



# EX TRS...AT

Temperature controller with variable output voltage



### 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
- Also usable as Ex-i-sensor

The Ex TRS .. AT with variable output voltage serves for the control of heatings, 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.

### PRODUCTION NUMBER

xxxx / 03.03

	Year
	Month
	Serial number

### GENERAL 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 at 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 bzw. 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 type (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, EN 60079-7:2015, EN 60079-1:2014, EN 60079-18:2015
EU-type examination certificate	PTZ 16 ATEX 0026
Identification	<div style="display: flex; align-items: center; gap: 20px;"> <div style="text-align: center;">  0344             </div> <div style="text-align: center;">  II 2 G Ex db eb mb IIC T4             </div> </div>

### TYPE CODE

Ex TRS 

1	2
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3
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 AT 

4
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<b>1</b>	-	Temperature controller with variable output voltage
	C	Temp. and voltage controller with thermal fuse
	B	Temp. and voltage controller with resetting limiter
<b>2</b>	-	Permanently set output voltage (arbitrary value of 70- 220 V )
	70-210	Output voltage in Volt or rather setting range
<b>3</b>	-	Permanently set temperature (arbitrary value of 5-70°C)
	5-70	Temperature or rather setting range
<b>4</b>	-	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 from 5 to 70 °C, output voltage and temperature adjustable:

Ex TRS 

C
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70-210
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5-70
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 AT 

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1	2	3	4
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## AREA OF APPLICATION

The temperature controller with optional limiter TRS ... AT is usually switched in row with an active heating element und serves as vorage 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 overswing 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 heatings 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.

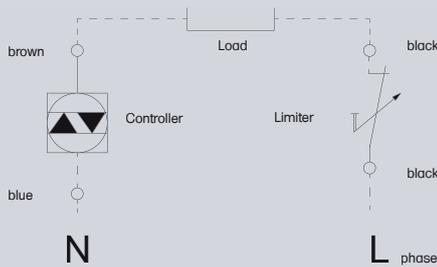
As in this case a thermal fuse could release, a use of the TRSC would be inexpedient.

## 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



## 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 voltae has influence on the output voltage. In approximation it can be estimated that with dimmer circuits  $U_{Last} = x \cdot U_{Netz}$  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.

## 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.

## POTENTIAL 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.

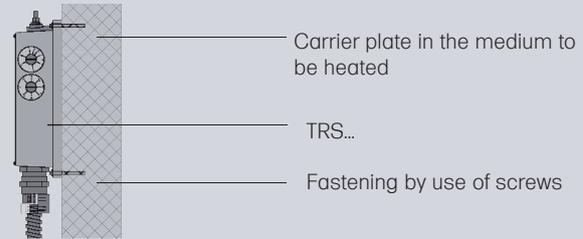
Depending on on the manufacture the fault current circuit breakers response differently to capacitive fault currents.

## 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  $4,7 \mu F$  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.

## 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.



## TYPE PLATE

1	Ex TRS	AT
2	Nennspannung	V
3	Nennstrom	7 A
4	Ausgangssp.	$V_{eff}$
5	Regeltemp.	$^{\circ}C$
6	Temp.-Sicherung:	$^{\circ}C$
	Ex db eb mb IIC-T4	
7	Umgebungtemp.	$-45^{\circ}C - +180^{\circ}C$
8	PTZ 16 ATEX 0026	
9	Fertigungs Nr.	
	CE 0344	10
	Ex II 2G	11

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

Weitere Daten entnehmen Sie bitte der Betriebsanleitung.  
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