

## Description

The power relay HPR10 belongs to E-T-A's product group of high-current relays. The hybrid version also features the electro-mechanical relay system plus an active electronic control unit for signal conditioning. This creates a wide range of options regarding activation and functionality of the power relay.

## Versions

- single-pole make contact
- side mount flanges as standard version
- extendable mounting with foot flange or side flange with standard hole sizes and also customised mounting methods
- standard: screw terminals for the activation

## Options

Optional functions are available, e.g.

- ON or OFF delay
- under-/overvoltage detection and corresponding automatic disconnection (load shedding) or automatic reset

## Applications

- battery isolation switch or battery switch-over relay
- switching of high-capacity loads (examples: air-conditioning, compressor units)
- Replacement of massive cylindrical standard automotive relays and relays for heavy duty applications.

## Features

- water-proof and dust-proof
- side mount and foot mount
- low weight
- long life span
- high continuous current
- low current consumption and power loss
- wide temperature range
- integral free-wheeling diodes
- barrier between main terminals

## Approvals

Approval authority	Logo	Directive
KBA	E1	ECE-R10



## Technical data

### Load circuit

Voltage rating	$U_N$	12 V DC, 24 V DC
Continuous current	$I_N$	100 A, 200 A, 300 A
Overload	20 s 1 s	$2 \times I_N$ $8 \times I_N$
Contact voltage drop	max. 150 mV max. 175 mV	(initially) (after typical life)

### Control circuit

Operating voltage	12 V DC: 9 ... 16 V DC	24 V DC: 16 ... 32 V DC
Closed current	< 0.4 mA	
Control current	2 ... 8 mA	2 ... 5 mA

### General

Typical life <sup>2)</sup>	mechanical resistive	> 100,000 cycles > 50,000 cycles (300 A)
Dielectric strength	1050 V / 1 min	to ISO 16750-2, Code F
Insulation resistance	> 100 M $\Omega$ (initially)	to ISO 16750-2, Code F
Temperature range	-40 ... +85° C	
Degree of Protection	enclosure 6K9K to ISO 20653 terminal area IP00 to ISO 20653	
Vibration	57.9 m/s <sup>2</sup> to ISO 16750-3 chapter 4.1.2.7	
Shock	500 m/s <sup>2</sup> : ON position 300 m/s <sup>2</sup> : OFF position to ISO 16750-3, chapter 4.2.2	

### Chemical resistance to ISO 16750-5

Oil, fuels, hydraulic liquids, alcohol, urea, extinguishing agents, battery acid, detergents, grease, cold cleaner

Corrosion	5 % salt mist to ISO 16750-4, chapter 5.5 code H	
Humidity	85 % RH to ISO 16750-4, chapter 5.7 code H	
Flammability	meets the requirements to ECE-R 118 02 app. 6.7	

### Dimensions

w x h x d (without terminals or flanges)		
single pole, bistable	49.6 (62) x 91.3 x 45.8 [mm]	
Mass single pole	≤ 290 g	
Tightening torque values:	M10 studs 15 Nm M4 screws 2.0 Nm M5 side flange 6.0 Nm	M8 studs 12 Nm

1) at rated current

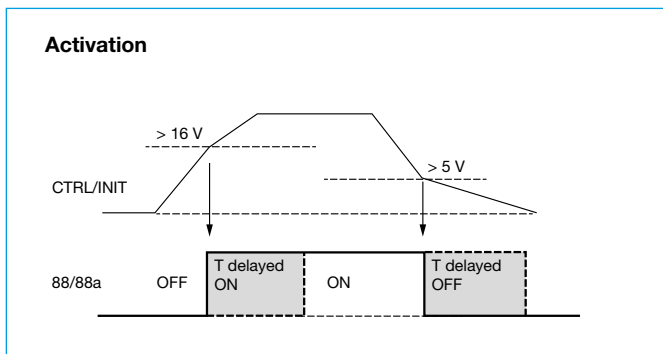
2) typical for a bistable relay

## Functional description

The HPR is voltage level controlled. This means, it will be programmed ex-factory how it should work: either like a signal-controlled relay, practically as a monostable function, or with an impulse like a bistable relay and even with a defined voltage level.

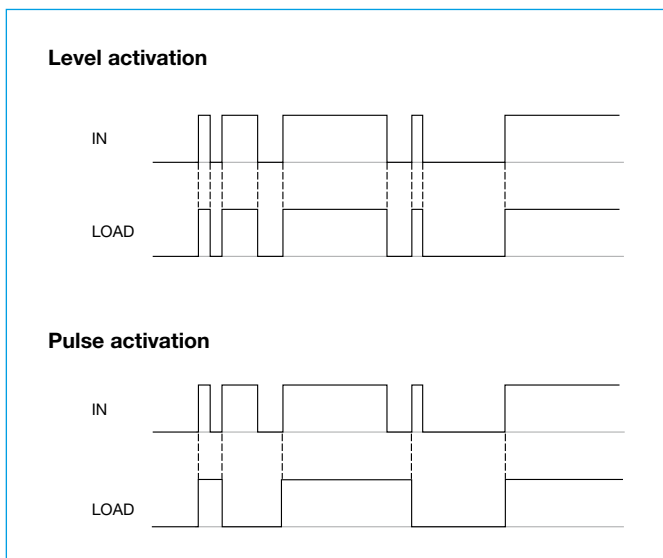
Delay times ( $T_{ON}$  or  $T_{OFF}$ ) can be programmed in the microcontroller. The relay will then be switched on or off after a defined time.

Measurement of the input signal is analog. This allows checking the system voltage. So for instance if the battery voltage falls below a certain programmed level (e.g. 5 V), the relay can open the main contact (automatic load shed). As soon as the level rises again (e.g. > 16 V) it will be switched back on.



### Activation:

There are two ways of activating the relay: level or pulse. The level activation requires a High Signal being applied to the IN+ terminal so that the relay switches on the load. The Low Signal disconnects the load. With the pulse activation the relay alternately switches the load on and off with each pulse.

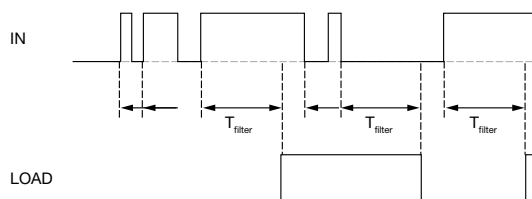


### Filter function in the activation:

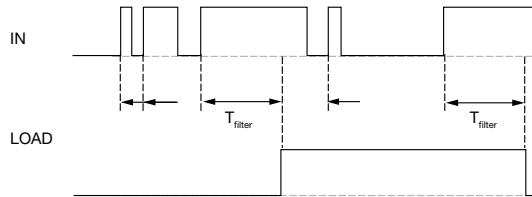
This function serves for tolerating disturbances on the activation line. Incidental peaks or contact chattering will then not cause inadvertent connection/disconnection of the load. The value configured for this function determines how long a control signal has to be applied permanently to the control input until it will be recognised as such. Should there be dips in the control signal during the configured time, it will not be recognised as activation.

Information: Inadvertent activation can thus be prevented.

### Level activation with filter function

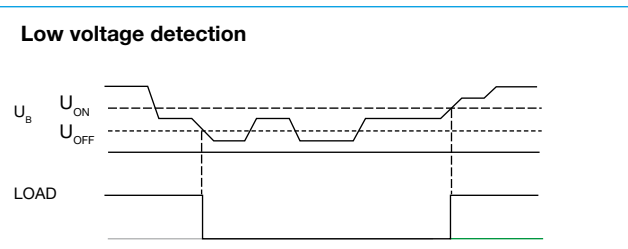


### Pulse activation with filter function



### Low voltage detection:

This function serves for undervoltage protection. If the voltage applied to the relay falls below the pre-set value ( $U_{OFF}$ ), the load will be disconnected. If the voltage rises again, the relay can be switched on again either automatically at the preset value  $U_{ON}$  or otherwise the switch-on procedure has to be re-triggered. This would for instance prevent inadvertent start-up of a machine as requested by the current machinery Directive. Low voltage detection is via internal tap (SENSE) at load contact 88.



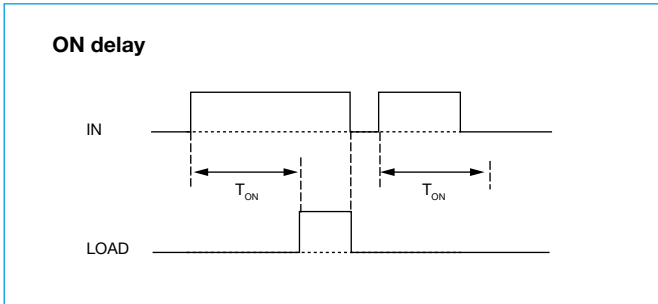
Behaviour in the event of reset of the operating voltage will be configured. Automatic ON or OFF

Caution: If e.g. an extreme discharge of the battery has the system voltage fall very quickly below the critical value, the electronic circuitry does not have enough time and energy to energize the relay. We recommend to set the status to a safe condition as soon as the operating voltage is restored, i.e. to the OFF condition.

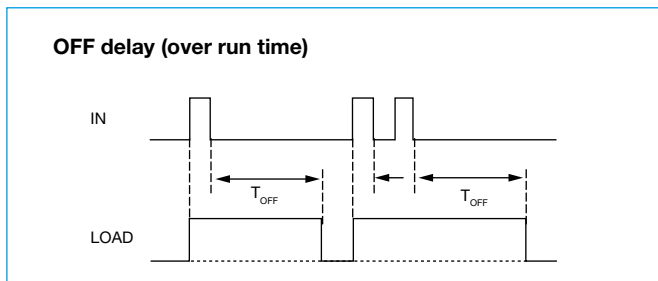
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## ON/OFF switching delay

The relay features a timer function allowing delayed switch on or off of the load, e.g. for applications with exhaust aftertreatment (SCRT catalytic converters).

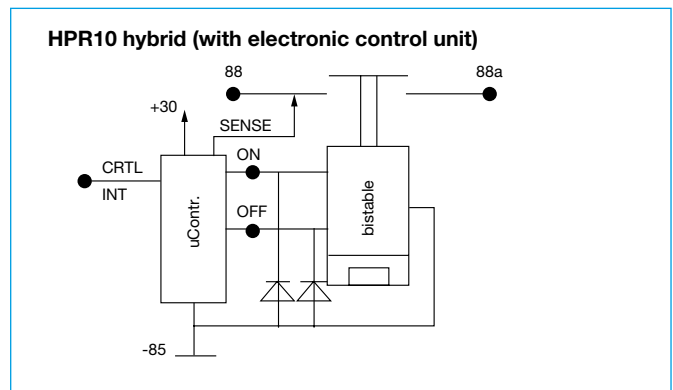


This function allows delayed switch-on of the relay. The configured value indicates the time elapsing between activation and switch-on. Information: Thus the relay may for instance give time to other system components to carry out their start-up, probably attenuating the inrush current peak in the entire system.



This function allows delayed switch-off of the relay. The configured value indicates the time elapsing between activation and switch-off. Information: An overrun is desired in many applications, e.g. to give some orientation with illuminations even after switch-off or to give a load enough time to complete the switch-off process.

## Schematic diagram



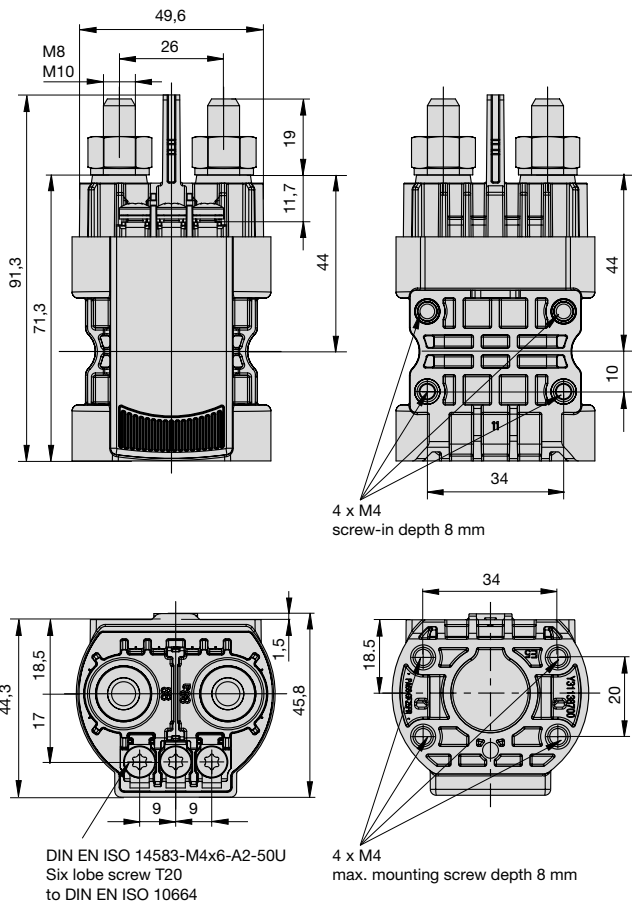
## Configurator

A programme for configuring the HPR10 is available on the E-T-A website. It allows selection of various functions and sets up the corresponding ordering code.

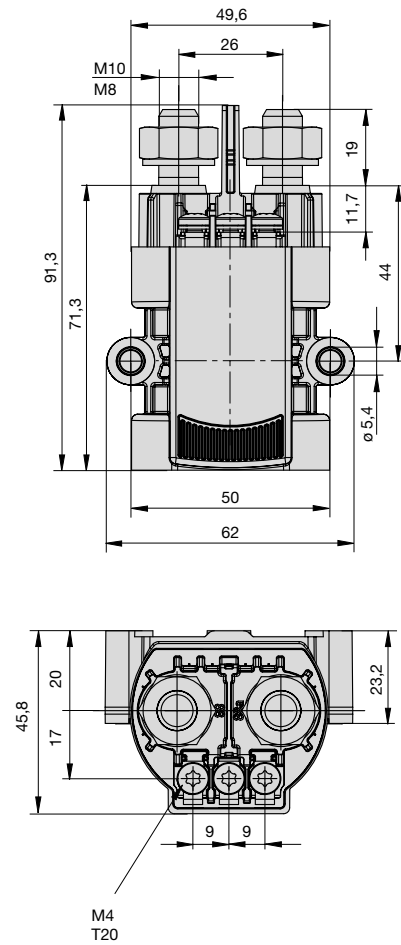
<http://relaisconfigurator.e-t-a.com/light/de/>

Dimensions

Version without integral side flange for optional side and foot plate with M4 connectors



Version with side flange (50 mm distance between holes) and M4 screw terminals



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All dimensions without tolerances are for reference only. E-T-A reserves the right to change specifications at any time in the interest of improved design, performance and cost effectiveness. Dimensions are subject to change without notice. Please enquire for the latest dimensional drawing with tolerances if required. without notice is reserved. Amendments, errors and omissions excepted. Ordering codes of the products may differ from their marking.