

## 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.

## 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 (Group A, coding black)
- Extension to 48 V in the load circuit

## 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	Directive	Rated voltage, control circuit
MPR10	KBA	ECE-R 10	24 V
MPR20	KBA	ECE-R 10	12 V or 24 V

## Compliance



MPR10

MPR20

MPR20  
incl. plug-in connector

MPR20  
incl. 48 V  
extension

## 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

## Technical data (25 °C)

### Load circuit

Voltage ratings	$U_N$	12 V DC, 24 V DC, 48 V DC
Continuous current	$I_N$	100 A, 200 A, 300 A
Overload	20 s	$2 \times I_N$
	1 s	$8 \times I_N$
Contact voltage drop <sup>1)</sup>	max. 150 mV	(initially)
	max. 175 mV	(after endurance)

### Control circuit

rated voltage	operating voltage
12 V DC:	9...16 V DC
24 V DC:	16...32 V DC

Edge steepness of control voltage 0.25 V/ms

Coil power	bistable	switching pulse length	< 60 W 50 ms ...1s
	monostable	switching pulse length	(≤ or max. 50 ms)
		12 V	< 2.5 A
		24 V	< 3 A
		holding current	
		12 V	< 0.12 A
		24 V	< 0.07 A

### General

Typical life	<b>mechanical</b>	MPR20	> 1,000,000 cycles
		MPR10	> 500,000 cycles
	<b>ohmic</b>	12 V	> 400,000 cycles at $I_N$
		24 V	> 200,000 cycles at $I_N$
		48 V	> 20,000 cycles at 300 A
		48 V	> 40,000 cycles at 100 A
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	IP 6K9K, IP X6k, IP X7 to ISO 20653	
	Terminal area	IP00 to ISO 20653	
Vibration	> 6 g 57.9 m/s <sup>2</sup> to ISO 16750-3, 4.1.2.7		
Shock	> 50g / 30g 500 m/s <sup>2</sup> ON position 300 m/s <sup>2</sup> OFF position to ISO 16750-3, chapter 4.2.2		
Flammability	UL V0 and meets the requirements to ECE-R 118 02, appendix 6 and 7, especially for vehicles used for carriage of passengers		

### Chemical resistance to ISO 16750-5

Oil, hydraulic liquids, alcohol, urea, extinguishing agents, battery acid <sup>1)</sup>, detergents, grease, cold cleaner

<sup>1)</sup> (except 48 V version)

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) x 91.3 x 45.8 [mm]

Mass ≤ 290 g

### Material

Enclosure Polyamide (PA), glass fiber reinforced

Optional mounting plates aluminium

## Technical data (25 °C)

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

## Ordering information

### Type no.

MPR10-N bistable

MPR20-N monostable

### Number of poles

1 single pole

### Voltage ratings in control circuit

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

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 Plus switching, joint mass

4 Mass switching, joint positive pole

### Voltage ratings in load circuit

0 12 V and 24 V

1 48 V

### 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 1-2 0 0 ordering example

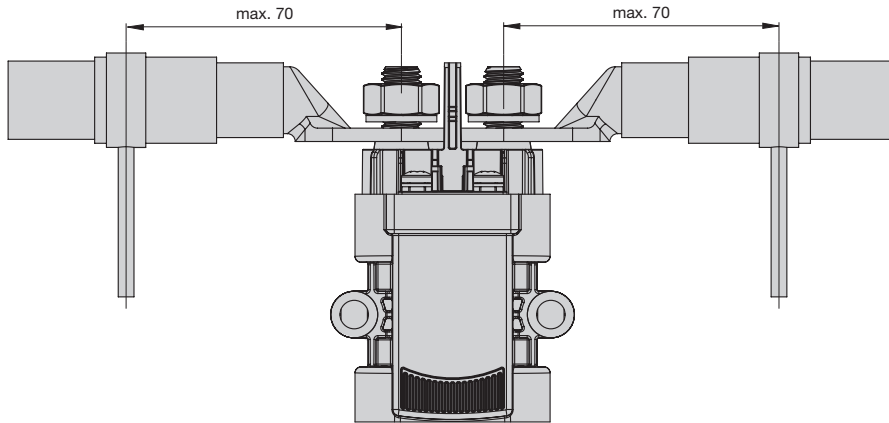
MPR10-N- 1 1 3-2 2 0 1-2 0 0 1 ordering example

## Notes

- Terminal cross section:  
> 35 mm<sup>2</sup> for 100 A at M8  
> 70 mm<sup>2</sup> for 200 A at M8/M10  
> 95 mm<sup>2</sup> for 300 A at M10

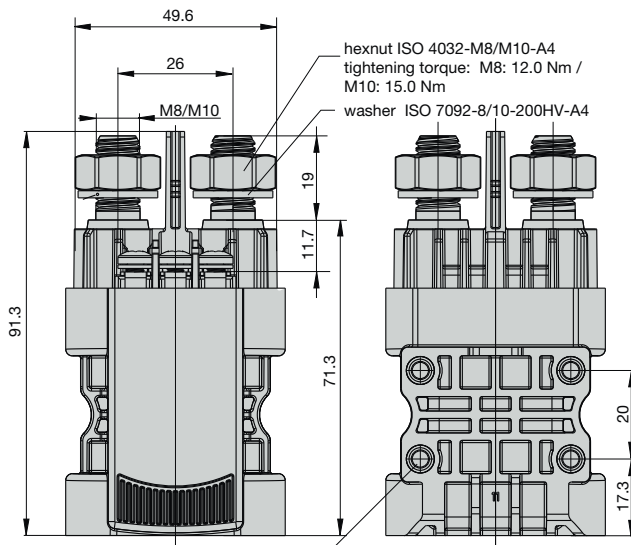
The connecting cables must be firmly fixed by suitable means at the latest after 7 cm from the axis of the screw terminal. See drawing

**Terminal drawing**

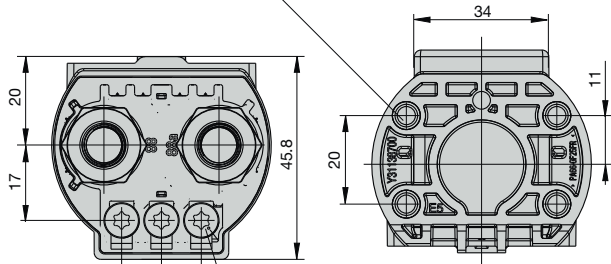


**Dimensions MPR10 (Design until July 2022)**

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

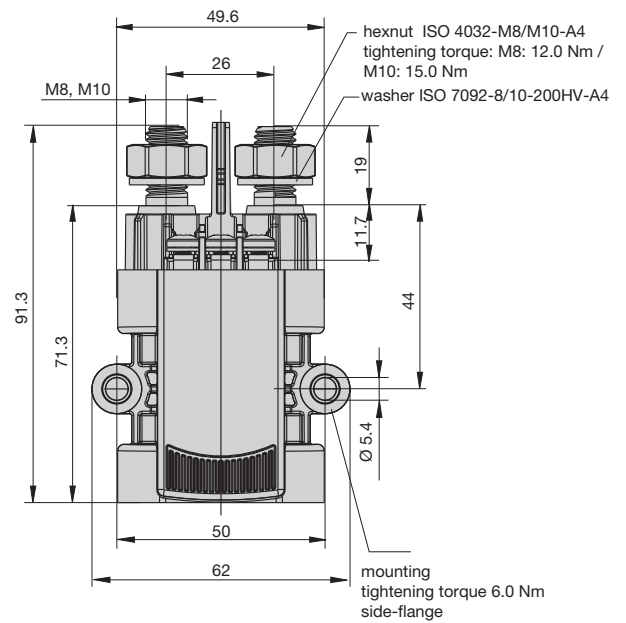


8 x M4 screw-in depth 8 mm  
tightening torque: max. 2.5 Nm

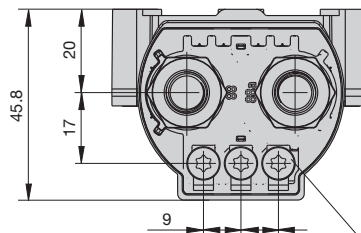


DIN EN ISO 14583 -M4x6-A2-50U  
Torx screw T20  
to DIN EN ISO 10664  
tightening torque: 2.0 Nm

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



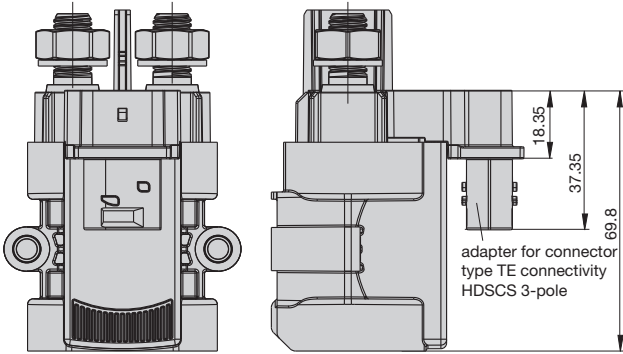
mounting  
tightening torque 6.0 Nm  
side-flange



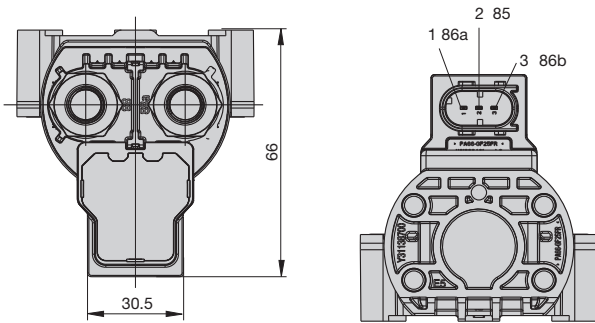
DIN EN ISO 14583 -M4x6-A2-50U  
Torx screw T20  
to DIN EN ISO 10664  
tightening torque: 2.0 Nm

**Dimensions MPR10 (Design until July 2022)**

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

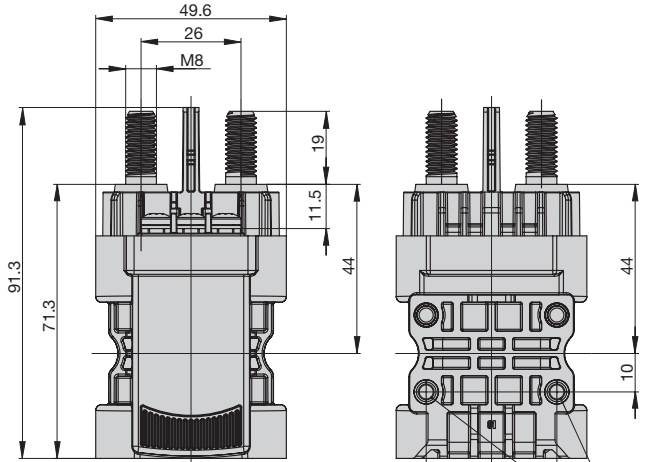


Pin assignment



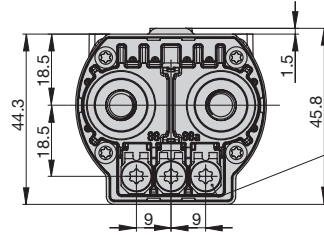
**Dimensions MPR20/MPR10 (Design from July 2022)**

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



max. mounting screw depth 8 mm  
tightening torque: : 2.0 Nm - 2,5 Nm

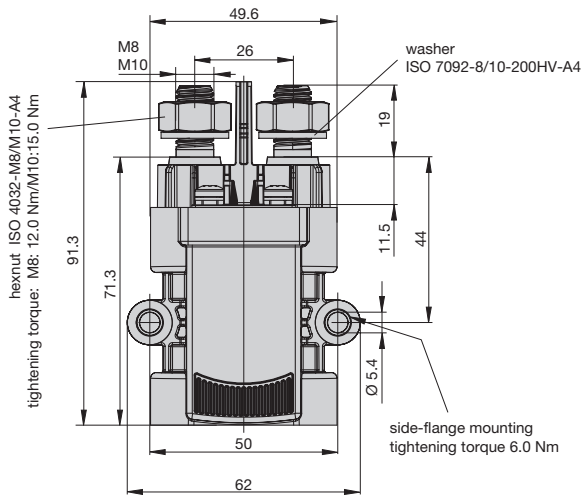
2 x M4



DIN EN ISO 14583-M4x6-A2-50U  
Torx screw T20  
to DIN EN ISO 10664  
tightening torque: 2.0 Nm

**Dimensions MPR20/MPR10 (Design from July 2022)**

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



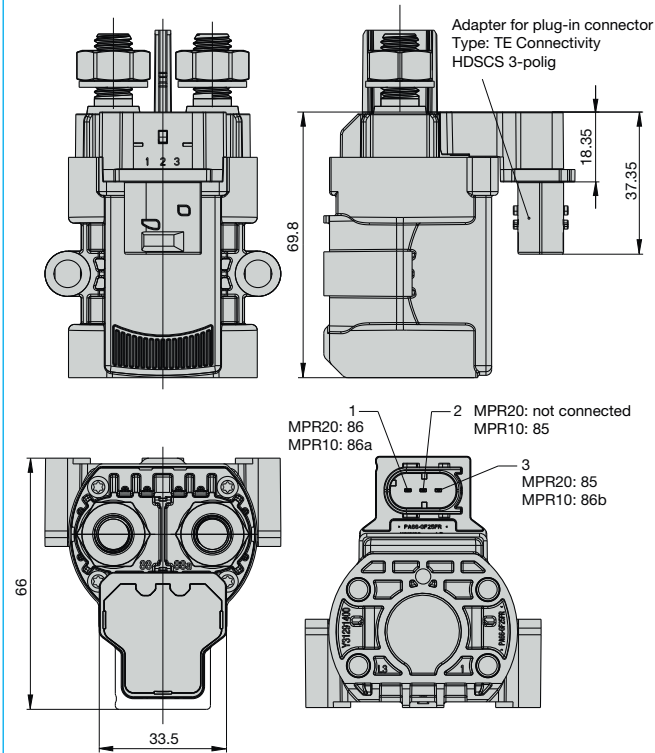
hexnut ISO 4032-M8/M10-A4  
tightening torque: M8: 12.0 Nm/M10:15.0 Nm

DIN EN ISO 14583-M4x6-A2-50U  
Torx screw T20  
to DIN EN ISO 10664  
tightening torque: 2.0 Nm

5

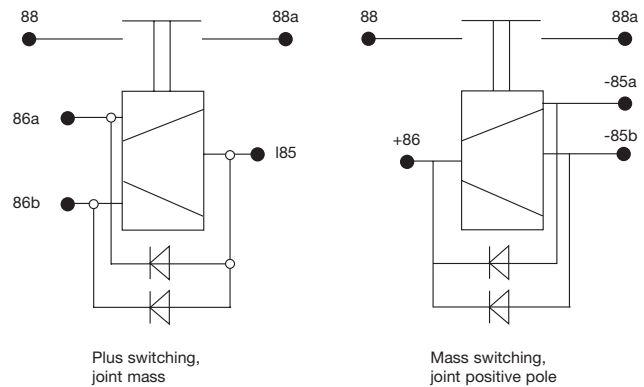
## Dimensions MPR20/MPR10 (Design from July 2022)

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

