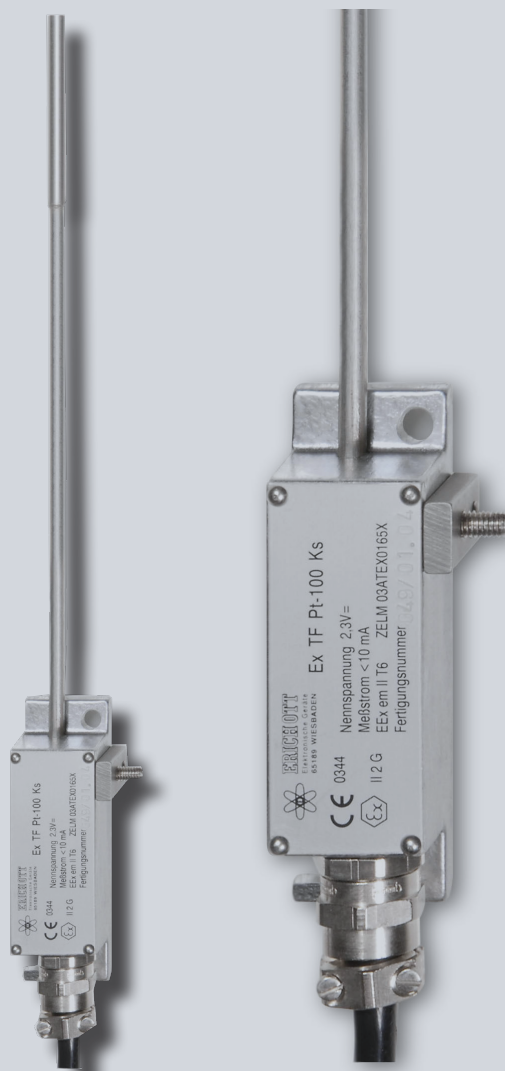



## EX TF... 100 Ks

Temperature sensor



|   |   |
|---|---|
| Identification                          |  II 2 G Ex eb mb IIC T1-T6 |
| EU-type examination certificate         | <b>PTZ 16 ATEX 0025X</b>  |
| Measuring ranges                        | <b>-40°C to +400°C</b>  |
| Nominal resistance                      | <b>100 Ω</b>  |
| Nominal voltage                         | <b>2,3 V</b>  |
| Nominal measured value current          | <b>1 - 10 mA</b>  |
| Insulation level voltage U <sub>0</sub> | <b>24 V</b>   |
| Ambient temperature range               | <b>-40°C to +180°C</b>  |
| Degree of protection                    | <b>IP65</b>   |
| Dimensions cabinet (B x H x T)          | <b>74 X 22 x 22 mm</b>  |
| Sensor tip                              | <b>5 x 50 mm</b>  |

### Temperature sensor

The temperature sensor type Ex TF...100 Ks is a sensor, that represents an optimization between fast setting time, vibration resistance, mechanical strength for the ex protection and for relatively high evaluation current at minimal distortion of measured values. The temperature sensor Ex TF...100 Ks is mounted in a sleeve made of stainless steel at the end of a mineral insulated cable.

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

|                                    |                |
|------------------------------------|----------------|
| Temperature sensor with sensor tip | Ex TF...100 Ks |
|------------------------------------|----------------|

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**Warning**

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



**Reservation**

We reserve the right for technical changes. Changes, errors and printing errors do not justify any claim for damage. For safety components and systems the respective standards and regulations must be observed as well as the applicable operation and installation instructions.



**Installation**

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

**Maintenance**

For the repair/ maintenance/ examination the regulations of the EN 60079-14 are relevant. The equipment is maintenance-free.

**Special conditions**

1. The thermometer stem cable, including the sensor, must be installed so that they are adequately protected against mechanical damages.
2. The minimum bending radius for the sensor line is 40 mm and may not be reduced.

3. The temperature sensor may only be connected to provided and for the operation of the plant certified feed units for passive resistance sensors according to the standard relevant for the element. The electrical operational values may not be exceeded.

4. Every temperature sensor has to be used in an appropriate manner with a series fuse, which is suitable for the possible short-circuit of 1500A. The series fuse can be mounted in the corresponding supply or evaluation unit.

**Repair**

The dismantling takes place in reverse order than the installation. The device is irreparable. An intrusion is not permitted. At non-compliance with the applicable standards and the specifications of this operating manual, the warranty as well as the declaration of conformity expire.



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

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

Contact us for technical information!  
 TELEPHONE: +49 (0)611 94587267  
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## 1.0 DESCRIPTION

### Characteristics

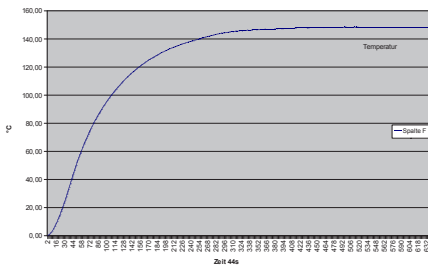
- Full protection due to encapsulation
- Aluminium cabinet
- Easy installation
- Protected supply cable (optionally)
- Long sensor tip (230 mm)
- Also usable as Ex-i sensor



The temperature sensor Ex TF...100 Ks is destined for the acquisition of temperature changes in potentially explosive atmospheres of zone 1 and higher. Its high test voltage guarantees operating safety also for long leads. The sensor can also be used as Ex-i sensor, as no effective inductivities and outputs are measurable. The temperature sensor serves for the temperature measurement of surfaces and room temperatures in protective cabinets. Depending on the used thermal element, different maximum measurable temperature ranges reveal. In addition the interference immunity for measuring in outside facilities at long input leads is secured, due to its raised test voltage for the insulation value. For the acquisition of fast temperature measurements in the Ex-area. The mineral insulated cable has an aluminium cabinet as junction to a assembled hose, at which an exterior PE connection is possible. The measured value is recorded by a resistor according to EN 60751 (Pt100), or DIN 43760 (Ni100) or IEC 751.

## 2.0 RESPONSE TIME

Temperature rise of about 5°C/s in oil. For an exact result the average value must be generated and the reaction time will become slower. It is barely possible to state an exact value with this, but roughly speaking would be about 100 s for 150°C for oil.



Generally:

The responding behaviour is significantly co-determined by the heat transfer. In other media with a different heat conductance value, the values are accordingly different. Media with low thermal conductivity (e.g. air) lead to inert properties, therefore less °C/s. For media with higher thermal conductivity this leads to more °C/s. Here must be considered for the installation, that the heat transfer is optimal to achieve high temperature increase rates, for example by using alu adhesive tape for surface measurements.

## 2.1 ELECTRICAL ACCURACY PT 100

Exclusively sensors of class B are used:

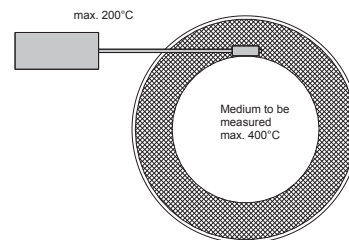
Error limits of classes in °C: Klasse B:  $dT = \pm (0,30 \text{ °C} + 0,005 \cdot T)$

## 3.0 WARMING OF THE SENSOR TIP

Depending on the conditioning instrument in the case of failure, caused by the conditioning instrumenta maximum admissible capacity of 0,8 watt can be converted inside the sensing element. How large this capacity and the corresponding temperature rise really can be in the case of application, also depends on the type of installation. In the worst case a temperature rise of 35 K. For usual errors a temperature rise of  $\leq 12$  K can be expected.

## 4.0 MOUNTING METHOD

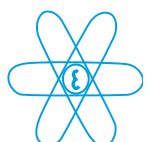
The fixation on pipelines takes place by use of a metal tensioning strap combined with a tension lock over the terminal enclosure. The surface pressure must be chosen so high, that the sensor can not be moved anymore from the installation site. For installation on a mounting plate two holes are provided, with which the temperature sensor can be fastened on the mounting plate by using two M3 screws. Alternatively also sheet-metal screws can be used.



## 5.0 GENERAL TECHNICAL DATA

|                                 |  |  |
|---------------------------------|--|--|
| Nominal voltage                 | 2,3 V  |  |
| Nominal measured value current  | 1 - 10 mA                                      |  |
| Insulation level voltage $U_0$  | 24 V   |  |
| Nominal resistance              | 100 $\Omega$                                   |  |
| Test voltage resistor           | 1100 V ~                                       |  |
| Protection degree               | IP65   |  |
| Design cabinet (B x H x T)      | 74 X 22 x 22 mm                                |  |
| Sensor tip                      | 5 x 50 mm                                      |  |
| Mi -cable                       | 2 x 230 mm                                     |  |
| Connection lead                 | 5-6 mm $\varnothing$ , Length 1,2 m (Standard) |  |
| Mounting dimensions             | 63 x 14,5 mm                                   |  |
| Measuring ranges:               | -40°C to +400°C                                |  |
| Ambient temperature range:      | -40°C to +180°C                                |  |
| EU-type examination certificate | PTZ 16 ATEX 0025X                              |  |
| Ignition protection type (gas)  | II 2 G Ex eb mb IIC T1-T6 (see table 1)        |  |
| Identification                  | CE 0344  | Ex II 2 G Ex eb mb T1-T6 (see table 1) |

| Table 1                             | Temperature class |       |        |        |        |        |
|-------------------------------------|-------------------|-------|--------|--------|--------|--------|
|                                     | T6                | T5    | T4     | T3     | T2     | T1     |
| Max. admissible ambient temperature | +70°C             | +85°C | +120°C | +180°C | +180°C | +180°C |
| Max. admissible sensor temperature  | +70°C             | +85°C | +120°C | +180°C | +280°C | +400°C |



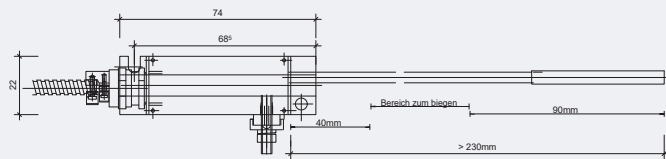


## 6.0 PROJECTION

For the accuracy of the temperature measurement must be considered that the thermal capacity of the sensor as well as the relation of heat supply and heat dissipation influence the measurement result. Very fast changes can accordingly be collected only with very small temperature sensors. Response curves of the sensor can be sent on request. As the sensor has a surface that applies the surface of the object to be measured only slightly without special provisions, an intermediate value of ambient temperature and surface temperature of the object to be measured is scaled. With appropriate measures, such as insulation and suchlike, the difference between those two temperatures can be kept as small as possible. The dynamic error results from the heat accumulation capacity and the relation heat accumulation capacity sensor to the object to be measured, whereas the mass of the object to be measured only has an influence on this relation in an immediate proximity of 2 bis 3 cm. The measurement error due to the connection cable of the device, whether 2-, 3- or 4-wire switch, is, compared to the previous influence possibilities, generally negligible. For the error calculation the connection point in the terminal box can be regarded as end of line error and thus the complete circuit can be constructed as if the sensor would be placed right there. The usual measuring error, in consequence of a measuring current of 10 mA, is less than 0,25 K at 20°C.

## 6.1 SENSOR

The Mi-cable of the temperature sensor may only be bent with a radius of 40 mm within the range, as shown in the picture.



## 6.2 CABLES AND LEADS

For supply cables longer than 5 m the exterior network must be earthed with PE at the feeding point. The max. resistivity of the supply line and its consistency depends on the presettings at the evaluation device. The inductivity of the device is negligible, the capacity of the sensor is  $\leq 1000$  pF. The supply line must generally be installed safely according to the standards of the EN 60079-14 and engineering rules. The connection end must be led into an appropriate terminal box. Attention should be paid to the fact that the screw joint, through which the cable is led into the terminal box, can take a cable with a diameter of 5 mm. The cold flow behaviour drops about approximately one decimal power per 10 K warming. A bending radius of  $5 \times D$  ( $D$  = cable diameter) must be adhered to. The PTFE connection cable must be installed non-spinning, without tensile load ( $\leq 1$  kg) and with a bending radius of  $10 \times D$  ( $\geq 60$ mm), for permanent temperatures of more than 80°C.

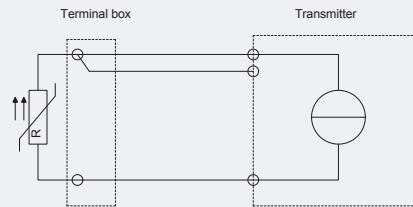


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## 7.0 CONNECTION PLAN



## 8.0 PRODUCTION NUMBER

xxxx / 03.03

|       |               |
|-------|---------------|
| _____ | Year          |
| _____ | Month         |
| _____ | Serial number |

## 8.1 TYPE CODE

Connecting length 1,2 m is standard. Excess lengths more than 5 m must be requested separately, as for this purpose a special teflon coated shielded cable must be ordered. Delivery times must be requested when ordering.

Ex TF 1 100 Ks 2 3

|          |     |  |
|----------|-----|--|
| <b>1</b> | Pt  | Standard   |
| <b>2</b> | -   | Standard   |
|          | s   | with protective hose (The protective hose is a corrugated hose made of stainless steel and fixed at the cabinet with a special screw.) |
| <b>3</b> | -   | Standard (1,2 m length)  |
|          | ... | Value, e.g. 4 for 4 m length   |
|          | s   | special length 5 m   |

Example: Device P100, with protective hose and standard length of 1,2 m

Ex TF Pt 100 Ks  
1 2 3

## 8.2 NAMEPLATE

|   |           |                        |                    |
|---|-----------|------------------------|--------------------|
|   |           | <b>Ex TF Pt 100 Ks</b> |                    |
| 1 | CE 0344   | Nennspannung           | 2,3 V ~            |
| 2 | Ex II 2 G | Meßstrom               | <10 mA             |
| 3 |           | Ex eb mb IIC T1-T6     | PTZ 16 ATEX 0025X  |
|   |           | Prozesstemperatur      | -40 °C ... +400 °C |
|   |           | Fertigungsnummer       | _____              |

|    |                             |    |   |
|----|-----------------------------|----|---|
| 1- | Supervising agency          | 5- | Nominal voltage                                       |
| 2- | Ex- labelling               | 6- | Measuring current                                     |
| 3- | Type of ignition protection | 7- | Inspecting authority/ EU-type examination certificate |
| 4- | Type code                   | 8- | Production number                                     |