



Explosion-proof thermoregulators

RIZUR-TB

Intended use and application area

Explosion-proof thermoregulators RIZUR-TB manufactured by OOO «NPO RIZUR» comply with Technical regulations TU-3442-003-12189681-2014, GOST R MEK 60079-0-2011, GOST R MEK 60079-7-2012, GOST R MEK 60079-18-2012 as high-reliability electric equipment with Ex-protection class «compound sealing» (m)», GOST IEC 60079-1-2011 as equipment with Ex-protection «explosion-proof casing «d», intended for use in explosion-hazardous gas areas, and are marked as 1Exmb IIC T6 Gb X, 1 Exd IIC T6 GbX (depending on the version). According to the Ex-marking, Ch. 7.3 of PUE (Electrical installation code) and other regulatory documents governing the use of electrical equipment in hazardous areas these heaters can be used in explosion-hazardous areas of internal and external facilities.

RIZUR-TB explosion-proof thermoregulators are used for control and maintenance of required ambient air temperature in heating/cooling systems that protect the equipment against excessively high/low temperatures and significant fluctuations that are averse to time and stability of performance of such control and measurement equipment.



RIZUR-TB-F*

Thermoregulator RIZUR-TB-F is an explosion-proof version, based on a bimetallic thermostat. This bimetallic thermostat is used for connecting and disconnecting power and low-signal electric circuits at a set temperature. The base of the thermostat is a bimetallic disc, tightly integrated with a group of electric contacts and undergoing deformation when the temperature changes. All electric elements of the thermostat have a metal housing. The standard version is designed for use in ambient air temperature ranging from 10°C to 20°C. The temperature range can be different upon request.

In a RIZUR-TB-F* thermoregulator with an Ex-protection class explosion-proof housing «d», the metal housing is explosion-proof.

In a RIZUR-TB-F* thermoregulator with an Ex-protection class «compound sealing (m)», all cavities of the thermostat's housing are filled with thermoresistant heat-conductive compound.

The RIZUR-TB-F* thermoregulator has three design variants.

Design variants of the thermoregulator RIZUR-TB-F*

RIZUR-TB-F

Built-in compact design of the thermoregulator based on a bimetallic thermostat. RIZUR-TB-F can help maintain the temperature range of +10°C to +20°C (not including the thermal lag of the thermoregulator's body). The thermoregulator is shipped with a power cable. Cable length is specified in the ordering code (the standard cable length is 1 m). Such design is possible only with the ex-marking 1ExmbIIC6GbX.

Thermoregulator RIZUR-TB-F is supplied only as a part of the heaters manufactured by OOO «NPO RIZUR».



Ordering information:

$$\frac{\text{RIZUR-TB-F-Exm}}{1} - \frac{(10/20)}{2} - \frac{1}{3} - \frac{M}{4} \frac{5}$$

1. Design variant	
RIZUR-TB-F	Design variant of the thermoregulator
2. Explosion protection marking	
Exm	1ExmbIICT6GbX
3. Maintained temperature	
10/20	From 10°C to 20°C
X	Specify the required temperature (upon an agreement with the manufacturer)
4. Cable length	
1	1 m
2	2 m
X	Specify the required cable length in meters
5. Cable protection with a metal hose	
0	Without a metal hose
M	With a metal hose

RIZUR-TB-FB



Ordering information:

$$\frac{\text{RIZUR-TB-FB-Exm}}{1} - \frac{(10/20)}{2} - \frac{2}{3} - \frac{M}{4} \frac{5}$$

1. Design variant	
RIZUR-TB-FB	Design variant of the thermoregulator
2. Explosion protection marking	
Exm	1ExmbIICT6GbX
3. Maintained temperature	
10/20	From 10°C to 20°C
X	Specify the required temperature (upon an agreement with the manufacturer)
4. Cable length	
1	1 m
2	2 m
X	Specify the required cable length in meters
5. Cable protection with a metal hose	
0	Without a metal hose
M	With a metal hose

Compact design of the thermoregulator. The thermoregulator is shipped with a power cable. Cable length is specified in the ordering code (the standard cable length is 1 m). If requested, it can also be shipped with a junction box for connection to the heater and power cable. Such design is possible only with the ex-marking 1ExmbIICT6GbX.

RIZUR-TB-FT



Ordering information:

$$\frac{\text{RIZUR-TB-FT-Exm}}{1} - \frac{(10/20)}{2} - \frac{M20}{3} \frac{4}$$

1. Design variant	
RIZUR-TB-FT	Design variant of the thermoregulator
2. Explosion protection marking	
Exm	1ExmbIICT6GbX
Exd	1ExdIICT6GbX
3. Maintained temperature	
10/20	From 10°C to 20°C
X	Specify the required temperature (upon an agreement with the manufacturer)
4. Cable gland for power cable	
M20	Cable gland M20x1,5 for cable diameter 6-12 mm
MR20	Cable gland M20x1,5 for cable diameter 6-12 mm with fastening for a metal hose DN15
MB20	Cable gland M20x1,5 for armored cable with external diameter 9-17 mm
X	Specify type and grade of cable and metal hose

Integral design of the thermoregulator. In this design, the thermoregulator is located in/on a metallic housing (depending on the ex-marking). This housing also performs the function of a junction box, meaning that there's a terminal block inside and ex-protected cable glands for power cables outside.

Such design is possible only with the Ex-markings 1ExmbIICT6GbX and 1ExdIICT6GbX.

RIZUR-TB-S*

Thermoregulators RIZUR-TB-S* are manufactured in the explosion-proof design and are based on an intelligent digital control module consisting of a microcontroller, a temperature sensor (based on semiconducting materials) and an indicator that is located in an aluminum housing. At the software level, the heater is controlled by Jack E. Bresenham's modified adaptive algorithm. This algorithm ensures stepless control of the heater's power in the continuous operation and helps to maintain the temperature range from -40 to +50 °C with an increment of 1°C. When the temperature is set, the microcontroller in a soft-control mode turns the helice on to such power that is necessary for loss compensation providing that the temperature inside the heated space is maintained.

The control module for the heating element has an indicator on the basis of light-emitting diode designed for the visual control - it helps to determine the system's operating mode without opening the box (if there's an observation window):

		
Red light means that the temperature is below the set minimum.	Green light means that the temperature is in the set range.	Yellow light means that the temperature is above the set maximum.
		
Blinking red light during the operating time means that there's an emergency, possibly a problem with the helice. Important! Blinking red light at the beginning of the operation does not mean that there's a problem - it signals that the heater is up and running at full power.	Blinking green light means that the temperature is in the set range but the warranty period has ended (the warranty is for 15000 hours of the heater's operation). The heater with an S-design is shipped with a power cable. Cable length is specified in the ordering code (the standard cable length is 1 m).	Red and yellow blinking light means that the temperature on the surface of the heater is at set maximum while the temperature inside is below the set minimum. In such a situation the heater is turned off and the heating progress is not completed. It's possible that the power of the heater is chosen incorrectly.

Design variants of the thermoregulator RIZUR-TB-S*

RIZUR-TB-S

Built-in compact design of the thermoregulator with an intelligent control module. The effectiveness of the power load and maintenance of the temperature are ensured at the software level.

RIZUR-TB-S helps to maintain the temperature from -40°C to +50°C (with an increment of 1°C). All of the settings are programmed on the basis of the ordering information at the manufacturing facility. There's no possibility to change the settings on site.

The thermoregulator is shipped with a power cable. Cable length is specified in the ordering code (the standard cable length is 1 m). Such design is possible only with the ex-marking 1ExmbIICT6GbX.

Thermoregulator RIZUR-TB-S is supplied only as a part of the heaters manufactured by OOO «NPO RIZUR».



Ordering information:

$$\frac{\text{RIZUR-TB-S-Exm-(+5)-1-M}}{\underset{1}{\quad} \quad \underset{2}{\quad} \quad \underset{3}{\quad} \quad \underset{4}{\quad} \quad \underset{5}{\quad}}$$

1. Design variant	
RIZUR-TB-FB	Design variant of the thermoregulator
2. Explosion protection marking	
Exm	1ExmbIICT6GbX
3. Maintained temperature	
X	Specify the required temperature within the limits of -40°C...+50°C, with an increment of 1°C
4. Cable length	
1	1 m
2	2 m
X	Specify the required cable length in meters
5. Cable protection with a metal hose	
0	Without a metal hose
M	With a metal hose

RIZUR-TB-ST

Built-in design of the thermoregulator with an intelligent control module.

Functionally, this thermoregulator is identical to the RIZUR-TB-S. Structurally, it's placed on the metal housing that performs the function of a junction box, meaning that there's a terminal block inside and ex-protected cable glands for power cables outside. Such design is possible only with the ex-marking 1ExmbIICT6GbX.

Thermoregulator RIZUR-TB-ST is supplied only as a part of the heaters manufactured by OOO «NPO RIZUR».



Ordering information:

$$\frac{\text{RIZUR-TB-ST-Exm-(+5)-M20}}{\underset{1}{\quad} \quad \underset{2}{\quad} \quad \underset{3}{\quad} \quad \underset{4}{\quad}}$$

1. Design variant	
RIZUR-TB-FB	Design variant of the thermoregulator
2. Explosion protection marking	
Exm	1ExmbIICT6GbX
3. Maintained temperature	
X	Specify the required temperature within the
4. Cable gland for power cable	
M20	Cable gland M20x1,5 for cable diameter 6-12 mm
MR20	Cable gland M20x1,5 for cable diameter 6-12 mm with fastening for a metal hose DN15
MB20	Cable gland M20x1,5 for armored cable with external diameter 9-17 mm
X	Specify type and grade of cable and metal hose

RIZUR-TB-DCS

Thermoregulator RIZUR-TB-DCS is manufactured on the base of a digital control system. The module consists of a microcontroller (regulated by the software) and remote digital air temperature indicator RIZUR-DT or RT 100 (the immersible version can be used for the temperature maintenance in the liquid media).

The hardware-software solution ensures that the temperature will be maintained with the accuracy of 1 °C. The temperature parameters are programmed at the manufacturing facility on the basis of the ordering information. For the purpose of signaling when the temperature surpasses the set limits, thermoregulator RIZUR-TB-DCS has additional relay outputs, as well as, depending on the design variant, an analogue output signal 4-20mA.

The housing of the thermoregulator also performs the function of a junction box, meaning that there's a terminal block inside and ex-protected cable glands for power cables, heater, and temperature sensors outside.

Thermoregulator RIZUR-TB-DCS is designed specifically for controlling heating elements of high power (up to 5kW), including self-regulating heating cables.

The thermoregulator can withstand the cold starting loads that surpass the nominal power load in 10 times.



Design variants of the thermoregulator RIZUR-TB-DCS

RIZUR-TB-DCS-1	RIZUR-TB-DCS-3	RIZUR-TB-DCS-4
<p>RIZUR-TB-DCS-1 - this version has two digital temperature sensors RIZUR-TD and two relay outputs for signaling when the temperature surpasses set limits causing an emergency.</p> <p>Thermoregulator RIZUR-TB-DCS-1 can change and control the temperature within the limits from - 50°C to +110°C.</p>	<p>RIZUR-TB-DCS-3 - this version has two temperature sensors RT 100 and two relay outputs for signaling when the temperature surpasses set limits causing an emergency.</p> <p>Thermoregulator RIZUR-TB-DCS-3 can change and control the temperature within the limits from -200°C to +600°C.</p>	<p>This version has two digital temperature sensors RIZUR-TD, one relay output, and one analogue output signal 4-20mA.</p> <p>Thermoregulator RIZUR-TB-DCS-4 can change and control the temperature within the limits from -50°C to +110°C.</p> <p>The relay output signal is for signaling when the temperature surpasses set limits causing an emergency. The analogue output signal 4-20mA is for broadcasting the current temperature value.</p>

Technical characteristics

Design variant	RIZUR-TB-DCS
Installation area	General industrial areas Explosion hazard zones V-1a and V-1g acc. to Ch. 7.3 of PUE
Explosion protection marking	1Ex d X [ia IIC Ga] IIC T6 G bX
Temperature control	Digital control system
Heating element power	Up to 5000 W
Supply voltage	230 (±15%)V, 24,36-48 V AC/DC (upon an agreement with the manufacturer)
Temperature maintained on the surface	-30°C ... +90°C, an increment of 1°C
Temperature maintained inside	-40°C ... +50°C, an increment of 1°C
Ingress protection	IP67
Preset temperature limit alarm	Relay, dry contact, 1 A
Warranty period	24 months
Average operation time	Over 15 years

Order code for the thermoregulator RIZUR-TB-DCS

Ordering information:

RIZUR-TB-DCS-1-(+90/2/0)-(-10/2/0)-(-20)-(+10)-M20-M20-M20

1
2
3
4
5
6
7
8

1. Design variant	
RIZUR-TB-DCS-1	Thermoregulator with 2 digital temperature sensors RIZUR-DT and 2 relay output signals
RIZUR-TB-DCS-3	Thermoregulator with 2 digital temperature sensors RIZUR-DT and 2 relay output signals
RIZUR-TB-DCS-4	Thermoregulator with 2 digital temperature sensors RIZUR-DT, 1 relay output signal and one analogue output signal 4-20mA
RIZUR-TB-DCS-X	Version with a different combination of the temperature sensors and output signals (upon an agreement with the manufacturer)
2. Parameters of the heating element's temperature control sensor	
N	Without the temperature sensor
(X/_/_)	Specify the target temperature, °C (for the digital sensor within the limits of -50°C...+110°C; for the temperature sensor RT 100 within the limits of -200°C...+600°C)
(_/X/_)	Specify the sensor's cable length, meters
(_/_/X)	Specify the sensor's cable type: 0-standard cable M-cable protection with a metal hose B-armoured cable
3. Parameters of the surface/heated medium's temperature control sensor	
(X/_/_)	Specify the target temperature, °C (for the digital sensor within the limits of -50°C...+110°C; for the temperature sensor RT 100 within the limits of -200°C...+600°C)
(_/X/_)	Specify the sensor's cable length, meters
(_/_/X)	Specify the sensor's cable type: 0-standard cable M-cable protection with a metal hose B-armoured cable
Note: in case the sensor is used in the liquid medium, it's necessary to specify the immersion depth and process parameters outside the order code.	

4. Setting of the minimal temperature for signaling relay*	
(X)	Specify the target temperature for signalization, °C (signaling relay is activated when the temperature goes below the set limit)
* In case there's no sensor, (N) should be put in the order code	
5. Setting of the maximal temperature for signaling relay* / the limits of the analogue output signal 4-20 mA	
(X)	Specify the target temperature for signalization, °C (signaling relay is activated when the temperature goes above the set limit). For RIZUR-TB-DCS-4 in this section it's necessary to specify the limits for the analogue output 4-20 mA, for example, if the limits are from -50°C to +40°C, the ordering information should have (-50/+40)
* In case there's no sensor, (N) should be put in the order code	
6. Cable gland for the heater's cable	
M20	Cable gland M20x1,5 for cable diameter 6-12 mm
MR20	Cable gland M20x1,5 for cable diameter 6-12 mm with fastening for a metal hose DN15
3	3 m
X	Specify cable's length in meters
7. Cable gland for the power cable	
M20	Cable gland M20x1,5 for cable diameter 6-12 mm
MR20	Cable gland M20x1,5 for cable diameter 6-12 mm with fastening for a metal hose DN15
MB20	Cable gland M20x1,5 for armored cable with external diameter 9-17 mm
X	Specify type and grade of cable and metal hose
8. Cable gland for the signaling cables	
M20	Cable gland M20x1,5 for cable diameter 6-12 mm
MR20	Cable gland M20x1,5 for cable diameter 6-12 mm with fastening for a metal hose DN15
MB20	Cable gland M20x1,5 for armored cable with external diameter 9-17 mm
X	Specify type and grade of cable and metal hose