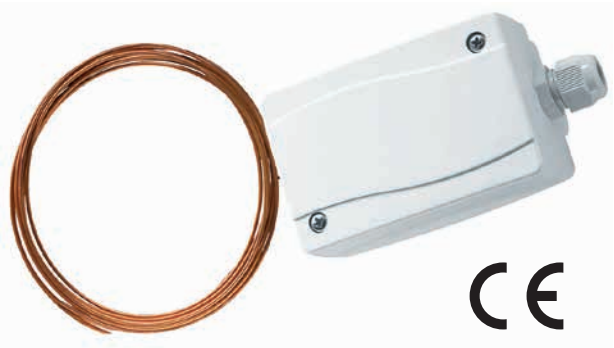
Description

The TBK-FR-2G antifreeze thermostats are suitable for monitoring systems to prevent freezing. Areas of application include heat exchangers, water circuit running systems and heating registers. In combination with the Ex-i switching amplifier EXL-IR-9170-11-12-11s with intrinsically safe circuit, the sensors may be used within hazardous areas of zones 1 and 2.

The device is maintenance-free.

ATEX-compliant for zone 1 and 2 according to ATEX Directive 2014/34/EU.



(Fig. similar)

Delivery program

Type	Product No.	Adjustment range	Gear shift difference
TBK-FR-2G / 1,8m	057.1403	-10...+15°C, factory setting w = +5°C	2 K ±1 K
TBK-FR-2G / 3m	057.1405	-10...+15°C, factory setting w = +5°C	2 K ±1 K
TBK-FR-2G / 6m	057.1400	-10...+15°C, factory setting w = +5°C	2 K ±1 K

Intrinsic

Simple electrical equipment according to IEC/EN 60079-11, Section 5.7, suitable for zone 1 and 2. Only for connection to intrinsically safe circuits.

The specified values at the terminals must not be exceeded.

$U_o \leq U_i$	9.6 V ≤ 30 V
$I_o \leq I_i$	10 mA ≤ 50 mA
$P_o \leq P_i$	24 mW ≤ 100 mW
$C_o \geq C_i + C_{Cable}$	C_i = 0 µF
$L_o \geq L_i + L_{Cable}$	L_i = 0 µH
C_{Cable}, L_{Cable}: see the specifications of the cable manufacturer	
C_o, L_o: see the documentation for the switching amplifier according to the gas group	

Technical data

Type	TBK-FR-2G / 1.8m	TBK-FR-2G / 3m	TBK-FR-2G / 6m
Supply	Via switching amplifier EXL-IR-9170-11-12-11s		
Contact	Dust-encapsulated microswitch as a single-pole, potential-free changeover switch		
Ambient	-15...+55 °C		
Storage temperature	-30...+70 °C		
Bezel material	Plastic		
Capillary	Copper, approx.1.8 m	Copper, approx. 3 m	Copper, approx. 6 m
Safety class	Simple electrical equipment according to EN 60079-11		
CE	2014/34/EU (ATEX)		
Installation location	In hazardous areas zone 1, 2 (when using a suitable switching amplifier)		
Protection class according to EN 60529	IP65		
Dimensions (W×H×D)	126 x 90 x 50 mm		
Included	Thermostat		

Installation and operation

Safety instructions

All relevant national and international standards and regulations for hazardous areas must be observed. Equipment must be installed in accordance with the manufacturer's instructions. If the device is used in a manner different from that specified by the manufacturer, the safety level of the device may be reduced. EN/IEC 60079-14 can be used for the design, selection and construction of electrical systems.

- Intrinsically safe circuits are designed in such a way that the energy content is below the minimum level that would be required to cause ignition of an explosive atmosphere in the event of a spark occurring.
- Intrinsically safe circuits are shown in light blue and are to be laid separately from non-intrinsically safe circuits.
- The intrinsically safe sensor is passive, potential-free and approved for zones 1 and 2.
- Observe the maximum connection values during instrumentation.
- Clean with damp cloth only. Avoid electrostatic charging. Remove dust deposits.
- Observe separate documentation:
  - Switching amplifiers

Location and installation

The device can be mounted in any position.

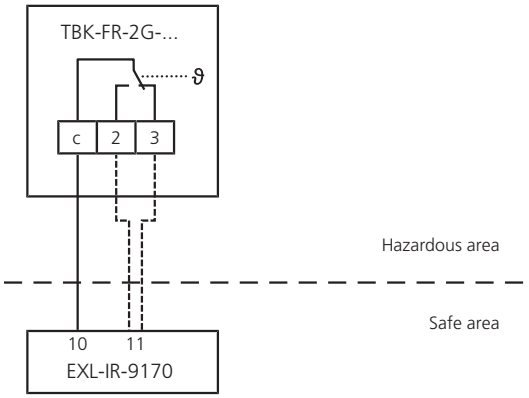
Assembly: Remove the lid for assembly and electrical connection. Use the supplied screws. The installation location must be selected in such a way that the maximum ambient temperature is not exceeded.

Recommended switching amplifier

- Ex-i switching amplifier from Company Stahl type EXL-IR-9170-11-12-11s
- When using the sensor together with a switching amplifier recommended by us, the intrinsic safety for simple circuits is proven
- Manufacturer's certificate for zone 1, 2

Electrical connection

The electrical connection is made according to the operating instructions of the switching amplifier.



Function TBK-FR-2G

Heating: To ensure the antifreeze function, connect the contact C-2. If the temperature drops below the set value, the contact closes.

Cooling: Connect the contact C-3; opens when the temperature drops below the set value.

Frost protection simulation: By immersing the capillary tube test loop (diameter approx. 20 cm) in a vessel filled with ice water, the frost situation can be simulated and the function of the device can be checked.

Function TBK-FR-2G-SF

Contacts red-white (1 - 2) open when the temperature drops to the set value. At the same time, the contacts close red-blue (1 - 4) and can be used as a signal contact.

Option 2-stage version: The 1st range emits a signal 5 K before the switch-off point.

We, the

Schischek GmbH
Mühlsteig 45
Business Park South 5
90579 Langenzenn
GERMANY

declare under sole responsibility in accordance with the provisions of the guidelines:

2014/34/EU

that the product

TBK-FR-2G

to which this declaration refers, complies with the following norms or normative documents:

EN 60079-11:2012 EN IEC 60079-0:2018+AC:2020-02

Marking:

CE Zone 1, Zone 2

Simple resources

Managing:

(Dr. Sven Ludwig)

90579 Langenzenn, 2024-09-01

Manufacturer's declaration for sensors for use in hazardous areas

Item	Antifreeze thermostat	**Manufacturer**	Schischek GmbH
Type	TBK-FR-2G	**Property**	Passive, potential-free
Installation in	Zone 1, 2	**Associated equipment**	EXL-IR-9170-11-12-11s

Test goal

The antifreeze thermostat has been tested for suitability for installation and operation in hazardous areas of zones 1 and 2. The test is based on Directive 2014/34/EU (ATEX). The standards applied are EN 60079-0 and EN 60079-11. The differential pressure switch is a simple electrical device within the meaning of EN 60079-11 Section 5.7 and must be operated via an intrinsically safe circuit. The switching amplifier EXL-IR-9170 from Company Stahl is suitable. The switching amplifier may only be installed and operated in non-hazardous areas.

Proof of intrinsic safety for simple circuits in use with EXL-IR-9170-11-12-11s

$U_o \leq U_i$	9.6 V ≤ 30 V
$I_o \leq I_i$	10 mA ≤ 50 mA
$P_o \leq P_i$	24 mW ≤ 100 mW
$C_o \geq C_i + C_{Cable}$	C_i = 0 µF
$L_o \geq L_i + L_{Cable}$	L_i = 0 µH
C_{Cable}, L_{Cable}: see the specifications of the cable manufacturer	
C_o, L_o: see the documentation for the switching amplifier according to the gas group	

Test	Result
IP protection	The device meets at least IP65
Inspection of metallic housing parts	Magnesium, titanium and zirconium content < 7.5%
Checking plastic	Suitable for use in the ambient temperature range -15...+55 °C
Electrostatics	Can be used without restriction in groups IIA and IIB, for group IIC the warning "Wipe only with a damp cloth" applies
Locks and latches	Not to comply with special conditions, not relevant
Grounding (potential equalisation)	Double insulation, no PE, PA necessary or grounded via system components
Cable and cable entries	The cables must be protected from mechanical and thermal stress, after installation, min. IP65 must be fulfilled
Temperature testing	Together with the switching amplifier EXL-IR-9170-11-12-11s, a temperature increase of <5 K was measured in the event of an error; operating temperature range: -15...+55 °C

Overall rating/additional comments

The TBK-FR-2G antifreeze thermostat can be used in zones 1 and 2 in conjunction with the EXL-IR-9170-11-12-11s switching amplifier. The information in the data sheet or the operating instructions must be observed. The warnings regarding electrostatic charging must also be observed. After installation, at least the protection class IP65 must be guaranteed.

Langenzenn, 01. Sept. 2024
Wen Liu
Explosion Protection Officer

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mail@rotork.com
www.rotork.com

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