

Switching Devices

Configuration Manual · 10/2010



SENTRON

Answers for infrastructure.

SIEMENS

Switching Devices

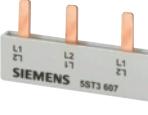


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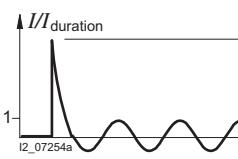
Switching devices

Introduction

Overview

Devices	Page	Application	Standards	Used in
				Non-residential buildings Residential buildings Industry
	7	For the switching of lighting and other electrical devices up to 20 A. For use in control cabinets for the logical linking of functions.	IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1, (VDE 0632-1); GB14048.3-2002 CCC	✓ ✓ ✓
	9	To be used as pushbuttons in control systems, e.g. to switch on seal-in circuits or as pushbuttons with maintained-contact function for manual use, as control switches or for the switching of loads up to 20 A.	IEC/EN 60947-3, (VDE 0660-07); IEC/EN 60669-1, (VDE 0632-1); GB14048.3-2002 CCC	✓ -- ✓
	11	Light indicators for signaling switching states or faults in systems.	DIN VDE 0710-1	✓ -- ✓
	12	For the switching of lighting, motors and other electrical devices from 20 to 125 A.	16 A ... 25 A and 40 A ... 100 A: IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1, (VDE 0632-1) 32 A and 125 A: IEC/EN 60947-3, (VDE 0660-107); GB14048.3-2002 CCC	✓ ✓ ✓
	15	The DC isolator is a specific switch disconnector for activating the solar modules in photovoltaic systems according to DIN VDE 0100-712.	IEC/EN 60947-3, IEC/EN 60669-1	✓ ✓ ✓
	17	For fast and safe connection	IEC/EN 60439-1, (VDE 0660-500)	✓ -- ✓

Introduction

Devices	Page	Application	Standards	Used in
				Non-residential Residential Buildings Industry
	18	For the switching of lighting up to 16 A in rooms using several push-buttons and central ON/OFF switches.	IEC 60669-1 IEC 60669-2 IEC 60669-3 EN 60669 (VDE 0632) EN 60669-2-2 and EN 60669-2-2/A1	✓ ✓ ✓
	24	For the switching of small loads up to 16 A or as coupling devices in control systems.	EN 60947-5-1 (VDE 0660-200)	✓ -- ✓
Insta contactors				
	26	Insta contactors 24, 40 and 63 A for the switching of heating, lighting, such as fluorescent lamps, incandescent lamps, ohmic or inductive loads.	IEC 60947-4-1 IEC 60947-5-1 IEC 61095 EN 60947-4-1 EN 60947-5-1 EN 61095 VDE 0660 UL 508	✓ ✓ ✓
	31	Insta contactors 20, 25, 40 and 63 A for the switching of heating, lighting, such as fluorescent lamps, incandescent lamps, ohmic or inductive loads.	IEC 60947-4-1 IEC 60947-5-1, IEC 61095, EN 60947-4-1 EN 60947-5-1 EN 61095 VDE 0660 NF C 61-480 (NF EN 61095)	✓ ✓ ✓
	35	Protection of machines with transmission, belt or chain drives, conveyor belts, fans, pumps, compressors, packing machines or door operating mechanisms	EN 60947-4-2 (VDE 0660-117)	-- -- ✓
	37	For the ON/OFF switching of loads, contact selection for lighting installations, OFF switching of direct currents and the switching of safety extra-low voltages. A wide range of options for practical use.		

Switching devices

Introduction

Devices	Page	Application	Standards	Used in			
				Non-residential buildings	Residential buildings	Industry	
Timers							
	38	Digital time switches, 7LF4	Minute-precise switching of devices and system components in day, week and year programs. Unique due to the wide variety of functions offered by the Mini and Top versions; for PC programming Astro, Profi and Expert	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7	✓	✓	✓
	44	7LF5 mechanical time switches	Accurate and 15-minute switching accuracy. With automatic time setting during commissioning and automatic switching to daylight savings.	IEC 60730-1 and IEC 60730-2-7 EN 60730-1 and EN 60730-2-7 VDE 0631 Part 1 and Part 2-7 UL 60730	✓	✓	✓
	48	Timers for buildings, 7LF6	Lighting controls with stairwell lighting timers ensure the safe use of stairwells and save energy. Expanded applications for common rooms and garages, as well as the time switching of ventilators and fluorescent lamps.	IEC 60699 EN 60669, DIN 18015	✓	✓	
	53	Timers for industry, 5TT3	Multifunctional, delay, wiper, flashing and OFF-delay timers in control circuits expand the use of distribution boards in both small and large plants.	IEC 60255 EN 60255			✓

Control switches, 5TE8

Overview

Two-way switches are used in control cabinets and distribution boards for switching small loads on/off or over.

Group switches with center position permit the positions open/stop/closed, for example to control anti-clockwise rotation
- Off - clockwise rotation.

Control switches in a range of contact versions have an integral control lamp for the ON setting.

The auxiliary switch (AS) signals the contact position of the switch. It has the same design as the auxiliary switch used for the miniature circuit breakers (see Chapter "Miniature Circuit Breakers").

Technical specifications

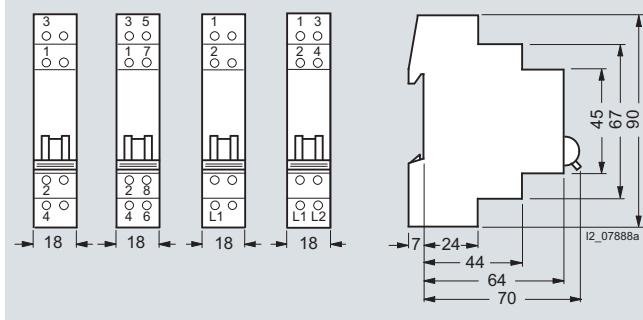
5TE8 1			
Standards			IEC/EN 60947-3 (VDE 0660-107); IEC/EN 60669-1 (VDE 0632-1) EN 60669
Approvals			
Rated operational current I_e	Per conducting path	A	20
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400
Rated power dissipation P_V	Contact per pole	VA	0.7
Thermal rated current I_{the}		A	20
Rated breaking capacity	At p.f. = 0.65	A	60
Rated making capacity	At p.f. = 0.65	A	60
Short-circuit strength	In conjunction with fuse of the same rated operational current	EN 60269 gL/gG	kA
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	Open contacts Between the poles	mm mm	2 × > 2 > 7
Creepage distances		mm	> 7
Mechanical service life	Switching cycles		25000
Electrical service life	Switching cycles		10000
Minimum contact load		V; mA	10; 300
Rated short-time currents			
Per conducting path at p.f. = 0.7 (The respective rated surge current can be calculated by multiplying by a factor of 1.5).	Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	A A A A	650 400 290 170
Terminals	±screw (Pozidriv)		1
Max. tightening torque		Nm	1.2
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ² mm ²	1.5 ... 6 1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate			
At 95 % relative humidity	Acc. to DIN 50015	°C	45

Switching devices

Control switches, 5TE8

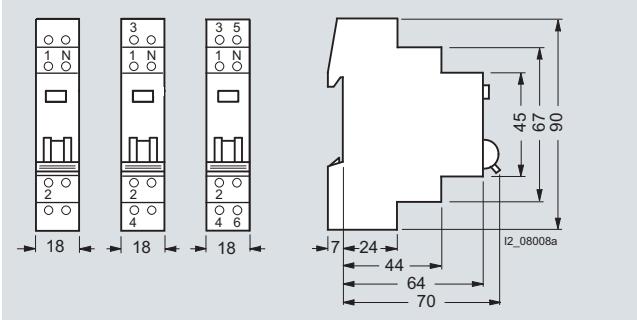
Dimensional drawings

Two-way switches, group switches with center position, 20 A



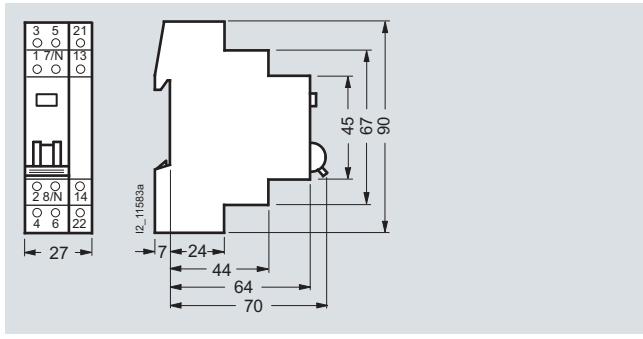
5TE8 151 5TE8 152 5TE8 141 5TE8 142
5TE8 153 5TE8 161 5TE8 162

5TE8 control switches, 20 A, with lamp



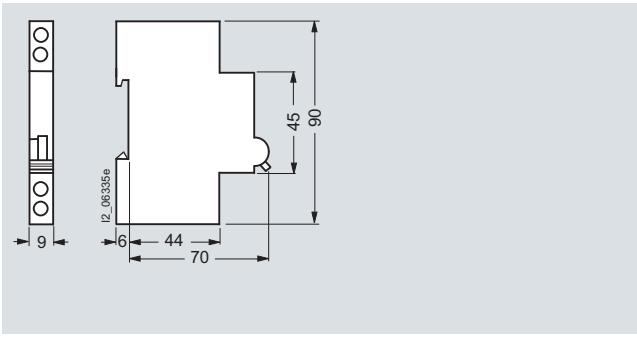
5TE8 101 5TE8 102 5TE8 103
5TE8 101-3
5TE8 105

5TE8 control switches, 20 A, with lamp and auxiliary switch



5TE8 108

5ST3 auxiliary switches

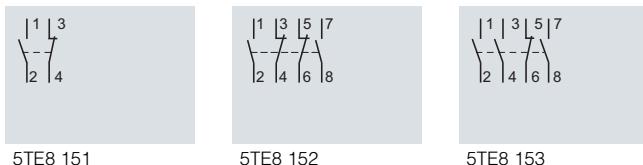


5ST3 010
5ST3 011
5ST3 012

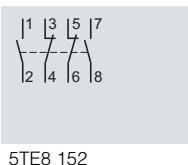
Schematics

Diagrams

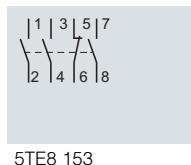
Two-way switches, group switches with center position, 20 A



5TE8 151

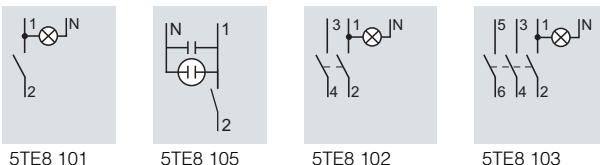


5TE8 152



5TE8 153

5TE8 control switches, 20 A, with lamp



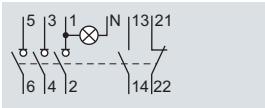
5TE8 101
5TE8 101-3

5TE8 105

5TE8 102

5TE8 103

5TE8 control switches, 20 A, with lamp and auxiliary switch

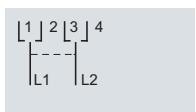


5TE8 108

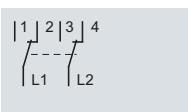
5TE8 141



5TE8 161

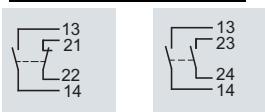


5TE8 142



5TE8 162

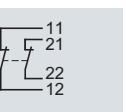
5ST3 auxiliary switches



5TE3 010



5ST3 011



5ST3 012

Pushbuttons, 5TE4

Overview

The pushbuttons are used in control systems, e.g. to switch on seal-in circuits or as pushbuttons with maintained-contact func-

tion for manual use, as control switches or for the switching of loads up to 20 A.

Technical specifications

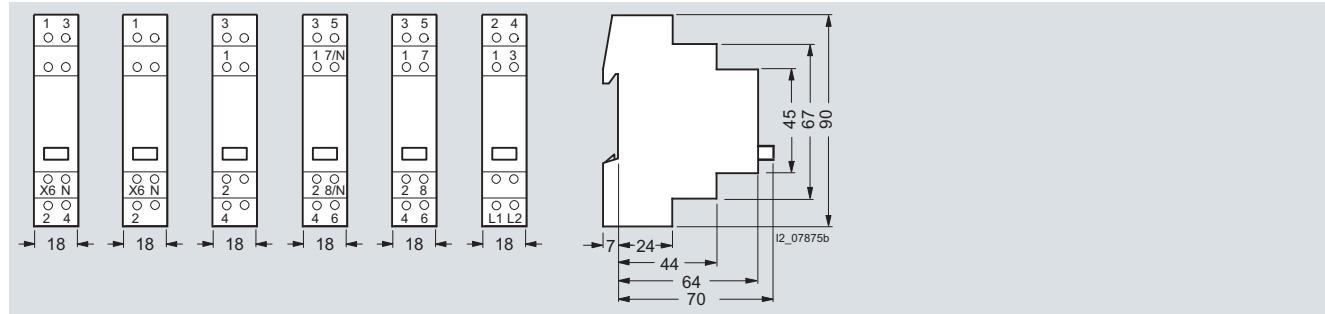
5TE4 8			
Standards	IEC/EN 60947-3 (VDE 0660-107); IEC/EN 60669-1 (VDE 0632-1) EN 60669-1		
Approvals			
Rated operational current I_e	Per conducting path	A	20
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400
Rated power dissipation P_v	Per pole	VA	0.6
Thermal rated current I_{the}		A	20
Rated breaking capacity	At p.f. = 0.65	A	60
Rated making capacity	At p.f. = 0.65	A	60
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	Open contacts Between the poles	mm mm	2 × > 2 > 7
Creepage distances		mm	> 7
Mechanical service life	Switching cycles	25000	
Minimum contact load		V; mA	10; 300
Rated short-time currents			
Per conducting path at p.f. = 0.7	Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	A A A A	650 400 290 170
(The respective rated surge current can be calculated by multiplying by a factor of 1.5).			
Terminals	±screw (Pozidriv)	1	
Max. tightening torque		Nm	1.2
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ² mm ²	1.5 ... 6 1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate			
At 95 % relative humidity	Acc. to DIN 50015	°C	45
Power loss of 5TG8 05. lamps			
Rated operational voltage U_e	V AC	5TG8 050	5TG8 051
Rated power dissipation P_v	mW	12	24
Rated operational voltage U_e	V DC	5TG8 052	5TG8 053
Rated power dissipation P_v	mW	85	190
Power loss of 5TG8 05.- LEDs		5TG8 054	
Rated power dissipation P_v	VA	450	550
• LED		50	135
Color coding according to IEC 60073			
Color	Safety of people or environment	Process state	System state
Red	Danger	Emergency	Faulty
Yellow	Warning/Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White			
Gray			
Black	No special significance assigned		

Switching devices

Pushbuttons, 5TE4

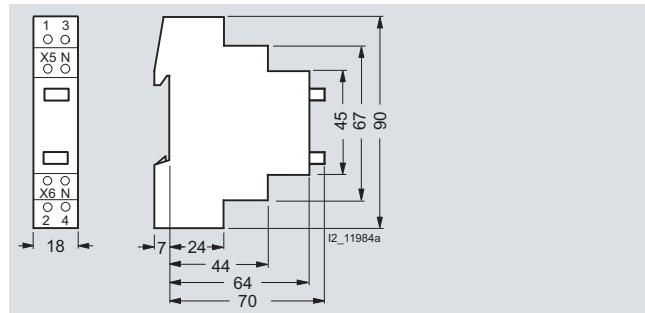
Dimensional drawings

5TE4 8 pushbuttons



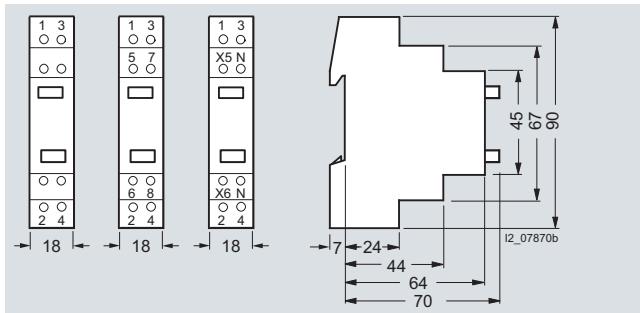
5TE4 820 5TE4 821 5TE4 800 5TE4 812 5TE4 813 5TE4 814
5TE4 823 5TE4 822 5TE4 805
5TE4 824 5TE4 806
5TE4 807
5TE4 808
5TE4 810
5TE4 811

5TE4 804 pushbuttons



5TE4 804

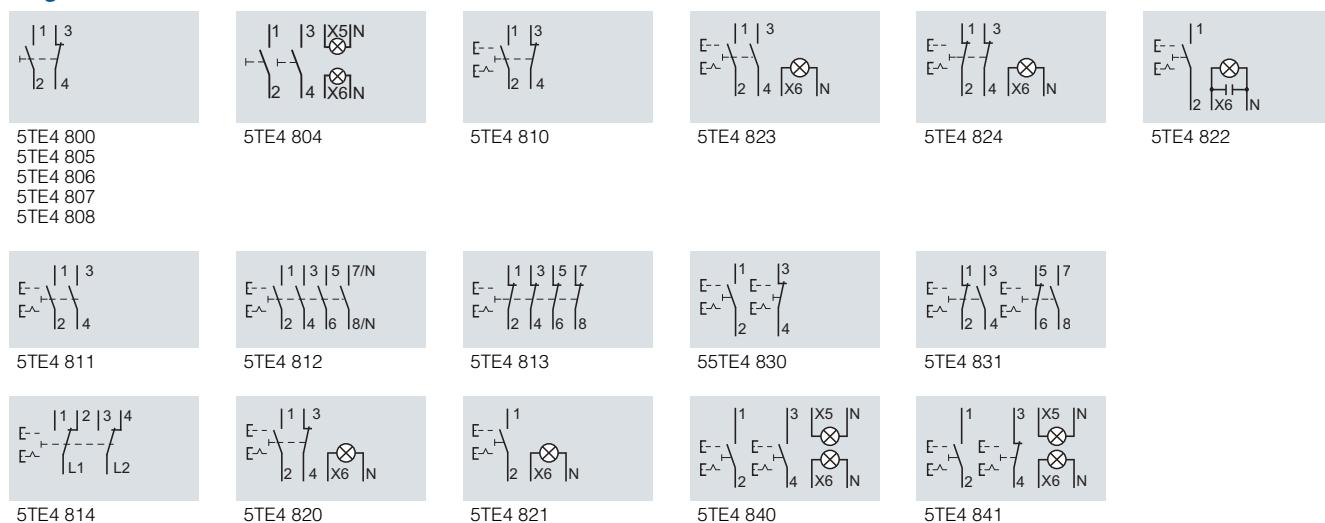
5TE4 8 double pushbuttons with maintained-contact function



5TE4 830 5TE4 831 5TE4 840
5TE4 841

Schematics

Diagrams



Light indicators, 5TE5

Overview

Light indicators are used to signal switching states or faults in systems.

They are available as single, double or triple light indicators. The triple light indicators are used as phase or signal indicators.

Technical specifications

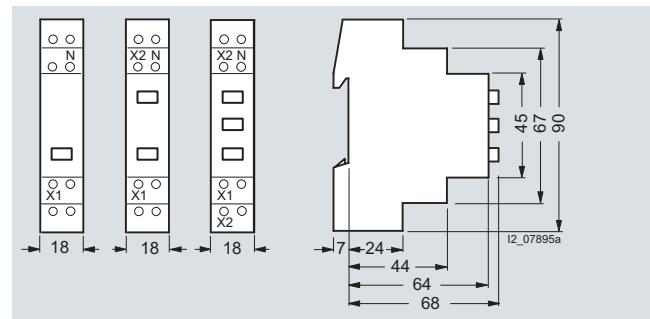
5TE5 8			
Standards			DIN VDE 0710-1
Rated operational voltage U_e	Max.	V AC	230 (for different voltages see 5TG8 lamps)
Rated power dissipation P_v		VA	See 5TG8 lamps
Clearances	Between the terminals	mm	> 7
Terminals	±screw (Pozidriv)	Nm	1 1.2
Max. tightening torque			
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ²	1.5 ... 6 1 ... 6
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate	At 95 % relative humidity	Acc. to DIN 50015	°C
			45

5TG8 05.

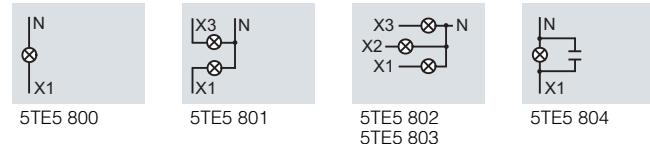
Rated power dissipation P_v	VA	0.4
• LED • Glow lamp	VA	0.4

Color coding according to IEC 60073

Color	Meaning	
	Safety of people and environment	Process state
Red	Danger	Emergency
Yellow	Warning/Caution	Abnormal
Green	Safety	Normal
Blue	Stipulation	
White	No special significance assigned	

Dimensional drawings

5TE5 800 5TE5 801 5TE5 802
5TE5 804 5TE5 803

Schematics**Diagrams**

Switching devices

ON/OFF switches, 5TE8

Overview

The devices are used for the switching of lighting, motors and other electrical devices.

The rated currents of the range are 20 A to 125 A. There is a compact series of space-saving devices with up to 4 NO contacts in a single MW available for rated currents 20 A and 32 A.

The ON/OFF switches in the rated currents 32 A to 125 A can be used as switch disconnectors according to IEC/EN 60947-3.

A special version of the ON/OFF switch with rated current 63 A is available for use in meter cabinets. This version can be locked in the "OFF" position using a special key. The clamping screws are mechanically covered so that they are no longer accessible.

Technical specifications

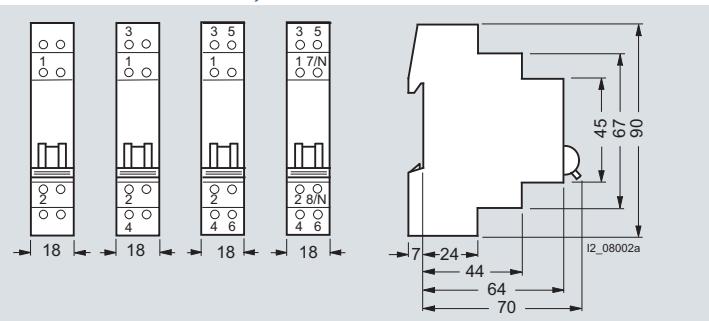
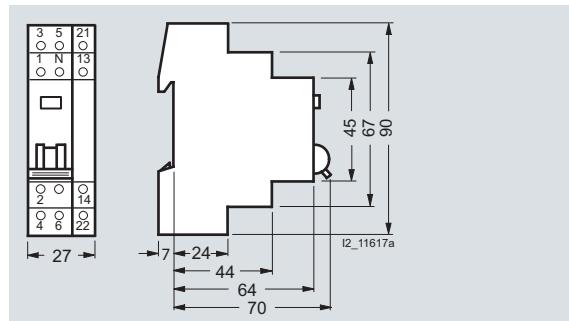
		5TE8 1	5TE8 2
Standards		IEC/EN 60947-3, (VDE 0660-107); IEC/EN 60669-1 EN 60669-1	IEC/EN 60947-3, (VDE 0660-107)
Approvals			
Rated operational current I_e	Per conducting path	A 20	32
Rated operational voltage U_e	1-pole Multipole	V AC V AC 230 400	
Rated power dissipation P_V	Per pole, max.	VA 0.7	
Thermal rated current I_{th}		A 20	32
Rated breaking capacity	At p.f. = 0.65	A 60	96
Rated making capacity	At p.f. = 0.65	A 60	96
Rated short-circuit making capacity I_{cm}	In conjunction with fuse of the same rated operational current	EN 60269 gL/gG kA 10	
Rated impulse withstand voltage U_{imp}		kV > 5	
Clearances	Open contacts Between the poles	mm mm 2 × > 2 > 7	
Creepage distances		mm > 7	
Mechanical service life		Switching cycles 25000	
Electrical service life		Switching cycles 10000	
Minimum contact load		V; mA 10; 300	
Rated short-time withstand current I_{cw}	Per conducting path at p.f. = 0.7 (The corresponding rated surge current can be established by multiplying by factor 1.5.)	Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	A A A A 650 400 290 170 1000 630 450 250
Terminals	±screw (Pozidriv) Max. tightening torque	Nm 1 1.2	
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ² mm ² 1.5 ... 6 1 ... 6	
Permissible ambient temperature		°C -5 ... +40	
Resistance to climate	At 95 % relative humidity	Acc. to DIN 50015 °C 45	

ON/OFF switches, 5TE8

			5TE8 3	5TE8 4	5TE8 5	5TE8 6	5TE8 7	5TE8 8
Standards			IEC/EN 60947-3 (VDE 0660-107)	--	IEC/EN 60669-1 (VDE 0632-1)	--	--	--
Approvals				EN 60669-1				
Rated operational current I_e	Per conducting path	A	32	40	63	80	100	125
Rated operational voltage U_e	1-pole Multipole	V AC V AC	230 400					
Rated power dissipation P_v	Per pole, max.	VA	0.7	0.9	2.2	3.5	5.5	8.6
Thermal rated current I_{th}	A	A	32	40	63	80	100	125
Rated breaking capacity	At p.f. = 0.65	A	96	120	196	240	300	375
Rated making capacity	At p.f. = 0.65	A	96	120	196	240	300	375
Rated short-circuit making capacity I_{cm}	In conjunction with fuse of the same rated operational current	EN 60269 gL/gG	kA	10				
Rated impulse withstand voltage U_{imp}		kV	> 5					
Clearances	Open contacts Between the poles	mm mm	> 7 > 7					
Creepage distances		mm	> 7					
Mechanical service life		Switching cycles	20000					
Electrical service life		Switching cycles	10000	5000	1000			
Minimum contact load		V; mA	24; 300					
Rated power	1-pole 2-pole 3-/4-pole	kW kW kW	5 9 15	6.5 11 15	10 18 30	13 22 39	16 28 48	16 28 48
Rated short-time withstand current I_{cw}	Per conducting path at p.f. = 0.7 (The corresponding rated surge current can be established by multiplying by factor 1.5.)	Up to 0.2 s Up to 0.5 s Up to 1 s Up to 3 s	A A A A	760 500 400 280	950 630 500 350	1500 1000 800 560	2700 1650 1350 800	3400 2100 1700 1000
Terminals	±screw (Pozidriv) Max. tightening torque	Nm	2 3.5					
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ² mm ²	1 ... 35 1 ... 35		2.5 ... 50 2.5 ... 50			
Permissible ambient temperature		°C	-5 ... +40					
Resistance to climate	At 95 % relative humidity	Acc. to DIN 50015	°C	45				

Dimensional drawings

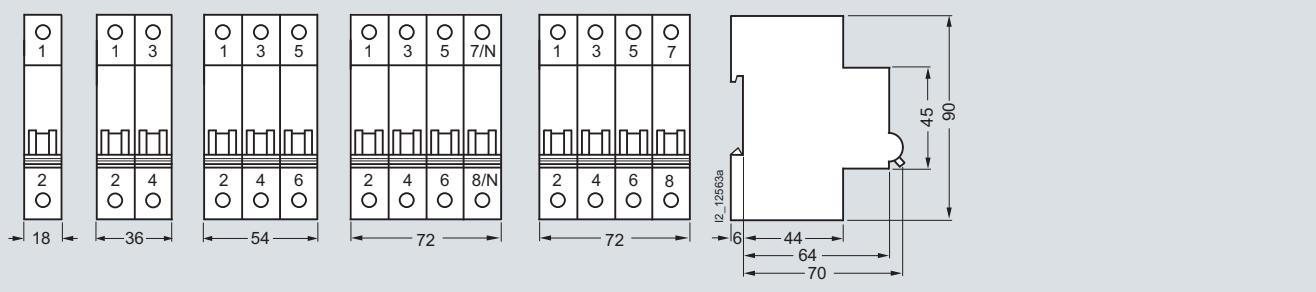
5TE8 ON/OFF switches, 20 A and 32 A

5TE8 111 5TE8 112 5TE8 113 5TE8 114
5TE8 211 5TE8 212 5TE8 213 5TE8 2145TE8 118
5TE8 218

Switching devices

ON/OFF switches, 5TE8

5TE8 ON/OFF switches, 32 A to 125 A



5TE8 311

5TE8 411

5TE8 511

5TE8 521

5TE8 611

5TE8 711

5TE8 721

5TE8 811

5TE8 312

5TE8 412

5TE8 512

5TE8 522

5TE8 612

5TE8 712

5TE8 722

5TE8 812

5TE8 313

5TE8 413

5TE8 513

5TE8 523

5TE8 613

5TE8 713

5TE8 723

5TE8 813

5TE8 314

5TE8 414

5TE8 514

5TE8 524

5TE8 614

5TE8 714

5TE8 724

5TE8 814

5TE8

315

415

515

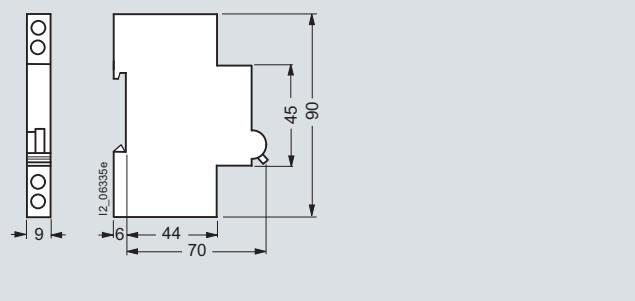
525

615

715

815

5ST3 auxiliary switches

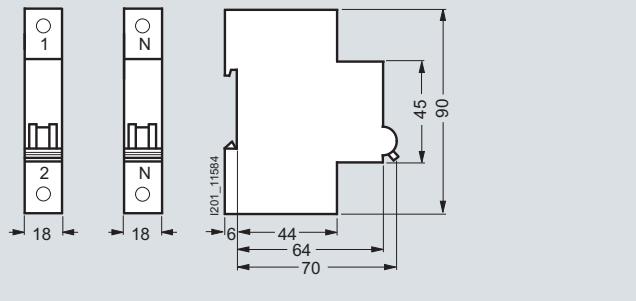


5ST3 010

5ST3 011

5ST3 012

Phase connectors/N-conductor connectors



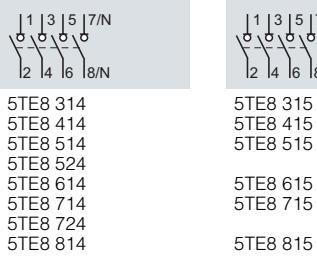
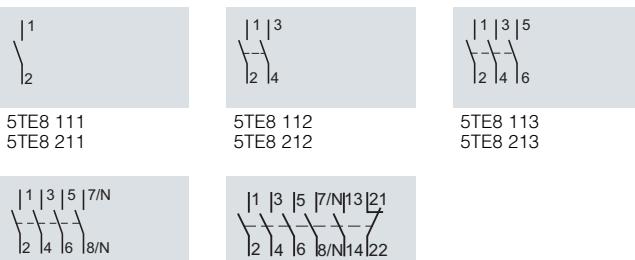
5TE9 112

5TE9 113

Schematics

Diagrams

5TE8 ON/OFF switches



5TE8 114

5TE8 214

5TE8 118

5TE8 218

5TE8 311

5TE8 411

5TE8 511

5TE8 521

5TE8 312

5TE8 412

5TE8 512

5TE8 522

5TE8 313

5TE8 413

5TE8 513

5TE8 523

5TE8 533

5TE8 314

5TE8 414

5TE8 514

5TE8 524

5TE8 613

5TE8 713

5TE8 723

5TE8 813

DC isolators, 5TE2**Overview**

DIN VDE 0100-712 specifies the use of special switch disconnectors for isolating solar modules in photovoltaic systems. With a high rated voltage of 1000 V DC, the 5TE2 515-1 switch disconnectors from Siemens go well above and beyond meeting these requirements.

The optimally coordinated BETA Low-Voltage Circuit Protection product range – which includes DC overvoltage protection and universal current-sensitive SIQUENCE TYPE B RCCBs – enables the quick and easy implementation of standard-conform protection for photovoltaic systems.

Technical specifications

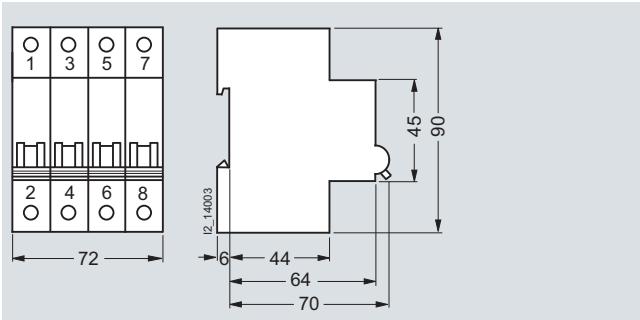
	5TE2 515-1	
Standards		IEC/EN 60947-3, IEC/EN 60669-1
Rated operational current I_e	A	63
Rated operational voltage U_e	V DC	1000
Rated power dissipation P_v	W	4.4
Rated short-circuit strength I_{cw}	1000 V DC, 4-pole	A
Rated short-circuit making capacity I_{cm}	1000 V DC, 4-pole	A
Rated impulse withstand voltage U_{imp}	kV	> 5
Mechanical service life	Switching cycles	10000
Electrical service life	Switching cycles	5000
Utilization category		DC-21B
Minimum contact load	V; mA	24; 300
Terminals Max. tightening torque	±screw (Pozidriv)	PZ 2 2.5 ... 3
Conductor cross-sections	Rigid Flexible, with end sleeve	mm ² mm ² 0.75 ... 35 0.75 ... 25
Permissible ambient temperature	°C	-25 ... +45
Resistance to climate At 95 % relative humidity	Acc. to DIN 50015	°C 45

Switching devices

DC isolators, 5TE2

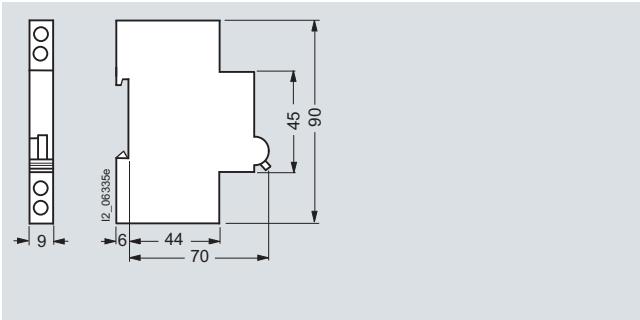
Dimensional drawings

5TE2 DC isolator



5TE2 515-1

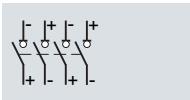
5ST3 auxiliary switches



5ST3 010
5ST3 011
5ST3 012

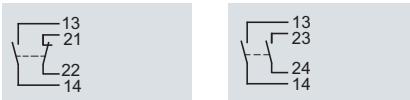
Schematics

5TE2 DC isolator

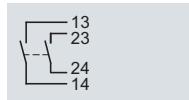


5TE2 515-1

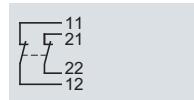
5ST3 auxiliary switches



5ST3 010



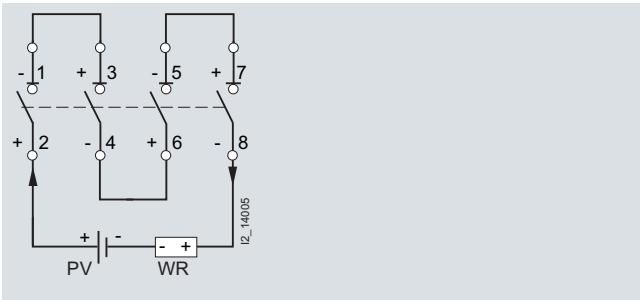
5ST3 011



5ST3 012

Configuration

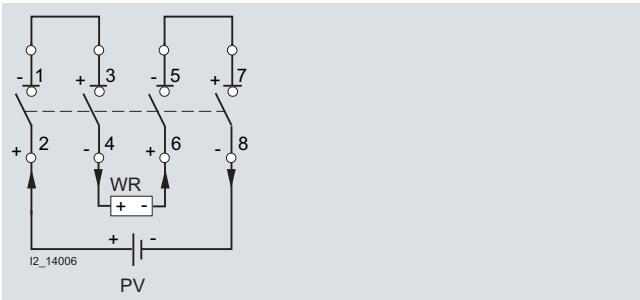
For DC voltages up to 1000 V, the four poles need to be connected in series. In contrast to normal flush-mounting switches, these devices are also fitted with arcing chambers and permanent solenoids to aid the positive quenching of the electric arc in direct currents.



Legend:

PV: Photovoltaic
Inverter: Inverter

For this reason it is essential to comply with the polarity specifications of the switches when connecting the conductor. Suitable precautions should be taken during plant configuration to ensure there can be no polarity reversal in DC operation (e.g. photovoltaic plants).

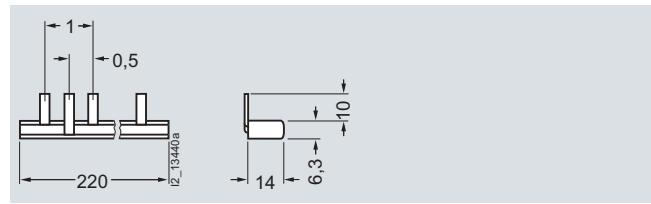
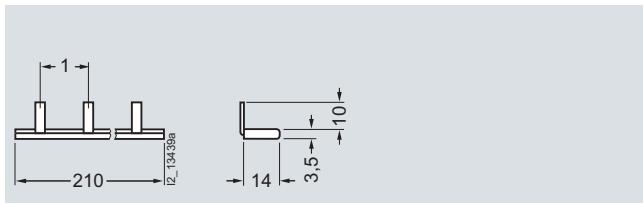


Overview

Siemens has developed a rail-mounting concept which makes the linking of switching devices just as easy as that of miniature circuit breakers.

The arrangement of the terminals on the devices is adapted to the bus mounting. With only two busbars, this saves considerable mounting time.

Dimensional drawings



Note:

Pin spacing in MW

Dimensions of side views in mm (approx.)

Switching devices

Remote control switches, 5TT4

Overview

Remote control switches are used in residential and non-residential buildings, as well as the switchgear engineering sector. They trip in the event of current inrushes, i.e. pulses, and then electromechanically save the switching position (i.e. without auxiliary power), even in the event of a power failure. In residential and non-residential buildings, used in conjunction with push-buttons, they facilitate installation of systems where, for example, a corridor light needs to be switched from more than one location. Because they save the switching position without standby losses, they enable the energy-efficient control of lighting.

With special functions, such as central and group control, or series and shutter/blind control sequences, even high feature control tasks can be implemented easily and energy-efficiently.

All the devices have the VDE mark and can also be equipped with an additional auxiliary switch. All devices have a switching position indicator and are operated manually. The switching noise is particularly quiet and meets the requirements of residential buildings.

Note:

Information about busbars to match the 5TT4 1 remote control switch can be found on page 17.

Technical specifications

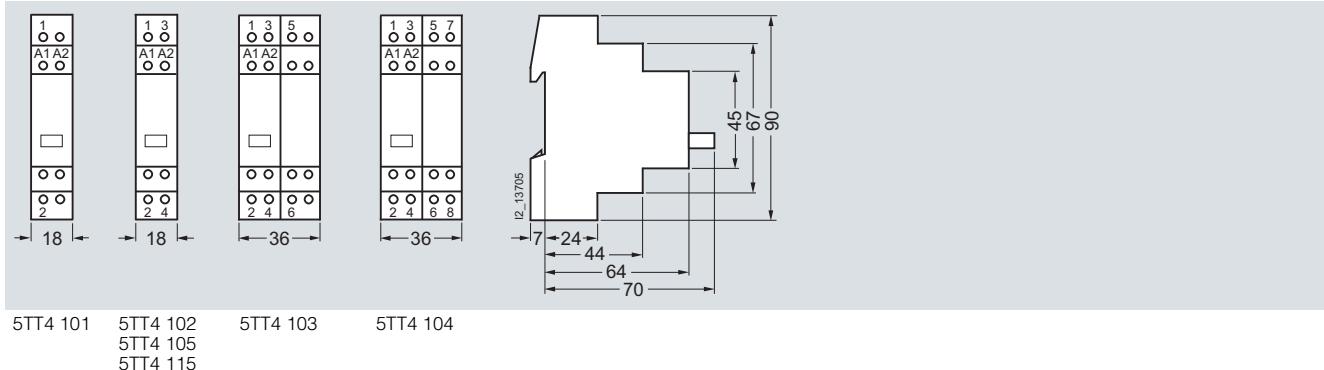
	Remote control switches				Auxiliary switches	
	5TT4 101 5TT4 102 5TT4 105 5TT4 115	5TT4 103 5TT4 104	5TT4 12 5TT4 15	5TT4 13 5TT4 14	5TT4 900	5TT4 901
Standards	IEC 60669-1, IEC 60669-2, IEC 60669-3, EN 60669 (VDE 0632), EN 60669-2-2, EN 60669-2-2/A1					
Approvals	VDE 0632					
Contact type	1 NO 2 NO	3 NO 4 NO	1 NO 2 NO	Series Shutter/ blind	1 CO	1 CO
	1 NO 1 NC		3 NO 1 NO 1 NC			
Manual operation	Yes				--	
Switching position indication	Yes				--	
Rated control voltage U_c	V AC V DC	8 ... 230 12 ... 110			--	
Primary operating range	$\times U_c$	0.8 ... 1.1			--	
Rated frequency f_c (AC types)	Hz	50			--	
Rated impulse withstand voltage U_{imp}	kV	4			1	
Rated power dissipation P_v						
• Magnet coil, only pulse	W/VVA	4.5/7	9/13	4.5/7	--	
• Per contact at 16 A	W	1.2			--	
Minimum contact load	V AC; mA	10; 100			10; 100	5 AC/DC; 1
Rated operational current I_e at p.f. $\varphi = 0.6 \dots 1$	A	16			5	0.1
Rated operational voltage U_e						
• 1 NO	V AC	250	--	250	250	30 AC/DC
• 2 NO	V AC	400	--	400	250	--
• 3 NO	V AC	--	400	400	--	--
• 4 NO	V AC	--	400	--	--	--
• 1 NO + 1 NC	V AC	250	--	250	--	--
Glow lamp load at 230 V	mA	5			--	
With 1 5TT4 920 compensator	mA	25			--	
• With 2x 5TT4 920 compensators	mA	45			--	
Incandescent lamp load	W	2400			--	
Different phases between magnet coil/contact		Permissible			--	
Contact gap	mm	> 1.2			< 1.2	
Safe separation						
Creepage distances and clearances between magnet coil/contact mm		> 6				
Pushbutton malfunction						
Protected against continuous voltage, safe due to design	Yes	PTC	Yes ¹⁾	Yes	--	
Minimum pulse duration	ms	50				
Electrical service life	In switching cycles	50000				
At I_e/U_e or specified lamp load						
Terminals ±screw (Pozidriv)		1				
Conductor cross-sections						
• Rigid	mm ²	1.5 ... 6			0.5 ... 4	
• Flexible, with end sleeve	mm ²	1 ... 6			0.75 ... 4	
Resistance to climate						
At 95 % relative humidity	Acc. to DIN 50015	°C	35			
Permissible ambient temperature					-10 ... +40	
Degree of protection	Acc. to EN 60529		IP20, with connected conductors			
Mounting position		any				

¹⁾ For 2.5 MW 5TT4 123-0 devices with PTC.

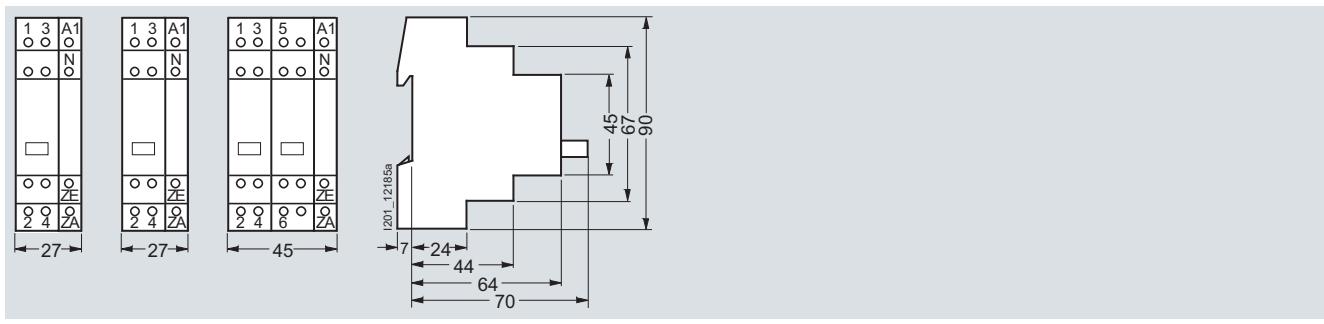
Remote control switches, 5TT4

Dimensional drawings

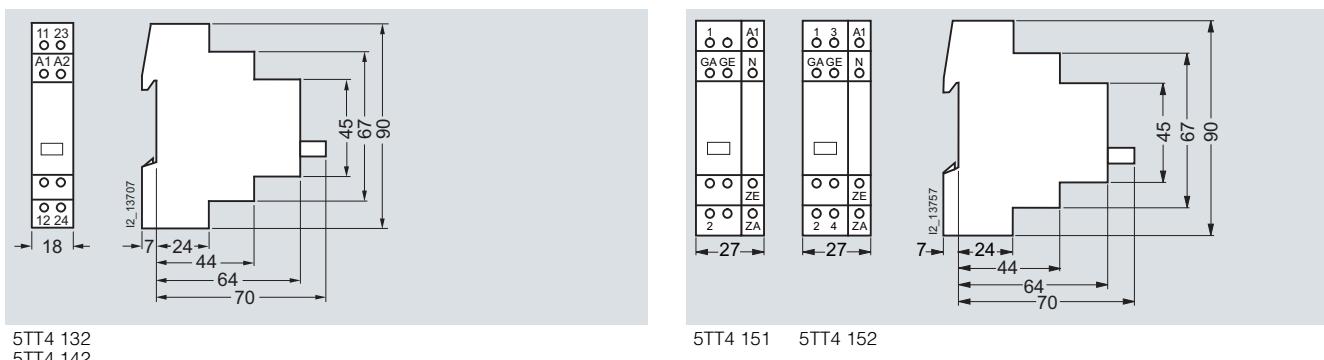
5TT4 1 remote control switches



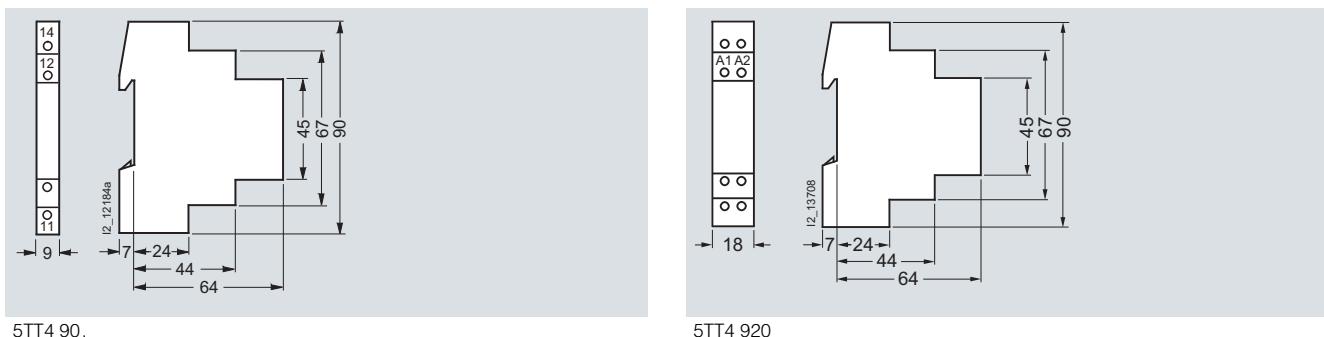
5TT4 12 remote control switches with central ON/OFF switching



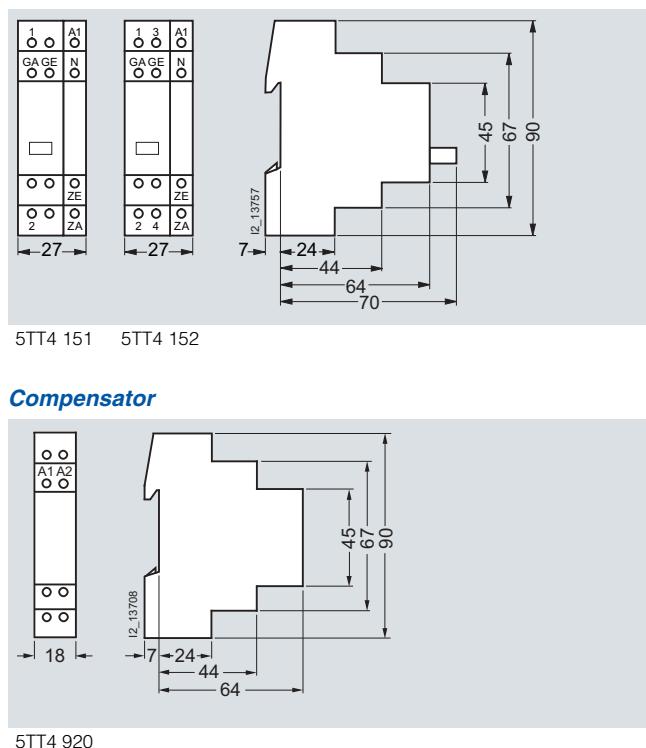
5TT4 132-0 series remote control switches and 5TT4 142 shutter/blind remote control switches



Auxiliary switches



Remote control switches with central and group ON/OFF switching



Compensator

Switching devices

Remote control switches, 5TT4

Schematics

Diagrams



More information

Mechanical storage

Remote control switches are used to switch lighting by means of several pushbuttons. This makes complex cross/two-way switching unnecessary. With each pushbutton impulse, the remote control switch changes its contact position from "OFF" to "ON", etc. In the event of a power failure, the last switching position is mechanically stored. Electromechanical remote control switches have no standby loss.

Pushbutton malfunction

Pushbuttons can jam, which may expose remote control switches to a continuous voltage. All remote control switches are protected against this type of malfunction through their design or through PTC.

Central switching functions

Versions with central ON/OFF function allow the central switching of all connected remote control switches. This type of central switching can also be actuated using a time switch. All remote control switches can be switched to the ON or OFF switching state, regardless of their current switching state.

Contact sequences

1 – 2 – 1+2 – 0 or 1 - 0 - 2 - 0 means:

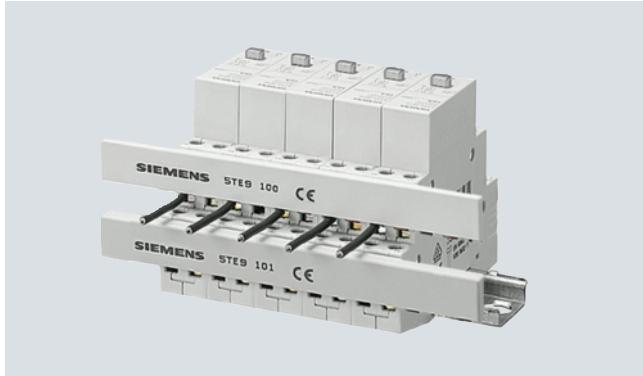
- 0: No contact closed
- 1: Only contact 1 closed
- 2: Only contact 2 closed
- 1+2: Contact 1 and Contact 2 are closed

The contact positions are constantly changing with each pushbutton impulse.

Note:

Synchronous switching of the contacts cannot be guaranteed with parallel switching. Products with central/group switching must be used for the mutual control of several remote control switches.

Busbar mounting

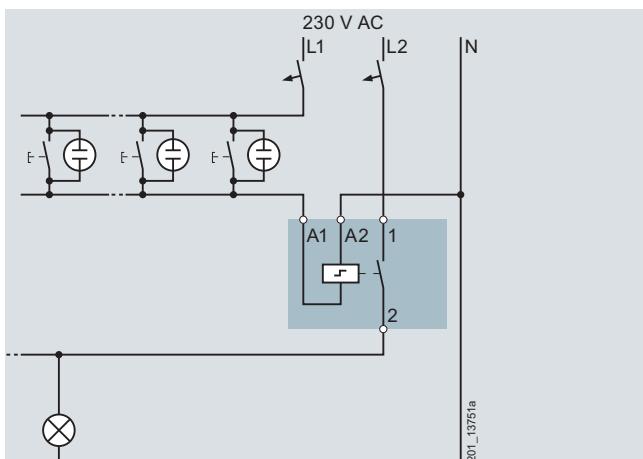


- All 5TT4 1 remote control switches can be bus-mounted with each other. This saves time and space.

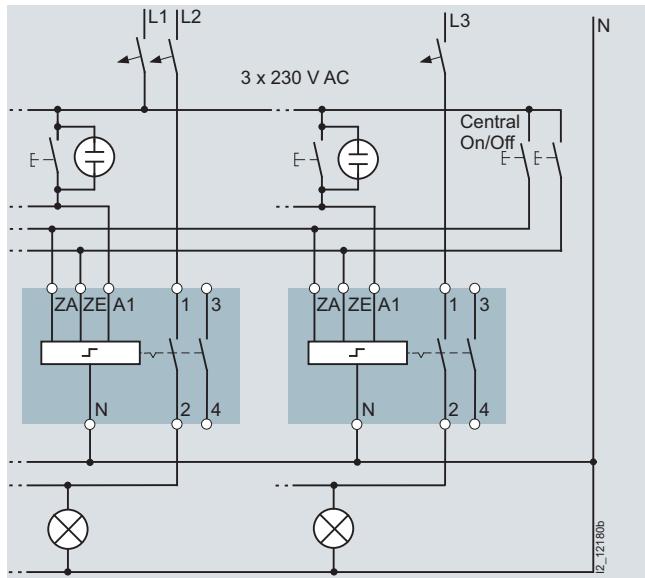
Note:

Busbars to match the 5TT4 1 remote control switch can be found on page 17.

Switching example: 5TT4 101-0

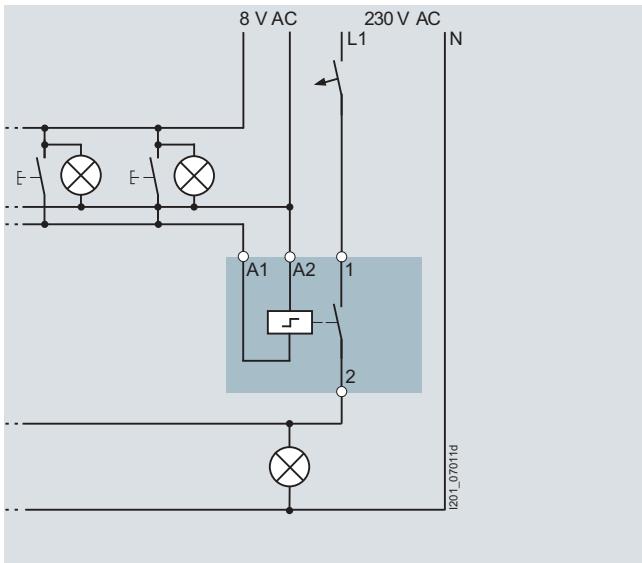


Single-phase lighting circuit with 230 V AC actuation,
e. g. in office buildings
201_13751a

Remote control switches, 5TT4**Switching example: 5TT4 122-0
with central ON/OFF switching**

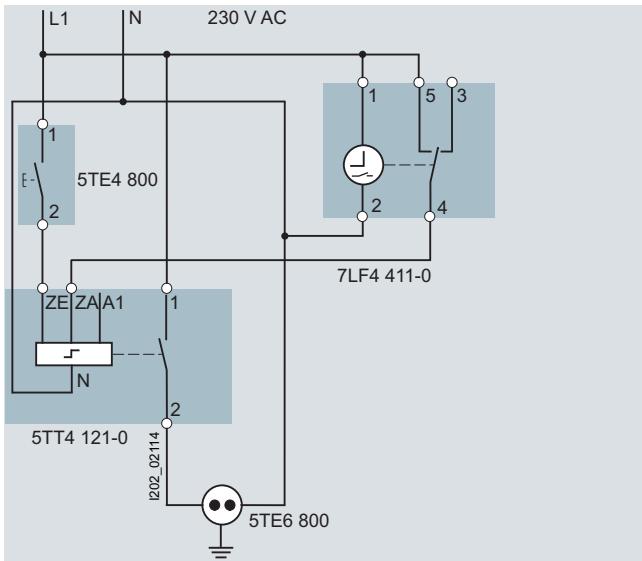
With the 2-pushbutton central "ON" and "OFF" function, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work. A time switch with a one-second pulse (e.g. 7LF4 444-0) can also be used if desired. Once a central on/off switching operation has been executed, the remote control switches can also be switched on and off locally at any time. Remote control switches with central ON/OFF switching can also be used to quickly and easily set up a panic circuit/panic lighting using conventional installation methods.

The input terminals on the remote control switch need to be connected to the same phase (L1, L2 or L3) and over the same residual current protective device. Otherwise residual current protective devices may be tripped unintentionally, or short circuits might occur.

Switching example: 5TT4 101-4

Single-phase lighting circuit with safety extra-low voltage 8 V AC, illuminated pushbutton

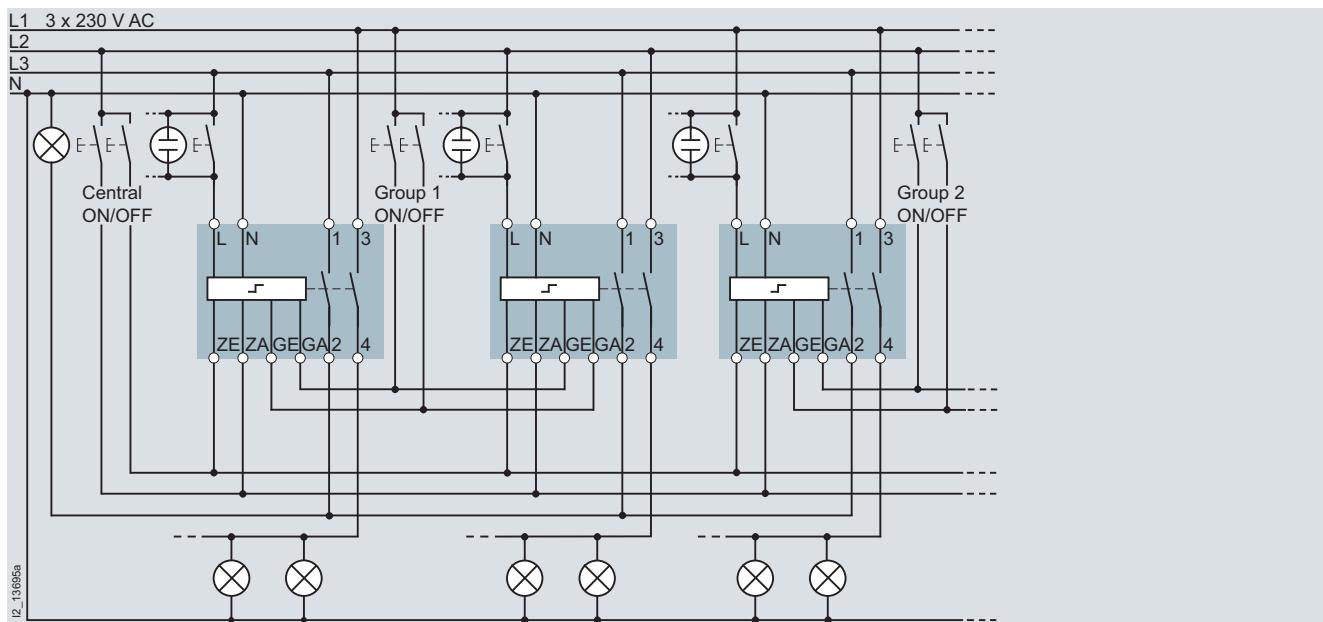
This circuit is also suitable for the control of circuits with a high number of illuminated pushbuttons.

**Switching example 5TT4 121-0
with central ON/OFF switching and clock timer**

Switching devices

Remote control switches, 5TT4

Switching example: 5TT4 152-0 with central ON/OFF switching and group ON/OFF switching

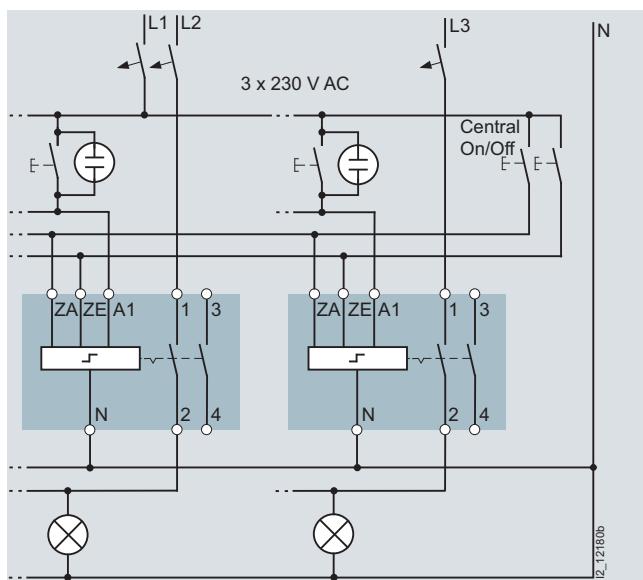


With the 2-pushbutton central "ON" and "OFF" function, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work.

With the 2-pushbutton group "ON" and "OFF" function, all remote control switches assigned to a group can be switched on or off, e.g. corridor. A digital 7LF4 4 time switch with a switching command of 1 s can also be used for the "Central" or "Group" function.

Once a central on/off switching operation has been executed, the remote control switches can also be switched on and off locally at any time. The phase relations of ZA, ZE and GA, GE and L can be different. If contact 1/2 is used as check-back contact for the central "ON" and "OFF" function, as shown above, terminal 1 of all remote control switches must be in phase.

Switching example: Glow lamp load and 5TT4 920 compensator



The use of multiple illuminated pushbuttons, in particular 230 V AC glow lamps, could cause the remote control switch to trip accidentally, or no longer drop out, due to the current used by the lamps. This may also occur in the case of high line capacities. Switching a 5TT4 920 compensator parallel to the coil increases the glow lamp load of the remote control switch from 5 mA to 25 mA. The parallel switching of several compensators is also possible. The power consumption of 230 V 5TG7 3.. glow lamps for pushbuttons is: Low luminosity 0.18 mA – medium 0.9 mA – high 1.35 mA, the power consumption of LED 5SG7 35. lighting is approx. 1.5 mA.

To reduce capacitive coupling due to long cable lengths, we recommend using shielded cables. Particularly in systems with frequency converter controlled motors or with parallel cable routes (e.g. cable support systems), the induced current may impair the function of the devices.

Remote control switches, 5TT4***Switching of lamps***

		Remote control switches			
		5TT4 101	5TT4 103	5TT4 12	5TT4 13
		5TT4 102	5TT4 104	5TT4 15	5TT4 14
		5TT4 105			
		5TT4 115			
Switching of transformers for halogen lamps		W	1200		
Fluorescent and compact lamps in ballast operation					
• Uncorrected		L18W	Unit(s)	35	30
		L36W	Unit(s)	35	30
		L58W	Unit(s)	25	20
• Parallel-corrected		L18W/4.5µF	Unit(s)	40	50
		L36W/4.5µF	Unit(s)	40	50
		L58W/7µF	Unit(s)	28	30
• DUO switching, 2-lamp		L18W	Unit(s)	2 × 30	2 × 24
		L36W	Unit(s)	2 × 30	2 × 24
		L58W	Unit(s)	2 × 30	2 × 16
Fluorescent and compact lamps with electronic ballast (ECG)					
• AC operation, 1-lamp		L18W	Unit(s)	36	30
		L36W	Unit(s)	36	30
		L58W	Unit(s)	24	20
• AC operation, 2-lamp		L18W/4.5µF	Unit(s)	2 × 22	2 × 18
		L36W/4.5µF	Unit(s)	2 × 22	2 × 18
		L58W/7µF	Unit(s)	2 × 15	2 × 12

The specified values are intended to serve as a guideline, the max. number of illuminants may vary, depending on the manufacturer.
The values specified here refer to Osram illuminants and ballasts.

Switching devices

Switching relays, 5TT4

Overview

Switching relays are used in residential, non-residential and industrial buildings for the purpose of contact multiplication. They can be used with safe isolation between coil voltage and contact. Switching relays for direct voltages in particular are seeing increasing use.

With the 5TE9 100 and 5TE9 101 busbar, the switching relays can be mounted quickly and safely, e.g. by bus-mounting the

N conductor and/or infeed – and this applies to the whole range of switching relays.

Note:

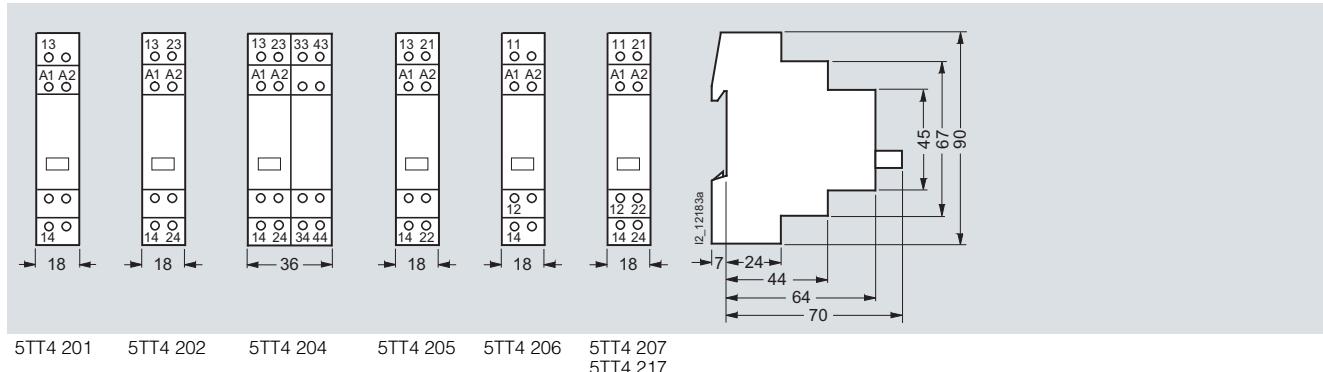
Busbars to match the 5TT4 2 switching relay can be found on page 17.

Technical specifications

	5TT4 201-.	5TT4 202-.	5TT4 204-.	5TT4 205-.	5TT4 206-.	5TT4 207-.	5TT4 217-.
Standards	EN 60947-5-1, EN 60669-2-2						
Contact type	1 NO	2 NO	4 NO	1 NO + 1 NC	1 CO	2 CO	2 CO
Manual operation	Yes						
Rated control voltage U_c	V AC V DC	8 ... 230 --					-- 12 ... 110
Primary operating range	$\times U_c$	0.8 ... 1.1					
Rated frequency f_c	Hz	50					
Rated impulse withstand voltage U_{imp}	kV	4					
Rated power dissipation P_v							
• Magnet coil	W/VA	2.4/3.0	2.4/3.0	4.8/6.0	2.4/3.0	2.4/3.0	1.7
• Per contact at 16 A	W	1.0					
Minimum contact load	V AC; mA	10; 100					
Rated operational current I_e							
At p.f.φ = 0.6 ... 1	A	16					
Rated operational voltage U_e		250	400	400	250	400	400
Different phases							
Between magnet coil/contact		Permissible					
Contact gap	mm	> 1.2					< 1.2
Safe separation							
Between creepage distances and clearances magnet coil/contact	mm	> 6					
Electrical service life							
At I_e/U_e or specified lamp load	Switching cycles	50000					
Terminals	±screw (Pozidriv)	1					
Conductor cross-sections							
• Rigid	mm ²	1.5 ... 6					
• Flexible, with end sleeve	mm ²	1 ... 6					
Resistance to climate							
At 95 % relative humidity Acc. to DIN 50015	°C	35					
Permissible ambient temperature	°C	-10 ... +40					
Degree of protection	Acc. to EN 60529	IP20, with connected conductors					
Mounting position		Any					

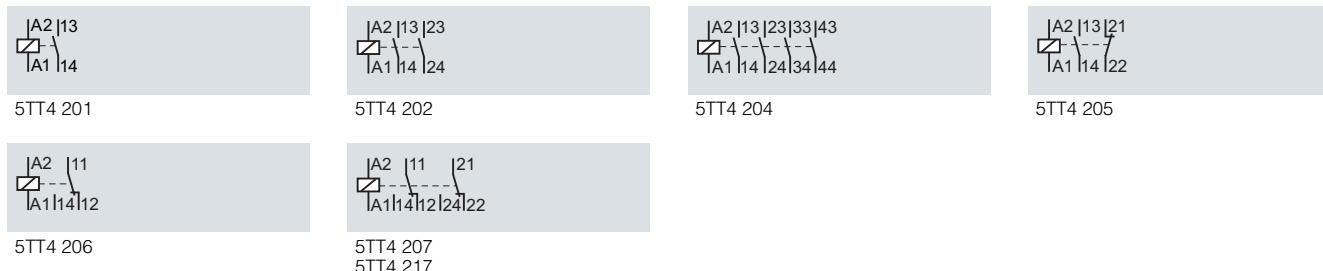
Dimensional drawings

5TT4 2 switching relays



Schematics

Diagrams



More information

5TT4 2...		
Incandescent lamp load	W	1200
Switching of transformers for halogen lamps	W	1200
Fluorescent and compact lamps		
In ballast operation (KVG)		
• Uncorrected	L18W L36W L58W	Unit(s) 27 Unit(s) 24 Unit(s) 15
Fluorescent and compact lamps		
With electronic primary switching device (ECG)		
• AC operation, 1-lamp	L18W L36W L58W	Unit(s) 43 Unit(s) 24 Unit(s) 15
Metal-vapor and high-pressure mercury-vapor lamps		
• Uncorrected	50 W 80 W 125 W 250 W 400 W 700 W 1000 CO	Unit(s) 12 Unit(s) 9 Unit(s) 6 Unit(s) 3 Unit(s) 2 Unit(s) 1 Unit(s) 1
Halogen metal-vapor lamps		
• Uncorrected	70 W 150 W 250 W 400 W	Unit(s) 8 Unit(s) 4 Unit(s) 2 Unit(s) 1
High-pressure sodium-vapor lamps		
• Uncorrected	50 W 70 W 110CO 150 W 250CO	Unit(s) 10 Unit(s) 8 Unit(s) 6 Unit(s) 4 Unit(s) 1

The specified values are intended to serve as a guideline, the max. number of illuminants may vary, depending on the manufacturer. The values specified here refer to Osram illuminants and ballasts.

Busbar mounting



- All 5TT4 2 switching relays can be bus-mounted with each other. This saves time and space.

Note:

Busbars to match the 5TT4 2 switching relay can be found on page 17.

Switching devices

Insta contactors

Insta contactors, DC technology, 5TT5

Overview

Insta contactors are standard devices in installation technology and belong to the BETA switching device range. Insta contactors are particularly suitable for switching heating, lighting and motors.

While Insta contactors have seen a considerable decline in use in the electrical heating sector in residential buildings, they have gained considerable significance for lighting circuits in buildings. Insta contactors are increasingly used in industry for motors where distribution technology plays a major role, e.g. in auxiliary installations for heat pumps and air conditioning technology.

In addition to their basic function, they can also be used for the ON/OFF switching of single-phase and three-phase electrical motors.

The 5TT5 7 Insta contactors meet the requirements of EN 60947 and are approved to UL 508.

Insta contactors, DC technology, 5TT5
Technical specifications

		5TT5 73 4-pole	5TT5 74 4-pole	5TT5 75 4-pole
Standards Approvals	EN 60947-4-1; EN 60947-5-1; EN 61095; UL 508 UL 508; UL File No. E30328			
Rated frequency at AC f_n	Hz	40 ... 450		
Rated control voltage U_c	V AC V DC	24, 115, 230 24, 110, 220	24, 230 24, 220	
Primary operating range	$\times U_c$	0.85 ... 1.1		
Rated operational voltage U_e	V	440		
Rated operational current I_e	at V AC A A A A	Acc. to UL 480; acc. to IEC 440 24 24 9 6	40 30 22 --	63 30 30 --
Rated power dissipation P_v	VA/W VA/W VA	4/4 4/4 1.5	5/5 5/5 3	6.5/6.5 4.2/4.2 6
Switching times	ms ms	≤ 40 ≤ 40		
Rated impulse withstand voltage U_{imp}	kV	≥ 4		
Contact gap (S contacts) min.	mm	2.4	2.8	2.6
Electrical service life				
At I_e and load	AC-1/AC-7a AC-3/AC-7b	For switching cycles For switching cycles	150000 500000	170000 240000
Mechanical service life		For switching cycles	1 million	
Maximum switching frequency				
At load	AC-1/AC-7a AC-3/AC-7b	Switching cycles/h Switching cycles/h	300 600	
Switching of resistive loads AC-1 for rated operational power P_s (NO contacts)	V AC	230		
• Single-phase • Three-phase	kW kW	5.3 16	8.8 26	13.8 41
Switching of three-phase asynchronous motors AC-3 for rated operational power P_s (NO contacts)	V AC	400		
• Single-phase • Three-phase	kW kW	-- 4	11	15
Minimum switching capacity	V; mA	≥ 17 ; ≥ 200		
Overload withstand capability				
Per conducting path (NO contacts only)	at 10 s	A	72	176
Short-circuit protection, according to coordination type 1				
Back-up fuse characteristic gL/gG	A	35	63	80
Terminals	\pm screw (Pozidriv)			
• Coil connection • Main connection		1 1	1 2	1 2
Tightening torques				
• Coil connection	Nm	0.9	0.9	0.9
- Solid - Stranded, with end sleeve - AWG cables Tightening torques	Nm	1.0	2.5	2.5
• Main connection	mm ² mm ² AWG lb. in	1.5 ... 4 1.5 ... 2.5 16 ... 10 8	2.5 ... 25 2.5 ... 16 16 ... 4 20	2.5 ... 25 2.5 ... 16 16 ... 4 20
Conductor cross-sections				
• Main connection	mm ² mm ² AWG lb. in	1.5 ... 10 1.5 ... 2.5 16 ... 8 9	2.5 ... 25 2.5 ... 16 16 ... 4 20	2.5 ... 25 2.5 ... 16 16 ... 4 20
Permissible ambient temperature				
• For operation • For storage	°C °C	-25 ... +55 -50 ... +80		
Degree of protection	Acc. to EN 60529	IP20, with connected conductors		
According to UL 508	I_n	A	24	40
UL 508 General Use 240 V/480 V	FLA	A	24	40
UL 508 AC discharge lamps		A	24	30
UL 508 motor load 240 V	Power	hp	3	7.5
UL 508 motor load 480 V	Power	hp	5	15
UL 508 Short circuit at 480 V	K5 fuses	A kA	25 5	40 75

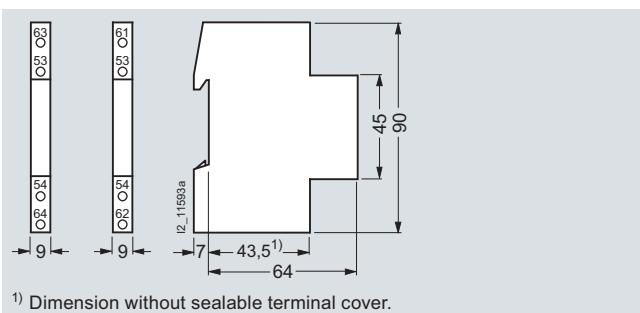
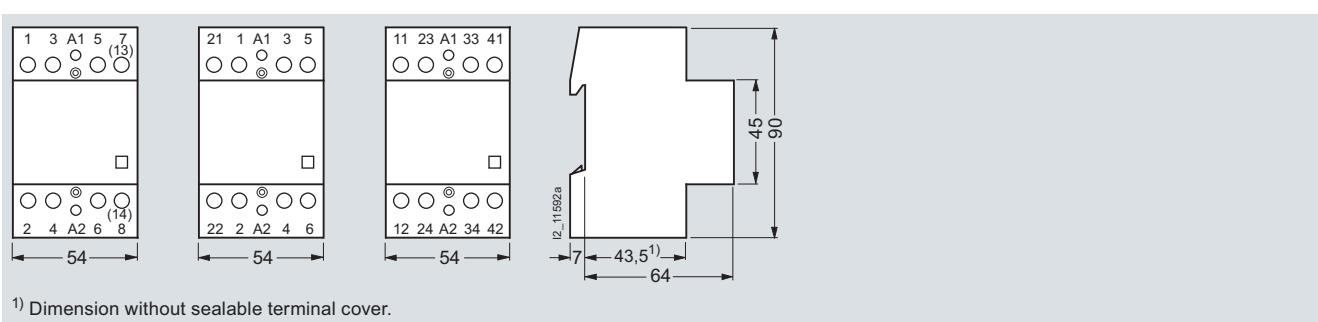
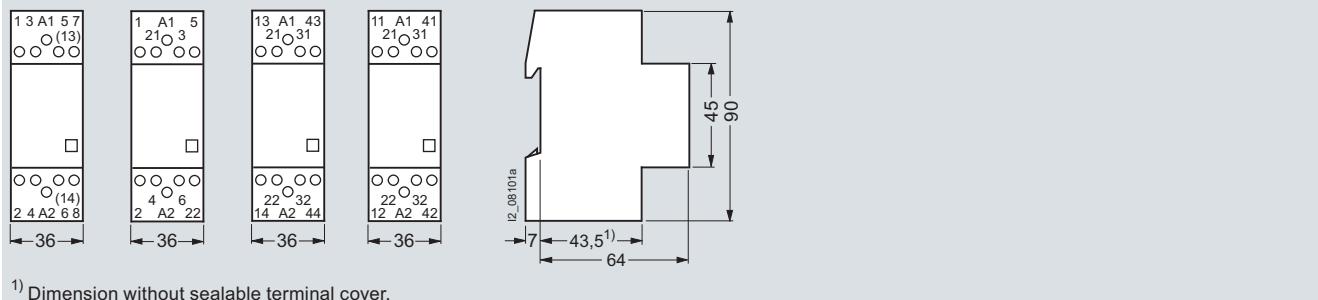
Switching devices

Insta contactors

Insta contactors, DC technology, 5TT5

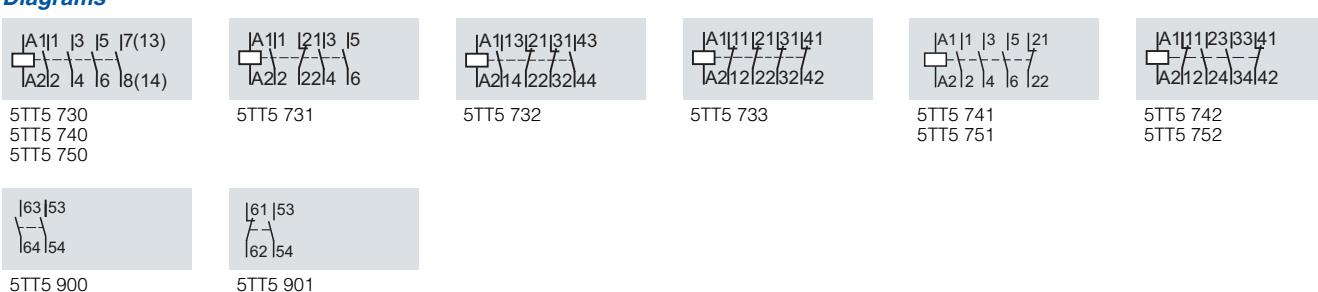
Dimensional drawings

5TT5 7 Insta contactors



Schematics

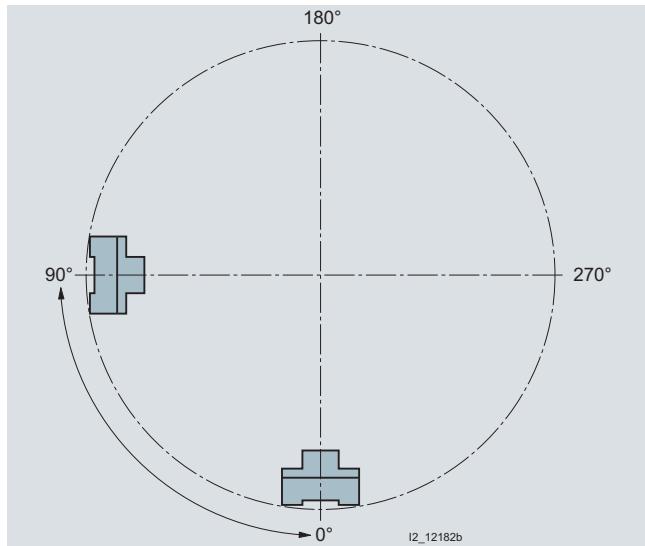
Diagrams



More information

Mounting position, Insta contactors, DC technology, 24 A, 40 A, 63 A

There are no restrictions for normal mounting position (see figure, 0° to 90°). For mounting positions between 100° and 260°, the level of control voltage must be at least 100 % of the rated value.

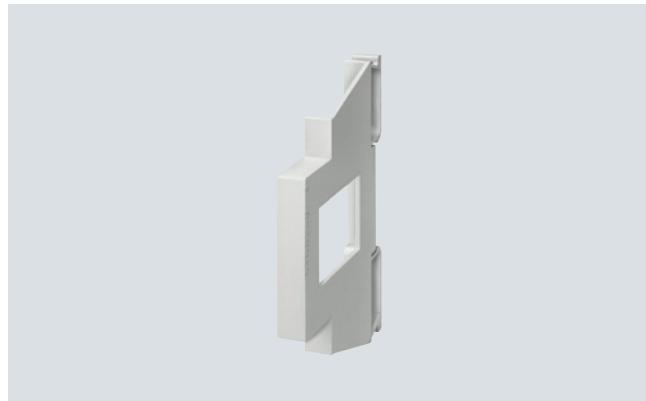


Heat dissipation

If more than one Insta contactor with DC magnetic system is installed, a 5TG8 240 spacer must be installed after every second contactor.

Spacers

Spacers can be used as a compensating element and have a width of ½ MW. They come with an integrated wiring duct for the insertion of conductors. Two oppositely installed spacers thus offer space for large conductor cross-sections up to a 14 mm diameter.



Switching of direct currents DC-1 and DC-3

Permissible DC switching currents for NO contacts with resistive load
4 contacts in series are not recommended for 24 V due to unreliable contacts

	I_e at $U_e =$	1 contact		2 contacts in series		3 contacts in series		4 contacts in series	
		DC-1	DC-3	DC-1	DC-3	DC-1	DC-3	DC-1	DC-3
5TT5 73 , 4-pole, 24 A	24 V DC	A	24	16	24	24	24	24	--
	48 V DC	A	21	8	24	18	24	24	--
	60 V DC	A	17	4	24	14	24	24	--
	110 V DC	A	7	1.6	16	6.5	24	16	8
	220 V DC	A	0.9	0.2	4.5	1	13	4	3.5
5TT5 74 , 4-pole, 40 A	24 V DC	A	40	19	40	40	40	40	--
	48 V DC	A	23	10	40	20	40	40	--
	60 V DC	A	16	5	32	16	40	34	--
	110 V DC	A	8	1.8	17	7	30	18	8
	220 V DC	A	1	0.3	5	1.1	15	4.5	3.5
5TT5 75 , 4-pole, 63 A	24 V DC	A	50	21	63	44	63	63	--
	48 V DC	A	26	11	43	22	63	47	--
	60 V DC	A	20	5.5	35	18	60	38	--
	110 V DC	A	9	2	19	8	33	21	--
	220 V DC	A	1.1	0.3	5.5	1.2	17	5	20

Switching of lamps

Incandescent lamp loads

5TT5 73 , 4-pole, 24 A	Per NO contact	W	1500
5TT5 74 , 4-pole, 40 A	Per NO contact	W	3000
5TT5 75 , 4-pole, 63 A	Per NO contact	W	5000

Maximum number of lamps in units, per NO contact at 230 V, 50 Hz.

Switching devices

Insta contactors

Insta contactors, DC technology, 5TT5

Fluorescent and compact lamps in ballast operation (KVG)
 (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			Uncorrected			Parallel-corrected			DUO circuit 2 lamps		
Lamp type	W	µF	L18	L36	L58	L18	L36	L58	2 x L18	2 x L36	2 x L58
Capacitor capacitance	--	--	--	--	--	4.5	4.5	7.0	--	--	--
5TT5 73 , 4-pole	24 A	Per NO contact	26	20	12	8	8	5	26	20	12
5TT5 74 , 4-pole	40 A	Per NO contact	85	65	40	16	16	10	85	65	40
5TT5 75 , 4-pole	63 A	Per NO contact	135	105	65	67	67	43	140	105	65

Fluorescent and compact lamps with electronic primary switching device (ECG)
 (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			1 lamp			2 lamps					
Lamp type	W		1 x L18	1 x L36	1 x L58	2 x L18	2 x L36	2 x L58			
5TT5 73 , 4-pole	24 A	Per NO contact	24	16	14	18	11	8			
5TT5 74 , 4-pole	40 A	Per NO contact	55	34	32	34	20	17			
5TT5 75 , 4-pole	63 A	Per NO contact	76	47	46	48	29	24			

High-pressure mercury-vapor lamps (HQL)
 (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			Uncorrected						Parallel-corrected							
Lamp type	W	µF	50	80	125	250	400	700	1 000	50	80	125	250	400	700	1 000
Capacitor capacitance	--	--	--	--	--	--	--	--	--	7	8	10	18	25	45	60
5TT5 73 , 4-pole	24 A	Per NO contact	14	10	7	4	2	1	1	5	4	3	2	1	0	0
5TT5 74 , 4-pole	40 A	Per NO contact	36	27	19	10	7	4	3	10	8	6	3	3	1	1
5TT5 75 , 4-pole	63 A	Per NO contact	50	38	26	14	10	6	4	43	37	26	15	10	5	4

Halogen metal-vapor lamps (HQI)
 (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			Uncorrected						Parallel-corrected						
Lamp type	W	µF	70	150	250	400	1 000	2 000	70	150	250	400	1 000		
Capacitor capacitance	--	--	--	--	--	--	--	--	12	20	33	35	95		
5TT5 73 , 4-pole	24 A	Per NO contact	5	3	2	1	0	0	3	1	1	0	0		
5TT5 74 , 4-pole	40 A	Per NO contact	14	8	5	4	1	1	5	3	2	2	0		
5TT5 75 , 4-pole	63 A	Per NO contact	20	11	7	6	2	1	18	9	5	4	1		

High-pressure sodium-vapor lamps (NAV)
 (permissible number of lamps in units per circuit at 230 V AC, 50 Hz)

			Uncorrected					Parallel-corrected				
Lamp type	W	µF	150	250	400	1 000	150	250	400	1 000		
Capacitor capacitance	--	--	--	--	--	--	20	33	48	106		
5TT5 73 , 4-pole	24 A	Per NO contact	4	3	1	0	1	1	0	0		
5TT5 74 , 4-pole	40 A	Per NO contact	15	9	6	3	3	2	1	0		
5TT5 75 , 4-pole	63 A	Per NO contact	20	15	8	4	15	9	6	2		

Insta contactors, AC technology, 5TT5**Overview**

The 5TT5 8 Insta contactors are equipped with an AC magnetic system and are ideal for use under harsh conditions. The auxiliary switches can be mounted without tools. When equipped with terminal covers, the devices can also be sealed.

Insta contactors without manual switch

Insta contactors are playing an ever growing role in lighting circuits in buildings. Insta contactors are increasingly used in industry for motors where distribution technology plays a major role, e.g. in installations for heat pumps and air conditioning technology. In addition to their basic function, they can also be used for the ON/OFF switching of single-phase and three-phase electrical motors.

Insta contactors with manual switch

A key feature of Insta contactors with manual operation is the fact that users can switch consumers/loads on and off by hand.

Switching devices

Insta contactors

Insta contactors, AC technology, 5TT5

Technical specifications

	Insta contactors					Auxiliary switches
	5TT5 80.	5TT5 82., 5TT5 83.	5TT5 84.	5TT5 85.	5TT5 910	
Standards	IEC 60947-4-1, IEC 60947-5-1, IEC 61095; EN 60947-4-1, EN 60947-5-1, EN 61095, VDE 0660 VDE 0637					
Approvals						
Number of poles	2	4	4	4	2	
Rated frequency at AC	Hz	50/60				
Rated control voltage U_c	V AC	24, 230	24, 115, 230	24, 230	24, 230	--
Primary operating range	$\times U_c$	0.85 ... 1.1				--
Rated operational voltage U_e	V AC	230	400			230/400
Rated operational current I_e	A	20	25	40	63	6/4 (230/400 V)
Rated power dissipation P_v						
• Pick-up power (without manual switch or manual switch in "I" position)	VA/W	6/3.8	10/5	15.4/6		--
• Pick-up power (with manual switch in "AUTO" position)	VA/W	12/10	33/25	62/50		--
• Holding power	VA/W	2.8/1.2	5.5/1.6	7.7/3		--
• Per contact	VA	1.7	2.2	4	8	--
Switching times						
• Closing (NO contacts)	ms	15 ... 25	10 ... 20	15 ... 20		--
• Opening (NO contacts)	ms	20	20	10		--
• Closing (NC contacts)	ms	20 ... 30	20 ... 30	5 ... 10		--
• Opening (NC contacts)	ms	10	10	10 ... 15		--
Rated impulse withstand voltage U_{imp}	kV	4				
Rated insulation voltage U_i	V	440		500		
Contact gap, minimum	mm	3.6		3.4		4
Electrical service life						
At I_e and load						
• AC-1/AC-7a	For switching cycles	200000		100000		--
• AC-3/AC-7b		300000	500000	150000		--
Mechanical service life	For switching cycles	3 million				
Maximum switching frequency						
At load	In switching cycles/h	600				
Switching of resistive loads AC-1/AC-7a						
For rated operational power P_s						
• Single-phase 230 V	kW	4	5.4	8.7	13.3	--
• Three-phase 400 V	kW	--	16	26	40	--
Switching of three-phase asynchronous motors AC-3/AC-7b						
For rated operational power P_s						
• Single-phase 230 V	kW	1.3 ¹⁾	1.3	3.7	5	--
• Three-phase 400 V	kW	--	4	11	15	--
Minimum switching capacity	V; mA	17; 50				12; 5
Overload withstand capability						
Per conducting path (NO contacts at 10 s only)	A	72	68	176	240	--
Short-circuit protection, according to coordination type 1						
Back-up fuse characteristic gL/gG	A	20	25	63	80	6
Terminals	\pm screw (Pozidriv)					
• Coil connection		1		1.2		--
• Main connection		1		3.5		1
Tightening torques						
• Coil connection	Nm	0.6				--
• Main connection	Nm	1.2		2		0.8
Conductor cross-sections						
• Coil connection	Rigid	mm ²	1.0 ... 2.5			--
	Flexible, with end sleeve	mm ²	1.0 ... 2.5			--
• Main connection	Rigid	mm ²	1.0 ... 10	1 ... 25		1 ... 2.5
	Flexible, with end sleeve	mm ²	1.0 ... 6	1 ... 16		1 ... 2.5
Permissible ambient temperature						
• For operation	°C	-5 ... +55				
• For storage	°C	-30 ... +80				
Degree of protection	Acc. to EN 60529		IP20, with connected conductors			

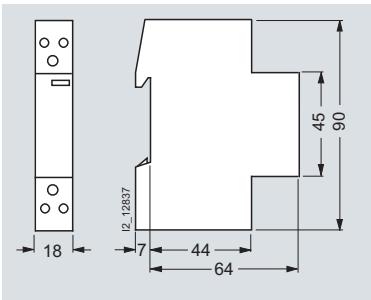
¹⁾ For NO contacts only.

Insta contactors, AC technology, 5TT5

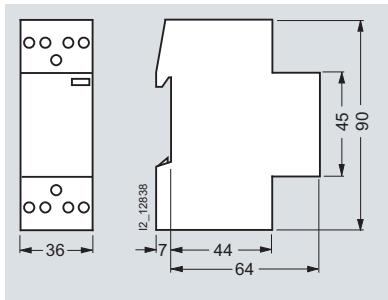
Dimensional drawings

Insta contactors, AC technology

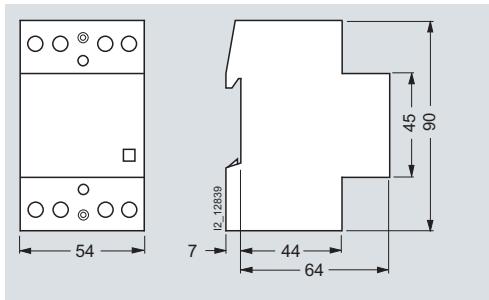
Without manual switch



5TT5 80.-0
5TT5 80.-2

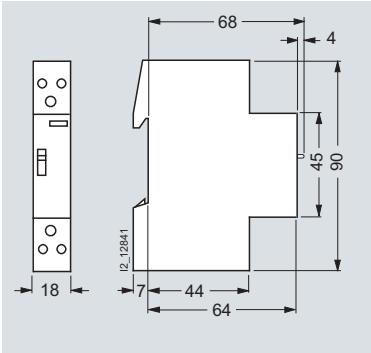


5TT5 820-0
5TT5 83.-0
5TT5 83.-2

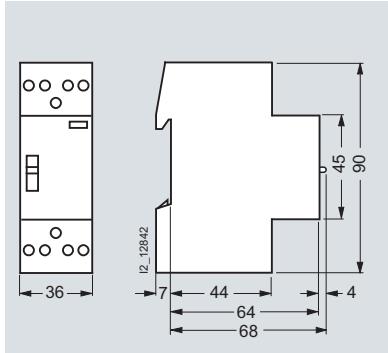


5TT5 84.-0
5TT5 84.-2
5TT5 85.-0
5TT5 85.-2

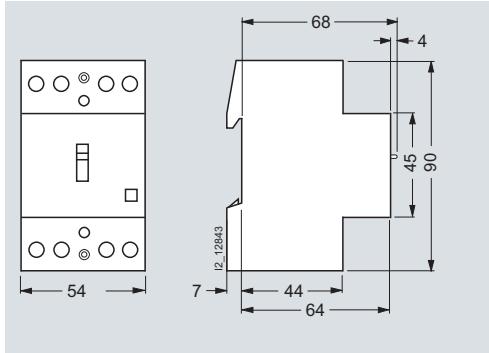
With manual switching



5TT5 80.-6
5TT5 80.-8

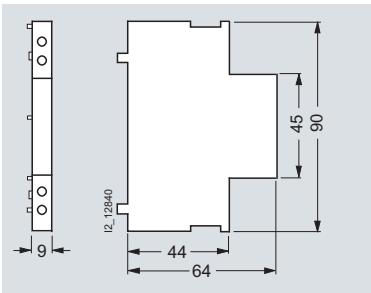


5TT5 83.-6
5TT5 83.-8



5TT5 84.-6
5TT5 84.-8
5TT5 85.-6

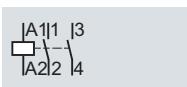
Auxiliary switches



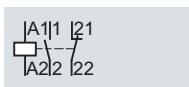
5TT5 910-0
5TT5 910-1

Schematics

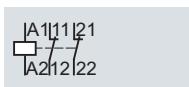
Diagrams



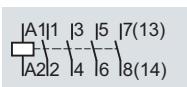
5TT5 800



5TT5 801



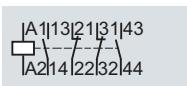
5TT5 802



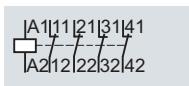
5TT5 820
5TT5 830
5TT5 840
5TT5 850



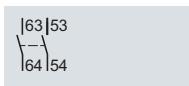
5TT5 831
5TT5 841
5TT5 851



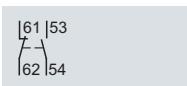
5TT5 832
5TT5 842
5TT5 852



5TT5 833
5TT5 843
5TT5 853



5TT5 910-0



5TT5 910-1

Switching devices

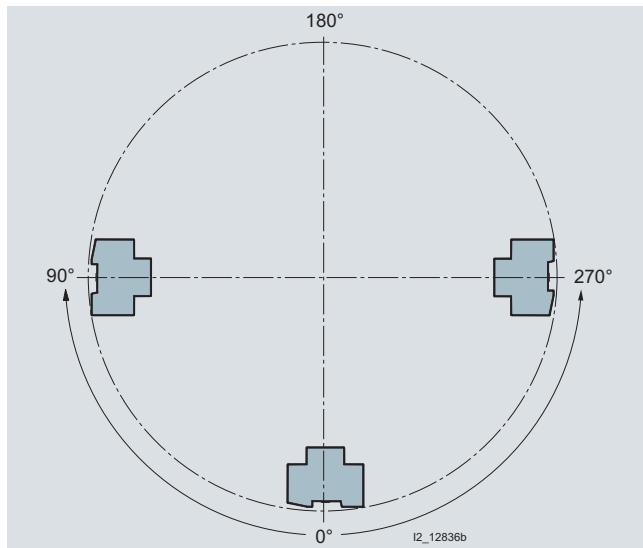
Insta contactors

Insta contactors, AC technology, 5TT5

More information

Mounting position, Insta contactors, AC technology

The installation of the devices is permissible in the positions shown in the following diagram (0° to 90°, 270° to 0°). There are no restrictions when the devices are installed in these normal mounting positions.



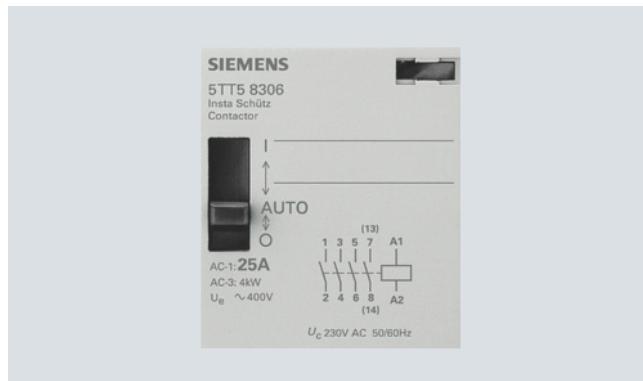
Heat dissipation

If several Insta contactors with AC magnetic system are mounted in series in a distribution board, there are no restrictions for the types 25 A, 40 A and 63 A within the permissible ambient temperature range up to 55 °C. For 20 A types within the temperature range up to 40 °C, a 5TG8 240 spacer must be installed after every third Insta contactor, and in the temperature range over 40 °C to 55 °C, after every second contactor.

Manual switching with O/I/Automatic function

The 5TT5 8...-6 and 5TT5 8...-8 versions also offer a manual switch. The knob allows preselection of 3 positions:

- Knob in the "AUTO" position
Automatic mode → normal protective function
- Knob in the "I" position
Continuous operation → switched on manually
(without control signal, when a control signal is applied, the manual switch on reset, i.e. the knob is automatically reset to the "AUTO" position)
- Knob in the "O" position
Off → switched off
(coil circuit interrupted)



Plant test without applying a control voltage

Insta contactors with O/I/Automatic function enable the testing of a plant by manual switch without the need to apply a control voltage.

Automatic resetting through control signal

When applying a control signal to the terminals A1 and A2, the Insta contactors can be reset from continuous operation mode ("I" position) to automatic mode ("AUTO" position).

Soft-starting devices, 5TT3

Overview

The soft-starting device is an electronic control for the soft startup of one-phase asynchronous machines. A phase control causes the current to rise steadily. This also increases the motor torque and the drive starts up smoothly. Because drive elements are handled more gently they can be designed more cost-effectively. As well as a considerable reduction in startup noise, this also helps prevent the tipping or sliding of materials to be transported. The starting current is minimized. There is no speed adjustment. There is no marked soft start behavior without a mechanically connected load.

If the power semiconductor is to be protected against short circuits or ground faults during startup, a super-quick fuse must be installed. Otherwise, the usual line and motor protective

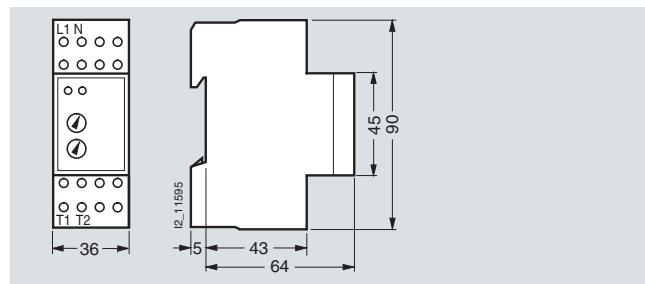
measures must be used. In the case of high switching frequencies, we recommend installing a thermistor motor protection for monitoring the permissible motor temperature.

The soft-starting device must not be operated with capacitive load. In order to ensure the safety of persons and systems, only suitably qualified personnel should work on these devices. To prevent losses in the device, the power electronics are bridged with relay contacts after startup. Existing plants can also be retrofitted at any time. See Technical Specifications

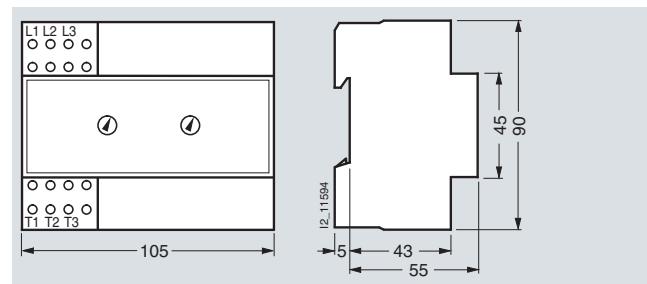
Technical specifications

	5TT3 440	5TT3 441
Standards	EN 60947-4-2 (VDE 0660-117)	
Supply/motor voltage	V AC	400 230
Primary operating range	$\times U_c$	0.8 ... 1.1
Rated power	VA	3.5 1.4
Rated frequency	Hz	50/60
Rated power dissipation P_v	Coil/drive contact ¹⁾ per pole	3.5 4.6 1.7 0.7
Rated output of motor		
- Max.	At 400 V	VA 5500
- Min.	At 400 V	VA 300 1500 100
Startup voltage	%	30 ... 70 20 ... 70
Starting ramp	s	0.1 ... 10
Recovery time	ms	100 200
Switching frequency		
$3 \times I_N, T_{AN} = 10 \text{ s}, v_u = 20 \%$	Switching cycles/h	36 (up to 3kW) 20 (from 3 ... 5.5 kW)
$3 \times I_N, T_{AN} = 10 \text{ s}, v_u = 20 \%$	Switching cycles/h	10 10
Semiconductor fuse	Super quick	A 35 20
Conductor cross-sections	Rigid Flexible, with end sleeve	max. mm ² min. mm ² 2 x 2.5 1 x 0.5
Permissible ambient temperature	°C	-20 ... +60 -20 ... +55
Resistance to climate	Acc. to EN 60068-1	20/60/4 20/55/4

1) For rated operational current.

Dimensional drawings**5TT3 44. soft-starting devices**

5TT3 441



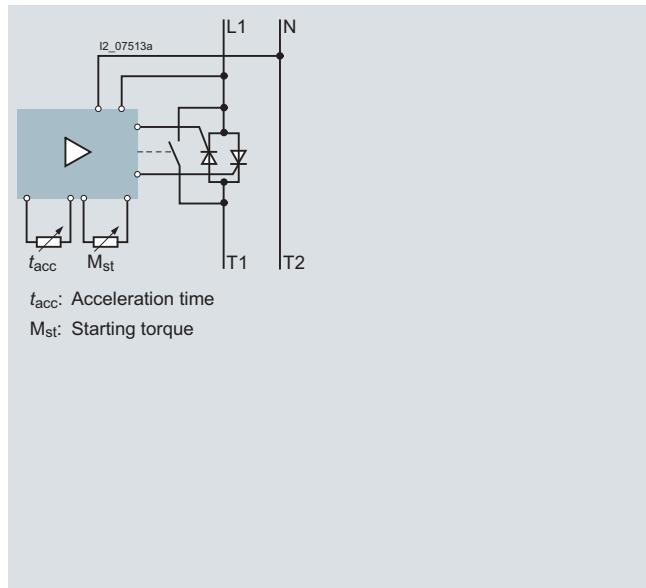
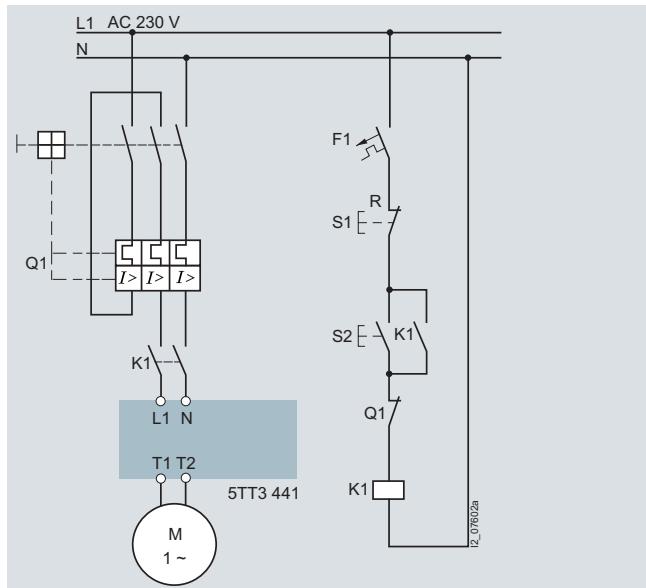
5TT3 440

Switching devices

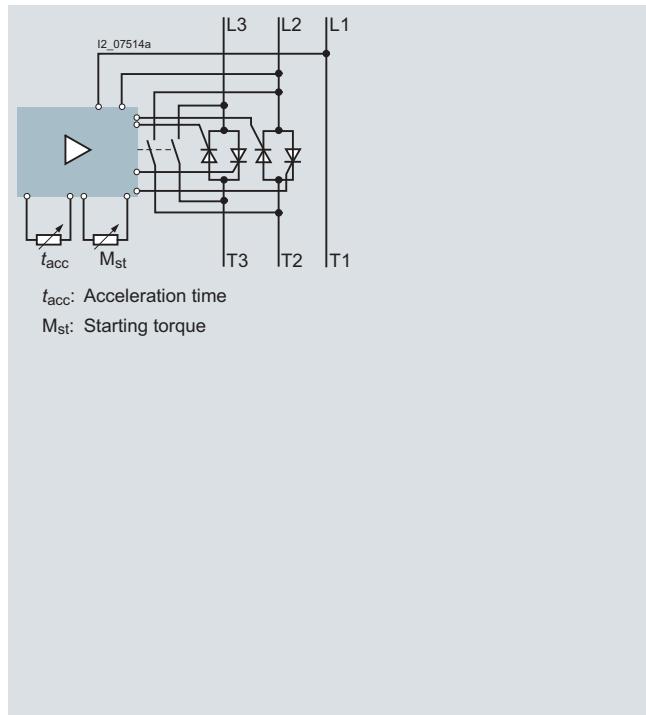
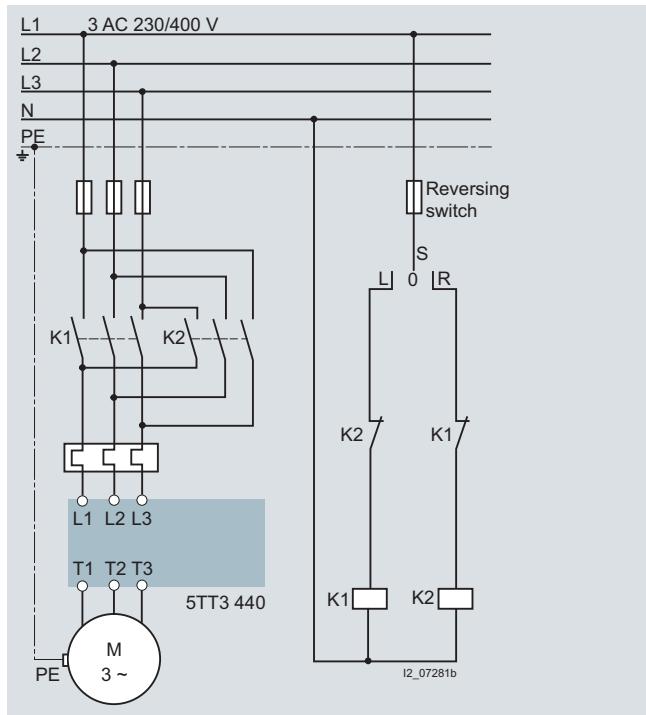
Soft-starting devices, 5TT3

Schematics

Switching example: 5TT3 441



Switching example: 5TT3 440



Overview

Connecting loads

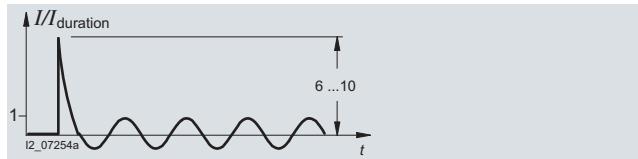
The increased starting currents of different loads and thus the risk of contacts welding is often underestimated.

Resistive load:

The resistive load, e.g. electrical heating, does not increase the starting current.

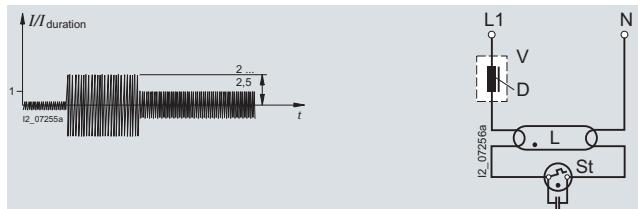
Incandescent lamps:

The cold coiled filament in incandescent lamps or halogen lamps causes a 6 to 10-fold starting current for approx. 10 ms.



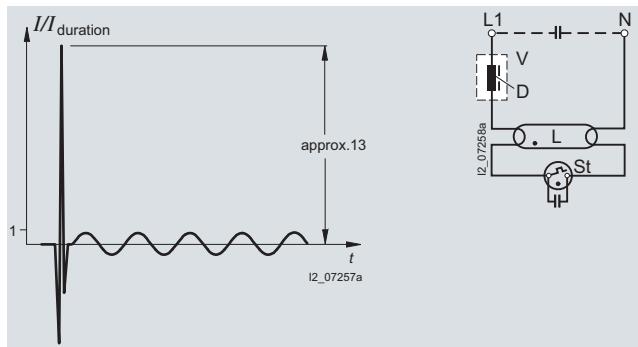
Uncorrected fluorescent lamps:

When switched on over several periods, the heating current of the coiled filament and the operational current produce a 2 to 2.5-fold inductive current.



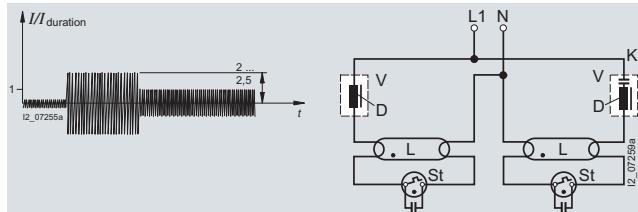
Parallel corrected fluorescent lamps:

When switched on, the capacitor causes an extreme, up to 13-fold, current for approx. 10 ms.



Fluorescent lamps in Duo circuit:

The series capacitor effects a correction. In spite of this, an increased starting current is produced over several periods, just as for uncorrected fluorescent lamps.



Selecting contacts for lighting installations

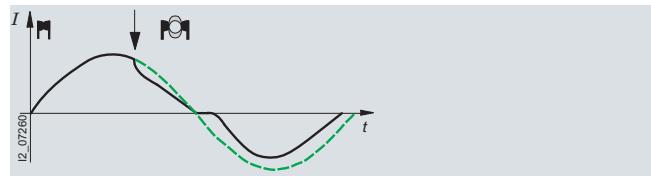
A wide range of different contacts are used for modular installation devices:

- Contacts with > 3 mm contact gap, as for Insta contactors, AC technology
- Switching relay contacts with m contacts (contact gap > 1.2 mm but < 3 mm)
- Manually operated contacts with > 3 mm contact gap, as for 5TE8 switches
- Relay contacts with μ contacts (contact gap > 0.5 mm), like those used on the printed boards of electronic devices.

The selection tables in the technical specifications help you to find the correct switching device for the different lighting installations.

Disconnecting loads

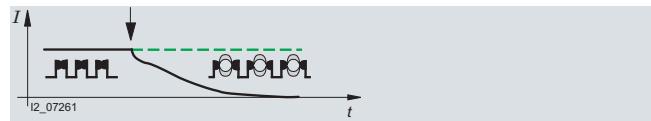
If a contact with current flowing through it opens, this always ignites an electric arc above 24 to 30 V. This electric arc depends on the voltage, the length of the isolating distance, contact speed, actuating angle and current intensity. The principle of the so-called zero cutoff is that after no more than 1½ half-waves, the electric arc is quenched in the current zero. There are no further quenching aids or current limiters, as is the case with the miniature circuit breakers.



Disconnecting direct currents

When switching direct voltages, there is no zero-crossing of the current to quench the electric arc. In order to still be able to switch appreciable currents, contacts are connected in series to increase the isolating distance.

Some switching devices are provided with planning data for switching direct currents. Compliance with these planning data is essential. If the data values are exceeded the electric arc is not reliably quenched and there is a risk of fire.



Safe separation

When operating 230 V and safety extra-low voltage SELV – voltage of bell transformers or transformers for permanent load – on a device, it is essential to ensure "safe separation". This requires at least 8 mm creepage distances and clearances and a voltage endurance greater than 4 kV. If these conditions – 8 mm or 4 kV – are not fulfilled, the term "electrical separation" as "not SELV" is used instead of the term "safe separation".

Switching devices

Timers

Digital time switches, 7LF4

Overview

These days, time switching is taken for granted.

In fact, it is now hard to imagine many process sequences and energy saving processes without time switching. It could also be argued that time switching satisfies a basic need in the electrical installation sector.

The new generation of digital time switches have a much more diverse range of functions than earlier devices and, thanks to better solutions, are simpler to operate.

They can be used for switching systems or system components, or for functions, such as: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy controls, school bells, church bells, shop window lighting, advertising lighting, gym lighting, traffic signal controls, street lighting, illuminated signs, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, ovens, heating systems, air-conditioning systems, fans and ventilation systems, heating and circulation pumps and sauna systems.

All devices have the VDE mark and are UL approved (not 7LF4 444).

Digital time switches, 7LF4

Technical specifications

	Mini 7LF4 401-5	Top 7LF4 411 7LF4 412	Profi 7LF4 421 7LF4 422	Astro 7LF4 431 7LF4 432	Expert 7LF4 444
Standards	EN 60730-1, -2-7; VDE 0631-1, -2-7; UL 60730				EN 60730-1, -2-7; VDE 0631-1, -2-7
Approvals	VDE, UL 60730-1,-2-7/UL 917 CSA C22.2 No. 14 and 177				VDE
Supply					
• Rated control supply voltage U_c	V AC V AC/DC $\times U_c$ Hz	110 ... 240 -- 0.85 ... 1.1 50 ... 60	120, 230 24 0.85 ... 1.1 ¹⁾ 50 ... 60 ²⁾	120, 230 24 0.85 ... 1.1 50 ... 60	230 -- 0.85 ... 1.1 50 ... 60
• Rated power dissipation P_v	VA	0.035	2	2	120/230 24 80 ... 253 V ¹⁾ 50 ... 60 ²⁾
Channels/contacts					
• Switching channels	V AC	1	1 or 2		4
- Rated operational voltage U_e	250				
- Rated operational current I_e	A	16			
At p.f. = 1	A	10			
At p.f. = 0.6					
• Contacts		1 CO > 5 6000 (20 A)	1 or 2 CO 10 100000		4 CO
- Mechanical switching cycles (in millions)					
- Electrical switching cycles	At p.f. = 1				
• Minimum contact load	V; mA	12; 100			
- Incandescent lamp load	A	5	8		
- Fluorescent lamp load	VA	58	60		
At 7 μ F	VA	1400			
Uncorrected	W	100			
- Energy-saving lamp load					
Safety					
• Different phases permissible between actuator/contact		Yes			
• Rated impulse withstand voltage U_{imp}	kV	4			
- EMC: burst	Acc. to IEC 61000-4-4	> 4.4			
- EMC: surge	Acc. to IEC 61000-4-5	> 2.0			
- Electrostatic discharge	Acc. to IEC 61000-4-2	> 8.0			
• Power reserve storage	Mains/battery	a	6/2	6	5
- Battery type					
• Program memory	Captive	--	Yes		
• Overvoltage category	Acc. to EN 61010-1	III			
Function					
• Minimum switching sequences		1 min			1 s
• Make and break cycles		1 min			1 s
• Clock errors per day	Typical	s/day	+0.3 ± 1 ⁴⁾	± 0.86	± 0.2
• Control input	Terminal S		--		Yes
• Memory spaces					
- Programs ⁵⁾		28	56 (2 × 28)		28 (2 × 14)
- Pulse (alternatively)		--	84		4 × 3 × 28
- Pulse cycle		--	1 s ... < 60 min	--	
Connections					
• Terminals ±screw (Pozidriv)		PZ 1			
• Conductor cross-sections of main current paths					
- Rigid, max.	mm ²	4			
- Rigid, min.	mm ²	1.5			
- Flexible with end sleeve	Max.	mm ²	2.5		
Environmental conditions					
• Permissible ambient temperature	°C	-10 ... +55	-20 ... +55		
• Storage temperature	°C	-20 ... +60			
• Resistance to climate	Acc. to EN 60068-1	10/055/21	20/055/21		
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors		
• Safety class	Acc. to EN 60730-1	II			

¹⁾ For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2): Tolerance -10/+10 %; operating range 0.9 ... 1.1 × U_c .

²⁾ For 24 V devices (7LF4 421-2, 7LF4 422-2 and 7LF4 444-2): Frequency range 0 ... 60 Hz.

³⁾ For 24 V device (7LF4 444-2): P_v = 4 VA.

⁴⁾ At 25°C a clock error of +0.3s is assumed. Accuracy may deviate by a further ±1s around this value.

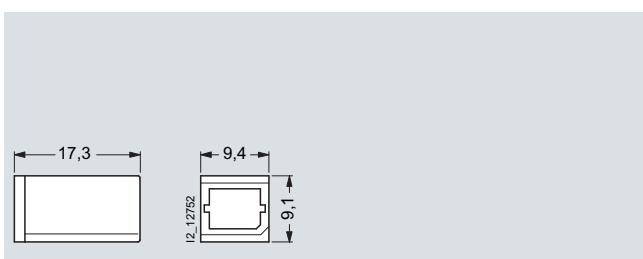
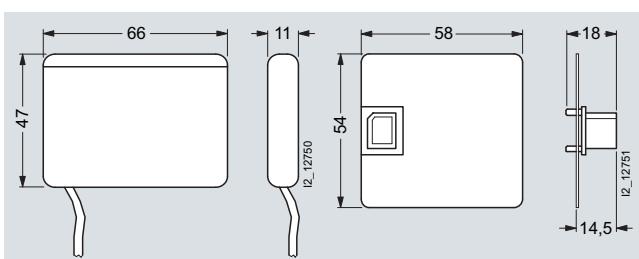
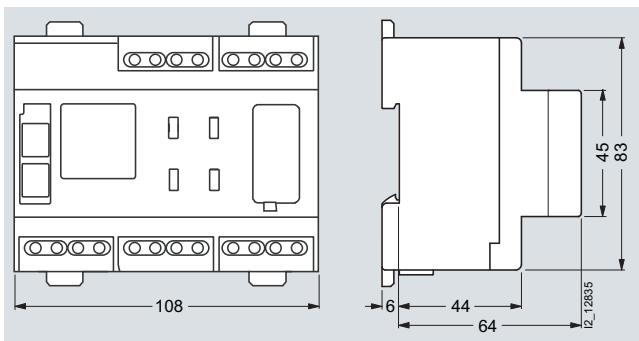
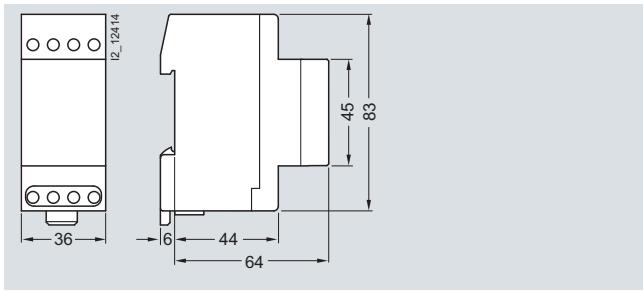
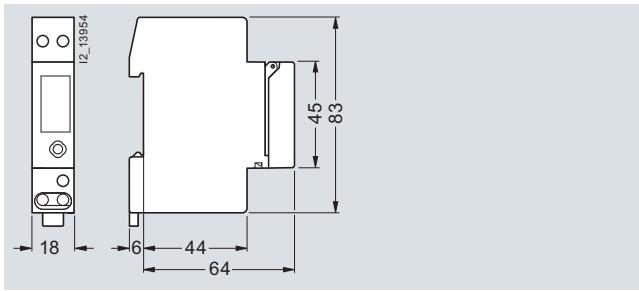
⁵⁾ A program consists of an ON time, an OFF time and assigned ON and OFF days or day blocks.

Switching devices

Timers

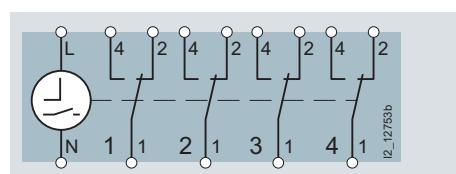
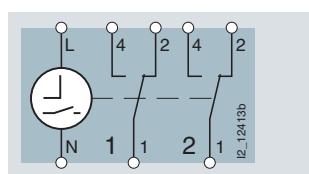
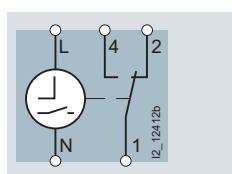
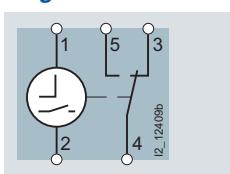
Digital time switches, 7LF4

Dimensional drawings



Schematics

Diagrams



More information

Mini digital time switches



The Mini digital time switch with a width of only 1 MW and its hourly, daily and weekly program is ideal for replacement and use in distribution boards with limited space.

The Mini digital time switch can be used flexibly as it can also be operated in battery mode with all its functionalities. Furthermore, the actuator of the clock can be removed from its enclosure for easy programming over the 5-way joystick prior to mounting.

Top, Profi, Astro and Expert digital time switches

Whether you are programming locally using the text-assisted programming, or sitting comfortably in front of your PC, the task is quicker and easier with the Top, Profi, Astro and Expert digital time switches.



Simple operation:

Four programming pushbuttons offer user-friendly assistance with a text menu.

Easy-to-read display:

And if you need to change the settings of the digital time switch at the back of a dark control cabinet, the integral background lighting of the display and the lighting of the control elements offer a clear overview.

Easy commissioning:

You can get started with the programming straight away. Profi, Astro and Expert are supplied with the time, date and automatic daylight savings for Central Europe already set.

Clear contrast:

In order to maintain an overview even in bad light conditions and extreme temperatures, the contrast of the display can be adjusted - practical down to the very last detail.

Convenient programming:

It has never been so easy and uncomplicated to operate and program a digital time switch.

1-channel time switches allow input of up to 56 switching programs, 2-channel time switches allow up to 28 programs per channel and 4-channel time switches up to 84 programs per channel. This means that the Profi, Astro and Expert time switches are ideally equipped for even the most complex of tasks.

Each entry required is clearly indicated so no prolonged studying of the operating instructions. And, particularly practical: you don't even need a power supply to program the digital time switches.

The Profi, Astro and Expert digital time switches offer more than reliable switching. Numerous integrated convenience functions make them versatile and simple problem solvers.

A data key enables easy programming of the Profi, Astro and Expert digital time switches at a PC, simplifies the setting of time switch programs and saves enormous amounts of time. This prevents human error and enables simple copying of complete time switch programs to different time switches.

Astro function:

The Astro and Expert time switches have one key strength: the Astro function. The exact time of sunrise and sunset is available for every location and every day in the year. This means, for example, that the connected outer lighting is only switched on when it is dark - whether it is winter when the days are shorter or in summer when the days are much longer. The benefits are obvious:

- Cost-savings, because electricity is only used when the lighting is really needed, and because this prolongs the service life of the lighting itself. Particularly in the case of dusk-dependent lighting controls.
- Safety and convenience, because the light is always switched on when it's dark
- Ease-of-use, because the digital time switch doesn't have to be reprogrammed throughout the year
- Installation couldn't be easier, because Astro digital time switches work in the distribution board. No further need for laborious cable laying to the light sensors. This means that it is not necessary to lay cables across the lightning protection zones. The compact 2-MW series is also ideally suited for retrofitting or replacement.

It goes without saying that the digital time switches Astro and Expert don't just switch at dawn and dusk, complex, combined programs are also possible. You always have the choice between astronomically calculated and individually set switching times, or a combination of both.

Switching devices

Timers

Digital time switches, 7LF4

PC programming:



The Profi, Astro and Expert digital time switches support plug-in data keys. This provides even greater safety and convenience.

For example, the data key lets you read out a program from a digital time switch, copy it to a PC, where it can be saved and edited - or simply transfer it to another time switch. You can also work with several data keys and it takes only a matter of seconds to change programs.

A safety copy ensures fast service. So if a time switch has been interfered with, you can simply use the data key to transfer the stored program back to the time switch.

Thanks to the standard operator interface, based on MS-Office, there is no need for laborious program training.

Pulse function for 1-channel devices:

With the pulse function, up to 84 start times and a pulse time can be programmed onto the time switch. The pulse duration can be selected between 1 s and 59 min 59 s.

Random function:

If the random function is activated, the set switching times are shifted within a range of +/- 30 min.

Operating hours meter:

For commercial fields of application in particular, it is often necessary to establish the running time of the switched load, e.g. lighting. The operating hours meter shows the total ON time per channel and the date of the last reset.

Vacation period function:

In the vacation program, the vacation period is set with start and end date. If the vacation program is activated, the digital time switch does not carry out any programmed switching commands during the relative period but, depending on the respective input, is set to "CONTINUOUSLY OFF" or "CONTINUOUSLY ON" during the vacation period. At the end of the specified vacation period, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

Control input:

The delay time that can be adjusted in the control input enables an additional switching of the relay, parallel to the switching program. Settable overtravel 0 min to 23 h 59 min, the delay time starts as soon as the voltage drops out at the control input.

1 h test:

The "1H TEST" function can be used for simulating switching. If "1H TEST" is activated, the switching outputs are switched for one hour. At the end of the specified time, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

PIN code:

Input and programming can be disabled using a four-digit PIN code.

Week programs:

Programs that are designed to be repeated regularly every week, e.g. light control, heating control. A weekly program comprises an ON/OFF time and assigned ON/OFF days.

Year programs:

Programs that are only to be executed within a defined period of validity. They overlap with the week programs of the same channel according to an OR operation. The period of validity is specified by entering the start/end date. Validity from start date 00:00:00 to end date 24:00:00. The start date must be prior to the end date. Within their period of validity, these programs act as weekly programs. Outside their period of validity, these programs have no influence on the switching behavior.

Exception programs:

have a higher priority than week and year programs. Week and year programs of the same channel will not be executed within the period of validity of an exception program. However, within the period of validity other exception programs will be executed. The different exception programs overlap according to an OR operation.

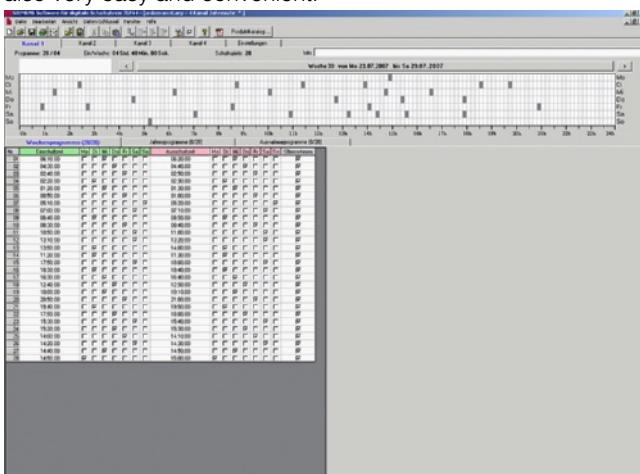
Cycle function:

On the year time switch, channel 1 has an additional option for "cyclic switching". The term "cyclic switching" means that within a specific period, the time switch is switched on for a specific duration (ON time). The cycle time can be set between 2 seconds and 2 hours. The ON time can be set between one second and one hour.

USB adapters



The Profi, Astro and Expert time switches are easy to program at the PC using the data key with the USB adapter and software. This enables the simple and fast creation of complicated time switch programs. Storing and copying time switch programs is also very easy and convenient.



- Clear data on the annual ON time of the consumer enables a precise statement on the annual power consumption.
- You can create switching programs for digital time switches easily and conveniently at the PC in the comfort of your own home, store it on the data key and transfer it to the time switch on site.
- You save time not only when creating and transferring programs, but also during maintenance.

Switching devices

Timers

Mechanical time switches, 7LF5

Overview

These days, time switching is taken for granted.

These days, energy savings through time switching have become a matter of course. In fact, it is now hard to imagine many process sequences without time switching.

Mechanical time switches are used wherever the minimum switching interval is sufficient. The switching control pins can be set without the use of tools at minimum intervals of 15 minutes. They can be used for switching systems or system components, or for functions, such as: irrigation systems, greenhouses, public gardens, swimming pools, filtering installations, canopy controls, church bells, shop window lighting, advertising lighting, gym lighting, traffic signal controls, street lighting, illuminated signs, office lighting, lighting of stairwells and entrances, object illumination, preheating of industrial furnaces, spraying machines, ovens, heating systems, air-conditioning systems, fans and ventilation systems, heating and circulation pumps and sauna systems.

All devices have the VDE mark and are approved to UL.

Mechanical time switches, 7LF5

Technical specifications

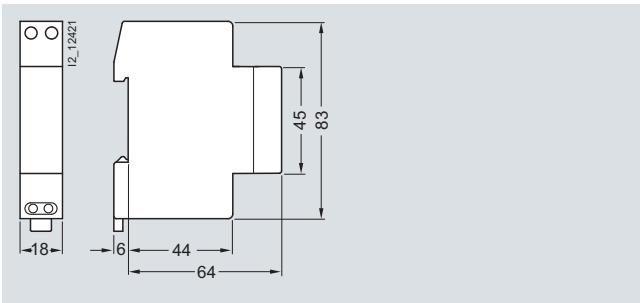
	Synchronous time switches without power reserve					Quartz-clock time switches with power reserve						
	7LF5 300-1	7LF5 300-5	7LF5 300-6	7LF5 300-7	7LF5 301-0	7LF5 301-1	7LF5 301-4	7LF5 301-5	7LF5 301-6	7LF5 301-7	7LF5 305-0	
Standards	EN 60730-1, -2-7, UL 917											
Approvals	UL 60730-1,-2-7/UL 917 CSA C22.2 No. 14 and 177											
Operating mode	Synchronous					Quartz						
• Time program	Day	Day	Week	Hour	Day	Day	Day	Week	Day	Week	Week	Day
Supply												
• Rated control supply voltage U_c	V AC	230				230						
- Primary operating range	$\times U_c$	0.85 ... 1.1				0.85 ... 1.1						
• Rated frequency	Hz	50				50						
- Frequency ranges	Hz	50				50/60						
• Rated power dissipation P_v	VA	1				1	0.2	0.2	1	1	1	
Channels/contacts												
• Switching channels	V AC	1				1						
- Rated operational voltage U_e	V AC	250				250						
- Rated operational current I_e	A	16				16						
At p.f. = 1	A	4				4						
At p.f. = 0.6	A											
• Contacts	1 NO	1 CO	1 CO	1 NO	1 CO	1 NO	1 CO	1 CO	1 CO	1 CO	1 CO	1 CO
- Mechanical switching cycles in millions	20					20						
- Electrical switching cycles at p.f. = 1	100000					100000						
• Minimum contact load	V; mA	4; 1				4; 1						
- Incandescent lamp load	A	5				5						
- Fluorescent lamps	VA	60				60						
At 7 µA	VA	1400				1400						
Uncorrected												
Safety												
• Different phases permissible between actuator/contact		Yes				Yes						
• Electrical isolation, creepage distances and clearances, actuator/contact	mm	8/6				8/6						
• Rated impulse withstand voltage U_{imp}	kV	4				4						
drive/contact												
- EMC: burst acc. to IEC 61000-4-4	kV	> 4.4				> 4.4						
- EMC: surge acc. to IEC 61000-4-5	kV	> 2.0				> 2.0						
- Electrostatic discharge acc. to IEC 61000-4-2	kV	> 8.0				> 8.0						
• Power reserve storage	a	--				100 h	6					
- Minimum loading time	h	--				48	--					
- Battery type		--				NiMH	Li primary cell					
- Service life of battery												
At 20 °C	a	--				6	10					
At 40 ?	a	--				5						6
• Overvoltage category acc. to EN 61010-1		III				III						
Function												
• Minimum switching sequences	min	30	240	5	30	30	240	30	240	30	240	30
• Make and break cycles	min	15	120	37.5 s	10	15	120	15	120	15	120	10
• Switching accuracy	min	± 5	± 30	± 0.2	± 5	± 5	± 30	± 5	± 30	± 5	± 30	± 5
• Clock errors per day			System-synchronized			± 2.5 s	± 60/year			± 2.5 s		
Connections												
• Terminals ±screw (Pozidriv)		PZ 1				PZ 1						
• Conductor cross-sections of main current paths												
- Rigid, max.	mm²	4				4						
- Rigid, min.	mm²	1.5				1.5						
- Flexible, with end sleeve	mm²	2.5				2.5						
- Flexible, without end sleeve	mm²	4				4						
Environmental conditions												
• Permissible ambient temperature	°C	-10 ... +55				-10 ... +55						
• Storage temperature	°C	-10 ... +60				-10 ... +60						
• Resistance to climate	Acc. to EN 60068-1	10/055/21				10/055/21						
• Degree of protection	Acc. to EN 60529	IP20, with connected conductors				IP20, with connected conductors						
• Safety class	Acc. to EN 61140	II				II						

Switching devices

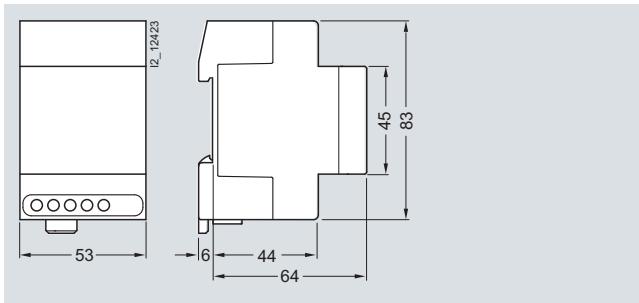
Timers

Mechanical time switches, 7LF5

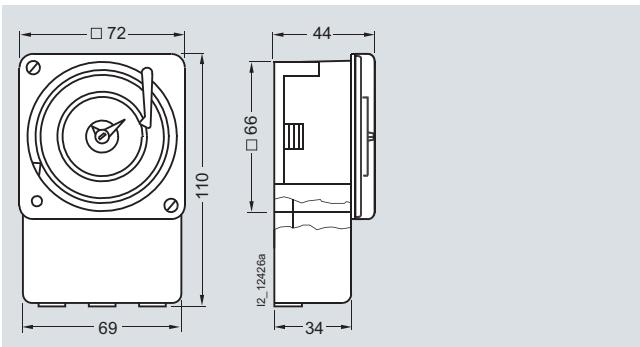
Dimensional drawings



7LF5 300-1
7LF5 300-7
7LF5 301-1



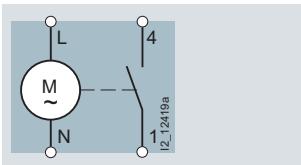
7LF5 300-5
7LF5 300-6
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7



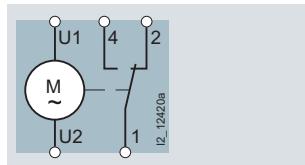
7LF5 301-0
7LF5 305-0

Schematics

Diagrams



7LF5 300-1
7LF5 300-7
7LF5 301-1



7LF5 300-5
7LF5 300-6
7LF5 301-0
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7
7LF5 305-0

More information



Mechanical time switches with day disk



Mechanical time switches with week disk

Synchronous time switches without power reserve

The control gear is driven by a synchronous motor so it is dependent on the power supply frequency. If this frequency is unstable, the devices cannot be used. In the event of a power failure, the time switch will stop.

Quartz-clock time switches with power reserve

A quartz electronic circuit supplies the drive with a stabilized frequency so that the time switch is not dependent on the power supply frequency. In the event of a power failure, the time switch continues to operate on its power reserve.

Automatic setting system

This supports fast and easy installation of the 7LF5 301-4 and 7LF5 301-5 time switches. These time switches self-adjust during commissioning in fast mode to the correct time and correct day within the Central European zone. They also automatically set the correct time for daylight saving. A further advantage is the quartz-precise adjustment of the correct time and the correct day as soon as the supply voltage is reconnected after a power failure.

Precision quartz mechanism

Clock accuracy: The internal precision clockwork has an accuracy of ± 1 min. per year. Until now, this level of accuracy and automatic operational safety was only possible using digital time switches.

Optimization of power consumption due to minimum make and break cycles of 15 minutes: it is possible to set the switching times in 15-minute patterns, with a switching interval of at least 30 minutes.

LED display

The adjustment data for Central Europe are stored and an LED provides information on the current state.

So: simply unpack, snap into place, connect and set the desired switching times - no tools required! This saves time and money.

Clear design

Extremely intuitive – thanks to clear design. The switching times are easy to read.

With the weekly time switch, the make and break cycles are only 120 minutes with a minimum switching interval of 240 minutes.

Switching devices

Timers

Timers for buildings, 7LF6

Overview

In many installations there is great savings potential to be found in the lighting of corridors, stairwells and ancillary rooms. Many installations are in operation for hours without anyone being present. Lighting which is switched on unnecessarily in ancillary rooms often goes unnoticed for days.

Due to the gradual phasing out of incandescent lamps starting in September 2009, it is crucial we switch to other types of lighting. In particular compact fluorescent lamps (energy-saving lamps such as the Osram Dulux EL) will be used more frequently in stairwells as in other areas.

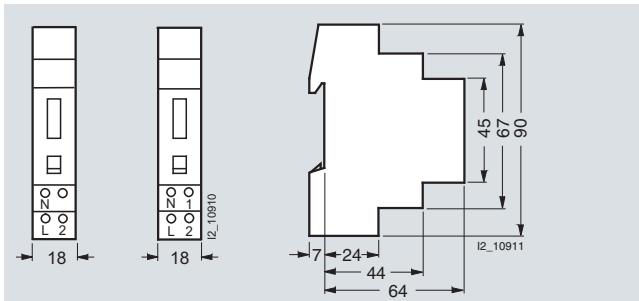
Our stairwell lighting timers offer different levels of convenience, depending on the range of functions. On stairwell lighting timers from Siemens, the required time can be precisely set without tools using the push-to-lock knurling wheel. With modern four-wire installations, stairwell lighting timers can always just be pressed again. A maintained light switch prevents the need for repeated pressing, for example when moving house. The various types are available either with or without warning prior to switch-off.

Technical specifications

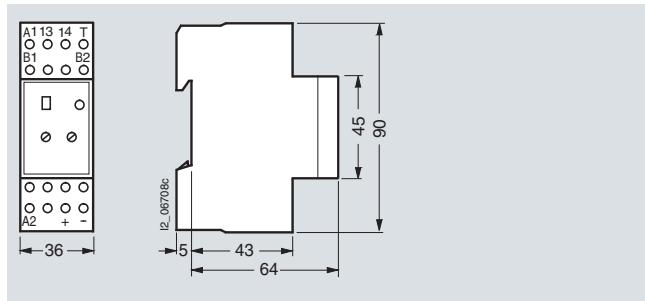
	7LF6 110	7LF6 111	7LF6 113	5TT1 303	7LF6 114	7LF6 115	7LF6 116	7LF6 112
Standards	IEC 60669, EN 60669							
Supply								
• Rated control supply voltage U_c - Primary operating range	At 50/60 Hz	V AC $\times U_c$	230 0.9 ... 1.1					
• Rated power dissipation P_v		VA	Approx. 5					
Setting range		min	0.5 ... 10		1 ... 10	0.5 ... 10	3 ... 60	0.5 ... 10
• Accuracy		s	± 30					
Manual switches	Automatic/permanent		Yes					
Minimum push duration		ms	30					
Voltage endurance	At pushbutton input (pushbutton malfunction)		Yes					
Short-circuit strength	A	700		--	700			
Channels/contacts								
• Switching channels - Rated operational voltage U_e - Rated operational current I_e	At p.f. = 1	V AC A	250 16	--	10	16		
• Contact gap		mm	> 3		0.3	> 3		
• Minimum contact load		V; mA	10; 300					
Max. incandescent lamp load	W	2000		--	2000		--	
Max. energy-saving lamp load 14 W	Unit(s)	20		--	20		--	
Fluorescent lamp load 58 W								
- Uncorrected		Unit(s)	20	--	20			
- DUO circuit		Unit(s)	2 x 20	--	2 x 20			
- Siemens ECG	1 lamp	Unit(s)	10	6	10			
	2 lamps	Unit(s)	2 x 5	3	2 x 5			
Glow lamp load	mA	50		10	50		--	
Max. fan load	VA	--					200	
Connections								
• Terminals \pm screw (Pozidriv)			PZ 1					
• Conductor cross-sections of main current paths - Rigid		mm ²	1.5 ... 6					
- Flexible, with end sleeve	Min.	mm ²	1					
Environmental conditions								
• Resistance to climate	Acc. to EN 60068-1	°C	-20 ... +50					
• Degree of protection	Acc. to EN 60529		IP20, with connected conductors					

Timers for buildings, 7LF6

Dimensional drawings



7LF6 110 7LF6 111
7LF6 112
7LF6 113
7LF6 114
7LF6 115
7LF6 116

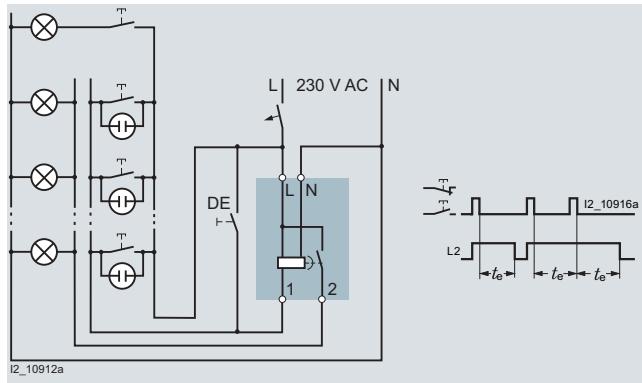


5TT1 303

Schematics

Switching example: 7LF6 111 timer in 4-wire circuit, L-momentary contact, resettable

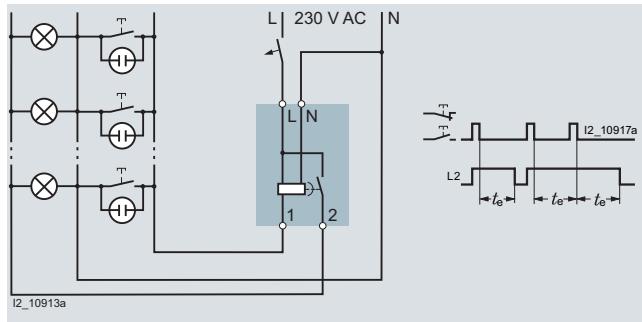
Usual circuit for new installation with separate cable routing for pushbuttons and lights. The additional DI switch allows external switching to continuous light. A time switch can also be used. An additional attic circuit is also available, which operates independently of the timer, but on the same electrical circuit. The timer can be restarted before the set time expires.



t_e = runtime

Switching example: 7LF6 111 timer in 3-wire circuit, N-momentary contact, resettable

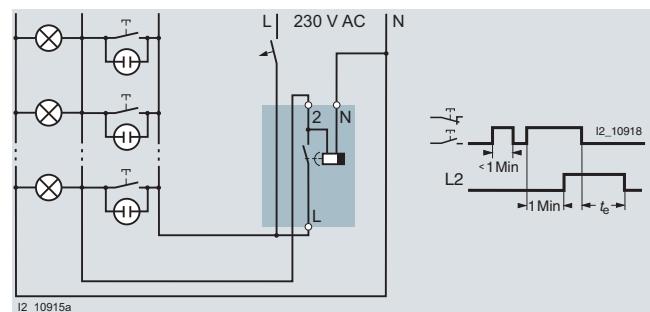
Can only be used with a limited number of wires. The timer can be restarted before the set time expires. While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0100-460. However, it is used in old systems for replacement purposes.



t_e = runtime

Switching example: 7LF6 112 timer for fans up to 200 VA

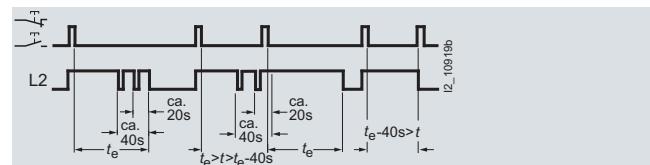
The switch switches the light on immediately, e.g. in a toilet. After a delay of approx. 1 minute, the fan is switched on. When the light is switched off, the fan continues to run for the time set at the timer.



t_e = runtime

Switching example: 7LF6 115 energy-saving timer with advance warning

The timer is connected in the same way as the 7LF6 111 timer in a 4-wire or 3-wire circuit. The energy-saving timer switches on if pressed once and switches off when it is pressed again. If it is not switched off manually, it is automatically switched off after the set time, max. 60 minutes. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending tripping. This allows time to reset the switch while the light is still on. Prior to the warning time, a push of the button ends the timing interval.



t_e = runtime

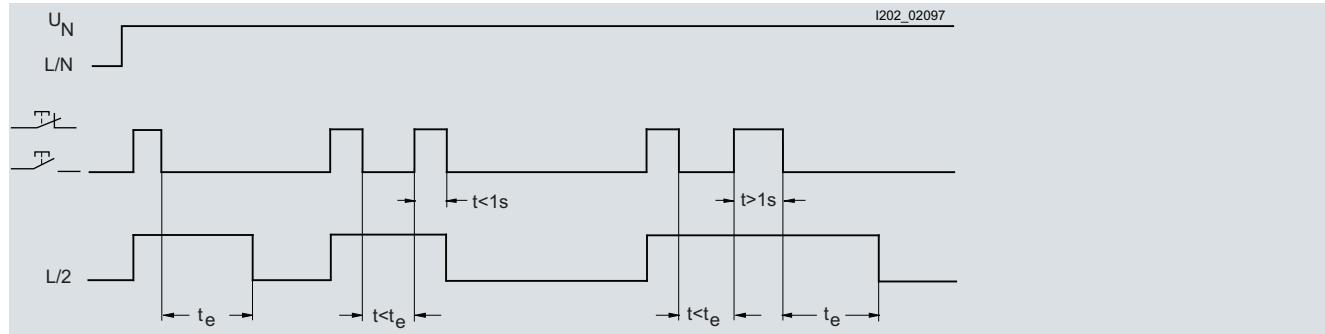
Switching devices

Timers

Timers for buildings, 7LF6

Switching example: 7LF6 116 energy-saving timer

The timer is connected in the same way as the 7LF6 115 timer in a 4-wire or 3-wire circuit. The energy-saving timer switches on if pressed once and switches off when it is pressed again briefly (less than 1 second).



t_e = runtime

Lighting in ancillary rooms and corridors

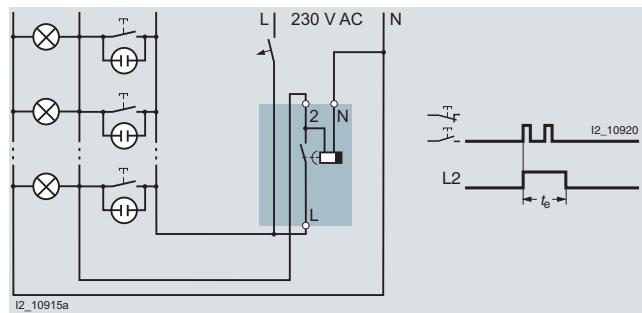
In rooms which are entered only rarely (basements, ironing rooms, attics, heating oil storerooms) there is a risk of the lighting remaining on unnecessarily for lengthy periods. For such cases the 7LF6 115 and 7LF6 116 energy-saving timers can cut energy costs notably while increasing user-friendliness.

When a user leaves the room he can switch off the light by push-button, as on an installation with remote control switch. If the user's hands are full or if he forgets to switch off, the lighting will go out automatically after a pre-set time.

The 7LF6 115 and 7LF6 116 energy-saving timers can also be used in corridors, e.g. as replacements for remote control switches. In this case they combine the familiar functionality of a remote control switch with the energy-saving features of a stairwell lighting timer.

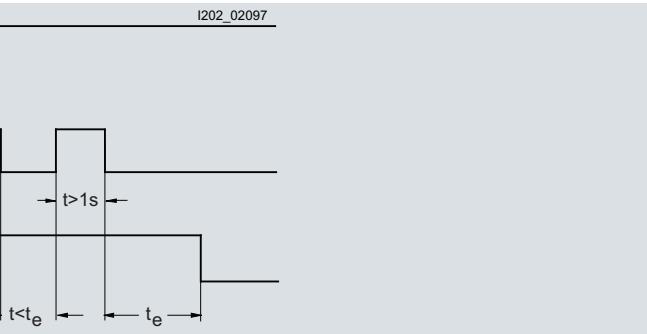
Switching example: 7LF6 110 timer in 3-wire circuit, L-momentary contact, not resettable

Circuit for new installation with shared cable routing for push-buttons and lights. The timer can only be restarted after the set time expires.



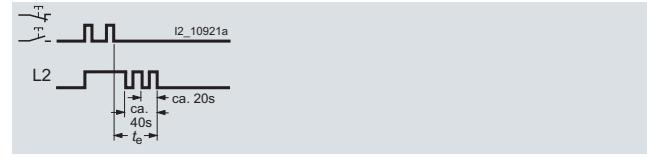
t_e = runtime

Resetting is possible by pressing a second time for longer (more than 1 second). If it is not switched off manually, it is automatically switched off after the set time, max. 60 minutes.



Switching example: 7LF6 113 timer with advance warning

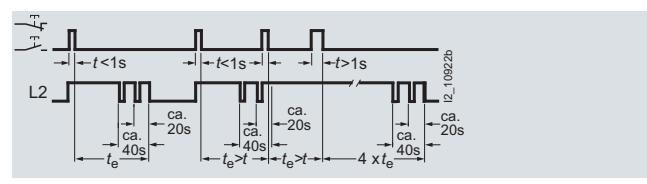
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire or 3-wire circuit. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending tripping. This allows time to reset the switch while the light is still on.



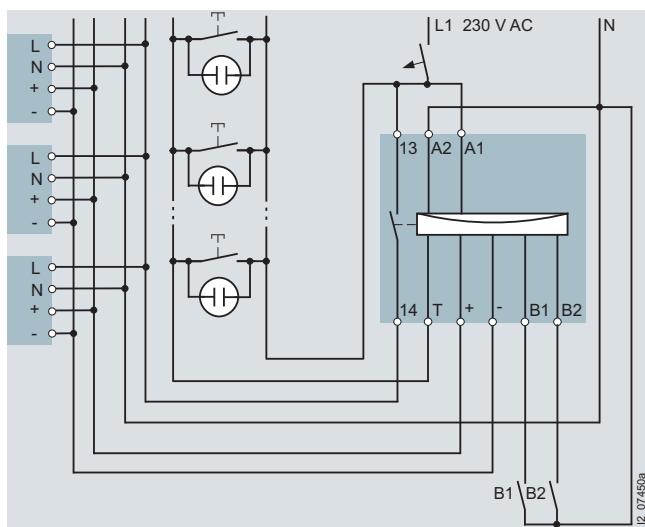
t_e = runtime

Switching example: 7LF6 114 lighting timer with advance warning

The timer is connected in the same way as the 7LF6 111 timer in a 4-wire or 3-wire circuit. When pressed, the lighting timer switches on for the set runtime, up to 10 minutes. If the switch is pressed for more than one second, the light is switched on for four times the set time, i.e. up to 40 minutes. The last press of the pushbutton is decisive. 20 and 40 seconds before expiry, the light flashes briefly twice (50 ms) to warn of the impending tripping. This allows time to reset the switch while the light is still on. The timing interval restarts each time the button is pressed.



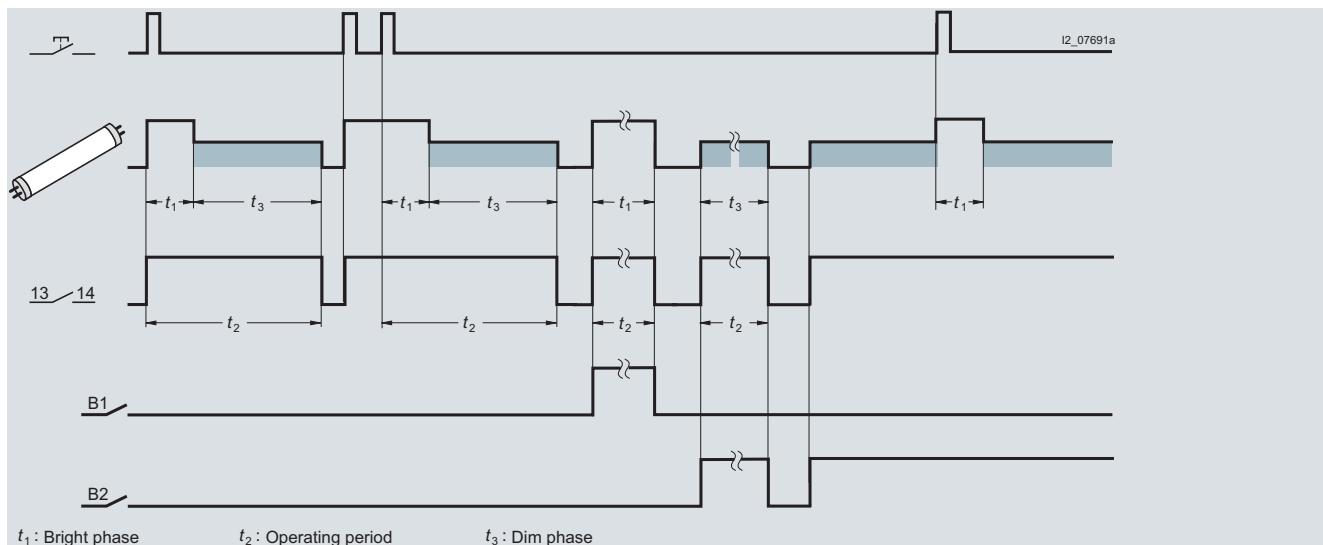
t_e = runtime

Switching example: 5TT1 303 ECG control switch

The device is fitted with a direct voltage input for the control of an ECG. When the pushbutton is actuated, the power supply is released and the ECG is brightened for up to 10 minutes, depending on the setting of the timer.

On expiry of this time, the ECG is dimmed according to the set dimmer level, if pressed again it brightens again. If the switch is not pressed for 30 minutes, the lighting switches off completely. In addition to these functions, the dimming time and brightness period can also be controlled using a separate pushbutton or time switch over the control inputs B1 and B2.

Switching the ECG and the fluorescent lamp as little as possible extends the service life.

**Corridor lighting in homes for the elderly**

At meal times, from 5 to 7 p.m., the light in the corridors can be permanently switched on using a time switch (contact B1). Between 7 p.m. and 10 p.m., the lighting is dimmed using switch B2. Simply press the corridor pushbutton again to return the lighting to the bright setting at any time. After 10 p.m., the light is switched off. It can be switched back on at any time by pressing the corridor pushbutton.

Corridor lighting in hospitals

During the day – during peak periods, lunch times, visiting times, shift changes, doctor's rounds – the light is switched on. During quiet periods, i.e. afternoons and nights, the light is switched to a dimmed state. A patient can switch the light back to the bright setting at any time by pressing the corridor pushbutton. In emergencies, the nurse can switch the light to "emergency operation", i.e. permanently bright, using switch B1 (no time limit of brightness period).

Switching devices

Timers

Timers for buildings, 7LF6

More information

Stairwell lighting

This is required in DIN 18015-2 "Electrical installations in residential buildings; Nature and extent of minimum equipment". What is less known is that 100 lux is required according to EN 12464-1 "Lighting of workplaces" for traffic areas and corridors, section 5.3. This means that approx. 60 W incandescent lamps, 25 W energy-saving lamps or 25 W fluorescent lamps need to be used. It is hard to see why lesser requirements should apply to stairwells in residential buildings than stipulated in EN 12464-1.

4-wire circuit, L-momentary contact

4 conductors are installed within the building. The timing interval is started by pressing phase L. During the runtime, the timer can be reset at all times.

3-wire circuit, L-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing phase L. No resetting is possible during the runtime as the pushbutton input and output are exposed to the same potential during this period. The glow lamps are switched off during the runtime.

3-wire circuit, N-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing the N conductor. During the runtime, the timer can be reset at all times. However, this switching no longer corresponds to DIN VDE 0100 and is now only used in old systems.

Safety through warning prior to switch-off

DIN 18015-2 "Electrical installations in residential buildings: Nature and extent of minimum equipment" stipulates that the automatic lighting-off control in stairwells of apartment houses must be equipped with a warning function to prevent sudden darkness in the building. This contribution towards safety is offered by 4 device versions. The 7LF6 113 stairwell lighting timer, the 7LF6 114 lighting timer and the 7LF6 115 energy-saving timer warn of an impending off by flashing, the 5TT1 303 stairwell lighting timer ECG warns of an impending switch-off by dimming, allowing sufficient time for the light switch to be pressed again.

Manual switches

All timers have a manual switch for the function "Automatic/ON". This allows the operator to switch to continuous light in the event of moving house or emergencies.

Useful continuous contact

Pushbuttons should never jam. For this reason, all our timers have a safeguard to prevent this type of malfunction. Even better, this feature can be used (e.g. by caretakers of properties) to switch to a continuous light in the event of moving house or emergencies.

Setting accuracy

The electronic remote control switches offer a high degree of accuracy. The runtime can be set precisely to +30 seconds using the push-to-lock knurling wheel setting. The factory settings ensure that the limit values of 1 and 10 or 60 minutes can be reliably set.

Short-circuit strength

Stairwell lighting timers are primarily used for the switching of incandescent lamps, which may occasionally be subject to short circuits. A key feature of all devices is their high short-circuit strength without the contacts welding.

Switching of fluorescent lamps

In order to extend their service life as far as possible, fluorescent lamps should only be switched using a stairwell lighting timer if the switching frequency is not excessive. Using electronic ballast (ECG) to operate them is more gentle on the device and saves energy. The 5TT1 303 stairwell lighting timer ECG switches the electronic ballast and warns of the impending switch-off by dimming.

Switching of energy-saving lamps

The switching of energy-saving lamps depends greatly on the lamp type used. Standard energy-saving lamps are generally unsuitable for warning by flashing or dimming prior to switch-off.

The 7LF6 110 and 7LF6 111 stairwell timers and the 7LF6 116 energy-saving timers without warning of impending switch-off are suitable for the use of standard energy-saving lamps (e.g. OSRAM DULUX EL).

For applications with warning of impending switch-off (7LF6 113 and 7LF6 114 stairwell lighting timers or 7LF6 115 energy-saving timers) we recommend the use of special energy-saving lamps such as OSRAM DULUX EL FACILITY or OSRAM DULUX EL VARIO.

Download from the Internet:

For more information please visit us on the Internet at:
www.siemens.com/beta

Overview

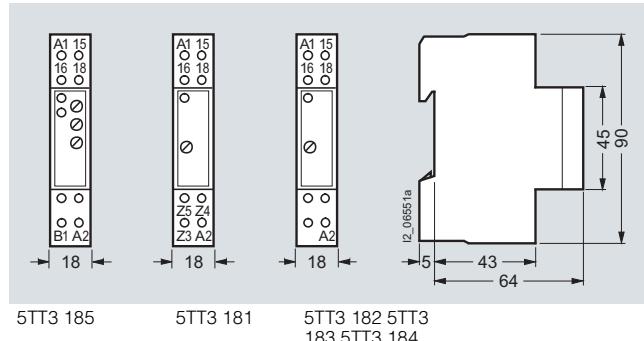
Time relays are primarily used in series applications where the use of PLC controls is too labor and cost-intensive. Multifunction

relays are now the market standard. Operation is clear, simple and offers a range of functions.

Technical specifications

	5TT3 185	5TT3 181 5TT3 182 5TT3 183	5TT3 184
Standards	EN 60255; DIN VDE 0435-110		
Supply			
• Rated control supply voltage U_c	V AC V DC $\times U_c$	12 ... 240 12 ... 240 0.8 ... 1.1	220 ... 240 -- 110 ... 240
- Primary operating range	Hz	45 ... 400	50/60
• Rated frequency f_n	VA	Approx. 1.5	Approx. 5
• Rated power dissipation P_V			Approx. 1
Setting ranges	See setting ranges, timing intervals		
Recovery time	ms	15 ... 80	Approx. 40
Contacts		Approx. 100	
• Switching channels	V AC A	250 4	8
- Rated operational voltage U_e	mm V; mA	μ contact 10; 300	5
• Contact gap			
- Minimum contact load			
Rated impulse withstand voltage U_{imp}	Input/output	kV	> 4
Electrical service life	In switching cycles At AC-15	1 A	1.5×10^5 -- 1.5×10^5 --
Connections		2	
• Terminals ±screw (Pozidriv)			
• Conductor cross-sections of main current paths	mm ²	2 × 2.5	
- Rigid, max.	mm ²	2 × 1.5	
- Flexible, with end sleeve, min.			
Environmental conditions			
• Permissible ambient temperature	°C	-40 ... +60	
• Resistance to climate	Acc. to EN 60068-1	40/60/4	

Dimensional drawings



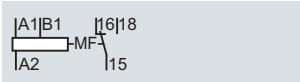
5TT3 185

5TT3 181

5TT3 182
5TT3 183
5TT3 184

Schematics

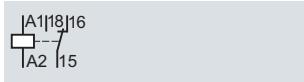
Diagrams



5TT3 185



5TT3 181

5TT3 182
5TT3 183
5TT3 184

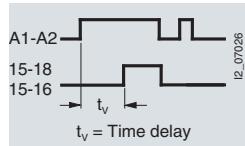
Switching devices

Timers

Timers for industry, 5TT3

More information

5TT3 181 delay timers

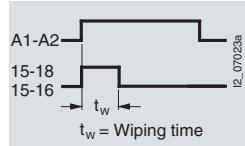


Possible time setting ranges t_v

0.25 s ...	2.5 s
1 s ...	10 s
8 s ...	80 s
64 s ...	300 s

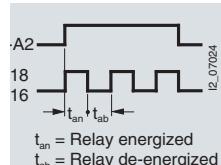
Response delay

5TT3 182 wiper timers



Wiper function

5TT3 183 flashing timers

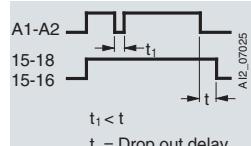


Possible joint time setting range of $t_{on} = t_{off} = t$

1 s ... 10 s

Flashing function

5TT3 184 off-delay timers



Possible time setting ranges

1 s ... 10 s

t_1 = interruption

OFF-delay

Timers for industry, 5TT3

5TT3 185 multifunctional timers

Setting aids

The period of the flashing of the green LED 1 when set for a timing interval is $1\text{ s} \pm 4\%$, which can therefore be used as a setting aid. This is particularly useful in the lower time setting range and for long delay times because the multiplication factors between the individual time ranges are exact.

Example:

Delay time to be set: 40 min.

Using the fine setting, this delay time can be set within the setting range 3 ... 300min. However, in this case it takes a long time to check the time and requires several operational sequences in realtime. To speed up the setting process, the setting range will be switched to 0.03 ... 3 min. In this case, the required value corresponds to a delay time 0.4 min (= 24 s). The timing interval is triggered and the potentiometer is set to 24 flashing periods of the yellow LED 2. The device is then set back to the setting range 3 ... 300 min and the setting process is completed.

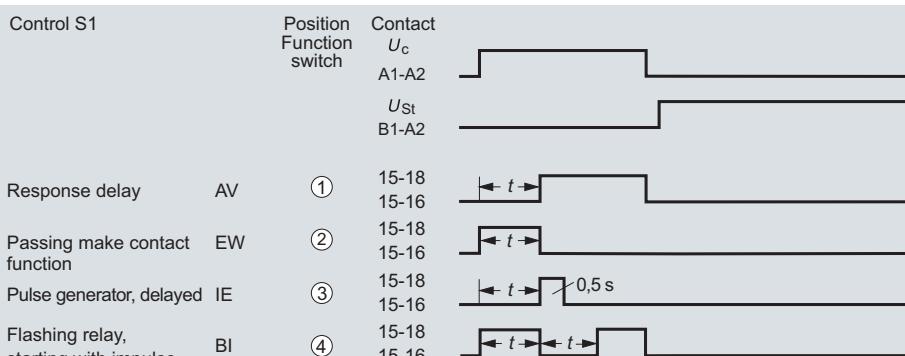
Time operation interruption/time addition

For the functions AV, EW, IE, BI, the timing interval can be interrupted at any time by activating B1 (+) and by removing the control voltage continued again (time addition).

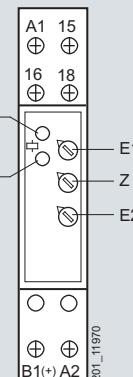
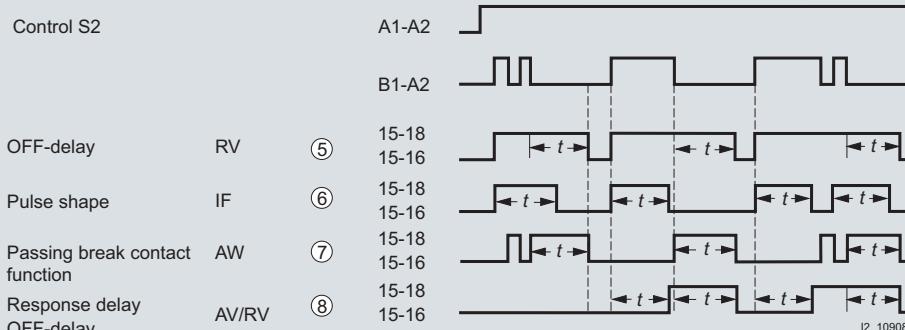
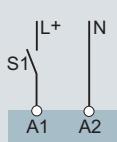
Control input B1

The functions RV, IF, AW, AV/RV can be controlled using the control input B1 (+) with potential against terminal A2. The auxiliary voltage of terminal A1 can be used for this purpose, as well as any other voltage within the range 12 ... 240 V AC/DC. The operation of parallel loads (e.g. contactors) from B1 (+) to A2 is also permissible.

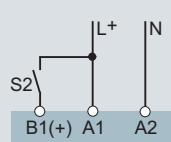
If voltage is simultaneously applied to the control input B1 (+) and A1 for the IF function, this triggers an output pulse with the set time interval t_1 .

**Possible time setting ranges t:**

0.02	...	1 s
0.06	...	6 s
0.3	...	30 s
0.03	...	3 min
0.3	...	30 min
3	...	300 min
0.3	...	30 h
3	...	300 h

**Control S1****Contact S1**

For the functions: response delay, passing make contact function, pulse generator delayed, clock generator – (start with pulse) – the timing interval is triggered by closing the switching contact S1.

Control S2**Control contact S2**

The functions: off-delay, pulse shape, passing break contact function, response and off-delay are triggered by continuous power supply over the control contact S2 between A1 and B1 (+).

User interfaces

- LED 1 Status display
- LED 2 Switching position indication
- E1 Setting range adjuster
- Z Fine adjuster for setting ranges
- E2 Function settings for timing intervals

Device displays

- LED 1 Lights up if operational voltage is applied (green)
- LED 2 indicates the timing interval and state of the equalizing relay (yellow)
 - Continuous light
 - Off output relay not activated, no timing interval
 - On output relay not activated, no timing interval
 - Flashing light
 - Short on, long off Output relay not activated, timing interval
 - Short on, long off Output relay activated, timing interval

Front view

- LED 1 green:status display
- LED 2 yellow:switching position indication
- E1: Setting range adjuster
- Z: Fine adjuster for setting ranges
- E2: Function settings for timing intervals

Switching devices

Notes

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