Mechanical power relays (MPR10, MPR20)

Description

The mechanical power relays (MPR10 and MPR20) are a product group of electro-mechanical high current relays.

These relays were designed for the use in utility vehicles and can switch or carry up to 300 A continuous load at 12 and/or 24 V DC.

A high number of switching cycles at rated load, including capacitive and inductive loads, make these power relays especially suitable for the severe requirements in the utility vehicles.

The main terminals are stud terminals. Various mounting methods allow horizontal or vertical mounting of the relay, including side flange, foot mount and M4 connectors. This allows direct replacement of conventional cylindrical relays, but also other flexible fittings.

E-T-A's power relays can replace all conventional power relays in the market.

MPR10 | **MPR20** | **MPR20** incl. plug-in connector

Versions

- Single pole make contact
- Monostable (MPR20) or bistable (MPR10) electro-mechanical relay versions
- Side flange for standard mounting
- Other mounting options with foot mount or side flange with standard hole sizes or customer-specific mounting versions
- Standard: screw terminals for the activation
- 3-pole automotive plug-in terminals, compatible with the Tyco HDSCS series

Target industries

- Utility vehicles
- Buses
- Trucks
- Construction machinery (cranes, excavators, dump trucks etc.)
- Special vehicles (emergency, service, municipal)
- Agricultural vehicles (tractors, harvesters etc.)

Approvals

Unit	Approval authority	Logo	Directive	Rated voltage
MPR10	KBA	E1 10R-047621	ECE-R 10	24 V
MPR20	KBA	E1*10R05/01 *902700	ECE-R 10	12 V or 24 V

Compliance

CE RoHS REACH

Features

- Water-proof and water vapour proof
- Side mount and foot mount
- Low weight
- Long life span
- High continuous current
- Low current consumption and power loss, also as monostable version
- Wide temperature range
- Integral free-wheeling diode
- Barrier between main terminals
- The MPR20 has a power-saving circuitry at the control terminal. It reduces the holding power by a factor 10 compared to coil terminals of standard power relays.

Applications

- Battery master switch or battery changeover relay
- Switching electrical loads with a high energy consumption (examples: air conditioning, compressors, heating systems etc.)
- Replacing massive cylindrical standard power relays in utility vehicles and relays for applications with extreme requirements, e.g. in construction machinery.
- Contactors in forklift trucks

5

Technical data (25 °C)

Load circuit		
Voltage ratings	U_N	12 V DC, 24 V DC
Continuous current	I_N	100 A, 200 A, 300 A
Overload	20 s 1 s	2 × I_N 8 × I_N
Contact voltage drop[1)]	max. 150 mV max. 175 mV	(initially) (after endurance)
Control circuit		
	rated voltage 12 V DC: 24 V DC:	operating voltage 9...16 V DC 16...32 V DC
Edge steepness of control voltage	0.25 V/ms	
Coil power	bistable switching pulse length monostable switching pulse length 12 V 24 V holding current 12 V 24 V	< 60 W 50 ms ...1s (min. 50 ms) < 2.5 A < 3 A < 0.12 A < 0.07 A
General		
Typical life	mechanical monostable bistable resistive (12 V) resistive (24 V)	 > 250,000 cycles > 100,000 cycles > 200,000 cycles at I_N > 100,000 cycles at I_N
Dielectric strength	1 kV to ISO 16750-2; chapter 04.11	
Insulation resistance	> 100 MΩ (initially) to ISO 16750-2, chapter 4.12	
Temperature range	-40 ... +85° C	
Degree of protection	Enclosure Terminal area	IP 6K9K, IP X6k, IP X7 to ISO 20653 IP00 to ISO 20653
Vibration	> 6 g 57.9 m/s² to ISO 16750-3, 4.1.2.7	
Shock	> 50g / 30g 500 m/s² ON position 300 m/s² OFF position to ISO 16750-3, chapter 4.2.2	
Flammability	UL V0 and meets the requirements to ECE-R 118 02, appendix 6.7, especially for vehicles used for carriage of passengers	
Chemical resistance to ISO 16750-5		
Oil, hydraulic liquids, alcohol, urea, extinguishing agents, battery acid, detergents, grease, cold cleaner		
Corrosion	5 % salt mist to ISO 16750-4, chapter 5.5.1, severity 4	
Humidity	85 % RH to ISO 16750-4, chapter 5.7	
Dimensions	w x h x d (without terminals or flanges) 49.6 (62) × 91.3 × 45.8 [mm]	
Mass	≤ 290 g	
Material		
Enclosure	Polyamide (PA), glass fiber reinforced	
Optional mounting plates	aluminium	
Main terminals	brass tin-plated	

Technical data (25 °C)

Permanent magnets	Neodym	
Screws, washers, nuts	stainless steel	
Tightening torque values:	M10 studs M8 studs M4 screws M5 side flange	15.0 Nm 12.0 Nm 2.0 Nm 6.0 Nm

Ordering information

Type no.

MPR10-N bistable
MPR20-N monostable

Number of poles
1 single pole

Voltage ratings
1 12 V
2 24 V

Current ratings
1 100 A
2 200 A
3 300 A

Design of load terminals
1 M8 studs (100 A, 200 A)
2 M10 studs (100 A, 200 A, 300 A)

Accessories of load terminals
0 without
2 washers and nuts bulk shipped

Coil connection (control contacts)
0 for 3-pole connector
1 M4 screws

Mounting method
0 without
1 side flange with Ø 5.4 mm hole
3 plate for side flange
4 plate for foot mount
5 without integral side flange, for optional side or foot plate with M4 connectors

Options 1
2 with suppressor diode

Options 2
0 without

Options 3
0 without

Options 4
Plug-in type terminals, compatible with Tyco HDSCS (control contacts)
without
1 3-pole (MPR10)
2 2-pole (MPR20)

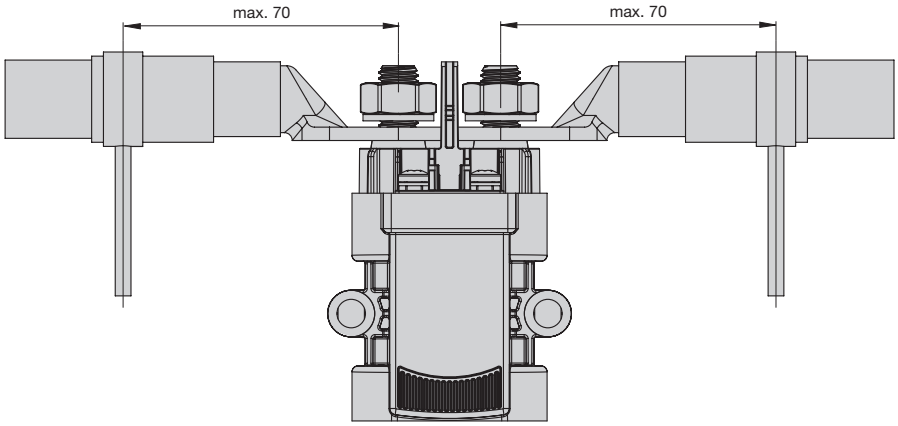
MPR20-N-	**1**	**2**	**2**	**-**	**1**	**1**	**1**	**-**	**2**	**0**	**0**		ordering example
MPR10-N-	**1**	**1**	**3**	**-**	**2**	**2**	**0**	**1**	**-**	**2**	**0**	**0**	**1**	ordering example

Notes

- Terminal cross section:
> 35 mm² for 100 A at M8
> 70 mm² for 200 A at M8/M10
> 95 mm² for 300 A at M10

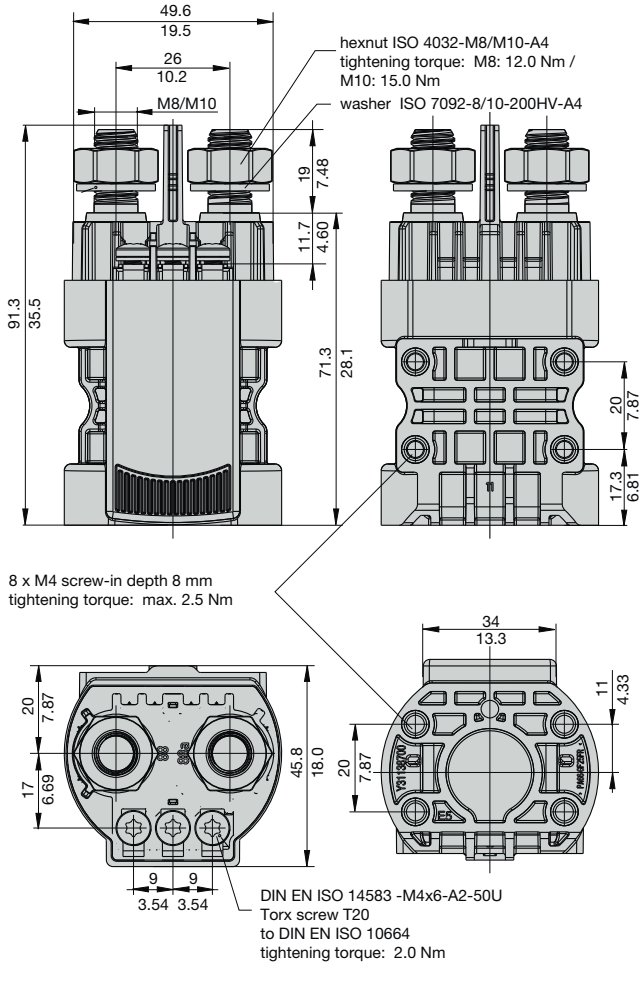
The connecting cables must be firmly fixed by suitable means at the latest after 7 cm from the axis of the screw terminal. See drawing

Terminal drawing

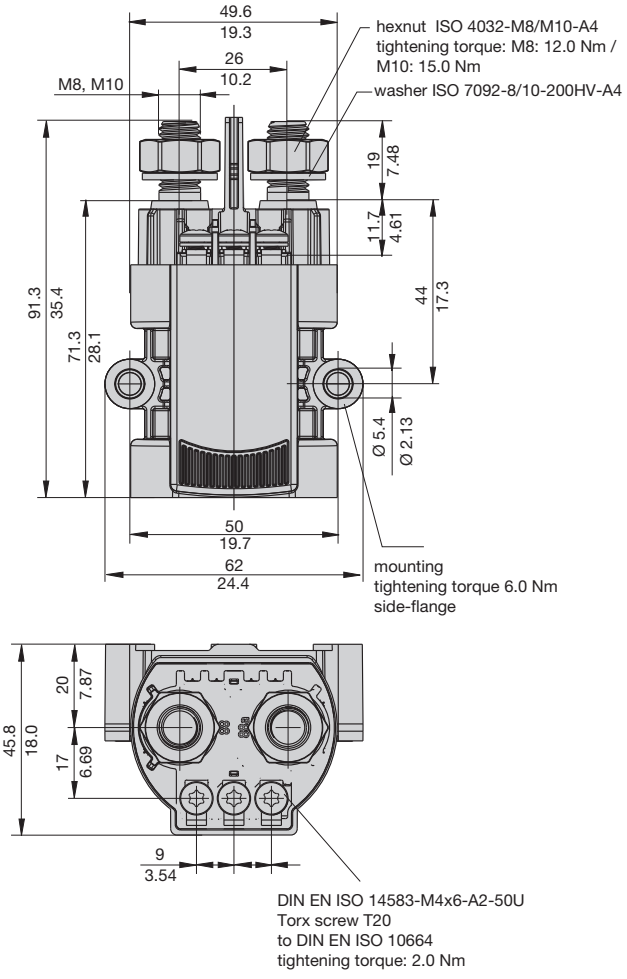


Dimensions MPR10

Mounting method 5: without integral side flange for optional side or foot plate with M4 connectors



Mounting method 1 including side flange (50 mm hole spacing) and M4 screw terminals



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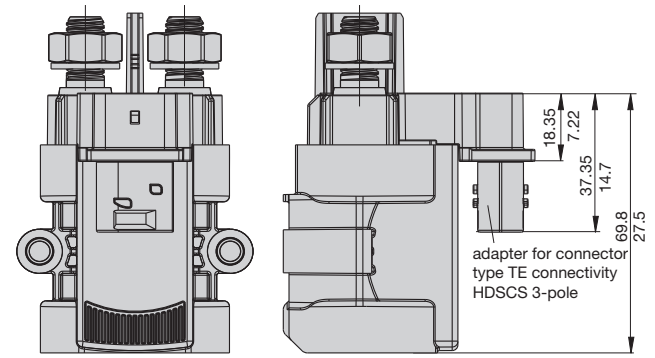
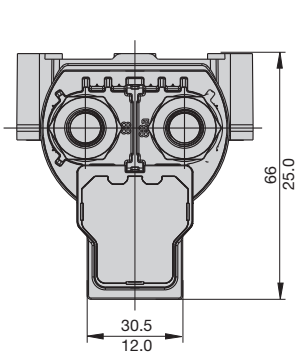
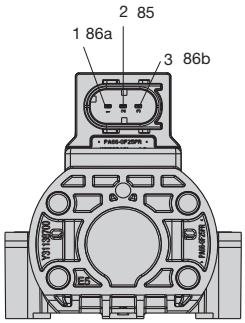
Dimensions MPR10

Mounting method 1 including option 4 – 3-pole connector compatible with Tyco HDSCS



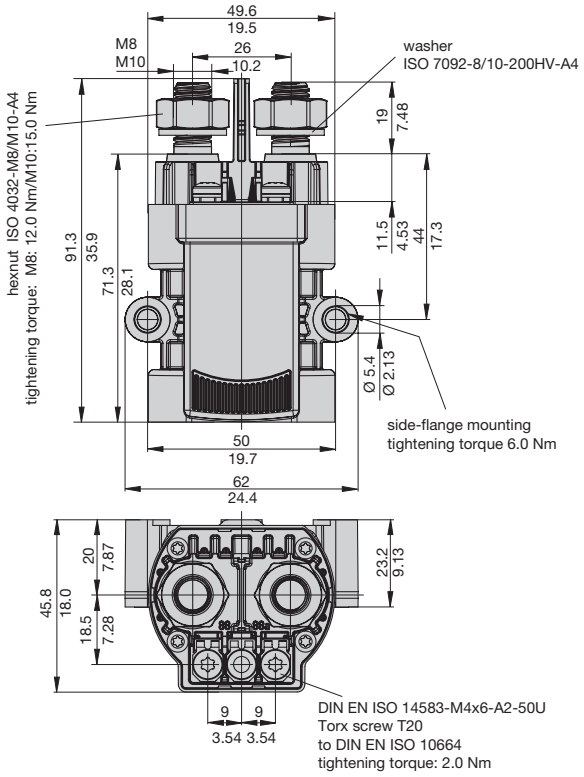


Pin assignment



Dimensions MPR20

Mounting method 1 including side flange (50 mm hole spacing) and M4 screw terminals



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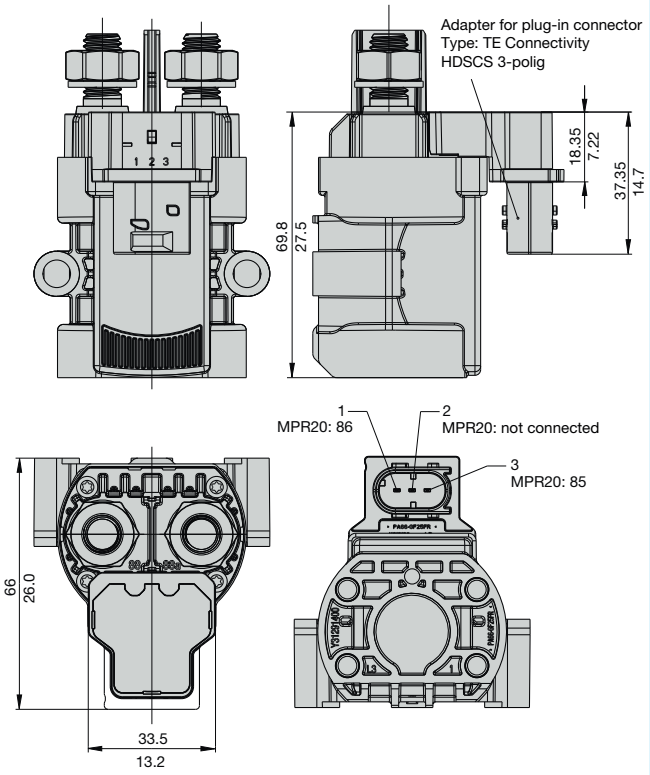
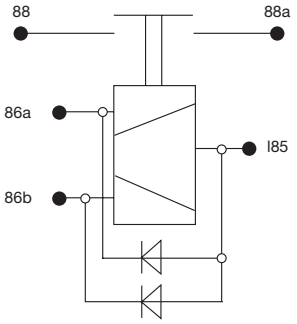
Dimensions MPR20

Mounting method 1 incl. option 4 - 2-pole plug-in connector compatible with Tyco HDSCS

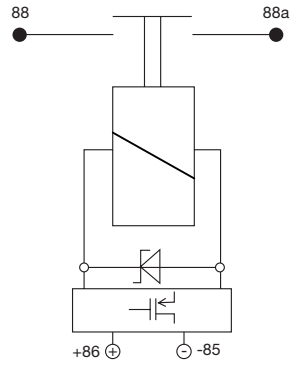


Schematic diagrams

MPR10 bistable



MPR20 monostable
including power-saving electronic circuitry



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