SST GROUP

HEAT TRACING SOLUTIONS

CATALOG

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SST Energomontazh
(part of SST Group)

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About SST Group

World-Class Electric Heating Solutions

SST Group, founded in 1991, is the largest in Russia and one of the world's largest manufacturers of heating cables and electric heating systems for industrial and domestic applications. Products and solutions offered by SST Group are available throughout Russia and are exported to 60 countries worldwide.

Europe's Largest Manufacturer of Electric Heating Systems

SST Group offers manufacture, design, selection, and supply of equipment, installation, commissioning and maintenance of electric cable heating systems of any complexity.

SST Group has many years of experience in research and commercialization of unique solutions ensuring uninterrupted operation and protection from climatic hazards of process equipment, components and assemblies of special-purpose machines, vessels and aircraft for various purposes in the Far North, in explosive and aggressive environments and on oil platforms.

SST Group's customers are companies in the oil and gas, chemical and petrochemical industries, aviation, shipbuilding and nuclear power, and defence sectors.

20 000 km of pipelines are heat traced by SST Group

10 000 km industrial heat tracing systems installed

1 300 000 km of heating cables produced by SST Group

13 200 000 electric heating systems are operated worldwide

Structure of SST Group

OKB Gamma

- Conductive plastics and self-regulating heating cables
- Series-resistance heating cables
- Heat tracing systems based on skin-effect
- Very Longline (VeLL) systems
- Power & control cables
- Junction boxes
- Cable glands and other accessories for heat tracing systems
- Corrugated stainless steel tubing

IWS

- Control & automation systems

SST Warm Floors

- Underfloor heating
- Thermostats
- Outdoor electric heating solutions for domestic and commercial applications

SST Energomontazh

- EPC contracts
- Consulting
- Design engineering and thermal calculations
- Installation
- Start-up and commissioning
- Servicing & post-guarantee service
- Control & power cabinets

Quality and Assurance

The company's unified quality management system is certified for compliance with the standards ISO 9001:2015 and GOST R ISO 9001-2015. The high quality of our products has been confirmed by the major European certification centers – VDE, SGS, NANIO CCVE, DEKRA, CSA Sira. Our industrial electric heating systems comply with the International Electrotechnical Commission's Standards Relating to Equipment for Use in Explosive Atmospheres (IECEx). Self-regulating electric heating cables and systems based on skin-effect have the EU certificate ATEX. SST Group's production facilities are certified by global EPC contractors.

More Than 10 000 Completed Projects

Over the years, SST Group has been successfully working with major global and Russian corporations, including Total, Mitsui Chemicals, Dragon Oil, Vopak Horizon, Eriell, Gazprom, ILIM Group, Polyus, LUKOIL, Rosneft, Bashneft, Tatneft, Transneft, ALROSA.

The following projects are part of the company's exceptional track record: East Siberia—Pacific Ocean oil pipeline, Yamal SPG liquefied natural gas facility, ice-resistant stationary offshore platforms at the oil fields Korchagin, Filanovsky, and Zhdanov in the Caspian Sea, Taman liquefied hydrocarbon gas, oil and oil products transshipment facility, merchant seaport Ust-Luga, Zapolyarnoye, Bovanenkovo, Kharyaginskoye oil and gas fields and many others.

SST Group has taken part in projects in Russia, Belarus, Kazakhstan, Uzbekistan, Turkmenistan, China, Korea, UAE and is continuosly expanding the geography of its projects.

You can find additional information about our products and solutions on our websites:
www.sst.ru/en, www.sst-international.com.

Turn-key engineering services

SST Energomontazh (part of SST Group) is Russia's largest engineering company spesializing in turn-key electric cable heating projects and offering the widest possible range of heat tracing solutions.

High service level, meeting international quality standards, many years of experience and industry expertise, state-of-the-art technology, and single point of responsibility enable us to carry out the most challenging projects for Russian and international customers.

Thanks to our integrated approach and project implementation control at all stages, our customers can always expect high quality and efficiency of the installed heat tracing systems.

We have the complete infrastructure required to develop and implement innovative solutions — from product development and manufacturing to installation, start-up & commissioning and post-guarantee service.

Complimentary scoping calculations and software

Scoping is required to estimate the investment needed to implement the project. SST Energomontazh offers complimentary scoping calculations and provides the customer with a quote containing preliminary equipment specifications and an approximate cost of the services.

At the request of the customer, we provide software that simplifies the design of the electrical heating system. The program allows to quickly estimate the required quantities of materials, determine the installation's technical specifications, and fill out the order.

Design engineering and field supervision

An in-house R&D center and engineering teams enable SST Energomontazh to prepare high-quality design and project documentation. We design heat tracing systems, thermal insulation, and power supply systems for various applications, including explosion hazard areas. Our services include field supervision to ensure that the structural and architectural parameters match the adopted design.

Technical support and training

Being experts in the field of heat tracing systems, construction and electrical installation solutions, we advise our customers on technical issues and help specify the equipment and cable heating systems for a given project. SST Energomontazh cooperates with the major design institutes and engineering companies. If the customer is responsible for installation, we offer training for the customer's staff.

Efficient logistics and fast delivery

SST Energomontazh offers shipment in the shortest possible time because of regular replenishment of the stock and established contacts with shipping companies. We offer delivery to the door – worldwide – and we are always open to the customer's suggestions when choosing a shipping option.

Turn-key installation

We offer installation and commissioning of electric heating systems, general electrical installation services, commissioning of electrical installations followed by delivery to the operator, as well as thermal insulation services. The high quality of installation is ensured by the considerable experience and high qualification of our staff who are authorized to work on electrical installations below and above 1000 V, electrical safety classes V and IV and hold safety certificates for high-rise operations.

Extended warranty and maintenance

Because of the exceptional reliability of the electric heating solutions and other equipment offered by SST Group, our customers have an option to extend the warranty and maintenance after the initial warranty period. Our warranty covers both the equipment and all services provided. In any phase of the project, our engineers are available to consult the customer on the operation of electric heating systems and, where appropriate, immediately make a site visit, which saves the customer's time and resources and minimizes downtime.

Additional information is available at
www.sst.ru/en
www.sst-international.com

Explosion hazard and explosion-proof electrical equipment

Explosion hazard areas (as classified in GOST, IEC, and PUE)

What is a hazardous area?

In the context of the petrochemical industry, a hazardous area can be defined as "a location on a site where, under normal operating conditions, the presence of flammable gases or vapors in the atmosphere is likely".

All electrical devices installed in hazardous areas have special protection preventing the ignition of the surrounding air-gas mixture by an accidental spark or contact with a hot surface. This provides protection only under normal operating conditions; in an emergency situation (such as explosion or detonation), same level of safety cannot be guaranteed.

In the vast majority of cases, an explosion or fire occurs as a result of a combination of the three key components known as "the risk triangle". Each of the components is necessary for the ignition of an explosive material.

FUEL may be present as gas, vapor, or dust.

OXYGEN is present in most cases, since the air contains 21% of oxygen by volume.

SOURCE OF IGNITION – sparks or hot surfaces may be potential causes of ignition.

If the concentration of dust, gas, or vapor in the air is between the upper and lower limits of ignition, and the source of ignition has sufficient energy or temperature, a fire or explosion may occur.

PROPERTIES OF EXPLOSIVE AREAS (BASED ON GOST)

Probability of explosive gases and vapors

- **Zone 0 –** continuous or prolomged leakage of an explosive mixture
- **Zone 1** – leakage of an explosive mixture of level 1 - observed periodically or accidentally during normal operation of the equipment
- **Zone 2** – leakage of an explosive mixture of level 2 – not observed during normal operation of the equipment, and if observed, is short-lived

Properties of an explosive atmosphere

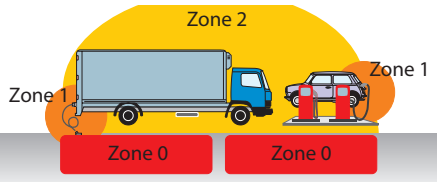
Explosion hazardous mixture category as per minimum ignition current (MIC) or maximum experimental safe gap (MESG)

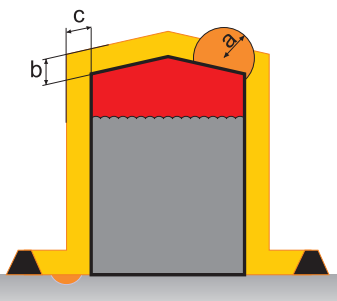
- **II A –** MIC higher than 0.9 A
- **II B –** MIC between 0.5 and 0.9 A
- **II C –** MIC lower than 0.4 A

Explosive mixture grouping by the autoignition temperature

- **T1** above 450 °C
- **T2** between 300 and 450 °C
- **T3** between 200 and 300 °C
- **T4** between 135 and 200 °C
- **T5** between 100 and 135 °C
- **T6** between 85 and 100 °C

Classification of hazardous areas in GOST 31610.0-2014 (IEC 60079-0:2011)





Zone 0
Zone 1
Zone 2

a = 3 m from ventilation openings
b = 3 m above the roof
c = 3 m in horizontal direction from the tank

Explosive area classification describes how easily an explosive atmosphere can ignite from a spark or arc.

The temperature classification, or T-class, takes into account the effect of ignition from contact with a heated surface. All gases and vapors are characterized by their self-ignition temperature, i.e. the temperature they have to be heated to to self-ignite.

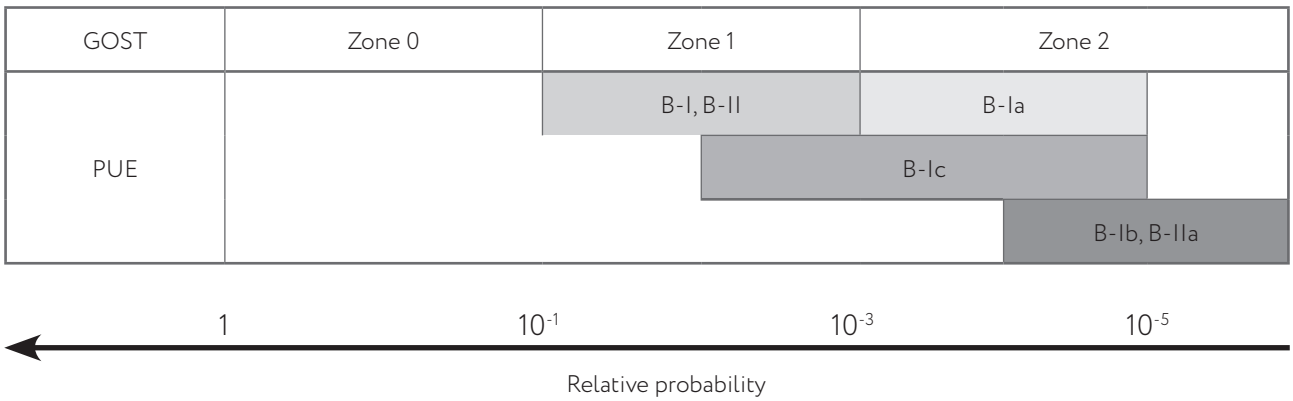
Explosive area category	Characteristic gas, mixture
II	Industrial gases and vapors
II A	Acetone, propane, gasoline, crude oil
II B	Ethylene, winter diesel
II C	Hydrogen, acetylene

CLASSIFICATION OF EXPLOSION HAZARD AREAS IN PUE

Class	Description
B-I	Indoor areas where flammable gases or flammable liquid vapors form in such quantities and with such properties that they can form explosive mixtures under normal operating conditions.
B-Ia	Indoor areas where explosive explosive mixtures of flammable gases or flammable liquid vapors do not form under normal operating conditions, but may form as a result of accidents or malfunctions.
B-Ib	Indoor areas where explosive explosive mixtures of flammable gases or flammable liquid vapors do not form under normal operating conditions, but may form as a result of accidents or malfunctions, and the explosive mixtures are characterized by a high concentration limit of ignition and a strong odor.
B-Ic	Areas around outdoor installations containing flammable gases or liquids, as well as areas adjacent to openings in the exterior wall envelope of indoor areas containing explosive areas of classes B-I, B-Ia, and B-II.
B-II	Indoor areas where combustible dust and fibers are released, capable of forming explosive mixtures with air under normal operating conditions.
B-IIa	Indoor areas located in rooms in which the release of combustible dusts and fibers capable of forming explosive mixtures with air, only as a result of accidents or malfunctions.

The classification in PUE of explosive mixtures by MESG and self-ignition temperature is similar to that adopted in GOST 60079.

GOST 60079 AND PUE CLASSIFICATIONS OF EXPLOSION HAZARD AREAS BY THE PROBABILITY OF EXPLOSIVE MIXTURES COMPARED



Classification of explosion-proof equipment

Explosion-proof electrical equipment is electrical equipment designed to prevent or hinder the risk of ignition of the surrounding explosive atmosphere due to the operation of the equipment.

In potentially explosive areas, explosion-proof electrical equipment must be installed, whose design and specifications correspond to the explosion hazard area class and the properties of the explosive mixture.

Depending on the application, explosion-proof electrical equipment is classified into the following **groups** GOST 31610.0-2014 (IEC 60079-0:2011):

Group symbol	Applications
I	Mining explosion-proof electrical equipment, intended for underground mining operations with a gas and dust hazard rating.
II	Explosion-proof electrical equipment for indoor and outdoor installation, other than mining explosion-proof equipment.

Explosion-proof electrical equipment for indoor and outdoor installation, depending on **level of explosion protection** is classified into GOST 31610.0-2014 (IEC 60079-0:2011):

Level symbol	Level of explosion protection	Description
2	Electrical equipment with improved explosion safety	Explosion-proof electrical equipment, in which explosion protection is guaranteed only under standard normal operating conditions.
1	Explosion-safe electrical equipment	Explosion-proof electrical equipment, in which explosion protection is guaranteed both under normal operating conditions and in the event of probable damage determined by the operating conditions, other than damage to the explosion protection components.
0	Highly explosion-proof electrical equipment	Explosion-proof electrical equipment, in which explosion-safe electrical equipment additional means of explosion protection are provided, as required by explosion protection type standards.

Explosion-proof electrical equipment of Group II is further classified into **subgroups** depending on the category of the explosive mixture, against which the electrical equipment is considered explosion-proof:

Electrical equipment group symbol	Electrical equipment subgroup symbol	Category of the explosive mixture, against which the electrical equipment is considered explosion-proof
II	–	IIA, IIB, IIC
	IIA	IIA
	IIB	IIA, IIB
	IIC	IIA, IIB, IIC

CLASSIFICATION BASED ON SELF-IGNITION TEMPERATURE AND MAXIMUM ALLOWABLE TEMPERATURE OF THE EQUIPMENT SURFACE

Temperature class	Self-ignition temperature, °C	Characteristic gas, mixture	Maximum surface temperature, °C	Temperature group for which the electrical equipment is considered explosion-proof of the explosive mixture
T1	Above 450	Acetone, hydrogen, propane	450	T1, T2, T3, T4, T5, T6
T2	From 300 to 450	Butane, alcohols, acetylene	300	T2, T3, T4, T5, T6
T3	From 200 to 300	Gasoline, kerosene, turpentine, oil	200	T3, T4, T5, T6
T4	From 135 to 200	Acetaldehyde, diethyl ether	135	T4, T5, T6
T5	From 100 to 135	Carbon disulphide	100	T5, T6
T6	From 85 to 100		85	T6

EXPLOSION PROTECTION LEVELS OF ELECTRICAL EQUIPMENT

In order to ensure the explosion protection of equipment and, depending on its design, following types of explosion protection are employed:

Level symbol	Level of explosion protection	Approved type of explosion protection
0	Highly explosion-safe electrical equipment	Explosion protection type "***i***" with intrinsically safe electrical circuit of the level "***ia***" Explosion protection type "***s***"
1	Explosion-safe electrical equipment	Explosion protection type "***i***" with intrinsically safe electrical circuit of the level "***ib***" Explosion protection type "***d***" – explosion-proof enclosure Explosion protection type "***e***" – equipment in an explosion-proof enclosure Explosion protection type "***s***" Types of explosion protection approved for level 0
2	Electrical equipment with improved explosion safety	Explosion protection type "***i***" with intrinsically safe electrical circuit of the level "***ic***" or higher Explosion protection type "***d***" – electrical equipment with improved explosion safety Explosion protection type "***q***" – quartz filling of the enclosure Explosion protection type "***m***" – compound-sealed Explosion protection type "***e***" Explosion protection type "***s***" Types of explosion protection approved for level 0 and 1

Choosing the right type of heating cable

Before the heating cable type and grade can be correctly specified, thermal design needs to be prepared. Thermal design is prepared for each of the pipelines.

For thermal design calculations, the software suite **TeplomagPro** can be used that was developed specifically for calculating the heat losses of pipelines and tanks and specifying heating cables and components.

TeploMagPro supports quick and convenient calculation of the heat losses of pipelines and tanks, selection of the self-regulating or series-resistance heating cable grade and preparing a specification of the electric heating system components and generating summary project documents.

With the help of TeploMagPro, the heating time of a pipeline (empty or filled with liquid) can be estimated from the set initial temperature to the maintenance temperature with the electric heating system activated.

In the case of a power failure in the electric trace heating system, the pipeline and the liquid will begin to cool down.

TeploMagPro can calculate the cooling time of the pipeline from the initial temperature to the specified final temperature.

The software supports heat loss calculations from the surface of outdoor, indoor, underground and underwater pipelines.

Thermal loss rates calculated by the software satisfy the requirements of GOST IEC 60079-30-2-2011, SP 41-103-2000, IEEE 844-2000.

For more information visit www.sst.ru/en and www.sst-international.com.

You can also specify the appropriate heating cable yourself by following the steps described below:

1. Estimate the thermal losses of the system to be heated
2. Select heating cable grade
3. Select heating cable power
4. Calculate heating cable length

Step 1: Thermal loss table

Table 1 shows typical design thermal losses of pipelines depending on diameter, temperature difference between the pipeline and the environment and the thermal insulation thickness.

1. Choose pipeline diameter
2. Choose thermal insulation thickness and temperature difference
3. At the intersection of the respective column and row find the thermal loss value

The calculation in the table is valid for the following conditions: pipeline is thermally insulated with a thermal conductivity coefficient of 0.05 W/(m·°C). For other conditions, make the following adjustment:

Heating cable type	Required safety factor E in the electric equipment design of pipelines / pipes of small diameter (low-inertia heated systems)
Self-regulating	1.1 / 1.12
Series-resistance cable	1.1 / 1.12

From Table on p. 13

$$Q_{tot.} = Q_{table} \times K_1 \times K_2 \times K_3 \times E$$

Thermal conductivity coefficient, W/m·°C	Adjustment factor K_1
0.025 – 0.035	0.6
0.035 – 0.045	0.8
0.045 – 0.055	1
0.055 – 0.07	1.2

Pipe location	Adjustment factor K_2
Outdoor	1
Indoor	0.9

Pipe material	Adjustment factor K_3
Metal	1
Plastic	0.7

The result of this calculation is the thermal loss of the pipeline while maintaining the required temperature for further selection of the heating cable grade.

Example:

- outdoot steel pipeline Dn 159 mm
- thermal insulation – mineral wool 50 mm
- maintainance temperature +10 °C
- minimum ambient temperature -40 °C

Thus: the difference between the pipeline temperature and the ambient temperature is $\Delta T=10-(-40)=50$ °C
From Table 1: thermal loss of the pipeline is $Q_{tab}=31.36$ W/m
Total thermal loss of the pipeline:

$Q_{tot.} = Q_{table} \times K1 \times K2 \times K3 \times E = 31.36 \times 1 \times 1 \times 1 \times 1.1 = 34.5$ W/m.

Table 1
Standard calculation of thermal loss from the pipeline surface

Parameters		Calculated thermal loss, Qv, W/m ((at a thermal conductivity coefficient of the thermal insulation of 0.05 W/(m·°C))																		
Pipeline diameter, mm		25	32	57	76	89	108	114	159	219	273	325	377	426	530	630	720	820	920	1020
	ΔT, °C																			
Thermal insulation 20 mm thick	20	6.24	7.33	11.1	13.91	15.82	18.61	19.48	26.05	34.77	42.62	50.16	57.71	64.81	79.9	94.4	107.44	121.94	136.42	150.92
	30	9.36	10.99	16.65	20.87	23.73	27.91	29.22	39.07	52.16	63.92	75.24	86.56	97.22	119.85	141.59	161.17	182.9	204.64	226.38
	40	12.48	14.66	22.2	27.82	31.64	37.21	38.97	52.09	69.55	85.23	100.32	115.41	129.63	159.79	188.79	214.89	243.87	272.85	301.84
	50	15.6	18.32	27.74	34.78	39.55	46.51	48.71	65.11	86.93	106.54	125.4	144.26	162.03	199.74	235.99	268.61	304.84	341.06	377.3
	60	18.72	21.98	33.29	41.73	47.47	55.82	58.45	78.14	104.32	127.85	150.48	173.12	194.44	239.69	283.19	322.33	365.81	409.27	452.76
	80	24.96	29.31	44.39	55.64	63.29	74.42	77.93	104.18	139.09	170.46	200.64	230.82	259.26	319.59	377.59	429.78	487.74	545.7	603.67
	100	31.2	36.64	55.49	69.55	79.11	93.03	97.41	130.23	173.87	213.08	250.8	288.53	324.07	399.48	471.98	537.22	609.68	682.12	754.59
Thermal insulation 30 mm thick	20	4.97	5.75	8.4	10.36	11.68	13.61	14.21	18.73	24.72	30.1	35.27	40.44	45.31	55.64	65.57	74.5	84.42	94.34	104.26
	30	7.46	8.63	12.6	15.54	17.53	20.41	21.32	28.09	37.08	45.15	52.91	60.66	67.97	83.46	98.35	111.75	126.63	141.5	156.38
	40	9.95	11.5	16.81	20.72	23.37	27.21	28.42	37.46	49.44	60.2	70.55	80.88	90.62	111.28	131.13	148.99	168.83	188.67	208.51
	50	12.44	14.38	21.01	25.9	29.21	34.02	35.53	46.82	61.81	75.25	88.18	101.1	113.28	139.1	163.91	186.24	211.04	235.84	260.64
	60	14.92	17.25	25.21	31.08	35.05	40.82	42.63	56.19	74.17	90.3	105.82	121.33	135.93	166.91	196.7	223.49	253.25	283.01	312.77
	80	19.9	23	33.61	41.44	46.73	54.43	56.85	74.92	98.89	120.4	141.09	161.77	181.24	222.55	262.26	297.99	337.67	377.34	417.02
	100	24.87	28.76	42.01	51.8	58.42	68.03	71.06	93.65	123.61	150.5	176.36	202.21	226.55	278.19	327.83	372.49	422.09	471.68	521.28
Thermal insulation 40 mm thick	20	4.28	4.9	6.97	8.48	9.5	10.98	11.45	14.9	19.48	23.58	27.52	31.45	35.16	43.01	50.56	57.35	64.9	72.44	79.98
	30	6.42	7.35	10.46	12.73	14.26	16.47	17.17	22.36	29.22	35.37	41.27	47.18	52.73	64.52	75.84	86.03	97.34	108.66	119.97
	40	8.57	9.8	13.94	16.97	19.01	21.96	22.89	29.81	38.96	47.15	55.03	62.9	70.31	86.02	101.12	114.71	129.79	144.88	159.96
	50	10.71	12.25	17.43	21.21	23.76	27.45	28.61	37.26	48.69	58.94	68.79	78.63	87.89	107.53	126.4	143.38	162.24	181.09	199.95
	60	12.85	14.69	20.91	25.45	28.51	32.95	34.34	44.71	58.43	70.73	82.55	94.35	105.47	129.04	151.68	172.06	194.69	217.31	239.94
	80	17.13	19.59	27.88	33.94	38.02	43.93	45.78	59.61	77.91	94.31	110.06	125.8	140.62	172.05	202.25	229.41	259.59	289.75	319.92
	100	21.41	24.49	34.85	42.42	47.52	54.91	57.23	74.52	97.39	117.88	137.58	157.25	175.78	215.06	252.81	286.77	324.48	362.19	399.9
Thermal insulation 50 mm thick	20	3.84	4.36	6.07	7.32	8.15	9.36	9.73	12.54	16.25	19.57	22.75	25.93	28.92	35.27	41.36	46.84	52.93	59.01	65.09
	30	5.76	6.53	9.11	10.97	12.23	14.03	14.6	18.82	24.38	29.35	34.13	38.9	43.38	52.9	62.04	70.26	79.39	88.51	97.64
	40	7.68	8.71	12.15	14.63	16.3	18.71	19.47	25.09	32.5	39.14	45.5	51.86	57.85	70.53	82.72	93.68	105.85	118.02	130.19
	50	9.6	10.89	15.18	18.29	20.38	23.39	24.34	31.36	40.63	48.92	56.88	64.83	72.31	88.16	103.4	117.1	132.31	147.52	162.74
	60	11.52	13.07	18.22	21.95	24.45	28.07	29.2	37.63	48.75	58.7	68.26	77.79	86.77	105.8	124.08	140.52	158.78	177.03	195.28
	80	15.36	17.42	24.29	29.27	32.6	37.43	38.94	50.18	65	78.27	91.01	103.72	115.69	141.06	165.43	187.36	211.7	236.04	260.38
	100	19.2	21.78	30.37	36.58	40.75	46.78	48.67	62.72	81.26	97.84	113.76	129.65	144.61	176.33	206.79	234.2	264.63	295.05	325.47
Thermal insulation 60 mm thick	20	3.53	3.98	5.45	6.51	7.22	8.25	8.57	10.94	14.06	16.85	19.53	22.19	24.71	30.03	35.14	39.73	44.83	49.93	55.03
	30	5.29	5.96	8.18	9.77	10.84	12.37	12.85	16.41	21.09	25.28	29.29	33.29	37.06	45.04	52.7	59.6	67.25	74.9	82.55
	40	7.06	7.95	10.91	13.03	14.45	16.49	17.13	21.88	28.12	33.7	39.05	44.39	49.41	60.05	70.27	79.46	89.67	99.87	110.07
	50	8.82	9.94	13.63	16.29	18.06	20.62	21.42	27.35	35.15	42.13	48.81	55.49	61.76	75.07	87.84	99.33	112.08	124.83	137.58
	60	10.58	11.93	16.36	19.54	21.67	24.74	25.7	32.82	42.19	50.55	58.58	66.58	74.12	90.08	105.41	119.19	134.5	149.8	165.1
	80	14.11	15.9	21.82	26.06	28.9	32.99	34.27	43.76	56.25	67.4	78.1	88.78	98.82	120.1	140.54	158.92	179.33	199.73	220.13
	100	17.64	19.88	27.27	32.57	36.12	41.23	42.83	54.7	70.31	84.25	97.63	110.97	123.53	150.13	175.68	198.65	224.17	249.67	275.16
Thermal insulation 80 mm thick	20	3.11	3.47	4.65	5.48	6.03	6.82	7.07	8.89	11.27	13.4	15.43	17.45	19.36	23.39	27.25	30.73	34.58	38.44	42.29
	30	4.67	5.21	6.97	8.21	9.04	10.23	10.6	13.33	16.91	20.09	23.14	26.18	29.03	35.08	40.88	46.09	51.88	57.66	63.44
	40	6.22	6.95	9.29	10.95	12.06	13.64	14.13	17.78	22.55	26.79	30.86	34.91	38.71	46.77	54.5	61.45	69.17	76.88	84.59
	50	7.78	8.68	11.62	13.69	15.07	17.05	17.67	22.22	28.18	33.49	38.57	43.63	48.39	58.46	68.13	76.82	86.46	96.1	105.74
	60	9.33	10.42	13.94	16.43	18.08	20.46	21.2	26.67	33.82	40.19	46.28	52.36	58.07	70.16	81.76	92.18	103.75	115.32	126.88
	80	12.44	13.89	18.58	21.91	24.11	27.28	28.26	35.56	45.1	53.59	61.71	69.81	77.42	93.54	109.01	122.91	138.34	153.76	169.18
	100	15.55	17.36	23.23	27.38	30.14	34.1	35.33	44.45	56.37	66.98	77.14	87.26	96.78	116.93	136.26	153.64	172.92	192.2	211.47
Thermal insulation 100 mm thick	20	2.84	3.15	4.14	4.83	5.28	5.93	6.14	7.63	9.57	11.29	12.93	14.56	16.1	19.35	22.46	25.26	28.36	31.46	34.56
	30	4.26	4.72	6.2	7.24	7.92	8.9	9.2	11.44	14.35	16.93	19.39	21.85	24.15	29.02	33.69	37.89	42.54	47.19	51.84
	40	5.68	6.3	8.27	9.65	10.57	11.87	12.27	15.25	19.13	22.57	25.86	29.13	32.2	38.69	44.92	50.51	56.72	62.92	69.12
	50	7.1	7.87	10.34	12.07	13.21	14.83	15.34	19.07	23.92	28.21	32.32	36.41	40.25	48.37	56.15	63.14	70.9	78.65	86.4
	60	8.52	9.45	12.41	14.48	15.85	17.8	18.41	22.88	28.7	33.86	38.79	43.69	48.3	58.04	67.38	75.77	85.08	94.38	103.68
	80	11.36	12.59	16.54	19.31	21.13	23.73	24.55	30.51	38.26	45.14	51.72	58.26	64.4	77.39	89.84	101.03	113.44	125.85	138.24
	100	14.2	15.74	20.68	24.13	26.41	29.67	30.68	38.14	47.83	56.43	64.64	72.82	80.5	96.73	112.3	126.28	141.8	157.31	172.8

Step 2: Select the heating cable grade

The heating cable grade is selected in accordance with the calculated thermal losses, taking into account the maximum operating temperature of the heating cable, its thermal output at the maintainance temperature and the exposure likelihood of the heating cable to any aggressive substances.

Step 3: Select the heating cable power

Each self-regulating heating cable has a temperature profile of thermal output as a function of the heated system temperature.

The relationships characterizing nominal thermal output of self-regulating heating cables at an operating voltage of 230 V are presented in the catalog (see pp. 19-31).

If the thermal losses of the pipeline slightly exceed the nominal power rating of the heating cable, the winding coefficient can be applied, i.e. the pipeline can be traced with more than 1 running meter of heating cable per 1 running meter of the pipeline (for example, with a winding coefficient of 1.1…1.3, but not higher than 1.5 m/m).

To observe the minimum bending radius of the heating cable the pipeline must have a diameter of at least 57 mm. The minimum bending radius is indicated in the technical specifications included in this catalog.

Step 4: Calculate the heating cable length

The length of the heating cable is determined for each pipeline on a case by case basis. The total length of the heating cable is the sum of the stretches required for each component of the pipeline system. When calculating the length of the heating stretch for each pipeline section, extra length should be added to compensate for the thermal losses via valves, flanged connections, pipe supports, etc.

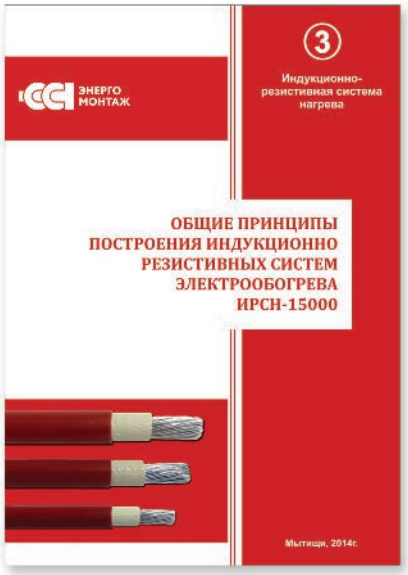
More detailed information on selecting the heating cable, designing trace heating systems, and specifying the components can be found in our handbooks available in Russian.

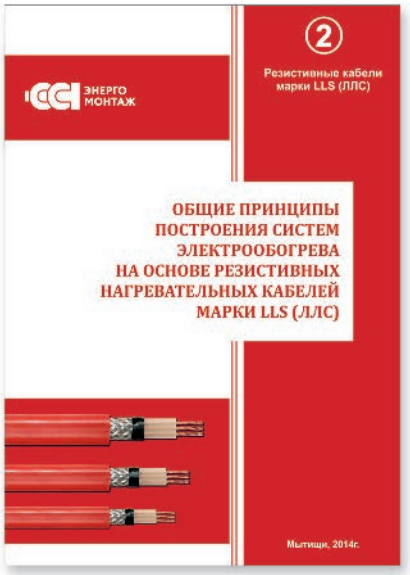
Manual on designing electric heating systems based on self-regulating heating cable describes the general methods of designing electric trace heating systems and offers a step-by-step project completion algorithm – from collecting the design inputs to design approval.

The manual “General design principles of electric heating systems based on the resistive heating cable LLS” describes the general principles of designing trace heating longline systems based on resistive LLS cable.

The manual “General design principles of induction resistive electric heating systems IRHS-15000” describes the general principles of designing trace heating systems of the type IRHS-15000 (skin-system).

For more information please visit www.sst.ru/en and www.sst-international.com.





CALCULATION OF PIPELINE COOLING TIME

The main purpose of the systems offered by SST Group is to maintain the required temperature in the heated pipelines by compensating for thermal losses. However, in case of scheduled or emergency repairs, the power supply can be turned off.

When the power is off, the pipeline trace heating system can no longer compensate for the thermal losses to the environment. Power outage will, in addition, cause pumps to stop. Pumping of liquid will stop. The pipeline will gradually cool down. Pipelines filled with liquid and thermally insulated have significant thermal inertia, and the larger the pipe diameter and the higher the permissible cooling of the liquid, the higher is the pipeline's thermal inertia.

For maintenance units, it is important to know the maximum permissible power outage time of the pipeline trace heating systems. The tables below show the cooling time estimated for some standard pipeline designs with inside diameters from 50 to 400 mm. In the presented cases, the pipelines are completely filled with oil or water. The pipes are thermally insulated with mineral wool, whose thermal conductivity coefficient is assumed to be 0.05 W/m·°C. The input values used in the calculations are shown in Table 2.

Table 2
Input data.

Liquid	Density, kg/m^3	Thermal capacity, J/kg·°C	T initial, °C	T final, °C	Ambient air temperature range, °C
Oil	852	1900	50	20	-50 ... 20
Water	1000	4200	8	2	-50 ... 0

Table 3 presents the calculation results of the cooling time of pipelines filled with medium-density oil, depending on the ambient air temperature. In addition to pipe dimensions, thermal insulation thickness and density are also indicated. The oil temperature at the time of the power outage is 50 °C. It is assumed that the minimum temperature that the oil can cool down to is +20 °C. The table shows the cooling time of the pipelines as a function of the pipeline design and thermal insulation, as well as ambient air temperature. Obviously, the higher the ambient air temperature, the slower the pipeline cools.

Table 3
Cooling time of an oil pipeline from +50 to +20 °C.

D, mm	D_n, mm	Δ_{ins}, mm	ρ_{ins}, kg/m^3	Ambient air temperature, °C								
				-50	-40	-30	-20	-10	0	10	15	20
50	58	30	80	1.1	1.2	1.4	1.6	2.0	2.6	3.8	5.2	8.8
80	89	40	80	2.1	2.4	2.8	3.3	4.1	5.3	7.8	10.5	17.8
100	114	50	90	3.5	4.0	4.6	5.5	6.7	8.8	12.9	17.3	29.5
150	168	50	90	5.4	6.1	7.0	8.3	10.2	13.3	19.6	26.3	44.8
200	219	60	100	8.4	9.5	11.0	13.0	16.0	20.9	30.6	41.1	70.0
250	273	60	100	10.6	12.1	13.9	16.5	20.3	26.5	38.9	52.1	88.9
300	324	80	100	16.5	18.7	21.6	25.6	31.5	41.1	60.3	80.8	138
400	430	100	100	27.4	31.1	36.8	42.5	52.3	68.2	100	134	229

Color coding used in the table:

– less than 2 hours, – from 2 to 3 hours, – from 3 to 6 hours,
– from 6 to 12 hours, – from 12 to 24 hours, – more than a day.

Table 4 shows the effect of the thermal insulation thickness on the cooling time. The calculation is based on an oil-filled pipeline with a diameter of 150 mm. Insulation thickness varied from 30 to 60 mm. Doubling the thermal insulation thickness produces a nearly double increase in the cooling time. This solution can be used to extend the cooling time of the pipeline.

Table 4
Cooling time of an oil-filled pipeline as a function of thermal insulation thickness.

D, mm	D_n, mm	Δ_{ins}, mm	ρ_{ins}, kg/m^3	Ambient air temperature, °C								
				-50	-40	-30	-20	-10	0	10	15	20
150	168	30	90	3.4	3.8	4.4	5.3	6.5	8.4	12.4	16.6	28.3
150	168	40	90	4.4	5.0	5.8	6.8	8.4	10.9	16.0	21.5	36.7
150	168	50	90	5.4	6.1	7.0	8.3	10.2	13.3	19.6	26.3	44.8
150	168	60	90	6.3	7.2	8.3	9.8	12.0	15.7	23.0	30.9	52.7

Color coding used in the table:

– from 3 to 6 hours, – from 6 to 12 hours, – from 12 to 24 hours, – more than a day

Table 5 shows the cooling time of a water-filled pipeline. The water temperature in a heated pipeline is usually maintained at 5-8 °C during the cold season, and cooling below 2 °C is undesirable. Table 5 is structured similarly to Table 3. Although the thermal capacity of 1 kg of water is 2.6 times greater than that of 1 kg of oil, the narrower permissible cooling range leads to shorter permissible cooling time.

Table 5
Cooling time of a water-filled pipeline from +8 to +2 °C.

D, mm	D_n, mm	Δ_{ins}, mm	ρ_{ins}, kg/m^3	Ambient air temperature, °C						
				-50	-40	-30	-20	-10	-5	0
50	58	30	80	0.55	0.67	0.86	1.2	2.0	3.0	6.5
80	89	40	80	1.23	1.50	1.93	2.7	4.5	6.8	14.5
100	114	50	90	1.92	2.35	3.0	4.2	7.0	10.6	22.7
150	168	50	90	3.1	3.8	4.9	6.8	11.4	17.1	36.6
200	219	60	100	5.1	6.2	8.0	11.2	18.6	28.1	60.0
250	273	60	100	6.6	8.0	10.3	14.4	24.1	36.3	77.5
300	324	80	100	10.4	12.7	16.3	22.8	38.0	57.4	122.6
400	430	100	100	17.5	21.4	27.4	38.4	64.0	96.6	206.0

Color coding used in the table:

– less than 2 hours, – from 2 to 3 hours, – from от 3 to 6 hours,
– from 6 to 12 hours, – from 12 to 24 hours, – more than a day.

Heat tracing systems

Self-regulating heating cable HTM

- 10 or 15 W/m
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Thermoplastic or Fluoropolymer overjacket
- Easy to install
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available
- Ideal for small diameter pipelines

1. Nickel-plated copper conductors, 0.56 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid or aluminum foil with drainage wire
5. Overjacket Thermoplastic or Fluoropolymer

Versions

HTM...BT	Thermoplastic elastomer overjacket with tinned copper braiding.
HTM...BP	Fluoropolymer overjacket with tinned copper braiding.
HTM...AT	Thermoplastic elastomer with aluminum foil and drainage wire.

Approvals

№ Sira 17ATEX3335U
№ Sira 18ATEX3038X
№ IECEx CCVE 17.0006U
№ IECEx CCVE 17.0007X
№ 16.00338.120
№ ТС RU C-RU.АА87.В.00340
№ С-RU.ПБ37.В.02047

Key features

HTM is an industrial grade self-regulating heating cable that can be used for freeze protection of pipelines and vessels. It can be used in nonhazardous and ex-hazardous areas.

It is suitable for small diameter pipes and equipment such as impulse or analyzer tubes that do not require steaming.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

HTM cable complies with international standards, as well as the Russian standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of HTM heating cable is quick and simple and requires no special skills or tools. Because of its parallel construction the power output of the heating cable is everywhere the same.

Ex Marking

II 2 GD
Ex 60079-30-1 IIC T6 Gb
Ex 60079-30-1 IIIC T85°C Db

Technical data

Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	65 °C
Maximum continuous exposure temperature (de-energized)	85 °C
Ambient temperature range	-60...+55 °C
Minimum installation temperature:	
Thermoplastic elastomer overjacket Fluoropolymer elastomer overjacket	-30 °C -60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	0.56 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
Thermoplastic overjacket, braiding	9.0×5.8	92
Fluoropolymer overjacket braiding	8.6×5.4	97
Thermoplastic Overjacket, Al screen	8.8×5.1	73

Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 52–57

JB2221-223-2X(11-15) – see pp. 52–57

JB2221-333- 1X(11-19) – see pp. 68–73

JB2221-333-2X(11-23) – see pp. 68–73

TKR connection kit for junction boxes – see p. 92

TKR/J connection kit for junction boxes without terminal glands – see p. 91

TKT/M kit for connection to the installation wire (without boxes) – see p. 93

CP-6 kit for connecting two heating cables (for maintenance, etc.) – see p. 94

Cable fasteners – see pp. 102-103

Ordering information

Example: 15HTM2-BT
① ② ③④ ⑤⑥

1. Linear power 15 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable: HT – low temperature
3. Cable version: M – for small diameter pipes
4. Rated voltage: 2 – 230 VAC (other voltages on request)
5. Screen construction: B – tinned copper braiding, A – aluminum foil and drainage wire
6. Overjacket material: T – thermoplastic elastomer, P – fluoropolymer

Max. heating circuit length

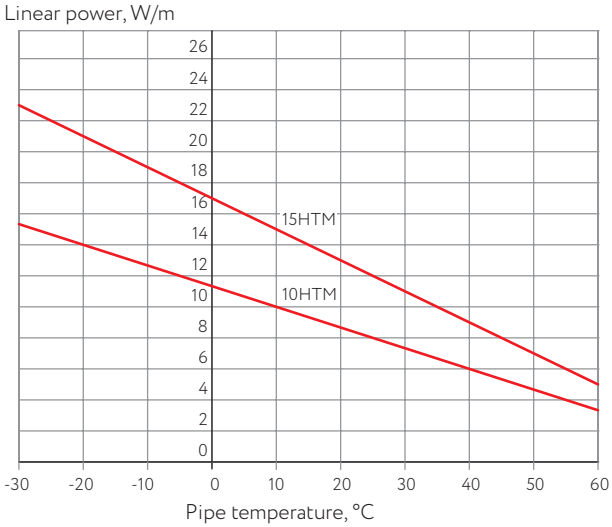
(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V, 10 A
10HTM	10	100
	0	95
	-10	83
	-20	77
	-30	60
	-40	51
15HTM	10	72
	0	66
	-10	59
	-20	52
	-30	45
	-40	39

For use with type C circuit breakers according to IEC 60898-1:2015

Power output curve

Nominal power output at rated voltage 230 VAC.



Self-regulating heating cable HTA

- 15, 20, 25 or 30 W/m
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Thermoplastic or Fluoropolymer overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available

1. Nickel-plated copper conductors, 1.00 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid or aluminum foil with drainage wire
5. Overjacket Thermoplastic or Fluoropolymer

Versions

HTA...BT	Thermoplastic elastomer overjacket with tinned copper braiding.
HTA...BP	Fluoropolymer overjacket with tinned copper braiding.
HTA...AT	Thermoplastic elastomer with aluminum foil and drainage wire.

Approvals

№ Sira 17ATEX3335U
№ Sira 18ATEX3038X
№ IECEx CCVE 17.0006U
№ IECEx CCVE 17.0007X
№ 16.00338.120
№ TC RU C-RU.AA87.B.00340
№ C-RU.ПБ37.B.02047

Key features

HTA is an industrial grade self-regulating heating cable that can be used for temperature maintenance or freeze protection of pipelines and vessels. It can be used in non-hazardous and ex-hazardous areas. The power output adjusts automatically in response to the ambient temperature.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

HTA cable complies with international standards, as well as the Russian standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of HTA heating cable is quick and simple and requires no special skills or tools.

Because of its parallel construction the power output of the heating cable is everywhere the same.

Thus it can be fitted on site to exact piping length without any complicated design calculations.

Ex Marking

II 2 GD
Ex 60079-30-1 IIC T6 Gb
Ex 60079-30-1 IIIC T85°C Db

Technical data

Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	65 °C
Maximum continuous exposure temperature (de-energized)	85 °C
Ambient temperature range	-60...+55 °C
Minimum installation temperature:	
Thermoplastic elastomer overjacket Fluoropolymer elastomer overjacket	-30 °C -60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	1.00 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
Thermoplastic overjacket, braiding	11.0×6.0	117
Fluoropolymer overjacket, braiding	10.6×5.6	124
Thermoplastic overjacket, Al screen	10.7×5.3	93

Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 52–57

JB2221-223-2X(11-15) – see pp. 52–57

JB2221-333- 1X(11-19) – see pp. 68–73

JB2221-333-2X(11-23) – see pp. 68–73

TKR connection kit for junction boxes – see p. 92

TKR/J connection kit for junction boxes without terminal glands – see p. 91

TKT/M kit for connection to the installation wire (without boxes) – see p. 93

CP-6 kit for connecting two heating cables (for maintenance, etc.) – see p. 94

Cable fasteners – see pp. 102-103

Ordering information

Example: 25HTA2-BT
① ② ③④ ⑤⑥

1. Linear power 25 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   HT – low temperature
3. Cable version: A – commercial application
4. Power supply voltage: 2 – 230 VAC (other voltages on request)
5. Braiding material: – copper tinned wire, A – aluminum foil and drainage wire
6. Overjacket material: T – thermoplastic elastomer, P – fluoropolymer

Max. heating circuit length

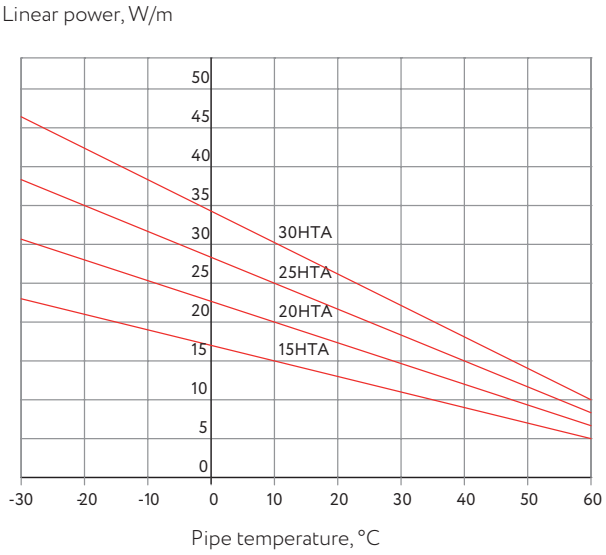
(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V	
		10 A	16 A
15HTA	10	104	136
	0	78	117
	-10	65	98
	-20	58	78
	-30	50	66
	-40	42	59
20HTA	10	79	110
	0	62	94
	-10	52	77
	-20	42	58
	-30	33	48
	-40	27	38
25HTA	10	60	83
	0	47	72
	-10	40	60
	-20	32	47
	-30	24	36
	-40	23	25
30HTA	10	45	70
	0	38	58
	-10	29	47
	-20	10	40
	-30	16	25
	-40	9	12

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

Power output curve

Nominal power output at rated voltage 230 VAC.



Self-regulating heating cable HTP

- 10, 15, 25, 33 or 40 W/m
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Thermoplastic or fluoropolymer overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Full range of accessories available

1. Nickel-plated copper conductors, 1.25 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid or aluminum foil with drainage wire
5. Overjacket thermoplastic or fluoropolymer

Versions

HTP...BT	Thermoplastic elastomer overjacket with tinned copper braiding.
HTP...BP	Fluoropolymer overjacket with tinned copper braiding.
HTP...AT	Thermoplastic elastomer with aluminum foil and drainage wire.

Approvals

№ Sira 17ATEX3335U
№ Sira 18ATEX3038X
№ IECEx CCVE 17.0006U
№ IECEx CCVE 17.0007X
№ 16.00338.120
№ TC RU C-RU.AA87.B.00340
№ C-RU.ПБ37.B.02047

Key features

HTP is an industrial grade self-regulating heating cable that can be used for temperature maintenance or freeze protection of pipelines and vessels. It can be used in non-hazardous and ex-hazardous areas. The power output adjusts automatically in response to the ambient temperature.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

HTP cable complies with international standards, as well as the Russian standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of HTP heating cable is quick and simple and requires no special skills or tools.

Because of its parallel construction the power output of the heating cable is everywhere the same.

Thus it can be fitted on site to exact piping length without any complicated design calculations.

Ex Marking

II 2 GD
Ex 60079-30-1 IIC T6 Gb
Ex 60079-30-1 IIIC T85°C Db

Technical data

Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	65 °C
Maximum continuous exposure temperature (de-energized)	85 °C
Ambient temperature range	-60...+55 °C
Minimum installation temperature:	
Thermoplastic elastomer overjacket Fluoropolymer elastomer overjacket	-30 °C -60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	1.25 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
Thermoplastic overjacket, braiding	13.2×6.1	142
Fluoropolymer overjackert braiding	12.8×5.7	152
Thermoplastic overjacket, Al screen	13.0x5.4	114

Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 50–57

JB2221-223-2X(11-15) – see pp. 50–57

JB2221-333- 1X(11-19) – see pp. 66–73

JB2221-333-2X(11-23) – see pp. 66–73

TKR connection kit for junction boxes – see p. 92

TKR/J connection kit for junction boxes without terminal glands – see p. 91

TKT/M kit for connection to the installation wire (without boxes) – see p. 91

CP-6 kit for connecting two heating cables (for maintenance, etc.) – see p. 92

Cable fasteners – see pp. 100-101

Ordering information

Example: 33HTP2-BT
① ②③④ ⑤⑥

1. Linear power 33 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   HT – low temperature
3. Cable version: P – for industrial applications
4. Rated voltage: 2 – 230 VAC (other voltages on request)
5. Braiding material: B – copper tinned wire, A – aluminum foil and drainage wire
6. Overjacket material: T – thermoplastic elastomer, P – fluoropolymer

Max. heating circuit length

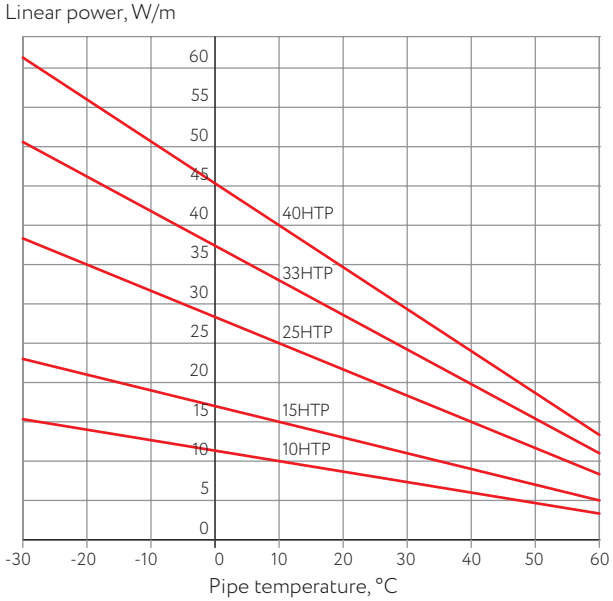
(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V		
		16 A	20 A	32 A
10HTP	10	205	–	–
	0	180	205	–
	-10	152	205	–
	-20	123	165	195
	-30	98	145	180
	-40	94	118	170
15HTP	10	145	162	–
	0	127	147	162
	-10	114	132	162
	-20	82	111	160
	-30	70	101	145
	-40	60	90	135
25HTP	10	88	117	126
	0	76	101	118
	-10	65	89	112
	-20	50	70	105
	-30	48	66	101
	-40	45	62	98
33HTP	10	70	90	108
	0	61	77	101
	-10	53	66	96
	-20	45	58	85
	-30	41	52	84
	-40	37	49	79
40HTP	10	56	73	91
	0	48	63	83
	-10	40	55	78
	-20	31	47	72
	-30	24	35	52
	-40	24	34	51

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

Power output curve

Nominal power output at rated voltage 230 VAC.



Self-regulating heating cable CTE

- 80 W/m
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Thermoplastic overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available

1. Nickel-plated copper conductors, 2.00 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid
5. Overjacket thermoplastic

Versions

CTE...BT Thermoplastic elastomer overjacket with tinned copper braiding.

Ex Marking

1Ex e IIC T6 Gb X

Approvals

№ 16.00338.120

№ ТС RU C-RU.АА87.В.00340

№ C-RU.ПБ37.В.02047.

Key features

CTE is an industrial-grade self-regulating heating cable used to prevent formation of ice and accumulation of snow on outdoor industrial sites (open pump sites, ramps, helipads).

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

CTE cable complies with international standards, as well as the Russian standards GOST 31610.0-2014

(IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of CTE heating cable is quick and simple and requires no special skills or tools.

Because of its parallel construction the power output of the heating cable is everywhere the same.

Thus it can be fitted on site to exact piping length without any complicated design calculations.

Can be supplied as pre-fabricated connection-ready sections with cold leads.

Technical data

Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	80 °C
Maximum continuous exposure temperature (de-energized)	100 °C
Ambient temperature range	-60...+55 °C
Minimum installation temperature	-30 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	2.00 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
CTE...BT	16.8×7.2	215

Accessories
(to be ordered separately)

TKT/M kit for connection to the installation wire (without boxes) – see p. 93

Zinc-plated fastening tape for securing the cable – see p. 103

Ordering information

Example: 80CTE2-BT
① ②③④ ⑤⑥

1. Linear power 80 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   CT – mid-temperature
3. Cable version: E – for industrial applications
4. Rated voltage: 2 – 230 VAC (other voltages on request)
5. Braiding material: B – copper tinned wire
6. Overjacket material: T – thermoplastic elastomer

Max. heating circuit length

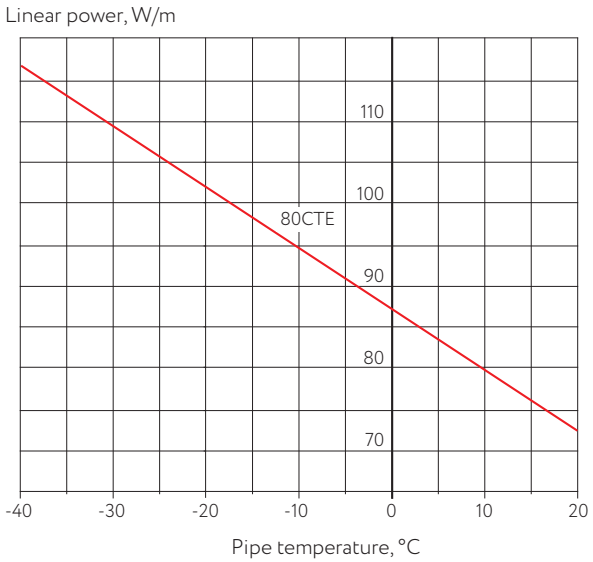
(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V	
		25 A	30 A
80CTE	10	78	83
	0	76	80
	-10	74	76
	-20	72	74
	-30	69	72
	-40	65	69

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

Power output curve

Nominal power output at rated voltage 230 VAC.



Self-regulating heating cable BTC

- 8, 15, 24, 30, 37, 45 or 60 W/m
- For steam cleaned pipelines
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Fluoropolymer overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available

1. Nickel-plated copper conductors, 1.25 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid
5. Overjacket fluoropolymer

Versions

BTC...BP Fluoropolymer overjacket with tinned copper braiding..

Ex Marking

II 2 GD
Ex 60079-30-1 IIC T3 Gb
Ex 60079-30-1 IIIC T200°C Db

Approvals

№ Sira 17ATEX3335U
№ Sira 18ATEX3038X
№ IECEx CCVE 17.0006U
№ IECEx CCVE 17.0007X
№ 16.00338.120
№ TC RU C-RU.AA87.B.00340
№ C-RU.ПБ37.B.02047

Key features

BTC is an industrial-grade self-regulating heating cable used on large diameter pipelines that require steaming, for freeze protection and temperature maintenance, as well as in systems where the heating cable is exposed to high temperatures.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

BTC cable complies with international standards, as well as the Russian standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of BTC heating cable is quick and simple and requires no special skills or tools. Because of its parallel construction the power output of the heating cable is everywhere the same. Thus it can be fitted on site to exact piping length without any complicated design calculations.

Technical data

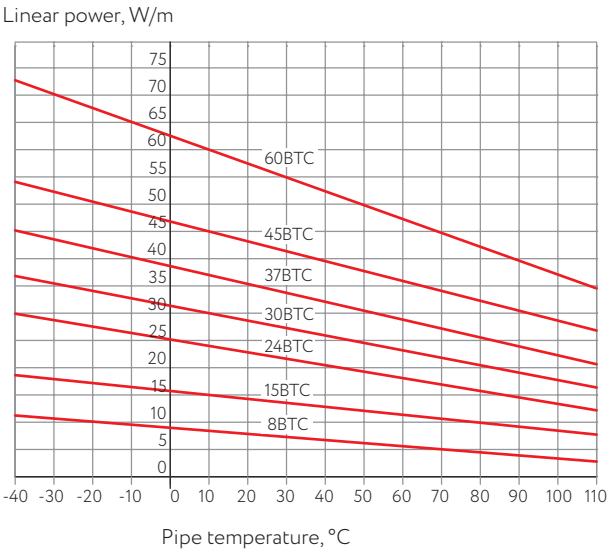
Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	120 °C
Maximum continuous exposure temperature (de-energized)	200 °C
Ambient temperature range	-60…+55 °C
Minimum installation temperature	-60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Minimum bending radius	25 mm
Conductor cross-section	1.25 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
BTC…BP	10.6 × 5.3	120

Power output curve

Nominal power output at rated voltage 230 VAC.



Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 52–57

JB2221-223-2X(11-15) – see pp. 52–57

JB2221-333- 1X(11-19) – see pp. 68–73

JB2221-333-2X(11-23) – see pp. 68–73

TKL, TKW connection kit for junction boxes – see p. 92

TKR/J, TKW/J connection kit for junction boxes without terminal glands – see p. 93

TKT/M kit for connection to the installation wire (without boxes) – see p. 93

CP-7 kit for connecting two heating cables (for maintenance, etc.) – see p. 94

Cable fasteners – see pp. 102-103

Max. heating circuit length

(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V 16 A	230 V 20 A	230 V 32 A
8BTC	10	200	–	–
	0	184	194	200
	-10	159	183	199
	-20	134	167	198
	-30	120	149	190
	-40	106	132	182
15BTC	10	165	200	–
	0	146	179	200
	-10	138	169	200
	-20	127	158	194
	-30	107	148	183
	-40	98	139	178
24BTC	10	126	147	–
	0	109	139	147
	-10	103	133	147
	-20	97	128	147
	-30	87	121	145
	-40	78	105	144
30BTC	10	90	120	–
	0	88	108	120
	-10	77	104	120
	-20	74	100	120
	-30	71	87	110
	-40	65	82	102
37BTC	10	79	106	–
	0	74	103	106
	-10	68	95	106
	-20	65	90	106
	-30	63	80	100
	-40	54	69	91
45BTC	10	70	82	–
	0	59	78	82
	-10	54	72	82
	-20	51	68	82
	-30	43	62	72
	-40	37	57	68
60BTC	10	51	66	–
	0	50	62	66
	-10	49	60	66
	-20	42	58	66
	-30	38	54	56
	-40	28	52	53

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

Ordering information

Example: 45BTC2-BP
① ② ③④ ⑤⑥

1. Linear power 45 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   BT – high temperature
3. Cable version: C – for industrial applications
4. Rated voltage: 2 – 230 VAC (other voltages on request)
5. Braiding material: B – copper tinned wire
6. Overjacket material: P – fluoropolymer

Self-regulating heating cable BTX

- 15, 30, 45, 60, 75 or 100 W/m
- For extra-high temperatures
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Fluoropolymer overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available

Temperature resistance up to 250 °C

1. Nickel-plated copper conductors, 1.25 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid
5. Overjacket fluoropolymer

Versions

BTX...BP — Fluoropolymer overjacket with tinned copper braiding.

Ex Marking

Ex e IIC T3..T2 Gb

Ex e IIIC T200...300°C Db

Approvals

IECEx SIR 19.009

IECEx SIR 19.010

№ 16.00338.120

№ ТС RU C-RU.АА87.В.00340

№ С-RU.ПБ37.В.02047.

Key features

BTX is an industrial-grade self-regulating heating cable used to protect against freezing and to maintain the desired temperature of industrial pipelines and tanks (and other process equipment), as well as in systems where the heating cable is exposed to high temperatures.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

BTX cable complies with international standards, as well as the Russian standards GOST 31610.0-2014

(IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of BTX heating cable is quick and simple and requires no special skills or tools. Because of its parallel construction the power output of the heating cable is everywhere the same. Thus it can be fitted on site to exact piping length without any complicated design calculations.

Technical data

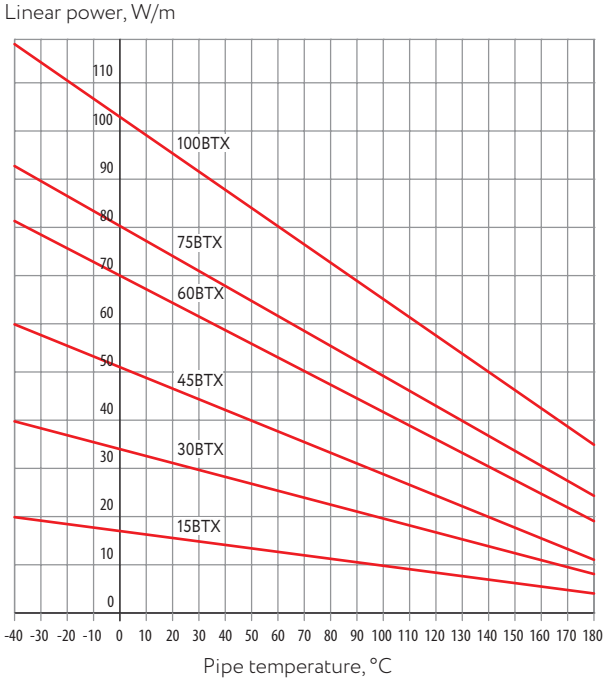
Rated voltage	230 VAC
Maximum continuous operating temperature (energized)	250 °C
Maximum continuous exposure temperature (de-energized)	250 °C
Ambient temperature range	-60…+55 °C
Minimum installation temperature	-60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	1.25 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
15BTX…75BTX	12.1×5.4	152
100BTX	14.4×5.5	198

Power output curve

Nominal power output at rated voltage 230 VAC.



Ordering information

Example: 45BTX2-BP
① ② ③④ ⑤⑥

1. Linear power 45 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   BT – high temperature
3. Cable version: X – for industrial applications
4. Rated voltage: 2 – 230 VAC (other voltages on request)
5. Braiding material: B – copper tinned wire
6. Overjacket material: P – fluoropolymer

Max. heating circuit length

(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	230 V 16 A	230 V 20 A	230 V 32 A
15BTX	10	122	154	165
	0	112	140	165
	-10	102	136	165
	-20	99	131	165
	-30	93	124	165
	-40	88	117	165
30BTX	10	82	102	110
	0	74	96	110
	-10	71	94	110
	-20	70	93	110
	-30	69	92	110
	-40	69	91	110
45BTX	10	62	76	88
	0	52	66	84
	-10	45	58	82
	-20	43	56	82
	-30	40	52	77
	-40	37	49	73
60BTX	10	38	46	76
	0	35	45	69
	-10	34	44	68
	-20	34	44	67
	-30	33	43	65
	-40	32	43	64
75BTX	10	27	37	52
	0	26	35	51
	-10	25	32	50
	-20	24	30	49
	-30	24	30	49
	-40	24	30	49
100BTX	10	24	30	46
	0	23	29	43
	-10	22	28	43
	-20	21	27	43
	-30	21	27	43
	-40	21	27	43

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 52–57

JB2221-223-2X(11-15) – see pp. 52–57

JB2221-333- 1X(11-19) – see pp. 68–73

JB2221-333-2X(11-23) – see pp. 68–73

TKW connection kit for junction boxes – see p. 92

TKW/J connection kit for junction boxes without terminal glands – see p. 93

CP-7 kit for connecting two heating cables (for maintenance, etc.) – see p. 94

Cable fasteners – see pp. 102-103

Self-regulating heating cable HTB

- 12 or 17 W/m
- Low voltage 22 – 24 V (11 – 12 V on request)
- Ex-approved solution
- Self-regulating, automatically adjusts power output in response to ambient temperature
- Thermoplastic or fluoropolymer overjacket
- Easy to install
- Can be cut to required length on site without any complicated design calculations
- Will not overheat even when overlapped
- Can be used in explosive environments without temperature limiter
- Full range of accessories available

1. Nickel-plated copper conductors, 1.00 mm^2
2. Semi-conductive self-regulating matrix
3. Matrix insulation
4. Tinned copper braid
5. Overjacket thermoplastic or fluoropolymer

Versions

HTB...BT	Thermoplastic elastomer overjacket with tinned copper braiding.
HTB...BP	Fluoropolymer overjacket with tinned copper braiding.

Ex Marking

1Ex e IIC T6 Gb X

Approvals

№ 16.00338.120

№ ТС RU C-RU.АА87.В.00340

№ С-RU.ПБ37.В.02047.

Key features

HTB is an industrial grade self-regulating heating cable designed for low loads and used for protection against freezing or maintaining the desired temperature of industrial pipelines and tanks in the construction industry, temperature controlled storage and road transportation.

Due to its self-regulating characteristics it will not overheat even when the cable is overlapped. This guarantees maximum safety and reliability.

HTB cable is approved for installation in safe and explosive areas pursuant to international standards, as well as the Russian standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST R IEC 60079-7-2012, GOST IEC 60079-30-1-2011.

The installation of HTP heating cable is quick and simple and requires no special skills or tools.

Because of its parallel construction the power output of the heating cable is everywhere the same.

Thus it can be fitted on site to exact piping length without any complicated design calculations.

Technical data

Rated voltage	22 – 24 V (11 – 12 V on request)
Maximum continuous operating temperature (energized)	65 °C
Maximum continuous exposure temperature (de-energized)	85 °C
Ambient temperature range	-60...+55 °C
Minimum installation temperature:	
Thermoplastic elastomer overjacket Fluoropolymer elastomer overjacket	-30 °C -60 °C
Minimum bending radius	25 mm
Maximum braiding resistance	10 Ohm/km
Conductor cross-section	1.00 mm^2

Weight and dimensions

Type	Nominal size, mm	Weight, kg/km
HTB...BT	10.5 × 5.9	105
HTB...BP	10.5 × 5.9	120

Accessories
(to be ordered separately)

Junction boxes

JB2221-223-1X(11-13) – see pp. 52–57

JB2221-223-2X(11-15) – see pp. 52–57

JB2221-333- 1X(11-19) – see pp. 68–73

JB2221-333-2X(11-23) – see pp. 68–73

TKL connection kit for junction boxes – see p. 92

TKL/J connection kit for junction boxes without terminal connector – see p. 93

TKT/M kit for connection to the installation wire (without boxes) – see p. 93

Cable fasteners – see pp. 102-103

Ordering information

Example: 12HTB24-BT
① ② ③ ④ ⑤ ⑥

1. Linear power 12 W/m (to IEC 60079-1-30)
2. Type of self-regulating heating cable:
   HT – low temperature
3. Cable version: B – low-voltage
4. Rated voltage: 1 – ~11–12 V, 2 – ~22–24 V
5. Braiding material: B – copper tinned wire
6. Overjacket material: T – thermoplastic elastomer,
   P – fluoropolymer

Max. heating circuit length

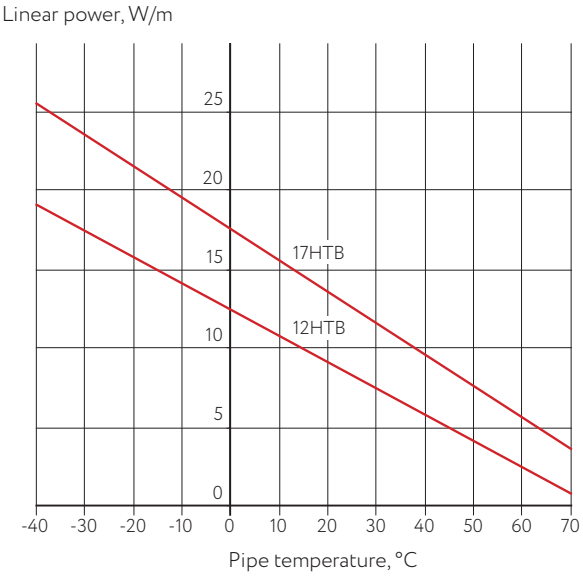
(or combined length of a section of same grade connected in parallel) depending on the type of automatic circuit breaker:

Type	Activation temperature, °C	24 V		
		6 A	10 A	16 A
12HTB	5	8	14	20
	0	8	12	20
	-20	6	10	16
	-40	4	8	12
17HTB	5	6	10	16
	0	6	10	16
	-20	6	8	14
	-40	4	8	12

For use with type C circuit breakers to GOST R 50345-2010 (IEC 60898-1:2003)

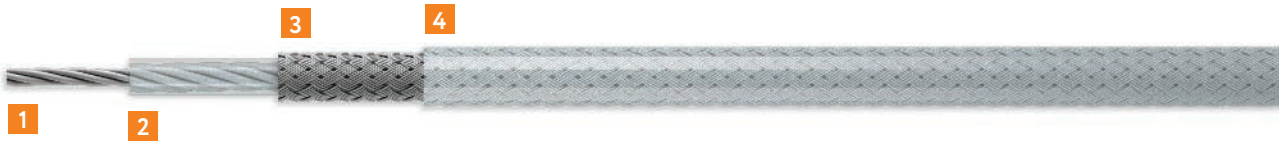
Power output curve

Nominal power output at rated voltage 24 V.



Series-resistance cables SNF, SNFL

- Linear heat generation up to 40* W/m
- Full set of control tools and accessories
- Operating temperature: up to 260 °C
- Operating voltages up to 450/750 VAC(U_0/U)
- Available with 7J (SNF) and 4J (SNFL) mechanical resistance



1. Resistive heating conductor
2. Fluoropolymer insulation
3. Nickel-plated copper braid
4. Fluoropolymer outer jacket

Purpose

Heating cables SNF, SNFL are designed for heating pipelines, tanks, process equipment and other facilities in the temperature range from -70 to +260 °C.

Applications

Heating cables can be used to heat equipment operated at high temperature and humidity, in explosive areas and in areas potentually exposed to corrosive chemical solutions or vapors.

Key features

This series of heating cables with fluoropolymer insulation is designed for use where high operating temperature and high heat output are required.

The fluoropolymer jacket allows the cable to be safely operated in humid and chemically aggressive environments.

Supplied as ready-made heating sections with installation wires and glands. Sections can also be assembled on site from individual components supplied by the manufacturer by following the design documents.

The installation of heating sections on site take little time and is straightforward. To speed up the installation, special glands and other accessories are included.

IMPORTANT!

1. To avoid overheating the cable should not overlap or be laid in insufficiently spaced stretches.
2. The installation instructions must be strictly followed.

* Linear heat generation is determined when designing the heating system and depends on the temperature and design of the heated system.

Technical data

Maximum exposure temperature		260 °C (intermittent +300 °C)
Ambient temperature range		-70...+55 °C
Minimum installation temperature		-70 °C
Rated voltage (U_0/U)		up to 450/750 VAC
Mechanical resistance	SNF SNFL	7J 4J
Maximum braiding resistance		18 Ohm/km
Maximum linear power output		up to 40 W/m
Ex marking		1Ex e IIC T2 Gb X
IP rate		IP67
Minimum permissible single bending radius during installation		2.5 diameters for cables with ext. ø up to 6 mm, 6 diameters for cables with ext. ø over 6 mm

Approvals

№ ТС RU C-RU.AA87.B.00579

№ C-RU.ПБ37.B.02046

IECEx CCVE 18.0005U

IECEx CCVE 18.0004X

Accessories
(to be ordered separately)

Junction boxes, series JB2221-223-1X(18-20) (see pp. 64-65), JB2221-333-1X(20-22) (see pp. 76-77)

Glands SNF MF – see pp. 36-37

Cable fasteners – see pp. 102-103

Heating cable specifications

Brand of heating cable		Nominal resistance at 20 °C, Ohm/km	Section length, star conn., U=380 V, (m)			Section length, loop conn., U=220 V, (m)			Section length, line conn., U=220 V, (m)			External cable diameter, (mm)	
			Power rating of a single heating cable line, W/m										
7J	4J		10	20	30	15	25	35	20	30	40	7J	4J
SNF 01R8	–	1.81	1635	–*	–*	1330	–*	–*	–*	–*	–*	7.80	–
SNF 02R9	–	2.95	1281	906	–*	1046	–*	–*	906	–*	–*	6.74	–
SNF 04R4	–	4.42	1046	740	604	854	660	550	740	604	–*	5.88	–
SNF 07R1	–	7.13	821	582	474	672	520	440	582	474	412	5.10	–
SNF 09R7	–	9.65	707	501	408	578	448	378	501	408	354	5.25	–
SNF 11R9	–	11.9	636	451	367	520	404	342	451	367	319	4.96	–
SNF 17R4	SNFL 17R4**	17.4	527	373	304	432	334	282	373	304	264	4.69	4.29
SNF 24R8	SNFL 24R8	24.8	441	312	254	360	280	236	312	254	221	4.48	4.08
SNF 32R7	SNFL 32R7	32.7	383	272	221	314	244	206	272	221	192	4.73	3.93
SNF 0050	SNFL 0050	50.0	309	219	178	252	196	166	219	178	155	4.55	3.75
SNF 0062	SNFL 0062	62.0	278	197	161	228	176	150	197	161	139	4.52	3.72
SNF 0080	SNFL 0080	80.0	247	175	143	202	156	132	175	143	124	4.40	3.60
SNF 0100	SNFL 0100	100.0	218	155	126	178	138	116	155	126	109	4.70	3.90
SNF 0142	SNFL 0142	142.0	184	131	106	150	116	98	131	106	92	4.61	3.81
SNF 0178	SNFL 0178	178.0	165	117	95	134	104	88	117	95	83	4.52	3.72
SNF 0200	SNFL 0200	200.0	154	109	89	126	98	82	109	89	77	4.55	3.75
SNF 0250	SNFL 0250	250.0	138	98	80	114	88	74	98	80	69	4.55	3.75
SNF 0340	SNFL 0340	340.0	119	84	69	98	76	64	84	69	60	4.45	3.65
SNF 0410	SNFL 0410	410.0	108	77	63	88	68	58	77	63	54	4.28	3.48
SNF 0490	SNFL 0490	490.0	99	70	57	82	62	54	70	57	50	4.45	4.05
SNF 0590	SNFL 0590	590.0	91	64	52	74	58	48	64	52	45	4.55	3.75
SNF 0665	SNFL 0665	665.0	85	60	49	70	54	46	60	49	43	4.70	3.90
SNF 0765	SNFL 0765	765.0	79	56	46	64	50	42	56	46	40	4.52	3.72
SNF 1000	SNFL 1000	1000.0	69	49	40	56	44	38	49	40	35	4.40	3.60
SNF 1300	SNFL 1300	1300.0	61	43	35	50	38	33	43	35	30	4.34	3.54
SNF 1480	SNFL 1480	1480.0	57	40	33	46	36	31	40	33	29	4.51	3.71
SNF 1865	SNFL 1865	1865.0	51	36	29	42	32	28	36	29	25	4.76	3.96
SNF 2825	SNFL 2825	2825.0	41	29	24	34	26	22	29	24	21	4.70	3.90
SNF 3950	SNFL 3950	3950.0	35	25	20	28	22	18	25	20	18	4.61	3.81
SNF 5900	SNFL 5900	5900.0	29	20	16	24	18	16	20	16	14	4.34	3.54
SNF 7000	SNFL 7000	7000.0	26	19	15	22	16	14	19	15	13	4.30	3.50
SNF 8000	SNFL 8000	8000.0	25	17	14	20	16	14	17	14	12	4.27	3.47

* – This cable is used as an installation wire.
** – For cold lead connection, 7J SNF cables from SNF 01R8 to SNF 11R9 must be used

Connector SNF MF

- Durable and reliable design
- Quick and easy to install
- High chemical resistance
- Operating temperature range up to 260 °C
- Explosion proof
- Power supply up to 450/750 V

1. Locknut
2. Seal
3. Collet
4. Heat-shrink tube
5. Body

Applications

The SNF MF connector is designed for connecting the SNF mid-temperature heating cable with the installation wire and other stretches of the cable.

Versions

SNF MF-03-01-1	Connector for connecting heating cables and installation wires with a cross section of less than 4 mm^2 and for connecting two cable stretches
SNF MF-05-00-1	Connector for connecting heating cables and installation wires with a cross section between 4 mm^2 and 10 mm^2
SNF MF-05-01-1	Connector for connecting heating cables with a cross-section of 6 and 10 mm^2 and for maintenance purposes

Key features

The connector design ensures reliable operation of the heating section.

The body is made of a durable thermoplastic material that can withstand temperatures up to 260 °C.

The installation of glands is quick and does not require special tools.

Heat-shrinkable tubing provides electrical protection.

Structural design

Body	high-temperature thermoplastic
Locknut	high-temperature thermoplastic
Collet	aluminum alloy
Seal	silicone rubber
Heat-shrink tube	fluoropolymer

Technical data

Maximum exposure temperature		260 °C (intermittent +300 °C)
Ambient temperature range		-70…+55 °C
Minimum installation temperature		-70 °C
Maximum cross-section of installation wire core		up to 10 mm^2
Rated voltage (U_0/U)		up to 450/750 VAC
Max current	SNF MF-03-01-1 SNF MF-05-00-1 SNF MF-05-01-1	up to 50 A up to 90 A up to 100 A
Ex marking		1Ex e IIC T2…T3 Gb X
Protection class		IP 67

Approvals

№ TC RU C-RU.AA87.B.00579

IECEx CCVE 18.0004X

Ordering information

Example: Connector SNF MF-03-01-1
① ② ③

1. Connector type: 03 – for connecting cables with a cross-section of up to 4 mm^2; 05 – for connecting cables with a cross-section of over 4 mm^2
2. Applications: 00 – only for connecting heating cable with SNF installation wire; 01 – for both connecting heating cable and installation wire and connecting of two SNF heating cables
3. Version: 0 – without fluoropolymer heat shrinkable tubing; 1 – with fluoropolymer heat shrinkable tubing

Heating cable specifications

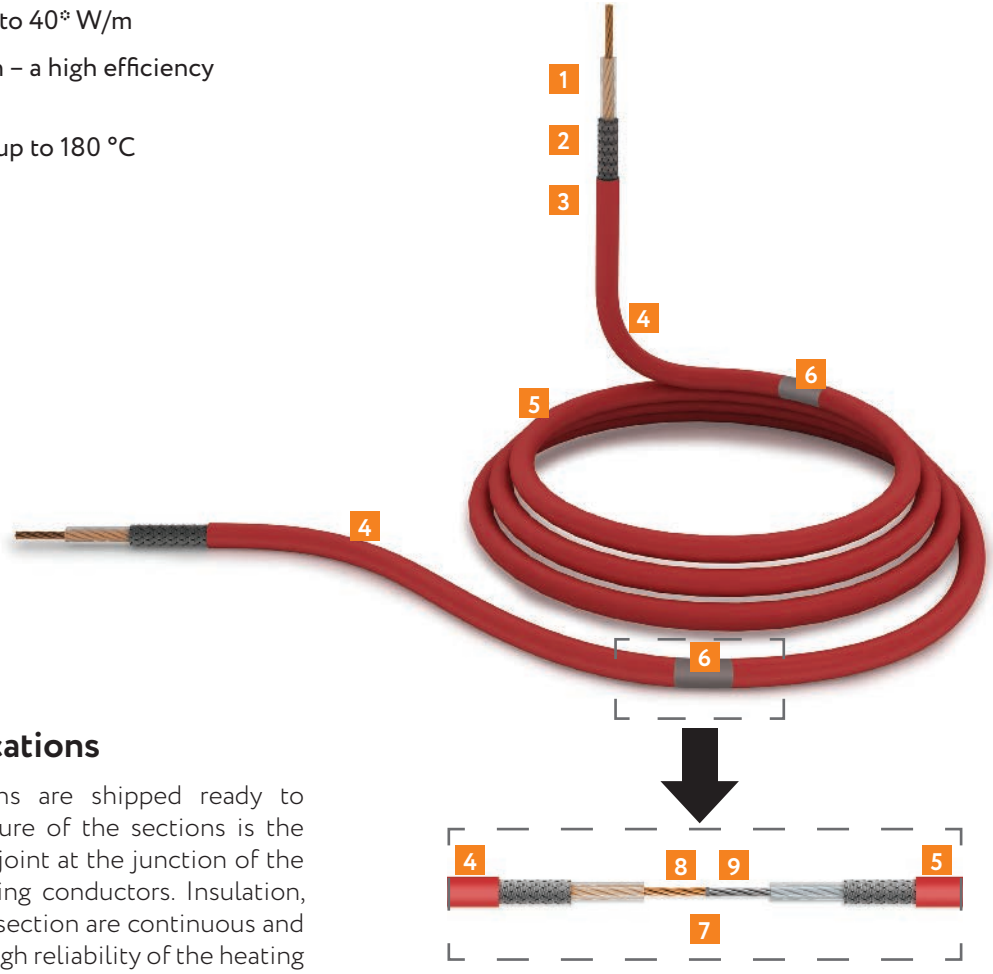
Grade, SNF heating cable	Installation wire grade at heating cable linear power			Connector type, heating cable to installation wire	Connector type, two heating cables
	up to 20 W/m	20–30 W/m	30–40 W/m		
SNF 01R8*	–	–	–	–	SNF MF-05-01-1
SNF 02R9	SNF 01R8	–	–	SNF MF-05-01-1	
SNF 04R4		SNF 01R8	–	SNF MF-05-00-1	SNF MF-03-01-1
SNF 07R1			SNF 01R8		
SNF 09R7	SNF 02R9				
SNF 11R9					
SNF, SNFL 17R4	SNF 04R4	SNF 02R9			
SNF, SNFL 24R8	SNF 07R1	SNF 04R4	SNF 04R4	SNF MF-03-01-1	
SNF, SNFL 32R7	SNF 09R7				
SNF, SNFL 0050	SNF 11R9	SNF 09R7			
SNF, SNFL 0062		SNF 11R9			
SNF, SNFL 0080					
SNF, SNFL 0100			SNF 07R1		
SNF, SNFL 0142					
SNF, SNFL 0178					
SNF, SNFL 0200					
SNF, SNFL 0250					
SNF, SNFL 0340					
SNF, SNFL 0410			SNF 11R9		
SNF, SNFL 0490					
SNF, SNFL 0590					
SNF, SNFL 0665					
SNF, SNFL 0765					
SNF, SNFL 1000					
SNF, SNFL 1300					
SNF, SNFL 1480					
SNF, SNFL 1865					
SNF, SNFL 2825					
SNF, SNFL 3950					
SNF, SNFL 5900					
SNF, SNFL 7000					
SNF, SNFL 8000					

* – This cable is used as an installation wire.

Seamless heating section based on TMF cable

- Linear power output up to 40* W/m
- Seamless section design – a high efficiency solution
- Operating temperature up to 180 °C
- Easy installation

1. Fluoropolymer insulation
2. Tinned copper wire armor
3. Fluoropolymer jacket
4. Installation wire
5. Heating cable
6. Splice point mark
7. Core welding point
8. Current-carrying conductor
9. Heating conductor



Features and applications

Seamless heating sections are shipped ready to install. A distinctive feature of the sections is the absence of a pronounced joint at the junction of the heating and current-carrying conductors. Insulation, braiding and jacket of the section are continuous and homogeneous to ensure high reliability of the heating section.

Section insulation and jackets are made of fluoropolymers to ensure a high operating temperature (up to 180 °C), resistance to aggressive chemicals and petroleum products.

Standard sections are available with a linear power rating of 40 and 30 W/m. Sections with other linear power ratings are available on request or as specified.

Ready-made sections and standard dimensions greatly simplify installation.

Medium-temperature seamless sections are the best solution for heating of pipelines, tanks, process equipment filled with oil, bitumen, paraffin, and other high-viscosity substances and for floor heating at pumping stations.

Purpose

Medium-temperature seamless heating sections based on the TMF cable are designed for heating pipelines, tanks, process equipment, and other systems in the temperature range from -60 to +180 °C, including those in hazardous areas, to prevent the formation of ice and snow on outdoor industrial sites.

Structural design

Heating conductor	copper-nickel alloys, high resistance
Installation wire core	tinned copper wires
Insulation of the conductor	fluoropolymer
Armor	tinned copper wire
Outer jacket	fluoropolymer

* Linear heat generation is determined when designing the heating system and depends on the temperature and design of the heated system.

Maximum operating temperature	180 °C
Maximum permissible temperature without load	200 °C
Ambient temperature range	-60...+50 °C
Minimum installation temperature	-60 °C
Versions for operating voltage	~220 and 380 V available
Protective armor resistance, max	18 Ohm/km
Linear heat generation, single cable	up to 40 W/m*
Ex marking	1Ex e IIC T2...T3 Gb X
Degree of external protection GOST 14254-96	IP67
Minimum bending radius, storage and transportation	150 mm
Minimum permissible radius single bending during installation	30 mm

IMPORTANT!

1. To avoid overheating, the cable should not overlap or be laid in insufficiently spaced stretches.
2. The installation instructions must be strictly followed.
3. Connection point of the installation wire with the heating cable is indicated by a foil band.

Approvals

№ ТС RU C-RU.АА87.В.00894

№ C-RU.ПБ37.В.01462

Accessories (to be ordered separately)

Junction boxes of series JB2221-223-1X(18-20) (see pp. 64-65), JB2221-333-1X(20-22) (see pp. 76-77)

Cable fasteners – see pp. 102-103

Ordering information

Example: Heating section, cable 30TMOE2 (TMF (7x0,3)н)-0270-040

① ② ③④⑤ ⑥ ⑦ ⑧

1. Linear power of the heating section, W/m
2. Resistive section (type TM)
3. Single-core section
4. Shield
5. Power supply voltage: 2 – 220–240 V, 3 – 380–400 V
6. Heating cable grade
7. Heating stretch length of the section, dm
8. Installation wire length on each side, dm

Serial heating section parameters

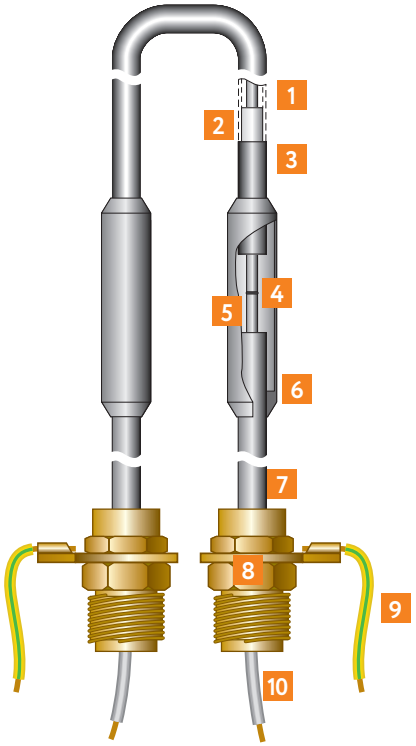
Section grade	Resistance of the section at 20 °C, (Ohm)± %	Length of the section heating stretch, (m)	Section power rating, (W)	External diameter, mm
1. Standard sections, operating voltage 220 V, linear power 30 W/m**				
30TMOE2 (TMF (7 × 0,3)n)-0270-040	55.89-64.92	27	810	4.10
30TMOE2 (TMF (7 × 0,3)sn)-0330-040	45.21-52.48	33	990	4.10
30TMOE2 (TMF (7 × 0,3)k)-0420-040	37.38-43.43	42	1260	4.10
30TMOE2 (TMF (7 × 0,3)a)-0490-040	30.87-35.96	49	1470	4.10
30TMOE2 (TMF (7 × 0,4)k)-0560-040	28.20-32.65	56	1680	4.46
30TMOE2 (TMF (7 × 0,4)a)-0650-040	23.24-26.91	65	1950	4.46
30TMOE2 (TMF (7 × 0,3)CuNi10)-0720-040	20.16-23.99	72	2160	4.10
30TMOE2 (TMF (7 × 0,4)CuNi10)-0960-040	15.36-17.95	96	2880	4.46
30TMOE2 (TMF (7 × 0,5)CuNi10)-1200-040	12.00-14.41	120	3600	4.76
30TMOE2 (TMF (7 × 0,5)CuNi6)-1480-040	8.88-11.84	148	4440	4.76
2. Standard sections, operating voltage 220 V, linear power 40 W/m**				
40TMOE2 (TMF (7 × 0,3)n)-0240-040	49.68-57.70	24	960	4.10
40TMOE2 (TMF (7 × 0,3)sn)-0290-040	39.73-46.12	29	1160	4.10
40TMOE2 (TMF (7 × 0,3)k-0360-040	32.04-37.22	36	1440	4.10
40TMOE2 (TMF (7 × 0,3)a)-0420-040	26.46-30.82	42	1680	4.10
40TMOE2 (TMF (7 × 0,4)k)-0480-040	24.17-27.98	48	1920	4.46
40TMOE2 (TMF (7 × 0,4)a)-0560-040	20.02-23.18	56	2240	4.46
40TMOE2 (TMF (7 × 0,3)CuNi10)-0630-040	17.64-20.99	63	2520	4.10
40TMOE2 (TMF (7 × 0,4)CuNi10)-0840-040	13.44-15.71	84	3360	4.46
40TMOE2 (TMF (7 × 0,5)CuNi10)-1050-040	10.50-12.61	105	4200	4.76
40TMOE2 (TMF (7 × 0,5)CuNi6)-1280-040	7.68-10.24	128	5120	4.76

** Two types of heating sections are available – with linear heat generation of 30 W/m and 40 W/m with an installation wire 4 m long on each side. To order and as specified, sections with different power ratings and different installation wire lengths may be shipped.

Sections on mineral insulated cable MOIC-M

- High mechanical strength
- High chemical resistance
- Easy installation
- Shipped as prefabricated sections
- Power supply voltage up to 660 V
- Temperature resistance up to +600 °C
- Explosion- and fire-safe

1. Heating conductor
2. MgO (magnesium oxide) core insulation
3. Outer metal jacket of the heating cable
4. Hard brazing
5. Current-carrying conductor
6. Coupling
7. Outer metal jacket of the cold cable insert
8. Cable connector M20
9. Grounding
10. Flexible installation wire



Purpose and applications

The heating cable MOIC-M is intended for heating pipelines, tanks and process equipment in the temperature range from -60 to +600 °C, including those operated in aggressive and explosive areas.

The heating cable MOIC-M can be used in the oil refining, chemical, pharmaceutical, food and other industries.

If the thermal output of the electrical heating system is correctly calculated, the cable can be used in a broad temperature range.

Shipped as ready-made sections. A section consists of a heating cable, couplings, cold cable inserts, cable glands and flexible installation wires.

Key features

Sections on the heating cable MOIC-M are purposefully designed for efficient and reliable operation where a high operating temperature has to be maintained, combined with high thermal output (for example, in the heating of bitumen plants and pipelines).

Due to the high thermal stability of the magnesium oxide insulation, the MOIC-M cable can be safely operated at jacket temperatures up to 600 °C.

MOIC-M cable have excellent mechanical strength and high corrosion resistance, can be operated in aggressive environments and hazardous areas, is fire-resistant and safe to operate.

Approvals

№ ТС RU C-RU.AA87.B.00894

№ C-RU.ПБ37.B.01462

IMPORTANT!

1. To avoid overheating the cable should not overlap.
2. The installation instructions must be strictly followed.

Resistance to corrosive substances

Material, jacket	Sulfur compounds (H_2S, SO_2)		Sulfuric acid*	Hydrochloric acid	Fluoride acid	Alkalis	Phosphoric acid	Sea water	Nitric acid	Chlorine**		Organic acids***
	dry	moist								dry	moist	
Copper												
Copper-nickel alloy												
Stainless steel												
Inconel												

– recommended
– permissible
– to be confirmed
– not recommended

* – depending on concentration and temperature
** – resistance to chlorines depends on the chemical composition of the salt
*** – different resistance to different organic acids

Technical data

Operating voltage	up to 660 V
Maximum linear power	up to 400 W/m
Insulation resistance, min	10^3 MOhm·m
Maximum thermal resistance	up to 600 °C
Ambient temperature range	-60…+50 °C
Ex marking	1Ex e IIC T1…T3 Gb X
Degree of external protection GOST 14254-96	IP67
Earth leakage current	3 mA/100 m
Minimum installation temperature	-60 °C
Minimum bending radius	6 outer diameters

Ordering information

Example: Heating section, cable MOIC-M

35MOIC-M ② 2-250-CN-0250-040

① ② ③ ④ ⑤ ⑥ ⑦

1. Linear power output, W/m
2. Section name (metal overjacket industrial cable, mineral insulated)
3. Rated voltage: (2 – 230, 3 – 400, 5 – custom value, 6 – 660 V)
4. Resistance, Ohm/km
5. Overjacket type (C – copper, CN – copper-nickel alloy, I – inconel, ST – stainless steel)
6. Hot cable length, dm
7. Cold fragment length on every side, dm

Accessories (to be ordered separately)

Junction boxes of series JB2221-223-2X(25-26) (see pp. 66-67), JB2221-333-2X(24-26) (see pp. 78-79)

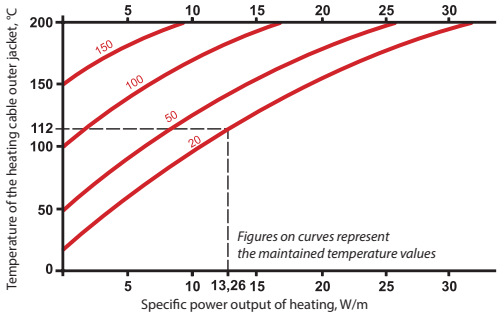
Available jacket options

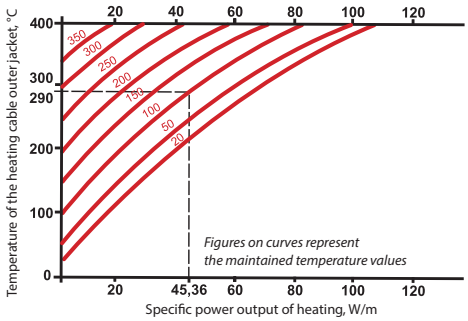
1. Copper	Maximum temperature resistance up to 200 °C
2. Copper-nickel alloy	Maximum temperature resistance up to 400 °C
3. Inconel or stainless steel	Maximum temperature resistance up to 600 °C

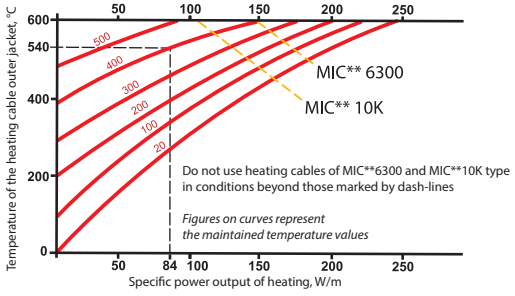
Cable (used in section) versions

Cable	Material core	Resistance core at 20°C, Ohm/km	Outer diameter of cable, mm	Cold ends	
				Cross section, mm	Dia-meter, mm
Heating cable with a copper jacket					
MOIC-M-4-C-LT	Copper	4	5,9	16	8,3
MOIC-M-7-C-LT	Copper	7	5,3	10	7,3
MOIC-M-11-C-LT	Copper	11	4,9	6,0	6,4
MOIC-M-17-C-LT	Copper	17	4,6	6,0	6,4
MOIC-M-25-C-LT	Copper	25	3,7	6,0	6,4
MOIC-M-40-C-LT	Copper	40	3,4	2,5	5,3
MOIC-M-63-C-LT	Copper	63	3,2	2,5	5,3
Heating cable with a copper-nickel jacket					
MOIC-M-4-CN-MT	Copper	4	5,9	16	8,3
MOIC-M-7-CN-MT	Copper	7	5,3	10	7,3
MOIC-M-11-CN-MT	Copper	11	4,9	6,0	6,4
MOIC-M-17-CN-MT	Copper	17	4,6	6,0	6,4
MOIC-M-25-CN-MT	Copper	25	3,7	6,0	6,4
MOIC-M-40-CN-MT	Copper	40	3,4	2,5	5,3
MOIC-M-63-CN-MT	Copper	63	3,2	2,5	5,3
MOIC-M-160-CN-MT	Constantan	160	4,9	6,0	6,4
MOIC-M-250-CN-MT	Constantan	250	4,4	2,5	5,3
MOIC-M-400-CN-MT	Constantan	400	4,0	2,5	5,3
MOIC-M-630-CN-MT	Constantan	630	3,7	2,5	5,3
MOIC-M-1000-CN-MT	Constantan	1000	3,4	2,5	5,3
MOIC-M-1600-CN-MT	Constantan	1600	3,2	2,5	5,3
Heating cable with an Inconel jacket					
MOIC-M-160-I-MT	Nichrome	160	6,5	6,0	6,4
MOIC-M-250-I-MT	Nichrome	250	5,3	6,0	6,4
MOIC-M-400-I-MT	Nichrome	400	4,7	2,5	5,3
MOIC-M-630-I-MT	Nichrome	630	4,3	2,5	5,3
MOIC-M-1000-I-MT	Nichrome	1000	3,9	2,5	5,3
MOIC-M-1600-I-MT	Nichrome	1600	3,6	2,5	5,3
MOIC-M-2500-I-MT	Nichrome	2500	3,4	2,5	5,3
MOIC-M-4000-I-MT	Nichrome	4000	3,2	2,5	5,3
MOIC-M-6300-I-MT	Nichrome	6300	3,2	2,5	5,3
MOIC-M-10000-I-MT	Nichrome	10000	3,2	2,5	5,3
Heating cable with a stainless steel jacket					
MOIC-M-160-ST-HT	Nichrome	160	6,5	6,0	6,4
MOIC-M-250-ST-HT	Nichrome	250	5,3	6,0	6,4
MOIC-M-400-ST-HT	Nichrome	400	4,7	2,5	5,3
MOIC-M-630-ST-HT	Nichrome	630	4,3	2,5	5,3
MOIC-M-1000-ST-HT	Nichrome	1000	3,9	2,5	5,3
MOIC-M-1600-ST-HT	Nichrome	1600	3,6	2,5	5,3
MOIC-M-2500-ST-HT	Nichrome	2500	3,4	2,5	5,3
MOIC-M-4000-ST-HT	Nichrome	4000	3,2	2,5	5,3
MOIC-M-6300-ST-HT	Nichrome	6300	3,2	2,5	5,3
MOIC-M-10000-ST-HT	Nichrome	10000	3,2	2,5	5,3

Maximum operating temperatures







Metal overjacket industrial cable MOIC-F

- Operating temperature up to 800 °C
- High mechanical resistance
- Ex-approved solution
- Can be used in chemically agressive and corrosive environments
- Wide range of controls and accessories

1. Resistive heating wire
2. Fiberglass insulation
3. Steel braid
4. Stainless steel outer jacket (plain or corrugated)

Purpose and applications

High temperature metal ovejacket industrial cable for heating of pipelines, vessels and process equipment.

Heating cable MOIC-F is specially designed to be an effective and reliable solution where high operating temperature to be maintained when thermal conditions are high (for example, for heating of bitumen facilities and pipelines).

Due to high thermal stability of the fiberglass insulation, MOIC-F cable can be used where outer jacket temperature reaches up to 800 °C.

MOIC-F cable has an excellent mechanical strength and high corrosion stability, it is fire-resistant and safe in operation and can be used in corrosive environments and explosion hazardous areas.

Correct calculation of the electrical heating system power output makes it possible to use the cable in a wide temperature range.

The cable is supplied as ready-made sections. The section consists of the heating cable, connection couplings, installation wires, cable entries and flexible installation wires.

Application areas

Temperature maintenace in non-hazardous and ex-hazardous areas, extra-high thermal conditions, chemically agressive environments.

Approvals

Contact SST Group sales representative for details

Accessories (to be ordered separately)

Junction boxes of series JB2221-223-2X(25-26) (see pp. 66-67), JB2221-333-2X(24-26) (see pp. 78-79).

Technical data

Maximum exposure temperature	
for MOIC HT series	800 °C
for MOIC LT series	350 °C
Minimum installation temperature	-70 °C
Rated voltage	Up to 400 VAC
Maximum power output	300 W/m
Minimal bending radius:	
for plain overjacket cable	40 mm
for corrugated overjacket cable	30 mm

Ordering information

Example: Heating cable

MOIC-F -160-SA/2-HT

① ② ③ ④ ⑤

1. Cable name (metal overjacket industrial cable, fiberglass)
2. Resistance, Ohm/km
3. Overjacket type (SA – steel annealed, SU – steel non-annealed)
4. Overjacket shape (1 – plain surface, 2 – corrugated surface)
5. Thermal resistance (HT – 800 °C, LT – 350 °C)

Example: Heating sections

30MOIC-F 2 -160-HSA/2-0510 /020

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

1. Linear power output, W/m
2. Cable name (metal overjacket industrial cable, fiberglass)
3. Rated voltage (2 – 230 VAC)
4. Resistance, Ohm/km
5. Temperature group and overjacket type (H – high temperature, L – low temperature, SA – steel annealed, SU – steel non-annealed)
6. Overjacket shape (1 – plain surface, 2 – corrugated surface)
7. Hot cable length, dm
8. Cold fragment length on every side, dm

Cable versions

Cable name	Nominal resistance (Ohm/km) at +20°C
MOIC-F-160-SA/1-LT	620
MOIC-F-900-SA/1-LT	900
MOIC-F-1400-SA/1-LT	1400
MOIC-F-2500-SA/1-LT	2500
MOIC-F-3600-SA/1-LT	3600
MOIC-F-5600-SA/1-LT	5600
MOIC-F-9900-SA/1-LT	9900
MOIC-F-160-SA/1-HT	620
MOIC-F-900-SA/1-HT	900
MOIC-F-1400-SA/1-HT	1400
MOIC-F-2500-SA/1-HT	2500
MOIC-F-3600-SA/1-HT	3600
MOIC-F-5600-SA/1-HT	5600
MOIC-F-9900-SA/1-HT	9900
MOIC-F-160-SU/2-LT	620
MOIC-F-900-SU/2-LT	900
MOIC-F-1400-SU/2-LT	1400
MOIC-F-2500-SU/2-LT	2500
MOIC-F-3600-SU/2-LT	3600
MOIC-F-5600-SU/2-LT	5600
MOIC-F-9900-SU/2-LT	9900
MOIC-F-160-SU/2-HT	620
MOIC-F-900-SU/2-HT	900
MOIC-F-1400-SU/2-HT	1400
MOIC-F-2500-SU/2-HT	2500
MOIC-F-3600-SU/2-HT	3600
MOIC-F-5600-SU/2-HT	5600
MOIC-F-9900-SU/2-HT	9900
MOIC-F-160-SA/2-LT	620
MOIC-F-900-SA/2-LT	900
MOIC-F-1400-SA/2-LT	1400
MOIC-F-2500-SA/2-LT	2500
MOIC-F-3600-SA/2-LT	3600
MOIC-F-5600-SA/2-LT	5600
MOIC-F-9900-SA/2-LT	9900
MOIC-F-160-SA/2-HT	620
MOIC-F-900-SA/2-HT	900
MOIC-F-1400-SA/2-HT	1400
MOIC-F-2500-SA/2-HT	2500
MOIC-F-3600-SA/2-HT	3600
MOIC-F-5600-SA/2-HT	5600
MOIC-F-9900-SA/2-HT	9900

Longline system based on the LLS cable

- Heated section length up to 4 km
- High heat generation up to 40 W/m
- High efficiency, large heat transfer surface area and flexibility
- Full set of control tools and accessories
- Single connection to the power source to minimize the cost of the cable system
- Easy installation

1. Heating cores of copper wire
2. Silicone rubber insulation
3. Tinned copper wire armor
4. Silicone rubber jacket

Key features

Structural design

The heating cable is composed of three parallel heating cores of copper wire insulated by silicone rubber, covered by a tinned copper wire armor and a silicone rubber jacket.

The heating cores are sized to support the desired heat generation by the required circuit length. Heating cables are connected directly to a three-phase power supply or, if required, to a step-up transformer.

Increased safety and efficiency

The large heat transfer surface of the flat heating cable reduces the operating temperature compared to similar heating cable with a cylindrical conductor design, thereby improving the efficiency, safety and service life of the heating cable. Using as an insulator silicone rubber capable of retaining its electrical and mechanical properties over a broad temperature range makes it possible to achieve a heat generation level of up to 40 W/m.

Installation

LLS cables can be arranged in a straight line or spirally on a pipe. On pre-insulated pipelines the cables are usually routed via conduits mounted on the pipe under the thermal insulation.

The heating cable is shipped cut to convenient lengths for serial connection on site or as ready-made heating sections TMTE.

Minimum power connection costs

The use of the system minimizes the number of power source connections and thus reduces the required investment into power supply networks.

Applicatins

LLS is a three-phase series-resistance heating cable used to prevent freezing or maintain the temperature in pipelines of intermediate length (up to 4 km) in safe and explosive areas.

A typical application is maintaining the temperature in aboveground or underground oil and gas pipelines, protecting water lines from freezing.

Power supply system

The electric heating system is connected to either a source of power (a dedicated step-up transformer with a supply voltage higher than 380 V) or a three-phase grid via a power management system.

The power supply output should match to the power intake of the electric heating system. The included cold start system to reduce starting currents.

Longline heat tracing system

SST Energomontazh not only offers LLS heating cables forming a part of the electric heating system, but also designs, manufactures and carries out the installation of integrated systems adapted to the specific conditions on the customer's site. As agreed with the customer, the scope of supply includes a source of power (if the voltage is other than 380 V), a power management and temperature control system, circuit integrity monitoring/control equipment, power connection boxes, maintenance boxes, connection fittings and other accessories designed for installation as part of electric heating systems.

IMPORTANT!

1. To avoid overheating, the cable should not overlap or be laid in insufficiently spaced stretches.
2. The installation instructions must be strictly followed.

Technical data

Maximum operating temperature	130 °C
Maximum permissible temperature without load	180 °C
Ambient temperature range	-60…+55 °C
Minimum installation temperature	-60 °C
Power supply	three-phase up to 900 V depending on version for specific application
Heat generation	up to 40 W/m depending on version for specific application
Ex marking	1Ex e IIC T3 Gb X
Degree of external protection GOST 14254-96	IP67
Heating core cross section	1.5 mm^2 3.0 mm^2 6.0 mm^2

Please note that the manufacturer can change the dimensions of the cores to provide the required heat generation (W/m) at a given circuit length.

Dimensions

Type	Nominal size, mm	Minimum bending radius, mm
LLS 3×1.5	14.9×7.8	40
LLS 3×3.0	16.9×8.5	45
LLS 3×6.0	19.6×9.4	50

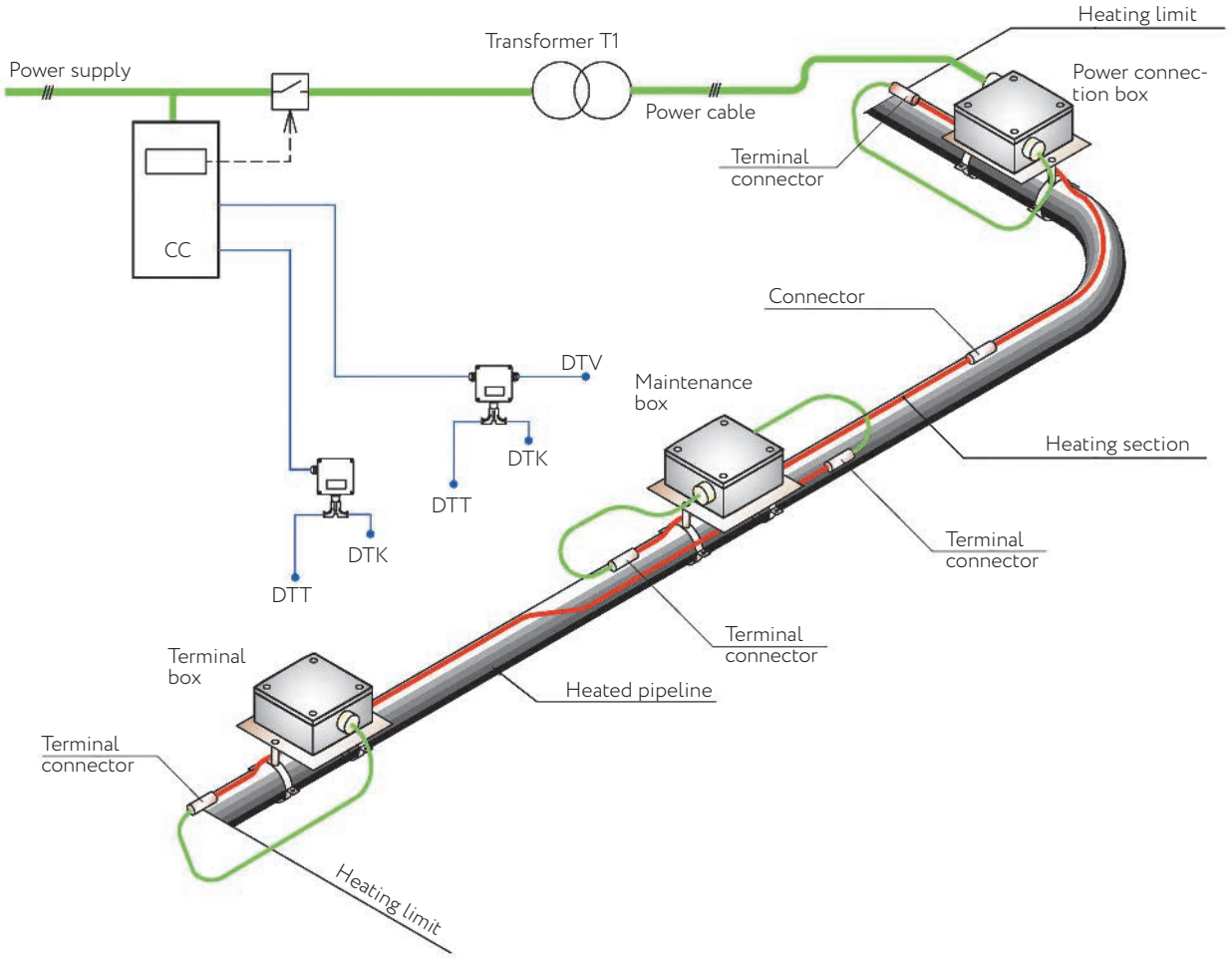
Maximum pipe/system temperature

The surface temperature of the heating cable must not exceed the maximum temperature that its structural materials can withstand or the temperature class of the respective area (if installed in a potentially explosive area). This is achieved by limiting the heat generation of the heating cable depending on the temperature of the pipe or heated system to a safe level as part of the design or by means of a temperature control system.

For the most unfavorable heat exchange conditions, the pipleline temperature must be limited to the following threshold values:

Nominal heat generation, heating cable, W/m	Maximum temperature of the heated system, °C						
	Location						
	Explosive						Safe
	T_6	T_5	T_4	T_3	T_2	T_1	
5	55	70	100	100	100	100	100
10	50	65	95	95	95	95	95
20	30	45	75	75	75	75	75
25	20	35	70	70	70	70	70
30	10	25	55	55	55	55	55
35	–	15	45	45	45	45	45
40	–	–	30	30	30	30	30

Model installation diagram



Approvals

№ ТС RU C-RU.АА87.В.00579

№ C-RU.ПБ37.В.02046

Accessories
(to be ordered separately)

Junction boxes, series JB2221-544-2X(60-64) (see pp. 84-85).

LLS-SK kit is a connection for splicing LLS heating cables on the site.

LLS-TK kit is a connection for the heating cable LLS 3x6.0, including installation wire connected to a power supply, maintenance or terminal box (factory-installed).

VLL-A longline trace heating system cable

VLL-A is a series-resistant cable for extra long heating systems, approved for use in hazardous and non-hazardous areas when used as a part of SST designed VeLL Trace Heating System. It has been designed for use in temperature maintenace or freeze protection applications of pipes. VLL-A cable implements an aluminum heating wire, thus offers an economical solution for a wide vareity of heat-tracing applications.

Cables installed linear way on pipe surface. In case of pre-insulated pipeline fragments, the cable usually laid in conduits, which are on the pipe under thermal insulation.

At the end of a heating segment cables are connected together in star (Y). At start of the segment voltage is applied between cables. Its value depends on pipeline length and necessary power output.

This is a specially designed conductor, resistant to high voltage up to 8 kV and thermal loads in operation up to 100 °C, also resistant to mechanical impact during installation or maintenance. The cable supplied on drums with length, convenient for installation and connection on site.

Cables installed linear way on pipe surface. In case of pre-insulated pipeline fragments, the cable usually laid in conduits, which are on the pipe under thermal insulation.

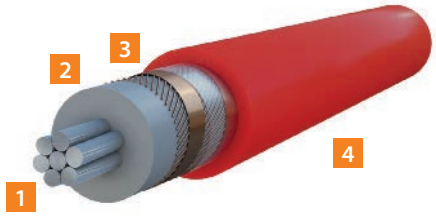
Features

- No limits for pipeline overall length
- Max length of heating 150 km
- Does not require alongside power line network
- High operating temperature up to 100°C
- High mechanical reliability
- Electrical safety
- Connection technology and fasteners are in unified kits
- Easy and convenient installation

Type 1 – up to 10 kV

1. Aluminum conductor core
2. Conductor screen(semi-conductive layer)
3. Insulation XLPE
4. Insulation screen(semi-conductive layer)
5. Copper wire braid covered with copper foil
6. Special abrasion-resistant outer jacket

Type 2 – up to 3 kV



1. Aluminum conductor core
2. Insulation XLPE
3. Copper wire braid covered with copper foil
4. Special abrasion-resistant outer jacket

Technical data

Rated voltage	up to 8 000 VAC
Maximum continuous operating temperature (trace heater energized)	up to 100 °C
Maximum intermittent temperature (trace heater de-energized)	up to 120 °C
Ambient temperature range	–60 … +55 °C
Minimum installation temperature	–40 °C
Conductive wire material	aluminum [Al]
Linear power output per one segment, connected in star	up to 30 W/m (average value, depends on application

SST Group offers the whole package for VeLL system – from design, production and delivery to installation and commissioning of systems, individually adapted to specific site conditions.

Product characteristics

Type	Conductor size	Dimensions (max OD), mm	Weight kg/km	Minimum bend radius, mm
VLL-A-25	25 mm²	18,2 – 22,6	601 – 814	15 outer diameters
VLL-A-35	35 mm²	19.5 – 25	674 – 900	15 outer diameters
VLL-A-50	50 mm²	21,3 – 25,9	703 – 932	15 outer diameters
VLL-A-70	70 mm²	22.4 – 27.3	721 – 986	15 outer diameters

VLL-C longline trace heating system cable

VLL-C is a series-resistant cable for extra long heating systems, approved for use in hazardous and non-hazardous areas when used as a part of SST designed VeLL Trace Heating System. It has been designed for use in temperature maintenace or freeze protection applications of pipes. VLL-C cable implements a copper heating wire, thus offers a perfect solution for a wide vareity of heat-tracing applications.

Cables installed linear way on pipe surface. In case of pre-insulated pipeline fragments, the cable usually laid in conduits, which are on the pipe under thermal insulation.

At the end of a heating segment cables are connected together in star (Y). At start of the segment voltage is applied between cables. Its value depends on pipeline length and necessary power output.

This is a specially designed conductor, resistant to high voltage up to 8 kV and thermal loads in operation up to 200 °C, also resistant to mechanical impact during installation or maintenance. The cable supplied on drums with length, convenient for installation and connection on site.

Cables installed linear way on pipe surface. In case of pre-insulated pipeline fragments, the cable usually laid in conduits, which are on the pipe under thermal insulation.

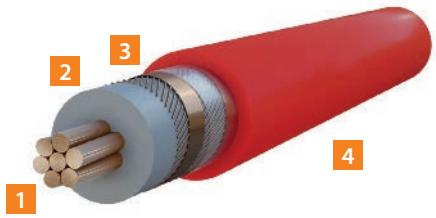
Features

- No limits for pipeline overall length
- Max length of heating 150 km
- Does not require alongside power line network
- High operating temperature up to 100°C
- High mechanical reliability
- Electrical safety
- Connection technology and fasteners are in unified kits
- Easy and convenient installation

Type 1 – up to 10 kV

1. Aluminum conductor core
2. Conductor screen(semi-conductive layer)
3. Insulation XLPE
4. Insulation screen(semi-conductive layer)
5. Copper wire braid covered with copper foil
6. Special abrasion-resistant outer jacket

Type 2 – up to 3 kV



1. Aluminum conductor core
2. Insulation XLPE
3. Copper wire braid covered with copper foil
4. Special abrasion-resistant outer jacket

Technical data

Rated voltage	up to 8 000 VAC
Maximum continuous operating temperature (trace heater energized)	up to 200 °C
Maximum intermittent temperature (trace heater de-energized)	up to 250 °C
Ambient temperature range	–60 … +55 °C
Minimum installation temperature	–40 °C
Conductive wire material	copper [Cu]
Linear power output per one segment, connected in star	up to 30 W/m (average value, depends on application

SST Group offers the whole package for VeLL system – from design, production and delivery to installation and commissioning of systems, individually adapted to specific site conditions.

Product characteristics

Type	Conductor size	Dimensions (max OD), mm	Weight kg/km	Minimum bend radius, mm
VLL-C-10	10 mm²	16,8 – 21,1	554 – 760	15 outer diameters
VLL-C-15	15 mm²	18,2 – 22,6	601 – 814	15 outer diameters
VLL-C-20	20 mm²	19,5 – 25	644 – 900	15 outer diameters
VLL-C-30	30 mm²	22,4 – 26,6	739 – 958	15 outer diameters
VLL-C-40	40 mm²	25,4 – 28,3	838 – 1019	15 outer diameters

Heat tracing system based on skin-effect

- Heated pipeline length is unlimited
- No auxiliary network required
- High operating temperatures
- Electrical safety
- High mechanical strength of the heating system
- Approved for explosive areas

1. High-voltage line
2. Control power station (CPS)
3. IR heater
4. IR conductor
5. Thermal insulation
6. Heated pipeline

Purpose

Heat tracing system IRHS-15000 based on skin-effect, also known as the skin system, is intended for maintaining pipeline temperature, preventing freezing, and start-up heating of long pipelines. The system supports aboveground, underground, underwater installation, including explosive areas.

It is the only system capable of heating pipelines up to 30 km long (without an auxiliary network). This heating system can be used to heat pipelines of any length with an auxiliary power supply network.

Structural design

IR heater	Low-carbon steel pipe with a diameter of 15-60 mm, wall thickness 3-4 mm
IR conductor	Special conductor is resistant to high voltage (up to (5 kV), thermal loads (up to 260 °C), and mechanical loads during installation
IRPK, IRSK, IRKK, IRS, KTP	Connection, power supply, terminal boxes, glands, control power station

Operating principle

The heating element of the system IRHS-15000 is composed of an inductive-resistive heater (IR heater) with an external diameter of 15–60 mm and a wall thickness of at least 3.0 mm and a built-in insulated inductive-resistive copper conductor (IR conductor) with a cross section of 8–40 mm^2.

At the terminal end of the heating segment, the IR conductor is electrically connected to the IR heater, and alternating voltage is supplied at the start end of the segment between the IR heater and the IR conductor. The voltage is determined based on the desired heat generation and the length of the heating section.

IR conductor and IR heater currents flow in opposite directions, resulting in a surface effect and proximity effect in the system. As a result, the current in the IR heater flows along the inner layer near the inner surface of the IR heater and there is no voltage on the IR heater.

The IR conductor is non-magnetic (copper), there is no noticeable surface effect in it, and the alternating current flows through the entire cross section of the IR conductor.

The main heat generating element in skin-effect system is the IR heater, accounting for up to 80% of the system's output.

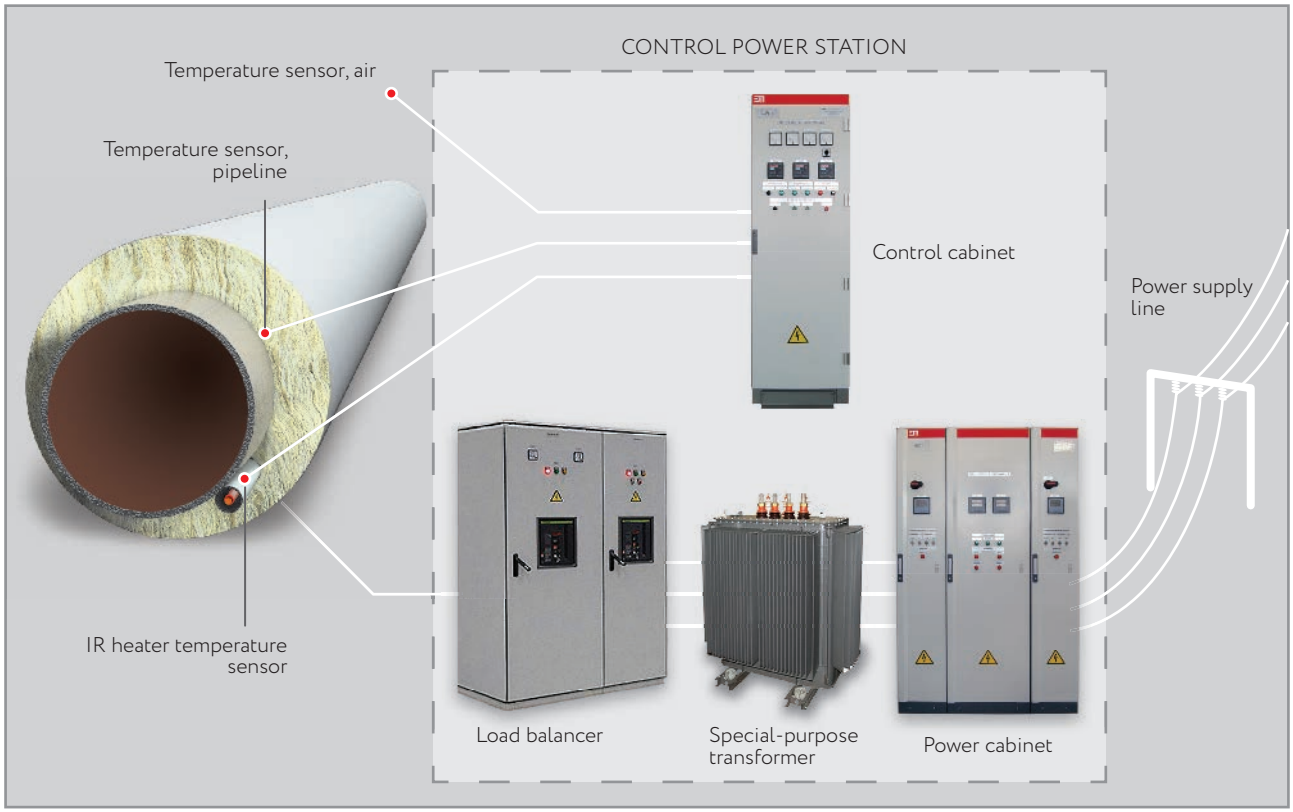
Technical data

Heated pipeline length	up to 30 km without an auxiliary network
Heating system output	up to 170 W/m
Maximum operating temperature	240 °C
Maximum permissible temperaturea (without load)	260 °C
Ambient temperature range	-60...+70 °C
Voltage on the heating element	up to 5 kV
Cross-section of the IR conductor	up to 40 mm^2

Approvals

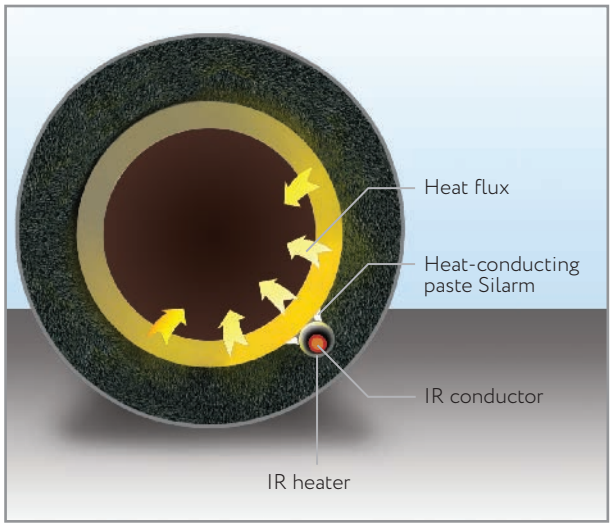
№ ТС RU C-RU.АА87.В.00495
№ C-RU.ПБ37.В.02044
№ ОГН4.RU.1304.В00238
IECEx CCVE 18.0002X
DEKRA 18ATEX0033 X

Control and power supply diagram



To power the load, transformer-capacitor converters are used, which consist of a load balancer and a special-purpose transformer. It allows to connect a high single-phase load (the skin system heater) to a three-phase supply, and there is no current misalignment on the power supply side.

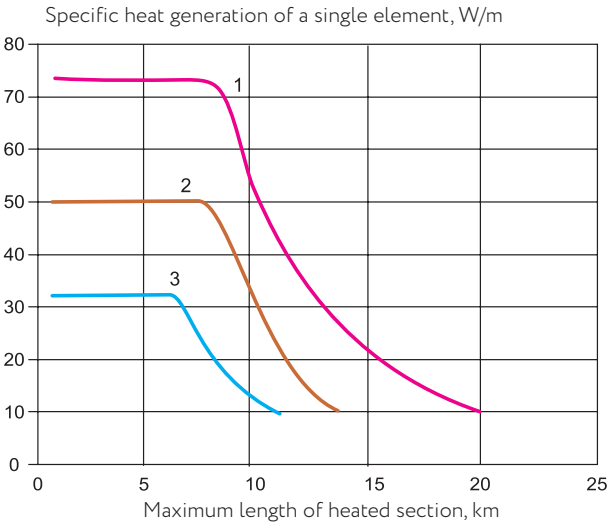
The control system monitors ambient air temperature, IR heater temperature, heated pipeline temperature, load current and load voltage. The control system allows to remotely control the heating and monitor all the vital parameters.



Safety of the system is provided bythe surface effect causing the current to follow the internal surface of the IR heater. The external surface potential is zero.

Heat transfer from the skin system to the pipeline is supported by the tight contact and the use of the heat-conducting paste SILARM.

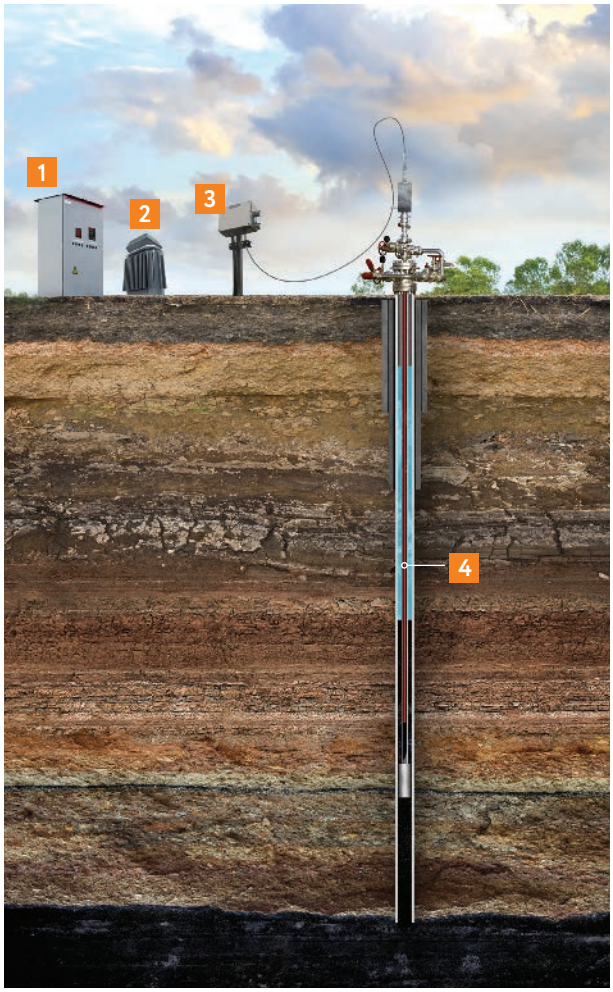
Heat generation



	Heater diameter	Cross-section of the current-carrying conductor
1	42×3	40 mm²
2	32×3	20 mm²
3	25×3	10 mm²

Oil well electric heating system Stream Tracer™

- Well protection from ARPD formation
- Fault-free operation of equipment and longer service life
- Less often emergency repairs
- Longer well workover intervals and reduced equipment downtime
- Better field performance due to a reduction of the heating energy costs by up to 50%*
- Quick installation using a mobile system



1. Power supply and control system
2. Special-purpose transformer
3. Terminal box
4. Flexible skin heater placed in the tubing

Purpose

The Stream Tracer™ system is an integrated solution for protecting oil wells from the formation of asphaltine-resin-paraffin deposits (ARPD), preventing the formation of gas hydrates in natural gas wells, heating subsea pipelines and pipeline sections at river crossings. The main function of the system is to keep the fluid at a temperature above the paraffinization temperature in the tubing string.

Description

Stream Tracer™ uses a special flexible self-supporting heater (skin heater) with increased and reduced power zones to significantly reduce the energy costs of the well heating system.

A special heating cable is placed inside the tubing using the mobile system. Power is supplied to the skin heater from the top end and a short-circuiting seal is installed at the bottom end. The fluid temperature is maintained in the well at a level higher than the crystallization temperature of the paraffins, which prevents the formation of deposits.

The heater in the Stream Tracer™ system has a coaxial design, with heat generated both by current flow in the conductors and by currents induced in the complex external conductor. This approach makes it possible to improve the heat transfer efficiency from the heater to the oil fluid, compared with the series-resistance electric heating systems.

SST Group's proprietary heater with output power varying along the length reduces the energy costs of the wellbore heating system by up to 50% compared to systems based on the series-resistance cable.

* Compared with the well heating solution based on a resistive heating cable.

Technical data

Power supply voltage	up to 1 kV
Linear power	50 W/m
Heater length	1.5 km*
Minimum temperature of installation	-25 °C
Minimum bending radius	400 mm
Crushing force	up to 12 kN (at a running speed of 0.25 m/sec)
Tensile force	up to 28 kN
Chemical resistance to petroleum products	high

The heater remains operational at an external pressure of up to 150 atm and a temperature of up to 70 °C.

The heater remains operational after 100 bends at a radius of 400 mm (at temperatures above 0 °C).

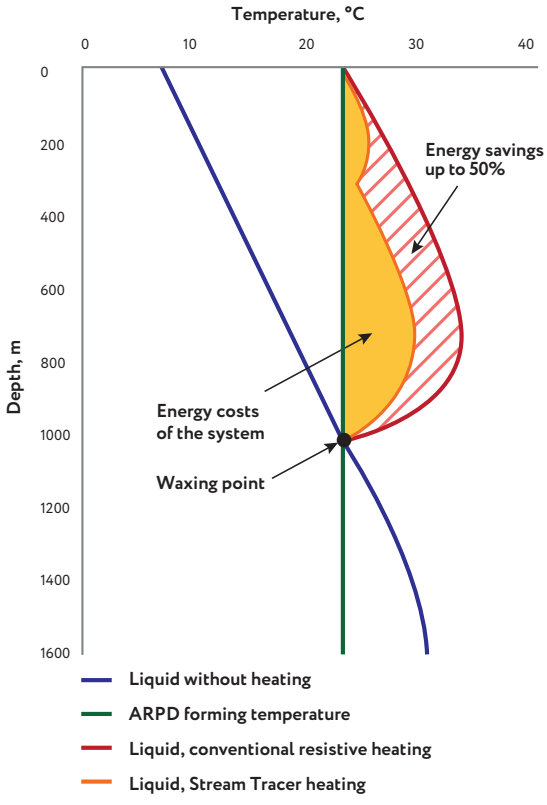
Approvals

№ TC RU C-RU.AA87.B.00615

EAC Ex

* A heater 3 km long is under development.

Energy efficiency

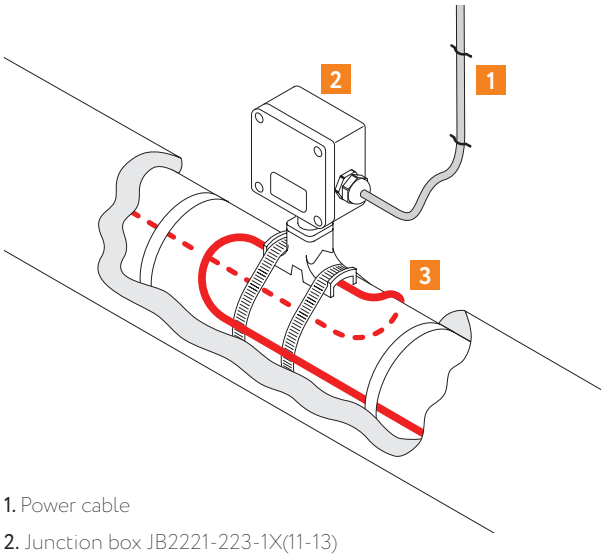


Energy efficiency of Stream Tracer™ compared to a series-resistance cable

The design and manufacturing technology offered by SST Group allows adjusting the linear power of heat generation in individual sections of the heater (the orange line in the figure), giving an advantage over the series-resistance heaters (the red line in the figure).

Junction box JB2221-223-1X(11-13) for self-regulating heating cables and power cables connection

- Efficient solution for power supply and input of self-regulating heating cables connection through thermal insulation in electrical heating systems
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-223-1X(11-13)
3. Heating cable

Description

The junction box JB2221-223-1X(11-13) is designed for connecting self-regulating electrical heating cables to the power network and for the branching of self-regulating heating cables*.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows connection of up to three self-regulating electrical heating cable to the power cable and connection of up to three cables for branching.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable gland of the box is intended for connecting unarmoured power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18–31.

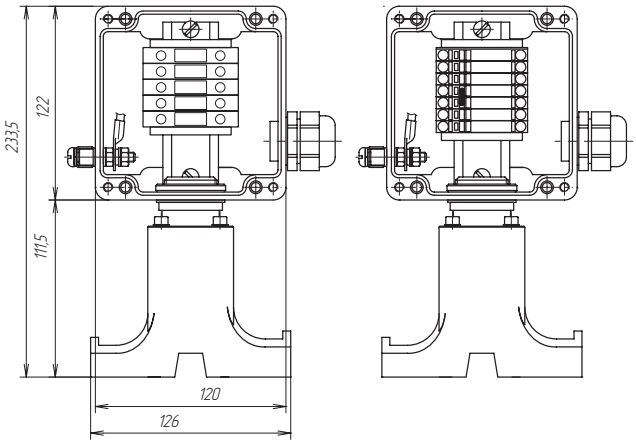
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85oC... T165oC Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.55 kg

Terminal block

Screw clamp		Spring-cage clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	3 modules 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	2 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block.

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see “Accessories”, p. 95.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see “Accessories”, pp. 92-93.

Delivery kit**

Box enclosure JB2221-223-1X(11-13) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmoured cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Rectangular-sectioned ring
Sealing grommet UVK.0013
Sealing grommet UVK.0013-01
Plug UVK.0014
Plug UVK.0014-01
Screw M5×40
Washer ø 5, zinc-plated

** Parts and their number in accordance with the selected grade / junction box type. See “Product range”.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box’s model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

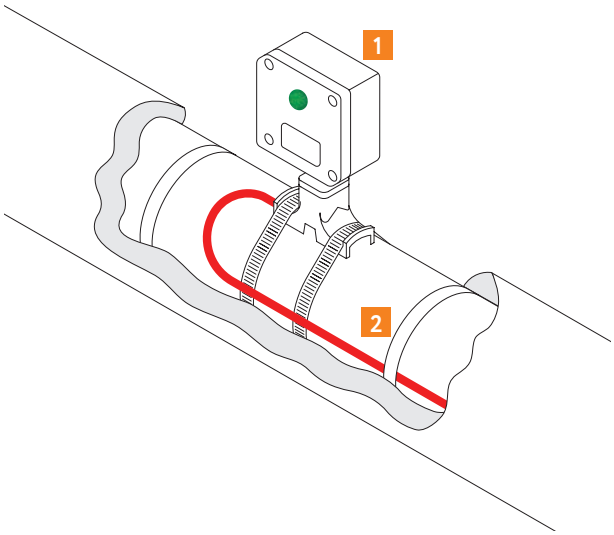
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring)
5. CC – box’s model

Product range

JB2221-223-1111	JB2221-223-1211
JB2221-223-1112	JB2221-223-1212
JB2221-223-1113	JB2221-223-1213

Junction box JB2221-223-1X(21-23) for light indication and connection of heating cables to power supply

- Provides light indication of power voltage existence at the end of heating cable section and connection of cables to power network
- Compatible with all types of self-regulating electrical heating cables
- Approved for installation in explosion hazard areas
- High mechanical strength
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Junction box JB2221-223-1X(21-23)
2. Heating cable

Description

Junction boxes JB2221-223-1X(21-23) light indicates the availability of power in heating sections based on self-regulating electric heating cables* and is intended for connecting heating cables to power network.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows connecting one self-regulating electrical heating cable to a power cable or two cables if the box is used as an intermediate splitter.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable gland of the box is intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

A light indicator with a super bright LED signals whether there is voltage at the heating section termination.

The green LED has a long service life and is visible from any angle, including in direct sunlight.

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18-31.

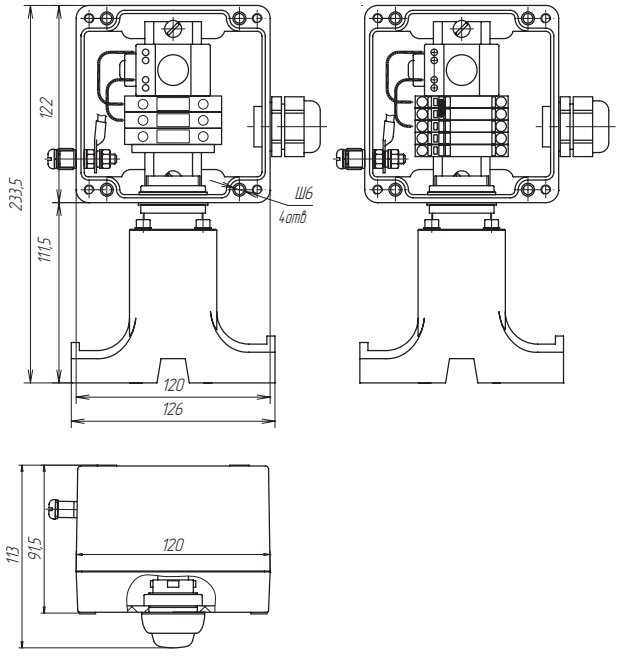
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex db eb IIC T6...T3 Gb Ex tb IIIC T85°C...T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+50 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Electric life of the LED	>10^5 hours
LED power intake	<1 W
Light source	green LED
View angle	180°
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.65 kg

Terminal block

Screw clamp		Spring-cage clamp	
WDU/Ex	1 module 10 mm²	TOPJOB 2006-1201	2 modules 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	1 module 6 mm²
WPE /Ex	1 module 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block.

Approvals

№ 17.09520.120
№ ТС RU C-RU.AA87.B.00450
№ IECEx CCVE 18.0006X

Delivery kit**

Box enclosure JB2221-223-1X(21-23) complete with a terminal block and LED light indicator
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section sealing ring
Sealing grommet UVK.0013
Sealing grommet UVK.0013-01
Plug UVK.0014
Plug UVK.0014-01
Screw M5×40
Washer ø 5, zinc-plated
Cu solid wire PVC insulated 1×1.0 L = 0.2 m
Cable ferrule NShvI 4.0-12

** Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see "Accessories", pp. 92-93.

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

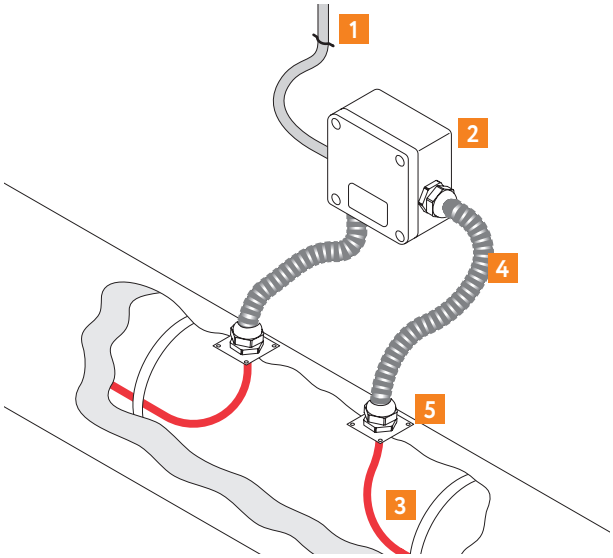
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring)
5. CC – box's model

Product range

JB2221-223-1121 JB2221-223-1221
JB2221-223-1122 JB2221-223-1222
JB2221-223-1123 JB2221-223-1223

Junction box JB2221-223-2X(11-15) for self-regulating heating cables and power cables connection

- Efficient solution for power supply to self-regulating heating cables in electrical heating systems
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-223-2X(11-15)
3. Heating cable
4. Protective sleeve
5. Cable entry unit

Description

The junction box JB2221-223-2X(11-15) designed for connecting self-regulating electrical heating cables* to the power network.

The box can be mounted onto the wall, onto a nearby metal structure or using a bracket directly onto the pipeline. The box allows one or two self-regulating electrical heating cables to be connected.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

The connected heating cable stretch between the box and the thermal insulation connector can be additionally equipped with protective sleeve (supplied separately). When the junction box is fitted with a protective sleeve, additional cable glands are additionally included to enable connection.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18-31.

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T3...T6 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.5 kg

Delivery kit**

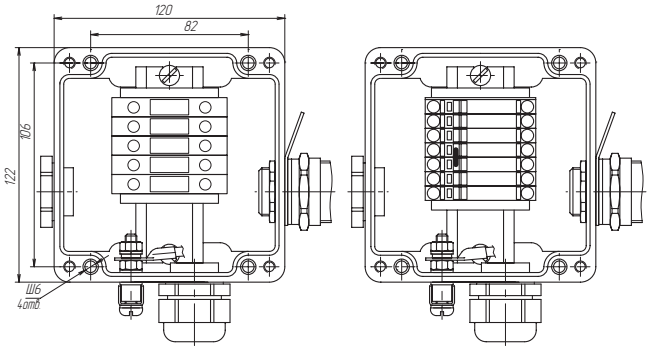
Box enclosure JB2221-223-2X(11-15) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06×150-00

** Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	3 modules 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	2 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Accessories
(to be ordered separately)

Metal strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see pp. 92-93.

Cable entry unit LEK/U. For ordering information, see "Accessories", p. 95.

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application..

Example: JB2221-XXX-ABCC

① ② ③④ ⑤

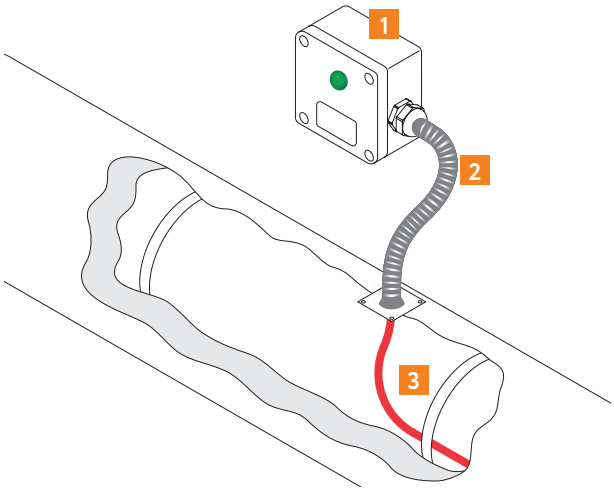
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Product range

JB2221-223-2111	JB2221-223-2211
JB2221-223-2112	JB2221-223-2212
JB2221-223-2113	JB2221-223-2213
JB2221-223-2114	JB2221-223-2214
JB2221-223-2115	JB2221-223-2215

Junction box JB2221-223-2X(27-31) for light indication and connection of heating cables to power supply

- Provides light indication of power voltage existence at the end of heating cable section and connection of cables to power network
- Compatible with all types of self-regulating electrical heating cables
- Approved for installation in explosion hazard areas
- High mechanical strength
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Junction box JB2221-223-2X(27-31)
2. Protective sleeve
3. Heating cable

Description

JB2221-223-2X(27-31) light indicate the availability of power in heating sections based on self-regulating electric heating cables* and is intended for connecting heating cables to power network.

The box can be mounted onto a wall, onto a nearby metal structure or using a bracket directly onto the pipeline. The box allows connecting one self-regulating electrical heating cable to power cable or two cables if the box is used as an intermediate splitter.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

A light indicator with a super bright LED signals whether there is voltage at the heating section termination.

The green LED has a long service life and is visible from any angle, including in direct sunlight.

Approvals

№ 17.09520.120

№ ТС RU C-RU.АА87.В.00450

№ IECEx CCVE 18.0006X

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18-31.

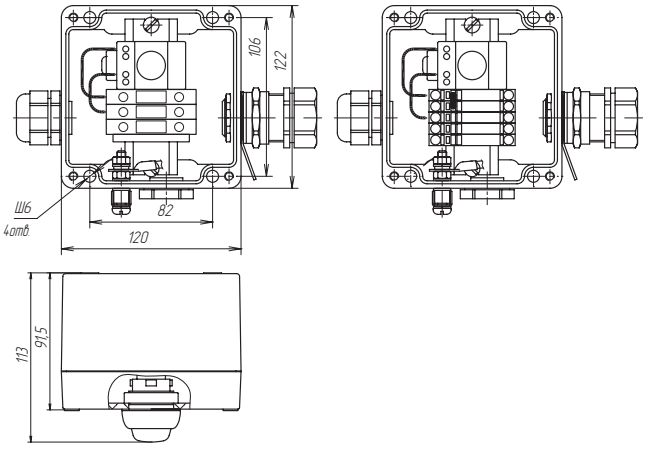
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex db eb IIC T6...T3 Gb Ex tb IIIC T85°C...T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Electric life of the LED	>10^5 hours
LED power intake	<1 W
Light source	green LED
View angle	180°
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.55 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	1 module 10 mm²	TOPJOB 2006-1201	2 modules 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	1 module 6 mm²
WPE /Ex	1 module 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Product range

JB2221-223-2127
JB2221-223-2128
JB2221-223-2129
JB2221-223-2130
JB2221-223-2131
JB2221-223-2227
JB2221-223-2228
JB2221-223-2229
JB2221-223-2230
JB2221-223-2231

Delivery kit**

Box enclosure JB2221-223-2X(27-31) complete with a terminal block and LED light indicator
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Cu solid wire PVC insulated 1×1.0 L = 0.2 m
Cable ferrule NShvI 4.0-12

** Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see pp. 92-93.

Cable entry unit LEK/U. For ordering information, see "Accessories", p. 95.

Ordering information

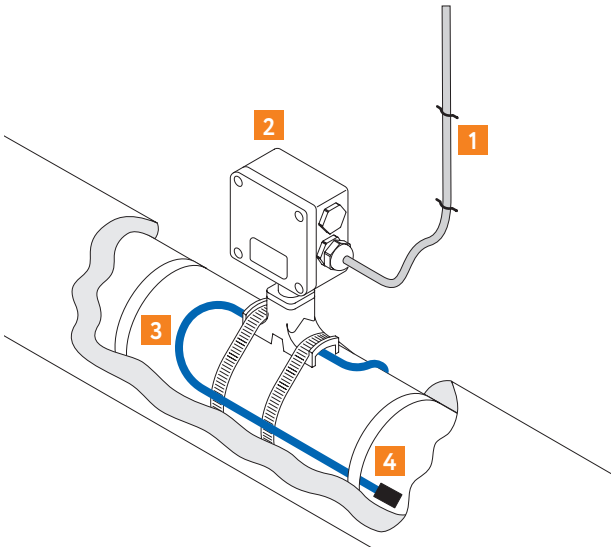
JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Junction box JB222(3)1-223-1X(14-17) for connection of data, control and signal cables

- Efficient solution for control cables connection and input through thermal insulation
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Control cable
2. Junction box JB222(3)1-223-1X(14-17)
3. Installation sensor cable
4. Temperature sensor

Description

Junction boxes JB222(3)1-223-1X(14-17) are designed for connecting control cables in the electric heating systems.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows connection of one or two control cables, up to three temperature sensors and input through thermal insulation of up to four temperature sensors (one reserved).

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 0.5 to 2.5 mm². Design options with screw or spring terminal blocks and with various types of explosion protection: models JB2221-223-1X(14-17) – type e (increased safety) and models JB2231-223-1X(14-17) – type ia (intrinsic safety) — are available.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex ia IIC T6 Gb Ex tb IIIC T85°C... T165°C Db
Operating ambient temperature range	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 21 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.8 kg

Terminal block

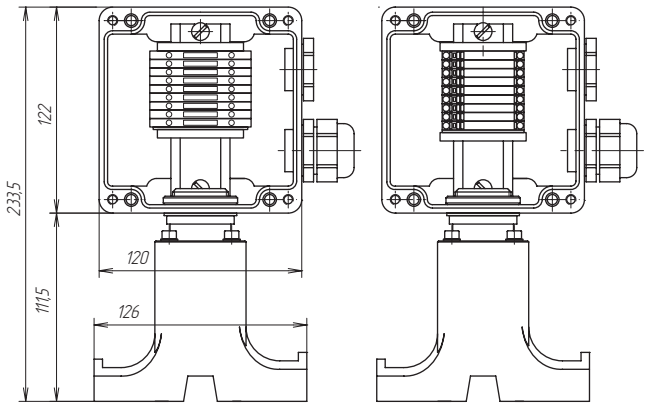
Screw clamp/ Explosion protection		Spring cage clamp	
WDU/Ex e	9 modules 2.5 mm²	TOPJOB 2002-1201	9 modules 2.5 mm²
WDU BL/ Ex ia	9 modules 2.5 mm²	TOPJOB 2002-1204	9 modules 2.5 mm²

Delivery kit**

Box enclosure JB222(3)1-223-1X(14-17) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section sealing ring
Sealing grommet UVK.0015
Plug UVK.0016
Screw M5×40
Washer ø 5, zinc-plated

** Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Construction



Box with screw (left) and spring (right) terminal block

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB22Y1-XXX-ABCC

① ② ③④ ⑤

1. Y – class of boxes according to explosion-proof level (2 – explosion-proofed level «e», 3 – explosion-proofed level «ia»)
2. XXX – dimension code (223 – 122×120×90 mm)
3. A – mounting type (1 – with pipe installation support, 2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Accessories
(to be ordered separately)

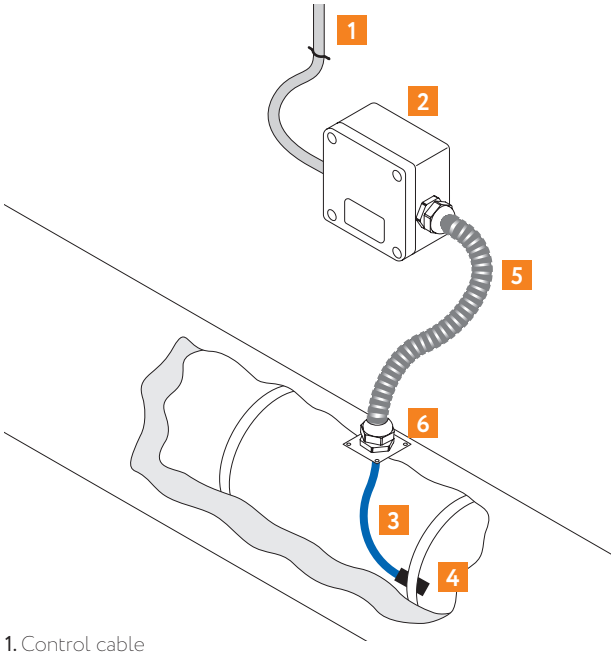
Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Product range

JB2221-223-1114	JB2221-223-1214
JB2221-223-1115	JB2221-223-1215
JB2221-223-1116	JB2221-223-1216
JB2221-223-1117	JB2221-223-1217
JB2231-223-1114	JB2231-223-1214
JB2231-223-1114	JB2231-223-1215
JB2231-223-1116	JB2231-223-1216
JB2231-223-1117	JB2231-223-1217

Junction box JB222(3)1-223-2X(16-24) for connection of data, control and signal cables

- Efficient solution for control cables connection and input through thermal insulation
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Control cable
2. Junction box JB222(3)1-223-2X(16-24)
3. Installation sensor cable
4. Temperature sensor
5. Protective sleeve
6. Cable entry unit

Description

Boxes JB222(3)1-223-2X(16-24) are designed for connecting control cables in the electric heating systems.

The box can be mounted onto a wall, onto a nearby metal structure, or using a bracket directly onto the pipeline.The box allows connection of one or two control cables, from one to three temperature sensors (requires sealing with two openings) and outputs of one to two temperature sensors.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 0.5 to 2.5 mm². Design options with screw or spring terminal clamps and with various types of explosion protection models JB2221-223-2X(16-24) – type e (increased safety) and models JB2231-223-2X(16-24) – type ia (intrinsic safety) — are available.

The connected heating cable stretch between the box and the thermal insulation connector can be additionally equipped with protective sleeve (supplied separately). When the junction box is fitted with a protective sleeve, additional cable glands are included to enable connection.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

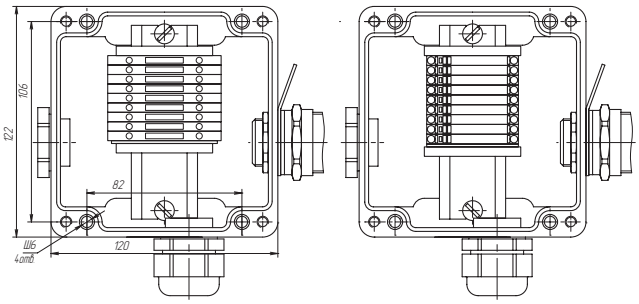
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex ia IIC T6 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	21 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.5 kg

Terminal block

Screw clamp/ Explosion protection		Spring cage clamp	
WDU/Ex e	9 modules 2.5 mm²	TOPJOB 2002-1201	9 modules 2.5 mm²
WDU BL/ Ex ia	9 modules 2.5 mm²	TOPJOB 2002-1204	9 modules 2.5 mm²

Construction



Box with screw (left) and spring (right) terminal block

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application..

Example: JB22Y1-XXX-ABCC

① ② ③④ ⑤

1. Y – class of boxes according to explosion-proof level (2 – explosion-proofed level «e», 3 – explosion-proofed level «ia»)
2. XXX – dimension code (223 – 122×120×90 mm)
3. A – mounting type (1 – with pipe installation support, 2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Delivery kit*

Box enclosure JB222(3)1-223-2X(16-24) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
GSL25 seal

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", pp. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

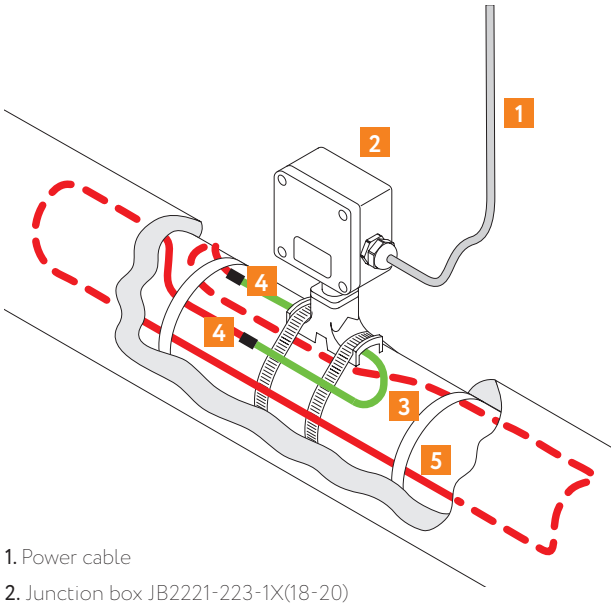
Cable entry under thermal insulation LEK/U. For ordering information, see "Accessories", p. 95.

Product range

JB2221-223-2116	JB2221-223-2216
JB2221-223-2117	JB2221-223-2217
JB2221-223-2118	JB2221-223-2218
JB2221-223-2119	JB2221-223-2219
JB2221-223-2120	JB2221-223-2220
JB2221-223-2121	JB2221-223-2221
JB2221-223-2122	JB2221-223-2222
JB2221-223-2123	JB2221-223-2223
JB2211-223-2124	JB2221-223-2224
JB2231-223-2116	JB2231-223-2216
JB2231-223-2117	JB2231-223-2217
JB2231-223-2118	JB2231-223-2218
JB2231-223-2119	JB2231-223-2219
JB2231-223-2120	JB2231-223-2220
JB2231-223-2121	JB2231-223-2221
JB2231-223-2122	JB2231-223-2222
JB2231-223-2123	JB2231-223-2223
JB2231-223-2124	JB2231-223-2224

Junction box JB2221-223-1X(18-20) for series-resistance cables

- Efficient solution for power supply and input of SNF and TMF series-resistance heating cables
- Compatible with cable types SNF and TMF
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-223-1X(18-20)
3. Installation wire
4. Connector SNF MF (for SNF)
5. Heating cable

Description

Junction boxes JB2221-223-1X(18-20) are designed for connecting to a source of series-resistance heating cables, such as SNF* and TMF**, to power network.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows connection of one section of the heating cable in a loop.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

* For ordering information, see "Heat tracing systems", pp. 32–33.
** For ordering information, see "Heat tracing systems", pp. 36–37.

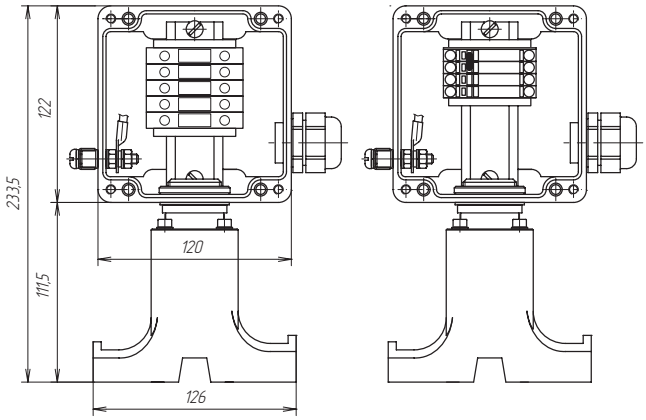
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.57 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	1 module 6 mm²
WDU BL/Ex	1 module 10 мм²	TOPJOB 2006-1204	1 module 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Delivery kit*

Box enclosure JB2221-223-1X(18-20) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section sealing ring
Sealing grommet UVK.0015
Plug UVK.0016
Screw M5×40
Washer ø 5, zinc-plated

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

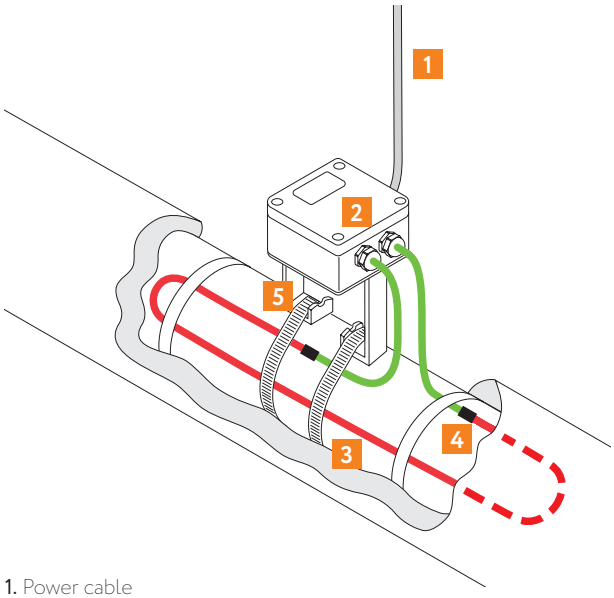
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring)
5. CC – box's model

Product range

JB2221-223-1118
JB2221-223-1119
JB2221-223-1120
JB2221-223-1218
JB2221-223-1219
JB2221-223-1220

Junction box JB2221-223-2X(25-26) for connection of mineral insulation cables

- Efficient solution for power supply to cables with mineral insulation
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-223-2X(25-26)
3. Heating section
4. Coupling
5. Bracket

Description

Junction boxes JB2221-223-2X(25-26) are designed for connecting mineral insulated high-temperature electric heating cables with mineral insulation to power network.

The box can be mounted onto a wall, onto a nearby metal structure or using a bracket directly onto the pipeline. The choice of the mounting option also depends on the temperature of the heated system (pipeline). At a pipeline temperature of over 200 °C, it is recommended to mount the box on a wall or on an adjacent metal structure. The box allows to connect one section of the heating cable.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability.

Cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

* For ordering information, see “Heat tracing systems”, pp. 38–39.

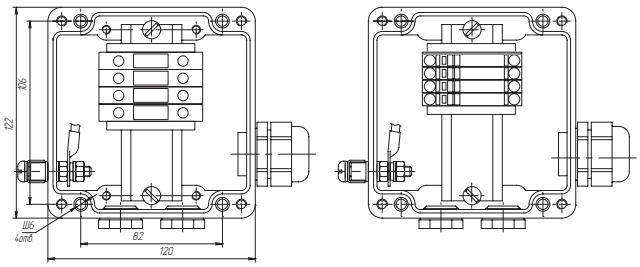
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	122×120×91.5 mm
Total weight (maximum)	1.26 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	1 module 10 mm²	TOPJOB 2006-1201	1 module 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	1 module 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Delivery kit*

Box enclosure JB2221-223-2X(25-26) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Sealing ring M20
Blanking plug M20
GP25 seal
Earthing terminal P06.06x150-00

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", pp. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Cable entry unit LEK/U. For ordering information, see "Accessories", p. 95.

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

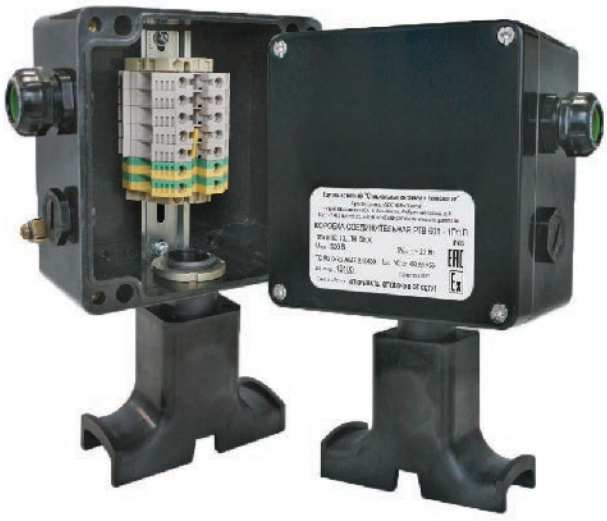
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

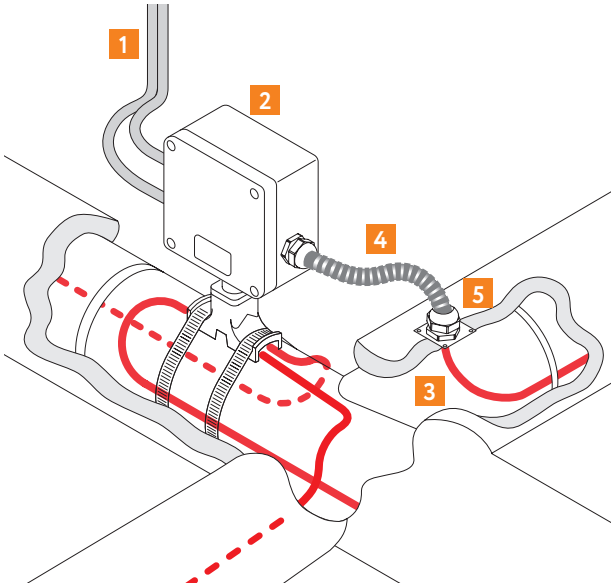
Product range

JB2221-223-2125 JB2221-223-2225
JB2221-223-2126 JB2221-223-2226

Junction box JB2221-333-1X(11-19) for self-regulating heating cables and power cables connection

- Efficient solution for power supply and input of self-regulating heating cables connection through thermal insulation in electrical heating systems
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive





1. Power cable
2. Junction box JB2221-333-1X(11-19)
3. Heating cable
4. Protective sleeve
5. Cable entry unit

Description

Junction boxes JB2221-333-1X(11-19) are designed for connecting self-regulating electrical heating cables to the power network* and for the branching of self-regulating heating cables. The box also supports branching of the power cable in utility networks.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows one or two self-regulating electrical heating cables to be connected.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

The connected heating cable stretch between the box and the thermal insulation connector can be additionally equipped with protective sleeve (supplied separately). When the junction box is fitted with a protective sleeve, additional cable glands are additionally included to enable connection.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see “Heat tracing systems”, pp. 18–31.

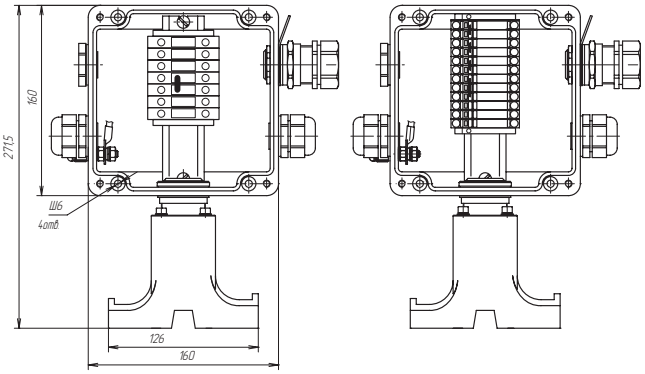
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	160×160×94.5 mm
Total weight (maximum)	2.76 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	3 modules 10 mm²	TOPJOB 2006-1201	6 modules 6 mm²
WDU BL/Ex	2 modules 10 mm²	TOPJOB 2006-1204	3 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	3 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Delivery kit*

Box enclosure JB2221-333-1X(11-19) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section sealing ring
Seal UVK.0013
Seal UVK.0013-01
Plug UVK.0014
Plug UVK.0014-01
Screw M5×40
Washer ø 5, zinc-plated

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

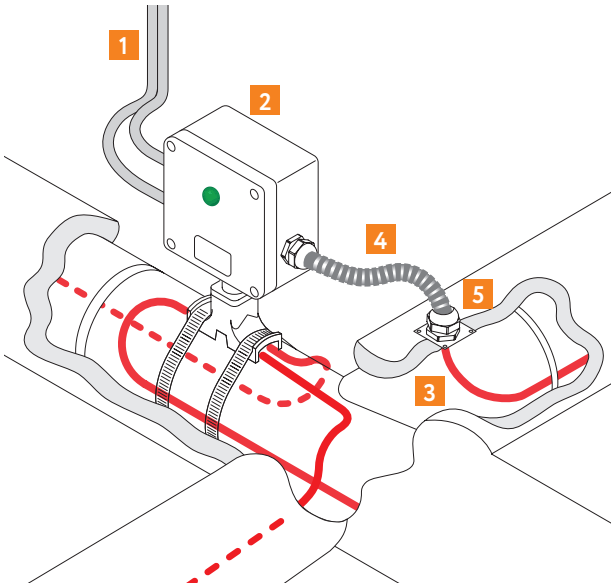
The heating cable termination kit is specified depending on the type of cable used. For ordering information, see pp. 92-93.

Product range

JB2221-333-1111
JB2221-333-1112
JB2221-333-1113
JB2221-333-1114
JB2221-333-1115
JB2221-333-1116
JB2221-333-1117
JB2221-333-1118
JB2221-333-1119
JB2221-333-1211
JB2221-333-1212
JB2221-333-1213
JB2221-333-1214
JB2221-333-1215
JB2221-333-1216
JB2221-333-1217
JB2221-333-1218
JB2221-333-1219

Junction box JB2221-333-1X(23-30) for light indication and connection of heating cables to power supply

- Efficient solution for power supply and input of self-regulating heating cables connection through thermal insulation in electrical heating systems
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-333-1X(23-30)
3. Heating cable
4. Protective sleeve
5. Cable entry unit

Description

Junction boxes JB2221-333-1X(23-30) light indicates the availability of power in heating sections based on self-regulating electric heating cables* and supports connection and branching of heating cables and connection to power network. The box also supports branching of the power cable in utility networks.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. The box allows connection to the power cable of up to three self-regulating electrical heating cables in the version with screw terminal straps and up to two in the version with spring terminal straps.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

A light indicator with a super bright LED signals whether there is voltage at the heating section termination.

The green LED has a long service life and is visible from any angle, including in direct sunlight.

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see “Heat tracing systems”, pp. 18–31.

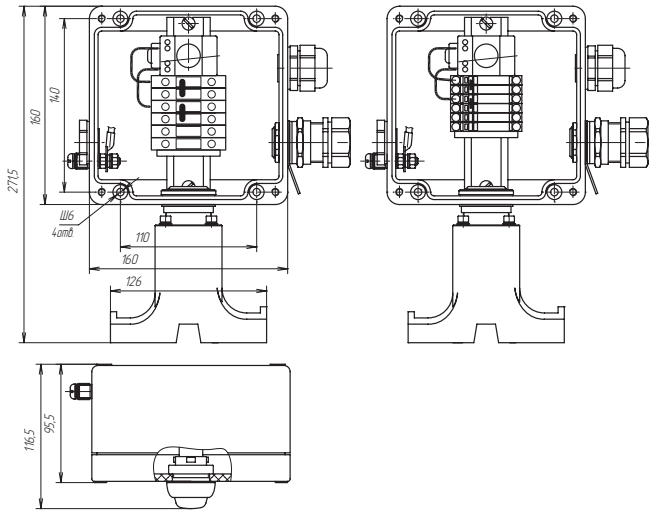
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex db eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Electric life of the LED	>10^5 hours
LED power intake	<1 W
Light source	green LED
View angle	180°
Enclosure dimensions	160×160×91.5 mm
Total weight (maximum)	2.44 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	2 modules 6 mm²
WDU BL/Ex	2 modules 10 mm²	TOPJOB 2006-1204	2 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see pp. 92-93.

Delivery kit*

Box enclosure JB2221-333-1X(23-30) complete with a terminal block and LED light indicator
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section realing ring
Seal UVK.0013
Seal UVK.0013-01
Plug UVK.0014
Plug UVK.0014-01
Screw M5×40
Washer ø 5, zinc-plated
Cu solid wire PVC insulated 1×1.0 L = 0.2 m
Cable ferrule NShvl 4.0-12

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Approvals

№ 17.09520.120
№ TC RU C-RU.AA87.B.00450
№ IECEx CCVE 18.0006X

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

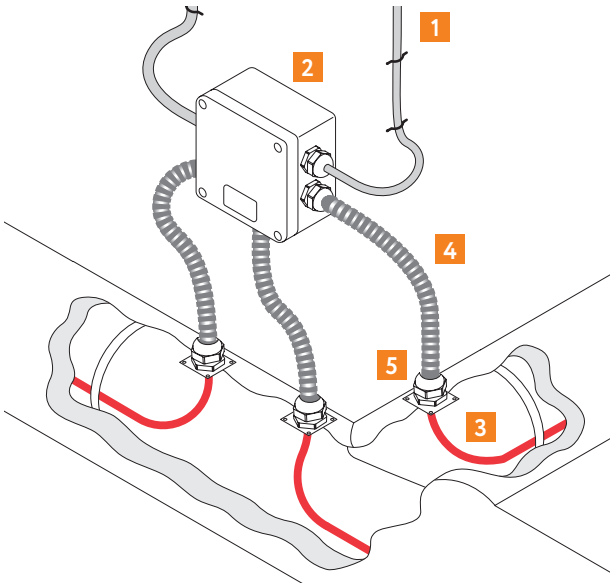
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Product range

JB2221-333-1123	JB2221-333-1223
JB2221-333-1124	JB2221-333-1224
JB2221-333-1125	JB2221-333-1225
JB2221-333-1126	JB2221-333-1226
JB2221-333-1127	JB2221-333-1227
JB2221-333-1128	JB2221-333-1228
JB2221-333-1129	JB2221-333-1229
JB2221-333-1130	JB2221-333-1230

Junction box JB2221-333-2X(11-23) for self-regulating heating cables and power cables connection

- Efficient solution for power supply to self-regulating heating cables in electrical heating systems
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-333-2X(11-23)
3. Heating cable
4. Protective sleeve
5. Cable entry unit

Description

Junction boxes JB2221-333-2X(11-23) are designed for connecting self-regulating electrical heating cables to the power network* and for the branching of self-regulating heating cables. The box also supports branching of the power cable in utility networks.

The box can be mounted onto the wall, onto a nearby metal structure or using a bracket directly onto the pipeline. The box allows up to four self-regulating electrical heating cables to be connected.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

The connected heating cable stretch between the box and the thermal insulation connector can be additionally equipped with protective sleeve (supplied separately). When the junction box is fitted with a protective sleeve, additional cable glands are additionally included to enable connection.

Approvals

№ 17.09520.120
№ TC RU C-RU.AA87.B.00450
№ IECEx CCVE 18.0006X

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18–31.

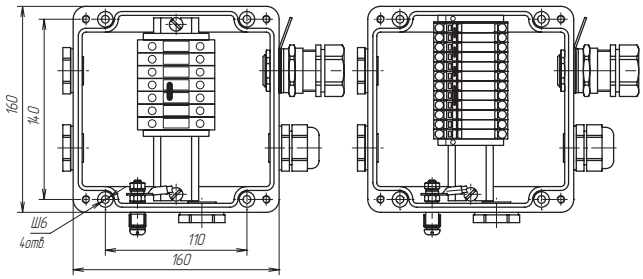
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T3...T6 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	160×160×94.5 mm
Total weight (maximum)	2.5 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	3 modules 10 mm²	TOPJOB 2006-1201	6 modules 6 mm²
WDU BL/Ex	2 modules 10 mm²	TOPJOB 2006-1204	3 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	3 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Accessories
(to be ordered separately)

Metal strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see “Accessories”, p. 95.

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see “Accessories”, pp. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

The heating cable termination kit is specified depending on the type of cable used. For ordering information, see pp. 92-93.

Cable entry unit LEK/U. For ordering information, see “Accessories”, p. 95.

Delivery kit*

Box enclosure JB2221-333-2X(11-23) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00

* Parts and their number in accordance with the selected grade / junction box type. See “Product range”.

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box’s model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

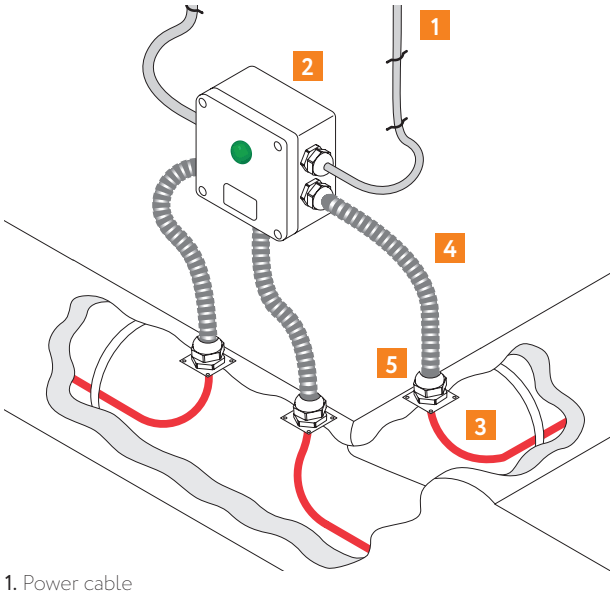
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box’s model

Product range

JB2221-333-2111	JB2221-333-2211
JB2221-333-2112	JB2221-333-2212
JB2221-333-2113	JB2221-333-2213
JB2221-333-2114	JB2221-333-2214
JB2221-333-2115	JB2221-333-2215
JB2221-333-2116	JB2221-333-2216
JB2221-333-2117	JB2221-333-2217
JB2221-333-2118	JB2221-333-2218
JB2221-333-2119	JB2221-333-2219
JB2221-333-2120	JB2221-333-2220
JB2221-333-2121	JB2221-333-2221
JB2221-333-2122	JB2221-333-2222
JB2221-333-2123	JB2221-333-2223

Junction box JB2221-333-2X(27-33) for light indication and connection of heating cables with power supply

- Efficient solution for power supply to self-regulating heating cables in electrical heating systems and visual indication of power
- Compatible with all types of self-regulating electrical heating cables
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-333-2X(27-33)
3. Heating cable
4. Protective sleeve
5. Cable entry unit

Description

Junction boxes JB2221-333-2X(27-33) light indicates the availability of power in heating sections based on self-regulating electric heating cables* and supports connection and branching of heating cables and connection to power network. The box also supports branching of the power cable in utility networks.

The box can be mounted onto a wall, onto a nearby metal structure, or using a bracket directly onto the pipeline. The box allows connection to the power cable of up to three self-regulating electrical heating cables in the version with screw terminal straps and up to two cables in the version with spring terminal straps.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting with unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

A light indicator with a super bright LED signals whether there is voltage at the heating section termination.

The green LED has a long service life and is visible from any angle, including in direct sunlight.

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

* This junction box is compatible with self-regulating heating cables HTM, HTA, HTP, BTC, BTX, HTB, CTE.
For ordering information, see "Heat tracing systems", pp. 18–31.

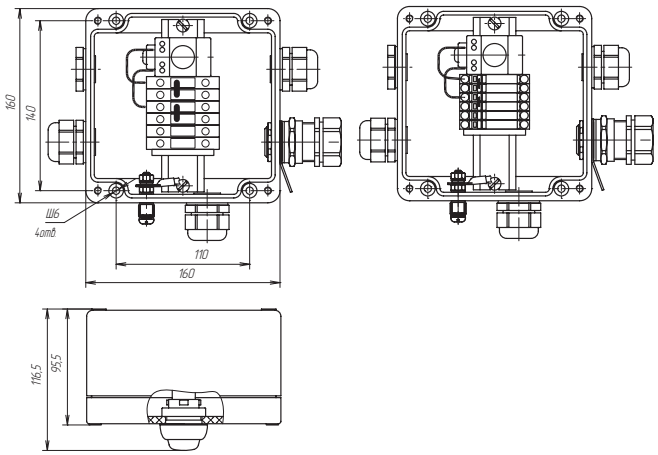
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex db eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Electric life of the LED	>10^5 hours
LED power intake	<1 W
Light source	green LED
View angle	180°
Enclosure dimensions	160×160×94.5 mm
Total weight (maximum)	2.67 kg

Terminal block

Screw clamp		Spring cage clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	2 modules 6 mm²
WDU BL/Ex	2 modules 10 mm²	TOPJOB 2006-1204	2 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	2 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application..

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Delivery kit*

Box enclosure JB2221-333-2X(27-33) complete with a terminal block and LED light indicator
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Blanking plug M25
GP25 seal
Earthing terminal P06.06x150-00
Cu solid wire PVC insulated 1×1.0 L = 0.2 m
Cable ferrule NShvI 4.0-12

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", pp. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

Heating cable termination kit – is specified depending on the type of cable used. For ordering information, see pp. 92-93.

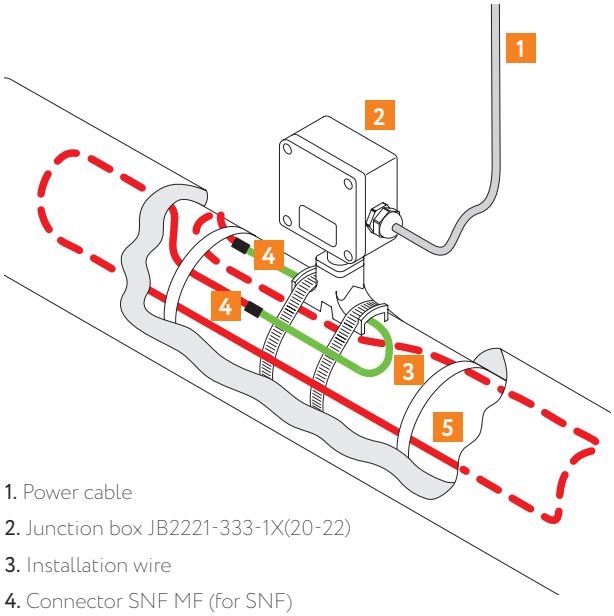
Cable entry unit LEK/U. For ordering information, see "Accessories", p. 95.

Product range

JB2221-333-2127
JB2221-333-2128
JB2221-333-2129
JB2221-333-2130
JB2221-333-2131
JB2221-333-2132
JB2221-333-2133
JB2221-333-2227
JB2221-333-2228
JB2221-333-2229
JB2221-333-2230
JB2221-333-2231
JB2221-333-2232
JB2221-333-2233

Junction box JB2221-333-1X(20-22) for series-resistance heating cables

- Efficient solution for power supply and input of SNF and TMF series-resistance heating cables
- Compatible with all cables of types SNF and TMF
- Excludes the risk of damage to the heating cables at the connection points
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-333-1X(20-22)
3. Installation wire
4. Connector SNF MF (for SNF)
5. Heating cable

Description

Junction boxes JB2221-333-1X(20-22) are designed for connecting of series-resistance heating cables, such as SNF* and TMF**, to power network.

The box is supplied complete with a pipe stand support and is to be mounted directly onto the surface of a pipeline or tank. JB2221-333-1X(20-22) allows one or two heating cable sections to be connected in a loop configuration or three sections in a star configuration.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. Cable glands of the box are intended for connecting unarmored power cables with a diameter of 14 to 25 mm or armored power cables with a diameter of 17 to 26.3 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 16 mm². Design options with screw or spring terminal straps are available to order.

* For ordering information, see "Heat tracing systems", pp. 32–33.
** For ordering information, see "Heat tracing systems", pp. 36–37

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C D
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 750 V
Operating current	up to 66 A
Enclosure dimensions	160×160×94.5 mm
Total weight (maximum)	2.26 kg

Terminal block

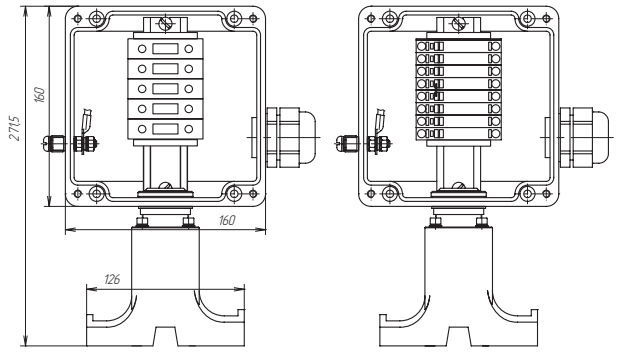
Screw clamp		Spring cage clamp	
WDU/Ex	2 modules 16 mm²	TOPJOB 2010-1201	3 modules 10 mm²
WDU BL/Ex	1 module 16 mm²	TOPJOB 2010-1204	2 modules 10 mm²
WPE /Ex	2 modules 16 mm²	TOPJOB 2010-1207	3 modules 10 mm²

Delivery kit*

Box enclosure JB2221-333-1X(20-22) complete with a terminal block
Armored cable gland, brass M32 Ex
Unarmored cable gland, plastic M32 Ex
Locking nut, brass M32
Earthing ring, brass M32
Sealing ring M32
Blanking plug M32
GP32 seal
Earthing terminal P06.06×150-00
Support stand UVK.01.01
Plate UVK.0012
Nut DESTU.002
Flat section sealing ring
Seal UVK.0015
Plug UVK.0016
Screw M5×40
Washer ø 5, zinc-plated

* Parts and their number in accordance with the selected grade / junction box type. See “Product range”.

Construction



Box with screw (left) and spring (right) terminal block

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box’s model depending on application.

Example: JB2221-XXX-ABCC

① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (1 – with pipe installation support)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box’s model

Accessories
(to be ordered separately)

Metal pipe strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see “Accessories”, p. 95.

Product range

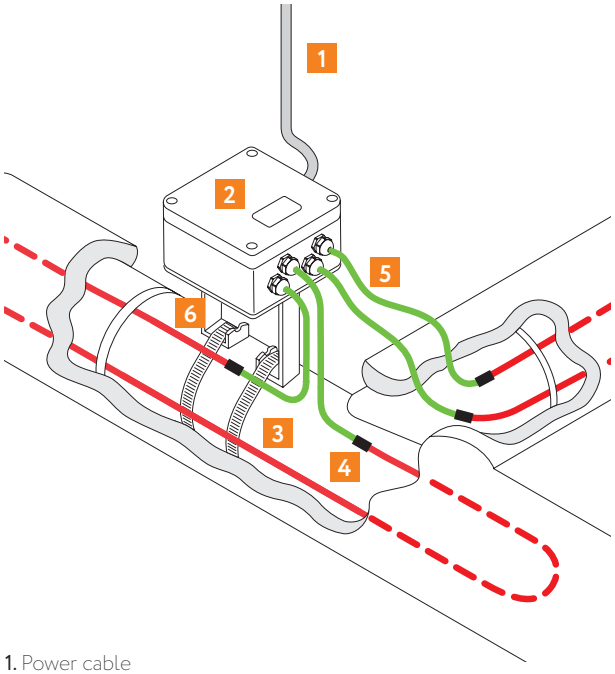
JB2221-333-1120
JB2221-333-1121
JB2221-333-1122
JB2221-333-1220
JB2221-333-1221
JB2221-333-1222

Approvals

№ 17.09520.120
№ TC RU C-RU.AA87.B.00450
№ IECEx CCVE 18.00006X

Junction box JB2221-333-2X(24-26) for connection of mineral insulation heating cables

- Efficient solution for power supply to cables with mineral insulation
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-333-2X(24-26)
3. Heating section
4. Coupling
5. Installation wire
6. Bracket

Description

Junction boxes JB2221-333-2X(24-26) are designed for connecting mineral insulated high-temperature electric heating cables to power network.

The box can be mounted onto a wall, onto a nearby metal structure or using a bracket directly onto the pipeline. The choice of the mounting option also depends on the temperature of the heated system (pipeline). At a pipeline temperature of over 200 °C, it is recommended to mount the box on a wall or on an adjacent metal structure. This box allows two heating cable sections to be connected in a loop configuration or three sections in a star configuration.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability. The cable glands of the box are intended for connecting unarmored power cables with a diameter of 7 to 18 mm or armored power cables with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 1.5 to 10 mm². Design options with screw or spring terminal straps are available to order.

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 550 V
Operating current	up to 50 A
Enclosure dimensions	160×160×94.5 mm
Total weight (maximum)	1.9 kg

Delivery kit*

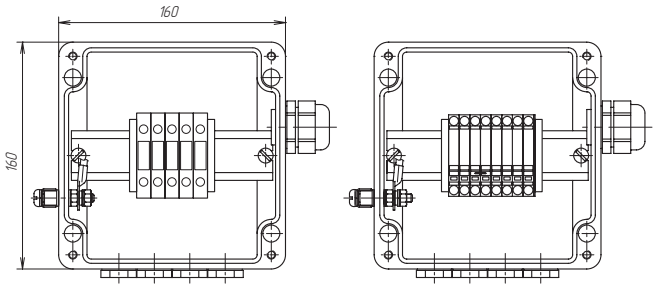
Box enclosure JB2221-333-2X(24-26) complete with a terminal block
Armored cable gland, brass M25 Ex
Unarmored cable gland, plastic M25 Ex
Locking nut, brass M25
Earthing ring, brass M25
Sealing ring M25
Sealing ring M20
Blanking plug M25
Blanking plug M20
GP25 seal
Earthing terminal P06.06x150-00

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Terminal block

Screw clamp		Spring clamp	
WDU/Ex	2 modules 10 mm²	TOPJOB 2006-1201	3 modules 6 mm²
WDU BL/Ex	1 module 10 mm²	TOPJOB 2006-1204	2 modules 6 mm²
WPE /Ex	2 modules 10 mm²	TOPJOB 2006-1207	3 modules 6 mm²

Construction



Box with screw (left) and spring (right) terminal block

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Accessories
(to be ordered separately)

Brackets PB, KP, PL.PTB 0606 – for mounting the box onto the pipeline. For ordering information, see "Accessories", pp. 98-99.

Z-profile – for mounting the box onto a metal structure or onto a wall.

Metal strap PFS/3 – for mounting the box onto the pipeline. For ordering information, see "Accessories", p. 95.

Cable entry unit LEK/U. For ordering information, see "Accessories", p. 95.

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

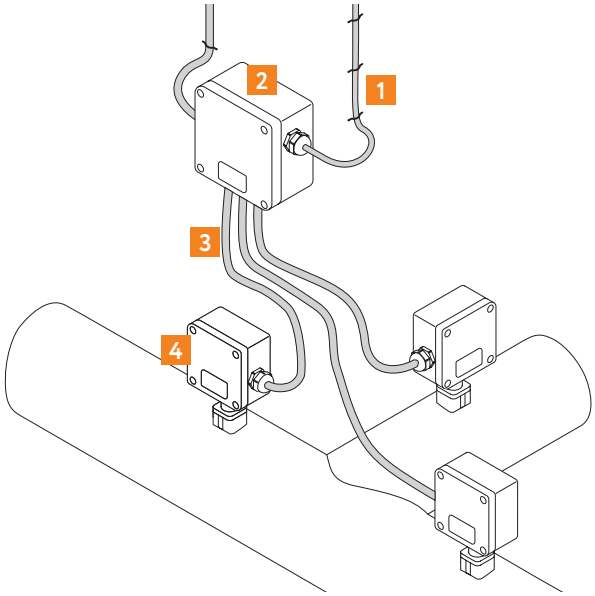
1. JB2221 – class of boxes
2. XXX – dimension code (223 – 122×120×90 mm, 333 – 160×160×90 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw, 2 – spring cage)
5. CC – box's model

Product range

JB2221-333-2124
JB2221-333-2125
JB2221-333-2126
JB2221-333-2224
JB2221-333-2225
JB2221-333-2226

Junction box JB2221-554-2X(11-38) for power cables connection

- Efficient solution for power supply cables connection in electrical heating systems
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-554-2X(11-38)
3. Power cable
4. Junction box

Description

Junction boxes JB2221-554-2X(11-38) are designed for power distribution during installation, repair and upgrade of power cables and utility networks in explosion hazard areas.

The box is mounted onto a nearby metal structure. The box allows connection of up to six power cables.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability.

The box has following cable glands:

- up to two glands for unarmored cable with a diameter of 14 to 25 mm or armored cable with a diameter of 17 to 26.3 mm.
- up to four glands for unarmored cable with a diameter of 7 to 18 mm or armored cable with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 2.5 to 35 mm².

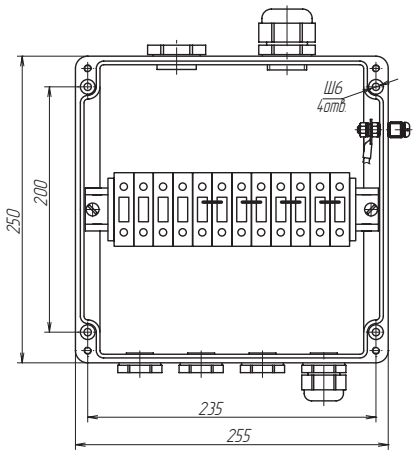
Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 750 V
Operating current	up to 109 A
Enclosure dimensions	250×255×120 mm
Total weight (maximum)	5.76 kg

Terminal block

Screw clamp	
WDU/Ex	6 modules 35 mm²
WDU BL/Ex	2 modules 35 mm²
WPE /Ex	4 modules 35 mm²

Construction



Schematic view of the box

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Accessories
(to be ordered separately)

Z-profile – for mounting the box onto a metal structure.

Delivery kit*

Box enclosure JB2221-554-2X(11-38) complete with a terminal block
Armored cable gland, brass M25 Ex
Armored cable gland, brass M32 Ex
Unarmored cable gland, plastic M25 Ex
Unarmored cable gland, plastic M32 Ex
Locking nut, brass M25
Locking nut, brass M32
Earthing ring, brass M25
Earthing ring, brass M32
Blanking plug M25 Ex
Blanking plug M32 Ex
Sealing ring M25 Ex
Sealing ring M32 Ex
GP25 seal
GP32 seal
Earthing terminal P06.06×150-00

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC
① ② ③④ ⑤

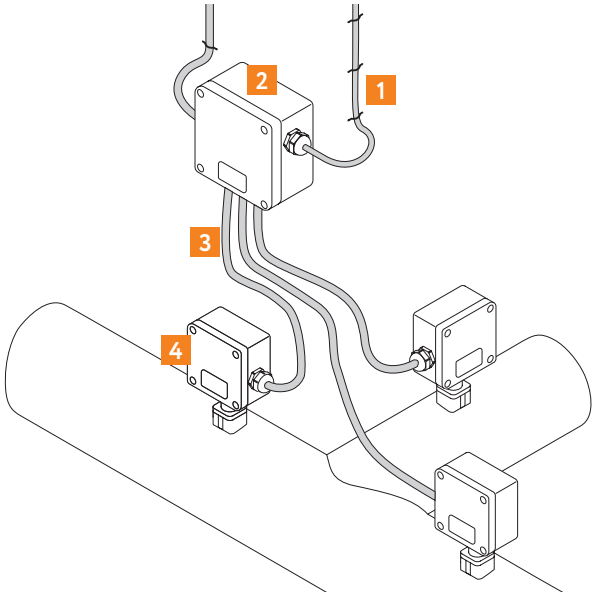
1. JB2221 – class of boxes
2. XXX – dimension code (544 – 255×250×120 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw)
5. CC – box's model

Product range

JB2221-544-2111
JB2221-544-2112
JB2221-544-2113
JB2221-544-2114
JB2221-544-2115
JB2221-544-2116
JB2221-544-2117
JB2221-544-2118
JB2221-544-2119
JB2221-544-2120
JB2221-544-2121
JB2221-544-2122
JB2221-544-2123
JB2221-544-2124
JB2221-544-2125
JB2221-544-2126
JB2221-544-2127
JB2221-544-2128
JB2221-544-2129
JB2221-544-2130
JB2221-544-2131
JB2221-544-2132
JB2221-544-2133
JB2221-544-2134
JB2221-544-2135
JB2221-544-2136
JB2221-544-2137
JB2221-544-2138

Junction box JB2221-544-21(39-59) for power supply cables connection

- Efficient solution for power supply cables connection in electrical heating systems
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive



1. Power cable
2. Junction box JB2221-544-21(39-59)
3. Power cable
4. Junction box

Description

Junction boxes JB2221-544-21(39-59) are designed for power distribution during installation, repair, and upgrade of power cables and utility networks in explosion hazard areas.

The box is mounted onto a nearby metal structure. The box allows connection of up to six power cables.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability.

The box has following cable glands:

- up to two glands for armored cable with a diameter of 23.5 to 33.6 mm.
- up to four glands for unarmored cable with a diameter of 7 to 18 mm or armored cable with a diameter of 12 to 20 mm.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 2.5 to 35 mm^2.

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C... T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 750 V
Operating current	up to 109 A
Enclosure dimensions	250×255×120 mm
Total weight (maximum)	5.8 kg

Terminal block

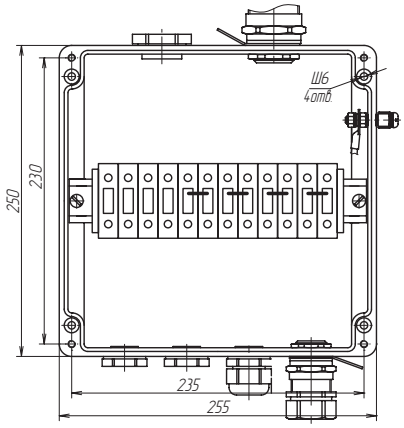
Screw clamp	
WDU/Ex	6 modules 35 mm²
WDU BL/Ex	2 modules 35 mm²
WPE /Ex	4 modules 35 mm²

Delivery kit*

Box enclosure JB2221-544-21(39-59) complete with a terminal block
Armored cable gland, brass M25 Ex
Armored cable gland, brass M40 Ex
Unarmored cable gland, plastic M25 Ex
Unarmored cable gland, plastic M40 Ex
Locking nut, brass M25
Locking nut, brass M40
Earthing ring, brass M25
Earthing ring, brass M40
Blanking plug M25 Ex
Blanking plug M40 Ex
Sealing ring M25 Ex
Sealing ring M40 Ex
GP25 seal
Earthing terminal P06.06×150-00

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Construction



Schematic view of the box

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC

① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (544 – 255×250×120 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw)
5. CC – box's model

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

№ IECEx CCVE 18.0006X

Accessories
(to be ordered separately)

Z-profile – for mounting the box onto a metal structure.

Product range

JB2221-544-2139
JB2221-544-2140
JB2221-544-2141
JB2221-544-2142
JB2221-544-2143
JB2221-554-2144
JB2221-544-2145
JB2221-544-2146
JB2221-544-2147
JB2221-544-2148
JB2221-544-2149
JB2221-544-2150
JB2221-544-2151
JB2221-544-2152
JB2221-544-2153
JB2221-544-2154
JB2221-544-2155
JB2221-544-2156
JB2221-544-2157
JB2221-544-2158
JB2221-544-2159

Junction boxes JB2221-544-21(60-64) and JB2221-544-2165

- Efficient solution for power supply to three-phase series-resistance heating cable LLS
- Approved for installation in explosion hazard areas
- All required component parts included in the scope of supply
- Wide application range
- Quick and easy installation
- High thermal stability
- Non-corrosive

Description

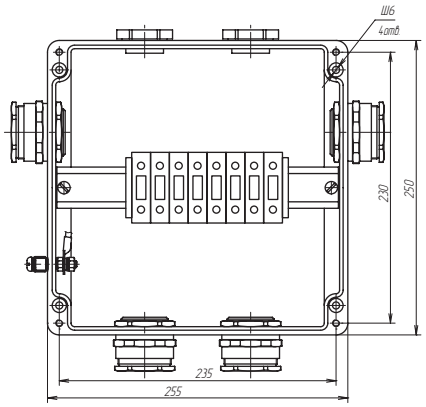
Boxes JB2221-544-21(60-64) and JB2221-544-2165 allow to connect heating sections based on a three-phase series-resistance heating cable with each other and with a power cable in explosion hazard areas.

The enclosure design ensures moisture and dust ingress protection IP66 and high corrosion stability.

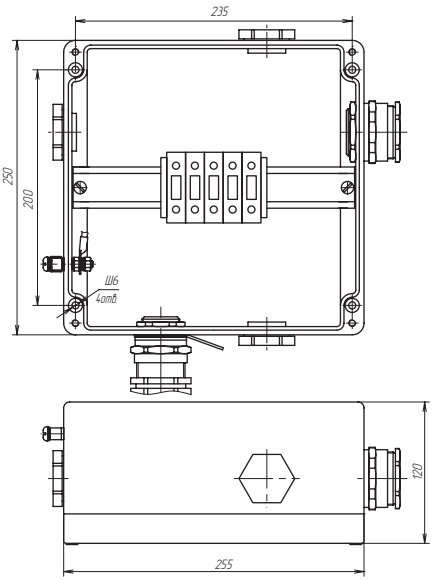
The box can be mounted onto a nearby metal structure or using a bracket directly onto the pipeline. Depending on the purpose, the boxes are classified into power connectin boxes (for connecting the heating section to a source of power), maintenance boxes (for connecting two strings of the heating section) and terminal boxes (for connecting the heating section at the heating stretch termination).

The cable gland of the box JB2221-544-21(60-64) is intended for connecting armored cable with a diameter of 23.5 to 33.6 mm. The box allows the connection of one section using the star or loop configuration. For conveniently connecting heating sections and power cables and orienting the box at the connection point, the box has an opening on each side sealed by a plug.

Construction



Junction box JB2221-544-21(63,64)



Junction box JB2221-544-21(60-62), JB2221-544-2165

JB2221-544-2165 is intended for connecting armored cable with a diameter from 17 to 26.3 mm. The box allows connection of one section using the star configuration. For conveniently connecting heating sections and power cables and orienting the box at the connection point, the box has an opening on each side sealed by a plug.

The installed terminal blocks allow the connection of multi-core or single-core wires with a cross-section of 2.5 to 35 mm².

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Dust and moisture protection rating	IP66
Explosion protection marking	Ex eb IIC T6...T3 Gb Ex tb IIIC T85°C...T165°C Db
Temperature group of the explosion hazard area	T6
Operating ambient temperature range	-60...+55 °C
Operating voltage	up to 750 V
Operating current	up to 109 A
Enclosure dimensions	250×255×120 mm
Total weight (maximum) JB2221-544-21(60-64) JB2221-544-2165	 5.7 kg 4.8 kg

Delivery kit*

Box enclosure JB2221-544-21(60-64) complete with a terminal block
Box enclosure JB2221-544-2165 complete with a terminal block
Armored cable gland, brass M32 Ex (JB2221-544-2165 only)
Armored cable gland, brass M40 Ex
Unarmored cable gland, plastic M40 Ex
Locking nut, brass M32 (JB2221-544-2165 only)
Locking nut, brass M40
Earthing ring, brass M32 (JB2221-544-2165 only)
Earthing ring, brass M40
Blanking plug M40 Ex
Sealing ring M32 Ex (JB2221-544-2165 only)
Sealing ring M40 Ex
Earthing terminal P06.06x150-00

* Parts and their number in accordance with the selected grade / junction box type. See "Product range".

Terminal block

Screw clamp		
Product range	JB2221-544-21(60-62), JB2221-544-2165	JB2221-544-21(63,64)
WDU/Ex	3 modules 35 mm²	6 modules 35 mm²
WPE /Ex	2 modules 35 mm²	6 modules 35 mm²

Approvals

№ 17.09520.120

№ TC RU C-RU.AA87.B.00450

IECEx CCVE 18.0006X

Ordering information

JB junction boxes are marked indicating class of boxes, dimensions, mounting type, terminals type. The last 2 digits indicate a box's model depending on application.

Example: JB2221-XXX-ABCC

① ② ③④ ⑤

1. JB2221 – class of boxes
2. XXX – dimension code (544 – 255×250×120 mm)
3. A – mounting type (2 – wall mounted)
4. B – code terminal type (1 – screw)
5. CC – box's model

Product range

JB2221-544-2160

JB2221-544-2161

JB2221-544-2162

JB2221-544-2163

JB2221-544-2164

JB2221-544-2165

Accessories (to be ordered separately)

Z-profile – for mounting the box onto a metal structure.

Plate PL.PTB 1007 and bracket K.PTB10.YYYxYYY – for mounting the box onto the pipeline.

For ordering information, see "Accessories", p. 99.

Installation cable ONEKEYELECTRO-KM

- Number of cores, pairs, triples, and fours: 1–100
- Core cross-section: 0.20; 0.35; 0.5; 0.75; 1.0; 1.2; 1.5; 2.5; 4.0; 6.0 mm²
- Operating temperature -60 °C to 130 °C
- Chemical, mechanical, and biological resistance
- Approved for installation in fireand explosion hazard areas

Purpose

ONEKEYELECTRO-KM cables are intended for industrial automation applications, are heat-resistant, cold-resistant, flame retardant, fireproof, suitable for installation on hazardous industrial sites. They are designed for laying in cabling structures, outdoor or indoor, without additional protection from UV rays and as part of safety systems at nuclear power plants, fire and explosion hazard areas of Class 0; 1; 2; 20; 21; 22; B-1; B-1(a-d); B-2 (GOST 30852.13-2002; GOST IEC 60079-14-2013, and PUE), including as part of explosion-proof electrical equipment.

Applications

- Connecting industrial automation devices, actuators, controllers, and sensors
- Connecting fire alarm devices
- Connecting control circuit devices
- Data transmission in field networks

Ordering information

Example: Cable ONEKEYELECTRO-KM - HM - EO m K b ng(A)-FRLS 2 x 2 x 1,0 l*

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

1. Cable grade:
   ONEKEYELECTRO-KM – installation cable.
2. Installation site:
   blank – not intended for cold installation;
   HM – intended for cold installation.
3. Screen:
   blank – no screen;
   EI – dedicated screen;
   EO – common screen.
4. Screen type:
   m – copper wire armor;
   l – tinned copper wire armor;
   fm – foil wraping and copper wire armor;
   fl – foil wraping and tinned copper wire armor.
5. Armor:
   blank – no armor;
   K – zinc-coated steel wire armor;
   B – zinc-coated steel tape armor;
   Bgt – corrugated steel tube armor.
6. Additional elements:
   b – water-proofing elements;
   z – filling by extrusion;
   n – belt insulation.
7. Fire safety and fire resistance rating (GOST 31565-2012).
8. Number of pairs
9. Number of cores in pairs
10. Core cross-section:
    Possible values: 0.20; 0.35; 0.5; 0.75; 1.0; 1.2; 1.5; 2.5; 4.0; 6.0 mm².
11. Wire type of the cores:
    bland – multi-wire cores;
    ok – single-wire cores;
    l – tinned cores.

* Cable ONEKEYELECTRO-KM-HM-EO m K b ng(A)-FRLS 2x2x1.0 l with two twisted pairs of insulated cores with a nominal section of 1.00 mm² insulated by a silicone rubber compound.

Technical data

Number of cores, pairs, triples and fours	1–100
Core cross-section	0.20; 0.35; 0.5; 0.75; 1.0; 1.2; 1.5; 2.5; 4.0; 6.0 mm^2
Electrical resistance of the conductors to direct current, recalculated per 1 km of cable at 20 °C	to GOST 22483-2012
Test alternating voltage: – between cores – between cores and screens	 2500 V 2000 V
Electrical insulation resistance, recalculated per 1 km of length under normal climatic conditions: – cables with insulation of a crosslinkable polyolefin composition – cables with insulation of silicone rubber and halogen-free polymer compounds – cables with PVC insulation	 500 MOhm 100 MOhm 10 MOhm
Inductance, max	1.0 mH/km
Operating capacity, max	200 nF/km
Wave resistance	80 ... 150 Ohm
High operating temperature: – versions ng(A)-HF, ng(A)-FRLS, ng(A)-FRHF – version T (heat-resistant)	up to 80 °C up to 105 °C up to 130 °C
Low operating temperature:	down to -60 °C (cables with HM index)
Resistance to vibration loads, impact loads, linear loads, stretching	high
Resistance to dust, molds, frost	high
Oil resistance	high
Warranty service life	5 years
Average service life	40 years

Installation and operation

Minimum installation temperature without preheating	
– HM version	–45 °C
– HL version	–35 °C
– other cables	–25 °C
Minimum bending radius, at installation:	
– at a temperature of +5 °C and above	6 outer diameters (non-armored) and 8 (armored)
– at a temperature below +5 °C	10 outer diameters

Approvals

№ ТС RU C-RU.МЛ66.В.05411

EAC

Power cable ONEKEYELECTRO-KS

- Number of cores in the cable: 1–5
- Core cross-section: 0.75; 1.0; 1.5; 2.5; 4; 6; 10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm^2
- Operating temperature -60 °C to 130 °C
- Approved for installation in fireand explosion hazard areas

Purpose

Power cable ONEKEYELECTRO-KS is intended for transmission and distribution of electrical current in stationary installations at a nominal alternating voltage of 0.66; 0.69; 1 kV, rated frequency of 50 Hz, and for operation in direct current systems up to 1.5 kV.

Applications

The cable is intended for indoor and outdoor installation, underground laying, including hazardous industrial sites and explosion hazard areas of classes B-1, B-1 (a-g), B-2 (GOST 30852.13-2002). Available climatic versions: HM, placement categories 1-5; HL (CR), placement categories 1-3; T – placement categories 1-3 (GOST 15150-69).

Ordering information

Example: Cable ONEKEYELECTRO-KS ① - HM ② - T ③ K ④ T ⑤ ng(A)-HF ⑥ 5 ⑦ x 16 mk ⑧ (N,PE) ⑨ - 1* ⑩

1. Cable grade:
   Power cable ONEKEYELECTRO-KS.
2. Installation site:
   blank –not intended for cold installation;
   HM – intended for cold installation.
3. Insulation:
   T – thermoplastic elastomer;
   B – polyvinyl chloride plastic;
   Pк – silicone rubber;
   Rep – ethylene propylene rubber;
   Pv – cross-linked polyethylene;
   P – halogen-free polymer composition.
4. Screen and armor:
   E – copper tape or wire screen;
   B – zinc-coated steel tape armor;
   K – zinc-coated steel wire armor;
   EB – zinc-coated steel tape screen and armor;
   EK – zinc-coated steel wire screen and armor.
5. Jacket:
   T – thermoplastic elastomer;
   B – polyvinyl chloride plastic;
   P – halogen-free polymer composition.
6. Fire safety and fire resistance rating (GOST 31565-2012).
7. Number of conductor cores:
   Possible values: 1 – 5.
8. Core cross-section and type:
   Possible values: 0.75; 1.0; 1.5; 2.5; 4; 6; 10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm^2;
   o – single-wire cores;
   m – milti-wire cores;
   l – tinned cores;
   k – round cores..
9. Zero core and earth conductor:
   N – zero core;
   PE – earth conductor.
10. Nominal voltage 1 kV.

* Cable ONEKEYELECTRO-KS-HM-TKT ng(A) 5x16mk (N,PE)-1 with thermoplastic elastomer insulation, armor, zinc-coated steel wire braiding, separating layer and a jacket of thermoplastic elastomer; the cable does not spread combustion in the case of combined installation of category A, climatic version HM, rated voltage 1 kV, with five multi-wire round copper cores with a nominal cross-section of 16 mm^2, zero core and earth core.

Technical data

Cores in the cable	1–5*
Nominal core cross-section	0.75; 1.0; 1.5; 2.5; 4; 6; 10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm^2
Cable lengths not less than	200 m**
High operating temperature: – versions ng(A)-HF, ng(A)-FRLS, ng(A)-FRHF – version T (heat-resistant)	up to 80 °C up to 105 °C up to 130 °C
Low operating temperature	down to -60 °C (cables with HM designation)
Warranty service life	5 years
Average service life	40 years

Insulation material of current-carrying conductors

Designation	Material
Cable without designation of fire hazard index and with ng(A) designation	polyvinylchloride plastic
cables with ng(A)-LS designation	polymer material with a reduced fire hazard index
cable with ng(A)-HF designation	polymer compound, halogen-free
cables with Pv designation	cross-linkable polyolefin composition
cables with T designation	thermoplastic elastomer
cables with Rep designation	ethylene propylene rubber
cables with ng(A)-FRLS designation	fire-resistant ceramic orga-nosilicon mix
cables with ng(A)-FRHF designation	fire-resistant ceramic orga-nosilicon mix, halogen-free

Installation and operation

Minimum installation temperature without preheating:	
– HM version	–45 °C
– HL version	–35 °C
– other cables	–25 °C
Minimum bending radius at operation and storage:	
– at operation	6 outer cable diameters
– at storage	300 mm
Minimum bending radius at installation:	
– at a temperature of +5 °C and above	6 external diameters (non-armored) and 8 (armored)
– at a temperature below +5 °C	10 outer diameters

Approvals

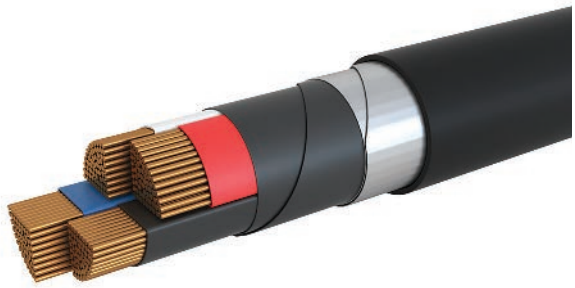
№ ТС RU C-RU.МЛ66.В.05433

EAC

** As agreed with the customer, cable with different parameters may be manufactured.

Power cable ONEKEYELECTRO-KS

- Number of cores in the cable: 1–5
- Core cross-section: 10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm^2
- Operating temperature -60 °C to 130 °C
- Approved for installation in fire and explosion hazard areas



Purpose

Power cable ONEKEYELECTRO-KS is intended for transmission and distribution of electrical current in stationary installations at a nominal alternating voltage of 3 kV, rated frequency of 50 Hz and for operation in direct current systems up to 4 kV.

Applications

The cable is intended for indoor and outdoor installation, underground laying, including hazardous industrial sites and explosion hazard areas of classes B-1, B-1(a-g), B-2 (GOST 30852.13-2002). Available climatic versions: HM, placement categories 1-5; HL (CR), placement categories 1-3; T – placement categories 1-3 (GOST 15150-69).

Ordering information

Example: Cable ONEKEYELECTRO-KS ① - HM ② - T ③ K ④ T ⑤ ng(A)-HF ⑥ 5 ⑦ x 50 mk ⑧ (N,PE) ⑨ - 3* ⑩

1. Cable grade:
   Power cable ONEKEYELECTRO-KS.
2. Installation site:
   blank –not intended for cold installation;
   HM – intended for cold installation.
3. Insulation:
   T – thermoplastic elastomer;
   B – polyvinyl chloride plastic;
   Pк – silicone rubber;
   Pep – ethylene propylene rubber;
   Pv – cross-linked polyethylene;
   P – halogen-free polymer composition.
4. Screen and armor:
   E – copper tape or wire screen;
   B – zinc-coated steel tape armor;
   K – zinc-coated steel wire armor;
   EB – zinc-coated steel tape screen and armor;
   EK – zinc-coated steel wire screen and armor.
5. Jacket:
   T – thermoplastic elastomer;
   B – polyvinyl chloride plastic;
   P – halogen-free polymer composition.
6. Fire safety and fire resistance rating (GOST 31565-2012).
7. Number of conductor cores:
   Possible values: 1 – 5.
8. Core cross-section and type:
   Possible values: 10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm^2;
   o – single-wire cores;
   m – milti-wire cores;
   l – tinned cores;
   k – round cores.
9. Zero core and earth conductor:
   N – zero core;
   PE – earth conductor.
10. Nominal voltage 3 kV.

* Cable ONEKEYELECTRO-KS-HM-TKT ng(A)-HF 5x50mk(N, PE)-3 with thermoplastic elastomer insulation, armor, zinc-coated steel wire braiding, separating layer and a jacket of thermoplastic elastomer; the cable does not spread combustion in the case of combined installation of category A, climatic version HM, rated voltage 3 kV, with five multi-wire round copper cores with a nominal cross-section of 50 mm^2, zero core and earth core.

Technical data

Cores in the cable	1–5**
Nominal core cross-section	10; 16; 25; 35; 50; 70; 95; 120; 150; 185; 240; 300; 400; 500; 625; 630; 800; 1000 mm² **
Cable lengths not less than	200 m**
High operating temperature: – versions ng(A)-HF – version T (heat-resistant)	 up to 80 °C up to 105 °C up to 130 °C
Low operating temperature	down to -60 °C (cables with HM designation)
Warranty service life	5 years
Average service life	40 years

Insulation material of current-carrying conductors

Designation	Material
cable without designation of fire hazard index and with ng(A) designation	polyvinylchloride plastic
cables with ng(A)-LS designation	polymer material with a reduced fire hazard index
cable with ng(A)-HF designation	polymer compound, halogen-free
cables with Pv designation	cross-linkable polyolefin composition
cables with T designation	thermoplastic elastomer
cables with Rep designation	ethylene propylene rubber
cables with ng(A)-FRLS designation	fire-resistant ceramic orga-nosilicon mix
cables with ng(A)-FRHF designation	fire-resistant ceramic orga-nosilicon mix, halogen-free

Installation and operation

Minimum installation temperature without preheating:	
– HM version	–45 °C
– HL version	–35 °C
– other cables	–25 °C
Minimum bending radius at operation and storage:	
– at operation	6 outer cable diameters
– at storage	300 mm
Minimum bending radius at installation:	
– at a temperature of +5 °C and above	6 external diameters (non-armored) and 8 (armored)
– at a temperature below +5 °C	10 outer diameters

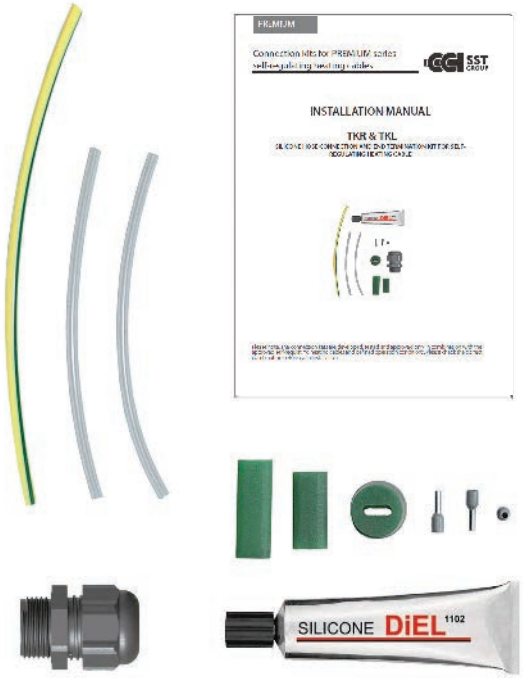
Approvals

№ C-RU.ПБ68.В.02641

№ РОСС RU.АГ35.Д00273

** As agreed with the customer, cable with different parameters may be manufactured.

Kit for heating cables TKL, TKR, TKW



Description

Standard connection kits for self-regulating electric heating cables include organosilicon rubber tips for simple and quick connection of cable ends.

The kit includes crimp terminals, ground wire tube, organosilicone seal for the M25 cable connector, 10 ml of sealant.

Matching kits to heating cables

Kit	Self-regulating heating cable type
TKL	HTB, BTC
TKR	HTP, HTM, HTA
TKW	BTX

Ordering information

Kit TKn, where n denotes connector kit.

Approvals

№ IECEx CCVE 17.0007.X
№ 16.00338.120
№ TC RU C-RU.AA87.B.00340
№ Sira 18ATEX3038X

Kit for heating cables TKL/j, TKR/j, TKW/j

Description

Standart kits for connecting one end of the self-regulating heating cable to a junction box and light indication box (JB2221-223-1X(21-23), JB2221-223-2X(27-31)).

The kit includes crimp terminals, ground wire tube, organosilicone seal for the M25 cable connector, 10 ml of sealant.

Matching kits to heating cables

Kit	Self-regulating heating cable type
TKL/j	HTB, BTC
TKR/j	HTP, HTM, HTA
TKW/j	BTX

Approvals

№ 16.00338.120

№ TC RU C-RU.AA87.B.00340

Ordering information

Kit TKn, where n denotes connector kit.

Kit for heating cables TKT/M

Description

TKT/M kit is intended for connecting self-regulating heating cable and installation wire on the site, including explosion hazard areas with a maximum exposure temperature of 125 °C.

TKT/M kit includes heat-shrinkable tubing based on a polyethylene composition and crimp sleeves.

Approvals

№ IECEx CCVE 17.0007.X.

№ 16.00338.120

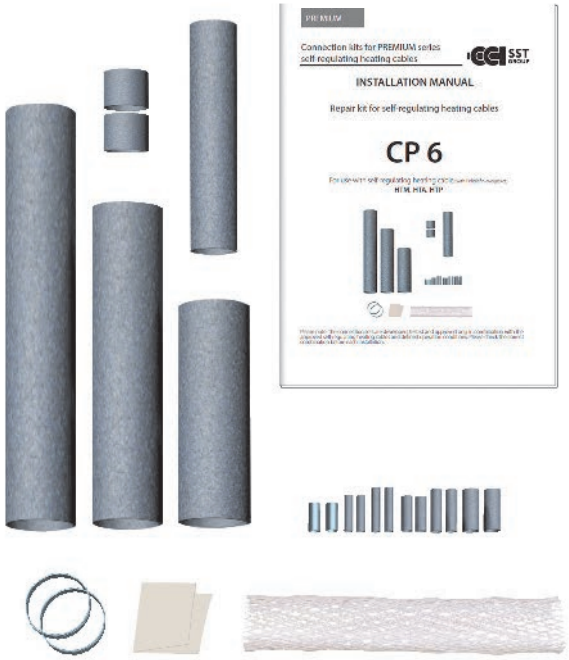
№ TC RU C-RU.AA87.B.00340

№ Sira 18ATEX3038X

Ordering information

Kit TKT/M

Kit for heating cables CP-6



Description

CP-6 kit is intended for connecting self-regulating heating cables HTM, HTA, HTP with a thermoplastic elastomer and fluoroplastic jacket. Maximum exposure temperature – 125 °C.

CP-6 includes heat shrinkable tubing based on a polyethylene composition, solder, copper braid, fluoroplastic tape.

Approvals

№ IECEx CCVE 17.0007.X

№ 16.00338.120

№ TC RU C-RU.AA87.B.00340

№ Sira 18ATEX3038X

Ordering information

Connection kit CP-6.

Kit for heating cables CP-7

Description

CP-7 kit is intended for connecting high-temperature self-regulating heating cables BTC (over 125 °C) and BTX with a fluoroplastic casing jacket and a maximum exposure temperature of 200 °C. CP-7 includes heat shrinkable tubing based on fluoroplastic, solder, copper braid, fluoroplastic tape and sealant.

Approvals

№ IECEx CCVE 17.0007.X

№ 16.00338.120

№ TC RU C-RU.AA87.B.00340

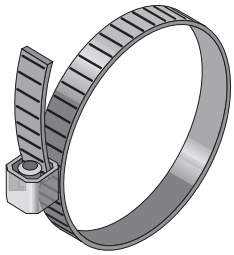
№ Sira 18ATEX3038X

Ordering information

Connection kit CP-7.

Straps for mounting junction box brackets onto the pipe

- Quick-action lock allows to mount the strap without the use of special tools, simplifying and speeding up the installation process
- High strength and corrosion resistance
- Highly reliable installation
- Packaging convenient for storage and transportation



Description

The strap is intended for mounting junction box brackets directly to the surface of the heated system (pipe, tank) and also to mounting heating sections based on MIC cable with mineral insulation. The kit contents make it possible to assemble worm drive straps of the required diameter in a short time without the use of special tools. With the help of the strap, parts can be mounted onto structures and equipment of any shape and size.

Material – stainless steel.

Approvals

This product is exempt from mandatory certification.

Fasteners for the strap PFS/30

Metal lock with a screw for tightening the strap. Intended for reliably connecting worm drive straps of the required diameter. The fasteners are universal and can be used both for creating small-diameter straps and for mounting large-sized parts. Allow to connect the strap's two loose ends. A small overlap is recommended when mounting the strap.

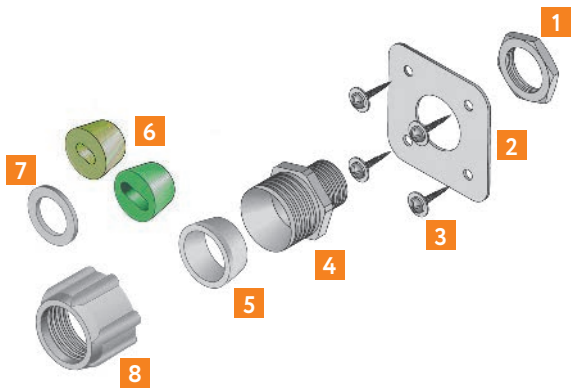
Material – stainless steel.

Ordering information

1. PFS/n strap, where n is the strap length in meters (3, 30).
2. Fasteners for the strap PFS/30.

Part name	Length, m	Width, mm	Type of band	Weight, kg	Type of packaging	Delivery kit, pcs.
PFS/3	3	12,7	Hose strap	0,3	Blister pack	Strap – 1 pc. Fastening element – 8 pcs.
PFS/30	30	9	Hose strap	1,447	Plastic reel	Strap – 1 pc. Fastening element – to be ordered separately / not included in the package.

Cable entry unit LEK/U



Delivery kit

The kit includes:

Part	Qty
1. Lock nut	1
2. Metal plate	1
3. Self-tapping screws	4
4. Connector body GW50416	1
5. Connector seal	1
6. Cable seal (2 types)	1
7. Washer	1
8. Connector head	1

Ordering information

Cable entry unit LEK/U.

Approvals

This product is exempt from mandatory certification.

Pipe support stand UVK

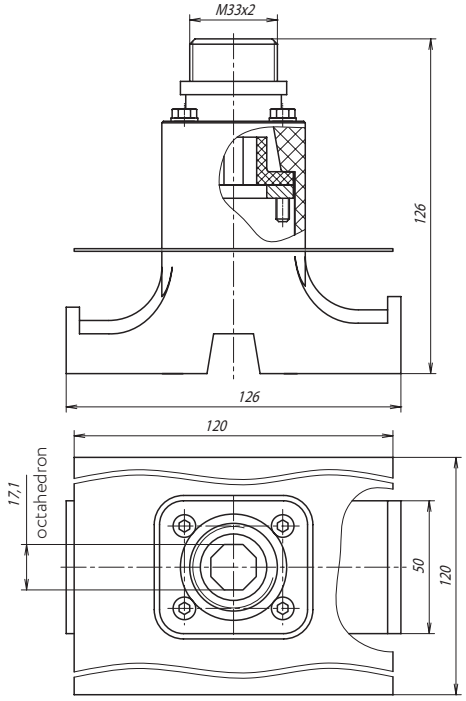
- Efficient solution for input through thermal insulation
- Excludes the risk of damage at connection points
- Quick and easy installation
- High heat stability
- Non-corrosive

Description

Pipe support stand UVK.0120 intended for installation of the junction boxes JB and the subsequent petentration of the thermal insulation with heating cables. Depending on the chosen electric heating system, up to three self-regulating heating cables, up to four lines of series-resistance heating cable or up to three temperature sensors can be connected to the junction box.

UVK stand is mounted with straps directly onto the surface of the pipeline or tank.

The design of the stand's body provides mechanical protection and high corrosion resistance of the installed electrical system. The stand has all the necessary fasteners for attaching the electrical equipment inside the stand's body.



UVK.0120

Technical data

Climatic version and location category according to GOST 15150-69	UHL1 (boreal climate)
Operating ambient temperature range	-60...+55 °C
Maximum exposure temperature	+240 °C (briefly up to +260 °C)
Minimum installation temperature	-50 °C
Mechanical resistance	7 J
Dust and moisture protection rating	IP66
Explosion protection marking (UVK.0120)	1Ex e IIC Gb/ 1Ex tb IIIC Db
Dimensions	126×126×50 mm
Total weight (maximum)	0.25 kg

Delivery kit

Part	Qty
Pipe support stand UVK.0120	
Support stand UVK.0101	1
Plate UVK.0012	1
Nut DESTU.002	1
Flat section ring	1
Seal UVK.0013	1
Seal UVK.0013-01	1
Seal UVK.0015	1
Plug UVK.0014	2
Plug UVK.0014-01	2
Plug UVK.0016	3
Screw 5×40 мм	4
Washer ø5	4
Zip lock bag	2

Accessories
(to be ordered separately)

Metal strap PFS/3 – for mounting support stand onto the pipeline.

Ordering information

Pipe support stand for input through thermal insulation UVK.XXXX.
①

Version: 0120 – for use with electric heating cables

Approvals

UVK.0120 EAC Ex

Product range

UVK.0120

Support brackets for mounting junction boxes onto a pipe or a tank

- Quick and easy installation, which does not require special tools
- Increased structural strength and reliable fastening to the heated surface
- Resistance to vibration and alternating stresses
- High accuracy of surface interface
- Optimum size and weight
- Versatility and compatibility with all standard sizes of JB junction boxes

Description. Product range

Support brackets are used in cases where it is not possible to reliably mount the junction box onto the surface of a nearby structure (supports, traverses, etc.) of the heated system.

When specifying the bracket, the dimensions of the heated system, its operating parameters and the types of permissible installation work should be taken into account.

On pp. 96-101 the product range of support brackets fully compatible with all types of junction boxes by SST Group are shown.

If you have question concerning compatibility with other equipment, please contact the nearest office of SST Group.

Approvals

This product is exempt from mandatory certification.

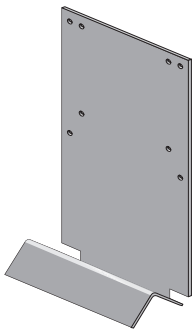
Bracket PB

Intended for mounting onto small diameter pipelines (up to 54 mm).

Compatible with boxes JB2221-223-2X(11-15), JB2221-223-2X(27-31), JB222(3)1-223-2X(16-24), JB2221-333-2X(11-23) and JB2221-333-1X(23-30).

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
331×158×39	0,73	Two straps PFS*

Material – galvanized steel



PB

Ordering information

Bracket PB

* To be ordered separately.

Bracket PL.JB 0606-10

Intended for mounting onto pipelines with thermal insulation up to 100 mm thick.

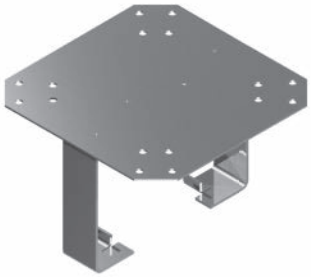
Compatible with boxes JB2221-223-2X(11-15), JB2221-223-2X(27-31), JB222(3)1-223-2X(16-24), JB2221-223-2X(25-26), JB2221-333-2X(11-23), JB2221-333-2X(27-33) and JB2221-333-2X(24-26), thermostat exTHERM-AT. The equipment is mounted horizontally.

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
158×158×103	0.54	Two straps PFS*. Fasteners included in the bracket kit.

Material – galvanized steel.

Ordering information

Bracket PL.JB 0606-10



PL.PTB 0606-10

Bracket PL.JB 0606-20

Intended for mounting onto pipelines with thermal insulation up to 150 mm thick.

Compatible with boxes JB2221-223-2X(11-15), JB2221-223-2X(27-31), B222(3)1-223-2X(16-24), JB2221-223-2X(25-26), JB2221-333-2X(11-23), JB2221-333-1X(23-30) and JB2221-333-2X(24-26), thermostat exTHERM-AT. The equipment is mounted vertically.

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
299×160×40	1.09	Two straps PFS*. Fasteners included in the bracket kit.

Material: plate – galvanized steel, channel – steel.

Ordering information

Bracket PL. JB 0606-20

PL.PTB 0606-20

Bracket KP1

Intended for mounting onto large diameter pipelines and tanks with thermal insulation up to 120 mm thick.

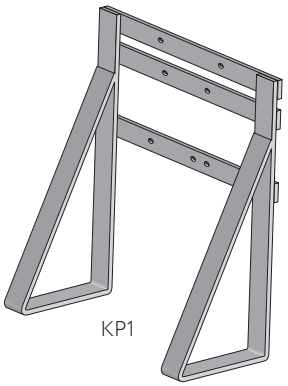
Compatible with boxes JB2221-223-2X(11-15), JB2221-223-2X(27-31), JB222(3)1-223-2X(16-24), JB2221-223-2X(25-26), JB2221-333-2X(11-23), JB2221-333-2X(27-33), and JB2221-333-2X(24-26).

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
304×300×115	1.8	Weld

Material – steel.

Ordering information

Bracket KP1



KP1

* To be ordered separately.

Bracket KP3

Intended for mounting onto adjacent metal structures, large diameter pipelines and tanks with thermal insulation up to 120 mm thick.

Compatible with boxes JB2221-223-2X(11-15), JB2221-223-2X(27-31), JB222(3)1-223-2X(16-24), JB2221-223-2X(25-26), JB2221-333-2X(11-23), JB2221-333-2X(27-33) and JB2221-333-2X(24-26).


KP3

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
152×158×128	0.6	Weld

Material – steel.

Ordering information

Bracket KP3

Bracket KP101

Intended for fastening the fastening tape to the heated surface. Mounted by welding to the heated surface.

Material – steel.


KP101

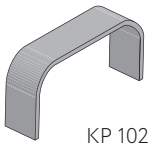
Ordering information

Bracket KP101

Adapter bracket KP 102

Intended for mounting the support stand UVK.01.01 (part of the pipe support stand UVK.0100) onto small diameter pipelines (smaller than 32 mm).

Compatible with boxes JB2221-223-1X(11-13), JB2221-223-1X(21-23), JB222(3)1-223-1X(14-17), JB2221-223-1X(18-20), JB2221-333-1X(11-19), JB2221-333-1X(23-30) and JB2221-333-1X(20-22). Mounted onto the lower part of the support. One support requires one bracket kit KP 102 and KP 102-01.


KP 102

Designation	Dimensions L×W×H, mm	Weight, kg/pc.
KP 102	39×18×15	0.0338
KP 102-01	39×22×15	0.0386

Material – steel.

Ordering information

Adapter bracket KP 102

Adapter bracket KP 102-01

Bracket K.JB10.YYY×ZZZ

Intended for mounting onto pipelines with Longline electric heating system.

Compatible with JB2221-544-21(60-65) boxes. The boxes are bolted to the plate PL.JB 1007-01.

Dimensions L×W×H, mm	Weight, kg/pc.	Mount
299×160×40	1.09	Belt clamp, bolt tightening. Fasteners included in the bracket kit.

Material: channel – steel

Ordering information

Bracket K.JB10.YYY×ZZZ
(YYY – pipe diameter in mm, ZZZ – model).

Product range

YYY	ZZZ
057	050
057	064
057	090
057	100
089	070
089	100
108	050
108	060
108	100
114	060
114	070
134	000
159	050
159	100
168	090
219	050
219	100
219	120
234	000
273	000
273	075
273	100
280	000
280	100

YYY	ZZZ
308	000
314	000
315	000
325	050
325	100
331	100
334	000
348	000
355	000
355	100
400	000
419	000
422	000
426	080
450	000
500	000
556	000
556	150
560	000
573	000
630	100
720	090
1020	110
1220	000

K.JB10.YYY×ZZZ

Plate PL.JB 1007

Intended for mounting onto pipelines with Longline electric heating system.

Compatible with JB2221-544-21(60-65) boxes. Mod. 01 for securing the JB junction box to the bracket K.JB10. YYY×ZZZ. Mod. 02 for securing the JB box is mounted onto the heated pipeline with two PFS straps.

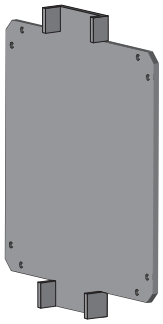
Designation	Dimensions L×W×H, mm	Weight, kg/pc.
PL.JB 1007-01	330×255×1.5	1.0
PL.JB 1007-02	300×255×1.5	0.76

Material – galvanized steel.

Ordering information

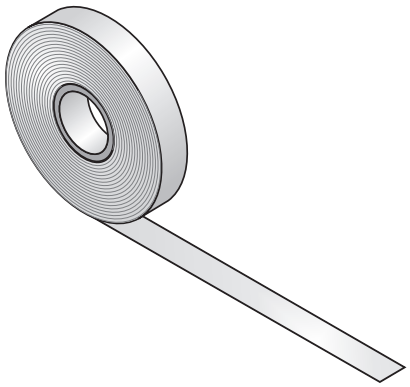
Plate PL.JB 1007-01
Plate PL.JB 1007-02

PL.JB 1007-01



PL.JB 1007-02

Self-adhesive fastening tape



Applications

Fastening of heating cable to high temperature pipes.
Compatible with all heating cable types.

Technical data

Length	33 m
Width	11 mm
Permanent exposure temperature	200 °C
Recommended installation temperature	not lower than -15 °C
Adhesive material	modified silicone

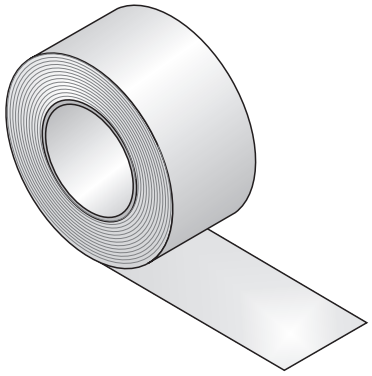
Approvals

This product is exempt from mandatory certification.

Ordering information

Fastening tape FT/HTM

Self-adhesive aluminum fastening tape



Applications

Fastening of heating cable to flat surfaces, e.g. tanks, or to a valve/pump body, padding of heating cables laid onto plastic pipes.

Technical data

Length	50 m
Width	50 mm
Permanent exposure temperature	110 °C
Recommended installation temperature	not lower than -5 °C
Adhesive material	acryl

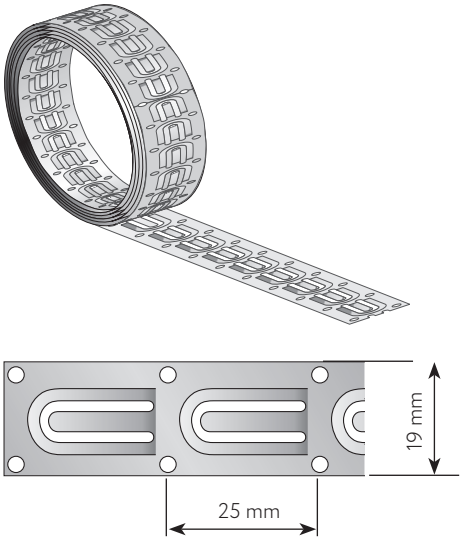
Approvals

This product is exempt from mandatory certification.

Ordering information

Self-adhesive aluminum fastening tape

Fastening tape



Applications

Fastening of cable to a tank.

The fastening tape is fastened to the tank using the bracket KP101 or straps PFS.

Ordering information

Fastening tape 25,
where 25 is the fastening spacing in mm.

Approvals

This product is exempt from mandatory certification.

Label “Caution! Electric heating!”

Ordering information

Label “Caution! Electric heating!”

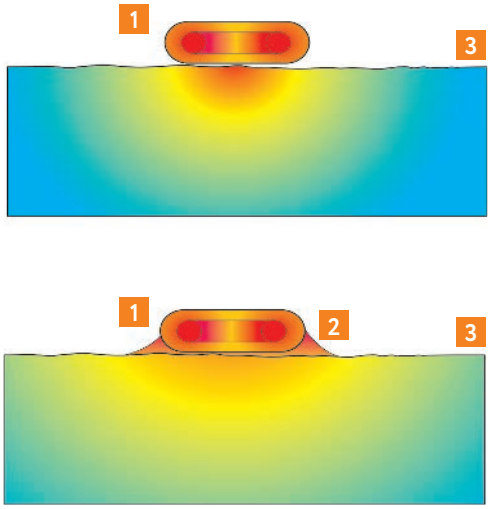
Approvals

This product is exempt from mandatory certification.

Heat-conducting paste SILARM

- Reduces transient thermal resistance
- Reduces thermal loss at active heating
- Operating temperatures -60 °C to +200 °C (SILARM-81) or -60 °C to +180 °C (SILARM-3)
- Protects steel surfaces from corrosion
- Smooths the thermal field of the heated system
- Available in 600 ml tubes and containers up to 5 liters

Temperature distribution



1. Heating cable
2. SILARM
3. Heated surface

Purpose

The heat-conducting paste SILARM provides efficient heat transfer from the heating elements to the heated pipeline, tank and other structures operated in the temperature range between -60 °C and +200 °C (SILARM-81) or between -60 °C and +180 °C (SILARM-3).

Operating principle

SILARM has high thermal conductivity. After application, it fills the air gaps between the heater and the heated surface, thereby greatly improving the heat exchange in the system. Reduces overheating of the heating element.

Resistant to temperature changes

SILARM is resistant to negative temperatures down to -60 °C, positive up to +200 °C / +180 °C and temperature shocks in this range. This ensures stable operation of the heating system when exposed to cyclic temperature changes.

Easy to apply

SILARM-3 is available in 600 ml tubes. From the tube, the paste is applied onto the heated surface with a gun.

SILARM-81 is available as a kit containing component 1 (in containers up to 5 liters) and a corresponding volume of catalyst. After mixing the components SILARM-81 paste is applied onto the heated surface with a spatula.

Safety and reliability

All components of the SILARM paste are safe, non-toxic and do not emit substances harmful to human health. A time-proven manufacturing process ensures consistent properties of the product.

Long service life

The established manufacturing process and quality components of the paste ensure a service life of at least 10 years.

Versions

SILARM is available in two versions – vulcanizable and non-vulcanizable.

SILARM-3 is a non-vulcanizable single-component white paste with a high viscosity preventing slipping on vertical surfaces. It fills well cavities and gaps.

SILARM-81 is a vulcanizable two-component white paste with a cure time of 4 to 24 hours and high heat resistance. In the cured state, SILARM-81 has excellent dielectric properties.

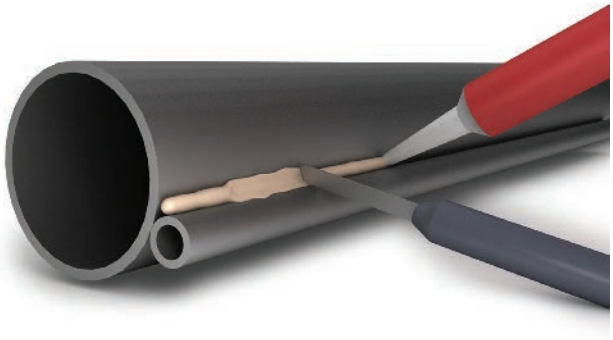
When applied, SILARM-81 does not require additional casings to maintain the shape and physical parameters of the resulting thermal bridge.

Thermal insulation materials can be directly laid on top of the paste layer.

Technical data

Type	SILARM-3	SILARM-81
Number of components	1	2
Proportion of components	–	1:100
Pot time of mixed components, h	–	⩾1
Cure time, h	non-vulcanizable	24
Heat resistance, °C	180	200
Cold resistance, °C	–60	–60
Thermal conductivity, min, W/m°C	0,8	0,7
Density, min, g/cm^3	2,5	2,3
Service life	10 years	

Application example



SILARM is applied with a gun and a spatula into the gap between the heated pipe and the tubular heater or cable for better thermal contact.

Approvals

№ РОСС RU.АГ66.Н06728

№ РОСС RU.АГ66.Н06729

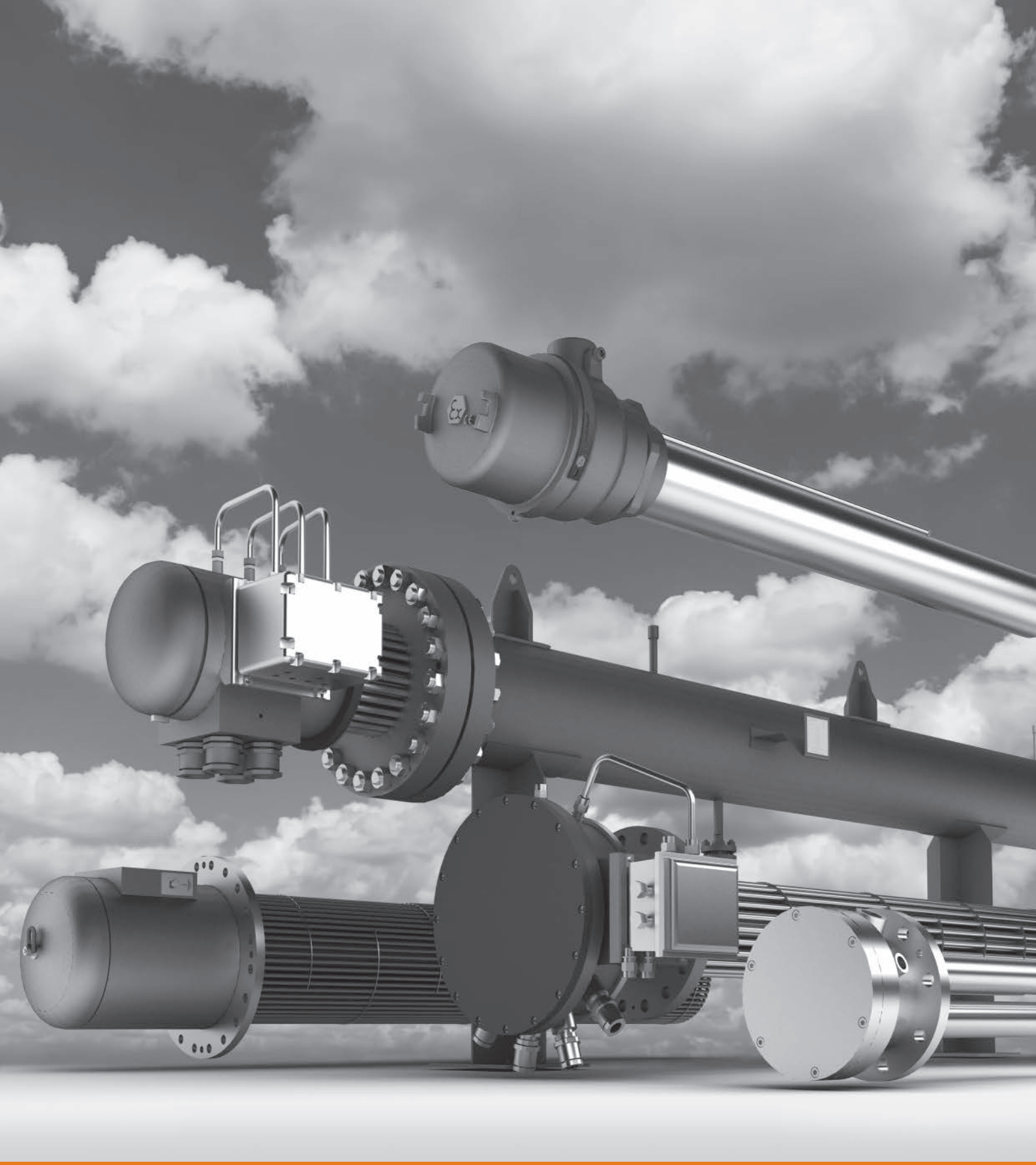
Accessories

The manufacturer has in stock everything necessary for applying the SILARM paste – guns, application manuals.

Specifications

SILARM-81: TU 2257-250-33006874-2004

SILARM-3: TU 2257-251-33006874-2004



Industrial electric heaters

SST Energomontazh is the exclusive distributor and authorized service provider of the Masterwatt Srl, Italy, within the Eurasian Customs Union

Inline electric heater

- High mechanical strength
- Corrosion resistance
- Quick and easy installation
- Overheating protection of the heater and heated substance
- Customized design
- Power rating of a single electric heater up to 5 MW
- Explosion and fire safety
- High heat resistance
- A broad range of applications
- A system of several electric heaters can be assembled

Purpose and applications

Inline electric heaters are intended for heating various fluids (water, oil and oil products, acid and alkaline solutions, various heat transfer agents), gases and melts (plastics, rubber, paraffins) in pipelines and tanks (as part of a circulation system) of different configurations and sizes.

Key features

Inline electric heaters are a bundle of heating elements (HEs) placed in a special housing (pressure vessel) and powered via an explosion-proof connection box. The cold substance is fed into the housing. While passing through the housing, the substance, when in contact with the bundle of heating elements, is heated to the desired process temperature and discharged through the output flange.

Depending on the temperature, type of substance, operation mode, the material of the heating element shell is specified (various grades of carbon and stainless steel, copper, titanium, special nickel alloys).

The electric heating system can be controlled from a local control panel, from a power supply and control cabinet or by an automated control system via a remote workstation.

Versions

Depending on the substance being heated, the heater is made of compatible materials:

- Carbon steel
- Stainless steel
- Nickel alloys
- Copper
- Titanium, etc.

Technical data

Power	up to 5 MW
Heating temperature	up to 750 °C
Operating pressure	up to 250 bar
Dust and moisture protection	up to IP68
Different types of explosion protection	Ex-d, Ex-e, etc.
Area classes	1, 2, 21, 22

Ordering information

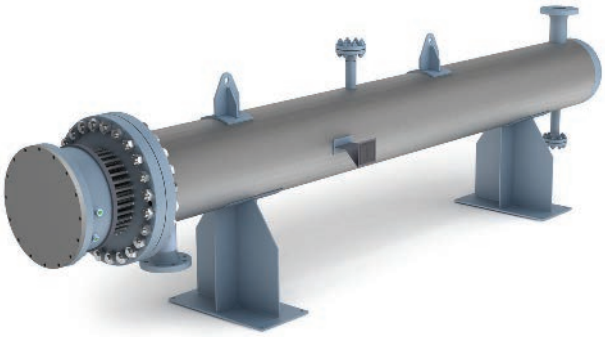
All Masterwatt inline electric heaters are manufactured to order. To order an electric heater and request a quote, fill out the questionnaire.

Certification

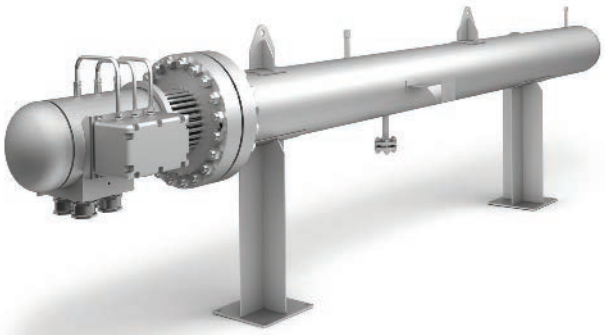
All required certificates of compliance are available: TR TS, GOST R, ATEX, PED, ASME, etc.

Examples of inline heater versions

Inline electric heater for petroleum products

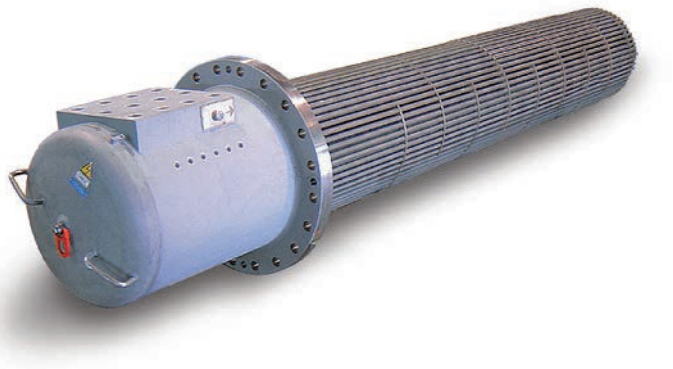


Inline heater for natural gas



Immersion electric heater

- High chemical resistance
- Corrosion-resistant
- Quick and easy installation
- Overheating protection of the heater and heated substance
- Customized design
- Power rating of a single electric heater up to 5 MW
- Explosion and fire safety
- High heat resistance
- Full set of control tools and accessories



Purpose and applications

Immersion electric heaters are intended for heating a wide range of products in tanks of various configurations and sizes:

- liquids (water, oil and oil products, acid and alkaline solutions, various heat transfer agents);
- gases (methan, nitrogen, hydrogen oxygen, ethylene, etc.);
- melts (plastics, rubber, paraffins, and metals).

Key features

Immersion electric heaters are a bundle of heating elements (HEs) powered via a terminal box.

Depending on the temperature, type of substance, operation mode, the material of the heating element shell is specified (various steel alloys, copper, titanium, special nickel alloys – incoloy and inconel).

The electric heating system is controlled by an automated control system via a remote workstation.

Immersion electric heaters are ideally suited for heating oil and oil products in vertical storage tanks, providing the following advantages:

- easy installation and operation;
- uniform heating of the substance;
- no paraffin deposits on the bottom of the tank;
- high efficiency.

Versions

Depending on the substance being heated, the heater is made of compatible materials:

- carbon steel;
- stainless steel;
- nickel alloys;
- copper;
- titanium, etc.

Technical data

Power	up to 5 MW
Heating temperature	up to 750 °C
Operating pressure	up to 250 bar
Dust and moisture protection	up to IP68
Different types of explosion protection	Ex-d, Ex-e, etc.
Area classes	1, 2, 21, 22

Ordering information

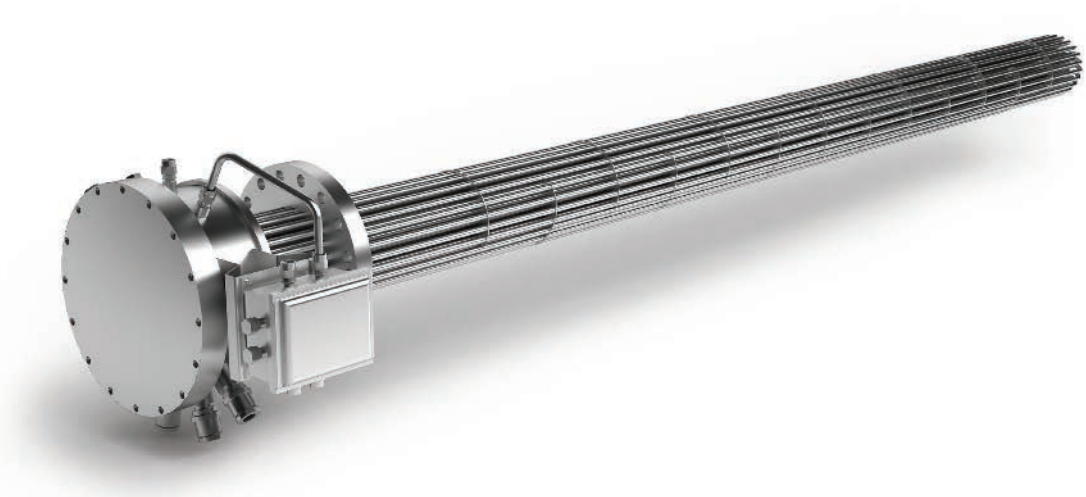
All Masterwatt immersion electric heaters are manufactured to order. To order an electric heater and request a quote, fill out the questionnaire.

Certification

All required certificates of compliance are available: TR TS, GOST R, ATEX, PED, ASME, etc.

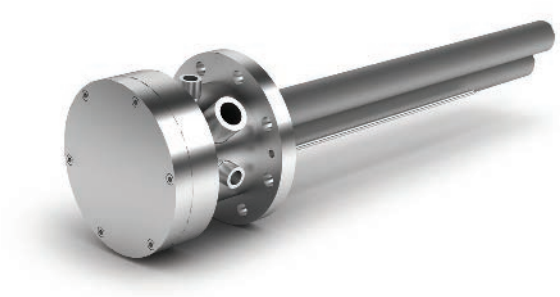
Versions of immersion heaters

Flanged electric heaters



Threaded electric heaters

Electric heaters with interchangeable cartridge elements



Electric duct heater

- Durable and reliable design
- Quick and easy installation
- Explosion and fire safety
- High heat resistance

Purpose and applications

Duct heaters are used in industrial processes where a constant temperature of heated air or other gas is required, regardless of the initial temperature of the feed, as well as for heating of industrial buildings, equipment, shops, drying chambers, hangars, cabinet rooms, warehouses with explosive or wet materials, etc., where the temperature conditions deviate from the requirements.

Key features

Heating elements are made of ordinary or stainless steel with a finned or smooth surface.

Heating elements are mounted on plate or rod supports in a special way to reduce the weight of the ventilation ducts and improve heat exchange with the environment. Heating elements (HEs) have fins to intensify heat transfer. If the heated gas/air contains suspended particles, unfinned heaters are specified.

Operating conditions

If the natural thermal convection rate is not sufficient, the process is intensified by installing a blowing fan, which, in addition to the intensification of the process, also ensures uniform heating of the space.

Technical data

Power	up to 3 MW
Heating temperature	up to 650 °C
Dust and moisture protection	up to IP68
Different types of explosion protection	Ex-d, Ex-e, etc.
Area classes	1, 2, 21, 22

Certification

All required certificates of compliance are available: TR TS, GOST R, ATEX, PED, ASME, etc.

Versions

The required type of explosion protection is specified depending on the hazardous area classification.

Ordering information

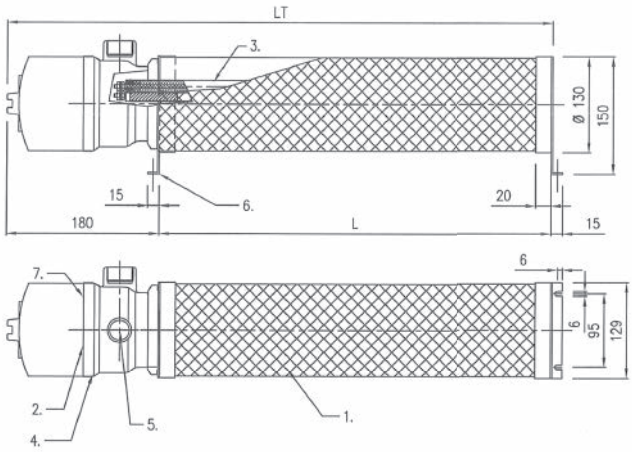
All Masterwatt duct heaters are manufactured to order. To order an electric heater and request a quote, fill out the questionnaire.

Anti-condensation electric heater, air

- Explosion protection Ex-d
- Quick and easy installation
- Automatic control
- Explosion and fire safety
- Simplicity and ease of operation
- Power up to 3 kW

Purpose and applications

Anticondensation electric air heaters are intended for installation in indoor areas, housings of large machines, ship's holds, electrical cabinets.



Structural design

1. Protective grating.
2. Overheating protection: automatic thermostat calibrated for 30-120 °C.
3. U-shaped heating element (HE).
4. Terminal box with IP65 dust and moisture protection.
5. Power connections: 2 connections ½" GK (½" GK + ¾" GK in 3 kW heater).
6. Support plates of stainless steel.
7. Overheat protection: internal thermostat with manual control and 100 °C cut-off setting (in accordance with the explosion protection standards).

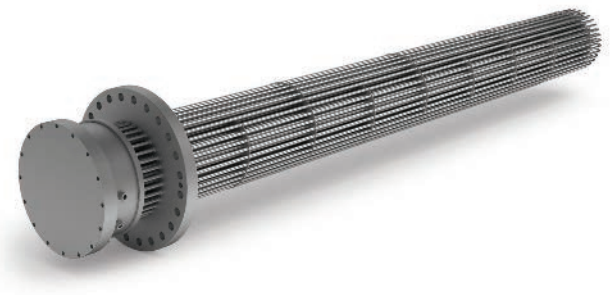
Technical data

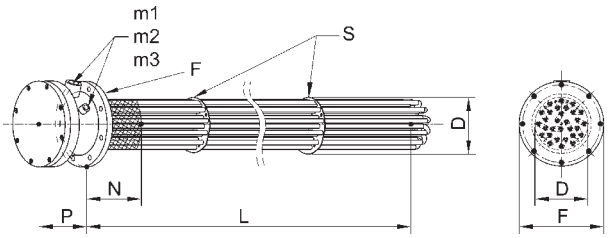
HE shell	High-alloyed corrosion-resistant stainless steel AISI 316Ti
Explosion protection	II 2GD Exde IIC T4 in Areas 1 and 2
Climatic version	-60 ... 60 °C
Certification	TR TS, GOST R, ATEX, PED, ASME etc.

Power, W	Length HE, mm	Diameter HE, mm	Quantity HE	Heat generation, W/cm²	Dimensions		Material of protective grating	Voltage, V	Marking
					L, mm	LT, mm			
500	300	16	3	0.66	325	505	stainless steel	220/1 phase	X0367-150
								380/3 phases	X0580-150
							galvanized steel	220/1 phase	X0321-150
								380/3 phases	X0584-150
1000	550	16	3	0.66	575	755	stainless steel	220/1 phase	X0343-150
								380/3 phases	X0581-150
							galvanized steel	220/1 phase	X0459-150
								380/3 phases	X0386-150
1500	800	16	3	0.66	825	1005	stainless steel	220/1 phase	X0308-150
								380/3 phases	X0378-150
							galvanized steel	220/1 phase	X0395-150
								380/3 phases	X0585-150
2000	1050	16	3	0.66	1075	1255	stainless steel	220/1 phase	X0340-150
								380/3 phases	X0582-150
							galvanized steel	220/1 phase	X0290-150
								380/3 phases	X0586-150
3000	1450	16	3	0.71	1475	1655	stainless steel	220/1 phase	X0314-150
								380/3 phases	X0583-150
							galvanized steel	220/1 phase	X0297-150
								380/3 phases	X0298-150

Explosion-proof flanged electric heater, water

- Heated substances: water and other non-aggressive low-viscosity fluids
- Corrosion-resistant stainless steel heating elements
- Single electric heater power rating up to 70 kW
- Explosion protection Ex-d
- Overheat protection of heating elements and heated substance
- Easy installetion and convenient operation





Structural design

Heating element: U-shaped.

Heating element diameter: 16 mm.

Heating element material: high grade stainless corrosion-resistant steel AISI 316Ti.

Overheat protection: internal thermostat with manual control and 100 °C cut-off setting (in accordance with the explosion protection standards).

Option: additional protection by an automatic thermostat.

Substance overheat protection: automatic power cut-off at 90 °C.

Terminal box: IP65.

Power supply: 380 V, 3 phases.

Explosion protection: II 2G Exde IIB T4, ExtD A21 T135°C; Zones 1, 2, 21, 22.

Climatic version: -60 ... 60 °C.

Rated maximum working pressure: 6 bar.

Operating pressure: 4 bar.

Test pressure: 9 bar.

Technical data

Power	up to 70 kW
Heating temperature	up to 100 °C
Degree of protection	IP65
Explosion protection	Ex-d
Area classes	1, 2, 21, 22
Certification	TR TS, GOST R, ATEX, PED, ASME etc.

Ordering information

All Masterwatt submersible electric heaters are manufactured to order. To order an electric heater and request a quote, fill out the questionnaire.

Important!

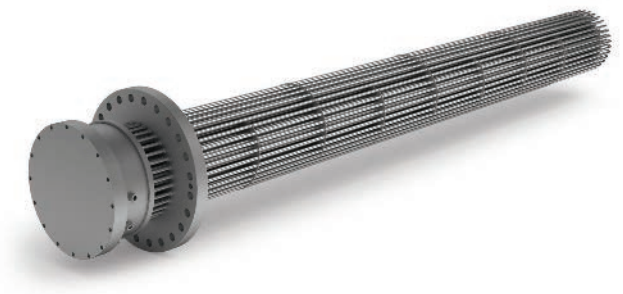
Incompatible with deionized, demineralized and osmotic water! (A different heating element material is required)

Power, W	Length L, mm	Diameter D, mm	Quantity HE	Thermal generation, W/cm²	Flange F*	Cold zone N, mm	Size P, mm	Material of terminal box	Flange material
20 000	750	95	6	5.1	DN100 Pn16	100	182	FE 42	ASTM A 350 LF2
								AISI 304	AISI 316L
30 000	1250	95	6	4.3	DN100 Pn16	100	182	FE 42	ASTM A 350 LF2
								AISI 304	AISI 316L
40 000	750	145	12	5.1	DN150 Pn16	100	204	FE 42	ASTM A 350 LF2
								AISI 304	AISI 316L
50 000	1250	145	12	3.6	DN150 Pn16	100	182	FE 42	ASTM A 350 LF2
								AISI 304	AISI 316L
70 000	1750	145	12	3.5	DN150 Pn16	100	204	FE 42	ASTM A 350 LF2
								AISI 304	AISI 316L

* Flanges may be specified to GOST.

Explosion-proof flanged electric heater, oil and oil products

- Soft heating mode preventing burning and coking
- Minimized paraffin deposition at the bottom of the tank
- Corrosion-resistant stainless steel heating elements
- Explosion protection Ex-d
- Overheat protection of heating elements and heated substance
- Easy installtation and convenient operation
- Single electric heater power rating up to 30 kW



Structural design

Heated substances: oil and oil products, water, suspensions and other non-aggressive liquids.

Heating element: U-shaped.

Heating element diameter: 16 mm.

Heating element material: high grade stainless steel AISI 304.

Overheat protection: internal thermostat with manual control and 5–200 °C cut-off setting (in accordance with the explosion protection standards).

Option: additional protection by an automatic thermostat.

Substance overheat protection: automatic power cut-off at 5–200 °C.

Terminal box: IP65.

Power supply: 380 V, 3 phases.

Explosion protection: II 2G Exde IIB T4, ExtD A21 T135°C; Areas 1, 2, 21, 22.

Climatic versions: -60...60 °C.

Rated maximum working pressure: 6 bar.

Operating pressure: 4 bar.

Test pressure: 9 bar.

Purpose and applications

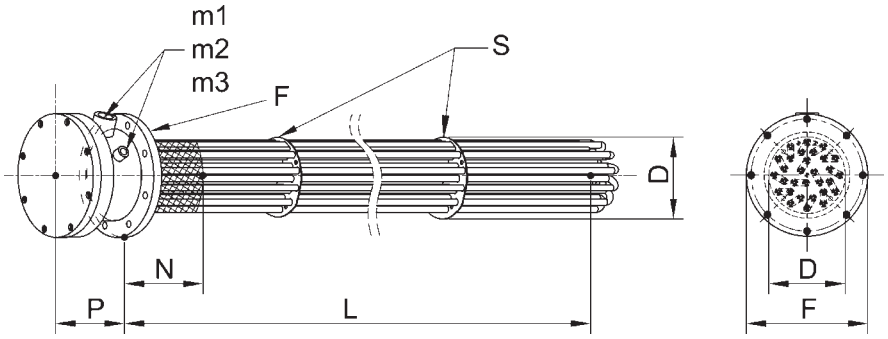
These electric heaters are specially designed for heating viscous fluids, such as oil. When the oil is overheated, the coking process intensifies and its products, when deposited on the surface of the heating elements, reduce their efficiency. To prevent overheating of the oil and to minimize the formation of coking products when heating viscous products, heaters with a low specific heat generation of 1 W/cm^2. This solution allows to significantly improve the operational efficiency of the electric heating system, to avoid deterioration of the product and also to significantly reduce the amount of paraffin deposits in the tank.

Technical data

Power	up to 30 kW
Heating temperature	5 to 200 °C
Protection class	IP65
Protection	Ex-d
Area classes	1, 2, 21, 22
Certification	TR TS, GOST R, ATEX, PED, ASME etc.

Ordering information

All Masterwatt submersible electric heaters are manufactured to order. To order an electric heater and request a quote, fill out the questionnaire.



Power, W	Length L, mm	Diameter D, mm	Quantity	Thermal generation, W/cm²	Flange F*	Cold zone N, mm	Size P, mm	Material of terminal box	Flange material
3 500	750	95	6	0.9	DN100 Pn16	100	182	FE 42	ASTM A 350
								AISI 304	AISI 304
6 000	1250	95	6	0.9	DN100 Pn16	100	182	FE 42	ASTM A 350
								AISI 304	AISI 304
7 000	750	145	12	0.9	DN150 Pn16	100	204	FE 42	ASTM A 350
								AISI 304	AISI 304
9 000	1750	95	6	0.9	DN150 Pn16	100	182	FE 42	ASTM A 350
								AISI 304	AISI 304
12 000	1250	145	12	0.9	DN150 Pn16	100	204	FE 42	ASTM A 350
								AISI 304	AISI 304
15 000	2500	95	6	1.0	DN150 Pn16	100	182	FE 42	ASTM A 350
								AISI 304	AISI 304
18 000	1750	145	12	0.9	DN150 Pn16	100	204	FE 42	ASTM A 350
								AISI 304	AISI 304
30 000	2500	145	12	1.0	DN150 Pn16	100	204	FE 42	ASTM A 350
								AISI 304	AISI 304

* Flanges may be specified to GOST.

Automated control systems

Automated control systems, electric heating (ACSEH)

Description

ACSEH is a combination of tools for automatic control, monitoring, collection and transmission of information to an existing process control system.

It automatically controls electrical heating using the signals received from temperature sensors. By analyzing the received data the system automatically switches on or off the heating. On-off control using surface temperature as the input or proportional control using air temperature as the input are supported. The temperature settings can be adjusted during the operation of the system.

ACSEH system uses programmable logic controllers (PLCs), input and output modules for discrete and analog signals, an operator panel, and a serial interface module RS232/RS485.

Regardless of the complexity and scale of the system, ACSEH can significantly improve the performance of electric heating systems in terms of control and regulation, protection and monitoring functions and if an integrated process control system has been implemented on the site, ACSEH will complement it.

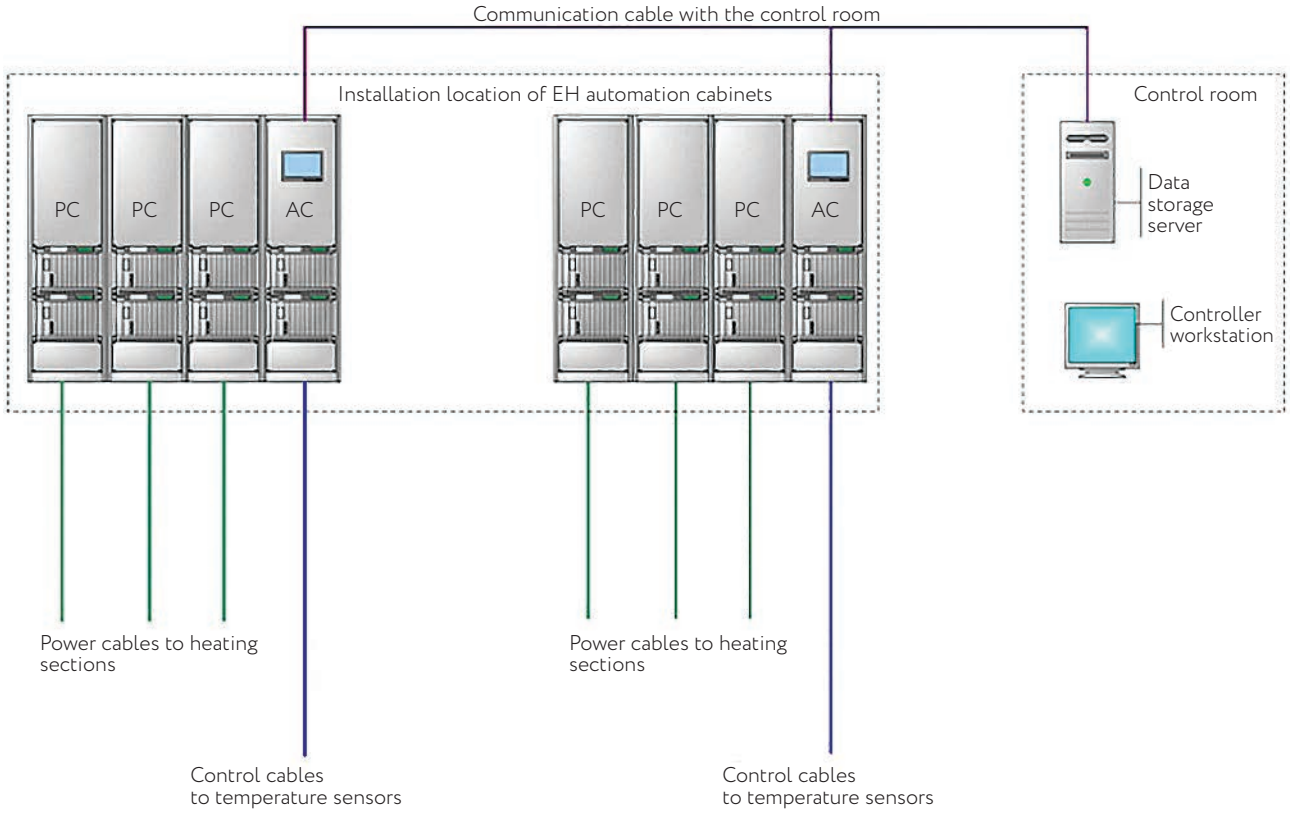
Purpose

- Convenient control and regulation
- Prompt and objective decision-making on electric heating settings
- Improved reliability of thermal control, prompt elimination of pre-emergency and emergency conditions and follow-up
- Diagnostics of the equipment and lower maintenance costs
- Access to historical process data (registration, archive of events, estimates for the analysis of operation)
- Recording, control and optimization of power consumption

Structure

ACSEH includes:

- power cabinets (PC);
- automation cabinets (AC);
- temperature sensors.



Advantages

- Optimal control of electric heating and maximum energy savings with the help of control algorithms
- Remote control of the electric heating system
- Access to a broad range of information (temperature, load current, mains voltage, power consumption, emergencies, etc.)
- Upgrades to older control systems
- Lower operating costs through remote data collection, control and regulation of power consumption
- Improved process safety in high hazard industries through authorization of access and archiving of signals, alarms, failures and control actions
- Simplicity and convenience: all software, GUI, manuals are in Russian
- Professional set-up, commissioning and final adjustments ti the systems on the site, adjustments given the needs of operating personnel and production functions
- Scaling of the control system is possible by connecting additional I/O modules
- Monitoring of drops in the heating cable power output by measuring the current in each line and the supply voltage
- Simple and flexible adjustment of the distributed electric heating control system from the user terminal (operator touch panel)
- Emergency algorithms for the operation of the system in the event of abnormal situations

Graphic user interface of the ACSEH operator panel

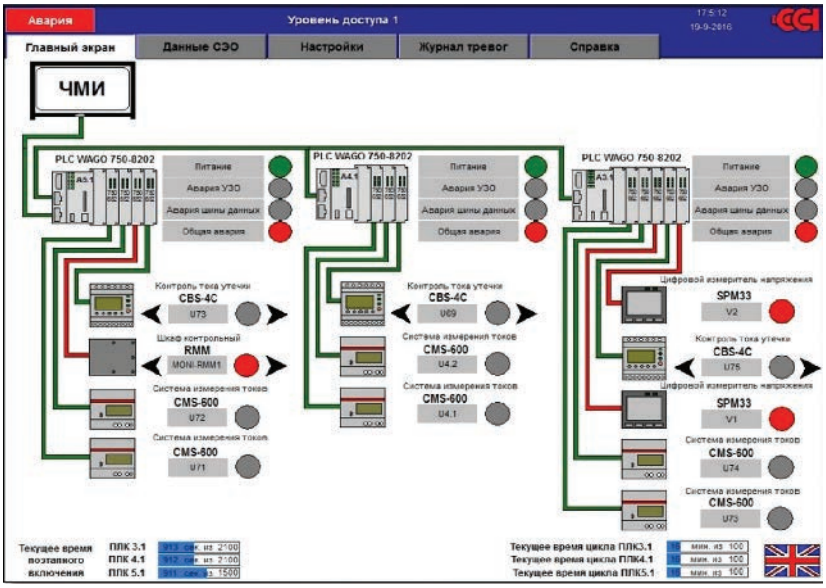
The central function of the operator touch panels that are part of automation cabinets is offering an interface for visualization and adjustment of the electric heating system's operation parameters.

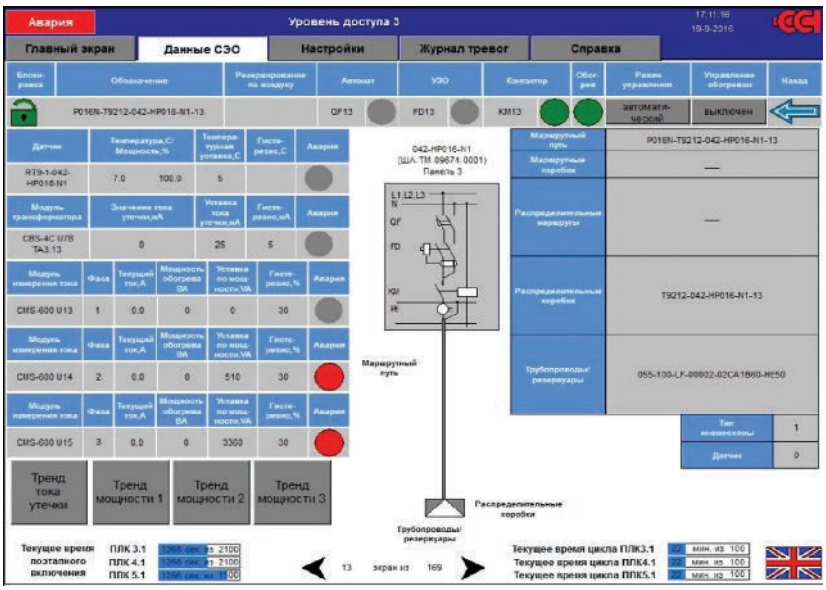
The systems offered by SST Group use modern programmable operator panels of leading Russian and international brands. A wide range of devices that a control system can be built of makes it possible to find the optimal price vs. quality balance, and the programmability of the operator panels supports almost any customer requirements to visualization and control. Panels have 5.7 to 15" touch screens accomodating multiple graphic elements, parameters, text labels and controls.

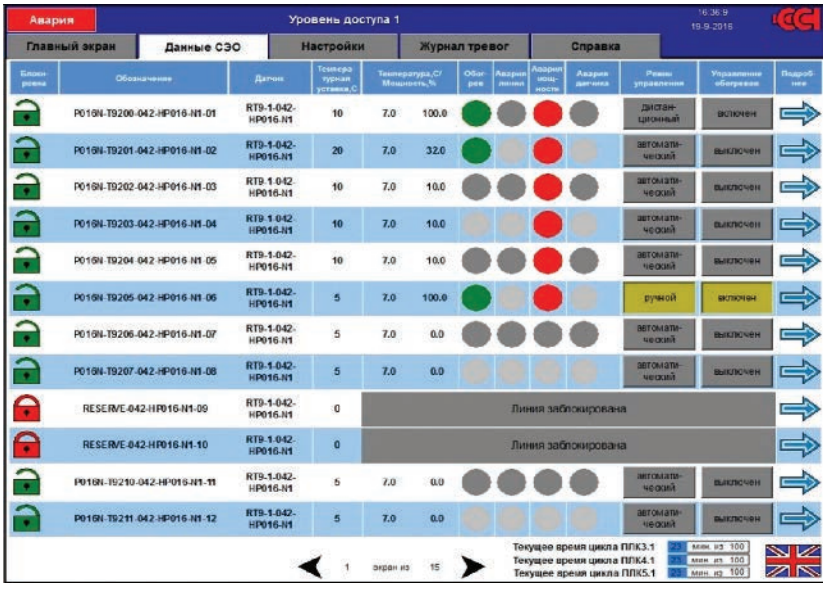
In addition to displaying and configuring all the operating parameters of an electric heating system, the operator panel interface supports the following:

- registration of warnings and emergency alerts including date and time;
- protection from unauthorized access to the data and controls by the means of a multi-level password protection;
- choosing the language of visualization (Russian/English);
- display of the control system diagnostic information (loss of communication between the PLC, I/O modules, operator panel, etc.);
- estimating trendlines of the measured parameters (temperature, power, leakage current, etc.);
- background information on the operation of the system for the operating personnel.

Over the years, SST Group has accumulated extensive experience in the development of software for components (including operator touch panels) of automated control systems in electric heating. Continuous cooperation with contractors offering EH commissioning services and operators has allowed to design ergonomic interfaces of operator screens with the optimal structure and data content.



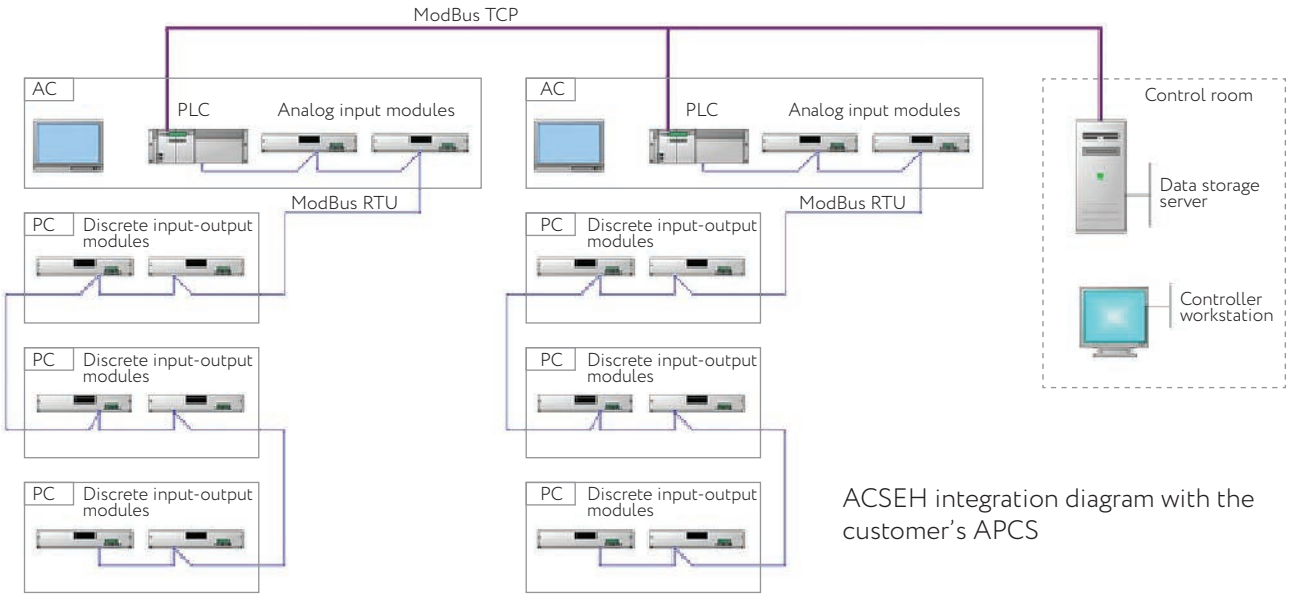




Examples of the operator panel GUI

Integration of ACSEH with the customer's APCS

ACSEH can be integrated with the customer's APCS by implementing the ModBus TCP data transfer protocol or the Modbus RTU protocol. The data from all the AC are accumulated by the data storage server and sent to the controller's automated workstation (AWS). For the transfer of data either cable or fiber optic or radio communication links can be used.



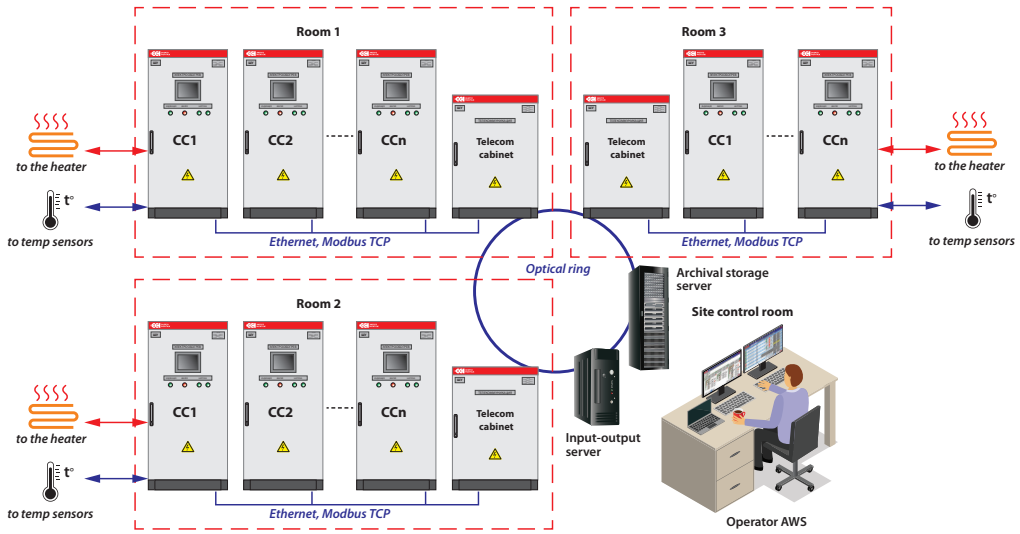
ACSEH integration diagram with the customer's APCS

EH control

Electric heating systems for large industrial sites have a branched structure with multiple monitoring and control parameters (on average, from 1500 to 40 000 I/O points), with 10 to 40 ACs and PCs.

ACs are co-located on the site with the heated process equipment.

The control system (CS) including the EH automated operator workstation (operator AWS) with a real-time system (SCADA), provides centralized control and monitoring, reduces operating costs, improves system safety by timely detecting abnormally functioning equipment.



Structure of the control system (CS):

- Operator AWS with SCADA is located in the operator room and is indended for centralized display of control parameters and control of the entire distributed EHS in real time with the help of a GUI. Operator AWS has functions of control, archiving, management, diagnostics, and output of reference information.
- Servers are located in the same building as the operator room and collect, archive, and make data in the required format available to the operator AWS. When the volume of data is small, the server can be combined with the operator AWS.
- Telecom cabinets (TCs) are installed in the same room as the AC. TCs collect information from AC PLCs and transmit this information to the servers via a fiber optic link.
- Fiber-optic communication link (FOCL) connects in an optical ring the TCs with the servers into a single data network.
- The local controller network is a cable local area network for data sharing between the CC controllers and the TC switch.

Functions of the control system:

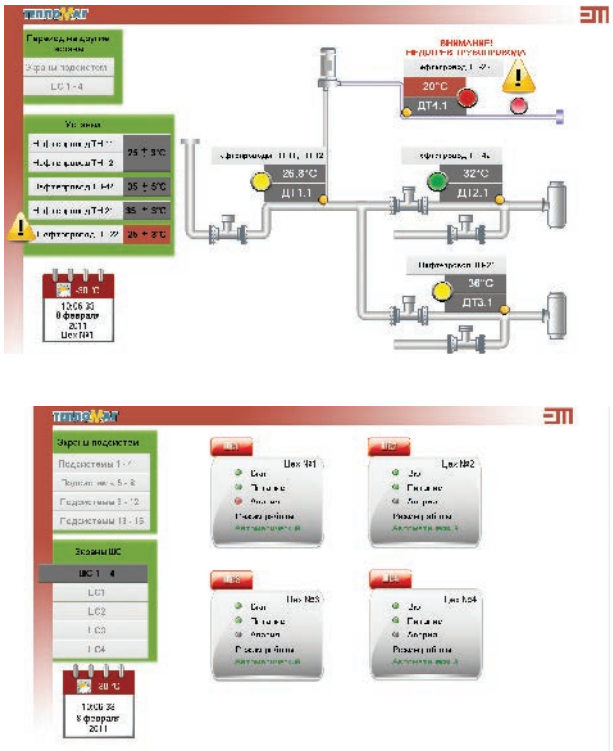
Visualization. Display of monitored parameters (system temperature, ambient temperature, EHS power parameters). Display of the general proces diagram of the site indicating control points and heating lines.

Control. Selection of operating mode, temperature settings, control of the electric heating system.

Archiving. Recording the values of monitored parameters in the archival graphs (trendlines). Keeping a log of emergency events and alarms, recording information from the diagnostic system on the status of the EHS equipment. Preparation of reports for printing and sharing via e-mail.

Diagnostics. Control of the system operation parameters, power supply, operation of the input-output modules, calculation of the operating time of each heating circuit of the EHS, monitoring of the communication system.

Reference. Providing the AWS operator with all the necessary background information on the EHS operation and its components and control actions in the event of an abnormal situation.



Examples of visualization in the control system

Examples of cabinets

Automation cabinet (AC)

Power cabinet (PC)

Ordering information

All ACSEH systems are designed and manufactured to order.

Electric heating control system ConTrace

Description

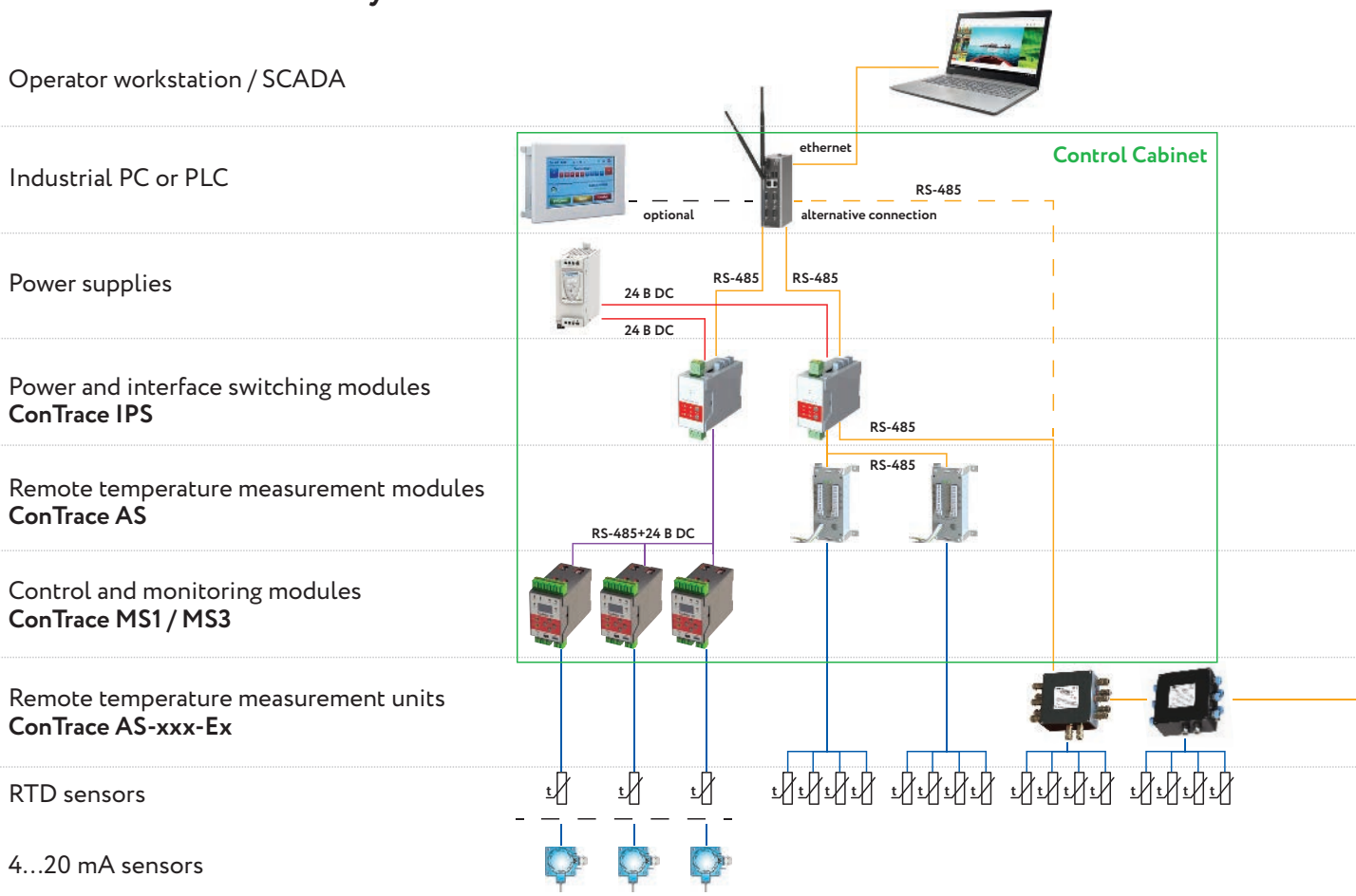
ConTrace is the first specialized multi-level integrated control system for electrical heating produced in Russia.

It is a complex of devices for analyzing, monitoring andcontrolling an electro-heating system which includes field and intrapanelboard devices, explosion-proof performance and intrinsically safe circuits.

The system built on the components of ConTrace has a high level of functional reliability.

- High reliability
- Redundant control function
- Control modules are full all-in-one controllers
- Hot swap control modules
- Multilingual interface
- Easy and intuitive settings
- Individual total control of states of each heating line
- Broad system integration capabilities
- The possibility of using individual modules of the system as part of third-party control systems

Architecture of control system “ConTrace”

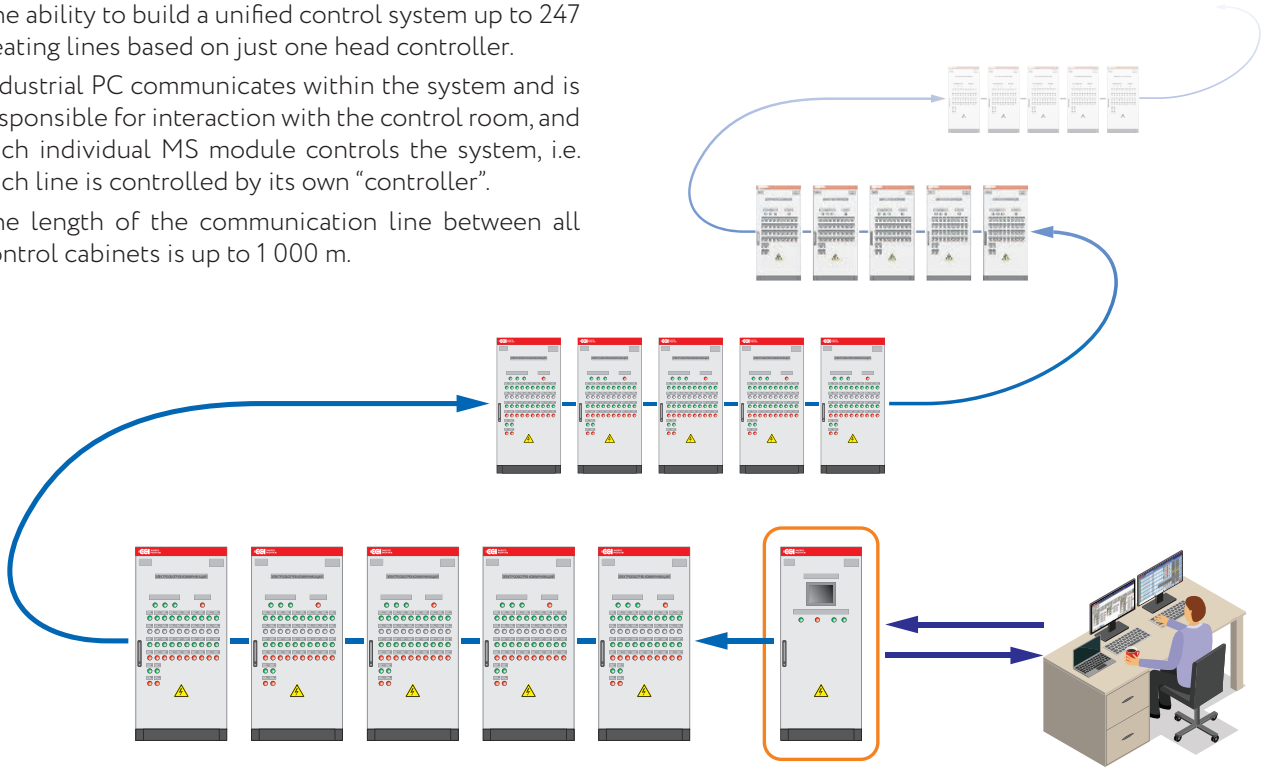


The scale of the control system

The ability to build a unified control system up to 247 heating lines based on just one head controller.

Industrial PC communicates within the system and is responsible for interaction with the control room, and each individual MS module controls the system, i.e. each line is controlled by its own “controller”.

The length of the communication line between all control cabinets is up to 1 000 m.



Remote monitoring and control system

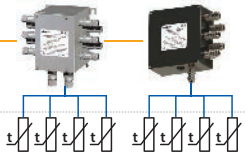
Centralized control

Power supply of MS and IPS modules

Power and RS-485 network distribution

Converting RTD values to RS-485 signals

Monitoring and control of one single or three-phase heating line



Field explosion-proof thermal converters

Temperature measurement of pipes, tanks, air, etc.

Control and monitoring modules ConTrace MS

- Each MS module is a full-fledged controller
- Ability to build a multi-channel control system
- System status monitoring during idle time
- Measurement of leakage currents
- Measurement of operation currents
- Ability to configure parameters from the module itself, via a connected PC or via RS-485
- Backup function with interception control
- Monitoring of external RCD
- Monitoring the status of the contactor
- Contactor life meter
- Running time counter
- Smooth or discrete load control
- Universal measuring channel for various types of temperature sensors
- Intrinsically safe circuits

Purpose

The main purpose of the ConTrace MS1 and MS3 modules is to control the electrical heating system. It is used for protection against freezing or maintaining the temperature of industrial pipelines and tanks.

Description

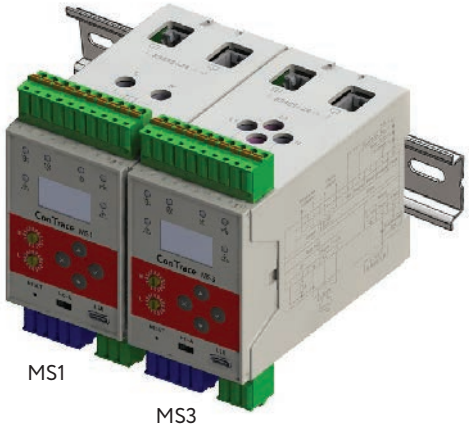
Control and monitoring modules ConTrace MS1 and MS3 are full-fledged single-channel controllers capable of operating with maximum efficiency as a part of the multichannel specialized control system ConTrace. The control module is designed to control a three-phase or single-phase load using one of the options: an electromagnetic contactor, a solid-state relay or a continuously adjustable device controlled by a voltage of 0 ... 10 V.

Setting and control

Control and monitoring modules ConTrace MS have a two-color OLED-display and navigation buttons. Thanks to the intuitive interface and a sufficient number of indicators and controls on the device itself, each module can be configured from the front panel. The ConTrace MS module can also be configured by connecting a PC or laptop to the USB Type C connector on the front panel of the module. Remote configuration and management of the device is performed via the RS-485 interface.

Monitoring of electrical heating system

The control module continuously measures the operation current, as well as the leakage current in a non-contact manner. In the event that the leakage current exceeds the value set by the operator or the load current exceeds the specified range, an alarm message is output and the load is disconnected. In this case, for the leakage current, a warning value can be set, after which the device will signal an event, but the heating will not be stopped.



MS1

MS3

Modules ConTrace MS are able to notify the expiration of the resource of individual nodes of the system, according to such parameters as the number of cycles of on-off contactor and the time of operating the heating cable. These values are available for user customization. In addition, the user is provided with information on the total running time of system and operating time of the ConTrace MS module after the last reboot.

The MS module has four digital inputs to monitor the operation of the actuators and receive remote control commands. The module also has a configurable discrete output, triggered by a user-defined scenario.

Emergency interception of control

The function of emergency redundancy of MS modules is realized by the 1+1 principle, i.e. the same MS module is connected to the main MS module via a special connector. The backup module monitors the operation of the main control module and in the event of a failure of the main control module, the standby module intercepts control by itself. Also, a temperature sensor can be connected to the backup module, in which case it will act as a temperature limiter. This significantly increases the reliability of the control system and is applicable for particularly important loads.

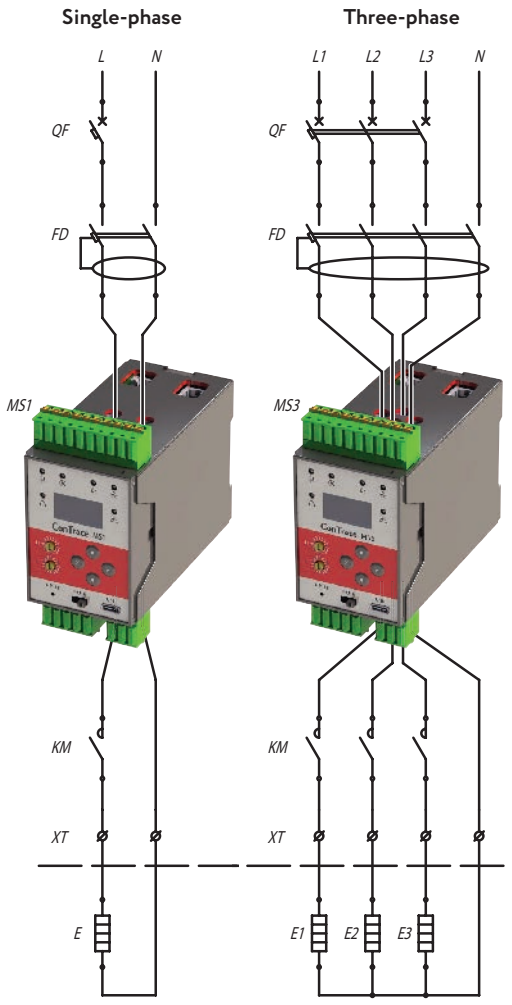
Technical data

Ex marking	Ex ia IIC
Supply voltage	24 V ⎓
Maximum measurable load current	60 A
Power consumption, max	2 W
Interface	RS-485
Communication protocol	Modbus / RTU
RS-485 interface connection	A, B, com
Connectors power supply / interface RS-485 and backup module	8P8C
Cable for power supply / RS-485 interface and a backup module	UTP/FTP cat.5
Type of terminal clamps	detachable
Clamping mechanism type of terminal clamps	spring
Cross-section / number of simultaneously connected wires to terminals	up to 2,5 mm^2 / 1
Diameter of through-holes for load conductors	8 mm
Discrete output of load control	250 V, 5 A
Analog output of load control	0…10 V
Impulse output for solid state load control relay	24 V
Discrete alarm output	250 V, 5 A
Number of discrete inputs	4
Number of measuring temperature channels	1
Type of sensors	see the table “Types of sensors”
Temperature measurement range	-100 … +500 °C
Accuracy of measurements	0,5 °C
Operating temperature range	-40…+50 °C
Mounting type	DIN-rail 35 mm
Degree of protection	IP20
Dimensions (W×H×D), mm	55×109×110
Weight, g	500
Service life	not less than 10 years

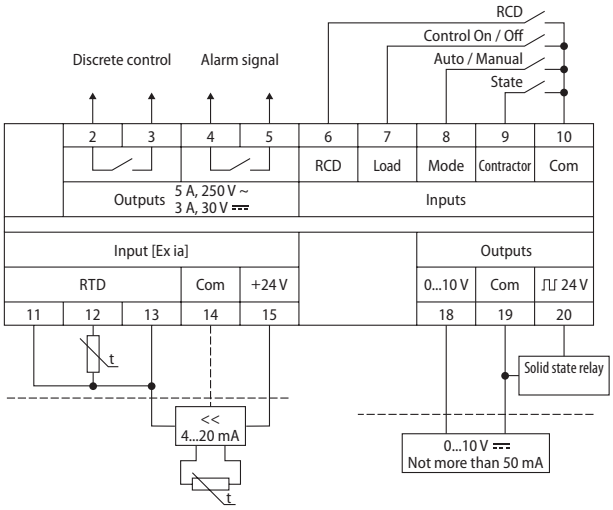
Types of sensors

Material	Type of RTD	Measuring range, °C
Platinum	PT50	-100 … +500
	PT100	
Copper	Cu50	-100 … +200
	Cu100	
	50M	
	100M	
Current loop 4…20 mA		

Installing MS modules in load circuits



Wiring diagram



Approvals

Contact SST Group sales representative for details

Product range

1. Control and monitoring module ConTrace MS1
2. Control and monitoring module ConTrace MS3

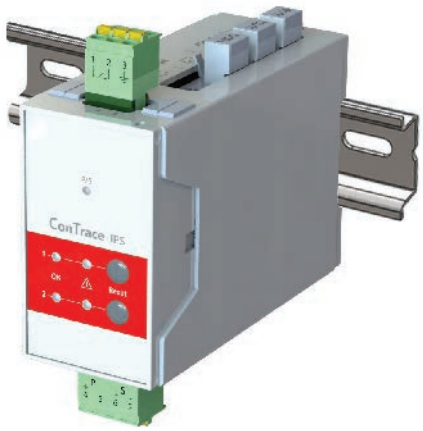
Power and interface switching module ConTrace IPS

- Power and interface switching RS-485 for 40 MS modules
- Networking for 247 MS, AS, and AS-xxx-Ex Units
- Automatic switching from primary to redundant power supplies
- Indication and notification of alarms
- Protection of incoming and outgoing circuits

Purpose

The main purpose of the ConTrace IPS module is to provide the ConTrace MS modules with power and RS-485 communication interface. In addition to the MS modules, remote temperature measurement modules ConTrace AS and remote temperature measurement units ConTrace AS-xxx-Ex can also be connected to the ConTrace IPS module. In this way, all ConTrace devices form a single control system for electrical heating, ready for connection via the RS-485 Modbus RTU protocol to an industrial computer or PLC with the installed specialized software ConTrace.

Thanks to ConTrace IPS modules, the control system can be extended during operation by adding new ConTrace MS control modules and ConTrace AS remote temperature measurement devices.



Description

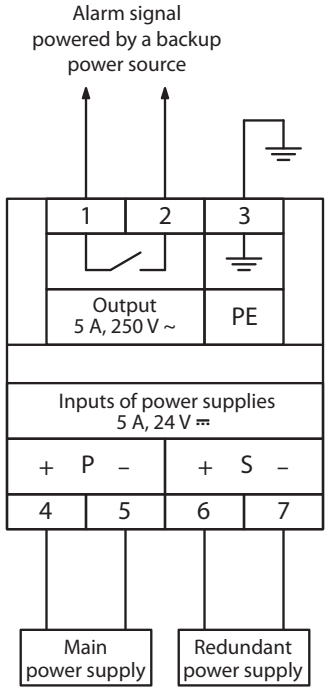
The ConTrace IPS module, depending on the number of MS modules connected to it, is connected to the power units of the appropriate power, as well as to the RS-485 network, for communication with the industrial PC / PLC. Further, through the patch cord, it simultaneously transmits power and interface to the ConTrace MS modules. Further, through the patch cord, it simultaneously transmits power and interface to the ConTrace MS modules. IPS has 2 outputs, combining power and interface buses. For each output, up to 20 MS modules can be connected in series. Thus, with the help of one IPS, it is possible to power up to 40 MS modules.

ConTrace IPS can work from either one or two power supplies. Operation from two power sources is assumed by the principle of primary / backup, with automatic switching to a working power supply and simultaneous signaling by closing the alarm relay contact. The IPS module is protected against excess supply voltage.

Each of the two output power and interface lines is equipped with its own protection against overcurrent, undervoltage and overvoltage. The operation of the protection is indicated by the LEDs on the front panel. Resetting the protection is done by pressing the "Reset" buttons on the device, separately for each outgoing line.

ConTrace IPS is supplied with three terminators of the ConTrace BT bus. This set is sufficient for implementing any connection scheme.

Wiring diagram



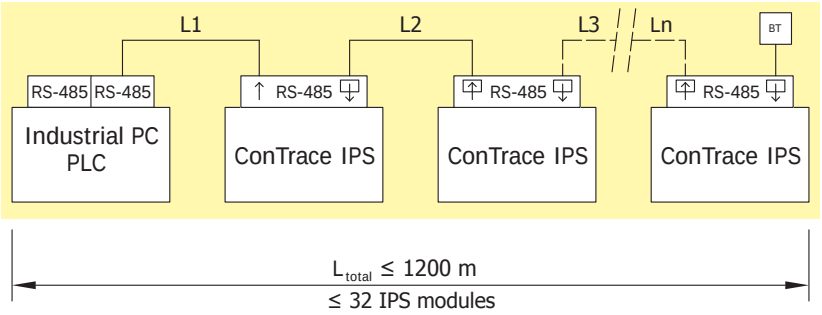
Technical data

Module supply voltage	20...30 V ⎓
Power consumption, max	3 W
Power consumption, max	40 pcs*
Maximum number of MS modules in one RS-485 network segment	247 pcs
Maximum number of IPS modules in one RS-485 network segment without a repeater	32 pcs
Type of connectors RS-485+24 ⎓ и RS-485	8P8C
Type of connection cable RS-485+24 ⎓ и RS-485	UTP/FTP cat.5
Data transfer interface	RS-485
Built-in RS-485 signal repeater	Yes
The maximum current of each output line	3 A
Maximum allowable current for each output line	5 A

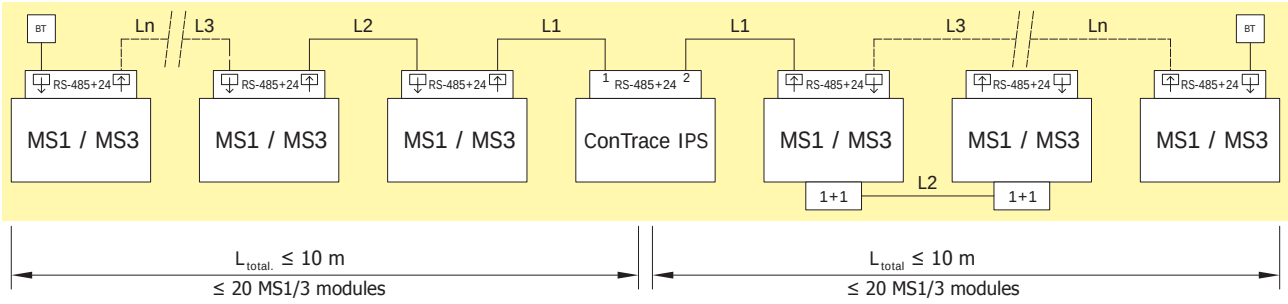
Maximum permissible long-term power	120 W
Discrete alarm output	250 V, 5 A
Type of terminal clamps	detachable
Clamping mechanism type of terminal clamps	spring
Cross-section / number of simultaneously connected wires to terminals	up to 2,5 mm^2 / 1
Operating temperature range	-40...+50 °C
Mounting type	DIN-rail 35 mm
Degree of protection	IP20
Dimensions (W×H×D), mm	45×75×109,7
Weight, g	145
Service life	not less than 10 years

* taking into account the connected redundant modules in the "1 + 1" scheme

The scheme of connection IPS modules in RS-485 network



The scheme of connection MS1 / 3 modules to the IPS module



Approvals

Contact SST Group sales representative for details

Product range

Power and interface switching module ConTrace IPS

Remote temperature measurement module ConTrace AS

- Connection of 8 temperature sensors
- Up to 16 blocks can be daisy chained together
- Up to 128 temperature sensors when scaling the system
- The maximum distance of the module from the control cabinet to 1 200 m
- The intrinsically safe circuit

Purpose

The remote temperature measurement module ConTrace AS is used for temperature control of process pipelines and tanks of different industries.

Designed for installation in control cabinets.

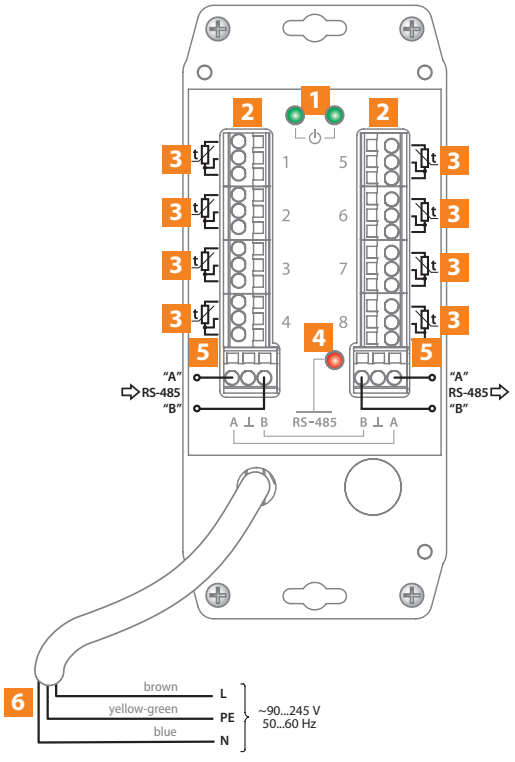
Description

The remote temperature measurement module ConTrace AS is one of the components of the specialized control system for electrical heating ConTrace. Transmission of temperatures data is carried out via RS-485 (Modbus RTU). This makes possible to use the ConTrace AS modules as a part of third-party control systems that support this type of communication.

Using ConTrace AS modules allows for centralized control and transmission values of the temperatures of remote objects, which is particularly effective for a large gathering of measurement points within a radius of 100 m. For each ConTrace AS module up to 8 RTD temperature sensors can be connected. Incoming data from sensors are transferred to the control device by means of only one cable according to the RS-485 standard. At a distance of 1 200 m, up to 16 ConTrace remote temperature measurement devices can be connected in series. This makes it possible to monitor changes in the temperature characteristics of the electrical heating system at 128 points simultaneously.

ConTrace remote temperature measuring devices are fully compatible with each other, which allows the use of ConTrace AS modules installed in control cabinets simultaneously with ConTrace AS-xxx-Ex units located in an explosive area. The ConTrace AS modules can be connected in series with the field units of the remote temperature measurement ConTrace ASxxx-Ex in any order.

Connection and indication



1. Voltage presence LED
2. Terminal blocks for temperature sensors
3. Note for connecting temperature sensors
4. Data transfer LED on the RS-485 interface
5. Terminal blocks for the RS-485 interface
6. Power wires

Technical data

Ex marking	[Ex ia m] IIC
Supply voltage	90…245 VAC, 50…60 Hz
Power consumption, max	5 W
Interface	RS-485
Communication protocol	Modbus RTU
RS485 interface connection	A, B, com
RS485 communication speed	9 600 …115 200 bps.
Max length of the RS485 network segment	1200 m*
Terminal blocks for connections 1. Temperature Sensors 2. Interface cable	up do 2,5 mm^2
The length of the power supply wires	210 mm
The cross section of the supply wires	0,75 mm^2
Ground wire length	230 mm
The cross-section of the ground wire	4,0 mm^2
Number of temperature measurement channels	8
The resolution of the ADC of the measuring channel	23 bits
Type of sensors	see the table "Types of sensors"
Temperature measurement range	-100…+500 °C
Accuracy of measurements	0,5 °C
Maximum sensor distance from the unit	100 m
Sensor connection circuit	three-wire circuit
Operating temperature range	-55…+50 °C
Degree of protection	IP20
Dimensions (W×H×D), mm	81,4×189,4×64
Weight, g	1 000
Service life	not less than 10 years

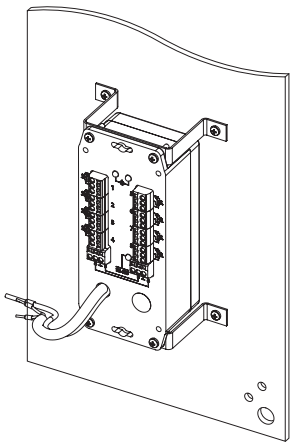
* Depends on the selected data rate and the conditions for the protection of the control cable against electromagnetic interference.

Types of sensors

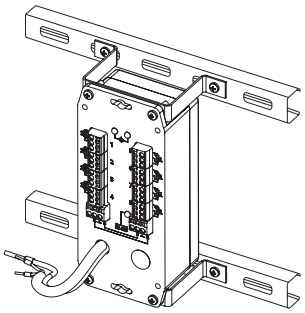
Material	Type of RTD	Measuring range, °C
Platinum	PT50	-100 … +500
	PT100	
Copper	Cu50	-100 … +200
	Cu100	
	50M	
	100M	

Installation

Mounting to the mounting plate

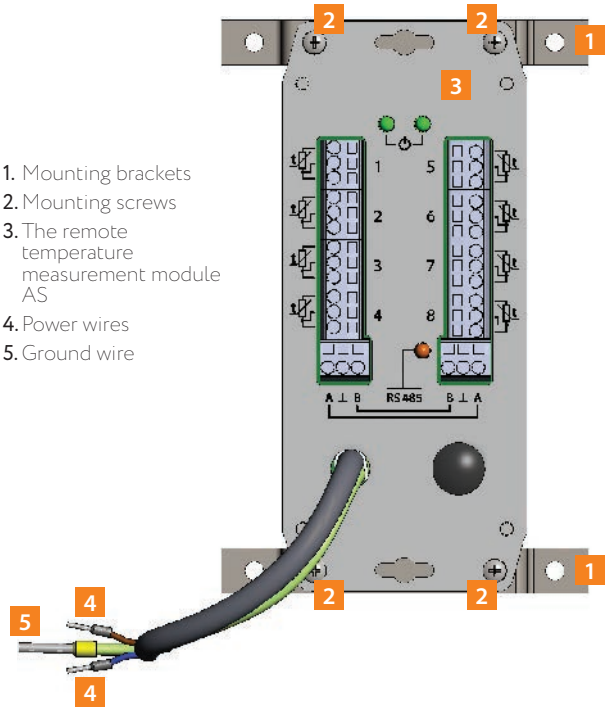


Mounting on profiles and traverses



Construction

The remote temperature measurement module AS is supplied with mounting brackets and mounting screws in the kit.



1. Mounting brackets
2. Mounting screws
3. The remote temperature measurement module AS
4. Power wires
5. Ground wire

Approvals

Contact SST Group sales representative for details

Product range

Remote temperature measurement module ConTrace AS

Remote temperature measurement unit ConTrace AS-xxx-Ex

- Connection of 8 temperature sensors
- Up to 16 blocks can be daisy chained together
- Up to 128 temperature sensors when scaling the
- The maximum distance of the unit from the control cabinet to 1 200 m
- Various modifications
- Operation in hazardous zones 1, 2 (21, 22)

Purpose

The remote temperature measurement unit ConTrace AS-xxx-Ex is used for temperature control of process pipelines and tanks of different industries. Designed for placed near desired monitoring locations, even in hazardous areas.

Description

The remote temperature measurement unit ConTrace AS-xxx-Ex is one of the components of the specialized control system for electrical heating ConTrace. Transmission of temperatures data is carried out via RS-485 (Modbus RTU). This makes possible to use the ConTrace AS-xxx-EX units as a part of third-party control systems that support this type of communication.

Using ConTrace AS-xxx-Ex units allows for centralized control and transmission values of the temperatures of remote objects, which is particularly effective for a large gathering of measurement points within a radius of 100 m. For each ConTrace AS-xxx-Ex unit, depending on the modification, up to 8 RTD temperature sensors can be connected. Incoming data from sensors are transferred to the control cabinet by means of only one cable according to the RS-485 standard. At a distance of 1 200 m, up to 16 ConTrace AS-xxx-Ex units can be connected in series. This makes it possible to monitor changes in the temperature characteristics of the electrical heating system at 128 points simultaneously.

The intrinsically safe circuit and hazardous area enclosure allow the installation of the remote temperature measurement unit ConTrace AS-xxx-Ex in zones 1 and 2 (21, 22).

Modifications

Design	Name	Number of measuring channels	Housing material	Material of cable glands*	Number / type of cable glands	Dimensions, mm HxWxD	Weight, kg	Type of construction**
	AS-8MM-Ex	8	Steel	Brass	Power supply: 2xM25 Sensors: 8xM20 Network: 2xM20	340×325×215	8,0	Transit/ Terminal
	AS-8PP-Ex	8	Polyester	Polyester	Power supply: 2xM25 Sensors: 8xM20 Network: 2xM20	315×290×125	4,5	Transit/ Terminal
	AS-8PM-Ex	8	Polyester	Brass	Power supply: 2xM25 Sensors: 8xM20 Network: 2xM20	380×325×125	6,0	Transit/ Terminal
	AS-4PM-Ex	4	Polyester	Brass	Power supply: 2xM25 Sensors: 8xM20 Network: 2xM20	325×325×125	4,5	Terminal

* Brass cable glands are designed for use with armored cables, polyester - for non-armored cables.

** Units of transit / terminal type can be used for single installation as well as for serial connection.

Units of the terminal type are not structurally designed for further transit of the power and information networks, so they can only be used for a single installation or be the last ones in the AS-xxx-Ex circuit.

Technical data

Ex marking		1 Ex e ia m IIC T6
Supply voltage		90…245 VAC, 50…60 Hz
Power consumption, max		5 W
Interface		RS-485
Communication protocol		Modbus RTU
RS485 interface connection		A, B, com
RS485 communication speed		9 600 … 115 200 bps.
Max length of the RS-485 network segment		1200 m *
Terminal blocks for connections 1. Temperature Sensors 2. Interface cable		up to 2,5 mm^2
Terminal blocks for mains power connections		up to 6 mm^2
Number of temperature measurement channels		8
The resolution of the ADC of the measuring channel		23 bits
Type of sensors		see the table “Types of sensors”
Temperature measurement range		-100…+500 °C
Accuracy of measurements		0,5 °C
Maximum sensor distance from the unit		100 m
Sensor connection circuit		three-wire circuit
Operating temperature range		-55…+50 °C
Degree of protection		IP66
Dimensions (W×H×D), mm	AS-8MM-Ex	340×325×215
	AS-8PP-Ex	315×290×125
	AS-8PM-Ex	380×325×125
	AS-4PM-Ex	325×325×125
Weight, kg	AS-8MM-Ex	8,0
	AS-8PP-Ex	4,5
	AS-8PM-Ex	6,0
	AS-4PM-Ex	4,5
Service life		not less than 10 years

* Depends on the selected data rate and the conditions for the protection of the control cable against electromagnetic interference.

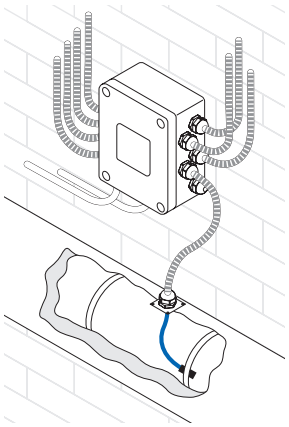
Types of sensors

Material	Type of RTD	Measuring range, °C
Platinum	PT50	-100 … +500
	PT100	
Copper	Cu50	-100 … +200
	Cu100	
	50M	
	100M	

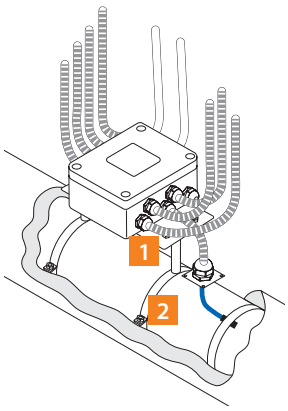
TC RU C-RU.AA87.B.00057-18

Installation

Surface mount



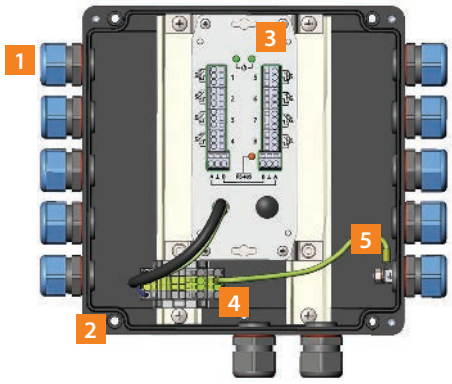
Mounting on a pipe



1. Mounting plate PL.PTB 1007
2. Mounting bracket K.PTB10. YYYxZZZ

Construction

The design of the remote temperature measurement unit without a lid, example ConTrace AS-8PP-Ex.



1. Cable glands
2. Explosion proof enclosure
3. Remote temperature measurement module
4. Terminal blocks for mains connection
5. Ground wire

Approvals

Contact SST Group sales representative for details

Product range

1. Remote temperature measurement unit ConTrace AS-8MM-Ex
2. Remote temperature measurement unit ConTrace AS-8PP-Ex
3. Remote temperature measurement unit ConTrace AS-8PM-Ex
4. Remote temperature measurement unit ConTrace AS-4PM-Ex

Accessories

1. Mounting plate PL.PTB 1007
2. Mounting bracket K.PTB10.YYYxZZZ

Capillary thermostat HeatTHERM-AT

- Installation in the immediate vicinity of the heated system
- Max. switching capacity 16 A
- Signal open contact
- Maintenance-free clamp terminals
- Sighting window for monitoring the set temperature
- Operating temperature -40 ... +80 °C

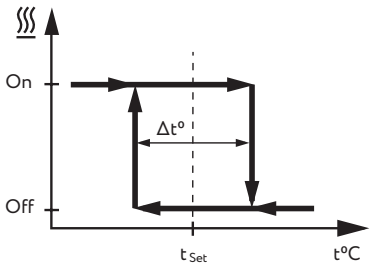
Description

The thermostat is a temperature switch and operates by the principle of expanding gas or liquid. Switching of the relay contact is carried out within the hysteresis limits relative to the set maintenance temperature. The electric switching device is a microswitch without an additional source of power.

Principle of operation

When the temperature of the sensor falls below the setpoint (switching differential), the microswitch trips via the transmission mechanism and the power circuit closes (contacts 1–2). At the same time, the signal circuit opens (contacts 1–4).

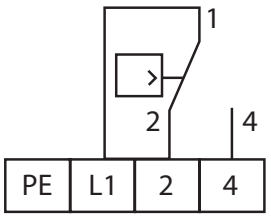
If the sensor temperature exceeds the set value (switching differential), the microswitch trips and the power circuit opens (contacts 1–2). The signal circuit closes (contacts 1–4).



Purpose

Capillary thermostat heatTHERM-AT is intended for monitoring and regulating the temperature of general-purpose industrial pipelines outside explosion hazard areas.

Wiring diagram



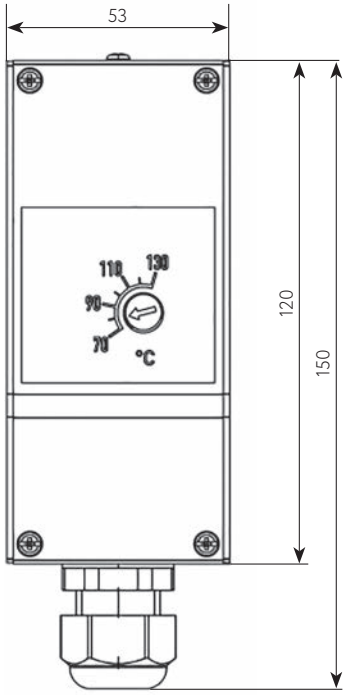
Technical data

Control temperature range, °C	0 … +200
Hysteresis, %	7
Length of capillary, mm	1000
Capillary material	stainless steel
Diameter of probe, mm	6
Switching capacity, power contacts (1-2), at ~220 V, A	16
Switching capacity, signal contacts (1-4), at ~220 V, A	6
Operating temperature, °C	-40 … +80
Protection type	IP54

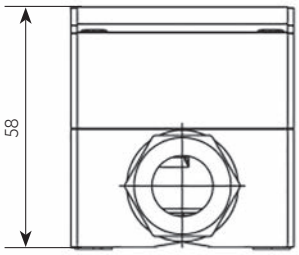
Cable inlet	Plastic cable gland M20×1.5 ((crimping ø 6…12 mm)
Conductor cross-section, mm^2	through 2.5
Weight, kg	0,2
Dimensions (not incl. cable glands), mm	53×120×58
Installation type	Surface mount Onto pipe

Construction

Front view



Bottom view



Approvals

№ TC RU C-DE.AB98.B.00348

EAC

Accessories
(to be ordered separately)

Strap for attaching the thermostat to the pipe ø 15 … 100 mm – PFS/30

For a detailed description of PFS/30, see p. 93

Ordering information

Thermostat heatTHERM-AT with a range of 0 … +200 °C, type 60/00625586

Capillary thermostat ExTHERM-AT

- Installation in the immediate vicinity of the heated system
- Max. switching capacity 25 A
- Signal open contact
- Maintenance-free clamp terminals
- Operating temperature -55 ...+50 °C (-60 ...+70 °C version available)
- The thermostat is RoHS compliant and is cadmium-free

Description

The thermostat is a temperature switch and operates by the principle of expanding gas or liquid. Switching of the relay contact is carried out within the hysteresis limits relative to the set maintenance temperature.

The electric switching device is a microswitch (without an additional source of power) located inside a fire-proof housing. Supports connection of armored cables with sealing of jacket over the armor.

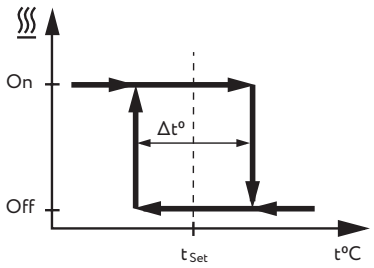
Principle of operation

When the temperature of the sensor falls below the setpoint (switching differential), the microswitch trips via the transmission mechanism and the power circuit closes (contacts 1–2). At the same time, the signal circuit opens (contacts 1-4).

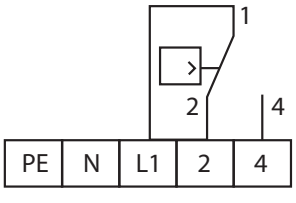
If the sensor temperature exceeds the set value (switching differential), the microswitch trips and the power circuit opens (contacts 1–2). The signal circuit closes (contacts 1–4).

Purpose

The explosion proof thermostat exTHERM-AT is intended for monitoring and controlling the temperature of process pipelines in explosion hazard areas (1 and 21).



Wiring diagram

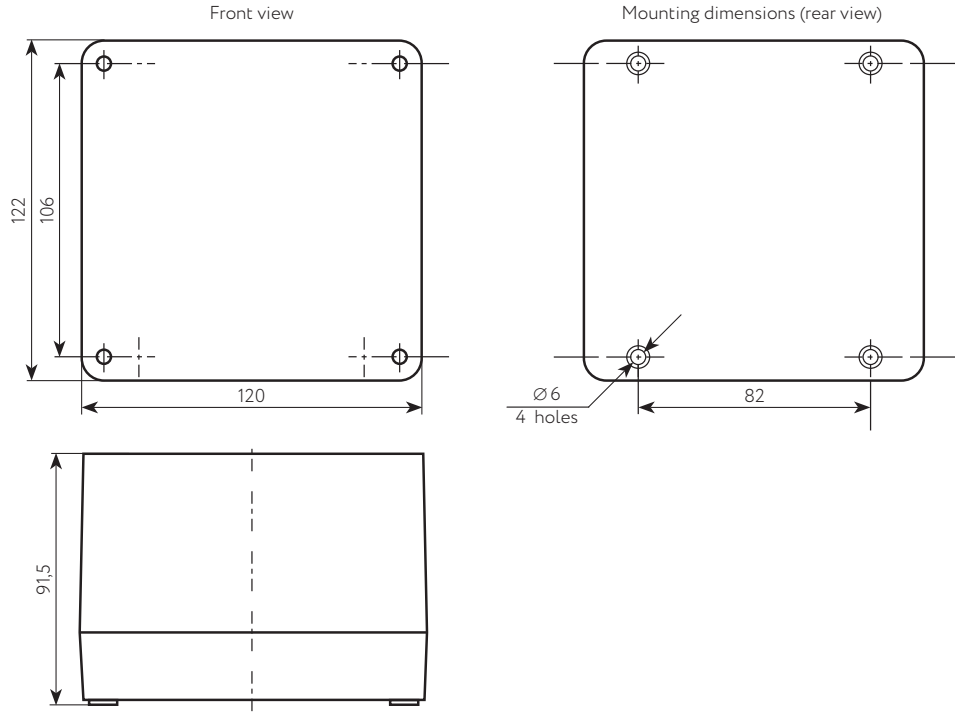


Technical data

Control temperature range, °C	0 … +190
Hysteresis, %	7
Length of capillary, mm	1000
Capillary material	stainless steel
Diameter of probe, mm	4
Switching capacity, power contacts (1–2), at ~220 V, A	25
Switching capacity, signal contacts (1–4), at ~220 V, A	2
Operating temperature, °C	-55 … +50 (standard version) -60 … +70 (special version)

Protection type	IP65
Cable inlet	Plastic cable gland M20×1.5 (crimping ø 6…12 mm) Blanking plug M25×1.5
Cross-section of connected conductors, mm^2	through 4
Explosion protection marking	1Ex de IIC T4/T5/T6 Gb
Weight, kg	1.2
Dimensions (not incl. cable glands), mm	122×120×91.5
Installation type	Surface mount

Construction



Approvals

№ TC RU C-DE.ME92.B.00443

Ordering information

1. Thermostst exTHERM-AT (type 605055), 60/00679925, scale 0…+190 °C
   Standart version
2. Thermostst exTHERM-AT (type 605055), 60/00686033, scale 0…+190 °C
   Special version

Electronic temperature controller PT-300

- Easy operation
- Small size
- Max. switching capacity 8 A
- Maintenance of set temperature without additional adjustments
- Indication of power and heating status
- Parameter storage in non-volatile memory
- Relay changeover contact

Purpose

The electronic temperature controller is designed to maintain the temperature in the set range.

Applications

PT-300 is used in general-purpose industrial electric heating systems of pipelines and tanks, in de-icing systems, as well as for maintaining a positive temperature in control cabinets within the set temperature range. The required temperature range shall be indicated when ordering the TST04 sensor. The sensor is programmed at the factory and cannot be reprogrammed.

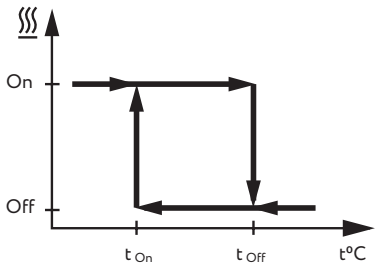
Reliability

100% of products have passed quality control. The settings are saved in non-volatile memory.

Principle of operation

The regulator, in conjunction with the connected temperature sensor TST04, maintains the temperature according to the factory setting and does not require any settings for installation and operation.

The on/off button allows to switch off the heating system when it is not needed.

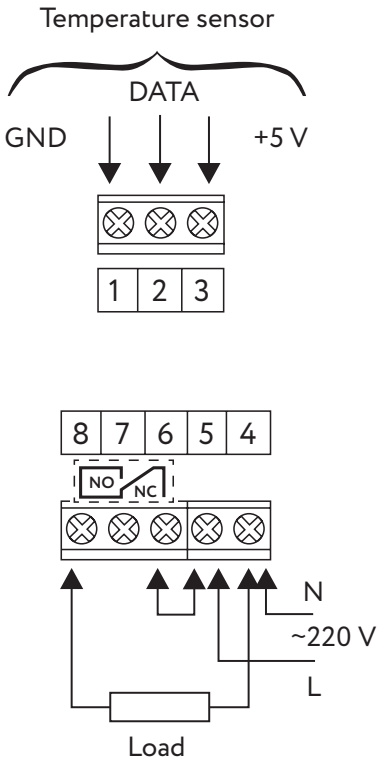


Technical data

Temperature control range (to be specified when ordering)	–55 … +125 °C
Supply voltage	~220 V, 50 Hz
Power consumption	0,5 W
Dimensions	35×90×68 mm
Weight	100 g
Operating temperature	+5 … +45 °C
Relative humidity	80 %
Degree of protection	IP20
Mounting type	DIN rail, 2 modules
Type of temperature sensor*	TST04
Maximum sensor distance from the controller	up to 100 m
Number of temperature measurement channels	1
Number of control channels	1
Switching capacity	8 A
Temperature measurement accuracy	±0.5 °C

* The sensor is not included in the scope of supply and must be ordered separately.

Wiring diagram



Approvals

№ TC RU C-RU.ME67.B.00117

EAC

Ordering information

1. Electronic temperature controller PT-300.
2. Temperature sensor TST04 (for a detailed description, see p. 143).

Electronic temperature controller PTM-2000

- Control over 4 independent channels
- High accuracy of temperature measurement
- High noise immunity of measuring channels
- Maximum distance to temperature sensors is up to 1000 m
- Simultaneous display of temperature in all control channels
- Temperature control range: –100... +600 °C

Applications

Automated control system PTM-2000 is widely used in industrial electric heating systems to monitor and maintain the set temperature of process pipelines and tanks, as well as in building heating systems.

The controller has high accuracy and high noise immunity of temperature measurement channels.

It can be installed at considerable distances to controlled zones (up to 1000 m).

PTM-2000 maintains the optimal temperature in each of the four independent control channels.

The control algorithms programmed in the device, together with the sensors required for each specific task, provide optimal control of the electric heating system. As a result, high efficiency and energy savings are achieved.

PTM-2000 can be integrated into a process control system with the help of the RS485 interface via the protocol Modbus RTU. The electric heating system is controlled with the help of output relay channels.

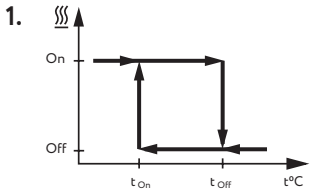
The controller has an LCD display to indicate the current status of the system and adjust the parameters.

- Built-in LCD display
- Simple adjustment of controlled temperatures
- Supply voltage ~ 90...245 V, 50 ... 60 Hz
- Interface RS485, Modbus RTU
- Parameter storage in non-volatile memory

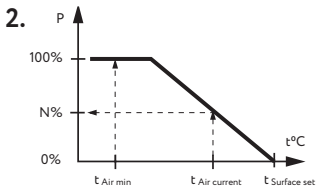
Control algorithms

Temperature controller PTM-2000 has 5 control algorithms for each of the 4 control channels:

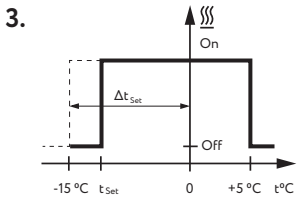
1. PIPE – two-position control (by on and off temperature).



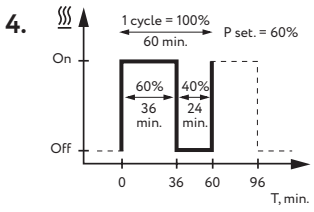
2. PIPE+ — proportional control (proportional to ambient air temperature with surface temperature control).



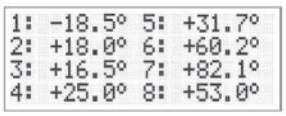
3. ROOF/ROAD — deicing control of roof and outdoor areas.



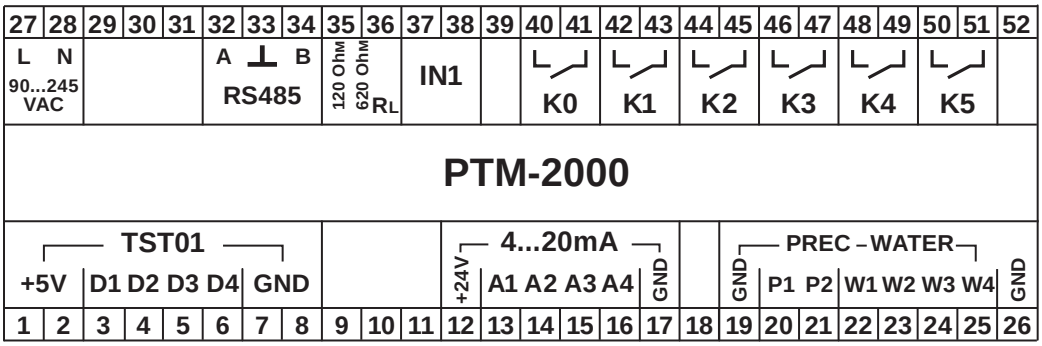
4. TIMER — control of the percentage of power based on period of time.



5. MEASUREMENT — measurement and indication of the eight temperature channels simultaneously.



Connection diagram



Technical data

Temperature control range	–55 … +60 °C (+125 °C*) for TST01 –100 … +600 °C for standard signal 4…20 mA
Supply voltage	~90…245 V, 50…60 Hz
Power consumption	12 W
Dimensions	160×90×60 mm
Weight	450 g
Operating temperature	+5 … +45 °C
Relative humidity	80 %
Degree of protection	IP20
Mounting type	DIN rail, 9 modules
Interface, communication protocol	RS485, Modbus RTU
Types of sensors** (configured in the settings menu, separately for each channel)	TST01, TSP01, TSP02, TSW01, Standard measurement signal 4…20 mA
Maximum sensor distance from the controller	up to 100 m for TST01 up to 1000 m for standard 4 … 20 mA signal
Number of temperature measurement channels	8 channels: – 4 for sensor TST01 – 4 for standard signal 4 … 20 mA
Number of precipitation sensor channels	2 for sensors TSP01, TSP02
Number of water sensor channels	4 for sensor TSW01
Number of control channels	4 channels (6 A, ~ 230 V, 50 … 60 Hz)
Temperature measurement accuracy	0.5 °C for TST01 0.1 °C for standard signal 4 … 20 mA

* – For sensor in silicone enclosure.

** – The temperature sensor is not included in the delivery kit, it should be ordered separately.

Reliability

100% of products have passed quality control. Set settings are saved in non-volatile memory

Approvals

№ TC RU C-RU.PC52.B.00215

EAC

Ordering information

1. Electronic temperature controller PTM-2000.

Depending on the purpose of the heating system can be ordered additionally:

2. Temperature sensor TST01.
3. Temperature transducer TPU 0304.
4. Precipitation sensor TSP01, TSP02.
5. Water sensor TSW01.

For a detailed description of the sensors, see pp. 142-147.

Precipitation sensors TSP01, TSP02 and water sensor TSW01

Applications

Precipitation sensors detect the presence of precipitation on the heated surface. Used in building heating systems.

When snow falls on the precipitation sensor, the heating element melts it into water. Contacts close when water is detected and the temperature controller records the precipitation.

The water sensor monitors the presence of water on the heated surface. Operates jointly with the electronic temperature regulator RTM-2000 in building heating systems.

TSP01

TSP02

TSW01

Purpose

Precipitation sensor TSP01 without the upper casing (snow receiver) is used for installation into the screed when operated as part of heating systems of outdoor areas. Precipitation sensor TSP02 is installed on a bracket on a vertical surface in a place accessible to precipitation. The bracket is in the package.

The water sensor detects precipitation in the form of rain. The operating principle is similar to the precipitation sensor, but it does not have a heater. Contacts close when water is detected and the temperature controller records the precipitation. The sensor can be manufactured to order taking into account the structural features of the roof.

Technical data

Sensor type	TSP01	TSP02
Dimensions, mm	110×110×55	110×210×160 (with bracket)
Supply voltage*	~36 V ± 10 %	
Rated power of heating element	5 W ± 10 %	3,5 W ± 10 %
Operating temperature range	-40 … +50 °C	
Max. sensor distance from the controller	up to 100 m	
Compatibility with thermostat type	PTM-2000	

Dimensions	160×40×15 mm
Maximum sensor/cable diameter	10/3 mm
Operating temperature	-40 … +50 °C
Maximum sensor distance from the controller	up to 100 m
Compatible with thermostat type	PTM-2000

Ordering information

Example:
Precipitation sensor TSP01-X
① ②

1. Precipitation sensor grade
2. Length of the installation wire in m

Example:
Water sensor TSW01-X
① ②

1. Water sensor grade
2. Length of the installation wire in m

* To power the precipitation sensors, additionally order the power supply adapter for precipitation sensors BPDO.

Approvals

Sensors are exempt from mandatory certification.

Temperature sensors TST01 and TST04

Applications

Temperature sensors are intended to continually measure the temperature of various non-aggressive media. Used in conjunction with electronic temperature controllers in trace heating systems of pipelines and tanks and in building heating systems. Temperature sensors are different in design and type of sensing element.

TST01

TST04

Technical data

Temperature measurement range	–55 … +60 °C (standard) –55 … +125 °C (heat-resistant)
Temperature measurement accuracy	±0,5 °C
Type of sensing element	digital
Number of cores in connection cable	3 cores
Sensor diameter/cable diameter	10/8 mm
Degree of protection	IP65
Max. sensor distance from the controller	up to 100 m
Compatible with thermostat type	PTM-2000

Temperature measurement range*	–55 … +60 °C (standard) –55 … +125 °C (heat-resistant)
Temperature measurement accuracy	±0,5 °C
Type of sensing element	digital
Number of cores in connection cable	3 cores
Sensor diameter/cable diameter	20/8 mm
Degree of protection	IP65
Max. sensor distance from the controller	up to 100 m
Compatible with thermostat type	PT-300

* TST04 is programmed at the factory for a specified maintenance temperature. Thereafter, reprogramming the temperature is not possible.

Ordering information

Example: Temperature sensor
TST01-2,0-P (-55 °C … +60 °C)
① ② ③ ④

1. Temperature sensor grade
2. Installation wire length*
3. Sensor body material: P – polyethylene, S – silicone
4. Temperature measurement range

Example: Temperature sensor
TST04-2,0-P (+12 °C … +15 °C)
① ② ③ ④

1. Temperature sensor grade
2. Installation wire length*
3. Sensor body material: P – polyethylene, S – silicone
4. Temperature measurement range

Approvals

Sensors are exempt from mandatory certification.

* On request the sensor connection cable can be up to 100 m long.

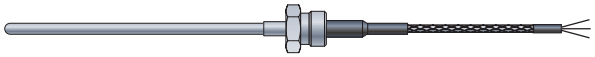
Temperature sensors TS

Purpose

The TS temperature sensors are thermistors with a platinum sensing element. Intended for measuring the temperature of the heated surface of pipes, tanks and other solid bodies.

Used in conjunction with the PTM-2000 temperature regulator (with switching via PTB/IPM), electric heating control cabinets, as well as control devices with an input for connection of compatible thermistors.

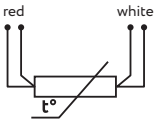
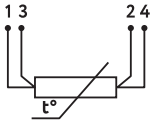
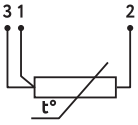
TSPT



TS-1288

TS-1388

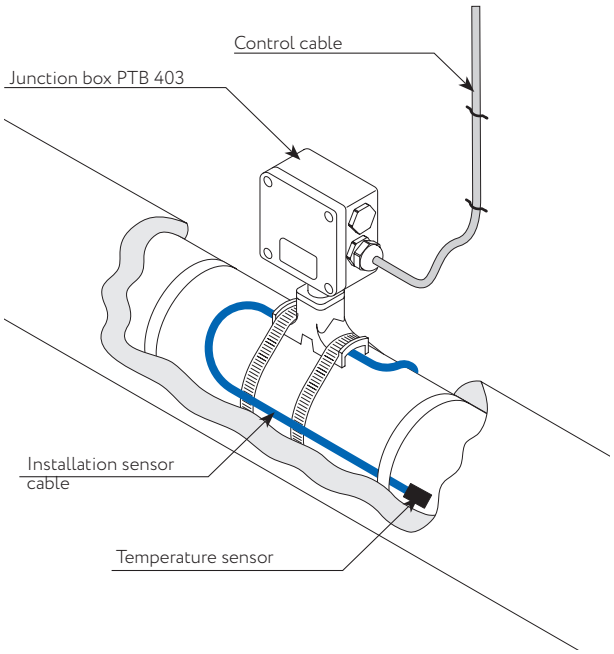
Technical data

	TSPT	TS-1388	TS-1288
Equipment class	General purpose industrial grade	General purpose industrial grade	General purpose industrial grade
Sensing element type	PT100	PT100	100P
Range of measured temperatures	-50...+200 °C	-50...+200 °C	-50...+450 °C
Installation section length	60 mm	50 mm	300 mm
Sensing element diameter	5 mm	6 mm	6 mm
Installation wire length, mm*	300 1500 3000 5000 10000	300 1500 5000 10000	500 1000
Max. sensor distance from the controller	up to 100 m	up to 100 m	up to 100 m
Ordering code	Resistance thermometer TSPT-300-050-Pt100-B4-C10-5-60/***mm	Resistance thermometer TS-1388/5/Pt100/-50..+200C/50mm/6/***mm/KMM SE/B/N3	Resistance thermometer TS-1288/2/100P/-50..+450/***mm/6/300mm/KMNE/B/-/-/№2/GP/- (inverted nozzle version)
Connection diagram			

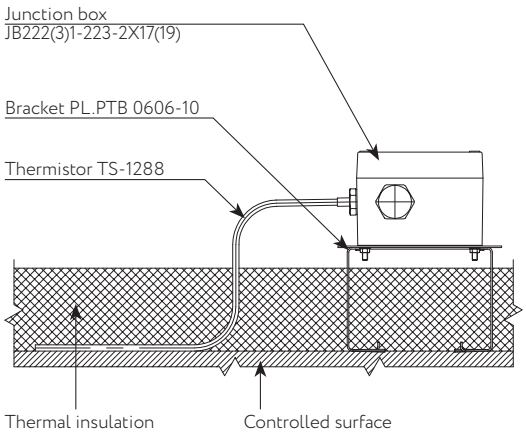
* Installation wire length to be indicated in the ordering code.

Mounting on a pipe

TSPT, TS-1388



TS-1288



Accessories
(to be ordered separately)

1.Junction box JB222(3)1-223-1X(14-17) for connection of data, control and signal cables (page 58) to TSPT, TS-1388.

2. Junction box JB222(3)1-223-2X17(19) for connection of data, control and signal cables (page 60) to TSPT, TS-1388, TS-1288.

3. Support bracket (pp. 98-101).

4. Measurement and converter unit PTB/IPM (page 148).

Approvals

Sensor is exempt from mandatory certification.

Temperature transducers TPU 0304

Purpose

Transducers TPU 0304 are intended for continuous conversion of temperature value signals into a standard current output signal 4... 20 mA and (or) into a digital signal based on the HART protocol.

Used for measuring the surface temperature of the heated pipes and ambient air.

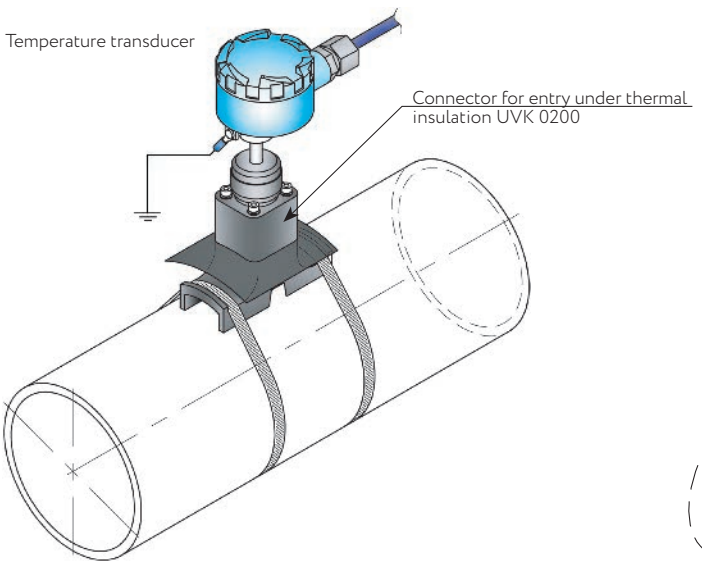
Compatible with the temperature controller PTM-2000.

Technical data and ordering information

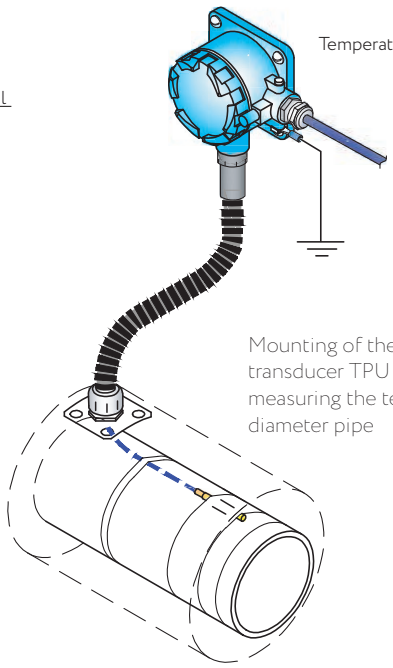
Purpose	Measuring surface temperature of a pipe	
Explosive-proof design	1ExdIICT6 X (flame-proof enclosure)	
Installation	onto glands for penetrating the thermal insulation UVK.0200*	
Range of measured temperatures	–50 ... +200 °C	–50 ... +200 °C
Operating temperature	–55 ... +70 °C	–55 ... +70 °C
Cable connector type	non-armored cable Ø6...13 mm	armored cable Ø6...13 mm
Max. sensor distance from the controller	up to 1000 m	up to 1000 m
Ordering code	TPU 0304Exd/M1-H/AG14Exd/K13 (-50...+200)Pt100 GP	TPU 0304Exd/M1-H/AG14Exd/KB17 (-50...+200)Pt100 GP

* Not included in the scope of supply and must be ordered separately, see p. 92.

Purpose	Measuring surface temperature of a pipe	
Explosive-proof design	0ExiaIICT6 X (intrinsically safe circuit)	
Installation	onto a wall (surface mounting)	
Range of measured temperatures	–50 ... +200 °C	–50 ... +200 °C
Operating temperature	–55 ... +70 °C	–55 ... +70 °C
Cable connector type	non-armored cable Ø4...8 mm	armored cable Ø6...13 mm
Max. sensor distance from the controller	up to 1000 m	up to 1000 m
*Length of temperature sensor	1.5 m	1.5 m
	5 m	5 m
	10 m	10 m
Ordering code	TPU 0304Ex/M1-H/BP12/PGM (-50...+200)Pt100 XX* KMMFE GP	TPU 0304Ex/M1-H/BP12/KB17 (-50...+200)Pt100 XX* KMMFE GP



Mounting of the temperature transducer TPU 0304 on a pipe using the Connector for entry under thermal insulation UVK 0200

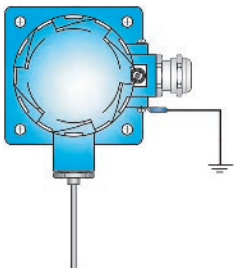


Mounting of the temperature transducer TPU 0304 on a wall for measuring the temperature of a small diameter pipe

Purpose	Measurement of ambient air temperature	
Explosive-proof design	1ExdIICT6 X (flame-proof enclosure)	
Installation	onto a wall (surface mounting)	
Range of measured temperatures	**–50 … +200 °C**	**–50 … +200 °C**
Operating temperature	–55 … +70 °C	–55 … +70 °C
Cable connector type	non-armored cable Ø6…13 mm	armored cable Ø6…13 mm
Max. sensor distance from the controller	up to 1000 m	up to 1000 m
Ordering code	TPU 0304Exd/M1-H/BP12Exd/K13 (-50…+200)Pt100 GP	TPU 0304Exd/M1-H/BP12Exd/KB17 (-50…+200)Pt100 GP

Purpose	Measurement of ambient air temperature	
Explosive-proof design	1ExdIICT6 X (flame-proof enclosure)	
Installation	onto a wall (surface mounting)	
Range of measured temperatures	**–60 … +200 °C**	**–60 … +200 °C**
Operating temperature	–55 … +70 °C	–55 … +70 °C
Cable connector type	non-armored cable Ø6…13 mm	armored cable Ø6…13 mm
Max. sensor distance from the controller	up to 1000 m	up to 1000 m
Ordering code	TPU 0304Exd/M1-H/BP12Exd/ K13(-60…+200) GP	TPU 0304Exd/M1-H/ BP12Exd/KB17(-60… +200)Pt100 GP

Temperature transducer



Mounting of the temperature transducer TPU 0304 on a wall for measuring the ambient air temperature

Accessories
(to be ordered separately)

Connector for entry under thermal insulation UVK.0200.

For a detailed description of UVK.0200, see p. 97.

For detailed information on installation, see the model solutions catalog.

Approvals

№ ТС RU C-RU.ОБ01.В.00181

№ ТС RU C-RU.ОБ01.В.00202

No. 14.00106.120

Measurement and converter unit PTB/IPM

- Up to eight independent measuring channels
- Length of the line between the regulator (controller) and the unit is up to 1,000 m
- Installation in explosive hazard areas
- Minimum operating temperature: -55 °C
- Protection class IP66

Purpose

The main purpose of the measurement and converter unit is to convert signals from:

- thermistors (TS)
- thermoelectric converters (TP)
- converters with standard output signals

into a standard signal (4...20 mA) and/or into a digital signal based on the HART protocol and to send to a control computer or controller measured values of temperature and current coming from a variety of sensors.

Components and configuration

Structurally, the measurement and converter unit has a rectangular enclosure made of thermoplastic material reinforced with glass fiber. For installation onto a pipeline, the unit has special fasteners.

The housing has cable glands and plugs.

Depending on the installation method and the number of connected measurement channels, the PTB/IPM units can be of three types:

1. **Version A** – measurement and converter unit 250×255×120 mm.

   Supports one to eight IPM measurement and converter modules (up to eight independent measuring channels).

2. **Version B** – measurement and converter unit 160×160×120 mm.

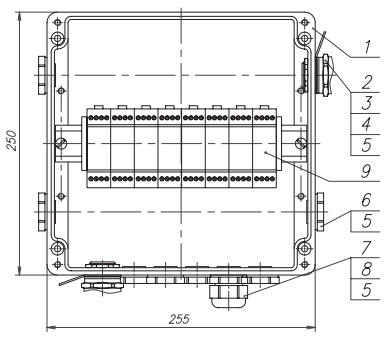
   Supports one to two IPM measurement and converter modules (up to two independent measuring channels).

3. **Version C** – measurement and converter unit 160×160×120 mm with the UVK connector.

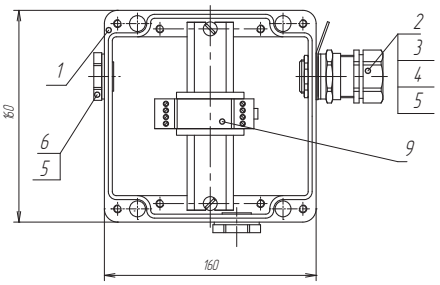
   Supports one to two IPM measurement and converter modules (up to two independent measuring channels).

Structural design:

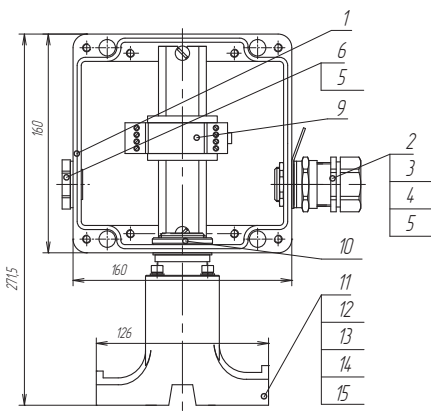
1. Housing
2. Armored cable connector, brass M25
3. Counter nut, brass M25
4. Earthing ring, brass M25
5. Sealing ring M25
6. Plug M25
7. Non-armored cable connector, plastic, M25
8. GP25 seal
9. Modular measurement transducer
10. Nut DESTU.002
11. Support UVK.01.01
12. Seal UVK.0013
13. Plug UVK.0014
14. Plate UVK.0012
15. Rectangular-sectioned ring



Version A



Version B

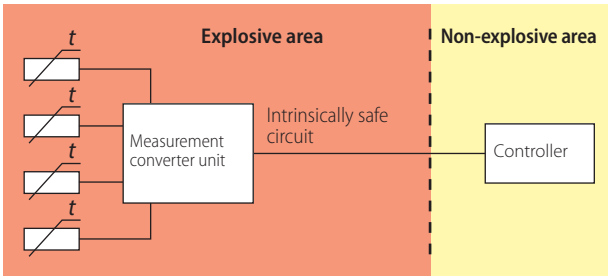


Version C

Applications

The product is used as part of electric heating systems for pipelines and tanks. It is also possible to use these products in other automatic control systems.

The use of the product in explosion hazard areas must strictly follow the explosion safety marking.



Technical data

Item		Value
Explosion protection		1Ex ia IIC T6 Gb X, [Ex ia] IIC
Degree of protection		IP66
Ambient temperature range, °C		-55 … +55
Maximum input voltage, U_m, V		42
Electrical equipment class according to method of protection against electric shock (GOST 12.2.007.0-75)		III
Operating temperature, °C		-55 … +55
Storage temperature, °C		-55 … +55
Overall dimensions (L×W×D), max, mm:	Version A Version B and C	250×255×120 160×160×120
Weight, kg, max:	Version A Version B Version C	3 1.5 1.75

Electrical intrinsically safe product parameters	
Input intrinsically safe converter parameters Ex-marking 1Ex ia IIC T6 Gb X	
Maximum input voltage, Ui*, V	30
Maximum input current, Ii*, mA	120
Maximum input power, Pi*, W	0.9
Maximum internal inductance, Li, mH	0.1
Maximum internal capacity, Ci, nF	15
Input intrinsically safe converter parameters Ex-marking [Ex ia] IIC	
Maximum output voltage, Uo, V	5.4
Maximum output current, Io, mA	6
Maximum output current, Lo, mH	200
Maximum external capacitance, Co, µF	10

* Specific values of Ui, Ii are determined based on the maximum permissible input power Pi and cannot affect the device input simultaneously.

Accessories
(to be ordered separately)

Z-profile – for mounting the product (Version A) onto a metal structure or onto a wall.

Fasteners (straps, screws, etc.) – specified depending on the surface type.

Brackets PB, KP, PL.PTB 0606 – for mounting the product (Version B) onto the pipeline.

For ordering information, see “Accessories”, p. 98-99.

Metal strap PFS/3 is used for attaching the brackets and the connector UVK to the piping.

For ordering information, see “Accessories”, p. 95.

Connector for penetrating thermal insulation LEK/U – for the installation of resistance thermometers and temperature transducers.

For ordering information, see “Accessories”, p. 95.

Interface cable with a galvanic decoupler or a HART modem for communication with a PC or the process control system – depending on the type of transducers used.

Approvals

№ TC RU C-RU.AA87.B.00580

Ordering information

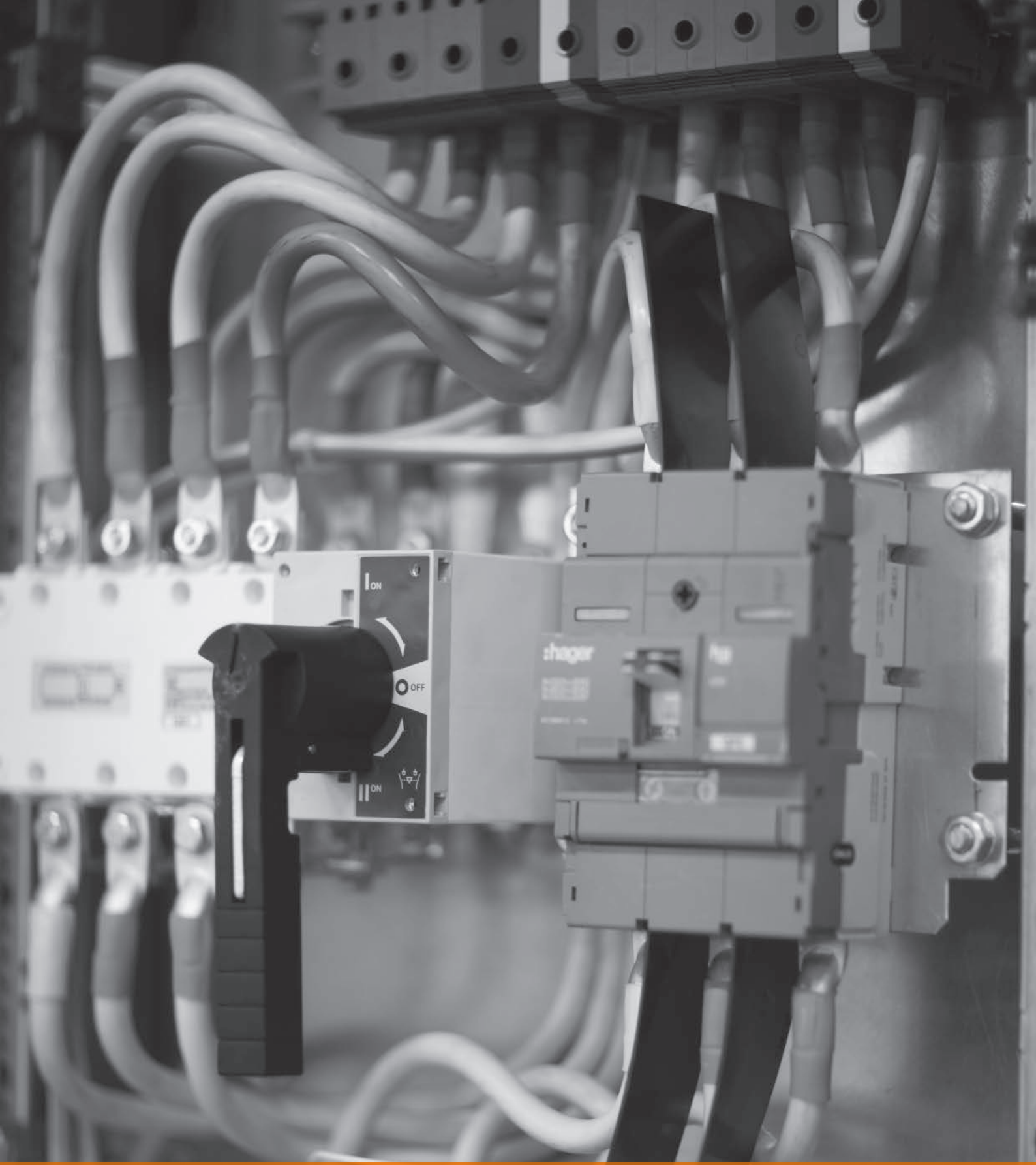
Example:

Measurement and converter unit

PTB X/IPMY-(UVK)-ZZ/WW

① ② ③ ④ ⑤ ⑥ ⑦

1. Plastic housing
2. Housing size (blank – 160×160 mm, 10 –250×255 mm)
3. Modular measurement transducer
4. Number of converters (1 to 8)
5. Digit indicating whether connector for penetrating thermal insulation is included (for products mounted onto pipelines, applies to housings with the dimensions 160×160 mm)
6. Number and type of input glands (P – plastic glands, B – armored cable glands)
7. Number and type of output glands (P – plastic glands, B – armored cable glands)



Switchboard equipment

Main switchboard

- Input and distribution of power from the CPS
- Protection against single-phase and multiphase short-circuits, overloads, and leaks
- Power metering for management and process control purposes
- Remote control of the main switchboard electrical parameters
- Busbar sectioning for the safety of maintenance
- Automatic load switching (ALS section) for boards with two and three inputs on the basis of the microprocessor devices analyzing the system status
- Operating and emergency status indication of the system

Purpose

Main switchboard (MS) are used in the assembly of the CPS KTP 6 (10 kV) / 0,4 kV (low-voltage component), input devices at industrial sites, in administrative and residential buildings to provide protection from overloads and short-circuits, power metering, and infrequent operational switching of electrical circuits.

MS can have one or two inputs, as well as additional input from the diesel generator. Metal switchboards with single or multiple sections for single-sided or double-sided maintenance are available. Each section can be fitted with protective panels (shields) and doors. Multi-section switchboards are easily assembled and disassembled as required for transportation. Switchboards have cable or busbars inputs. Inputs can be either from above or from below. Output can be both through the sections where the devices are installed and through dedicated sections, which is especially convenient for unilateral maintenance. Power busbars are made of a calibrated copper strip.

Technical data

Rated current, I_n	from 400 to 3200 A
Shock current, I_{kp}	up to 120 kA
Nominal three-phase voltage, U_n	380 V
Insulation voltage, U_i	1000 V
Rated frequency, f	50 Hz
Degree of protection	IP31 or IP54
Dimensions of a single section (height × width × depth), mm	1800–2200 × 600–1200 × 600–1000
Climatic version	UHL4
Design option	Only floor-mounted version

Ordering information

When placing an order, depending on its type, the customer should provide the following technical documentation:

1. Compeleted questionnaire in case of ordering to customer specifications. The design of the equipment usually is required.
2. Ordering standard items, please, indicate standard diagram numbers, enclosure types (wall-mounted/integrated/floor-mounted, housing material, IP protection), manufacturers of components, other technical parameters.
3. When ordering to custom design, design documentation is required: single-line or schematic diagram, specifications of components, drawings. When ordering control cabinets and automation devices, a control system diagram (functional diagram) is required.

To order, please, fill in questionnaire at p. 191.

Approvals

№ TC RU C-RU.PC52.B.00586

EAC

Input switching device

- Connection to a three-phase power mains with a voltage of 380 V
- Distribution of power to three-phase and/or single-phase circuits
- Protection of circuits against overloads and short-circuit currents
- Power metering in three-phase and single-phase circuits
- Infrequent switching of output circuits

Purpose

Input switching device (ISD) provides protection against short circuits, overloads and leaks in power supply systems with rated voltages up to 380 V, frequency 50 Hz with dead-earthed neutral. Used for input, metering and distribution of power, for infrequent switching of electrical circuits.

ISD is assembled from the single-side maintenance sections in metal cabinets. ISD can consist of one or more floor-mounted cabinets. When connecting ISD to two independent power sources, it is possible to assemble ISD input panels with an automatic switch in one cabinet with a partition between the sections. ISD is assembled with automatic circuit breakers, meters and other equipment depending on the terms of reference.

Technical data

Rated current, I_n	from 16 to 630 A
Shock current, I_{kp}	up to 20 kA
Nominal three-phase voltage, U_n	380 V
Rated frequency, f	50 Hz
Protection class	IP31 – IP65
Dimensions of a single section (height × width × depth), mm	600–2000 × 450–800 × 220–450
Design	Depending on the rated current and project requirements, floor-mounted, wall-mounted and integrated versions are available

Ordering information

When placing an order, depending on its type, the customer should provide the following technical documentation:

1. Compeleted questionnaire in case of ordering to customer specifications. The design of the equipment usually is required.
2. Ordering standard items, please, indicate standard diagram numbers, enclosure types (wall-mounted/integrated/floor-mounted, housing material, IP protection), manufacturers of components, other technical parameters.
3. When ordering to custom design, design documentation is required: single-line or schematic diagram, specifications of components, drawings. When ordering control cabinets and automation devices, a control system diagram (functional diagram) is required.

To order, please, fill in questionnaire at p. 191.

Approvals

№ TC RU C-RU.PC52.B.00586

EAC

Automatic load switching board

- Continuous automatic monitoring of power on the main and backup inputs
- Reliable supply of power
- Visual monitoring of power at main and backup inputs, operation of devices for main and backup power switching

Purpose

Automatic load switching board (ALSB) is used to reconnect the load to a source of power by automatically switching to a second (backup) input when power is lost at the first (main) input. Normally, the switchboard is reset automatically when the main source of power is restored (priority of the first input). The main input is typically a stationary power mains U_n = 380 V, f = 50 Hz. The backup input can be a stationary power mains or a diesel generator. ALSBs are widely used at industrial and civil engineering sites, cellular communication stations, etc., and are also used to supply power during scheduled maintenance and repair work.

State-of-the-art electronic devices are used to automate the switchboard. The most frequently used set of control circuits is a full-function phase-monitoring relay; special controllers are specified less often. These devices control power elements – contactors, breakers, or circuit breakers with servo drives.

Technical data

Rated operational voltage, U_n	380 V
Rated current, I_n	160–3200 A (for ALSB up to 160 A)
Rated frequency, f	50 Hz
Time switching from the main input to the backup and vice versa	0.5–0.8 sec
Earthing system	TN-S; TN-C; TN-C-S
Protection class	IP31 – IP54
Climatic versions and placement category	UHL4
Design option	floor-mounted/wall-mounted (ALSB)

Ordering information

When placing an order, depending on its type, the customer should provide the following technical documentation:

1. Compeleted questionnaire in case of ordering to customer specifications. The design of the equipment usually is required.
2. Ordering standard items, please, indicate standard diagram numbers, enclosure types (wall-mounted/integrated/floor-mounted, housing material, IP protection), manufacturers of components, other technical parameters.
3. When ordering to custom design, design documentation is required: single-line or schematic diagram, specifications of components, drawings. When ordering control cabinets and automation devices, a control system diagram (functional diagram) is required.

To order, please, fill in questionnaire at p. 191

Approvals

№ TC RU C-RU.PC52.B.00586

EAC

Low-voltage electric cabinets

- Temperature monitoring and control of trace heating systems
- Automatic switching of backup power
- Status indication of the trace heating system
- Protection of the equipment against short-circuit, insulation damage (monitoring of leakage currents), high / low supply voltage
- Monitoring and indication of overheating/ underheating of the heated system
- Load cascading to reduce starting currents
- Integration into the customer's APCS

Purpose

Automation and distribution of power in power supply and control systems of a trace heating system.

Used in various industries, energy, housing and utilities, transportation, construction, etc.

Technical data

Rated operational voltage, U_n	up to 1000 V AC or 1500 V DC
Rated frequency, f	50 Hz
Earthing system	TN-S; TN-C; TN-C-S
Protection class	IP31 – IP65
Climatic version	UHL1-UHL4
Structural design	floor-mounted / wall-mounted

Applications

Control cabinets are used in trace heating systems:

- process pipelines and tanks;
- mid-length pipelines (longline system);
- long pipelines (skin-effect system);
- oil wells (Stream Tracer™);
- Masterwatt gas and liquid heating;
- roofs, ramos, outdoor areas;
- sports facilities;
- soil under freezers;
- tram and railway switches.

Ordering information

When placing an order, depending on its type, the customer should provide the following technical documentation:

1. Compeleted questionnaire in case of ordering to customer specifications. The design of the equipment usually is required.
2. Ordering standard items, please, indicate standard diagram numbers, enclosure types (wall-mounted/ integrated/floor-mounted, housing material, IP protection), manufacturers of components, other technical parameters.
3. When ordering to custom design, design documentation is required: single-line or schematic diagram, specifications of components, drawings. When ordering control cabinets and automation devices, a control system diagram (functional diagram) is required.

To order, please, fill in questionnaire at p. 191.

Approvals

TC RU C-RU.ME67.B.00110

EAC

Control cabinet heater

- An efficient solution for heating switchboard cabinets
- Low temperature protection
- Prevention of condensate formation
- Longer service life of electrical equipment
- High reliability
- Heating power control based on inputs from ambient sensors
- Mounting on a DIN-rail

1. Aluminum radiator
2. Heating element
3. Crossbeam
4. Screw
5. DIN-rail fastener
6. Installation wire
7. Thermal fuse
8. Bimetallic thermostat

Purpose

Anticondensation heating and maintaining a positive temperature inside the cabinet.

Applications

Control cabinet heater (NShU) is intended for improving the reliability of the control equipment in the winter months and for extending its service life.

The heating element is made of a special heat-conducting material. This ensures high heat transfer, significantly reduces weight, improves the electric strength and tightness of the heater.

Radiated heat is evenly distributed over a large surface via the finned metal body of the heater.

The materials used ensure high resistance of the heater to both negative and high positive temperatures.

The installation of the heater is simple and takes little time. Fasteners allow to quickly install the heater inside the cabinet.

Reliability

The heating element is protected by a metal shell on both sides. This provides mechanical protection against damage.

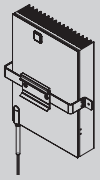
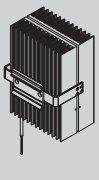
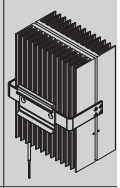
The power cable is of a silicon wire that is resistant to overheating.

Heater materials have high electrical strength and insulation resistance for high reliability.

All heaters are factory tested.

To control the temperature inside the cabinet, the heating system is recommended to be combined with the PT-300 temperature controller, thermostat or hygrostat.

Technical data

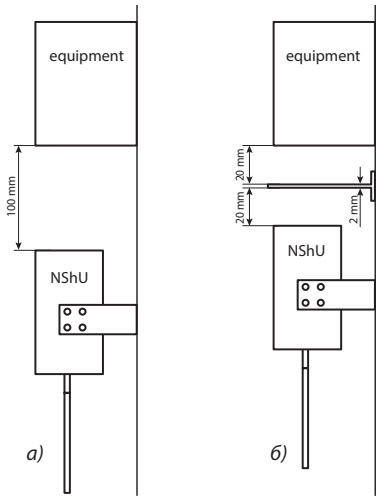
Specifications	NShU-150A	NShU-200A	NShU-300A
			
Dimensions, mm	240×170×50	180×125×80	240×170×80
Supply voltage at a frequency of 50 Hz, V	220 ± 10%		
Rated power*, W	150	200	300
Maximum permissible temperature of the heater surface, °C	125		
Maximum permissible air temperature when the heater is on, °C	+20		
Minimum permissible air temperature when the heater is on, °C	-50		
Installation wire length, m	min 1,5		
Class of electric shock protection (GOST R 52161.1-2004)	I		
Protection type	IP44		
Weight, kg	2.00	1.85	3.40

* Permissible deviation from rated power: +5%; -10%. Rated power is specified at an ambient temperature of +25 °C.

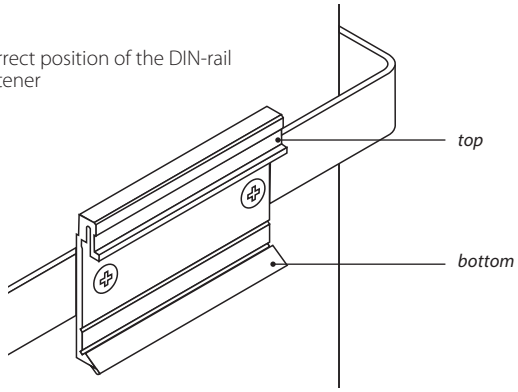
Installation

Installation options:

a) without a heat reflective screen;
b) with a heat reflective screen.



Correct position of the DIN-rail fastener



Delivery kit

	NShU-150A	NShU-200A	NShU-300A
Datasheet combined with installation and operation manual	1	1	1
Heater	1	1	1
Unit package	1	1	1
Crossbar for attachment to a DIN-rail	1	1	1
Screw M3	4	8	8
Washer GOST 6402-70	4	8	8
Washer GOST 10450-78	4	8	8

Approvals

№ RU Д-RU.АБ37.В.11481

Ordering information

Example: Control cabinet heater NShU-150A

① ②

1. Control cabinet heater
2. Heater power, W

Anticorrosion coatings

Primer InWarm Reform EP 0111

- Dense surface texture
- High cathode protection at a layer thickness of 50–70 μm
- No white corrosion and defects in self-applied coatings typical of high-zinc primers
- High resistance to oil products, oils, solvents, sea and fresh water
- Nondrip layer thickness 300 μm
- Can be applied at -15 °C

Technical data

Color	gray, no hue specified
Volume fraction of nonvolatile substances, %	63
Density, g/cm^3	2.6
Estimated consumption (75 μm)	280 g/m^2 (9.3 m^2/l)

Brief description

Two-component primer cured with a polyamide adduct.

Applications

Protection against atmospheric, underground and marine corrosion of steel structures, bridges, marine engineering and port structures, power plants, internal surfaces of steel tanks, oil and oil product pipelines. Can be applied both as a primer in corrosion protection systems and as a standalone coating in industrial and marine environments.

Approvals

№ RU.68.01.03.008.E.000009.05.16

Primer InWarm Reform EP 0121

- High chemical resistance and mechanical strength
- Excellent adhesion
- Resistant to water, salt solutions, lubricants, oil and oil products, sulfur compounds, and mineral fertilizers
- Temperature of the coated surface not higher than 120 °C (short term exposure to up to 150 °C can be tolerated)
- Nondrip layer thickness – 350 μm
- Can be applied at -15 °C

Technical data

Color	gray, red-brown
Volume fraction of nonvolatile substances, %	68
Density, g/cm^3	1.36
Estimated consumption (150 μm)	340 g/m^2 (4.2 m^2/l)

Brief description

A two-component epoxy primer containing zinc phosphate with a polyamide curing agent.

Applications

Intended for protection of the internal surface of tanks, storage of oil and oil products, external protection of underground structures. Used as a primer in epoxy and polyurethane systems or as a standalone coating in the absence of UV exposure for steel, aluminum, zinc and reinforced concrete structures, underwater parts of ship hulls, docks, hydraulic structures, bridges, agricultural machinery, vehicles, pipelines, nuclear power plant, oil refinery equipment, etc.

Approvals

№ RU.68.01.03.008.E.000009.05.16

Primer InWarm Reform EP 0141

- High chemical resistance and mechanical strength
- Excellent adhesion
- Resistant to water, salt solutions, lubricants, oil and oil products
- Nondrip layer thickness 350 μm
- Can be applied at -15 °C

Brief description

A two-component epoxy primer containing zinc phosphate with a polyamide curing agent.

Applications

Anticorrosion protection of metal industrial and civil engineering structures operated in atmospheric conditions in any type of climatic conditions. The primer is compatible with trace heating systems for process equipment, tanks and pipelines of all types.

Technical data

Color	gray, red-brown
Volume fraction of nonvolatile substances, %	63
Density, g/cm^3	1,42–1,45
Estimated consumption (100 μm)	250 g/m^2 (7,7 m^2/l)

Approvals

№ RU.68.01.03.008.E.000009.05.16

Primer InWarm Reform EP 0171

- High chemical resistance and mechanical strength
- Excellent adhesion
- Resistant to water, salt solutions, lubricants, oil and oil products, sulfur compounds and mineral fertilizers
- Temperature of the coated surface not higher than 120 °C (short term exposure to up to 150 °C can be tolerated)
- Nondrip layer thickness 350 μm
- Can be applied at +5 °C
- Electrostatic spark protection

Brief description

A two-component epoxy primer with a polyamide curing agent.

Applications

Anticorrosion protection of internal surfaces of tanks and pipelines for storage light oil products, where electrostatic spark protection requirements apply.

Technical data

Color	dark gray, black
Volume fraction of nonvolatile substances, %	63
Density, g/cm^3	1.2–1.25
Estimated consumption (150 μm)	286 g/m^2

Approvals

№ RU.68.01.03.008.E.000009.05.16

Priming enamel InWarm Reform EP 5191

- High resistance to abrasive wear
- High chemical resistance and mechanical strength
- Excellent adhesion
- Resistant to water, salt solutions, lubricants, oil and oil products, sea water
- Nondrip layer thickness 350 μm
- Can be applied at -15 °C

Applications

Abrasion-resistant anticorrosion protection of metal industrial and civil engineering structures operated in atmospheric conditions in any type of climatic conditions.

Brief description

A two-component epoxy enamel containing glass flakes with a polyamide curing agent.

Technical data

Color	gray, red-brown
Volume fraction of nonvolatile substances, %	69
Density, g/cm^3	1.5–1.7
Estimated consumption (150 μm)	390 g/m^2 (4.1 m^2/l)

Primer InWarm Reform EP 0112

- 2 years service life at a coat thickness of 20–25 microns in a moderately cold climate in an industrial environment.

Applications

Holding primer protection of steel structures, parts and rolled steel.

Used in automated production lines. The coating allows welding without removing the coating. Used for priming surfaces made of steel, non-ferrous metals and alloys in anticorrosion systems.

Brief description

A two-component zinc epoxy primer with a polyamide curing agent.

Technical data

Color	gray
Volume fraction of nonvolatile substances, %	50
Density, g/cm^3	2.2
Estimated consumption (25 μm)	130 g/m^2

Primer InWarm Reform EP 0142

- 2 years service life at a coat thickness of 25 μm in a moderately cold climate in an industrial environment.

Applications

Holding primer protection of steel structures, parts and rolled steel.

Used in automated production lines. The coating allows welding without removing the coating. Used for priming surfaces made of steel, non-ferrous metals and alloys in anticorrosion systems.

Brief description

A two-component zinc epoxy primer with a polyamide curing agent.

Technical data

Color	red-brown
Volume fraction of nonvolatile substances, %	34
Density, g/cm^3	1.2
Estimated consumption (25 μm)	65 g/m^2

Enamel InWarm Reform PU 6211

- Excellent adhesion to epoxy and polyurethane coatings
- Good decorative properties
- UV-resistant

Brief description

Polyurethane two-component enamel, consisting of a base and an aliphatic curing agent.

The coating has good decorative properties and is UV-resistant.

Applications

Anticorrosion protection of structures operated in the atmospheric conditions of all climatic regions, atmospheres and placement categories in accordance with GOST 15150-69.

Used as the top protective and decorative layer in complex systems for the protection of metal structures, external surfaces of reservoirs, pipelines in the oil and gas and petroleum, processing, nuclear and hydraulic power industries, railroad and road transport, bridge structures.

Technical data

Color	RAL
Volume fraction of nonvolatile substances, %	50±2
Density, g/cm^3 for color	1.05–1.15
Finish	glossy
Estimated consumption (DFT = 50 µm)	90 g/m^2 (11 m^2/l)

Approvals

№ RU.68.01.03.008.E.000009.05.16

Primer InWarm Reform PU 0211

- Dense surface texture
- High cathode protection at a layer thickness of 50–70 µm
- No white corrosion and defects in self-applied coatings typical of high-zinc primers
- High resistance to oil products, oils, solvents, sea and fresh water
- Can be applied at -25 °C

Applications

Protection against atmospheric, underground and marine corrosion of steel structures, bridges, marine engineering and port structures, power plants, internal surfaces of steel tanks, oil and oil product pipelines.

Can be applied both as a primer in corrosion protection systems and as a standalone coating in industrial and marine environments.

Brief description

One-component moisture-cured polyurethane primer.

Technical data

Color	gray, hue not specified
Volume fraction of nonvolatile substances, %	70
Density, g/cm^3	2.8
Estimated consumption (80 µm)	320 g/m^2 (8.1 m^2/l)

Enamel InWarm Reform PU 6221

- Dense surface texture
- High elasticity
- High resistance to oil products, oils, solvents, sea and fresh water
- Can be applied at -25 °C

Applications

Protection against atmospheric, underground and marine corrosion of steel structures, bridges, marine engineering and port structures, power plants, internal surfaces of steel tanks, oil and oil product pipelines in industrial and marine environments.

Used as a finishing enamel in corrosion protection systems where there is no UV exposure.

Brief description

One-component moisture-cured polyurethane enamel.

Technical data

Color	RAL
Volume fraction of nonvolatile substances, %	70
Density, g/cm^3	1.4
Estimated consumption (50 µm)	113 g/m^2 (12.3 m^2/l)

Priming enamel InWarm Reform S 1321

- High resistance and mechanical strength
- Excellent adhesion
- Resistant to water, salt solutions, lubricants, oil and oil products
- Can be applied at -25 °C

Brief description

One-component hybrid coating, resistant to UV, oil products, water and aggressive atmospheres C3-C4.

Applications

Coating of steel structures operated in various atmospheric conditions, transport infrastructure facilities, railroad rolling stock.

Technical data

Color	RAL
Finish	matte
Volume fraction of nonvolatile substances, %	47
Density, g/cm^3	1.25
Estimated consumption (80 µm)	185 g/m^2 (6 m^2/l)

Priming enamel InWarm Reform S 1322

- High resistance and mechanical strength
- Excellent adhesion to concrete
- Resistant to water, salt solutions, lubricants, oil and oil products
- Can be applied at -25 °C

Brief description

One-component hybrid coating, resistant to UV, oil products, water and aggressive atmospheres C3-C4.

Applications

Coating of reinforced concrete structures operated in all kinds of regions and climatic conditions.

Technical data

Color	RAL
Finish	matte
Volume fraction of nonvolatile substances, %	47
Density, g/cm^3	1.25
Estimated consumption (80 µm)	185 g/m^2 (6 m^2/l)

Priming enamel InWarm Reform S 1323

- High resistance and mechanical strength
- Excellent adhesion to various surfaces (concrete, ferrous and non-ferrous metals)
- Resistant to water, salt solutions, lubricants, oil and oil products
- Can be applied at -25 °C

Brief description

One-component hybrid coating, resistant to UV, oil products, water and aggressive atmospheres (versions C3-C4).

Applications

Coating of process equipment, structural steel and concrete structures.

Technical data

Color	RAL
Finish	semigloss
Volume fraction of nonvolatile substances, %	47
Density, g/cm^3	1.2
Estimated consumption (80 µm)	185 g/m^2 (6 m^2/l)

Primer InWarm Reform AU 0411

- Barrier and inhibitor protection
- Excellent adhesion to flame retardant compounds
- Forms hard elastic coating
- Short drying time – 3 hours at 20 °C
- Resistant to temperatures from -45 °C to +60 °C
- Resistant to nitro-enamel
- Service life of three years as a standalone coating

Applications

Priming of metal surfaces for various purposes with short drying time required. The primer is compatible with various enamels.

Used as a primer in the following systems: alkyd including various modifications, acrylic, nitrocellulose, polyvinylchloride, epoxy ether, etc. Used as a standalone coating for the temporary protection of steel structures.

InWarm Reform AU 0411 is used to protect various steel structures in civil engineering and industry, in ship maintenance and mechanical engineering as part of a coating system including alkyd-urethane enamels InWarm Reform AU 1421.

Brief description

A suspension of pigments and functional fillers in an alkyd-urethane substance forming a homogeneous matte protective film after drying.

Technical data

Color	gray, red- brown
Volume fraction of nonvolatile substances, %	60
Density, g/cm^3	1.35
Estimated consumption (40 µm)	95 g/m^2 (13 m^2/l)

Enamel InWarm Reform AU 1421

- Barrier protection
- Short drying time – 4 hours at 20 °C and 30 minutes at 70 °C
- Resistant to temperatures from -40 °C to +60 °C
- Resistant to UV radiation, salt water, mineral oils, and other aliphatic hydrocarbons
- Serves as decorative coating for 3 years and as protective coating for 6 years

Applications

Protective and decorative coating of metal surfaces for various purposes with strict requirements to protective and decorative characteristics and minimum drying time.

The enamel forms a smooth, glossy, weather-resistant coating that is resistant to sea water, mineral oil and aliphatic hydrocarbons.

InWarm Reform AU 1421 is recommended for the protection of metal surfaces of agricultural machinery, railroad rolling stock, gas station equipment, ship superstructures protection of other metal surfaces operated outdoors and indoors.

The enamel is recommended for application in combination with the primer InWarm Reform AU 0411.

Brief description

A suspension of pigments and functional fillers in an alkyd-urethane substance forming a homogeneous gloss protective film after drying.

Technical data

Color	RAL
Finish	glossy
Volume fraction of nonvolatile substances, %	52,2
Density, g/cm^3	1.15–1.25 (depending on color)
Estimated consumption (40 µm)	75 g/m^2 (15 m^2/l)

Priming enamel InWarm Reform AU 1431

- Barrier and inhibitor protection
- Excellent adhesion to steel and concrete structures
- Short drying time – 4 hours at 20 °C and 30 minutes at 70 °C
- Resistant to temperatures from -40 °C to +60 °C
- UV-resistant
- Service life of the coating in an industrial environment in a temperate or cold climate – 6 years

Applications

Protective and decorative coating of metal and concrete surfaces for various purposes with short drying time required.

Applied on unprimed surfaces. InWarm Reform AU 1431 forms a smooth (semimatte, glossy) weather-resistant coating, resistant to temporary exposure to weak solutions of acids, alkalis and oil products.

Recommended for the protection of concrete and metal surfaces of agricultural machinery, railroad rolling stock, ship superstructures and for the protection of concrete and metal surfaces operated outdoors.

Brief description

A suspension of pigments, anticorrosion and functional fillers in an alkyd-urethane substance forming a homogeneous matte decorative and protective film after drying.

Technical data

Color	RAL
Volume fraction of nonvolatile substances, %	52±2
Density, g/cm^3	1.25
Estimated consumption (40 μm)	90 g/m^2 (13 m^2/l)
Finish:	
semi-matte	20–35
glossy	40–50

Enamel InWarm Reform AF 5511

- Self-polishing coating
- Does not contain tin and lead
- Service life of a 100 µm coating – 3 years
- Can be applied at -25 °C

Applications

Used for underwater hull protection in deep-sea vessels.

Brief description

One-component material based on a vinyl polymer modified with epoxy resin.

Technical data

Color	brown
Volume fraction of nonvolatile substances, %	64
Density, g/cm^3	1.4
Estimated consumption (100 µm)	180–250 g/m^2

Enamel InWarm Reform AF 5521

- Durability: service life of the coating on the underwater hull up to 60 months
- Removal from fouling during vessel travel and when docked
- Unsusceptible to deterioration by microorganisms
- Retains its protective properties in fresh, salty water and during vessel storage out of water
- Easily polishable during maintenance
- High efficiency: keeps the surface smoother longer improving the vessel speed and fuel efficiency
- Increases the docking interval
- Environmentally friendly: no emissions in the sea (no biocides), reduction of greenhouse gas emissions into the air due to reduced consumption of fuel, low in volatile organic compounds (⩽ 75 g/l)

Brief description

A two-component material based on a hybrid siloxane with a high dry residue value.

The enamel forms a smooth coating with low surface energy, which does not contain copper, tin, biocides and meets the requirements of the 2001 International Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention 2001).

Can be applied directly onto a worn antifouling coating.

Applications

Protection of the underwater hull of ocean-going vessels traveling at speeds above 8 knots, offshore stationary platforms, hydraulic structures, bridges and other metal and concrete structures operated under water and exposed to biofouling.

Technical data

Color	RAL
Volume fraction of nonvolatile substances, %	82±2
Density, g/cm^3	1.23–1.25
Tack-free drying time up to level 3 at t (20 ± 2) °C, h, max	6
Estimated consumption (125 µm)	190 g/m^2 (6.7 m^2/l)
Full cure at t (20±2)°C, h	24

Thermal shielding membrane InWarm Reform Industrial

- Reduces the surface temperature
- Acts as an additional seamless thermal insulation layer
- Reduces the effect on thermal insulation materials of shock thermal loads (cyclic, abrupt temperature shocks)
- Protects the staff from burns
- Due to low weight, does not exert any additional stress on equipment, pipelines, and machines
- Can be applied in hard-to-reach places and onto shaped surfaces
- Eliminates condensate
- Acts as an additional barrier between the metal surface and corrosive environment under the thermal insulation
- Prevents cracking of the primer layers due to alternating loads, vibrations
- Water-repellent properties

Approvals

C-RU.ПБ37.В.01553

Brief description

A low density paste. Can be applied by spraying, has thermal shielding properties. Forms in a dry thin layer a structure with closed pores filled with rarefied air whose volume fraction is up to 85%.

Applications

- Pipelines
- Vessels
- Furnaces
- Tanks, storage containers
- Machines and equipment
- Basement, underground areas
- Technical areas with various functions

Technical data

Appearance	homogeneous paste-like mass white
Drying time of the film surface (tack-free) up to level 3 at (20 ± 2) °C, min., max	60
Density, g/cm^3	0.55–0.65
Resistance to variable temperatures from -40 to +60 °C	unchanged
Resistance to temperature of +200 °C over 1.5 hours	no bubbles, cracks, detachments
Thermal conductivity, W/m·K at 20 °C, max	0.068

Industrial thermal insulation InWarm

- SYNTHETIC FOAM RUBBER
- BASALT ROCK WOOL

InWarm Flex BT in tubes and rolls

Brief description

Universal thermal insulation material made of synthetic foam rubber with a closed cellular structure.

The material retains its properties during the entire service life and does not require maintenance.

Applications

The material is intended for use in industrial pipelines, tanks, refrigerators, cryogenic equipment, ventilation systems and air conditioning systems.

Technical data

Item	Value
Operating temperature, continuous operation, °C	–200 to +105
Thermal conductivity coefficient, W/(m·°C) at, °C*	0.032 (at -40 °C)
	0.034 (at -20 °C)
	0.036 (at 0 °C)
	0.038 (at +20 °C)
Resistance to water steam diffusion (μ factor) (GOST R EN 12086)	⩾7000
Fire safety (GOST 30244-94)	G1
Acidity index (pH) (EN 13468)	Neutral
Oil and gasoline resistance	high

Versions

Tubes* (nominal dimensions)

Thickness, mm	Inside diameter, mm
6–50	6–170

Rolls* (nominal dimensions)

Thickness, mm	Width, mm
3–50	1000

* To be confirmed with SST Group office.

Approvals

C-RU.ПБ37.В.01697

InWarm Flex PH in tubes and rolls

Brief description

Thermal insulation material made of synthetic foam rubber with a closed cellular structure.

The material retains its properties during the entire service life and does not require maintenance.

Applications

The material is intended for high temperature surfaces, gas pipelines, heating system pipelines, steam and boiler equipment, oil pipelines, etc.

Technical data

Item	Value
Operating temperature, continuous operation, °C	–200 to +105
Thermal conductivity coefficient, W/(m·°C) at, °C*	0.034 (at -40 °C)
	0.036 (at -20 °C)
	0.038 (at 0 °C)
	0.040 (at +20 °C)
Resistance to water steam diffusion (μ factor) (GOST R EN 12086)	≥4000
Fire safety (GOST 30244-94)	G1
Environmental safety	asbestos-free
Oil and gasoline resistance	high

Versions

Tubes* (nominal dimensions)

Thickness, mm	Inside diameter, mm
9–32	10–133

Rolls* (nominal dimensions)

Thickness, mm	Width, mm
10–50	1000

* To be confirmed with SST Group office.

Approvals

C-RU.ПБ37.В.01697

Protective liner InWarm Flex AluArm

Brief description

The protective liner InWarm Flex AluArm is a flexible aluminized coating material.

Available as a liner system composed of thermal insulation materials InWarm Flex BT and PH.

Applications

The material is used to protect thermal insulation materials from UV radiation, mechanical and atmospheric impacts.

Technical data

Item	Value
Thickness, μm	280
Specific weight, kg/m^2	0.4
Application temperature without mechanical impacts, °C	-60 to +100
Flammability group (GOST 30244-94)	G1
Resistance to mechanical impacts	high resistance to punctures and ruptures
Resistance to UV radiation	excellent
Ozone resistance	excellent
Health safety	does not contain dust and fibers

Protective liner InWarm Flex PolyArm

Brief description

The protective liner InWarm Flex PolyArm is a polymeric lining material. Available as a liner system composed of thermal insulation materials InWarm Flex BT and PH.

Applications

The material is intended for use as a protective lining of outdoor thermal insulation systems, in indoor areas and tunnels exposed to aggressive environmental factors, for protection against UV radiation and mechanical impacts.

Technical data

Item	Value
Thickness, µm	1000
Density, kg/m^3	~1650
Application temperature without mechanical impacts, °C	- 60 to +75
Flammability group (GOST 30244-94)	G1
Water steam diffusion	resistant
Resistance to UV radiation	excellent
Ozone resistance	excellent
Resistance to mechanical impacts	high
Elongation at failure, %	min 200

Cylinder InWarm Wool SF

Brief description

A thermal insulation cylinder made of basalt mineral wool. Cylinders are also available laminated with reinforced aluminum foil (AluArm).

Laminated cylinders have a self-adhesive foil overlap to simplify installation.

Applications

Thermal insulation of process pipelines in various industries (including food industry) and in the construction. Maximum operating temperature is +650 °C. Flammability group – NG (KM0) (GOST 30244-94).

Used in civil engineering in greenfield and brownfield projects and for thermal insulation of pipelines. Can be used in round pipelines as a thermal insulation and vapor barrier layer.

Technical data

Item		InWarm Wool SF-80	InWarm Wool SF-120
Density, kg/m^3		70–110	110–140
Thermal conductivity, W/(m·K), max	10 °C	0.036	0.036
	25 °C	0.038	0.038
	125 °C	0.053	0.05
Flammability group		KM0	KM0
		NG	NG
Flammability group AluArm		G1	G1

Versions*

Length, mm	Inside diameter, mm	Thickness, mm
1200	18–324	20–120

* On request, cylinders of other lengths are available.

Cylinders InWarm Wool are available in following versions:

- non-laminated;
- laminated on the outside with aluminum reinforced foil (AluArm).

Laminated cylinders have a self-adhesive foil overlap to simplify installation.

Approvals

РОСС RU.МО10.Н01626

С-RU.ПБ68.В.02158

Insulation mat InWarm Wool Tech-40

Brief description

Unstitched mat of hydrophobized basalt rock wool.

Applications

Thermal insulation of air ducts, gas ducts, electrostatic precipitators, tanks, boilers, process and power equipment, flat vertical and horizontal surfaces in various industries (excl. the food industry) and utility systems in housing construction and civil engineering, heating systems, trunk and industrial pipelines.

Technical data

Item		InWarm Wool Tech-40
Density, kg/m^3		40±5
Thermal conductivity, W/(m·K), max	10 °C	0.034
	25 °C	0.037
	125 °C	0.060
Compressibility, %, max		50
Elasticity, %, min		–
Humidity, % by weight, max		2
Share of organic substances, % by weight, max		2
Nominal dimensions, (L×W×T), mm		3500×1200×50–100

Approvals

РОСС RU.МО10.Н01628

С-RU.ПБ68.В.02159

Support ring InWarm Wool SF-L

Brief description

A novel product with no analogs available in the market.

InWarm Wool SF-L support rings are innovative spacers designed to reinforce the pipeline structure and compensate for the mechanical stress acting on InWarm Wool thermal insulation mats from the metal casing side. A high quality solution manufactured to the current fire safety standards and providing the heat insulation.

Applications

Used in pipelines, where InWarm Wool mats are used as the main thermal insulation layer.

InWarm Wool SF-L support ring is an alternative to metal braces and plastic spacers, whose installation involves some difficulties.

Technical data

Item	Value*
Grade	135
Density, kg/m^3 (depending on the source material)	116…135
Thermal conductivity**, W/m·K, at 25 °C, max	0.038
Compressive strength at 10 % strain, kPa, min	15
Compressive strength at 10 % strain, after sorption humidification, kPa, min	9
Share of organic substances, % by weight, max	4.5
Water absorption at full submersion, % by volume, max	1.5
Humidity, % by weight, max	0.5

* Values for uncoated base materials are indicated.

** Maximum thermal conductivity is indicated for standard grades (for other grades, thermal conductivity depends on the properties of the thermal insulation used as a source material).

Versions***

Width, mm	Inside diameter, mm	Thickness, mm
50, 100	18–324	20–200

*** On request rings of other diameters are available.

Approvals

C-RU.ПБ74.В.00355

Stitched mat InWarm Wool BT

Brief description

Non-flammable thermal and acoustic insulation mat of basalt rock wool. On the one side the mat is laminated with a galvanized or steel mesh and stitched with metal wire to add rigidity and facilitate installation. Also available with a one-sided non-reinforced or reinforced aluminum foil lining.

Applications

In civil engineering, greenfild and brownfield projects for thermal, acoustic insulation, fire protection of air ducts, for insulation of high-temperature equipment and complex geometry equipment, pipelines, steam pipelines, gas ducts, electrostatic precipitators. Can be applied at insulated surface temperatures up to +750 °C. Certified as a flame retardant lining for air ducts.

Technical data

Indicator		InWarm Wool BT		
		50	80	100
Density, kg/m^3		50	80	100
Application temperature, °C		up to 750		
Thermal conductivity, W/(m·K), max	10 °C	0.034	0.035	0.034
	25 °C	0.037	0.038	0.037
	125 °C	0.056	0.050	0.049
Compressibility, %, max		45	25	20
Elasticity, %, min		85	90	90
Humidity, % by weight, max		2	2	2
Share of organic substances, % by weight, max		2	2	2
Nominal dimensions, (L×W×T), mm		2400×1200×50–100	2400×1200×30–100	

InWarm Wool mat

Brief description

Rock wool thermal insulating mats are rigid mats of basalt rock wool with/without a liner.

Applications

Used as thermal and acoustic insulation of air ducts, gas ducts, electrostatic precipitators, vessels, boilers, tanks, process equipment, flat vertical and horizontal surfaces, furnaces in various industries and in utility systems in housing construction and civil engineering, in structures and systems operated in non-aggressive, slightly aggressive or moderately aggressive air environments.

Technical data

Item		InWarm Wool					
		40	60	80	100	120	150
Density, kg/m^3		30-50	50-70	70-85	95-110	110-135	135-170
Thermal conductivity, W/(m·K), max	10 °C	0.036	0.036	0.033	0.035	0.036	0.038
	25 °C	0.039	0.038	0.037	0.037	0.038	0.040
	125 °C	0.056	0.050	0.053	0.051	0.050	0.051
Compressive strength at 10% strain, kPa		–	–	6	10	15	20
Share of organic substances, % by weight, max		3	3	3	3	3	3
Water absorption at full submersion, % by volume, max		1.5	1.5	1.5	1.5	1.5	1.5
Nominal dimensions, (L×W×T), mm		1200×600×50–100					

Versions

Mats InWarm Wool 40, 60, 80, 100, 120, 150 are available with a length of 1200 mm and width of 600 mm. On request, the other sizes are available.

Following InWarm Wool versions are available:

- non-laminated;
- laminated on one side with aluminum foil (Alu – aluminum foil; AluArm – reinforced aluminum foil);
- laminated with fiberglass.

Certification

SST Group holds all necessary licenses for installation and maintenance of cable heating systems. All our products – heating cables, ready-made heating sections including heating cable, couplings and installation wires, control equipment, and accessories – come with valid certificates of conformity and fire safety certificates.

Most products are certified for use in explosion hazard areas. Details are given in the technical data sheets.

Self-regulating cables are certified to IEC Ex: IECEx CCVE 17.0006U, IECEx CCVE 17.0007X.

Self-regulating heating cables are compliant with the EU Directive ATEX 2014/34/EU regulating the operation of electrical equipment in explosive environments (certificates Sira 17ATEX3335U and Sira 18ATEX3038X).

The heating system based on skin-effect IRHS–15000 is certified to IECEx (certificate IECEx CCVE 18.0002X), ATEX (DEKRA 18ATEX033 X).

IRHS-15000 has certificate of compliance with the Customs Union Technical Regulation 012/2011 on the safety of equipment for operation in explosion hazard atmospheres with explosion protection marking of its components: No. TC RU C-RU.AA87.B.00495.

Teplomag electric heating system has certificate of compliance with the Customs Union Technical Regulation 012/2011 on the safety of equipment for operation in explosion hazard atmospheres with explosion protection marking of its components: № TC RU C-RU.ГБ04.B.00249.

SST Energomontazh holds permit to deliver a particular type or types of work affecting the safety of capital construction projects: No. P–2.0192/03.

Products	Certificates			
	EAC		Ex	Other
Self-regulating electric heating cables HTB, HTM, HTA, HTP, BTC, BTX, CTE	+	+	+	+
Heating cable sections TOOE, TMOE, TSOE, SMBE, TMTE	+	+		
Electric heating system IRHS-15000 (based on skin-effect)	+	+	+	+
Electric heating system Teplomag	+			
Junction boxes PTB 40*, PTB 60*, PTB 100*, PTB 40*-IS, PTB 60*-IS	+			+
Series-resistance electric heating cables LLS, SNF	+	+		
High temperature heating cables BHO, BHS	+			
Heat-conducting paste SILARM				Добровольная сертификация
Electronic temperature controllers PT-300, PTM-2000	+			
Measurement and converter unit PTB/IPM	+			
Industrial thermal insulation InWarm Flex		+		Добровольная сертификация
Low-voltage electric cabinets	+			

Questionnaires

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Heat tracing systems

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Name
Location*
Available design documentation for heated object ◯ Yes ◯ No
Installer
Responsible representative | Phone

3 Type of design works*

☐ Thermotechnical stage (TTS) (installation drawings and cabinets one-line diagrams)
☐ Electrotechnical stage (ETS) (electric networks laying diagrams, cable record)
☐ Automation (ACS - automated control systems) (a possibility of centralized control and data transfer to the higher level)
☐ Thermal insulation (TI) (equipment thermal insulation drawings, list of equipment to be installed)

4 Purpose of the system

☐ Freeze protection
☐ Temperature maintenance
☐ Anti-condensate heating
☐ Heating-up Time of heating ____ hours Initial temperature ____ °C

5 Temperature conditions

____ °C, Required pipe temperature*
____ °C, Minimum ambient temperature
____ °C, Maximum ambient temperature
____ °C, Standard process-oriented temperature* (Product temperature under standard operational conditions)
____ °C, Maximum process-oriented temperature* (The highest process-oriented temperature the product may occasionally attain)
____ °C, Maximum allowed product temperature* (The product highest temperature having no adverse effect on the product properties)
____ °C, Minimum activation temperature* (The lowest temperature, which enables activation of the heating system)

6 Steaming*

____ °C, Maximum steam temperature in case an object steaming is stipulated

7 Environment

◯ Normal (water, household wastewater) ◯ Corrosive (oil, lube oils, industrial wastes)

8 Pipeline location*

☐ Open air
☐ Indoors
☐ Underground Depth ____ m Soil

9 Cabling

◯ External ◯ Internal

10 Heat insulation type*

☐ Mineral wool
☐ Foamed rubber
☐ Preinsulated pipes
☐ Other, heat conductivity coefficient ____ W/m•°C

11 Heat insulation installation

☐ Onsite
☐ Preinsulated pipes

12 Zone classification

☐ Safe
☐ Explosion hazardous

13 Pipe material*

☐ Carbon steel
☐ Plastic
☐ Stainless steel
☐ Other, heat conductivity coefficient ____ W/m•°C

14 Parameters of pipeline*

Pipeline	1	2	3	4	5
Pipeline name					
Pipeline diameter					
Heat insulation thickness, mm					
Pipe length, m					
Quantity of valves, pcs					
Quantity of flanges, pcs					
Quantity of pipe supports, pcs					
Pumped product					
Product density, kg/m³					
Product heat capacity, J/(kg•°C)					

15 Further information

Date*

* Required field (mandatory for completion).

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Heating of tanks

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Name
Location*
Available design documentation for heated object
Installer
Responsible representative | Phone

3 Type of design works*

☐ Thermotechnical stage (TTS) (installation drawings and cabinets one-line diagrams)
☐ Electrotechnical stage (ETS) (electric networks laying diagrams, cable record)
☐ Automation (ACS - automated control systems) (a possibility of centralized control and data transfer to the higher level)
☐ Thermal insulation (TI) (equipment thermal insulation drawings, list of equipment to be installed)

4 Purpose of the system*

☐ Freeze protection
☐ Temperature maintenance
☐ Anti-condensate heating
☐ Heating-up Time of heating ____ hours Initial temperature ____ °C

5 Temperature conditions

____ °C, Required vessel temperature*
____ °C, Minimum ambient temperature
____ °C, Maximum ambient temperature
____ °C, Standard process temperature* (Product temperature under standard operational conditions)
____ °C, Maximum process temperature* (The highest temperature the vessel may occasionally attain)
____ °C, Maximum allowed product temperature* (The product highest temperature having no adverse effect on the product properties)
____ °C, Minimum activation temperature* (The lowest temperature, which enables activation of the heating system)

6 Steaming

____ °C, Maximum steam temperature in case an object steaming is provided

7 Object location*

☐ Open air
☐ Indoors
☐ On the soil
☐ On supports, their design:

8 Cabling*

☐ External
☐ Internal
Distance to heating control point ____ m
Distance to power supply point ____ m

9 Heat insulation type*

☐ Mineral wool (mats) Thickness ____ mm
☐ Others, heat-conductivity factor ____ W/m•°C

10 Zone classification

☐ Safe
☐ Explosion hazardous (zone classification)

11 Vessel material*

☐ Carbon steel
☐ Plastic
☐ Stainless steel
☐ Other, heat conductivity coefficient ____ W/m•°C

12 Parameters of the vessel*

☐ Horizontal ☐ Vertical Fullness coefficient
Diameter ____ mm Height ____ mm Walls thickness ____ mm
Fittings and hatches:
Type of cover: ☐ Flat ☐ Spherical ☐ Conic Cover height ____ m

13 Parameters of the product

Name*
Density ____ kg/m³
Viscosity ____ kg/m•s at a temperature ____ °C
Heat capacity ____ J/kg•°C
Discharge ____ m³/h ☐ Continuous ☐ Cyclic

14 Further information

Date*

* Required field (mandatory for completion).

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Heat racing system IRHS-15000 based on skin-effect for pipelines

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE (INCLUDES ATTACHMENT FOR PACKAGE TRANSFORMER SUBSTATION DESIGN)

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Name
Location*
Available design documentation for heated object ◯ Yes ◯ No
Installer
Responsible representative | Phone

3 Type of design works*

☐ Thermotechnical stage (TTS) (installation drawings and package transformer substation (PTS) diagrams)
☐ Automation (ACS – automated control systems) (a possibility of centralized control and data transfer to the higher level)
☐ Electrotechnical stage (ETS) (electric networks laying diagrams, cable record)
☐ Thermal insulation (TI) (equipment thermal insulation drawings, list of equipment to be installed)

4 Purpose of system

☐ Freeze protection ☐ Anti-condensate heating
☐ Temperature maintenance ☐ Heating-up Time of heating ____ hours Initial temperature ____ °C

5 Temperature conditions

____ °C, Required pipeline temperature*
Minimum ambient temperature minus ____ °C, maximum ambient temperature ____ °C
____ °C, Standard process temperature* (Product temperature under standard operational conditions)
____ °C, Maximum process temperature* (The highest temperature the vessel may occasionally attain)
____ °C, Maximum allowed product temperature* (The product highest temperature having no adverse effect on the product properties)
____ °C, Minimum activation temperature* (The lowest temperature, which enables activation of the heating system)

6 Pipeline location*

☐ Open air
☐ Subsea
☐ Buried Laying depth ____ m Soil ____
With pipeline laying depth of over 0.7m from the soil surface, specify the average temperature of the coldest month ____ °C

7 Heat insulation installation*

☐ In plant conditions ☐ Onsite

8 Heat insulation type*

☐ Mineral wool ☐ Foamed polyurethane
☐ Foamed rubber ☐ Other, heat conductivity coefficient ____ W/m•°C

9 Supply points location*

☐ From one end of heated area ☐ Others ____
☐ From both ends Distance from power supply point to the beginning of heated area* ____ m

10 Zone classification

☐ Safe ☐ Explosion hazardous (area classification)

11 Pipe material*

☐ Carbon steel ☐ Stainless steel
☐ Plastic ☐ Other, heat conductivity coefficient ____ W/m•°C

12 Parameters of pipelines*

Pipeline	1	2	3	4	5
Pipeline name					
Pipe outer diameter, mm					
Pipe wall thickness, mm					
Heat insulation thickness, mm					
Pipe length, m					
Number of valves, pcs					
Number of flanges, pcs					
Number of pipe supports, pcs					

13 Further information

More detailed further information can be entered in the Attachment

Date*

* Required field (mandatory for completion).

Please make sure to fill in the Attachment!

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Heat racing system IRHS-15000 based on skin-effect for pipelines

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

ATTACHMENT TO THE QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Name
Location*
Available design documentation for heated pipeline ◯ Yes ◯ No
Installer
Responsible representative | Phone

3 PTS design

☐ Kiosk type without heat insulation and heating
☐ Kiosk type with heat insulation and heating

4 Supply lead

☐ Cable
☐ Aerial
☐ Others

5 Installation

☐ On soil
☐ On supports

6 Fire fighting system

☐ Indication ☐ Automatic
☐ Fire extinguisher ☐ Others:

7 Ventilation system

☐ Natural draft ☐ Air conditioner
☐ Forced draft ☐ Others:

8 Remote control

☐ Yes
☐ No ☐ Others:

9 Telemetry

☐ Signaling ☐ Monitoring
☐ Control ☐ Others:

10 Earthing

☐ Horizontal
☐ Vertical ☐ Others:

11 Energy accounting

☐ Yes
☐ No ☐ Others:

12 Transformer type

☐ Oil filled
☐ Dry

13 Protection type

☐ Relay module
☐ Electronic module

14 System's power supply parameters*

☐ Diesel generator
☐ Power line
☐ Others

Supply voltage ____ V
Frequency ____ Hz
Number of phases ____

15 Further information

Date* ____

* Required field (mandatory for completion).

Please make sure to fill in the Questionnaire!

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Electric heaters

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site*

Site name
Location*
Available design documents ◯ Yes ◯ No

3 Purpose of the heater*

◯ Heating of indoor areas
◯ Anticondensation heating
Type I – Air heater

◯ Maintenance of process temperature
◯ Substance heating
Type II – Immersion heater

◯ Maintenance of process temperature
◯ Substance heating
Type III – Inline heater

4 Substance*

Pumped substance
Flow rate, m^3/h
Thermal conductivity coefficient, W/(m•°C) | Required heating time ____ h

Physical state of the substance

Phase transition during heating ☐ Yes ☐ No

Operating pressure P, bar | Permissible pressure difference, bar
Density at P_{op}, kg/m^3 | Design plant pressure, bar
Thermal capacity at P_{op}, J/(kg•°C)
Viscosity, Pa•sec or m^2/sec

5 Temperature conditions*

____ °C, Desired substance temperature (for Type I)*
____ °C, Min ambient temperature
____ °C, Max ambient temperature
____ °C, Initial substance temperature
____ °C, Normal process temperature*
(substance temperature at normal operating conditions)
____ °C, Max process temperature*
(highest potential substance temperature)
____ °C, Max permissible substance temperature*
(max substance temperature not affecting its properties)
____ °C, Min activation temperature*
(lowest temperature of activating the heating system)
____ °C, Max steam temperature (if steaming is required)

6 Site location*

☐ Outdoor
☐ Indoor | Min indoor temperature ____ °C | Room volume ____ m^3
☐ Underground | Depth ____ m | Soil
If the pipeline is laid deeper than 0.7 m from the day surface, indicate the average temperature of the coldest month ____ °C

7 Thermal insulation

Mineral wool
Thickness ____ mm | Thermal conductivity coefficient ____ W/m•°C

8 Area classification

☐ No explosion hazard ☐ Explosion hazard | Gas group | Temperature class

9 Tank parameters

Material | Filling ratio
◯ Horizontal | Dimensions | Length ____ mm × Width ____ mm × Height ____ mm
◯ Vertical

10 Additional details

Date*

* Required field (mandatory for completion).

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Low-voltage electric switchboards

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail
Phone

2 General data*

NKU name (purpose in brief)
Diagram sequence number (for typified product)
Earthquake intensity as per MSK-64
Seismic safety group according to GOST 30546.1-98
Location of installation ◯ Outdoors ◯ Indoors
Minimum ambient temperature minus ☐ °C, maximum ambient temperature ☐ °C
Protection rating IP ☐ Climatic version according to GOST 15150-69 ☐
Power cables lead ☐ From top ☐ From bottom
Power cables cross section ☐ mm²
Cables lead from load ☐ From top ☐ From bottom
Cables cross section from load ☐ mm²
Number of phases ☐ Supply voltage ☐ V Frequency ☐ Hz
Power supply category ☐
Earth system ☐ TN-S ☐ TN-C ☐ TN-C-S
Version by installation method ☐ On-floor ☐ Hinged ☐ Built-in
Dimensions of body, mm ☐ Height × ☐ Width × ☐ Depth
Version of front door
Version of back door
Equipment element base ◯ Hager ◯ ABB ◯ SE ◯ Legrand ◯ ETI Others
Rated power output of load, maximum ☐ kW Starting current, maximum ☐ A

3 Control

Equipment type ☐ None ☐ Temperature controllers ☐ PLC
Data transfer protocol ☐ Data transfer interface ☐

4 Auxiliary equipment

Fiscal metering device	◯ Yes	◯ No
Input amperemeter	◯ Yes	◯ No
Input voltmeter	◯ Yes	◯ No
Ventilation system	◯ Yes	◯ No
Cabinet lighting system	◯ Yes	◯ No
Cabinet heater	◯ Yes	◯ No

5 Further information

Date* ☐

* Required field (mandatory for completion).

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Preventing wax deposits in oil wells: Stream Tracer™

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 General information*

Company
Oil field name
Well ID
Mode of operation
Well depth ____ m
The diameter of the production string ____ mm
Diameter of PSP (Pressure-compressor pipe) ____ mm
Depth of suspension of PSP ____ m

2 Temperatures distribution by the depth

Oil layer temperature ____ °C
Permafrost depth ____ m
Average temperature of the coldest month ____ °C
Maximum temperature of the warmest month ____ °C

3 Stratum fluid details

Water percentage ____ %
Paraffin percentage ____ %
The gas factor ____ m^3/ton
Beginning temperature of paraffin's deposition ____ °C

4 Well operation mode

Static level ____ m
Fluid debit (with clean PSP) ____ m^3 /day
Oil debit ____
Minimum fluid debit ____
Dynamic level ____ m
Fluid temperature at wellhead ____ °C
The maximum depth of the heavy oil's deposits ____ m

5 Well site's data

Type and size of wellhead flange for lubricator installation
Explosive area borders during maintenance mode and normal operation mode
Power supply available for heating system (voltage, power)

6 Data for evaluation of the heating effectiveness

Well maintenance schedule ____ times per year
The period between cleaning of SPS from heavy oils ____ times per year
PSP cleaning method

Data provided by (name, position)*
Phone, e-mail*

* Required field (mandatory for completion).

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Truncated pyramid hopper

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Project name
Location (Country)

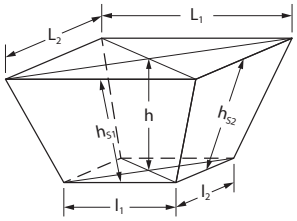
3 Site conditions

Ex area and temperature classification
Available power supply
Type of thermostat: ☐ Capillary ☐ Digital ☐ Process control systems
Thermostat location: ☐ Power distribution panel ☐ Mounted on vessel

4 Vessel parameters

Pyramid Height (h)
If known, length of h_{S1}
If known, length of h_{S2}
Pyramid length (L_1)
Pyramid length (L_2)
Pyramid length (l_1)
Pyramid length (l_2)
Total fill height (h)
Wall material
Wall thickness in mm
Insulation material
Insulation thickness in mm

Truncated Pyramid Hopper



Please provide technical drawings to include:

Pyramid dimensions
Supports / Feet
Reinforcemets / Insulation brackets
Manholes
Mark-up of area to be heated

5 Temperature conditions

Minimum ambient temperature °C
Vessel wall maintenance temperature °C
Maximum process temperature of vessel °C

6 Vessel wall heat raise conditions

Starting temperature °C
End temperature °C
Desired heat raise time hours

7 Quotation requirements

Latest date the quotation is required
Required goods delivery date
Language (German or English)
Country and City for delivery of goods

Extent of quoation:

Heating materials and accessories
Measurement and control
Power control panel
Supervision
Installation
Commissioning of the system

* Required field (mandatory for completion).

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Cylindrical vessel with cone

Please fill out and send us this questionnaire containing the parameters required to design the electric heating system. We will respond with a detailed quote.

QUESTIONNAIRE

1 Customer*

Company
Name | Surname
Phone | E-mail

2 Site object*

Project name
Location (Country)

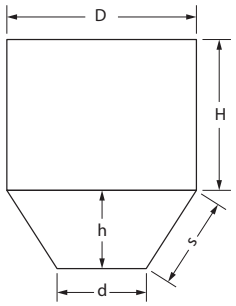
3 Site conditions

Ex area and temperature classification
Available power supply
Type of thermostat: ☐ Capillary ☐ Digital ☐ Process control systems
Thermostat location: ☐ Power distribution panel ☐ Mounted on vessel

4 Vessel parameters

Vessel diameter (D)
Vessel height (H)
Cone diameter (d)
Cone height (h)
Total fill height (h+H)
Wall material
Wall thickness in mm
Insulation material
Insulation thickness in mm

Cylindrical vessel with cone



Please provide technical drawings to include:

Vessel dimensions
Supports / Feet
Reinforcemets / Insulation brackets
Manholes
Mark-up of area to be heated

5 Temperature conditions

Minimum ambient temperature °C
Vessel wall maintenance temperature °C
Maximum process temperature of vessel °C

6 Vessel wall heat raise conditions

Starting temperature °C
End temperature °C
Desired heat raise time hours

7 Quotation requirements

Latest date the quotation is required
Required goods delivery date
Language (German or English)
Country and City for delivery of goods

Extent of quoation:

Heating materials and accessories
Measurement and control
Power control panel
Supervision
Installation
Commissioning of the system

* Required field (mandatory for completion).

Notes

Notes

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