


## Ex- B-Pt100

## Ex- R-Pt100

Temperature controller and limiter



Identification	 II 2G Ex e mb d IIC T4
EU-type examination certificate	ISSeP 08 ATEX 022X
Ambient temperature range	-40°C - +50°C
Control range	0 - 400°C
Rated current	20 mA
Nominal voltage	230 V
Monitoring	2 or 3 conductor
Degree of protection	IP65

### Temperature controller and limiter

The controller Ex R... or rather limiter Ex B.. is designed for the operation outside of substations (industry-outdoor substations).

- 3-wire connection for analysis of Pt100 sensors
- Min monitoring with setpoint adjuster
- Setpoint adjuster sealable
- Switch relay and fault signal relay
- Sensor line monitoring of all 3 wires

Devices and protective systems for the intended use in explosion-prone areas according to directive 2014/34/EU.

Temperature limiter	Typ Ex B - PT 100
Temperature controller	Typ Ex R - PT 100

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**Warning**

The installation, configuration and commissioning may only be carried out by accordingly trained persons. The on-site installation and safety regulations must be observed.



**Proviso**

We reserve the right to make technical changes. Changes, aberrations and printing errors do not justify any claim for damage. For safety components and systems the relevant standards and regulations must be observed as well as the according operating and mounting instructions.



**Installation notes**

For the establishment / operation the EN 60079-14 ff and the respectively applicable installation regulations as well as the generally recognized engineering principles and this operating manual are relevant.

The controller Ex R... or rather the limiter Ex B. is a component of a heating system and inspected and approved in association with the manufacturer's declaration in connection with other components. Only by adherence to this regulation the EU-declaration of conformity is valid. In case of doubt the manufacturer should be consulted.

**Installation site**

The controller Ex R... or rather the limiter Ex B. is designed for the operation outside of substations (industry outdoor substations).

**Special conditions**

The temperature sensor as well as any other accessory that can be connected with the equipment must be certified. This is not included in the certificate range.

The terminal box can be equipped with any certified cable entry gland of the type Ex-e.



**Protective measure**

The protective measure for the controllers or rather the limiters and heating circuits is grounding (potential equalization).

**Maintenance**

The regulations applying regulations of the EN 60079-14 for repair / maintenance / examinations must be observed. The equipment is maintenance-free.

**Sundries**

The devices may not be thrown or fall. If a deformation is observable at the device, it must be sent back for examination.

The interconnection of individual certified components to one heating is equivalent to a new unit, at whose proper installation normally the additional temperature behaviour etc. must be evaluated again. Dismantling takes place in reverse order than the installation. Due to the low heavy metal content a defect device must be disposed of as hazardous waste.

The device is irreparable. An intervention is not permitted.

At non-compliance with the installation instructions the warranty expires.

Read through this operating manual carefully before you take the device into operation. Keep this manual at a place accessible for all users at any time.

Support us to improve this operating manual. We are grateful for your suggestions.

Please contact us for technical queries!  
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## 1.0 DESCRIPTION

### Characteristics

Digital controller / limiter for the Ex- area
Operation is also possible in open condition
Single or combination unit
Fault signal lamp on the cabinet + fault signal contact for the control room



### Field of application

The electronic temperature limiter is preferably designed for heat tracing in the Ex-area. The measured value acquisition results via a measuring sensor Pt 100. The measuring circuit is not intrinsically safe. The analysis complies with the relevant VDE-regulations for safety low voltage and guarantees the EMV-compatibility. The high protection class enables the operation under extreme conditions. A functional impairment due to condensation water accumulation is not given. The same applies to the version as controller.

The use of this device is particularly appropriate where capillary controller or rather limiters are only partially suitable. This is especially the case, when:

- the regulation or rather the monitoring must take place inside the plant .
- the measuring sensor is mounted away from the evaluation device.
- an additional potential-free contact for the failure report is necessary .
- capillary limiters can not be used due to mechanical reasons.
- the maximum temperature lies more than 20% from the measuring range final value of the sensor system when flushing the pipeline.
- an additional limit value, preferably min. temperature, is necessary.

### Function

The limiter or rather the controller is mounted in a Ex „e“ terminal box. Standard size for single units: 160 x 160 x 90 mm. As combination device controller-limiter-unit in terminal box 260 x 160 x 90 mm. The adjuster can be found on the modules. (Alternatively also with outside adjuster for the temperature setpoint.) Sensor input, connection to supply system and contact outputs of the relays are wired on a terminal block. (Clamping range 4 mm<sup>2</sup>). The permissible upper limit temperature is adjusted at the limiter scale, 0..200 °C, or rather 0..300/ 400/ 600 °C, with the indicator pointer and this is covered with the twisting protection\*. The twisting

protection is secured with sealing wax, if necessary. After exceeding the limit temperature the limiter relay d1 drops down. Via a safety switch the limiter relay remains in rest position\* until the failure has been remedied. and the limiter reset button has been used. Sensor line end or a line interruption releases the limiter and indicates a failure report.

With the 2. limit value, min.-monitoring, a drop of the temperature under a preset limit value can be recorded early enough to be able to eventually resolve the failure before a damage occurs. The adjustment of the temperature switching point is made at the min.-scale. Also available as usual switch-off function as precontact. Only takes effect on the fault signal relay.

\* only an option for the controller

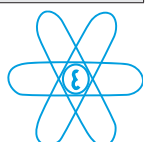
The fault signal responds to any of the following errors: (drop in rest position).

Min.-temperature underflow
Limiter released
Measuring sensor short
Measuring sensor break
Measuring line interruption*
Measuring line end*
Voltage breakdown

\* no matter which of the 3 measuring lines is affected

## 2.0 TECHNICAL DATA

Nominal voltage	230 V ~ +/- 10% (110, 130 V) 50-60 Hz
Protection degree	IP65
Admissible ambient temperature range	-30 to +50°C (-40 to +50°C) (depending on cable gland)
Electrical connection	Terminals for 4 mm
Fixation KA	160 x 160 x 90 (140 x 110)
Input - network	2,5 kV ~
Network - cabinet	2,5 kV ~
Input - cabinet	1,5 kV ~
Measuring sensor input	Temperature sensor Pt100
Measuring circuit	6 mA, 3-wire switch, Pt 100
Measuring circuit monitoring	all 3 lines
Line break	≥ 200 Ω for Pt100 (depending on measuring range) (or rather 20% above the measuring value range)
Line end	≤ 50 Ω (or rather 20% under the measuring value range)
Combination version KC	260 x 160 x 90 ( 240 x110)
Rated current	20 mA (50 mA)
Type of ignition protection (gas)	Ex e mb d II C T4
EU-type examination certificate	ISSeP08ATEX022X
Identification	 0344  II 2G Ex e mb d IIC T4



## 2.1 TECHNICAL DATA LIMITER / CONTROLLER

Setting range/ Scale	0..200/ 300/ 400 (600) °C
Limit adjuster	Precision poti; Rotation angle 300°
Switching point accuracy	≤ 1,5%
Switching hysteresis	≤ 3K (for 200°C scale)
Limiter relay	1 potential-free changeover contact 250 V ; 16 A (25 A (max. inrush current impulse (4sec), no continuous operation)); COS φ ≥ 0,7; 4000 VA, (see load diagram)
Resetting	Push button in front panel of the module
Series fuse	≤ 16A
Requirement class	AK4

## 2.2 TECHNICAL DATA SETPOINT VALUE MIN.-MONITORING

Setting range (Scale)	0-100/200/300/400 °C
Setpoint adjustment	Precision poti; Rotation angle 300°
Switching point accuracy	≤ 1,5 %
Switching hysteresis	≤ 2 K (for 100°C scale)
Fault signal	by fault signal relay d2
1 potential-free make-contact	250 V~ ; 5 A cos φ ≥ 0,7; 1250 VA; 30 V=; 5 A; 150 W

## 3.0 TEMPERATURE LIMITATION

The temperature limiter is equipped with an additional monitoring, which is switched on the fault signal relay, so that at safety related view VK4 or similar can be taken as a basis, but only if the integration and the construction of the heating installation is accordingly designed.

### 3.1 AUTOMATIC RESTART AFTER POWER FAILURE OF THE LIMITER

After breakdown of the limiter supply voltage all previous functions switch on again automatically when the power returns, if the limiter circuit is not blocked by a excess temperature release. This saves the maintenance personnel from resetting each individual controller by hand (limiter resetting).

### 3.2 MEASURING SENSOR

The Ex B Pt100, or rather the Ex R Pt100 makes two Pt100 inputs in 3-wire technique available, at which suitable temperature sensors can be operated in the potentially explosive atmosphere. The measuring sensor inputs are designed separately for controller and limiter and independant. We supply suitable, certified Pt100 sensors in two basic versions:

Type Ex TF Pt100L as remote sensor with minimum dimensions of 7,4 cm x 2,1 cm x 2,1 cm. Fully encapsulated in an aluminium cabinet with a measuring temperature of up to 200°C.

Type Ex TF Pt100Ks with a measuring sensor tip of 5 mm a length of 23 cm. Fully encapsulated in an aluminium cabinet, a stainless steel measuring sensor tip and a measuring temperature of up to 400°C.

Pt-100 measuring sensors are part of the EMV examination. Both measuring sensors are particularly safe of interfering voltage. For further details see the product literature Ex Pt-100Ks or Ex Pt-100L.

Download on [www.erich-ott.de](http://www.erich-ott.de)

## 3.3 SWITCH AND MONITORING INSTALLATIONS

For the purpose of voltage activation a bipolar shut-off device must be provided. The fault signal relay is located between terminal 16 and terminal 18, see drawing chapter 6.1

A combination device with additional voltage controller is also available as independant device SIPT. Please take further information from the product literature. Download on [www.erich-ott.de](http://www.erich-ott.de)

### 3.4 ADJUSTMENT OF THE SETPOINTS

Basic setting shall only be made in switched-off state. Limiter

Adjust temperature setpoint of the limiter from 200°C by turning to the left on the setpoint value, which must be determined by the official expert. Seal transparent cover. The setpoint adjusters have an adjustment protection against slight vibration. If the device is exposed to strong vibrations, then additionally seal the adjuster. For the purpose of easier adjustment an adjustment tool is provided.

Set min. setpoint adjuster according to the specifications of process, but at least 5°C below the setpoint temperature of the controller.

\* must be avoided.

### 3.5 REFERENCES FOR THE DETERMINATION OF THE LIMITER SETPOINT

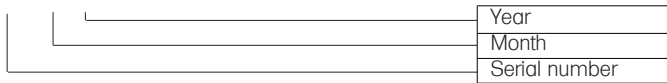
In pipe heatings the heating cable gets even at optimal installation 2 to 3°K/ Watt/ m warmer than the pipeline in unfavorable points. That means that the limiter must be adjusted more than 30°K lower than the ignition group temperature.

### 3.5 MIN - TEMPERATURE MONITORING

The min - temperature monitoring must be adjusted seperately for controller and limiter at the respective controller or limiter cabinet by use of a poti. The alarm can be led into the control-room for both controller and limiter. As standard the limiter is equipped with min-alarm and adjusted to the control range. Please take further details from the type code.

## 4.0 PRODUCTION NUMBER

xxx / 03.03



## 4.1 TYPE CODE

The type code is also the complete ordering information.



1	B	Limiters
	R	Controller
2		Combination unit (e.g. Ex B R Pt 100 KCAT)
3	A	Single device
	C	Combination device
4	Measuring range for controller / limiter / min- temperature	
	1	0-100°C
	2	0-200°C
	3	0-300°C
	4	0-400°C
	5	0-500°C
5	-	Standard ( only min.- temperature monitoring limiter)
	BoM	Limiter without min.- temperature monitoring
	RMx	Controller min.- temp. x - replace according to key 4
	BMx	Limiter min.- temp. x - replace according to key 4
6	-	without fault signal lamp
	S	with fault signal lamp
7*	M	M32 screw joint
	R	M32 reduction to M25
	B	Filler plug
8	-	Standard enclosure
	G	Big enclosure 260 x 160 x 90 mm (Only für single units (Combination devices are always supplied in big enclosures))
9	-	Spring clips (Standard)
	Z	Tension spring terminals
10	-	Ambient temperature range -20°C (Standard) (Plastic screw joint)
	- 40	Ambient temperature range -40°C (Metal screw joint)

with 3, the small enclosure (160 x 160 x 90 mm made of aluminium) with 2 screw joints. M25 and M32 screw joints as well as filler plugs can then be freely combined. (Please request more screw joints separately).

### Example:

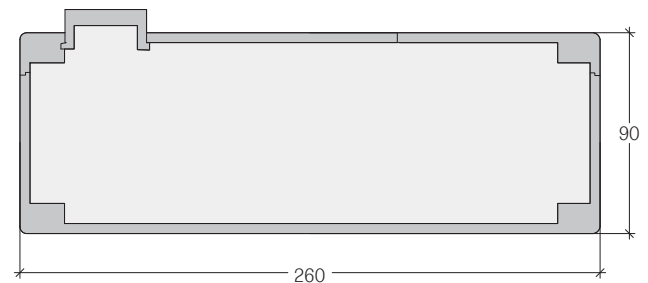
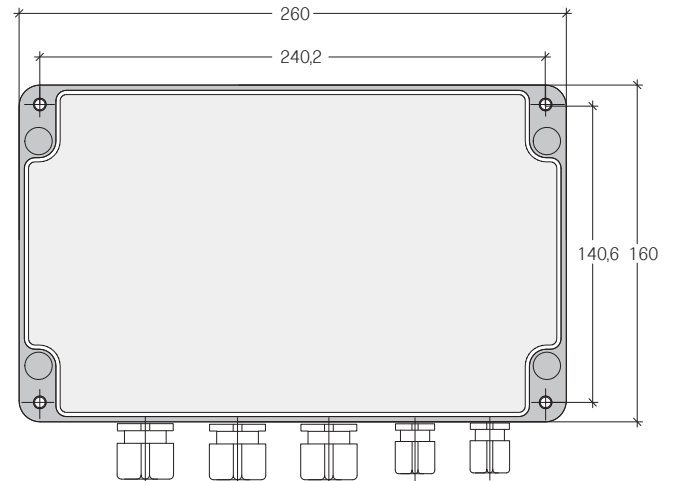
Limiters - controller combination.

Limiter with a temperature setting range of 0 - 200 °C, standard min-temperature monitoring of the limiter of 200 °C, controller with a temperature setting range of 0 - 100 °C without min- temperature monitoring, with fault signal lamp, two M32 screw joints and a reduction to M25 in standard enclosure. Tension spring terminal connections. Ambient temperature range of -20°C:

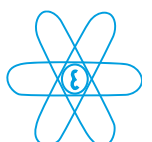


Note: The positions 7, 8 and 9 are not indicated on the type plate.

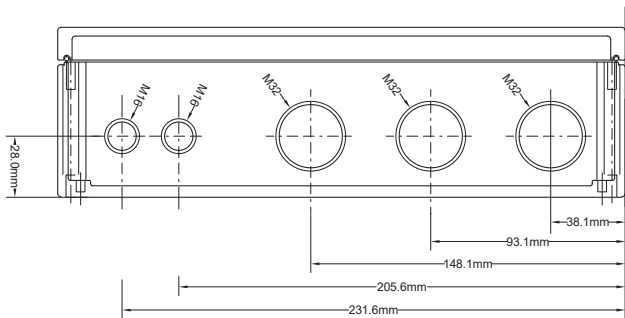
## 5.0 DIMENSIONS



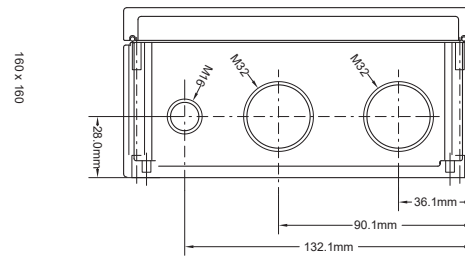
\* The number of screw joints depends on the size of the enclosure: The big enclosure (260 x 160 x 90 mm made of polycarbonate) is manufactured



5.1 ANCHOR POINTS

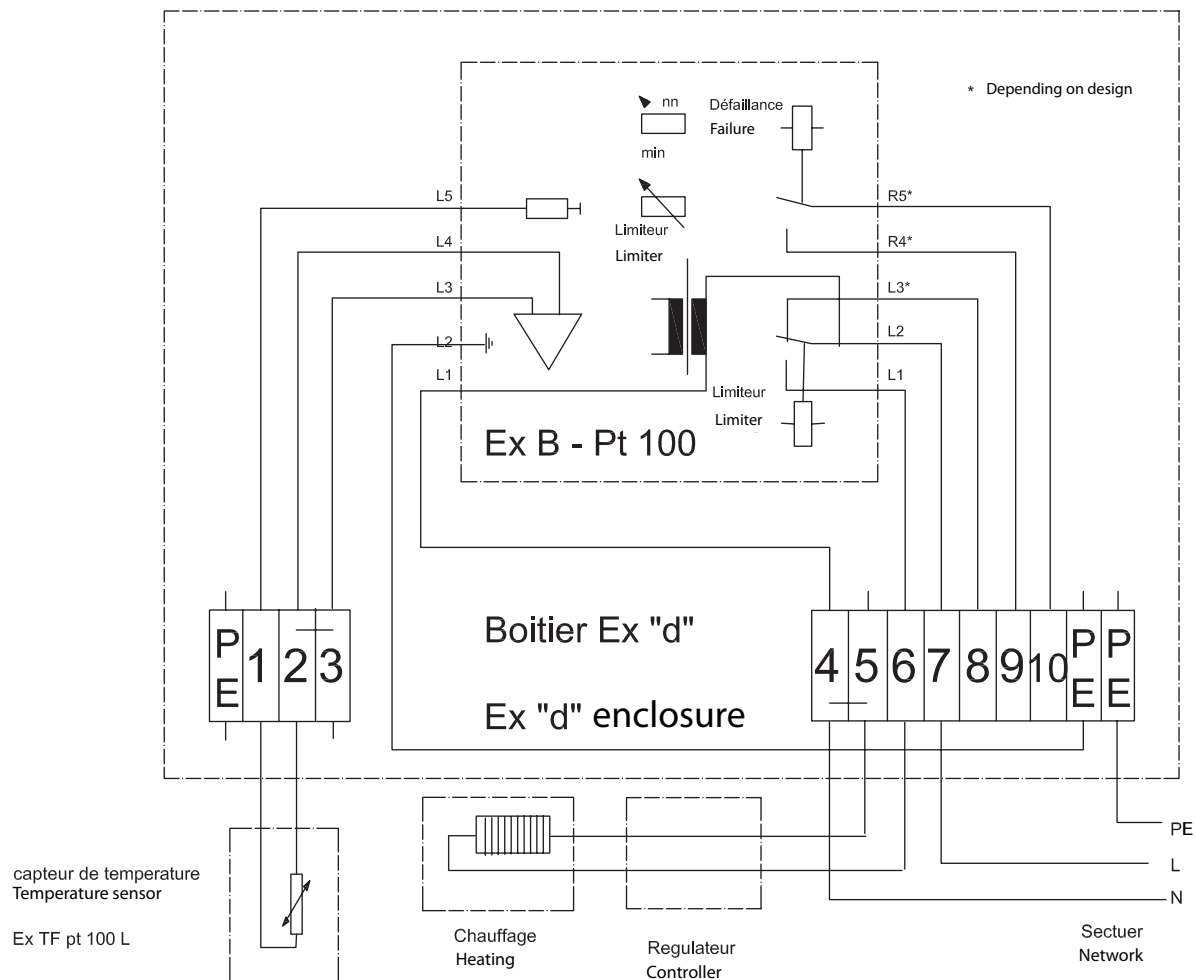


Cabinet size 260 x 160

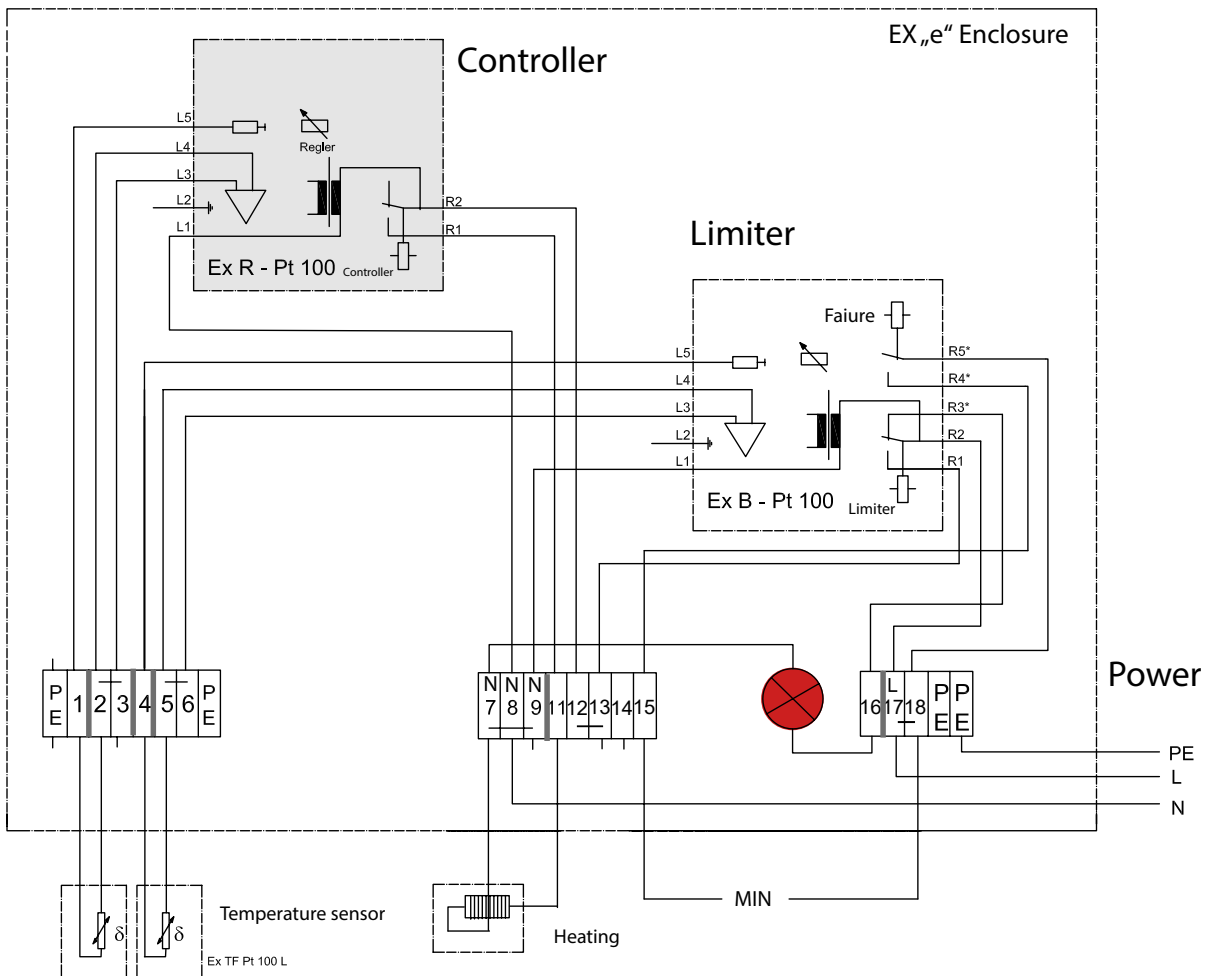


Cabinet size 160 x 160

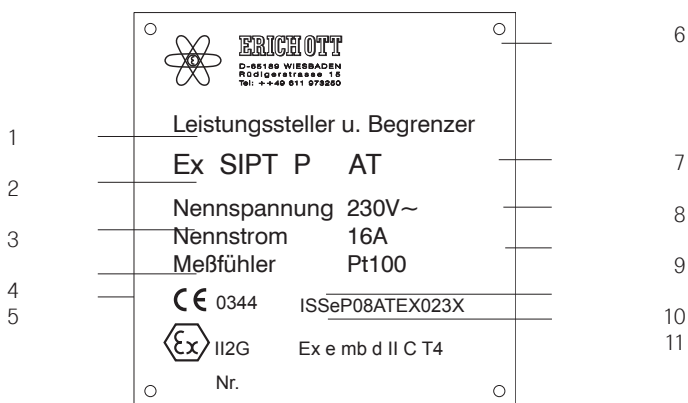
6.0 CONNECTION EXAMPLE EX B-PT100 KA (ALSO VALID FOR EX R-PT100 KA)



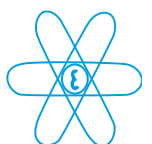
## 6.1 CONNECTION EXAMPLE EX BR-PT100



## 7.0 TYPE PLATE



1-	Type designation	6-	Supervising agency
2-	Switching capacity	7-	Nominal voltage
3-	Ambient temperature range	8-	Measuring sensor
4-	Inspecting authority/EU-type examination certificate	9-	Type of protection
5-	Ex-identification	10-	Serial device number
		11-	Type of ignition protection



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