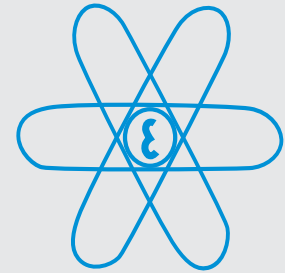


ERICH OTT

Temperature controller- and limiters

For the assembly within the ex range after
ATEX



Type of protection
EX II 2 GD

Ambient
temperature
-40°C - +60°C

Measuring range

0°C - 50°C
0°C - 100°C
0°C - 300°C

Nominal voltage
16 A

Nominal curren
400 V

Protection
IP 65

Temperature limiter

Ex TBK ... / .. KA

Temperature controller

Ex TRK ... / .. KA

Temperature limiter modul

Ex TBK ... / .. KAU

Temperature controller modul

Ex TRK ... / .. KAU

Temperature limiter -controller combination

Ex TBK/TRK ... /.. KA



| |
|-------------------|
| TBK KA / TRK KA |
| TBK/ TRK |
| TBK KAU / TRK KAU |

1.0 BASIC DEVICE

The pressure - resistant enclosed switching element is inserted into a housing in the type of protection "increased safety". The housing material is polyester. The switching element of the limiter has a manual resetting mechanism.

1.1 RANGE OF APPLICATION

The temperature controller and/or temperature limiter is intended for being used in industrial plants and serves for the temperature measurement of surfaces, air or in protective pipes for general on-off controls. In particular it is intended for electrical resistance trace heating and protection cabinet heaters in explosive atmospheres of zone 1 or 2.

1.2 GENERAL DESCRIPTION

Temperature changes are detected by the temperature sensor and transferred over the capillary and diaphragm directly to the precision micro switch. The switching temperature can be adjusted after removing the housing cover by a handwheel with a thermometric scale steplessly. Temperature setting and limiter resetting may also be made under voltage (strip terminal taken off). The illustration of the contact in the connection diagram implies that the sensor temperature is lower than 5% and/or min. 5°K than the temperature set at the setpoint element. The devices have only one setpoint element and a two-way contact (change-over switch) each. The capillary tube limiter is suitable for temperatures up to 300°C and 16A/400V.

1.3 TEMPERATURE LIMITATION

The limiter was originally a safety limiter, which was equipped with an adjustable setpoint and because of that it is no limiter. This function is however safety-relevant for the practice of electrical resistance trace heating, since also safety limiters of other design lose their function by corrosion or freezing up, as a squeezed capillary generally leads to inoperability of the capillary tube limiters. Due to the adjusting possibility of the desired value the operability can be checked at any time at temperatures over 0°C.

2.0 GENERAL TECHNICAL DATA

| | |
|------------------------|-----------------------------|
| Measuring range: | 0-50°C, 0-100°C and 0-300°C |
| Capillary tube length: | 1 m and 3 m |
| Contact | |
| Contact rating: | max: 4000 VA |
| Switching power: | min: 10 V, 0,1 A |
| Nominal voltage: | 16 A ~ |
| Nominal current: | 400 V ~ |



ERICH OTT

Temperature limiter TRK ...
Temperature controller TBK ...

| |
|-------------------|
| TBK KA / TRK KA |
| TBK/ TRK |
| TBK KAU / TRK KAU |

| | |
|---|------------------|
| Type of protection: | IP65 II 2 GD |
| Enclosure dimensions: | 160 x 75 x 75 mm |
| Material: | Polyester |
| Mounting dimensions: | 148 x 45 mm |
| Ambient temperature: | - 40°C - +60°C** |
| **Usual continuous operating temperature of the cable | >90°C |

| Adjustment range | 0..50°C | 0..100°C | 0..300°C |
|-------------------------|---------|----------|----------|
| Cut off accuracy* | + 1K | + 1,5K | + 4,5K |
| Differential gap | + 1,5K | + 3K | + 9K |
| max. sensor temperature | 70°C | 120°C | 320°C |
| sensor dimensions | 6x250mm | 6x135mm | 4x175mm |
| Capillary (V4A) | 1 / 3 m | 1 / 3 m | 1 / 3 m |

* Delivery status. In dependence on the ambient temperature this value can double.

Confirmity: the essential requirements of the directives by application of the following harmonized standards:

EN 60079-0: 2007
EN 60079-1: 2004 +Korr. 2006
EN 60079-18: 2004
EN 61241-0: 2006
EN 61241-1: 2004 +Korr. 2006

| | |
|--------------|---|
| Cable gland: | M 25 brass-ni (-40°C - 100°C) box 160x75 |
| | M 32 plastic (-40°C - 70°C) box 160x160; 160x260; 160x360 |
| | PG 9 steel (-40°C - 100°C) modul |

EC - type Examination Certificate: ZELM 03 ATEX 0171 (single and combination)

Marking: **CE**₀₃₄₄  **II 2 GD** **II2G Ex de mb IIC T6** bzw T5 bzw. T4
II2D Ex tD A21 IP6x T100°C

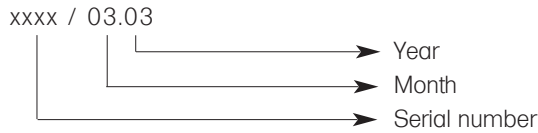
EC - type Examination Certificate: ZELM 03 ATEX 0172X (modul)

Marking: **CE**₀₃₄₄  **II 2 G** **II2G Ex d mb IIC T6** bzw T5 bzw. T4

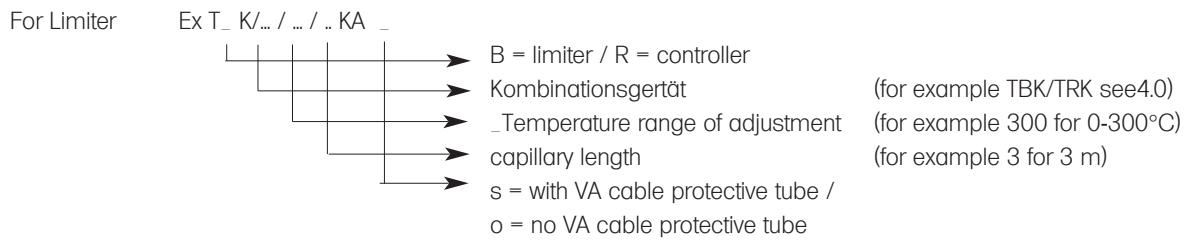


| |
|-------------------|
| TBK KA / TRK KA |
| TBK/ TRK |
| TBK KAU / TRK KAU |

2.1 FERTIGUNGSNUMMER



2.2 MODEL CODE



2.3 ORDER DATA

The standard type designation is the complete ordering designation for metal cable glands. If plastic cable glands are desired, this must be mentioned in plain text.

Shortcuts:

R = limiter
B = controller

The first number after the shift is the effective range of the basic device:

5 = 0 to +50°C
1 = 0 to +100°C
3 = 0 to +300°C

The second number after the shift specify the length of the capillary tube system:

1 = 1m
3 = 3m
5 = 5m

The third number after the shift specify if there is an cable protective tube or no cable protective tube.

s = Schutzschlauch (Kapillarrohrschutz (VA Wellschlauch) gegen Knickbelastungen bei der Montage)
o = ohne Schutzschlauch



| |
|-------------------|
| TBK KA / TRK KA |
| TBK/ TRK |
| TBK KAU / TRK KAU |

ASSEMBLY INSTRUCTION

3.0 INSTALLATION

For installation/operation the EN 60079-14 FF and respectively the valid installation regulations as well as this instruction manual shall be observed.

The devices may not be thrown or dropped. If a damage has been recognized, the devices shall be sent back for examination.

The capillary may not be stressed by external loads, e.g. other equipment. This applies for storage as well as during transport. The capillary may not be dragged, folded or squeezed, at least a bending radius of 15 mm should be ensured.

The sensor may not be deformed. The smallest deformation may lead to an misadjustment and so a switchpoint deviation of the temperature preset at the interior adjuster might occur.

The measured temperature corresponds to the average temperature value of the capillary tube sensor. The temperature of the capillary and the switching element has a very small influence on the switching behaviour. According to DIN the sensors may be warmed up to 20% over the measuring temperature at maximum without leading to a misadjustment of the switching point. Warming above this temperature should be avoided.

All installations have to be verified for functionality before commissioning and after assembly at temperatures over 0°C. The contact of the switching element is a heavy current contact. In case of too low switching capacity (below 10 mA, 12 V) high contact resistances may occur and inoperability may be the result. This error can be repaired by e.g. switching a lamp with 50 Watts 230 V. Afterwards the equipment can be used again for small contact ratings which are higher than 10 mA and 12 V. The interconnection of individual certified components to a new equipment, is conform to a new unit, with new ignition risks, resulting in a new examination of the critical parameters such as the max. temperature.

3.1 ASSEMBLY

The local assembly regulations of the operator* and the applicable standards, like EN 62086-2 and EN 60079-14 have to be obeyed. In case of doubt consultations with the supervising body or a notified body may be useful. The special conditions of the EC - type Examination Certificate have to be obeyed.

The fixation of the sensor on piping shall be carried out with tension band or adhesive tape. No stress may be exerted on the sensor system. The sensor may not be opposed to stress during operation, too.

For the assembly of the devices on a mounting plate there are designed four bores in the housing of the temperature controller and/or limiter. With those bores the devices can be fixed using two M4 (M5) screws DIN 84. The grid dimension for mounting is shown in the handout. Concerning installation of the devices and in particular the connection cable the necessary rules and standards (e.g. EN 60079-14 and EN 62086-2) shall be obeyed. The sealing for the cable glands must be selected appropriate to the cable diameter.

3.2 PROJECT ENGINEERING

The switching hysteresis depends on the adjustable temperature range final value. On - off control are producing heat waves with dead times in the heating system, so that in the in-regulated condition min. and max. temperatures are resulting, whose difference usually is more than the triple of the switching hysteresis. Heated objects exhibit smaller variations in temperature depending on there thermal inertia (mass, material).

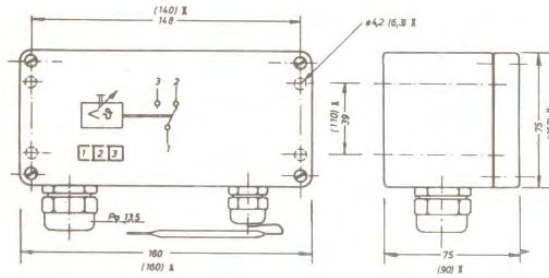
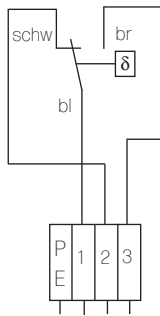


TBK KA / TRK KA

TBK/ TRK

TBK KAU / TRK KAU

3.3 CONNECTION DIAGRAM



3.4 SAFETY MEASURE

As safety measure for the heating circuit grounding (potential equalization) is essential. Due to in many cases long connection cables and the resulting capacitive residual currents, which may increase significant by humidity saturation of the isolation, earth-leakage circuit breakers with 300mA should be used. It should be kept in mind that dependent on the brand of the Residual Current Device these devices can respond differently to capacitive residual currents.

3.5 OTHER

The equipment is maintenance free. Disassembly takes place in reverse order of the assembly. Due to the small heavy metal portion defective devices shall be disposed as hazardous waste. A repair of the devices is not possible because of the properties of the switching element. All other repairs shall only be carried out in the factory of the manufacturer.

- In case of disregarding of the assembly guidelines the warranty expires.
- The basic devices (devices without terminal box) are irreparable with exception of the capillary. These must only be replaced by the manufacturer. An interference is not permissible.
- Only qualified personal shall perform installations.
- The switching hysteresis produces heat waves in the application and contribute to an enlargement of the variations in temperature.
- Local the replacement of the basic devices (devices without terminal box) is restricted to persons which were authorized by Erich Ott.

3.6 MAINTENANCE

The valid regulations for repair / maintenance / examination of the EN 60079-14 have to be considered. The devices themselves are maintenance-free.

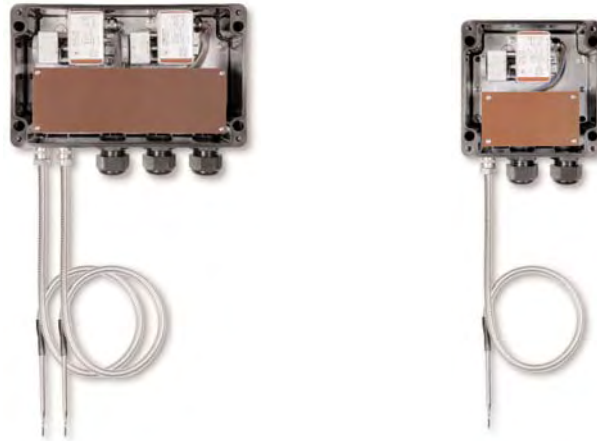


TBK KA / TRK KA
TBK/ TRK
TBK KAU / TRK KAU

4.0 SPECIAL DESIGNS

according to EC - type Examination certificate ZELM 03 ATEX 0171

Different users need several independent temperature limiters, controllers or guards at one object. Therefore we offer different combinations of basic devices in a terminal box and/or a basic device in a larger terminal box. In these cases it is necessary to deliver the basic devices as spare parts. Three different terminal boxes can be used for the installation of 1 to 4 basic devices, equipped with clamps for 2.5 (4) mm² and cable glands of M 32 or smaller.



| | | | | |
|---------------------------|------------|------------|------------|------------|
| Number of special devices | 1 | 2 | 3 | 4 |
| Housing size | 160x160x90 | 260x160x90 | 360x160x90 | 360x160x90 |
| Mounting dimensions | 140x110 | 240x110 | 340x110 | 340x110 |
| Number of cable glands | 2 x M32 | 3x M32 | 4 x M32 | 4 x M32 |

4.1 SPECIAL DESIGNS according to EC - type Examination certificate ZELM 03 ATEX 0172 X

The basic devices are designated for retrofitting or for the installation into a control with separate EC - type Examination certificate. The EC - type Examination certificate ZELM 03 ATEX 0172 X and the mentioned conditions for safe use have to be considered. The type designation according to page 2, under point 2.2 is supplemented with an additional "U".



4.2 MODEL CODE

The sequence of the abbreviations corresponds to the sequence in which the basic devices are mounted. One character is always followed by two numbers. The first module determines the type designation. R or B for the first module are thus already given

Shortcuts:

- R = controller (Regler)
- B = limiter (Begrenzer)

The first number after the character indicates the measuring range of the basic device:

- 5 = 0 to 50°C
- 1 = 0 to 100°C
- 3 = 0 to 300°C



| |
|-------------------|
| TBK KA / TRK KA |
| TBK/ TRK |
| TBK KAU / TRK KAU |

The second number behind the character indicates the length of the capillary tube system:

- 1 = 1m
- 3 = 3m
- 5 = 5m

Depending on the version the model code consists of three up to twelve indications. Combinations with the number 5 are only available in exceptional cases and must be asked for. Connection diagrams according to draft Point: 4.4
* smaller cable glands on request

4.3 TECHNICAL DATA MODUL

Cable gland modul: PG9 steel (-40°C - 100°C)

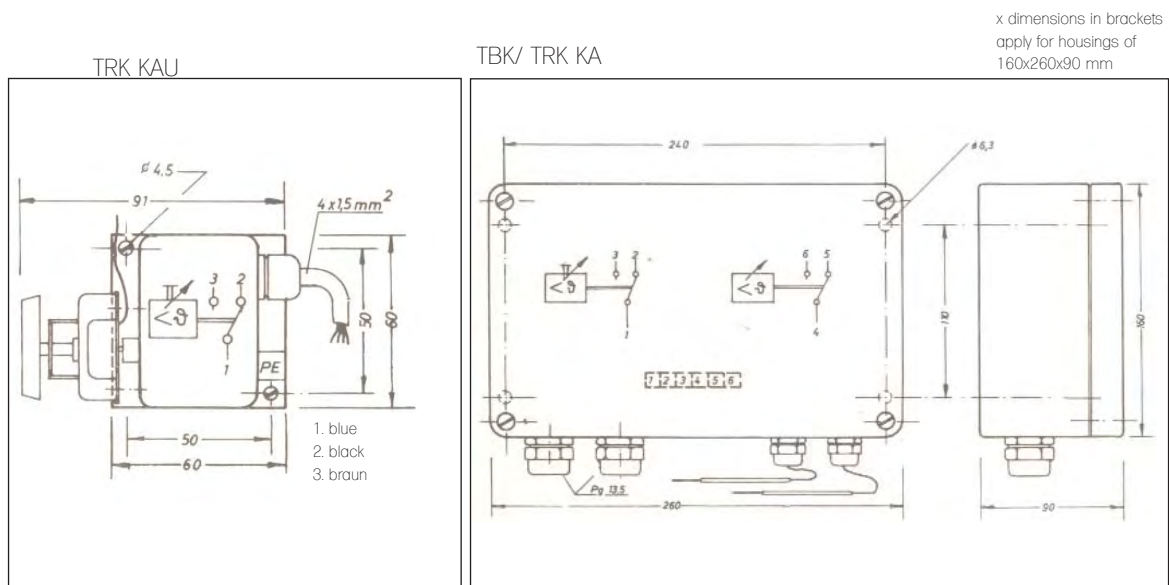
EC - type Examination Certificate: ZELM 03 ATEX 0172X (modul)

Marking: **CE 0344** **Ex** II2G Ex d mb IIC T6 bzw T5 bzw. T4

Conformity: the essential requirements of the directives by application of the following harmonized standards
EN 60079-0: 2004
EN 60079-1: 2004
EN 60079-18 : 2004

Other technical details are analog to Point 2.0

4.4 CONNECTION DIAGRAM



If the assembly instructions are not maintained, the warranty expires.