

## TRB - PS

Temperature controller- limiter - alarm unit



### Characteristics

- Certified STB ( SIL1 )
- Precise regulation
- Large dimensioned display
- Parameterization easy to understand
- Simple installation
- Remote switch connection
- Standstill monitoring
- Analog output

The TRB-PS provides two Pt100 inputs in three wire technologie, at which appropriate temperature sensors can be operated in the potentially explosive area. The sensor inputs are individually designed for controller and limiter and independant. We supply suitable, certified Pt100 sensors in two basic designs.

Type Ex TF Pt100L as strap-on sensor with minimal 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 sensor tip 5 mm and a length of 23 cm. Fully encapsulated in an aluminium cabinet, a stainless steel sensor tip and a measuring temperature of up to 400°C.

Both sensors are exceptionally reliable of interference voltage. For further information please refer to the product literature Pt-100Ks or Pt-100L.

The device is absolutely configurable directly on site. The complete overview of the operating condition and all functions can be read directly off the frontplate.

The TRB-PS consists of a temperature controller and an according to the guideline 2014/34/EU certified safety temperature limiter (STL) with classification of the functional safety according to SIL 1. It offers the user an optimum of safety and reliability with the monitoring of thermal processes.

### Controlling

The control unit is designed as temperature controller with On/Off switching behaviour and asquires the temperature by means of a Pt-100- sensor in 3-wire technique, which is directly connected to the

installation rack (optionally) of the TRB-PS.

In dependence of the temperature at the sensor and the value set as desired value, the relay at the output of the controller operates. The desired value is set analogue by means of a knob of a scale at the front and is protected against unintentional adjustment with a pneumatic locking. The actual value is reported on a three digit display.

### Monitoring

A variety of parameters, such as temperature and temperature undershoot, limiter alarm, sensor break/-short circuit, power failure and heat conductor break (optionally), are monitored..

To ensure the operational safety, the TRB-PS provides three special functions:

Periodically switched off heating circuits are monitored regularly. (Stand-still monitoring)

With the infinitely adjustable undertemperature monitoring a descent of the process temperature below the given setpoint value can be recorded so early that the error can possibly be remedied before a damage occurs.

Overtemperature supervision with necessary switching off the heating and manual reclosing lockout of the limiter.

### Overtemperature – limitation (SIL)

The registration of the maximum temperature results via a Pt-100 sensor in 3-wire technique, which is connected to the subrack of the device (optionally).

To ensure that the temperature is measured at the warmest point, the sensor must be installed at the correct hot-spot. If the admissible temperature limit is exceeded or an error (sensor break, power failure) occurs within the possible temperature range, the built-in relay switches the system to a safe operating condition without any delay. The switching off remains active until a manual approval is carried out by use of a release button at the front of the TRB-PS.

In case of a power failure, without triggering of the alarm contact, an automatic release takes place when the power supply is back.



The analogue limit value adjuster for the over temperature limitation is mounted at the front. An unintentional or unauthorised adjustment of the limit value is prevented by use of a sealable transparent cover.

### Voltage regulator SRS

The TRB-PS can optionally be supplemented by a voltage regulator for power adjustment or length adjustment of trace heatings.

The planning, installation and subsequent expansion of heater circuits is substantially simplified. The voltage regulator is designed as standard 19"-board. Optionally an installation cabinet is available. The product literature for the SRS includes further details.

## TECHNICAL DATA

|   |  |   |
|---|--|---|
| Ambiente temperature                                  | 0 °C to +50 °C   |   |
| Dimensions  | 19"-euroboard 100x160 mm according to DIN 41494  |   |
| Design<br>Front panel (Aluminium)<br>(1 TE = 5,08 mm) | Width 12 TE  | approx. 61 mm without digital display   |
|   | Width 14 TE  | approx. 71 mm with digital display  |
|   | Height 3 HE  | 129 mm  |
|   | Length   | 176 mm (with front panel and connector strip)   |
| Electrical connection                                 | 32-pole connector strip according to DIN 41612, design F   |   |
|   | Pin assignment b+z (standard, connector strip 1)   |   |
|   | 32-pole connector strip according to DIN 41612, pin assignment d + z (optionally, connector strip 2) |   |
| Cabinet type  | Alu-installation cabinet with terminal strips (210 x 190 mm, T x H)<br>IP20 (optionally)             |   |
|   | 19"-sub-rack according to DIN 41494  |   |
| Cabinet protection degree                             | IP20 / EN 60529 (when ordering the installation cabinet)   |   |
| EU-type examination certificate                       | BVS 07 ATEX F 001  |   |
| Identification  |  0344             |  II (2) GD |

## CONTROLLER CIRCUIT

|                               |   |
|-------------------------------|---|
| Measuring range               | -40...200°C<br>-40...300°C<br>-40...400°C             |
| Setting ranges/ Scales        | 0...100°C<br>0...200°C<br>0...300°C<br>0...400°C      |
| Setpoint adjustment           | Precision potentiometer lockable, rotation angle 300° |
| Switching point accuracy      | ≤ 1 %   |
| Switching hysteresis          | ≤ 1 % of full scale value                             |
| Ambient temperature influence | ≤ 0,02 % per K  |
| Linearization error           | ≤ 0,1 %   |
| Supply line measuring error   | 1 K for lead 3 x 1,5 mm <sup>2</sup> , Length 1,0 km  |
| Measuring circuit monitoring  |   |
| Conductor break               | ≥ 200 Ω (depends on measuring range*)                 |
| Cable connection              | ≤ 50 Ω  |

\* For measuring ranges above 200°C the conductor break is 10 % over the end of the measuring range

## LIMITER CIRCUIT

|                               |   |
|-------------------------------|---|
| Setting ranges / Scales       | 0...200°C<br>0...300°C<br>0...400°C<br>0...500°C      |
| Desired value adjustment      | Precision potentiometer lockable, rotation angle 300° |
| Switching point accuracy      | 1 %, reproducible 0,2 %                               |
| Switching hysteresis          | ≤ 2 % des full scale value                            |
| Ambient temperature influence | ≤ 0,02 % per K  |
| Linearization fault           | ≤ 0,1 %   |
| Zuleitungsmessfehler          | 1 K for lead 3 x 1,5 mm <sup>2</sup> , length 1,0 km  |
| Measuring circuit monitoring  |   |
| Conductor breakage            | ≥ 200 Ω (depends on measuring range*)                 |
| Cable connection              | ≤ 50 Ω  |
| Push button                   | b2 behind the front panel                             |

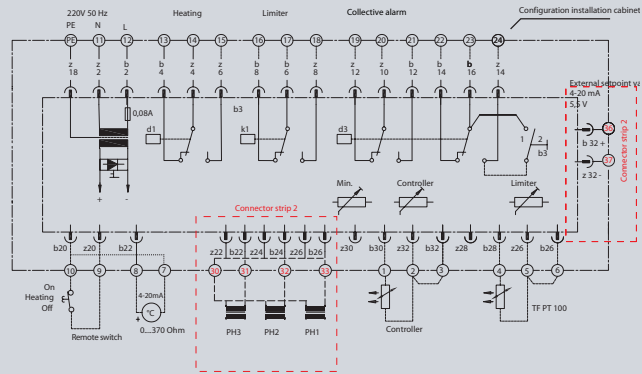
\* For measuring ranges above 300°C the conductor breakage is 10% above the end of the measuring range.

## OVERVIEW OF ALL AVAILABLE DEVICES

|              | Availability | Ex safety              | SIL certification | PT 100 3-wire with conductor break/fault | Actual value output controller: 20 mA | ext. setpoint control controller: 4-20 mA | Current monitoring 1/3 phase | Display | Configuration connector strip 1 | 2nd connector strip | Configuration connector strip 2 |
|--------------|--------------|------------------------|-------------------|--|---------------------------------------|---|------------------------------|---------|---------------------------------|---------------------|---------------------------------|
| TRB- P       | X            | not Ex                 |                   | X  | X                                     |   |                              | X       | b/z                             |                     |                                 |
| TRB - P0     | X            | not Ex                 |                   | X  | X                                     |   |                              |         | b/z                             |                     |                                 |
| TRB- P S     | X            | Ex II 2 GD             | X                 | X  | X                                     |   |                              | X       | b/z                             |                     |                                 |
| TRB- P0 S    | X            | Ex II 2 GD             | X                 | X  | X                                     |   |                              |         | b/z                             |                     |                                 |
| TRB - Pie S  | X            | Ex II 2 GD             | X                 | X  | X                                     | X   | X                            | X       | b/z                             | X                   | d/z                             |
| TRB - P0ie S | X            | Ex II 2 GD             | X                 | X  | X                                     | X   | X                            |         | b/z                             | X                   | d/z                             |
| TRB- P axS   | X            | Ex II 2 GD [Ex ib] IIC | X                 | X  | X                                     |   |                              | X       | d/z                             |                     |                                 |
| TRB- P0 axS  | X            | Ex II 2 GD [Ex ib] IIC | X                 | X  | X                                     |   |                              |         | d/z                             |                     |                                 |
| TRB- PteaxS  | X            | Ex II 2 GD [Ex ib] IIC | X                 | X  | X                                     | X   | X                            | X       | d/z                             | X                   | d/z                             |
| TRB-P0ieaxS  | X            | Ex II 2 GD [Ex ib] IIC | X                 | X  | X                                     | X   | X                            |         | d/z                             | X                   | d/z                             |
| TRB-Pax      | Substitute   | EEx ib IIC             |                   | X  | X                                     |   |                              | X       | d/z                             |                     |                                 |
| TRB-P0ax     | Substitute   | EEx ib IIC             |                   | X  | X                                     |   |                              |         | d/z                             |                     |                                 |
| TRB-Pi ax    | Substitute   | EEx ib IIC             |                   | X  | X                                     |   | X                            | X       | d/z                             | X                   | d/z                             |
| TRB-P0i ax   | Substitute   | EEx ib IIC             |                   | X  | X                                     |   | X                            |         | d/z                             | X                   | d/z                             |

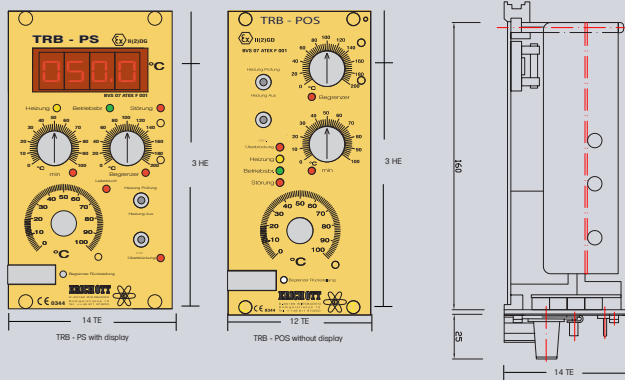
## CIRCUIT DIAGRAM

Depending on the model, the power strip 2 exists. The terminals on the cabinet are mounted according to the type of device. See price-list for scope of delivery.



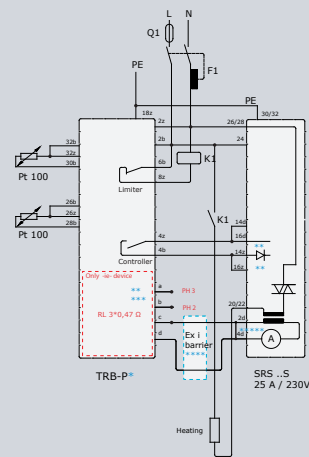
## DIMENSIONS

Dimensions (nominal), measures in mm



## APPLICATION EXAMPLE

SRS... with TRB-P



\* for Ex- construction ...d instead of ...b

\*\*

| Pin assignment of the current transformer input |  |  |                   |
|---|--|--|-------------------|
| Connector strip 2                               |  |  | Connector strip 1 |
| STB (SIL)<br>BVS 07 ATEX F001                   | STB (SIL) + [Ex ib] IIC<br>ZELM 03 ATEX 0140 | Old devices***<br>[Ex ib] IIC<br>Zelm 03 ATEX 0140 | not Ex***         |
| a   | 22b  | 22d  | 8d                |
| b   | 24b  | 24d  | 10d               |
| c   | 26b  | 26d  | 12d               |
| d   | 22z, 24z, 26z                                | 22z, 24z, 26z                                      | 8d, 10d, 12d      |

\*\*\* for 1-phase operation bridge a-c (Only for TRB- P.. VDE)

\*\*\*\* only for Ex i devices ( TRB-P.ax.)

\*\*\*\*\* only for TRB-P.. devices without current monitoring

Please take further data from the operating manual.  
Download on [www.erich-ott.de](http://www.erich-ott.de)