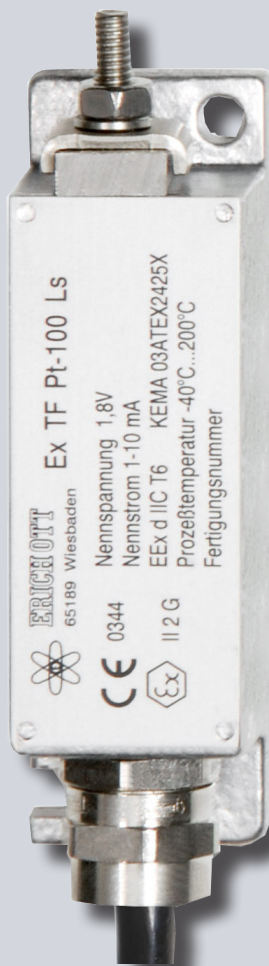



EX TF... 100 L

Temperature sensor



Identification	 II 2G EEx d IIC T6
EC-type examination certificate	KEMA 03 ATEX 2425X
Measuring ranges	-40°C to +200°C
Nominal resistance	100 Ω / 1000 Ω
Nominal voltage	1,8 V
Nominal measured value current	1 - 10 mA
Ambient temperature range	-40°C to +80°C
Insulation level voltage U_0	24 V
Testing voltage resistance	1100 V ~
Degree of protection	IP65
Construction type cabinet (B x H x T)	74 X 22 x 22 mm

Temperature sensor

Support sensor for the measurement of surface temperatures in the ex-area.

The temperature sensor Typ EX TF...100 L 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.

Devices and protection systems for the intended use in explosion prone areas according to directive 94/ 9 EG.

Temperature sensor	Ex TF...100 L
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Warning

The installation, configuration and commissioning may only be carried out by accordingly trained persons. The on-site installation 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 applicable standards and regulations must be observed as well as the operating and mounting instructions.



Installation notes

For the establishing / operation the EN 60079-14, where applicable the standard series EN 60079-30 or EN 62086-1 and EN 62086-2 and their respectively prevailing establishment regulations as well as this operating manual must be observed. The devices may mechanically not be overloaded more than it is provided by the standards and the included examinations. If a deformation is visible at the device, it must be sent back for inspection. The evaluating device must ensure that the maximum admissible current is not exceeded in the case of failure. The indications of the EC-type examination certificate must be observed. In case of doubt the manufacturer must be consulted. Please consider the additional mounting indications on page 2, article 3.0.

Maintenance

The regulations of the EN 60079-14, if valid and applicable the standard series EN 60079-30 or EN 62086-1 as well as EN 62086-2, applicable for the repair / maintenance and inspection, must be observed. The equipment is maintenance-free.



Special conditions

The loose cable end of the permanently connected, not terminated cable end must be connected in a suitable, certified terminal enclosure.

Repair

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

Read through this manual before you put the device into operation. Keep this manual at a place accessible to all users at any time. Please support us to improve this operation manual. We are grateful for your suggestions.

Contact us for technical information!
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1.0 DESCRIPTION

Characteristics

Full protection due to encapsulation
Aluminium cabinet
Easy installation
Protected supply cable (optionally)
Laying sensor with special contact milling for heat conductor thermometry
Also usable as Ex-i - sensor



Because of its increased test voltage for the insulation value, the interference resistance for measurements in outside facilities at long supply lines is ensured. The measured value is recorded by a resistor according to EN 60751 (Pt100) or DIN 43760 (Ni100) or IEC 751.

Field of application

The temperature sensor Ex TF..100 L 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 temperature measurement of surfaces and ambient temperatures in protective cabinets. Depending on the used thermal element, different maximum measurable temperature ranges reveal.

1.1 WARMING UP OF THE SENSOR TIP

Depending on the conditioning instrument, in the case of failure caused by the conditioning instrument, a maximum admissible capacity of 0,8 watt can be converted inside the sensing element. How large this power 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 must be expected. For usual errors a temperature rise of ≤ 12 K can be expected.

2.0 RESPONSE TIME

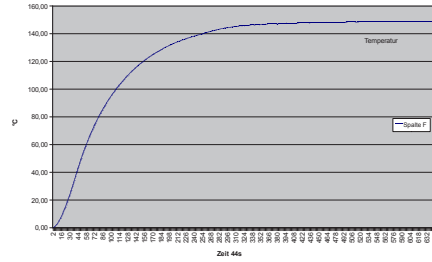
Temperature rise time of about 5°C/s in oil. For an exact result the average value must be generated and the reaction time will become slower. It is hardly possible to state an exact value at this, but roughly speaking would be about 100s for 150°C for oil.

4.0 TECHNICAL DATA

Nominal voltage	1,8 VDC
Nominal reading current	1 - 10 mA at 100 Ohm, ≤ 1 mA at 1000 Ω
Series voltage U_0	24 V
Nominal resistance	100 Ω (Pt 100 oder Ni 100)/ 1000 Ω (Pt 100)
Test voltage resistor	1100 V ~
Protection degree	IP65
Design cabinet (W x H x D)	74 X 22 x 22 mm
Connection lead	5-6 mm \varnothing , length 1,2 m (standard)
Mounting dimensions	63 x 14,5 mm
Measuring ranges	-40°C to +200°C
Temperature class	T6
Ambient temperature	-40°C to + 80°C
EC type examination certificate	KEMA 03 ATEX 2425X
Ignition protection type (Gas)	II 2G EEx d IIC T6
Identification	0344 II 2G EEx d IIC T6

Table 1

	Temperature class			
	T6	T5	T4	T3
Max. admissible ambient temperature	+40°C	+55°C	+90°C	+155°C
Max. admissible sensor temperature	+40°C	+55°C	+90°C	+155°C



Generally:

The responding quality is decisively influenced by the heat transfer. In other media with a different heat conduction value, the values are accordingly different. Media with low thermal conductivity (e.g. air) lead to slow-blowing properties, therefore °C/s. At 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 rise rates, for example by the use of alu adhesive type for surface measurements.

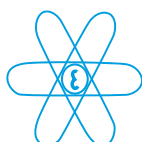
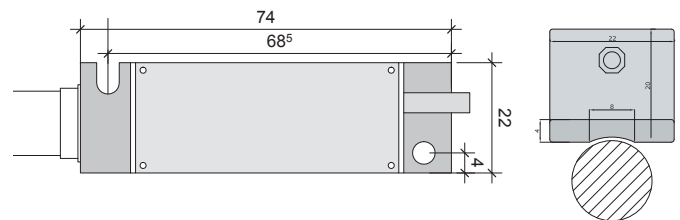
2.1 ELECTRICAL ACCURACY PT100

Exclusively sensors of class B are used:

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

3.0 MOUNTING METHOD

The fixture on pipings takes place by use of a metal tensioning strap combined with a tension lock above the terminal box. The clamping pressure must be chosen so high that the sensor can not be moved anymore from the installation site. For the installation of 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 sheet-metal screws can be used.





5.0 PROJECTION

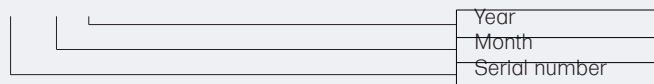
For the accuracy of the temperature measurement it must be considered that both, thermal capacity and the relation heat supply and heat dissipation can influence the measurement result. Very fast changes can accordingly be collected with very small temperature sensors. Response curves of the sensor can be sent when requested. As the sensor has a surface that bonds 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 arrangements 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 of the sensor and the relation ability of thermal energy storage sensor to the object to be measured, whereas the mass of the object to be measured only has an influence on this relation in immediate affinity of 2-3 cm. The observational error due to the connection line of the device, whether 2-, 3- or 4-conductor circuit is, compared to the previous influence possibilities, generally negligible. For the error calculation the connection point in the terminal box can be regarded as the end of line fault and thus the complete circuit can be constructed as if the sensing element would be placed right there. The usual measuring error, conditioned by a test current of 10 mA, amounts at 20°C less than 0,25 K.

5.1 CABLES AND LEADS

For supply cables longer than 5 m the exterior network must be earthed with PE at the feed point. The max. resistivity of the supply line and its consistency depends on the presettings of the evaluation device. The inductivity of the device is negligible, the capacity of the sensor is ≤ 1000 pF. The supply line must generally be installed safely according to the standards of the EN 60079-14 and the 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 seal up a lead with a diameter of 5 mm. The cold flow properties drop 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 line must be installed non-spinning, without tensile load (≤ 1 kg) and with a bending radius of $10 \times D$ (≥ 60 mm) for permanent temperatures of more than 80°C.

6.0 PRODUCTION NUMBER

xxxx / 03.03



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6.1 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 L** 2 3

1	Pt	Standard
	Ni	Nickel (as long as stocks last)
2	-	Standard
	s	with protective hose (The protective hose is a corrugated hose made of stainless steel and fixed with a special screw at the cabinet)
3	-	Standard (1,2 m length)
	...	Value e.g. 4 for 4 m length
	s	Special length ≥ 5 m

Example: Device with PT100, with protective hose and a standard length of 1,2m:

Ex TF Pt **100 L** s 2 3

6.2 NAME PLATE

1-	Supervising agency	5-	Nominal voltage
2-	Ex- labelling	6-	Nominal current
3-	Ignition protection type	7-	Inspecting authority/ EC-type examination certificate
4-	Type code	8-	Operating temperature
		9-	Production number

7.0 CONNECTION PLAN

