12 Modular Installation Devices Mounting Depth 55 mm N-system

Note:

This chapter lists all the devices with 55 mm mounting depth, which will be available for the period of validity of this catalog, up to fall 2005. From fall 2005, we are planning a basic product range that will ensure the long-term availability of the devices. For further information, please refer to the Chapter “Information on product transition”.

The Chapters “Switchgear”, “Power supply units” and “Monitoring devices” also contain modular installation devices with 55 mm mounting depth and modular installation devices with transparent caps. The latter can also be installed without their transparent caps in distribution boards with 55 mm mounting depth.

Introduction

Overview

Devices		Tripping characteristic	Rated currents I_n	Standards	Rated short-circuit capacity Energy limitation class	Usage Non-res.	Res. bldgs.	Industry
Miniature circuit-breakers Standard product range								
	**5SQ2**	B C	6 ... 40 A 0.5 ... 63 A	IEC/EN 60898	3 000	• •	• •	
	**5SX2**	A B C D	1 ... 40 A 6 ... 50 A 0.3 ... 63 A 0.5 ... 50 A	IEC/EN 60898	6 000 3	• • • •	• • • •	
	**5SX4**	B C	6 ... 50 A 0.5 ... 50 A	IEC/EN 60898	10 000 3	• •	• •	
	**5SX5**	B C	6 ... 32 A 0.5 ... 32 A	IEC/EN 60898	4 500 10 000 T4 3	• •	• •	
Residual-current operated circuit-breakers (RCCBs)								
	**5SM1**	• Type AC and type A • I_n = 16 ... 80 A • $I_{\Delta n}$ =10 mA ... 1 A • 2-pole (1-pole + N) and 4-pole (3-pole + N) • Versions K and S • Version for 500 V • Version 50 ... 400 Hz		IEC/EN 61008		•	•	•

Devices		Application	Standards	Usage Non-res.	Res. bldgs.	Industry
Switches						
	**Switches** • 5TE7 changeover switches 16 A • 5TE7 group switches with center position 16 A • 5TE7 switches with pilot lamp 16 A • 5TE7 On/Off switches 16 A to 125 A	For the switching of luminaires, motors and other electrical devices For the application of logical links in control cabinets	16 A to 25 A and 80 A to 100 A: IEC 60947-3, EN 60947-3; IEC 60669-1, EN 60669-1 32 A and 125 A: IEC 60947-3, EN 60947-3	• • • •	 	• • • •

Overview

Devices	Application	Standards	Usage		
			Non-res.	Res. bldgs.	Industry
Switches					
 **Pushbuttons** • 5TE4 7 pushbuttons	In control systems, e.g. for switching on modal electrical circuits	IEC 60669-1, EN 60669-1	•		•
Timers					
 **Time switches for building lighting** • 5TT1 310-1 and 5TT1 311-1 stairwell time switches, 16 A	Energy saving in stairwell lighting	IEC 60669, EN 60669	•	•	
• 5TT1 313 prewarning timer, 10 A	Warns of impending off of stairwell lighting in apartment houses	IEC 60669, EN 60669, DIN 18015	•	•	
• 5TT1 300 energy-saving timer	Energy saving in rooms with infrequent or varied usage	IEC 60669, EN 60669	•	•	
• 5TT1 301 lighting time switch			•	•	
• 5TT1 312 delay timer for fans	Fan delay time for toilet areas	DIN VDE 0637	•	•	
 • 5TT1 303 ECG control switch for ECG dynamic	Stairwell lighting timer for fluorescent lamps with ECG dynamic	IEC 60669, EN 60669	•		
 **Digital time switches** • Time switches with daily and weekly programs 7LF4 11, 7LF4 12	To-the-minute switching in daily, weekly and yearly sequences	IEC 60730, EN 60730; VDE 0633	•	•	•
• 7LF4 15 time switches with yearly/weekly program	Automatic operational startup without input of time and monitoring for accuracy	IEC 60730, EN 60730; IEC 60255, EN 60255; IEC 61812-1, EN 61812-1	•	•	•
• 7LF4 2 time switches with weekly program for wall mounting or front-panel mounting	Creating, changing and documenting switching programs	IEC 60730, EN 60730; IEC 60255, EN 60255; IEC 61812-1, EN 61812-1	•	•	•
• 7LF4 101 mini time switches			•	•	•
 **Mechanical time switches** • 7LS1 0 synchronous time switches, mounting width 36 mm	Switching of day and week program, accurate to 30 minutes	IEC 60730, EN 60730; VDE 0633	•		•
• 7LQ1 0 quartz time switches, mounting width 36 mm			•		•
• 7LS1 10 synchronous time switch, mounting width 54 mm			•		•
• 7LQ1 10 quartz time switches, mounting width 54 mm			•		•
Power Supply Units					
 **Transformers** for continuous load 4AC2 9	AC voltage/current supply up to 40 VA as safety extra-low voltage for the supply of calibration circuits, switching relays, Insta contactors and AC power supplies for SELF systems for continuous operation.		•		•

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Introduction

Overview

Devices	Application	Standards	Usage		
			Non-res.	Res. bldgs.	Industry
Measuring Devices					
 **Time counters and pulse counters** • 7KT5 7 time counters • 7KT5 7 pulse counters • 7KT5 77 time counters 7KT5 78 pulse counters	Monitoring of operating hours and making operations of devices and plants	IEC 60255, EN 60255; VDE 0435	• • •	• • •	• • •
Monitoring Devices					
 **Light signals** 5TE5 70	Visual signal output in PLCs for the indication of switching states or faults	DIN VDE 0710-1	•		•
 **Alarm signaling devices, 55/70 mm** 5TT3 45	Acoustic alarm output of fault indications	IEC 60255, EN 60255; DIN VDE 0435-303	•		•
 **Phase indicators, 55/70 mm** 5TT3 420	Monitoring of power supply	IEC 60255, EN 60255; VDE 0435			•
Phase sequence indicators, 55/70 mm 5TT3 422	Monitoring of the direction of rotation of a power supply	IEC 60255, EN 60255; VDE 0435			•
 **Direct voltage monitors, 55/70 mm** 5TT3 196	Monitoring of 24-V DC power supplies	IEC 60255, EN 60255; VDE 0435			•
 **Current monitors, 55/70 mm** 5TT6 110	Monitoring of lamps and transformers for halogen lighting	IEC 60255, EN 60255; VDE 0435	•		

Overview

Definitions

I_e = rated operational current
U_e = rated operational voltage
I_c = rated control supply current
U_c = rated control supply voltage
P_s = rated operational capacity
1 MW = 18 mm modular width
55/70 mm = mounting depth either 55 mm or 70 mm, due to transparent cap; see adjacent figure.

Transparent cap

Adding a transparent cap extends the 55 mm mounting depth of a device to 70 mm. This is a useful option for improving the appearance of a distribution board. All products that are marked with 55/70 mm are supplied with an extra transparent cap as shown here. You will find the product designation 55/70 mm in the Chapters, "Switching devices", "Power supply units" and "Monitoring devices".

Overview

Technical specifications

			5SQ2	5SX2	5SX4	5SX5
Tripping characteristic			B, C	A, B, C, D	B, C	B, C
Number of poles	1		•	•	•	•
	1 + N		•	•	•	•
	2		•	•	•	•
	3		•	•	•	•
	3 + N		•	•	•	•
	4		•	•	•	•
Rated voltage		V AC	230/400			
		V DC	–			
Operational voltage	min.	V AC/DC	24			
	max.	V DC/pole	60 [1]			
	max.	V AC	440			
Rated breaking capacity						
acc. to EN 60898		kA AC	3			
		kA DC	–			
Insulation coordination						
rated insulation voltage		V AC	250/440			
degree of soiling for overvoltage category III			2			
Protection against contact acc. to IEC 61140, EN 61140; EN 50274			Protection against contact with fingers or the back of the hand			
Sealable in handle end position			•	•	•	•
Device depth according to DIN 43880		mm	55			
Degree of protection according to IEC 60529			IP00, IP40 for installation in distribution boards			
CFC and silicone-free			yes			
Mounting technique			can be snapped onto 35 mm standard mounting rails (EN 60715)			
Terminals			5SQ2 with box terminals at both sides 5SX2, 5SX4, 5SX5 with combination terminals underneath for the simultaneous connection of busbars (fork-type version) and conductors, box terminals above			
Terminal tightening torque, recommended		Nm	2.5 ... 3			
Conductor cross sections						
solid and stranded, max.						
• upper terminal		mm^2	25	16		
• lower terminal		mm^2	25	25		
finely stranded with end sleeve, max.						
• upper terminal		mm^2	16	10		
• lower terminal		mm^2	16	16		
different conductor cross sections may be clamped together simultaneously; further details available on request.						
Supply connection			any, observe the polarity for DC applications			
Mounting position			any			
Service life			an average of 20.000 operations at the rated load			
Ambient temperature		°C	-25 ... +45, occasionally +55, max. 95% humidity, storage temperature: -40 ... +75			
Resistance to climate			6 cycles acc. to IEC 60068-2-30			
Resistance to vibrations		m/s^2	60 at 10 Hz ... 150 Hz acc. to IEC 60068-2-6			

1) ≙ Battery charging voltage of 72 V.

2) ≙ For rated currents ≤ 32 A: 10 mm^2.

Overview

Tripping characteristics

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristic	Standards	Thermal releases Test currents: limiting no-damage current I_1	minimum no-damage current I_2	tripping time $I_n \leq 63$ A t	$I_n > 63$ A	Electromagnetic releases Test currents: hold I_4	latest tripping instant I_5	tripping time t
A		1.13 x I_n		> 1 h	> 2 h	2 x I_n		≥ 0.1 s
			1.45 x I_n	< 1 h	< 2 h		3 x I_n	< 0.1 s
B	IEC 60898-1/EN 60898-1	1.13 x I_n		> 1 h	> 2 h	3 x I_n		≥ 0.1 s
			1.45 x I_n	< 1 h	< 2 h		5 x I_n	< 0.1 s
C		1.13 x I_n		> 1 h	> 2 h	5 x I_n		≥ 0.1 s
			1.45 x I_n	< 1 h	< 2 h		10 x I_n	< 0.1 s
D		1.13 x I_n		> 1 h	> 2 h	10 x I_n		≥ 0.1 s
			1.45 x I_n	< 1 h	< 2 h		20 x I_n	< 0.1 s

Breaking capacity

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

The values are standardized and are determined acc. to the test conditions of EN 60898-1.
The most common values are 6 000 and 10 000.

For other test conditions, different values can be specified that are higher those of EN 60898-1.

One such standard is IEC 60947-2, EN 60947-2 for circuit-breakers.

Rated short-circuit capacity

		EN 60898 (IEC 60898) 1-pole 230 V AC	2, 3 and 4-pole 400 V AC	EN 60947-2 (IEC 60947-2) 1-pole 230 V AC	2, 3 and 4-pole 400 V AC
Rated current	I_n [A]	I_{cn} [kA]	I_{cn} [kA]	I_{cu} [kA]	I_{cu} [kA]
5SQ2	0.5 ... 63	3	3	4.5	4.5
5SX2	0.5 ... 63	6	6	10 [1]	10 [1]
5SX4	0.5 ... 50	10	10	15 [2]	15 [2]
		E DIN VDE 0641 T 12 1-pole 230 V AC	**2-pole 400 V AC**	**E DIN VDE 0641 T 12 1-pole 220 V AC**	**2-pole 440 V AC**
Rated current	I_n [A]	I_{cn} [kA]	I_{cn} [kA]	I_{cu} [kA]	I_{cu} [kA]
5SX5	0.5 ... 32	4.5	4.5	10 [1]	10 [1]

1) I_n = 63 A corresponds to I_{cu} = 6 kA

2) I_n = 40 A and 50 A corresponds to I_{cu} = 10 kA

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Introduction

Overview

Selective miniature circuit-breakers/fuses

Distribution systems are usually set up as radial networks. An overcurrent protection device is required for each reduction of the cable 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 circuit is tripped. This means that current circuits in parallel can maintain a power flow.

In the case of miniature circuit-breakers with upstream fuses, the selectivity limit depends largely on the current limiting 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 short-circuit capacity.

The following tables provide information on the short-circuit currents up to which selectivity exists between miniature circuit-breakers and upstream fuse acc. to IEC 60269-2-1, DIN VDE 0636-201. 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 selective line 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
5SX2									
Characteristic A	≤ 2	0.4	0.7	2.0	•	•	•	•	•
	3	0.3	0.6	1.6	2.0	•	•	•	•
	4	0.3	0.6	0.9	1.6	•	•	•	•
	6	0.2	0.4	0.8	1.2	3.0	3.2	•	•
	10	–	0.4	0.6	1.1	2.2	3.0	•	•
	16	–	–	0.5	1.0	2.0	2.6	4.5	•
	20	–	–	–	1.0	2.0	2.4	4.1	•
	25	–	–	–	–	1.5	2.0	3.7	•
	32	–	–	–	–	1.2	1.8	3.0	5.0
	40	–	–	–	–	–	1.7	2.5	4.0
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	–	–	–	–	–	–	–	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
Characteristic D	≤ 2	0.3	0.5	0.7	1.3	3.0	•	•	•
	3	0.3	0.4	0.7	1.2	3.0	•	•	•
	4	–	0.4	0.6	1.0	2.5	4.0	•	•
	6	–	–	0.5	0.9	2.0	3.0	•	•
	8	–	–	–	0.7	1.4	2.0	3.1	•
	10	–	–	–	–	1.4	2.0	3.1	•
	13	–	–	–	–	–	1.7	3.0	•
	16	–	–	–	–	–	1.7	3.0	•
	20	–	–	–	–	–	–	2.4	5.0
	25	–	–	–	–	–	–	–	5.0
	32	–	–	–	–	–	–	–	4.0
	40	–	–	–	–	–	–	–	–
	50	–	–	–	–	–	–	–	–

• ≙ ≥ rated short-circuit capacity 5SX2 acc. to EN 60898 6 000.

Overview

Selective miniature circuit-breakers/fuses

In the event of a short circuit, when using the 5SX4 MCBs and fuses according to to IEC 60269-2-1, DIN VDE 0636-201, selectivity is provided up to the indicated values in kA.

Limit values of selective line 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	125 A
5SX4										
Characteristic B	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	–	–	–	–	–	–	–	–	–

• ≙ ≥ rated short-circuit capacity 5SX4 acc. to EN 60898 10 000.

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Introduction

Overview

Selective 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 $\hat{I}$ 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 circuit-breakers and upstream circuit-breaker acc. to IEC 60947-2, EN 60947-2 at 230/400 V AC, 50 Hz.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers				**Upstream** circuit-breakers								
				3RV1.1		**3RV1.2**						
	I_n [A]			10	12	8	10	12.5	16	20	22	25
		$I >$[A]		120	144	96	120	150	192	240	264	300
			I_{cn} [kA]	50	50	100	100	100	50	50	50	50
				Selectivity limits [kA] [1]								
5SX2												
Characteristic A	2	6	6	0.2	0.2	–	–	0.2	0.2	0.6	1.2	1.5
	10	30	6	–	–	–	–	–	–	0.3	0.5	0.5
	16	48	6	–	–	–	–	–	–	0.3	0.4	0.5
	32	96	6	–	–	–	–	–	–	–	–	–
	40	120	6	–	–	–	–	–	–	–	–	–
5SX2/5SX4												
Characteristic B	6	30	6/10	0.2	0.2	–	–	0.2	0.2	0.3	0.5	0.5
	10	50	6/10	–	0.2	–	–	0.2	0.2	0.3	0.4	0.5
	13	65	6/10	–	–	–	–	–	0.2	0.2	0.4	0.4
	16	80	6/10	–	–	–	–	–	–	0.2	0.4	0.4
	20	100	6/10	–	–	–	–	–	–	–	–	0.4
	25	125	6/10	–	–	–	–	–	–	–	–	–
	32	160	6/10	–	–	–	–	–	–	–	–	–
	40	200	6/10	–	–	–	–	–	–	–	–	–
	50	250	6/10	–	–	–	–	–	–	–	–	–
5SX2/5SX4												
Characteristic C	0.5	5	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1	10	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1.6	16	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	2	20	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	3	30	6/10	–	0.2	–	–	0.2	0.2	0.3	0.4	0.5
	4	40	6/10	–	0.2	–	–	0.2	0.2	0.3	0.4	0.5
	6	60	6/10	–	0.2	–	–	0.2	0.2	0.3	0.4	0.5
	8	80	6/10	–	0.2	–	–	0.2	0.2	0.2	0.4	0.4
	10	100	6/10	–	0.2	–	–	0.2	0.2	0.2	0.4	0.4
	13	130	6/10	–	–	–	–	–	0.2	0.2	0.4	0.4
	16	160	6/10	–	–	–	–	–	–	0.2	0.4	0.4
	20	200	6/10	–	–	–	–	–	–	–	–	0.4
	25	250	6/10	–	–	–	–	–	–	–	–	–
	32	320	6/10	–	–	–	–	–	–	–	–	–
	40	400	6/10	–	–	–	–	–	–	–	–	–
	50	500	6/10	–	–	–	–	–	–	–	–	–
	63	630	6	–	–	–	–	–	–	–	–	–
5SX2												
Characteristic D	2	40	6	–	–	–	–	0.2	0.2	0.4	0.6	0.6
	6	120	6	–	–	–	–	–	–	0.3	0.4	0.4
	10	200	6	–	–	–	–	–	–	0.2	0.4	0.4
	16	320	6	–	–	–	–	–	–	–	–	–
	32	640	6	–	–	–	–	–	–	–	–	–
	40	800	6	–	–	–	–	–	–	–	–	–
	50	1,000	6	–	–	–	–	–	–	–	–	–

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

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers acc. to IEC 60947-2, EN 60947-2 up to the specified values in kA.

Limit values of selective line miniature circuit-breakers/fuses in kA

Downstream miniature circuit-breakers				**Upstream** circuit-breakers **3RV1.3**						
	I_n [A]			16	20	25	32	40	45	50
		$I >$[A]		192	240	300	384	480	540	600
			I_{cn} [kA]	50	50	50	50	50	50	50
				Selectivity limits [kA] [1]						
5SX2										
Characteristic A	2	6	6	0.2	0.8	1.2	2.5	3	6	6
	10	30	6	0.2	0.4	0.5	0.6	0.8	1	1.2
	16	48	6	–	0.3	0.4	0.6	0.8	0.8	1
	32	96	6	–	–	–	–	0.6	0.8	0.8
	40	120	6	–	–	–	–	–	–	0.8
5SX2/5SX4										
Characteristic B	6	30	6/10	0.2	0.3	0.5	0.6	0.8	1	1.2
	10	50	6/10	0.2	0.3	0.4	0.6	0.8	1	1.2
	13	65	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	16	80	6/10	–	0.3	0.4	0.6	0.8	1	1
	20	100	6/10	–	–	0.4	0.6	0.8	1	1
	25	125	6/10	–	–	–	0.5	0.6	0.8	0.8
	32	160	6/10	–	–	–	–	0.6	0.8	0.8
	40	200	6/10	–	–	–	–	–	–	0.8
	50	250	6/10	–	–	–	–	–	–	–
5SX2/5SX4										
Characteristic C	0.5	5	6/10	0.3	0.5	0.6	1	1	1.5	3
	1	10	6/10	0.3	0.5	0.6	1	1	1.5	3
	1.6	16	6/10	0.3	0.5	0.6	1	1	1.5	3
	2	20	6/10	0.3	0.5	0.6	1	1	1.5	3
	3	30	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	4	40	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	6	60	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	8	80	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	10	100	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	13	130	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	16	160	6/10	–	0.2	0.4	0.6	0.6	0.8	1
	20	200	6/10	–	–	0.4	0.6	0.6	0.8	1
	25	250	6/10	–	–	–	0.5	0.6	0.8	0.8
	32	320	6/10	–	–	–	–	0.6	0.8	0.8
	40	400	6/10	–	–	–	–	–	–	0.8
	50	500	6/10	–	–	–	–	–	–	–
	63	630	6	–	–	–	–	–	–	–
5SX2										
Characteristic D	2	40	6	0.3	0.5	0.6	0.8	1.2	1.5	1.5
	6	120	6	0.2	0.3	0.4	0.6	0.8	1	1
	10	200	6	–	0.3	0.4	0.5	0.6	0.8	0.8
	16	320	6	–	–	–	0.5	0.6	0.6	0.8
	32	640	6	–	–	–	–	–	0.6	0.6
	40	800	6	–	–	–	–	–	–	–
	50	1000	6	–	–	–	–	–	–	–

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

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Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers acc. to IEC 60947-2, EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/ circuit-breakers in kA

Downstream miniature circuit-breakers				**Upstream** circuit-breakers **3RV1.4**									
	I_n [A]	$I >$[A]	I_{cn} [kA]	16	20	25	32	40	50	63	75	90	100
				192	240	300	384	480	600	756	900	1 080	1 140
				100	100	100	100	100	100	100	100	100	100
				Selectivity limits [kA] [1]									
5SX2													
Characteristic A	2	6	6	0.5	0.8	1.5	2.5	3	6	6	6	6	6
	10	30	6	0.3	0.4	0.5	0.6	0.8	1,2	1.5	2.5	3	4
	16	48	6	–	0.3	0.5	0.6	0.6	1	1.5	2	3	3
	32	96	6	–	–	–	–	0.6	0.8	1.5	2	2.5	3
	40	120	6	–	–	–	–	–	0.8	1.2	1.5	2	2
5SX2/5SX4													
Characteristic B	6	30	6/10	0.2	0.4	0.5	0.6	0.8	1.2	2	3	6/10	6/10
	10	50	6/10	0.2	0.3	0.5	0.6	0.8	1	1.5	2.5	4	4
	13	65	6/10	0.2	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	16	80	6/10	–	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	20	100	6/10	–	–	0.5	0.6	0.8	1	1.5	2	3	3
	25	125	6/10	–	–	–	0.5	0.8	0.8	1.5	2	3	3
	32	160	6/10	–	–	–	–	0.6	0.8	1.5	2	3	3
	40	200	6/10	–	–	–	–	0.6	0.8	1.2	1.5	2.5	2.5
	50	250	6/10	–	–	–	–	–	–	1.2	1.5	2.5	2.5
5SX2/SX4													
Characteristic C	0.5	5	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	1	10	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	1.6	16	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	2	20	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	3	30	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	4	40	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	6	60	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	8	80	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	10	100	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	13	130	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	16	160	6/10	–	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	20	200	6/10	–	–	0.4	0.6	0.6	1	1.5	2	3	3
	25	250	6/10	–	–	–	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	320	6/10	–	–	–	–	0.6	0.8	1.2	1.5	2.5	2.5
	40	400	6/10	–	–	–	–	–	0.6	1	1.5	2	2
	50	500	6/10	–	–	–	–	–	–	1	1.2	1.5	2
	63	630	6/10	–	–	–	–	–	–	–	–	1.5	1.5
5SX2													
Characteristic D	2	40	6	0.4	0.5	0.6	0.8	1	1.5	3	4	6	6
	6	120	6	0.2	0.3	0.4	0.6	0.6	1	1.5	2.5	3	3
	10	200	6	–	0.3	0.4	0.5	0.6	0.8	1.5	2	3	3
	16	320	6	–	–	–	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	640	6	–	–	–	–	–	0.6	1	1.5	2	2
	40	800	6	–	–	–	–	–	–	1	1.2	1.5	1.5
	50	1000	6	–	–	–	–	–	–	1	1.2	1.5	1.5

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

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers acc. to IEC 60947-2, EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers				**Upstream** circuit-breakers											
				3VF3 adjustable						**3VF3 fixed setting**					
	I_n [A]			50	63	80	100	125	160	50	63	80	100	125	160
		$I >$[A]		500	630	800	1 000	1 250	1600	400	500	630	800	1 000	1 280
			I_{cn} [kA]	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100
				Selectivity limits [kA] 1)											
5SX2															
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	30	6	1.6	4.7	6	6	6	6	2.5	4	4	4.5	4.9	6
	16	48	6	1.4	4.7	6	6	6	6	2.3	3.7	3.7	4.4	5	6
	32	96	6	1.2	3.6	4.6	6	6	6	1.8	3	3	3.5	3.7	6
	40	120	6	1	2.5	3.1	6	6	6	1.5	2	2	2.4	2.7	3.2
5SX2/3SX4															
Characteristic B	6	30	6/10	2.1	6/10	6/10	6/10	6/10	6/10	3.2	6/10	6/9.7	6/10	6/10	6/10
	10	50	6/10	1.8	6/8	6/10	6/10	6/10	6/10	2.5	6/6.2	4.8	6/6.2	6/6.5	6/10
	13	65	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9
	16	80	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9
	20	100	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	6/8.9
	25	125	6/10	1.4	3.5	4.6	5.5	6	6/10	2.1	3.4	3	3.4	3.7	5.2
	32	160	6/10	1.4	3.5	4.6	5.5	6	6/10	2.1	3.4	3	3.4	3.7	5.2
	40	200	6/10	1.3	2.4	2.8	3.3	4.5	6.7	1.8	2.3	2.2	2.4	2.7	3.6
	50	250	6/10	–	2.4	2.8	3.3	4.3	5.8	–	2.3	2.2	2.4	2.7	3.6
5SX2/3SX4															
Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1	10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1.5	15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	2	20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	3	30	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10
	4	40	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10
	6	60	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10
	8	80	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	6/9.4
	10	100	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	6/9.4
	13	130	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5
	16	160	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5
	20	200	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	6/7.5
	25	250	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	4.9
	32	320	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	4.9
	40	400	6/10	0.9	2.2	2.6	2.8	3.1	4.8	1.4	2.1	2.2	2.2	2.3	2.9
	50	500	6/10	–	2.1	2.5	2.8	3.1	4.8	–	–	2.1	2.1	2.2	2.9
5SX2															
Characteristic D	2	40	6	2.4	6	6	6	6	6	4.2	6	6	6	6	6
	6	120	6	1.4	4.2	4.8	6	6	6	2.3	4.1	4.2	4.2	4.3	6
	10	200	6	1.3	3.9	5.5	6	6	6	1.9	3.7	3.7	3.7	4	6
	16	320	6	1.1	3.5	4.2	4.9	6	6	1.7	3.3	3.7	3.3	3.5	4.7
	32	640	6	–	–	3.3	3.9	4.2	6	–	–	–	2.4	2.7	3.7
	40	800	6	–	–	–	3.1	3.3	4.9	–	–	–	–	1.5	3
	50	1000	6	–	–	–	–	2.9	4.8	–	–	–	–	–	2.6

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.

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers acc. to IEC 60947-2, EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers				**Upstream** circuit-breakers														
				3VF4				**3VF5**				**3VF6**		**3VF7**	**3VF8**	**3WN1**	**3WN6**	
I_n [A]				125	160	200	250	200	250	315	400	315	400-800	400-1250	800-2500	315-6300	315-3200	
$I >$[A]				1250	1600	2000	2500	2000	2500	3150	4000	3200	1575-6400	15000	20000	3780-75600	3780-48000	
			I_{cn} [kA]	40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	65/80/100	65/75	
				Selectivity limits [kA] [1]														
5SX2/3SX4																		
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	10	30	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	16	48	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	32	96	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	40	120	6	3.9	4.6	6	6	6	6	6	6	6	6	6	6	6	6	
Characteristic B	6	30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	10	50	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	13	65	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	16	80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	20	100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	25	125	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	32	160	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	40	200	6/10	6	6	6	6	6	6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	50	250	6/10	5.1	5.9	6	6	6	6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1	10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1.5	15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	2	20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	3	30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	4	40	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	6	60	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	8	80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	10	100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	13	130	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	16	160	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	20	200	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	25	250	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	32	320	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	40	400	6/10	3.6	4.8	6/6.5	6/6.5	6/6.5	6/6.5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	50	500	6/10	3.6	4.8	6/6.2	6/6.2	6/6.2	6/6.3	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
Characteristic D	2	40	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	6	120	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	200	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	16	320	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	32	640	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	800	6	4	4.9	6	6	6	6	6	6	6	6	6	6	6	6	6
	50	1000	6	4	4.8	6	6	6	6	6	6	6	6	6	6	6	6	6

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.

Overview

Selective miniature circuit-breakers/miniature circuit-breakers

Within narrow limits, miniature circuit-breakers also offer selectivity between circuit-breakers in a fuseless distribution board.
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.

The following table shows the short-circuit current in kA up to which there is selectivity between series-connected circuit-breakers at 230 V AC.

Limit values of selective miniature circuit-breakers/ miniature circuit-breakers in kA

Downstream miniature circuit-breakers				**Upstream** miniature circuit-breakers								
				5SX4 7 C characteristic					**5SP4 7 C characteristic**		**5SP4 8 D characteristic**	
	I_n [A]			20	25	32	40	50	80	100	80	100
		$I >$[A]		200	250	320	400	500	800	1 000	1 200	1 500
			I_{cn} [kA]	10	10	10	10	10	10	10	10	10
				Selectivity limits [kA]								
5SX2/5SX4												
Characteristic B	6	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	5
	10	50	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.2	3	4
	13	65	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	16	80	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	20	100	6/10	–	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	25	125	6/10	–	–	–	0.4	0.4	0.6	1.2	1.5	3
	32	160	6/10	–	–	–	0.4	0.4	0.6	1.2	1.5	3
	40	200	6/10	–	–	–	–	0.4	0.6	1.2	1.5	2.5
	50	250	6/10	–	–	–	–	–	0.6	1	1.5	2.5
Characteristic C	0.5	5	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	1	10	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	1.5	15	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	2	20	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	3	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	4	40	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	6	60	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	8	80	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	10	100	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	13	130	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	16	160	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	20	200	6/10	–	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	25	250	6/10	–	–	–	0.3	0.4	0.6	1	1.5	2.5
	32	320	6/10	–	–	–	0.3	0.4	0.6	1	1.5	2.5
	40	400	6/10	–	–	–	–	–	–	0.8	1.5	2
	50	500	6/10	–	–	–	–	–	–	0.8	1.5	2
	63	630	6	–	–	–	–	–	–	0.8	1.2	1.5

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Introduction

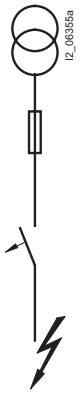
Overview

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 short-circuit 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 acc. to IEC 60269-2-1, DIN VDE 0636-201.

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	80a	100 A	125 A	160 A
5SX2/5SX4							
	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

Test circuit data:

U_p = 250 V
power factor = 0.3 ... 0.5

Test cycle:

Acc. to EN 60947 - 2 (0 - C0)

Overview

Back-up protection miniature circuit-breakers/circuit-breakers

If MCBs are used in fuseless distribution boards, circuit-breakers are to be provided as back-up protection according to EN 60947-2.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed if circuit-breakers are used.

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

Downstream MCBs	I_n [A]	I >[A] / I_{cn} [kA]	Upstream circuit-breakers											
			3VF3 adjustable						3VF3 fixed setting					
			50 500 40/70/100	63 630 40/70/100	80 800 40/70/100	100 1 000 40/70/100	125 1 250 40/70/100	1 60 1 600 40/70/100	50 400 40/70/100	63 500 40/70/100	80 630 40/70/100	100 800 40/70/100	125 1 000 40/70/100	160 1 280 40/70/100
			Back-up-protection up to kA											
5SX2/5SX4														
Characteristic A, Characteristic B, Characteristic C, Characteristic D	0.3 ... 4	6/10	No back-up protection required up to 50 kA											
	6	6/10	50	50	50	50	50	50	50	50	50	50	50	50
	8 ... 20	6/10	25	25	25	25	25	25	25	25	25	25	25	25
	25	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	32	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	40	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	50	6/10	10	10	10	10	10	10	10	10	10	10	10	10
	63	6	10	10	10	10	10	10	10	10	10	10	10	10
5SQ2														
Characteristic B, Characteristic C	0.5 ... 2	3	6	6	6	6	6	6	6	6	6	6	6	6
	3, 4	3	4	4	4	4	4	4	4	4	4	4	4	4
	6 ... 63	3	4,5	4,5	4,5	4	4	4	4,5	4,5	4,5	4,5	4	4

Downstream MCBs	I_n [A]	I >[A]	I_{cn} [kA]	Upstream circuit-breakers												
				3VF4				3VF5				3VF6	3VF7	3VF8	3WN1/ 3WS1
				125	160	200	250	200	250	315	400	315 - 630	400 - 1,250	1,600 - 2,000	315 - 6,300
				1,250	1,600	2,000	2,500	2,000	2,500	3,150	4,000	3,200 - 6,300	15,000	20,000	3,780 - 75,600
				40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	65-100
				Back-up-protection up to kA												
5SX2/5SX4																
Characteristic A, Characteristic B, Characteristic C, Characteristic D	0.3 ... 4	6/10		No back-up protection required up to 50 kA												
	6	6/10		50	50	50	50	50	50	50	50	50	50	50	50	
	8 ... 20	6/10		25	25	25	25	25	25	25	25	25	25	25	25	
	25	6/10		20	20	20	20	20	20	20	20	20	20	20	20	
	32	6/10		20	20	20	20	20	20	20	20	20	20	20	20	
	40	6/10		20	20	20	20	20	20	20	20	20	20	20	20	
	50	6/10		10	10	10	10	10	10	10	10	10	10	10	10	
	63	6		10	10	10	10	10	10	10	10	10	10	10	10	
5SQ2																
Characteristic B, Characteristic C	0.5 ... 2	3		3	6	6	6	6	6	6	6	6	6	6	6	
	3, 4	3		3	4	4	4	4	4	4	4	4	4	4	4	
	6 ... 63	3		3	3	3	3	3	3	3	3	3	3	3	3	

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Introduction

Overview

Internal resistance and power dissipation		Data per pole (loaded with I_n)							
	I_n [A]	**Type A**		**Type B**		**Type C**		**Type D**	
		R_1 mW	P_v W	R_1 mW	P_v W	R_1 mW	P_v W	R_1 mW	P_v W
5SX2, 5SX4, 5SX5									
	0.3	–	–	–	–	10,500	0.95	–	–
	0.5	–	–	–	–	3,000	0.75	3,000	0.75
	1	1,400	1.4	–	–	640	0.64	650	0.65
	1.6	540	1.4	–	–	312	0.80	270	0.7
	2	380	1.5	–	–	212	0.85	165	0.66
	3	170	1.5	–	–	82	0.74	77	0.7
	4	120	1.9	–	–	53	0.85	60	1
	6	43	1.5	28	1.0	19	0.70	20	0.7
	8	–	–	–	–	15	0.96	14	0.9
	10	18	1.8	16.5	1.65	12.5	1.25	12	1.2
	13	–	–	11.5	1.94	9	1.52	10	1.7
	16	10	2.5	8.5	1.17	7.8	2	7	1.8
	20	7.5	3	6.5	2.6	6	2.4	5.6	2.2
	25	4.7	2.9	4.8	3	4.5	2.8	4.5	2.8
	32	3.1	3.6	4	4.1	3.7	3.8	2.9	3
	40	2.6	4.2	2.7	4.3	2.5	4	2.4	3.8
	50	–	–	2	5	1.9	4.7	1.8	4.5
	63	–	–	–	–	1.6	6.6	–	–
5SQ2									
	0.5	–	–	–	–	8,000	2	–	–
	1	–	–	–	–	1,850	1.85	–	–
	1.6	–	–	–	–	631	1.62	–	–
	2	–	–	–	–	690	2.76	–	–
	3	–	–	–	–	260	2.34	–	–
	4	–	–	–	–	170	2.72	–	–
	6	–	–	77	2.8	68	2.45	–	–
	8	–	–	–	–	42.5	2.72	–	–
	10	–	–	16.2	1.6	13.5	1.95	–	–
	13	–	–	10.3	1.7	8.1	1.37	–	–
	16	–	–	8	2.1	6.8	1.74	–	–
	20	–	–	5.9	2.3	5.5	2.2	–	–
	25	–	–	5.2	3.2	4.6	2.87	–	–
	32	–	–	3.9	4	2.6	2.66	–	–
	40	–	–	3.1	4.96	2.3	3.68	–	–
	50	–	–	–	–	1.8	4.5	–	–
	63	–	–	–	–	1.5	5.95	–	–

Correction factor for power dissipation

- Direct current and alternating current up to 60 Hz: x 1.0
- Alternating current 200 Hz: x 1.1
  400 Hz: x 1.15
  1 100 Hz: x 1.3

Overview

Personnel safety with miniature circuit-breakers

According to DIN VDE 0100-410 (IEC 60364-4-41), 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 occurs (i.e. a short-circuit) at any point between an outer conductor and a PE conductor, or a connected exposed conductive part, automatic tripping is achieved within the specified times of 0.4 s / 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
5SX, 5SQ								
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 x 1.04 applies.
At U_O = 127 V AC, Z_S x 0.55 applies.

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Introduction

Overview

Fusing of luminaire circuits

Maximum permissible lamp load of a miniature circuit-breaker when operating fluorescent lamps L18 W, L 36 W, L 38 W, L 58 W.

Maximum number of fluorescent lamps

	I_n [A]	Lamp	Conventional ballast single-lamp uncor-rected	Conventional ballast single-lamp parallel corrected	Electronic ballast full switching single lamp B	Electronic ballast full switching single lamp C	Electronic ballast full switching two lamps B	Electronic ballast full switching two lamps C	Electronic ballast group switching single lamp	Electronic ballast group switching two lamps
5SX										
Characteristic			**all**	**all**	**B**	**C**	**B**	**C**	**all**	**all**
	10	L 18 W	21	26	20	40	27	56	80	92
		L 36 W	18	26	20	40	27	48	46	48
		L 38 W	18	26	20	40	27	46	44	46
		L 58 W	11	16	13	28	12	25	30	30
	13	L 18 W	28	34	26	52	35	72	104	121
		L 36 W	24	34	26	52	35	**62**	60	62
		L 38 W	24	34	26	52	35	**60**	57	60
		L 58 W	15	21	17	36	16	**33**	40	40
	16	L 18 W	34	42	32	65	44	89	128	150
		L 36 W	29	42	32	65	44	76	75	76
		L 38 W	29	42	32	65	44	75	70	75
		L 58 W	18	27	22	44	20	41	48	49
	20	L 18 W	43	52	40	81	56	112	160	187
		L 36 W	36	52	40	81	56	96	93	96
		L 38 W	36	52	40	81	56	92	88	92
		L 58 W	23	33	28	56	25	52	60	62
	25	L 18 W	53	66	51	102	68	139	200	235
		L 36 W	46	66	51	102	68	120	117	120
		L 38 W	46	66	51	102	68	116	110	116
		L 58 W	29	42	34	69	32	65	76	78
	32	L 18 W	68	84	65	131	89	179	250	300
		L 36 W	59	84	65	131	89	153	150	153
		L 38 W	59	84	65	131	89	150	141	150
		L 58 W	37	54	44	89	41	84	98	99

Comments:

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 %, at 200 mΩ by 20 %.

Reduction factors for miniature circuit-breakers for the simultaneously switching on of filament lamp load taking into account the rated current of the miniature circuit-breaker and the summated current of the lamps

	Reduction factors Switching with miniature circuit-breaker	Switching with separate switch
5SX, 5SQ2		
Characteristic A	0.3	0.35
Characteristic B	0.5	0.6
Characteristic C	1	1
Characteristic D	1	1

Overview

Current carrying capacity of circuit- breakers with corrected and uncorrected HQ, HQI and NAV lamps (no.)

		Lamp wattage [W]							
		35	70	150	250	400	1 000	2000	3 500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Corr. 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 wattage [W]							
		35	70	150	250	400	1 000	2000	3 500
5SX2, 5SX4									
Characteristic B	6	3	1	0	0	0	0	0	0
	10	5	2	1	0	0	0	0	0
	13	6	3	1	1	1	0	0	0
	16	8	4	2	1	1	0	0	0
	20	10	5	2	1	1	0	0	0
	25	13	7	3	2	1	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	21	12	6	3	3	1	1	1
Characteristic C	1	1	0	0	0	0	0	0	0
	1.6	2	1	0	0	0	0	0	0
	2	2	1	0	0	0	0	0	0
	3	3	1	0	0	0	0	0	0
	4	4	2	1	0	0	0	0	0
	6	6	3	1	1	0	0	0	0
	8	8	4	2	1	1	0	0	0
	10	10	5	2	1	1	0	0	0
	13	13	7	3	2	1	1	1	0
	16	16	9	4	2	2	1	1	0
	20	20	11	5	3	2	1	1	0
	25	25	14	7	4	3	2	1	1
	32	32	17	8	5	4	2	2	1
	40	40	22	11	6	5	3	3	1
	50	50	27	13	8	7	4	3	2
Characteristic D	1	1	0	0	0	0	0	0	0
	1.6	2	1	0	0	0	0	0	0
	2	2	1	0	0	0	0	0	0
	3	3	2	1	0	0	0	0	0
	4	5	2	1	1	0	0	0	0
	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	3	1
	50	70	35	19	11	10	4	3	2

Introduction

Overview

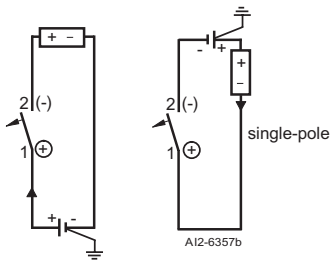
MCBs for DC and AC/DC

In DC networks up to 60 V or 120 V, all MCBs 5SX2 and 5SX4 are suitable for single-pole and double-pole application.

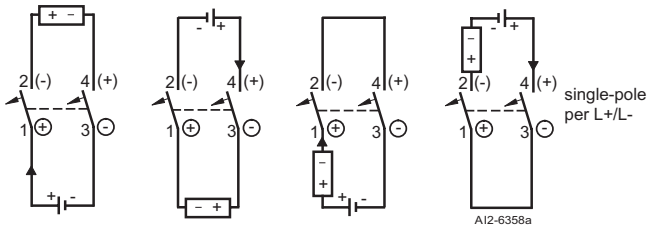
The 5SX5 design is required for higher voltages. Contrary to the standard product range, the 5SX5 MCBs are equipped with additional permanent magnets in the quenching chamber to support arc suppression.

For this reason, the polarity of the MCB is clearly marked and must be observed when connecting the cables and conductors.

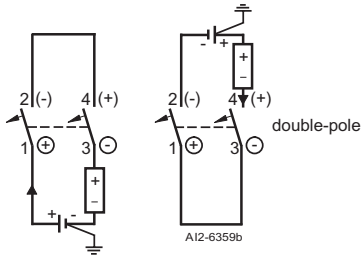
Up to max. 220 V DC battery voltage



Up to max. 220 V DC battery voltage



Up to max. 440 V DC battery voltage



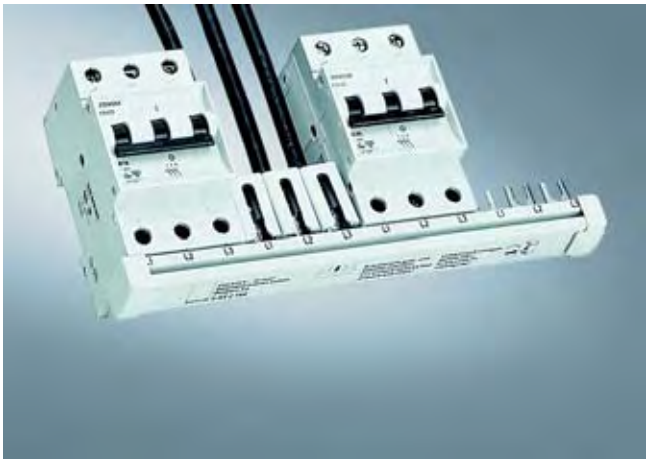
Benefits

Sample applications for 5SX miniature circuit-breakers

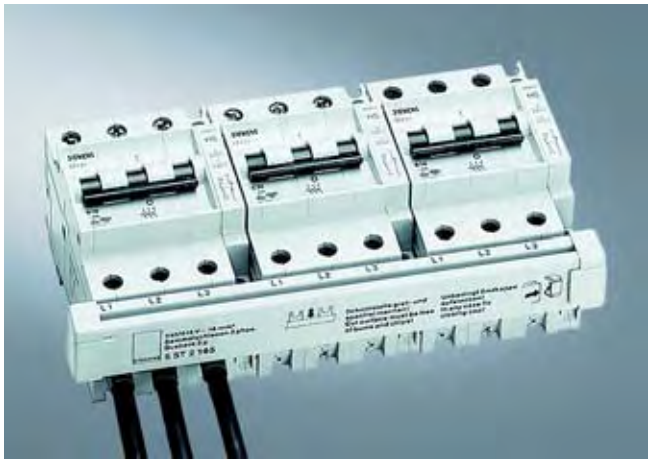
Simultaneous connection of the supply leads coming from below with cross-sections of up to 25 mm^2 and the three-pole 5ST2 144 busbar to the combination terminal of the miniature circuit-breaker.

Simultaneous connection of the supply leads coming from below with cross-sections of up to 35 mm^2 and 2-pole 5ST2 143 busbar over 5ST2 166 terminal.

Process is the same if the connecting cables are fed in from above.



Connection of the supply leads coming from above with cross-sections of up to 35 mm^2 to 5ST2 144 busbar over additional terminal 5ST2 157.



Simultaneous connection of supply leads of up to 25 mm^2 and 5ST2 165 busbar to combination terminal of the miniature circuit-breaker with auxiliary circuit switches that have been added on-site.

The busbars and connection terminals are described on page 12/36.

Miniature Circuit-Breakers

Introduction

Benefits

- High rated breaking capacity up to 10,000 A acc. to EN 60898
- Excellent current limiting and selectivity characteristics
- Tripping characteristics B and C
- Terminals offer protection against contact with fingers or the back of the hand acc. to the German accident prevention regulations VBG 4/BGV A2
- Combined terminals enable a simultaneous connection of busbars and feeder cables
- Uniform additional components which can be mounted individually, fast and on-site thanks to their snap-on technique
- The handle locking device effectively prevents any unauthorized operation of the handle
- Particularly suitable for installation in flat distribution boards for building installations

Application

N system miniature circuit-breakers primarily serve to protect cables and lines against overload and short circuit. Thus, they also serve to protect electrical equipment against excessive overheating acc. to DIN VDE 0100-430 (see also IEC 60364-4).

Under certain conditions, miniature circuit-breakers also offer protection against dangerous leakage currents caused by excessive touch voltage due to insulation faults acc. to DIN VDE 0100-410.

Thanks to their fixed rated current settings, the miniature circuit-breakers may also be used for limited motor protection applications.

A range of different tripping characteristics are available for the applications described here. The EN 60898-1 and IEC 60898-1 standards form the basis for the miniature circuit-breakers' design and approval.
When used for industrial applications and for system and plant engineering applications, the *N system* miniature circuit-breakers can be supplemented by individually mountable add-on components such as auxiliary circuit switches, fault signal contacts, shunt trips and individually mountable accessories, such as busbar systems and mounting parts.

Design

N system miniature circuit-breakers 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.

Function

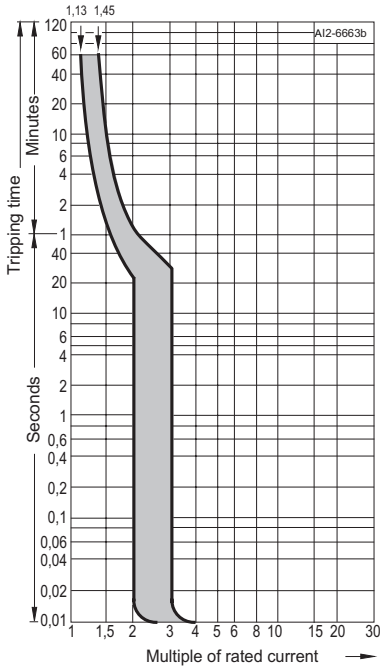
Thanks to the extremely fast contact separation in cases of failures and the rapid quenching of the arc consequently generated in the arcing chamber, the *N system* miniature circuit-breakers ensure safe and current-limiting disconnection.

The permissible limit I^2t values of the energy limitation class 3 specified in EN 60898-1 and IEC 60898-1 are generally undercut by 50%. This guarantees an excellent selectivity towards upstream overcurrent protection devices.

Characteristic curves

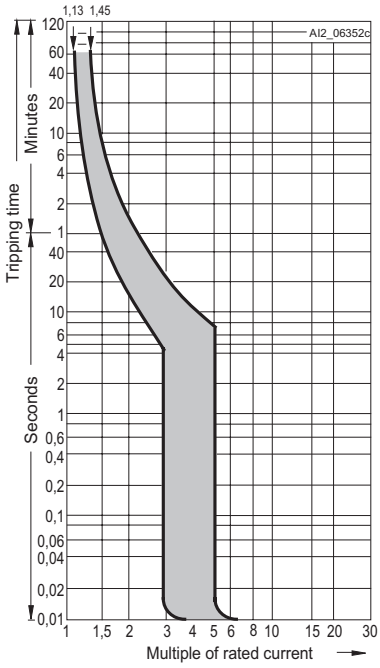
Tripping characteristic acc. to IEC 60898-1, EN 60898-1

Tripping characteristic A



- For limited semiconductor protection
- Protection of measuring circuits with transformers
- Protection of circuits with long cable lengths which will require tripping within 0.4 s acc. to DIN VDE 0100-410

Tripping characteristic B



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

Introduction

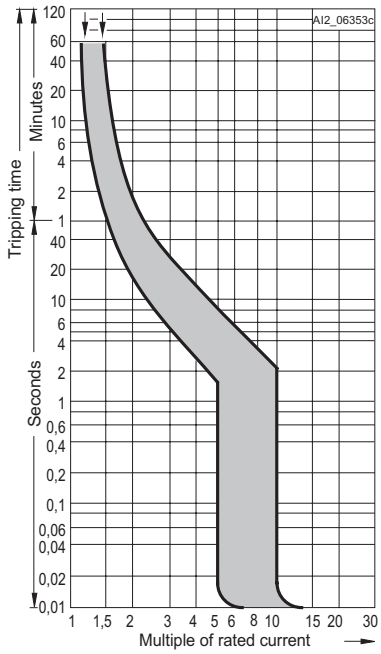
In the case of different ambient temperatures, the current values of the delayed tripping operation change by approx. 5% per 10 K temperature difference -> for temperatures lower and < for temperatures higher than 30 °C.
For direct voltages, the maximum current values of the instantaneous tripping operation increase by a factor of 1.2.

If more than one electrical circuit is loaded in a series of circuit-breakers the resulting increase in ambient temperature affects the characteristic curve.

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

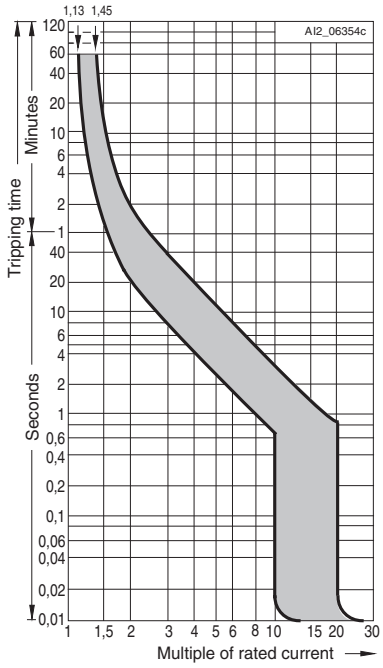
Number	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Tripping characteristic C



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

Tripping characteristic D



- The tripping range has been matched to applications involving equipment generating significant pulses (transformers, solenoid valves)

12

Miniature Circuit-Breakers

5SQ2, 3 kA

Application

- U_n: 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: EN 60898-1, IEC 60898-1

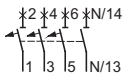
Selection and ordering data

		I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 item	PS*/ P. unit
		A				kg	Items
	**1-pole**						
		0.5	1	–	5SQ2 170-0KA05	0.100	1/12
		1		–	5SQ2 170-0KA01	0.100	1/12
		1.6		–	5SQ2 170-0KA15	0.100	1/12
		2		–	5SQ2 170-0KA02	0.100	1/12
		3		–	5SQ2 170-0KA03	0.100	1/12
		4		–	5SQ2 170-0KA04	0.100	1/12
		6		5SQ2 160-0KA06	5SQ2 170-0KA06	0.100	1/12
		8		–	5SQ2 170-0KA08	0.100	1/12
		10		5SQ2 160-0KA10	5SQ2 170-0KA10	0.100	1/12
		13		5SQ2 160-0KA13	5SQ2 170-0KA13	0.100	1/12
		16		5SQ2 160-0KA16	5SQ2 170-0KA16	0.100	1/12
		20		5SQ2 160-0KA20	5SQ2 170-0KA20	0.100	1/12
		25		5SQ2 160-0KA25	5SQ2 170-0KA25	0.100	1/12
		32		5SQ2 160-0KA32	5SQ2 170-0KA32	0.100	1/12
		40		5SQ2 160-0KA40	5SQ2 170-0KA40	0.100	1/12
		50		–	5SQ2 170-0KA50	0.100	1/12
		63		–	5SQ2 170-0KA63	0.100	1/12
	**1-pole + N**						
		0.5	2	–	5SQ2 570-0KA05	0.180	1/6
		1		–	5SQ2 570-0KA01	0.180	1/6
		1.6		–	5SQ2 570-0KA15	0.180	1/6
		2		–	5SQ2 570-0KA02	0.180	1/6
		3		–	5SQ2 570-0KA03	0.180	1/6
		4		–	5SQ2 570-0KA04	0.180	1/6
		6		5SQ2 560-0KA06	5SQ2 570-0KA06	0.180	1/6
		8		–	5SQ2 570-0KA08	0.180	1/6
		10		5SQ2 560-0KA10	5SQ2 570-0KA10	0.180	1/6
		13		5SQ2 560-0KA13	5SQ2 570-0KA13	0.180	1/6
		16		5SQ2 560-0KA16	5SQ2 570-0KA16	0.180	1/6
		20		5SQ2 560-0KA20	5SQ2 570-0KA20	0.180	1/6
		25		5SQ2 560-0KA25	5SQ2 570-0KA25	0.180	1/6
		32		5SQ2 560-0KA32	5SQ2 570-0KA32	0.180	1/6
		40		5SQ2 560-0KA40	5SQ2 570-0KA40	0.180	1/6
		50		–	5SQ2 570-0KA50	0.180	1/6
		63		–	5SQ2 570-0KA63	0.180	1/6
	**2-pole**						
		0.5	2	–	5SQ2 270-0KA05	0.200	1/6
		1		–	5SQ2 270-0KA01	0.200	1/6
		1.6		–	5SQ2 270-0KA15	0.200	1/6
		2		–	5SQ2 270-0KA02	0.200	1/6
		3		–	5SQ2 270-0KA03	0.200	1/6
		4		–	5SQ2 270-0KA04	0.200	1/6
		6		5SQ2 260-0KA06	5SQ2 270-0KA06	0.200	1/6
		8		–	5SQ2 270-0KA08	0.200	1/6
		10		5SQ2 260-0KA10	5SQ2 270-0KA10	0.200	1/6
		13		5SQ2 260-0KA13	5SQ2 270-0KA13	0.200	1/6
		16		5SQ2 260-0KA16	5SQ2 270-0KA16	0.200	1/6
		20		5SQ2 260-0KA20	5SQ2 270-0KA20	0.200	1/6
		25		5SQ2 260-0KA25	5SQ2 270-0KA25	0.200	1/6
		32		5SQ2 260-0KA32	5SQ2 270-0KA32	0.200	1/6
		40		5SQ2 260-0KA40	5SQ2 270-0KA40	0.200	1/6
		50		–	5SQ2 270-0KA50	0.200	1/6
		63		–	5SQ2 270-0KA63	0.200	1/6

For accessories, see page 12/39.

* You can order this quantity or a multiple thereof.

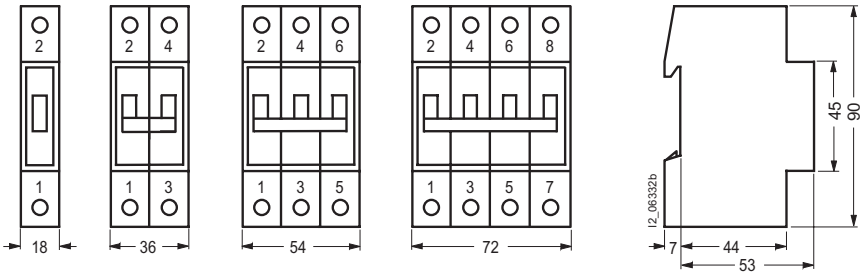
Selection and ordering data

		I_n A	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 item kg	PS*/ P. unit Items
	**3-pole** 	0.5	3	–	**5SQ2 370-0KA05**	0.300	1/4
		1		–	**5SQ2 370-0KA01**	0.300	1/4
		1.6		–	**5SQ2 370-0KA15**	0.300	1/4
		2		–	**5SQ2 370-0KA02**	0.300	1/4
		3		–	**5SQ2 370-0KA03**	0.300	1/4
		4		–	**5SQ2 370-0KA04**	0.300	1/4
		6		**5SQ2 360-0KA06**	**5SQ2 370-0KA06**	0.300	1/4
		8		–	**5SQ2 370-0KA08**	0.300	1/4
		10		**5SQ2 360-0KA10**	**5SQ2 370-0KA10**	0.300	1/4
		13		**5SQ2 360-0KA13**	**5SQ2 370-0KA13**	0.300	1/4
		16		**5SQ2 360-0KA16**	**5SQ2 370-0KA16**	0.300	1/4
		20		**5SQ2 360-0KA20**	**5SQ2 370-0KA20**	0.300	1/4
		25		**5SQ2 360-0KA25**	**5SQ2 370-0KA25**	0.300	1/4
		32		**5SQ2 360-0KA32**	**5SQ2 370-0KA32**	0.300	1/4
		40		**5SQ2 360-0KA40**	**5SQ2 370-0KA40**	0.300	1/4
		50		–	**5SQ2 370-0KA50**	0.300	1/4
		63		–	**5SQ2 370-0KA63**	0.300	1/4
	**3-pole + N** 	0.5	4	–	**5SQ2 670-0KA05**	0.380	1/3
		1		–	**5SQ2 670-0KA01**	0.380	1/3
		1.6		–	**5SQ2 670-0KA15**	0.380	1/3
		2		–	**5SQ2 670-0KA02**	0.380	1/3
		3		–	**5SQ2 670-0KA03**	0.380	1/3
		4		–	**5SQ2 670-0KA04**	0.380	1/3
		6		–	**5SQ2 670-0KA06**	0.380	1/3
		8		–	**5SQ2 670-0KA08**	0.380	1/3
		10		–	**5SQ2 670-0KA10**	0.380	1/3
		13		–	**5SQ2 670-0KA13**	0.380	1/3
		16		–	**5SQ2 670-0KA16**	0.380	1/3
		20		–	**5SQ2 670-0KA20**	0.380	1/3
		25		–	**5SQ2 670-0KA25**	0.380	1/3
		32		–	**5SQ2 670-0KA32**	0.380	1/3
		40		–	**5SQ2 670-0KA40**	0.380	1/3
		50		–	**5SQ2 670-0KA50**	0.380	1/3
		63		–	**5SQ2 670-0KA63**	0.380	1/3

For accessories, see page 12/39.

Dimensional drawings

5SQ2



* You can order this quantity or a multiple thereof.

Miniature Circuit-Breakers

6 000 / 3

5SX2, 6 kA

Application

- U_n: 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: EN 60898-1, IEC 60898-1
- Additional components can be retrofitted individually.

Selection and ordering data

		I_n	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 item	PS*/ P. unit
		A				kg	Items
	**1-pole** 	1	1	**5SX2 101-5**	–	0.150	1/12
		1.6		**5SX2 115-5**	–	0.150	1/12
		2		**5SX2 102-5**	–	0.150	1/12
		3		**5SX2 103-5**	–	0.150	1/12
		4		**5SX2 104-5**	–	0.150	1/12
		6		**5SX2 106-5**	**5SX2 106-6**	0.150	1/12
		10		**5SX2 110-5**	**5SX2 110-6**	0.150	1/12
		13		–	**5SX2 113-6**	0.150	1/12
		16		**5SX2 116-5**	**5SX2 116-6**	0.150	1/12
		20		**5SX2 120-5**	**5SX2 120-6**		
		25		**5SX2 125-5**	**5SX2 125-6**	0.150	1/12
		32		**5SX2 132-5**	**5SX2 132-6**	0.150	1/12
		40		**5SX2 140-5**	**5SX2 140-6**	0.150	1/12
		50		–	**5SX2 150-6**	0.150	1/12
	**1-pole + N** 	6	2	–	**5SX2 506-6**	0.210	1/6
		10		–	**5SX2 510-6**	0.210	1/6
		13		–	**5SX2 513-6**	0.210	1/6
		16		–	**5SX2 516-6**	0.210	1/6
		20		–	**5SX2 520-6**	0.210	1/6
		25		–	**5SX2 525-6**	0.210	1/6
		32		–	**5SX2 532-6**	0.210	1/6
		40		–	**5SX2 540-6**	0.210	1/6
		50		–	**5SX2 550-6**	0.210	1/6
	**2-pole** 	1	2	**5SX2 201-5**	–	0.300	1/6
		1.6		**5SX2 215-5**	–	0.300	1/6
		2		**5SX2 202-5**	–	0.300	1/6
		3		**5SX2 203-5**	–	0.300	1/6
		4		**5SX2 204-5**	–	0.300	1/6
		6		**5SX2 206-5**	**5SX2 206-6**	0.300	1/6
		10		**5SX2 210-5**	**5SX2 210-6**	0.300	1/6
		13		–	**5SX2 213-6**	0.300	1/6
		16		**5SX2 216-5**	**5SX2 216-6**	0.300	1/6
		20		**5SX2 220-5**	**5SX2 220-6**	0.300	1/6
		25		**5SX2 225-5**	**5SX2 225-6**	0.300	1/6
		32		**5SX2 232-5**	**5SX2 232-6**	0.300	1/6
		40		**5SX2 240-5**	**5SX2 240-6**	0.300	1/6
		50		–	**5SX2 250-6**	0.300	1/6
	**3-pole** 	1	3	**5SX2 301-5**	–	0.450	1/4
		1.6		**5SX2 315-5**	–	0.450	1/4
		2		**5SX2 302-5**	–	0.450	1/4
		3		**5SX2 303-5**	–	0.450	1/4
		4		**5SX2 304-5**	–	0.450	1/4
		6		**5SX2 306-5**	**5SX2 306-6**	0.450	1/4
		10		**5SX2 310-5**	**5SX2 310-6**	0.450	1/4
		13		–	**5SX2 313-6**	0.450	1/4
		16		**5SX2 316-5**	**5SX2 316-6**	0.450	1/4
		20		**5SX2 320-5**	**5SX2 320-6**	0.450	1/4
		25		**5SX2 325-5**	**5SX2 325-6**	0.450	1/4
		32 [1]		**5SX2 332-5**	**5SX2 332-6**	0.450	1/4
		40		**5SX2 340-5**	**5SX2 340-6**	0.450	1/4
		50		–	**5SX2 350-6**	0.450	1/4

The versions 5SX2 B 6 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and I_n = 40 A is recommended.

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

Selection and ordering data

		I_n A	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 item kg	PS*/ P. unit Items
	**3-pole + N**						
		10	2	–	**5SX2 610-6**	0.450	1/3
		13		–	**5SX2 613-6**	0.450	1/3
		16		–	**5SX2 616-6**	0.450	1/3
		20		–	**5SX2 620-6**	0.450	1/3
		25		–	**5SX2 625-6**	0.450	1/3
		32		–	**5SX2 632-6**	0.450	1/3
		40		–	**5SX2 640-6**	0.450	1/3
		50		–	**5SX2 650-6**	0.450	1/3
	**4-pole**						
		20 [1]		–	**5SX2 420-6**	0.590	1/3
		25 [1]		–	**5SX2 425-6**	0.590	1/3
		32 [1]		–	**5SX2 432-6**	0.590	1/3
		40		–	**5SX2 440-6**	0.590	1/3

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

1) Without VDE mark.

12

Miniature Circuit-Breakers

6 000
3

5SX2, 6 kA

Selection and ordering data

		I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 item	PS*/ P. unit
		A				kg	Items
	**1-pole**						
		0.3	1	**5SX2 114-7**	**–**	0.140	1/12
		0.5		**5SX2 105-7**	**5SX2 105-8**	0.140	1/12
		1		**5SX2 101-7**	**5SX2 101-8**	0.140	1/12
		1.6		**5SX2 115-7**	**5SX2 115-8**	0.140	1/12
		2		**5SX2 102-7**	**5SX2 102-8**	0.140	1/12
		3		**5SX2 103-7**	**5SX2 103-8**	0.140	1/12
		4		**5SX2 104-7**	**5SX2 104-8**	0.140	1/12
		6		**5SX2 106-7**	**5SX2 106-8**	0.140	1/12
		8		**5SX2 108-7**	**5SX2 108-8**	0.140	1/12
		10		**5SX2 110-7**	**5SX2 110-8**	0.140	1/12
		13		**5SX2 113-7**	**5SX2 113-8**	0.140	1/12
		16		**5SX2 116-7**	**5SX2 116-8**	0.140	1/12
		20		**5SX2 120-7**	**5SX2 120-8**	0.140	1/12
		25		**5SX2 125-7**	**5SX2 125-8**	0.140	1/12
		32 1)		**5SX2 132-7**	**5SX2 132-8**	0.140	1/12
		40 2)		**5SX2 140-7**	**5SX2 140-8**	0.150	1/12
		50 2)		**5SX2 150-7**	**5SX2 150-8**	0.150	1/12
		63 3)		**5SX2 163-7**	**–**	0.150	1/12
	**1-pole + N**						
		6	2	**5SX2 506-7**	**–**	0.210	1/6
		10		**5SX2 510-7**	**–**	0.210	1/6
		13		**5SX2 513-7**	**–**	0.210	1/6
		16		**5SX2 516-7**	**–**	0.210	1/6
		20		**5SX2 520-7**	**–**	0.210	1/6
		25		**5SX2 525-7**	**–**	0.210	1/6
		32		**5SX2 532-7**	**–**	0.210	1/6
		40		**5SX2 540-7**	**–**	0.210	1/6
		50		**5SX2 550-7**	**–**	0.210	1/6
	**2-pole**						
		0.5	2	**5SX2 205-7**	**5SX2 205-8**	0.280	1/6
		1		**5SX2 201-7**	**5SX2 201-8**	0.280	1/6
		1.6		**5SX2 215-7**	**5SX2 215-8**	0.280	1/6
		2		**5SX2 202-7**	**5SX2 202-8**	0.280	1/6
		3		**5SX2 203-7**	**5SX2 203-8**	0.280	1/6
		4		**5SX2 204-7**	**5SX2 204-8**	0.280	1/6
		6		**5SX2 206-7**	**5SX2 206-8**	0.280	1/6
		8		**5SX2 208-7**	**5SX2 208-8**	0.280	1/6
		10		**5SX2 210-7**	**5SX2 210-8**	0.280	1/6
		13		**5SX2 213-7**	**5SX2 213-8**	0.280	1/6
		16		**5SX2 216-7**	**5SX2 216-8**	0.280	1/6
		20		**5SX2 220-7**	**5SX2 220-8**	0.280	1/6
		25		**5SX2 225-7**	**5SX2 225-8**	0.280	1/6
		32		**5SX2 232-7**	**5SX2 232-8**	0.280	1/6
		40		**5SX2 240-7**	**5SX2 240-8**	0.300	1/6
		50 2)		**5SX2 250-7**	**5SX2 250-8**	0.300	1/6
		63 3)		**5SX2 263-7**	**–**	0.300	1/6

The versions 5SX2 C 0.5 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and I_n = 40 A is recommended.

2) Rated breaking capacity 4.5 kA is only valid for characteristic D.

3) Without VDE mark.

* You can order this quantity or a multiple thereof.

Selection and ordering data

		I_n A	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 item kg	PS*/ P. unit Items
	**3-pole**						
		0.5	3	**5SX2 305-7**	**5SX2 305-8**	0.440	1/4
		1		**5SX2 301-7**	**5SX2 301-8**	0.440	1/4
		1.6		**5SX2 315-7**	**5SX2 315-8**	0.440	1/4
		2		**5SX2 302-7**	**5SX2 302-8**	0.440	1/4
		3		**5SX2 303-7**	**5SX2 303-8**	0.440	1/4
		4		**5SX2 304-7**	**5SX2 304-8**	0.440	1/4
		6		**5SX2 306-7**	**5SX2 306-8**	0.440	1/4
		8		**5SX2 308-7**	**5SX2 308-8**	0.440	1/4
		10		**5SX2 310-7**	**5SX2 310-8**	0.440	1/4
		13		**5SX2 313-7**	**5SX2 313-8**	0.440	1/4
		16		**5SX2 316-7**	**5SX2 316-8**	0.440	1/4
		20		**5SX2 320-7**	**5SX2 320-8**	0.440	1/4
		25		**5SX2 325-7**	**5SX2 325-8**	0.440	1/4
		32 [1]		**5SX2 332-7**	**5SX2 332-8**	0.440	1/4
		40 [2]		**5SX2 340-7**	**5SX2 340-8**	0.450	1/4
		50 [2]		**5SX2 350-7**	**5SX2 350-8**	0.450	1/4
		63 [3]		**5SX2 363-7**	–	0.450	1/4
	**3-pole + N**						
		6	4	**5SX2 606-7**	–	0.450	1/3
		10		**5SX2 610-7**	–	0.450	1/3
		13		**5SX2 613-7**	–	0.450	1/3
		16		**5SX2 616-7**	–	0.450	1/3
		20		**5SX2 620-7**	–	0.450	1/3
		25		**5SX2 625-7**	–	0.450	1/3
		32		**5SX2 632-7**	–	0.450	1/3
		40		**5SX2 640-7**	–	0.450	1/3
		50		**5SX2 650-7**	–	0.450	1/3
	**4-pole**						
		6 [3]	4	**5SX2 406-7**	–	0.590	1/3
		10 [3]		**5SX2 410-7**	–	0.590	1/3
		13 [3]		**5SX2 413-7**	–	0.590	1/3
		16 [3]		**5SX2 416-7**	–	0.590	1/3
		20 [3]		**5SX2 420-7**	–	0.590	1/3
		25 [3]		**5SX2 425-7**	–	0.590	1/3
		32 [3]		**5SX2 432-7**	–	0.590	1/3
		40		**5SX2 440-7**	–	0.590	1/3
		50		**5SX2 450-7**	–	0.590	1/3

The versions 5SX2 C 0.5 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

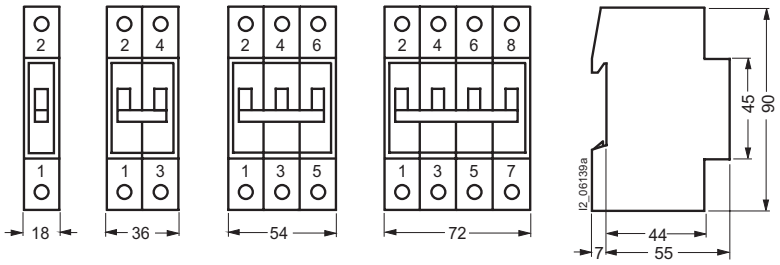
1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and I_n = 40 A is recommended.

2) Rated breaking capacity 4.5 kA is only valid for characteristic D.

3) Without VDE mark.

Dimensional drawings

5SX2



Miniature Circuit-Breakers

10 000
3

5SX4, 10 kA

Application

- U_n: 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: EN 60898-1, IEC 60898-1
- Additional components can be retrofitted individually.

Selection and ordering data

		I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 item	PS*/ P. unit
		A				kg	Items
	**1-pole**						
		0,5	1	–	**5SX4 105-7**	0,140	1/12
		1		–	**5SX4 101-7**	0,140	1/12
		1,6		–	**5SX4 115-7**	0,140	1/12
		2		–	**5SX4 102-7**	0,140	1/12
		3		–	**5SX4 103-7**	0,140	1/12
		4		–	**5SX4 104-7**	0,140	1/12
		6		**5SX4 106-6**	**5SX4 106-7**	0,140	1/12
		8		–	**5SX4 108-7**	0,140	1/12
		10		**5SX4 110-6**	**5SX4 110-7**	0,140	1/12
		13		**5SX4 113-6**	**5SX4 113-7**	0,140	1/12
		16		**5SX4 116-6**	**5SX4 116-7**	0,140	1/12
		20		**5SX4 120-6**	**5SX4 120-7**	0,140	1/12
		25		**5SX4 125-6**	**5SX4 125-7**	0,140	1/12
		32[1]		**5SX4 132-6**	**5SX4 132-7**	0,140	1/12
		40		**5SX4 140-6**	**5SX4 140-7**	0,115	1/12
		50		**5SX4 150-6**	**5SX4 150-7**	0,115	1/12
	**1-pole + N**						
		6	2	**5SX4 506-6**	**5SX4 506-7**	0,210	1/6
		10		**5SX4 510-6**	**5SX4 510-7**	0,210	1/6
		13		**5SX4 513-6**	**5SX4 513-7**	0,210	1/6
		16		**5SX4 516-6**	**5SX4 516-7**	0,210	1/6
		20		**5SX4 520-6**	**5SX4 520-7**	0,210	1/6
		25		**5SX4 525-6**	**5SX4 525-7**	0,210	1/6
		32		**5SX4 532-6**	**5SX4 532-7**	0,210	1/6
		40		**5SX4 540-6**	**5SX4 540-7**	0,300	1/6
		50		**5SX4 550-6**	**5SX4 550-7**	0,300	1/6
	**2-pole**						
		0,5	2	–	**5SX4 205-7**	0,280	1/6
		1		–	**5SX4 201-7**	0,280	1/6
		1,6		–	**5SX4 215-7**	0,280	1/6
		2		–	**5SX4 202-7**	0,280	1/6
		3		–	**5SX4 203-7**	0,280	1/6
		4		–	**5SX4 204-7**	0,280	1/6
		6		**5SX4 206-6**	**5SX4 206-7**	0,280	1/6
		8		–	**5SX4 208-7**	0,280	1/6
		10		**5SX4 210-6**	**5SX4 210-7**	0,280	1/6
		13		**5SX4 213-6**	**5SX4 213-7**	0,280	1/6
		16		**5SX4 216-6**	**5SX4 216-7**	0,280	1/6
		20		**5SX4 220-6**	**5SX4 220-7**	0,280	1/6
		25		**5SX4 225-6**	**5SX4 225-7**	0,280	1/6
		32		**5SX4 232-6**	**5SX4 232-7**	0,280	1/6
		40		**5SX4 240-6**	**5SX4 240-7**	0,280	1/6
		50		**5SX4 250-6**	**5SX4 250-7**	0,280	1/6

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

1) Also suitable for 21 kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7 kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and I_n = 40 A is recommended.

* You can order this quantity or a multiple thereof.

Selection and ordering data

		I_n A	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 item kg	PS*/ P. unit Items
	**3-pole** 	0,5	3	–	**5SX4 305-7**	0,440	4
		1		–	**5SX4 301-7**	0,440	4
		1,6		–	**5SX4 315-7**	0,440	4
		2		–	**5SX4 302-7**	0,440	4
		3		–	**5SX4 303-7**	0,440	4
		4		–	**5SX4 304-7**	0,440	4
		6		**5SX4 306-6**	**5SX4 306-7**	0,044	4
		8		–	**5SX4 308-7**	0,440	4
		10		**5SX4 310-6**	**5SX4 310-7**	0,440	4
		13		**5SX4 313-6**	**5SX4 313-7**	0,440	4
		16		**5SX4 316-6**	**5SX4 316-7**	0,440	4
		20		**5SX4 320-6**	**5SX4 320-7**	0,440	4
		25		**5SX4 325-6**	**5SX4 325-7**	0,440	4
		32 [1]		**5SX4 332-6**	**5SX4 332-7**	0,450	4
		40		**5SX4 340-6**	**5SX4 340-7**	0,450	4
		50		**5SX4 350-6**	**5SX4 350-7**	0,450	4
	**3-pole + N** 	6	4	–	**5SX4 606-7**	0,450	3
		10		**5SX4 610-6**	**5SX4 610-7**	0,450	1
		13		**5SX4 613-6**	**5SX4 613-7**	0,450	3
		16		**5SX4 616-6**	**5SX4 616-7**	0,450	3
		20		**5SX4 620-6**	**5SX4 620-7**	0,450	3
		25		**5SX4 625-6**	**5SX4 625-7**	0,450	3
		32		**5SX4 632-6**	**5SX4 632-7**	0,450	3
		40		**5SX4 640-6**	**5SX4 640-7**	0,610	3
		50		**5SX4 650-6**	**5SX4 650-7**	0,610	3
	**4-pole** 	6	4	–	**5SX4 406-7**	0,590	3
		10		–	**5SX4 410-7**	0,590	3
		13		–	**5SX4 413-7**	0,590	3
		16		–	**5SX4 416-7**	0,590	3
		20		–	**5SX4 420-7**	0,590	3
		25		–	**5SX4 425-7**	0,590	3
		32		–	**5SX4 432-7**	0,590	3
		40		–	**5SX4 440-7**	0,590	3
		50		–	**5SX4 450-7**	0,590	3

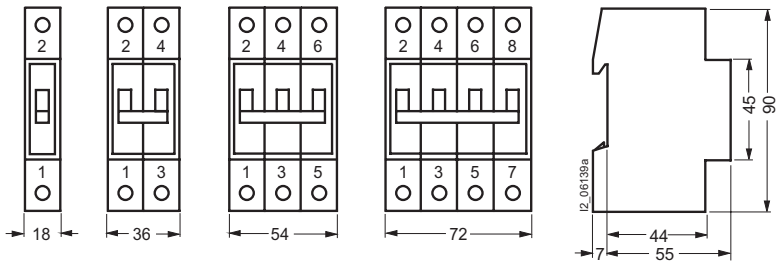
For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

1) Also suitable for 21 kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7 kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and I_n = 40 A is recommended.

2) Without VDE mark.

Dimensional drawings

5SX4



* You can order this quantity or a multiple thereof.

Miniature Circuit-Breakers

5SX5, 4.5 kA (10 kA)

Application

- U_n: 230/400 V, 50 to 60 Hz, 220 V DC per pole, can be used in systems up to 250/440 V AC,
  - 1-pole: 220 V DC
  - 2-pole: 440 V DC
- Standards: EN 60898-1, IEC 60898-1
- Additional components can be retrofitted individually.

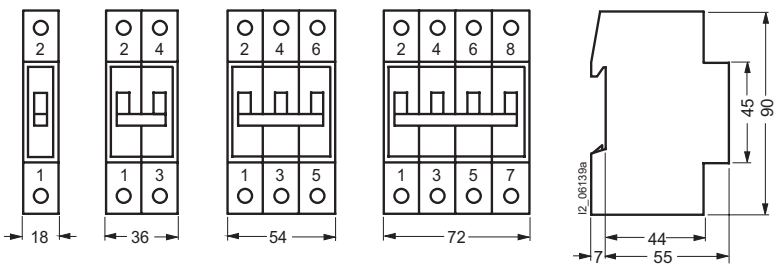
Selection and ordering data

		I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 item	PS*/ P. unit
		A				kg	Items
	**1-pole**						
		0,5	1	–	**5SX5 105-7**	0,145	1/12
		1		–	**5SX5 101-7**	0,145	1/12
		1,6		–	**5SX5 115-7**	0,145	1/12
		2		–	**5SX5 102-7**	0,145	1/12
		3		–	**5SX5 103-7**	0,145	1/12
		4		–	**5SX5 104-7**	0,145	1/12
		6		**5SX5 106-6**	**5SX5 106-7**	0,145	1/12
		8		–	**5SX5 108-7**	0,145	1/12
		10		**5SX5 110-6**	**5SX5 110-7**	0,145	1/12
		13		**5SX5 113-6**	**5SX5 113-7**	0,145	1/12
		16		**5SX5 116-6**	**5SX5 116-7**	0,145	1/12
		20		**5SX5 120-6**	**5SX5 120-7**	0,145	1/12
		25		**5SX5 125-6**	**5SX5 125-7**	0,145	1/12
		32		**5SX5 132-6**	**5SX5 132-7**	0,145	1/12
	**2-pole**						
		0,5	2	–	**5SX5 205-7**	0,290	1/6
		1		–	**5SX5 201-7**	0,290	1/6
		1,6		–	**5SX5 215-7**	0,290	1/6
		2		–	**5SX5 202-7**	0,290	1/6
		3		–	**5SX5 203-7**	0,290	1/6
		4		–	**5SX5 204-7**	0,290	1/6
		6		**5SX5 206-6**	**5SX5 206-7**	0,290	1/6
		8		–	**5SX5 208-7**	0,290	1/6
		10		**5SX5 210-6**	**5SX5 210-7**	0,290	1/6
		13		**5SX5 213-6**	**5SX5 213-7**	0,290	1/6
		16		**5SX5 216-6**	**5SX5 216-7**	0,290	1/6
		20		**5SX5 220-6**	**5SX5 220-7**	0,290	1/6
		25		**5SX5 225-6**	**5SX5 225-7**	0,290	1/6
		32		**5SX5 232-6**	**5SX5 232-7**	0,290	1/6

For additional components, see page 12/35.
For accessories, See pages 12/36 to 12/39.

Dimensional drawings

5SX5



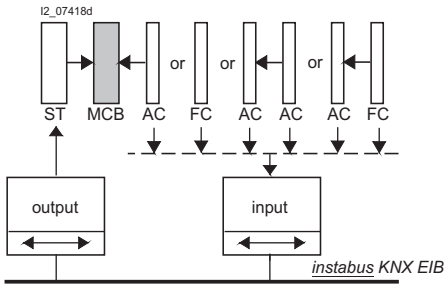
* You can order this quantity or a multiple thereof.

Benefits

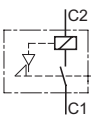
Additional Components
- Can be retrofitted individually
- Can be connected to *instabus* KNX *EIB* and AS-Interface bus through binary inputs.

Auxiliary circuit switches (AS) and fault signal contacts (FC)
- Mounting with factory-fitted brackets
- Max. contact load:
  6 A, 230 V AC, AC-15
  1 A, 220 V DC, DC-13
  acc. to EN 60947-5-1, IEC 60947-5-1
- Short-circuit protection through 5SX2 miniature circuit-breakers ...-6, ...-7 with I_n = 6 A or fuse gL 6 A, depending on the version.
- Remote indication of the miniature circuit-breaker switching state
  - AS: ON/OFF
  - FS: tripped.

Shunt trips (ST)
- Assembly with enclosed screws
- Applicable for voltages of 110 to 415 V AC
- Short-circuit protection through 5SX2 ...-7 miniature circuit-breaker with $I_n \geq 16$ A
- Remote tripping of the miniature circuit-breaker

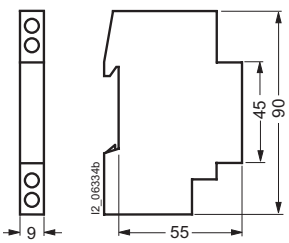


Selection and ordering data

	Design		MW	Order No.	Weight 1 item	PS*/ P.unit
					kg	Items
	**Auxiliary circuit switches (AS)**					
		1 NO + 1 NC	0.5	**5SX9 100**	0.040	1
		2 NO		**5SX9 101**	0.040	1
		2 NC		**5SX9 102**	0.040	1
	**Fault signal contacts (FS)**					
		1 NO + 1 NC	0.5	**5SX9 200**	0.040	1
		2 NO		**5SX9 201**	0.040	1
		2 NC		**5SX9 202**	0.040	1
	**Shunt trip (ST) 100 % duty ratio**					
			1	**5SX9 300**	0.141	1

Dimensional drawings

5SX9 1.., 5SX9 2..



Accessories for 5SX2, 5SX4, 5SX5

Application

5ST2 1 busbar system
- Acc. to DIN 57606 and DIN 57659
- Load for one-side/central infeed:
  50 A/90 A for 10 mm^2
  65 A/120 A for 16 mm^2
- Fork-type connections
- Single and multi-phase
- Cu 10 mm^2 and 16 mm^2, fully insulated

5ST2 13, 5ST2 14, 5ST2 15, 5ST2 16 busbar systems
- Lug spacing: 18 mm
- No additional connection terminal required for bottom connection.

5ST2 18, 5ST2 19 busbar systems
- Lug spacing: 17.8 mm

5ST2 4 busbar system
- Acc. to EN 60664-1, IEC 60664-1, 500 V (40 °C), fully insulated
- Load at center infeed:
  single-phase: up to 70 A
  2- to 4-phase: up to 120 A

Application
- Fork-type connections
- Any length possible thanks to the combination of 3 fixed busbar lengths
- Favorable current and temperature conduction thanks to the overlapping of individual components
- Time-consuming work such as cutting, cutting to length, deburring, cleaning of cut surfaces as well as mounting of end caps is made unnecessary
- Safe protection against contact for non-assigned connections.

Selection and ordering data

	Version	Length	Order No.	Weight 1 item	PS*/ P. unit
		mm		kg	Items
5ST2 13, 5ST2 14, 5ST2 15, 5ST2 16 busbar systems					
	**Cu busbars 10 mm^2**				
	with end caps				
	1-phase	210	**5ST2 137**	0.088	1/25
	2-phase		**5ST2 138**	0.103	1/10
	3-phase		**5ST2 140**	0.153	1/10
	without end caps:				
	1-phase	1 000	**5ST2 146**	0.408	1/10
	2-phase		**5ST2 147**	0.523	1/5
	3-phase		**5ST2 148**	0.838	1/10
	**Cu busbars 16 mm^2**				
	with end caps				
	1-phase	210	**5ST2 142**	0.102	1/25
	2-phase		**5ST2 143**	0.154	1/10
	3-phase		**5ST2 144**	0.231	1/10
	3-phase + N		**5ST2 145**	0.315	1/10
	without end caps:				
	1-phase	1 000	**5ST2 151**	0.487	1/10
	2-phase		**5ST2 152**	0.692	1/5
	3-phase		**5ST2 153**	1.100	1/10
	3-phase + N		**5ST2 154**	1.498	1/5
	without end caps:				
	lug spacing acc. to the busbar mounting of devices; 1-pole, 2-pole, 3-pole with one auxiliary circuit switch each				
	1-phase + AS	1 000	**5ST2 163**	0.460	1/5
	2-phase + AS		**5ST2 164**	0.900	1/5
	3-phase + AS		**5ST2 165**	1.490	1/10
	**End caps**				
	for lateral insulation of cut-to-length busbars				
	1- and 2-phase		**5ST2 155**	0.013	10
	3- and 4-phase		**5ST2 156**	0.017	10
	**Connection terminals up to 35 mm^2 (stranded)**				
	for top or bottom direct infeed into miniature circuit-breakers; side-by-side mounting possible				
	for 1- and 2-phase busbars		**5ST2 166**	0.020	1/10
	for 3- and 4-phase busbars		**5ST2 167**	0.020	1/10
	**Connection terminal up to 35 mm^2 (stranded)**				
	for direct infeed into miniature circuit-breakers, side-by-side mounting possible		**5ST2 157**	0.030	1

For sample applications of busbars, see page 12/36.

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

Selection and ordering data

	Design	Length	Order No.	Weight 1 item	PS*/ P.unit
		mm		kg	Items
5ST2 18, 5ST2 19 busbar systems					
	**Cu busbars 10 mm²**				
	with end caps				
	1-phase	220	**5ST2 180**	0.060	1/50
	2-phase		**5ST2 181**	0.080	1/25
	3-phase		**5ST2 182**	0.110	1/25
	without end caps:				
	1-phase	1 000	**5ST2 183**	0.290	1/20
	2-phase		**5ST2 184**	0.600	1/20
	3-phase		**5ST2 185**	0.820	1/20
	**Cu busbars 16 mm²**				
	with end caps				
	1-phase	220	**5ST2 186**	0.090	1/50
	2-phase		**5ST2 187**	0.160	1/25
	3-phase		**5ST2 188**	0.230	1/25
	without end caps:				
	1-phase	1 000	**5ST2 190**	0.500	1/20
	2-phase		**5ST2 191**	0.710	1/20
	3-phase		**5ST2 192**	1.100	1/20
	without end caps:				
	lug spacing to match busbar mountings of devices 1-pole, 2-pole, 3-pole, each with 1 auxiliary circuit switch respectively				
	1-phase + AS	1 000	**5ST2 193**	0.450	1/10
	2-phase + AS		**5ST2 194**	0.890	1/10
	3-phase + AS		**5ST2 195**	1.470	1/10
	**End caps**				
	for Cu busbars, for the lateral insulation of cut-to-length busbars				
	1-phase		**5ST2 196**	0.001	1/10
	2- and 3-phase		**5ST2 197**	0.001	1/10

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* You can order this quantity or a multiple thereof.

Accessories for 5SX2, 5SX4, 5SX5

Selection and ordering data

	Design Number of electrical circuits	Order No.	Weight 1 item kg	PS*/ P.unit Items
5ST2 4 busbar system				
	Cu busbars			
	1-phase			
	2 x single-phase	**5ST2 400**	0.006	1/20
	6 x single-phase	**5ST2 401**	0.017	1/20
	12 x single-phase	**5ST2 402**	0.033	1/20
	2 x (single-phase + HS/FS)	**5ST2 403**	0.008	1/20
	6 x (single-phase + HS/FS)	**5ST2 404**	0.024	1/20
	9 x (single-phase + HS/FS)	**5ST2 405**	0.036	1/20
	2-phase			
	2 x 2-phase	**5ST2 406**	0.011	1/10
	3 x 2-phase	**5ST2 407**	0.017	1/10
	6 x 2-phase	**5ST2 408**	0.033	1/10
	2 x (2-phase + HS/FS)	**5ST2 410**	0.023	1/10
	3 x (2-phase + HS/FS)	**5ST2 411**	0.034	1/10
	5 x (2-phase + HS/FS)	**5ST2 412**	0.056	1/10
	3-phase			
	2 x 3-phase	**5ST2 413**	0.037	1/10
	3 x 3-phase	**5ST2 414**	0.055	1/10
	4 x 3-phase	**5ST2 415**	0.086	1/10
	2 x (3-phase + HS/FS)	**5ST2 416**	0.057	1/10
	4 x (3-phase + HS/FS)	**5ST2 417**	0.065	1/10
	2 x (3 x (single-phase) + HS/FS) [1]	**5ST2 418**	0.057	1/10
	3 x (3 x (single-phase) + HS/FS) [1]	**5ST2 420**	0.086	1/10
	4-phase			
	2 x 4-phase	**5ST2 421**	0.046	1/5
	3 x 4-phase	**5ST2 422**	0.091	1/5
	2 x 3 x (single-phase + N) [2]	**5ST2 423**	0.060	1/5
	3-phase, for a 5SM1 4-pole RCCB module with 8 miniature circuit-breakers:			
	3/N + 8 terminals	**5ST2 424**	0.091	1/5
	**Feeder terminal** can be mounted side-by-side, for supply to 35 mm^2 busbar system (stranded)	**5ST2 425**	0.024	1/10
	**Protection against contact** for free connections, yellow (RAL 1004)	**5ST2 426**	0.004	1/10

1) 3 x (single-phase + HS/FS) ≙ 3 x (L 1 + HS/FS, L 2 + HS/FS, L3 + HS/FS).

2) 3 x (single-phase + N) ≙ 3 x (L 1 + N, L 2 + N, L3 + N).

* You can order this quantity or a multiple thereof.

Selection and ordering data

	Design	Length mm	Order No.	Weight 1 item kg	PS*/ P.unit Items
Mounting and cover parts					
	**Cable links** cross-section 6 mm^2 end sleeves at both ends	125 250	**5ST1 292** **5ST1 293**	0.008 0.017	5/50 5/50
	**Snap-on terminal** for 16 mm^2 1-wire or 10 mm^2 stranded width: 0.5 MW		**5ST2 112**	0.008	1/50
	**Spacer** (contour miniature circuit-breaker, 0.5 MW)		**5ST2 122**	0.009	1/10
	**Packer** for increasing height from 53 to 60 mm snap-on adapter 1 MW		**5ST2 120**	0.002	1/10
	**Fixing parts** 4 MW (plastic)		**5ST2 201**	0.012	1/20
	**Handle locking device** for 5SX miniature circuit-breaker 1-pole for protection against accidental mechanical switching on (part red) switching off (part transparent)		**5ST2 168** **5ST2 170**	0.007 0.007	1/10 1/10
	**Terminal cover, gray** for surface mounting, degree of protection, IP40 with 35 mm mounting rail, sealable up to 2.5 MW up to 4.5 MW		**5SW3 004** **5SW3 005**	0.084 0.114	1 1
	for flush mounting, degree of protection, IP40 with 35 mm mounting rail up to 2.5 MW up to 4.5 MW		**5SW3 006** **5SW3 007**	0.126 0.147	1 1
	**Molded-plastic cover** surface mounting, IP54 with 35 mm mounting rail, sealable, with transparent hinged lid up to 4.5 MW		**5SW1 200**	0.450	1
	**Cover** can be assembled as mini-distribution boards, cover parts prepared for rail mounting of conventional label caps,comprising:				
	• end plate (for snapping onto standard mounting rail)		**5ST2 134**	0.022	1/10
	• angle section (approx. 1 m long)		**5ST2 135**	0.330	1/5
	• flat section(as cover between the device types)		**5ST2 136**	0.260	1/5

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

Residual-Current Operated Circuit-Breakers

5SM1, product overview

Overview

	Number of poles	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Mountable auxiliary circuit switch
Residual-current operated circuit-breakers – RCCBs, type AC [1], 16 ... 80 A					
	2	10 30, 100, 300	16 25 40	2	• • •
	2	30, 100, 300	63 80	2.5	• •
	4	30, 100, 300, 500	25 40 63	4	• • •
		30, 300	80		•
Residual-current operated circuit-breakers – RCCBs, type A [2], 16 ... 80 A					
	2	10, 30 30, 100, 300	16 25 40	2	• • •
	2	30, 100, 300	63 80	2.5	• •
	4	30, 300, 500 30, 100, 300, 500	25 40 63	4	• • •
		30, 300	80		•
K short-time delayed	4	30 100	25 40 63	4	• • •
S selective	2	300	63	2.5	•
	4	100, 300 300, 1 000	40 63	4	• •
for 50 Hz to 400 Hz	4	30	25 40	4	• •
for 500 V AC	4	30, 300	25 40 63	4	• • •

1) ~ = Type AC for AC residual-currents
2) ⩙ = Type A for AC and pulsating DC residual-currents

Note:
⩙ ⎓ = Type B for AC residual currents, pulsating and smooth DC residual-currents, see chapter 4 “Residual current protective devices”.

For description, see chapter 4 “Residual current protective devices, General data”.

(Type AC)

Technical specifications

Standards		IEC/EN 61008-1, IEC/EN 61543		
Designs		2 and 4-pole		
Rated voltages U_n	V AC	125 ... 230 50 ... 60 230 ... 400 50 ... 60 Hz, 50 ... 400 Hz 500 50 ... 60 Hz		
Rated currents I_n	A	16, 25, 40, 63, 80		
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1 000		
Casing		gray plastic (RAL 7035)		
Terminals		tunnel terminals at both ends with wire protection, lower combined terminal for simultaneous connection of busbars (fork-type) and conductors	Conductor cross-section mm^2	Recommended tightening torque Nm
		for 2 MW at I_n = 16 A, 25 A, 40 A	1.0 ... 16	2.5 ... 3.0
		for 2.5 MW at I_n = 63 A, 80 A	1.5 ... 25	2.5 ... 3.0
		for 4 MW at I_n = 25 A, 40 A, 63 A, 80 A	1.5 ... 25	2.5 ... 3.0
		screw terminals for auxiliary circuit switches	0.75 ... 2.5	0.6 ... 0.8
Feeder connection		either top or bottom		
Mounting position		any		
Mounting technique		can be snapped onto 35 mm mounting rail (TH 35 acc. to DIN EN 60715)		
Degree of protection acc. to EN 60529		IP20 IP40 for installation in distribution boards IP54 for installation in molded-plastic housing		
Protection against contact acc. to EN 50274		protection against contact with fingers or the back of the hand		
Minimum operating voltage for test function operation	V AC	100		
Device service life		> 10 000 operations (electrical and mechanical; Test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +75		
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45		
Resistance to climate according to DIN IEC 60068-2-30		28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free		yes		

Residual Current Protective Devices

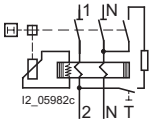
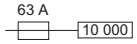
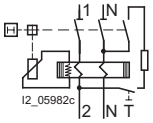
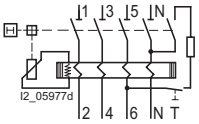
(Type AC)

5SM1 residual-current operated circuit-breakers (RCCBs), type AC, 16 ... 80 A

Application

- Personnel and fire protection
  - $I_{\Delta n} \leq 30$ mA: Additional protection in the case of direct contact
  - $I_{\Delta n} \leq 300$ mA: Preventative fire protection in the case of ground fault currents
- Product standards: IEC 61008-1, EN 61008-1; IEC 61008-2-1, EN 61008-2-1; IEC 61543, EN 61543
- U_n 230/400 V; 50 to 60 Hz; applicable in networks up to 240/415 V AC

Selection and ordering data

	Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current $I_{\Delta n}$	Rated current I_n	MW	Order No.	Weight 1 item	PS*/ P. unit
			mA	A			kg	Items
Instantaneous tripping								
	**125 ... 230 V AC; 50 ... 60 Hz; 2-pole**							
			10	16	2	**5SM1 111-0**	0.220	1
			30	25		**5SM1 312-0**	0.220	1
				40		**5SM1 314-0**	0.220	1
			100	25		**5SM1 412-0**	0.220	1
				40		**5SM1 414-0**	0.220	1
			300	25		**5SM1 612-0**	0.220	1
				40		**5SM1 614-0**	0.220	1
	**125 ... 230 V AC; 50 ... 60 Hz; 2-pole**							
			30	63	2.5	**5SM1 316-0**	0.300	1
				80		**5SM1 317-0**	0.300	1
			100	63		**5SM1 416-0**	0.300	1
				80		**5SM1 417-0**	0.300	1
			300	63		**5SM1 616-0**	0.300	1
				80		**5SM1 617-0**	0.300	1
	**230 ... 400 V AC; 50 ... 60 Hz; 4-pole**							
			30	25	4	**5SM1 342-0**	0.473	1
				40		**5SM1 344-0**	0.473	1
				63		**5SM1 346-0**	0.473	1
				80		**5SM1 347-0**	0.473	1
			100	25		**5SM1 442-0**	0.473	1
				40		**5SM1 444-0**	0.473	1
				63		**5SM1 446-0**	0.473	1
			300	25		**5SM1 642-0**	0.473	1
				40		**5SM1 644-0**	0.473	1
				63		**5SM1 646-0**	0.473	1
				80		**5SM1 647-0**	0.473	1
			500	25		**5SM1 742-0**	0.473	1
				40		**5SM1 744-0**	0.473	1
				63		**5SM1 746-0**	0.473	1

For additional components, see page 13/45.
For accessories, see page 13/46.

* You can order this quantity or a multiple thereof.

(Type A)

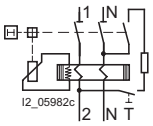
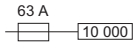
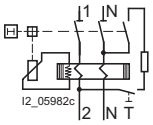
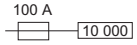
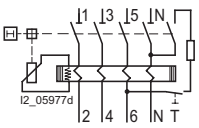
Residual Current Protective Devices

5SM1 residual-current operated circuit-breakers (RCCBs), type A, 16 ... 80 A

Application

- Personnel and fire protection
  - $I_{\Delta n} \leq 30$ mA: Additional protection in the case of direct contact
  - $I_{\Delta n} \leq 300$ mA: Preventative fire protection in the case of ground fault currents
- Product standards: IEC 61008-1, EN 61008-1; IEC 61008-2-1, EN 61008-2-1; IEC 61543, EN 61543
- U_n 230/400 V; 50 to 60 Hz; applicable in networks up to 240/415 V AC
- U_n 500 V; 50 to 60 Hz; applicable in networks up to 500 V AC
- Definition of surge current withstand capability with current waveform 8/20 µs acc. to IEC/EN 60060-2
- S S-type: Can be used as upstream group switch for selective tripping contrary to downstream standard RCCBs. Extremely high surge current withstand capability >5 kA
- K K-type: Short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: >3 kA
- 50 ... 400 Hz – version for use with line frequencies between 50 and 400 Hz

Selection and ordering data

	Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Instantaneous tripping, surge current withstand capability >1 kA								
	**125 ... 230 V AC; 50 ... 60 Hz; 2-pole** 		10	16	2	**5SM1 111-6**	0.218	1
			30	16		**5SM1 311-6**	0.218	1
			30	25		**5SM1 312-6**	0.218	1
				40		**5SM1 314-6**	0.218	1
			100	25		**5SM1 412-6**	0.218	1
				40		**5SM1 414-6**	0.218	1
			300	25		**5SM1 612-6**	0.218	1
				40		**5SM1 614-6**	0.218	1
	**125 ... 230 V AC; 50 ... 60 Hz; 2-pole** 		30	63	2.5	**5SM1 316-6**	0.300	1
				80		**5SM1 317-6**	0.300	1
			100	63		**5SM1 416-6**	0.280	1
				80		**5SM1 417-6**	0.280	1
			300	63		**5SM1 616-6**	0.280	1
				80		**5SM1 617-6**	0.280	1
	**230 ... 400 V AC; 50 ... 60 Hz; 4-pole** 		30	25	4	**5SM1 342-6**	0.473	1
				40		**5SM1 344-6**	0.473	1
				63		**5SM1 346-6**	0.473	1
				80		**5SM1 347-6**	0.473	1
			100	40		**5SM1 444-6**	0.483	1
				63		**5SM1 446-6**	0.509	1
			300	25		**5SM1 642-6**	0.473	1
				40		**5SM1 644-6**	0.473	1
				63		**5SM1 646-6**	0.473	1
				80		**5SM1 647-6**	0.473	1
			500	25		**5SM1 742-6**	0.473	1
				40		**5SM1 744-6**	0.473	1
				63		**5SM1 746-6**	0.473	1

For additional components, see page 13/45.
For accessories, see page 13/46.

Device designs with terminals located at the left hand side for the neutral conductor are available on request.

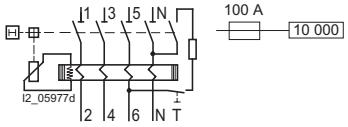
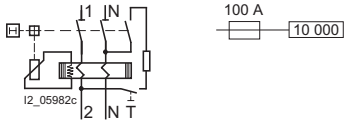
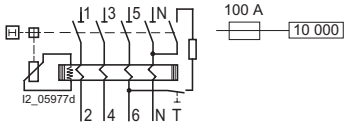
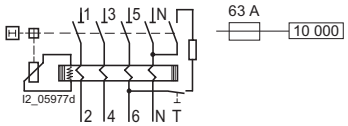
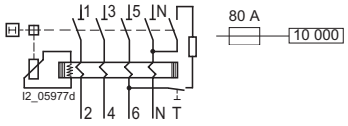
* You can order this quantity or a multiple thereof.

Residual Current Protective Devices

(Type A)

5SM1 residual-current operated circuit-breakers (RCCBs), type A, 16 ... 80 A

Selection and ordering data

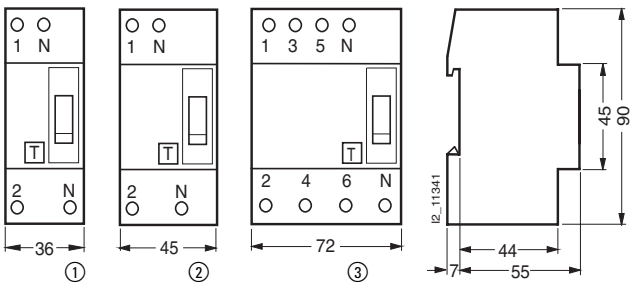
	Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 item kg	PS*/ P. unit Items
K short-time delayed, surge current withstand capability > 3 kA									
	**230 ... 400 V AC; 50 ... 400 Hz; 4-pole** 	100 A 10 000	30	25	4	K	**5SM1 342-6KK01**	0.473	1
				40		K	**5SM1 344-6KK01**	0.473	1
			100	63		K	**5SM1 446-6KK01**	0.473	1
S selective, surge current withstand capability > 5 kA									
	**125 ... 230 V AC; 50 ... 60 Hz; 2-pole** 	100 A 10 000	300	63	2.5	S	**5SM1 616-8**	0.280	1
	**230 ... 400 V AC; 50 ... 60 Hz; 4-pole** 	100 A 10 000	100	40	4	S	**5SM1 444-8**	0.473	1
			300	40		S	**5SM1 644-8**	0.473	1
				63		S	**5SM1 646-8**	0.473	1
			1 000	63		S	**5SM1 846-8**	0.473	1
Type A, 500 V, 25 ... 63 A, surge current withstand capability > 1 kA									
	**500 V AC [1]; 50 ... 60 Hz; 4-pole** 	63 A 10 000	30	25	4		**5SM1 352-6**	0.515	1
				40			**5SM1 354-6**	0.515	1
				63			**5SM1 356-6**	0.515	1
			300	25			**5SM1 652-6**	0.515	1
				40			**5SM1 654-6**	0.515	1
				63			**5SM1 656-6**	0.515	1
Type A, 50 ... 400 Hz, 25 ... 40 A, surge current withstand capability > 1 kA									
	**230 ... 400 V AC; 50 ... 400 Hz; 4-pole** 	80 A 10 000	30	25	4		**5SM1 342-6KK03**	0.473	1
				40			**5SM1 344-6KK03**	0.473	1

For additional components, see page 13/45.
For accessories, see page 13/46.

1) Approval acc. to IEC/EN 61008, only possible up to 440 V.

Dimensional drawings

16 ... 80 A for busbar mounting



① 5SM1 111,
5SM1 311, 5SM. 312, 5SM1 314,
5SM1 412, 5SM. 414,
5SM1 612, 5SM. 614

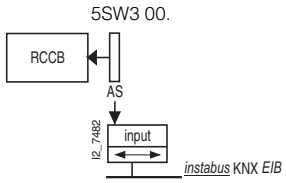
② 5SM1 316, 5SM. 317,
5SM1 416, 5SM. 417,
5SM1 616, 5SM. 617

③ 5SM1 342, 5SM. 344, 5SM. 346, 5SM. 347,
5SM1 352, 5SM. 354, 5SM. 356,
5SM1 444, 5SM. 446,
5SM1 642, 5SM. 644, 5SM. 646, 5SM. 647,
5SM1 652, 5SM. 654, 5SM. 656,
5SM1 742, 5SM. 744, 5SM. 746,
5SM1 846

* You can order this quantity or a multiple thereof.

Benefits

- An auxiliary circuit switch can be fitted to the right-hand side of the RCCB casing by the customer
- Mounting with factory-fitted brackets
- Ideal for installation in flat distribution boards
- Can be connected to *instabus* KNX *EIB* and AS-Interface bus or PROFIBUS through binary inputs.



Application

- Remote indications of the circuit state of the RCCB: ON/OFF
- Short-circuit protection ensured by miniature circuit-breakers of B or C characteristic with I_n = 6 A or fuse gL 6 A
- Product standards: IEC/EN 62019 (VDE 0640).

Technical specifications

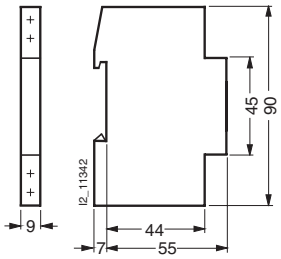
		5SW3 00.
Terminals		
• Conductor cross section	mm^2	0.75 ... 2.5
• Recommended tightening torque	Nm	0.6 ... 0.8
Min. contact load		50 mA/24 V
Max. contact load		
• 230 V AC, AC-12	A	6
• 230 V AC, AC-14	A	3.6
• 220 V DC, DC-12	A	1

Selection and ordering data

	Circuit diagram	Version	MW	Order No.		Weight 1 item	PS*/ P. unit
						kg	Items
	Auxiliary circuit switches (AS)						
		1 NO + 1 NC	0.5	**5SW3 000**		0.042	1
		2 NC	0.5	**5SW3 001**		0.042	1
		2 NO	0.5	**5SW3 002**		0.042	1

Dimensional drawings

5SW3 auxiliary circuit switches, can be retrofitted



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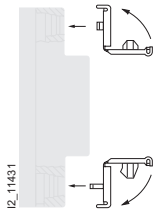
* You can order this quantity or a multiple thereof.

Accessories for 5SM1

Selection and ordering data

		Length mm	Order No.	Weight 1 item kg	PS*/ P.unit Items
	**Cover for connection terminals**				
	for residual-current operated circuit-breakers up to 80 A, sealable (2 pcs in plastic bag)				
	2 MW		**5SW3 010**	0.003	1 set
	2.5 MW		**5SW3 011**	0.004	1 set
	4 MW		**5SW3 008**	0.006	1 set
	**Locking device**				
	sealable and lockable				
	4.5 mm lock hasp diameter		**5SW3 003**	0.008	1
	**Padlock**				
	for locking device 5SW3 003		**5ST3 802**	0.027	1
	Locking device with padlock			1 set	
	comprising locking device 5SW3 003 and padlock 5ST3 802		**5SW3 012**	0.035	1 set
	**Cu busbars 16 mm²**				
	for horizontal busbar mounting of 5SM1 RCCBs, with 5SX2 miniature circuit-breakers or 5TE7 flush-mounting switches with I_e 40 A ... 100 A				
	2-phase	210	**5ST2 143**	0.154	1/10
		1 000	**5ST2 152**	0.692	1/5
	3-phase	210	**5ST2 144**	0.231	1/10
		1 000	**5ST2 153**	1.100	1/10
	3-phase + N	210	**5ST2 145**	0.315	1/10
		1 000	**5ST2 154**	1.498	1/5
	**End caps**				
	required for lateral insulation of cut-to-length busbars				
	single and 2-phase		**5ST2 155**	0.013	10
	3 and 4-phase		**5ST2 156**	0.017	10
	**Busbar, 3-phase**				
	for a 4-pole 5SM1 RCCB module with 8 miniature circuit-breakers				
	3/N + 8 terminals		**5ST2 424**	0.091	1/5

For further busbar versions, see section “Miniature circuit-breakers”.

* You can order this quantity or a multiple thereof.

Technical specifications

16 A, 25 A and 40 A to 100 A according to DIN VDE 0632-101 and EN 60947-3 32 A acc. to EN 60947-3 40 A to 125 A acc. to EN 60947-3 utilization category AC-22b but for cable cross-sections up to 9.5 mm diameter and without complying with the bending test				**5TE7 1**	**5TE7 2** **5TE7 3**
Rated operational current I_e	per current path		A	16	25, 32
Rated operational voltage U_e	1-pole		V AC	230	
	multi-pole		V AC	400	
Thermal rated current I_{the}			A	16	25
Rated breaking capacity	for p.f. = 0.65		A	48	75
Rated making capacity	for p.f. = 0.65		A	48	75
Short-circuit strength	used together with fuse of the same rated operating current (DIN VDE 0636 gL/gG)		kA	10	
Rated impulse withstand voltage U_{imp}			kV	>5	
Clearances	open contacts		mm	2 × 4.5	
	between the poles		mm	>7	
• Creepage distances			mm	>7	
Mechanical lifetime	switching cycles			25 000	
Minimum contact load			V; mA	10; 300	
Switching of lamp loads	incandescent lamp load		kW	2.4	
	halogen lamps with transformer		kW	1.2	
• Electrical service life	switching cycles			20 000	
Rated power	1-pole		kW	2.5	–
• Switching of resistive load including moderate overload AC-21	2-pole		kW	4.5	–
	3-/4-pole		kW	8	12
• Electrical service life	switching cycles			20 000	
Rated power	1-pole		kW	1.1	–
• Switching of mixed resistive and inductive load including moderate overload AC-22	2-pole		kW	1.9	–
	3-/4-pole		kW	3.5	5
• Electrical service life	switching cycles			20 000	10 000
Rated power	1-pole		kW	0.5	–
• Switching of motor loads to other highly inductive loads AC-23	2-pole		kW	0.7	–
	3-/4-pole		kW	1.2	2
• Electrical service life	switching cycles			20 000	10 000
Switching of direct voltages [1]	per current path up to	24 V DC	A	16	25
	per current path at	24 V DC	A	4	
		100 V DC	A	0.9	
		220 V DC	A	0.45	
Rated short-time currents [2]	per current path up to	0.2 s	A	650	1 000
for p.f. = 0.7		0.5 s	A	400	630
		1 s	A	290	450
		3 s	A	170	260
Terminals	+/- screw (Pozidriv)			1	
Conductor cross-sections	rigid		mm^2	1.5 ... 6	
	flexible with sleeve		min. mm^2	1	
Permissible ambient temperature			°C	-5 ... +40	
Resistance to climate	acc. to DIN 50015 at 95 % relative air humidity		°C	45	

1) The switches are designed as zero-current interrupters and have no additional quenching aids.
The rated breaking current for voltages over 24 V DC is very limited due to the safety hazard of the non-quenching electric arc.

2) The corresponding rated surge current can be established through multiplying by factor 1.5.

Technical specifications

Devices for switching lamps

Fluorescent and compact lamps (DULUX) in ballast operation (KVG)

Maximum number of lamps per current path at 230 V, 50 Hz											
		Uncorrected					**Parallel-corrected**				
Lamp type	W	S11	L18	L24	L36	L58	S11	L18	L24	L36	L58
Capacitor capacitance	mF	–	–	–	–	–	4.5	4.5	4.5	4.5	7.0
Switches											
5TE7 111 **5TE7 112** **5TE7 113**	16 A	–	35	–	35	25	–	50	–	50	35

Fluorescent lamps with electronic ballast

Maximum number of lamps per current path at 230 V, 50 Hz												
		DUO circuit specifications are for lights with 2 lamps each respectively					**AC operation**					
							1-lamp			**2-lamp**		
Lamp type	W	S11	L18	L24	L36	L58	L18	L36	L58	L18	L36	L58
Switches												
5TE7 111 **5TE7 112** **5TE7 113**	16 A	–	30	–	30	20	45	45	30	2×22	2×22	2×15

Rated power dissipation

Order No.	Short designation	**Power loss P_v (VA)** contact [1] per pole
5TE7 101	switch 16 A , 1 NO contact indicator light	0.8
5TE7 105	switch 16 A, 1 NO contact indicator light 150 m	0.8
5TE7 111	switch 16 A, 1 NO contact	0.6
5TE7 112	switch 16 A, 2 NO contacts	0.6
5TE7 113	switch 16 A, 3 NO contacts	0.6
5TE7 141	switch 16 A 1 CO contact, group	0.6
5TE7 142	switch 16 A 2 CO contacts, group	0.6
5TE7 161	switch 16 A, 1 CO contact	0.6
5TE7 162	switch 16 A, 1 CO contact	0.6
5TE7 211	switch 32 A, 1 NO contact	0.6
5TE7 212	switch 32 A, 2 NO contacts	0.6
5TE7 213	switch 32 A, 3 NO contacts	2.5
5TE7 214	switch 32 A, 4 NO contacts	2.5
5TE7 313	switch 25 A, 3 NO contacts	1.5
5TE7 314	switch 25 A, 4 NO contacts	1.5

1) For rated operational current.

Selection and ordering data

		U_e	I_e	Conductor cross sections	M W	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	up to mm²			kg	Items
	**Changeover switches**							
	with sealable switch position							
	1 CO contact 	230	16	6	1	**5TE7 161**	0.058	1/12
	2 COs 	400	16	6	2	**5TE7 162**	0.110	1/6
	2 NO contact + 2 NC contact 	400	16	6	2	**5TE7 165**	0.120	1/6
	**Group switches with center position**							
	with sealable switch position							
	1 CO contact 	230	16	6	1	**5TE7 141**	0.058	1/12
	2 CO contacts 	400	16	6	2	**5TE7 142**	0.110	1/6
	**Control switches with glow lamp**							
	with sealable switch position							
	for max. 5 m cable length 	230	16	6	1	**5TE7 101**	0.055	1/12
	for max. 150 m cable length 	230	16	6	1	**5TE7 105**	0.055	1/12
	**On/Off switches (16 A to 32 A)**							
	with sealable switch position							
	1 NO contact 	230	16 32	6	1	**5TE7 111** **5TE7 211**	0.050 0.050	1/12 1/12
	2 NO contacts 	400	16 32	6	1	**5TE7 112** **5TE7 212**	0.060 0.060	1/12 1/12
	3 NO contacts 	400	16 25 32	6	2	**5TE7 113** **5TE7 313** **5TE7 213**	0.100 0.100 0.100	1/6 1/6 1/6
	3 NO contacts + N 	400	25 32	6	2	**5TE7 314** **5TE7 214**	0.120 0.120	1/6 1/6

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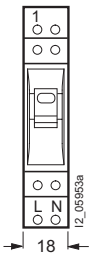
* You can order this quantity or a multiple thereof.

5TE7 1 ... 5TE7 3 switches

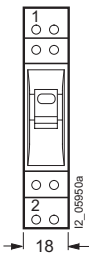
Dimensional drawings

5TE7 switches 1, 2, 3

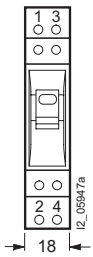
5TE7 101
5TE7 105



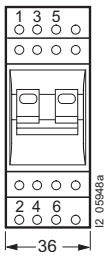
5TE7 111
5TE7 211



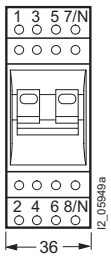
5TE7 112
5TE7 212



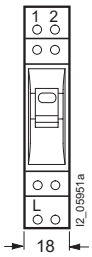
5TE7 113
5TE7 213
5TE7 313



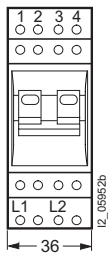
5TE7 165
5TE7 214
5TE7 314

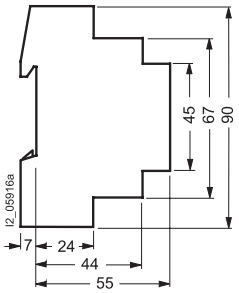


5TE7 141
5TE7 161



5TE7 142
5TE7 162





Overview

	Color coding acc. 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		

Benefits

- Control glow lamp, white, transparent

Technical specifications

Acc. to IEC 60947-3, EN 60947-3 and IEC 60669-1, EN 60669-1				5TE4 7
Rated operational current I_e	per current path		A	16
Rated operational voltage U_e	1-pole multi-pole		V AC V AC	230 400
Rated thermal current I_{the}			A	20
Rated breaking capacity	for p.f. = 0.65		A	60
Rated making capacity	for p.f. = 0.65		A	60
Rated impulse withstand voltage U_{imp}			kV	>5
Clearances	open contacts between the poles		mm mm	2 × > 2 >7
• Creepage distances			mm	>7
Mechanical lifetime	switching cycles			25 000
Minimum contact load			V; mA	10; 300
Rated short-time currents [1]	per current path up to	0.2 s	A	650
for p.f. = 0.7		0.5 s	A	400
		1 s	A	290
		3 s	A	170
Terminals/tightening torque	± screw (Pozidriv); Nm			1; 1.2
Conductor cross-sections	rigid flexible with sleeve		mm^2 min. mm^2	1.5 ... 6 1
Permissible ambient temperature			°C	-5 ... +40

Rated power dissipation

Order No.	Short designation	Power loss P_v (VA) coil/drive	contact [1] per pole
5TE4 700	16 A pushbutton 1NO contact 1 NC contact, gray	–	0.1
5TE4 701	230 V AC pushbutton 16 A 1 NO contact, gray, indicator light	0.2	0.1
5TE4 702	230 V AC pushbutton 16 A 1 NC contact, gray, indicator light	0.2	0.1
5TE4 703	230 V AC pushbutton 16 A 1 NO contact, gray, indicator light	0.2	0.1
5TE4 704	16 A pushbutton 1 NO contact 1 NC contact, red	–	0.1
5TE4 705	16 A pushbutton 1 NO contact 1 NC contact, green	–	0.1
5TE4 706	16 A pushbutton 1 NO contact 1 NC contact, yellow	–	0.1
5TE4 707	16 A pushbutton 1 NO contact 1 NC contact, blue	–	0.1

1) For rated operational current.

5TE4 7 pushbuttons

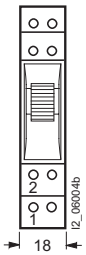
Selection and ordering data

	U_e	I_e	Conductor cross sect.	MW	Order No.	Weight 1 item	PS*/ P.unit
	V AC	A	up to mm^2			kg	Items
Pushbuttons							
1 NO contact, 1 NC contact 							
gray pushbutton	230	16	6	1	**5TE4 700**	0.050	1/12
red pushbutton					**5TE4 704**	0.050	1/12
green pushbutton					**5TE4 705**	0.050	1/12
yellow pushbutton					**5TE4 706**	0.050	1/12
blue pushbutton					**5TE4 707**	0.050	1/12
Pushbuttons with control glow lamp for max. 5 m cable length							
1 NO contact 							
gray pushbutton	230	16	6	1	**5TE4 701**	0.050	1/12
1 NC contact 							
gray pushbutton	230	16	6	1	**5TE4 702**	0.050	1/12
Pushbuttons with control glow lamp for max. 150 m cable length							
1 NO contact 							
gray pushbutton	230	16	6	1	**5TE4 703**	0.060	1/12

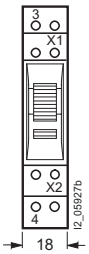
Dimensional drawings

5TE4 7 pushbuttons

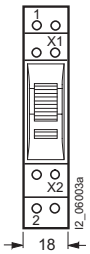
5TE4 700
5TE4 703
5TE4 704
5TE4 705
5TE4 706
5TE4 707

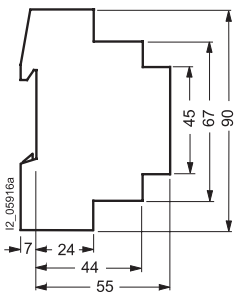


5TE4 701



5TE4 702





* You can order this quantity or a multiple thereof.

Technical specifications

16 A, 25 A and 40 A to 100 A according to IEC 60669-1, EN 60669-1 and IEC 60947-3, EN 60947-3 32 A acc. to IEC 60947-3, EN 60947-3 40 A to 125 A acc. to EN 60947-3 utilization category AC-22b but for cable cross-sections up to 9.5 mm diameter and without complying with the bending test				5TE7 4	5TE7 5	5TE7 6	5TE7 7 5TE7 8
Rated operational current I_e	per current path		A	40	63	80	100
Rated operational voltage U_e	1-pole		V AC	230			
	multi-pole		V AC	400			
Thermal rated current I_{the}			A	40	63	80	100
Rated breaking capacity	for p.f. = 0.65		A	120	190	240	300
Rated making capacity	for p.f. = 0.65		A	120	190	240	300
Short-circuit strength	used together with fuse of the same rated operating current (IEC 60269 gL/gG)		kA	10			
Rated impulse withstand voltage U_{imp}			kV	> 7			
Clearances	open contacts between the poles		mm mm	> 7			
• Creepage distances			mm				
Mechanical lifetime	switching cycles			25 000			
Minimum contact load			V; mA	24; 300			
Switching of lamp loads	incandescent lamp load halogen lamps with transformer		kW kW	3.6 1.2	6.9	7.6	9.6
• Electrical service life	switching cycles			20 000			
Rated power • Switching of resistive load including moderate overload AC-21	1-pole 2-pole 3-/4-pole		kW kW kW	6.5 11.5 20	10 18 30	13 22 39	– 28 48
• Electrical service life	switching cycles			10 000	3 000	1 000	
Rated power • Switching of mixed resistive and inductive load including moderate overload AC-22	1-pole 2-pole 3-/4-pole		kW kW kW	2.7 4.5 8	4 7.3 13	5.5 9.3 16	– 11.5 20
• Electrical service life	switching cycles			5 000	1 000		
Rated power • Switching of motor loads to other highly inductive loads AC-23	1-pole 2-pole 3-/4-pole		kW kW kW	1 1.8 3	1.6 2.8 5	2 3.5 6	– 4.4 7.5
• Electrical service life	switching cycles			5 000	1 000		
Switching of direct voltages [1]	per current path up to	24 V DC	A	40	63	80	100
	per current path at	24 V DC	A	4			
		100 V DC	A	0.9			
		220 V DC	A	0.45			
Rated short-time currents [2]	per current path up to	0.2 s	A	1 350	2 000	2 700	3 400
for p.f. = 0.7		0.5 s	A	840	1 300	1 650	2 100
		1 s	A	680	1 000	1 350	1 700
		3 s	A	400	580	800	1 000
Terminals	+/- screw (Pozidriv)			2			
Conductor cross-sections	rigid flexible with sleeve		mm^2 min. mm^2	6 ... 50 2.5			
Permissible ambient temperature			°C	-5 ... +40			
Resistance to climate	according to DIN 50015 at 95 % relative humidity		°C	45			

1) The switches are designed as zero-current interrupters and have no additional quenching aids.
The rated breaking current for voltages over 24 V DC is very limited due to the safety hazard of the non-quenching electric arc.

2) The corresponding rated surge current can be established through multiplying by factor 1.5.

5TE7 4 ... 5TE7 8 switches

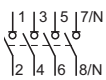
Technical specifications

Rated power dissipation

Order No.	Short designation	**Power loss P_v (VA)** contact [1] per pole
5TE7 411	switch 40 A 1 NO contact	0.9
5TE7 412	switch 40 A 2 NO contacts	0.9
5TE7 413	switch 40 A 3 NO contacts	0.9
5TE7 414	switch 40 A 4 NO contacts	0.9
5TE7 511	switch 63 A 1 NO contact	2.2
5TE7 512	switch 63 A 2 NO contacts	2.2
5TE7 513	switch 63 A 3 NO contacts	2.2
5TE7 513-2	switch 63 A 4 NO contacts, lockable	2.2
5TE7 514	switch 63 A 4 NO contact	2.2
5TE7 514-2	switch 63 A 4 NO contacts, lockable	2.2
5TE7 611	switch 80 A 1 NO contact	3.5
5TE7 612	switch 80 A 2 NO contacts	3.5
5TE7 613	switch 80 A 3 NO contacts	3.5
5TE7 614	switch 80 A 4 NO contacts	3.5
5TE7 711	switch 100 A 1 NO contact	5.5
5TE7 712	switch 100 A 2 NO contacts	5.5
5TE7 713	switch 100 A 3 NO contacts	5.5
5TE7 714	switch 100 A 4 NO contacts	5.5
5TE7 813	switch 125 A 3 NO contacts	8.6

1) For rated operational current.

Selection and ordering data

		U_e	I_e	Conductor cross sections	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	up to mm^2			kg	Items
	On/Off switches (40 A to 125 A) can be used as switch-disconnector according to EN 60947-1							
	with sealable switch position							
	1 NO contact 	230	40 63 80 100	50	1	**5TE7 411** **5TE7 511** **5TE7 611** **5TE7 711**	0.105 0.105 0.105 0.105	1/12 1/12 1/12 1/12
	2 NO contacts 	400	40 63 80 100	50	2	**5TE7 412** **5TE7 512** **5TE7 612** **5TE7 712**	0.205 0.205 0.212 0.205	1/6 1/6 1/6 1/6
	3 NO contacts 	400	40 63 80 100 125	50	3	**5TE7 413** **5TE7 513** **5TE7 613** **5TE7 713** **5TE7 813**	0.311 0.311 0.311 0.311 0.318	1/4 1/4 1/4 1/4 1/4
	3 NO contacts + N 	400	40 63 80 100	50	4	**5TE7 414** **5TE7 514** **5TE7 614** **5TE7 714**	0.415 0.415 0.425 0.415	1/3 1/3 1/3 1/3
	handle can be locked with padlock (lock fastener ∅ max. 3.5 mm)							
	3 NO contacts 	400	63	50	3	**5TE7 513-2**	0.321	1/4
	3 NO contacts + N 	400	63	50	4	**5TE7 514-2**	0.425	1/3

5ST2 400 to 5ST2 424 for 5TE7 411 to 5TE7 813 busbars see page 12/38.

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

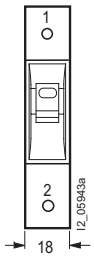
Accessories

		U_e	I_e	Conductor cross sections	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	up to mm²			kg	Items
	**Phase connector** for easier wiring in various wiring versions and busbars or as a fixpoint terminal for conductors from 2.5 mm² to 50 mm² 1-pole 1 2	230	125	50	1	**5TE9 110**	0.111	1/12
	**N conductor connector** for easier wiring in different circuit versions and busbar mountings or as a fixpoint terminal for conductors from 2.5 mm² to 50 mm² with blue color marking 1-pole N N	230	125	50	1	**5TE9 111**	0.111	1/12
	**Handle locking device** for all 5TE7 switches with 1 MW for protection against accidental switching on or off					**5ST2 168** **5ST2 170**	0.007 0.007	1/10 1/10

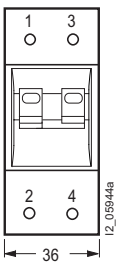
Dimensional drawings

5TE7 4, 5TE7 5, 5TE7 6, 5TE7 7, 5TE7 813 switches

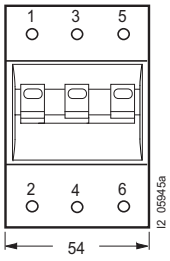
5TE7 411
5TE7 511
5TE7 611
5TE7 711
5TE9 110



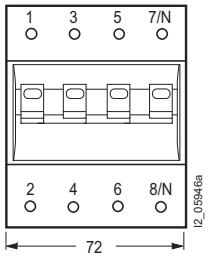
5TE7 412
5TE7 512
5TE7 612
5TE7 712

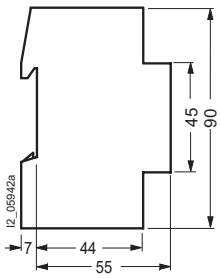


5TE7 413
5TE7 513
5TE7 513-2
5TE7 613
5TE7 713
5TE7 813



5TE7 414
5TE7 514
5TE7 514-2
5TE7 614
5TE7 714





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* This quantity or a multiple therof can be ordered.

Timers

5TT1 3
Time switches for building lighting

Overview

Switching lighting	5TT1 300 and 5TT1 301	5TT1 310-1 and 5TT1 311-1
• filament lamp load:	1200 W	1200 W
• fluorescent lamp load 58 W		
- Uncorrected	20 items	14 items
- parallel-corrected	–	17 items
- DUO circuit	2 × 20 Items	14 items
- ECG Siemens, 1-lamp	–	18 items
2-lamp	–	2 × 9 items

Benefits

	Energy saving timer	Lighting timer	Stairwell lighting timers	
	5TT1 300	5TT1 301	5TT1 310-1	5TT1 311-1
Setting range	3 ... 60 min	0.3 ... 5 min	1 ... 10 min	1 ... 10 min
3-wire circuit L-momentary contact, can be reset	–	–	•	–
4-wire circuit L-momentary contact, can be reset	•	•	–	•
3-wire circuit N-momentary contact, cannot be reset	•	•	–	•
Early deactivation by pushing the button a 2nd time	•	2 ... 5 min	–	–
Short-circuit strength	–	–	–	•
Half-light switching	–	–	–	–
ECG control 1 ... 10 V	–	–	–	–

4-conductor circuit, L-momentary contact
4 conductors are installed within the building. The timing interval is started with a phase L. During the runtime, the device can be reset at any time, i.e. the runtime restarts.

3-conductor circuit, N-momentary contact
3 conductors are installed within the building. The timing interval is started with the neutral conductor. During the runtime, the timer can be reset at all times. However, this switching no longer corresponds to DIN VDE 0110 T460. It is only still in use in old installations.

3-conductor circuit, L-momentary contact
3 conductors are installed within the building. The timing interval is started with a phase L. No resetting is possible during the runtime as the pushbutton's input and output are exposed to the same potential during the runtime. The glow lamps are switched off during the runtime.

High setting accuracy
The electronic remote control switch works very accurately. The setting can be made every +30 seconds. The factory settings ensure reliable setting of the 1 and 10-minute limit values.

Useful continuous contact
If pushbuttons jam, a so-called pushbutton malfunction, this does not damage the devices but produces a steady light. This feature can be used (e.g. by caretakers of properties) to switch to a permanent steady light in the event of moving house or emergencies.

Short-circuit strength
Stairwell lighting timers are primarily used for the switching of incandescent lamps, which may occasionally be subject to short-circuits during operation.

Technical specifications

Data according to DIN VDE 0632				5TT1 300	5TT1 301
Rated control voltage U_c			V AC	230	
Operating range × U_c				0.8 ... 1.1	
Rated frequency			Hz	50/60	
Setting ranges	operating time connection B1 degree of dimming connection B2		min % 	3 ... 60 – – –	0.5 ... 5/20 – – –
Minimum pulse duration			ms	20	
Max. On period	in the event of pushbutton malfunction		%	100	
Incandescent lamp load			mA	10	40
Rated impulse withstand voltage U_{imp}			kV	> 2.5	
Direct current output	for control of ECG dynamic		V	–	
Rated operational voltage U_e			V AC	250	
Rated operational current I_e	for p.f. = 1		A	10	
Contact gap Minimum contact load			mm V; mA	µ-contact 10; 300	
Switching of lamp loads	incandescent lamp load fluorescent lamp loads		W	1200 1)	
Electrical service life in switching cycles at I_e or specified lamp load and U_e = 230 V AC				50 000	
Terminals	+/– screw (Pozidriv)			2	
Conductor cross-sections	rigid flexible with sleeve	max. min.	mm^2 mm^2	2 × 2.5 1 × 0.5	
Permissible ambient temperature			°C	-20 ... +60	-20 ... +45
Resistance to climate	according to DIN IEC 60068-1			20/60/4	20/45/4

Data acc. to EN 60669				5TT1 310-1, 5TT1 311-1
Rated control voltage U_c			V AC	250
Operating range × U_c				0.9 ... 1.1
Rated frequency			Hz	50 ... 60
Setting range/accuracy				0.5 ... 10 min/±10 s
Minimum pulse duration			ms	30
Max. On period	in the event of pushbutton malfunction		%	100
Incandescent lamp load			mA	15
Rated operational voltage U_e			V AC	230
Rated operational current I_e	for p.f. = 1		A	16
Contact gap **Maximum fan load** **Minimum contact load**			mm VA V; mA	3 – 10; 300
Switching of lamp loads	incandescent lamp load halogen lamps with transformer fluorescent lamp load		W W 	1200 600 1)
Electrical service life in switching cycles at I_e or specified lamp load ad U_e = 230 V AC				100 000
Terminals	+/- screw (Pozidriv)			2
Conductor cross-sections	rigid flexible with sleeve	max. min.	mm^2 mm^2	2.5 1.5
Permissible ambient temperature			°C	-15 ... +40
Resistance to climate	acc. to DIN IEC 60068-2-3 at 95 % relative humidity		°C	40

1) See next page.

5TT1 3
Time switches for building lighting

Technical specifications

Devices for switching lamps

Fluorescent and compact lamps (DULUX) in ballast operation (KVG)

Maximum number of lamps per current path at 230 V, 50 Hz																
			Uncorrected					**Parallel-corrected**					**DUO circuit** specifications are for lights with 2 lamps each respectively				
Lamp type		W	S11	L18	L24	L36	L58	S11	L18	L24	L36	L58	S11	L18	L24	L36	L58
Capacitor capacitance		mF	–	–	–	–	–	4.5	4.5	4.5	4.5	7.0	–	–	–	–	–
Timers																	
5TT1 300 **5TT1 301**	10 A		–	22	–	22	14	–	–	–	–	–	–	21	–	21	10

Fluorescent lamps with electronic primary switching device (ballast)

Maximum number of lamps per current path at 230 V, 50 Hz														
			AC operation						**DC operation, 3 current paths in series**					
			1-lamp			**2-lamp**			**1-lamp**			**2-lamp**		
Lamp type		W	L18	L36	L58	L18	L36	L58	L18	L36	L58	L18	L36	L58
Timers														
5TT1 300 [1] **5TT1 301** [1]	10 A		26	26	18	2 × 12	2 × 12	2 × 8	–	–	–	–	–	–

1) Max. capacitive load 10 µF.

Rated power dissipation

Order No.	Short designation	**Power loss P_v (VA)** coil/drive	contact [1] per pole
5TT1 300	time switch 230 V AC 10 A 1 CO contact energy-saving	3	0.9
5TT1 301	time switch 230 V AC 10 A 1 CO contact, lighting	5	0.9

1) For rated operational current.

2) Only short-time operation max. 10 min.

3) Only short-time operation max. 30 s.

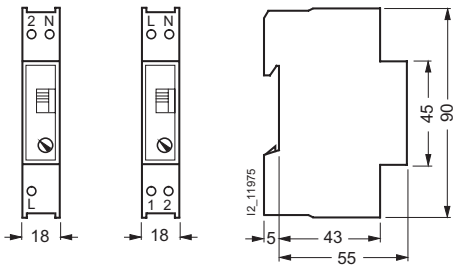
Selection and ordering data

		U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	V AC			kg	Items
	**Stairwell lighting timers** **setting range 1 to 12 minutes, manual switch** four-wire connection L-momentary contact or three-wire connection N-momentary contact, can be reset	230	10	230	1	**5TT1 311-1**	0.080	1
								
	for 3-wire circuit, L-momentary contact, cannot be reset	230	10	230	1	**5TT1 310-1**	0.075	1
								
	**Energy-saving timer 55/70 mm** setting range 3 to 60 minutes, manual switch switch-off through timing interval or 2nd press of the button four-wire connection L-momentary contact or 3-wire circuit N-momentary contact	230	10	230	1	**5TT1 300**	0.075	1
								
	**Lighting time switch 55/70 mm** setting range 0.5 to 5 minutes, manual switch if the button is pushed for longer than 1 second, the runtime is extended by 20 minutes four-wire connection L-momentary contact	230	10	230	1	**5TT1 301**	0.075	1
								

Dimensional drawings

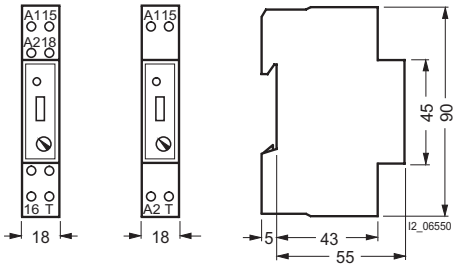
5TT1 31 time switches for stairwell lighting and fans

5TT1 310-1 5TT1 311-1



5TT1 300 energy-saving timer
5TT1 301 lighting time switch

5TT1 300 5TT1 301



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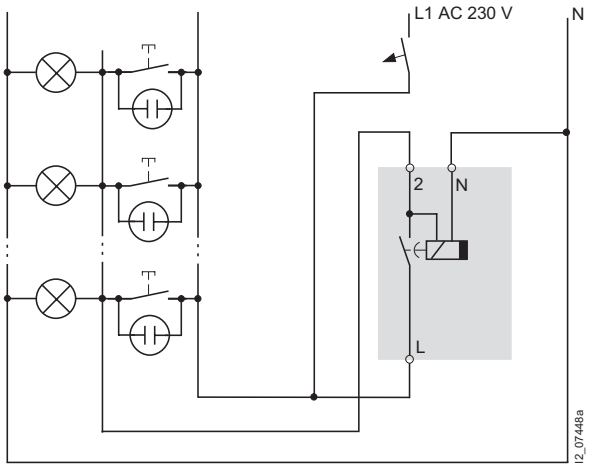
5TT1 3
Time switches for building lighting

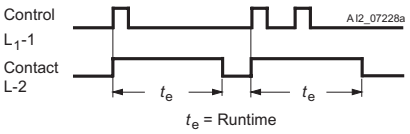
Schematics

Switching example: 5TT1 310-1 time switch in 3-wire circuit, L-momentary contact

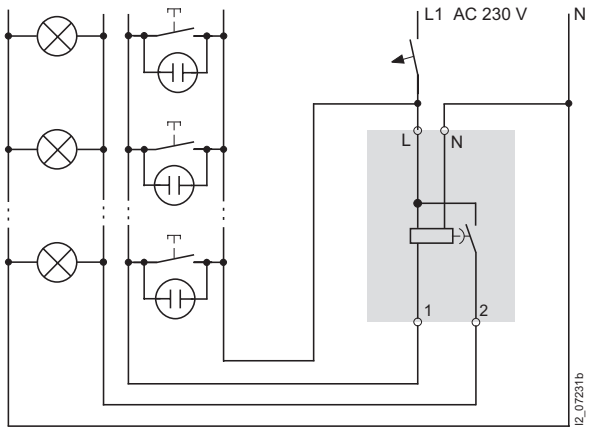


Circuit for new installation with shared cable routing for pushbuttons and lights.

The time switch can only be restarted after the set time expires.



Switching example: 5TT1 311-1 time switch in four-wire connection, L-momentary contact with permanent light and attic circuit

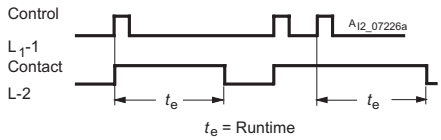


Usual circuit for new installation with separate cable routing for pushbuttons and lights.

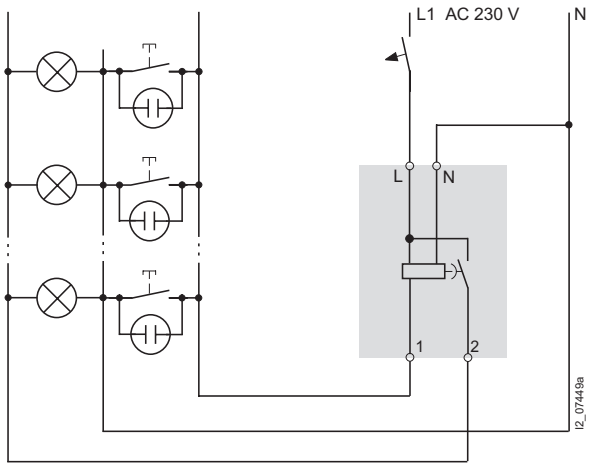
The additional DI switch allows external switching to permanent light. A time switch can also be used.

An additional attic circuit is also available, which operates independently of the time switch, but on the same electrical circuit.

The time switch can be restarted before the set time expires.



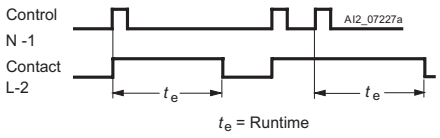
Switching example: 5TT1 311-1 time switch in 3-wire circuit, N-momentary contact



Can only be used with a limited number of wires.
The time switch can be restarted before the set time expires.

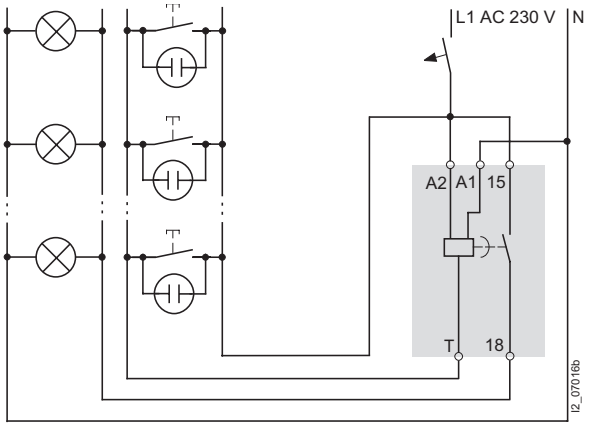
While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0100 Part 460 (compare IEC 60364-4-46).

However, it is used in old systems for replacement purposes.

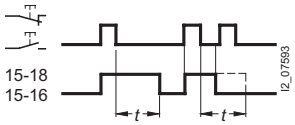


Schematics

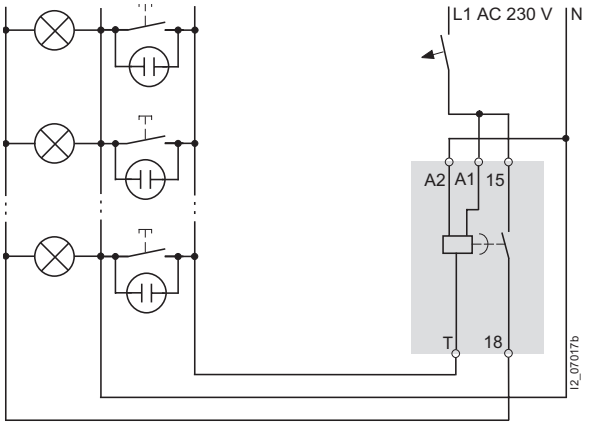
Switching example: 5TT1 300 energy-saving timer in four-wire connection, L-momentary contact



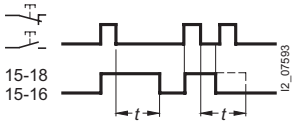
The energy-saving timer switches on if pressed once and switches off at the 2nd press of the button. If it is not switched off manually, it is automatically switched off after the set time, max. 60 minutes.



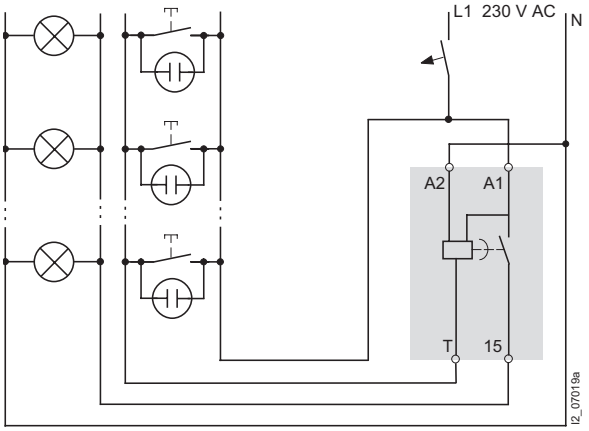
Switching example: 5TT1 300 energy-saving timer in 3-wire circuit, N-momentary contact



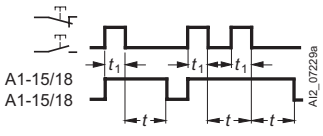
The energy-saving timer switches on if pressed once and switches off at the 2nd press of the button. If it is not switched off manually, it is automatically switched off after the set time, max. 60 minutes. While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0100 Part 460. However, it is used in old systems for replacement purposes.



Switching example: 5TT1 301 lighting time switch in four-wire connection, L-momentary contact



When pressed, the lighting time switch switches on for the set run-time, up to 5 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 20 minutes.
The last press of the pushbutton is decisive.



Pushbutton < 1: short-time up to 5 min.
Pushbutton > 1: long-time up to 20 min.

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Timers

7LF4 1, 7LF4 2
Digital time switches

Benefits

	Mini digital time switches	Digital time switches			
	7LF4 101	7LF4 110	7LF4 111 7LF4 112 7LF4 114 7LF4 200	7LF4 120 7LF4 121 7LF4 201	7LF4 15
Day program	•	•	–	–	–
Weekly program with user-definable block programming	•	–	•	•	•
Year program	–	–	–	–	•
Single-shot date switching	–	–	–	–	•
Cycle program 1 to 99 min.	–	–	7LF4 114	7LF4 121	•
Pulse program 1 to 59 s	–	–	7LF4 114	7LF4 121	•
Random program 1 to 59 min.	•	–	–	–	•
DC-77 radio signal application	–	–	–	–	•
Automatic daylight savings	–	•	•	•	•
Manual switching	–	•	•	•	•
Switching instants	42	12	28	42	105
Permanent storage	–	•	•	•	•
Supercap	–	•	•	•	•
Protected programming	•	•	•	•	•
Reserve power (h)	150	50	50	50	70

User-definable block programming

Switching instants can be freely assigned to weekdays during programming.

Year time switch

The year timer is always based on a 7-day time switch. By entering date ranges, whole days can be hidden or additional weekly switching programs activated.

Single-shot date switching

After execution, a time switching point is automatically deleted because it will not be required in the year to follow, e.g. Easter vacation.

Cycle program

Instead of an ON command, an ON time of e.g. 5 min. and an OFF time of e.g. 55 min. can be programmed.

This cycle is then constantly repeated until it is ended by the cycle OFF command.

For example, if you want a fan to run for 5 minutes in every hour from 8 am to 6 pm, only four further switching instants are required.

Pulse program

Instead of an ON command, you can program a pulse of 1 - 59 seconds. This enables automation of pushbutton commands for remote-control switches or self-holding switches.

Random program

An ON or OFF command is randomly delayed from 1 - 59 min.

DCF-77 technology

A long-wave time signal with a range of approx. 1500 km is emitted from Frankfurt/Main. This time signal synchronizes the internal time signal of the time switch. There is never any need to correct the time of day. In the event of a power failure, the time of day is automatically set correctly.

Automatic daylight savings

The system automatically switches over to daylight saving on the last weekends in March and October (in the nights from Saturday to Sunday) in accordance with statutory regulations.

If required, the following additional options are also available:

H = semi-automatic:
The switchover is always performed on the set date. If no date is entered, there is no switchover.

C = calculated:
Switchovers are always effected on the same weekday of the calendar week.

Manual switching

The automatic time program can be also be temporarily or permanently disabled by means of special pushbuttons.

Permanent storage

The programmed switching instants are not lost in the event of a power failure. The Time of Day continues to be calculated, even when the power reserve is activated.

Supercap

Wear-free, passive component for maintaining the reserve power during a power failure.

Protected programming

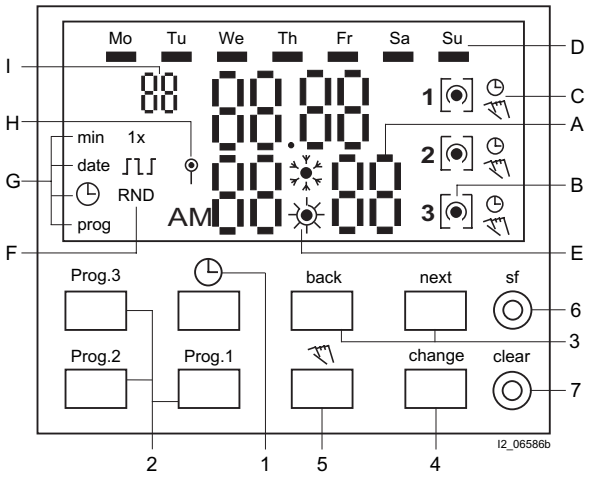
The devices have a sealable device cover.

Application

Digital time switches can be used for switching systems or system sections, or for a wide range of functions, including the following: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy control, school bells, church bells, shop window lighting, advertising lighting, gym lighting, street lighting, illuminated signs, traffic light controls, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, baking ovens, heating systems, air conditioning systems and devices, fans and ventilation systems, heating circulation pumps, sauna systems, aquariums, fountains.

Design

Control elements



7LF4 152 display

Pushbutton functions

1 Pushbutton for entering the time, date and – if applicable – changing the automatic daylight savings.

2 Pushbutton(s) for entering the switching instant per channel, such as the type of switching command (ON/OFF). Switching time, selection of week day, date and date range.

3 Pushbuttons for switching backwards and forwards when reading, switching backwards and forwards in programming mode or when entering corrections, changing times, switching instants, date ranges and manual/automatic switching.

4 Pushbutton for selecting inputs, e.g., Friday from 7 weekdays or for counting increments, e.g. for entering a time of 20:30.

5 Manual/Automatic switching. The Automatic function can be temporarily or permanently disabled and the time switch can be permanently switched on or off.

6 The "sf" pushbutton (special function) is required for programming cycles, pulses and random programs and – if applicable – for changing the daylight savings.

7 This pushbutton lets you delete switching points.

Indicators

A Time indication. The 7LF4 13 devices display a date (day, month) at the top. The programming mode offers a display aid with the term "date", see G.

B Indicates the switching state of the time switch, such as ON/OFF, duration ON/OFF.

C Manual/Automatic indication.

D Weekday indication. The day blocks are displayed in programming mode.

E Daylight savings indication.

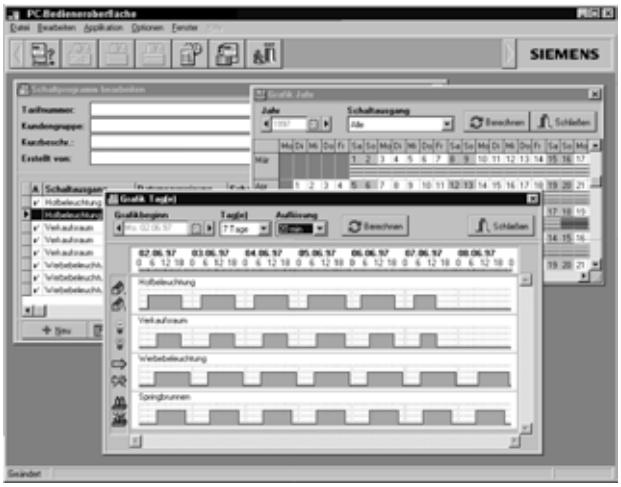
F Display of special functions, such as cycle, pulse, random (RND) or single-shot date switching.

G Mode indication, such as Time of Day or programming mode. To ensure the programming mode is unambiguous, "min" indicates minutes and "date" the date input. AM indicates a 12-hour display.

H Indicates reception of the DCF-77 time signal.

I Indication of year, i.e. 96 for 1996, or a block number, like the ones used for programming data ranges.

PC operator interface for year time switch



- MS Windows 3.11/MS Windows 95/MS Windows NT
- Free channel definitions
- Switching states represented as symbols, can be freely selected
- Symbol library
- Clearly arranged display of the switching program
- Wizard support when creating switching programs
- Control options:
  - Year overview of the switching program
  - Day/week simulation of the switching program
  - Statistics of switching commands for definable time periods
- Status indication of free memory space
- Clearly arranged, table display.

Application

The PC user interface is intuitive and user-friendly and makes it easy to create complex switching programs.

Benefits

Due to the large number of switching commands and dates entered, switching programs can be very confusing. In these situations, direct programming at the digital time switch is not particularly helpful. However, the PC user interface allows the fast and reliable creation of complex switching programs.

Function

The quartz-controlled Time of Day is compared with the switching program and switched on or off, depending on the programmed switching instant.
Digital time switches can switch to the minute exactly and execute different time switchings on weekdays, on a specific date or within data ranges. They are therefore far superior to mechanical time switches.

7LF4 1, 7LF4 2
Digital time switches

Technical specifications

Data according to IEC 60730, EN 60730			7LF4 101	7LF4 110	7LF4 111 7LF4 112 7LF4 114 7LF4 200	7LF4 120 7LF4 121 7LF4 201	7LF4 15
Rated control voltage U_c		V AC V DC	230 ... 240 –	230 –	12, 24, 230 12, 24	230 –	12, 24, 230 12, 24
Operating range × U_c	at 50 Hz at 60 Hz		0.85 ... 1.1 0.85 ... 1.06				
Rated frequency		Hz	50 ... 60				
Channels/contacts	µcontact, changeover	Items	1			2	1 ... 3
Rated operational voltage U_e		V AC	250				
Rated operational current I_e	for p.f. = 1 for p.f. = 0.6	A A	16 2.5	16 4			10 4
Different phases	actuator/contact permissible contact/contact		yes –			yes	no
Electrical isolation	creepage and clearances actuator/contact contact/contact	 mm mm	 4 –			 4	 3
Rated impulse withstand voltage U_{imp}	actuator/contact contact/contact	kV kV	>2.5 –			>2.5	
Minimum contact load		V; mA	10; 300				
Incandescent lamp load		W	1 000	400			
Minimum switching interval		min	1				
Clock error per day	typical	s	±2.5				±1.0
Minimum loading time	for power reserve	h	70	24			
Power reserve storage			Ni/Cd	Supercap			
Terminals	+/- screw (Pozidriv)		1				
Conductor cross-sections	rigid flexible with sleeve min.	mm^2 mm^2	1.5 ... 4 0.5				
Permissible ambient temperature		°C	-10 ... +55				
Resistance to climate	acc. to DIN 50016		FW 24				

Available switching instants	Number
7LF4 150	105
7LF4 151	2 × 53
7LF4 152	3 × 35
7LF4 153	3 × 35
7LF4 154	3 × 35

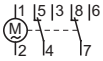
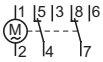
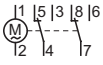
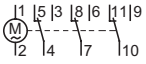
Switching instant requirements	Number
Standard (time, weekday/block)	1
Random command (RND)	2
Pulse command	2
Cycle command	2
Date/data range/1 × switching	each + 1

Rated power dissipation

Order No.	Short designation	Power loss P_v (VA) coil/drive	contact [1] per pole
7LF4 101	digital time switch 230 V AC 16 A 1 MW	3.1	1.1
7LF4 110	digital time switch 230 V AC 16 A, day	7.6	1.6
7LF4 111	digital time switch 230 V AC 16 A, week	5.3	1.6
7LF4 112	digital time switch 24 V AC/DC 16 A, week	1.8	1.6
7LF4 114	digital time switch 230 V AC 16 A, week	6.2	1.6
7LF4 120	digital time switch 230 V AC 16 A, week, two-channel	5.4	1.6
7LF4 121	digital time switch 230 V AC 16 A week, two-channel, special	6.2	1.6
7LF4 150	digital time switch 230 V AC 10 A, year	6.4	0.5
7LF4 151	digital time switch 230 V AC 10 A, year, two-channel	9	0.5
7LF4 152	digital time switch 230 V AC 10 A, year, three-channel	9.3	0.5
7LF4 153	digital time switch 24 V AC/DC 10 A, year, three-channel	2.9	0.5
7LF4 154	digital time switch 12 V AC/DC 10 A, year, three-channel	0.9	0.5
7LF4 200	digital time switch 230 V AC week, surface-mounting/front	5.3	1.2
7LF4 201	digital time switch 230 V AC, week, two-channel, surface-mounting/front	0.8	1.2

1) For rated operational current.

Selection and ordering data

		U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	V			kg	Items
7LF4 1 digital time switches								
	**Day program** single-channel 50 h reserve power 12 switching instants							
		250	16	230 AC	2	**7LF4 110**	0.100	1
	**Week program** single-channel 50 h reserve power 28 switching instants							
		250	16	230 AC AC/DC 24	2	**7LF4 111** **7LF4 112**	0.100 0.175	1 1
	with cycle and pulse program							
		250	16	230 AC		**7LF4 114**	0.100	1
	two-channel 50 h reserve power 2 × 21 switching instants							
		250	16	230	2	**7LF4 120**	0.100	1
	with cycle and pulse program							
		250	16	230		**7LF4 121**	0.130	1
	**Year/week program** for DCF-77 radio signal startup 70 h reserve power 1.0 s/day typ. accuracy with cycle, random and pulse program and single-shot date switching							
	single-channel 105 switching instants							
		250	10	230	3	**7LF4 150**	0.170	1
	two-channel 2 × 53 switching instants							
		250	10	230	3	**7LF4 151**	0.180	1
	three-channel 3 × 35 switching instants							
		250	10	230	3	**7LF4 152**	0.200	1
				24		**7LF4 153**	0.200	1
				12		**7LF4 154**	0.200	1

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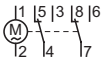
* You can order this quantity or a multiple thereof.

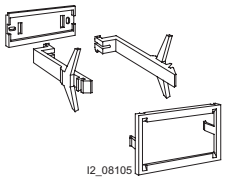
7LF4 1, 7LF4 2
Digital time switches

Selection and ordering data

		U_e	I_e	U_c	MW	Order No.		Weight 1 item	PS*/ P.unit
		V AC	A	V AC				kg	Items
7LF4 2 digital time switches for wall mounting or front-panel mounting									
	**Week program** 50 h reserve power with terminal cover degree of protection, IP20 panel cutout $68^{+0.5} \times 68^{+0.5}$ mm single-channel 42 switching instants	250	16	230	–	**7LF4 200**		0.200	1
									
	two-channel 2 × 21 switching instants	250	16	230	–	**7LF4 201**		0.230	1
									
7LF4 101 mini digital time switches									
	**Day and week program** reserve power: 150 h/typ. manual daylight savings switchover permanent switching 99-day switching random program for presence simulation 1 CO contact, 42 switching instants	250	16	230	1	**7LF4 101**		0.120	1
									

* You can order this quantity or a multiple thereof.

Accessories

	U_c V AC	MW	Order No.	Weight 1 item kg	PS*/ P.unit Items
Expansion units for 7LF4 15 digital time switches					
 **DCF-77 aerial** for the control of 7LF4 14 power supply units. degree of protection, IP54, temperature range -20 °C to +60 °C cable length 1.5 m extension up to 100 m with NYM 2 × 0.75 mm^2 line possible	–	–	**7LF4 142**	0.230	1
 **DCF-77 power supply unit** one power supply unit is required for each time switch. This is plugged onto the right-hand side of the time switch. The signal of the DCF-77 aerial can be looped through any number of DCF-77 power supply units. Maximum cable length between the power supply units: 50 m.	230	2	**7LF4 143**	0.170	1
 with IR interface for the IR program transmitter	230	2	**7LF4 144**	0.170	1
 **IR program transmitter** used to transmit switching programs to the time switch. Programs stored in the time switch can also be read by to the IR program transmitter. Up to four different switching programs can be stored in the IR program transmitter. Operation is over three pushbuttons and is supported by an LCD. Scope of delivery includes the software (CD), which can run under Windows 3.1, Windows 95 and Windows NT.	–	–	**7LF4 148**	0.197	1
7LF9 00 mount for the front-mounting of time switches					
 for mounting on panels with a sheet thickness of up to 2.5 mm. the mount must be completely filled with devices. **for devices with 2 MW** cutout dimensions H × W: 45$^{+0.5}$ mm × 45$^{+0.5}$ mm front dimensions H × W: 72 mm × 55 mm	–	2	**7LF9 002**	0.017	1
for devices with 3 MW cutout dimensions H × W: 45$^{+0.5}$ mm × 63$^{+0.5}$ mm front dimensions H × W: 72 mm × 72 mm	–	3	**7LF9 004**	0.017	1
for devices with 4 MW cutout dimensions H × W: 45$^{+0.5}$ mm × 81$^{+0.5}$ mm front dimensions H × W: 72 mm × 90 mm	–	4	**7LF9 003**	0.017	1

I2_08105

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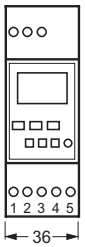
7LF4 1, 7LF4 2
Digital time switches

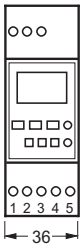
Dimensional drawings

7LF4 1 digital time switches

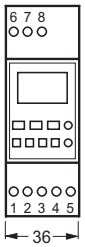
7LF4 110
7LF4 111
7LF4 112
7LF4 113



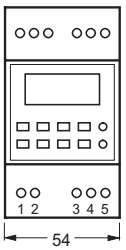
7LF4 114



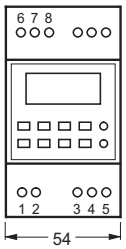
7LF4 120
7LF4 121



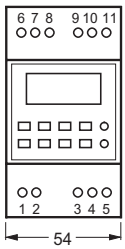
7LF4 150

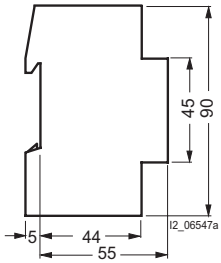


7LF4 151



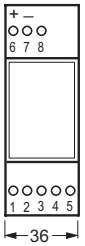
7LF4 152
7LF4 153
7LF4 154



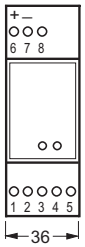


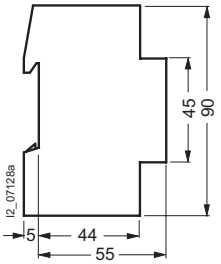
DCF 7LF4 power supply unit

7LF4 143

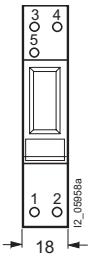


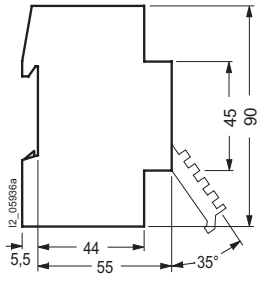
7LF4 144





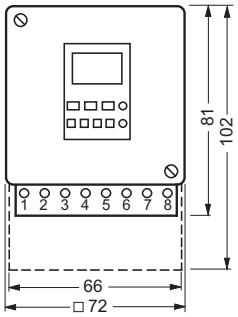
7LF4 101 mini digital time switches



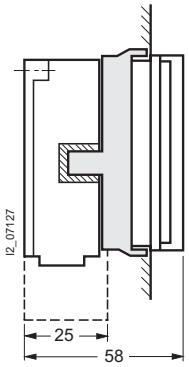


7LF4 2 digital time switches

7LF4 200
7LF4 201



Also suitable for front-panel mounting
panel cutout: 66 × 66 mm²



Technical specifications

Data according to IEC 60730, EN 60730				7LF5 101	7LF5 141
Rated control voltage U_c			V AC	220 ... 240	230
Operating range × U_c	at 50 Hz at 60 Hz			0.85 to 1.1	0.85 to 1.1 0.85 ... 1.06
Operating mode				synchronous	quartz
Rated frequency			Hz	50	50 ... 60
Switching program				day	
Contact	µ-contact			NO contact	
Rated operational voltage U_e			V AC	250	
Rated operational current I_s	for p.f. = 1 for p.f. = 0.6		A A	16 4	
Different phases	actuator/contact permissible			yes	
Protective separation	creepage and clearances actuator/contact		mm	8	
Rated impulse withstand voltage U_{imp}	actuator/contact		kV	>4	
Minimum contact load			V; mA	20; 100	
Incandescent lamp load			W	1 000	
Day program				yes	
Minimum switching interval			min	30	
Clock error per day	typical		s	synchronous	±2.5
Power reserve storage				–	Ni/Cd
Power reserve typical			h	–	50
Minimum loading time	for power reserve		h	–	100
Terminals	+/- screw (Pozidriv)			1	
Conductor cross-sections	rigid flexible with sleeve	min.	mm^2 mm^2	1.5 ... 4 1 × 0.5	
Permissible ambient temperature			°C	-25 ... +55	-20 ... +55
Resistance to climate	acc. to DIN 50016			FW 24	

Data acc. to EN 60730-1, EN 60760-2-7				7LS1 105	7LS1 106	7LS1 107	7LQ1 106	7LQ1 107
Rated control voltage U_c			V AC	230				
Operating range × U_c	at 50 Hz at 60 Hz			0.85 to 1.1 –			0.85 to 1.1	
Operating mode				synchronous			quartz	
Rated frequency			Hz	50			50 ... 60	
Switching program				day	week	hour	day	week
Contact	µ-contact			CO contact				
Rated operational voltage U_e			V AC	250				
Rated operational current I_s	for p.f. = 1 for p.f. = 0.6		A A	16 4				
Different phases	drive/contact permissible contact/contact			yes				
Electrical isolation	creepage and clearances actuator/contact		mm	4				
Rated impulse withstand voltage U_{imp}	actuator/contact		kV	>2.5				
Minimum contact load			V; mA	10; 100				
Incandescent lamp load			W	1350				
Minimum switching interval			min	30	210	1.2	30	210
Clock error per day	typ. at +20°C		s	synchronous			±2.5	
Pointer element				yes				
Terminals	+/- screw (Pozidriv)			1				
Conductor cross-sections	rigid flexible with sleeve	min.	mm^2 mm^2	1.5 ... 4 0.5				
Permissible ambient temperature			°C	-25 ... +55				
Protection class	acc. to EN 60730-1			II				
Degree of protection	acc. to EN 60529			IP20				
Resistance to climate	acc. to IEC 60068			FW 24				

Timers

7LF5 1, 7LQ1 1, 7LS1 1
Mechanical time switches

Technical specifications

Rated power dissipation

Order No.	Short designation	**Power loss P_v (VA)** coil/drive	contact [1] per pole
7LF5 101	Synchronous time switch 230 V AC 16 A 1 MW	3.1	1.7
7LF5 141	Quartz time switch 230 V AC 16 A 1 MW	2.2	1.7
7LQ1 106	Quartz time switch 230 V AC 16 A 3 MW, day	1	1
7LQ1 107	Quartz time switch 230 V AC 16 A 3 MW, week	1	1
7LS1 105	Synchronous time switch 230 V AC 16 A 3 MW, day	1	1
7LS1 106	Synchronous time switch 230 V AC 16 A 3 MW, week	1	1
7LS1 107	Synchronous time switch 230 V AC 16 A 3 MW, hour	1	1

1) For rated operational current.

Selection and ordering data

		U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	V AC			kg	Items
Synchronous time switches								
	**Synchronous time switches** without reserve power Day disk, 1 NO contact	250	16	220 ... 240	1	**7LF5 101**	0.120	1
	Day disk, 1 CO contact	250	16	230	3	**7LS1 105**	0.160	1
	Week disk, 1 CO contact	250	16	230	3	**7LS1 106**	0.160	1
	Hour disk, 1 CO contact	250	16	230	3	**7LS1 107**	0.160	1
	**Quartz-clock time switches** reserve power 50 h typ. Day disk, 1 NO contact	250	16	230	1	**7LF5 141**	0.120	1
	Day disk, 1 CO contact	250	16	230	3	**7LQ1 106**	0.160	1
	Week disk, 1 CO contact	250	16	230	3	**7LQ1 107**	0.160	1

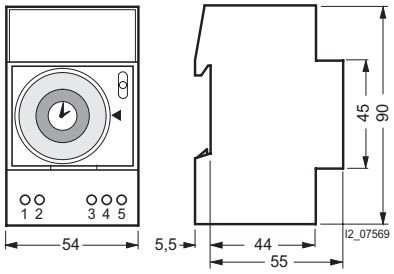
* You can order this quantity or a multiple thereof.

Dimensional drawings

7LQ1, 7LS1 mechanical time switches

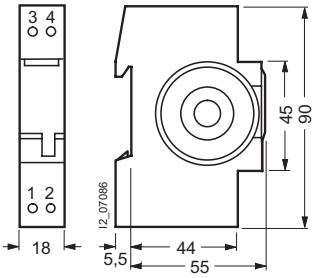
7LQ1 106
7LQ1 107

7LS1 105
7LS1 106
7LS1 107



7LF5 mechanical time switches

7LF5 101
7LF5 141



12

Power Supply Units

4AC2 9 transformers

NEW

Overview

Certification

VDE approval pending.

Uniform standards

The standard EN 61558 distinguishes between transformers for short-time loading and those for permanent loading.

Failsafe with PTC

Siemens transformers for permanent loading 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 cool down the PTC resistor.

Two secondary voltages

The 12 V outputs must be switched in parallel or in series. In parallel connection, they can be used, e.g. for 12 V and 16 VA, in series connection for 24 V and 16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Hum-free

The transformers with 24 and 40 VA cores are molded, which means that they are virtually hum-free and highly suitable for installation in sound-sensitive distribution boards.

Voltage stability

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 acc. to DIN 41302.

Typical applications

AC voltage/current supply for 8, 12 or 24 V AC, up to 55 VA as safety extra-low voltage with a mounting depth of 55 mm for the supply of calibration circuits, switching relays or Insta contactors in continuous duty.

Technical specifications

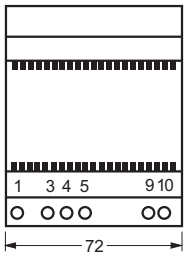
Data acc. to EN 61558-2-2			4AC2 940-8	4AC2 951-6	4AC2 952-4	4AC2 961-6	4AC2 962-4	4AC2 964-0
Rated apparent power P_s		VA	8	16	24	16	24	40
Rated short-time power p.f. = 0.5, t = 10 s		VA	10	18	27	18	27	48
Rated operational voltage U_e		V AC	230					
Operating range × U_c	at 50/60 Hz		0.9 ... 1.1					
Rated frequency		Hz	50					
Operating frequency range		Hz	48 ... 62					
Secondary rated voltage U_{sek} in series connection		V AC V AC	8 –	2 x 4 8	8 –	2 x 12 24		
Secondary rated current I_{sek} at 4 V at 8 V at 12 V at 24 V		 A AC A AC A AC A AC	 – 1 – –	 2 x 2 2	 – 3	 – 0.67 0.67	 1 1	 1.67 1.67
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	 8.0 3.6	 13.1 6.3	 8.3 5.7
Core molded			–	yes	yes	–	yes	yes
Protective separation creepage 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 sleeve		 mm^2 min. 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					
Protection class	acc. to EN 60730		II					

Selection and ordering data

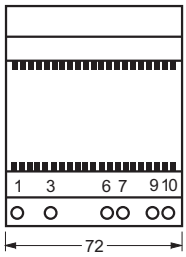
	U_e	U_{sec}	I_{sec}	P_s	MW	Order No.	Weight 1 item	PS*/ P.unit
	V AC	V AC	A AC	VA			kg	Items
	**Transformers for permanent loads**							
	with PTC protection for AC voltage/current supply as safety extra-low voltage for continuous operation for the supply of calibration circuits, switching relays and Insta contactors							
	with one secondary voltage							
	230	8	1	8	3	**4AC2 940-8**	0.380	1
			3	24	4	**4AC2 952-4**	0.590	1
	with two secondary voltages, optionally available with series or parallel switching							
	230	2x4/8	2x2/2	16	3	**4AC2 951-6**	0.540	1
		2x12/24	2x0.67/0.67	16	3	**4AC2 961-6**	0.580	1
			2x1.0/1.0	24	4	**4AC2 962-4**	0.590	1
			2x1.67/1.67	40	4	**4AC2 964-0**	0.790	1

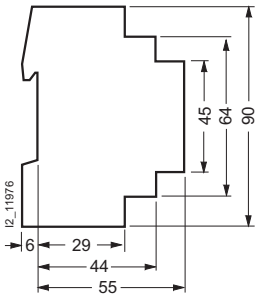
Dimensional drawings

4AC2 952-4

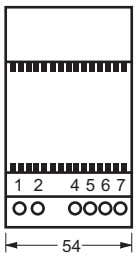


4AC2 962-4
4AC2 964-0

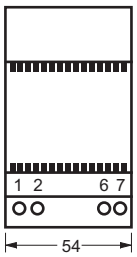


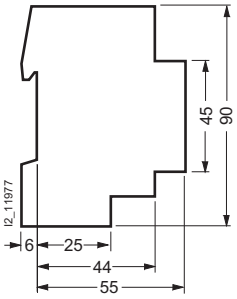


4AC2 951-6
4AC2 961-6



4AC2 940-8





12

* You can order this quantity or a multiple thereof.

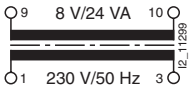
Power Supply Units

4AC2 9 transformers

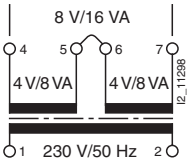
Schematics

4AC2 940-8

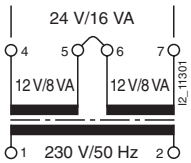
4AC2 952-4



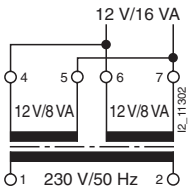
4AC2 951-6



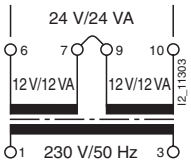
4AC2 961-6



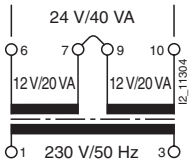
4AC2 961-6
parallel connection



4AC2 962-4



4AC2 964-0



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.

Benefits

- Counting mechanism 00000.0 h or 000000 ⎍
- Suppression of leading zero from the 3rd decade onwards
- 7-Segment display, 6-digit, height 5 mm
- Start/Stop and Reset function
- Unlimited data backup in the event of a power failure
- Ambient temperature -30 °C to +65 °C (below -5 °C increasing slowness/delay of indication)

Technical specifications

Data according to VDE 0435			**7KT5 745-0 7KT5 745-1 7KT5 745-2 7KT5 745-3 7KT5 745-4**
Display			00000.0 or 00000 ⎍
Data backup	unlimited		EEPROM
Minimum pulse lengths		ms	20
Max. counting frequency	pulse	s	15
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid	max. mm^2	2 × 2.5
Ambient temperature		°C	-30 ... +65

Order No.	Short designation	**Power loss P_v (VA)** coil/drive
7KT5 745	time counter 12 ... 24 V DC	0.1
7KT5 745-0	time counter 115 V AC 50 Hz	0.9
7KT5 745-1	time counter 230 V AC 50 Hz	1.8
7KT5 745-2	time counter 115 V AC 60 Hz	0.9
7KT5 745-3	time counter 230 V AC 60 Hz	1.8
7KT5 745-4	time counter 24 V AC 50 Hz	0.2
7KT5 751	pulse counter 24 V DC	0.1
7KT5 752	pulse counter 24 V AC 50 Hz	0.1
7KT5 753	pulse counter 230 V AC 50 Hz	0.1
7KT5 761	time counter 2 × 230 V AC 50 Hz	1.6
7KT5 762	time/pulse counter 2 × 230 V AC 50 Hz	1.9
7KT5 763	pulse counter 2 × 230 V AC 50 Hz	2.2

7KT5 7 time and pulse counters

Selection and ordering data

	U_C	P_s	MW	Order No.	Weight 1 item	PS*/ P.unit
		VA			kg	Items
	**Time counter with one counting mechanism**					
	Counting mechanism 00000.0 h					
	10 ... 27 V DC	0.07 ... 0.09	2	**7KT5 745**	0.084	1
	24 V AC, 50 Hz	0.2	2	**7KT5 745-4**	0.087	1
	115 V AC, 50 Hz	0.9		**7KT5 745-0**	0.060	1
	230 V AC, 50 Hz	1.8		**7KT5 745-1**	0.087	1
	115 V AC, 60 Hz	0.9		**7KT5 745-2**	0.087	1
	230 V AC, 60 Hz	1.8		**7KT5 745-3**	0.087	1
	**Time counter with two counting mechanisms**					
	Counting mechanism 00000.00 h					
	2 × 230 V AC, 50 Hz	0.8 [1] each	2	**7KT5 761**	0.108	1
	**Pulse counter with one counting mechanism**					
	• Counting mechanism 0000000 ⎍⎍					
	• Counting frequency 10 Imp/s					
	• Pulse duration/interval 10 ms					
	24 V DC	0.1	2	**7KT5 751**	0.092	1
	24 V AC, 50 Hz	0.1	2	**7KT5 752**	0.092	1
	230 V AC, 50 Hz	1.1		**7KT5 753**	0.092	1
	**Pulse counter with two counting mechanisms**					
	• Counting mechanism 0000000 ⎍⎍					
	• Counting frequency 10 Imp/s					
	• Pulse duration/interval 10 ms					
	2 × 230 V AC, 50 Hz	2 × 1.1	2	**7KT5 763**	0.108	1
	Combined time and pulse counter					
	• Counting mechanism 00000.00 h and 0000000 ⎍⎍					
	• Counting frequency 10 Imp/s					
	• Pulse duration/interval 10 ms					
	2 × 230 V AC, 50 Hz	0.8 [1]/1.1	2	**7KT5 762**	0.108	1

1) Clocked power consumption: max. 10 mA.

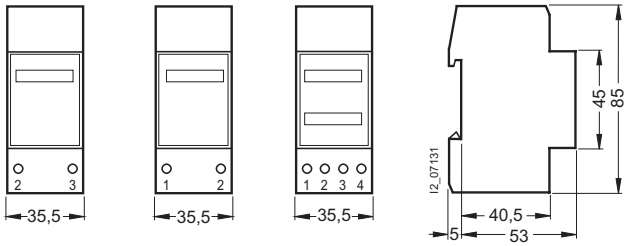
Dimensional drawings

7KT5 7 time counters

7KT5 745
7KT5 745-0 to
7KT5 745-4

7KT5 751
7KT5 752
7KT5 753

7KT5 761
7KT5 762
7KT5 763



* You can order this quantity or a multiple thereof.

Benefits

- According to DIN VDE 0710-1
- With glow lamp 230 V, E10 socket, without cap
- Colors acc. to IEC 60073

Technical specifications

Data according to DIN VDE 0710-1			5TE5 7
Rated voltage U_e		V AC	230
Clearances	between the terminals	mm	> 7
Terminals/tightening torque	± screw (Pozidriv); Nm		1; 1.2
Conductor cross-sections	rigid flexible with sleeve	mm^2 min. mm^2	1.5 ... 6 1
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate	acc. to DIN 50015 at 95 % relative air humidity	°C	45

Rated power dissipation

Order No.	Short designation	Power loss P_v (VA) coil/drive
5TE5 700	light signal 230 V AC lamp without cap	see lamp 5TG8
5TE5 702	light signal 230 V AC lamp without cap	see lamp 5TG8
5TG8 004	glow lamp 230 V AC for light signal	0.4
5TG8 006	glow lamp 230 V AC green for light signal	0.4
5TG8 037	filament lamp 24 V for light signal	1
5TG8 040	glow lamp 110 V AC for light signal	0.4

Selection and ordering data

		U_e	Conductor cross section	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	up to mm^2			kg	Items
	**Light signaling device**						
	for max. cable length 5 m, without cap						
		230	6	1	**5TE5 700**	0.045	1/12
	for max. cable length 250 m, without cap						
		230	6	1	**5TE5 702**	0.045	1/12

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* You can order this quantity or a multiple thereof.

5TE5 70 light signals

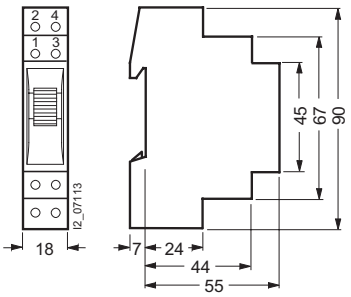
Accessories

		U_e	Conductor cross section	Order No.	Weight	PS*/ P.unit
		V AC	up to mm^2		kg	Items
	**Caps**				1 item	
	clear			**5TG8 036**	0.002	5/10
	red			**5TG8 034**	0.002	5/10
	green			**5TG8 035**	0.002	5/10
	yellow			**5TG8 041**	0.001	5/10
	blue			**5TG8 042**	0.001	5/10
	Spare glow lamps					
	for red, yellow, blue and clear caps	230		**5TG8 004**	0.002	5/10
	for green cap	230		**5TG8 006**	0.002	1/10
	for all caps	115		**5TG8 040**	0.003	5/10
	**Filament lamp**				1 set	
	1.2 W, 24 V, E10 socket, clear 1 set comprises 10 filament lamps and a lamp extractor			**5TG8 037**	0.020	1 set

Dimensional drawings

5TE5 70 light signal

5TE5 700, 5TE5 702



* You can order this quantity or a multiple thereof.

5TT3 45
Alarm signaling devices, 55/70 mm

Benefits

- Continuous tone, fixed pitch
- Interval/continuous tone, adjustable

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255			5TT3 450 5TT3 451	5TT3 452 5TT3 453
Rated control voltage U_c		V AC	24, 230	
Operating range × U_c (overload capability)			0.8 ... 1.1	
Rated frequency		Hz	50/60	
Continuous tone		kHz	3.8	2.4/4.8 adjustable
Interval	pulse/interval	s	–	0.25/0.25
Volume	in 2-m distance	dB (A)	80	55 at 2.4 kHz/75 at 4.8 kHz
Terminals	+/- screw (Pozidriv)		1	
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	
Humidity class	acc. to IEC 60068-2-30		F	

Rated power dissipation

Order No.	Short designation	Power loss P_v (VA) coil/drive
5TT3 450	alarm sensor 230 V AC, non-adjustable	5
5TT3 451	alarm sensor 24 V AC, non-adjustable	5
5TT3 452	alarm sensor 230 V AC, adjustable	5
5TT3 453	alarm sensor 24 V AC, adjustable	5

Selection and ordering data

		U_c V AC	MW	Order No.	Weight 1 item kg	PS*/ P.unit Items
	**Alarm signaling devices**					
	non-adjustable continuous tone and pitch					
	A1 ◁ A2	230	1	**5TT3 450**	0.110	1
		24		**5TT3 451**	0.110	1
	adjustable pitch and continuous tone/interval					
	A1 ◁ A2	230	1	**5TT3 452**	0.110	1
		24		**5TT3 453**	0.110	1

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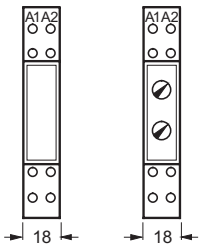
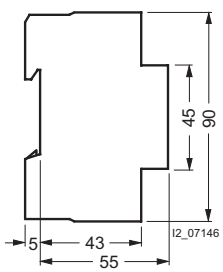
Dimensional drawings

5TT3 45 alarm signaling devices

5TT3 450
5TT3 451



5TT3 452
5TT3 453



* You can order this quantity or a multiple thereof.

Monitoring Devices

5TT3 42 phase and phase sequence indicators 55/70 mm

Benefits

Phase indicator

- LED display for each phase
- 1 CO contact
- Any phase sequence
- Conductor cross-sections up to 2 × 2.5 mm^2

Phase sequence indicator

- LED display for the phase sequence

Application

Phase indicator

For visual detection / signaling of phase failures in a 3-phase system. The three LEDs can all be controlled with the same phase.

Phase sequence indicator

For optical detection or indication of the phase sequence L1, L2, L3 in a 3-phase system.

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255			5TT3 420	5TT3 422
Rated control voltage U_c		V AC	230/400	400
Operating range × U_c			0.8 ... 1.1	
Rated frequency		Hz	50/60	
Rated operational current I_e		A	1	–
Terminals	+/- screw (Pozidriv)		1	
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	
Resistance to climate	acc. to DIN EN 60068-1		20/60/4	

Rated power dissipation

Order No.	Short designation	Power loss P_v (VA) coil/drive
5TT3 420	Phase indicator 230 V AC	4.6
5TT3 422	Phase sequence indicator 230 V AC	9

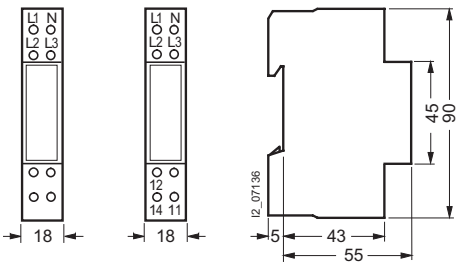
Selection and ordering data

		U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC			kg	Items
	**Phase indicator** for optical monitoring of phases 	230/400	1	**5TT3 420**	0.050	1
	**Phase sequence indicator** for optical monitoring of the phase sequence 	400	1	**5TT3 422**	0.050	1

Dimensional drawings

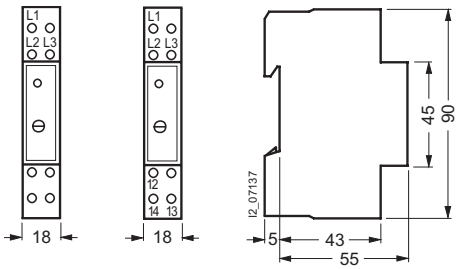
5TT3 42 phase indicator

5TT3 420 5TT3 421



5TT3 42 phase sequence indicator

5TT3 422 5TT3 423



* You can order this quantity or a multiple thereof.

5TT3 196 direct voltage monitor, 55/70 mm

Benefits

- residual ripple detection 0 % to 15 %, adjustable
- for undervoltage U_{from} = 0.82
- for overvoltage U_{from} = 1.18
- conductor cross-sections up to 2 × 2.5 mm^2

Application

For monitoring under- and overvoltages and residual ripple of a 24 V direct voltage system.

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255			**5TT3 196**
Rated control voltage U_c		V DC	24
Rated power dissipation P_v • coil/drive • contact [1] per pole		 VA VA	 0.6 0.8
Hysteresis		%	4
Response values × U_c	undervoltage overvoltage		0.82 1.18
Residual ripple tripping ΔU_c	infinitely variable	%	0 ... 15
Overload capability	33 V DC 35 V DC 45 V DC	 ms ms	continuous 500 10
Creepage and clearances		mm	4
Rated impulse withstand voltage U_{imp}	input/output	kV	> 2.5
Minimum contact load		V/mA	24/300
Rated operational current I_e	AC-11 AC-1	A A	1 4
Contact			µ-contact
Electrical service life	in switching cycles at I_e		5 × 10^5
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2 × 2.5 1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	acc. to DIN EN 60068-1		20/60/4

1) For rated operational current.

Selection and ordering data

		U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	V DC			kg	Items
	**Direct voltage monitor** 	230	5	24	1	**5TT3 196**	0.150	1

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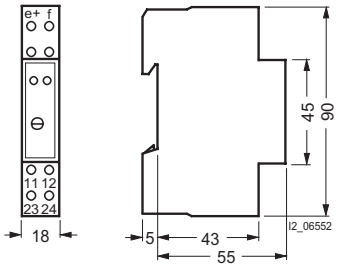
* You can order this quantity or a multiple thereof.

5TT3 196 direct voltage monitor, 55/70 mm

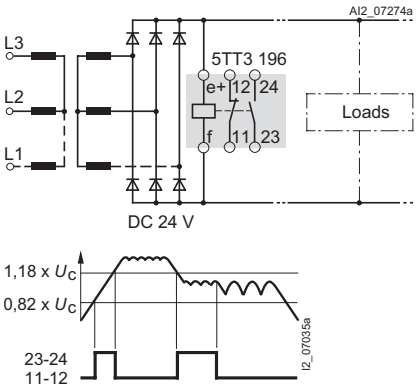
Dimensional drawings

5TT3 196 direct voltage monitors



Schematics

Switching example, functional diagram



If 0.82 × U_C is fallen below or 1.18 × U_C exceeded, or in the event of excessive residual ripple, contact 11/12 is closed and contact 23/24 opened.

5TT6 110 current monitor, 55/70 mm

Benefits

- For the detection of power supply (transformers) faults, such as
  - short circuits
  - overload
  - underload (failed lamps)
- 3 measuring ranges, can be set using jumpers

Application

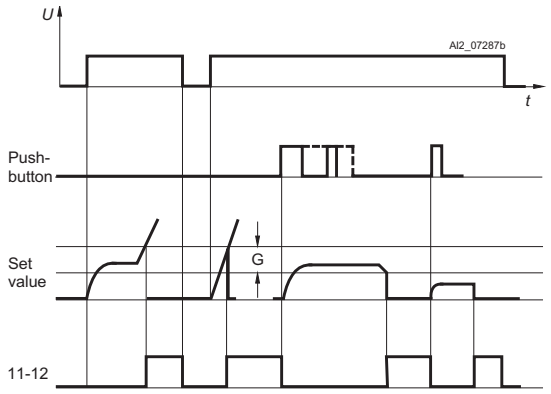
For monitoring halogen lamps, as well as dimmed and undimmed filament lamps in low-voltage lighting systems, in particular in safety monitoring systems.

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255				5TT6 110
Rated control voltage U_c			V AC	230
Rated power dissipation P_v				
• coil/drive			VA	2
• contact [1] per pole			VA	3.5
Operating range × U_c	without dimming		V AC	60 ... 265
Rated frequency			Hz	50/60
Set value	link	transformer load		
(lower window value)	x3 – x4	200 VA	VA	25 ... 200
	x4 – x5	300 VA	VA	30 ... 300
	none	400 VA	VA	50 ... 400
Monitoring window	x3 – x4	200 VA	VA	approx. 30
(acceptance range)	x4 – x5	300 VA	VA	approx. 45
	none	400 VA	VA	approx. 60
break time	for Overcurrent		ms	max. 100
	Undercurrent		ms	max. 300
	short circuit		ms	max. 10
Rated operational voltage U_e			V AC	250
Rated operational current I_e			A	5
Minimum contact load			V/mA	10/100
Contact	μ-contact (AC-11)		A	3
Terminals	+/- screw (Pozidriv)			1
Conductor cross-sections	rigid		max. mm^2	2 × 2.5
	flexible with sleeve		min. mm^2	1 × 0.5
Permissible ambient temperature			°C	-20 ... +60
Resistance to climate	acc. to DIN EN 60068-1			20/60/4

1) For rated operational current.

Timing interval

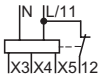


G = Performance range (monitoring window), the width of the window cannot be adjusted.

Monitoring Devices

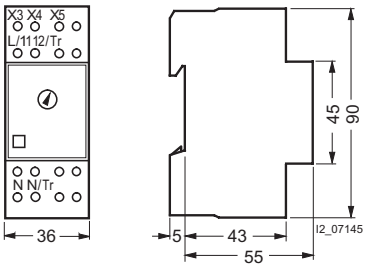
5TT6 110 current monitor, 55/70 mm

Selection and ordering data

		U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P.unit
		V AC	A	V AC			kg	Items
	**Current monitor** 	230	5	230	2	**5TT6 110**	0.100	1

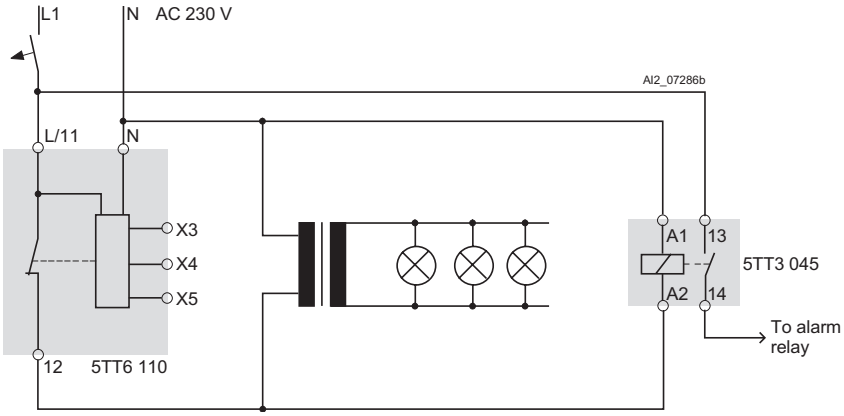
Dimensional drawings

5TT6 110 current monitor



Schematics

Switching example



The current monitor monitors the operational current of the transformer.
If the current is too high (incl. short circuit) or too low, the transformer is switched off. The reset pushbutton is used to switch the device back on.
This ensures reliable operation, particularly in the case of object illumination.
A 5TT3 045 switching relay accepts the fault indication and the phase separation for the alarm relay 5TT3 460 or 5TT3 461.

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