

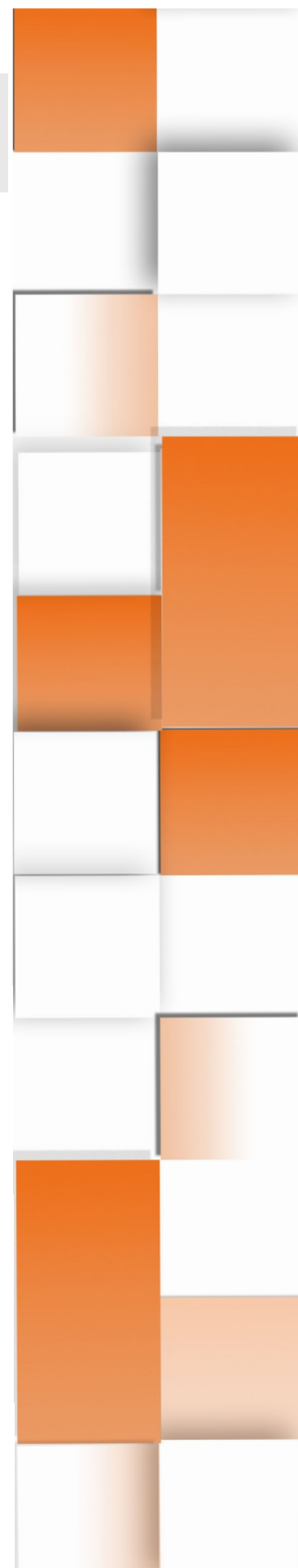
PRODUCT CATALOG



**CONTROL, MONITORING, DIAGNOSTICS FOR
POWER AND DISTRIBUTION TRANSFORMERS**

2023

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ABOUT THE COMPANY

ATF factory is a manufacturing company producing modern, technologically advanced components and equipment for power and distribution transformers since 2005. Today we produce a wide range of quality components and comprehensive solutions. Among our customers there are all the biggest transformer factories in Russia, we successfully export our products to CIS countries, Europe, Middle East and Latin American countries.

The geography of our deliveries is 17 countries as for the moment.

Our achievements

We have created 25 product lines, and 7 more unique for Russia product groups are under development;

1

We have obtained a license from Rosatom for design and manufacture of equipment. We have passed all audits of the largest transformer plants;

2

We have registered as systemic company;

3

We have won the national award «Business Success» in the nomination «Best Export Project of Russia 2022»;

4

We have won the national Business Success Award in the category «Best Manufacturing Project 2022 in the Region»

5

We have taken the 2nd place in the regional contest «Exporter of the Year in Industry and High Technology sphere»;

6

We have been doubling all of our financial performance every year for the past 8 years

7

The "ATF" factory now:





All products manufactured by "ATF" factory have all necessary certificates of conformity. The quality management system and compliance with all standards are confirmed not only by certificates, but also by our customer's audits. We have received a license from Rosatom company for design and manufacture of equipment for nuclear stations. We are regularly audited by the largest transformer plants in Russia.

The main competitive advantage is the development of our own test benches for all product groups. And direct testing of each device before shipment to the customer.

NO DEVICE LEAVES THE FACTORY UNTESTED!

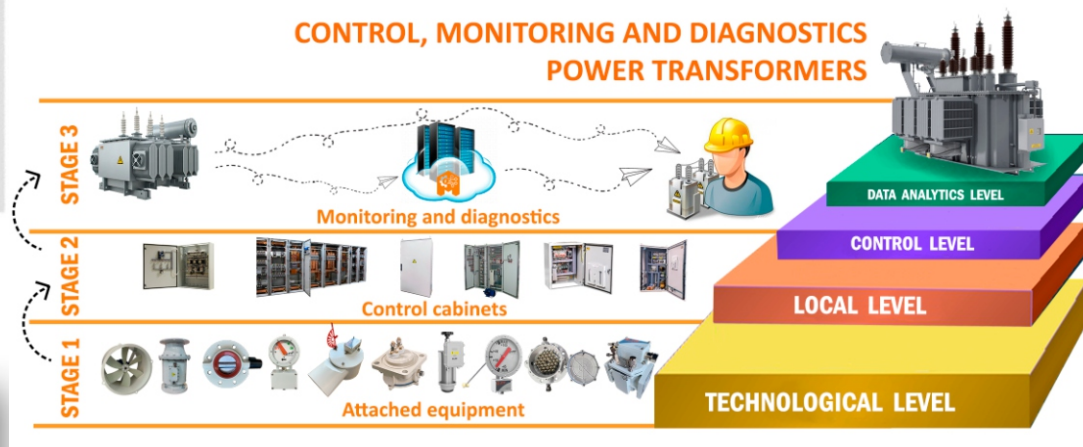
We are distinguished by our individual approach to each customer. Depending on the customer's wishes, special designs are possible: any RAL color, number of cable glands, connection dimensions, housing or sealing materials (rubber or fluorosilicone).

WHY SHOULD YOU CHOOSE THE ATF FACTORY?

- We are the largest manufacturer and leader in the industry in Russia and CIS countries;
- We develop and grow by developing new markets and directions every year;
- We have already produced the entire range of components and now offer comprehensive solutions for diagnostics and monitoring;
- We are recommended by the biggest players in the market;
- The technical advantages of our equipment are obvious;
- The quality guarantee is 3 years;
- There is a possibility for individual customization and design.

OUR OFFERS

We have produced the entire range of power transformer equipment - from the process level (components) to the data analysis level (monitoring systems) and offer comprehensive solutions for various applications.



You can choose any direction of our activity:

TECHNOLOGICAL LEVEL:

The widest range of components for power and distribution transformers. It is the equipment, which exceeds foreign analogs by technical characteristics. The warranty - 3 years!

CONTROL LEVEL:

Control cabinets that control fan motors and electric pumps in automatic and manual mode, conduct automated data collection from sensors for subsequent transmission and processing, as well as realize other tasks to control and monitor the equipment.

LEVEL OF DATA MONITORING AND DIAGNOSTICS:

- **A comprehensive power transformer monitoring system (AM) :**
 - Partial discharge measurement system (AM-D);
 - System for analyzing gas content in oil (AM-G);
 - Monitoring and automatic control system for cooling (AM-C);
 - System for analyzing moisture content in oil (AM-M);
 - System for monitoring the hot point temperature of the winding of oil-filled transformer (AM-N-O);
 - High-voltage bushings condition monitoring system (AM-I).
- **SDS effective oil drying management system;**
- **CHM oil degassing system;**
- **Electronic monitoring module (EMM) for E-motor control.**

GET COMPLETE INFORMATION ON THE CONDITION OF THE TRANSFORMER



OLTC

- Current position of the OLTC oil temperature;
- Number of switching operations;
- Actuator motor current;
- Switching duration;
- Residual life assessment

PAPER INSULATION

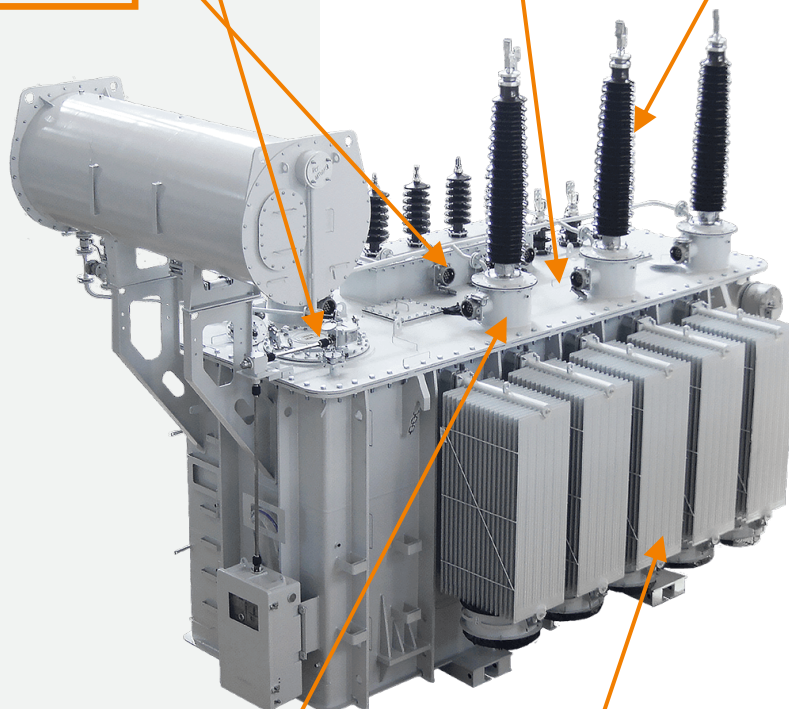
- Humidity;
- Degree of polymerization;
- Insulation Condition Assessment;
- Partial discharge level;
- Rate of aging

HOT SPOT TEMPERATURE

- Direct measurement in real time

HIGH-VOLTAGE BUSHINGS

- Tangency $Tg\delta$;
- Capacity C1



CURRENT TRANSFORMER

- On the sides;
- Operating current;
- Power (active, reactive);
- COS;
- Load capacity and temporary increases voltage;
- Oscillography

COOLING SYSTEM

- Oil temperature at the inlet and cooler outlet;
- Control of oil flow in coolers;
- Counting engine hours and starts;
- Evaluating the efficiency of the cooling system;
- Cooling system control

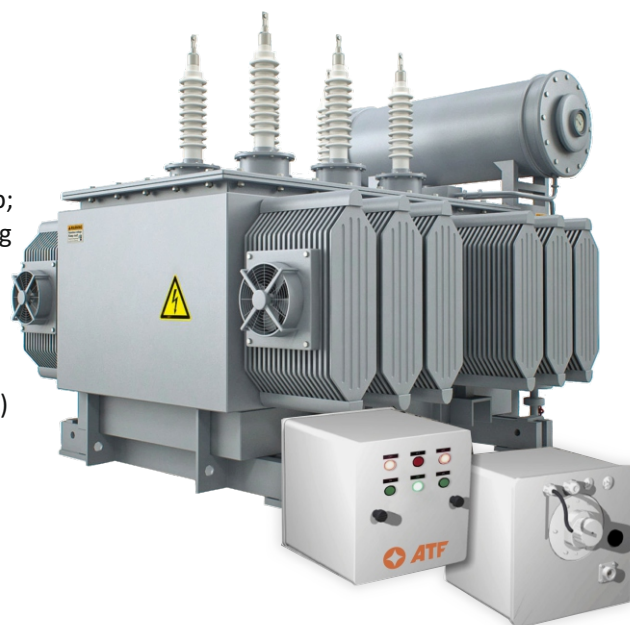
Monitoring and automatic control system for transformer cooling (AM-C).

USING:

Monitoring and automatic control system for transformer cooling (AM-C) is designed for monitoring and control of electric motors (hereinafter - EM) of fans, pumps of power transformers cooling system .AM-C is installed both on new transformers and on existing transformers (replacing the outdated cooling control system).

BASIC FUNCTIONS:

- protection of each electric motor against short circuits, overloads, overvoltage and undervoltage operation, breakage, asymmetry and phase sequence disturbance;
- signaling of cooling control system operation modes;
- signaling about switching off of any EM;
- manual shutdown of the power supply unit;
- operation from two power sources;
- main and backup with priority of the main input;
- EM contactor diagnostics;
- accounting of operation time and the number of starts of pump drives;
- accounting of operation time and number of starts of fans of each group;
- accounting of operation modes of the cooling control system and cooling groups;
- accounting of any EM shutdowns;
- accounting of temperature indices of cooling groups and environment;
- accounting of calculated readings of NNT;
- automatic reassignment of pump and cooling group roles (reserve-main) to equalize resource performance;
- redundant discrete outputs with control via a digital communication channel;
- redundant analog input;
- digital data transmission;
- control of EM service intervals;
- microclimate maintenance inside the enclosure shell;
- lighting in the cabinet.



EM CONTROL:

The EM is controlled by the operator panel in the corresponding window of the cooling group or pump. The cooling system is controlled in automatic mode by programmable logic controller (hereinafter PLC) by analog or discrete signal of oil temperature sensors and current relay, which fixes the transformer load. The sensors can be included in the delivery set or used on the transformer. In the automatic mode, the EM is switched on when the upper oil layers are heated up to 55 °C or when the transformer load is higher than the current relay set point. When the current relay is switched off and the temperature of the upper oil layer drops below 50 °C, the DE is switched off. Setpoints of 50 °C and 55 °C are standard, according to the requirements of the rules of technical operation of electrical installations of consumers, but can be changed for specific customer requirements or during operation. The setpoints are displayed on the screen of the operator panel. The cooling system can be switched on remotely, by external relay or push button. In automatic operation mode, the PLC performs diagnostics of contactors, controlling their operation.

Electronic monitoring module (EMM) for E-motor control

USING:

EMM motor control module (hereinafter referred to as EMM module) provides continuous monitoring of electric motor operation: it monitors phase current consumption, controls compliance with the monitoring parameters (current and time limits, consumption skew, signaling the presence of current consumption). The EMM module is equipped with built-in proximity transformers AC IPT, microcontroller and display, there are function keys for easy parameterization. Depending on the monitoring parameters, diagnostic messages are generated.

TECHNICAL CHARACTERISTICS:

The EMM module is designed as a monoblock for DIN rail mounting and is available in two versions:

- with through holes through which the phase wires of the electric motor power supply are passed (basic version);
- with installed terminals for power supply and motor connection.

The EMM is characterized by its resistance to mechanical influences: vibration, shocks, jolts, rocking and tilting.

The EMM continuously monitors the performance of the motor and switching elements:

- current consumption according to min/max and time settings;
 - current consumption asymmetry;
 - phase failure;
 - current consumption in the absence of conditions for operation
- motor operation conditions.

The module is equipped with dry contacts and network interest RS 485 (Modbus protocol). Messages are transmitted via RS485/Modbus: phase current, total current (phase average), error code.

The relay unit generates messages: error / in operation / current presence.



ADVANTAGES:

Thanks to the continuous monitoring of the electric motor operation, the maintenance personnel receives a timely signal of deviations in the operation of the unit with electric motor, which significantly reduces the probability of emergency failure of the unit and the cost of repair work. And thanks to the built-in automation module EMM can give a signal to shut down the node to avoid its further mechanical destruction. EMM is a low-cost, simple and effective solution to increase MTBF (Mean Time Between Failures), reduce the financial cost of emergency shutdowns, and optimize preventive maintenance schedules.

EFFECTIVE OIL DRYING MANAGEMENT SYSTEM SDS - (Smart Drainage System)

USING:

The SDS system allows to significantly reduce the moisture level of solid insulation through oil drying due to natural water migration and the law of equilibrium. The use of the system reduces the aging rate of cellulose insulation and improves the dielectric strength of insulating oil, which significantly affects the reliability of transformer operation and increases its service life. When using the SDS system, the risks of transformer failure at higher load cycles are significantly reduced.

ADVANTAGES:

The SDS system installed on a new transformer will maintain the moisture content at or below the original factory level, which will significantly extend the life of the transformer equipment. The goal of using SDS in operational transformers is to reduce the moisture content of the insulation and maintain that level. The time required to remove moisture from the main insulation of a transformer depends on the transformer capacity, the moisture content of the insulation, and variations in operating temperature. As a rule of thumb, the SDS time period is usually between 3 months and a year, which ensures that the insulation is dehumidified while maintaining all its properties.

MODULAR CONCEPT OF THE PRODUCT:

SDS has a modular product concept that can be easily adapted to individual requirements. Two basic models SDS-1 (single module version) and SDS-3 (three-module version) are available. An optional additional module of 3 silica gel flasks for cleaning oil from aging products (frame + flasks) is available.

GENERAL VIEW:



TECHNICAL CHARACTERISTICS OF THE SDS:

Transformer oil from the electrical equipment tank is passed through the inlet 10 μm filter, sorbent (silica gel or zeolite), cleaned and dried due to the operation of the system pump. As a result, mechanical impurities and contaminants remain in the inlet filter, the sorbent is saturated with moisture. The design of the device allows to promptly replace the elements of the inlet filter, as well as to replace the sorbent, either together with the flasks or in the flasks.

The complex is equipped with moisture sensors that determine the presence of moisture in transformer oil both at the inlet and outlet, which allows to timely determine and plan the replacement of flasks with adsorbent or replacement of adsorbent in flasks.

Controls and terminals for electrical connections are located in the control cabinet.

The types of the complex are selected depending on the total volume of transformer oil and pump capacity.

The weight of the complex in the maximum configuration is 495 kg. The rate of moisture removal of TU 38101-85 oil at a temperature of 20 $^{\circ}\text{C}$ and relative humidity of 20% of the incoming oil in the complex will be 2.5 liters per month*.

* This indicator depends on the degree of contamination of transformer oil.

CHM OIL DEGASSING SYSTEM

USING:

The system is designed for cleaning from mechanical impurities, degassing, vacuum drying, as well as for preparation for storage, transportation and filling of oils under pressure in various equipment. The unit is suitable for processing transformer and other insulating oils, as well as for vacuumizing external objects.

COMPOSITION OF THE COMPLEX:

- A vacuum tank in which the oil is dried, degassed and heated; and oil;
 - Vacuum pump for creating vacuum, removing water and gases;
 - A gear pump for pumping oil out of the vacuum tank both external and internal circulation;
 - A coarse and fine filter to remove mechanical impurities; A gear pump for pumping oil out of the vacuum tank, both external and internal circulation; A filter for removing mechanical impurities;
 - A safety container to protect the vacuum pump against the ingress of processed oil into the vacuum pump with a sensor level sensor;
 - Control panel for monitoring and control of the installation units;
 - Inlet and outlet threaded connection;
 - Three-way valve for switching between "internal circulation" and "external circulation" modes.
- Three-way valve for switching between "internal circulation" and "external circulation" modes.

GENERAL VIEW:



COMPLETENESS OF THE COMPLEX:

Product name	Quantity, pcs
Installation UVF-250	1
Fill hose 3/4 inch O(DN 20), 10 m	1
Drain hose, 1/2 inch, 10 m	1
Mains connection cable, 18 m	1
Technical description and operating instructions	1

TECHNICAL CHARACTERISTICS OF THE COMPLEX:

Oil pump capacity, l/h (depending on oil viscosity)	250-12000
Purified oil parameters	
Mass moisture content, g/t (ppm)	10(10)
Gas content, %	0,1
Degree of purification from mechanical impurities, kl	9-10
Moisture content decreases, by a factor of	1,5
Gas content decreases, in times	5
Vacuum tank filling volume with oil, l	35-500
Filtration fineness, μm	10
Oil heater capacity, kW/V	4/220 - 110/380
Oil heating, adjustable, °C	55-60
Vacuum pump vacuum depth, mbar	0,5
Degasser tank volume, l	100-1000
Residual pressure in degassing tank, mbar	0,2
Gross weight, kg	150-3000
Ambient operating temperature range, °C	-5.....+55

OIL LEVEL INDICATORS TYPE MC1, MC2

Oil level indicators are designed for all existing world standards and standard sizes.

USING:

- to determine the level of liquid dielectric in the expander of an oil transformer or other apparatus during its operation;
- to establish a normal oil level in the expander when filling the transformer with it;
- for issuing an electrical signal at minimum and maximum operating oil levels in the expander.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Possibility of technical customization;
- Production experience of more than 15 years;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Depending on the wishes of the customer, special execution is possible: any color, number of cable entries, connection dimensions, housing materials or seals (rubber or fluorosilicon);
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

- Climatic design and placement category 1 according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-2015;
- Oil indicator position – vertical;
- The value of the main electrical parameters of the contacts must correspond to Table 1.

Table 1.

Name of the parameter	Meaning
AC voltage	250B, 50Hz, 3A,
DC voltage	220V, 0,2A
Maximum test voltage of the signal circuit	2500 V

MC type oil indicators are installed on expanders of small, medium and large transformers of voltage class 35-500 kV.

The MC1 series oil indicators have an axial lever drive. It is installed in the tank of the main tank of the transformer.

Two versions of these oil indicators are available:

- the lever float moves under the film protection, floating in oil;
- the lever float moves inside the film protection, without contact with oil.

The MC2 series oil indicators are equipped with a radial drive and a float.

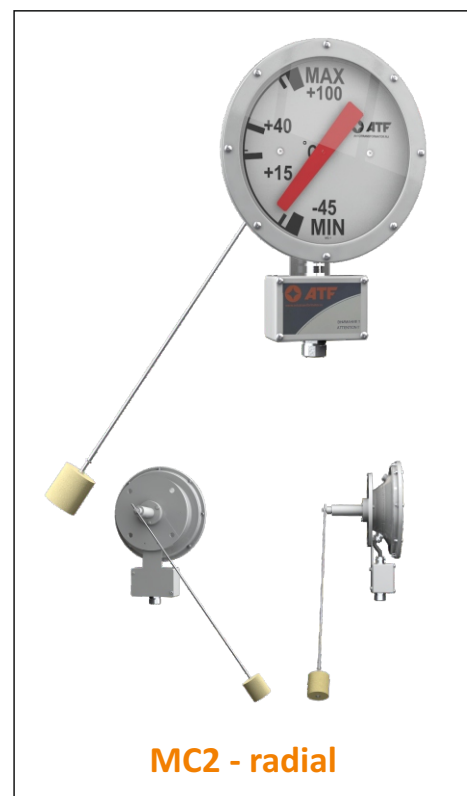
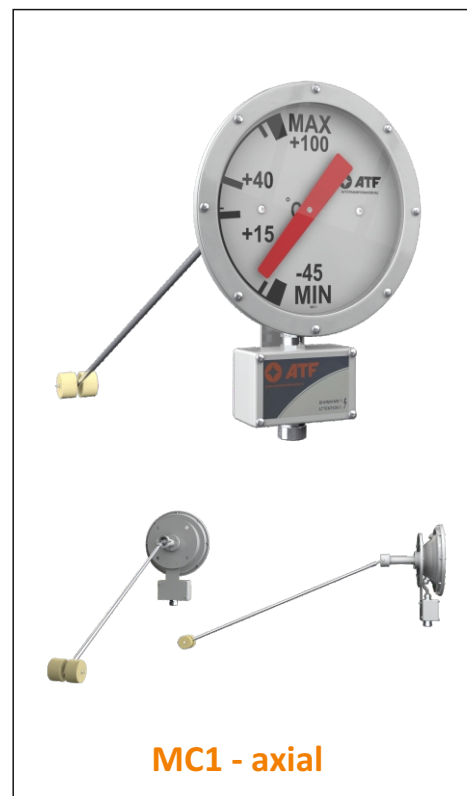
Options available to order:

- redundant switching system;
- digital output 4-20mA.

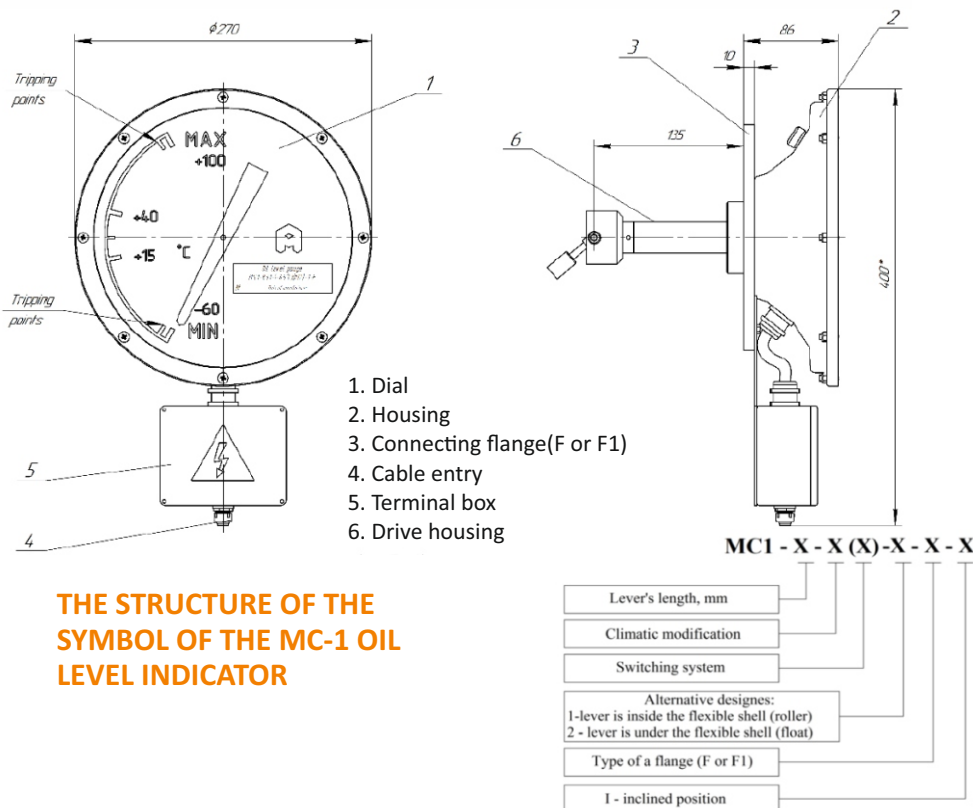
The MC series oil indicators are manufactured using modern components and taking care of the environment.

Completely interchangeable with:
the Qualitrol series AKM 032 oil indicator.

GENERAL VIEW:

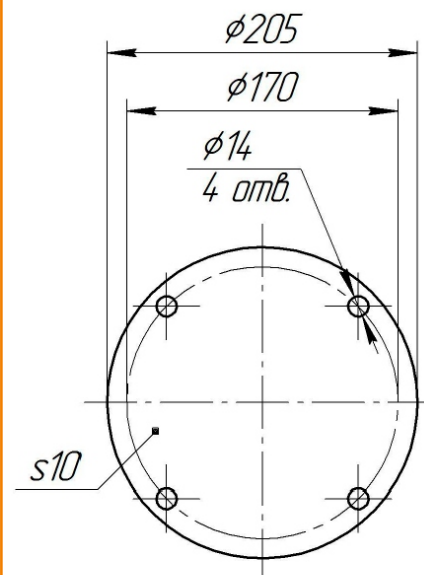


OIL LEVEL INDICATORS TYPE MC1

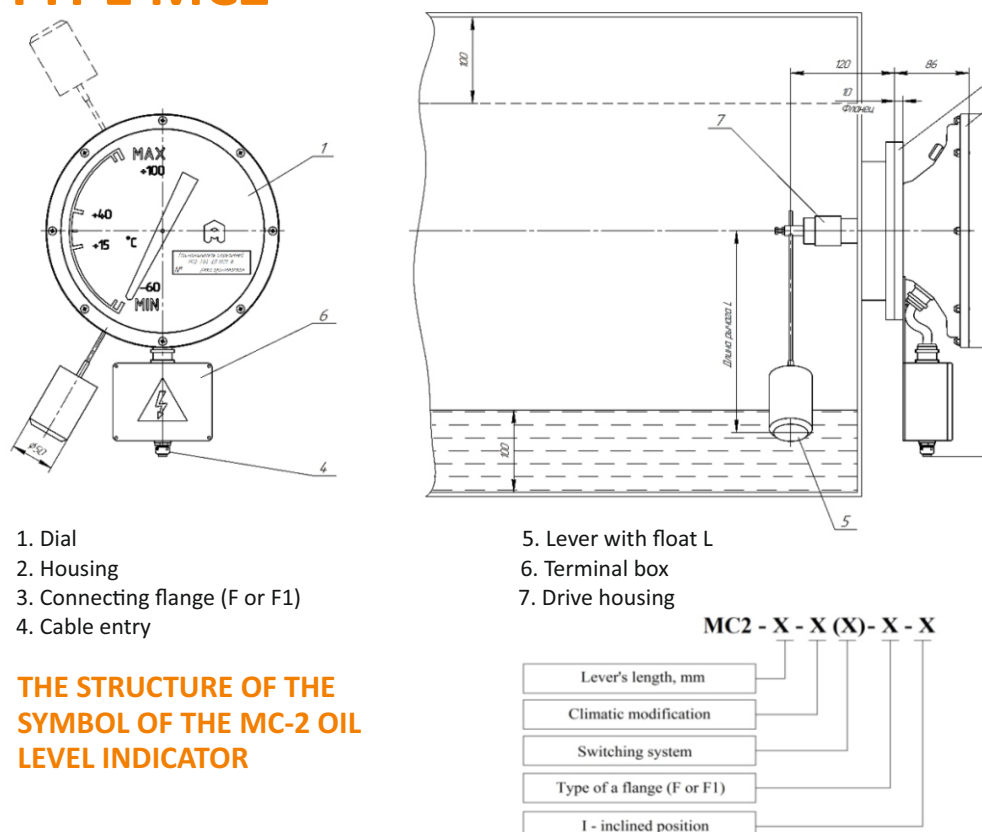


**THE STRUCTURE OF THE
SYMBOL OF THE MC-1 OIL
LEVEL INDICATOR**

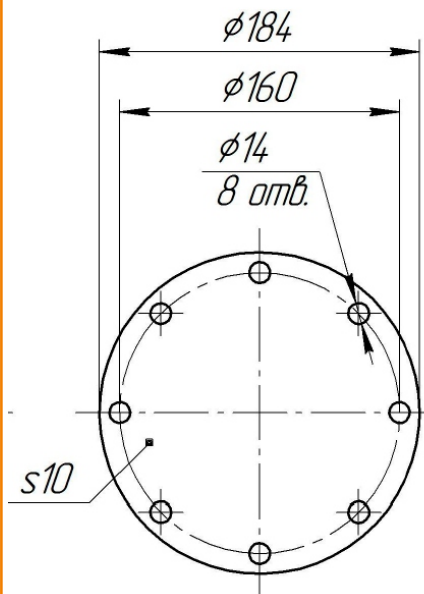
Types and sizes of connecting
flanges



OIL LEVEL INDICATORS TYPE MC2



**THE STRUCTURE OF THE
SYMBOL OF THE MC-2 OIL
LEVEL INDICATOR**



OIL LEVEL INDICATOR OF THE INCLINED TYPE MC1..N, MC2..N

Oil level indicators are designed for all existing world standards and standard sizes.

USING:

- to determine the level of liquid dielectric in the expander of an oil transformer or other apparatus during its operation;
- to establish a normal oil level in the expander when filling the transformer with it;
- for issuing an electrical signal at minimum and maximum operating oil levels in the expander.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Production experience of more than 15 years;
- Possibility of technical customization;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Depending on the customer's wishes, special execution is possible: any RAL color, number of cable entries, connection dimensions, housing materials or seals (rubber or fluorosilicon);
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

- Climatic design and accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-2015;
- The position of the oil indicator is inclined;
- The value of the main electrical parameters of the contacts must correspond to Table 1.

Table 1.

Name of the parameter	Meaning
AC voltage	250B, 50Hz, 3A,
DC voltage	220V, 0,2A
Maximum resistance of the measuring circuit	1000 Om

Oil level indicators of the inclined type MC are installed on the expanders of medium and large transformers. For the convenience of visual control of the oil level, the dial is made at an angle of 20 degrees.

Axial and radial versions of this type of oil indicator are available to order.

The axial type oil indicator is available in two versions of the lever design:

- 1) the roller moves inside the flexible shell;
- 2) the lever float moves under the flexible shell.

Any color based on the customer's specifications. The length of the rod and the climatic design are any and do not affect the cost.

Options available to order:

- redundant switching system;
- digital output 4-20mA.

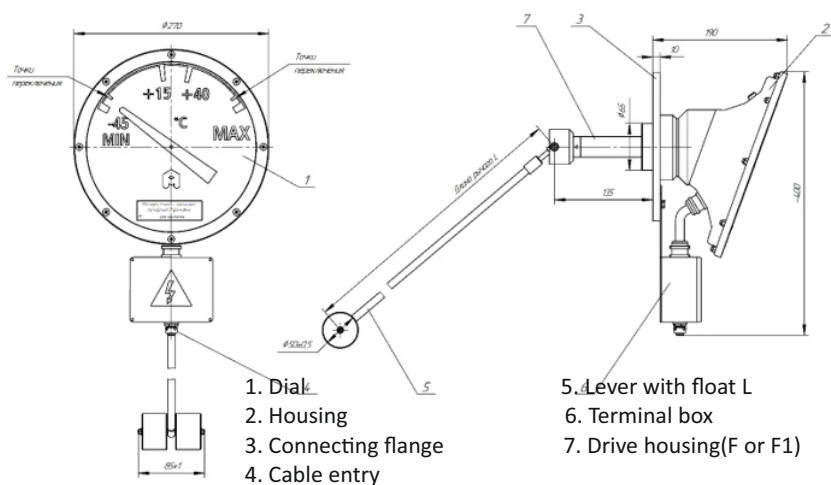
Oil level indicators of the MC series..The products are manufactured using modern components and with care for the environment.

Completely interchangeable with: [oil level indicator Cedaspe IFG series.](#)

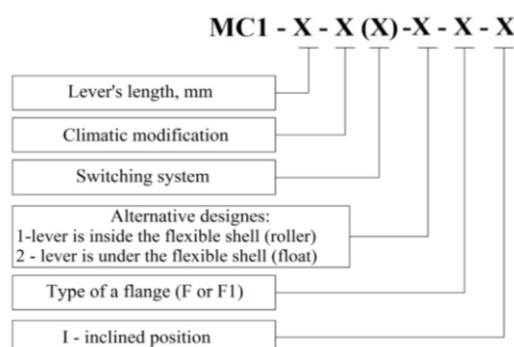
GENERAL VIEW:



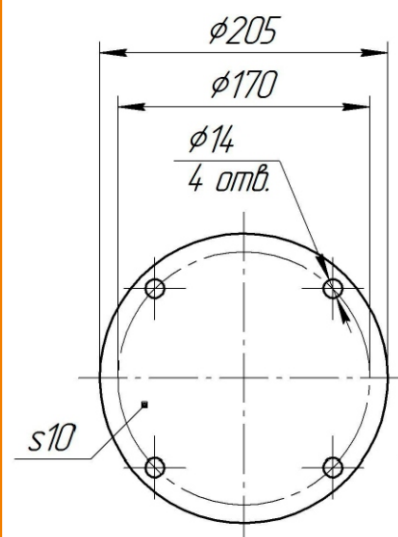
OIL LEVEL INDICATOR OF THE INCLINED TYPE MC1..N



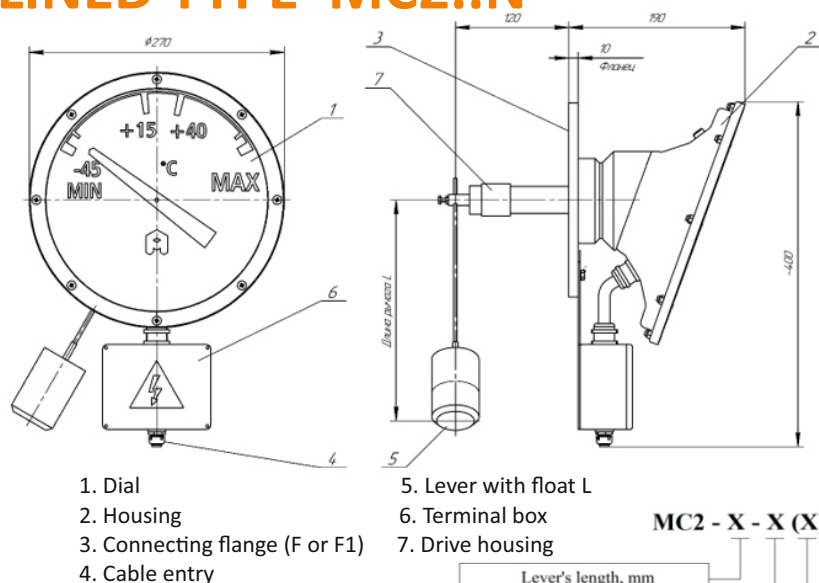
THE STRUCTURE OF THE OIL LEVEL INDICATOR SYMBOL MC1..N



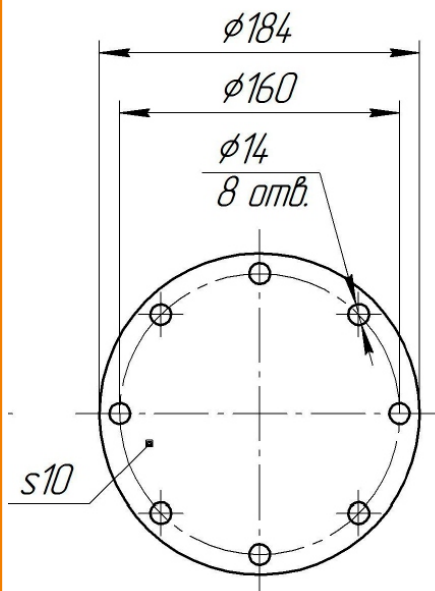
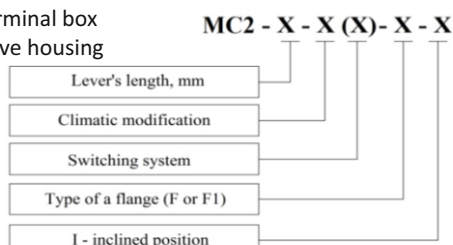
Types and sizes of connecting flanges



OIL LEVEL INDICATOR OF THE INCLINED TYPE MC2..N



THE STRUCTURE OF THE OIL LEVEL INDICATOR SYMBOL MC2..N



KOVALEV 'S OIL LEVEL INDICATORS MCK 1 and MCK 2 UPGRADED DESIGN

USING:

- to determine the level of liquid dielectric (hereinafter referred to as oil) in the expander of an oil transformer or other apparatus during its operation;
- to establish a normal oil level in the expander when filling the transformer with it;
- for issuing an electrical signal at minimum and maximum operating oil levels in the expander.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Production experience of more than 15 years;
- Mass production flow gives the most favorable cost;
- Possibility of technical customization;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Depending on the customer's wishes, special execution is possible: any RAL color, number of cable entries, connection dimensions, housing materials or seals (rubber or fluorosilicon);
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

- Climatic design and accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-2015;
- The position of the oil indicator is inclined;
- The value of the main electrical parameters of the contacts must correspond to Table 1.

Table 1.

Name of the parameter	Meaning
Location during operation	Open air
Position	inclined 30°
AC voltage	250B, 50Hz, 3A
DC voltage	220V, 0,2A

The MCK oil level indicators were developed by the designer M.S. Kovalev. They are fully adapted to Russian operating conditions. They are characterized by high-quality components and a high degree of reliability.

Axial and radial versions of this type of oil indicator are available to order.

Options available to order:

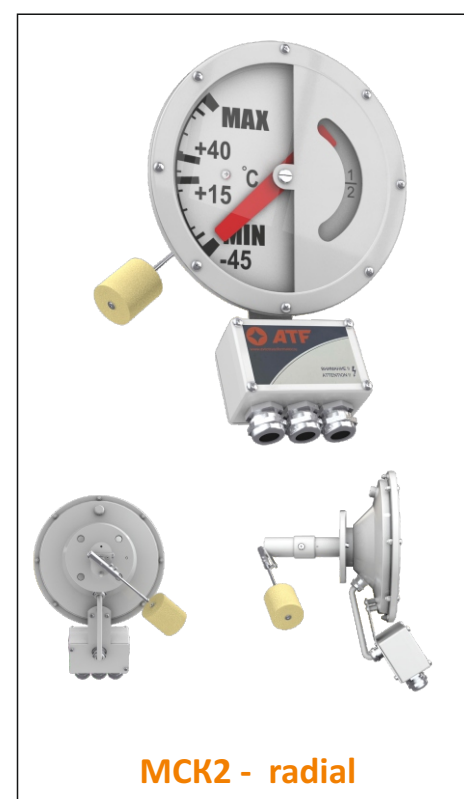
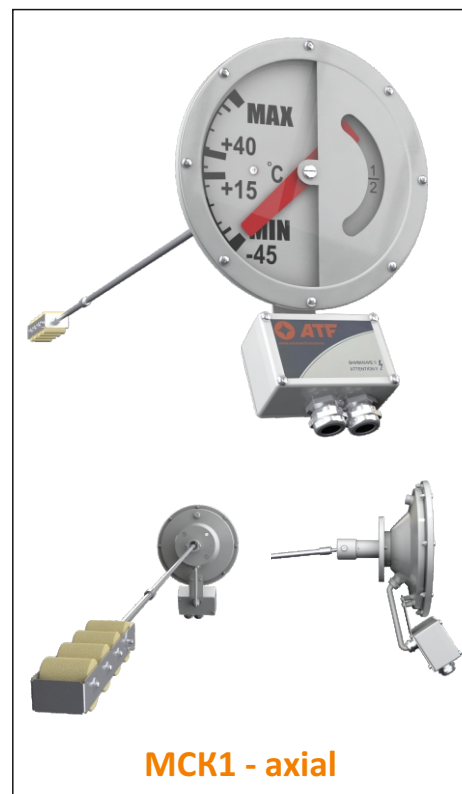
- redundant switching system;
- digital output 4-20 mA.

The MCK series oil level indicators are manufactured using modern components and with care for the environment.

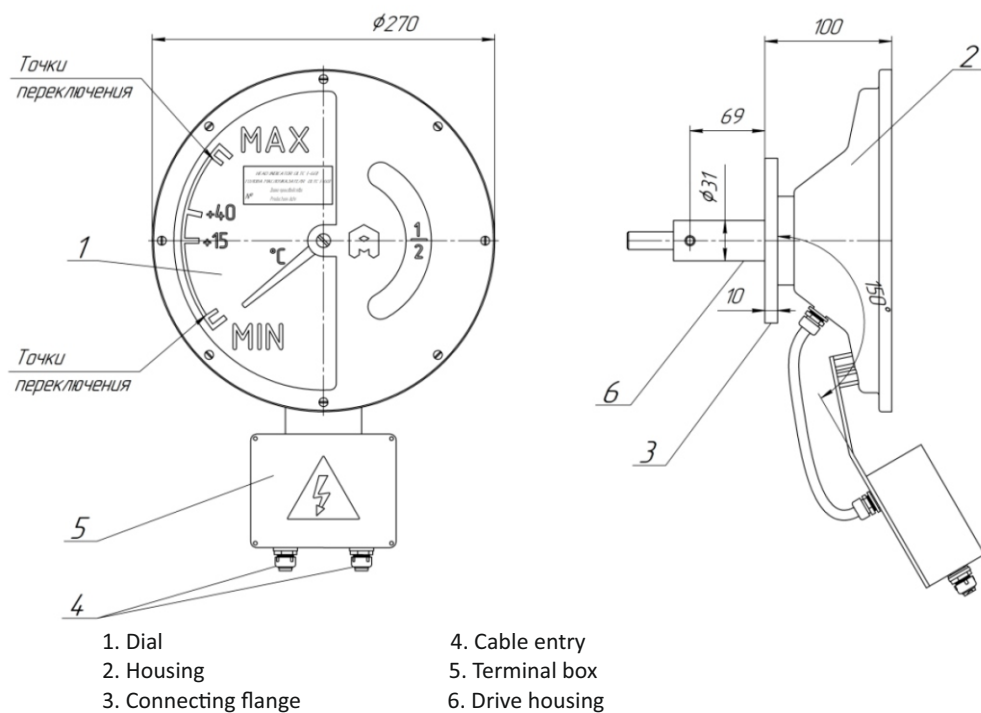
Completely interchangeable with oil level indicator:

- [Messko, oil level indicator, MTO-STF / TT series, MTO-STF/RM series;](#)
- [Qualitrol, oil level indicator, series AKM 042.](#)

GENERAL VIEW:



KOVALEV 'S OIL LEVEL INDICATORS MCK 1



THE STRUCTURE OF THE OIL INDICATOR SYMBOL MCK-1 and MCK-2

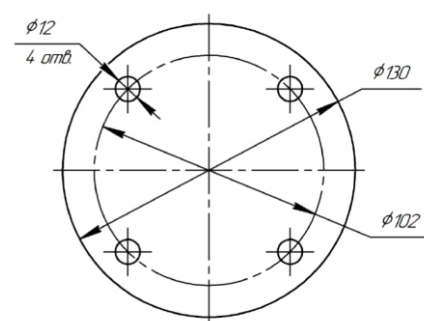
MCK X - X - X

Climatic modification
and location category

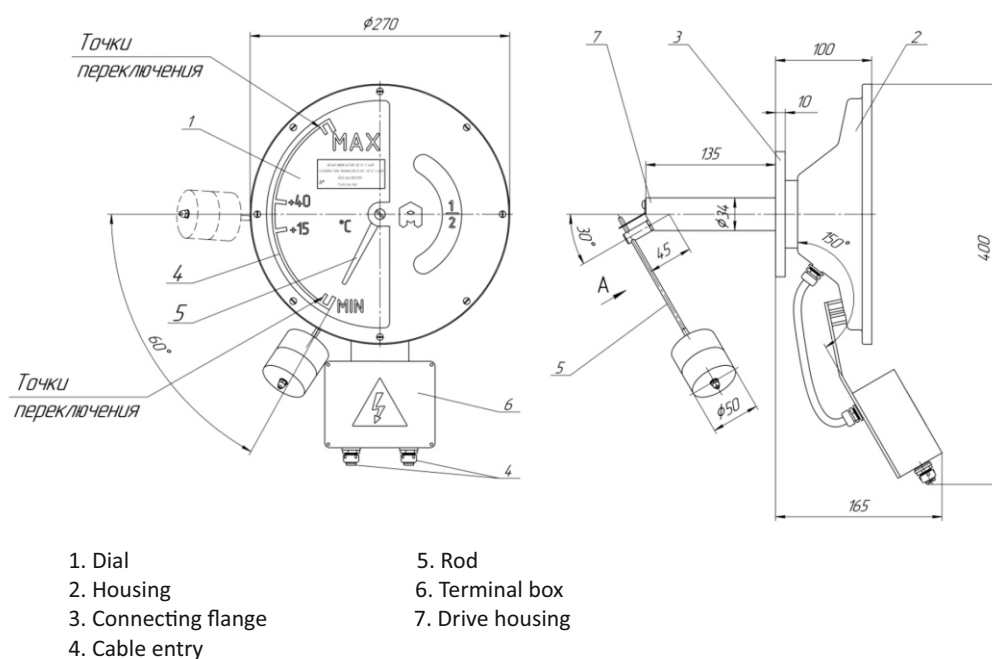
Length of the bar, mm

1 - for the main conservator tank
2 - for OLTC conservator tank

CONNECTING FLANGE MCK1 and MCK2



KOVALEV 'S OIL LEVEL INDICATORS MCK 2



KOVALEV 'S OIL LEVEL INDICATOR SMALL - MCKM

USING:

- to determine the level of liquid dielectric (hereinafter referred to as oil) in the expander of an oil transformer or other apparatus during its operation;
- to establish a normal oil level in the expander when filling the transformer with it;
- for issuing an electrical signal at minimum and maximum operating oil levels in the expander;
- for use in different climatic conditions

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Production experience of more than 15 years;
- Mass production flow gives the most favorable cost;
- Possibility of technical customization;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Depending on the customer's wishes, special execution is possible: any RAL color, number of cable entries, connection dimensions, housing materials or seals (rubber or fluorosilicon);
- Oil indicators are manufactured using modern components and taking care of the environment;
- 5 years warranty.

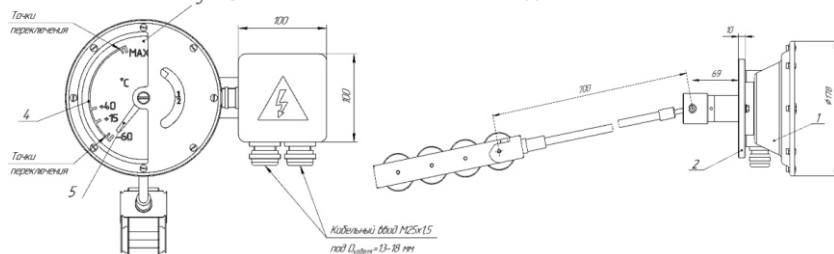
TECHNICAL CHARACTERISTICS:

- The value of the main electrical parameters of the contacts must correspond to Table 1.

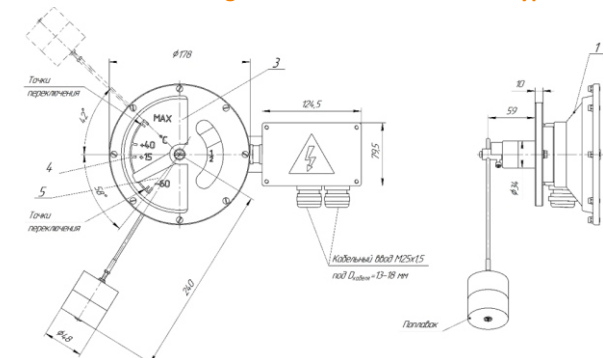
Table 1.

Name of the parameter	Meaning
Location during operation	Open air
Position	inclined 30°
AC voltage	250B, 50Hz, 3A
DC voltage	220V, 0,2A

Overall and connecting dimensions of the MCKM1 type oil level indicator



Overall and connecting dimensions of the MCKM1 type oil level indicator

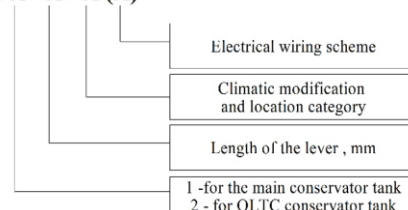


GENERAL VIEW:

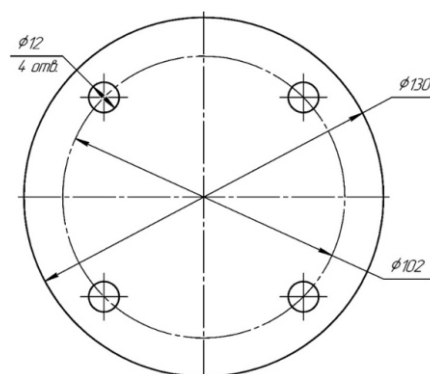


THE STRUCTURE OF THE SYMBOL OF THE MCKM OIL LEVEL INDICATOR

MCKM X - X - X (X)



CONNECTING FLANGE MCKM1 and MCKM2



ACR MONITORING RELAY

USING:

The ACR monitoring relay is used in transformers with a liquid dielectric for timely detection of violations of normal operating modes and the occurrence of internal damage to the transformer. Depending on the type of transformer and the installation option, the relay can perform the following functions:

1. tightness control of oil film protection;
2. control of gas formation in the transformer.

ADVANTAGES:

- Original design;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Relays are manufactured using modern components and taking care of the environment;
- 5-year warranty.

TECHNICAL SPECIFICATIONS:

- The value of the main electrical parameters of the contacts must correspond to Table 1.

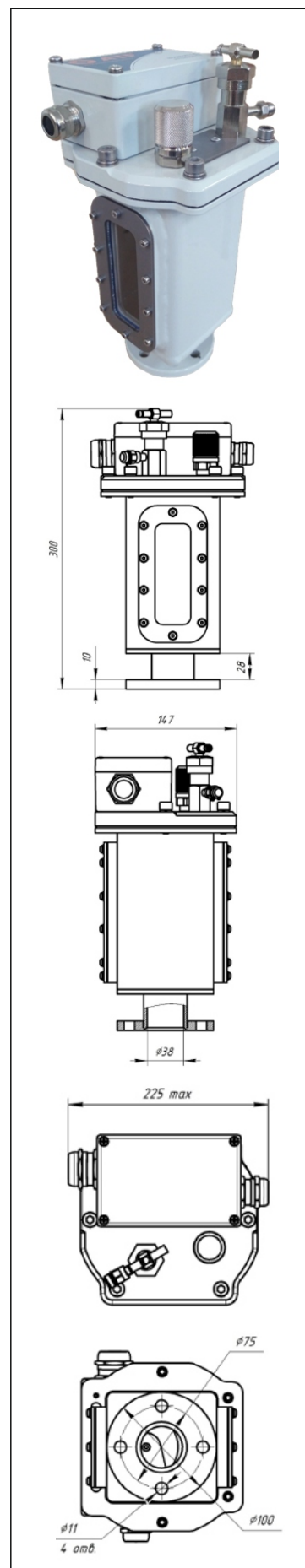
Table 1.

Name of the parameter	Meaning
DC/AC voltage, V max	250
Switching current, A, no more	2,5
Electrical insulation strength, kV, not less	1,0
Electrical insulation strength of open contacts of types N.O. , kV, not less	1,0
Transient resistance of contacts of types N.O., Ohms, no more	0,1
Minimum switching voltage, V, at least	0,1
The resource of magnetically controlled contacts, thousand actuations, not	1
Degree of protection according to GOST 14254	IP56
Weight, kg, no more	7

Completely interchangeable with:

- Reley CF38, EMB (Germany);
- Reley CPR3, CEDASPE (Italy).

GENERAL VIEW:



BUCHHOLZ GAS RELAY

type ABR 50 and ABR 80

USING:

The gas relay is designed to protect oil-filled transformers, autotransformers and reactors with an expander. They provide protection against damage inside the tank, in which gas is released, the oil level is lowered or the oil flow from the tank to the expander occurs.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Original design;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Relays are manufactured using modern components and taking care of the environment;
- 5-year warranty.

TECHNICAL SPECIFICATIONS:

- The value of the main electrical parameters of the contacts must correspond to Table 1.

Table 1.

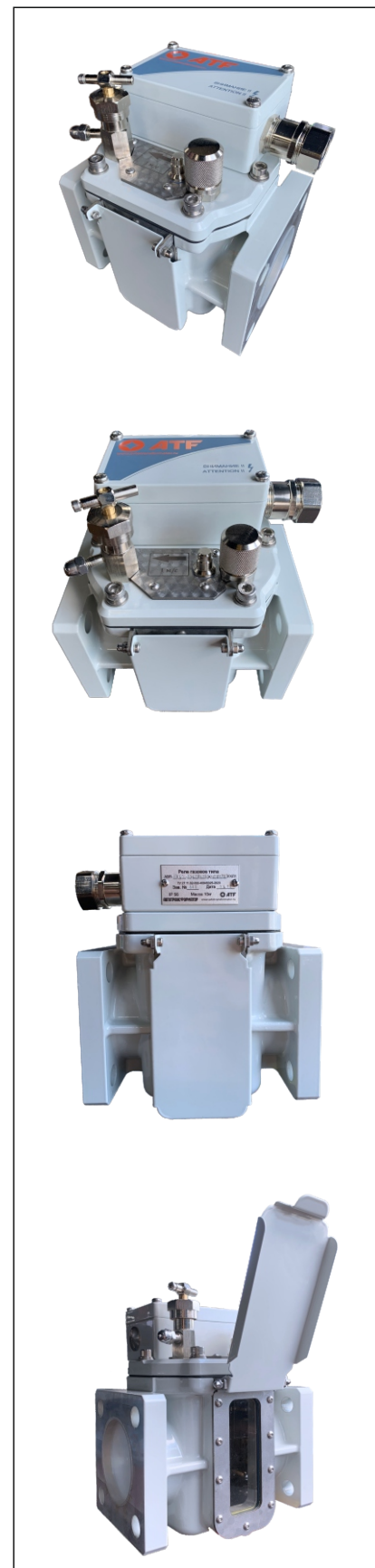
Name of the parameter	Meaning
DC/AC voltage, V, max	250
Switching current, A, no more	2,5
Electrical insulation strength, kV, not less	1,0
Electrical insulation strength of open contacts of types N.O., kV, not less	1,0
Electrical insulation strength of open contacts of types N.O., kV, not less	0,1
The resource of magnetically controlled contacts, thousand actuations, not less	1
Degree of protection according to GOST 14254	IP56
Weight, kg, no more	10

The setpoint of the relay operation according to the oil flow rate, the conditional passage are indicated in the relay passport and must correspond to one of the values according to Table 2.

Table 2.

Type of relay	The diameter of the conditional passage, mm	Oil flow rate setpoint, m/s		
ABR-50	50	0,65	1,0	1,5
ABR-80	80	0,65	1,0	1,5

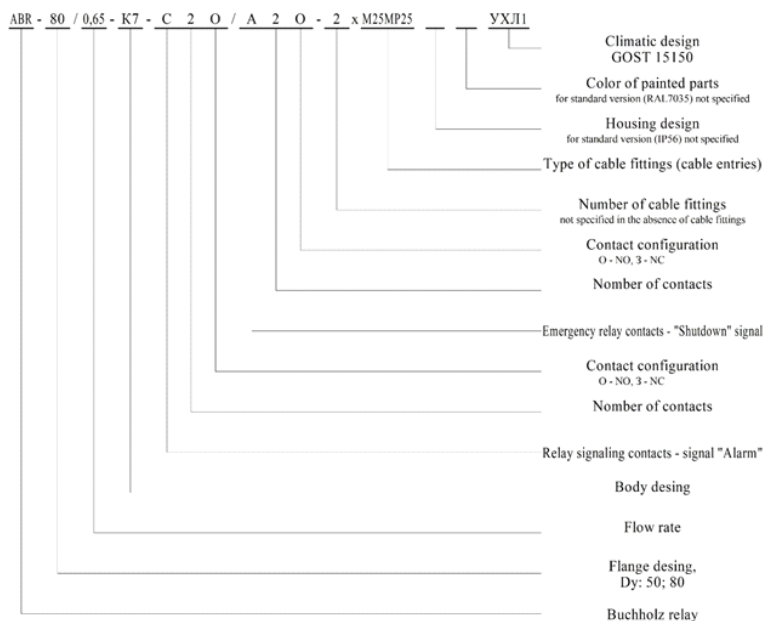
GENERAL VIEW:




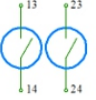

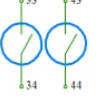
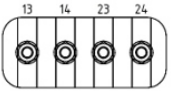
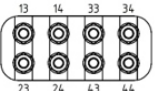
BUCHHOLZ GAS RELAY

type ABR 50 and ABR 80

THE STRUCTURE OF THE RELAY SYMBOL:

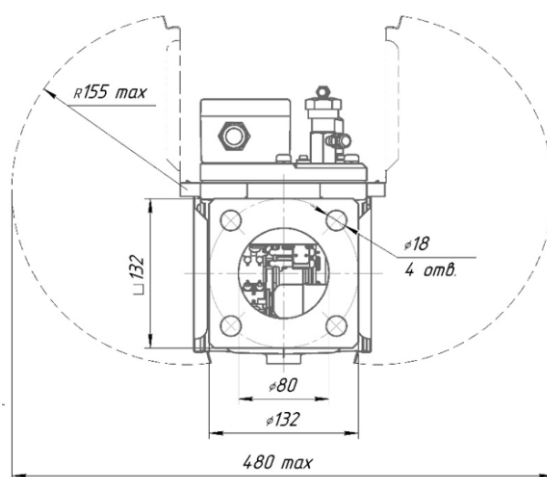
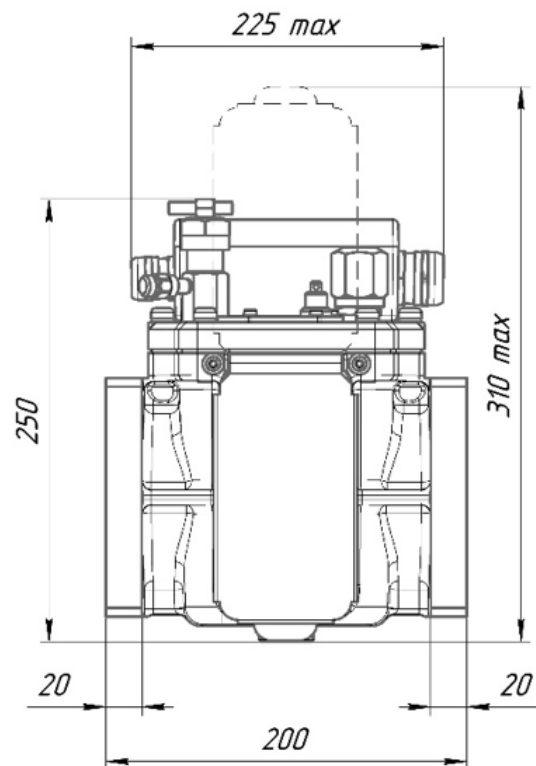


The main wiring diagrams of the gas relay:

Scheme designation	C10/A10	C20/A20
Alarm circuit	1 H.O.	2 H.O.
Scheme		
Protection circuit	1 H.O.	2 H.O.
Scheme		
Terminal block		

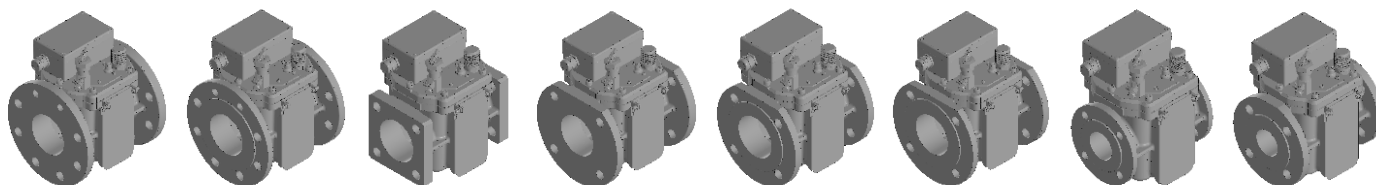
Completely interchangeable with:

- Buchholz gas relay BF-50(80) Q
- Elektromotoren und Gerätebau Barleben GmbH
- Gas relay PFT-50(80)
- Transformer protection relay P3T-50(80)



IT IS POSSIBLE TO MAKE ANY TYPES OF FLANGES TO ORDER

Options for standard flange types:



JET RELAY type ARF 25/28

USING:

The jet relay is designed to protect contactors of oil-filled switches, branches of transformer windings and autotransformers from damage accompanied by the occurrence of oil flow from the switch tank into the expander.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Original design;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Relays are manufactured using modern components and taking care of the environment;
- 5-year warranty.

TECHNICAL SPECIFICATIONS:

The values of the main electrical parameters of the contacts must correspond to Table 1 and 2.

Table 1.

Name of the parameter	Meaning
DC/AC voltage, V, max	250
Switching current, A, no more	2,5
Electrical insulation strength, kV, not less	1,0
Electrical insulation strength of open contacts of types N.O., kV, not less	1,0
Transient resistance of contacts of types N.O., Ohms, no more	0,1
Minimum switching voltage, V, at least	0,1
The resource of magnetically controlled contacts, thousand actuations, not less	1
Degree of protection according to GOST 14254	IP56
Weight, kg, no more	5

Table 2.

Type of relay	The diameter of the conditional passage, mm	Oil flow rate setpoint, m/s						
ARF-25	25	0,65	0,9	1,2	1,5	2,0	2,5	3,0
ARF-28	28							

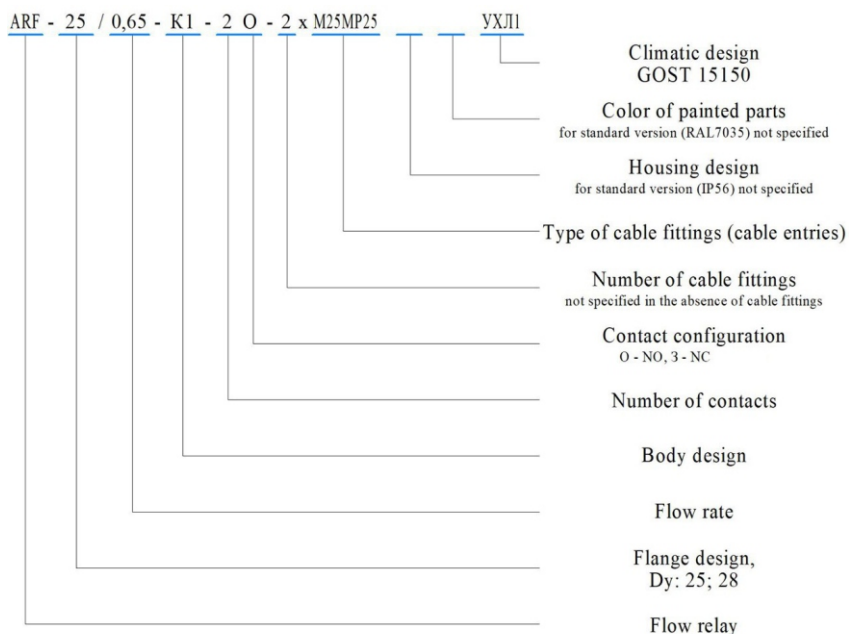
Jet type relays (series) The ARFs installed on the oil line between the expander and the RPN tank have a chamber designed to control the flow of oil.

GENERAL VIEW:


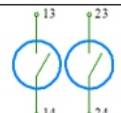

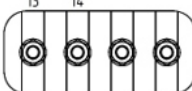
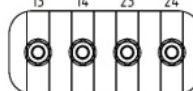
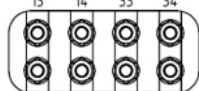


JET RELAY type ARF 25/28

THE STRUCTURE OF THE RELAY SYMBOL:

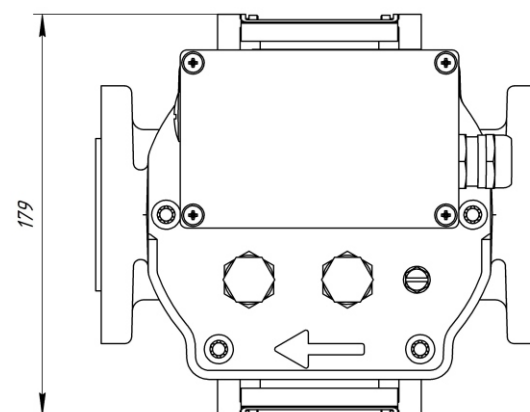
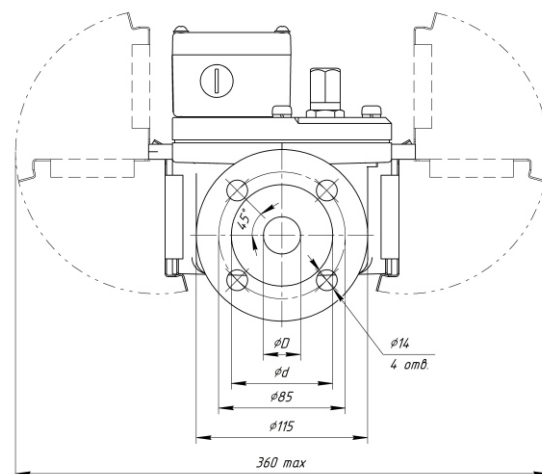
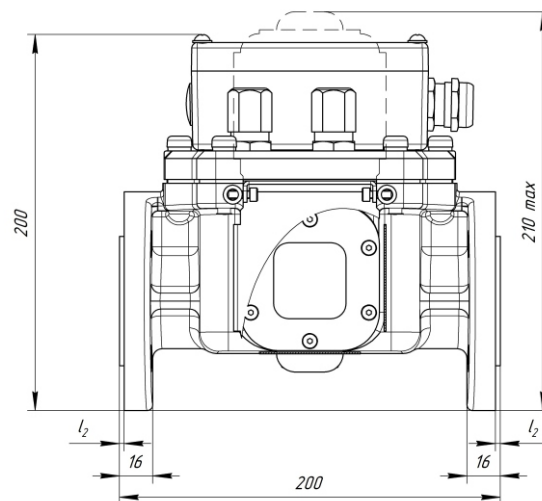


Basic wiring diagrams of the jet relay:

Scheme designation	10	20	40
Signal	1 H.O.	2 H.O.	4 H.O.
Scheme			
Terminal block			

Completely interchangeable with:

- Jet relay URF-25/10 Elektromotoren und Gerätebau Barleben GmbH
- Jet relay PCT-25-201
- Transformer protection relay P3T-25



DST GAS SAMPLING DEVICE FOR RELAY

USING:

The gas sampling device of the DST series is designed for sampling gases accumulated in the gas protection relay of the transformer. DST gas sampling devices are installed on a transformer and connected by a tube to a gas relay, allowing gas sampling to be carried out at a convenient and safe height for operation.

ADVANTAGES:

- Original design;
- Durable sealed housing;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- The devices are manufactured using modern components and taking care of the environment.

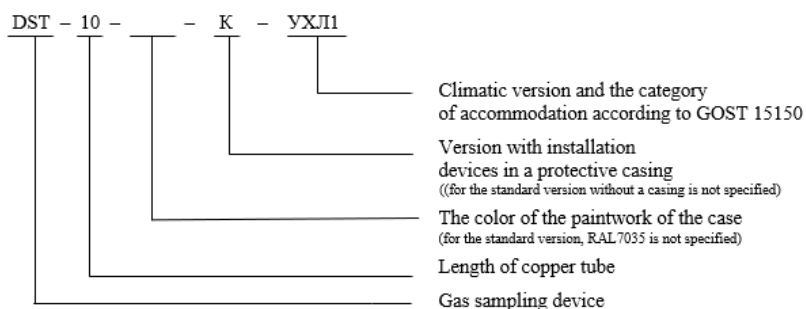
TECHNICAL CHARACTERISTICS OF THE GAS SAMPLING DEVICE:

The main technical data are shown in Table 1.

Table 1.

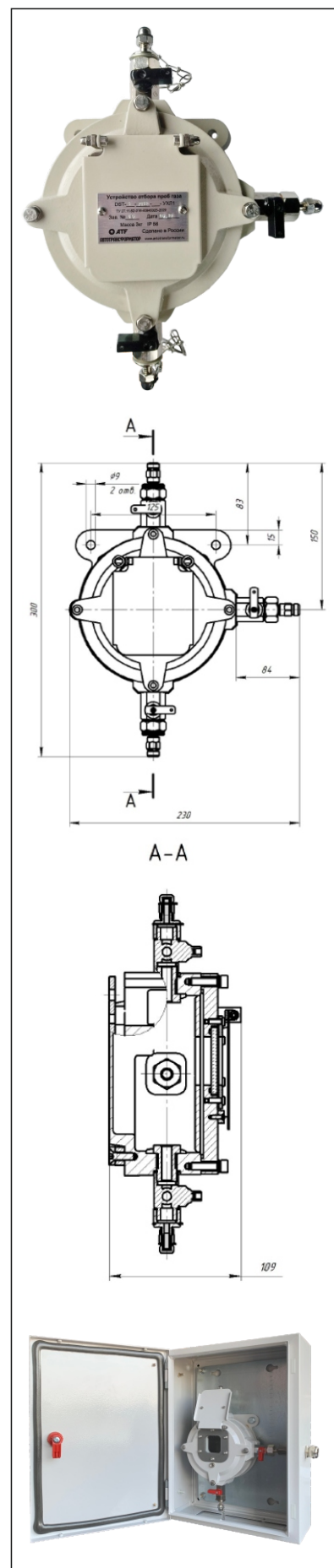
Name of the parameter	Meaning
Internal volume, ml ³	800
Gas volume up to the middle of the viewing window, ml ³	250
Conditional passage of the tube connecting the device and the gas protection relay (Buchholz relay), mm	4
Degree of protection according to GOST 14254-2015	IP67
Weight, kg, no more	3.5

THE STRUCTURE OF THE SYMBOL OF THE GAS SAMPLING DEVICE FOR THE RELAY



Completely interchangeable with:
Gas sampling device ZG 1.2. of EMB company (Germany)

GENERAL VIEW:



OIL SAMPLING VALVE

USING:

Designed for sampling transformer oil from the transformer tank and process tanks.

ADVANTAGES:

- Original and aesthetic design;
- Convenience and ease of operation;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Cranes are manufactured using modern components and taking care of the environment.

TECHNICAL CHARACTERISTICS OF THE OIL SAMPLING VALVE:

The main technical data are shown in Table 1.

Table 1.

№	Characteristic	Unit of measurement	The value of the characteristic	
			MK-1F	MK-2F
1.	Maximum operating pressure	kgf/cm ²	6,3	
2.	Tightness class (GOST 95544-93)		A (leaks are not allowed)	
3.	Maximum oil temperature	°C	150	
4.	Minimum oil temperature	°C	-60	
5.	Connection option		flanged	
6.	Controlling		handheld	
7.	Maximum ambient temperature	°C	+60	
8.	Minimum ambient temperature	°C	-60	
9.	Type of climatic performance		temperate and cold climate	
10.	Working environment:		Oil, petroleum products, water, liquid non-aggressive media	
11.	Maximum relative humidity of the surrounding air		90	
12.	Weight		0,9	0,95
13.	Color		RAL 7035	
14.	Anti-corrosion protection			nickel/zinc
15.	Oil sampling fitting external	MM	8	

THE STRUCTURE OF THE SYMBOL OF THE OIL SAMPLING VALVE

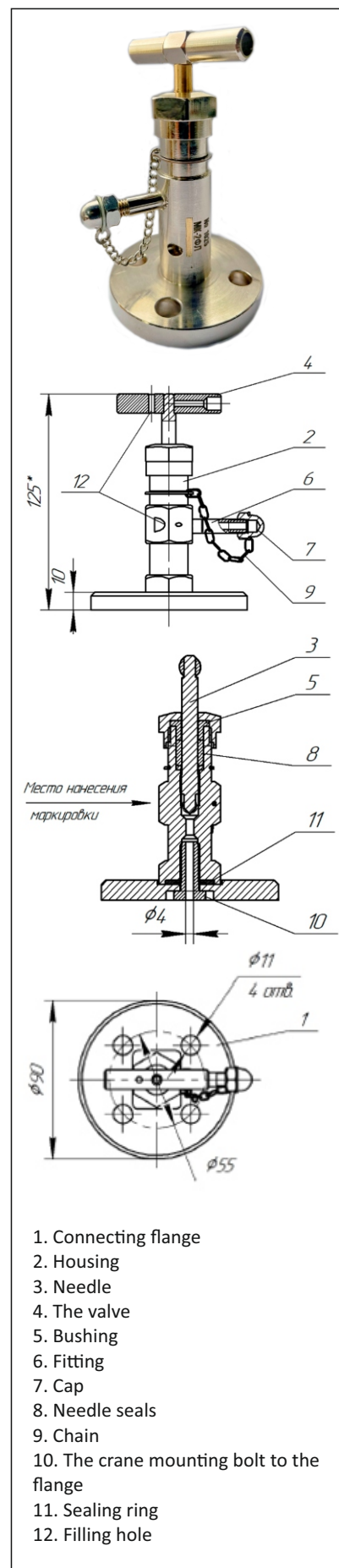
MK – X X X

*Body shape (L – cast)
The team form is not specified*

Flange connection (F)

Model – 2

GENERAL VIEW:



ATB BIMETALLIC THERMOMETER

USING:

The ATB bimetallic thermometer is used to display and monitor the oil temperature of distribution transformers.

PRINCIPLES OF OPERATION:

ATB thermometer operation is based on the dependence of the deformation of the sensitive element (bimetallic spring) on the temperature of the medium. The spring is located inside the thermosensitive cylinder (sleeve), which is mounted on the transformer tank cover by means of threaded connection A (R1/2" or R3/4" or R1" or has an individual value). The mounting connection is equipped with a fluorosilicone seal. The change of the medium temperature is displayed on the scale of the device and reaching the set temperature value is converted into a signal (alarm/transformer shutdown).

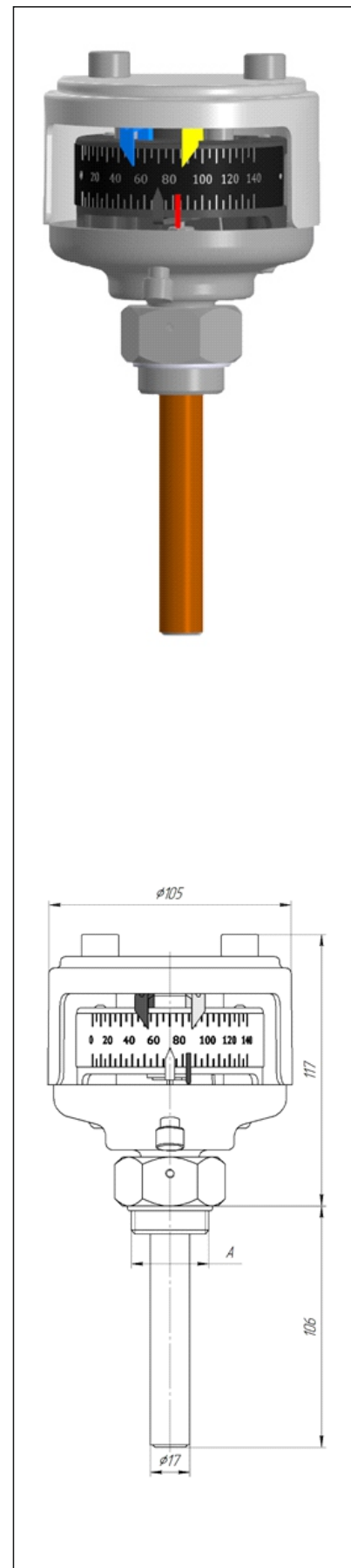
TECHNICAL CHARACTERISTICS :

- Temperature range of the medium: 0°C to 140°C.
- Adjustment of the position of the end microswitches of the alarm signal and transformer trip signal.
- Visual control.
- Equipped with the function of "memory" of the highest heating temperature and the function of resetting the "memory".
- Corrosion resistant materials.
- Protection class IP65.

Fully interchangeable with:

- Bimetal Thermometre MBTS 14/ MBTS 16/ MBTSA 16
- AKM direct mount bimetal thermometer 44612/44622/44617/44618
- Transformer protection relay RZT-25

GENERAL VIEW:



ATM MANOMETRIC TEMPERATURE INDICATOR

indicating and signaling

USING:

Designed for measuring and controlling the temperature of oil and winding of power oil transformers, for signaling when the setpoints are reached and for controlling the operation of the cooling system.

The design of the ATM thermometer allows:

- measure the temperature of the liquid (transformer oil) and show the temperature of the most heated point of the windings of power oil transformers or other apparatus during its operation;- remotely transmit the result of temperature measurements by means of conversion of the state (position of the spiral of the Bourdon tube) into the current of the analog output. output. In other words, converts the value of the measured temperature into a 4-20 mA signal for use with remote indicators or for connection to a SCADA system;

- independently set the actuation value (adjust setpoints) of the limit switches (dry contacts);

TECHNICAL CHARACTERISTICS :

- Temperature measuring range: 0/160 °C
- Capillary tube length: 10 m
- Possible number of alarms: 2, 4, 6
- Degree of protection: IP54, IP56, IP66, Ip67

PRINCIPLE OF OPERATION:

The operation of the manometer thermometer is based on the dependence of temperature on the pressure of the thermometric substance. Under the influence of the temperature of the measured working medium (transformer oil, winding) the pressure inside the hermetically closed manometric system changes

The manometer system consists of a thermosensitive cylinder (thermoballoon), capillary tube and Bourdon tube. The thermoballoon, which acts as a temperature sensor, is mounted on top of the transformer or on top of the side wall of the transformer tank.

In order to avoid moisture getting into the transformer oil, if the thermometer needs to be replaced or upgraded, the thermoballoon is mounted in a sleeve (pocket).

Under the influence of the oil temperature on the thermoballoon, the pressure inside the manometer system changes and the Bourdon tube is stretched.

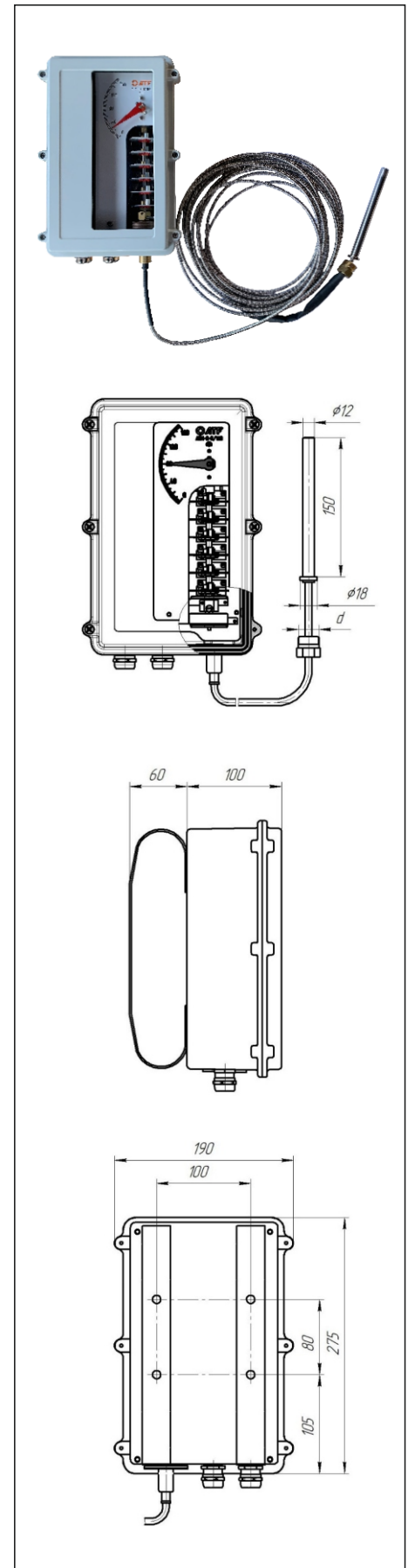
SYMBOL STRUCTURE:

ATM - X - X/X - X - X - X - IPX - X

	Climatic version and accommodation category to GOST 15150-69 (NF1, T1)
	Degree of protection by GOST 14254-2015
	Amount of cable fittings
	Capillary length, m
	Number of Switches
	Operating temperature measurement range
	Type: O - measures the temperature of the OIL W - measures the temperature of the WINDING
	Thermometer manometric indicating and signaling ATM

Fully interchangeable with:-
AKM 345;
Qualitrol- 63283-16
MESSKO BeTech Series

GENERAL VIEW:



TERMINAL BOX CM2-C-B (from 1 to 12 pins M6)

USING:

Terminal boxes of the CM2-C-B type make it easy to connect the cables of the external and internal measuring circuits of the transformer tank. For example, the output of current transformers. This type of boxes is available on 4, 6, 9, 12 terminals (pin).

ADVANTAGES:

- A wide range of versions (number and type of cable entries / plugs);
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- The boxes are manufactured using modern components and taking care of the environment.
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

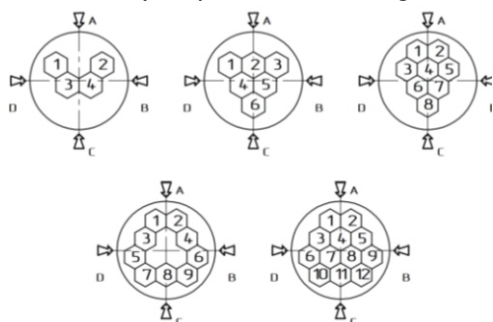
- Climatic design and placement category 1 according to GOST 15150-69;
- According to the degree of protection IP65 according to GOST 14254;
- Working environment temperature from -60 C to +100 C. A short-term increase in the temperature of the working medium to 115 C. is allowed.
- Working medium – transformer oil according to GOST 982-80, TU 38.1011025-85 and other brands of transformer oils;
- The shell for resistance to mechanical external factors corresponds to the group of operating conditions M6 according to GOST 17516.1;
- The main technical data are given in Table 1.

Table 1.

Name of the parameter	Meaning
Test voltage	2,5 kV
Current, no more than	10
Electrical insulation resistance, not less	5
Cross section of clamped wires (conductors) mm ² , from and to	0,75-2,5
Contact resistance of one circuit, Ohms	about 0.00017

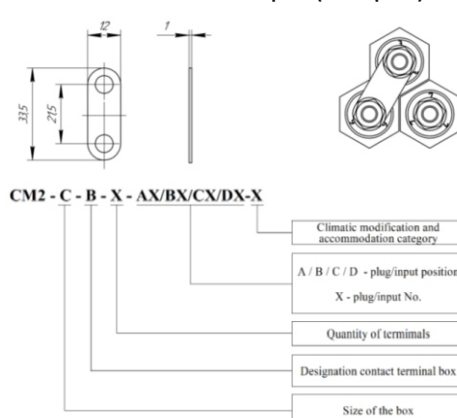
The weight of the box assembly is not more than 3.5 kg. The color of the protective coating is agreed with the customer.

Terminal layout options in standard design

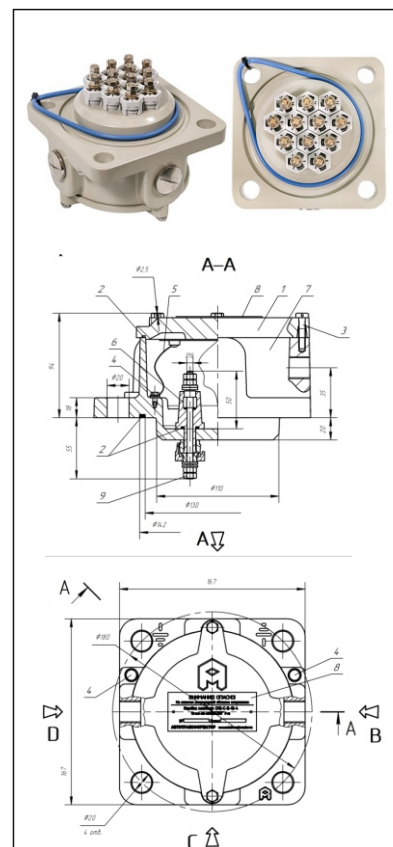


THE STRUCTURE OF THE BOX SYMBOL

Terminal connection plate (on request)

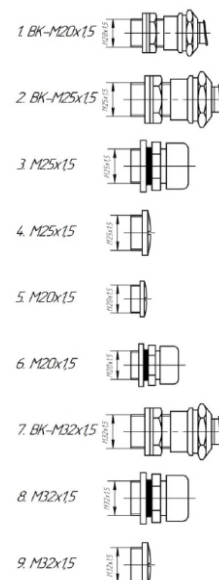


GENERAL VIEW:



1. The lid of the box is aluminum, painted
2. Sealing rings, fluorosilicon FSI 70
3. Cap mounting screw (stainless steel) with a hole for sealing d25mm
4. Grounding box mount, stainless steel
5. Cable for attaching the lid to the body, polyamide
6. Terminal (stud), brass
7. The case of the box is aluminum, enameled
8. Outer plate (nameplate)
9. Nut M6, brass

Cable entries and plugs options



TERMINAL BOX CM2-L-B (from 15 to 36 pins M6)

USING:

Terminal boxes of type CM2-L-BL are designed to connect secondary circuits of current transformers and other secondary circuits of the transformer and their output outside the tank while maintaining tightness. This type of boxes is available for 4 to 36 terminals (pin).

ADVANTAGES:

- A wide range of versions (number and type of cable entries / plugs);
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

- Climatic design and placement category 1 according to GOST 15150-69;
- According to the degree of protection IP65 according to GOST 14254;
- Working environment temperature from -60 C to +100 C. A short-term increase in the temperature of the working medium to 115 C is allowed;
- Working medium – transformer oil according to GOST 982-80, TU 38.1011025-85 and other brands of transformer oils;
- The shell for resistance to mechanical external factors corresponds to the group of operating conditions M6 according to GOST 17516.1;
- The main technical data are given in Table 1.

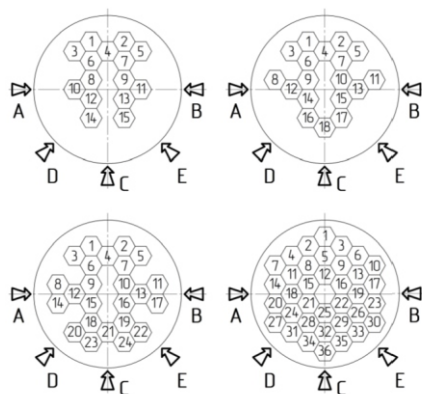
Table 1.

Name of the parameter	Meaning
DC voltage with a frequency of 50 Hz, V	220
AC voltage with a frequency of 50 Hz, V	250
Current A, no more	6,3
Electrical insulation resistance, not less	5
Cross section of clamped wires (conductors) mm ² , from and to	0,75-2,5
Contact resistance of one circuit, Ohms	about 0,00017

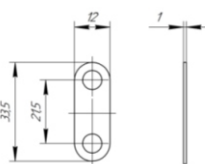
The weight of the box assembly is not more than 7.5 kg.

The color of the protective coating is agreed with the customer.

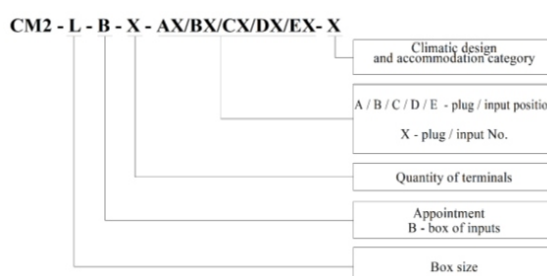
Terminal layout options in standard design



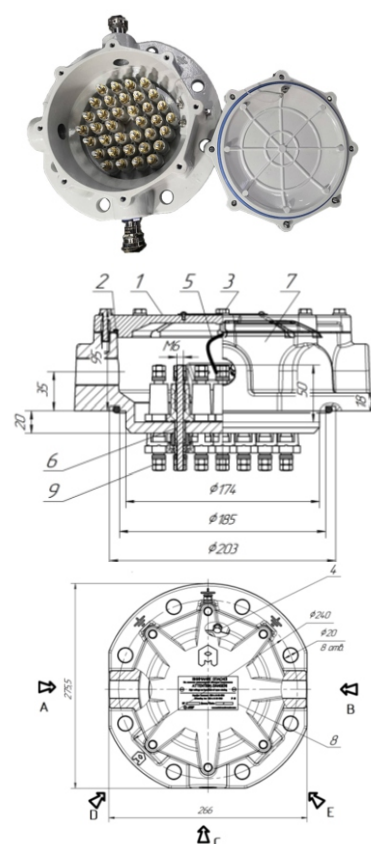
Terminal connection plate(on request)



THE STRUCTURE OF THE BOX SYMBOL

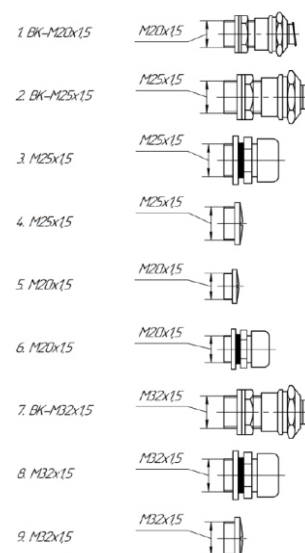


GENERAL VIEW:



1. The lid of the box is aluminum, painted
2. Sealing rings, fluorosilicon FSI 70
3. Cap mounting screw (stainless steel) with a hole for sealing d25mm
4. Grounding box mount, stainless steel
5. Cable for attaching the lid to the body, polyamide
6. Terminal (stud), brass
7. The case of the box is aluminum, enameled
8. Outer plate (nameplate)
9. Nut M6, brass

Cable entries and plugs options



GROUNDING BOX CM2-C-3 (from 1 to 3 pins M12)

USING:

The transformer grounding box is designed to implement an easy, fast and reliable solution for grounding the transformer core and backbone. This type of boxes is available from 1 to 3 terminals (pin).

ADVANTAGES:

- A wide range of versions (number and type of cable entries / plugs);
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

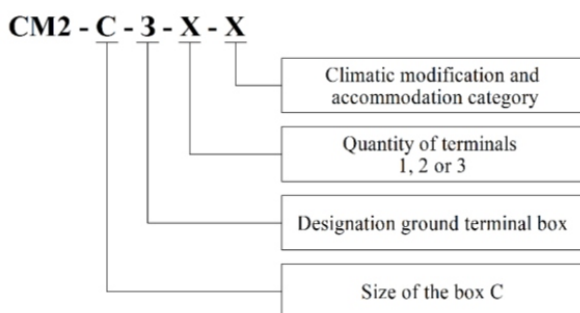
- Climatic version according to GOST 15150-69;
- Accommodation category 1 according to GOST 15150-69;
- According to the degree of protection IP65 according to GOST 14254;
- Working environment temperature from -60 C to +100 C. A short-term increase in the temperature of the working medium to 115 C is allowed;
- Working medium – transformer oil according to GOST 982-80, TU 38.1011025-85 and other brands of transformer oils;
- The shell for resistance to mechanical external factors corresponds to the group of operating conditions M6 according to GOST 17516.1;
- The main technical data are given in Table 1.

Table 1.

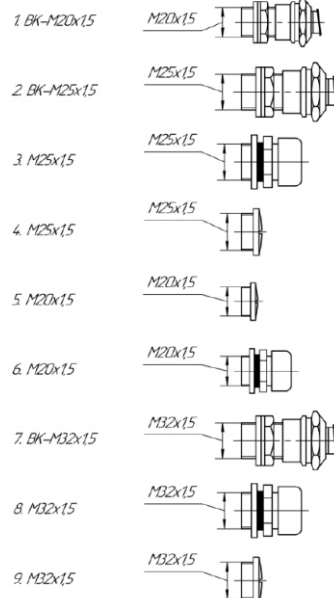
Name of the parameter	Meaning
Current, A, no more	100
Electrical insulation resistance, not less	5
Cross section of clamped wires (conductors) mm ² , from and to	0,75-2,5
Contact resistance of one circuit, Ohms	about 0,00007

The weight of the box assembly is not more than 3.5 kg.
The color of the protective coating is agreed with the customer.

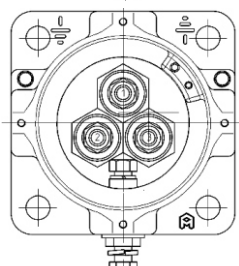
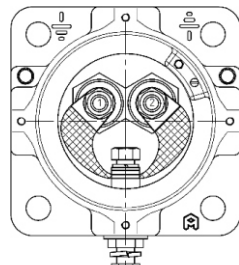
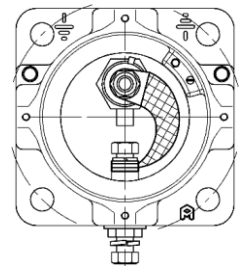
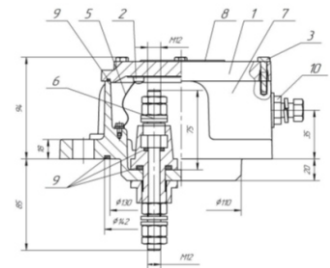
THE STRUCTURE OF THE BOX SYMBOL



Cable entries and plugs options



GENERAL VIEW:



1. The lid of the box is aluminum, painted
2. Sealing rings, fluorosilicon FSI 70
3. Cap mounting screw (stainless steel) with a hole for sealing d25mm
4. Grounding box mount, stainless steel
5. Cable for attaching the lid to the body, polyamide
6. Terminal (stud), brass
7. The case of the box is aluminum, enameled
8. Outer plate (nameplate)
9. Nut M6, brass

CABINET EQUIPMENT ON REQUEST

USING:

Control cabinets allow automatic and manual control of fan motors, electric pumps, automated data collection from sensors for subsequent transmission and processing, as well as other equipment management tasks.

TYPES OF CABINET EQUIPMENT FOR TRANSFORMERS:

- **Electricity Metering Cabinets** - designed to work indoors or outdoors in climatic conditions corresponding to the required category according to GOST 15150-69 and GOST 15543.1-89. They are a steel shell with a lockable door. A circuit board with the required list of components is installed inside.
- **Control Panels** - designed to perform the functions of relay protection, automation, alarm, control of power electrical equipment with a voltage of 3-150 kV and embedding in existing or newly designed cabinets / panels / assemblies.
- **Cabinets of the RS series** - designed to perform the functions of relay protection, automation, alarm and control of power electrical equipment (overhead and cable lines, transformers, converter units, etc.) with a voltage of 3-150 kV.
- **Transformer Automatic Cooling Cabinet** - they allow to control fan motors in automatic and manual mode, as well as electric pumps of transformer cooling systems in accordance with GOST and based on individual customer requirements.
- **Automatic Blow Control Cabinet** designed to control electric motors of air cooling fans of transformers.
- **Terminal Cabinet** designed to work indoors or outdoors in climatic conditions corresponding to the required category of U/UHL according to GOST 15150-69 and GOST 15543.1-89.
- **Control Cabinet For Insulation Of Inputs** designed to connect the inputs of a power transformer to the windings of matching transformers installed inside the cabinet.
- **Fan Control Cabinet** - it is designed to control electric motors of air-cooled fans of transformers, but unlike according to the customer's technical specifications.
- **Protection Control Cabinet** - it is intended for the installation of temperature meters, signaling devices, control of electric motors of cooling system fans of the M/D type of power transformers, connection of built-in current transformers and sensors of technological protections of transformer equipment of voltage class up to 1150 kV to relay protection and automation circuits (RSIA) monitoring systems or automated control systems of an energy facility.

THE POSSIBILITY OF ORDERING ANY CONTROL CABINET ACCORDING TO THE TECHNICAL INSTRUCTIONS OF THE CUSTOMER



GENERAL VIEW:



SAFETY VALVE

(pressure from 41kPa to 83kPa), with and without alarm

USING:

The safety valve is designed to protect the transformer when the pressure inside the transformer tank increases by more than 41 / 55 / 69 / 83 kPa (6/8/10 psi) depending on the valve model. It is installed both on the cover and on the wall of the transformer.

- 1) At normal oil pressure in the inner tank, the safety valve is closed.
- 2) Operation occurs when the pressure exceeds the set value. As a result, the valve opens and performs an emergency oil discharge through a hole in the housing.
- 3) When the oil pressure is normalized, the valve returns to its original position.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Does not require replacement of seals after actuation;
- Complete set of up to 4 limit switches;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- The valves have the function of setting up to precise operation. There are no such mechanisms in any analog
- Valves are manufactured using modern components and taking care of the environment;
- 5-year warranty.

TECHNICAL SPECIFICATIONS:

- Actuation pressures and valve mass are given in the valve designation and must correspond to one of the values according to Table 1, other actuation indicators are allowed at the request of the customer.

Table 1.

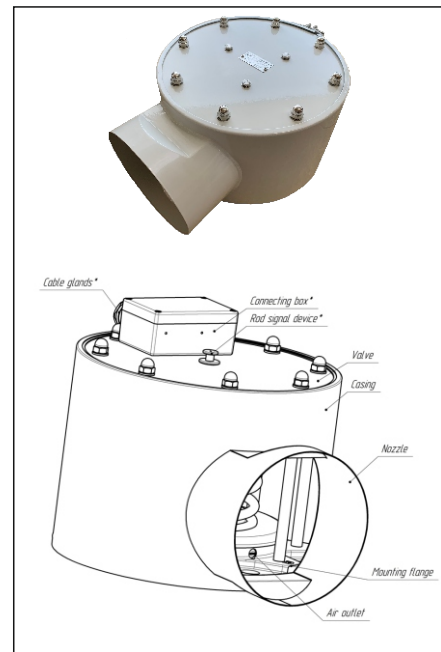
The sizevalve	Valve actuation pressure, kPa										Weight, no more than, kg
M	41	50	55	69	80	83					17
L	50					80					20
S	20	30	40	50	60	70	80	140	175	3.5	

Table 2.

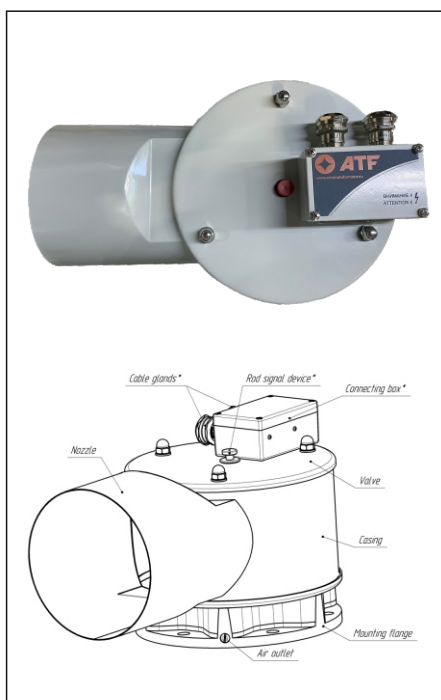
SPECIFICATIONS OF THE ALARM VALVE:

Name of the parameter	Meaning
DC/AC voltage, V, max	250
Switched current, A, no more	2,5
Dielectric strength of insulation, kV, not less than	2,5
Resource of limit switches of contacts, thousand operations, not less	1,0
Degree of protection according to GOST 14254	IP56

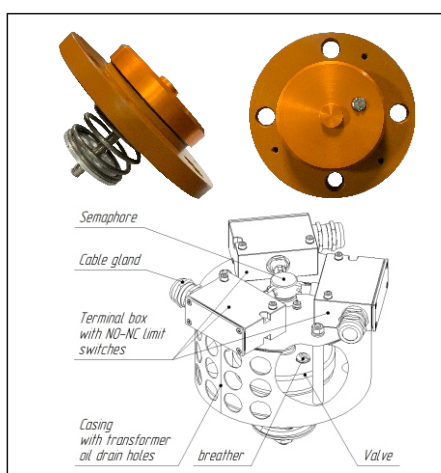
GENERAL VIEW OF SIZE L VALVE:



GENERAL VIEW OF SIZE M VALVE:



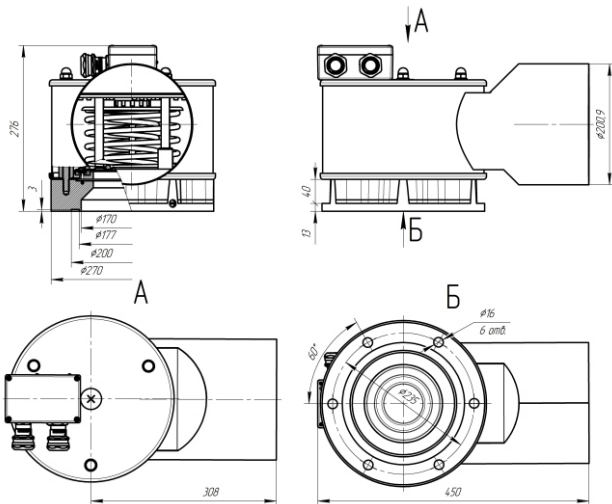
GENERAL VIEW OF SIZE S VALVE:



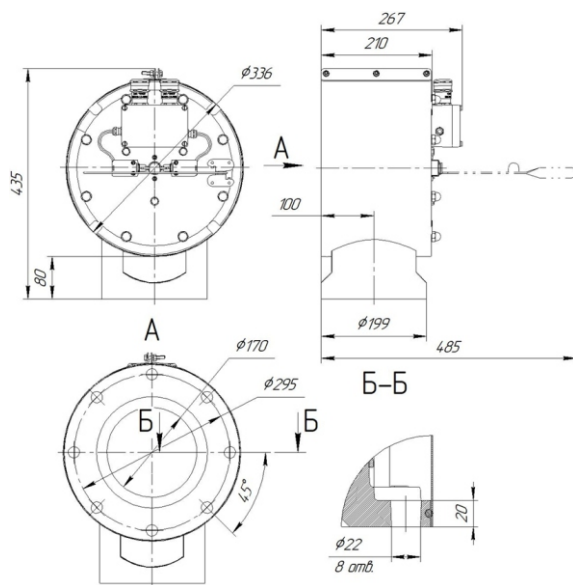
SAFETY VALVE

(pressure from 41kPa to 83kPa),
with and without alarm

SIZE M VALVE OVERALL DIMENSIONS:



SIZE L VALVE OVERALL DIMENSIONS:



VALVE LEGEND STRUCTURE:

APRD - 80 - 1 - L - 2 x M25MP25 IP66 RAL9999 4X/11

Climatic version and placement category according to GOST 15150

Valve color for standard version (RAL7035) not specified

Degree of protection according to GOST 14254 for standard version (IP56) not specified

Type of cable accessories (cable glands) not indicated if there are no cable glands

Number of cable accessories not indicated if there are no cable glands

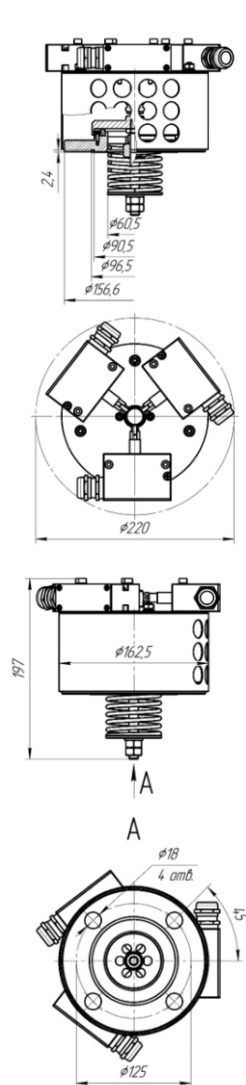
Valve size

Signaling scheme

Set pressure, kPa

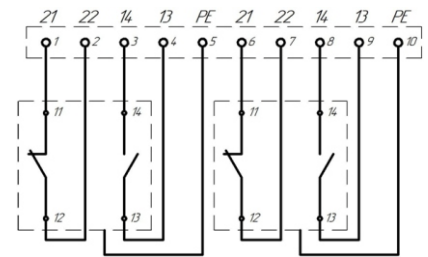
Safety valve

SIZE S VALVE OVERALL DIMENSIONS:

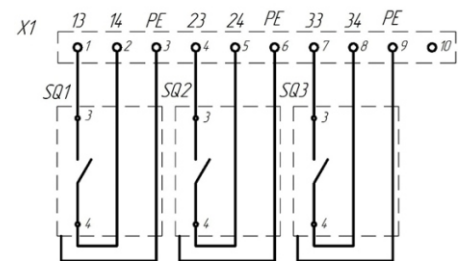


SWITCHING SCHEMES TYPE L, M:

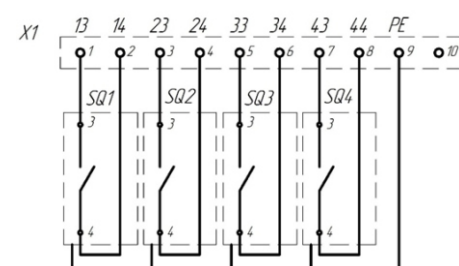
Option 1:



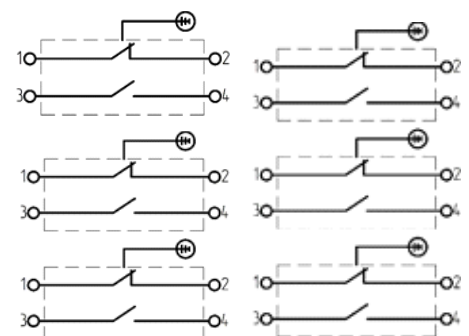
Option 2:



Option 3:



SWITCHING SCHEMES TYPE S



Completely interchangeable with:

- Ж83-Р1226 (Электрохимприбор)

- Ж83-Р1226-01

Pressure relief devices

- QUALITROL 201/202/205

- QUALITROL 206 MPRD

- QUALITROL 208/213/216 LPRD

- QUALITROL XPRD

STRAIGHT SHUT-OFF VALVE

DN-50 and DN-80

USING:

The shut-off valve is designed to block the movement of the working medium in pipelines during emergencies. It is used in power oil transformers, autotransformers and reactors, it is installed in the oil pipeline between the expander and the main tank.

ADVANTAGES:

- The products are certified and attested by the ROSATOM concern;
- All components from domestic manufacturers;
- Mass flow of production gives the most favorable cost;
- Fasteners made of stainless steel;
- Valves are produced using modern components and with care for the environment;
- Guarantee 5 years.

TECHNICAL SPECIFICATIONS:

The main parameters and technical characteristics of the valve are shown in Table 1.

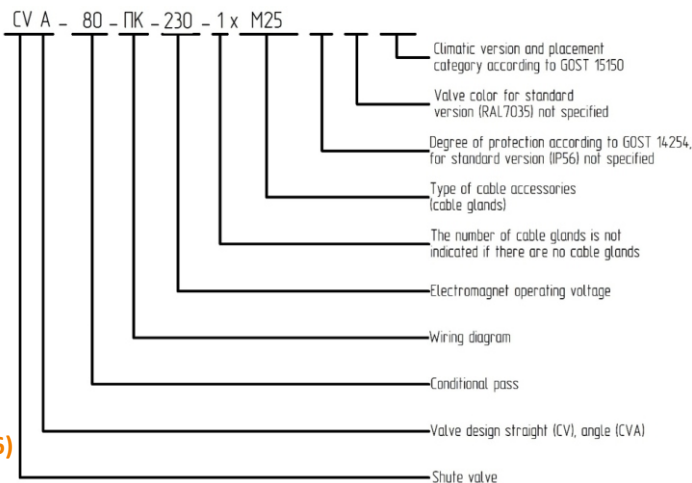
Table 1.

Name of the parameter	Meaning
The voltage of the electromagnet (AC, frequency 50 Hz)	
- nominal value, V	230
- permissible limit deviations, %	+10; -15
Rated current consumed by the electromagnet, A, no more	1,0
Electrical insulation strength, kV, not less	2,5
The degree of protection of the valve according to GOST 14254	IP56
Weight, kg, no more	18

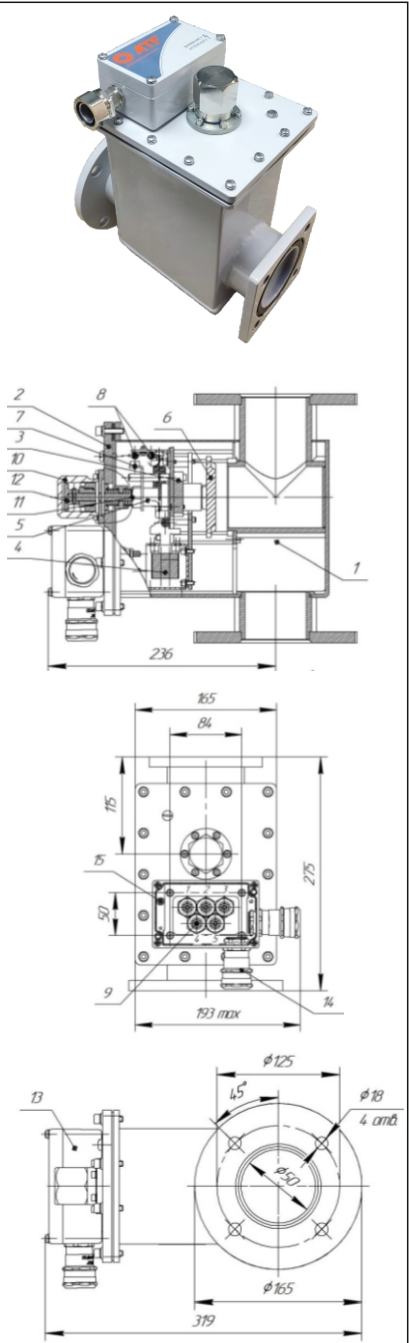
They are made in two versions of the pipe passage DN-50 and DN-80 :

THE STRUCTURE OF THE CUT-OFF VALVE SYMBOL

Completely interchangeable with:
ББНЕ.494155.003
(0ББ.456.246)
ББНЕ.494155.008
(494155.003; 5ББ.456.246)



GENERAL VIEW:



1. Valve cover
2. Corpus
3. Executive mechanism
4. Electromagnet
- 5 и 11 Stock
6. Valve
7. Magnet
8. Magnetically controlled contacts
9. Sealed inlets
10. Top
12. Handle
13. Cable box
14. Cable gland
15. Screw

ANGLE SHUT-OFF VALVE

DN-50 and DN-80

USING:

The shut-off valve is designed to block the movement of the working medium in pipelines during emergency situations. It is used in power oil transformers, autotransformers and reactors, installed in the oil pipeline between the expander and the main tank.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Valves are manufactured using modern components and taking care of the environment;
- 5-year warranty.

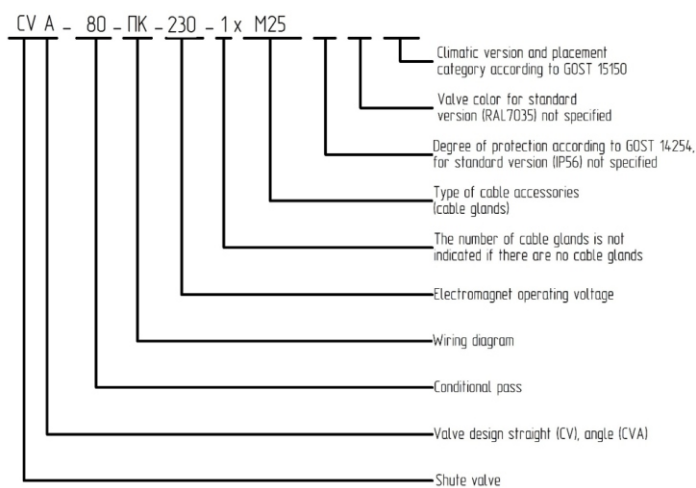
TECHNICAL SPECIFICATIONS:

The main parameters and technical characteristics of the valve are shown in Table 1.

Table 1.

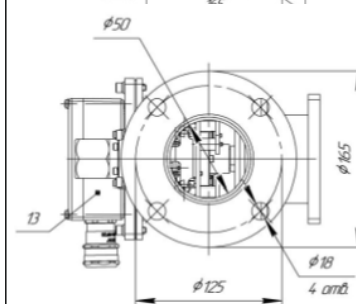
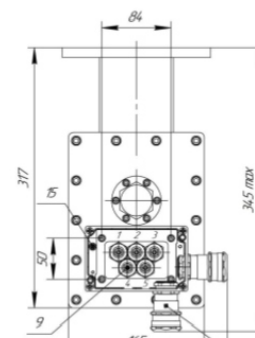
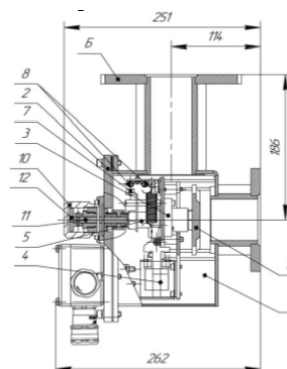
Name of the parameter	Meaning
The voltage of the electromagnet (AC, frequency 50 Hz)	
- nominal value, V	230
- permissible limit deviations, %	+10; -15
Rated current consumed by the electromagnet, A, no more	1,0
Electrical insulation strength, kV, not less	2,5
The degree of protection of the valve according to GOST 14254	IP56
Weight, kg, no more	18

THE STRUCTURE OF THE CUT-OFF VALVE SYMBOL



Completely interchangeable with:
ББН.494155.003
(ОБ.456.246)
ББН.494155.008
(494155.003; 5Б.456.246)

GENERAL VIEW:



1. Valve cover
2. Corpus
3. Executive mechanism
4. Electromagnet
- 5 и 11 Stock
6. Valve
7. Magnet
8. Magnetically controlled contacts
9. Sealed inlets
10. Top
12. Handle
13. Cable box
14. Cable gland
15. Screw

ENERGY INDEPENDENT SAFETY VALVE

USING:

The shut-off flow valve is used in power oil transformers, autotransformers and reactors according to GOST R 52719-2007 and GOST 16772-77 for general and special purposes (hereinafter referred to as electrical equipment). The valve is installed in the oil line between the expander and the main tank of electrical equipment and is designed to automatically limit the flow of oil from the expander in the event of a significant leak. In case of operation, the valve emits an electronic signal.

ADVANTAGES:

- Original patented design;
- Smooth adjustment of the setpoint;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Valves are manufactured using modern components and taking care of the environment;
- 5-year warranty.

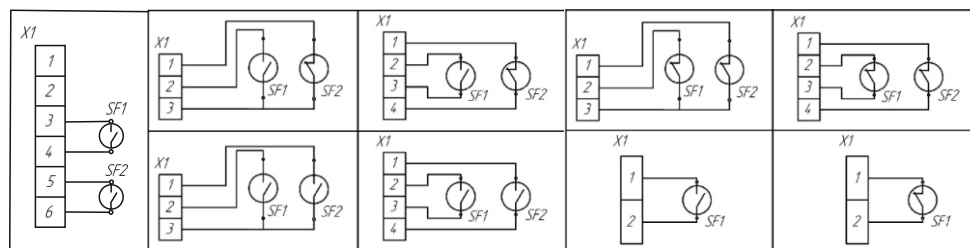
TECHNICAL SPECIFICATIONS:

- The value of the main electrical parameters of the contacts must correspond to Table 1.

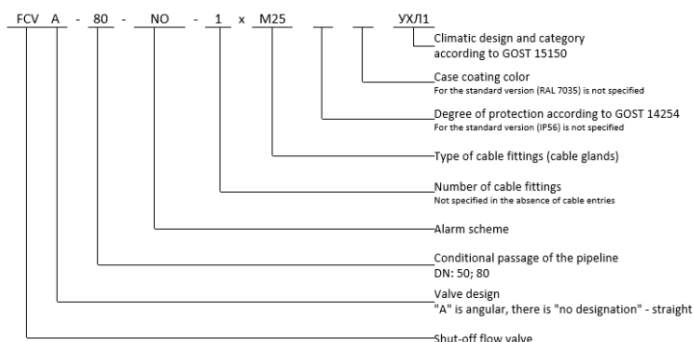
Table 1.

Name of the parameter	Meaning
Electrical insulation strength, kV, not less	2,5
Transient resistance of contacts of types N.O., Ohms, no more	0,1
Degree of protection according to GOST 14254	IP56
Weight, kg, no more	17

Basic switching schemes:

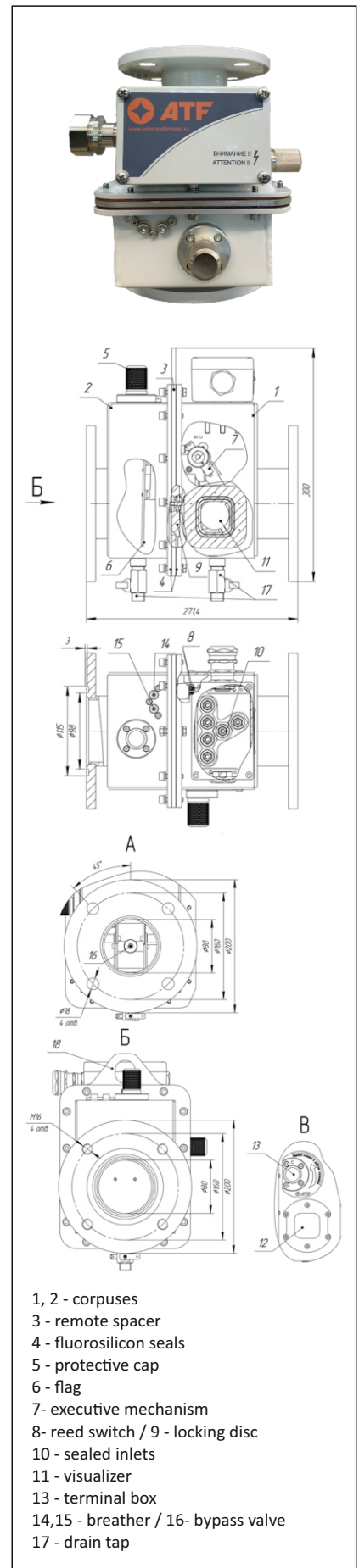


THE STRUCTURE OF THE VALVE SYMBOL:



Completely
interchangeable with:
Valve Daroc
ETI Elettindustria (Italy)

GENERAL VIEW:



- 1 - 2 - corpuses
- 3 - remote spacer
- 4 - fluorosilicon seals
- 5 - protective cap
- 6 - flag
- 7 - executive mechanism
- 8 - reed switch / 9 - locking disc
- 10 - sealed inlets
- 11 - visualizer
- 13 - terminal box
- 14,15 - breather / 16- bypass valve
- 17 - drain tap

DEHYDRATING BREATHER FOR TRACTION TRANSFORMERS

USING:

Designed to dehydrating breather entering the expander of the traction transformer.
Principle of operation: The dehydrating breather the expander passes through the indicator silica gel located in the device and is drained. As the moisture increases, the silica gel changes color from blue to pink. The lighter the shade of silica gel, the more moisture it contains. The pink color indicates that it is time to replace the silica gel. At the inlet/outlet, air passes through a hydraulic seal from transformer oil, which allows cleaning the incoming air from mechanical impurities.

ADVANTAGES:

- Compactness and conciseness;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Dehydrating breathers are manufactured using modern components and taking care of the environment.
- 5-year warranty.

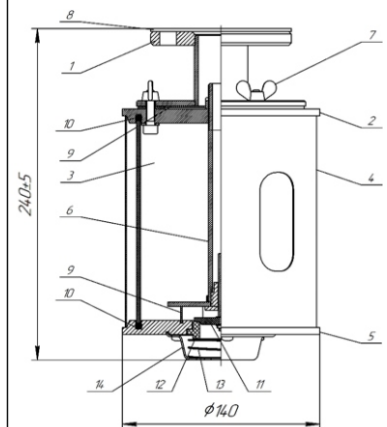
TECHNICAL CHARACTERISTICS OF THE DEHYDRATING BREATHER:

- Climatic design and accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-2015;
- The position of the air dryer is vertical;
- The mass of the air dryer – no more than 2.7 kg without sorbent;
- The main technical data are given in Table 1.

Table 1.

Name of the parameter	Meaning
Cover material (upper and lower)	Aluminum Alloy
Material of the connecting flange	Painted steel
Cylinder material	Polymethylmethacrylate
Material of the protective casing	Stainless steel
Color of the protective coating	RAL 7032/7035/7038/7040/8012
Group of operating conditions according to GOST	M6

GENERAL VIEW:



1. Connecting flange
2. Upper flange
3. Silica gel container
4. Protective cover
5. Bottom flange
6. Carrier pipe
7. Hardware
8. Transport plug
9. Stainless steel mesh
10. Rubber seals
11. The "inhale" valve
12. The "exhalation" valve
13. Spring
14. Spring housing

VS TYPE DEHYDRATING BREATHER (from 1 kg to 15 kg)

USING:

VS type dehydrating breathers are designed to protect the transformer oil contained in the expander from moisture and industrial pollution from the air. They allow you to effectively remove moisture from the over-oil expander space, since moisture negatively affects the properties of transformer oil and can cause the transformer to fail. The air entering the transformer expander passes through the adsorber (silica gel) located in the device and is drained. During operation, the adsorber is saturated with moisture.

ADVANTAGES:

- Aesthetic appearance;
- Easy to operate;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Dehydrating breathers are manufactured using modern components and taking care of the environment;
- 5-year warranty.

TECHNICAL CHARACTERISTICS OF THE DEHYDRATING BREATHER:

- Climatic design and accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-2015;
- The position of the air dryer is vertical;
- The main parameters and technical characteristics of the valve are listed in Tables 1 and 2.

Table 1.

Name of the parameter	Meaning
Cover material (upper and lower)	Aluminum Alloy
Material of the connecting flange	Painted steel
Cylinder material	PMMA
Material of the protective casing	Stainless steel
Color of the protective coating	RAL 7032/7035/7038/7040/8012
Group of operating conditions according to GOST	M6
Corrosion protection according to ISO 12944	C5M

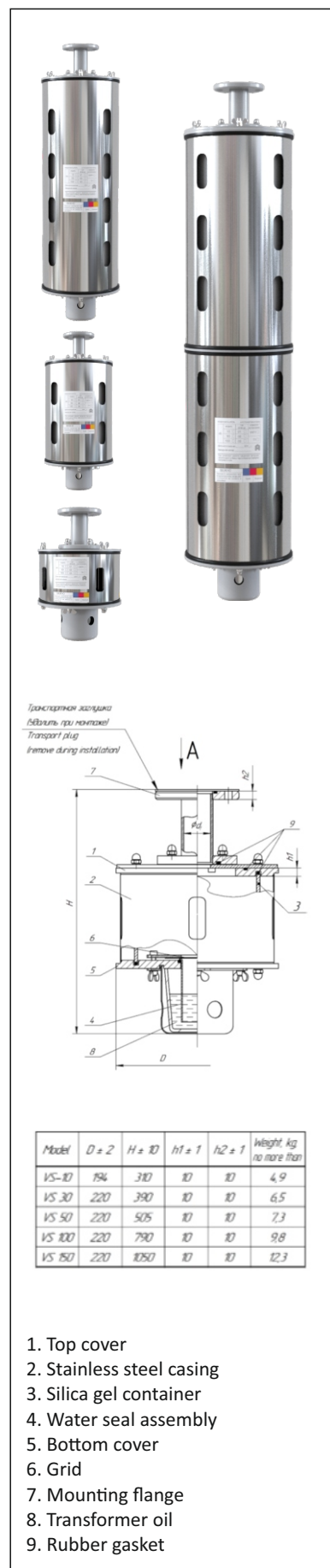
Type	Weight, kg (no more)	Loaded weightsorbent, kg	Transformer oil volume	
			Kg	Dm3
VS10	4.9	1	3500	4000
VS30	6.5	3	10000	12000
VS50	7.3	5	18000	20000
VS100 (VS100S)	9.3	10	34000	40000
VS150	12.3	15	55000	65000

THE STRUCTURE OF THE DEHYDRATING BREATHER SYMBOL

VS - X - X - X

Climatic modification
Type of a flange
Model

GENERAL VIEW:



SMART DEHYDRATING BREATHHER - SVS TYPE

USING:

The SVS type smart dehydrating breathers are designed to protect the transformer oil contained in the expander from moisture and industrial pollution from the air. They do not need constant monitoring of the moisture content of the sorbent. Regeneration of the sorbent in automatic mode and "on exhalation" of the transformer. Modifications are available for the main tank and for the RPN tank. Automatic warm-up to prevent freezing.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- Intelligent microprocessor control device;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Registration of all events in memory;
- A wide range of data transmission methods;
- Increase in service life due to the use of posistor heaters;
- Dehydrating breathers are manufactured using modern components and taking care of the environment.

TECHNICAL CHARACTERISTICS OF THE DEHYDRATING BREATHHER:

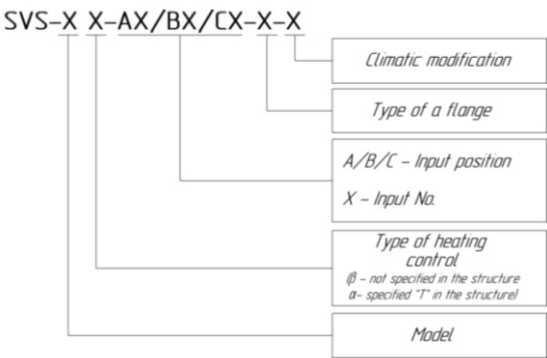
The main technical data are shown in Table 1.

Table 1.

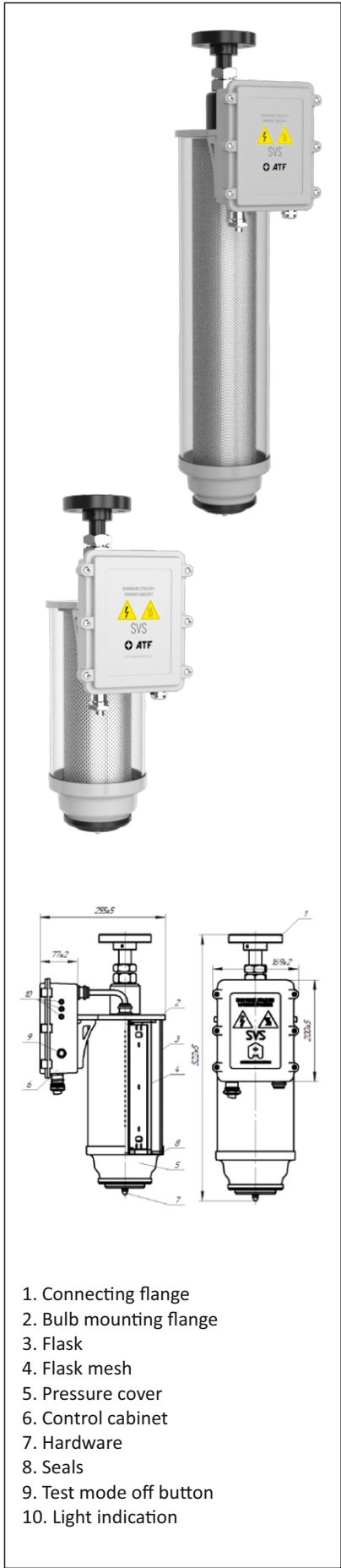
№	Name of the parameter	Meaning		
		SVS-10	SVS-10T	SVS-20T
1	Type of execution	single - chamber		
2	Cable entries	M20x1.5 (under the metal jacket), stainless steel		
3	Analog output	4...20 mA		
4	Digital output	RS-485		
5	Supply voltage	230 B, AC ± 10%		
6	Ambient temperature	from minus 60 to plus 80 °C		
7	Flange Type	on request		
8	Drying agent	colorless non-toxic silica gel (included in the package)		
9	Execution of the control cabinet	с подогревом		
10	Regeneration power	360 watt	360 watt	720 watt
11	Idle power	1 watt		
12	Drain heating on-off temperature	-	<5 °C	<5 °C
13	General type of management	β	α или γ	α или γ
14	Maximum permissible heating power	1,5 kW		3 kW
15	Maximum permissible (peak) short-term heating current	16 A		21 A

THE STRUCTURE OF THE DEHYDRATING BREATHHER SYMBOL

Completely interchangeable with:
MTRAB® 2.5-type DB100
Qualitrol STB-100-1



GENERAL VIEW:



OIL FILTER

(particle filtration from 50 up to 500 microns)

USING:

The filters are equipped with an innovative filter element that allows you to filter out particles with a size of 0.1 mm and above.

ADVANTAGES:

- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Filters are manufactured using modern components and with care for the environment.

TECHNICAL CHARACTERISTICS OF THE OIL PURIFICATION FILTER:

Climatic design and accommodation category according to GOST 15150-69.

Degree of protection IP68 according to GOST 14254-2015.

The position of the FOM is horizontal.

The main technical data are shown in Table 1.

Table 1.

Name of parameter		Value (standard)
Body material		Steel 09G2S
Material of connecting flanges		Steel 09G2S
Degree of protection according to GOST 14254-96		IP68
Group of operating conditions according to GOST 17516.1		M6
OF weight, kg (not more than)	ΦOM-100 / OF-100	35,0
	ΦOM-125 / OF-125	40,0
	ΦOM-150 / OF-150	45,0
	ΦOM-200 / OF-200	100,0

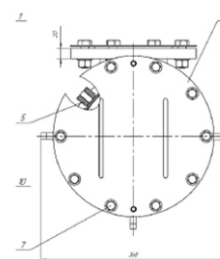
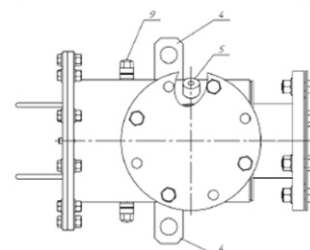
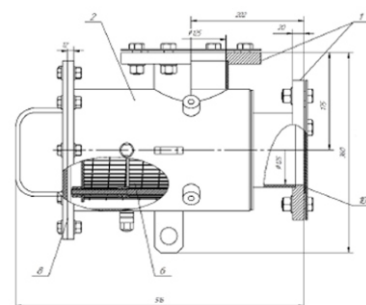
THE STRUCTURE OF THE SYMBOL OF OIL PURIFICATION FILTERS

OF - X - X

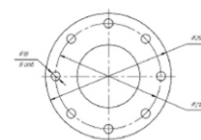
Climatic modification

Filter's schedule-size

GENERAL VIEW:



Connecting flange(standard version)



1. Connecting flange
2. Filter housing
3. Filter cover
4. Transportation bracket
5. Grounding boss
6. Filter element
7. Hardware
8. FSI seal
9. Air escapement breather
10. Plug and gasket transportation

THERMOSIPHON FILTER

(the amount of silicagel from 16 kg up to 160 kg)

USING:

- Cleans and dries transformer oil. The amount of silicagel: 16 -160 kg.

ADVANTAGES:

- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Filters are manufactured using modern components and with care for the environment.

TECHNICAL CHARACTERISTICS OF THE THERMOSIPHON FILTER:

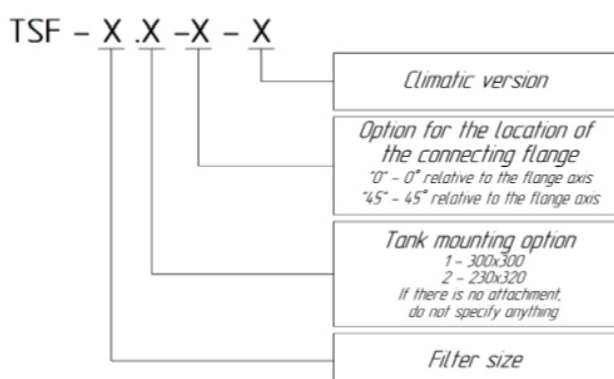
- Climatic design of UHL and placement category 1 according to GOST 15150-69;
- According to the degree of protection IP66 according to GOST 14254;
- Working environment temperature from minus 60 °C to plus 100 °C;
- Working medium – transformer oil according to GOST 982-80, TU 38.1011025-85 and other brands of transformer oils;
- The masses of thermosiphon filters are indicated in Table 1.

Designation	Name of the filter	Weight of silica gel, kg (no more)
TSF-16	Thermosyphon filter (16 kg)	16
TSF-25	Thermosyphon filter (25 kg)	25
TSF-40	Thermosyphon filter (40 kg)	40
TSF-50	Thermosyphon filter (50 kg)	50
TSF-100	Thermosyphon filter (100 kg)	100
TSF-100.1	Thermosyphon filter (100 kg with 300x300 mount)	100
TSF-100.2	Thermosyphon filter (100 kg with 230x320 mount)	100
TSF-160	Thermosyphon filter (160 kg)	160
TSF-160.1	Thermosyphon filter (160 kg with 300x300 mount)	160
TSF-160.2	Thermosyphon filter (160 kg with 230x320 mount)	160

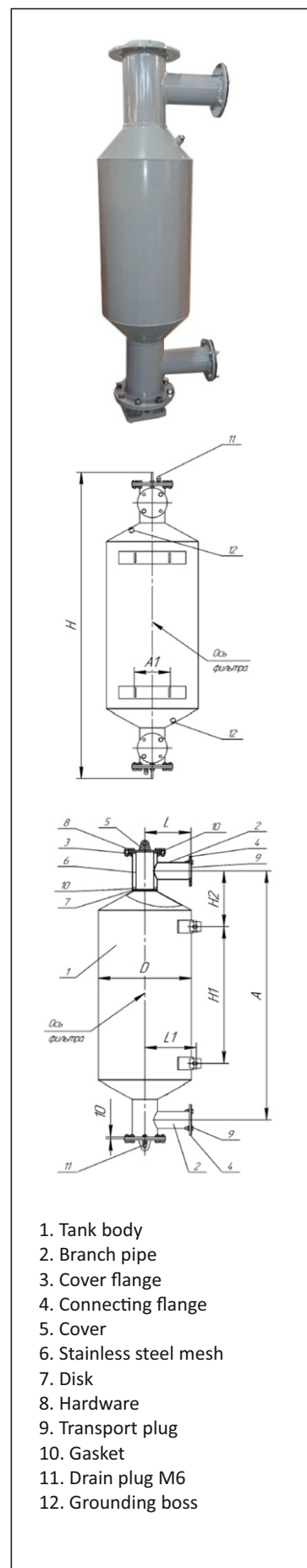
Table 1.

The color of the outer coating is RAL7032. At the request of the customer, a different color is possible.

THE STRUCTURE OF THE THERMOSIPHON FILTER SYMBOL



GENERAL VIEW:



AVA AXIAL FAN

USING:

Axial fans designed for cooling the oil of power transformers in the following cooling systems:

1. Oil cooling with blowing and natural oil circulation;
2. Oil cooling with blowing and forced oil circulation through air coolers;
3. Oil-water cooling of transformers with forced oil circulation.

ADVANTAGES:

- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Possibility of painting in any color;
- Fans are manufactured using modern components and taking care of the environment.

TECHNICAL CHARACTERISTICS OF THE AXIAL FAN:

The material of the blades, the fan bushings is aluminum alloy, the body is steel.

The degree of protection of the engine is Ip55.

Operating conditions: from minus 60 S to plus 45 S.

The main technical data are given in Table 1.

Table 1.

Name of the parameter	Meaning		
Diameter, mm	500	800	1000
Capacity, not less than m3/h	5000	17000	21000
Rotation speed, revolutions/min	1320	920	690
Electric motor power consumption, W	0,375	0,55	0,9
Operating voltage of the motor	380		
Noise power level	65-77		
Network frequency	50		
Rated voltage of the electric motor	380/220		



Table 2.

Climatic version	Operating temperature range		Maximum operating temperature range	
	from	to	from	to
Temperate and cold climate	-60 C	+ 40 C	-70 C	+45 C
Tropical climate	-10 C	+ 50 C	-10 C	+60 C



CENTRIFUGAL PUMP FOR TRANSFORMERS CP-30/10-R

GENERAL VIEW:

USING:

Centrifugal pump SR-30/10-R is designed for installation on locomotive transformers. The pump performs the function of pressure displacement (suction, discharge) in order to provide forced circulation of oil in the cooling system. The pump has small dimensions due to the specific equipment of such transformers.

ADVANTAGES:

- All components are from domestic manufacturers;
- Mass flow production gives the most favorable cost;
- Stainless steel fasteners;
- Possibility of painting in any color;
- Pumps are manufactured with the use of modern components and with care for the environment.

TECHNICAL CHARACTERISTICS:

The electric centrifugal pump is a single monoblock unit consisting of a casing and a special built-in asynchronous electric motor. Inside the pump casing, the impeller is rigidly mounted on the motor shaft. The impeller consists of a rear and a front disk with vanes between them. They are bent away from the radial direction in the opposite direction to the direction of rotation of the impeller. The pump is mounted on the oil line of the transformer cooling system in horizontal direction by a flange connection. The direction of oil flow is according to the arrow on the pump casing.

SYMBOL STRUCTURE:

CP X/X-R-X

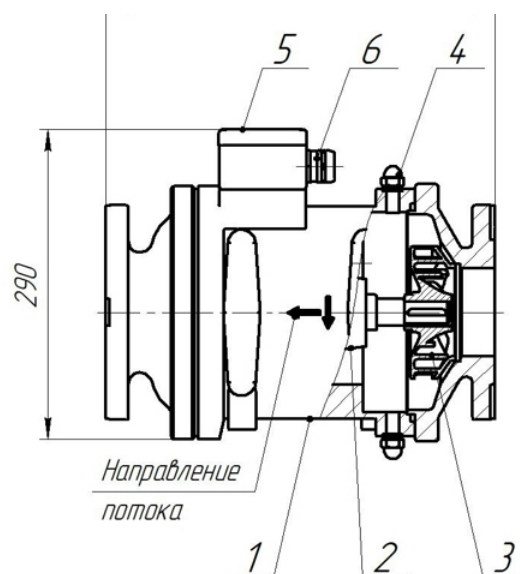
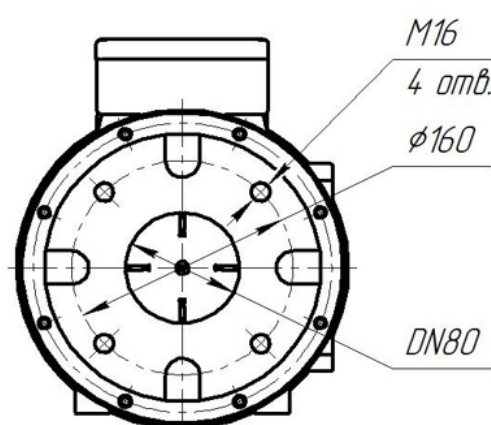
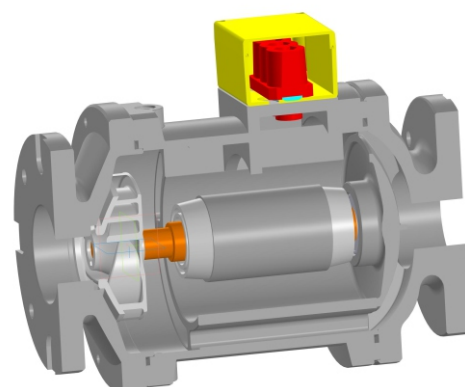
Climatic version and accommodation category to GOST 15150-69 (NF1, T1)

for railway electrification

pressure, m

capacity/feed, m³/h

Centrifugal Pump



1. Корпус насоса
2. Электродвигатель
3. Рабочее колесо
4. Спускной/сливной винт
5. Коробка клеммная
6. Кабельный ввод

CENTRIFUGAL PUMP

CP-63/20 CP-100/8

USING:

Centrifugal oil pump is a device used for pressure movement (suction, discharge) and to provide forced circulation of oil in the cooling system of power transformer equipment in cooling systems with forced oil circulation. A centrifugal pump increases pressure by transferring mechanical energy from an electric motor to the fluid by means of a rotating impeller.

ADVANTAGES:

- All components are from domestic manufacturers;
- Mass flow production gives the most favorable cost;
- Stainless steel fasteners;- Possibility of painting in any color;
- Pumps are manufactured with the use of modern components and with care for the environment.

TECHNICAL CHARACTERISTICS:

Pumps for oil transfer have their own design features, so they are not interchangeable with pumps for water, steam or gas.

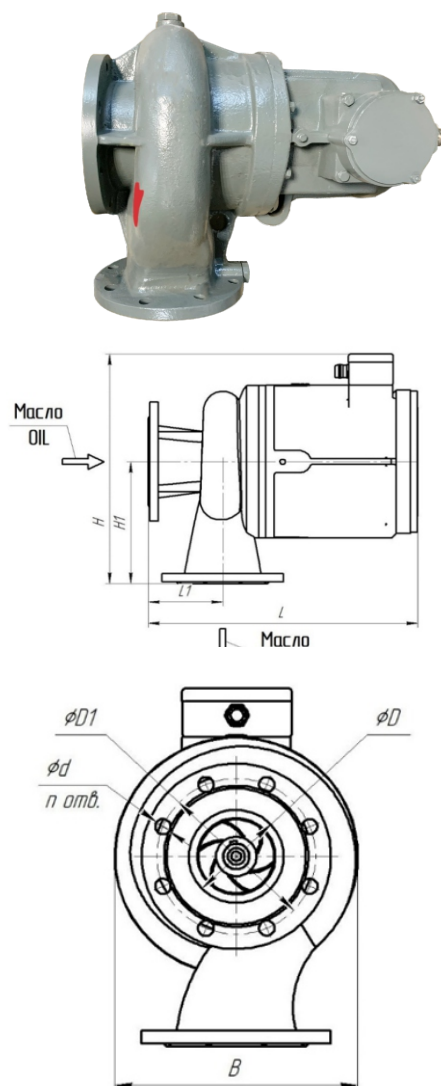
A centrifugal pump is a single monoblock unit consisting of a pump casing and a special built-in asynchronous electric motor. Inside the casing, which is usually spiral-shaped, the impeller is rigidly mounted on the motor shaft. The wheel consists of rear and front disks, between which the blades are mounted. They are bent away from the radial direction in the opposite direction, the direction of rotation of the impeller. The pump is connected to the transformer cooling system piping by means of a suction and discharge connection.

The sizes are listed in Table 1.

Table 1.

Electric pump type	Dimensions, mm								
	D	D1	d	n	H	H1	L	L1	B
CP 16/10	50	110	14	4	305	160	352	206	305
CP 63/10	100	170	18	8	390	200	414	255	
CP 63/20	100	180	18	8	430	220	480	132	280
CP 100/8	130	210	18	8	460	260	459	118	330

GENERAL VIEW:



SYMBOL STRUCTURE:

CP X/X-R-X

Climatic version and accommodation category to GOST 15150-69 (NF1, T1)

for railway electrification

pressure, m

capacity/feed, m³/h

Centrifugal Pump

DIRECT FLOW PUMP

USING:

The transformer's direct-flow pump operates in a constant mode, creating pressure in the system and providing continuous cooling of the traction transformer.

ADVANTAGES:

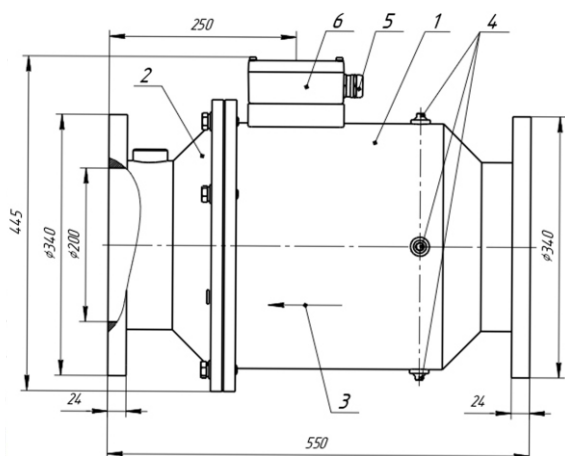
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Possibility of painting in any color;
- Pumps are manufactured using modern components and with care for the environment.

TECHNICAL CHARACTERISTICS OF DIRECT FLOW PUMP:

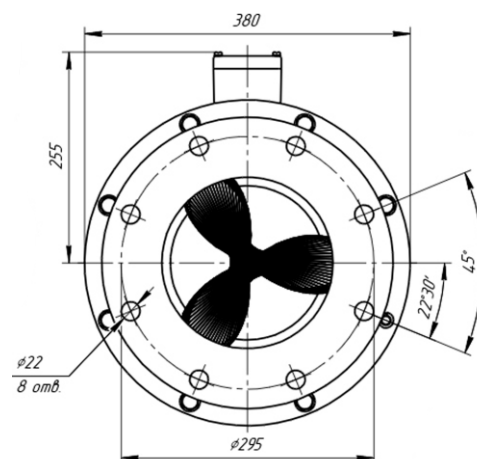
The ramjet pump consists of a steel housing, an electric motor built into it, designed to work in hot transformer oil, and an impeller made of stainless steel. The design of the pump housing and impeller does not reduce the conditional passage of the pipeline in the disconnected state.

- Conditional passage DN200 mm.
- The working medium is transformer oil.
- Capacity - 100 m³/h at a head of 1.5 m.
- Head - 4 m.
- The temperature range of the pump is from minus 60 C to plus 90 C.
- The maximum temperature of the pumped transformer oil is plus 115 C.
- The power of the electric motor is 3 kW.
- Rated voltage - 3 F, 380 V, 50 Hz.
- Rated current - 7.5 A.
- The multiplicity of the starting current is 10.

GENERAL VIEW:



1. Pump body: steel 09G2S
2. Pump cover: 09G2S steel
3. Oil flow direction
4. Drain/Drain screw
5. Cable entry: Brass
6. Terminal box: aluminum



THE STRUCTURE OF THE SYMBOL OF DIRECT FLOW PUMP

MP X/X-X

Climatic version and accommodation category to GOST 15150-69 (NF1, T1)

pressure, m

capacity/feed, m³/h

Monotube Pump

ORF OIL FLOW INDICATOR

USING:

- to determine the presence of the flow and direction of the liquid dielectric (hereinafter referred to as oil) in the pipeline of the cooling system of a transformer or other apparatus during its operation;
- for monitoring the presence of flow and signaling (issuing an electrical signal) about the presence/absence of a controlled flow.

ADVANTAGES:

- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Possibility of painting in any color;
- The indicators are manufactured using modern components and with care for the environment.

TECHNICAL CHARACTERISTICS OF OIL FLOW INDICATOR:

- The main technical data are shown in Table 1.

№	Name of the parameter	Meaning
1	AC voltage	250 V, 50 Hz, 3A
2	DC voltage	220 V, 0,2 A

Table 1.

The size range depends on the conditional passage of the cooling system pipeline. See table 2.

Table 2.

DN	B, MM	ØD*, MM	Ød*, MM
DN80 DN100	100	130	9
DN125 DN150	130		
DN180 DN200	160		
DN250 DN300	190		

Completely interchangeable with :

- Oil flow indicator SCFR2 Cedaspe
- Cedaspe CCL2
- Qualitrol 092 flow indicators

THE STRUCTURE OF OIL FLOW INDICATOR ORF

ORF - X - X - X

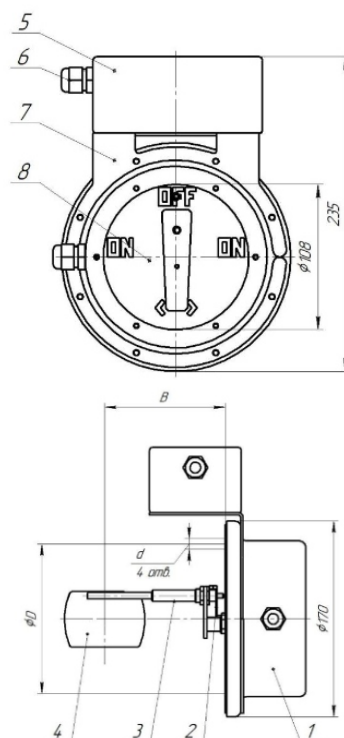
Climatic version and accommodation category to GOST 15150-69 (NF1, T1)

Type of cable gland

Conditional passage of the oil pipeline
DN: 80/100; 125/150; 180/200; 250/300

Type of indicator:
ORF - flow direction left or right
ORF-L - flow direction to the left
ORF-R - flow direction to the right
ORF-D - flow direction down
ORF-U - upward flow direction

GENERAL VIEW:



1. Housing, aluminum
2. Drive mechanism "arrow flag"
3. Flag axis, steelstainless, brass
4. Flag, stainless steel
5. Terminal box, aluminum
6. Cable entry
7. Box bracket
8. Dial, aluminum

ORFP OIL FLOW INDICATOR

USING::

The ORFP is designed for use as part of the cooling system of transformers with liquid dielectric (transformer oil) in order to control the presence of flow in the cooling system piping and to signalize the presence/absence of the controlled flow. Thus the indicator informs about the operation of the electric pump creating oil circulation or about the shutdown/stop of the electric pump.

ADVANTAGES:

- All components are from domestic manufacturers;
- Mass flow production gives the most favorable cost;
- Stainless steel fasteners;
- Possibility of painting in any color;
- Indicators are manufactured with the use of modern components and with care for the environment.

TECHNICAL CHARACTERISTICS OF OIL FLOW INDICATOR:

- The main technical data are shown in Table 1.

№	Name of the parameter	Meaning
1	AC voltage	250 V, 50 Hz, 3A
2	DC voltage	220 V, 0,2 A

Size range depending on the nominal bore of the cooling system piping. See table 2.

Table 1.

Table 2.

DN	B	Ød
DN50/65	90	40
DN80/100	90	50
DN 125/150	115	50
DN 175/200	140	50
DN 250	165	50
DN 300	195	50

THE STRUCTURE OF OIL FLOW INDICATOR ORF

ORFP - X - X - X

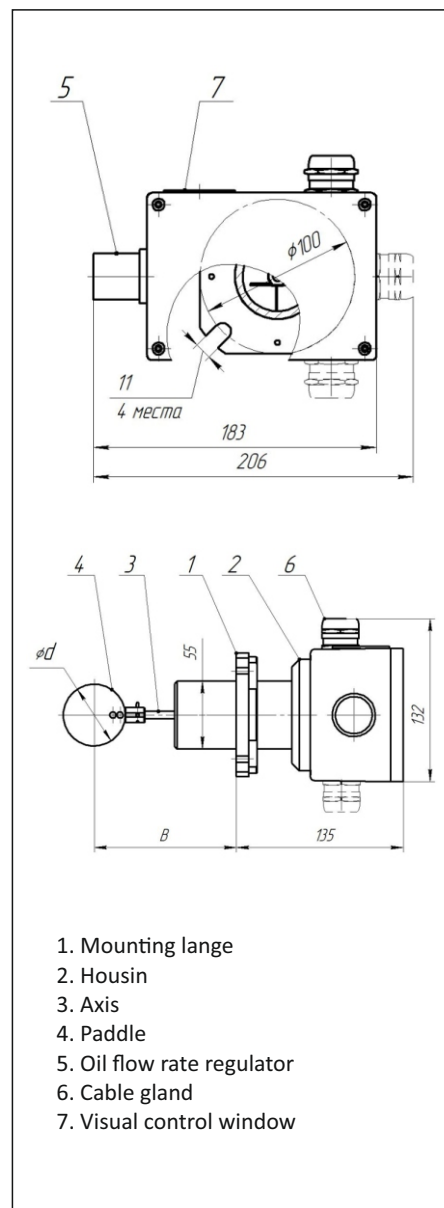
Climatic version and accommodation category to GOST 15150-69 (NF1, T1)

Type of cable gland

Conditional passage of the oil pipeline
DN: 65/100; 125/150; 175/200; 250; 300

Paddle oil flow relay

GENERAL VIEW:



Fully interchangeable with:
- Cedaspe CCL2

BUTTERFLY VALVES (rubber/fluorosilicon seal)

BFV50 - BFV200

USING:

Designed for installation on power oil transformers and pipeline systems in places where transformer oil passes, both in the middle (cutting) and at the ends of pipelines, as shut-off devices that do not require special maintenance.

ADVANTAGES:

- The products are certified and certified by ROSATOM Concern;
- All components from domestic manufacturers;
- Seals made of oil- and gasoline-resistant rubber or fluorosilicon;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- The possibility of painting in any color;
- The valves are manufactured using modern components and taking care of the environment.

TECHNICAL CHARACTERISTICS OF THE BUTTERFLY VALVES:

- The main technical data are shown in Table 1.

Table 1.

No.	Parameters, measures	Parameters' definition					
		3	4	5	6	7	8
1	Type of a valve	BFV-50	BFV-80	BFV-100	BFV-125	BFV-150	BFV-200
2	BFV nominal diameter, mm	50	80	100	125	150	200
3	Rated working pressure PN, MPA (kgf/cm ²)	0,63 (6,3)					
4	Permissible torque on the lever (handle) is no more than, kgf*m	3,0	3,0	3,2	5,1	16,2	18,4
5	Lever pressing is no more than, kgf	10,0	11,5	12,3	16,4	52,3	59,4
6	Efficient clear opening, mm ²	1030	3700	5500	9000	13000	23600
7	Leakage rate	A (no visible leaks)					
8	Testing pressure for tightness and density, (kgf/cm ²)	6,3+0,6					
9	Operating environment temperature	-60 0C +100 0C					
10	Valve opening and closing at operating environment temperature	No lower than -300C					
11	Mass, kg, no less than	0,95	1,5	1,8	3,1	3,9	6,8
12	Quantity of tapping	4	4	4	8	8	8
13	Seal material	Rubber or fluorosilicone					
14	Body material	Aluminium casting alloy AK9ch					

All materials, components and structural characteristics allow the use of the shutter when:

- ambient temperature from -60°C to +50°C;
- climatic design according to GOST 15150.

100% of products pass control tests:

- Visual inspection;
- Instrumental control for compliance with CD;
- Leakproofness test with an increased pressure of 6.3 kgf/cm² for 1 minute;
- Check for functionality (operability).

THE INNOVATIVE NEXT SERIES OF VALVES with fluorosilicon seals
2 times more economical, 8 times more durable!

DN-50, DN80, DN100, Dn125, DN150, Dn200

GENERAL VIEW:



NEW SERIES «NEXT»



BUTTERFLY VALVES (rubber/fluorosilicon seal)

DN50 - Dn200

STANDARD SIZES OF BUTTERFLY VALVES

Overall, installation and connection dimensions of the butterfly valves with a conditional passage of the 50, 80, 100 mm

Table 2.

BFV, MM	H±1,0, MM	h ± 1,0, MM	D ±1,0, MM	D1±0,5, MM	D2±0,5, MM	d±0,5, MM	B±0,5, MM	B1±1,0, MM	S, MM
BFV 50	178	107	150	110	125	14	34	37	14
BFV 80	224	128	195	150	160	18	33	37	14
BFV 100	246	145	215	170	180	18	38	42	17

Overall, installation and connection dimensions of the butterfly valves with conditional passage 125, 150, 200 mm

Table 3.

BFV, MM	H ±3,0, MM	h ± 1,0, MM	D ±1,0, MM	D1±0,5, MM	d±0,5, MM	B±0,5, MM	B1±1,0, MM	S, MM
BFV 125	280	165	245	210	18	46	50	19
BFV 150	320	185	280	240	22	47	54	19
BFV 200	388	225	335	295	22	69	78	24

THE STRUCTURE OF THE LEGEND OF THE BUTTERFLY VALVES

BFV - XXX - 0,63 - A - X (X) - X

Version of execution
 - Standard design shutter with a cap (not specified in the marking)
 - RBF - valve with a key handle
 - RSF - valve with lock
 - P1 - valve with a standard platform for the drive
 - P2 - valve with a platform for the drive (in agreement with the customer)
 - ZP - valve with electric drive

Sealing material
 S - Fluorosilicone, R - rubber (not applicable on the table)

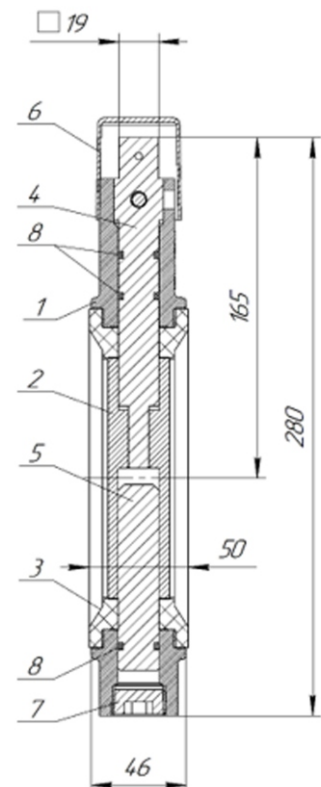
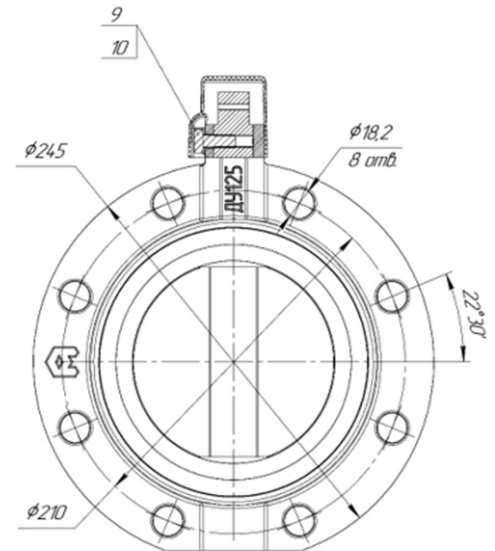
Climatic modification and location category
 (N1, NF1, T1)

Leakage rate

Rated working pressure PN, MPa

Nominal inside diameter DN50, 80, 100, 125, 150, 200

The drawing shows one of the gate options: DN-125



1. Housing
2. The flap
3. Cuff
4. Upper axis
5. Lower axis
6. Protective cap
7. Plug
8. Sealing ring
9. Washer
10. Bolt

VERTICAL OIL LEVEL INDICATOR WITH FLOAT for distribution transformers

USING:

Vertical oil indicator type MV-G1 is designed for visual monitoring of the oil level of power oil transformers with a sealed tank. The oil level sensor is screwed into the tank cap. It shows the oil level and makes it possible to control gas formation in the transformer and leakage from the tank. The oil level shows a bright red indicator.

ADVANTAGES:

- Along with the standard version, it is possible to change the length of the rod according to the customer's requirements;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- Floats made of foamed polymer;
- Oil level indicators are manufactured using modern components and taking care of the environment;
- 5 years warranty.

TECHNICAL CHARACTERISTICS:

- Climatic version according to GOST 15150-69;
- Accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-96;
- Location during operation - outdoors;
- Permissible ambient temperature: from -60C to +50C.

GENERAL VIEW:

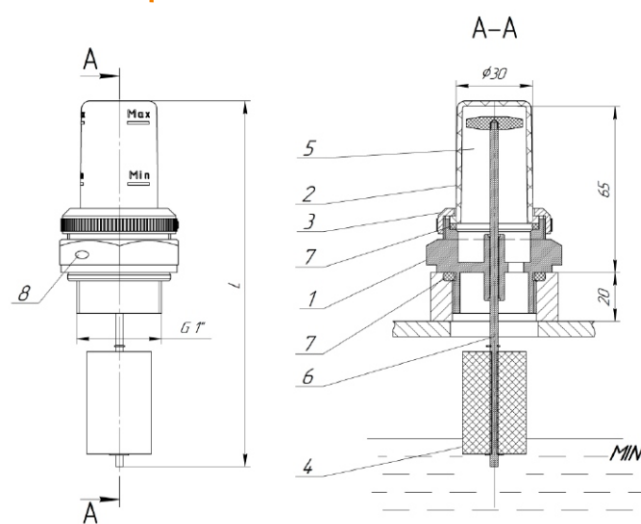


THE STRUCTURE OF THE OIL INDICATOR SYMBOL MB-G1

MB - G1"

Connection size (inch thread)

Vertical float oil indicator



1. MV housing, brass
2. Cap, PMMA
3. Cap lock, brass
4. Float
5. Level indicator
6. Pieces
7. O-rings
8. Sealing hole d3 mm

SAFETY VALVE for distribution transformers

USING:

The safety valve is designed to relieve pressure in case of an emergency increase. Principle of operation: when the pressure in the pipeline, tank, transformer tank rises above the set limit, the valve moves upwards together with the gasket, thereby releasing excess pressure. When the pressure drops to the permissible values, the spring returns the valve to its original position, while the tightness of the valve remains. The installation can be both internal and external. Permissible ambient temperature: -60 to +80 C.

ADVANTAGES:

- Body parts made of brass;
- Valve stem, spring and fasteners made of stainless steel;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- The valve is manufactured using modern components and taking care of the environment;
- 5 years warranty.

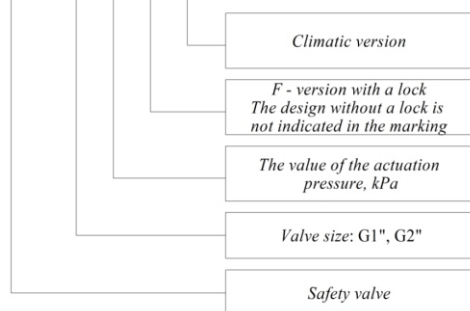
TECHNICAL CHARACTERISTICS:

- Climatic design and accommodation category according to GOST 15150-69;
- Degree of protection IP56 according to GOST 14254-96;
- Location during operation - outdoors;
- Permissible ambient temperature: from -60 C to +50 C.

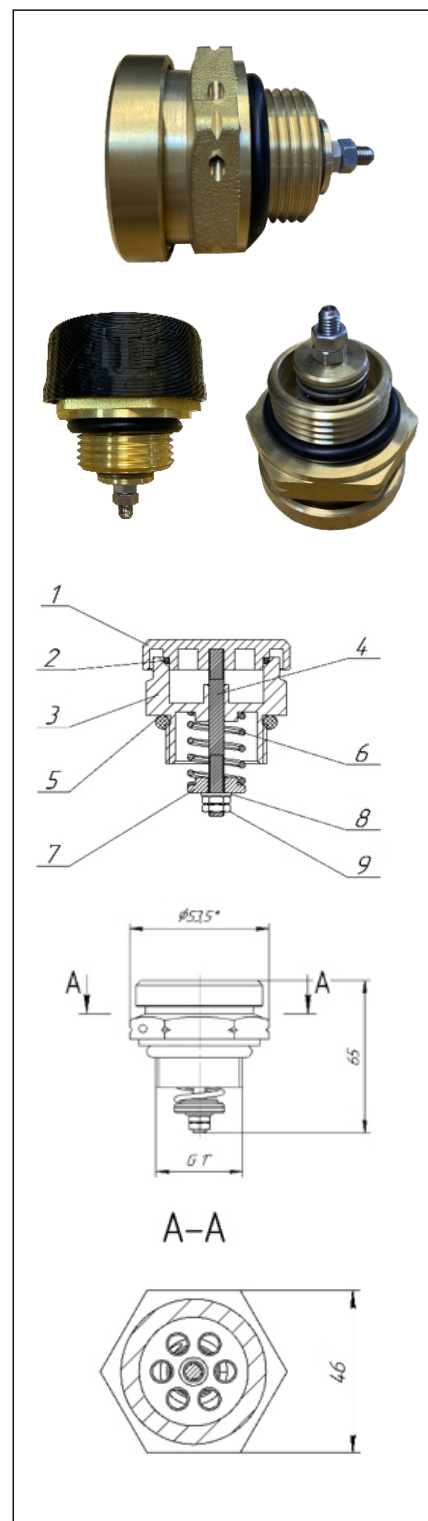
Designation	Actuation pressure, kPa
KPM-G1"-20	20
KPM-G1"-25	25
KPM-G1"-30	30
KPM-G1"-35	35
KPM-G1"-40	40
KPM-G1"-45	45
KPM-G1"-50	50
KPM-G1"-55	55
KPM-G1"-60	60
KPM-G1"-65	65
KPM-G1"-70	70
KPM-G1"-75	75

THE STRUCTURE OF THE VALVE SYMBOL

KPM - X - X - X - X



GENERAL VIEW:



1. Valve, brass
2. Gasket, rubber/FSI
3. Body, brass
4. Hairpin, stainless steel
5. Gasket, rubber/FSI
6. Spring, stainless steel
7. Spring stop, brass
8. Washer
9. Nut

Completely interchangeable with :
EMC 2L-45-01
MAIER 3 01 K

TERMINAL BOXES

(for radio and electrical equipment)

USING:

Designed to accommodate electronics, industrial automation and other equipment that requires protection from environmental influences. The hermetic aluminum alloy housing, the design and material of the seal between the cover and the housing can limit or prevent environmental exposure to the equipment inside.

TECHNICAL SPECIFICATIONS AND STANDARD DIMENSIONS:

SERIES	Length MM	Width MM	Height MM	Material	Protection class
P3A 100 	96	96	45	aluminum	IP-67
	96	96	67	aluminum	IP-67
	192	96	45	aluminum	IP-67
	192	96	67	aluminum	IP-67
	274	173	66	aluminum	IP-67
	274	173	100	aluminum	IP-67
	150	100	50	aluminum	IP-67
	150	100	75	aluminum	IP-67
	200	150	50	aluminum	IP-67
	200	150	50	aluminum	IP-67
	200	150	75	aluminum	IP-67
	152	112	30	aluminum	IP-67
	162	162	25	aluminum	IP-67
	262	182	90	aluminum	IP-67
P3A 200 	50	45	30	aluminum	IP-67
	90	36	30	aluminum	IP-67
	98	64	34	aluminum	IP-67
	64	58	35	aluminum	IP-67
	55,5	41	31	aluminum	IP-67
	115	65	30	aluminum	IP-67
	125	80	40	aluminum	IP-67
	125	80	57	aluminum	IP-67
	150	63	36,5	aluminum	IP-67
	79,6	74,6	52	aluminum	IP-67
	115	65	55	aluminum	IP-67
	102,5	52,5	25,5	aluminum	IP-67
	115	52,5	25,5	aluminum	IP-67
	115	90	75	aluminum	IP-67
	148	108	75	aluminum	IP-67
	160	100	60	aluminum	IP-67
	160	100	81	aluminum	IP-67
	175	80	60	aluminum	IP-67
	171	121	55	aluminum	IP-67
	200	120	75	aluminum	IP-67
	222	146	55	aluminum	IP-67
	222	146	82	aluminum	IP-67
	120,5	120,5	101,5	aluminum	IP-67
	158,5	158,5	101,5	aluminum	IP-67
	260	160	90,5	aluminum	IP-67

GENERAL VIEW:



TERMINAL AND DISTRIBUTION BOXES

USING:

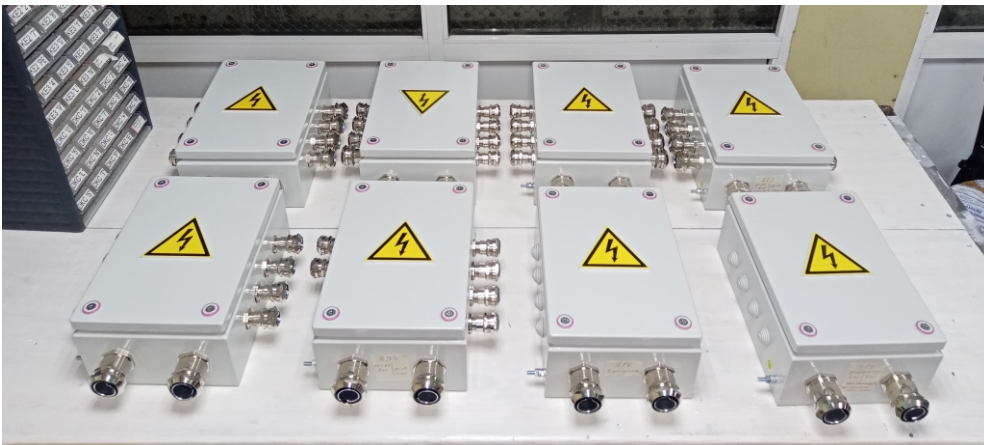
Terminal boxes are designed for connecting and branching electrical power circuits, secondary electrical circuits, alarm circuits, control control, relay protection circuits and automation with aluminum or copper cores.

ADVANTAGES:

- A huge number of standard sizes of cases;
- High degree of protection from external influences, high mechanical strength to shock, vibration, increased corrosion resistance;
- The presence of external brackets;
- The possibility of installing hinges to fix the lid on the housing;
- The possibility of installing a lock on the lid;
- Modern universal terminal clamps;
- Various combinations of cable entries (brass, plastic);
- Ease of installation;
- Assistance in the selection of the housing in accordance with the requirements of the customer and the provision of drawings.



Production of the product according to the customer's specification in a short time



GENERAL VIEW:



NO-LOAD TAP CHANGER (NLTC) for power transformers

USING:

Designed for installation on power oil transformers and systems for voltage regulation – changing the transformation coefficient. This product is controlled when the transformer is switched off.

ADVANTAGES:

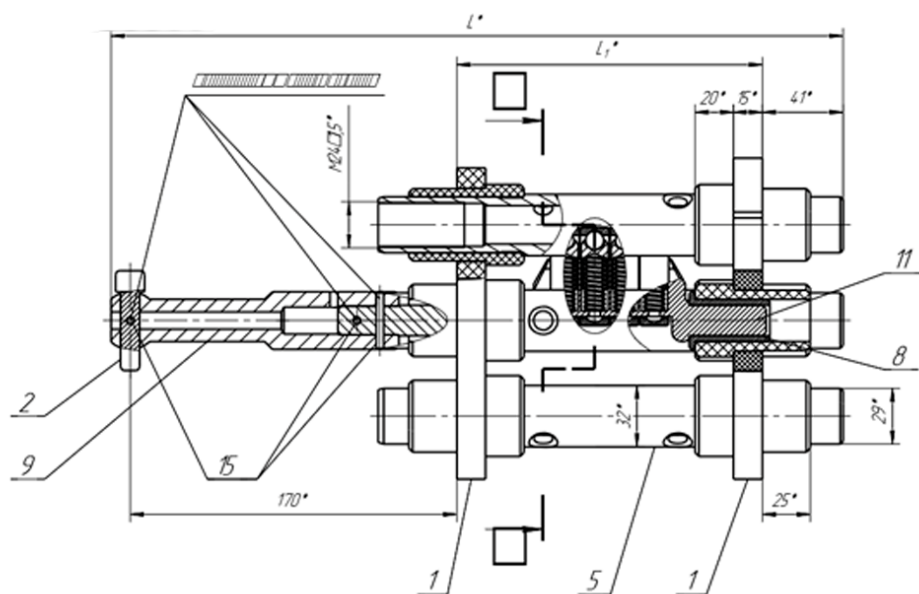
- Compact, time-tested design;
- All components from domestic manufacturers;
- Mass production flow gives the most favorable cost;
- Stainless steel fasteners;
- The possibility of painting in any color.

TECHNICAL CHARACTERISTICS OF PBV DEVICE:

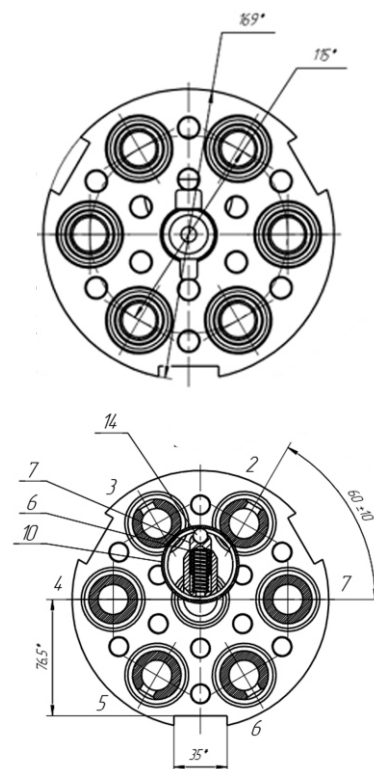
The load level usually changes over time due to existing seasonal fluctuations. Changing the load, in turn, entails the need to regulate the voltage in the network. Maintaining the voltage level within certain limits is a critical condition for consumers. Voltage regulation can be carried out using PBV devices built into the transformer design. By changing the number of turns and windings included in the operation, these devices change the transformation coefficient.

Rated voltage - 35 kV, currents: 320, 720, 1000, 1250, 1600 A.

Обозначение	Тип	Кол-во колец	L1, мм	L1, мм
БТЛИ.685123.003	П-35/320-6*5	4	160	383
-01	П-35/720-6*5	7	206,5	429,5
-02	П-35/1000-6*5	10	253	476
-03	П-35/1250-6*5	12	284	507
-04	П-35/1600-6*5	16	346	569



GENERAL VIEW:



NLTC

for distribution transformers

USING:

It is intended for installation in oil-filled power transformers for voltage regulation - change of transformation ratio. This product is controlled when the transformer is switched off.

ADVANTAGES:

- Compact, time-proven design;
- Easy to operate and install;
- The design provides for fixing the position of the UBV by means of a lock;
- All components are from domestic manufacturers;
- Mass flow production gives the most favorable cost.

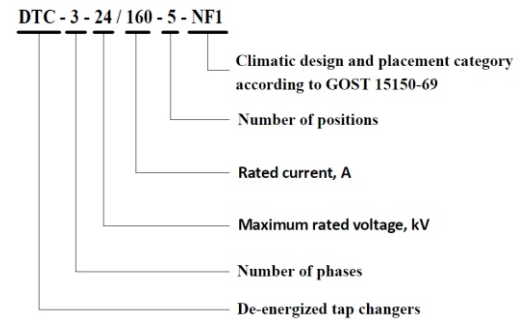
TECHNICAL CHARACTERISTICS OF PBV DEVICE:

Load levels tend to change over time due to existing seasonal variations. The load variation, in turn, entails the need to regulate the grid voltage. Maintaining the voltage level within certain limits for consumers is critical. Voltage regulation can be realized by means of rack and pinion devices, which are integrated into the transformer design.

These devices change the transformation ratio by changing the winding turns included in the operation.

Maximum rated voltage - 24 kV. Rated current - 63 A; 160 A; 250 A.

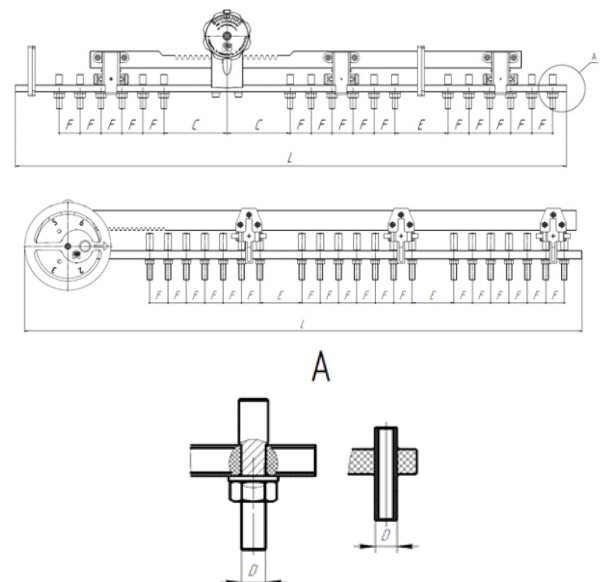
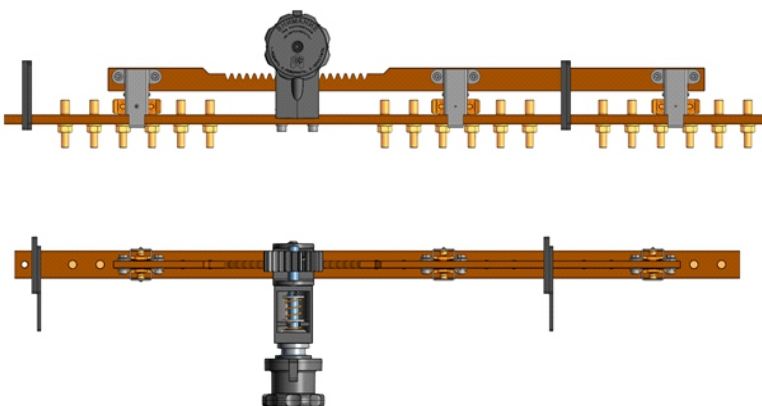
SYMBOL STRUCTURE



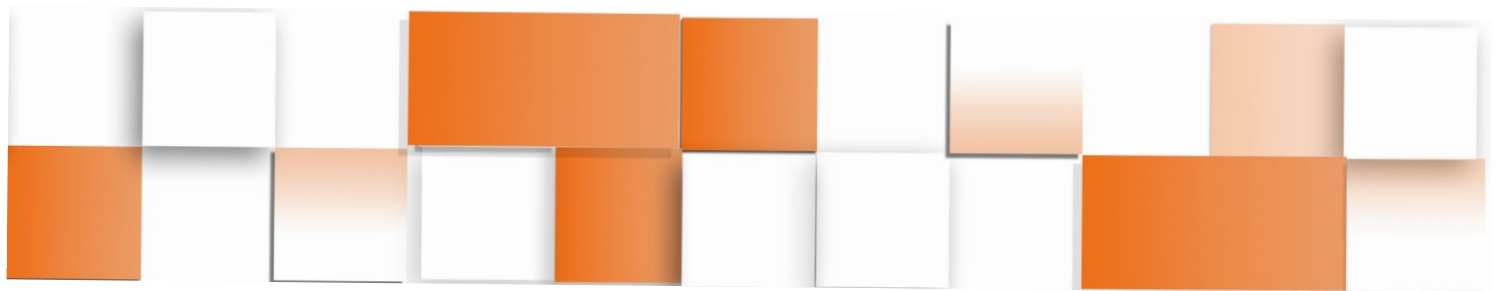
TYPICAL SIZES:

Type	Nominal current	L, mm	C, mm	E, mm	F, mm	D
DTC-3-24/63 -5	63 A	455	55	55	18	Ø 7 mm
DTC-3-24/160 -5	160 A	790	90	76	30	M8
DTC-3-24/250 -6	250 A	970	-	73	32	M10

GENERAL VIEW:



GEOGRAPHY OF SUPPLIES



wide range



short
production
time



high quality
and warranty



comfortable
prices



individual
approach



delivery to
anywhere in
the world

Our company has been audited by all transformer plants in Russia.
We invite you to cooperate.



**You can get all additional technical and commercial
information on request**

LLC "Avtotransformator»
Russian Federation, Samara region, Togliatti, Kommunalnaya str. 16