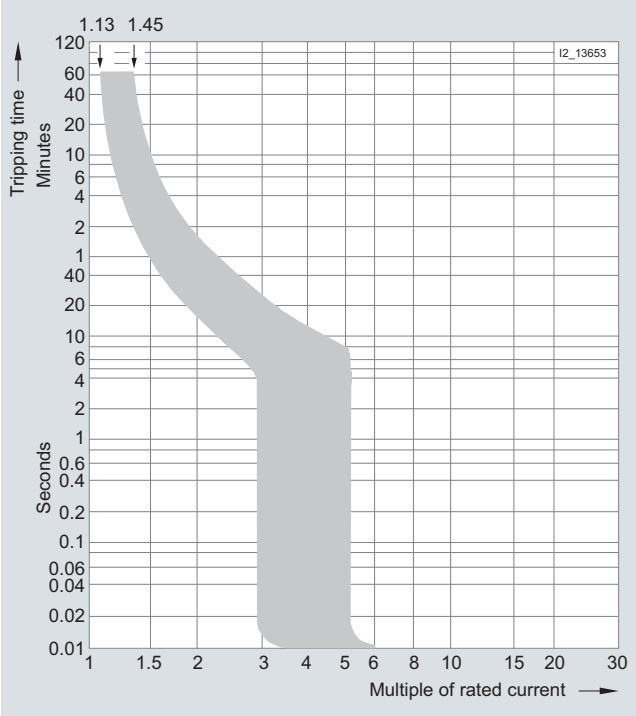


4P,
125 A

Characteristic curves

Tripping characteristics according to EN 61009-1 (VDE 0664 Part 20)

Tripping characteristic B

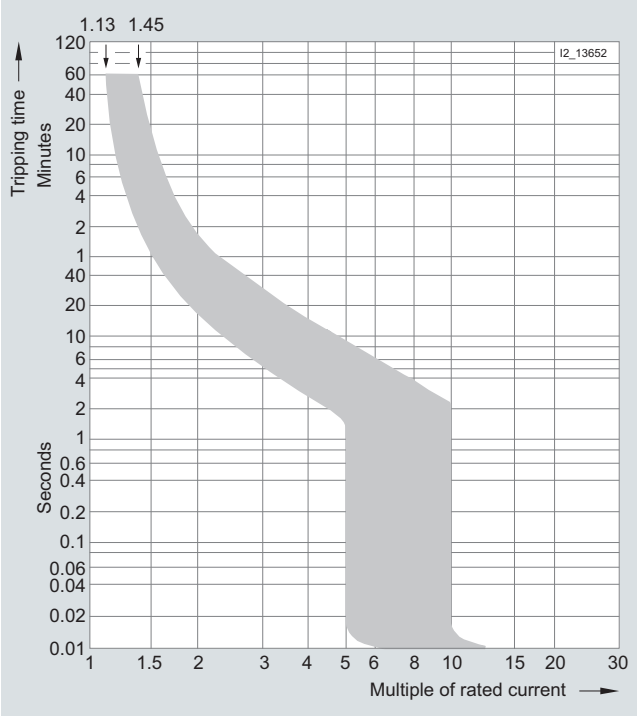


- Line protection mainly in outlet circuits; no proof required regarding personal safety.

If the ambient temperature is not 30 °C, the current values of the delayed tripping operation change by approx. 5 % per 10 K temperature difference > for temperatures lower and < for temperatures higher than 30 °C.

If more than one electrical circuit is loaded in a series of RCBOs or MCBs, the resulting increase in ambient temperature affects the characteristic curve.

Tripping characteristic C



- General line protection, especially advantageous with higher starting currents (lamps, motors, etc.)

In this case an additional correction factor, specific to the rated current of the RCBOs, must be taken into account.

Number	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristic	**Standards**	**Thermal trips** Test currents: Limiting Test current I_1	Minimum Test current I_2	Tripping time $I_n \leq 63$ A t	$I_n > 63$ A	**Electromagnetic trips** Test currents: Hold I_4	Latest tripping instant I_5	Tripping time t
B	IEC 61009-1/EN 61009-1	1.13 × I_n		> 1 h	> 2 h	3 × I_n		≥ 0.1 s
	VDE 0664 Part 20		1.45 × I_n	< 1 h	< 2 h		5 × I_n	< 0.1 s
C		1.13 × I_n		> 1 h	> 2 h	5 × I_n		≥ 0.1 s
			1.45 × I_n	< 1 h	< 2 h		10 × I_n	< 0.1 s

Switching capacity

Particular demands are made on the MCB component of the RCBO with regard to switching capacity.

The values are standardized and are determined according to the test conditions of EN 61009-1 (VDE 0664 Part 20).

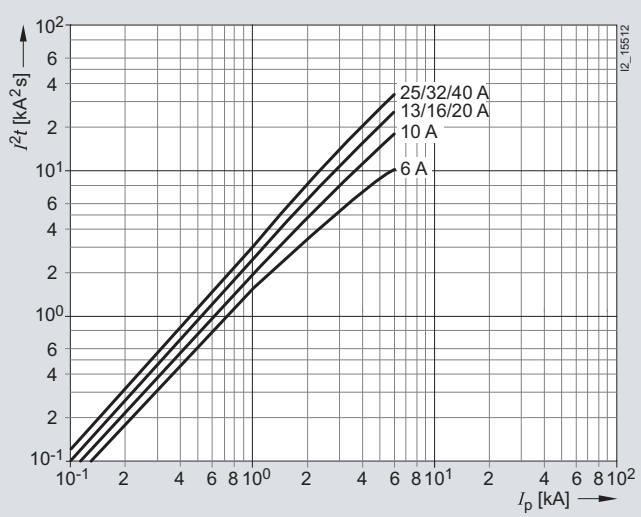
The most common values are 6 000 and 10 000.

(Type A)

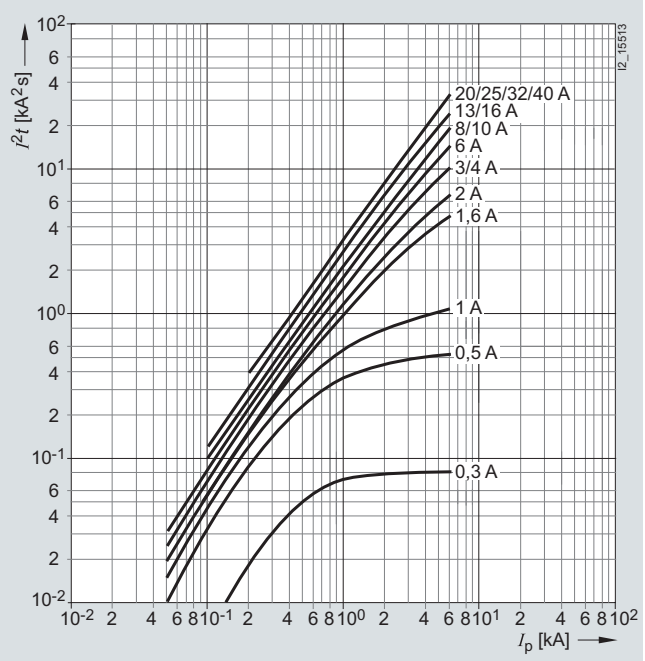
Let-through I^2t-values

Rated switching capacity, 5SU1, 6000 A

Characteristic B

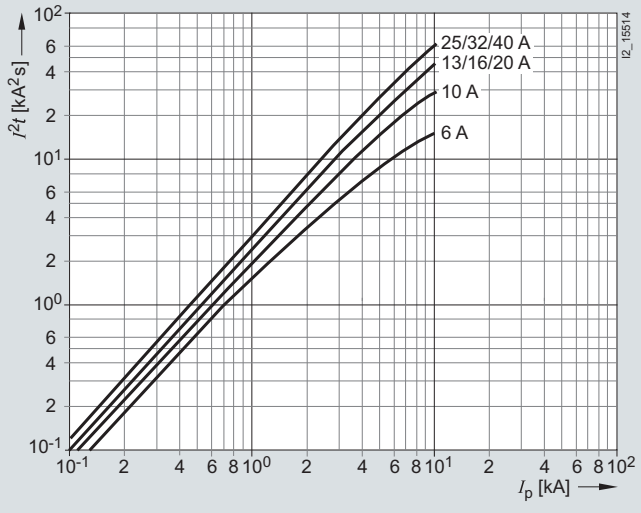


Characteristic C

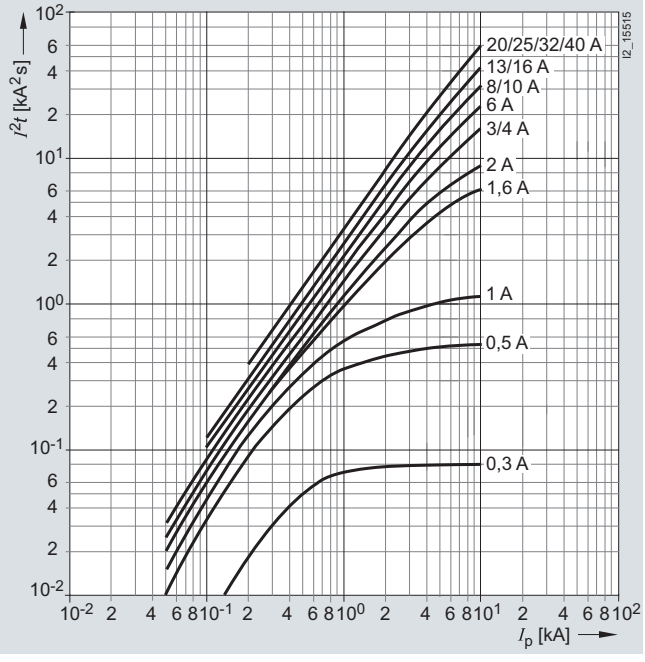


Rated switching capacity, 5SU1, 10 000 A

Characteristic B

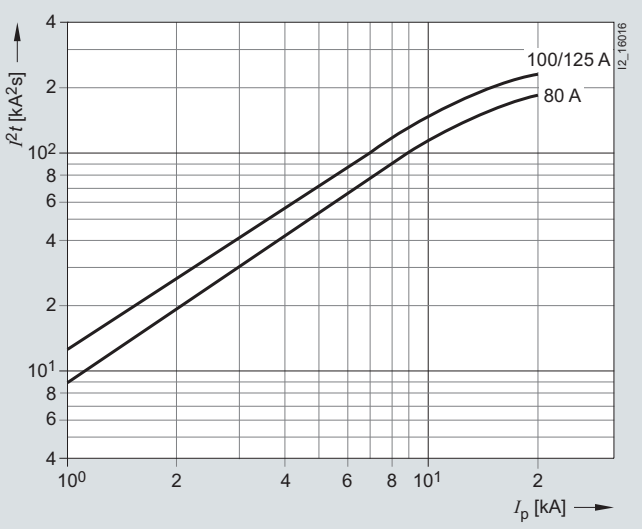


Characteristic C

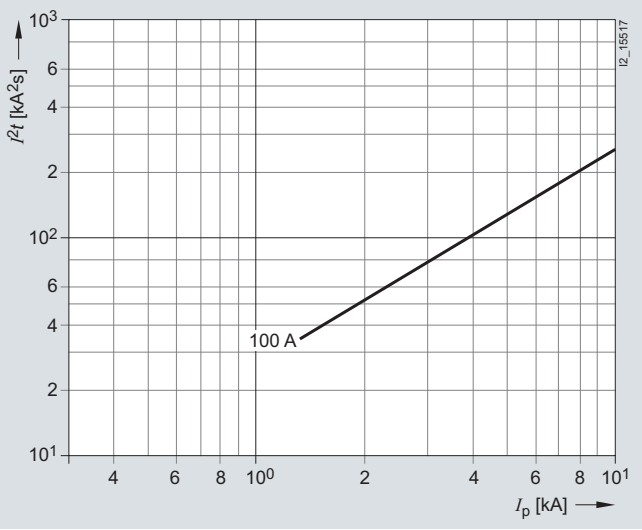


Rated switching capacity, 5SU1, 10 000 A

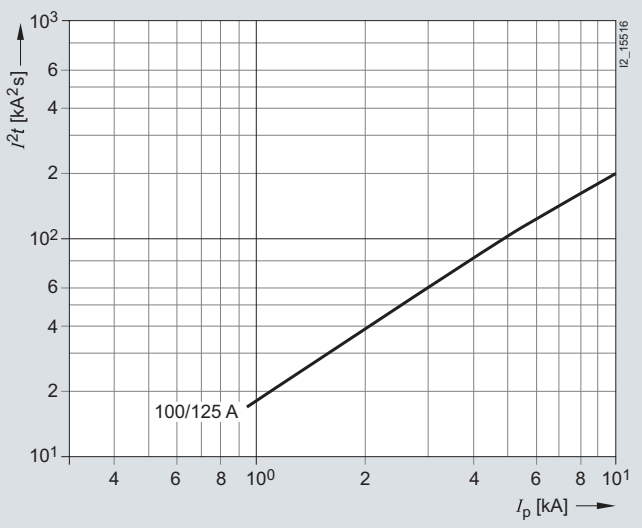
Characteristic B



Characteristic D



Characteristic C



More information

Selectivity of RCBOs/fuses

Distribution systems are usually set up as radial networks. An overcurrent protection device is required for each reduction of the conductor cross-section. This produces a series connection staggered according to rated currents, which should be "selective" if possible.

Selectivity means that, in the event of a fault, only the protective device that is directly next to the fault in the current path is tripped. This means that parallel current paths can maintain a power flow.

In the case of RCBOs with upstream fuses, the selectivity limit depends largely on the current limitation and tripping characteristics of the RCBO and the melting I^2t value of the fuse.

This produces different selectivity limits for RCBOs with different characteristics and rated switching capacity.

The following tables provide information on the short-circuit currents up to which selectivity exists between RCBOs and upstream fuse according to DIN VDE 0636 Part 21. The values specified in kA are limit values that were determined under unfavorable test conditions. Under normal practical conditions, you can often expect considerably better values, depending on the upstream fuses.

Limit values of selectivity of RCBOs/fuses in kA

Downstream RCBOs		Upstream fuses								
	I_n [A]	16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
Characteristic B 5SU1 .56	6	0.4	0.7	1.1	2.0	4.1	•	•	•	--
	10	--	0.5	0.75	1.4	2.4	3.4	4.2	•	--
	13	--	0.45	0.7	1.3	2.0	2.7	3.6	•	--
	16	--	0.45	0.7	1.3	2.0	2.7	3.6	•	--
	20	--	--	0.7	1.3	2.0	2.7	3.6	•	--
	25	--	--	--	1.3	2.0	2.7	3.6	•	--
	32	--	--	--	--	2.0	2.7	3.6	•	--
	40	--	--	--	--	1.8	2.7	3.6	•	--
Characteristic C 5SU1 .56	6	0.35	0.55	0.8	1.5	2.8	4.7	•	•	--
	8	--	0.45	0.7	1.4	2.3	3.3	4.2	•	--
	10	--	0.45	0.7	1.4	2.3	3.3	4.2	•	--
	13	--	0.4	0.6	1.2	2.0	3.0	3.5	•	--
	16	--	0.4	0.6	1.2	2.0	3.0	3.5	•	--
	20	--	--	0.6	1.2	2.0	3.0	3.5	•	--
	25	--	--	--	1.2	2.0	3.0	3.5	•	--
	32	--	--	--	--	2.0	2.8	3.5	•	--
	40	--	--	--	--	1.8	2.8	3.5	•	--

• ≙ ≥ rated switching capacity according to EN 61009-1 6 000.

Characteristic B 5SU1 .54	6	0.45	0.7	1.1	2.2	5.0			•	•
	10	--	0.55	0.8	1.5	2.8	4.6	7.0	•	•
	13	--	0.5	0.75	1.4	2.3	3.9	6.0	•	•
	16	--	0.5	0.75	1.4	2.3	3.9	6.0	•	•
	20	--	--	0.75	1.4	2.3	3.9	6.0	•	•
	25	--	--	--	1.2	2.0	3.1	4.5	8.0	•
	32	--	--	--	--	2.0	3.1	4.5	8.0	•
	40	--	--	--	--	1.8	2.8	4.0	7.0	•
Characteristic C 5SU1 .54	6	0.4	0.6	0.9	1.7	3.3	6.5	•	•	•
	8	--	0.5	0.8	1.5	2.7	5.0	7.0	•	•
	10	--	0.5	0.8	1.5	2.7	5.0	7.0	•	•
	13	--	0.5	0.7	1.3	2.3	4.0	5.0	•	•
	16	--	0.5	0.7	1.3	2.3	4.0	5.0	•	•
	20	--	--	0.6	1.2	2.0	3.2	4.4	8.0	•
	25	--	--	--	1.2	2.0	3.2	4.4	8.0	•
	32	--	--	--	--	1.8	2.8	3.6	7.0	•
	40	--	--	--	--	1.8	2.8	3.6	7.0	•

• ≙ ≥ rated switching capacity according to EN 61009-1 10 000.

Overview

4-pole 5SM3 RCCBs are bus-mounted either together or in combination with miniature circuit breakers. RCCBs with an N wire connection on the left-hand side facilitate installation because normal busbars are used, as those used for miniature circuit breakers.

Busbars are available in 10 mm^2 and 16 mm^2.

The extremely flexible 5ST3 6 busbar system with fixed lengths enables installation in any length as the busbars can be overlapped.

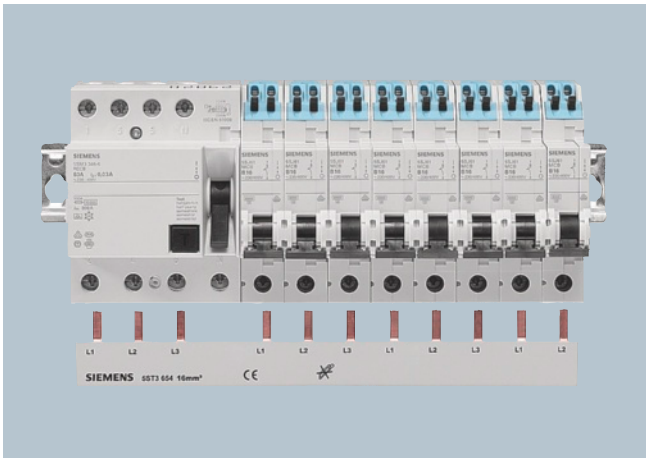
No further need for time-consuming tasks, such as cutting, cutting to length, deburring, cleaning of cut surfaces and mounting of end caps.

Any free pins on the busbars can be made safe by covering with touch protection.

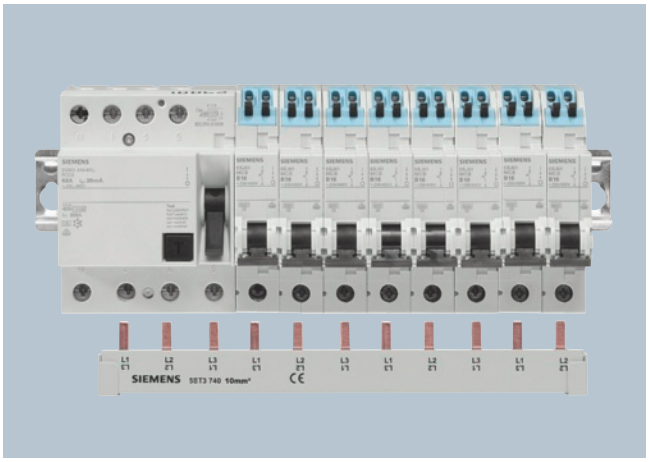
If several RCBOs are bus-mounted together, this is implemented with two-phase busbars, which are used as 1+N busbars.

Benefits

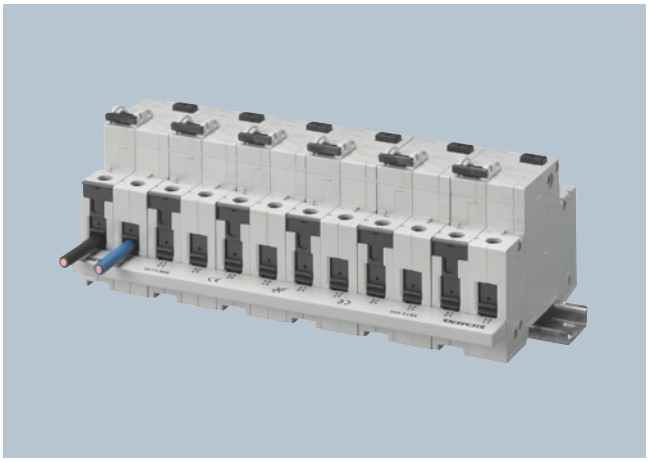
- Connection of miniature circuit breakers to 4-pole RCCBs with N connection right and three-phase busbar, using busbar specially designed for this application. No cutting or end caps required.



- Connection of miniature circuit breakers to 4-pole RCCBs with N connection left, with three-phase busbar that can be cut. No need to stock-keep additional items and busbars that are always available.



- Connection of 1P+N RCBOs with two-phase busbar. No cutting or end caps required.



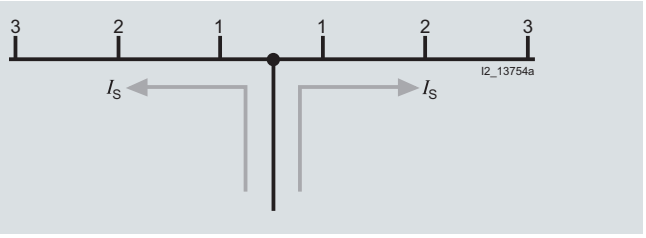
- Bus-mounting of RCCBs on busbar (three-phase +N) that can be cut. A proven and frequently used application

Technical specifications

			5ST3, 5ST2
Standards			EN 60439-1 (VDE 0660-500): 2005-01
Busbar material			SF-Cu F 24
Partition material			Plastic, Cycoloy 3600 Heat-resistant to more than 90 °C flame-retardant and self-extinguishing, dioxin and halogen-free
Rated operational voltage U_e		V AC	400
Rated current I_n			
• Cross-section 10 mm^2		A	63
• Cross-section 16 mm^2		A	80
Rated impulse withstand voltage U_{imp}		kV	4
Test pulse voltage (1.2/50)		kV	6.2
Rated conditional short-circuit current I_{cc}		kA	25
Resistance to climate			
• Constant atmosphere	Acc. to DIN 50015		23/83; 40/92; 55/20
• Humid heat	Acc. to IEC 68-2-30		28 cycles
Insulation coordination	Acc. to IEC 664 (VDE 0110-1)		
• Overvoltage category			III
• Degree of pollution			2
Maximum busbar current I_S/phase			
• Infeed at the start of the busbar			
- Cross-section 10 mm^2		A	63
- Cross-section 16 mm^2		A	80
• Infeed at the center of the busbar			
- Cross-section 10 mm^2		A	100
- Cross-section 16 mm^2		A	130

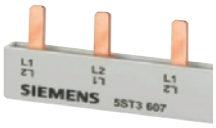
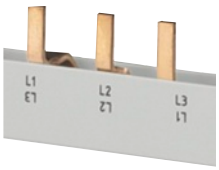
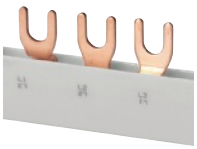
Infeed at the busbar end

Infeed near the busbar end or at the busbar center

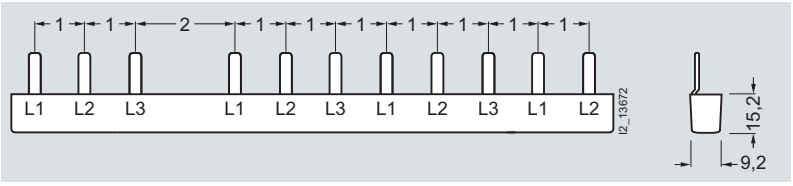


The sum of the output current per branch (1, 2, 3 ... n) must not be greater than the max. busbar current I_S/phase

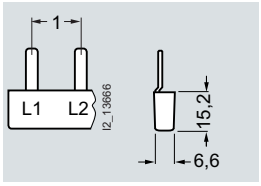
Selection and ordering data

	Version	Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	**5ST3 6 busbar systems, fixed lengths, cannot be cut, fully insulated**									
	For 1 RCCB 4P, N connection right, and 8 MCB 1P									
	• Three-phase 10 mm²	1	210	A	**5ST3 624**		027	1	10	0.075
	• Three-phase 16 mm²	1	210	A	**5ST3 654**		027	1	10	0.114
	For 6 RCBOs 1P+N together									
	• Two-phase 10 mm²		210	A	**5ST3 608**		027	1	10	0.048
	• Two-phase 16 mm²		210	A	**5ST3 638**		027	1	10	0.076
	**5ST3 7 busbar systems, 12 MW, can be cut, with end caps**									
	For 1 RCCB 4P, N connection right, and 8 MCB 1P									
	• Three-phase 16 mm²			A	**5ST3 717**		027	1	25	0.150
	For 6 RCBO 1P+N									
	• Two-phase 10 mm²	1	216	A	**5ST3 734**		027	1	1	0.060
	• Two-phase 16 mm²	1	216	A	**5ST3 704**		027	1	1	0.060
	End caps for 5ST3 7, can be cut									
	For two-phase busbars			►	**5ST3 750**		027	1	10	0.001
	**Touch protection**									
	For free connections, yellow (RAL 1004)			A	**5ST3 655**		027	1	10	0.003
	**Busbars, 12 MW, with fork-type connections, can be cut, with end caps**									
	For bus-mounting RCCBs together									
	• Three-phase + N, 16 mm²	1	216	A	**5ST2 145**		027	1	1	0.315
	**End caps for 5ST3 7, can be cut**									
	For three-phase busbars			A	**5ST2 156**		027	1	10	0.017
	**Terminals up to 35 mm² (stranded), for direct infeed of 5ST2 145 busbar**									
	Side-by-side mounting possible			A	**5ST2 157**		027	1	5	0.030

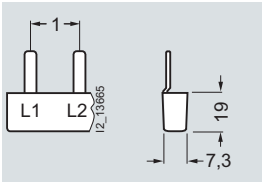
Dimensional drawings



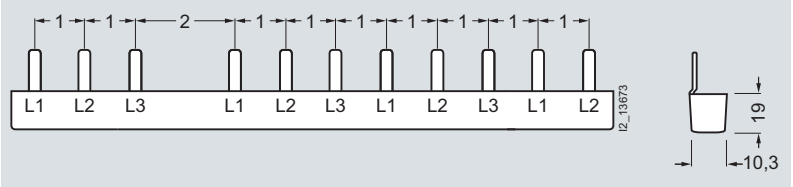
5ST3 624



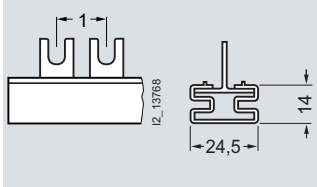
5ST3 608



5ST3 638



5ST3 654



5ST2 145

Note:
Pin spacing in MW
Dimensions of side views in mm (approx.).

*** You can order this quantity or a multiple thereof.**

5SM1 and 5SZ9 RCCB socket outlets

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	~ (Type A)
RCCB protective socket outlets				
• For mounting onto device box, equipped with RCCB and 2 SCHUKO socket outlets	2	16	10, 30	✓
• Molded-plastic enclosures, equipped with RCCB and SCHUKO socket outlet	2	16	10	✓

~ = Type A for AC and pulsating DC residual currents

Application

RCCB protective socket outlets

- Molded-plastic enclosure equipped with residual current operated circuit breaker and flush-mounting SCHUKO socket outlet or flush-mounting SCHUKO double socket outlet
- For electric devices where there is a risk of accidental contact with live parts in the event of damage
- Rated voltage: 230 V AC, 50 to 60 Hz
- For outdoor connection of gardening equipment and socket outlets in workshops or for agricultural purposes
- Degree of protection IP54 (5SZ9 2.6).

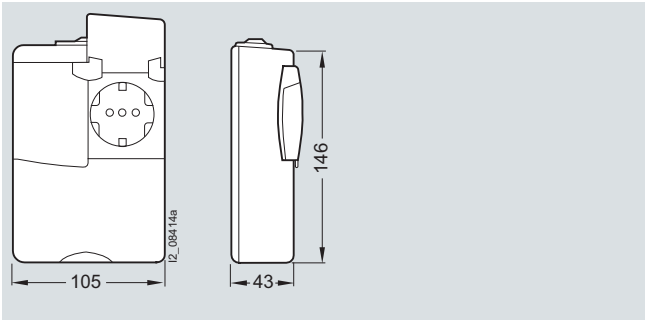
Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	DT	Order No.	Price per PU 1 Stück	PG	PE Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
RCCB protective socket outlets									
 • RCCB protective socket outlets according to VDE 0664, for mounting on device boxes, equipped with residual current operated circuit breaker and 2 childproof SCHUKO socket outlets	10	16	B	**5SM1 920-5**		008	1	1	0.500
	30		B	**5SM1 920-8**		008	1	1	0.500
 • RCCB protective socket outlets according to VDE 0664, in molded-plastic enclosure, equipped with residual current operated circuit breaker and flush-mounted SCHUKO socket outlet	10	16	C	**5SZ9 206**		008	1	1	0.760
	30		C	**5SZ9 216**		008	1	1	0.760

Dimensional drawings

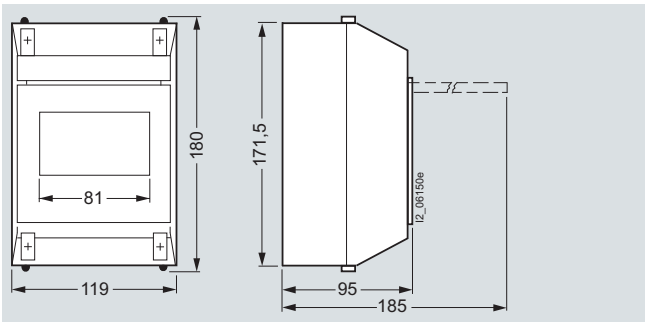
5SM1 920 RCCB protective socket outlets

According to VDE 0664, for mounting on device boxes, equipped with residual current operated circuit breakers and 2 childproof SCHUKO socket outlets.



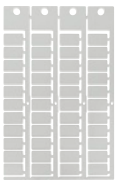
5SZ9 2.6 RCCB protective socket outlets

Molded-plastic enclosures, equipped with RCCB and flush-mounting SCHUKO socket outlets.



* You can order this quantity or a multiple thereof.

Accessories

	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
						Unit(s)	Unit(s)	kg
	**Terminal covers, gray**							
	For surface mounting, degree of protection IP40, sealable, with 35 mm standard mounting rail							
	• Up to 2.5 MW	B	**5SW3 004**		008	1	1	0.084
	• Up to 4.5 MW	B	**5SW3 005**		008	1	1	0.114
	**Wall enclosures, gray**							
	For flush mounting, degree of protection IP40, with 35 mm standard mounting rail							
	• Up to 2.5 MW	B	**5SW3 006**		008	1	1/4	0.126
	• Up to 4.5 MW	B	**5SW3 007**		008	1	1	0.147
	**Molded-plastic enclosures, gray**							
	For surface mounting, degree of protection IP54, sealable, with 35 mm standard mounting rail, with transparent hinged lid for 4.5 MW	A	**5SW1 200**		008	1	1	0.450
	**Covers**							
	Can be assembled as mini distribution board, suitable for all devices, cover parts prepared for rail mounting of conventional label caps, comprising:							
	• End plates (for snapping onto standard mounting rail)	A	**5ST2 134**		027	1	10	0.022
	• Angle section (approx. 1 m long)	A	**5ST2 135**		027	1	5	0.330
	• Flat profile (as a cover between the rows of devices length approx. 1 m)	B	**5ST2 136**		027	1	5	0.260
	**Fixing parts**							
	Plastic 4 MW	B	**5ST2 201**		027	1	1	0.012
	**Inscription labels (white)**							
	15 mm × 9 mm, 3 frames with 44 labels each any attachment and inscription, self-adhesive	B	**5ST2 173**		027	1 set	1 set	0.038

Labeling systems

Inscription on self-adhesive labels for a uniform and tidy appearance in electrical power distribution. The labeling program can be downloaded to your PC free of charge at:

http://www.siemens.com/beta

Recommended ELAT-3-747 labels for printing out on normal printers can be ordered at:

Brady GmbH
Otto-Hahn-Str. 5-7
D-63222 Langen
Tel.: +49 (0) 61 03/75 98-660

* You can order this quantity or a multiple thereof.

Overview

Protection over residual current protective devices

In the case of "automatic disconnection of the power supply" by means of a residual current protective device, it is essential that the system components and equipment to be protected are fitted with an appropriately grounded PE conductor. This means that it is only possible for a person to be subjected to a flow of current if two faults occur (in addition to an insulation fault, the interruption of the PE conductor) or in the event of accidental contact with live parts.

Additional protection (protection against direct contact) with $I_{\Delta n} \leq 30$ mA

Direct contact refers to a situation where a person comes into direct contact with a part that is live under operating conditions. If a person directly touches live parts, two series-connected resistors determine the level of the current – the internal resistance of the person R_m and the contact resistance of the location R_{st}.

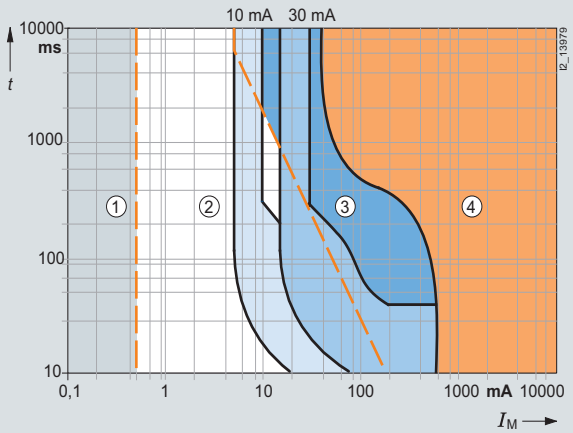
For a proper assessment of the accident risk, it must be assumed that the contact resistance of the location is virtually zero

The resistance of the human body depends on the current path and the contact resistance of the skin. Measurements have shown, for example, that a current path of hand/hand or hand/foot has a resistance of approx. 1000 Ω.

Based on this assumption, a touch voltage of 230 V would produce a dangerous leakage current of 230 mA. The illustration "Areas of impact of alternating current 50/60 Hz on the human body" shows the current intensity/contact time curve in reference to the physiological reactions on the human body. The dangerous values are the current/ contact time values in range 4, as they can trigger ventricular fibrillations, which can cause death.

It also shows the tripping ranges of the residual current protective devices with rated residual current 10 mA and 30 mA and the max. permissible tripping times according to VDE 0664-10. As can be seen from the tripping curve, residual current protective devices do not restrict the level of the fault current, rather they have a protective effect due to the fast disconnection of the current, and thus short contact time.

Areas of impact of alternating current 50/60 Hz on the human body



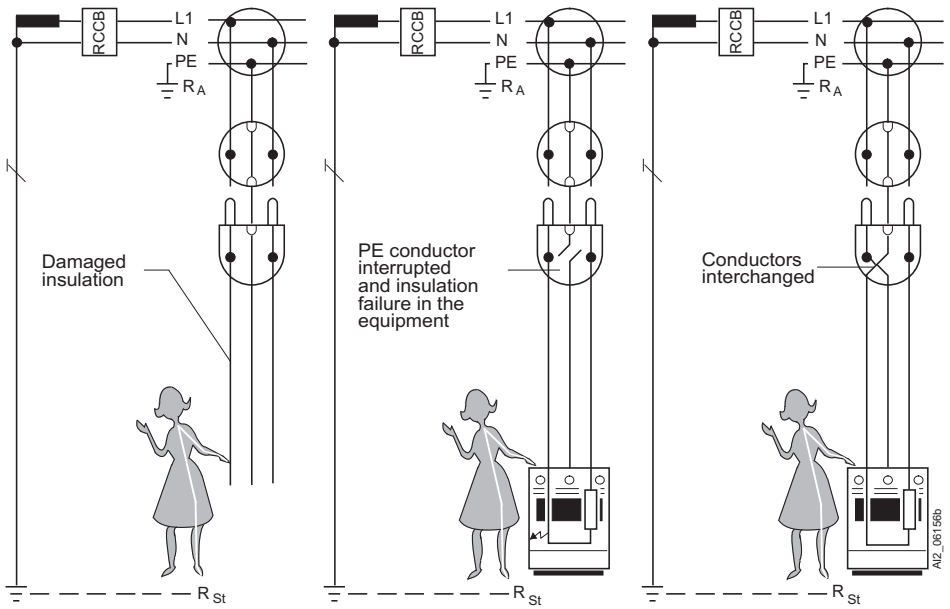
Range ① Usually not perceptible

Range ② No muscle spasms

Range ③ Muscle spasms possible

Range ④ Ventricular fibrillations may occur

I_M: Leakage current
t: Contact time



Examples of accidental direct contact

Residual current protective devices with rated residual current $I_{\Delta n} \leq 10$ mA have a tripping characteristic in range 2, i.e. below the let-go current. There are generally no injurious effects or muscle spasms (see illustration). They are therefore suitable for sensitive areas, such as bathrooms.

Residual current protective devices with rated residual current $I_{\Delta n} \leq 30$ mA meet the conditions of additional protection against electric shock (see illustration):

- In the case of accidental direct contact with parts that are live under operating conditions (e.g.: failure of the basic insulation, improper use, ineffectiveness of the basic protection)
- In the case of negligence on the part of the user (e.g. use of defective devices, inexpert repairs to systems and/or equipment)
- In the case of contact with faulty live parts (e.g. failure of leakage protection in the event of interruption of the protective conductor)

The use of residual current protective devices with rated residual current of up to 30 mA has proven an effective enhanced protection in the event of failure of basic protection measures (protection against direct contact) and/or fault protection measures (protection against indirect contact), as well as in the case of negligence on the part of the user when handling electrical equipment. However, this must not be the sole means of protection against electric shock. This does not replace the need for further protective measures as required by DIN VDE 0100-410.

The requirement for "enhanced protection" with residual current protective devices according to sections 411.3.3 and 415.1 of DIN VDE 0100-410 does not mean that the application of this protection is optional. Rather, it means that this enhanced protection may be required in relation to external influences and in specific areas in coordination with further protective measures.

In several parts of the standards for Groups 4 and 7 of DIN VDE 0100, this additional protection is required or explicitly recommended. The following explains some of the key requirements.

The general building standard for protection against electric shock, DIN VDE 0100-410:2007-06 requires the use of residual current protective devices with rated residual current ≤ 30 mA for

- all socket outlets with a rated current of up to ≤ 20 A if they are intended for use by non-experts and for general use.
- branch circuits for portable tools and equipment used outdoors with a rated current up to ≤ 32 A.

Note:
While DIN VDE 0100-410:06-2007 specifies two exceptions to these requirements, these are not generally applicable to the majority of applications.

The standard does not specify enhanced protection for socket outlets that are used solely by electrical engineers and persons with electrical training (e.g. in electrical workshops) or if it is ensured that the socket outlet is permanently used solely for "specific equipment".

The standard DIN VDE 0100-723:2005-06, "Requirements for special installations or locations – class-rooms with experimental equipment" stipulates that, for the supply of experimental equipment and their circuits, the TN or TT systems must be fitted with residual current protective devices, type B, with rated residual current ≤ 30 mA.

Leakage protection (protection against indirect contact)

Indirect contact refers to the electric contact of persons with a conductive part which is not normally live under operating conditions but has become live under fault conditions. In such cases, it is essential that the power supply is automatically disconnected if a fault means that the size and duration of the touch voltage could pose a risk.

For this purpose, residual current protective devices with a rated residual current of over 30 mA are also suitable. Compliance with the trip conditions is essential in order to ensure sufficient protection. Taking into account the grounding resistance and the rated residual current, the dangerous touch voltage must not persist for a time sufficient to cause a risk of harmful physiological effect in a person.

Fire protection

DIN VDE 0100-482 requires measures to be taken to prevent fires in "Locations exposed to fire hazards" that may result from insulation faults. This stipulates that cables and conductors in TN and TT systems must be protected by means of residual current protective devices with a rated residual current of $I_{\Delta n}$ = 300 mA. This does not include mineral-insulated cables and busbar systems.

In the case of applications where resistance-related faults may cause a fire (e.g. ceiling heating with panel heating elements), the rated residual current must be $I_{\Delta n}$ = 30 mA.

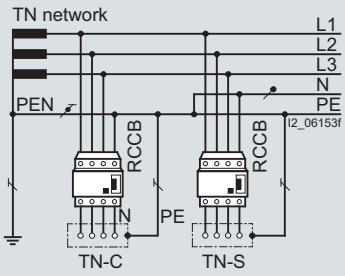
Protection against fires provided by separate residual current protective devices should not be solely restricted to locations exposed to fire hazards, but universally implemented.

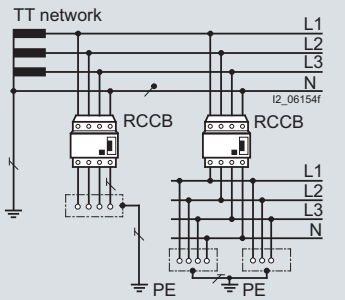
Residual-current operated circuit breakers

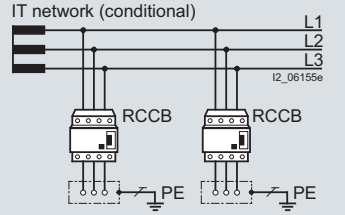
Application

Residual current protective devices can be used in all three system types (DIN VDE 0100-410).

In the IT system, tripping is not required for the first fault as this situation cannot produce any dangerous touch voltages. It is essential that an insulation monitoring device is fitted so that the first fault is indicated by an acoustic or visual signal and the fault can be eliminated as quickly as possible. Tripping is not requested until the 2nd fault. The required compliance with the trip conditions of the TN or TT system will depend on how the device is grounded. A residual current protective device is also a suitable circuit-protection device, whereby a separate residual current protective device is required for each piece of current-using equipment.







Grounding resistances

When using residual current protective devices in a TT system, the maximum grounding resistances (as shown in the following table) must be complied with, depending on the rated residual current and the max. permissible touch voltage.

Rated residual current	Max. permissible grounding resistance at a max. permissible touch voltage of	
$I_{\Delta n}$	50 V DC	25 V DC
10 mA	5000 Ω	2500 Ω
30 mA	1660 Ω	830 Ω
100 mA	500 Ω	250 Ω
300 mA	166 Ω	83 Ω
500 mA	100 Ω	50 Ω
1 A	50 Ω	25 Ω

Design and method of operation of residual current protective devices

The design of residual current protective devices is largely determined by 3 function groups:
1) Summation current transformers for fault-current detection
2) Releases to convert the electrical measured quantities into a mechanical tripping operation
3) Breaker mechanism with contacts

The summation current transformer covers all conductors required to conduct the current, i.e. also the neutral conductor where applicable.
In a fault-free system, the magnetizing effects of the conductors through which current is flowing cancel each other out for the summation current transformer as the sum of all currents is zero (as defined in Kirchhoff's current law. There is no residual magnetic field left that could induce a voltage in the secondary winding.

However, by contrast, if a residual current is flowing due to an insulation fault, this destroys the equilibrium and a residual magnetic field is left in the transformer core. This generates a voltage in the secondary winding, which then uses the release and the breaker mechanism to switch off the electrical circuit afflicted by the insulation fault.
This tripping principle operates independently of the supply voltage or an auxiliary power supply. This is also a condition for the high protection level provided by residual current protective devices according to IEC/EN 61008 (VDE 0664).
This is the only way to ensure that the full protective action of the residual current protective device is maintained even in the event of a system fault, e.g. failure of an outer conductor or an interruption in the neutral conductor.

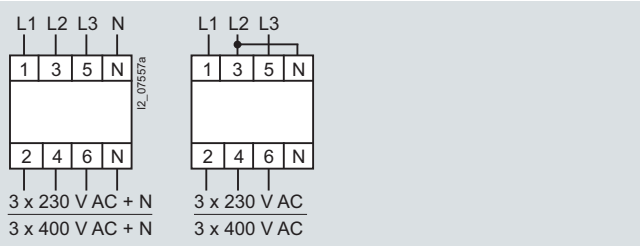
Test button

All residual current protective devices are equipped with a test button. Simply press this button to test whether the residual current protective device is ready to run. Pressing the test button generates an artificial residual current – the residual current protective device must trip.
We recommend testing the functionality when commissioning the system and then at regular intervals – approx. every six months.
Furthermore, it is also essential to ensure compliance with the test intervals specified in the pertinent rules and regulations (e.g. accident prevention regulations).
The minimum operational voltage for operation of the test equipment is 100 V AC (series 5SM3)[1].

[1] For detailed information, see Technical specifications.

3-pole connection

4-pole residual current protective devices can also be operated in 3-pole systems. In this case, connection must be at terminals 1, 3 and 5 and 2, 4 and 6.
The function of the test equipment is only ensured if a jumper is fitted between terminals 3 and N.



SIGRES RCCB for harsh environmental conditions

Our SIGRES RCCBs have been developed for use in environments with increased pollution gas loads, such as

- Indoor swimming pools: chlorine gas atmosphere,
- Agriculture: ammoniac,
- Worksite distribution boards, chemical industry: nitrogen oxides [NO_x], sulfur dioxide [SO_2]

A significant increase in service life is achieved using our patented active condensation protection.

When using SIGRES RCCBs, the following points must be observed:

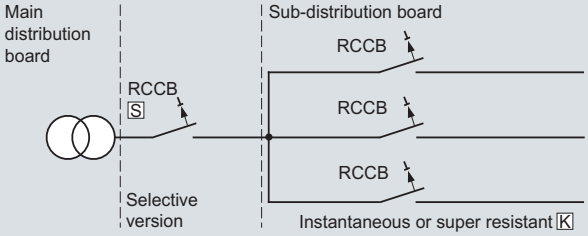
- The infeed must always be from below, from terminals 2/N or 2/4/6/N.
- Before carrying out insulation tests on installation systems with voltages greater than 500 V, the SIGRES RCCB must be switched off or the cables on the input side (below) must be disconnected.

Short-time delayed tripping, super resistant K

Electrical loads that temporarily produce high leakage currents when they are switched on (e.g. temporary residual currents flowing through interference-suppression capacitors between outer conductor and PE) may trip instantaneous residual current protective devices, if the leakage current exceeds the rated residual current $I_{\Delta n}$ of the residual current protective device. Short-time delayed, super resistant residual current protective devices can be installed for this type of application, where it is not possible, or only partially possible, to eliminate such interference sources. These devices have a minimum tripping delay of 10 ms, i.e., they should not trip for a residual current pulse of 10 ms. This complies with the maximum permissible break times according to IEC/EN 61008-1 (VDE 0664-10). The devices have a high surge current withstand capability of 3 kA.
Short-time delayed, super resistant residual current protective devices have the identification code **K**.

Selective tripping S

Residual current protective devices normally have an instantaneous tripping operation. This means that a series connection of this type of residual current protective devices does not provide selective tripping in the event of a fault. In order to achieve selectivity for a series connection of residual current protective devices, both the tripping time and the rated residual current of series-connected devices must be time graded. Selective residual current protective devices have a tripping delay.
Furthermore, selective residual current protective devices must have an increased surge current withstand capability of at least 3 kA according to IEC/EN 61008-1 (VDE 0664-10). Siemens devices have a surge current withstand capability of ≥ 5 kA.
Selective residual current protective devices have the identification code **S**.
The table below shows the time grading options available for residual current protective devices for selective tripping in series connection with devices without time delay and super resistant devices with short-time delay **K**.



Upstream RCCB for selective disconnection S		Downstream RCCB		
		Instantaneous version	or	Super resistant version K
$I_{\Delta n}$	Break time at 5 x $I_{\Delta n}$	$I_{\Delta n}$	Break time at 5 x $I_{\Delta n}$	Break time at 5 x $I_{\Delta n}$
100 mA 300 mA 500 mA 1000 mA	50 ...150 ms	10 mA or 30 mA 10 mA, 30 mA or 100 mA 10 mA, 30 mA ,100 mA 300 mA	≤ 40 ms	20 … 40 ms

I2_15510

[1] For residual current circuit breakers of type AC: < 40 ms.

Versions for 50 … 400 Hz

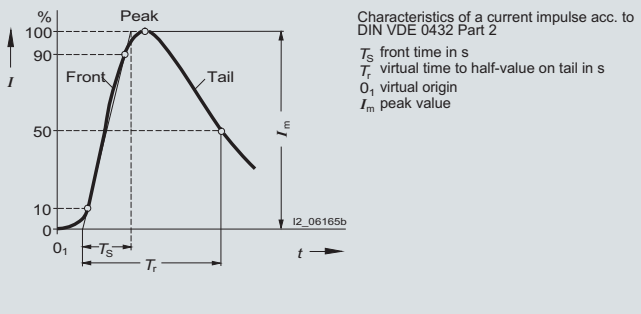
Due to their principle of operation, the standard versions of residual current protective devices are designed for maximum efficiency in 50/60 Hz systems. Product standards and tripping conditions also refer to this frequency. The sensitivity decreases with increasing frequency. In order to implement an effective fault-current protection for applications in systems up to 400 Hz (e.g. industry), you need to use suitable devices. This type of residual current protective devices fulfills the tripping conditions up to the specified frequency and provides the appropriate level of protection.

Residual current circuit breaker with left-side N-connection

The fact that the RCCBs are usually located to the left of the miniature circuit breakers, but have their N wire connection on the right-hand side, interferes with the integrated busbar connection. For this reason, when used with miniature circuit breakers, RCCBs require a special busbar. In order to enable the use of standard busbars, 4-pole RCCBs are also provided with their N connection on the left-hand side. This means that it is still possible to install RCCBs to the left of miniature circuit breakers using standard busbar connections.

Surge current withstand capability

During thunderstorms, atmospheric overvoltages in the form of traveling waves can penetrate the installations of a system over an overhead system and trip the residual current protective devices.
To prevent such inadvertent tripping operations, residual current protective devices sensitive to power pulse currents must pass specific tests proving its surge current withstand capability. These tests are carried out using a surge current of the standardized surge current wave 8/20 µs.



Surge current wave 8/20 µs (front time 8 µs: time to half-value 20 µs)

Siemens residual current protective devices of types A and B all have a high surge current withstand capability. The following table shows the surge current withstand capability of the various versions:

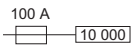
Version	Surge current withstand capability
Instantaneous	> 1 kA
Short-time delayed, super resistant K	> 3 kA
Selective S	> 5 kA

Switching capacity, short-circuit strength

In accordance with the installation regulations DIN VDE 0100-410 (protection against electric shock) residual current protective devices can be installed in three system types (TN, TT and IT systems).
However, if using the neutral conductor as a protection conductor in TN systems, a fault may cause residual currents similar to a short-circuit. For this reason, residual current protective devices must be installed together with a back-up fuse and have the appropriate short-circuit strength. Tests have been defined for this purpose.
The short-circuit strength of the combination must be specified on the devices.
Siemens residual current protective devices, together with a suitable back-up fuse, have a short-circuit strength of 10 000 A. This is the highest possible level of short-circuit strength as specified in the VDE regulations.
Data for the rated switching capacity according to IEC/EN 61008, i.e. the maximum permissible short-circuit back-up fuses for residual current protective devices are contained in the following table:

Rated current of the residual current protective device		**Rated switching capacity I_m acc. to IEC/EN 61008 (VDE 0664) with a grid distance of 35 mm**	**Maximum permissible short-circuit back-up fuse, LV HRC, DIAZED, NEOZED operational class gL/gG for residual current protective device**	
			125 ... 400 V AC	500 V AC
A		A	A	A
~	**Type A**			
16 ... 40	2 MW	500	63	--
63	2.5 MW	800	100	--
80	2.5 MW	800	100	--
100	2 MW	1000	125	--
125	2 MW	1250	125	--
25 ... 63	4 MW	800	100	63
80	4 MW	800	100	--
100	4 MW	1000	125	--
125	4 MW	1250	125	--
~ ⎓	**Type B**			
25 ... 80	4 MW	800	100	--

Example:



Short-circuit strength 10 kA with max. permissible short-circuit back-up fuse 100 A.

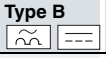
Types of current

Due to the use of electronic components in household appliances and industrial plants, insulation faults can also cause residual currents that are not AC residual currents to flow through residual current protective devices, even in the case of devices with PE/ground terminals (Safety Class I).

The regulations for residual current protective devices contain additional requirements and test regulations for residual currents whose power supply frequency is zero or virtually zero within a certain period.

Residual current protective devices that trip for both sinusoidal AC residual currents and pulsating DC residual currents (type A) are identified by the mark  .

Residual current protective devices that also trip for smooth DC residual currents (type B) are identified by the mark  .

Type of current	Current waveform	Correct function of residual current protective devices of type			Tripping current[1]
		Type AC 	Type A 	Type B 	
AC residual current		✓	✓	✓	0.5 ... 1.0 $I_{\Delta n}$
Pulsating DC residual currents (pos. or neg. half-waves)		--	✓	✓	0.35 ... 1.4 $I_{\Delta n}$
Started half-wave currents **Start angle 90° el** **Start angle 135° el**		-- 	✓ ✓	✓ ✓	 0.25 ... 1.4 $I_{\Delta n}$ 0.11 ... 1.4 $I_{\Delta n}$
Half-wave current during superimposition with smooth direct current of 6 mA		--	✓	✓	Max. 1.4 $I_{\Delta n}$ + 6 mA
Smooth direct current		--	--	✓	0.5 ... 2.0 $I_{\Delta n}$

[1] Tripping currents according to IEC/EN 61008-1 (VDE 0664, Part -10); for smooth DC residual currents defined to IEC 60755 UB1 INT.

Note:

You will find further information on the subject of residual current protective devices in the technology primer "Residual current protective devices", Order No.: E20001-A5660-P420-V1.

Application

Standards	Application	Required $I_{\Delta n}$ [mA]	Recommended residual current protective devices		
			5SM. (Type A)	5SM. (Type B)	SIGRES
DIN VDE 0100-410	Socket outlets ≤ 20 A and branch circuits for outdoor use ≤ 32 A	≤ 30	✓	--	--
DIN VDE 0100-482	Fire protection for particular risks or safety hazard	30, 300	✓	✓	--
DIN VDE 0100-551	Low-voltage generating sets	≤ 30	✓	--	--
DIN VDE 0100-559	Luminaires and lighting installations, display stands for lights	≤ 30	✓	--	--
DIN VDE 0100-701	Rooms with baths or showers, socket outlets in zone 3	≤ 30	✓	--	--
DIN VDE 0100-702	Swimming pools, zone 1 and 2	≤ 30	✓	--	✓
DIN VDE 0100-704	Construction and demolition site installations, socket outlet current circuits (single-phase operation) up to 32 A	≤ 30	✓	--	✓
	and for hand-held equipment		✓	✓	✓
DIN VDE 0100-705	Agricultural and general horticultural premises	≤ 500	✓	--	✓
	Socket outlet current circuits	≤ 30	✓	--	✓
DIN VDE 0100-706	Conductive areas with limited freedom of movement	≤ 30	✓	--	--
DIN VDE 0100-708	Feeding points for caravan parking spaces, camping sites	≤ 30	✓	--	--
DIN VDE 0100-710	Medical premises, depending on application group 1 or 2 and equipment	≤ 30 or	✓	✓	--
		≤ 300	✓	✓	--
DIN VDE 0100-722	Portable buildings, vehicles, mobile homes for fairgrounds	≤ 500	--	--	✓
DIN VDE 0100-723	Classrooms with experiment equipment	≤ 30	--	✓	--
DIN VDE 0100-738	Fountains zone 2, general	≤ 500	✓	--	✓
	Socket outlets in zone 2	≤ 30	✓	--	✓
	Zones 0 and 1	≤ 30	✓	--	✓
DIN VDE 0100-739	Additional protection against direct contact in homes	≤ 30	✓	--	--
DIN VDE 0118-100	Mining plants	≤ 500	✓	--	✓
EN 50178 (VDE 0160)	Fitting of power installations with electronic equipment	General requirements for correct selection when using res. current protection	✓	✓	--
DIN VDE 0832-100	Traffic signals				
	• Class T1	≤ 300	✓	--	✓
	• Class U1	≤ 30	✓	--	✓
BG FE BGI 608	Selection and operation of electrical equipment on worksites				
	General:				
	• Socket outlet circuits ≤ 32 A	≤ 30	✓	✓	✓
	• Socket outlet circuits > 32 A	≤ 500	✓	✓	✓
	Frequency-controlled equipment:				
	• With plug-and-socket device ≤ 32 A	≤ 30	--	✓	--
	• With plug-and-socket device > 32 A	≤ 500	--	✓	--
	Chemical industry and food processing industries	30 (recommended)	✓	✓	✓

Note:
For reasons of basic fire protection, we recommend a maximum rated residual current of 300 mA for residual current protective devices.

BETA Protecting Low-Voltage Fuse Systems

3

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**NEOZED fuse systems**	3/4	Fuse links, MINIZED switch disconnectors, bases, fuse links from 2 to 63 A of operational class gG and accessories. Everything you need for a complete system.	Fuse system: IEC 60269-3; DIN VDE 0636-3; Safety switching devices IEC/EN 60947-3 DIN VDE 0638; DIN VDE 0660-107	✓	✓	✓
	**DIAZED fuse systems**	3/14	Fuse links from 2 to 100 A in various operational classes, base versions with classic screw base connections. A widely used fuse system.	IEC 60269-3; DIN VDE 0635; DIN VDE 0636-3; CEE 16	✓	✓	✓
	**3NW cylindrical fuse systems**	3/23	Line protection or protection of switching devices. The fuse holders with touch-protection ensure the safe "no-voltage" replacement of fuse links. Auxiliary switches can be retrofitted	IEC 60269-1, -2, -3; NF C 60-200; NF C 63-210, -211; NBN C 63269-2, CEI 32-4, -12	✓	✓	✓
	**3NW. ...-0HG Class CC fuse systems**	3/28	These comply with American standard and have UL and SCA approval, for customers exporting OEM products and mechanical engineers. Modern design with touch protection according to BGV A3 for use in "branch circuit protection".	Fuse holders: UL 512; CSA 22.2 Fuse links: UL 248-4; CSA 22.2	✓	✓	✓
	**5ST2, 5ST3 busbars, for fuse systems**	3/30	Busbars for NEOZED fuse bases, NEOZED fuse disconnectors, MINIZED switch disconnectors, DIAZED fuse systems and cylindrical fuse systems.	EN 60439-1 (VDE 0660-500)	✓	✓	✓
	**3NA, 3ND LV HRC fuse links**	3/36	Fuse links from 2 to 1250 A for selective line protection and plant protection in non-residential buildings, industry and power supply companies.	IEC 60269-1, -2; EN 60269-1; DIN VDE 0636-2	✓	✓	✓
	**3NX1 LV HRC signal detectors**	3/47	Signal detectors for when a fuse is tripped on all LV HRC fuse links with combination or front indicators with non-insulated grip lugs. Plus the comprehensive accessory range required for LV HRC fuses.		✓	✓	✓
	**3NH LV HRC fuse bases**	3/49	Fuse bases for screw or snap-on mounting onto standard mounting rails available as 1-pole or 3-pole version.	IEC 60269-1, -2; EN 60269-1; DIN VDE 0636-2	✓	✓	✓

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**3NP LV HRC fuse switch disconnectors**	3/63	LV HRC fuse switch disconnectors for power distribution. Versions for mounting on mounting plates, installation in front panels or on busbars.	IEC 60947-1; IEC 60947-3; VDE 0660-107	✓	--	✓

Overview

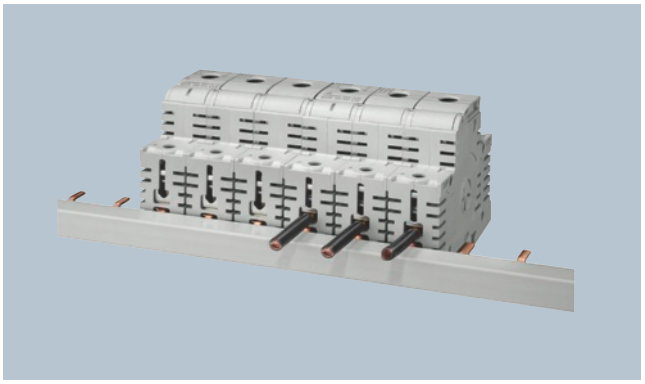
The NEOZED fuse system is primarily used in distribution technology and industrial switchgear assemblies. The system is easy to use and is also approved for domestic installation.

MINIZED switch disconnectors are primarily used in switchgear assemblies and control engineering. They are approved for switching loads and also for safe switching in the event of short circuits. The MINIZED D02 is also suitable for use in the pre-counter area in households in accordance with the recommendations of the VDEW as defined in TAB 2007.

Due to its small footprint, the NEOZED disconnector is primarily used in control engineering.

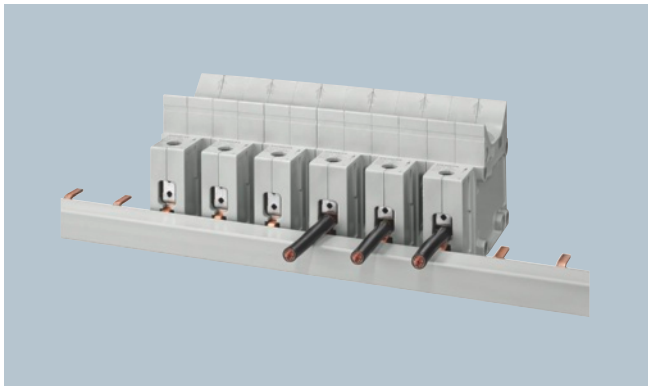
The NEOZED fuse bases are the most cost-effective solution for the application of NEOZED fuses. All NEOZED bases must be fed from the bottom to ensure that the threaded ring is insulated during removal of the fuse link. The terminals of the NEOZED bases are available in different versions and designs to support the various installation methods.

Benefits



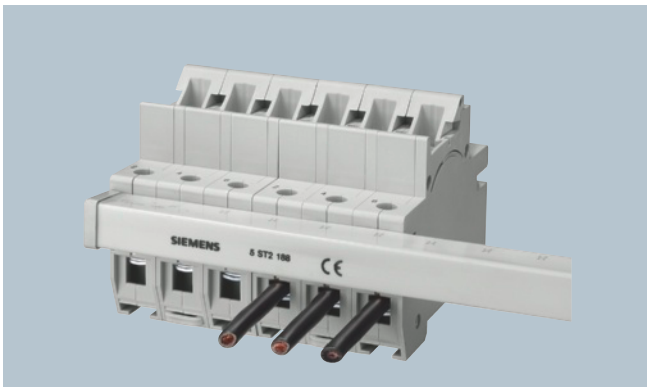
MINIZED switch disconnectors

- Clear and visible conductor connection that can be easily checked. This facilitates insertion of the conductor and saves time.
- With draw-out technology for off-circuit replacement of fuses. This provides enhanced safety.
- The infeed of the devices can be from the top or the bottom. This enables flexible application.



NEOZED fuse bases made of molded plastic

- Clear and visible conductor connection that can be easily checked. This facilitates insertion of the conductor and saves time.
- Greater safety for personnel thanks to terminals with touch-protection according to BGV A3 at incoming and outgoing feeders. This ensures enhanced safety.
- Two type ranges with different terminals offer expanded application options.



NEOZED fuse disconnectors

- With draw-out technology for off-circuit replacement of fuses. This provides enhanced safety.
- Extremely slim design with a single MW per pole. This saves space and costs.

NEOZED fuse bases made of ceramic

- Different terminal versions support a huge range of different installation methods. This ensures greater flexibility.
- These bases are the most widely used devices for applications with NEOZED fuses. An unrivaled cost-effective solution.

Technical specifications

		NEOZED fuse links 5SE2
Standards		IEC 60269-3; DIN VDE 0636-3
Operational class		gG
Rated voltage U_n	V AC	400
	V DC	250
Rated current I_n	A	2 ... 100
Rated breaking capacity	kA AC	50
	kA DC	8
Non-interchangeability		Using adapter sleeves
Resistance to climate	°C	Up to 45 at 95 % rel. humidity
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20

		MINIZED switch dis-connectors	**MINIZED fuse switch disconnectors**	**Fuse bases, made of ceramic**			**Comfort bases**	**Fuse bases**
		D02	**D01**	**D01**	**D02**	**D03**	**D01/02**	
		5SG7 1	**5SG7 6**	**5SG1 5 5SG5 5**	**5SG1 6 5SG5 6**	**5SG1 8**	**5SG1 .01 5SG5 .01**	**5SG1 .30 5SG1 .31 5SG5 .30**
Standards		DIN VDE 0638; DIN VDE 0660-107 IEC/EN 60947-3		IEC 60269-3; DIN VDE 0636-3				
Main switch characteristic EN 60204-1		Yes	--	--				
Insulation characteristic EN 60664-1		Yes		--				
Rated voltage U_n	V AC	230/400, 240/415		400				
	V DC			250				
• 1P	V DC	65	48	--				
• 2P in series	V DC	130	110	--				
Rated current I_n	A	63	16	16	63	100	16/63	16/63
Rated insulation voltage	V AC	500	400	--				
Rated impulse withstand voltage	kV AC	6	2.5	--				
Overvoltage category		4	--	--				
Utilization category acc. to VDE 0638								
• AC-22	A	63	16	--				
Utilization category acc.to EN 60947-3								
• AC-22 B	A	63	16	--				
• AC-23 B	A	35	--	--				
• DC-22 B	A	63	--	--				
Sealable when switched on		Yes		Yes, with sealable screw caps				
Mounting position		Any, but preferably vertical						
Reduction factor of I_n with 18 pole								
• Side-by-side mounting		0.9	--					
• On top of one another, with vertical standard mounting rail		0.87	--					
Degree of protection acc. to IEC 60529		IP20, with connected conductors						
Terminals with touch-protection acc. to BGVA		Yes		No			Yes	
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20						
Terminal versions		--	--	B	K, S	K/S	--	--
Conductor cross-sections								
• Solid and stranded	mm^2	1.5 ... 35	1.5 ... 16	1.5 ... 4	1.5 ... 25	10 ... 50	0.75 ... 35	1.5 ... 35
• Flexible, with end sleeve	mm^2	1.5 ... 35	1.5	1.5	1.5	10	--	--
• Finely stranded, with end sleeve	mm^2	--	--	0.75 ... 25	--	--	--	--
Tightening torque	Nm	4	1.2	1.2	2	3.5/2.5	2.5 ... 3	3

Selection and ordering data

	Size	Number of poles	I_n	Identification color	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
			A							Unit(s)	Unit(s)	kg
	NEOZED fuse links **Rated voltage 400 V AC/250 V DC** **Operational class gG**											
	D01		2	Pink		▶	**5SE2 302**		016	1	10	0.006
			4	Brown		▶	**5SE2 304**		016	1	10	0.006
			6	Green		▶	**5SE2 306**		016	1	10/500	0.006
			10	Red		▶	**5SE2 310**		016	1	10/500	0.007
			13	Black		A	**5SE2 013-2A**		016	1	10	0.007
			16	Gray		▶	**5SE2 316**		016	1	10/500	0.007
	D02		20	Blue		▶	**5SE2 320**		016	1	10	0.012
			25	Yellow		▶	**5SE2 325**		016	1	10	0.013
			32	Black		B	**5SE2 332**		016	1	10	0.014
			35	Black		▶	**5SE2 335**		016	1	10	0.014
			40	Black		B	**5SE2 340**		016	1	10	0.014
			50	White		▶	**5SE2 350**		016	1	10	0.015
			63	Copper		▶	**5SE2 363**		016	1	10	0.016
	D03		80	Blue		▶	**5SE2 280**		016	1	10	0.039
			100	Red		▶	**5SE2 300**		016	1	10	0.042
	MINIZED switch disconnectors with fuses Using draw-out technology and touch protection to BGV A3 (adapter sleeves not included in delivery)											
	D02	1P	63		1.5	▶	**5SG7 113**		016	1	1	0.145
		1P+N	63		3	B	**5SG7 153**		016	1	1	0.267
		2P	63		3	B	**5SG7 123**		016	1	1	0.283
		3P	63		4.5	▶	**5SG7 133**		016	1	1	0.421
		3P+N	63		6	B	**5SG7 163**		016	1	1	0.540
	Versions for Austria only, with permanently fitted adapter sleeves, incl. fuse link											
	D02	3P	25		4.5	B	**5SG7 133-8BA25**		016	1	1	0.420
			35			B	**5SG7 133-8BA35**		016	1	1	0.420
			50			B	**5SG7 133-8BA50**		016	1	1	0.420
	Reducers											
	For fuse links D01 in MINIZED switch disconnectors D02					C	**5SH5 527**		016	1	10/100	0.003
	Auxiliary switches (AS)											
	For MINIZED switch disconnectors D02 1 NO + 1 NC				0.5	▶	**5ST3 010**		027	1	1	0.050
	For technical specifications, see chapter Miniature Circuit Breakers –> Additional components											

* You can order this quantity or a multiple thereof.

	Size	Number of poles	I_n A	Matching cover[1]	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	MINIZED fuse switch disconnectors For industrial applications With draw-out technology and touch protection to BGV A3 (not compatible with NEOZED adapter sleeves)											
	D01	1P	16		1	A	**5SG7 610**		016	1	1	0.070
		1P+N	16		2	B	**5SG7 650**		016	1	1	0.150
		2P	16		2	B	**5SG7 620**		016	1	1	0.150
		3P	16		3	A	**5SG7 630**		016	1	1	0.220
		3P+N	16		4	B	**5SG7 660**		016	1	1	0.300
	NEOZED comfort bases made of molded plastic With touch protection according to BGV A3											
	D01	1P	16	--	1.5	▶	**5SG1 301**		016	1	3	0.123
	D02		63	--		▶	**5SG1 701**		016	1	3	0.120
	D01	3P	16	--	4.5	▶	**5SG5 301**		016	1	1	0.371
	D02		63	--		▶	**5SG5 701**		016	1	1	0.360
	NEOZED fuse bases made of molded plastic With touch protection according to BGV A3											
	With cover											
	D01	1P	16	(A1)	1.5	A	**5SG1 330**		016	1	6	0.068
	D02		63	(A1)	1.5	A	**5SG1 730**		016	1	6	0.087
	Without cover											
	D01	1P	16	A1	1.5	B	**5SG1 331**		016	1	6	0.056
	D02		63	A1	1.5	A	**5SG1 731**		016	1	6	0.080
	With cover											
	D01	3P	16	(A2)	4.5	A	**5SG5 330**		016	1	2	0.216
	D02		63	(A2)	4.5	A	**5SG5 730**		016	1	2	0.252

For busbars, see page 3/32 ff.

[1] Covers in brackets are included in the scope of supply.
Covers without brackets are not included in the scope of supply.

*** You can order this quantity or a multiple thereof.**

	Size	Number of poles	I_n A	Matching cover[1]	Terminals[2]	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	NEOZED fuse bases made of ceramic												
	With cover												
	D01	1P	16	(A4)	BB	1.5	▶	**5SG1 553**		016	1	6	0.083
	D02		63	(A10)	SS	1.5	▶	**5SG1 653**		016	1	6	0.093
	D02		63	(A10)	KS	1.5	▶	**5SG1 693**		016	1	6	0.090
	Without cover												
	D01	1P	16	A4	BB	1.5	B	**5SG1 595**		016	1	6	0.071
	D02		63	A10	SS	1.5	▶	**5SG1 655**		016	1	6	0.081
	D02		63	A10	KS	1.5	B	**5SG1 695**		016	1	6	0.078
	D03		100	A6, A9	KS	2.5	A	**5SG1 812**		016	1	10	0.176
	For screw fixing only, without cover												
	D01	1P	16	A4	BB	1.5	B	**5SG1 590**		016	1	6	0.061
	D02		63	A10	SS	1.5	B	**5SG1 650**		016	1	6	0.078
	D03		100	A6, A9	KS	2.5	B	**5SG1 810**		016	1	10	0.176
	With cap												
	D01	1P	16	(A8)	BB	1.5	▶	**5SG1 594**		016	1	6	0.105
	D02		63	(A8)	SS	1.5	B	**5SG1 694**		016	1	6	0.115
	D03		100	(A9)	KS	2.5	B	**5SG1 813**		016	1	10	0.242
	With cover												
	D01	3P	16	(A5)	BB	4.5	▶	**5SG5 553**		016	1	2	0.263
	D02		63	(A11)	SS	4.5	▶	**5SG5 653**		016	1	2	0.240
	D02		63	(A11)	KS	4.5	▶	**5SG5 693**		016	1	2	0.290
	Without cover												
	D01	3P	16	A5	BB	4.5	B	**5SG5 555**		016	1	2	0.228
	D02		63	A11	SS	4.5	B	**5SG5 655**		016	1	2	0.265
	D02		63	A11	KS	4.5	B	**5SG5 695**		016	1	2	0.255
	For screw fixing only, without cover												
	D01	3P	16	A5	BB	4.5	B	**5SG5 550**		016	1	2	0.228
	D02		63	A11	SS	4.5	B	**5SG5 650**		016	1	2	0.260
	D02		63	A11	KS	4.5	B	**5SG5 690**		016	1	2	0.250
	NEOZED covers												
	Made of molded plastic, plug-in, for fuse base made of molded plastic												
	D01, D02			A1		1.5	C	**5SH5 244**		016	1	15	0.008
	D01, D02			A2		4.5	C	**5SH5 245**		016	1	5	0.017
	For fuse bases made of ceramic												
	D01			A4		1.5	B	**5SH5 251**		016	1	15	0.012
	D02			A10		1.5	B	**5SH5 253**		016	1	15	0.020

[1] Covers in brackets are included in the scope of supply. Covers without brackets are not included in the scope of supply.

[2] For terminal versions, see page 3/13.

* You can order this quantity or a multiple thereof.

	Size	Matching cover	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
								Unit(s)	Unit(s)	kg
	NEOZED covers									
	D01	A5	4.5	C	**5SH5 252**		016	1	5	0.035
	D02	A11	4.5	C	**5SH5 254**		016	1	5	0.045
	Screw-on									
	D03	A6	2.5	B	**5SH5 233**		016	1	20	0.021
	NEOZED caps									
	Made of molded plastic, plug-in									
	D01, D02	A8		B	**5SH5 235**		016	1	5	0.034
	Screw-on									
	D03	A9		C	**5SH5 234**		016	1	10	0.066
	NEOZED screw caps									
	Molded plastic, with inspection hole									
	D01			►	**5SH4 116**		016	1	10/1000	0.007
	D02			►	**5SH4 163**		016	1	10/200	0.008
	Ceramic									
	D01, sealable			A	**5SH4 316**		016	1	10	0.014
	D02, sealable			A	**5SH4 363**		016	1	10	0.015
	D03			A	**5SH4 100**		016	1	3	0.070
	Ceramic, with inspection hole									
	D01			►	**5SH4 317**		016	1	20	0.014
	D02			►	**5SH4 362**		016	1	20	0.017

*** You can order this quantity or a multiple thereof.**

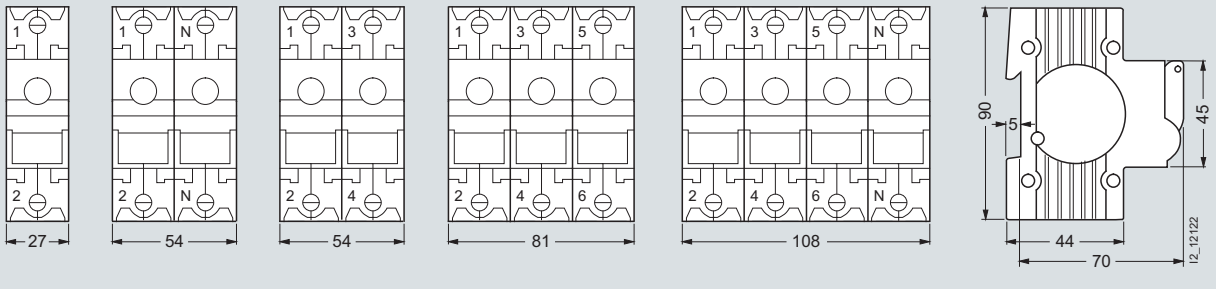
NEOZED fuse systems

	Size	For fuse links	Identification color	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A							Unit(s)	Unit(s)	kg
	NEOZED adapter sleeves										
	D01	2	Pink		►	**5SH5 002**		016	1	10	0.001
		4	Brown		►	**5SH5 004**		016	1	10	0.001
		6	Green		►	**5SH5 006**		016	1	10	0.001
		10/13	Red		►	**5SH5 010**		016	1	10	0.001
	D02	20	Blue		►	**5SH5 020**		016	1	10	0.001
		25	Yellow		►	**5SH5 025**		016	1	10	0.001
		32/35/40	Black		►	**5SH5 035**		016	1	10	0.001
		50	White		►	**5SH5 050**		016	1	10	0.001
	D03	80	Silver		A	**5SH5 080**		016	1	25	0.001
	For fuse links D01 in base D02 and MINIZED switch disconnectors D02										
	D02	2	Pink		A	**5SH5 402**		016	1	10	0.001
		4	Brown		A	**5SH5 404**		016	1	10	0.001
		6	Green		A	**5SH5 406**		016	1	10	0.001
		10/13	Red		A	**5SH5 410**		016	1	10	0.001
		16	Gray		A	**5SH5 416**		016	1	10	0.001
	NEOZED adapter sleeve fitters										
					A	**5SH5 100**		016	1	1/10	0.016
	NEOZED retaining springs For fuse links D01 in screw caps										
	D02	2 ... 16			A	**5SH5 400**		016	1	25	0.001
	For fuse links D01 in screw caps DL										
	DL	2 ... 16			A	**5SH5 417**		016	1	25	0.001
	Busbar adapters										
	For mounting MINIZED switch disconnectors on busbars 12 × 5 mm at a distance of 40 mm Rated current 63 A, 16 mm²			4.5	C	**5SH5 503**		016	1	1	0.280

* You can order this quantity or a multiple thereof.

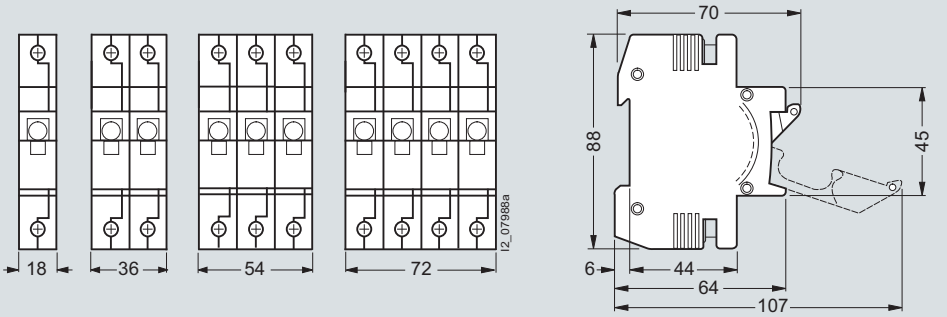
Dimensional drawings

5SG7 1.3 MINIZED switch disconnectors D02, with draw-out technology



1P 1P+N 2P 3P 3P+N

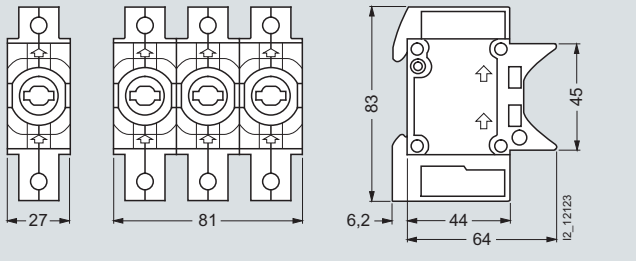
5SG7 6 MINIZED fuse switch disconnectors D01, with draw-out technology



1P 2P 3P 3P+N

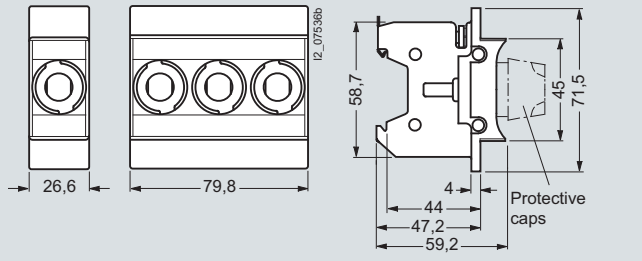
Fuse bases, with touch protection to BGV A3 (VBG4), molded plastic

Sizes D01/D02, with combined terminal, can be busbar mounted



5SG1 301, 5SG1 701, 5SG5 301, 5SG5 701

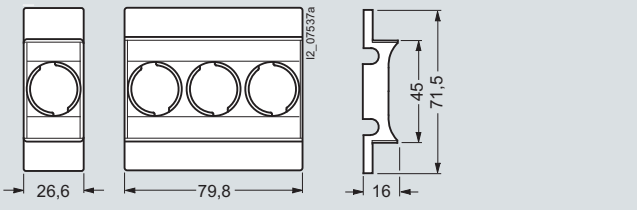
With cover



5SG1 330, 5SG1 331, 5SG1 730, 5SG1 731, 5SG5 330, 5SG5 730

NEOZED covers made of molded plastic

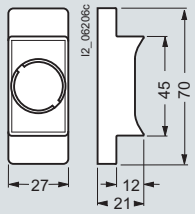
NEOZED covers for NEOZED bases, made of molded plastic



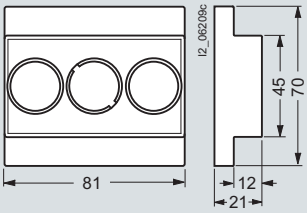
5SH5 244 (A1) and 5SH5 245 (A2)

NEOZED fuse systems

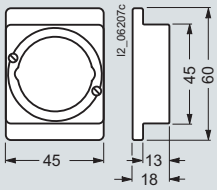
NEOZED covers



5SH5 251 (A4) and 5SH5 253 (A10)



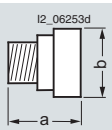
5SH5 252 (A5) and 5SH5 254 (A11)



5SH5 233 (A6)

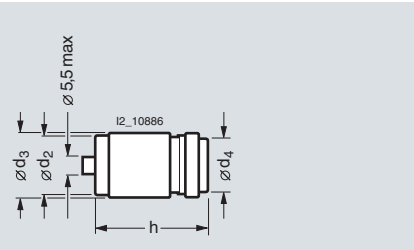
NEOZED screw caps

5SG4



Type	Size	Sealable	For mounting depth	Dimensions	
				a	b
5SH4 116	D01	--	55/70	24.5	23
5SH4 163	D02	--	55/70	24.5	23
5SH4 316	D01	x	70	33	26.5
5SH4 363	D02	x	76	33	26.5
5SH4 100	D03	--	70	37	44
5SH4 317	D01	--	70	29.5	25
5SH4 362	D02	--	70	30.5	25

NEOZED fuse links



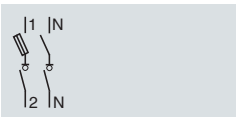
Size/thread	D01/E14	D02/E18	D03/M30
Rated current in A	2 ... 16	20 ... 63	80 ... 100
Dimension $d_{2\ min}$	9.8	13.8	20.8
Dimension d_3	11	15.3	22.5
Dimension $d_{4\ max}$	6	10	18
Dimension h	36	36	43

Schematics

5SG7 1.3 MINIZED switch disconnectors D02, with draw-out technology

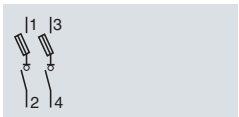
5SG7 113

1P



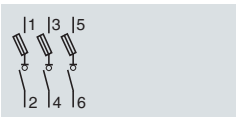
5SG7 153

1P+N



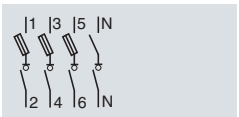
5SG7 123

2P



5SG7 133
5SG7 133-8BA25
5SG7 133-8BA35
5SG7 133-8BA50

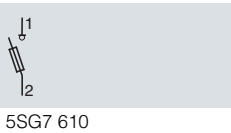
3P



5SG7 163

3P+N

5SG7 6 MINIZED fuse switch disconnectors D01, with draw-out technology



5SG7 610

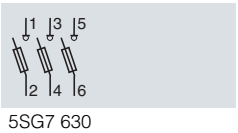
1P

5SG7 650

1P+N

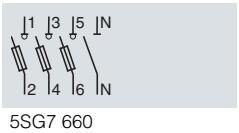
5SG7 620

2P



5SG7 630

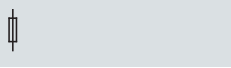
3P



5SG7 660

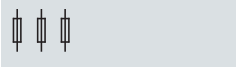
3P+N

5SG1, 5SG5 NEOZED fuse switch disconnectors, made of molded plastic



5SG1

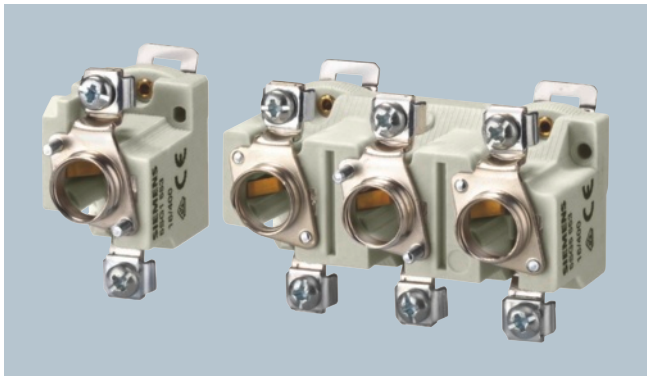
1P



5SG5

3P

More information



Fuse bases D01 with terminal type BB
- Incoming feeders, clamp-type terminal B
- Outgoing feeders, clamp-type terminal B

Fuse bases D02, with terminal type KS
- Incoming feeders, screw head contact K
- Outgoing feeders, saddle terminal S

Fuse bases D02, with terminal type SS
- Incoming feeders, saddle terminal S
- Outgoing feeders, saddle terminal S

DIAZED fuse systems

Overview

The DIAZED fuse system is one of the oldest fuse systems in the world. It was developed by Siemens as far back as 1906. It is still the standard fuse system in many countries to this day. It is particularly widely used in the harsh environments of industrial applications.

The series is available with rated voltages from 500 to 750 V.

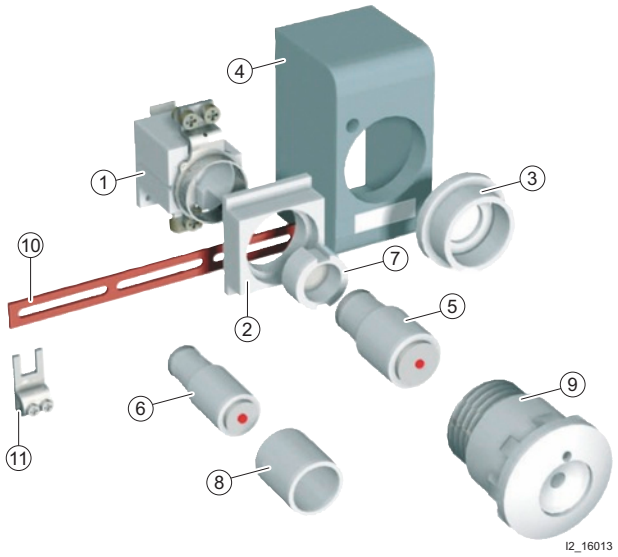
All DIAZED bases must be fed from the bottom to ensure an insulated threaded ring when the fuse link is being removed. Reliable contact of the fuse links is only ensured when used together with DIAZED screw adapters.

The terminals of the DIAZED bases are available in different versions and designs to support the various installation methods.

A key feature is the high-performing EZR bus-mounting system for screw fixing. The busbars, which are particularly suited for bus-mounting bases, have a load capacity of up to 150 A with lateral infeed.

DIAZED stands for **"Dia**metral gestuftes **z**weiteiliges Sicherungssystem mit **Ed**isongewinde" (diametral two-step fuse system with Edison screw).

Benefits



DIAZED fuse systems area a result of the well-designed modular system, the components can be combined in any way to meet the various requirements and to facilitate different installation methods.

① DIAZED base
② DIAZED cover
③ DIAZED cover ring
④ DIAZED cap
⑤ DIAZED fuse link, DII
⑥ DIAZED fuse link, NDz
⑦ DIAZED screw adapter
⑧ DIAZED adapter sleeve
⑨ DIAZED screw cap
⑩ Busbar, oblong hole, single-phase
⑪ Terminal, fork-type terminal, non-insulated

Technical specifications

			5SA, 5SB, 5SC, 5SD
Standards			IEC 60269-3; DIN VDE 0635; DIN VDE 0636-3; CEE 16
Operational class	Acc. to IEC 60269; DIN VDE 0636		gG
Characteristic	Acc. to DIN VDE 0635		Slow and quick
Rated voltage U_n		V AC V DC	500, 690, 750 500, 600, 750
Rated current I_n		A	2 ... 100
Rated breaking capacity		kA AC kA DC	50, 40 at E16 8, 1.6 at E16
Mounting position			Any, but preferably vertical
Non-interchangeability			Using screw adapter or adapter sleeves
Degree of protection	Acc. to IEC 60529		IP20, with connected conductors
Resistance to climate		°C	Up to 45, at 95 % rel. humidity
Ambient temperature		°C	-5 ... +40, humidity 90 % at 20

		Terminal type								
		B		**K**			**NO**		**R**	
Size		DII	DIII	NDz	DII	DIII	DIII	DIV	DII	DIII
Conductor cross-sections										
• Rigid, min.	mm^2	1.5	2.5	1.0	1.5	2.5	2.5	10	1.5	1.5
• Rigid, max.	mm^2	10	25	6	10	25	25	50	35	35
• Flexible, with end sleeve	mm^2	10	25	6	10	25	25	50	35	35
Tightening torque										
• Screw M4	Nm	1.2							--	
• Screw M5	Nm	2.0							--	
• Screw M6	Nm	2.5							4	
• Screw M8	Nm	3.5							--	

Selection and ordering data

	Size	U_n	I_n	Identification color	Thread	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC/ V DC	A								Unit(s)	Unit(s)	kg
	DIAZED fuse links												
	Operational class gG												
	DII	500/500	2	Pink	E27		►	**5SB2 11**		016	1	5	0.026
			4	Brown			►	**5SB2 21**		016	1	5	0.026
			6	Green			►	**5SB2 31**		016	1	5	0.026
			10	Red			►	**5SB2 51**		016	1	5	0.027
			16	Gray			►	**5SB2 61**		016	1	5	0.028
			20	Blue			►	**5SB2 71**		016	1	5	0.029
			25	Yellow			►	**5SB2 81**		016	1	5	0.031
	DIII	500/500	32	Black	E33		B	**5SB4 010**		016	1	5	0.048
			35	Black			A	**5SB4 11**		016	1	5	0.050
			50	White			A	**5SB4 21**		016	1	5	0.051
			63	Copper			A	**5SB4 31**		016	1	5	0.054
	DIV	500/400	80	Silver	R1¼"		B	**5SC2 11**		016	1	3	0.110
			100	Red			B	**5SC2 21**		016	1	3	0.110
	Characteristic: slow												
	TNDz	500/500	2	Pink	E16		B	**5SA2 11**		016	1	10	0.013
			4	Brown			B	**5SA2 21**		016	1	10	0.013
			6	Green			B	**5SA2 31**		016	1	10	0.013
			10	Red			B	**5SA2 51**		016	1	10	0.013
			16	Gray			B	**5SA2 61**		016	1	10	0.013
			20	Blue			B	**5SA2 71**		016	1	10	0.015
			25	Yellow			B	**5SA2 81**		016	1	10	0.016
	Characteristic: quick												
	NDz	500/500	2	Pink	E16		B	**5SA1 11**		016	1	10	0.013
			4	Brown			B	**5SA1 21**		016	1	10	0.013
			6	Green			B	**5SA1 31**		016	1	10	0.013
			10	Red			B	**5SA1 51**		016	1	10	0.013
			16	Gray			B	**5SA1 61**		016	1	10	0.013
			20	Blue			B	**5SA1 71**		016	1	10	0.015
			25	Yellow			B	**5SA1 81**		016	1	10	0.016
	DII	500/500	2	Pink	E27		B	**5SB1 11**		016	1	5	0.026
			4	Brown			B	**5SB1 21**		016	1	5	0.026
			6	Green			B	**5SB1 31**		016	1	5	0.026
			10	Red[1)]			B	**5SB1 41**		016	1	5	0.026
			10	Red			A	**5SB1 51**		016	1	5	0.027
			16	Gray			A	**5SB1 61**		016	1	5	0.028
			20	Blue			A	**5SB1 71**		016	1	5	0.029
			25	Yellow			A	**5SB1 81**		016	1	5	0.031
	DIII	500/500	35	Black	E33		A	**5SB3 11**		016	1	5	0.050
			50	White			A	**5SB3 21**		016	1	5	0.051
			63	Copper			A	**5SB3 31**		016	1	5	0.054
	DIV	500/500	80	Silver	R1¼"		B	**5SC1 11**		016	1	3	0.110
			100	Red			B	**5SC1 21**		016	1	3	0.110
	Operational class gG, use 5SF1 and 5SF5 fuse bases made of ceramic, for 2 A ... 25 A, use DII screw adapters												
	DIII	690/600	2	Pink	E33		B	**5SD8 002**		016	1	5	0.068
			4	Brown			B	**5SD8 004**		016	1	5	0.068
			6	Green			B	**5SD8 006**		016	1	5	0.068
			10	Red			B	**5SD8 010**		016	1	5	0.068
			16	Gray			B	**5SD8 016**		016	1	5	0.069
			20	Blue			B	**5SD8 020**		016	1	5	0.071
			25	Yellow			B	**5SD8 025**		016	1	5	0.072
			35	Black			B	**5SD8 035**		016	1	5	0.078
			50	White			B	**5SD8 050**		016	1	5	0.080
			63	Copper			B	**5SD8 063**		016	1	5	0.082

1) Use screw adapter 6 A.

* You can order this quantity or a multiple thereof.

DIAZED fuse systems

	Size	U_n	I_n	Identification color	Thread	Terminals	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC/ V DC	A								Unit(s)	Unit(s)	kg
	DIAZED fuse links												
	Characteristic: quick, also for direct current railway facilities for 2 A ... 25 A, use DII screw adapters												
	DIII	750/750	2	Pink	E33		A	**5SD6 01**		016	1	5	0.068
			4	Brown			B	**5SD6 02**		016	1	5	0.068
			6	Green			B	**5SD6 03**		016	1	5	0.068
			10	Red			B	**5SD6 04**		016	1	5	0.068
			16	Gray			B	**5SD6 05**		016	1	5	0.069
			20	Blue			B	**5SD6 06**		016	1	5	0.071
			25	Yellow			A	**5SD6 07**		016	1	5	0.072
			35	Black			B	**5SD6 08**		016	1	5	0.078
			50	White			B	**5SD6 10**		016	1	5	0.080
			63	Copper			B	**5SD6 11**		016	1	5	0.082
	DIAZED fuse bases made of ceramic												
	1P, for standard mounting rail												
	NDz	500/500	25		E16	KK	A	**5SF1 012**		016	1	5	0.060
	DII		25		E27	BB	▶	**5SF1 005**		016	1	5	0.093
	DIII[1)]		63		E33	BS	▶	**5SF1 205**		016	1	5	0.191
	DIII[1)]		63		E33	SS	B	**5SF1 215**		016	1	5	0.154
	1P, for screw fixing												
	NDz	500/500	25		E16	KK	A	**5SF1 01**		016	1	5	0.055
	DII		25		E27	BB	A	**5SF1 024**		016	1	5	0.093
	DIII[1)]		63		E33	BS	A	**5SF1 224**		016	1	5	0.137
	DIII[1)]		63		E33	SS	B	**5SF1 214**		016	1	5	0.141
	1P, with flat terminal												
	DIV		100		R1¼"		B	**5SF1 401**		016	1	1	0.380
	3P, for standard mounting rail, with cap and N-type fixpoint terminal												
	DII	500/500	3 × 25		E27	BB	B	**5SF5 067**		016	1	1	0.400
	DIII[1)]		3 × 63		E33	BB	B	**5SF5 237**		016	1	1	0.580
	3P, for screw fixing, with cap and N-type fixpoint terminal												
	DII	500/500	3 × 25		E27	KB	B	**5SF5 066**		016	1	1	0.410
	DIII[1)]		3 × 63		E33	KB	B	**5SF5 236**		016	1	1	0.590
	DIAZED fuse bases made of molded plastic With touch protection BGV A3												
	1P, for standard mounting rail or screw fixing												
	DII	500/500	25		E27		▶	**5SF1 060**		016	1	3/108	0.152
	DIII[1)]		63		E33		▶	**5SF1 260**		016	1	3/108	0.186
	3P												
	DII	500/500	3 × 25		E27		▶	**5SF5 068**		016	1	1/36	0.457
	DIII[1)]		3 × 63		E33		▶	**5SF5 268**		016	1	1/36	0.538

[1)] Can also be used with 690 V AC/600 V DC.

* You can order this quantity or a multiple thereof.

	Size	U_n	I_n	Thread	Terminals	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC/V DC	A							Unit(s)	Unit(s)	kg
	DIAZED components 750 V											
	DIAZED fuse bases 1P, for screw fixing, with fine thread and cap											
	DIII	750/750	63	E33S	KK	A	**5SF4 230**		016	1	1	0.460
	DIAZED screw caps made of ceramic, with fine thread											
	DIII	750/750	63	E33S		A	**5SH1 161**		016	1	5	0.084
	DIAZED EZR bus-mounting bases											
	1P, to snap onto EZR busbars for screw fixing											
	DII	500/500	25	E27	B	B	**5SF6 005**		016	1	5	0.072
	DIII	500/500	63	E33	B	B	**5SF6 205**		016	1	5	0.135
	DIAZED screw caps											
	Ceramic											
	NDz	500/500	25	E16		A	**5SH1 11**		016	1	5/200	0.016
	Molded plastic, with inspection hole, black, not for SILIZED fuse links											
	DII	500/500	25	E27		▶	**5SH1 221**		016	1	5/200	0.026
	DIII[1)]		63	E33		▶	**5SH1 231**		016	1	5/5000	0.042
	Ceramic											
	DII	500/500	25	E27		▶	**5SH1 12**		016	1	30	0.034
	DIII[1)]		63	E33		▶	**5SH1 13**		016	1	30	0.059
	Ceramic, with inspection hole, sealable											
	DII	500/500	25	E27		A	**5SH1 22**		016	1	30	0.050
	DIII[1)]		63	E33		A	**5SH1 23**		016	1	30	0.076
	Ceramic											
	DIV	500/500	100	R1¼"		C	**5SH1 141**		016	1	1	0.181
	Ceramic, prolonged version											
	DIII	690/600	63	E33		A	**5SH1 170**		016	1	5	0.086

[1)] Can also be used with 690 V AC/600 V DC.

*** You can order this quantity or a multiple thereof.**

DIAZED fuse systems

	Size	Thread	For fuse links A	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	DIAZED screw adapters									
	NDz	E16	2	C	**5SH3 28**		016	1	10	0.002
			4	C	**5SH3 31**		016	1	10	0.002
			6	C	**5SH3 05**		016	1	10	0.002
			10	C	**5SH3 06**		016	1	10	0.002
			16	C	**5SH3 07**		016	1	10	0.002
	Also for 5SF2 30 up to 750 V									
	DII	E27	2	▶	**5SH3 10**		016	1	25	0.015
			4	▶	**5SH3 11**		016	1	25	0.015
			6	▶	**5SH3 12**		016	1	25	0.015
			10	▶	**5SH3 13**		016	1	25	0.015
			16	▶	**5SH3 14**		016	1	25	0.014
			20	▶	**5SH3 15**		016	1	25	0.012
			25	▶	**5SH3 16**		016	1	25	0.012
	Also for 5SF2 30 up to 750 V									
	DIII	E33	35	▶	**5SH3 17**		016	1	25	0.019
			50	▶	**5SH3 18**		016	1	25	0.018
			63	▶	**5SH3 20**		016	1	25	0.017
	DIAZED adapter sleeves									
	DIV	R1¼"	80	C	**5SH3 21**		016	1	10/1000	0.006
			100	C	**5SH3 22**		016	1	10/1000	0.005
	DIAZED adapter sleeves for screw caps									
	For NDz/TNDz fuse links in base DII			C	**5SH3 01**		016	1	10	0.012
	For DII fuse links in base DIII			B	**5SH3 02**		016	1	10	0.023
	DIAZED adapter sleeve fitters									
	DII/DIII			A	**5SH3 703**		016	1	1	0.025
	DIAZED covers made of molded plastic									
	Not for SILIZED fuse links									
	DII 5 bases = 12 MW	E27		▶	**5SH2 032**		016	1	10/620	0.017
	DIII 4 bases = 12 MW	E33		▶	**5SH2 232**		016	1	10/620	0.020
	DIAZED caps made of molded plastic									
	NDz	E16		A	**5SH2 01**		016	1	5	0.028
	DII	E27		A	**5SH2 02**		016	1	5	0.038
	DIII	E33		A	**5SH2 22**		016	1	5	0.048

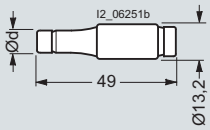
* You can order this quantity or a multiple thereof.

	Size	Thread	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	DIAZED cover rings								
	Ceramic DII and DIII, also for EZR bus-mounting base								
	NDz	E16	C	**5SH3 30**		016	1	5	0.020
	DII	E27	B	**5SH3 32**		016	1	10	0.029
	DIII	E33	B	**5SH3 34**		016	1	10	0.035
	Made of molded plastic, also for EZR bus-mounting base								
	DII	E27	A	**5SH3 401**		016	1	5/60	0.013
	DIII	E33	A	**5SH3 411**		016	1	5/60	0.014

Dimensional drawings

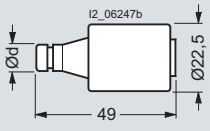
DIAZED fuse links

5SA1, 5SA2



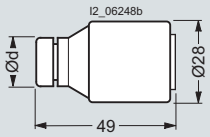
Size/thread	TNDz/E16, NDz/E16						
Rated current in A	2	4	6	10	16	20	25
Dimension d	6	6	6	8	10	12	14

5SB1, 5SB2



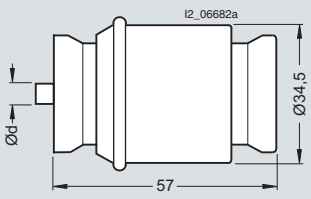
Size/thread	DII/E27						
Rated current in A	2	4	6	10	16	20	25
Dimension d	6	6	6	8	10	12	14

5SB3, 5SB4



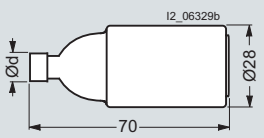
Size/thread	DIII/E33			
Rated current in A	32	35	50	63
Dimension d	16	16	18	20

5SC1, 5SC2



Size/thread	DIV/R1¼"	
Rated current in A	80	100
Dimension d	5	7

5SD6, 5SD8



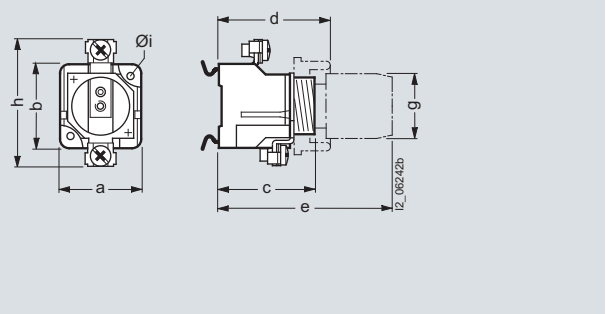
Size/thread	DIII/E33									
Rated current in A	2	4	6	10	16	20	25	35	50	63
Dimension d	6	6	6	8	10	12	14	16	18	20

*** You can order this quantity or a multiple thereof.**

DIAZED fuse systems

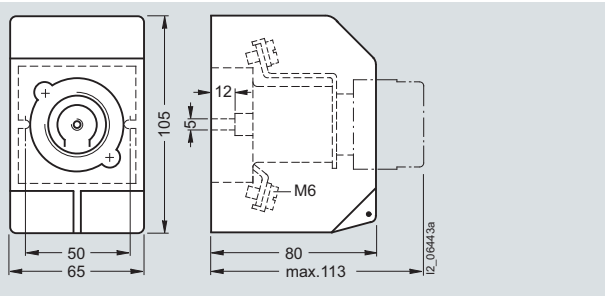
DIAZED fuse bases made of ceramic

5SF1

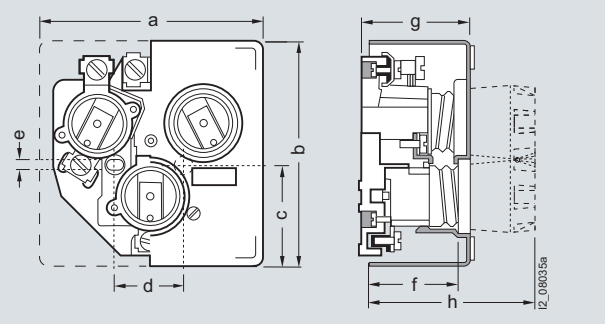


Version Type	Terminal type	Dimensions a	b	c	d	e	Øg	h	Øi
NDz/25 A									
5SF1 012	KK	29	49	44.6	55	75	32	49	--
5SF1 01	KK	29	49	44.6	55	75	32	49	4.2
DII/25 A									
5SF1 005	BB	38.4	41	46.6	53	83	34	63	--
5SF1 024	BB	38.4	41	46.6	53	83	34	63	4.3
DIII/63 A									
5SF1 205	BS	45.5	46	47	54	83	43	78	--
5SF1 215	SS	45.5	46	47	54	83	43	78	--
5SF1 224	BS	45.5	46	47	54	83	43	78	4.3
5SF1 214	SS	45.5	46	47	54	83	43	78	4.3
DIV/100 A									
5SF1 401	Flat connection	68	68	--	79	110	65	116	6.5

5SF4 230



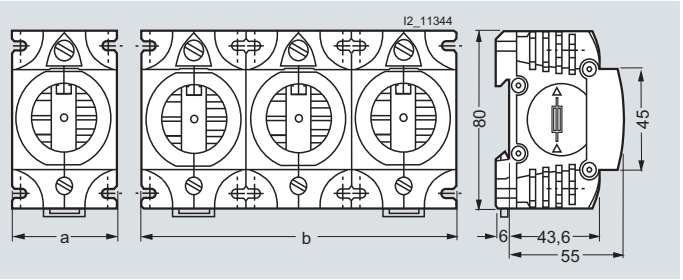
5SF5



Version Type	Terminal type	Dimensions a	b	c	d	e	f	g	h
DII/3 × 25 A									
5SF5 067	BB	106	106	48	--	--	45	52	86
5SF5 066	KB	106	106	48	32	5.2	45	52	86
DIII/3 × 63 A									
5SF5 237	BB	127	130	54	--	--	45	52	85
5SF5 236	KB	127	130	54	32	5.2	45	52	85

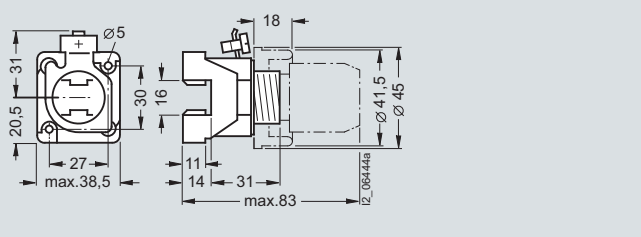
DIAZED fuse bases made of molded plastic

5SF15SF5

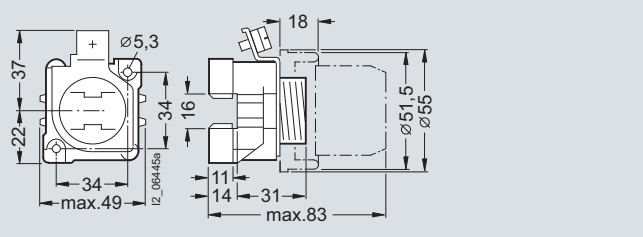


Type	Dimensions a	b
5SF1 060	40	--
5SF1 260	50	--
5SF5 068	--	120
5SF5 268	--	150

DIAZED EZR bus-mounting bases



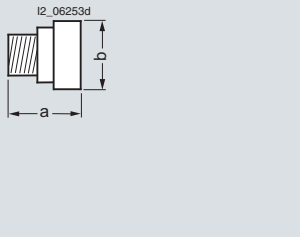
5SF6 005,



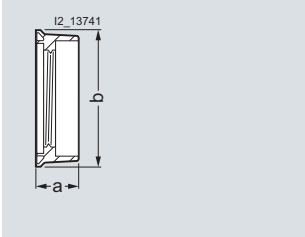
5SF6 205

DIAZED screw caps/cover rings made of molded plastic/ceramic

Screw caps
5SH1



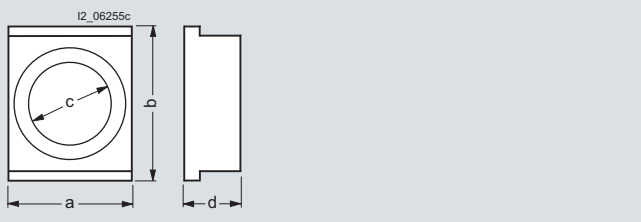
Cover rings
5SH3



Size/thread	Screw caps			Cover rings		
	Type	Dimensions a	∅b	Type	Dimensions a	∅b
NDz/E16	5SH1 11	35	28	5SH3 30	16.5	30
DII/E27	5SH1 221 5SH1 12 5SH1 22	42 45.5 43	33 34 39	5SH3 401 5SH3 32	17.5 17.5	39.5 41.5
DIII/E33	5SH1 231 5SH1 13 5SH1 23 5SH1 161 5SH1 170	42 45.5 47 48 68	40 43 45 48 43	5SH3 411 5SH3 34	17.5 19	49.5 51.5
DIV/R1¼"	5SH1 141	53	65			

DIAZED covers made of molded plastic

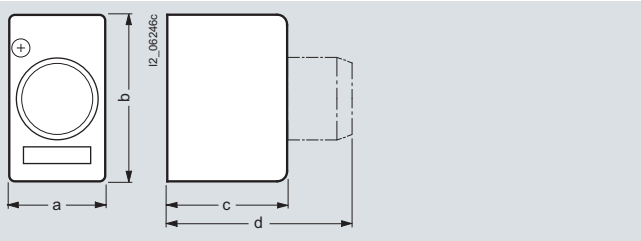
5SH2



Size/thread	Type	Dimensions a	b	∅c	d
DII/E27	5SH2 032	41	51	27.5	19
DIII/E33	5SH2 232	52	51	34.5	18.5

DIAZED caps made of molded plastic

5SH2



Size/thread	Type	Dimensions a_{max}	b_{max}	c_{max}	d_{max}
NDz/E16	5SH2 01	33	68	51.7	75
DII/E27	5SH2 02	43	74.7	53.6	83
DIII/E33	5SH2 22	51	90.5	53.6	83

More information

Fuse based DIII with terminal type BS
- Outgoing feeders (top), saddle terminal S
- Incoming feeders (bottom), clamp-type terminal B

NDZ fuse bases with terminal type KK
- Outgoing feeders (top), screw head contact K
- Incoming feeders (bottom), screw head contact K

DII fuse bases with terminal type BB
- Outgoing feeders (top), clamp-type terminal B
- Incoming feeders (bottom), clamp-type terminal B

DII fuse bases with terminal type SS
- Outgoing feeders (top), saddle terminal S
- Incoming feeders (bottom), saddle terminal S

Overview

Cylindrical fuses are standard in Europe. There are a range of different cylindrical fuse links and holders that comply with the standards IEC 60269-1, -2 and -3. They are suitable for use in industrial applications. In South West Europe they are also approved for use in residential buildings.

The cylindrical fuse holders are also approved to UL 512. The cylindrical fuse holders are tested and approved as fuse disconnectors in accordance with the switching device standard IEC 60947-3. They are not suitable for switching loads.

Cylindrical fuse holders can be supplied with or without signal detectors. In the case of devices with signal detectors, a small electronic device with LED is located behind an inspection window in the plug-in module. If the inserted fuse link is tripped, this is indicated by the LED flashing

An auxiliary switch, which can be laterally mounted, enables the forwarding of the switching state of the fuse holder, and thus an integration of the fuses in the automation processes.

Benefits

- Devices with pole number 1P+N are available in a single modular width. This reduces the footprint by 50 %.
- The sliding catch for type ranges 8 x 32 mm and 10 x 38 mm enables the removal of individual devices from the assembly.
- Space for a spare fuse in the plug-in module enables the fast replacement of fuses. This saves time and money and increases plant availability.
- A flashing LED signals that a fuse link has been tripped. This enables fast detection during runtime.

Technical specifications

		Cylindrical fuse links						
		3NW6 3..	**3NW6 0..**	**3NW6 1..**	**3NW6 2..**	**3NW8 0..**	**3NW8 1..**	**3NW8 2..**
Sizes	mm × mm	8 × 32	10 × 38	14 × 51	22 × 58	10 × 38	14 × 51	22 × 58
Standards		IEC 60269-1, -2, -3; NF C 60-200; NF C 63-210, -211; NBN C 63269-2, CEI 32-4, -12						
Operational class		gG				aM		
Rated voltages U_n	V AC	400 or 500						
Rated current I_n	A	2 ... 20	2 ... 32	4 ... 50	8 ... 100	0.5 ... 25	2 ... 50	10 ... 100
Rated breaking capacity								
• 500 V versions	kA AC	100						
• 400 V versions	kA AC	20						
Mounting position		Any, but preferably vertical						

			Cylindrical fuse holders			
			3NW7 3..	**3NW7 0..**	**3NW7 1..**	**3NW7 2..**
Sizes		mm × mm	8 × 32	10 × 38	14 × 51	22 × 58
Standards			IEC 60269-1, -2, -3; NF C 60-200, NF C 63-210, -211; NBN C 63269-2-1; CEI 32-4, -12			
Certifications	Acc. to UL		--	cULus	cULus	--
	Acc. to CSA		--	CSA	CSA	--
Rated voltage	**U_n**	V AC	400	690		
	Acc. to UL/CSA	V AC	400	600		
Rated current I_n		A AC	20	32	50	100
Rated breaking capacity		kA	20	100		
Switching capacity						
• Utilization category			AC-20B (switching without load), DC-20B			
No-voltage changing of fuse links			Yes			
Sealable when installed			Yes			
Mounting position			Any, but preferably vertical			
Degree of protection	Acc. to IEC 60529		IP20, with connected conductors			
Terminals with touch-protection acc. to BGV A3 at incoming and outgoing feeder			Yes			
Ambient temperature		°C	-5 ... +40, humidity 90 % at +20			
Conductor cross-sections						
• Rigid		mm^2	0.5 ... 10		2.5 ... 10	4 ... 10
• Stranded		mm^2	0.5 ... 10		2.5 ... 25	4 ... 50
• Finely stranded, with end sleeve		mm^2	0.5 ... 10		2.5 ... 16	4 ... 35
• AWG (American wire gauge)			--	10 ... 20	6 ... 10	--
Tightening torques		Nm	1.2		2.0	2.5

Selection and ordering data

	Sizes	I_n	U_n	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm	A	V AC					Unit(s)	Unit(s)	kg
	Cylindrical fuse links, operational class gG									
	8 × 32	2	400	B	**3NW6 302-1**		018	1	10	0.004
		4		B	**3NW6 304-1**		018	1	10	0.004
		6		B	**3NW6 301-1**		018	1	10	0.004
		10		B	**3NW6 303-1**		018	1	10	0.004
		16		B	**3NW6 305-1**		018	1	10	0.004
		20		B	**3NW6 307-1**		018	1	10	0.004
	10 × 38	2	500	▶	**3NW6 002-1**		018	1	10	0.008
		4		▶	**3NW6 004-1**		018	1	10	0.008
		6		▶	**3NW6 001-1**		018	1	10	0.008
		8		B	**3NW6 008-1**		018	1	10	0.008
		10		▶	**3NW6 003-1**		018	1	10	0.008
		12		B	**3NW6 006-1**		018	1	10/100	0.008
		16		▶	**3NW6 005-1**		018	1	10	0.008
		20		B	**3NW6 007-1**		018	1	10	0.008
		25		B	**3NW6 010-1**		018	1	10	0.008
		32	400	B	**3NW6 012-1**		018	1	10	0.008
	14 × 51	4	500	B	**3NW6 104-1**		018	1	10	0.019
		6		B	**3NW6 101-1**		018	1	10	0.019
		8		B	**3NW6 108-1**		018	1	10/100	0.019
		10		B	**3NW6 103-1**		018	1	10	0.019
		12		B	**3NW6 106-1**		018	1	10/100	0.019
		16		B	**3NW6 105-1**		018	1	10	0.019
		20		B	**3NW6 107-1**		018	1	10	0.019
		25		B	**3NW6 110-1**		018	1	10	0.019
		32		B	**3NW6 112-1**		018	1	10	0.019
		40		B	**3NW6 117-1**		018	1	10	0.019
		50	400	B	**3NW6 120-1**		018	1	10	0.019
	22 × 58	8	500	B	**3NW6 208-1**		018	1	10/100	0.051
		10		B	**3NW6 203-1**		018	1	10/100	0.051
		12		B	**3NW6 206-1**		018	1	10/100	0.051
		16		B	**3NW6 205-1**		018	1	10	0.051
		20		B	**3NW6 207-1**		018	1	10	0.051
		25		B	**3NW6 210-1**		018	1	10	0.051
		32		B	**3NW6 212-1**		018	1	10	0.051
		40		B	**3NW6 217-1**		018	1	10	0.051
		50		B	**3NW6 220-1**		018	1	10	0.051
		63		B	**3NW6 222-1**		018	1	10	0.051
		80		B	**3NW6 224-1**		018	1	10	0.051
		100	400	B	**3NW6 230-1**		018	1	10	0.051
	Cylindrical fuse links, operational class aM									
	10 × 38	0.5	500	B	**3NW8 000-1**		018	1	10	0.003
		1		B	**3NW8 011-1**		018	1	10	0.008
		2		B	**3NW8 002-1**		018	1	10	0.008
		4		B	**3NW8 004-1**		018	1	10	0.008
		6		B	**3NW8 001-1**		018	1	10	0.008
		8		B	**3NW8 008-1**		018	1	10	0.003
		10		A	**3NW8 003-1**		018	1	10	0.008
		12		B	**3NW8 006-1**		018	1	10/100	0.008
		16		B	**3NW8 005-1**		018	1	10	0.008
		20		B	**3NW8 007-1**		018	1	10	0.008
		25	400	B	**3NW8 010-1**		018	1	10	0.008
	14 × 51	2	500	B	**3NW8 102-1**		018	1	10/50	0.019
		4		B	**3NW8 104-1**		018	1	10	0.019
		6		B	**3NW8 101-1**		018	1	10/50	0.019
		8		B	**3NW8 108-1**		018	1	10/50	0.019
		10		B	**3NW8 103-1**		018	1	10	0.019
		12		B	**3NW8 106-1**		018	1	10/50	0.019
		16		B	**3NW8 105-1**		018	1	10	0.019
		20		B	**3NW8 107-1**		018	1	10	0.019
		25		B	**3NW8 110-1**		018	1	10	0.019
		32		B	**3NW8 112-1**		018	1	10	0.019
		40		B	**3NW8 117-1**		018	1	10	0.019
		50	400	B	**3NW8 120-1**		018	1	10	0.019

* You can order this quantity or a multiple thereof.

	Sizes	I_n	U_n	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm	A	V AC					Unit(s)	Unit(s)	kg
	22 × 58	10	500	B	**3NW8 203-1**		018	1	10/50	0.051
		12		B	**3NW8 206-1**		018	1	10/50	0.051
		16		B	**3NW8 205-1**		018	1	10/50	0.051
		20		B	**3NW8 207-1**		018	1	10	0.051
		25		B	**3NW8 210-1**		018	1	10	0.051
		32		B	**3NW8 212-1**		018	1	10	0.051
		40		B	**3NW8 217-1**		018	1	10	0.051
		50		B	**3NW8 220-1**		018	1	10	0.051
		63		B	**3NW8 222-1**		018	1	10	0.051
		80		B	**3NW8 224-1**		018	1	10	0.051
		100	400	B	**3NW8 230-1**		018	1	10	0.051

	Number of poles	I_n	For fuse links of size	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	mm × mm						Unit(s)	Unit(s)	kg
	Cylindrical fuse holders With signal detector										
	1P										
		20	8 × 32	1	C	**3NW7 314**		018	1	1	0.059
		32	10 × 38	1	A	**3NW7 014**		018	1	1	0.059
		50	14 × 51	1.5	B	**3NW7 112**		018	1	1	0.095
		100	22 × 58	2	B	**3NW7 212**		018	1	1	0.145
	1P+N										
		20	8 × 32	1	C	**3NW7 354**		018	1	1	0.072
		32	10 × 38	1	A	**3NW7 054**		018	1	1	0.072
		50	14 × 51	3	B	**3NW7 152**		018	1	1	0.215
		100	22 × 58	4	B	**3NW7 252**		018	1	1	0.330
	2P										
		20	8 × 32	2	C	**3NW7 324**		018	1	1	0.123
		32	10 × 38	2	A	**3NW7 024**		018	1	1	0.123
		50	14 × 51	3	B	**3NW7 122**		018	1	1	0.195
		100	22 × 58	4	B	**3NW7 222**		018	1	1	0.300
	3P										
		20	8 × 32	3	C	**3NW7 334**		018	1	1	0.180
		32	10 × 38	3	A	**3NW7 034**		018	1	1	0.180
		50	14 × 51	4.5	B	**3NW7 132**		018	1	1	0.295
		100	22 × 58	6	B	**3NW7 232**		018	1	1	0.480
	3P+N										
		20	8 × 32	3	C	**3NW7 364**		018	1	1	0.193
		32	10 × 38	3	A	**3NW7 064**		018	1	1	0.193
		50	14 × 51	6	B	**3NW7 162**		018	1	1	0.315
		100	22 × 58	8	B	**3NW7 262**		018	1	1	0.475
	Without signal detectors										
	1P										
		20	8 × 32	1	A	**3NW7 313**		018	1	1	0.056
		32	10 × 38	1	▶	**3NW7 013**		018	1	1/12	0.056
		50	14 × 51	1.5	▶	**3NW7 111**		018	1	1	0.095
		100	22 × 58	2	▶	**3NW7 211**		018	1	1	0.145
	1P+N										
		20	8 × 32	1	A	**3NW7 353**		018	1	1	0.069
		32	10 × 38	1	▶	**3NW7 053**		018	1	1	0.069
		50	14 × 51	3	B	**3NW7 151**		018	1	1	0.215
		100	22 × 58	4	B	**3NW7 251**		018	1	1	0.330
	2P										
		20	8 × 32	2	A	**3NW7 323**		018	1	1	0.118
		32	10 × 38	2	▶	**3NW7 023**		018	1	1/6	0.118
		50	14 × 51	3	▶	**3NW7 121**		018	1	1	0.195
		100	22 × 58	4	▶	**3NW7 221**		018	1	1	0.300

* You can order this quantity or a multiple thereof.

3NW cylindrical fuse systems

Number of poles	I_n	For fuse links of size	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A	mm × mm						Unit(s)	Unit(s)	kg
3P										
	20	8 ×32	3	A	**3NW7 333**		018	1	1	0.172
	32	10 × 38	3	▶	**3NW7 033**		018	1	1/4	0.172
	50	14 × 51	4.5	▶	**3NW7 131**		018	1	1	0.295
	100	22 × 58	6	▶	**3NW7 231**		018	1	1	0.691
3P+N										
	20	8 × 32	3	A	**3NW7 363**		018	1	1	0.185
	32	10 × 38	3	▶	**3NW7 063**		018	1	1	0.185
	50	14 × 51	6	A	**3NW7 161**		018	1	1	0.315
	100	22 × 58	8	A	**3NW7 261**		018	1	1	0.475

Auxiliary switches

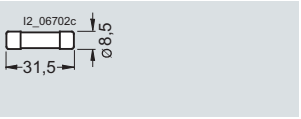
For indicating disconnection of the fuse link, solely for application of striker fuse links.
For retrofitting using the factory-fitted brackets.
Contact: 250 V AC, 5 A,
Minimum contact load: 12 V, 25 mA

For fuse bases	14 × 51	0.5	B	**3NW7 901**		018	1	1	0.050
For fuse bases	22 × 58		B	**3NW7 902**		018	1	1	0.050

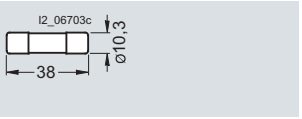
For indicating the switching state of the fuse holder. For retrofitting using the factory-fitted brackets.
Contact: 230 V AC, 6 A/110 V DC, 1 A
Minimum contact load: 12 V, 25 mA
Terminals 1.5 mm² - 0.5 Nm

For fuse holders	10 × 38	0.5	B	**3NW7 903**		018	1	1	0.034

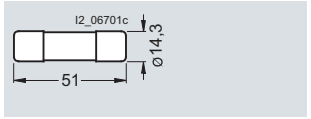
Dimensional drawings



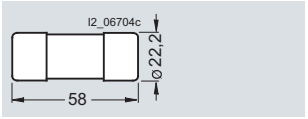
Sizes
8 × 32 mm



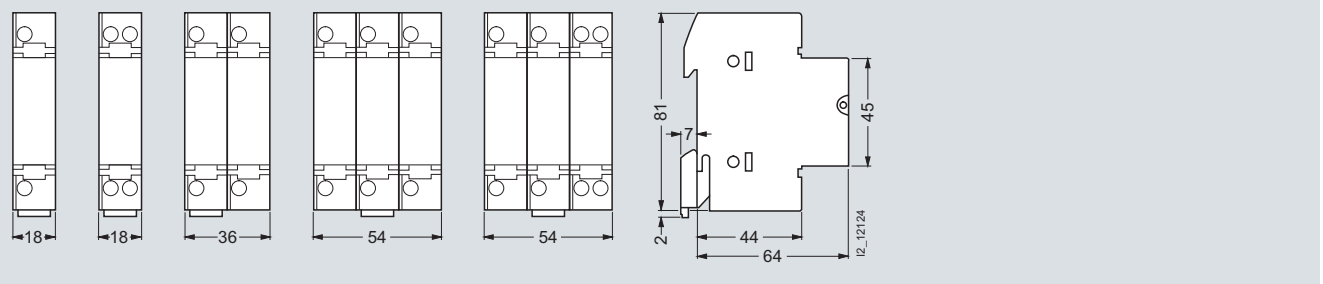
10 × 38 mm



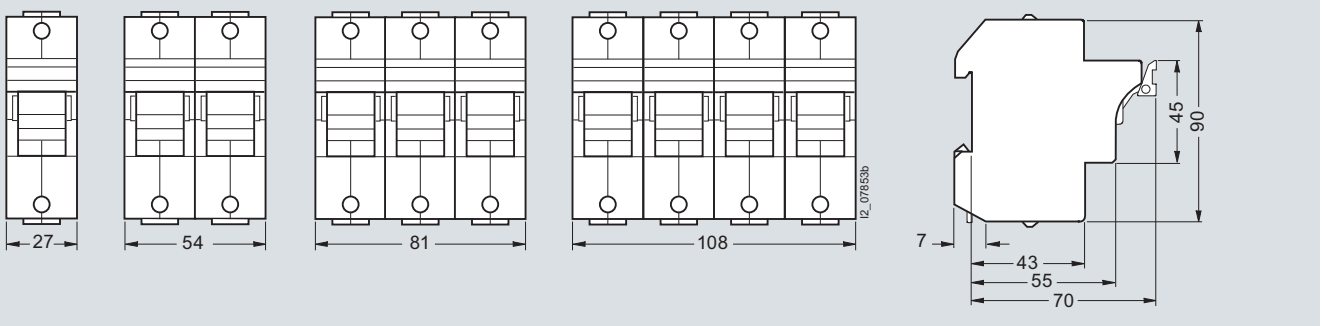
14 × 51 mm



22 × 58 mm

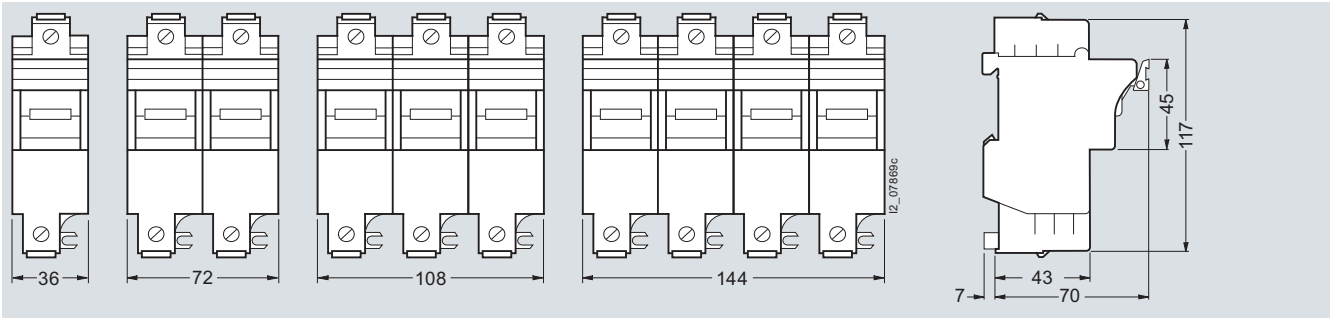


3NW7 0, 3NW7 3
1P 1P+N 2P 3P 3P+N



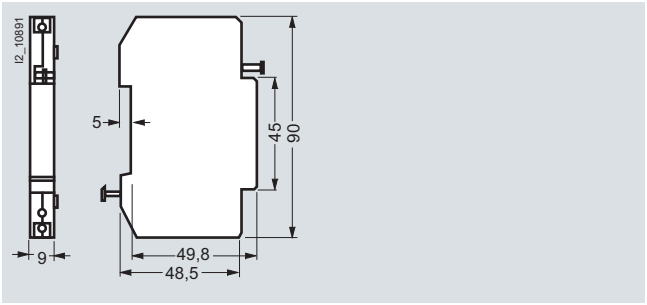
3NW7 1
1P 1P+N / 2P 3P 3P+N

* You can order this quantity or a multiple thereof.

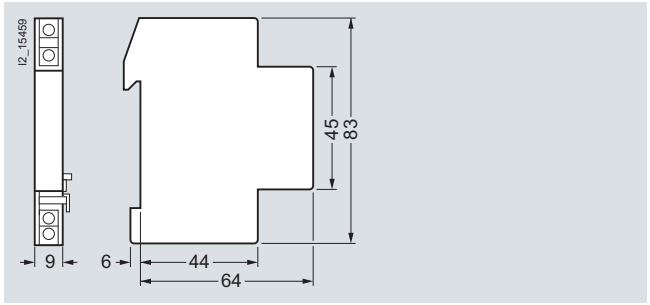


3NW7 2
1P 1P+N / 2P 3P 3P+N

Auxiliary switches

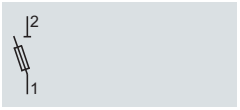


3NW7 901
3NW7 902

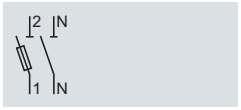


3NW7 903

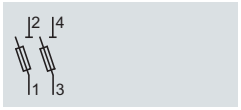
Schematics



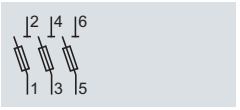
1P



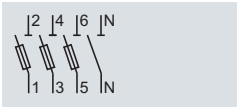
1P+N



2P

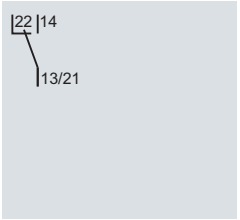


3P

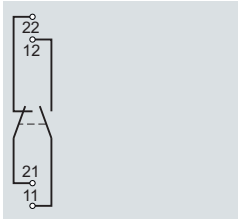


3P+N

Auxiliary switches



3NW7 901
3NW7 902



3NW7 903

More information

Installation

Fuse holders, sizes 8 mm × 32 mm and 10 mm × 38 mm have a sliding catch that enables the removal of individual devices from the assembly.

The infeed can be from the top or the bottom. Because the cylindrical fuse holders are fitted with the same anti-slip terminals at the top and the bottom, the devices can also be bus-mounted at the top or the bottom.

Auxiliary switches

Auxiliary switches are available for the cylindrical fuse holders. These are simply clipped onto the base using the factory-fitted brackets.

Sizes 8 mm × 32 mm and 10 mm × 38 mm:
The auxiliary switches support the remote display of the ON/OFF switching state of the fuse holder.

Sizes 14 mm × 51 mm and 22 mm × 58 mm:
The auxiliary switches support the remote display of fuse failure. However, fuse links with strikers are required for this function. When the fuse is tripped, a small striking pin – the striker – shoots out of the front of the fuse. Over an armature link in the auxiliary switch, the kinetic energy of this striker is used to switch a mini switch, which then initializes this signal over a floating contact.

3NW. ...-0HG Class CC fuse systems

Overview

Class CC fuses are used for "branch circuit protection".

The encapsulated fuse holders are tested and designed to the US National Electrical Code NEC 210.20(A) so that in continuous operation only 80 % of the rated current is permitted as operational current.

An operational current of 100 % of the rated current (30 A) is only permitted short-time.

The devices are prepared for the inscription labels of the ALPHA FIX terminal blocks 8WH8 120-7AA15 and 8WH8 120-7XA05.

There are three different series:

- Characteristic: slow, 3NW1 ...-0HG
  For the protection of control transformers, reactors, inductances. Significantly slower than the minimum requirements of 12 s at $2 \times I_n$ as specified by UL for Class CC fuses.
- Characteristic: quick 3NW2 ...-0HG
  For a wide range of applications, for the protection of lighting installations, heating, control systems.
- Characteristic: slow, current-limiting, 3NW3 ...-0HG
  Slow for overloads and quick for short circuits. High current limitation for the protection of motor circuits.

Benefits

- For switchgear assemblies and mechanical engineers who export their plants. Compliance with the American standard is as follows:
- Approved according to UL and CSA for typical "branch circuit protection" applications. This facilitates export.
- Modern design with touch protection to BGV A3 ensures safe installation.

Technical specifications

		Class CC fuse holders 3NW7 5.3-0HG
Standards **Approved acc. to**		UL 512; CSA C22.2 UL 512; UL File No. E171267
Rated voltage	V AC	600
Rated current I_n	A	30
Max. power dissipation of fuse links • With cable, 6 mm² • With cable, 10 mm²	 W W	 3 4.3
Conductor cross-sections • Solid and stranded • AWG Conductor cross-section, solid and stranded	 mm² AWG	 1.5 ... 25 18 ... 4

		Class CC fuse links		
		3NW1 ...-0HG	**3NW2 ...-0HG**	**3NW3 ...-0HG**
Standards **Approved acc. to**		UL 248-4; CSA C22.2 UL 248-4; UL File Number E258218		
Characteristic		Slow	Quick	Slow, current limiting
Rated voltage	V AC V DC	600	600	600 150 (3 .... 15 A) 300 (< 3 A, > 15 A)
Rated breaking capacity	kA AC	200		

Selection and ordering data

	Number of poles	U_n	I_n	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V	A						Unit(s)	Unit(s)	kg
	Class CC fuse holders										
	1P	600	30	1	C	**3NW7 513-0HG**		018	1	12	0.056
	2P	600	30	2	C	**3NW7 523-0HG**		018	1	6	0.118
	3P	600	30	3	C	**3NW7 533-0HG**		018	1	4	0.172

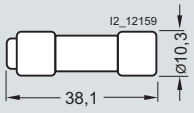
* You can order this quantity or a multiple thereof.

	I_n[1]	DT	Characteristic: slow Order No.	Price per PU	PG	DT	Characteristic: quick Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A									Unit(s)	Unit(s)	kg
	Class CC fuse links											
	0.6 (6/10)	C	**3NW1 006-0HG**		018		--			1	10	0.008
	0.8 (8/10)	C	**3NW1 008-0HG**		018		--			1	10	0.008
	1	C	**3NW1 010-0HG**		018	C	**3NW2 010-0HG**		018	1	10	0.008
	1.5 (1 ½)	C	**3NW1 015-0HG**		018		--			1	10	0.008
	2	C	**3NW1 020-0HG**		018	C	**3NW2 020-0HG**		018	1	10	0.008
	3	C	**3NW1 030-0HG**		018	C	**3NW2 030-0HG**		018	1	10	0.008
	4	C	**3NW1 040-0HG**		018	C	**3NW2 040-0HG**		018	1	10	0.008
	5	C	**3NW1 050-0HG**		018	C	**3NW2 050-0HG**		018	1	10	0.008
	6	C	**3NW1 060-0HG**		018	C	**3NW2 060-0HG**		018	1	10	0.008
	8	C	**3NW1 080-0HG**		018	C	**3NW2 080-0HG**		018	1	10	0.008
	10	C	**3NW1 100-0HG**		018	C	**3NW2 100-0HG**		018	1	10	0.008
	12		--			C	**3NW2 120-0HG**		018	1	10	0.008
	15	C	**3NW1 150-0HG**		018	C	**3NW2 150-0HG**		018	1	10	0.008
	20	C	**3NW1 200-0HG**		018	C	**3NW2 200-0HG**		018	1	10	0.008
	25	C	**3NW1 250-0HG**		018	C	**3NW2 250-0HG**		018	1	10	0.008
	30	C	**3NW1 300-0HG**		018		--			1	10	0.008

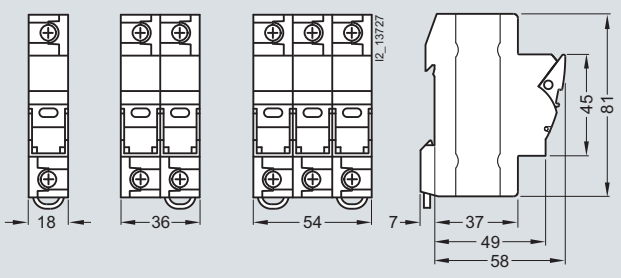
	I_n[1]	DT	Characteristic: slow, current limiting Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A					Unit(s)	Unit(s)	kg
	Class CC fuse links							
	0.6 (6/10)		--					
	0.8 (8/10)		--					
	1	C	**3NW3 010-0HG**		018	1	10	0.008
	1.5 (1 ½)		--					
	2	C	**3NW3 020-0HG**		018	1	10	0.008
	3	C	**3NW3 030-0HG**		018	1	10	0.008
	4	C	**3NW3 040-0HG**		018	1	10	0.008
	5	C	**3NW3 050-0HG**		018	1	10	0.008
	6	C	**3NW3 060-0HG**		018	1	10	0.008
	8	C	**3NW3 080-0HG**		018	1	10	0.008
	10	C	**3NW3 100-0HG**		018	1	10	0.008
	12	C	**3NW3 120-0HG**		018	1	10	0.008
	15	C	**3NW3 150-0HG**		018	1	10	0.008
	20	C	**3NW3 200-0HG**		018	1	10	0.008
	25	C	**3NW3 250-0HG**		018	1	10	0.008
	30	C	**3NW3 300-0HG**		018	1	10	0.008

[1] Values in brackets, American English

Dimensional drawings



3NW1 ...-0HG
3NW2 ...-0HG
3NW3 ...-0HG



3NW7 5..-0HG

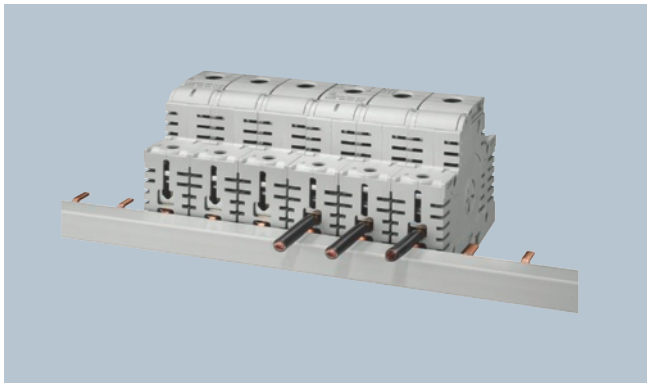
5ST2, 5ST3 busbars, for fuse systems

Overview

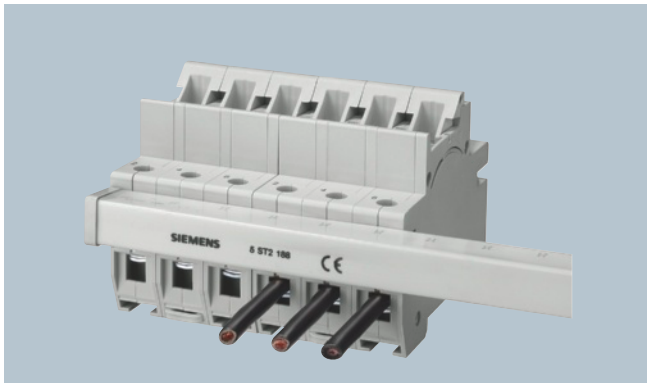
Busbars with pin-type connections can be used for NEOZED safety switching devices and fuse bases. Busbars are available in 10 mm^2 and 16 mm^2.

Busbars with fork plugs are used for the most frequently used NEOZED fuse bases made of ceramic.

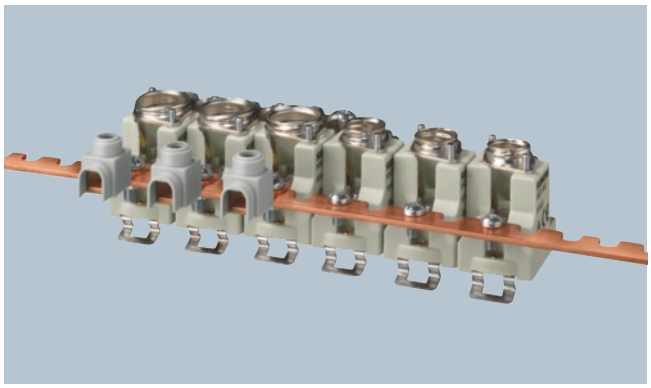
Benefits



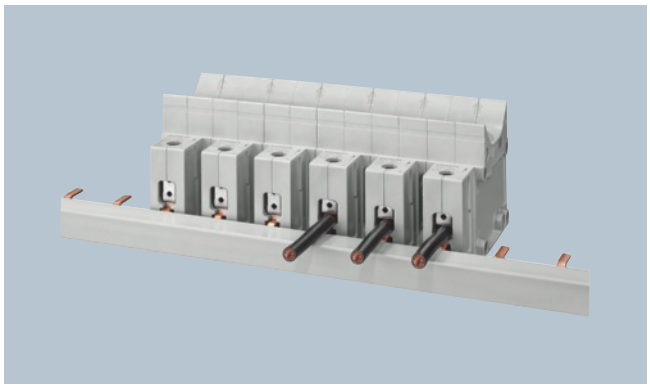
- Clear and visible conductor connection that can be easily checked when using MINIZED switch disconnectors D02. This facilitates the insertion of conductors and saves time.



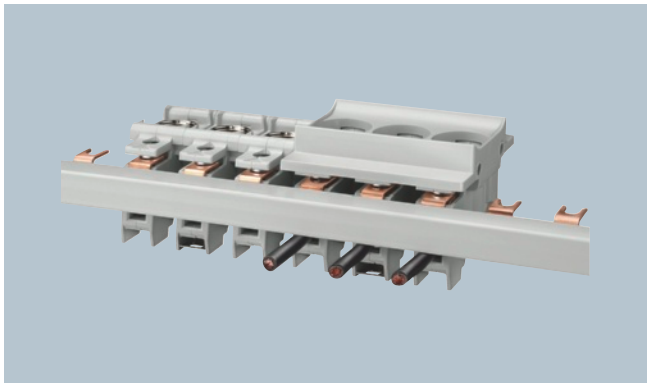
- Bus-mounting of MINIZED fuse switch disconnectors D01 with three-phase pin busbar, which can be cut to length. Tried and tested.



- Single-phase busbar mounting of NEOZED fuse bases.

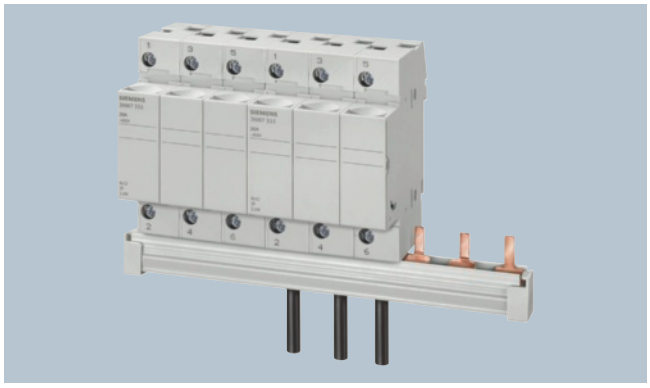


- Clear and visible conductor connection that can be easily checked when using NEOZED comfort base D02. This facilitates the insertion of conductors and saves time.

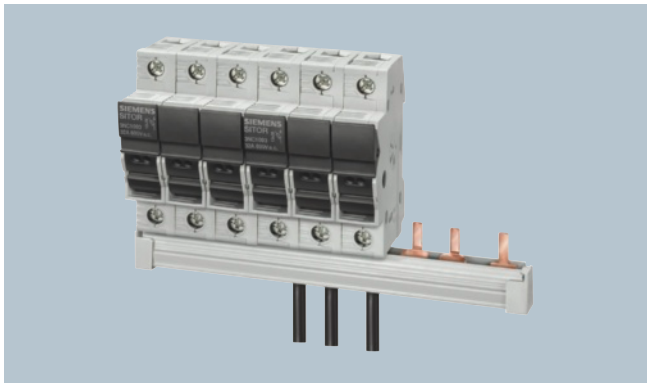


- Bus-mounting of NEOZED fuse bases made of molded plastic on three-phase busbar with fork plug, which can be cut to length. Frequently used.

- Bus-mounting of NEOZED fuse bases made of ceramic on three-phase busbar with fork plug, which can be cut to length. Most common application.



- Bus-mounting of cylindrical fuse holders 8 x 32 mm and 10 x 38 mm with three-phase pin busbar, which can be cut to length.



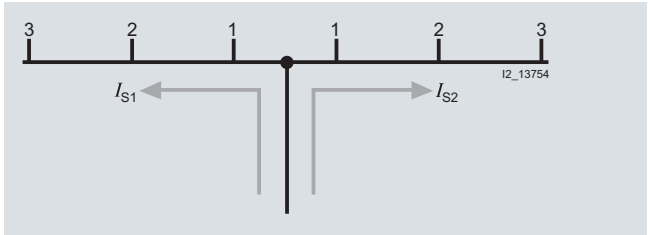
- Bus-mounting of SITOR cylindrical fuse holders 10 mm × 38 mm with the same terminal connection as Class CC fuse holder with three-phase pin busbars, which can be cut to length.

Technical specifications

			5ST, 5SH
Standards			EN 60439-1 (VDE 0660-500): 2005-01
Busbar material			SF-Cu F 24
Partition material			Plastic, Cycoloy 3600 heat-resistant to more than 90 °C flame-retardant and self-extinguishing, dioxin and halogen-free
Rated operational voltage U_c		V AC	400
Rated current I_n			
• Cross-section 10 mm^2		A	63
• Cross-section 16 mm^2		A	80
Rated impulse withstand voltage U_{imp}		kV	4
Test pulse voltage (1.2/50)		kV	6.2
Rated conditional short-circuit current I_{cc}		kA	25
Resistance to climate			
• Constant atmosphere	Acc.to DIN 50015		23/83; 40/92; 55/20
• Humid heat	Acc. to IEC 60068-2-30		28 cycles
Insulation coordination			
• Overvoltage category			III
• Degree of pollution			2
Maximum busbar current I_S/phase			
• Infeed at the start of the busbar			
- Cross-section 10 mm^2		A	63
- Cross-section 16 mm^2		A	80
• Infeed at the center of the busbar			
- Cross-section 10 mm^2		A	100
- Cross-section 16 mm^2		A	130

Infeed at the start of the busbar

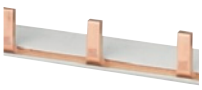
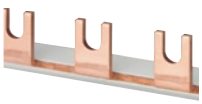
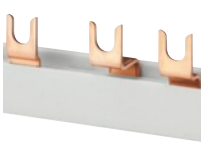
Infeed along the busbar or midpoint infeed



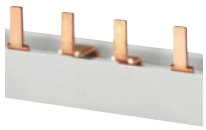
The sum of the output current per branch must not be greater than the busbar current $I_{S1,2}$ / phase.

3

Selection and ordering data

	Phases	Conductor cross-section	Load capacity up to	Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm^2	A	MW	mm					Unit(s)	Unit(s)	kg
	Busbars											
	For MINIZED switch disconnectors D02 **For NEOZED comfort bases D01/D02** Made of molded plastic 5SG1 01, 5SG5 01											
	For NEOZED fuse bases D01/D02 made of ceramic, **terminal version S** For cylindrical fuse holders 14 x 51 mm For SITOR cylindrical fuse holders 14 x 51 mm, can be cut to length, without end caps											
	Single-phase	16	130	1.5	1016	A	**5ST3 703**		027	1	1	0.190
	Three-phase	16	120	1.5	1016	A	**5ST3 714**		027	1	1	0.430
	For NEOZED fuse switch disconnectors D01											
	Can be cut to length, without end caps											
	Single-phase	16	120	1	1000	B	**5ST2 190**		027	1	1	0.500
	Two-phase					B	**5ST2 191**		027	1	1	0.710
	Three-phase					B	**5ST2 192**		027	1	1	1.100
	Can be cut to length, with 2 end caps											
	Single-phase	16	120	1	220	B	**5ST2 186**		027	1	1	0.090
	Two-phase					B	**5ST2 187**		027	1	1	0.160
	Three-phase					B	**5ST2 188**		027	1	1	0.230
	For NEOZED fuse bases D01/D02 made of molded plastic 5SG1 .30, 5SG1 .31, 5SG5 .30											
	For NEOZED fuse bases D01/D02 made of ceramic **Terminal versions B and K**											
	Non-insulated											
	Single-phase	20	116	1.5	1000	▶	**5SH5 321**		016	1	1	0.214
		36	168	1.5		▶	**5SH5 322**		016	1	1	0.321
	Can be cut to length, without end caps											
	Single-phase	24	160	1.5	1000	A	**5SH5 517**		016	1	1	0.550
	Three-phase	16	120	1.5	1000	▶	**5SH5 320**		016	1	1	0.843

* You can order this quantity or a multiple thereof.

	Phases	Conductor cross-section	Load capacity up to	Pin spacing	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm^2	A	MW	mm					Unit(s)	Unit(s)	kg
	For cylindrical fuse holders 8 × 32 mm and 10 × 38 mm For SITOR cylindrical fuse holders 10 × 38 mm For Class CC fuse holders											
	Can be cut to length, without end caps											
	Single-phase	16	120	1	1016	A	**5ST3 701**		027	1	1	0.190
	Two-phase		120	1		A	**5ST3 705**		027	1	1	0.290
	Three-phase	16	120	1	1016	►	**5ST3 710**		027	1	1	0.430
	Cannot be cut to length, fully insulated											
	Single-phase	16		1	214	►	**5ST3 700**		027	1	1	0.040
	Two-phase			1		A	**5ST3 704**		027	1	1	0.060
	Three-phase			1		►	**5ST3 708**		027	1	1	0.100
	End caps for busbars											
	For single-phase 5ST3 7, 5SH5 5 busbars				156	►	**5ST3 748**		027	1	10	0.001
	For three-phase 5ST3 7 and 5SH5 320 busbars					►	**5ST3 750**		027	1	10	0.001
	Touch protection for free connection of pin busbars											
	Yellow, (RAL 1004)					A	**5ST3 655**		027	1	10	0.003
	Terminals											
	For NEOZED fuse bases D01/D02 made of ceramic For DIAZED fuse bases DII/DIII, made of ceramic For cylindrical fuse holders											
	Terminal version S For conductors	2 ... 25				►	**5SH5 327**		016	1	10/300	0.014
	Terminal versions B and K For conductors	6 ... 25				►	**5SH5 328**		016	1	10/300	0.014
	For the infeed of fork-type or pin busbars For conductors	6 ... 35				A	**5ST2 157**		027	1	5	0.030

* You can order this quantity or a multiple thereof.

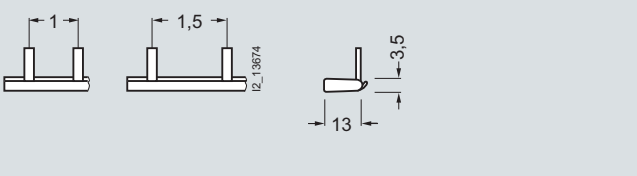
5ST2, 5ST3 busbars, for fuse systems

	Phases	Conductor cross-section	Load capacity up to	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm^2	A	mm					Unit(s)	Unit(s)	kg
	Busbars for 1-pole DIAZED fuse bases made of ceramic with terminal versions BB and BS										
	Size DII, for 19 bases Single-phase	24	80	1000	A	**5SH3 500**		016	1	1/25	0.095
	Size DIII, for 25 bases Single-phase	39	120	1000	A	**5SH3 501**		016	1	1/25	0.180
	Busbars For DIAZED bus-mounting bases/EZR with thread for screw adapters										
	For size DII, 42 5SF6 005 bases Single-phase	48	150	2000	C	**5SH3 54**		016	1	5	0.740
	For size DIII, 34 5SF6 205 bases Single-phase	48	150	2000	C	**5SH3 55**		016	1	5	0.740
	Bus-mounting terminals For DIAZED EZR bus-mounting bases										
	Non-insulated										
	For conductors	1.5 ... 16			A	**8JH4 122**		046	1	10	0.012
	For conductors	10 ... 35			A	**8JH4 124**		046	1	10	0.024

Dimensional drawings

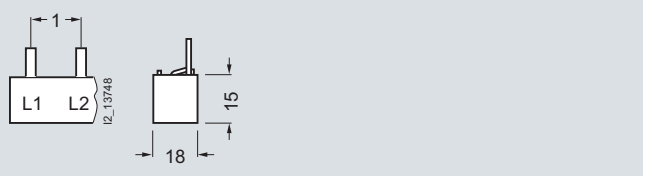
5ST3 7

Pin spacing in MW
Dimensions of side views in mm (approx.)

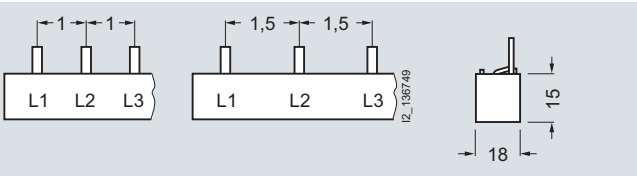


5ST3 700
5ST3 701
Single-phase

5ST3 703
Single-phase



5ST3 704
5ST3 705

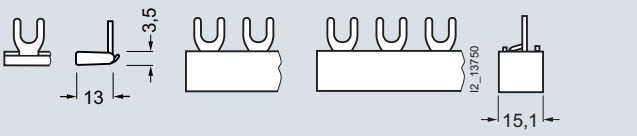


5ST3 708
5ST3 710

5ST3 714

5ST2

Fork spacing in MW
Dimensions of side views in mm (approx.)

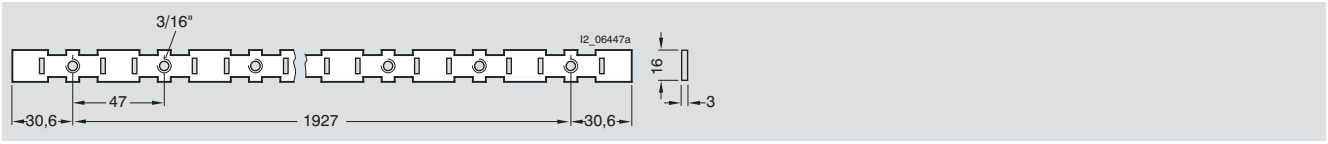


5ST2 186
5ST2 190

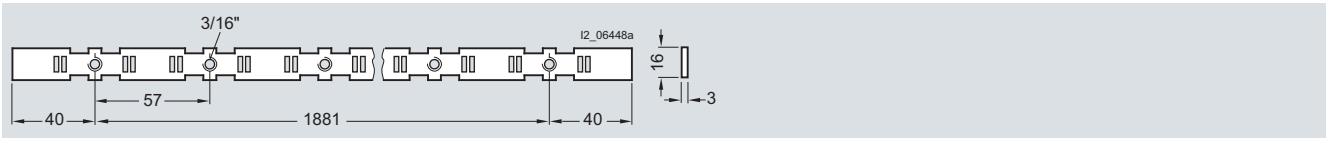
5ST2 187
5ST2 188
5ST2 191
5ST2 192

* You can order this quantity or a multiple thereof.

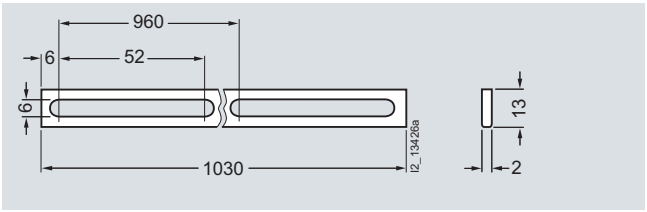
Busbars for DIAZED EZR fuse bases



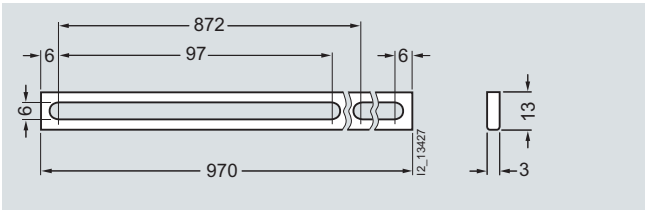
5SH3 54



5SH3 55



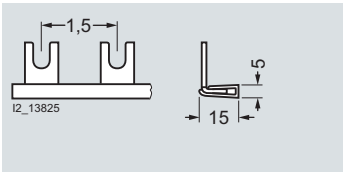
5SH3 500



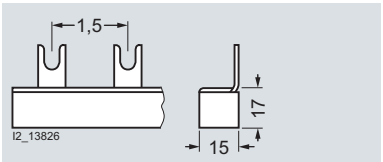
5SH3 501

5SH5

Fork spacing in MW
Dimensions of side views in mm (approx.)



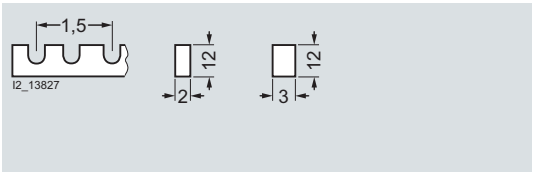
5SH5 517



5SH5 320

5SH5

Fork spacing in MW
Dimensions of side views in mm (approx.)



5SH5 321 5SH5 322

Overview

LV HRC fuses are used for installation systems in non-residential, commercial and industrial buildings, as well as in the switchboards of power supply companies. They therefore protect essential building parts and installations.

LV HRC fuses are fuse systems designed for operation by skilled personnel. There are no constructional requirements for non-interchangeability of rated current and touch protection.

The components and auxiliary equipment are designed in such a way as to ensure the safe replacement of LV HRC fuses or isolation of systems.

LV HRC fuse links are available in the sizes 000, 00, 0, 1, 2, 3, 4 and 4a.

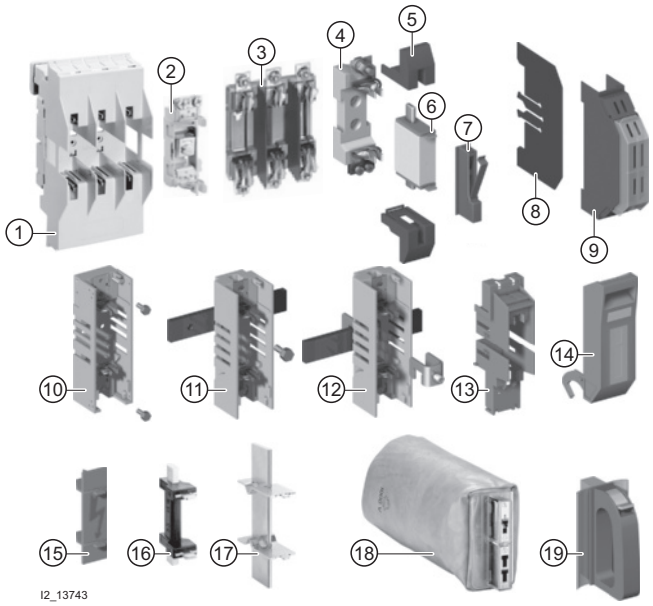
LV HRC fuse links are available in the following operational classes:

- gG for cable and line protection
- aM for the short-circuit protection of switching devices in motor circuits
- gR or aR for the protection of power semiconductors
- gS: The new gS operational class combines cable and line protection with semiconductor protection.

LV HRC fuse links of size 000 can also be used in LV HRC fuse bases, LV HRC fuse switch disconnectors, LV HRC fuse strips as well as in LV HRC in-line fuse switch disconnectors of size 00.

The fuse links 300 A, 355 A and 425 A comply with the standard but do not have the VDE mark.

LV HRC components:

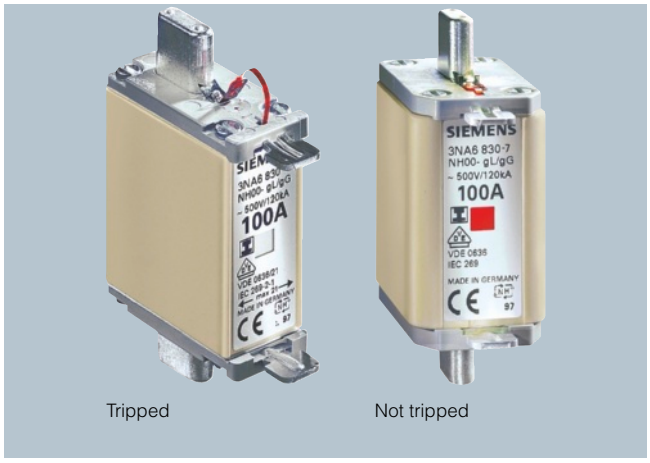


① LV HRC fuse base from the SR60 busbar system
② LV HRC fuse base for busbar mounting
③ LV HRC fuse base, 3P
④ LV HRC fuse base, 1P
⑤ LV HRC contact cover
⑥ LV HRC fuse link
⑦ LV HRC signal detector
⑧ LV HRC partition
⑨ LV HRC protective cover

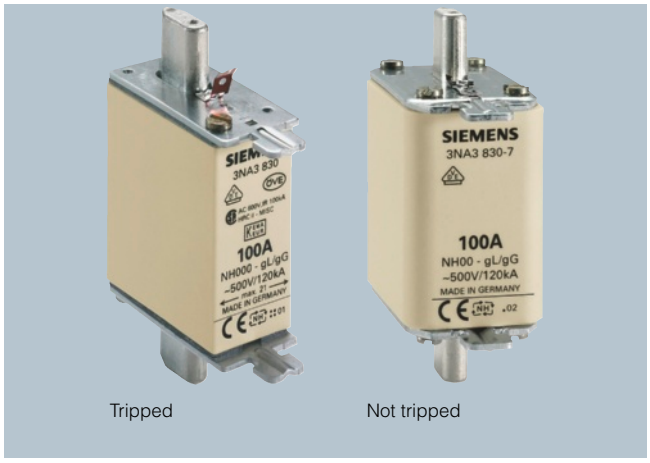
LV HRC fuse bases with swivel mechanism

⑩ - For screw fixing on mounting plate
⑪ - For screw fixing on busbar system
⑫ - For claw fixing on busbar
⑬ LV HRC protective cover for LV HRC fuse bases with swivel mechanism
⑭ LV HRC swivel mechanism
⑮ LV HRC fuse base cover
⑯ LV HRC isolating link with insulated grip lugs
⑰ LV HRC isolating link with non-insulated grip lugs
⑱ LV HRC fuse puller with sleeve
⑲ LV HRC fuse puller

Benefits



- LV HRC fuse links with combination alarm signal the tripping of a fuse by a clear color change from red to white. This enables fast identification and replacement of the tripped fuse links. This increases plant availability.
- The insulated grip lugs made of metal are integrated in the top and bottom covers of the fuse link in molded plastic and provide greater safety when replacing. The mark shown below indicates that the grip lugs are insulated .



- In the standard series with front indicator, the front-mounted red indicator signals the tripping of a fuse.
- LV HRC fuse links are always equipped with silver-plated contact blades. This means that they are non-corroding and have less contact resistance. This ensures the long-term operational safety of the plant.

Technical specifications

		LV HRC fuse links					
		Operational class gG					Operational class aM
		3NA6 ...-4 3NA6 ...-4KK 3NY1 8..	3NA6 ... 3NA6 ...-7 3NA7 ... 3NA7 ...-7	3NA3 ... 3NA3 ...-7	3NA6 ...-6 3NA7 ...-6	3NA3 ...-6	3ND1 3ND2
Standards **Approved acc. to**		IEC 60269-1, -2; EN 60269-1; DIN VDE 0636 DIN VDE 0636-2; CSA 22.2 No.106, File No. 1710842					
Rated voltage U_n							
• Sizes 000 and 00	V AC	400	500	500	690	690	500
	V DC	--	250	250	250	250	--
• Sizes 1 and 2	V AC	400	500	500	690	690	690
	V DC	--	440	440	440	440	--
• Size 3	V AC			500		690	690
	V DC			440		--	
• Sizes (IEC design)	V AC			500		--	
4 and 4a	V DC			400		--	
Rated current I_n	A	10 ... 400	2 ... 400	2 ... 1250	2 ... 315	2 ... 500	6 ... 630
Rated breaking capacity	kA AC	120					
	kA DC	--	25				--
Contact pins		Non-corroding, silver-plated					
Resistance to climate	°C	-20 ... +50 at 95% relative humidity					

Selection and ordering data

	Sizes	Mounting width	I_n	U_n	DT	Insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm	A	V AC/ V DC					Unit(s)	Unit(s)	kg
	LV HRC fuse links with combination alarm, operational class gG										
	000	21	10	400/--	B	**3NA6 803-4**		013	1	3	0.135
			16		B	**3NA6 805-4**		013	1	3	0.135
			20		B	**3NA6 807-4**		013	1	3	0.135
			25		B	**3NA6 810-4**		013	1	3	0.135
			32		B	**3NA6 812-4**		013	1	3	0.135
			35		B	**3NA6 814-4**		013	1	3	0.135
			40		B	**3NA6 817-4**		013	1	3	0.135
			50		B	**3NA6 820-4**		013	1	3	0.135
			63		B	**3NA6 822-4**		013	1	3	0.135
			80		B	**3NA6 824-4**		013	1	3	0.135
			100		B	**3NA6 830-4**		013	1	3	0.135
	00	30	80	400/--	B	**3NA6 824-4KK**		013	1	3	0.200
			100		B	**3NA6 830-4KK**		013	1	3	0.200
			125		B	**3NA6 832-4**		013	1	3	0.200
			160		B	**3NA6 836-4**		013	1	3	0.200
	1	30	35	400/--	B	**3NA6 114-4**		013	1	3	0.290
			40		B	**3NA6 117-4**		013	1	3	0.290
			50		B	**3NA6 120-4**		013	1	3	0.290
			63		B	**3NA6 122-4**		013	1	3	0.290
			80		B	**3NA6 124-4**		013	1	3	0.290
			100		B	**3NA6 130-4**		013	1	3	0.290
			125		B	**3NA6 132-4**		013	1	3	0.290
			160		B	**3NA6 136-4**		013	1	3	0.290
		47.2	200		B	**3NA6 140-4**		013	1	3	0.430
			224		B	**3NA6 142-4**		013	1	3	0.430
			250		B	**3NA6 144-4**		013	1	3	0.430
	2	47.2	50	400/--	B	**3NA6 220-4**		013	1	3	0.450
			63		B	**3NA6 222-4**		013	1	3	0.450
			80		B	**3NA6 224-4**		013	1	3	0.450
			100		B	**3NA6 230-4**		013	1	3	0.450
			125		B	**3NA6 232-4**		013	1	3	0.450
			160		B	**3NA6 236-4**		013	1	3	0.450
			200		B	**3NA6 240-4**		013	1	3	0.450
			224		B	**3NA6 242-4**		013	1	3	0.450
			250		B	**3NA6 244-4**		013	1	3	0.450
		57.8	300		B	**3NA6 250-4**		013	1	3	0.650
			315		B	**3NA6 252-4**		013	1	3	0.650
			355		B	**3NA6 254-4**		013	1	3	0.650
			400		B	**3NA6 260-4**		013	1	3	0.650

* You can order this quantity or a multiple thereof.

	Size	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	DT	Insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
			A	V AC/ V DC									Unit(s)	Unit(s)	kg
	LV HRC fuse links with combination alarm, operational class gG														
	000	21	2	500/	B	**3NA7 802**		013	B	**3NA6 802**		013	1	3	0.135
			4	250	B	**3NA7 804**		013	B	**3NA6 804**		013	1	3	0.135
			6		B	**3NA7 801**		013	B	**3NA6 801**		013	1	3	0.135
			10		B	**3NA7 803**		013	B	**3NA6 803**		013	1	3	0.136
			16		▶	**3NA7 805**		013	▶	**3NA6 805**		013	1	3	0.136
			20		▶	**3NA7 807**		013	▶	**3NA6 807**		013	1	3	0.136
			25		▶	**3NA7 810**		013	▶	**3NA6 810**		013	1	3	0.600
			32		B	**3NA7 812**		013	B	**3NA6 812**		013	1	3	0.136
			35		▶	**3NA7 814**		013	▶	**3NA6 814**		013	1	3	0.440
			40		B	**3NA7 817**		013	B	**3NA6 817**		013	1	3	0.136
			50		▶	**3NA7 820**		013	▶	**3NA6 820**		013	1	3	0.128
			63		▶	**3NA7 822**		013	▶	**3NA6 822**		013	1	3	0.120
			80		▶	**3NA7 824**		013	▶	**3NA6 824**		013	1	3	0.128
			100		▶	**3NA7 830**		013	▶	**3NA6 830**		013	1	3	0.120
	00	30	80	500/	B	**3NA7 824-7**		013	B	**3NA6 824-7**		013	1	3	0.211
			100	250	B	**3NA7 830-7**		013	B	**3NA6 830-7**		013	1	3	0.211
			125		▶	**3NA7 832**		013	▶	**3NA6 832**		013	1	3	0.200
			160		▶	**3NA7 836**		013	A	**3NA6 836**		013	1	3	0.200
	1	30	16	500/	B	**3NA7 105**		013	B	**3NA6 105**		013	1	3	0.290
			20	440	B	**3NA7 107**		013	B	**3NA6 107**		013	1	3	0.290
			25		B	**3NA7 110**		013	B	**3NA6 110**		013	1	3	0.290
			35		B	**3NA7 114**		013	B	**3NA6 114**		013	1	3	0.290
			40		B	**3NA7 117**		013	B	**3NA6 117**		013	1	3	0.290
			50		B	**3NA7 120**		013	B	**3NA6 120**		013	1	3	0.290
			63		B	**3NA7 122**		013	B	**3NA6 122**		013	1	3	0.290
			80		B	**3NA7 124**		013	▶	**3NA6 124**		013	1	3	0.290
			100		B	**3NA7 130**		013	▶	**3NA6 130**		013	1	3	0.290
			125		▶	**3NA7 132**		013	▶	**3NA6 132**		013	1	3	0.290
			160		▶	**3NA7 136**		013	▶	**3NA6 136**		013	1	3	0.290
		47.2	200		▶	**3NA7 140**		013	▶	**3NA6 140**		013	1	3	0.440
			224		B	**3NA7 142**		013	B	**3NA6 142**		013	1	3	0.440
			250		▶	**3NA7 144**		013	▶	**3NA6 144**		013	1	3	0.400
	2	47.2	35	500/	B	**3NA7 214**		013	B	**3NA6 214**		013	1	3	0.450
			50	440	B	**3NA7 220**		013	B	**3NA6 220**		013	1	3	0.450
			63		B	**3NA7 222**		013	B	**3NA6 222**		013	1	3	0.450
			80		B	**3NA7 224**		013	B	**3NA6 224**		013	1	3	0.450
			100		B	**3NA7 230**		013	B	**3NA6 230**		013	1	3	0.450
			125		B	**3NA7 232**		013	B	**3NA6 232**		013	1	3	0.450
			160		▶	**3NA7 236**		013	▶	**3NA6 236**		013	1	3	0.450
			200		▶	**3NA7 240**		013	▶	**3NA6 240**		013	1	3	0.450
			224		B	**3NA7 242**		013	B	**3NA6 242**		013	1	3	0.450
			250		▶	**3NA7 244**		013	▶	**3NA6 244**		013	1	3	0.450
		57.8	300			**--**			B	**3NA6 250**		013	1	3	0.641
			315		▶	**3NA7 252**		013	▶	**3NA6 252**		013	1	3	0.660
			355			**--**			B	**3NA6 254**		013	1	3	0.641
			400		▶	**3NA7 260**		013	▶	**3NA6 260**		013	1	3	0.660

* You can order this quantity or a multiple thereof.

	Sizes	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm	A	V AC/ V DC					Unit(s)	Unit(s)	kg
	LV HRC fuse links with front indicator, operational class gG										
	000	21	2	500/250	►	**3NA3 802**		013	1	3	0.133
			4		►	**3NA3 804**		013	1	3	0.133
			6		►	**3NA3 801**		013	1	3	0.133
			10		►	**3NA3 803**		013	1	3	0.133
			16		►	**3NA3 805**		013	1	3	0.133
			20		►	**3NA3 807**		013	1	3	0.133
			25		►	**3NA3 810**		013	1	3	0.133
			32		►	**3NA3 812**		013	1	3	0.133
			35		►	**3NA3 814**		013	1	3/90	0.133
			40		►	**3NA3 817**		013	1	3	0.133
			50		►	**3NA3 820**		013	1	3/90	0.133
			63		►	**3NA3 822**		013	1	3/90	0.133
			80		►	**3NA3 824**		013	1	3/90	0.133
			100		►	**3NA3 830**		013	1	3/90	0.133
			125		►	**3NA3 832-8**		013	1	3	0.160
			160	400/250	►	**3NA3 836-8**		013	1	3	0.160
	00	30	35	500/250	B	**3NA3 814-7**		013	1	3	0.200
			50		B	**3NA3 820-7**		013	1	3	0.200
			63		B	**3NA3 822-7**		013	1	3	0.200
			80		B	**3NA3 824-7**		013	1	3	0.200
			100		B	**3NA3 830-7**		013	1	3	0.200
			125		►	**3NA3 832**		013	1	3	0.217
			160		►	**3NA3 836**		013	1	3	0.217
	0	30	6	500/440	B	**3NA3 001**		013	1	3	0.340
			10		B	**3NA3 003**		013	1	3	0.340
			16		B	**3NA3 005**		013	1	3	0.340
			20		B	**3NA3 007**		013	1	3	0.340
			25		B	**3NA3 010**		013	1	3	0.340
			32		B	**3NA3 012**		013	1	3	0.340
			35		B	**3NA3 014**		013	1	3	0.340
			40		B	**3NA3 017**		013	1	3	0.340
			50		B	**3NA3 020**		013	1	3	0.340
			63		A	**3NA3 022**		013	1	3	0.340
			80		B	**3NA3 024**		013	1	3	0.340
			100		A	**3NA3 030**		013	1	3	0.340
			125		A	**3NA3 032**		013	1	3	0.340
			160		A	**3NA3 036**		013	1	3	0.340
	1	30	16	500/440	B	**3NA3 105**		013	1	3	0.290
			20		B	**3NA3 107**		013	1	3	0.290
			25		B	**3NA3 110**		013	1	3	0.290
			35		B	**3NA3 114**		013	1	3	0.300
			40		B	**3NA3 117**		013	1	3	0.300
			50		B	**3NA3 120**		013	1	3	0.300
			63		►	**3NA3 122**		013	1	3	0.300
			80		►	**3NA3 124**		013	1	3	0.300
			100		►	**3NA3 130**		013	1	3	0.300
			125		►	**3NA3 132**		013	1	3	0.300
			160		►	**3NA3 136**		013	1	3	0.300
		47.2	200		►	**3NA3 140**		013	1	3	0.440
			224		A	**3NA3 142**		013	1	3	0.440
			250		►	**3NA3 144**		013	1	3	0.440

* You can order this quantity or a multiple thereof.

	Sizes	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm	A	V AC/ V DC					Unit(s)	Unit(s)	kg
	LV HRC fuse links with front indicator, operational class gG										
	2	47.2	35	500/440	B	**3NA3 214**		013	1	3	0.453
			50		B	**3NA3 220**		013	1	3	0.453
			63		A	**3NA3 222**		013	1	3	0.453
			80		A	**3NA3 224**		013	1	3	0.453
			100		A	**3NA3 230**		013	1	3	0.453
			125		A	**3NA3 232**		013	1	3	0.453
			160		▶	**3NA3 236**		013	1	3	0.453
			200		▶	**3NA3 240**		013	1	3	0.453
			224		▶	**3NA3 242**		013	1	3	0.453
			250		▶	**3NA3 244**		013	1	3	0.453
		57.8	300		A	**3NA3 250**		013	1	3	0.647
			315		▶	**3NA3 252**		013	1	3	0.647
			355		▶	**3NA3 254**		013	1	3	0.647
			400		▶	**3NA3 260**		013	1	3	0.647
	3	57.8	200	500/440	B	**3NA3 340**		013	1	3	0.647
			224		B	**3NA3 342**		013	1	3	0.640
			250		A	**3NA3 344**		013	1	3	0.647
			300		B	**3NA3 350**		013	1	3	0.647
			315		▶	**3NA3 352**		013	1	3	0.647
			355		A	**3NA3 354**		013	1	3	0.647
			400		▶	**3NA3 360**		013	1	3	0.647
		71.2	425		A	**3NA3 362**		013	1	3	1.000
			500		▶	**3NA3 365**		013	1	3	1.000
			630		▶	**3NA3 372**		013	1	3	1.000
	Can only be used for 3NH3 530 LV HRC fuse base										
	4 (IEC design)	101.8	630	500/440	B	**3NA3 472**		013	1	1	2.500
			800		A	**3NA3 475**		013	1	1	2.500
			1000		A	**3NA3 480**		013	1	1	2.500
			1250		A	**3NA3 482**		013	1	1	2.500
	Can only be used for 3NH7 520 LV HRC fuse base										
	4a	101.8	500	500/440	B	**3NA3 665**		013	1	1	2.700
			630		B	**3NA3 672**		013	1	1	2.700
			800		A	**3NA3 675**		013	1	1	2.700
			1000		A	**3NA3 680**		013	1	1	2.840
			1250		A	**3NA3 682**		013	1	1	2.840

*** You can order this quantity or a multiple thereof.**

3NA, 3ND LV HRC fuse links

	Size	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	DT	Insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
			A	V AC/ V DC									Unit(s)	Unit(s)	kg
	LV HRC fuse links with combination alarm, operational class gG														
	000	21	2	690/ 250	B	**3NA7 802-6**		013	B	**3NA6 802-6**		013	1	3	0.136
			4		B	**3NA7 804-6**		013	B	**3NA6 804-6**		013	1	3	0.136
			6		B	**3NA7 801-6**		013	B	**3NA6 801-6**		013	1	3	0.136
			10		B	**3NA7 803-6**		013	B	**3NA6 803-6**		013	1	3	0.136
			16		B	**3NA7 805-6**		013	B	**3NA6 805-6**		013	1	3	0.136
			20		B	**3NA7 807-6**		013	B	**3NA6 807-6**		013	1	3	0.136
			25		B	**3NA7 810-6**		013	B	**3NA6 810-6**		013	1	3	0.136
			32		B	**3NA7 812-6**		013	B	**3NA6 812-6**		013	1	3	0.136
			35		B	**3NA7 814-6**		013	B	**3NA6 814-6**		013	1	3	0.136
	00	30	40	690/ 250	B	**3NA7 817-6**		013	B	**3NA6 817-6**		013	1	3	0.211
			50		B	**3NA7 820-6**		013	B	**3NA6 820-6**		013	1	3	0.211
			63		B	**3NA7 822-6**		013	B	**3NA6 822-6**		013	1	3	0.211
			80		B	**3NA7 824-6**		013	B	**3NA6 824-6**		013	1	3	0.211
			100		B	**3NA7 830-6**		013	B	**3NA6 830-6**		013	1	3	0.211
	1	30	50	690/ 440	B	**3NA7 120-6**		013	B	**3NA6 120-6**		013	1	3	0.290
			63		B	**3NA7 122-6**		013	B	**3NA6 122-6**		013	1	3	0.290
			80		B	**3NA7 124-6**		013	B	**3NA6 124-6**		013	1	3	0.290
			100		B	**3NA7 130-6**		013	B	**3NA6 130-6**		013	1	3	0.290
			125		B	**3NA7 132-6**		013	B	**3NA6 132-6**		013	1	3	0.290
			160		B	**3NA7 136-6**		013	B	**3NA6 136-6**		013	1	3	0.290
		47.2	200		B	**3NA7 140-6**		013	B	**3NA6 140-6**		013	1	3	0.440
	2	47.2	80	690/ 440	B	**3NA7 224-6**		013	B	**3NA6 224-6**		013	1	3	0.450
			100		B	**3NA7 230-6**		013	B	**3NA6 230-6**		013	1	3	0.450
			125		B	**3NA7 232-6**		013	B	**3NA6 232-6**		013	1	3	0.450
			160		B	**3NA7 236-6**		013	B	**3NA6 236-6**		013	1	3	0.450
			200		B	**3NA7 240-6**		013	B	**3NA6 240-6**		013	1	3	0.450
		57.8	224		B	**3NA7 242-6**		013	B	**3NA6 242-6**		013	1	3	0.660
			250		B	**3NA7 244-6**		013	B	**3NA6 244-6**		013	1	3	0.660
			300		B	**3NA7 250-6**		013	B	**3NA6 250-6**		013	1	3	0.660
			315		B	**3NA7 252-6**		013	B	**3NA6 252-6**		013	1	3	0.660

* You can order this quantity or a multiple thereof.

	Sizes	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm	A	V AC/ V DC					Unit(s)	Unit(s)	kg
	LV HRC fuse links with front indicator, operational class gG										
	000	21	2	690/250	►	**3NA3 802-6**		013	1	3	0.135
			4		►	**3NA3 804-6**		013	1	3	0.135
			6		►	**3NA3 801-6**		013	1	3	0.135
			10		►	**3NA3 803-6**		013	1	3	0.135
			16		►	**3NA3 805-6**		013	1	3	0.135
			20		►	**3NA3 807-6**		013	1	3	0.135
			25		►	**3NA3 810-6**		013	1	3	0.135
			32		B	**3NA3 812-6**		013	1	3	0.135
			35		►	**3NA3 814-6**		013	1	3	0.135
	00	30	40	690/250	B	**3NA3 817-6**		013	1	3	0.200
			50		►	**3NA3 820-6**		013	1	3	0.200
			63		►	**3NA3 822-6**		013	1	3	0.200
			80		►	**3NA3 824-6**		013	1	3	0.200
			100		►	**3NA3 830-6**		013	1	3	0.200
	1	30	50	690/440	B	**3NA3 120-6**		013	1	3	0.290
			63		B	**3NA3 122-6**		013	1	3	0.290
			80		B	**3NA3 124-6**		013	1	3	0.290
			100		►	**3NA3 130-6**		013	1	3	0.290
			125		►	**3NA3 132-6**		013	1	3	0.290
			160		►	**3NA3 136-6**		013	1	3	0.290
		47.2	200		►	**3NA3 140-6**		013	1	3	0.426
	2	47.2	80	690/440	B	**3NA3 224-6**		013	1	3	0.426
			100		B	**3NA3 230-6**		013	1	3	0.426
			125		B	**3NA3 232-6**		013	1	3	0.426
			160		►	**3NA3 236-6**		013	1	3	0.426
			200		►	**3NA3 240-6**		013	1	3	0.426
		57.8	224		B	**3NA3 242-6**		013	1	3	0.660
			250		►	**3NA3 244-6**		013	1	3	0.680
			300		B	**3NA3 250-6**		013	1	3	0.660
			315		►	**3NA3 252-6**		013	1	3	0.680
	3	57.8	250	690/440	B	**3NA3 344-6**		013	1	3	0.660
			315		B	**3NA3 352-6**		013	1	3	0.660
		71.2	355		B	**3NA3 354-6**		013	1	3	1.000
			400		►	**3NA3 360-6**		013	1	3	1.000
			425		B	**3NA3 362-6**		013	1	3	1.000
			500		►	**3NA3 365-6**		013	1	3	1.000

*** You can order this quantity or a multiple thereof.**

3NA, 3ND LV HRC fuse links

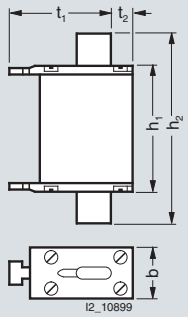
	Sizes	Mounting width	I_n	U_n	DT	Non-insulated grip lugs Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm	A	V AC/ V DC					Unit(s)	Unit(s)	kg
	LV HRC fuse links with front indicator, operational class aM										
	000	21	6	500/--	B	**3ND1 801**		014	1	3	0.130
			10		B	**3ND1 803**		014	1	3	0.130
			16		B	**3ND1 805**		014	1	3	0.130
			20		B	**3ND1 807**		014	1	3	0.130
			25		B	**3ND1 810**		014	1	3	0.130
			32		B	**3ND1 812**		014	1	3	0.130
			35		B	**3ND1 814**		014	1	3	0.130
			40		B	**3ND1 817**		014	1	3	0.130
			50		B	**3ND1 820**		014	1	3	0.130
			63		B	**3ND1 822**		014	1	3	0.130
			80		B	**3ND1 824**		014	1	3	0.130
	00	30	100	500/--	B	**3ND1 830**		014	1	3	0.192
			125		B	**3ND1 832**		014	1	3	0.192
			160		B	**3ND1 836**		014	1	3	0.192
	1	30	63	690/--	B	**3ND2 122**		014	1	3	0.290
			80		B	**3ND2 124**		014	1	3	0.290
			100		B	**3ND2 130**		014	1	3	0.440
		47.2	125		B	**3ND2 132**		014	1	3	0.440
			160		B	**3ND2 136**		014	1	3	0.440
			200		B	**3ND2 140**		014	1	3	0.440
			250		B	**3ND2 144**		014	1	3	0.440
	2	47.2	125	690/--	B	**3ND2 232**		014	1	3	0.440
			160		B	**3ND2 236**		014	1	3	0.440
			200		B	**3ND2 240**		014	1	3	0.440
			250		B	**3ND2 244**		014	1	3	0.440
		57.8	315		B	**3ND2 252**		014	1	3	0.650
			355		B	**3ND2 254**		014	1	3	0.650
			400		A	**3ND2 260**		014	1	3	0.650
	3	57.8	315	690/--	B	**3ND2 352**		014	1	3	0.650
			355		B	**3ND2 354**		014	1	3	0.650
			400		B	**3ND2 360**		014	1	3	0.650
		71.2	500		B	**3ND1 365**		014	1	3	1.030
			630		B	**3ND1 372**		014	1	3	1.000

* You can order this quantity or a multiple thereof.

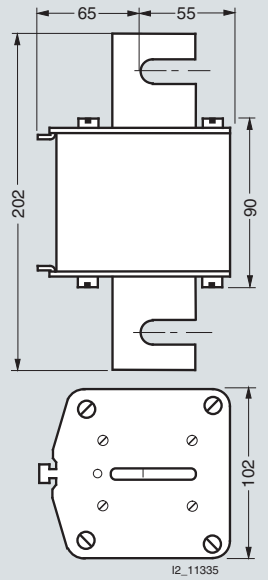
Dimensional drawings

LV HRC fuse links, operational class gG

Sizes 000 to 3 and 4a



Size 4 (IEC design)

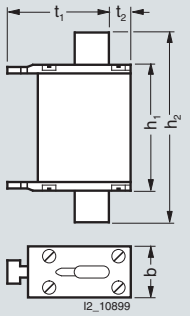


Size	I_n A	U_n V	Type	Dimensions b	h_1	h_2	t_1	t_2
000	2 ... 35	690 V AC/ 250 V DC	3NA3 8..-6	21	54	80	45	8
	2 ... 160	500 V AC	3NA3 8../-8					
	2 ... 100	500 V AC/250 V DC	3NA6 8..					
	10 ... 100	400 V AC	3NA6 8..-4					
	2 ... 35	690 V AC/250 V DC	3NA6 8..-6					
	10 ... 100	500 V AC/250 V DC	3NA7 8..					
	2 ... 35	690 V AC/250 V DC	3NA7 8..-6					
00	35 ... 160	500 V AC/250 V DC	3NA3 8..	30	54	80	45	14
	40 ... 100	690 V AC/250 V DC	3NA3 8..-6					
	80 ... 160	500 V AC/250 V DC	3NA6 8../-7					
	80 ... 160	400 V AC	3NA6 8..-4 (KK)					
	40 ... 100	690 V AC/250 V DC	3NA6 8..-6					
	80 ... 160	500 V AC/250 V DC	3NA7 8../-7					
	40 ... 100	690 V AC/250 V DC	3NA7 8..-6					
0	6 ... 160	500 V AC/440 V DC	3NA3 0..	30	67	126	45	14
1	16 ... 160	500 V AC/440 V DC	3NA3 1..	30	75	137	50	15
	50 ... 160	690 V AC/440 V DC	3NA3 1..-6					
	16 ... 160	500 V AC/440 V DC	3NA6 1..					
	35 ... 160	400 V AC	3NA6 1..-4					
	50 ... 160	690 V AC/440 V DC	3NA6 1..-6					
	16 ... 160	500 V AC/440 V DC	3NA7 1..					
	50 ... 160	690 V AC/440 V DC	3NA7 1..-6					
	200 ... 250	500 V AC/440 V DC	3NA3 1..	47	75	137	51	9
	200	690 V AC/440 V DC	3NA3 1..-6					
	200 ... 250	500 V AC/440 V DC	3NA6 1..					
	200 ... 250	400 V AC	3NA6 1..-4					
	200	690 V AC/440 V DC	3NA6 1..-6					
	200 ... 250	500 V AC/440 V DC	3NA7 1..					
	200	690 V AC/440 V DC	3NA7 1..-6					
2	35 ... 250	500 V AC/440 V DC	3NA3 2..	47	75	151	58	10
	80 ... 200	690 V AC/440 V DC	3NA3 2..-6					
	35 ... 250	500 V AC/440 V DC	3NA6 2..					
	50 ... 250	400 V AC	3NA6 2..-4					
	80 ... 200	690 V AC/440 V DC	3NA6 2..-6					
	35 ... 250	500 V AC/440 V DC	3NA7 2..					
	80 ... 200	690 V AC/440 V DC	3NA7 2..-6					
	300 ... 400	500 V AC/440 V DC	3NA3 2..	58	74	151	59	13
	224 ... 250	690 V AC/440 V DC	3NA3 2..-6					
	300 ... 400	500 V AC/440 V DC	3NA6 2..					
	300 ... 400	400 V AC	3NA6 2..-4					
	224 ... 315	690 V AC/440 V DC	3NA6 2..-6					
	300 ... 400	500 V AC/440 V DC	3NA7 2..					
	224 ... 315	690 V AC/440 V DC	3NA7 2..-6					
3	200 ... 400	500 V AC/440 V DC	3NA3 3..	58	74	151	71	13
	250, 315	690 V AC/440 V DC	3NA3 3..-6					
	425 ... 630	500 V AC/440 V DC	3NA3 3..	71	74	151	70	13
	355 ... 500	690 V AC/440 V DC	3NA3 3..-6					
4	630 ... 1250	500 V AC/440 V DC	3NA3 4..	See adjacent drawing				
4a	500 ... 1250	500 V AC/440 V DC	3NA3 6..	102	97	201	95	20

3NA, 3ND LV HRC fuse links

LV HRC fuse links, operational class aM

Size 000 to 3



Size	I_n	U_n	Type	Dimensions				
	A	V		b	h_1	h_2	t_1	t_2
000	6 ... 80	500 V AC	3ND1 8..	21	54	80	45	8
00	100 ... 160			30	54	80	45	14
1	63 ... 100	690 V AC	3ND2 1..	30	75	137	50	15
	125 ... 250			47	75	137	51	9
2	125 ... 250	690 V AC	3ND2 2..	47	75	151	58	10
	315 ... 400			58	74	151	59	13
3	315 ... 400	690 V AC	3ND2 3..	58	74	151	71	13
	500, 630		3ND1 3..	71	74	151	70	13

Overview

LV HRC signal detectors are used for remote indication that the LV HRC fuse links have been tripped. Three different solutions are available:

- 3NX1 021 signal detectors with signal detector link 3

The LV HRC signal detectors with signal detector link support monitoring of LV HRC fuse links with non-insulated grip lugs of sizes 000 to 4 at 10 A or more.
The signal detector link is connected in parallel to the LV HRC fuse link. In the event of a fault, the LV HRC fuse links are released simultaneously with the LV HRC fuse signaling link. A tripping pin switches a floating microswitch

- 3NX1 024 signal detector top

The signal detector top can be used with LV HRC fuse links, sizes 000, 00, 1 and 2, which are equipped with non-insulated grip lugs and have a front indicator or combination alarm. It is simply plugged into the grip lugs

- 5TT3 170 fuse monitors

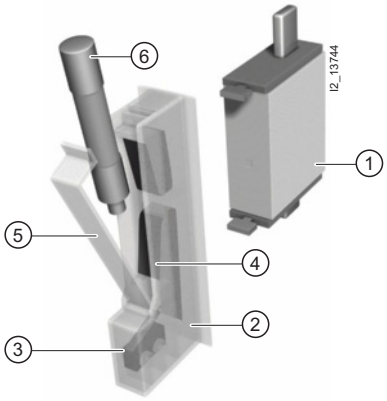
If a fuse is tripped, the front indicator springs open and switches a floating microswitch. This solution should not be used for safety-relevant plants. For this purpose, we recommend our electronic fuse monitors.

Benefits

Uniform solution for all sizes

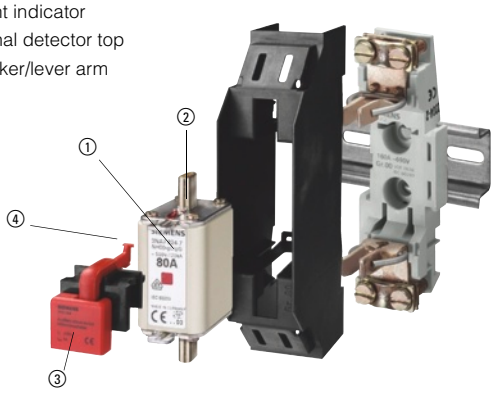
LV HRC signal detectors reliably indicate when a fuse has tripped. Tripped fuses are quickly located. This saves time and increases plant availability.

① LV HRC fuse link
② LV HRC signal detector
③ Microswitch
④ Spring contact
⑤ Hinged lid
⑥ Signal detector link



The LV HRC signal detector top is a cost-effective solution for the monitoring of Siemens LV HRC fuse links of sizes 000, 00, 1 and 2.

① LV HRC fuse link
② Front indicator
③ Signal detector top
④ Rocker/lever arm



Selection and ordering data

		Sizes	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	**LV HRC signal detectors** Only for SIEMENS 3NA3, 3NA7 and 3ND LV HRC fuse links with non-insulated grip lugs • Rated voltage up to 690 V AC/600 V DC • Contact: microswitches 250 V AC, 6 A • Connection: flat termination 2.3 mm	000 ... 4	A	**3NX1 021**		014	1	1	0.036
	**Signal detector links** • Rated voltage up to 690 V AC/ 600 V DC	000 ... 4							
	Response value > 9 V; 2.5 A; For standard applications		A	**3NX1 022**		014	1	3	0.015
	Response value > 2 V; 7 A; Only for meshed networks		C	**3NX1 023**		014	1	3	0.015
	**Signal detector tops** Only for SIEMENS 3NA3, 3NA7 and 3ND LV HRC fuse links with non-insulated grip lugs • Rated voltage up to 690 V AC/600 V DC • Contact: Microswitches 230 V AC, 5 A, 1 W • Connection: flat termination 2.3 mm	000, 00, 1, 2	►	**3NX1 024**		014	1	1	0.010

* You can order this quantity or a multiple thereof.

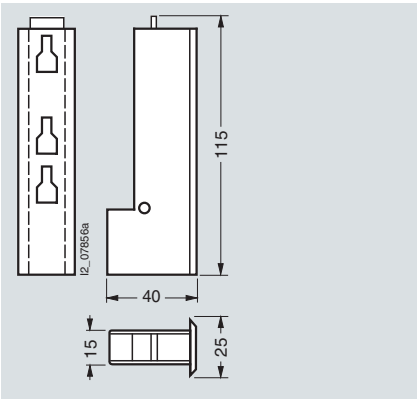
3NX1 LV HRC signal detectors

	U_e	I_n	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A	V						Unit(s)	Unit(s)	kg
	**Fuse monitors** For all low-voltage fuse systems. Can be used in asymmetric systems afflicted with harmonics and regenerative feedback motors. Signal also for disconnected loads.										
	230	4	3 380 ... 415 AC	2	►	**5TT3 170**		027	1	1	0.150

For more information on fuse monitors, please refer to the chapter "Monitoring of electrical values".

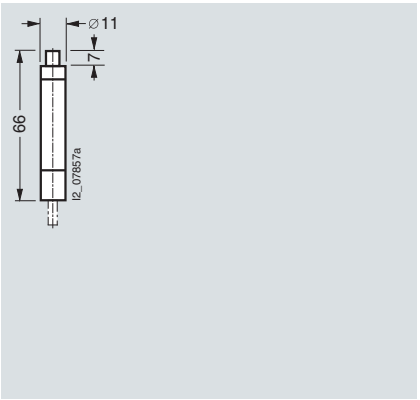
Dimensional drawings

LV HRC signal detector



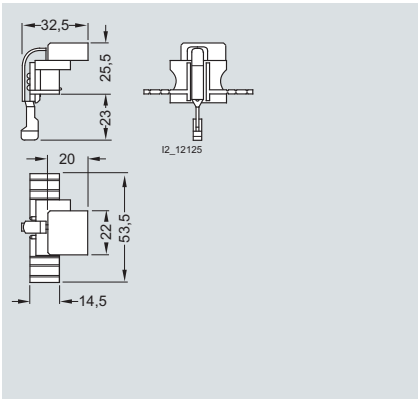
3NX1 021

Signal detector link



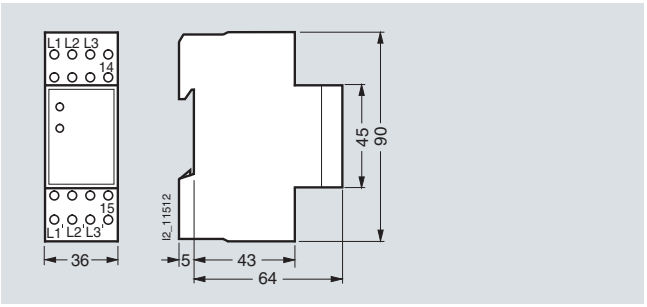
3NX1 022, 3NX1 023

Signal detector top



3NX1 024

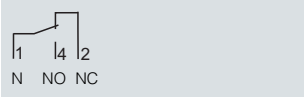
Fuse monitor



5TT3 170

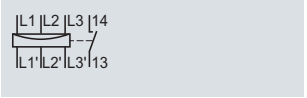
Schematics

LV HRC signal detector
Signal detector top



3NX1 021
3NX1 024

Fuse monitor



5TT3 170

* You can order this quantity or a multiple thereof.

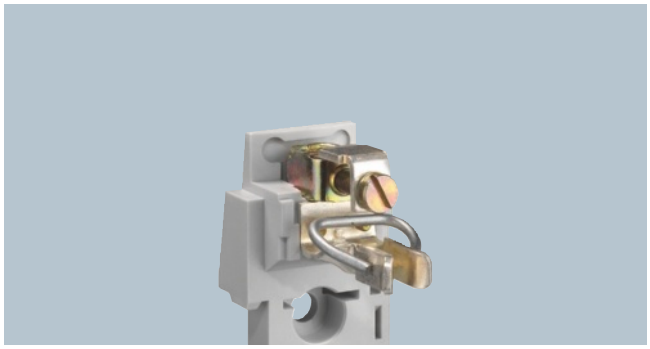
Overview

Terminals for all applications

Terminals are as different as the requirements of individual systems.

Flat terminals with screws are suitable for connecting busbars or cable lugs. They have a torsion-proof screw connection with shim, spring washer and nut. When tightening the nut, always ensure compliance with the specified torque due to the considerable leverage effect.

The double busbar terminal differs from the flat terminal in that it supports connection of two busbars, one on the top and one at the bottom of the flat terminal.



The modern box terminal ensures efficient and reliable connection to the conductors. They support connection of conductors with or without end sleeves.

In the case of flat terminals with nuts, connection of the nut to the terminal lug is torsion-proof. When tightening the nut, the torque must be observed because of the considerable leverage effect.

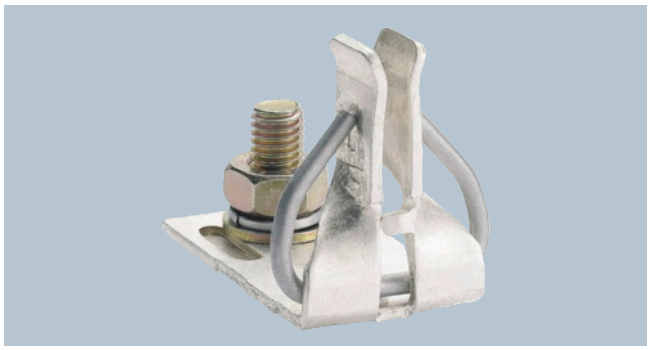
Up to three conductors can be clamped to the terminal strip.

The plug-in terminal is equipped for connecting two conductors.

One conductor can be clamped to the saddle-type terminal.

3NH LV HRC fuse bases

Benefits



- The silver-plated Lyra contact provides a large contact area for the contact blade of the LV HRC fuse link. This improves heat transmission and lowers the temperature. It also minimizes aging of the fuse link in the maximum load range, in particular when using SITOR fuses
- The large contact area also facilitates replacement of LV HRC fuse links
- The spring washer that tensions the contact is mechanically galvanized. This prevents hydrogen embrittlement. The contact is resistant to aging and there will be no dreaded annealing of contacts, which considerably improves operating safety.

Technical specifications

		LV HRC fuse bases, LV HRC bus-mounting bases					
Size		**000/00**	**0**	**1**	**2**	**3**	**4**
Standards		IEC 60269-1, -2; EN 60269-1; DIN VDE 0636-2					
Rated current I_n	A	160	160	250	400	630	1250
Rated voltage U_n	V AC	690	690 (Also suitable for 1000 V SITOR fuse links)				
	V DC	250	440				
Rated breaking capacity	kA AC	120					
	kA DC	25					
Flat terminals							
Screw		M8		M10		M12	
Nut		M8	--				
Max. tightening torque	Nm	14		38			65
Plug-in terminals							
Conductor cross-section	mm^2	2.5 ... 50		--			
Saddle-type terminals							
Conductor cross-section	mm^2	6 ... 70	--				
Box terminals							
Conductor cross-section	mm^2	2.5 ... 50					
Terminal strips							
Conductor cross-section, 3-wire	mm^2	1.5 ... 16	--				
Max. torque for attachment of LV HRC fuse base	Nm	2		2.5			--

		LV HRC fuse bases with swivel mechanism			
Size		**000/00**	**1**	**3**	**4a**
Rated voltage U_n	V AC	690			
	V DC	440			
Power loss	W	4	5	20	32
Flat terminals					
Screw		M8	M10	M12	M16
Nut		M8	--		
Max. tightening torque	Nm	14	38		65

Selection and ordering data

	Sizes	I_n A	Version	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	LV HRC fuse bases									
	Made of molded plastic, for standard rail mounting or screw fixing									
	**000/00**		1P							
		160	With flat terminals, screw	▶	**3NH3 051**		014	1	1/10	0.119
			With saddle-type terminals	▶	**3NH3 052**		014	1	1/10	0.114
		125	With box terminals, up to 50 mm^2	▶	**3NH3 053**		014	1	1/10	0.109
	Made of ceramic for screw fixing									
	000/00	160	1P							
			With flat terminals, screw	▶	**3NH3 030**		014	1	3	0.235
			With plug-in terminals	B	**3NH3 031**		014	1	3	0.230
			With saddle-type terminals	▶	**3NH3 032**		014	1	3	0.266
			With flat terminals and terminal strip	B	**3NH3 035**		014	1	3	0.230
			With flat terminals, nut	B	**3NH3 038**		014	1	3	0.207
			With flat and saddle-type terminals	B	**3NH3 050**		014	1	3	0.227
			3P (incl. two partitions)							
			With flat terminals	▶	**3NH4 030**		014	1	1	0.700
			With plug-in terminals	B	**3NH4 031**		014	1	1	0.800
			With saddle-type terminals	B	**3NH4 032**		014	1	1	0.800
			With flat terminals and terminal strip	B	**3NH4 035**		014	1	1	0.750
	Made of ceramic for screw fixing									
	0	160	1P							
			With flat terminals	A	**3NH3 120**		014	1	3	0.460
			With plug-in terminals	B	**3NH3 122**		014	1	3	0.460
	Made of ceramic for screw fixing									
	1	250	1P							
			With flat terminals	▶	**3NH3 230**		014	1	3	0.789
			With double busbar terminals	B	**3NH3 220**		014	1	3	0.789
	Ceramic supports on base plate for screw fixing									
	1	250	3P (incl. two partitions)							
			With flat terminals	A	**3NH4 230**		014	1	1	2.100
	Made of ceramic for screw fixing									
	2	400	1P							
			With flat terminals	▶	**3NH3 330**		014	1	1	0.843
			With double busbar terminals	A	**3NH3 320**		014	1	1	1.000
	Made of ceramic for screw fixing									
	3	630	1P							
			With flat terminals	▶	**3NH3 430**		014	1	1	1.100
			With double busbar terminals	A	**3NH3 420**		014	1	1	1.100

* You can order this quantity or a multiple thereof.

3NH LV HRC fuse bases

	Sizes	I_n A	Version	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	LV HRC fuse bases									
	Ceramic supports on base plate for screw fixing (IEC design)									
	4	1250	1P							
			With flat terminals	A	**3NH3 530**		014	1	1	3.000
	LV HRC bus-mounting bases made of molded plastic									
	For busbars 12 mm × 5 mm to 12 mm × 10 mm, busbar spacing 40 mm									
	**000/00**	160	1P							
			With top saddle-type terminals	B	**3NH3 036**		014	1	1	0.150
			With bottom saddle-type terminals	B	**3NH3 037**		014	1	1	0.150
	**000/00**	80	3P, in tandem design 3 outgoing feeders at top and bottom respectively, with saddle-type terminals							
			With 4 barriers	B	**3NH4 037**		014	1	1	0.800
			With 2 non-interrupted barriers	B	**3NH4 045**		014	1	1	0.800
	LV HRC fuse bases with swivel mechanism									
	With flat terminals and additional saddle-type terminals (included)									
	**000/00**	160	1P							
			With screw fixing for mounting plate	A	**3NH7 030**		014	1	1	1.000
			With claw fixing for non-perforated busbar	B	**3NH7 031**		014	1	1	1.000
			With screw fixing for perforated busbar	B	**3NH7 032**		014	1	1	1.000
	**1**	250	1P							
			With screw fixing for mounting plate	A	**3NH7 230**		014	1	1	2.500
			With claw fixing for non-perforated busbar	B	**3NH7 231**		014	1	1	2.500
			With screw fixing for perforated busbar	B	**3NH7 232**		014	1	1	2.500
	Can also be used for fuse links of size 2									
	**3**	630	1P							
			With screw fixing for mounting plate	B	**3NH7 330**		014	1	1	4.800
			With claw fixing for non-perforated busbar	B	**3NH7 331**		014	1	1	4.800
			With screw fixing for perforated busbar, can be used as disconnector	B	**3NH7 332**		014	1	1	4.800

* You can order this quantity or a multiple thereof.

	Sizes	I_n	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A						Unit(s)	Unit(s)	kg
	LV HRC fuse bases with swivel mechanism									
	**4a**	1250	1P							
			With screw fixing for mounting plate	A	**3NH7 520**		014	1	1	5.200
	**LV HRC contact covers for LV HRC fuse bases**									
	Touch protection for contact pieces									
	000/00			▶	**3NX3 105**		014	1	2/20	0.013
	0			B	**3NX3 114**		014	1	2/40	0.010
	1			▶	**3NX3 106**		014	1	2/20	0.027
	2			▶	**3NX3 107**		014	1	2/12	0.031
	3			▶	**3NX3 108**		014	1	2/10	0.038
	**LV HRC partitions for LV HRC fuse bases**									
	As intermediate phase and end barrier									
	000/00		Type							
			3NH3 0/3NH4 0	▶	**3NX2 023**		014	1	2	0.025
	0		3NH3 1	B	**3NX2 030**		014	1	2	0.050
	1		3NH3 2	▶	**3NX2 024**		014	1	2	0.053
	2		3NH3 3	▶	**3NX2 025**		014	1	2	0.066
	3		3NH3 4	▶	**3NX2 026**		014	1	2	0.101
	**LV HRC protective covers IP2X**									
	For LV HRC fuse bases									
	000/00		1P and 3P	B	**3NX3 115**		014	1	10	0.039
	**LV HRC covers**									
	000/00		For plugging into IP2X LV HRC protective covers	B	**3NX3 116**		014	1	10	0.014
	**LV HRC contact covers for LV HRC bus-mounting bases**									
	000/00		Touch protection for contact pieces							
			Outgoing terminal	▶	**3NX3 105**		014	1	2/20	0.013
			Incoming terminal	B	**3NX3 113**		014	1	2/50	0.006
	**LV HRC partitions for 3NH3 0 LV HRC bus-mounting bases**									
	000/00		As intermediate phase barrier	C	**3NX2 027**		014	1	2	0.017
	**000/00**		As end barrier	C	**3NX2 028**		014	1	2/50	0.020

* You can order this quantity or a multiple thereof.

3NH LV HRC fuse bases

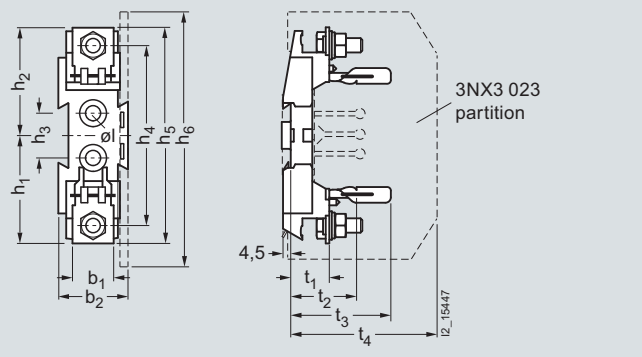
	Sizes	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	**Non-interrupted barriers**								
	000/00	For 3NH4 0 LV HRC bus-mounting bases	C	**3NX2 031**		014	1	2/30	0.050
	**Fuse-base covers**								
	For LV HRC fuse bases, red with inscription "Isolating point"								
	000/00		C	**3NX1 003**		014	1	3	0.050
	1, 2, 3		C	**3NX1 004**		014	1	3	0.100
	**Fuse pullers**								
	000 ... 4	For LV HRC fuse links							
		Without sleeve	▶	**3NX1 013**		014	1	1	0.280
		With sleeve	▶	**3NX1 014**		014	1	1	0.480
	**Isolating links For LV HRC fuse bases and fuse switch disconnectors**								
	With insulated grip lugs								
	000/00	Silver-plated	▶	**3NG1 002**		014	1	3/30	0.080
	0		C	**3NG1 102**		014	1	1/10	0.110
	1		▶	**3NG1 202**		014	1	1/10	0.170
	2		▶	**3NG1 302**		014	1	1/5	0.240
	3		▶	**3NG1 402**		014	1	1/5	0.290
	With non-insulated grip lugs								
	4	Tinned	B	**3NG1 503**		014	1	6	0.708
	4a	Nickel-plated	B	**3NG1 505**		014	1	1/5	0.730

* You can order this quantity or a multiple thereof.

Dimensional drawings

LV HRC fuse bases made of molded plastic

Size 000/00, 1P

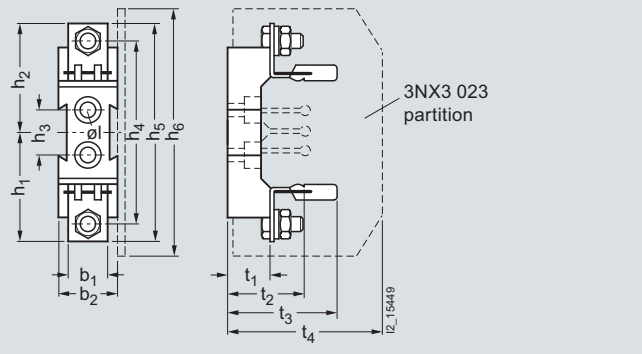


3NH3 051 to 3NH3 053

Sizes	I_n A	Poles	Connection	Type	b_1	b_2	h_1	h_2	h_3	h_4	h_5	h_6	⌀ I	t_1	t_2	t_3	t_4
000/00	160	1P	M8 flat terminal, screw	3NH3 051	23	39	61	61	25	101	121	139	7.5	26	42	61	86
			Saddle-type terminal	3NH3 052	--	39	60	60	25	108	120	139	7.5	26	42	61	86
	125		Box terminal	3NH3 053	--	39	59	50	25	99	117	139	7.5	23	39	61	86

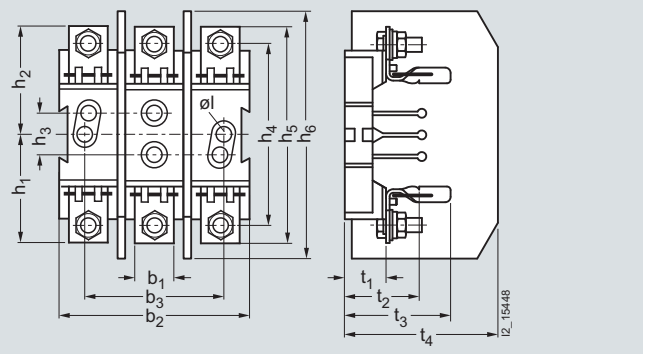
LV HRC fuse bases made of ceramic

Size 000/00
1P



3NH3 03., 3NH3 050

3P

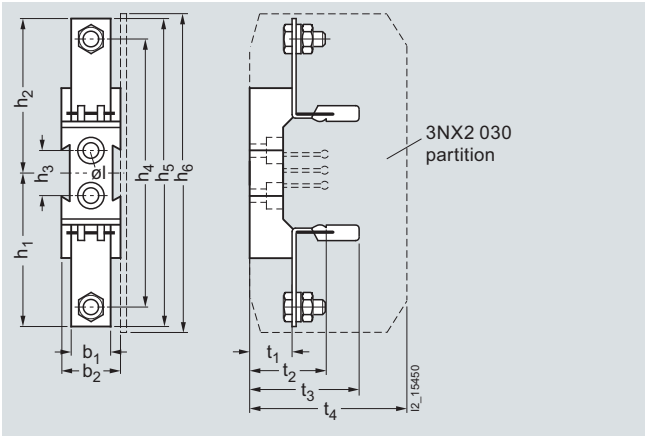


3NH4 03.

Sizes	I_n A	Poles	Connection	Type	b_1	b_2	b_3	h_1	h_2	h_3	h_4	h_5	h_6	⌀ I	t_1	t_2	t_3	t_4
000/00	160	1P	Flat terminal, screw	3NH3 030	23	34	--	61	61	25	102	122	139	7.5	24	40	60	86
			M8 plug-in terminal	3NH3 031	31	34	--	64	64	25	102	128	139	7.5	24	40	60	86
			Saddle-type terminal	3NH3 032	29	34	--	61	61	25	109	122	139	7.5	24	40	60	86
			Flat terminal, terminal strip	3NH3 035	26	34	--	61	70	25	113	130	139	7.5	24	40	60	86
			Flat terminal, nut	3NH3 038	23	34	--	61	61	25	102	122	139	7.5	24	40	60	86
			Flat and saddle-type terminals	3NH3 050	29	34	--	61	61	25	102	122	139	7.5	24	40	60	86
		3P	Flat terminal	3NH4 030	23	102	70	61	61	25	102	122	139	7.5	24	40	60	86
			M8 plug-in terminal	3NH4 031	31	102	70	64	64	25	102	128	139	7.5	24	40	60	86
			Saddle-type terminal	3NH4 032	29	102	70	61	61	25	102	122	139	7.5	24	40	60	86
			Flat terminal, terminal strip	3NH4 035	26	102	70	61	70	25	113	130	139	7.5	24	40	60	86

3NH LV HRC fuse bases

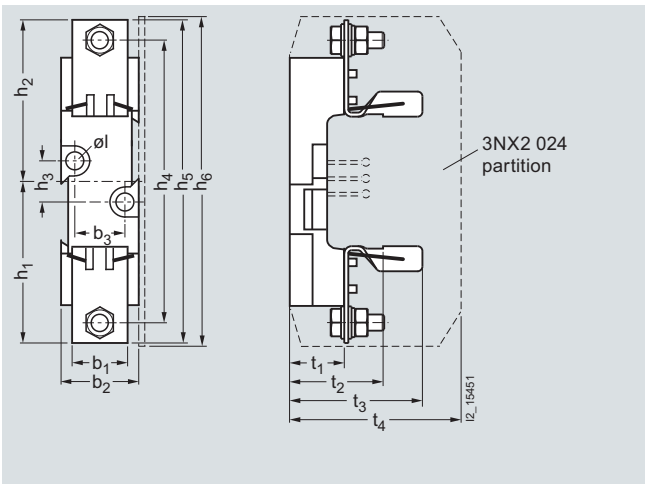
Size 0, 1P



3NH3 12.

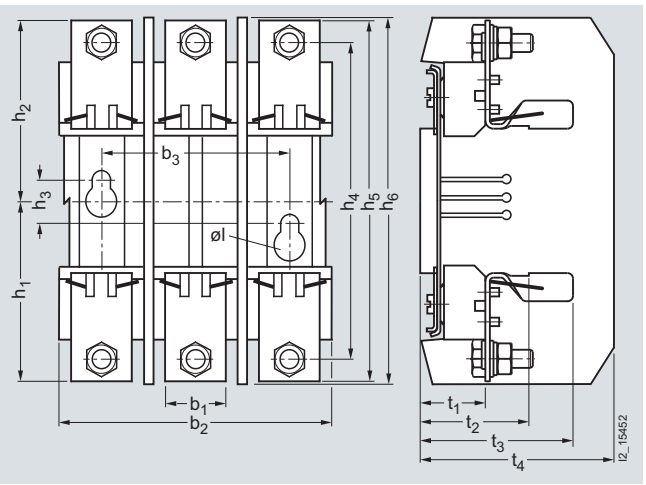
Sizes	I_n A	Poles	Connection	Type	b_1	b_2	h_1	h_2	h_3	h_4	h_5	h_6	⌀ I	t_1	t_2	t_3	t_4
0	160	1P	Flat terminal	3NH3 120	23	38	87	87	25	150	173	179	7.5	24	40	60	88
			Plug-in terminal	3NH3 122	31	38	87	87	25	150	173	179	7.5	24	40	60	88

Size 1
1P



3NH3 2.0

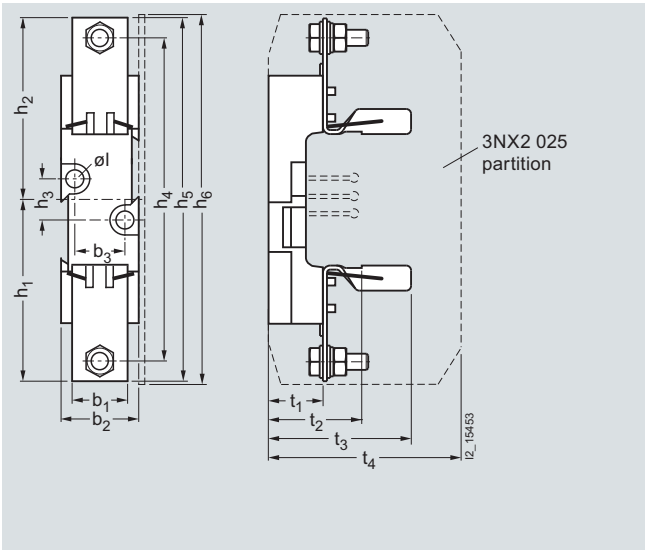
3P



3NH4 230

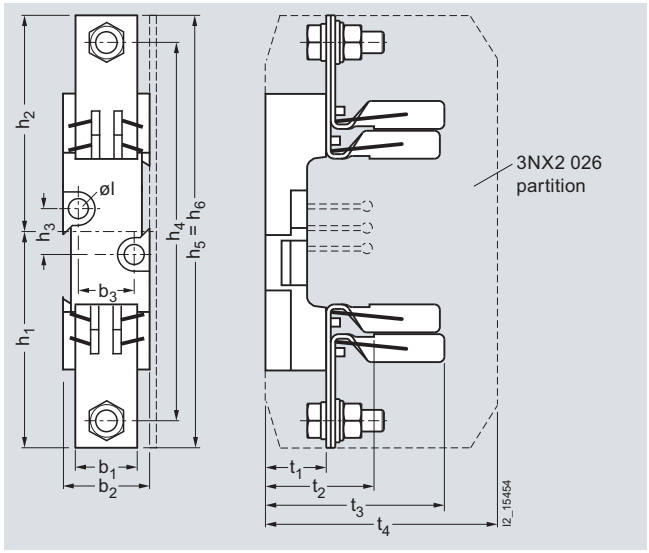
Sizes	I_n A	Poles	Connection	Type	b_1	b_2	b_3	h_1	h_2	h_3	h_4	h_5	h_6	⌀ I	t_1	t_2	t_3	t_4
1	250	1P	M10 flat terminal	3NH3 230	35	49	--	101	101	25	177	202	203	10.5	35	55	84	107
			Double busbar terminal	3NH3 220	35	49	--	101	101	25	177	202	203	10.5	35	55	84	107
		3P	M10 flat terminal	3NH4 230	35	146	111	101	101	25	177	202	203	10.5	35	55	84	107

Size 2
1P



3NH3 3.0

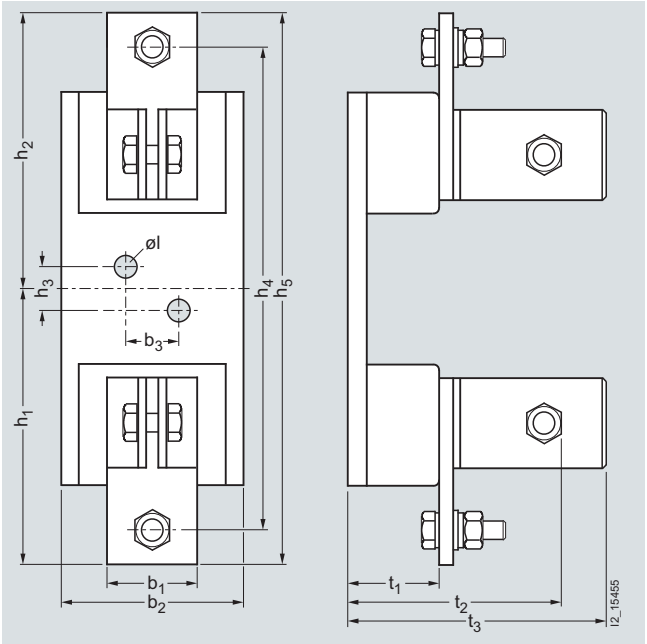
Size 3
1P



3NH3 4.0

Sizes	I_n A	Poles	Connection	Type	b_1	b_2	h_1	h_2	h_3	h_4	h_5	h_6	⌀ I	t_1	t_2	t_3	t_4
2	400	1P	M10 flat terminal	3NH3 330	35	49	113	113	25	202	227	228	10.5	35	55	90	115
			Double busbar terminal	3NH3 320	35	49	113	113	25	202	227	228	10.5	35	55	90	115
3	630	1P	M12 flat terminal	3NH3 430	35	49	121	121	25	212	242	242	10.5	35	57	101	130
			Double busbar terminal	3NH3 420	35	49	121	121	25	212	242	242	10.5	35	57	101	130

Size 4, 1P



3NH3 530

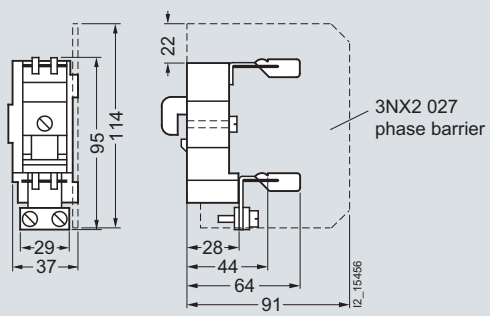
Sizes	I_n A	Poles	Connection	Type	b_1	b_2	b_3	h_1	h_2	h_3	h_4	h_5	⌀ I	t_1	t_2	t_3
4[1]	1250	1P	M12 flat terminal	3NH3 530	50	102	30	156	156	25	270	312	13	51	116	144
4a	Can only be used in bases with swivel mechanism															

[1] Size 4 LV HRC fuse links are also screwed onto the base.

3NH LV HRC fuse bases

LV HRC bus-mounting bases[1)]

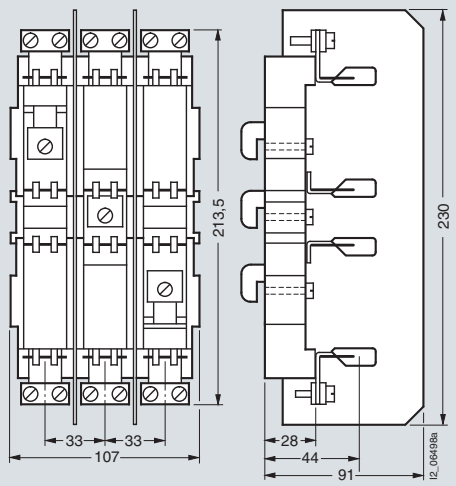
Size 000/00, 160 A
1P



3NH3 036, 3NH3 037

LV HRC fuse bases with tandem design

Size 000/00, 80 A
3P

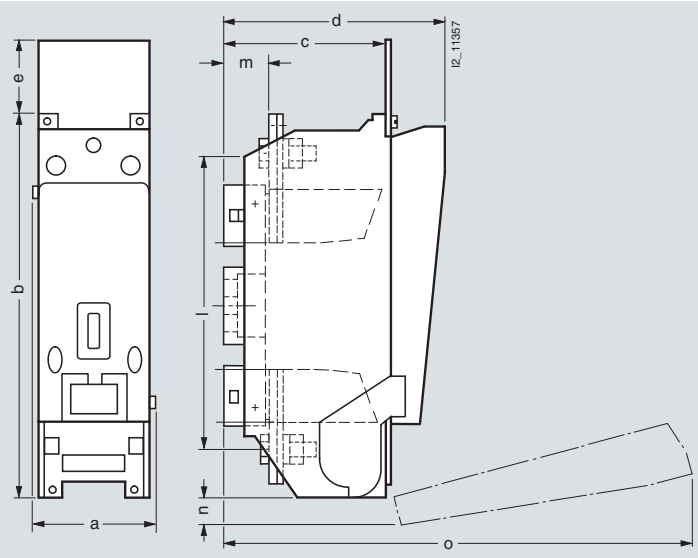


Busbar center-to-center clearance 40 mm
3NH4 037, 3NH4 045

[1)] LV HRC bus-mounting bases are only connected on one side using terminals, the second connection is made through the bottom of the base.

LV HRC fuse bases with swivel mechanism

Sizes 000/00, 1, 3 and 4a

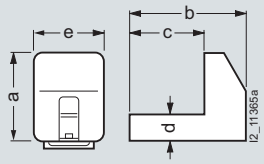


3NH7 03., 3NH7 23., 3NH7 33., 3NH7 520

Sizes	I_n A	Type	a	b	c	d	e	l	m	n	o
000/00	160	3NH7 030, 3NH7 031, 3NH7 032	44	149	45	88.5	22.5	120	17	18	200
1	250	3NH7 230, 3NH7 231, 3NH7 232	68	230	68	123.5	23	177	25	40	300
3	630	3NH7 330, 3NH7 331, 3NH7 332	90	270	96	153.5	15.5	220.5	30.5	35	350
4a	1250	3NH7 520	116	350	154.5	217.5	69	270	40	26	440

LV HRC contact covers for LV HRC fuse bases and LV HRC bus-mounting bases[1)]

Size 000/00 to 3

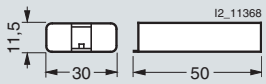


3NX3 105 to 3NX3 108, 3NX3 114

Sizes	Type	a	b	c	d	e
000/00	3NX3 105[1)]	38	47.5	34	11.5	30
0	3NX3 114	51.5	47.5	34	11.5	30
1	3NX3 106	61.5	57	42.5	35	46
2	3NX3 107	74	65	51	35	46
3	3NX3 108	81.5	77.5	57.5	35	46

[1)] The 3NX3 105 LV HRC contact covers can be used for both LV HRC fuse bases and LV HRC bus-mounting bases.

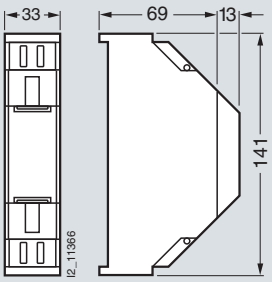
LV HRC contact covers for LV HRC bus-mounting bases



3NX3 113 for the incoming terminal, dimensional drawing 3NX3 105, for the outgoing terminal, see dimensional drawing above

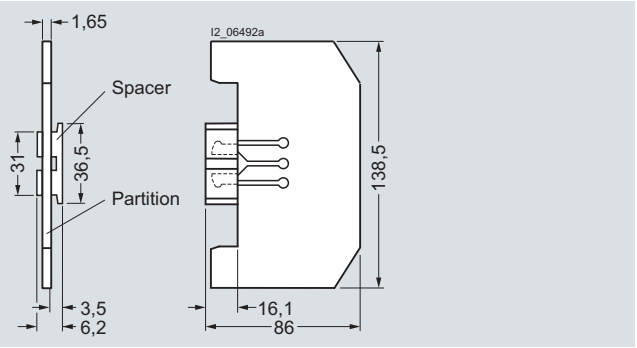
3NX3 115 LV HRC protective covers, with 3NX3 116 LV HRC covers

Size 000/00, degree of protection IP2X



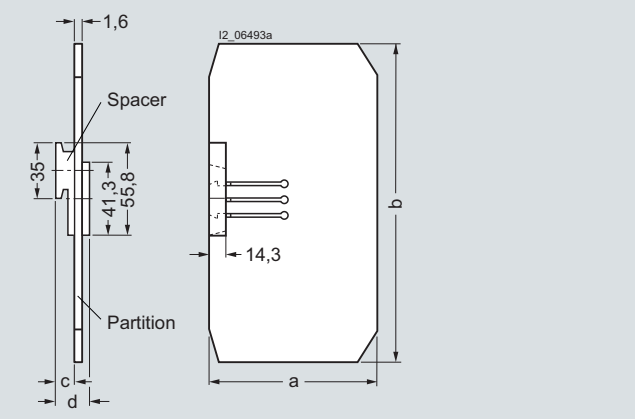
LV HRC partitions for LV HRC fuse bases

Size 000/00



3NX3 023

Sizes 0 to 3

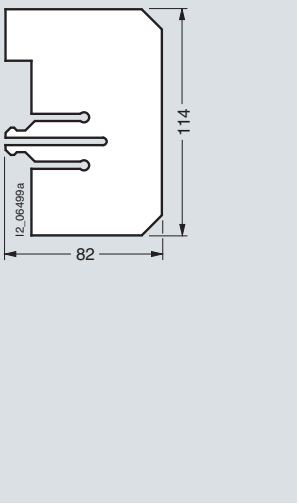


3NX2 030, 3NX2 024 to 3NX2 026

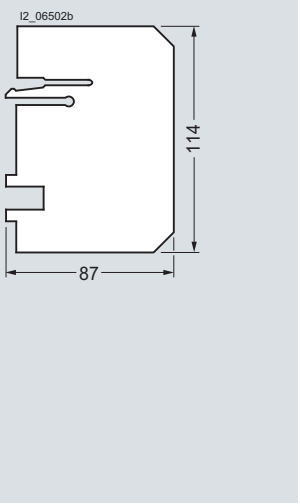
Sizes	Type	a	b	c	d
0	3NX2 030	87.6	178.5	7.7	12.3
1	3NX2 024	107.3	202.5	7.7	12.3
2	3NX2 025	115.3	227.5	14.2	25.1
3	3NX2 026	129.8	242	20.2	37.2

LV HRC partitions for LV HRC bus-mounting bases

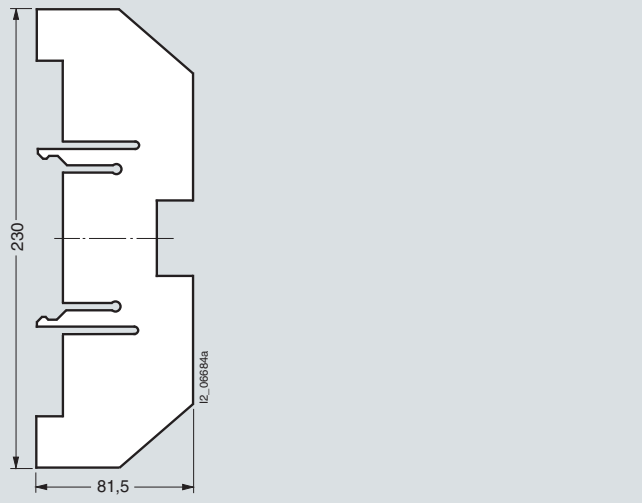
Size 000/00



Phase barrier
3NX2 027



End barrier
3NX2 028

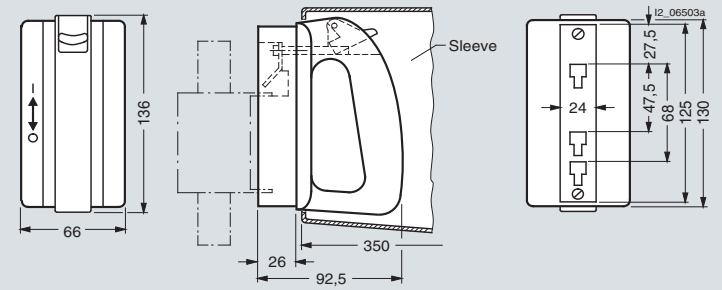


For LV HRC bus-mounting bases in tandem design
3NX2 031

3NH LV HRC fuse bases

Fuse pullers

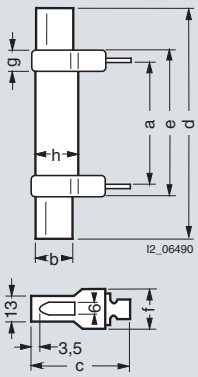
Sizes 000 to 4



3NX1 013 (without sleeve), 3NX1 014 (with sleeve)

Isolating links with insulated grip lugs

Size 000/00 to 3

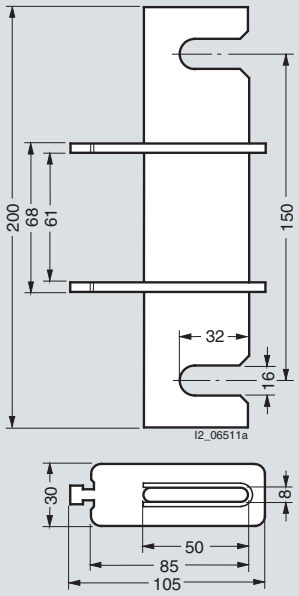


3NG1 .02

Sizes	Type	a	b	c	d	e	f	g	h
000/00	3NG1 002	44	15	48	78	54	20.5	8	19
0	3NG1 102	60.5	15	48	125	68	20.5	8	19
1	3NG1 202	61	20	53	135	72	23	9	24
2	3NG1 302	61	26	61	150	72	23	9	29
3	3NG1 402	61	32	73	150	72	23	9	36

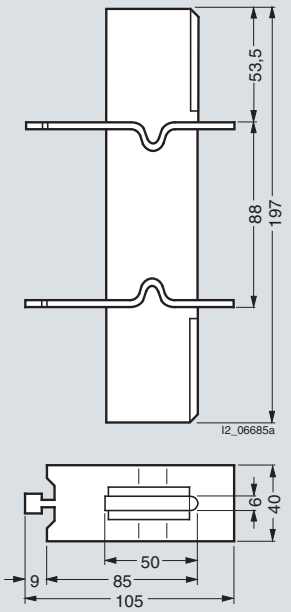
Isolating links with non-insulated grip lugs

Size 4



3NG1 503

Size 4a

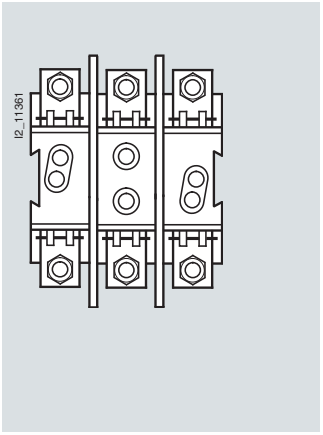


3NG1 505

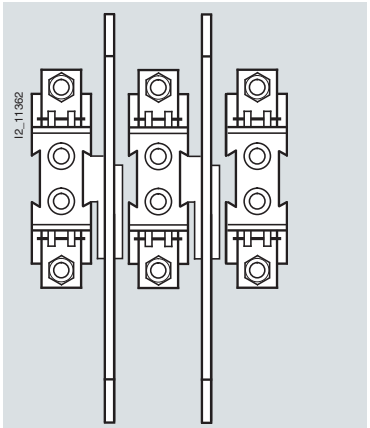
More information

Space requirements when installing LV HRC fuse bases

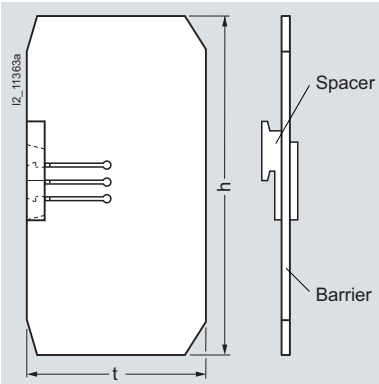
1 LV HRC fuse base, 3P



3 LV HRC fuse bases, 1P



LV HRC partition



Size	Mounting width (mm) of LV HRC fuse bases					Mounting height (mm)	Mounting depth (mm)
	1 unit, 3P		3 units, 1P		Distance through spacer	3NX2 0.. barriers with matching bases[1]	
	Bases with phase barrier, without end barrier	Bases with phase barrier and 2 end barriers	Bases with phase barrier, without end barrier	Bases with phase barrier and 2 end barriers		h	d
000/00	102	106	100	104[2]	2	138	86
	LV HRC bus-mounting bases see page 3/58				–	114	90
0	--	--	128	142	7	178	90
1	163	177	158	172	7	202	110
2	--	--	184	224	20[3]	227	118
3	--	--	208	272	32[3]	242	132
4	Installation without barriers; for mounting see page 3/58					n/a	
4a	Can only be used in bases with swivel mechanism					n/a	

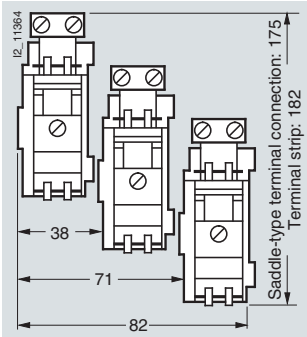
1) This measurement specifies the required overall mounting depth with base d and the overall mounting height h.

2) Placing an additional base on the barrier and plug-on part does not increase the distance, rather the bases lie flat directly on top of one another.

3) If the bases are installed directly on a side wall in the distribution board, one spacer part can be broken off. This would reduce the distance measurement.

Space requirements when installing LV HRC bus-mounting bases

Space requirements for 3-piece, 1-pole 3NH3 036 and 3NH3 037 LV HRC bus-mounting bases, staggered

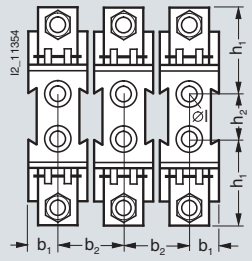


3NH LV HRC fuse bases

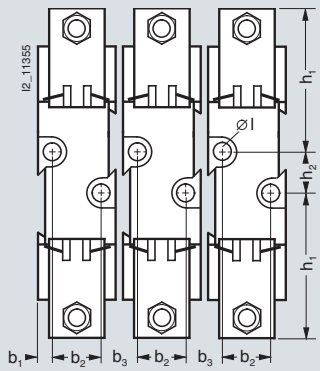
Drill hole dimensions for base plate mounting

LV HRC fuse bases, 3 units, 1P

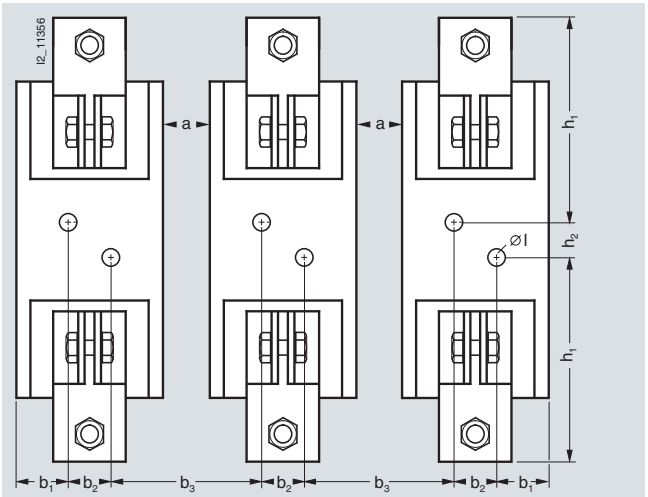
Sizes 000/00 and 0



Sizes 1, 2 and 3



Size 4



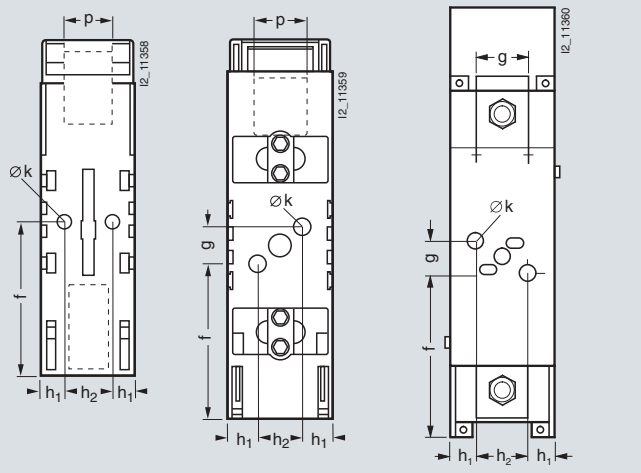
Sizes	Type	b_1	b_2	b_3	h_1	h_2	I
000/00	3NH3 030, 3NH3 031, 3NH3 032, 3NH3 035, 3NH3 038, 3NH3 050	17	34	--	48	25.5	7.5
0	3NH3 120, 3NH3 122	19	45	--	74	25	7.5
1	3NH3 220, 3NH3 230	9	30	25.5	88	25	10.5
2	3NH3 320, 3NH3 330	9	30	38.5	100	25	10.5
3	3NH3 420, 3NH3 430	9	30	50.5	108	25	10.5
4	3NH3 530	36	30	95	141	25	13

Note:

These LV HRC fuse bases are mounted without phase barriers.
A minimum clearance of a = 25 mm is required.

LV HRC fuse bases with swivel mechanism

Size 000/00 Sizes 1 and 3 Size 4a



Sizes	I_n A	Type	f	g	h_1	h_2	⌀ k	p
000/00	160	3NH7 030, 3NH7 031, 3NH7 032	79	--	9.5	25	7	20
1	250	3NH7 230, 3NH7 231, 3NH7 232	102.5	25	19	30	10.5	25
3	630	3NH7 330, 3NH7 331, 3NH7 332	122.5	25	30	30	10.5	40
4a	1250	3NH7 520	170	30	31.5	45	13	50

Overview

SENTRON 3NP4 and 3NP5 fuse switch disconnectors are switching devices for the occasional manual switching/isolating of loads and distribution boards. They are able to switch on, lead and switch off the specified rated current (including a specific overload).

With the SENTRON 3NP4 and 3NP5 fuse switch disconnectors, all poles of downstream electric loads can be safely disconnected from the system under load.

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are ideal for surface mounting and installation on and in distribution boards (e.g. ALPHA, SIKUS), meter cabinets (e.g. ALPHA 400-ZS) and molded-plastic distribution systems, such as 8HP.

The ability to mount them on a range of different busbar systems allows their very diverse implementation in control cabinet and control engineering.

The sizes SENTRON 3NP4 LV HRC 000[1)] and LV HRC 00 can be snapped onto 35 mm standard mounting rails and are ideal for combining with other switching devices e.g. in capacitor modules for p.f. compensation.

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are used in conjunction with SITOR semiconductor fuses for the effective protection of frequency converters and soft starters (see chapter "SITOR semiconductor fuses").

Benefits

- The SENTRON 3NP4 and 3NP5 fuse switch disconnectors comprise a base and a removable fuse carrier with view and measuring window. The fuse links can be replaced without tools. This considerably facilitates installation
- The three conducting paths in the base and the fuse links in the fuse carrier are separated by partitions that overlap when opening and closing the device. This type of failsafe protection is called "complete compartmentalization" and effectively prevents phase arcing.
- SENTRON 3NP5 fuse switch disconnectors are also equipped with locating springs, which are fitted to the side of the base. These enable the "high speed closing" of devices, regardless of the actuation speed of the operator.
- The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are used with LV HRC fuse links of sizes LV HRC 000 to LV HRC 3 according to IEC 60269-2 and DIN VDE 43620. SITOR semiconductor fuses can continue to be used for a wide range of applications.
- With its LV HRC fuse links, size 000 with a rated current of 125 and 160 A, Siemens offers an extremely compact solution.

[1)] Corresponds to the fuse size LV HRC 000 according to IEC 60269-2.

Technical specifications

		3NP40 1	3NP40 7	3NP42 7	3NP43 7	3NP44 7
Standards **Approved acc. to**		IEC 60947-1; IEC 60947-3; VDE 0660-107 UL508				
Rated uninterrupted current I_u For fuse links acc. to DIN 43620	A Size	160[1)] 00C/000	160 00	250 1 and 0	400 2 and 1	630 3 and 2
Conventional thermal current I_{th}	A	160[1)]	160	250	400	630
Rated operational voltage U_e 50 Hz/60 Hz	V AC V DC	690 220 (3 conducting paths series-connected)		690 440 (2 conducting paths series-connected)		
Rated insulation voltage U_i	V	690		800 For safety monitoring max. 690 V.		
Rated impulse withstand voltage U_{imp}	kV	6				
Rated conditional short-circuit current with fuses (by fast switch on)						
With fuse links Rated current At 400 V AC (690 V)	Size/A kA (r.m.s. value)	000/100 (35) 50 (50)	00/160 50	1/250 50	2/400 50	3/630 50
Maximum permissible let-through I^2t value	kA^2s	56 (7.8)	158	551	1515	4340
Permissible let-through current of the fuse	kA (peak value)	11 (5)	15	25	35	55
Short-circuit strength with fuses (with closed disconnector)						
With fuse links Rated current At 690 V	Size/A kA (r.m.s. value)	000/100 100	00/160 50	1/250 50	2/400 50	3/630 50
Permissible let-through current of the fuse	kA (peak value)	15	15	25	35	55
Rated making and breaking capacity (infeed from top or bottom)						
At 400 V AC, with fuse links or isolating links Rated breaking current I_c (p.f. = 0.35)	Size A (r.m.s. value)	000 800 (p.f. = 0.45)	00 800	1 2000	2 3200	3 5040
Rated operational current I_e at AC-21B, AC-22B AC-23B	 A A	 160 100	 160 100	 250 250	 400 400	 630 630
At 500 V AC, with fuse links or isolating links Rated breaking current I_c (p.f. = 0.35)	Size A (r.m.s. value)	000 320 (p.f. = 0.45)	00 320	1 750	2 1200	3 1890
Rated operational current I_e at AC-21B AC-22B AC-23B	 A A A	 160 100 40	 160 100 40	 250 250 --	 400 400 --	 630 630 --
At 690 V AC, with fuse links or isolating links Rated breaking current I_c (p.f. = 0.35)	Size A (r.m.s. value)	000 200/240 (at p.f. = 0.45/0.95)	00 200/240 (at p.f. = 0.45/0.95)	1 375	2 600	3 945
Rated operational current I_e at AC-21B AC-22B AC-23B	 A A A	 160 50 25	 160 50 25	 250 -- --	 400 -- --	 630 -- --
At 220/240 V DC, with fuse links[2)] or isolating links Rated operational current I_e at 220 V DC-23B/DC-21B 440 V DC-21B	Size A A	000 80/160 --	00 80/160 --	1 -- 250	2 -- 400	3 -- 630

1) 125/160 A only with 3NY1 236 feeder terminals and 21 mm wide 3NY1 822 (125 A) and 3NY1 824 (160 A) fuse links;
see page 3/76.

2) When switching without load (AC-20 B, DC-20 B), direct voltages up to 690 V DC can be applied.
For degree of pollution 2, the disconnectors can be used up to 1000 V AC-20 B, DC-20 B (switching without load).
Conducting paths in series: 3 for 3NP40; 2 for 3NP42, 3NP43 and 3NP44.

		3NP40 1	3NP40 7	3NP42 7	3NP43 7	3NP44 7
Capacitor switching capacity						
At 400 V AC						
Capacitor rating	kvar	50	50	--	--	--
Rated current I_n	A	72	72	--	--	--
At 525 V AC						
Capacitor rating	kvar	50	50	--	--	--
Rated current I_n	A	55	55	--	--	--
Permissible ambient temperature	°C	-25 ... +55[1] for operation -50 ... +80 for storage				
Mechanical service life	Operating cycles	2000	2000	1600	1000	1000
Degree of protection (operator side)						
Without molded-plastic cover/cable lug cover		IP00 (3NP40 with box terminal and properly connected conductors: IP20)				
With molded-plastic cover/cable lug cover		IP30 (switch closed), IP20 (switch open)				
Power loss of switch at I_{th} (plus power dissipation of fuse links)						
Without busbar adapter	W	4.5 (at 100 A)	10	15	30	47
with busbar adapter	W	8.5 (at 100 A)	20	47	83	127
Main conductor connections						
Flat terminal for cable lug acc. to DIN 46234, Max. conductor cross-section (stranded)	mm^2	--	Up to 2 × 70 (M8)	Up to 150 (M10)	Up to 240 (M10)	Up to 2 × 240 (M12)
Box terminal/terminal (finely stranded, with end sleeve)	mm^2	1.5 ... 50 (35)	2.5 ... 70 (50)	70 ... 150	120 ... 240	150 ... 300
Busbars (width × thickness)	mm × mm	--	22 × 5	22 ... 30 × 5 ... 10	22 ... 30 × 5 ... 10	25 ... 40 × 5 ... 10
Laminated Cu strips, non-perforated in terminals (width × thickness)	mm × mm	8 × 8	Up to 9 × 8	Up to 16 × 8	Up to 20 × 10	Up to 24 × 10
Tightening torques for terminal screws						
For flat terminals	Nm	--	10 ... 12	30 ... 35	30 ... 35	35 ... 40
With SIGUT box terminal/terminal	Nm	3 ... 3.5	8 ... 10	6	8	8
Auxiliary switch 1 CO (accessories)						
3NY3 035 50 Hz/60 Hz to 230 V AC rated operational current I_e at AC-14	A	0.25 (I_{th} = 5 A), at 24 V DC: I_e = 0.45 A; flat termination according to DIN 46244: A 2.8 × 0.5				
3NY3 030 50 Hz/60 Hz to 230 V AC Rated operational current I_e at AC-13	A	0.1 (I_{th} = 0.1 A); quick-connect terminal according to DIN 46245: A 2.8 ... 1				
Permissible mounting positions		Vertical or horizontal installation (no reduction of specified switching capacity)				

[1] Only with isolating links; otherwise, please observe specifications of fuse manufacturer.

		3NP50	3NP52	3NP53	3NP54
Standards **Approved acc. to**		IEC 60947-1, IEC 60947-3, VDE 0660-107 UL508			
Rated uninterrupted current I_u For fuse links acc. to DIN 43620 (if using semiconductor protection fuse links, the rated current must be reduced – see catalog "Configuring SITOR", Order No. E20001-A700-P302)	A Size	160 00	250 1 and 0	400 2 and 1	630 3 and 2
Conventional free air thermal current I_{th}	A	160	250	400	630
Rated operational voltage U_e 50 Hz/60 Hz	V AC V DC	690 440 (3 conducting paths in series), 220 (2 conducting paths in series and for fuse monitoring through 3RV)			
Rated insulation voltage U_i	V	690[1]			
Rated impulse withstand voltage U_{imp}	kV	6			
Rated conditional short-circuit current with fuses (by fast switch on)					
With fuse links					
Rated current	Size/A	00/160	1/250	2/400	3/630
At 500 V AC	kA (r.m.s. value)	50	50	50	50
Permissible let-through current of the fuses	kA (peak value)	15	25	40	50

[1] Implementation up to U_i = 1000 V is also possible if maintaining degree of pollution 2 (instead of 3).

3NP LV HRC fuse switch disconnectors

		3NP50	3NP52		3NP53		3NP54	
Short-circuit strength with fuses (with closed disconnector) With fuse links								
Rated current	Size/A	00/160	1/250		2/400		3/630	
At 500 V AC	kA (r.m.s. value)	100	100		50		50	
Maximum permissible let-through I^2t value	kA^2s	223	780		2150		5400	
Permissible let-through current of the fuses	kA (peak value)	23	32		40		60	
Rated short-circuit making capacity With isolating links[1]	Size	00	1		2		3	
At 500 V AC	kA (peak value)	6	17		17		17	
Rated making and breaking capacity[1] (infeed from top or bottom)[2]								
	Size	00	1	0	2	1	3	2
At 400 V AC, with fuse links								
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	1600	2500	1600	4000	2500	5040	4000
Rated operational current I_e for AC-21B, AC-22B, AC-23B	A	160	250	160	400	250	630	400
At 500 V AC, with fuse links								
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	1300	2500	1600	4000	2500	5040	4000
Rated operational current I_e for AC-21B, AC-22B, AC-23B	A	160	250	160	400	250	630	400
At 690 V AC, with fuse links								
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	800	1280	1000	2520	1600	3200	2520
Rated operational current I_e at								
AC-21B, AC-22B	A	160	250	160	400	250	630	400
AC-23B	A	100	160	125	315	200	400	315
At 220 (440) V DC, with 2 (3) conducting paths in series and fuse links								
Breaking current I_c (L/R = 15 ms)	A	640	1000	640	1600	1600	2520	1600
Rated operational current I_e for DC-23B	A	160	250	160	250	250	630	400
Switching capacity with isolating links[3] (infeed from top or bottom)								
At 400 V AC, with isolating links	Size	00	1		2		3	
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	1600	2500		2500		4000	
Rated operational current I_e at								
AC-21B, AC-22B	A	160	250		400		630	
AC-23B	A	160	250		315		500	
At 500 V AC, with isolating links								
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	1300	2500		2500		4000	
Rated operational current I_e at								
AC-21B, AC-22B	A	160	250		400		630	
AC-23B	A	160	250		315		500	
At 690 V AC, with isolating links								
Breaking current I_c (p.f. = 0.35)	A (r.m.s. value)	800	1280		1600		2520	
Rated operational current I_e at								
AC-21B, AC-22B	A	160	250		400		630	
AC-23B	A	100	160		200		315	
At 220 V DC, with isolating links								
Breaking current I_c (L/R = 15 ms)	A	640	1000		1600		1600	
Rated operational current I_e for DC-23B	A	160	200		400		400	
Switching capacity for horizontal installation Up to 690 V AC-22B		No reduction of the specified switching capacity (values for AC-23B to 690 V on request)						

1) Rated making and breaking current according to IEC 60947-3
rated making current
I = 10 × I_e (AC-23); 3 × I_e (AC-22); 1.5 × I_e (AC-21)
rated breaking current
I = 8 × I_e (AC-23); 3 × I_e (AC-22); 1.5 × I_e (AC-21).

2) When electronic fuse monitors are used, infeed must be from the top.

3) Insert silver-plated isolating links.

		3NP50	3NP52	3NP53	3NP54
Capacitor switching capacity					
At 400 V AC					
Capacitor rating	kvar	80	90	150	250
Rated current I_n	A	116	130	216	361
At 525 V AC					
Capacitor rating	kvar	100	125	200	300
Rated current I_n	A	110	137	220	330
Permissible ambient temperature	°C	-25 ... +55 for operation[1)] -50 ... +80 for storage			
Mechanical service life	Operating cycles	1600			
Degree of protection					
Without molded-plastic cover		IP00[2)]			
With molded-plastic cover and closed fuse carrier on the operator side		IP30			
With open fuse carrier		IP10			
Power loss of switches at I_{th} (plus power loss of the fuse links) without busbar adapter	W	7.8 (16.3[3)])	7.5	15	39
Main conductor connections					
Cable lug, max. conductor cross-section (stranded)	mm^2	2.5 ... 120	6 ... 150	6 ... 240	6 ... 2 × 240
Busbars	mm	16 ... 22	22 ... 30	22 ... 30	22 ... 30
Clamp terminal	mm^2	2.5 ... 50	35 ... 120	--	--
Tightening torques					
With cable lugs	Nm	18 ... 22	25 ... 30	25 ... 30	25 ... 30
With busbars	Nm	18 ... 22	25 ... 30	25 ... 30	25 ... 30
With clamp terminal	Nm	9 ... 11	5 ... 6	--	--
Terminal screws					
With cable lugs		M8	M10	M10	M10
With busbars		M8	M10	M10	M10
With clamp terminal		M8	2 × M6	--	--
PE/ground terminal					
Cable lug acc. to DIN 46234	mm^2	--	2.5 ... 70	6 ... 2 × 70	6 ... 2 × 120
Busbars	mm	--	25	25	30
Terminal screws		--	M8	M10	M10
Auxiliary switch 1 NO + 1 NC (accessories) (the same voltage potential must be applied to both NO and NC contact)					
At 50 Hz/60 Hz to 400 V AC, Rated operational current I_e at AC-12/AC-15	A	16/6			
Flat plug-in terminal (DIN 46244)	mm × mm	6.3 × 0.8			
Permissible mounting positions		Vertical or horizontal installation (switching capacity is sometimes reduced with horizontal installation)			
Fuse monitors with 3RV motor starter protectors		See motor starter protectors in Catalog LV 1.			
Electronic fuse monitoring					
Rated voltage AC 50 Hz/60 Hz	V	400 -15 % ... 500 +10 %, self-powered (infeed from above)			
Max. starting current	A	20			
Continuous current	A	5			
Breaking current	A	5			
Switching capacity	VA	1000			
Short-circuit strength (1 ms)	A	100			
Response time	s	< 1			
Temperature range (operation)	°C	-10 ... +75			
Plug-in connectors/connections		6P			
Minimum potential difference required between top and bottom connections of the switch (e.g. for use in meshed networks)	V	>10			
Signal contact for electronic fuse monitoring		2 NO + 1 NC			
Rated operational current I_e					
At 250 V, DC-13	A	0.27			
At 240 V, AC-15	A	1.5			
Rated free air thermal current I_{th}	A	5			

1) When using isolating links. If using fuse links, please observe specifications of fuse manufacturer.

2) For 3NP52 with clamp terminal, degree of protection IP10.

3) With busbar adapter.

Selection and ordering data

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links[2]		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
	I_u	Connection	For conductor cross-section			DT	Order No.	Price per PU				
	A		mm²	Size	Size					Unit(s)	Unit(s)	kg
	Up to 160 A, also clip-on for standard mounting rail											
	160[3]	Box terminals	1.5 ... 50	000[4]	00	▶	**3NP40 10-0CH01**		103	1	1	0.512
	160	Flat terminals	Up to 2 × 70 (M8)	00 a. 000	00	▶	**3NP40 70-0CA01**		103	1	1	0.749
		Box terminals	2.5 ... 70 or 2 × 2.5 ... 16			▶	**3NP40 70-0CH01**		103	1	1	0.800
	250	Flat terminals	Up to 150 (M10)	1 and 0	1 and 0	▶	**3NP42 70-0CA01**		103	1	1	2.436
	400		Up to 240 (M10)	2 and 1	2 and 1	▶	**3NP43 70-0CA01**		103	1	1	3.614
	630		Up to 2 × 240 (M12)	3 and 2	3 and 2	▶	**3NP44 70-0CA01**		103	1	1	4.984
	For 40 mm busbar system **For busbars of width 12 mm or 15 mm and thickness 5 mm or 10 mm[5]** **With adapter, deep, e.g. for installation in ALPHA meter cabinets (ALPHA 400-ZS) and ALPHA distribution boards**											
	160[3]	Box terminals	1.5 ... 50									
			Connection, top	000[4]	00	A	**3NP40 15-0CK01**		103	1	1	0.952
			Connection, bottom			A	**3NP40 15-0CJ01**		103	1	1	0.970
	160	Flat terminals	Up to 2 × 70 (M8)									
			Connection, top	00 a. 000	00	A	**3NP40 75-0CE01**		103	1	1	1.210
			Connection, bottom			A	**3NP40 75-0CF01**		103	1	1	1.244
		Box terminals	2.5 ... 70 or 2 × 2.5 ... 16									
			Connection, top	00 a. 000	00	A	**3NP40 75-0CK01**		103	1	1	1.290
			Connection, bottom			A	**3NP40 75-0CJ01**		103	1	1	1.274

3NP40 15-0CK01

All fuse switch disconnectors with flat terminals must be used with the appropriate cable lug covers (3NY7 101 to 3NY7 141) for finger-safe cover according to BGV A2, see page 3/76.

1) See LV HRC Fuse Links.

2) Insert silver-plated isolating links.

3) 125/160 A only possible with 21-mm wide 3NY1 822 (125 A) and 3NY1 824 (160 A) LV HRC fuse links, see page 3/77.

4) Corresponds to LV HRC fuse link size 00 with maximum width 21 mm (according to IEC 60269-2-1 and DIN 43620).

5) Can only be mounted on 5 mm thick busbars, a busbar thickness compensator is required for 3NP42 and 3NP43; see page 3/77.
3NP44 can only be mounted on busbars with a thickness of 10 mm!

*** You can order this quantity or a multiple thereof.**

Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links[2]		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
I_u	Connection	For conductor cross-section			DT	Order No.	Price per PU				
A		mm²	Size	Size					Unit(s)	Unit(s)	kg
For 40 mm busbar system											
For busbars of width 12 mm or 15 mm and thickness 5 mm or 10 mm[3]											
With flat adapter according to DIN 43620 -6, for ALPHA distribution boards (STAB/SIKUS)											
160[4]	Box terminals	1.5 ... 50									
		Connection, top	000[5]	00	A	**3NP40 15-1CK01**		103	1	1	0.892
		Connection, bottom			B	**3NP40 15-1CJ01**		103	1	1	0.888
160	Flat terminals	Up to 2 × 70 (M8)									
		Connection, top	00 a. 000	00 a. 000	A	**3NP40 75-1CE01**		103	1	1	1.186
		Connection, bottom			A	**3NP40 75-1CF01**		103	1	1	1.189
	Box terminals	2.5 ... 70 or 2 × 2.5 ... 16									
		Connection, top	00 a. 000	00 a. 000	A	**3NP40 75-1CK01**		103	1	1	1.261
		Connection, bottom			A	**3NP40 75-1CJ01**		103	1	1	1.213
250	Flat terminals	Up to 240 (M10)									
		Connection, top or bottom	1 and 0	1 and 0	A	**3NP42 75-1CG01**		103	1	1	3.719
For 60 mm busbar system											
For busbars of width 12 mm or 30 mm and thickness 5 mm or 10 mm[3]											
As flat, T and I profiles, as well as Rittal PLS systems											
160[4]	Box terminals[6]	1.5 ... 50									
		Connection, top	000[3]	00	A	**3NP40 16-1CK01**		103	1	1	0.916
		Connection, bottom			►	**3NP40 16-1CJ01**		103	1	1	0.950

All fuse switch disconnectors with flat terminals must be used with the appropriate cable lug covers (3NY7 101 to 3NY7 141) for finger-safe cover according to BGV A2, see page 3/76.

1) See LV HRC Fuse Links.

2) Insert silver-plated isolating links.

3) Can only be mounted on 5 mm thick busbars, a busbar thickness compensator is required for 3NP42 and 3NP43; see page 3/77.
3NP44 can only be mounted on busbars with a thickness of 10 mm!

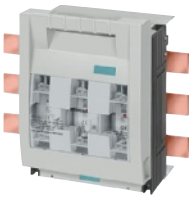
4) 125/160 A only possible with 21 mm 3NY1 822 (125 A) and 3NY1 824 (160 A) LV HRC fuse links, see page 3/77.

5) Corresponds to LV HRC fuse link size 00 with maximum width 21 mm (according to IEC 60269-2-1 and DIN 43620).

6) No further cover required for 3NP40 with box terminal.

*** You can order this quantity or a multiple thereof.**

3NP LV HRC fuse switch disconnectors

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links[2]		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
	I_u	Connection	For conductor cross-section			DT	Order No.	Price per PU				
	A		mm²	Size	Size					Unit(s)	Unit(s)	kg
	For 60 mm busbar system											
	For busbars of width 12 mm or 30 mm and thickness 5 mm or 10 mm[3]											
	As flat, T and I profiles, as well as Rittal PLS systems											
	160	Flat terminals	Up to 2 × 70 (M8)									
			Connection, top	00 a. 000	00	A	**3NP40 76-1CE01**		103	1	1	1.203
			Connection, bottom			▶	**3NP40 76-1CF01**		103	1	1	1.201
		Box terminals[4]	2.5 ... 70 or 2 × 2.5 ... 16									
			Connection, top	00 a. 000	00	B	**3NP40 76-1CK01**		103	1	1	1.295
			Connection, bottom			▶	**3NP40 76-1CJ01**		103	1	1	1.249
	250	Flat terminals	Up to 150 (M10)									
			Connection, top or bottom	1 and 0	1 and 0	▶	**3NP42 76-1CG01**		103	1	1	3.713
	400	Flat terminals	Up to 240 (M10)									
			Connection, top or bottom	2 and 1	2 and 1	▶	**3NP43 76-1CG01**		103	1	1	5.440
	630	Flat terminals	Up to 2 × 240 (M12)									
			Connection, top or bottom	3 and 2	3 and 2	▶	**3NP44 76-1CG01**		103	1	1	7.688
	Surface mounting and installation											
	With fuse monitoring by SIRIUS motor starter protector[5] [6]											
	Up to 160 A, also clip-on for standard mounting rail											
	160	Flat terminals	Up to 2 × 70 (M8)	00 a. 000	00	A	**3NP40 70-0FA01**		103	1	1	1.276
		Box terminals	2.5 ... 70 or 2 × 2.5 ... 16			A	**3NP40 70-0FH01**		103	1	1	1.350
	250	Flat terminals	Up to 150 (M10)	1 and 0	1 and 0	A	**3NP42 70-0FA01**		103	1	1	2.940
	400	Flat terminals	Up to 240 (M10)	2 and 1	2 and 1	A	**3NP43 70-0FA01**		103	1	1	4.174
	630	Flat terminals	Up to 2 × 240 (M12)	3 and 2	3 and 2	A	**3NP44 70-0FA01**		103	1	1	5.495

All fuse switch disconnectors with flat terminals must be used with the appropriate cable lug covers (3NY7 101 to 3NY7 141) for finger-safe cover according to BGV A2, see page 3/76.

1) See LV HRC Fuse Links.

2) Insert silver-plated isolating links.

3) Can only be mounted on 5 mm thick busbars, a busbar thickness compensator is required for 3NP42 and 3NP43; see page 3/77.
3NP44 can only be mounted on busbars with a thickness of 10 mm!

4) No further cover required for 3NP40 with box terminal.

5) SIRIUS motor starter protector with auxiliary switch 1 NO + 1 NC as standard. 3NP40 7 also available with auxiliary switch 2 NOs or 2 NCs on request.

6) For 3NP40 7 with output socket for auxiliary switch, the signal lead must be ordered separately, see page 3/77. In the case of 3NP41 to 3NP44, the auxiliary switch must be connected over a 2.8 mm × 0.5 mm flat terminal according to DIN 46244-A.

* You can order this quantity or a multiple thereof.

Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links[2]		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
I_u	Connection	For conductor cross-section			DT	Order No.	Price per PU				
A		mm²	Size	Size					Unit(s)	Unit(s)	kg
For 40 mm busbar system											
For busbars of width 12 mm or 15 mm and thickness 5 mm or 10 mm[3]											
With fuse monitoring by SIRIUS motor starter protector[4][5]											
With deep adapter, e.g. for installation in ALPHA meter cabinets and ALPHA distribution boards (STAB/SIKUS)											
160	Flat terminals	Up to 2 × 70 (M8) Connection, top	00 a. 000	00 a. 000	B	**3NP40 75-0FE01**		103	1	1	1.812
		Connection, bottom			B	**3NP40 75-0FF01**		103	1	1	1.780
	Box terminals	2.5 ... 70 or 2 × 2.5 ... 16 Connection, top	00 a. 000	00 a. 000	B	**3NP40 75-0FK01**		103	1	1	1.820
		Connection, bottom			B	**3NP40 75-0FJ01**		103	1	1	1.831
With flat adapter according to DIN 43620 -6, for ALPHA distribution boards (STAB/SIKUS)											
160	Flat terminals	Up to 2 × 70 (M8) Connection, top	00 a. 000	00 a. 000	B	**3NP40 75-1FE01**		103	1	1	1.616
		Connection, bottom			B	**3NP40 75-1FF01**		103	1	1	1.620
	Box terminals	2.5 ... 70 or 2 × 2.5 ... 16 Connection, top	00 a. 000	00 a. 000	B	**3NP40 75-1FK01**		103	1	1	1.717
		Connec-tion, bottom			B	**3NP40 75-1FJ01**		103	1	1	1.630
250	Flat terminals	Up to 240 (M10) Connection, top or bottom	1 and 0	1 and 0	A	**3NP42 75-1FG01**		103	1	1	4.210

All fuse switch disconnectors with flat terminals must be used with the appropriate cable lug covers (3NY7 101 to 3NY7 141) for finger-safe cover according to BGV A2, see page 3/76.

1) See LV HRC Fuse Links.

2) Insert silver-plated isolating links.

3) Can only be mounted on 5 mm thick busbars, a busbar thickness compensator is required for 3NP42 and 3NP43; see page 3/77.
3NP44 can only be mounted on busbars with a thickness of 10 mm!

4) SIRIUS motor starter protectors, as standard with auxiliary switches 1 NO + 1 NC. See Catalog LV 1

5) For 3NP40 7 with output socket for auxiliary switch, the signal lead must be ordered separately, see page 3/77. In the case of 3NP41 to 3NP44, the auxiliary switch must be connected over a 2.8 mm × 0.5 mm flat terminal according to DIN 46244-A.

*** You can order this quantity or a multiple thereof.**

3NP LV HRC fuse switch disconnectors

Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links[2]		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
I_u	Connection	For conductor cross-section			DT	Order No.	Price per PU				
A		mm^2	Size	Size					Unit(s)	Unit(s)	kg
For 60 mm busbar system											
For busbars of width 12 mm or 15 mm and thickness 5 mm or 10 mm[3]											
Flat, T and I profiles, as well as on Rittal PLS systems											
With fuse monitoring by SIRIUS motor starter protector[4][5]											
160	Flat terminals	Up to 2 × 70 (M8)									
		Connection, top	00 and 000	00	B	**3NP40 76-1FE01**		103	1	1	1.670
		Connection, bottom			A	**3NP40 76-1FF01**		103	1	1	1.890
	Box terminals	2.5 ... 70 or 2 × 2.5 ... 16									
		Connection, top	00 and 000	00	B	**3NP40 76-1FK01**		103	1	1	1.755
		Connection, bottom			B	**3NP40 76-1FJ01**		103	1	1	1.915
250	Flat terminals	Up to 150 (M10)									
		Connection, top or bottom	1 and 0	1 and 0	A	**3NP42 76-1FG01**		103	1	1	4.171
400	Flat terminals	Up to 240 (M10)									
		Connection, top or bottom	2 and 1	2 and 1	A	**3NP43 76-1FG01**		103	1	1	5.845
630	Flat terminals	Up to 2 × 240 (M12)									
		Connection, top or bottom	3 and 2	3 and 2	A	**3NP44 76-1FG01**		103	1	1	8.235

All fuse switch disconnectors with flat terminals must be used with the appropriate cable lug covers (3NY7 101 to 3NY7 141) for finger-safe cover according to BGV A2, see page 3/76.

1) See LV HRC Fuse Links.

2) Insert silver-plated isolating links.

3) Can only be mounted on 5 mm thick busbars, a busbar thickness compensator is required for 3NP42 and 3NP43; see page 3/77.
3NP44 can only be mounted on busbars with a thickness of 10 mm!

4) SIRIUS motor starter protectors, as standard with auxiliary switches 1 NO + 1 NC. See Catalog LV 1

5) For 3NP40 7 with output socket for auxiliary switch, the signal lead must be ordered separately, see page 3/77. In the case of 3NP41 to 3NP44, the auxiliary switch must be connected over a 2.8 mm × 0.5 mm flat terminal according to DIN 46244-A.

* You can order this quantity or a multiple thereof.

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	For isolating links	AS on switch disconnector		Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
	I_u	Connection	For conductor cross-section				DT	Order No.	Price per PU				
	A		mm²	Size	Size						Unit(s)	Unit(s)	kg
	For surface mounting and installation on and in distribution boards completely compartmentalized, with high speed closing feature												
	160	Flat terminals[2]	2.5 ...150[3]	00 a. 000	00	Without[4] 1 NO + 1 NC	▶ B	**3NP50 60-0CA00** **3NP50 60-0CA10**		103 103	1 1	1 1	1.608 1.650
		Clamp terminals	1-wire 2.5 ... 50 or 2 conductors 1 × 2.5 ... 50 1 × 2.5 ... 35	00 a. 000	00	Without[4] 1 NO + 1 NC	A B	**3NP50 60-0CB00** **3NP50 60-0CB10**		103 103	1 1	1 1	1.739 1.748
	250	Flat terminals	6 ... 150[5]	1 and 0	1	Without 1 NO + 1 NC	▶ A	**3NP52 60-0CA00** **3NP52 60-0CA10**		103 103	1 1	1 1	5.475 5.491
		Clamp terminals	35 ... 120	1 and 0	1	Without 1 NO + 1 NC	C B	**3NP52 60-0CB00** **3NP52 60-0CB10**		103 103	1 1	1 1	5.605 5.814
	400	Flat terminals	6 ... 240[5]	2 and 1	2	Without 1 NO + 1 NC	▶ A	**3NP53 60-0CA00** **3NP53 60-0CA10**		103 103	1 1	1 1	6.532 6.551
	630	Flat terminals	2 × 6 ... 240[5]	3 and 2	3	Without	▶	**3NP54 60-0CA00**		103	1	1	7.945
						1 NO + 1 NC	B	**3NP54 60-0CA10**		103	1	1	7.958
	For 40 mm busbar system Completely compartmentalized, with high speed closing[6] **Busbar width: 12 mm and 5 mm or 10 mm thickness**												
	160	Flat terminals	2.5 ...150[3] Connection, bottom	00 a. 000		Without 1 NO + 1 NC	C B	**3NP50 65-1CF00** **3NP50 65-1CF10**		103 103	1 1	1 1	2.380 2.370
		Clamp terminals	1-wire 2.5 ... 50 or 2 conductors 1 × 2.5 ... 50 1 × 2.5 ... 35 bottom connection	00 a. 000		Without 1 NO + 1 NC	B B	**3NP50 65-1CG00** **3NP50 65-1CG10**		103 103	1 1	1 1	2.433 2.437
	For 60 mm busbar system Surface mounting and installation completely compartmentalized, with high speed closing Use switch version "Surface mounting and installation" and busbar adapter, see page 3/82.												

1) See LV HRC Fuse Links.

2) The relevant 3NY1 106 cable lug covers must be used for 3NP50 60 with flat terminals (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106-100 (see page 3/76).

3) According to DIN 46234 or 16 mm² ... 95 mm² according to DIN 46235 (use M10 cable lug if necessary).

4) If auxiliary switch is retrofitted, additional drill holes are required on the switch.

5) According to DIN 46234 or DIN 46235; with cable lug according to DIN 46235; conductor cross-section min. 16 mm² (use M12 cable lug if necessary).

6) According to DIN 46234 or 16 ... 95 mm² according to DIN 46235 (use M cable lug if necessary).

*** You can order this quantity or a multiple thereof.**

3NP LV HRC fuse switch disconnectors

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	Auxiliary switches (AS)			Degree of protection IP00, without fuse links, without isolating links, with terminal screws					
					On	On							
	I_u	Connection	For conductor cross-section		Switch disconnectors	Motor starter protectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A		mm²	Size							Unit(s)	Unit(s)	kg
	Surface mounting and installation **Completely compartmentalized, with high speed closing feature and fuse monitoring by SIRIUS motor starter protectors[2]**												
	With plug-in connection of the auxiliary switch connecting cable (length approx. 1 m) to the motor starter protector												
	160	Flat terminals[3]	2.5 ... 150[4]	00 a. 000	1 NO + 1 NC	1 NO + 1 NC	►	**3NP50 60-0EA86**		103	1	1	2.484
					1 NO + 1 NC	2 NO	B	**3NP50 60-0EA26**		103	1	1	2.550
		Clamp terminals	1 conductor 2.5 ... 50	00 a. 000	1 NO + 1 NC	1 NO + 1 NC	B	**3NP50 60-0EB86**		103	1	1	2.616
			2 conductors 1 × 2.5 ... 50 1 × 2.5 ... 35		1 NO + 1 NC	2 NO	B	**3NP50 60-0EB26**		103	1	1	2.650
	250	Flat terminals	6 ... 150[5]	1 and 0	1 NO + 1 NC	1 NO + 1 NC	►	**3NP52 60-0EA86**		103	1	1	6.014
					1 NO + 1 NC	2 NO	B	**3NP52 60-0EA26**		103	1	1	6.867
		Clamp terminals	35 ... 120	1 and 0	1 NO + 1 NC	1 NO + 1 NC	B	**3NP52 60-0EB86**		103	1	1	7.095
					1 NO + 1 NC	2 NO	B	**3NP52 60-0EB26**		103	1	1	6.659
	400	Flat terminals	6 ... 240[5]	2 and 1	1 NO + 1 NC	1 NO + 1 NC	►	**3NP53 60-0EA86**		103	1	1	7.083
					1 NO + 1 NC	2 NO	B	**3NP53 60-0EA26**		103	1	1	5.410
	630	Flat terminals	6 ... 2 × 240[5]	3 and 2	1 NO + 1 NC	1 NO + 1 NC	►	**3NP54 60-0EA86**		103	1	1	8.462
					1 NO + 1 NC	2 NO	B	**3NP54 60-0EA26**		103	1	1	9.233
	For 40 mm busbar system **Completely compartmentalized, with high speed closing and fuse monitoring by SIRIUS motor starter protectors[2] [6]**												
	Busbar width: 12 mm and 5 mm or 10 mm thickness												
	160	Flat terminals	2.5 ... 150[4]	00 a. 000	1 NO + 1 NC	1 NO + 1 NC	A	**3NP50 65-1EF86**		103	1	1	2.908
			Connection, bottom		1 NO + 1 NC	2 NO	B	**3NP50 65-1EF26**		103	1	1	2.950
		Clamp terminals	1-wire	00 a. 000	1 NO + 1 NC	1 NO + 1 NC	B	**3NP50 65-1EG86**		103	1	1	3.020
			2.5 ... 50 2 conductors 1 × 2.5 ... 50 1 × 2.5 ... 35 with bottom connection		1 NO + 1 NC	2 NO	C	**3NP50 65-1EG26**		103	1	1	2.973
	For 60 mm busbar system												
	Use switch version "Surface mounting and installation" and busbar adapter, see page 3/82.												

1) See LV HRC Fuse Links.

2) SIRIUS motor starter protectors: auxiliary switches, 2 NC also available on request.

3) The relevant 3NY1 106 cable lug covers must be used for 3NP50 60 with flat terminals (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106-100 (see page 3/76).

4) According to DIN 46234 or 16 mm² ... 95 mm² according to DIN 46235 (use M10 cable lug if necessary).

5) According to DIN 46234 or DIN 46235, with cable lug according to DIN 46235: min. conductor cross-section 16 mm² (use M12 cable lugs if required).

6) For accessories and further devices on busbar systems, see Accessories and Switchgear, SIVACON Distribution Boards and Cabinet Systems -> Components for 8US, 8UC, 4NC distribution board systems -> 8US busbar systems.

* You can order this quantity or a multiple thereof.

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	Auxiliary switches			Degree of protection IP00, without fuse links, without isolating links, with terminal screws						
					On	On								
	I_u	Connection	For conductor cross-section		Switch disconnectors	Fuse monitoring	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A		mm^2	Size	Version	Version					Unit(s)	Unit(s)	kg
	Surface mounting and Installation **Completely compartmentalized, with high speed closing feature** **With electronic fuse monitoring EF (self-powered), open-circuit principle** **For rated operational voltages U_e of 400 V to 500 V AC, infeed must be from the top!** With plug-in connection of auxiliary switch connecting cable (length approx. 1 m) for fuse monitoring, status display: green LED, illuminated, fault indication: green LED, flashing, fuse failure: red LED (display per phase)												
	160	Flat terminals[2]	2.5 ...120[3]	00 a. 000	1 NO + 1 NC	2 NO + 1 NC	B	**3NP50 60-0HA13**		103	1	1	2.375
		Clamp terminals	1-wire: 2.5 ... 50 2-wire: 1× 2.5 ... 50 1× 2.5 ... 35	00 a. 000	1 NO + 1 NC	2 NO + 1 NC	B	**3NP50 60-0HB13**		103	1	1	2.500
	250	Flat terminals	6 ... 150[4]	1 and 0	1 NO + 1 NC	2 NO + 1 NC	B	**3NP52 60-0HA13**		103	1	1	5.865
	400	Flat terminals	6 ... 240[4]	2 and 1	1 NO + 1 NC	2 NO + 1 NC	B	**3NP53 60-0HA13**		103	1	1	6.951
	630	Flat terminals	6 ... 240[4]	3 and 2	1 NO + 1 NC	2 NO + 1 NC	B	**3NP54 60-0HA13**		103	1	1	8.513

1) See LV HRC Fuse Links.

2) The relevant 3NY1 106 cable lug covers must be used for 3NP50 60 with flat terminals (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106-100 (see page 3/76).

3) According to DIN 46234 or 16 mm^2 ... 95 mm^2 according to DIN 46235 (use M10 cable lug if necessary).

4) According to DIN 46234 or DIN 46235; with cable lug according to DIN 46235: Conductor cross-section min 16 mm^2 (use M12 cable lugs if required).

*** You can order this quantity or a multiple thereof.**

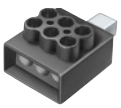
3NP LV HRC fuse switch disconnectors

	Rated residual current	Connection type (double-ended)		For LV HRC fuse links acc. to DIN 43620[1]	Auxiliary switches			Degree of protection IP00, without fuse links, without isolating links, with terminal screws		PG	PU	PS*/ P. unit	Weight per PU approx.
					On	On							
	I_u	Connection	Conductor cross-section		Switch disconnectors	Fuse monitoring	DT	Order No.	Price per PU				
	A		mm²	Size							Unit(s)	Unit(s)	kg
	For 40 mm busbar system **Completely compartmentalized, with high speed closing feature** **With electronic fuse monitoring EF (self-powered), open-circuit principle** **For rated operational voltages U_e of 400 V to 500 V AC, infeed must be from the top!** For busbar width: 12 mm and 5 mm or 10 mm thickness												
	160	Flat terminals	2.5 ...120[2] with bottom connection	00 and 000	1 NO + 1 NC	2 NO + 1 NC	B	**3NP50 65-1HF13**		103	1	1	2.776
	For 60 mm busbar system Use switch version "Surface mounting and installation" and busbar adapter, see page 3/82.												

[1] See LV HRC Fuse Links.

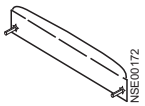
[2] According to DIN 46234 or 16 mm² ... 95 mm² according to DIN 46235 (use M10 cable lug if necessary).

All fuse switch disconnectors with flat connections must be used with the relevant cable lug covers (3NY7 101 to 3NY7 141) in order to ensure protection against finger touch according to BGVA3, see the following table.

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
 3NY1 995	**Quick retaining plates** Between two support rails to EN 60715								
	Busbar center-to-center clearance 125 mm	3NP40 10, 3NP40 70	B	**3NY1 995**		103	1	1/200	0.135
	Busbar center-to-center clearance 125 mm	3NP42 70	B	**3NY7 322**		103	1	1	0.249
	Cable lug covers								
	and finger-safe cover to BGV A3 (1 set = 2 units) for 1 single mounting or 2 adapter devices	3NP40 7 with flat terminal[1]	▶	**3NY7 101**		103	1	1	0.065
		3NP42 7	▶	**3NY7 121**		103	1	1	0.220
		3NP43	▶	**3NY7 131**		103	1	1	0.221
		3NP44	▶	**3NY7 141**		103	1	1	0.319
	Terminals (1 set = 3 units) Conductor cross-section								
	70 mm² ... 150 mm²	3NP42 7	A	**3NY7 120**		103	1	1	0.333
	120 mm² ... 240 mm²	3NP43	A	**3NY7 130**		103	1	1	0.583
	150 mm² ... 300 mm²	3NP44	A	**3NY7 140**		103	1	1	0.725
	Triple terminals (1 set = 3 units)								
 3NY7 102	For retrofitting on box terminals conductor cross-section solid/stranded: 2.5 mm² ... 16 mm²	3NP40 1 3NP40 7	A	**3NY7 102**		103	1	1	0.131
	For mounting on flat terminals finely stranded with end sleeve: 2.5 mm² ... 10 mm²	3NP40 7	B	**3NY7 105**		103	1	1	0.113

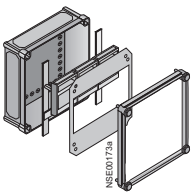
[1] The fuse switch disconnector with mounted cable lug covers, together with molded-plastic covers for distributor/device field/incoming feeder unit, is easy to install in the meter cabinet.

* You can order this quantity or a multiple thereof.

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
 3NY1 237	**Three-phase busbars** Modular width 90 mm = 5 MW For I_u max = 225 A For 2 switch disconnectors	3NP40 1	A	**3NY1 237**		103	1	1	0.265
 3NY1 238	Permissible connection 25 mm² or supply terminal For 3 switch disconnectors For 4 switch disconnectors		A A	**3NY1 238** **3NY1 438**		103 103	1 1	1 1	0.434 0.650
 3NY1 263	Link rails		A	**3NY1 263**		103	1	1	0.267
	Covers For 1 blank space in 3NY1 238	3NP40 1	A	**3NY1 265**		103	1	1	0.012
 3NY1 236	**Feeder terminals** (1 Set = 3 units) For I_u max = 225 A Conductor cross-section solid/stranded: 25 mm² ... 95 mm² Finely stranded with end sleeve: 16 mm² ... 70 mm	3NP40 1	A	**3NY1 236**		103	1	1	0.262
 3NY7 481	**Overreaching protections**	3NP42 7 3NP43 3NP44	A	**3NY7 481**		103	1	1	0.021
	Sealing pins (1 package = 10 units)	3NP42 7 3NP43 3NP44	A	**3NY7 482**		103	1	10	0.056
	Bar thickness compensations								
	(1 Assembly kit = 5 units) for only 5 mm thick busbars	3NP42 7 3NP43	A	**3NY7 381**		103	1	1	0.064
	Fuse carriers								
	Gray with inscription label with voltage inspection holes	3NP40 1 3NP40 7	B B	**3NY7 003** **3NY7 001**		103 103	1 1	1 1	0.160 0.220
 3NY3 035	**Auxiliary switches 1 CO** For sizes 000 and 00 with self-tapping screws for sizes 1 to 3 to clip on	3NP40 1 up to 3NP44	►	**3NY3 035**		103	1	1	0.004
	Electronically optimized		B	**3NY3 030**		103	1	1	0.004
	Fuse links **Size 000** With non-insulated grip lugs, operational class gL/gG for cable and line protection, mounting width 21 mm according to IEC 60269-2-1 and DIN 43620	3NP40 1							
	400 V/125 A 400 V/160 A		A B	**3NY1 822** **3NY1 824**		013 013	1 1	3 3	0.130 0.129
	Signal leads For connection to output socket of fuse monitoring, size 00								
	1-m cable with connector 3-m cable with connector	3NP40 7 3NP40 7	B B	**3NY1 910** **3NY1 911**		103 103	1 1	1 1	0.097 0.261

* You can order this quantity or a multiple thereof.

3NP LV HRC fuse switch disconnectors

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm						Unit(s)	Unit(s)	kg
	Masking frames **For flush mounting in 40 mm and 60 mm busbar systems**								
	Touch protection covers[1]								
		3NP40 75 3NP40 76	B	**3NY7 601**		103	1	1	0.125
	Masking frames **For installation in any distribution boards**[2]								
	Molded-plastic masking frames								
	215 × 130	3NP40 1	A	**3NY1 251**		103	1	1	0.052
	215 × 130	3NP40 7 with box terminals ►		**3NY7 200**		103	1	1	0.037
	215 × 130	3NP40 7 with flat terminals ►		**3NY7 201**		103	1	1	0.046
	375 × 220	3NP42 7 ►		**3NY7 220**		103	1	1	0.112
	375 × 245	3NP43	A	**3NY7 230**		103	1	1	0.117
3NY1 251	375 × 290	3NP44	A	**3NY7 240**		103	1	1	0.125
	Masking frames **For installation in ALPHA 400-ZS meter cabinets**								
	Molded-plastic masking frames								
	Suitable for distribution board/device panel or for incoming feeder unit in the meter cabinet (busbar mounted)								
	197 × 215.5	2 × 3NP40 1	A	**3NY1 258**		103	1	1	0.063
	197 × 215.5	1 x 3NP40 1 left	A	**3NY1 262**		103	1	1	0.093
	197 × 215.5	1 x 3NP40 1 right	A	**3NY1 264**		103	1	1	0.091
	208 × 229	1 x 3NP40 7 left	A	**3NY7 500**		103	1	1	0.120
	208 × 229	1 x 3NP40 7 right	A	**3NY7 501**		103	1	1	0.120
	208 × 236	2 × 3NP40 7	A	**3NY7 502**		103	1	1	0.054
	309 × 216	3NP42 7 ►		**3NY7 220**		103	1	1	0.112
	375 × 245	3NP43	A	**3NY7 230**		103	1	1	0.117
	375 × 290	3NP44	A	**3NY7 240**		103	1	1	0.125
	Masking frames **For installation in ALPHA 160- and ALPHA 400 wall-mounted distribution boards (STAB 160/STAB 400), and ALPHA 630 floor-mounted distribution boards (SIKUS 630)**								
	Touch protection covers[1][3]								
		3NP40 76	B	**3NY7 600**		103	1	1	0.095
	Molded-plastic masking frames								
	For mounting on mounting plates or busbars. Further information see Catalog ET A1 "ALPHA distribution boards and terminal blocks"								
	166 × 199	1 × 3NP40 1 right	A	**3NY1 260**		103	1	1	0.082
	166 × 199	1 × 3NP40 1 left	A	**3NY1 261**		103	1	1	0.086
	166 × 199	2 × 3NP40 1	A	**3NY1 248**		103	1	1	0.036
	208 × 229	1 × 3NP40 7 left	A	**3NY7 500**		103	1	1	0.120
	208 × 229	1 × 3NP40 7 right	A	**3NY7 501**		103	1	1	0.120
	208 × 236	2 × 3NP40 7	A	**3NY7 502**		103	1	1	0.054
	309 × 216[4]	3NP42 7	A	**3NY7 820**		103	1	1	0.113
	375 × 245	3NP43	A	**3NY7 230**		103	1	1	0.117
	375 × 290	3NP44	A	**3NY7 240**		103	1	1	0.125
	Masking frames **For installation in 8HP molded-plastic distribution systems**								
	Molded-plastic masking frames								
	For installation in 8HP complete enclosures with fuse switch disconnectors 8HP enclosure (size)								
	1	1 × 3NP40 10	A	**8HP6 431**		046	1	1	0.221
	1	1 × 3NP40 70	A	**8HP6 422**		046	1	1	0.224
	2	2 × 3NP40 10	A	**8HP6 432**		046	1	1	0.465
	2	3 × 3NP40 10	A	**8HP6 432**		046	1	1	0.465
	2	1 × 3NP40 70	A	**8HP6 423**		046	1	1	0.230
	2	2 × 3NP40 70	A	**8HP6 424**		046	1	1	0.203
	2.5	1 × 3NP40 70	A	**8HP6 423**		046	1	1	0.230
	2.5	2 × 3NP40 70	A	**8HP6 424**		046	1	1	0.203
	2.5	1 × 3NP42 70	A	**8HP6 427**		046	1	1	0.250

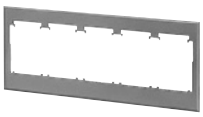
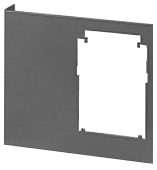
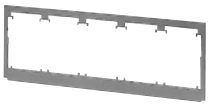
1) When using LV HRC fuse links, size 00 (160 A), the permissible load current is 0.9 x I_n.

2) To some extent, special masking frames are required for installation in ALPHA wall-mounted and floor-mounted distribution boards (STAB, SIKUS), and ALPHA 400-ZS meter cabinets; see page 3/78.

3) In 60 mm busbar systems, the conductor cross-section is limited to 16 mm^2 if the outgoing feeder is at the bottom.

4) If 8GE3 818-0 mounting plates are used, 3NY7 220 molded-plastic masking frames can also be used (for installation in any distribution boards).

* You can order this quantity or a multiple thereof.

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm						Unit(s)	Unit(s)	kg
	Molded-plastic masking frames For installation in 8HP molded-plastic distribution systems								
	For mounting between 2 standard mounting rails with 3NY1 995 quick retaining plate								
	197 × 215.5	1 × 3NP40 10 right, with and without auxiliary switch	A	**3NY1 256**		103	1	1	0.116
	197 × 215.5	1 × 3NP40 10 left, with and without auxiliary switch	A	**3NY1 257**		103	1	1	0.118
	In a field of width B1 197 × 215.5	2 × 3NP40 10, with and without auxiliary switch	A	**3NY1 258**		103	1	1	0.063
 3NY1 250	In a field of width B2/2 197 × 235	2 × 3NP40 10, with and without auxiliary switch	A	**3NY1 250**		103	1	1	0.075
 3NY1 253	In a field of width B2 197 × 485	3 × 3NP40 10 with and without auxiliary switch (supports included in delivery)	B	**3NY1 253**		103	1	1	0.225
	197 × 485	4 × 3NP40 10 with and without auxiliary switch (supports included in delivery)	B	**3NY1 254**		103	1	1	0.188
 3NY1 255	197 × 485	5 × 3NP40 10, with and without auxiliary switch	A	**3NY1 255**		103	1	1	0.125
	Supports								
	(1 set = 10 units) for 3NY1 253 and 3NY1 254 molded-plastic masking frames	3NP40 1	C	**3NY1 271**		103	1	1	0.100
	Molded-plastic masking frames								
 3NY1 260	For mounting on 3NP40 1 switch disconnectors, 166 × 199	1 × 3NP40 1 right with and without auxiliary switch	A	**3NY1 260**		103	1	1	0.082
	On standard mounting rails with special 8GD9 equipment rack and for mounting on busbars (except 3NY1 247) 166 × 199	1 × 3NP40 1 left, with and without auxiliary switch	A	**3NY1 261**		103	1	1	0.086
	In a field of width B1 166 × 199	2 × 3NP40 1, with and without auxiliary switch	A	**3NY1 248**		103	1	1	0.036
 3NY1 247	In a field of width B2 166 × 469	5 × 3NP40 1, with and without auxiliary switch	A	**3NY1 247**		103	1	1	0.072
	Blanking covers (1 set = 10 units) for covering blank spaces in the 3NY1 2 molded-plastic masking frames, width 90	3NP40 1	B	**3NY1 270**		103	1	1	0.040

* You can order this quantity or a multiple thereof.

3NP LV HRC fuse switch disconnectors

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm						Unit(s)	Unit(s)	kg
	Molded-plastic masking frames								
	For mounting between two standard mounting rails								
	208 × 219	1 × 3NP40 7 left	B	**3NY7 800**		103	1	1	0.100
	208 × 219	1 × 3NP40 7 right	B	**3NY7 801**		103	1	1	0.120
	With 3NY1 995 quick retaining plate 208 × 222	2 × 3NP40 7	B	**3NY7 802**		103	1	1	
	With 3NY1 322 quick retaining plate 309 × 216	1 × 3NP42 7	A	**3NY7 820**		103	1	1	0.113
	Molded-plastic masking frames								
	For fixing on 8GD9 100 mounting plates								
	208 × 229	1 × 3NP40 7 left	A	**3NY7 500**		103	1	1	0.120
	208 × 229	1 × 3NP40 7 right	A	**3NY7 501**		103	1	1	0.120
	208 × 236	2 × 3NP40 7	A	**3NY7 502**		103	1	1	0.054
	309 × 216[1)]	1 × 3NP42 70	A	**3NY7 820**		103	1	1	0.113
	Molded-plastic masking frames								
	For fixing on 8GD9 591 mounting plates								
	375 × 245	1 × 3NP43 70	A	**3NY7 230**		103	1	1	0.117
	For fixing on 8GD9 592 mounting plates								
	375 × 290	1 × 3NP44 70	A	**3NY7 240**		103	1	1	0.125
	Fuse carriers								
 3NY1 074		3NP50 6.-.C..0	B	**3NY1 074**		103	1	1	0.620
		3NP52 60-.C..0	B	**3NY1 371**		103	1	1	0.263
		3NP53 60-.C..0	B	**3NY1 372**		103	1	1	1.510
		3NP54 60-.C..0	B	**3NY1 373**		103	1	1	1.690
	With fuse monitoring by 3RV1 motor starter protectors (with auxiliary switches, 1 NO + 1 NC), with plug-in connection, without connector and connecting cable	3NP50 6.-.E..6	B	**3NY1 420**		103	1	1	1.405
		3NP52 60-.E..6	B	**3NY1 421**		103	1	1	1.900
		3NP53 60-.E..6	B	**3NY1 422**		103	1	1	1.980
		3NP54 60-.E..6	B	**3NY1 423**		103	1	1	2.600
	Connector and connecting cable								
	1 m long	3NP5 with 3RV1	B	**3NY1 910**		103	1	1	0.097
	3 m long		B	**3NY1 911**		103	1	1	0.261
 3NY1 513-3	With electronic fuse monitoring for 400 V ... 500 V DC (with auxiliary switches, 2 NO + 1 NC), with plug-in connection, without connector and connecting cable	3NP50 6.-.H.13	B	**3NY1 513-0**		103	1	1	1.235
		3NP52 60-.H.13	C	**3NY1 513-2**		103	1	1	2.130
		3NP53 60-.H.13	B	**3NY1 513-3**		103	1	1	2.146
		3NP54 60-.H.13	C	**3NY1 513-4**		103	1	1	0.325
 3NY1 915	Connector and connecting cable (6P) 3 m long	3NP5 with EF	B	**3NY1 915**		103	1	1	0.372
	Auxiliary switches 1 NO + 1 NC								
 3NY3 033	With actuating cams, screws and washers (mounting kit)	3NP50[2)]	B	**3NY3 033**		103	1	1	0.015
 3NY3 034	With fixing bracket and screws (mounting kit)	3NP52 ... 3NP54	B	**3NY3 034**		103	1	1	0.015

1) For mounting on 8GD9 590 mounting plate, the 3NY7 220 molded-plastic masking frame can also be used.

2) If retrofitted, drill holes required.

* You can order this quantity or a multiple thereof.

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm						Unit(s)	Unit(s)	kg
	Arc chutes								
 3NY4 031	(for 3NP52, 3NP53 and 3NP54, 3 units each are required)	3NP50	B	**3NY4 031**		103	1	1	0.218
		3NP52	B	**3NY4 011**		103	1	1	0.215
		3NP53, 3NP54	B	**3NY4 012**		103	1	1	0.240
 3NY4 011									
	Molded-plastic masking frames								
	As replacement for masking frames from assembly kits for flush mounting (without fixing brackets and small components)								
	300 × 220	3NY1 210	A	**3NY1 102**		103	1	1	0.071
	300 × 245	3NY1 211	A	**3NY1 103**		103	1	1	0.075
	300 × 290	3NY1 212	A	**3NY1 104**		103	1	1	0.084
	Molded-plastic masking frames, for installation in any distribution board								
	For installation in cabinet								
	215 × 135	3NP50 with and without auxiliary switch	A	**3NY1 105**		103	1	1/400	0.045
	215 × 135	With auxiliary switch	A	**3NY1 115**		103	1	1/400	0.044
	For installation in metal front panels								
	220 × 160	With and without auxiliary switch	A	**3NY1 125**		103	1	1	0.062
	For covering connection terminals								
	265 × 135	3NP50 with and without auxiliary switch	A	**3NY1 107**		103	1	1	0.073
	For covering cable lug connections								
	290 × 135	3NP50 with and without auxiliary switch	A	**3NY1 106**		103	1	1/225	0.071
	For separate covering of top and bottom cable lug connections								
	290 × 135	With auxiliary switch	A	**3NY1 116**		103	1	1/225	0.071
	290 × 135	3NP50 with and without auxiliary switch	A	**3NY1 108**		103	1	1/200	0.048
 3NY1 212	**Assembly kits for flush mounting** With molded-plastic masking frames, fixing brackets and small components. For disconnectors with and without auxiliary switch								
	250 × 149	3NP50 60	B	**3NY1 208**		103	1	1	0.531
	300 × 220	3NP52 60	B	**3NY1 210**		103	1	1	0.287
	300 × 245	3NP53 60	B	**3NY1 211**		103	1	1	0.298
	300 × 290	3NP54 60	B	**3NY1 212**		103	1	1	0.313

*** You can order this quantity or a multiple thereof.**

3NP LV HRC fuse switch disconnectors

	Version	For fuse switch disconnectors	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	Covers for cable lug connection (1 set = 6 units) screw-on to free screw end for protection against unintentional contact								
 3TX6 546-3B	Covering length, 99	3NP52	A	**3NY1 241**		103	1	1	0.205
	Covering length, 95	3NP53 3NP54	B	**3TX6 546-3B**		101	1	1	0.260
	Covering length, 120		B	**3NY1 245**		103	1	1	0.336
 3NY1 907	**Clamp terminals** (1 set = 3 units)								
	2.5 ... 50 mm^2 [1]	3NP50	B	**3NY1 903**		103	1	1	0.108
	35 ... 120 mm^2	3NP52	B	**3NY1 907**		103	1	1	0.225
 8US12 10-4AG00	**Busbar adapters**								
	For 60 mm busbar system Busbar width								
	108	3NP50	A	**8US12 91-4SB00**		143	1	1	0.551
	250 (length 320 mm, M10 terminal screws, connecting cables must be made)	3NP52, 3NP53, 3NP54[2]	A	**8US12 10-4AG00**		143	1	1	3.060
	Sealing eyes								
	Can be retrofitted (1 package = 10 units)	3NP50	B	**3NY1 940**		103	1	1	0.010

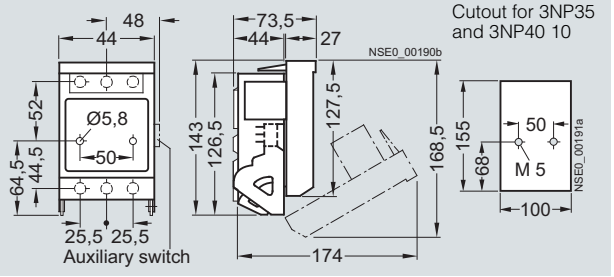
[1] Also available in 2-wire version: 1 × 2.5 mm^2 ... 50 mm^2 and 1 × 2.5 ... 35 mm^2.

[2] Switch is wider than adapter; however, this can be expanded to 276 mm using two 8US19 98–2BM00 lateral modules.

* You can order this quantity or a multiple thereof.

Dimensional drawings

3NP40 10

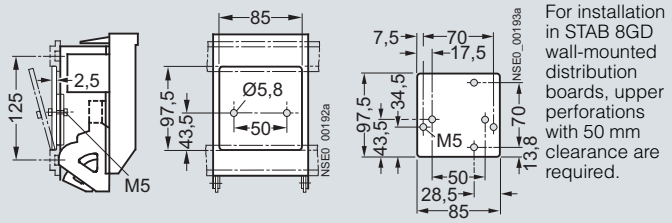


3NP40 10

3NY1 995 quick retaining plate

With 3NY1 995 quick retaining plate, mounting rail center-to-center clearance: 125 mm

For 3NP40 10 and 3NP40 70



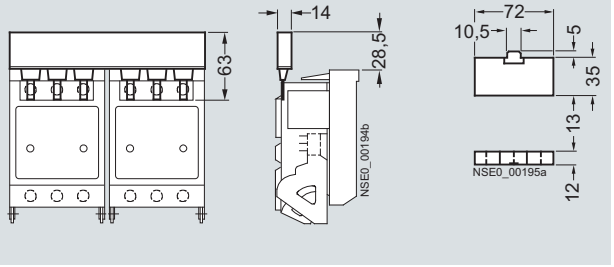
For installation in STAB 8GD wall-mounted distribution boards, upper perforations with 50 mm clearance are required.

3NP40 10

With three-phase **3NY1 237** busbars
For 2 fuse switch disconnectors

3NY1 265 caps

For three-phase **3NY1 238** busbars

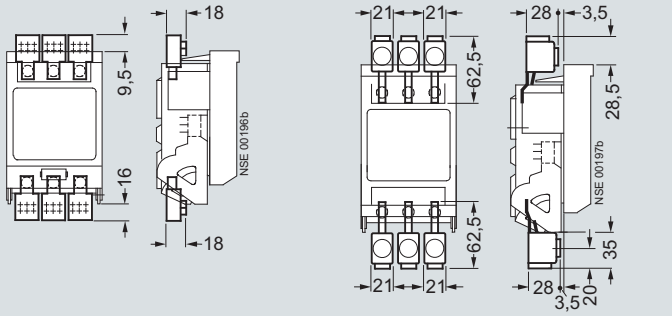


3NP40 10

With **3NY1 235** triple terminals

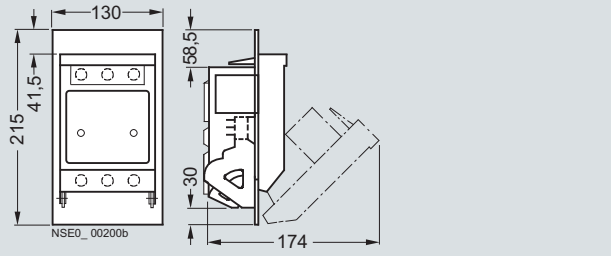
3NP40 10

With **3NY1 236** feeder terminals



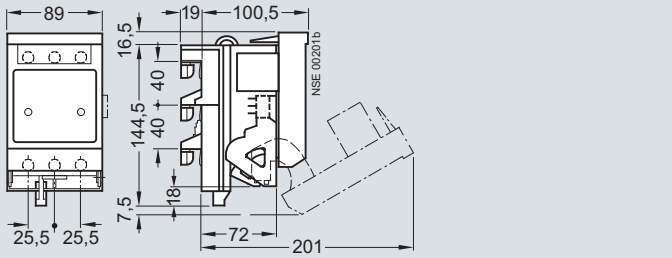
3NP40 10

With **3NY1 251** molded-plastic masking frames



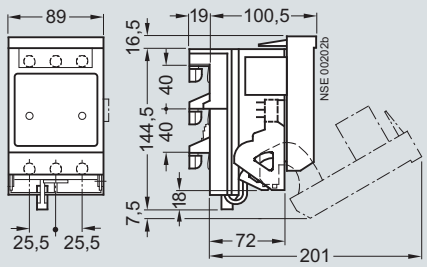
3NP40 15-1CJ01

With busbar adapter, flat, busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm, with bottom connection



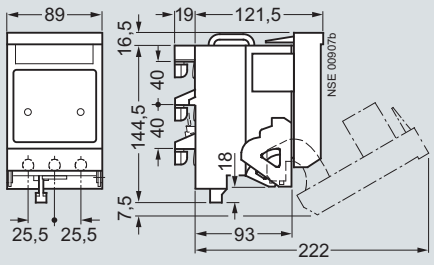
3NP40 15-1CK01

With busbar adapter, flat, busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm, with top connection



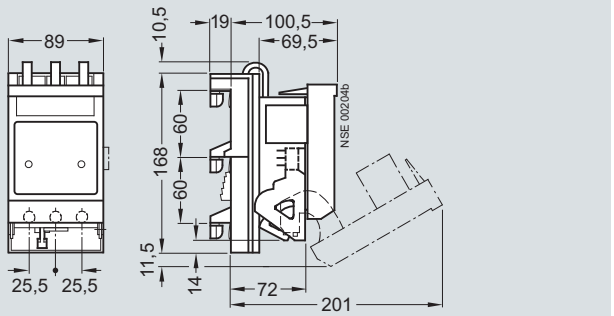
3NP40 15-0CJ01

With busbar adapter, deep, busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm, with bottom connection



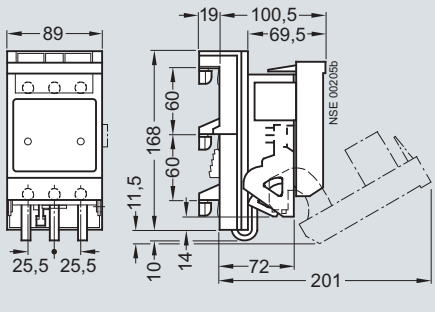
3NP40 16-1CJ01

With busbar adapter, rails of width 12, 15, 20 mm or 30 mm and thickness 5 mm or 10 mm, flat, T, I profiles and other renowned busbar systems, with bottom connection



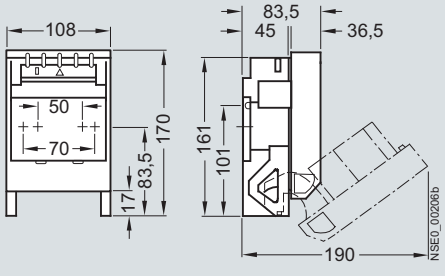
3NP40 16-1CK01

With busbar adapter, rails of width 12, 15, 20, 25 mm or 30 mm and thickness 5 mm or 10 mm, flat, T, I profiles and other renowned busbar systems, with top connection

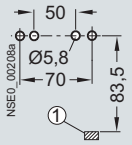


3NP LV HRC fuse switch disconnectors

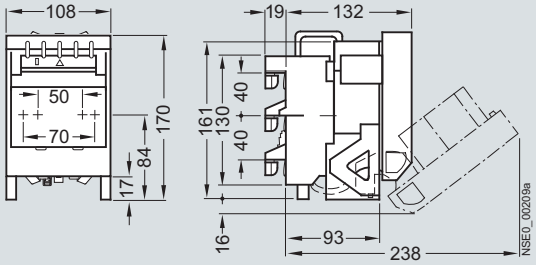
3NP40 70
For mounting



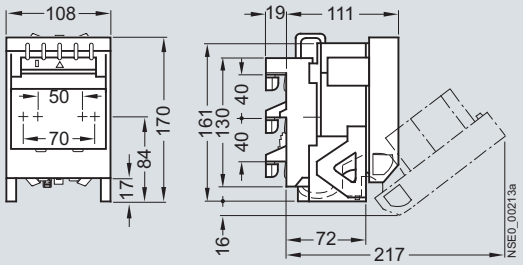
Drilling pattern for 3NP40 70



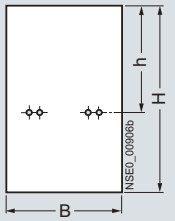
3NP40 75-0
With busbar adapter, deep,
busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm



3NP40 75-1
With busbar adapter, flat,
busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm



For metal frames
Cutouts for 3NP4

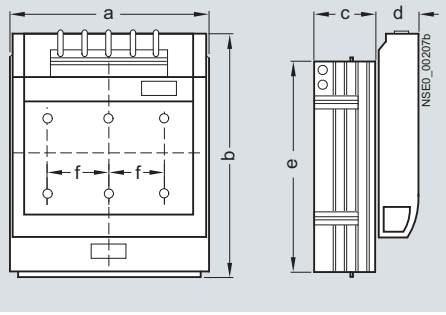


Type	Masking frame between assembly kit Molded-plastic masking frame behind panel Type	B	H	Min. panel cutout B	H	h[1]
3NP40 1	3NY1 251	130	215	100	180	100
3NP40 7	3NY7 200, 3NY7 201	130	215	118	195	110
3NP42 7	3NY7 220	220	375	210	275	157
3NP43 7	3NY7 230	245	375	235	315	174
3NP44 7	3NY7 240	290	375	280	325	178

	Molded-plastic masking frame in front of panel Type	B	H	B	H	h[1]
3NP40 1	3NY1 251	130	215	100	155	87
3NP40 7	3NY7 200, 3NY7 201	130	215	118	195	110
3NP42 7	3NY7 220	220	375	198	275	157
3NP43 7	3NY7 230	245	375	224	315	174
3NP44 7	3NY7 240	290	375	270	325	178

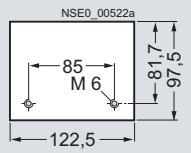
[1] h = distance from upper edge of switchboard cutout to center of disconnector mounting.

3NP42 70, 3NP43 70, 3NP44 70
For mounting

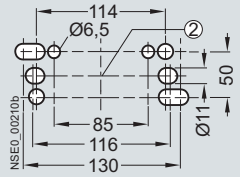


Type	a	b	c	d	e	f
3NP42 70	184	243	66	45.5	215	57
3NP43 70	210	288	80	48	255	65
3NP44 70	256	300	94.5	48	267	81

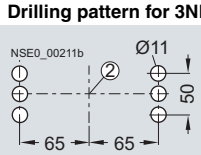
3NY73 22 quick retaining plate



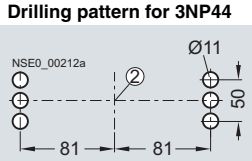
Drilling pattern for 3NP42 70



Drilling pattern for 3NP43 70

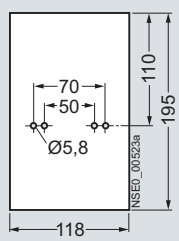


Drilling pattern for 3NP44

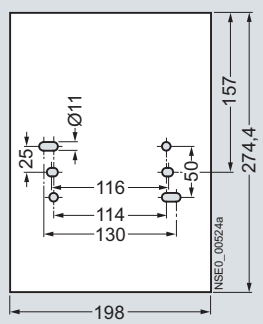


① Bottom edge disconnector-base
② Center disconnector-base

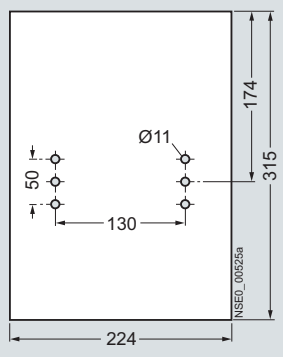
For plastic frames
Cutouts[2] for 3NP40 70



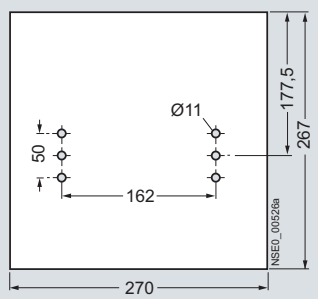
Cutouts[2] for 3NP42



Cutouts[2] for 3NP43

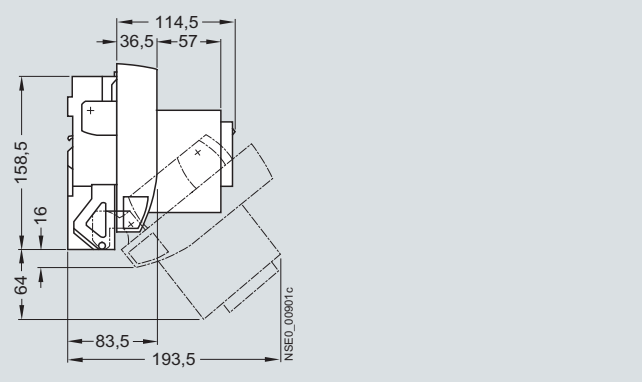


Cutouts[2] for 3NP44

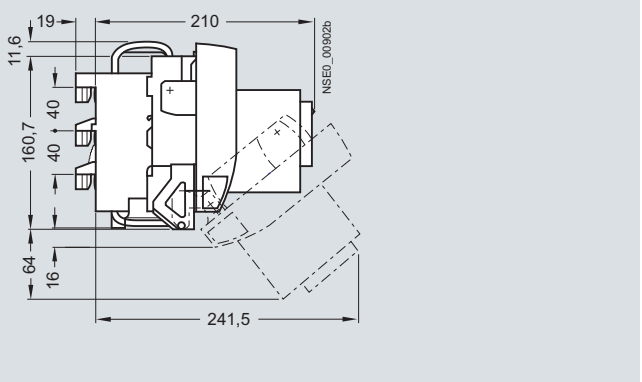


[2] Masking frame is placed open on the switchgear cabinet panel, for cover behind control cabinet panel: cutout dimensions on request.

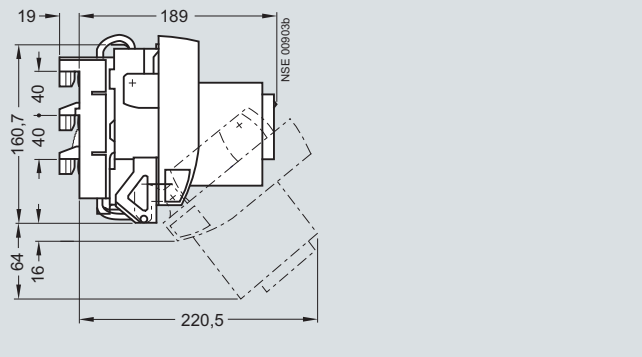
3NP40 70-0F
For mounting and installation



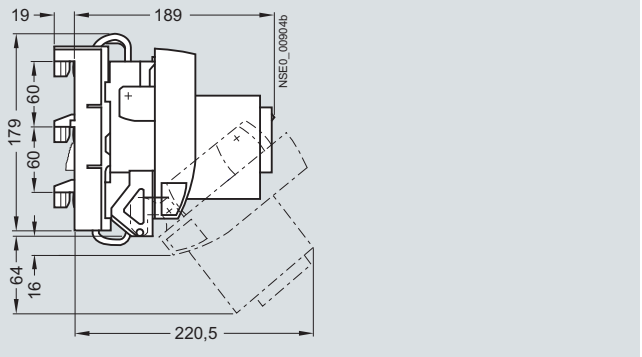
3NP40 75-0F
With busbar adapter, deep, 40 mm
Busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm



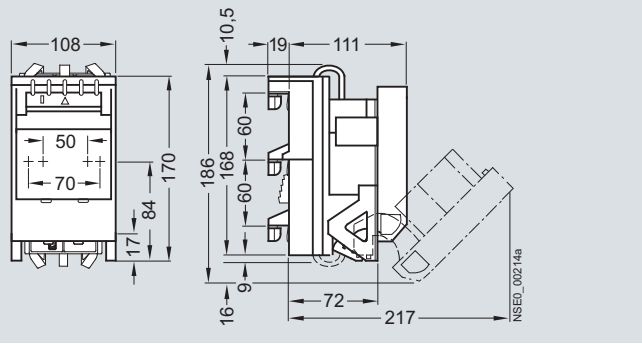
3NP40 75-1F
With busbar adapter, flat, 40 mm
Busbar width 12 mm or 15 mm and thickness 5 mm or 10 mm



3NP40 76-0F
With busbar adapter, flat, 60 mm
Busbar width 12 mm or 30 mm and thickness 5 mm or 10 mm

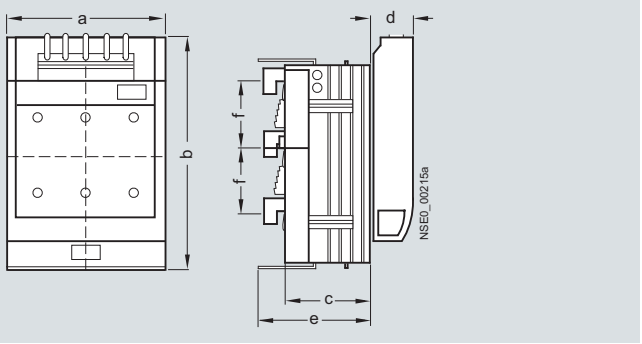


3NP40 76-1
With busbar adapter,
busbar width 12 mm to 30 mm
and thickness 5 mm or 10 mm,
flat, T and I profile



3NP42 75-1
3NP42 76-1
3NP43 76-1
3NP44 76-1

With busbar adapter,
busbar width 12 mm to 30 mm
and thickness 5 mm or 10 mm,
flat, T and I profile



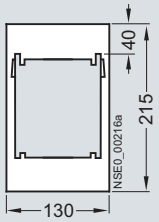
Type	a	b[1]	c	d	e	f
3NP42 75-1	184	243	83[2]	45.5	111	40
3NP42 76-1	184	243	83[2]	45.5	111	60
3NP43 76-1	210	288	97	48	125	60
3NP44 76-1	256	300	112	48	139	60

[1] For VBG4 plus dimension c of cable lug covers (see page 3/76).

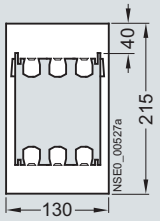
[2] When installed together with size 000 or size 00 in STAB/SIKUS distribution boards, 3NY7 820 molded-plastic masking frame is used as a depth compensation (below).

3NP LV HRC fuse switch disconnectors

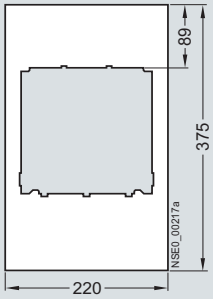
3NY7 200 molded-plastic masking frame
For 3NP40 7
For installation in any distribution boards



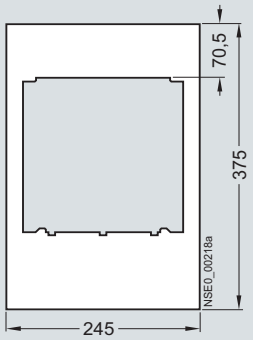
3NY7 201 molded-plastic masking frame
For 3NP40 7.-
For 3NP40 7.-CA01



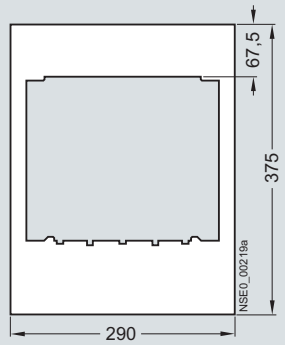
3NY7 220 molded-plastic masking frame
For 3NP42
For installation in any distribution boards



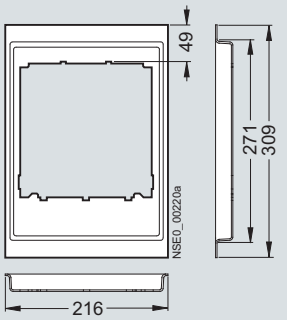
3NY7 230 molded-plastic masking frame
For 3NP43
For installation in any distribution boards



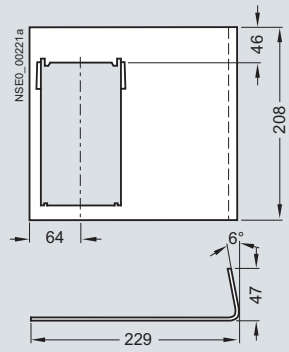
3NY7 240 molded-plastic masking frame
For 3NP44
For installation in any distribution boards



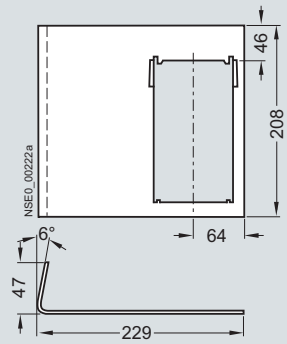
3NY7 820 molded-plastic masking frame
For 1 3NP42 70 switch disconnector
For installation in STAB-/SIKUS distribution boards



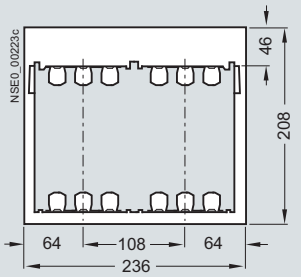
3NY7 500 molded-plastic masking frame
For 1 3NP40 switch disconnector, left
For installation in SIKUS 3200-, STAB 160- and 400- and SIKUS 630 distribution boards



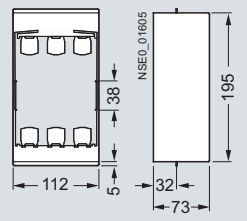
3NY7 501 molded-plastic masking frames
For one 3NP40 switch disconnector, right
For installation in SIKUS 3200, STAB 160 and 400 and SIKUS 630 distribution boards



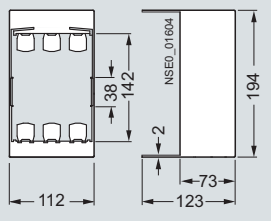
3NY7 502 molded-plastic masking frame
For 2 3NP40 switch disconnectors
For installation in SIKUS 3200-, STAB 160- and 400- and SIKUS 630 distribution boards



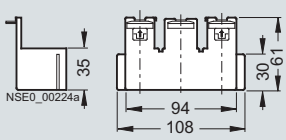
3NY7 600 touch protection cover
For installation in ALPHA distribution boards
For 3NP40 76 switch disconnectors



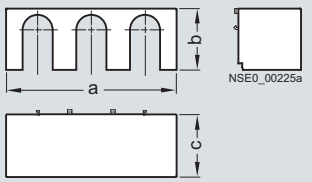
3NY7 601 touch protection cover
For 3NP40 75 and 3NP40 76 switch disconnectors



Cable lug cover for 3NP40 7, with 3NY7 101 flat terminal

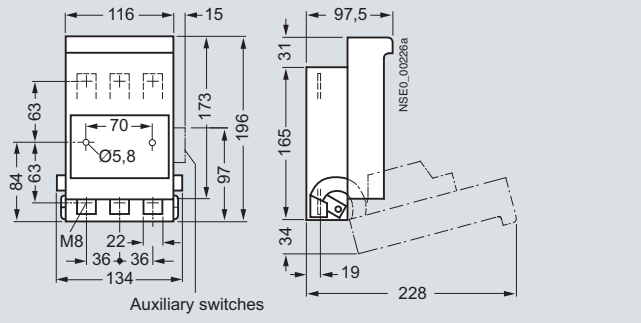


Cable lug cover for 3NP42 to 3NP44, 3NY7 121, 3NY7 131, 3NY7 141

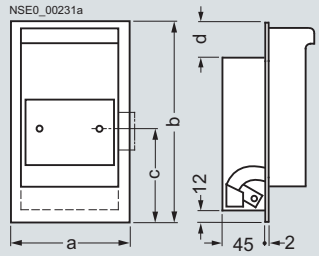


Type	a	b	c
3NY7 121	181	65	67
3NY7 131	207	79	50
3NY7 141	253	94	47

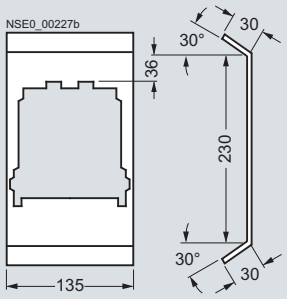
3NP50 60, 160 A
For mounting



3NP50 60, 160 A
With molded-plastic masking frame
For any type of installation

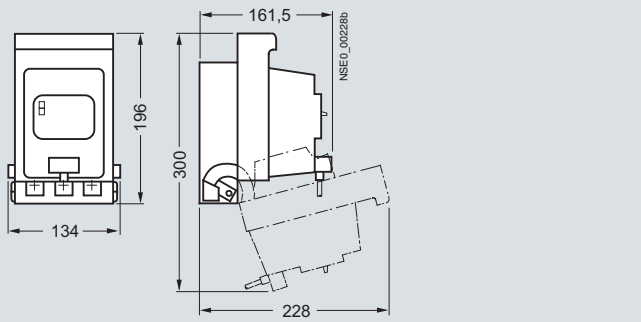


3NY1 107 molded-plastic masking frames



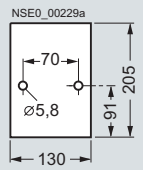
Type	a	b	c	d
3NY1 105	135	215	95.5	38
3NY1 115	135	215	95.5	38
3NY1 106	135	290	144.5	64
3NY1 108	135	290	144.5	64
3NY1 208	149	250	115	53.5

3NP50 60, 160 A
With fuse monitoring by 3RV1 motor starter protectors, with plug-in connector

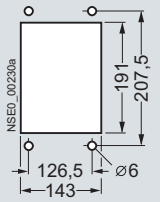


For plastic frames

Cutout
For 3NP50 60, with and without auxiliary switches

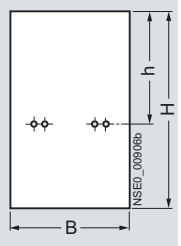


Cutout
For 3NY1 208 mounting kit



For metal frames

Cutouts for 3NP5



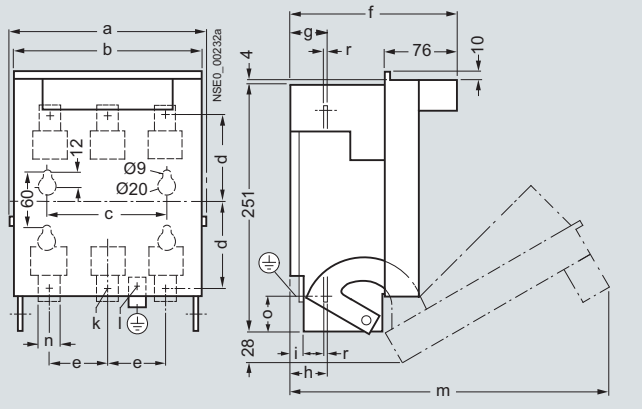
Type	Masking frame between assembly kit		Min. panel cutout		
	Molded-plastic masking frame behind panel				
	Type	B	H	B	H	h[1]
3NP50 6	3NY1 105[2]	135	215	130	206	115
3NP50 6	3NY1 125					
3NP52 6	3NY1 210	222	300	210	293	146
3NP53 6	3NY1 211	245	300	235	293	146
3NP54 6	3NY1 212	290	300	280	293	146
	Molded-plastic masking frame in front of panel					
	Type	B	H	B	H	h[1]
3NP50 6	3NY1 105	135	215	130	205	115
3NP50 6	3NY1 208	149	250	143	191	--
3NP52 6	3NY1 210	220	300	210	262	132

1) h = distance from upper edge of switchboard cutout to center of disconnector mounting.

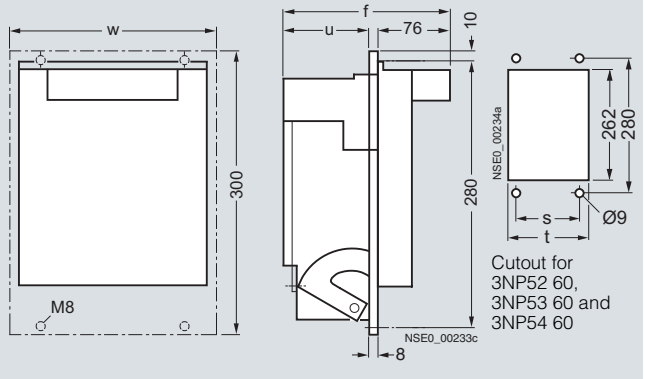
2) With standard molded-plastic masking frame behind panel and corresponding switchboard cutout, the standard switching capacity is reduced to the following AC 23B values: at 400 V I_e 160 A, at 500 V from I_e 160 A to 125 A and at 690 V from I_e 100 A to 50 A.

3NP LV HRC fuse switch disconnectors

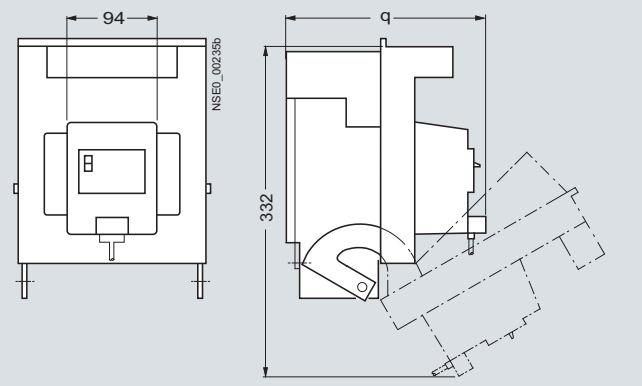
3NP5. 60, 250 to 630 A for mounting



3NP5. 60, 250 to 630 A with molded-plastic masking frame, for mounting



3NP5. 60, 250 to 630 A with fuse monitoring
by 3RV motor starter protectors, with plug-in connection



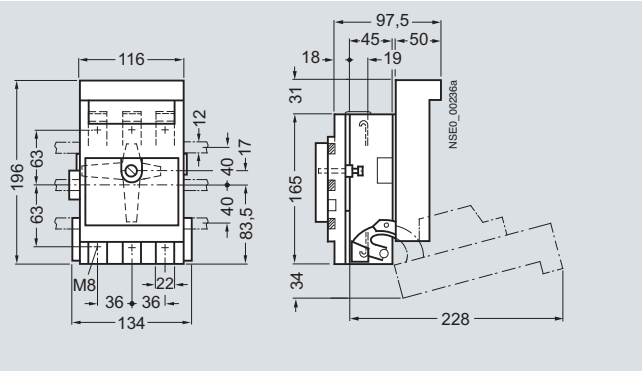
Type	a	b	c	d	e	f	g	h	i
3NP52 60	207	202	130	93	62	176	38	41	11.5
3NP53 60	231	226	130	106	70	192	39	39	11.5
3NP54 60	276	271	200	111	85	207	40.5	40.5	11.5

	k[1]	l[1]	m	n	o	q	r	s	t
3NP52 60	M10	M8	336	25	32	212	3.6	156	210
3NP53 60	M10	M10	352	25	25	228	4.4	180	234
3NP54 60	M10	M10	367	30	25	243	6	225	279

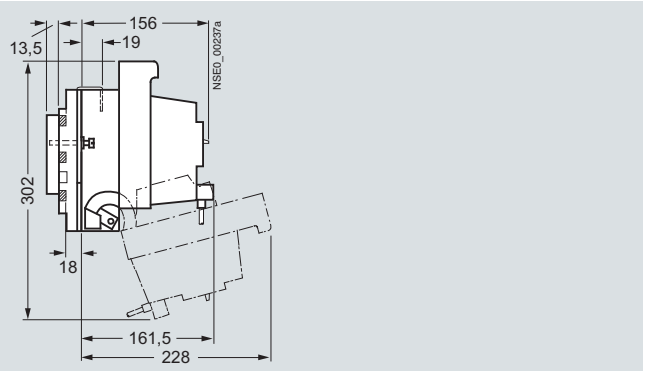
	u	w	x	y
3NP52 60	89.5	220	186.5	200.5
3NP53 60	105.5	245	202.5	216.5
3NP54 60	120.5	290	217.5	231.5

[1] Through-hole for screw.

3NP50 65, 160 A with busbar adapter,
busbar width 12 mm and thickness 5 mm or 10 mm

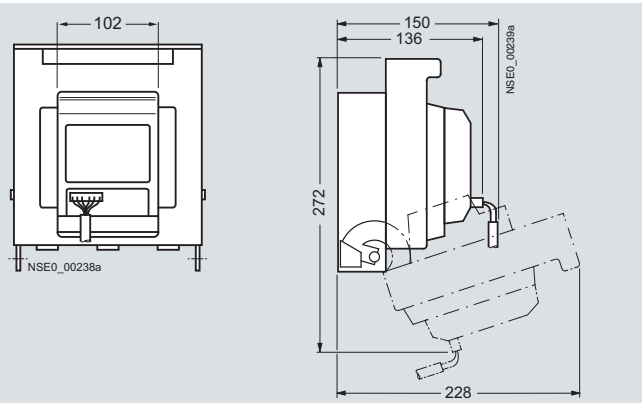


3NP50 65, 160 A with busbar adapter,
with fuse monitoring by 3RV motor starter protectors,
with plug-in connection

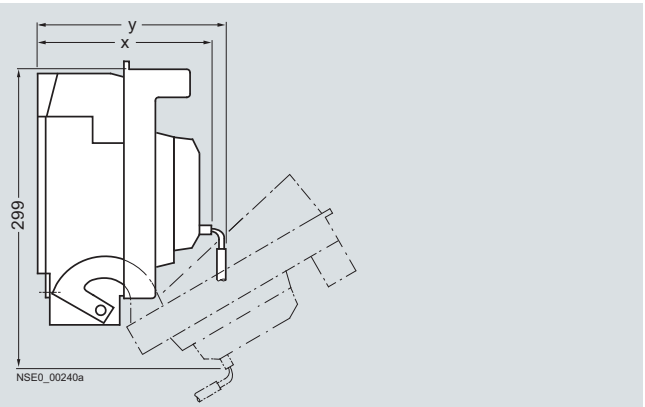


3NP5. 60, 160 to 630 A
With electronic fuse monitoring EF,
with plug-in connection and control cable

3NP50 60, 160 A
With electronic fuse monitoring EF, with
plug-in connection and control cable

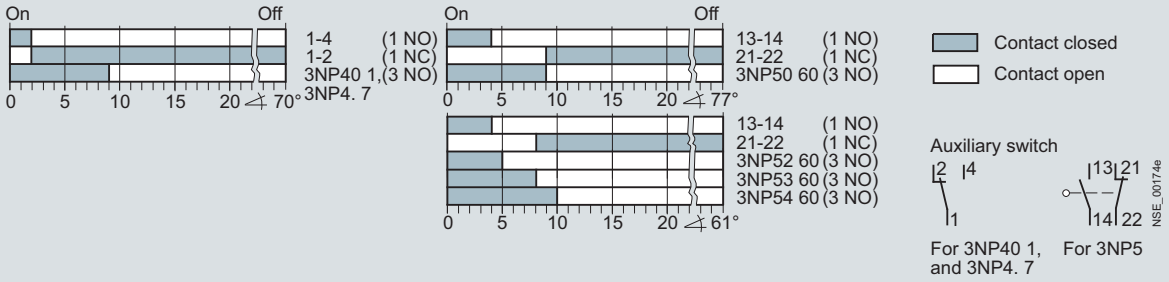


3NP5. 60, 250 to 630 A
With electronic fuse monitoring EF,
with plug-in connection and control cable



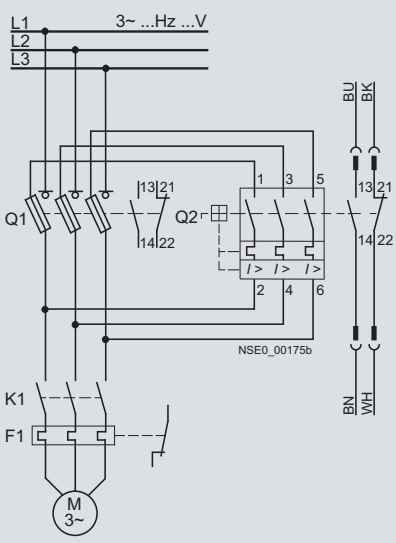
Schematics

Function auxiliary contact – main contact at SENTRON 3NP4 and 3NP5

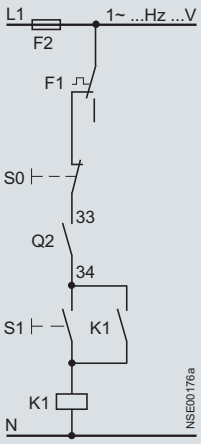


SENTRON 3NP fuse switch disconnectors with fuse monitoring (with 3RV1 motor starter protector, with auxiliary switch 1 NO + 1 NC)

Circuit diagram of main circuit



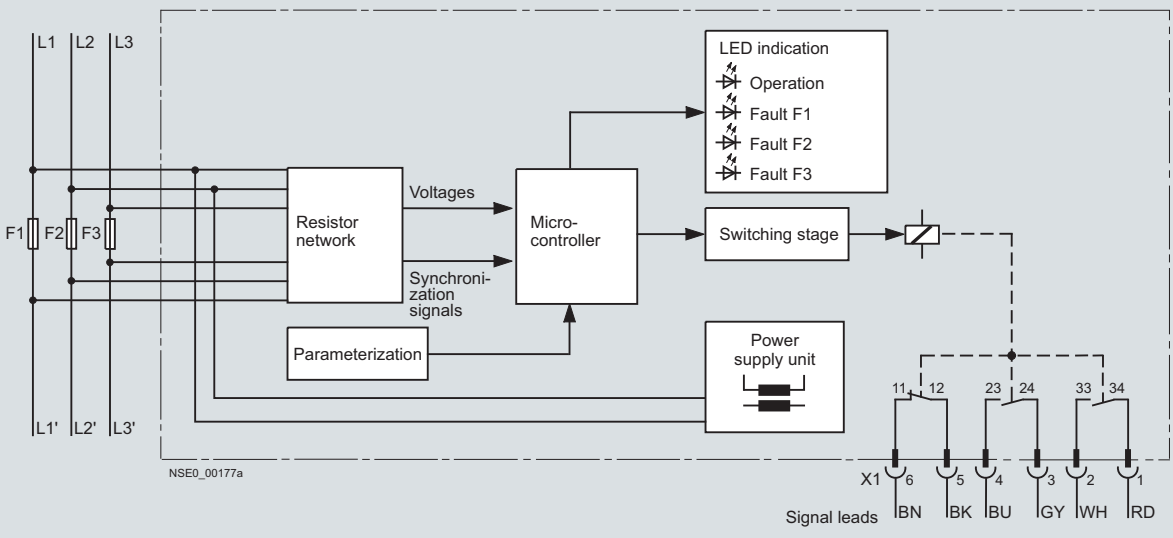
Circuit diagram of auxiliary circuit



Q1 = Fuse switch disconnector
Q2 = Motor starter protector
K1 = Contactor
S1 = ON pushbutton
S0 = OFF pushbutton
F1 = Overload relay
F2 = Control-circuit fuse

SENTRON 3NP5 fuse switch disconnectors with electronic fuse monitoring

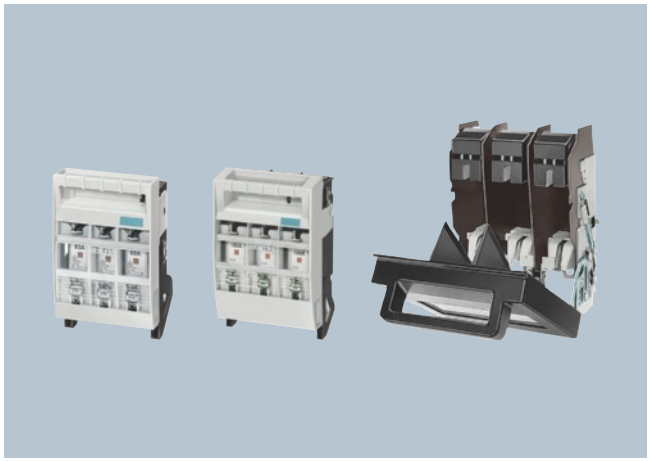
Block diagram



Version "A" (open-circuit principle):
Auxiliary switches only pick up if fuse faulty and voltage is applied.
Version "R" (closed-circuit principle):
Auxiliary contacts pick up as soon as voltage is applied and as long as fuses are intact.

More information

SENTRON 3NP fuse switch disconnectors



3NP40 10 3NP40 70 3NP52 with opened fuse carrier

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are climate-proof and meet the requirements of IEC 60947-1, IEC 60947-3 and DIN VDE 0660-107.
For use in heavily sulfurous atmospheres, the SENTRON 3NP5 series and the 3NP40 1 and 3NP40 7 versions are available as tinned modules (delivery on request). The SENTRON 3NP5 fuse switch disconnector series also complies with the standard BS 5419 and is approved for use in shipboard systems (use approved fuse links).

All SENTRON 3NP4 and 3NP5 fuse switch disconnectors can be sealed as standard or can be sealed through accessories.

Fuse monitoring by SIRIUS motor starter protector

For fuse monitoring, a SIRIUS motor starter protector is factory-fitted and hard-wired to the fuse carrier of the SENTRON 3NP4 and 3NP5 fuse switch disconnectors. If the fuse carrier is closed, the three conducting paths of the SIRIUS motor starter protector are switched in parallel to the fuse links to be monitored. If the fuse carrier is open, all main current paths of the motor starter protector are off circuit. The internal resistance of the motor starter protector is great enough not to impair the protective function of the monitored fuse links. Failure of a fuse will trip the motor starter protector.

Electronic fuse monitoring EF

For electronic fuse monitoring, the EF monitor is factory-fitted and hard-wired to the fuse carrier of SENTRON 3NP5 fuse switch disconnectors.

The EF monitor works independently of any loads. Failure of a fuse can be relayed to a control room through integrated auxiliary switches (2 NO + 1 NC) by means of a centralized fault indication or used to isolate the load through e.g. a contactor. Actuation of the auxiliary switch depends on the EF version. Version "A" stands for "open-circuit principle", version "R" for "closed-circuit principle" (see block diagram).

If a fuse is tripped, a green LED signal flashes (general fault) and the location of the failed fuse is indicated by a red LED. Using more than one device facilitates identification of the affected branch circuit. The EF monitor is automatically reset to the standby position once the faulty fuses are replaced. This state is indicated visually by the status display (green LED). The EF monitor is also suitable for use in industrial systems badly afflicted by harmonics.

Auxiliary switches

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors can also be retrofitted with auxiliary switches for indicating the switching position of the fuse carrier. One switch block (1 CO) can be mounted on SENTRON 3NP4 fuse switch disconnectors size LV HRC 000 and two switch blocks (1 CO) on sizes LV HRC 00 to LV HRC 3 respectively. SENTRON 3NP5 fuse switch disconnectors can also be delivered with a 2-pole auxiliary switch (1 NO + 1 NC) if required. The version with fuse monitoring is fitted with this auxiliary switch as standard.

The auxiliary switch of the motor starter protector can be used for indication purposes or to disconnect the main circuit, e.g. through a contactor. The signal lead for the SENTRON 3NP4 fuse switch disconnector size LV HRC 00 needs to be ordered separately. Sizes LV HRC 1 to LV HRC 3 are connected using flat terminations. Delivery of the SENTRON 3NP5 fuse switch disconnectors includes the signal lead, complete with connector. SIRIUS motor starter protectors cannot be used for fuse monitoring in branch circuits by motor starter protectors where a fault may result in > 220 V DC feedback. In the case of parallel cables and meshed networks, only a voltage difference of > 24 V at the switch will trigger the motor starter protector.

BETA Protecting SITOR Semiconductor Fuses

4

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**SITOR, LV HRC design**	4/3	Fuse links in LV HRC design and a huge variety of models support a wide range of applications from 500 V to 1500 V and 150 A to 1250 A. Fuses with slotted blade contacts, bolt-on links or female thread and special designs.		--	--	✓
	**SITOR, cylindrical fuse design**	4/17	Fuse links, fuse holders – can be used as fuse switch disconnectors and fuse bases to 600/690 V AC and 400/700 V DC from 1 to 100 A in sizes 10 × 38 mm, 14 × 51 mm and 22 × 58 mm.		--	--	✓
	**SILIZED, NEOZED and DIAZED design**	4/22	NEOZED fuse links for 400 V AC and 250 V DC and DIAZED for 500 V AC and 500 V DC.		--	--	✓

Overview

SITOR fuses protect power semiconductors from the effects of a short circuit because the super-quick disconnect characteristic is far quicker than that of conventional LV HRC fuses. They protect expensive devices and system components such as converters with fuses in the input and in the DC link, UPS systems and soft starters for motors.

Panel mounting requirements have given rise to various connection versions and designs.

The fuses with blade contacts comply with IEC 60269-2 and are suitable for installation in LV HRC fuse bases, in LV HRC switch disconnectors and in switch disconnectors with fuses. They also include fuses with slotted blade contacts for screw fixing with 110 mm mounting dimension, whose sizes comply with IEC 60269-4.

Fuses with slotted blade contacts for screw fixing with 80 mm or 110 mm mounting dimension are often screwed directly onto busbars for optimum heat dissipation. Even better heat transmission is provided by the compact fuses with M10 or M12 female thread, which are also mounted directly onto busbars.

Bolt-on links with 80 mm mounting dimension are another panel-mounting version for direct busbar mounting.

The fuses for SITOR thyristor sets, railway rectifiers or electrolysis systems were developed specially for these applications.

To find out which LV HRC fuse bases and safety switching devices can be used with the SITOR fuses, please refer to the chapter "Low-voltage fuse systems".

The characteristic curves for the configuration and assignment of SITOR fuses to fuse bases and 3NP and 3KL safety switching devices can be found in the Catalog ET B1 Add-On Characteristic Curves and on the Internet.

The new size 3 type ranges have a round ceramic body instead of a square one. Key features of these type ranges are small I^2t values with low power dissipation and a high alternating load capability. The dimensions and the functional dimensions comply with the current standards IEC 60269-4/EN 60269-4 (VDE 0636-4).

Note:
The ordering data of the fuses are listed in ascending order of the rated voltage in the selection tables.

Benefits

- SITOR fuses have a high varying load factor, which ensures a high level of operating safety and plant availability – even when subject to constant load change.
- The use of SITOR fuses in LV HRC bases or Siemens switch disconnectors has been tested with regard to heat dissipation and maximum current loading. This makes planning and dimensioning easier and prevents consequential damage.
- Our high standard of quality ensures good compliance with the characteristic curve and accuracy. This ensures long-term protection of devices.

Operational classes

Fuses are categorized according to function and operational classes. SITOR semiconductor fuses, in LV HRC design, are available in the following operational classes:

- aR: for the short-circuit protection of power semiconductors (partial range protection)
- gR: for the protection of power semiconductors (full range protection)
- gS: The gS operational class combines cable and line protection with semiconductor protection (full range protection).

SITOR, LV HRC design

Selection and ordering data

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
	SITOR, LV HRC design													
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors													
	3	150	500	gR	33000	35	0.85	B	**3NC2 423-3C**		047	1	3	0.940
		200			64000	40	0.85	B	**3NC2 425-3C**		047	1	3	0.940
		250			99000	50	0.85	B	**3NC2 427-3C**		047	1	3	0.940
		300			132000	65	0.85	B	**3NC2 428-3C**		047	1	3	0.940
		350		aR	249000	60	0.85	B	**3NC2 431-3C**		047	1	3	0.940
		400			390000	50	0.85	B	**3NC2 432-3C**		047	1	3	0.940
	With slotted blade contacts with two M10 oblong slots, or for installation in LV HRC fuse bases or switch disconnectors													
	3	150	500	gR	33000	35	0.85	D	**3NC2 423-0C**		047	1	3	0.940
		200			64000	40	0.85	D	**3NC2 425-0C**		047	1	3	0.940
		250			99000	50	0.85	D	**3NC2 427-0C**		047	1	3	0.940
		300			132000	65	0.85	D	**3NC2 428-0C**		047	1	3	0.940
		350		aR	249000	60	0.85	C	**3NC2 431-0C**		047	1	3	0.940
		400			390000	50	0.85	D	**3NC2 432-0C**		047	1	3	0.940
	With blade contacts for mounting in LV HRC fuse bases or switch disconnectors													
	3	710	600	gR	2460000	65	1.0	D	**3NE1 437-1**		047	1	3	1.120
		800			3350000	72	1.0	B	**3NE1 438-1**		047	1	3	1.113
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors													
	3	150	690	gR	17600	40	0.85	B	**3NC8 423-3C**		047	1	3	0.940
		200			38400	55	0.85	B	**3NC8 425-3C**		047	1	3	0.940
		250			70400	72	0.85	B	**3NC8 427-3C**		047	1	3	0.940
		350			176000	95	0.85	B	**3NC8 431-3C**		047	1	3	0.940
		500			448000	130	0.85	B	**3NC8 434-3C**		047	1	3	0.940
		1000	600	aR	2480000	140	0.9	C	**3NC8 444-3C**		047	1	3	0.940
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors							NEW						
	1	160	690	gR	18600	30	1.0	B	**3NE1 224-3**		047	1	3	0.610
		200			51800	28	1.0	B	**3NE1 225-3**		047	1	3	0.610
		250			80900	35	1.0	B	**3NE1 227-3**		047	1	3	0.610
		315			168000	42	1.0	B	**3NE1 230-3**		047	1	3	0.610
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors							NEW						
	2	350	690	gR	177000	44	1.0	B	**3NE1 331-3**		047	1	3	0.750
		400			224000	54	1.0	B	**3NE1 332-3**		047	1	3	0.750
		450			276500	62	1.0	B	**3NE1 333-3**		047	1	3	0.750
		500			398000	65	1.0	B	**3NE1 334-3**		047	1	3	0.750

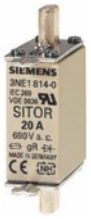
* You can order this quantity or a multiple thereof.

Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
SITOR, LV HRC design													
With slotted blade contacts for M12 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors							NEW						
3	560	690	gR	890000	60	1.0	B	**3NE1 435-3**		047	1	3	1.150
	630			1390000	62	1.0	B	**3NE1 436-3**		047	1	3	1.150
	670			1640000	65	1.0	B	**3NE1 447-3**		047	1	3	1.150
	710			1818000	72	1.0	B	**3NE1 437-3**		047	1	3	1.150
	800			2475000	82	1.0	B	**3NE1 438-3**		047	1	3	1.150
	850			3640000	76	1.0	B	**3NE1 448-3**		047	1	3	1.150
With slotted blade contacts with 2 M10 oblong slots for screw fixing, or for installation in LV HRC fuse bases or switch disconnectors													
3	150	690	gR	17600	40	0.85	B	**3NC8 423-0C**		047	1	3	0.940
	200			38400	55	0.85	B	**3NC8 425-0C**		047	1	3	0.940
	250			70400	72	0.85	B	**3NC8 427-0C**		047	1	3	0.940
	350			176000	95	0.85	B	**3NC8 431-0C**		047	1	3	0.940
	500			448000	130	0.85	B	**3NC8 434-0C**		047	1	3	0.940

Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A	V AC/ V DC		A^2s	W	WL					Unit(s)	Unit(s)	kg
SITOR, LV HRC design													
With M8 bolt-on links, mounting dimension: 80 mm, for screwing onto busbars													
000	20	690/ 700	gR	83	7	0.9	B	**3NE8 714-1**		047	1	10	0.130
	25			140	9	0.9	B	**3NE8 715-1**		047	1	10	0.130
	32			285	10	0.9	A	**3NE8 701-1**		047	1	10	0.131
	40			490	12	0.9	A	**3NE8 702-1**		047	1	10	0.131
	50			815	15	0.9	A	**3NE8 717-1**		047	1	10	0.132
	63		aR	1550	16	0.95	A	**3NE8 718-1**		047	1	10	0.132
	80			2700	18	0.9	▶	**3NE8 720-1**		047	1	10	0.131
	100			4950	19	0.95	▶	**3NE8 721-1**		047	1	10	0.130
	125			9100	23	0.95	▶	**3NE8 722-1**		047	1	10	0.131
	160			17000	31	0.9	▶	**3NE8 724-1**		047	1	10	0.132
	200			30000	36	0.9	▶	**3NE8 725-1**		047	1	10	0.130
	250			55000	42	0.9	▶	**3NE8 727-1**		047	1	10	0.133
	315			85500	54	0.85	▶	**3NE8 731-1**		047	1	10	0.134

*** You can order this quantity or a multiple thereof.**

SITOR, LV HRC design

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
	SITOR, LV HRC design													
	With blade contacts for mounting in LV HRC fuse bases or switch disconnectors													
	000	16	690	gS	200	3.0	1.0	▶	**3NE1 813-0**		047	1	3	0.127
		20			430	3.5	1.0	▶	**3NE1 814-0**		047	1	3	0.128
		25			780	4.0	1.0	▶	**3NE1 815-0**		047	1	3	0.127
		35			1700	5.0	1.0	▶	**3NE1 803-0**		047	1	3	0.128
		40			3000	5.0	1.0	▶	**3NE1 802-0**		047	1	3	0.127
		50			4400	6.0	1.0	▶	**3NE1 817-0**		047	1	3	0.128
		63			9000	7.0	1.0	▶	**3NE1 818-0**		047	1	3	0.128
		80			18000	8.0	1.0	▶	**3NE1 820-0**		047	1	3	0.129
	00	100	690	gS	33000	10	1.0	▶	**3NE1 021-0**		047	1	3	0.202
		125			63000	11	1.0	▶	**3NE1 022-0**		047	1	3	0.202
	1	160	690	gS	60000	24	1.0	▶	**3NE1 224-0**		047	1	3	0.580
		200			100000	27	1.0	▶	**3NE1 225-0**		047	1	3	0.582
		250			200000	30	1.0	▶	**3NE1 227-0**		047	1	3	0.580
		315			310000	38	1.0	A	**3NE1 230-0**		047	1	3	0.581
	2	350	690	gS	430000	42	1.0	▶	**3NE1 331-0**		047	1	3	0.766
		400			590000	45	1.0	▶	**3NE1 332-0**		047	1	3	0.743
		450			750000	53	1.0	A	**3NE1 333-0**		047	1	3	0.760
		500			950000	56	1.0	A	**3NE1 334-0**		047	1	3	0.766
	3	560	690	gS	1700000	50	1.0	A	**3NE1 435-0**		047	1	3	1.111
		630			2350000	55	1.0	A	**3NE1 436-0**		047	1	3	1.114
		710			3400000	60	1.0	A	**3NE1 437-0**		047	1	3	1.117
		800			5000000	59	1.0	A	**3NE1 438-0**		047	1	3	1.124
	00	80	690	gR	5800	10.5	1.0	A	**3NE1 020-2**		047	1	3	0.203
		100			11000	11.5	1.0	A	**3NE1 021-2**		047	1	3	0.203
		125			23000	13.5	1.0	A	**3NE1 022-2**		047	1	3	0.203
	1	160	690	gR	18600	30	1.0	A	**3NE1 224-2**		047	1	3	0.613
		200			51800	28	1.0	A	**3NE1 225-2**		047	1	3	0.612
		250			80900	35	1.0	A	**3NE1 227-2**		047	1	3	0.626
		315			168000	42	1.0	A	**3NE1 230-2**		047	1	3	0.615
	2	350	690	gR	177000	44	1.0	A	**3NE1 331-2**		047	1	3	0.754
		400			224000	54	1.0	B	**3NE1 332-2**		047	1	3	0.760
		450			276500	62	1.0	A	**3NE1 333-2**		047	1	3	0.768
		500			398000	65	1.0	A	**3NE1 334-2**		047	1	3	0.768
	3	560	690	gR	890000	60	1.0	A	**3NE1 435-2**		047	1	3	1.149
		630			1390000	62	1.0	A	**3NE1 436-2**		047	1	3	1.179
		670			1640000	65	1.0	A	**3NE1 447-2**		047	1	3	1.170
		710			1818000	72	1.0	B	**3NE1 437-2**		047	1	3	1.153
		800			2475000	82	1.0	A	**3NE1 438-2**		047	1	3	1.184
		850			3640000	76	1.0	A	**3NE1 448-2**		047	1	3	1.207

* You can order this quantity or a multiple thereof.

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
	SITOR, LV HRC design													
	With blade contacts for mounting in LV HRC fuse bases or switch disconnectors (contd.)													
	00	25	690	gR	180	7	0.95	▶	**3NE8 015-1**		047	1	3	0.205
		35			400	9	0.95	▶	**3NE8 003-1**		047	1	3	0.204
		50			700	14	0.95	▶	**3NE8 017-1**		047	1	3	0.203
		63			1400	16	0.95	▶	**3NE8 018-1**		047	1	3	0.205
		80		aR	2400	19	0.95	▶	**3NE8 020-1**		047	1	3	0.203
		100			4200	22	0.95	▶	**3NE8 021-1**		047	1	3	0.205
		125			6500	28	0.95	▶	**3NE8 022-1**		047	1	3	0.213
		160			13000	38	0.95	▶	**3NE8 024-1**		047	1	3	0.207
	With slotted blade contacts for M12 screw fixing, mounting dimension: 80 mm													
	3	630	690	aR	244000	120	0.85	C	**3NC3 236-1**		047	1	3	0.785
		710			346000	130	0.85	D	**3NC3 237-1**		047	1	3	0.785
		800			498000	135	0.9	C	**3NC3 238-1**		047	1	3	0.785
		900			677000	145	0.9	D	**3NC3 240-1**		047	1	3	0.785
		1000			975000	155	0.95	C	**3NC3 241-1**		047	1	3	0.785
		1100			1382000	165	0.95	D	**3NC3 242-1**		047	1	3	0.785
		1250			1990000	175	0.95	C	**3NC3 243-1**		047	1	3	0.785
		1400	500		2100000	200	0.95	D	**3NC3 244-1**		047	1	3	0.785
		1600			2860000	240	0.9	D	**3NC3 245-1**		047	1	3	0.785
	With M12 female thread at both ends for direct busbar mounting													
	3	630	690	aR	244000	125	0.9	C	**3NC3 236-6**		047	1	3	0.765
		710			346000	130	0.9	D	**3NC3 237-6**		047	1	3	0.765
		800			498000	135	0.95	C	**3NC3 238-6**		047	1	3	0.765
		900			677000	140	0.95	D	**3NC3 240-6**		047	1	3	0.765
		1000			975000	145	1.0	C	**3NC3 241-6**		047	1	3	0.765
		1100			1382000	150	1.0	D	**3NC3 242-6**		047	1	3	0.765
		1250			1990000	155	1.0	C	**3NC3 243-6**		047	1	3	0.765
		1400	500		2100000	175	1.0	C	**3NC3 244-6**		047	1	3	0.765
		1600			2860000	195	0.95	C	**3NC3 245-6**		047	1	3	0.765
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors													
	2	250	800	aR	29700	105	0.85	▶	**3NE4 327-0B**		047	1	3	0.753
		315			60700	120	0.85	▶	**3NE4 330-0B**		047	1	3	0.760
		450			191000	140	0.85	▶	**3NE4 333-0B**		047	1	3	0.760
		500			276000	155	0.85	▶	**3NE4 334-0B**		047	1	3	0.754
		710			923000	155	0.85	▶	**3NE4 337**		047	1	3	0.771
	With blade contacts for mounting in LV HRC fuse bases or switch disconnectors													
	0	32	1000	gR	280	12	0.9	▶	**3NE4 101**		047	1	3	0.278
		40			500	13	0.9	▶	**3NE4 102**		047	1	3	0.277
		50			800	16	0.9	▶	**3NE4 117**		047	1	3	0.276
		63		aR	1500	20	0.9	▶	**3NE4 118**		047	1	3	0.279
		80			3000	22	0.9	▶	**3NE4 120**		047	1	3	0.276
		100			6000	24	0.9	▶	**3NE4 121**		047	1	3	0.278
		125			14000	30	0.9	▶	**3NE4 122**		047	1	3	0.279
		160			29000	35	0.9	▶	**3NE4 124**		047	1	3	0.279

* You can order this quantity or a multiple thereof.

SITOR, LV HRC design

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
	SITOR, LV HRC design													
	With slotted blade contacts for M10 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors													
	1	100	1000	aR	4800	28	0.95	A	**3NE3 221**		047	1	3	0.580
		125			7200	36	0.95	A	**3NE3 222**		047	1	3	0.568
		160			13000	42	0.95	▶	**3NE3 224**		047	1	3	0.573
		200			30000	42	0.95	▶	**3NE3 225**		047	1	3	0.570
		250			48000	50	0.95	▶	**3NE3 227**		047	1	3	0.580
		315			80000	65	0.95	▶	**3NE3 230-0B**		047	1	3	0.585
		350			100000	75	0.9	A	**3NE3 231**		047	1	3	0.590
		400			135000	85	0.9	A	**3NE3 232-0B**		047	1	3	0.576
		450			175000	95	0.9	▶	**3NE3 233**		047	1	3	0.720
	2	400	1000	aR	135000	85	1.0	A	**3NE3 332-0B**		047	1	3	0.759
		450			175000	90	1.0	A	**3NE3 333**		047	1	3	0.748
		500			260000	90	1.0	▶	**3NE3 334-0B**		047	1	3	0.753
		560			360000	95	1.0	▶	**3NE3 335**		047	1	3	0.756
		630			600000	100	1.0	▶	**3NE3 336**		047	1	3	0.760
		710	900	aR	800000	105	1.0	▶	**3NE3 337-8**		047	1	3	0.762
		800	800		850000	130	0.95	▶	**3NE3 338-8**		047	1	3	0.764
		900	690		920000	165	0.95	▶	**3NE3 340-8**		047	1	3	0.753
	With slotted blade contacts for M10 screw fixing, mounting dimension: 130 mm													
	3	100	1000	aR	13500	25	1.0	D	**3NE3 421-0C**		047	1	3	1.120
		224			54000	85	1.0	B	**3NE3 626-0C**		047	1	3	1.120
		315			218000	80	1.0	B	**3NE3 430-0C**		047	1	3	1.120
		400			364000	110	1.0	B	**3NE3 432-0C**		047	1	3	1.120
		450			488000	110	1.0	B	**3NE3 635-0C**		047	1	3	1.120
		500			870000	95	1.0	B	**3NE3 434-0C**		047	1	3	1.120
		630			1280000	132	1.0	D	**3NE3 636-0C**		047	1	3	1.120
		710			1950000	145	1.0	D	**3NE3 637-0C**		047	1	3	1.120
	With M10 female thread at both ends for direct mounting on busbars													
	3	450	1000	aR	488000	110	1.0	D	**3NE3 635-6**		047	1	3	1.184
	With slotted blade contacts for M12 screw fixing, mounting dimension: 140 mm													
	3	710	1000	aR	1950000	145	1.0	D	**3NE3 637-1C**		047	1	3	1.120
	With slotted blade contacts for M12 screw fixing, mounting dimension: 110 mm, or for installation in LV HRC fuse bases or switch disconnectors													
	3	630	1000	aR	418000	145	0.85	C	**3NC3 336-1**		047	1	3	1.020
		710			569000	150	0.85	D	**3NC3 337-1**		047	1	3	1.020
		800			819000	155	0.85	C	**3NC3 338-1**		047	1	3	1.020
		900			1160000	165	0.9	D	**3NC3 340-1**		047	1	3	1.020
		1000			1670000	170	0.9	C	**3NC3 341-1**		047	1	3	1.020
		1100	800		1910000	185	0.9	D	**3NC3 342-1**		047	1	3	1.020
		1250			2600000	210	0.9	D	**3NC3 343-1**		047	1	3	1.020

* You can order this quantity or a multiple thereof.

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
	SITOR, LV HRC design													
	With M12 female thread at both ends for direct busbar mounting													
	3	630	1000	aR	418000	130	0.90	C	**3NC3 336-6**		047	1	3	0.980
		710			569000	140	0.90	D	**3NC3 337-6**		047	1	3	0.980
		800			819000	150	0.90	C	**3NC3 338-6**		047	1	3	0.980
		900			1160000	160	0.95	D	**3NC3 340-6**		047	1	3	0.980
		1000			1670000	165	0.95	C	**3NC3 341-6**		047	1	3	0.980
		1100	800		1910000	175	0.95	D	**3NC3 342-6**		047	1	3	0.980
		1250			2600000	185	0.95	C	**3NC3 343-6**		047	1	3	0.980
	With slotted blade contacts for M12 screw fixing, mounting dimension: 110 mm						NEW							
	3	315	1250	aR	72500	80	0.95	B	**3NC3 430-1**		047	1	3	0.950
		400			163000	95	0.95	B	**3NC3 432-1**		047	1	3	0.950
		500			290000	115	0.90	B	**3NC3 434-1**		047	1	3	0.950
		630			650000	120	0.95	B	**3NC3 436-1**		047	1	3	0.950
		800	1100		985000	145	0.90	B	**3NC3 438-1**		047	1	3	1.150
	With M12 female thread at both ends for direct busbar mounting						NEW							
	3	315	1250	aR	72500	80	0.95	B	**3NC3 430-6**		047	1	3	0.910
		400			163000	95	0.95	B	**3NC3 432-6**		047	1	3	0.910
		500			290000	115	0.90	B	**3NC3 434-6**		047	1	3	0.910
		630			650000	120	0.95	B	**3NC3 436-6**		047	1	3	0.910
		800	1100		985000	145	0.95	B	**3NC3 438-6**		047	1	3	1.110
	With slotted blade contacts for M10 screw fixing, mounting dimension: 210 mm													
	3	160	1500	aR	54000	56	1.0	D	**3NE5 424-0C**		047	1	2	1.860
		224			138000	80	1.0	C	**3NE5 426-0C**		047	1	2	1.860
		315			311000	115	1.0	D	**3NE5 430-0C**		047	1	2	1.860
		350			428000	135	1.0	D	**3NE5 431-0C**		047	1	2	1.860
		450			870000	145	0.95	D	**3NE5 433-0C**		047	1	2	1.860
		450			870000	145	0.95	D	**3NE5 433-1C**		047	1	2	1.860
	With slotted blade contacts for M10 screw fixing, mounting dimension: 170 mm													
	3	250	1500	aR	84000	130	1.0	D	**3NE5 627-0C**		047	1	3	1.520
		450			590000	160	1.0	B	**3NE5 633-0C**		047	1	3	1.520
		600			1950000	145	1.0	D	**3NE5 643-0C**		047	1	3	1.520
	With slotted blade contacts for M10 screw fixing, mounting dimension: 210 mm													
	3	200	2000	aR	138000	75	1.0	D	**3NE7 425-0C**		047	1	2	1.860
		250			218000	110	1.0	D	**3NE7 427-0C**		047	1	2	1.860
		350			555000	120	1.0	D	**3NE7 431-0C**		047	1	2	1.860
		400			870000	150	1.0	D	**3NE7 432-0C**		047	1	2	1.860
		450			960000	160	1.0	D	**3NE7 633-0C**		047	1	2	1.860
		630			1950000	220	1.0	D	**3NE7 636-0C**		047	1	2	1.860
	With slotted blade contacts for M12 screw fixing, mounting dimension: 210 mm													
	3	450	2000	aR	960000	160	1.0	C	**3NE7 633-1C**		047	1	2	1.860
		525			1120000	210	1.0	D	**3NE7 648-1C**		047	1	2	1.860
		630			1950000	220	1.0	C	**3NE7 636-1C**		047	1	1	1.860
		710			3110000	275	1.0	B	**3NE7 637-1C**		047	1	2	1.860

*** You can order this quantity or a multiple thereof.**

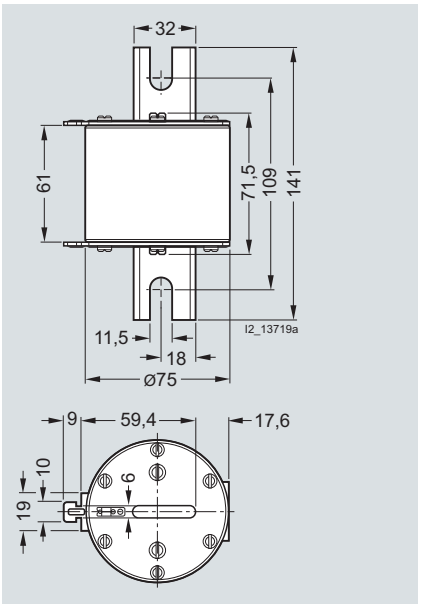
SITOR, LV HRC design

	Size	I_e	U_e	Operational classes	Breaking I^2t value	Power loss	Varying load factor	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC		A^2s	W	WL					Unit(s)	Unit(s)	kg
		SITOR, LV HRC design												
		With slotted blade contacts for M12 screw fixing, mounting dimension: 260 mm												
	3	400	2500	aR	620000	250	1.0	D	**3NE9 632-1C**		047	1	1	2.350
		500			1270000	235	1.0	D	**3NE9 634-1C**		047	1	1	2.350
		630			2800000	275	1.0	D	**3NE9 636-1C**		047	1	1	2.350
		Fuses for special applications												
		For screwing onto water-cooled busbars, for rectifiers in electrolysis systems												
	--[1]	350	800	aR	260000	80	0.9	X	**3NC5 531**		047	1	3	0.671
		600	1000		888000	150	0.9	D	**3NC5 840**		047	1	3	1.408
		630	800		888000	145	0.9	C	**3NC5 841**		047	1	3	1.185
		800	1000		1728000	170	0.9	D	**3NC5 838**		047	1	3	1.196
		710	900		620000	150	0.9	D	**3NE6 437-7**		047	1	3	1.168
		1250	600		2480000	210	0.9	D	**3NE9 450-7**		047	1	3	1.245
		With M10 female thread at both ends for direct mounting on busbars, for air-cooled rectifiers in electrolysis systems												
	--[1]	710	900	gR	620000	150	0.9	D	**3NE6 437**		047	1	3	1.093
		850	600		2480000	85	1.0	D	**3NE9 440-6**		047	1	3	1.082
		900	900	aR	1920000	170	0.9	C	**3NE6 444**		047	1	3	1.175
		1250	600		2480000	210	0.9	D	**3NE9 450**		047	1	3	1.114
		Fuses with installation holder for SITOR 6QG10 thyristor sets												
	--	200	1000	aR	44000	50	0.85	D	**3NE3 525-5**		047	1	2	0.744
		450			395000	90	0.85	D	**3NE3 535-5**		047	1	2	0.746
		Fuses with installation holder for SITOR 6QG11 thyristor sets												
	--[1]	50	1000	gR	1100	20	0.85	C	**3NE4 117-5**		047	1	2	0.303
		100		aR	7400	35	0.85	B	**3NE4 121-5**		047	1	2	0.309
		170		aR	60500	43	0.85	B	**3NE4 146-5**		047	1	2	0.311
		Fuses female thread at both ends for SITOR 6QG12 thyristor sets												
	--[1]	250	800	aR	29700	105	0.85	▶	**3NE4 327-6B**		047	1	3	0.692
		315			60700	120	0.85	▶	**3NE4 330-6B**		047	1	3	0.688
		450			191000	140	0.85	▶	**3NE4 333-6B**		047	1	3	0.690
		500			276000	155	0.85	▶	**3NE4 334-6B**		047	1	3	0.688
		710			923000	155	0.95	▶	**3NE4 337-6**		047	1	3	0.689
		With M12 female thread at both ends for direct mounting on busbars for railway supply rectifiers												
	--[1]	250	680	aR	635000	25	0.9	D	**3NC7 327-2**		047	1	3	0.725
		350			1430000	32	0.9	D	**3NC7 331-2**		047	1	3	0.740

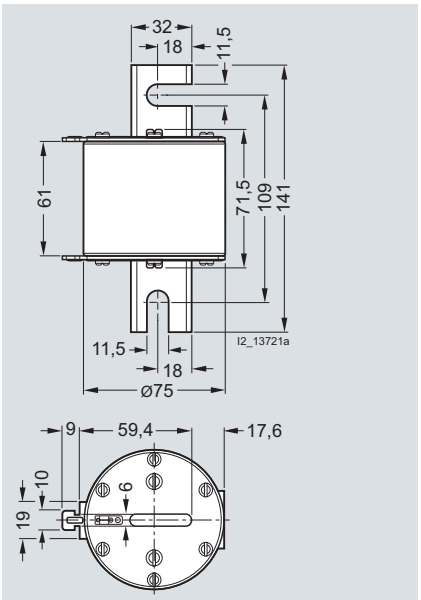
[1] Special design.

* You can order this quantity or a multiple thereof.

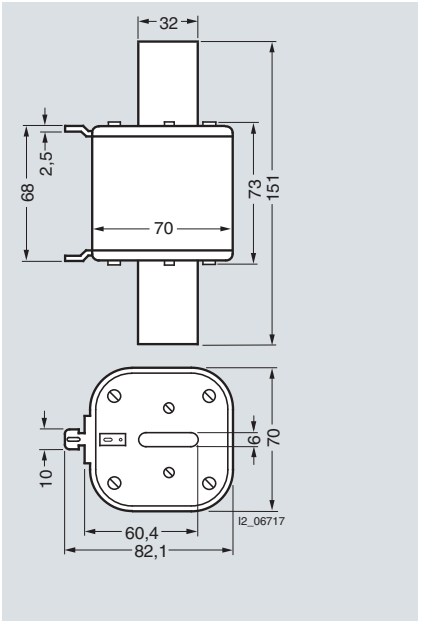
Dimensional drawings



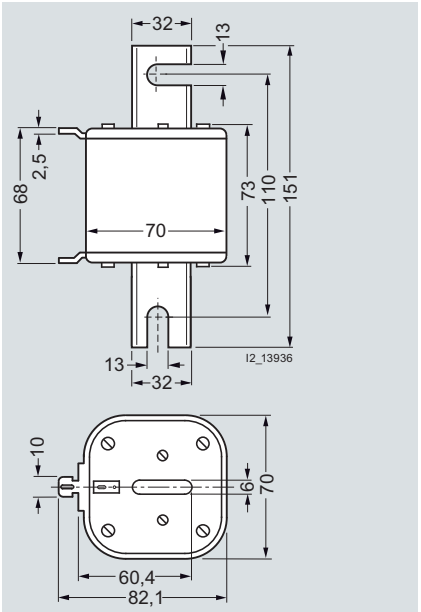
3NC2 4..-0C, 3NC8 4..-0C



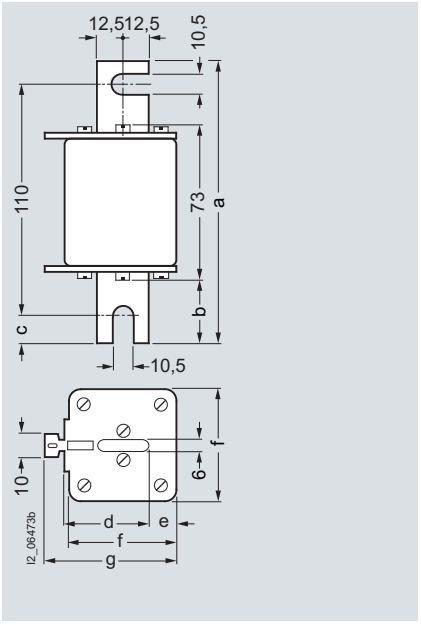
3NC2 4..-3C, 3NC8 4..-3C



3NE1 43.-0, 3NE1 43.-1



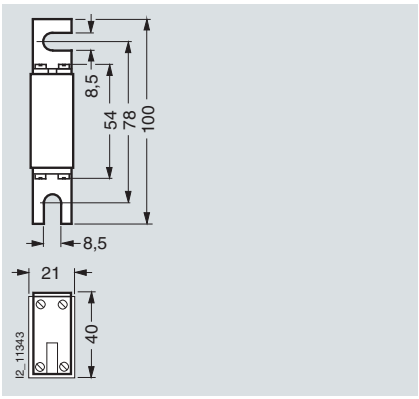
3NE1 4..-3



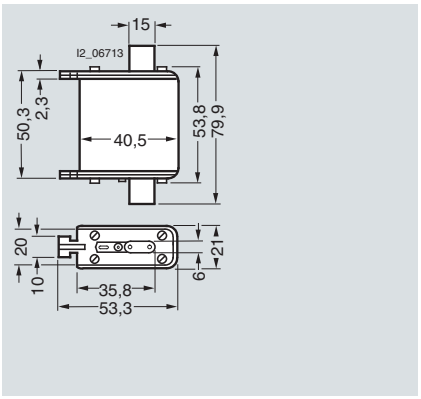
3NE1 2..-3, 3NE1 3..-3

Type	Dimensions (mm)						
	a	b	c	d	e	f	g
3NE1 2..-3	135	31	12.5	40.5	13.5	52	63.5
3NE1 3..-3	149	38	19.5	47.5	15	60	72

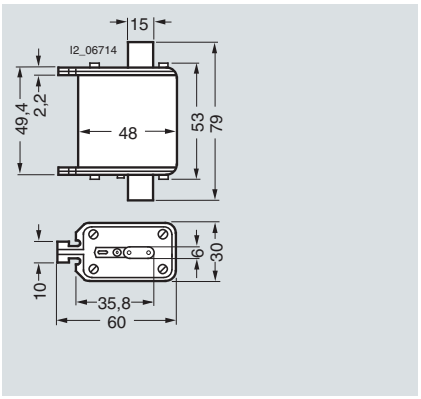
SITOR, LV HRC design



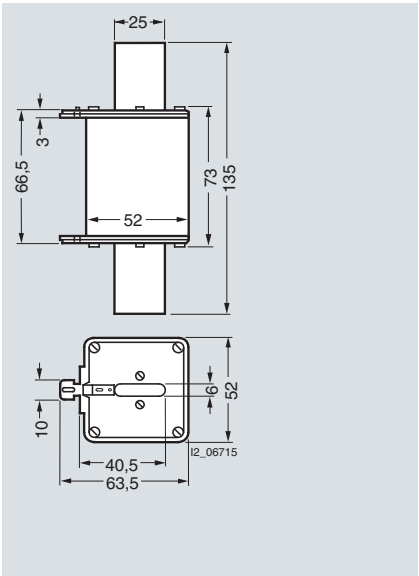
3NE8 7..-1



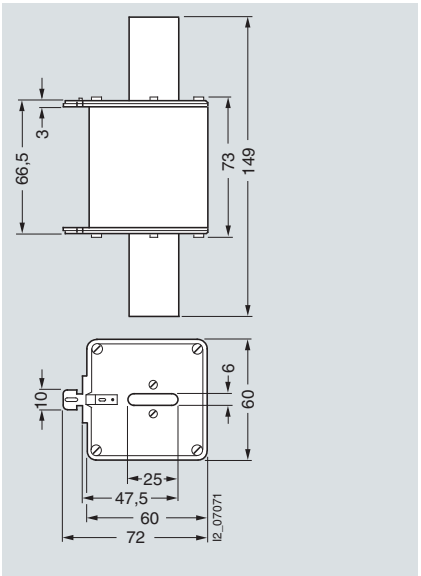
3NE1 8..-0



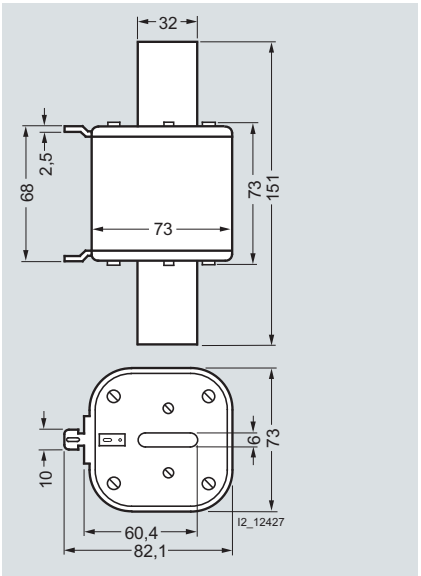
3NE1 02.-0, 3NE1 02.-2, 3NE8 0..-1



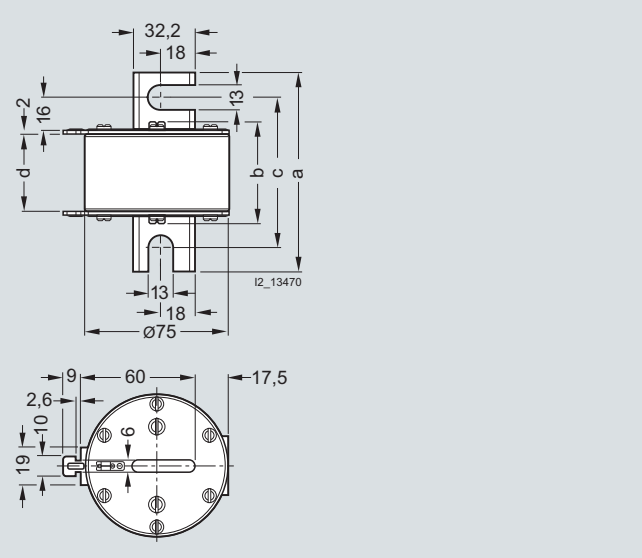
3NE1 2..-0, 3NE1 2..-2



3NE1 33.-0, 3NE1 33.-2

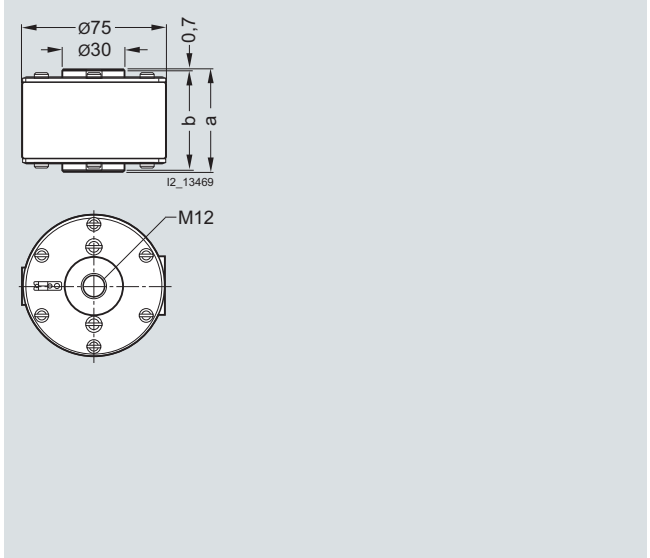


3NE1 4..-2



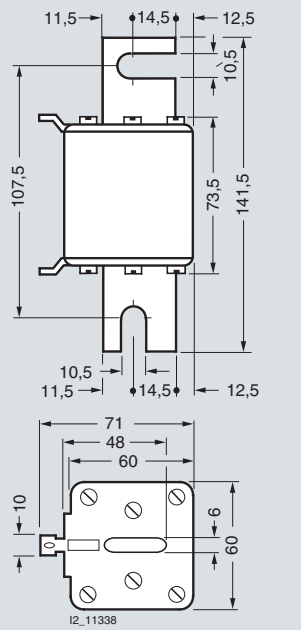
3NC3 2..-1, 3NC3 3..-1

Type	Dimensions (mm)			
	a	b	c	d
3NC3 2..-1	102	51	78	40
3NC3 3..-1	139	72	108	61

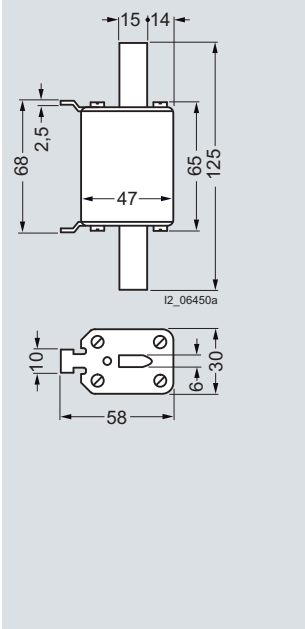


3NC3 2..-6, 3NC3 3..-6

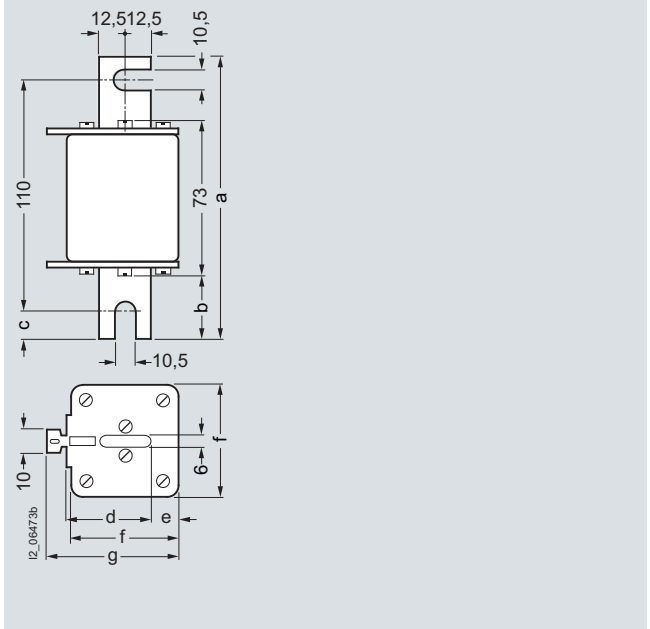
Type	Dimensions (mm)	
	a	b
3NC3 2..-6	52	50
3NC3 3..-6	73	71



3NE4 3..-0B, 3NE4 337



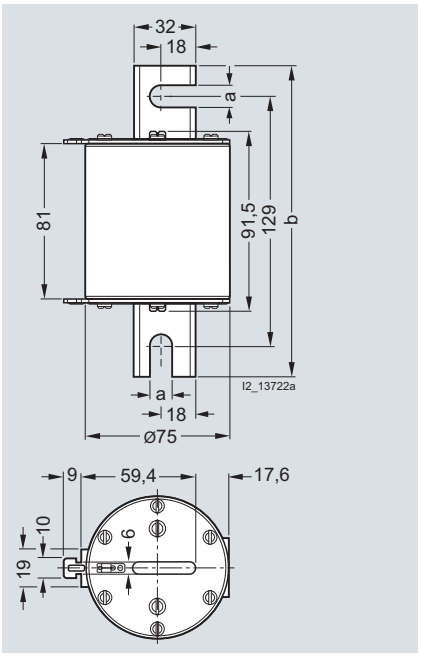
3NE4 1..



3NE3 22., 3NE3 23., 3NE3 3..

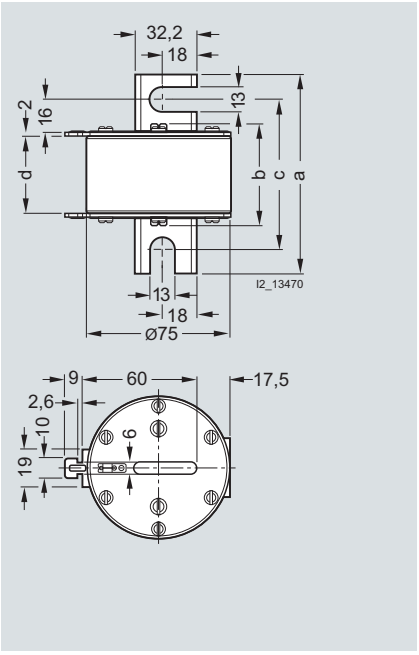
Type	Dimensions (mm)						
	a	b	c	d	e	f	g
3NE3 22.	135	31	12.5	40.5	13.5	52	63.5
3NE3 23.	135	31	12.5	40.5	13.5	52	63.5
3NE3 3..	149	38	19.5	47.5	15	60	72

SITOR, LV HRC design



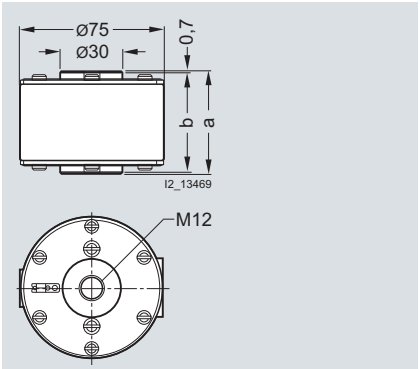
3NE3 . . .-0C, 3NE3 6. .-1C

Type	Dimensions (mm)	
	a	b
3NE3 . . .-0C	11.5	161
3NE3 6. .-1C	13	171



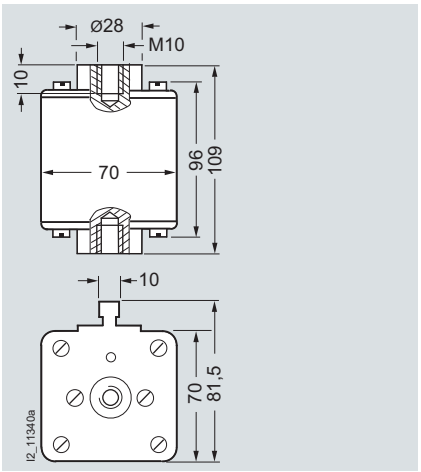
3NC3 4. .-1

Type	Dimensions (mm)			
	a	b	c	d
3NC3 4. .-1	139	72	108	61

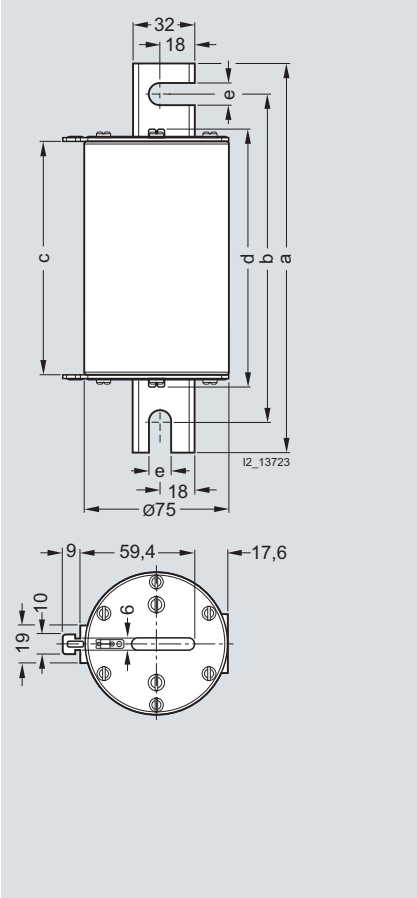


3NC3 4. .-6

Type	Dimensions (mm)	
	a	b
3NC3 4. .-6	73	71

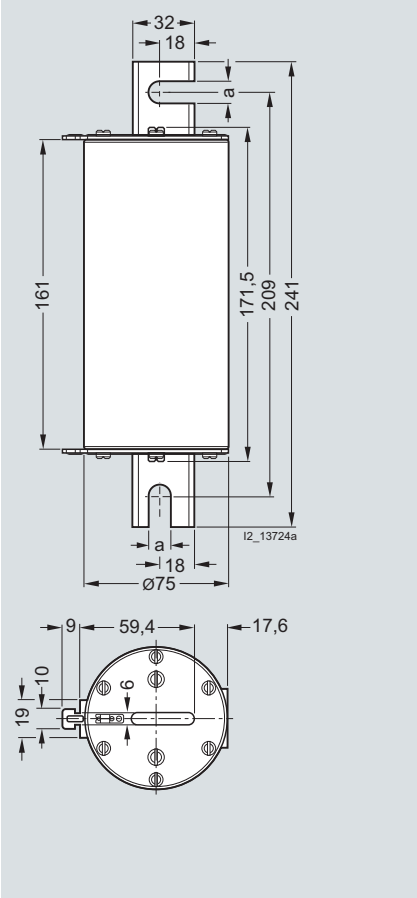


3NE3 635-6



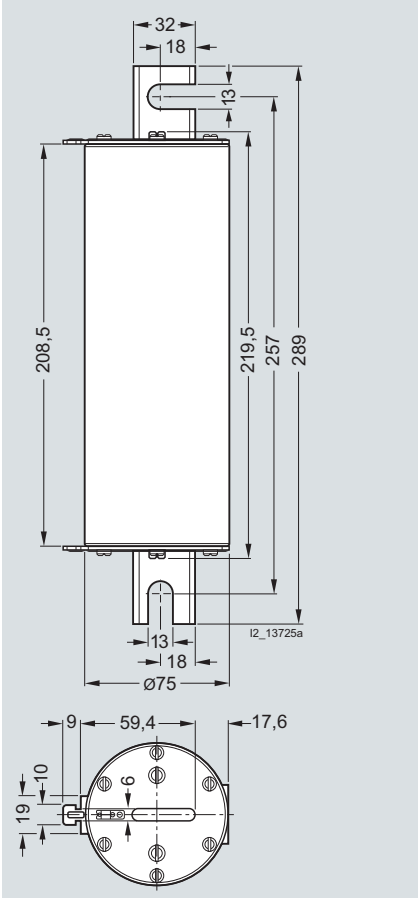
3NE5 6..-0C

Type	Dimensions (mm)				
	a	b	c	d	e
3NE5 6..-0C	201	169	121	131.5	11.5



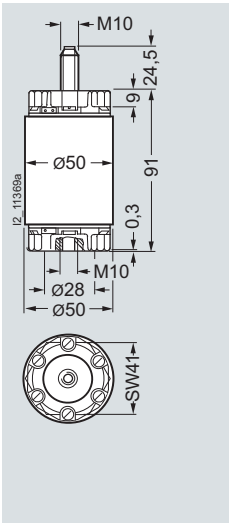
3NE5 4..-0C, 3NE5 4..-1C;
3NE7 ...-0C, 3NE7 ...-1C

Type	Dimensions (mm)
	a
3NE5 4..-0C	11.5
3NE5 4..-1C	13
3NE7 ...-0C	11.5
3NE7 ...-1C	13

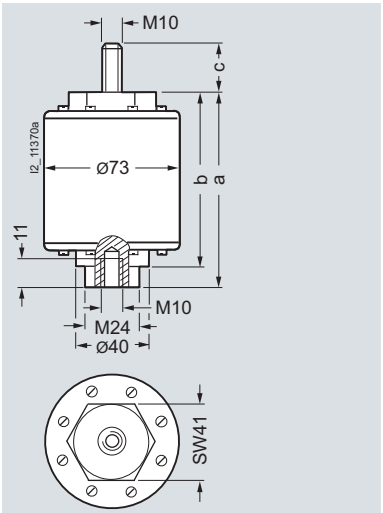


3NE9 6..-1C

SITOR, LV HRC design

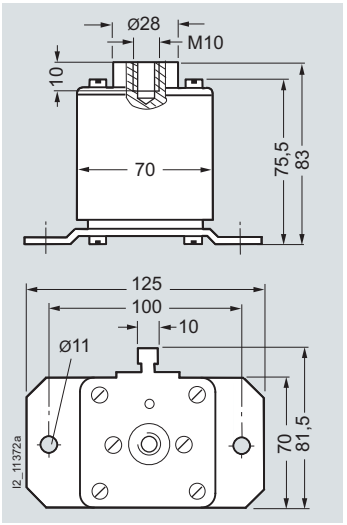


3NC5 531

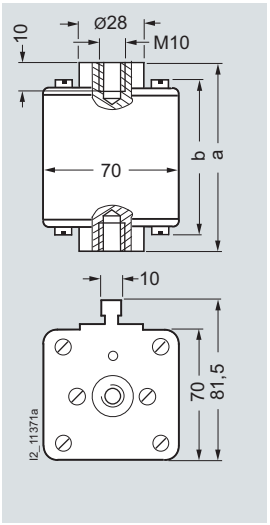


3NC5 8. .

Type	Dimensions (mm)		
	a	b	c
3NC5 838	98	88.5	25
3NC5 841	98	88.5	25
3NC5 840	119	109.5	20.5

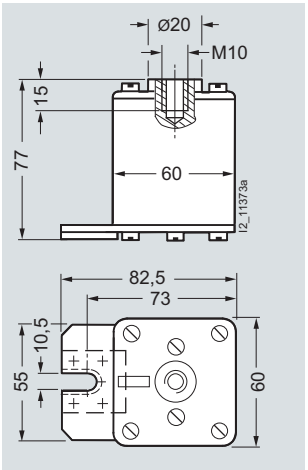


3NE6 4. .-7, 3NE9 4. .-7

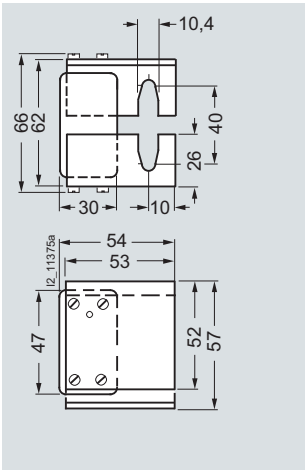


3NE6 4. ., 3NE9 4. .

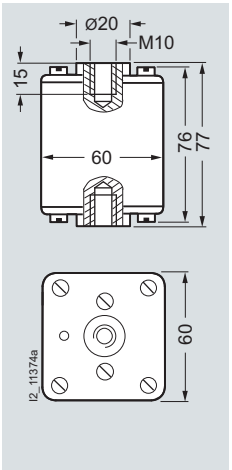
Type	Dimensions (mm)	
	a	b
3NE6 437	89	76
3NE9 450	89	76
3NE9 440-6	89	76
3NE6 444	99	86



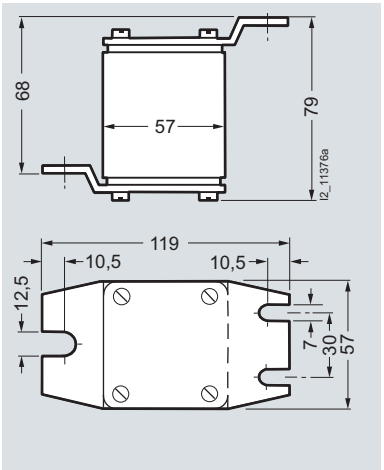
3NE3 . . .-5



3NE4 1. .-5



3NE4 3. .-6B, 3NE4 337-6



3NC7 3. .-2

Overview

SITOR cylindrical fuses protect power semiconductors against the effects of short circuits because the super quick disconnect characteristic is far quicker than that of conventional fuses. They protect expensive devices and system components such as semiconductor contactors, electronic relays (solid state), converters with fuses in the input and in the DC link, UPS systems and soft starters for motors up to 100 A.

The cylindrical design is approved for industrial applications. The cylindrical fuse links comply with IEC 60269.

Cylindrical fuse holders also comply with IEC 60269 and UL 512. The cylindrical fuse holders for 10 x 38 mm and 14 x 51 mm have been tested and approved as fuse switch disconnectors and the cylindrical fuse holders for 22 x 58 mm as fuse disconnectors according to the switching device standard IEC 60947-3. The utilization category and the tested current and voltage values are specified in the Table "Technical Specifications".

The cylindrical fuse holders have been specially developed for the application of SITOR fuse links with regard to heat tolerance and heat dissipation and are therefore not recommended for standard applications.

Cylindrical fuse bases do not offer the same comprehensive touch protection as the fuse holders, but have better heat dissipation. The single-pole cylindrical fuse bases for 14 x 51 mm and 22 x 58 mm allow modular expansion to multipole bases.

Benefits

- Cylindrical fuses have an extremely compact design and a correspondingly small footprint.
- The cylindrical fuses have IEC and UL approval and are suitable for universal use worldwide.
- The use of SITOR cylindrical fuses in the cylindrical fuse holders and bases has been tested with regard to heat dissipation and maximum current loading. This makes planning and dimensioning easier and prevents consequential damage.
- The use of fuse holders as switch disconnectors expands the area of application of these devices and increases operating safety.

Technical specifications

Sizes	mm × mm	**10 × 38**	**14 × 51**	**22 × 58**
		Cylindrical fuse links 3NC1 0, 3NC1 4, 3NC2 2		
Standards		IEC 60269-4; UL 248-13; CSA C22.2 No. 248.13		
Approved acc. to		UL 248-13; UL File No. E167357; CSA C22.2 No. 248.13		
		Fuse holders, fuse bases 3NC1, 3NC2		
Standards		IEC 60269-2; EN 60947-3;UL 512; CSA C22.2 No. 39-M		
Approved acc. to		UL 512; UL File No. E220063; CSA C22.2 No. 39-M		
Rated voltage	V AC	690		
Rated current I_n	A	32	50	100
Max. power dissipation of fuse links (conductor cross-section used)	W	3 (6 mm^2) 4.3 (10 mm^2)	5 (10 mm^2) 6.5 (25 mm^2)	9.5 (35 mm^2) 11 (50 mm^2)
Feeder terminals	mm^2	1.5 ... 25	1.5 ... 35	4 ... 50
Conductor cross-sections				
• Solid and stranded	mm^2	1.5 ... 25	1.5 ... 35	4 ... 50
• AWG Conductor cross-section, solid and stranded	AWG	18 ... 4	14 ... 2	10 ... 1/0
Utilization category Acc. to IEC 60947-3		AC 22B/32 A/400 V AC 22B/10 A/690 V	AC 22B/50 A/400 V AC 22B/20 A/690 V	AC 20B/690 V
Rated conditional short-circuit current				
• At 400 V	kA	50 (32 A gG)	100 (50 A gG)	100 (100 A gG) 80 (80 A gG)

SITOR, cylindrical fuse design

Selection and ordering data

Size	I_e	U_e	Breaking I^2t value	Power loss	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
mm × mm	A	V AC/ V DC	A^2s	W					Unit(s)	Unit(s)	kg
Cylindrical fuse links, operational class aR											
10 × 38	3	600/400	8	1.2	A	**3NC1 003**		047	1	10	0.009
	6		20	1.5	▶	**3NC1 006**		047	1	10	0.009
	8		30	2	B	**3NC1 008**		047	1	10	0.009
	10		60	2.5	▶	**3NC1 010**		047	1	10	0.009
	12		110	3	B	**3NC1 012**		047	1	10	0.009
	16		150	3.5	▶	**3NC1 016**		047	1	10	0.009
	20		200	4.8	▶	**3NC1 020**		047	1	10	0.009
	25		250	6	▶	**3NC1 025**		047	1	10	0.009
	32		500	7.5	▶	**3NC1 032**		047	1	10	0.009
14 × 51	1	660/700	1.2	5	B	**3NC1 401**		047	1	10	0.020
	2		10	3	▶	**3NC1 402**		047	1	10	0.020
	3		15	2.5	B	**3NC1 403**		047	1	10	0.020
	4		25	3	▶	**3NC1 404**		047	1	10	0.020
	5	690/700	9	1.5	B	**3NC1 405**		047	1	10	0.020
	6		12	1.5	▶	**3NC1 406**		047	1	10	0.020
	10		20	4	▶	**3NC1 410**		047	1	10	0.020
	15		75	5.5	▶	**3NC1 415**		047	1	10	0.020
	20		120	6	▶	**3NC1 420**		047	1	10	0.020
	25		250	7	▶	**3NC1 425**		047	1	10	0.020
	30		300	9	B	**3NC1 430**		047	1	10	0.020
	32		700	7.6	▶	**3NC1 432**		047	1	10	0.021
	40		900	8	▶	**3NC1 440**		047	1	10	0.021
	50		1800	9	▶	**3NC1 450**		047	1	10	0.021
22 × 58	20	690/700	220	4.6	B	**3NC2 220**		047	1	5	0.056
	25		300	5.6	B	**3NC2 225**		047	1	5	0.056
	32		450	7	B	**3NC2 232**		047	1	5	0.056
	40		700	8.5	B	**3NC2 240**		047	1	5	0.056
	50		1350	9.5	▶	**3NC2 250**		047	1	5	0.056
	63		2600	11	▶	**3NC2 263**		047	1	5	0.056
	80		5500	13.5	▶	**3NC2 280**		047	1	5	0.057
	100	600/700	8000	16	▶	**3NC2 200**		047	1	5	0.057
Cylindrical fuse links with striking pin, operational class aR											
14 × 51	10	690/700	90	4	B	**3NC1 410-5**		047	1	10	0.020
	15		100	5.5	B	**3NC1 415-5**		047	1	10	0.020
	20		500	6	B	**3NC1 420-5**		047	1	10	0.020
	25		400	7	C	**3NC1 425-5**		047	1	10	0.020
	30		500	9	C	**3NC1 430-5**		047	1	10	0.020
	32		600	7.6	B	**3NC1 432-5**		047	1	10	0.020
	40		900	8	B	**3NC1 440-5**		047	1	10	0.020
	50		2000	9	B	**3NC1 450-5**		047	1	10	0.020
22 × 58	20	690/700	240	5	C	**3NC2 220-5**		047	1	10	0.056
	25		350	6	C	**3NC2 225-5**		047	1	5	0.056
	32		500	8	B	**3NC2 232-5**		047	1	5	0.056
	40		800	9	B	**3NC2 240-5**		047	1	5	0.056
	50		1500	9.5	B	**3NC2 250-5**		047	1	5	0.056
	63		3000	11	B	**3NC2 263-5**		047	1	5	0.056
	80		6000	13.5	B	**3NC2 280-5**		047	1	5	0.057
22 × 58	100	600/700	8500	16	B	**3NC2 200-5**		047	1	5	0.057

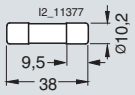
* You can order this quantity or a multiple thereof.

	Size	Version	Rated voltage	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mm × mm		V AC					Unit(s)	Unit(s)	kg
	Cylindrical fuse holders Can be used as fuse switch disconnectors[1)]									
	10 × 38	1P	690	▶	**3NC1 091**		047	1	12	0.065
		2P		▶	**3NC1 092**		047	1	6	0.131
		3P		▶	**3NC1 093**		047	1	4	0.197
	14 × 51	1P		▶	**3NC1 491**		047	1	6	0.125
		2P		▶	**3NC1 492**		047	1	3	0.233
		3P		B	**3NC1 493**		047	1	2	0.350
	22 × 58	1P		▶	**3NC2 291**		047	1	1	0.193
		2P		▶	**3NC2 292**		047	1	3	0.381
		3P		B	**3NC2 293**		047	1	2	0.584
	Cylindrical fuse holders Can be used as fuse switch disconnectors, with alarm switches for fuse links with striking pin[1)]									
	14 × 51	1P	690	B	**3NC1 491-5**		047	1	6	0.125
	22 × 58	1P		B	**3NC2 291-5**		047	1	6	0.193
	Cylindrical fuse bases									
	10 × 38	1P	600	B	**3NC1 038-1**		047	1	10	0.042
		2P		C	**3NC1 038-2**		047	1	8	0.077
		3P		B	**3NC1 038-3**		047	1	6	0.113
	14 × 51	1P	690	B	**3NC1 451-1**		047	1	3	0.120
	22 × 58	1P		B	**3NC2 258-1**		047	1	3	0.238
	Cylindrical fuse clips									
	For fuses 10 × 38			C	**3NC1 038**		047	1	20	0.002
	For fuses 14 × 51			B	**3NC1 451**		047	1	20	0.005
	Fuse tongs									
	10 × 38, 14 × 51, 22 × 58			B	**3NC1 000**		047	1	1	0.069

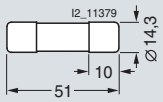
1) Please observe the utilization category and current/voltage values specified in the "Technical specifications" table.

Dimensional drawings

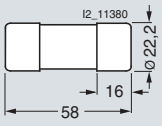
Cylindrical fuse links



3NC1 0..



3NC1 4..

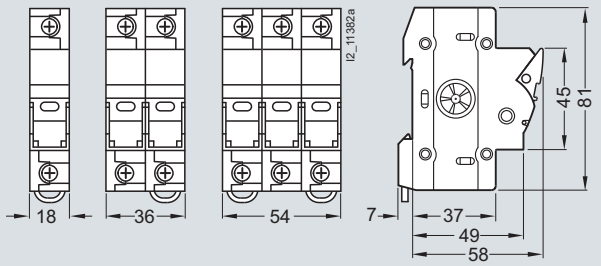


3NC2 2..

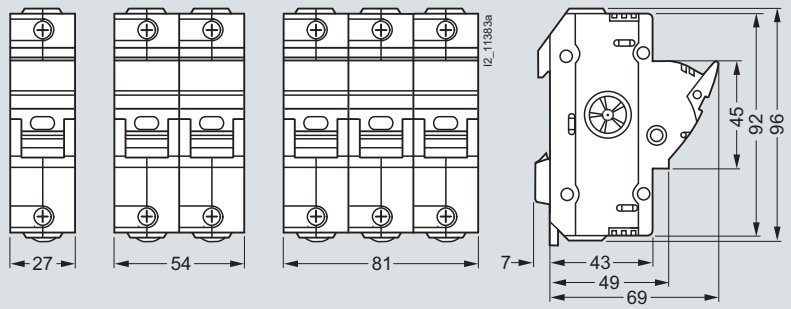
* You can order this quantity or a multiple thereof.

SITOR, cylindrical fuse design

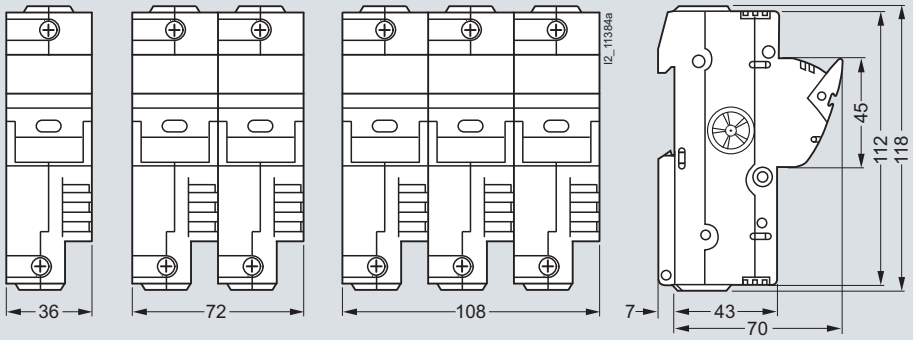
Cylindrical fuse holders



3NC1 09.

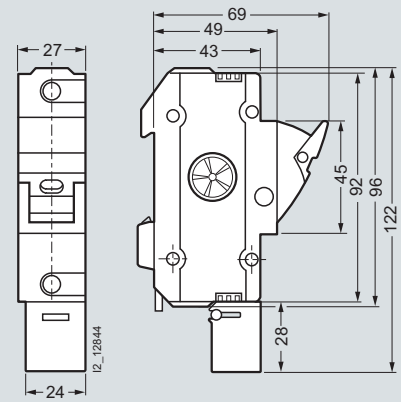


3NC1 49.

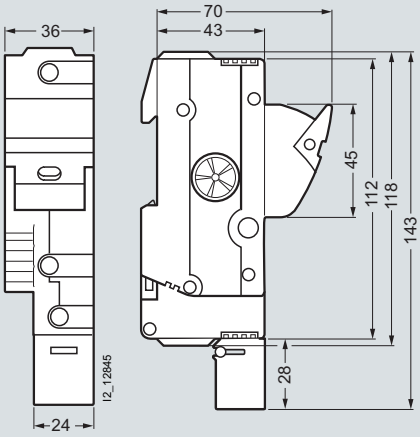


3NC1 29.

Cylindrical fuse holders with alarm switch

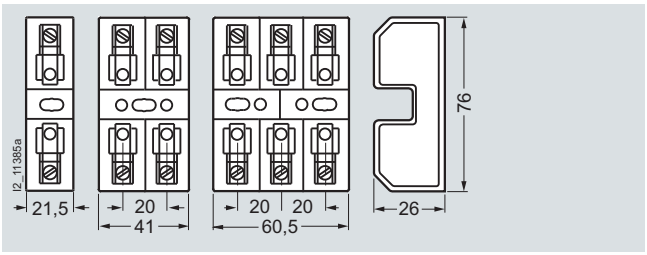


3NC1 491-5

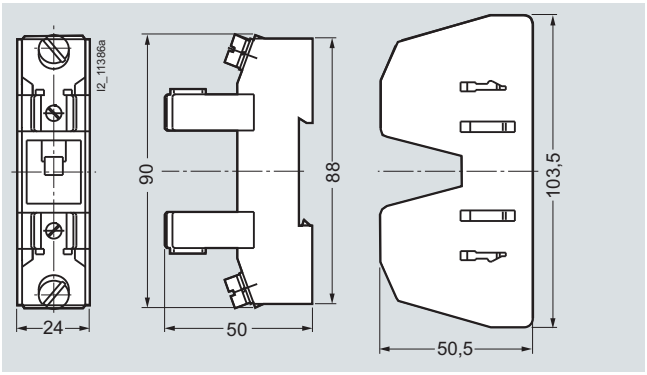


3NC1 291-5

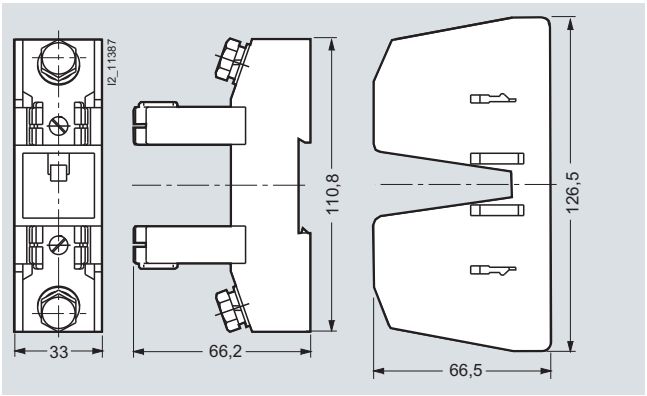
Cylindrical fuse bases



3NC1 038-1 to 3NC1 038-3



3NC1 451-1



3NC2 258-1

SILIZED, NEOZED and DIAZED design

Overview

SILIZED is the brand name of the NEOZED fuses (D0 fuses) and the DIAZED fuses (D fuses) with super quick characteristic for semiconductor protection.
The fuses are used together with fuse bases, fuse screw caps and accessories of the standard fuse system.

SILIZED fuses protect power semiconductors from the effects of short circuits because the super quick disconnect characteristic is far quicker than that of conventional fuses. They protect expensive devices and system components such as semiconductor contactors, static relays, converters with fuses in the input and in the DC link, UPS systems and soft starters for motors up to 100 A.

If using fuse bases and fuse screw caps made of molded plastic, always take into account the maximum permissible values of power loss due to the high power dissipation (power loss) of the SILIZED fuses.
If using these components, the following maximum permissible power losses apply:
- NEOZED D02: 5.5 W
- DIAZED DII: 4.5 W
- DIAZED DIII: 7.0 W.

For this reason, in some cases, a thermal permanent load of only 50 % is possible.

The DIAZED screw adapter DII for 25 A is used for the 30 A fuse link.

Benefits

- SILIZED fuses have an extremely compact design. This means they have a very small footprint – particularly the NEOZED version.
- The rugged and well-known DIAZED design complies with IEC 60269-3. It is globally renowned and can be used in many countries.
- A huge range of fuse bases and accessories are available for the NEOZED and DIAZED versions of the SILIZED fuses. This increases the application options in many devices.

Technical specifications

		SILIZED fuse links, NEOZED design 5SE1 3	SILIZED fuse links, DIAZED design 5SD4
Standards		DIN VDE 0636-3; IEC 60269-3; DIN VDE 0636-4; IEC 60269-4	
Operational class		gR	
Characteristic		Super quick	
Rated voltage U_n	V AC V DC	400 250	500 500
Rated current I_n	A	10 ... 63	16 ... 100
Rated breaking capacity	kA AC kA DC	50 8	
Mounting position		Any, but preferably vertical	
Non-interchangeability		Using adapter sleeves	Using screw adapter or adapter sleeves
Resistance to climate	°C	Up to 45 at 95 % rel. humidity	
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20	

Selection and ordering data

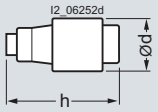
	Size	I_e	U_e	Breaking I^2t value	Power loss	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC/ V DC	A^2s	W					Unit(s)	Unit(s)	kg
	SILIZED fuse links, NEOZED design Operational class gR											
	D01	10	400/250	73	6.9	B	**5SE1 310**		016	1	10	0.006
		16		120	6.2	B	**5SE1 316**		016	1	10	0.007
	D02	20		190	8.1	B	**5SE1 320**		016	1	10	0.012
		25		215	8.2	B	**5SE1 325**		016	1	10	0.012
		35		470	16.7	B	**5SE1 335**		016	1	10	0.012
		50		1960	12.0	B	**5SE1 350**		016	1	10	0.013
		63		4230	15.5	B	**5SE1 363**		016	1	10	0.014

* You can order this quantity or a multiple thereof.

	Size	I_e	U_e	Breaking I^2t value	Power loss	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC/ V DC	A^2s	W					Unit(s)	Unit(s)	kg
	SILIZED fuse links, DIAZED design Operational class gR											
	DII	16	500/500	60	12.1	A	**5SD4 20**		016	1	5	0.028
		20		139	12.3	A	**5SD4 30**		016	1	5	0.029
		25		205	12.5	A	**5SD4 40**		016	1	5	0.031
		30		310	13.5	A	**5SD4 80**		016	1	5	0.031
	DIII	35		539	14.8	A	**5SD4 50**		016	1	5	0.050
		50		1250	18.5	A	**5SD4 60**		016	1	5	0.051
		63		1890	28	A	**5SD4 70**		016	1	5	0.054
	DIV	80		4200	34.3	B	**5SD5 10**		016	1	3	0.110
		100		8450	41.5	B	**5SD5 20**		016	1	3	0.110

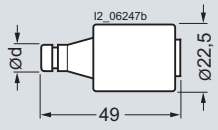
Dimensional drawings

5SE1



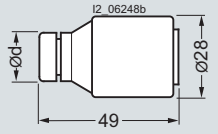
Size	D01	D02
Rated current in A	10 ... 16	20 ... 63
Dimension d	11	15.3
Dimension h	36	36

5SD4 20, 5SD4 30, 5SD4 40, 5SD4 80



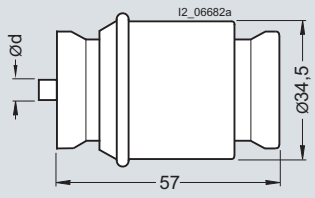
Size/thread	DII/E27			
Rated current in A	16	20	25	30
Dimension d	10	12	14	14

5SD4 50, 5SD4 60, 5SD4 70



Size/thread	DIII/E33		
Rated current in A	35	50	63
Dimension d	16	18	20

5SD5 10, 5SD5 20



Size/thread	DIV/R1¼"	
Rated current in A	80	100
Dimension d	5	7

* You can order this quantity or a multiple thereof.

Notes

BETA Protecting SR60 Busbar Systems

5

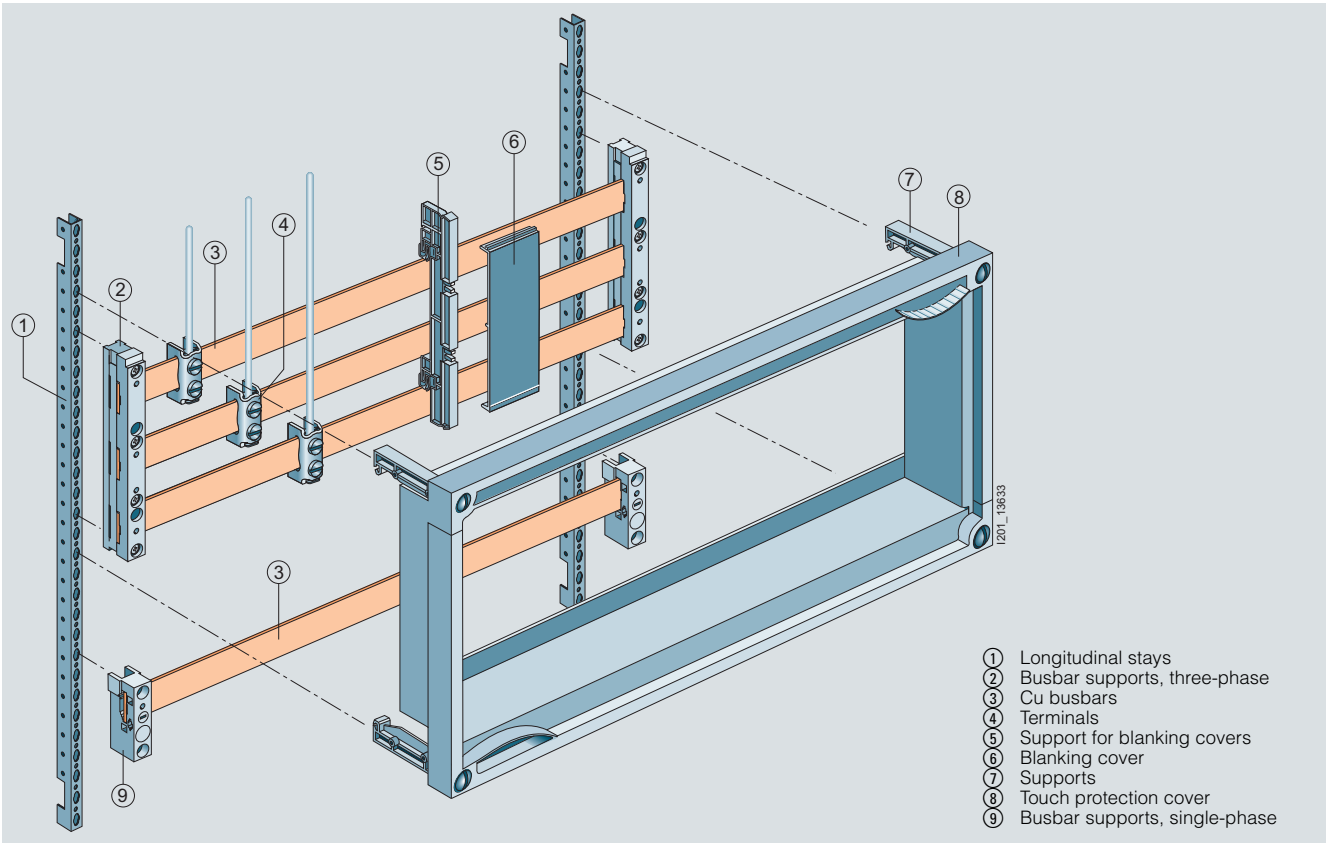
Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**Distribution board components**	5/3	Busbars, busbar supports and covers for touch protection.		✓	--	✓
	**Built-in components**	5/9	3-pole NEOZED bus-mounting bases or DIAZED bus-mounting bases, NEOZED bus-mounting switch disconnectors, LV HRC fuse switch disconnectors and device adapters.		✓	--	✓
	**Mounting components**	5/19	Bases, blanking covers, cover profiles for busbars, edges, slotted partitions, end covers for busbar supports, supports for blanking covers.		--	--	✓

Overview

The use of busbar systems with their versatile rail-adaptable connection, switching and installation devices is an ideal and cost-effective electrotechnical enhancement of modern distribution boards due to their small footprint, compact design and quick assembly contacts. Mounting is implemented on longitudinal stays. The busbar spacing is 60 mm.



Benefits

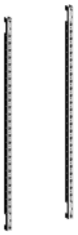
- Only a few distribution board components are required to ensure the integration of busbars in the distribution board. This saves time and space
- The touch protection cover is sealable as standard and is quick and easy to attach to the supports thanks to the use of quick-release locking technology.

Technical specifications

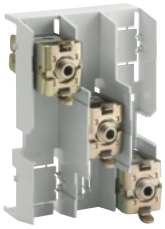
Infeed, connection modules, three-phase		5SH3 538	5SH3 535	8US19 21-1BA00	8US19 21-1AA00
Busbar center-to-center clearance	mm	60	60	60	60
Current carrying capacity of the terminal points The specified current carrying capacities reflect the thermal load capability of the terminal points under favorable conditions (with the largest conductors it is possible to connect). This does not invalidate the assignment of conductor cross-sections and current carrying capacities as defined in national and international specifications.	A	80	560	300	440
Tightening torques	Nm	--	30	8 ... 10	12 ... 15
Clamping space W × H	mm	--	--	10 × 15	15 × 15
Conductors that can be used	mm^2	1.5 ... 16 Cu, re, rm, f, f+AE (reduction of the max. conductor cross-sections may be required)	150 ... 300 Cu, Al (connections with aluminum conductors are not maintenance free), rm, sm, f	6 ... 50 (70) Cu, rm, f, f+AE (reduction of the max. conductor cross-sections may be required), la. Cu 6 × 9 × 0.8	35 ... 120 Cu, rm, f, f+AE (reduction of the max. conductor cross-sections may be required), la. Cu 6/10 × 15.5 × 0.8

5

Selection and ordering data

		Dimensions	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm					Unit(s)	Unit(s)	kg
	**Longitudinal stays**								
	For mounting the assembly kits in unequipped distribution boards, two longitudinal stays are required for each assembly kit width 1 set = 2 stays								
		Height							
		600	A	**8GK4 851-4KK00**		039	1 set	1 set	1.000
		750	A	**8GK4 851-5KK00**		039	1 set	1 set	1.300
		900	A	**8GK4 851-6KK00**		039	1 set	1 set	1.500
		1050	A	**8GK4 851-7KK00**		039	1 set	1 set	1.800
		1200	A	**8GK4 851-8KK00**		039	1 set	1 set	2.080
		1350	A	**8GK4 852-8KK00**		039	1 set	1 set	2.340
	**Busbar supports**								
	For busbars with a busbar thickness of 5 or 10 mm and a busbar height of 12, 15, 20, 25 or 30 mm For mounting on longitudinal stays, with fixing screws								
	Three-phase		A	**8GK9 711-0KK03**		039	1	1	1.100
	N/PE busbar supports								
	For flat copper profiles For 5/10 mm busbars								
			A	**5SH3 540**		016	1	1	0.059
	Cu busbars								
	Cu cross-section	**Length**							
	12 × 5 mm, current intensity 250 A	250	A	**8GK9 731-0KK10**		039	1	5	0.100
		500	A	**8GK9 731-0KK20**		039	1	5	0.330
		750	A	**8GK9 731-0KK30**		039	1	5	0.500
		1000	A	**8GK9 731-0KK40**		039	1	5	0.660
		1250	A	**8GK9 731-0KK50**		039	1	5	0.830
	20 × 5 mm, current intensity 320 A	250	A	**8GK9 733-0KK10**		039	1	5	0.290
		500	A	**8GK9 733-0KK20**		039	1	5	0.570
		750	A	**8GK9 733-0KK30**		039	1	5	0.850
		1000	A	**8GK9 733-0KK40**		039	1	5	1.120
		1250	A	**8GK9 733-0KK50**		039	1	5	1.470
	30 × 5 mm, current intensity 450 A	250	A	**8GK9 735-0KK10**		039	1	5	0.400
		500	A	**8GK9 735-0KK20**		039	1	5	0.750
		750	A	**8GK9 735-0KK30**		039	1	5	1.460
		1000	A	**8GK9 735-0KK40**		039	1	5	2.170
		1250	A	**8GK9 735-0KK50**		039	1	5	2.880
	30 × 10 mm, current intensity 630 A	250	A	**8GK9 736-0KK10**		039	1	5	0.750
		500	A	**8GK9 736-0KK20**		039	1	5	1.720
		750	A	**8GK9 736-0KK30**		039	1	5	2.600
		1000	A	**8GK9 736-0KK40**		039	1	5	3.400
		1250	A	**8GK9 736-0KK50**		039	1	5	4.600
	**Cover profiles for busbars**								
	Busbar thickness 5 mm								
	Width 12 mm	1000	A	**8US19 22-2CA00**		143	1	10	0.200
	Width 15, 20, 25, 30 mm	1000	A	**8US19 22-2AA00**		143	1	10	0.156
	Busbar thickness 10 mm								
	Width 12, 15, 20, 25, 30 mm	1000	A	**8US19 22-2BA00**		143	1	10	0.105

* You can order this quantity or a multiple thereof.

		Conductor cross-section		DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm²						Unit(s)	Unit(s)	kg
	**Infeeds, connection modules, three-phase** For 5/10 mm busbars with cover									
	With screwless terminals, 200 mm long, 20 mm wide	1.5 ... 16	NEW	A	**5SH3 538**		016	1	5	0.181
	With screw terminals									
	200 mm long, 54 mm wide	6 ... 50		A	**8US19 21-1BA00**		143	1	1	0.397
	200 mm long, 81 mm wide	35 ... 120		A	**8US19 21-1AA00**		143	1	1	0.607
	(shown without cover in the illustration, but cover included in delivery)	150 ... 300		C	**5SH3 535**		016	1	1	1.657

	Dimensions	Conductor cross-section	Tightening torques	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm²	Nm					Unit(s)	Unit(s)	kg
	Terminals for circular conductors									
 8US19 21-2AA00	Busbar thickness 5 mm									
		1.5 ... 16		▶	**8US19 21-2AA00**		143	1	100	0.001
		4 ... 35		▶	**8US19 21-2AB00**		143	1	50	0.046
		16 ... 70		▶	**8US19 21-2AD00**		143	1	50	0.072
		16 ... 120		▶	**8US19 21-2AC00**		143	1	50	0.107
	Busbar thickness 10 mm									
		1.5 ... 16		▶	**8US19 21-2BA00**		143	1	100	0.020
		4 ... 35		▶	**8US19 21-2BB00**		143	1	50	0.040
		16 ... 70		▶	**8US19 21-2BD00**		143	1	50	0.070
		16 ... 120		▶	**8US19 21-2BC00**		143	1	50	0.100
	Terminals for one busbar									
	Busbar thickness 5 mm									
	Width 12 mm	1.5 ... 6	1.4	A	**8JH4 102**		046	1	10	0.010
		16 ... 35	3.0	A	**8JH4 104**		046	1	10	0.030
		16 ... 70	6.0	A	**8JH4 105**		046	1	10	0.030
		16 ... 95	10.0	A	**8JH4 106**		046	1	10	0.070
		25 ... 120	10.0	A	**8JK3 061**		046	1	10	0.090

* You can order this quantity or a multiple thereof.

Distribution board components

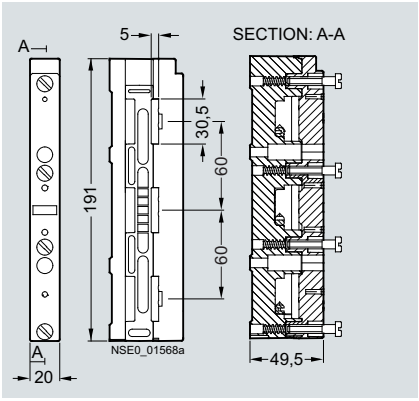
	Dimensions	Conductor cross-section	Tightening torques	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm^2	Nm					Unit(s)	Unit(s)	kg
	**Extension terminals** For 12 x 5 mm busbars (busbar not included in the scope of supply) (1 set = 2 units)		6.0	A	**8JK3 201**		046	1 set	10 sets	0.100
	**Terminals for circular conductors** 20 mm × 5 mm to 30 mm × 10 mm	150 ... 240		A	**8US19 41-2BB00**		143	1	6	0.307

		Dimensions (H x W)	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm × mm					Unit(s)	Unit(s)	kg
	**Assembly kits** Comprising touch protection cover and 4 supports **Cutout width** For three-phase busbar systems								
	216 mm	300 × 250	A	**8GK4 801-2KK13**		039	1	1	0.500
	466 mm	300 × 500	A	**8GK4 801-2KK23**		039	1	1	0.700
	716 mm	300 × 750	A	**8GK4 801-2KK33**		039	1	1	0.900
	216 mm	450 × 250	A	**8GK4 801-3KK13**		039	1	1	0.650
	466 mm	450 × 500	A	**8GK4 801-3KK23**		039	1	1	0.900
	716 mm	450 × 750	A	**8GK4 801-3KK33**		039	1	1	1.150
	**Supports for blanking covers** For blanking cover, mounting on busbar (2 units required for each section of blanking cover)		B	**5SH3 536**		016	1	4/160	0.040
	**Blanking covers** Mounting on 5SH3 536 support for blanking covers Length 1000 mm, Height 202 mm		A	**5SH3 537**		016	1	2	0.075

* You can order this quantity or a multiple thereof.

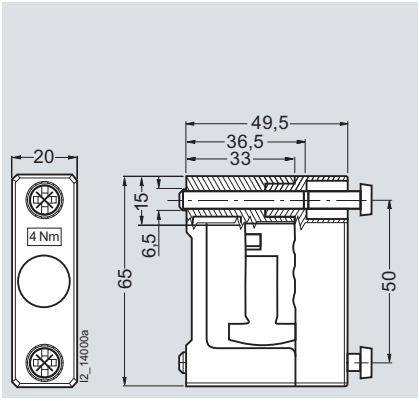
Dimensional drawings

8GK9 busbar support



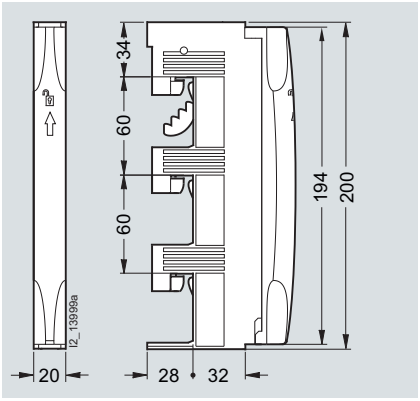
8GK9 711-0KK03

N/PE busbar support



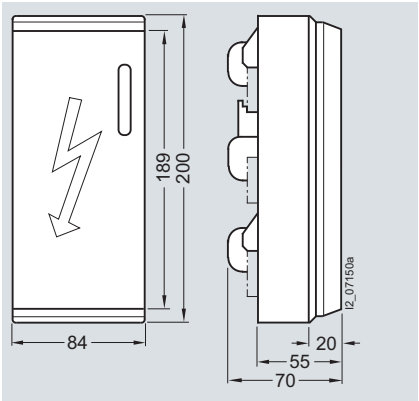
5SH3 540

Connection module



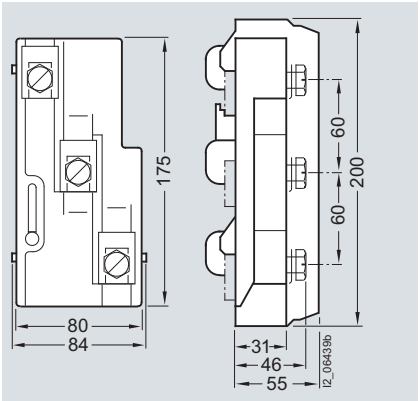
5SH5 538

Connection module



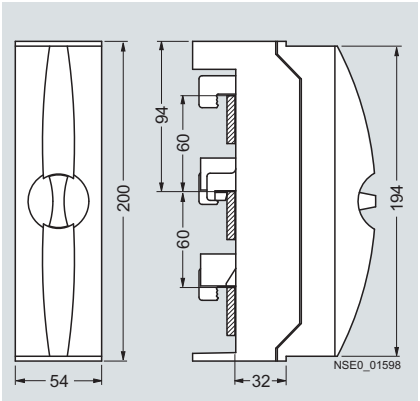
8US19 21-1AA00 shown closed

Connection module



8US19 21-1AA00 shown open

Connection module



8US19 21-1BA00

More information

Material properties

Busbar supports and busbar-mounting fuse bases (see "Built-in components" on page 5/9 ff.) are manufactured from glass-fiber reinforced, thermoplastic polyester (color RAL 7035, light gray). The material ensures excellent mechanical, chemical and electrical properties. Furthermore, the material has an extremely low flammability and meets the requirements of UL 94 V0. This satisfies the load requirements of the busbar supports at rated operational voltage 500 V and rated currents at 200 A to 630 A, as well as the rated short-circuit strength 50 kA.

Ambient temperatures

When dimensioning the busbars based on rated currents, the ambient temperature and the Cu busbar temperature must also be taken into account.

The location of the busbar system and its ability to dissipate heat through convection also play a key role in this calculation. Because conditions can vary for each distribution board, the values in the following table serve as a guideline only. However, they must be applied to the entire busbar length.

Continuous currents depending on the Cu power rail dimensions and Cu busbar temperatures at 35°C ambient temperature

Cu busbar dimensions H × D mm × mm	Continuous current for open busbar run Ambient temperature 35 °C A	Continuous current of fuse link Operational class gL/gG A
12 × 5	200	200
12 × 10	360	315
15 × 5	250	250
15 × 10	447	400
20 × 5	320	315
20 × 10	520	500
25 × 5	400	400
25 × 10	580	500
30 × 5	447	400
30 × 10	630	630

As far as other types of upstream protective devices are concerned, please observe the permissible continuous current of the busbar.

Distribution board components

Dynamic rated short-circuit strength

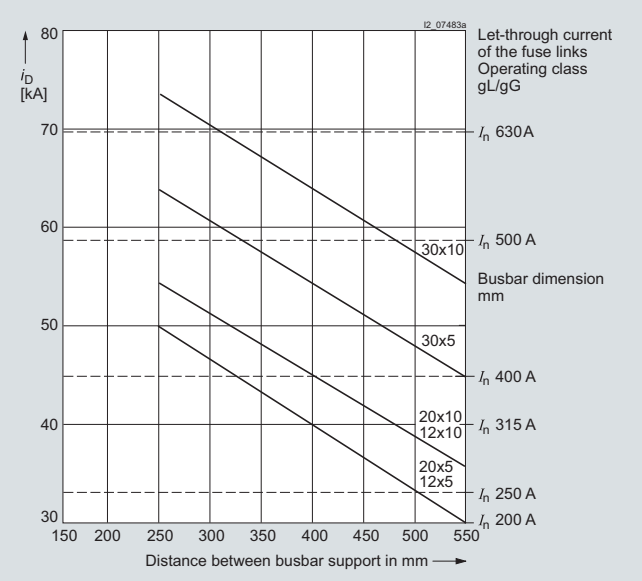
The electrodynamic load of the busbars depends on the level of short-circuit current, the length of the busbar section through which the current flows, the support spacing of the busbar supports and, of course, on the distance between the busbars themselves. This is because, for example, if an LV HRC fuse is connected upstream to the busbars in the protective device, the let-through current i_D is the maximum current to flow through this protective device. The value i_D depends on the maximum system short-circuit current and the current-limiting action of the protective device used. The permissible let-through values of the protective equipment are specified by the manufacturers in the form of a current limitation diagram as a function of the so-called prospective short-circuit current (r.m.s. value of the possible rated short-circuit current for the system).

You will find the current-limiting characteristics for the fuse links in the Catalog Add-On ET B1 AO · 2008 BETA Low-Voltage Circuit Protection, Characteristic Curves for Catalog ET B1.

For busbar supports with busbars of 12 × 5 mm to 20 × 5 mm, the distance between the holders of the support spacing should be adapted to suit the bars in the distribution board and should not exceed 250 mm if possible. When using busbars of 25 × 5 mm, 30 × 5 mm, 12 × 10 mm to 30 × 10 mm, the distance can also be up to 500 mm. In the case of larger distances, subcarriers must be fitted as increased support spacing reduces the dynamic stability.

It is essential to ensure that the permissible current carrying capacity of the individual busbars is not exceeded. A center infeed is required in the limit range. However, the infeed can also be carried out at both ends of the busbar.

Diagram of the dynamic short-circuit strength of the busbars



i_D: Let-through values (kA) of the LV HRC fuse links, operational class gL/gG with rated current 200 A to 630 A for a prospective short-circuit current I_p = 120 kA.

Planning dimensions

	Width mm	MW
NEOZED bus-mounting bases D02		
Covers	27	1.5
Covers, extra wide	36	2.0
Covers, double width	54	3.0
DIAZED bus-mounting bases DII		
Covers	42	2.3
Covers, double width	84	4.7
DIAZED bus-mounting bases DIII		
Covers	57	3.2
Covers, double width	114	6.3
NEOZED bus-mounting switch disconnectors	27	1.5
LV HRC fuse switch disconnectors size 00	108	6

Number of built-in components that can be mounted

Height	Width	Cutout width	D02/63 A 5SH5 241	D02/63 A 5SH5 242	D02/63 A 5SH5 243	DII/25 A 5SH2 042	DIII/63 A 5SH2 242	LV HRC00 (3NP40 76)	5SG7 230 bus-mounting switch disconnectors D02
mm	mm	mm	(27 mm wide)	(36 mm wide)	(54 mm wide)	(42 mm wide)	(57 mm wide)	(108 mm wide)	(26.8 mm wide)
300	250	216	8	6	4	5	3	1	8
	500	466	17	12	8	11	8	4	17
	750	716	26	19	13	17	12	6	26
450	250	216	8	6	4	5	3	1	8
	500	466	17	12	8	11	8	4	17
	750	715	26	19	13	17	12	6	26

Overview

Rail-adaptable built-in components, such as NEOZED and DIAZED bus-mounting bases, adapters for modular installation devices, LV HRC fuse switch disconnectors and NEOZED bus-mounting fuse switch disconnectors are made of glass-fiber reinforced, thermoplastic polyester. The material ensures required mechanical, chemical and electrical properties.

Efficient power distribution up to 630 A.
There are many ways for users to mount the SR60 busbar system:

1. Mounting in distribution boards

The busbar supports are mounted on longitudinal stays. Once the built-in components have been mounted and connected, the touch protection cover (front cover) protects against accidental contact with live parts.

2. Installation in industrial control cabinets

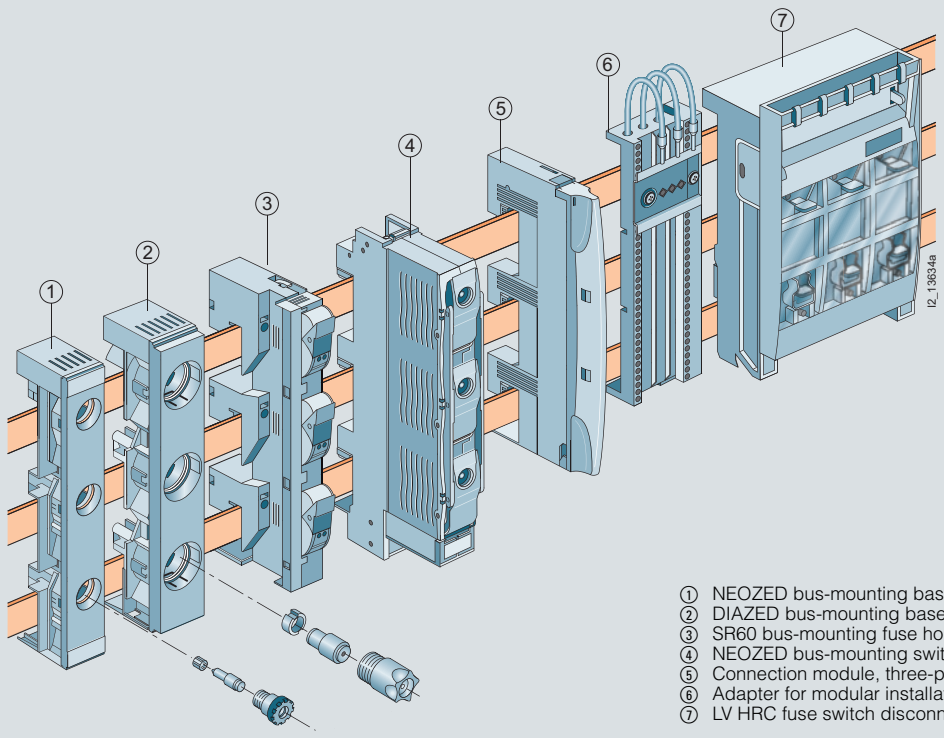
The demand for comprehensive touch protection has generated new solutions: built-in components, such as busbar fuse bases have integrated reach-through guards, enable the implementation of cost-effective overall solutions.

Previously two optional solutions were provided, which can now be replaced using new technology: the touch protection over base and the respective edges, or touch protection by means of partitions.

Overall, increased efficiency and cost savings for the plant manufacturer.

With fuse holders for cylindrical fuses, size 10 × 38 and for American fuses class CC, they can also be deployed in the international plant engineering sector. In addition, Siemens offers a wide range of UL-approved components for the design of switchgear assemblies in accordance with UL 508 A.
For further information, see chapter BETA Devices According to UL Standard in Catalog LV 16 · 2009.

For the ultimate in user safety and convenience, we also offer fuse holders and connection modules 16 mm² with screwless terminals.



① NEOZED bus-mounting base, 3-pole
② DIAZED bus-mounting base, 3-pole
③ SR60 bus-mounting fuse holder, 3-pole
④ NEOZED bus-mounting switch disconnector, 3-pole
⑤ Connection module, three-phase
⑥ Adapter for modular installation devices according to DIN 43880
⑦ LV HRC fuse switch disconnector

Benefits

- The direct contact of the rail-adaptable switching and installation devices on the Cu busbars reduces distribution panels and mounting times
- The transfer resistance of the connections, when compared to conventional installation, help prevent unnecessary temperature rises.
- New touch-protected built-in components ensure comprehensive touch protection without the previously required partitions
- International implementation due to UL-approved components
- Enhanced effectiveness and increased safety due to screwless terminals.

Built-in components

5

Technical specifications

		NEOZED SR60 bus-mounting bases		DIAZED SR60 bus-mounting bases	
		5SG6 202 5SG6 206 5SG6 207		5SF6 014 5SF6 015 5SF6 018 5SF6 020	5SF6 214 5SF6 215 5SF6 218 5SF6 220
		D01	D02	DII	DIII
Standards		IEC 60269-3/DIN VDE 0636-3			
Rated voltage	V AC/DC	400/250		500	690/600
Rated frequency	Hz	50			
Rated current		16 (with NEOZED retaining springs)	63	25	63
Rated conditional short-circuit current	kA AC	50		50	
	kA DC	8		8	
For fuse links with power losses per phase	W	2.5	5.5	4	7
Busbar center-to-center clearance	mm	60		60	

		3NW7 431	3NW7 431-0HG 3NW7 432-0HG
Standards		IEC 60269-2	--
Approvals		UL 512	
Sizes		10 × 38	Class CC
Rated frequency	Hz	50/60	
Max. rated operational current I_e (When several devices are used next to each other, it is essential to comply with the rated load factor acc. to VDE 0660, Part 500 / EN 60 439-1, Table 1).			
• IEC/EN	A	32	--
• UL/CSA	A	30	30
Utilization categories			
• IEC/EN		AC-22B (500 V) AC-21B (690 V)	
• UL/CSA		Can only be used as fuse holder	
Rated conditional short-circuit current (type-tested with fuse links, operational class gL/gG)			
• IEC/EN	kA	100 (400 V, 500 V, 690 V)	--
• UL/CSA	kA	50 (600 V)	200
For fuse links with power losses per phase	W	3	--
Screwless wire connections			
• IEC/EN	mm^2	Cu 1.5 … 6 (f)	
• UL/CSA	AWG	16 … 10 (str)	

		5SG7 230		3NW7 430
Standards		IEC 60269-3 IEC 60269-2		IEC 60269-3 IEC 60269-2
Approvals		VDE 0660-107, EN 60947-3, IEC 60947-3		VDE 0660-107, EN 60947-3, IEC 60947-3
Sizes		D01	D02	10 mm × 38 mm
Rated frequency	Hz	50/60		50/60
Rated voltage U_e	V AC V DC	400 110		690 --
Rated insulation voltage U_i	V	800		800
Rated impulse withstand voltage U_{imp}	kV	6		6
Rated operational current I_e	A	63[1)]		Up to 32
Utilization categories (Type-tested with 3-poled, switchable version)		AC-23 A (400 V) -- -- DC-21 B (48 V) – 1 pole DC-21 B (110 V) – 2 pole		AC-23 A (400 V) AC-22 A (690 V) AC-21 A (690 V) DC-21 B (48 V) – 1 pole DC-21 B (110 V) – 2 pole
Rated conditional short-circuit current (type-tested with fuse links, operational class gL/gG)	kA AC kA DC	50 8		50 --
Permissible power loss of fuse links per phase For standalone operation without lateral modules or for group operation with lateral modules	W	5.5		3

[1)] In the case of permanent load over 35 A, we recommend the use of 5SH5 526 lateral modules. Please observe EN 60439-1, Table 1.

		5SG7 230	3NW7 430
Box terminals for wire connection	mm^2 mm^2 mm^2	Cu 1.5 … 6 (re) Cu 1.5 … 16 (f) Cu 1.5 … 16 (f+AE)	Cu 1.5 … 6 (re) Cu 1.5 … 16 (f) Cu 1.5 … 16 (f+AE)
Alarm switches for the display of switching positions		1 CO	1 CO
Cable terminals		Bottom	Bottom
Busbar thickness	mm	Through combination foot for 5, 10 mm	Through combination foot for 5, 10 mm

Selection and ordering data

	Size	Rated current	Rated voltage	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V						Unit(s)	Unit(s)	kg
	**NEOZED SR60 bus-mounting bases with touch protection, 3P** NEW For 5/10 mm busbars										
	27 mm wide										
	D02	63	400	1.5	B	**5SG6 206**		016	1	4	0.175
	36 mm wide										
	D02	63	400	2	B	**5SG6 207**		016	1	4	0.188
	**NEOZED SR60 bus-mounting bases, 3P, standard version** For 5/10 mm busbars										
	D02	63	400	1.5	A	**5SG6 202**		016	1	4/104	0.141
	**NEOZED SR60 covers for standard version**										
	D02 Extra wide, with clearance for wiring			1.5	A	**5SH5 241**		016	1	4/200	0.026
	D02			2	B	**5SH5 242**		016	1	4/140	0.031
	With double width For more clearance for wiring										
	D02			3	C	**5SH5 243**		016	1	4/120	0.040
	**DIAZED SR60 bus-mounting bases with touch protection, 3P** NEW For 5/10 mm busbars										
	For use with DIAZED SR60 adapter rings										
	DII	25	500	2.3	B	**5SF6 018**		016	1	4	0.301
	DIII	63	500 V AC/DC (according to DIN VDE 0636-3 also 690 V AC/600 V DC)	3.2	B	**5SF6 218**		016	1	4	0.402
	For use with DIAZED screw adapters										
	DII	25	500	2.3	B	**5SF6 020**		016	1	4	0.291
	DIII	63	500 V AC/DC (according to DIN VDE 0636-3 also 690 V AC/600 V DC)	3.2	B	**5SF6 220**		016	1	4	0.392

For NEOZED screw caps, adapter sleeves and fuse links, see chapter, "Low-voltage fuse systems, NEOZED fuse systems".

* You can order this quantity or a multiple thereof.

Built-in components

	Size	Rated current	Rated voltage	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V						Unit(s)	Unit(s)	kg
	**DIAZED SR60 bus-mounting bases, 3P standard version**										
	For 5/10 mm busbars										
	For use with DIAZED adapter rings										
	DII	25	500	2.3	B	**5SF6 014**		016	1	2/52	0.230
	DIII	63	500 V AC/DC (acc. to DIN VDE 0636-3 also 690 V AC/600 V DC)	3.2	B	**5SF6 214**		016	1	2/52	0.318
	For use with DIAZED screw adapters										
	DII	25	500	2.3	B	**5SF6 015**		016	1	2/52	0.222
	DIII	63	500 V AC/DC (acc. to DIN VDE 0636-3 also 690 V AC/600 V DC)	3.2	B	**5SF6 215**		016	1	2/52	0.310
	**DIAZED SR60 covers for standard version**										
	DII			2.3	B	**5SH2 042**		016	1	2/120	0.050
	DIII			3.2	B	**5SH2 242**		016	1	2/120	0.061
	DIAZED SR60 adapter rings										
	Only for DIAZED SR60 bus-mounting bases										
	DII	2			C	**5SH3 071**		016	1	10/1500	0.005
		4			C	**5SH3 072**		016	1	10/1500	0.005
		6			C	**5SH3 073**		016	1	10/3000	0.005
		10			C	**5SH3 074**		016	1	10/4000	0.005
		16			C	**5SH3 075**		016	1	10/5000	0.005
		20			C	**5SH3 076**		016	1	10/3000	0.004
	DIII	2			C	**5SH3 078**		016	1	10	0.008
		4			C	**5SH3 080**		016	1	10	0.008
		6			C	**5SH3 081**		016	1	10	0.008
		10			C	**5SH3 082**		016	1	10	0.008
		16			C	**5SH3 083**		016	1	10	0.008
		20			C	**5SH3 084**		016	1	10	0.006
		25			C	**5SH3 085**		016	1	10/1000	0.007
		35			C	**5SH3 086**		016	1	10/3500	0.006
		50			C	**5SH3 087**		016	1	10/600	0.005
	**SR60 bus-mounting fuse holders, 3P** NEW										
	For 5/10 mm busbars										
	With screwless terminals										
	For cylindrical fuses, 10 × 38 mm										
	--	30	690	1.5	A	**3NW7 431**		018	1	1	0.185
	For UL fuses, class CC										
	--	30	600	1.5	A	**3NW7 431-0HG**		018	1	1	0.186
	For UL fuses, class CC										
	With LED signal detectors										
	--	30	600	1.5	A	**3NW7 432-0HG**		018	1	1	0.188
	**NEOZED SR60 bus-mounting switch disconnectors, 3P**										
	For 5/10 mm busbars										
	D02	63*	400	1.5	A	**5SG7 230**		016	1	1/30	0.700
	*For loads > 35 A, use 5SH5 526 lateral modules										
	SR60 bus-mounting disconnectors, 3P For cylindrical fuses 10 × 38 mm										
	For 5/10 mm busbars										
	--	32	690	1.5	A	**3NW7 430**		018	1	1/40	0.700

For DIAZED screw caps, screw adapters and fuse links, see chapter, "Low-voltage fuse systems, DIAZED fuse systems".

* You can order this quantity or a multiple thereof.

	Size	Rated current	Rated voltage	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V						Unit(s)	Unit(s)	kg
	Auxiliary switches for signaling the switching state of the NEOZED bus-mounting switch disconnectors and disconnectors										
	1 CO			0.5	C	**5SH5 525**		016	1	1/50	0.007
	**Lateral modules** For greater heat dissipation for loads > 35 A with NEOZED bus-mounting switch disconnectors			0.5	C	**5SH5 526**		016	1	5/50	0.060
	**Reducers** For NEOZED fuse links D01										
	In SR60 bus-mounting switch disconnectors				C	**5SH5 527**		016	1	10/100	0.003
	**SR60 LV HRC bus-mounting fuse bases, 3P, size 00** For 5/10 mm busbars With cover, connections at top Terminals up to 70 mm^2										
	With saddle-type terminals		690		A	**3NH4 052**		014	1	4	0.641

	Rated current	Conductor cross-section, max.	For LV HRC fuse links	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	A	mm^2	Sizes					Unit(s)	Unit(s)	kg
	**Fuse switch disconnectors for SR60 busbars** Climate-proof, rated operational voltage 690 V AC delivered without LV HRC fuse links									
	100	35	000 and 00	A	**3NP40 16-1CK01**		103	1	1	0.916
				▶	**3NP40 16-1CJ01**		103	1	1	0.950
	160	70	000 and 00	A	**3NP40 76-1CE01**		103	1	1	1.203
				▶	**3NP40 76-1CF01**		103	1	1	1.201
	160	70 (SIGUT terminal)	000 and 00	B	**3NP40 76-1CK01**		103	1	1	1.295
				▶	**3NP40 76-1CJ01**		103	1	1	1.249
	250	150	0 and 1	▶	**3NP42 76-1CG01**		103	1	1	3.713
	400	240	2	▶	**3NP43 76-1CG01**		103	1	1	5.440
	630	240	3	▶	**3NP44 76-1CG01**		103	1	1	7.688
	Touch protection covers			B	**3NY7 600**		103	1	1	0.095

For additional busbar adapters, see Catalog LV 1.
For further fuse switch disconnectors, see chapter "Low-voltage fuse systems".

*** You can order this quantity or a multiple thereof.**

Built-in components

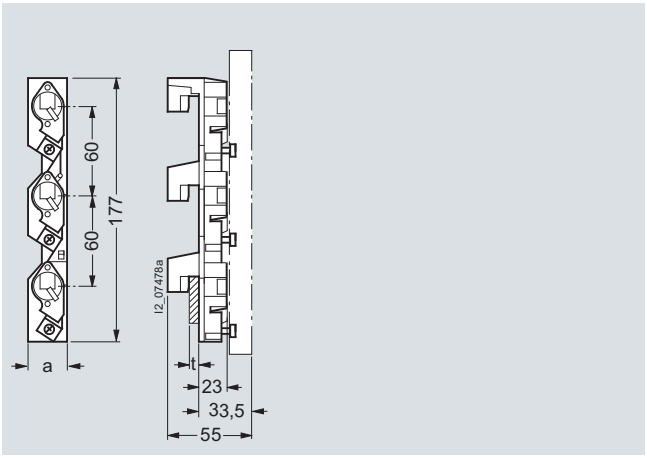
	Number of support rails (35 mm)	Rated current	Conductor cross-section	Adapters L × W	U_n	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	mm^2	mm × mm	V					Unit(s)	Unit(s)	kg
	**Device adapters with top terminal**											
	1	25	4	182 × 45	690	A	**8US12 50-5RM07**		143	1	1	0.174
	Device adapters with top connecting cables											
	1	25	4	182 × 45	690	►	**8US12 51-5DM07**		143	1	1	0.183
	1	56	10	182 × 55	690	►	**8US12 61-5FM08**		143	1	1	0.263
	Device adapters with Cage Clamp connection											
	1	12.5	2.5	182 × 45	690	►	**8US12 51-5CM47**		143	1	1	0.190
	**Device holders for lateral mounting on device adapters of the same length**											
	1	--	--	182 × 45	--	►	**8US12 50-5AM00**		143	1	1	0.158
	Connecting plates (2 units required for mounting)											
	--	--	--	--	--	►	**8US19 98-1AA00**		143	100	100	0.100
	Lateral modules for widening device adapters and device holders of the same length											
	--	--	--	182 × 13.5	--	A	**8US19 98-2BM00**		143	1	4	0.036

* You can order this quantity or a multiple thereof.

Dimensional drawings

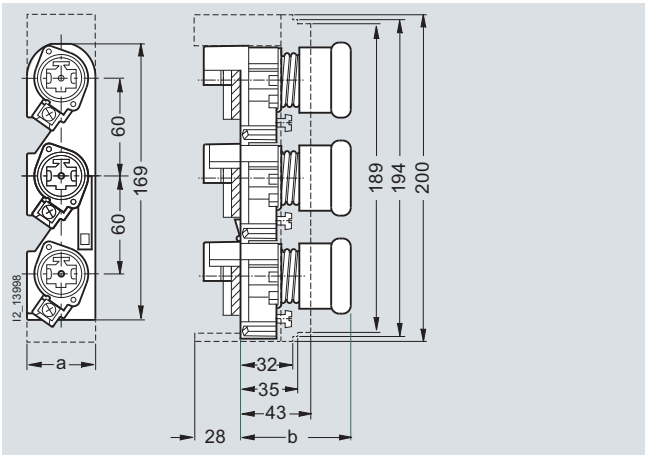
NEOZED SR60 bus-mounting bases

D02/63 A
(a = 27 mm, t = bar thickness)



5SG6 202 (t = 5 mm)

D02/63 A
(a = 27 mm, b = 50 mm)



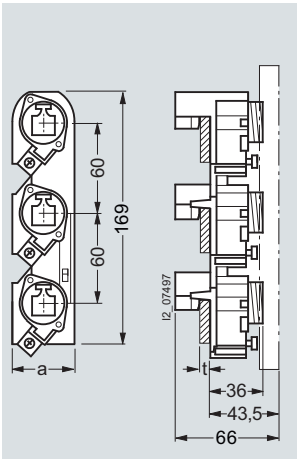
5SG6 206

D02/63 A
(a = 36 mm, b = 50 mm)

5SG6 207

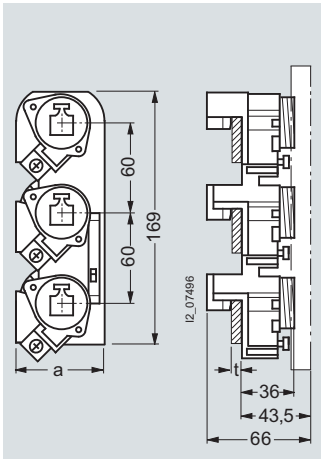
DIAZED SR60 bus-mounting bases

DII/25 A
(a = 42 mm)



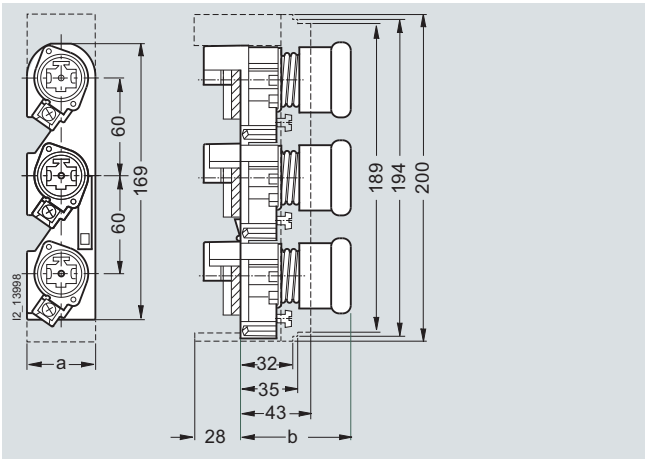
5SF6 014, 5SF6 015
(t = 5 mm)

DIII/63 A
(a = 57 mm)



5SF6 214, 5SF6 215
(t = 5 mm)

DII/25 A
(a = 42 mm)



5SF6 018, 5SF6 020
(b = 70 mm)

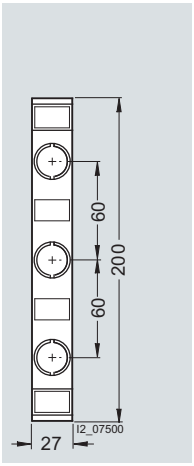
DIII/63 A
(a = 57 mm)

5SF6 218, 5SF6 220
(b = 70 mm)

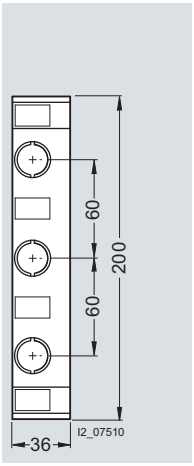
Built-in components

NEOZED SR60 covers

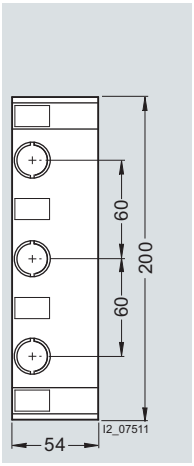
D02/63 A



5SH5 241
1-fold

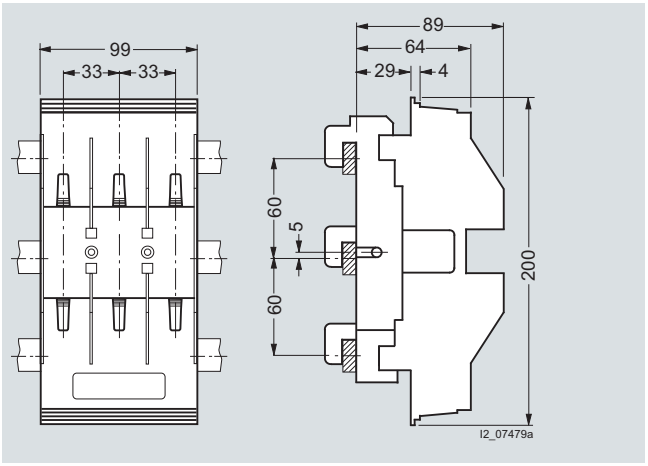


5SH5 242
1.33-fold



5SH5 243
2-fold

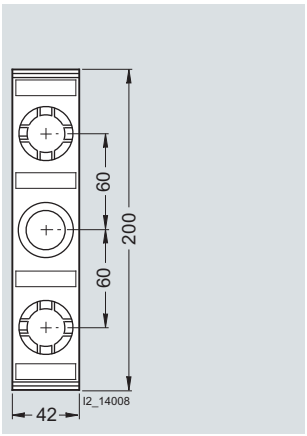
SR60 LV HRC bus-mounting fuse bases, 3P



3NH4 052

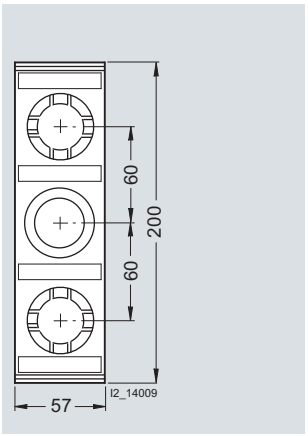
DIAZED SR60 covers

DII/25 A



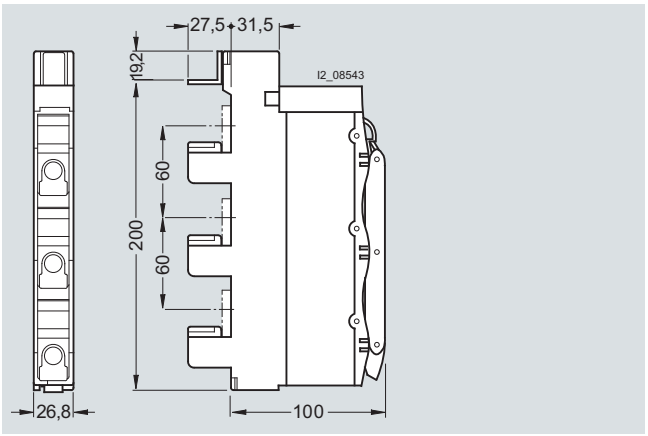
5SH2 042 (1-fold: a = 42 mm)

DIII/63 A



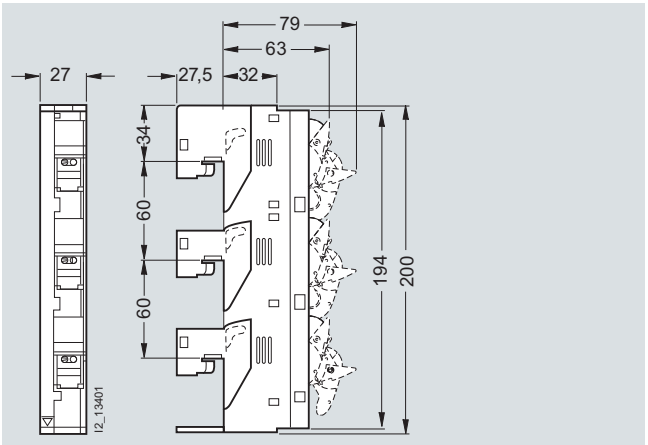
5SH2 242 (1-fold: a = 57 mm)

NEOZED SR60 bus-mounting switch disconnectors/ SR60 bus-mounting disconnectors



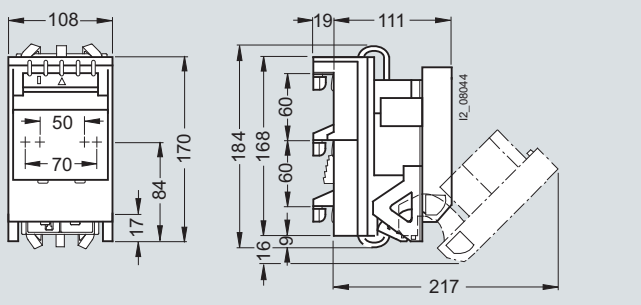
5SG7 230
3NW7 430

SR60 bus-mounting fuse holders for cylindrical fuses

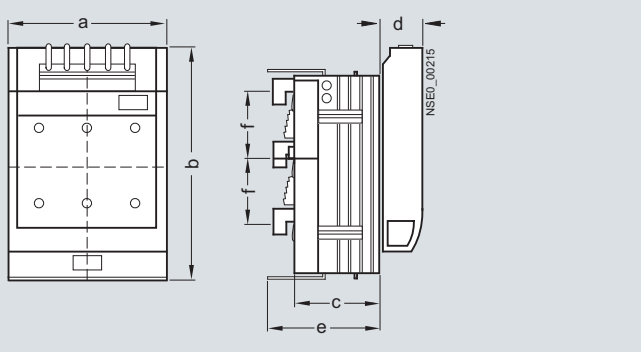


3NW7 431,
3NW7 431-0HG,
3NW7 432-0HG

Fuse switch disconnectors for SR60 busbars



Busbar spacing 60 mm
3NP4 076



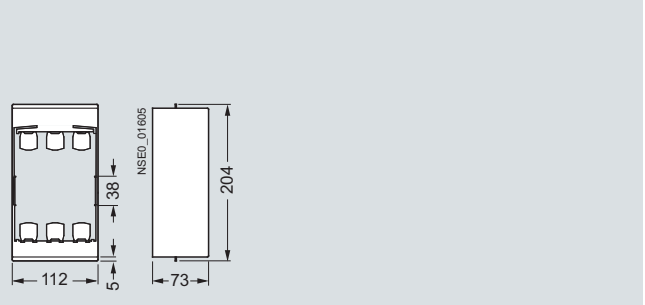
3NP4. 76

Type	a	b[1]	c	d	e	f
3NP42 76-1	184	243	83[2]	45.5	111	60
3NP43 76-1	210	288	97	48	125	60
3NP44 76-1	256	300	112	48	139	60

[1] For VBG4 plus dimension c of cable lug covers.

[2] When installed together with size 000 or size 00 in STAB/SIKUS distribution boards, 3NY7 820 molded-plastic covers are used for depth compensation.

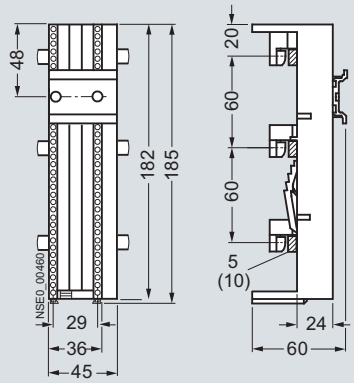
Touch protection covers



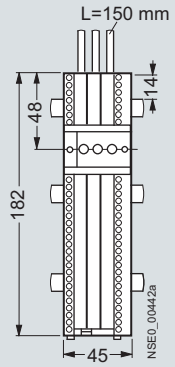
3NY7 600

Built-in components

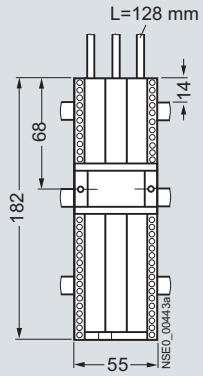
Device adapters



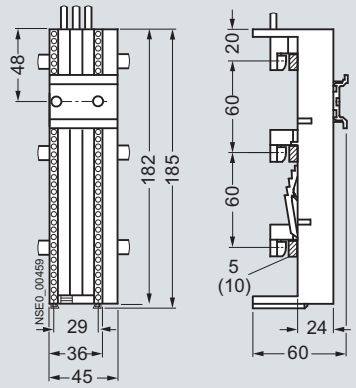
8US12 50-5RM07



8US12 51-5DM07

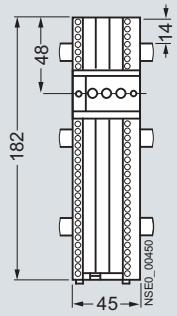


8US12 61-5FM08



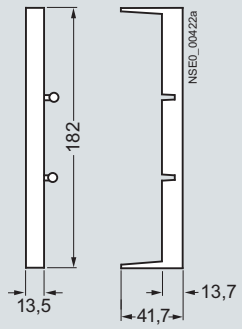
8US12 51-5CM47

Device holders



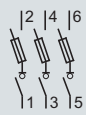
8US12 50-5AM00

Lateral modules

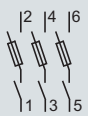


8US19 98-2BM00

Schematics



5SG7 230

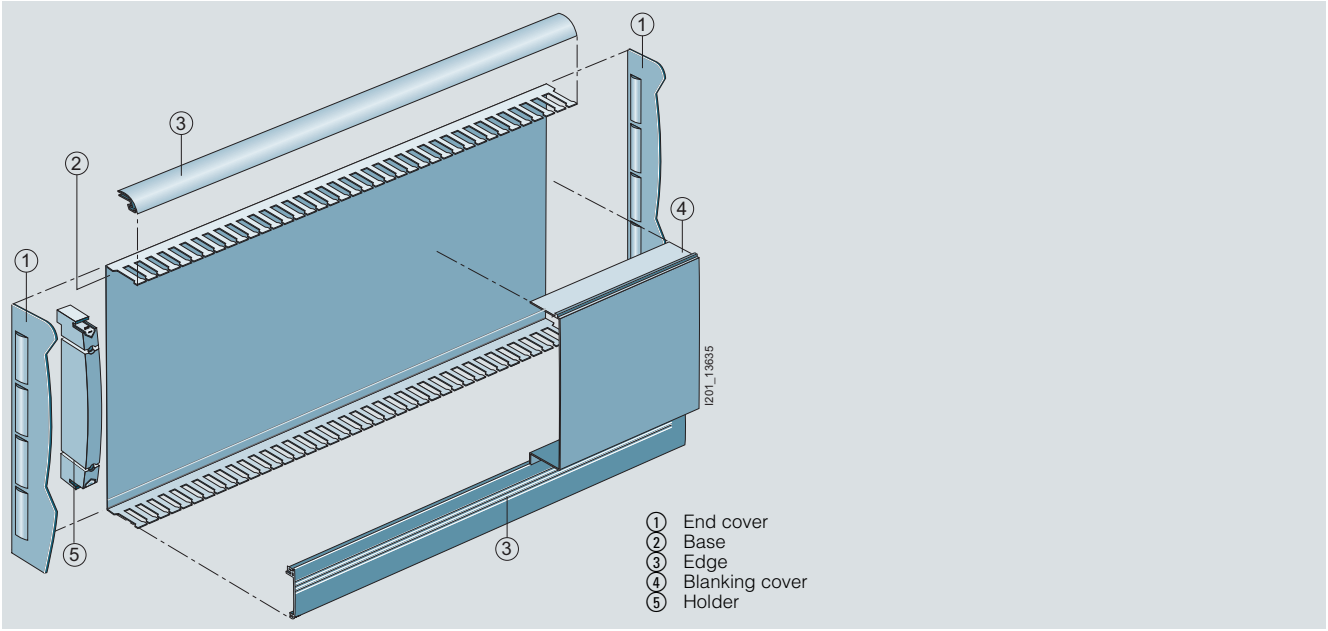


3NW7 430

Overview

The mounting components enable an enclosed design on a mounting plate.

The base, the holders for the edges, the edges, the supports for blanking covers with blanking cover and the end covers form a complete enclosure with degree of protection IP20.



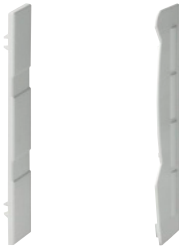
Benefits

- The mounting components enable a closed design for the SR60 busbar system in any switchgear assembly.
- The touch protection rating to IP20 means that operation is safe, even for non-specialists.

Mounting components

5

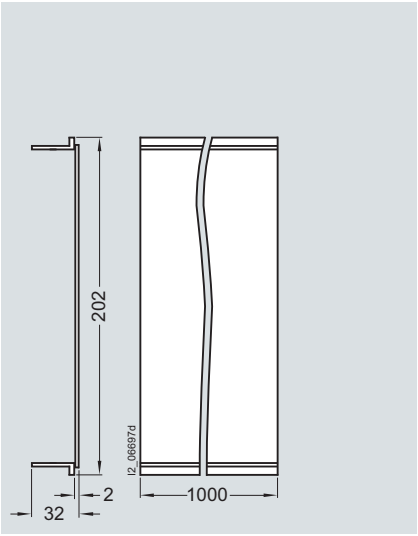
Selection and ordering data

		Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm					Unit(s)	Unit(s)	kg
	**Bases** Height								
	230 mm, for 3 busbars	1100	B	**5SH3 526**		016	1	1	1.100
	290 mm, for 4 busbars		C	**5SH3 527**		016	1	2	1.300
	**Blanking covers**								
	Mounting on 5SH3 536 supports for blanking covers, height 202 mm	1000	A	**5SH3 537**		016	1	2	0.075
	**Edges**								
	17 x 36 mm, for 3 busbars	1100	B	**5SH3 528**		016	1	2	0.311
	77 x 36 mm, for 4 busbars		C	**5SH3 530**		016	1	2	0.583
	**Partitions**								
	For additional touch protection on systems without bases, slotted								
	17 × 86 mm	1100	C	**5SH3 531**		016	1	2	0.365
 8US19 22-1AC00 5SH3 534	**End covers**								
	For covering free busbar ends								
	L1–L3, for 8US19 23-2AA01 or 8US19 23-3AA01		A	**8US19 22-1AC00**		143	1	10	0.020
	L1–L3+PE/N, 4P, for 8US19 23-4AA00 (1 pack = 2 units, (1x right, 1x left))		A	**8US19 22-1AB00**		143	1	1	0.055
	For 5SH3 532 holders								
	Height 230 mm (3P)		B	**5SH3 533**		016	1	4	0.038
	Height 290 mm (4P or 3P + wiring duct), (1 pack = 2 units, (1x right, 1x left))		C	**5SH3 534**		016	1	4/40	0.048
	**Holders**								
	For edges and partitions 5SH3 528, 5SH3 530 and 5SH3 531		B	**5SH3 532**		016	1	2	0.106
	**Supports for blanking covers**								
	For blanking covers, mounting on busbar (2 units required for each section of blanking cover)		B	**5SH3 536**		016	1	4/160	0.040
	**Busbar supports** **For SR60 busbar system** For busbars with a bar thickness of 5 or 10 mm and a busbar height of 12, 15, 20, 25 or 30 mm								
	L1–L3, 3P, with outer mounting		A	**8US19 23-2AA01**		143	1	10	0.200
	L1–L3, 3P, with inner mounting		A	**8US19 23-3AA01**		143	1	10	0.200
	L1–L3+PE/N, 4P, with inner mounting		A	**8US19 23-4AA00**		143	1	10	0.269

* You can order this quantity or a multiple thereof.

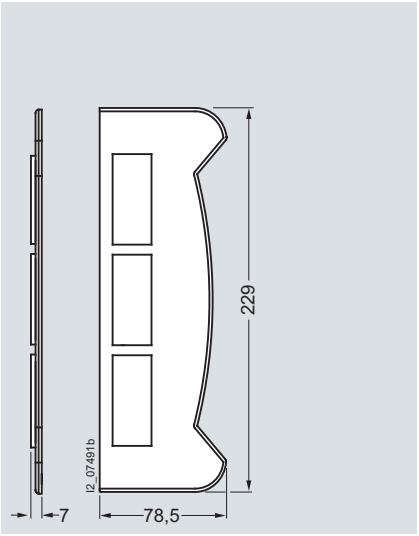
Dimensional drawings

Blanking cover

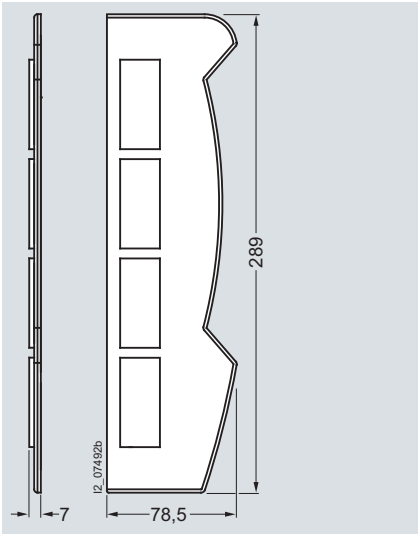


5SH3 537

End cover for busbar support, lateral

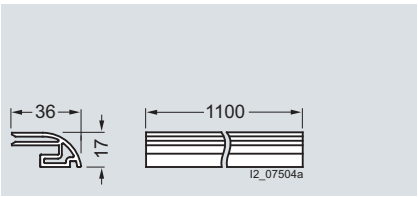


5SH3 533



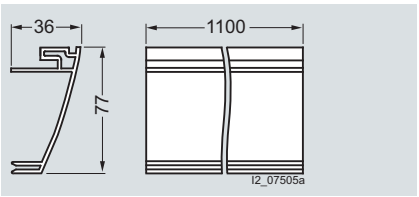
5SH3 534

Edge



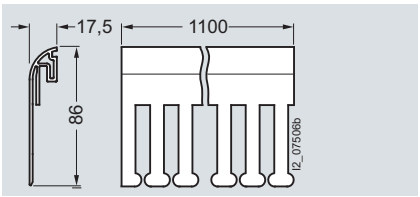
5SH3 528

Edge



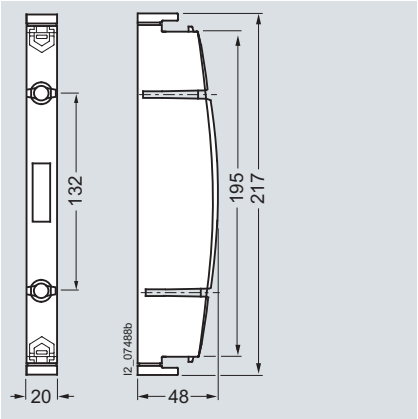
5SH3 530

Partition



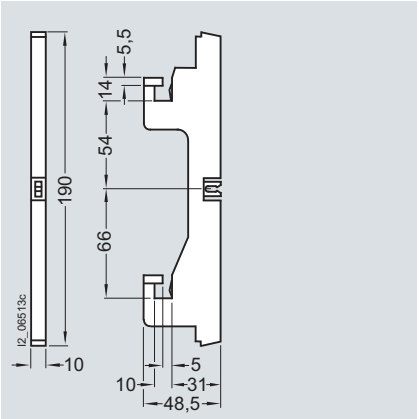
5SH3 531

Holder for edges and partitions



5SH3 532

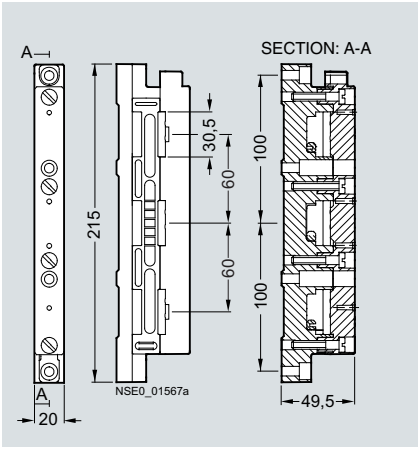
Support for blanking covers



5SH3 536

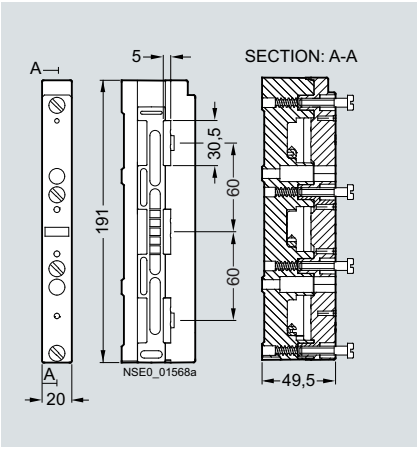
Mounting components

Busbar support for SR60



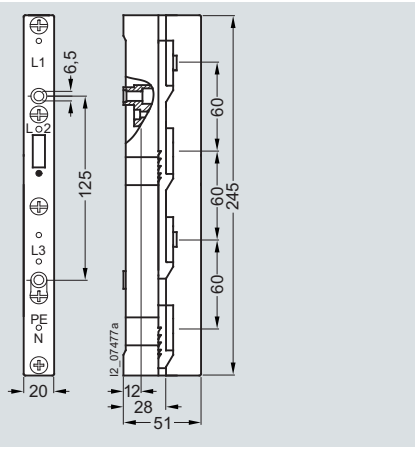
8US19 23-2AA01

Busbar support for SR60



8US19 23-3AA01

Busbar support for SR60



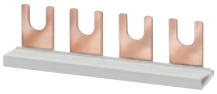
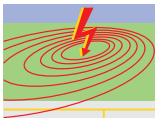
8US19 23-4AA00

BETA Protecting Overvoltage Protection Devices

6

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**Lightning arresters, type 1**	6/3	With plug-in protective modules for TN-C, TN-S and TT systems Rated voltage 350 V AC for lightning currents from 50 to 100 kA. All versions with remote signaling contact. For installation in main distribution boards, upstream or downstream of the counter.	EN 61643-11	✓	✓	✓
	**Combination surge arresters, type 1 and type 2**	6/5	With plug-in protective modules for TN-C, TN-S and TT systems Rated voltage 350 V AC for lightning currents from 50 to 100 kA. All versions with remote signaling contact. For installation in main distribution boards downstream of the counter.	EN 61643-11	✓	✓	✓
	**Surge arresters, type 2**	6/7	With plug-in protective modules for TN-C, TN-S and TT systems Rated voltage 350 V AC, rated discharge current 20 kA and discharge surge current 40 kA. For installation in sub-distribution boards.	EN 61643-11	✓	✓	✓
	**Surge arresters, type 3**	6/13	With plug-in protective modules for single-phase and three-phase systems. Rated voltage, single-phase 24 V AC/DC, 60 V, 120 V, 230 V and three-phase 230/400 V AC. For installation as close as possible upstream from the terminal equipment.	EN 61643-11	✓	✓	✓
	**Accessories for surge arresters**	6/15	Male connectors for lightning and surge arresters and through-type terminals for installation.	EN 61643-11	✓	✓	✓
	**Link rails**	6/17	Link rails provide the electrical interconnection of the N-conductors, PE conductors or PEN conductors of 1-pole surge arresters, type 2.	--	✓	✓	✓
	**Overvoltage protection adapters**	6/18	Can be plugged into SCHUKO socket outlets, with status display and monitoring of protection circuit. For line protection, telecommunication devices, ISDN/RDSI, TV/radio and SAT installations.	EN 61643-11	✓	✓	--
	**Configuration**	6/20	Everything you need to know about overvoltage protection. Function, mounting and technical connections.				
	**Surge arresters for measuring and control technology**	6/18	With plug-in protective modules for measuring and control technology for installation in signal circuits.	EN 61643-21	✓	--	✓

Overview

Type 1 lightning arresters protect low-voltage systems against overvoltages and high surge currents that can be triggered by direct or indirect lightning strikes.

The protection level is lowered to 1.5 kV by the lightning arresters.

The lightning arresters are enclosed and suitable for mounting in the precounter sector.

All spark gaps are tripped. For this reason, decoupling reactors are no longer required for the installation of overvoltage protection devices.

The lightning arresters are tested using wave-shaped lightning impulses, 25 ... 100 kA with waveform 10/350 µs.

Benefits

- The rated arrester voltage is a uniform 350 V AC. This increases safety in systems with extended voltage overshoots.
- All lightning arresters are fitted with a mechanical fault indication that does not require an extra power supply. This means they can be installed in the precounter sector, where electrical plants can be protected particularly effectively.
- The protective modules are plug-in versions. No dismantling of electrical wires required when replacing the protective modules. When taking insulation measurements, the protective modules are simply removed in order to ensure disconnection from the power supply.
- All lightning arresters have a remote signaling contact, which signals if the device fails.

Technical specifications

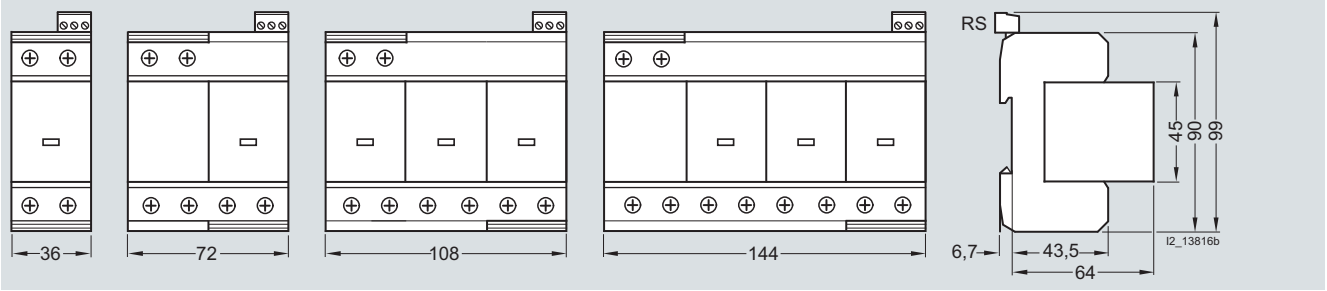
			5SD7 411-1	5SD7 412-1	5SD7 413-1	5SD7 414-1
Standards			IEC 61643-11; DIN VDE 06754-6			
Approved acc. to			--	UL/CUL	UL/CUL	UL/CUL
Rated voltage U_N		V AC	240		240/415	
Rated arrester voltage U_C						
• L/N, N/PE, L/PEN		V AC	350			
Lightning impulse current I_{imp} (10/350 µs)						
• L/N or L/PEN, 1P/3P		kA	25	25/100	25/75	25/100
• N/PE		kA	--	100	--	100
Rated discharge surge current I_n (8/20 µs)						
• L/N or L/PEN, 1P/3P		kA	25	25/100	25/75	25/100
• N/PE		kA	--	100	--	100
Protection level U_p						
• L/N, N/PE, L/PEN		kV	≤ 1.5			
Follow current discharge capacity I_{fi} (AC)						
• L/N or L/PEN	For 264 V/350 V	kA	50/25	50/25	50/25	50/25
• N/PE		A	--	100	--	100
Response time t_A						
• L/N or L/PEN		ns	≤ 100	≤ 100	≤ 100	≤ 100
• L-(N)-PE		ns	--	≤ 100	--	≤ 100
Required back-up fuse, max.		A	315 gL/gG			
Short-circuit strength with max. back-up fuse		kA_{rms}	50			
Temperature range		°C	-40 ... +80			
Degree of protection			IP20, with connected conductors			
Conductor cross-section						
• Finely stranded		mm^2	2.5 ... 25			
• Solid		mm^2	2.5 ... 35			
Mounting width	Acc. to DIN 43880	MW	2	4	6	8
Remote signaling (RS)			Yes			
• Contact type			Floating CO contact (plug-in)			
• Operational voltage, max.		V AC	250			
		V DC	125			
• Operational current, max.						
- Resistive/inductive load		A AC	1/1			
- Resistive/inductive load		mA DC	200/30			
• Conductor cross-section						
- Finely stranded		mm^2	1.5			
- Solid		mm^2	1.5			

Lightning arresters, type 1

Selection and ordering data

	Version	Discharge capacity	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		kA						Unit(s)	Unit(s)	kg
	Lightning arresters									
	1P For 1-wire systems with remote signaling NEW	25	2	A	**5SD7 411-1**		008	1	1	0.424
	2P For TN-S and TT systems with remote signaling	100	4	B	**5SD7 412-1**		008	1	1	0.732
	3P For TN-C systems with remote signaling	75	6	A	**5SD7 413-1**		008	1	1	0.909
	4P For TN-S and TT systems with remote signaling	100	8	A	**5SD7 414-1**		008	1	1	1.310

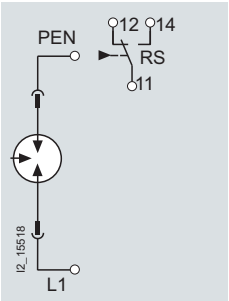
Dimensional drawings



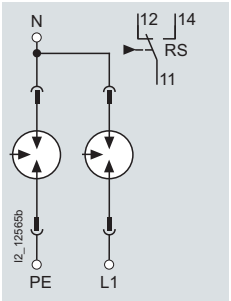
1P 2P 3P 4P

RS = remote signaling

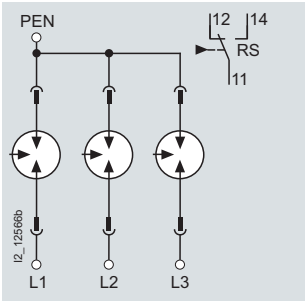
Schematics



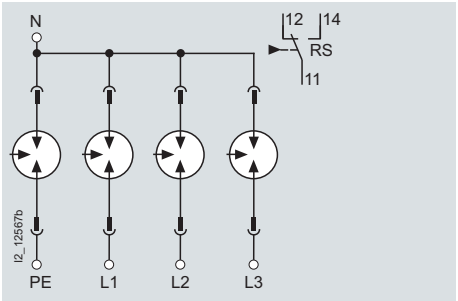
1P



2P



3P



4P

RS = remote signaling

* You can order this quantity or a multiple thereof.

Overview

Type 1 and type 2 combination surge arresters protect low-voltage systems against the overvoltages and high currents that can be triggered by direct lightning strikes. They are tested by wave-shaped lightning impulses, 25 ... 100 kA with waveform 10/350 µs.

The protection level is lowered to 1.5 kV by the combination surge arresters.

A thermal isolating arrester disconnector offers a high degree of protection against overload.

All spark gaps are tripped. For this reason, decoupling reactors are no longer required for the installation of overvoltage protection devices.

Benefits

- The rated arrester voltage is a uniform 350 V AC. This increases safety in systems with extended voltage overshoots.
- All combination surge arresters are fitted with a mechanical fault indication that does not require an extra power supply.
- The protective modules are plug-in versions. No dismantling of electrical wires required when replacing the protective modules. When taking insulation measurements, the protective modules are simply removed in order to ensure disconnection from the power supply.
- The same type 2 overvoltage protective modules are used as for the slim version of the surge arresters (5SD7 42.). This simplifies stock-keeping.
- All combination surge arresters have a remote signaling contact, which signals if the device fails.

Technical specifications

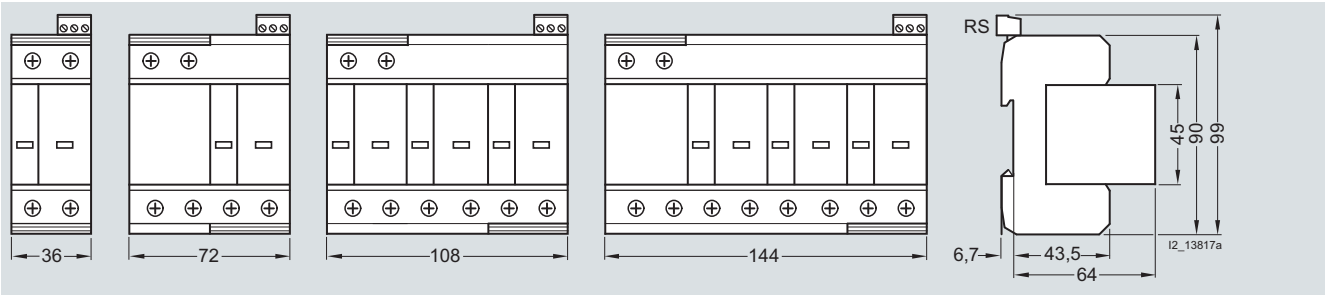
			5SD7 441-1	5SD7 442-1	5SD7 443-1	5SD7 444-1
Standards			IEC 61643-11; EN 61643-11			
Approved acc. to			--	KEMA, UL/CUL	KEMA, UL/CUL	KEMA, UL/CUL
Rated voltage U_N		V AC	240		240/415	
Rated arrester voltage U_C						
• L/N, N/PE, L/PEN		V AC	350			
Lightning impulse current I_{imp} (10/350 µs)						
• L/N or L/PEN, 1P/3P		kA	25	25/100	25/75	25/100
• N/PE		kA	--	100	--	100
Rated discharge surge current I_n (8/20 µs)						
• L/N or L/PEN, 1P/3P		kA	25	25/100	25/75	25/100
• N/PE		kA	--	100	--	100
Protection level U_p						
• L/N, N/PE, L/PEN		kV	≤ 1.5			
Follow current discharge capacity I_{fi} (AC)						
• L/N or L/PEN		kA	25	25	25	25
• N/PE		kA	--	100	--	100
Response time t_A						
• L/N or L/PEN		ns	≤ 25	≤ 100	≤ 100	≤ 100
• L-(N)-PE		ns	--	≤ 100	--	≤ 100
Required back-up fuse, max.		A	315 gL/gG			
Short-circuit strength with max. back-up fuse		kA_{rms}	25			
Temperature range		°C	-40 ... +80			
Degree of protection			IP20, with connected conductors			
Conductor cross-section						
• Finely stranded		mm^2	2.5 ... 25			
• Solid		mm^2	2.5 ... 35			
Mounting width	Acc. to DIN 43880	MW	2	4	6	8
Visual function/fault indication			Yes			
Remote signaling (RS)			Yes			
• Contact type			Floating CO contact (plug-in)			
• Operational voltage, max.		V AC	250			
		V DC	125			
• Operational current, max.						
- Resistive/inductive load		A AC	1/1			
- Resistive/inductive load		mA DC	200/30			
• Conductor cross-section						
- Finely stranded		mm^2	1.5			
- Solid		mm^2	1.5			

Combination surge arresters, type 1 and type 2

Selection and ordering data

	Version	Discharge capacity	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		kA						Unit(s)	Unit(s)	kg
	Combination surge arresters									
	1P For 1-wire systems with remote signaling NEW	25	2	A	**5SD7 441-1**		008	1	1	0.356
	2P For TN-S and TT systems with remote signaling	100	4	B	**5SD7 442-1**		008	1	1	0.770
	3P For TN-C systems with remote signaling	75	6	A	**5SD7 443-1**		008	1	1	1.040
	4P For TN-S and TT systems with remote signaling	100	8	A	**5SD7 444-1**		008	1	1	1.430

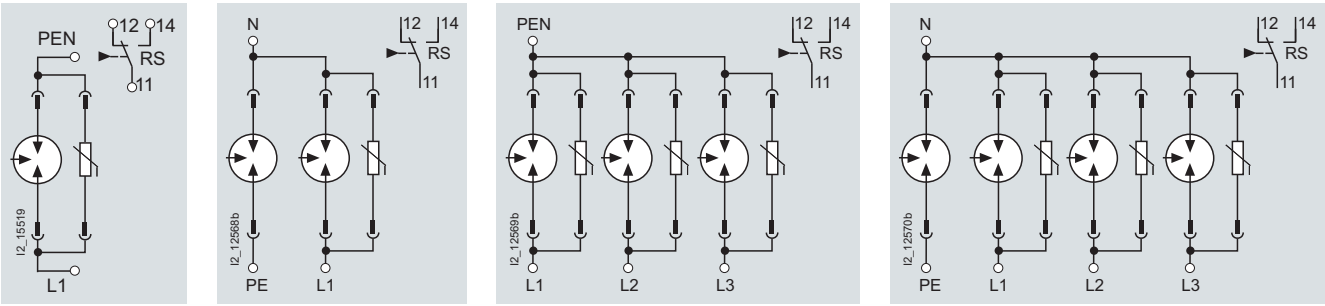
Dimensional drawings



1P 2P 3P 4P

RS = remote signaling

Schematics



1P 2P 3P 4P

RS = remote signaling

* You can order this quantity or a multiple thereof.

Overview

Type 2 surge arresters are installed downstream of type 1 lightning arresters in main distribution boards or sub-distribution boards. They protect low-voltage systems against transient overvoltages.

The type 2 surge arrester lowers the level of protection to between 1.4 and 1.5 kV. A remote signaling contact signals whether a protective module has been disconnected from the network by the thermal arrester disconnector or whether it is just not plugged in.

All spark gaps are tripped. For this reason, decoupling reactors are no longer required for the installation of overvoltage protection devices.

To ensure fault-free operation of photovoltaic systems, it is essential to have standardized protection against lightning and overvoltages. SPDs (5SD7 483-.) for the DC side protect the photovoltaic generator and the inverter against overvoltages.

In addition, there are now 4 new SPDs (5SD7 473-., 5SD7 485-.) for the protection of IT systems.

Benefits

- The rated arrester voltage is a uniform 350 V AC. This increases safety in systems with extended voltage overshoots.
- All type 2 surge arresters are fitted with a mechanical fault indication that does not require an extra power supply.
- A thermal isolating arrester installed in each device offers a high degree of protection. In the event of overload, the surge arrester is disconnected from the mains – the plant continues running.
- The protective modules are plug-in versions. No dismantling of electrical wires required when replacing the protective modules. When taking insulation measurements, the protective modules are simply removed in order to ensure disconnection from the power supply.
- All surge arresters are available with a remote signaling contact, which signals if the device fails.

6

Technical specifications

			Surge arresters, standard design							
			N/PE	Single-pole		Multipole				
			Plug-in	Compact	Plug-in	3P	4P	3P	4P	3P
			5SD7 481-0	5SD7 466-.	5SD7 461-.	5SD7 463-.	5SD7 464-.	5SD7 473-.	5SD7 485-.	5SD7 483-.
Standards			IEC 61643-11; EN 61643-11							
Approved acc. to			KEMA	--						
Rated voltage U_N		V AC	240	240	240	240/415	240/415	500	240/415	--
Rated arrester voltage U_C										
• L/N		V AC	--	350	350	--	--	--	--	--
• L/N or L/PEN		V	--	--	--	350 AC	350 AC	580 AC	440 AC	1000 DC
• N/PE		V AC	260	--	--	--	260	--	--	--
Rated discharge surge current I_n (8/20 µs)										
• L/N		kA	--	20	20	--	--	--	--	--
• L/N or L/PEN, 1P		kA	--	--	--	20	20	15	20	15
• N/PE		kA	20	--	--	--	20	--	--	--
Discharge surge current I_{imp} (8/20 µs)										
• L/N		kA	--	40	40	--	--	--	--	--
• L/N or L/PEN, 1P		kA	--	--	--	40	40	--	--	30
• L/N or L/PEN, 1P/multipole		kA	--	--	--	--	--	30	40	--
• N/PE		kA	40	--	--	--	40	--	--	--
Lightning impulse current I_{imp} (10/350 µs)		kA	12	--						
Protection level U_p										
• L/N		kV	--	≤ 1.4	--	--	--	--	--	--
• L/N or L/PEN		kV	--	--	≤ 1.4	≤ 1.4	≤ 1.4	≤ 2.5	≤ 2.2	≤ 5
• N/PE		kV	≤ 1	--	--	--	≤ 1.5	--	--	--
Response time t_A										
• L/N or L/PEN		ns	--	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25
• N/PE		ns	≤ 100	--	--	--	≤ 100	--	--	--
Required back-up fuse, max.		A	125 gL							
Short-circuit strength with max. back-up fuse		kA_{rms}	25							
Temperature range		°C	-40 ... +80							
Degree of protection			IP20, with connected conductors							
Conductor cross-section										
• Finely stranded		mm^2	1.5 ... 25							
• Solid		mm^2	1.5 ... 35							
Mounting width	Acc. to DIN 43880	MW	1	1	1	3	4	3	4	3
Visual function/fault indication			Yes							

Surge arresters, type 2

			Multipole surge arresters, narrow design					
			5SD7 422-0	5SD7 422-1	5SD7 423-0	5SD7 423-1	5SD7 424-0	5SD7 424-1
Standards			IEC 61643-11; VDE 06754-6					
Approved acc. to			KEMA	KEMA/UL/ CUL	KEMA	KEMA/UL/ CUL	KEMA	KEMA/UL/ CUL
Rated voltage U_N		V AC	240		240/415		240/415	
Rated arrester voltage U_C								
• L/N or L/PEN		V AC	350		350		350	
• N/PE		V AC	264		--		264	
Rated discharge surge current I_n (8/20 µs)								
• L/N or L/PEN, 1P/3P		kA	20		20		20	
• N/PE		kA	20		--		20	
Discharge surge current I_{Imp} (8/20 µs)								
• L/N or L/PEN, 1P/3P		kA	40		40		40	
• N/PE		kA	40		--		40	
Protection level U_p								
• L/N or L/PEN		kV	≤ 1.4		≤ 1.4		≤ 1.4	
• N/PE		kV	≤ 1.5		--		≤ 1.5	
Response time t_A								
• L/N		ns	≤ 25		≤ 25		≤ 25	
• N/PE		ns	≤ 100		--		≤ 100	
Required back-up fuse, max.		A	125 gL		125 gL		125 gL	
Short-circuit strength with max. back-up fuse		kA_{rms}	25		25		25	
Temperature range		°C	-40 ... +80					
Degree of protection			IP20, with connected conductors					
Conductor cross-section								
• Finely stranded		mm^2	1.5 ... 16					
• Solid		mm^2	1.5 ... 25					
Mounting width	Acc. to DIN 43880	mm	26		38		50	
Visual function/fault indication			Yes					

			Remote signaling contact
Remote signaling (RS)			Yes
Contact type			Floating CO contact (plug-in)
Operational voltage, max.		V AC	250
		V DC	125
Operational current, max.			
- Resistive/inductive load		A AC	1/1
- Resistive/inductive load		mA DC	200/30
Conductor cross-section			
- Finely stranded		mm^2	1.5
- Solid		mm^2	1.5

Selection and ordering data

	Version	Max. continuous voltage U_C	Discharge surge current I_n/I_{max}	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V	kA						Unit(s)	Unit(s)	kg
	Surge arresters, standard design										
	• 1P, compact (non plug-in)										
	- Without remote signaling	350 AC	20/40	1	A	**5SD7 466-0**		008	1	1	0.114
	- With remote signaling	350 AC	20/40	1	A	**5SD7 466-1**		008	1	1	0.120
	• 1P, plug-in										
	- Without remote signaling	350 AC	20/40	1	A	**5SD7 461-0**		008	1	1	0.130
	- With remote signaling	350 AC	20/40	1	A	**5SD7 461-1**		008	1	1	0.134
	• N/PE, 1P, plug-in										
	- Without remote signaling	350 AC	20/40	1	A	**5SD7 481-0**		008	1	1	0.131
	• 3P, plug-in, 3+0 circuit For TN-C systems										
	- Without remote signaling	350 AC	20/40	3	A	**5SD7 463-0**		008	1	1	0.393
	- With remote signaling	350 AC	20/40	3	B	**5SD7 463-1**		008	1	1	0.403
	• 3P, plug-in, 3+0 circuit For IT systems			NEW							
	- Without remote signaling	580 AC	15/30	3	A	**5SD7 473-0**		008	1	1	0.384
	- With remote signaling	580 AC	15/30	3	A	**5SD7 473-1**		008	1	1	0.371
	• 3P, plug-in, for protecting the DC part of the photovoltaic systems up to 1000 V DC according to IEC 60364-7-712			NEW							
	- Without remote signaling	1000 DC	15/30	3	A	**5SD7 483-0**		008	1	1	0.344
	- With remote signaling	1000 DC	15/30	3	A	**5SD7 483-1**		008	1	1/44	0.352

6

* You can order this quantity or a multiple thereof.

Surge arresters, type 2

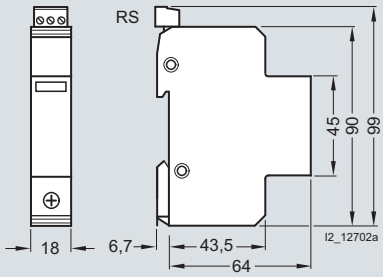
	Version	Max. continuous voltage U_C	Discharge surge current I_n/I_{max}	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V	kA						Unit(s)	Unit(s)	kg
	• 4P, plug-in, 3+1 circuit For TN-S and TT systems										
	- Without remote signaling	350 AC	20/40	4	A	**5SD7 464-0**		008	1	1	0.433
	- With remote signaling	350 AC	20/40	4	A	**5SD7 464-1**		008	1	1	0.443
	• 4P, plug-in, 4+0 circuit For IT systems with N-conductor incorporated in the cable										
	- Without remote signaling	440 AC	20/40	4	A	**5SD7 485-0**		008	1	1/44	0.445
	- With remote signaling	440 AC	20/40	4	A	**5SD7 485-1**		008	1	1	0.455

	Version	Discharge surge current I_n/I_{max}	Mounting width	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		kA	mm (MW)					Unit(s)	Unit(s)	kg
	Surge arresters, narrow design									
	• 2P For TN-S and TT systems									
	- Without remote signaling	20/40	24 (1 1/3)	A	**5SD7 422-0**		008	1	1	0.220
	- With remote signaling	20/40	24 (1 1/3)	B	**5SD7 422-1**		008	1	1	0.227
	• 3P For TN-C systems									
	- Without remote signaling	20/40	36 (2)	A	**5SD7 423-0**		008	1	1	0.320
	- With remote signaling	20/40	36 (2)	B	**5SD7 423-1**		008	1	1	0.330
	• 4P For TN-S and TT systems									
	- Without remote signaling	20/40	48 (2 2/3)	A	**5SD7 424-0**		008	1	1	0.408
	- With remote signaling	20/40	48 (2 2/3)	A	**5SD7 424-1**		008	1	1	0.416

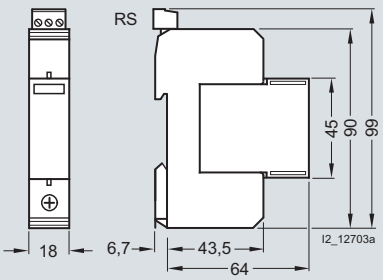
* You can order this quantity or a multiple thereof.

Dimensional drawings

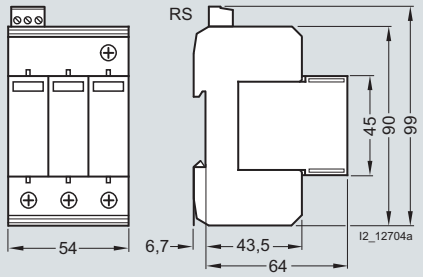
Surge arresters, standard design



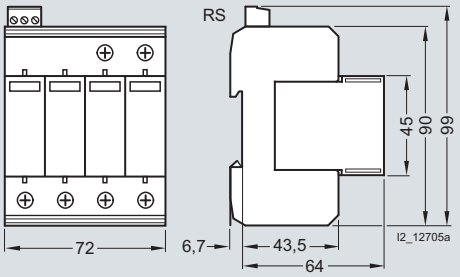
1P
5SD7 466-0 without RS[1)]
5SD7 466-1 with RS[1)]



1P
5SD7 461-0, 5SD7 481-0 without RS[1)]
5SD7 461-1 with RS[1)]

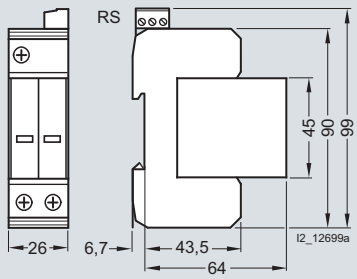


3P
5SD7 463-0, 5SD7 473-0, 5SD7 483-0 without RS[1)]
5SD7 463-1, 5SD7 473-1, 5SD7 483-1 with RS[1)]

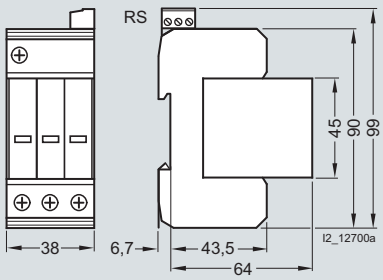


4P
5SD7 464-0, 5SD7 485-0 without RS[1)]
5SD7 464-1, 5SD7 485-1 with RS[1)]

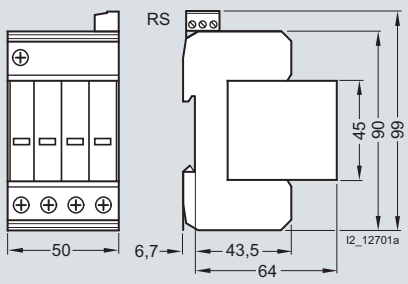
Surge arresters, narrow design



2P
5SD7 422-0 without RS[1)]
5SD7 422-1 with RS[1)]



3P
5SD7 423-0 without RS[1)]
5SD7 423-1 with RS[1)]



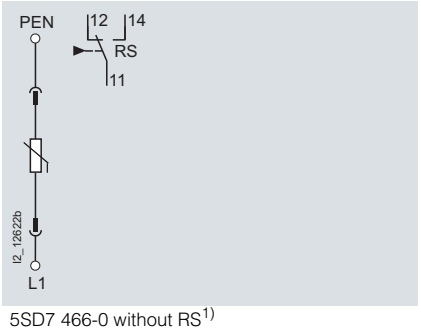
4P
5SD7 424-0 without RS[1)]
5SD7 424-1 with RS[1)]

[1)] RS = remote signaling.

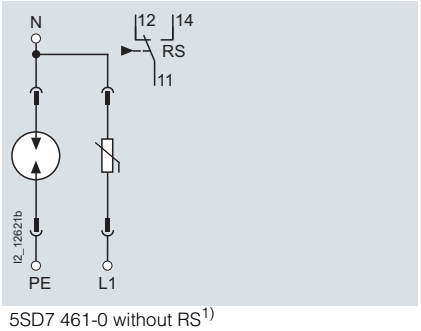
Surge arresters, type 2

Schematics

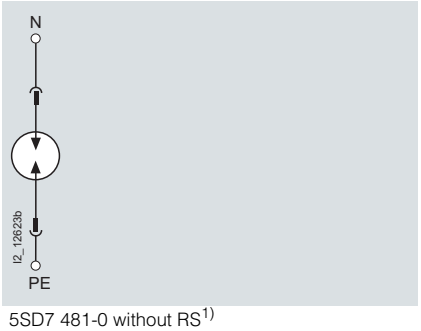
Surge arresters, standard design



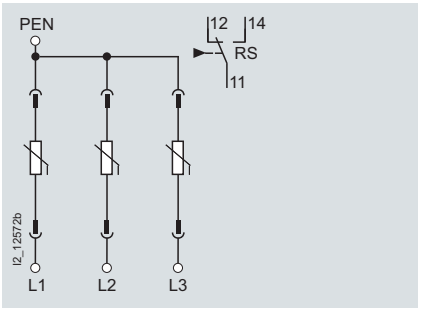
5SD7 466-0 without RS[1)]
5SD7 466-1 with RS[1)]



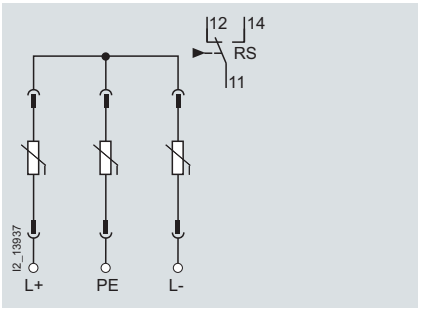
5SD7 461-0 without RS[1)]
5SD7 461-1 with RS[1)]



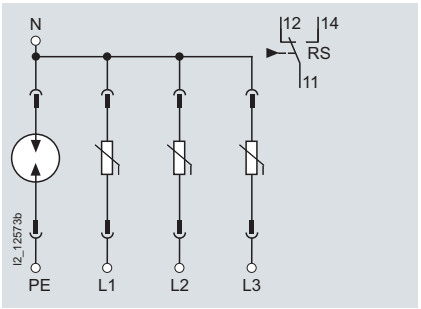
5SD7 481-0 without RS[1)]



5SD7 463-0, 5SD7 473-0 without RS[1)]
5SD7 463-1, 5SD7 473-1 with RS[1)]



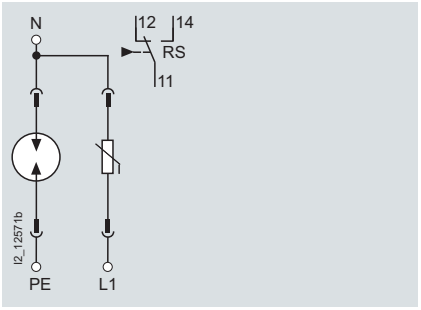
5SD7 483-0 without RS[1)]
5SD7 483-1 with RS[1)]



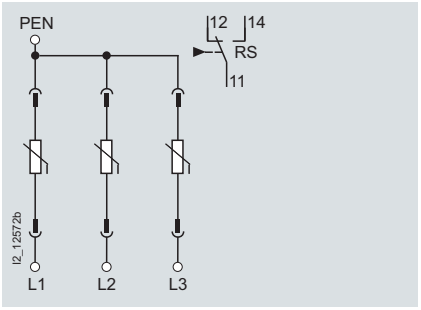
5SD7 464-0, 5SD7 485-0 without RS[1)]
5SD7 464-1, 5SD7 485-1 with RS[1)]

[1)] RS = remote signaling

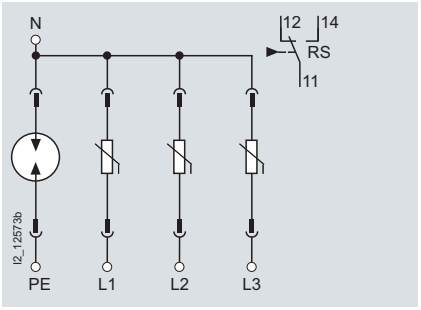
Surge arresters, narrow design



2P
5SD7 422-0 without RS[1)]
5SD7 422-1 with RS[1)]



3P
5SD7 423-0 without RS[1)]
5SD7 423-1 with RS[1)]



4P
5SD7 424-0 without RS[1)]
5SD7 424-1 with RS[1)]

[1)] RS = remote signaling.

Overview

Type 3 surge arresters are installed downstream of type 2 surge arresters in sub-distribution boards close to the loads in single or multiphase systems and further limit the overvoltage in order to protect the connected loads.

Type 3 surge arresters in voltage versions 24, 60, 120 and 240 V can be used in AC and DC systems.

Benefits

- The protective modules are plug-in versions. No mounting work required when replacing the protective modules
- All type 3 surge arresters are fitted with a mechanical fault indication that does not require an extra power supply
- In the event of a power failure, a remote signaling is output over an optocoupler with open collector output.

Technical specifications

			Multipole surge arresters, plug-in				
			2P				4P
			5SD7 432-1	5SD7 432-2	5SD7 432-3	5SD7 432-4	5SD7 434-1
Standards			IEC 61643-11; EN 61643-11				
Approved acc. to			KEMA		KEMA (available soon)		
Rated voltage U_N		V AC V DC	230 230	120 120	60 60	24 24	230/400 --
Rated load current I_N (at 30 °C)		A	26	26	26	26	3 × 26
Rated arrester voltage U_C		V AC V DC	253 275	150 200	100 130	34 44	335 --
Rated discharge surge current I_n (8/20 µs)		kA	3	2.5	2.5	1	1.5
Max. discharge surge current I_{max} (8/20 µs)		kA	10	10	6.5	2	4.5
Combined surge U_{oc}		kV	6	6	4	2	4
Protection level U_p	L–N/L(N)–PE	V	≤ 1500/≤ 600	≤ 850/≤ 350	≤ 700/≤ 250	≤ 550/≤ 100	≤ 1200
Response time t_A		ns	≤ 100	≤ 100	≤ 100	≤ 100	≤ 100
Required back-up fuse, max.		A	25 gL/gG	25 gL/gG	25 gL/gG	25 gL/gG	25 gL/gG
Temperature range		°C	-40 ... +85				
Degree of protection			IP20, with connected conductors				
Conductor cross-section							
• Finely stranded		mm^2	0.2 ... 4				
• Solid		mm^2	0.2 ... 2.5				
Mounting width	Acc. to DIN 43880	MW	1	1	1	1	2
Visual function/fault indication			Yes				
Remote signaling (RS)			Yes				
• Contact type			NC contacts				
• Operational voltage, max.		V AC	250				
• Operational current, max.			3				

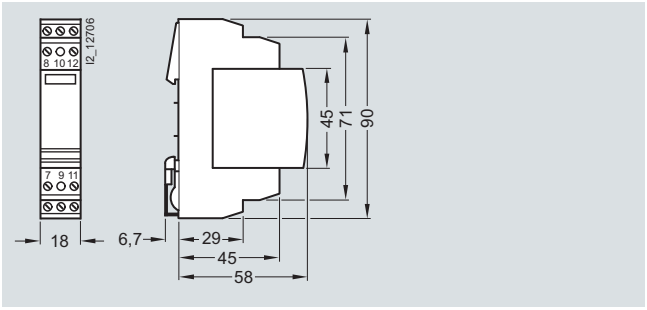
Selection and ordering data

	Version	Rated voltage U_N	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC/V DC						Unit(s)	Unit(s)	kg
	Surge arresters, plug-in									
	• 2P									
	With remote signaling	24	1	A	**5SD7 432-4**		008	1	1	0.027
		60	1	B	**5SD7 432-3**		008	1	1	0.026
		120	1	B	**5SD7 432-2**		008	1	1	0.081
		230	1	A	**5SD7 432-1**		008	1	1	0.071
	• 4P									
	With remote signaling	230/400	2	A	**5SD7 434-1**		008	1	1	0.056

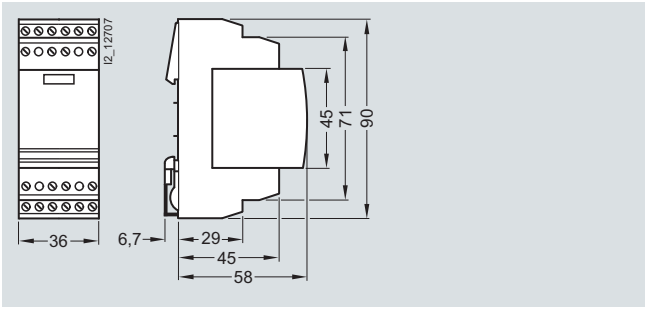
* You can order this quantity or a multiple thereof.

Surge arresters, type 3

Dimensional drawings

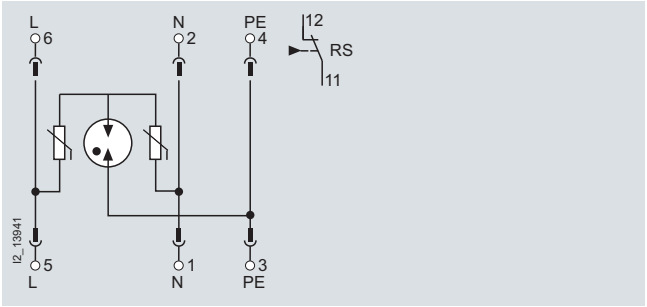


2P
5SD7 432-.

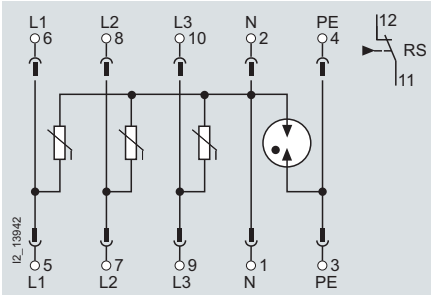


4P
5SD7 434-1

Schematics



2P
5SD7 432-.



4P
5SD7 434-1

RS = remote signaling

Technical specifications

		Through-type terminals 5SD7 490-1
Standards		EN 61643-11, UL 1059, UL 486E
Rated voltage U_N	V AC	230
Rated load current I_L (at 30 °C)	A	125
Rated arrester voltage U_C	V DC/AC	500
Required back-up fuse, max.	A	125 gL/gG
Short-circuit strength with max. back-up fuse	kA_{rms}	25
Temperature range	°C	-40 ... +85
Degree of protection		IP20, with connected conductors
Conductor cross-section		
• Finely stranded	mm^2	0.5 ... 25
• Solid	mm^2	0.5 ... 35

Selection and ordering data

	Version	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	**Through-type terminals** For simple wiring in various wiring versions	B	**5SD7 490-1**		008	1	1	0.191
	**Male connectors for lightning arresters, type 1 and combination surge arresters, type 1 and 2**							
	• Lightning arresters L/N I_{fi} 50 kA_{rms} For 5SD7 41 lightning arresters.	B	**5SD7 418-1**		008	1	1	0.240
	• Lightning arresters N/PE For 5SD7 41. lightning arresters and 5SD7 44. combination surge arresters.	B	**5SD7 418-0**		008	1	1	0.240
	**Male connectors for lightning arresters, type 1 and combination surge arresters, type 1 and 2**							
	• Lightning arresters L/N I_{fi} 50 kA_{rms}	B	**5SD7 448-1**		008	1	1	0.129
	• Lightning arresters N/PE For 5SD7 41. lightning arresters and 5SD7 44. combination surge arresters.	B	**5SD7 418-0**		008	1	1	0.240
	**Male connectors for lightning arresters, type 2 and combination surge arresters, type 1 and 2**							
	• Surge arresters L/N For 5SD7 42. surge arresters and 5SD7 44. combination surge arresters.	B	**5SD7 428-1**		008	1	1	0.052
	• Lightning arresters N/PE For 5SD7 41. lightning arresters and 5SD7 44. combination surge arresters.	B	**5SD7 428-0**		008	1	1	0.049
	**Male connectors for 5SD7 46. combination surge arresters, type 2**							
	• Surge arresters L/N	B	**5SD7 468-1**		008	1	1	0.051
	• Surge arresters N/PE	B	**5SD7 488-0**		008	1	1	0.040
	**Male connectors for 5SD7 485-. combination surge arresters, type 2**	NEW						
	• Surge arresters for IT systems	A	**5SD7 488-1**		008	1	1	0.053
	**Male connectors for 5SD7 473-. and 5SD7 483-. combination surge arresters, type 2**	NEW						
	• Surge arresters for photovoltaics and IT systems	A	**5SD7 498-1**		008	1	1	0.065

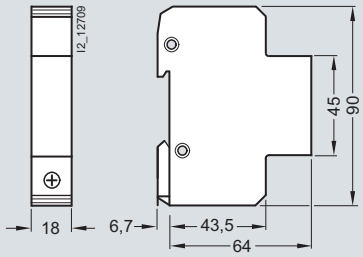
* You can order this quantity or a multiple thereof.

Accessories for surge arresters

	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
						Unit(s)	Unit(s)	kg
	**Male connectors for 5SD7 432-. combination surge arresters, type 3**							
	• Rated voltage U_N = 230 V	B	**5SD7 437-1**		008	1	1	0.028
	• Rated voltage U_N = 120 V	B	**5SD7 437-2**		008	1	1	0.027
	• Rated voltage U_N = 60 V	B	**5SD7 437-3**		008	1	1	0.026
	• Rated voltage U_N = 24 V	B	**5SD7 437-4**		008	1	1	0.027
	**Male connectors for 5SD7 434-1 combination surge arresters, type 3**	B	**5SD7 438-1**		008	1	1	0.162

6

Dimensional drawings



5SD7 490-1

* You can order this quantity or a multiple thereof.

Overview

Link rails let you combine 1-pole surge arresters to create complete solutions for multiphase systems.

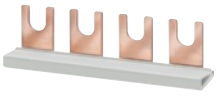
Benefits

These link rails allow cable lengths to be reduced to a minimum and save time during mounting.

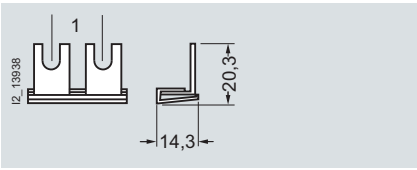
Technical specifications

		Link rails 5SD7 490-2, 5SD7 490-3, 5SD7 490-4
Standards		EN 60439-1 (VDE 0660-500:2005-01)
Busbar material		SF-Cu F 24
Partition material		Plastic, cycolor 3600 heat-resistant ≥ 90 °C
Busbar cross-section	mm^2	16
Rated operational voltage U_c	V AC	400
Rated current I_n		
• Cross-section 16 mm^2	A	80
Rated impulse withstand voltage U_{imp}	kV	4
Test pulse voltage (1.2/50)	kV	6.2
Rated conditional short-circuit current I_{cc}	kA	25
Resistance to climate		
• Constant atmosphere acc. to DIN 50015		23/83; 40/92; 55/20
• Humid heat (acc. to IEC 68, Part 2-30)		28 cycles
Insulation coordination acc. to VDE 0110-1 April 1997 (IEC 664)		
• Overvoltage category		III
• Degree of pollution		2
Maximum busbar current I_s/phase		
• Cross-section 16 mm^2	A	80
Maximum current in the arm I_E / phase		
• Cross-section 16 mm^2	A	130

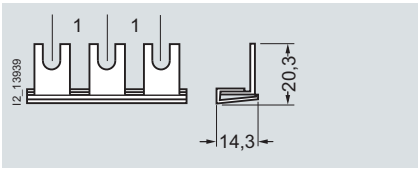
Selection and ordering data

	Version	Linking sequence	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		MW	mm					Unit(s)	Unit(s)	kg
	**Link rails for the interconnection of single-pole surge arresters, type 2**			NEW						
	• 2-pole	2	34	A	**5SD7 490-2**		008	1	10/100	0.093
	• 3-pole	3	51.8	A	**5SD7 490-3**		008	1	10/100	0.143
	• 4-pole	4	69.6	A	**5SD7 490-4**		008	1	10/100	0.194

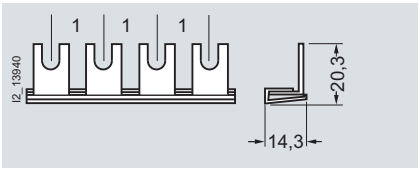
Dimensional drawings



5SD7 490-2



5SD7 490-3



5SD7 490-4

Pin spacing in MW.
Dimensions of side views in mm.

* You can order this quantity or a multiple thereof.

Overvoltage protection adapters

Overview

Type 3 overvoltage protection adapters for insertion in a SCHUKO socket outlet protect electronic loads against overvoltages from main power supplies.

However, overvoltages do not just reach loads over power cables. Telecommunication devices for TAE, ISDN/RDS and RJ12 connection, televisions or radios with aerial connection or satellite radio connection are all connected to a further power supply system which may allow overvoltages to reach – and damage – devices.

Benefits

- All type 3 overvoltage protection adapters are fitted with an LED as a visual status and fault indication
- The protection circuit is subject to continuous thermal monitoring. This ensures constant safe operation for the operator.

6

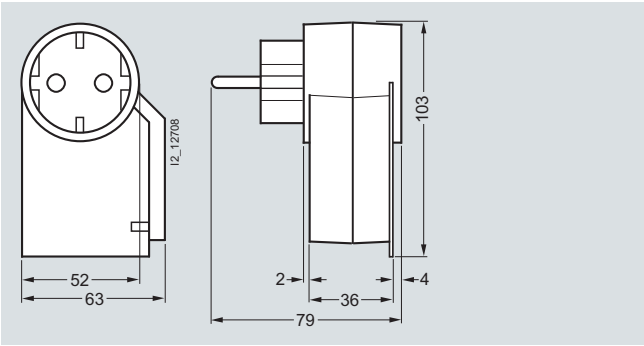
Technical specifications

			Overvoltage protection adapters					
			SCHUKO, line protection	TC analog/ TAE	ISDN/RDSI	TV/radio	TC analog/ RJ12	TV/SAT
			5SD7 435-0	5SD7 435-2	5SD7 435-3	5SD7 435-5	5SD7 435-6	5SD7 435-7
Standards			IEC 61643-11; EN 61643-11					
Approved acc. to			VDE					
Rated voltage U_N (power supply)		V AC	230					
Rated load current I_L (at 30 °C)		A	16	1.5				
Rated arrester voltage U_C (power supply)								
• L/N		V AC V DC	275 --	-- 200	-- 6	-- 72	-- 200	-- 72
• L–(N)–PE		V AC V DC	360 --	-- 200	-- 6	-- 72	-- 200	-- 72
Rated discharge surge current I_n (8/20 µs)								
• Core – shield • Core – ground		kA kA	3 3	1 2.5	0.65 2.5	2.5 5	1 2.5	2.5 5
Combined surge U_{oc}		kV	4					
Response time t_A		ns	25					
Protection level U_p								
• Core – shield/core – ground		kV	≤ 1.2	≤ 0.9	--	≤ 0.7/≤ 0.9	≤ 0.9	≤ 0.7/≤ 0.9
Output voltage limit at 1 kV/µs								
• Core - core • Core – shield • Core – ground		V V V	-- -- --	≤ 360 -- ≤ 450	≤ 65 -- ≤ 900	-- ≤ 700 ≤ 900	-- -- --	-- ≤ 700 ≤ 900
Residual voltage at I_n								
• Core - core • Core – shield • Core – ground		V V V	-- ≤ 1200 ≤ 900 L-/N/PE	≤ 35 -- ≤ 30	-- -- --	-- ≤ 30 ≤ 30	≤ 35 -- ≤ 30	-- ≤ 30 ≤ 30
Response time t_A								
• Core - core • Core – shield • Core – ground		ns ns ns	-- ≤ 25 ≤ 100 L-/N/PE	≤ 25 -- ≤ 100	≤ 1 -- ≤ 100	-- ≤ 100 ≤ 100	≤ 25 -- ≤ 100	-- ≤ 100 ≤ 100
Limit frequency f_G (3 dB)			--	--	--	≥ 1.8 GHz	--	≥ 1.8 GHz
• In 100 Ω system (typ.) • In 600 Ω system (typ.)			-- --	-- 700 kHz	300 kHz --	-- --	-- 700 kHz	-- --
Temperature range		°C	-25 ... +75					
Flammability category	Acc. to UL 94		V0					
Degree of protection	Acc. to IEC 60529		IP20, with connected conductors					

Selection and ordering data

	Version	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
						Unit(s)	Unit(s)	kg
	Overvoltage protection adapters							
	• For line contactors	B	**5SD7 435-0**		008	1	1	0.115
	• For telecommunication devices/TAE	B	**5SD7 435-2**		008	1	1	0.156
	• For ISDN/RDSI	B	**5SD7 435-3**		008	1	1	0.156
	• For telecommunication devices/RJ12	B	**5SD7 435-6**		008	1	1	0.144
	• For TV/radio	B	**5SD7 435-5**		008	1	1	0.156
	• For SAT installations	B	**5SD7 435-7**		008	1	1	0.156

Dimensional drawings



5SD7 435-.

* You can order this quantity or a multiple thereof.

Configuration

Overview

Overvoltage protection devices (SPD)

Overvoltage protection devices (SPD: Surge Protection Device): equipment whose main components comprise spark gaps (discharge paths) and/or voltage-independent resistors (varistors, suppressor diodes). Overvoltage protection devices serve to protect other electrical equipment and electrical systems against unacceptably high overvoltages and to establish equipotential bonding.

Overvoltage protection devices are categorized:

a) According to their application:

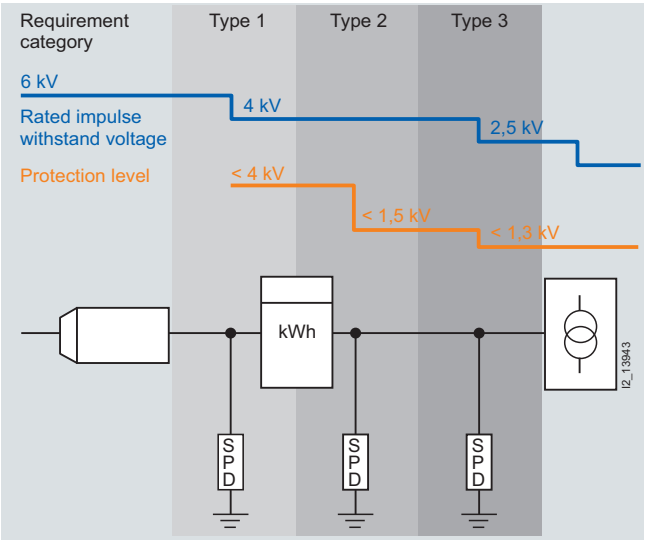
- Overvoltage protection devices for systems and devices in power systems
- Overvoltage protection devices for plants and devices in information systems for protecting modern electronic devices in telecommunication and signal processing systems against the indirect and direct effects of lightning strikes and other transient overvoltages
- Spark gaps for grounding systems or for equipotential bonding

b) According to their surge current discharge capacity and their protective action:

- Type 1 lightning arresters for influences as a result of direct or close-up strikes for the protection of installations and equipment
- Type 1 and 2 combination surge arresters in one device for influences as a result of direct or close-up strikes for the protection of installations, equipment and terminal equipment.
- Type 1 and type 2 surge arresters for remote strikes, switching overvoltages, as well as electrostatic discharges for the protection of installations, equipment and terminal equipment.

Requirement categories of arresters

Lightning current and overvoltage protection is only effective if the pertinent insulation resistance of plant sections is also taken into account. To do this, the impulse withstand voltage of the different overvoltage categories is adapted to suit the protection level U_p of the different overvoltage protection devices.



The international standard IEC 60664-1 (EN 60664-1) distinguishes between four impulse withstand voltage categories for low-voltage devices. For low-voltage systems with a rated voltage of 230/400V in particular, the following categories apply:

Surge voltages		
Category	**Impulse withstand voltage**	**Description**
IV	6 kV	Devices at the infeed of the installation, e.g. main distribution boards, E-counters, overcurrent circuit breakers, ...
III	4 kV	Devices that are part of the permanent installation: e.g distribution boards, protective devices, ...
II	2.5 kV	Devices for connection to the permanent installation, e.g. household appliances
I	1.5 kV	Extremely sensitive devices e.g. electronic devices, ...

The following table shows the breakdown of lightning and surge arresters into requirement categories.

German Product Standard EN 61643-11	**International Standard IEC 61643-1**	**Designation**
Type 1	Class I	Lightning arresters
Type 2	Class II	Surge arresters for distribution boards
Type 3	Class III	Surge arresters for terminal equipment

Furthermore, the following country-specific product standards also apply:

- Italian: CEI EN 61643-11
- Austria: ÖVE/ÖNORM E 8001.

Note:

You can download the technology primer, "Lightning current and overvoltage protection" on the Internet (www.siemens.com/beta) or obtain a copy from your local Siemens representative.

Coordinated use of lightning and surge arresters

In practice, arresters of the different requirement categories are switched in parallel. Due to their different operating characteristics, discharge capacity and protection tasks, the different arrester types must be installed in the system so that the nominal values of the individual devices are not exceeded, thus ensuring consistent protection.

In order to enable subsequent coupling, we recommend inserting an additional type 2 surge arrester every 10 m.

In order to ensure that a surge current always switches to the nearest upstream arrester – if there is a risk that the surge current could overload the respective arrester – it is necessary to take energetic considerations into account.

This is called "energetic coordination" and must be established between type 1 and type 2 arresters, as well as between type 3 arresters.

In the past, this was achieved through the laborious and costly installation of decoupling reactors or sufficiently long cable lengths. However, thanks to modern tripping technology, this is no longer necessary.

Follow current discharge capacity

The data for the follow current discharge capacity of lightning arresters indicates the maximum line current that the arrester is capable of interrupting by itself without needing help to extinguish the fault from an upstream protective device, such as a fuse or miniature circuit breaker. The follow current is a result of the short circuit produced briefly by the lightning arrester to discharge the lightning current. The follow current is therefore a short-circuit current and has a frequency of 50 Hz.

If the maximum permissible short-circuit current of the plant is smaller than the maximum follow current that can be extinguished by the SPD, no upstream protective device is required. If this is not the case, a fuse or miniature circuit breaker is required.

Devices	Maximum permissible energy value I^2t_{max} kA²s	Maximum permissible peak current value $I_{p\ max}$ kA	No protection necessary if $I_{cc\ rms}$ kA
Lightning arresters, type 1	180	12	Up to 50
Combination surge arresters, type 1 and 2	180	12	Up to 25
Surge arresters, type 2	180	12	Up to 25

SPD with miniature circuit breakers and fuses

Miniature circuit breakers or fuses should perform the following tasks:

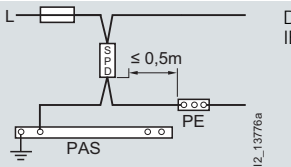
- Protect the SPD from overload in the event of overcurrent
- Ensure plant availability
- Help suppress system follow currents

Fuses or miniature circuit breakers therefore ensure that the max. permissible peak current $I_{p\ max}$ and the maximum permissible energy value I^2t_{max} of the SPD are not exceeded. This prevents damage to the SPD.

We recommend using fuses rather than miniature circuit breakers as they have a smaller voltage drop and ensure better protection.

A distinction is generally made between 2 different connection types:

- Series connection:
  The installation is protected over the protective device that is fitted in the power distribution as standard. The SPD is protected over the plant fuse installed in the system. If this fuse is tripped because the SPD is overloaded, the plant is disconnected from the supply by the fuse or miniature circuit breakers.

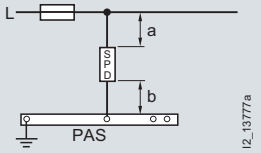


DIN V VDE V 0100-534;
IEC 60364-5-534

PAS = equipotential bonding strip

Recommended max. cable length for series connection

- Parallel connection:
  the protective device is located in the connecting cable of the SPD. If the miniature circuit breaker or fuse is tripped, the power supply of the plant is maintained. In this case, we recommend using a signaling device to signal that the overvoltage protection function has been disconnected from the supply and is therefore no longer effective.



DIN V VDE V 0100-534 (for a, b ≤ 0.5 m);
IEC 60364-5-534 (for a + b ≤ 0.5 m);
CEI 81-8:2002-02 (for a + b ≤ 0.5 m)

PAS = equipotential bonding strip

Recommended max. cable lengths for parallel connections

Your configuration should therefore take into account the values for the maximum permissible arrester back-up fuses stipulated in the technical specifications.

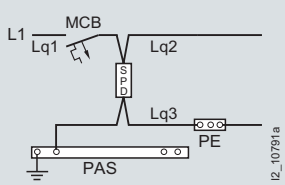
Generally speaking, a series connection is always preferable to a parallel connection. This connection is particularly suitable for reducing additional voltages on surge current cables.

Configuration

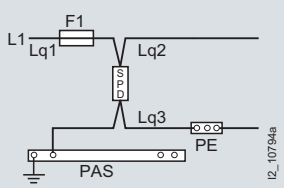
Dimensioning of conductor cross-sections

The different conductor cross-sections (Lq 1 to Lq 3) must be dimensioned according to the rated current of the miniature circuit breaker or the fuse.

Series connection



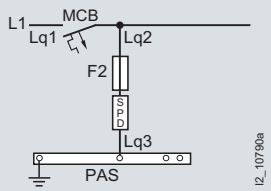
a) Protection of the SPD over miniature circuit breakers



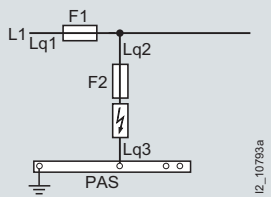
a) Protection of the SPD over fuses

PAS = equipotential bonding strip

Parallel connection



a) Protection of the SPD over miniature circuit breakers



a) Protection of the SPD over fuses

Conductor cross-sections for lightning arresters and combination surge arresters with series connection

MCB/fuse upstream connected [gL/gG]	Lq 1 Lq 2 [mm²]	Lq 3 [mm²]
25	6	16
35	10	16
50	16	16
63	25	25
80	25	25
100	35	35
125	35	35

Conductor cross-sections for lightning arresters and combination surge arresters with parallel connection

MCB/fuse upstream connected [gL/gG]	Lq 1 [mm²]	Lq 2 [mm²]	Lq 3 [mm²]	Fuse F 2 [A; gL/gG]
25	6	6	16	/
32	10	10	16	/
50	16	16	16	/
63	25	25	25	/
80	35	25	35	/
100	50	25	35	/
125	50	25	35	/
160	95	25	35	/
200	120	25	35	160[1)]
250	/	25	35	160[1)]
> 250	/	25	35	160[1)]

[1)] Recommended fuse.

Conductor cross-sections surge arresters with parallel connection

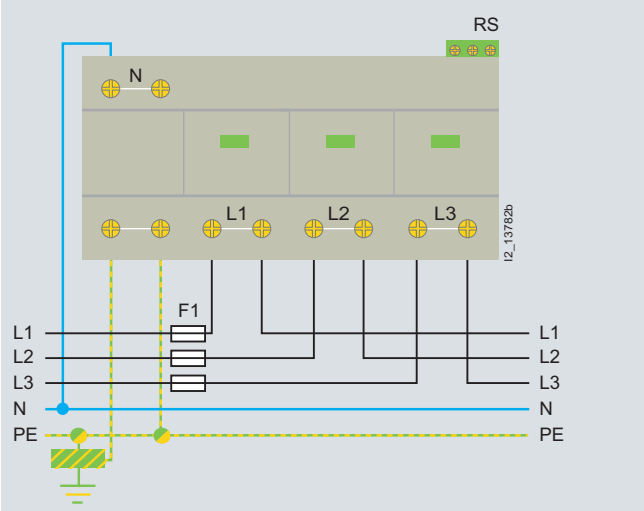
MCB/fuse upstream connected [A]	Lq 1 [mm²]	Lq 2 [mm²]	Lq 3 [mm²]	Fuse F [A]
10	1.5	6	6	/
16	2.5	6	6	/
25	6	6	6	/
32	10	10	10	/
50	16	16	16	/
63	25	25	25	/
80	35	25	25	/
100	50	25	25	/
125	50	25	25	/
160	95	25	25	Up to 100[1)]
200	120	25	25	Up to 125
> 250	> 120	25	25	Up to 125

[1)] Due to selectivity to upstream protective device.

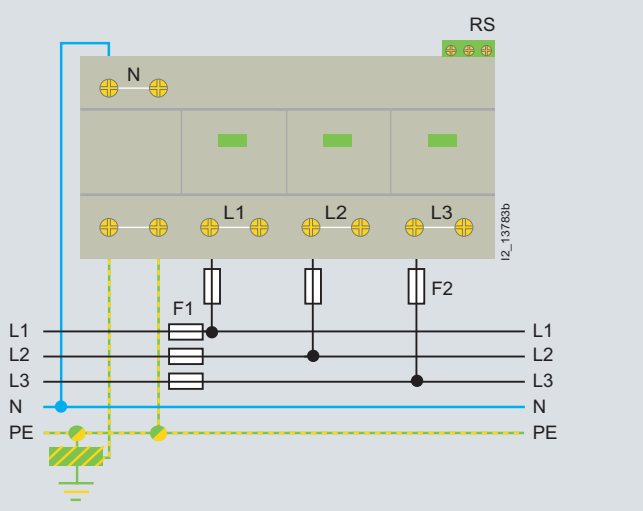
Schematics

Examples

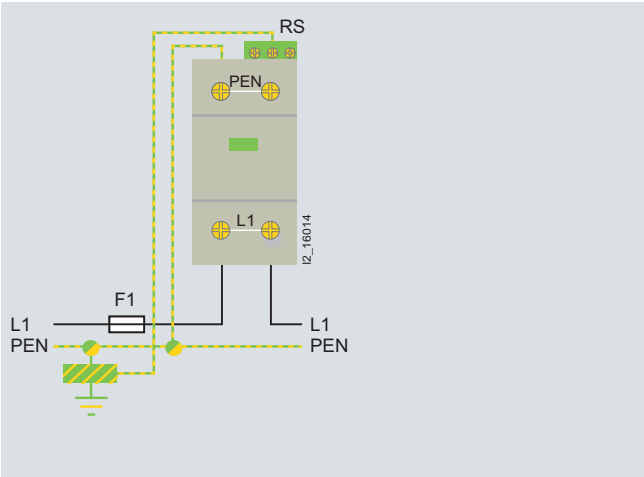
Series connection



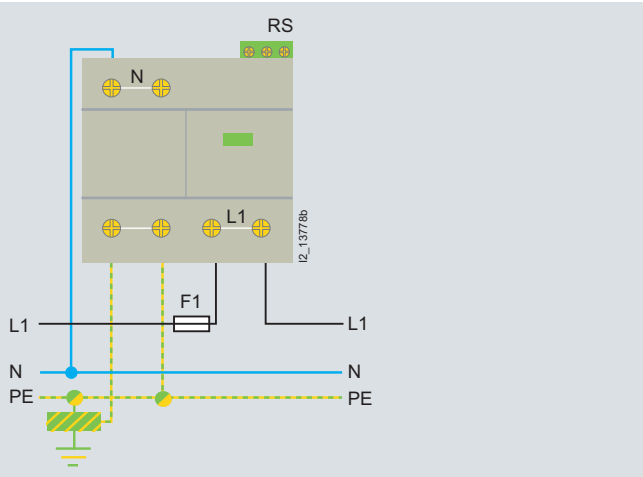
Parallel connection



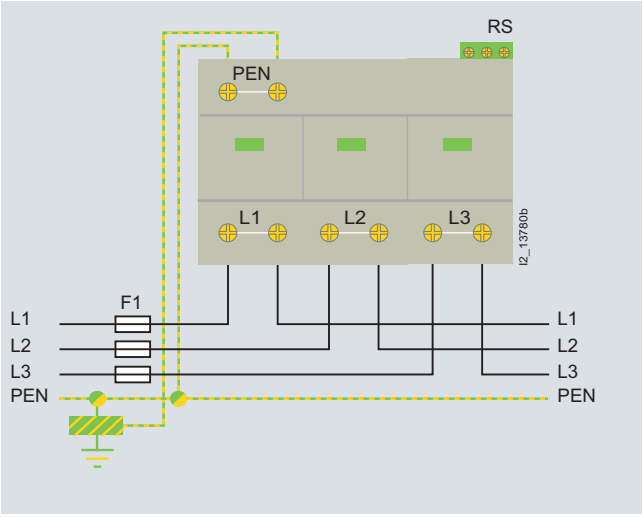
Lightning arresters, type 1



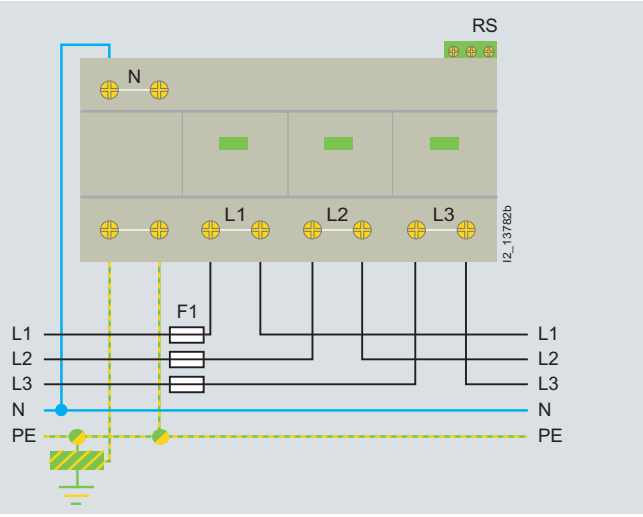
5SD7 411-1 for 1-wire systems



5SD7 412-1 for TN-S/TT systems



5SD7 413-1 for TN-C systems

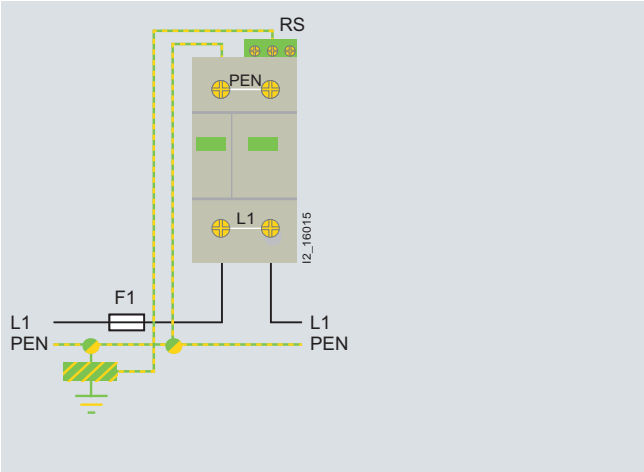


5SD7 414-1 for TN-S/TT systems

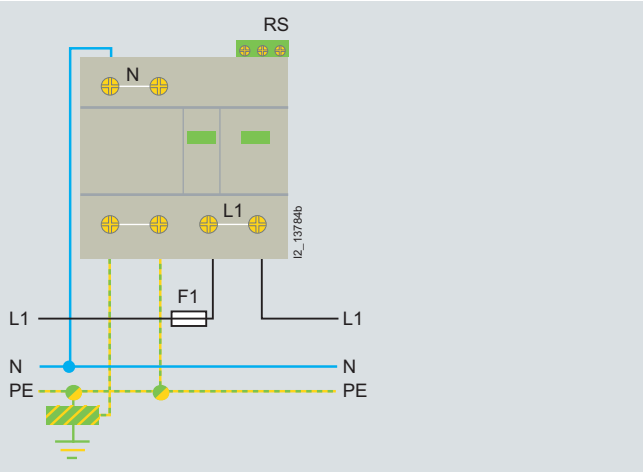
RS = remote signaling

Configuration

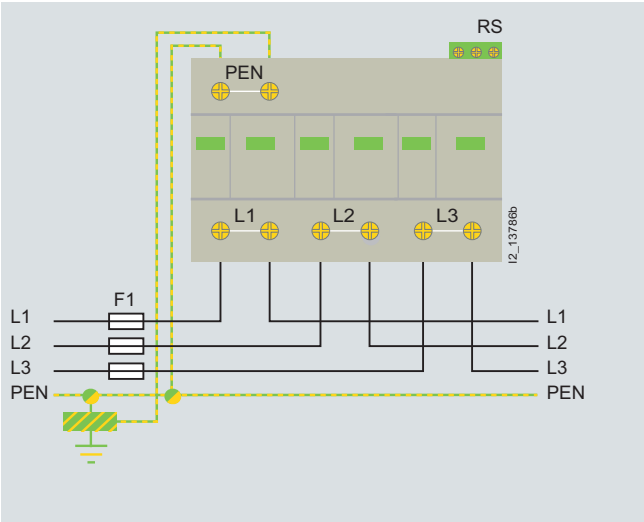
Combination surge arresters, type 1 and type 2



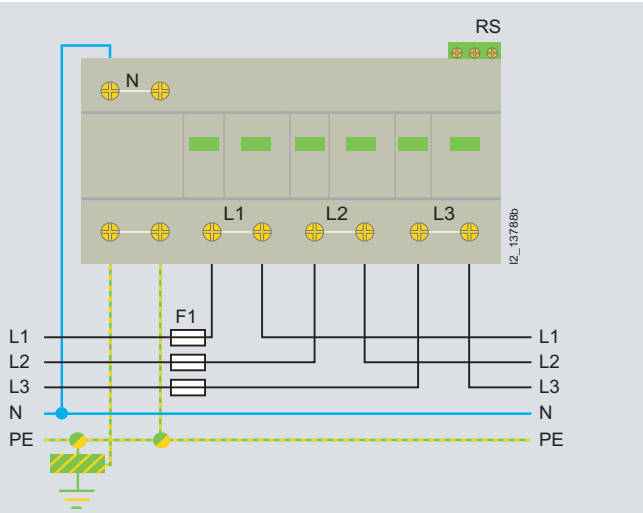
5SD7 441-1 for 1-wire systems



5SD7 442-1 for TN-S/TT systems

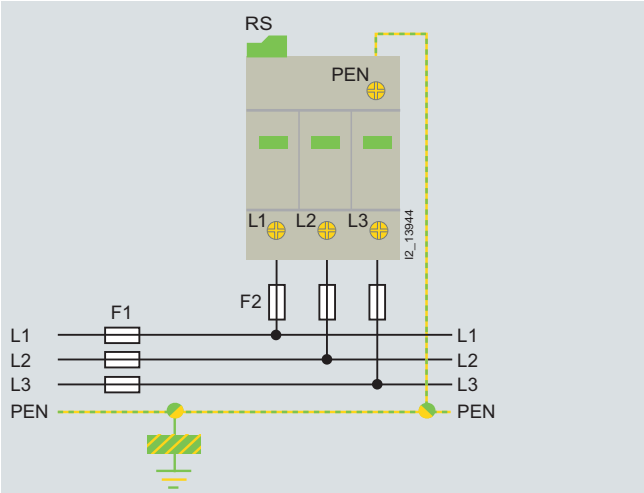


5SD7 443-1 for TN-C systems

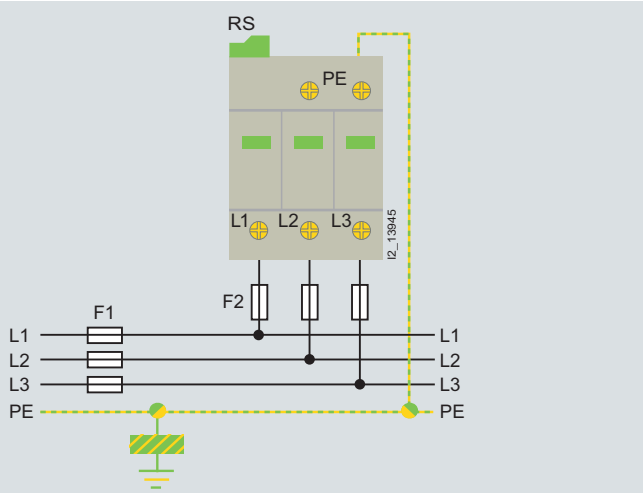


5SD7 444-1 for TN-S/TT systems

Surge arresters, type 2

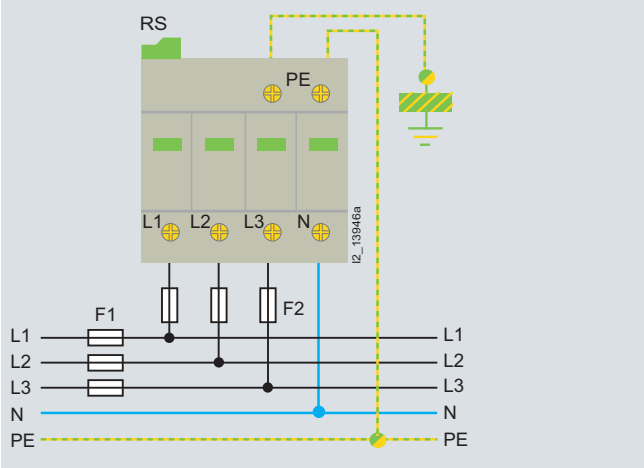


5SD7 463-. for TN-C systems

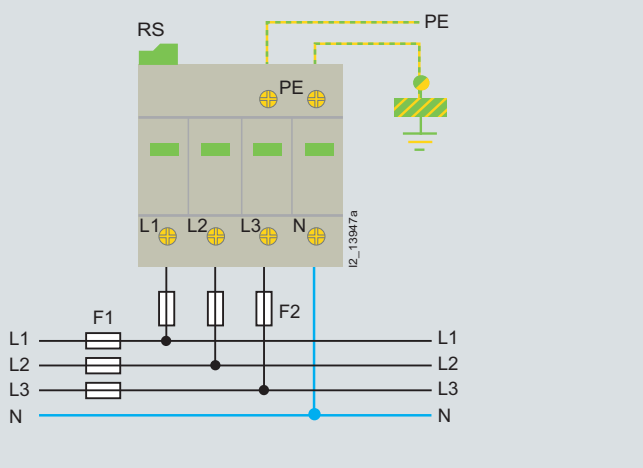


5SD7 473-. for IT systems

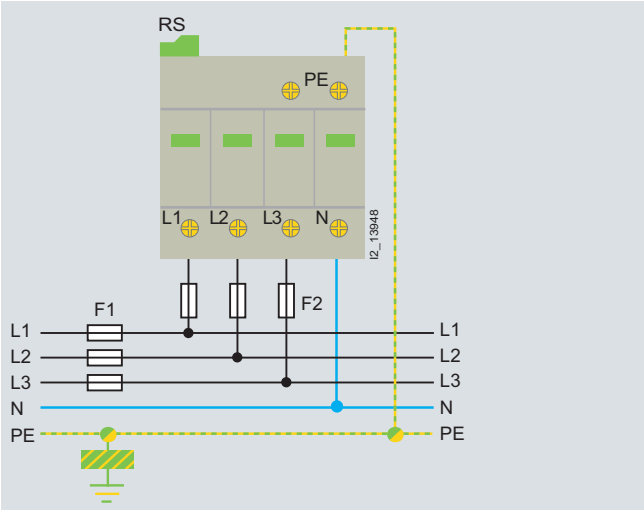
RS = remote signaling



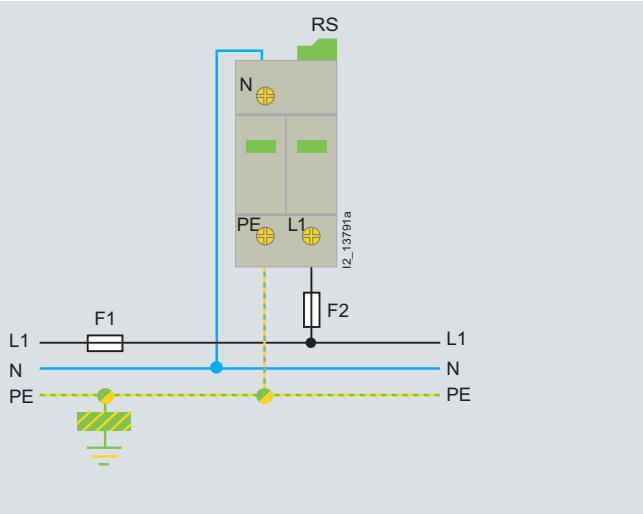
5SD7 464-. for TN-S systems



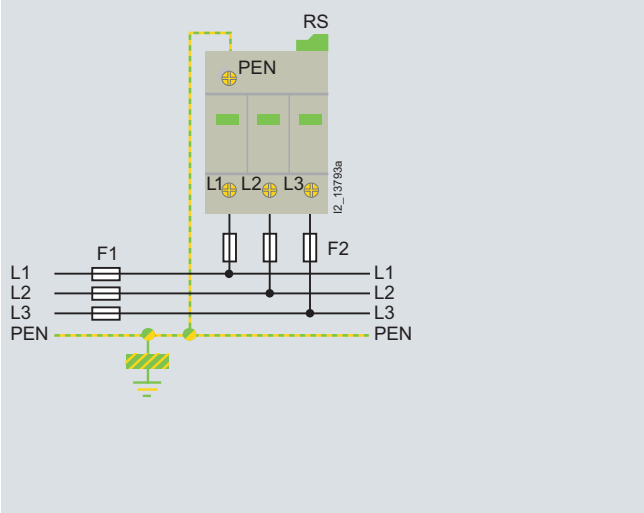
5SD7 464-. for TN-S/TT systems



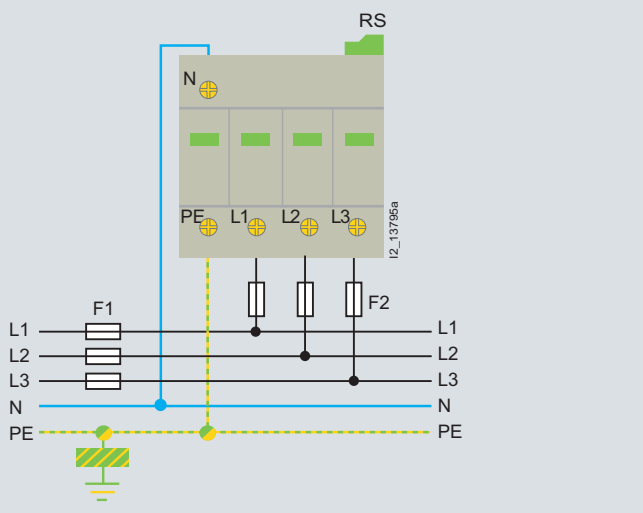
5SD7 485-. for IT systems



5SD7 422-. for TN-S/TT systems



5SD7 423-. for TN-C systems

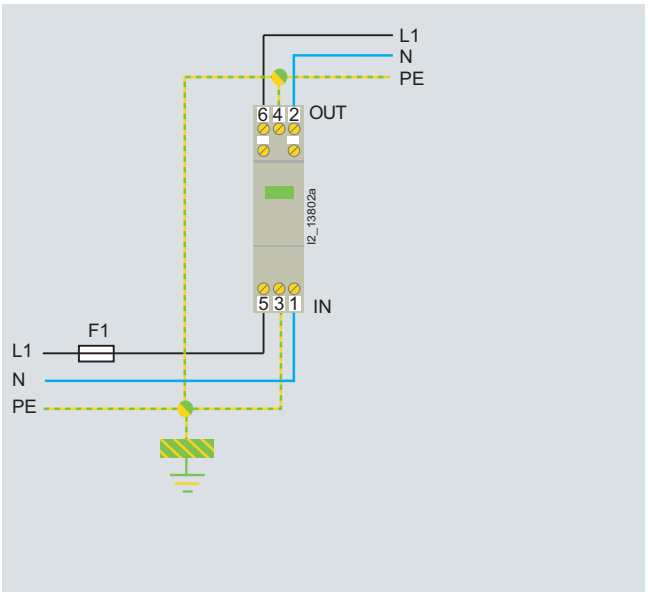


5SD7 424-. for TN-S/TT systems

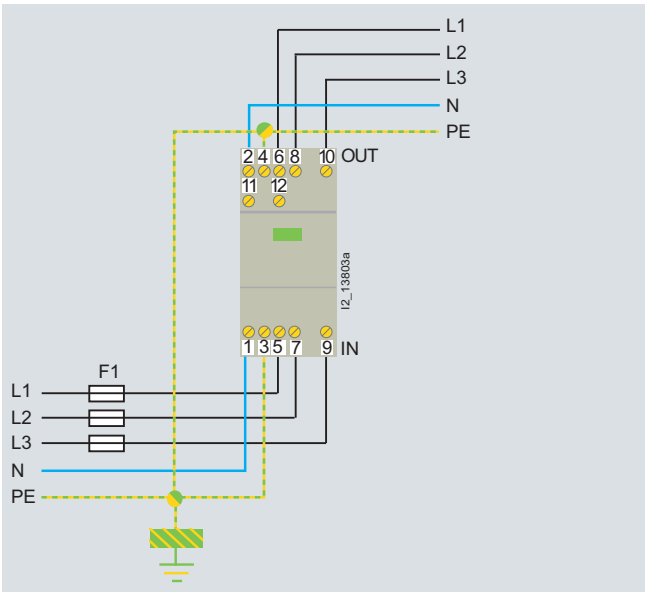
RS = remote signaling

Configuration

Surge arresters, type 3

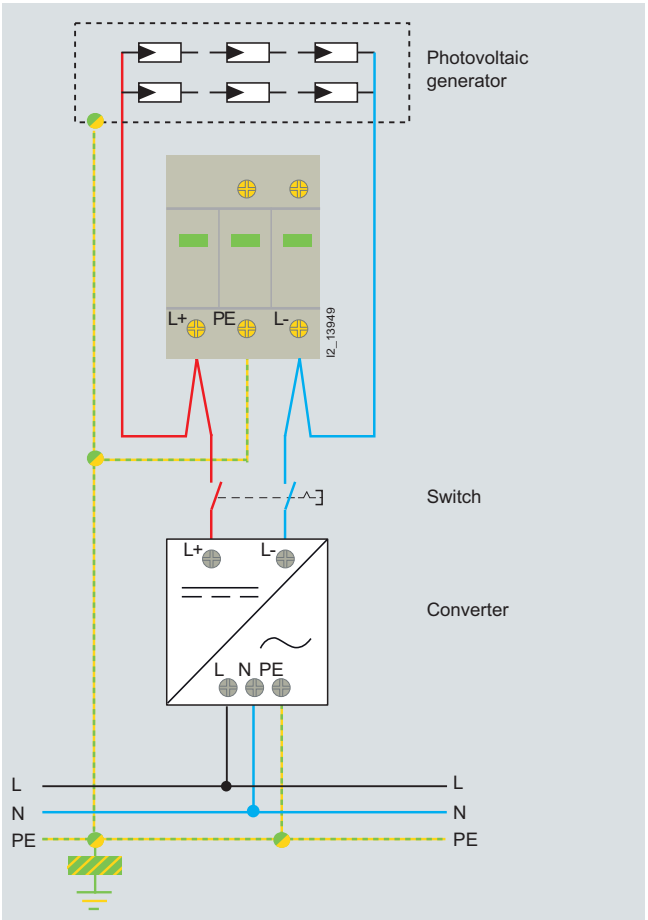


5SD7 432-. for TN-S/TT systems



5SD7 434-. for TN-S/TT systems

Surge arresters, type photovoltaic



5SD7 483-.

Due to the combination of three power varistors, the overvoltage protection required for the inverters is implemented on the DC side.

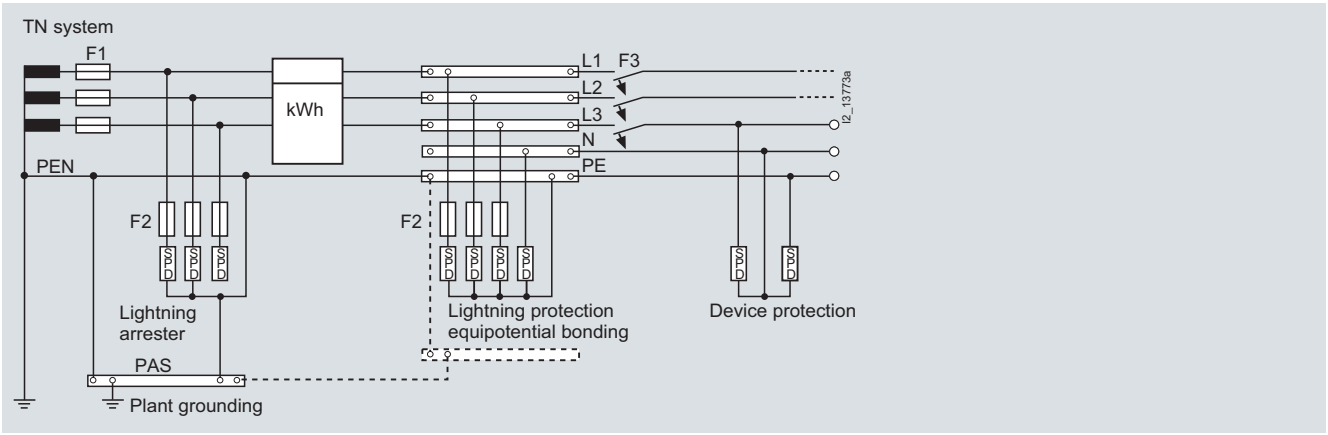
On the AC side, the overvoltage protection can be ensured using surge arresters type 2 (5SD7 422-. or 5SD7 424-.).

Scope when installing overvoltage protection systems

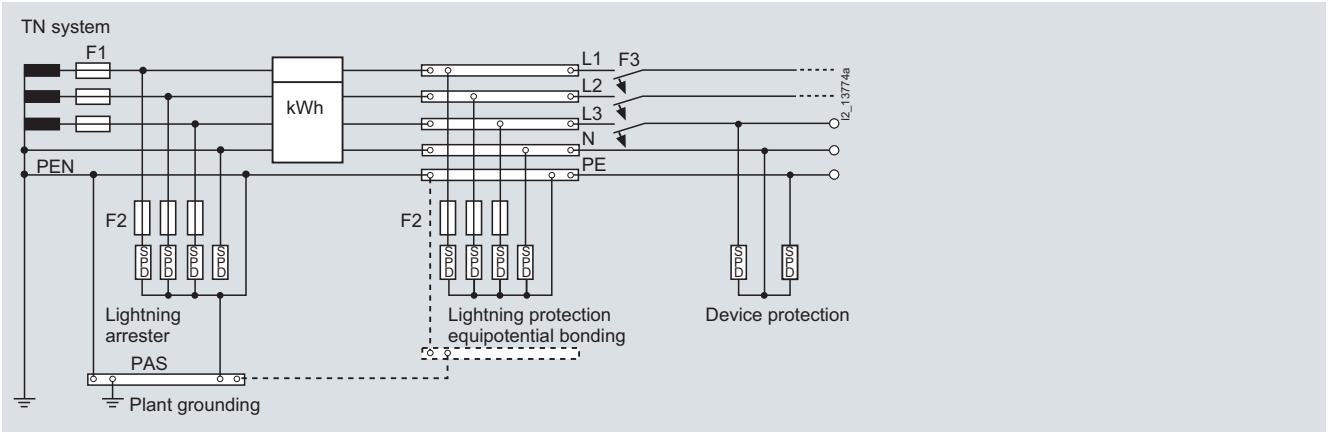
The scope of IEC 60364-4-443 – Electrical installations of buildings, Protection for safety; Protection against voltage disturbances and electromagnetic disturbances – extends from the protective device over the counter, through to the socket outlet.

The scope of IEC 61024-1 – Protection of structures against lightning – and IEC 61312-1 – Protection against lightning electromagnetic impulse – extends from the incoming main feeder box through to the socket outlet and includes grounding measures for SPDs.

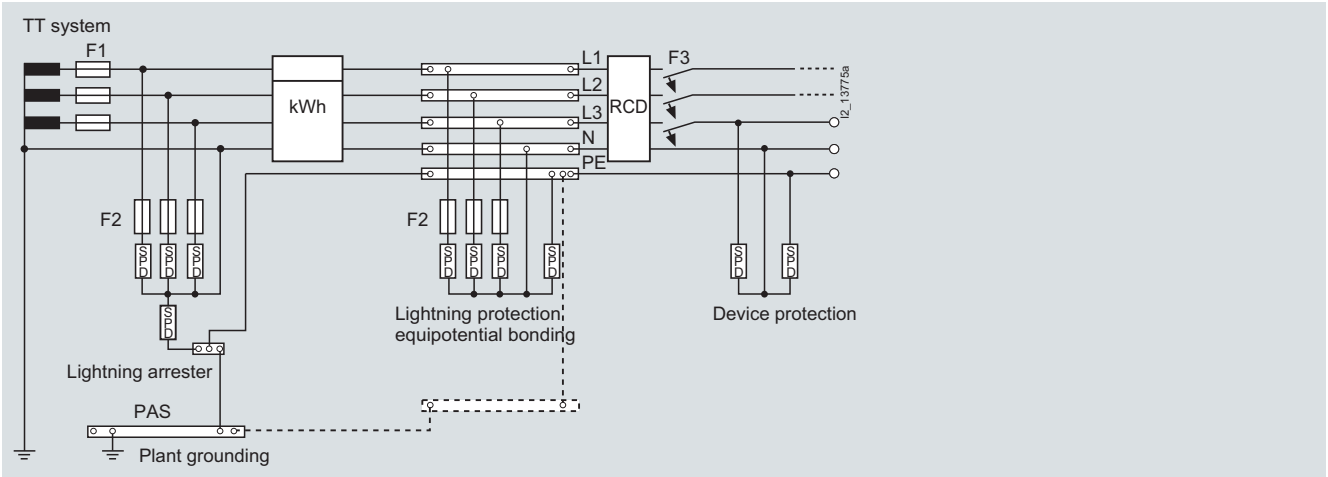
If a lightning protection equipotential bonding is installed, it must be connected to the base points of the overvoltage protective devices.



TN-C system



TN-S system



TT system

PAS = Equipotential bonding strip
RCD (Residual Current Device): Residual current-operated circuit breakers

More information

Breaking capacity, follow current discharge capacity I_{fi}

The breaking capacity is the prospective r.m.s. value of the follow current that can be extinguished by the overvoltage protection device on its own when U_C is applied. This is proven in the operating duty test acc. to EN 61643-11.

Break time t_a

The break time is the time required to automatically switch off the power supply in the event of a fault in the electrical circuit or equipment being protected. The break time is an application-specific value, which is derived from the level of fault current flowing and the characteristic of the protective device.

Categories according to IEC 61643-21 (DIN VDE 0845-3-1)

To test the current carrying capacity and the voltage limitation during pulse interference, the standard IEC 61643-21 (DIN 0845-3-1) describes a range of surge voltage and surge current impulses. All Siemens overvoltage protection devices exceed these values in the depicted categories. For this reason, the explicit value for the surge current carrying capacity is derived from the specified rated discharge surge current (8/20) and lightning impulse current (10/350).

Combined surge U_{oc}

The combined surge is produced by a hybrid generator (1.2/50 µs, 8/20 µs) with a fictitious impedance of 2 ohm. The no-load voltage of this generator is indicated as U_{oc}. The specification of U_{oc} is primarily achieved with type 3 arresters.

Frequency ranges

The frequency range characterizes the transmission band or let-through frequency of the arrester, depending on the described damping characteristics.

Insertion loss

At a specified frequency, the insertion loss of a overvoltage protection device is described by the ratio of the voltage value at the installation site before and after insertion of the overvoltage protection device. Unless otherwise specified, this is based on a 50 ohm system.

Lightning impulse current I_{imp}

The lightning impulse current is a standardized surge current curve with waveform 10/350 µs. With its parameters (peak value, load, specific energy) it simulates the load of natural lightning currents. Lightning and combination surge arresters must be capable of repeatedly discharging these types of lightning impulse currents.

Limit frequency f_G

The limit frequency describes the frequency-dependent behavior of an arrester. The limit frequency is the respective frequency that produces an insertion loss under specific test conditions (a_E) of 3 dB (see EN 61643-21). Unless otherwise specified, this is based on a 50 ohm system.

Line-side overcurrent protection/discharge back-up fuse

An overcurrent protection device (e.g. fuse or miniature circuit breaker) that is located outside the arrester on the infeed side and serves to interrupt the line-frequency follow current if the breaking capacity of the overvoltage protection device is exceeded.

Maximum discharge surge current I_{max}

The maximum peak value of the surge current with the waveform 8/20 µs that the device can safely discharge.

N-PE arrester

Protective devices that are intended solely for installation between the N and PE conductor.

Operating loss

In high-frequency applications, the operating loss indicates how many parts of the "advancing" wave are reflected at the protective device ("transition point"). This is a direct benchmark for how well suited a protective device is to the surge impedance of the system.

Operating temperature range

The operating temperature range specifies the range within which the devices can be used. In the case of devices without self-heating, this is identical to the ambient temperature range. The temperature rise in devices with self-heating must not exceed the specified maximum value.

Protection circuit

Protection circuits are multi-step cascading protective devices. The individual protection steps can be made up of discharge paths, varistors and/or semiconductor devices. The energetic coordination of the individual protection steps is achieved using decoupling elements.

Protection level U_p

The protection level of an overvoltage protection device is the highest instantaneous value of the voltage at the terminals of an overvoltage protection device, determined from standardized individual tests:

- Lightning impulse sparkover voltage 1.2/50 µs (100 %)
- Operational voltage at a rate of rise: 1 kV/µs
- Residual voltage U_{res} for rated discharge surge current

The protection level characterizes the capability of an overvoltage protection device to limit overvoltages to a remainder level. When used in power systems, the protection level determines the mounting location with regard to overvoltage category acc. to DIN VDE 0110-1, -11.
In the case of overvoltage protection devices used in information systems, the protection level must be adapted to the immunity to interference of the equipment being protected (EN 61000-4-5, -12).

Protective conductor current I_{PE}

The current that flows through the PE terminal when the overvoltage protection device is connected to the rated arrester voltage U_C without any load-side consumers.

Rated arrester voltage U_C

The highest continuous voltage (maximum permissible operational voltage) is the r.m.s. value of the maximum voltage that can be applied under field conditions to the terminals of the overvoltage protection device as specified on the respective terminal. It is the maximum voltage that can be applied to the arrester in a defined, non-conductive state that still ensures that this state can be restored after it has tripped and discharged. The value of U_C is based on the rated voltage of the system being protected and the specifications of the installation regulations (DIN VDE 0100-534).

Rated discharge surge current I_n

The rated discharge surge current is the peak value of a surge current of the waveform 8/20 µs, for which the overvoltage protection device is designed in accordance with a specified test program.

Rated load current (rated current) I_L

The rated load current is the highest permissible operational current that can be continuously routed over the terminals with this specification.

Rated voltage U_N

This corresponds to the rated voltage of the system to be protected. In the case of information systems, the rated voltage usually serves as the type rating.
In the case of AC voltage, it is specified as the r.m.s. value.

Response time t_A

Response times largely characterize the response behavior of the individual protective elements used in arresters. Depending on the rate of rise du/dt of the surge voltage or the di/dt of the surge current, response times may change within specific limits.

Screening attenuation

Ratio of feeding power of a coaxial cable to that of the radiated power of the cable supplied by the outer conductor

Series impedance

The impedance in signal flow direction between the input and output of an arrester.

Short-circuit strength

The value of the prospective short-circuit current that can be controlled by the overvoltage protection device if the respective back-up fuse is connected.

Thermal isolating arrester

Overvoltage protection devices for power systems that are equipped with voltage-dependent resistors (varistors) have an integral isolating arrester, which disconnects the overvoltage protection device from the mains in the event of an overload and displays this operating state. The isolating arrester reacts to "joule heat" generated by an overloaded varistor and disconnects the overvoltage protection device from the mains if a specific temperature is exceeded. The isolating arrester disconnects the overloaded overvoltage protection device from the mains so fast that any risk of fire is prevented. However, it is not the task of an isolating arrester to ensure "Protection against indirect contact".

Versions for Austria

The standard ÖVE/ÖNORM E 8001-1 is generally applied in Austria – with pertinent additions.
The key difference for implementation of devices of type 2 is that these have to have a higher rated voltage (335 V AC, 440 V AC).

Symbols

Switching symbol	Description
	Overvoltage protection device (SPD: Surge Protection Device)
	Lightning arresters, type 1
	Surge arrester type 2 or type 3
	Tripped spark gap
	Varistors
	Spark gap
	Gas-filled surge arrester
	Plug-in contact
	Suppressor diode

6

Configuration

Selection of overvoltage protection devices

Situation Which type of building do you want to protect? Generally speaking, all our devices are suitable for residential buildings, office buildings, industrial and commercial buildings.	Systems	Basic protection For installation upstream of counters in main distribution boards or in combined main/sub-distribution boards
Low risk buildings  - No outer lightning protection - Power supply over ground conductor	**TN-S and TT systems**	**Surge arresters, type 2** Narrow design 5SD7 424-0, 5SD7 424-1 Wide design 5SD7 464-0, 5SD7 464-1 With or without remote signaling 
	TN-C systems	**Surge arresters, type 2** Narrow design 5SD7 423-0, 5SD7 423-1 Wide design 5SD7 463-0, 5SD7 463-1 With or without remote signaling 
High-risk buildings  - Outer lightning protection system  - Power supply over overhead lines  - Grounded aerial built-on accessories	**TN-S and TT systems**	**Lightning arresters, type 1** 5SD7 414-1 With remote signaling 
	TN-C systems	**Lightning arresters, type 1** 5SD7 413-1 With remote signaling 5SD7411-1 
	TN-S and TT systems	**Combination surge arresters, type 1 and type 2** 5SD7 444-1 With remote signaling 
	TN-C systems	**Combination surge arresters, type 1 and type 2** 5SD7 443-1 With remote signaling 5SD7441-1 
	IT systems without N-conductor incorporated in the cable	Typically, IT systems are only installed in special building sections. There are generally still TN-C, TN-S or TT systems in the area of the main distribution board. In this case, the protective devices shown above must be installed.
	IT systems with N-conductor incorporated in the cable	

Medium protection

For installation upstream of counters in main distribution boards or in combined main/sub-distribution boards

Surge arresters, type 2

Narrow design
5SD7 424-0, 5SD7 424-1

Standard design
5SD7 464-0, 5SD7 464-1

With or without remote signaling

Only required if the distance between the main and sub-distribution boards is **> 10 m**

Surge arresters, type 2

Narrow design
5SD7 423-0, 5SD7 423-1

Standard design
5SD7 463-0, 5SD7 463-1

With or without remote signaling

Only required if the distance between the main and sub-distribution boards is **> 10 m**

Surge arresters, type 2

Narrow design
5SD7 424-0, 5SD7 424-1

Standard design
5SD7 464-0, 5SD7 464-1

With or without remote signaling

Surge arresters, type 2

Narrow design
5SD7 423-0, 5SD7 423-1

Standard design
5SD7 463-0, 5SD7 463-1

With or without remote signaling

Surge arresters, type 2

Narrow design
5SD7 424-0, 5SD7 424-1

Standard design
5SD7 464-0, 5SD7 464-1

With or without remote signaling

Only required if the distance between the main and sub-distribution boards is **> 10 m**

Surge arresters, type 2

Narrow design
5SD7 423-0, 5SD7 423-1

Standard design
5SD7 463-0, 5SD7 463-1

With or without remote signaling

Only required if the distance between the main and sub-distribution boards is **> 10 m**

Surge arresters, type 2

5SD7 473-0, 5SD7 473-1
3-pole (3+0 circuit)
U_C = 580 V AC
With or without remote signaling

Surge arresters, type 2

5SD7 485-0, 5SD7 485-1
4-pole (4+0 circuit)
U_C = 440 V AC
With or without remote signaling

Fine protection

For installation directly upstream of the terminal equipment

Surge arresters, type 3

For installation in sub-distribution boards or control cabinets

5SD7 432-x and 5SD7 434-1

With remote signaling

Overvoltage protection adapters, type 3

For line contactors

5SD7 435-0

Overvoltage protection adapters, type 3

For telecommunication devices/TAE

5SD7 435-2

Overvoltage protection adapters, type 3

For ISDN/RDSI

5SD7 435-3

Overvoltage protection adapters, type 3

For TV/radio

5SD7 435-5

Overvoltage protection adapters, type 3

For telecommunication devices/RJ12

5SD7 435-6

Overvoltage protection adapters, type 3

For TV/SAT installations

5SD7 435-7

Surge arresters for measuring and control technology

Overview

The new surge arresters for measuring and control technology are overvoltage protection modules, which comprise one basic element and one male connector, i.e. two components. Their application area is the protection of signal circuits.

The cable shields of basic elements can be either directly or indirectly grounded.

The mounting width of the new surge arresters is 1 MW.

Through the number of integrated paths, it is possible to protect up to four signal cores or two twin-wires against overvoltages.

Benefits

- The two-component design offers users maximum maintenance convenience. The basic element is always a fixed integral part of the installation. No laborious interventions, e.g. in the case of repair work
- The benefits:
  - Two-component design, comprising one male connector and one basic element
  - Interruption-free and impedance neutral plugging in and pulling out of the male connector
  - Reverse polarity protection through mechanical encoding
  - Surge current carrying capable contacting to standard mounting rail thanks to snap-on technique – no further laborious wiring of the reference potential.
- The arrangement of suppressor diodes between signal cores achieves a fine protection in connection with a fast response. The low capacitive coupling of the suppressor diodes to the signal cores enables high data transmission rates
- The use of gas-filled surge arresters ensures a high discharge capacity.

Technical specifications

			5SD7 502-0	5SD7 520-1	5SD7 522-7	5SD7 530-3	5SD7 541-7	5SD7 550-4
IEC category/EN type			C1/C2/C3/D1	C1/C2/C3/D1/ B2	C1/C2/C3/D1	C1/C2/C3/D1	C1/C2/C3/D1	C1/C2/C3/D1
Max. continuous voltage U_C								
• DC voltage		V DC	68	185	40	5.2	40	14
• AC voltage		V AC	48	130	28	3.6	28	9.8
Rated current I_N		mA	2000	450	450	450	300	450
Lightning test current I_{imp} 10/350 µs	Per path	kA	5	--	2.5	2.5	2.5	2.5
Rated discharge current I_n	8/20 µs							
• Core - Core		kA	--	10	10	10	--	10
• Core - Ground		kA	20	10	10	10	10	10
Total surge current I_N	8/20 µs	kA	40	10	20	20	20	20
Output voltage limit at 1 kV/µs								
• Core - Core		V	--	≤ 300	≤ 55	≤ 15	--	≤ 25
• Core - Ground		V	≤ 600	≤ 300	≤ 450	≤ 15	≤ 55	≤ 25
Residual voltage at I_n								
• Core - Core		V	--	≤ 160 (C2/5 kA)	≤ 55	≤ 15	--	≤ 25
• Core - Ground		V	--	≤ 160 (C2/5 kA)	--	≤ 30	≤ 55	≤ 40
Response time t_A								
• Core - Core		ns	--	≤ 500	≤ 1	≤ 500	--	≤ 500
• Core - Ground		ns	≤ 100	≤ 500	≤ 100	≤ 500	≤ 1	≤ 500
Insertion loss A_E								
• Symmetrical in the 50-Ω system		dB	--	--	Typ. 0.5 (1.5 MHz)	--	--	--
• Asymmetrical in the 50-Ω system		dB	0.1 (1 MHz)	--	--	--	0.5 (1.5 MHz)	--
• Symmetrical in the 100-Ω system		dB	--	Typ. 0.2 (5 MHz)	--	0.2 (5 MHz)	--	0.2 (5 MHz)
Limit frequency f_G (3 dB)								
• Symmetrical in the 50-Ω system		MHz	--	--	Typ. 8	--	--	--
• Asymmetrical in the 50-Ω system		MHz	--	--	--	--	Typ. 8	--
• Symmetrical in the 100-Ω system		MHz	--	Typ. 70	--	Typ. 70	--	Typ. 70
Resistor per path		Ω	--	--	2.2	2.2	4.7	2.2
Temperature range		°C	-40 ... +85					
Degree of protection acc. to IEC 60529/EN 60529			IP20					
Flammability category acc. to UL 94			V0					
Test standards			EN 61643-21/ EN 61643-21	IEC 61643-21	EN 61643-21/ EN 61643-21	IEC 61643-21	EN 61643-21/ EN 61643-21	IEC 61643-21

Combination options for basic elements and male connectors

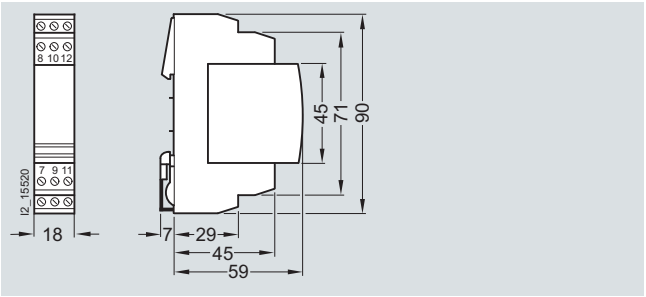
Basic element	Male connector 5SD7 502-0	5SD7 520-1	5SD7 522-7	5SD7 530-3	5SD7 541-7	5SD7 550-4
5SD7 500-0	✓	--	--	--	--	--
5SD7 512-1	--	✓	--	✓	--	--
5SD7 522-0	--	--	✓	--	--	✓
5SD7 522-1	--	--	✓	--	--	✓
5SD7 541-1	--	--	--	--	✓	--

Selection and ordering data

	Version	Rated arrester voltage U_C V AC	V DC	MW	DT	Order No.	Price per PU	PG	PU Unit(s)	PS*/ P. unit Unit(s)	Weight per PU approx. kg
	Basic elements										
	• For male connectors with protection circuit for one 2-wire ungrounded signal circuit • Jumper between terminals 3/4 (GND) and 9/10 • For 5SD7 520-1 and 5SD7 530-1 male connectors			1	B	**5SD7 512-1**		008	1	1	0.050
	• For male connectors with protection circuit for two 2-wire ungrounded signal circuits • Jumper between terminals 3/4 (GND) and 9/10 • For 5SD7 522-1 and 5SD7 550-4 male connectors			1	B	**5SD7 522-1**		008	1	1	0.056
	• For male connectors with protection circuit for two 2-wire ungrounded signal circuits • Gas arrester between terminals 3/4 (GND) and 9/10 • For 5SD7 522-1 and 5SD7 550-4 male connectors			1	B	**5SD7 522-0**		008	1	1	0.057
	• For male connectors with protection circuit for four conductors single-sided grounded signal circuit • Jumper between terminals 3/4 (GND) and 9/10 • For 5SD7 541-7 male connectors			1	B	**5SD7 541-1**		008	1	1	0.056
	• Jumper between terminals 3/4 (GND) and 9/10 • For 5SD7 502-0 male connectors			1	B	**5SD7 500-0**		008	1	1	0.050
	**PROFIBUS male connectors** • Protection for 2 signal cores with shared reference potential • For 5SD7 512-1 basic element			1	B	**5SD7 530-3**		008	1	1	0.020
	Male connectors for analog telecommunication interfaces • Protection for 2-wire Telecom cable (U_{k0} or T-DSL) • For 5SD7 512-1 basic element			1	B	**5SD7 520-1**		008	1	1	0.020
	Male connectors, 24 V AC • Protection for two 2-wire ungrounded signal circuits. • Fine protection element between the respective wires • For 5SD7 522-0 and 5SD7 522-1 basic elements			1	B	**5SD7 522-7**		008	1	1	0.024
	Male connectors, 12 V DC • Protection for field bus systems and signal circuits in 3- or 4-wire method • For 5SD7 522-0 and 5SD7 522-1 basic elements			1	B	**5SD7 550-4**		008	1	1	0.026
	Male connectors, 24 V DC • Protection for 4 signal cores with shared reference potential • For 5SD7 541-1 basic element			1	B	**5SD7 541-7**		008	1	1	0.026
	Male connectors, 2-wire • Coarse protection for 2 single-sided signal leads • For 5SD7 500-0 basic element			1	B	**5SD7 502-0**		008	1	1	0.020

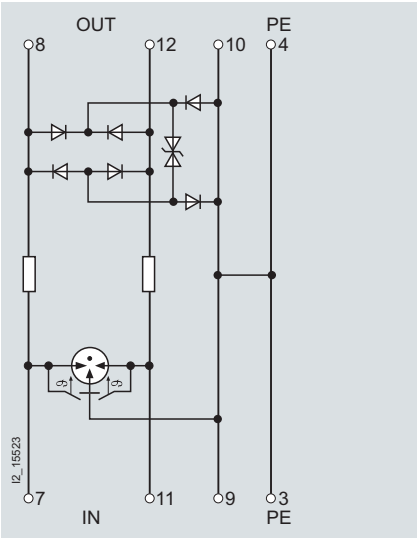
* You can order this quantity or a multiple thereof.

Dimensional drawings

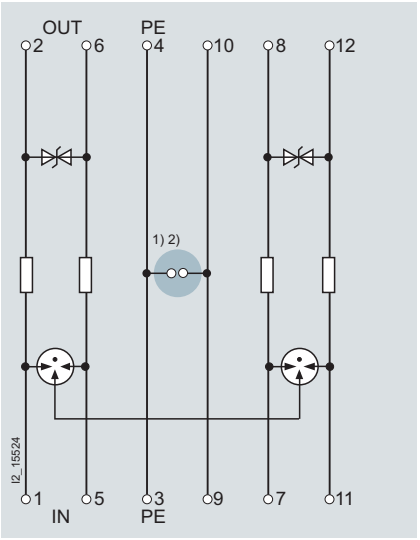


5SD7 5..

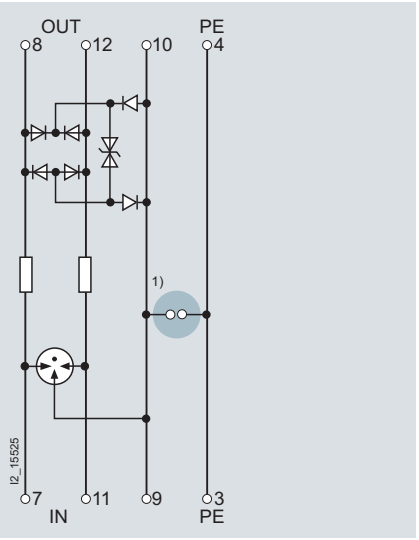
Schematics



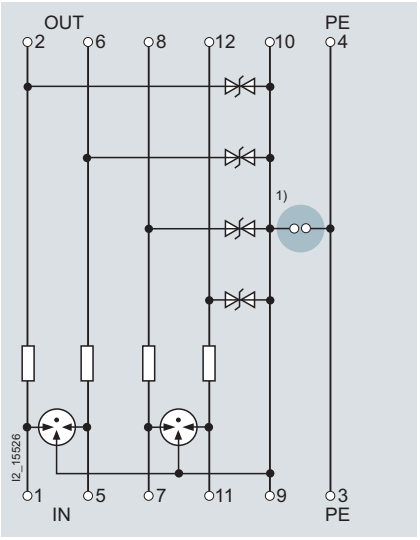
5SD7 520-1



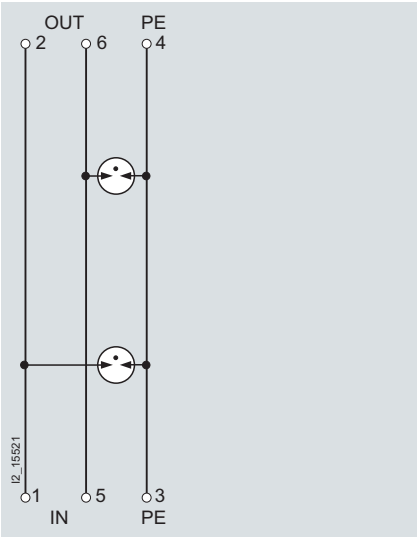
5SD7 522-7



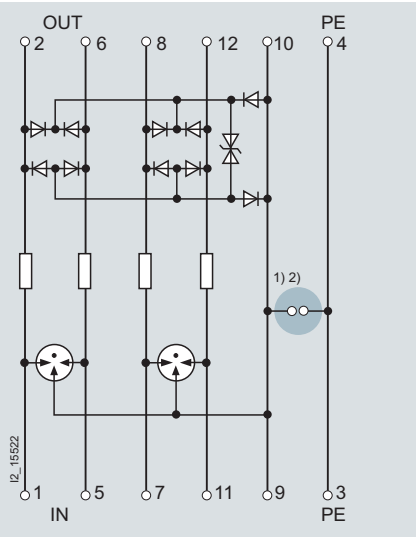
5SD7 530-3



5SD7 541-7



5SD7 502-0



5SD7 550-4

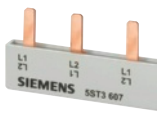
1) With the 5SD7 512-1, 5SD7 522-1, 5SD7 541-1 and 5SD7 500-0 basic elements , the terminals 9 and 10 (GND) directly linked to the standard mounting rail over the metallic mounting foot.

2) With the 5SD7 522-0 basic element, the terminals 9 and 10 (GND) are linked with the metallic mounting foot over a gas arrester.

BETA Switching
Switches and Light Indicators

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**5TE8 control switches**	7/3	For the switching of lighting and other electrical devices up to 20 A. For use in control cabinets for the logical linking of functions.	IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1, (VDE 0632-1); GB14048.3-2002 CCC	✓	✓	✓
	**5TE4 pushbuttons**	7/7	To be used as pushbuttons in control systems, e.g. to switch on seal-in circuits or as pushbuttons with maintained-contact function for manual use, as control switches or for the switching of loads up to 20 A.	IEC/EN 60947-3, (VDE 0660-07); IEC/EN 60669-1, (VDE 0632-1); GB14048.3-2002 CCC	✓	--	✓
	**5TE5 light indicators**	7/12	Light indicators for signaling switching states or faults in systems.	DIN VDE 0710-1	✓	--	✓
	**5TE8 ON/OFF switches**	7/15	For the switching of lighting, motors and other electrical devices from 20 to 125 A.	16 A ... 25 A and 40 A ... 100 A: IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1, (VDE 0632-1) 32 A and 125 A: IEC/EN 60947-3, (VDE 0660-107); GB14048.3-2002 CCC	✓	✓	✓
	**5TE9 busbars**	7/22	For fast and safe connection	IEC/EN 60439-1, (VDE 0660-500)	✓	--	✓
	**5TE1 switch disconnectors**	7/24	For the switching of lighting, motors and other electrical devices or for switching system components from 100 to 200 A.	IEC/EN 60947-3; KEMA certified UL 508	✓	--	✓

Overview

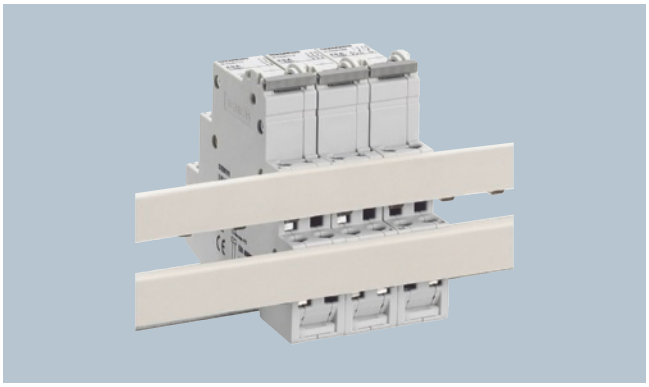
Two-way switches are used in control cabinets and distribution boards for switching small loads on/off or over.

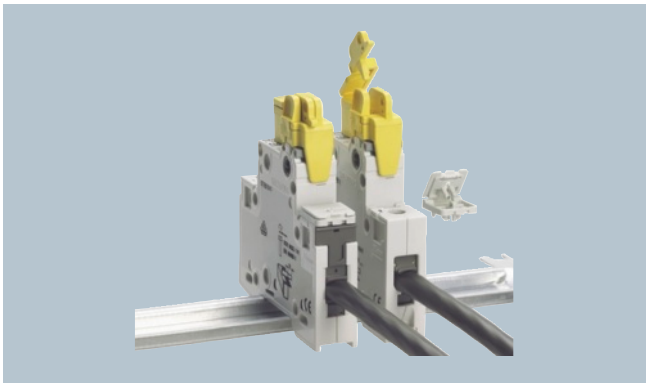
Group switches with center position permit the positions open/stop/closed, for example to control anti-clockwise rotation - Off - clockwise rotation.

Control switches in a range of contact versions have an integral control lamp for the ON setting.

The auxiliary switch (AS) signals the contact position of the switch. It has the same design as the auxiliary switch used for the miniature circuit breakers (see Chapter "Miniature Circuit Breakers").

Benefits





- The control switches can be bus-mounted with each other or with 5TE4 8 pushbuttons, 5TE5 8 light indicators or 5TT4 1 remote control switches and 5TT4 2 switching relays. This saves time and space.
- For busbars, see page see page 7/22 ff.
- The handle locking device prevents undesired manual on and off switching. This increases safe operation.
- The handle locking device is a universal accessory for all switches and miniature circuit breakers. This simplifies logistics.

Technical specifications

			5TE8 1
Standards **Approved acc. to**			IEC/EN 60947-3 (VDE 0660-107); IEC/EN 60669-1 (VDE 0632-1) EN 60669
Rated operational current I_e	Per conducting path	A	20
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400
Rated power dissipation P_v	Contact per pole	VA	0.7
Thermal rated current I_{the}		A	20
Rated breaking capacity	At p.f. = 0.65	A	60
Rated making capacity	At p.f. = 0.65	A	60
Short-circuit strength In conjunction with fuse of the same rated operational current	EN 60269 gL/gG	kA	10
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	Open contacts Between the poles	mm mm	2 × > 2 > 7
Creepage distances		mm	> 7
Mechanical service life	Switching cycles		25000
Electrical service life	Switching cycles		10000
Minimum contact load		V; mA	10; 300
Rated short-time currents Per conducting path at p.f. = 0.7 (The respective rated surge current can Calculated by multiplying by a factor of 1.5).	 Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	 A A A A	 650 400 290 170
Terminals Max. tightening torque	± screw (Pozidriv)	 Nm	1 1.2
Conductor cross-sections	Rigid Flexible, with end sleeve	mm^2 mm^2	1.5 ... 6 1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C	45

5TE8 control switches

Selection and ordering data

	Version	I_e	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC	Up to mm²						Unit(s)	Unit(s)	kg
	**Two-way switches (20 A)**											
	With sealable switch position, separate handle locking device can be retrofitted											
	Mountable auxiliary switch											
	1 NO + 1 NC	20	400	6	1	►	**5TE8 151**		027	1	1	0.062
	Auxiliary switch cannot be retrofitted											
	2 NO + 2 NC	20	400	6	1	B	**5TE8 152**		027	1	1	0.081
	3 NO + 1 NC	20	400	6	1	B	**5TE8 153**		027	1	1	0.082
	1 CO	20	230	6	1	►	**5TE8 161**		027	1	1	0.060
	2 CO	20	400	6	1	►	**5TE8 162**		027	1	1	0.076
	**Group switches with center position (20 A)**											
	With sealable switch position, separate handle locking device can be retrofitted											
	Auxiliary switch cannot be retrofitted											
	1 CO contact	20	230	6	1	►	**5TE8 141**		027	1	1	0.060
	2 CO contacts	20	400	6	1	►	**5TE8 142**		027	1	1	0.077
	**Control switches (20 A)**											
	With fixed mounted glow lamp 230 V or diode 48 V, with replaceable, white transparent luminescent cap, with sealable switch position separate handle locking device can be retrofitted											
	Auxiliary switch cannot be retrofitted											
	1 NO	20	230	6	1	►	**5TE8 101**		027	1	1	0.057
		20	48	6	1	B	**5TE8 101-3**		027	1	1	0.057
	1 NO, for max. 150 m cable length	20	230	6	1	B	**5TE8 105**		027	1	1	0.057
	2 NO	20	400	6	1	B	**5TE8 102**		027	1	1	0.066
	3 NO	20	400	6	1	B	**5TE8 103**		027	1	1	0.078
	With mounted auxiliary switch (1 NO, 1 NC)											
	3 NO	20	400	6	1.5	B	**5TE8 108**		027	1	1	0.128

7

* You can order this quantity or a multiple thereof.

	Version	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
							Unit(s)	Unit(s)	kg
	**Auxiliary switches (AS)**								
	For right-side retrofitting with factory-fitted brackets, for further technical specifications, see chapter "Miniature Circuit Breakers"								
	1 NO + 1 NC	0.5	►	**5ST3 010**		027	1	1	0.050
	2 NO	0.5	A	**5ST3 011**		027	1	1	0.050
	2 NC	0.5	A	**5ST3 012**		027	1	1	0.050
	**Handle locking devices**								
	For all 5TE8 switches, can be sealed against unwanted manual ON/OFF switching For padlock with max. 3 mm shackle		A	**5ST3 801**		027	1	1	0.008
	**Spacers**								
	Contour for modular devices with a mounting depth of 70 mm; can be snapped onto either side of the busbar, so that two spacers allow for convenient cable routing	0.5	►	**5TG8 240**		027	1	2	0.010
	**Cap sets**								
	For manual changing of the luminous plates for 5TE8 10 control switches								
	Cap set comprising 1 red, green, and yellow plate each		C	**5TG8 068**		027	1 set	1 set	0.006

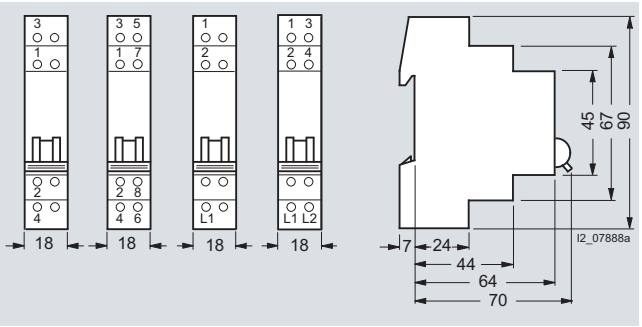
For busbars for control switch, see page 7/22.

* You can order this quantity or a multiple thereof.

5TE8 control switches

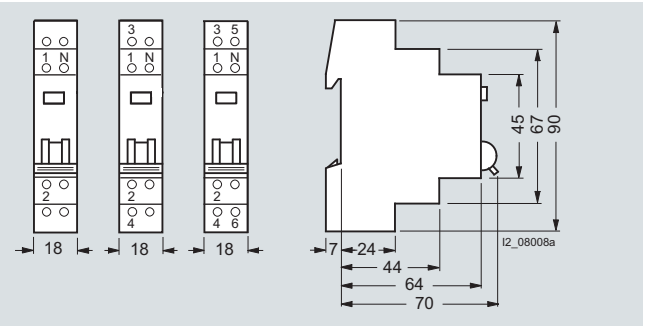
Dimensional drawings

Two-way switches, group switches with center position, 20 A



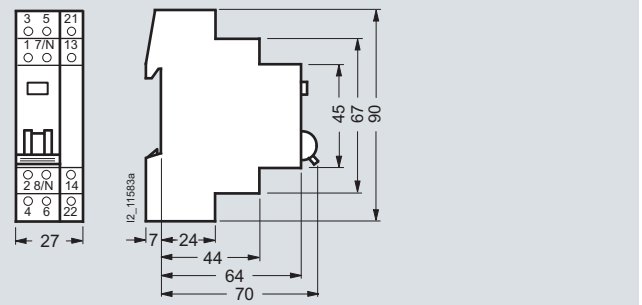
5TE8 151 5TE8 152 5TE8 141 5TE8 142
5TE8 153 5TE8 161 5TE8 162

5TE8 control switches, 20 A, with lamp



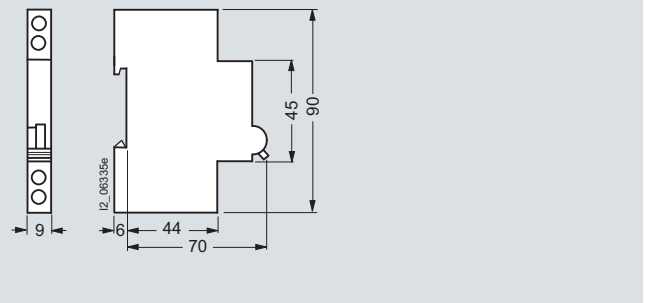
5TE8 101 5TE8 102 5TE8 103
5TE8 101-3
5TE8 105

5TE8 control switches, 20 A, with lamp and auxiliary switch



5TE8 108

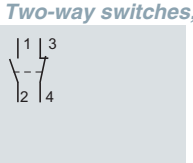
5ST3 auxiliary switches



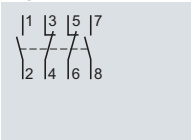
5ST3 010
5ST3 011
5ST3 012

Schematics

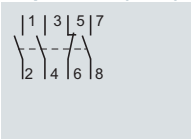
Two-way switches, group switches with center position (20 A)



5TE8 151

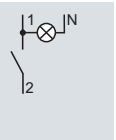


5TE8 152

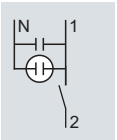


5TE8 153

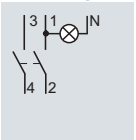
5TE8 control switches, 20 A, with lamp



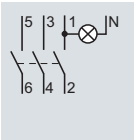
5TE8 101
5TE8 101-3



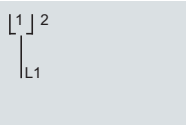
5TE8 105



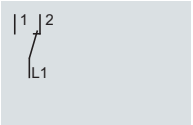
5TE8 102



5TE8 103

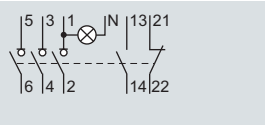


5TE8 141

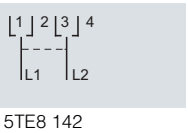


5TE8 161

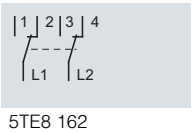
5TE8 control switches, 20 A, with lamp and auxiliary switch



5TE8 108

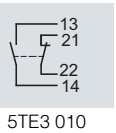


5TE8 142

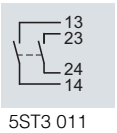


5TE8 162

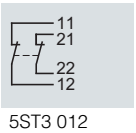
5ST3 auxiliary switches



5TE3 010



5ST3 011

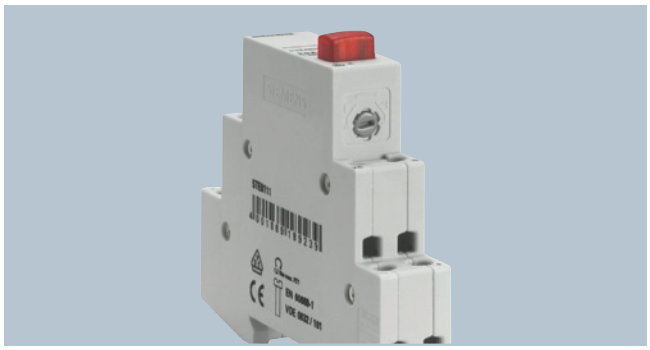


5ST3 012

Overview

The pushbuttons are used in control systems, e.g. to switch on seal-in circuits or as pushbuttons with maintained-contact function for manual use, as control switches or for the switching of loads up to 20 A.

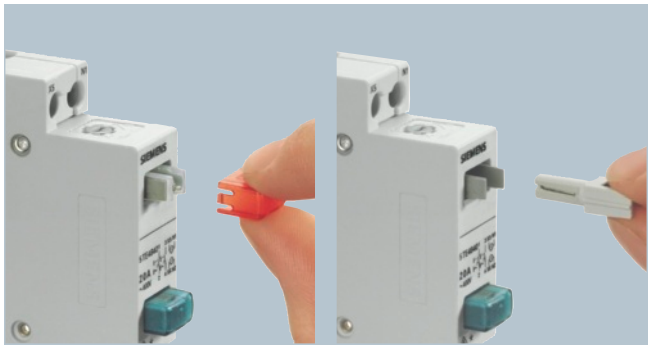
Benefits



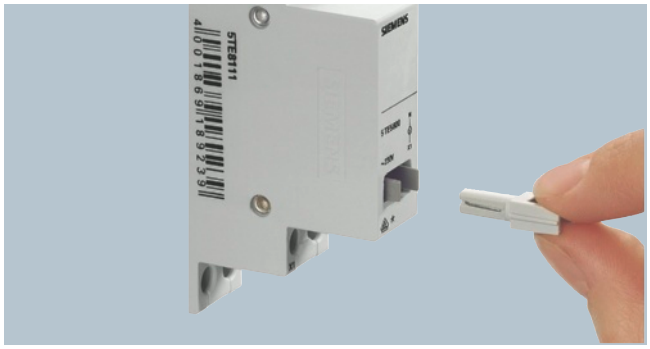
- Pushbuttons with setting function for momentary-contact or maintained-contact operation can be changed over after installation and connection. This increases the application options of the devices and saves laborious working in the distribution board.

- Pushbuttons and light indicators with separate infeed in one device. This means they can also be used for voltages other than the switching voltage.
- Pushbuttons with remote signaling pilot light in one modular width inmomentary-contact or maintained-contact operation save space.

- In the case of devices with 2 pushbuttons and 2 lamps, each pushbutton must be set separately. This increases the application options of devices.



- Pilot lights and caps can also be safely replaced during operation without the use of tools. Functionality is quickly restored.
- Transparent caps in different colors the signaling of system states according to IEC 60073. Three indications per device are possible – this saves mounting space.



- The pilot lights, either glow lamp or diode, depending on the voltage, are nested in a slotted base.

Technical specifications

			5TE4 8
Standards			IEC/EN 60947-3 (VDE 0660-107); IEC/EN 60669-1 (VDE 0632-1)
Approved acc. to			EN 60669-1
Rated operational current I_e	Per conducting path	A	20
Rated operational voltage U_e	1-pole	V AC	230
	Multipole	V AC	400
Rated power dissipation P_v	Per pole	VA	0.6
Thermal rated current I_{the}		A	20
Rated breaking capacity	At p.f. = 0.65	A	60
Rated making capacity	At p.f. = 0.65	A	60
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	Open contacts	mm	2 × > 2
	between the poles	mm	> 7
Creepage distances		mm	> 7
Mechanical service life	Switching cycles		25000
Minimum contact load		V; mA	10; 300
Rated short-time currents			
per conducting path at p.f. = 0.7	Up to 0.2 s	A	650
	Up to 0.5 s	A	400
(The respective rated surge current can	Up to 1 s	A	290
be calculated by multiplying by a factor of 1.5).	Up to 3 s	A	170
Terminals	± screw (Pozidriv)		1
Max. tightening torque		Nm	1.2
Conductor cross-sections	Rigid	mm^2	1.5 ... 6
	Flexible, with end sleeve	mm^2	1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate			
at 95 % relative humidity	Acc. to DIN 50015	°C	45

Power loss of 5TG8 05. lamps		**5TG8 050**	**5TG8 051**	**5TG8 052**	**5TG8 053**	**5TG8 054**	**5TG8 055**
Rated operational voltage U_e	V AC	12	24	48	60	115	230
Rated power dissipation P_v	mW	70	160	350	420	70	170
Rated operational voltage U_e	V DC	12	24	48	60	110	220
Rated power dissipation P_v	mW	85	190	450	550	50	135

	Color coding according to IEC 60073		
Color	Safety of people or environment	Process state	System state
Red	Danger	Emergency	Faulty
Yellow	Warning/Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White **Gray** **Black**	No special significance assigned		

Selection and ordering data

	Version	I_e	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC	Up to mm^2						Unit(s)	Unit(s)	kg
	**Pushbuttons without maintained-contact function**											
	1 NO, 1 NC 1 gray pushbutton	20	230	6	1	►	**5TE4 800**		027	1	1	0.061
	1 NO, 1 NO 1 green pushbutton, 1 blue pushbutton	20	230	6	1	B	**5TE4 804**		027	1	1	0.053
	1 NO, 1 NC 1 red pushbutton	20	230	6	1	B	**5TE4 805**		027	1	1	0.061
	1 NO, 1 NC 1 green pushbutton	20	230	6	1	B	**5TE4 806**		027	1	1	0.061
	1 NO, 1 NC 1 yellow pushbutton	20	230	6	1	B	**5TE4 807**		027	1	1	0.061
	1 NO, 1 NC 1 blue pushbutton	20	230	6	1	B	**5TE4 808**		027	1	1	0.061
	Pushbuttons with maintained-contact function											
	1 NO, 1 NC 1 gray pushbutton	20	230	6	1	B	**5TE4 810**		027	1	1	0.060
	2 NO 1 gray pushbutton	20	400	6	1	B	**5TE4 811**		027	1	1	0.061
	3 NO + N 1 gray pushbutton	20	400	6	1	B	**5TE4 812**		027	1	1	0.080
	4 NC 1 gray pushbutton	20	400	6	1	B	**5TE4 813**		027	1	1	0.080
	2 CO 1 gray pushbutton	20	400	6	1	B	**5TE4 814**		027	1	1	0.075
	**Control pushbuttons with maintained-contact function or momentary-contact function and lamp, 230 V For max. 5 m cable length**											
	1 NO, 1 NC 1 red pushbutton	20	400	6	1	►	**5TE4 820**		027	1	1	0.071
	1 NO 1 red pushbutton	20	230	6	1	►	**5TE4 821**		027	1	1	0.078
	2 NO 1 red pushbutton	20	400	6	1	B	**5TE4 823**		027	1	1	0.080
	2 NC 1 red pushbutton	20	400	6	1	B	**5TE4 824**		027	1	1	0.080
	Control pushbuttons with maintained-contact function or momentary-contact function and lamp, 230 V For max. 150 m cable length											
	1 NO 1 red pushbutton	20	400	6	1	B	**5TE4 822**		027	1	1	0.078
	**Double pushbuttons with maintained-contact function and/or momentary-contact function**											
	1 NO and 1 NC 1 red pushbutton, 1 green pushbutton	20	400	6	1	B	**5TE4 830**		027	1	1	0.065
	1 NO, 1 NC and 1 NO, 1 NC 1 red pushbutton, 1 green pushbutton	20	400	6	1	B	**5TE4 831**		027	1	1	0.084

7

* You can order this quantity or a multiple thereof.

5TE4 pushbuttons

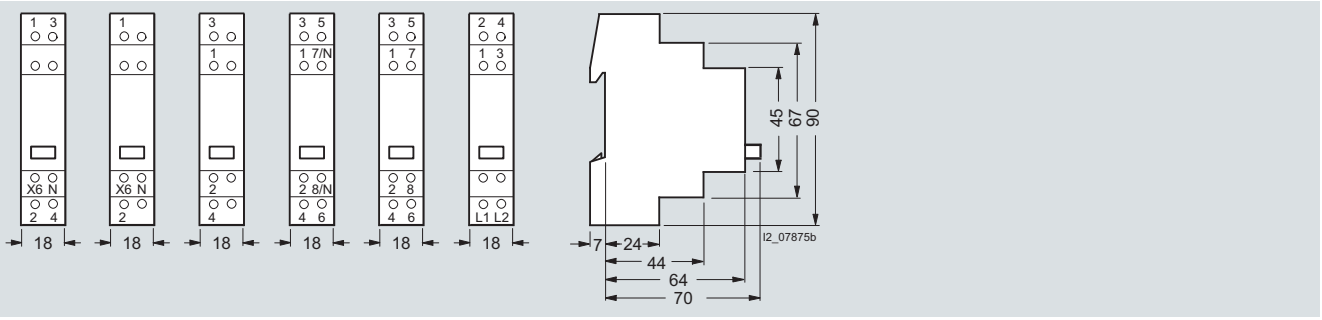
	Version	I_e	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC	Up to mm²						Unit(s)	Unit(s)	kg
	**Double pushbuttons with maintained-contact function and/or momentary-contact function and two lamps, 230 V For max. 5 m cable length**											
	1 NO and 1 NC, 1 red pushbutton, 1 green pushbutton	20	400	6	1	B	**5TE4 840**		027	1	1	0.080
	1 NO and 1 NC, 1 red pushbutton, 1 green pushbutton	20	400	6	1	B	**5TE4 841**		027	1	1	0.080

	Version	U_n	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V					Unit(s)	Unit(s)	kg
	**Lamps, manually removable for voltages other than 230 V or as spare lamps With inscription label**								
	LED	12 AC/DC	C	**5TG8 050**		027	1	1/10	0.001
	LED	24 AC/DC	▶	**5TG8 051**		027	1	1/10	0.001
	LED	48 AC/DC	B	**5TG8 052**		027	1	1/10	0.001
	LED	60 AC/DC	B	**5TG8 053**		027	1	1/10	0.001
	Glow lamp	115 AC 110 DC	C	**5TG8 054**		027	1	1/10	0.001
	Glow lamp	230 AC 220 DC	B	**5TG8 055**		027	1	1/10	0.001
	Cap sets, manually replaceable with colored caps With or without lamps								
	Gray, non-transparent (1 set = 5 units)		D	**5TG8 060**		027	1 set	1 set	0.002
	Red, transparent (1 set = 5 units)		B	**5TG8 061**		027	1 set	1 set	0.002
	Green, transparent (1 set = 5 units)		B	**5TG8 062**		027	1 set	1 set	0.002
	Yellow, transparent (1 set = 5 units)		B	**5TG8 063**		027	1 set	1 set	0.002
	Blue, transparent (1 set = 5 units)		C	**5TG8 064**		027	1 set	1 set	0.002
	Black, non-transparent (1 set = 5 units)		D	**5TG8 065**		027	1 set	1 set	0.002
	White, transparent (1 set = 5 units)		B	**5TG8 066**		027	1 set	1 set	0.002
	Red and green (1 set contains 10 lamps per color), yellow, blue and white (1 set contains 5 lamps per color)		D	**5TG8 067**		027	1 set	1 set	0.012
	Red, green, yellow (1 set = 3 units)		C	**5TG8 070**		027	1 set	1 set	0.002

* You can order this quantity or a multiple thereof.

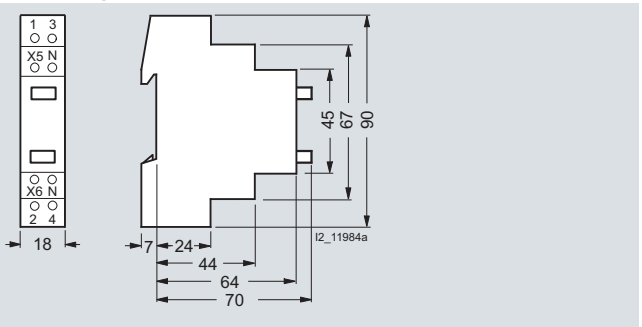
Dimensional drawings

5TE4 8 pushbuttons



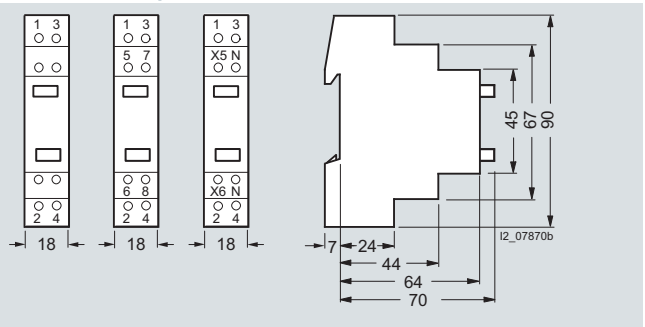
5TE4 820 5TE4 821 5TE4 800 5TE4 812 5TE4 813 5TE4 814
5TE4 823 5TE4 822 5TE4 805
5TE4 824 5TE4 806
5TE4 807
5TE4 808
5TE4 810
5TE4 811

5TE4 804 pushbuttons



5TE4 804

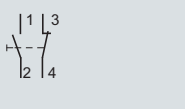
5TE4 8 double pushbuttons with maintained-contact function



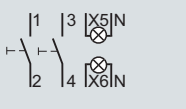
5TE4 830 5TE4 831 5TE4 840
5TE4 841

Schematics

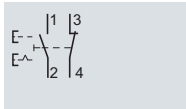
5TE4 8 pushbuttons



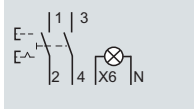
5TE4 800
5TE4 805
5TE4 806
5TE4 807
5TE4 808



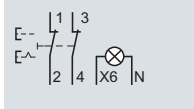
5TE4 804



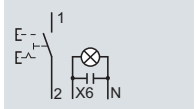
5TE4 810



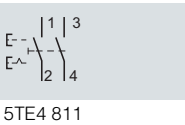
5TE4 823



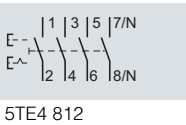
5TE4 824



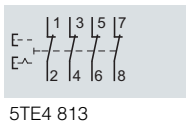
5TE4 822



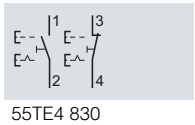
5TE4 811



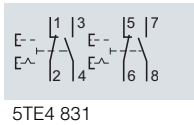
5TE4 812



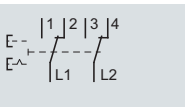
5TE4 813



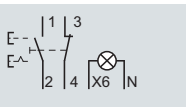
55TE4 830



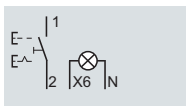
5TE4 831



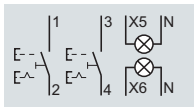
5TE4 814



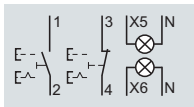
5TE4 820



5TE4 821



5TE4 840



5TE4 841

5TE5 light indicators

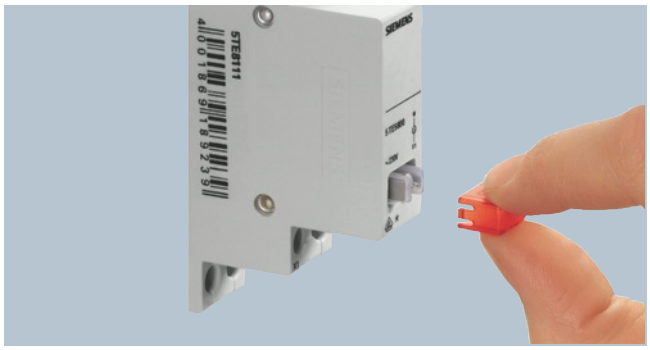
Overview

Light indicators are used to signal switching states or faults in systems.

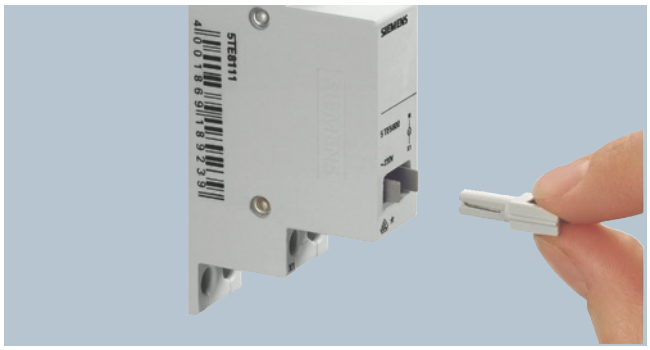
They are available as single, double or triple light indicators.

The triple light indicators are used as phase or signal indicators.

Benefits



- Pilot lights and caps can also be safely replaced during operation without the use of tools. Functionality is quickly restored.
- Transparent caps in different colors the signaling of system states according to IEC 60073. Three indications per device are possible – this saves mounting space.



- The pilot lights, either glow lamp or diode, depending on the voltage, are nested in a slotted base. Thus correct polarization is always ensured for DC applications.
- Transparent caps in different colors the signaling of system states according to IEC 60073. Three indications per device are possible – this saves mounting space.

- The devices have preferred positions for the N terminals, so that it is possible to bus-mount several devices. This ensures fast and simple installation.
- The option for busbar mountings is described in the chapter "Miniature Circuit Breakers".

- A light indicator with three lamps enables three-phase signaling and "traffic-light signaling" in a single modular width. This saves valuable installation space and makes things more manageable.

Technical specifications

			5TE5 8
Standards			DIN VDE 0710-1
Rated operational voltage U_e	Max.	V AC	230 (for different voltages see 5TG8 lamps)
Rated power dissipation P_v		VA	See 5TG8 lamps
Clearances	Between the terminals	mm	> 7
Terminals Max. tightening torque	± screw (Pozidriv)	 Nm	1 1.2
Conductor cross-sections	Rigid Flexible, with end sleeve	mm^2 mm^2	1.5 ... 6 1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C	45

		5TG8 05.
Rated power dissipation P_v		
• LED	VA	0.4
• Glow lamp	VA	0.4

Color coding according to IEC 60073

	Meaning		
	Safety of people and environment	Process state	System state
Color			
Red	Danger	Emergency	Faulty
Yellow	Warning/Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White **Gray** **Black**	No special significance assigned		

Selection and ordering data

	Version	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	Up to mm^2						Unit(s)	Unit(s)	kg
	Light indicators for max. cable length up to 5 m										
	With 1 red lamp	230	6	1	►	**5TE5 800**		027	1	1/12	0.060
	With 2 lamps, red and green				►	**5TE5 801**		027	1	1	0.056
	With 3 green lamps				►	**5TE5 802**		027	1	1	0.063
	With 3 lamps, red, yellow and green				►	**5TE5 803**		027	1	1	0.063
	Light indicators for max. cable length up to 250 m										
	With 1 red lamp	230	6	1	B	**5TE5 804**		027	1	1	0.060

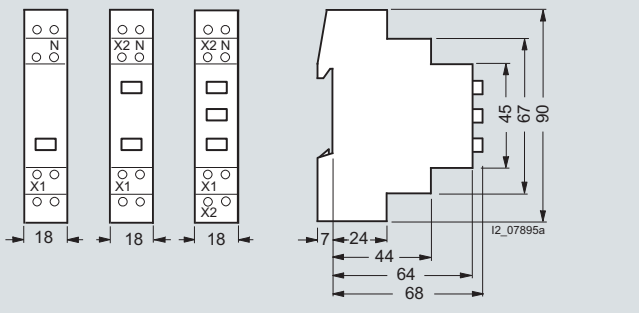
* You can order this quantity or a multiple thereof.

5TE5 light indicators

	I_e	U_e	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	mA	V					Unit(s)	Unit(s)	kg
	**Lamps, manually removable for voltages other than 230 V or as spare lamps with inscription label**								
	LED	0.4	12 AC/DC	C	**5TG8 050**		027	1	1/10	0.001
	LED		24 AC/DC	▶	**5TG8 051**		027	1	1/10	0.001
	LED		48 AC/DC	B	**5TG8 052**		027	1	1/10	0.001
	LED		60 AC/DC	B	**5TG8 053**		027	1	1/10	0.001
	Glow lamp		115 AC 110 DC	C	**5TG8 054**		027	1	1/10	0.001
	Glow lamp		230 AC 220 DC	B	**5TG8 055**		027	1	1/10	0.001
	Cap sets for manual changing of colored caps								
	Red, transparent (1 set = 5 units)			B	**5TG8 061**		027	1 set	1 set	0.002
	Green, transparent (1 set = 5 units)			B	**5TG8 062**		027	1 set	1 set	0.002
	Yellow, transparent (1 set = 5 units)			B	**5TG8 063**		027	1 set	1 set	0.002
	Blue, transparent (1 set = 5 units)			C	**5TG8 064**		027	1 set	1 set	0.002
	White, transparent (1 set = 5 units)			B	**5TG8 066**		027	1 set	1 set	0.002
	Red and green (1 set = 10 lamps per color), yellow, blue and white (1 set = 5 lamps per color)			D	**5TG8 067**		027	1 set	1 set	0.012
	Red, green, yellow (1 set = 3 units)			C	**5TG8 070**		027	1 set	1 set	0.002

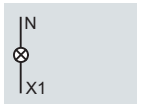
7

Dimensional drawings

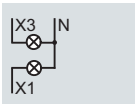


5TE5 800 5TE5 801 5TE5 802
5TE5 804 5TE5 803

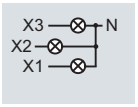
Schematics



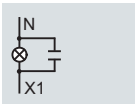
5TE5 800



5TE5 801



5TE5 802
5TE5 803



5TE5 804

* You can order this quantity or a multiple thereof.

Overview

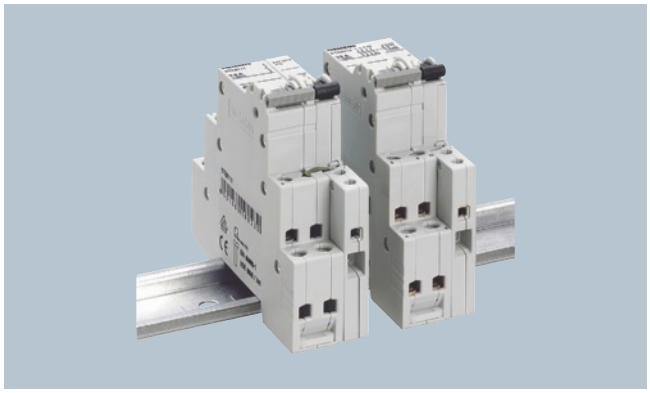
The devices are used for the switching of lighting, motors and other electrical devices.

The rated currents of the range are 20 to 125 A.
There is a compact series of space-saving devices with up to 4 NO contacts in a single MW available for rated currents 20 and 32 A.

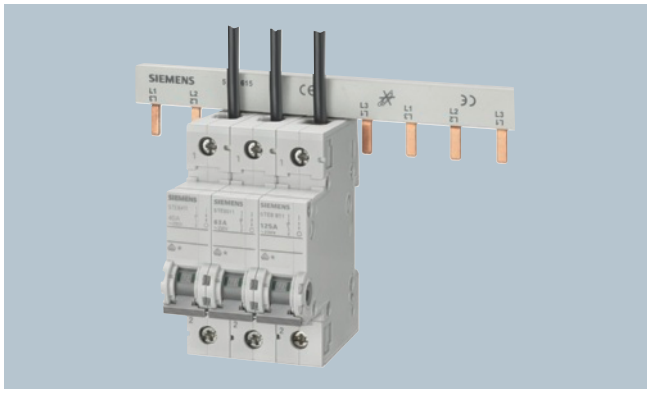
The ON/OFF switches in the rated currents (32 to 125 A) can be used as switch disconnectors according to IEC/EN 60947-3.

A special version of the ON/OFF switch with rated current 63 A is available for use in meter cabinets. This version can be locked in the OFF position using a special key. The clamping screws are mechanically covered so that they are no longer accessible.

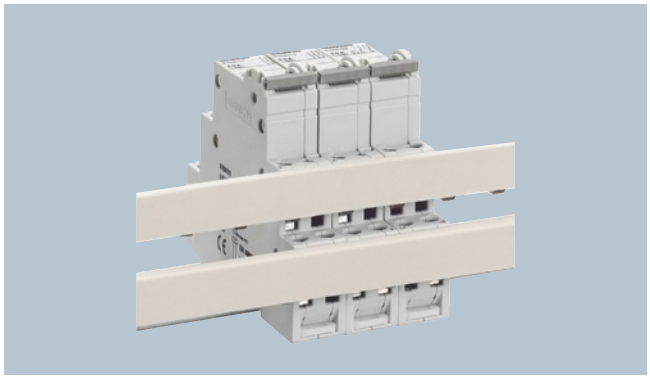
Benefits



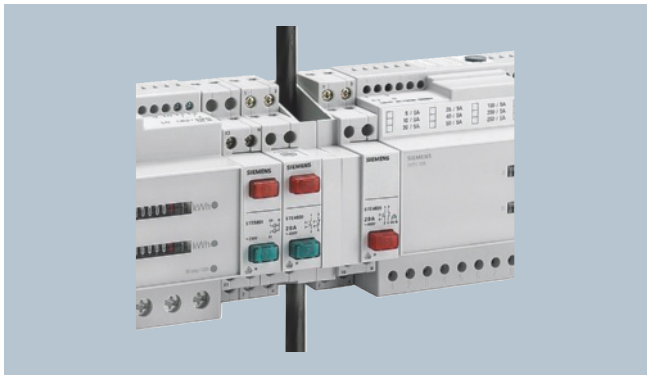
- The switches can be retrofitted with auxiliary switches without the need for tools.
- Uniform auxiliary switches for miniature circuit breakers and switches. So no need to stock-keep additional components.



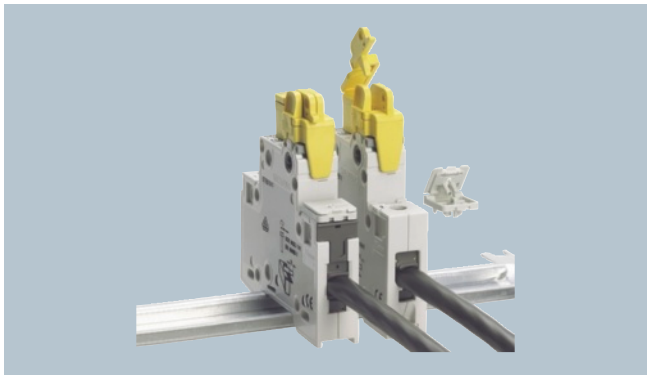
- Clear and visible conductor connection in front of the busbar for safe and easy mounting.
- The infeed can be either from the top or the bottom as the terminals are identical. This simplifies connection.



- The 20 and 32 A switches can be bus-mounted with each other or with 5TE4 8 pushbuttons, 5TE5 8 light indicators or 5TT4 1 remote control switches and 5TT4 2 switching relays. This saves time and space.
- For busbars, see page 7/22.



- Spacers can be used as a compensating element and have a width of 0.5 MW. They come with an integrated wiring duct for the insertion of conductors.
- Two reciprocally installed spacers thus offer space for large conductor cross-sections up to a 15 mm diameter. This simplifies cable routing in the distribution board.



- The handle locking device prevents undesired manual on and off switching. This increases operational safety.
- The handle locking device is a universal accessory for all switches and miniature circuit breakers. This simplifies logistics.

Technical specifications

			5TE8 1	5TE8 2
Standards			IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1	IEC/EN 60947-3, (VDE 0660-107)
Approved acc. to			EN 60669-1	
Rated operational current I_e	Per conducting path	A	20	32
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400	
Rated power dissipation P_v	Per pole, max.	VA	0.7	
Thermal rated current I_{th}		A	20	32
Rated breaking capacity	At p.f. = 0.65	A	60	96
Rated making capacity	At p.f. = 0.65	A	60	96
Short-circuit strength In conjunction with fuse of the same rated operational current	EN 60269 gL/gG	kA	10	
Rated impulse withstand voltage U_{imp}		kV	> 5	
Clearances	Open contacts Between the poles	mm mm	2 × > 2 > 7	
Creepage distances		mm	> 7	
Mechanical service life		Switching cycles	25000	
Electrical service life		Switching cycles	10000	
Minimum contact load		V; mA	10; 300	
Rated short-time currents[2)] Per conducting path at p.f. = 0.7 (The corresponding rated surge current can be established by multiplying by factor 1.5.)	 Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	 A A A A	 650 400 290 170	 1000 630 450 250
Terminals Max. tightening torque	± screw (Pozidriv)	 Nm	1 1.2	
Conductor cross-sections	Rigid Flexible, with end sleeve	mm^2 mm^2	1.5 ... 6 1 ... 6	
Permissible ambient temperature		°C	-5 ... +40	
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C	45	

			5TE8 3	5TE8 4	5TE8 5	5TE8 6	5TE8 7	5TE8 8
Standards			IEC/EN 60947-3 (VDE 0660-107)					
			--	IEC/EN 60669-1 (VDE 0632-1)				--
Approved acc. to			EN 60669-1					
Rated operational current I_e	Per conducting path	A	32	40	63	80	100	125
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400					
Rated power dissipation P_v	Per pole, max.	VA	0.7	0.9	2.2	3.5	5.5	8.6
Thermal rated current I_{th}		A	32	40	63	80	100	125
Rated breaking capacity	At p.f. = 0.65	A	96	120	196	240	300	375
Rated making capacity	At p.f. = 0.65	A	96	120	196	240	300	375
Short-circuit strength In conjunction with fuse of the same rated operational current	EN 60269 gL/gG	kA	10					
Rated impulse withstand voltage U_{imp}		kV	> 5					
Clearances	Open contacts Between the poles	mm mm	> 7 > 7					
Creepage distances		mm	> 7					
Mechanical service life		Switching cycles	20000					
Electrical service life		Switching cycles	10000		5000	1000		
Minimum contact load		V; mA	24; 300					
Rated power Switching of resistive loads including moderate overload AC-21	1-pole 2-pole 3-/4-pole	kW kW kW	5 9 15	6.5 11 15	10 18 30	13 22 39	16 28 48	16 28 48
Rated short-time currents[2)] Per conducting path at p.f. = 0.7 (The corresponding rated surge current can be established by multiplying by factor 1.5.)	Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	A A A A	760 500 400 280	950 630 500 350	1500 1000 800 560	2700 1650 1350 800	3400 2100 1700 1000	3400 2100 1700 1000
Terminals Max. tightening torque	± screw (Pozidriv)	 Nm	2 3.5					
Conductor cross-sections	Rigid Flexible, with end sleeve	mm^2 mm^2	1 ... 35 1 ... 35			2.5 ... 50 2.5 ... 50		
Permissible ambient temperature		°C	-5 ... +40					
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C	45					

5TE8 ON/OFF switches

Selection and ordering data

	Version	I_e	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC	Up to mm²						Unit(s)	Unit(s)	kg
	**ON/OFF switches (20 A and 32 A)**											
	With sealable switch position, separate handle locking device can be retrofitted											
	Mountable auxiliary switch											
	1 NO	20	230	6	1	►	**5TE8 111**		027	1	1/12	0.053
		32				B	**5TE8 211**		027	1	1	0.053
	2 NO	20	400	6	1	►	**5TE8 112**		027	1	1	0.062
		32				►	**5TE8 212**		027	1	1	0.062
	3 NO	20	400	6	1	B	**5TE8 113**		027	1	1	0.072
		32				B	**5TE8 213**		027	1	1	0.072
	Auxiliary switch cannot be retrofitted											
	3 NO + N	20	400	6	1	B	**5TE8 114**		027	1	1	0.082
		32				►	**5TE8 214**		027	1	1	0.081
	With mounted auxiliary switch											
	3 NO + N	20	400	6	1.5	B	**5TE8 118**		027	1	1	0.128
		32				B	**5TE8 218**		027	1	1	0.128
	ON/OFF switches (32 A to 125 A) can be used as switch disconnector according to EN 60947-1											
	With sealable switch position, separate handle locking device can be retrofitted, auxiliary switches can be retrofitted											
	1 NO, red handle	63	230	35	1	B	**5TE8 521**		027	1	1	0.100
		100		50		B	**5TE8 721**		027	1	1	0.112
	1 NO, gray handle	32		35		B	**5TE8 311**		027	1	1	0.100
		40				B	**5TE8 411**		027	1	1	0.100
		63				B	**5TE8 511**		027	1	1	0.100
		80		50		B	**5TE8 611**		027	1	1	0.112
		100				B	**5TE8 711**		027	1	1	0.112
		125				B	**5TE8 811**		027	1	1	0.112
	2 NO, red handle	63	400	35	2	B	**5TE8 522**		027	1	1	0.204
		100		50		B	**5TE8 722**		027	1	1	0.225
	2 NO, gray handle	32		35		►	**5TE8 312**		027	1	1	0.204
		40				►	**5TE8 412**		027	1	1	0.204
		63				►	**5TE8 512**		027	1	1	0.204
		80		50		B	**5TE8 612**		027	1	1	0.225
		100				B	**5TE8 712**		027	1	1	0.225
		125				B	**5TE8 812**		027	1	1	0.225
	3 NO, red handle	63	400	35	3	B	**5TE8 523**		027	1	1	0.307
		100		50		B	**5TE8 723**		027	1	1	0.338
	3 NO, gray handle	32		35		►	**5TE8 313**		027	1	1	0.307
		40				►	**5TE8 413**		027	1	1	0.307
		63				►	**5TE8 513**		027	1	1	0.307
		80		50		►	**5TE8 613**		027	1	1	0.340
		100				►	**5TE8 713**		027	1	1	0.338
		125				B	**5TE8 813**		027	1	1	0.338
	3 NO + N, red handle	63	400	35	4	B	**5TE8 524**		027	1	1	0.413
		100		50		B	**5TE8 724**		027	1	1	0.445
	3 NO + N, gray handle	32		35		►	**5TE8 314**		027	1	1	0.410
		40				►	**5TE8 414**		027	1	1	0.410
		63				►	**5TE8 514**		027	1	1	0.413
		80		50		►	**5TE8 614**		027	1	1	0.455
		100				►	**5TE8 714**		027	1	1	0.445
		125				►	**5TE8 814**		027	1	1	0.455
	4 NO, gray handle	32		35	4	B	**5TE8 315**		027	1	1	0.413
		40				B	**5TE8 415**		027	1	1	0.413
		63				B	**5TE8 515**		027	1	1	0.413
		80		50		B	**5TE8 615**		027	1	1	0.455
		100				B	**5TE8 715**		027	1	1	0.455
		125				B	**5TE8 815**		027	1	1	0.455

* You can order this quantity or a multiple thereof.

	Version	I_e	U_e	Conductor cross-sections	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A	V AC	Up to mm^2						Unit(s)	Unit(s)	kg
	**ON/OFF switches (63 A)** **Can be used as switch disconnector according to EN 60947-1** Terminal access from the bottom and off-position lockable with special key (exclusive power supply company tool) lockable Reduced lower terminal entry for conductors with approx. 7 mm diameter											
	3 NO	63	400	35	3	B	**5TE8 533**		027	1	1	0.263
	**Auxiliary switches (AS)** For all 5TE8 switches, for right-side retrofitting with factory-fitted brackets, for further technical specifications, see the chapter "Miniature circuit breakers"											
	1 NO + 1 NC				0.5	►	**5ST3 010**		027	1	1	0.050
	2 NO				0.5	A	**5ST3 011**		027	1	1	0.050
	2 NC				0.5	A	**5ST3 012**		027	1	1	0.050
	Auxiliary switches for small output											
	1 NO + 1 NC				0.5	►	**5ST3 013**		027	1	1	0.050
	2 NO				0.5	B	**5ST3 014**		027	1	1	0.050
	2 NC				0.5	B	**5ST3 015**		027	1	1	0.050
	**Handle locking devices** For all 5TE8 switches, can be sealed against unwanted manual ON/OFF switching, padlock with max. 3 mm shackle					A	**5ST3 801**		027	1	1	0.008
	**Terminal covers** For all 5TE8 5 to 5TE8 8 switches, in 1 MW per pole version, for covering screw openings, sealable					B	**5ST3 800**		027	1	10	0.001
	**Spacers** Contour for modular devices with a mounting depth of 70 mm; can be snapped onto either side of the busbar, so that two spacers allow for convenient cable routing				0.5	►	**5TG8 240**		027	1	2	0.010
	**Phase connectors** For easier wiring in various wiring versions and busbar mountings or as a fixpoint terminal for conductors from 2.5 mm^2 to 50 mm^2											
	1P	125	230	50	1	B	**5TE9 112**		027	1	1	0.111
	**N-conductor connectors** For easier wiring in various wiring versions and busbar mountings or as a fixpoint terminal for N-conductors from 2.5 mm^2 to 50 mm^2 with blue marking											
	1P	125	230	50	1	B	**5TE9 113**		027	1	1	0.111

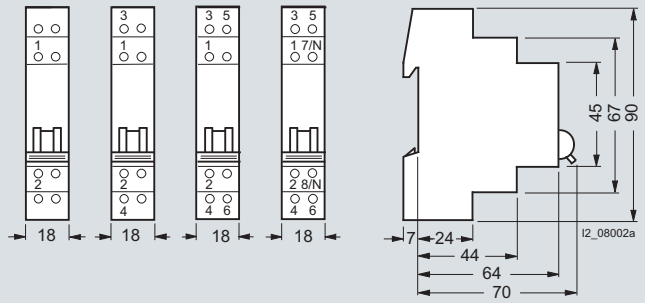
7

* You can order this quantity or a multiple thereof.

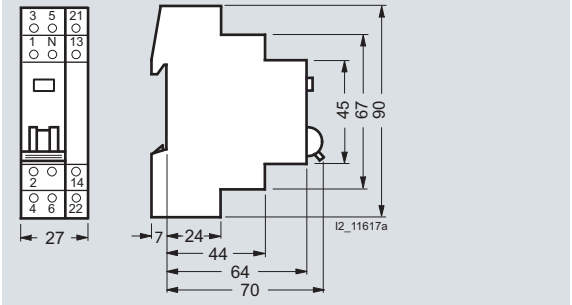
5TE8 ON/OFF switches

Dimensional drawings

5TE8 ON/OFF switches (20 A and 32 A)

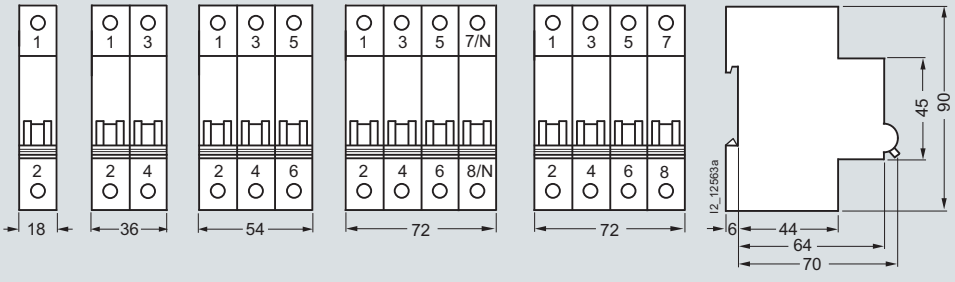


5TE8 111 5TE8 112 5TE8 113 5TE8 114
5TE8 211 5TE8 212 5TE8 213 5TE8 214



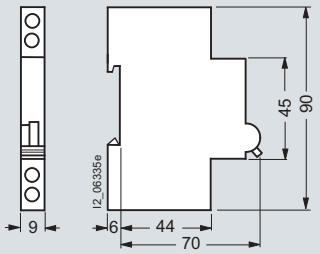
5TE8 118
5TE8 218

5TE8 ON/OFF switches (32 A and 125 A)



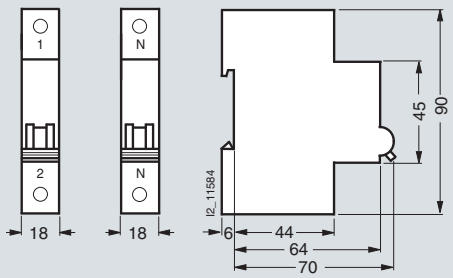
5TE8 311	5TE8 312	5TE8 313	5TE8 314	5TE8 315
5TE8 411	5TE8 412	5TE8 413	5TE8 414	5TE8 415
5TE8 511	5TE8 512	5TE8 513	5TE8 514	5TE8 515
5TE8 521	5TE8 522	5TE8 523	5TE8 524	
		5TE8 533		
5TE8 611	5TE8 612	5TE8 613	5TE8 614	5TE8 615
5TE8 711	5TE8 712	5TE8 713	5TE8 714	5TE8 715
5TE8 721	5TE8 722	5TE8 723	5TE8 724	
5TE8 811	5TE8 812	5TE8 813	5TE8 814	5TE8 815

5ST3 auxiliary switches



5ST3 010
5ST3 011
5ST3 012

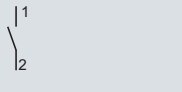
Phase connectors/N-conductor connectors



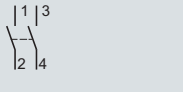
5TE9 112 5TE9 113

Schematics

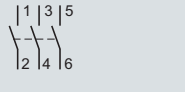
5TE8 ON/OFF switches



5TE8 111
5TE8 211

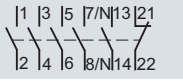


5TE8 112
5TE8 212

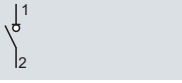


5TE8 113
5TE8 213

5TE8 114
5TE8 214

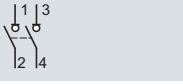


5TE8 118
5TE8 218



5TE8 311
5TE8 411
5TE8 511
5TE8 521

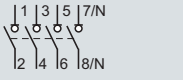
5TE8 611
5TE8 711
5TE8 721
5TE8 811



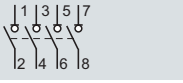
5TE8 312
5TE8 412
5TE8 512
5TE8 522

5TE8 612
5TE8 712
5TE8 722
5TE8 812

5TE8 313
5TE8 413
5TE8 513
5TE8 523
5TE8 533
5TE8 613
5TE8 713
5TE8 723
5TE8 813



5TE8 314
5TE8 414
5TE8 514
5TE8 524
5TE8 614
5TE8 714
5TE8 724
5TE8 814

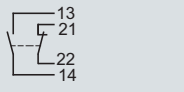


5TE8 315
5TE8 415
5TE8 515

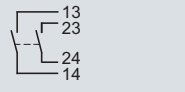
5TE8 615
5TE8 715

5TE8 815

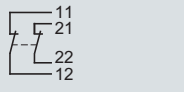
5STE3 auxiliary switches



5ST3 010



5ST3 011



5ST3 012

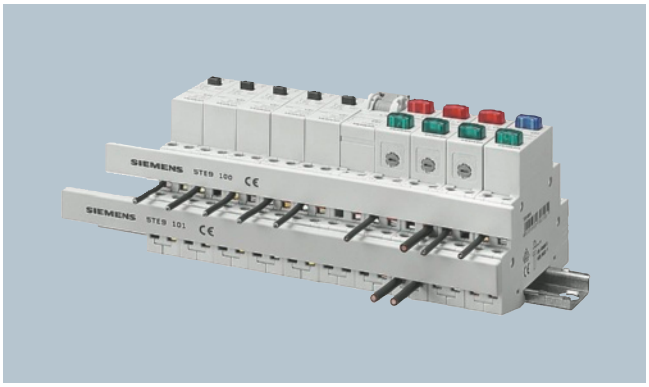
5TE9 busbars

Overview

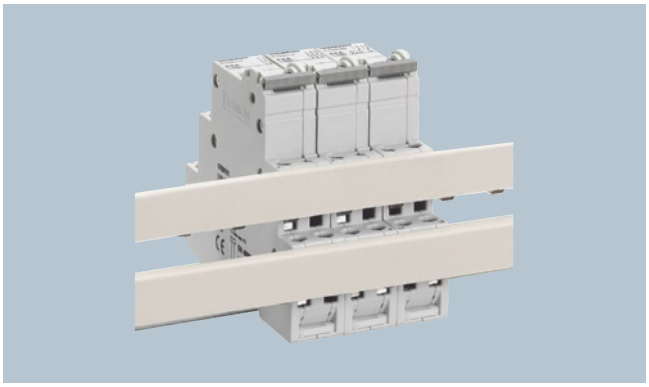
Siemens has developed a rail-mounting concept which makes the linking of switching devices just as easy as that of miniature circuit breakers.

The arrangement of the terminals on the devices is adapted to the bus-mounting. With only two busbars, this saves considerable mounting time.

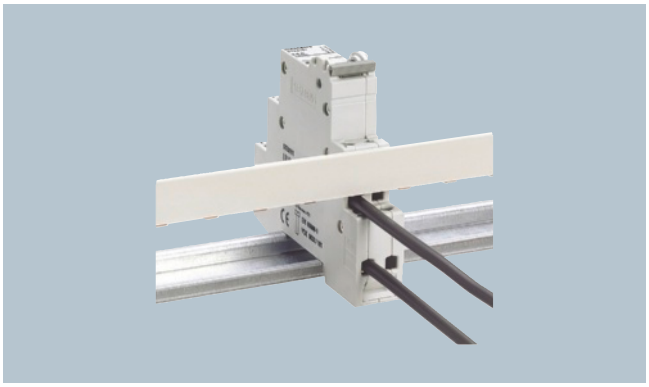
Benefits



- Uniform bus-mounting on many devices
- All 5TE8 switches (20 and 32 A), 5TE4 8 pushbuttons, 5TE5 8 light indicators and 5TT4 1 remote control switches and 5TT4 2 switching relays can be bus-mounted. This makes installation tasks considerably easier.

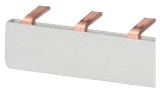
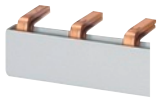
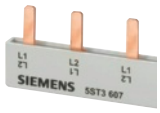


- All 5TE8 switches (20 A and 32 A) in 1 MW can be fed via the single or two-phase busbars. Thus 2 two-phase busbars support a 4-pole infeed. This is unique.

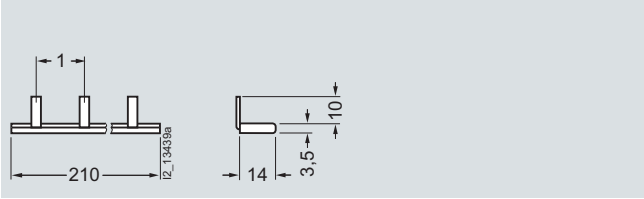


- Infeed: The phase busbar is fed in at the tunnel terminal for conductors up to 6 mm^2 and 32 A. No additional feeder terminals required.

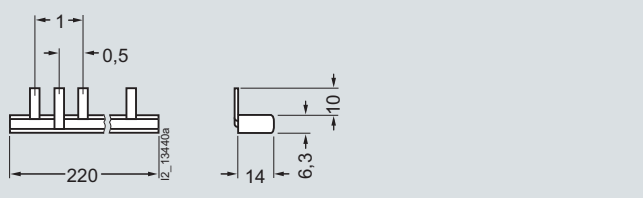
Selection and ordering data

	Version	Length	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		mm					Unit(s)	Unit(s)	kg
	**Single-phase busbars** For all 5TE8 switches, 20 A and 32 A In the 12 MW version for the cutting of unused terminal lugs to ensure insulation clearances if one device terminal is to be supplied separately despite being mounted on the busbar, modular clearance = 1 MW Infeed of the busbar at the device terminal with a conductor cross-section of 6 mm^2 to 32 A Can be mounted top or bottom in the front or rear terminal area	210	B	**5TE9 100**		027	1	10	0.040
	**Two-phase busbars** For all 5TE8 switches, 20 A and 32 A In 12 MW version with 1 MW division, whereby the two busbars are offset by 0.5 MW Both copper conductors of the two-phase busbar are insulated together. Infeed of the busbar at the device terminal with a conductor cross-section of 6 mm^2 to 32 A Can be mounted from top or bottom, or in the front or rear terminal area, thus allowing realization of a 4-conductor connection using two two-phase busbars.	220	B	**5TE9 101**		027	1	10	0.060
	**End caps for two-phase busbars** End caps for 5TE9 101 two-phase busbars to keep insulation clearances when the bar is being cut. 1 set = 10 units		B	**5TE9 102**		027	1 set	1 set	0.001
	**5ST3 6 and 5ST3 7 busbar systems** All bars of the 5ST3 6 and 5ST3 7 busbar systems can also be used for all 1 MW per pole versions of the 5TE8 switches from 32 A to 125 A (see chapter Miniature Circuit Breakers).								

Dimensional drawings



5TE9 100



5TE9 101

Note:
Pin spacing in MW.
Dimensions of side views in mm (approx.).

* You can order this quantity or a multiple thereof.

5TE1 switch disconnectors

Overview

The 5TE1 switch disconnectors are available from 100 A to 200 A in 3 and 4-pole versions and can be used as main switches, repair switches, outgoing feeder switches, as well as emergency system interrupters.

The series corresponds to the requirements of IEC/EN 60947-3 and its key features are its compact and robust design, high short-circuit strength, high DC switching capacity and comprehensive accessories.

Its small footprint means it is easy to install in all types of enclosures, distribution boards and control cabinets.

The devices are approved to UL 508 and KEMA certified.

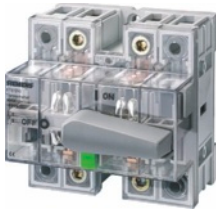
Benefits

- Transparent enclosures ensure that the contact position is always visible
- Contacts with double breaks ensure reliable insulation characteristics
- Can be locked in the OFF position to allow for maintenance work
- With a red knob and yellow cap, it can also be used as an emergency system interrupter.

Technical specifications

				5TE1 .1	5TE1 .2	5TE1 .3	5TE1 .4
Standards **Approved acc. to**				IEC/EN 60947-3, UL 508 UL 508 for the following types: 5TE1 320, 5TE1 330, 5TE1 340, 5TE1 420, 5TE1 430 and 5TE1 440. UL File No. E302554			
Rated operational current I_e With utilization category AC-21A	Per conducting path at U_e =	400 V DC 415 V DC 500 V DC 690 V DC	A A A A	100 100 100 100	125 125 125 125	160 160 160 160	200 200 200 200
Rated operational current I_e With utilization category AC-22A	Per conducting path at U_e =	400 V DC 415 V DC 500 V DC 690 V DC	A A A A	100 100 100 63	125 125 100 63	160 160 160 160	200 200 200 200
Rated operational current I_e With utilization category AC-23A	Per conducting path at U_e =	400 V DC 415 V DC 500 V DC 690 V DC	A A A A	80 80 50 40		125 125 125 63	160 160 125 80
Rated operational current I_e With utilization category DC-23A	2 poles in series 2 poles in series 4 poles in series	110 V DC 220 V DC 220 V DC	A A A	100 -- 100		160 100 160	
Rated operational voltage U_e			V AC	Acc. to UL: 480, acc. to IEC: 690			
Rated insulation voltage U_i			V AC	690			
Rated impulse withstand voltage U_{imp}	2000 m		kV	8			
Impulse test voltage	At sea level		kV	12.3			
Max. rated operational power With utilization category AC-23A	At U_e =	400 V DC 415 V DC 500 V DC 690 V DC	kW kW kW kW	44 46 35 36		69 72 86 60	88 92 86 76
Thermal rated current I_{th}	At 40 °C, 50 °C and 60 °C		A	100	125	160	200
Rated making capacity	At 415 V AC-23A		A	1875		3200	4000
Rated breaking capacity	At 415 V AC-23A		A	1000		1920	2400
Rated short-circuit making capacity I_{cm}	Per conducting path At U_e =	400 V DC 415 V DC 500 V DC 690 V DC	kA kA kA kA	10 10 6.7 6.7			
Rated short-time withstand current I_{cw} (peak value)	Per conducting path	0.25 s 1 s	kA kA	5 2.5		6 3	
Rated conditional short-circuit current With back-up protection with back-up fuse With identical rated current	At U_e =	400 V DC 415 V DC 500 V DC 690 V DC	kA kA kA kA	50 50 50 33	33	20	18
Capacitive load	At 400 V		kVar	50	60	77	97
Number of poles				2/3/4			
Rated power dissipation P_v	Per pole		VA	2.9	4.5	6.5	10
Frequency			Hz	50/60			
Conductor cross-sections • Solid and stranded • AWG cables • Copper busbars			 mm^2 AWG mm^2	 6 ... 50 10 ... 1/0 --		 -- 8 Max. 20 x 6	
Service life	Electrical Mechanical		Switching cycles	1500 20000		1000 10000	
Acc. to UL 508 **UL 508 General Use 480 V** **UL 508 manual motor controller 230 V** **UL 508 manual motor controller 480 V** **UL 508 short circuit at 480 V**	I_n FLA (full load amperes) Power Power With Class H or K5 fuses With J fuses		A A hp hp kA kA	-- -- -- -- -- --	80 28 10 20 10 50	100 34 25 15	125 40 30 15

Selection and ordering data

	Version	I_e	U_e	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A AC	V AC						Unit(s)	Unit(s)	kg
	**Switch disconnectors, lockable, with gray knob and transparent enclosure, mounting depth 92 mm**										
	2 NO										
		100	690	5	B	**5TE1 210**		027	1	1	0.480
		125			B	**5TE1 220**		027	1	1	0.480
		160		8	B	**5TE1 230**		027	1	1	0.620
		200			B	**5TE1 240**		027	1	1	0.620
	3 NO										
		100	690	5	B	**5TE1 310**		027	1	1	0.540
		125			B	**5TE1 320**		027	1	1	0.540
		160		8	B	**5TE1 330**		027	1	1	0.730
		200			B	**5TE1 340**		027	1	1	0.730
	4 NO										
		100	690	5	B	**5TE1 410**		027	1	1	0.590
		125			B	**5TE1 420**		027	1	1	0.590
		160		8	B	**5TE1 430**		027	1	1	0.770
		200			B	**5TE1 440**		027	1	1	0.770
	3 NO with N-conductor through-type terminal										
		100	690	5	B	**5TE1 610**		027	1	1	0.590
		125			B	**5TE1 620**		027	1	1	0.590
		160		8	B	**5TE1 630**		027	1	1	0.770
		200			B	**5TE1 640**		027	1	1	0.770
	**Switch disconnectors with red knob and yellow cap, can be used as emergency system interrupter to IEC 60204-1, EN 60204-1 (VDE 0113 -1) If switch is easily accessible, mounting depth 92 mm**										
	3 NO										
		100	690	5	B	**5TE1 315**		027	1	1	0.540
		125			B	**5TE1 325**		027	1	1	0.540
		160		8	B	**5TE1 335**		027	1	1	0.730
		200			B	**5TE1 345**		027	1	1	0.730
	4 NO										
		100	690	5	B	**5TE1 415**		027	1	1	0.590
		125			B	**5TE1 425**		027	1	1	0.590
		160		8	B	**5TE1 435**		027	1	1	0.770
		200			B	**5TE1 445**		027	1	1	0.770

* You can order this quantity or a multiple thereof.

5TE1 switch disconnectors

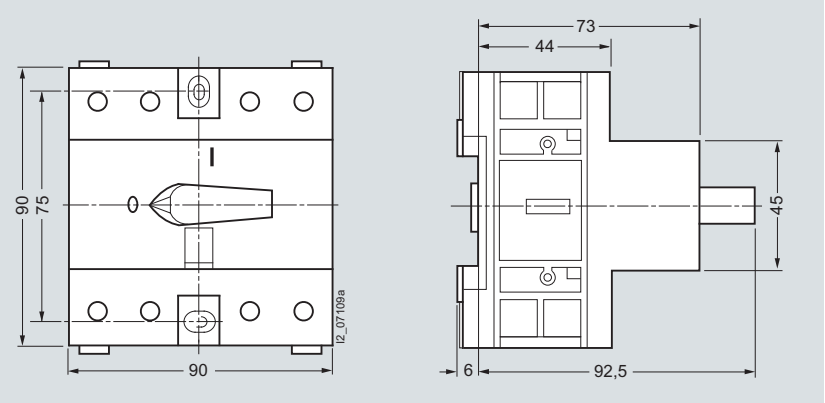
	Version	I_e	U_e	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A AC	V AC					Unit(s)	Unit(s)	kg
 	**Terminal covers** Sealable									
	For 100 A and 125 A switch disconnectors			B	**5TE9 000**		027	1	1	0.060
	For 160 A and 200 A switch disconnectors			B	**5TE9 001**		027	1	1	0.050
	**Cage Clamp terminals** For switch disconnectors 160 A and 200 A, terminal diameter 14.5 mm for 35 mm^2 cables, 5 mm Allen screw									
	1 set = 3 units			B	**5TE9 003**		027	1 set	1 set	0.080
	1 set = 4 units			A	**5TE9 004**		027	1 set	1 set	0.080
	**Auxiliary switches** Can be mounted on the left, the right or both sides (2 units) Minimum contact load 24 V, 50 mA									
	1 CO	6	230	B	**5TE9 005**		027	1	1	0.080
	2 CO	6	230	B	**5TE9 006**		027	1	1	0.080
	**Locking units** For up to three padlocks with max. ∅ 8 mm			B	**5TE9 014**		027	1	1	0.230
	**Conversion kits, 4-pole, for 100 A and 125 A, for the connection of busbars or cables with cable lugs** For busbars max. 15 mm wide Including terminal cover			B	**5TE9 015**		027	1 set	1 set	0.110
	**Rotary actuators with extension axes for mounting on hinged doors or enclosure lids, lockable, IP65** Black knob									
	Axis length 200 mm			B	**5TE9 010**		027	1	1	0.550
	Axis length 400 mm			B	**5TE9 011**		027	1	1	0.550
	Red knob									
	Axis length 200 mm			B	**5TE9 012**		027	1	1	0.550
	Axis length 400 mm			B	**5TE9 013**		027	1	1	0.550

7

* You can order this quantity or a multiple thereof.

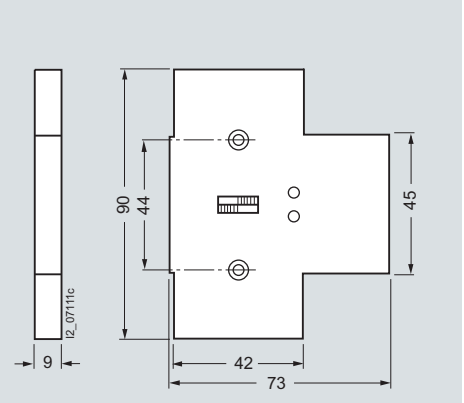
Dimensional drawings

5TE1 switch disconnectors, 100 A and 125 A



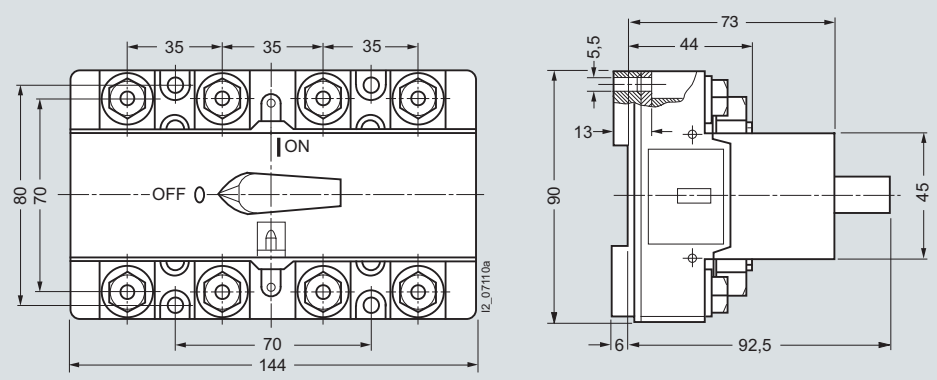
5TE1 210 5TE1 310 5TE1 410 5TE1 610
5TE1 220 5TE1 320 5TE1 420 5TE1 620
5TE1 315 5TE1 415
5TE1 325 5TE1 425

5TE9 auxiliary switches



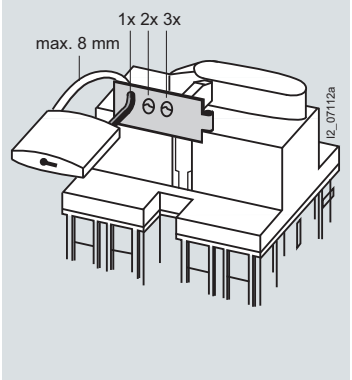
5TE9 005
5TE9 006

5TE1 switch disconnectors

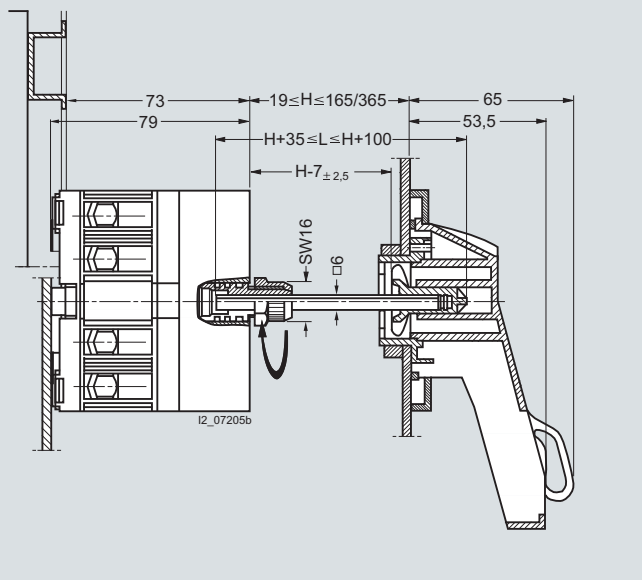


5TE1 230 5TE1 330 5TE1 430 5TE1 630
5TE1 240 5TE1 335 5TE1 435 5TE1 640
5TE1 340 5TE1 440
5TE1 345 5TE1 445

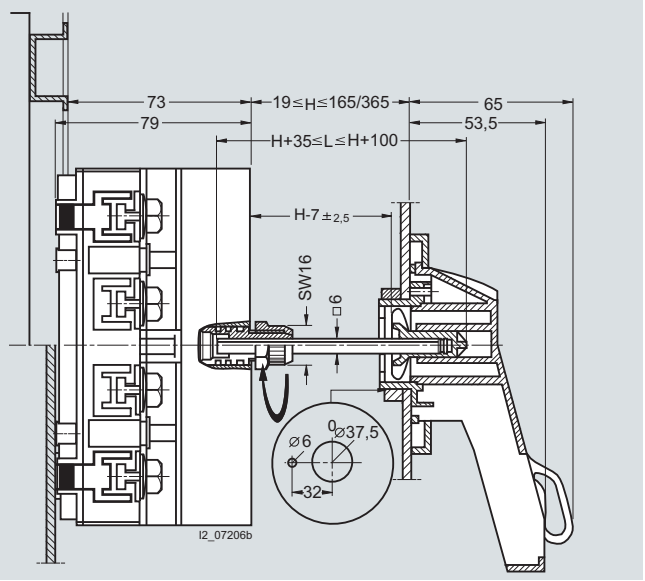
5TE9 014 locking units



5TE9 rotary actuators with extension axis



With switch disconnectors 100 A and 125 A,
5TE9 010, 5TE9 011, 5TE9 012, 5TE9 013

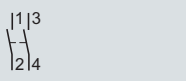


With switch disconnectors 160 A and 200 A,
5TE9 010, 5TE9 011, 5TE9 012, 5TE9 013
It is possible to open the door in both a connected and disconnected state.

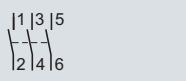
5TE1 switch disconnectors

Schematics

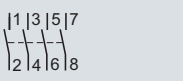
5TE1 switch disconnectors



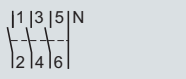
5TE1 210
5TE1 220
5TE1 230
5TE1 240



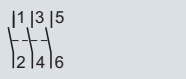
5TE1 310
5TE1 320
5TE1 330
5TE1 340



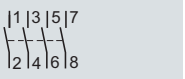
5TE1 410
5TE1 420
5TE1 430
5TE1 440



5TE1 610
5TE1 620
5TE1 630
5TE1 640

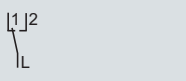


5TE1 315
5TE1 325
5TE1 335
5TE1 345

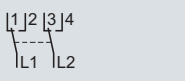


5TE1 415
5TE1 425
5TE1 435
5TE1 445

5STE9 auxiliary switches



5TE9 005

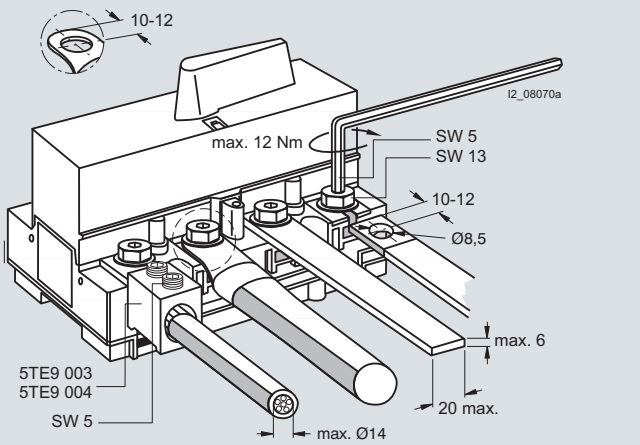


5TE9 006

7

More information

Connection of 5TE1 .3 and 5TE1 .4 switches, 160 A and 200 A



Design

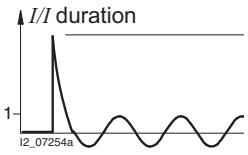
- From 160 A: supplied with one terminal cover
- 160 A and 200 A: version for connection with cable lug
- Screw fixing on base plate
- Installation on standard mounting rail according to EN 60715, which is raised at least 5 mm from the base plate

BETA Switching Switching Devices

8

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**5TT4 1 remote control switches**	8/3	For the switching of lighting up to 16 A in rooms using several pushbuttons and central ON/OFF switches with auxiliary switches that can be retrofitted.	IEC 60669-1 IEC 60669-2 IEC 60669-3 EN 60669 (VDE 0632) EN 60669-2-2 and EN 60669-2-2/A1	✓	✓	✓
	**5TT4 2 switching relays**	8/11	For the switching of small loads up to 16 A or as coupling devices in control systems.	EN 60947-5-1 (VDE 0660-200)	✓	--	✓
	**5TT5 7 Insta contactors, DC technology** With DC magnetic system	8/14	Insta contactors 24, 40 and 63 A for the switching of heating, lighting, such as fluorescent lamps, incandescent lamps, ohmic or inductive loads.	IEC 60947-4-1 IEC 60947-5-1 IEC 61095 EN 60947-4-1 EN 60947-5-1 EN 61095 VDE 0660 UL 508	✓	✓	✓
	**5TT5 8 Insta contactors, AC technology** With AC magnetic system and optional manual switch	8/20	Insta contactors 20, 25, 40 and 63 A for the switching of heating, lighting, such as fluorescent lamps, incandescent lamps, ohmic or inductive loads.	IEC 60947-4-1 IEC 60947-5-1, IEC 61095, EN 60947-4-1 EN 60947-5-1 EN 61095 VDE 0660 NF C 61-480 (NF EN 61095)	✓	✓	✓
	**5TT3 4 soft-starting devices**	8/28	For the protection of machines with transmission, belt or chain drives, conveyor belts, fans, pumps, compressors, packing machines or door operating mechanisms	EN 60947-4-2 (VDE 0660-117)	--	--	✓
	**Circuit protection**	8/30	For the ON/OFF switching of loads, contact selection for lighting installations, OFF switching of direct currents and the switching of safety extra-low voltages. A wide range of options for practical use.				

Overview

Remote control switches are used in residential buildings, as well as the switchgear engineering sector. They trip in the event of current inrushes, i.e. pulses, and then electromechanically (without auxiliary power) save the switching position, even in the event of a power failure. In residential buildings, used e.g. if a light in a corridor needs to be switched from more than one location. Because they save the switching position, they are integrated in the logic of the switchgear engineering.

All the devices have the VDE mark and can also be equipped with an additional auxiliary switch. They can be bus-mounted on 5TE9 100 and 5TE9 101 busbars; e.g.: bus-mounting of the N-conductor and / or infeed. All devices have a switching position indicator and are operated manually. The switching noise is particularly quiet and meets the requirements of residential buildings.

Benefits

- All the devices have the VDE mark. This increases operational safety.
- All remote control switches can be infed over single or two-phase busbars. In the same way, 5TE4 8 pushbuttons, 5TE5 8 light indicators, 5TE8 switches in 20 or 32 A and 5TT4 2 switching relays can be bus-mounted. This considerably facilitates installation.
- All devices have a switching position indicator and are operated manually. This enables simple on-site operation and fast recognition of the switching state.
- The switching noise is particularly quiet and meets the requirements of residential buildings. This prevents any disturbing noises, particularly in living accommodation.
- All the remote control switches can be fitted with an additional auxiliary switch. This increases application flexibility.

5TT4 1 remote control switches

Technical specifications

		Remote control switches				Auxiliary switches	
		5TT4 101 5TT4 102 5TT4 105 5TT4 115	**5TT4 103 5TT4 104**	**5TT4 12 5TT4 15**	**5TT4 13 5TT4 14**	**5TT4 900**	**5TT4 901**
Standards **Approved acc. to**		IEC 60669-1, IEC 60669-2, IEC 60669-3, EN 60669 (VDE 0632), EN 60669-2-2, EN 60669-2-2/A1 VDE 0632					
Contact type		1 NO 2 NO 1 NO 1 NC	3 NO 4 NO	ZEZA GEGA	Series shutter/blind	1 CO	1 CO
Manual operation		Yes				--	
Switching position indication		Yes	Yes	Yes	--	--	
Rated control voltage U_c	V AC V DC	8 ... 230 12 ... 110				-- --	
Operating range	× U_c	0.8 ... 1.1				--	
Rated frequency f_c (AC types)	Hz	50				--	
Rated impulse withstand voltage U_{imp}	kV	4				1	
Rated power dissipation P_v							
• Magnet coil, only pulse	W/VA	4.5/7	9/13	4.5/7 9[1]/13[1]	4.5/7	--	
• Per contact at 16 A	W	1.2				--	
Minimum contact load	V AC; mA	10; 100	10; 100	10; 100	10; 100	10; 100	5 AC/DC; 1
Rated operational current I_e at p.f. = 0.6 ... 1	A	16				5	0.1
Rated operational voltage U_e							
• 1P	V AC	250	--	--	--	250	30 AC/DC
• 2P	V AC	250/400	--	250/400	250	--	--
• 3P	V AC	--	400	400	--	--	--
• 4P	V AC	--	400	--	--	--	--
Glow lamp load at 230 V	mA	5				--	
• With one 5TT4 920 compensator	mA	25				--	
• With two 5TT4 920 compensators	mA	45				--	
Incandescent lamp load	W	2400				--	
Different phases Between magnet coil/contact		Permissible				--	
Contact gap	mm	> 1.2				< 1.2	
Safe isolation Creepage distances and clearances between magnet coil/contact	mm	> 6					
Pushbutton malfunction Protected against continuous voltage, safe due to design		Yes	PTC	Yes[1]	Yes	--	
Minimum pulse duration	ms	50					
Electrical service life At I_e/U_e or specified lamp load	In switching cycles	50 000					
Terminals ±screw (Pozidriv)		1					
Conductor cross-sections							
• Rigid	mm^2	1.5 ... 6				0.5 ... 4	
• Flexible, with end sleeve	mm^2	1 ... 6				0.75 ... 4	
Resistance to climate At 95 % relative humidity Acc. to DIN 50015	°C	35					
Permissible ambient temperature	°C	-10 ... +40					
Degree of protection Acc. to EN 60529		IP20, with connected conductors					
Mounting position		Any					

[1] For 2.5 MW 5TT4 123-0 devices with PTC.

Selection and ordering data

	Contacts	U_e	I_e	U_c	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC	V DC				1 unit		Unit(s)	Unit(s)	kg
	**Remote control switches, auxiliary switches can be retrofitted**												
	1 NO	250	16	230		1	▶	**5TT4 101-0**		027	1	1/12	0.126
				115			B	**5TT4 101-1**		027	1	1	0.120
				24			▶	**5TT4 101-2**		027	1	1	0.121
				12			B	**5TT4 101-3**		027	1	1	0.118
				8			B	**5TT4 101-4**		027	1	1	0.124
	2 NO	400	16	230		1	▶	**5TT4 102-0**		027	1	1	0.132
				115			B	**5TT4 102-1**		027	1	1	0.132
				24			▶	**5TT4 102-2**		027	1	1	0.132
				12			B	**5TT4 102-3**		027	1	1	0.130
				8			B	**5TT4 102-4**		027	1	1	0.136
	3 NO	400	16	230		2	▶	**5TT4 103-0**		027	1	1	0.200
				24			▶	**5TT4 103-2**		027	1	1	0.195
	4 NO	400	16	230		2	▶	**5TT4 104-0**		027	1	1	0.211
				24			▶	**5TT4 104-2**		027	1	1	0.206
	1 NO + 1 NC	250	16	230		1	▶	**5TT4 105-0**		027	1	1	0.137
				115			B	**5TT4 105-1**		027	1	1	0.131
				24			▶	**5TT4 105-2**		027	1	1	0.132
				12			B	**5TT4 105-3**		027	1	1	0.129
				8			B	**5TT4 105-4**		027	1	1	0.135
	1 NO + 1 NC	250	16		110	1	▶	**5TT4 115-1**		027	1	1	0.131
					24		▶	**5TT4 115-2**		027	1	1	0.131
					12		▶	**5TT4 115-3**		027	1	1	0.131
	**Remote control switches with central ON/OFF switching, auxiliary switch cannot be retrofitted**												
	2 NO	400	16	230		1.5	▶	**5TT4 122-0**		027	1	1	0.181
	3 NO	400	16	230		2.5	▶	**5TT4 123-0**		027	1	1	0.194
	1 NO + 1 NC	250	16	230		1.5	▶	**5TT4 125-0**		027	1	1	0.182
	**Remote control switches, with central and group ON/OFF switching, auxiliary switch cannot be retrofitted**												
	1 NO	250	16	230		1.5	▶	**5TT4 151-0**		027	1	1	0.145
				24		1.5	▶	**5TT4 151-2**		027	1	1	0.144
	2 NO	250	16	230		1.5	▶	**5TT4 152-0**		027	1	1	0.156
				24		1.5	▶	**5TT4 152-2**		027	1	1	0.155
	**Series remote control switches Contact sequence 0 – 1 – 2 – 1+2**												
	2 NO	250	16	230		1	▶	**5TT4 132-0**		027	1	1	0.130
				12			▶	**5TT4 132-3**		027	1	1	0.130
	Shutter/blind remote control switches Contact sequence 1 – 0 – 2 – 0												
	2 NO	250	16	230		1	▶	**5TT4 142-0**		027	1	1	0.138
				24			B	**5TT4 142-2**		027	1	1	0.132
				12			B	**5TT4 142-3**		027	1	1	0.130

8

* You can order this quantity or a multiple thereof.

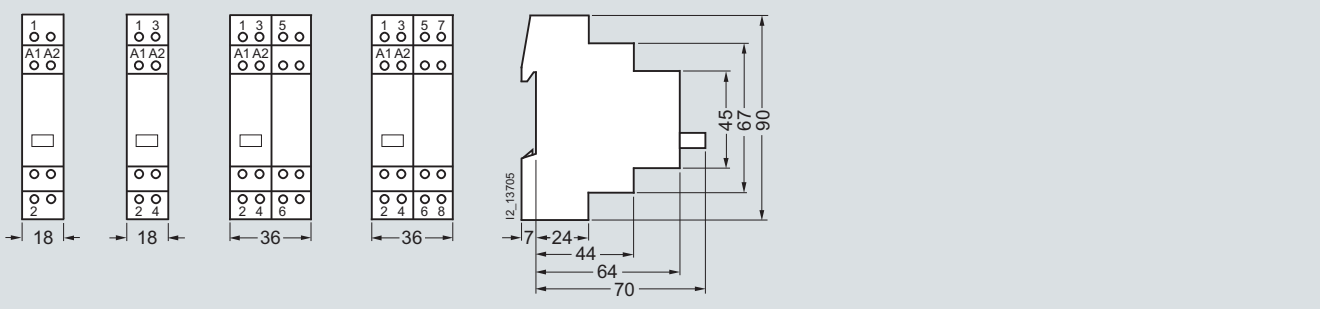
5TT4 1 remote control switches

	Contacts	U_e	I_e	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC				1 unit		Unit(s)	Unit(s)	kg
	**Auxiliary switches** **One device can be retrofitted per remote control switch**										
	1 CO 250 V AC/5 A	250	5	0.5	▶	**5TT4 900**		027	1	1	0.032
	1 CO For small outputs	30 AC/DC	0.1	0.5	▶	**5TT4 901**		027	1	1	0.054
	**Compensators** **For increasing the glow lamp load by 20 mA**										
		250	--	1	▶	**5TT4 920**		027	1	1	0.060

8

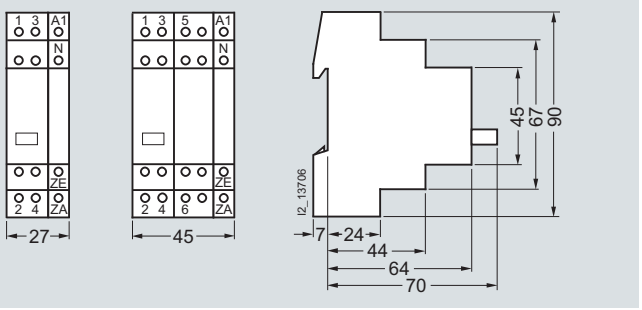
Dimensional drawings

5TT4 1 remote control switches



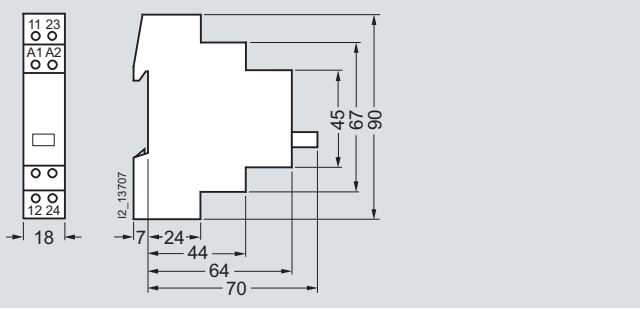
5TT4 101 | 5TT4 102, 5TT4 105, 5TT4 115 | 5TT4 103 | 5TT4 104

5TT4 12 remote control switches with central ON/OFF switching



5TT4 122-0, 5TT4 125-0 | 5TT4 123-0

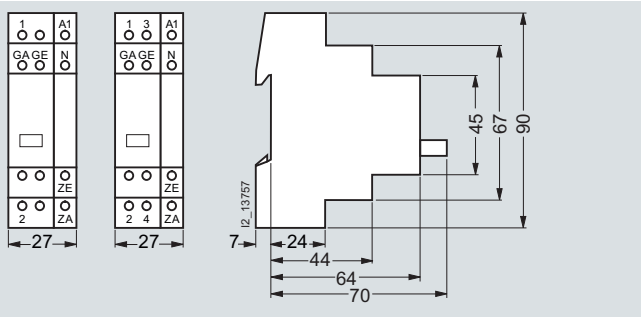
5TT4 132-0 series remote control switches and 5TT4 142 shutter/blind remote control switches



5TT4 132, 5TT4 142

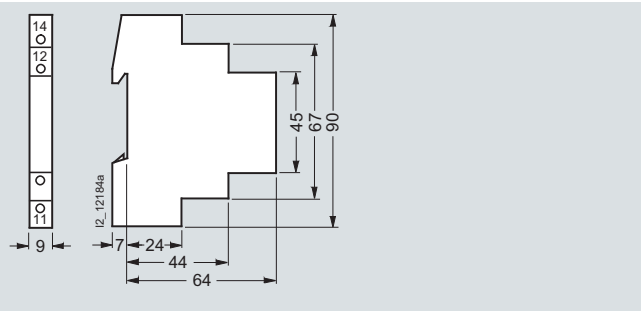
* You can order this quantity or a multiple thereof.

Remote control switches with central and group ON/OFF switching



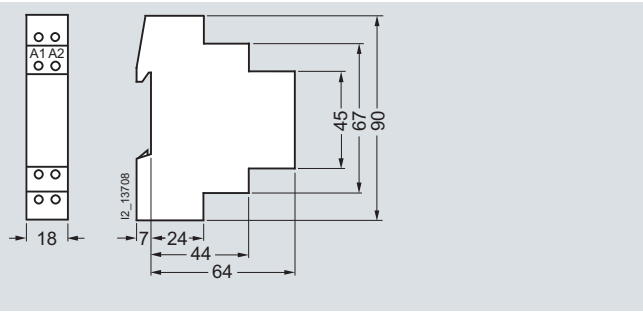
5TT4 151 5TT4 152

Auxiliary switches



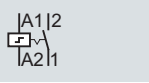
5TT4 90.

Compensators

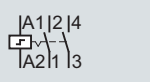


5TT4 920

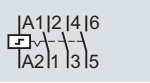
Schematics



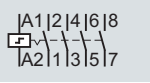
5TT4 101



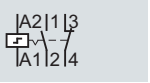
5TT4 102



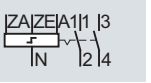
5TT4 103



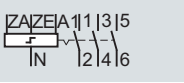
5TT4 104



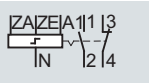
5TT4 105
5TT4 115



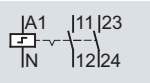
5TT4 122-0



5TT4 123-0

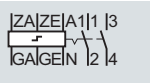


5TT4 125-0

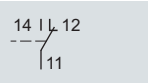


5TT4 132
5TT4 142

5TT4 151



5TT4 152



5TT4 90.

5TT4 920

More information

Mechanical storage

Remote control switches are used to switch lighting by means of several pushbuttons. This makes complex cross/two-way switching unnecessary. With each pushbutton impulse, the remote control switch changes its contact position from OFF to ON, etc. In the event of a power failure, the last switching position is mechanically stored. Electromechanical remote control switches have no standby loss.

Pushbutton malfunction

Pushbuttons can jam, which may expose remote control switches to a continuous voltage. All remote control switches are protected against this type of malfunction through their design or through PTC.

Central switching functions

Versions with central ON/OFF functions allow the central switching of all connected remote control switches, which can also be carried out over a clock timer.
All remote control switches can be switched to the ON or OFF switching state, regardless of their current switching state.

Contact sequences

0 – 1 – 2 – 1+2 or **1 – 0 – 2 – 0** means:

0: No contact closed

1: Only contact 1 closed

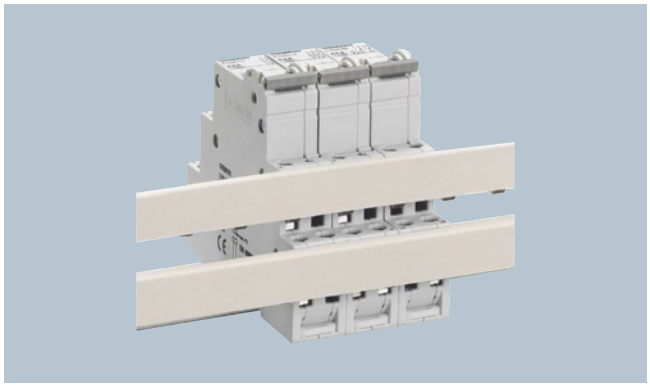
2: Only contact 2 closed

1+2: Contact 1 and contact 2 are closed

The contact positions are constantly changing with each pushbutton impulse.

5TT4 1 remote control switches

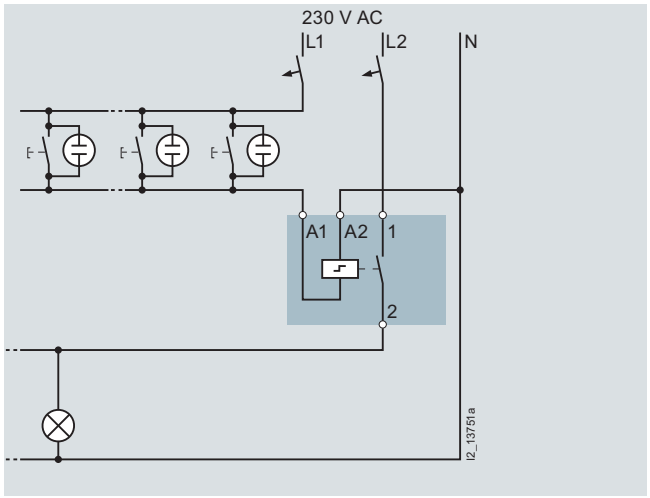
Busbar mounting



- All 5TT4 1 remote control switches can be bus-mounted with each other. This saves time and space.

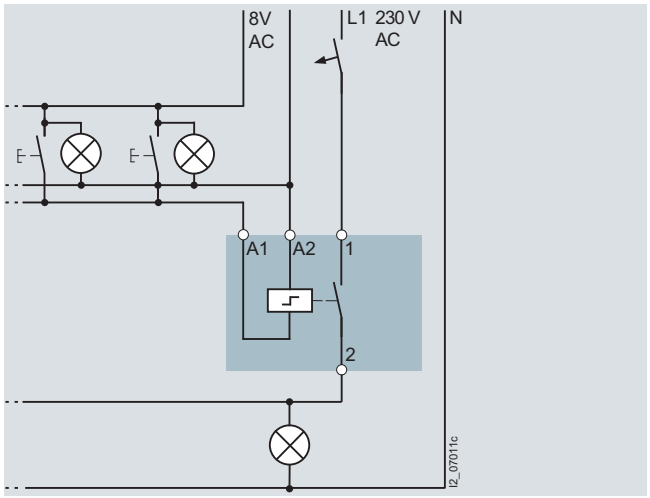
Switching example: 5TT4 101-0

Single-phase lighting circuit with 230 V AC actuation, e.g. in office buildings

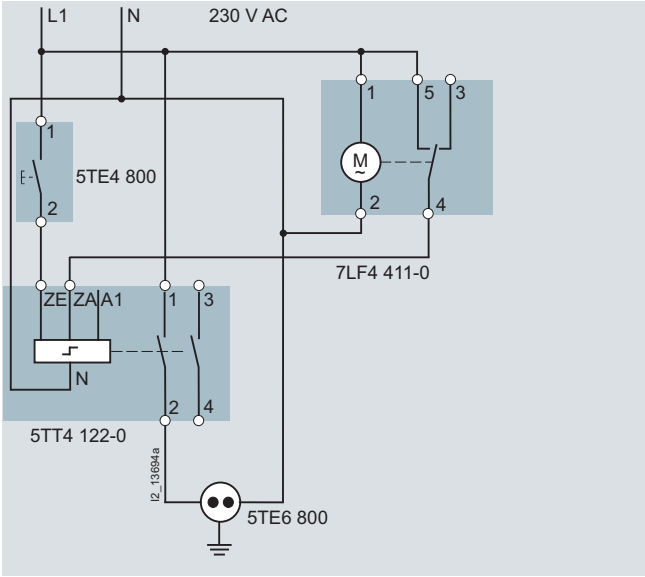


Switching example: 5TT4 101-4

Single-phase lighting circuit with safety extra-low voltage 8 V AC, illuminated pushbutton

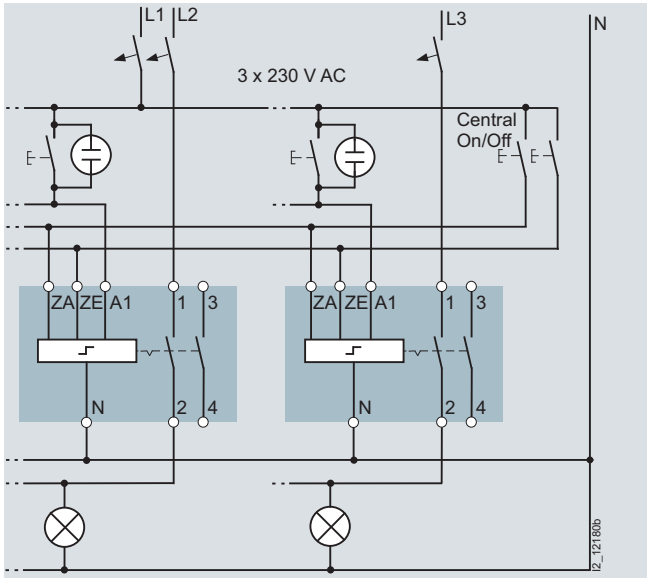


Switching example: 5TT4 122-0 with central ON/OFF switching and time switch



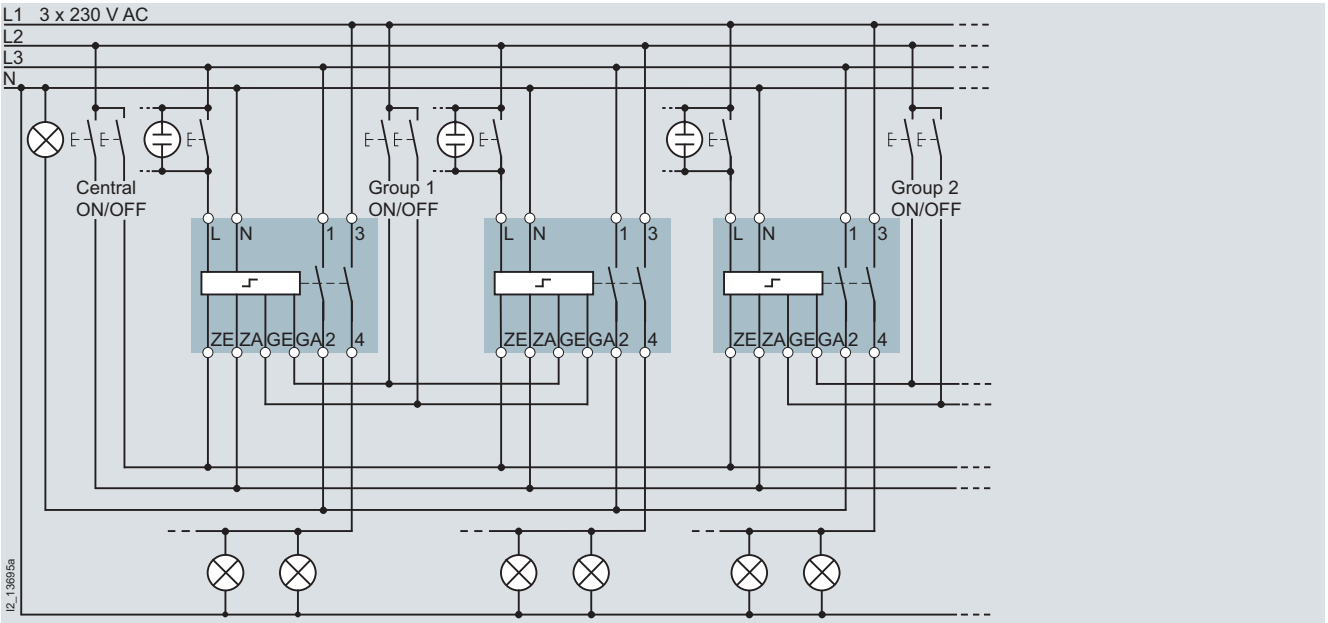
Printers and copiers are to be switched on with the pushbutton at the beginning of the working day. At the end of the working day, e.g. 6 p.m. to 10 p.m., an hourly one-second pulse of the time switch switches off the socket outlet. This ensures that printers and copiers are not "forgotten". If the device is switched on again after 6 p.m., a switch-off is actuated again hourly.

Switching example: 5TT4 122-0 with central ON/OFF switching



With the pushbuttons for ON/OFF switching, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work. A time switch with a one-second pulse (e.g. 7LF4 444-0) can also be used if desired. Once a central on/off switching operation has been done, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and A1 is arbitrary. Remote control switches with central ON/OFF switching can also be used to quickly and easily set up a panic circuit/panic lighting using conventional installation methods.

Switching example: 5TT4 152-0 with central ON/OFF switching and group ON/OFF switching

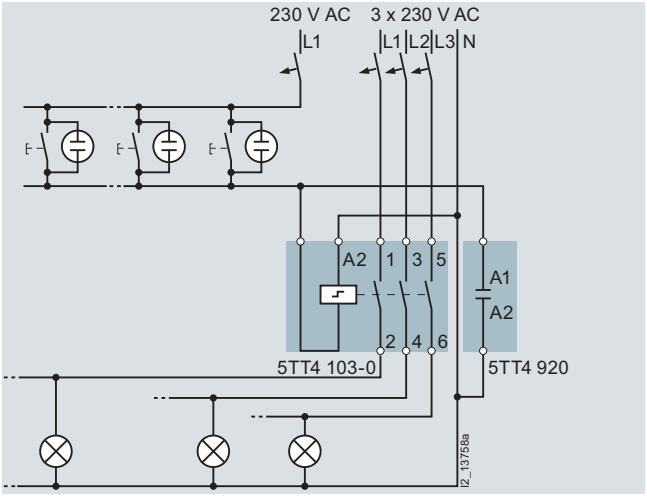


With the pushbuttons for ON/OFF switching, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work.
With the 2-pushbutton group "ON" and "OFF" function, all remote control switches assigned to a group can be switched on or off, e.g. corridor. A 7LF44 digital time switch with a switching command of 1 s can also be used for the "Central" or "Group" function.

Once a central on/off switching operation has been done, the remote control switches can also be switched on and off locally at any time. The phase relations of ZA, ZE and GA, GE and L may vary. If contact 1/2 is used as check-back contact for the central "ON" and "OFF" function, as shown above, terminal 1 of all remote control switches must be in phase.

5TT4 1 remote control switches

Switching example: glow lamp load and 5TT4 920 compensator



The use of multiple illuminated pushbuttons, in particular 230 V AC glow lamps, could cause the remote control switch to trip accidentally, or no longer drop out, due to the current used by the lamps. This may also occur in the case of high line capacities. Switching a 5TT4 920 compensator parallel to the coil, increases the glow lamp load of the remote control switch from 5 mA to 25 mA. The parallel switching of several compensators is also possible. The power consumption of 5TG7 3.. glow lamps, 230 V, for pushbuttons is as follows: low luminosity 0.18 mA – medium 0.9 mA – high 1.35 mA, the power consumption of 5SG7 35. LED lighting approx. 1.5 mA.

8

			Remote control switches			
			5TT4 101 5TT4 102 5TT4 105 5TT4 115	**5TT4 103 5TT4 104**	**5TT4 12 5TT4 15**	**5TT4 13 5TT4 14**
Switching of transformers for halogen lamps		W	1200			
Fluorescent and compact lamps In ballast operation (KVG)						
• Uncorrected	L18W	Unit(s)	35	30		
	L36W	Unit(s)	35	30		
	L58W	Unit(s)	25	20		
• Parallel-corrected	L18W/4.5 µF	Unit(s)	40	50		
	L36W/4.5 µF	Unit(s)	40	50		
	L58W/7 µF	Unit(s)	28	30		
• DUO switching, 2-lamp	L18W	Unit(s)	2 × 30	2 × 24		
	L36W	Unit(s)	2 × 30	2 × 24		
	L58W	Unit(s)	2 × 30	2 × 16		
Fluorescent and compact lamps With electronic primary switching device (ECG)						
• AC operation, 1-lamp	L18W	Unit(s)	36	30		
	L36W	Unit(s)	36	30		
	L58W	Unit(s)	24	20		
• AC operation, 2-lamp	L18W/4.5 µF	Unit(s)	2 × 22	2 × 18		
	L36W/4.5 µF	Unit(s)	2 × 22	2 × 18		
	L58W/7 µF	Unit(s)	2 × 15	2 × 12		

Overview

Switching relays are used in residential, non-residential and industrial buildings for the purpose of contact multiplication. They can be used with safe isolation between coil voltage and contact. Switching relays for direct voltages in particular find increasing use.

With the 5TE9 100 and 5TE9 101 busbar, the switching relays can be mounted quickly and safely, e.g. by bus-mounting the N-conductor and/or infeed – and this applies to the whole range of switching relays.

Benefits

- Fast and simple installation thanks to bus-mounting
- Switching position indicator when checking the plant for enhanced safety
- Manual intervention possible at any time – easy fault locating due to manual operation.

Technical specifications

			5TT4 201-.	5TT4 202-.	5TT4 204-.	5TT4 205-.	5TT4 206-.	5TT4 207-.	5TT4 217-.
Standards			EN 60947-5-1, EN 60669-2-2						
Contact type			1 NO	2 NO	4 NO	1 NO 1 NC	1 CO	2 CO	2 CO
Manual operation			Yes						
Rated control voltage U_c		V AC V DC	8 ... 230 --						-- 12 ... 110
Operating range		× U_c	0.8 ... 1.1						
Rated frequency f_c		Hz	50						
Rated impulse withstand voltage U_{imp}		kV	4						
Rated power dissipation P_v • Magnet coil • Per contact at 16 A		W/VA W	2.4/3.0 1.0	2.4/3.0	4.8/6.0	2.4/3.0	2.4/3.0	2.4/3.0	1.7
Minimum contact load		V AC; mA	10; 100						
Rated operational current I_e At p.f. = 0.6 ... 1		A	16						
Rated operational voltage U_e			250	400	400	400	250	400	400
Different phases Between magnet coil/contact			Permissible						
Contact gap		mm	> 1.2				< 1.2		
Safe isolation Between creepage distances and clearances magnet coil/contact		mm	> 6						
Electrical service life At I_e/U_e or specified lamp load		Operating cycles	50000						
Terminals	± screw (Pozidriv)		1						
Conductor cross-sections • Rigid • Flexible, with end sleeve		mm^2 mm^2	1.5 ... 6 1 ... 6						
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C	35						
Permissible ambient temperature		°C	-10 ... +40						
Degree of protection	Acc. to EN 60529		IP20, with connected conductors						
Mounting position			Any						

5TT4 2 switching relays

Selection and ordering data

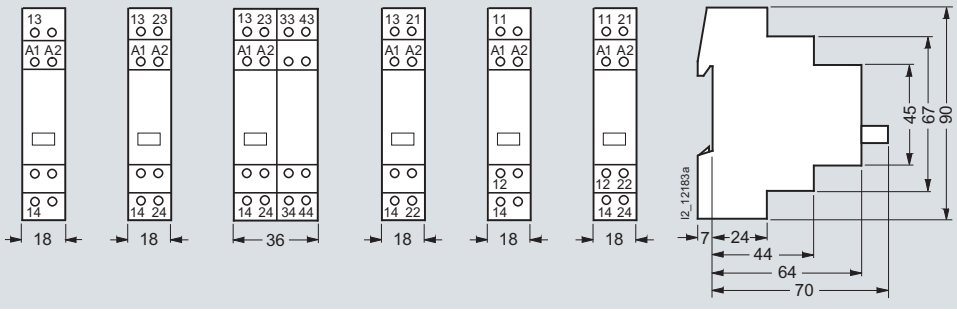
	Contacts	U_e	I_e	U_c	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC	V DC				1 unit		Unit(s)	Unit(s)	kg
	**Switching relays for AC voltage**												
	1 NO	250	16	230		1	►	**5TT4 201-0**		027	1	1/12	0.126
				115			B	**5TT4 201-1**		027	1	1	0.120
				24			►	**5TT4 201-2**		027	1	1	0.120
				12			►	**5TT4 201-3**		027	1	1	0.118
				8			►	**5TT4 201-4**		027	1	1	0.124
	2 NO	400	16	230		1	►	**5TT4 202-0**		027	1	1	0.137
				115			B	**5TT4 202-1**		027	1	1	0.131
				24			►	**5TT4 202-2**		027	1	1	0.131
				12			B	**5TT4 202-3**		027	1	1	0.129
				8			B	**5TT4 202-4**		027	1	1	0.135
	4 NO	400	16	230		2	►	**5TT4 204-0**		027	1	1	0.250
				115			B	**5TT4 204-1**		027	1	1	0.257
				24			►	**5TT4 204-2**		027	1	1	0.253
				12			B	**5TT4 204-3**		027	1	1	0.250
				8			B	**5TT4 204-4**		027	1	1	0.245
	1 NO + 1 NC	400	16	230		1	►	**5TT4 205-0**		027	1	1	0.137
				115			B	**5TT4 205-1**		027	1	1	0.131
				24			►	**5TT4 205-2**		027	1	1	0.131
				12			B	**5TT4 205-3**		027	1	1	0.129
				8			B	**5TT4 205-4**		027	1	1	0.135
	1 CO	250	16	230		1	►	**5TT4 206-0**		027	1	1	0.127
				115			B	**5TT4 206-1**		027	1	1	0.121
				24			►	**5TT4 206-2**		027	1	1	0.122
				12			B	**5TT4 206-3**		027	1	1	0.120
				8			B	**5TT4 206-4**		027	1	1	0.125
	2 CO	400	16	230		1	►	**5TT4 207-0**		027	1	1	0.140
				115			B	**5TT4 207-1**		027	1	1	0.134
				24			►	**5TT4 207-2**		027	1	1	0.135
				12			B	**5TT4 207-3**		027	1	1	0.133
				8			B	**5TT4 207-4**		027	1	1	0.138
	**Switching relays for direct voltage**												
	2 CO	400	16		110	1	►	**5TT4 217-1**		027	1	1	0.134
					30		►	**5TT4 217-6**		027	1	1	0.135
					24		►	**5TT4 217-2**		027	1	1	0.135
					12		►	**5TT4 217-3**		027	1	1	0.132
	**Spacers**												
	In the case of higher ambient temperatures, we recommend placing a spacer after every second switching relay for better heat dissipation.					0.5	►	**5TG8 240**		027	1	2	0.010

8

* You can order this quantity or a multiple thereof.

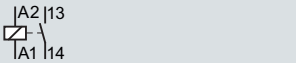
Dimensional drawings

5TT4 2 switching relays

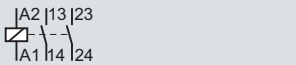


5TT4 201 | 5TT4 202 | 5TT4 204 | 5TT4 205 | 5TT4 206 | 5TT4 207 5TT4 217

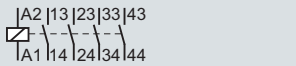
Schematics



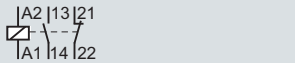
5TT4 201



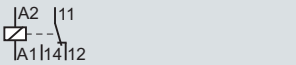
5TT4 202



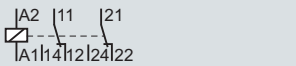
5TT4 204



5TT4 205



5TT4 206

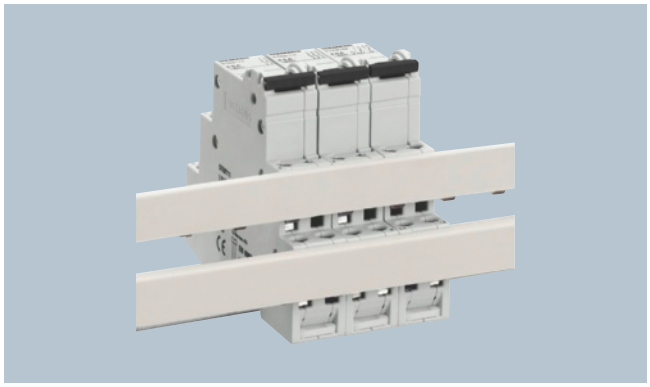


5TT4 207
5TT4 217

More information

			5TT4 2..-.
Incandescent lamp load		W	1200
Switching of transformers for halogen lamps		W	1200
Fluorescent and compact lamps In ballast operation (KVG)			
• Uncorrected	L18W	Unit(s)	27
	L36W	Unit(s)	24
	L58W	Unit(s)	15
Fluorescent and compact lamps With electronic primary switching device (ECG)			
• AC operation, 1-lamp	L18W	Unit(s)	43
	L36W	Unit(s)	24
	L58W	Unit(s)	15
Metal-vapor and high-pressure mercury-vapor lamps			
• Uncorrected	50 W	Unit(s)	12
	80 W	Unit(s)	9
	125 W	Unit(s)	6
	250 W	Unit(s)	3
	400 W	Unit(s)	2
	700 W	Unit(s)	1
	1000 W	Unit(s)	1
Halogen metal-vapor lamps			
• Uncorrected	70 W	Unit(s)	8
	150 W	Unit(s)	4
	250 W	Unit(s)	2
	400 W	Unit(s)	1
High-pressure sodium-vapor lamps			
• Uncorrected	50 W	Unit(s)	10
	70 W	Unit(s)	8
	110 W	Unit(s)	6
	150 W	Unit(s)	4
	250 W	Unit(s)	1

Busbar mounting



- All 5TT4 2 switching relays can be bus-mounted with each other. This saves time and space.

5TT5 7 Insta contactors, DC technology

Overview

Insta contactors are standard devices in installation technology and belong to the BETA switching device range. Insta contactors are particularly suitable for switching heating, lighting and motors. While Insta contactors have seen a considerable decline in use in the electrical heating sector in residential buildings, they are playing an increasingly significant role in building lighting circuits. Insta contactors are also increasingly used in industry for motors where distribution technology plays a major role, e.g. in auxiliary installations for heat pumps and air conditioning technology.

In addition to their basic function, they can also be used to switch single-phase and three-phase electrical motors on and off.
The 5TT5 7 Insta contactors meet the requirements of EN 60947 and are approved to UL 508.

Benefits

- DC magnetic system for silent operation.
  They are therefore especially suited for applications in residential buildings.
- Safe cable routing by cable entry funnel – saves time during installation.
- The insulation goes right through into the cable entry funnel - therefore maximum touch protection.

- Switching position indicator for fast recognition of operating state offers greater safety when checking the plant.

Technical specifications

			5TT5 73 4-pole	5TT5 74 4-pole	5TT5 75 4-pole
Standards **Approved acc. to**			EN 60947-4-1; EN 60947-5-1; EN 61095; UL 508 UL 508; UL File No. E303328		
Rated frequency at AC f_n		Hz	40 ... 450		
Rated control voltage U_c		V AC V DC	24, 115, 230 24, 110, 220	24, 230 24, 220	
Operating range		× U_c	0.85 ... 1.1		
Rated operational voltage U_e		V	440		
Rated operational current I_e		At V AC	Acc. to UL 480; acc. to IEC 440		
• AC-1/AC-7a, NO contacts		A	24	40	63
• AC-1/AC-7a, NC contacts		A	24	30	30
• AC-3/AC-7b, NO contacts		A	9	22	30
• AC-3/AC-7b, NC contacts		A	6	--	--
Rated power dissipation P_v					
• Pick-up power		VA/W	4/4	5/5	65/65
• Holding power		VA/W	4/4	5/5	4.2/4.2
• Per contact AC-1/AC-7a		VA	1.5	3	6
Switching times					
• Closing (NO contacts)		ms	≤ 40		
• Opening (NO contacts)		ms	≤ 40		
Rated impulse withstand voltage U_{imp}		kV	≥ 4		
Contact gap (NO contacts) min.		mm	2.4	2.8	2.6
Electrical service life					
At I_e and load	AC-1/AC-7a	For switching cycles	150000		
	AC-3/AC-7b	For switching cycles	500000	170000	240000
Mechanical service life		For switching cycles	1 million		
Maximum switching frequency					
At load	AC-1/AC-7a	Switching cycles/h	300		
	AC-3/AC-7b	Switching cycles/h	600		
Switching of resistive loads AC-1		V AC	230		
For rated operational power P_s (NO contacts)					
• Single-phase		kW	5.3	8.8	13.8
• Three-phase		kW	16	26	41
Switching of three-phase asynchronous motors AC-3		V AC	400		
For rated operational power P_s (NO contacts)					
• Single-phase		kW	--		
• Three-phase		kW	4	11	15
Minimum switching capacity		V; mA	≥ 17; ≥ 200		
Overload withstand capability					
Per conducting path (NO contacts only)	At 10 s	A	72	176	240
Short-circuit protection, according to coordination type 1					
Back-up fuse characteristic gL/gG		A	35	63	80
Terminals	± screw (Pozidriv)				
• Coil connection			1	1	1
• Main connection			1	2	2
Tightening torques					
• Coil connection		Nm	0.9	0.9	0.9
• Main connection		Nm	1.0	2.5	2.5
Conductor cross-sections					
• Coil connection					
- Solid		mm^2	1.5 ... 4		
- Stranded, with end sleeve		mm^2	1.5 ... 2.5		
- AWG cables		AWG	16 ... 10		
Tightening torques		lb. in	8		
• Main connection					
- Solid		mm^2	1.5 ... 10	2.5 ... 25	
- Stranded, with end sleeve		mm^2	1.5 ... 2.5	2.5 ... 16	
- AWG cables		AWG	16 ... 8	16 ... 4	
Tightening torques		lb. in	9	20	
Permissible ambient temperature					
• For operation		°C	-25 ... +55		
• For storage		°C	-50 ... +80		
Degree of protection	Acc. to EN 60529		IP20, with connected conductors		
Acc. to UL 508	I_n	A	24	40	63
UL 508 General Use 240 V/480 V	FLA	A	24	40	63
UL 508 AC discharge lamps		A	24	30	40
UL 508 motor load 240 V	Power	hp	3	7.5	10
UL 508 motor load 480 V	Power	hp	5	15	15
UL 508 short circuit at 480 V	K5 fuses	A	25	40	75
		kA	5		

5TT5 7 Insta contactors, DC technology

Selection and ordering data

	Contacts	U_e	I_e	U_c		MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC	V DC						Unit(s)	Unit(s)	kg
 5TT5 730-0	**Insta contactors** For AC or DC continuous operation, with switching position indication, with DC magnetic system												
	4 NO	440	24	230	220	2	A	**5TT5 730-0**		027	1	1	0.247
				115	110		B	**5TT5 730-1**		027	1	1	0.247
				24	24		A	**5TT5 730-2**		027	1	1	0.247
	3 NO, 1 NC	440	24	230	220	2	A	**5TT5 731-0**		027	1	1	0.247
				24	24		A	**5TT5 731-2**		027	1	1	0.247
	2 NO, 2 NC	440	24	230	220	2	A	**5TT5 732-0**		027	1	1	0.247
				24	24		A	**5TT5 732-2**		027	1	1	0.247
	4 NC	440	24	230	220	2	A	**5TT5 733-0**		027	1	1	0.247
				24	24		B	**5TT5 733-2**		027	1	1	0.247
 5TT5 740-0	4 NO	440	40	230	220	3	A	**5TT5 740-0**		027	1	1	0.410
				24	24		A	**5TT5 740-2**		027	1	1	0.410
	3 NO, 1 NC	440	40[1)]	230	220	3	A	**5TT5 741-0**		027	1	1	0.410
				24	24		B	**5TT5 741-2**		027	1	1	0.410
	2 NO, 2 NC	440	40[1)]	230	220	3	A	**5TT5 742-0**		027	1	1	0.410
				24	24		B	**5TT5 742-2**		027	1	1	0.410
	4 NO	440	63	230	220	3	A	**5TT5 750-0**		027	1	1	0.410
				24	24		A	**5TT5 750-2**		027	1	1	0.410
	3 NO, 1 NC	440	63[1)]	230	220	3	B	**5TT5 751-0**		027	1	1	0.410
				24	24		B	**5TT5 751-2**		027	1	1	0.410
	2 NO, 2 NC	440	63[1)]	230	220	3	B	**5TT5 752-0**		027	1	1	0.410
				24	24		B	**5TT5 752-2**		027	1	1	0.410
	**Auxiliary switches** For left-sided mounting on the 24 A, 40 A and 63 A Insta contactors, max. one auxiliary switch per Insta contactor, minimum contact load 24 V AC; 5 mA												
	2 NO	230 AC-15	4			0.5	►	**5TT5 900**		027	1	1	0.039
	1 NO, 1 NC	230 AC-15	4			0.5	►	**5TT5 901**		027	1	1	0.039
	**Spacers** For heat dissipation between the Insta contactors. We recommend placing a spacer after every second Insta contactor. Can be mounted reciprocally, so that two spacers enable greater cable penetration.					0.5	►	**5TG8 240**		027	1	2	0.010
	**Sealable terminal covers** For Insta contactors 24 A, (1 set = 2 units)					2	B	**5TT5 902**		027	1 set	1 set	0.010
	For Insta contactors 40 A and 63 A (1 set = 2 units)					3	B	**5TT5 903**		027	1 set	1 set	0.010

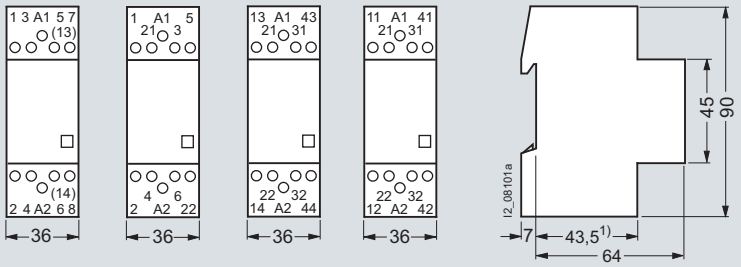
[1)] For NC contacts 30 A.

8

* You can order this quantity or a multiple thereof.

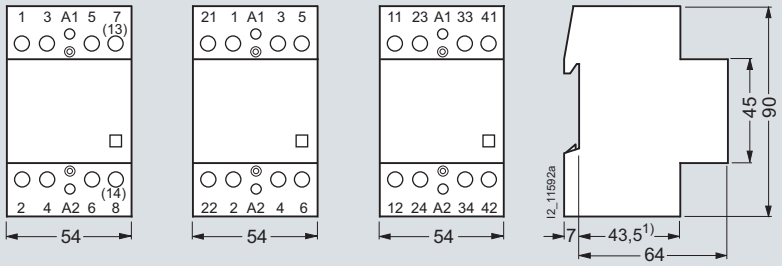
Dimensional drawings

5TT5 7 Insta contactors



¹⁾ Dimension without sealable terminal cover.

5TT5 730 5TT5 731 5TT5 732 5TT5 733

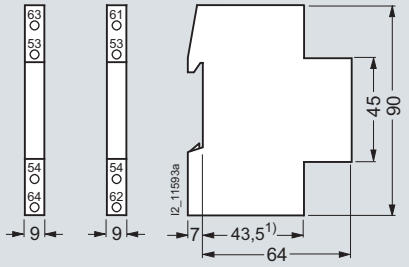


¹⁾ Dimension without sealable terminal cover.

5TT5 740
5TT5 750

5TT5 741
5TT5 751

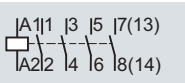
5TT5 742
5TT5 752



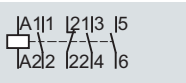
¹⁾ Dimension without sealable terminal cover.

5TT5 900
5TT5 901

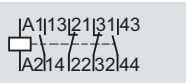
Schematics



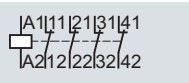
5TT5 730
5TT5 740
5TT5 750



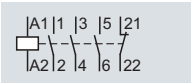
5TT5 731



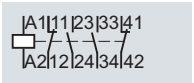
5TT5 732



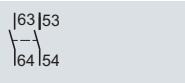
5TT5 733



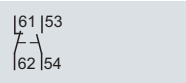
5TT5 741
5TT5 751



5TT5 742
5TT5 752



5TT5 900

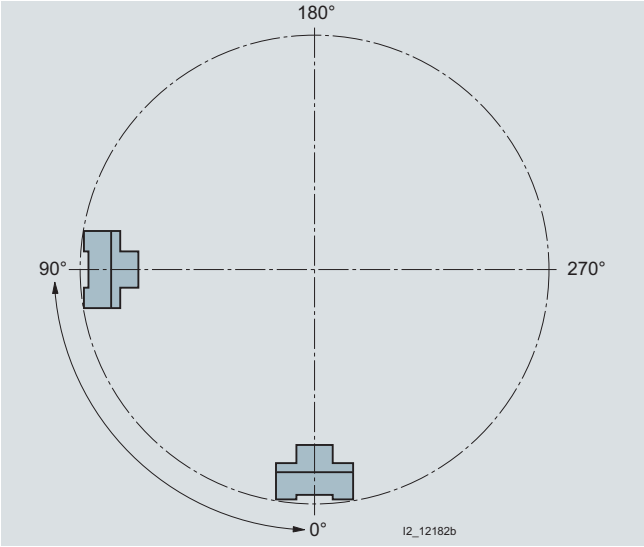


5TT5 901

More information

Mounting position, Insta contactors, DC technology 24 A, 40 A, 63 A

There are no restrictions for normal mounting position (see figure, 0° to 90°). For mounting positions between 100° and 260°, the level of control voltage must be at least 100 % of the rated value.

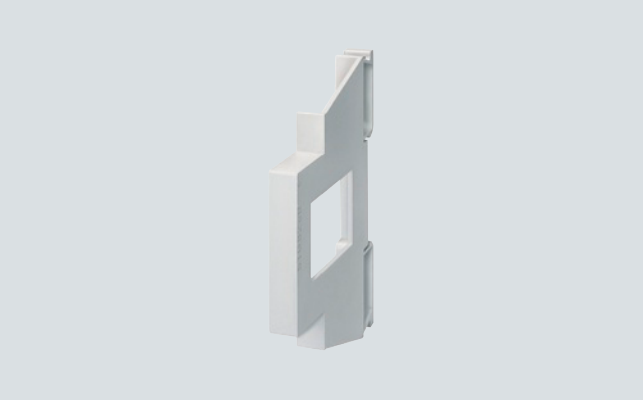


Heat dissipation

If more than one Insta contactor with DC magnetic system is installed, a 5TG8 240 spacer must be installed after every second contactor.

Spacers

Spacers can be used as a compensating element and have a width of ½ MW. They come with an integrated wiring duct for the insertion of conductors. Two reciprocally installed spacers thus offer space for large conductor cross-sections up to a 14 mm diameter.



Switching of direct voltages DC-1 and DC-3

Permissible DC switching currents for NO contacts with resistive load 4 contacts in series are not recommended for 24 V due to unreliable contacts				1 contact		2 contacts in series		3 contacts in series		4 contacts in series	
				DC-1	DC-3	DC-1	DC-3	DC-1	DC-3	DC-1	DC-3
5TT5 73, 4-pole, 24 A	I_e at U_e =	24 V DC	A	24	16	24	24	24	24	24	--
		48 V DC	A	21	8	24	18	24	24	--	--
		60 V DC	A	17	4	24	14	24	24	--	--
		110 V DC	A	7	1.6	16	6.5	24	16	8	--
		220 V DC	A	0.9	0.2	4.5	1	13	4	3.5	--
5TT5 74, 4-pole, 40 A	I_e at U_e =	24 V DC	A	40	19	40	40	40	40	24	--
		48 V DC	A	23	10	40	20	40	40	--	--
		60 V DC	A	16	5	32	16	40	34	--	--
		110 V DC	A	8	1.8	17	7	30	18	8	--
		220 V DC	A	1	0.3	5	1.1	15	4.5	3.5	--
5TT5 75, 4-pole, 63 A	I_e at U_e =	24 V DC	A	50	21	63	44	63	63	63	--
		48 V DC	A	26	11	43	22	63	47	--	--
		60 V DC	A	20	5.5	35	18	60	38	--	--
		110 V DC	A	9	2	19	8	33	21	--	--
		220 V DC	A	1.1	0.3	5.5	1.2	17	5	20	--

Switching of lamps

Incandescent lamp loads			
5TT5 73, 4-pole, 24 A	Per NO contact	W	1500
5TT5 74, 4-pole, 40 A	Per NO contact	W	3000
5TT5 75, 4-pole, 63 A	Per NO contact	W	5000

Maximum number of lamps in units, per NO contact at 230 V AC, 50 Hz.

Fluorescent and compact lamps in ballast operation (KVG) (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

				Uncorrected			**Parallel-corrected**			**DUO circuit** 2 lamps		
Lamp type			W	L18	L36	L58	L18	L36	L58	2 × L18	2 × L36	2 × L58
Capacitor capacitance			µF	--	--	--	4.5	4.5	7.0	--	--	--
5TT5 73, 4-pole	24 A	Per NO contact		26	20	12	8	8	5	26	20	12
5TT5 74, 4-pole	40 A	Per NO contact		85	65	40	16	16	10	85	65	40
5TT5 75, 4-pole	63 A	Per NO contact		135	105	65	67	67	43	140	105	65

Fluorescent and compact lamps with electronic primary switching device (ECG) (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			1 lamp			**2 lamps**		
Lamp type		W	1 × L18	1 × L36	1 × L58	2 × L18	2 × L36	2 × L58
5TT5 73, 4-pole	24 A	Per NO contact	24	16	14	18	11	8
5TT5 74, 4-pole	40 A	Per NO contact	55	34	32	34	20	17
5TT5 75, 4-pole	63 A	Per NO contact	76	47	46	48	29	24

High-pressure mercury-vapor lamps (HQL) (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

				Uncorrected							**Parallel-corrected**						
Lamp type			W	50	80	125	250	400	700	1 000	50	80	125	250	400	700	1 000
Capacitor capacitance			µF	--	--	--	--	--	--	--	7	8	10	18	25	45	60
5TT5 73, 4-pole	24 A	Per NO contact		14	10	7	4	2	1	1	5	4	3	2	1	0	0
5TT5 74, 4-pole	40 A	Per NO contact		36	27	19	10	7	4	3	10	8	6	3	3	1	1
5TT5 75, 4-pole	63 A	Per NO contact		50	38	26	14	10	6	4	43	37	26	15	10	5	4

Halogen metal-vapor lamps (HQI) (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

				Uncorrected						**Parallel-corrected**				
Lamp type			W	70	150	250	400	1 000	2 000	70	150	250	400	1 000
Capacitor capacitance			µF	--	--	--	--	--	--	12	20	33	35	95
5TT5 73, 4-pole	24 A	Per NO contact		5	3	2	1	0	0	3	1	1	0	0
5TT5 74, 4-pole	40 A	Per NO contact		14	8	5	4	1	1	5	3	2	2	0
5TT5 75, 4-pole	63 A	Per NO contact		20	11	7	6	2	1	18	9	5	4	1

High-pressure sodium-vapor lamps (NAV) (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

				Uncorrected				**Parallel-corrected**			
Lamp type			W	150	250	400	1 000	150	250	400	1 000
Capacitor capacitance			µF	--	--	--	--	20	33	48	106
5TT5 73, 4-pole	24 A	Per NO contact		4	3	1	0	1	1	0	0
5TT5 74, 4-pole	40 A	Per NO contact		15	9	6	3	3	2	1	0
5TT5 75, 4-pole	63 A	Per NO contact		20	15	8	4	15	9	6	2

5TT5 8 Insta contactors, AC technology

Overview

The 5TT5 8 Insta contactors are equipped with an AC magnetic system and are ideal for use under harsh conditions. The auxiliary switches can be mounted without tools. When used with terminal covers, the devices are also sealable.

Insta contactors without manual switch

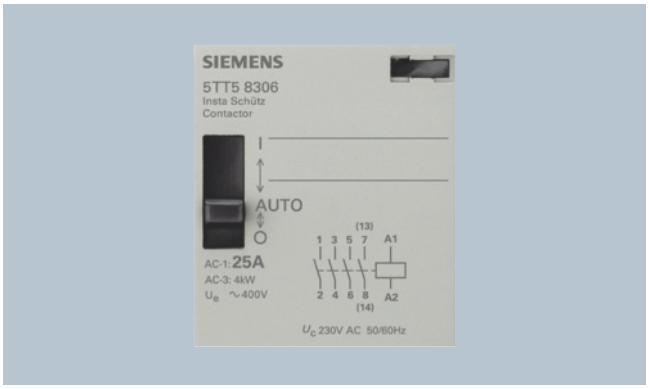
They are playing an increasingly significant role in lighting circuits in buildings. Insta contactors are increasingly used in industry for motors where distribution technology plays a major role, e.g. in installations for heat pumps and air conditioning technology. In addition to their basic function, they can also be used to switch single-phase and three-phase electrical motors on and off.

Insta contactors with manual switch

A key feature of Insta contactors with manual operation is the fact that users can switch consumers/loads on and off by hand.

Benefits

- Extremely long service life of 3 million switching cycles is a testimony to their reliability
- Switching position indicator for fast recognition of operating state offers greater safety when checking the plant.
- Safe insertion of conductor through cable entry funnel – saves time during installation
- Insulated right through to the cable entry funnel. This provides enhanced touch protection
- Auxiliary switches can be retrofitted on all versions – even on the type 20 A. More functionality when using the devices.



- Insta contactors with O/I/Automatic function enable the testing of a plant by manual switch without the need to apply a control voltage.

Technical specifications

			Insta contactors				Auxiliary switches
			5TT5 80.	5TT5 82., 5TT5 83.	5TT5 84.	5TT5 85.	5TT5 910
Standards			IEC 60947-4-1, IEC 60947-5-1, IEC 61095; EN 60947-4-1, EN 60947-5-1, EN 61095, VDE 0660				
Approved acc. to			VDE 0637				
Number of poles			2	4	4	4	2
Rated frequency at AC		Hz	50/60				
Rated control voltage U_c		V AC	24, 230	24, 115, 230	24, 230	24, 230	--
Operating range		× U_c	0.85 ... 1.1				--
Rated operational voltage U_e		V AC	230	400			230/400
Rated operational current I_e		A	20	25	40	63	6/4 (230/400 V)
Rated power dissipation P_v							
• Pick-up power (without manual switch or manual switch in "I" position)		VA/W	6/3.8	10/5	15.4/6		--
• Pick-up power (with manual switch in "AUTO" position)		VA/W	12/10	33/25	62/50		--
• Holding power		VA/W	2.8/1.2	5.5/1.6	7.7/3		--
• Per contact		VA	1.7	2.2	4	8	--
Switching times							
• Closing (NO contacts)		ms	15 ... 25	10 ... 20	15 ... 20		--
• Opening (NO contacts)		ms	20	20	10		--
• Closing (NC contacts)		ms	20 ... 30	20 ... 30	5 ... 10		--
• Opening (NC contacts)		ms	10	10	10 ... 15		--
Rated impulse withstand voltage U_{imp}		kV	4				
Rated insulation voltage U_i		V	440		500		
Contact gap, minimum		mm	3.6		3.4		4
Electrical service life							
At I_e and load							
• AC-1/AC-7a		For switching cycles	200000		100000		--
• AC-3/AC-7b			300000	500000	150000		--
Mechanical service life		For switching cycles	3 million				
Maximum switching frequency							
At load		In switching cycles/h	600				
Switching of resistive loads AC-1/AC-7a							
For rated operational power P_s							
• Single-phase 230 V		kW	4	5.4	8.7	13.3	--
• Three-phase 400 V		kW	--	16	26	40	--
Switching of three-phase asynchronous motors AC-3/AC-7b							
For rated operational power P_s							
• Single-phase 230 V		kW	1.3[1)]	1.3	3.7	5	--
• Three-phase 400 V		kW	--	4	11	15	--
Minimum switching capacity		V; mA	17; 50				12; 5
Overload withstand capability							
Per conducting path (NO contacts only)	At 10 s	A	72	68	176	240	--
Short-circuit protection, acc. to coordination type 1							
Back-up fuse characteristic gL/gG		A	20	25	63	80	6
Terminals	**± screw (Pozidriv)**						
• Coil connection			1		1.2		--
• Main connection			1		3.5		1
Tightening torques							
• Coil connection		Nm	0.6				--
• Main connection		Nm	1.2		2		0.8
Conductor cross-sections							
• Coil connection	Rigid	mm^2	1.0 ... 2.5				--
	Flexible, with end sleeve	mm^2	1.0 ... 2.5				--
• Main connection	Rigid	mm^2	1.0 ... 10		1 ... 25		1 ... 2.5
	Flexible, with end sleeve	mm^2	1.0 ... 6		1 ... 16		1 ... 2.5
Permissible ambient temperature							
• For operation		°C	-5 ... +55				
• For storage		°C	-30 ... +80				
Degree of protection	Acc. to EN 60529		IP20, with connected conductors				

[1)] For NO contacts only.

5TT5 8 Insta contactors, AC technology

Selection and ordering data

	Version	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC				1 unit		Unit(s)	Unit(s)	kg
 5TT5 800-0	**Insta contactors without manual switch** For alternating current continuous operation, with switching position indication, with AC magnetic system											
	2 NO	230	20	230	1	▶	**5TT5 800-0**		027	1	1	0.130
				24		▶	**5TT5 800-2**		027	1	1	0.130
	1 NO, 1 NC	230	20	230		▶	**5TT5 801-0**		027	1	1	0.130
				24		▶	**5TT5 801-2**		027	1	1	0.130
	2 NC	230	20	230		▶	**5TT5 802-0**		027	1	1	0.130
				24		▶	**5TT5 802-2**		027	1	1	0.130
 5TT5 830-0	4 NO	400	25	230	2	▶	**5TT5 830-0**		027	1	1	0.230
				115		B	**5TT5 830-1**		027	1	1	0.230
				24		▶	**5TT5 830-2**		027	1	1	0.230
	3 NO, 1 NC	400	25	230		▶	**5TT5 831-0**		027	1	1	0.230
				115		B	**5TT5 831-1**		027	1	1	0.230
				24		B	**5TT5 831-2**		027	1	1	0.230
	4 NO For high capacitive loads up to 150 µF	400	25	230	2	B	**5TT5 820-0**		027	1	1	0.230
	2 NO, 2 NC	400	25	230		▶	**5TT5 832-0**		027	1	1	0.230
				24		▶	**5TT5 832-2**		027	1	1	0.230
	4 NC	400	25	230		▶	**5TT5 833-0**		027	1	1	0.230
				24		B	**5TT5 833-2**		027	1	1	0.230
 5TT5 840-0	4 NO	400	40	230	3	▶	**5TT5 840-0**		027	1	1	0.380
				24		▶	**5TT5 840-2**		027	1	1	0.380
	3 NO, 1 NC	400	40	230		B	**5TT5 841-0**		027	1	1	0.380
				24		B	**5TT5 841-2**		027	1	1	0.380
	2 NO, 2 NC	400	40	230		B	**5TT5 842-0**		027	1	1	0.380
				24		B	**5TT5 842-2**		027	1	1	0.380
	4 NC	400	40	230		▶	**5TT5 843-0**		027	1	1	0.380
				24		B	**5TT5 843-2**		027	1	1	0.380
	4 NO	400	63	230	3	▶	**5TT5 850-0**		027	1	1	0.380
				24		▶	**5TT5 850-2**		027	1	1	0.380
	3 NO, 1 NC	400	63	230		▶	**5TT5 851-0**		027	1	1	0.380
				24		B	**5TT5 851-2**		027	1	1	0.380
	2 NO, 2 NC	400	63	230		B	**5TT5 852-0**		027	1	1	0.380
				24		B	**5TT5 852-2**		027	1	1	0.380
	4 NC	400	63	230		▶	**5TT5 853-0**		027	1	1	0.380
				24		B	**5TT5 853-2**		027	1	1	0.380
 5TT5 910-0	**Auxiliary switches** For mounting on right-hand side Max. one auxiliary switch per Insta contactor.											
	2 NO	230, AC-15	6	--	0.5	▶	**5TT5 910-0**		027	1	1	0.030
	1 NO, 1 NC	230, AC-15	6	--		▶	**5TT5 910-1**		027	1	1	0.030
	**Sealable terminal covers**											
	For Insta contactor 20 A				1	B	**5TT5 910-5**		027	1	2	0.002
	For Insta contactor 25 A				2	B	**5TT5 910-6**		027	1	2	0.003
	For Insta contactor 40 A and 63 A				3	B	**5TT5 910-7**		027	1	2	0.004

8

* You can order this quantity or a multiple thereof.

	Version	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC				1 unit		Unit(s)	Unit(s)	kg
 5TT5 800-6	**Insta contactors with manual switch 0/I/Automatic** For alternating current continuous operation, with switching position indication, with AC magnetic system											
	2 NO	230	20	230	1	►	**5TT5 800-6**		027	1	1	0.135
				24		►	**5TT5 800-8**		027	1	1	0.135
	1 NO, 1 NC	230	20	230		B	**5TT5 801-6**		027	1	1	0.135
				24		B	**5TT5 801-8**		027	1	1	0.135
 5TT5 830-6	4 NO	400	25	230	2	►	**5TT5 830-6**		027	1	1	0.235
				24		►	**5TT5 830-8**		027	1	1	0.235
	3 NO, 1 NC	400	25	230		►	**5TT5 831-6**		027	1	1	0.235
				24		B	**5TT5 831-8**		027	1	1	0.235
 5TT5 840-6	4 NO	400	40	230	3	►	**5TT5 840-6**		027	1	1	0.390
				24		B	**5TT5 840-8**		027	1	1	0.390
	3 NO, 1 NC	400	40	230		B	**5TT5 841-6**		027	1	1	0.390
				24		B	**5TT5 841-8**		027	1	1	0.390
	4 NO	400	63	230		►	**5TT5 850-6**		027	1	1	0.390
	**Auxiliary switches** For mounting on right-hand side Max. one auxiliary switch per Insta contactor.											
	2 NO	230, AC-15	6	--	0.5	►	**5TT5 910-0**		027	1	1	0.030
	1 NO, 1 NC	230, AC-15	6	--		►	**5TT5 910-1**		027	1	1	0.030
	**Sealable terminal covers**											
	For Insta contactor 20 A				1	B	**5TT5 910-5**		027	1	2	0.002
	For Insta contactor 25 A				2	B	**5TT5 910-6**		027	1	2	0.003
	For Insta contactor 40 A and 63 A				3	B	**5TT5 910-7**		027	1	2	0.004

8

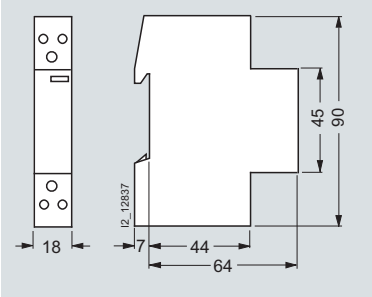
*** You can order this quantity or a multiple thereof.**

5TT5 8 Insta contactors, AC technology

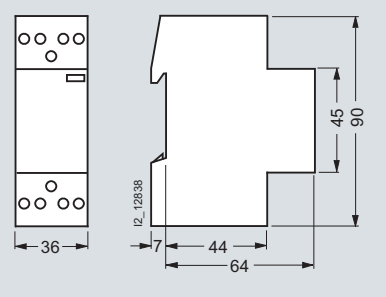
Dimensional drawings

Insta contactors, AC technology

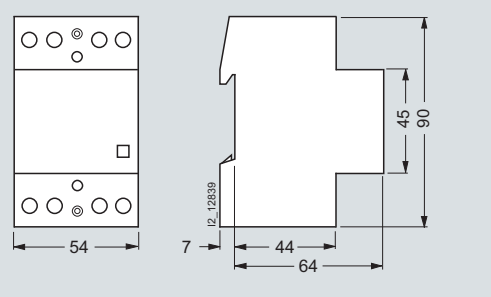
Without manual switch



5TT5 80.-0
5TT5 80.-2

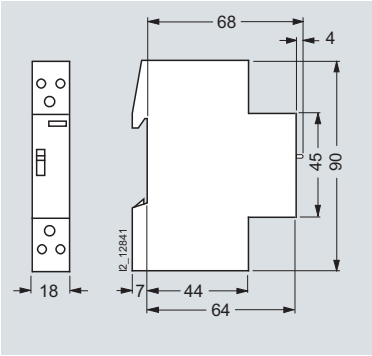


5TT5 820-0
5TT5 83.-0
5TT5 83.-2

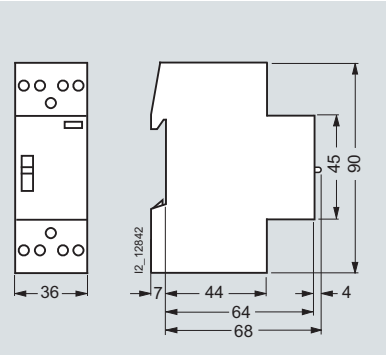


5TT5 84.-0
5TT5 84.-2
5TT5 85.-0
5TT5 85.-2

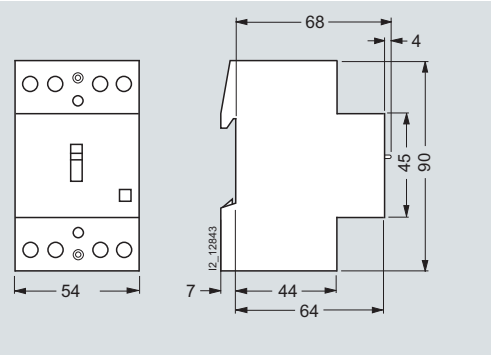
With manual switch



5TT5 80.-6
5TT5 80.-8

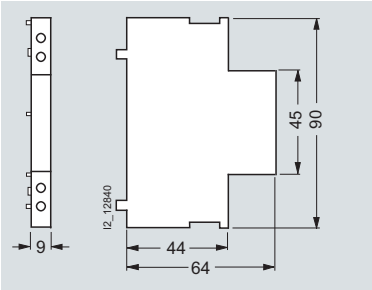


5TT5 83.-6
5TT5 83.-8



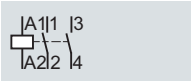
5TT5 84.-6
5TT5 84.-8
5TT5 85.-6

Auxiliary switches

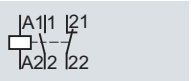


5TT5 910-0
5TT5 910-1

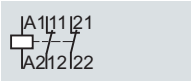
Schematics



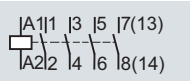
5TT5 800



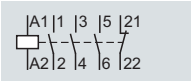
5TT5 801



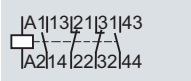
5TT5 802



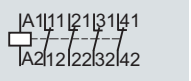
5TT5 820
5TT5 830
5TT5 840
5TT5 850



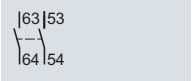
5TT5 831
5TT5 841
5TT5 851



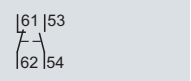
5TT5 832
5TT5 842
5TT5 852



5TT5 833
5TT5 843
5TT5 853



5TT5 910-0

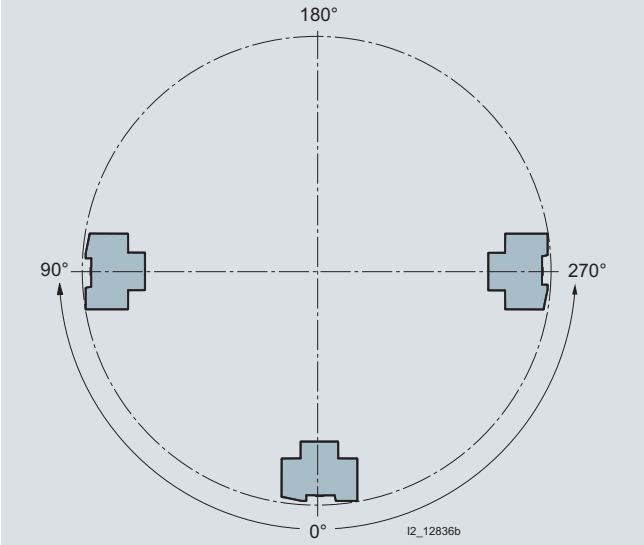


5TT5 910-1

More information

Mounting position, Insta contactors, AC technology

The installation of the devices is permissible in the positions shown in the following diagram (0° to 90°, 270° to 0°). There are no restrictions when the devices are installed in these normal mounting positions.



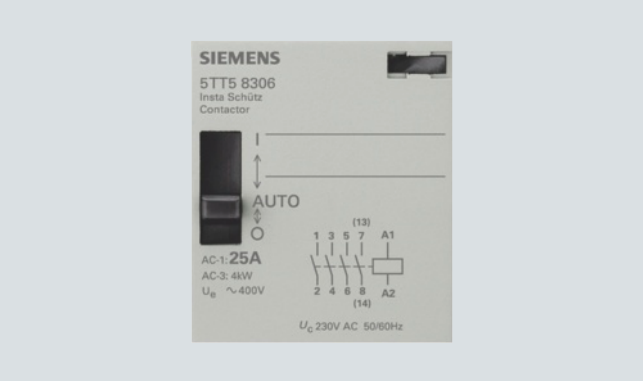
Heat dissipation

If several Insta contactors with AC magnetic system are mounted in series in a distribution board, there are no restrictions for the types 25 A, 40 A and 63 A within the permissible ambient temperature range up to 55 °C. For 20 A types within the temperature range up to 40 °C, a 5TG8 240 spacer must be installed after every third Insta contactor, and in the temperature range over 40 °C to 55 °C, after every second contactor.

Manual switching with O/I/Automatic function

The versions 5TT5 8. . .-6 and 5TT5 8. . .-8 are also fitted with a manual switch. The knob allows preselection of 3 positions:

- Knob in the "AUTO" position
  Automatic mode → normal protective function
- Knob in the "I" position
  Continuous operation → switched on manually
  (without control signal, when a control signal is applied, the manual switch on reset, i.e. the knob is automatically reset to the "AUTO" position).
- Knob in the "O" position
  Off → switched off
  (coil circuit interrupted)



Plant test without applying a control voltage

Insta contactors with O/I/Automatic function enable the testing of a plant by manual switch without the need to apply a control voltage.

Automatic by control signal

When applying a control signal to the terminals A1 and A2, the Insta contactors can be reset from continuous operation mode ("I" position) to automatic mode ("AUTO" position).

5TT5 8 Insta contactors, AC technology

Switching of AC voltages DC-1

Permissible DC switching currents for NO contacts with resistive load					1 contact	2 contacts in series	3 contacts in series	4 contacts in series
5TT5 80	2-pole, 20 A	I_e for	U_e = 24 V DC	A	20	20	--	--
			U_e = 110 V DC	A	6	10	--	--
			U_e = 220 V DC	A	0.6	6	--	--
5TT5 82, 5TT5 83	4-pole, 25 A	I_e for	U_e = 24 V DC	A	25	25	25	25
			U_e = 110 V DC	A	6	10	20	20
			U_e = 220 V DC	A	0.6	6	15	15
5TT5 84	4-pole, 40 A	I_e for	U_e = 24 V DC	A	40	40	40	40
			U_e = 110 V DC	A	4	10	30	40
			U_e = 220 V DC	A	1.2	8	20	40
5TT5 85	4-pole, 63 A	I_e for	U_e = 24 V DC	A	63	63	63	63
			U_e = 110 V DC	A	4	10	35	63
			U_e = 220 V DC	A	1.2	8	30	63

Switching of lamps

Incandescent lamp loads, lamp type			1000 W	500 W	200 W	100 W	60 W
5TT5 80, 2-pole	20 A	Per NO/NC contact	1	3	10	20	33
5TT5 82, 4-pole	25 A	Per NO/NC contact	2	4	10	20	33
5TT5 83, 4-pole	25 A	Per NO/NC contact	1	3	10	20	33
5TT5 84, 4-pole	40 A	Per NO/NC contact	4	8	20	40	65
5TT5 85, 4-pole	63 A	Per NO/NC contact	5	10	25	50	85

Maximum number of lamps in units, per NO/NC contact at 230 V AC, 50 Hz.

Fluorescent and compact lamps in ballast operation (KVG) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				Uncorrected			Parallel-corrected			DUO switching, 2-lamp		
Lamp type			W	L18	L36	L58	L18	L36	L58	2 × L18	2 × L36	2 × L58
Capacitor capacitance			µF	--	--	--	4.5	4.5	7.0	--	--	--
5TT5 80, 2-pole	20 A	Per NO/NC contact		22	17	14	7	7	4	30	17	10
5TT5 82, 4-pole	25 A	Per NO/NC contact		41	41	28	33	33	21	54	36	19
5TT5 83, 4-pole	25 A	Per NO/NC contact		24	20	17	8	8	5	40	24	14
5TT5 84, 4-pole	40 A	Per NO/NC contact		90	65	45	48	48	31	100	65	40
5TT5 85, 4-pole	63 A	Per NO/NC contact		140	95	70	73	73	47	150	95	60

Fluorescent and compact lamps with electronic primary switching device (ECG) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				1 lamp			2 lamps		
Lamp type			W	1 × L18	1 × L36	1 × L58	2 × L18	2 × L36	2 × L58
5TT5 80, 2-pole	20 A	Per NO/NC contact		25	15	14	12	7	7
5TT5 82, 4-pole	25 A	Per NO/NC contact		35	20	19	17	10	9
5TT5 83, 4-pole	25 A	Per NO/NC contact		35	20	19	17	10	9
5TT5 84, 4-pole	40 A	Per NO/NC contact		100	52	50	50	26	25
5TT5 85, 4-pole	63 A	Per NO/NC contact		140	75	72	70	38	36

High-pressure mercury-vapor lamps (HQL) (permissible number of lamps in units per NO contact/NC contact at 230 V AC, 50 Hz)

				Uncorrected							Parallel-corrected						
Lamp type			W	50	80	125	250	400	700	1000	50	80	125	250	400	700	1000
Capacitor capacitance			µF	--	--	--	--	--	--	--	7	8	10	18	25	45	60
5TT5 80, 2-pole	20 A	Per NO/NC contact		14	10	7	4	2	1	1	4	4	3	1	1	0	0
5TT5 82, 4-pole	25 A	Per NO/NC contact		18	13	9	5	3	2	1	21	18	15	8	6	3	2
5TT5 83, 4-pole	25 A	Per NO/NC contact		18	13	9	5	3	2	1	5	5	4	2	1	0	0
5TT5 84, 4-pole	40 A	Per NO/NC contact		38	29	20	10	7	4	3	31	27	22	12	9	5	4
5TT5 85, 4-pole	63 A	Per NO/NC contact		55	42	29	15	10	6	4	47	41	33	18	13	7	5

Halogen metal-vapor lamps (HQI) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				Uncorrected						Parallel-corrected						With electronic ballast PCI			
Lamp type			W	70	150	250	400	1000	2000	70	150	250	400	1000	2000	20	35	70	150
Capacitor capacitance			µF	--	--	--	--	--	--	12	20	33	35	95	148	--	--	--	--
5TT5 80, 2-pole	20 A	Per NO/NC contact		10	5	3	3	1	0	2	1	0	0	0	0	9	6	5	4
5TT5 82, 4-pole	25 A	Per NO/NC contact		12	7	4	3	1	0	12	7	4	4	1	1	9	6	5	4
5TT5 83, 4-pole	25 A	Per NO/NC contact		12	7	4	3	1	0	3	1	1	0	0	0	9	6	5	4
5TT5 84, 4-pole	40 A	Per NO/NC contact		23	12	7	6	2	1	18	11	6	6	2	1	18	11	10	8
5TT5 85, 4-pole	63 A	Per NO/NC contact		32	18	10	9	3	1	25	15	9	8	3	2	20	13	12	10

High-pressure sodium-vapor lamps (NAV) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				Uncorrected				Parallel-corrected				With electronic ballast PCI			
Lamp type			W	150	250	400	1000	150	250	400	1000	20	35	70	150
Capacitor capacitance			µF	--	--	--	--	20	33	48	106	--	--	--	--
5TT5 80, 2-pole	20 A	Per NO/NC contact		5	3	2	0	1	0	0	0	9	6	5	4
5TT5 82, 4-pole	25 A	Per NO/NC contact		6	4	2	1	7	4	3	1	9	6	5	4
5TT5 83, 4-pole	25 A	Per NO/NC contact		6	4	2	1	1	1	0	0	9	6	5	4
5TT5 84, 4-pole	40 A	Per NO/NC contact		17	10	6	3	11	6	4	2	18	11	10	8
5TT5 85, 4-pole	63 A	Per NO/NC contact		22	13	8	3	16	10	6	3	20	13	12	12

High-pressure sodium-vapor lamps (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				Uncorrected						Parallel-corrected					
Lamp type			W	18	35	55	90	135	180	18	35	55	90	135	180
Capacitor capacitance			µF	--	--	--	--	--	--	5	20	20	26	45	40
5TT5 80, 2-pole	20 A	Per NO/NC contact		22	7	7	4	3	3	6	1	1	1	--	--
5TT5 82, 4-pole	25 A	Per NO/NC contact		27	9	9	5	4	4	30	7	7	5	3	3
5TT5 83, 4-pole	25 A	Per NO/NC contact		27	9	9	5	4	4	7	1	1	1	--	--
5TT5 84, 4-pole	40 A	Per NO/NC contact		71	23	23	14	10	10	44	11	11	8	4	5
5TT5 85, 4-pole	63 A	Per NO/NC contact		90	30	30	19	13	13	66	16	16	12	7	8

Fluorescent Lumilux lamps T5 type FC, with electronic ballast (ECG) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				1 lamp			2 lamps		
Lamp type			W	22	40	55	2 × 22	2 × 40	2 × 55
5TT5 80, 2-pole	20 A	Per NO/NC contact		22	12	8	11	6	4
5TT5 82, 4-pole	25 A	Per NO/NC contact		30	15	12	15	7	6
5TT5 83, 4-pole	25 A	Per NO/NC contact		30	15	12	15	7	6
5TT5 84, 4-pole	40 A	Per NO/NC contact		80	40	30	40	20	15
5TT5 85, 4-pole	63 A	Per NO/NC contact		110	60	45	55	30	22

Fluorescent Lumilux lamps T5 type HE, with electronic ballast (ECG) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				1 lamp				2 lamps			
Lamp type			W	14	21	28	35	2 × 14	2 × 21	2 × 28	2 × 35
5TT5 80, 2-pole	20 A	Per NO/NC contact		30	22	18	14	15	11	9	7
5TT5 82, 4-pole	25 A	Per NO/NC contact		40	30	22	18	20	15	11	9
5TT5 83, 4-pole	25 A	Per NO/NC contact		40	30	22	18	20	15	11	9
5TT5 84, 4-pole	40 A	Per NO/NC contact		105	80	60	48	52	40	30	24
5TT5 85, 4-pole	63 A	Per NO/NC contact		150	115	90	70	75	57	45	35

Fluorescent Lumilux lamps T5 type HO, with electronic ballast (ECG) (permissible number of lamps in units per NO/NC contact at 230 V AC, 50 Hz)

				1 lamp					2 lamps				
Lamp type			W	24	39	49	54	80	2 × 24	2 × 39	2 × 49	2 × 54	2 × 80
5TT5 80, 2-pole	20 A	Per NO/NC contact		20	12	10	9	6	10	6	5	4	3
5TT5 82, 4-pole	25 A	Per NO/NC contact		26	16	14	13	8	13	8	7	6	4
5TT5 83, 4-pole	25 A	Per NO/NC contact		26	16	14	13	8	13	8	7	6	4
5TT5 84, 4-pole	40 A	Per NO/NC contact		70	42	35	32	22	35	21	17	16	11
5TT5 85, 4-pole	63 A	Per NO/NC contact		100	62	52	47	32	50	31	26	23	16

5TT3 4 soft-starting devices

Overview

The soft-starting device is an electronic control for the soft startup of single-phase asynchronous machines. A phase control causes the current to rise steadily. This also increases the motor torque and the drive starts up smoothly. Because drive elements are handled more gently they can be designed more cost-efficient. As well as a considerable reduction in startup noise, this also helps prevent the tipping or sliding of materials to be transported. The starting current is minimized. There is no speed adjustment. There is no marked soft start behavior without a mechanically connected load.
If the power semiconductor is to be protected against short circuits or ground faults during startup, a super-quick fuse must be installed. Otherwise, the usual line and motor protective measures must be used. In the case of high switching frequencies, we recommend installing a thermistor motor protection for monitoring the permissible motor temperature.

The soft-starting device must not be operated with capacitive load. In order to ensure the safety of persons and systems, only qualified personnel should work on these devices.
To prevent losses in the device, the power electronics are bridged with relay contacts after startup. Can be retrofitted in existing plants at any time.

Benefits

- On completion of startup, the power semiconductors are bridged, which prevents overheating in the case of frequent starting and inhibits premature wear and tear
- Separate setting of ramp up time and starting torque enables optimum adaptation to the mechanics
- The LEDs for startup and continuous operation provide constant information on the operating state.

Technical specifications

			5TT3 440	5TT3 441
Standards			EN 60947-4-2 (VDE 0660-117)	
Supply/motor voltage		V AC	400	230
Operating range		× U_c	0.8 ... 1.1	
Rated power		VA	3.5	1.4
Rated frequency		Hz	50/60	
Rated power dissipation P_v	Coil/drive Contact[1] per pole		3.5 4.6	1.7 0.7
Rated output of motor				
- Max.	At 400 V	VA	5500	1500
- Min.	At 400 V	VA	300	100
Startup voltage		%	30 ... 70	20 ... 70
Starting ramp		s	0.1 ... 10	
Recovery time		ms	100	200
Switching frequency				
3 × I_N, T_{AN} = 10 s, ν_u = 20 %		Switching cycles/h	36 (up to 3 kW)	10
3 × I_N, T_{AN} = 10 s, ν_u = 20 %		Switching cycles/h	20 (from 3 ... 5.5 kW)	10
Semiconductor fuse	Super quick	A	35	20
Conductor cross-sections	Rigid Flexible, with end sleeve	max. mm² min. mm²	2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	-20 ... +55
Resistance to climate	Acc.to EN 60068-1		20/60/4	20/55/4

[1] For rated operational current.

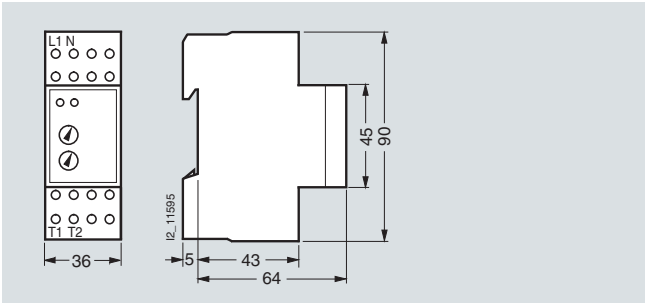
Selection and ordering data

	Version	U_e	P_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	W				1 unit		Unit(s)	Unit(s)	kg
	**Soft-starting devices**										
	Single-phase	230	100 ... 1500	2	B	**5TT3 441**		027	1	1	0.135
	**Soft-starting devices, mounting depth 55 mm**										
	Three-phase, two-phase motor actuation	400	300 ... 5500	6	B	**5TT3 440**		027	1	1	0.430

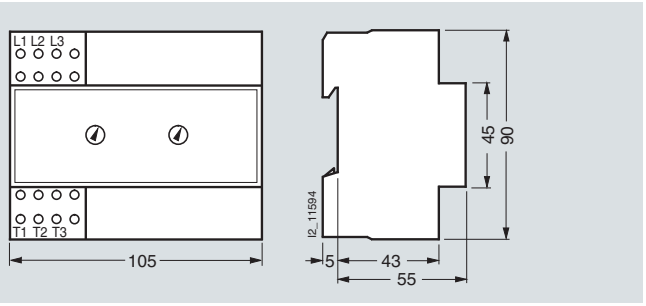
* You can order this quantity or a multiple thereof.

Dimensional drawings

5TT3 44. soft-starting devices



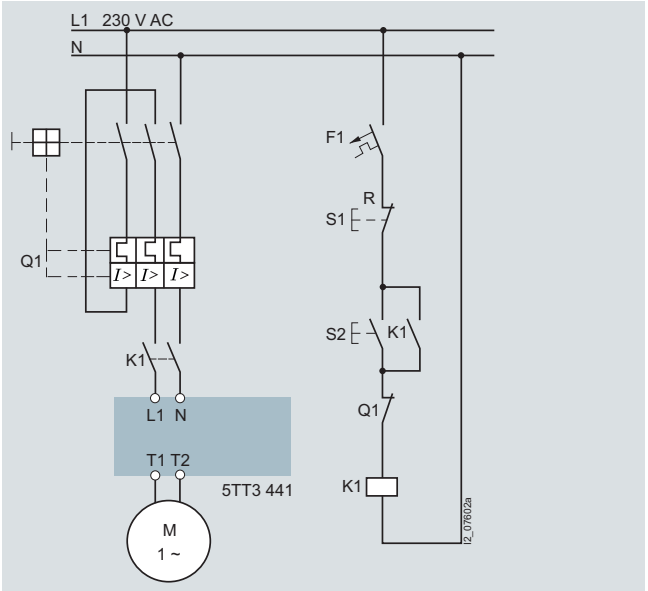
5TT3 441

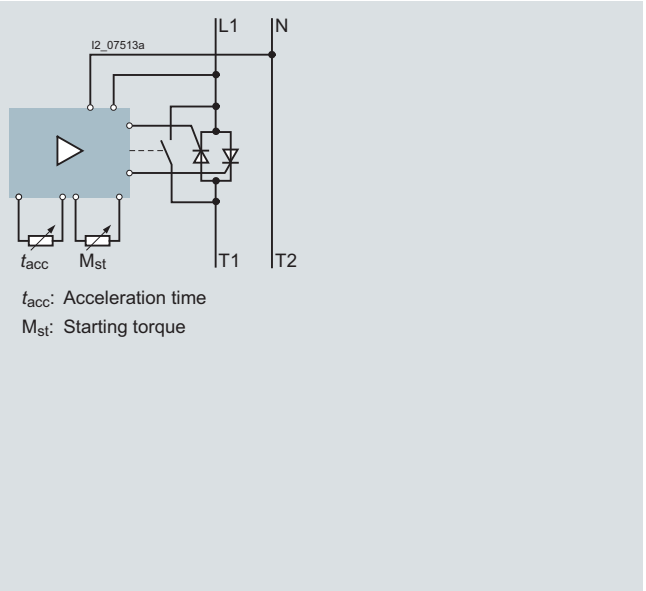


5TT3 440

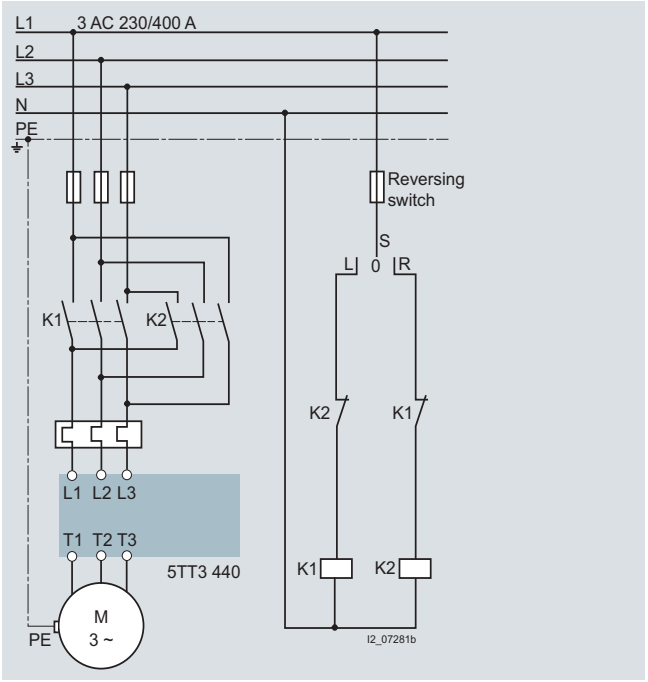
Schematics

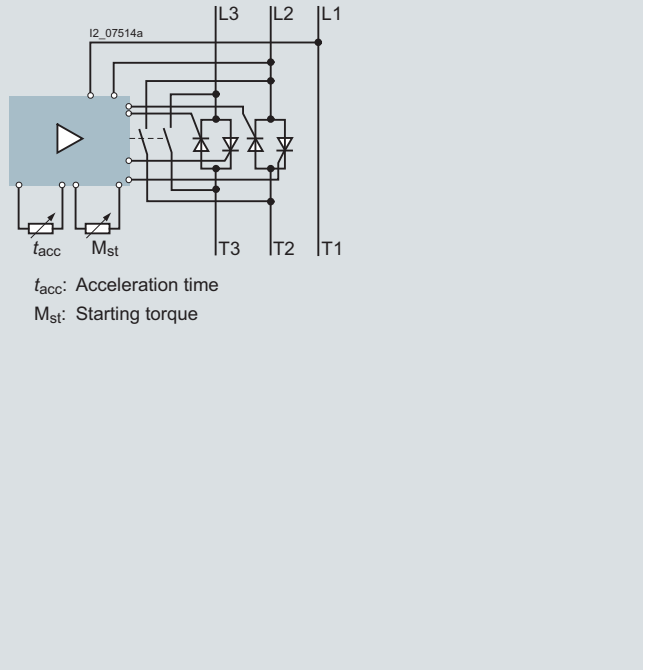
Switching example 5TT3 441





Switching example 5TT3 440





8

Overview

Connecting loads

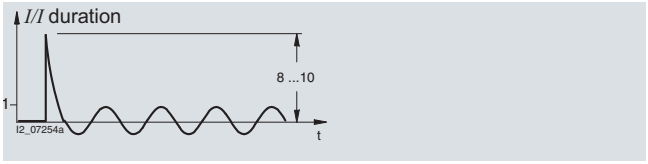
The increased starting currents of different loads and thus the risk of contacts welding is often underestimated.

Resistive load:

The resistive load, e.g. electrical heating, does not increase the starting current.

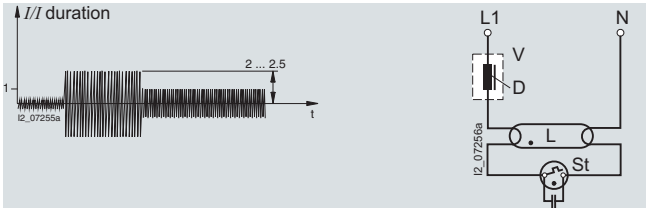
Incandescent lamps:

The cold coiled filament in incandescent lamps or halogen lamps causes a 6 to 10-fold starting current for approx. 10 ms.



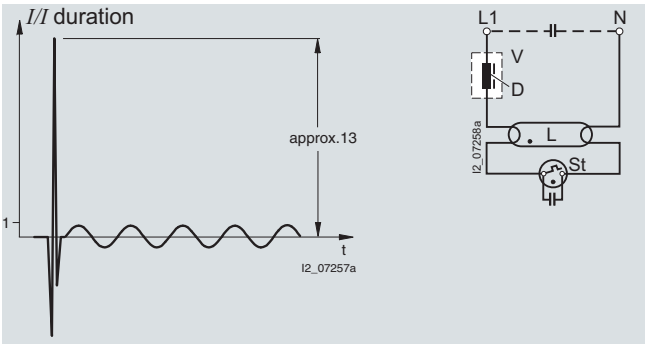
Uncorrected fluorescent lamps:

When switched on over several periods, the heating current of the coiled filament and the operational current produce a 2 to 2.5-fold inductive current.



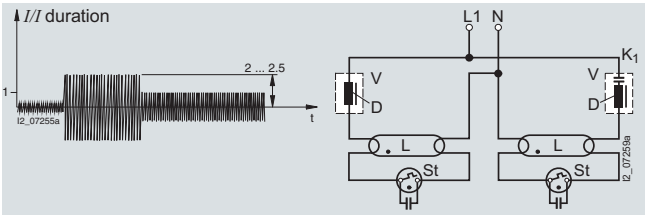
Parallel-corrected fluorescent lamps:

When switched on, the capacitor causes an extreme, up to 13-fold, current for approx. 10 ms.



Fluorescent lamps in Duo circuit:

The series capacitor effects a correction. In spite of this, an increased starting current is produced over several periods, just as for uncorrected fluorescent lamps.



Selecting contacts for lighting installations

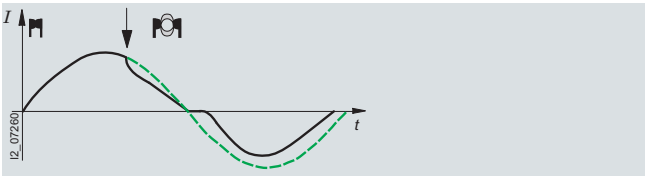
A wide range of different contacts are used for modular installation devices:

- Contacts with > 3 mm contact gap, as for Insta contactors, AC technology
- Switching relay contacts with m contacts (contact gap > 1.2 mm but < 3 mm)
- Manually operated contacts with > 3 mm contact gap, as for 5TE8 switches
- Relay contacts with μ contacts (contact gap > 0.5 mm), like those used on the printed boards of electronic devices.

The selection tables in the technical specifications help you to find the correct switching device for the different lighting installations.

Disconnecting loads

If a contact with current flowing through it opens, this always ignites an electric arc from around 24 to 30 V. This electric arc depends on the voltage, the length of the isolating distance, contact speed, actuating angle and current intensity. The principle of the so-called zero cutoff is that after no more than 1½ half-waves, the electric arc is quenched in the current zero. There are no further quenching aids or current limiters, as is the case with the miniature circuit breakers.



Disconnecting direct currents

When switching direct voltages, there is no zero-crossing of the current to quench the electric arc. In order to still be able to switch appreciable currents, contacts are connected in series to increase the isolating distance.
Some switching devices are provided with planning data for switching direct currents. Compliance with these planning data is essential. If the data values are exceeded the electric arc is not reliably quenched and there is a risk of fire.

Safe isolation

When operating 230 V and safety extra-low voltage SELV – voltage of bell transformers or transformers for permanent load – on a device, it is essential to ensure "safe isolation". This requires at least 8 mm creepage distances and clearances and a voltage endurance greater than 4 kV. If these conditions – 8 mm or 4 kV – are not fulfilled, the term "electrical isolation" as "not SELV" is used instead of the term "safe isolation".

BETA Switching Timers

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**7LF4 digital time switches**	9/3	Minute-precise switching of devices and system components in day, week and year programs. Unique due to the wide variety of functions offered by the Mini and Top versions; for PC programming Astro, Profi and Expert	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7 UL 60730	✓	✓	✓
	**7LF5 mechanical time switches**	9/11	Accurate and 15-minute switching accuracy. With automatic time setting during commissioning and automatic switching to daylight savings.	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7 UL 60730	✓	✓	✓
	**7LF6, 5TT1 3 timers for buildings**	9/16	Lighting controls with stairwell lighting timers ensure the safe use of stairwells and save energy. Expanded applications for common rooms and garages, as well as the time switching of ventilators and fluorescent lamps.	IEC 60699 EN 60669, DIN 18015	✓	✓	
	**5TT3 18 timers for industrial applications**	9/21	Multifunctional, delay, wiper, flashing and OFF-delay timers in control circuits expand the use of distribution boards in both small and large plants.	IEC 60255 EN 60255			✓

Overview

These days, time switching is taken for granted.

In fact, it is now hard to imagine many process sequences and energy saving processes without time switching. It could also be argued that time switching satisfies a basic need.

The new generation of digital time switches have a much more diverse range of functions than earlier devices and, thanks to better solutions, are simpler to operate.

They can be used for switching systems or system components, or for a whole range of functions, such as: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy controls, school bells, church bells, shop window lighting, advertising lighting, gym lighting, traffic signal controls, street lighting, illuminated signs, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, ovens, heating systems, air-conditioning systems, fans and ventilation systems, heating and circulation pumps and sauna systems.

All devices have the VDE mark and are approved to UL.

Benefits

- The menu-assisted operation with background lighting, contrast setting of the display and illuminated keys offer a clear overview for any application
- The text-assisted programming of the time switches with their logical 4 pushbutton system and extremely intuitive menu-driven handling saves time
- Simple programming on the PC enables the fast creation of complicated switching programs, thus saving time and eliminating errors
- Data keys enable the transfer of programs to the switch key, thus saving huge amounts of time during commissioning and maintenance
- Intuitive operation of 5-way joystick.

7LF4 digital time switches

Technical specifications

			Mini 7LF4 401-5	Top 7LF4 411 7LF4 412	Profi 7LF4 421 7LF4 422	Astro 7LF4 431 7LF4 432	Expert 7LF4 444
Standards			EN 60730-1, -2-7; VDE 0631-1, -2-7; UL 60730				
Approved acc. to			VDE, UL 60730-1,-2-7/UL 917 CSA C22.2 No. 14 and 177				
Supply							
• Rated control supply voltage U_c		V AC V AC/DC	110 ... 240 --	120, 230 --	120, 230 24	230 --	120/230 24
- Operating range		$\times U_c$	0.85 ... 1.1	0.85 ... 1.1	0.85 ... 1.1[1]	0.85 ... 1.1	80 .. 253 V[1]
- Frequency ranges		Hz	50 ... 60	50 ... 60	50 ... 60[2]	50 ... 60	50 ... 60[2]
• Rated power dissipation P_v		VA	0.035	2	2	2	2.5/4[3]
Channels/contacts							
• Switching channels			1	1 or 2			4
- Rated operational voltage U_e		V AC	250				
- Rated operational current I_e	At p.f. = 1	A	16				
	At p.f. = 0.6	A	10				
• Contacts			1 CO	1 or 2 CO			4 CO
- Mechanical switching cycles (in millions)			> 5	10			
- Electrical switching cycles	At p.f. = 1		6000 (20 A)	100 000			
• Minimum contact load		V; mA	12; 100				
- Incandescent lamp load		A	5	8			
- Fluorescent lamp load	At 7 µF	VA	58	60			
	Uncorrected	VA	1400				
Safety							
• Different phases permissible between drive/contact			Yes				
• Rated impulse withstand voltage U_{imp}		kV	4				
- EMC: burst	Acc. to IEC 61000-4-4	kV	> 4.4				
- EMC: surge	Acc. to IEC 61000-4-5	kV	> 2.0				
- Electrostatic discharge	Acc. to IEC 61000-4-2	kV	> 8.0				
• Power reserve storage	Mains/battery	a	6/2	6		5	
- Battery type			Li primary cell				
• Program memory	Non-volatile		--	Yes			
• Overvoltage category	Acc. to EN 61010-1		III				
Function							
• Minimum switching sequences			1 min				1 s
• Make and break cycles			1 min				1 s
• Clock errors per day	Typical	s/day	+0.3 ± 1[4]	± 0.86	± 0.2		
• Control input	Terminal S		--			Yes	
• Memory spaces							
- Programs[5]			28	56 (2 × 28)		28 (2 × 14)	4 × 3 × 28
- Pulse (alternatively)			--		84	--	
- Pulse cycle			--		1 s ... < 60 min	--	
Terminals							
• Terminals ± screw (Pozidriv)			PZ 1				
• Conductor cross-sections of main current paths							
- Rigid, max.		mm^2	4				
- Rigid, min.		mm^2	1.5				
- Flexible with end sleeve	Max.	mm^2	2.5				
Environmental conditions							
• Permissible ambient temperature		°C	-10 ... +55	-20 ... +55			
• Storage temperature		°C	-20 ... +60				
• Resistance to climate	Acc. to EN 60068-1		10/055/21	20/055/21			
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors				
• Safety class	Acc. to EN 60730-1		II				

1) For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2): Tolerance -10/+10 %; operating range 0.9 ... 1.1 x U_c.

2) For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2): Frequency range 0 ... 60 Hz.

3) For 24 V device (7LF4 444-2): P_v = 4 VA.

4) At 25 °C a clock error of +0.3 s is assumed. Accuracy may deviate by a further ± 1 s around this value.

5) A program consists of an ON time, an OFF time and assigned ON and OFF days or day blocks.

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Mini digital time switches**				NEW							
	• Week program											
	1 channel											
	1 CO	250	16	110 ... 240	1	B	**7LF4 401-5**		027	1	1	0.156
	**Top digital time switches**											
	• Week program • With text-assisted programming concept Languages: German, English, French, Italian, Dutch, Spanish											
	1 channel • 56 programs											
	1 CO	250	16	230	2	►	**7LF4 411-0**		027	1	1	0.230
	1 CO	250	16	120	2	B	**7LF4 411-1**		027	1	1	0.230
	2 channels • 56 programs (28 per channel)											
	2 CO	250	16	230	2	A	**7LF4 412-0**		027	1	1	0.230
	2 CO	250	16	120	2	B	**7LF4 412-1**		027	1	1	0.230
	**Profi digital time switches**											
	• Week program • With text-assisted programming concept Languages: German, English, French, Italian, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Vacation program • Random program • Operating hours meter, counting range: 65535 h											
	1 channel • 56 programs • Pulse function, 84 start times											
	1 CO	250	16	230	2	A	**7LF4 421-0**		027	1	1	0.235
	1 CO	250	16	120	2	B	**7LF4 421-1**		027	1	1	0.235
	1 CO	250	16	24 AC/DC	2	A	**7LF4 421-2**		027	1	1	0.235
	2 channels • 56 programs (28 per channel)											
	2 CO	250	16	230	2	A	**7LF4 422-0**		027	1	1	0.270
	2 CO	250	16	120	2	B	**7LF4 422-1**		027	1	1	0.270
	2 CO	250	16	24 AC/DC	2	B	**7LF4 422-2**		027	1	1	0.270
	**Astro digital time switches**											
	• Week program • Astro function • With text-assisted programming concept Languages: German, English, French, Italian, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Vacation program • 1 h-test • Input disable over PIN code • Operating hours meter, counting range: 65535 h											
	1 channel • 28 programs • With control input, delay time 0 min ... 23 h 59 min											
	1 CO	250	16	230	2	►	**7LF4 431-0**		027	1	1	0.235
	2 channels • 28 programs (14 per channel)											
	2 CO	250	16	230	2	►	**7LF4 432-0**		027	1	1	0.270

* You can order this quantity or a multiple thereof.

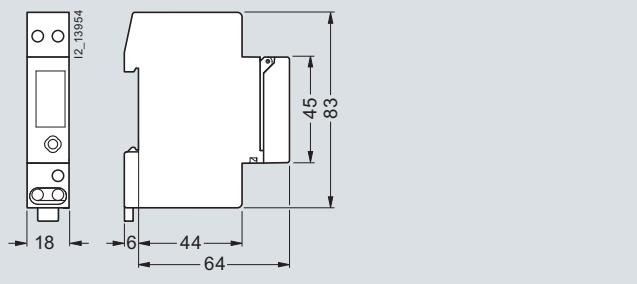
7LF4 digital time switches

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	Expert digital time switches											
	• Week program • Year program • Exception program (priority program) • Astro function • With text-assisted programming concept Languages: German, English, French, Italian, Dutch, Spanish • Simple program creation by means of PC using the software included with the 7LF4 940-0 USB adapter • Cycle function for channel 1 • Vacation function • 1 h-test • Input disable over PIN code • Operating hours meter, counting range: 65535 h • 84 programs per channel • With control input, (only 1 channel), delay time 0 min ... 23 h 59 min • With Expert data key, Order No. 7LF4 940-2											
	• 4 channels											
	4 CO	250	16	120/230	6	►	**7LF4 444-0**		027	1	1	0.455
	4 CO	250	16	24 AC/DC	6	B	**7LF4 444-2**		027	1	1	0.451
	Data keys for Profi and Astro digital time switches											
	• Programming at the PC (7LF4 940-0 USB adapters and software required) • Read-in of programs to the time switch • Writing of programs from the time switch • Transfer of programs - From PC to time switch and vice versa - From time switch to time switch					B	**7LF4 940-1**		027	1	1	0.003
	Data keys for Expert digital time switch											
	• Programming at the PC (7LF4 940-0 USB adapters and software required) • Read-in of programs to the time switch • Writing of programs from the time switch • Transfer of programs - From PC to time switch and vice versa - From time switch to time switch					B	**7LF4 940-2**		027	1	1	0.003
	USB adapters and software for Profi, Astro and Expert digital time switches											
	• For the reading and writing of data keys at the PC • With programming software • With one data key for Profi, Astro Order No. 7FL4 940-1 • Can be connected over USB interface • System requirements: - Windows Vista, Windows 2000, Windows ME, Windows XP, or Windows 98 Second Edition - USB connection - 40 MB free disk space					B	**7LF4 940-0**		027	1	1	0.125

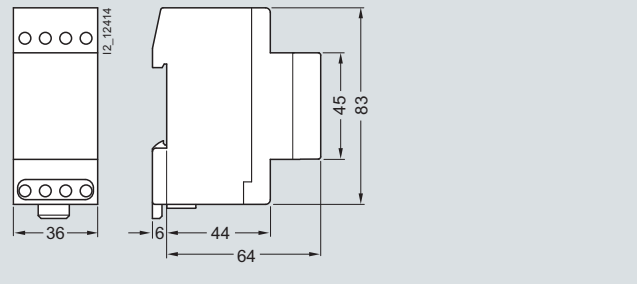
9

* You can order this quantity or a multiple thereof.

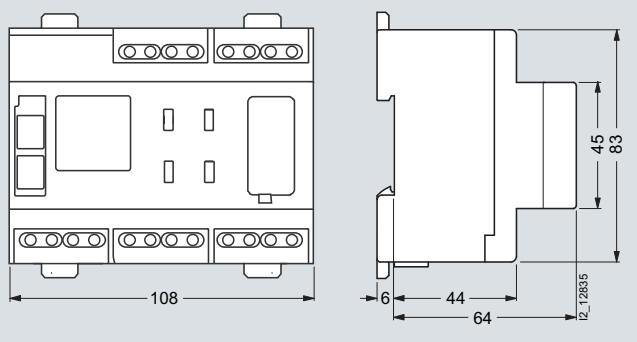
Dimensional drawings



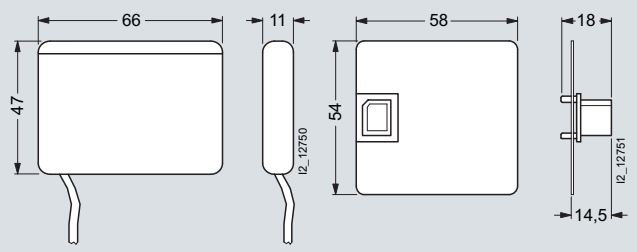
7LF4 401-5



7LF4 41.
7LF4 42.
7LF4 43.

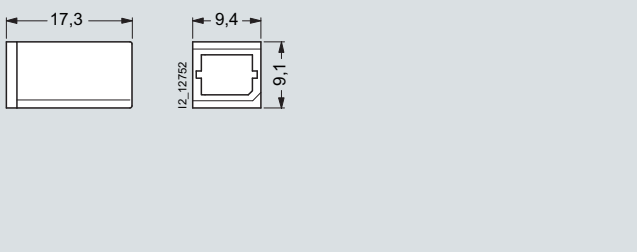


7LF4 444



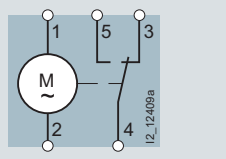
7LF4 940-0
USB adapter

Plug-in card for data key

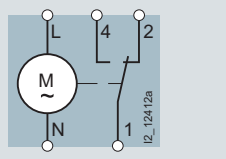


7LF4 940-1,
7LF4 940-2

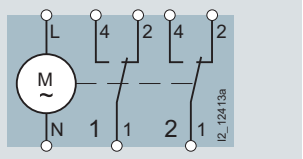
Schematics



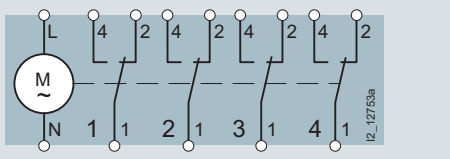
7LF4 401-5



7LF4 411
7LF4 421
7LF4 431



7LF4 412
7LF4 422
7LF4 432



7LF4 444

More information

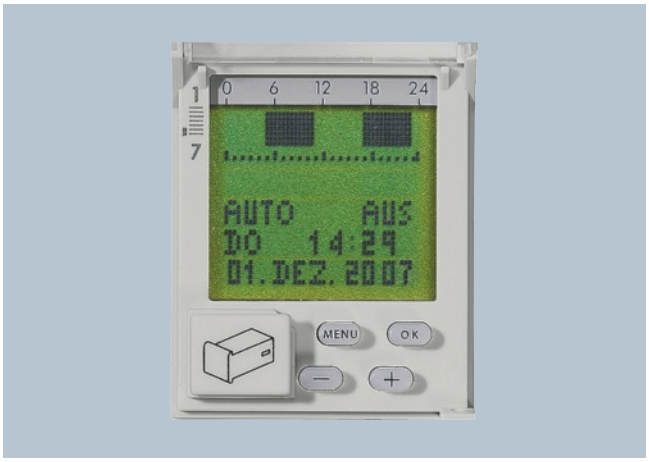
Mini digital time switches

The Mini digital time switch with a width of only 1 MW and its hour, day and week program is ideal for replacement and use in distribution boards with limited space.

The Mini digital time switch can be used flexibly as it can also be operated in battery mode with all its functionalities. Furthermore, the actuator of the clock can be removed from its enclosure for easy programming over the 5-way joystick prior to mounting.

Top, Profi, Astro and Expert digital time switches

Whether you are programming locally using the text-assisted programming, or sitting comfortably in front of your PC, the task is quicker and easier with the Top, Profi, Astro and Expert digital time switches.



Simple operation:

Four programming pushbuttons offer user-friendly assistance with a text menu.

Easy-to-read display:

And if you need to change the settings of the digital time switch at the back of a dark control cabinet, the integral background lighting of the display and the lighting of the control elements offer a clear overview.

Easy commissioning:

You can get started with the programming straight away. Profi, Astro and Expert are supplied with the time, date and automatic daylight savings for Central Europe already set.

Clear contrast:

In order to maintain an overview even in bad light conditions and extreme temperatures, the contrast of the display can be adjusted – practical down to the very last detail.

Convenient programming:

It has never been so easy and uncomplicated to operate and program a digital time switch.

1-channel time switches allow input of up to 56 switching programs, 2-channel time switches allow up to 28 programs per channel and 4-channel time switches up to 84 programs per channel. This means that the Profi, Astro and Expert time switches are ideally equipped for even the most complex of tasks.

Each entry required is clearly indicated so no prolonged studying of the operating instructions. And, particularly practical: you can even program the digital time switches without the supply voltage being applied.

The Profi, Astro and Expert digital time switches offer more than reliable switching. Numerous integrated convenience functions make them versatile and simple problem solvers.

A data key enables easy programming of the Profi, Astro and Expert digital time switches at a PC, simplifies the setting of time switch programs and saves enormous amounts of time. This prevents human errors and enables simple copying of complete time switch programs to different time switches.

Astro function:

The Astro and Expert time switches have one key strength: the Astro function. The exact time of sunrise and sunset is available for every location and every day in the year. This means, for example, that the connected outer lighting is only switched on when it is dark – whether it is winter when the days are shorter or in summer when the days are much longer. The benefits are obvious:

- Cost-savings, because electricity is only used when the lighting is really needed, and because this prolongs the service life of the lighting itself. Particularly in the case of dawn-dependent lighting controls
- Safety and convenience, because the light is always switched on when it's dark
- Ease-of-use, because the digital time switch doesn't have to be reprogrammed throughout the year
- Installation couldn't be easier, because Astro digital time switches work in the distribution board. No further need for laborious cable laying to the light sensors. This means that it is not necessary to lay cables across the lightning protection zones. The compact 2-MW series is also ideally suited for retrofitting or replacement.

It goes without saying that the Astro and Expert digital time switches don't just switch at dawn and dusk, complex, combined programs are also possible. You always have the choice between astronomically calculated and individually set switching times, or a combination of both.

PC programming:

The Profi, Astro and Expert digital time switches support plug-in data keys. This provides even greater safety and convenience.

For example, the data key lets you read out a program from a digital time switch, copy it to a PC, where it can be saved and edited – or simply transfer it to another time switch. It goes without saying that you can work with several data keys and it will only take seconds to change programs.

A safety copy ensures fast service. So if a time switch has been interfered with, you can simply use the data key to transfer the stored program back to the time switch.

Thanks to the standard operator interface, based on MS-Office, there is no need for laborious program training.

Pulse function for 1-channel devices:

With the pulse function, up to 84 start times and a pulse time can be programmed onto the time switch. The pulse duration can be selected between 1 s and 59 min 59 s.

Random function:

If the random function is activated, the set switching times are shifted within a range of +/- 30 min.

Operating hours meter:

For commercial fields of application in particular, it is often necessary to establish the running time of the switched load, e.g. lighting. The operating hours meter shows the total ON time per channel and the date of the last reset.

Vacation period function:

In the vacation program, the vacation period are set with start and end date. If the vacation program is activated, the digital time switch does not carry out any programmed switching commands during the relative period but, depending on the respective input, is set to "CONTINUOUSLY OFF" or "CONTINUOUSLY ON" during the vacation period.
At the end of the specified vacation period, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

Control input:

The delay time that can be adjusted in the control input enables an additional switching of the relay, parallel to the switching program. Adjustable delay time 0 min ... 23 h 59 min, the delay time begins as soon as the voltage drops at the control input.

1 h-test:

The "1H TEST" function can be used for simulating switching. If "1H TEST" is activated, the switching outputs are switched for one hour. At the end of the specified time, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

PIN code:

Input and programming can be disabled using a four-digit PIN code.

Week programs:

Programs that are designed to be repeated regularly every week, e.g. light control, heating control. A week program comprises an ON/OFF time and assigned ON/OFF days.

Year programs:

Programs that are only to be executed within a defined period of validity. They overlap with the week programs of the same channel according to an OR operation. The period of validity is specified by entering the start/end date. Validity from start date 00:00:00 to end date 24:00:00. The start date must be prior to the end date. Within their period of validity, these programs act as week programs. Outside their period of validity, these programs have no influence on the switching behavior.

Exception programs:

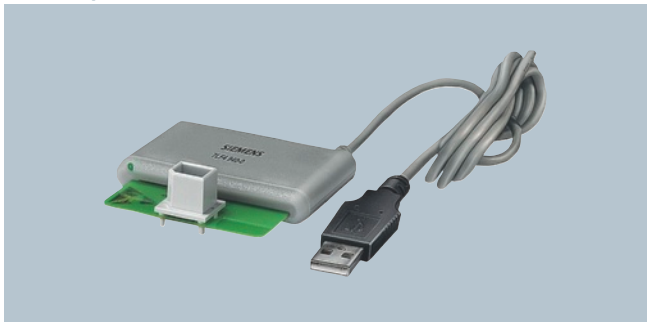
Have a higher priority as week and year programs. Week and year programs of the same channel will not be executed within the period of validity of an exception program, however, within the period of validity other exception programs will be executed. The different exception programs overlap according to an OR operation.

Cycle function:

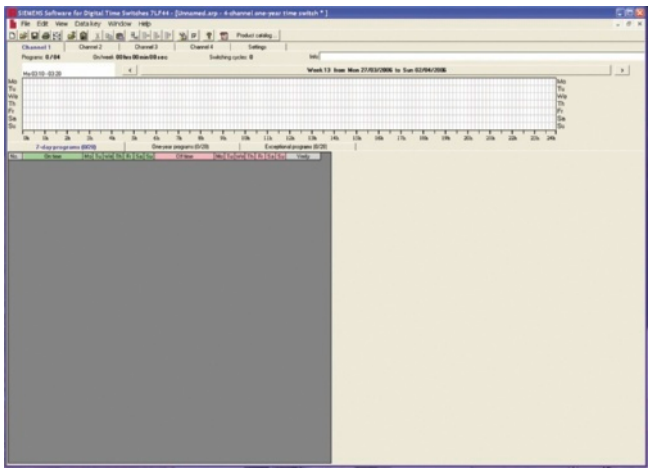
On the year time switch, channel 1 has an additional option for "cyclic switching". The term "cyclic switching" means that within a specific period, the time switch is switched on for a specific duration (ON time). The cycle time can be between 2 seconds and 2 hours. The ON time can be set between one second and one hour.

7LF4 digital time switches

USB adapters



The Profi, Astro and Expert time switches are easy to program at the PC using the data key with the USB adapter and software. This enables the simple and fast creation of complicated time switch programs. Storing and copying time switch programs are also very easy.



- Clear data on the annual ON time of the consume enables a precise statement on the annual power consumption.
- You can create switching programs for digital time switches easily and conveniently at the PC in the comfort of your own home, store it on the data key and transfer it to the time switch on site.
- Not only do you save time when creating and transferring programs, but also during maintenance.

Overview

These days, time switching is taken for granted.

These days, energy savings through time switching has become a matter of course. In fact, it is now hard to imagine many process sequences without time switching.

Mechanical time switches are used wherever the minimum switching interval is sufficient. The switching control pins can be set without the use of tools at minimum intervals of 15 minutes. They can be used for switching systems or system components, or for functions, such as: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy controls, church bells, shop window lighting, advertising lighting, gym lighting, traffic signal controls, street lighting, illuminated signs, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, ovens, heating systems, air-conditioning systems, fans and ventilation systems, heating and circulation pumps and sauna systems.

All devices have the VDE mark and are approved to UL.

Benefits

- The automatic make ready system automatically sets the clock timers during commissioning. No need to manually adjust the pointer for daylight savings.
- The automatic make ready system also continues to operate automatically after a power failure. No need for manual time reset.
- The precision quartz clock mechanism adds all clock errors to approx. +/- 1 min clock accuracy per year. So there is also no need to reset the clock timer during operation.

7LF5 mechanical time switches

Technical specifications

		Synchronous time switches without power reserve					Quartz-clock time switches with power reserve					
		7LF5 300-1	7LF5 300-5	7LF5 300-6	7LF5 300-7	7LF5 301-0	7LF5 301-1	7LF5 301-4	7LF5 301-5	7LF5 301-6	7LF5 301-7	7LF5 305-0
Standards		EN 60730-1, -2-7, UL 917										
Approved acc. to		UL 60730-1, -2-7/UL 917, CSA C22.2 No. 14 and 177										
Operating mode		Synchronous					Quartz					
• Time program		Day	Day	Week	Hour	Day	Day	Day	Week	Day	Week	Day
Supply												
• Rated control supply voltage U_c	V AC	230					230					
- Operating range	× U_c	0.85 ... 1.1					0.85 ... 1.1					
• Rated frequency	Hz	50					50					
- Frequency ranges	Hz	50					50/60					
• Rated power dissipation P_v	VA	1					1	0.2	0.2	1	1	1
Channels/contacts												
• Switching channels		1					1					
- Rated operational voltage U_e	V AC	250					250					
- Rated operational current I_e												
At p.f. = 1	A	16					16					
At p.f. = 0.6	A	4					4					
• Contacts		1 NO	1 CO	1 CO	1 NO	1 CO	1 NO	1 CO	1 CO	1 CO	1 CO	1 CO
- Mechanical switching cycles	In millions	20					20					
- Electrical switching cycles at p.f. = 1		100 000					100 000					
• Minimum contact load	V; mA	4; 1					4; 1					
- Incandescent lamp load	A	5					5					
- Fluorescent lamps												
At 7 µA	VA	60					60					
Uncorrected	VA	1400					1400					
Safety												
• Different phases permissible between drive/contact		Yes					Yes					
• Electrical isolation, creepage distances and clearances, actuator/contact	mm	8/6					8/6					
• Rated impulse withstand voltage U_{imp} operating mechanism/contact	kV	4					4					
- EMC: Burst acc. to IEC 61000-4-4	kV	> 4.4					> 4.4					
- EMC: Surge acc. to IEC 61000-4-5	kV	> 2.0					> 2.0					
- Electrostatic discharge acc. to IEC 61000-4-2	kV	> 8.0					> 8.0					
• Power reserve storage	a	--					100 h	6		100 h		
- Minimum loading time	h	--					48	--		48		
- Battery type		--					NiMH cell	Li primary cell		NiMH cell		
- Service life of battery												
At 20 °C	a	--					6	10		6		
At 40 °C	a	--					5					
• Overvoltage category acc. to EN 61010-1		III					III					
Function												
• Minimum switching sequences	min	30		240	5	30	30		240	30	240	30
• Make and break cycles	min	15		120	37.5 s	10	15		120	15	120	10
• Switching accuracy	min	± 5		± 30	± 0.2	± 5	± 5		± 30	± 5	± 30	± 5
• Clock errors per day		System-synchronized					± 2.5 s	± 60 s/year		± 2.5 s		
Terminals												
• Terminals ± screw (Pozidriv)		PZ 1					PZ 1					
• Conductor cross-sections of main current paths												
- Rigid, max.	mm^2	4					4					
- Rigid, min.	mm^2	1.5					1.5					
- Flexible, with end sleeve	mm^2	2.5					2.5					
- Flexible, without end sleeve	mm^2	4					4					
Environmental conditions												
• Permissible ambient temperature	°C	-10 ... +55					-10 ... +55					
• Storage temperature	°C	-10 ... +60					-10 ... +60					
• Resistance to climate	Acc. to EN 60068-1	10/055/21					10/055/21					
• Degree of protection	Acc. to EN 60529	IP20, with connected conductors					IP20, with connected conductors					
• Safety class	Acc. to EN 61140	II					II					

Selection and ordering data

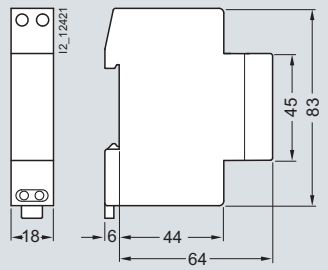
	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Synchronous time switches without power reserve, 1 MW**											
	• Day disk											
	1 NO	250	16	230	1	►	**7LF5 300-1**		027	1	1	0.850
	• Hour disk 1 MW											
	1 NO	250	16	230	1	B	**7LF5 300-7**		027	1	1	0.850
	**Synchronous time switches without power reserve, 3 MW**											
	• Day disk											
	1 CO	250	16	230	3	►	**7LF5 300-5**		027	1	1	0.155
	• Week disk											
	1 CO	250	16	230	3	A	**7LF5 300-6**		027	1	1	0.155
	**Synchronous time switches without power reserve, for wall mounting**											
	• Day disk											
	1 CO	250	16	230	--	B	**7LF5 301-0**		027	1	1	0.220
	**Quartz-clock time switches with power reserve**											
	• Day disk											
	1 NO	250	16	230	1	A	**7LF5 301-1**		027	1	1	0.900
	**Quartz-clock time switches with power reserve and automatic time setting for Central European time zone**											
	Time set automatically during commissioning Automatic daylight savings With quartz clock mechanism Clock accuracy ± 0.2 s/day 5 year power reserve (time buffer in the event of a power failure)											
	• Day disk											
	1 CO	250	16	230	3	A	**7LF5 301-4**		027	1	1	0.165
	• Week disk											
	1 CO	250	16	230	3	B	**7LF5 301-5**		027	1	1	0.165
	**Quartz-clock time switches with power reserve**											
	Clock accuracy ± 2.5 s/day											
	• Day disk											
	1 CO	250	16	230	3	►	**7LF5 301-6**		027	1	1	0.165
	• Week disk											
	1 CO	250	16	230	3	A	**7LF5 301-7**		027	1	1	0.165
	**Quartz-clock time switches with power reserve, for wall mounting (surface mounting)**											
	• Day disk											
	1 CO	250	16	230	--	B	**7LF5 305-0**		027	1	1	0.230

9

* You can order this quantity or a multiple thereof.

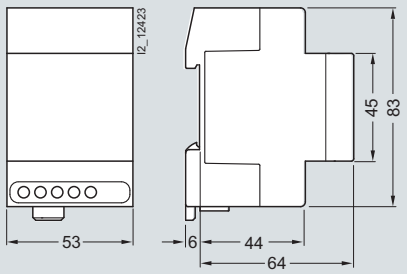
7LF5 mechanical time switches

Dimensional drawings



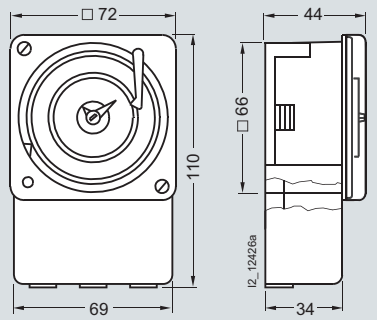
7LF5 300-1
7LF5 300-7

7LF5 301-1



7LF5 300-5
7LF5 300-6

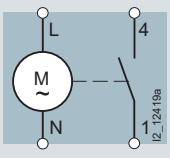
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7



7LF5 301-0

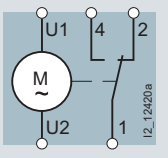
7LF5 305-0

Schematics



7LF5 300-1
7LF5 300-7

7LF5 301-1



7LF5 300-5
7LF5 300-6

7LF5 301-0
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7

7LF5 305-0

More information

Mechanical time switches with day disk

Mechanical time switches with week disk

Synchronous time switches without power reserve

The control gear is driven by a synchronous motor so it is dependent on the power supply frequency. If this frequency is unstable, the devices cannot be used. In the event of a power failure, the time switch will stop.

Quartz-clock time switches with power reserve

A quartz electronic circuit supplies the drive with a stabilized frequency so that the time switch is not dependent on the power supply frequency. In the event of a power failure, the time switch continues to operate on its power reserve.

Automatic make ready system

This supports fast and easy installation of the 7LF5 301-4 and 7LF5 301-5 time switches. These time switches self-adjust during commissioning in fast mode to the correct time and correct day within the Central European time zone. They also automatically set the correct time for daylight saving. A further advantage is the quartz-precise adjustment of the correct time and the correct day as soon as the supply voltage is reconnected after a power failure.

Precision quartz mechanism

Clock accuracy: the internal precision clockwork has an accuracy of ± 1 min. per year. Until now, this accuracy and automatic operational safety was only offered by digital time switches.

Optimization of energy consumption through minimum make and break cycles of 15 minutes: it is possible to set the switching times in 15-minute patterns, with a switching interval of at least 30 minutes.

LED display

The adjustment data for Central Europe are stored and an LED provides information on the current state.

So: simply unpack, snap into place, connect and set the desired switching times – no tools required! This saves time and money.

Clear design

Extremely intuitive – thanks to clear design. The switching times are easily recognizable.

With the weekly time switch, the make and break cycles are only 120 minutes with a minimum switching interval of 240 minutes.

7LF6, 5TT1 3 timers for buildings

Overview

Stairwell lighting is part of the standard equipment of a building. This is required in DIN 18015-2 "Electrical systems in residential buildings; minimum type and scope of equipment".

Stairwell lighting timers can be distinguished by the level of convenience offered with regard to the range of functions. The required time can be precisely set using the push-to-lock knurling wheel setting. With modern four-wire installations, stairwell lighting timers can always just be pressed again. A maintained light switch prevents the need for repeated pressing, for example during relocations.

Benefits

- Reliable durable switching of incandescent lamps using patented contact design
- Ultra-quiet stairwell lighting timers – ideal for residential areas
- Energy savings through disconnection of unnecessary equipment
- Warning prior to switch off acc. to DIN 18015-2 for stairwell lighting in apartment houses.

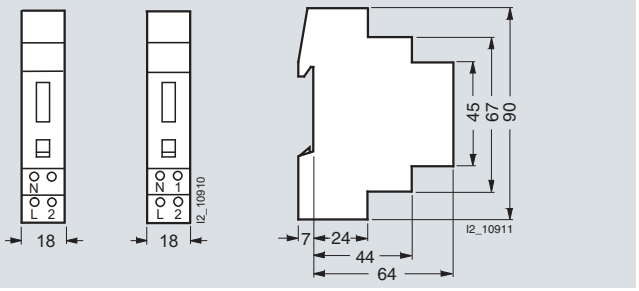
Technical specifications

			7LF6 110	7LF6 111	7LF6 113	5TT1 303	7LF6 114	7LF6 115	7LF6 112
Standards			IEC 60669, EN 60669						
Supply									
• Rated control supply voltage U_c		V AC	230						
- Operating range	At 50/60 Hz	× U_c	0.9 ... 1.1						
• Rated power dissipation P_v		VA	Approx. 5						
Setting ranges		min	0.5 ... 10			1 ... 10	0.5 ... 10	3 ... 60	0.5 ... 10
• Accuracy		s	±30						
Manual switches	Automatic/permanent		Yes						
Minimum push duration		ms	30						
Voltage endurance	At pushbutton input (pushbutton malfunction)		Yes						
Short-circuit strength		A	700			--	700		
Channels/contacts									
• Switching channels									
- Rated operational voltage U_e		V AC	250						
- Rated operational current I_e	At p.f. = 1	A	16		--	10	16		
• Contact gap		mm	> 3			0.3	> 3		
• Minimum contact load		V; mA	10; 300						
Max. incandescent lamp load		W	2000			--	2000		--
Fluorescent lamp load 58 W									
- Uncorrected		Unit(s)	20			--	20		
- DUO circuit		Unit(s)	2 × 20			--	2 × 20		
- Siemens ECG	1 lamp	Unit(s)	10			6	10		
	2 lamps	Unit(s)	2 × 5			3	2 × 5		
Glow lamp load		mA	50			10	50		--
Max. fan load		VA	--						200
Terminals									
• Terminals ± screw (Pozidriv)			PZ 1						
• Conductor cross-sections of main current paths									
- Rigid		mm^2	1.5 ... 6						
- Flexible, with end sleeve	Min.	mm^2	1						
Environmental conditions									
• Permissible ambient temperature		°C	-10 ... +50						
• Resistance to climate	Acc. to EN 60068-1		20/045/04						
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors						

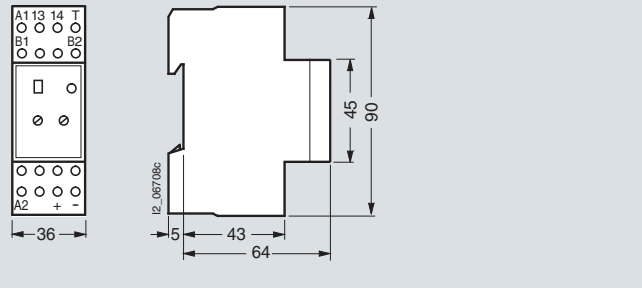
Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Stairwell lighting timers**										
	With switch for continuous light and push-to-lock knurling wheel setting, setting range 0.5 ... 10 minutes										
	For 3-wire circuit, L-momentary contact, not resettable										
	250	16	230	1	►	**7LF6 110**		027	1	1	0.085
	For 4-wire circuit, L-momentary contact, resettable, or 3-wire circuit, N-momentary contact, resettable										
	250	16	230		A	**7LF6 111**		027	1	1	0.085
	With warning by flashing prior to switch-off, for 4-wire circuit, L-momentary contact, resettable, or 3-wire circuit, N-momentary contact, resettable										
	250	16	230		►	**7LF6 113**		027	1	1	0.085
	Lighting timers										
	With switch for continuous light and push-to-lock knurling wheel setting, with warning by flashing prior to switch-off, setting range 0.5 ... 10 minutes, 4-fold extension of runtime by pressing the pushbutton for 1 second, for 4-wire circuit, L-momentary contact, or 3-wire circuit, N-momentary contact										
	250	16	230	1	B	**7LF6 114**		027	1	1	0.085
	Energy-saving timers										
	With switch for continuous light and push-to-lock knurling wheel setting, with warning by flashing prior to switch-off, setting range 3 ... 60 minutes, switch off by pressing pushbutton second time as with remote control switch, for 4-wire circuit, L-momentary contact, resettable, or 3-wire circuit, N-momentary contact, resettable										
	250	16	230	1	A	**7LF6 115**		027	1	1	0.085
	Timers for fans up to 200 VA										
	With switch for continuous light and push-to-lock knurling wheel setting, setting range 0.5 ... 10 minutes, for delayed switch-on of fan										
	250	16	230	1	B	**7LF6 112**		027	1	1	0.085
	ECG control switches for ECG dynamic										
	With transparent cap, with switch for continuous light and position indication, setting range 1 ... 10 minutes, with warning through dimming prior to switch-off, direct current output 1 ... 10 V for control of 20 ECG dynamic mounting depth 55 mm										
	250	10	230	2	B	**5TT1 303**		027	1	1	0.130

Dimensional drawings



7LF6 110 7LF6 111 7LF6 112 7LF6 113 7LF6 114 7LF6 115



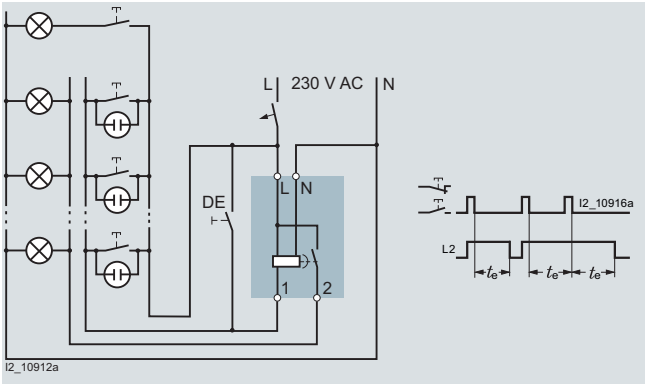
5TT1 303

* You can order this quantity or a multiple thereof.

Schematics

Switching example: 7LF6 111 timer in 4-wire circuit, L-momentary contact, resettable

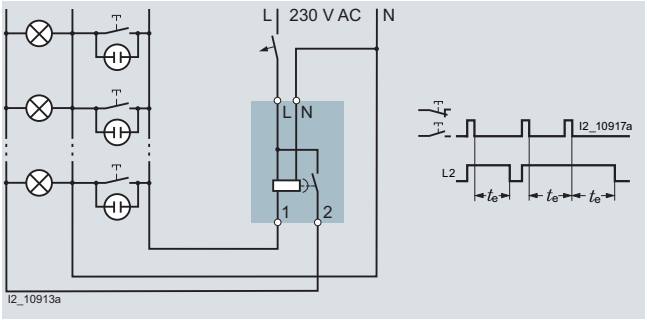
Typical circuit for new installation with separate cable routing for pushbuttons and lights. The additional DI switch allows external switching to continuous light. A time switch can also be used. An additional attic circuit is also available, which operates independently of the timer, but on the same electrical circuit. The timer can be restarted before the set time expires.



t_e = runtime

Switching example: 7LF6 111 timer in 3-wire circuit, N-momentary contact, resettable

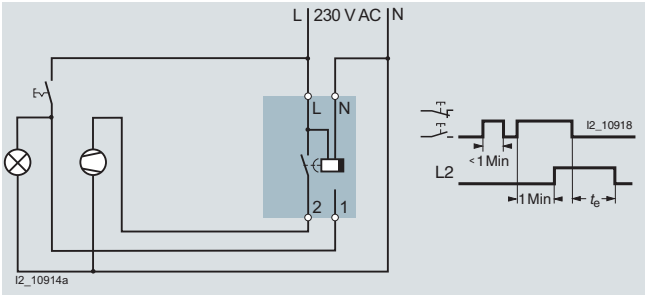
Can only be used with a limited number of wires. The timer can be restarted before the set time expires. While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0100-460. However, it is used in old systems for replacement purposes.



t_e = runtime

Switching example: 7LF6 112 timer for fans up to 200 VA

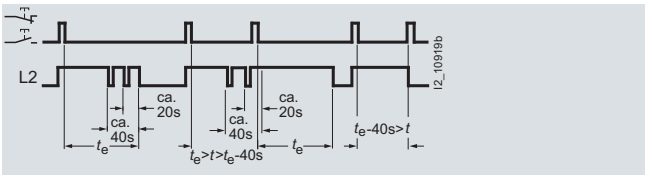
The switch switches the light on immediately, e.g. in a toilet. After a delay of approx. 1 minute, the fan is switched on. When the light is switched off, the fan continues to run for the time set at the timer.



t_e = runtime

Switching example: 7LF6 115 energy-saving timer with advance warning

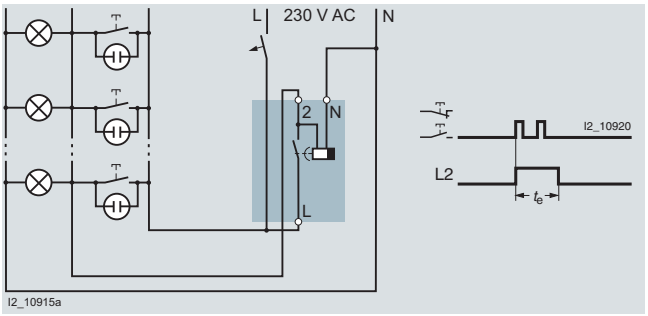
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. The energy-saving timer switches on if pressed once and switches off when it is pressed again. If it is not switched off manually, it is automatically switched off after the set time, or max. 60 minutes. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending switch-off. This allows time to reset the switch while the light is still on. Prior to the warning time, a push of the button ends the timing interval.



t_e = runtime

Switching example: 7LF6 110 timer in 3-wire circuit, L-momentary contact, resettable

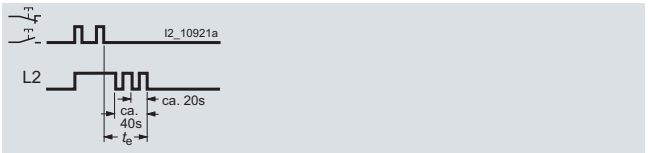
Circuit for new installation with shared cable routing for pushbuttons and lights. The timer can only be restarted after the set time expires.



t_e = runtime

Switching example: 7LF6 113 timer with advance warning

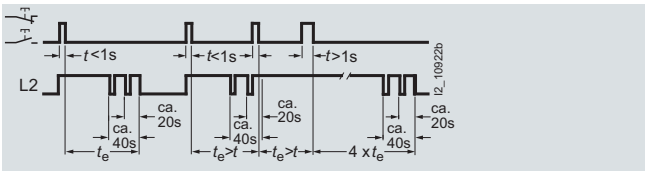
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending switch-off. This allows time to reset the switch while the light is still on.



t_e = runtime

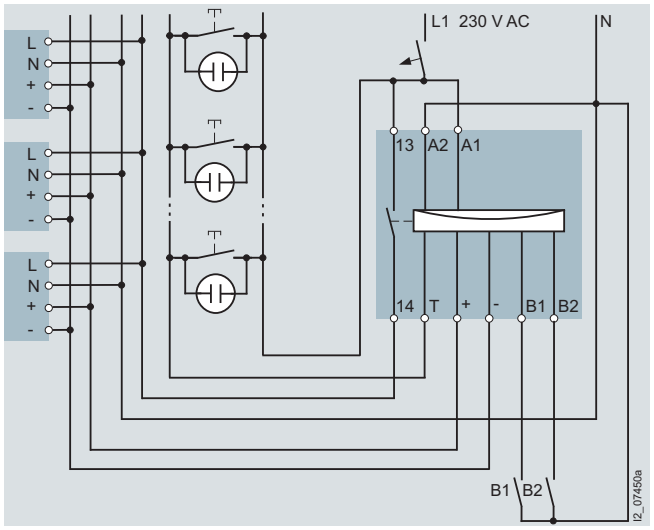
Switching example: 7LF6 114 lighting timer with advance warning

The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. When pressed, the lighting timer switches on for the set runtime, up to 10 minutes. If the switch is pressed for more than one second, the light is switched on for four times the set time, i.e. up to 40 minutes. The last press of the pushbutton is decisive. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending switch-off. This allows time to reset the switch while the light is still on. The timing interval restarts each time the button is pressed.



t_e = runtime

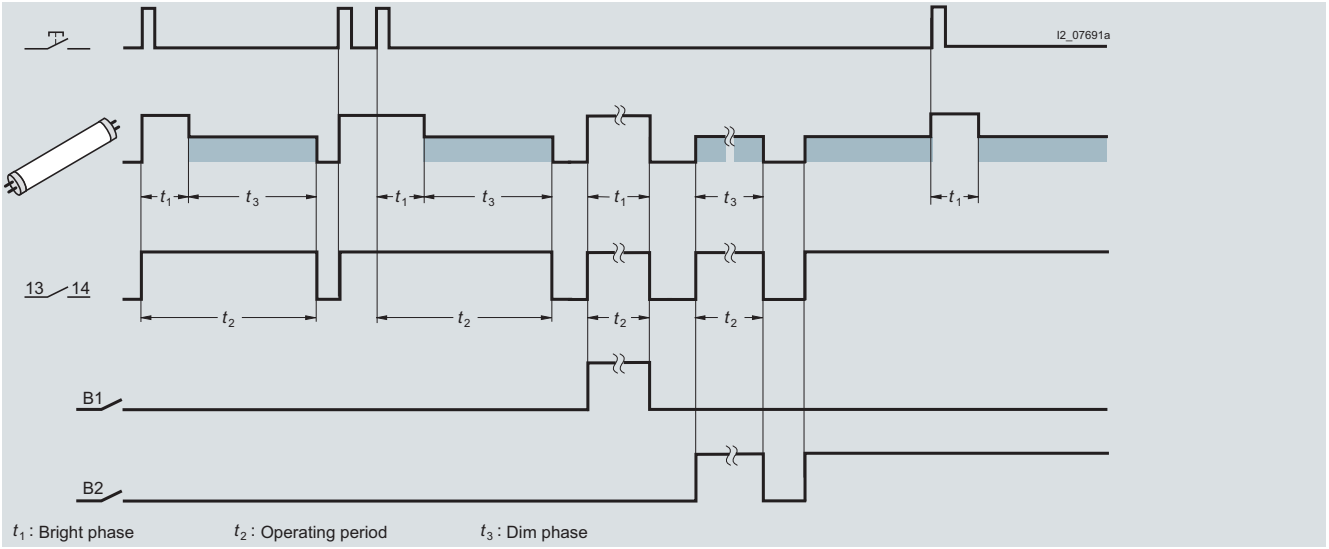
Switching example: 5TT1 303 ECG control switch



The device is fitted with a direct voltage input for the control of an 5LZ. ...-4 ECG Dynamic. When the pushbutton is actuated, the power supply is released and the ECG dynamic is brightened, depending on the setting of the timer, for up to 10 minutes.

On expiry of this time, the ECG dynamic is dimmed according to the set dimmer level, if pressed again it brightens again. If the switch is not pressed for 30 minutes, the lighting switches off completely. In addition to these functions, the dimming time and brightness period can also be controlled using a separate pushbutton or time switch over control inputs B1 and B2.

Switching the ECG dynamic and the fluorescent lamp as little as possible extends the service life.



t_1 : Bright phase t_2 : Operating period t_3 : Dim phase

Corridor lighting in homes for the elderly

At mealtimes, from 5 to 7 p.m., the light in the corridors can be permanently switched on using a time switch (contact B1). Between 7 and 10 p.m., the lighting is dimmed using switch B2. Simply press the corridor pushbutton again to return the lighting to the brighter setting at any time. After 10 p.m., the light is switched off. It can be switched back on at any time by pressing the corridor pushbutton.

Corridor lighting in hospitals

During the day – during peak periods, lunch times, visiting times, shift changes, doctor's rounds – the light is switched on. During quiet periods, i.e. afternoons and nights, the light is switched to a dimmed state. A patient can switch the light back to the bright setting at any time by pressing the corridor pushbutton. In emergencies, the nurse can switch the light to "emergency operation", i.e. permanently bright, using switch B1 (no time limit of brightness period).

More information

Stairwell lighting

This is required in DIN 18015-2 "Electrical systems in residential buildings; minimum type and scope of the equipment". What is less known is that 100 lux is required according to EN 12464-1 "Lighting of workplaces" for traffic areas and corridors, section 5.3. This means that approx. 60 W incandescent lamps, 25 W energy-saving lamps or 25 W fluorescent lamps need to be used. It is hard to see why lesser requirements should apply to stairwells in residential buildings than stipulated in EN 12464-1.

4-wire circuit, L-momentary contact

4 conductors are installed within the building. The timing interval is started by pressing phase L. During the runtime, the timer can be reset at all times.

3-wire circuit, L-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing phase L. No resetting is possible during the runtime as the pushbutton input and output are exposed to the same potential during this period. The glow lamps are switched off during the runtime.

3-wire circuit, N-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing the N-conductor. During the runtime, the timer can be reset at all times. However, this switching no longer corresponds to DIN VDE 0100 and is now only used in old installations.

Safety through warning prior to switch-off

DIN 18015-2 "Electrical systems in residential buildings: type and scope of minimum equipment" stipulates that the automatic lighting-off control in stairwells of multifunctional dwellings must be equipped with a warning function to prevent sudden darkness in the building. This contribution towards safety is offered by 4 device versions. The 7LF6 113 stairwell lighting timer, the 7LF6 114 lighting timer and the 7LF6 115 energy-saving timer warn of an impending off by flashing, the 5TT1 303 stairwell lighting timer ECG warns of the impending switch-off by dimming, allowing sufficient time for the light switch to be pressed again.

Manual switches

All timers have a manual switch for the function Automatic/ON. This allows the operator to switch to continuous light in the event of moving house or emergencies.

Useful continuous contact

Pushbuttons should never jam. For this reason, all our timers have a safeguard to prevent this type of malfunction. Even better, this feature can be used (e.g. by caretakers of properties) to switch to a continuous light in the event of moving house or emergencies.

Setting accuracy

The electronic remote control switches offer a high degree of accuracy. The runtime can be set precisely to + 30 seconds using the push-to-lock knurling wheel setting. The factory settings ensure that the limit values of 1 and 10 or 60 minutes can be reliably set.

Short-circuit strength

Stairwell lighting timers are primarily used for the switching of incandescent lamps, which may occasionally be subject to short circuits.
A key feature of all devices is their high short-circuit strength without the contacts welding.

Switching of fluorescent lamps

In order to extend their service life as far as possible, fluorescent lamps should only be switched using a stairwell lighting timer if the switching frequency is not excessive. Using electronic ballast (ECG) to operate them is more gentle on the device and saves energy. The 5TT1 303 stairwell lighting timer ECG switches the electronic ballast and warns of the impending switch-off by dimming.

Switching of energy-saving lamps

The switching of energy-saving lamps has provoked heated discussions. Energy-saving lamps require a certain time before they produce their full light output. The characteristic of the electronics is not ideal for flashing operation. They do not dim. It is difficult to find suppliers of energy-saving lamps that are suitable for stairwell lighting timers and comply with the required specifications.

5TT3 18 timers for industrial applications

Overview

Time relays are primarily used in series applications where the use of PLC controls is too labor and cost-intensive. Multifunction relays are now the market standard. Operation is clear, simple and with various functions.

Benefits

- Suitable for universal use because the devices can be operated with 12 V to 240 V AC/DC and work across a broad range from seconds to hours
- An off-delay without auxiliary power supports expanded application.

Technical specifications

			5TT3 185	5TT3 181 5TT3 182 5TT3 183	5TT3 184
Standards			EN 60255; DIN VDE 0435-110		
Supply					
• Rated control supply voltage U_c		V AC V DC	12 ... 240 12 ... 240	220 ... 240 --	110 ... 240 110 ... 240
- Operating range		× U_c	0.8 ... 1.1		
• Rated frequency f_n		Hz	45 ... 400	50/60	
• Rated power dissipation P_v		VA	Approx. 1.5	Approx. 5	Approx. 1
Setting ranges			See setting ranges, timing intervals		
Recovery time		ms	15 ... 80	Approx. 40	Approx. 100
Contacts					
• Switching channels					
- Rated operational voltage U_e		V AC	250		
- Rated operational current I_e		A	4	8	5
• Contact gap		mm	µ contact		
- Minimum contact load		V; mA	10; 300		
Rated impulse withstand voltage U_{imp}	Input/output	kV	> 4		
Electrical service life	In switching cycles At AC-15	1 A	1.5×10^5 --	-- 1.5×10^5	1.5×10^5 --
Terminals					
• Terminals ± screw (Pozidriv)			2		
• Conductor cross-sections of main current paths					
- Rigid, max.		mm^2	2 × 2.5		
- Flexible, with end sleeve, min.		mm^2	2 × 1.5		
Environmental conditions					
• Permissible ambient temperature		°C	-40 ... +60		
• Resistance to climate	Acc. to EN 60068-1		40/60/4		

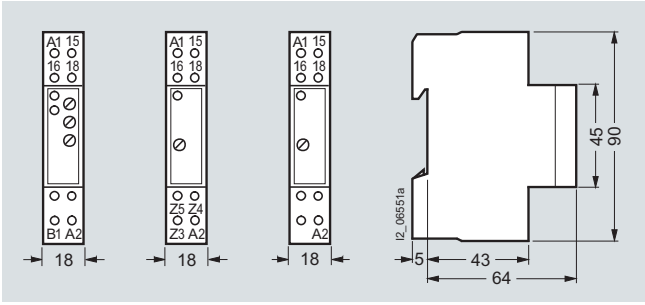
Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V						Unit(s)	Unit(s)	kg
	**Multifunction timers**											
	Programmable for: response delay; passing make contact function; delayed pulse generator; clock generator starting with impulse; off-delay; pulse converter; passing break contact function; response/off-delay											
	1 CO	250	4	12 ... 240 DC 12 ... 240 AC	1	►	**5TT3 185**		027	1	1	0.065
	Delay timers											
	1 CO	250	8	220 ... 240 AC	1	►	**5TT3 181**		027	1	1	0.100
	Wiper timers											
	1 CO	250	8	220 ... 240 AC	1	B	**5TT3 182**		027	1	1	0.100
	Flashing timers											
	Pulse time is equal to idle time											
	1 CO	250	8	220 ... 240 AC	1	B	**5TT3 183**		027	1	1	0.100
	Off-delay timers											
	1 CO	250	5	110 ... 240 AC 110 ... 240 DC	1	B	**5TT3 184**		027	1	1	0.100

* You can order this quantity or a multiple thereof.

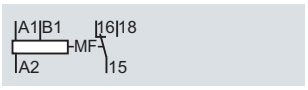
5TT3 18 timers for industrial applications

Dimensional drawings



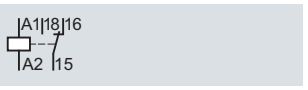
5TT3 185 | 5TT3 181 | 5TT3 182, 5TT3 183, 5TT3 184

Schematics

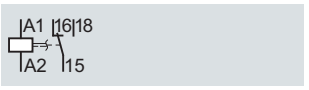


5TT3 185

5TT3 181



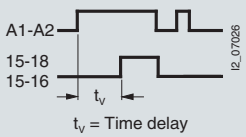
5TT3 182



5TT3 183, 5TT3 184

More information

5TT3 181 delay timers

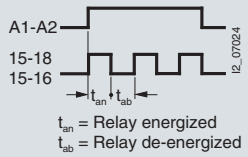


Possible time setting ranges t_v

0.25 s	...	2.5 s
1 s	...	10 s
8 s	...	80 s
64 s	...	300 s

Response delay

5TT3 183 flashing timers

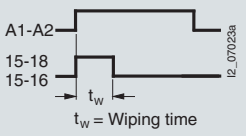


Possible joint time setting range of $t_{on} = t_{off} = t$

1 s ... 10 s

Flashing function

5TT3 182 wiper timers

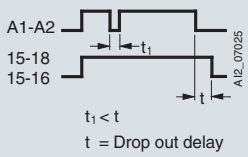


Possible time setting ranges t_w

1 s ... 10 s

Wiper function

5TT3 184 off-delay timers



Possible time setting ranges t

1 s ... 10 s

t_1 = interruption

OFF-delay

9

5TT3 185 multifunctional timers

Setting aids

The period of the flashing of the green LED 1 when set for a timing interval is 1 s ± 4%, which can therefore be used as a setting aid. This is particularly useful in the lower time setting range and for long delay times because the multiplication factors between the individual time ranges are exact.

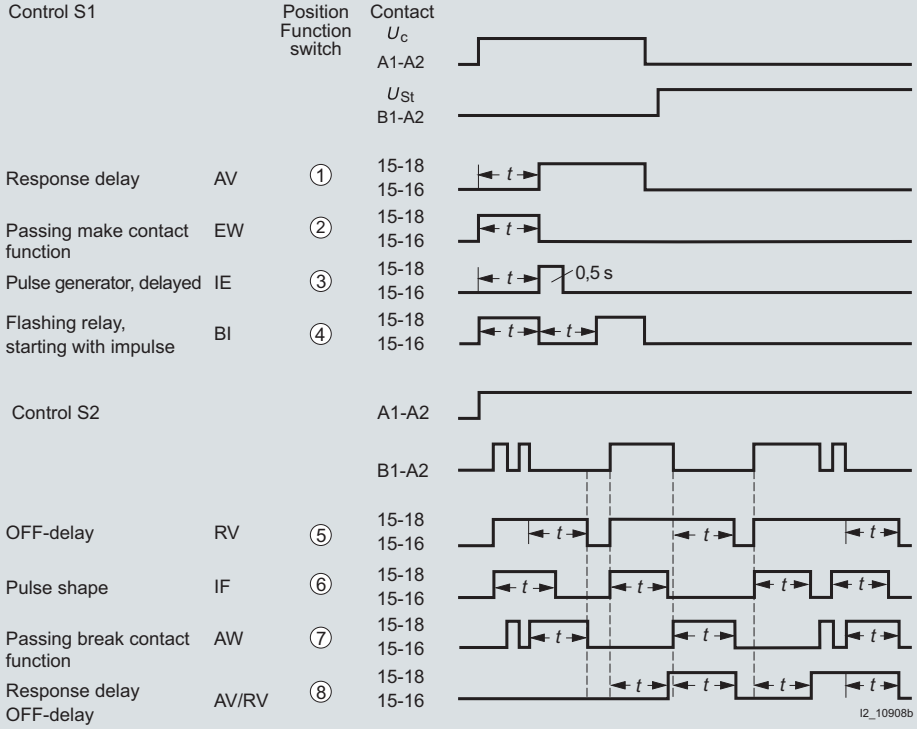
Example:
Delay time to be set: 40 min.
Using the fine setting, this delay time can be set within the setting range 3 ... 300 min. However, in this case it takes a long time to check the time and requires several operational sequences in realtime. To speed up the setting process, the setting range will be switched to 0.03 ... 3 min. In this case, the required value corresponds to a delay time 0.4 min (= 24 s). The timing interval is triggered and the potentiometer is set to 24 flashing periods of the yellow LED 2. The device is then set back to the setting range 3 ... 300 min and the setting process is completed.

Time operation interruption/time addition

For the functions AV, EW, IE, BI, the timing interval can be interrupted at any time by activating B1 (+) and by removing the control voltage continued again (time addition).

Control input B1

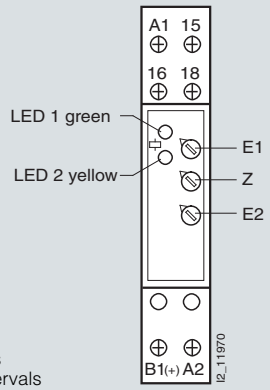
The functions RV, IF, AW, AV/RV can be controlled using the control input B1 (+) with potential against terminal A2. The auxiliary voltage of terminal A1 can be used for this purpose, as well as any other voltage within the range 12 ... 240 V AC/DC. The operation of parallel loads (e.g. contactors) from B1 (+) to A2 is also permissible.
If voltage is simultaneously applied to the control input B1 (+) and A1 for the IF function, this triggers an output pulse with the set time interval t_1.



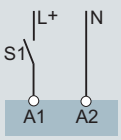
Possible time setting ranges *t*

0.02	...	1 s
0.06	...	6 s
0.3	...	30 s
0.03	...	3 min
0.3	...	30 min
3	...	300 min
0.3	...	30 h
3	...	300 h

① AV = Response delay
② EW = Passing make contact function
③ IE = Pulse generator, delayed
④ BI = Flashing relay, starting with impulse
⑤ RV = Off-delay
⑥ IF = Pulse shape
⑦ AW = Passing break contact function
⑧ AV/RV = Response/off delay

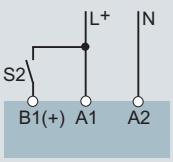


Control S1



Contact S1
For the functions: response delay, passing make contact function, pulse generator delayed, clock generator – (start with pulse) – the timing interval is triggered by closing the switching contact S1.

Control S2



Control contact S2
The functions: off-delay, pulse shape, passing break contact function, response and off-delay are triggered by continuous power supply over the control contact S2 between A1 and B1 (+).

Operator interfaces

LED 1 Status display
LED 2 Switching position indication
E1 Setting range adjuster
Z Fine adjuster for setting ranges
E2 Function settings for timing intervals

Device displays

LED 1 Lights up if operational voltage is applied (green)
LED 2 Indicates the timing interval and state of the equalizing relay (yellow)
- Continuous light
  - Off output relay not activated, no timing interval
  - On output relay not activated, no timing interval
- Flashing light
  - Short on, long off
    Output relay not activated, timing interval
  - Short on, long off
    Output relay activated, timing interval

Front view

LED 1 green:status display
LED 2 yellow:switching position indication
E1: Setting range adjuster
Z: Fine adjuster for setting ranges
E2: Function settings for timing intervals

Notes

BETA Switching Transformers, Bells and Socket Outlets

10

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**4AC3 0, 4AC3 1 bell transformers**	10/3	Power supply up to 40 VA as safety extra-low voltage in residential buildings for the supply of gongs, buzzers, bells, door openers and remote control switches	EN 61558-2-8	✓	✓	--
	**4AC3 4 ... 4AC3 6 transformers for permanent loads**	10/5	Power supply up to 63 VA as safety extra-low voltage for the supply of control circuits, switching relays and Insta contactors	EN 61558-2-2	✓	--	✓
	**4AC2 4 power supply units**	10/8	Direct voltage power supply up to 24 V DC and 2 A as safety extra-low voltage for the supply of gongs, buzzers, bells, door openers, switching relays and Insta contactors	EN 61558-2-6	✓	✓	✓
	**7LQ2 2 bells and buzzers**	10/10	Bells and buzzers serve to indicate alarm states or for general acoustic signaling. They are used as modular installation devices in distribution boards.		✓	✓	✓
	**5TE6 8 socket outlets**	10/11	For power supply during maintenance in distribution boards in DIN VDE, CEE 7, CEI 23-50 and UL 489 versions	DIN VDE 0620-1, CEE 7 standard sheet V, CEI 23-50, UL 498	✓	✓	✓

Overview

A typical application for these bell transformers is short-time use, i.e. bells, gongs, door openers or remote control switches in residential buildings.

The standard EN 61558 distinguishes between transformers for short-time loading and those for permanent loading. This means that clear requirements for bell transformers are defined. A bell transformer must maintain 100 % of its rated power for 1 minutes or 20 % for 5 minutes, without shutting down.

Siemens bell transformers are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the bell transformer must be switched off for approx. 30 minutes to cool down the PTC resistor.

Benefits

- Bell transformers with a footprint of only one modular width
- Reliable device protection through PTC resistors; for protection against overload and short circuits
- The bell transformers are IMQ (Italy) and VDE approved. This guarantees safety during applications.

Technical specifications

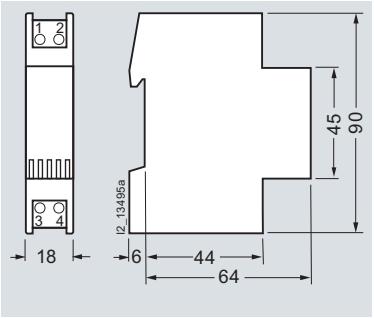
			4AC3 006	4AC3 008	4AC3 016	4AC3 108	4AC3 116	4AC3 140
Standards **Approved acc. to**			EN 61558-2-8 EN 61558-2, IMQ					
Rated operational power P_s		VA	8	8	16	8	16	40
Rated operational voltage U_e		V AC	230					
Operating range at 50/60 Hz		× U_e	0.9 ... 1.06					
Rated frequency		Hz	50					
Operating frequency range		Hz	45 ... 65	48 ... 62				
Rated secondary voltage U_{sec} • In series connection		V AC V AC	12 --	2 × 4 8		2 × 12 24		
Rated secondary current I_{sec} • At 4 V • At 8 V • At 12 V • At 24 V		 A AC A AC A AC 	 -- -- 0.67 --	 2 × 1.0 1 -- --	 2 × 2.0 1 -- --	 -- -- 2 × 0.33 0.33	 -- -- 2 × 0.67 0.67	 -- -- 2 × 1.67 1.67
Rated power dissipation P_V • In no-load operation • At rated load		 W W	 0.78 1.65	 1.8 5	 2.4 7.5	 1.6 3.6	 1.6 8.2	 1.2 17.2
Safe isolation • Creepage distances and clearances		 mm	 > 3					
Insulation class			B					
Test voltage, 50 Hz, 1 minute • Primary against secondary winding		 kV	 4	 > 3.75				
Terminals	± screw (Pozidriv)		1					
Conductor cross-sections • Rigid • Flexible, with end sleeve		 mm^2 mm^2	 1 × 6 or 2 × 4 0.75					
Permissible ambient temperature		°C	-10 .... +25					
Permissible humidity		%	≤ 80					
Degree of protection	Acc. to EN 60629		IP20					
Safety class	Acc. to EN 61140/ VDE 0140-1		II					

4AC3 0, 4AC3 1 bell transformers

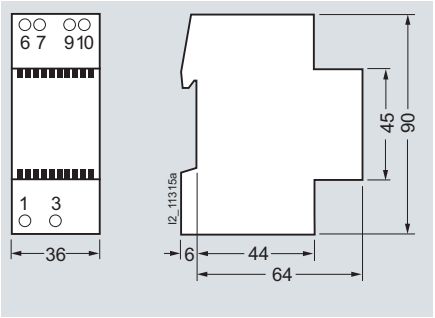
Selection and ordering data

	U_e	U_c	I_{sec}	P_s	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	V AC	A AC	VA						Unit(s)	Unit(s)	kg
	**Bell transformers**											
	230	12	0.67	8	1	B	**4AC3 006**		027	1	1	0.168
	With two secondary voltages, optionally for series or parallel switching											
	230	2 × 4/8	2 × 1/1	8	2	A	**4AC3 008**		027	1	1	0.290
			2 × 2/2	16	2	B	**4AC3 016**		027	1	1	0.370
		2 × 12/24	2 × 0.33/0.33	8	2	▶	**4AC3 108**		027	1	1	0.260
			2 × 0.67/0.67	16	2	A	**4AC3 116**		027	1	1	0.320
			2 × 1.67/1.67	40	3	A	**4AC3 140**		027	1	1	0.490

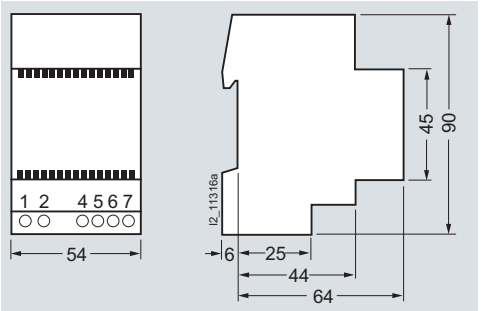
Dimensional drawings



4AC3 006

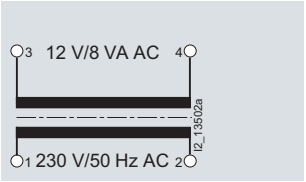


4AC3 008
4AC3 016
4AC3 108
4AC3 116

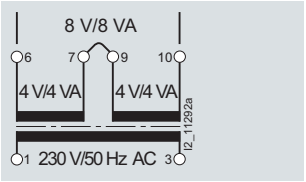


4AC3 140

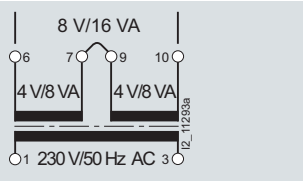
Schematics



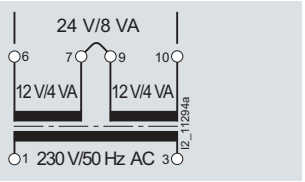
4AC3 006



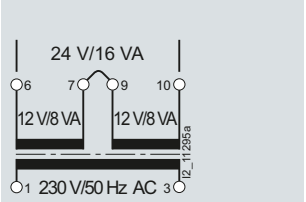
4AC3 008



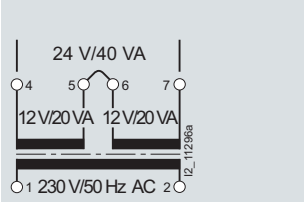
4AC3 016



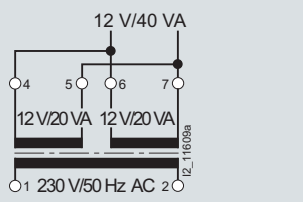
4AC3 108



4AC3 116



4AC3 140



4AC3 140, parallel switching

Note:
The 12 V outputs must be switched in parallel or in series. Our example shows the 4AC3 140. In parallel connection, they can be used for 12 V/40 VA, in series connection for 24 V/40 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

* You can order this quantity or a multiple thereof.

Overview

These transformers up to 63 VA provide a safety extra-low voltage (SELV) for the supply of control circuits, switching relays and Insta contactors in continuous operation as an AC voltage/ current supply for 8, 12 or 24 V AC.

Siemens transformers for permanent loads are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the transformer must be switched off for approx. 30 min to allow the PTC resistor to cool down.

EN 61558-2-2 specifies that the difference between the non-loaded output voltage and the output voltage loaded with the rated load for transformers for permanent loading must not exceed 10 %. This requirement places the highest demands on the design of this type of transformer. It can only be met by using high-quality core materials and a core design with an extraordinarily high efficiency, such as type EI according to DIN 41302.

Benefits

- The transformers with 24, 40 and 63 VA cores are molded, which means that they are hum-free and suitable for installation in sound-sensitive distribution boards
- Reliable device protection through PTC; provide longstanding protection against overload and short circuits
- The transformers are IMQ and VDE approved – this ensures safety in use.

Technical specifications

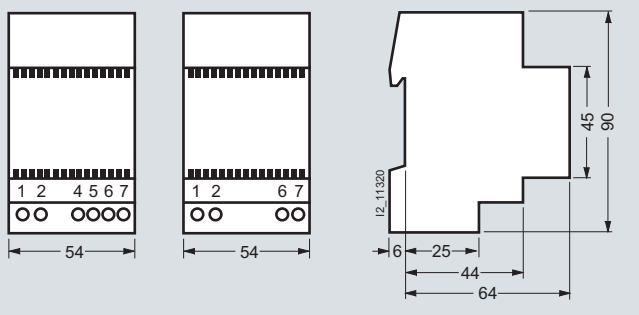
			4AC3 408	4AC3 516	4AC3 524	4AC3 540	4AC3 616	4AC3 624	4AC3 640	4AC3 663
Standards **Approved acc. to**			EN 61558-2-2 EN 61558-2, IMQ							
Rated operational power P_s		VA	8	16	24	40	16	24	40	63
Rated short-time power p.f. = 0.5; t = 10 s		VA	10	18	27	48	18	27	48	80
Rated operational voltage U_e		V AC	230							
Operating range at 50/60 Hz		× U_e	0.9 ... 1.1							
Rated frequency		Hz	50							
Range of operating frequency		Hz	48 ... 62							
Rated secondary voltage U_{sec} In series connection		V AC V AC	8 No	2 × 4 8	8 No		2 × 12 24			
Rated secondary current I_{sec} • At 4 V • At 8 V • At 12 V • At 24 V		A AC A AC A AC A AC	No 1 No No	2 × 2 2	No 3	5	No 2 × 0.67 0.67	2 × 1 1	2 × 1.67 1.67	2 × 2.62 2.62
Rated power dissipation P_V • In no-load operation • At rated load		VA W	3.5 2.6	10.3 4.6	8.0 2.7	13.8 6.9	8.0 3.6	13.1 6.3	8.3 5.7	23.0 10.0
Hum-free Core molded			No		Yes		No	Yes		
Safe isolation Creepage distances and clearances		mm	≥ 3							
Insulation class			B							
Test voltage, 50 Hz 1 minute Primary against secondary winding		kV	≥ 4							
Terminals	± screw (Pozidriv)		1							
Conductor cross-sections • Rigid • Flexible, with end sleeve, min.		mm^2 mm^2	1 ... 6 0.75							
Permissible ambient temperature In operation		°C	-10 ... +40							
Permissible humidity		%	≤ 80							
Degree of protection	Acc. to EN 60529		IP20							
Safety class	Acc. to EN 61140/ VDE 0140-1		II							

4AC3 4 ... 4AC3 6
transformers for permanent loads

Selection and ordering data

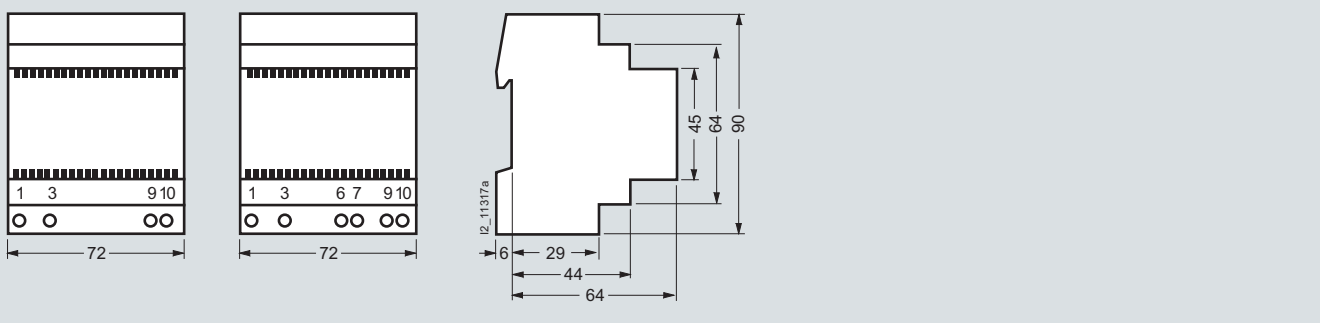
	U_e	U_{sec}	I_{sec}	P_s	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	V AC	A AC	VA						Unit(s)	Unit(s)	kg
	**Transformers for permanent loads**											
	With PTC protection for AC voltage/current supply as safety extra-low voltage for continuous operation for the supply of control circuits, switching relays and Insta contactors											
	With one secondary voltage											
	230	8	1	8	3	A	**4AC3 408**		027	1	1	0.320
			3	24	4	B	**4AC3 524**		027	1	1	0.940
			5	40	4	B	**4AC3 540**		027	1	1	0.870
	With two secondary voltages, optionally for series or parallel switching											
	230	2 × 4/8	2 × 2/2	16	3	B	**4AC3 516**		027	1	1	0.600
		2 × 12/24	2 × 0.67/0.67	16	3	A	**4AC3 616**		027	1	1	0.600
			2 × 1.0/1.0	24	4	A	**4AC3 624**		027	1	1	0.910
			2 × 1.67/1.67	40	4	A	**4AC3 640**		027	1	1	0.840
			2 × 2.62/2.62	63	5	A	**4AC3 663**		027	1	1	1.170

Dimensional drawings



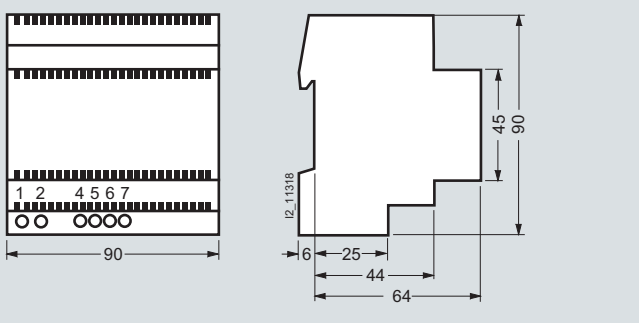
4AC3 516
4AC3 616

4AC3 408



4AC3 524
4AC3 540

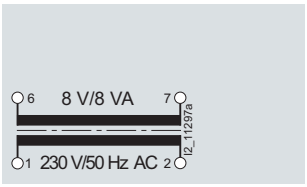
4AC3 624
4AC3 640



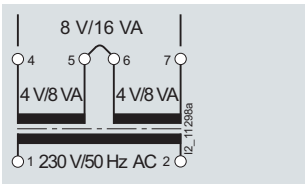
4AC3 663

* You can order this quantity or a multiple thereof.

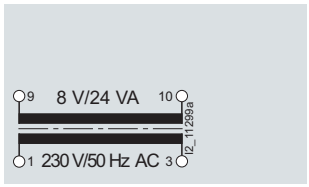
Schematics



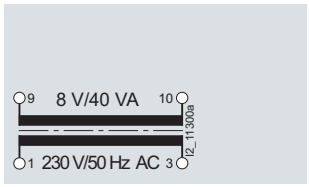
4AC3 408



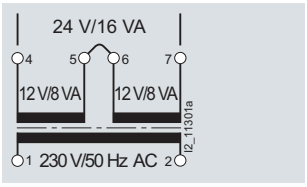
4AC3 516



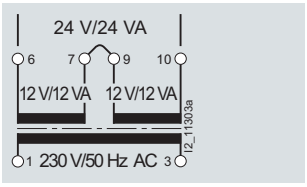
4AC3 524



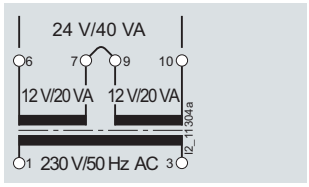
4AC3 540



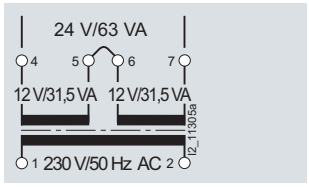
4AC3 616



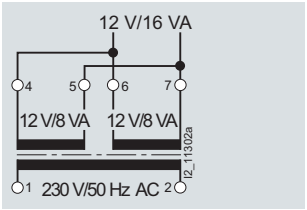
4AC3 624



4AC3 640



4AC3 663



4AC3 616, parallel switching

Please note:
The 12 V outputs must be switched in parallel or in series. Our example shows the 4AC3 616. In parallel connection, they can be used for 12 V/16 VA, in series connection for 24 V/16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

4AC2 4 power supply units

Overview

The electronic power supply unit provides a 24 V DC supply to systems with an operational voltage of 85 to 265 V AC or 85 to 300 V DC. The device operates in the lower class for minimum power supply with a safety extra-low voltage.

In the event of short circuits and high capacitive loads, the power supply unit detects the overcurrent as soon as it is activated and shuts down immediately.
It switches back on after 2.5 seconds. The electronic power supply unit is suitable for supplying the 5TT7 1 GSM alarm modules within a supply voltage range of 150 to 230 V AC.

Power supply units for direct voltages with rectifiers are used to supply gongs, bells, door openers, switching relays, remote control switches, Insta contactors or for safety extra-low voltage systems (SELV) in continuous operation. They are protected against short circuit or moderate overload by a PTC resistor. If tripped, the power supply unit must be switched off for approx. 30 minutes to allow the PTC resistor time to cool down.

Benefits

- Expanded applications due to safety extra-low voltage SELV.

Electronic power supply unit

- Smallest electronic power supply unit in the lower power class in 2 MW. This saves valuable space in distribution boards
- Universal applications in many systems, thanks to wide range voltage supply of 85 to 265 V AC or 85 to 300 V DC
- Interference suppression to limit value Class B (lower limit) even meets the requirements for residential buildings.

Power supply units with bridge rectifiers

- The power supply units are IMQ and VDE approved. This ensures continuous operation.

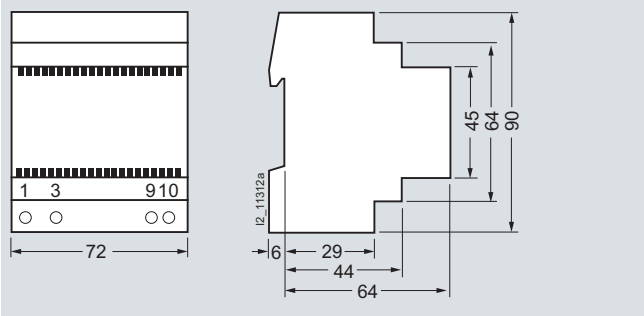
Technical specifications

			4AC2 400	4AC2 401	4AC2 402
Standards			EN 61558-2-6		EN 60068-2, EN 61558-1, EN 61000-4
Certifications			EN 61558-2; IMQ		--
Rated operational power P_s		W	24	43	8.4
Rated operational voltage U_e		V AC V DC	230 --		85 ... 265 85 ... 300
Permissible operational voltage For the 5TT7 1 GSM alarm modules		V AC/DC	--		150 ... 265
Operating range	At 50/60 Hz	× U_e	0.9 ... 1.1		--
Rated frequency		Hz	50		50/60
Operating frequency range		Hz	48 ... 52		--
Rated secondary voltage U_{sec}		V DC	12	24	24 ± 5 %
Rated secondary current I_{sec}		A DC	2.0	1.8	0.35
Current limitation			PTC		Electronic overload protection
Residual ripple		mV	--		< 100
Rated power dissipation P_v	In no-load operation At rated load	W W	5 10	6 15	-- --
Hum-free	Core molded		Yes		--
Safe isolation	Creepage distances and clearances	mm	8		> 5.5
Insulation class			B		--
Test voltage Primary against secondary winding	50 Hz, 1 min	kV	> 4		--
Insulation resistance		kV	--		4
Rated impulse withstand voltage/degree of pollution	Acc. to IEC 60664-1		--		6 kV/2
Static discharge	Acc. to IEC/EN 61000-4-2	kV	--		8
RF irradiation	Acc. to IEC/EN 61000-4-3	V/m	--		10
Transient overvoltage (burst)	Acc. to IEC/EN 61000-4-4	kV	--		4
Transient overvoltage (surge) • Supply lines A1, A2 • A1/A2 and ground	Acc. to IEC/EN 61000-4-5	 kV kV	 -- --		 1 2
RF, conducted disturbance	Acc. to IEC/EN 61000-4-6	V	--		10
Interference suppression to lower limit class	Acc. EN 61000-6-3		--		Complied with
Terminals • Screw (slotted-head) • ± screw (Pozidriv)			 -- 1		 M2,5 --
Conductor cross-sections • Rigid • Flexible, with end sleeve, min.		 mm^2 mm^2	 1.5 ... 6 0.75		 0.5 ... 2.5 0.5 ... 1.5
Permissible ambient temperature		°C	-10 ... +40		-20 ... +60
Permissible humidity		%	≤ 80		
Resistance to climate	Acc. to IEC/EN 60068-1		--		20/045/04
Resistance to vibrations Frequency 10 ... 55 Hz	Acc. to IEC/EN 60068-2-6	mm	--		0.35 amplitude
Degree of protection	Acc. to EN 60529		IP20, with connected conductors		
Safety class	Acc. to EN 61140		II		

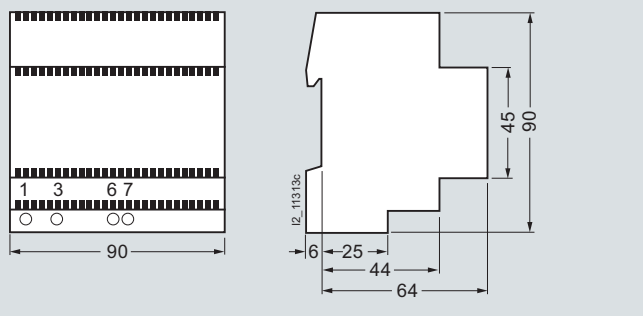
Selection and ordering data

	U_e		U_{sec}	I_{sec}	P_s	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	V DC	V DC	A DC	W						Unit(s)	Unit(s)	kg
	**Power supply units** With transformer for safety extra-low voltage, with rectifier in center tap connection												
	230	--	12	2.0	24	4	A	**4AC2 400**		027	1	1	0.830
		--	24	1.8	43	5	A	**4AC2 401**		027	1	1	1.160
	**Electronic power supply units** SELV, short-circuit resistant												
	85 ... 265	85 ... 300	24 ± 5 %	0.35	8.4	2	B	**4AC2 402**		027	1	1	0.080

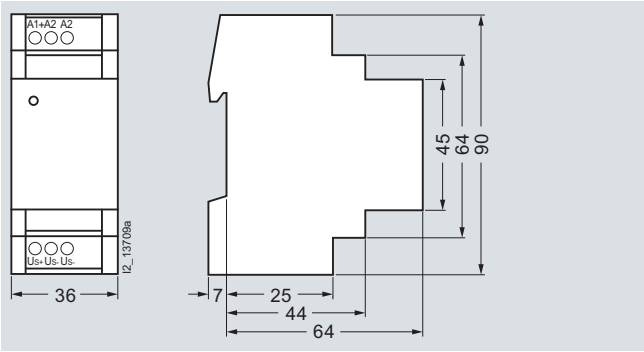
Dimensional drawings



4AC2 400

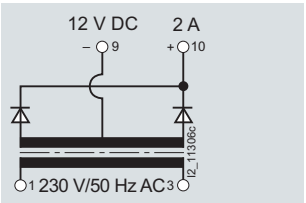


4AC2 401

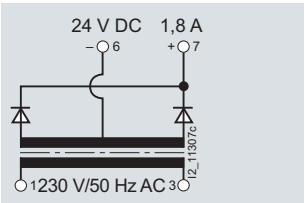


4AC2 402

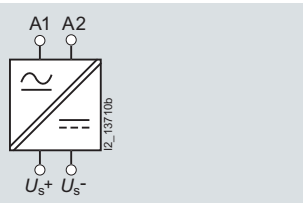
Schematics



4AC2 400



4AC2 401



4AC2 402

* You can order this quantity or a multiple thereof.

7LQ2 2 bells and buzzers

Overview

Bells and buzzers are typically used in residential buildings and non-residential buildings, such as shops, offices, banks, etc. They are used to indicate alarm states or for general acoustic signaling.

Bells and buzzers are used as modular installation devices in distribution boards. These devices are designed for short-time use in compliance with IEC 62080.

Benefits

- Bell transformers and buzzers with a footprint of only one modular width
- Reliable device protection through PTC; for protection against overload and short circuits.

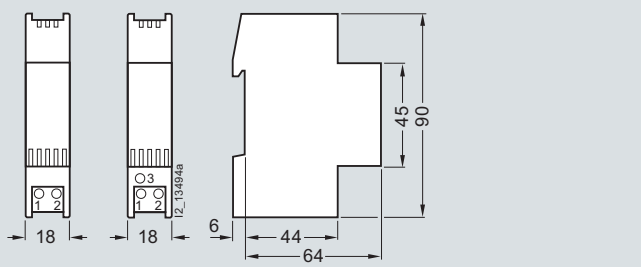
Technical specifications

			7LQ2 204-0 7LQ2 205-0 7LQ2 206-0	7LQ2 204-1 7LQ2 205-1 7LQ2 206-1
Standards			IEC 62080	
Rated operational power P_s		VA	5.5	4
Rated operational voltage U_e		V AC	230	12
Operating range	At 50/60 Hz	× U_e	0.94 ... 1.06	
Rated frequency		Hz	50	
Operating frequency range		Hz	45 ... 65	
Rated power dissipation P_V	In no-load operation	W	0.83	
Degree of pollution	Acc. to EN 61010-1		2	
Working voltage	Acc. to EN 61010-1	V AC	230	12
Insulating material group	Acc. to EN 61010-1		II	
Safe isolation • Clearance • Creepage distances in device		 mm mm	 ≥ 3 ≥ 2.5	 ≥ 1.5 ≥ 1.5
Test voltage 50 Hz, 1 min.		kV	1.25	1
Flammability		Class	V0	
Conductor cross-sections • Rigid • Flexible with end sleeve		 mm^2 mm^2	 1 × 6 or 2 × 4 0.75	
Volume		dB	≥ 75	
Permissible ambient temperature		°C	-10 ... +55	
Permissible humidity		%	≤ 80	
Degree of protection	Acc. to EN 60529		IP20, with connected conductors	
Safety class	Acc. to EN 61140		II	

Selection and ordering data

	U_e	P_s	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	VA							Unit(s)	kg
Bells										
	230	5.5	1	B	**7LQ2 204-0**		027	1	1	0.053
	12	4	1	B	**7LQ2 204-1**		027	1	1	0.053
Buzzers										
	230	5.5	1	B	**7LQ2 205-0**		027	1	1	0.053
	12	4	1	B	**7LQ2 205-1**		027	1	1	0.053
Bell-buzzer combinations										
	230	5.5	1	B	**7LQ2 206-0**		027	1	1	0.053
	12	4	1	B	**7LQ2 206-1**		027	1	1	0.091

Dimensional drawings

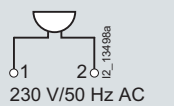


7LQ2 204
7LQ2 205

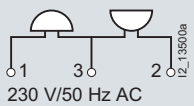
7LQ2 206

Schematics

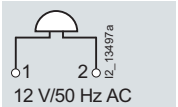
7LQ2 204-0



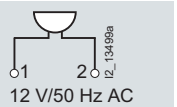
7LQ2 205-0



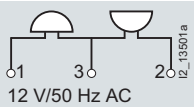
7LQ2 206-0



7LQ2 204-1



7LQ2 205-1



7LQ2 206-1

* You can order this quantity or a multiple thereof.

Overview

The socket outlets for mounting in distribution boards acc. to DIN 43880 and on standard mounting rails acc. to DIN 60715 have since become standard in modern switchgear assemblies/distribution boards. They are used for tasks such as the connection of plug-in communication devices in communication distribution boards, in switchgear assemblies for maintenance purposes or in private plants for the occasional use of devices with heavy starting and separate fusing. The socket outlet range complies with a number of different standards and is available according to the standards of the following countries: VDE for Germany, CEE7 for Belgium/France, CEI for Italy and UL for USA.

In distribution boards with 55 mm mounting depth the socket outlet can only be used without the hinged lid. The lids can be retrofitted on all devices. To make installation easier, the touch-protected terminals L, N and PE are located on the side of the socket outlet.

In plant sections where equipment is still current-carrying, even after the main switch has been disconnected, this must be indicated acc. to DIN VDE 0105-1 and IEC/EN 60204-1/ DIN VDE 0113-1. Yellow socket outlets are used for these applications.

Benefits

- Complete program according to VDE, UL, CEI and CEE for worldwide application.
- By pulling on the hinges, the hinged lid stays open at more than 180°. This facilitates manual insertion of connectors.

Technical specifications

		5TE6 800	5TE6 801	5TE6 810	5TE6 802	5TE6 803	5TE6 804
Standards		**VDE 0620-1**	**VDE 0620-1**	**VDE 0620-1**	**CEI 23-50**	**CEE 7 standard sheet V**	**UL 498**
Approved acc. to		VDE 0620-1			--		UL File No. E258598/ CSA C22.2 No. 182.3M
Rated operational voltage U_e	V AC	230					125
Rated operational current I_e	A AC	16					15
Terminals ± screw (Pozidriv)		PZ1					
Terminal tightening torque, max.	N	1.2					
Stripped length	mm	10					
Conductor cross-sections							
• Rigid	mm^2	1.5 ... 6					
• Flexible, with end sleeve	mm^2	0.5 ... 4					
• Rigid	AWG	10 ... 14					
• Flexible	AWG	14					
Permissible ambient temperature	°C	-10 ... +55					
Degree of protection Acc. to EN 60529		IP20, with connected conductors					
Mounting position		Without cover: any, with cover: vertical or horizontal					

Selection and ordering data

	U_e	I_e	Conductor cross-section	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A	mm^2				1 unit		Unit(s)	Unit(s)	kg
											
(SCHUKO) socket outlets according to DIN VDE 0620-1											
• Without hinged lid	230	16	6	2.5	►	**5TE6 800**		027	1	1	0.089
											
(SCHUKO) socket outlets according to DIN VDE 0620-1											
• With hinged lid	230	16	6	2.5	►	**5TE6 801**		027	1	1	0.094

* You can order this quantity or a multiple thereof.

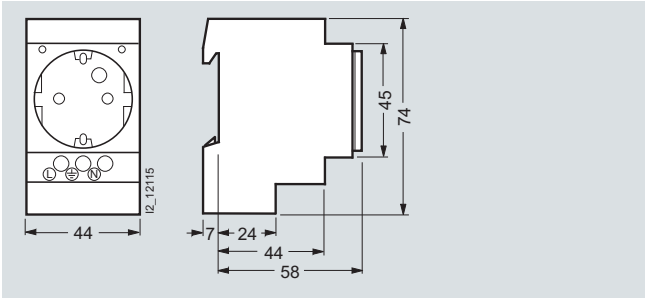
5TE6 8 socket outlets

	U_e	I_e	Conductor cross-section	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A	mm^2				1 unit		Unit(s)	Unit(s)	kg
	**SCHUKO socket outlets according to DIN VDE 0620-1**										
	• Without hinged lid, yellow RAL 1018										
	230	16	6	2.5	►	**5TE6 810**		027	1	1	0.089
	**Socket outlets according to CEI 23-50**										
	• With hinged lid										
	230	16	6	2.5	►	**5TE6 802**		027	1	1	0.094
	**Socket outlets according to CEE 7 standard sheet V**										
	• Without hinged lid, with grounding pin										
	230	16	6	2.5	►	**5TE6 803**		027	1	1	0.090
	**UL 498 socket outlets**										
	• Without hinged lid										
	125	15	6	2.5	►	**5TE6 804**		027	1	1	0.088
	**Hinged lids for 5TE6 socket outlets**			2.5	B	**5TE9 120**		027	1	1	0.020

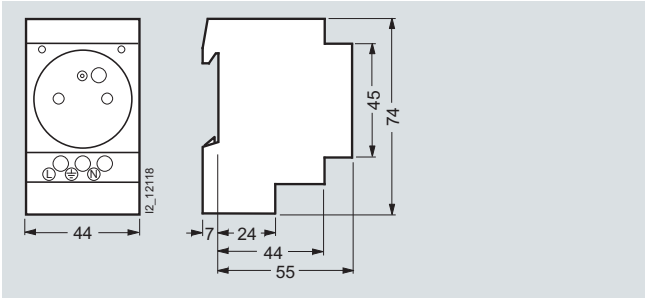
10

* You can order this quantity or a multiple thereof.

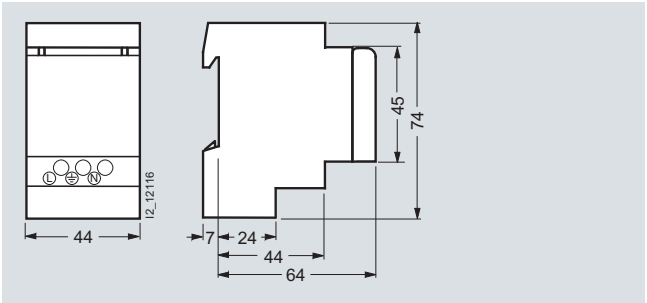
Dimensional drawings



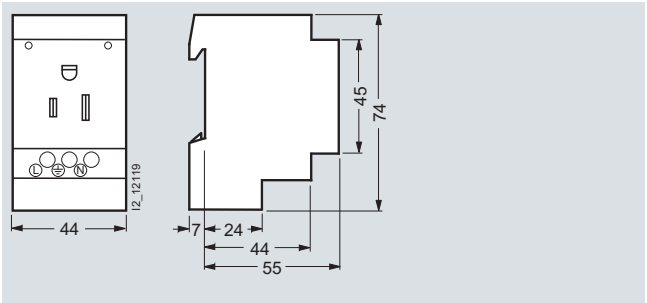
5TE6 800
5TE6 810



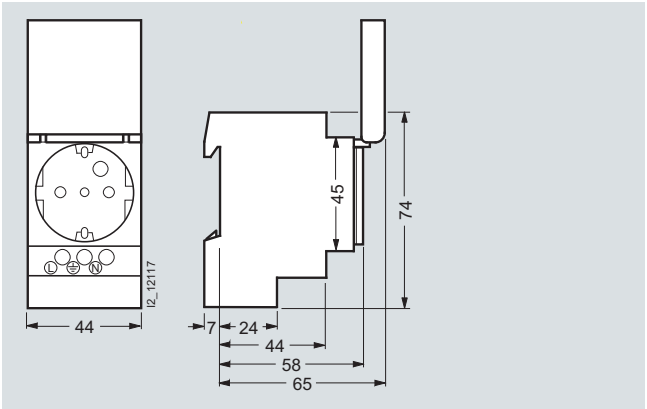
5TE6 803



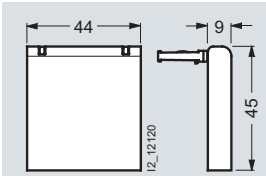
5TE6 801



5TE6 804



5TE6 802

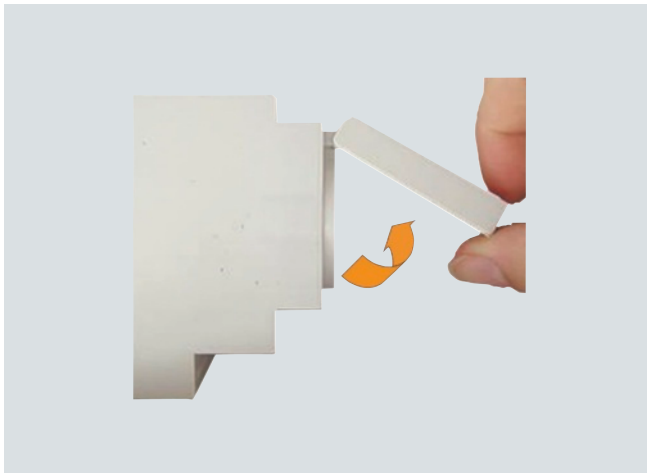


5TE9 120

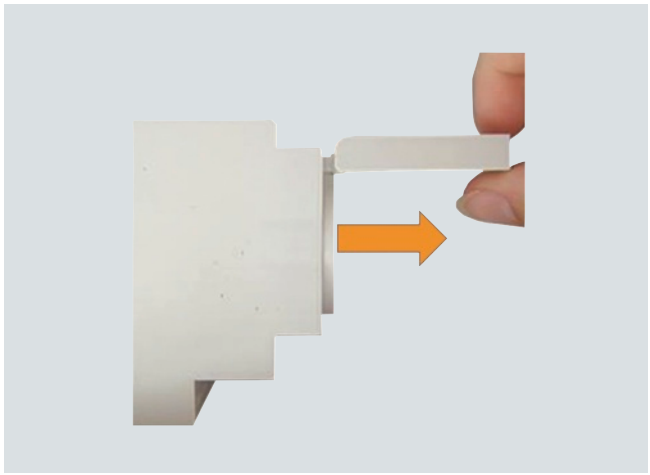
10

More information

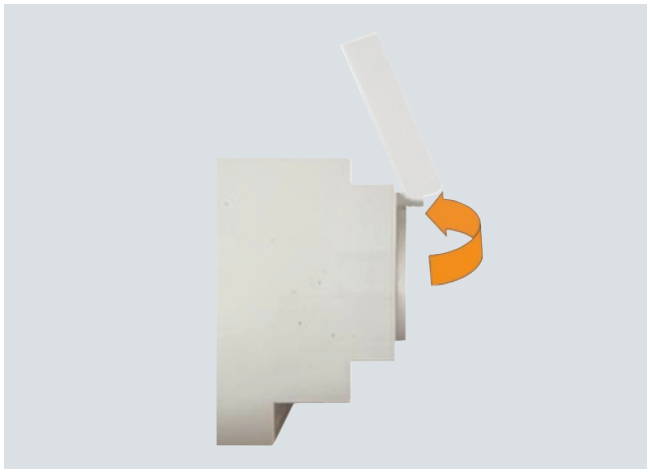
Hinged lid for simple application



The hinged lid can be opened at an angle greater than 180°.



By pulling on the hinges, the covers stay open, which facilitates plugging in. The hinged lids can be retrofitted on all versions.



In order to make sure that it is possible to work on the distribution board in the event of a power failure, we recommend that the infeed socket outlet is fed using a short-circuit current proof cable installation and a separate fuse. The yellow socket outlet must be used for this purpose.

BETA Measuring
Three-Phase Measuring Devices

11

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**7KT1 30 multimeters**	11/3	Display of 23 electrical measured values for switchgear assemblies, infeed or outgoing feeders. Easy commissioning due to fault detection if connected incorrectly.	IEC 60051-2, EN 60051-2 IEC 61010-1, EN 61010-1 (VDE 0411 T 1)	✓	--	✓
	**7KT1 31, 7KT1 34, 7KT1 35 multicounters**	11/8	Display of 35 electrical measured values and consumption values in switchgear assemblies, infeed or outgoing feeders. Easy commissioning due to fault detection if connected incorrectly. Transmission of measured values over PROFIBUS DP, Modbus RTU or LAN.	IEC 60051-2, EN 60051-2 IEC 61010-1, EN 61010-1 (VDE 0411 T 1) IEC 62053-21, EN 62053-21 (VDE 0418 T 3-21)	✓	--	✓
	**7KT1 39 LAN couplers**	11/16	Up-to-date consumption data of the multicounter and E-counter available worldwide over LAN data communication. Microsoft Excel operator interface. Signaling of limit violations with time stamp.	IEEE 802	✓	--	✓
	**7KT1 5 E-counters**	11/19	Measurement of consumption data and plant capacity utilization in three-phase systems of system components, offices or holiday apartments. Transmission of measured values over LAN using LAN couplers.	IEC 61010-1, EN 61010-1 (VDE 0411 T 1) IEC 62053-11, EN 62053-11 (VDE 0418 T 3-11) IEC 62053-21, EN 62053-21 (VDE 0418 T 3-21)	✓	✓	✓
	**7KT1 1 E-counters *instabus* KNX**	11/23	Measurement of consumption data and plant capacity utilization in three-phase systems of system components, offices or holiday apartments. Transmission of measured values over *instabus* KNX interface	IEC 61036 EN 61036 (VDE 0418 T7)	✓	--	✓
	**7KT1 2 current transformers**	11/27	Straight-through transformers for installation in distribution boards and non-contact measuring of primary currents. Ideal for combining with switch disconnectors, multimeters, multicounters and E-counters.	IEC 60044-1, EN 60044-1 (VDE 0414 T 44-1)	✓	--	✓
	**7KT9 0 measuring selector switches**	11/28	For switching over the phases for voltmeters and ammeters		✓	--	✓

Overview

Multimeters are mainly used in power distribution boards for infeeds into buildings and plants. They replace the more common analog voltmeters and ammeters with measuring point changeover, as well as measuring devices for power outputs and power factor p.f.

The standard measured quantity to be indicated in the 5 display fields of the multimeter can be tailored to customer requirements. Versions for direct connection 63 A or for transformers /5 A with adjustable transformer primary current from 5 to 5000 A support a wide range of applications.

The green 7-segment displays for the measured values and the orange indicators of the units of measurement directly alongside the measured values make for easy reading.

Benefits

- Clear display of all necessary measured values
- All measured values can be read from a distance
- Customized setting of the measured quantities for the standard display
- Wide range of applications thanks to flexible adaptation to measuring current transformers
- Detection of connection errors during commissioning saves considerable time when trying to locate faults
- Large, 11 mm high, green 7-segment displays for measured values makes for easy reading
- Indication of units of measurement directly alongside the related measured values provide a clear overview.

Technical specifications

			7KT1 300	7KT1 301	7KT1 302
Standards			DIN 43751-1, DIN 43751-2 and EN 61010-1		
Supply					
• Rated control supply voltage U_c		V AC	230		
• Operating range		× U_c	0.8 ... 1.2		
• Rated frequency		Hz	50		
• Frequency range		Hz	45 ... 65		
• Rated power dissipation P_v		VA	≤ 10		
Overload capability					
• Voltage	Continuous: phase/phase 1 second: phase/phase	V V	480 800		
	Continuous: phase/N 1 second: phase/N	V V	276 460		
• Current	Continuous 0.5 s 10 ms	A A A	76 -- 1000	6 110 --	
Measuring inputs					
• Connection type			Direct	Transformer /5 A	
• Voltage U_e	Phase/phase Phase/N	V V	400 230		
• Operating range voltage	Phase/phase Phase/N	V V	87 ... 400 50 ... 230		
• Current I_e		A	63	5	
• Operating range current		A	0.1 ... 63	0.01 ... 5	
• Transformer current	Primary current of the transformer Smallest input step	A A	-- --	5 ... 5000 5	
• Frequency		Hz	50		
• Frequency ranges		Hz	45 ... 65		
Display					
• Connection errors	Inverted phases		Err		
• Voltage: 3 displays, 3-digit	Delta L1 – L2, L2 – L3, L3 – L1 Star L1/N – L2/N – L3/N Voltage > 480/276 V Voltage < 87/50 V	V V	87 ... 480 50 ... 276 H H H – – –		
• Current: 3 displays, 3-digit	L1 – L2 – L3 For current > 76 A or 6 A × transformer conversion ratio For current < 0.1 A or 0.01 A × transformer conversion ratio		0.3 ... 76 A H H H O O O	0.1 A ... 1.2 kA	
• Frequency: 1 display, 3-digit	ΣL	Hz	45.0 ... 65.0		
• Active power: 3 displays, 3-digit or 1 display, 3 of 7 digits	L1 – L2 – L3, ΣL Display with floating decimal point	W, kW or MW	0 ... 999		
• Reactive power: 1 display, 3-digit	ΣL, with capacitive or inductive indication; display with floating decimal point	var, kvar or Mvar	0 ... 999		
• Apparent power: 3 displays, 3-digit or 1 display, 3-digit	L1 – L2 – L3, ΣL Display with floating decimal point	W, kW or MW	0 ... 999		
• p.f.: 3 displays, 3-digit or 1 display, 3-digit	L1 – L2 – L3, ΣL Display with floating decimal point		0.01 ... 1.00		
• Transformer primary current	Only if set	A	--	5 ... 5000	
• Transformer secondary current	Only if set	A	--	5	
• Display period		/s	2		
• Storage of setting			EEPROM		

7KT1 30 multimeters

			7KT1 300	7KT1 301	7KT1 302
Measuring accuracy					
• Voltage		%	2		
• Current		%	2		
• Power		%	4		
• p.f.		%	4		
• Frequency		%	2		
Safety acc. to EN 61010-1					
• Degree of pollution			2		
• Overvoltage category			II		
• Operating voltage category		V	600		
• Clearances		mm	≥ 3.0		
• Creepage distances	In device	mm	≥ 4.3		
	On printed boards (not installed)	mm	≥ 3.0		
• Test pulse voltage	1.2/50 µs	kV	4		
• Test voltage	50 Hz, 1 min	kV	2.2		
Terminals					
• Main current paths	± screw (Pozidriv)		2	1	
• Supply terminals	Blade for slotted screw	mm × mm	0.4 × 2.5		
• Conductor cross-sections, main current paths	Rigid, maximum	mm^2	1 × 25 or 2 × 16	1 × 6 or 2 × 4	
	Rigid, minimum	mm^2	1 × 1.5		
• Conductor cross-sections for supply terminals	Rigid, maximum	mm^2	1 × 2.5 or 2 × 1.5		
	Flexible, with end sleeve, minimum	mm^2	1 × 0.75		
Ambient conditions					
• Temperature		°C	0 ... +55		
• Relative humidity		%	≤ 80		
• Vibrations	Sinus amplitude at 50 Hz	mm	±0.25		
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors		
- Front panel, 96 mm × 96 mm			--		IP54
• Safety class	Acc. to EN 61010-1		II		

11

Selection and ordering data

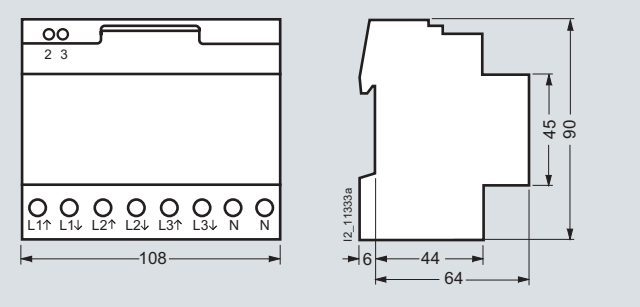
	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	Multimeters										
	For the display of 23 electrical values, of which 5 values can be continuously displayed.										
	Standard rail mounting										
	For direct connection										
	3 × 230/400	63	230	6	B	**7KT1 300**		027	1	1	0.400
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A										
	3 × 230/400 Trans-formers /5		230	6	B	**7KT1 301**		027	1	1	0.380
	Front-panel mounting										
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A, mounting dimensions 96 mm × 96 mm										
	3 × 230/400 Trans-formers /5		230	--	B	**7KT1 302**		027	1	1	0.378

7KT1 300

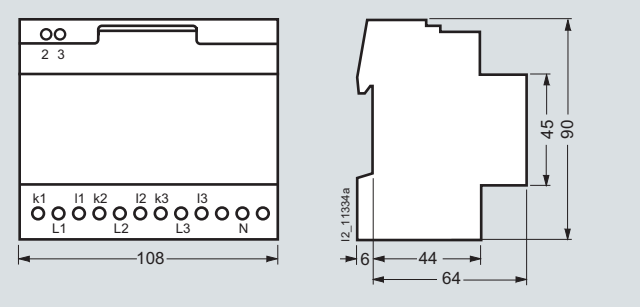
7KT1 302

* You can order this quantity or a multiple thereof.

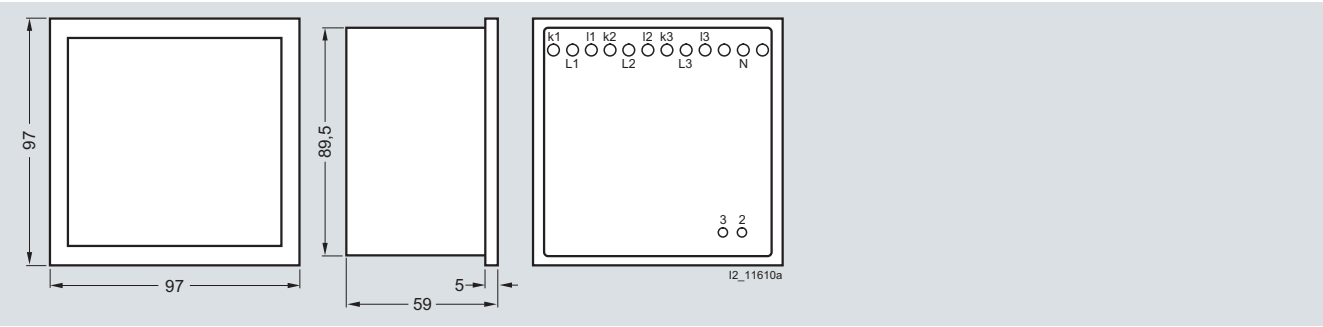
Dimensional drawings



7KT1 300



7KT1 301



7KT1 302

Rear panel

11

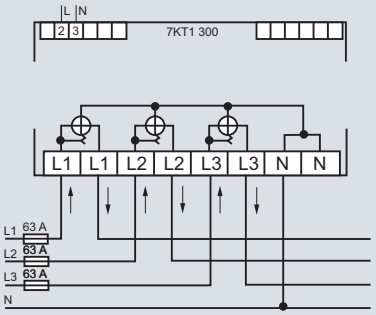
Schematics

Instructions for the connection of transformer counters

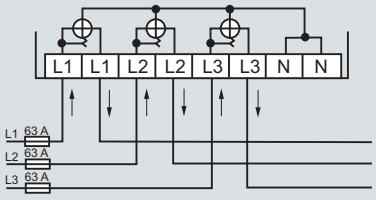
In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminal 2, depending on the fusing for phases L1, L2, L3. A fuse of 6 A is recommended for the line protection.

Current transformers must not be operated with open terminals as this can result in dangerously high voltages, which may result in personal injuries and property damage. It can also lead to a thermal overload of the transformers.

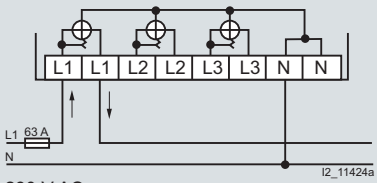
230 V AC



230/400 V AC
Direct connection 63 A, 4-wire circuit

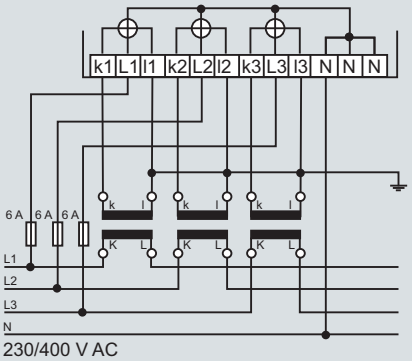


400 V AC
Direct connection 63 A, 3-wire circuit

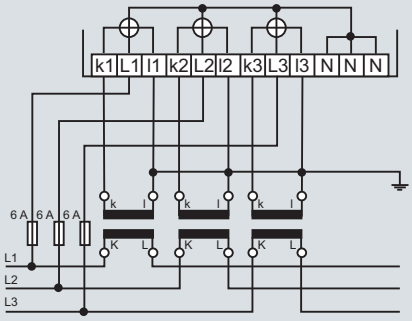


230 V AC
Direct connection 63 A, single-phase

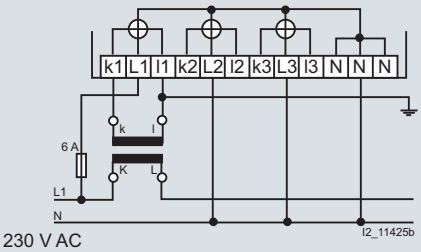
230 V AC



230/400 V AC
Current transformer connection, 4-wire circuit



400 V AC
Current transformer connection, 3-wire circuit



230 V AC
Current transformer connection, single-phase

11

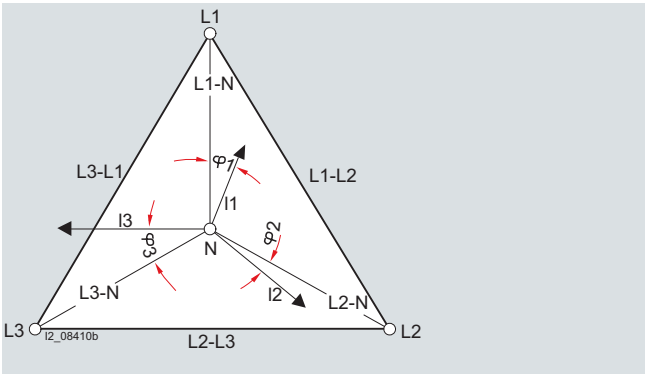
More information

Voltage measurement

The multimeter measures the delta voltages L1 against L2; L2 against L3 and L3 against L1 or the star voltages L1, L2, L3 against N.

ΣL symbol for the 3-phase system

This indicates that all physical units shown under this symbol are always 3 phase.



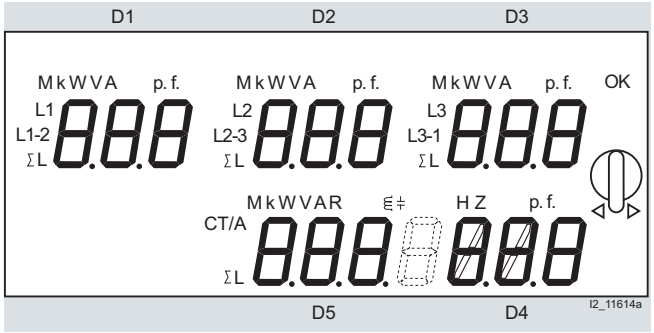
Readout data

You can continuously display 5 measured quantities from the following 23 options.

No.	Measured value	Display	Unit	Assignment
1	Active power	D1	W	L1
2	Voltage	D1	V	L1
3	Current	D1	A	L1
4	Apparent power	D1	VA	L1
5	p.f.	D1	p.f.	L1
6	Voltage	D1	V	L1 – L2
7	Active power	D2	W	L2
8	Voltage	D2	V	L2
9	Current	D2	A	L2
10	Apparent power	D2	VA	L2
11	p.f.	D2	p.f.	L2
12	Voltage	D2	V	L2 – L3
13	Active power	D3	W	L3
14	Voltage	D3	V	L3
15	Current	D3	A	L3
16	Apparent power	D3	VA	L3
17	p.f.	D3	p.f.	L3
18	Voltage	D3	V	L3 – L1
19	Active power	D1, D2, D3, D5	W	ΣL
20	Apparent power	D1, D2, D3, D5	VA	ΣL
21	Reactive power	D5	var	ΣL
22	Frequency	D4	Hz	ΣL
23	p.f.	D1, D2, D3, D4	p.f.	ΣL
2 set values are also indicated:				
24	Transformer setting	D5	CT/A	/5
25	Transformer setting		CT/A	5 ... 5000

Display

The multimeters have a covered, brightly lit LED display. The measured values are indicated on an 11 mm high, green, 7-segment LED, the physical units are indicated by orange text abbreviations. Both colors are easier to recognize than the red LEDs used for conventional displays. Capacitive loads are automatically indicated by a capacitor symbol, inductive loads by a coil symbol – also in orange.



Matrix selection

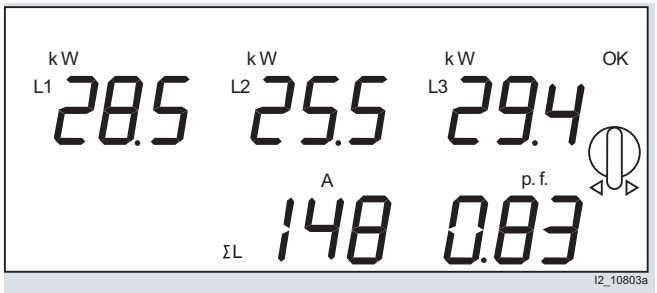
Conventional measuring instruments display voltages, currents, powers, etc. in a rigid sequence on several "screens". These multimeters allow users to define their own standard for measured quantities per display field, so that they can be implemented far more universally and flexibly.

A special feature is the analysis of the different loads on the phases. Phase displacement and unsymmetrical or unbalanced loads can cause partial overloads. These multimeters offer a range of different options for combining and assessing measured values.

The display fields are selected using rotary pushbuttons and the desired indications confirmed with OK. By making the horizontal selection e.g. W, V, A or p.f., and the vertical selection, e.g. L1, L1 – L2 or ΣL, users can then define the desired measured quantities for this display field.

The vertical data on the display can be assigned to any measured value in the horizontal data. The letters M(ega) and k(ilo) are automatically assigned according to measuring range, i.e. measured value, e.g. kW or MW. Capacitive loads are automatically indicated by a capacitor, inductive loads by a coil.

The following diagram shows an example of what your matrix selection might look like.



7KT1 31, 7KT1 34, 7KT1 35 multicounters

Overview

Multicounters are mainly used in power distribution boards for infeeds into buildings and plants. They replace the more common analog voltmeters and ammeters with measuring point changeover, as well as measuring devices for power outputs and power factor p.f.

The standard measured quantity to be indicated in the 6 display fields of the multicounter can be tailored to customer requirements. The measured values of all measured quantities can also be displayed quickly and easily over the operator buttons. Versions for direct connection 63 A or for transformers /5 A with adjustable transformer primary current from 5 to 5000 A support a wide range of applications.

The green 7-segment displays for the measured values and the orange indicators of the units of measurement directly alongside the measured values make for easy reading.

Benefits

- Clear display of all necessary measured values
- All measured values can be read from a distance
- Customized setting of the measured quantities for the standard display. Fast display of all measured quantities over operator buttons
- Wide range of applications thanks to flexible adaptation to measuring current transformers
- Detection of incorrect connections during installation
- Communication with LAN, Modbus or PROFIBUS DP enables integration in an energy management system
- Software package for data transmission over LAN and visualization of measurement data with Microsoft EXCEL enables implementation of customized solutions.

Technical specifications

Multicounters without communication interface Multicounters with RS485 interface (Modbus RTU, for LAN couplers) Multicounters with PROFIBUS DP V0 interface			**7KT1 310** **7KT1 340** **7KT1 350**	**7KT1 311** **7KT1 341** **7KT1 351**	**7KT1 312** **7KT1 342** **7KT1 352**
Standards			EN 61010-1, EN 62053-21, -23, -31		
Supply					
• Rated control supply voltage U_C		V AC	230		
• Operating range		× U_C	0.8 ... 1.2		
• Rated frequency		Hz	50		
• Frequency ranges		Hz	45 ... 65		
• Rated power dissipation P_V		VA	≤ 10		
Overload capability					
• Voltage	Continuous: phase/phase 1 second: phase/phase	V V	480 800		
	Continuous: phase/N 1 second: phase/N	V V	276 460		
• Current	Continuous 0.5 s 10 ms	A A A	76 -- 2000	6 110 --	
Measuring inputs					
• Connection type			Direct	Transformer /5 A	
• Voltage U_e	Phase/phase Phase/N	V V	400 230		
- Operating range voltage	Phase/phase Phase/N	V V	87 ... 480 50 ... 276		
• Current I_e - Operating range current		A A	63 0.3 ... 63	5 0.012 ... 5	
• Transformer current	Primary current of the transformer Smallest input step	A A	-- --	5 ... 5000 5	
• Frequency - Operating frequency range		Hz Hz	50 45 ... 65		
Display					
• Connection errors	Inverted phases		Err		
• Voltage: 3 displays, 3-digit	Delta L1 – L2, L2 – L3, L3 – L1 Star L1/N – L2/N – L3/N Voltage > 480/276 V Voltage < 87/50 V	V AC V AC	87 ... 480 50 ... 276 H H H L L L		
• Current:	L1 – L2 – L3 – N-conductor		0.3 ... 76 A	0.1 A ... 1.2 kA or 0.1 ... 6 A × transformer conversion ratio	
	For current > 76 A or 6 A × transformer conversion ratio For current < 0.3 A or 0.012 A × transformer conversion ratio		H H H O O O		
• Frequency: 1 display, 3-digit	∑L	Hz	45.0 ... 65.0		
• Active power: 3 displays, 3-digit	L1 – L2 – L3, display with floating decimal point	W, kW or MW	0 ... 999		
• Active power: 3 3 display, 3-digit, 3 of 7 digits + display Import or export	∑L, display with floating decimal point	W, kW or MW	0 ... 999		
• Reactive power: 1 display, 3 of 7 digits + capacitive or inductive load	∑L, display with floating decimal point	var, kvar or Mvar	0 ... 999		
• Apparent power: 3 displays, 3-digit	L1 – L2 – L3, ∑L Display with floating decimal point	VA, kVA or MV	0 ... 999		
• Apparent power: 5 displays, 3-digit, adjustable	∑L, display with floating decimal point	VA, kVA or MV	0 ... 999		
• Active energy: 1 display, 7-digit display Import or export, + display rate 1 or 2	∑L, display with floating decimal point	Wh, kWh or MW	0 ... 9999999 or 0 ... 999		
• Reactive energy: 1 indicator, 7-digit + capacitive or inductive load	∑L, display with floating decimal point	varh, kvarh or Mvarh	0 ... 9999999 or 0 ... 999		
• Apparent energy: 5 displays, 3-digit, adjustable rate	∑L, display with floating decimal point	VAh, kVAh or MVh	0 ... 9999999 or 0 ... 999		
• p.f.: 3 displays, 3-digit	L1 – L2 – L3, display with floating decimal point		0.01 ... 1.00		
• p.f.: 4 displays, 3-digit, adjustable	∑L		0.01 ... 1.00		

7KT1 31, 7KT1 34, 7KT1 35 multicounters

Multicounters without communication interface Multicounters with RS485 interface (Modbus RTU, for LAN couplers) Multicounters with PROFIBUS DP V0 interface			**7KT1 310 7KT1 340 7KT1 350**	**7KT1 311 7KT1 341 7KT1 351**	**7KT1 312 7KT1 342 7KT1 352**
Standards			EN 61010-1, EN 62053-21, -23, -31		
Display (contd.)					
• Transformer primary current	Only if set	A	--	5 ... 5000	
• Transformer secondary current	Only if set	A	--	5	
• Temperature		°C	0 ... +99		
• Display period		/s	2		
• Storage of setting and energy values			EEPROM		
S0 interfaces	Acc. to IEC 62053-31		Class A		
• Terminal output	For direct connection 63 A, adjustable	Imp/kWh	10 – 1 – 0.1 – 0.01 – 0.001	--	
	Depending on the transformer factor, adjustable	Imp/kWh	--	10 – 1 – 0.1 – 0.01 – 0.001	
• Pulse duration		ms	125 ... 300		
• Minimum interval between 2 pulses		ms	300		
• Required voltage		V DC	5 ... 30		
• Current ON/OFF		mA	10 ... 27/0 ... 2		
Measuring accuracy					
• Voltage		%	1		
• Current		%	1		
• Power outputs		%	2		
• Active energy	Acc. to IEC 62053-21		Class 2		
• Reactive energy	Acc. to IEC 62053-23		Class 2		
• p.f.		%	2		
• Frequency		%	1		
Safety acc. to EN 61010-1					
• Degree of pollution			2		
• Overvoltage category			II		
• Operating voltage category		V	600		
• Clearances		mm	≥ 3.0		
• Creepage distances	In device On printed boards (not installed)	mm mm	≥ 4.3 ≥ 3.0		
• Test pulse voltage	1.2/50 µs	kV	4		
• Test voltage	50 Hz, 1 min	kV	2.2		
Terminals					
• Main current paths	± screw (Pozidriv)		2	1	
• Supply and control terminals	Blade for slotted screw	mm × mm	0.4 × 2.5		
• Conductor cross-sections, main current paths	Rigid, maximum	mm^2	1 × 25 or 2 × 16	1 × 6 or 2 × 4	
	Rigid, minimum	mm^2	1 × 1.5		
• Conductor cross-sections Supply and control terminals	Rigid, maximum	mm^2	1 × 6 or 2 × 4		
	Flexible, with end sleeve, minimum	mm^2	1 × 0.75		
Ambient conditions					
• Temperature		°C	0 ... +55		
• Relative humidity		%	≤ 80		
• Vibrations	Sinus amplitude at 50 Hz	mm	±0.25		
• Degree of protection - Front panel, 96 mm × 96 mm	Acc. to EN 60529		IP20, with connected conductors --		 IP54
• Safety class	Acc. to EN 61010-1		II		

Selection and ordering data

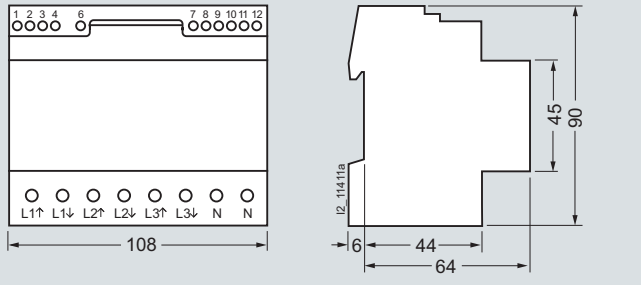
	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	Multicounters										
	For the display of 35 electrical values, of which 5 or 6 values can be continuously displayed. For 3-phase, 3/4-wire connection, with S0 interface										
	Without communication interface										
	Standard rail mounting										
 7KT1 310	For direct connection										
	3 × 230/400	63	230	6	B	**7KT1 310**		027	1	1	0.420
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 311**		027	1	1	0.410
	Front-panel mounting										
 7KT1 312	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A, mounting dimensions 96 mm × 96 mm										
	3 × 230/400	Trans-formers /5	230	--	B	**7KT1 312**		027	1	1	0.410
	With RS485 interface and RTU Modbus protocol or for connection to LAN networks over 7KT1 390 LAN coupler										
	Standard rail mounting										
	For direct connection										
	3 × 230/400	63	230	6	B	**7KT1 340**		027	1	1	0.470
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 341**		027	1	1	0.423
	Front-panel mounting										
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A, mounting dimensions 96 mm × 96 mm										
	3 × 230/400	Trans-formers /5	230	--	B	**7KT1 342**		027	1	1	0.397
	With PROFIBUS DP V0 interface										
	Standard rail mounting										
	For direct connection										
	3 × 230/400	63	230	6	B	**7KT1 350**		027	1	1	0.415
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 351**		027	1	1	0.415
	Front-panel mounting										
	For transformer connection 5 ... 5000 A, in 5 A increments, secondary current 5 A, mounting dimensions 96 mm × 96 mm										
	3 × 230/400	Trans-formers /5	230	--	B	**7KT1 352**		027	1	1	0.460

11

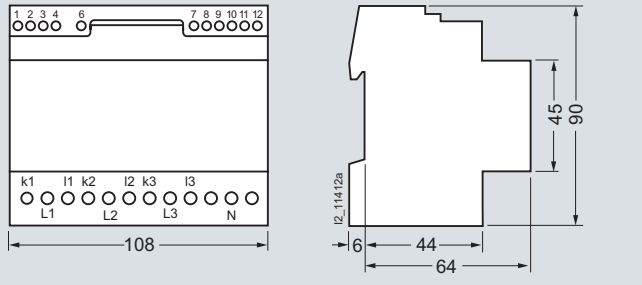
* You can order this quantity or a multiple thereof.

7KT1 31, 7KT1 34, 7KT1 35 multicounters

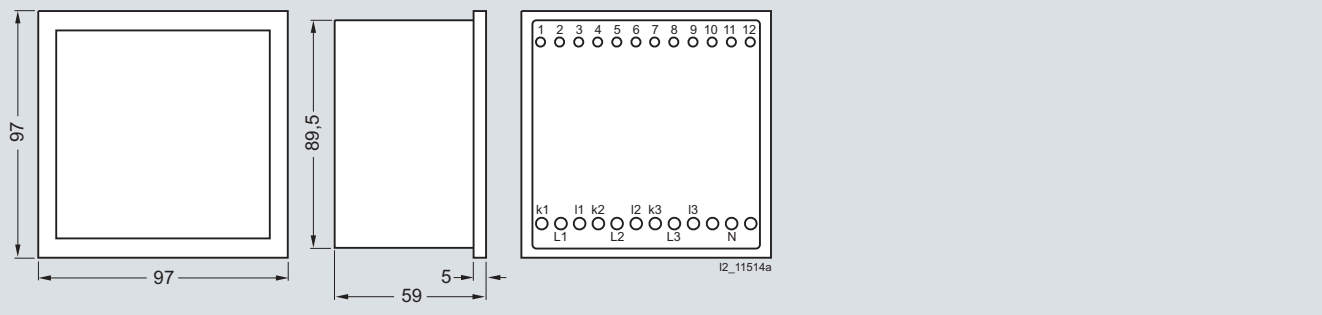
Dimensional drawings



7KT1 3.0



7KT1 3.1

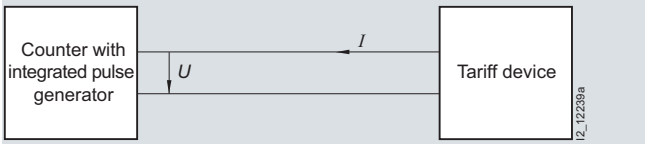


7KT1 3.2 Rear panel

Schematics

S0 interfaces

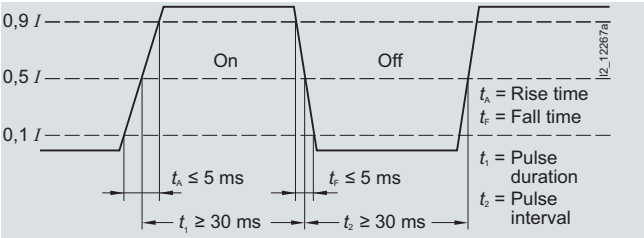
The S0 interface is a current interface for pulse transmission between a counter with integral pulse generator device and tariff rate device.



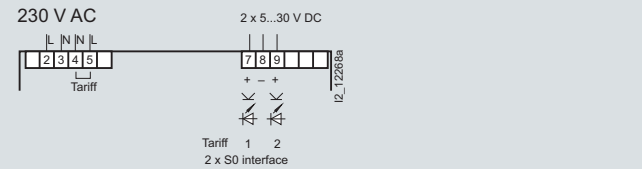
U: Voltage at terminals of tariff device
I: Current via counter with integrated pulse generator

The tariff rate device is connected to the S0 interface of the counter over a 2-wire conductor and – acting as a passive electrical two-pole – supplies the pulse generator with a direct voltage.

The following diagram shows the dependency of the current path on the time according to DIN 43864.



The following diagram shows the pulse output (S0 interface) for a 2-tariff counter:
e.g. tariff 1 –> normal tariff, tariff 2 –> special tariff.



For pulse recording with devices from other manufacturers (pulse counters or digital inputs), a voltage within the range of 5 ... 30 V DC must be applied to the output terminals of the S0 interface. The optocoupler operates as the switch. In order to prevent overloading, the current must not exceed a max. of 20 mA.

The pulse duration is 125 ms. The minimum pulse interval is also 125 ms.

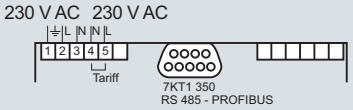
Grounding terminal

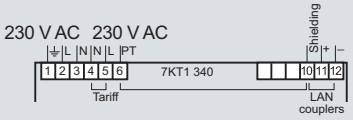
The interpolation point grounding terminals, required for the transmission technology, only serve to shield the transmission cables and do not have a protective function.

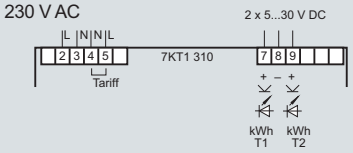
Instructions for the connection of transformer counters

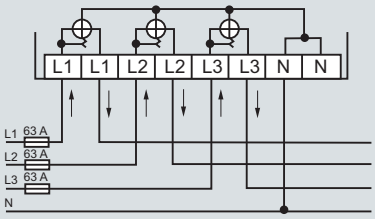
In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals 2, 5 and 8, depending on the fusing for phases L1, L2, L3. A fuse of 6 A is recommended for the line protection.

Current transformers must not be operated with open terminals as this can result in dangerously high voltages, which may result in personal injuries and property damage. It can also lead to a thermal overload of the transformers.

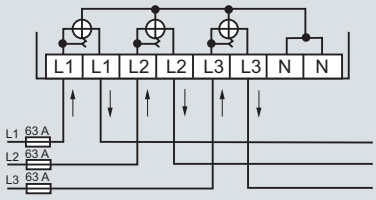




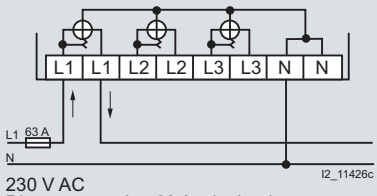




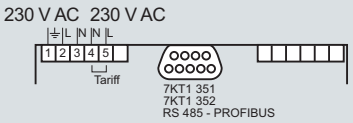
230/400 V AC
Direct connection 63 A, 4-wire circuit

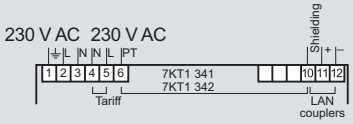


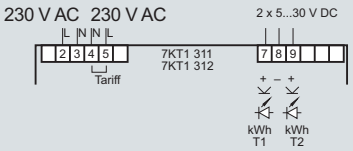
400 V AC
Direct connection 63 A, 3-wire circuit

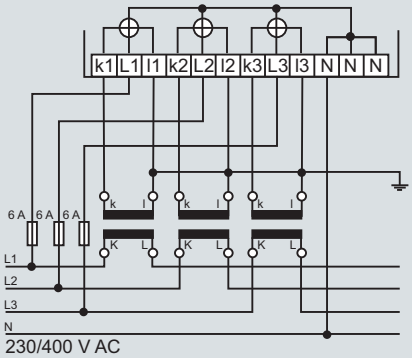


230 V AC
Direct connection 63 A, single-phase

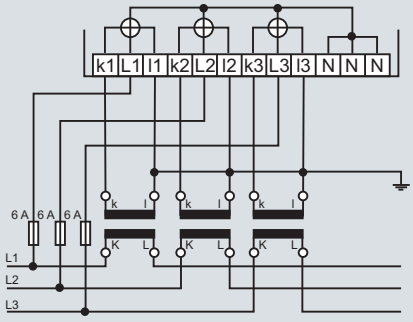




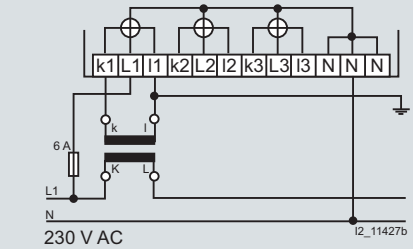




230/400 V AC
Current transformer connection, 4-wire circuit



400 V AC
Current transformer connection, 3-wire circuit



230 V AC
Current transformer connection, single-phase

11

More information

Communication interfaces

Multicounters with PROFIBUS interface

Multicounters are also available with PROFIBUS interface. In a PROFIBUS network, the multicounters act as PROFIBUS DP slave according to the usual standard V0 (cyclic communication only).

In a PROFIBUS network, several PROFIBUS slaves are always assigned to a single master. A PC with a PROFIBUS communication module or PLC, such as the PLCs of the SIMATIC range from Siemens, can be used as the master. The master communicates with the connected slaves cyclically at extremely brief intervals. The master sends the slaves a request message to which the slave replies with a response message. The communication frame of the message (e.g. number of send and receive bytes) is slave-specific and is defined in a standardized text file; the device data base file (DDBF). This DDBF file is read in by the software configuration tools of the various PROFIBUS masters, whereby the master knows which communication frame the respective slave requires.

In normal cyclic mode, the multicounter sends a response message in the specified communication frame in reply to the request message from the master. This communication frame contains all 35 measured quantities in encoded form as user data. The master receives the message, decodes it and then uses the measurement data for a range of tasks.

As well as the DDBF file, a detailed description of the communication and the configuration of the user data are also required for the configuration and implementation of a PROFIBUS network with multicounters. For more information please visit us on the Internet at: http://www.siemens.com/beta

Multicounters with Modbus interface

The Modbus RTU is a very common communications solution. It is a serial, asynchronous form of communication, which requires RS 485 networks as the hardware platform. RS 485 networks can be set up with 2-wire copper or optical fiber cables and, compared to the RS 232 serial interface, offer fast transmission rates.

In a Modbus network, each bus station has a bus address within the range from 1 to 255. All stations within a network must be set to the same transmission rate. We recommend transmission speeds of 9600 or 19200 bit/s. The address and transmission speed can be set in the user menu of the multicounters.

In order to customize a Modbus installation, it is necessary to implement the appropriate software application for the master. This requires specific information about communication with multicounters. For more information please visit us on the Internet at:
http://www.siemens.com/beta

Multicounters with LAN coupler on LAN

The 7KT1 390 LAN couplers support connection of up to ten 7KT1 34 multicounters to a LAN network. The LAN couplers and multicounters are interlinked over an RS 485 network. Setting the bus address in the 7KT1 34 multicounters to "0" specifies that it is operating in "LAN" mode. It is not necessary to set the transmission speed, as a fixed transmission rate is always used in this mode. It is also not necessary to set the address of the bus stations, as the LAN coupler automatically detects and identifies the multicounter connected.

The server components run on the PC in the background and handle the data transmission and storage of the most recent measured values from all the multicounters connected over one or more LAN couplers.

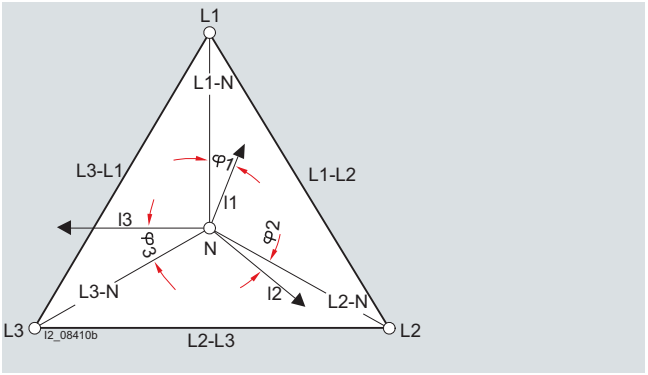
For more information on LAN operation and the MS Excel operator interface, see 7KT1 390 LAN couplers on page 11/16 ff.

Voltage measurement

Depending on the selected connection type, the multicounter measures the delta voltages L1 against L2; L2 against L3 and L3 against L1 or the star voltages L1, L2, L3 against N.

ΣL symbol for the 3-phase system

This indicates that all physical units shown under this symbol are always 3-phase.



Temperature

The temperature indication of the multicounter is not suitable for an exact measurement of the ambient temperature. The device does not have a temperature sensor. It is also not possible to connect an external temperature sensor.

The temperature information merely enables a rough estimate of the temperature conditions in the device interior and immediate surroundings.

Readout data

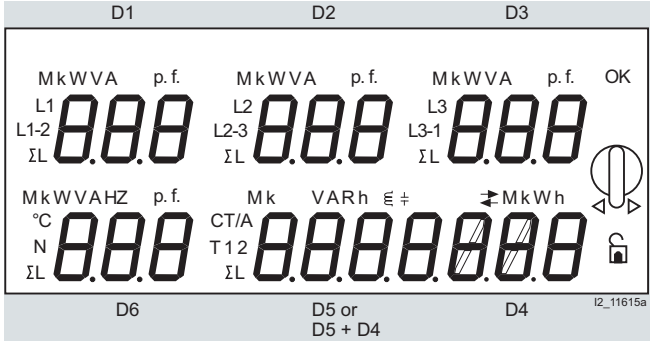
You can continuously display 6 measured quantities from the following 35 options.

No.	Measured value	Display	Unit	Assignment
1	Active power	D1	W	L1
2	Voltage	D1	V	L1
3	Current	D1	A	L1
4	Apparent power	D1	VA	L1
5	p.f.	D1	p.f.	L1
6	Voltage	D1	V	L1 – L2
7	Active power	D2	W	L2
8	Voltage	D2	V	L2
9	Current	D2	A	L2
10	Apparent power	D2	VA	L2
11	p.f.	D2	p.f.	L2
12	Voltage	D2	V	L2 – L3
13	Active power	D3	W	L3
14	Voltage	D3	V	L3
15	Current	D3	A	L3
16	Apparent power	D3	VA	L3
17	p.f.	D3	p.f.	L3
18	Voltage	D3	V	L3 – L1
19	Temperature	D6	°C	–
20	Current, N-conductor	D6	A	∑L
21	Active power	D4	W	∑L
22	Reactive power	D5	var	∑L
23	Apparent power	D5	var	∑L
24	Frequency	D6	Hz	∑L
25	p.f.	D1, D2, D3, D6	p.f.	∑L
26	Active energy rate 1	D4	Wh	∑L →
27	Active energy rate 2	D4	Wh	∑L →
28	Active energy rate 1	D4	Wh	∑L ←
29	Active energy rate 2	D4	Wh	∑L ←
30	Reactive energy rate 1	D5	varh	∑L, ind.
31	Reactive energy rate 2	D5	varh	∑L, ind.
32	Reactive energy rate 1	D5	varh	∑L, cap.
33	Reactive energy rate 2	D5	varh	∑L, cap.
34	Apparent energy rate 1	D5	VAh	∑L
35	Apparent energy rate 2	D5	VAh	∑L
2 set values are also indicated:				
36	Transformer setting	D4	CT/A	/5
37	Transformer setting	D5	CT/A	5 ... 5000

All the measured values are transmitted via LAN.

Display

The multicounters have a covered, brightly lit LED display. The measured values are indicated on an 11 mm high, green, 7-segment LED, the physical units are indicated by orange text abbreviations. Both colors are easier to recognize than the red LEDs used for conventional displays. Capacitive loads are automatically indicated by a capacitor symbol, inductive loads by a coil symbol – also in orange.



Matrix selection

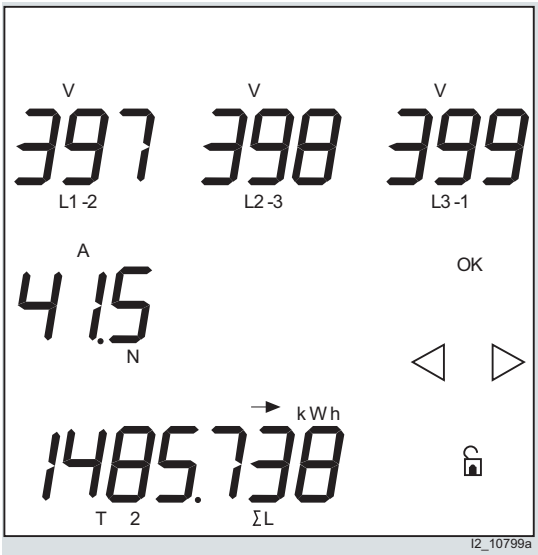
Conventional measuring instruments display voltages, currents, powers, etc. in a rigid sequence on several "screens". These multicounters allow users to define their own standard for measured quantities per display field, thus allowing more universal and flexible application.

A special feature is the analysis of the different loads on the phases. Phase displacement and unsymmetrical or unbalanced loads can cause partial overloads. In this case, the multicounter offers a range of different options to combine measured values and assess them.

The display fields are selected using rotary pushbuttons and the desired indications confirmed with OK. By making the horizontal selection e.g. W, V, A or p.f., and the vertical selection, e.g. L1, L1 – L2 or ∑L, users can then define the desired measured quantities for this display field.

The vertical data on the display can be assigned to any measured value in the horizontal data. The letters M(ega) and k(ilo) are autom. assigned according to measuring range, i.e. measured value, e.g. kW or MW. Capacitive loads areautomatically indicated by a capacitor, inductive loads by a coil.

The following diagram shows an example of what your matrix selection might look like.



7KT1 39 LAN couplers

Overview

A LAN coupler supports the worldwide data recall of up to 10 multicounters and E-counters over a LAN link to the Internet.

The LAN coupler is used in conjunction with multicounters and E-counters. Up to 10 devices can be linked with a LAN coupler. In turn, the LAN coupler is connected to a LAN.

Data communication between the LAN coupler and the PC is implemented using the TCP/IP protocol.

The supplied software can be used to call up the measurement data over LAN coupler and transfer it to a PC. The measurement data are constantly stored as a text file with a time and date stamp. This allows users to create flexible designs to their own specific solutions (e.g. data can be prepared using MS Excel).

Benefits

- Integration of measuring devices in industrial or office communication
- Display of measurement data using the standard software MS Excel
- Use of existing local networks (LAN) for transmitting the measurement data
- TCP/IP data protocol enables a wide range of applications
- Limit value signals with time information for all measured values increases your plant's safety
- Open software structure enables the implementation of customized solutions for measured data indication and analysis
- Worldwide communication of the measured values via LAN
- One LAN coupler for 10 devices

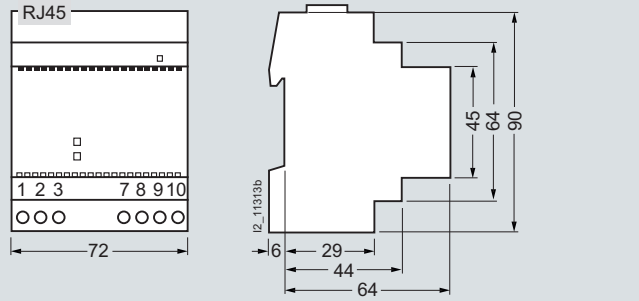
Technical specifications

			7KT1 390
Standards			EN 61010-1
Supply			
• Rated control supply voltage U_c		V AC	230
• Operating range		× U_c	0.8 ... 1.2
• Rated frequency		Hz	50
• Frequency ranges		Hz	45 ... 65
• Rated power dissipation P_v		VA	≤ 5
Function			
• System start			Automatic when the control supply voltage is switched on
• LAN coupler identification			Over the IP address
• Device identification			By means of the device number
• Transmission rate		Mbit/s	100
RS 485 interface for connection of measuring devices			
• Line	Version		STP (shielded twisted pair)
- Minimum cross-section		mm^2	2 × 0.2/AWG 24
- Maximum line capacity		pF/m	< 50
- Impedance		W	100
- Maximum overall cable length		m	1800
- Type of installation			Parallel connection
Safety acc. to EN 61010-1			
• Degree of pollution			2
• Overvoltage category			II
• Operating voltage category		V	600
• Material			II
• Clearances		mm	≥ 3
• Creepage distances			
- In device		mm	≥ 4.3
- On printed boards, not installed		mm	≥ 3
• Test pulse voltage	1.2/50 µs	kV	4
• Test voltage	50 Hz, 1 min	kV	2.2
Terminals	± screw (Pozidriv)		1
• Conductor cross-sections			
- Rigid, maximum		mm^2	1 × 2.5 or 2 × 1.5
- Flexible, with end sleeve, minimum		mm^2	1 × 0.75
Ambient conditions			
• Ambient temperature	In operation	°C	0 ... +55
• Relative humidity	In operation	%	≤ 80
• Vibration	Sinus amplitude at 50 Hz	mm	± 0.25
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors
• Safety class	Acc. to EN 61010-1		II
Software requirements for PCs			
• Operating system			MS Windows 2000, Windows XP or Windows Vista
• Software for communication			.net Framework V1.1 (included in delivery)
• Software for visualization			MS Excel, version 6 or higher
			MS Excel macro for the display of data (included in delivery)

Selection and ordering data

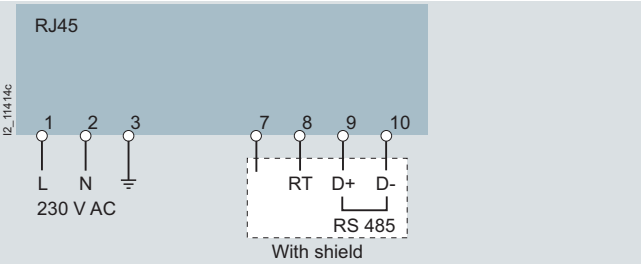
		U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC						Unit(s)	Unit(s)	kg
	**LAN couplers** For connection of up to 10 devices over RS485 Software tools included for: • Installation and commissioning • Data transmission and storage • MS Excel macro for visualization of measurement data	230	4	B	**7KT1 390**		027	1	1	0.232

Dimensional drawings



7KT1 390

Schematics

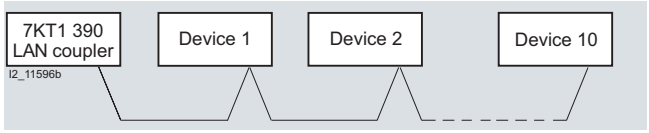


Connecting the devices to the LAN coupler

All the devices are connected in parallel with a shielded two-wire cable. Point-to-point installations, junctions or ring installations are not possible.

Grounding potential

Both the LAN cable with the RJ45 connector and the shielded cable of the RS 485 bus system must be grounded. This also applies to the devices connected to the LAN coupler.



11

* You can order this quantity or a multiple thereof.

More information

Connection of the LAN coupler to a LAN

Each station in a LAN must be assigned its own IP address. On delivery, or after a reset, the LAN coupler has a standard IP address. The new IP address must be set in the LAN coupler during commissioning. To do this, the LAN coupler must be directly connected to a PC using a so-called "cross-over" cable. This is a network cable in which the transmit and receive wires are cross-connected. This creates a small LAN with 2 stations, PC and LAN coupler can communicate with each other directly. The supplied LAN coupler configuration tool must be installed on the PC. This direct connection can then be used to set a new IP address in the LAN coupler, as well as other network parameters, such as subnet mask and default gateway. The LAN coupler must then be connected to the target system as communication is subsequently only possible with the new settings.

Connection of measuring devices to the LAN coupler

E-counters and multicounters are connected to the LAN couplers over their communication interface. The network is an RS 485 network in which devices are connected over a shielded 2-wire cable. When using Modbus, the device address and transmission rate must be set in the multicounters. This is not necessary if using the multicounters and E-counters over the LAN coupler, as the LAN coupler automatically detects and identifies any connected E-counters and multicounters. You can now use the LAN coupler configuration tool (over the LAN network) to tell the LAN coupler the device from which you want to retrieve the measurement data.

The LAN coupler carries out a so-called "polling" during runtime. This cyclically retrieves the most recently gathered measurement data from the measuring devices and buffers them in the LAN coupler. This can then be called up at any time over the LAN.

Data transmission from LAN coupler to PC

This data transmission is PC-controlled. A software tool runs in the background on the PC and uses the network to cyclically retrieve any measurement data from all available LAN couplers and save it to the hard disk.

Software tool

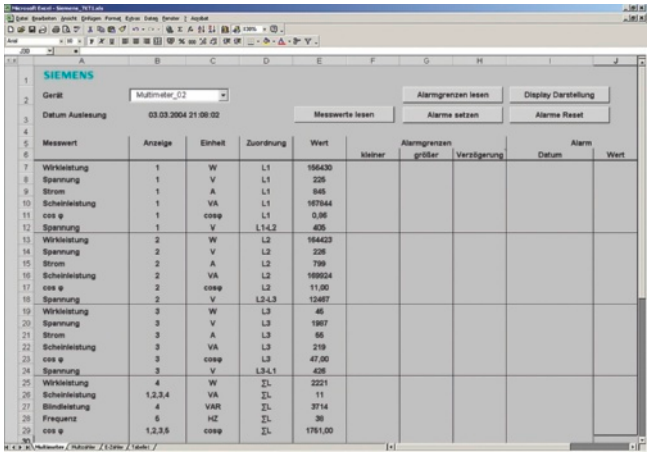
The supplied software tool has the following functions:
- Background transmission of measurement data from multicounters and E-counters and a number of LAN couplers
- Full display of device measurement data through a macro based on MS Excel
- Adjustable limit value signals for measured quantities
- Limit violations are signaled with time stamp.

You will find further information on Modbus operation on the Internet at: http://www.siemens.com/beta

Display of measurement data on the PC

A Visual Basic macro for MS Excel is supplied with the LAN coupler for the display of measurement data on a PC. Among other things, this software tool lets you display all 35 measurement data of a 7KT1 34 multicounter on a single panel. You can then select the various measuring devices you want to display from a small list box. The software also lets you set alarm limits for up to 10 measured quantities of a multicounter.

If a measured value exceeds or falls below the specified limits, the relevant indication is output, complete with time stamp from the PC clock.



Display of measurement data of a multicounter

Simultaneous display of measurement data on more than one PC

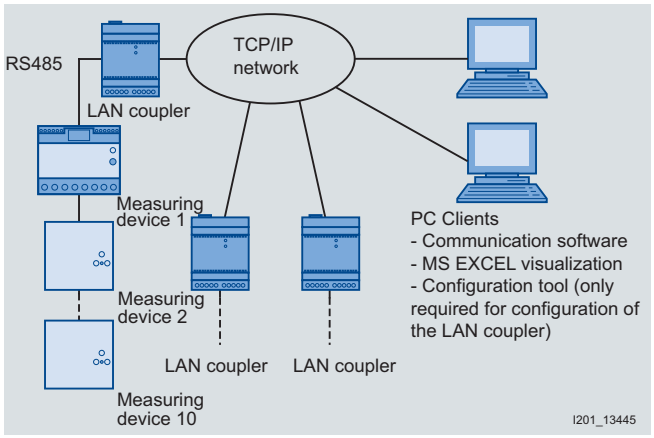
The software supplied with the LAN coupler supports display of measurement data on any number of PCs connected to the network over a client-server architecture.

A PC acts as the server, similar to an Intranet or Internet server. This PC runs the software components that retrieve the measurement data from the LAN coupler and save it to hard disk. The MS Excel macro can be used to visualize the measurement data on both the server PC and the clients.

Other client PCs can access the data pool of the server PC to visualize the measurement data.

Open software architecture

The architecture of the software tool is open and can be customized to suit user requirements. The MS Excel macros are freely accessible and can also be customized by the user.



Block diagram of a system

Overview

E-counters are used to measure the power consumption in 3-phase systems, e.g. in industrial plants, offices and apartments in apartment houses.

Cost pressures are growing, particularly in industry. Product operating times are reduced and manufacturing facilities must be retrofitted more frequently. The load levels of the distribution boards during operation are therefore constantly under observation in order to avoid peak loads in a timely manner or to perform retrofitting.

The versions can be used for consumption analysis and minimization of operating costs in industrial plants and office buildings. The device versions with LAN interfaces allow a readout to be performed easily using an existing LAN network.

The devices indicate 6 measured values on an LCD display: Active energy rate 1 and rate 2, reactive energy rate 1 and rate 2, active power and reactive power. This means that the current load of a distribution board can be read out.

Benefits

- The measurement data are constantly stored as a text file with a time and date stamp. This allows users to create flexible designs for their own specific solutions (e.g.with MS Excel)
- The devices indicate the instantaneous power in addition to the consumption, providing an overview of plant capacity utilization at all times and saving additional measuring devices into the bargain
- For practically unlimited use: E-counters for direct connection, 63 A for small plants and up to 5000 A with transformer for large plants.

Function

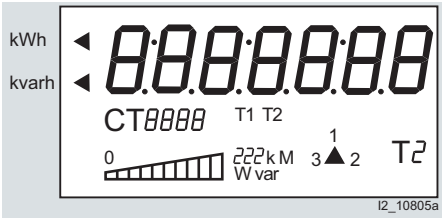
E-counters with LAN coupler on LAN

The 7KT1 390 LAN couplers support connection of up to 10 7KT1 52 E-counters to a LAN network.

For more information on LAN operation and the MS Excel operator interface, see 7KT1 390 LAN couplers see page 11/16 ff.

Display

The display of the E-counters comprises a 7-digit 7-segment display for measured quantities and additional function indications:



		Unit	ID
Active energy	Rate 1	kWh	Arrow and T1
	Rate 2	kWh	Arrow and T2
Reactive energy	Rate 1	kvarh	Arrow and T1
	Rate 2	kvarh	Arrow and T2
Active power		kW	Utilization and instantaneous value
Reactive power		kvar	Utilization and instantaneous value
Phase-sequence indication		1 – 2 – 3	Flashing triangle next to left-hand phase sequence
Transformer primary current		5 ... 5000 A	CT (current transformer)

Technical specifications

			7KT1 500, 7KT1 502, 7KT1 510, 7KT1 512, 7KT1 520	7KT1 501, 7KT1 503, 7KT1 511, 7KT1 513, 7KT1 521
Standards			EN 61010-1, EN 62053-11, -21, -31	
Supply				
• Rated control supply voltage U_c		V AC	230	
• Operating range		× U_c	0.80 ... 1.20	
• Rated frequency		Hz	50	
• Frequency ranges		Hz	45 ... 65	
• Rated power dissipation P_v		VA	≤ 10	
Measuring inputs				
• Connection type			Direct	Transformer /5 A
• Voltage U_e	Phase/phase Phase/N	V V	400 230	
• Operating range voltage	Phase/phase Phase/N	V V	87 ... 480 50 ... 276	
• Current I_e		A	63	5
• Operating range current	Direct connection Transformer connection	A A	0.3 ... 63 --	-- 0.012 ... 5
• Transformer current	Primary current Smallest input step	A A	-- --	5 ... 5000 5
• Frequency		Hz	50	
• Frequency ranges		Hz	45 ... 65	
Overload capability				
• Voltage U_e	Continuous: phase/phase 1 second: phase/phase Continuous: phase/N 1 second: phase/N	V V V V	480 800 276 460	
• Current I_e	Continuous 0.5 second 10 ms	A A A	76 -- 2000	

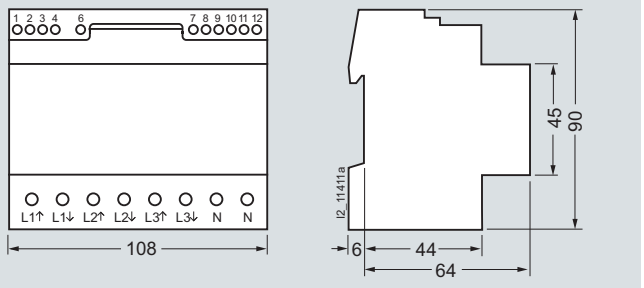
7KT1 5 E-counters

			7KT1 500, 7KT1 502, 7KT1 510, 7KT1 512, 7KT1 520	7KT1 501, 7KT1 503, 7KT1 511, 7KT1 513, 7KT1 521
Display				
• Connection errors	Discernible from phase-sequence indication		Yes	
• Active energy: 1 display, 7-digit + display import or export (arrow)		kWh	000000.0 ... 999999.9	
• Reactive energy: 1 display, 7-digit + display import or export (arrow)		kvarh	000000.0 ... 999999.9	
• Active power: 1 display, 3-digit + display import or export (arrow)		kW or MW	000 ... 999	
• Reactive power: 1 display, 3-digit + display import or export (arrow)		kvar or Mvar	000 ... 999	
• Instantaneous rate measurement: 1 display, 1-digit	For 7KT1 500, 7KT1 501, 7KT1 502, 7KT1 503 For 7KT1 510, 7KT1 511, 7KT1 512, 7KT1 513, 7KT1 520, 7KT1 521		1 1 or 2	
• Display rate identifier	For 7KT1 510, 7KT1 511, 7KT1 512, 7KT1 513, 7KT1 520, 7KT1 521		T1 or T2	
• Transformer primary current	Adjustable in 5 A steps	A	--	5 ... 5000
• Display period		/s	2	
• Storage of setting and energy values			EEPROM	
Measuring accuracy				
• Active energy acc. to IEC 62053-21			Class 2	
• Reactive energy acc. to IEC 62053-23			Class 3	
• Active or reactive power		%	± 2 ... 4 ± 1 digit	
S0 interfaces	Acc. to IEC 62053-31		Class A	
• Terminal output	For 7KT1 500 fixed For 7KT1 502, 7KT1 510, 7KT1 512 For direct connection 63 A, adjustable	Imp/kWh Imp/kWh	10 10 – 1 – 0.1 – 0.01 – 0.001	-- --
	For 7KT1 501 fixed For 7KT1 503, 7KT1 511, 7KT1 513 depending on the transformer factor, adjustable	Imp/kWh Imp/kWh	-- --	1 10 – 1 – 0.1 – 0.01 – 0.001
• Pulse duration		ms	125 ... 300	
• Minimum interval between 2 pulses		ms	300	
• Required voltage		V DC	5 ... 30	
• Current ON/OFF		mA	10 ... 27/0 ... 2	
LAN interface	Only for 7KT1 520, 7KT1 521			
• Terminals			+, –, shielding	
Safety acc. to EN 61010-1				
• Degree of pollution			2	
• Overvoltage category			II	
• Operational voltage		V	600	
• Clearances		mm	≥ 3.0	
• Creepage distances	In device On printed boards (not installed)	mm mm	≥ 4.3 ≥ 3.0	
• Test pulse voltage	1.2/50 µs	kV	4	
• Test voltage	50 Hz, 1 min	kV	2.2	
Terminals				
• Main current paths	± screw (Pozidriv)		2	1
• Supply and control terminals	Blade for slotted screw	mm × mm	0.4 × 2.5	
• Conductor cross-sections, main current paths	Rigid, max. Rigid, min.	mm^2 mm^2	1 × 25 or 2 × 16 1 × 1.5	1 × 6 or 2 × 4 1 × 0.95
• Conductor cross-sections supply and control terminals	Rigid, max. Flexible, with end sleeve, minimum	mm^2 mm^2	1 × 2.5 or 2 × 1.5 0.75	
Ambient conditions				
• Ambient temperature		°C	0 ... +55	
• Relative humidity	Storage	%	≤ 80	
• Vibration	Sinus amplitude at 50 Hz	mm	± 0.25	
• Degree of protection	(terminal area)		IP40 (IP20)	
• Safety class	Acc. to EN 61010-1		II	

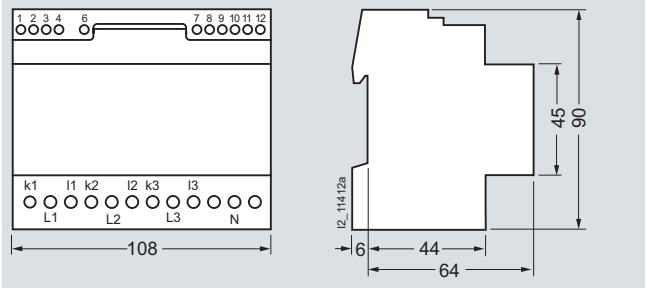
Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	**E-counters for active energy**										
	With S0 interface, for 3-phase, 4-wire connection										
	For direct connection, single rate										
	3 × 230/400	63	230	6	B	**7KT1 500**		027	1	1	0.396
	For transformer connection, single rate										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 501**		027	1	1	0.396
	For direct connection, double rate, can be reset										
	3 × 230/400	63	230	6	B	**7KT1 510**		027	1	1	0.396
	For transformer connection, double rate, can be reset										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 511**		027	1	1	0.396
	E-counters for active and reactive energy										
	With S0 interface, for 3-phase, 4-wire connection										
	For direct connection, single rate, can be reset										
	3 × 230/400	63	230	6	B	**7KT1 502**		027	1	1	0.396
	For transformer connection, single rate, can be reset										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 503**		027	1	1	0.396
	For direct connection, double rate, can be reset										
	3 × 230/400	63	230	6	B	**7KT1 512**		027	1	1	0.396
	For transformer connection, double rate, can be reset										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 513**		027	1	1	0.396
	E-counters for active and reactive energy										
	For connection to LAN networks with 7KT1 390 LAN server, for 3 phases, 4-wire connection										
	For direct connection, double rate, can be reset										
	3 × 230/400	63	230	6	B	**7KT1 520**		027	1	1	0.450
	For transformer connection, double rate, can be reset										
	3 × 230/400	Trans-formers /5	230	6	B	**7KT1 521**		027	1	1	0.388

Dimensional drawings



7KT1 500, 7KT1 502,
7KT1 510, 7KT1 512,
7KT1 520



7KT1 501, 7KT1 503,
7KT1 511, 7KT1 513,
7KT1 521

* You can order this quantity or a multiple thereof.

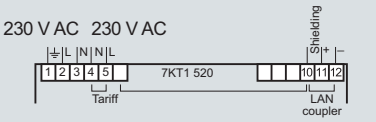
Schematics

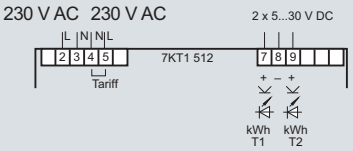
Grounding terminal

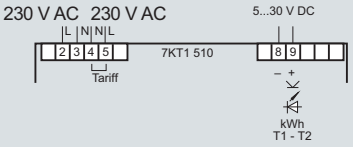
The grounding terminals required for the transmission technology for 7KT1 520 and 7KT1 521 versions only serve to shield the transmission cables and do not have a protective function.

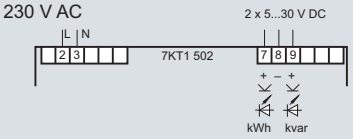
Rate switchover

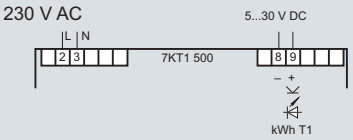
If a voltage of 230 V AC is applied to terminals 4 and 5, the rate is switched to rate 2.

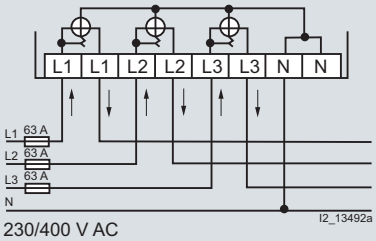










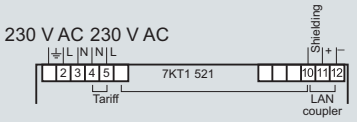


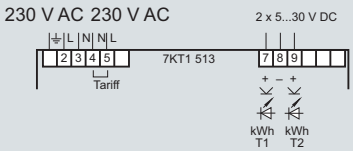
230/400 V AC
Direct connection 63 A, 4-wire circuit

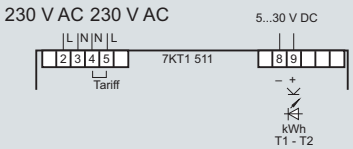
Instructions for the connection of transformer counters

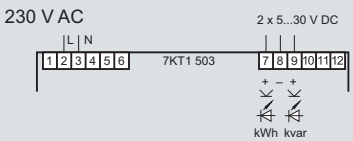
In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals L1, L2 and L3 depending on the fusing for phases L1, L2 and L3. A fuse of 6 A is recommended for line protection.

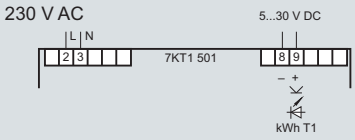
Current transformers must not be operated with open terminals as this can result in dangerously high voltages, which may result in personal injuries and property damage. In addition to this, the transformers are exposed to thermal overload.

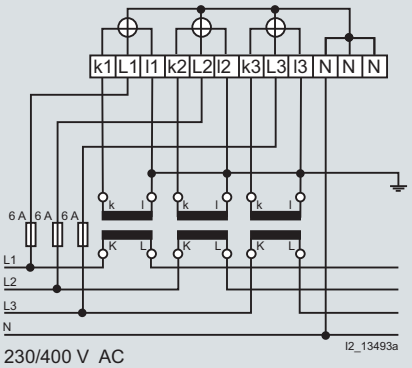










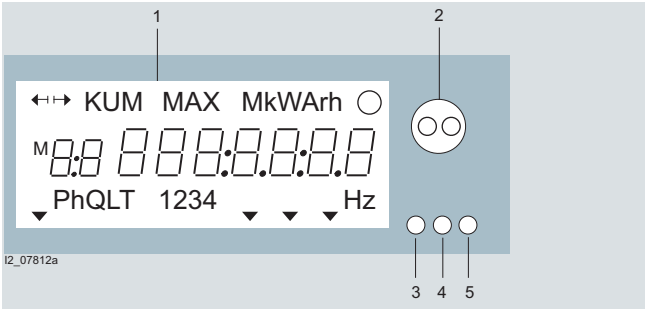


230/400 V AC
Current transformer connection, 4-wire circuit

Overview

E-counters are used for the measurement of kWh in single- and three-phase systems, e.g. in industrial plants, offices and apartments in apartment houses. They help minimize operating costs and facilitate cost assignment.

E-counter with LCD



1 Large-format 7-digit LCD 8 × 4 mm
2 IR readout interface for mounting the readout measuring head
3 Display pushbutton
4 IR test output LED (10 IMP./W)
5 Sealable Set/Reset pushbutton

Readout data for consumption analysis

Manual readout

The above data can be called up and manually displayed directly on the E-counter by pressing pushbutton 5 (Set/Reset pushbutton) and pushbutton 3 (Display pushbutton). The E-counter calculates the consumption costs when the price per kWh has been entered. The ability to input the device number facilitates assignment to a number system and cost assignment to one of the various cost centers.

Readout software for the IR measuring head

The data of the above table are read into a PC using the magnetic IR measuring head and stored in an ASCII file according to IEC 61107.
This ASCII file can be further processed in an Excel or Access file. The product range can run under Windows 95, 98 and Windows NT.

Readout data on the LCD or over IR interface

			7KT1 162 7KT1 165
Active energy	Rate 1/2	kWh	x/x
Price per kWh, adjustable	Rate 1/2	Cost/ kWh	x/x
Total costs	Rate 1/2	Total cost	x/x
Reactive energy	Rate 1/2	kvarh	x/x
Apparent energy	Rate 1/2	kVAh	--
Maximum active power	Rate 1/2	kW	--
Integration periods, adjustable	Rate 1/2	min	--
Instantaneous active power	Sum total Phase L1/L2/L3	kW kW	x x
Instantaneous voltage	Phase L1/L2/L3	V	--
Instantaneous imported kWh	Sum total Phase L1/L2/L3	A A	-- --
Instantaneous current factor (Only for transformer counters)		FA I	x
Instantaneous reactive power	Sum total Phase L1/L2/L3	kvar kvar	-- --
Instantaneous apparent power	Sum total Phase L1/L2/L3	kVA kVA	-- --
Instantaneous p.f.	Phase L1/L2/L3	p.f.	--
Instantaneous frequency		Hz	--
Device number, adjustable		No.	x

x = data are displayed

Data transmission instabus KNX

The 7KT1 162 and 7KT1 165 counters are intended for the following data transmission:

Active energy (kWh) rate 1
Active energy (kWh) rate 2
Device number
Active power (kW) phase L1
Active power (kW) phase L2
Active power (kW) phase L3

Visualization software "Recording of consumption data and maximum time analysis" (available soon)

The software can read out and assign counter readings, and prepare the data for accounting.
The system does not differentiate between counters that are read out manually or in online operation.
A maximum time analysis can be carried out over several days on the PC in online operation. Graphical analyses are also available.

Energy flow direction

Counting is only carried out in the specified energy flow direction. For counters with transformer connection, the energy flow direction of the transformer (primary and secondary) as well as the correct assignment of the voltage and current paths must be taken into account.

Benefits

- The devices have accuracy class 2. This enables extremely precise energy measurements.
- The large LCD for the reading out of all data locally makes for easy reading.

7KT1 1 E-counters instabus KNX

Technical specifications

			7KT1 162	7KT1 165
Standards				
Supply				
Rated control voltage U_e		V AC	230	
Operating range U_e			0.80 ... 1.20	
Rated frequency		Hz	50	
Operating frequency range		Hz	45 ... 65	
Power consumption	Per phase	VA	0.8	
Measuring inputs				
Connection type			Direct	Transformer
Voltage		V	400	
Operating range voltage		V	320 ... 480	
Current		A	63	5
Operating range current	Direct connection Transformer connection	A A	0.005 ... 63 --	-- 0.005 ... 6
Minimum operational current		mA	5	
Current factor	Of transformer, input in full digits	FAI	--	0 ... 255
Frequency		Hz	50	
Operating frequency range	Distortion factor ≤ 3 %; symmetric sinus curve	Hz	45 ... 65	
Overload capability				
Voltage	Duration: phase/N 1 second: phase/N Duration: phase/phase 1 second: phase/phase	V V V V	276 460 480 800	
Current	Duration 1 second	A A	76 126	6 10
Display				
Rate			Double	
	LCD H × W	mm × mm	8 × 4	
	Readout data		See table on page 11/23.	
	7-digit with decimal points		Active/reactive	
Active energy	Drum-type register H × W: 7-digit with 1 decimal	mm × mm		
Display period		/s	0.5	
Storage of measured values		kWH	EEPROM	
Measuring accuracy	At 23 °C ± 1 °C			
Active energy	Acc. to IEC 61036	Class	2	
Safety				
Supply measuring circuit isolation			Electrical	
Rated insulation voltage		V	600	
Rated impulse withstand voltage	Inputs against ground for 1 min. at 50 Hz	kV	4	
Overvoltage category	VDE 0110 T1		III	
Pulse output, S0 interface	Acc. to IEC 61393/DIN 43864			
	IR test output LED	Imp/Wh	10	
	Terminals, output	Imp/kWh	10	1
	Minimum pulse duration	ms	125	
	External voltage	V DC	5 ... 30	
	Current	mA	10 ... 20	
	Resistance	kΩ	0.5 ... 1.5	
instabus KNX interface				
Standard			EIS 9	
Readout data			1)	
Terminals				
Main current paths	± screw (Pozidriv)		2	
Supply/control terminals	Blade for slotted screw	mm	0.4 × 2.5	
Conductor cross-sections Main current paths	Rigid (max.) Rigid (min.)	mm^2 mm^2	1 × 10 1 × 1.5	
Conductor cross-sections Supply/control terminals	Rigid (max.) Flexible, with end sleeve	mm^2 mm^2	1 × 2.5 1 × 0.75	

1) See table on page 11/23.

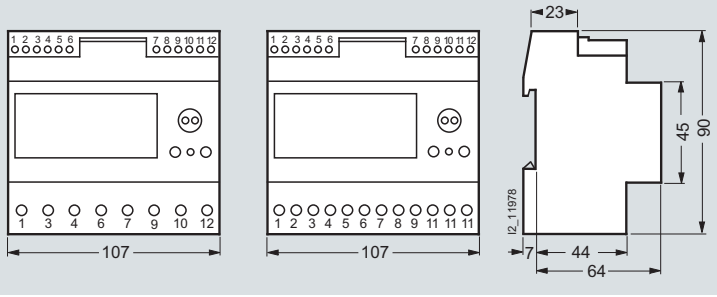
			7KT1 162	7KT1 165
Ambient conditions				
Temperature	Storage Operation	°C °C	-40 ... +70 0 ... +55	
Relative air humidity	Storage Operation	% %	≤ 98 ≤ 80	
Minimum vibration	Sinus amplitude at 50 Hz	mm	± 0.25	
Degree of pollution	VDE 0110-1		2	
Degree of protection	(terminal area)		IP40 (IP20)	

Selection and ordering data

		I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		A AC	V DC						Unit(s)	Unit(s)	kg
	**E-counters for 3/4 wire connection, with LCD, with IR interface for double rate**										
	Direct connection, with 2 S0 pulse outputs and *instabus* interface										
	Active and reactive energy 10 (63)		3 × 230/400	6	B	**7KT1 162**		027	1	1	0.450
	Transformer connection, with 2 S0 pulse outputs and *instabus* KNX interface										
	Active and reactive energy Trans-formers /5(6)		3 × 230/400	6	B	**7KT1 165**		027	1	1	0.390
	**IR measuring heads for 7KT1 16**				C	**7KT9 030**		027	1	1	0.170
	For reading out data according to IEC 61107, with 9-pin COM connector and readout software										

Dimensional drawings

E-counters



7KT1 162 7KT1 165

* You can order this quantity or a multiple thereof.

7KT1 1 E-counters instabus KNX

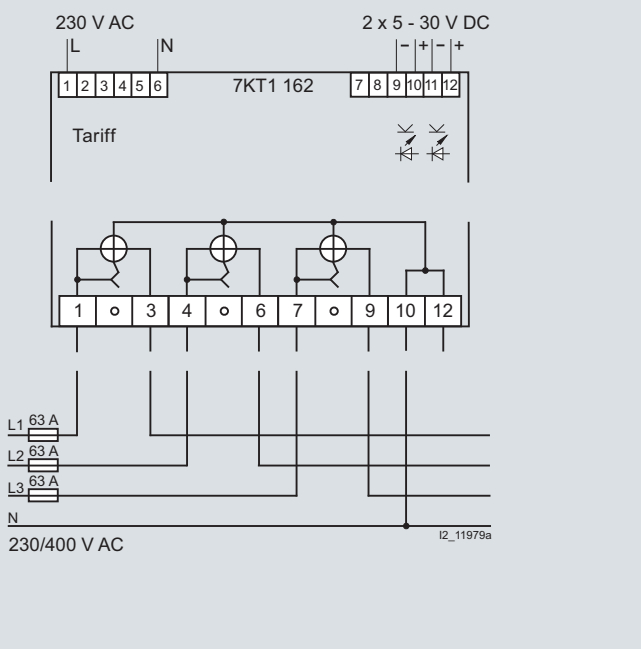
Schematics

S0 interfaces

Connection with S0 interface

The short-circuit resistant optocoupler is operated at 5 ... 30 V DC. The current must be selected within a range of max. 20 mA. The pulse duration is 125 ms.

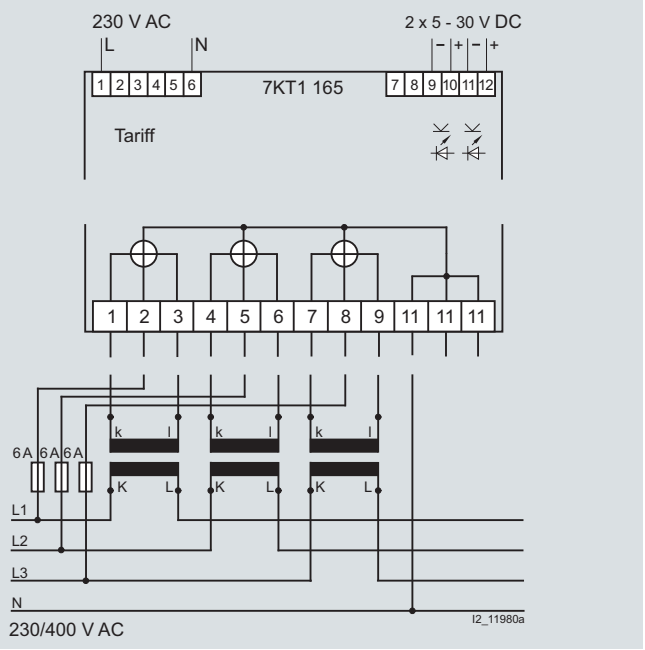
Direct connection 10 (63) A



Instructions for the connection of transformer counters

In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals 2, 5 and 8, depending on the fusing for phases L1, L2, L3. A 6 A fuse is recommended for the line protection.

Transformer connection 5 (6) A



Overview

This three-phase current transformer can be used in distribution boards according to DIN 43880. The measuring leads are routed vertically through the standard mounting rail.
This type of current transformer is suitable for supply systems or outgoing conductors in connection with the installation of a 5TE8 switch or a 5TE1 disconnector, as the primary connecting leads do not have to be interrupted.
The current transformer is designed for cables of up to 13 mm in diameter, e.g. H07V-R with 50 mm^2 conductor cross-section.

Benefits

- The current transformer has an accuracy class 1 in accordance with EN 60044-1. This value is better than most measuring devices in this area of application.
- The versions designed for a transformer ratio of 60/5 A, 100/5 A and 150/5 A enable an even broader range of applications.

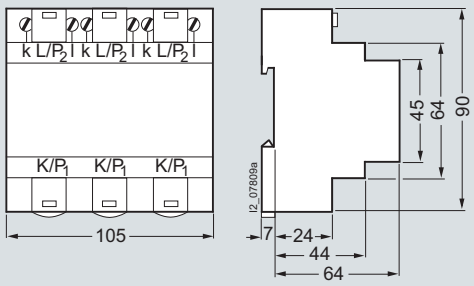
Technical specifications

			7KT1 200	7KT1 201	7KT1 202
Standards			EN 60044-1		
Secondary rated current strength		A	5		
Accuracy class		Cl.	1		
Rated power		VA	1.25	2.5	3.75
Rated frequency f_n		Hz	50/60		
Thermal current limit I_{th}	short-time	A	60 × I_e		
Thermal continuous current		A	1 × I_e		
Overcurrent limit factor		FS	5		
Rated impulse withstand voltage U_{imp}		kV	> 3		
Creepage distances and clearances		mm	> 3		
Rated operational voltage U_e		V AC	720		
Rated operational current I_e		A AC	3 × 60	3 × 100	3 × 150
Terminals ± screw (Pozidriv)			PZ 1		
Conductor cross-sections					
- Rigid		mm^2	0.5 ... 4		
- Flexible, with end sleeve		mm^2	0.5 ... 2.5		
Permissible ambient temperature		°C	-5 ... +60		
Resistance to climate	Acc. to EN 60068-1		20/60/4		

Selection and ordering data

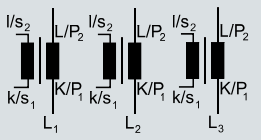
	U_e	I_e	I_{sec}	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	**Current transformers**										
	720	3 × 60	5	6	B	**7KT1 200**		027	1	1	0.460
		3 × 100			B	**7KT1 201**		027	1	1	0.460
		3 × 150			B	**7KT1 202**		027	1	1	0.465

Dimensional drawings



7KT1 200
7KT1 201
7KT1 202

Schematics



7KT1 200
7KT1 201
7KT1 202

Note:
Current transformers must not be operated with open terminals as this can result in dangerously high voltages, which may result in personal injuries and property damage. It also exposes the transformer to thermal overload.

* You can order this quantity or a multiple thereof.

7KT9 0 measuring selector switches

Overview

Measuring selector switches are used as CO contacts of the phases for voltages and currents in three-phase systems for voltmeters and ammeters.

The design of these switches is adapted to match the modular installation devices. They support use in compliance with EN 60947-3.

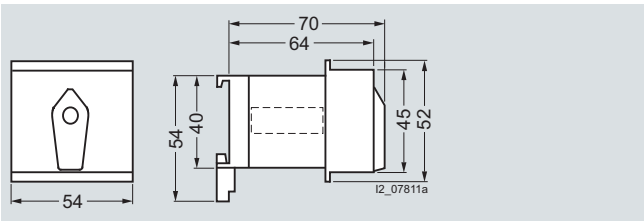
Benefits

- The devices have a rated insulation voltage of 660 V. This permits use in many systems.

Selection and ordering data

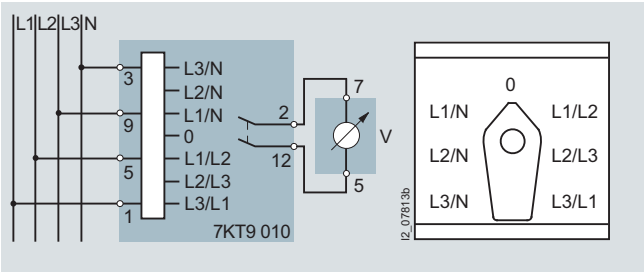
	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	**Voltmeter selector switches**										
	400	12	6	3	A	**7KT9 010**		027	1	1/48	0.110
	**Ammeter selector switches for transformer operation**										
	400	12	6	3	A	**7KT9 011**		027	1	1	0.110

Dimensional drawings

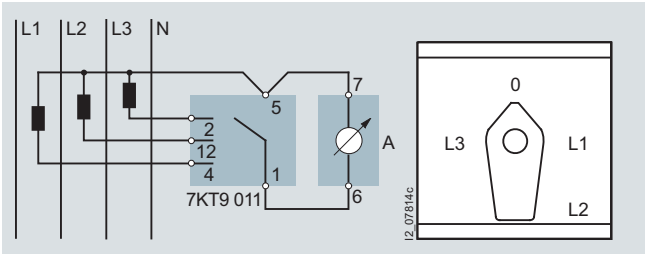


7KT9 010
7KT9 011

Schematics



Voltmeter switching



Ammeter switching

Internal interconnection of the phases in the ammeter changeover contact for the prevention of glitches at the connections of the current transformers:

Switch position	Short-circuited phases		
	L1	L2	L3
0	✓	✓	✓
L1	--	✓	✓
L2	✓	--	✓
L3	✓	✓	--

* You can order this quantity or a multiple thereof.

BETA Measuring
Single-Phase Measuring Devices

12

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**7KT1 14 E-counters**	12/3	For the measurement of kWh in single-phase systems, e.g. in industrial plants, offices and apartments in apartment houses	EN 50740-1, EN 50470-3, EN 62053-31	✓	✓	✓
	**7KT1 11, 7KT1 12 digital measuring devices**	12/5	Voltage and current measurement with large 3-digit LEDs for monitoring incoming and outgoing currents as well as device currents in order to prevent plant overload.	DIN 43751-1, DIN 43751-2	✓	--	✓
	**7KT1 0 analog measuring devices**	12/7	Voltage and current measurement for monitoring incoming and outgoing currents as well as device currents in order to prevent plant overload.	IEC 60051-2, EN 60051-2	✓	--	✓
	**7KT5 8 time and pulse counters**	12/8	For monitoring operating hours and starting operations for planning preventative maintenance tasks and preventing sudden shutdowns	IEC 60255-6, EN 60255-6, (VDE 0435-301), UL 94	✓	✓	✓
	**7KT5 5, 7KT5 6 time counters for front-panel mounting**	12/10	For monitoring operating hours and starting operations for planning preventative maintenance tasks and preventing sudden shutdowns.	IEC 60255-6, EN 60255-6 (VDE 0435-301)	✓	✓	✓

Overview

E-counters serve the measurement of kWh in single-phase systems, e.g. in industrial plants, offices and apartments in apartment houses.

Benefits

- The accuracy class 1 according to EN 50470-3 ensures that you always have the correct measured value
- The drum-type register in digit size 3.8 mm × 1.5 mm enables easy reading
- The short-circuit resistant pulse output protects the device if it is assembled incorrectly.

Technical specifications

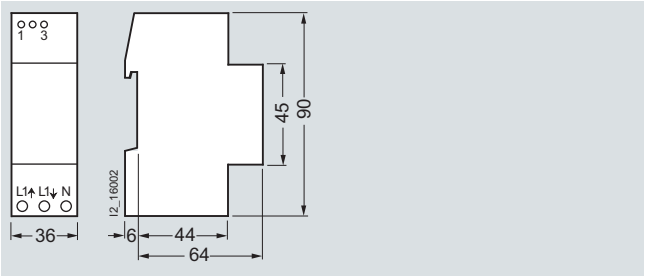
			7KT1 140
Standards			EN 62053-31, EN 50740-1, EN 50470-3
Supply			
• Rated control voltage U_n		V AC	230
• Operating range		V	184 ... 276
• Rated frequency		Hz	50/60
• Operating frequency range		Hz	45 ... 65
• Rated power dissipation P_v		W	≤ 0.6
Measuring inputs			
• Connection type			Direct
• Voltage		V	230
• Operating range voltage		V	184 ... 276
• Current		A	75
• Operating range current	Direct connection	A	0.025 ... 75
• Minimum operational current		mA	25
• Frequency		Hz	50/60
• Operating frequency range - Distortion factor ≤ 3 %; symmetric sinus curve		Hz	45 ... 65
Overload capability			
• Voltage U_e	Continuous: phase/N Short-time (1 s)	V V	276 300
• Current I_e	Continuous Short-time (10 ms)	A A	75 2250
Display			
• Rate			1 rate
• Active energy	Drum-type register H × W: 7-digit with 1 decimal	mm × mm	3.8 × 1.5 0 ... 999999.9
Measuring accuracy	At 23 °C ±1 °C		
Active energy	Acc. to EN 50470-3	%	±1
Safety	Acc. to EN 62052-11		
• Separation of current and voltage circuit			Electrical
• Rated insulation voltage		V	300
• Rated impulse withstand voltage	1.2/50 µs	kV	6
• Overvoltage category			4
Pulse output			
• S0 interface acc. to EN 62053-31	IR test output LED Terminals, output Pulse duration	Imp/kWh Imp/kWh ms	1000 10 100 ±5
	Minimum interval between 2 pulses Required voltage Permissible current	ms V DC mA	125 5 ... 30 90
Terminals			
• Main current paths	± screw (Pozidriv)		2
• S0 interface/control terminals	Blade for slotted screw	mm	0.8 × 3.5
• Conductor cross-sections, main current paths	Rigid Flexible, with end sleeve	mm^2 mm^2	1.5 ... 35 1.5 ... 35
• Conductor cross-sections S0 interface/control terminals	Rigid Flexible, with end sleeve	mm^2 mm^2	0.14 ... 2.5 0.14 ... 1.5
Ambient conditions			
• Temperature	Storage Operation	°C °C	-25 ... +70 -10 ... +55
• Relative air humidity	Storage Operation	% %	≤ 80 ≤ 80
• Maximum vibration	Sinus amplitude at 50 Hz	mm	±0.075
• Degree of protection			IP20, with connected conductors

7KT1 14 E-counters

Selection and ordering data

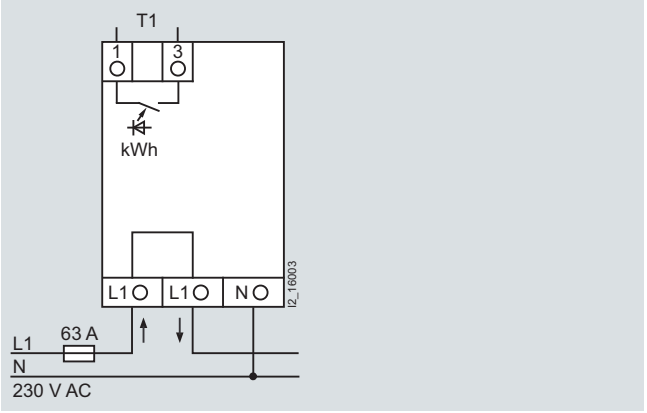
	U_c	I_e	U_e	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**E-counters for active energy**										
	With 7-digit drum-type register, with S0 interface, for single-phase operation										
	Direct connection, single rate										
	230	63	230	2	B	**7KT1 140**		027	1	1	0.400

Dimensional drawings



7KT1 140

Schematics



7KT1 140

12

* You can order this quantity or a multiple thereof.

Overview

These devices for measuring voltages and currents can be used for monitoring input and output currents or device currents in electric plants. They are suitable for direct connection in a single-phase system or for three-phase systems when used in conjunction with a measuring selector switch.

The measuring ranges of the ammeter are set at the device with a coding switch.

Benefits

- The ammeters have 14 measuring ranges from 0 ... 20 A to 0 ... 999 A, which can be set using a coding switch. This ensures universal application.

Technical specifications

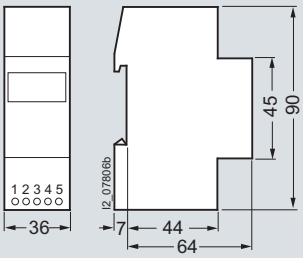
			7KT1 110	7KT1 120
Standards			DIN 43751-1, -2	
Rated control supply voltage U_c		V AC	230	
Operating range		× U_c	0.9 ... 1.15	
Rated frequency		Hz	45 ... 65	
Rated operational power P_s		VA	< 2	
Measuring range				
• Voltage	Direct measurement	V AC	12 ... 600	--
• Current	Direct measurement Transformer measurement	A AC A AC	-- --	0.4 ... 20 direct 0.1 ... 1000/5
Display			3 LED red; height 10 mm	
• Voltage	> 600 V < 12 V		H H H -- -- --	-- --
• Current	Direct > 20 A Transformer > 5 A		-- --	H H H H H H
	Direct < 0.4 A Transformer < 0.1 A		-- --	-- -- -- -- -- --
Measuring cycle		/s	4 times	
Measuring accuracy	At 23 °C	%	±0.5 ±1 digit	
Temperature influence		%/°C	±0.03	
Overload capability				
• Voltage	Continuous Short-time for 1 s	V V	720 780	-- --
• Current	Continuous, direct Continuous, transformer	A A	-- --	22 5.5
	Short-time for 1 s, direct Short-time for 1 s, transformer	A A	-- --	200 50
Electrical isolation				
• Clearances		mm	≥ 3	≥ 1.5
• Creepage distances in the device		mm	≥ 4.3	≥ 2.1
• Creepage distances on the printed board	Printed boards not installed	mm	≥ 3.0	≥ 1.5
Test voltage	50 Hz, 1 min	kV	2.2	1.35
Terminals	± screw (Pozidriv)		1	
Conductor cross-sections	Rigid, max. Flexible, with end sleeve, min.	mm^2 mm^2	1 × 6/2 × 4 0.75	
Permissible ambient temperature		°C	-10 ... +55	
Degree of protection			IP20, with connected conductors	

7KT1 11, 7KT1 12 digital measuring devices

Selection and ordering data

		U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Digital voltmeters**											
		230	600		2	B	**7KT1 110**		027	1	1	0.190
	**Digital ammeters for direct and transformer connection**											
		230		0 ... 20 transformer /5	2	B	**7KT1 120**		027	1	1	0.200

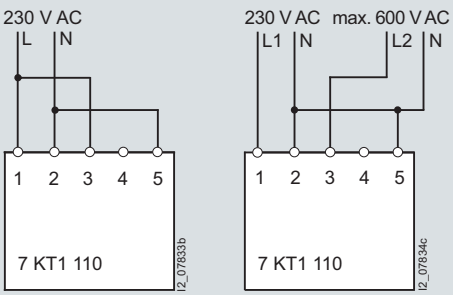
Dimensional drawings



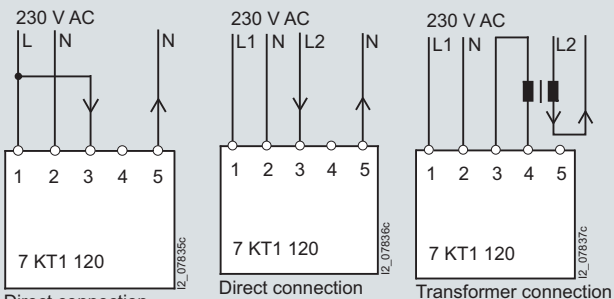
7KT1 110, 7KT1 120

Schematics

Switching examples



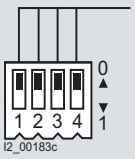
Digital voltmeters



Digital ammeters

More information

Range selector switch for 7KT1 120 digital ammeter



1 2 3 4
Direct measurement
0 0 0 0 20 A AC
Transformer measurement

1 0 0 0	25/5 A AC	0 0 0 1	200/5 A AC
0 1 0 0	40/5 A AC	1 0 0 1	250/5 A AC
1 1 0 0	50/5 A AC	0 1 0 1	400/5 A AC
0 0 1 0	60/5 A AC	1 1 0 1	500/5 A AC
1 0 1 0	80/5 A AC	0 0 1 1	600/5 A AC
0 1 1 0	100/5 A AC	1 0 1 1	800/5 A AC
1 1 1 0	150/5 A AC	0 1 1 1	999/5 A AC

* You can order this quantity or a multiple thereof.

Overview

These devices for measuring voltages and currents can be used for monitoring input and output currents or device currents in electric plants. They are suitable for direct connection in a single-phase system or for three-phase systems when used in conjunction with a measuring selector switch.

Benefits

- The 7KT1 020 ammeters can be equipped with changeable scales for primary currents of 60, 150 or 400 A AC, depending on the transformer ratio of the installed current transformer. The changeable scales are included in delivery. This ensures universal application
- Permanent overload up to 20 % does not damage the device. Protection for your plant.

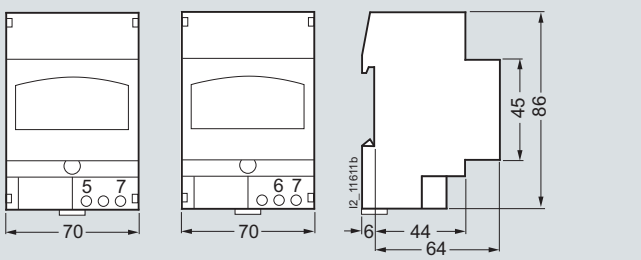
Technical specifications

			7KT1 000	7KT1 01.	7KT1 020
Standards			EN 60051-2		
Measuring ranges					
• Direct measurement		V AC	0 ... 500	--	--
		A AC	--	0 ... 25	--
		A AC	--	0 ... 40	--
		A AC	--	0 ... 60	--
• Transformer measurement		A AC	--	--	0 ... 150/5
Max. permissible measuring frequency		Hz	45 ... 65		
Display			Pointer		
Measuring accuracy	At 23 ±1 °C	%	±1.5	±3	±1.5
Rated operational power P_s		VA	< 2	< 1.1	
Temperature influence		%/°C	±0.03		
Overload capability	Continuous Short-time for 1 s		1.2 × U_{meas} 2 × U_{meas}	1.2 × I_{meas} 10 × I_{meas}	
Test voltage	50 Hz, 1 min	kV	> 2		
Terminals	± screw (Pozidriv)		1	2	1
Conductor cross-sections	Rigid, max. Flexible, with end sleeve, min.	mm^2 mm^2	1 × 6/2 × 4 0.75	1 × 25/2 × 16	1 × 6/2 × 4 0.75
Permissible ambient temperature		°C	-10 ... +55		
Degree of protection			IP20, with connected conductors		

Selection and ordering data

	U_{meas}	I_{meas}	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC						Unit(s)	Unit(s)	kg
Analog voltmeters										
	500		4	B	**7KT1 000**		027	1	1	0.105
Analog ammeters for direct connection										
		25	4	B	**7KT1 010**		027	1	1	0.110
		40		B	**7KT1 011**		027	1	1	0.125
		60		B	**7KT1 012**		027	1	1	0.135
Analog ammeters for transformer connection with 3 different interchangeable scales										
0 ... 60 A, 0 ... 150 A and 0 ... 400 A		0 ... 60/5 0 ... 150/5 0 ... 400/5	4	B	**7KT1 020**		027	1	1	0.105

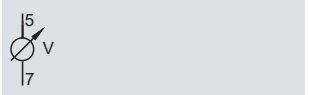
Dimensional drawings



7KT1 000 7KT1 01., 7KT1 020

Schematics

Terminals



7KT1 000 7KT1 01., 7KT1 020

* You can order this quantity or a multiple thereof.

7KT5 8 time and pulse counters

Overview

Time and pulse counters are used for the reliable monitoring of production and service times, which enables the exact planning and monitoring of production sequences, maintenance cycles and warranty times.

As well as the proven electromechanical time and pulse counters for mounting in distribution boards, we also supply digital time and pulse counters.

The fields of application for both counter types are very diverse, such as the recording of operating hours of machines, systems or building management systems, as well as pulse counting for general volume flow counting, registration of starting frequencies, starting cycles or production quantities in systems and machines.

Benefits

- Time and pulse counters help to plan maintenance intervals and ensure high plant availability
- Versions without zero position and with electric or manual zero position for all applications
- Flexible application of the digital counters for power supplies of 12 to 150 V DC and 24 to 240 V AC in a single device.

Technical specifications

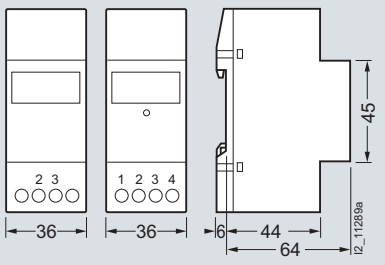
			7KT5 801	7KT5 802	7KT5 803	7KT5 804	7KT5 806	7KT5 807
Standards **Approved acc. to**			DIN VDE 0435-110; EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55					
Rated control supply voltage U_c		V AC V DC	-- 12 ... 24	24 --	115	230	115	230
Operating range	At 50/60 Hz	× U_c	0.9 ... 1.1					
Rated frequency		Hz	--	50			60	
Rated power dissipation P_v		VA	< 1		< 2			
Method of operation	Counting of		Hours					
Display	Drum-type register	h	00000.00					
Terminals	± screw (Phillips)		1					
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75					
Permissible ambient temperature		°C	-10 ... +70					
Degree of protection	Acc. to EN 60529		IP20, with connected conductors					
Safety class	Acc. to EN 61140/VDE 0140-1		II					
Permissible humidity		%	< 80					

			7KT5 811	7KT5 812	7KT5 814	7KT5 821	7KT5 822	7KT5 823	7KT5 833
Standards **Approved acc. to**			DIN VDE 0435-110; EN 60255-6; UL 863 UL 863, UL File No. E300537, CSA C22.2 No. 6 and 55						
Rated control supply voltage U_c		V AC V DC	-- 12 ... 24	24 --	230 --	24 ... 240 12 ... 150			
Operating range	At 50/60 Hz	× U_c	0.9 ... 1.1						
Rated frequency		Hz	--	50/60					
Rated power dissipation P_v		VA	< 1		< 2	< 1			
Method of operation	Counting of		Pulses			Hours			Pulses
Display	Drum-type register LCD	⎍⎍ h ⎍⎍	0000000 -- --			-- 000000.0 --			-- -- 0000000
Counting frequency		Hz	10			--			10
Pulse duration		ms	50			--			50
Resetting	Electrical Mechanical		-- --				Yes	Yes	
Terminals	± screw (Phillips)		1						
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75						
Permissible ambient temperature		°C	-10 ... +70						
Degree of protection	Acc. to EN 60529		IP20, with connected conductors						
Safety class	Acc. to EN 61140/VDE 0140-1		II						
Permissible humidity		%	< 80						

Selection and ordering data

	U_c	Frequency	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V	Hz						Unit(s)	Unit(s)	kg
	**Time counters**									
	Mechanical counting mechanism, display 00000.00 h without zero position									
	12 ... 24 DC	--	2	A	**7KT5 801**		027	1	1	0.095
	24 AC	50		A	**7KT5 802**		027	1	1	0.095
	115 AC			B	**7KT5 803**		027	1	1	0.095
	230 AC			A	**7KT5 804**		027	1	1	0.095
	115 AC	60		B	**7KT5 806**		027	1	1	0.095
	230 AC			B	**7KT5 807**		027	1	1	0.095
	Pulse counters									
	Mechanical counting mechanism, display 0000000 ⎍⎍ without zero position									
	12 ... 24 DC	--	2	B	**7KT5 811**		027	1	1	0.095
	24 AC	50/60		B	**7KT5 812**		027	1	1	0.095
	230 AC			B	**7KT5 814**		027	1	1	0.095
	**Electronic time counters**									
	LCD 000000.0 h without zero position									
	12 ... 150 DC, 24 ... 240 AC	-- 50/60	2	B	**7KT5 821**		027	1	1	0.080
	With electrical zero positioning									
	12 ... 150 DC, 24 ... 240 AC	-- 50/60		B	**7KT5 822**		027	1	1	0.080
	With electrical and mechanical zero positioning									
	12 ... 150 DC, 24 ... 240 AC	-- 50/60		B	**7KT5 823**		027	1	1	0.080
	Electronic pulse counters									
	LCD 0000000 ⎍⎍									
	With electrical and mechanical zero positioning									
	12 ... 150 DC, 24 ... 240 AC	-- 50/60	2	B	**7KT5 833**		027	1	1	0.080

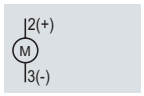
Dimensional drawings



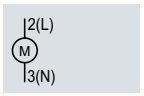
7KT5 80. 7KT5 82.
7KT5 81. 7KT5 833

Schematics

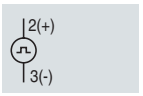
Terminals



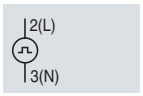
7KT5 801



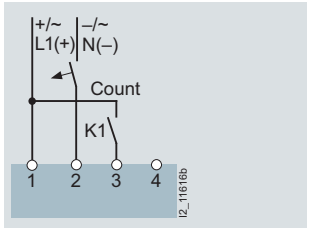
7KT5 802
7KT5 803
7KT5 804
7KT5 806
7KT5 807



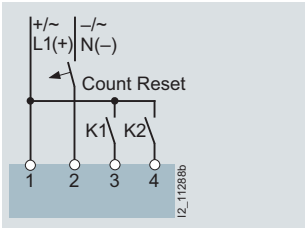
7KT5 811



7KT5 812
7KT5 814



7KT5 821



7KT5 822, 7KT5 823, 7KT5 833

More information

Time counters count the time in hours with an accuracy of two decimal places (hundredths of an hour). The pulse counter sums up the number of pulses, e.g. the making operations of devices.

A power supply is required at terminals 1 and 3 of the electronic counters so that the device can constantly display the measured values. Once terminal 3 is supplied with voltage (for DC "+"), the counting procedure starts. If terminal 4 is supplied short-time with voltage (for DC "+"), the counter is reset.

In the case of electronic counters, the counting result is saved indefinitely in the event of a power failure (EEPROM). On recovery of the power, the counting is continued from the saved value. As well as a modern design, the electronic counter has a 7-digit LCD, which can be reset electrically or manually.

*** You can order this quantity or a multiple thereof.**

7KT5 5, 7KT5 6 time counters for front-panel mounting

Overview

Time and pulse counters for control cabinets, control and mechanical engineering are used, e.g. in boilers, machine tools or compressors. The pulse counters count the starting frequencies. This supports planning for preventative maintenance.

In-time and regular maintenance is the best protection against unexpected shutdowns. Time counters count the time in hours with an accuracy of two decimal places (hundredths of an hour).

Benefits

- Time and pulse counters help to plan maintenance intervals and ensure high plant availability.

Technical specifications

			7KT5 500	7KT5 501	7KT5 502	7KT5 503	7KT5 504	7KT5 505
Standards			DIN VDE 0435-110; EN 60255-6					
Rated control supply voltage U_c		V AC V DC	-- 10 ... 80	115 --	230	115	230	24
Operating range		× U_c	0.9 ... 1.1					
Rated frequency		Hz	--	50		60		50
Rated power dissipation P_v		VA	< 1	0.2	1.8	0.9	1.8	0.2
Method of operation	Counting of		Hours					
Display	Drum-type register	h	00000.00					
Pulse duration	Pulse length, pulse interval	ms	50					
Front-panel mounting • Without cover 55 mm × 55 mm • With cover 55 mm × 55 mm	Switchboard cutout	 mm × mm Ø mm	 45.2 × 45.2$^{+0.3}$ 50.2$^{+0.3}$					
Terminals	± screw (Phillips)		1					
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75					
Permissible ambient temperature		°C	-10 ... +70					
Degree of protection • Front panel • Installation with seal • Terminals	Acc. to EN 60529		 IP65 IP43 IP20, with connected conductors					
Safety class	Acc. to EN 61140/ VDE 0140-1		II					
Permissible humidity		%	< 93					

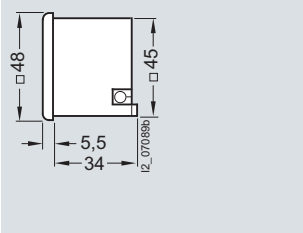
12

			7KT5 600	7KT5 601	7KT5 602	7KT5 603	7KT5 604
Standards			DIN VDE 0435-110; EN 60255-6				
Rated control supply voltage U_c		V AC V DC	-- 10 ... 50	115 --	230	115	230
Operating range		× U_c	0.9 ... 1.1				
Rated frequency		Hz	--	50		60	
Rated power dissipation P_v		VA	< 1				
Method of operation	Counting of		Hours				
Display	Drum-type register	h	00000.00				
Pulse duration	Pulse length, pulse interval	ms	50				
Front-panel mounting	Switchboard cutout	mm × mm	68$^{+0.5}$ × 68$^{+0.5}$				
Terminals	± screw (Phillips)		1				
Conductor cross-sections	Rigid Flexible, with end sleeve, min.	mm^2 mm^2	1.5 0.75				
Permissible ambient temperature		°C	-10 ... +70				
Degree of protection • Front panel • Terminals	Acc. to EN 60529		 IP52 IP00				
Safety class	Acc. to EN 61140/ VDE 0140-1		II				
Permissible humidity		%	< 93				

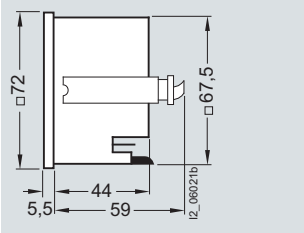
Selection and ordering data

	U_c	Frequency	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V	Hz						Unit(s)	Unit(s)	kg
	**Time counters**									
	Mechanical counting mechanism, display 00000.00 h, For front-panel mounting, front frame 48 mm × 48 mm									
	10 ... 80 DC	–		A	**7KT5 500**		027	1	1	0.045
	24 AC	50		A	**7KT5 505**		027	1	1	0.045
	115 AC			A	**7KT5 501**		027	1	1	0.045
	230 AC			A	**7KT5 502**		027	1	1	0.045
	115 AC	60		A	**7KT5 503**		027	1	1	0.045
	230 AC			A	**7KT5 504**		027	1	1	0.045
	For front-panel mounting, front frame 72 mm × 72 mm With narrow frame according to DIN 43700									
	10 ... 50 DC	–	2	B	**7KT5 600**		027	1	1	0.120
	115 AC	50		B	**7KT5 601**		027	1	1	0.120
	230 AC			A	**7KT5 602**		027	1	1	0.120
	115 AC	60		B	**7KT5 603**		027	1	1	0.120
	230 AC			B	**7KT5 604**		027	1	1	0.120
	Covers for 7KT5 5 time counters									
	55 mm × 55 mm			B	**7KT9 020**		027	1	1	0.015
	Sealing rings for 7KT9 020 covers									
	IP43 installation in switchboards, with smooth surfaces (1 set = 5 units)			C	**7KT9 000**		027	1 set	1 set	0.020
	Terminal covers for 7KT5 6 time counters									
	Degree of protection, IP20, with connected conductors			B	**7KT9 021**		027	1	1	0.010

Dimensional drawings



7KT5 5



7KT5 6

Schematics

Terminals

7KT5 5, 7KT5 6

12

* You can order this quantity or a multiple thereof.

Notes

BETA Monitoring
Monitoring of Electrical Values

13

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-resid. buildings	Residential buildings	Industry
	**5TT3 voltage relays**	13/3	Monitoring the voltage of emergency lighting in public buildings, short-time failures of 20 ms, for ensuring operational parameters for devices or system components or monitoring the neutral conductor for breaks.	IEC 60255; DIN VDE 0435-303; DIN VDE 0108; DIN VDE 0435; DIN VDE 0633	✓	--	✓
	**5TT6 current relays**	13/11	Monitoring of emergency and signal lighting and motors. All current relays can be short-time overloaded and connected either with direct measurement or through transformers.	IEC 60255; DIN VDE 0435-303	✓	--	✓
	**5TT6 priority switches**	13/17	For reduction of the connection fee in accordance with German Federal Regulations on Tariffs when used in systems with electric storage heaters where the continuous-flow heaters are switched with priority.	IEC 60669 (VDE 0632); BTO § 6 Section 4	--	✓	--
	**5TT3 fuse monitors**	13/18	Monitoring of all types of low-voltage fuses. Can be used in asymmetric systems afflicted with harmonics and regenerative feedback motors.	IEC 60255; DIN VDE 0435	✓	--	✓
	**5TT3 phase and phase sequence monitors**	13/20	For the visual signaling of phase failures or phase sequences in three-phase systems. The phase sequence is arbitrary. The device is also suitable for 1, 2 or 3-phase operation.	IEC 60255; DIN VDE 0435	--	--	✓
	**5TT3 insulation monitors for industrial applications**	13/22	We recommend the use of insulation monitors in all systems without grounding. Adjustable alarm value 2 to 100 kΩ and electrical isolation of measuring circuit, power supply and contact voltage.	IEC 60255; IEC 61557	--	--	✓
	**7LQ3 insulation monitors for medical premises**	13/25	For the insulation monitoring of IT systems or load current monitoring of IT system transformers for inadmissible overheating. The response value is 50 to 500 kΩ and is adjustable.	EN 61557-8; IEC 61557-8; DIN VDE 0100-710; IEC 60364-7-710	✓	--	--

Overview

Voltage relays are used for device and plant protection, supplying emergency light devices and the detection of N-conductor breaks and short-time voltage interruptions.

They are available as undervoltage, overvoltage and under/overvoltage relays. The devices are equipped with different functions, depending on their intended use, and comply with the pertinent regulations.

Benefits

- Complete voltage protection in a compact design for overvoltage and undervoltage monitoring in a single device
- Plants and devices are reliably and easily protected by phase-failure relays
- Overvoltages and consequential damage due to high voltages are prevented through N-conductor monitoring
- Asymmetry monitoring in the voltage relay also protects three-phase AC motors against operation with voltage skew.

Technical specifications

			5TT3 400 5TT3 401 5TT3 402 5TT3 403	5TT3 404 5TT3 405	5TT3 406	5TT3 194	5TT3 195
Standards			IEC 60255; DIN VDE 0435-110, -303				
Rated control voltage U_c		V AC	230/400				400
Operating range (overload capability)		× U_c	1.1			1.35	
Rated frequency		Hz	50/60				
Response values	ON-switching OFF-switching	× U_c	0.9/0.95 0.7/0.85		4 % hysteresis 0.7 ... 0.95	0.9 ... 1.3	
Minimum contact load		V; mA	10; 100				
Phase asymmetry	Setting accuracy Repeat accuracy	% %	-- --	Approx. 5 ... 10 1		-- --	Approx. 5 ... 10 1
Phase failure detection	At L1 or L2 or L3	ms	100			--	
N-conductor monitoring			--	Yes		--	
Rated insulation voltage U_i	Between coil/contact	kV	4				
Contacts	μ contact (AC-11)	A	4				
Electrical isolation	Creepage distances and clearances Actuator/contact	mm	3	5.5			
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 2.5	> 4			
Terminals	± screw (Pozidriv)		1				
Conductor cross-sections • Rigid, max. • Flexible, with end sleeve, min.		 mm^2 mm^2	 2 × 2.5 0.5				
Permissible ambient temperature		°C	-20 ... +60				
Resistance to climate	Acc. to EN 60068-1		20/60/4				

5TT3 voltage relays

			5TT3 407	5TT3 408	5TT3 410
Standards			IEC 60255; DIN VDE 0435-110		
Rated control voltage U_c		V AC	230/400		
Operating range (overload capability)		× U_c	1.1	1.35	1.2
Rated frequency		Hz	50/60		
Back-up fuse	Terminals L1/L2/L3	A	2		
Response values	Overvoltage:				
	OFF-switching	× U_c	--	0.9 ... 1.3	--
	ON-switching		--	4 % hysteresis	--
	Undervoltage:				
	OFF-switching	× U_c	0.8	0.7 ... 1.1	--
	ON-switching		0.85	4 % hysteresis	--
Minimum contact load		V; mA	10; 100		
Phase asymmetry	Setting accuracy	%	Approx. 5 ... 10		
	Repeat accuracy	%	1		
Phase failure detection	At L1, L2 or L3	ms	≥ 20	100	--
OFF delay		s	--	0.1 ... 20	--
Automatic reclosing delay		s	0.2 ... 20	--	--
Rated insulation voltage U_i	Between coil/contact	kV	4		
Contacts	μ contact (AC-11)	A	3	1	4
Electrical isolation	Creepage distances and clearances				
	Contact/contact	mm	--	4	--
	Actuator/contact	mm	4		5.5
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 4		
Rated operational power P_s	AC operation:				
	230 V and p.f = 1	VA	2000	--	--
	230 V and p.f = 0.4	VA	1250	--	--
	DC operation:				
	U_e = 24 V and I_e = 6 A	W	Max. 100	--	--
	U_e = 60 V and I_e = 1 A	W	Max. 100	--	--
	U_e = 110 V and I_e = 0.6 A	W	Max. 100	--	--
	U_e = 220 V and I_e = 0.5 A	W	Max. 100	--	--
Terminals	± screw (Pozidriv)		1		
Conductor cross-sections					
• Rigid, max.		mm^2	2 × 2.5		
• Flexible, with end sleeve, min.		mm^2	0.5		
Permissible ambient temperature		°C	-20 ... +60		
Humidity class	Acc. to IEC 60068-2-30		F		

13

			Voltage relays	
			5TT3 411	5TT3 412
Rated control voltage U_c		V AC	230	230/400
Overload capability		× U_c	1.15	1.1
Rated frequency		Hz	50/60	
Response values	ON-switching		2 % hysteresis	4 % hysteresis
	OFF-switching	× U_c	0.9	0.9
Minimum contact load		V/mA	10/100	
Phase failure detection	At L1, L2 or L3	ms	--	100
N-conductor monitoring			--	Yes
Rated insulation voltage U_i	Between coil/contact	kV	4	
Contacts	NO contacts AC 15		3	3
	NC contacts AC 15		2	1
Electrical service life in switching cycles	AC 15, 1 A, 230 V AC		5×10^5	
Rated impulse withstand voltage	Acc. to IEC 60664-1	kV	4	
Degree of pollution			2	
Terminals	± screw (Pozidriv)		2	
Conductor cross-sections				
• Rigid		mm^2	2 × 2.5	
• Flexible, with end sleeve		mm^2	2 × 1.5	
Permissible ambient temperature		°C	-20 … +60	
Resistance to climate	Acc. to EN 60068-1		20/060/04	

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A	V AC						Unit(s)	Unit(s)	kg
	Overvoltage relays											
	For the monitoring of 1, 2 or 3 phases against N, switching thresholds: 0.9 ... 1.3 × U_c, 4 % adjustable hysteresis											
	2 CO	230	4	230/400	2	B	**5TT3 194**		027	1	1	0.150
	For monitoring of 3 phase against N, with N-conductor monitoring, switching thresholds: 0.9 ... 1.3 × U_c, 4 % adjustable hysteresis											
	2 CO	230	4	230/400	2	B	**5TT3 195**		027	1	1	0.150
	Undervoltage relays											
	For the monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.7 and 0.9 × U_c, not adjustable											
	1 CO	230	4	230/400	1	►	**5TT3 400**		027	1	1	0.065
	For the monitoring of safety light devices of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.85 and 0.95 × U_c, not adjustable											
	1 CO	230	4	230/400	1	►	**5TT3 401**		027	1	1	0.065
	For the monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.7 and 0.9 × U_c, not adjustable											
	2 CO	230	4	230/400	2	►	**5TT3 402**		027	1	1	0.110
	For the monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.9 ... 0.95 × U_c, 5 % adjustable hysteresis											
	2 CO	230	4	230/400	2	A	**5TT3 403**		027	1	1	0.110
	For the monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.7 and 0.9 × U_c, not adjustable											
	2 CO	230	4	230/400	2	B	**5TT3 404**		027	1	1	0.110
	For undervoltage monitoring of safety light devices of 3-phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.85 and 0.95 × U_c, not adjustable											
	2 CO	230	4	230/400	2	B	**5TT3 405**		027	1	1	0.110
	For the monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.7 ... 0.95 × U_c, 5 % adjustable hysteresis											
	2 CO	230	4	230/400	2	B	**5TT3 406**		027	1	1	0.110
	Short-time relays											
	For monitoring of short-time failure detection ≥ 20 ms of 1, 2 or 3 phases against N, with phase failure detection and N-conductor monitoring, switching thresholds: 0.8 ... 0.85 × U_c, not adjustable											
	2 CO	230	4	230/400	2	B	**5TT3 407**		027	1	1	0.110

13

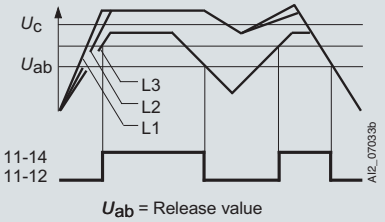
* You can order this quantity or a multiple thereof.

5TT3 voltage relays

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A	V AC						Unit(s)	Unit(s)	kg
	**Under and overvoltage relays** For the monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring and adjustable time delay of 0.1 to 20 s, switching thresholds: Undervoltage: 0.7 ... 1.1 × U_c, 4 % adjustable hysteresis Overvoltage: 0.9 ... 1.3 × U_c, 4 % adjustable hysteresis											
	2 CO	230	4	230/400	2	B	**5TT3 408**		027	1	1	0.110
	**N-conductor monitors** With asymmetry detection and N-conductor monitoring											
	2 CO	230	4	230/400	2	B	**5TT3 410**		027	1	1	0.110
	**Voltage relays for undervoltage monitoring of medical premises** Single-phase against N with test button, switching thresholds: 0.9 × U_n, 2 % hysteresis											
	2 NO, 2 NC	230	4	230	4	C	**5TT3 411**		027	1	1	0.220
	Single, two or three-phase against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, and one test button each for the phases, switching thresholds: 0.9 × U_n, 4 % hysteresis											
	1 CO, 1 NO, 1 NC	230	4	230/400	4	C	**5TT3 412**		027	1	1	0.230

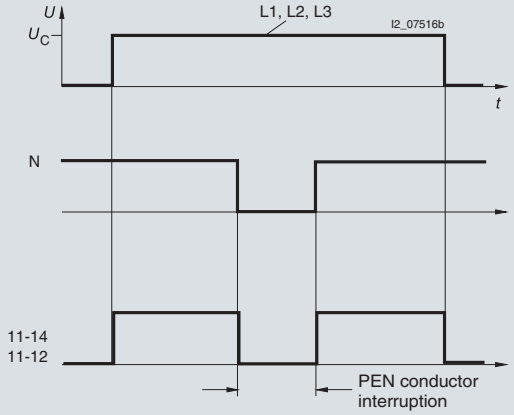
Characteristic curves

Timing interval of 5TT3 400 ... 5TT3 406 undervoltage relays



U_{ab} = Release value

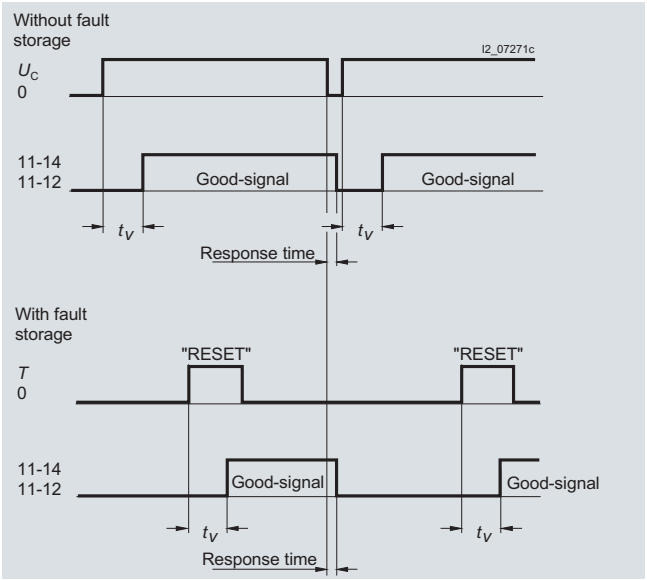
Timing interval of 5TT3 410 N-conductor monitors



13

* You can order this quantity or a multiple thereof.

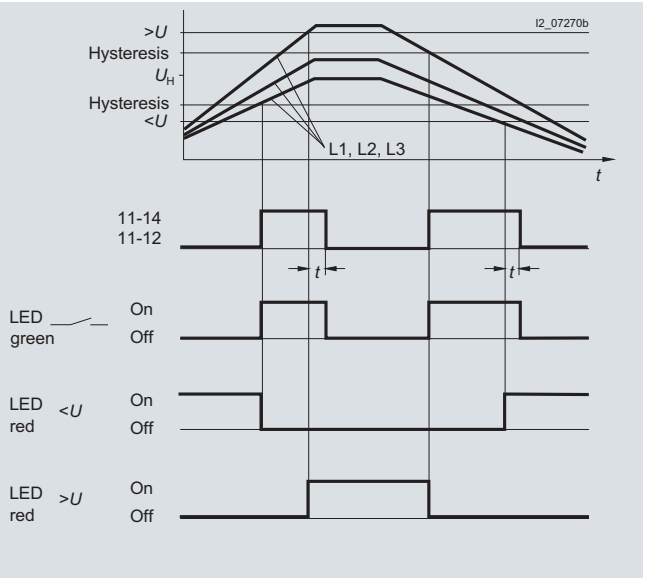
Timing interval of 5TT3 407 short-time relays



t_V: adjustable automatic reclosing delay 0.2 to 20 s

The undervoltage relay switches at a phase asymmetry of approx. 6 to 8 %, regardless of the response values for undervoltage. The above diagram shows the timing interval for undervoltage or asymmetry.

Timing interval of 5TT3 408 under/overvoltage relays



t: adjustable OFF delay 0.1 to 20 s

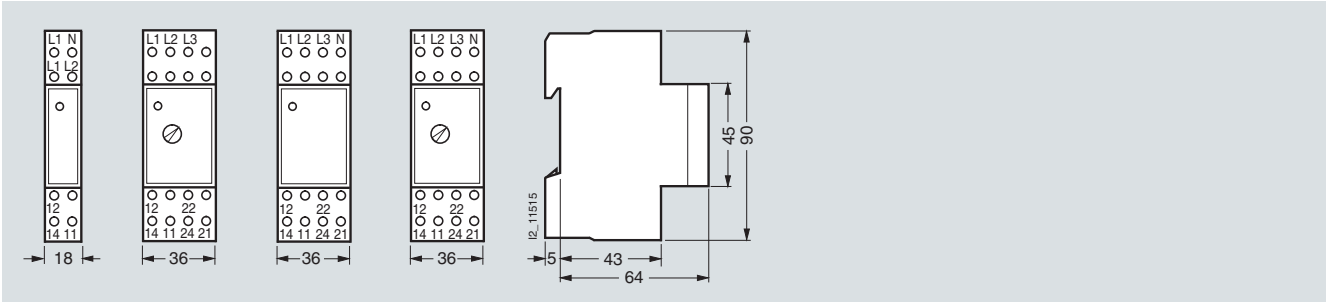
The undervoltage relay switches at a phase asymmetry of approx. 6 to 8 %, regardless of the response values for undervoltage. The above diagram shows the timing interval for undervoltage.

5TT3 411 and 5TT3 412 voltage relays

For characteristic curves of the 5TT3 411 and 5TT3 412 voltage relays, see "Monitoring of medical premises" on page 13/33.

Dimensional drawings

5TT3 4 and 5TT3 1 voltage relays



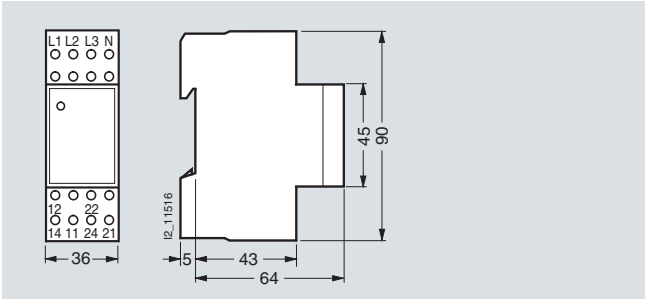
5TT3 400
5TT3 401

5TT3 402
5TT3 403

5TT3 404
5TT3 405
5TT3 407
5TT3 408

5TT3 194 5TT3 195
5TT3 406

5TT3 410 N-conductor monitors

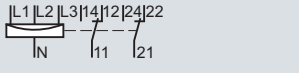


5TT3 411 and 5TT3 412 voltage relays

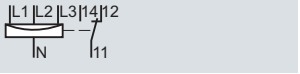
For dimensional drawings of the 5TT3 411 and 5TT3 412 voltage relays, see "Monitoring of medical premises" on page 13/31.

5TT3 voltage relays

Schematics



5TT3 194
5TT3 195
5TT3 402
5TT3 403
5TT3 404
5TT3 405
5TT3 406
5TT3 407
5TT3 408
5TT3 410



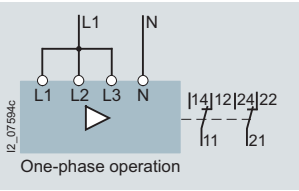
5TT3 400
5TT3 401

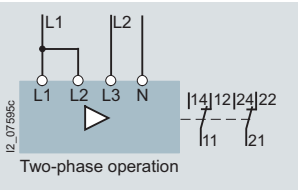
5TT3 411 and 5TT3 412 voltage relays

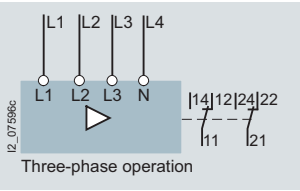
For schematics of the 5TT3 411 and 5TT3 412 voltage relays, see "Monitoring of medical premises" on page 13/32.

Switching example for 5TT3 195, 5TT3 40 voltage relays

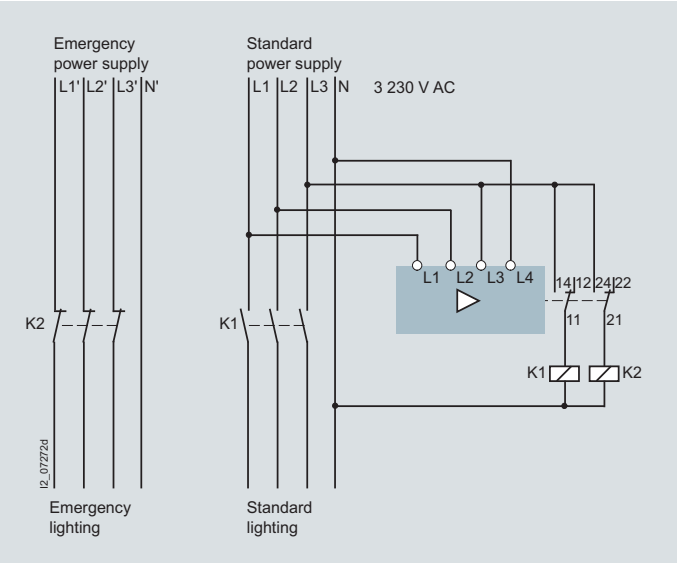
1, 2, 3-phase operation against N



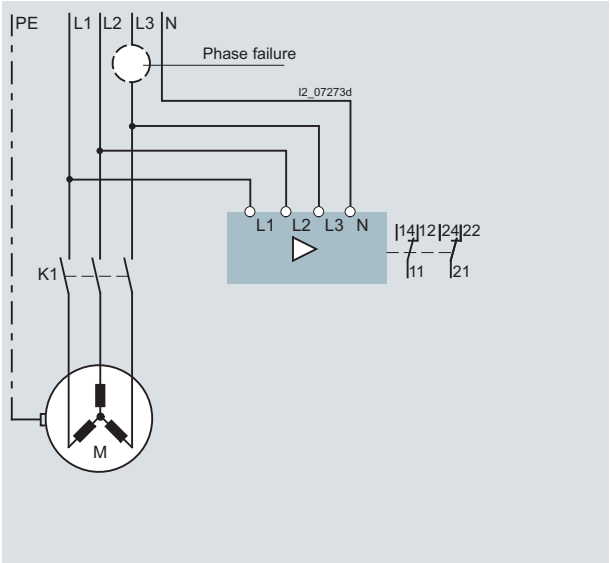




Switching example for 5TT3 401, 5TT3 403, 5TT3 405 undervoltage relays



Switching example for 5TT3 404, 5TT3 405, 5TT3 406, 5TT3 408 undervoltage relays



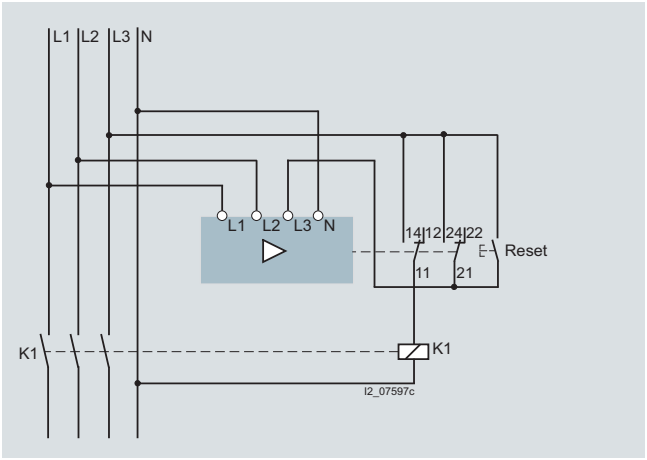
One application of the undervoltage relays is the switchover to a safety power supply after a fault.
Buildings are distinguished according to use, such as business premises, exhibition areas or guest houses. These are all covered generically as rooms/buildings where "people meet".

There is a fault if the voltage of the general power supply drops > 15 % in relation to the rated voltage for 0.5 seconds (i.e. 195 V at 230 V).

In this case, depending on the type of use of the building, the lighting must be switched to a safety power supply after 0.5 to 15 s. A safety power supply may be: a battery system, generating set or a quick-starting standby generating set.

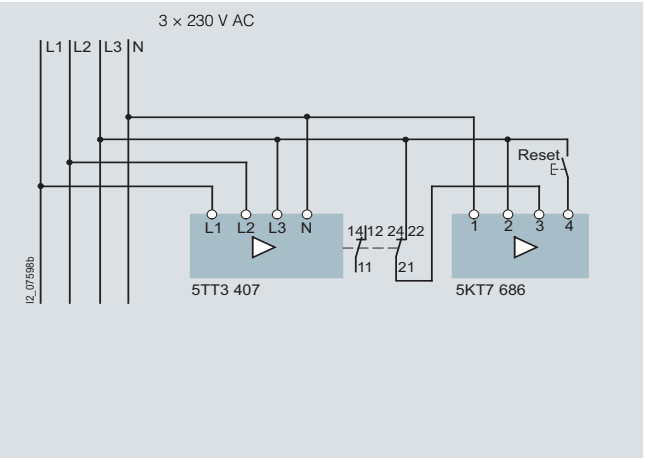
These voltage relays can only be used for 3-phase operation. As well as monitoring undervoltages and overvoltages in accordance with their description, they also monitor reverse voltage, asymmetry and N-conductor breaks.

Switching example for 5TT3 407 short-time relays



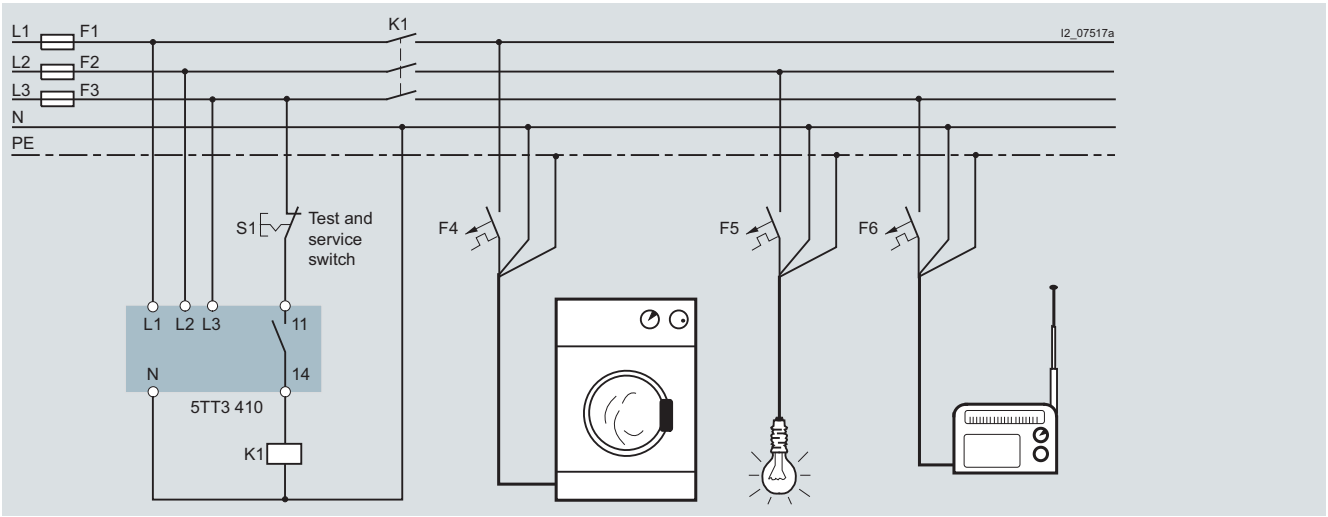
In the case of sensitive technical sequences, it is often not possible to tell whether this interrupt has interfered with the process sequence. The switch disconnects the power supply, which can then be switched back by using the reset pushbutton.

Switching example for 5TT3 407 short-time relays



In simple cases, it may be sufficient that a short-time interrupt is registered without the need to disconnect the power supply. In this case, the duration is counted by the pulse counter. The pulse counter can be reset if required.

Switching example of 5TT3 410 N-conductor monitors



More information

	5TT3 194	5TT3 195	5TT3 400	5TT3 401	5TT3 402	5TT3 403	5TT3 404	5TT3 405	5TT3 406	5TT3 407	5TT3 408	5TT3 410
Overvoltage	✓	✓	--	--	--	--	--	--	--	--	✓	--
Undervoltage	--	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	--
Monitoring of safety light devices	--	--	--	✓	--	--	--	✓	--	--	--	--
Monitoring of medical premises	--	--	--	--	--	--	--	--	✓	--	--	--
Monitoring of N-conductor	--	--	--	--	--	--	--	--	--	--	--	✓
Monitoring of short-time interruptions	--	--	--	--	--	--	--	--	--	✓	--	--
1, 2, 3 phases against N	✓	--	✓	✓	✓	✓	--	--	--	✓	--	--
3 phases against N	--	✓	--	--	--	--	✓	✓	✓	--	✓	--
Asymmetry detection	--	✓	--	--	--	--	✓	✓	✓	--	✓	✓
N-conductor monitoring	--	--	--	--	--	--	✓	✓	✓	✓	✓	✓
Reverse voltage detection	--	✓	--	--	--	--	✓	✓	✓	--	✓	--
Short-time failure detection	--	--	--	--	--	--	--	--	--	✓	--	--
Phase failure detection	--	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	--
Switching thresholds:	--	--	--	--	--	--	--	--	--	--	--	--
0.7/0.9 × U_c, not adjustable	--	--	✓	--	✓	--	✓	--	--	--	--	--
0.8/0, 85 × U_c, not adjustable	--	--	--	--	--	--	--	--	--	✓	--	--
0.85/0.95 × U_c, not adjustable	--	--	--	✓	--	✓	--	✓	--	--	--	--
0.7 ... 0.95 × U_c, 5 % hysteresis, adjustable	--	--	--	--	--	--	--	--	✓	--	--	--
0.7 ... 1.1 × U_c, 4 % hysteresis, adjustable	--	--	--	--	--	--	--	--	--	--	✓	--
0.9 ... 1.3 × U_c, 4 % hysteresis, adjustable	✓	✓	--	--	--	--	--	--	--	--	✓	--
Adjustable time delay	--	--	--	--	--	--	--	--	--	--	✓	--
Contact: 1 CO contact	--	--	✓	✓	--	--	--	--	--	--	--	--
Contact: 2 CO contacts	✓	✓	--	--	✓	✓	✓	✓	✓	✓	✓	✓

General voltage monitoring

For general device and plant protection, voltage relays with switching thresholds of 0.7 × U_c, i.e.161 V are used. If they have fixed, unchangeable switching thresholds, they switch back to normal operation at 0.85 × U_c, 195 V or at 0.9 × U_c, 207 V, depending on the version. If they have adjustable threshold values, they switch back to normal operation with 4 % hysteresis, 9 V.

1, 2 or 3 phases against N or 3 phases against N

All voltage relays require an N-conductor. Devices for single, two or three phases against N can be used for 1, 2, or 3-phase operation. Devices for 3 phases against N require all three phases, whereby the sequence in which they are connected is irrelevant.

Asymmetry detection

If different voltages occur in a three-phase network, this is called phase asymmetry. Some voltage relays detect an asymmetry of approx. 6 to 8 % of the phase-to-neutral voltage, i.e. approx. 14 to 16 V and switch off. This type of operation is used to protect motors against a "skew" (for example).

N-conductor monitoring

An N-conductor break causes a "skew", depending on the phase load. In extreme cases, this could cause 400 V to be applied to a phase, which would destroy any connected devices. Each voltage relay with asymmetry detection is tripped by an N-conductor break, if the phase displacement is at least 14 to 18 V.

The 5TT3 410 N-conductor monitor detects a phase displacement of 5 %, which is roughly 12 V. This provides earlier protection against overvoltage for connected devices. The N-conductor monitor does not react if the voltage drops or rises in all phases simultaneously; or if a phase is swapped with the N-conductor.

Reverse voltage detection

If a phase fails, the motors feed a reverse voltage to the missing phase. However, voltage relays with reverse voltage detection will disconnect in this case because they are monitoring the phase angle.

Phase failure detection

If a phase fails completely, the voltage relays disconnect with a delay as specified in the technical specifications.

Short-time failure detection

Short-time failures upwards of 20 ms cannot be detected with conventional voltage relays. However, they can occur in the case of system transfers or lightning strikes and can lead to uncertainty for sensitive process sequences or measuring procedures. The 5TT3 407 short-time voltage relay has a reset function that allows a procedure to be permanently interrupted after a fault.

Back-up fuse

The voltage relays do not require a back-up fuse as device protection. However, they are often installed in junctions, i.e. in main supply systems with high fusing. In this case, the supply lead to the voltage relay must be short-circuit resistant. The back-up fuse only serves as line protection.

5TT3 411 and 5TT3 412 voltage relays

For control elements of the 5TT3 411 and 5TT3 412 voltage relays, see "Monitoring of medical premises" on page 13/40.

Overview

Current relays monitor single and three-phase systems for the flow of current in emergency lighting installations and the load of motors. They are available as undercurrent, overcurrent and under/overcurrent relays.

Benefits

- Devices with an extremely broad range of applications of minimum 0.1 to maximum 15 A without transformer
- Permanent overload capability up to 20 or 30 A may, for up to 3 seconds, protect the function against uncontrolled plant states and increase plant availability
- Range changing enables the precise setting of current values through a high resolution
- Ultra compact current relays require only the smallest of spaces and save costs

Technical specifications

			5TT6 111	5TT6 112
Standards			IEC 60255; DIN VDE 0435-303	
Rated control current I_c		A	1 ... 10	
Rated control voltage U_c		V AC	230	
Operating range **Overload capability, continuous** **Overload capability, short-time**	 At 50 °C ambient temperature max. 3 s	× U_c A A	0.9 ... 1.1 15 20	
Rated frequency		Hz	50/60	
Response values	Switching on infinitely variable, switching off non-adjustable	× I_c	0.1 ... 1 4 % hysteresis	
Switching delay t_v	Infinitely adjustable	s	0.1 ... 20	
Response time	Non-adjustable	ms	Current corresponds to the rated operational power of the continuous-flow heater	
Minimum contact load		V; mA	10; 100	
Rated insulation voltage U_i	Between coil/contact	kV	2.5	
Contacts μ contact (AC-15)	 NO contacts NC contacts	 A A	 3 1	
Electrical isolation	Creepage distances and actuator/contact	mm	3	
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 4	
Terminals	± screw (Pozidriv)		1	
Conductor cross-sections	Rigid Flexible, with end sleeve	max. mm² min. mm²	2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	
Resistance to climate	Acc. to EN 60068-1		20/60/4	

			5TT6 113	5TT6 114	5TT6 115	5TT6 120
Standards			IEC 60255; DIN VDE 0435-303			
Rated control current I_c		 A A A A	4 ranges 0.1 ... 1 0.5 ... 5 1 ... 10 1.5 ... 15			1 range 0.5 ... 5
Rated control voltage U_c		V AC	230			
Operating range **Overload capability, continuous** **Overload capability independent of measuring range**	 Max. 3 s	× U_c A A	0.9 ... 1.1 20 30			15
Rated frequency		Hz	50/60			
Response values	Switching on infinitely variable, switching off non-adjustable	× I_c	1 ... 10 4 % hysteresis			
Switching delay t_v	Infinitely adjustable	s	0.1 ... 20			
Response time	Non-adjustable	ms	See page 13/15			
Minimum contact load		V; mA	10; 100			
Rated insulation voltage U_i	Between coil/contact	kV	2.5			
Contacts μ contact (AC-15)	 NO contacts NC contacts	 A A	 5 1			
Electrical isolation	Creepage distances and actuator/contact	mm	3			
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 4			
Terminals	± screw (Pozidriv)		1			
Conductor cross-sections	Rigid Flexible, with end sleeve	max. mm² min. mm²	2 × 2.5 1 × 0.5			
Permissible ambient temperature		°C	-20 ... +60			
Resistance to climate	Acc. to EN 60068-1		20/60/4			

5TT6 current relays

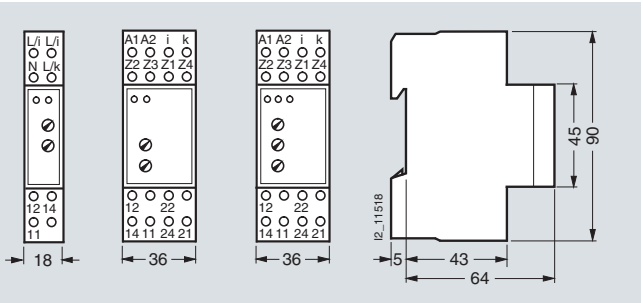
Selection and ordering data

	Contacts	U_e	I_e	Measuring range	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A	A AC						Unit(s)	Unit(s)	kg
	**Current relays for single-phase loads up to 230 V AC, auxiliary voltage and measuring circuit not isolated**											
	Undervoltage monitoring, single-phase											
	1 CO	230	5	1 ... 10	1	B	**5TT6 111**		027	1	1	0.065
	Overcurrent monitoring, single-phase											
	1 CO	230	5	1 ... 10	1	B	**5TT6 112**		027	1	1	0.065
	**Current relays for single-phase loads up to 230 V AC, auxiliary voltage and measuring circuit not isolated**											
	Undervoltage monitoring, single-phase											
	2 CO	230	5	4 ranges 0.1 ... 1 0.5 ... 5 1 ... 10 1.5 ... 15	2	B	**5TT6 113**		027	1	1	0.122
	Overcurrent monitoring, single-phase											
	2 CO	230	5	4 ranges 0.1 ... 1 0.5 ... 5 1 ... 10 1.5 ... 15	2	B	**5TT6 114**		027	1	1	0.122
	Over/undervoltage monitoring, single-phase											
	2 CO	230	5	4 ranges 0.1 ... 1 0.5 ... 5 1 ... 10 1.5 ... 15	2	B	**5TT6 115**		027	1	1	0.122
	**Current relays for three-phase loads up to 3 × 400 V AC, separate signal with N-wire connection**											
	Over/undervoltage monitoring, three-phase											
	2 CO each for overcurrent/ undercurrent respectively	230	5	0.5 ... 5	4	B	**5TT6 120**		027	1	1	0.220

13

Dimensional drawings

5TT6 11 current relays

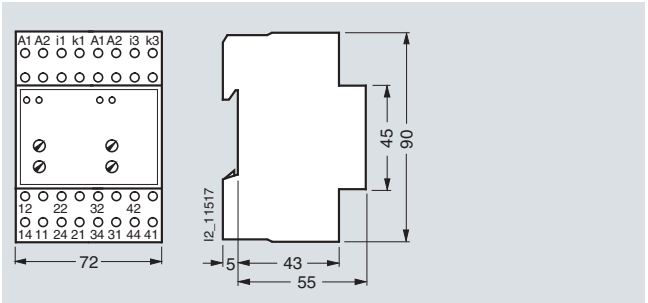


5TT6 111
5TT6 112

5TT6 113
5TT6 114

5TT6 115

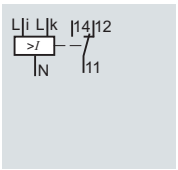
5TT6 120 current relays



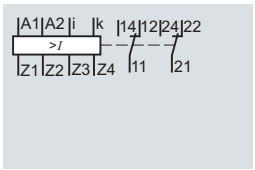
5TT6 120

* You can order this quantity or a multiple thereof.

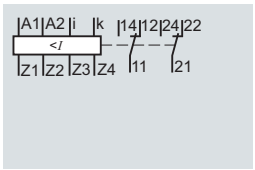
Schematics



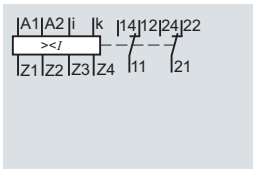
5TT6 111
5TT6 112



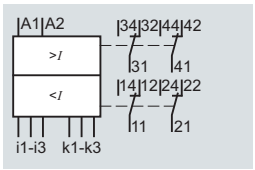
5TT6 113



5TT6 114

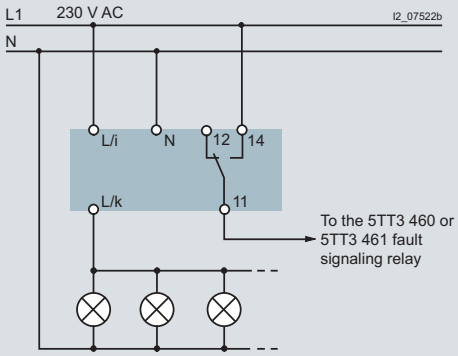


5TT6 115

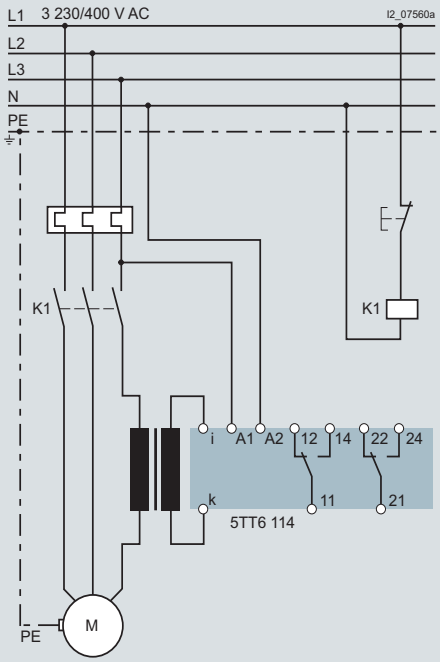


5TT6 120

Switching example:
5TT6 111 undervoltage monitoring



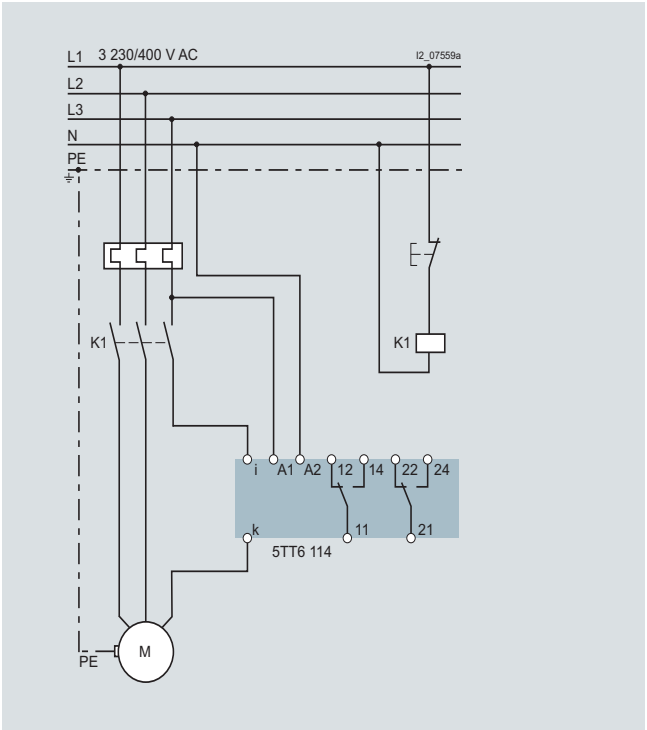
Switching example:
5TT6 114 overcurrent monitoring measurement with transformer



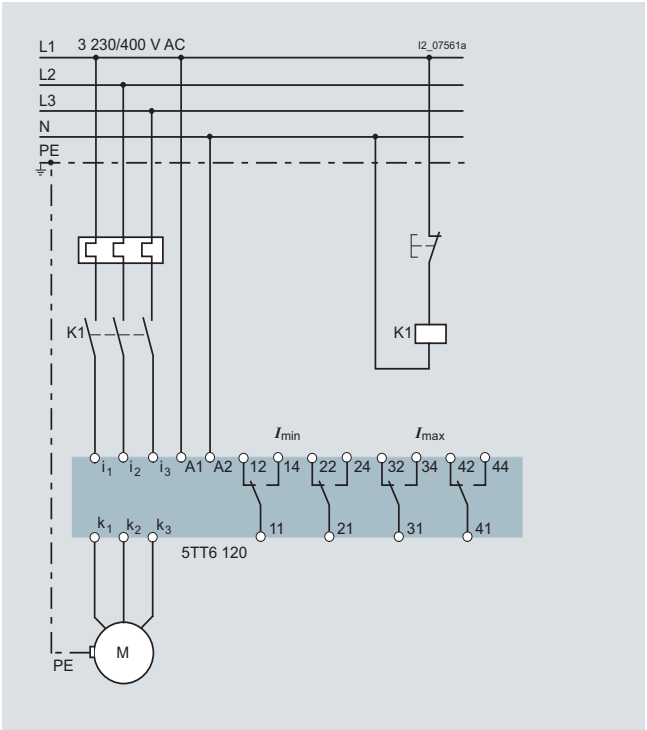
13

5TT6 current relays

Switching example:
5TT6 114 with direct measurement up to 15 A
for overcurrent measurement



Switching example:
5TT6 120 with direct measurement up to 5 A
for undercurrent/overcurrent measurement



More information

Direct measurement, transformer measurement

All current relays can be connected with direct measurement or through transformers.

N potential

Versions 5TT6 113 to 5TT6 120 can be connected with a separate N potential.

Response time

Current relays are not circuit-protection devices for lines. They switch with a delay in the ms range.

Overload capability

Independent of the set measuring range and set measured value, current relays can be permanently overloaded up to 15 A or 20 A for 3 s, even up to 20 A or 30 A.

Device overview		5TT6 111	5TT6 112	5TT6 113	5TT6 114	5TT6 115	5TT6 120
Undercurrent		✓	--	✓	--	✓	✓
Overcurrent		--	✓	--	✓	✓	✓
Single-phase		✓	✓	✓	✓	✓	--
Three-phase		--	--	--	--	--	✓
Separate N potential		--	--	✓	✓	✓	✓
Measuring ranges:	**Jumper:**						
0.1 ... 1 A	Z1 – Z2	--	--	✓	✓	✓	--
0.5 ... 5 A	Z1 – Z3	--	--	✓	✓	✓	✓
1 ... 10 A	Z1 – Z4	✓	✓	✓	✓	✓	--
1.5 ... 15 A	Z1 – Z3 – Z4	--	--	✓	✓	✓	--
Can be programmed over jumpers		--	--	✓	✓	✓	--
Contacts	1 CO contact	✓	✓	--	--	--	--
	2 CO contacts	--	--	✓	✓	✓	✓

Buildings/object-safe guiding lights

In the approach corridors of planes, high buildings must be fitted with position lighting. The same planning instructions apply to the monitoring of this type of lighting and runway lighting as the monitoring of emergency lighting.

Monitoring of emergency lighting with incandescent lamps

The function of emergency lighting according to DIN VDE 0108 must be checked at regular intervals. The operational current is continuously monitored using current relays. The lighting can either be integrated in the general lighting system or just supplied on demand with emergency current.

The current relay is set so that it switches on at the max. lamp current. If an incandescent lamp fails, a fault is signaled.

Monitoring of motors

If the warning is sent early enough, the fault can be eliminated before the motor starts to overheat and the circuit breaker switches the motor off.

Current relays reliably safeguard the monitoring of fault-free running motors and, in some cases are more suitable than a voltage relay, which is geared more towards motor protection.

Example: screw conveyor

Hard objects in screw conveyors, e.g. in sewage treatment plants, often lead to the conveyor system getting blocked up. Appropriately set, the current relay signals over its contact(s) that a hazardous situation has occurred and threatens to block the motor.

Example: stirrer

As with the conveyor processes, changes to the viscosity can lead to an overload of the motors.

Example: crane motor control system

The current monitoring of the main motor (hoisting motor) ensures that the electrical holding brake is not released until the main motor is in operation and the load is held.

Example: dust extraction

In the interests of work safety and to protect against massive dust development, it is essential to ensure that the dust extraction system is working perfectly before a saw or sanding machine is switched on.

Planning the monitoring of an incandescent lamp

Current relays have a hysteresis of approx. 4 %. The smallest lamp must not exceed the set measuring range by more than 8 %.

Example: 12 Lamps à 100 W = 1200 W, which corresponds to a current of approx. 5.2 A. If a lamp fails, the current drops by 0.4 A. This 0.4 A corresponds to 8 % of the set measured value 5.2 A.

Response time

The response time of the fault signal is produced by the "Adjustable switching delay" (see the technical specifications) and an additional delay, which is determined from the actual current and the set value.

F	Pick-up ms	Drop-out ms
1	10	250
2	70	70
5	120	30
10	180	15
20	220	10
30	240	12

$$F = \frac{I_{act}}{I_{meas}}$$

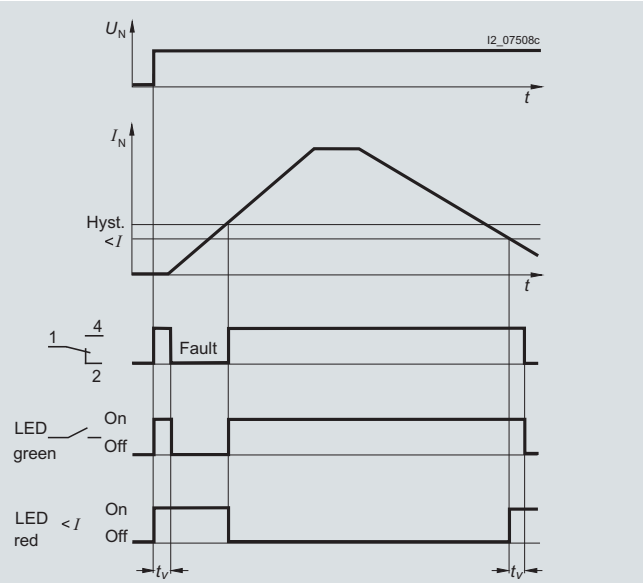
I_{act}: Actual current

I_{meas}: Set current threshold value to be measured

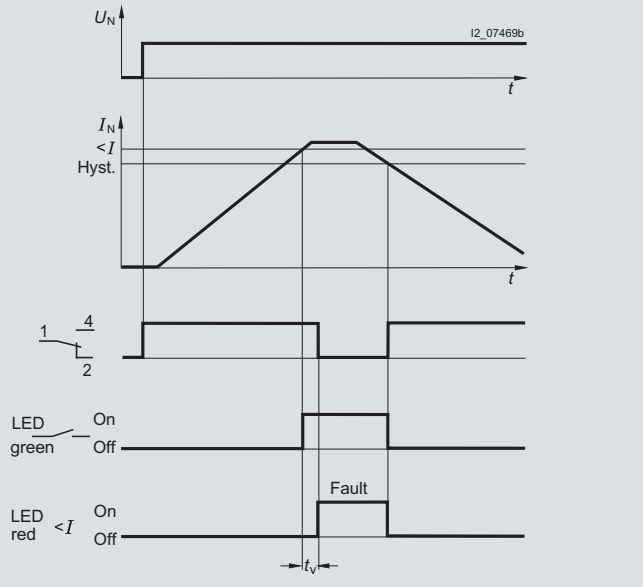
Pick-up: With an overcurrent relay, the contact 11 – 14 (21 – 24) to the fault signal closes when the actual current flowing is higher than the switching threshold. The relay picks up.

Drop-out: With an undercurrent relay, the contact 11 – 12 (21 – 22) to the fault signal closes when the actual current flowing is lower than the switching threshold. The relay drops out.

Function chart for 5TT6 1 undercurrent relay signal



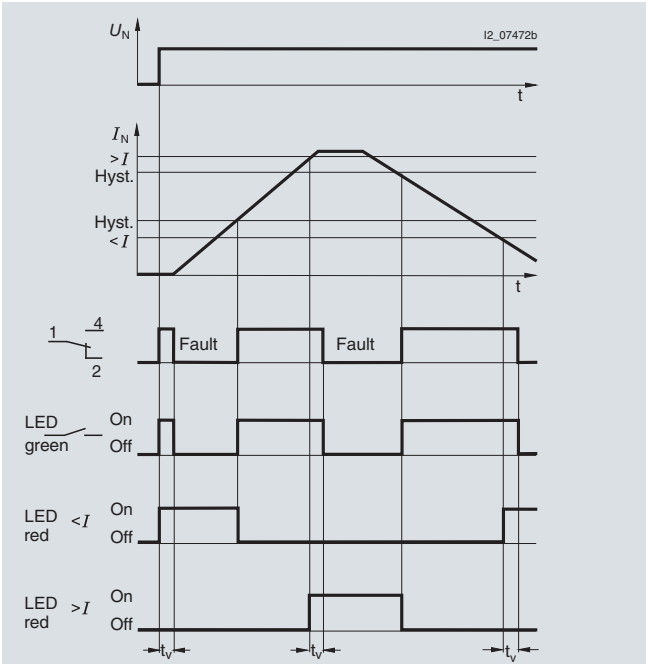
5TT6 1 overcurrent relay signal



13

5TT6 current relays

Function chart for
5TT6 115 under/overcurrent relay signal



Contrary to all other current relays, a fault signal is always output over the contact 11 – 14 (21 – 24). The red LEDs indicate whether the signal is for an undercurrent or an overcurrent.

Overview

In the mixed operation of electric hot water and electric storage heaters, the priority switch interrupts the charging procedure of the storage heater if hot water is required during the low-tariff time, thus limiting the connected load in compliance with BTO § 6. The control circuit terminals must be sealable.

Benefits

Reduction of the connection fee, which depends on the maximum load to be supplied (BTO, German Federal Regulation on Tariffs § 6 Section 4), when used in systems with continuous-flow heaters and electric storage heaters where the continuous-flow heaters are switched with priority.

Technical specifications

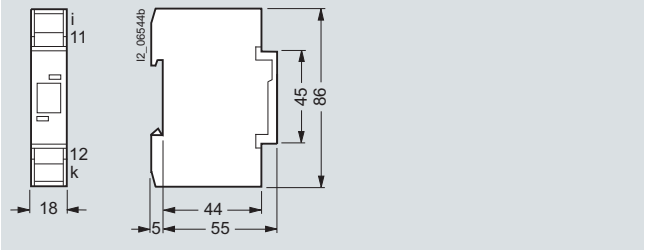
			5TT6 101	5TT6 102	5TT6 103
Standards			EN 60669 (VDE 0632), BTO § 6 Section 4		
Rated control current I_c		A	40 (Current corresponds to the rated operational power of the continuous-flow heater).	54	6 ... 40
Rated frequency		Hz	50		
Response currents		A	13 (Continuous rise not permissible)	23	6
Rated operational power For continuous-flow heaters	Up to 230 V AC Up to 3 × 230 V AC	kW kW	9 27	12 36	1.5 ... 9 4.5 ... 27
Rated impulse withstand voltage U_{imp}		kV	> 2.5		
Rated operational voltage U_e		V AC	250		
Rated operational current I_e	At U_e = 230 V AC	A	1		
Terminals	± screw (Pozidriv)		1		
Conductor cross-sections					
• Coil	For conductor cross-sections up to	mm^2	10		
• Contacts	For conductor cross-sections up to	mm^2	2 × 2.5		
Permissible ambient temperature		°C	-20 ... +40		
Resistance to climate	Acc. to DIN 50016		FW 24		

Selection and ordering data

	U_e	I_e	Response currents	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A	A						Unit(s)	Unit(s)	kg
Priority switches											
For continuous-flow heaters up to 27 kW											
	230	40	13	1	►	**5TT6 101**		027	1	1	0.100
For continuous-flow heaters up to 33 kW											
	230	54	23	1	B	**5TT6 102**		027	1	1	0.100
For electronically controlled continuous-flow heaters up to 27 kW											
	230	40	6 ... 40	1	►	**5TT6 103**		027	1	1	0.100

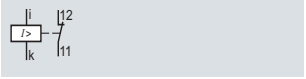
5TT6 101

Dimensional drawings



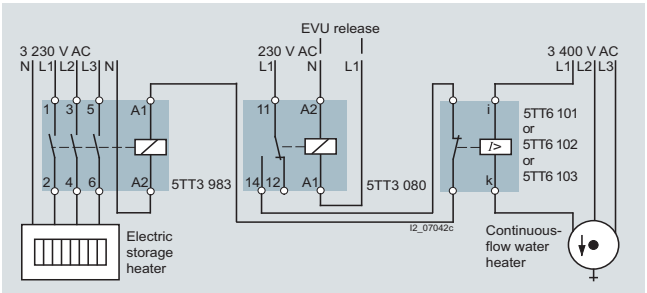
5TT6 101, 5TT6 102, 5TT6 103

Schematics



5TT6 101, 5TT6 102, 5TT6 103

Switching example: 5TT6 10



5TT6 101, 5TT6 102, 5TT6 103

In mixed operation of electric hot water and electric storage heaters, the priority switch interrupts the charging procedure of the storage heater if hot water is required during the low-tariff time, thus limiting the connected load.

* You can order this quantity or a multiple thereof.

13

5TT3 fuse monitors

Overview

Fuse monitors serve to monitor all types and versions of melting fuses that cannot be equipped with a fault signal contact. This enables integration in fault signaling circuits or a central alarm in order to improve plant availability.

Benefits

- Increase in plant availability because fuse failures – which could cause considerable damage to the plant – are detected in plenty of time.
- A fuse failure is detected even if the load is switched off. This ensures the highest level of plant availability.

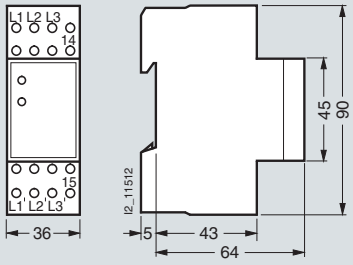
Technical specifications

			5TT3 170
Standards			IEC 60255; DIN VDE 0435-110
Rated control voltage U_c		V	3 x 380 ... 415 AC
Operating range		× U_c	0.8 ... 1.1
Rated frequency		Hz	50 ... 400
Internal resistance of measuring paths		Ω/V	> 1000
Max. permissible rear feed		%	90
Response/release time		ms	< 50
Rated impulse withstand voltage U_{imp} Input/output		kV	> 4
Rated operational voltage U_e		V AC	250
Rated operational current I_e	AC-1	A	4
Electrical service life	AC-11	In switching cycles at 1 A	1.5×10^5
Terminals	± screw (Pozidriv)		1
Conductor cross-sections	Rigid, max. Flexible, with end sleeve, min.	mm^2 mm^2	2 × 2.5 1 × 0.5
Permissible ambient temperature		°C	-20 ... +45
Resistance to climate	Acc. to EN 60068-1		20/45/4

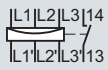
Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A	3 V AC						Unit(s)	Unit(s)	kg
 **Fuse monitors** For all low-voltage fuse systems. Can be used in asymmetric systems afflicted with harmonics and regenerative feedback motors. Signal also for disconnected loads.	230	4	380 ... 415	2	►	**5TT3 170**		027	1	1	0.150

Dimensional drawings



Schematics

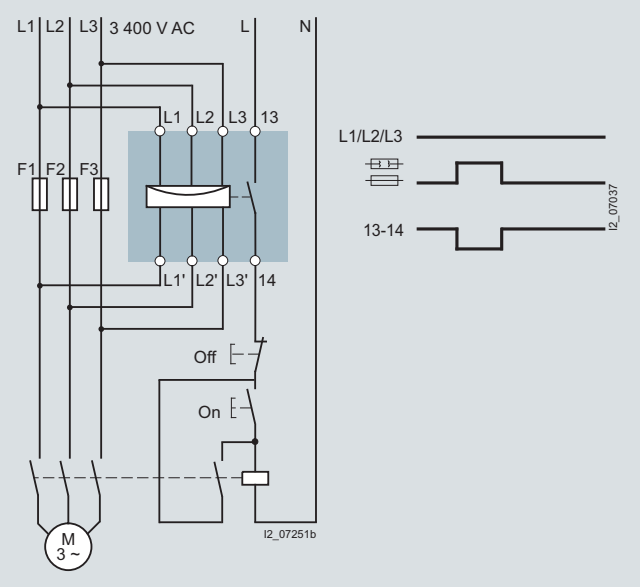


13

* You can order this quantity or a multiple thereof.

More information

Switching example, function chart



If the fuse fails, the motor is immediately disconnected (prevention of two-phase run). After changing the fuse, the motor can be restarted by pressing the "ON" button.
Unlike conventional motor circuit breakers, it is not possible to switch the motor on if the fuse is faulty.

Note:

The internal resistance of the measuring paths of the fuse monitor is in the MW range so that the VDE regulations with regard to touch voltage are met in the event of faulty fuses (> 1000 Ω/V). To isolate the main switch, it must be switched off. The enclosed label should be affixed to the switchgear as a reminder.

5TT3 phase and phase sequence monitors

Overview

Phase monitors monitor the voltages in three-phase system and signal the power failure of one or more phases over a floating contact. Phase sequence monitors monitor the phase sequence in three-phase systems and signal any changes in the phase sequence – change of rotating field – over a floating changeover contact.

Benefits

- The three-phase LED in the phase monitor and the LED in the phase sequence monitors provide constant information on the switching state of the plant
- The compact design in 1 MW saves space.

Technical specifications

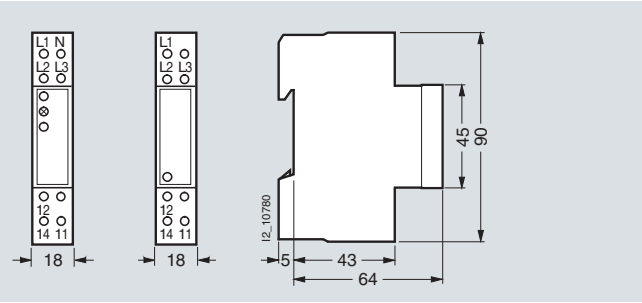
			5TT3 421	5TT3 423
Standards			IEC 60255; DIN VDE 0435	
Rated control voltage U_c		V AC	230/400	400
Operating range		× U_c	0.8 ... 1.1	
Rated frequency		Hz	50/60	
Rated power dissipation P_v	Electronics Contacts	VA VA	9 0.2	
Rated operational voltage U_e		V AC	250	
Rated operational current I_e		A	4	
Minimum contact load		V; mA	10; 100	
Rated insulation voltage U_i	Between coil/contact	kV	4	
Contacts	μ contact (AC-11)	A	3	
Electrical isolation	Creepage distances and clearances Actuator/contact	 mm	 4	
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 2.5	
Terminals	± screw (Pozidriv)		1	
Conductor cross-sections	Rigid, max. Flexible, with end sleeve, min.	mm^2 mm^2	2 × 2.5 –	
Degree of protection	Acc. to EN 60529		IP20, with connected conductors	
Safety class	Acc. to EN 61140/ VDE 0140-1		II	
Permissible ambient temperature		°C	-20 ... +60	
Resistance to climate	Acc. to EN 60068-1		20/60/4	

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A	V AC						Unit(s)	Unit(s)	kg
	**Phase monitors** With 3 green LEDs for 3 phases											
	1 CO	250	4	230/400	1	►	**5TT3 421**		027	1	1	0.060
	**Phase sequence monitors** With one green LED, which lights up for right-rotating field											
	1 CO	250	4	400	1	►	**5TT3 423**		027	1	1	0.050

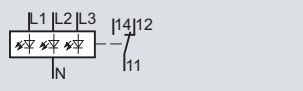
* You can order this quantity or a multiple thereof.

Dimensional drawings

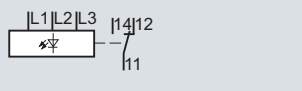


5TT3 421 5TT3 423

Schematics



5TT3 421



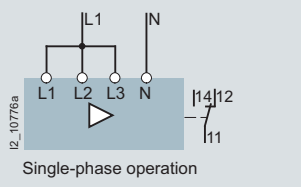
5TT3 423

More information

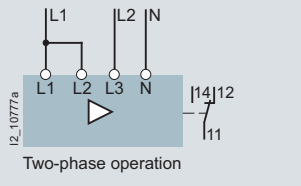
Switching examples

5TT3 421 phase monitors

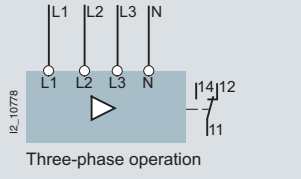
The phase monitor can be operated either in 1, 2 or 3-phase operation.



Single-phase operation



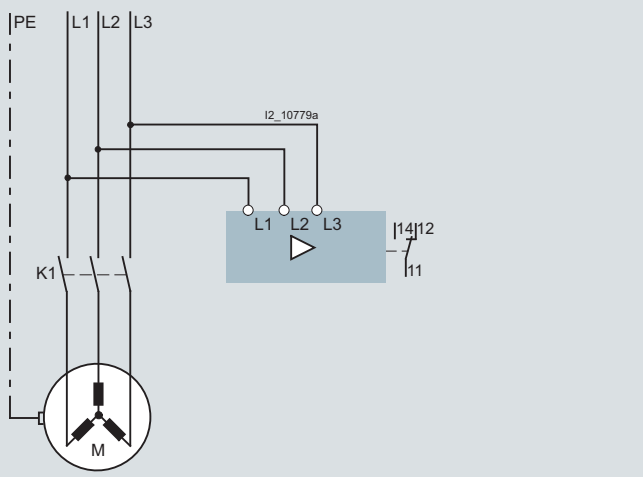
Two-phase operation



Three-phase operation

5TT3 423 phase sequence monitors

Phase sequence monitors must always be connected in three-phase.



13

5TT3 insulation monitors for industrial applications

Overview

Insulation monitors are used for the protection of persons against ungrounded systems – IT systems. The insulation resistance of the system being monitored is measured against ground.

These types of measurements are specified according to DIN/VDE 0100-410 – Erection of power installations up to 1000 V – Protection against electric shock.

Benefits

- The insulation monitoring for AC voltage systems of up to 500 V AC and 1000 Hz enables application in 400 V three-phase systems
- Easy operation with potentiometers as the set limit value of the insulation resistance is always visible
- Simple and cost-efficient solution for remote signaling and signaling due to option for connecting an external LED and/or external testing and canceling pushbutton
- Simplified planning and logistics as no auxiliary voltage is required for the insulation monitoring of direct voltage systems up to 280 V DC.

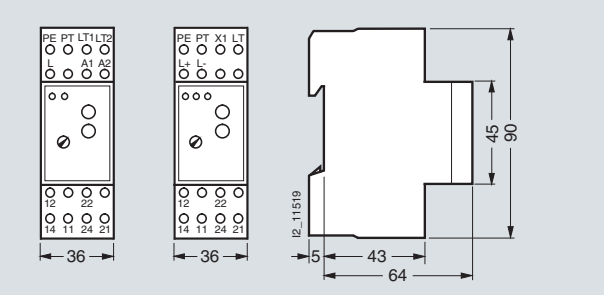
Technical specifications

			5TT3 470	5TT3 471
Rated control voltage U_c		V AC V DC	220 ... 240 --	-- 12 ... 280
Operating range	For AC supply For DC supply	× U_c	0.8 ... 1.1 --	-- 0.9 ... 1.25
Frequency range for U_c		Hz	45 ... 400	--
Rated power dissipation P_v	For AC supply For DC supply	VA W	Approx. 2 --	-- Approx. 1
Rated impulse withstand voltage U_{imp}	Terminals A1 to A2 Terminals L to PE Terminals A1, A2 to L, PE Terminals against contacts	kV kV kV kV	< 4 < 4 < 4 < 6	< 4 < 4 < 3 < 6
Measuring circuit			For AC systems	For DC systems
Measurement voltage range U_{meas}		V AC V DC	0 ... 500 --	-- 12 ... 280
Operating range		× U_{meas}	0 ... 1.1	0.9 ... 1.1
Frequency range for U_{meas}		Hz	10 ... 1000	--
Alarm values	Measuring shunt R_{AL}	kΩ	5 ... 10	5 ... 200
Setting of alarm value	On absolute scale		Infinitely variable	Infinitely variable
Alternating current internal resistance	Internal testing resistor	kΩ	> 250	--
Direct current internal resistance	Internal testing resistor L+ and L- to PE	kΩ kΩ	> 250 --	-- 75 each
Measurement voltage U_{meas}	Internal	V DC	Approx. 15	--
Max. measurement current I_{meas}	Short circuit	mA	< 0.1	0.2 ... 4, depending on the voltage
Direct interference voltage	Max. permissible	V DC	500	--
Response delay	At R_{AL} 50 kΩ and 1 µF and ∞ up to 0.9 x R_{meas} and R_{meas} from ∞ to 0 Ω	 s s	 < 1.3 < 0.7	 0.8 0.4
Switching hysteresis	At R_{meas} 50 kΩ	%	15	10 15
Contacts	µ contact		2 CO	2 CO
Rated operational voltage U_e		V AC	250	250
Rated operational current I_s	Thermal current limit I_{th} AC-13 at 24 V DC AC-13 at 250 V DC AC-15 AC-15 NO contacts AC-15 NC contacts	A A A A A A	4 -- -- -- 5 2	4 3 0.2 3 -- --
Terminals	± screw (Pozidriv)		2	2
Conductor cross-sections	Rigid, max. Flexible, with end sleeve, min.	mm^2 mm^2	2 × 2.5 1 × 0.50	
Permissible ambient temperature		°C	-20 ... +60	
Degree of protection	EN 60529	°C	IP20, with connected conductors	
Resistance to climate	Acc. to EN 60068-1		20/060/04	

Selection and ordering data

	Contacts	U_c	U_e	Measuring range	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	V	kΩ						Unit(s)	Unit(s)	kg
	**Insulation monitors**											
	For monitoring the insulation resistance in non-grounded AC and three-phase systems from 10 ... 1000 Hz											
	2 CO	250	0 ... 500 V AC	5 ... 100	2	B	**5TT3 470**		027	1	1	0.160
	For monitoring the insulation resistance in non-grounded DC systems											
	2 CO	250	12 ... 280 V DC	5 ... 200	2	B	**5TT3 471**		027	1	1	0.170

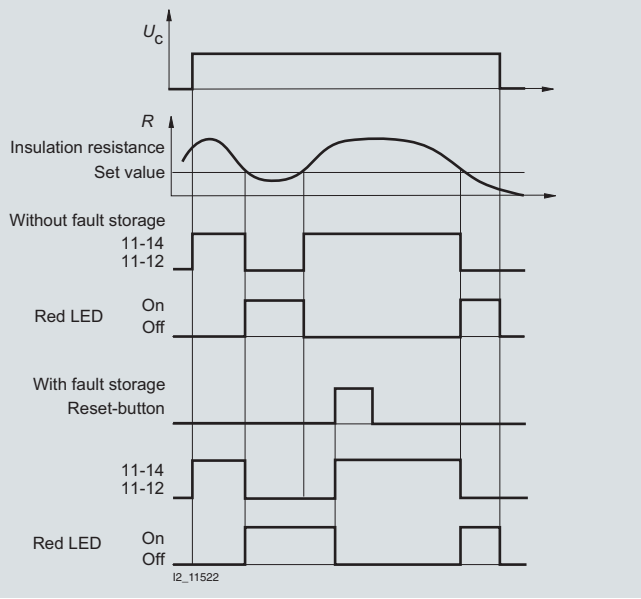
Dimensional drawings



5TT3 470 5TT3 471

More information

Function charts



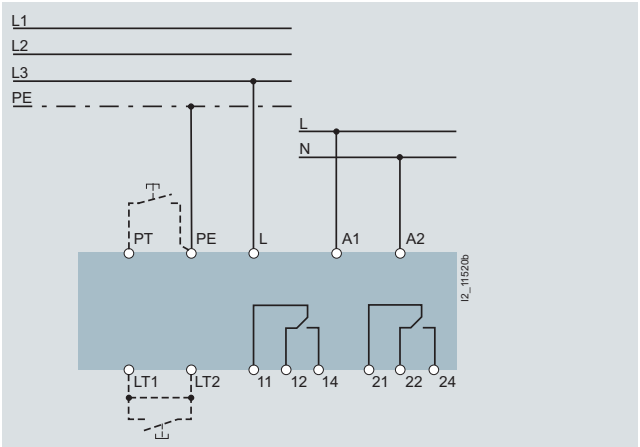
5TT3 470, 5TT3 471

13

* You can order this quantity or a multiple thereof.

5TT3 insulation monitors for industrial applications

5TT3 470 for AC and three-phase systems

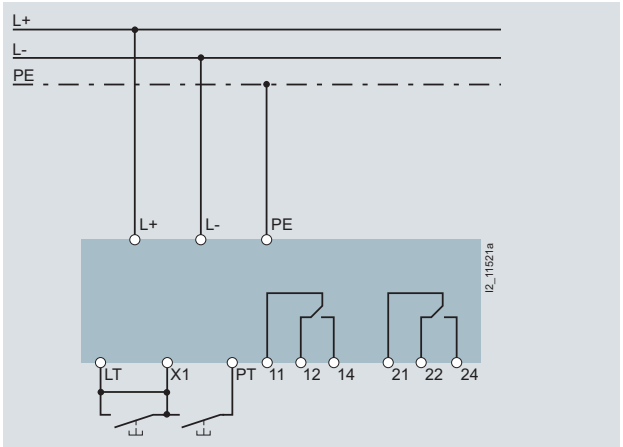


The actuating voltage of terminals A1 – A2 can be taken from the system being monitored. However, in this case it is important to ensure compliance of the voltage range with the technical specifications.

With a jumper LT1 – LT2: a fault signal is not stored; the device is automatically released again if the insulation resistance improves.
Without a jumper LT1 – LT2: the error message is stored; pressing the pushbutton terminals LT1 – LT2 clears the fault signal.

Pressing the pushbutton terminals PT – PE simulates a fault.

5TT3 471 for direct voltage systems

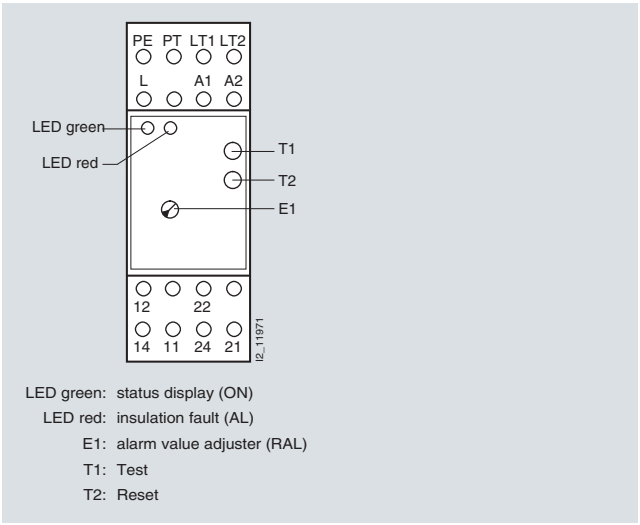


The actuating voltage for the terminals L+ and L- is also the measurement voltage.

With a jumper LT – X1: a fault signal is not stored; the device is automatically released again if the insulation resistance improves. Without a jumper LT – X1: the error message is stored; pressing the pushbutton terminals LT – X1 clears the fault signal.

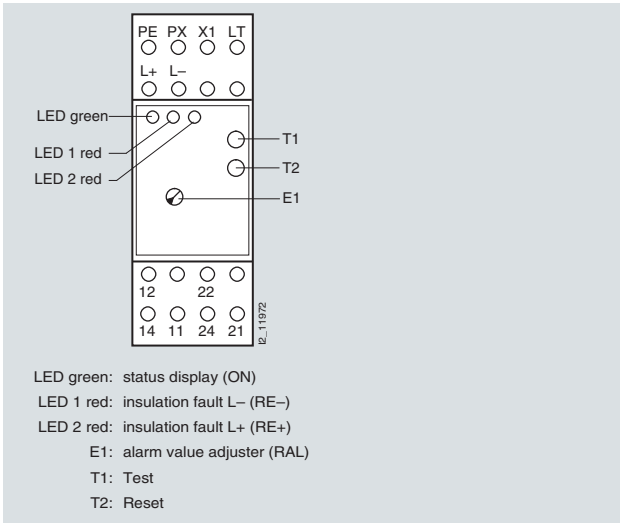
Pressing the pushbutton terminals PT – X1 simulates a fault.

Front views



LED green: status display (ON)
LED red: insulation fault (AL)
E1: alarm value adjuster (RAL)
T1: Test
T2: Reset

5TT3 470



LED green: status display (ON)
LED 1 red: insulation fault L– (RE–)
LED 2 red: insulation fault L+ (RE+)
E1: alarm value adjuster (RAL)
T1: Test
T2: Reset

5TT3 471

Direct interference voltage

While direct interference voltages do not damage the devices they often interfere with conditions in the measuring circuit. In a system being monitored, only one insulation monitor should be connected. This must be taken into account if gateways are used.

System capacitances against the protective ground do not corrupt the insulation measurement as these are implemented with direct current. However, it may extend the response time in the event of an insulation fault, primarily in the case of the time constant RE times CE. The auxiliary voltage of the insulation monitor can be taken from a separate system or from the one being monitored. In this case the voltage range of the auxiliary power input must be taken into account.

LEDs:
- Green LED lights up if actuating voltage U_c is applied
- Red LED lights up in the event of an insulation fault.

Leakage capacitance

The insulation monitor can be installed in systems with higher leakage capacitance against PE. In the case of high-resistance alarm values, a transient alarm signal may occur when switching on the monitored system due to an existing ground leakage capacitance.
For the following set values for R, these values for the CE capacitance are approx.:
- R = 200 kΩ: CE > 0.8 µF
- R = 50 kΩ: CE > 2.0 µF
- R = 20 kΩ: CE > 4.5 µF

In these applications, you should work without an alarm storage. Due to the measuring function with bridge circuit, the insulation monitor does not respond in the event of a simultaneous, exactly symmetric ground fault of L+ and L-. However, exactly symmetric ground faults are highly unlikely in practice.
LEDs:
- Green LED lights up if actuating voltage U_c is applied
- Red LED 1 lights up for insulation fault L+ against PE
- Red LED 2 lights up for insulation fault L- against PE.

7LQ3 insulation monitors for medical premises

Overview

Medical premises require additional protective measures against the occurrence of excessively high touch voltages.

In rooms that conform to Group 2 of DIN VDE 0100-710, any interruption to the examination and /or treatment of patients would place those patients at risk.

This is prevented through the use of changeover and monitoring units. These monitor the insulation resistance of the non-grounded IT system, the load current and the temperature of the transformer. A warning signal is output if the limit values are exceeded. This function is carried out by an insulation monitor.

In addition, a special voltage relay monitors the voltage of the power supply and switches to a second power supply if it falls below the specified limit values.

Benefits

- Systems engineers can tailor the changeover and monitoring unit at the control cabinet to suit individual requirements.
- Binary inputs and actuators support connection of the changeover and monitoring unit to any bus system. This permits integration in existing systems.
- Easy operation over potentiometers, the set limit values are always visible.

Technical specifications

			Insulation monitors 7LQ3 354	7LQ3 355
Standards			EN 61557-8	
Power supply U_v		V AC	230	
Operating range		× U_v	0.9 … 1.1	
Supply frequency f_v		Hz	50 … 60	
Power loss max. P_v		VA	Approx. 7	
Rated system voltage U_n (measuring circuit)		V AC	0 … 300	
Rated frequency f_n		Hz	10 … 1000	
EMC immunity to interference			IEC 61000-6-2	
EMC emitted interference			IEC 61000-6-3	
Insulation coordination			IEC 60664-1	
Rated impulse withstand voltage		kV	4	
Degree of pollution			3	
Flammability class			UL 94V-0	
Measuring circuit insulation monitoring				
Response value R_{resp}		kΩ	50	50 ... 500
Response deviation			DIN VDE 61557-8	
Response time t_{on} at R_{on} = 50 kΩ, C_e = 1 µF	R_F from ∞ to 0.5 × R_{on} R_F from ∞ to 0 kΩ	s s	< 1.3 < 0.7	
Hysteresis		%	15	
Measurement voltage U_m		V DC	Approx. 15	
Measurement current I_m max (at R_F = 0 Ω)		µA	< 50	
Internal resistance DC R_i		kΩ	> 250	
Impedance Z_i at 50 Hz		kΩ	> 250	
Permissible direct interference voltage U_{fg}		V DC	< 300	
Measuring circuit load current monitoring				
Response value, adjustable with external transformer 50/5 A, Class 1		A	5 … 50	
Hysteresis		%	4	
Temperature influence		%/°C	≤ 0.05	
Time delay t_v, adjustable		s	0.1 … 20	
Measuring circuit temperature monitoring				
Response value		kΩ	3.2 … 3.8	
Release value		kΩ	1.5 … 1.8	
PTC thermistor	Acc. to DIN 44081/44082	Unit(s)	1 … 6 in series	
Display and control elements				
Operating error	Acc. to IEC 61557-8			
LED display • Current and temperature monitoring • Ready-to-run • Insulation fault • Line breakage monitoring of the isolation measuring circuit • Display of current insulation resistance			 One red and one green LED Green Red Red --	 11-step LED chain
Pushbuttons			Test and Reset	

13

7LQ3 insulation monitors for medical premises

			Insulation monitors 7LQ3 354	7LQ3 355
Output relay				
Contacts for	Overtemperature Overload Insulation fault		2 CO 2 CO 2 CO	
Mode of operation			Working current	
Contacts	NO contact AC 15 NC contact AC 15	A AC/V AC A AC/V AC	3/230 1/230	
Electrical service life	AC 15, 1 A, 230 V AC	Operating cycles	30 000	
Thermal current		A AC	5	
Connection				
Terminals • Conductor cross-sections	± screw (Pozidriv) Rigid Flexible, with end sleeve	 mm^2 mm^2	2 2 × 2.5 1 × 2.5	
Environmental conditions				
Permissible ambient temperature		°C	-20 ... +60 °C.	
Resistance to climate	Acc. to EN 60068-1		20/060/04	
Degree of protection	Acc. to EN 60529		IP20, with connected conductors	
Mounting position			Any	
Vibration stress • Amplitude • Frequency	Acc. to IEC 60068-2-6	 mm Hz	 0.35 10 … 55	

			Test and signaling panels 7LQ3 356	7LQ3 357
Standards			DIN VDE 0100-710; IEC 60364-7-710	
Rated voltage U_n		V AC/DC	24	
Rated impulse withstand voltage	Acc. to IEC 60664-1	kV	4	
Voltage range		AC DC	0.8 ... 1.1 U_n 0.9 ... 1.2 U_n	
Rated current per input		mA	0.25	
Rated consumption		VA	6	
Rated operating mode			Continuous operation	
Degree of pollution	Acc. to IEC 60664-1		2	
Degree of protection • Enclosures • Terminals	 Acc. to IEC/EN 60529 Acc. to IEC/EN 60529		 IP40 IP20	
Flammability class			UL 94V-0	
Vibration strain • Amplitude • Frequency	Acc. to IEC/EN 60068-2-6	 mm Hz	 0.35 10 … 55	
Resistance to climate	Acc. to IEC/EN 60068-1		20/045/04	
Terminal marking			EN 50005	
Connection of conductors	Acc. to DIN 46228-1/-2/-3			
• Solid		mm^2 mm^2	1 × 1.5 2 × 0.5	
• Strand		mm^2 mm^2	1 × 1 2 × 0.2	
• Strand with sleeve		mm^2	1 × 0.5	
Conductor mounting			Box terminals with wire protection	
Net weight		g	200	
Device dimensions		mm	80 × 160 × 57	82 × 150 × 57
Temperature range		°C	-20 ... +45	

			Current transformer Class 1 7LQ3 358
Standards			IEC/EN 60044-1, VDE 0414
Rated control voltage U_c		V AC	230
Rated frequency		Hz	50/60
Test voltage	50 Hz ... 1 min	kV	3
Rated transmission ratio k_n		A	50/5
Primary rated current		A	50
Secondary rated current		A	5
Rated power		V/A	1.5
Class			1
Rated frequency		Hz	50 ... 60
Highest voltage at equipment / insulation level		kV	0.72 / 3
Overcurrent factor • Thermal rated short-time current • Thermal rated continuous current			FS5 60 × I_n 1.2 × I_n
Expanded current range			120 %
Permissible ambient temperature		°C	-20 … +60

			Test and signaling combination for insulation monitors 7LQ3 360
Standards			DIN VDE 0100-710; IEC 60364-7-710
Rated voltage U_n		V AC	24
Voltage range		AC	0.8 ... 1.1 U_n
Connected load		W	0.5
Rated operating mode			Continuous operation
EMC			
• Static discharge	Acc. to IEC/EN 61000-4-2	kV	8 (air discharge)
• RF irradiation	Acc. to IEC/EN 61000-4-3	V/m	10
• Rapid transients	Acc. to IEC/EN 61000-4-4	kV	2
• Surge voltage (surge)	Acc. to IEC/EN 61000-4-5	kV	1
Degree of protection			IP30
Resistance to vibrations	Acc. to IEC/EN 60068-2-6		
Amplitude		mm	0.35
Frequency		Hz	10 ... 55
Temperature range		°C	-5 ... +55
Resistance to climate	Acc. to IEC/EN 60068-1		05/055/04
Terminal marking			EN 50005
Connection of conductors			
• Solid		mm^2	1 × 4
• Strand with sleeve and plastic collar		mm^2	1 × 2.5
• Strand with sleeve and plastic collar	DIN 46228-1/-2/-3/-4	mm^2	2 × 1.5
• Strand with sleeve	DIN 46228-1/-2/-3	mm^2	2 × 2.5
Conductor mounting			Box terminals with wire protection
Net weight		g	100
Device dimensions		mm	80 × 80 × 35

7LQ3 insulation monitors for medical premises

			Voltage relays	
			5TT3 411	**5TT3 412**
Rated control voltage U_c		V AC	230	230/400
Overload capability		× U_c	1.15	1.1
Rated frequency		Hz	50/60	
Response values	ON-switching OFF-switching	 × U_c	2 % hysteresis 0.9	4 % hysteresis 0.9
Minimum contact load		V/mA	10/100	
Phase failure detection	At L1, L2 or L3	ms	--	100
N-conductor monitoring			--	Yes
Rated insulation voltage U_i	Between coil/contact	kV	4	
Contacts	NO contacts AC 15 NC contacts AC 15		3 2	3 1
Electrical service life in switching cycles	AC 15, 1 A, 230 V AC		5×10^5	
Rated impulse withstand voltage	Acc. to IEC 60664-1	kV	4	
Degree of pollution			2	
Terminals	± screw (Pozidriv)		2	
Conductor cross-sections • Rigid • Flexible, with end sleeve		 mm^2 mm^2	 2 × 2.5 2 × 1.5	
Permissible ambient temperature		°C	-20 … +60	
Resistance to climate	Acc. to EN 60068-1		20/060/04	

Selection and ordering data

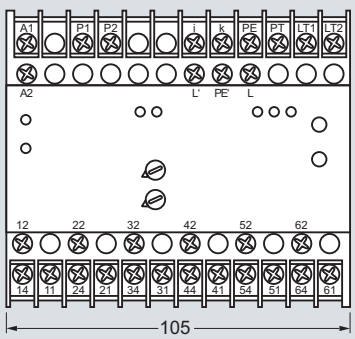
	Version	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A	V AC						Unit(s)	Unit(s)	kg
	**Insulation monitors**											
	With load current and temperature monitoring for medical premises	300			6	B	**7LQ3 354**		027	1	1	0.420
	With load current and temperature monitoring of medical premises with adjustable response value of 50 … 500 kΩ and output for 7LQ3 360 test and signaling combination	300			8	►	**7LQ3 355**		027	1	1	0.590
	Test and signaling panels				NEW							
	For switchover devices, 24 V AC/DC 50/60 Hz Surface mounting					B	**7LQ3 356**		027	1	1	0.200
	Flush mounting					B	**7LQ3 357**		027	1	1	0.200
	Test and signaling combinations for insulation monitors				NEW							
	24 V AC, 50/60 Hz					B	**7LQ3 360**		027	1	1	0.100
	Current transformers AC 50A/5A Class 1											
	With base angle	230				►	**7LQ3 358**		027	1	1	0.390
	Voltage relays for the overvoltage monitoring of medical premises											
	Single-phase against N, with test button, switching thresholds: 0.9 × U_n, 2 % hysteresis											
	2 NO, 2 NC	230	4	230	4	C	**5TT3 411**		027	1	1	0.220
	Single, two or three-phase against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, and one test button each for the phases, switching thresholds: 0.9 × U_n, 4 % hysteresis											
	1 CO, 1 NO, 1 NC	230	4	230/400	4	C	**5TT3 412**		027	1	1	0.230

* You can order this quantity or a multiple thereof.

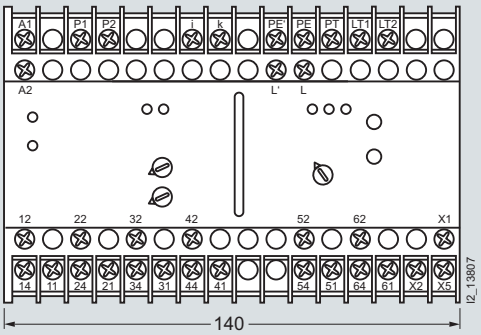
7LQ3 insulation monitors for medical premises

Dimensional drawings

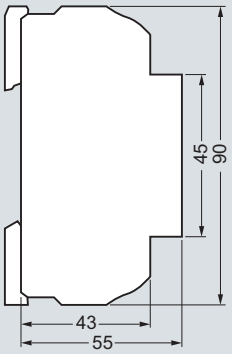
Insulation monitors



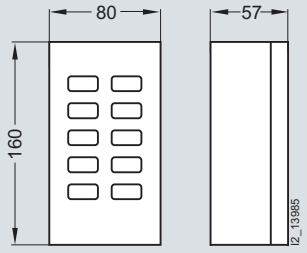
7LQ3 354



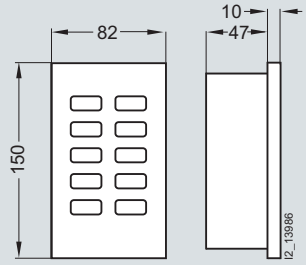
7LQ3 355



Test and signaling panels

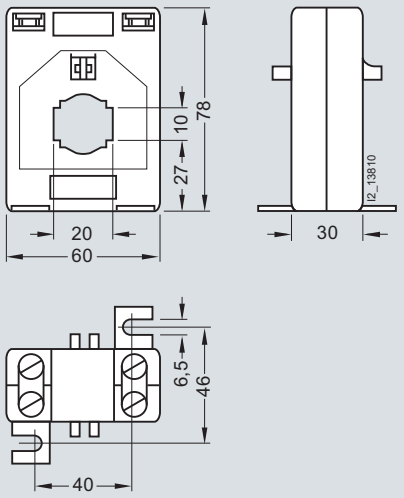


7LQ3 356



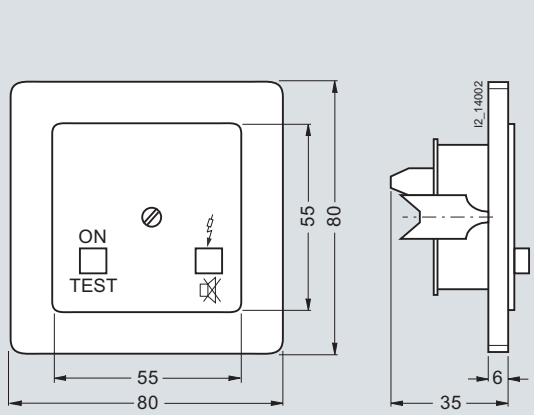
7LQ3 357

Current transformers



7LQ3 358

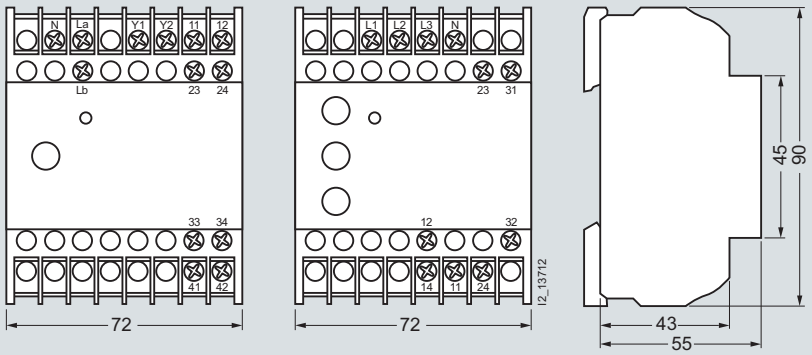
Test and signaling combination for insulation monitors



7LQ3 360

13

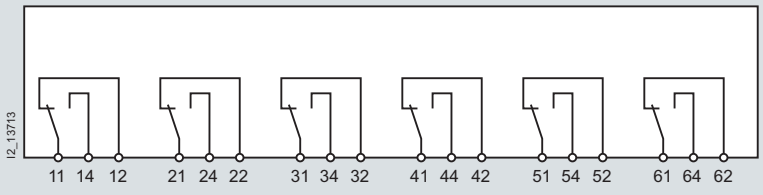
Voltage relays



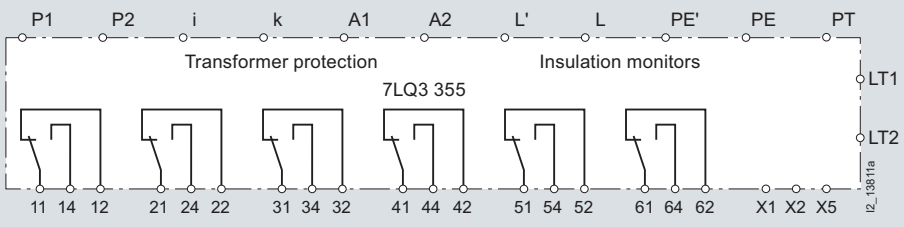
5TT3 411 5TT3 412

Schematics

Insulation monitors

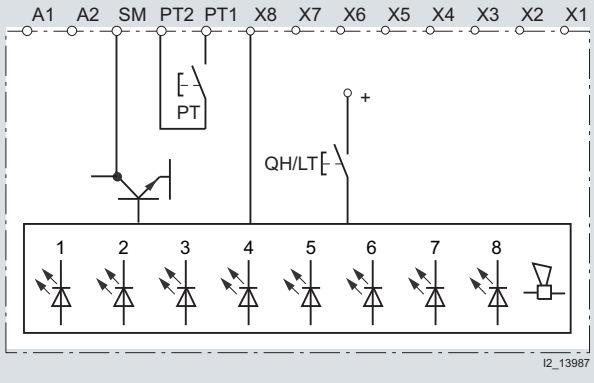


7LQ3 354



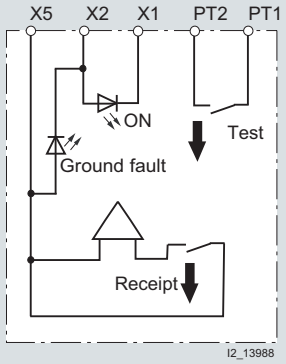
7LQ3 355

Test and signaling panels



7LQ3 356, 7LQ3 357

Test and signaling combination for insulation monitors

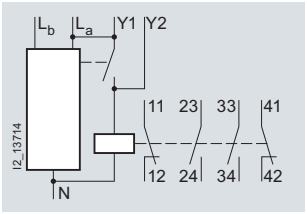


7LQ3 360

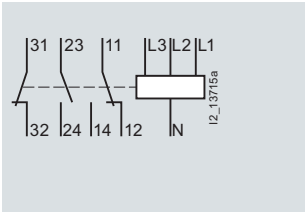
13

7LQ3 insulation monitors for medical premises

Voltage relays



5TT3 411



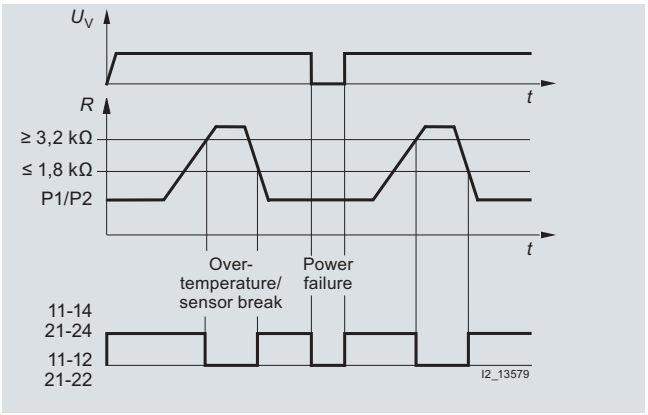
5TT3 412

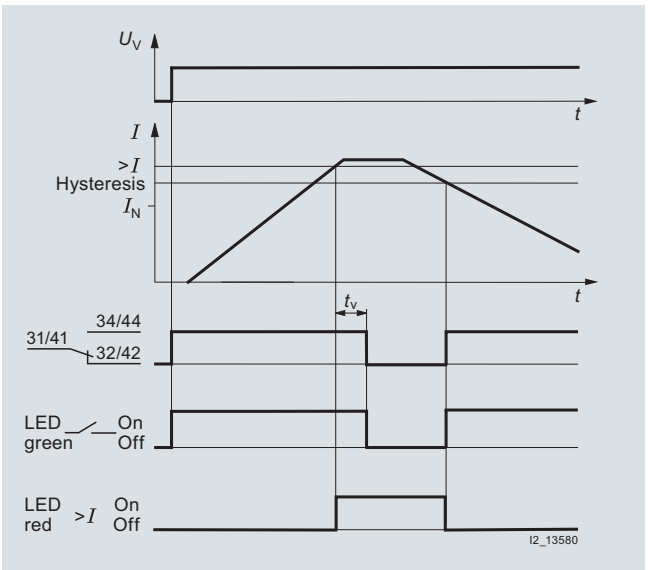
Use L_a und L_b for monitoring 2 phases or 2-channel monitoring of 1 phase. If only L_a is used, L_b must be bridged with L_a.

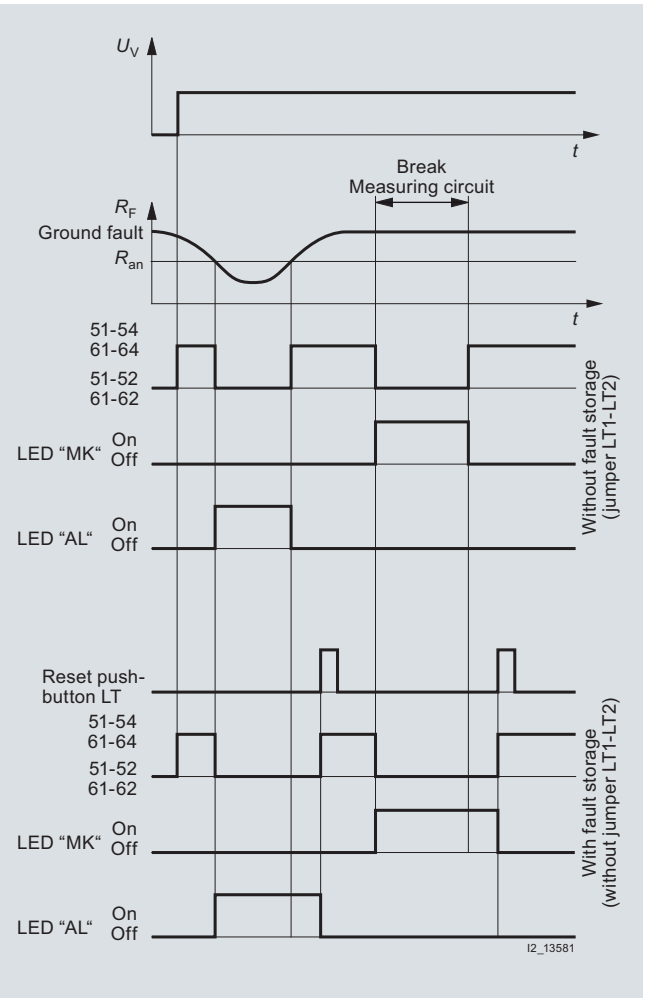
Characteristic curves

7LQ3 354 and 7LQ3 355 insulation monitors

The following diagrams show the function of the measuring circuits of the temperature monitors (top left), the load current monitors (bottom left) and the insulation monitors (right).

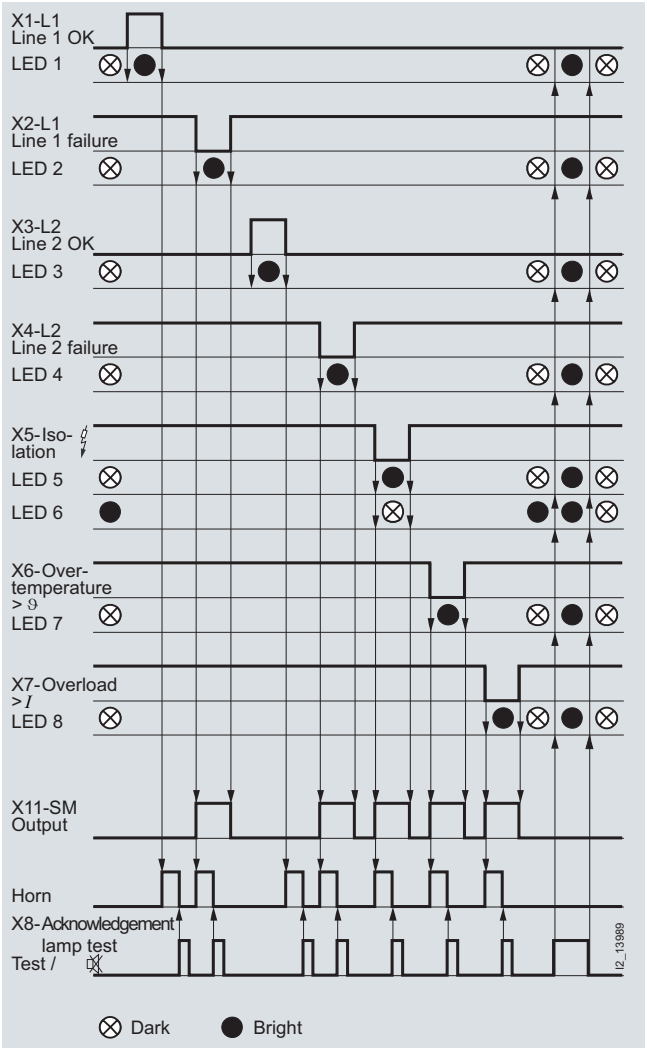






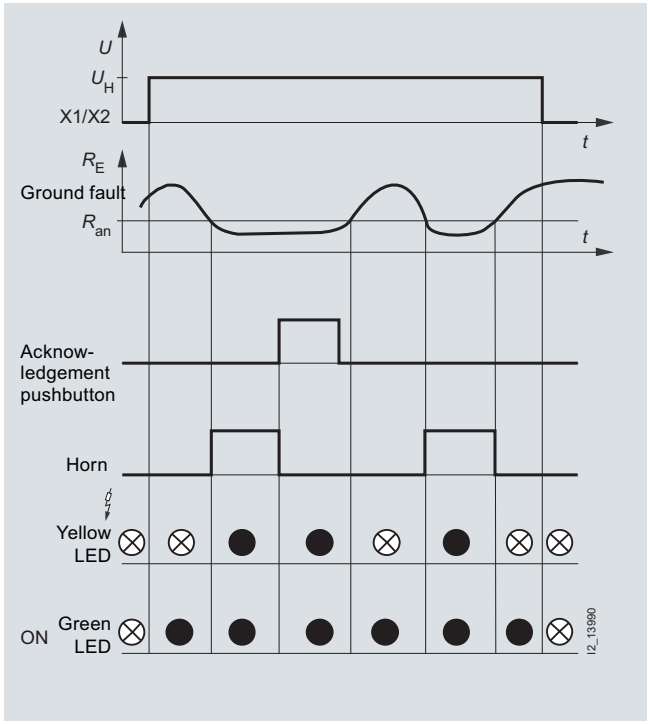
7LQ3 insulation monitors for medical premises

Test and signaling panels



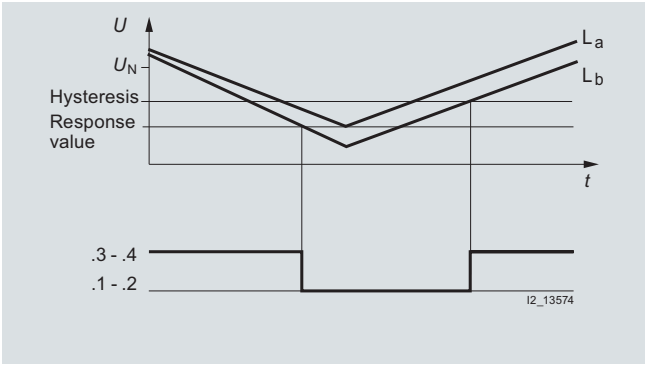
7LQ3 356, 7LQ3 357

Test and signaling combination for insulation monitors

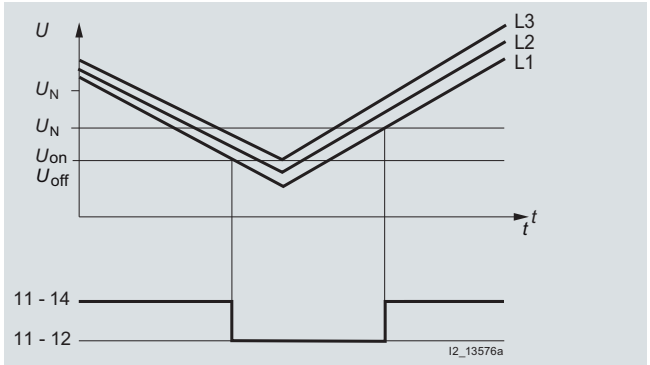


7LQ3 360

Voltage relays



5TT3 411



5TT3 412

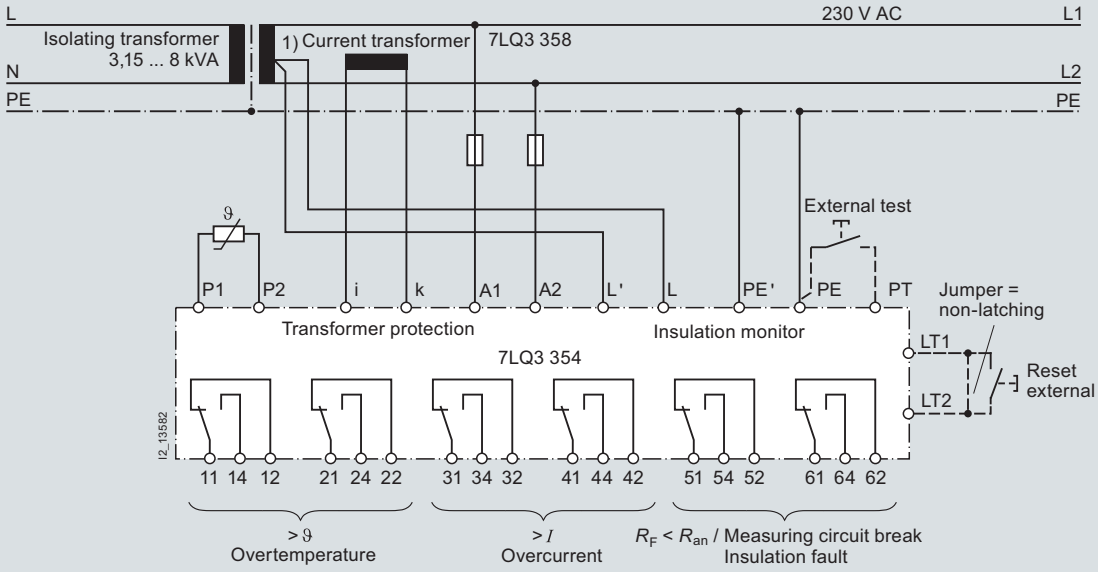
The voltage relay switches at a phase asymmetry of approx. 6 to 8 %, regardless of the response values for undervoltage. The above diagram also shows the timing interval.

7LQ3 insulation monitors for medical premises

More information

Connection examples

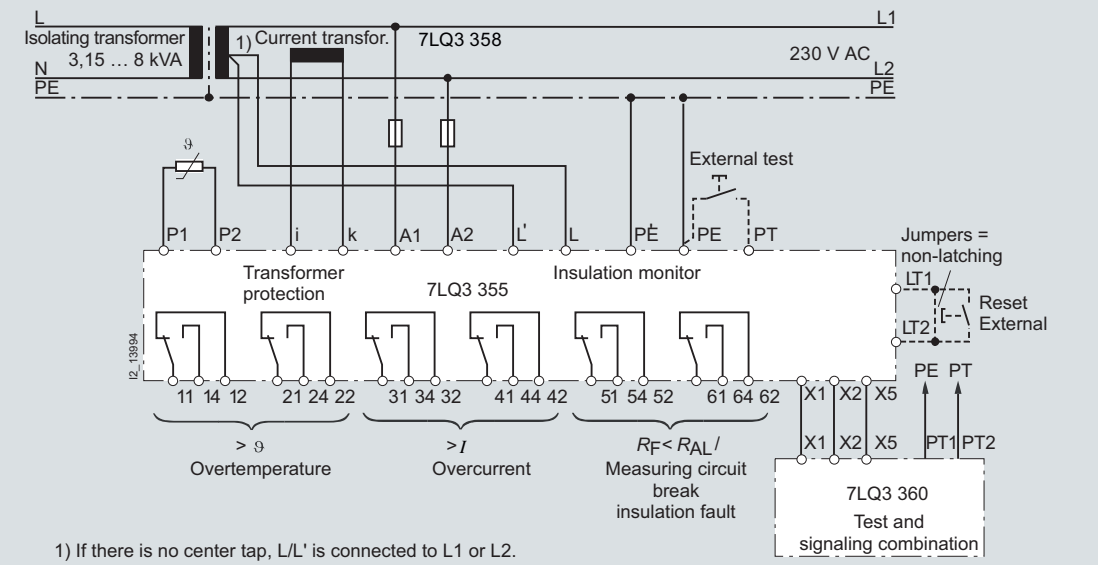
Insulation monitors



1) If there is no center tap, L/L' is connected to L1 or L2.

7LQ3 354

Insulation monitors

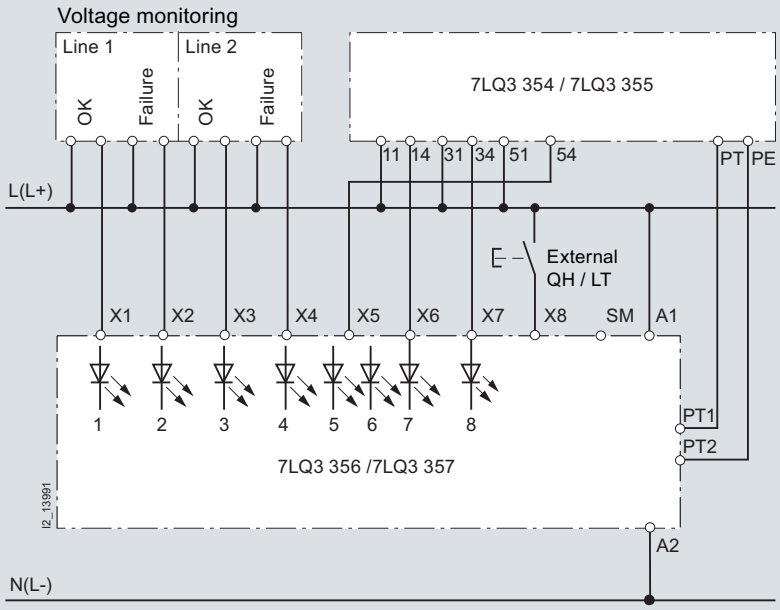


1) If there is no center tap, L/L' is connected to L1 or L2.

7LQ3 355

13

Test and signaling panels



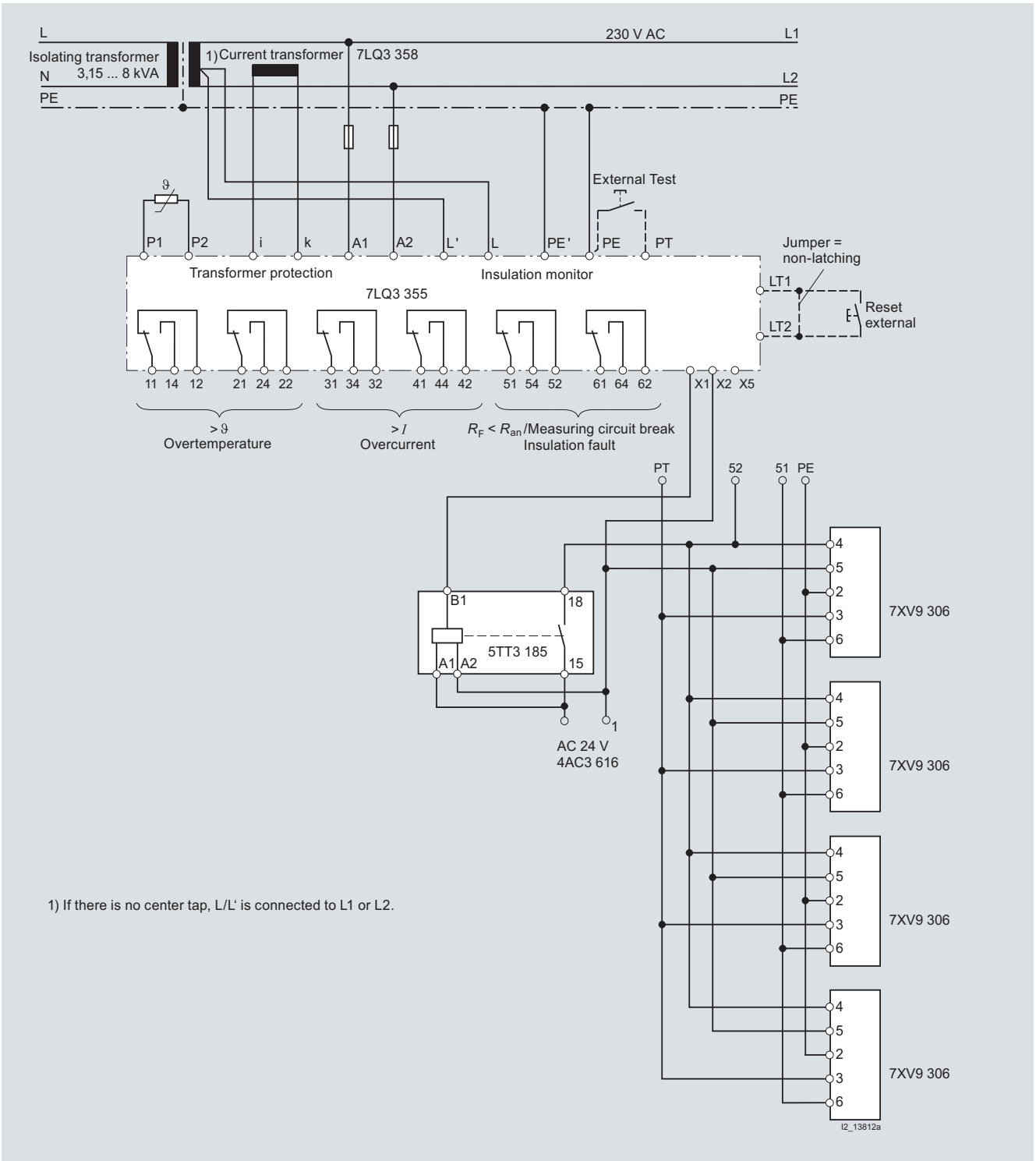
X1 ... X7	Fault signaling inputs
X8	Acknowledgement of horn/lamp test
SM	Central indication output
PT1, PT2	Test button for insulation monitors

7LQ3 356, 7LQ3 357

13

7LQ3 insulation monitors for medical premises

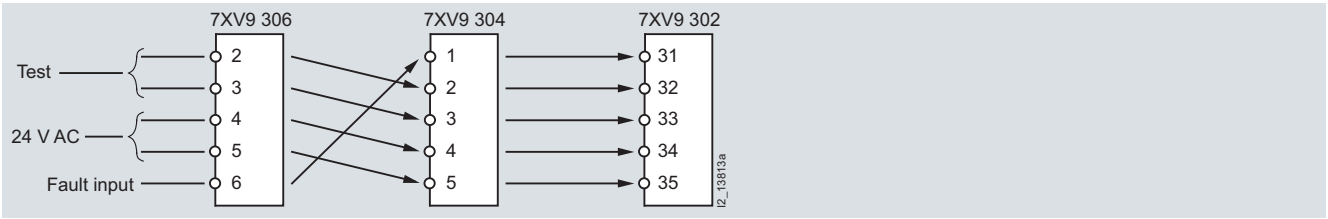
Connection example: 7LQ3 355 insulation monitors with 7XV9 306 test and signaling combination



7LQ3 355

Connection of up to four 7XV9 306, 7XV9 304 or 7XV9 302 test and signaling combinations.

An external 4AC3 616 transformer must be used to supply the test and signaling combinations with power.



Comparison of the contact assignment of the previously no longer available 7XV9 306, 7XV9 304 und 7XV9 302 test and signaling combinations.

Monitoring of medical premises

Medical premises are all rooms used for the examination or treatment of persons or animals. As well as doctor's surgeries and clinics, this includes treatment rooms for hydrotherapy and physiotherapy and massage rooms.

TÜV approved and safety-tested changeover and monitoring units ensure the reliable power supply of such premises. Any insulation monitors and voltage relays installed in these changeover and monitoring units must meet the requirements of DIN VDE 0100-710 and IEC 60364-7-710.

The standard DIN VDE 0100-710, published in 2002, divides medical premises into three groups.

For premises in groups 0 and 1, standard requirements include, implementation of the system type TN-S and residual current protective devices (RCD) for protection against excessively high touch voltages.

The premises of group 2 are defined as follows:

- The system must not be disconnected in the event of a first short circuit to frame or to ground or if the general power supply fails.
- Repetition of treatment is unacceptable for patients or it is impossible to obtain results of examinations again.
- An irregularity (a fault) in the power supply can cause danger to life.
- A piece of equipment used for medical purposes, which is used occasionally for applications in accordance with DIN VDE 0100-710.2.7, should be assigned to group 2.

Typical locations in group 2 are areas used for anesthesia, operating and recovery in hospitals, clinics or doctor's surgeries, as well as equipment used in veterinary medicine.

Standard DIN VDE 0100-710 makes the following stipulations:

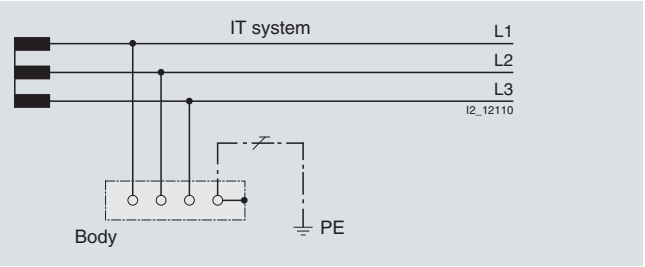
- Constant monitoring of the supply voltage on the preferred supply line and on the second supply line.
- Automatic changeover to the second supply line within a defined time (< 0.5 s or < 15 s)
- Reliable operation even if a fault occurs (one-fault security).

The switchover device monitors the supply voltage on the preferred and second supply line for undervoltage and power failure. As soon as a voltage drop to a defined value is determined, the voltage relays operate and the switchover device automatically switches to the second supply line. As soon as the power is restored on the preferred supply line, the system switches back to it.

IT system

In the IT system designation, the first letter describes the grounding conditions of the power source. *I* stands for isolation of all live parts from the ground or the linking of a point to the ground over an impedance. The second letter designates the grounding conditions of the body of the electrical plant.

T means that the body is directly grounded, independent of any existing grounding of a point of the power source.



Medical IT systems

Standard DIN VDE 0100-710 makes the following stipulations for a medical IT system in group 2:

- The medical IT system must be used for socket outlet current circuits in the patient environment. This also applies for circuits supplying operating room lights.
- At least one IT system is required for each area/room group.
- Separate circuits must be provided for multiple socket outlets.
- First faults must not lead to disconnection of the system.

The IT system is powered over an isolating transformer or an independent power source (e.g. a battery). The special feature here is the fact that no active conductor is directly linked to the ground in this system. This has the advantage that only a small residual current can flow in the event of a insulation fault. This is essentially dictated by the network discharge capacities and is harmless to patients and staff. The upstream fuse does not respond so that the power supply, and therefore operation, is maintained, even in the event of a phase-to-ground fault. The high reliability of an IT system is ensured by continuous insulation monitoring. The insulation monitor detects isolation faults as they develop and promptly signals if a value drops below the limit value before any further insulation faults can cause an unforeseen interruption. The temperature of the transformer and the transformer load continue to be monitored constantly. Any exceeding of limit values is signaled immediately.

7LQ3 insulation monitors for medical premises

Insulation monitoring

The 7LQ3 354 and 7LQ3 355 insulation monitors are used for the monitoring of the insulation resistances of non-grounded IT systems in medical premises. They also simultaneously monitor the load current and the temperature of the IT isolating transformer. The devices can monitor both three-phase and AC systems.

Temperature measurement: The temperature in the transformer development is recorded over PTC thermistor or NC contacts.

As well as an adjustable response value of 50 … 500 kΩ, the 7LQ3 355 insulation monitor also has an 11-step LED chain for displaying the current insulation resistance of the system. A range of different colored LEDs indicate the insulation resistance within the range of 20 kΩ … 1 MΩ. This allows insulation deteriorations to be detected even before an alarm is triggered. The device is also equipped with an additional relay for connection of a test and signaling combination. This means that the 7LQ3 360 test and signaling combination and the previously unavailable 7XV9 306, 7XV9 304 and 7XV9 302 test and signaling combinations can be connected to the 7LQ3 355 insulation monitors (see the diagram on page 13/36 "Connection example: 7LQ3 355 insulation monitor to 7XV9 306 test and signaling combination").

Load current sensing: The 7LQ3 358 current transformer detects the load current of a phase. Evaluation is carried out over the 7LQ3 354 and 7LQ3 355 insulation monitors.

Evaluation: If one of the values is outside the limit values, an alarm is triggered. The LED for the relevant fault lights up and the alarm relay switches. The information is made available over the changeover contacts and can be displayed on the 7LQ3 356 and 7LQ3 357 test and signaling panels.

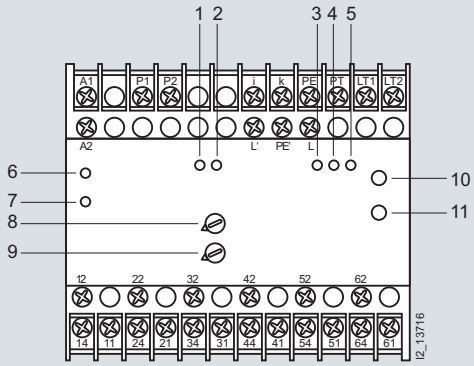
Voltage monitoring

In the case of undervoltage, there is no guarantee that medical equipment will continue to function. Because of the risk this presents to patients, e.g. during operations, the changeover unit must reliably switch to a second power supply in the event of an undervoltage in the preferred power supply.

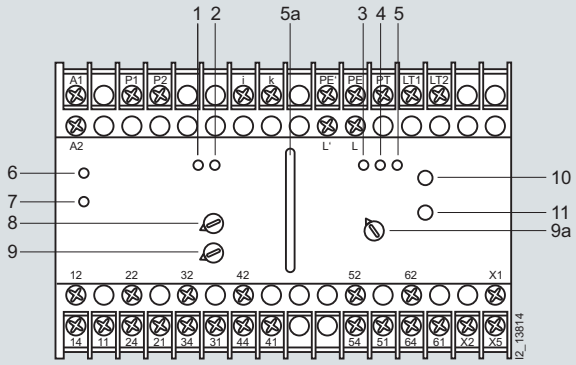
The voltage relays switch when the voltage falls below 90 % of the rated voltage. The 5TT3 411 relays serve to monitor a single-phase infeed. Three-phase infeeds can be monitored using 5TT3 412 relays. These relays also offer asymmetry, reverse voltage and phase failure detection.

7LQ3 insulation monitors for medical premises

Control elements for insulation monitors



7LQ3 354

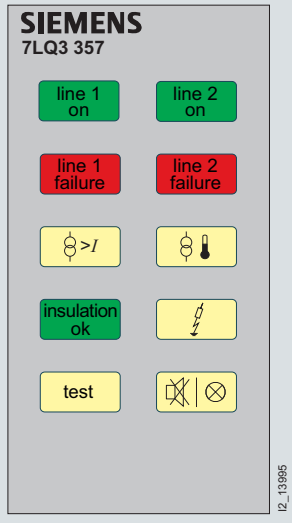


7LQ3 355

	LED	Meaning
1	Current monitoring (green)	Lights up if the current is correct (Go-state)
2	Current monitoring ">*I*" (red)	Lights up in the case of overcurrent
3	Insulation monitoring "ON" (green)	Lights up when the power supply is switched on (ready to run)
4	Insulation monitoring "MK" (red)	Lights up if a line of the measuring circuit is interrupted (L, L', PE, PE')
5	Insulation monitoring "AL" (red)	Lights up in the case of an insulation fault, R_F<R_{on} (value has fallen below the response value)
5a	Line insulation monitoring "R_F" (location, yellow, green)	11-step LED chain to display the current resistance
6	Temperature monitoring (green)	Lights up when the power supply is switched on
7	Temperature monitoring (red)	Lights up in the event of overtemperature or an interruption in the sensor circuit

	Pushbutton/rotary regulator	Meaning
8	Rotary regulator response value ">*I*"	Setting of the response value for current monitoring
9	Rotary regulator delay time	Setting of delay time after which the CO contacts return to their normal position if the current value exceeds the set response value.
9a	Rotary regulator response value "R_{an} kΩ"	Setting of the response value for line insulation monitoring.
10	"Test" pushbutton	Pressing the test button simulates an insulation deterioration in the measuring circuit (R_F approx. 40 kΩ), thus checking that the line insulation monitor is fully functional.
11	"Reset" pushbutton	Deletion of fault if the fault storage is activated

Control elements of the test and signaling panels

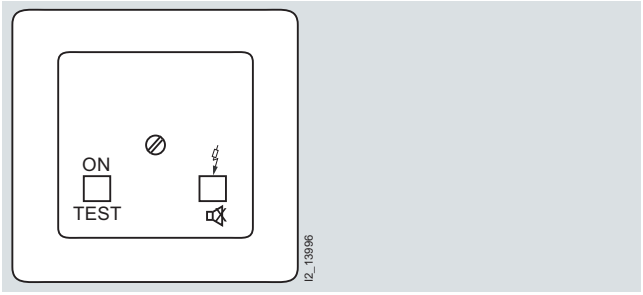


7LQ3 356, 7LQ3 357

	LED window displays	Meaning
	Line 1 On	Power supply is implemented over the preferred infeed
	Line 2 On + Line 1 Failure	Power supply is implemented over the second line as the preferred infeed has failed
	Line 1 On + Line 2 Failure	Power supply is implemented over the preferred infeed. However the second line is no longer available
	Line 2 On + Line 1 Failure + Line 2 Failure	Power supply is implemented over the second line as the preferred infeed is faulty. There is undervoltage on the second line
	Overload	Excessive power consumption of the IT system
	Overtemperature	The transformer of the IT system is overloaded
	Insulation is good	The transformer of the IT system is overloaded
	Insulation is defective	The insulation resistance of the IT system is too low
	Test	Pushbutton for testing the insulation monitoring devices
	Acknowledgement pushbutton/lamp test	Pushbutton for acknowledging the acoustic alarm signal/function test of the display elements

7LQ3 insulation monitors for medical premises

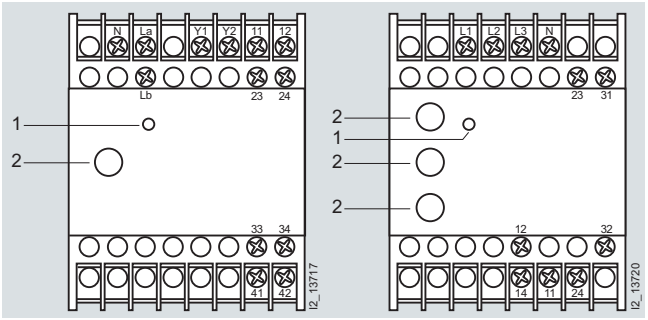
Control elements of the test and signaling combination



7LQ3 360

	LED/pushbutton	Meaning
ON	Green LED	The LED lights up if the power supply is applied
Ground fault	Yellow LED	Insulation fault: the insulation resistance of the IT system is too low
	Test	Pushbutton for testing the insulation monitoring devices
	Acknowledgement pushbutton	Pushbutton for acknowledging the acoustic alarm signal

Control elements of voltage relay



5TT3 411 5TT3 412

	LED/pushbutton	Meaning
1	5TT3 411: Yellow LED 5TT3 412: Green LED	The LED lights up if the system is fault-free
2	Test button	Pressing the test button simulates an undervoltage. The three-phase 5TT3 412 voltage relay has a test button for each phase.

BETA Monitoring
Monitoring of Plants and Devices

14

Product overview

Overview

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**5TT7 1 GSM alarm modules**	14/4	Mobile monitoring and switching of plants worldwide per SMS for greater safety and convenience. Plants can be remotely switched and signals received.		✓	✓	✓
	**5TT3 46 fault signaling units**	14/8	Evaluation and display of fault alarms and alarm signals for monitoring industrial plants and control systems. With 4 inputs and connections for 39 expansion fault signaling units.	IEC 60255, DIN VDE 0435-303	✓	--	✓
	**5TT5 2 EMERGENCY-STOP modules**	14/11	For EMERGENCY-STOP switching in accordance with the EC Machine Directive 98/37/EC. Safe types of circuits for machines, plants or test stations in industrial, commercial and private enterprise applications.	According to the EC Machine Directive for machines 98/37/EC, EN 954-1	✓	--	✓
	**5TT3 435 level relays**	14/15	Control of liquid levels in containers with 3 electrode connections for 1-step and 2-step level control. High immunity to interference of the measuring circuit isolated from the system.	IEC 60255, DIN VDE 0435	✓	--	✓
	**5TT3 171 line circuit relays**	14/18	For disconnecting the voltage or field circuit of unused lines when loads are disabled.	IEC 60255, DIN VDE 0435	--	✓	--
	**7LQ2 1, 5TT3 3 dusk switches**	14/20	For demand-oriented switching of lighting installations for shop windows or paths in order to cut energy costs	EN 60730	✓	✓	--

Devices		Page	Field of application	Standards	Used in		
					Non-residential buildings	Residential buildings	Industry
	**7LQ2 0 temperature controllers**	14/23	For controlling and limiting temperatures. Three setting ranges from - 30 to + 100 °C. For PT 100 measuring element + 2 to + 400 °C.	EN 60730	✓	✓	✓
	**5TT3 472 p.f. controllers**	14/26	For the monitoring of asynchronous motors for underload and no-load operation, e.g. fan monitoring in the case of V-belt breakage, filter blockages, pump monitoring in the event of valve closure or dry runs.	IEC 60255, IEC 61557	--	--	✓
	**5TT3 43 thermistor motor protection relays**	14/28	For the prevention of thermal motor overloads, e.g. due to high switching frequency, single-phasing, disabled cooling or excessive ambient temperatures. With detection of wire breaks in the sensor circuit.	IEC 60255, DIN VDE 0435	--	--	✓

5TT7 1 GSM alarm modules

Overview

The GSM alarm module (GSM = Global System for Mobile Communications) enables cost-effective remote control of industrial and private building management, e.g. of heating, air-conditioning and cooling systems. But it is also possible to safely control elevators and escalators and all kinds of production equipment, such as machines, automatic devices and conveyor belts. The GSM alarm module is particularly suitable for monitoring remote plants, i.e. for monitoring the heating of summer houses or the pumps of a water treatment plant.

Using voltage relays, current relays, fuse monitors, miniature circuit breakers, residual current operated circuit breakers or surge arresters fitted with auxiliary switches or signal contacts, there are virtually no limits to the type of monitoring tasks that can be carried out. The use of remote controlled mechanisms with miniature circuit breakers and residual current operated circuit breakers also allows realization of a range of cost-effective and interesting solutions.

Note:

Because the availability of mobile networks cannot be guaranteed, GSM alarm modules should not be used for safety-relevant control functions.

Benefits

- Mobile monitoring and control of electrical plants and system components
- Fast and reliable alarm signaling over SMS
- Simple operation and parameterization over SMS
- Saves space and can be retrofitted in any plant
- 1 administrator telephone number from any mobile network for configuration
- Transmission of alarm messages to up to 5 cell phones
- Customized tests for 2 alarm inputs and switchable output.

Technical specifications

			5TT71 110-0	5TT71 120-0
Rated power P_s		W	3.5	4.5
Digital inputs		V DC	24; 2-wire connection, isolated	
Signal voltage "0" at the input		V DC	-2 ... 2	
Signal voltage "1" at the input		V DC	8 ... 30	
Maximum contact load	At p.f. = 1	V; A	250; 5	
Maximum contact load		V; A	30; 5	
Rated operational voltage U_e		V DC	10 ... 30	
• Permissible residual ripple				
- At 10 V		%	< 1	
- At 30 V		%	< 10	
Vibration resistance	Acc. to EN 60068-2-34	g	1 at 10 ... 500 Hz	
Shock resistance	Acc. to EN 60068-2-27	g	30 for 18 ms	
Shock resistance	Acc. to EN 60068-2-29	g	25 for 6 ms	
EMC	Acc. to EN 6100-6-2, EN 61000-6-3		Complied with	
Frequency band			E-GSM 900/GSM 1800	
Power class			GSM 900:4 (2 W)/GSM 1800:1 (1 W)	
GPRS class			Multislot Class 8, operation mode Class B, HSCSD, SAT	
Terminals				
• Terminals	± screw (Pozidriv)		1	
• Conductor cross-sections of main current paths				
- Rigid, max.		mm^2	1.5 ... 4	
- Flexible, with end sleeve, min.		mm^2	1 ... 2.5	
Ambient temperature		°C	-20 ... +55	-20 ... +50
• Expanded[1)]		°C	-30 ... +75	--
Storage temperature		°C	-40 ... +85	-20 ... +50
Humidity at 40 °C		%	0 ... 95	

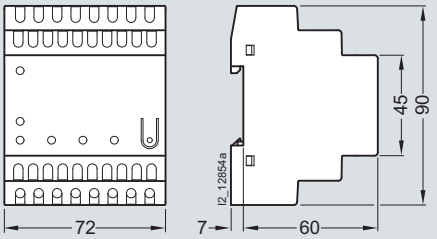
1) Continuous operation possible with restricted function: The device is able to log into the system and there is a > 90 % likelihood it will execute calls with a signal strength of -85 dBm. The sender output capacity and the receiver sensitivity may be reduced.

Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V DC						Unit(s)	Unit(s)	kg
	**GSM alarm modules**										
	For GSM network operating with two alarm inputs and one switching output										
	230	5	24	4	A	**5TT7 110-0**		027	1	1	0.205
	• With backup battery for signaling in the event of power failures										
	230	5	24	4	A	**5TT7 120-0**		027	1	1	0.250
	Aerials[1]										
	Rod aerial with magnet base, with MMC connection and connecting cable				B	**5TT7 908-1**		027	1	1	0.070
	Flat form for adhesion, with MMC connection and connecting cable				B	**5TT7 908-2**		027	1	1	0.050
	**Electronic power supply units** SELV, short-circuit resistant										
	For supplying the 5TT7 11 GSM alarm modules within a supply voltage range of 150 V AC to 230 V AC				B	**4AC2 402**		027	1	1	0.080
	For further information, please refer to chapter 10, Transformers, Bells and Socket Outlets.										

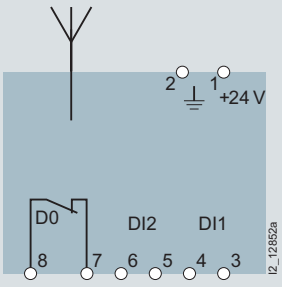
[1] Essential accessories.

Dimensional drawings



5TT7 110
5TT7 120

Schematics

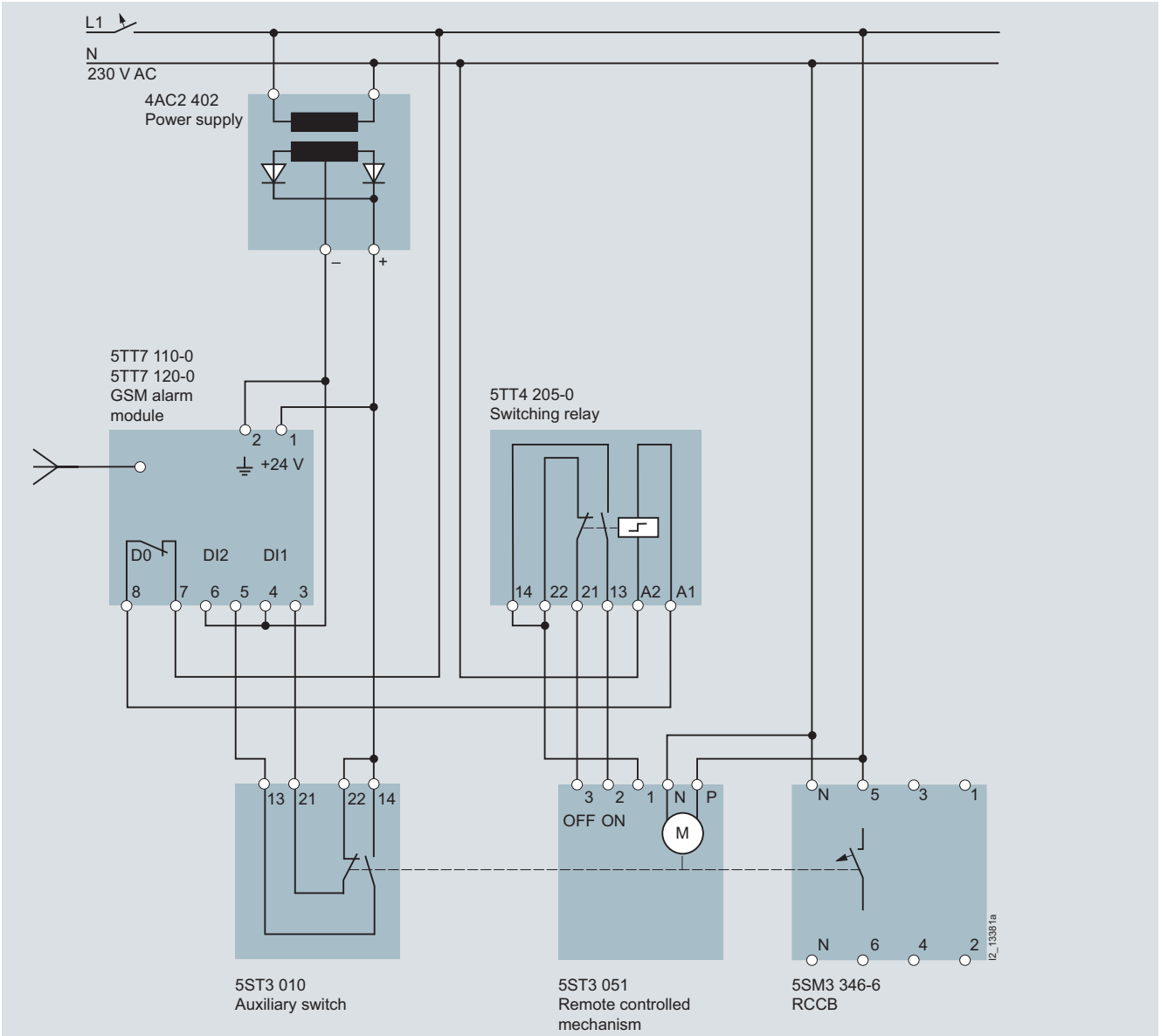


5TT7 110
5TT7 120

* You can order this quantity or a multiple thereof.

5TT7 1 GSM alarm modules

Switching example



Switching a 5ST3 051 remote controlled mechanism

- The GSM alarm module sends an ON command.
- The switching relay switches and sends this command to the remote controlled mechanism, whereby the voltage at the remote control switches the relay from the OFF to the ON input over the changeover contact.
- The auxiliary switch relays the ON position of the remote controlled mechanism to the input of the GSM alarm module. This sends the switching position ON per SMS.

More information

SIM card

An activated SIM card of a GSM network provider is used (e.g. T-Mobile D1, Vodafone D2, E-Plus, O2 – even prepaid cards). The card is prepared for use in the GSM alarm module in a conventional cell phone, by setting the PIN to "1234". The device can then be simply configured and put into service without any software tools or programming skills. The status of two digital inputs are monitored and in the event of any change, an SMS is sent. By sending an SMS from a cell phone to the GSM alarm module you can switch the output.

Administrator

One cell telephone number has administrator rights. This administrator number is used to specify the signaling and control texts, define time responses at outputs and inputs and register and store up to 5 further phone numbers in the device. An SMS alarm message is then also sent to these 5 phone numbers in the event of a fault.

Freecall function

The freecall function is an extremely interesting feature and – unlike the sending of SMS messages – completely free. It can be used for the functions of the GSM alarm module. By simply selecting the device, this function can be used to switch the output, switch it over or call up the switching states of inputs and outputs. The GSM alarm module detects the phone number that is calling, checks the authorization and executes the desired function. To use this function, the anonymous call feature must be disabled on the phone being used.

Safety in the event of power failure

In contrast to the 5TT7 110-0 GSM alarm module, the 5TT7 120-0 version is also fitted with a backup battery. Any device power failure is detected by the 5TT7 120-0 GSM alarm module. The device then sends an appropriate alarm SMS and switches itself off.

Status interrogation

A status SMS can be used to query the switching state of both inputs and the output. If required, the freecall function can also be used for this purpose.

Heartbeat function

The GSM alarm module automatically sends a status SMS at user-definable intervals.

User-definable device name

In the devices, users can define their own device names. This device name then prefixes each SMS. If more than one device is in use, the user can clearly see where the alarm has occurred.

Power-On SMS

If required, the GSM alarm module automatically sends a so-called Power-On SMS with device name and time delay after the system is switched on. A time delay can be set for the inputs. If there is a change in the device state, the alarm SMS is not sent until the set delay time has expired.

Time delay

The adjustable delay time serves to suppress the sending of multiple alarm SMS texts, e.g. in the case of chattering contacts. This time is started after an alarm SMS is sent. No further SMS is then sent within the set time interval.

Monoflop function

This allows a time to be set after which the output is automatically reset to zero.

Password protection

If the password protection is activated, the password must be entered as a prefix to each SMS. This protects against unauthorized access.

Interrogation settings

All the settings of a device can be called up using a range of SMS interrogations.

5TT3 46 fault signaling units

Overview

Fault signaling units are used in small plants where the installation of complex fault signaling systems would be too cost and labor-intensive. In the event of a fault, they enable fast fault localization of all monitoring devices and limit monitors from a central location. This increases plant availability. With the correct sensor configuration, they also provide the option of preventative maintenance.

- 4 fault signal inputs with LED
- 1 LED as centralized fault indicator
- One unit each for centralized fault indication and acoustic signaling
- With acknowledgment for acoustic indicators
- Open-/closed-circuit principle to the 4 inputs can be set via jumpers X1 – X2
- A maximum of 39 5TT3 461 expansion fault signaling units can be connected to the 5TT3 460 centralized fault signaling unit
- The maximum possible cable length between 5TT3 460 centralized fault signaling units and 5TT3 461 expansion fault signaling units is approx. 100 m with a conductor cross-section of 1.5 mm^2.

Benefits

- Ultra compact device designs that only require the smallest of spaces in distribution boards
- The modular design means that extra devices can be simply added as your system expands.

Technical specifications

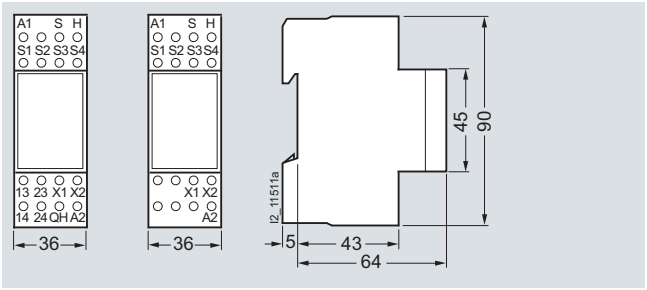
			5TT3 460	5TT3 461
Standards			IEC 60255; DIN VDE 0435-110, -303	
Rated control voltage U_c		V AC	230	
Operating range		× U_c	0.8 ... 1.1	
Rated frequency f_n		Hz	50/60	
Fault signaling inputs S1 ... S4		V AC	230	
Signal voltage to terminals S and H		V	7 ... 10	
Noise pulse duration		ms	≥ 100	
Acknowledgment pulse duration		ms	≥ 200	
Contacts				
• Rated operational voltage U_e		V AC	230	--
• Rated operational current I_e		A	5	--
• Minimum contact load		V; mA	10;100	--
Terminals				
• Terminals	± screw (Pozidriv)		PZ 1	
• Conductor cross-sections - Rigid, max. - Flexible, with end sleeve, min.		 mm^2 mm^2	 2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	
Humidity class	Acc. to IEC 60068-2-30		F	

Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
Centralized fault signaling units with transparent cap											
	230	5	230	2	B	**5TT3 460**		027	1	1	0.130
Expansion fault signaling units with transparent cap											
	230			2	B	**5TT3 461**		027	1	1	0.110

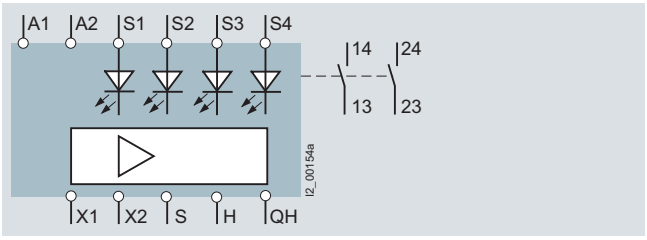
* You can order this quantity or a multiple thereof.

Dimensional drawings

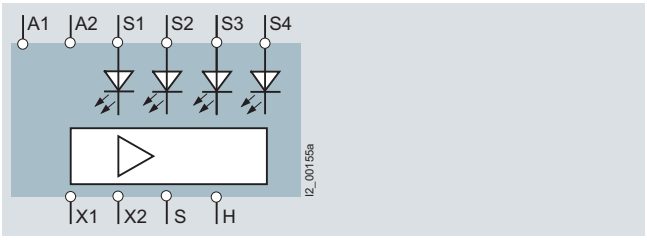


5TT3 460 5TT3 461

Schematics

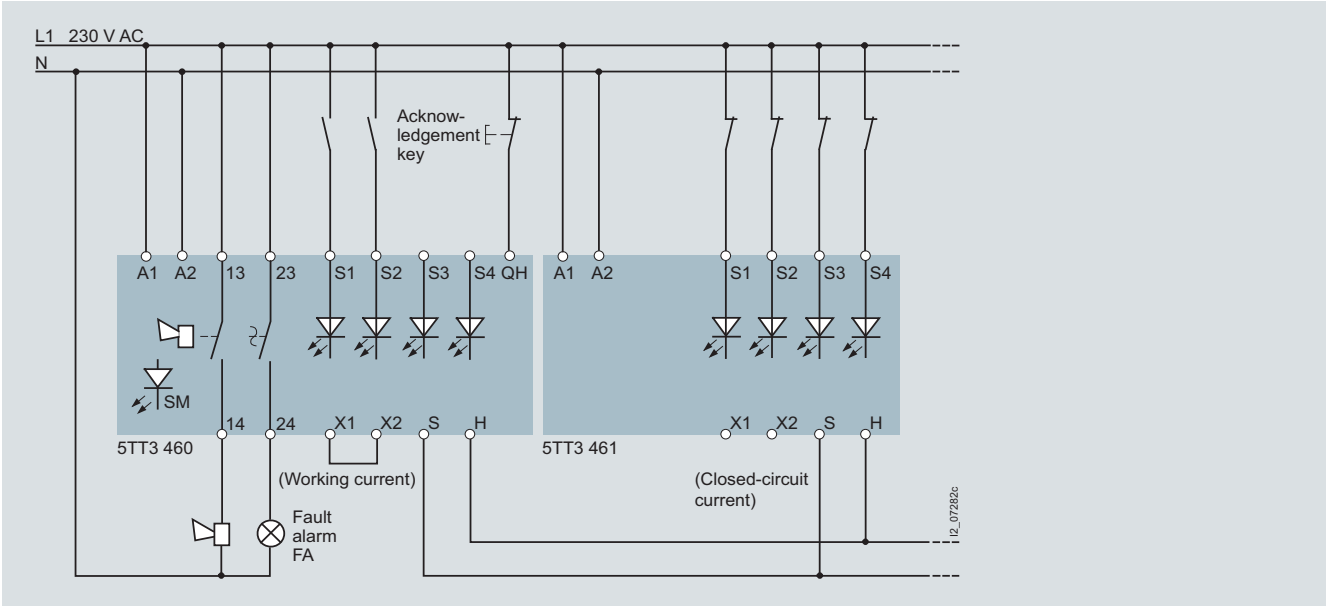


5TT3 460



5TT3 461

Switching example, function chart



If there is a fault, the fault indication contact closes and a centralized fault is indicated over an LED. The assigned LED remains lit until the fault is eliminated. Until the acknowledgment, momentary faults can be identified by the remaining centralized fault.

5TT3 46 fault signaling units

The terminals A1, S1 to S4 and QH must be operated in-phase. If no external acknowledgment key is connected, terminal QH must be laid to L1.

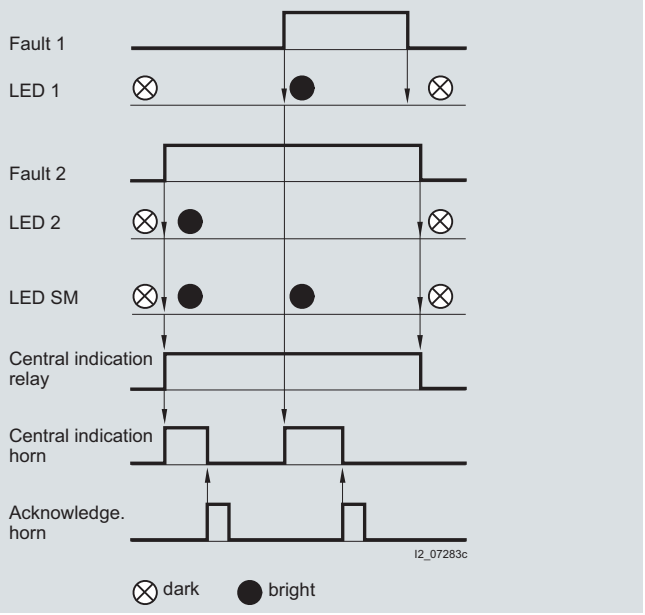
If jumper X1 – X2 is fitted, open-circuit protection (otherwise closed-circuit protection).

Contacts 13/14 and 23/24 close in the event of an incoming fault. The assigned LED and the centralized fault indication LEDSM light up.

The alarm sensor (contact 13/14) is switched off using the acknowledgment key. The assigned LED and the centralized fault indication LED continue to light up and contact 23/24 remains closed until the fault is eliminated.

Cables S and H carry an extra-low voltage. In the case of long connections between different distribution boards a shielded cable must be laid parallel to the installed load lines.

As a light signal sensor for the group messages, we recommend devices 5TE5 7 or 5TE5 8; as alarm sensor, the devices 5TT3 450 to 5TT3 453.



Overview

EMERGENCY-STOP circuits are common safety measures in all laboratory equipment and industrial plants. The EMERGENCY-STOP modules used here must meet the most rigorous demands with regard to functional reliability. Benchmark is the degree of self-monitoring. The Machine Directive 98/37/EC, valid from 31.2.1994, only specifies global safety standards. Details on how to implement individual safety demands are defined in standards, e.g. by the European Committee for Electrotechnical Standardization (CENELEC), which form the basis for international standards.

Benefits

- The electrical isolation between electric circuit and control meets the requirements of the standard
- An LED for the operating and switching state provides constant information on the operating state
- The safety category 4 to EN 954-1 expands the application options in many fields
- Compliance with the regulations according to EC Machine Directive 98/37/EC supports a high safety standard for those working in the plants.

Technical specifications

				5TT5 200
Standards				**IEC 60204-1; EN 60204-1 (VDE 0113-1)**
Supply				
• Rated control voltage U_c			V AC	230
- Operating range			× U_c	0.8 ... 1.1
• Rated frequency f_n			Hz	50
• Rated power dissipation P_v	Coil/drive			3.5
	Contact per pole		VA	0.8
Control voltage	Terminal Y1		V AC/DC	24
Control current	Terminal Y1		DC mA	45
Recovery time			ms	500
Safety				
• Electrical isolation, creepage distances and clearances, actuator/contact			mm	3
• Rated impulse withstand voltage U_{imp} drive/contact			kV	> 4
Contacts				
• Contacts	NO contacts	AC-15	A	3
	NC contacts	AC-15	A	2
	NO contact/ NC contact	AC-1	A	5
• Contact gap			mm	> 1
• Electrical service life	AC-15, 2 A, 230 V AC		Switching cycles	10^5
• Reliable switching frequency			Switching cycles/h	600
Vibration resistance				
Amplitude	Acc. EN 60068-2-610	Up to 55 Hz	mm	0.35
Terminals				
• Terminals	± screw (Pozidriv)			PZ 1
• Conductor cross-sections of main current paths				
- Rigid	Max.		mm^2	2 × 2.5
- Flexible, with end sleeve	Min.		mm^2	1 × 0.5
Permissible ambient temperature			°C	0 ... +50
Resistance to climate	Acc. to EN 60068-1			0/55/04

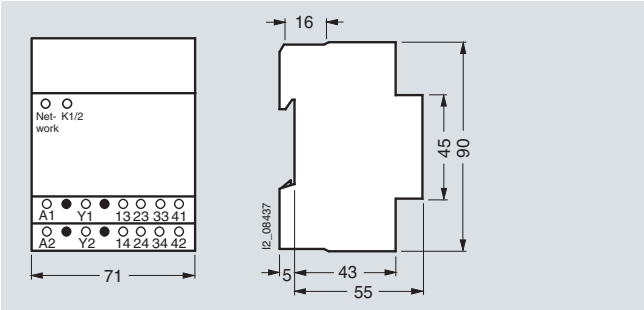
5TT5 2 EMERGENCY-STOP modules

Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	EMERGENCY-STOP modules										
	400	5	230	4	B	**5TT5 200**		027	1	1	0.250

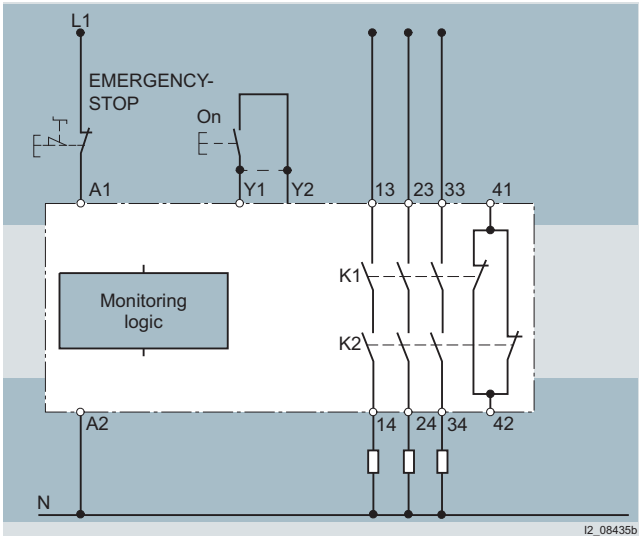
Dimensional drawings

5TT5 200 EMERGENCY-STOP modules



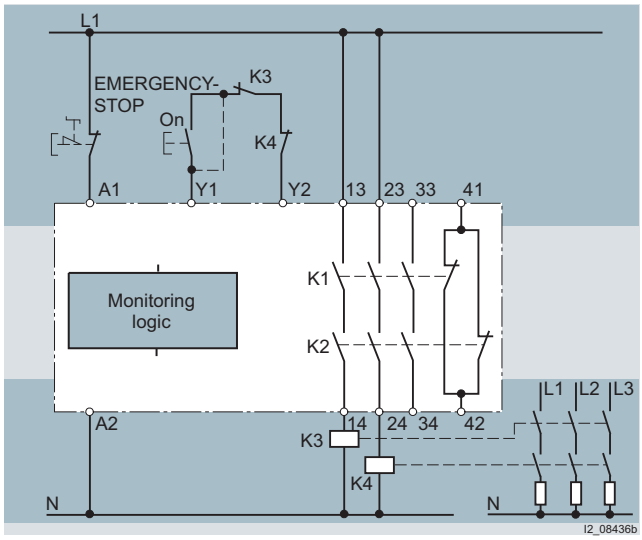
Schematics

Switching examples



Direct connection 230 V/400 V to 5 A

The monitoring logic checks internal relay contacts (not shown) to see whether both relays have been released prior to switching on. This ensures that no contacts are welded. The voltage level at terminal A1 is also monitored. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.



Connection of external contactors

External contactors may be used when they are equipped with positively driven contacts according to safety regulations ZH1/457 of the German Trade Association. Contactors with 3 NO contacts and 1 NC contact must be used, whereby the NC contacts must be integrated in the monitoring loop – terminals Y1/Y2. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.

* You can order this quantity or a multiple thereof.

More information

Category of safety-related parts of control systems according to CEN/TC 114 EN 954-1

Category	Summary of requirements	System behavior
B	The safety-related parts of machine control systems and/or their protective devices and their components must be state of the art and designed, selected, assembled and combined such that they can withstand the expected influences.	The occurrence of a fault can lead to the loss of the safety function. Some faults remain undetected.
1	The requirements of B must be fulfilled. Use of proven safety components and principles.	As described for category B, but with a higher level of safety-related reliability
2	The requirements of B must be fulfilled. Use of proven safety principles. The safety functions must be tested at suitable intervals using the machine control system. Note: What is considered suitable depends on the application and the type of machine.	The occurrence of a fault can lead to the loss of safety function between testing intervals. The fault is detected by the test.
3	The requirements of B must be fulfilled. Use of proven safety principles. The control systems must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) Wherever possible, the single fault is detected by the appropriate means, which must be state-of-the-art.	If a single fault occurs, the safety function is always maintained. Some, but not all, faults are detected. An accumulation of undetected faults may lead to the loss of the safety function.
4	The requirements of B must be fulfilled. Use of proven safety principles. A control system must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) Wherever possible, a single fault is detected at or before the next request for the safety function or c) If b) is not possible, that an accumulation of faults does not lead to the loss of the safety function.	If faults occur, the safety function is always maintained. The faults are detected in time to prevent the loss of the safety function.

Scope

The scope of the EC Directive Machines is no longer restricted to industrial machinery, but now covers virtually all machines used in all areas of commercial and private trade and industry and applies to all

- Stationary
- Movable
- Hand-held
- Mobile
- Machine tools and processing machines
- Prime movers and production machines
- Compressors
- Operating and packaging machines
- Machines in underground mining
- Earthmoving machines and harvesters
- Hoisting equipment
- Floor conveyors
- Machines for lifting persons
- Plants
- Interchangeable equipment, such as snow ploughs and mountable sweeping devices.

5TT5 2 EMERGENCY-STOP modules

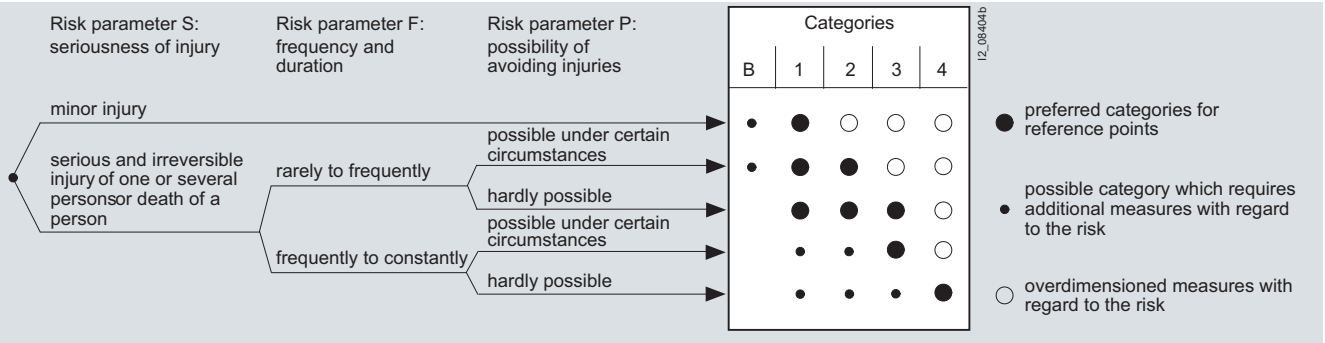
Risk analysis and selection of a suitable category

Engineers and operators assume responsibility for the correct risk assessment.

It is difficult to make a quantitative assessment of the risk, so that when selecting the category, the reasonable risk can be determined within a broad band width.

This becomes clear if you select "F2 – frequently to continuous" instead of "F1 – rarely to frequently", for the risk parameters "F – Frequency and duration" when drawing up a risk graph (see image).

The whole band width of safety categories may lie between the assessment of "often" and "frequently".



Key standards

- **EN 60204-1 (VDE 0113-1):1998**
  "Safety of machinery – Electrical equipment of machinery
  Part 1: General requirements"
- **EC Machine Directive 98/37/EC**
- **EN 292-1:1991**
  "Basic concepts, general principles for design
  Part 1: Basic terminology, methodology "
- **EN 292-2:1991 and EN 292-2/A1:1995**
  "Basic concepts, general principles for design
  Part 2: Technical principles and specifications "
- **EN 418:1992**
  "Safety of machinery – EMERGENCY-STOP equipment, functional aspects, principles for design"
- **EN 954-1:1996**
  "Safety of machinery – Safety-related parts of control systems
  Part 1: General principles for design"
- **EN 1088:1995**
  "Safety of machinery – Interlocking devices associated with guards – Principles for design and selection".

Overview

Level relays are used for the monitoring and control of conductive, non-combustible liquids and powders. They ensure overflow and dry run protection. Due to their sensor performance, the devices can also be used for general resistance monitoring.

LED displays:

- Green LED: lights up when operational voltage is applied
- Yellow LED: lights up if MIN output relay is activated
- Red LED: lights up if MAX output relay is activated.

Benefits

The measuring range up to 450 kΩ enables a differentiation between foam and liquid. It also increases the universal application for resistance measurements.

Due to its low-frequency, electrically isolated measuring circuit, the device has a high immunity to interference against system coupling, which enables cable lengths of up to 1500 m and suppresses the effects of electrolysis in the liquid.

- The two outputs for minimum and maximum control can also be used for the advance warning and tripping of limit values.
- 3 electrode connections for 1-step and 2-step level control
- All standard products can be used as electrodes
- High immunity to interference of the measuring circuit isolated from the system
- Programmable for open-circuit principle (with bridge X2 COM) or closed-circuit principle (without jumper)
- Separately adjustable delay times for $t_{v\ min}$ and $t_{v\ max}$, 0.2 to 2 s

Technical specifications

			5TT3 435
Standards			IEC 60255; DIN VDE 0435-110
Supply			
• Rated control voltage U_c		V AC	230
- Operating range		× U_c	0.8 ... 1.1
• Rated frequency f_n		Hz	50/60
Setting range of the liquid level		kΩ	2 ... 450
Switching point hysteresis of set value			
- At 450 kΩ		%	3
- At 2 kΩ		%	6
Voltage temperature influence	From set value	%	< 2
Max. cable length to the electrodes at 100 µF/km	Set value kΩ		
	450	m	50
	100	m	200
	35	m	500
	10	m	1500
	5	m	3000
Electrode voltage	Max.	V AC	Approx. 10
Electrode current	Max.	mA AC	Approx. 1.5
Response delay	Adjustable	s	0.2 ... 20
OFF-delay	Adjustable	s	0.2 ... 20
Rated operational voltage U_e		V	250
Rated operational current I_e		A	5
Test voltage			
	Input/auxiliary circuit	kV	4
	Input/output circuit	kV	4
	Auxiliary/output circuit	kV	4
Terminals			
• Terminals	± screw (Pozidriv)		PZ 2
• Conductor cross-sections			
- Rigid	Max.	mm^2	2 × 2.5
- Flexible, with end sleeve	Min.	mm^2	1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	Acc. to EN 60068-1		20/60/4

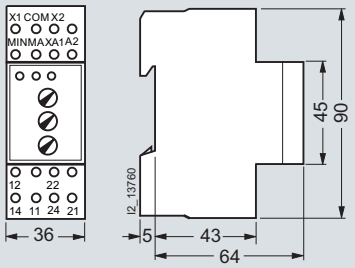
5TT3 435 level relays

Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Level relays**										
	230	4	230	2	B	**5TT3 435**		027	1	1	0.162
	**Immersion electrodes** • Made of stainless steel, with PG13 sealing cap • Temperature range 0 ... 60 °C • Suitable for pure water in open containers										
	With terminal connection				B	**5TG8 223**		027	1	1/24	0.100

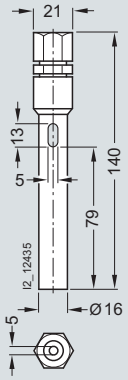
Dimensional drawings

5TT3 43 level relays



5TT3 435

5TG8 223 immersion electrodes

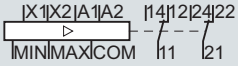


5TG8 223

14

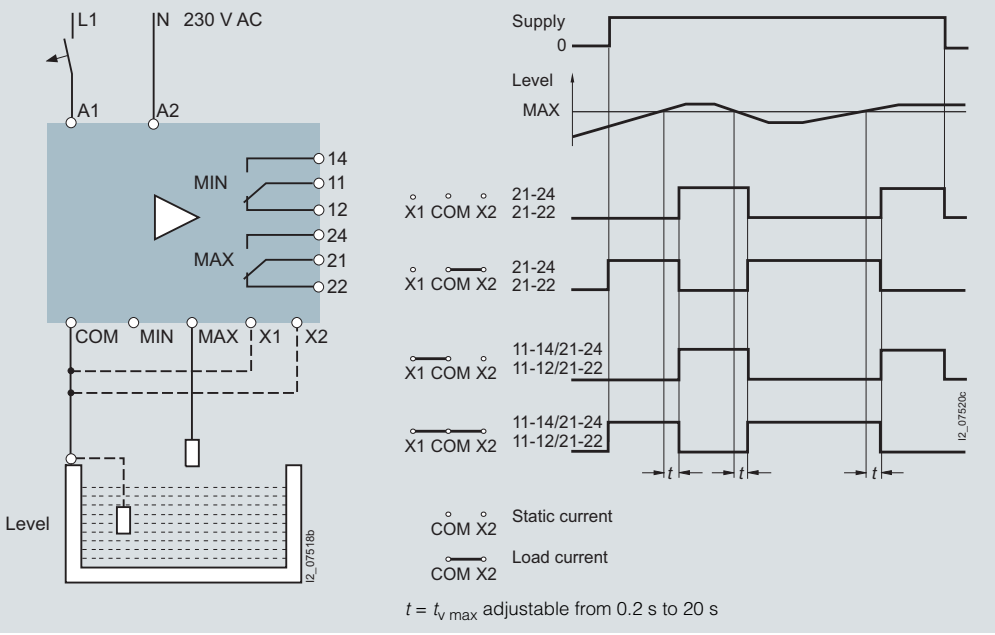
* You can order this quantity or a multiple thereof.

Schematics



Switching example: 5TT3 435

One-step level control



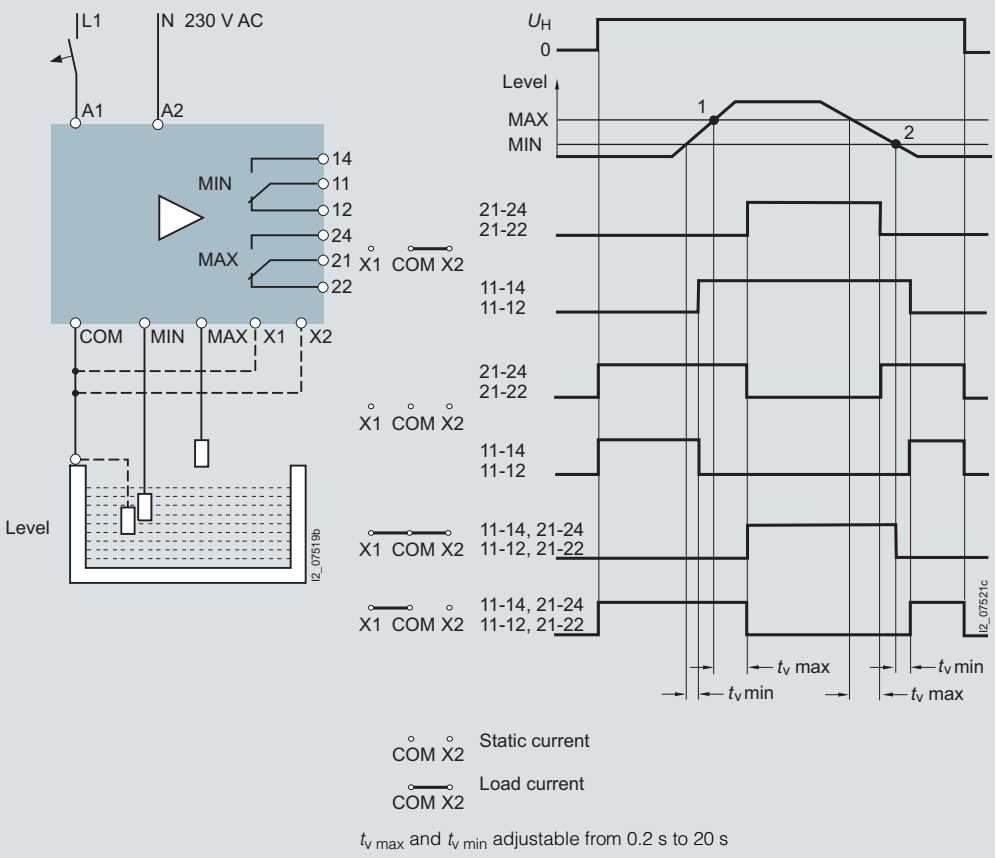
The one-step level control is particularly suitable for dry run or overrun protection with free inflow/outflow.

The COM reference electrode and the MAX electrode are required.

Without the jumper X1-COM only relay 21-22-24 switches.

With the jumper X1-COM both relays switch together.

Two-step level control



The 2-step level control keeps the liquid level between a minimum and a maximum level.
Three electrodes are required: MIN, MAX and COM.

Without the jumper X1-COM, switching is as follows:

- If the MAX level is fallen below/ exceeded, only relay 21-22-24.
- If the MIN level is fallen below/ exceeded, only relay 11-12-14.

With the jumper X1–COM, both relays switch together if the MAX level is exceeded or the MIN level is fallen below.

5TT3 171 line circuit relays

Overview

Line circuit relays are used to interrupt circuits and prevent electromagnetic fields in circuits where there are currently no active loads.
If the loads are disconnected, and the line circuit relay measures a usage of only 2 to 20 VA – adjustable – it disconnects the cable to the supply voltage and switches over to extra-low voltage. As soon as loads are reconnected, the line circuit relay detects the increase in usage and switches back to the supply voltage.
While the line circuit relay switches off any unnecessary system components, it is not a device for ensuring isolation in the sense of safe disconnection.

The line circuit relay is unable to detect consumers with electronic power supply units, e.g. electronically controlled vacuum cleaners. It is expedient to connect such equipment to a base load resistor (PTC resistor) so that the line circuit relay is reset to supply voltage.

Benefits

- High availability to a wide range of loads, as all resistive, capacitive and inductive loads are detected
- Adjustable from 2 to 20 VA
- With status display for contact adjustment
- With switch continuously ON
- With safety information on stickers for socket outlets and distribution boards.

Technical specifications

			5TT3 171
Standards			IEC 60255; DIN VDE 0435-110
Rated control voltage U_c		V AC	230
Operating range		× U_c	0.85 ... 1.15
Rated frequency		Hz	50/60
Rated power dissipation P_v	Electronics Contacts	VA VA	5 2.6
Monitoring voltage		V	3
Response value	Adjustable	VA	2 ... 20
Release value	% of the response value		70
Rated impulse withstand voltage U_{imp}	Input/output	kV	> 4
Rated operational voltage U_e		V AC	250
Rated operational current I_e	AC-1 AC-11	A A	16 3
Contacts			μ contact
Electrical service life	In switching cycles at 3 A	AC-11	5×10^5
Terminals	+/- screw (Pozidriv)		PZ 1
Conductor cross-sections - Rigid - Flexible, with end sleeve	 Max. Min.	 mm^2 mm^2	 2×2.5 1×0.5
Permissible ambient temperature		°C	-20 ... +45
Degree of protection	Acc. to IEC/EN 60529		IP20, with connected conductors
Safety class	Acc. to EN 61140/ VDE 0140-1		II
Humidity class	Acc. to IEC 60068-2-30		F

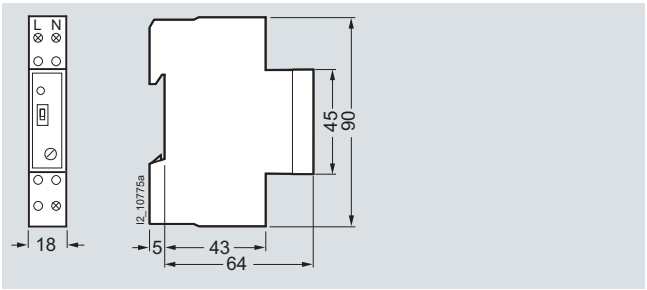
14

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Line circuit relays**											
	For disconnecting the voltage or field circuit of electrical systems even when loads are disabled.											
	1 NC	250	16	230	1	A	**5TT3 171**		027	1	1	0.072
	Base load resistors for electronic devices											
	With 15-cm connection wires, end sleeves and shrink sleeving					C	**5TG8 222**		027	1	1	0.010

* You can order this quantity or a multiple thereof.

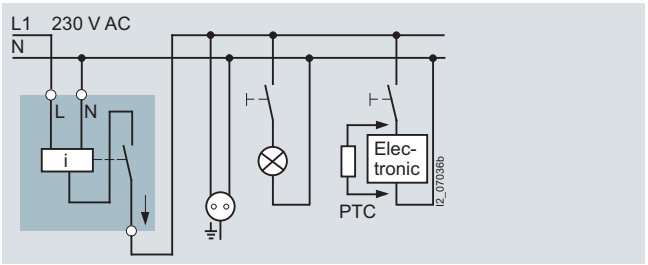
Dimensional drawings



5TT3 171

Schematics

Switching example



If the line circuit relay does not respond to a load, it must be connected with a 5TG8 222 base load resistor. Devices in active standby operation may impair the function of the line circuit relay.

7LQ2 1, 5TT3 3 dusk switches

Overview

Dusk switches are used for the demand-oriented switching of lighting installations for shop windows or paths in order to cut operating costs.
A light sensor measures the level of daylight. Switching depends on the desired brightness. A time delay and the switching hysteresis prevent clock-pulse behavior.
The sensor must be mounted so that it is not influenced by the lighting feedback.

Benefits

- The 7LQ2 101 and 7LQ2 103 devices have 2 switching channels that can be set independently of each other. This requires a light sensor
- 12 dusk switches can be switched parallel to a light sensor. This saves the multiple installation of light sensors in a single system and all dusk switches operate independently of each other and can be adjusted individually.

Technical specifications

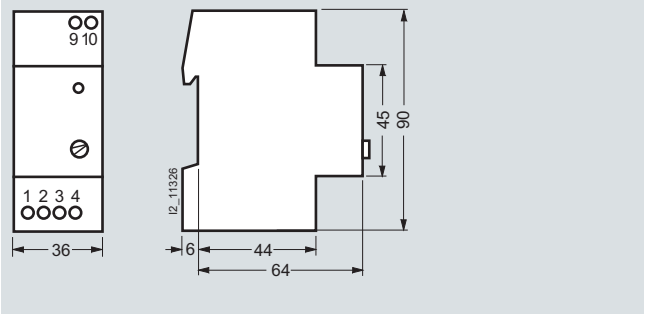
			7LQ2 100	7LQ2 101	7LQ2 102	7LQ2 103	5TT3 303
Standards			EN 60730				
Rated control voltage U_c		V AC	230				
Operating range	At 50/60 Hz	× U_c	0.8 ... 1.2				
Rated frequency f_n		Hz	45 ... 65				
Measuring ranges, setting ranges		Lux	2 ... 500	2 × 2 ... 500	2 ... 500	2 × 2 ... 500	2 ... 2000
Time delay	Non-adjustable Adjustable	s	75 ± 25 No	No 2 × 50 ... 100 ± 25	75 ± 25 No	No 2 × 50 ... 100 ± 25	50 No
Status indication, LED	Switching status indication Switching state OFF Switching state ON		Instantaneous Green Red				No No No
Incandescent lamp load		W	2000	2 × 2000	2000	2 × 2000	1200
Different phases	Actuator/contact permissible Contact/contact		Yes No	Yes	No	Yes	No No
Electrical isolation	Creepage distances and clearances Actuator/contact Contact/contact	 mm mm	 4 No	 4	 No	 4	 No No
Rated impulse withstand voltage U_{imp} 1.2/50 µs	Actuator/contact Contact/contact	kV kV	> 2.5 No	> 2.5	No	> 2.5	No No
Contacts	µ contact		1 NO	2 NO	1 NO	2 NO	1 NO
• Rated operational voltage U_e		V AC	250				
• Rated operational current I_s - At p.f. = 1 - At p.f. = 0.4		 A A	 16 4				 10 2
• Minimum contact load		V; mA	10; 100				
• Contact switching	Closes with approaching darkness	Terminals	3/4	5/6 and 9/10	3/4	5/6 and 9/10	No
Terminals							
• Terminals	± screw (Pozidriv)		PZ 1				
• Conductor cross-sections - Rigid - Flexible, with end sleeve	 Min.	 mm^2 mm^2	 1.5 ... 6 0.75				 1.5 0.5
Environmental conditions							
• Permissible ambient temperature - Device - Light sensor		 °C °C	 -10 ... +55 -30 ... +70				 --
• Permissible humidity - Device - Light sensor		 % %	 < 80 < 98				 --
• Degree of protection - Device - Light sensor	Acc. to EN 60529		 IP20, with connected conductors IP55		 IP65		 IP54 No
• Safety class	Acc. to EN 61010		II				

Selection and ordering data

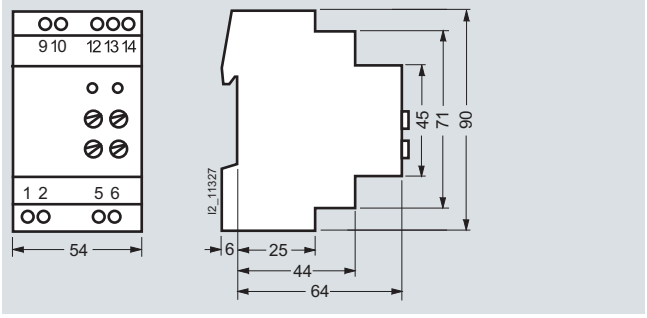
	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	Dusk switches										
	1-channel version, Setting range 2 ... 500 lux with 7LQ2 910 light sensor for surface mounting, IP55										
	250	16	230	2	A	**7LQ2 100**		027	1	1	0.210
	With 7LQ2 911 light sensor, for flush wall mounting, IP65										
	250	16	230	2	B	**7LQ2 102**		027	1	1	0.210
	2-channel version, Setting range 2 ... 500 lux with 7LQ2 910 light sensor, for surface mounting, IP55, expandable to 24 channels through parallel switching of 12 devices, which can be mutually controlled through a light sensor.										
	250	16	230	3	B	**7LQ2 101**		027	1	1	0.210
	With 7LQ2 911 light sensor, for flush wall mounting, IP65 expandable to 24 channels through parallel switching of 12 devices, which can be mutually controlled through a light sensor.										
	250	16	230	3	B	**7LQ2 103**		027	1	1	0.210
	1-channel version, Setting range 2 ... 2000 lux for surface mounting, IP54, with integrated light sensor										
	250	10	230	–	C	**5TT3 303**		027	1	1	0.190
	Replacement light sensors										
	With watertight/resistant resin molding material, heat-resistant up to 70 C										
	Degree of protection IP55, for 7LQ2 100 and 7LQ2 101, for surface mounting, 2 ... 500 lux				B	**7LQ2 910**		027	1	1	0.060
	Degree of protection IP65, for 7LQ2 102 and 7LQ2 103, for flush wall mounting, 2 ... 500 lux				B	**7LQ2 911**		027	1	1	0.060

14

Dimensional drawings



7LQ2 100
7LQ2 102

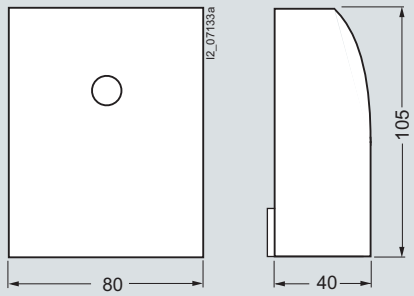


7LQ2 101
7LQ2 103

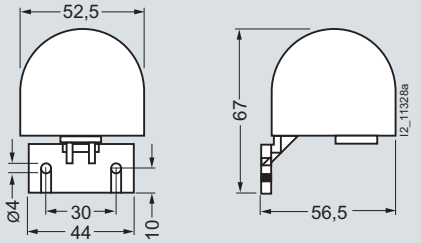
* You can order this quantity or a multiple thereof.

7LQ2 1, 5TT3 3 dusk switches

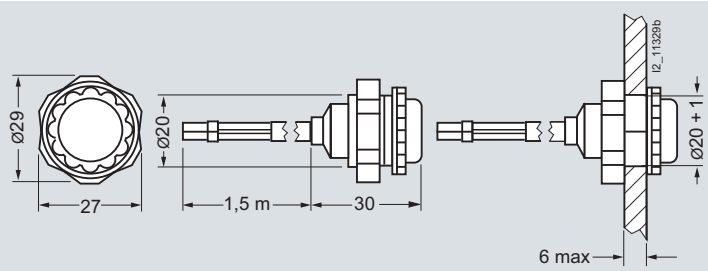
For surface mounting



5TT3 303

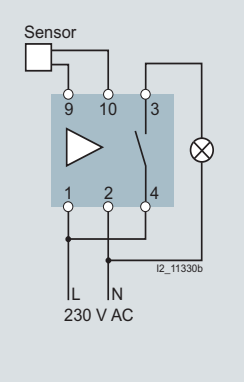


7LQ2 910

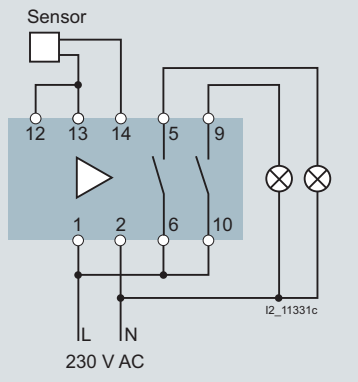


7LQ2 911

Schematics

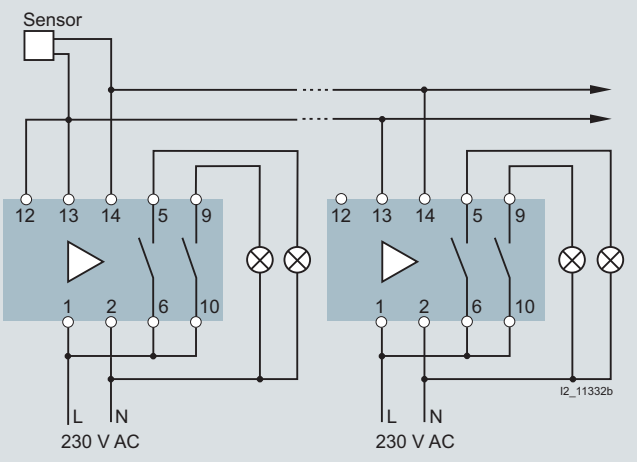


Dusk switches
7LQ2 100
7LQ2 102



Dusk switches
7LQ2 101
7LQ2 103

The cable length between the device and the light sensor must not exceed a maximum of 50 m. The conductor cross-section must be a minimum of 2 × 0.75 mm².



Up to 12 dusk switches with a single sensor
7LQ2 101
7LQ2 103

Up to 12 dusk switches can be operated with a single sensor.

If the device measures a light level below the set value or if the device is no-voltage, the contacts are in the position shown.

- If the surrounding light level increases by approx. 30 to 100 % above the set value, the light is switched off after the set delay time.
- If the surrounding light level falls below the set value, the light is switched on after the set delay time.

Overview

The temperature controllers are used for controlling or limiting temperatures in residential and non-residential buildings, as well as in industrial areas. They're used for heating registers, panel and hot air heating and direct floor heating, as a limiting thermostat for air-conditioning systems and cooling systems, control cabinet cooling, etc. as well as for temperature control in humid and dusty rooms. Can also be used for inaccessible room temperature setting for rooms in public buildings, such as schools, dayrooms and comparable applications.

Benefits

- Electronic temperature controllers with red/green LED for supply voltage indication, switching status indication and temperature sensor monitoring. This supports the monitoring of safe operation at all times
- The temperature sensor with the measuring element KTY or a PT100 is monitored for short circuits and interruptions. This protects against unpleasant surprises during operation.

Technical specifications

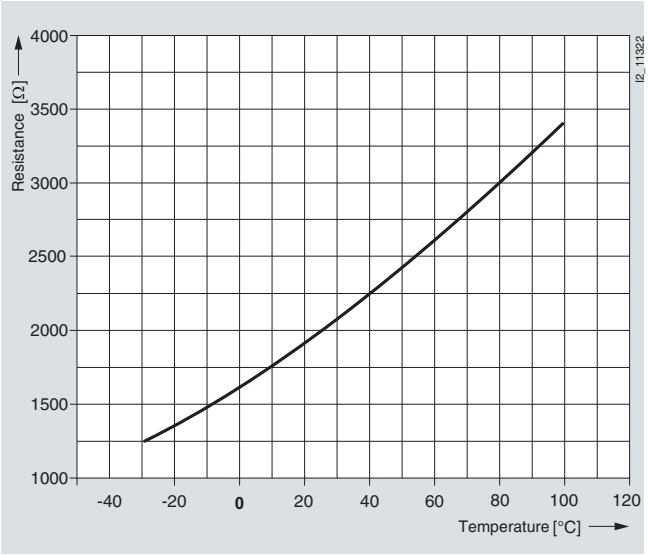
			7LQ2 001	7LQ2 002	7LQ2 003	7LQ2 005
Standards			EN 60730			
Rated control voltage U_c		V AC	230			
Operating range	At 50/60 Hz	× U_c	0.8 ... 1.2			
Rated frequency f_n		Hz	45 ... 65			
Measuring ranges, setting ranges		°C	-30 ... +30	0 ... +60	+40 ... +100	2 ... +400
Switching hysteresis	Adjustable	°C	1 ... 5			4 ... 20
Status indication, LED Switching status indication						
• Actuating voltage			Green			
• Switching state ON			Red			
• Break or short circuit of the sensor conductor			Red flashing			
Different phases	Actuator/contact permissible		Yes			
Electrical isolation	Creepage distances and clearances, actuator/contact	mm	4			
Rated impulse withstand voltage U_{imp} (1.2/50 µs)	Actuator/contact	kV	> 2.5			
Contacts	µ contact		1 CO			
• Rated operational voltage U_e		V AC	250			
• Rated operational current I_s						
- At p.f. = 1		A	16			
- At p.f. = 0.4		A	4			
• Minimum contact load		V; mA	10; 100			
• Contact switching	Closes with increasing temperature	Terminals	3/4			
Terminals						
• Terminals	± screw (Pozidriv)		PZ 1			
• Conductor cross-sections						
- Rigid		mm^2	1.5 ... 6			
- Flexible, with end sleeve	Min.	mm^2	0.75			
Environmental conditions						
• Permissible ambient temperature						
- Device		°C	-10 ... +55			
- Temperature sensor		°C	-30 ... +105			--
• Permissible humidity						
- Device		%	≤ 80			
- Temperature sensor		%	≤ 98			--
• Degree of protection	Acc. to EN 60529					
- Device			IP20, with connected conductors			
- Temperature sensor			IP65			--
• Safety class	Acc. to EN 61010		II			

7LQ2 0 temperature controllers

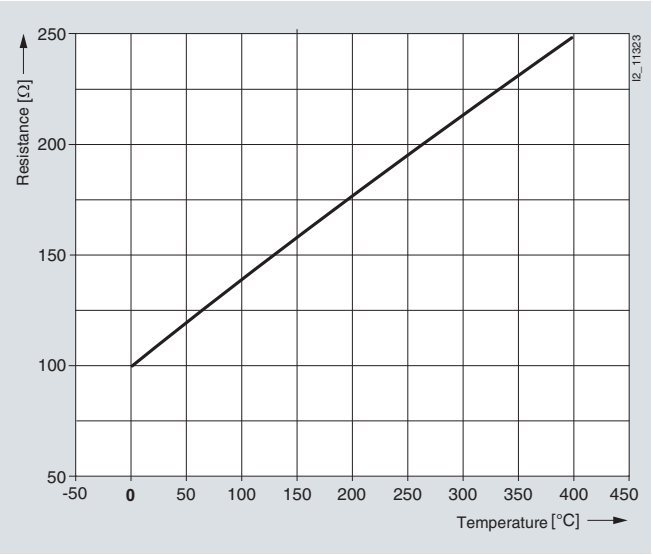
Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Temperature controllers**										
	With KTY 11-6 temperature sensor										
	Setting range -30 ... +30 °C, 1 CO										
	250	16	230	2	B	**7LQ2 001**		027	1	1	0.210
	Setting range 0 ... +60 °C, 1 CO										
	250	16	230	2	B	**7LQ2 002**		027	1	1	0.210
	Setting range +40 ... +100 °C, 1 CO										
	250	16	230	2	B	**7LQ2 003**		027	1	1	0.210
	Temperature controllers without temperature sensor										
	For PT100 measuring element (not included in delivery)										
	Setting range +2 ... +400 °C, 1 CO										
	250	16	230	2	B	**7LQ2 005**		027	1	1	0.210
	**KTY 11-6 replacement temperature sensors**										
	Safety class IP65, for 7LQ2 001, 7LQ2 002 and 7LQ2 003, encapsulated, with watertight/resistant resin material, with 1 m silicone line, heat-resistant up to 105 °C, can be extended up to 100 m										
			230		B	**7LQ2 900**		027	1	1	0.040

Characteristic curves



Resistor characteristic curves KTY 11-6

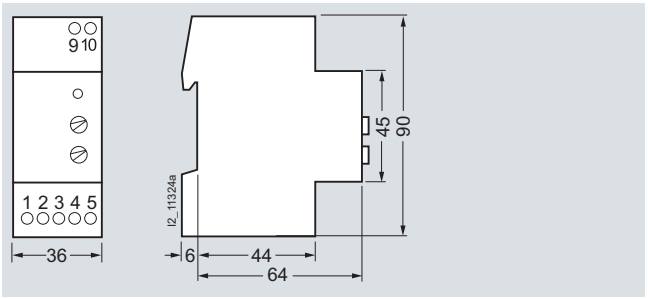


Resistor characteristic curves PT100 acc. to EN 60751

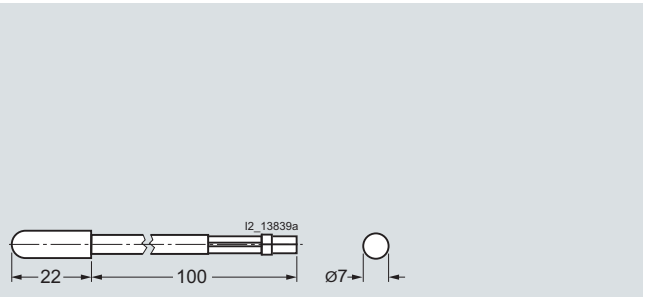
14

* You can order this quantity or a multiple thereof.

Dimensional drawings



7LQ2 0



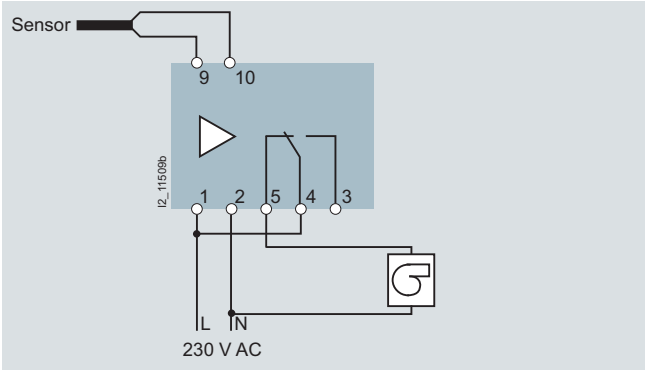
7LQ2 900

Schematics

Switching examples

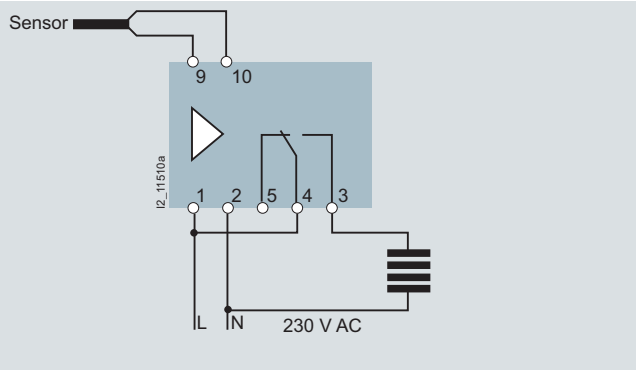
7LQ2 0 temperature controllers in cooling operation with adjustable functioning temperature difference

7LQ2 0



7LQ2 0 temperature controllers in cooling operation with adjustable functioning temperature difference

7LQ2 0



The cable length between the device and the temperature sensor must not exceed a maximum of 100 m. The conductor cross-section must be a minimum of 2 × 0.75 mm^2.

14

5TT3 472 p.f. controllers

Overview

The p.f. controllers monitor the phase displacement between current and voltage. Because the phase displacement angle changes with the load of the motor, this measurement method is ideal for the monitoring of asynchronous motors for underload and no-load operation, independent of size. However, in some cases, the p.f. barely changes if the load of the motor changes, e.g. in the case of relatively minor load changes on large-scale motors or single-phase split-pole motors or collector motors.

The p.f. controller monitors single and three-phase asynchronous motors up to approx. 5 A (without current transformer) for underload and no-load operation. This is phase-sequence independent and increases plant availability. Typical applications are fan monitoring in the case of V-belt breakage, pump monitoring in the event of valve closure or dry runs. A current transformer is used for higher rated currents.

If the p.f. value set at the p.f. controller is fallen below for the duration of the set response delay, the output relay switches to the alarm state and the red LED lights up. If it exceeds the p.f. value, the output relay switches back without any significant delay.

- Adjustable p.f. response value, from 0 to 0.97
- Current range up to 8 A
- LED display for operation and alarm
- Automatic resetting of alarm.

Benefits

- The ultra compact p.f. controller requires only the smallest of spaces and saves costs.

Technical specifications

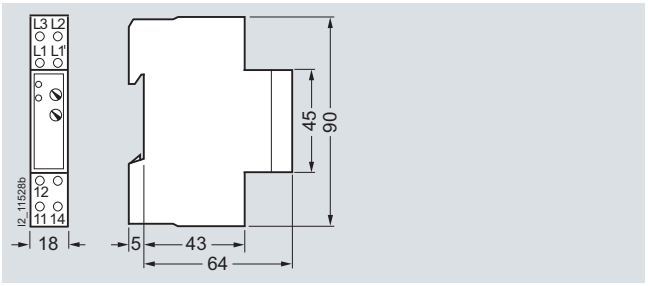
			5TT3 472
Standards			IEC/EN 60255, VDE 0435
Rated control voltage U_c		3 V AC	400
Operating range	With AC supply	× U_c	0.8 ... 1.1
Frequency range f_n		Hz	45 ... 65
Rated power dissipation P_v		VA	Approx. 11
Rated impulse withstand voltage U_{imp}	Against contacts	kV	< 4
Current measuring circuits			For AC systems
Current measuring range I_{meas}		A AC	0.4 ... 8
Short-time overload capability	For 2 s For 0.5 s	A A	20 40
Current transformer, Class 3 or better	Secondary current	A	1 or 5
Setting ranges	Adjustable	p.f.	0 ... 0.97
Response delay	Adjustable	s	1 ... 100
Short-circuit strength	Fuse 4 A gL	A	4
Contacts	μ contact		1 CO
• Rated operational voltage U_e		V AC	250
• Rated operational current I_e	Thermal current AC-15 NO contacts AC-15 NC contacts AC-13 at 24 V DC	A A A A	4 3 1 1
• Minimum contact load		V; mA	10; 100
Terminals			
• Terminals	± screw (Pozidriv)		PZ 2
• Conductor cross-sections - Rigid - Flexible, with end sleeve	 Max. Min.	 mm^2 mm^2	 2 × 2.5 1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	Acc. to EN 60068-1		20/60/4
Degree of protection	Acc. to EN 60529		IP20, with connected conductors

Selection and ordering data

	Contacts	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
		V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**p.f controllers** For monitoring of the underload of motors up to approx. 5 A AC by making p.f. measurements, setting range p.f. from 0 to 0.97											
	1 CO	4	3 × 400	0.4 ... 8	1	B	**5TT3 472**		027	1	1	0.065

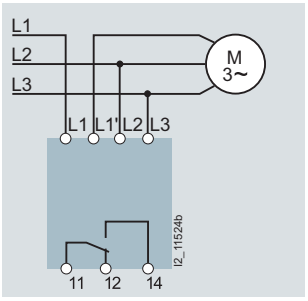
* You can order this quantity or a multiple thereof.

Dimensional drawings

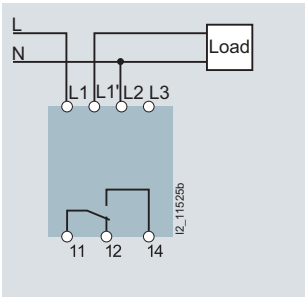


5TT3 472

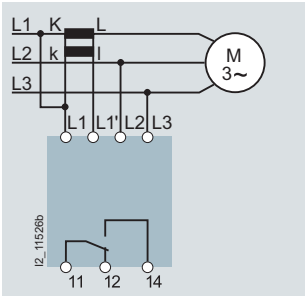
Schematics



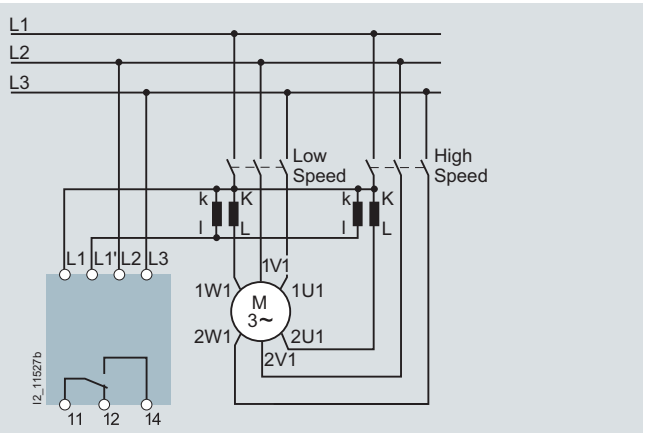
Connection of three-phase load



Connection of single-phase load



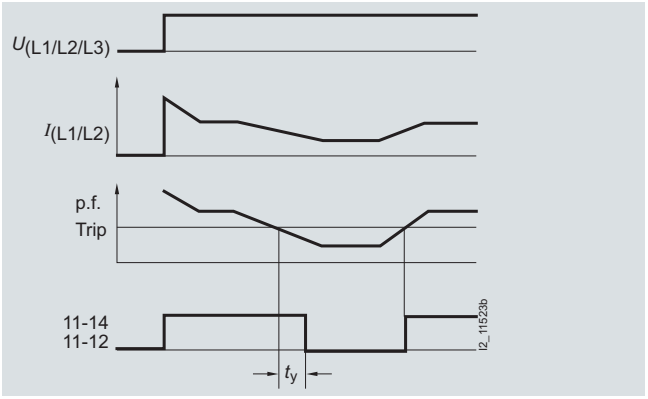
Connection of three-phase load with external current transformer, whereby the winding sense of the current transformer must be taken into account.



Connection of motors with separate windings

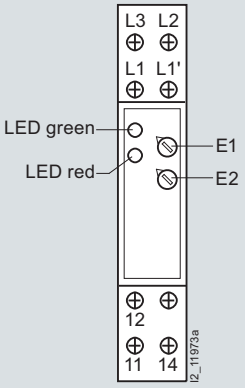
More information

Function charts



If the p.f. value set at the p.f. controller is fallen below for the duration of the set response delay, the output relay switches to the alarm state and the red LED lights up. Contact 11–14 closes and the red LED lights up.

Front view



LED green: Status display (*U*)
LED red: Underloading indicator (p.f. alarm)
E1: Response value
E2: Response delay t_y

5TT3 43 thermistor motor protection relays

Overview

Thermistor motor protection relays monitor the thermistors wound in motors. This helps prevent thermal motor overloads, e.g. due to high switching frequency, single-phasing, disabled cooling or excessive ambient temperatures. Up to 6 thermistors in series can be monitored. A conductor break in the sensor conductor will immediately trip the device. The device can also be used for monitoring wound quick-break switches – e.g. bimetal thermostats. This offers all-round motor protection.

- For the detection of
  - Temperature limits being exceeded
  - Wire breaks in sensor circuits
- 1 input for 1 to 6 thermistors
- With 2 LEDs green/red for ready-to-run and fault
- Response value: 3.2 to 3.8 kΩ
- Release value: 1.5 to 1.8 kΩ
- Max. cable length of the sensor supply cable NYM 2 × 1.5 is 100 m
- Remote Reset: over A1/A2 (NC contact) or over X1/X2 (NO contact)

LED displays:

- Green LED: lights up when operational voltage is applied
- Red LED: lights up in the event of overtemperatures or an interruption in the sensor circuit.

Benefits

- The test button for the diagnosis of the devices ensures high functional reliability for users
- The ultra compact thermistor motor protection relay requires only the smallest of spaces. This saves costs
- A remote reset enables the device to be switched back on again centrally at any time. This increases plant availability.

Technical specifications

			5TT3 431 5TT3 432
Standards			IEC 60255; DIN VDE 0435-110
Rated control voltage U_c		V AC	230
Operating range		× U_c	0.9 ... 1.1
Rated frequency		Hz	50/60
Response value		kΩ	3.2 ... 3.8
Release value		kΩ	1.5 ... 1.8
Minimum contact load		V; mA	10; 100
Rated insulation voltage U_i	Between coil/contact	kV	4
Rated impulse withstand voltage U_{imp}	Actuator/contact	kV	> 2.5
Contacts	μ contact (AC-11)	A	3
• Rated operational voltage U_e		V AC	230
• Rated operational current I_e		A	5
	Actuator/contact	mm	4
Terminals			
• Terminals	± screw (Pozidriv)		PZ 1
• Conductor cross-sections			
- Rigid	Max.	mm^2	2 × 2.5
- Flexible, with end sleeve	Min.	mm^2	1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	Acc. to EN 60068-1		20/60/4

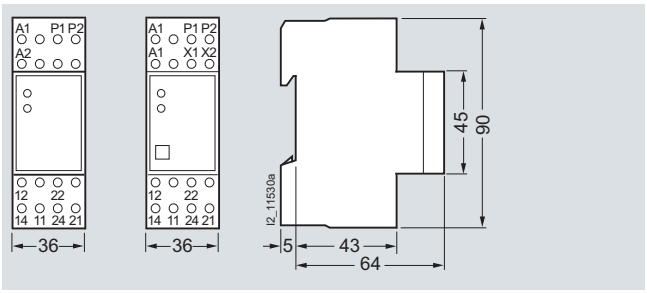
Selection and ordering data

	U_e	I_e	U_c	MW	DT	Order No.	Price per PU	PG	PU	PS*/ P. unit	Weight per PU approx.
	V AC	A AC	V AC						Unit(s)	Unit(s)	kg
	**Thermistor motor protection relays**										
	230	5	230	2	B	**5TT3 431**		027	1	1	0.160
	With fault storage, reset pushbutton and remote reset										
	230	5	230	2	B	**5TT3 432**		027	1	1	0.160

* You can order this quantity or a multiple thereof.

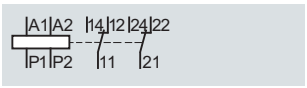
Dimensional drawings

5TT3 43 thermistor motor protection relays

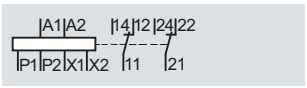


5TT3 431 5TT3 432

Schematics

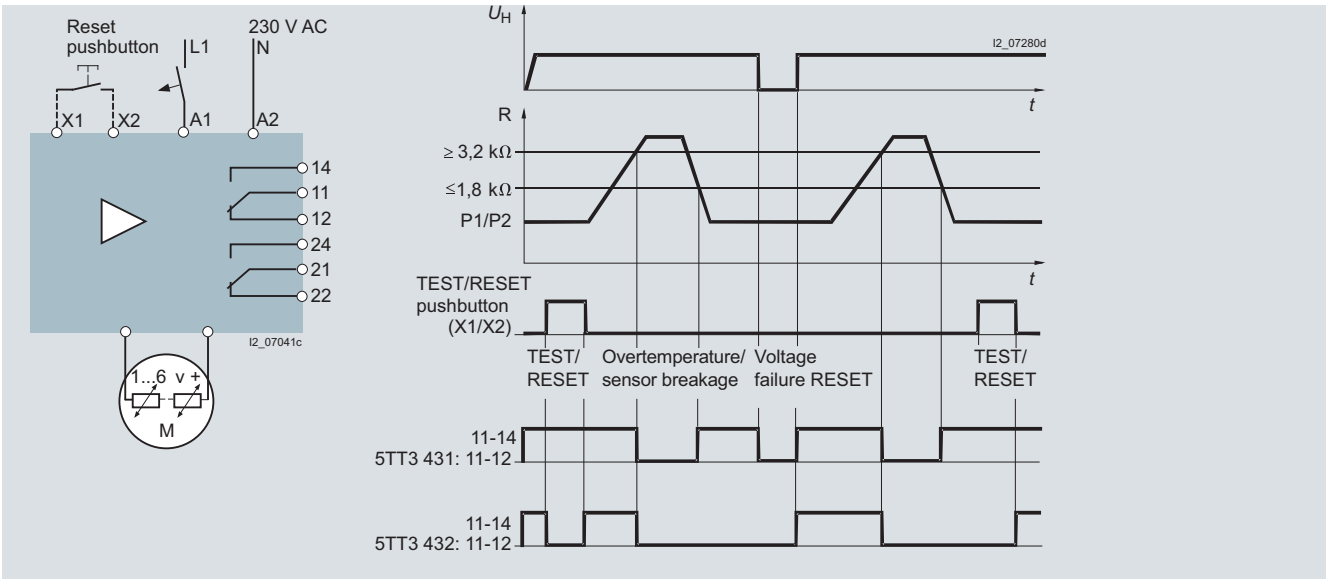


5TT3 431



5TT3 432

Switching example:
5TT3 431, 5TT3 432



If one of the thermistors (possible for up to 6) reaches the response temperature, the device switches.

5TT3 431 (without terminals X1/X2 and without Reset pushbutton) switches back on after cooling and after the value falls below the value permanently set for the hysteresis. To switch on prior to this time, briefly disconnect the power supply.

5TT3 432 stores the fault and remains switched off until the Reset pushbutton is pressed.

Notes

Appendix

15

Order information

Trademarks

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.

Ordering special designs

When ordering products that differ from the standard designs, the Order No. in the catalog must be supplemented by a **"–Z"**; the required characteristics must then be specified either by means of brief alphanumeric data or in plain text.

Ordering very small quantities

When ordering very small quantities, the cost of order processing often exceeds the order value. We therefore recommend that you combine several small orders. Where this is not possible, please note that we are obliged to make a small processing charge: for orders with a net goods value of less than € 100.– we charge a € 15.– supplement to cover our order processing and invoicing costs.

Internet

Visit us on the Internet. Our addresses are as follows:

- For Building Technologies: http://www.siemens.com/buildingtechnologies
- For Electrical Installation Technology: http://www.siemens.com/e-installation
- For the offline mall CA 01: http://www.siemens.com/automation/ca01
- For the online mall: http://www.siemens.com/automation/mall

Notes

All technical data, dimensions and weights are subject to change without notice unless otherwise specified on the pages of this catalog. All dimensions are specified in mm, the illustrations are for reference purposes only.

The technical data are for general information. The instruction manuals and the instructions on the products must be observed during assembly, operation and maintenance.

Explanations on the Selection and Ordering Data

DT (delivery time class)

LK	Meaning
►	preferred type
A	two workdays
B	one week
C	three weeks
D	six weeks
X	on request

Preferred types are device types that can be delivered immediately ex works, i.e. they are dispatched within 24 hours.

If ordered in normal quantities, the products are usually delivered within the specified delivery times, calculated from the date we receive your order.

In exceptional cases, delivery times may vary from those specified.

The delivery times are valid ex works from Siemens AG (products ready for dispatch).

Shipping times depend on the destination and the method of shipping. The standard shipping time for Germany is one day.

The delivery time classes specified in the catalog are valid as of 10/2008 and are constantly being optimized. For more up-to-the-minute information, please visit our site at: http://www.siemens.com/automation/mall.

PU (price unit)

The PU column (price unit) specifies the quantity to which the price and weight refer.

PS/P. unit (packaging size/ packaging unit)

The first digit in the PS/P. unit column (packaging size/packaging unit) indicates the minimum order quantity. You can only order this specified quantity or a multiple thereof.

The second digit in the PS/P. unit column (packaging size/packaging unit) specifies the number of units contained in larger packaging (e.g. in a carton). You must order this quantity or a multiple thereof if you want the item to be delivered in a larger packaging quantity. Examples:

PS/P. unit	Significance
1	You can order one item or a multiple thereof.
5	For example, five units are packed in a bag. Because the bags cannot be opened, you can only order a multiple of the quantity contained in the bag: 5, 10, 15, 20 etc.
5/100	One carton contains (for example) 20 bags, each containing 5 units, i.e. a total of 100 units. If only cartons are available for delivery, you need to order a multiple of the carton quantity: 100, 200, 300, etc. Ordering a quantity of 220 units, would produce the following delivery: two cartons, each containing 100 units (= 200 units) and 4 bags, each containing 5 units (= 20 units).

PG (price group)

Each product is assigned to a price group.

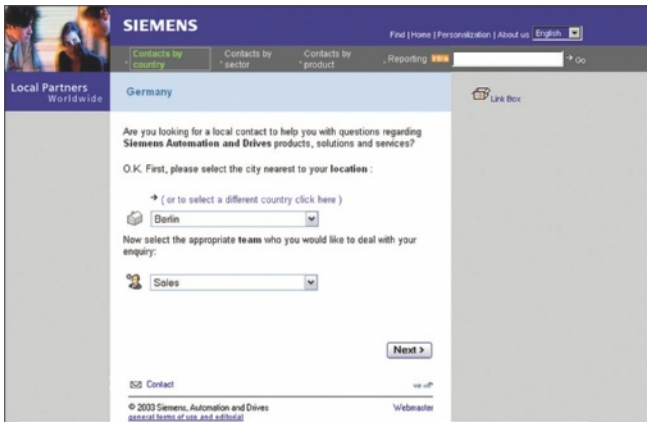
Weight

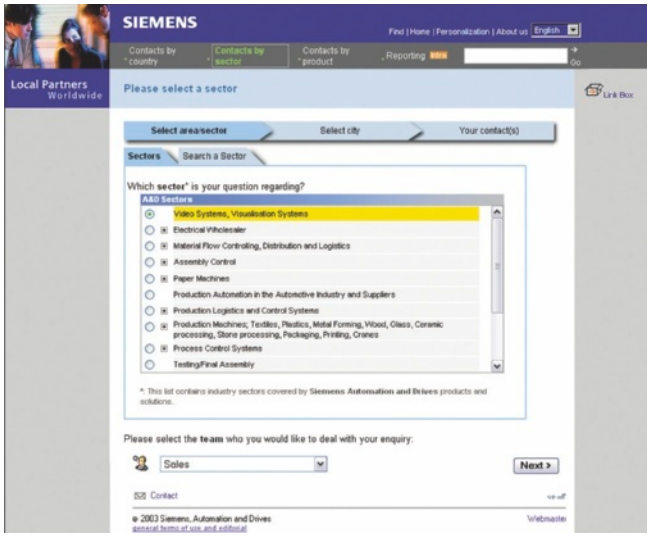
The value specified in the Weight column specifies the weight in kg for the quantity specified in the PU column (price unit).

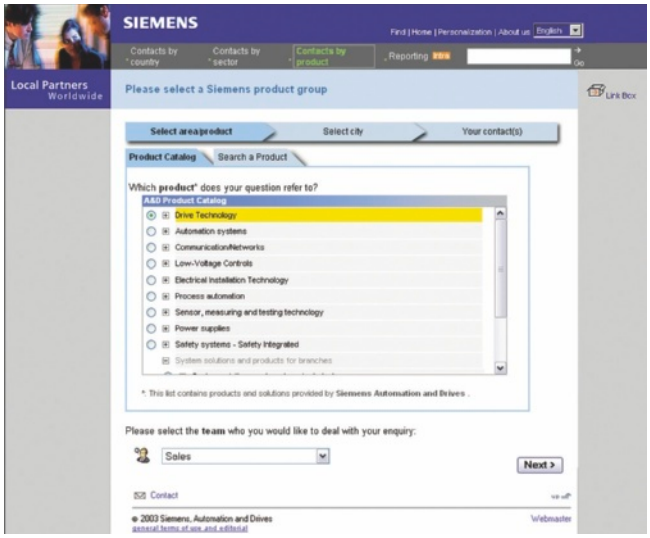
Dimensions

Unless stated otherwise, all dimensions are specified in mm.

Siemens contacts on the World Wide Web







At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner forr

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Information and ordering in the Internet and on DVD

Siemens Industry Automation and Drive Technologies in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

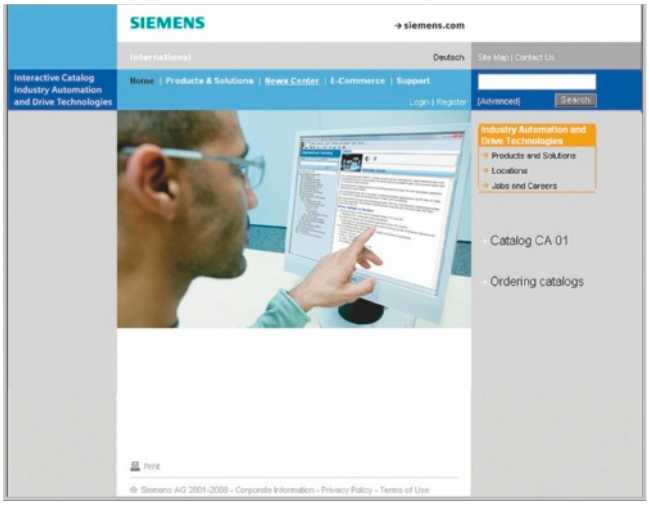
Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product selection using the Offline Mall



Detailed information together with convenient interactive functions:
The Offline Mall CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

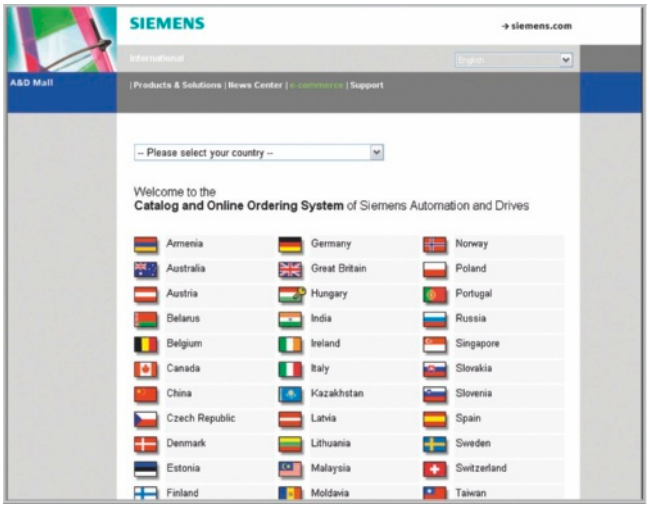
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found in the Internet under

http://www.siemens.com/automation/ca01

or on DVD.

Easy shopping with the Online Mall



The Online Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Online Mall on the Internet under:

http://www.siemens.com/automation/mall

Our services for every phase of your project

In the face of harsh competition you need optimum conditions to keep ahead all the time:
A strong starting position. A sophisticated strategy and team for the necessary support – in every phase.
Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online Support

The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

http://www.siemens.com/automation/service&support

Technical Support

Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

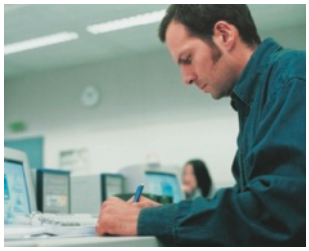
Tel.: +49 (0)180 50 50 222
Fax: +49 (0)180 50 50 223
(0.14 €/min from a German landline network, mobile telephone prices my vary)

http://www.siemens.com/automation/support-request

Technical Consulting

Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.[1)]

Configuration and Software Engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.[1)]

Service On Site

With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany
+49 (0)180 50 50 444[1)]
(0.14 €/min from a German landline network, mobile telephone prices my vary)

Repairs and Spare Parts

In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany
+49 (0)180 50 50 446[1)]
(0.14 €/min from a German landline network, mobile telephone prices my vary)

Optimization and Modernisation

To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.[1)]

[1)] For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support.

Glossary

Ambient temperature

The temperature of the air surrounding an electrical device, determined under prescribed conditions (e.g. for enclosed miniature circuit breakers; the temperature of the air outside the enclosure). The ambient temperature affects the heat dissipation, so that it may be necessary to reduce the rated current.

Apparent power

In the case of alternating current, the product of voltage and current, without taking into account the power factor p.f. The apparent power is a measurable variable. It is specified in VA (power).

Auxiliary circuit

All conductive components of a switchgear combination in a circuit (with the exception of the main circuit), that serve for control, measurement, signaling, latching, data processing, etc.

Back-up protection

Interaction of two coordinated, series-connected overcurrent protection devices at points where a device (e.g. miniature circuit breakers) cannot switch the prospective short-circuit current alone in the event of a fault. If a high short-circuit current occurs, the backup overcurrent protective device relieves the downstream device, thus prevent it from being subject to overload. Both protective devices must have sufficient switching capacity.

Body (of electrical device)

Exposed conductive component of an electrical device that is not normally live, but which may be live in the event of a fault.

Breaker mechanism

Component of a key-operated switching device that locks the switch in the ON position. The breaker mechanism includes all the mechanical parts required for switching and latching to a closed component. It also contains the release-free mechanism.

Breaking capacity

r.m.s. value of the current at a specified p.f. and specified voltage, which can still safely switch off a switching device or fuse under prescribed conditions (rated breaking capacity) In the case of alternating current, the r.m.s. value of the symmetric components applies.

Breaking current

Current in one pole of a switching device or of a fuse at the moment the arc is formed (in the case of alternating current, this is the r.m.s. value of the AC components).

Central p.f. correction

p.f. correction units are primarily used for central p.f. correction. These are assigned directly to a switchgear assembly and installed centrally.

Circuit breakers

General key-operated switching devices that switch on, control and switch off currents in circuits under normal operating conditions. Under prescribed conditions that are not normal through to short circuit, they can also switch on the current, control it for a specified interval and interrupt it.

Note:
Miniature circuit breakers are generally designed for infrequent switching, although some versions are also suitable for more frequent switching.

Circuit (electrical)

A circuit comprises all the electrical devices in an installation that are protected by the same overcurrent protective device(s).

Clearance

The shortest (thread measure) distance between two conductive components. It is decisive for the level of insulation of an electrical device.

Conductive component

Component through which current can flow, even if it is not necessarily used to carry currents during normal operation.

Contact

Component of the contact system over which the circuit is opened or closed. A distinction is made between fixed and adjustable contacts and main and auxiliary contacts.

Contactor

Switching device with only one off position, usually without mechanical lock, which is not operated manually and which, under normal conditions, can switch on, transmit, and switch off the circuit, including normal overload currents. Contactors are preferably used for high switching frequencies. A distinction is made between contactors for switching motors and auxiliary contactors for control.

Note:
A contactor can switch short-circuit currents on and off if designed for this purpose. It is not generally designed for separation. A contactor whose main contact elements are locked in the OFF position is described as a "rupteur" in French. There is no comparable term in English.

Control circuit

This is part of an auxiliary circuit and covers all components of a circuit that do not belong to the main circuit. Control circuits are circuits for:

- Signal generation and signal input,
- Signal processing, including conversion, storage, locking and amplification,
- Signal output and the control of actuators and signal transmitters.

Creepage

Current that forms on a surface that is insulating material when dry and clean, due to conductive soiling between two live components.

Creepage distance

The shortest distance the length of an insulating surface between two reference points (taking into account possible grooves) along which a current can flow (rated insulation voltage).

Current limitation

The expected peak short-circuit current, taking into account the circuit constants (R, L) does not occur, but is limited to a lower value; the let-through current. This is achieved by means of fuses or so-called current-limiting circuit breakers and instantaneous switches that switch off extremely quickly in the event of high short-circuit currents (in a couple of milliseconds).

Current limiter

Circuit breakers and miniature circuit breakers whose contactors are directly opened dynamically in the event of a short circuit without waiting for the release through the breaker mechanism. The resulting arc considerably reduces the current.

The current limitation effect is achieved by the fast opening of the contactor as the short-circuit current is rising and through the outstanding efficacy of the arc quenching device. The electric arc must be extinguished before the natural (prospective) current reaches its peak if a limiting effect is to be achieved.

DC component

The largest of the deviations from the zero line of the normal sinusoidal oscillation of the AC current. Occurs briefly, for example, in the event of a short-circuit. The DC component can be no greater than 100 % of the peak value of the symmetrical short-circuit current and in the usual low-voltage systems is usually a maximum 50 %.

Degree of pollution

A conventional classification for the degree of pollution to be expected in the micro-environment. Pollution refers to any foreign, solid, liquid or gaseous substance that might change the voltage endurance or surface resistance.

Degree of protection

The degree of protection of a device specifies the scope of protection. The scope of protection comprises the protection of persons against contact with live parts and the protection of electrical devices against the penetration of foreign bodies and water by means of enclosures and encapsulation.

The degree of protection is expressed internationally by a combination of letters (IP = International Protection) and numbers. The first number defines the degree of contact and foreign body protection, the second the water protection.

Dynamic short-circuit strength

Mechanical strength against short-circuit loads at switching devices and particularly for busbars in switchgear assemblies and distribution boards. (Short-circuit strength)

Electric arcs

Sparking that always occurs when an electrical circuit is turned on at voltages > 15 V. The strength of the arc depends on, among other things, the type and level of the load, the power factor, as well as the phase relation of the voltage curve at the instant of the contact separation. Temperatures of 10 000 °C to 15 000 °C can occur at the center of an arc, which may cause the contact material to vaporize. Because the electric arc has a direct influence on the service life of the contact, it is essential to take measures to ensure that the arc is kept small and/or that it is extinguished as quickly as possible.

Electromagnetic compatibility (EMC)

Electromagnetic compatibility (EMC) is the ability of an electrical device to function perfectly in its electromagnetic environment, i.e. without being unacceptably influenced by it or vice versa.

Encapsulation

Enclosure for the protection of electrical devices. If offers enclosed equipment protection against harmful environmental influences (degrees of protection) and protection against direct contact (protective measures).

Enclosure

Component that protects the equipment against certain external influences and which offers degree of protection of at least IP 2X against direct contact from any direction.

Equipment (electrical)

Technical products or their components insofar as their function and design serve the use of electrical energy. This includes products that generate, transmit, distribute, store, measure, monitor, control or convert electrical energy.

EVU / VNB

German abbreviation for electric utility companies, i.e. the providers of electrical energy (power stations).

Fault current (differential current)

A fault current is the current that flows due to an insulation fault. For example, it is measured as the differential between the currents flowing into the system over a measuring device and those flowing out over the same device (DIN VDE 0664).

Fault voltage

Voltage that occurs between exposed, conductive components that do not belong to the main circuit, or between these components and the earth. Persons coming into contact with faulty machines or plants who are also, for example, standing on conductive flooring, will be subjected to a partial fault voltage, the so-called touch voltage.

Function classes

These specify which current range the fuse link can switch off (operational classes).

Functional extra-low voltage

Protective measure, during which the circuits are operated with a rated voltage of up to 50 V alternating voltage or 120 V direct voltage, but which do not fulfill the requirements of safety extra-low voltage (SELV) and are therefore subject to further conditions. With functional extra-low voltages, a distinction is made between with and without safe isolation.

Fuse

Protective device that serves to open the circuit in which it is installed if the current exceeds a specified value for a prescribed duration. It does this by melting one or more fuse elements, thus interrupting the current in accordance with the respective tripping characteristic.

Note:
The fuse covers all components that are part of the complete protective device.

Fuse element

Specially shaped conductors made of copper (in special cases of silver) in the fuse body of the fuse link. It melts in the case of overloads or short circuits due to joule heat. Key features are the solder area and limiters. The solder area melts in the event of a non-permissible overload, the limiters are defined fusing points in the event of short circuits.

Fuse link

The fuse link is the part of the fuse that holds one or more fuse elements and which must be replaced after the fuse has been tripped in order to restart the device. The current interruption and all associated actions are carried out inside an enclosed melting chamber filled with quartz sand.

Ground

Designation for the conductive earth whose electrical potential is set to zero. According to DIN VDE 0100 Part 200 the word ground is the designation for the place as well as the material.

Group p.f. correction

With group p.f. correction, the correction device is assigned a load group. This may comprise motors or fluorescent lamps that are connected to the system over a common contactor or other switching devices.

Impedance (Z)

Impedance (Z) is the sum of the resistors in a circuit at the rated current. It is made up of the resistance (R) and inductive resistance/reactance ($X = \omega L$). The specified values refer to the rated frequency.

Individual p.f. correction

For individual p.f. correction, the capacitors are connected directly to the terminals of the individual loads and switched on together with these over a common switching device.

Inherently ground-fault-proof

Equipment or conducting paths are inherently earth-fault-proof when, through the application of suitable measures under prescribed operating conditions, no ground faults (short-circuits to frame) are to be expected (inherently short-circuit-proof).

Inherently short-circuit-proof

Equipment or conducting paths are inherently short-circuit-proof when, through the application of suitable measures under prescribed operating conditions, no short-circuit faults are to be expected (inherently short-circuit-proof).

Glossary

Inrush current

Current peak when switching on transformers or switching motors on and off. Caused by electromagnetic transient reactions (inrush effect) when the magnetic field is set up. The current peak can take the following values for motors at the rated voltage:

On-switching: $I_{max} = \sqrt{2}\ I_{on}$ * (1.8 to 2.0),

Star-delta time transfer: $I_{max} = \sqrt{2}\ I_{on}$ * (2.1 to 3.7),

Reversing: $I_{max} = \sqrt{2}\ I_{on}$ * (2.7 to 5.0).

With transformers, the inrush current (starting current) depends on the design, version, winding construction, application, power rating, etc. as r.m.s. value is approx. 15 to 30 times the primary rated current.

The inrush current dies down very quickly and is considerably smaller after just 20 ms.

Insulation monitoring

Measure that monitors the insulation resistance of an electrical system of a measuring device of which neither an outer conductor nor a neutral point is directly grounded. Any insulation fault that occurs is indicated or, if a second fault occurs, the electrical system may be switched off.

Insulation resistance

The smallest resistance that is measured between components that are insulated from each other – or between these and the ground.

Let-through current I_D

The largest instantaneous value of the current during the OFF time of a switching device or fuse. Limited short-circuit currents occur when the switching device, e.g. as result of resistance, operating delay and peak arc voltage, lowers the amplitude of the short-circuit current. The let-through current of a device (e.g. current-limiting miniature circuit breakers) is decisive for the thermal load (I^2t-value) of downstream devices (current limitation).

Live component

Conductive component of a device that is live under normal operating conditions. This also includes the neutral conductor (N) and conductive components that are connected to it. However, this does not apply if the neutral conductor is also the PEN conductor.

Load / current-using equipment

Devices or installations that convert electrical energy to another non-electronic energy form. In the field of alternating current technology, loads are divided into three categories:

- Resistive loads that do not cause phase displacement between current and voltage in the system, e.g. heating, incandescent lamps.
- Inductive loads that cause the current to lag behind the voltage, e.g. motors, coils, electromagnets.
- Capacitive loads that cause the current to lead the voltage, e.g. capacitors.

Loop impedance

The impedance of a fault loop is the sum of the impedances (apparent resistances) in a current loop, comprising the impedance of the power source, the impedance of the outer conductor from one pole of the power source to the measuring point and the impedance of the return conductor (e.g.protective conductor, ground electrode and ground) from the measuring point to the other pole of the power source.

Main circuit

Circuit that contains devices that generate, convert, distribute, switch and pick-up electrical energy.

Making capacity

The value of the prospective starting current, which can switch on a switching device under the prescribed conditions at a specified voltage

Melting time

The time required to melt the fuse element of a fuse link, from the start of the non-permissible overload current or short-circuit current through to the start of the interruption process.

Meshed network

The meshed network is used to distribute energy over a cable system with a network-like topology. The power is generally infed over a number of points. If a cable fails, each load is automatically fed (no need for switchover) over the remaining cable branches (radial network, ring network).

Miniature circuit breakers

Mechanical switching device that serves to manually connect or disconnect a circuit according to the mains and automatically disconnect the circuit from the mains if the current exceeds a specific maximum value.

In the event of the thermal overload of a connected load or branch, a thermally delayed release initiates the switch-off process. In the event of a short circuit, the instantaneous short-circuit release takes over disconnection. Both releases function independently of each other and protect each other. The release-free mechanism of the miniature circuit breaker ensures that the switch trips in the case of overcurrent and short circuit, even if the actuating lever is jammed in one setting or is held in place by an operator. In order to provide optimum branch protection, the miniature circuit breakers are produced with several different tripping characteristics (B, C and D).

Modular width (MW)

The width of modular devices is specified at n ($17{,}5^{+0{,}5}_{-0}$) mm, whereby n=0.5; 1.0; 1.5; 2.0; 2.5… is possible.

A modular width (MW) is 18 mm (17.5 + 0.5 mm) and the mounting width n * 18 mm, available for modular devices. e.g. distribution boards.

Neutral conductor (N)

A conductor connected to the neutral or star point of the network that is suitable for transmitting electrical energy.

N devices

Installation devices according to DIN 43830, with a mounting depth of max. 55 mm.

N distribution boards

Small distribution boards according to DIN 43871 with a small mounting depth for N devices up to 63 A.

No-load voltage U_0

Output voltage of an unloaded transformer at the rated input voltage and rated frequency.

OFF time

Duration from the start of the command output to open a switching device through to the final extinguishing of the electric arcs (ON and OFF time).

ON or OFF time

Duration from the start of the command output to switch a switching device ON or OFF until the current is flowing uniformly in all poles, or is no longer flowing.

When connecting to a short-circuit current, the time that elapses from the moment the response current of a release is reached to the time when the electric arc is extinguished in all poles.

Operational classes

Operational classes for low-voltage fuses are designated by letters, the first of which represents the function class and the second the object to be protected. The objects to be protected are specified as follows:

1. letter

a	≙ partial range protection
g	≙ full range protection

2. letter

G	Cables and lines (general applications)
M	Switching devices
R	Semiconductors
B	Mining plants
Tr	Transformers

This produces the following operational classes:

gG	Full range cable and line protection
aM	Partial range switching device protection
gR	Partial range semiconductor protection
gB	Full range mining plant protection
gTr	Full range transformer protection

Operational voltage

The voltage between two lines respectively on any equipment or system component.

Overcurrent

Every current in a circuit that exceeds the value of the rated current; overload, short-circuit current. Overcurrent can damage lines, electrical machines and devices due to unacceptably high heat generation and the possible occurrence of mechanical forces

Overload

Operating conditions that cause an overcurrent in an electrical circuit that is undisturbed and fault-free. Overload can cause damage when it is sustained over an extended period and not switched off.

Overload current

The overcurrent that occurs in a circuit that is undisturbed and fault-free.

Overvoltage $U_{ü}$

Peak value of the high-frequency transient recovery voltage; it is greater than the rated operational voltage U_e ($U_{ü} > U_e$)

Peak short-circuit current I_p

The highest instantaneous value of the prospective current after the short-circuit has occurred. It is made up of the short-circuit current and a direct current component and is specified as the peak value.

PEN conductor

Grounded neutral conductor with protective function in three-phase system.

p.f.

Power factor: The ratio of active power to apparent power in AC and three-phase systems.

p.f. correction

Measure to increase the cost-effectiveness of electrical systems. In doing so it corrects (compensates) the reactive power generated in the inductive loads during operation. In a p.f. corrected system, the current in the infeed is smaller than that of an uncorrected system. This enables the use of smaller conductor cross-sections and reduces the cross-section of the winding wires of transformers and generators. Depending on the application, a distinction is made between: Individual, group and central p.f. correction.

p.f. correction unit

This comprises capacitors that can be connected and disconnected to compensate the changing reactive power in systems.

Power

1. physical

The energy expended per time unit in Watts.

2. Electrical

The electrical energy consumed from the system by a load per time unit.

Depending on the load, the following types of power occur in an AC system:

- Active power (P)
  Part of the power that is converted to a different form of energy.
  The proportion of active power to apparent power is calculated as follows: $P\,(W) = U * I *$ p.f.
- Reactive power (Q)
  Part of the power that cannot be converted to the desired energy form. Reactive power is created as a result of induction, whereby the current and voltage curve are offset.
  The proportion of reactive power to apparent power is calculated as follows:
  $Q\,(var) = U * I * \sin \varphi$
- Apparent power (S)
  This is the power taken from the system, which is a vectorial combination of active and reactive power.
  The apparent power is calculated as follows:
  $S\,(VA) = U * I$

These three types of power are geometrically interdependent. This can be illustrated on a power chart.

The relationship between active power and apparent power is determined by the power factor (p.f.). It is expressed through a trigonometric function as the cosine of the angle φ.

Protection against direct contact

Measures to protect persons (and domestic animals) from the dangers resulting coming into contact with live components of an electrical device.

This may be full or partial protection. In the case of partial protection, protection is only given in the case of inadvertent contact.

Protection against indirect contact

Measures to protect persons (and domestic animals) from the dangers resulting from a fault when coming into contact with frames or other extraneous conductive components.

Protective conductor / PE conductor

Conductors used for some protective measures against indirect contact for the bonding connection of frames with other frames and extraneous conductive components that do not belong to the electrical installation: e.g., ground electrodes, ground conductors and grounded live components, PEN conductors of the grounded terminal of the power source or an artificial neutral point.

Protective measures

Measures for the protection of persons and animals against touch voltages, resulting from insulation faults in electrical devices.

PTC thermistor sensor

Component of the thermistor protective device that is installed in the winding of the motor to be protected or in the cast resin transformer. As the temperature rises, the PTC thermistor detector increases its resistance within a small specified temperature range by several powers of ten.

Radial network

The wiring diagram corresponds to the branches of a tree, whereby the supply comes from the trunk and there is only one route (branch) for the electrical energy to reach each load (leaf) (see also; meshed network, ring network)

Rated breaking capacity

The highest current that a switching device can switch on under certain conditions.

Glossary

Rated breaking capacity I_{en} (I_{er})

The rated breaking capacity of a miniature circuit breaker is the value of the short-circuit current that it can switch off at the rated operational voltage, rated frequency and specified power factor p.f. (or specified time constant). The value of the prospective current applies (in the case of alternating current: r.m.s. value of the AC components) as specified by the manufacturer.

Rated current I_n (I_r)

The current for which the electrical equipment is rated and to which specific characteristics refer, e.g. rated power S_n (S_r).

Rated frequency

The rated frequency is the frequency for which the electrical equipment is designed and to which the device characteristics refer.

Rated impulse withstand voltage (U_{imp})

The peak value of a surge voltage of specified form and polarity to which, under specified test conditions, the electrical equipment can be subjected without failing and to which the clearance refers.

The rated impulse withstand voltage of an electrical device must correspond to, or be greater than, the transient overvoltages that occur in the system in which the electrical equipment is installed.

Rated input voltage U_{1n} (U_{1r})

Input voltage (in the case of three-phase currents, the phase-to-phase voltage) with which a transformer can be excited at the rated frequency.

Rated insulation voltage U_i

The voltage value, which specifies the insulation resistance of the electrical equipment and accessories and to which the insulation tests and creepage distances and clearances refer.

On no account must the rated operational voltage exceed the rated insulation voltage.

Note:
In the case of electrical equipment without specified rated insulation voltage, the highest rated operational voltage should be taken as the rated insulation voltage.

Rated making capacity

The highest current that a switching device can switch on under certain conditions.

Rated making capacity I_{em}

The rated making capacity of a miniature circuit breaker is the value of the short-circuit current as specified by the manufacturer that it can switch on at the rated operational voltage, rated frequency and specified power factor p.f. φ (or specified time constant). It is expressed by the maximum peak value of the prospective current.

Rated operational current I_e

The rated operational current is the current that is determined by the specified conditions of an electrical equipment. It takes into account the rated voltage and frequency, the rated duty and the degree of protection.

Rated operational voltage U_e

The rated operational voltage of a circuit is the voltage value which, together with the rated current, determines the usability of the circuit. In the case of multiphase circuits, the voltage between the outer conductors is specified.

Rated peak withstand current I_p (peak short-circuit current)

The largest permissible instantaneous value (peak value) of the prospective short-circuit current in the most stressed conducting path. It characterizes the dynamic short-circuit strength of an electrical equipment.

Rated residual current $I_{\Delta n}$

The value specified by the manufacturer for the RCD for the residual operating current at which the RCD must switch off under prescribed conditions.

Rated short-time current

Permissible r.m.s. value of the AC components of the prospective short-circuit current, which can control the electrical equipment, e.g. a control room, for a specific length of time, e.g. from 0.05 s to 1 s (1-s current) (thermal short-circuit strength). This is specified as an r.m.s. value of the short-circuit current.

Rated switching capacity

Rated making and rated breaking capacity. The switching capacity for short-circuit currents is expressed by the prospective sustained short-circuit current at the installation site of the miniature circuit breaker. In the case of alternating current, the r.m.s. value of the symmetric components applies.

Rated voltage U_n (U_r)

The voltage of an electrical equipment to which its other characteristics refer. In the case of three-phase circuits, the phase-to-phase voltage of the system is taken as the rated voltage. For switchgear assemblies, the manufacturer must specify the voltage limits within which the problem-free function of the main and auxiliary circuits can be guaranteed. These limits must always be such that, under normal load conditions, the voltage at the terminals of the control circuits of the installed device stay within the limit values specified in the standards applicable for the respective equipment.

Reactive power

The power required to create electromagnetic fields, e.g. in electrical motors and transformers, for AC or three-phase currents. It is essential for the operation of all inductive loads but, in contrast to active power, cannot be converted to a useful form of energy. It is therefore an "unnecessary" load on cables and plants, particularly the systems of electrical supply companies.

Capacitor control units, reactive-power compensation equipment and capacitors that have to be subsequently installed provide loads with the necessary capacitive reactive power, thus compensating electromagnetic fields and relieving the energy supply.

Release (of a mechanical switching device)

A device connected to a mechanical switching device, which trips latching if the prescribed variables (e.g. current, voltage) are exceeded or fallen below, thus enabling the opening or closing of the switching device.

Response current, ground fault (g)

Ground-fault current, which, when reached or exceeded, activates and triggers the ground-fault release (g), e.g. a miniature circuit breaker.

Response current, instantaneous (n)

Current, which, when exceeded causes instantaneous tripping.

Response current, overload (a)

Continuous current, which when exceeded, causes tripping within a specified time (current-dependent delayed release!)

Response current, short-time delay (z)

Current, which when exceeded causes tripping after a user-definable delay time.

Ring network

In a ring network, several transformers supply a closed cable ring to which all loads are connected. If the ring is separated at any point, the loads are supplied from one side as in a radial network. The ring network is a type of energy supply network (meshed network).

r.m.s. value

Value, which corresponds to the r.m.s. value of a periodic quantity. Because the values in an AC system are instantaneous values that are dependent on the phase relation, current and voltage are specified in the theory of alternating currents as r.m.s. values. Measuring devices (moving coil instruments) always display the r.m.s. value. For the sine curve, the r.m.s. value = 1 / $\sqrt{2}$ * Amplitude (peak value).

The r.m.s. value of an alternating current is the same as that of a direct current, which generates the same heat (power) as the alternating current.

Safe isolation

Safe isolation is ensured when an individual fault does not cause the overspill of the voltage of one circuit according to another. This is particularly important when safety extra-low voltages (SELV) and other voltages up to 1000 V are transmitted in a single device.

Safety extra-low voltage (SELV)

Protective measure through which circuits with rated voltages up to 50 V AC voltage or 120 V DC voltage can be operated without grounding and the supply from circuits with higher voltages is safely isolated.

Selectivity

Co-ordination of series-connected overcurrent protective devices (miniature circuit breakers, fuses) for sequenced switch-off. It must switch off the overcurrent protective device closest to the point of short-circuit. The other overcurrent protective devices in the busbar run remain switched on. Selectivity minimizes the effect of a fault both spatially and time-wise.

Service life

The period that electrical equipment works problem-free under normal operating conditions. It is specified in (for example) operating hours or switching cycles. A distinction is made between mechanical and electrical service life.

The end of the electrical service life is reached, for example, when the number of operating hours are exceeded or when the switching contacts are worn out through contact erosion that reliable and safe contact can no longer be ensured.

The mechanical service life is specified by the manufacturer as the number of switching cycles without load that the device can execute without the need for servicing or the replacement of parts.

Short circuit

Connection with negligible small impedance between two conductors that are live under operating conditions. In this case, the current is a multiple of the operational current; this can cause a thermal (rated short-time current) or mechanical (peak withstand current) overloading of the electrical equipment and system components.

Short-circuit current (sustained short-circuit current I_k)

Overcurrent that occurs in an electrical circuit with negligible impedance between points with different potentials, in the event of a fault, e.g. with short-circuited terminals on electrical equipment or in the case of defective jumpering.

Short-circuits to frame

A conductive connection between the frame and live components of an electrical device due to a fault.

Short-circuit strength

Resistance of an electrical device against the electrodynamic (dynamic short-circuit strength) and thermal (thermal short-circuit strength) stress that occurs in the event of a short-circuit.

The characteristic for the dynamic stress is the peak short-circuit current as the highest instantaneous value of the short-circuit current.

The characteristic for the thermal stress of the short-circuit current is the r.m.s. value of the short-circuit current for its duration (sustained short-circuit current).

Short-circuit voltage U_{kr} (U_{kn})

Rated value of the voltage in % of the rated input voltage that needs to be applied to the input terminals of a transformer, so that if the output terminals are short-circuited, the rated output current (I_{2r}) flows, relative to 20 °C.

Starting current

The current that occurs immediately after closing a circuit, e.g. when connecting a transformer or motor. The size depends on the instant of closing (phase relation of the voltage). Maximum current flows when switching on at voltage zero; it then decreases to the rated value after approx. 20 ms.

Surge current withstand capability

The peak value of the current that a circuit or switching device can withstand in closed position under prescribed applications or corresponding use.

Switching capacity

Current that can switch a switching device on and off under prescribed conditions (making and breaking capacity).

If a switching device can switch on larger currents than it can switch off or vice versa, the specifications of the switching capacity can be separated into making and breaking capacity (short circuit, making and breaking capacity).

Switchgear combination

Combination of l.v. switching devices, designed and tested according to DIN VDE 0660 Part 500. This standard distinguishes between type-tested (TSK) and partially type-tested (PTSK) l.v. switchgear combinations.

TSK: the TSK is a switchgear combination that corresponds to the switchgear combination type-tested in accordance with the aforementioned standards without any significant deviations from the original type or system.

PTSK: the PTSK is a switchgear combination that contains both type-tested and non-type-tested components that can be shown to conform to the respective testing requirements.

Switching frequency

Switching frequency specifies how many switching cycles can be carried out with the switching device in a specified time period (e.g. in 1 h) under field conditions.

Switching operation

The result of actuating from one switching position to another and back to the original position and, where applicable, passing through all intermediate positions

Note:
This could be closing followed by opening. Actuations that do not form a switching operation are called a series of actuations.

Switch / switching device

Device for switching on or interrupting current in one or more circuits.

Temperature limit

The highest temperature that individual components of an electrical equipment can withstand continuously without suffering damage. It is reached by adding the ambient temperature and the permissible self-heating temperature for the electrical equipment. The functional safety of the device is at risk if the temperature limit is exceeded.

Temperature-rise limit

The specified maximum overtemperature for the individual components of an electrical device (temperature rise).

Temperature sensor

Semiconductor device that changes its resistance value depending on the temperature. It serves to monitor the winding temperature, e.g. in three-phase asynchronous motors (thermistor protection) and cast resin transformers.

Thermistor protection

Protection of the motor or cast resin transformer through temperature sensors fitted in the windings (PTC or NTC thermistors). These directly monitor the winding temperature.

Glossary

Time/current characteristic curve

This is the characteristic curve that specifies the virtual time for specific operating conditions (e.g. melting time or switch-off time) as a function of the prospective breaking current.

Total operating time

The time from the start of the switch off command to the end of the arcing time.

Touch voltage

The voltage that can occur between two simultaneously exposed components in the event of an insulation fault.

Trip-free mechanism

Design feature of key-operated switching devices and releases. The trip-free mechanism prevents any obstruction of the release process – even when the drive is blocked or the device is manually held in the "ON" position.

Tripping characteristic

The graphical representation of the connection between the tripping time and the influencing variable is shown in the characteristic curve. The time/current diagram shows, e.g. how long the release or tripping relay takes to respond to a specific current.

Tripping time

Current value at which a release trips within a specified time.

Types of networks and systems

Electrical networks are categorized according to voltage, configuration and topology. AC voltages are categorized according to:

- Low-voltage networks up to 1000 V,
- High-voltage networks over 1 KV to 380 kV,
- e.h.v. systems over 380 kV.

The topology of the networks are distinguished as follows:

- Open network (e.g. radial network) and
- Closed network (e.g. ring network, meshed network)

There are the following system types for low voltages:

- TN system (network)
  In the TN system, one point of the network (star point or outer conductor) is directly grounded. The frames of the electrical equipment are linked to the grounded network point over a protective or PEN conductor. The TN system is available in the following versions:
  - TN-S system (network)
    Neutral conductor (N) and protective conductor (PE) are separated throughout the network.
  - TN-C system (network)
    The neutral conductor and the protective conductor function are combined in a single conductor, the PEN conductor, throughout the network.
  - TN-C-S system (network)
    The neutral conductor and protective conductor function are combined in a single conductor, the PEN conductor, in part of the network only; in the rest of the system, the neutral and PE conductor are installed separately.
- TT system (network)
  In the TT system, one point of the network is directly grounded; the frames of the electrical equipment are linked to ground electrodes.
- IT system (network)
  The IT system has no direct connection between live conductors and grounded components: the frames of the electrical equipment are grounded.

Voltage drop U_R (V); U_R (%); ΔU (V); U (%)

The difference between the no-load voltage U_0 and the rated voltage U_{2r} of a transformer at rated power, in relation to 20 °C ambient temperature. The degree to which the voltage drop will affect the power depends on the length, cross-section and which material is used for the conductors. When covering large distances, the expected voltage drop must be taken into account.

A

B

C

D

E

F

G

H

I

L

Subject index

S

T

U

V

W

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NA3 0						
3NA3 001	3/40	B		1	3	013
3NA3 003	3/40	B		1	3	013
3NA3 005	3/40	B		1	3	013
3NA3 007	3/40	B		1	3	013
3NA3 010	3/40	B		1	3	013
3NA3 012	3/40	B		1	3	013
3NA3 014	3/40	B		1	3	013
3NA3 017	3/40	B		1	3	013
3NA3 020	3/40	B		1	3	013
3NA3 022	3/40	A		1	3	013
3NA3 024	3/40	B		1	3	013
3NA3 030	3/40	A		1	3	013
3NA3 032	3/40	A		1	3	013
3NA3 036	3/40	A		1	3	013
3NA3 1						
3NA3 105	3/40	B		1	3	013
3NA3 107	3/40	B		1	3	013
3NA3 110	3/40	B		1	3	013
3NA3 114	3/40	B		1	3	013
3NA3 117	3/40	B		1	3	013
3NA3 120	3/40	B		1	3	013
3NA3 120-6	3/43	B		1	3	013
3NA3 122	3/40	▶		1	3	013
3NA3 122-6	3/43	B		1	3	013
3NA3 124	3/40	▶		1	3	013
3NA3 124-6	3/43	B		1	3	013
3NA3 130	3/40	▶		1	3	013
3NA3 130-6	3/43	▶		1	3	013
3NA3 132	3/40	▶		1	3	013
3NA3 132-6	3/43	▶		1	3	013
3NA3 136	3/40	▶		1	3	013
3NA3 136-6	3/43	▶		1	3	013
3NA3 140	3/40	▶		1	3	013
3NA3 140-6	3/43	▶		1	3	013
3NA3 142	3/40	A		1	3	013
3NA3 144	3/40	▶		1	3	013
3NA3 2						
3NA3 214	3/41	B		1	3	013
3NA3 220	3/41	B		1	3	013
3NA3 222	3/41	A		1	3	013
3NA3 224	3/41	A		1	3	013
3NA3 224-6	3/43	B		1	3	013
3NA3 230	3/41	A		1	3	013
3NA3 230-6	3/43	B		1	3	013
3NA3 232	3/41	A		1	3	013
3NA3 232-6	3/43	B		1	3	013
3NA3 236	3/41	▶		1	3	013
3NA3 236-6	3/43	▶		1	3	013
3NA3 240	3/41	▶		1	3	013
3NA3 240-6	3/43	▶		1	3	013
3NA3 242	3/41	▶		1	3	013
3NA3 242-6	3/43	B		1	3	013
3NA3 244	3/41	▶		1	3	013
3NA3 244-6	3/43	▶		1	3	013
3NA3 250	3/41	A		1	3	013
3NA3 250-6	3/43	B		1	3	013
3NA3 252	3/41	▶		1	3	013
3NA3 252-6	3/43	▶		1	3	013
3NA3 254	3/41	▶		1	3	013
3NA3 260	3/41	▶		1	3	013
3NA3 3						
3NA3 340	3/41	B		1	3	013
3NA3 342	3/41	B		1	3	013
3NA3 344	3/41	A		1	3	013
3NA3 344-6	3/43	B		1	3	013
3NA3 350	3/41	B		1	3	013
3NA3 352	3/41	▶		1	3	013
3NA3 352-6	3/43	B		1	3	013
3NA3 354	3/41	A		1	3	013
3NA3 354-6	3/43	B		1	3	013
3NA3 360	3/41	▶		1	3	013
3NA3 360-6	3/43	▶		1	3	013
3NA3 362	3/41	A		1	3	013
3NA3 362-6	3/43	B		1	3	013
3NA3 365	3/41	▶		1	3	013
3NA3 365-6	3/43	▶		1	3	013
3NA3 372	3/41	▶		1	3	013
3NA3 4						
3NA3 472	3/41	B		1	1	013
3NA3 475	3/41	A		1	1	013
3NA3 480	3/41	A		1	1	013
3NA3 482	3/41	A		1	1	013
3NA3 6						
3NA3 665	3/41	B		1	1	013
3NA3 672	3/41	B		1	1	013
3NA3 675	3/41	A		1	1	013
3NA3 680	3/41	A		1	1	013
3NA3 682	3/41	A		1	1	013
3NA3 8						
3NA3 801	3/40	▶		1	3	013
3NA3 801-6	3/43	▶		1	3	013
3NA3 802	3/40	▶		1	3	013
3NA3 802-6	3/43	▶		1	3	013
3NA3 803	3/40	▶		1	3	013
3NA3 803-6	3/43	▶		1	3	013
3NA3 804	3/40	▶		1	3	013
3NA3 804-6	3/43	▶		1	3	013
3NA3 805	3/40	▶		1	3	013
3NA3 805-6	3/43	▶		1	3	013
3NA3 807	3/40	▶		1	3	013
3NA3 807-6	3/43	▶		1	3	013
3NA3 810	3/40	▶		1	3	013
3NA3 810-6	3/43	▶		1	3	013
3NA3 812	3/40	▶		1	3	013
3NA3 812-6	3/43	B		1	3	013
3NA3 814	3/40	▶		1	3/90	013
3NA3 814-6	3/43	▶		1	3	013
3NA3 814-7	3/40	B		1	3	013
3NA3 817	3/40	▶		1	3	013
3NA3 817-6	3/43	B		1	3	013
3NA3 820	3/40	▶		1	3/90	013
3NA3 820-6	3/43	▶		1	3	013
3NA3 820-7	3/40	B		1	3	013
3NA3 822	3/40	▶		1	3/90	013
3NA3 822-6	3/43	▶		1	3	013
3NA3 822-7	3/40	B		1	3	013
3NA3 824	3/40	▶		1	3/90	013
3NA3 824-6	3/43	▶		1	3	013
3NA3 824-7	3/40	B		1	3	013
3NA3 830	3/40	▶		1	3/90	013
3NA3 830-6	3/43	▶		1	3	013
3NA3 830-7	3/40	B		1	3	013
3NA3 832	3/40	▶		1	3	013
3NA3 832-8	3/40	▶		1	3	013
3NA3 836	3/40	▶		1	3	013
3NA3 836-8	3/40	▶		1	3	013
3NA6 1						
3NA6 105	3/39	B		1	3	013
3NA6 107	3/39	B		1	3	013

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
3NA6 110	3/39	B		1	3	013
3NA6 114	3/39	B		1	3	013
3NA6 114-4	3/38	B		1	3	013
3NA6 117	3/39	B		1	3	013
3NA6 117-4	3/38	B		1	3	013
3NA6 120	3/39	B		1	3	013
3NA6 120-4	3/38	B		1	3	013
3NA6 120-6	3/42	B		1	3	013
3NA6 122	3/39	B		1	3	013
3NA6 122-4	3/38	B		1	3	013
3NA6 122-6	3/42	B		1	3	013
3NA6 124	3/39	▶		1	3	013
3NA6 124-4	3/38	B		1	3	013
3NA6 124-6	3/42	B		1	3	013
3NA6 130	3/39	▶		1	3	013
3NA6 130-4	3/38	B		1	3	013
3NA6 130-6	3/42	B		1	3	013
3NA6 132	3/39	▶		1	3	013
3NA6 132-4	3/38	B		1	3	013
3NA6 132-6	3/42	B		1	3	013
3NA6 136	3/39	▶		1	3	013
3NA6 136-4	3/38	B		1	3	013
3NA6 136-6	3/42	B		1	3	013
3NA6 140	3/39	▶		1	3	013
3NA6 140-4	3/38	B		1	3	013
3NA6 140-6	3/42	B		1	3	013
3NA6 142	3/39	B		1	3	013
3NA6 142-4	3/38	B		1	3	013
3NA6 144	3/39	▶		1	3	013
3NA6 144-4	3/38	B		1	3	013
3NA6 2						
3NA6 214	3/39	B		1	3	013
3NA6 220	3/39	B		1	3	013
3NA6 220-4	3/38	B		1	3	013
3NA6 222	3/39	B		1	3	013
3NA6 222-4	3/38	B		1	3	013
3NA6 224	3/39	B		1	3	013
3NA6 224-4	3/38	B		1	3	013
3NA6 224-6	3/42	B		1	3	013
3NA6 230	3/39	B		1	3	013
3NA6 230-4	3/38	B		1	3	013
3NA6 230-6	3/42	B		1	3	013
3NA6 232	3/39	B		1	3	013
3NA6 232-4	3/38	B		1	3	013
3NA6 232-6	3/42	B		1	3	013
3NA6 236	3/39	▶		1	3	013
3NA6 236-4	3/38	B		1	3	013
3NA6 236-6	3/42	B		1	3	013
3NA6 240	3/39	▶		1	3	013
3NA6 240-4	3/38	B		1	3	013
3NA6 240-6	3/42	B		1	3	013
3NA6 242	3/39	B		1	3	013
3NA6 242-4	3/38	B		1	3	013
3NA6 242-6	3/42	B		1	3	013
3NA6 244	3/39	▶		1	3	013
3NA6 244-4	3/38	B		1	3	013
3NA6 244-6	3/42	B		1	3	013
3NA6 250	3/39	B		1	3	013
3NA6 250-4	3/38	B		1	3	013
3NA6 250-6	3/42	B		1	3	013
3NA6 252	3/39	▶		1	3	013
3NA6 252-4	3/38	B		1	3	013
3NA6 252-6	3/42	B		1	3	013
3NA6 254	3/39	B		1	3	013
3NA6 254-4	3/38	B		1	3	013
3NA6 260	3/39	▶		1	3	013
3NA6 260-4	3/38	B		1	3	013
3NA6 8						
3NA6 801	3/39	B		1	3	013
3NA6 801-6	3/42	B		1	3	013
3NA6 802	3/39	B		1	3	013
3NA6 802-6	3/42	B		1	3	013
3NA6 803	3/39	B		1	3	013
3NA6 803-4	3/38	B		1	3	013
3NA6 803-6	3/42	B		1	3	013
3NA6 804	3/39	B		1	3	013
3NA6 804-6	3/42	B		1	3	013
3NA6 805	3/39	▶		1	3	013
3NA6 805-4	3/38	B		1	3	013
3NA6 805-6	3/42	B		1	3	013
3NA6 807	3/39	▶		1	3	013
3NA6 807-4	3/38	B		1	3	013
3NA6 807-6	3/42	B		1	3	013
3NA6 810	3/39	▶		1	3	013
3NA6 810-4	3/38	B		1	3	013
3NA6 810-6	3/42	B		1	3	013
3NA6 812	3/39	B		1	3	013
3NA6 812-4	3/38	B		1	3	013
3NA6 812-6	3/42	B		1	3	013
3NA6 814	3/39	▶		1	3	013
3NA6 814-4	3/38	B		1	3	013
3NA6 814-6	3/42	B		1	3	013
3NA6 817	3/39	B		1	3	013
3NA6 817-4	3/38	B		1	3	013
3NA6 817-6	3/42	B		1	3	013
3NA6 820	3/39	▶		1	3	013
3NA6 820-4	3/38	B		1	3	013
3NA6 820-6	3/42	B		1	3	013
3NA6 822	3/39	▶		1	3	013
3NA6 822-4	3/38	B		1	3	013
3NA6 822-6	3/42	B		1	3	013
3NA6 824	3/39	▶		1	3	013
3NA6 824-4	3/38	B		1	3	013
3NA6 824-4KK	3/38	B		1	3	013
3NA6 824-6	3/42	B		1	3	013
3NA6 824-7	3/39	B		1	3	013
3NA6 830	3/39	▶		1	3	013
3NA6 830-4	3/38	B		1	3	013
3NA6 830-4KK	3/38	B		1	3	013
3NA6 830-6	3/42	B		1	3	013
3NA6 830-7	3/39	B		1	3	013
3NA6 832	3/39	▶		1	3	013
3NA6 832-4	3/38	B		1	3	013
3NA6 836	3/39	A		1	3	013
3NA6 836-4	3/38	B		1	3	013
3NA7 1						
3NA7 105	3/39	B		1	3	013
3NA7 107	3/39	B		1	3	013
3NA7 110	3/39	B		1	3	013
3NA7 114	3/39	B		1	3	013
3NA7 117	3/39	B		1	3	013
3NA7 120	3/39	B		1	3	013
3NA7 120-6	3/42	B		1	3	013
3NA7 122	3/39	B		1	3	013
3NA7 122-6	3/42	B		1	3	013
3NA7 124	3/39	B		1	3	013
3NA7 124-6	3/42	B		1	3	013
3NA7 130	3/39	B		1	3	013
3NA7 130-6	3/42	B		1	3	013
3NA7 132	3/39	▶		1	3	013

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NA7 132-6	3/42	B		1	3	013
3NA7 136	3/39	▶		1	3	013
3NA7 136-6	3/42	B		1	3	013
3NA7 140	3/39	▶		1	3	013
3NA7 140-6	3/42	B		1	3	013
3NA7 142	3/39	B		1	3	013
3NA7 144	3/39	▶		1	3	013
3NA7 2						
3NA7 214	3/39	B		1	3	013
3NA7 220	3/39	B		1	3	013
3NA7 222	3/39	B		1	3	013
3NA7 224	3/39	B		1	3	013
3NA7 224-6	3/42	B		1	3	013
3NA7 230	3/39	B		1	3	013
3NA7 230-6	3/42	B		1	3	013
3NA7 232	3/39	B		1	3	013
3NA7 232-6	3/42	B		1	3	013
3NA7 236	3/39	▶		1	3	013
3NA7 236-6	3/42	B		1	3	013
3NA7 240	3/39	▶		1	3	013
3NA7 240-6	3/42	B		1	3	013
3NA7 242	3/39	B		1	3	013
3NA7 242-6	3/42	B		1	3	013
3NA7 244	3/39	▶		1	3	013
3NA7 244-6	3/42	B		1	3	013
3NA7 250-6	3/42	B		1	3	013
3NA7 252	3/39	▶		1	3	013
3NA7 252-6	3/42	B		1	3	013
3NA7 260	3/39	▶		1	3	013
3NA7 8						
3NA7 801	3/39	B		1	3	013
3NA7 801-6	3/42	B		1	3	013
3NA7 802	3/39	B		1	3	013
3NA7 802-6	3/42	B		1	3	013
3NA7 803	3/39	B		1	3	013
3NA7 803-6	3/42	B		1	3	013
3NA7 804	3/39	B		1	3	013
3NA7 804-6	3/42	B		1	3	013
3NA7 805	3/39	▶		1	3	013
3NA7 805-6	3/42	B		1	3	013
3NA7 807	3/39	▶		1	3	013
3NA7 807-6	3/42	B		1	3	013
3NA7 810	3/39	▶		1	3	013
3NA7 810-6	3/42	B		1	3	013
3NA7 812	3/39	B		1	3	013
3NA7 812-6	3/42	B		1	3	013
3NA7 814	3/39	▶		1	3	013
3NA7 814-6	3/42	B		1	3	013
3NA7 817	3/39	B		1	3	013
3NA7 817-6	3/42	B		1	3	013
3NA7 820	3/39	▶		1	3	013
3NA7 820-6	3/42	B		1	3	013
3NA7 822	3/39	▶		1	3	013
3NA7 822-6	3/42	B		1	3	013
3NA7 824	3/39	▶		1	3	013
3NA7 824-6	3/42	B		1	3	013
3NA7 824-7	3/39	B		1	3	013
3NA7 830	3/39	▶		1	3	013
3NA7 830-6	3/42	B		1	3	013
3NA7 830-7	3/39	B		1	3	013
3NA7 832	3/39	▶		1	3	013
3NA7 836	3/39	▶		1	3	013
3NC1						
3NC1 000	4/19	B		1	1	047
3NC1 003	4/18	A		1	10	047

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NC1 006	4/18	▶		1	10	047
3NC1 008	4/18	B		1	10	047
3NC1 010	4/18	▶		1	10	047
3NC1 012	4/18	B		1	10	047
3NC1 016	4/18	▶		1	10	047
3NC1 020	4/18	▶		1	10	047
3NC1 025	4/18	▶		1	10	047
3NC1 032	4/18	▶		1	10	047
3NC1 038	4/19	C		1	20	047
3NC1 038-1	4/19	B		1	10	047
3NC1 038-2	4/19	C		1	8	047
3NC1 038-3	4/19	B		1	6	047
3NC1 091	4/19	▶		1	12	047
3NC1 092	4/19	▶		1	6	047
3NC1 093	4/19	▶		1	4	047
3NC1 401	4/18	B		1	10	047
3NC1 402	4/18	▶		1	10	047
3NC1 403	4/18	B		1	10	047
3NC1 404	4/18	▶		1	10	047
3NC1 405	4/18	B		1	10	047
3NC1 406	4/18	▶		1	10	047
3NC1 410	4/18	▶		1	10	047
3NC1 410-5	4/18	B		1	10	047
3NC1 415	4/18	▶		1	10	047
3NC1 415-5	4/18	B		1	10	047
3NC1 420	4/18	▶		1	10	047
3NC1 420-5	4/18	B		1	10	047
3NC1 425	4/18	▶		1	10	047
3NC1 425-5	4/18	C		1	10	047
3NC1 430	4/18	B		1	10	047
3NC1 430-5	4/18	C		1	10	047
3NC1 432	4/18	▶		1	10	047
3NC1 432-5	4/18	B		1	10	047
3NC1 440	4/18	▶		1	10	047
3NC1 440-5	4/18	B		1	10	047
3NC1 450	4/18	▶		1	10	047
3NC1 450-5	4/18	B		1	10	047
3NC1 451	4/19	B		1	20	047
3NC1 451-1	4/19	B		1	3	047
3NC1 491	4/19	▶		1	6	047
3NC1 491-5	4/19	B		1	6	047
3NC1 492	4/19	▶		1	3	047
3NC1 493	4/19	B		1	2	047
3NC2						
3NC2 200	4/18	▶		1	5	047
3NC2 200-5	4/18	B		1	5	047
3NC2 220	4/18	B		1	5	047
3NC2 220-5	4/18	C		1	10	047
3NC2 225	4/18	B		1	5	047
3NC2 225-5	4/18	C		1	5	047
3NC2 232	4/18	B		1	5	047
3NC2 232-5	4/18	B		1	5	047
3NC2 240	4/18	B		1	5	047
3NC2 240-5	4/18	B		1	5	047
3NC2 250	4/18	▶		1	5	047
3NC2 250-5	4/18	B		1	5	047
3NC2 258-1	4/19	B		1	3	047
3NC2 263	4/18	▶		1	5	047
3NC2 263-5	4/18	B		1	5	047
3NC2 280	4/18	▶		1	5	047
3NC2 280-5	4/18	B		1	5	047
3NC2 291	4/19	▶		1	1	047
3NC2 291-5	4/19	B		1	6	047
3NC2 292	4/19	▶		1	3	047
3NC2 293	4/19	B		1	2	047

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NC2 423-0C	4/4	D		1	3	047
3NC2 423-3C	4/4	B		1	3	047
3NC2 425-0C	4/4	D		1	3	047
3NC2 425-3C	4/4	B		1	3	047
3NC2 427-0C	4/4	D		1	3	047
3NC2 427-3C	4/4	B		1	3	047
3NC2 428-0C	4/4	D		1	3	047
3NC2 428-3C	4/4	B		1	3	047
3NC2 431-0C	4/4	C		1	3	047
3NC2 431-3C	4/4	B		1	3	047
3NC2 432-0C	4/4	D		1	3	047
3NC2 432-3C	4/4	B		1	3	047
3NC3						
3NC3 236-1	4/7	C		1	3	047
3NC3 236-6	4/7	C		1	3	047
3NC3 237-1	4/7	D		1	3	047
3NC3 237-6	4/7	D		1	3	047
3NC3 238-1	4/7	C		1	3	047
3NC3 238-6	4/7	C		1	3	047
3NC3 240-1	4/7	D		1	3	047
3NC3 240-6	4/7	D		1	3	047
3NC3 241-1	4/7	C		1	3	047
3NC3 241-6	4/7	C		1	3	047
3NC3 242-1	4/7	D		1	3	047
3NC3 242-6	4/7	D		1	3	047
3NC3 243-1	4/7	C		1	3	047
3NC3 243-6	4/7	C		1	3	047
3NC3 244-1	4/7	D		1	3	047
3NC3 244-6	4/7	C		1	3	047
3NC3 245-1	4/7	D		1	3	047
3NC3 245-6	4/7	C		1	3	047
3NC3 336-1	4/8	C		1	3	047
3NC3 336-6	4/9	C		1	3	047
3NC3 337-1	4/8	D		1	3	047
3NC3 337-6	4/9	D		1	3	047
3NC3 338-1	4/8	C		1	3	047
3NC3 338-6	4/9	C		1	3	047
3NC3 340-1	4/8	D		1	3	047
3NC3 340-6	4/9	D		1	3	047
3NC3 341-1	4/8	C		1	3	047
3NC3 341-6	4/9	C		1	3	047
3NC3 342-1	4/8	D		1	3	047
3NC3 342-6	4/9	D		1	3	047
3NC3 343-1	4/8	D		1	3	047
3NC3 343-6	4/9	C		1	3	047
3NC3 430-1	4/9	B		1	3	047
3NC3 430-6	4/9	B		1	3	047
3NC3 432-1	4/9	B		1	3	047
3NC3 432-6	4/9	B		1	3	047
3NC3 434-1	4/9	B		1	3	047
3NC3 434-6	4/9	B		1	3	047
3NC3 436-1	4/9	B		1	3	047
3NC3 436-6	4/9	B		1	3	047
3NC3 438-1	4/9	B		1	3	047
3NC3 438-6	4/9	B		1	3	047
3NC4						
3NC5 531	4/10	X		1	3	047
3NC5 838	4/10	D		1	3	047
3NC5 840	4/10	D		1	3	047
3NC5 841	4/10	C		1	3	047
3NC7						
3NC7 327-2	4/10	D		1	3	047
3NC7 331-2	4/10	D		1	3	047
3NC8						
3NC8 423-0C	4/5	B		1	3	047
3NC8 423-3C	4/4	B		1	3	047
3NC8 425-0C	4/5	B		1	3	047
3NC8 425-3C	4/4	B		1	3	047
3NC8 427-0C	4/5	B		1	3	047
3NC8 427-3C	4/4	B		1	3	047
3NC8 431-0C	4/5	B		1	3	047
3NC8 431-3C	4/4	B		1	3	047
3NC8 434-0C	4/5	B		1	3	047
3NC8 434-3C	4/4	B		1	3	047
3NC8 444-3C	4/4	C		1	3	047
3ND1						
3ND1 365	3/44	B		1	3	014
3ND1 372	3/44	B		1	3	014
3ND1 801	3/44	B		1	3	014
3ND1 803	3/44	B		1	3	014
3ND1 805	3/44	B		1	3	014
3ND1 807	3/44	B		1	3	014
3ND1 810	3/44	B		1	3	014
3ND1 812	3/44	B		1	3	014
3ND1 814	3/44	B		1	3	014
3ND1 817	3/44	B		1	3	014
3ND1 820	3/44	B		1	3	014
3ND1 822	3/44	B		1	3	014
3ND1 824	3/44	B		1	3	014
3ND1 830	3/44	B		1	3	014
3ND1 832	3/44	B		1	3	014
3ND1 836	3/44	B		1	3	014
3ND2						
3ND2 122	3/44	B		1	3	014
3ND2 124	3/44	B		1	3	014
3ND2 130	3/44	B		1	3	014
3ND2 132	3/44	B		1	3	014
3ND2 136	3/44	B		1	3	014
3ND2 140	3/44	B		1	3	014
3ND2 144	3/44	B		1	3	014
3ND2 232	3/44	B		1	3	014
3ND2 236	3/44	B		1	3	014
3ND2 240	3/44	B		1	3	014
3ND2 244	3/44	B		1	3	014
3ND2 252	3/44	B		1	3	014
3ND2 254	3/44	B		1	3	014
3ND2 260	3/44	A		1	3	014
3ND2 352	3/44	B		1	3	014
3ND2 354	3/44	B		1	3	014
3ND2 360	3/44	B		1	3	014
3NE1						
3NE1 020-2	4/6	A		1	3	047
3NE1 021-0	4/6	▶		1	3	047
3NE1 021-2	4/6	A		1	3	047
3NE1 022-0	4/6	▶		1	3	047
3NE1 022-2	4/6	A		1	3	047
3NE1 224-0	4/6	▶		1	3	047
3NE1 224-2	4/6	A		1	3	047
3NE1 224-3	4/4	B		1	3	047
3NE1 225-0	4/6	▶		1	3	047
3NE1 225-2	4/6	A		1	3	047
3NE1 225-3	4/4	B		1	3	047
3NE1 227-0	4/6	▶		1	3	047
3NE1 227-2	4/6	A		1	3	047
3NE1 227-3	4/4	B		1	3	047
3NE1 230-0	4/6	A		1	3	047
3NE1 230-2	4/6	A		1	3	047
3NE1 230-3	4/4	B		1	3	047
3NE1 331-0	4/6	▶		1	3	047
3NE1 331-2	4/6	A		1	3	047

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NE1 331-3	4/4	B		1	3	047
3NE1 332-0	4/6	►		1	3	047
3NE1 332-2	4/6	B		1	3	047
3NE1 332-3	4/4	B		1	3	047
3NE1 333-0	4/6	A		1	3	047
3NE1 333-2	4/6	A		1	3	047
3NE1 333-3	4/4	B		1	3	047
3NE1 334-0	4/6	A		1	3	047
3NE1 334-2	4/6	A		1	3	047
3NE1 334-3	4/4	B		1	3	047
3NE1 435-0	4/6	A		1	3	047
3NE1 435-2	4/6	A		1	3	047
3NE1 435-3	4/5	B		1	3	047
3NE1 436-0	4/6	A		1	3	047
3NE1 436-2	4/6	A		1	3	047
3NE1 436-3	4/5	B		1	3	047
3NE1 437-0	4/6	A		1	3	047
3NE1 437-1	4/4	D		1	3	047
3NE1 437-2	4/6	B		1	3	047
3NE1 437-3	4/5	B		1	3	047
3NE1 438-0	4/6	A		1	3	047
3NE1 438-1	4/4	B		1	3	047
3NE1 438-2	4/6	A		1	3	047
3NE1 438-3	4/5	B		1	3	047
3NE1 447-2	4/6	A		1	3	047
3NE1 447-3	4/5	B		1	3	047
3NE1 448-2	4/6	A		1	3	047
3NE1 448-3	4/5	B		1	3	047
3NE1 802-0	4/6	►		1	3	047
3NE1 803-0	4/6	►		1	3	047
3NE1 813-0	4/6	►		1	3	047
3NE1 814-0	4/6	►		1	3	047
3NE1 815-0	4/6	►		1	3	047
3NE1 817-0	4/6	►		1	3	047
3NE1 818-0	4/6	►		1	3	047
3NE1 820-0	4/6	►		1	3	047
3NE3						
3NE3 221	4/8	A		1	3	047
3NE3 222	4/8	A		1	3	047
3NE3 224	4/8	►		1	3	047
3NE3 225	4/8	►		1	3	047
3NE3 227	4/8	►		1	3	047
3NE3 230-0B	4/8	►		1	3	047
3NE3 231	4/8	A		1	3	047
3NE3 232-0B	4/8	A		1	3	047
3NE3 233	4/8	►		1	3	047
3NE3 332-0B	4/8	A		1	3	047
3NE3 333	4/8	A		1	3	047
3NE3 334-0B	4/8	►		1	3	047
3NE3 335	4/8	►		1	3	047
3NE3 336	4/8	►		1	3	047
3NE3 337-8	4/8	►		1	3	047
3NE3 338-8	4/8	►		1	3	047
3NE3 340-8	4/8	►		1	3	047
3NE3 421-0C	4/8	D		1	3	047
3NE3 430-0C	4/8	B		1	3	047
3NE3 432-0C	4/8	B		1	3	047
3NE3 434-0C	4/8	B		1	3	047
3NE3 525-5	4/10	D		1	2	047
3NE3 535-5	4/10	D		1	2	047
3NE3 626-0C	4/8	B		1	3	047
3NE3 635-0C	4/8	B		1	3	047
3NE3 635-6	4/8	D		1	3	047
3NE3 636-0C	4/8	D		1	3	047
3NE3 637-0C	4/8	D		1	3	047
3NE3 637-1C	4/8	D		1	3	047
3NE4						
3NE4 101	4/7	►		1	3	047
3NE4 102	4/7	►		1	3	047
3NE4 117	4/7	►		1	3	047
3NE4 117-5	4/10	C		1	2	047
3NE4 118	4/7	►		1	3	047
3NE4 120	4/7	►		1	3	047
3NE4 121	4/7	►		1	3	047
3NE4 121-5	4/10	B		1	2	047
3NE4 122	4/7	►		1	3	047
3NE4 124	4/7	►		1	3	047
3NE4 146-5	4/10	B		1	2	047
3NE4 327-0B	4/7	►		1	3	047
3NE4 327-6B	4/10	►		1	3	047
3NE4 330-0B	4/7	►		1	3	047
3NE4 330-6B	4/10	►		1	3	047
3NE4 333-0B	4/7	►		1	3	047
3NE4 333-6B	4/10	►		1	3	047
3NE4 334-0B	4/7	►		1	3	047
3NE4 334-6B	4/10	►		1	3	047
3NE4 337	4/7	►		1	3	047
3NE4 337-6	4/10	►		1	3	047
3NE5						
3NE5 424-0C	4/9	D		1	2	047
3NE5 426-0C	4/9	C		1	2	047
3NE5 430-0C	4/9	D		1	2	047
3NE5 431-0C	4/9	D		1	2	047
3NE5 433-0C	4/9	D		1	2	047
3NE5 433-1C	4/9	D		1	2	047
3NE5 627-0C	4/9	D		1	3	047
3NE5 633-0C	4/9	B		1	3	047
3NE5 643-0C	4/9	D		1	3	047
3NE6						
3NE6 437	4/10	D		1	3	047
3NE6 437-7	4/10	D		1	3	047
3NE6 444	4/10	C		1	3	047
3NE7						
3NE7 425-0C	4/9	D		1	2	047
3NE7 427-0C	4/9	D		1	2	047
3NE7 431-0C	4/9	D		1	2	047
3NE7 432-0C	4/9	D		1	2	047
3NE7 633-0C	4/9	D		1	2	047
3NE7 633-1C	4/9	C		1	2	047
3NE7 636-0C	4/9	D		1	2	047
3NE7 636-1C	4/9	C		1	1	047
3NE7 637-1C	4/9	B		1	2	047
3NE7 648-1C	4/9	D		1	2	047
3NE8						
3NE8 003-1	4/7	►		1	3	047
3NE8 015-1	4/7	►		1	3	047
3NE8 017-1	4/7	►		1	3	047
3NE8 018-1	4/7	►		1	3	047
3NE8 020-1	4/7	►		1	3	047
3NE8 021-1	4/7	►		1	3	047
3NE8 022-1	4/7	►		1	3	047
3NE8 024-1	4/7	►		1	3	047
3NE8 701-1	4/5	A		1	10	047
3NE8 702-1	4/5	A		1	10	047
3NE8 714-1	4/5	B		1	10	047
3NE8 715-1	4/5	B		1	10	047
3NE8 717-1	4/5	A		1	10	047
3NE8 718-1	4/5	A		1	10	047
3NE8 720-1	4/5	►		1	10	047
3NE8 721-1	4/5	►		1	10	047

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NE8 722-1	4/5	▶		1	10	047
3NE8 724-1	4/5	▶		1	10	047
3NE8 725-1	4/5	▶		1	10	047
3NE8 727-1	4/5	▶		1	10	047
3NE8 731-1	4/5	▶		1	10	047
3NE9						
3NE9 440-6	4/10	D		1	3	047
3NE9 450	4/10	D		1	3	047
3NE9 450-7	4/10	D		1	3	047
3NE9 632-1C	4/10	D		1	1	047
3NE9 634-1C	4/10	D		1	1	047
3NE9 636-1C	4/10	D		1	1	047
3NG1						
3NG1 002	3/54	▶		1	3/30	014
3NG1 102	3/54	C		1	1/10	014
3NG1 202	3/54	▶		1	1/10	014
3NG1 302	3/54	▶		1	1/5	014
3NG1 402	3/54	▶		1	1/5	014
3NG1 503	3/54	B		1	6	014
3NG1 505	3/54	B		1	1/5	014
3NH3						
3NH3 030	3/51	▶		1	3	014
3NH3 031	3/51	B		1	3	014
3NH3 032	3/51	▶		1	3	014
3NH3 035	3/51	B		1	3	014
3NH3 036	3/52	B		1	1	014
3NH3 037	3/52	B		1	1	014
3NH3 038	3/51	B		1	3	014
3NH3 050	3/51	B		1	3	014
3NH3 051	3/51	▶		1	1/10	014
3NH3 052	3/51	▶		1	1/10	014
3NH3 053	3/51	▶		1	1/10	014
3NH3 120	3/51	A		1	3	014
3NH3 122	3/51	B		1	3	014
3NH3 220	3/51	B		1	3	014
3NH3 230	3/51	▶		1	3	014
3NH3 320	3/51	A		1	1	014
3NH3 330	3/51	▶		1	1	014
3NH3 420	3/51	A		1	1	014
3NH3 430	3/51	▶		1	1	014
3NH3 530	3/52	A		1	1	014
3NH4						
3NH4 030	3/51	▶		1	1	014
3NH4 031	3/51	B		1	1	014
3NH4 032	3/51	B		1	1	014
3NH4 035	3/51	B		1	1	014
3NH4 037	3/52	B		1	1	014
3NH4 045	3/52	B		1	1	014
3NH4 052	5/13	A		1	4	014
3NH4 230	3/51	A		1	1	014
3NH7						
3NH7 030	3/52	A		1	1	014
3NH7 031	3/52	B		1	1	014
3NH7 032	3/52	B		1	1	014
3NH7 230	3/52	A		1	1	014
3NH7 231	3/52	B		1	1	014
3NH7 232	3/52	B		1	1	014
3NH7 330	3/52	B		1	1	014
3NH7 331	3/52	B		1	1	014
3NH7 332	3/52	B		1	1	014
3NH7 520	3/53	A		1	1	014
3NP40 1						
3NP40 10-0CH01	3/68	▶		1	1	103
3NP40 15-0CJ01	3/68	A		1	1	103
3NP40 15-0CK01	3/68	A		1	1	103
3NP40 15-1CJ01	3/69	B		1	1	103
3NP40 15-1CK01	3/69	A		1	1	103
3NP40 16-1CJ01	3/69, 5/13	▶		1	1	103
3NP40 16-1CK01	3/69, 5/13	A		1	1	103
3NP40 7						
3NP40 70-0CA01	3/68	▶		1	1	103
3NP40 70-0CH01	3/68	▶		1	1	103
3NP40 70-0FA01	3/70	A		1	1	103
3NP40 70-0FH01	3/70	A		1	1	103
3NP40 75-0CE01	3/68	A		1	1	103
3NP40 75-0CF01	3/68	A		1	1	103
3NP40 75-0CJ01	3/68	A		1	1	103
3NP40 75-0CK01	3/68	A		1	1	103
3NP40 75-0FE01	3/71	B		1	1	103
3NP40 75-0FF01	3/71	B		1	1	103
3NP40 75-0FJ01	3/71	B		1	1	103
3NP40 75-0FK01	3/71	B		1	1	103
3NP40 75-1CE01	3/69	A		1	1	103
3NP40 75-1CF01	3/69	A		1	1	103
3NP40 75-1CJ01	3/69	A		1	1	103
3NP40 75-1CK01	3/69	A		1	1	103
3NP40 75-1FE01	3/71	B		1	1	103
3NP40 75-1FF01	3/71	B		1	1	103
3NP40 75-1FJ01	3/71	B		1	1	103
3NP40 75-1FK01	3/71	B		1	1	103
3NP40 76-1CE01	3/70, 5/13	A		1	1	103
3NP40 76-1CF01	3/70, 5/13	▶		1	1	103
3NP40 76-1CJ01	3/70, 5/13	▶		1	1	103
3NP40 76-1CK01	3/70, 5/13	B		1	1	103
3NP40 76-1FE01	3/72	B		1	1	103
3NP40 76-1FF01	3/72	A		1	1	103
3NP40 76-1FJ01	3/72	B		1	1	103
3NP40 76-1FK01	3/72	B		1	1	103
3NP42						
3NP42 70-0CA01	3/68	▶		1	1	103
3NP42 70-0FA01	3/70	A		1	1	103
3NP42 75-1CG01	3/69	A		1	1	103
3NP42 75-1FG01	3/71	A		1	1	103
3NP42 76-1CG01	3/70, 5/13	▶		1	1	103
3NP42 76-1FG01	3/72	A		1	1	103
3NP43						
3NP43 70-0CA01	3/68	▶		1	1	103
3NP43 70-0FA01	3/70	A		1	1	103
3NP43 76-1CG01	3/70, 5/13	▶		1	1	103
3NP43 76-1FG01	3/72	A		1	1	103
3NP44						
3NP44 70-0CA01	3/68	▶		1	1	103
3NP44 70-0FA01	3/70	A		1	1	103
3NP44 76-1CG01	3/70, 5/13	▶		1	1	103
3NP44 76-1FG01	3/72	A		1	1	103
3NP50						
3NP50 60-0CA00	3/73	▶		1	1	103
3NP50 60-0CA10	3/73	B		1	1	103
3NP50 60-0CB00	3/73	A		1	1	103
3NP50 60-0CB10	3/73	B		1	1	103
3NP50 60-0EA26	3/74	B		1	1	103
3NP50 60-0EA86	3/74	▶		1	1	103
3NP50 60-0EB26	3/74	B		1	1	103
3NP50 60-0EB86	3/74	B		1	1	103
3NP50 60-0HA13	3/75	B		1	1	103
3NP50 60-0HB13	3/75	B		1	1	103
3NP50 65-1CF00	3/73	C		1	1	103
3NP50 65-1CF10	3/73	B		1	1	103
3NP50 65-1CG00	3/73	B		1	1	103
3NP50 65-1CG10	3/73	B		1	1	103

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NP50 65-1EF26	3/74	B		1	1	103
3NP50 65-1EF86	3/74	A		1	1	103
3NP50 65-1EG26	3/74	C		1	1	103
3NP50 65-1EG86	3/74	B		1	1	103
3NP50 65-1HF13	3/76	B		1	1	103
3NP52						
3NP52 60-0CA00	3/73	▶		1	1	103
3NP52 60-0CA10	3/73	A		1	1	103
3NP52 60-0CB00	3/73	C		1	1	103
3NP52 60-0CB10	3/73	B		1	1	103
3NP52 60-0EA26	3/74	B		1	1	103
3NP52 60-0EA86	3/74	▶		1	1	103
3NP52 60-0EB26	3/74	B		1	1	103
3NP52 60-0EB86	3/74	B		1	1	103
3NP52 60-0HA13	3/75	B		1	1	103
3NP53						
3NP53 60-0CA00	3/73	▶		1	1	103
3NP53 60-0CA10	3/73	A		1	1	103
3NP53 60-0EA26	3/74	B		1	1	103
3NP53 60-0EA86	3/74	▶		1	1	103
3NP53 60-0HA13	3/75	B		1	1	103
3NP54						
3NP54 60-0CA00	3/73	▶		1	1	103
3NP54 60-0CA10	3/73	B		1	1	103
3NP54 60-0EA26	3/74	B		1	1	103
3NP54 60-0EA86	3/74	▶		1	1	103
3NP54 60-0HA13	3/75	B		1	1	103
3NW1						
3NW1 006-0HG	3/29	C		1	10	018
3NW1 008-0HG	3/29	C		1	10	018
3NW1 010-0HG	3/29	C		1	10	018
3NW1 015-0HG	3/29	C		1	10	018
3NW1 020-0HG	3/29	C		1	10	018
3NW1 030-0HG	3/29	C		1	10	018
3NW1 040-0HG	3/29	C		1	10	018
3NW1 050-0HG	3/29	C		1	10	018
3NW1 060-0HG	3/29	C		1	10	018
3NW1 080-0HG	3/29	C		1	10	018
3NW1 100-0HG	3/29	C		1	10	018
3NW1 150-0HG	3/29	C		1	10	018
3NW1 200-0HG	3/29	C		1	10	018
3NW1 250-0HG	3/29	C		1	10	018
3NW1 300-0HG	3/29	C		1	10	018
3NW2						
3NW2 010-0HG	3/29	C		1	10	018
3NW2 020-0HG	3/29	C		1	10	018
3NW2 030-0HG	3/29	C		1	10	018
3NW2 040-0HG	3/29	C		1	10	018
3NW2 050-0HG	3/29	C		1	10	018
3NW2 060-0HG	3/29	C		1	10	018
3NW2 080-0HG	3/29	C		1	10	018
3NW2 100-0HG	3/29	C		1	10	018
3NW2 120-0HG	3/29	C		1	10	018
3NW2 150-0HG	3/29	C		1	10	018
3NW2 200-0HG	3/29	C		1	10	018
3NW2 250-0HG	3/29	C		1	10	018
3NW3						
3NW3 010-0HG	3/29	C		1	10	018
3NW3 020-0HG	3/29	C		1	10	018
3NW3 030-0HG	3/29	C		1	10	018
3NW3 040-0HG	3/29	C		1	10	018
3NW3 050-0HG	3/29	C		1	10	018
3NW3 060-0HG	3/29	C		1	10	018
3NW3 080-0HG	3/29	C		1	10	018
3NW3 100-0HG	3/29	C		1	10	018
3NW3 120-0HG	3/29	C		1	10	018
3NW3 150-0HG	3/29	C		1	10	018
3NW3 200-0HG	3/29	C		1	10	018
3NW3 250-0HG	3/29	C		1	10	018
3NW3 300-0HG	3/29	C		1	10	018
3NW6						
3NW6 001-1	3/24	▶		1	10	018
3NW6 002-1	3/24	▶		1	10	018
3NW6 003-1	3/24	▶		1	10	018
3NW6 004-1	3/24	▶		1	10	018
3NW6 005-1	3/24	▶		1	10	018
3NW6 006-1	3/24	B		1	10/100	018
3NW6 007-1	3/24	B		1	10	018
3NW6 008-1	3/24	B		1	10	018
3NW6 010-1	3/24	B		1	10	018
3NW6 012-1	3/24	B		1	10	018
3NW6 101-1	3/24	B		1	10	018
3NW6 103-1	3/24	B		1	10	018
3NW6 104-1	3/24	B		1	10	018
3NW6 105-1	3/24	B		1	10	018
3NW6 106-1	3/24	B		1	10/100	018
3NW6 107-1	3/24	B		1	10	018
3NW6 108-1	3/24	B		1	10/100	018
3NW6 110-1	3/24	B		1	10	018
3NW6 112-1	3/24	B		1	10	018
3NW6 117-1	3/24	B		1	10	018
3NW6 120-1	3/24	B		1	10	018
3NW6 203-1	3/24	B		1	10/100	018
3NW6 205-1	3/24	B		1	10	018
3NW6 206-1	3/24	B		1	10/100	018
3NW6 207-1	3/24	B		1	10	018
3NW6 208-1	3/24	B		1	10/100	018
3NW6 210-1	3/24	B		1	10	018
3NW6 212-1	3/24	B		1	10	018
3NW6 217-1	3/24	B		1	10	018
3NW6 220-1	3/24	B		1	10	018
3NW6 222-1	3/24	B		1	10	018
3NW6 224-1	3/24	B		1	10	018
3NW6 230-1	3/24	B		1	10	018
3NW6 301-1	3/24	B		1	10	018
3NW6 302-1	3/24	B		1	10	018
3NW6 303-1	3/24	B		1	10	018
3NW6 304-1	3/24	B		1	10	018
3NW6 305-1	3/24	B		1	10	018
3NW6 307-1	3/24	B		1	10	018
3NW7						
3NW7 013	3/25	▶		1	1/12	018
3NW7 014	3/25	A		1	1	018
3NW7 023	3/25	▶		1	1/6	018
3NW7 024	3/25	A		1	1	018
3NW7 033	3/26	▶		1	1/4	018
3NW7 034	3/25	A		1	1	018
3NW7 053	3/25	▶		1	1	018
3NW7 054	3/25	A		1	1	018
3NW7 063	3/26	▶		1	1	018
3NW7 064	3/25	A		1	1	018
3NW7 111	3/25	▶		1	1	018
3NW7 112	3/25	B		1	1	018
3NW7 121	3/25	▶		1	1	018
3NW7 122	3/25	B		1	1	018
3NW7 131	3/26	▶		1	1	018
3NW7 132	3/25	B		1	1	018
3NW7 151	3/25	B		1	1	018
3NW7 152	3/25	B		1	1	018
3NW7 161	3/26	A		1	1	018

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NW7 162	3/25	B		1	1	018
3NW7 211	3/25	▶		1	1	018
3NW7 212	3/25	B		1	1	018
3NW7 221	3/25	▶		1	1	018
3NW7 222	3/25	B		1	1	018
3NW7 231	3/26	▶		1	1	018
3NW7 232	3/25	B		1	1	018
3NW7 251	3/25	B		1	1	018
3NW7 252	3/25	B		1	1	018
3NW7 261	3/26	A		1	1	018
3NW7 262	3/25	B		1	1	018
3NW7 313	3/25	A		1	1	018
3NW7 314	3/25	C		1	1	018
3NW7 323	3/25	A		1	1	018
3NW7 324	3/25	C		1	1	018
3NW7 333	3/26	A		1	1	018
3NW7 334	3/25	C		1	1	018
3NW7 353	3/25	A		1	1	018
3NW7 354	3/25	C		1	1	018
3NW7 363	3/26	A		1	1	018
3NW7 364	3/25	C		1	1	018
3NW7 430	5/12	A		1	1/40	018
3NW7 431	5/12	A		1	1	018
3NW7 431-0HG	5/12	A		1	1	018
3NW7 432-0HG	5/12	A		1	1	018
3NW7 513-0HG	3/28	C		1	12	018
3NW7 523-0HG	3/28	C		1	6	018
3NW7 533-0HG	3/28	C		1	4	018
3NW7 901	3/26	B		1	1	018
3NW7 902	3/26	B		1	1	018
3NW7 903	3/26	B		1	1	018
3NW8						
3NW8 000-1	3/24	B		1	10	018
3NW8 001-1	3/24	B		1	10	018
3NW8 002-1	3/24	B		1	10	018
3NW8 003-1	3/24	A		1	10	018
3NW8 004-1	3/24	B		1	10	018
3NW8 005-1	3/24	B		1	10	018
3NW8 006-1	3/24	B		1	10/100	018
3NW8 007-1	3/24	B		1	10	018
3NW8 008-1	3/24	B		1	10	018
3NW8 010-1	3/24	B		1	10	018
3NW8 011-1	3/24	B		1	10	018
3NW8 101-1	3/24	B		1	10/50	018
3NW8 102-1	3/24	B		1	10/50	018
3NW8 103-1	3/24	B		1	10	018
3NW8 104-1	3/24	B		1	10	018
3NW8 105-1	3/24	B		1	10	018
3NW8 106-1	3/24	B		1	10/50	018
3NW8 107-1	3/24	B		1	10	018
3NW8 108-1	3/24	B		1	10/50	018
3NW8 110-1	3/24	B		1	10	018
3NW8 112-1	3/24	B		1	10	018
3NW8 117-1	3/24	B		1	10	018
3NW8 120-1	3/24	B		1	10	018
3NW8 203-1	3/25	B		1	10/50	018
3NW8 205-1	3/25	B		1	10/50	018
3NW8 206-1	3/25	B		1	10/50	018
3NW8 207-1	3/25	B		1	10	018
3NW8 210-1	3/25	B		1	10	018
3NW8 212-1	3/25	B		1	10	018
3NW8 217-1	3/25	B		1	10	018
3NW8 220-1	3/25	B		1	10	018
3NW8 222-1	3/25	B		1	10	018
3NW8 224-1	3/25	B		1	10	018
3NW8 230-1	3/25	B		1	10	018
3NX1						
3NX1 003	3/54	C		1	3	014
3NX1 004	3/54	C		1	3	014
3NX1 013	3/54	▶		1	1	014
3NX1 014	3/54	▶		1	1	014
3NX1 021	3/47	A		1	1	014
3NX1 022	3/47	A		1	3	014
3NX1 023	3/47	C		1	3	014
3NX1 024	3/47	▶		1	1	014
3NX2						
3NX2 023	3/53	▶		1	2	014
3NX2 024	3/53	▶		1	2	014
3NX2 025	3/53	▶		1	2	014
3NX2 026	3/53	▶		1	2	014
3NX2 027	3/53	C		1	2	014
3NX2 028	3/53	C		1	2/50	014
3NX2 030	3/53	B		1	2	014
3NX2 031	3/54	C		1	2/30	014
3NX3						
3NX3 105	3/53	▶		1	2/20	014
3NX3 106	3/53	▶		1	2/20	014
3NX3 107	3/53	▶		1	2/12	014
3NX3 108	3/53	▶		1	2/10	014
3NX3 113	3/53	B		1	2/50	014
3NX3 114	3/53	B		1	2/40	014
3NX3 115	3/53	B		1	10	014
3NX3 116	3/53	B		1	10	014
3NY1						
3NY1 074	3/80	B		1	1	103
3NY1 102	3/81	A		1	1	103
3NY1 103	3/81	A		1	1	103
3NY1 104	3/81	A		1	1	103
3NY1 105	3/81	A		1	1/400	103
3NY1 106	3/81	A		1	1/225	103
3NY1 107	3/81	A		1	1	103
3NY1 108	3/81	A		1	1/200	103
3NY1 115	3/81	A		1	1/400	103
3NY1 116	3/81	A		1	1/225	103
3NY1 125	3/81	A		1	1	103
3NY1 208	3/81	B		1	1	103
3NY1 210	3/81	B		1	1	103
3NY1 211	3/81	B		1	1	103
3NY1 212	3/81	B		1	1	103
3NY1 236	3/77	A		1	1	103
3NY1 237	3/77	A		1	1	103
3NY1 238	3/77	A		1	1	103
3NY1 241	3/82	A		1	1	103
3NY1 245	3/82	B		1	1	103
3NY1 247	3/79	A		1	1	103
3NY1 248	3/78, 3/79	A		1	1	103
3NY1 250	3/79	A		1	1	103
3NY1 251	3/78	A		1	1	103
3NY1 253	3/79	B		1	1	103
3NY1 254	3/79	B		1	1	103
3NY1 255	3/79	A		1	1	103
3NY1 256	3/79	A		1	1	103
3NY1 257	3/79	A		1	1	103
3NY1 258	3/78, 3/79	A		1	1	103
3NY1 260	3/78, 3/79	A		1	1	103
3NY1 261	3/78, 3/79	A		1	1	103
3NY1 262	3/78	A		1	1	103
3NY1 263	3/77	A		1	1	103
3NY1 264	3/78	A		1	1	103
3NY1 265	3/77	A		1	1	103

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
3NY1 270	3/79	B		1	1	103
3NY1 271	3/79	C		1	1	103
3NY1 371	3/80	B		1	1	103
3NY1 372	3/80	B		1	1	103
3NY1 373	3/80	B		1	1	103
3NY1 420	3/80	B		1	1	103
3NY1 421	3/80	B		1	1	103
3NY1 422	3/80	B		1	1	103
3NY1 423	3/80	B		1	1	103
3NY1 438	3/77	A		1	1	103
3NY1 513-0	3/80	B		1	1	103
3NY1 513-2	3/80	C		1	1	103
3NY1 513-3	3/80	B		1	1	103
3NY1 513-4	3/80	C		1	1	103
3NY1 822	3/77	A		1	3	013
3NY1 824	3/77	B		1	3	013
3NY1 903	3/82	B		1	1	103
3NY1 907	3/82	B		1	1	103
3NY1 910	3/77, 3/80	B		1	1	103
3NY1 911	3/77, 3/80	B		1	1	103
3NY1 915	3/80	B		1	1	103
3NY1 940	3/82	B		1	1	103
3NY1 995	3/76	B		1	1/200	103
3NY3						
3NY3 030	3/77	B		1	1	103
3NY3 033	3/80	B		1	1	103
3NY3 034	3/80	B		1	1	103
3NY3 035	3/77	▶		1	1	103
3NY4						
3NY4 011	3/81	B		1	1	103
3NY4 012	3/81	B		1	1	103
3NY4 031	3/81	B		1	1	103
3NY7						
3NY7 001	3/77	B		1	1	103
3NY7 003	3/77	B		1	1	103
3NY7 101	3/76	▶		1	1	103
3NY7 102	3/76	A		1	1	103
3NY7 105	3/76	B		1	1	103
3NY7 120	3/76	A		1	1	103
3NY7 121	3/76	▶		1	1	103
3NY7 130	3/76	A		1	1	103
3NY7 131	3/76	▶		1	1	103
3NY7 140	3/76	A		1	1	103
3NY7 141	3/76	▶		1	1	103
3NY7 200	3/78	▶		1	1	103
3NY7 201	3/78	▶		1	1	103
3NY7 220	3/78	▶		1	1	103
3NY7 230	3/78, 3/80	A		1	1	103
3NY7 240	3/78, 3/80	A		1	1	103
3NY7 322	3/76	B		1	1	103
3NY7 381	3/77	A		1	1	103
3NY7 481	3/77	A		1	1	103
3NY7 482	3/77	A		1	10	103
3NY7 500	3/78, 3/80	A		1	1	103
3NY7 501	3/78, 3/80	A		1	1	103
3NY7 502	3/78, 3/80	A		1	1	103
3NY7 600	3/78, 5/13	B		1	1	103
3NY7 601	3/78	B		1	1	103
3NY7 800	3/80	B		1	1	103
3NY7 801	3/80	B		1	1	103
3NY7 802	3/80	B		1	1	103
3NY7 820	3/78, 3/80	A		1	1	103
3TX6						
3TX6 546-3B	3/82	B		1	1	101

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
4AC2						
4AC2 400	10/9	A		1	1	027
4AC2 401	10/9	A		1	1	027
4AC2 402	10/9, 14/5	B		1	1	027
4AC3						
4AC3 006	10/4	B		1	1	027
4AC3 008	10/4	A		1	1	027
4AC3 016	10/4	B		1	1	027
4AC3 108	10/4	▶		1	1	027
4AC3 116	10/4	A		1	1	027
4AC3 140	10/4	A		1	1	027
4AC3 408	10/6	A		1	1	027
4AC3 516	10/6	B		1	1	027
4AC3 524	10/6	B		1	1	027
4AC3 540	10/6	B		1	1	027
4AC3 616	10/6	A		1	1	027
4AC3 624	10/6	A		1	1	027
4AC3 640	10/6	A		1	1	027
4AC3 663	10/6	A		1	1	027
5SA1						
5SA1 11	3/15	B		1	10	016
5SA1 21	3/15	B		1	10	016
5SA1 31	3/15	B		1	10	016
5SA1 51	3/15	B		1	10	016
5SA1 61	3/15	B		1	10	016
5SA1 71	3/15	B		1	10	016
5SA1 81	3/15	B		1	10	016
5SA2						
5SA2 11	3/15	B		1	10	016
5SA2 21	3/15	B		1	10	016
5SA2 31	3/15	B		1	10	016
5SA2 51	3/15	B		1	10	016
5SA2 61	3/15	B		1	10	016
5SA2 71	3/15	B		1	10	016
5SA2 81	3/15	B		1	10	016
5SB1						
5SB1 11	3/15	B		1	5	016
5SB1 21	3/15	B		1	5	016
5SB1 31	3/15	B		1	5	016
5SB1 41	3/15	B		1	5	016
5SB1 51	3/15	A		1	5	016
5SB1 61	3/15	A		1	5	016
5SB1 71	3/15	A		1	5	016
5SB1 81	3/15	A		1	5	016
5SB2						
5SB2 11	3/15	▶		1	5	016
5SB2 21	3/15	▶		1	5	016
5SB2 31	3/15	▶		1	5	016
5SB2 51	3/15	▶		1	5	016
5SB2 61	3/15	▶		1	5	016
5SB2 71	3/15	▶		1	5	016
5SB2 81	3/15	▶		1	5	016
5SB3						
5SB3 11	3/15	A		1	5	016
5SB3 21	3/15	A		1	5	016
5SB3 31	3/15	A		1	5	016
5SB4						
5SB4 010	3/15	B		1	5	016
5SB4 11	3/15	A		1	5	016
5SB4 21	3/15	A		1	5	016
5SB4 31	3/15	A		1	5	016
5SC1						
5SC1 11	3/15	B		1	3	016
5SC1 21	3/15	B		1	3	016

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SC2						
5SC2 11	3/15	B		1	3	016
5SC2 21	3/15	B		1	3	016
5SD4						
5SD4 20	4/23	A		1	5	016
5SD4 30	4/23	A		1	5	016
5SD4 40	4/23	A		1	5	016
5SD4 50	4/23	A		1	5	016
5SD4 60	4/23	A		1	5	016
5SD4 70	4/23	A		1	5	016
5SD4 80	4/23	A		1	5	016
5SD5						
5SD5 10	4/23	B		1	3	016
5SD5 20	4/23	B		1	3	016
5SD6						
5SD6 01	3/16	A		1	5	016
5SD6 02	3/16	B		1	5	016
5SD6 03	3/16	B		1	5	016
5SD6 04	3/16	B		1	5	016
5SD6 05	3/16	B		1	5	016
5SD6 06	3/16	B		1	5	016
5SD6 07	3/16	A		1	5	016
5SD6 08	3/16	B		1	5	016
5SD6 10	3/16	B		1	5	016
5SD6 11	3/16	B		1	5	016
5SD7 4						
5SD7 411-1	6/4	A		1	1	008
5SD7 412-1	6/4	B		1	1	008
5SD7 413-1	6/4	A		1	1	008
5SD7 414-1	6/4	A		1	1	008
5SD7 418-0	6/15	B		1	1	008
5SD7 418-1	6/15	B		1	1	008
5SD7 422-0	6/10	A		1	1	008
5SD7 422-1	6/10	B		1	1	008
5SD7 423-0	6/10	A		1	1	008
5SD7 423-1	6/10	B		1	1	008
5SD7 424-0	6/10	A		1	1	008
5SD7 424-1	6/10	A		1	1	008
5SD7 428-0	6/15	B		1	1	008
5SD7 428-1	6/15	B		1	1	008
5SD7 432-1	6/13	A		1	1	008
5SD7 432-2	6/13	B		1	1	008
5SD7 432-3	6/13	B		1	1	008
5SD7 432-4	6/13	A		1	1	008
5SD7 434-1	6/13	A		1	1	008
5SD7 435-0	6/19	B		1	1	008
5SD7 435-2	6/19	B		1	1	008
5SD7 435-3	6/19	B		1	1	008
5SD7 435-5	6/19	B		1	1	008
5SD7 435-6	6/19	B		1	1	008
5SD7 435-7	6/19	B		1	1	008
5SD7 437-1	6/16	B		1	1	008
5SD7 437-2	6/16	B		1	1	008
5SD7 437-3	6/16	B		1	1	008
5SD7 437-4	6/16	B		1	1	008
5SD7 438-1	6/16	B		1	1	008
5SD7 441-1	6/6	A		1	1	008
5SD7 442-1	6/6	B		1	1	008
5SD7 443-1	6/6	A		1	1	008
5SD7 444-1	6/6	A		1	1	008
5SD7 448-1	6/15	B		1	1	008
5SD7 461-0	6/9	A		1	1	008
5SD7 461-1	6/9	A		1	1	008
5SD7 463-0	6/9	A		1	1	008
5SD7 463-1	6/9	B		1	1	008
5SD7 464-0	6/10	A		1	1	008
5SD7 464-1	6/10	A		1	1	008
5SD7 466-0	6/9	A		1	1	008
5SD7 466-1	6/9	A		1	1	008
5SD7 468-1	6/15	B		1	1	008
5SD7 473-0	6/9	A		1	1	008
5SD7 473-1	6/9	A		1	1	008
5SD7 481-0	6/9	A		1	1	008
5SD7 483-0	6/9	A		1	1	008
5SD7 483-1	6/9	A		1	1/44	008
5SD7 485-0	6/10	A		1	1/44	008
5SD7 485-1	6/10	A		1	1	008
5SD7 488-0	6/15	B		1	1	008
5SD7 488-1	6/15	A		1	1	008
5SD7 490-1	6/15	B		1	1	008
5SD7 490-2	6/17	A		1	10/100	008
5SD7 490-3	6/17	A		1	10/100	008
5SD7 490-4	6/17	A		1	10/100	008
5SD7 498-1	6/15	A		1	1	008
5SD7 5						
5SD7 500-0	6/33	B		1	1	008
5SD7 502-0	6/33	B		1	1	008
5SD7 512-1	6/33	B		1	1	008
5SD7 520-1	6/33	B		1	1	008
5SD7 522-0	6/33	B		1	1	008
5SD7 522-1	6/33	B		1	1	008
5SD7 522-7	6/33	B		1	1	008
5SD7 530-3	6/33	B		1	1	008
5SD7 541-1	6/33	B		1	1	008
5SD7 541-7	6/33	B		1	1	008
5SD7 550-4	6/33	B		1	1	008
5SD8						
5SD8 002	3/15	B		1	5	016
5SD8 004	3/15	B		1	5	016
5SD8 006	3/15	B		1	5	016
5SD8 010	3/15	B		1	5	016
5SD8 016	3/15	B		1	5	016
5SD8 020	3/15	B		1	5	016
5SD8 025	3/15	B		1	5	016
5SD8 035	3/15	B		1	5	016
5SD8 050	3/15	B		1	5	016
5SD8 063	3/15	B		1	5	016
5SE1						
5SE1 310	4/22	B		1	10	016
5SE1 316	4/22	B		1	10	016
5SE1 320	4/22	B		1	10	016
5SE1 325	4/22	B		1	10	016
5SE1 335	4/22	B		1	10	016
5SE1 350	4/22	B		1	10	016
5SE1 363	4/22	B		1	10	016
5SE2						
5SE2 013-2A	3/6	A		1	10	016
5SE2 280	3/6	▶		1	10	016
5SE2 300	3/6	▶		1	10	016
5SE2 302	3/6	▶		1	10	016
5SE2 304	3/6	▶		1	10	016
5SE2 306	3/6	▶		1	10/500	016
5SE2 310	3/6	▶		1	10/500	016
5SE2 316	3/6	▶		1	10/500	016
5SE2 320	3/6	▶		1	10	016
5SE2 325	3/6	▶		1	10	016
5SE2 332	3/6	B		1	10	016
5SE2 335	3/6	▶		1	10	016
5SE2 340	3/6	B		1	10	016
5SE2 350	3/6	▶		1	10	016

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SE2 363	3/6	▶		1	10	016
5SF1						
5SF1 005	3/16	▶		1	5	016
5SF1 01	3/16	A		1	5	016
5SF1 012	3/16	A		1	5	016
5SF1 024	3/16	A		1	5	016
5SF1 060	3/16	▶		1	3/108	016
5SF1 205	3/16	▶		1	5	016
5SF1 214	3/16	B		1	5	016
5SF1 215	3/16	B		1	5	016
5SF1 224	3/16	A		1	5	016
5SF1 260	3/16	▶		1	3/108	016
5SF1 401	3/16	B		1	1	016
5SF4						
5SF4 230	3/17	A		1	1	016
5SF5						
5SF5 066	3/16	B		1	1	016
5SF5 067	3/16	B		1	1	016
5SF5 068	3/16	▶		1	1/36	016
5SF5 236	3/16	B		1	1	016
5SF5 237	3/16	B		1	1	016
5SF5 268	3/16	▶		1	1/36	016
5SF6						
5SF6 005	3/17	B		1	5	016
5SF6 014	5/12	B		1	2/52	016
5SF6 015	5/12	B		1	2/52	016
5SF6 018	5/11	B		1	4	016
5SF6 020	5/11	B		1	4	016
5SF6 205	3/17	B		1	5	016
5SF6 214	5/12	B		1	2/52	016
5SF6 215	5/12	B		1	2/52	016
5SF6 218	5/11	B		1	4	016
5SF6 220	5/11	B		1	4	016
5SG1						
5SG1 301	3/7	▶		1	3	016
5SG1 330	3/7	A		1	6	016
5SG1 331	3/7	B		1	6	016
5SG1 553	3/8	▶		1	6	016
5SG1 590	3/8	B		1	6	016
5SG1 594	3/8	▶		1	6	016
5SG1 595	3/8	B		1	6	016
5SG1 650	3/8	B		1	6	016
5SG1 653	3/8	▶		1	6	016
5SG1 655	3/8	▶		1	6	016
5SG1 693	3/8	▶		1	6	016
5SG1 694	3/8	B		1	6	016
5SG1 695	3/8	B		1	6	016
5SG1 701	3/7	▶		1	3	016
5SG1 730	3/7	A		1	6	016
5SG1 731	3/7	A		1	6	016
5SG1 810	3/8	B		1	10	016
5SG1 812	3/8	A		1	10	016
5SG1 813	3/8	B		1	10	016
5SG5						
5SG5 301	3/7	▶		1	1	016
5SG5 330	3/7	A		1	2	016
5SG5 550	3/8	B		1	2	016
5SG5 553	3/8	▶		1	2	016
5SG5 555	3/8	B		1	2	016
5SG5 650	3/8	B		1	2	016
5SG5 653	3/8	▶		1	2	016
5SG5 655	3/8	B		1	2	016
5SG5 690	3/8	B		1	2	016
5SG5 693	3/8	▶		1	2	016
5SG5 695	3/8	B		1	2	016

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SG5 701	3/7	▶		1	1	016
5SG5 730	3/7	A		1	2	016
5SG6						
5SG6 202	5/11	A		1	4/104	016
5SG6 206	5/11	B		1	4	016
5SG6 207	5/11	B		1	4	016
5SG7						
5SG7 113	3/6	▶		1	1	016
5SG7 123	3/6	B		1	1	016
5SG7 133	3/6	▶		1	1	016
5SG7 133-8BA25	3/6	B		1	1	016
5SG7 133-8BA35	3/6	B		1	1	016
5SG7 133-8BA50	3/6	B		1	1	016
5SG7 153	3/6	B		1	1	016
5SG7 163	3/6	B		1	1	016
5SG7 230	5/12	A		1	1/30	016
5SG7 610	3/7	A		1	1	016
5SG7 620	3/7	B		1	1	016
5SG7 630	3/7	A		1	1	016
5SG7 650	3/7	B		1	1	016
5SG7 660	3/7	B		1	1	016
5SH1						
5SH1 11	3/17	A		1	5/200	016
5SH1 12	3/17	▶		1	30	016
5SH1 13	3/17	▶		1	30	016
5SH1 141	3/17	C		1	1	016
5SH1 161	3/17	A		1	5	016
5SH1 170	3/17	A		1	5	016
5SH1 22	3/17	A		1	30	016
5SH1 221	3/17	▶		1	30	016
5SH1 23	3/17	A		1	5/5000	016
5SH1 231	3/17	▶		1	5/5000	016
5SH2						
5SH2 01	3/18	A		1	5	016
5SH2 02	3/18	A		1	5	016
5SH2 032	3/18	▶		1	10/620	016
5SH2 042	5/12	B		1	2/120	016
5SH2 22	3/18	A		1	5	016
5SH2 232	3/18	▶		1	10/620	016
5SH2 242	5/12	B		1	2/120	016
5SH3						
5SH3 01	3/18	C		1	10	016
5SH3 02	3/18	B		1	10	016
5SH3 05	3/18	C		1	10	016
5SH3 06	3/18	C		1	10	016
5SH3 07	3/18	C		1	10	016
5SH3 071	5/12	C		1	10/1500	016
5SH3 072	5/12	C		1	10/1500	016
5SH3 073	5/12	C		1	10/3000	016
5SH3 074	5/12	C		1	10/4000	016
5SH3 075	5/12	C		1	10/5000	016
5SH3 076	5/12	C		1	10/3000	016
5SH3 078	5/12	C		1	10	016
5SH3 080	5/12	C		1	10	016
5SH3 081	5/12	C		1	10	016
5SH3 082	5/12	C		1	10	016
5SH3 083	5/12	C		1	10	016
5SH3 084	5/12	C		1	10	016
5SH3 085	5/12	C		1	10/1000	016
5SH3 086	5/12	C		1	10/3500	016
5SH3 087	5/12	C		1	10/600	016
5SH3 10	3/18	▶		1	25	016
5SH3 11	3/18	▶		1	25	016
5SH3 12	3/18	▶		1	25	016
5SH3 13	3/18	▶		1	25	016

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SH3 14	3/18	▶		1	25	016
5SH3 15	3/18	▶		1	25	016
5SH3 16	3/18	▶		1	25	016
5SH3 17	3/18	▶		1	25	016
5SH3 18	3/18	▶		1	25	016
5SH3 20	3/18	▶		1	25	016
5SH3 21	3/18	C		1	10/1000	016
5SH3 22	3/18	C		1	10/1000	016
5SH3 28	3/18	C		1	10	016
5SH3 30	3/19	C		1	5	016
5SH3 31	3/18	C		1	10	016
5SH3 32	3/19	B		1	10	016
5SH3 34	3/19	B		1	10	016
5SH3 401	3/19	A		1	5/60	016
5SH3 411	3/19	A		1	5/60	016
5SH3 500	3/34	A		1	1/25	016
5SH3 501	3/34	A		1	1/25	016
5SH3 526	5/20	B		1	1	016
5SH3 527	5/20	C		1	2	016
5SH3 528	5/20	B		1	2	016
5SH3 530	5/20	C		1	2	016
5SH3 531	5/20	C		1	2	016
5SH3 532	5/20	B		1	2	016
5SH3 533	5/20	B		1	4	016
5SH3 534	5/20	C		1	4/40	016
5SH3 535	5/5	C		1	1	016
5SH3 536	5/6, 5/20	B		1	4/160	016
5SH3 537	5/6, 5/20	A		1	2	016
5SH3 538	5/5	A		1	5	016
5SH3 54	3/34	C		1	5	016
5SH3 540	5/4	A		1	1	016
5SH3 55	3/34	C		1	5	016
5SH3 703	3/18	A		1	1	016
5SH4						
5SH4 100	3/9	A		1	3	016
5SH4 116	3/9	▶		1	10/1000	016
5SH4 163	3/9	▶		1	10/200	016
5SH4 316	3/9	A		1	10	016
5SH4 317	3/9	▶		1	20	016
5SH4 362	3/9	▶		1	20	016
5SH4 363	3/9	A		1	10	016
5SH5						
5SH5 002	3/10	▶		1	10	016
5SH5 004	3/10	▶		1	10	016
5SH5 006	3/10	▶		1	10	016
5SH5 010	3/10	▶		1	10	016
5SH5 020	3/10	▶		1	10	016
5SH5 025	3/10	▶		1	10	016
5SH5 035	3/10	▶		1	10	016
5SH5 050	3/10	▶		1	10	016
5SH5 080	3/10	A		1	25	016
5SH5 100	3/10	A		1	1/10	016
5SH5 233	3/9	B		1	20	016
5SH5 234	3/9	C		1	10	016
5SH5 235	3/9	B		1	5	016
5SH5 241	5/11	A		1	4/200	016
5SH5 242	5/11	B		1	4/140	016
5SH5 243	5/11	C		1	4/120	016
5SH5 244	3/8	C		1	15	016
5SH5 245	3/8	C		1	5	016
5SH5 251	3/8	B		1	15	016
5SH5 252	3/9	C		1	5	016
5SH5 253	3/8	B		1	15	016
5SH5 254	3/9	C		1	5	016
5SH5 320	3/32	▶		1	1	016
5SH5 321	3/32	▶		1	1	016
5SH5 322	3/32	▶		1	1	016
5SH5 327	3/33	▶		1	10/300	016
5SH5 328	3/33	▶		1	10/300	016
5SH5 400	3/10	A		1	25	016
5SH5 402	3/10	A		1	10	016
5SH5 404	3/10	A		1	10	016
5SH5 406	3/10	A		1	10	016
5SH5 410	3/10	A		1	10	016
5SH5 416	3/10	A		1	10	016
5SH5 417	3/10	A		1	25	016
5SH5 503	3/10	C		1	1	016
5SH5 517	3/32	A		1	1	016
5SH5 525	5/13	C		1	1/50	016
5SH5 526	5/13	C		1	5/50	016
5SH5 527	3/6, 5/13	C		1	10/100	016
5SJ4 1						
5SJ4 101-7HG40	1/44	B		1	1	012
5SJ4 101-7HG41	1/45	C		1	1	012
5SJ4 101-7HG42	1/46	C		1	1	012
5SJ4 101-8HG40	1/44	C		1	1	012
5SJ4 101-8HG41	1/45	C		1	1	012
5SJ4 101-8HG42	1/46	C		1	1	012
5SJ4 102-7HG40	1/44	B		1	1	012
5SJ4 102-7HG41	1/45	C		1	1	012
5SJ4 102-7HG42	1/46	C		1	1	012
5SJ4 102-8HG40	1/44	C		1	1	012
5SJ4 102-8HG41	1/45	C		1	1	012
5SJ4 102-8HG42	1/46	C		1	1	012
5SJ4 103-7HG40	1/44	B		1	1	012
5SJ4 103-7HG41	1/45	C		1	1	012
5SJ4 103-7HG42	1/46	C		1	1	012
5SJ4 103-8HG40	1/44	C		1	1	012
5SJ4 103-8HG41	1/45	C		1	1	012
5SJ4 103-8HG42	1/46	C		1	1	012
5SJ4 104-7HG40	1/44	B		1	1	012
5SJ4 104-7HG41	1/45	C		1	1	012
5SJ4 104-7HG42	1/46	C		1	1	012
5SJ4 104-8HG40	1/44	C		1	1	012
5SJ4 104-8HG41	1/45	C		1	1	012
5SJ4 104-8HG42	1/46	C		1	1	012
5SJ4 105-7HG40	1/44	C		1	1	012
5SJ4 105-7HG41	1/45	C		1	1	012
5SJ4 105-7HG42	1/46	C		1	1	012
5SJ4 105-8HG40	1/44	C		1	1	012
5SJ4 105-8HG41	1/45	C		1	1	012
5SJ4 105-8HG42	1/46	C		1	1	012
5SJ4 106-6HG40	1/44	B		1	1	012
5SJ4 106-7HG40	1/44	B		1	1	012
5SJ4 106-7HG41	1/45	C		1	1	012
5SJ4 106-7HG42	1/46	C		1	1	012
5SJ4 106-8HG40	1/44	C		1	1	012
5SJ4 106-8HG41	1/45	C		1	1	012
5SJ4 106-8HG42	1/46	C		1	1	012
5SJ4 108-7HG40	1/44	B		1	1	012
5SJ4 108-7HG41	1/45	C		1	1	012
5SJ4 108-7HG42	1/46	C		1	1	012
5SJ4 108-8HG40	1/44	C		1	1	012
5SJ4 108-8HG41	1/45	C		1	1	012
5SJ4 108-8HG42	1/46	C		1	1	012
5SJ4 110-6HG40	1/44	B		1	1	012
5SJ4 110-7HG40	1/44	B		1	1	012
5SJ4 110-7HG41	1/45	C		1	1	012
5SJ4 110-7HG42	1/46	C		1	1	012
5SJ4 110-8HG40	1/44	C		1	1	012

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SJ4 110-8HG41	1/45	C		1	1	012
5SJ4 110-8HG42	1/46	C		1	1	012
5SJ4 111-7HG40	1/44	C		1	1	012
5SJ4 111-7HG41	1/45	C		1	1	012
5SJ4 111-7HG42	1/46	C		1	1	012
5SJ4 111-8HG40	1/44	C		1	1	012
5SJ4 111-8HG41	1/45	C		1	1	012
5SJ4 111-8HG42	1/46	C		1	1	012
5SJ4 113-6HG40	1/44	C		1	1	012
5SJ4 113-7HG40	1/44	C		1	1	012
5SJ4 113-7HG41	1/45	C		1	1	012
5SJ4 113-7HG42	1/46	C		1	1	012
5SJ4 113-8HG40	1/44	C		1	1	012
5SJ4 113-8HG41	1/45	C		1	1	012
5SJ4 113-8HG42	1/46	C		1	1	012
5SJ4 114-7HG40	1/44	C		1	1	012
5SJ4 114-7HG41	1/45	C		1	1	012
5SJ4 114-7HG42	1/46	C		1	1	012
5SJ4 114-8HG40	1/44	C		1	1	012
5SJ4 114-8HG41	1/45	C		1	1	012
5SJ4 114-8HG42	1/46	C		1	1	012
5SJ4 115-7HG40	1/44	C		1	1	012
5SJ4 115-7HG41	1/45	C		1	1	012
5SJ4 115-7HG42	1/46	C		1	1	012
5SJ4 115-8HG40	1/44	C		1	1	012
5SJ4 115-8HG41	1/45	C		1	1	012
5SJ4 115-8HG42	1/46	C		1	1	012
5SJ4 116-6HG40	1/44	C		1	1	012
5SJ4 116-7HG40	1/44	B		1	1	012
5SJ4 116-7HG41	1/45	C		1	1	012
5SJ4 116-7HG42	1/46	C		1	1	012
5SJ4 116-8HG40	1/44	C		1	1	012
5SJ4 116-8HG41	1/45	C		1	1	012
5SJ4 116-8HG42	1/46	C		1	1	012
5SJ4 118-6HG40	1/44	C		1	1	012
5SJ4 118-7HG40	1/44	C		1	1	012
5SJ4 118-7HG41	1/45	C		1	1	012
5SJ4 118-7HG42	1/46	C		1	1	012
5SJ4 118-8HG40	1/44	C		1	1	012
5SJ4 118-8HG41	1/45	C		1	1	012
5SJ4 118-8HG42	1/46	C		1	1	012
5SJ4 120-6HG40	1/44	C		1	1	012
5SJ4 120-7HG40	1/44	B		1	1	012
5SJ4 120-7HG41	1/45	C		1	1	012
5SJ4 120-7HG42	1/46	C		1	1	012
5SJ4 120-8HG40	1/44	C		1	1	012
5SJ4 120-8HG41	1/45	C		1	1	012
5SJ4 120-8HG42	1/46	C		1	1	012
5SJ4 125-6HG40	1/44	C		1	1	012
5SJ4 125-7HG40	1/44	B		1	1	012
5SJ4 125-7HG41	1/45	C		1	1	012
5SJ4 125-7HG42	1/46	C		1	1	012
5SJ4 125-8HG40	1/44	C		1	1	012
5SJ4 125-8HG41	1/45	C		1	1	012
5SJ4 125-8HG42	1/46	C		1	1	012
5SJ4 130-6HG40	1/44	C		1	1	012
5SJ4 130-7HG40	1/44	C		1	1	012
5SJ4 130-7HG41	1/45	C		1	1	012
5SJ4 130-7HG42	1/46	C		1	1	012
5SJ4 130-8HG40	1/44	C		1	1	012
5SJ4 130-8HG41	1/45	C		1	1	012
5SJ4 130-8HG42	1/46	C		1	1	012
5SJ4 132-6HG40	1/44	C		1	1	012
5SJ4 132-7HG40	1/44	C		1	1	012
5SJ4 132-7HG41	1/45	C		1	1	012
5SJ4 132-7HG42	1/46	C		1	1	012
5SJ4 132-8HG40	1/44	C		1	1	012
5SJ4 132-8HG41	1/45	C		1	1	012
5SJ4 132-8HG42	1/46	C		1	1	012
5SJ4 135-6HG40	1/44	C		1	1	012
5SJ4 135-7HG40	1/44	C		1	1	012
5SJ4 135-7HG41	1/45	C		1	1	012
5SJ4 135-7HG42	1/46	C		1	1	012
5SJ4 135-8HG40	1/44	C		1	1	012
5SJ4 135-8HG41	1/45	C		1	1	012
5SJ4 140-6HG40	1/44	C		1	1	012
5SJ4 140-7HG40	1/44	C		1	1	012
5SJ4 140-7HG41	1/45	C		1	1	012
5SJ4 140-7HG42	1/46	C		1	1	012
5SJ4 140-8HG40	1/44	C		1	1	012
5SJ4 140-8HG41	1/45	C		1	1	012
5SJ4 145-6HG40	1/44	C		1	1	012
5SJ4 145-7HG40	1/44	C		1	1	012
5SJ4 145-7HG41	1/45	C		1	1	012
5SJ4 145-8HG40	1/44	C		1	1	012
5SJ4 145-8HG41	1/45	C		1	1	012
5SJ4 150-6HG40	1/44	C		1	1	012
5SJ4 150-7HG40	1/44	C		1	1	012
5SJ4 150-7HG41	1/45	C		1	1	012
5SJ4 150-8HG40	1/44	C		1	1	012
5SJ4 150-8HG41	1/45	C		1	1	012
5SJ4 160-6HG40	1/44	C		1	1	012
5SJ4 160-7HG40	1/44	C		1	1	012
5SJ4 160-7HG41	1/45	C		1	1	012
5SJ4 160-8HG40	1/44	C		1	1	012
5SJ4 160-8HG41	1/45	C		1	1	012
5SJ4 163-6HG40	1/44	C		1	1	012
5SJ4 163-7HG40	1/44	C		1	1	012
5SJ4 163-7HG41	1/45	C		1	1	012
5SJ4 163-8HG40	1/44	C		1	1	012
5SJ4 163-8HG41	1/45	C		1	1	012
5SJ4 2						
5SJ4 201-7HG41	1/45	C		1	1	012
5SJ4 201-7HG42	1/47	C		1	1	012
5SJ4 201-8HG41	1/45	C		1	1	012
5SJ4 201-8HG42	1/47	C		1	1	012
5SJ4 202-7HG41	1/45	C		1	1	012
5SJ4 202-7HG42	1/47	C		1	1	012
5SJ4 202-8HG41	1/45	C		1	1	012
5SJ4 202-8HG42	1/47	C		1	1	012
5SJ4 203-7HG41	1/45	C		1	1	012
5SJ4 203-7HG42	1/47	C		1	1	012
5SJ4 203-8HG41	1/45	C		1	1	012
5SJ4 203-8HG42	1/47	C		1	1	012
5SJ4 204-7HG41	1/45	C		1	1	012
5SJ4 204-7HG42	1/47	C		1	1	012
5SJ4 204-8HG41	1/45	C		1	1	012
5SJ4 204-8HG42	1/47	C		1	1	012
5SJ4 205-7HG41	1/45	C		1	1	012
5SJ4 205-7HG42	1/47	C		1	1	012
5SJ4 205-8HG41	1/45	C		1	1	012
5SJ4 205-8HG42	1/47	C		1	1	012
5SJ4 206-7HG41	1/45	C		1	1	012
5SJ4 206-7HG42	1/47	C		1	1	012
5SJ4 206-8HG41	1/45	C		1	1	012
5SJ4 206-8HG42	1/47	C		1	1	012
5SJ4 208-7HG41	1/45	C		1	1	012
5SJ4 208-7HG42	1/47	C		1	1	012
5SJ4 208-8HG41	1/45	C		1	1	012

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SJ4 208-8HG42	1/47	C		1	1	012
5SJ4 210-7HG41	1/45	C		1	1	012
5SJ4 210-7HG42	1/47	C		1	1	012
5SJ4 210-8HG41	1/45	C		1	1	012
5SJ4 210-8HG42	1/47	C		1	1	012
5SJ4 211-7HG41	1/45	C		1	1	012
5SJ4 211-7HG42	1/47	C		1	1	012
5SJ4 211-8HG41	1/45	C		1	1	012
5SJ4 211-8HG42	1/47	C		1	1	012
5SJ4 213-7HG41	1/45	C		1	1	012
5SJ4 213-7HG42	1/47	C		1	1	012
5SJ4 213-8HG41	1/45	C		1	1	012
5SJ4 213-8HG42	1/47	C		1	1	012
5SJ4 214-7HG41	1/45	C		1	1	012
5SJ4 214-7HG42	1/47	C		1	1	012
5SJ4 214-8HG41	1/45	C		1	1	012
5SJ4 214-8HG42	1/47	C		1	1	012
5SJ4 215-7HG41	1/45	C		1	1	012
5SJ4 215-7HG42	1/47	C		1	1	012
5SJ4 215-8HG41	1/45	C		1	1	012
5SJ4 215-8HG42	1/47	C		1	1	012
5SJ4 216-7HG41	1/45	C		1	1	012
5SJ4 216-7HG42	1/47	C		1	1	012
5SJ4 216-8HG41	1/45	C		1	1	012
5SJ4 216-8HG42	1/47	C		1	1	012
5SJ4 218-7HG41	1/45	C		1	1	012
5SJ4 218-7HG42	1/47	C		1	1	012
5SJ4 218-8HG41	1/45	C		1	1	012
5SJ4 218-8HG42	1/47	C		1	1	012
5SJ4 220-7HG41	1/45	C		1	1	012
5SJ4 220-7HG42	1/47	C		1	1	012
5SJ4 220-8HG41	1/45	C		1	1	012
5SJ4 220-8HG42	1/47	C		1	1	012
5SJ4 225-7HG41	1/45	C		1	1	012
5SJ4 225-7HG42	1/47	C		1	1	012
5SJ4 225-8HG41	1/45	C		1	1	012
5SJ4 225-8HG42	1/47	C		1	1	012
5SJ4 230-7HG41	1/45	C		1	1	012
5SJ4 230-7HG42	1/47	C		1	1	012
5SJ4 230-8HG41	1/45	C		1	1	012
5SJ4 230-8HG42	1/47	C		1	1	012
5SJ4 232-7HG41	1/45	C		1	1	012
5SJ4 232-7HG42	1/47	C		1	1	012
5SJ4 232-8HG41	1/45	C		1	1	012
5SJ4 232-8HG42	1/47	C		1	1	012
5SJ4 235-7HG41	1/45	C		1	1	012
5SJ4 235-7HG42	1/47	C		1	1	012
5SJ4 235-8HG41	1/45	C		1	1	012
5SJ4 240-7HG41	1/45	C		1	1	012
5SJ4 240-7HG42	1/47	C		1	1	012
5SJ4 240-8HG41	1/45	C		1	1	012
5SJ4 245-7HG41	1/45	C		1	1	012
5SJ4 245-8HG41	1/45	C		1	1	012
5SJ4 250-7HG41	1/45	C		1	1	012
5SJ4 250-8HG41	1/45	C		1	1	012
5SJ4 260-7HG41	1/45	C		1	1	012
5SJ4 260-8HG41	1/45	C		1	1	012
5SJ4 263-7HG41	1/45	C		1	1	012
5SJ4 263-8HG41	1/45	C		1	1	012
5SJ4 3						
5SJ4 301-7HG41	1/46	C		1	1	012
5SJ4 301-7HG42	1/47	C		1	1	012
5SJ4 301-8HG41	1/46	C		1	1	012
5SJ4 301-8HG42	1/47	C		1	1	012
5SJ4 302-7HG41	1/46	C		1	1	012
5SJ4 302-7HG42	1/47	C		1	1	012
5SJ4 302-8HG41	1/46	C		1	1	012
5SJ4 302-8HG42	1/47	C		1	1	012
5SJ4 303-7HG41	1/46	C		1	1	012
5SJ4 303-7HG42	1/47	C		1	1	012
5SJ4 303-8HG41	1/46	C		1	1	012
5SJ4 303-8HG42	1/47	C		1	1	012
5SJ4 304-7HG41	1/46	C		1	1	012
5SJ4 304-7HG42	1/47	C		1	1	012
5SJ4 304-8HG41	1/46	C		1	1	012
5SJ4 304-8HG42	1/47	C		1	1	012
5SJ4 305-7HG41	1/46	C		1	1	012
5SJ4 305-7HG42	1/47	C		1	1	012
5SJ4 305-8HG41	1/46	C		1	1	012
5SJ4 305-8HG42	1/47	C		1	1	012
5SJ4 306-7HG41	1/46	C		1	1	012
5SJ4 306-7HG42	1/47	C		1	1	012
5SJ4 306-8HG41	1/46	C		1	1	012
5SJ4 306-8HG42	1/47	C		1	1	012
5SJ4 308-7HG41	1/46	C		1	1	012
5SJ4 308-7HG42	1/47	C		1	1	012
5SJ4 308-8HG41	1/46	C		1	1	012
5SJ4 308-8HG42	1/47	C		1	1	012
5SJ4 310-7HG41	1/46	C		1	1	012
5SJ4 310-7HG42	1/47	C		1	1	012
5SJ4 310-8HG41	1/46	C		1	1	012
5SJ4 310-8HG42	1/47	C		1	1	012
5SJ4 311-7HG41	1/46	C		1	1	012
5SJ4 311-7HG42	1/47	C		1	1	012
5SJ4 311-8HG41	1/46	C		1	1	012
5SJ4 311-8HG42	1/47	C		1	1	012
5SJ4 313-7HG41	1/46	C		1	1	012
5SJ4 313-7HG42	1/47	C		1	1	012
5SJ4 313-8HG41	1/46	C		1	1	012
5SJ4 313-8HG42	1/47	C		1	1	012
5SJ4 314-7HG41	1/46	C		1	1	012
5SJ4 314-7HG42	1/47	C		1	1	012
5SJ4 314-8HG41	1/46	C		1	1	012
5SJ4 314-8HG42	1/47	C		1	1	012
5SJ4 315-7HG41	1/46	C		1	1	012
5SJ4 315-7HG42	1/47	C		1	1	012
5SJ4 315-8HG41	1/46	C		1	1	012
5SJ4 315-8HG42	1/47	C		1	1	012
5SJ4 316-7HG41	1/46	C		1	1	012
5SJ4 316-7HG42	1/47	C		1	1	012
5SJ4 316-8HG41	1/46	C		1	1	012
5SJ4 316-8HG42	1/47	C		1	1	012
5SJ4 318-7HG41	1/46	C		1	1	012
5SJ4 318-7HG42	1/47	C		1	1	012
5SJ4 318-8HG41	1/46	C		1	1	012
5SJ4 318-8HG42	1/47	C		1	1	012
5SJ4 320-7HG41	1/46	C		1	1	012
5SJ4 320-7HG42	1/47	C		1	1	012
5SJ4 320-8HG41	1/46	C		1	1	012
5SJ4 320-8HG42	1/47	C		1	1	012
5SJ4 325-7HG41	1/46	C		1	1	012
5SJ4 325-7HG42	1/47	C		1	1	012
5SJ4 325-8HG41	1/46	C		1	1	012
5SJ4 325-8HG42	1/47	C		1	1	012
5SJ4 330-7HG41	1/46	C		1	1	012
5SJ4 330-7HG42	1/47	C		1	1	012
5SJ4 330-8HG41	1/46	C		1	1	012
5SJ4 330-8HG42	1/47	C		1	1	012
5SJ4 332-7HG41	1/46	C		1	1	012

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SJ4 332-7HG42	1/47	C		1	1	012
5SJ4 332-8HG41	1/46	C		1	1	012
5SJ4 332-8HG42	1/47	C		1	1	012
5SJ4 335-7HG41	1/46	C		1	1	012
5SJ4 335-7HG42	1/47	C		1	1	012
5SJ4 335-8HG41	1/46	C		1	1	012
5SJ4 340-7HG41	1/46	C		1	1	012
5SJ4 340-7HG42	1/47	C		1	1	012
5SJ4 340-8HG41	1/46	C		1	1	012
5SJ4 345-7HG41	1/46	C		1	1	012
5SJ4 345-8HG41	1/46	C		1	1	012
5SJ4 350-7HG41	1/46	C		1	1	012
5SJ4 350-8HG41	1/46	C		1	1	012
5SJ4 360-7HG41	1/46	C		1	1	012
5SJ4 360-8HG41	1/46	C		1	1	012
5SJ4 363-7HG41	1/46	C		1	1	012
5SJ4 363-8HG41	1/46	C		1	1	012
5SJ6						
5SJ6 110-6KS	1/23	B		1	1/12	002
5SJ6 110-7KS	1/23	B		1	1	003
5SJ6 113-6KS	1/23	B		1	1/12	002
5SJ6 113-7KS	1/23	B		1	1/12	003
5SJ6 116-6KS	1/23	A		1	1/12	002
5SJ6 116-7KS	1/23	B		1	1	003
5SJ6 120-6KS	1/23	B		1	1/12	002
5SJ6 120-7KS	1/23	B		1	1/12	003
5SJ6 210-6KS	1/23	B		1	1/6	002
5SJ6 210-7KS	1/23	B		1	1/6	003
5SJ6 213-6KS	1/23	B		1	1/6	002
5SJ6 213-7KS	1/23	B		1	1/6	003
5SJ6 216-6KS	1/23	B		1	1/6	002
5SJ6 216-7KS	1/23	B		1	1/6	003
5SJ6 220-6KS	1/23	B		1	1/6	002
5SJ6 220-7KS	1/23	B		1	1/6	003
5SJ6 310-6KS	1/23	B		1	1/4	002
5SJ6 310-7KS	1/23	B		1	1/4	003
5SJ6 313-6KS	1/23	B		1	1/4	002
5SJ6 313-7KS	1/23	B		1	1/4	003
5SJ6 316-6KS	1/23	B		1	1/4	002
5SJ6 316-7KS	1/23	B		1	1/4	003
5SJ6 320-6KS	1/23	B		1	1/4	002
5SJ6 320-7KS	1/23	B		1	1/4	003
5SJ6 510-6KS	1/23	B		1	1/6	002
5SJ6 510-7KS	1/23	B		1	1/6	003
5SJ6 513-6KS	1/23	B		1	1/6	002
5SJ6 513-7KS	1/23	B		1	1/6	003
5SJ6 516-6KS	1/23	B		1	1/6	002
5SJ6 516-7KS	1/23	B		1	1/6	003
5SJ6 520-6KS	1/23	B		1	1/6	002
5SJ6 520-7KS	1/23	B		1	1/6	003
5SK9						
5SK9 011-1KK24	1/54	A		1	10	027
5SK9 011-1KK25	1/54	A		1	10	027
5SK9 011-1KK26	1/54	B		1	10	027
5SK9 011-1KK27	1/54	A		1	10	027
5SK9 011-1KK28	1/54	B		1	10	027
5SK9 011-2KK24	1/54	A		1	10	027
5SK9 011-2KK25	1/54	A		1	10	027
5SK9 011-2KK26	1/54	A		1	10	027
5SK9 011-2KK27	1/54	A		1	10	027
5SK9 011-2KK28	1/54	B		1	10	027
5SK9 011-4KK24	1/54	B		1	5	027
5SK9 011-4KK25	1/54	A		1	5	027
5SK9 011-4KK26	1/54	A		1	5	027
5SK9 011-4KK27	1/54	B		1	5	027
5SK9 011-4KK28	1/54	B		1	5	027
5SK9 011-6KK24	1/54	B		1	5	027
5SK9 011-6KK25	1/54	B		1	5	027
5SK9 011-6KK26	1/54	B		1	5	027
5SK9 011-6KK27	1/54	B		1	5	027
5SK9 011-6KK28	1/54	B		1	5	027
5SK9 011-8KK23	1/54	B		1	5	027
5SK9 011-8KK24	1/54	A		1	5	027
5SK9 011-8KK25	1/54	A		1	5	027
5SK9 011-8KK26	1/54	A		1	5	027
5SK9 011-8KK27	1/54	A		1	5	027
5SK9 011-8KK28	1/54	B		1	5	027
5SM1						
5SM1 920-5	2/34	B		1	1	008
5SM1 920-8	2/34	B		1	1	008
5SM1 930-0	2/15	B		1	1	008
5SM2						
5SM2 121-6	1/30, 2/19	B		1	1	007
5SM2 322-6	1/30, 2/19	▶		1	1	007
5SM2 322-6KK01	1/31, 2/20	B		1	1	007
5SM2 325-6	1/30, 2/19	A		1	1	007
5SM2 325-6KK01	1/31, 2/20	B		1	1	007
5SM2 327-6	1/30, 2/19	B		1	1	007
5SM2 332-6	1/30, 2/19	A		1	1	007
5SM2 332-6KK01	1/31, 2/20	B		1	1	007
5SM2 335-6	1/30, 2/19	B		1	1	007
5SM2 335-6KK01	1/31, 2/20	B		1	1	007
5SM2 342-6	1/30, 2/19	▶		1	1	007
5SM2 342-6KK01	1/31, 2/20	B		1	1	007
5SM2 345-6	1/30, 2/19	A		1	1	007
5SM2 345-6KK01	1/31, 2/20	B		1	1	007
5SM2 347-6	1/30, 2/19	B		1	1	007
5SM2 425-6	1/30, 2/19	B		1	1	007
5SM2 435-6	1/30, 2/19	B		1	1	007
5SM2 445-6	1/30, 2/19	B		1	1	007
5SM2 622-6	1/30, 2/19	A		1	1	007
5SM2 622-8	1/31, 2/20	A		1	1	007
5SM2 625-6	1/30, 2/19	B		1	1	007
5SM2 625-8	1/31, 2/20	B		1	1	007
5SM2 627-6	1/30, 2/19	B		1	1	007
5SM2 627-8	1/31, 2/20	B		1	1	007
5SM2 632-6	1/30, 2/19	A		1	1	007
5SM2 635-6	1/30, 2/19	B		1	1	007
5SM2 635-8	1/31, 2/20	B		1	1	007
5SM2 642-6	1/30, 2/19	▶		1	1	007
5SM2 645-6	1/30, 2/19	A		1	1	007
5SM2 645-8	1/31, 2/20	A		1	1	007
5SM2 647-6	1/30, 2/19	A		1	1	007
5SM2 647-8	1/31, 2/20	A		1	1	007
5SM2 725-6	1/30, 2/19	B		1	1	007
5SM2 735-6	1/30, 2/19	B		1	1	007
5SM2 735-8	1/31, 2/20	B		1	1	007
5SM2 745-6	1/30, 2/19	A		1	1	007
5SM2 745-8	1/31, 2/20	A		1	1	007
5SM2 835-8	1/31, 2/20	B		1	1	007
5SM2 845-8	1/31, 2/20	A		1	1	007
5SM2 847-8	1/31, 2/20	A		1	1	007
5SM3						
5SM3 111-6	2/5	A		1	1	007
5SM3 111-6KL	2/5	B		1	1	007
5SM3 311-6	2/5	A		1	1	007
5SM3 311-6KK13	2/6	B		1	1	007
5SM3 311-6KL	2/5	B		1	1	007
5SM3 312-6	2/5	▶		1	1	007
5SM3 312-6KK01	2/7	B		1	1	007

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SM3 312-6KK12	2/6	B		1	1	007
5SM3 312-6KL	2/5	B		1	1	007
5SM3 314-6	2/5	▶		1	1	007
5SM3 314-6KK01	2/7	B		1	1	007
5SM3 314-6KK12	2/6	B		1	1	007
5SM3 314-6KL	2/5	B		1	1	007
5SM3 315-6KK	2/5	B		1	1	007
5SM3 316-6	2/5	A		1	1	007
5SM3 316-6KK01	2/7	B		1	1	007
5SM3 316-6KK12	2/6	B		1	1	007
5SM3 316-6KL	2/5	B		1	1	007
5SM3 317-6	2/5	B		1	1	007
5SM3 317-6KK12	2/6	B		1	1	007
5SM3 318-6KK	2/5	B		1	1	007
5SM3 321-4	2/10	A		1	1	015
5SM3 322-4	2/10	A		1	1	015
5SM3 324-4	2/10	A		1	1	015
5SM3 326-4	2/10	A		1	1	015
5SM3 342-4	2/10	A		1	1	015
5SM3 342-6	2/5	▶		1	1	007
5SM3 342-6KK01	2/7	B		1	1	007
5SM3 342-6KK03	2/6	B		1	1	007
5SM3 342-6KK12	2/6	B		1	1	007
5SM3 342-6KL	2/6	B		1	1	007
5SM3 344-4	2/10	A		1	1	015
5SM3 344-6	2/5	▶		1	1	007
5SM3 344-6KK01	2/7	B		1	1	007
5SM3 344-6KK03	2/6	B		1	1	007
5SM3 344-6KK12	2/6	B		1	1	007
5SM3 344-6KL	2/6	▶		1	1	007
5SM3 345-6	2/5	A		1	1	007
5SM3 346-4	2/10	A		1	1	015
5SM3 346-6	2/5	▶		1	1	007
5SM3 346-6KK01	2/7	B		1	1	007
5SM3 346-6KK12	2/6	B		1	1	007
5SM3 346-6KL	2/6	B		1	1	007
5SM3 347-4	2/10	B		1	1	015
5SM3 347-6	2/5	A		1	1	007
5SM3 347-6KK12	2/6	B		1	1	007
5SM3 347-6KL	2/6	B		1	1	007
5SM3 348-6	2/5	▶		1	1	007
5SM3 352-6	2/6	B		1	1	007
5SM3 354-6	2/6	B		1	1	007
5SM3 356-6	2/6	B		1	1	007
5SM3 412-6	2/5	B		1	1	007
5SM3 414-6	2/5	B		1	1	007
5SM3 414-6KL	2/5	B		1	1	007
5SM3 415-6KK	2/5	B		1	1	007
5SM3 416-6	2/5	B		1	1	007
5SM3 416-6KL	2/5	B		1	1	007
5SM3 416-8	2/7	B		1	1	007
5SM3 417-6	2/5	B		1	1	007
5SM3 418-6KK	2/5	B		1	1	007
5SM3 444-6	2/5	A		1	1	007
5SM3 444-8	2/7	B		1	1	007
5SM3 445-6	2/5	B		1	1	007
5SM3 446-6	2/5	A		1	1	007
5SM3 446-8	2/7	B		1	1	007
5SM3 448-6	2/5	▶		1	1	007
5SM3 612-6	2/5	A		1	1	007
5SM3 612-6KL	2/5	B		1	1	007
5SM3 614-6	2/5	A		1	1	007
5SM3 614-6KL	2/5	B		1	1	007
5SM3 614-8	2/7	B		1	1	007
5SM3 615-6KK	2/5	B		1	1	007
5SM3 616-6	2/5	B		1	1	007
5SM3 616-6KK01	2/7	B		1	1	007
5SM3 616-6KL	2/5	B		1	1	007
5SM3 616-8	2/7	A		1	1	007
5SM3 617-6	2/5	B		1	1	007
5SM3 617-8	2/7	B		1	1	007
5SM3 618-6KK	2/5	B		1	1	007
5SM3 621-4	2/10	A		1	1	015
5SM3 622-4	2/10	A		1	1	015
5SM3 624-4	2/10	A		1	1	015
5SM3 626-4	2/10	A		1	1	015
5SM3 642-4	2/10	▶		1	1	015
5SM3 642-6	2/5	A		1	1	007
5SM3 642-6KL	2/6	B		1	1	007
5SM3 644-4	2/10	A		1	1	015
5SM3 644-6	2/5	A		1	1	007
5SM3 644-6KK01	2/7	B		1	1	007
5SM3 644-6KK12	2/6	B		1	1	007
5SM3 644-6KL	2/6	B		1	1	007
5SM3 644-8	2/7	A		1	1	007
5SM3 645-6	2/5	A		1	1	007
5SM3 645-8	2/7	A		1	1	007
5SM3 646-4	2/10	A		1	1	015
5SM3 646-5	2/10	B		1	1	015
5SM3 646-6	2/5	A		1	1	007
5SM3 646-6KK01	2/7	B		1	1	007
5SM3 646-6KK12	2/6	B		1	1	007
5SM3 646-6KL	2/6	B		1	1	007
5SM3 646-8	2/7	A		1	1	007
5SM3 646-8KK12	2/7	B		1	1	007
5SM3 646-8KL	2/7	B		1	1	007
5SM3 647-4	2/10	B		1	1	015
5SM3 647-5	2/10	B		1	1	015
5SM3 647-6	2/5	A		1	1	007
5SM3 647-6KK01	2/7	B		1	1	007
5SM3 647-6KL	2/6	B		1	1	007
5SM3 648-6	2/5	▶		1	1	007
5SM3 652-6	2/6	B		1	1	007
5SM3 654-6	2/6	B		1	1	007
5SM3 656-6	2/6	B		1	1	007
5SM3 742-6	2/5	B		1	1	007
5SM3 744-6	2/5	A		1	1	007
5SM3 745-6	2/5	A		1	1	007
5SM3 745-8	2/7	B		1	1	007
5SM3 746-4	2/10	B		1	1	015
5SM3 746-5	2/10	B		1	1	015
5SM3 746-6	2/5	A		1	1	007
5SM3 747-4	2/10	B		1	1	015
5SM3 747-5	2/10	B		1	1	015
5SM3 748-6	2/5	▶		1	1	007
5SM3 846-8	2/7	A		1	1	007
5SP3						
5SP3 716	1/51	B		1	1	005
5SP3 716-1	1/51	B		1 set	1 set	005
5SP3 720	1/51	C		1	1	005
5SP3 720-1	1/51	B		1 set	1 set	005
5SP3 725	1/51	B		1	1	005
5SP3 725-1	1/51	B		1 set	1 set	005
5SP3 732	1/51	C		1	1	005
5SP3 732-1	1/51	B		1 set	1 set	005
5SP3 735	1/51	A		1	1	005
5SP3 735-1	1/51	A		1 set	1 set	005
5SP3 740	1/51	B		1	1	005
5SP3 740-1	1/51	A		1 set	1 set	005

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SP3 750	1/51	B		1	1	005
5SP3 750-1	1/51	A		1 set	1 set	005
5SP3 763	1/51	A		1	1	005
5SP3 763-1	1/51	A		1 set	1 set	005
5SP3 780	1/51	B		1	1	005
5SP3 780-1	1/51	B		1 set	1 set	005
5SP3 791	1/51	B		1	1	005
5SP3 791-1	1/51	B		1 set	1 set	005
5SP4						
5SP4 180-6	1/13	B		1	1	002
5SP4 180-7	1/13	A		1	1	003
5SP4 180-8	1/13	B		1	1	004
5SP4 191-6	1/13	C		1	1	002
5SP4 191-7	1/13	A		1	1/6	003
5SP4 191-8	1/13	C		1	1	004
5SP4 192-6	1/13	B		1	1	002
5SP4 192-7	1/13	A		1	1	003
5SP4 280-6	1/13	C		1	1	002
5SP4 280-7	1/13	A		1	1	003
5SP4 280-8	1/13	C		1	1	004
5SP4 291-6	1/13	C		1	1	002
5SP4 291-7	1/13	A		1	1	003
5SP4 291-8	1/13	C		1	1	004
5SP4 292-6	1/13	C		1	1	002
5SP4 292-7	1/13	A		1	1	003
5SP4 380-6	1/13	B		1	1	002
5SP4 380-7	1/13	▶		1	1	003
5SP4 380-8	1/13	A		1	1	004
5SP4 391-6	1/13	B		1	1	002
5SP4 391-7	1/13	▶		1	1	003
5SP4 391-8	1/13	A		1	1	004
5SP4 392-6	1/13	C		1	1	002
5SP4 392-7	1/13	A		1	1	003
5SP4 480-6	1/13	B		1	1	002
5SP4 480-7	1/13	A		1	1	003
5SP4 480-8	1/13	A		1	1	004
5SP4 491-6	1/13	C		1	1	002
5SP4 491-7	1/13	A		1	1	003
5SP4 491-8	1/13	C		1	1	004
5SP4 492-6	1/13	C		1	1	002
5SP4 492-7	1/13	A		1	1	003
5SP5						
5SP5 180-7	1/14	B		1	1	003
5SP5 191-7	1/14	B		1	1	003
5SP5 192-7	1/14	B		1	1	003
5SP5 280-7	1/14	B		1	1	003
5SP5 291-7	1/14	B		1	1	003
5SP5 292-7	1/14	B		1	1	003
5ST1						
5ST1 316	1/51	B		1	6	005
5ST1 318	1/51	D		1	10	005
5ST1 323	1/51	B		1	3	005
5ST1 328	1/51	B		1	1	005
5ST1 822-7KK00	1/54	A		1	10	027
5ST1 822-7KK01	1/54	A		1	20	027
5ST1 822-7KK02	1/54	A		1	20	027
5ST1 822-7KK03	1/54	A		1	10	027
5ST1 822-7KK04	1/54	A		1	10	027
5ST1 822-7KK06	1/54	A		1	20	027
5ST1 822-7KK07	1/54	A		1	20	027
5ST2						
5ST2 134	1/33, 2/35	A		1	10	027
5ST2 135	1/33, 2/35	A		1	5	027
5ST2 136	1/33, 2/35	B		1	5	027
5ST2 145	2/33	A		1	1	027
5ST2 156	2/33	A		1	10	027
5ST2 157	2/33, 3/33	A		1	5	027
5ST2 173	1/32, 2/35	B		1 set	1 set	027
5ST2 186	3/32	B		1	1	027
5ST2 187	3/32	B		1	1	027
5ST2 188	3/32	B		1	1	027
5ST2 190	3/32	B		1	1	027
5ST2 191	3/32	B		1	1	027
5ST2 192	3/32	B		1	1	027
5ST2 201	1/32, 2/35	B		1	1	027
5ST3 0						
5ST3 010	1/29, 3/6, 7/5, 7/19	▶		1	1	027
5ST3 011	1/29, 7/5, 7/19	A		1	1	027
5ST3 012	1/29, 7/5, 7/19	A		1	1	027
5ST3 013	1/29, 7/19	▶		1	1	027
5ST3 014	1/29, 7/19	B		1	1	027
5ST3 015	1/29, 7/19	B		1	1	027
5ST3 020	1/29	▶		1	1	027
5ST3 021	1/29	B		1	1	027
5ST3 022	1/29	A		1	1	027
5ST3 030	1/29	▶		1	1	027
5ST3 031	1/29	▶		1	1	027
5ST3 040	1/29	A		1	1	027
5ST3 041	1/29	B		1	1	027
5ST3 042	1/29	B		1	1	027
5ST3 043	1/29	A		1	1	027
5ST3 044	1/29	B		1	1	027
5ST3 045	1/29	A		1	1	027
5ST3 050	1/29	A		1	1	027
5ST3 051	2/15	B		1	1	027
5ST3 6						
5ST3 600	1/37	A		1	10	027
5ST3 601	1/37	A		1	10	027
5ST3 602	1/37	A		1	10	027
5ST3 603	1/37	A		1	10	027
5ST3 604	1/37	A		1	10	027
5ST3 605	1/37	A		1	10	027
5ST3 606	1/37	A		1	10	027
5ST3 607	1/37	A		1	10	027
5ST3 608	1/37, 2/33	A		1	10	027
5ST3 613	1/26, 1/37	A		1	10	027
5ST3 614	1/26, 1/37	A		1	10	027
5ST3 615	1/26, 1/37	▶		1	10	027
5ST3 616	1/37	A		1	10	027
5ST3 617	1/37	A		1	10	027
5ST3 618	1/37	A		1	10	027
5ST3 620	1/37	A		1	10	027
5ST3 621	1/37	A		1	10	027
5ST3 622	1/37	A		1	10	027
5ST3 623	1/37	A		1	10	027
5ST3 624	1/37, 2/33	A		1	10	027
5ST3 630	1/37	A		1	10	027
5ST3 631	1/37	A		1	10	027
5ST3 632	1/37	A		1	10	027
5ST3 633	1/37	A		1	10	027
5ST3 634	1/37	A		1	10	027
5ST3 635	1/37	A		1	10	027
5ST3 636	1/37	A		1	10	027
5ST3 637	1/37	A		1	10	027
5ST3 638	1/37, 2/33	A		1	10	027
5ST3 640	1/37	A		1	10	027
5ST3 641	1/37	A		1	10	027
5ST3 642	1/37	A		1	10	027
5ST3 643	1/38	A		1	10	027

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5ST3 644	1/38	A		1	10	027
5ST3 645	1/38	▶		1	10	027
5ST3 646	1/38	A		1	10	027
5ST3 647	1/38	A		1	10	027
5ST3 648	1/38	A		1	10	027
5ST3 650	1/38	A		1	10	027
5ST3 651	1/38	A		1	10	027
5ST3 652	1/38	A		1	10	027
5ST3 653	1/38	A		1	10	027
5ST3 654	1/38, 2/33	A		1	10	027
5ST3 655	1/38, 2/33, 3/33	A		1	10	027
5ST3 656	1/38	A		1 set	1 set	027
5ST3 657	1/38	A		1 set	1 set	027
5ST3 663-0HG	1/48	A		1	10	012
5ST3 663-1HG	1/48	A		1	10	012
5ST3 663-2HG	1/48	A		1	10	012
5ST3 664-0HG	1/48	A		1	10	012
5ST3 664-1HG	1/48	A		1	10	012
5ST3 664-2HG	1/48	A		1	10	012
5ST3 665-0HG	1/48	A		1	10	012
5ST3 665-1HG	1/48	A		1	10	012
5ST3 665-2HG	1/48	A		1	10	012
5ST3 666-0HG	1/48	A		1	10	012
5ST3 666-1HG	1/48	A		1	10	012
5ST3 666-2HG	1/48	A		1	10	012
5ST3 667	1/37	A		1	10	027
5ST3 668	1/38	A		1	10	027
5ST3 7						
5ST3 700	1/39, 3/33	▶		1	1	027
5ST3 701	1/39, 3/33	A		1	1	027
5ST3 702	1/39	A		1	1	027
5ST3 703	1/39, 3/32	A		1	1	027
5ST3 704	1/39, 2/33, 3/33	A		1	1	027
5ST3 705	1/39, 3/33	A		1	1	027
5ST3 706	1/39	A		1	1	027
5ST3 707	1/39	A		1	1	027
5ST3 708	1/39, 3/33	▶		1	1	027
5ST3 710	1/39, 3/33	▶		1	1	027
5ST3 711	1/39	A		1	1	027
5ST3 712	1/39	A		1	1	027
5ST3 713	1/39	A		1	1	027
5ST3 714	1/39, 3/32	A		1	1	027
5ST3 715	1/39	A		1	1	027
5ST3 716	1/39	A		1	1	027
5ST3 717	2/33	A		1	25	027
5ST3 718	1/39	▶		1	10	027
5ST3 730	1/38	A		1	1	027
5ST3 731	1/38	A		1	1	027
5ST3 732	1/38	A		1	1	027
5ST3 733	1/38	A		1	1	027
5ST3 734	1/38, 2/33	A		1	1	027
5ST3 735	1/38	A		1	1	027
5ST3 736	1/38	A		1	1	027
5ST3 737	1/38	A		1	1	027
5ST3 738	1/38	▶		1	1	027
5ST3 740	1/38	A		1	1	027
5ST3 741	1/38	A		1	1	027
5ST3 742	1/38	A		1	1	027
5ST3 743	1/38	A		1	1	027
5ST3 744	1/38	A		1	1	027
5ST3 745	1/38	A		1	1	027
5ST3 746	1/38	A		1	1	027
5ST3 748	1/39, 3/33	▶		1	10	027
5ST3 750	1/39, 2/33, 3/33	▶		1	10	027
5ST3 762	1/26, 1/39	A		1	10	027
5ST3 763	1/26, 1/39	A		1	10	027
5ST3 764	1/26, 1/39	A		1	10	027
5ST3 765	1/26, 1/39	A		1	10	027
5ST3 766	1/26, 1/39	A		1 set	10 sets	027
5ST3 767	1/26, 1/39	A		1 set	10 sets	027
5ST3 768	1/26, 1/39	A		1	25	027
5ST3 8						
5ST3 800	1/32, 7/19	B		1	10	027
5ST3 801	1/32, 1/48, 7/5, 7/19	A		1	1	027
5ST3 802	1/32, 1/48, 2/15	▶		1	1	027
5ST3 803	1/32	B		1 set	1 set	027
5ST3 805-1	2/25	▶		1 set	1 set	027
5SU1 1						
5SU1 154-6KK06	2/24	B		1	1	011
5SU1 154-6KK10	2/24	B		1	1	011
5SU1 154-6KK13	2/24	B		1	1	011
5SU1 154-6KK16	2/24	B		1	1	011
5SU1 154-7KK06	2/24	B		1	1	011
5SU1 154-7KK10	2/24	B		1	1	011
5SU1 154-7KK13	2/24	B		1	1	011
5SU1 154-7KK16	2/24	▶		1	1	011
5SU1 3						
5SU1 324-6FA06	2/24	B		1	1	011
5SU1 324-6FA10	2/24	▶		1	1	011
5SU1 324-6FA13	2/24	B		1	1	011
5SU1 324-6FA16	2/24	▶		1	1	011
5SU1 324-6FA20	2/24	B		1	1	011
5SU1 324-6FA25	2/24	B		1	1	011
5SU1 324-6FA32	2/24	B		1	1	011
5SU1 324-6FA40	2/24	B		1	1	011
5SU1 324-6KK82	2/24	B		1	1	011
5SU1 324-7FA06	2/24	B		1	1	011
5SU1 324-7FA10	2/24	▶		1	1	011
5SU1 324-7FA13	2/24	B		1	1	011
5SU1 324-7FA16	2/24	▶		1	1	011
5SU1 324-7FA20	2/24	B		1	1	011
5SU1 324-7FA25	2/24	B		1	1	011
5SU1 324-7FA32	2/24	B		1	1	011
5SU1 324-7FA40	2/24	B		1	1	011
5SU1 324-7KK82	2/24	B		1	1	011
5SU1 344-6KK82	2/24	B		1	1	011
5SU1 344-7KK82	2/24	B		1	1	011
5SU1 354-6KK06	2/24	B		1	1	011
5SU1 354-6KK10	2/24	B		1	1	011
5SU1 354-6KK13	2/24	B		1	1	011
5SU1 354-6KK16	2/24	▶		1	1	011
5SU1 354-6KK20	2/24	B		1	1	011
5SU1 354-6KK25	2/24	B		1	1	011
5SU1 354-6KK32	2/24	B		1	1	011
5SU1 354-6KK40	2/24	B		1	1	011
5SU1 354-7KK06	2/24	▶		1	1	011
5SU1 354-7KK08	2/24	B		1	1	011
5SU1 354-7KK10	2/24	▶		1	1	011
5SU1 354-7KK13	2/24	B		1	1	011
5SU1 354-7KK16	2/24	▶		1	1	011
5SU1 354-7KK20	2/24	B		1	1	011
5SU1 354-7KK25	2/24	B		1	1	011
5SU1 354-7KK32	2/24	B		1	1	011
5SU1 354-7KK40	2/24	B		1	1	011
5SU1 354-7VK10	2/25	B		1	1	011

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SU1 354-7VK16	2/25	B		1	1	011
5SU1 354-7VK20	2/25	B		1	1	011
5SU1 354-7VK25	2/25	B		1	1	011
5SU1 356-6KK06	2/23	A		1	1	011
5SU1 356-6KK10	2/23	A		1	1	011
5SU1 356-6KK13	2/23	B		1	1	011
5SU1 356-6KK16	2/23	▶		1	1	011
5SU1 356-6KK20	2/23	B		1	1	011
5SU1 356-6KK25	2/23	B		1	1	011
5SU1 356-6KK32	2/23	B		1	1	011
5SU1 356-6KK40	2/23	B		1	1	011
5SU1 356-7KK06	2/23	A		1	1	011
5SU1 356-7KK08	2/23	B		1	1	011
5SU1 356-7KK10	2/23	▶		1	1	011
5SU1 356-7KK13	2/23	A		1	1	011
5SU1 356-7KK16	2/23	▶		1	1	011
5SU1 356-7KK20	2/23	B		1	1	011
5SU1 356-7KK25	2/23	A		1	1	011
5SU1 356-7KK32	2/23	B		1	1	011
5SU1 356-7KK40	2/23	B		1	1	011
5SU1 374-7AK81	2/10	B		1	1	017
5SU1 374-7AK82	2/10	B		1	1	017
5SU1 374-8AK81	2/10	B		1	1	017
5SU1 6						
5SU1 624-6KK82	2/24	B		1	1	011
5SU1 624-6WK82	2/25	B		1	1	011
5SU1 624-7KK82	2/24	B		1	1	011
5SU1 624-7WK82	2/25	B		1	1	011
5SU1 644-6KK82	2/24	B		1	1	011
5SU1 644-6WK82	2/25	B		1	1	011
5SU1 644-7KK82	2/24	B		1	1	011
5SU1 644-7WK82	2/25	B		1	1	011
5SU1 654-6KK06	2/24	B		1	1	011
5SU1 654-6KK10	2/24	B		1	1	011
5SU1 654-6KK13	2/24	B		1	1	011
5SU1 654-6KK16	2/24	B		1	1	011
5SU1 654-6KK20	2/24	B		1	1	011
5SU1 654-6KK25	2/24	B		1	1	011
5SU1 654-6KK32	2/24	B		1	1	011
5SU1 654-6KK40	2/24	B		1	1	011
5SU1 654-7KK06	2/24	B		1	1	011
5SU1 654-7KK10	2/24	B		1	1	011
5SU1 654-7KK13	2/24	B		1	1	011
5SU1 654-7KK16	2/24	B		1	1	011
5SU1 654-7KK20	2/24	B		1	1	011
5SU1 654-7KK25	2/24	B		1	1	011
5SU1 654-7KK32	2/24	B		1	1	011
5SU1 654-7KK40	2/24	B		1	1	011
5SU1 656-6KK06	2/23	B		1	1	011
5SU1 656-6KK10	2/23	B		1	1	011
5SU1 656-6KK13	2/23	B		1	1	011
5SU1 656-6KK16	2/23	B		1	1	011
5SU1 656-6KK20	2/23	B		1	1	011
5SU1 656-6KK25	2/23	B		1	1	011
5SU1 656-6KK32	2/23	B		1	1	011
5SU1 656-6KK40	2/23	B		1	1	011
5SU1 656-7KK06	2/23	B		1	1	011
5SU1 656-7KK10	2/23	A		1	1	011
5SU1 656-7KK13	2/23	B		1	1	011
5SU1 656-7KK16	2/23	A		1	1	011
5SU1 656-7KK20	2/23	B		1	1	011
5SU1 656-7KK25	2/23	B		1	1	011
5SU1 656-7KK32	2/23	B		1	1	011
5SU1 656-7KK40	2/23	B		1	1	011
5SU1 674-7AK81	2/10	B		1	1	017
5SU1 674-7AK82	2/10	B		1	1	017
5SU1 674-7BK82	2/10	B		1	1	017
5SU1 674-7CK81	2/10	B		1	1	017
5SU1 674-7CK82	2/10	B		1	1	017
5SU1 674-8AK81	2/10	B		1	1	017
5SU1 674-8BK81	2/10	B		1	1	017
5SW1						
5SW1 200	1/33, 2/35	A		1	1	008
5SW3						
5SW3 004	1/33, 2/35	B		1	1	008
5SW3 005	1/33, 2/35	B		1	1	008
5SW3 006	1/33, 2/35	B		1	1/4	008
5SW3 007	1/33, 2/35	B		1	1	008
5SW3 008	2/15	A		1	1/50	008
5SW3 010	2/15	A		1	1/50	008
5SW3 011	2/15	A		1	1/50	008
5SW3 300	2/15	▶		1	1/10	008
5SW3 301	2/15	C		1	1/10	008
5SW3 302	2/15	A		1	1/10	008
5SW3 303	2/15	B		1	1	008
5SW3 312	2/15	B		1 set	1 set	008
5SW3 330	2/15	B		1	1	008
5SY4 1						
5SY4 101-5	1/9	A		1	1	001
5SY4 101-7	1/11	▶		1	1/12	003
5SY4 101-8	1/11	A		1	1	004
5SY4 102-5	1/9	A		1	1	001
5SY4 102-7	1/11	▶		1	1/12	003
5SY4 102-8	1/11	A		1	1/12	004
5SY4 103-5	1/9	A		1	1	001
5SY4 103-7	1/11	A		1	1/12	003
5SY4 103-8	1/11	A		1	1	004
5SY4 104-5	1/9	A		1	1/12	001
5SY4 104-7	1/11	▶		1	1/12	003
5SY4 104-8	1/11	A		1	1/12	004
5SY4 105-7	1/11	A		1	1	003
5SY4 105-8	1/11	B		1	1	004
5SY4 106-5	1/9	A		1	1/12	001
5SY4 106-6	1/9	A		1	1/12	002
5SY4 106-7	1/11	▶		1	1/12	003
5SY4 106-8	1/11	A		1	1	004
5SY4 108-5	1/9	B		1	1	001
5SY4 108-7	1/11	A		1	1	003
5SY4 108-8	1/11	A		1	1	004
5SY4 110-5	1/9	A		1	1	001
5SY4 110-6	1/9	▶		1	1/12	002
5SY4 110-7	1/11	▶		1	1/12	003
5SY4 110-8	1/11	A		1	1/12	004
5SY4 113-5	1/9	C		1	1	001
5SY4 113-6	1/9	A		1	1	002
5SY4 113-7	1/11	A		1	1/12	003
5SY4 113-8	1/11	B		1	1	004
5SY4 114-7	1/11	B		1	1	003
5SY4 114-8	1/11	C		1	1	004
5SY4 115-5	1/9	B		1	1	001
5SY4 115-7	1/11	A		1	1	003
5SY4 115-8	1/11	B		1	1	004
5SY4 116-5	1/9	A		1	1	001
5SY4 116-6	1/9	▶		1	1/12	002
5SY4 116-7	1/11	▶		1	1/12	003
5SY4 116-8	1/11	A		1	1	004
5SY4 120-5	1/9	A		1	1	001
5SY4 120-6	1/9	A		1	1	002
5SY4 120-7	1/11	▶		1	1	003
5SY4 120-8	1/11	A		1	1	004

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY4 125-5	1/9	A		1	1	001
5SY4 125-6	1/9	▶		1	1	002
5SY4 125-7	1/11	▶		1	1	003
5SY4 125-8	1/11	B		1	1	004
5SY4 132-5	1/9	B		1	1	001
5SY4 132-6	1/9	A		1	1	002
5SY4 132-7	1/11	▶		1	1	003
5SY4 132-8	1/11	B		1	1	004
5SY4 140-5	1/9	B		1	1	001
5SY4 140-6	1/9	B		1	1	002
5SY4 140-7	1/11	A		1	1	003
5SY4 140-8	1/11	B		1	1	004
5SY4 150-5	1/9	C		1	1	001
5SY4 150-6	1/9	B		1	1	002
5SY4 150-7	1/11	A		1	1	003
5SY4 150-8	1/11	B		1	1	004
5SY4 163-5	1/9	C		1	1	001
5SY4 163-6	1/9	B		1	1	002
5SY4 163-7	1/11	B		1	1	003
5SY4 163-8	1/11	B		1	1	004
5SY4 180-6	1/9	C		1	1	002
5SY4 180-7	1/11	B		1	1	003
5SY4 2						
5SY4 201-5	1/9	B		1	1	001
5SY4 201-7	1/11	A		1	1	003
5SY4 201-8	1/11	A		1	1	004
5SY4 202-5	1/9	A		1	1	001
5SY4 202-7	1/11	A		1	1/6	003
5SY4 202-8	1/11	A		1	1	004
5SY4 203-5	1/9	B		1	1	001
5SY4 203-7	1/11	A		1	1	003
5SY4 203-8	1/11	A		1	1	004
5SY4 204-5	1/9	A		1	1	001
5SY4 204-7	1/11	A		1	1/6	003
5SY4 204-8	1/11	A		1	1	004
5SY4 205-7	1/11	A		1	1	003
5SY4 205-8	1/11	A		1	1	004
5SY4 206-5	1/9	A		1	1	001
5SY4 206-6	1/9	A		1	1	002
5SY4 206-7	1/11	A		1	1/6	003
5SY4 206-8	1/11	A		1	1	004
5SY4 208-5	1/9	C		1	1	001
5SY4 208-7	1/11	A		1	1	003
5SY4 208-8	1/11	A		1	1	004
5SY4 210-5	1/9	A		1	1	001
5SY4 210-6	1/9	A		1	1/6	002
5SY4 210-7	1/11	▶		1	1/6	003
5SY4 210-8	1/11	A		1	1	004
5SY4 213-5	1/9	C		1	1	001
5SY4 213-6	1/9	B		1	1	002
5SY4 213-7	1/11	A		1	1	003
5SY4 213-8	1/11	A		1	1	004
5SY4 214-7	1/11	A		1	1	003
5SY4 214-8	1/11	B		1	1	004
5SY4 215-5	1/9	B		1	1	001
5SY4 215-7	1/11	A		1	1	003
5SY4 215-8	1/11	A		1	1	004
5SY4 216-5	1/9	A		1	1	001
5SY4 216-6	1/9	▶		1	1/6	002
5SY4 216-7	1/11	▶		1	1/6	003
5SY4 216-8	1/11	A		1	1	004
5SY4 220-5	1/9	B		1	1	001
5SY4 220-6	1/9	A		1	1	002
5SY4 220-7	1/11	A		1	1	003
5SY4 220-8	1/11	A		1	1	004
5SY4 225-5	1/9	B		1	1	001
5SY4 225-6	1/9	A		1	1	002
5SY4 225-7	1/11	A		1	1/6	003
5SY4 225-8	1/11	A		1	1	004
5SY4 232-5	1/9	A		1	1	001
5SY4 232-6	1/9	B		1	1	002
5SY4 232-7	1/11	A		1	1	003
5SY4 232-8	1/11	A		1	1	004
5SY4 240-5	1/9	B		1	1	001
5SY4 240-6	1/9	B		1	1	002
5SY4 240-7	1/11	A		1	1	003
5SY4 240-8	1/11	A		1	1	004
5SY4 250-5	1/9	C		1	1	001
5SY4 250-6	1/9	B		1	1	002
5SY4 250-7	1/11	A		1	1	003
5SY4 250-8	1/11	B		1	1	004
5SY4 263-5	1/9	C		1	1	001
5SY4 263-6	1/9	B		1	1	002
5SY4 263-7	1/11	A		1	1	003
5SY4 263-8	1/11	B		1	1	004
5SY4 280-6	1/9	C		1	1	002
5SY4 280-7	1/11	B		1	1/6	003
5SY4 3						
5SY4 301-5	1/10	C		1	1	001
5SY4 301-7	1/12	A		1	1	003
5SY4 301-8	1/12	A		1	1	004
5SY4 302-5	1/10	B		1	1	001
5SY4 302-7	1/12	A		1	1	003
5SY4 302-8	1/12	A		1	1	004
5SY4 303-5	1/10	C		1	1	001
5SY4 303-7	1/12	A		1	1	003
5SY4 303-8	1/12	A		1	1	004
5SY4 304-5	1/10	B		1	1	001
5SY4 304-7	1/12	A		1	1	003
5SY4 304-8	1/12	A		1	1	004
5SY4 305-7	1/12	B		1	1	003
5SY4 305-8	1/12	B		1	1	004
5SY4 306-5	1/10	B		1	1	001
5SY4 306-6	1/10	A		1	1	002
5SY4 306-7	1/12	▶		1	1	003
5SY4 306-8	1/12	A		1	1	004
5SY4 308-5	1/10	C		1	1	001
5SY4 308-7	1/12	A		1	1	003
5SY4 308-8	1/12	B		1	1	004
5SY4 310-5	1/10	B		1	1	001
5SY4 310-6	1/10	▶		1	1	002
5SY4 310-7	1/12	▶		1	1/4	003
5SY4 310-8	1/12	A		1	1	004
5SY4 313-5	1/10	C		1	1	001
5SY4 313-6	1/10	B		1	1	002
5SY4 313-7	1/12	A		1	1	003
5SY4 313-8	1/12	B		1	1	004
5SY4 314-7	1/12	C		1	1	003
5SY4 314-8	1/12	C		1	1	004
5SY4 315-5	1/10	C		1	1	001
5SY4 315-7	1/12	C		1	1	003
5SY4 315-8	1/12	B		1	1	004
5SY4 316-5	1/10	A		1	1	001
5SY4 316-6	1/10	▶		1	1/4	002
5SY4 316-7	1/12	▶		1	1/4	003
5SY4 316-8	1/12	A		1	1/4	004
5SY4 320-5	1/10	B		1	1	001
5SY4 320-6	1/10	A		1	1	002
5SY4 320-7	1/12	▶		1	1	003
5SY4 320-8	1/12	A		1	1	004

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY4 325-5	1/10	B		1	1	001
5SY4 325-6	1/10	A		1	1	002
5SY4 325-7	1/12	►		1	1	003
5SY4 325-8	1/12	A		1	1	004
5SY4 332-5	1/10	B		1	1	001
5SY4 332-6	1/10	►		1	1/4	002
5SY4 332-7	1/12	►		1	1/4	003
5SY4 332-8	1/12	A		1	1	004
5SY4 340-5	1/10	B		1	1	001
5SY4 340-6	1/10	A		1	1	002
5SY4 340-7	1/12	A		1	1	003
5SY4 340-8	1/12	A		1	1	004
5SY4 350-5	1/10	B		1	1	001
5SY4 350-6	1/10	A		1	1	002
5SY4 350-7	1/12	A		1	1	003
5SY4 350-8	1/12	A		1	1	004
5SY4 363-5	1/10	C		1	1	001
5SY4 363-6	1/10	A		1	1	002
5SY4 363-7	1/12	A		1	1	003
5SY4 363-8	1/12	A		1	1	004
5SY4 380-6	1/10	B		1	1	002
5SY4 380-7	1/12	B		1	1	003
5SY4 4						
5SY4 401-5	1/10	C		1	1	001
5SY4 401-7	1/12	C		1	1	003
5SY4 401-8	1/12	C		1	1	004
5SY4 402-5	1/10	C		1	1	001
5SY4 402-7	1/12	B		1	1	003
5SY4 402-8	1/12	C		1	1	004
5SY4 403-5	1/10	C		1	1	001
5SY4 403-7	1/12	C		1	1	003
5SY4 403-8	1/12	C		1	1	004
5SY4 404-5	1/10	C		1	1	001
5SY4 404-7	1/12	B		1	1	003
5SY4 404-8	1/12	C		1	1	004
5SY4 405-7	1/12	C		1	1	003
5SY4 405-8	1/12	C		1	1	004
5SY4 406-5	1/10	C		1	1	001
5SY4 406-6	1/10	A		1	1	002
5SY4 406-7	1/12	A		1	1	003
5SY4 406-8	1/12	B		1	1	004
5SY4 408-5	1/10	C		1	1	001
5SY4 408-7	1/12	C		1	1	003
5SY4 408-8	1/12	C		1	1	004
5SY4 410-5	1/10	C		1	1	001
5SY4 410-6	1/10	B		1	1	002
5SY4 410-7	1/12	A		1	1	003
5SY4 410-8	1/12	A		1	1	004
5SY4 413-5	1/10	C		1	1	001
5SY4 413-6	1/10	C		1	1	002
5SY4 413-7	1/12	C		1	1	003
5SY4 413-8	1/12	C		1	1	004
5SY4 414-7	1/12	C		1	1	003
5SY4 414-8	1/12	C		1	1	004
5SY4 415-5	1/10	C		1	1	001
5SY4 415-7	1/12	C		1	1	003
5SY4 415-8	1/12	C		1	1	004
5SY4 416-5	1/10	C		1	1	001
5SY4 416-6	1/10	A		1	1	002
5SY4 416-7	1/12	A		1	1/3	003
5SY4 416-8	1/12	►		1	1	004
5SY4 420-5	1/10	C		1	1	001
5SY4 420-6	1/10	C		1	1	002
5SY4 420-7	1/12	A		1	1	003
5SY4 420-8	1/12	A		1	1	004

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY4 425-5	1/10	C		1	1	001
5SY4 425-6	1/10	B		1	1	002
5SY4 425-7	1/12	A		1	1	003
5SY4 425-8	1/12	A		1	1	004
5SY4 432-5	1/10	C		1	1	001
5SY4 432-6	1/10	B		1	1	002
5SY4 432-7	1/12	A		1	1/3	003
5SY4 432-8	1/12	►		1	1	004
5SY4 440-5	1/10	C		1	1	001
5SY4 440-6	1/10	B		1	1	002
5SY4 440-7	1/12	A		1	1	003
5SY4 440-8	1/12	A		1	1	004
5SY4 450-5	1/10	C		1	1	001
5SY4 450-6	1/10	B		1	1	002
5SY4 450-7	1/12	A		1	1	003
5SY4 450-8	1/12	A		1	1	004
5SY4 463-5	1/10	C		1	1	001
5SY4 463-6	1/10	B		1	1	002
5SY4 463-7	1/12	A		1	1	003
5SY4 463-8	1/12	A		1	1	004
5SY4 480-6	1/10	B		1	1	002
5SY4 480-7	1/12	B		1	1	003
5SY4 5						
5SY4 501-5	1/9	C		1	1	001
5SY4 501-7	1/11	A		1	1	003
5SY4 501-8	1/11	B		1	1	004
5SY4 502-5	1/9	B		1	1	001
5SY4 502-7	1/11	A		1	1	003
5SY4 502-8	1/11	A		1	1	004
5SY4 503-5	1/9	C		1	1	001
5SY4 503-7	1/11	A		1	1	003
5SY4 503-8	1/11	B		1	1	004
5SY4 504-5	1/9	B		1	1	001
5SY4 504-7	1/11	A		1	1	003
5SY4 504-8	1/11	B		1	1	004
5SY4 505-7	1/11	B		1	1	003
5SY4 505-8	1/11	C		1	1	004
5SY4 506-5	1/9	C		1	1	001
5SY4 506-6	1/9	A		1	1	002
5SY4 506-7	1/11	A		1	1	003
5SY4 506-8	1/11	A		1	1	004
5SY4 508-5	1/9	C		1	1	001
5SY4 508-7	1/11	B		1	1	003
5SY4 508-8	1/11	C		1	1	004
5SY4 510-5	1/9	B		1	1	001
5SY4 510-6	1/9	A		1	1	002
5SY4 510-7	1/11	A		1	1	003
5SY4 510-8	1/11	A		1	1	004
5SY4 513-5	1/9	C		1	1	001
5SY4 513-6	1/9	A		1	1/6	002
5SY4 513-7	1/11	A		1	1/6	003
5SY4 513-8	1/11	B		1	1	004
5SY4 514-7	1/11	C		1	1	003
5SY4 514-8	1/11	C		1	1	004
5SY4 515-5	1/9	B		1	1	001
5SY4 515-7	1/11	C		1	1	003
5SY4 515-8	1/11	C		1	1	004
5SY4 516-5	1/9	C		1	1	001
5SY4 516-6	1/9	A		1	1/6	002
5SY4 516-7	1/11	A		1	1/6	003
5SY4 516-8	1/11	A		1	1	004
5SY4 520-5	1/9	C		1	1	001
5SY4 520-6	1/9	B		1	1	002
5SY4 520-7	1/11	A		1	1	003
5SY4 520-8	1/11	B		1	1	004

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SY4 525-5	1/9	C		1	1	001
5SY4 525-6	1/9	B		1	1	002
5SY4 525-7	1/11	A		1	1	003
5SY4 525-8	1/11	B		1	1	004
5SY4 532-5	1/9	C		1	1	001
5SY4 532-6	1/9	B		1	1	002
5SY4 532-7	1/11	A		1	1	003
5SY4 532-8	1/11	B		1	1	004
5SY4 540-5	1/9	C		1	1	001
5SY4 540-6	1/9	C		1	1	002
5SY4 540-7	1/11	B		1	1	003
5SY4 540-8	1/11	C		1	1	004
5SY4 550-5	1/9	C		1	1	001
5SY4 550-6	1/9	C		1	1	002
5SY4 550-7	1/11	C		1	1	003
5SY4 550-8	1/11	C		1	1	004
5SY4 563-5	1/9	C		1	1	001
5SY4 563-6	1/9	C		1	1	002
5SY4 563-7	1/11	C		1	1	003
5SY4 563-8	1/11	C		1	1	004
5SY4 580-7	1/11	B		1	1	003
5SY4 6						
5SY4 601-5	1/10	C		1	1	001
5SY4 601-7	1/12	C		1	1	003
5SY4 601-8	1/12	C		1	1	004
5SY4 602-5	1/10	C		1	1	001
5SY4 602-7	1/12	B		1	1	003
5SY4 602-8	1/12	C		1	1	004
5SY4 603-5	1/10	C		1	1	001
5SY4 603-7	1/12	B		1	1	003
5SY4 603-8	1/12	C		1	1	004
5SY4 604-5	1/10	C		1	1	001
5SY4 604-7	1/12	C		1	1	003
5SY4 604-8	1/12	C		1	1	004
5SY4 605-7	1/12	C		1	1	003
5SY4 605-8	1/12	C		1	1	004
5SY4 606-5	1/10	C		1	1	001
5SY4 606-6	1/10	B		1	1	002
5SY4 606-7	1/12	B		1	1	003
5SY4 606-8	1/12	C		1	1	004
5SY4 608-5	1/10	C		1	1	001
5SY4 608-7	1/12	C		1	1	003
5SY4 608-8	1/12	C		1	1	004
5SY4 610-5	1/10	C		1	1	001
5SY4 610-6	1/10	B		1	1	002
5SY4 610-7	1/12	A		1	1	003
5SY4 610-8	1/12	B		1	1	004
5SY4 613-5	1/10	C		1	1	001
5SY4 613-6	1/10	C		1	1	002
5SY4 613-7	1/12	B		1	1	003
5SY4 613-8	1/12	C		1	1	004
5SY4 614-7	1/12	C		1	1	003
5SY4 614-8	1/12	C		1	1	004
5SY4 615-5	1/10	C		1	1	001
5SY4 615-7	1/12	C		1	1	003
5SY4 615-8	1/12	C		1	1	004
5SY4 616-5	1/10	C		1	1	001
5SY4 616-6	1/10	A		1	1	002
5SY4 616-7	1/12	A		1	1	003
5SY4 616-8	1/12	A		1	1	004
5SY4 620-5	1/10	C		1	1	001
5SY4 620-6	1/10	B		1	1	002
5SY4 620-7	1/12	A		1	1	003
5SY4 620-8	1/12	B		1	1	004
5SY4 625-5	1/10	C		1	1	001
5SY4 625-6	1/10	A		1	1	002
5SY4 625-7	1/12	A		1	1	003
5SY4 625-8	1/12	A		1	1	004
5SY4 632-5	1/10	C		1	1	001
5SY4 632-6	1/10	B		1	1	002
5SY4 632-7	1/12	A		1	1	003
5SY4 632-8	1/12	A		1	1	004
5SY4 640-5	1/10	C		1	1	001
5SY4 640-6	1/10	C		1	1	002
5SY4 640-7	1/12	A		1	1	003
5SY4 640-8	1/12	A		1	1	004
5SY4 650-5	1/10	C		1	1	001
5SY4 650-6	1/10	C		1	1	002
5SY4 650-7	1/12	B		1	1	003
5SY4 650-8	1/12	A		1	1	004
5SY4 663-5	1/10	C		1	1	001
5SY4 663-6	1/10	A		1	1	002
5SY4 663-7	1/12	A		1	1	003
5SY4 663-8	1/12	B		1	1	004
5SY4 680-7	1/12	B		1	1	003
5SY5 1						
5SY5 101-7	1/14	A		1	1	003
5SY5 102-6	1/14	C		1	1	002
5SY5 102-7	1/14	A		1	1	003
5SY5 103-7	1/14	A		1	1	003
5SY5 104-6	1/14	B		1	1	002
5SY5 104-7	1/14	A		1	1	003
5SY5 105-7	1/14	B		1	1	003
5SY5 106-6	1/14	A		1	1	002
5SY5 106-7	1/14	▶		1	1	003
5SY5 108-7	1/14	A		1	1	003
5SY5 110-6	1/14	A		1	1	002
5SY5 110-7	1/14	▶		1	1	003
5SY5 113-6	1/14	C		1	1	002
5SY5 113-7	1/14	B		1	1	003
5SY5 114-7	1/14	C		1	1	003
5SY5 115-7	1/14	A		1	1	003
5SY5 116-6	1/14	A		1	1	002
5SY5 116-7	1/14	A		1	1	003
5SY5 120-6	1/14	C		1	1	002
5SY5 120-7	1/14	A		1	1	003
5SY5 125-6	1/14	C		1	1	002
5SY5 125-7	1/14	B		1	1	003
5SY5 132-6	1/14	C		1	1	002
5SY5 132-7	1/14	B		1	1	003
5SY5 140-6	1/14	C		1	1	002
5SY5 140-7	1/14	C		1	1	003
5SY5 150-6	1/14	C		1	1	002
5SY5 150-7	1/14	C		1	1	003
5SY5 163-6	1/14	C		1	1	002
5SY5 163-7	1/14	C		1	1	003
5SY5 2						
5SY5 201-7	1/14	A		1	1	003
5SY5 202-7	1/14	▶		1	1	003
5SY5 203-7	1/14	▶		1	1	003
5SY5 204-7	1/14	A		1	1	003
5SY5 205-7	1/14	B		1	1	003
5SY5 206-6	1/14	A		1	1	002
5SY5 206-7	1/14	▶		1	1/6	003
5SY5 208-7	1/14	B		1	1	003
5SY5 210-6	1/14	A		1	1	002
5SY5 210-7	1/14	▶		1	1	003
5SY5 213-6	1/14	C		1	1	002
5SY5 213-7	1/14	B		1	1	003
5SY5 214-7	1/14	C		1	1	003

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY5 215-7	1/14	B		1	1	003
5SY5 216-6	1/14	A		1	1	002
5SY5 216-7	1/14	▶		1	1	003
5SY5 220-6	1/14	A		1	1	002
5SY5 220-7	1/14	A		1	1	003
5SY5 225-6	1/14	C		1	1	002
5SY5 225-7	1/14	A		1	1	003
5SY5 232-6	1/14	B		1	1	002
5SY5 232-7	1/14	B		1	1	003
5SY5 240-6	1/14	C		1	1	002
5SY5 240-7	1/14	B		1	1	003
5SY5 250-6	1/14	C		1	1	002
5SY5 250-7	1/14	A		1	1	003
5SY5 263-6	1/14	C		1	1	002
5SY5 263-7	1/14	A		1	1	003
5SY6 0						
5SY6 002-7	1/26	A		1	1	003
5SY6 002-7KL	1/26	A		1	1	003
5SY6 004-7	1/26	A		1	1	003
5SY6 004-7KL	1/26	A		1	1	003
5SY6 006-6	1/26	A		1	1	002
5SY6 006-7	1/26	A		1	1	003
5SY6 006-7KL	1/26	D		1	1	003
5SY6 008-7	1/26	D		1	1	003
5SY6 008-7KL	1/26	D		1	1	003
5SY6 010-6	1/26	A		1	1	002
5SY6 010-7	1/26	A		1	1	003
5SY6 010-7KL	1/26	A		1	1	003
5SY6 013-6	1/26	A		1	1	002
5SY6 013-7	1/26	A		1	1	003
5SY6 013-7KL	1/26	D		1	1	003
5SY6 016-6	1/26	A		1	1	002
5SY6 016-7	1/26	A		1	1	003
5SY6 016-7KL	1/26	D		1	1	003
5SY6 020-6	1/26	A		1	1	002
5SY6 020-7	1/26	A		1	1	003
5SY6 020-7KL	1/26	D		1	1	003
5SY6 025-6	1/26	A		1	1	002
5SY6 025-7	1/26	A		1	1	003
5SY6 025-7KL	1/26	D		1	1	003
5SY6 032-6	1/26	A		1	1	002
5SY6 032-7	1/26	A		1	1	003
5SY6 032-7KL	1/26	D		1	1	003
5SY6 040-6	1/26	A		1	1	002
5SY6 040-7	1/26	D		1	1	003
5SY6 040-7KL	1/26	D		1	1	003
5SY6 1						
5SY6 101-7	1/7	▶		1	1/12	003
5SY6 101-8	1/7	A		1	1	004
5SY6 102-6	1/6	B		1	1	002
5SY6 102-7	1/7	▶		1	1/12	003
5SY6 102-8	1/7	A		1	1/12	004
5SY6 103-7	1/7	A		1	1/12	003
5SY6 103-8	1/7	A		1	1	004
5SY6 104-6	1/6	B		1	1	002
5SY6 104-7	1/7	▶		1	1/12	003
5SY6 104-8	1/7	A		1	1	004
5SY6 105-7	1/7	A		1	1/12	003
5SY6 105-8	1/7	A		1	1	004
5SY6 106-6	1/6	▶		1	1/12	002
5SY6 106-7	1/7	▶		1	1/12	003
5SY6 106-8	1/7	A		1	1/12	004
5SY6 108-7	1/7	A		1	1/12	003
5SY6 108-8	1/7	A		1	1	004
5SY6 110-6	1/6	▶		1	1/12	002
5SY6 110-7	1/7	▶		1	1/12	003
5SY6 110-8	1/7	A		1	1	004
5SY6 113-6	1/6	A		1	1/12	002
5SY6 113-7	1/7	A		1	1/12	003
5SY6 113-8	1/7	A		1	1	004
5SY6 114-7	1/7	A		1	1	003
5SY6 114-8	1/7	C		1	1	004
5SY6 115-7	1/7	A		1	1	003
5SY6 115-8	1/7	C		1	1	004
5SY6 116-6	1/6	▶		1	1/12	002
5SY6 116-7	1/7	▶		1	1/12	003
5SY6 116-8	1/7	A		1	1	004
5SY6 120-6	1/6	A		1	1/12	002
5SY6 120-7	1/7	▶		1	1/12	003
5SY6 120-8	1/7	A		1	1	004
5SY6 125-6	1/6	A		1	1/12	002
5SY6 125-7	1/7	▶		1	1/12	003
5SY6 125-8	1/7	A		1	1	004
5SY6 132-6	1/6	A		1	1/12	002
5SY6 132-7	1/7	▶		1	1/12	003
5SY6 132-8	1/7	B		1	1	004
5SY6 140-6	1/6	B		1	1	002
5SY6 140-7	1/7	A		1	1/12	003
5SY6 140-8	1/7	B		1	1	004
5SY6 150-6	1/6	B		1	1	002
5SY6 150-7	1/7	A		1	1/12	003
5SY6 150-8	1/7	B		1	1	004
5SY6 163-6	1/6	B		1	1	002
5SY6 163-7	1/7	A		1	1/12	003
5SY6 163-8	1/7	B		1	1	004
5SY6 2						
5SY6 201-7	1/7	A		1	1/6	003
5SY6 201-8	1/7	A		1	1	004
5SY6 202-7	1/7	▶		1	1/6	003
5SY6 202-8	1/7	A		1	1/6	004
5SY6 203-7	1/7	A		1	1/6	003
5SY6 203-8	1/7	A		1	1	004
5SY6 204-7	1/7	▶		1	1/6	003
5SY6 204-8	1/7	A		1	1/6	004
5SY6 205-7	1/7	A		1	1	003
5SY6 205-8	1/7	A		1	1	004
5SY6 206-6	1/6	A		1	1/6	002
5SY6 206-7	1/7	▶		1	1/6	003
5SY6 206-8	1/7	A		1	1/6	004
5SY6 208-7	1/7	A		1	1	003
5SY6 208-8	1/7	A		1	1	004
5SY6 210-6	1/6	A		1	1/6	002
5SY6 210-7	1/7	▶		1	1/6	003
5SY6 210-8	1/7	A		1	1/6	004
5SY6 213-6	1/6	B		1	1	002
5SY6 213-7	1/7	A		1	1	003
5SY6 213-8	1/7	B		1	1	004
5SY6 214-7	1/7	B		1	1	003
5SY6 214-8	1/7	B		1	1	004
5SY6 215-7	1/7	A		1	1	003
5SY6 215-8	1/7	A		1	1	004
5SY6 216-6	1/6	A		1	1/6	002
5SY6 216-7	1/7	▶		1	1/6	003
5SY6 216-8	1/7	A		1	1	004
5SY6 220-6	1/6	B		1	1	002
5SY6 220-7	1/7	▶		1	1/6	003
5SY6 220-8	1/7	A		1	1	004
5SY6 225-6	1/6	B		1	1	002
5SY6 225-7	1/7	A		1	1/6	003
5SY6 225-8	1/7	A		1	1	004

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY6 232-6	1/6	A		1	1	002
5SY6 232-7	1/7	A		1	1/6	003
5SY6 232-8	1/7	A		1	1	004
5SY6 240-6	1/6	B		1	1	002
5SY6 240-7	1/7	A		1	1	003
5SY6 240-8	1/7	B		1	1	004
5SY6 250-6	1/6	C		1	1	002
5SY6 250-7	1/7	A		1	1	003
5SY6 250-8	1/7	B		1	1	004
5SY6 263-6	1/6	C		1	1	002
5SY6 263-7	1/7	A		1	1	003
5SY6 263-8	1/7	B		1	1	004
5SY6 3						
5SY6 301-7	1/8	A		1	1	003
5SY6 301-8	1/8	A		1	1	004
5SY6 302-7	1/8	A		1	1/4	003
5SY6 302-8	1/8	A		1	1	004
5SY6 303-7	1/8	A		1	1	003
5SY6 303-8	1/8	A		1	1	004
5SY6 304-7	1/8	A		1	1/4	003
5SY6 304-8	1/8	A		1	1	004
5SY6 305-7	1/8	A		1	1	003
5SY6 305-8	1/8	C		1	1	004
5SY6 306-6	1/6	A		1	1	002
5SY6 306-7	1/8	▶		1	1/4	003
5SY6 306-8	1/8	A		1	1	004
5SY6 308-7	1/8	A		1	1	003
5SY6 308-8	1/8	B		1	1	004
5SY6 310-6	1/6	A		1	1/4	002
5SY6 310-7	1/8	▶		1	1/4	003
5SY6 310-8	1/8	A		1	1	004
5SY6 313-6	1/6	B		1	1	002
5SY6 313-7	1/8	A		1	1	003
5SY6 313-8	1/8	B		1	1	004
5SY6 314-7	1/8	C		1	1	003
5SY6 314-8	1/8	C		1	1	004
5SY6 315-7	1/8	B		1	1	003
5SY6 315-8	1/8	C		1	1	004
5SY6 316-6	1/6	▶		1	1/4	002
5SY6 316-7	1/8	▶		1	1/4	003
5SY6 316-8	1/8	A		1	1	004
5SY6 320-6	1/6	A		1	1	002
5SY6 320-7	1/8	▶		1	1/4	003
5SY6 320-8	1/8	A		1	1	004
5SY6 325-6	1/6	A		1	1	002
5SY6 325-7	1/8	▶		1	1/4	003
5SY6 325-8	1/8	A		1	1	004
5SY6 332-6	1/6	A		1	1/4	002
5SY6 332-7	1/8	▶		1	1/4	003
5SY6 332-8	1/8	A		1	1	004
5SY6 340-6	1/6	A		1	1	002
5SY6 340-7	1/8	A		1	1/4	003
5SY6 340-8	1/8	A		1	1	004
5SY6 350-6	1/6	B		1	1	002
5SY6 350-7	1/8	A		1	1/4	003
5SY6 350-8	1/8	A		1	1	004
5SY6 363-6	1/6	B		1	1	002
5SY6 363-7	1/8	A		1	1/4	003
5SY6 363-8	1/8	A		1	1	004
5SY6 4						
5SY6 401-7	1/8	B		1	1	003
5SY6 401-8	1/8	C		1	1	004
5SY6 402-7	1/8	A		1	1	003
5SY6 402-8	1/8	C		1	1	004
5SY6 403-7	1/8	B		1	1	003
5SY6 403-8	1/8	C		1	1	004
5SY6 404-7	1/8	B		1	1	003
5SY6 404-8	1/8	C		1	1	004
5SY6 405-7	1/8	C		1	1	003
5SY6 405-8	1/8	C		1	1	004
5SY6 406-6	1/6	C		1	1	002
5SY6 406-7	1/8	A		1	1	003
5SY6 406-8	1/8	B		1	1	004
5SY6 408-7	1/8	B		1	1	003
5SY6 408-8	1/8	C		1	1	004
5SY6 410-6	1/6	B		1	1	002
5SY6 410-7	1/8	A		1	1/3	003
5SY6 410-8	1/8	A		1	1	004
5SY6 413-6	1/6	C		1	1	002
5SY6 413-7	1/8	A		1	1	003
5SY6 413-8	1/8	C		1	1	004
5SY6 414-7	1/8	C		1	1	003
5SY6 414-8	1/8	C		1	1	004
5SY6 415-7	1/8	C		1	1	003
5SY6 415-8	1/8	C		1	1	004
5SY6 416-6	1/6	A		1	1	002
5SY6 416-7	1/8	▶		1	1/3	003
5SY6 416-8	1/8	A		1	1	004
5SY6 420-6	1/6	A		1	1	002
5SY6 420-7	1/8	A		1	1/3	003
5SY6 420-8	1/8	A		1	1	004
5SY6 425-6	1/6	A		1	1	002
5SY6 425-7	1/8	▶		1	1/3	003
5SY6 425-8	1/8	A		1	1	004
5SY6 432-6	1/6	B		1	1	002
5SY6 432-7	1/8	▶		1	1/3	003
5SY6 432-8	1/8	A		1	1	004
5SY6 440-6	1/6	B		1	1	002
5SY6 440-7	1/8	▶		1	1/3	003
5SY6 440-8	1/8	A		1	1	004
5SY6 450-6	1/6	B		1	1	002
5SY6 450-7	1/8	A		1	1	003
5SY6 450-8	1/8	A		1	1	004
5SY6 463-6	1/6	B		1	1	002
5SY6 463-7	1/8	A		1	1/3	003
5SY6 463-8	1/8	▶		1	1	004
5SY6 5						
5SY6 501-7	1/7	A		1	1	003
5SY6 501-8	1/7	C		1	1	004
5SY6 502-7	1/7	A		1	1	003
5SY6 502-8	1/7	B		1	1	004
5SY6 503-7	1/7	A		1	1	003
5SY6 503-8	1/7	B		1	1	004
5SY6 504-7	1/7	A		1	1	003
5SY6 504-8	1/7	B		1	1	004
5SY6 505-7	1/7	A		1	1	003
5SY6 505-8	1/7	B		1	1	004
5SY6 506-6	1/6	A		1	1	002
5SY6 506-7	1/7	A		1	1/6	003
5SY6 506-8	1/7	A		1	1	004
5SY6 508-7	1/7	B		1	1	003
5SY6 508-8	1/7	B		1	1	004
5SY6 510-6	1/6	A		1	1	002
5SY6 510-7	1/7	A		1	1/6	003
5SY6 510-8	1/7	B		1	1	004
5SY6 513-6	1/6	A		1	1/6	002
5SY6 513-7	1/7	A		1	1/6	003
5SY6 513-8	1/7	C		1	1	004
5SY6 514-7	1/7	B		1	1	003
5SY6 514-8	1/7	C		1	1	004

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY6 515-7	1/7	B		1	1	003
5SY6 515-8	1/7	B		1	1	004
5SY6 516-6	1/6	A		1	1/6	002
5SY6 516-7	1/7	▶		1	1/6	003
5SY6 516-8	1/7	A		1	1	004
5SY6 520-6	1/6	B		1	1	002
5SY6 520-7	1/7	A		1	1	003
5SY6 520-8	1/7	C		1	1	004
5SY6 525-6	1/6	B		1	1	002
5SY6 525-7	1/7	A		1	1	003
5SY6 525-8	1/7	C		1	1	004
5SY6 532-6	1/6	B		1	1	002
5SY6 532-7	1/7	A		1	1	003
5SY6 532-8	1/7	C		1	1	004
5SY6 540-6	1/6	C		1	1	002
5SY6 540-7	1/7	B		1	1	003
5SY6 540-8	1/7	C		1	1	004
5SY6 550-6	1/6	C		1	1	002
5SY6 550-7	1/7	B		1	1	003
5SY6 550-8	1/7	C		1	1	004
5SY6 563-6	1/6	C		1	1	002
5SY6 563-7	1/7	B		1	1	003
5SY6 563-8	1/7	C		1	1	004
5SY6 6						
5SY6 601-7	1/8	C		1	1	003
5SY6 601-8	1/8	C		1	1	004
5SY6 602-7	1/8	A		1	1	003
5SY6 602-8	1/8	C		1	1	004
5SY6 603-7	1/8	C		1	1	003
5SY6 603-8	1/8	C		1	1	004
5SY6 604-7	1/8	B		1	1	003
5SY6 604-8	1/8	C		1	1	004
5SY6 605-7	1/8	C		1	1	003
5SY6 605-8	1/8	C		1	1	004
5SY6 606-6	1/6	B		1	1	002
5SY6 606-7	1/8	A		1	1	003
5SY6 606-8	1/8	A		1	1	004
5SY6 608-7	1/8	C		1	1	003
5SY6 608-8	1/8	C		1	1	004
5SY6 610-6	1/6	B		1	1	002
5SY6 610-7	1/8	A		1	1	003
5SY6 610-8	1/8	B		1	1	004
5SY6 613-6	1/6	B		1	1	002
5SY6 613-7	1/8	B		1	1/3	003
5SY6 613-8	1/8	C		1	1	004
5SY6 614-7	1/8	C		1	1	003
5SY6 614-8	1/8	C		1	1	004
5SY6 615-7	1/8	C		1	1	003
5SY6 615-8	1/8	C		1	1	004
5SY6 616-6	1/6	A		1	1	002
5SY6 616-7	1/8	▶		1	1/3	003
5SY6 616-8	1/8	B		1	1	004
5SY6 620-6	1/6	A		1	1	002
5SY6 620-7	1/8	A		1	1	003
5SY6 620-8	1/8	B		1	1	004
5SY6 625-6	1/6	B		1	1	002
5SY6 625-7	1/8	A		1	1	003
5SY6 625-8	1/8	B		1	1	004
5SY6 632-6	1/6	B		1	1	002
5SY6 632-7	1/8	A		1	1	003
5SY6 632-8	1/8	B		1	1	004
5SY6 640-6	1/6	C		1	1	002
5SY6 640-7	1/8	A		1	1	003
5SY6 640-8	1/8	B		1	1	004
5SY6 650-6	1/6	C		1	1	002
5SY6 650-7	1/8	A		1	1	003
5SY6 650-8	1/8	B		1	1	004
5SY6 663-6	1/6	C		1	1	002
5SY6 663-7	1/8	A		1	1	003
5SY6 663-8	1/8	B		1	1	004
5SY7 1						
5SY7 101-7	1/16	A		1	1	003
5SY7 101-8	1/16	C		1	1	004
5SY7 102-7	1/16	▶		1	1	003
5SY7 102-8	1/16	C		1	1	004
5SY7 103-7	1/16	A		1	1	003
5SY7 103-8	1/16	C		1	1	004
5SY7 104-7	1/16	A		1	1	003
5SY7 104-8	1/16	B		1	1	004
5SY7 105-7	1/16	B		1	1	003
5SY7 105-8	1/16	C		1	1	004
5SY7 106-6	1/15	▶		1	1	002
5SY7 106-7	1/16	▶		1	1	003
5SY7 106-8	1/16	B		1	1	004
5SY7 108-7	1/16	B		1	1	003
5SY7 108-8	1/16	C		1	1	004
5SY7 110-6	1/15	▶		1	1	002
5SY7 110-7	1/16	▶		1	1	003
5SY7 110-8	1/16	B		1	1	004
5SY7 113-6	1/15	C		1	1	002
5SY7 113-7	1/16	B		1	1	003
5SY7 113-8	1/16	C		1	1	004
5SY7 114-7	1/16	B		1	1	003
5SY7 114-8	1/16	C		1	1	004
5SY7 115-7	1/16	B		1	1	003
5SY7 115-8	1/16	C		1	1	004
5SY7 116-6	1/15	▶		1	1	002
5SY7 116-7	1/16	▶		1	1	003
5SY7 116-8	1/16	B		1	1	004
5SY7 120-6	1/15	B		1	1	002
5SY7 120-7	1/16	A		1	1	003
5SY7 120-8	1/16	C		1	1	004
5SY7 125-6	1/15	B		1	1	002
5SY7 125-7	1/16	B		1	1	003
5SY7 125-8	1/16	C		1	1	004
5SY7 132-6	1/15	B		1	1	002
5SY7 132-7	1/16	B		1	1	003
5SY7 132-8	1/16	C		1	1	004
5SY7 140-6	1/15	C		1	1	002
5SY7 140-7	1/16	B		1	1	003
5SY7 140-8	1/16	C		1	1	004
5SY7 150-6	1/15	C		1	1	002
5SY7 150-7	1/16	C		1	1	003
5SY7 150-8	1/16	C		1	1	004
5SY7 163-6	1/15	C		1	1	002
5SY7 163-7	1/16	B		1	1	003
5SY7 163-8	1/16	C		1	1	004
5SY7 2						
5SY7 201-7	1/16	A		1	1	003
5SY7 201-8	1/16	B		1	1	004
5SY7 202-7	1/16	A		1	1	003
5SY7 202-8	1/16	A		1	1	004
5SY7 203-7	1/16	A		1	1	003
5SY7 203-8	1/16	B		1	1	004
5SY7 204-7	1/16	A		1	1	003
5SY7 204-8	1/16	A		1	1	004
5SY7 205-7	1/16	B		1	1	003
5SY7 205-8	1/16	C		1	1	004
5SY7 206-6	1/15	B		1	1	002
5SY7 206-7	1/16	▶		1	1	003

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY7 206-8	1/16	A		1	1	004
5SY7 208-7	1/16	B		1	1	003
5SY7 208-8	1/16	B		1	1	004
5SY7 210-6	1/15	B		1	1	002
5SY7 210-7	1/16	▶		1	1	003
5SY7 210-8	1/16	A		1	1	004
5SY7 213-6	1/15	C		1	1	002
5SY7 213-7	1/16	B		1	1	003
5SY7 213-8	1/16	C		1	1	004
5SY7 214-7	1/16	C		1	1	003
5SY7 214-8	1/16	C		1	1	004
5SY7 215-7	1/16	C		1	1	003
5SY7 215-8	1/16	C		1	1	004
5SY7 216-6	1/15	B		1	1	002
5SY7 216-7	1/16	▶		1	1	003
5SY7 216-8	1/16	A		1	1	004
5SY7 220-6	1/15	B		1	1	002
5SY7 220-7	1/16	A		1	1	003
5SY7 220-8	1/16	B		1	1	004
5SY7 225-6	1/15	B		1	1	002
5SY7 225-7	1/16	A		1	1	003
5SY7 225-8	1/16	B		1	1	004
5SY7 232-6	1/15	C		1	1	002
5SY7 232-7	1/16	A		1	1	003
5SY7 232-8	1/16	C		1	1	004
5SY7 240-6	1/15	C		1	1	002
5SY7 240-7	1/16	A		1	1	003
5SY7 240-8	1/16	C		1	1	004
5SY7 250-6	1/15	C		1	1	002
5SY7 250-7	1/16	B		1	1	003
5SY7 250-8	1/16	C		1	1	004
5SY7 263-6	1/15	C		1	1	002
5SY7 263-7	1/16	B		1	1	003
5SY7 263-8	1/16	C		1	1	004
5SY7 3						
5SY7 301-7	1/17	C		1	1	003
5SY7 301-8	1/17	C		1	1	004
5SY7 302-7	1/17	B		1	1	003
5SY7 302-8	1/17	C		1	1	004
5SY7 303-7	1/17	C		1	1	003
5SY7 303-8	1/17	C		1	1	004
5SY7 304-7	1/17	A		1	1	003
5SY7 304-8	1/17	C		1	1	004
5SY7 305-7	1/17	C		1	1	003
5SY7 305-8	1/17	C		1	1	004
5SY7 306-6	1/15	B		1	1	002
5SY7 306-7	1/17	A		1	1	003
5SY7 306-8	1/17	C		1	1	004
5SY7 308-7	1/17	C		1	1	003
5SY7 308-8	1/17	B		1	1	004
5SY7 310-6	1/15	B		1	1	002
5SY7 310-7	1/17	A		1	1	003
5SY7 310-8	1/17	B		1	1	004
5SY7 313-6	1/15	C		1	1	002
5SY7 313-7	1/17	B		1	1	003
5SY7 313-8	1/17	C		1	1	004
5SY7 314-7	1/17	C		1	1	003
5SY7 314-8	1/17	C		1	1	004
5SY7 315-7	1/17	C		1	1	003
5SY7 315-8	1/17	C		1	1	004
5SY7 316-6	1/15	A		1	1	002
5SY7 316-7	1/17	▶		1	1	003
5SY7 316-8	1/17	A		1	1	004
5SY7 320-6	1/15	B		1	1	002
5SY7 320-7	1/17	▶		1	1	003
5SY7 320-8	1/17	B		1	1	004
5SY7 325-6	1/15	B		1	1	002
5SY7 325-7	1/17	▶		1	1	003
5SY7 325-8	1/17	A		1	1	004
5SY7 332-6	1/15	B		1	1	002
5SY7 332-7	1/17	▶		1	1	003
5SY7 332-8	1/17	B		1	1	004
5SY7 340-6	1/15	B		1	1	002
5SY7 340-7	1/17	▶		1	1	003
5SY7 340-8	1/17	B		1	1	004
5SY7 350-6	1/15	B		1	1	002
5SY7 350-7	1/17	▶		1	1	003
5SY7 350-8	1/17	B		1	1	004
5SY7 363-6	1/15	C		1	1	002
5SY7 363-7	1/17	▶		1	1	003
5SY7 363-8	1/17	B		1	1	004
5SY7 4						
5SY7 401-7	1/17	C		1	1	003
5SY7 401-8	1/17	C		1	1	004
5SY7 402-7	1/17	C		1	1	003
5SY7 402-8	1/17	C		1	1	004
5SY7 403-7	1/17	C		1	1	003
5SY7 403-8	1/17	C		1	1	004
5SY7 404-7	1/17	B		1	1	003
5SY7 404-8	1/17	C		1	1	004
5SY7 405-7	1/17	C		1	1	003
5SY7 405-8	1/17	C		1	1	004
5SY7 406-6	1/15	C		1	1	002
5SY7 406-7	1/17	B		1	1	003
5SY7 406-8	1/17	C		1	1	004
5SY7 408-7	1/17	C		1	1	003
5SY7 408-8	1/17	C		1	1	004
5SY7 410-6	1/15	B		1	1	002
5SY7 410-7	1/17	▶		1	1	003
5SY7 410-8	1/17	B		1	1	004
5SY7 413-6	1/15	C		1	1	002
5SY7 413-7	1/17	C		1	1	003
5SY7 413-8	1/17	C		1	1	004
5SY7 414-7	1/17	C		1	1	003
5SY7 414-8	1/17	C		1	1	004
5SY7 415-7	1/17	C		1	1	003
5SY7 415-8	1/17	C		1	1	004
5SY7 416-6	1/15	B		1	1	002
5SY7 416-7	1/17	▶		1	1	003
5SY7 416-8	1/17	B		1	1	004
5SY7 420-6	1/15	B		1	1	002
5SY7 420-7	1/17	A		1	1	003
5SY7 420-8	1/17	B		1	1	004
5SY7 425-6	1/15	C		1	1	002
5SY7 425-7	1/17	▶		1	1	003
5SY7 425-8	1/17	B		1	1	004
5SY7 432-6	1/15	C		1	1	002
5SY7 432-7	1/17	▶		1	1	003
5SY7 432-8	1/17	B		1	1	004
5SY7 440-6	1/15	C		1	1	002
5SY7 440-7	1/17	A		1	1	003
5SY7 440-8	1/17	B		1	1	004
5SY7 450-6	1/15	C		1	1	002
5SY7 450-7	1/17	A		1	1	003
5SY7 450-8	1/17	B		1	1	004
5SY7 463-6	1/15	C		1	1	002
5SY7 463-7	1/17	▶		1	1	003
5SY7 463-8	1/17	B		1	1	004
5SY7 5						
5SY7 501-7	1/16	B		1	1	003

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY7 501-8	1/16	C		1	1	004
5SY7 502-7	1/16	B		1	1	003
5SY7 502-8	1/16	C		1	1	004
5SY7 503-7	1/16	B		1	1	003
5SY7 503-8	1/16	C		1	1	004
5SY7 504-7	1/16	B		1	1	003
5SY7 504-8	1/16	B		1	1	004
5SY7 505-7	1/16	C		1	1	003
5SY7 505-8	1/16	C		1	1	004
5SY7 506-6	1/15	C		1	1	002
5SY7 506-7	1/16	A		1	1	003
5SY7 506-8	1/16	C		1	1	004
5SY7 508-7	1/16	C		1	1	003
5SY7 508-8	1/16	C		1	1	004
5SY7 510-6	1/15	C		1	1	002
5SY7 510-7	1/16	A		1	1	003
5SY7 510-8	1/16	C		1	1	004
5SY7 513-6	1/15	C		1	1	002
5SY7 513-7	1/16	B		1	1	003
5SY7 513-8	1/16	C		1	1	004
5SY7 514-7	1/16	C		1	1	003
5SY7 514-8	1/16	C		1	1	004
5SY7 515-7	1/16	C		1	1	003
5SY7 515-8	1/16	C		1	1	004
5SY7 516-6	1/15	C		1	1	002
5SY7 516-7	1/16	A		1	1	003
5SY7 516-8	1/16	B		1	1	004
5SY7 520-6	1/15	C		1	1	002
5SY7 520-7	1/16	B		1	1	003
5SY7 520-8	1/16	C		1	1	004
5SY7 525-6	1/15	C		1	1	002
5SY7 525-7	1/16	B		1	1	003
5SY7 525-8	1/16	C		1	1	004
5SY7 532-6	1/15	C		1	1	002
5SY7 532-7	1/16	B		1	1	003
5SY7 532-8	1/16	C		1	1	004
5SY7 540-6	1/15	C		1	1	002
5SY7 540-7	1/16	C		1	1	003
5SY7 540-8	1/16	C		1	1	004
5SY7 550-6	1/15	C		1	1	002
5SY7 550-7	1/16	C		1	1	003
5SY7 550-8	1/16	C		1	1	004
5SY7 563-6	1/15	C		1	1	002
5SY7 563-7	1/16	C		1	1	003
5SY7 563-8	1/16	C		1	1	004
5SY7 6						
5SY7 601-7	1/17	C		1	1	003
5SY7 601-8	1/17	C		1	1	004
5SY7 602-7	1/17	C		1	1	003
5SY7 602-8	1/17	C		1	1	004
5SY7 603-7	1/17	C		1	1	003
5SY7 603-8	1/17	C		1	1	004
5SY7 604-7	1/17	C		1	1	003
5SY7 604-8	1/17	C		1	1	004
5SY7 605-7	1/17	C		1	1	003
5SY7 605-8	1/17	C		1	1	004
5SY7 606-6	1/15	C		1	1	002
5SY7 606-7	1/17	C		1	1	003
5SY7 606-8	1/17	C		1	1	004
5SY7 608-7	1/17	C		1	1	003
5SY7 608-8	1/17	C		1	1	004
5SY7 610-6	1/15	C		1	1	002
5SY7 610-7	1/17	B		1	1	003
5SY7 610-8	1/17	C		1	1	004
5SY7 613-6	1/15	C		1	1	002

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY7 613-7	1/17	C		1	1	003
5SY7 613-8	1/17	C		1	1	004
5SY7 614-7	1/17	C		1	1	003
5SY7 614-8	1/17	C		1	1	004
5SY7 615-7	1/17	C		1	1	003
5SY7 615-8	1/17	C		1	1	004
5SY7 616-6	1/15	C		1	1	002
5SY7 616-7	1/17	A		1	1	003
5SY7 616-8	1/17	C		1	1	004
5SY7 620-6	1/15	C		1	1	002
5SY7 620-7	1/17	B		1	1	003
5SY7 620-8	1/17	C		1	1	004
5SY7 625-6	1/15	C		1	1	002
5SY7 625-7	1/17	B		1	1	003
5SY7 625-8	1/17	C		1	1	004
5SY7 632-6	1/15	C		1	1	002
5SY7 632-7	1/17	B		1	1	003
5SY7 632-8	1/17	C		1	1	004
5SY7 640-6	1/15	C		1	1	002
5SY7 640-7	1/17	B		1	1	003
5SY7 640-8	1/17	C		1	1	004
5SY7 650-6	1/15	C		1	1	002
5SY7 650-7	1/17	B		1	1	003
5SY7 650-8	1/17	C		1	1	004
5SY7 663-6	1/15	C		1	1	002
5SY7 663-7	1/17	B		1	1	003
5SY7 663-8	1/17	C		1	1	004
5SY8 1						
5SY8 101-7	1/18	B		1	1	003
5SY8 101-8	1/18	C		1	1	004
5SY8 102-7	1/18	A		1	1	003
5SY8 102-8	1/18	B		1	1	004
5SY8 103-7	1/18	C		1	1	003
5SY8 103-8	1/18	C		1	1	004
5SY8 104-7	1/18	B		1	1	003
5SY8 104-8	1/18	C		1	1	004
5SY8 105-7	1/18	C		1	1	003
5SY8 105-8	1/18	C		1	1	004
5SY8 106-7	1/18	A		1	1	003
5SY8 106-8	1/18	C		1	1	004
5SY8 108-7	1/18	C		1	1	003
5SY8 108-8	1/18	C		1	1	004
5SY8 110-7	1/18	A		1	1	003
5SY8 110-8	1/18	C		1	1	004
5SY8 113-7	1/18	C		1	1	003
5SY8 113-8	1/18	C		1	1	004
5SY8 114-7	1/18	C		1	1	003
5SY8 114-8	1/18	C		1	1	004
5SY8 115-7	1/18	C		1	1	003
5SY8 115-8	1/18	C		1	1	004
5SY8 116-7	1/18	A		1	1	003
5SY8 116-8	1/18	C		1	1	004
5SY8 120-7	1/18	A		1	1	003
5SY8 120-8	1/18	C		1	1	004
5SY8 125-7	1/18	C		1	1	003
5SY8 125-8	1/18	C		1	1	004
5SY8 132-7	1/18	B		1	1	003
5SY8 132-8	1/18	C		1	1	004
5SY8 140-7	1/18	C		1	1	003
5SY8 140-8	1/18	C		1	1	004
5SY8 150-7	1/18	C		1	1	003
5SY8 150-8	1/18	C		1	1	004
5SY8 163-7	1/18	C		1	1	003
5SY8 163-8	1/18	C		1	1	004

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY8 2						
5SY8 201-7	1/18	B		1	1	003
5SY8 201-8	1/18	C		1	1	004
5SY8 202-7	1/18	B		1	1	003
5SY8 202-8	1/18	B		1	1	004
5SY8 203-7	1/18	C		1	1	003
5SY8 203-8	1/18	C		1	1	004
5SY8 204-7	1/18	A		1	1	003
5SY8 204-8	1/18	C		1	1	004
5SY8 205-7	1/18	C		1	1	003
5SY8 205-8	1/18	C		1	1	004
5SY8 206-7	1/18	A		1	1	003
5SY8 206-8	1/18	A		1	1	004
5SY8 208-7	1/18	C		1	1	003
5SY8 208-8	1/18	C		1	1	004
5SY8 210-7	1/18	A		1	1	003
5SY8 210-8	1/18	B		1	1	004
5SY8 213-7	1/18	C		1	1	003
5SY8 213-8	1/18	C		1	1	004
5SY8 214-7	1/18	C		1	1	003
5SY8 214-8	1/18	C		1	1	004
5SY8 215-7	1/18	C		1	1	003
5SY8 215-8	1/18	C		1	1	004
5SY8 216-7	1/18	A		1	1	003
5SY8 216-8	1/18	C		1	1	004
5SY8 220-7	1/18	B		1	1	003
5SY8 220-8	1/18	C		1	1	004
5SY8 225-7	1/18	B		1	1	003
5SY8 225-8	1/18	B		1	1	004
5SY8 232-7	1/18	B		1	1	003
5SY8 232-8	1/18	C		1	1	004
5SY8 240-7	1/18	C		1	1	003
5SY8 240-8	1/18	C		1	1	004
5SY8 250-7	1/18	C		1	1	003
5SY8 250-8	1/18	C		1	1	004
5SY8 263-7	1/18	C		1	1	003
5SY8 263-8	1/18	C		1	1	004
5SY8 3						
5SY8 301-7	1/19	A		1	1	003
5SY8 301-8	1/19	C		1	1	004
5SY8 302-7	1/19	C		1	1	003
5SY8 302-8	1/19	C		1	1	004
5SY8 303-7	1/19	C		1	1	003
5SY8 303-8	1/19	C		1	1	004
5SY8 304-7	1/19	C		1	1	003
5SY8 304-8	1/19	C		1	1	004
5SY8 305-7	1/19	C		1	1	003
5SY8 305-8	1/19	C		1	1	004
5SY8 306-7	1/19	B		1	1	003
5SY8 306-8	1/19	C		1	1	004
5SY8 308-7	1/19	C		1	1	003
5SY8 308-8	1/19	C		1	1	004
5SY8 310-7	1/19	B		1	1	003
5SY8 310-8	1/19	C		1	1	004
5SY8 313-7	1/19	C		1	1	003
5SY8 313-8	1/19	C		1	1	004
5SY8 314-7	1/19	C		1	1	003
5SY8 314-8	1/19	C		1	1	004
5SY8 315-7	1/19	C		1	1	003
5SY8 315-8	1/19	C		1	1	004
5SY8 316-7	1/19	A		1	1	003
5SY8 316-8	1/19	C		1	1	004
5SY8 320-7	1/19	C		1	1	003
5SY8 320-8	1/19	C		1	1	004
5SY8 325-7	1/19	A		1	1	003
5SY8 325-8	1/19	B		1	1	004
5SY8 332-7	1/19	A		1	1	003
5SY8 332-8	1/19	B		1	1	004
5SY8 340-7	1/19	B		1	1	003
5SY8 340-8	1/19	C		1	1	004
5SY8 350-7	1/19	B		1	1	003
5SY8 350-8	1/19	B		1	1	004
5SY8 363-7	1/19	B		1	1	003
5SY8 363-8	1/19	C		1	1	004
5SY8 4						
5SY8 401-7	1/19	C		1	1	003
5SY8 401-8	1/19	C		1	1	004
5SY8 402-7	1/19	C		1	1	003
5SY8 402-8	1/19	C		1	1	004
5SY8 403-7	1/19	C		1	1	003
5SY8 403-8	1/19	C		1	1	004
5SY8 404-7	1/19	C		1	1	003
5SY8 404-8	1/19	C		1	1	004
5SY8 405-7	1/19	C		1	1	003
5SY8 405-8	1/19	C		1	1	004
5SY8 406-7	1/19	C		1	1	003
5SY8 406-8	1/19	C		1	1	004
5SY8 408-7	1/19	C		1	1	003
5SY8 408-8	1/19	C		1	1	004
5SY8 410-7	1/19	B		1	1	003
5SY8 410-8	1/19	C		1	1	004
5SY8 413-7	1/19	C		1	1	003
5SY8 413-8	1/19	C		1	1	004
5SY8 414-7	1/19	C		1	1	003
5SY8 414-8	1/19	C		1	1	004
5SY8 415-7	1/19	C		1	1	003
5SY8 415-8	1/19	C		1	1	004
5SY8 416-7	1/19	A		1	1	003
5SY8 416-8	1/19	C		1	1	004
5SY8 420-7	1/19	A		1	1	003
5SY8 420-8	1/19	C		1	1	004
5SY8 425-7	1/19	A		1	1	003
5SY8 425-8	1/19	C		1	1	004
5SY8 432-7	1/19	A		1	1	003
5SY8 432-8	1/19	C		1	1	004
5SY8 440-7	1/19	A		1	1	003
5SY8 440-8	1/19	C		1	1	004
5SY8 450-7	1/19	A		1	1	003
5SY8 450-8	1/19	C		1	1	004
5SY8 463-7	1/19	A		1	1	003
5SY8 463-8	1/19	C		1	1	004
5SY8 5						
5SY8 501-7	1/18	C		1	1	003
5SY8 501-8	1/18	C		1	1	004
5SY8 502-7	1/18	C		1	1	003
5SY8 502-8	1/18	C		1	1	004
5SY8 503-7	1/18	C		1	1	003
5SY8 503-8	1/18	C		1	1	004
5SY8 504-7	1/18	C		1	1	003
5SY8 504-8	1/18	C		1	1	004
5SY8 505-7	1/18	C		1	1	003
5SY8 505-8	1/18	C		1	1	004
5SY8 506-7	1/18	B		1	1	003
5SY8 506-8	1/18	C		1	1	004
5SY8 508-7	1/18	C		1	1	003
5SY8 508-8	1/18	C		1	1	004
5SY8 510-7	1/18	B		1	1	003
5SY8 510-8	1/18	C		1	1	004
5SY8 513-7	1/18	C		1	1	003
5SY8 513-8	1/18	C		1	1	004

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5SY8 514-7	1/18	C		1	1	003
5SY8 514-8	1/18	C		1	1	004
5SY8 515-7	1/18	C		1	1	003
5SY8 515-8	1/18	C		1	1	004
5SY8 516-7	1/18	B		1	1	003
5SY8 516-8	1/18	C		1	1	004
5SY8 520-7	1/18	C		1	1	003
5SY8 520-8	1/18	C		1	1	004
5SY8 525-7	1/18	C		1	1	003
5SY8 525-8	1/18	C		1	1	004
5SY8 532-7	1/18	B		1	1	003
5SY8 532-8	1/18	C		1	1	004
5SY8 540-7	1/18	C		1	1	003
5SY8 540-8	1/18	B		1	1	004
5SY8 550-7	1/18	B		1	1	003
5SY8 550-8	1/18	B		1	1	004
5SY8 563-7	1/18	B		1	1	003
5SY8 563-8	1/18	B		1	1	004
5SY8 6						
5SY8 601-7	1/19	C		1	1	003
5SY8 601-8	1/19	C		1	1	004
5SY8 602-7	1/19	C		1	1	003
5SY8 602-8	1/19	C		1	1	004
5SY8 603-7	1/19	C		1	1	003
5SY8 603-8	1/19	C		1	1	004
5SY8 604-7	1/19	C		1	1	003
5SY8 604-8	1/19	C		1	1	004
5SY8 605-7	1/19	C		1	1	003
5SY8 605-8	1/19	C		1	1	004
5SY8 606-7	1/19	C		1	1	003
5SY8 606-8	1/19	C		1	1	004
5SY8 608-7	1/19	C		1	1	003
5SY8 608-8	1/19	C		1	1	004
5SY8 610-7	1/19	C		1	1	003
5SY8 610-8	1/19	C		1	1	004
5SY8 613-7	1/19	C		1	1	003
5SY8 613-8	1/19	C		1	1	004
5SY8 614-7	1/19	C		1	1	003
5SY8 614-8	1/19	C		1	1	004
5SY8 615-7	1/19	C		1	1	003
5SY8 615-8	1/19	C		1	1	004
5SY8 616-7	1/19	B		1	1	003
5SY8 616-8	1/19	C		1	1	004
5SY8 620-7	1/19	C		1	1	003
5SY8 620-8	1/19	C		1	1	004
5SY8 625-7	1/19	C		1	1	003
5SY8 625-8	1/19	C		1	1	004
5SY8 632-7	1/19	B		1	1	003
5SY8 632-8	1/19	C		1	1	004
5SY8 640-7	1/19	C		1	1	003
5SY8 640-8	1/19	C		1	1	004
5SY8 650-7	1/19	C		1	1	003
5SY8 650-8	1/19	C		1	1	004
5SY8 663-7	1/19	A		1	1	003
5SY8 663-8	1/19	C		1	1	004
5SZ9						
5SZ9 206	2/34	B		1	1	008
5SZ9 216	2/34	B		1	1	008
5TE1						
5TE1 210	7/25	B		1	1	027
5TE1 220	7/25	B		1	1	027
5TE1 230	7/25	B		1	1	027
5TE1 240	7/25	B		1	1	027
5TE1 310	7/25	B		1	1	027
5TE1 315	7/25	B		1	1	027
5TE1 320	7/25	B		1	1	027
5TE1 325	7/25	B		1	1	027
5TE1 330	7/25	B		1	1	027
5TE1 335	7/25	B		1	1	027
5TE1 340	7/25	B		1	1	027
5TE1 345	7/25	B		1	1	027
5TE1 410	7/25	B		1	1	027
5TE1 415	7/25	B		1	1	027
5TE1 420	7/25	B		1	1	027
5TE1 425	7/25	B		1	1	027
5TE1 430	7/25	B		1	1	027
5TE1 435	7/25	B		1	1	027
5TE1 440	7/25	B		1	1	027
5TE1 445	7/25	B		1	1	027
5TE1 610	7/25	B		1	1	027
5TE1 620	7/25	B		1	1	027
5TE1 630	7/25	B		1	1	027
5TE1 640	7/25	B		1	1	027
5TE4						
5TE4 800	7/9	▶		1	1	027
5TE4 804	7/9	B		1	1	027
5TE4 805	7/9	B		1	1	027
5TE4 806	7/9	B		1	1	027
5TE4 807	7/9	B		1	1	027
5TE4 808	7/9	B		1	1	027
5TE4 810	7/9	B		1	1	027
5TE4 811	7/9	B		1	1	027
5TE4 812	7/9	B		1	1	027
5TE4 813	7/9	B		1	1	027
5TE4 814	7/9	B		1	1	027
5TE4 820	7/9	▶		1	1	027
5TE4 821	7/9	▶		1	1	027
5TE4 822	7/9	B		1	1	027
5TE4 823	7/9	B		1	1	027
5TE4 824	7/9	B		1	1	027
5TE4 830	7/9	B		1	1	027
5TE4 831	7/9	B		1	1	027
5TE4 840	7/10	B		1	1	027
5TE4 841	7/10	B		1	1	027
5TE5						
5TE5 800	7/13	▶		1	1/12	027
5TE5 801	7/13	▶		1	1	027
5TE5 802	7/13	▶		1	1	027
5TE5 803	7/13	▶		1	1	027
5TE5 804	7/13	B		1	1	027
5TE6						
5TE6 800	10/11	▶		1	1	027
5TE6 801	10/11	▶		1	1	027
5TE6 802	10/12	▶		1	1	027
5TE6 803	10/12	▶		1	1	027
5TE6 804	10/12	▶		1	1	027
5TE6 810	10/12	▶		1	1	027
5TE8						
5TE8 101	7/4	▶		1	1	027
5TE8 101-3	7/4	B		1	1	027
5TE8 102	7/4	B		1	1	027
5TE8 103	7/4	B		1	1	027
5TE8 105	7/4	B		1	1	027
5TE8 108	7/4	B		1	1	027
5TE8 111	7/18	▶		1	1/12	027
5TE8 112	7/18	▶		1	1	027
5TE8 113	7/18	B		1	1	027
5TE8 114	7/18	B		1	1	027
5TE8 118	7/18	B		1	1	027
5TE8 141	7/4	▶		1	1	027

* You can order this quantity or a multiple thereof.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5TE8 142	7/4	▶		1	1	027
5TE8 151	7/4	▶		1	1	027
5TE8 152	7/4	B		1	1	027
5TE8 153	7/4	B		1	1	027
5TE8 161	7/4	▶		1	1	027
5TE8 162	7/4	▶		1	1	027
5TE8 211	7/18	B		1	1	027
5TE8 212	7/18	▶		1	1	027
5TE8 213	7/18	B		1	1	027
5TE8 214	7/18	▶		1	1	027
5TE8 218	7/18	B		1	1	027
5TE8 311	7/18	B		1	1	027
5TE8 312	7/18	▶		1	1	027
5TE8 313	7/18	▶		1	1	027
5TE8 314	7/18	▶		1	1	027
5TE8 315	7/18	B		1	1	027
5TE8 411	7/18	B		1	1	027
5TE8 412	7/18	▶		1	1	027
5TE8 413	7/18	▶		1	1	027
5TE8 414	7/18	▶		1	1	027
5TE8 415	7/18	B		1	1	027
5TE8 511	7/18	B		1	1	027
5TE8 512	7/18	▶		1	1	027
5TE8 513	7/18	▶		1	1	027
5TE8 514	7/18	▶		1	1	027
5TE8 515	7/18	B		1	1	027
5TE8 521	7/18	B		1	1	027
5TE8 522	7/18	B		1	1	027
5TE8 523	7/18	B		1	1	027
5TE8 524	7/18	B		1	1	027
5TE8 533	7/19	B		1	1	027
5TE8 611	7/18	B		1	1	027
5TE8 612	7/18	B		1	1	027
5TE8 613	7/18	▶		1	1	027
5TE8 614	7/18	▶		1	1	027
5TE8 615	7/18	B		1	1	027
5TE8 711	7/18	B		1	1	027
5TE8 712	7/18	B		1	1	027
5TE8 713	7/18	▶		1	1	027
5TE8 714	7/18	▶		1	1	027
5TE8 715	7/18	B		1	1	027
5TE8 721	7/18	B		1	1	027
5TE8 722	7/18	B		1	1	027
5TE8 723	7/18	B		1	1	027
5TE8 724	7/18	B		1	1	027
5TE8 811	7/18	B		1	1	027
5TE8 812	7/18	B		1	1	027
5TE8 813	7/18	B		1	1	027
5TE8 814	7/18	▶		1	1	027
5TE8 815	7/18	B		1	1	027
5TE9						
5TE9 000	7/26	B		1	1	027
5TE9 001	7/26	B		1	1	027
5TE9 003	7/26	B		1 set	1 set	027
5TE9 004	7/26	A		1 set	1 set	027
5TE9 005	7/26	B		1	1	027
5TE9 006	7/26	B		1	1	027
5TE9 010	7/26	B		1	1	027
5TE9 011	7/26	B		1	1	027
5TE9 012	7/26	B		1	1	027
5TE9 013	7/26	B		1	1	027
5TE9 014	7/26	B		1	1	027
5TE9 015	7/26	B		1 set	1 set	027
5TE9 100	7/23	B		1	10	027
5TE9 101	7/23	B		1	10	027
5TE9 102	7/23	B		1 set	1 set	027
5TE9 112	7/19	B		1	1	027
5TE9 113	7/19	B		1	1	027
5TE9 120	10/12	B		1	1	027
5TG8						
5TG8 050	7/10, 7/14	C		1	1/10	027
5TG8 051	7/10, 7/14	▶		1	1/10	027
5TG8 052	7/10, 7/14	B		1	1/10	027
5TG8 053	7/10, 7/14	B		1	1/10	027
5TG8 054	7/10, 7/14	C		1	1/10	027
5TG8 055	7/10, 7/14	B		1	1/10	027
5TG8 060	7/10	D		1 set	1 set	027
5TG8 061	7/10, 7/14	B		1 set	1 set	027
5TG8 062	7/10, 7/14	B		1 set	1 set	027
5TG8 063	7/10, 7/14	B		1 set	1 set	027
5TG8 064	7/10, 7/14	C		1 set	1 set	027
5TG8 065	7/10	D		1 set	1 set	027
5TG8 066	7/10, 7/14	B		1 set	1 set	027
5TG8 067	7/10, 7/14	D		1 set	1 set	027
5TG8 068	7/5	C		1 set	1 set	027
5TG8 070	7/10, 7/14	C		1 set	1 set	027
5TG8 222	14/18	C		1	1	027
5TG8 223	14/16	B		1	1/24	027
5TG8 240	1/32, 7/5, 7/19, 8/12, 8/16	▶		1	2	027
5TT1						
5TT1 303	9/17	B		1	1	027
5TT3						
5TT3 170	3/48, 13/18	▶		1	1	027
5TT3 171	14/18	A		1	1	027
5TT3 181	9/21	▶		1	1	027
5TT3 182	9/21	B		1	1	027
5TT3 183	9/21	B		1	1	027
5TT3 184	9/21	B		1	1	027
5TT3 185	9/21	▶		1	1	027
5TT3 194	13/5	B		1	1	027
5TT3 195	13/5	B		1	1	027
5TT3 303	14/21	C		1	1	027
5TT3 400	13/5	▶		1	1	027
5TT3 401	13/5	▶		1	1	027
5TT3 402	13/5	▶		1	1	027
5TT3 403	13/5	A		1	1	027
5TT3 404	13/5	B		1	1	027
5TT3 405	13/5	B		1	1	027
5TT3 406	13/5	B		1	1	027
5TT3 407	13/5	B		1	1	027
5TT3 408	13/6	B		1	1	027
5TT3 410	13/6	B		1	1	027
5TT3 411	13/6, 13/29	C		1	1	027
5TT3 412	13/6, 13/29	C		1	1	027
5TT3 421	13/20	▶		1	1	027
5TT3 423	13/20	▶		1	1	027
5TT3 431	14/28	B		1	1	027
5TT3 432	14/28	B		1	1	027
5TT3 435	14/16	B		1	1	027
5TT3 440	8/28	B		1	1	027
5TT3 441	8/28	B		1	1	027
5TT3 460	14/8	B		1	1	027
5TT3 461	14/8	B		1	1	027
5TT3 470	13/23	B		1	1	027
5TT3 471	13/23	B		1	1	027
5TT3 472	14/26	B		1	1	027
5TT4						
5TT4 101-0	8/5	▶		1	1/12	027

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
5TT4 101-1	8/5	B		1	1	027
5TT4 101-2	8/5	▶		1	1	027
5TT4 101-3	8/5	B		1	1	027
5TT4 101-4	8/5	B		1	1	027
5TT4 102-0	8/5	▶		1	1	027
5TT4 102-1	8/5	B		1	1	027
5TT4 102-2	8/5	▶		1	1	027
5TT4 102-3	8/5	B		1	1	027
5TT4 102-4	8/5	B		1	1	027
5TT4 103-0	8/5	▶		1	1	027
5TT4 103-2	8/5	▶		1	1	027
5TT4 104-0	8/5	▶		1	1	027
5TT4 104-2	8/5	▶		1	1	027
5TT4 105-0	8/5	▶		1	1	027
5TT4 105-1	8/5	B		1	1	027
5TT4 105-2	8/5	▶		1	1	027
5TT4 105-3	8/5	B		1	1	027
5TT4 105-4	8/5	B		1	1	027
5TT4 115-1	8/5	▶		1	1	027
5TT4 115-2	8/5	▶		1	1	027
5TT4 115-3	8/5	▶		1	1	027
5TT4 122-0	8/5	▶		1	1	027
5TT4 123-0	8/5	▶		1	1	027
5TT4 125-0	8/5	▶		1	1	027
5TT4 132-0	8/5	▶		1	1	027
5TT4 132-3	8/5	▶		1	1	027
5TT4 142-0	8/5	▶		1	1	027
5TT4 142-2	8/5	B		1	1	027
5TT4 142-3	8/5	B		1	1	027
5TT4 151-0	8/5	▶		1	1	027
5TT4 151-2	8/5	▶		1	1	027
5TT4 152-0	8/5	▶		1	1	027
5TT4 152-2	8/5	▶		1	1	027
5TT4 201-0	8/12	▶		1	1/12	027
5TT4 201-1	8/12	B		1	1	027
5TT4 201-2	8/12	▶		1	1	027
5TT4 201-3	8/12	▶		1	1	027
5TT4 201-4	8/12	▶		1	1	027
5TT4 202-0	8/12	▶		1	1	027
5TT4 202-1	8/12	B		1	1	027
5TT4 202-2	8/12	▶		1	1	027
5TT4 202-3	8/12	B		1	1	027
5TT4 202-4	8/12	B		1	1	027
5TT4 204-0	8/12	▶		1	1	027
5TT4 204-1	8/12	B		1	1	027
5TT4 204-2	8/12	▶		1	1	027
5TT4 204-3	8/12	B		1	1	027
5TT4 204-4	8/12	B		1	1	027
5TT4 205-0	8/12	▶		1	1	027
5TT4 205-1	8/12	B		1	1	027
5TT4 205-2	8/12	▶		1	1	027
5TT4 205-3	8/12	B		1	1	027
5TT4 205-4	8/12	B		1	1	027
5TT4 206-0	8/12	▶		1	1	027
5TT4 206-1	8/12	B		1	1	027
5TT4 206-2	8/12	▶		1	1	027
5TT4 206-3	8/12	B		1	1	027
5TT4 206-4	8/12	B		1	1	027
5TT4 207-0	8/12	▶		1	1	027
5TT4 207-1	8/12	B		1	1	027
5TT4 207-2	8/12	▶		1	1	027
5TT4 207-3	8/12	B		1	1	027
5TT4 207-4	8/12	B		1	1	027
5TT4 217-1	8/12	▶		1	1	027
5TT4 217-2	8/12	▶		1	1	027
5TT4 217-3	8/12	▶		1	1	027
5TT4 217-6	8/12	▶		1	1	027
5TT4 900	8/6	▶		1	1	027
5TT4 901	8/6	▶		1	1	027
5TT4 920	8/6	▶		1	1	027
5TT5						
5TT5 200	14/12	B		1	1	027
5TT5 730-0	8/16	A		1	1	027
5TT5 730-1	8/16	B		1	1	027
5TT5 730-2	8/16	A		1	1	027
5TT5 731-0	8/16	A		1	1	027
5TT5 731-2	8/16	A		1	1	027
5TT5 732-0	8/16	A		1	1	027
5TT5 732-2	8/16	A		1	1	027
5TT5 733-0	8/16	A		1	1	027
5TT5 733-2	8/16	B		1	1	027
5TT5 740-0	8/16	A		1	1	027
5TT5 740-2	8/16	A		1	1	027
5TT5 741-0	8/16	A		1	1	027
5TT5 741-2	8/16	B		1	1	027
5TT5 742-0	8/16	A		1	1	027
5TT5 742-2	8/16	B		1	1	027
5TT5 750-0	8/16	A		1	1	027
5TT5 750-2	8/16	A		1	1	027
5TT5 751-0	8/16	B		1	1	027
5TT5 751-2	8/16	B		1	1	027
5TT5 752-0	8/16	B		1	1	027
5TT5 752-2	8/16	B		1	1	027
5TT5 800-0	8/22	▶		1	1	027
5TT5 800-2	8/22	▶		1	1	027
5TT5 800-6	8/23	▶		1	1	027
5TT5 800-8	8/23	▶		1	1	027
5TT5 801-0	8/22	▶		1	1	027
5TT5 801-2	8/22	▶		1	1	027
5TT5 801-6	8/23	B		1	1	027
5TT5 801-8	8/23	B		1	1	027
5TT5 802-0	8/22	▶		1	1	027
5TT5 802-2	8/22	▶		1	1	027
5TT5 820-0	8/22	B		1	1	027
5TT5 830-0	8/22	▶		1	1	027
5TT5 830-1	8/22	B		1	1	027
5TT5 830-2	8/22	▶		1	1	027
5TT5 830-6	8/23	▶		1	1	027
5TT5 830-8	8/23	▶		1	1	027
5TT5 831-0	8/22	▶		1	1	027
5TT5 831-1	8/22	B		1	1	027
5TT5 831-2	8/22	B		1	1	027
5TT5 831-6	8/23	▶		1	1	027
5TT5 831-8	8/23	B		1	1	027
5TT5 832-0	8/22	▶		1	1	027
5TT5 832-2	8/22	▶		1	1	027
5TT5 833-0	8/22	▶		1	1	027
5TT5 833-2	8/22	B		1	1	027
5TT5 840-0	8/22	▶		1	1	027
5TT5 840-2	8/22	▶		1	1	027
5TT5 840-6	8/23	▶		1	1	027
5TT5 840-8	8/23	B		1	1	027
5TT5 841-0	8/22	B		1	1	027
5TT5 841-2	8/22	B		1	1	027
5TT5 841-6	8/23	B		1	1	027
5TT5 841-8	8/23	B		1	1	027
5TT5 842-0	8/22	B		1	1	027
5TT5 842-2	8/22	B		1	1	027
5TT5 843-0	8/22	▶		1	1	027

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5TT5 843-2	8/22	B		1	1	027
5TT5 850-0	8/22	▶		1	1	027
5TT5 850-2	8/22	▶		1	1	027
5TT5 850-6	8/23	▶		1	1	027
5TT5 851-0	8/22	▶		1	1	027
5TT5 851-2	8/22	B		1	1	027
5TT5 852-0	8/22	B		1	1	027
5TT5 852-2	8/22	B		1	1	027
5TT5 853-0	8/22	▶		1	1	027
5TT5 853-2	8/22	B		1	1	027
5TT5 900	8/16	▶		1	1	027
5TT5 901	8/16	▶		1	1	027
5TT5 902	8/16	B		1 set	1 set	027
5TT5 903	8/16	B		1 set	1 set	027
5TT5 910-0	8/22, 8/23	▶		1	1	027
5TT5 910-1	8/22, 8/23	▶		1	1	027
5TT5 910-5	8/22, 8/23	B		1	2	027
5TT5 910-6	8/22, 8/23	B		1	2	027
5TT5 910-7	8/22, 8/23	B		1	2	027
5TT6						
5TT6 101	13/17	▶		1	1	027
5TT6 102	13/17	B		1	1	027
5TT6 103	13/17	▶		1	1	027
5TT6 111	13/12	B		1	1	027
5TT6 112	13/12	B		1	1	027
5TT6 113	13/12	B		1	1	027
5TT6 114	13/12	B		1	1	027
5TT6 115	13/12	B		1	1	027
5TT6 120	13/12	B		1	1	027
5TT7						
5TT7 110-0	14/5	A		1	1	027
5TT7 120-0	14/5	A		1	1	027
5TT7 908-1	14/5	B		1	1	027
5TT7 908-2	14/5	B		1	1	027
7KT1						
7KT1 000	12/7	B		1	1	027
7KT1 010	12/7	B		1	1	027
7KT1 011	12/7	B		1	1	027
7KT1 012	12/7	B		1	1	027
7KT1 020	12/7	B		1	1	027
7KT1 110	12/6	B		1	1	027
7KT1 120	12/6	B		1	1	027
7KT1 140	12/4	B		1	1	027
7KT1 162	11/25	B		1	1	027
7KT1 165	11/25	B		1	1	027
7KT1 200	11/27	B		1	1	027
7KT1 201	11/27	B		1	1	027
7KT1 202	11/27	B		1	1	027
7KT1 300	11/4	B		1	1	027
7KT1 301	11/4	B		1	1	027
7KT1 302	11/4	B		1	1	027
7KT1 310	11/11	B		1	1	027
7KT1 311	11/11	B		1	1	027
7KT1 312	11/11	B		1	1	027
7KT1 340	11/11	B		1	1	027
7KT1 341	11/11	B		1	1	027
7KT1 342	11/11	B		1	1	027
7KT1 350	11/11	B		1	1	027
7KT1 351	11/11	B		1	1	027
7KT1 352	11/11	B		1	1	027
7KT1 390	11/17	B		1	1	027
7KT1 500	11/21	B		1	1	027
7KT1 501	11/21	B		1	1	027
7KT1 502	11/21	B		1	1	027
7KT1 503	11/21	B		1	1	027
7KT1 510	11/21	B		1	1	027
7KT1 511	11/21	B		1	1	027
7KT1 512	11/21	B		1	1	027
7KT1 513	11/21	B		1	1	027
7KT1 520	11/21	B		1	1	027
7KT1 521	11/21	B		1	1	027
7KT5						
7KT5 500	12/11	A		1	1	027
7KT5 501	12/11	A		1	1	027
7KT5 502	12/11	A		1	1	027
7KT5 503	12/11	A		1	1	027
7KT5 504	12/11	A		1	1	027
7KT5 505	12/11	A		1	1	027
7KT5 600	12/11	B		1	1	027
7KT5 601	12/11	B		1	1	027
7KT5 602	12/11	A		1	1	027
7KT5 603	12/11	B		1	1	027
7KT5 604	12/11	B		1	1	027
7KT5 801	12/9	A		1	1	027
7KT5 802	12/9	A		1	1	027
7KT5 803	12/9	B		1	1	027
7KT5 804	12/9	A		1	1	027
7KT5 806	12/9	B		1	1	027
7KT5 807	12/9	B		1	1	027
7KT5 811	12/9	B		1	1	027
7KT5 812	12/9	B		1	1	027
7KT5 814	12/9	B		1	1	027
7KT5 821	12/9	B		1	1	027
7KT5 822	12/9	B		1	1	027
7KT5 823	12/9	B		1	1	027
7KT5 833	12/9	B		1	1	027
7KT9						
7KT9 000	12/11	C		1 set	1 set	027
7KT9 010	11/28	A		1	1/48	027
7KT9 011	11/28	A		1	1	027
7KT9 020	12/11	B		1	1	027
7KT9 021	12/11	B		1	1	027
7KT9 030	11/25	C		1	1	027
7LF4						
7LF4 401-5	9/5	B		1	1	027
7LF4 411-0	9/5	▶		1	1	027
7LF4 411-1	9/5	B		1	1	027
7LF4 412-0	9/5	A		1	1	027
7LF4 412-1	9/5	B		1	1	027
7LF4 421-0	9/5	A		1	1	027
7LF4 421-1	9/5	B		1	1	027
7LF4 421-2	9/5	A		1	1	027
7LF4 422-0	9/5	A		1	1	027
7LF4 422-1	9/5	B		1	1	027
7LF4 422-2	9/5	B		1	1	027
7LF4 431-0	9/5	▶		1	1	027
7LF4 432-0	9/5	▶		1	1	027
7LF4 444-0	9/6	▶		1	1	027
7LF4 444-2	9/6	B		1	1	027
7LF4 940-0	9/6	B		1	1	027
7LF4 940-1	9/6	B		1	1	027
7LF4 940-2	9/6	B		1	1	027
7LF5						
7LF5 300-1	9/13	▶		1	1	027
7LF5 300-5	9/13	▶		1	1	027
7LF5 300-6	9/13	A		1	1	027
7LF5 300-7	9/13	B		1	1	027
7LF5 301-0	9/13	B		1	1	027
7LF5 301-1	9/13	A		1	1	027
7LF5 301-4	9/13	A		1	1	027

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
7LF5 301-5	9/13	B		1	1	027
7LF5 301-6	9/13	▶		1	1	027
7LF5 301-7	9/13	A		1	1	027
7LF5 305-0	9/13	B		1	1	027
7LF6						
7LF6 110	9/17	▶		1	1	027
7LF6 111	9/17	A		1	1	027
7LF6 112	9/17	B		1	1	027
7LF6 113	9/17	▶		1	1	027
7LF6 114	9/17	B		1	1	027
7LF6 115	9/17	A		1	1	027
7LQ2						
7LQ2 001	14/24	B		1	1	027
7LQ2 002	14/24	B		1	1	027
7LQ2 003	14/24	B		1	1	027
7LQ2 005	14/24	B		1	1	027
7LQ2 100	14/21	A		1	1	027
7LQ2 101	14/21	B		1	1	027
7LQ2 102	14/21	B		1	1	027
7LQ2 103	14/21	B		1	1	027
7LQ2 204-0	10/10	B		1	1	027
7LQ2 204-1	10/10	B		1	1	027
7LQ2 205-0	10/10	B		1	1	027
7LQ2 205-1	10/10	B		1	1	027
7LQ2 206-0	10/10	B		1	1	027
7LQ2 206-1	10/10	B		1	1	027
7LQ2 900	14/24	B		1	1	027
7LQ2 910	14/21	B		1	1	027
7LQ2 911	14/21	B		1	1	027
7LQ3						
7LQ3 354	13/29	B		1	1	027
7LQ3 355	13/29	▶		1	1	027
7LQ3 356	13/29	B		1	1	027
7LQ3 357	13/29	B		1	1	027
7LQ3 358	13/29	▶		1	1	027
7LQ3 360	13/29	B		1	1	027
8GK4						
8GK4 801-2KK13	5/6	A		1	1	039
8GK4 801-2KK23	5/6	A		1	1	039
8GK4 801-2KK33	5/6	A		1	1	039
8GK4 801-3KK13	5/6	A		1	1	039
8GK4 801-3KK23	5/6	A		1	1	039
8GK4 801-3KK33	5/6	A		1	1	039
8GK4 851-4KK00	5/4	A		1 set	1 set	039
8GK4 851-5KK00	5/4	A		1 set	1 set	039
8GK4 851-6KK00	5/4	A		1 set	1 set	039
8GK4 851-7KK00	5/4	A		1 set	1 set	039
8GK4 851-8KK00	5/4	A		1 set	1 set	039
8GK4 852-8KK00	5/4	A		1 set	1 set	039
8GK9						
8GK9 711-0KK03	5/4	A		1	1	039
8GK9 731-0KK10	5/4	A		1	5	039
8GK9 731-0KK20	5/4	A		1	5	039
8GK9 731-0KK30	5/4	A		1	5	039
8GK9 731-0KK40	5/4	A		1	5	039
8GK9 731-0KK50	5/4	A		1	5	039
8GK9 733-0KK10	5/4	A		1	5	039
8GK9 733-0KK20	5/4	A		1	5	039
8GK9 733-0KK30	5/4	A		1	5	039

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
8GK9 733-0KK40	5/4	A		1	5	039
8GK9 733-0KK50	5/4	A		1	5	039
8GK9 735-0KK10	5/4	A		1	5	039
8GK9 735-0KK20	5/4	A		1	5	039
8GK9 735-0KK30	5/4	A		1	5	039
8GK9 735-0KK40	5/4	A		1	5	039
8GK9 735-0KK50	5/4	A		1	5	039
8GK9 736-0KK10	5/4	A		1	5	039
8GK9 736-0KK20	5/4	A		1	5	039
8GK9 736-0KK30	5/4	A		1	5	039
8GK9 736-0KK40	5/4	A		1	5	039
8GK9 736-0KK50	5/4	A		1	5	039
8HP6						
8HP6 422	3/78	A		1	1	046
8HP6 423	3/78	A		1	1	046
8HP6 424	3/78	A		1	1	046
8HP6 427	3/78	A		1	1	046
8HP6 431	3/78	A		1	1	046
8HP6 432	3/78	A		1	1	046
8JH4						
8JH4 102	5/5	A		1	10	046
8JH4 104	5/5	A		1	10	046
8JH4 105	5/5	A		1	10	046
8JH4 106	5/5	A		1	10	046
8JH4 122	3/34	A		1	10	046
8JH4 124	3/34	A		1	10	046
8JK3						
8JK3 061	5/5	A		1	10	046
8JK3 201	5/6	A		1 set	10 sets	046
8US12						
8US12 10-4AG00	3/82	A		1	1	143
8US12 50-5AM00	5/14	▶		1	1	143
8US12 50-5RM07	5/14	A		1	1	143
8US12 51-5CM47	5/14	▶		1	1	143
8US12 51-5DM07	5/14	▶		1	1	143
8US12 61-5FM08	5/14	▶		1	1	143
8US12 91-4SB00	3/82	A		1	1	143
8US19						
8US19 21-1AA00	5/5	A		1	1	143
8US19 21-1BA00	5/5	A		1	1	143
8US19 21-2AA00	5/5	▶		1	100	143
8US19 21-2AB00	5/5	▶		1	50	143
8US19 21-2AC00	5/5	▶		1	50	143
8US19 21-2AD00	5/5	▶		1	50	143
8US19 21-2BA00	5/5	▶		1	100	143
8US19 21-2BB00	5/5	▶		1	50	143
8US19 21-2BC00	5/5	▶		1	50	143
8US19 21-2BD00	5/5	▶		1	50	143
8US19 22-1AB00	5/20	A		1	1	143
8US19 22-1AC00	5/20	A		1	10	143
8US19 22-2AA00	5/4	A		1	10	143
8US19 22-2BA00	5/4	A		1	10	143
8US19 22-2CA00	5/4	A		1	10	143
8US19 23-2AA01	5/20	A		1	10	143
8US19 23-3AA01	5/20	A		1	10	143
8US19 23-4AA00	5/20	A		1	10	143
8US19 41-2BB00	5/6	A		1	6	143
8US19 98-1AA00	5/14	▶		100	100	143
8US19 98-2BM00	5/14	A		1	4	143

* You can order this quantity or a multiple thereof.

Modular Installation Devices, Mounting Depth 55 mm >N<

In this section we have listed by order number all the modular installation devices with 55 mm mounting depth.
These product series and devices are not discontinued and will continue to be available as a basic range. Depending on how demand develops we reckon with an availability period of a further 3 years.
For further technical information, see Catalog ET B1 AO modular installation devices 55 mm >N<.

Order No.	Page	DT	Price per PU	PU Unit(s)	PS*/ P.unit Unit(s)	PG
4AC2						
4AC2 940-8	1/14	A		1	1	027
4AC2 951-6	1/14	B		1	1	027
4AC2 952-4	1/14	B		1	1	027
4AC2 961-6	1/14	B		1	1	027
4AC2 962-4	1/14	A		1	1	027
4AC2 964-0	1/14	B		1	1	027
5SM1						
5SM1 111-6	1/6	B		1	1	007
5SM1 311-6	1/6	B		1	1	007
5SM1 312-6	1/6	B		1	1	007
5SM1 314-6	1/6	B		1	1	007
5SM1 316-6	1/6	B		1	1	007
5SM1 317-6	1/6	C		1	1	007
5SM1 342-6	1/6	B		1	1	007
5SM1 342-6KK01	1/7	C		1	1	007
5SM1 342-6KK03	1/7	C		1	1	007
5SM1 344-6	1/6	B		1	1	007
5SM1 344-6KK01	1/7	B		1	1	007
5SM1 344-6KK03	1/7	C		1	1	007
5SM1 346-6	1/6	B		1	1	007
5SM1 347-6	1/6	B		1	1	007
5SM1 352-6	1/7	B		1	1	007
5SM1 354-6	1/7	B		1	1	007
5SM1 356-6	1/7	B		1	1	007
5SM1 412-6	1/6	B		1	1	007
5SM1 414-6	1/6	B		1	1	007
5SM1 416-6	1/6	B		1	1	007
5SM1 417-6	1/6	B		1	1	007
5SM1 444-6	1/6	B		1	1	007
5SM1 444-8	1/7	B		1	1	007
5SM1 446-6	1/6	B		1	1	007
5SM1 446-6KK01	1/7	B		1	1	007
5SM1 612-6	1/6	B		1	1	007
5SM1 614-6	1/6	B		1	1	007
5SM1 616-6	1/6	B		1	1	007
5SM1 616-8	1/7	B		1	1	007
5SM1 617-6	1/6	B		1	1	007
5SM1 642-6	1/6	B		1	1	007
5SM1 644-6	1/6	B		1	1	007
5SM1 644-8	1/7	B		1	1	007
5SM1 646-6	1/6	B		1	1	007
5SM1 646-8	1/7	B		1	1	007
5SM1 647-6	1/6	B		1	1	007
5SM1 652-6	1/7	B		1	1	007
5SM1 654-6	1/7	B		1	1	007
5SM1 656-6	1/7	B		1	1	007
5SM1 742-6	1/6	B		1	1	007
5SM1 744-6	1/6	B		1	1	007
5SM1 746-6	1/6	B		1	1	007
5SM1 846-8	1/7	B		1	1	007
5ST1						
5ST1 292	1/5	B		1	50/1000	027
5ST1 293	1/5	B		1	50/500	027
5ST2						
5ST2 112	1/5	B		1	1	027
5ST2 120	1/5	B		1	10/200	027
5ST2 122	1/5	A		1	10	027
5ST2 134	1/5	A		1	10	027
5ST2 135	1/5	A		1	5	027
5ST2 136	1/5	B		1	5	027
5ST2 137	1/16	A		1	1	027
5ST2 138	1/16	B		1	1	027
5ST2 140	1/16	A		1	1	027
5ST2 142	1/16	A		1	1	027
5ST2 143	1/16	B		1	1	027
5ST2 144	1/16	A		1	1	027
5ST2 145	1/16	A		1	1	027
5ST2 146	1/16	A		1	1	027
5ST2 147	1/16	A		1	1	027
5ST2 148	1/16	A		1	1	027
5ST2 151	1/16	A		1	1	027
5ST2 152	1/16	A		1	1	027
5ST2 153	1/16	A		1	1	027
5ST2 154	1/16	A		1	1	027
5ST2 155	1/16	A		1	10	027
5ST2 156	1/16	A		1	10	027
5ST2 157	1/16	A		1	5	027
5ST2 163	1/16	A		1	1	027
5ST2 164	1/16	A		1	1	027
5ST2 165	1/16	A		1	1	027
5ST2 166	1/16	A		1	10	027
5ST2 167	1/16	A		1	10	027
5ST2 168	1/5	B		1	10	027
5ST2 170	1/5	B		1	10	027
5ST2 180	1/17	B		1	1	027
5ST2 181	1/17	B		1	1	027
5ST2 182	1/17	B		1	1	027
5ST2 183	1/17	B		1	1	027
5ST2 184	1/17	B		1	1	027
5ST2 185	1/17	B		1	1	027
5ST2 186	1/17	B		1	1	027
5ST2 187	1/17	B		1	1	027
5ST2 188	1/17	B		1	1	027
5ST2 190	1/17	B		1	1	027
5ST2 191	1/17	B		1	1	027
5ST2 192	1/17	B		1	1	027
5ST2 193	1/17	B		1	1	027
5ST2 194	1/17	B		1	1	027
5ST2 195	1/17	B		1	1	027

*** You can order this quantity or a multiple thereof.**

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5ST2 196	1/17	A		1	10	027
5ST2 197	1/17	A		1	10	027
5ST2 201	1/5	B		1	1	027
5ST2 400	1/18	B		1	1	027
5ST2 401	1/18	A		1	1	027
5ST2 402	1/18	A		1	1	027
5ST2 403	1/18	A		1	1	027
5ST2 404	1/18	A		1	1	027
5ST2 405	1/18	B		1	1	027
5ST2 406	1/18	B		1	1	027
5ST2 407	1/18	A		1	1	027
5ST2 408	1/18	A		1	1	027
5ST2 410	1/18	A		1	1	027
5ST2 411	1/18	A		1	1	027
5ST2 412	1/18	A		1	1	027
5ST2 413	1/18	A		1	1	027
5ST2 414	1/18	A		1	1	027
5ST2 415	1/18	A		1	1	027
5ST2 416	1/18	A		1	1	027
5ST2 417	1/18	A		1	1	027
5ST2 418	1/18	A		1	1	027
5ST2 420	1/18	A		1	1	027
5ST2 421	1/18	A		1	1	027
5ST2 422	1/18	A		1	1	027
5ST2 423	1/18	A		1	1	027
5ST2 424	1/18	A		1	1	027
5ST2 425	1/18	A		1	10	027
5ST2 426	1/18	A		1	10	027
5ST3						
5ST3 802	1/8	▶		1	1	027
5SW1						
5SW1 200	1/5	A		1	1	008
5SW3						
5SW3 000	1/8	A		1	1	008
5SW3 001	1/8	C		1	1	008
5SW3 002	1/8	B		1	1	008
5SW3 003	1/8	A		1	1	008
5SW3 004	1/5	B		1	1	008
5SW3 005	1/5	B		1	1	008
5SW3 006	1/5	B		1	1/4	008
5SW3 007	1/5	B		1	1	008
5SW3 008	1/8	A		1	1/50	008
5SW3 010	1/8	A		1	1/50	008
5SW3 011	1/8	A		1	1/50	008
5SW3 012	1/8	B		1 set	1 set	008
5SX2						
5SX2 101-7	1/2	A		1	1/12	003
5SX2 102-7	1/2	A		1	1/12	003
5SX2 103-7	1/2	A		1	1/12	003
5SX2 104-7	1/2	A		1	1/12	003
5SX2 105-7	1/2	A		1	1/12	003
5SX2 106-6	1/2	A		1	1/12	002
5SX2 106-7	1/2	A		1	1/12	003
5SX2 108-7	1/2	A		1	1/12	003
5SX2 110-6	1/2	A		1	1/12	002
5SX2 110-7	1/2	A		1	1/12	003
5SX2 113-6	1/2	A		1	1/12	002
5SX2 113-7	1/2	A		1	1/12	003
5SX2 114-7	1/2	A		1	1	003
5SX2 115-7	1/2	A		1	1	003
5SX2 116-6	1/2	A		1	1/12	002

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SX2 116-7	1/2	A		1	1/12	003
5SX2 120-6	1/2	A		1	1/12	002
5SX2 120-7	1/2	A		1	1/12	003
5SX2 125-6	1/2	A		1	1/12	002
5SX2 125-7	1/2	A		1	1/12	003
5SX2 132-6	1/2	A		1	1/12	002
5SX2 132-7	1/2	A		1	1/12	003
5SX2 201-7	1/2	A		1	1/6	003
5SX2 202-7	1/2	A		1	1/6	003
5SX2 203-7	1/2	A		1	1/6	003
5SX2 204-7	1/2	A		1	1/6	003
5SX2 205-7	1/2	A		1	1	003
5SX2 206-6	1/2	A		1	1/6	002
5SX2 206-7	1/2	A		1	1/6	003
5SX2 208-7	1/2	A		1	1	003
5SX2 210-6	1/2	A		1	1/6	002
5SX2 210-7	1/2	A		1	1/6	003
5SX2 213-6	1/2	A		1	1	002
5SX2 213-7	1/2	A		1	1	003
5SX2 215-7	1/2	A		1	1	003
5SX2 216-6	1/2	A		1	1/6	002
5SX2 216-7	1/2	A		1	1/6	003
5SX2 220-6	1/2	A		1	1	002
5SX2 220-7	1/2	A		1	1/6	003
5SX2 225-6	1/2	A		1	1	002
5SX2 225-7	1/2	A		1	1/6	003
5SX2 232-6	1/2	A		1	1	002
5SX2 232-7	1/2	A		1	1/6	003
5SX2 301-7	1/3	A		1	1	003
5SX2 302-7	1/3	A		1	1/4	003
5SX2 303-7	1/3	A		1	1	003
5SX2 304-7	1/3	A		1	1/4	003
5SX2 305-7	1/3	A		1	1	003
5SX2 306-6	1/3	A		1	1	002
5SX2 306-7	1/3	A		1	1/4	003
5SX2 308-7	1/3	A		1	1	003
5SX2 310-6	1/3	A		1	1/4	002
5SX2 310-7	1/3	A		1	1/4	003
5SX2 313-6	1/3	A		1	1	002
5SX2 313-7	1/3	A		1	1	003
5SX2 315-7	1/3	B		1	1	003
5SX2 316-6	1/3	A		1	1/4	002
5SX2 316-7	1/3	A		1	1/4	003
5SX2 320-6	1/3	A		1	1	002
5SX2 320-7	1/3	A		1	1/4	003
5SX2 325-6	1/3	A		1	1	002
5SX2 325-7	1/3	A		1	1/4	003
5SX2 332-6	1/3	A		1	1/4	002
5SX2 332-7	1/3	A		1	1/4	003
5SX2 406-7	1/3	B		1	1	003
5SX2 410-7	1/3	A		1	1	003
5SX2 413-7	1/3	B		1	1	003
5SX2 416-7	1/3	A		1	1	003
5SX2 420-6	1/3	B		1	1	002
5SX2 420-7	1/3	B		1	1	003
5SX2 425-6	1/3	B		1	1	002
5SX2 425-7	1/3	B		1	1	003
5SX2 432-6	1/3	B		1	1	002
5SX2 432-7	1/3	A		1	1	003
5SX2 506-6	1/2	A		1	1	002
5SX2 506-7	1/2	A		1	1/6	003

* You can order this quantity or a multiple thereof.

Order number index

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5SX2 510-6	1/2	A		1	1	002
5SX2 510-7	1/2	A		1	1/6	003
5SX2 513-6	1/2	A		1	1/6	002
5SX2 513-7	1/2	A		1	1/6	003
5SX2 516-6	1/2	A		1	1/6	002
5SX2 516-7	1/2	A		1	1/6	003
5SX2 520-6	1/2	B		1	1	002
5SX2 520-7	1/2	A		1	1	003
5SX2 525-6	1/2	B		1	1	002
5SX2 525-7	1/2	A		1	1	003
5SX2 532-6	1/2	B		1	1	002
5SX2 532-7	1/2	B		1	1	003
5SX2 606-7	1/3	A		1	1	003
5SX2 610-6	1/3	A		1	1	002
5SX2 610-7	1/3	A		1	1	003
5SX2 613-6	1/3	B		1	1	002
5SX2 613-7	1/3	A		1	1/3	003
5SX2 616-6	1/3	A		1	1	002
5SX2 616-7	1/3	A		1	1/3	003
5SX2 620-6	1/3	B		1	1	002
5SX2 620-7	1/3	A		1	1	003
5SX2 625-6	1/3	B		1	1	002
5SX2 625-7	1/3	A		1	1	003
5SX2 632-6	1/3	B		1	1	002
5SX2 632-7	1/3	A		1	1/3	003
5SX9						
5SX9 100	1/4	A		1	1	027
5SX9 101	1/4	A		1	1	027
5SX9 102	1/4	A		1	1	027
5SX9 200	1/4	A		1	1	027
5SX9 201	1/4	B		1	1	027
5SX9 202	1/4	A		1	1	027
5SX9 300	1/4	A		1	1	027
5TE7						
5TE7 101	1/9	B		1	1/12	027
5TE7 111	1/9	B		1	1/12	027
5TE7 141	1/9	B		1	1/12	027
5TE7 211	1/9	C		1	1	027
5TE7 513	1/9	B		1	1/4	027
5TG8						
5TG8 230	1/10	D		1	1	027
5TT1						
5TT1 310-1	1/12	A		1	1	027
5TT1 311-1	1/12	A		1	1	027
5TT1 313-1	1/12	B		1	1	027

Order No.	Page	DT	Price per PU	PU	PS*/ P.unit	PG
				Unit(s)	Unit(s)	
5TT3						
5TT3 045	1/10	A		1	1	027
5TT3 450	1/15	C		1	1	027
5TT3 451	1/15	C		1	1	027
5TT3 452	1/15	C		1	1	027
5TT3 453	1/15	C		1	1	027
5TT3 806	1/11	A		1	1	027
5TT3 807	1/11	A		1	1	027
5TT3 816	1/11	B		1	1	027
5TT3 817	1/11	B		1	1	027
5TT3 821	1/11	B		1	1	027
5TT3 822	1/11	B		1	1	027
5TT3 823	1/11	B		1	1	027
5TT3 824	1/11	B		1	1	027
5TT3 825	1/11	B		1	1	027
5TT3 841	1/11	B		1	1	027
5TT3 842	1/11	B		1	1	027
5TT3 843	1/11	B		1	1	027
5TT3 844	1/11	B		1	1	027
5TT3 845	1/11	B		1	1	027
5TT5						
5TT5 501	1/10	B		1	1	027
5TT5 502	1/10	B		1	1	027
5TT5 511	1/10	B		1	1	027
5TT5 512	1/10	B		1	1	027
5TT5 521	1/10	A		1	1	027
5TT5 522	1/10	A		1	1	027
5TT5 531	1/10	A		1	1/12	027
5TT5 532	1/10	A		1	1/12	027
7LF4						
7LF4 481-0	1/12	B		1	1	027
7LF4 491-0	1/12	A		1	1	027
7LF4 492-0	1/12	A		1	1	027
7LF5						
7LF5 390-1	1/13	A		1	1	027
7LF5 391-1	1/13	A		1	1	027
7LF5 391-6	1/13	A		1	1	027
7LF5 391-7	1/13	B		1	1	027
7LF9						
7LF9 002	1/12	B		1	1	027
7LF9 003	1/12	A		1	1	027
7LF9 006	1/12	B		1	1	027
7LQ2						
7LQ2 100-1	1/15	B		1	1	027
7LQ2 910	1/15	B		1	1	027

Legend:

DT Delivery time class
PG Price group
PU Price unit
PS Packaging size
P.unit Packaging unit

*** You can order this quantity or a multiple thereof.**

Terms and conditions of sale and delivery
Export regulations

Terms and conditions of sale and delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order. The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
  (for customers based in Germany)
- 6ZB5310-0KS53-0BA1
  (for customers based outside Germany)

or download them from the Internet
http://www.siemens.com/automation/mall
(Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "ECCN" not equal to "N" are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

A&D/VuL_ohne MZ/En 05.09.06

DT (delivery time class)

DT	Meaning
►	preferred type
A	two workdays
B	one week
C	three weeks
D	six weeks
X	on request

Preferred types are device types that can be delivered immediately ex works, i.e. they are dispatched within 24 hours.

If ordered in normal quantities, the products are usually delivered within the specified delivery times, calculated from the date we receive your order.

In exceptional cases, delivery times may vary from those specified.

The delivery times are valid ex works from Siemens AG (products ready for dispatch).

Shipping times depend on the destination and the method of shipping. The standard shipping time for Germany is one day.

The delivery time classes specified in the catalog are valid as of 10/2008 and are constantly being optimized. For more up-to-the-minute information, please visit our site at: http://www.siemens.com/automation/mall.

PU (price unit)

The PU column (price unit) specifies the quantity to which the price and weight refer.

PS/P. unit (packaging size/ packaging unit)

The first digit in the PS/P. unit column (packaging size/packaging unit) indicates the minimum order quantity. You can only order this specified quantity or a multiple thereof.

The second digit in the PS/P. unit column (packaging size/packaging unit) specifies the number of units contained in larger packaging (e.g. in a carton). You must order this quantity or a multiple thereof if you want the item to be delivered in a larger packaging quantity. Examples:

PS/P. unit	Significance
1	You can order one item or a multiple thereof.
5	For example, five units are packed in a bag. Because the bags cannot be opened, you can only order a multiple of the quantity contained in the bag: 5, 10, 15, 20 etc.
5/100	One carton contains (for example) 20 bags, each containing 5 units, i.e. a total of 100 units. If only cartons are available for delivery, you need to order a multiple of the carton quantity: 100, 200, 300, etc. Ordering a quantity of 220 units, would produce the following delivery: two cartons, each containing 100 units (= 200 units) and 4 bags, each containing 5 units (= 20 units).

PG (Price Group)

Each product is assigned to a price group.

Weight

The value specified in the Weight column specifies the weight in kg for the quantity specified in the PU column (price unit).

Dimensions

Unless stated otherwise, all dimensions are specified in mm.

Catalogs

Industry Automation, Drive Technologies and Electrical Installation Technology

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Automation and Drives	*Catalog*
Interactive catalog on DVD	CA 01

Drive Systems	
Variable-Speed Drives	
SINAMICS G110/SINAMICS G120 Inverter Chassis Units SINAMICS G120D Distributed Frequency Inverters	D 11.1
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE	NC 60
• Motors	
• Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
• Motors	
• Drive System SINAMICS S120	
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
Drive and Control Components for Hoisting Equipment	HE 1
Mechanical Driving Machines	
Flender Standard Couplings	MD 10.1

Electrical Installation Technology	
PDF: ALPHA Distribution Boards and Terminal Blocks	*ET A1*
PDF: ALPHA 8HP Molded-Plastic Distribution System	*ET A3*
PDF: BETA Low-Voltage Circuit Protection	*ET B1*
PDF: DELTA Switches and Socket Outlets	*ET D1*
PDF: GAMMA Building Management Systems	*ET G1*

Human Machine Interface Systems SIMATIC HMI	ST 80

Low-Voltage	*Catalog*
Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON	LV 1 T
SIDAC Reactors and Filters	LV 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar Trunking Systems	LV 70

Motion Control	
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Automation Systems for Machine Tools	NC 61
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21

Process Instrumentation and Analytics	
Field Instruments for Process Automation Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	FI 01
PDF: Indicators for panel mounting	*MP 12*
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
SIWAREX Weighing Systems	WT 01
Continuous Weighing and Process Protection	WT 02
Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	*PA 11*

SIMATIC Industrial Automation Systems	
Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
Migration solutions with the SIMATIC PCS 7 Process Control System	ST PCS 7.2
pc-based Automation	ST PC
SIMATIC Control Systems	ST DA

SIMATIC NET	
Industrial Communication	IK PI

SIMATIC Sensors	
Sensors for Factory Automation	FS 10

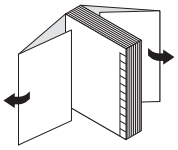
Systems Engineering	
Power supplies SITOP power and LOGO! Power	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2

System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

TELEPERM M Process Control System	
PDF: AS 488/TM automation systems	*PLT 112*

IA DT ET/3U/En 17.11.08



PDF: These catalogs are only available as pdf files.

Siemens AG
Industry Sector
Building Technologies
Electrical Installation Technology
Postfach 10 09 53
93009 REGENSBURG
GERMANY

www.siemens.com/beta
www.siemens.com/buildingtechnologies

Subject to change without prior notice
PDF only: (E86060-K8220-A101-B1-7600)
3P.8103.61.02
KG 1208 574 En

www.siemens.com/e-installation