

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

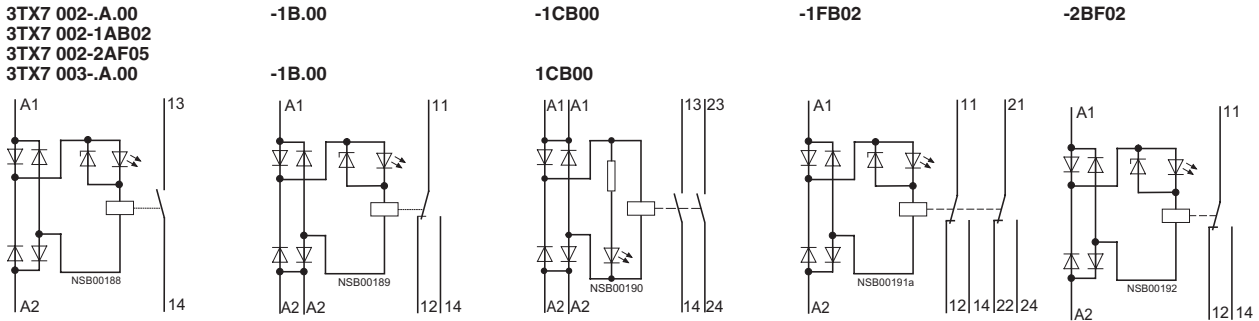
General data

Circuit diagrams

Relay connectors – connection diagrams

Terminal designations acc. to EN 50005

3TX7 002-A.00
3TX7 002-1AB02
3TX7 002-2AF05
3TX7 003-A.00



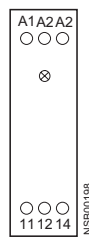
Relay connectors – position of the terminals

Output interfaces

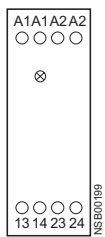
3TX7 002-1AB0.
3TX7 003-1AB00



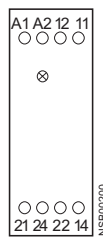
-1B.00
-1B.00



-1CB00
-1CB00



-1FB02

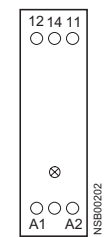


Input interfaces

3TX7 002-2A.0.
3TX7 003-2A.0.



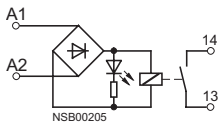
-2BF02



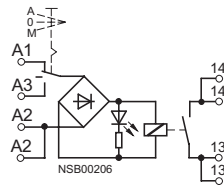
Relay connectors – connection diagrams

Output interfaces

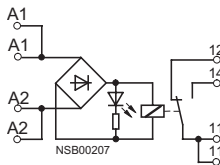
3TX7 00.-1M.00



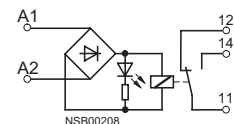
3TX7 00.-1AB10



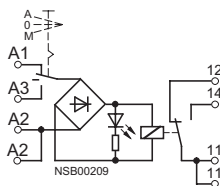
3TX7 00.-1BB00
3TX7 00.-1BF05



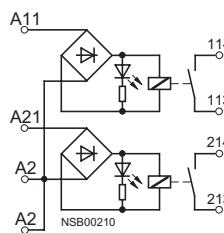
3TX7 00.-1L.0.



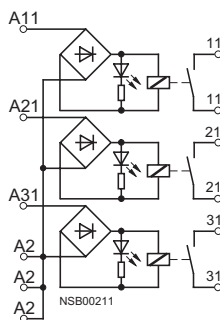
3TX7 00.-1BB10



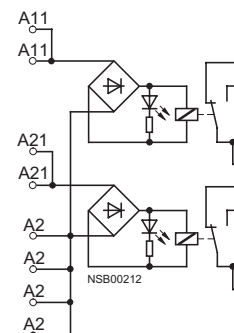
3TX7 00.-1CB00



3TX7 00.-1HB00

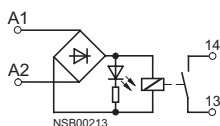


3TX7 00.-1GB00



Input interfaces

3TX7 00.-2M.02



A = automatic
0 = neutral position
M = manual

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

General data

Relay connectors – position of the terminals

Output interfaces

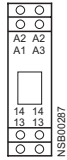
3TX7 004
-1M.00



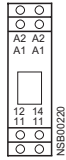
-1L.0.



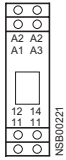
-1AB10



-1B.0.



-1BB10



-1CB00



-1HB00



-1GB00



Input interfaces

3TX7 004-2M...



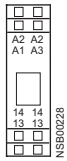
3TX7 005
-1M.00



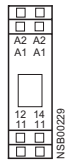
-1L.0.



-1AB10



-1BB00



-1BB10



-1CB00



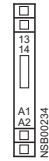
-1HB00



-1GB00



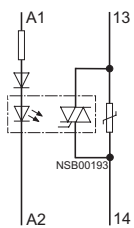
3TX7 005-2M...



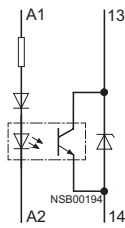
Semiconductor interfaces – connection diagrams

Terminal designations acc. to EN 50005

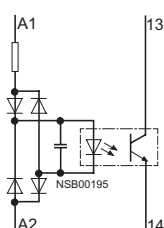
3TX7 002-3AB00



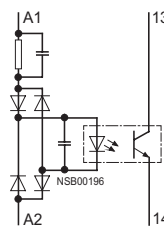
-3AB01



-4AB00



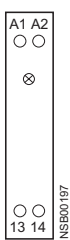
-4AG00



Semiconductor interfaces – position of the interfaces

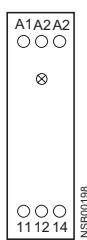
Output interfaces

3TX7 002-3AB0.



Input interfaces

3TX7 002-4A.0.



Coupling Relays and Converters

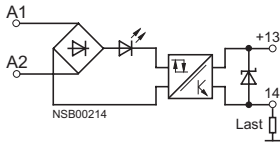
Coupling Relays with Narrow Type of Construction

General data

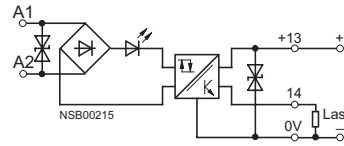
Semiconductor interfaces – connection diagrams

Output interfaces

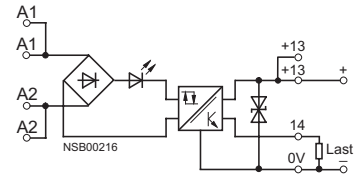
3TX7 00.-3AB04
3TX7 00.-3PB41



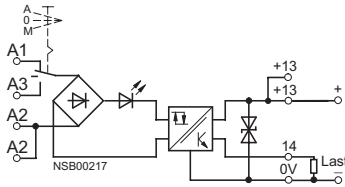
3TX7 00.-3PB54
3TX7 00.-3PG74
3TX7 00.-3PB74



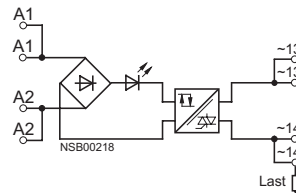
3TX7 00.-3AC04



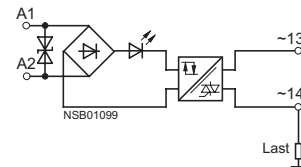
3TX7 00.-3AC14



3TX07 00.-3AC03

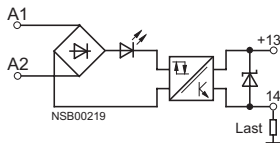


3TX7 00.-3RB43



Input interfaces

3TX7 00.-4AB04
3TX7 00.-4P.24



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Semiconductor interfaces – position of the interfaces

Output interfaces

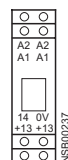
3TX7 004
-3AB04,
-3PB41



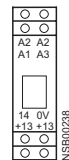
-3PB54,
-3PB74,
-3PG74



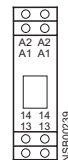
-3AC04



-3AC14



-3AC03

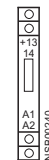


-3RB43



Input interfaces

3TX7 004-4AB04
3TX7 004-4P.24



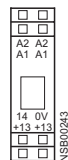
3TX7 005
-3AB04,
-3PB41



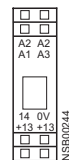
-3PB54,
-3PB74,
-3PG74



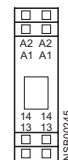
-3AC04



-3AC14



-3AC03



-3RB43



3TX7 005-4AB04
3TX7 005-4P.24



A = automatic
0 = neutral position
M = manual

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Overview

AC and DC operation

DIN VDE 0110 Part 1, DIN VDE 0435, DIN VDE 0660 and EN 50005

In the coupling elements in double-decker format, the connections are arranged on two levels; the units are extremely compact. Connection method: screw-type connection or spring-loaded terminal. For test purposes, versions are available with manual 0 automatic switches.

The input and output coupling elements differ with regard to the positioning of the terminals and the LEDs. For equipment identification purposes, each coupling element has a blank legend plate.

In accordance with the technical specifications of electronic systems, the coupling elements have a lower power consumption.

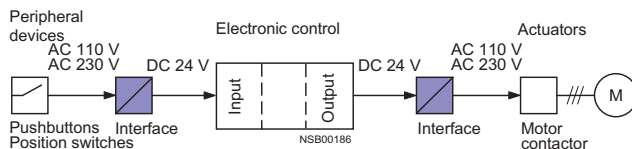
Design

Note on mounting

Snap-on mounting is possible on horizontal and vertical rails. In the case of vertical rails and closely mounted units, the maximum permissible ambient temperature $T_u = 40\text{ °C}$. Any service position is possible.

If the coupling elements are operated continuously 24 hours per day (100% ON time) at the maximum permissible rated control supply voltage and the maximum permissible ambient temperature, it is recommended that no similar equipment or other units that generate heat are placed directly adjoining the coupling elements because this can reduce the service life of the couplers.

A clearance of $> 10\text{ mm}$ to the right and left of the coupling element reduces the risk of a premature failure under these conditions of application.



Functions

Surge suppression

The coupling links have been tested with 1×10^5 operating cycles at AC-15 operation with the values specified in the Technical specifications.

If inductive loads are connected, the service life of the relay connectors can be increased.

Note:

If capacitive loads without series resistors are switched, which limit temporary peak currents, microscopic welding of the relay contacts may result.



Connecting a lead to the spring-loaded terminals

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Technical specifications

Type	3TX7 002-/3TX7 003-	
General data		
Rated insulation voltage U_i (pollution degree 3)	V	300
Safe isolation ¹⁾ between the coil and the contacts acc. to DIN VDE 0106 Part 101	V	up to AC 300 V
Degree of protection	Connections Enclosures	IP20 IP30
Short-circuit protection acc. to IEC 60947-5-1 (weld-free protection at $I_k \geq 1$ kA) Fuse-links, operational class gL/gG	A	4
Permissible ambient temperature	during operation during storage	°C -25 ... +60 °C -40 ... +80
Conductor cross-sections		
• Screw-type connections		
- solid	mm ²	1 × (0.25 ... 4)
- finely stranded with or without end sleeve	mm ²	1 × (0.5 ... 2.5)
- terminal screw		M 3
• Spring-loaded terminals (for 3TX7 003):		
- solid or finely stranded	mm ²	1 × (0.08 ... 2.5)
- finely stranded with end sleeve	mm ²	1 × (0.25 ... 1.5)

1) For 3TX7 00.-1FB02, no safe isolation acc. to DIN VDE 0106 Part 101.

Type	3TX7 002-/3TX7 003-	1AB02	1AB00	1BB00 1FB02	1CB00	2AB00	2AE00	1BF00 2BF02	2AF00	2AF05	
Control side											
• Operating range		0.8 ... 1.25 × U_s					0.8 ... 1.1 × U_s				
• Power consumption at U_s	W	0.75	0.75	0.75	1.2	0.75	0.75	1.2	1.2	1.2	
• Release voltage	% of U_s	≥ 10									≥ 25
• Max. permissible conductor length (min. conductor cross-section: 0.75 mm ²)	- AC - DC	m 300	300	300	300	300	15	7	7	350	
• Permissible residual current of the electronic circuit (for 0 signal)		mA 2	2	2	4	2	0.4	0.35	0.35	4	
• Switching times at U_s	- ON-delay - OFF-delay	ms < 8 ms < 10									
• Function display		yellow LED									
Load side											
Rated currents²⁾											
• Conventional thermal current I_{th}		A 6									
• Rated operating currents I_e acc. to utilization categories (DIN VDE 0660) (3TX7 002-1CB00: AC-15, $I_e = 2$ A)											
- AC-15	- at 24 V - at 110 V - at 230 V	A 3 A 3 A 3									
- DC-13	- at 24 V - at 110 V - at 230 V	A 1.0 A 0.2 A 0.1									
• Operating current with resistive load to DIN VDE 0435 (relay standard) and DIN VDE 0660											
- AC-12	- at 24 V - at 110 V - at 230 V	A 6 A 6 A 6									
- DC-12	- at 24 V - at 110 V - at 230 V	A 6 A 0.2 A 0.2									
• Operating voltage	- AC/DC	V 24 ... 250									
• Min. contact load for 3TX7 00.-...02		mA AC/DC 1 V, 0.1									
• Mechanical endurance	Oper. cycles	20 × 10 ⁶									
• Electrical endurance at I_e	Oper. cycles	1 × 10 ⁵									
• Operating frequency	Oper. cycles 1/h	5000									
• Contact material for 3TX7 00.-...02		Ag/Ni 0.15 hard gold-plated									
• Power limit hard gold plating for 3TX7 00.-...02											
- Voltage	V	30									
- Current	mA	20									

Note: If inductive loads are connected in parallel, the service life of the relay connectors can be increased.

1) No safe isolation for 3TX7 00.-1FB02

2) Capacitive loads can result in micro-welding on the contacts

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Type	3TX7 004/3TX7 005	
General data		
Rated insulation voltage U_i (pollution degree 3)	V	300
Safe isolation between the coil and the contacts acc. to DIN VDE 0106 Part 101	AC V	up to 300
Degree of protection	Connections Enclosures	IP20 IP30
Short-circuit protection acc. to IEC 60947-5-1 (weld-free protection at $I_k \geq 1$ kA) fuse-links, operational class gL/gG	A	4
Permissible ambient temperature	during operation during storage	°C -25 ... +60 °C -40 ... +80
Conductor cross-sections		
• Screw connections (for 3TX7 004):		
- solid	mm ²	1 × (0.25 ... 4)
- finely stranded with end sleeve	mm ²	1 × (0.5 ... 2.5)
- finely stranded without end sleeve	mm ²	1 × (0.5 ... 2.5)
- terminal screws		M 3
• Spring-loaded terminals (for 3TX7 005):		
- solid or finely stranded	mm ²	1 × (0.08 ... 2.5)
- finely stranded with end sleeve	mm ²	1 × (0.25 ... 1.5)
Control side		
• Operating range	at DC 17 ... 40 V at $U_s =$ AC/DC 24 V at $U_s =$ AC/DC 110 and 230 V	- 0.7 ... 1.25 × U_s 0.8 ... 1.1 × U_s
• Power consumption at U_s		approx. 0.5 W/channel; 3TX7 00-...05: 1 W at DC/6 VA at AC
• Permissible residual current of the electronics (for 0 signal)		
- Width 6.2 mm	mA	2
- $U_s = 24$ V	mA	0.5
- $U_s > 24$ V	mA	2.5
- From 12.5 mm width		
Exceptions: 3TX700.-1LH00, 3TX700.-1BF05	mA	1.5 5 ($U_s =$ AC 230 V) 0.5 ($U_s =$ AC 230 V)
• Switching times at U_s	- ON-delay - OFF-delay	ms < 8 ms < 15
• Function display		yellow LED

Type	3TX7 004/3TX7 005	-1.F00 -2ME02 -2MF02	-1.B.. -2MB02	1.HO.	-1BF05
Max. permissible conductor length (min. conductor cross-section: 0.75 mm ²)					
• AC	m	40	400	on request	350
• DC	m	2000	2000	on request	2000

Type	3TX7 00.-1A/1B-/1C-/1H/1G		3TX7 00.-.L/M	
Load side				
Rated operating currents $I_e^{1)}$				
• Conventional thermal current I_{th}	A	6		6
• Rated operating current I_e according to utilization categories (DIN VDE 0660)				
- AC-15				
- at 24 V	A	3		2
- at 110 V	A	3		2
- at 230 V	A	3		2
- DC-13				
- at 24 V	A	1		1
- at 110 V	A	0.2		0.2
- at 230 V	A	0.1		0.1
• Operating current with resistive load to DIN VDE 0435 (relay standard) and DIN VDE 0660				
- AC-12				
- at 24 V	A	6		6
- at 110 V	A	6		6
- at 230 V	A	6		6
- DC-12				
- at 24 V	A	6		6
- at 110 V	A	0.3		0.3
- at 230 V	A	0.2		0.2
• Power limit/hard gold plating				
- Voltage	V	30		30
- Current	mA	20		20
• Operating voltage	AC/DC	V	17 ... 250	17 ... 250
• Endurance				
- mechanical	Operating cycles		20×10^6	20×10^6
- electrical (at I_e)	Operating cycles		1×10^6	0.5×10^6
• Operating frequency	Operating cycles		5000	5000
	1/h			

Note: If inductive loads are connected in parallel, the service life of the relay connectors can be increased.

1) Capacitive loads can result in micro-welding on the contacts


Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Selection and ordering data

AC and DC operation • for snap-on mounting onto 35 mm standard mounting rail

Rated control supply voltage U_s	Contacts Version	Width	DT	Screw-type connection	PS*	Weight per PU approx.	DT	Spring-loaded terminal	PS*	Weight per PU approx.		
AC 50/60 Hz	S W	mm		Order No.		kg		Order No.		kg		
3TX7 002 and 3TX7 003 relay connectors												
Output interfaces												
 3TX7 002	AC/DC 24 V	1	–	11.5	▶	3TX7 002-1AB00	1 unit	0.032	▶	3TX7 003-1AB00	1 unit	0.030
	AC/DC 24 V	1 (hard gold-plated)	–	11.5	▶	3TX7 002-1AB02	1 unit	0.032	▶	–	–	–
	AC/DC 24 V	–	1	17.5	▶	3TX7 002-1BB00	1 unit	0.043	▶	3TX7 003-1BB00	1 unit	0.038
	AC/DC 230 V	–	1	17.5	▶	3TX7 002-1BF00	1 unit	0.044	A	3TX7 003-1BF00	1 unit	0.039
	AC/DC 24 V	2 ¹⁾	–	22.5	▶	3TX7 002-1CB00	1 unit	0.055	▶	3TX7 003-1CB00	1 unit	0.050
	AC/DC 24 V	–	2 (hard gold-plated) ¹⁾	22.5	▶	3TX7 002-1FB02	1 unit	0.055	▶	–	–	–
	Input interfaces											
	AC/DC 24 V	1	–	11.5	▶	3TX7 002-2AB00	1 unit	0.032	A	3TX7 003-2AB00	1 unit	0.030
	AC/DC 110 V	1	–	11.5	▶	3TX7 002-2AE00	1 unit	0.032	–	–	–	–
	AC/DC 230 V ¹⁾	1	–	11.5	▶	3TX7 002-2AF00	1 unit	0.033	A	3TX7 003-2AF00	1 unit	0.031
AC/DC 230 V ¹⁾	1	–	11.5	▶	3TX7 002-2AF05	1 unit	0.038	–	–	–	–	
AC/DC 230 V	–	1 (hard gold-plated) ²⁾	17.5	▶	3TX7 002-2BF02	1 unit	0.043	–	–	–	–	

Note:

For coil voltages which are not listed, see DC power supplies SITOP power e.g. 6EP1 331-2BA10 and 6EP1 731-2BA00 in "Transformers and power supplies".

- 1) The same potential must be applied to 2 NO/2 CO relays.
- 2) Observe max. permissible conductor length, see Technical specifications.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Rated control supply voltage U_s	Contacts Version		Channel	Manual-0-automatic switch for testing purposes	Width	DT	Screw-type connection			Spring-loaded terminal		
	S	W					PS*	Weight per PU approx.	DT	PS*	Weight per PU approx.	
AC 50/60 Hz	S	W			mm		Order No.	kg		Order No.	kg	

Relay connectors 3TX7 004 and 3TX7 005

Output interfaces

AC/DC 24 V	–	1	1	without	6.2	▶	3TX7 004-1LB00	1 unit	0.033	▶	3TX7 005-1LB00	1 unit	0.029
AC/DC 230 V	–	1	1	without	6.2	▶	3TX7 004-1LF00	1 unit	0.035	▶	3TX7 005-1LF00	1 unit	0.030
AC/DC 230 V	–	1	1	without	12.5 ¹⁾	▶	3TX7 004-1BF05	1 unit	0.057	A	3TX7 005-1BF05	1 unit	0.053
DC 17/40 V	–	1	1	without	6.2	▶	3TX7 004-1LH00	1 unit	0.033	A	3TX7 005-1LH00	1 unit	0.029
AC/DC 24 V	–	1 (hard gold-plated)	1	without	6.2	▶	3TX7 004-1LB02	1 unit	0.033	▶	3TX7 005-1LB02	1 unit	0.028
AC/DC 24 V	1	–	1	without	6.2	▶	3TX7 004-1MB00	1 unit	0.038	▶	3TX7 005-1MB00	1 unit	0.034
AC/DC 230 V	1	–	1	without	6.2	▶	3TX7 004-1MF00	1 unit	0.037	▶	3TX7 005-1MF00	1 unit	0.034
AC/DC 24 V	–	1	1	with	12.5	▶	3TX7 004-1BB10	1 unit	0.052	C	3TX7 005-1BB10	1 unit	0.048

Input interfaces

AC/DC 24 V	1 (hard gold-plated)	–	1	without	6.2	▶	3TX7 004-2MB02	1 unit	0.037	C	3TX7 005-2MB02	1 unit	0.034
AC/DC 110 V	1 (hard gold-plated)	–	1	without	6.2	▶	3TX7 004-2ME02	1 unit	0.037	C	3TX7 005-2ME02	1 unit	0.031
AC/DC 230 V	1 (hard gold-plated)	–	1	without	6.2	▶	3TX7 004-2MF02	1 unit	0.038	C	3TX7 005-2MF02	1 unit	0.034



3TX7 004-1LB0.



3TX7 005-2MB02.

Note:

For replacement products, see interfaces with 3RS18 industrial enclosure or other 3TX70 products.

For coil voltages which are not listed, see DC power supplies SITOP power e.g. 6EP1 331-2BA10 and 6EP1 731-2BA00 in "Transformers and power supplies".



1) For long conductors.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Relay connectors

Accessories

	For interface	Version	DT	Order No.	PS*	Weight per PU approx. kg
	Type					
Connecting comb	3TX7 004	24 terminals, blue, width 6.2 mm	▶	3TX7 004-8AA00	1 unit	0.017
						
Connecting lead	3TX7 002, 3TX7 003, 3TX7 004, 3TX7 005	24 terminals with supply cable, blue	A	3TX7 004-8BA00	1 unit	0.050
						

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Plug-in relay connectors

Benefits

The wire is fed in and screwed down from the front. This results in faster wiring time and wiring errors are prevented.

Overview

Coupling elements are used to connect signals to and from a PLC. The plug-in relays enable the relay to be replaced at the end of its service life without the need for any changes in the wiring.

For easy bridging of the signals, each terminal can be jumpered using an external connecting comb.

Technical specifications

Type	3TX7 01.-1		
General data			
Rated insulation voltage U_i (pollution degree 3)	V	300	
Safe isolation between the coil and the contacts acc. to DIN VDE 0106 Part 101	V	up to AC 300 V	
Degree of protection	Connections Enclosures	IP20 IP40	
Short-circuit protection acc. to IEC 60947-5-1 (weld-free protection at $I_k \geq 1$ kA) Fuse-links, operational class gL/gG	A	4	
Permissible ambient temperature	during operation during storage	°C	-25 ... +55 -40 ... +80
Conductor cross-sections			
• Screw connections		mm ²	1 × (0.5 ... 2.5)
- solid		mm ²	1 × (0.5 ... 1.5)
- finely stranded with or without end sleeve			M 3
- terminal screw			
Type	3TX7 01.-1.M	3TX7 01.-1.B	3TX7 01.-1.E/F
Control side			
• Operating range	0.9 ... 1.1 × U_s	0.7 ... 1.25 × U_s	0.8 ... 1.1 × U_s
• Power consumption at U_s	W	0.5	
• Release voltage	% of U_s	10	
• Max. permissible conductor length (min. conductor cross-section: 0.75 mm)	- AC - DC	m 7 m 2000	
• Permissible residual current of the electronic circuit (for 0 signal)	mA	2	2 0.4
• Operating times at U_s	- ON-delay - OFF-delay	ms < 5	< 7 < 7 < 8 < 13
• Function display		yellow LED	
• Protection circuit	- DC - AC	flywheel diode + reverse voltage protection Varistor	
Type	3TX7 01.-1		
Load side			
Rated currents¹⁾			
• Conventional thermal current I_{th}	A	5	
• Rated operating currents I_e			
- AC-15	- at 24 V - at 110 V - at 230 V	A 3 A 3 A 3	
- DC-13	- at 24 V - at 110 V - at 230 V	A 1 A 0.2 A 0.1	
• Operating voltage	AC/DC	V	24 ... 250
• Min. contact load	- standard contact - hard gold-plated contacts		AC/DC 17 V, 5 mA at 1 ppm fault ²⁾ AC/DC 5 V, 1 mA for 1 ppm fault ²⁾
• Mechanical endurance	Operating cycles		20
• Electrical endurance for I_e acc. to AC-15	Operating cycles		100000
• Operating frequency	Operating cycles 1/h		5000

Note: If inductive loads are connected in parallel, the service life of the relay connectors can be increased.

1) Capacitive loads can result in micro-weldings on the contacts



2) 1 ppm = one fault per one million operating cycles.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Plug-in relay connectors

Selection and ordering data

Rated control supply voltage U_s	Contacts		DT	Screw connection	PS*	Weight per PU approx. kg	
	S	W					
Plug-in interface, complete with relay							
	DC 24 V	1	–	A	3TX7 014-1AM00	1 unit 0.035	
	DC 24 V	–	1	A	3TX7 014-1BM00	1 unit 0.035	
	AC/DC 24 V	–	1	A	3TX7 014-1BB00	1 unit 0.035	
	AC/DC 115 V	–	1	A	3TX7 014-1BE00	1 unit 0.045	
	AC/DC 230 V	–	1	A	3TX7 014-1BF00	1 unit 0.045	
Plug-in base interface, complete with relay and hard gold-plating¹⁾							
	DC 24 V	–	1 hard gold-plated	A	3TX7 014-1BM02	1 unit on request	
	AC/DC 24 V	–	1 hard gold-plated	A	3TX7 014-1BB02	1 unit 0.035	
	AC/DC 115 V	–	1 hard gold-plated	A	3TX7 014-1BE02	1 unit on request	
	AC/DC 230 V	–	1 hard gold-plated	A	3TX7 014-1BF02	1 unit on request	
Coil voltage	Used for			DT	Order No.	PS*	Weight per PU approx. kg
Individual relay modules²⁾, 1 changeover contact							
DC 24 V	Complete unit DC 24 V			A	3TX7 014-7BQ00	1 unit	on request
DC 24 V	Complete unit, DC 24 V, hard gold-plated			A	3TX7 014-7BQ02	1 unit	on request
DC 24 V	Complete unit AC/DC 24 V			A	3TX7 014-7BM00	1 unit	0.035
DC 24 V	Complete unit, DC 24 V, hard gold-plated			A	3TX7 014-7BM02	1 unit	0.035
DC 24 V	Complete unit AC/DC 115 V and 230 V			A	3TX7 014-7BP00	1 unit	on request
DC 24 V	Complete unit AC/DC 115 V and 230 V, hard gold-plated			A	3TX7 014-7BP02	1 unit	on request
Connecting comb 16-pole, blue							
	for jumpering the same potentials, 16-pole, 6 A current-carrying capacity			A	3TX7 014-7AA00	1 unit	on request

Note:

Start of delivery of the socket interfaces with screw-type connection, expected at the beginning of 2004, units with spring-loaded terminals at the end of 2004.

1) The variants with hard gold-plated contacts with high contact reliability (also for low currents) are especially suitable for electronic inputs of programmable logic controllers.

2) The order number is **not** printed on the relays.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

Area of application

AC and DC operation

DIN VDE 0110 Part 1, DIN VDE 0435, DIN VDE 0660 and EN 50 005 optocoupler: DIN VDE 0884, DIN VDE 0411 Part 500, IEC 61131-2 (programmable logic controllers).

In the coupling elements in double-decker format, the connections are arranged on two levels; the units are extremely compact. Connection method: screw-type connection or spring-loaded terminal. For test purposes, versions are available with manual 0 automatic switches.

The input and output coupling elements differ with regard to the positioning of the terminals and the LEDs. For equipment identification purposes, each coupling element has a blank legend plate.

In accordance with the technical specifications of electronic systems, the coupling elements have a lower power consumption.

Design

Note on mounting

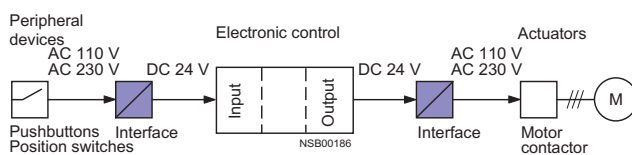
Snap-on mounting is possible on horizontal and vertical rails. In the case of vertical rails and closely mounted units, the maximum permissible ambient temperature $T_u = 40\text{ }^\circ\text{C}$. Any service position is possible.

If the coupling elements are operated continuously 24 hours per day (100% ON time) at the maximum permissible rated control supply voltage and the maximum permissible ambient temperature, it is recommended that no similar equipment or other units that generate heat are placed directly adjoining the coupling elements because this can reduce the service life of the couplers.

A clearance of $> 10\text{ mm}$ to the right and left of the coupling element reduces the risk of a premature failure under these conditions of application.

Optocouplers switch using semiconductors. These are not subject to wear; welding is not possible.

The 6.2 mm wide optocouplers have an opening in the right-hand side of the casing. They can, like relay connectors, be mounted side-by-side without gaps.

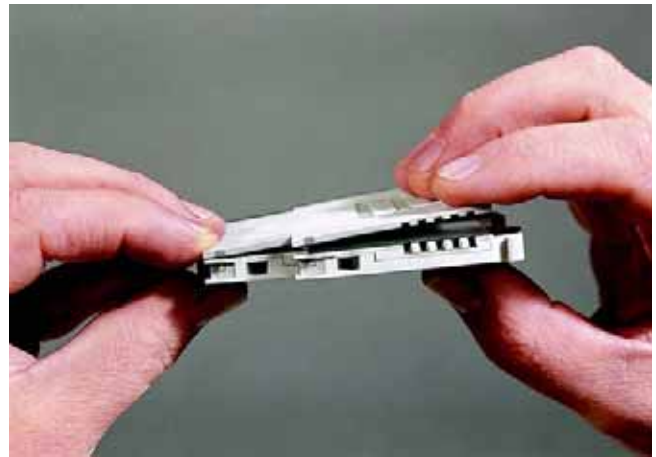


Functions

Surge suppression

In the case of optocouplers, the contact element is a semiconductor. These are not subject to wear; so welding is not possible.

With semiconductors, the switching current is not dependent on the inductance of the load, i.e. the switching current for a DC-13 load is the same as that for an inductive DC-12 load. This means that coupling elements with a semiconductor output are particularly suitable for inductive loads such as solenoid valves. It is not relevant to specify the number of operating cycles because this does not affect the service life of the semiconductor provided it is not overheated.



To provide shock-hazard protection in the case of modules of 6.2 mm width (e.g. 3TX7 004-3AB04) with an opening in the casing, the single module or the last module in a row must be fitted with a cover plate.



Connecting a lead to the spring-loaded terminals

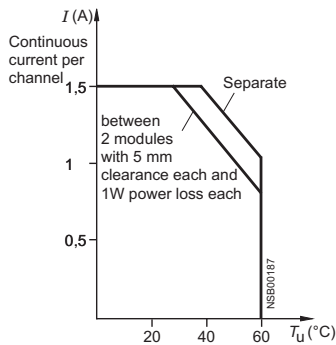
Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

Technical specifications

Type	3TX7 002/3TX7 003	
General data		
Derating diagram for 3TX7 002-3AB01 Load current depending on ambient temperature T_u	Rated insulation voltage U_i (pollution degree 3)	V 300
	Optoelectronic coupling element for safe isolation acc. to DIN VDE 0660 Part 101	V ... 300
	Conductor cross-sections solid finely stranded with or without end sleeve terminal screws	mm ² 1 × (0.25 ... 4) mm ² 1 × (0.5 ... 2.5) M 3
	Permissible ambient temperature during operation during storage	°C -25 ... +60 °C -40 ... +80



Type	3TX7 002-	3AB00	3AB01	4AB00	4AG00
Control side					
Operating range	V	DC 17 ... 30	DC 11 ... 30	AC/DC 17 ... 30	AC 88 ... 264
Control side current input	<ul style="list-style-type: none"> • at DC 17 V • at DC 24 V • at DC 30 V • at AC/DC 17 V • at AC/DC 24 V • at AC/DC 30 V • at AC 88 V • at AC 230 V • at AC 264 V 	mA < 18 mA < 20 mA < 22 mA – mA – mA – mA – mA – mA –	< 5 < 7 < 8.5 – – – – –	– – < 10 < 14 < 18 – – –	– – – – < 9 < 24 < 28
Release voltage	V	> 5	> 8	> 5	> 40
Operating times					
• ON-delay	at DC 17 V at DC 24 V at DC 30 V at AC/DC 17 V at AC/DC 24 V at AC/DC 30 V at AC 88 V at AC 230 V at AC 264 V	ms < 10 ms < 10 ms < 10 ms – ms – ms – ms – ms – ms –	< 0.1 < 0.1 < 0.1 – – – – –	– – < 1 < 1 < 1 – – –	– – – < 18 < 20 < 22
• OFF-delay	at DC 17 V at DC 24 V at DC 30 V at AC/DC 17 V at AC/DC 24 V at AC/DC 30 V at AC 88 V at AC 230 V at AC 264 V	ms < 10 ms < 10 ms < 10 ms – ms – ms – ms – ms – ms –	< 0.1 < 0.1 < 0.1 – – – – –	< 18 < 25 < 30 < 18 < 25 < 30 – – –	– – – < 10 < 20 < 25
Function display		yellow LED	yellow LED	yellow LED	yellow LED
Max. permissible conductor length (min. conductor cross-section: 0.75 mm ²)	AC DC	m m	– 2000	– 2000	1000 2000
Load side					
• Rated operating current I_e	A	1.8	1.5 (see derating diagram)	0.1	0.1
• Short-time loading capacity	A ms	20 20	4 0.2	1 20	1 20
• Contacts		1 NO, Triac	1 NO, transistor	1 NO, transistor	1 NO, transistor
• Switching voltage¹⁾ (working range)	effective AC 50/60 Hz DC	V V	48 ... 264	≤ 60	≤ 30 ≤ 60
• Minimum load current	mA	60	–	–	–
• Voltage drop (conducting)	V	≤ 1.5	≤ 1.1	≤ 1.7	≤ 0.3
• Leakage current of the electronics (for 0 signal)	mA	< 5	< 0.1	< 0.1	< 0.001
• Operating frequency at I_e	Hz	1	1	5	5

1) Observe minimum operating voltage for 3TX7 002-3AB00.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

Type	3TX7 004/3TX7 005	
General data		
Rated insulation voltage U_i (pollution degree 3)	V	300
Safe isolation acc. to DIN VDE 0106 Part 101	V	... 300
Permissible ambient temperature		
• during operation	°C	- 25 ... + 60
• during storage	°C	- 40 ... + 80
Conductor cross-sections		
• Screw connections (for 3TX7 004):		
- solid	mm ²	1 × (0.25 ... 4)
- finely stranded with end sleeve	mm ²	1 × (0.5 ... 2.5)
- finely stranded without end sleeve	mm ²	1 × (0.5 ... 2.5)
- terminal screws		M 3
• Spring-loaded terminals (for 3TX7 005):		
- solid or finely stranded	mm ²	1 × (0.08 ... 2.5)
- finely stranded with end sleeve	mm ²	1 × (0.25 ... 1.5)

Type		3TX7 004- 3TX7 005-	3AB04/ 4AB04	3AC.4	3AC03	3PB54	4PG24
Control side							
• Operating range	V	11 ... 30 DC	11 ... 30 DC	11 ... 30 DC	11 ... 30 DC	11 ... 30 DC	110 ... 230 AC/DC
• Power consumption							
- at DC 24 V	W	≤ 0.5	≤ 0.5	≤ 0.25	≤ 0.2	-	-
- at AC 230 V	W	-	-	-	-	≤ 1.5	-
• Release voltage	V	6	5	6	9	20	
• Permissible residual current of the electronic circuit (for 0 signal)	mA	2.3	2.6	1.5	1.5	0.4	
• Operating times							
- ON-delay	ms	2.5	0.3	10	0.3	1	
- OFF-delay	ms	8	4	10	0.3	6	
• Function display		yellow LED	yellow LED	yellow LED	yellow LED	yellow LED	yellow LED
• Max. permissible conductor length (min. conductor cross-section: 0.75 mm ²)	m	1700	2000	2000	2000	2000	40
Load side							
Operating voltage	V	≤ 48 DC	≤ 30 DC	24 ... 250 V AC	≤ DC 30 V	≤ DC 30 V	
Operating current	A	0.5	5	2	1.5	0.1	
• Short-time loading capacity							
	A	1.5	Short-circuit resistant ¹⁾	100	Short-circuit resistant ²⁾	0.2	
	ms	20		20		3	
• Contacts		1 NO contact, transistor	1 NO contact, transistor	1 NO contact, triac	1 NO contact, transistor	1 NO contact, transistor	
• Minimum load current	mA	-	500 ³⁾	50	-	-	
• Voltage drop (conducting)	V	≤ 1	≤ 0.5	≤ 1.6	≤ 0.5	≤ 1.5	
• Leakage current for 0 signal	mA	< 0.1	< 0.1	< 6	< 0.1	< 0.1	
• Operating frequency for resistive load	Hz	50	50	1	500	500	

1) In the event of a short-circuit or overload, the semiconductor output switches off. In order to operate the unit again, it must be temporarily disconnected from the power supply.

2) In the event of a short-circuit or overload, the current is limited by the semiconductor output.

3) If the current falls below the minimum load current, the built-in semiconductor detects an open-circuit in the load circuit. The control must be temporarily switched off for resetting.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

Type	3TX7 004-/ 3TX7 005-	3P.74	3PB41	3RB43	4PB24
Control side					
• Operating range	V	110 ... 230 AC/DC	11 ... 30 DC	18 ... 30 DC	11 ... 30 DC
• Power consumption					
	- at DC 24 V	W –	≤ 0.5	≤ 0.3	≤ 0.2
	- at AC 230 V	W ≤ 1.5	–	–	–
• Release voltage	V	25	5	12	6
• Permissible residual current of the electronic circuit (for 0 signal)	mA	1	1.5	4	1.2
• Operating times					
	- ON-delay	ms 1.5	4	0.2	0.2
	- OFF-delay	ms 75	6	10	1
• Function display		yellow LED	yellow LED	yellow LED	yellow LED
• Max. permissible conductor length (min. conductor cross-section: 0.75 mm ²)	m	40	2000	2000	2000
Load side					
Operating voltage	V	≤ DC 30	≤ DC 200	AC 24 ... 250	≤ DC 30
Operating current	A	3	0.75	0.5	0.1
• Short-time loading capacity					
	A	Short-circuit resistant ¹⁾	3	0.8	0.2
	ms		2	3	3
• Contacts		1 NO contact, transistor	1 NO contact, transistor	1 NO contact, triac	1 NO contact, transistor
• Minimum load current	mA	–	–	10	–
• Voltage drop (conducting)	V	≤ 0.5	≤ 2	≤ 1.5	≤ 1.5
• Leakage current of the electronics (for 0 signal)	mA	≤ 0.1	≤ 0.1	≤ 1	≤ 0.1
• Operating frequency for resistive load	Hz	10	50	50	500

1) In the event of a short-circuit or overload, the current is limited by the semiconductor output.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

Selection and ordering data

AC and DC operation • for snap-on mounting onto 35 mm standard mounting rail

Rated control supply voltage U_s	Contacts		Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
	Version				mm	Order No.					kg	Order No.	
AC 50/60 Hz			mm		Order No.		kg				Order No.		kg

3TX7 002 semiconductor interfaces



3TX7 002

Output interfaces		Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
DC 24 V				mm	Order No.					kg	Order No.	
1 triac	–	12.5	▶	3TX7 002-3AB00	1 unit	0.033	–	–	–	–	–	
1 triac	–	11.5	▶	3TX7 002-3AB01	1 unit	0.035	–	–	–	–	–	
Input interfaces		Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
AC/DC 24 V				mm	Order No.					kg	Order No.	
1 transistor	–	12.5	▶	3TX7 002-4AB00	1 unit	0.031	–	–	–	–	–	
AC 110 ... 240 V	1 transistor	–	▶	3TX7 002-4AG00	1 unit	0.035	–	–	–	–	–	

Control	Operating voltage	Operating current	Manual-0-automatic switch for testing purposes	Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
AC 50/60 Hz	A	mm		Order No.		kg	Order No.					kg		

3TX7 004 and 3TX7 005 semiconductor interfaces



3TX7 004-3AB04 with cover plate

Output interfaces		Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
DC 24 V				mm	Order No.					kg	Order No.	
DC 24 V	≤ 48 V DC	0.5	without	6.2	▶	3TX7 004-3AB04	1 unit	0.034	▶	3TX7 005-3AB04	1 unit	0.031
DC 24 V	≤ DC 30 V	1.5	without	6.2	▶	3TX7 004-3PB54	1 unit	0.029	▶	3TX7 005-3PB54	1 unit	0.024
DC 24 V	≤ DC 30 V	3	without	6.2	▶	3TX7 004-3PB74	1 unit	0.032	A	3TX7 005-3PB74	1 unit	0.027
AC/DC 110 ... 230 V	≤ DC 30 V	3	without	6.2	▶	3TX7 004-3PG74	1 unit	0.033	A	3TX7 005-3PG74	1 unit	0.027
DC 24 V	≤ DC 30 V	5	without	12.5	▶	3TX7 004-3AC04	1 unit	0.056	▶	3TX7 005-3AC04	1 unit	0.047
DC 24 V	≤ DC 30 V	5	with	12.5	C	3TX7 004-3AC14	1 unit	0.053	C	3TX7 005-3AC14	1 unit	0.051
DC 24 V	≤ 200 V DC	0.75	without	6.2	▶	3TX7 004-3PB41	1 unit	0.035	A	3TX7 005-3PB41	1 unit	0.032
DC 24 V	24 ... 250 V AC	0.5	without	6.2	▶	3TX7 004-3RB43	1 unit	0.041	A	3TX7 005-3RB43	1 unit	0.032
DC 24 V	24 ... 250 V AC	2	without	12.5	▶	3TX7 004-3AC03	1 unit	0.060	C	3TX7 005-3AC03	1 unit	0.056
Input interfaces		Width	DT	Screw connection			PS*	Weight per PU approx.	DT	Spring-loaded terminal		
AC/DC 110 ... 230 V				mm	Order No.					kg	Order No.	
DC 24 V	≤ DC 30 V	0.1	without	6.2	▶	3TX7 004-4PG24	1 unit	0.034	▶	3TX7 005-4PG24	1 unit	0.031
DC 24 V	≤ DC 30 V	0.1	without	6.2	▶	3TX7 004-4PB24	1 unit	0.034	A	3TX7 005-4PB24	1 unit	0.031
DC 24 V ¹⁾	≤ 48 V DC	0.5	without	6.2	C	3TX7 004-4AB04	1 unit	0.034	C	3TX7 005-4AB04	1 unit	0.034

Note:

For replacement products, see interfaces with 3RS18 industrial enclosure or other 3TX70 products.




For coil voltages which are not listed, see DC power supplies SITOP power e.g. 6EP1 331-2BA10 and 6EP1 731-2BA00 in "Transformers and power supplies".

1) Discontinued products: will no longer be manufactured from the beginning of 2004.

Coupling Relays and Converters

Coupling Relays with Narrow Type of Construction

Semiconductor couplers

	For interface	Version	DT	Order No.	PS*	Weight per PU approx. kg
	Type					
	Connecting comb	3TX7 004	24 terminals, blue, width 6.2 mm	▶ 3TX7 004-8AA00	1 unit	0.017
	Connecting lead	3TX7 002, 3TX7 003, 3TX7 004, 3TX7 005	24 terminals with supply, blue	A 3TX7 004-8BA00	1 unit	0.050
	Cover plate	3TX7 004-3AB04, 3TX7 004-4AB04, 3TX7 005-3AB04, 3TX7 005-4AB04, 3TX7 005-4PB24	RAL 7035, light gray	▶ 3TX7 004-8CE00	1 unit	0.016

Coupling Relays and Converters

Coupling Relays in Industrial Enclosure

Relay connectors

Overview

The new 3 RS18 coupling relays are couplers in the well-proven standard 22.5 mm time-delay relay enclosure. The series comprises relays with 1, 2 and 3 changeover contacts with screw-type and spring-loaded terminals for combined voltages and wide voltage ranges.

Benefits

- Wide voltage range: one product for all voltages
- The industrial enclosure supports the same connection methods as the time-delay relay including spring-loaded terminals, 2 wires can be clamped
- Versions with electronically optimized outputs (gold-plated)
- Up to 3 changeover contacts with only 22.5 mm width.

Area of application

Typical applications are found wherever electronically optimized contacts are required and equipment with a wide voltage range is implemented.

Technical specifications

Type	3RS18..-....1	3RS18..-....0
General data		
Rated insulation voltage U_i pollution degree 3	V 300	
Safe isolation acc. to DIN VDE 0106 between the coil and the contacts	V 300	
Degree of protection acc. to EN 60529		
• Enclosure	IP20	
• Cover	IP40	
Permissible ambient temperature		
• during operation	°C -25 ... +60	
• during storage	°C -40 ... +80	
Permissible mounting position	any	
Shock resistance Half-sine acc. to IEC 60028-2-27	15/11	
Vibration resistance acc. to IEC 60068-2-6	10 ... 55/0.35	
Electromagnetic compatibility (EMC) Tests according to basic specification	IEC 61000-6-2/IEC 61000-6-4	
Conductor cross-section		
• Screw connection		
- Solid	mm ² 1 × (0.5 ... 4)/2 × (0.5 ... 2.5)	
- Finely stranded with end sleeve	mm ² 2 × (0.5 ... 2.5)	
- AWG conductors, solid or stranded	mm ² 2 × (20 ... 14)	
- Terminal screw	M 3.5	
- Tightening torque	Nm 0.8 ... 1.2	
- Corresponding opening tool	Standard screwdriver, size 2 or Pozidrive 2	
• Spring-loaded terminal		
- Solid	mm ² 2 × (0.25 ... 1.5)	
- Finely stranded with end sleeve	mm ² 2 × (0.25 ... 1)	
- Finely stranded without end sleeve	mm ² 2 × (0.25 ... 1.5)	
- AWG conductors, solid or stranded	AWG 2 × (24 ... 16)	
- Corresponding opening tool	Screwdriver with 3 mm blade or 8WA2 807 opening tool	
Control side		
• Operating range	0.85 ... 1.1 × U_s	
• Rated power		
- max. DC	W 1	
- max. AC	VA 8	
• Mains buffering		
- depends on version	ms 5 ... 100	
• Max. permissible conductor length		
- 330 pF/m AC	m 200	1 changeover contact
- min. cross-section 0.75 mm ² DC	m 1500	100
		2000
• Permissible OFF-state current of the electronic circuit (for 0 signal)	mA 2	
• Function display	yellow LED	

Coupling Relays and Converters

Coupling Relays in Industrial Enclosure

Relay connectors

Type	3RS18..-....1	3RS18..-....0
Load side		
• Conventional thermal current I_{th}	A 6	
• Rated operating currents I_e		
- AC-15		
- at 24 V	A 3	
- at 110 V	A 3	
- at 230 V	A 3	
- at 400 V	A 3	
- DC-13		
- at 24 V	A 1	
- at 110 V	A 0.2	
- at 230 V	A 0.1	
• Operating current for resistive load		
- AC-12		
- at 24 V	A 5	
- at 115 V	A 5	
- at 230 V	A 5	
- at 400 V	A 5	
- DC-12		
- at 24 V	A 5	
- at 115 V	A 0.2	
- at 230 V	A 0.2	
• Operating voltage		
- max. AC	V 400	
- max. DC	V 250	
• Contact material	AgNi 0.15 hard gold-plated	AgSnO ₂
• Min. contact load		
- Standard contact	-	DC 17 V, 5 mA for 1ppm fault
- Hard gold-plated contacts	DC 5 V, 1 mA for 1ppm fault	-
• Endurance		
- Mechanical operating cycles	20 × 10 ⁶	
- Electrical (at I_e) operating cycles	1 × 10 ⁶	
• Operating times		
- max. ON-delay at U_s	ms 8 (for 3RS18 00-..W0. < 30)	
- max. OFF-delay at U_s	ms 30 (for 3RS18 00-..W0. < 150)	
• Operating frequency	Oper. cycles/h 5000	
Short-circuit protection	A 4	
Weld-free fuse, operational class gL/gG at $I_k \geq 1$ kA		

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Selection and ordering data

Rated control supply voltage U_s	Contacts Version	DT	Screw connection	PS*	Weight per PU approx.	DT	Spring-loaded terminal	PS*	Weight per PU approx.
50/60 Hz	W		Order No.		kg		Order No.		kg

Coupling relays in 22.5 mm industrial enclosure

Wide-range voltage	Contacts	DT	Order No.	PS*	Weight per PU approx.	DT	Order No.	PS*	Weight per PU approx.
24 ... 240 V AC/DC	2	B	3RS18 00-1BW00	1 unit	0.145	B	3RS18 00-2BW00	1 unit	0.128
	3	B	3RS18 00-1HW00	1 unit	0.170	B	3RS18 00-2HW00	1 unit	0.147
	3 ¹⁾	B	3RS18 00-1HW01	1 unit	0.170	B	3RS18 00-2HW01	1 unit	0.147
Combination voltage AC/DC 24 V and AC 110 ... 120 V	1	B	3RS18 00-1AQ00	1 unit	0.116	B	3RS18 00-2AQ00	1 unit	0.104
	2	B	3RS18 00-1BQ00	1 unit	0.142	B	3RS18 00-2BQ00	1 unit	0.123
	3	B	3RS18 00-1HQ00	1 unit	0.173	B	3RS18 00-2HQ00	1 unit	0.147
	3 ¹⁾	B	3RS18 00-1HQ01	1 unit	0.173	B	3RS18 00-2HQ01	1 unit	0.147
AC/DC 24 V and AC 220 ... 240 V	1	B	3RS18 00-1AP00	1 unit	0.116	B	3RS18 00-2AP00	1 unit	0.104
	2	B	3RS18 00-1BP00	1 unit	0.142	B	3RS18 00-2BP00	1 unit	0.123
	3	B	3RS18 00-1HP00	1 unit	0.170	B	3RS18 00-2HP00	1 unit	0.147
	3 ¹⁾	B	3RS18 00-1HP01	1 unit	0.170	B	3RS18 00-2HP01	1 unit	0.147



1) Hard gold-plated.

Design

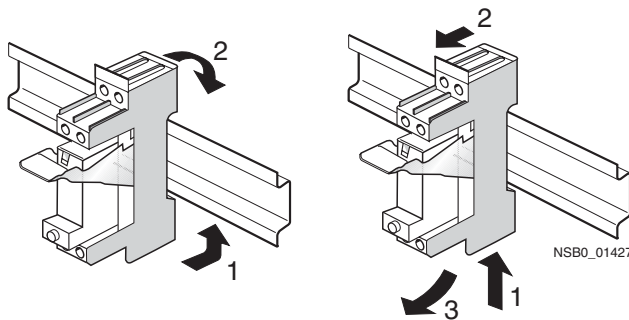
Plug-in relay coupling elements can be ordered complete or as single modules.

Mounting

The relays are plugged into the socket and this is snapped onto the 35 mm EN 50022 standard rail.

Note:

For the plug-in relay coupling elements LZX of Series RT, the spring element must be hung onto the standard rail from below and fixed in place.



A fixing bracket can be ordered for the MT series that additionally fixes the relay into a plug-in socket (under conditions of increased mechanical stress). For the RT and PT series, a combined fixing and ejection bracket is available which can be used to remove the relay where access is difficult, for example, when relays are mounted side-by-side.

They can be mounted as required.

Functions

In accordance with the technical specifications of electronic systems, the coupling elements have a lower power consumption. In the versions equipped with LEDs, these indicate the switching status. The LZX:PT/MT relay connectors have a test button. This can be used to force the relay connector into the tripped state and to lock it. This is indicated by a raised orange-colored lever.

Surge suppression

The 24 V DC relays LZX:RT and LZX:PT with LEDs can be supplied with, all others without integral surge suppression (free-wheeling diode connected in parallel with A1/A2). The positive supply voltage must be connected to coil terminal A1.

Logical disconnection

The terminals for the contacts and the terminals for the coil are arranged on separate levels, e.g. above for contacts and below for coil. Logical disconnection is not identical to safe isolation.

Safe isolation

For safe isolation, transfer of the voltage of one circuit to another circuit is prevented to a suitable degree of safety (see DIN VDE 106, Part 101).

Coupling Relays and Converters

Plug-In Relays

Relay connectors

Technical specifications

Relay type	RT print relay, 8- and 11-pole, (12.7 mm) 1 CO/2 CO				PT industrial relay, 8-, 11-, and 14-pole, (22.5 mm) 2 CO/3 CO/4 CO				
AC and DC operation									
Rated control supply voltage $U_s^1)$	V	DC 24	AC 24	AC 115	AC 230	DC 24	AC 24	AC 115	AC 230
Rated insulation voltage U_i Pollution degree	V	250 3				250 3			
Overvoltage category		III				III			
Safe isolation between the coil and the contacts acc. to DIN VDE 0106		... 250 V (with socket LZXR:RT78626) no (for complete units)				no			
Degree of protection relay/socket		IP 67/IP 20				IP 50/IP 20			
Permissible ambient temperature • during operation • during storage	°C	- 40 ... + 70 - 40 ... + 80				- 40 ... + 70 (+ 50 for base assembly) - 40 ... + 80			
Conductor cross-sections • solid • finely stranded with or without end sleeve	mm ²	2 × 2.5 2 × 1.5				2 × 2.5 2 × 1.5			
Control side									
Operating range • at 20 °C	V	16.8 ... 52	18 ... 52	86.3 ... 127	172 ... 264	18 ... 40.	19.2 ... 39.6	92 ... 190	184 ... 380
Power consumption at U_s		0.4 W	0.5 VA	0.75 VA	0.75 VA	0.5 W	1 VA	1 VA	1 VA
Release voltage	V	2.4	7.2	34.5	69	3.6	7.2	34.5	69
Protection circuit		Freewheel diode for complete unit	no	no	no	Freewheel diode in LED module	no	no	no
Max. permissible conductor length at $U_s^2)$ (min. cross-section 0.75 mm ²)		> 2000 m	30 m (with LED), 20 m (without LED)			> 2000 m	500 m	200 m	50 m
Load side									
Operating voltage • AC/DC	V	24 ... 250				24 ... 250			
Rated currents ³⁾ Conventional thermal current I_{th}	A	16/8 (1 CO/2 CO)				12/10/6 (2 CO/3 CO/4 CO)			
Rated operating current I_o AC-15 according to utilization categories (DIN VDE 0660)	A	6/3				5/5/4			
Rated operating current I_o DC-13 according to utilization categories (DIN VDE 0660)	A	2 at 24 V 0.27 at 230 V				5 at 24 V 0.5 at 230 V			
Short-circuit protection $I_k \geq 1$ kA acc. to IEC 60947-5-1 fuse links, operational class gL/gZ DIAZED	A	10				6			
Shock resistance Half-sine acc. to IEC 60068-2-27	g/ms	10/11				9/11			
Vibration resistance floating sine acc. to IEC 60068-2-6 30 Hz... 150 Hz • Opening the normally-closed contacts along the critical axis • Closing the normally-open contacts	g	5 > 20				approx. 7 > 20			
Min. contact load (reliability: 1ppm)		standard 17 V, 10 mA; hard gold-plated 17 V/ 0.1 mA				standard 17 V, 10 mA; hard gold-plated 20 mV/ 1 mA			
Mechanical endurance	Oper. cycles	30 × 10 ⁶	10 × 10 ⁶			10 × 10 ⁶			
Electrical endurance (resistive load at 250 V AC)	Oper. cycles	1 × 10 ⁵	1 × 10 ⁵			1 × 10 ⁵			
Operating frequency		7200 operating cycles/h				6/600 operating cycles/min (with/without load)			
Make-time	typi- cally/ms	7				15			
Break-time	typi- cally/ms	3				10			
Bounce time	typi- cally/ms	2				5			
Contact material		AgNi 90/10				AgNi 90/10			

1) AC voltages, 50 Hz; for 60 Hz operation, the lower response value must be increased by 10 %; the power loss will be reduced slightly.

2) The max. conductor length depends on the conductor capacity and the cable installation. It can be increased by means of parallel load on A1/A2.

3) Capacitive loads can result in micro-weldings on the contacts.

Coupling Relays and Converters

Plug-In Relays

Relay connectors

Relay type	MT industrial relay, 11-pole (35.5 mm) 3 COs				
AC and DC operation					
Rated control supply voltage U_s ¹⁾	V	DC 24 V	AC 24 V	AC 115 V	AC 230
Rated insulation voltage U_i	V	250		250	
Pollution degree		3		3	
Overvoltage category		III		III	
Safe isolation between the coils and the contacts to DIN VDE 0106		no		no	
Degree of protection relay/socket		IP 50/IP 20			
Permissible ambient temperature					
• during operation	°C	-45 ... +60	-45 ... +50	-45 ... +50	-45 ... +50
• during storage	°C	-45 ... +80	-45 ... +80	-45 ... +80	-45 ... +80
Conductor cross-sections					
• solid	mm ²	2 × 2.5			
• finely stranded with or without end sleeve	mm ²	2 × 1.5			
Control side					
Operating range					
• at 20 °C	V	18 ... 38	19.2 ... 38	92 ... 137	184 ... 264
Power consumption at U_s		1.2 W	2.3 VA	2.3 VA	2.3 VA
Release voltage	V	2.4	9.6	46	92
Protection circuit		no			
Max. permissible conductor length at U_s ²⁾ (min. cross-section: 0.75 mm ²)		> 2000 m	on request	on request	80 m
Load side					
Operating voltage					
• AC/DC	V	AC/DC 24 ... 250			
Rated currents³⁾					
Conventional thermal current I_{th}	A	10			
Rated operating current I_o DC-13 according to utilization categories (DIN VDE 0660)	A	2 at 24 V 0.27 at 230 V			
Rated operating current I_o AC-15 according to utilization categories (DIN VDE 0660)	A	5 at 24 V and 230 V			
Short-circuit protection					
$I_k \geq 1$ kA acc. to IEC 60947-5-1 fuse links, operational class gL/gZ DIAZED	A	10			
Shock resistance					
Half-sine acc. to IEC 60068-2-27	g/ms	13/11			
Vibration resistance					
floating sine acc. to IEC 60068-2-6 30 Hz... 150 Hz					
• Opening the normally-closed contacts along the critical axis	g	2			
• Closing the normally-open contacts	g	> 20			
Min. contact load (reliability: 1 ppm)					
		DC 12 V/10 mA			
Mechanical endurance					
	Oper. cycles	20 × 10 ⁶			
Electrical endurance (resistive load at 250 V AC)					
	Oper. cycles	4 × 10 ⁵			
Operating frequency					
	Oper. cycles/h	6000			
Make-time					
	typi- cally/ms	12			
Break-time					
	typi- cally/ms	5			
Bounce time					
	typi- cally/ms	4			
Contact material					
		AgNi 90/10			

1) AC voltages, 50 Hz; for 60 Hz operation, the lower response value must be increased by 10 %; the power loss will reduce slightly.

2) The max. conductor length depends on the conductor capacity and the cable installation. It can be increased by means of parallel load on A1/A2.




3) Capacitive loads can result in micro-weldings on the contacts.

Coupling Relays and Converters

Plug-In Relays

Relay connectors

Selection and ordering data

Version	Rated control supply voltage U_s	Contacts	Width mm	DT	Order No.	PS*	Weight per PU approx. kg	
Complete units, 11- and 14-pole, PT series								
	Complete unit with socket for snap-on mounting on 35 mm standard mounting rail consisting of: plug-in relay, standard socket, LED module (DC-24-V-LED with free-wheel diode, AC without freewheel diode), fixing/ejection bracket and label	DC 24 V	3 COs	27	A	LZX:PT3A5L24	1 unit	0.099
		AC 24 V			A	LZX:PT3A5R24	1 unit	0.099
		AC 115 V			A	LZX:PT3A5S15	1 unit	0.099
		AC 230 V			A	LZX:PT3A5T30	1 unit	0.099
	DC 24 V AC 24 V AC 115 V AC 230 V	4 COs	27	A	A	LZX:PT5A5L24	1 unit	0.099
					A	LZX:PT5A5R24	1 unit	0.100
					A	LZX:PT5A5S15	1 unit	0.099
					A	LZX:PT5A5T30	1 unit	0.099
	Complete unit with socket (logical isolation) for snap-on mounting on 35 mm standard mounting rail comprising: plug-in relay with safe isolation, LED module (DC-24-V-LED with free-wheel diode, AC without freewheel diode), fixing/ejection bracket and label	DC 24 V	3 COs	27	A	LZX:PT3B5L24	1 unit	0.106
		AC 24 V			A	LZX:PT3B5R24	1 unit	0.107
		AC 115 V			A	LZX:PT3B5S15	1 unit	0.105
		AC 230 V			A	LZX:PT3B5T30	1 unit	0.106
DC 24 V AC 24 V AC 115 V AC 230 V	4 COs	27	A	A	LZX:PT5B5L24	1 unit	0.112	
				A	LZX:PT5B5R24	1 unit	0.112	
				A	LZX:PT5B5S15	1 unit	0.112	
				A	LZX:PT5B5T30	1 unit	0.112	
Complete units, 8-pole, 5 mm pinning, RT series								
	Complete unit with socket for snap-on mounting onto 35 mm standard mounting rail comprising: print relay, standard socket, LED module (DC-24-V-LED with free-wheel diode, AC without freewheel diode), fixing/ejection bracket and label	DC 24 V	1 CO	15.5	A	LZX:RT3A4L24	1 unit	0.057
		DC 24 V	2 COs		A	LZX:RT4A4L24	1 unit	0.057
		AC 230 V	1 CO		A	LZX:RT3A4T30	1 unit	0.057
		AC 230 V	2 COs		A	LZX:RT4A4T30	1 unit	0.060
	AC 24 V AC 24 V AC 115 V AC 115 V	1 CO	15.5	A	A	LZX:RT3A4R24	1 unit	0.060
					A	LZX:RT4A4R24	1 unit	0.060
					A	LZX:RT3A4S15	1 unit	0.060
					A	LZX:RT4A4S15	1 unit	0.060
	Complete unit with socket (logical isolation) for snap-on mounting onto 35 mm standard mounting rail comprising: print relay with safe isolation, LED module (DC-24-V-LED with free-wheel diode, AC without freewheel diode), fixing/ejection bracket and label	DC 24 V	1 CO	15.5	A	LZX:RT3B4L24	1 unit	0.065
		DC 24 V	2 COs		A	LZX:RT4B4L24	1 unit	0.065
		AC 230 V	1 CO		A	LZX:RT3B4T30	1 unit	0.064
		AC 230 V	2 COs		A	LZX:RT4B4T30	1 unit	0.064
AC 24 V AC 24 V AC 115 V AC 115 V	1 CO	15.5	A	A	LZX:RT3B4R24	1 unit	0.064	
				A	LZX:RT4B4R24	1 unit	0.064	
				A	LZX:RT3B4S15	1 unit	0.064	
				A	LZX:RT4B4S15	1 unit	0.065	
Complete units, 5-pole, 3.2 mm pinning, RY series								
	Complete unit with socket (logical isolation) for snap-on mounting on 35 mm standard mounting rail comprising: print relay, standard socket, LED module (DC-24-V-LED with free-wheel diode, AC without freewheel diode), fixing/ejection bracket and label	DC 24 V	1 CO	15.5	A	LZX:RY1A4L24	1 unit	0.048

Note:






Logical isolation: the terminals for the contacts and the terminals for the coil are arranged on separate levels, e.g. above for contacts and below for coil. Logical isolation is not identical to safe isolation.

Safe isolation: safe isolation prevents voltage of one circuit affecting another circuit with sufficient protection (DIN VDE 106 Part 101).

Coupling Relays and Converters

Plug-In Relays

Relay connectors

Version	Rated control supply voltage U_s	Contacts Change-over contacts	Width	DT	Order No.	PS*	Weight per PU approx.		
			mm				kg		
Print relays, 8- and 11-pole, 5 mm pinning, RT series									
Individual modules for customer assembly									
	Print relay with hard gold plating	DC 24 V	1 CO	12.7	A	LZX:RT315024	1 unit 0.016		
		AC 24 V	1 CO	12.7	▶	LZX:RT315524	1 unit 0.013		
		AC 230 V	1 CO	12.7	D	LZX:RT315730	1 unit 0.015		
	Print relay	DC 24 V	1 CO	12.7	▶	LZX:RT314024	1 unit 0.016		
		DC 24 V	2 COs	12.7	▶	LZX:RT424024	1 unit 0.015		
		AC 24 V	1 CO	12.7	▶	LZX:RT314524	1 unit 0.007		
		AC 24 V	2 COs	12.7	▶	LZX:RT424524	1 unit 0.014		
		AC 115 V	1 CO	12.7	A	LZX:RT314615	1 unit 0.013		
		AC 115 V	2 COs	12.7	▶	LZX:RT424615	1 unit 0.012		
		AC 230 V	1 CO	12.7	▶	LZX:RT314730	1 unit 0.003		
		AC 230 V	2 COs	12.7	▶	LZX:RT424730	1 unit 0.010		
		–	1/2 COs	15.5	▶	LZX:RT78625	1 unit 0.041		
		–	1/2 COs	15.5	▶	LZX:RT78626	1 unit 0.046		
	Socket for mounting onto standard mounting rail	–	1/2 COs	15.5	▶	LZX:RT78625	1 unit 0.041		
	Socket for mounting onto standard mounting rail with safe isolation	–	1/2 COs	15.5	▶	LZX:RT78626	1 unit 0.046		
	LED module	red	with freewheel diode	DC 24 V	–	15.5	▶	LZX:RPML0024	1 unit 0.003
			without freewheel diode	AC/DC 24 V	–	▶	LZX:RPML0524	1 unit 0.003	
		AC/DC 110 ... 230 V	–	▶	LZX:RPML0730	1 unit 0.003			
	green	with freewheel diode	DC 24 V	–	15.5	▶	LZX:RPMG0024	1 unit 0.003	
		without freewheel diode	AC 24 ... 60 V	–	A	LZX:RPMG0524	1 unit 0.003		
		AC 110 ... 230 V	–	▶	LZX:RPMG0730	1 unit 0.003			
–	Fixing/ejection bracket	–	–	15.5	▶	LZX:RT16016	10 units 0.020		
–	Label	–	–	–	▶	LZX:RY16040	20 units 0.040		
–	RC element	AC 24 ... 48 V	–	A	▶	LZX:RPMU0548	1 unit 0.004		
–		AC 110 ... 230 V	–	▶	LZX:RPMU0730	1 unit 0.003			
–	Freewheel diode with connection to A1	DC 6 ... 230 V	–	▶	LZX:RPMT00A0	1 unit 0.002			
Print relays, 5-pole, RY series									
Individual modules for customer assembly									
	Print relay Label on unit: RY213024, RY613024 or JS24N-K	DC 24 V	1 CO	10.7	A	LZX:RY213024	1 unit 0.009		
		–	1 CO	15.5	A	LZX:RY78626	1 unit 0.035		
		–	–	–	A	LZX:RY16016	10 units 0.020		
–	Socket for mounting onto standard mounting rail	–	1 CO	15.5	A	LZX:RY78626	1 unit 0.035		
–	Fixing/ejection bracket	–	–	–	A	LZX:RY16016	10 units 0.020		







Note:

For coil voltages which are not listed, see DC power supplies SITOP power e.g. 6EP1 331-2BA10 and 6EP1 731-2BA00 in "Transformers and power supplies".

Coupling Relays and Converters

Plug-In Relays

Relay connectors

Version	Rated control supply voltage U_s	Con- tacts	Width	DT	Order No.	PS*	Weight per PU approx. kg	
		Change- over contact	mm					
Industrial relays, 8-, 11-, and 14-pole, PT series								
Individual modules for customer assembly								
 LZX:PT570024	Mini industrial relay with test bracket and mechanical contact position indicator, without LED ¹⁾	DC 24 V	2	22.5	▶	LZX:PT270024	1 unit 0.030	
		DC 24 V	3		▶	LZX:PT370024	1 unit 0.031	
		DC 24 V	4		▶	LZX:PT570024	1 unit 0.034	
		AC 24 V	2		A	LZX:PT270524	1 unit 0.030	
		AC 24 V	3		A	LZX:PT370524	1 unit 0.031	
		AC 24 V	4		▶	LZX:PT570524	1 unit 0.031	
		AC 115 V	2		D	LZX:PT270615	1 unit 0.029	
		AC 115 V	3		A	LZX:PT370615	1 unit 0.030	
		AC 115 V	4		▶	LZX:PT570615	1 unit 0.030	
		AC 230 V	2		▶	LZX:PT270730	1 unit 0.029	
		AC 230 V	3		▶	LZX:PT370730	1 unit 0.030	
		AC 230 V	4		▶	LZX:PT570730	1 unit 0.030	
	 LZX:PT78702	with hard gold-plating	DC 24 V	4	22.5	▶	LZX:PT580024	1 unit 0.031
			AC 24 V	4		▶	LZX:PT580524	1 unit 0.031
		AC 230 V	4		▶	LZX:PT580730	1 unit 0.031	
Relay without test bracket		DC 24 V	4	22.5	▶	LZX:PT520024	1 unit 0.031	
		AC 24 V	4		A	LZX:PT520524	1 unit 0.032	
		AC 230 V	4		A	LZX:PT520730	1 unit 0.031	
Socket for mounting onto standard mounting rail		–	2	27	▶	LZX:PT78702	1 unit 0.051	
		–	3		▶	LZX:PT78703	1 unit 0.062	
		–	4		▶	LZX:PT78704	1 unit 0.063	
 LZX:RPML0024		LED module red	with freewheel diode	DC 24 V	–	▶	LZX:RPML0024	1 unit 0.003
		without freewheel diode	AC/DC 24 V	–	▶	LZX:RPML0524	1 unit 0.003	
	 LZX:PT16016	green	with freewheel diode	AC/DC 110 ... 230 V	–	▶	LZX:RPML0730	1 unit 0.003
			without freewheel diode	DC 24 V	–	▶	LZX:RPMG0024	1 unit 0.003
			without freewheel diode	AC 24 ... 60 V	–	A	LZX:RPMG0524	1 unit 0.003
			without freewheel diode	AC/DC 110 ... 230 V	–	▶	LZX:RPMG0730	1 unit 0.003
		Fixing/ejection bracket	–	–	▶	LZX:PT16016	10 units 0.020	
		Label	–	–	▶	LZX:PT16040	20 units 0.040	
		RC element	AC 24 ... 48 V	–	A	LZX:RPMU0548	1 unit 0.004	
			AC 110 ... 230 V	–	▶	LZX:RPMU0730	1 unit 0.003	
	Freewheel diode with connection to A1	DC 6 ... 230 V	–	▶	LZX:RPMT00A0	1 unit 0.002		
Industrial relays, 11-pole, MT series								
Individual modules for customer assembly								
 LZX:MT326024	Industrial relay with test bracket without LED	DC 24 V	3	35.5	A	LZX:MT321024	1 unit 0.088	
	with LED	DC 24 V	3		▶	LZX:MT323024	1 unit 0.089	
	without LED	AC 24 V	3		A	LZX:MT326024	1 unit 0.089	
	with LED	AC 24 V	3		A	LZX:MT328024	1 unit 0.089	
	without LED	AC 115 V	3		A	LZX:MT326115	1 unit 0.087	
	with LED	AC 115 V	3		A	LZX:MT328115	1 unit 0.093	
	without LED	AC 230 V	3		A	LZX:MT326230	1 unit 0.089	
	with LED	AC 230 V	3		A	LZX:MT328230	1 unit 0.089	
	With test bracket, with LED, with freewheel diode	DC 24 V	3	35.5		LZX:MT3230C4	1 unit 0.090	
	 LZX:MT78750	Socket for mounting onto standard mounting rail	–	–	38	▶	LZX:MT78750	1 unit 0.063
Fixing bracket		–	–	38	▶	LZX:MT28800	1 unit 0.001	

Note:

For coil voltages which are not listed, see DC power supplies SITOP power e.g. 6EP1 331-2BA10 and 6EP1 731-2BA00 in "Transformers and power supplies".

1) The test bracket is designed to be non-latching. If the test bracket is pressed further until 90° has been reached, two small lugs break off and the test bracket can be latched in position.

Accessories

Version	DT	Order No.	PS*	Weight per PU approx. kg
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for PT relays



LZX:PT78802

Logical socket
with logical arrangement of the contacts
2 changeover contacts
3 changeover contacts
4 changeover contacts

A	LZX:PT78802	1 unit	0.063
A	LZX:PT78803	1 unit	0.070
A	LZX:PT78804	1 unit	0.075



LZX:PT78604

Base with top slide, pinning 3.5 mm
2 different conductor cross-sections can be connected
2 changeover contacts
4 changeover contacts

A	LZX:PT78602	1 unit	0.043
A	LZX:PT78604	1 unit	0.051

Note:
Accessories, LED modules LZX: RPM und fixing/ejection bracket LZX:PT16016 can not be used with these bases!

Version	Rated control supply voltage U_s	Width mm	DT	Order No.	PS*	Weight per PU approx. kg
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for PT and RT relays



LZX:RPML0024



LZX:PT16016

LED module

red	with freewheel diode	DC 24 V	15.5	▶	LZX:RPML0024	1 unit	0.003
	without freewheel diode	AC/DC 24 V		▶	LZX:RPML0524	1 unit	0.003
		AC/DC 110 ... 230 V		▶	LZX:RPML0730	1 unit	0.003
green	with freewheel diode	DC 24 V	15.5	▶	LZX:RPMG0024	1 unit	0.003
	without freewheel diode	AC 24 ... 60 V		A	LZX:RPMG0524	1 unit	0.003
		AC/DC 110 ... 230 V		▶	LZX:RPMG0730	1 unit	0.003

Fixing/ejection bracket

for RT range	–	15.5	▶	LZX:RT16016	10 units	0.020
for PT range			▶	LZX:PT16016		

Label

for RT range	–	–	▶	LZX:RY16040	20 units	0.040
for PT range				LZX:PT16040		

RC element

	AC 24 ... 48 V	–	A	LZX:RPMU0548	1 unit	0.004
	AC 110 ... 230 V	–	▶	LZX:RPMU0730	1 unit	0.003

Freewheel diode

with connection to A1	DC 6 ... 230 V	–	▶	LZX:RPMT00A0	1 unit	0.002
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for RY relays

Base

3.2 mm pinning, 1 changeover contact			A	LZX:RY78626	1 unit	0.035
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Fixing/ejection bracket

A	LZX:RY16016	10 units	0.020
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Coupling Relays and Converters

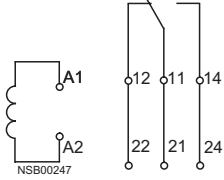
Plug-In Relays

Relay connectors

Circuit diagrams

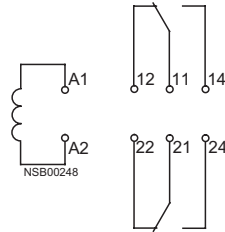
LZX:RT3

1-pole



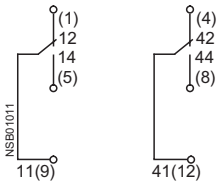
LZX:RT4

2-pole



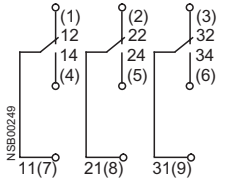
LZX:PT270

2-pole



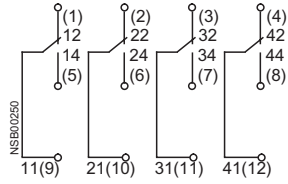
LZX:PT370

3-pole



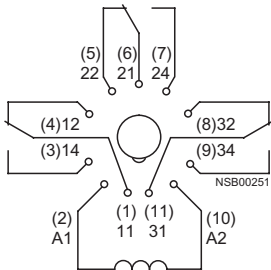
LZX:PT570

4-pole



LZX:MT32

3-pole



Values in brackets: socket designations.
Without brackets: contact/coil designations.