


Ex TRS...AT

Temperature controller with variable output voltage



Identification		II 2G Ex db eb mb IIC T4
EU type examination certificate		PTZ 16 ATEX 0026
Output voltage		70 V - 220 V
Temperature switch point		5°C - 70°C
Ambient temperature range		-45°C - +180°C
Nominal voltage		230 V
Operating current		7A
Protection degree		IP66

Temperature controller

Temperature controller / limiter with variable output voltage for the use in the Ex-area.

The TRS ... AT can be switched in row with an active heating element and serves as voltage supply with temperature secure control / limitation. It is also available with fixed voltage values and temperatures.

Temperature controller with variable output voltage	EX TRS AT
TRS AT + Temperature cutout	EX TRSC AT
TRS AT + Reset limiter	EX TRSB AT

Devices and protective systems for the intended use in explosion-prone areas according to directive 2014/34/EU

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Warning

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

Proviso

We reserve the right to make technical changes. Changes, aberrations and printing errors do not justify any claim for damage. For safety components and systems the relevant standards and regulations must be observed as well as the according operating and mounting instructions.



Installation notes

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 temperature controller, Type Ex TRS .. AT with voltage reduction is for the most part a component of a heating system. The EU-type examination certificate only refers to the TRS...AT and not to the eventually connected components and the resulting ignition hazards. Only by adherence to the state of art (e.g. EN 60079-14), the operating manual and the eventually available factory specifications (provided that these do not contradict the requirements mentioned before), the EU-declaration of conformity is valid. In case of doubt the manufacturer should be contacted or rather the responsible and qualified person for the plant or a notified body should be consulted.

For the fixation clearance holes with a diameter of 4,4 mm are provided. The fixation must be secured against loosening.

The devices may not be thrown or fall. If a deformation can be seen at the device it must be sent back for examination.

The operation of the device without load in series connection is inadmissible. See the stated minimum values in chapter 2.0, technical data.

If, after all, difficulties should occur during the commissioning, please do not carry out any inadmissible manipulations at the device. You endanger your rights under the warranty!

Please contact us. In the case of service the device must be sent

back to us.

Maintenance

For the repair / maintenance / examinations the regulations of the EN 60079-14, EN 60079-17 and eventually additional safety measures, which result from the factory specifications or from the general state of art, are relevant.

The equipment should be checked every 5 years for its functions. This can be done during the examination of the entire installation.



Repair

The dismantling takes place in reverse order than the installation. The device is irreparable. An intervention is not permitted.

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!

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1.0 GENERAL DESCRIPTION

Characteristics

- Low-priced voltage adjuster for the Ex- area
- Phase angle control
- Temperature control by use of Pt100 in the base plate
- Variable modulation of the heat conductor lengths by use of variable voltage and temperature potentiometer
- Small cabinet size



The Ex TRS .. AT with variable output voltage serves for the control of heaters, which can be limited in its maximum capacity with the help of the phase angle control, to be able to limit a thermal overshoot in the heating circuit to a reasonable extent. Temperature control and output voltage can, depending on the design, result via a variable threshold value adjustment or a selectable, indicatable when ordering, fixed value. The variable adjustment is possible via a threshold value potentiometer. The temperature control is realized by use of a Pt100 that is integrated in the bottom. The output voltage is not controlled. Voltage fluctuations in the net, which influence the output power, can be compensated by use of the integrated temperature control. The extremely small switching hysteresis operates separately for each alternation of the power supply and makes it possible at corresponding thermal coupling to keep also air temperatures, for example in a switching cabinet, constant. Especially suitable is the assembly at pipelines as from 6 mm diameter.

2.0 AREA OF APPLICATION

The temperature controller with optional limiter TRS ... AT is usually switched in row with an active heating element and serves as voltage supply for that. The load regulation takes place via phase angle control and is therefore especially suitable for systems, which are laid out via the rated current. Exemplary a 3 A system, in which the heating element and the heat conductor for pipe trace heating are switched in row. The reduced output

voltage is usually used to reduce the thermal overshwing of the heating circuit to a sensible measure.

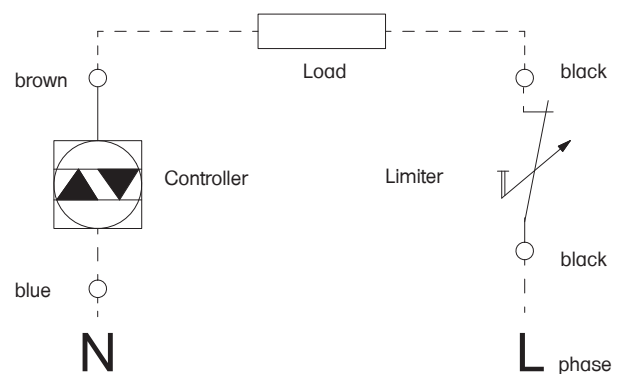
The temperature controller with integrated thermal fuse of the type TRSC is mainly designed for the temperature control within transmitter boxes. A response of the fuse is adequately improvable at expedient layout, to be able to forego with the resetting function.

the temperature controller with resetting limiter Type TRSB is designed for example for pipe trace heaters or for places where it must be feared that a short-term exceeding of the temperature on site is possible, e.g. where cleaning is done with steam.

As in this case a thermal fuse could release, a use of the TRSC would be inexpedient.

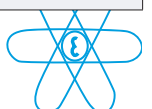
2.1 THERMAL FUSE

Devices with thermal fuse are irreparably damaged after the exceeding of the maximum temperature. If a further heating element is switched in row, care must be taken that during the normal operation the trigger temperature of the fuse is not exceeded. Usually a heating system is laid out so that the maximum temperature emerges on the heating element and not on the controller.



3.0 TECHNICAL DATA

Nominal voltage	230 V ± 15 %, 48 - 62 Hz (other on request)	
No-load current	1 - 4 mA in temperature affected switched-off condition	
Output voltage	70-220 V adjustable or non-adjustable	
Temperature switching point	5-70°C adjustable or non-adjustable	
Hysteresis	≤ 0,1 K	
max. operating current	7 A (40 A Triac)	
Dissipation loss 7A	7 W	
Load resistance	≥ 13,5 Ω	
Series fuse	≤ 16 A fast	
Breaking capacity	≥ 4000 A	
Short circuit pulse I²t	≥ 450 A²s	
Thermal fuse	106°C ± 4°K continuous working temperature -85°C	
Limiter	112°C ± 8°K	
Electrical connection	Connection cable, Silicone 3 x 1,5 mm² or rather 5 x 1,5 mm² 1,2 m long, Ø 6-8 mm	
Ambient temperature range	-45°C to +180°C	
Construction type	Aluminium cabinet casting technology (See also chapter 8.0 construction type)	
Ignition protection degree (Gas)	II 2 G Ex db eb mb IIC T4	
Protection degree	IP66 / EN 60529:1991+A1:2000+A2:2013	
Standard conformity	The operating equipment complies with the technical requirements of the EN 60079-0:2012+A11:2013, EN60079-7:2015, EN 60079-1:2014, EN 60079-18:2015	
EU-Type examination certificate	PTZ 16 ATEX 0026	
Identification	0344	II 2 G Ex db eb mb IIC T4

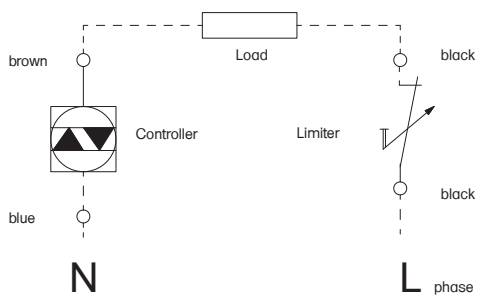


4.0 RESETTING LIMITER

Devices with resetting limiter can manually be taken into operation again. Before resetting the cause for the release of the limiter must be determined and remedied.



TRSB controller with reset button



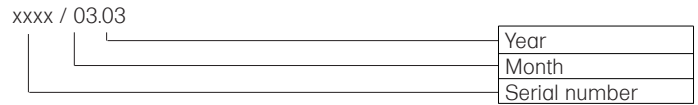
4.1 VOLTAGE REDUCTION

The through-connection of the voltage depends on the momentary value of the input voltage after the adjustment. This means that any voltage and deformation of the input voltage has influence on the output voltage. In approximation it can be estimated that with dimmer circuits $U_{\text{Last}} = x \cdot U_{\text{Netz}}$ when $x < 1$. The setting scales are only rough reference values. It is recommended to control the effective current and to correct the voltage adjustment afterwards.

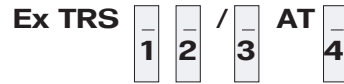
5.0 ORDERING INFORMATION

Controller with resetting limiter, adjustable temperature control and output voltage	Cabinet size 3	Ex TRSB 70-210/5-70 AT
Controller with resetting limiter, adjustable temperature control and permanently adjusted output voltage	Cabinet size 2	Ex TRSB xxx/5-70 AT
Controller with resetting limiter, adjustable output voltage and permanently adjusted temperature control	Cabinet size 2	Ex TRSB 70-210/xx AT
Controller with thermal fuse, adjustable temperature control and output voltage	Cabinet size 2	Ex TRSC 70-210/5-70 AT
Controller with thermal fuse, adjustable temperature control and permanently adjusted output voltage	Cabinet size 2	Ex TRSC xxx/5-70 AT
Controller with thermal fuse, adjustable output voltage and permanently adjusted temperature control	Cabinet size 2	Ex TRSC 70-210/xx AT
Controller with thermal fuse, output voltage and temperature control permanently adjusted	Cabinet size 1	Ex TRS xxx/xx AT

5.1 PRODUCTION NUMBER

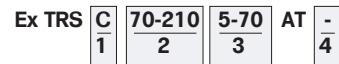


5.2 TYPE CODE



1	-	Temperature controller with variable output voltage
	C	Temp. and voltage controller with thermal fuse
	B	Temp. and voltage controller with resetting limiter
2	-	Permanently set output voltage (arbitrary value of 70- 220 V)
	70-210	Output voltage in Volt or rather setting range
3	-	Permanently set temperature (arbitrary value of 5-70°C)
	5-70	Temperature or rather setting range
4	-	Standard limiter permanently set 112°C (only for TRSB)
	65	Fix limiter temperature 65°C (only for TRSB)
	105	Fix limiter temperature 105°C (only for TRSB)

Example: Thermal fuse with setpoint adjustment, output voltage 70 to 210 V, Temperature 5 to 70 °C, Output voltage and temperature adjustable :



6.0 TEMPERATURE ADJUSTMENT

The device has a self-heating, that depends on the current that flows through the load. In first approximation this self-heating is about 1 K/A. The scale includes an effective current of 3 Ampere. It is recommended, depending on mass and coupling of the device to the object to be heated, to control the adjusted temperature and if necessary to correct the temperature adjustment.

For the choice of the operating temperature of the heating the expert knowledge about irregular temperature distribution at the object to be heated should be considered.

6.1 POTENZIAL EQUALIZATION

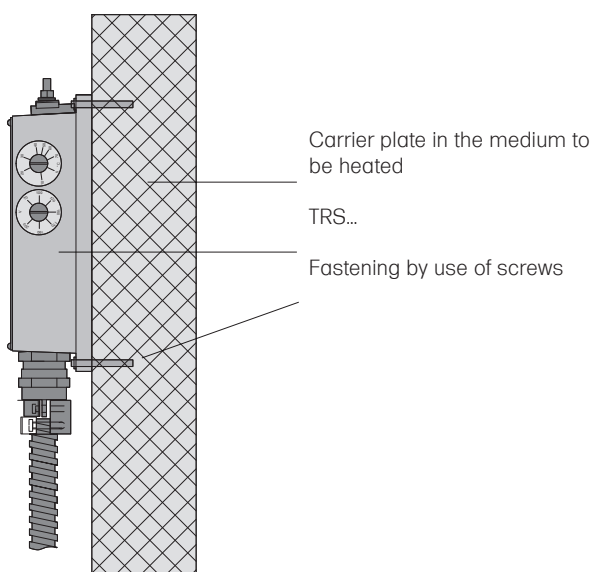
The Ex TRS .. AT must be included in the potential equalization. For this the twistable clamping at the external housing is provided. Due to often long supply lines and thereby related capacitive fault currents, which can substantially increase due to humidity saturation of the insulation, fault current circuit breakers with 300 mA can prevent an unwanted response. Depending on the manufacture the fault current circuit breakers response differently to capacitive fault currents.

6.2 COMPENSATING CIRCUITS AND INTERFERENCE ELIMINATION

PE-conductors and N-conductors should be led separately from the switching cabinet. If this connection is disconnected in the switching cabinet, the insulation value must be checked with >0,5 kV. Depending on the regulaton the larger value is applicable. In each single switching cabinet or switch panel a 4,7 μ F capacitor must be switched at the feed point per phase nearly zero, of which the supply line may only 0,15m maximum. The capacitors should be mounted in close proximity to the connection N - PE. If a protection for the capacitors is necessary, then this should only be carried out via melting fuse. This facility is part of the heating circuit or of the heating system and can optionally once more be mounted at the network feed point. If not only heating circuits shall be connected to the output of the switch cabinet, special measures concerning line-related interferences could be necessary. Please contact us in this case.

7.0 INSTALLATION SITE

The temperature controller Ex TRS .. AT with voltage reduction is designed for the operation in plants. Usual installation sites are for example instrument safety cabinets and under the isolation on a pipeline.



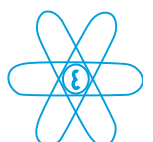
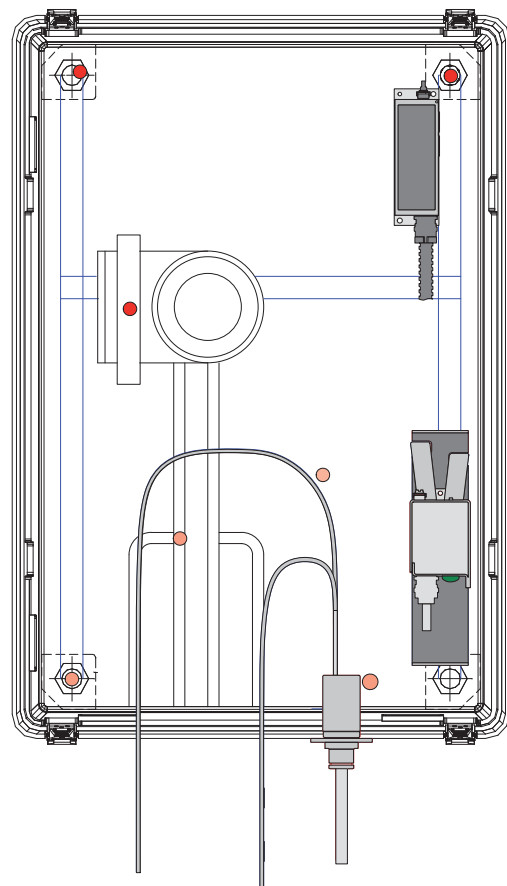
7.1 MOUNTING VERSIONS

the TRS... can also be used for the heating of safety cabinets. We offer, among other things, a safety cabinet system heating Ex SSB. Please take more information that from the product literature Ex SSB. Download on www.erich-ott.de.

The voltage controller with adjustable holding temperature (TRSB or TRSC) is used in a series connection with radiator with controller and limiter function (HKA.../ 100 AT) and a heating conductor loop , which is connected by use of a connection fitting of the type GH.

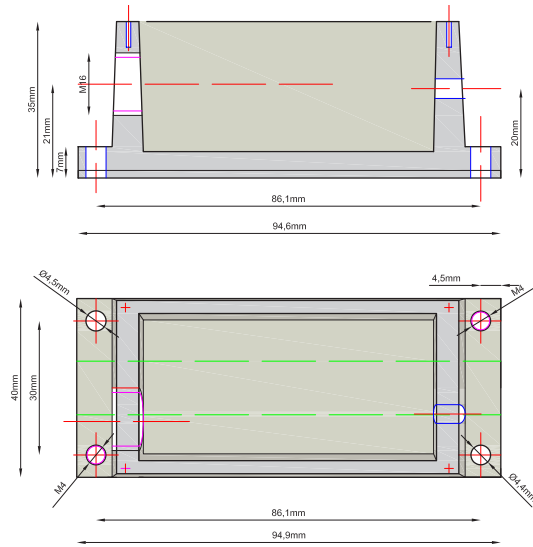
Suitable components:

Radiator versions	EX HKA 33/ 100 AT
	EX HKA 20/ 100 AT
Voltage controller	EX TRSC 20-70 °C
	EX TRSB 20-70 °C
Connection fittings	EX GH/ GH L
Heating cable versions	1600 Ω /km mineral insulated
	1000 Ω /km mineral insulated

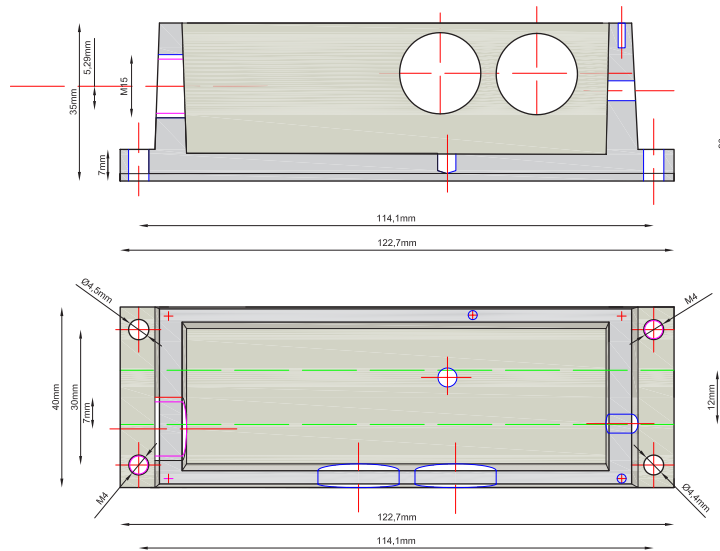


8.0 CONSTRUCTION TYPE

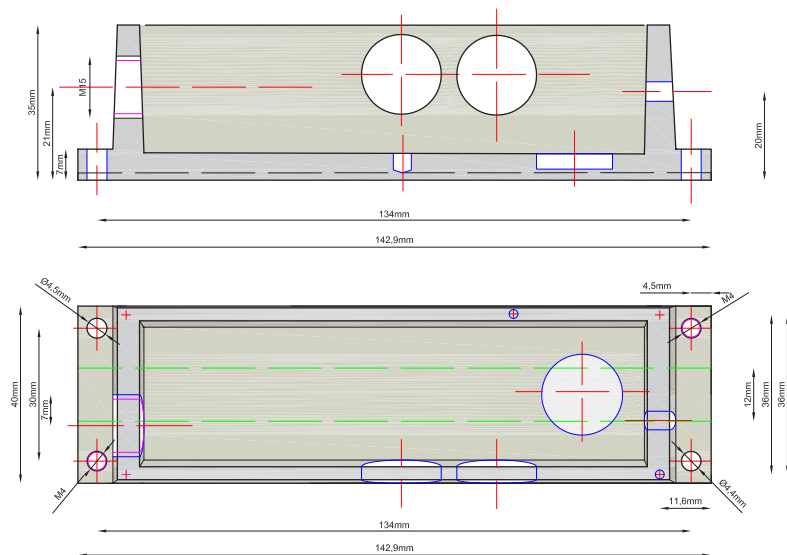
Cabinet size 1
Length x Width x Height
95mm x 40mm x 35mm



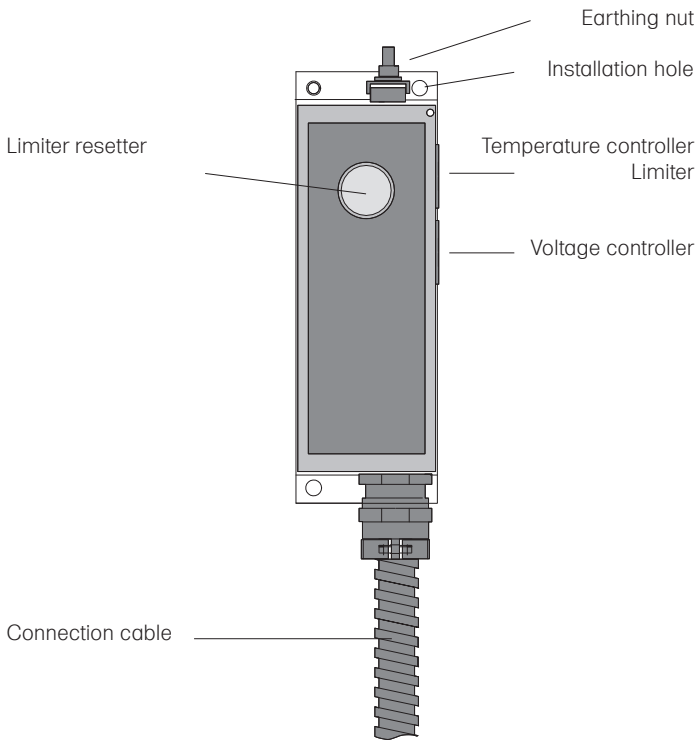
Cabinet size 2
Length x Width x Height
122mm x 40mm x 35mm



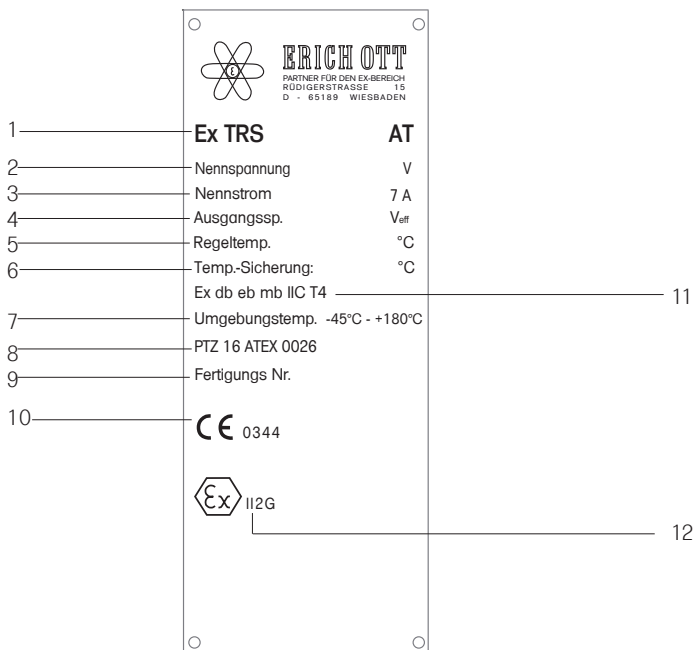
Cabinet size 3
Length x Width x Height
143mm x 40mm x 35mm



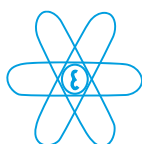
9.0 FUNCTIONAL SURVEY



10.0 TYPE PLATE



1-	Type designation	7-	Ambient temperature
2-	Nominal voltage	8-	Inspecting authority/ EU-type examination certificate
3-	Nominal current	9-	Production number
4-	Output voltage	10-	Supervising agency
5-	Control temperature	11-	Type of ignition protection
6-	Thermal fuse	12-	Ex- Identification



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