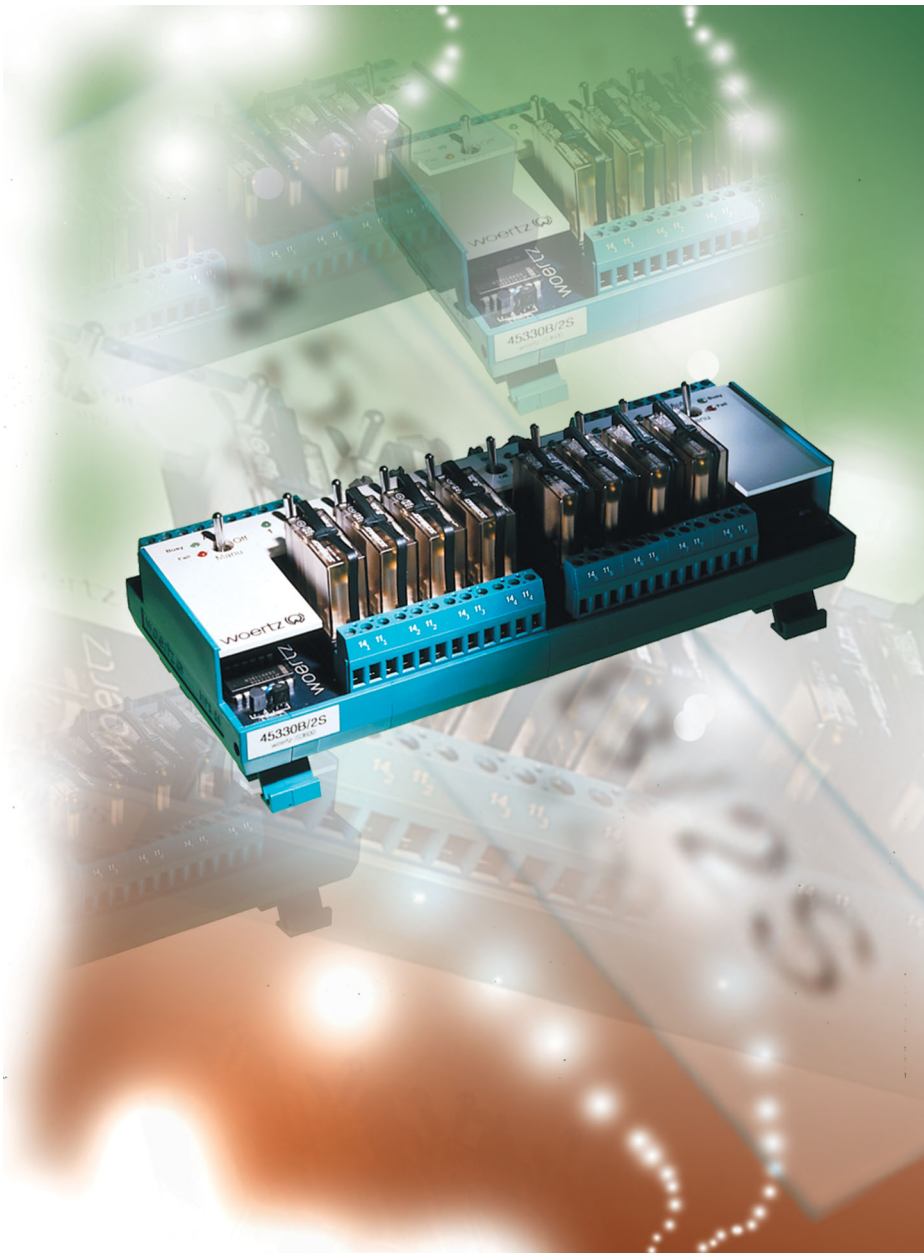
RELAY MODULES

woertz



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Applications

In 1837 when Samuel Morse made the first telegraph operate, using the electromagnets invented by J. Henry in 1824, the relay was born. Those indeed who at that time - the diligence time - spoke about relays, meant the stations where one could exchange exhausted horses for a fresh set of those animals.
Interface relays were created in the eighties to meet the requirements of the electronics. Since then they were continuously improved, became smaller, used less power in the coil, and both security against contact and lifetime were increased. The relays can nowadays almost not be excluded from the automation technique. They are used in all the cases where potential freedom and high operating security are needed during the signal exchange between control systems and process periphery.
In practice when signals are transmitted, the most varied signal forms, voltages and connection techniques meet. A modern electrical interface must be able to take all these requirements into account. Relay modules having the following properties, fulfil these requirements:

- Multiple switching functions
- Interface between electronical control circuit and power circuit (potential separation)
- Signal multiplication: low power controls high power
- Separation between DC and AC circuits i.e. switching of an AC circuit by a DC signal or vice versa.
- Non-sensitive to short time voltage spikes or short circuits
- Signal delaying, shaping and transforming
- Easy handling
- Ruggedness towards electromagnetic fields
- No leakage between open contacts (galvanic separation)

How Woertz relay modules are conceived

For the industrial use of the relay modules, it is important that they can easily be inserted and quickly be mounted. Because of the modular plastic housing, made for the rough industrial environment, the Woertz relay modules can easily and quickly be mounted on any common EN mounting rail. Woertz modules are built so they don't take up much place on the mounting rail; your control panels can therefore be used more efficiently!
In the case of facility extensions or maintenance works, it is possible to insert or exchange the modules easily.

The Woertz relay modules are marked according to the following standards:

A1	Positive coil connection
A2	Negative coil connection
1	Common connection at the changeover commutator
2	NC contact
3 or 4	NO contact

If the module has several relays or the relay several contacts, an index is also added to designate the connection and contact.

The different sorts of relay modules and their properties

There are four different types of relay modules, having the following properties:

Reed relay:	Quick switching of small loads, also in aggressive environments Low control power (50 ... 270 mW), long life, short bouncing time, constant contact resistance
Signal relay:	Switching of signal currents and low voltage Low control power (approx. 150 mW), low contact resistance, minimal contact power (10 mA, 10 mV DC)
Power relay:	Switching of high power Low control power (220 ... 520 mW or 0.75 VA), switching currents from 0.1 to 16 A
Industrial relay:	Switching of average power with long life expectancy Very robust models for industrial use

Switching of signal current and low power

If signals at control inputs (for example of a PLC) are transmitted over a relay, the relay must be able to switch very low power. Common values for digital use are 24 V DC / 5 mA for example or 0 ... 10 V (some micro- or milliamperes) for analog signals. Relays with gold contacts have become very popular, especially because of the low and constant contact resistance and because of the ruggedness towards atmosphere containing sulphur.

Switching high power

Switching high AC loads allows the relay to operate at the maximum breaking capacity (max. turn-on voltage, max. switching current). If an arc arises during the turn-off process, it will automatically disappear at the next zero-crossing of the load current. In the case of an inductive load, the shortened lifetime of the contacts can be counteracted by means of an efficient contact protection.
If high DC loads are switched, the maximum switching current will be significantly smaller than in the case of an AC load. The possible DC load depends on the contact interval, the contact opening speed and the voltage to be switched. Relay manufacturers have defined the limits in DC load diagrams. In the case of inductive DC loads, the switching current decreases even more; however a good protection of the contacts can help getting closer to the values of an ohmic load.

What sort of contact material is suitable to what type of load

For the various switching functions in the field of communication engineering, control techniques and power engineering, a wide range of contact materials has been developed. As one universal contact material does not exist for all these applications, the material must be determined according to the most important required properties. Important quality criteria are:

- Evaporating resistance
- Contact resistance
- Welding tendency
- Resistance to chemical influence
- Material migration

Properties of some important contact materials are mentioned in the table below:

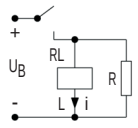
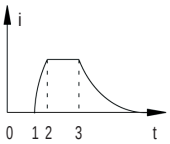
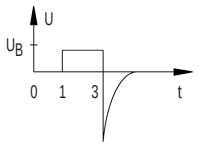
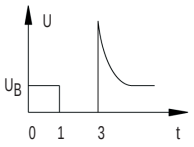
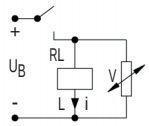
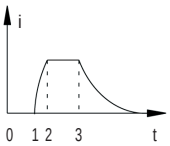
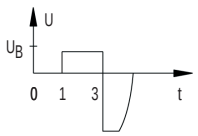
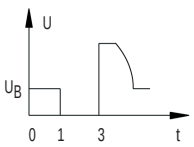
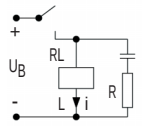
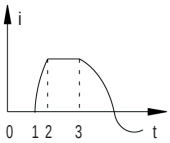
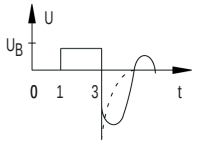
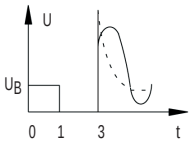
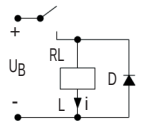
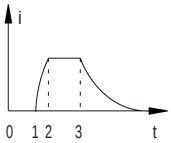
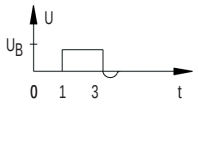
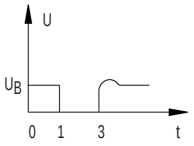
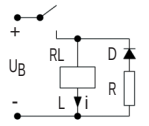
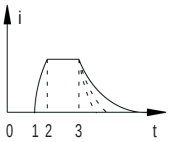
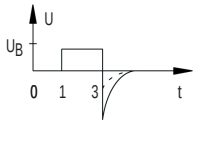
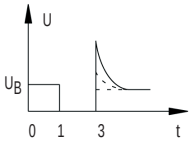
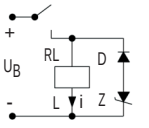
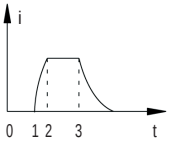
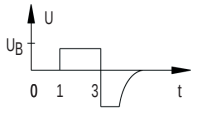
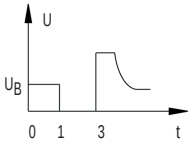
Contact material	Attacked by		Typical properties	Typical applications	Range of applications
	Sulphur	Oxidation			
Pure gold	No	No	Best resistance to corrosion; rare use as a solid material, as too soft; danger of cold welding	In layer thickness ≤ 1 mm: gold layer before storage only. Cheap contact protection in sulphur-containing atmosphere, in layer thickness of at least 2-3 µm	
Hard gold AuNi1 AuCo1	No	No	High resistance to corrosion; low constant contact resistance at lower breaking capacities	Dry circuits, use in sulphur-containing atmosphere, at least 2-3 µm	µV ... 60 V µA ... 0.2 A
Rhodium (Rh)	No	No	Fine layers (0, 1 ... 1 mm) on reed contact tabs as galvanic coat	Low loads at high duty classification; long contact lifetime	
Gold-Silver AuAg10	No	No	Low, constant contact resistance at lower breaking capacities	Dry circuits, measuring circuits, unfritted phone channels	µV ... 60 V µA ... 0.3 A
Silver-Palladium AgPd30	No	No	More resistant to tarnishing than silver; harder; little wear; expensive; constant contact resistance	Signal circuits with moderate loads; fritted phone channels	≥ 1 V 1 mA ...1 A
Fine grain silver AgNi0.15	Yes	No	Better mechanical strength; little tendency to weld and higher wear resistance than silver; relative low contact resistance	Universal use at moderate loads, with values higher than pure silver	≥ 12 V 10 mA ...10 A
Solid silver AgCu3	Yes	At switching	Better mechanical strength, little tendency to weld, and higher wear resistance than fine grain silver; but higher contact resistance	Use at moderate loads	≥ 12 V 10 mA ...10 A
Silver-Nickel AgNi10	Yes	No	High resistance to wear; little tendency to weld; higher contact resistance	Circuits at moderate or high loads; direct current circuits	≥ 12 V ≥ 100 mA
Silver-Cadmium oxide AgCdO10	Yes	No	Little tendency to weld; high resistance to consumption at higher breaking powers	Especially suited to switching inductive loads	≥ 12 V ≥ 100 mA
Silver stannic oxide AgSnO10	Yes	No	Little tendency to weld; very high resistance to wear at high breaking powers; little material migration	Circuits with high turn-on, turn-off loads; direct current circuits	≥ 12 V ≥ 100 mA

Source: Schrack Relaistechnik

How to protect contacts and increase their life expectancy

Relay contacts are submitted to hard conditions during their whole lifetime. Especially in the case of inductive loads, evaporation of the contacts can lead to a significant reduction of their life. Opening a circuit with an inductive load (relay coils, magnetic coils, engines, ...), induces an overvoltage at the switching contacts (self-inductive overvoltage) which can reach a multiple of the operating voltage. The resulting breaking spark leads to the evaporation of relay contacts. In the case of inductive loads, protection is thus very important as it reduces the spark and increases the life expectancy. However all types of protection have some kind of disadvantage.

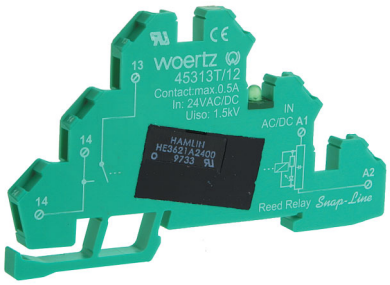
The different properties of the most important protections are shown in the table below.

Spark smothering through	Current variation per unit of time at the load	Voltage variation per unit of time at the load	Voltage variation per unit of time at the switch	Advantages / Disadvantages
DC/AC  Resistance	 	 	 	Attractive price, adapted to any power Wasting energy causes significant off delay
DC/AC  Varistor	 	 	 	Attractive price, short off delay Not suitable for all power or operating voltage ranges
DC/AC  RC element	 	 	 	Low switching overvoltage and short off delay Prices increasing proportionally to the power
DC  Diode	 	 	 	Low overvoltage, suitable to the whole power range, not bulky Long off delay
DC  Diode + Resistance	 	 	 	Overvoltage and off delay proportio-nal to R Significant off delay
DC  Diode + Zener diode	 	 	 	Low defined overvoltage, short off delay Expensive, not suitable for high power

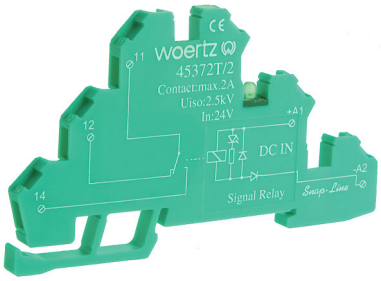
If no protection can be provided at the load, an RC element on the switch contact can also contribute to absorb the turn-off voltage peaks. It's important to notice that the opened switch contact no longer serves as a galvanic separation.

Properties

- Signal relay with one changeover contact (type C) or reed relay with a NO contact, in 5.08mm wide terminal housing
- LED indicating on state
- For applications where signal currents must be quickly and reliably switched
- Available for common industrial voltages



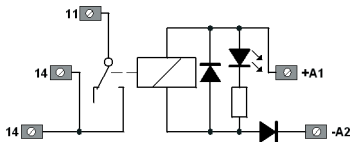
45313T/12



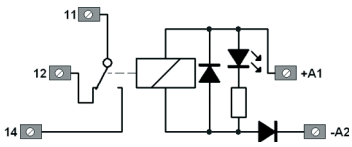
45372T/2

Accessories

30407T	End barrier
30403	Compatible 3-level terminal
30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
30790	Cross connection 10-pole grey
81535/x	Insulated cross-connections w. screws x = 2, 3, 4, 5, 10 poles
30411, 12	Isolation strip red, blue
80247, 48	Test plug red, black
35455/55xx	Labels for custom use RB5x5



AC versions with rectifier instead of diode



AC versions with rectifier instead of diode

Technical data (T_a = 25°C)

	Reed relay	Signal relay
Output		
Max. switching voltage	200 VDC/ 125 VAC	200 VDC/ 125 VAC
Max. switching current	0.5 A	2 A
Max. breaking capacity (res. load)	10 W	60 W
Contacts	Closing contact (type A)	Changeover contact (type C)
Max. contact resistance	200 mΩ	50 mΩ (1A)
Min. load	µA / mV	µA / mV
Mechanical contact life	10^8 switching cycles	10^8 switching cycles
Electrical contact life	5 x 10^7 (load 24 V DC / 10 mA)	2 x 10^6 (load 24 V DC / 50 mA)
Coil		
Operating voltage tolerance for U_N < 10V	± 15%	± 15%
Operating voltage tolerance for U_N > 10V	± 20%	± 20%
Control current at rated voltage (U_N)	about 17 mA	about 17 mA
General data		
Pickup time / dropout time (DC-Version)	1.0 / 0.5 ms	1.5 / 1.0 ms
Input / output dielectric strength	1.5 kV	2.5 kV
Input / output creepage distance	1.6 mm	3.0 mm
Operating temperature range	-40°C up to +45°C	-40°C up to +45°C
Rated cross section of connecting terminals	2.5 mm² (AWG 24 - 14)	2.5 mm² (AWG 24 - 14)
Max. torque	0.4 Nm	0.4 Nm
Size W x H x D (from rail)	5.08 x 86.5 x 44 mm	5.08 x 86.5 x 44 mm
Order numbers		
5 V DC	**45313T/7**	**45372T/7**
12 V DC	**45313T/1**	**45372T/1**
24 V DC	**45313T/2**	**45372T/2**
48 V DC	**45313T/3**	**45372T/3**
24 VAC (50 - 60 Hz) / DC	**45313T/12**	**45372T/12**

Signal relay modules

2 changeover contacts, max. 2 A, independent relays

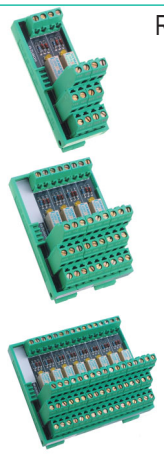
Properties

- Relays for universal use
- 2 changeover contacts per relay
- Relays with low power consumption
- Relays with state indicator
- Compact structure
- Easy connection by means of junction racks
- Relay coils can be individually connected (no common negative pole)
- Clearly structured modules
- Marking possibilities
- COM terminals for the connection of several modules (except for the version with 2 relays)
- Series 45341 replaces series 45102
- Series 45342 replaces series 45103

Accessories

30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
80095	Marking label RB 6 x 12
45294/20	Marking label 10 x 20mm
45294/30	Marking label 10 x 30mm

Range

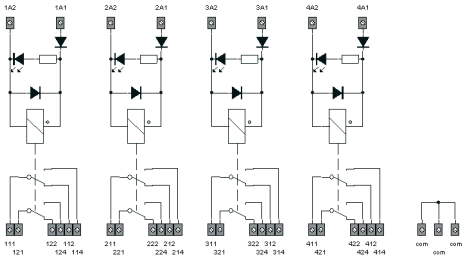


45341A/2

45342A/2

45343A/2

45342A/2



Technical data

	2 relays	4 relays	8 relays
Contacts			
Max. switching voltage	250 V AC / 220 V DC	250 V AC / 220 V DC	250 V AC / 220 V DC
Rated switching current	2 A	2 A	2 A
Max. admissible constant current	2 A	2 A	2 A
Rated breaking capacity	62.5 V A / 60 W	62.5 V A / 60 W	62.5 V A / 60 W
Number of contacts per relay	2 changeover contacts	2 changeover contacts	2 changeover contacts
Type of contact	Twin contacts	Twin contacts	Twin contacts
Min. switching voltage	500 µV	500 µV	500 µV
Coil			
Rated power	140 mW	140 mW	140 mW
Pickup voltage 5 / 12 / 24 V DC	4.0 / 9.6 / 19.2 V DC	4.0 / 9.6 / 19.2 V DC	4.0 / 9.6 / 19.2 V DC
Breaking voltage 5 / 12 / 24 V DC	0.5 / 1.2 / 2.4 V DC	0.5 / 1.2 / 2.4 V DC	0.5 / 1.2 / 2.4 V DC
Current consumption per channel (at rated voltage)	34 / 15 / 9 mA	34 / 15 / 9 mA	34 / 15 / 9 mA
General data			
Operating temperature	-40°C up to +60°C	-40°C up to +60°C	-40°C up to +60°C
Mechanical life	10^8 cycles	10^8 cycles	10^8 cycles
Pickup-/ Breaking-/ Bouncing time	4 / 5 / 1 ms	4 / 5 / 1 ms	4 / 5 / 1 ms
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²	2.5 mm²
Size L x W x H (from rail)	30 x 83 x 67 mm	55 x 83 x 67 mm	95 x 83 x 67 mm
Order numbers			
5 V DC	**45341A/7**	**45342A/7**	**45343A/7**
12 V DC	**45341A/1**	**45342A/1**	**45343A/1**
24 V DC	**45341A/2**	**45342A/2**	**45343A/2**

Properties

- Relays for universal use
- 2 changeover contacts per relay
- Relays with low power consumption
- Relays with state indicators
- Compact structure
- Easy connection by means of junction racks
- Relay coils with common negative pole
- Clearly structured modules
- Marking possibilities
- COM terminals for the connection of several modules
- Additional terminals for the mounting of the junction racks (only for the version with 16 relays)

Accessories

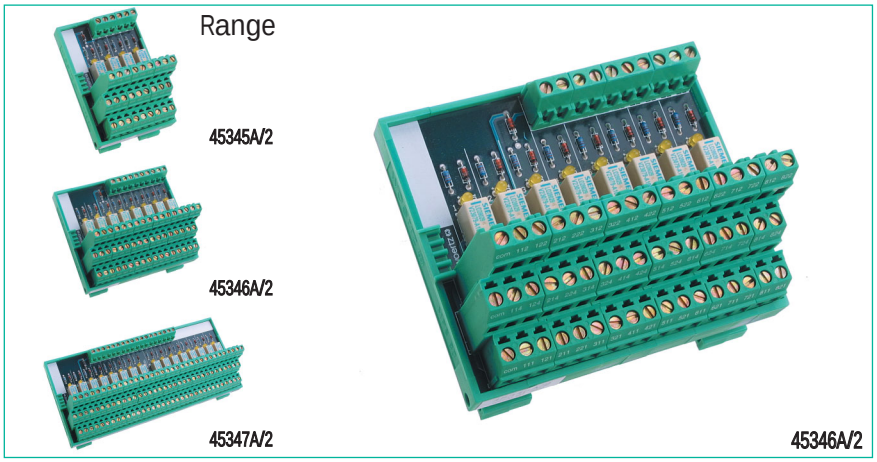
30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
80095	Marking label RB 6 x 12
45294/20	Marking label 10 x 20mm
45294/30	Marking label 10 x 30mm

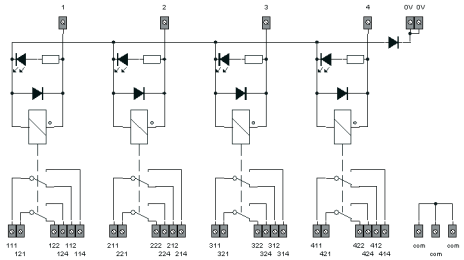
Technical data

	4 relays	8 relays	16 relays
Contacts			
Max. switching voltage	250 V AC / 220 V DC	250 V AC / 220 V DC	250 V AC / 220 V DC
Rated switching current	2 A	2 A	2 A
Max. admissible constant current	2 A	2 A	2 A
Rated breaking capacity	62.5 V A / 60 W	62.5 V A / 60 W	62.5 V A / 60 W
Number of contacts per relay	2 changeover contacts	2 changeover contacts	2 changeover contacts
Type of contact	Twin contacts	Twin contacts	Twin contacts
Min. switching voltage	500 µV	500 µV	500 µV
Coil			
Rated power	140 mW	140 mW	140 mW
Pickup voltage 5 / 12 / 24 V DC	4.0 / 9.6 / 19.2 V DC	4.0 / 9.6 / 19.2 V DC	4.0 / 9.6 / 19.2 V DC
Breaking voltage 5 / 12 / 24 V DC	0.5 / 1.2 / 2.4 V DC	0.5 / 1.2 / 2.4 V DC	0.5 / 1.2 / 2.4 V DC
Current consumption per channel (at rated voltage)	34 / 15 / 9 mA	34 / 15 / 9 mA	34 / 15 / 9 mA
General data			
Operating temperature	-40°C up to +60°C	-40°C up to +60°C	-40°C up to +60°C
Mechanical life	10^8 cycles	10^8 cycles	10^8 cycles
Pickup-/ Breaking-/ Bouncing time	4 / 5 / 1 ms	4 / 5 / 1 ms	4 / 5 / 1 ms
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²	2.5 mm²
Size L x W x H (from rail)	55 x 83 x 67 mm	95 x 83 x 67 mm	185 x 83 x 67 mm

Order numbers

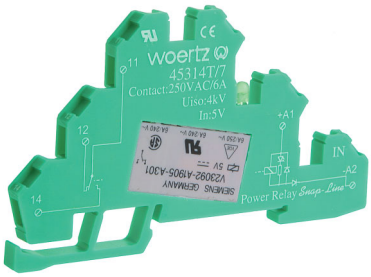
5 V DC	**45345A/7**	**45346A/7**	**45347A/7**
12 V DC	**45345A/1**	**45346A/1**	**45347A/1**
24 V DC	**45345A/2**	**45346A/2**	**45347A/2**



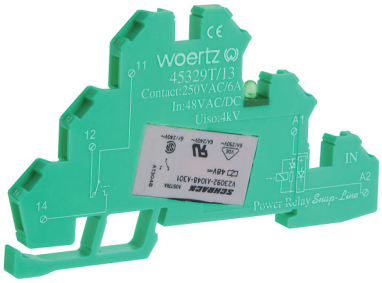


Power relay terminals

SnapLine, 250 V AC / 6 A



45314T/7



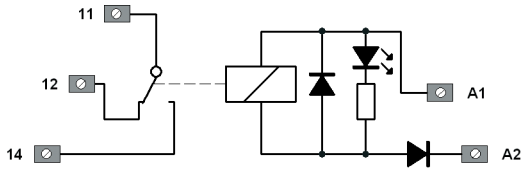
45329T/13

Properties

- SnapLine terminals with 1 power relay with changeover contact (type C)
- 250 VAC/ 6 A breaking capacity
- 5.08mm wide terminal housing
- LED indicating on state
- Available for all common industrial voltages
- For many applications where isolation, minimum space and high power switching are required
- An end barrier should be placed at the end of the terminal block

Accessories

30407T	End barrier
30403	Compatible 3-level terminal
30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
30790	Cross connection 10-pole grey
81535/x	Insulated cross-connections w. screws x = 2, 3, 4, 5, 10 poles
30411, 12	Isolation strip red, blue
80247, 48	Test plug red, black
35455/55xx	Labels for custom use RB 5 x 5



AC/DC versions:
with rectifier instead of diode

Technical data (T_a = 25°C)

	DC versions	AC/DC versions
Contacts		
Max. switching voltage	250 V AC	250 V AC
Max. switching current	6 A*	6 A*
Max. continuous current (stacked terminals)	5 A*	5 A*
Max. breaking capacity	1500 VA	1500 VA
Max. contact resistance	100 mΩ (1A)	100 mΩ (1A)
Min. load	0.1 A / 12 V	0.1 A / 12 V
Mechanical life	5 x 10^6 cycles	5 x 10^6 cycles
Coil		
Operating voltage tolerance for U_N < 100V	± 20%	± 20%
Operating voltage tolerance for U_N > 100V	± 10%	± 10%
Rated power	0.2 W (110 V : 0.5 W)	0.25 VA (115 - 230 V : 0.6 VA)
Frequency		50-60 Hz
General data		
Pickup time / dropout time	5 / 6 ms	
Dielectric strength (Input - Output)	4 kV	4 kV
Creepage distance (Input - Output)	8 mm	8 mm
Operating temperature range	-40°C up to +45°C	-40°C up to +45°C
Rated cross section of connecting terminals	2.5 mm^2 (AWG 24 - 14)	2.5 mm^2 (AWG 24 - 14)
Max. torque	0.4 Nm	0.4 Nm
Size W x H x D (from rail)	5.08 x 86.5 x 44 mm	5.08 x 86.5 x 44 mm

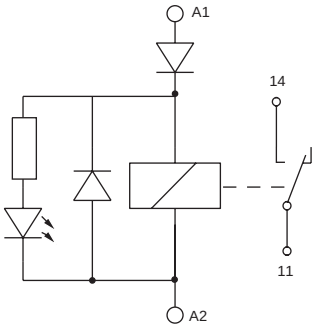
Order numbers

5 V	**45314T/7**	**45329T/12**
12 V	**45314T/1**	**45329T/13**
24 V	**45314T/2**	**45329T/15**
48 V	**45314T/3**	**45329T/14**
110 V	**45314T/9**	
230 V		

Properties

- Contact material without cadmium
- DC types with polarity protection diode
- Relays on bases or soldered
- Relay coils have no common negative pole

45105C/6S



Technical data

2 relays, NO contact, 12 A

Contacts	
Rated voltage / Max. contact voltage	250 V AC / 440 V AC
Rated current	12 A
Rated breaking capacity (res. load)	3000 VA
Number of contacts per relay	1 NO contact
Contact material	AgNi 90/10
Mechanical life	30 x 10^6 / 10 x 10^6 cycles
Coil	
Rated power (DC/AC)	0.4 W / 0.75 VA
Pickup voltage (DC/AC)	0.7 x U_n / 0.7 x U_n
Breaking voltage (DC/AC)	0.1 x U_n / 0.45 x U_n
General data	
Pickup, breaking and bouncing time	7 / 12 / 2 ms (DC versions)
Rated cross section of connecting terminals	2.5 mm²
Operating temperature	-20°C up to +40°C
Size W x H x D	30 x 83 x 44 mm / 30 x 83 x 50 mm

Order numbers

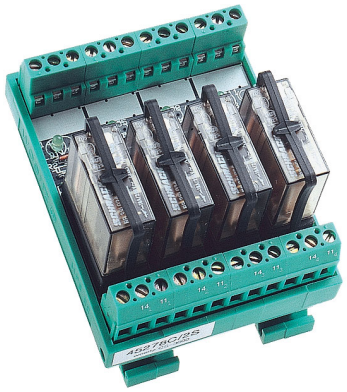
	Pluggable relays	
12 V DC	45105C/5	45105C/5S
24 V DC	45105C/6	45105C/6S
48 V DC	45105C/7	45105C/7S
115 V AC	45105C/4	45105C/4S
230 V AC	45105C/2	45105C/2S

Modules with 1-pole power relays

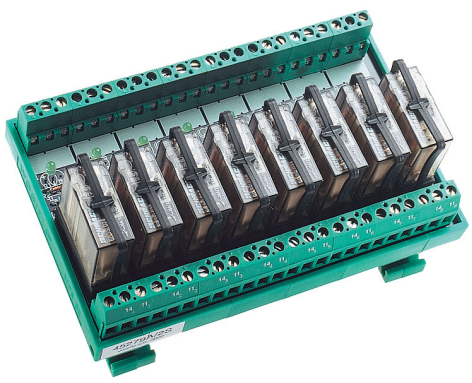
for high inrush currents, with independent relays

Properties

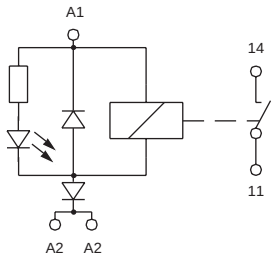
- For high inrush currents up to 120A/20ms
- Distance between contacts > 0.6 mm
- Dielectric strength 2000 V at open contact
- For switching incandescent lamps, halogen lamps, capacitors, etc.
- 4 kV / 8 mm
- Two terminals A2
- With pluggable relays



45278C/2S



45279A/2S



Technical data

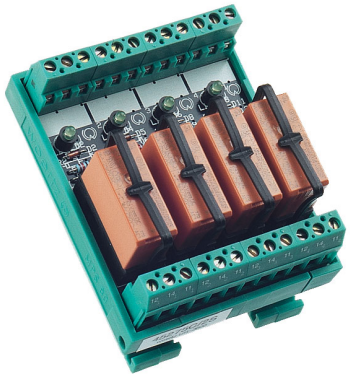
	4 relays	8 relays
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	12 A	12 A
Inrush current / Inrush peak current	20 A / 120 A	20 A / 120 A
Rated breaking capacity (res. load)	3000 VA	3000 VA
Number of contacts per relay	1 NO contact	1 NO contact
Contact material	AgSnO	AgSnO
Mechanical life	30 x 10^6 cycles	30 x 10^6 cycles
Coil		
Rated power	0.5 W	0.5 W
Pickup voltage	0.8 x U_n	0.8 x U_n
Breaking voltage	0.1 x U_n	0.1 x U_n
General data		
Pickup, breaking and bouncing time	8 / 2 / 4 ms	8 / 2 / 4 ms
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	65 x 83 x 58 mm	130 x 83 x 58 mm

Order numbers

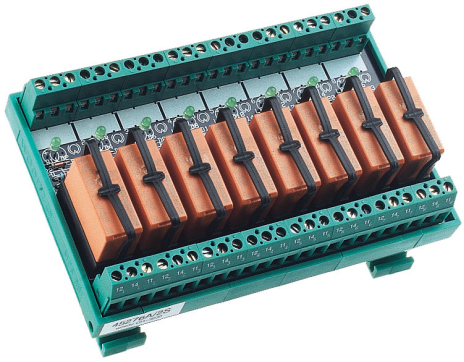
12 V DC	**45278C/1S**	**45279A/1S**
24 V DC	**45278C/2S**	**45279A/2S**
48 V DC	**45278C/3S**	**45279A/3S**

Properties

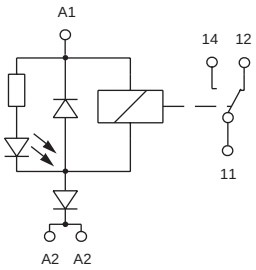
- Contact material without cadmium
- Two terminals A2
- With pluggable relays
- DC types with polarity protection diodes
- 5 kV / 10 mm



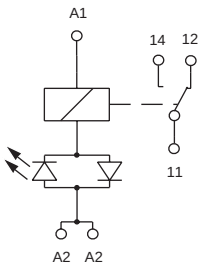
45275C/2S



45276A/2S



DC version



AC version

Technical data

	4 relays	8 relays
Contacts		
Rated voltage	250 V AC	250 V AC
Rated current	16 A	16 A
Rated breaking capacity (res. load)	4000 VA	4000 VA
Number of contacts per relay	1 changeover contact	1 changeover contact
Contact material	AgNi 90/10	AgNi 90/10
Mechanical life	30 x 10^6 / 10 x 10^6 cycles	30 x 10^6 / 10 x 10^6 cycles
Coil		
Rated power (DC/AC)	0.4 W / 0.75 VA	0.4 W / 0.75 VA
Pickup voltage (DC/AC)	0.7 x U_n / 0.7 x U_n	0.7 x U_n / 0.7 x U_n
Breaking voltage (DC/AC)	0.1 x U_n / 0.45 x U_n	0.1 x U_n / 0.45 x U_n
General data		
Pickup, breaking and bouncing time	7 / 12 / 2 ms	
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	65 x 83 x 50 mm	130 x 83 x 50 mm

Order numbers

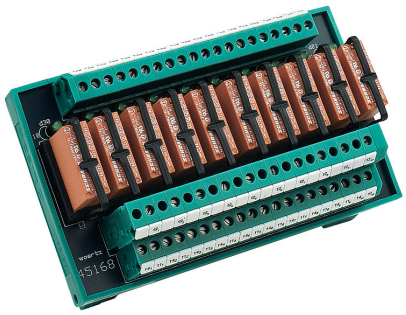
12 V DC	**45275C/1S**	**45276A/1S**
24 V DC	**45275C/2S**	**45276A/2S**
48 V DC	**45275C/3S**	**45276A/3S**
230 V AC	**45275C/4S**	**45276A/4S**
115 V AC	**45275C/5S**	**45276A/5S**
24 V AC	**45275C/6S**	**45276A/6S**

Modules with 1-pole power relays

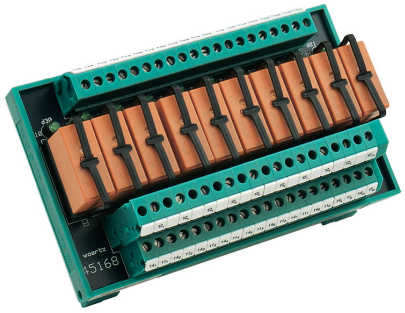
with sensitive independent relays

Properties

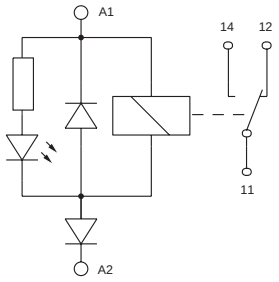
- For low current applications eg. programmable logic controllers
- DC versions with polarity protection diode
- With pluggable relays or soldered
- Relay coils are independent



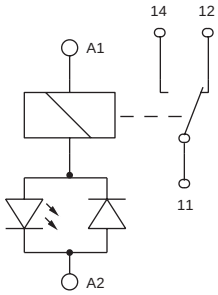
45168C/2S



45168C/4S



DC version



AC version

Technical data

	10 relays, DC version	10 relays, AC version
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	8 A	8 A
Inrush current (to UL 508)	30 A	30 A
Rated breaking capacity (res. load)	2000 VA	2000 VA
Number of contacts per relay	1 changeover contact	1 changeover contact
Contact material	AgNi 90/10	AgNi 90/10
Mechanical life	20 x 10^6 cycles	10 x 10^6 cycles
Coil		
Rated power	0.22 W	0.75 VA
Pickup voltage	0.7 x U_n + 1 V	0.7 x U_n
Breaking voltage	0.1 x U_n	0.45 x U_n
General data		
Pickup, breaking and bouncing time	7 / 12 / 4 ms	
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	150 x 83 x 58 mm	150 x 83 x 58 mm

Order numbers

	Pluggable relays		Pluggable relays
12 V DC	45168C/1	45168C/1S	
24 V DC	45168C/2	45168C/2S	
48 V DC	45168C/3	45168C/3S	
115 V AC			45168C/5 45168C/5S
230 V AC			45168C/4 45168C/4S

woertz

Properties

- 4kV/ 8mm between inputs and outputs (test voltage)
- Relays for universal use
- Contacts without cadmium
- 1 changeover contact per relay
- Relays with low power consumption
- Relays with state indicator
- Compact design
- Two terminals with common coil connection allow easy jumpering to next module
- Clearly structured modules
- Marking possibilities
- Complete range: 1, 4, 8 or 16 relays per module

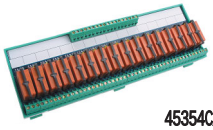
Accessories

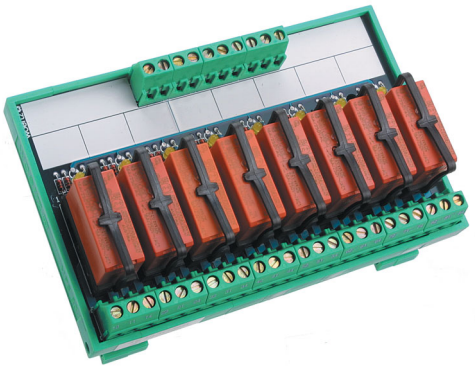
30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
45294/20	Marking label 10 x 20mm
45294/30	Marking label 10 x 30mm

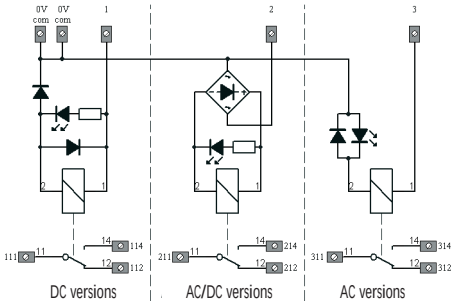
Range


45351C/2S


45352C/2S


45354C/2S


45353C/2S



Technical data

	1 relay	4 relays	8 relays	16 relays
Contacts				
Switching voltage / Max. switching voltage	250 V AC / 440 V AC			
Rated switching current	16 A			
Max. continuous current	12 A			
Max. inrush current	30 A			
Rated breaking capacity (res. load)	4000 VA			
Number of contacts per relay	1 changeover contact			
Contact material	AgNi 90 / 10			
Coil				
Rated power	400 mW / 0.75 VA			
Pickup voltage (12 / 24 / 48 / 115 / 230)	8.4 / 16.8 / 33.6 / 86.3 / 172.5 V			
Breaking voltage (12 / 24 / 48 / 115 / 230)	1.2 / 2.4 / 4.8 / 17.3 / 34.5 V			
Current consumption (12 / 24 / 48 / 115 / 230)	33.3 / 16.7 / 8.7 / 6.6 / 3.2 mA			
General data				
Operating temperature	-40°C up to +60°C			
Mechanical life (DC/AC)	> 30 x 10^6 / > 10 x 10^6 cycles			
Pickup-/ Breaking-/ Bouncing time (DC)	7 / 12 / 3			
Rated cross section of connecting terminals	2.5 mm^2			
Size W x H (from rail)	83 x 53 mm			
Length	20 mm	65 mm	130 mm	250 mm

Order numbers

12 V DC	45351C/1S	45352C/1S	45353C/1S	45354C/1S
24 V DC	45351C/2S	45352C/2S	45353C/2S	45354C/2S
48 V DC	45351C/3S	45352C/3S	45353C/3S	45354C/3S
24 V AC/DC	45351C/12S	45352C/12S	45353C/12S	45354C/12S
115 V AC	45351C/5S	45352C/5S	45353C/5S	45354C/5S
230 V AC	45351C/4S	45352C/4S	45353C/4S	45354C/4S

Relay modules

1 changeover contact, 250 V AC / 16 A (100 A)

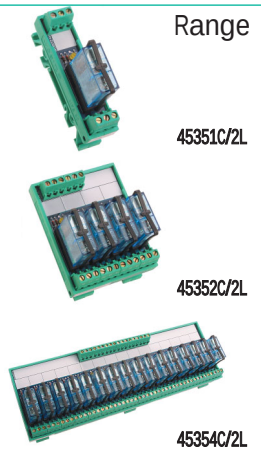
Properties

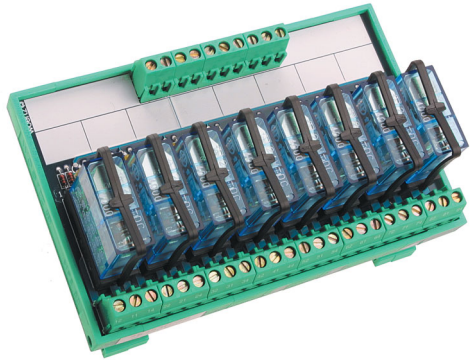
- 4kV/ 8mm between inputs and outputs (test voltage)
- Relays for inrush current up to 100A
- Specially designed to switch capacitive loads and electronic fluorescent lamp ballasts
- 1 changeover contact per relay
- Relays with state indicator
- Compact design
- Two terminals with common coil connection allow easy jumpering to next module
- Clearly structured modules
- Marking possibilities
- Complete range: 1, 4, 8 or 16 relays per module

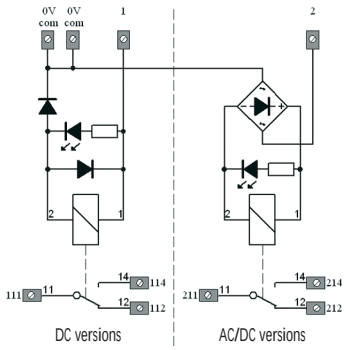
Accessories

30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
45294/20	Marking label 10 x 20mm
45294/30	Marking label 10 x 30mm

Range







Technical data

	1 relay	4 relays	8 relays	16 relays
Contacts				
Switching voltage / Max. switching voltage	250 V AC / 400 V			
Rated switching current	16 A			
Max. continuous current	12 A			
Max. inrush current	100 A			
Rated breaking capacity (res. load)	4000 VA			
Number of contacts per relay	1 changeover contact			
Contact material	$AgSnO_2$			
Coil				
Rated power	500 mW			
Pickup voltage (12 / 24 / 48)	9.6 / 19.2 / 38.4 V			
Breaking voltage (12 / 24 / 48)	1.2 / 2.4 / 4.8 V			
Current consumption (12 / 24 / 48)	41.7 / 20.8 / 10.4 mA			
General data				
Operating temperature	-40°C up to + 60°C			
Mechanical life	> 20 x 10^6 cycles			
Pickup-/ Breaking time (Bouncing time included)	15 / 60 ms			
Rated cross section of connecting terminals	2.5 mm^2			
Size W x H (from rail)	83 x 62 mm			
Length	20 mm	65 mm	130 mm	250 mm

Order numbers

12 V DC	45351C/1L	45352C/1L	45353C/1L	45354C/1L
24 V DC	45351C/2L	45352C/2L	45353C/2L	45354C/2L
48 V DC	45351C/3L	45352C/3L	45353C/3L	45354C/3L
24 V AC/DC	45351C/12L	45352C/12L	45353C/12L	45354C/12L

Properties

- 4kV/ 8mm between inputs and outputs on the circuit board (test voltage)
- For relays and optocouplers with 5mm pin spacing
- Plastic clips for 16 mm or 25 mm high relays (to order separately)
- State indicators on the circuit boards
- Compact design
- Two common terminals on coil side allow easy jumpering to next module
- Clearly structured modules
- Marking possibilities
- Complete range: 1, 4, 8 or 16 plug-in bases per module

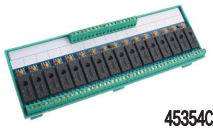
Accessories

30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
45294/20	Marking label 10 x 20mm
45294/30	Marking label 10 x 30mm
30374	4 plastic clips for 16mm high relays
30375	4 plastic clips for 25mm high relays

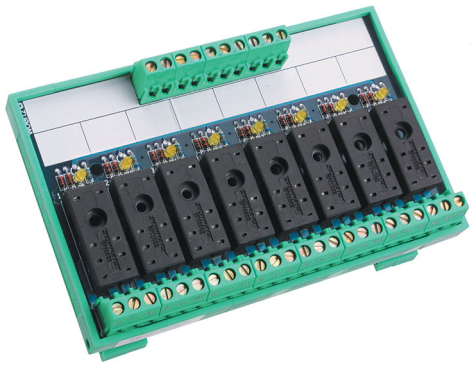
Range

45351C/2E

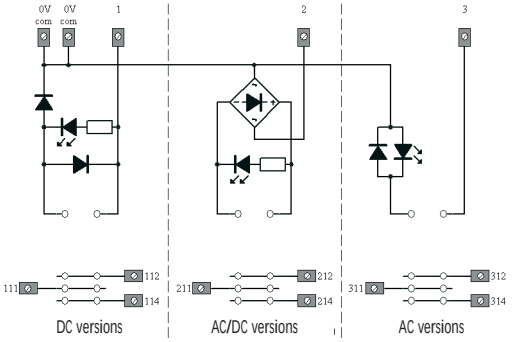
45352C/2E



45354C/2E



45353C/2E



Technical data

	1 base	4 bases	8 bases	16 bases
Circuit elements: required specifications				
Pin spacing	5 mm			
Total height	16 mm und 25 mm			
Type of contact	1 changeover contact, 1 NO contact or 1 NC contact			
Possible relays (incomplete listing)	Siemens: RT2, RT3, RPxx0, RPxx1, RP3SL; Finder: 40.51, 40.61, 41.61			
Possible optocouplers (incomplete listing)	Woertz: 45331, 45337, 45338, 45339			
Output				
Max. voltage	250 V AC			
Max. switching current	16 A			
Max. continuous current	12 A			
Number of contacts per circuit element	1 changeover contact			
Control side				
Operating voltage tolerance	given range ± 20%			
Protection element for DC types	polarity protection diode and recovery diode			
General data				
Operating temperature	-40°C up to +60°C			
Rated cross section of connecting terminals	2.5 mm²			
Size W x H (from rail)	83 x 53 mm			
Length	20 mm	65 mm	130 mm	250 mm

Order numbers

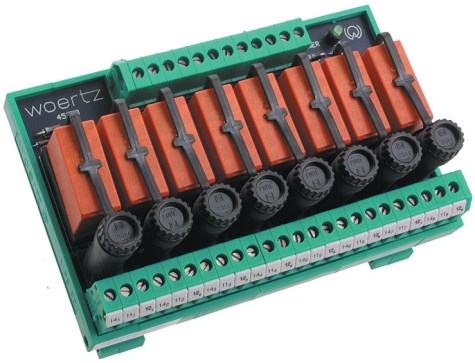
12 V DC	45351C/1E	45352C/1E	45353C/1E	45354C/1E
24 V DC	45351C/2E	45352C/2E	45353C/2E	45354C/2E
48 - 60 V DC	45351C/19E	45352C/19E	45353C/19E	45354C/19E
24 V AC/DC	45351C/12E	45352C/12E	45353C/12E	45354C/12E
115 - 230 V AC	45351C/45E	45352C/45E	45353C/45E	45354C/45E

Relay modules

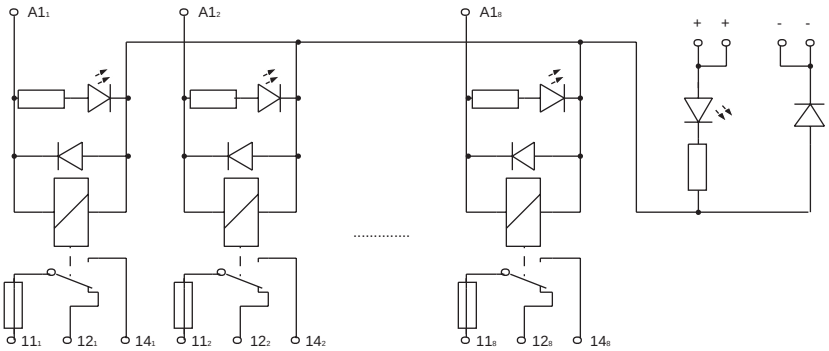
1 changeover contact, with fuse

Properties

- Two terminals with common coil connection allow easy jumpering to next module
- Relay with state indicator
- Compact design
- Contact without cadmium
- Pluggable relays
- Power supply indicator
- Fuses may be replaced by hand



45253A/2S



Accessories

30413RO	Cross connection 20-pole red
30413BL	Cross connection 20-pole blue
45294/20	Marking label 10 x 20 mm
45294/30	Marking label 10 x 30 mm
08634	Fuse 8 AT
02460	Relay 1 x Um, 12 A
01479	Relay clip

Technical data

Contacts	
Rated voltage / max. switching voltage	250 V AC / 440 V AC
Rated current	12 A
Rated breaking capacity (res. load)	3000 VA
Number of contacts per relay	1 changeover contact
Contact material	AgNi 90 / 10
Mechanical life	30 x 10^6 cycles
Pickup-/ Breaking-/ Bouncing time	7 / 12 / 2 ms
Coil	
Rated power	0.4 W
Pickup voltage	0.7 x U_n
Breaking voltage	0.1 x U_n
General data	
Fuses	8 A lag
Rated cross section of connecting terminals	2.5 mm²
Size L x W x H	130 x 83 x 58 mm

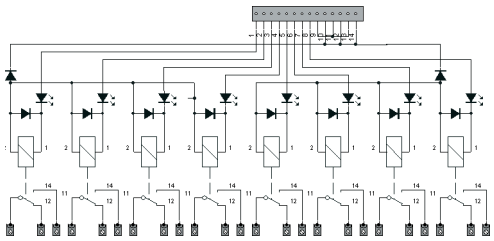
Order numbers

12 V DC	**45253A/1S**
24 V DC	**45253A/2S**
48 V DC	**45253A/3S**

Properties

- Designed for interfacing PLC's
- Compatible with Woertz systems
- Compact housing
- Front connection through 14pole flat connector (DIN 41651)
- Sensitive relays
- Coils with common negative pole
- With indication of logical states
- PCB connectors at the output
- Solid spring fastening system, for clipping on to rail EN 60715 TH 35-7.5 and EN 60715 TH 35-15

45370U/2



Technical data

Outputs	
Switching voltage	max. 250 V AC
Switching current (res. load)	max. 8 A
Inrush current	max. 30 A
Switching capacity	2000 VA
Number of contacts per relay	1 changeover contact
Contact material	AgNi 0.15
Inputs	
Rated power	220 mW
Rated voltage	24 V DC
Pickup voltage	19.5 V
Breaking voltage	2.4 V
Current consumption per channel (at rated voltage)	9 mA
General data	
Operating temperature	-40°C up to + 60°C
Mechanical life	30 x 10^6 cycles
Pickup, breaking and bouncing time	7 / 12 / 1 ms
Rated cross section of connecting terminals	2.5 mm^2
Size L x W x H (with/without multipolar connector)	19 / 20 x 81/ 102 x 107 mm

Order numbers

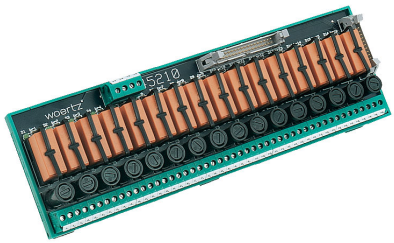
24 V DC	**45370U/2**

Modules with 1-pole power relays

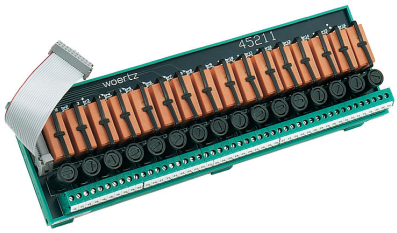
with flat push-on connector according to DIN 41651 and fuses

Properties

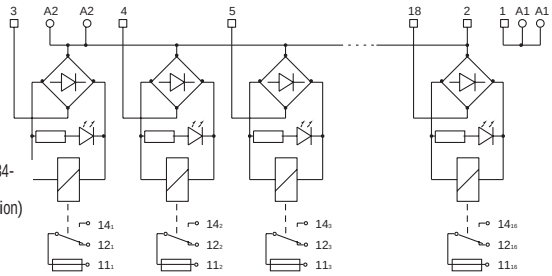
- Connection through a 34-pole socket to DIN 41651
- For PLC applications (Sinumerik 810, 850, 880, Fanuc)
- The extension can be connected to the basic unit through a 20-pole connector (cable included with the extension)
- 24 V control voltage (positive, negative or AC)
- Fuses at the output
- Visible indication of the relay logical states



45210C/12



45211C/12



Pin configuration of the 34-pole connector:
1: Terminals A_1 (no function)
2: Terminals A_2
3 ... 18: relays 1 ... 16
19 ... 34: relays 17 ... 32
on the extension

Technical data

	Basic unit, 16 relays	Extension, 16 relays
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	8 A (16 A relay)	8 A (16 A Relais)
Fuse	5 A	5 A
Rated breaking capacity (res. load)	2000 VA	2000 VA
Number of contacts per relay	1 changeover contact	1 changeover contact
Contact material	AgNi 90 / 10	AgNi 90 / 10
Mechanical life	30 x 10^6 cycles	30 x 10^6 cycles
Coil		
Rated power	0.4 W	0.4 W
Pickup voltage	19 V	19 V
Breaking voltage	2.4 V	2.4 V
General data		
Pickup, breaking and bouncing time	7 / 12 / 2 ms	7 / 12 / 2 ms
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Socket (DIN 41651)	34-pole	20-pole
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	260 x 83 x 58 mm	260 x 83 x 58 mm

Order numbers

	Basic unit, 16 relays	Extension, 16 relays
24 V AC/DC	45210C/12	45211C/12

common negative pole

Rel 32	Rel 30	Rel 28	.....	Rel 18	Rel 16	Rel 14	.....	Rel 6	Rel 4	Rel 2	A2
34	32	30	...	20	18	16	...	8	6	4	2
33	31	29	...	19	17	15	...	7	5	3	1
Rel 31	Rel 29	Rel 27	.....	Rel 17	Rel 15	Rel 13	.....	Rel 5	Rel 3	Rel 1	A1 NC

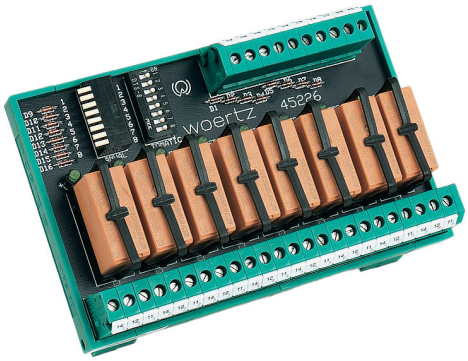
NC	NC	Rel 30	Rel 32	Rel 23	Rel 20	Rel 28	Rel 19	Rel 17	Rel 26
20	18	16	14	12	10	8	6	4	2
19	17	15	13	11	9	7	5	3	1
A2	A2	Rel 31	Rel 24	Rel 22	Rel 21	Rel 29	Rel 18	Rel 27	Rel 25

common negative pole

woertz

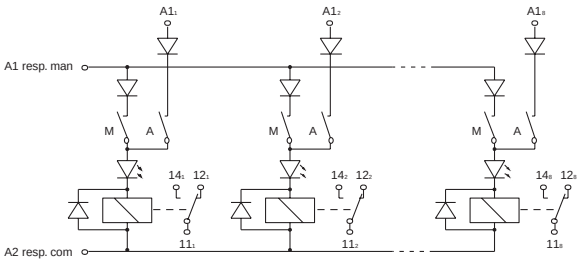
Properties

- Contact without cadmium
- With polarity protection diode
- With pluggable relays
- Relay coil with common negative(or positive) pole
- DIP switches allow the relays to be manually or automatically controlled
- Very useful for tests and start-up sequences
- Independent switches: an OR function can be implemented



45226A

If the A_1 terminal (resp. A2 for the 45226 A/7 version) is connected to an emergency supply by means of the NC contact of a relay, a sort of emergency function is established. The relays in "M" mode will switch and thus place the process in emergency mode.



Technical data

	8 relays
Contacts	
Rated voltage / Max. contact voltage	250 V AC / 440 V AC
Rated current	8 A
Rated breaking capacity (res. load)	2000 VA
Number of contacts per relay	1 changeover contact
Contact material	AgNi 90 / 10
Mechanical life	30 x 10^6 cycles
Coil	
Control current per relay 24 / 48 V DC	16.7 / 8.3 mA
Pickup voltage 24 / 48 V DC	19.4 / 36.2 V DC
Breaking voltage 24 / 48 V DC	2.4 / 4.8 V DC
General data	
Pickup, breaking and bouncing time	7 / 12 / 2 ms
Rated cross section of connecting terminals	2.5 mm^2
Operating temperature	-20°C up to +40°C
Size W x H x D	130 x 83 x 50 mm

Order numbers

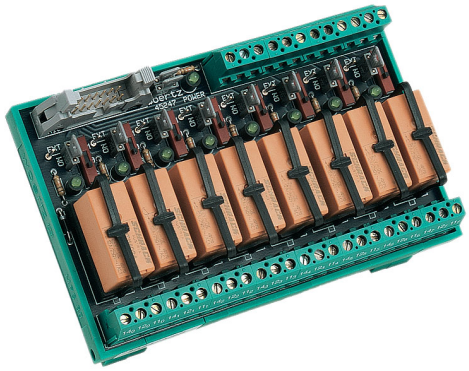
24 V DC	**45226A**
48 V DC	**45226A/3**
with common positive pole, 24 V DC	**45226A/7**

Modules with 1-pole power relays

with simulation feature and 14-pole DIN 41651 header

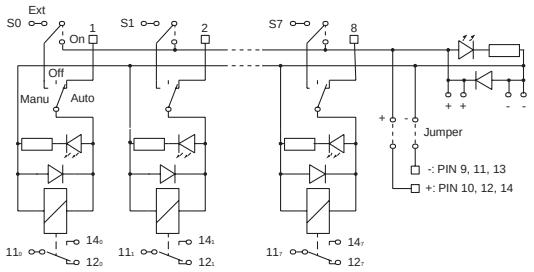
Properties

- For PLC interface
- Terminals labelled 0 ... 7
- Relays 0 ... 7 correspond to pins 1 ... 8
- Contacts without cadmium
- Relay with logical state indicator
- With sliding switches
- Module can be supplied by means of the header or by the PCB terminals. The supply connection between header and terminals can be interrupted
- 2 supply terminals allow easy jumpering to next module



45247A/2S

Two operation modes:
Jumper in ON position: relays switch between "Automatic" (header), "Off" or "On".
Jumper on EXT position: relays switch between "Automatic" (header), "Off" or "External signal" (PCB terminals).



Technical data

Contacts	
Rated voltage / Max. contact voltage	250 V AC / 440 V AC
Rated current	8 A
Rated breaking capacity (res. load)	2000 VA
Number of contacts per relay	1 changeover contact
Contact material	AgNi 90 / 10
Mechanical life	30 x 10^6 cycles
Coil	
Rated power	0.4 W
Pickup voltage	17 V
Breaking voltage	2.4 V
General data	
Pickup, breaking and bouncing time	7 / 12 / 2 ms
Rated cross section of connecting terminals	2.5 mm^2
Flat push-on connector	DIN 41651, 14-pole
Size W x H x D	130 x 83 x 58 mm

Order numbers

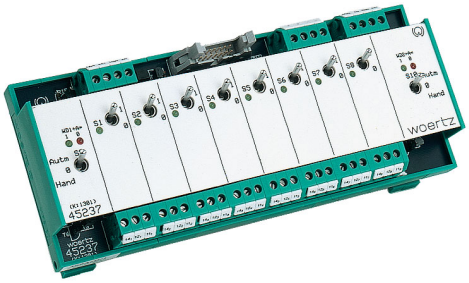
	Pluggable relays
24 V DC	45247A/2S

Properties

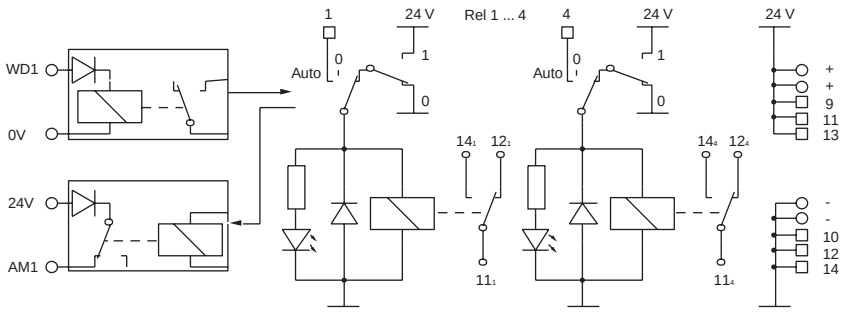
- For PLC interface
- With well-accessible toggle switches
- Relays controlled through the flat cable header
- Simulation feature is very useful for tests or start-up sequences
- Emergency function if failure of the PLC
- Error signal through a potential-free contact
- Modules can be subdivided into two 4-pole units

WD = Watchdog:
If 24V is applied to this input, the automatic mode is activated (input over flat cable). If the voltage disappears, the emergency mode becomes active

AM = Alarm output:
In automatic mode the alarm switch is closed; it opens when emergency mode is entered



45237B/1



Technical data

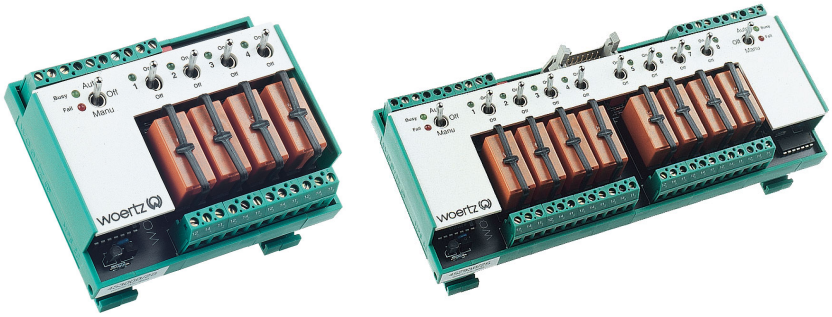
Contacts	
Rated voltage / Max. contact voltage	250 V AC / 440 V AC
Rated current	8 A
Inrush current (to UL 508)	30 A
Rated breaking capacity (res. load)	2000 VA
Number of contacts per relay	1 changeover contact
Contact material	AgNi 90/10
Mechanical life	4.3 x 10^5 cycles
Coil	
Rated power	0.22 W
Pickup voltage	20 V DC
Breaking voltage	2.4 V DC
General data	
Pickup, breaking and bouncing time	7 / 12 / 4 ms
Rated cross section of connecting terminals	2.5 mm²
Socket	DIN 41651, 14-pole
Size W x H x D	200 x 83 x 56 mm

Order numbers

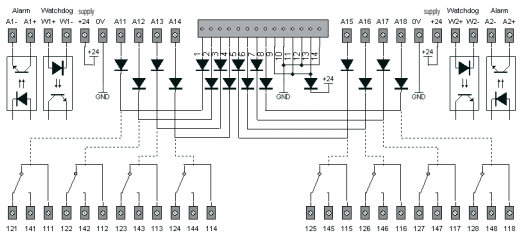
24 V DC	45237B/1

Relay modules with emergency function

1 changeover contact, 250 V AC / 16 A



45300B/2S 45293B/2S



Properties

- Relay modules with emergency function. If no voltage is applied at the watchdog input, the predefined relay states will become active.
- Relays controlled through PCB terminals or flat cable header.
- Modules can be subdivided into two 4-pole independent units, which may function in automatic or manual mode or be switched off.
- In manual mode, relays may be switched on and off by means of toggle switches.
- Alarm output switch is closed in automatic mode. It opens if the watchdog disappears or the switch is placed in manual or off mode.
- Good isolation (4kV/ 8mm) between input circuit and relay outputs.

Accessories

45294/20 Marking label 10 x 20 mm
45294/30 Marking label 10 x 30 mm

Technical data

	4 relays	8 relays
Contacts		
Switching voltage / Max. switching voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated switching current (res. load) / Max. continuous current / Max. inrush current	16 A / 12 A / 30 A	16 A / 12 A / 30 A (45330B/2S:120 A/20 ms)
Rated breaking capacity	4000 VA (45330B/2S: 3000 VA)	4000 VA (45330B/2S: 3000 VA)
Number of contacts per relay / Contact material	1 changeover contact AgNi 90 / 10	1 changeover contact AgNi 90 / 10
Pickup-/ Breaking-/ Bouncing time	7 / 12 / 4 ms	7 / 12 / 4 ms
Mechanical life	> 30 x 10^6 cycles	> 30 x 10^6 cycles
Inputs		
Supply voltage tolerance	± 20% (48 V DC: max. 52 V DC)	± 20% (48 V DC: max. 52 V DC)
Current consumption with U_{rated} 12/24/48 V	12 / 15 / 16 mA	20 / 25 / 28 mA
Pickup voltage of relays 12/24/48 V	9 / 17 / 34 V DC	9 / 17 / 34 V DC
Breaking voltage of relays 12/24/48 V	1 / 2 / 5 V DC	1 / 2 / 5 V DC
Current consumption per channel 12/24/48 V	35 / 20 / 12 mA	35 / 20 / 12 mA
Watchdog input		
If no voltage is applied to the watchdog input, the emergency state is entered!		
Switching threshold 12/24/48 V	7.5 / 15 / 30 V DC ± 10%	7.5 / 15 / 30 V DC ± 10%
Max. voltage 12/24/48 V	30 / 45 / 70 V DC	30 / 45 / 70 V DC
Input current	4 mA	4 mA
Alarm output		
In automatic mode, alarm switch is closed; in case of failure, manual mode or switched off relays, switch opens		
Max. voltage to be applied	50 V DC	50 V DC
Max. load	100 mA (approx. voltage drop 1V)	100 mA (approx. voltage drop 1V)
General data		
Operating temperature range	0°C up to +45°C	0°C up to +45°C
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Size W x H x D (from rail)	100 x 83 x 56 mm	200 x 83 x 56 mm

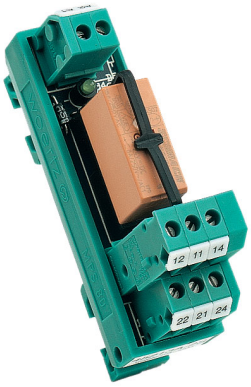
Order numbers

12 V DC	**45300B/1S**	**45293B/1S**
24V DC	**45300B/2S**	**45293B/2S**
48 V DC	**45300B/3S**	**45293B/3S**
24 V DC, for high inrush current max. 100 A (AgSnO)		**45330B/2S**

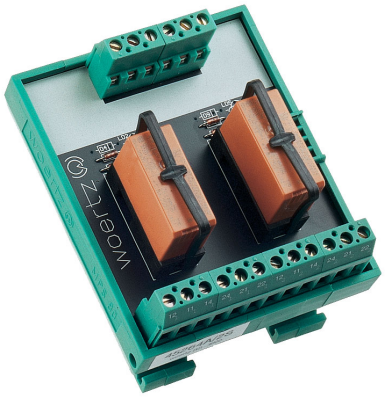
woertz

Properties

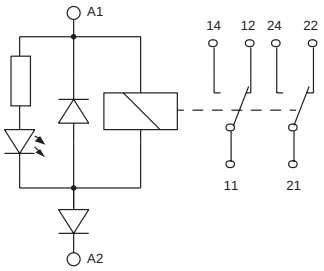
- Contacts without cadmium
- DC versions with polarity protection diode
- Pluggable relays or soldered
- Independent relays



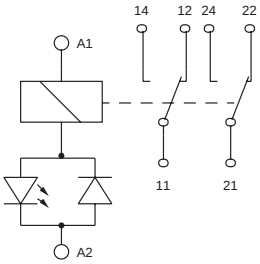
45213A/2S



45264A/2S



DC version



AC version

Technical data

	1 relay	2 relays
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	8 A	8 A
Rated breaking capacity (res. load)	2000 VA	2000 VA
Number of contacts per relay	2 changeover contacts	2 changeover contacts
Contact material	AgNi 90/10	AgNi 90/10
Mechanical life (DC/AC)	30 x 10^6 / 10 x 10^6 cycles	30 x 10^6 / 10 x 10^6 cycles
Coil		
Rated capacity (DC/AC)	0.4 W / 0.75 VA	0.4 W / 0.75 VA
Pickup voltage (DC/AC)	0.7 x U_n + 1 / 0.7 x U_n	0.7 x U_n + 1 / 0.7 x U_n
Breaking voltage (DC/AC)	0.1 x U_n / 0.45 x U_n	0.1 x U_n / 0.45 x U_n
General data		
Pickup, breaking and bouncing time	6 / 8 / 1 ms (DC versions)	6 / 8 / 1 ms (DC versions)
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +45°C
Size W x H x D	30 x 83 x 58 mm / 30 x 83 x 58 mm	70 x 83 x 44 mm / 70 x 83 x 50 mm

Order numbers

	1 relay		2 relays	
		Pluggable relays		Pluggable relays
12 V DC	45213A/1	45213A/1S	45264A/1	45264A/1S
24 V DC	45213A/2	45213A/2S	45264A/2	45264A/2S
48 V DC	45213A/3	45213A/3S	45264A/3	45264A/3S
230 V AC	45213A/4	45213A/4S	45264A/4	45264A/4S
115 V AC	45213A/5	45213A/5S	45264A/5	45264A/5S
24 V AC			45264A/6	45264A/6S

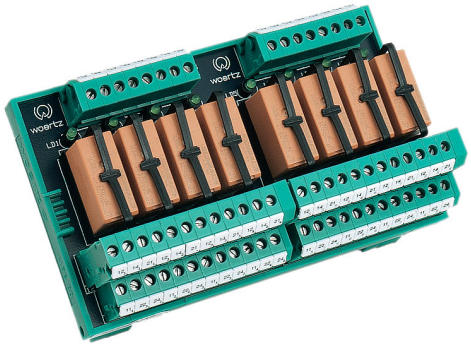
Modules with 2-pole power relay

Independent relays

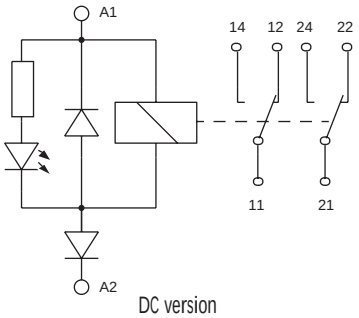
Properties

- Contacts without cadmium
- DC versions with polarity protection diode
- Pluggable relays or soldered
- Independent relays

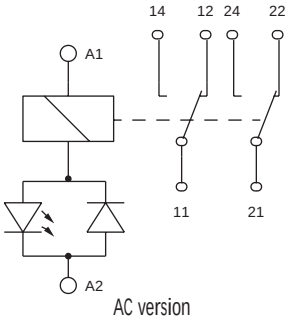
45255A/2S



45256A/4S



DC version



AC version

Technical data

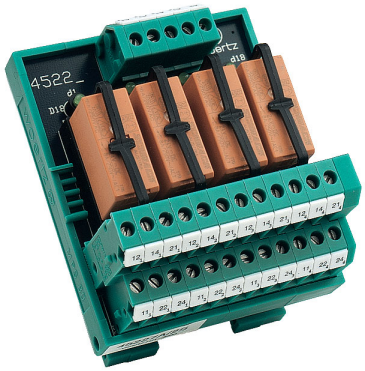
	4 relays	8 relays
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	8 A	8 A
Rated breaking capacity (res. load)	2000 VA	2000 VA
Number of contacts per relay	2 changeover contacts	2 changeover contacts
Contact material	AgNi 90/10	AgNi 90/10
Mechanical life (DC/AC)	30 x 10^6 / 10 x 10^6 cycles	30 x 10^6 / 10 x 10^6 cycles
Coil		
Rated capacity (DC/AC)	0.4 W / 0.75 VA	0.4 W / 0.75 VA
Pickup voltage (DC/AC)	0.7 x U_n + 1 / 0.7 x U_n	0.7 x U_n + 1 / 0.7 x U_n
Breaking voltage (DC/AC)	0.1 x U_n / 0.45 x U_n	0.1 x U_n / 0.45 x U_n
General data		
Pickup, breaking and bouncing time	6 / 8 / 1 ms (DC versions)	6 / 8 / 1 ms (DC versions)
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	70 x 83 x 58 mm	140 x 83 x 58 mm

Order numbers

	4 relays	8 relays
	Pluggable relays	Pluggable relays
12 V DC	45255A/1S	45256A/1S
24 V DC	45255A/2S	45256A/2S
48 V DC	45255A/3S	45256A/3S
230 V AC	45255A/4S	45256A/4S
115 V AC	45255A/5S	45256A/5S
24 V AC		45256A/6S
	45255A/2	45256A/2

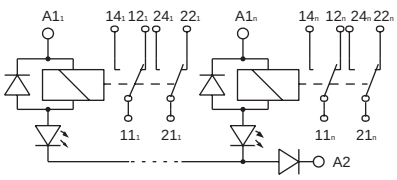
Properties

- Contacts without cadmium
- DC versions with polarity protection diode
- Pluggable relays or soldered
- Relay coils with common negative pole
- Two changeover contacts per relay

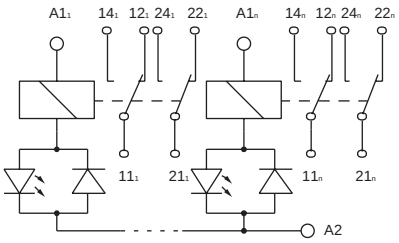


45227A/2S

45228A/4S



DC version



AC version

Technical data

	4 relays	8 relays
Contacts		
Rated voltage / Max. contact voltage	250 V AC / 440 V AC	250 V AC / 440 V AC
Rated current	8 A	8 A
Rated breaking capacity (res. load)	2000 VA	2000 VA
Number of contacts per relay	2 changeover contacts	2 changeover contacts
Contact material	AgNi 90/10	AgNi 90/10
Mechanical life (DC/AC)	30 x 10^6 / 10 x 10^6 cycles	30 x 10^6 / 10 x 10^6 cycles
Coil		
Rated power (DC/AC)	0.4 W / 0.75 VA	0.4 W / 0.75 VA
Pickup voltage (DC/AC)	0.7 x U_n + 1 / 0.7 x U_n	0.7 x U_n + 1 / 0.7 x U_n
Breaking voltage (DC/AC)	0.1 x U_n / 0.45 x U_n	0.1 x U_n / 0.45 x U_n
General data		
Pickup, breaking and bouncing time	6 / 8 / 1 ms (DC versions)	6 / 8 / 1 ms (DC versions)
Rated cross section of connecting terminals	2.5 mm²	2.5 mm²
Operating temperature	-20°C up to +40°C	-20°C up to +40°C
Size W x H x D	70 x 83 x 58 mm	140 x 83 x 58 mm

Order numbers

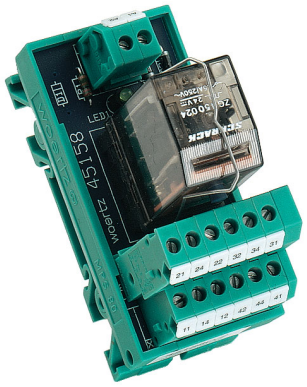
	4 relays	8 relays
	Pluggable relays	Pluggable relays
12 V DC	45227A/1S	45228A/1S
24 V DC	45227A/2S	45228A/2S
48 V DC	45227A/3S	45228A/3S
230 V AC	45227A/4S	45228A/4S
115 V AC	45227A/5S	45228A/5S
	45227A/2	45228A/2

Modules with industrial miniature relay

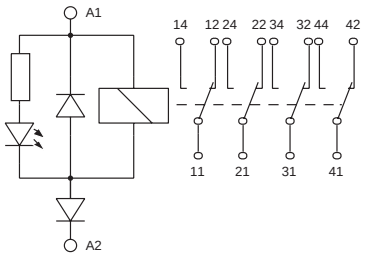
with 4-pole changeover contacts

Properties

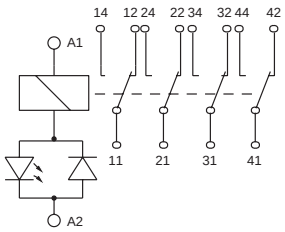
- Contacts without cadmium
- DC versions with polarity protection diode
- Four changeover contacts
- Test key
- For control and automation circuits in the machine industry. For remote control systems, electric apparatus engineering, etc.



45158C/2



DC version



AC version

Technical data

Contacts	
Rated voltage / Max. contact voltage	250 V AC / 440 V AC
Rated current	5 A
Inrush current	10 A
Rated breaking capacity (res. load)	1250 VA
Number of contacts per relay	4 changeover contacts
Contact material	AgNi 0.15 + hv
Mechanical life (DC/AC)	100 x 10^6 / 50 x 10^6 cycles
Coil	
Rated power (DC/AC)	1 W / 1.6 VA
Pickup voltage (DC/AC)	0.75 x U_n / 0.8 x U_n
Breaking voltage (DC/AC)	0.15 x U_n / 0.3 x U_n
General data	
Pickup, breaking and bouncing time	10 / 32 / 2 ms (DC versions)
Rated cross section of connecting terminals	2.5 mm^2
Operating temperature	-20°C up to +40°C
Size W x H x T	40 x 83 x 70 mm

Order numbers

12 V DC	**45158C/1**
24 V DC	**45158C/2**
48 V DC	**45158C/3**
115 V AC	**45158C/5**
230 V AC	**45158C/4**

Notes

09.2002 / 1'500 E