Explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, RIZUR-ONP

Intended use and application area

Explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, RIZUR-ONP are manufactured by OOO «NPO RIZUR», according to the TU-3443-003-12189681-2014 and comply with GOST R MEK 60079-0-2011, GOST R MEK 60079-7-2012, and GOST R MEK 60079-18-2012 for electric equipment of high Ex-protection, with «compound encapsulation (m)» and and are marked 1 Ex mb IICT6...T3 Gb X depending on the manufacturer's set values and the emergency shut-off temperature.

According to Ex-marking, Ch. 7.3 of Electrical installation code (PUE) and other relevant regulations, these heaters can be operated in explosion hazardous areas at indoor and outdoor facilities.

The heater's operational safety at explosion-hazardous areas is confirmed by the Customs Union's Certificate of compliance, «On safety of equipment operation in explosive areas» № EAEU RU CRU. ME92.B.00041/19, as well as a Certificate of compliance with Industrial safety requirements № S-RTE.002.TU.00198.



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Explosion-proof heaters RIZUR-OShA-R are designed for heating and temperature maintenance in the enclosures, insulation jackets, block-boxes, and instrumentation rooms with equipment that requires specific temperature for stable and reliable service. Heaters RIZUR-OUR and RIZUR-OUR-PL for EC&I equipment are designed for the heating of the instrumentation that has condensation of moisture in the form of frost or ice appear inside at negative temperatures preventing the successful operation of the EC&I equipment, electronic devices, and LCD-elements.

Explosion-proof heaters RIZUR-ONP can be used for oil heating at the exit out of the well in the winter season, as well as for local heating of the freezing parts of the industrial pipelines, e.g. in the places of Xmas needle valves, pipe valves, etc. used in fuel-power complexes, oil, gas, chemical, and other branches of the industry. Thanks to the quality design and multilayer testing during the manufacturing process, including run-to-failure tests, explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, RIZUR-ONP manufactured by OOO «NPO RIZUR» are defined by reliably stable operation and the absence of failures in the field conditions.

Warranty period is 24 months from the start-up date while service life is over 10 years.

Design description and functions

In terms of design, the heater consists of a radiator - two plates made of aluminum alloy with powderpolymer coating and an electric heating element placed between them.

Explosion protection is provided by sealing the electric heater and other electric components in the metal housing with a sealing compound. The minimum thickness of the compound layer between electric elements and the housing should be no less than 1 mm. The minimum thickness of the compound layer between the electrical elements and the outer surface is no less than 3 mm.

Protection from the surface overheating is ensured by the external surface area that matches the nominal heat capacity, and (additionally) by placing a temperature sensor (bimetallic or digital - depending on the design variant) to switch off at a set maximum temperature. To prevent pulling and disconnection of the power cable, the cable gland is sealed and equipped with a lock.



Technical specifications

Installation area	 General industrial areas Explosion hazard zones V-1a and V-1g acc. to Regulations of equipment installation (PUE), Ch. 7.3
Explosion protection marking	1Ex mb IIC T6T3 Gb X
Heating element capacity	40 to 2000 W
Power supply	 230 (±15%) V 24, 36-48 V DC/AC (upon an agreement with the manufacturer)
Temperature on heater's surface	 +90+100°C -30+90°C, an increment of 1°C (with digital thermoregulators manufactured by OOO «NPO RIZUR»)
Temperature maintained in the box	 +10+20°C (for design variants F, FT) -40+50°C, an increment of 1°C (for design variants S, ST, SR, AR)
Ingress protection	 IP54 acc.to GOST 14254-96 IP66 acc.to GOST 14254-96 (upon an agreement with the manufacturer) IP67 acc.to GOST 14254-96 (upon an agreement with the manufacturer)
Electric strength of the insulation	Min. 1500 V
Insulation resistance	Min. 20 MOhm
Class of personnel protection against electric shock	Class 1 acc. to GOST 12.2.007.0
Indication of achieving maximum set temperature	Relay «Dry» contact; Break-before-make contact (for design variants SR, AR)
Warranty period	24 months
Average operation time	Over 10 years

Technical specifications of RIZUR-OSha-R, -OUR, -ONP

Design variant	Nominal capacity, W	Resistance in the heater's circuit, Ohm	Dimensions, mm	Heated pipe diameter, mm	Weight, kg
RIZUR-OShA-R-1	100	478±10%	200x100x45	-	0,67
RIZUR-OShA-R-2	200	241±10%	200x200x45	-	1,24
RIZUR-OShA-R-3	300	161±10%	300x200x45	-	1,78
RIZUR-OShA-R-4	400	121±10%	300x300x45	-	2,7
RIZUR-OShA-R-10	1000	48±10%	500x400x45	-	5,75
RIZUR-OShA-R-15	1500	32±10%	700x400x45	-	8,33
RIZUR-OShA-R-20	2000	24±10%	700x500x45	-	10,77
RIZUR-OUR-1	75	650±10%	120x90x50	60	0,18
RIZUR-OUR-2	40	1235±10%	120x60x30	80	0,17
RIZUR-OUR-3	75	650±10%	120x90x60	42	0,15
RIZUR-OUR-PL-1	60	810±10%	120x120x32	-	0,21
RIZUR-OUR-PL-2	100	494±10%	120x220x32	-	0,36
RIZUR-OUR-PL-3	75	650±10%	140x140x32	-	0,28
RIZUR-OUR-PL-4	150	320±10%	220x220x32	-	0,59
RIZUR-ONP-1	500	97±10%	300x140x80	89	0,55
RIZUR-ONP-2	1000	48±10%	580x140x80	89	0,58
RIZUR-ONP-3	500	97±10%	300x150x85	100	0,6
RIZUR-ONP-4	1000	48±10%	580x150x85	100	0,91

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Mounting dimensions

Mounting on a vertical surface			
Design variant	Dimensions, mm		
	Α	В	С
OShA-R-1	218226(248)	-(-)	44(15)
OShA-R-2	218226(248)	-103	44(15)
OShA-R-3	218226(248)	-203	44(15)
OShA-R-4	318326(348)	-203	44(15)
OShA-R-10	518526(548)	345(303)	44(15)
OShA-R-15	718726(748)	345(303)	44(15)
OShA-R-20	718726(748)	445(403)	44(15)



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Mounting on a horizontal surface

Decign variant	Dimensions, mm			
Design variant	Α	В	С	
OShA-R-1	218226(248)	-	44(15)	
OShA-R-2	218226(248)	-	44(15)	
OShA-R-3	218226(248)	-	44(15)	
OShA-R-4	318326(348)	-	44(15)	
OShA-R-10	518526(548)	-	44(15)	
OShA-R-15	718726(748)	-	44(15)	
OShA-R-20	718726(748)	-	44(15)	

Location of holes to drill for the installation of OShA-R heaters



Design variants of the explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, and RIZUR-ONP

F-variant

The explosion-proof heater is equipped with inbuilt thermoregulators of the heater's surface and the ambient air temperature in the heated area that switch off the power supply when air and\or surface temperature reaches the set limits. Temperature control is carried out by a bimetallic thermostat that's designed for opening and closing the small-signal and electric power circuits upon reaching the set temperature. The base of the thermostat is a bimetallic disc tightly connected with a group of electric contacts. It undergoes deformation when the temperature changes. All of the electric elements are in a metal casing and the jacket cavities are filled with heat-resistant heatconductive compound. The heater in F-variant is supplied with a power cable. The length of the power cable is specified at the time of order (standard length - 1m). This design variant does not allow for changes in temperature settings. The heaters in F-variant can be repaired by the manufacturer only.

FT-variant

The explosion-proof heater has a built-in thermoregulator of the heater's surface on the base of a bimetallic thermostat (similar to F-variant).

Ambient air temperature control is performed by the independent thermoregulator RIZUR-TB-FT on the base of a bimetallic thermostat. This design variant of the heater allows maintenance and repairs on site (see more information about RIZUR-TB-FT on page 26).



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Design variants of the explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, and RIZUR-ONP

S-variant

This version is equipped with an inbuilt intelligent digital control module that consists of a microcontroller, temperature sensor (based on semiconductive materials) and an indicator which are all placed in an aluminum housing. The heater also has another similar housing with a temperature sensor, a control element, and a thermal switch inside. At the software level, the heater is controlled by Jack E. Bresenham's modified adaptive algorithm. This algorithm ensures smooth long-time control of the heater's capacity and allows to maintain ambient air temperature in the heated area within an accuracy of 1°C.

Once the mode is activated, the microcontroller will gradually adjust the heating spiral to the precise level that is required for the loss compensation and temperature maintenance inside the housing. This communication mode does not add noise, gaps or voltage surges that could impact the measuring equipment.

For the visual inspection, the heater's control module is equipped with an LED indicator that makes it possible to identify the system mode without opening the box (if there's an observation window):



•	•	•
Red light indicates that the tempera- ture is below the set minimum.	Green light indicates that the tempera- ture is within the set limits.	Yellow light means that the tempera- ture is above the set maximum.
- \		- \
Flashing red light during operation indicates an emergency; it might be necessary to check the heater spiral. Important! Flashing red light at the	Flashing green light means that the temperature is within the set limits but the warranty for the equipment has ended (the warranty is for 15 000 hours of the heater's	Red and yellow flashing light indicates that the heater's surface temperature is above the set limits while the media temperature is below the set limits.

heater's launch does not indicate a failure; it means that the heater runs at full capacity.

work).

S-version heaters are shipped with a power cable. The length of the power cable should be specified in the order code (the standard length is 1 m).

In this case, the heater is turned off but the heating has been performed. It's possible that the heater's capacity had been chosen incorrectly.

ST-variant

This design variant of the explosion-proof heater is equipped with an inbuilt surface thermoregulator. Temperature control of the surface and air is carried out by the digital control modules (similar to S-variant). In this design variant, the thermoregulator is located on a 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. This design variant can maintain the necessary temperature with an accuracy of 1°C.



Design variants of the explosion-proof heaters RIZUR-OShA-R, RIZUR-OUR, RIZUR-OUR-PL, and RIZUR-ONP

SR-variant

This version of the explosion-proof heater is equipped with a built-in thermoregulator RIZUR-TB-DCS based on the digital control system consisting of a microcontroller, operating under the software, and a remote digital temperature sensor RIZUR-TD. This design variant can maintain the necessary temperature to an accuracy of 5°C. It also has a signaling feature of the temperature reaching the set limits thanks to the additional relay output (see more information on the thermoregulator RIZUR-TB-DCS on page 29).



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AR-variant

This version of the heater is equipped with a built-in thermoregulator RIZUR-DCS-2 and is actually an intelligent heating system that can not only maintain the required temperature in the heating area with an accuracy of 1°C but also perform remote operating control of the climate conditions, as well as signal the increase/decrease of the temperature above/below the set limits thanks to an additional relay output.

Explosion-proof heaters in the AR-design variants are built out of modern electronic components and thus satisfy the strictest requirements, such as:

1. High-quality complex algorithm for reaching and maintaining the necessary temperature;

2. High precision of the required temperature maintenance, within the accuracy of 1°C (granted correct power level choice);

3. Flexibility in self-adjustment, depending on set values and dynamics of temperature indications in the box;

4. Operational control of ambient temperatures and sensor measurements via inbuilt displays;

5. Precise modification of ambient temperature and heater set values, both at manufacturing facility and on the site;

6. High electromagnetic compatibility – there is practically no impact on the voltage at the moment of the heater's switch on/off;

7. Absence of mechanical components under voltage impacting accuracy or reliability;

8. Remote control using RS 485 interface and a connection to the SCADA or a similar system in the AR design variant;

9. Alarm signaling when the temperature in the box reaches the set limits;

10. Energy efficiency (see more information on the digital thermoregulator RIZUR-DCS-2 on page 31)



Order code for explosion-proof heater RIZUR-OShA-R

on: $\frac{\text{RIZUR-OShA-R-4-S-(+5)-T6-230-25-0-1-0}}{1} \xrightarrow{2} 3 \xrightarrow{4} 5 \xrightarrow{6} 7 \xrightarrow{8} 9 \xrightarrow{1} 0$

Ordering information:

1. Mc	del
RIZUF	R-OShA-R Model of the heater
2. Ca	pacity
1	100 W
2	200 W
3	300 W
4	400 W
10	1000 W
15	1500 W
20	2000 W
х	Specify the required capacity (upon an agreement with the manufacturer)
3. He	ater's design variants
F	F-variant. Thermoregulator based on bimetallic thermostat. (page 25)
FT	FT-variant. Thermoregulator based on bimetallic thermostat. Please, also specify the order code for the thermoregulator RIZUR-TB-FT. (page 26)
S	S-variant. Thermoregulator based on digital controls. (page 27)
ST	ST-variant. Thermoregulator based on digital controls.
SR	SR-variant. Thermoregulator based on digital controls, with alarm signaling. Please, specify the order code for the thermoregulator RIZUR-TB-DCS. (page 29)
AR	AR-variant. Thermoregulator based on digital controls with local or remote controls and an emergency alarm. Please, specify the order code for the thermoregulator RIZUR-DCS-2. (see page 31)
4. Air	temperature maintained
-10	+10/+20°C (for F, FT design variants)
(X)	Specify the required temperature in the range of 40°C +50°C (for S, ST, SR design variants)

5. Ten	nperature rating
Т4	Temperature on the heater's surface is under +135°C
Т5	Temperature on the heater's surface is under +100°C
Т6	Temperature on the heater's surface is under +85°C
х	Specify the required temperature on the heater's surface (upon an agreement with the manufacturer)
6. Sup	pply voltage
230	230 V AC
24	24 V DC (upon an agreement with the manufacturer only)
380	380 V AC (upon an agreement with the manufacturer only)
х	Specify the required power supply voltage (upon an agreement with the manufacturer)
7. Cak	le length to thermoregulator, L2
25	250 mm
30	300 mm
50	500 mm
х	Specify the required cable length
8. L2 (cable protection with a metal hose
0	Without a metal hose
М	With a metal hose
9. Cal	ble length from the thermoregulator , L1 (only for the S- and
F-Vari	ants)
1	
2	2 m
2	3 m
x	Specify the required cable length
10 11	cable protection with a metal hose
0	Without a metal hose
M	With a metal hose
IVI	

Order code for explosion-proof heater RIZUR-OUR, RIZUR-ONP RIZUR-OUR-PL-1-F-(-10)-T6-230-20-0-2-M

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Ordering information:

1. Mo	del		
RIZUR	-OUR-PL-1	Ex-proof heater RIZUR-OUR-PL-1, 60 W	
RIZUR	-OUR-PL-2	Ex-proof heater RIZUR-OUR-PL-2, 100 W	
RIZUR	-OUR-PL-3	Ex-proof heater RIZUR-OUR-PL-3, 75 W	
RIZUR	-OUR-PL-4	Ex-proof heater RIZUR-OUR-PL-4, 150 W	
RIZUR	-OUR-1	Ex-proof heater RIZUR-OUR-1, 75 W	
RIZUR	-OUR-2	Ex-proof heater RIZUR-OUR-2, 40 W	
RIZUR	-OUR-3	Ex-proof heater RIZUR-OUR-3, 75 W	
RIZUR	-ONP-1	Ex-proof heater RIZUR-ONP-1, 500 W	
RIZUR	-ONP-2	Ex-proof heater RIZUR-ONP-2, 1000 W	
RIZUR	-ONP-3	Ex-proof heater RIZUR-ONP-3, 500 W	
RIZUR	-ONP-4	Ex-proof heater RIZUR-ONP-4, 1000 W	
2. Hea	ater's design	variant	
F	F-variant. T thermostat	hermoregulator based on bimetallic (page 25)	
FT-variant. Thermoregulator based on bimetallic FT thermostat. Please, also specify the order code for the thermoregulator RIZUR-TB-FT (page 26)			
S	S-variant. Thermoregulator based on digital controls (page 27)		
ST	ST-variant. Thermoregulator based on digital controls (page 28)		
SR-variant. Thermoregulator based on digital controls, with SR alarm signaling. Please, specify the order code for the thermoregulator RIZUR-TB-DCS (page 29).			
AR-variant. Thermoregulator based on digital control system with local or remote controls and an emergency alarm. Please, specify the order code for the thermoregulator (see page 31)			
3. Air	temperature	maintained	
-10	+10/+20°C	(for F, FT design variants))	
(X)	Specify the required temperature in the range of 40°C+50°C (for S, ST, SR design variants)		

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4. Ten	nperature rating
T4	Temperature on the heater's surface is under +135°C
Т5	Temperature on the heater's surface is under +100°C
Т6	Temperature on the heater's surface is under +85°C
x	Specify the required temperature on the heater's surface under (upon an agreement with the manufacturer)
5. Sup	ply voltage
230	230 V AC
24	24 V DC (upon an agreement with the manufacturer only)
380	380 V AC (upon an agreement with the manufacturer only)
x	Specify the required power supply voltage (upon an agreement with the manufacturer)
6. Cab	le length to thermoregulator, L2
20	200 mm
25	250 mm
30	300 mm
50	500 mm
Х	Specify the required cable length
7. L2 c	able protection with a metal hose
0	Without a metal hose
М	With a metal hose
8. Cab	le length from the thermoregulator , L1 (only for the S- and
0	For the following heater design variants: FT, ST, SR, AR
1	1 m
2	2 m
3	3 m
Х	Specify the required cable length
9. L1 c	able protection with a metal hose
0	Without a metal hose
М	With a metal hose

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