7 Switching Devices

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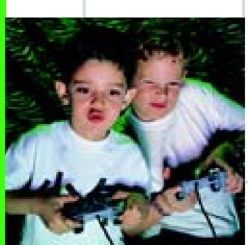
7



Product overview

Overview

Devices		Application	Standards	Usage: Non-res. bldgs.	Usage: Res. bldgs.	Usage: Industry
	**Remote control switches**					
	• without central switching	Switching of lighting by pushbutton	EN 61095 (VDE 0637) EN 60669 (VDE 0632)	•	•	
	• with central switching			•		
	• with central and group switching			•		
	Blind and series remote control switches			•	•	
	Electronic series remote control switches				•	
	Flush-mounting remote control switches			•	•	
	System remote control switches					
	• without central switching			•	•	
	• with central switching			•		
	• with central and group switching			•		
	**Relays**					
	• for PLCs	Switching of small loads or application in controllers	EN 60255 (VDE 0435)	•		•
	• for capacitive loads	Specially suited for the switching of luminaires such as fluorescent lamps or high-pressure and metal-halide lamps, with capacitive properties		•	•	
	**Insta contactors**	Switching of motors, heating or lighting, such as fluorescent lamps or filament lamps, and resistive and inductive loads	EN 60947-4-1, EN 60947-5-1, EN 61095	•	•	•
	**Soft-starting devices**					
	• 5TT3 441, 230 V AC	Protection of machines with transmission, belt or chain drives, conveyor belts, fans, pumps, compressors, packing machines, door operating mechanisms	EN 60947-4-2, (VDE 0660 Part 117)			•
	• 5TT3 440, 400 V AC					•
	N-type EMERGENCY-STOP modules					
	• 5TT5 200, 10 A	EMERGENCY-STOP switching of machines in industrial, commercial and private economic applications	Acc. to the EC directive for machines 98/37/EG, EN 954-1	•		•
	Electrical switching	There are a number of general operational demands, particularly with regard to the switching of lighting, that need to be taken into consideration during planning. The technical background represented here is for illustration and clarification purposes and is intended to help you avoid planning errors and prevent the time and hassle caused by premature failures.				

Definitions

I_e = Rated operational current
U_e = Rated operational voltage
I_c = Rated control supply current
U_c = Rated control supply voltage
P_s = Rated operational capacity
1 MW = 18 mm modular width

Uniform mounting depth

Fitted with a transparent cap, these devices have the same uniform mounting depth valid for all products.

Overview

	Remote control switches 5TT5 5 5TT5 15	Blind and series remote control switches 5TT5 16	Electronic series remote control switches 5TT5 650	Flush-mounting remote control switches 5TT5 431	System remote control switches 5TT5 60 5TT5 61 5TT5 62
Manual operation	•	•	–	–	–
Switch position indication	•	–	–	–	–
Fuse protected against continuous voltage	•	•	–	•	•
For different phases between magnet coil and terminals for central and group input	yes, 5TT5 15 no	no	no	no	yes
Operating noises	standard	quiet	very quiet	quiet	very quiet
Short-circuit current proof up to 800 A	•	–	–	–	–

Function

Remote control switches are used to switch lightings 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 switch position is mechanically stored.

Pushbutton malfunction

Pushbuttons may jam, thus exposing the remote control switch to a continuous voltage. It will then no longer react when a second pushbutton is actuated. All our remote control switches are protected against such malfunction.

Central switching functions

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

System remote control switches

A 2-MW casing holds up to four remote control switches, which are wired in the device. This saves space and mounting time. These remote control switches offer particularly quiet switching properties. These are superior to electronic remote control switches because they do not require a permanent power supply for the electronics and the switching position is maintained even in the event of a power failure. The operating noises are the same as those for the electronic remote control switches.

Parallel connection of remote control switches

It is not possible to control more than one remote control switch using just one pushbutton or contact. This would lead to an undefined contact position as there is no synchronization.

Short-circuit strength

Remote control switches are primarily used for the switching of incandescent lamps, which may occasionally be subject to short-circuits during operation. A feature of the 5TT5 5 remote control switches is their short-circuit strength of 800 A.

Central lockout device

System remote control switches also allow actuation of the central functions during continuous operation. However, this means that the room pushbutton can no longer be switched. This range is specially suited for emergency lighting in switching rooms of banks, object lighting, sales premises but also prisons.

Glow lamp load, compensator

If the installed glow lamp load is too high, or if the system has a high line capacity, the 5TG8 230 compensator can be used to increase the glow lamp load of a remote control switch. The incandescent lamp load stated always refers to a 230-V actuation. The compensators are switched parallel to the coil. Several compensators can be switched in parallel.

		1 compensator	2 compensators
for 5TT5 53	from 10 mA	to 30 mA	to 50 mA
for 5TT5 15	from 4 mA	to 14 mA	to 24 mA
for 5TT5 16	from 4 mA	to 26 mA	to 48 mA
for 5TT5 6	from 5 mA	to 20 mA	to 35 mA

5TT5 remote control switches

Technical specifications

5TT5 5, 5TT5 1, 5TT5 4 acc. to EN 61095 (VDE 0637) and EN 60669 (VDE 0632) 5TT5 6 acc. to EN 60669 (VDE 0632)			5TT5 5 5TT5 15	5TT5 16	5TT5 650	5TT5 431 5TT5 153	5TT5 60 5TT5 61 5TT5 62
Rated control voltage U_c		V AC	See selection table				
Operating range × U_c			0.9 ... 1.1				
Rated power dissipation P_v	magnet coil, pulse per contact only at 16 A at 8 and 10 A	approx. VA VA VA	30 0.9 –	11 1.5 –	20 0.8 –	20 0.9 –	30 0.9 0.8
Minimum pulse duration		ms	30				
Fuse protected against continuous voltage	magnet coil		yes				
Contact gap		mm	> 3	μ-contact	μ-contact	μ-contact	> 3
Rated operational voltage U_e	1-pole 2-pole 3-pole	V AC V AC V AC	250 400 400	250 250 –	250	250	250 –
Safe isolation	creepage distances and clearances magnet coil/contact	mm	> 8				> 3
Different phases	magnet coil/contact		permissible				
	magnet coil/terminals for central-and group input		yes, 5TT5 15 no	–	–	–	yes
Rated operational current I_s	for p. f. = 1	A	16				
Rated impulse withstand voltage U_{imp}		kV	> 4				
Minimum contact load		V; mA	10; 100				
Electrical service life	in switching cycles for I_e and U_e or specified lamp load		50000				
Terminals	± screw (Pozidrive)		1				
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	1.5 ... 4 0.5	2 x 2.5 0.5			1.5 ... 2.5 0.5
Permissible ambient temperature		°C	-10 ... +40	-20 ... +45			-10 ... +40
Degree of protection	acc. to EN 60529		IP20			–	IP20
Resistance to climate	acc. to DIN 50015 at 95 % relative air humidity	°C	45	–	–	45	–
Humidity class	acc. to DIN 50016 acc. to IEC 60068-2-30		– –	FW 24	F	– –	F

Switching of lamps

			5TT5 5 1-pole and 1 CO contact	5TT5 5 multipole and 5TT5 511	5TT5 1	5TT5 650	5TT5 60 5TT5 61 5TT5 62
Incandescent lamp loads		W	2400	1200	1500	1500	1500
Transformers for halogen lamps		W	1200	800	–	–	–
Fluorescent and compact lamps in ballast operation			Items	Items	Items	Items	Items
• non-corrected	L18 L36 L58	W W W	35 35 25	30 30 20	– – 20	– – –	– – –
• parallel-corrected	L18/4.5 L36/4.5 L58/7	W/μF W/μF W/μF	40 40 28	50 50 30	– – –	– – –	– – –
• DUO switching, 2-lamp • 2 lamps	L18 L36 L58	W W W	2 x 30 2 x 30 2 x 20	2 x 24 2 x 24 2 x 16	– – –	– – –	2 x 22 2 x 22 2 x 14
Fluorescent and compact lamps with electronic ballast (ECG)			Items	Items	Items	Items	Items
• AC operation, 1-lamp	L18 L36 L58	W W W	36 36 24	30 30 20	– – –	– – –	– – –
• AC operation, 2-lamp	L18/4.5 L36/4.5 L58/7	W/μF W/μF W/μF	2 x 22 2 x 22 2 x 15	2 x 18 2 x 18 2 x 12	– – –	– – –	– – –

Selection and ordering data

	Version	U_e	I_e	U_c		MW	Order No.	Weight 1 item	PS*/ P. unit
		V AC	A AC	V AC	V DC			kg	Items
 5TT5 511	**Remote control switches with transparent cap** contact gap 3 mm, short-circuit strength up to 800 A								
	1 NO contact	230	16	8	–	1	**5TT5 511**	0.090	1/12
				12	–		**5TT5 501**	0.090	1/12
				–	12		**5TT5 551**	0.090	1/12
				24	24		**5TT5 521**	0.090	1/12
				110	110		**5TT5 541**	0.090	1/12
				230	220		**5TT5 531**	0.090	1/12
	2 NO contacts	400	16	8	–	1	**5TT5 512**	0.097	1/12
				12	–		**5TT5 502**	0.097	1/12
 5TT5 150				–	12		**5TT5 552**	0.097	1/12
				24	24		**5TT5 522**	0.097	1/12
				110	110		**5TT5 542**	0.097	1/12
				230	220		**5TT5 532**	0.097	1/12
	1 CO contact	230	16	8	–	1	**5TT5 516**	0.091	1/12
				12	–		**5TT5 506**	0.091	1/12
				24	24		**5TT5 526**	0.091	1/12
				110	110		**5TT5 546**	0.091	1/12
				230	220		**5TT5 536**	0.091	1/12
	with central switching, contact gap 3 mm, short-circuit current strength up to 800 A								
	1 CO contact	230	16	230	–	1	**5TT5 535**	0.091	1/12
	2 NO contacts	400	16	230	–	1	**5TT5 534**	0.114	1/12
	3 NO contacts	400	16	230	–	2	**5TT5 537**	0.137	1/6
	with central and group switching, µ contact, very quiet operation								
	1 NO contact	230	16	24	–	2	**5TT5 150**	0.150	1
				230	–		**5TT5 151**	0.150	1
	2 NO contacts	230	16	24	–	2	**5TT5 152**	0.150	1
				230	–		**5TT5 153**	0.150	1
 5TT5 503	**Remote control switches,** without transparent cap contact gap 3 mm, short-circuit strength up to 800 A								
	3 NO contacts	400	16	22	–	2	**5TT5 503**	0.150	1/6
				24	24		**5TT5 523**	0.150	1/6
				110	110		**5TT5 543**	0.150	1/6
				230	230		**5TT5 533**	0.150	1/6
 5TT5 163	**Blind remote control switch with transparent cap** contact sequence 1 – 0 – 2 – 0, contact gap 3 mm								
	2 NO contacts	230	16	230	–	1	**5TT5 163**	0.100	1
 5TT5 166	**Series remote control switches with transparent cap** contact sequence 1 – 2 – 1 + 2 – 0, contact gap 3 mm								
	2 NO contacts	230	16	12	–	1	**5TT5 166**	0.100	1
				24	–		**5TT5 165**	0.100	1
				230	–		**5TT5 164**	0.100	1

* You can order this quantity or a multiple thereof.

5TT5 remote control switches

Selection and ordering data

5TT5 650

Version	U_e V AC	I_e A AC	U_c V AC	U_c V DC	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Electronic series remote control switch with transparent cap								
contact sequence 1 – 2 – 1 + 2 – 0, μ-contacts								
2 NO contacts	230	16	12	–	1	**5TT5 650**	0.100	1

5TT5 601

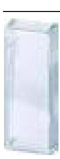
5TT5 613

5TT5 621

Version	U_e V AC	I_e A AC	U_c V AC	U_c V DC	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Remote control system switches with transparent cap, μ-contact, very quiet operation								
1 NO contact	230	16	24	–	1	**5TT5 601**	0.065	1
			230	–		**5TT5 602**	0.065	1
			12	–		**5TT5 603**	0.073	1
with 2 switching systems								
1 NO contact per switching system								
	230	10	24	–	1	**5TT5 605**	0.080	1
			230	–		**5TT5 606**	0.065	1
			12	–		**5TT5 607**	0.073	1
with central switching								
1 NO contact	230	10	230	–	1	**5TT5 611**	0.065	1
with central switching, with 2 switching systems								
1 NO contact per switching system								
	230	8	230	–	1	**5TT5 612**	0.080	1
with central switching, with 3 switching systems								
1 NO contact per switching system								
	230	10	230	–	2	**5TT5 613**	0.140	1
with central switching, with 3 switching systems								
1 NO contact per switching system								
	230	10	230	–	2	**5TT5 614**	0.160	1
with central and group switching, with transparent cap								
1 NO contact	230	10	230	–	1	**5TT5 621**	0.065	1
with central and group switching, with 3 switching systems								
1 NO contact per switching system								
	230	10	230	–	2	**5TT5 623**	0.140	1

5TG8 230

Version	U_e V AC	I_e A AC	U_c V AC	U_c V DC	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Compensator, mounting depth 55 mm								
PTC resistor combination for increasing glow lamp loads								
	230	–	–	–	1	**5TG8 230**	0.050	1



5TG8 236

5TG8 238

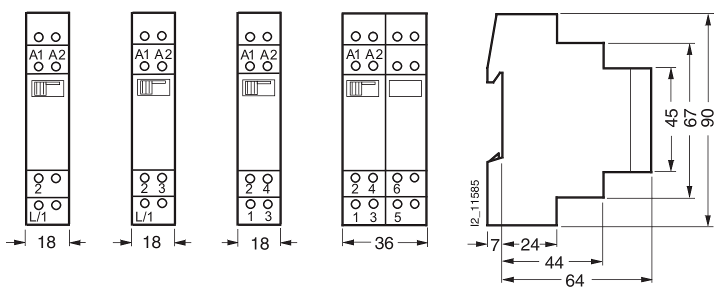
Version	U_e V AC	I_e A AC	U_c V AC	U_c V DC	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Transparent caps								
Spare part for devices with an overall width of 1 MW 5TT5 5. Only for devices with an overall width of 1 MW. (1 set = 5 items)					1	**5TG8 236**	1 set 0.025	1 set
Spare part for 5TT3 0., 5TT3 1, 5TT3 4., 5TT5 1. and 5TT5 6. devices with an overall width of 1 MW 2 transparent caps are required for 5TT5 1. devices with an overall width of 2 MW (1 set = 5 items)					1	**5TG8 237**	1 set 0.025	1 set
Spare part for 5TT3 4., 5TT5 6. and 5TT6 1.devices with an overall width of 2 MW (1 set = 5 items)					2	NEW **5TG8 238**	1 set 0.045	1 set

* You can order this quantity or a multiple thereof.

Dimensional drawings

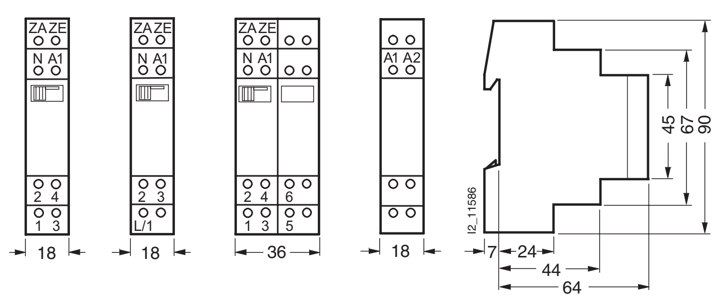
5TT5 5 remote control switches

5TT5 501 5TT5 506 5TT5 502 5TT5 503
5TT5 511 5TT5 516 5TT5 512 5TT5 523
5TT5 521 5TT5 526 5TT5 522 5TT5 533
5TT5 531 5TT5 536 5TT5 532 5TT5 543
5TT5 541 5TT5 546 5TT5 542
5TT5 551 5TT5 552



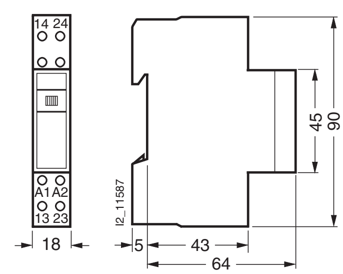
5TT5 remote control switches, central ON/OFF

5TT5 534 5TT5 535 5TT5 537 5TG8 230 compensator

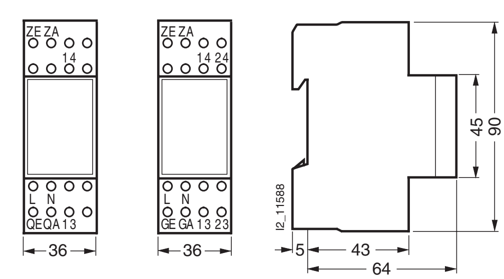


5TT5 16 blind and series remote control switches/ 5TT5 650 electronic series remote control switch

5TT5 163
5TT5 164
5TT5 165
5TT5 166
5TT5 650

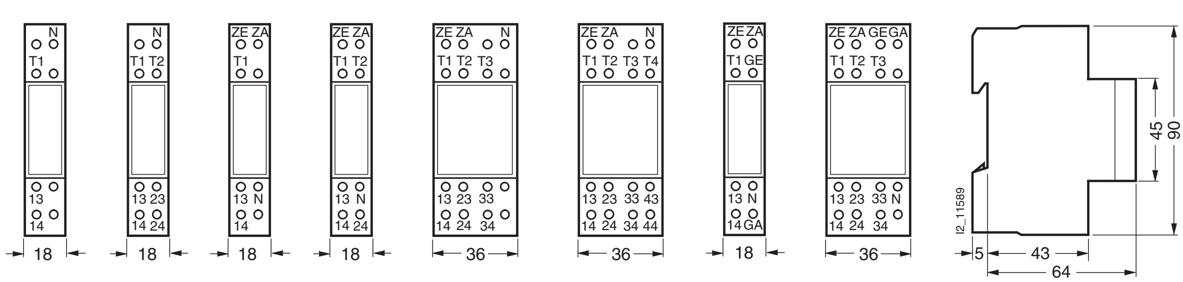


5TT5 150 5TT5 152
5TT5 151 5TT5 153



5TT5 6 remote control switch system

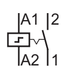
5TT5 601 5TT5 605 5TT5 611 5TT5 612 5TT5 613 5TT5 614 5TT5 621 5TT5 623
5TT5 602 5TT5 606
5TT5 603 5TT7 607



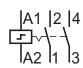
5TT5 remote control switches

Schematics

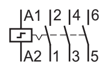
5TT5 5. 1



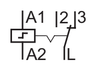
5TT5 5. 2



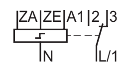
5TT5 5. 3



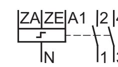
5TT5 5. 6



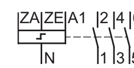
5TT5 535



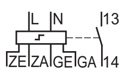
5TT5 534



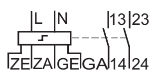
5TT5 537



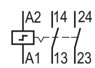
5TT5 150
5TT5 151



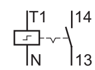
5TT5 152
5TT5 153



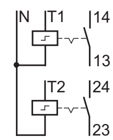
5TT5 16



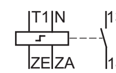
5TT5 601
5TT5 602
5TT5 603



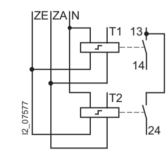
5TT5 605
5TT5 606
5TT5 607



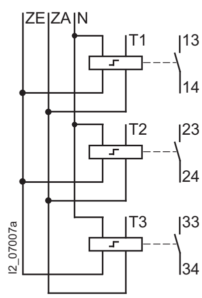
5TT5 611



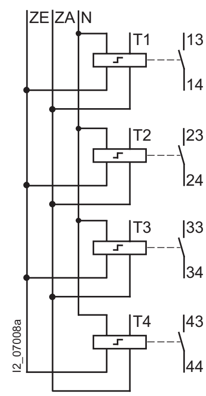
5TT5 612



5TT5 613

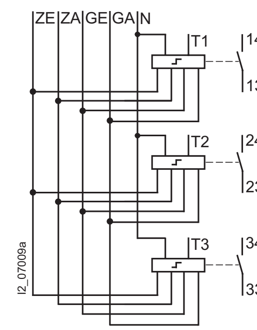


5TT5 614

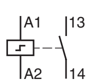


5TT5 621

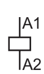
5TT5 623



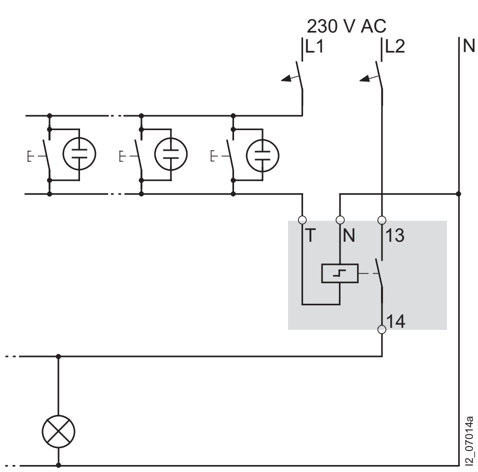
5TT5 431



5TG8 230

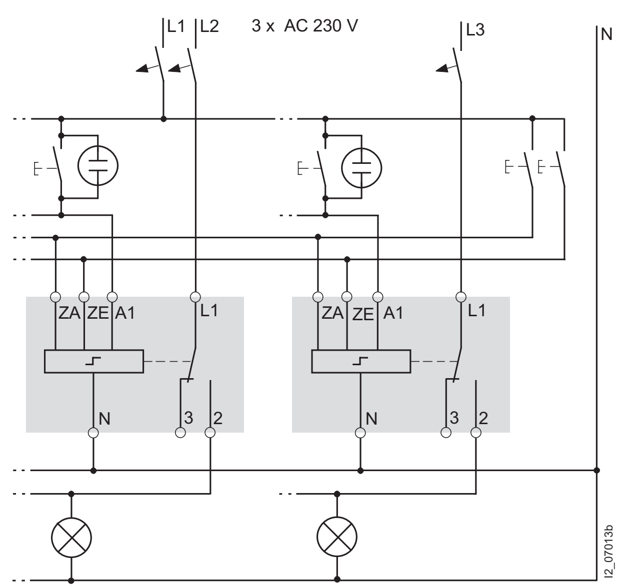


Switching example: 5TT5 602



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

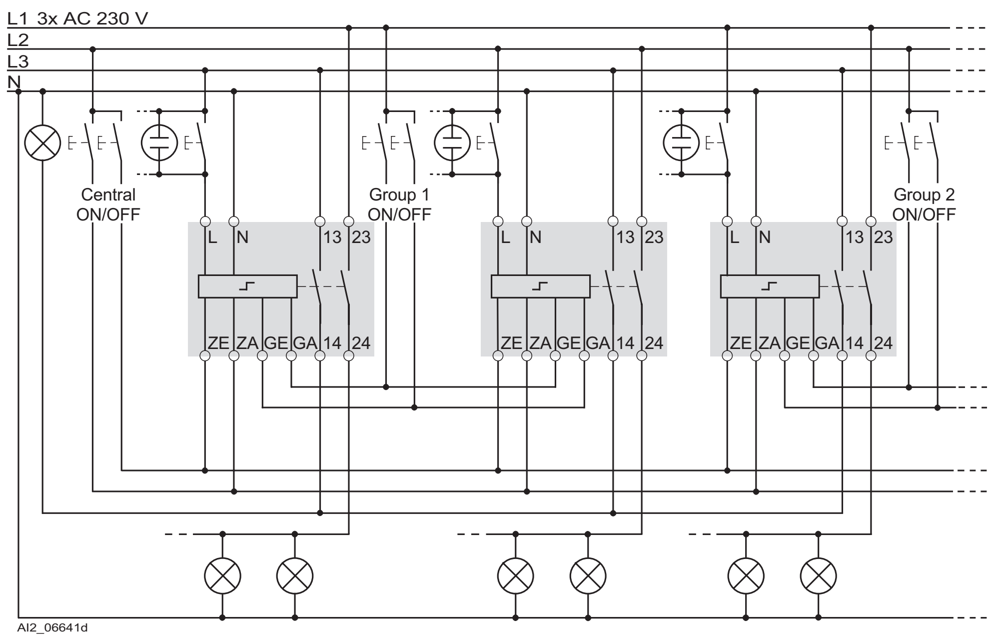
Switching example: 5TT5 535 with central ON/OFF switching



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 can also be used if desired. Once a central on/off switching has been executed, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and A1 is arbitrary.

Schematics

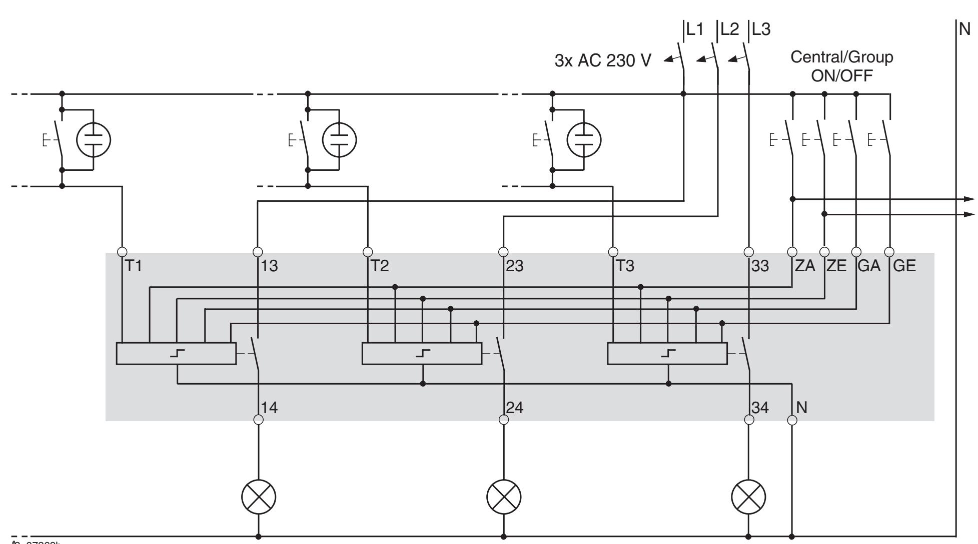
Switching example: 5TT5 153 with central ON/OFF switching



With the 2-pushbutton central "ON" and "OFF", 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 the respective group, e.g. halls, are switched on/off. A time switch with a one-second pulse can also be used with the "central" and "group" function if desired.

Once a central on/off switching has been executed, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and GA, GE and L do not have to be the same. If the contact 13/14 is used for the central "ON" and "OFF" function as a check-back contact, as shown above, terminals 13 of all remote control switches must be in-phase.

Switching example: 5TT5 623

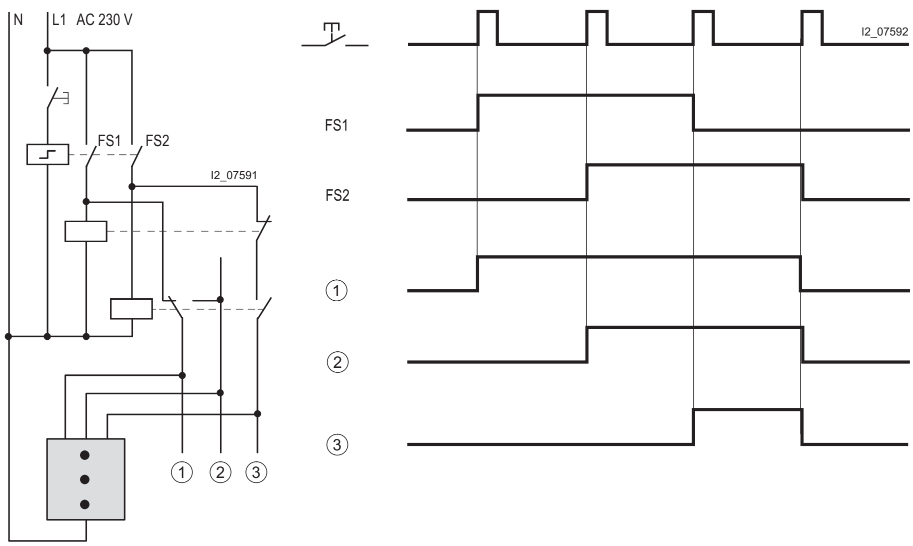


The 5TT5 623 remote control switch comprises 3 separately controllable remote control switches for central/group ON/OFF with housing-internal wiring of the central/group ON/OFF function. In our example, we have used pushbuttons to control the central/group ON/OFF function. However, if the room pushbuttons T1 to T3 are to be permanently locked, then switches must be used for the central/group ON/OFF function instead of pushbuttons. Voltage must not be applied to ZA/ZE and GA and GE simultaneously. This type of priority, the permanent locking of system pushbuttons, e.g. prisons, security areas (banks, exhibitions), should only be switched centrally.

5TT5 remote control switches

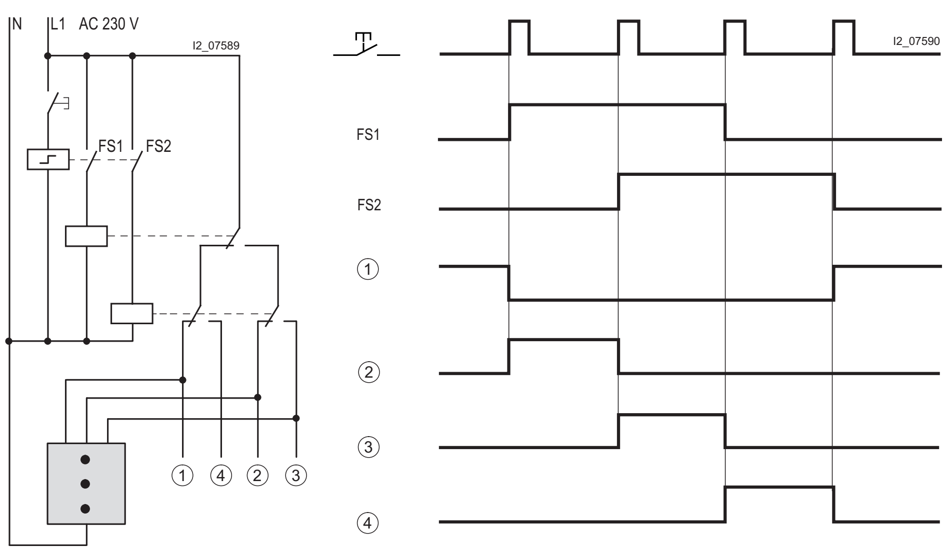
Schematics

Switching example: triple tap-changing gear and neutral position - 1, 2 and 3



Devices required:
- 5TT5 164 series remote control switch
- 5TT3 065 or 5TT3 075 switching relay
- 5TE5 804 light indicator

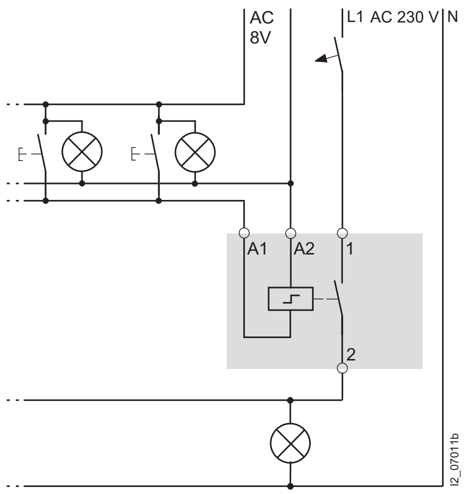
Switching example: quadruple tap-changing gear - 1, 2, 3 or 4



Devices required:
- 5TT5 164 series remote control switch
- 5TT3 065 or 5TT3 075 switching relay
- 5TE5 804 light indicator

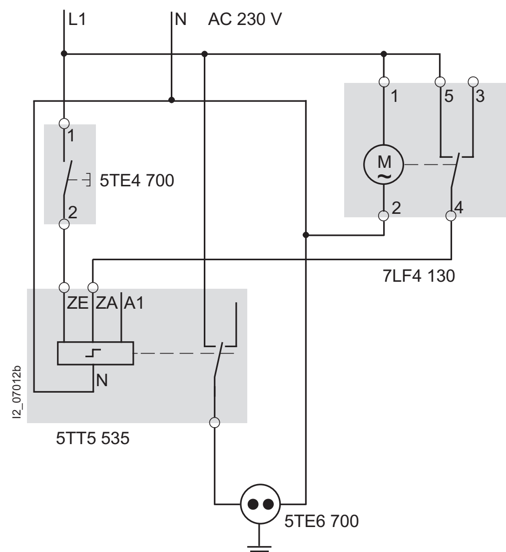
Schematics

Switching example: 5TT5 511



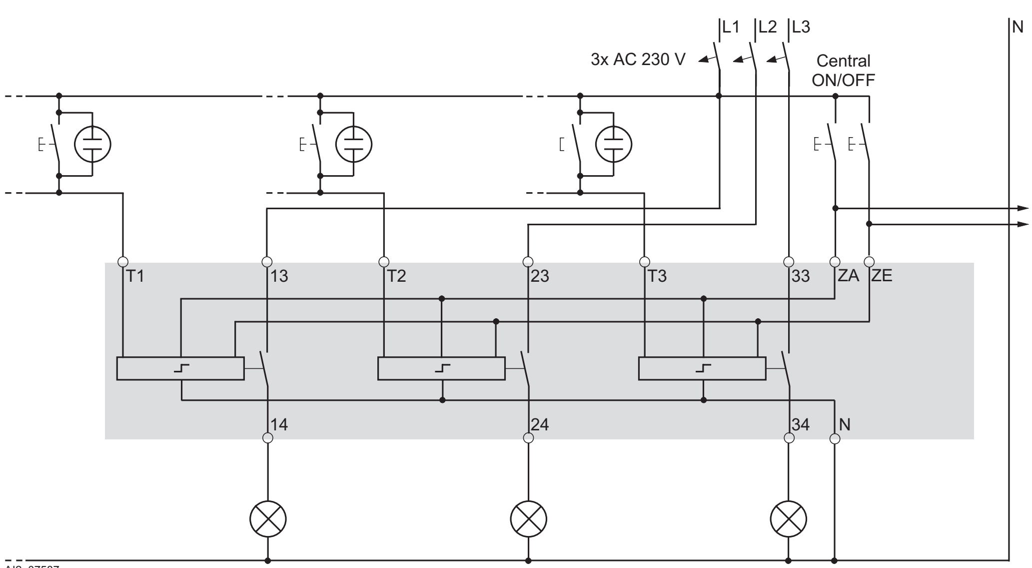
Single-phase lighting circuit with safety extra-low voltage 8 V AC, pushbutton and glow lamp.

Switching example: 5TT5 535 with ON/OFF time switching



Printers and copiers are to be switched on with the pushbutton at the beginning of the working day. At the end of the working day, e.g. 6 p.m. to 10 p.m., an hourly one-second pulse of the time switch switches the outlet off. This ensures that printers and copiers are not "forgotten". If the device is switched on again after 6 p.m., a switch-off is actuated again hourly.

Switching example: 5TT5 613 with central ON/OFF switching

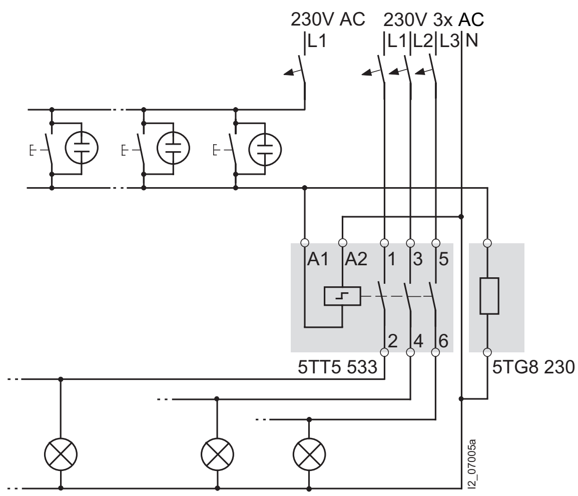


The 5TT5 613 remote control switch comprises 3 separately controllable remote control switches for central ON/OFF switching with housing-internal wiring of the central ON/OFF function. In our example, pushbuttons have been used to control the central ON/OFF function. However, if room pushbuttons T1 to T3 are to be permanently locked, switches must be used for the central ON/OFF function instead of pushbuttons. Voltage must not be applied simultaneously to the ZA and ZE terminals. Suitable switches are the 5TE7 141 group switches with center position or double changeover switches for wall mounting.

5TT5 remote control switches

Schematics

Glow lamp load and line capacity



When the pushbutton is open, the glow lamps in the pushbuttons draw their current over the magnet coil of the remote control switch. If the current is too high, this can prevent the armature from dropping.

The 5TG8 230 compensator, which is switched in parallel to the magnet coil, discharges the current.

Overview

Function

Switching relays are used in control systems as coupling relays, for the electrical or safe isolation of electrical circuits.

Safe isolation

The magnet coil and the contacts meet the requirements for safety extra-low voltage from the actuating voltage safely through to disconnection.

Checking functions using the manual switch

Switching relays have a manual switch that shows the switching position. This switch can be used to manually switch the switching relay, thus allowing system devices and control functions to be checked.

Technical specifications

Acc. to EN 60255 (VDE 0435)			**5TT3 05. 5TT3 06. 5TT3 07. 5TT3 080**	**5TT3 040**	**5TT3 081**	**5TT3 085**
Rated control supply voltage U_c		V AC V DC	8, 12, 24, 110 or 230 12, 24, 30 or 110, depending on type			
Operating range		$\times U_c$	0.9 ... 1.1			
Rated power dissipation P_v	pick-up power, approx. 20 ms holding power per contact	VA VA VA	2.1 1.3 1	1.1 1.8 1	2.1 1.3 1	1.1 1.8 1
Rated frequency	AC versions	Hz	50			
Response time/returning time		ms	30			
Contact gap		mm	μ-contact			
Rated operational voltage U_e	1-pole	V AC	250			
Safe isolation	creepage distances and clearances magnet coil/contact	mm	> 8			
Different phases	magnet coil/contact		permissible			
Rated operational current I_s	for p. f. = 1	A	16			
Rated impulse withstand voltage U_{imp}	magnet coil/contact contact/contact	kV kV	>4 >2.5			
Minimum contact load		V; mA	10; 100			
Terminals	± screw (Pozidrive)		1			
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2 x 2.5 0.5			
Permissible ambient temperature		°C	-20 ... +45			
Protection class	acc. to EN 60730-1		IP20			
Degree of protection	acc. to EN 60529		II			
Humidity class	acc. to DIN 50016 acc. to IEC 60068-2-30		FW 24			

5TT3 0 switching relays

Technical specifications

Switching of lamps

				5TT3 0..	5TT3 081
Incandescent lamp loads			W	1200	
Fluorescent and compact lamps in ballast operation					
• uncorrected	W	L18	Items	36	–
	W	L36	Items	31	–
	W	L58	Items	20	–
• parallel-corrected	W/µF	S11/4.5	Items	–	20
	W/µF	L18/4.5	Items	–	20
	W/µF	L24/4.5	Items	–	20
	W/µF	L36/4.5	Items	–	20
	W/µF	L58/7	Items	–	13
• DUO switching, 2-lamp	W	L18	Items	–	–
	W	L36	Items	–	–
	W	L58	Items	–	–
Fluorescent and compact lamps with electronic ballast (ECG)					
AC operation, 1-lamp	W	L18	Items	58	–
	W	L36	Items	32	–
	W	L58	Items	20	–
Metal-vapor and high-pressure mercury-vapor lamps					
• uncorrected	W	50	Items	16	–
	W	80	Items	12	–
	W	125	Items	8	–
	W	250	Items	4	–
	W	400	Items	3	–
	W	700	Items	2	–
	W	1000	Items	1	–
• parallel-corrected	W/µF	50/ 7	Items	–	13
	W/µF	80/ 8	Items	–	11
	W/µF	125/10	Items	–	9
	W/µF	250/18	Items	–	5
	W/µF	400/25	Items	–	3
	W/µF	700/40	Items	–	2
	W/µF	1000/60	Items	–	1
Halogen metal-vapor lamps					
• uncorrected	W	70	Items	10	–
	W	150	Items	5	–
	W	250	Items	3	–
	W	400	Items	2	–
• parallel-corrected	W/µF	70/12	Items	–	7
	W/µF	150/20	Items	–	4
	W/µF	250/20	Items	–	3
	W/µF	400/35	Items	–	2
	W/µF	1000/85	Items	–	1
High-pressure sodium-vapor lamps					
• uncorrected	W	50	Items	13	–
	W	70	Items	10	–
	W	110	Items	8	–
	W	150	Items	5	–
	W	250	Items	2	–
• parallel-corrected	W/µF	50/8	Items	–	11
	W/µF	70/12	Items	–	7
	W/µF	110/12	Items	–	7
	W/µF	150/20	Items	–	4
	W/µF	250/36	Items	–	2
	W/µF	400/45	Items	–	2

Selection and ordering data

	Design	U_e	I_e	U_c		MW	Order No.	Weight 1 item	PS*/ P. unit
		V AC	A AC	V AC	V DC			kg	Items
 5TT3 041	**Switching relays with transparent cap** [1]								
	1 NO contact	230	16	8	–	1	**5TT3 041**	0.100	1
				12	–		**5TT3 042**	0.100	1
				24	–		**5TT3 043**	0.100	1
				110	–		**5TT3 044**	0.100	1
				230	–		**5TT3 045**	0.100	1
	2 NO contacts	230	16	8	–	1	**5TT3 051**	0.100	1
				12	–		**5TT3 052**	0.100	1
				24	–		**5TT3 053**	0.100	1
				110	–		**5TT3 054**	0.100	1
				230	–		**5TT3 055**	0.100	1
 5TT3 061	1 CO contact	230	16	8	–	1	**5TT3 061**	0.100	1
				12	–		**5TT3 062**	0.100	1
				24	–		**5TT3 063**	0.100	1
				110	–		**5TT3 064**	0.100	1
				230	–		**5TT3 065**	0.100	1
	2 CO contacts	230	16	8	–	1	**5TT3 071**	0.100	1
				12	–		**5TT3 072**	0.100	1
				24	–		**5TT3 073**	0.100	1
				110	–		**5TT3 074**	0.100	1
				230	–		**5TT3 075**	0.100	1
	for control with direct voltage								
	2 CO contacts	230	16	–	12	1	**5TT3 078**	0.105	1
				–	24		**5TT3 076**	0.100	1
				–	30		**5TT3 082**	0.120	1
				–	110		**5TT3 077**	0.100	1
	for switching capacitive loads; of lighting								
	1 NO contact	230	16	230	–	1	**5TT3 081**	0.100	1
	for control of PLCs contact: 15 to 60 V, 2 to 30 mA according to EN 61131-2, type 1								
	1 NO contact	230	16	230	–	1	**5TT3 085**	0.110	1
 5TT3 080	**Sealable enable relay, mounting depth 55 mm**								
	used for boiler /storage relays In the case of continuous duty, a distance of 1 MW must be maintained between the devices.								
	1 CO contact	230	16	230	–	1	**5TT3 080**	0.100	1

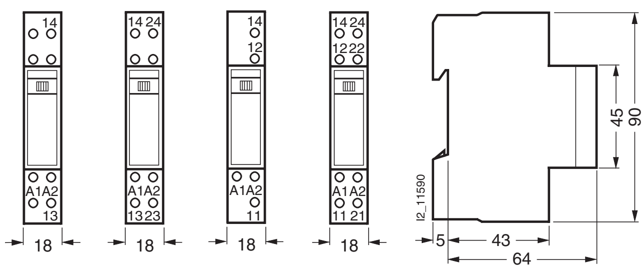
1) Spare transparent cap, see Page 7/6.

5TT3 0 switching relays

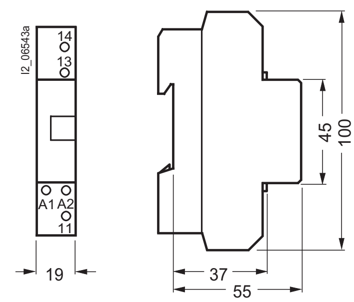
Dimensional drawings

5TT3 0 switching relays

5TT3 04. 5TT3 085 | 5TT3 05. | 5TT3 06. | 5TT3 07. 5TT3 080 5TT3 082

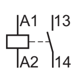


5TT3 081

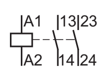


Schematics

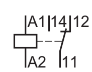
5TT3 04.
5TT3 081
5TT3 085



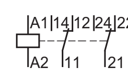
5TT3 05.



5TT3 06.



5TT3 07.
5TT3 080
5TT3 082



Overview

Low-noise contactors, 24, 40 and 63 A devices

The 5TT5 73., 5TT5 74. and 5TT5 75. Insta contactors are equipped with a DC magnetic system. Apart from a very quiet switching noise, they are noise-free. They are therefore especially suitable for applications in residential buildings.

Spacers

Spacers can be used as a balancing 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.

Heat dissipation

If Insta contactors are installed in distribution boards, they should be designed for a standard temperature of 40 °C. If more than one Insta contactor is installed, a 5TG8 240 spacer must be installed after every second contactor.

5TT5 7 Insta contactors

Technical specifications

			5TT5 70 2-pole	5TT5 73 4-pole	5TT5 74 4-pole	5TT5 75 4-pole
Rated control supply voltage U_c		V AC V DC	24, 230 –	24, 115, 230 24, 110, 220	24, 230 24, 220	
Operating range × U_c			0.85 ... 1.1			
Rated operational voltage U_e		V	250	440	440	440
Rated operational current I_e						
• AC-1/AC-7a, NO contacts • AC-1/AC-7a, NC contacts • AC-3/AC-7b, NO contacts • AC-3/AC-7b, NC contacts		A A A A	20 20 9 9	24 24 9 6	40 30 22 –	63 30 30 –
Rated power dissipation P_v						
• Pick-up power • Holding power • per contact AC-1/AC-7a		VA VA VA	8 3.2 1	4 4 1.5	5 5 3	65 4.2 6
Rated frequency	at AC	Hz	50			
Switching times						
• closing (NO contacts) • opening (NO contacts)		ms ms	≤12 ≤12	≤40 ≤40	≤40 ≤40	≤40 ≤40
Rated impulse withstand voltage U_{imp}		kV	≤4	≥4		
Contact gap	(NO contacts) min.	mm	1.5	2.4	2.8	2.6
Electrical service life						
for switching cycles at I_e and load AC-1			100.000	100.000	50.000	50.000
Switching of resistive loads AC-1		V AC	230	230	230	230
for rated operational power P_s (NO contacts)	1-phase 3-phase	kW kW	4 –	5.3 16	8.8 26	13.8 41
Switching of three-phase asynchronous motors AC-3		V AC	230	400	400	400
for rated operational power P_s (NO contacts)	1-phase 3-phase	kW kW	1.3 –	– 4	– 11	– 15
Overload withstand capability						
per current path (NO contacts only)	at 10 s	A	72	72	176	240
Short-circuit protection, acc. to coordination type 1						
back-up fuse	characteristic gL/gG	A	20	35	63	80
Terminals						
• •	± screw (Pozidrive)		1 1	1 1	1 2	1 2
Tightening torque						
• coil connection • main connection		Nm Nm	0.9 1.2	0.9 1.0	0.9 2.5	0.9 2.5
Conductor cross-sections						
• coil connection	rigid rigid	mm^2 mm^2	1.0 ... 2.5 1.0 ... 2.5	1.5 ... 4 1.5 ... 2.5	1.5 ... 4 1.5 ... 2.5	1.5 ... 4 1.5 ... 2.5
• main connection	rigid flexible with sleeve	mm^2 mm^2	1.0 ... 4 1.0 ... 4	1.5 ... 10 1.5 ... 6	2.5 ... 25 2.5 ... 16	2.5 ... 25 2.5 ... 16
Permissible ambient temperature						
• for operation • for storage		°C °C	-25 ... +55 -40 ... +70	-25 ... +55 -50 ... +80	-25 ... +55 -50 ... +80	-25 ... +55 -50 ... +80
Degree of protection	acc. to EN 60529		IP20			

Switching of direct voltages DC-1

Permissible DC switching currents for NO contacts at p. f. = 1 4 contacts in series are not recommended for 24 V due to unreliable contacts			1 contact	2 contacts in series	3 contacts in series	4 contacts in series
5TT5 70, 2-pole, 20 A	I_e at U_e =24 V DC I_e at U_e = 220 V DC	A A	20 –	20 –	– –	– –
5TT5 73, 4-pole, 24 A	I_e at U_e =24 V DC I_e at U_e =110 V DC I_e at U_e = 220 V DC	A A A	24 2 0.5	24 4 1.5	24 6 2.5	24 8 3.5
5TT5 74, 4-pole, 40 A	I_e at U_e =24 V DC I_e at U_e = 220 V DC	A A	40 0.8	40 5	40 15	40 18
5TT5 75, 4-pole, 63 A	I_e at U_e =24 V DC I_e at U_e = 220 V DC	A A	50 0.8	63 5.5	63 17	63 20

Technical specifications

Switching of lamps

Incabdescent lamp loads			
5TT5 70, 2-pole, 20 A	per current path	W	1000
5TT5 73, 4-pole, 24 A	per current path	W	1000
5TT5 74, 4-pole, 40 A	per current path	W	3000
5TT5 75, 4-pole, 63 A	per current path	W	5000

Maximum number of lamps,
per conducting path at 230 V AC, 50 Hz.

Fluorescent and compact lamps in ballast operation

				Uncorrected			**Parallel-corrected**			**DUO circuit** 2-lamp		
Lamp type Capacitor capacitance			W µF	L18 –	L36 –	L58 –	L18 4.5	L36 4.5	L58 7.0	L18 –	L36 –	L58 –
5TT5 70, 2-pole	20 A	NO		22	14	10	6	5	4	17	11	10
5TT5 73, 4-pole	24A	NO		24	20	12	8	8	5	24	20	12
5TT5 74, 4-pole	40 A	NO		85	65	40	16	16	10	85	65	40
5TT5 75, 4-pole	63 A	NO		135	95	60	67	67	43	140	95	60

Fluorescent and compact lamps with electronic ballast (ECG)

				1-lamp			**2-lamp**		
Lamp type			W	L18	L36	L58	L18	L36	L58
5TT5 70, 2-pole	20 A	NO		15	12	8	2 × 8	2 × 6	2 × 3
5TT5 73, 4-pole	24A	NO		24	16	12	2 × 16	2 × 8	2 × 5
5TT5 74, 4-pole	40 A	NO		55	30	22	2 × 20	2 × 10	2 × 8
5TT5 75, 4-pole	63 A	NO		76	42	30	2 × 24	2 × 13	2 × 9

High-pressure mercury-vapor lamps

				Uncorrected							**Parallel-corrected**						
Lamp type Capacitor capacitance			W µF	50 –	80 –	125 –	250 –	400 –	700 –	1 000 –	50 7	80 8	125 10	250 18	400 25	700 45	1 000 60
5TT5 70, 2-pole	20 A	NO		12	7	5	3	1	0	0	4	3	2	1	0	0	0
5TT5 73, 4-pole	24A	NO		14	10	7	4	2	1	1	5	4	3	2	1	0	0
5TT5 74, 4-pole	40 A	NO		36	27	19	10	7	4	3	10	8	6	3	3	1	1
5TT5 75, 4-pole	63 A	NO		50	38	26	14	10	6	4	43	37	26	15	10	5	4

Halogen metal-vapor lamps

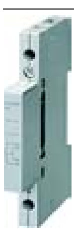
				Uncorrected						**Parallel-corrected**				
Lamp type Capacitor capacitance			W µF	70 –	150 –	250 –	400 –	1 000 –	2000 –	70 12	150 20	250 33	400 35	1 000 95
5TT5 70, 2-pole	20 A	NO		0	0	0	0	0	0	0	0	0	0	0
5TT5 73, 4-pole	24A	NO		5	3	2	1	0	0	3	1	1	0	0
5TT5 74, 4-pole	40 A	NO		14	8	5	4	1	0	5	3	2	2	0
5TT5 75, 4-pole	63 A	NO		20	11	7	6	2	1	18	9	5	4	1

High-pressure sodium-vapor lamps

				Uncorrected				**Parallel-corrected**			
Lamp type Capacitor capacitance			W µF	150 -	250 -	400 -	1 000 -	150 20	250 33	400 48	1 000 106
5TT5 70, 2-pole	20 A	NO		0	0	0	0	0	0	0	0
5TT5 73, 4-pole	24A	NO		4	3	1	0	1	1	0	0
5TT5 74, 4-pole	40 A	NO		12	7	5	2	3	2	1	0
5TT5 75, 4-pole	63 A	NO		19	11	7	3	15	9	6	2

5TT5 7 Insta contactors

Selection and ordering data

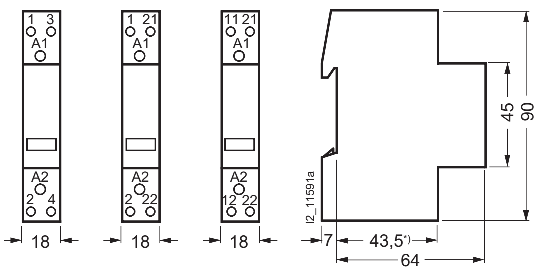
	Design	U_e	I_e	U_c		MW	Order No.	Weight 1 item	PS*/ P. unit
		V AC	A AC	V AC	V DC			kg	Items
 5TT5 700-0	**Insta contactors**								
	for alternating current continuous operation, with switch position indication, with alternating current magnetic system								
	2 NO contacts	250	20	230	–	1	**5TT5 700-0**	0.132	1
				24	–		**5TT5 700-2**	0.132	1
	1 NO contact, 1 NC contact	250	20	230	–	1	**5TT5 701-0**	0.132	1
				24	–		**5TT5 701-2**	0.132	1
	2 NC contacts	250	20	230	–	1	**5TT5 702-0**	0.132	1
				24	–		**5TT5 702-2**	0.132	1
 5TT5 730-0	for AC or DC continuous operation, with switch position indication, with DC magnetic system								
	4 NO contacts	440	24	230	220	2	**5TT5 730-0**	0.247	1
				115	110		**5TT5 730-1**	0.247	1
				24	24		**5TT5 730-2**	0.247	1
	3 NO contacts, 1 NC contact	440	24	230	220	2	**5TT5 731-0**	0.247	1
				24	24		**5TT5 731-2**	0.247	1
	2 NO contacts, 2 NC contacts	440	24	230	220	2	**5TT5 732-0**	0.247	1
 5TT5 740-0				24	24		**5TT5 732-2**	0.247	1
	4 NC contacts	440	24	230	220	2	**5TT5 733-0**	0.247	1
				24	24		**5TT5 733-2**	0.247	1
	4 NO contacts	440	40	230	220	3	**5TT5 740-0**	0.410	1
				24	24		**5TT5 740-2**	0.410	1
	3 NO contacts, 1 NC contact	440	40 1)	230	220	3	**5TT5 741-0**	0.410	1
				24	24		**5TT5 741-2**	0.410	1
	2 NO contacts, 2 NC contacts	440	40 1)	230	220	3	**5TT5 742-0**	0.410	1
				24	24		**5TT5 742-2**	0.410	1
	4 NO contacts	440	63	230	220	3	**5TT5 750-0**	0.410	1
				24	24		**5TT5 750-2**	0.410	1
	3 NO contacts, 1 NC contact	440	63 1)	230	220	3	**5TT5 751-0**	0.410	1
				24	24		**5TT5 751-2**	0.410	1
	2 NO contacts, 2 NC contacts	440	63 1)	230	220	3	**5TT5 752-0**	0.410	1
				24	24		**5TT5 752-2**	0.410	1
 5TT5 900	**Auxiliary switches**								
	for left-sided mounting on the 24-A, 40-A and 63-A Insta contactor; max. one auxiliary switch per Insta contactor. minimum contact load 24 V AC; 5 mA								
	2 NO contacts	230, AC-15	4			0.5	**5TT5 900**	0.039	1
	1 NO contact, 1 NC contact	230, AC-15	4			0.5	**5TT5 901**	0.039	1
 5TG8 240	**Spacer**								
	for heat conduction between the Insta contactors. We recommend placing a spacer between each second Insta contactor. Can be mounted reciprocally, so that two spacers enable greater cable penetration					0.5	**5TG8 240**	0.010	2
 5TT5 903	**Sealable terminal covers**							1 set	
	for Insta contactors 24 A, (1 set = 2 items)					2	**5TT5 902**	0.010	1 set
								1 set	
	for Insta contactors 40 A and 63 A, (1 set = 2 items)					3	**5TT5 903**	0.010	1 set

1) For NC contacts 30 A.

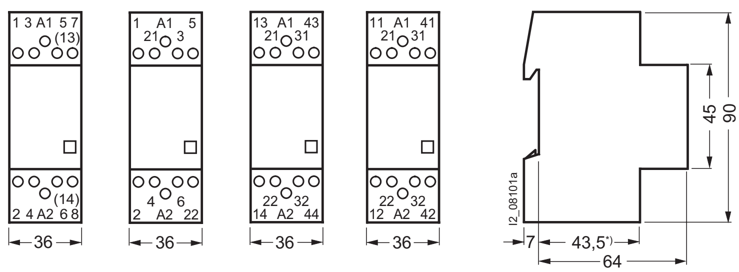
Dimensional drawings

5TT5 7 Insta contactors

5TT5 700 5TT5 701 5TT5 702



5TT5 730 5TT5 731 5TT5 732 5TT5 733

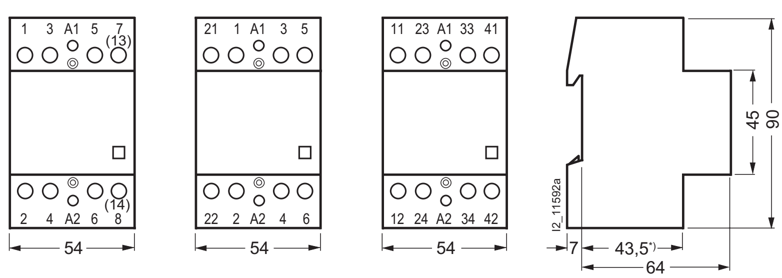


*) Without sealable terminal cover

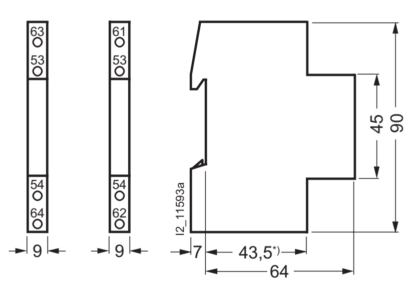
5TT5 740
5TT5 750

5TT5 741
5TT5 751

5TT5 742
5TT5 752

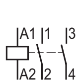


5TT5 900 5TT5 901

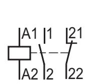


Schematics

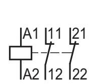
5TT5 700



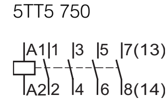
5TT5 701



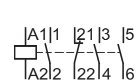
5TT5 702



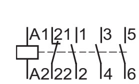
5TT5 730
5TT5 740
5TT5 750



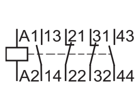
5TT5 731



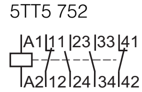
5TT5 741
5TT5 751



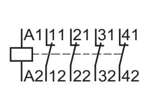
5TT5 732



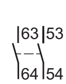
5TT5 742
5TT5 752



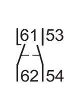
5TT5 733



5TT5 900



5TT5 901



5TT3 4 soft-starting devices

Overview

- 1-phase 1.5 kW
- 3-phase 5.5 kW
- Increases the service life of one-phase asynchronous motors and mechanical drive equipment
- Can also be retrofitted in existing systems
- Separate setting of acceleration time and starting torque
- With LED display for startup or continuous operation
- The power semiconductors bridged after completion of start-up.

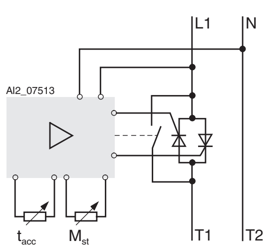
Technical specifications

Data acc. to EN 60947-4-2 (VDE 0660 Part 117)			**5TT3 440**	**5TT3 441**
Supply/motor voltage		V AC	400	230
Operating range × U_c			0.8 ... 1.1	
Rated power		VA	3.5	1.4
Rated frequency		Hz	50/60	
Rated power dissipation P_v	coil/drive contact1) per pole		3.5 4.6	1.7 0.7
Max. rated motor power	at 400 V	VA	5500	1500
Min. rated motor power	at 400 V	VA	300	100
Startup voltage		%	30 ... 70	20 ... 70
Starting ramp		s	0.1 ... 10	
Recovery time		ms	100	200
Switching frequency				
$3 \times I_N$, T_{AN} = 10 s, ν_u = 20 %		switching cycles/h	36 (to 3 kW)	10
$3 \times I_N$, T_{AN} = 10 s, ν_u = 20 %		switching cycles/h	20 (from 3 ... 5.5 kW)	
Semiconductor fuse	super quick	A	35	20
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2 × 2.5 1 × 0.5	
Permissible ambient temperature		°C	-20 ... +60	-20 ... +55
Resistance to climate	acc. to EN 60068-1		20/60/4	20/55/4

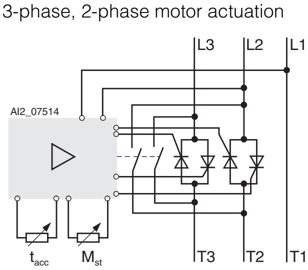
1) For rated operational current.

Selection and ordering data

	Design	U_e	P_c	MW	Order No.	Weight 1 item	PS*/ P. unit
		V AC	W			kg	Items
	Soft-starting device with transparent cap 1)						
 5TT3 441	1-phase	230	100 ... 1 500	2	**5TT3 441**	0.135	1
	Soft-starting device, mounting depth 55 mm						
 5TT3 440	3-phase, 2-phase motor actuation	400	300 ... 5 500	6	**5TT3 440**	0.430	1



t_{acc}: Acceleration time
M_{st}: Starting torque



t_{acc}: Acceleration time
M_{st}: Starting torque

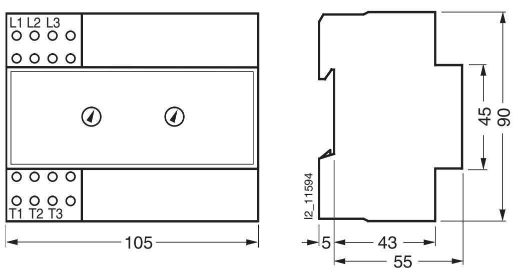
1) Spare transparent cap, see Page 7/6.

* You can order this quantity or a multiple thereof.

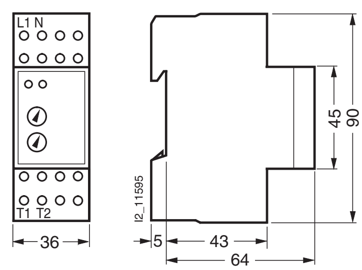
Dimensional drawings

5TT3 44 soft-starting devices

5TT3 440

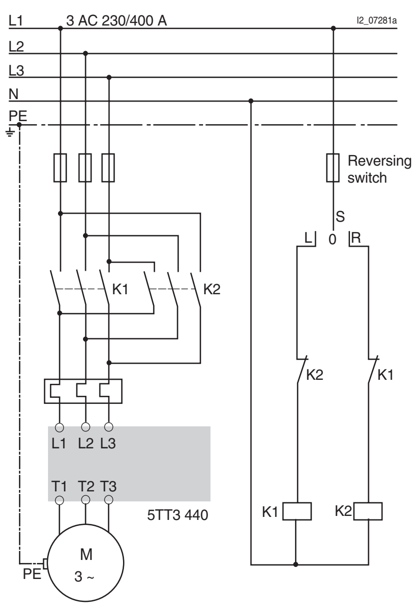


5TT3 441



Schematics

Switching example: 5TT3 440



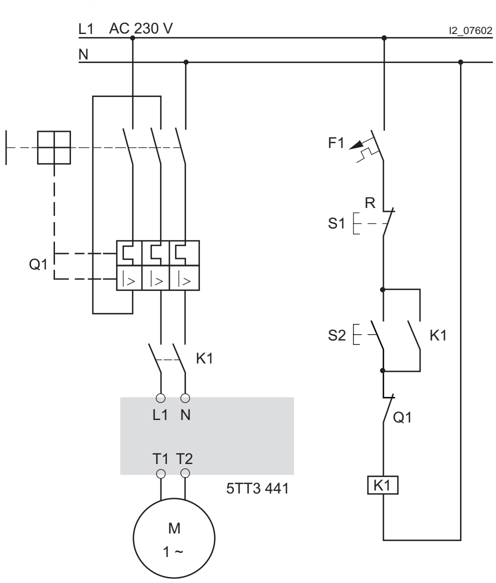
The soft-starting device is an electronic control for the soft startup of three-phase asynchronous machines. Two of three phases are influenced by the phase control such that the current rises steadily. This also increases the motor torque and the drive starts up smoothly.

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.

To prevent losses in the device, the power electronics are bridged with relay contacts after startup.

Note:
There is no speed adjustment. There is no marked soft start behavior without a mechanically connect load. 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.
There must be no source of heat located underneath the device.
However, soft-starting devices can be arranged next to each other.

Switching example: 5TT3 441



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.

To prevent losses in the device, the power electronics are bridged with relay contacts after startup.

Note:
There is no speed adjustment. There is no marked soft start behavior without a mechanically connect 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.

5TT5 2 EMERGENCY-STOP modules

Overview

Regulations

The machine Directive 98/37/EG, valid from 31.12.1994, only specifies global safety standards. Details on how to implement individual safety demands are defined in standards, e.g. by the European Committee for Electrotechnical Standardization (CENELEC), which are based on international standards.

Key standards

- **EN 60204-1 (VDE 0113 Part 1):1998**
  "Machine safety – Electrical equipment of machinery
  Part 1: General requirements"
- **EC Directive machinery 98/37/EG**
- **EN 292-1:1991**
  "Basic concepts, general principles for design
  Part 1: Basic terminology, methodology"
- **EN 292-2:1991 and EN 292-2/A1:1995**
  "Basic concepts, general principles for design
  Part 2: Technical principles and specifications"
- **EN 418:1992**
  "Safety of machinery – Emergency stop equipment,
  functional aspects, principles for design"
- **EN 954-1:1996**
  "Safety of machinery – Safety-related parts of control systems
  Part 1: General principles for design"
- **EN 1088:1995**
  "Safety of machinery – Interlocking devices associated with guards – Principles for design and selection"

Category of safety-related parts of control systems acc. to CEN/TC 114 EN 954-1

Category	Summary of requirements	System behavior
B	The safety-related parts of machine control systems and/or their protective devices and their components must be state of the art and designed, selected, assembled and combined such that they can withstand the expected influences.	The occurrence of a fault can lead to the loss of the safety function. Some faults remain undetected.
1	The requirements of B must be fulfilled. Use of proven safety components and principles.	As described for category B, but with a higher level of safety-related reliability
2	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. The safety functions must be tested at suitable intervals by the control system of the machine. Note: What is considered suitable depends on the application and the type of machine.	The occurrence of a fault can lead to the loss of safety function between testing intervals. The fault is detected by the test.
3	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. The control systems must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) Wherever practically possible, the single fault is detected by the appropriate means, which must be state-of-the-art.	If a single fault occurs, the safety function is always maintained. Some, but not all, faults are detected. An accumulation of undetected faults may lead to the loss of the safety function.
4	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. A control system must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) Whenever possible, a single fault is detected at or before the next request for the safety function or c) If b) is not possible, that an accumulation of faults does not lead to the loss of the safety function.	If faults occur, the safety function is always maintained. The faults are detected in time to prevent the loss of the safety function.

Overview

Scope

The scope of the EC Directive Machines is no longer restricted to industrial machinery, but now covers virtually all machines used in all areas of commercial and private trade and industry and applies to all
- stationary
- movable,
- hand-held,
- mobile
- machine tools and processing machines
- prime movers and production machines
- compressors
- operating and packaging machines
- machines in underground mining
- earthmoving machines and harvesters
- hoisting equipment
- floor conveyors
- machines for lifting persons
- plants
- interchangeable equipment, such as snow ploughs and mountable sweeping devices

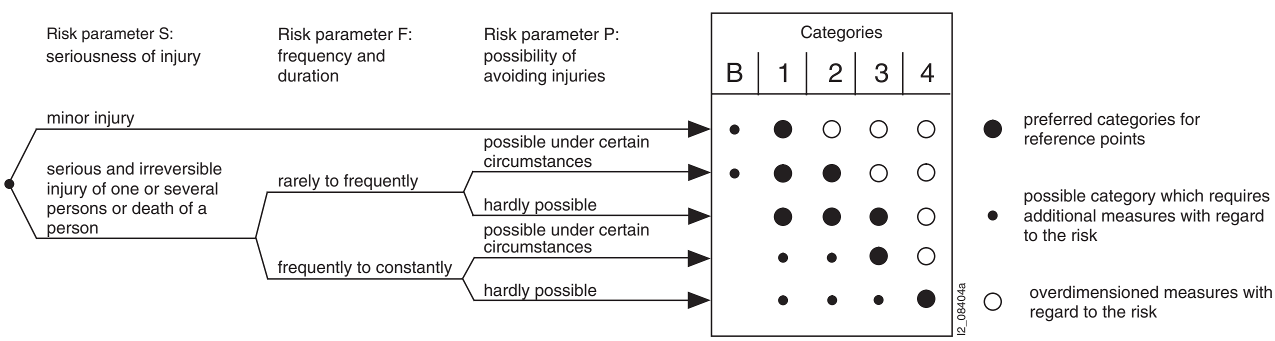
Risk analysis and selection of a suitable category

Engineers and operators assume responsibility for the correct risk assessment.

It is difficult to make a quantitative assessment of the risk, so that when selecting the category, the reasonable risk can be determined within a broad band width.

This becomes clear if you select "F2 - frequently to continuous" instead of "F1 - rarely to frequently", for the risk parameters "F - Frequency and duration" when drawing up a risk graph (see image).

The whole band width of safety categories may lie between the assessment of "often" and "frequently".



7

Benefits

- Acc. to the 98/37/EC EC directive for machines
- Safety category 4 acc. to EN 954-1
- Acc. to the 98/37/EC EC directive for machines
- Safety category 4 acc. to EN 954-1
- Electrical isolation between electric circuit and control
- LED display for operation and circuit state

Technical specifications

Data acc. to IEC 60204-1; EN 60204-1 (VDE 0113 Part 1)				**5TT5 200**
Rated control voltage U_c			V AC	230
Rated power dissipation P_v	coil/drive contact [1] per pole			3.5 0.8
Operating range × U_c				0.8 ... 1.1
Rated frequency			Hz	50
Control supply voltage	terminal Y1		V AC/DC	24
Control current	terminal Y1		DC mA	45
Recovery time			ms	500
Electrical isolation	creepage and clearances actuator/contact		mm	3
Rated impulse withstand voltage U_{imp}	actuator/contact		kV	> 4
Contact	NO contact NC NO contact/NC contact	AC-15 AC-15 AC-1	A A A	3 2 5
Contact gap			mm	> 1
Electrical service life	AC-15, 2A, 230 V AC		operating cycles	10^5
Reliable switching frequency			switching cycles/h	600
Vibration strength according to EN 60068-2-6	10 to 55 Hz	amplitude in	mm	0.35
Terminals	+/- screw (Pozidrive)			1
Conductor cross-sections	rigid flexible with sleeve		max. mm² min. mm²	2 × 2.5 1 × 0.5
Permissible ambient temperature			°C	0 ... +50
Resistance to climate acc. to EN 60068-1				0/55/04

1) For rated operational current.

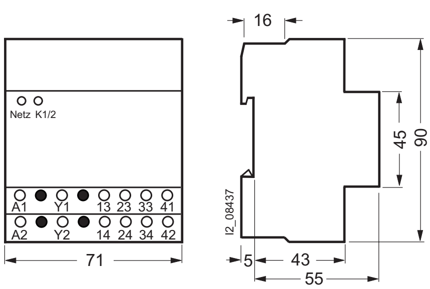
5TT5 2 EMERGENCY-STOP modules

Selection and ordering data

	Design	U_e	I_e	U_c	MW	Order No.	Weight 1 item	PS*/ P. unit
		V AC	A	V AC			kg	Items
 5TT5 200	**EMERGENCY-STOP module, mounting depth 55 mm**							
		400	5	230	4	**5TT5 200**	0.250	1

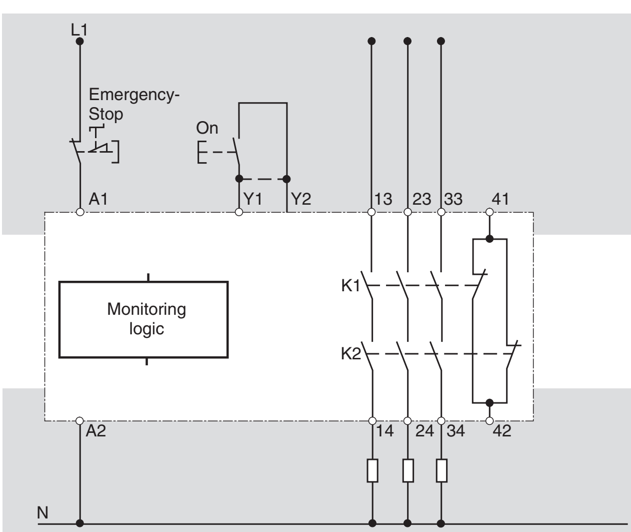
Dimensional drawings

5TT5 200 emergency stop module



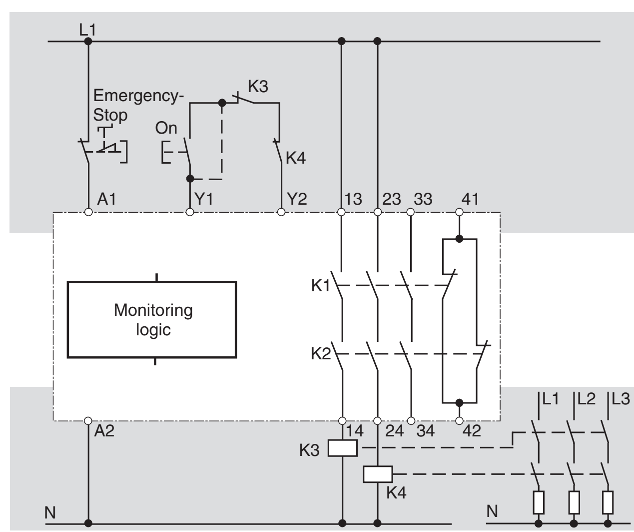
Schematics

Switching examples



Direct connection 230 V/400 V to 5 A

The monitoring logic checks internal relay contacts (not shown) to see whether both relays have been released prior to switching on. This ensures that no contacts are welded. In addition, the voltage level at terminal A1 is monitored. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.



Connection of external contactors

External contactors may be used when they are equipped with positively driven contacts according to safety regulations ZH1/457 of the German Trade Association (compare catalog ET B1 · 2002, Technical specifications, pages 6/15 or 6/20). Contactors with 3 NO contacts and 1 NC contact must be used, whereby the NC contacts must be integrated in the monitoring loop – terminals Y1/Y2. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.

* You can order this quantity or a multiple thereof.

Overview

Connecting loads

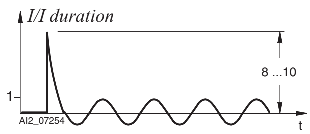
The increased starting currents of different loads and thus the risk of contacts welding is often underestimated.

Resistive load:

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

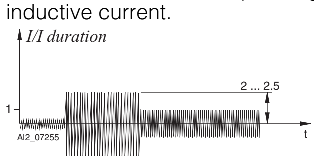
Incandescent lamps:

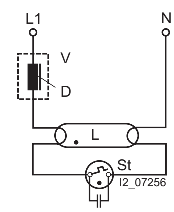
The cold coiled filament in incandescent lamps or halogen lamps causes a 6 to 10-fold starting current for approx. 10 ms.



Uncorrected fluorescent lamps:

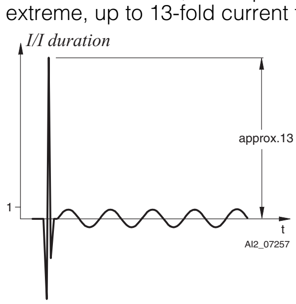
When switched on over several periods, the heating current of the coiled filament and the operating current produce a 2 to 2.5-fold inductive current.

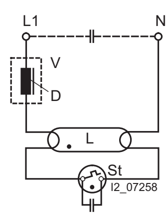




Parallel corrected fluorescent lamps:

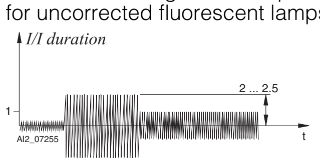
When switched on, the capacitor causes an extreme, up to 13-fold current for approx. 10 ms.

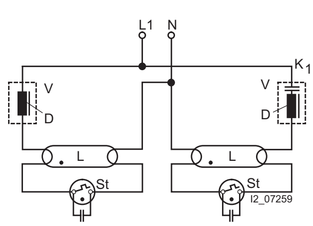




Fluorescent lamps in Duo circuit:

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

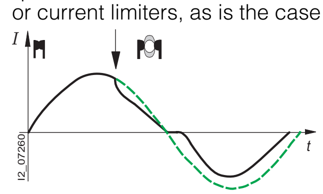
A wide range of different contacts are used for modular installation devices:

- Contacts as for contactors with >3 mm contact gap, as for remote switches
- Relay contacts with >3 mm contact gap, as for Insta contactors
- Manually operated contacts with >3 mm contact gap, as for switches
- Relay contacts with μ-contacts (contact gap >0.5 mm), like those used on the printed boards of electronic devices.

The selection table of devices at the end of this chapter helps you to find the correct switching device for different illumination systems.

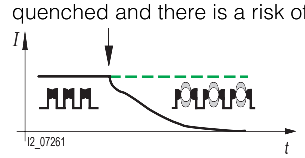
Disconnecting loads

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



Disconnecting direct currents

When switching direct voltages, there is no zero-crossing of the current to quench the electric arc. In order to still be able to switch appreciable currents, contacts are connected in series to increase the isolating distance.
Some switching devices are provided with planning data for switching direct currents. Compliance with these planning data is essential. If the data values are exceeded the electric arc is not reliably quenched and there is a risk of fire.



Safe isolation

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

Notes