AGT | AEROSPACE GLOBAL TRADE

CONTENT

AGT AEROSPACE GLOBAL TRADE

AVIATION

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SPACE

Pressure sensors

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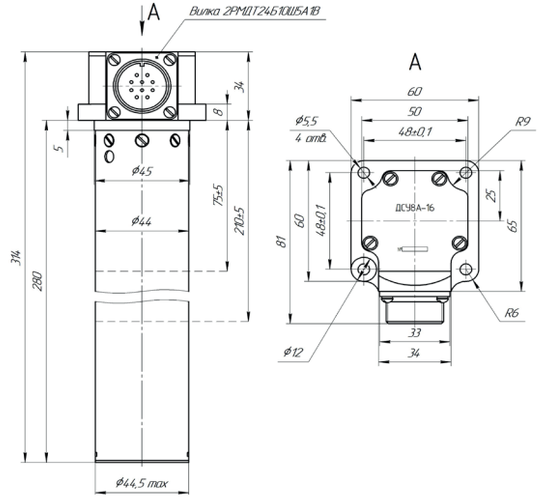
Signal converters

ДСУ, DSU
Level sensor

Designation:
The level sensor is designed to issue to the indicating devices and register electrical signals about the maximum and minimum levels of the working fluid in the tank of the aircraft.

Key performance data:
1) Working position of the sensor:
   - ДСУ10-16, ДСУ10-27 - pipe up;
   - ДСУ8А-16, ДСУ8А-16Т - pipe down.
2)Distance from flange to signalling level:
   - ДСУ10-16 - Hmin 60 mm;
   - ДСУ10-27 - Hmin 100 mm;
   - ДСУ8А-16, ДСУ8А-16Т - Hmax 75 mm, Hmin 210 mm.
3)Level signalling error - not more than ± 5 mm.
4)The variation of signal operation should not exceed 15 mm
   for ДСУ10-16, ДСУ10-27, ДСУ8А-16 and 10 mm for DSU8A-16T.
5)The load current of the sensor circuits is from 15 mA to 150 mA
   at a supply voltage of 27V.
6)Operating temperature
   In the pipe area:
   - ДСУ10-16, ДСУ10-27 - from minus 60ºС to 150ºС (short-term limit 180ºС for 45 minutes per 1 hour of operation);
   - ДСУ8А-16, ДСУ8А-16Т - from minus 60ºС to 165ºС (short-term limit 200ºС for 8 minutes per 1 hour of operation);
   In the electrical connector area:
   - ДСУ10-16, ДСУ10-27 - from minus 60ºС to 150ºС (short-term limit 180ºС for 45 minutes per 1 hour of operation);
   ДСУ8А-16, ДСУ8А-16Т - from minus 60ºС to 200ºС (short-term limit 215ºС for 8 minutes per 1 hour of operation);
7)Sensor mass:
   - DSU10-16 - not more than 0.18 kg;
   - DSU10-27 - not more than 0.205 kg;
   - ДСУ8А-16, ДСУ8А-16Т - not more than 0.650 kg.



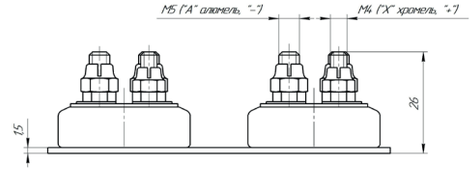
Design:
The sensor is a body part with a flange, to which a sealed non-magnetic metal tube of round cross section and an electrical connector are attached. Signalling devices, consisting of magnetically controlled contacts (reed switches) and insulators, are installed in a sealed tube and connected to an electrical connector through flexible leads. Floats with installed magnets are located on a sealed tube and are covered with a casing.

AVIATION AGGREGATES

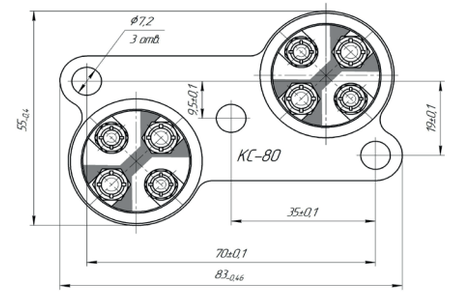
KC- 80

Connecting block

Designation:
The KC- 80 connecting block is designed to connect compensating wires coming from thermocouples to measuring devices and to the pointer.



Key performance data:
1) Working temperature range:
   - working temperature from minus 60 to +250 °C,
   - limit - +350 °C.
2) Terminal screws:
   smaller diameter (M4) - chromel (X)
   larger diameter (M5) - alumel (A)
3) Electrical insulation resistance in normal climatic conditions of not less than 0.5 MOhm.
4) The product mass is not more than 0.128 kg.



Design:
The block is a non-separable structure, consisting of a flange, on which the glasses are welded by spot welding, insulators are rolled into the glasses, spring-loaded from below with a spring washer. Terminal screws are installed in the insulators). The terminal screws in the insulators are fixed with nuts.

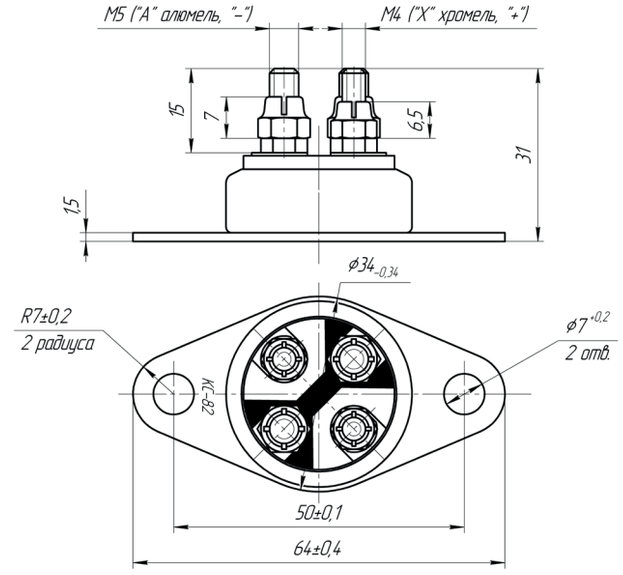
AVIATION AGGREGATES

KC- 82

Connecting block

Designation:
The KC-82 connecting block is designed to connect compensating wires coming from thermocouples to measuring devices and to the pointer.

Key performance data:
1) Working temperature range:
   - working temperature from minus 60 to 250 °C,
   - limit - 350 °C.
2) Terminal screws:
   smaller diameter (M4) - chromel (X)
   larger diameter (M5) - alumel (A)
3) Electrical insulation resistance in normal climatic conditions of not less than 0.5 MOhm.
4) The product mass is not more than 0.075 kg.



Design:
The block is a non-separable structure consisting of a flange, on which a cup is welded by spot welding, an insulator spring-loaded from below with a spring washer is rolled into the cup. Terminal screws are installed in the insulator). The terminal screws in the insulators are fixed with nuts.

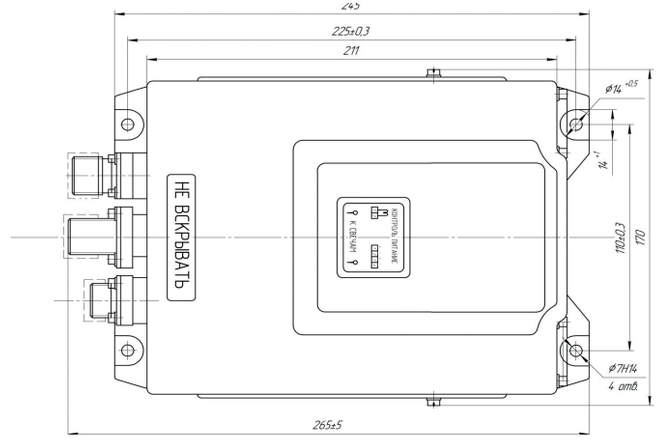
AVIATION AGGREGATES

СК-22-2КУ

Ignition unit

Designation:
The СК-22-2КУ ignition unit is designed to convert the voltage of the power source into the voltage required for the operation of a semiconductor spark plug. The unit has two independent equivalent electrical circuits and, together with two spark plugs, shielded high-voltage wires, high-voltage fittings as part of the launch system, is used to ignite the fuel-air mixture in the engine combustion chamber during ground and flight start.

Key performance data:
1) Sparking on plugs: uniformly periodic
2) Supply voltage: 16-30V
3) Current consumption at supply voltage (27±1) V: 5.0±2.0A
4) Mass of the unit, not more than 3.35 kg
5) The unit is operational in the temperature range from minus 60 to +60°C and can withstand staying at +100°C for a long time in the off state;



Design:
The unit is made by two identical groups of nodes, fixed in the housing with screws using clamps and fittings pressed into the plastic housings of the nodes. on the outer side of the unit body there are two plug connectors POWER and CONTROL, nipples of high-voltage outputs.
The body has 4 paws with holes for mounting the unit on the engine.
The unit is closed with a cover welded to the body after the unit is assembled.

AVIATION AGGREGATES

○ ЕРД-3УВМ

Electronic engine regulator

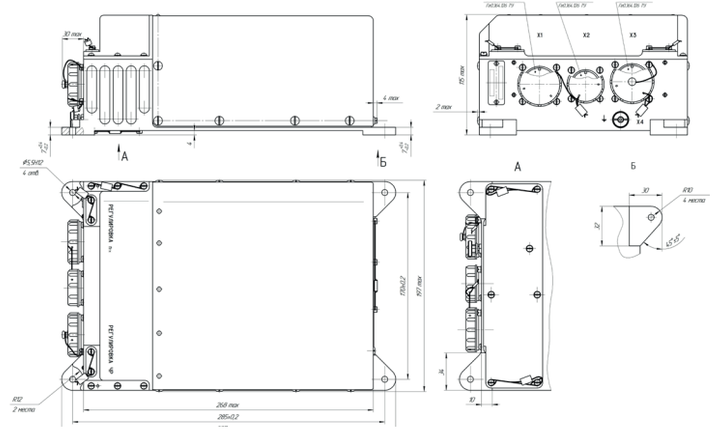
AGT AEROSPACE GLOBAL TRADE

Designation:

The ЭРД-3УВМ (ЭРД-3УВМА) electronic engine regulator of series 2 is part of the electronic part of the ТВ3-117ВМ (ТВ3-117ВМА) engine control system and is designed to generate control actions on the actuator (ИМ-47), which regulates fuel consumption during frequency control rotation of the turbocharger, the actuating mechanism for restructuring the stop of the automatic pump injectivity of the НР-3ВМ regulator, and the ИМ-3А actuating mechanism for the engine stop regulator during free turbinespin-up.
The ЭРД-3УВМ and ЭРД-3УВМА regulators are distinguished by the initial factory setting of the РЕГУЛИРОВКА ЧР, РЕГУЛИРОВКА nтк adjusting screws.

Key performance data:

1) Power supply:
   - from the rectifying device of the onboard power supply system with a voltage of 27 V_{-3}^{+2}
   - from the onboard storage battery with voltage from 18 to 30 V.
2) Current not more than 2 A.
3) Continuous working time: not more than 10 hours
4) Operating conditions:
   Working temperature range: from minus 60 to +60°C,
   Atmospheric pressure, not less than 46.6kPa (0.476kgf/cm²
5) Product mass: 3,5 $^{-0,4}$ kg.



Design:

It consists of a base with four paws, for rigid mounting of the regulator when mounted on a helicopter, and a casing that protects the subunits and volumetric mounting elements assembled on cassettes.
On the front side of the regulator there are the X1, X2 plugs for docking with engine and helicopter systems, the X3 socket of the control connector, the X4 metallization terminal and the РЕГУЛИРОВКА ЧР, РЕГУЛИРОВКА nтк adjusting screws under protective covers.

AVIATION AGGREGATES

AZBT-31

Capacitive ignition unit

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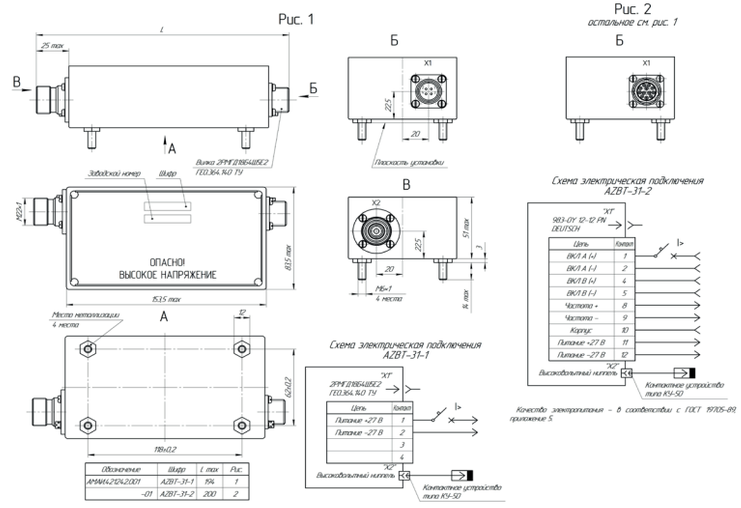
Designation:

The AZBT-31 capacitive ignition unit is designed to convert the voltage of the power source into the voltage required for the operation of a semiconductor spark plug in aircraft engine starting systems. The unit, together with spark plugs, shielded high-voltage wire, high-voltage fittings as part of the launch system, is used to ignite the fuel-air mixture in the engine combustion chamber during start-up on the ground and in flight.

Key performance data:

1) Power system: two-wire;
2) Current consumption at supply voltage (27±1) V, not more than: 2A;
3) The repetition rate of discharges on a plug at a voltage of (27 ± 1) V: from 13 to 22 Hz.
4) Unit mass, not more than: 1.3 kg.
5) Working temperature range: from minus 55°C to +100°C (limit - long-term +120°C in off state).



Design:

It consists of units located in the body and filled with foam sealant.
From the outside, on one of the walls of the unit, there is a high-voltage output nipple X2 for connecting a shielded high-voltage wire with a sealing sleeve. The X1 power connector is on the opposite wall of the unit. The housing has pins for mounting the unit on the engine.

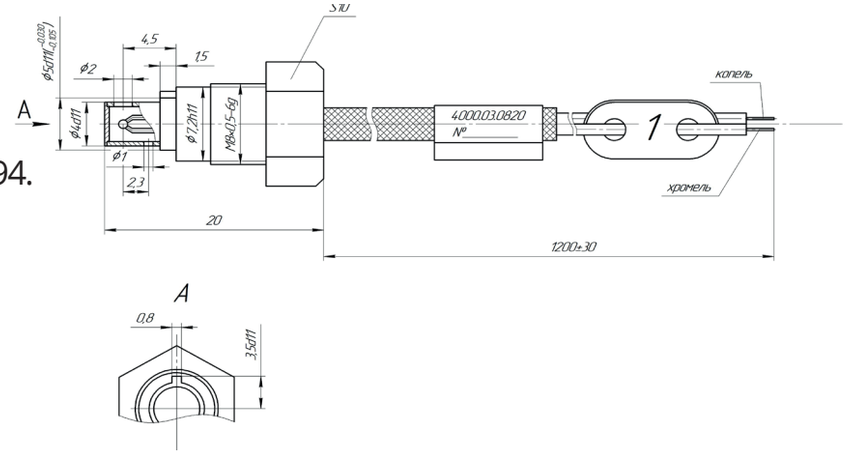
AVIATION AGGREGATES

○ 4000.03.0820

Temperature sensor

Designation:
Temperature sensor 4000.03.820 is designed to measure the temperature of outgoing gases.

Key performance data:
1) Working range of temperature measurement: from 0 to +900 °C,
2) The nominal static characteristic of the sensor corresponds to the L nominal static characteristic of the conversion as per GOST3044-94.
3) Electrical resistance of the sensor in normal climatic conditions (8±1) Ohm.
4) The sensor measures the temperature of controlled media with pressure up to 65 kgf/cm2 (6.4 MPa)
5) The mass of the sensor is not more than 0.03 kg.



Design:
The sensor consists of the following main parts: thermocouple, body, cable.
A thermocouple of XK(L) type is installed in the housing, which is connected to the cable outlets.
The end of the thermocouple installed in the tip of the housing forms a working junction, and the cable leads are free ends.

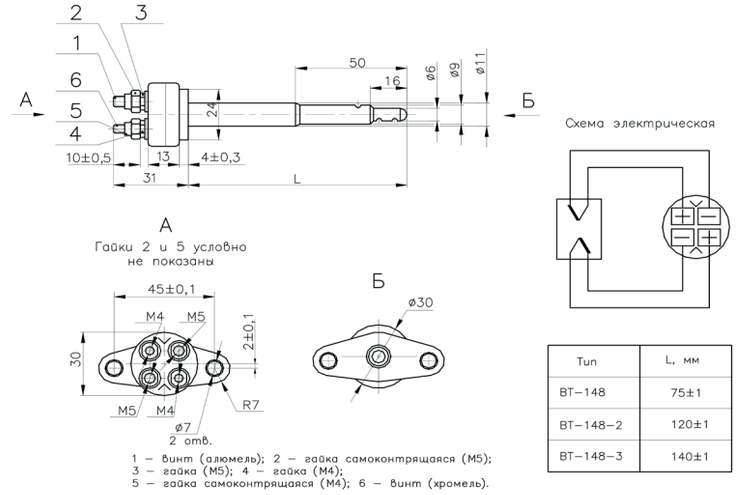
TEMPERATURE SENSORS

BT-148

Thermoelectric temperature sensor

Designation:
The BT-148 thermoelectric temperature sensor is designed to convert the temperature of the working medium flow passing through the braking chamber into a thermoelectromotive force with the output of two independent DC voltages proportional to the perceived temperature.

Key performance data:
1) Temperature measurement range from minus 65 to plus +1200 °C.
2) The operating temperature measurement range is from 0 to plus +1000 °C.
3) Polarity: positive (X) - for M4 screws, negative (A) - for M5 screws.
4) Increased operating temperature of the medium in the area of the sensor head, not more than +315 °C.
5) Increased short-term temperature of the medium in the area of the sensor head, not more than +400 °C.
6) For used sensors, the insulation resistance must be not less than 0.02 MOhm.
7) The product mass is not more than 0.12 kg.



1 – винт (алюмель); 2 – гайка самоконтрящаяся (М5); 3 – гайка (М5); 4 – гайка (М4); 5 – гайка самоконтрящаяся (М4); 6 – винт (хромель).

Тип	L, мм
BT–148	75±1
BT–148–2	120±1
BT–148–3	140±1

Design:
Double-type thermocouple, in one shell there are two independent thermoelements (chromel (X) - alumel (A)), each pair of which forms a “working end” that goes into the stagnation chamber of the sensor cap, which has two inlets and one outlet.
The insulation of thermoelectrodes is provided by a ceramic insulator and aluminophosphate thermocement mass.
Cable thermoelectrodes are welded to terminal screws (free ends of thermocouples) installed in the insulator and fixed to the cover with nuts.

BT-82K

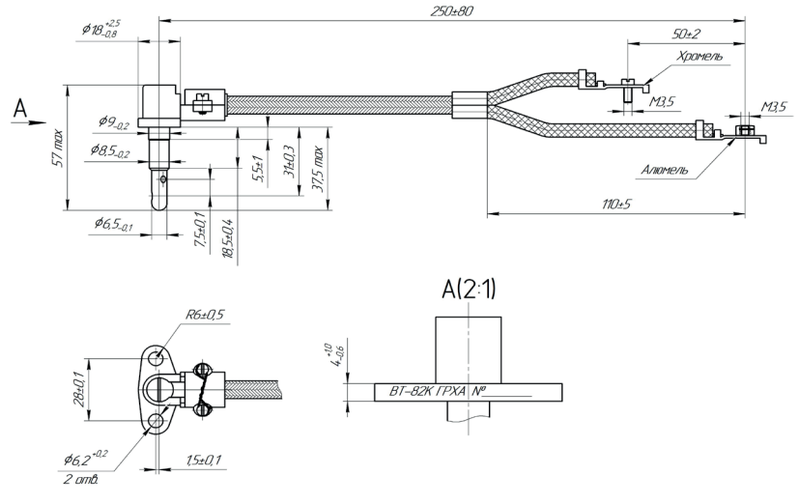
Thermocouple

Designation:

The thermocouple is designed to convert the temperature of the gas flow into a thermoelectromotive force (TEMF) with the output of a direct current voltage proportional to the perceived temperature

Key performance data:

1) Temperature measurement range
   from 0 °C to +1000 °C.
2) The operating temperature measurement
   range is from +450 °C to +1000 °C.
3) Heat resistance of the thermocouple head:
   working - +250 °C; limit - +300 °C
4) Polarity:
   short lead wire - positive (X)
   longer lead wire - negative (A)
5) For used thermocouples, the insulation
   resistance must be at least 0.02 MOhm.
6) The product mass is not more than 0.1 kg.



Design:

Chromel (X) and alumel (A) alloy wires were used as thermoelectrodes. Thermoelectrode from chromel alloy is positive, from alloy alumel - negative thermocouple thermoelectrode. Each thermoelectrode forms a «working end».

The insulation of thermoelectrodes is provided by a ceramic insulator and aluminophosphate thermocement mass. The braking chamber, made in the body of a cap made of heat-resistant steel, has one inlet and two outlets. The cap and the body are connected by welding. The tips are soldered to the chromel, alumel wires and are the «free ends» of the thermocouple.

BT- 4

Collector of thermocouples

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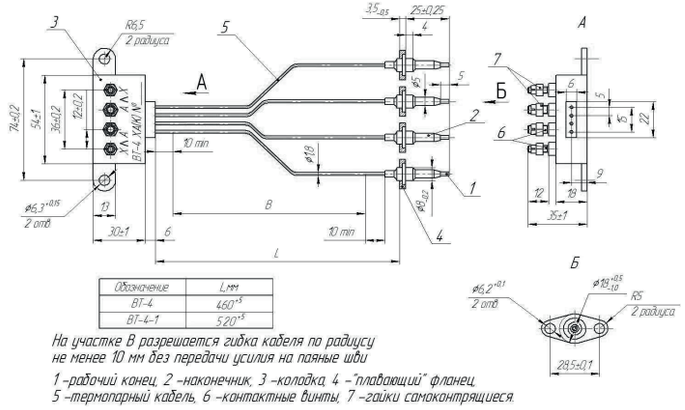
Designation:

The collector of BT- 4 thermocouples is designed to convert the temperature of the outgoing gases into a thermoelectromotive force with the issuance of two independent DC voltages proportional to the average temperature of the engine gases to the control system.

The length of thermocouple cables (from the outlet of the block to the thermocouple flange)
BT- 4 - 460 $^{+5}$ mm, BT- 4 -1 – 520 $^{+5}$ mm.

Key performance data:

1) Temperature measurement range from minus 60 to +1150 °C (short-term measurement at a temperature of +1000 °C - not more than 1 min, and not more than 10 hours for the collector resource, short-term measurement at a temperature above +1000 °C - not more than 3 s, and not more than 30 minutes percollector resource).
2) The operating temperature measurement range is from 200 to +850 °C.
3) Nominal static characteristic (NSC) of thermoelectrode materials of collector thermocouples corresponds to GOST 3044--94 for material nickel - chromium/nickel - aluminium XA(K).
4) Elevated temperatures:
   in the area of the connecting block:
   a) working + 200 °C,
   b) limit +250 °C;
   – in the area of location of thermocouple flanges and thermocouple cable:
   a) working +550 °C,
   b) limit +650 °C (duration of exposure to temperature of 650 °C is not more than 2.5 minutes and not more than 0.5% for the collector resource).
5) Electrical insulation resistance in normal climatic conditions is not less than 0.15 MOhm.
6) The electrical resistance of the collector circuits is 4.2 ± 0.1 Ohm.
7) The product mass is not more than 0.25 kg.



Design:

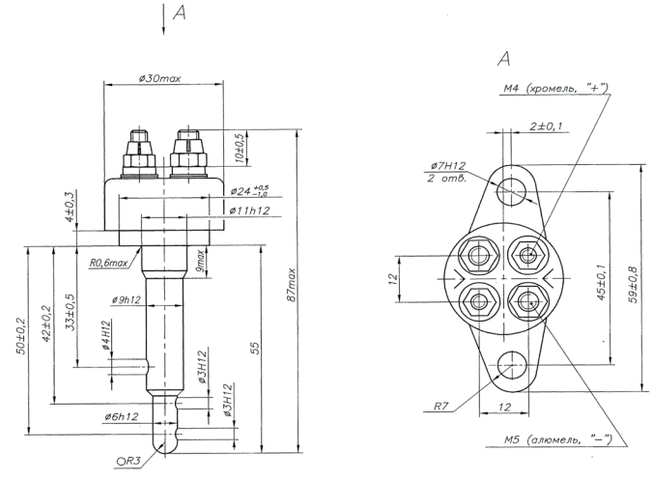
The thermocouple collector is a non-separable structure consisting of four double cable-type thermocouples forming two independent measuring circuits, and a connecting block with terminal screws.

TEMPERATURE SENSORS

BT-36
Thermocouple

Designation:
The BT-36 thermocouple is designed to generate two independent signals corresponding to the temperature of gases of the turbine of aircraft gas turbine engines.

Key performance data:
1) Temperature measurement range from 0 to +1250 °C.
2) Working temperature measurement range from +450 to +1000 °C.
3) The thermocouple head must withstand the operating temperature of +250 °C.
4) Polarity:
   terminal screws
   smaller diameter - positive (X);
   larger diameter - negative (A).
5) For used thermocouples, the insulation resistance must be at least 0.02 MOhm.
6) The product mass is not more than 0.14 kg.



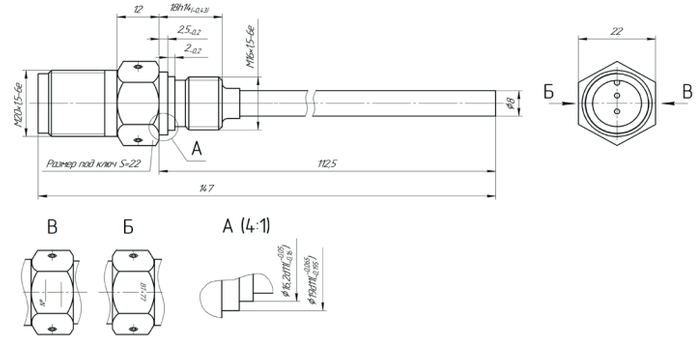
Design:
A double-type thermocouple, in one shell there are two independent thermoelements (chromel (X) - alumel (A)), each pair of which forms a "working end" that goes into the stagnation chamber of the sensor cap, which has two inlets and one outlet.
The insulation of thermoelectrodes is provided by a ceramic insulator and aluminophosphate thermocement mass.
Cable thermoelectrodes are welded to terminal screws (free ends of thermocouples) installed in the insulator and fixed to the cover with nuts.

BT-77

Temperature receiver

Designation:
The BT-77 temperature receiver is designed to measure the temperature of the working medium and issue signals proportional to the measured temperature to the secondary equipment.

Key performance datai:
1) Working range of temperature measurement: from minus 60 to +300 °C,
   In the area of the electrical connector: operating temperature not more than +200 °C.
2) Rated static characteristic corresponds to 100П as per GOST 6651-2009.
3) The error of the receiver in all operating conditions during the entire resource should not exceed the values determined by the formula:
   in the range from 0°C to +300°C:
   $\delta = \pm (0.30 + 4.5\ 10\text{-}3 \cdot | t |)$,
   in the range from minus 60°C to 0°C:
   $\delta = \pm (0.30 + 6\ 10\text{-}3 \cdot | t |)$,
   where t is the absolute value of the measured medium temperature, °C.
4) The index of thermal inertia is not more than 5 s.
5) The mass of the receiver is not more than 0.09 kg.



Design:
The receiver is a non-separable structure and has one measurement channel.
A platinum wire wound on mica plates, hermetically sealed by a case, was used as a sensitive element.
The ends of the wire are connected through flexible leads to the contacts of the connector plug.

TEMPERATURE SENSORS

BT-98, BT-98M1

Temperature sensor

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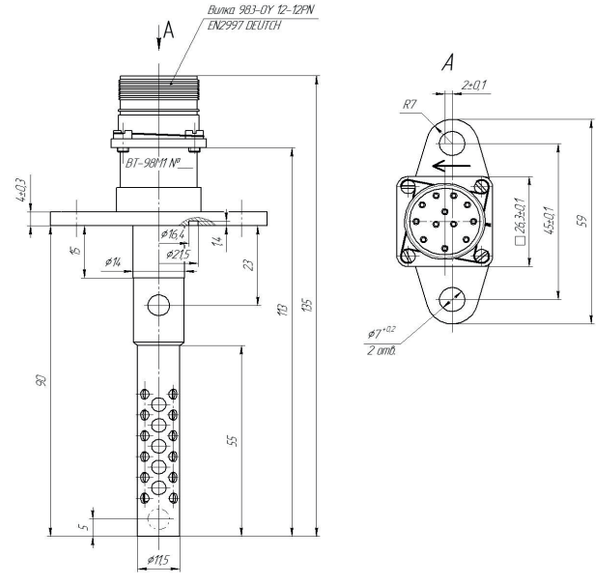
Designation:

The BT-98, BT-98M1 temperature sensor is designed to output electrical signals corresponding to the air temperature to digital and analogue automatic control systems.
The BT-98 sensor is connected using the СНЦ 28-10/18 В-1-В connector, BT-98M1 is connected using the 983-OY 12-12 PN DEUTSCH connector.

Key performance data:

1) Working range of temperature measurement:
   from minus 60 to +300 °C, (from +250 to +300 °C for a short time - not more than 10 hours per resource
   In the zone of the electrical connector: operating temperature not more than +120 °C, limit - 215 ° C - not more than 6 min. in one working cycle, not more than 9 hours in total.
2) Rated static characteristic corresponds to 50П as per GOST 6651-94.
3) Sensor error is determined by the formula:
   in the range from minus 60 °C to +25 °C:
   δ = ± (0.35 + 5 103 | t |), in the range from +25 °C to +300 °C:
   δ = ± (0.5 + 5 10-3 | t |), where δ is the sensor error, °C, t is the measured temperature, °C.
4) The number of independent electrical signals - 2.
5) The index of thermal inertia is not more than 1.6 s.
6) The mass of the sensor is not more than 0.12 kg.



Design:

The sensor is a non-separable structure and has two measurement channels (two sensitive elements).
As sensitive elements, a platinum wire was used, wound bifilarly on an insulated tube, hermetically sealed by a casing.
The ends of the wire are connected through flexible leads to the contacts of the connector plug.

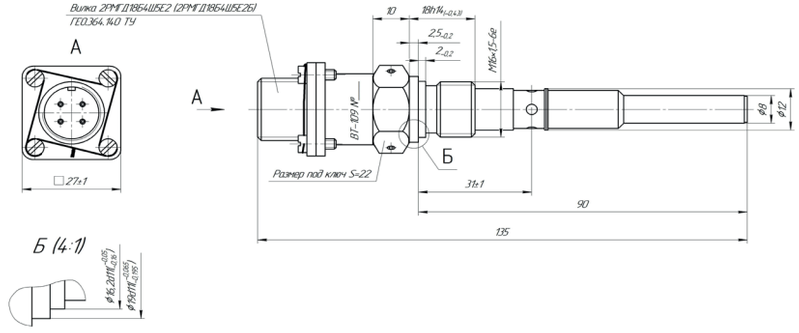
TEMPERATURE SENSORS

BT-109

Temperature sensor

Designation:
The BT-109 temperature sensor is designed to output electrical signals proportional to the measured temperature of fuel, oil, air, air-oil emulsion to the control system and measurement system.

Key performance data:
1) Working range of temperature measurement: from minus 60 to +300 °C,
   In the zone of the electrical connector: operating temperature not more than +200 °C, limit - +250 ° C.
2) Rated static characteristic corresponds
   to 100П as per GOST 6651-94.
3) Sensor error is determined by the formula:
   $\delta \leq \pm (0.5 + 5 \cdot 10^{-3} |t|)$, where
   δ – sensor error, °C, t – measured temperature, °C.
4) The number of independent electrical signals - 2.
5) The index of thermal inertia is not more than 3 s.
6) The mass of the sensor is not more than 0.12 kg.



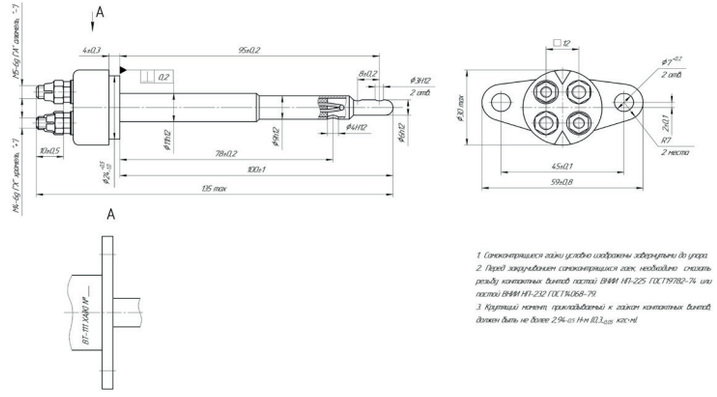
Design:
The sensor is a non-separable structure and has two measurement channels (two sensitive elements).
As sensitive elements, a platinum wire was used, wound bifilarly on an insulated tube, hermetically sealed by a casing.
The ends of the wire are connected through flexible leads to the contacts of the connector plug

TEMPERATURE SENSORS

BT-111
Thermocouple

Designation:
The BT-111 thermocouple is designed to convert the temperature of the working medium flow passing through the stagnation chamber into a thermoelectromotive force with the output of two independent DC voltages proportional to the perceived temperature.

Key performance data:
1) Temperature measurement range from minus 65 °C to +1200 °C.
2) The operating temperature measurement range
   is from 0 °C to +1000 °C.
3) Polarity: positive (X) - for M4 screws,
   negative (A) - for M5 screws.
4) Heat resistance of thermocouple head:
   working - +315 °C;
   limit - +400 ° C
5) The product mass is not more than 0.2 kg.



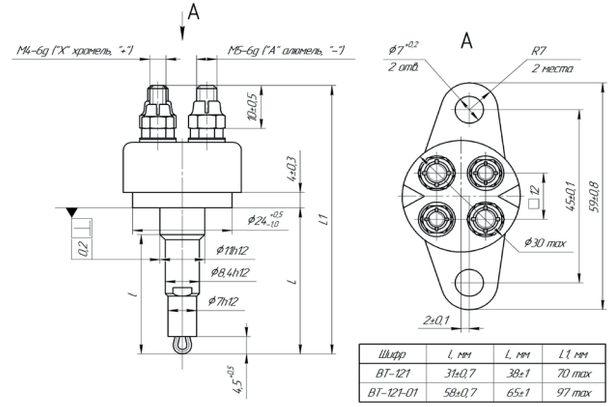
Design:
The thermocouple is of a double type, two independent thermoelements (chromel (X) - alumel (A)) are placed in one shell, each pair of which forms a «working end».
The insulation of thermoelectrodes is provided by a ceramic insulator and aluminophosphate thermocement mass.
Cable thermoelectrodes are welded to terminal screws (free ends of thermocouples) installed in the insulator and fixed to the cover with nuts.

BT-121

Thermocouple

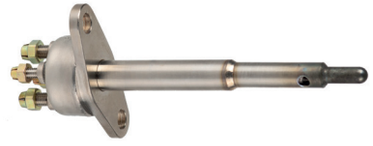
Designation:
The BT-121 thermocouple is designed to convert the temperature of the working medium into thermoelectromotive force and output two independent DC voltages proportional to the perceived temperature.

Key performance data:
1) Temperature measurement range from minus 60 to +700 °C.
2) Operating temperature measurement range from +300 to +700 °C.
3) Polarity: positive (X) - for M4 screws,
   negative (A) - for M5 screws.
4) Heat resistance of the thermocouple head +250 °C.
5) The product mass is not more than 0.12 kg.



Шкар	L, мм	L, мм	L1, мм
BT-121	31±0.7	38±1	70 max
BT-121-01	58±0.7	65±1	97 max

Design:
Double-type thermocouple, two identical working ends are placed in one housing.
Chromel and alumel alloy wires were used as thermoelectrodes.
Each pair of thermoelectrodes forms a «working end».
The insulation of thermoelectrodes is provided by a ceramic insulators and aluminophosphate thermocement mass.
Terminal screws made of thermoelectrode material, to which thermoelectrodes are welded, are installed in the insulator and fixed on the cover with nuts and are the «free ends» of the thermocouple.



BT-125, BT-125M1

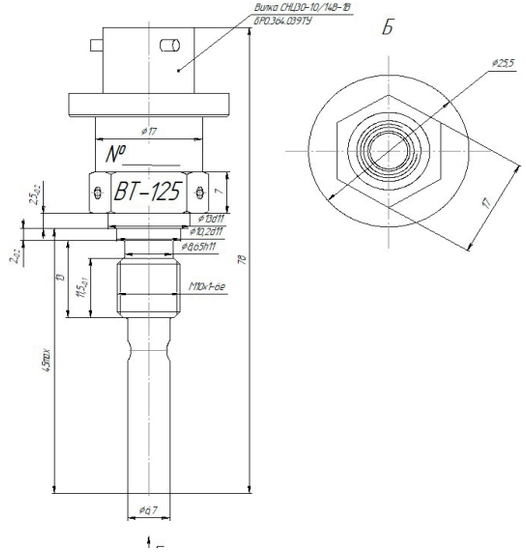
Temperature sensor

Designation:

The BT-125, BT-125M1 temperature sensor is designed to issue signals to the measuring system that are proportional to the measured fuel and oil temperature.
The BT-125 sensor is connected using the СНЦ30-10/14В-1В connector, the BT-125M1 sensor is connected using the 983-1Y 12-12PN DEUTSCH connector or the 8533-1Y 12-12PN SOURIAU connector.

Key performance data:

1) Working range of temperature measurement:
   from minus 60 to +300°C, (from +250 to +300 ° C - not more than 10 hours per resource, limiting 315 ° C - not more than 2 hours per resource)
   In the area of the electrical connector: operating temperature is not more than 150°C, limit - 200°C
2) Rated static characteristic corresponds to 50П as per GOST 6651-94.
3) Sensor error is determined by the formula:
   $\delta \le \pm (0.5 + 5 \cdot 10^{-3} |t|)$, where δ – sensor error °C,
   t – measured temperature, °C.
4) The sensor measures the temperature of controlled media with pressure up to 65 kgf/cm2 (6.4 MPa)
5) The index of thermal inertia is not more than 2.5 s.
6) The mass of the BT-125 sensor is not more than 0.05 kg,
BT-125M1 - not more than 0.06 kg.



Design:

The sensor is a non-separable structure and has two measurement channels (two sensitive elements).
As sensitive elements, a platinum wire was used, wound bifilarly on an insulated tube, hermetically sealed by a casing.
The ends of the wire are connected through flexible leads to the contacts of the connector plug

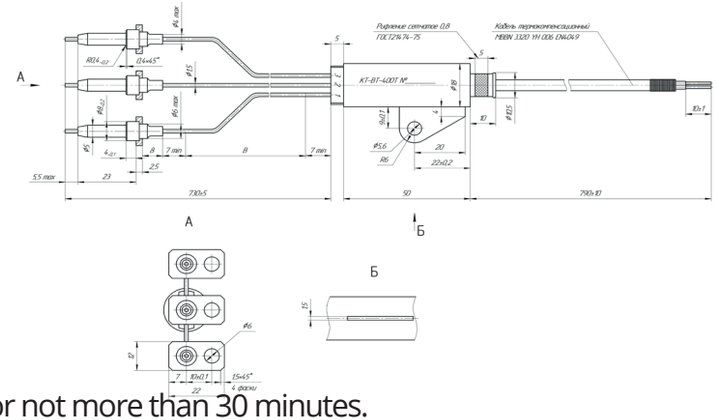
TEMPERATURE SENSORS

KT-BT-400T

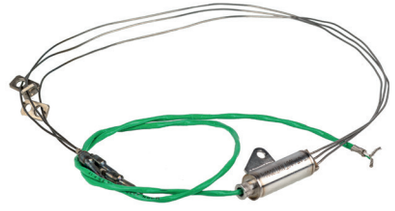
Temperature sensor

Designation:
The KT-BT-400T temperature sensor is designed to convert the temperature of the outgoing gases into a thermoelectromotive force with the output of direct current voltages proportional to the average temperature of the engine gases into the control system.

Key performance data:
1) Outlet gas temperature measurement range from 0 to +1000 °C.
   Measurement time at a temperature of +1000 °C - not more than 30 minutes.
2) Nominal static characteristic (NSC) of thermoelectrode materials of thermocouples (thermoelements) of the sensor must comply with DSTU 2837-94 for chromel-alumel material (nickel-chromium/nickel-aluminium) of XA(K) characteristics.
3) Polarity: positive (chromel) - the white wire,
   negative (alumel) - the green wire.
4) Elevated temperatures:
   a) in the zone of the connecting block +200 °C;
   b) in the zone of the thermocouple flange:
      1) +650 °C - working;
      2) +700 °C - limit.
   c) in the zone of the thermal cable:
      1) +550 °C - working;
      2) +650 °C - limit.
   d) in the zone of working ends of thermoelements +1000 °C for not more than 30 minutes.
5) Electrical insulation resistance of the sensor in normal climatic conditions not less than 0.5 MOhm.
6) The electrical resistance of the sensor circuit under normal climatic conditions (10 ± 0.20) Ohm.
7) The mass of the sensor is not more than 0.25 kg.



Design:
The sensor is a non-separable structure consisting of three cable-type thermocouples, a housing and a temperature compensation cable.
The thermoelement consists of a working end, a tip, a "free" flange and a thermal cable.
The working ends of the thermoelements are formed by a junction of thermoelectrodes made of chromel and alumel alloys, insulated from the cable sheath.



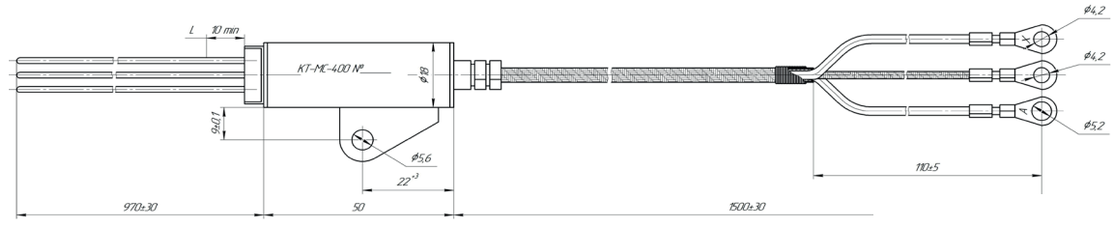
TEMPERATURE SENSORS

KT-MC-400

Temperature sensor

Designation:
The KT-MC-400 temperature sensor is designed to convert the temperature of the outgoing gases into a thermoelectromotive force (TEMF) and issue a DC voltage proportional to the average temperature of the engine gases at the sensor thermocouples to the temperature meter and controller.

Key performance data:
1) Temperature measurement range from 0 to +900 °C.
2) Working temperature range from +450 to +850 °C.
3) The nominal static characteristic of the sensor corresponds to the nominal static characteristic of the conversion K as per GOST 3044-94.
4) Electrical resistance of the sensor in normal climatic conditions (10±0.20) Ohm.
5) The mass of the sensor is not more than 0.25 kg.



Design:
The sensor consists of the following main parts: thermal leads, body, cable.
The sensor's thermal leads are made of the KTMC type thermocouple cable. The thermal leads of the sensor in the housing are connected to the cable leads. The thermal leads of the sensor form working junctions, and the cable leads are free ends.

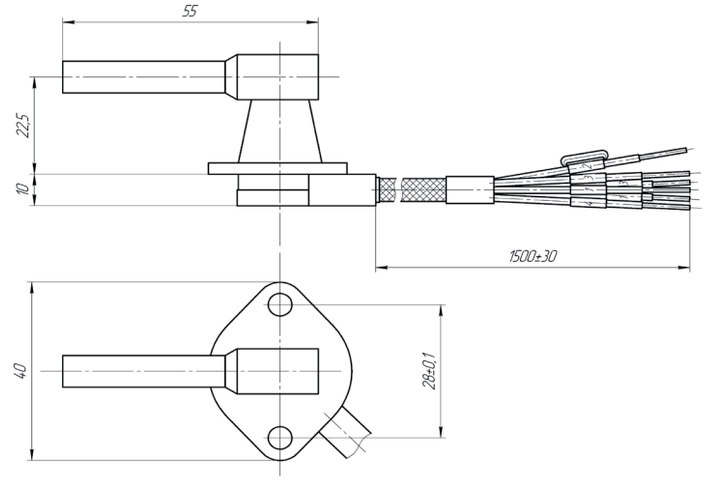
TEMPERATURE SENSORS

П102-МС-400

Temperature sensor

Designation:
The П102-МС-400 temperature sensor is designed to measure the airflow stagnation temperature and issue a signal to the electronic controller.

Key performance data:
1) Temperature measurement range:
   from minus 60 to +200 °C,
2) Electrical resistance of sensitive elements at
   a temperature of 0 °C (46 ± 0.25) Ohm.
3) The static error of the sensor is not more than ±2 °C
   for the temperature range from 30 to 110 °C, ±3 °C
   for the temperature range from 110 to 170 °C.
4) The mass of the sensor is not more than 0.12 kg.



Design:
The sensor consists of the following main parts: sensitive element, body, cable.
The sensitive elements of the sensor (platinum wire) are bifilarly wound on a steel tube of the housing. The winding of sensitive elements is covered with insulating varnish. The cable leads are soldered to the sensitive elements in the sensor housing.

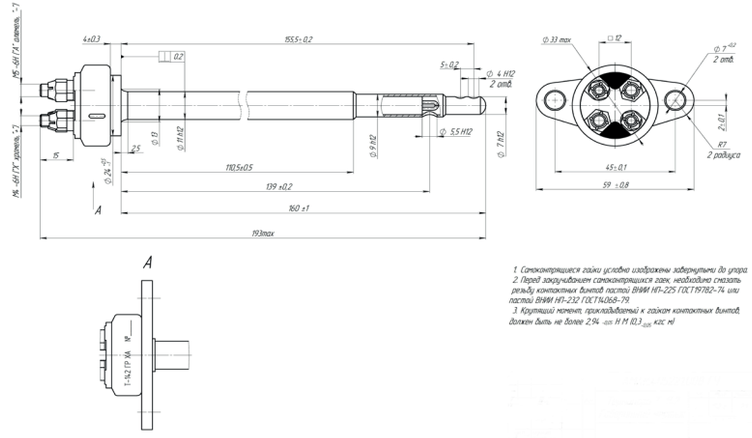
TEMPERATURE SENSORS

T-142

Thermocouple

Designation:
The T-142 thermocouple is designed to convert the temperature of the working medium flow passing through the braking chamber into thermoelectromotive force (TEMF) with the output of two independent DC voltages proportional to the perceived temperature.

Key performance data:
1) Temperature measurement range from minus 60 °C to +1200 °C.
2) The operating temperature measurement range is from +300 °C to +1000 °C.
3) Polarity: positive (X) - for M4 screws, negative (A) - for M5 screws.
4) Thermal resistance of the thermocouple head working - +315 °C, limiting - +400 °C
5) The product mass is not more than 0.17 kg.



Design:
The thermocouple is of a double type, two independent thermoelements (chromel (X) - alumel (A)) are placed in one shell, each pair of which forms a «working end».
The insulation of thermoelectrodes is provided by a ceramic insulator and aluminophosphate thermocement mass.
Cable thermoelectrodes are welded to terminal screws (free ends of thermocouples) installed in the insulator and fixed with nuts.

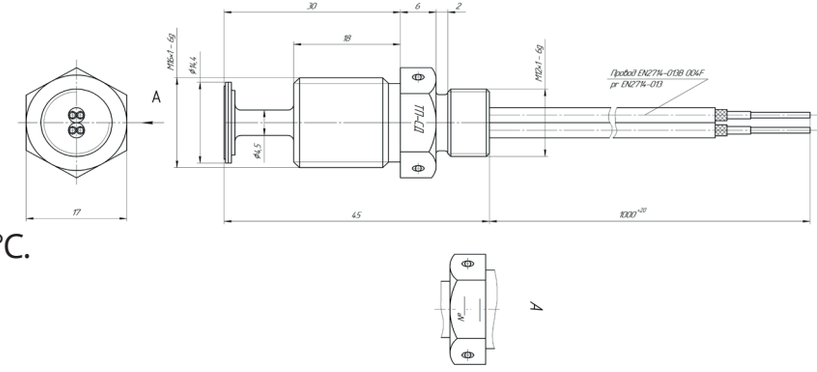
TEMPERATURE SENSORS

ТП-СД

Temperature sensor

Designation:
The ТП-СД temperature sensor is designed to measure the air temperature at the engine inlet.

Key performance data:
1) Working range of temperature measurement:
   from minus 60 to +120 °C, (up to +150 °C for
   a short time - not more than 10% of the resource)
2) Rated static characteristic corresponds
   to 50П as per GOST 6651-94.
3) Sensor error is determined by the formula:
   $\delta = \pm (0.3 + 5 \cdot 10\text{-}3 \mid t \mid)$, where
   δ– sensor error, °C; t is the measured temperature, °C.
4) The index of thermal inertia is not more than 3 s.
5) The mass of the sensor is not more than 0.06 kg.

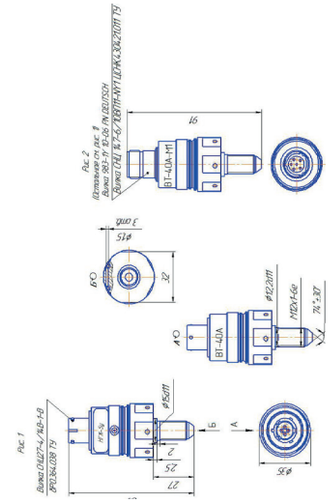


Design:
The sensor is a non-separable design and has one measurement channel. A platinum wire wound bifilarly in the form of a spiral was used as a sensitive element. The sensitive element is glued to the end plane of the body and hermetically sealed by a disc welded to the body.

SENSORS
PRESSURE

BT- 40A

Explosion-proof pressure switch



Designation:
The BT- 40A explosion-proof pressure switch is designed to close the electrical circuit when the excess pressure of the НГЖ-5У Skydrol LD-4 working fluid in the system rises to a predetermined value.
By design, signalling devices are made with open contacts.
The number included in the code of the signalling device means the nominal value of the pressure of the signalling device in kgf/cm², at which the electric circuit closes.
The BT- 40A sensor is connected using the СНЦ27- 4/14В -1-В connector,
BT- 40A - M1 - using the 983 - 1Y 10-06PN DEUTSCH or СНЦ147- 6/10ВП11- NY1 connector

Key performance data:

Parameter	Value
1) Actuation pressure, kgf/cm²	40
2) Operation error, kgf/cm²	±2
3) DC supply voltage, V	$27^{+2,4}_{-3,0}$
4) Ambient temperature, °C - working - limit	 from minus 60 to +100 incl. +125
5) Overload pressure, kgf/cm²	315
6) Vibration loads: - acceleration, m/s² (g) - frequency, Hz	 294 (30) from 5 to 2000 incl.
7) Insulation resistance of electrical circuits under normal climatic conditions, MOhm, not less than	20
8) Number of operations	40000
9) Signalling device mass, kg, not more than:	0,17

Design:
The principle of operation of the signalling device is based on the ability of the sensitive element-membrane to deform depending on the pressure entering the receiving cavity. Deformation of the membrane causes the centre to move, with the contact and insulator attached to it. Contacts, when the pressure rises to a predetermined value, are closed.

SENSORS
PRESSURE

ДАП-3,5

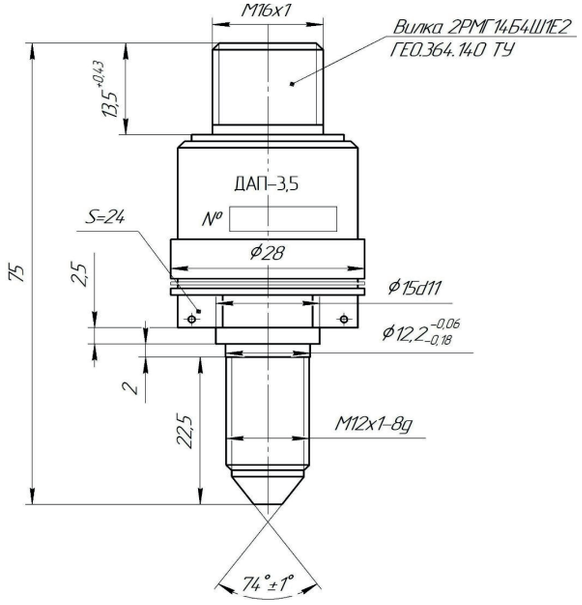
Absolute pressure sensor

Designation:

The ДАП-3,5 sensor is designed to measure the absolute pressure of aggressive (amyl, heptyl) and non-aggressive (air, nitrogen, ЛЗМГ-2 liquid) media with output signal output to a radio telemetry station

Key performance data:

1) Measurement range, kgf/cm² (absolute), from 0 to 3.5.
2) Overload pressure, kgf/cm² (excessive) 35
3) Supply voltage, V, not more than 6.5.
4) Working temperature range, °C from minus 60 to +100.
5) Sensor error (deviation of readings from the calibration characteristic), %, not more than: basic (under normal conditions) ±2.0, at the first calibration point ±5.0, total (under the influence of all destabilizing factors) ±4.0, at the first calibration point ±5.0.
6) Insulation resistance of current-carrying circuits (under normal conditions), MOhm, not less than 20.
7) Potentiometer resistance, Ohm, not less than 1000.
8) Mass is not more than 0.1 kg.



Design:

The sensor consists of the following main units: receiving unit, transmission mechanism, potentiometer and casing with parts.

The receiving unit consists of a body, a membrane with a rod, a ring and a stop, which protects the membrane from destruction during pressure overloads.

The transmission mechanism of the sensor, mounted on the stop of the receiving unit, includes: a bracket, an axle, a spring driver, a brush holder with a current lead, a return spring, which ensures the reverse motion of the mechanism.

The sensor potentiometer assembly includes: a bracket-mounted potentiometer. The beginning and end of the potentiometer are connected respectively to the first and second pins of the plug.

Sliding contacts through the brush holder to the current lead are connected to the third output of the plug.

The sensor mechanism is covered with a casing and welded.

ДАТ-12А, ДАТ-12АЄ2

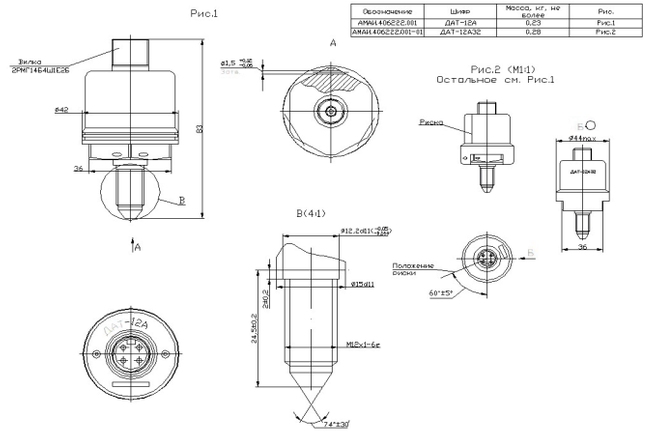
Absolute pressure sensor

Designation:

The ДАТ-12А, ДАТ-12АЭ2 absolute pressure sensors are designed for remote measurement of absolute pressures of neutral liquids and gases, including fuels and oils with a signal output to an electronic engine controller or control means.

Key performance data:

1) Range of measured pressure, kgf/cm² absolute from 0 to 12.
2) The sensor is designed for operation at ambient temperature from minus 60 to 220 °C, for a short period of 15 minutes 250 °C (ДАТ-12А) and minus 60 to 100 °C (ДАТ-12АЭ2).
3) Instability from the value of the output voltage of the ndividual calibration characteristic, %, not more than ±3.
4) Insulation resistance under normal conditions, MOhm, not less than 20.
5) Current consumed by the sensor, mA, not more than 95.
6) Mass of the sensor, kg, not more than 0.280.
7) Proportionality coefficient (Kpr) 2.7±0.7



Design:

The receiving unit of the sensor consists of a fitting and a membrane and a stop that protects the membrane from destruction. Coils with cores and an armature of a differential transformer are attached to the stop.

The pressure of the measured medium acts on the sensitive element of the sensor, forcing its centre to move, which moves the armature of the differential transformer rigidly connected to it. In this case, due to the redistribution of gaps between the magnetic circuits and the armature, the output voltage of the sensor changes.

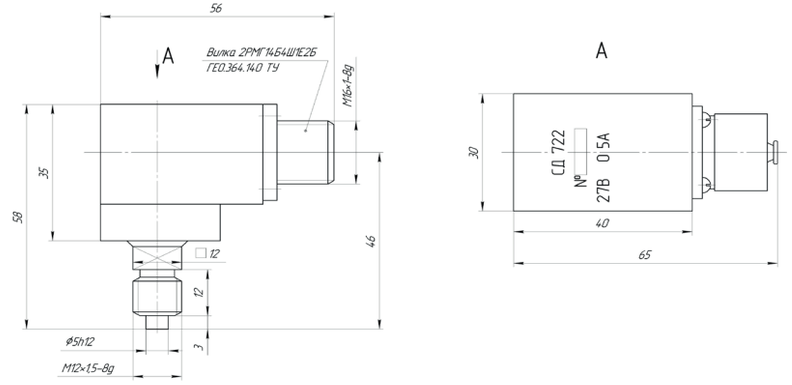
SENSORS
PRESSURE

СД722

Pressure signalling

Designation:
The СД722 pressure signalling device is designed to control pressure and issue an electrical signal when the pressure of freons 114 V2 and 13 V1 drops below a predetermined value in the signalling systems of transport vehicles.

Key performance data:
1) Working pressure of the controlled environment, 100 kgf/cm².
2) Overload pressure for 16 hours, 150 kgf/cm².
3) Operation threshold, 35 kgf/cm².
4) Operation threshold error, 2.5 kgf/cm².
5) DC switching voltage, 27 V at 0.5 A.
6) Ambient temperature, from minus 50 to +50 °C.
7) Relative humidity at 35 °C, 98%
8) Mass is not more than 0.25 kg.



Design:
The sensitive element of the microswitch is a membrane welded to the fitting.
An emphasis is screwed into the case, which is countered by the board.
A plate with a microswitch is installed on the board by means of screws.
When the value of the controlled pressure is above the threshold, the normally open contacts are closed.
The stem moves freely in the stop hole. The stem is constantly in contact on one side of the membrane, and the other with a leaf spring.
The mechanism of the signalling device is closed by a cover on which the fork is fixed.

СПД (-0,4; -0,6; -1,0)

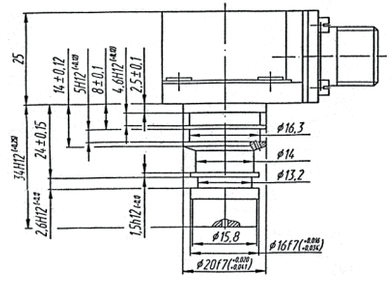
Differential pressure switch

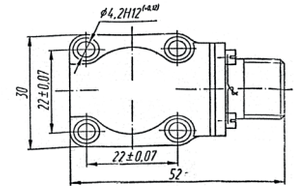
Designation:

The СПД differential pressure switch is designed to generate an electrical signal in case of increasing in the hydraulic friction of the filter due to its clogging. Depending on the pressure drop (kgf/cm²) of operation, the three design versions of the signalling devices are manufactured: СПД-0,4; СПД-0,6; СПД-1,0.

Key performance data:

1) Actuation value kgf/cm² in the temperature range from minus 60 °C to +175 °C: СПД-0,4 – (0.4±0.10), СПД-0,6 – (0.6±0.12), СПД-1,0 – (1.0±0.15).
2) Mass, kg, not more than 0.10.
3) The indicator is designed for operation at ambient temperature from minus 60°C to 175°C.





Обозначение	Шифр	P кгс/см²
0780899700	СПД-0,4	0,4
-01	СПД-0,6	0,6
-02	СПД-1,0	1,0

Design:

The receiving unit of the signalling device consists of a housing, a piston with a magnet and a spring.
A bracket with a contact group installed in its grooves is fixed on the body.
Liquid P_1 is supplied to the cavity where the piston magnet is located through a special hole in the housing, and purified liquid with pressure P_2 is supplied to the spring cavity. When the pressure difference $\Delta P=P_1-P_2$ is reached, a signal is given that the filter has become clogged.

SENSORS
PRESSURE

BT-335, BT-337

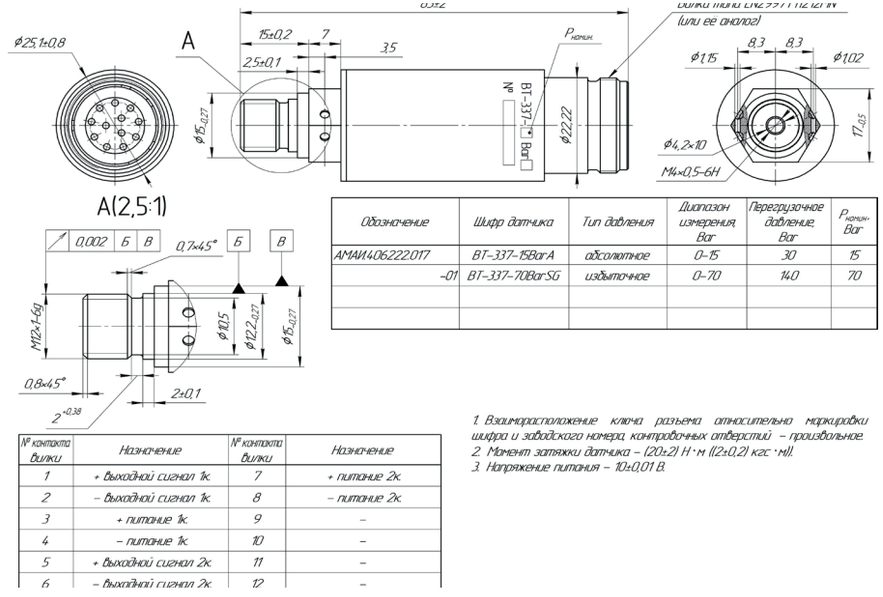
Sensors pressure

Designation:

The BT-335, BT-337 pressure sensors are designed for remote measurement of absolute, gauge pressures of aviation oils and their vapours, as well as fuels, air, neutral liquids and gases with the issuance of an electrical signal proportional to the measured pressure.

The BT-335, BT-337 sensor, depending on the measurement range and type of pressure, as well as the number of measuring channels, is manufactured in the options indicated in the table:

Designation	Sensor code	Type of pressure	Quantity of channels	Pressure working measuring range, bar	Overload pressure, bar
АМАИ.406222.016	BT-335- 6BarG	Exc.	1	0 – 6	12
АМАИ.406222.017	BT-337- 15BarA	Abs	2	0 – 15	30
АМАИ.406222.017-01	BT-337- 70BarSG	Exc.	2	0 – 70	140
АМАИ.406222.018	BT-335- 40BarA	Abs.	1	0 – 40	80



Обозначение	Шифр датчика	Тип давления	Диапазон измерения, Bar	Перегрузочное давление, Bar	$P_{комн.}$, Bar
АМАИ.406222.017	BT-337-15BarA	абсолютное	0–15	30	15
-01	BT-337-70BarSG	избыточное	0–70	140	70

№ контакта вилки	Назначение	№ контакта вилки	Назначение
1	+ выходной сигнал 1к.	7	+ питание 2к.
2	– выходной сигнал 1к.	8	– питание 2к.
3	+ питание 1к.	9	–
4	– питание 1к.	10	–
5	+ выходной сигнал 2к.	11	–
6	– выходной сигнал 2к.	12	–

1. Взаиморасположение ключа разъема относительно маркировки шифра и заводского номера, контровочных отверстий – произвольное.
2. Момент затяжки датчика – (20±2) Н·м ((2±0,2) кгс·м)).
3. Напряжение питания – 10±0,01 В.

BT-335, BT-337

Pressure sensors

Key performance data:

1) The output signal of the sensor is linear within the permissible measurement error and varies in nominal value from 0 to 100 mV when the pressure changes from the minimum to the upper value of the measurement range.
2) Sensor supply voltage (10 ±0.1) V DC.
3) Operating temperature range of the sensor: from minus 54 to +150°C,
4) The error of the sensor in the operating pressure range should be not more than:
   a) ±3% of the upper limit of measurements (UL), in the temperature range from minus 54 to 0 °C;
   b) ±1% of UL in the temperature range from 0 to +125 °C;
   c) ±1.8% of UL in the temperature range from 125 to 150 °C.
5) The mass of the sensor is not more than 0.3 kg.

Design:

The sensor consists of a receiving unit with sensitive elements, a transducer, a casing, and a connector.
The receiving unit consists of a housing with a fitting and is used to mount the sensor and supply the pressure of the measured medium to the sensitive elements. Depending on the number of sensor channels, one or two sensitive elements are welded into the receiving unit.
Each contains a separating diaphragm, behind which a strain-sensitive chip is fixed in the volume of silicone oil (a strain-resistive Wheatstone bridge), as well as a cavity separated by a measuring membrane:

- with vacuum, for versions of sensors of absolute pressure or conditionally excessive;
- connected to the atmosphere, for gauges of relative pressure.

Electrical connection of single-channel sensors of type BT-335 is carried out through a connector of type 2997 1Y 10-06 MN, two-channel sensors of type BT-337 are made through a connector of type 2997 1Y 12-12 MN.

BT-380, BT-381

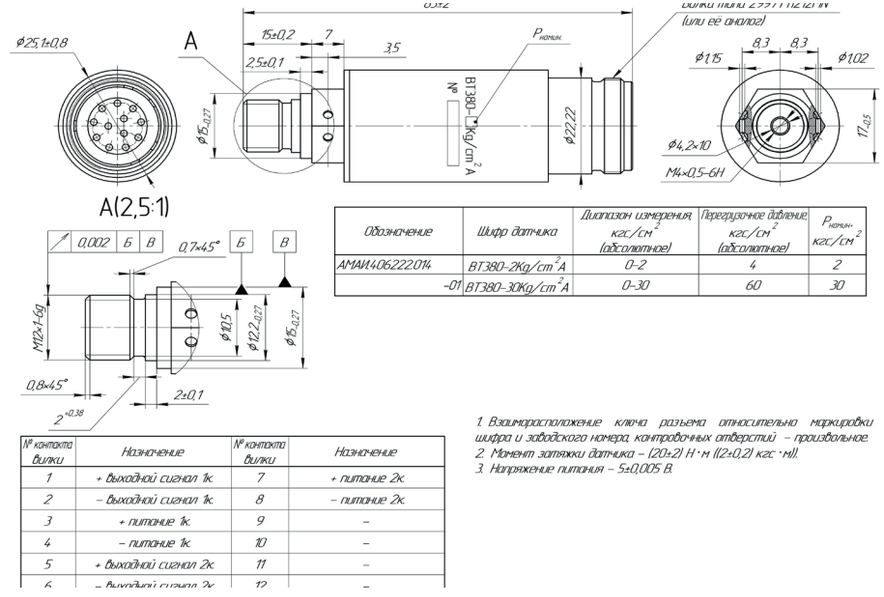
Pressure sensors

Designation:

The BT380, BT381 pressure sensors are designed for remote measurement of absolute, gauge pressures of aviation oils and their vapours, as well as fuels, air, neutral liquids and gases with the output of an electrical signal proportional to the measured pressure.

The BT380, BT381 sensors, depending on the measurement range and type of pressure, as well as the number of measuring channels, are manufactured in the options indicated in table:

Designation	Sensor code	Type of pressure	Quantity of channels	Pressure working measuring range, kgf/cm²	Overload pressure, kgf/cm²
АМАИ.406222.014	BT380- 2Kg/cm²A	Abs	2	0 – 2	4
АМАИ.406222.014-01	BT380- 30Kg/cm²A	Abs.	2	0 – 30	60
АМАИ.406222.019	BT381- 6Kg/cm²G	Exc.	1	0 – 6	12
АМАИ.406222.015	BT381- 100Kg/ cm²SG	Exc..	1	0 – 100	200



Обозначение	Шифр датчика	Диапазон измерения, кгс/см² (абсолютное)	Перегрузочное давление, кгс/см² (абсолютное)	Pнапр., кгс/см²
АМАИ.406222.014	BT380-2Kg/cm²A	0–2	4	2
-01	BT380-30Kg/cm²A	0–30	60	30

№ контакта вилки	Назначение	№ контакта вилки	Назначение
1	+ выходной сигнал 1к.	7	+ питание 2к.
2	– выходной сигнал 1к.	8	– питание 2к.
3	+ питание 1к.	9	–
4	– питание 1к.	10	–
5	+ выходной сигнал 2к.	11	–
6	– выходной сигнал 2к.	12	–

1. Взаиморасположение ключа разъема относительно маркировки шифра и заводского номера, контровочных отверстий – произвольное.
2. Момент затяжки датчика – (20±2) Н·м ((2±0,2) кгс·м).
3. Напряжение питания – 5±0,005 В.

BT-380, BT-381

Pressure sensors

Key performance data:

1) The output signal of the sensor is linear within the permissible measurement error and varies in nominal value from 0 to 50 mV when the pressure changes from the minimum to the upper value of the measurement range.
2) Sensor supply voltage (5 ±0.005) V DC.
3) Operating temperature range of the sensor: from minus 54 to +150°C,
4) The error of the sensor in the operating pressure range should be not more than:
   a) ±1% of the output signal corresponding to the upper limit of measurements (UL), in the temperature range from minus 55 to +100 °C;
   b) ±2% of UL in the temperature range from 100 to 120 °C.
5) The mass of the sensor is not more than 0.3 kg.

Design:

The sensor consists of a receiving unit with sensitive elements, a transducer, a casing, and a connector.
The receiving unit consists of a housing with a fitting and is used to mount the sensor and supply the pressure of the measured medium to the sensitive elements. Depending on the number of sensor channels, one or two sensitive elements are welded into the receiving unit. Each contains a separating diaphragm, behind which a strain-sensitive chip is fixed in the volume of silicone oil
(a strain-resistive Wheatstone bridge), as well as a cavity separated
by a measuring membrane:

- with vacuum, for versions of sensors of absolute pressure or conditionally excessive;
- connected to the atmosphere, for gauges of relative pressure.

Electrical connection of single-channel sensors of type BT-381 is carried out through a connector of type 2997 1Y 10-06 MN, two-channel sensors of type BT-380 are made through a connector of type 2997 1Y 12-12 MN.
The type of threaded connection is M12x1 fitting as per GOST 19125-90.

МСД (-А, -С, -М, -Т)

Small-sized pressure signalling devices

Designation:

CThe small-sized МСД pressure signalling devices are designed to close or open the electrical circuit when the system reaches the specified values of the excess pressure of the working medium (fuel - ТС-1. РТ, Т-2 as per GOST 10227, as well as fuel according to the РТМ Ц2-98 list, edition 6, 1998; oil type БЗВ air, etc.

Example of a designation: МСД-2,5 - a signalling device with normally closed contacts (at a pressure below the response threshold). The number included in the signalling device code means the value of the response pressure in kgf/cm². Letter or letters - design version features:

Літера або літери – особливості виконання:

- А – signalling device with normally open contacts
- С – signalling device with a special fitting
- М – high temperature signalling device
- Т – Signalling device with increased accuracy

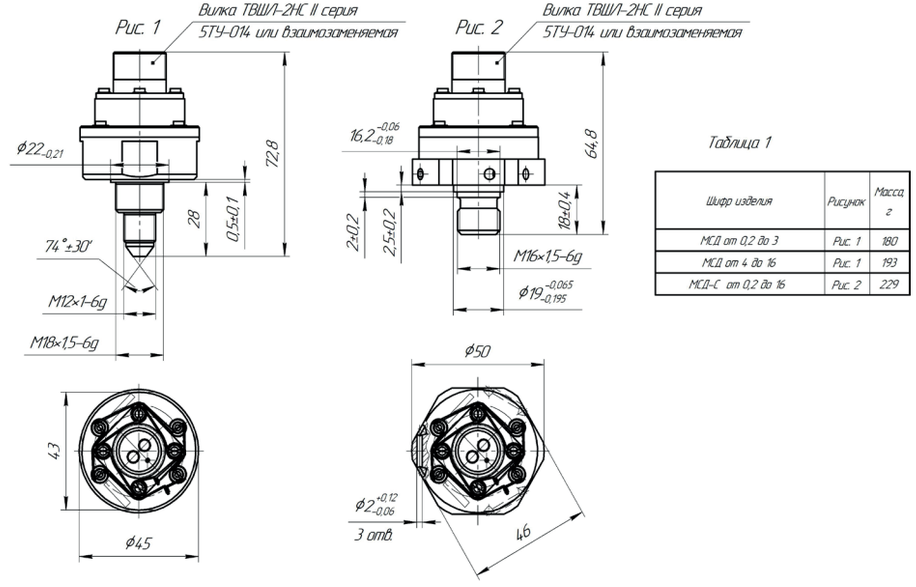


Таблица 1

Шифр изделия	Рисунок	Масса, г
МСД от 0,2 до 3	Рис. 1	180
МСД от 4 до 16	Рис. 1	193
МСД-С от 0,2 до 16	Рис. 2	229

МСД (-А, -С, -М, -Т)

Small-sized pressure signalling devices

AGT AEROSPACE GLOBAL TRADE

Key performance data:

Parameter	Value		
	МСД	МСД-Т	МСД-М
1) Error, kgf/cm², at temperatures from minus 60°C to 180°C (for МСД-М from minus 60 °C to 220 °C) does not exceed for:			
range from 0.2 to 0.3 kgf/cm²	±0,05	–	–
range from 0.4 to 1 kgf/cm²	±0,2	±0,1	±0,2
range over 1 to 2 kgf/cm²	±0,3	±0,15	±0,3
range over 2 to 3 kgf/cm²	±0,45	–	±0,45
range from 4 to 10 kgf/cm²	±1,2	–	±1,2
range over 10 to 16 kgf/cm²	±1,8	–	±1,8
2) Mass without mounting parts, g, not more than for:			
МСД range from 0.2 to 3 kgf/cm²		189	
МСД range from 4 to 16 kgf/cm²		193	
МСД - С		229	

The МСД signalling devices are operational after a short-term increase (within 5 minutes) of temperature up to 270°C.

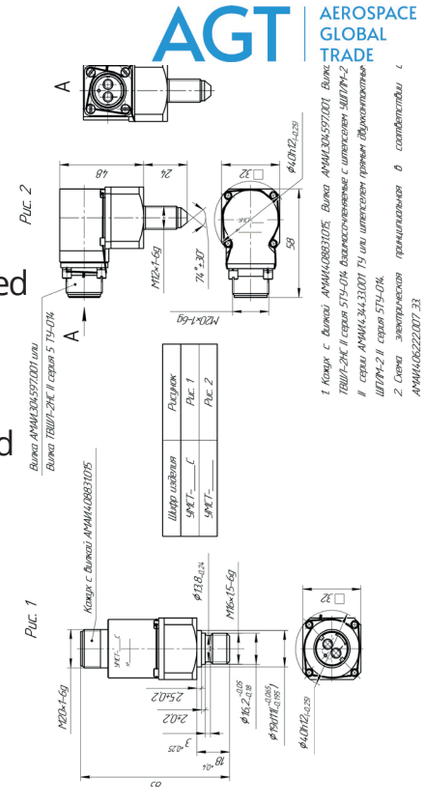
Design:

The sensitive element of the МСД signalling device is an elastic corrugated membrane. The membrane is fixed in the body of the device. A contact system is fixed on the body. The contact system closes (or opens) when the excess pressure of the working medium in the system is reached.

SENSORS PRESSURE

○ УМСТ

Heat-resistant pressure switch



Designation:

The УМСТ heat-resistant pressure switch is designed to close or open the electrical circuit when the specified values of the operating medium overpressure are reached in the system (neutral liquids and gases,
as well as НГЖ-5У, Skydrol LD-4, АМГ-10 liquids).
Example of a designation: УМСТ-35 - a signalling device with normally closed contacts (at a pressure below the response threshold). The number included in the signalling device code means the value of the response pressure in kgf/cm².
Letter or letters - design version features:

- A – signalling device with normally open contacts
- C – signalling device with a special fitting
- M – high temperature signalling device

Key performance data:

Parameter	Value	
1) Actuation pressure, kgf/cm²:		
range 2 to 4	2; 2,5; 2,8; 3; 3,2; 3,5	
range 4 to 6	4; 4,5; 5; 5,5	
range 6 to 10	6; 6,5; 7; 7,5; 8; 9	
range 10 to 15	10; 11; 12; 13; 14	
range 15 to 25	15; 16; 18; 19; 20; 22; 24	
range 25 to 40	25; 28; 30; 32; 35; 37	
range 40 to 60	40; 43; 50; 55	
2) Operation error, at temperatures kgf/cm²	from -60 °C to +120 °C	from +180 °C to +220 °C
range 2 to 4	± 0,4	± 0,6
range 4 to 6	± 0,63	± 1,2
range 6 to 10	± 0,4	± 0,65
range 10 to 15	± 0,63	± 1,2
range 15 to 25	± 1,0	± 1,8
range 25 to 40	± 1,63	± 3,0
range 40 to 60	± 2,5	± 4,0

○ УМСТ

Heat-resistant pressure switcht

3) DC supply voltage, V	27±2,7
4) Current load, A, not more than a) under ohmic load b) under inductive-ohmic load	 1,5 0,5
5) Ambient temperature, °C: a) working for УМСТ signalling devices b) working for УМСТ-М signalling devices	 from minus 60 to + 180 from minus 60 to + 220
6) Overload pressure, kgf/cm², for: range 2 to 4 range 4 to 6 range 6 to 10 range 10 to 15 range 15 to 25 range 25 to 40 range 40 to 60	 18 70 70 180 180 180 300
7) Vibration loads: - acceleration, m/s² (g) - frequency, Hz	 294 (30) from 5 to 2000 incl.
8) 8 Insulation resistance of electrical circuits under normal climatic conditions, MOhm, not less than	20
9) Number of operations	40000
10) Signalling device mass, kg, not more than:	0,19

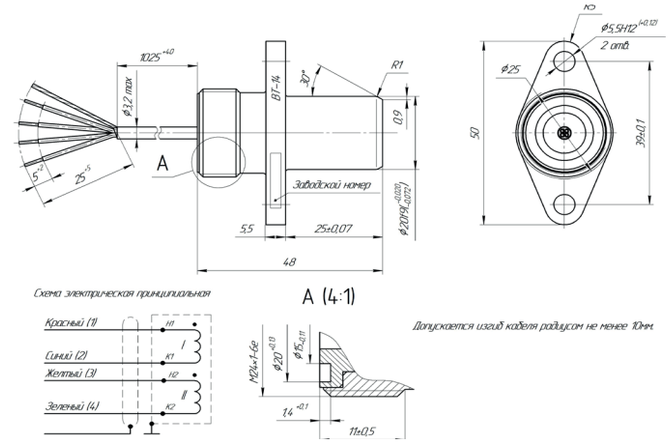
Design:
The sensitive element of the УМСТ signalling device is an elastic corrugated membrane. The membrane is fixed in the body of the device. A contact system is fixed on the body. The contact system closes (or opens) when the excess pressure of the working medium in the system is reached.

SENSORS
PRESSURE

BT-14

Rotation speed sensor

Designation:
Rotation speed sensor BT-14 - designed for issuing electrical voltage pulses to the control system, the frequency of which is proportional to the shaft rotation frequency.
The sensor works in conjunction with an inductor, which can be the working gear of the product.



Key performance data:

Parameter	Value
1) Voltage amplitude of each winding in normal climatic conditions at a load of 2 kOhm, with an inductor speed of 500 rpm and a gap of 1.25 mm, V, not less than	0,2
2) Sensor magnetic flux, Wb, not less than: in operation after transportation and storage	$30 \cdot 10^{-6}$
3) Active electrical resistance of the windings, Ohm: first second	 45±10 110±15
4) Sensor mass, kg, not more than	0,2

The sensor is operable at the following temperatures: operating temperature 200 °C, short-term operating temperature 250 °C (not more than 2 hours per cycle and not more than 6000 hours per resource), short-term limit 300 °C (not more than 15 minutes per cycle and not more than 500 hours per resource);

Design:
A magnetic system is installed in the sensor housing, which includes a permanent magnet and a magnetic circuit, as well as two coils placed on the frame. The ends of each winding of the coil are connected to the cable, forming two independent electrical circuits.
The load is connected to the BT-14 sensor by soldering to the cable outlets.

BT-15 (BT-15M)

Rotation speed sensor

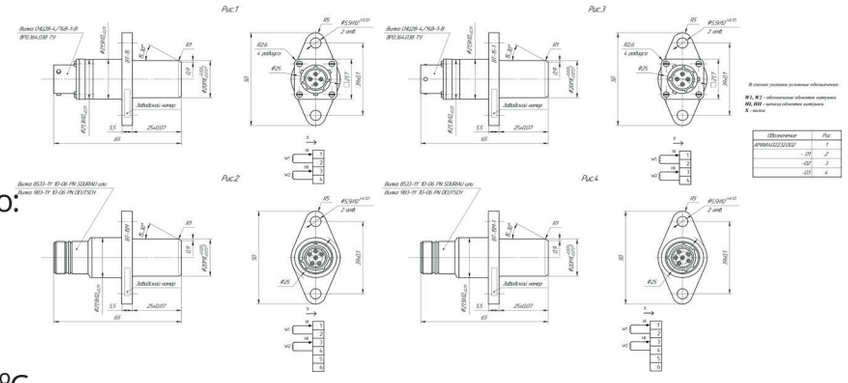
AGT AEROSPACE GLOBAL TRADE

Designation:

The BT-15 (BT-15M) rotation speed sensor - is designed for issuing electrical voltage pulses to the control system, the frequency of which is proportional to the shaft rotation frequency. The sensor works in conjunction with an inductor, which can be the working gear of the product.

Key performance data:

1) The voltage amplitude of each winding in normal climatic conditions at a load of 2 kOhm:
   - at a frequency of rotation of the inductor 960 rpm and a gap of 0.7 mm, not less than 0.9 V;
   - at an inductor speed of 4490 rpm and a gap of 0.7 mm, not less than 1.75 V;
   - at an inductor speed of 4490 rpm and a gap of 0.3 mm, not more than 15 V;
2) The magnetic flux of the sensor in operation, after transportation and storage is not less than: $30 \cdot 10^{-6}$ Wb;
3) Active electrical resistance of each winding, 77±10 Ohm
4) Sensor mass is not more than 0.2 kg
5) the sensor is operational at temperatures from -60 °C to:
   - working: 200 °C;
   - limiting in the zone of the electrical connector 215 °C (not more than 6 minutes per cycle and not more than 9 hours per resource).
   - limit in the zone of the working end of the sensor 250 °C



Design:

A magnetic system is installed in the sensor housing, consisting of a permanent magnet and a magnetic circuit, as well as two coils placed directly on the magnetic circuit. The windings of the coils are brought to the terminal block, and further, to the connector, forming two independent electrical circuits.
The BT-15 sensor is connected using the СНЦ28-4/14В-1-В plug, the BT-15M sensor is connected using the 983-1Y 10-06 PN DEUTSCH plug or the 8533-1Y 10-06 PN SOURIAU plug.

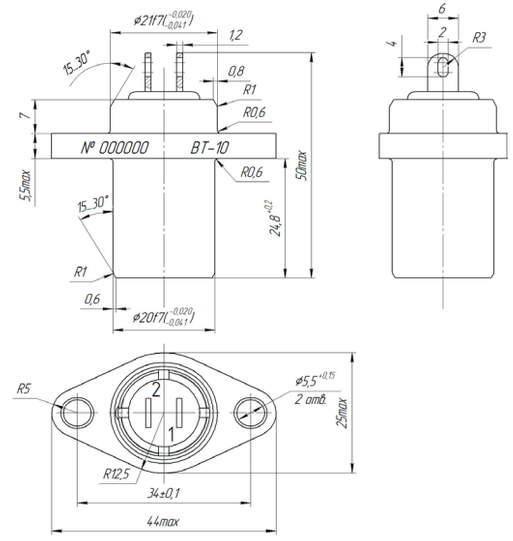
SPEED SENSORS

BT-10

Rotation speed sensor

Designation:
The BT-10 speed sensor is designed to output an electric sinusoidal signal to the control system and measurement system, the frequency of which is proportional to the engine rotor speed.

Key performance data:
1) The amplitude of the sensor voltage at the active load is 2 kOhm when working with a reference inductor:
   - at a speed of rotation of the inductor 1400 rpm and a radial gap between the end face of the sensor and the inductor 1.3 mm - not less than 0.4 V.
   - at a speed of rotation of the inductor 14200 rpm and a radial gap between the end face of the sensor and the inductor 0.7 mm - not more than 10 V.
2) The resistance of the sensor winding is 175±25 Ohm.
3) Working temperature range: from minus 60 to +250 °C (temperature limit +270 °C - not more than 6 minutes per cycle and not more than 9 hours per rated service life).
4) Conditional magnetic flux in operation, after transportation and storage, not less than 2 · 10-5 Wb.
5) The mass of the sensor is not more than 0.1 kg.

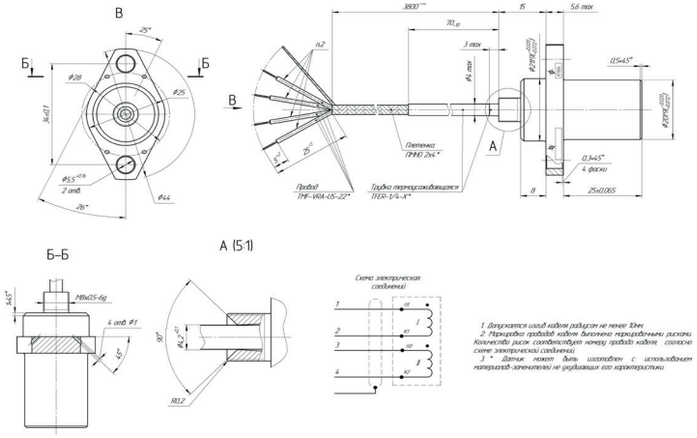


Design:
The sensor consists of a permanent cylindrical magnet with a coil made of heat-resistant wire. The ends of the coil winding are connected by soldering to the pins of the contact block made of press material.

SPEED SENSORS

BT1004

Rotation speed sensor



Designation:
Rotation speed sensor BT1004 - designed for issuing electrical voltage pulses to the control system, the frequency of which is proportional to the shaft rotation frequency. The sensor works in conjunction with an inductor, which can be the working gear of the product.

Key performance data:

Parameter	Value
1) Voltage amplitude of each winding in normal climatic conditions at a load of 2 kOhm, with an inductor speed of 1400 rpm, with a gap of 1.3 mm, V, not less than	0,4
2) Sensor magnetic flux, Wb, not less than: in operation after transportation and storage	30 · 10-6
3) Active electrical resistance of the windings, Ohm: first second	35±7 88±12
4) Sensor mass, kg, not more than	0,2
5) The sensor is operable at temperature, °C : working limit (within 30 minutes)	260 300

Design:
The sensor is a non-separable structure and consists of a permanent magnet, two coils mounted on a common frame, which are placed on a core soldered into the bottom of the sensor housing. The ends of each winding of the coil are connected to the cable, forming two independent electrical circuits.
The load is connected to the BT1004 sensor by soldering to the cable outlets.

SPEED SENSORS

MKT-BT-1

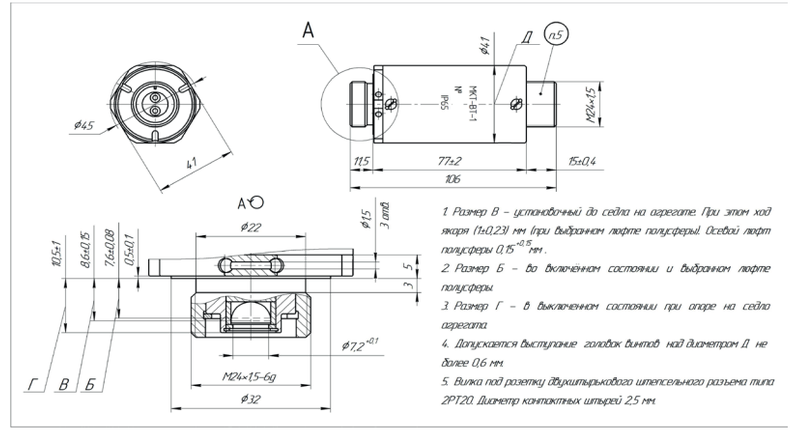
Solenoid valve

Designation:

The MKT-BT-1 solenoid valve is designed to work in conjunction with hydraulic and pneumatic units and is used to open and close the channel of the working medium. It is a normally closed solenoid valve Working medium - diesel fuel EURO DSTU 7688:2015, diesel fuel EURO GOST R 52368-2015, air, natural gas GOST 5542-87, hydrogen, etc.

Key performance data:

1) Operating supply voltage (DC), V 27^{+3}_{-7}
2) Current consumption at a voltage of 27 V in normal climatic conditions, A, not more than 1.5.
3) Product mass, kg, not more than 0.63
4) The solenoid valve works under the conditions of ambient temperature from -60 to +90, the temperature of the working fluid from -50 to +100.



Design:

When voltage is applied to the electromagnet winding, the armature with the locking hemisphere moves under the influence of the electromagnetic field and provides free movement of the working medium through the channel of the mating unit. When the voltage is removed, the armature with the locking hemisphere returns to its original position under the action of the spring and blocks the passage of the working medium.

Mounting on the object - using a threaded shank M24x1.5-6g, connection - the 2PT20 plug connector type.

MKT-BT-2

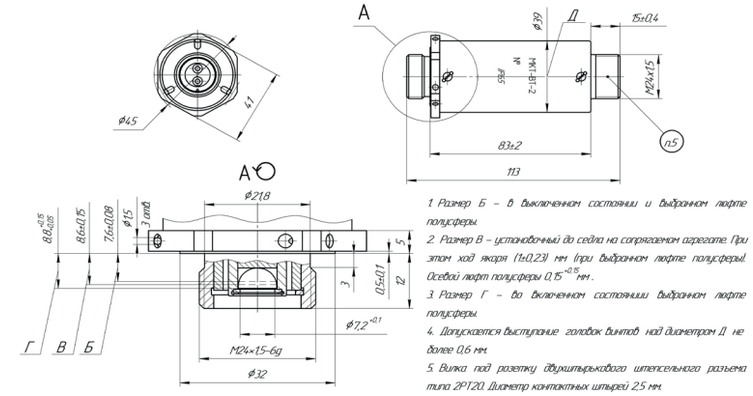
Solenoid valve

Designation:

The MKT-BT-2 solenoid valve is designed to work in conjunction with hydraulic and pneumatic units and is used to open and close the channel of the working medium. It is the normally open type solenoid valve
Working medium - diesel fuel EURO DSTU 7688:2015, diesel fuel EURO GOST R 52368-2015, air, natural gas GOST 5542-87, hydrogen, etc.

Key performance data:

1) Operating supply voltage (DC), V 27^{+3}_{-7}
2) Current consumption at a voltage of 27 V in normal climatic conditions, A, not more than 1.5.
3) Product mass, kg, not more than 0.58
4) The solenoid valve works under the conditions of ambient temperature from -60 to +90, the temperature of the working fluid from -50 to +100.



1. Размер Б – в выключенном состоянии и выбранном люфте полусферы.
2. Размер В – установочный до седла на сопрягаемом агрегате. При этом ход якоря (1±0,23) мм (при выбранном люфте полусферы). Осевой люфт полусферы $0,15^{+0,15}$ мм.
3. Размер Г – до включенном состоянии выбранном люфте полусферы.
4. Допускается выступание головок винтов над диаметром Д не более 0,6 мм.
5. Вилка под розетку двухштырькового штепсельного разъема типа 2РТ20. Диаметр контактных штырей 2,5 мм.

Design:

When voltage is applied to the electromagnet winding, the armature with the shut-off hemisphere moves under the influence of the electromagnetic field and blocks the channel of the working medium. When the voltage is removed, the armature with the locking hemisphere returns to its original position under the action of the spring and provides free movement of the working medium through the channel of the mating unit.
Mounting on the object - using a threaded shank M24x1.5-6g, connection - the 2PT20 plug connector type.

ELECTROMAGNETIC VALVES

MKT-BT-3

Solenoid valve

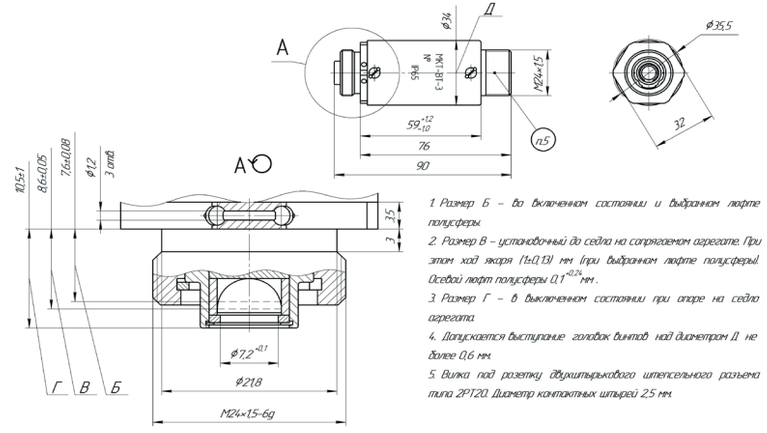
AGT AEROSPACE GLOBAL TRADE

Designation:

The MKT-BT-3 solenoid valve is designed to work in conjunction with hydraulic and pneumatic units and is used to open and close the channel of the working medium. It is a normally closed solenoid valve Working medium - diesel fuel EURO DSTU 7688:2015, diesel fuel EURO GOST R 52368-2015, air, natural gas GOST 5542-87, hydrogen, etc.

Key performance data:

1) Operating supply voltage (DC), V 27^{+3}_{-7}
2) Current consumption at a voltage of 27 V in normal climatic conditions, A, not more than 1.5.
3) Product mass, kg, not more than 0.37
4) The solenoid valve works under the conditions of ambient temperature from -60 to +120, the temperature of the working fluid from -50 to +100



1. Размер Б – во включенном состоянии и выбранном люфте полусферы.
2. Размер В – установочный до седла на сопрягаемом агрегате. При этом ход якоря (1±0,13) мм (при выбранном люфте полусферы). Осевой люфт полусферы $0,1^{+0,2}$ мм.
3. Размер Г – в выключенном состоянии при опоре на седло агрегата.
4. Допускается выступание головок винтов над диаметром Д не более 0,6 мм.
5. Вилка под розетку двухштырькового штепсельного разъема типа 2РТ20. Диаметр контактных штырей 2,5 мм.

Design:

When voltage is applied to the electromagnet winding, the armature with the locking hemisphere moves under the influence of the electromagnetic field and provides free movement of the working medium through the channel of the mating unit. When the voltage is removed, the armature with the locking hemisphere returns to its original position under the action of the spring and blocks the passage of the working medium.
Mounting on the object - using a threaded shank M24x1.5-6g, connection - the 2PT20 plug connector type.

ELECTROMAGNETIC VALVES

MKT-BT-4

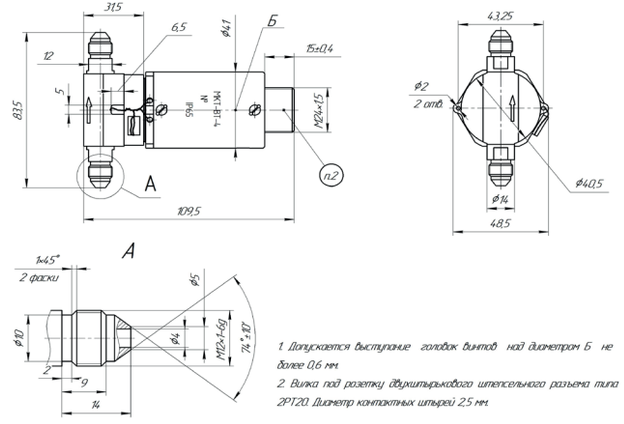
Solenoid valve

Designation:

The MKT-BT-4 solenoid valve is designed to work in conjunction with hydraulic and pneumatic units and is used to open and close the channel of the working medium. It is a normally closed solenoid valve Working medium - diesel fuel EURO DSTU 7688:2015, diesel fuel EURO GOST R 52368-2015, air, natural gas GOST 5542-87, hydrogen, etc.

Key performance data:

1) Operating supply voltage (DC), V 27^{+3}_{-7}
2) Current consumption at a voltage of 27 V in normal climatic conditions, A, not more than 1.5.
3) Product mass, kg, not more than 0.75
4) The solenoid valve works under the conditions of ambient temperature from -60 to +90, the temperature of the working fluid from -50 to +100.



1. Допускается выступание головок винтов над диаметром Б не более 0,6 мм.
2. Вилка под розетку двухштырькового штепсельного разъема типа 2РТ20. Диаметр контактных штырей 2,5 мм.

Design:

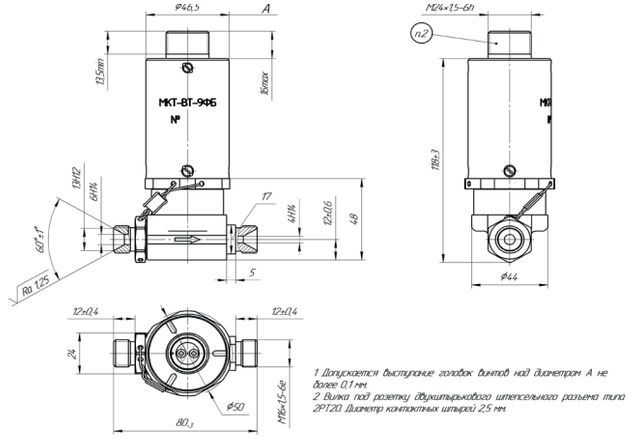
When voltage is applied to the electromagnet winding, the armature with the locking hemisphere moves under the influence of the electromagnetic field and provides free movement of the working medium through the channel of the mating unit. When the voltage is removed, the armature with the locking hemisphere returns to its original position under the action of the spring and blocks the passage of the working medium.
Mounting on the object - using a clamp or bracket attached to the valve body, connection - the 2PT20 type plug connector.

МКТ-ВТ-9ФБ

Solenoid valve

Designation:
The МКТ-ВТ-9ФБ solenoid valve is designed to open and close the channel of the working fluid.
It is a normally closed solenoid valve

Key performance data:
1) Supply voltage (DC) - (27 ± 2.7) V.
2) Current consumption at a voltage of 27 V and an ambient temperature of 20 °C - not more than 3.5A.
3) Product mass – $1.25_{-0.25}$ kg.
4) The solenoid valve works under the conditions of ambient temperature from -60 to +120, the temperature of the working fluid from -60 to +100.



Design:
In the de-energized position, the valve is closed. When voltage is applied to the winding, a magnetic flux is created, which, closing through the body, liners, casing and armature, creates the necessary traction force at the anchor. As a result of this, the armature, together with the locking device (hemisphere), being drawn into the body, opens the fitting (seat) opening, ensuring the passage of the working fluid through the valve. When the voltage is removed, the armature under the action of the spring returns to its original position

VT206

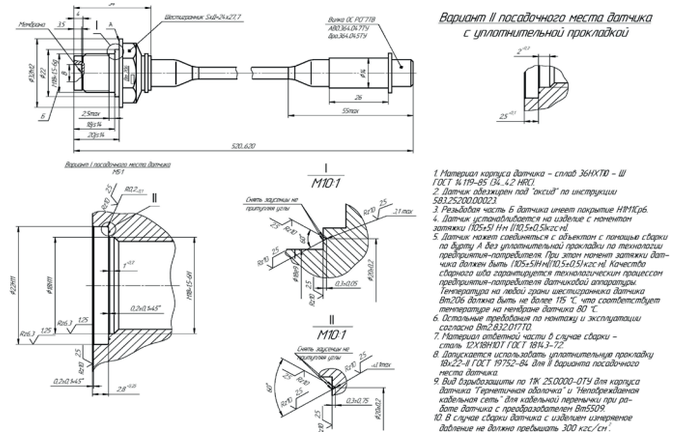
Pressure sensors

Designation:
The Vt206 pressure sensor is designed to measure the processes of static-dynamic pressure in liquid and gaseous media «energen», «naphthyl», «oxide», «heptyl», «amyl».
The sensor provides measurement of static-dynamic pressure processes together with secondary equipment providing DC supply voltage and frequency bandwidth from 0 to 200 Hz.

Key performance data:
1) DC supply voltage (6±1.2) V.
2) Natural frequency of the sensor is 10 kHz min.
3) The rated output signal of the sensor in calibration resistance units Rc at the rated pressure Pr and normal climatic conditions is (120 $^{+30}_{-5}$) kOhm, which corresponds to the output signal in relative units:

$$\frac{\Delta R}{R} = (6+0{,}3/-1{,}2) \cdot 10^{-3}$$

4) Measurement ranges: 0-10; 0-14; 0-20; 0-28; 0-40; 0-56; 0-80; 0-110; 0-160; 0-220; 0-300; 0-450; 0-600 kgf/cm²
5) The provided value of the error from the nonlinearity of the static calibration characteristic is 2% max.
6) Ambient temperature range from minus 50 to 50 °C.
7) Mass of the Vt206 transducer - 0.15 kg max.



Design:
The main unit of the sensor is a sensitive element. On its membrane dielectrics and strain gauges, thermal compensation resistor and contact pads are applied in series using the thin-film technology. The deformation of the membrane is converted by the strain gauge into a relative change in resistance, which is converted by a bridge circuit into the value of the output signal.
Connecting thread M18x1.5-6g.
Overall dimensions without cable jumper are Ø32x43 mm.

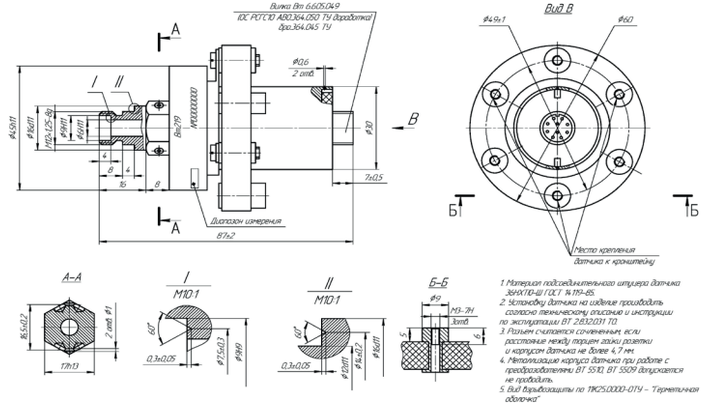
PRESSURE SENSORS

VT219, VT220

Absolute pressure sensors

Designation:
Absolute pressure sensor Vt219, Vt220 is designed to measure absolute pressure in operating media in liquid or gaseous phase.
The sensor is designed to work with the converter type Vt5509, Vt5510.

Key performance data:
1) Absolute pressure sensors Vt219 are designed for the following measuring ranges: 0-0.16; 0-0.30; 0- 0.60 kgf/cm².
2) Absolute pressure sensors Vt220 are designed for the following measuring ranges: 0-1.25; 0-2.50; 0- 5.00 kgf/cm².
3) Ambient temperature range from minus 50 to plus 50 °C.
4) Transducer supply voltage is 6 V.
5) Initial output signal reduced to supply voltage at pressure in the reception cavity of 0.1 mmHg within ± 0.15 mV/V.
6) Mass of the Vt219 transducer - 0.25 kg max.
7) Mass of the Vt220 transducer - 0.16 kg max.



Design:
The sensor consists of the following components: sensing element, housing, plug.
Sensing element of the sensor consists of connector, base, membrane, cushion and beam. There are tensoresistors on the beam. The measured pressure Px is converted into a force by the diaphragm and transferred to the beam via the cushion. Deformation of the beam causes a change in resistance of the bridge electric circuit strain gauges and when the sensor is lead into the output signal U out.

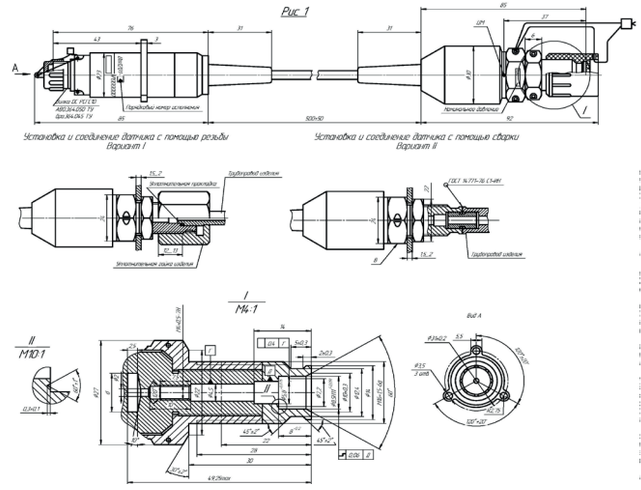
PRESSURE SENSORS

Bm1202

Absolute pressure sensors

Designation:
The Bm1202 frequency pressure sensor is designed to measure excess pressure.
Measured medium: high-temperature gaseous medium, liquid and gaseous phases of amyl, heptyl components.
The sensor can work both autonomously and as a set with the ЛХ-5564 or Bm7613 converter.

Key performance data:
1) Supply voltage is 27 V.
2) The current consumption is not more than 50 mA.
3) Measurement range: 0-0,5; 0-1; 0-2; 0-4; 0-5,6; 0-8;
   0-16; 0-22; 0-30; 0-45; 0-60; 0-11 MPa, with cable jumper
   (TKP tube with length of: 150, 1000, 1500 mm).
4) Frequency deviation:
   - when changing the measured parameter from P=0 to P=Pn
   is equal to 6000±1200 Hz;
   - at P=0, the resonant frequency is 15000±850 Hz.
5) RMS error under operating conditions, reduced to
   a pressure limit of ±0.4%.
6) Vibration loads in the frequency range from 5 to 6000 Hz.
7) Ambient temperature range from minus 50°C to plus 50°C
   (at ambient temperature +100°C for 100 s).
8) The mass of the sensor is not more than 0.32 kg.
9) The sensor has the type of explosion protection as per МК25.0000-ОТУ.



Design:
The Bm1202 frequency pressure sensor is a membrane-type string sensor
and consists of a string transducer and an amplifier connected by a cable jumper.
Supplying power to the sensor and removing the signal from it is carried out through
the ОС РСГС 10 plug.
Connecting thread M12x1-6g.

PRESSURE SENSORS

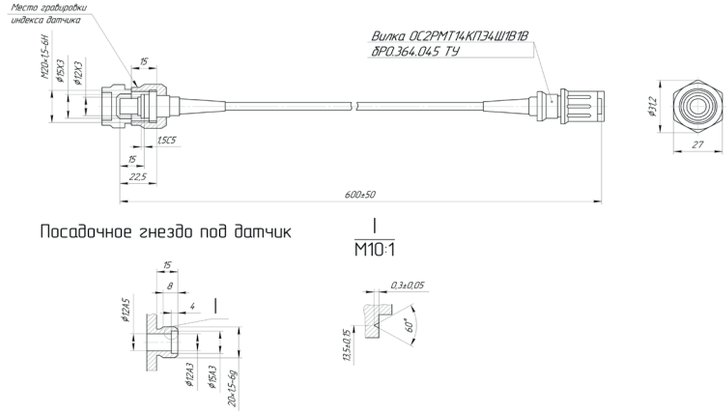
LH-611AM

Sensor of rapidly changing pressures

AGT AEROSPACE GLOBAL TRADE

Designation:

The LX-611AM type rapidly varying pressure transmitter is designed for conversion of rapidly varying pressure of liquid or gaseous nitrogen, acetyl and other media into electric signal (to be agreed with the developer).



Key performance data:

1) Operating range of static pressures is from 28 to 630 kgf/cm².
2) Operating range of rapidly varying pressures is from 0.45 to 56 kgf/cm².
3) Sensitivity of the sensor under load: Rin is 1 MOhm min, Sin=4700 pF and Pst=315 kgf/cm², 20 mV/(kgf/cm²) min.
4) Natural frequency, 60 kHz min.
5) Vibration equivalent in frequency range from 31.5 to 5000 Hz, 0.25 max ((kgf/cm²)/(1000m/s²) without water in the cooling duct.
6) Basic reduced error of the sensor is ±10% max.
7) Operating frequency range from 11.2 Hz to 22.4 kHz.
8) Operating medium temperature range is from 62.6% (p.2.7.2 of Vt0.006.004) to 473 K.
9) Ambient temperature range from 213 to 338 K.
10) Mass of the sensor with a cable jumper, 0.15 kg max.

Design:

The sensor consists of a housing, a sensing element, a cable jumper and parts of the cable jumper termination. The sensing element includes a titanium gasket, two piezo elements, a current collector and a bushing. The sensor operation is based on the principle of occurrence of alternating charges on the surface of the piezoelements under the effect of rapidly varying pressure.

PRESSURE SENSORS

DAV-068

Pressure sensor

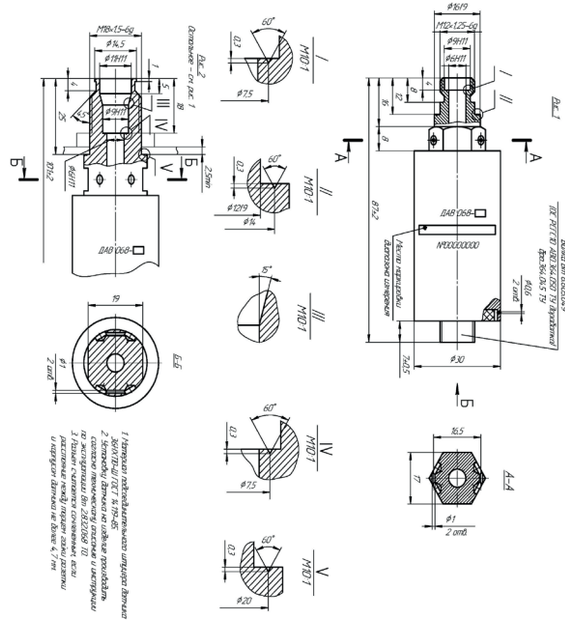
Designation:

The pressure sensor DAV-068 is designed to measure absolute pressure in operating media in liquid or gaseous phase.

The sensor is designed to work with the converter type Vt5509, Vt5510.

Key performance data:

1) Pressure sensors DAV-068 are manufactured for the following measurement ranges: 0-0.30; 0-0.60; 0-1.25; 0-2.50; 0-0.5.00; 0-10.00; 0-16.00; kgf/cm².
2) The frequency range of measurement is from 0 to 500 Hz.
3) Natural frequency, 1250 - 5000 Hz min.
4) The normalizing value of the output signal from the sensor is in the range from 1.3 mV / V to 1.4 mV/V.
5) The main reduced error is ±0.6% with a confidence level of 0.95.
6) Ambient temperature range from minus 60 to 250 °C.
7) Transducer supply voltage is 6 V.
8) Initial output signal reduced to supply voltage at pressure in the reception cavity of 0.1 mmHg within ± 0.07 mV/V.
9) Mass of the DAV-068 sensor - 0.20 kg max.



Design:

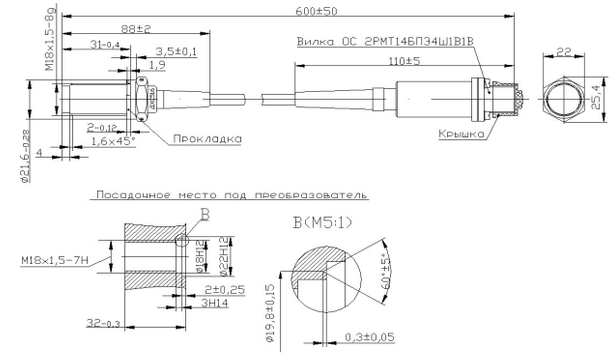
The sensor consists of the following components: sensing element, housing, plug. The sensitive element of the sensor includes a fitting, a base, a membrane, a pillow and a beam. There are tensoresistors on the beam. The measured pressure Pi is converted into a force by the diaphragm and transferred to the beam via the cushion. Deformation of the beam causes a change in resistance of the bridge electric circuit strain gauges and when the sensor is lead into the output signal U out.

DHS - 516

Pressure transducer

Designation:
The DHS-517 pressure transducer is designed to convert the measured sound pressure of gaseous nitrogen and air.
The transducer is operated in conjunction with the «Deviz» charge amplifier in the frequency range from 32 to 10,000 Hz.

Key performance data:
1) The range of absolute slowly changing pressure is from 0.5 to 16 kgf/cm².
2) Ambient temperature range from minus 50 to 60 °C.
3) The conversion coefficient at load Rin≥1.0 MOhm, Cin=4700 pF at the frequency of 1000 Hz must be (600±350) mV/kgf · cm^{-2}.
4) Basic relative conversion error from minus 2 to +2 dB at a confidence level of 0.95.
5) The vibration equivalent of the transducer in the frequency range from 20 to 4000 Hz is 2 · 10^{-5} kgf · cm^{-2} · m^{-1} · s² max.
6) Operating medium temperature is from 200°C (exposure time is 100 s).
7) Operating medium temperature is from 100°C to 200°C (exposure time is 2000 s).
8) Operating medium temperature is to 100°C (exposure time is 36000 s).
9) Frequency range is from 10 to 10000 Hz.
10) The capacity of the transducer must be (3400) пФ;
11) Mass of the transducer - 0.16 kg max.



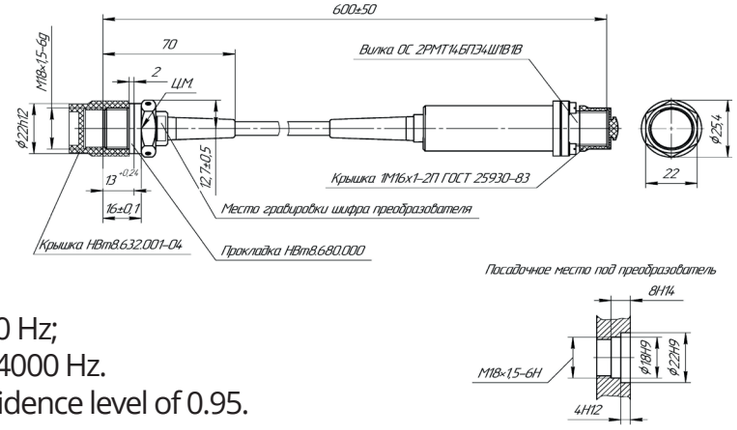
Design:
The transducer consists of a housing where the sensitive element - a piezoceramic element - is located.
The transducer operation is based on the principle of occurrence of alternating charges on the surface of the piezoelements under the effect of sound pressure.
Connecting thread M18x1.5-8g.

PRESSURE SENSORS

DHS - 517

Pressure transducer

Designation:
The DHS-517 pressure transducer is designed to convert the measured sound pressure of gaseous nitrogen and air in the sound pressure range into an electrical signal.
The transducer is operated in conjunction with the «Deviz» charge amplifier in the frequency range from 32 to 10,000 Hz.



Key performance data:
1) Ambient temperature range from minus 50 to 60 °C.
2) Operating medium temperature is from 100°C to 200°C.
   Exposure time is 2000 s.
3) The conversion coefficient at load Rin≥1.0 MOhm,
   Cin=4700 pF must be (5000±3000) mV/kgf · cm^{-2}.
4) Uneven frequency response:
   - from minus 5 to plus 5 dB in the frequency range from 3 to 40 Hz;
   - from minus 3 to plus 3 dB in the frequency range from 40 to 4000 Hz.
5) Basic relative conversion error from minus 3 to +3 dB at a confidence level of 0.95.
6) The capacity of the transducer must be (5750±2250) pF.
7) Mass of the DHS 517 sensor - 0.13 kg max.
8) Mass of the DHS 517-01 sensor - 0.2 kg max.
9) Mass of the DHS 517-02 sensor - 0.215 kg max.

Design:
The transducer consists of a housing where the sensitive element - a piezoceramic element - is located.
The transducer operation is based on the principle of occurrence of alternating charges on the surface of the piezoelements under the effect of sound pressure.
According to the mounting method on the studied object and the operating conditions, the transducers are manufactured in three versions: DHS 517 - without shock absorber, DHS 517-01, DHS 517-02 - with shock absorber.
Connecting thread M18x1.5-6g.

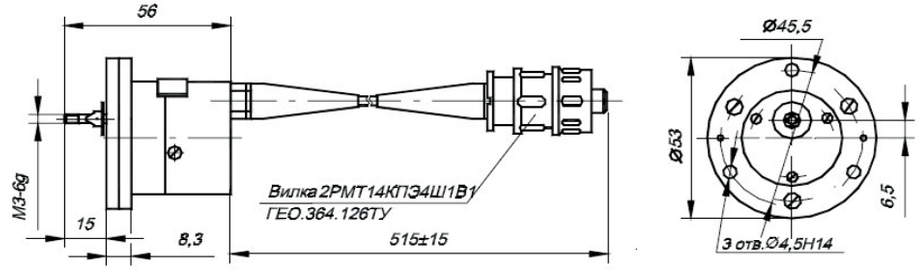
PRESSURE SENSORS

VT 712

Linear transducer

Designation:
Primary transducer of angular displacement Vt712 is designed to measure angular positions, displacements (in one plane) and convert them into an electrical signal.

Key performance data:
1) The transducer is designed to work under following exposure conditions:
   - ambient temperature from minus 60 to 60 °C;
   - Vibration in three mutually perpendicular positions in the frequency range from 5 to 5000 Hz with acceleration up to 300 m/s² (30g);
   - multiple shocks with acceleration up to 2000 m/s2 (200g)
2) Transducer error:
   - basic error, 1.0% max;
   - additional static error, 1.5% max.
3) Supply voltage: (6 ± 1) VDC.
4) The transducer mass is 0.2 kg max.



Design:
Structurally the transducer consists of the cylindrical case. Connection of the transducer with an object of movement is carried out by an input shaft, ending by thread M3, and fixation of mutual position of an input shaft of the transducer and an output shaft of the object of movement is carried out by a coupling, which mating part is fixed on an input shaft of the transducer by a pin. Electric circuits of the variable resistor are brought out to the plug 2RM14KPE4Sh1V1V.

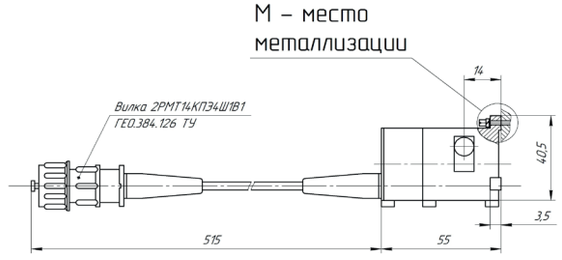
PRESSURE SENSORS

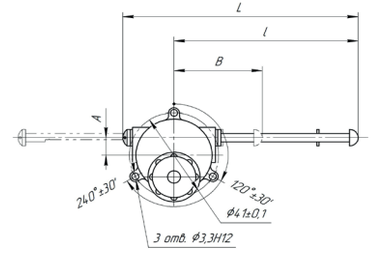
VT713

Linear transducer

Designation:
The primary linear displacement transducer VT713 is designed to measure the linear displacements of blocks of products and convert them into an electrical signal.

Key performance data:
1) The inverter is designed to operate under the following conditions:
   - at ambient temperature from minus 50 to plus 50 °C;
   - at relative air humidity up to 98% at a temperature of 30 °C;
   - when accelerating measured linear displacements up to 1 m/s2;
2) The static error of the transducer under operating conditions is not more than 2% of the measuring range.
3) Supply voltage (6 ± 0.2) VDC.
4) Converter weight, no more than 0.18 kg.





Design:
Structurally, the converter is made in the form of a cylindrical body. The transducer is connected to the object by means of a rod ending in a spherical tip. The electrical circuits of the variable resistor are brought to the plug 2РМТ14КПЭ4Ш1В1

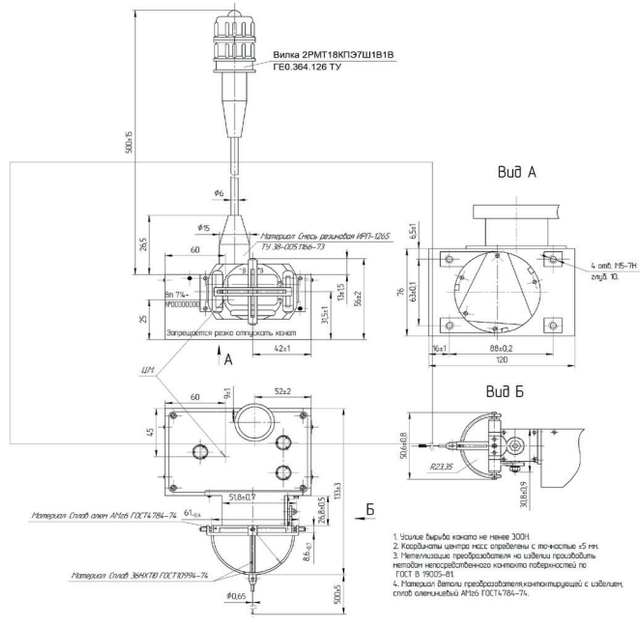
SENSORS
MOVING

○ BT-714

Linear transducer

Designation:
The Вт 714 primary linear and angular displacement transducer is designed to measure linear and angular displacements (in two mutually perpendicular planes) of blocks of mechanical systems and convert them into an electrical signal.

Key performance data:
1) The converter is designed to operate under the following conditions:
   - ambient temperature range from minus 60°C to + 60°C
   - sinusoidal vibration in the frequency range from 5 to 5000 Hz
   with acceleration up to 400 m/s² for 15 minutes;
   impact loads with an acceleration of 1500 m/s² with a shock pulse duration of 1-5 ms with a number of impacts of 20 in each of three mutually perpendicular directions;
   - relative humidity of the environment up to 98% at a temperature of 30°C;
   - changes in angular displacements with acceleration up to 5 m/s²;
   - rope retraction at a speed of up to 5 m/s and an acceleration of 2-3 m/s²;
2) Converter error:
   - main error
   not more than 1.5% for linear movements;
   not more than 2% for angular displacements;
   - additional static error
   not more than 1.3% for linear movements;
   not more than 2.2% for angular displacements;
3) Supply voltage (6 ± 1) VDC.
4) Converter mass, not more than 1 kg.



Design:
Structurally, the transducer consists of two measuring units: a unit for measuring linear displacements and a unit for measuring angular displacements.
Both units are functionally interconnected by a rope.
The case of the angular displacement transducer is fastened with screws to the base and the board of the linear displacement transducer. Electrical wires from all potentiometers are led to a 2PM plug.

SENSORS MOVING

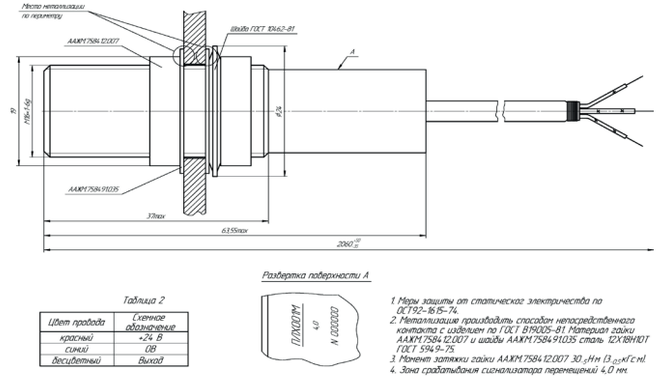
○ ПЛХ001М

Non-contact movement sensor

AGT AEROSPACE GLOBAL TRADE

Designation:
The ПЛХ001М non-contact displacement sensor is designed to control the position of the working bodies of the actuators of technological equipment.

Key performance data:
1) Supply voltage: 15–30 V.
   Rated supply voltage (24±1) V.
2) Current consumption at supply voltage (24±1) V:
   a) not more than 250 mA at temperatures from minus 20 °C to +35 °C;
   b) not more than 200 mA at a temperature of 35 °C to 70 °C.
3) The switching frequency – not more than 500 Hz with an on-off time ratio of 2.
4) Time for the sensor to enter the operating mode after applying the supply voltage not more than 3 min.
5) Mass of the sensor, not more than 95 g.
6) The sensor is operable in the temperature range from minus 20 to +70°C



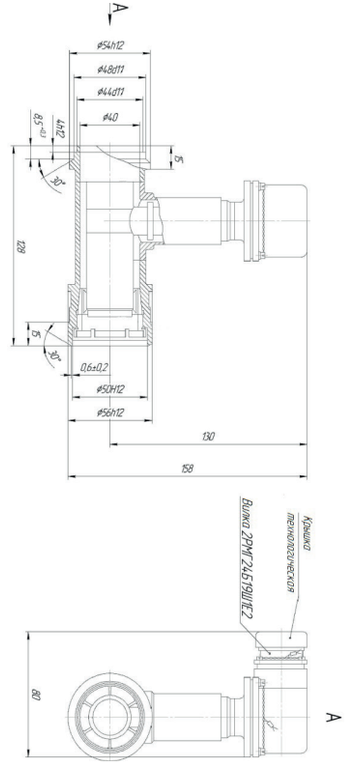
Design:
The sensor consists of a sensitive element, a signal conditioner (a board with electronic components) and a cable jumper ending with tinned wires. The sensitive element, the signal conditioner and part of the cable jumper are installed in the housing and filled with compound. For mounting on the object, the sensor is equipped with two washers, a lock washer and two nuts. An LED is located on the back of the sensor.

SENSORS MOVING

4К-ДТО

Oxide temperature sensor

Designation:
Oxide temperature sensor designed to measure the average temperature of the oxide in the pipeline.



Key performance data:
1) Rated temperature 86 K;
2) Internal pressure is not more than 20.0 MPa;
3) Resistance of the sensitive element: at a temperature of 0 °C – $200^{+0.5}_{-4.5}$ Ohm, at a nominal temperature of 45.96 ± 0.2 Ohm;
4) The sensor is designed to work when exposed to:
   - when exposed to cyclic temperature changes from minus 50 to 50 ºC;
   - when exposed to high humidity of 98% at a temperature of 30 ºC;
   - when exposed to low atmospheric pressure $1.33 \cdot 10^{-4}$ Pa;
5) The value of the current constantly flowing through the sensor, not more than - 5 mA;
6) Electrical insulation resistance between separate isolated circuits and the case, as well as between separate isolated circuits under normal climatic conditions, not less than 20 MOhm, in conditions of high humidity, not less than 1 Ohm.
7) The mass of the sensor is not more than 1 kg.

Design:
The oxide temperature sensor is a pipeline section with a built-in resistance thermometer.
The sensor resistance thermometer is a hollow double-walled vacuum-tight aluminium alloy cylinder, in which three independent sensitive elements are placed.
The inner cavity of the vacuum-tight cylinder is filled with a special gas mixture to improve heat transfer from the liquid to the sensitive element.

ИС-470А

Thermoelectric temperature sensor

AGT AEROSPACE GLOBAL TRADE

Designation:
The ИС-470А thermoelectric temperature sensor is a one-time sensor and is designed to measure the temperature of a non-aggressive gaseous medium.

Key performance data:
1) Range of measured temperatures from 0 to +2500 °C;
2) The value of the ohmic resistance of the thermocouple (0.9 ± 0.15) Ohm;
3) Rated static characteristic complies with GOST 3044-94,
4) The insulation resistance of each thermoelectrode relative to the sensor housing is at least 1 MOhm at a relative humidity of (95±3)% and a temperature of (30±5) °C.
5) The mass of the sensor is not more than 0.32 kg.

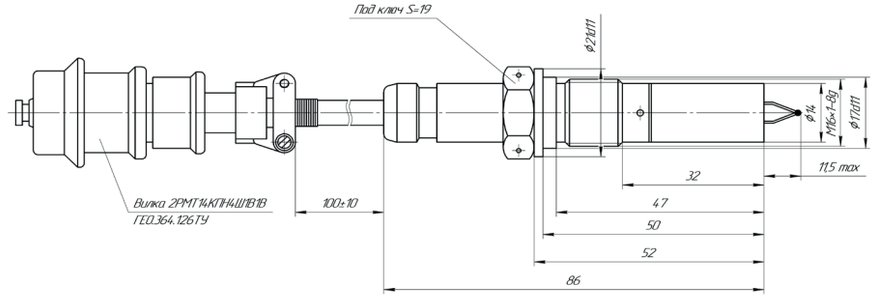


Схема соединения

1. Рабочее давление датчика 40 МПа.
2. По требованию заказчика допускается применять вилку ОС2РМТ14КПН4Ш1В1В ГЕО.364.126ТУ, ВРО364.045 ТУ.

Design:
The sensitive element of the sensor is a thermocouple made of the BP5 and BP20 tungsten-rhenium alloys.
The sensor cable is shielded with braid. The shield has no electrical contact with the sensor body. The sensor cable ends with the 2РМ14КПН4Ш1В1 plug.

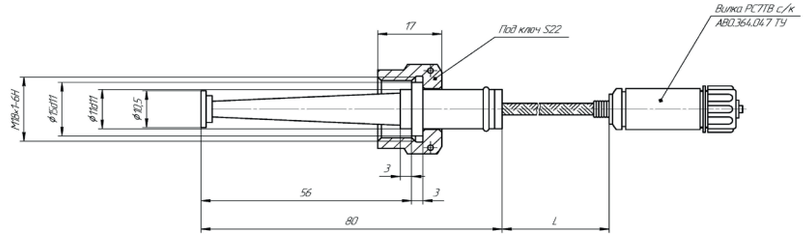
TEMPERATURE SENSORS

IT2000

Temperature sensor

Designation:
The Ит2000 sensor is designed to measure the temperature of liquid supercooled oxygen in filling and drain lines, non-aggressive and aggressive liquids, as well as the Vinyl product in tanks and lines.

Key performance data:
1) Temperature measurement range from -215 to +50 °C;
2) Insulation resistance between disconnected circuits and the sensor housing is not less than 20 MOhm under normal climatic conditions, not less than 1 MOhm at 95% relative humidity and 25 °C;
3) The thermal inertia of the sensor in boiling water is not more than 1 s;
4) The temperature converter is designed to work under the influence of operating pressureof 107 Pa
5) Sensor output voltage in normal climatic conditions and supply current (100±1) μA - (750±30) mV;
6) The value of the reverse direct current of the sensor under normal climatic conditions and a voltage of minus 5 V is not more than 5×10^{-9} A;
7) Sensor mass not more than 0.09 kg - Ит 2000, 0.11 kg - Ит 2000-01, 0.13 kg - Ит 2000-02.



Обозначение	L, мм	Масса, г
АЛЖМ4.05.213.001	500±50	0,09
-01	1000±50	0,11
-02	1500±50	0,13

Design:
The sensitive element of the sensor is the ПТД-100 primary thermodiode converter. The outputs of the sensitive element are soldered to the output and then soldered through the cable to the PC7TB plug.
The sensing element and output are built into the housing.

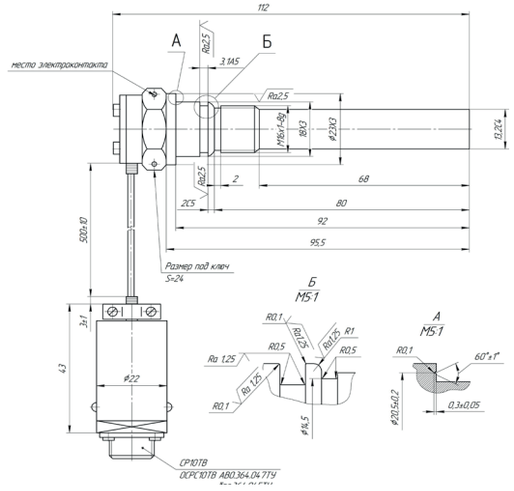
TEMPERATURE SENSORS

TGE 007

Thermometer

Designation:
The TGE 007 thermometer is designed to measure the temperature of liquid non-aggressive media and produce a command current.

Key performance data:
1) Temperature of the TGE 007 setting point - 14 °C, TGE 007-01 - 20 °C;
2) Load resistance, Ohm: TGE 007 - 300±50, TGE 007-01 - 200±50;
3) Supply voltage, V: TGE 007 - nominal 27±0.5, TGE 007-01 - nominal 18±0.5;
4) The thermometer is designed to work in conditions of temperature exposure from 0 to 40 °C;
5) The thermometer mass is 0.09 kg max.



Design:
Sensitive elements of the thermometer are ST4-17 thermoresistors, installed in the slots of the frame.
Current leads of thermistors are soldered to contact boards. On the cable outlet side, the housing is closed with a cover, which provides a rigid attachment of the cable to the housing.

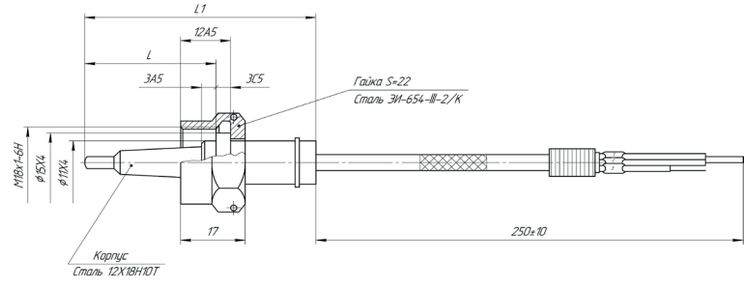
TEMPERATURE SENSORS

TM 006
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 006 thermometer is designed to measure surface temperature.

Key performance data:
1) Working range of thermometer measurement from -196 to +200 °C;
2) Resistance of the sensing element R0 at 0 °C: TM 006 – 17±0.25 Ohm, TM 006-01 – 23±0.25 Ohm, TM 006-02 – 30±0.25 Ohm, TM 006-03 – 53±0.25 Ohm, TM 006-04 – 60±0.25 Ohm, TM 006-05 – 100±0.25 Ohm;
3) Error value, °C in the temperature range from minus 196 °C to minus 50 °C - ±0.5, in the temperature range from minus 50 °C to +200 °C is determined by the formula $\pm\left(\frac{24}{R_0}+8{,}0\times10^{-3}\,|t|\right)$, where t is the absolute temperature value, for which the error °C is determined;
4) The thermal inertia index of thermometers is not more than 0.01 s;
5) Insulation resistance of the sensitive element of the thermometer relative to the termination of the current leads under normal climatic conditions is at least 20 MOhm.
6) The thermometer is designed to operate under tenfold exposure to the extreme temperatures of the operating measurement range.
7) The mass of the thermometer is not more than 0.008 kg



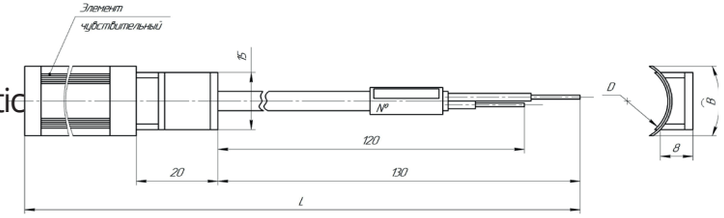
Design:
The sensitive element of the thermometer is a copper wire wound on a special device and fixed on a fibreglass plate using a siliconevarnish. Current leads are soldered to the ends of the sensing element, which are sealed on top with a plate of fibreglass.

TM 104
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 104 thermometer is designed to measure the surface temperature of pipelines with a diameter of 14...200 mm. The diameter of the pipeline where the thermometer will be installed is specified when the order is placed.

Key performance data:
1) Operating range of thermometer is from - 196 to +200 C;
2) Resistance of the sensor R0 at 0 °C: TM 104 - 17 ± 0.25 Ohm, TM 104 - 01 - 23 ± 0.25 Ohm, TM 104-02 - 30 ± 0.25 Ohm, TM 104-03 -53 ± 0.25 Ohm, TM 104-04 - 60±0.25 Ohm, TM 104-05 - 100±0.25 Ohm;
3) The value of the error, °C in the temperature range from minus 196 °C to minus 50 °C is ±0.5, in the temperature range from minus 50 °C to +200 °C is determined by the formula $\pm\left(\frac{24}{R_0}+8{,}0\times10^{-3}\,|t|\right)$, where t is the absolute temperature value, for which the error °C is determined;
4) The thermal inertia index of the thermometer is 0.01 s max;
5) The insulation resistance of the sensitive element of the thermometer relative to the current leads under normal climatic conditions - 20 MOhm min.
6) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
7) The thermometer mass is 0.008 kg max



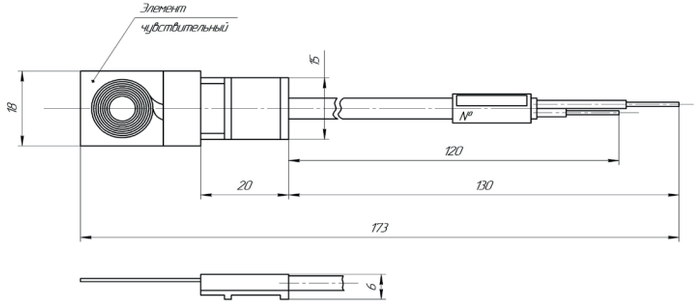
Design:
The sensor of the thermometer is a copper wire, wound on a special device and fixed on the glass tissue plate with the silicone-organic lacquer. Current leads are soldered to the ends of the sensor, which are sealed from above with a glass tissue plate.

TEMPERATURE SENSORS

TM 119
Thermometer

Designation:
Thermometer TM 119 is designed to measure the temperature of low-boiling aggressive liquids and gases.

Key performance data:
1) Operating range of thermometer is from -196 to +200 C;
2) Resistance of the sensor R0 at 0 °C: TM 119 - 23±0.3 Ohm, TM 119 - 01 - 23±0.3 ohm,
   TM 119-02 - 23±0.3 Ohm, TM 119-03 - 30±0.3 Ohm, TM 119-04 – 30±0.3 Ohm, TM 119-05 – 30±0.3 Ohm,
   TM 119-06 – 53±0.3 Ohm TM 119-07 – 53±0.3 Ohm, TM 119-08 – 53± 0.3 Ohm, TM 119-09 - 60±0.9 Ohm,
   TM 119-10 - 60±0.9 Ohm, TM 119-11 - 60±0.9 Ohm, TM 119-12 - 100±0, 9 Ohm,
   TM 119-13 - 100 ± 0.9 Ohm, TM 119-14 - 100 ± 0.9 Ohm;
3) The thermal inertia index of the thermometer in boiling water is 4 s max;
4) The thermometer is designed to work under following conditions:
   the temperature in the operating environment changes from -196 ... +200 for ten cycles
   under dynamic pressure up to 5 kg/cm²
5) The thermometer mass is 0.060 kg max

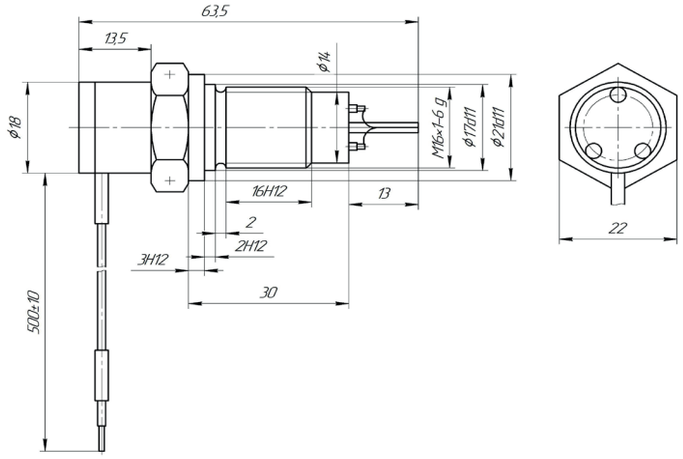


Design:
The sensitive element of the thermometer (copper wire), wound on a copper frame, pre-coated with electrical insulating varnish. The frame is inserted into the housing and pressed ensuring the contact of the frame with the housing of the thermometer.
A wire of sensitive element is connected to a cable using current leads made of copper wire.
The hermetic sealing of the thermometer is ensured by soldering of the case with the rod, as well as by filling the interior of the housing.

TM 166
Thermometer

Designation:
The TM 166 thermometer is designed to measure the temperature of calm non-aggressive non-conductive liquids and gases.

Key performance data:
1) Operating range of thermometer is from -196 to +200 C;
2) Resistance of the sensor R0 at 0 °C: TM 166 - 23±0.3 Ohm,
   TM 166-01 - 30±0.3 Ohm, TM 166-02 - 53±0.3 Ohm,
   TM 166-03 - 60±0.9 Ohm, TM 166-04 - 100±0.9 Ohm;
3) Thermal inertia index of thermometers at air speed
   (5±0.5) m/1 is (5±1) s max;
4) The insulation resistance of the thermometer's sensor
   relative to the housing at the extreme values of the
   working range temperature - 0.1 MOhm min.
5) The thermometer is designed to work under
   following conditions:
   at cyclic temperature changes in the working range
   from -196...+200
   under dynamic pressure up to 1.5 n/cm² .
6) The thermometer mass is 0.08 kg max



Design:
The sensor of the thermometer is a copper wire, bifilarly wound in the form of a flat tablet, it is glued to a thin stainless steel plate, which is mounted on a frame to a block of press material, which, in turn, is fixed to the thermometer housing..
The ends of the sensor are soldered to the current leads of the thermometer, pressed into a block of heat-insulating material.
A cable is soldered to the current leads and the soldering area is sealed with heat-resistant compound to secure the contact.

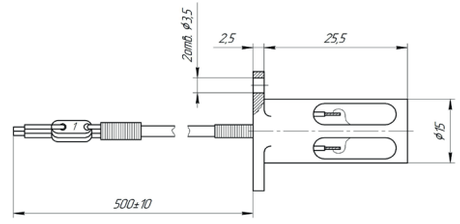
TEMPERATURE SENSORS

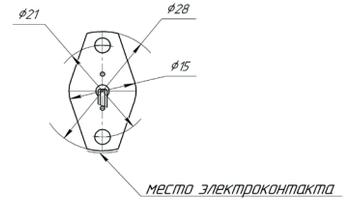
TM 168
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 168 thermometer is designed to measure the temperature of calm non-aggressive non-conductive liquids and gases.

Key performance data:
1) Operating range of thermometer is from -196 to +200 C;
2) Resistance of the sensor R0 at 0 °C: TM 168 - 23±0.3 Ohm, TM 168-01 - 30±0.3 Ohm, TM 168-02 - 53±0.3 Ohm, TM 168-03 - 60±0.9 Ohm, TM 168-04 - 100±0.9 Ohm;
3) Thermal inertia index of thermometers at air speed (5±0.5) m/1 is (5±1) s max;
4) The insulation resistance of the thermometer's sensor relative to the housing at the extreme values of the working range temperature - 0.1 MOhm min.
5) The thermometer is designed to work under following conditions: at cyclic temperature changes in the working range from -196...+200 under dynamic pressure up to 1.5 n/cm² .
6) The thermometer mass is 0.020 kg max





Design:
The sensor of the thermometer is a copper wire, bifilarly wound in the form of a flat tablet, it is glued to a thin stainless steel plate, which is mounted on a frame to a block of press material, which, in turn, is fixed to the thermometer housing.
The ends of the sensor are soldered to the current leads of the thermometer, pressed into a block of heat-insulating material.
A cable is soldered to the current leads and the soldering area is sealed with heat-resistant compound to secure the contact.

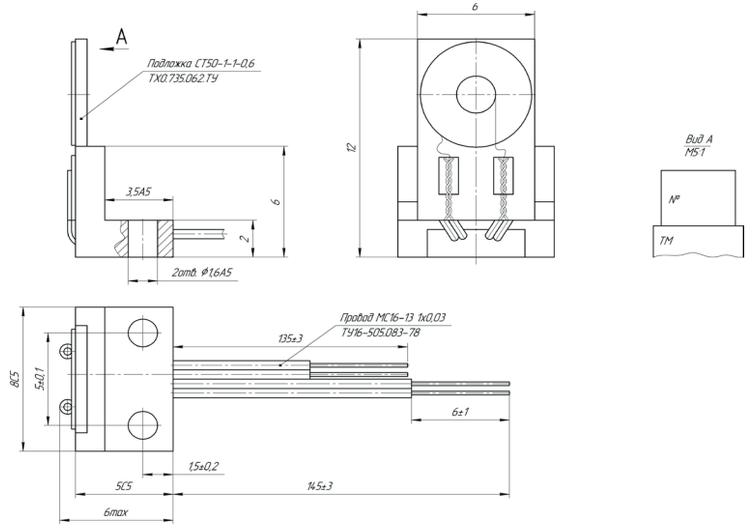
TEMPERATURE SENSORS

TM 222
Thermometer

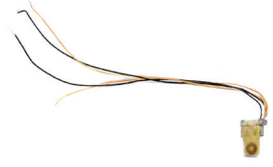
AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 222 thermometer is designed to measure the neutral gaseous medium.

Key performance data:
1) Measured temperature range - TM 222 - from 0 to +50 C,
   TM 222-01 - from +15 to +25;
2) Resistance of the sensor R0 at 0 °C:
   TM 222 - 100±0.45 Ohm, TM 221-01 - 200±0.8 Ohm;
3) Insulation resistance of the thermometer's sensitive element relative to the housing - 20 MOhm min - in normal climatic conditions, 1 MOhm - under high humidity conditions, 5 MOhm - at the extreme values of the measured temperature;
4) The thermometer is designed to work under following conditions:
   influence of helium-air medium with the geium content up to 5% at the pressure of $0.5 \cdot 10^5$ Pa during 40 hours.
   pressure decrease to $4 \cdot 10^4$ Pa at the rate of $2 \cdot 10^3$ Pa/s
   exposure to reduced pressure of $1.33 \cdot 10^{-4}$ Pa during 2160 hours
5) The thermometer mass is 0.0015 kg max



Design:
The sensor of the thermometer is a copper wire, wound on a special device and fixed on the cital plate with the silicone-organic lacquer
The sensing element is soldered to the contact pads, to which the thermometer current leads are also soldered.



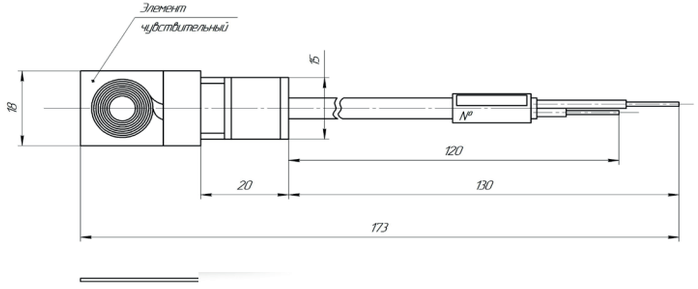
TEMPERATURE SENSORS

TM 221
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 221 thermometer is designed to measure the temperature of metal and optical flat surfaces, metal surfaces with a radius of double curvature ($R_1 \geq 6$. $R_2 \geq 30$) as well as cylindrical and conical surfaces with radius of curvature R≥20 mm.

Key performance data:
1) Measured temperature range -TM 221, TM 221-01 - from -50 to +200 C,
   TM 221-02, TM 221-03 - from +15 to +25;
2) Resistance of the sensor R_0 at 0 °C: TM 221 - 100±0.45 Ohm, TM 221-01 - 53±0.45 Ohm,
   TM 221-02 - 200±0.8 Ohm, TM 221-03 - 200±0.8 Ohm;
3) Insulation resistance of the thermometer's sensitive element relative to the surface on which
   it is mounted, 20 MOhm min - in normal climatic conditions, 1 MOhm - under high humidity conditions,
   5 MOhm - at the extreme values of the measured temperature;
4) The thermometer is designed to work under
   following conditions:
   influence of helium-air medium with the geium content
   up to 5% at the pressure of $0.5 \cdot 10^5$ Pa during 40 hours.
   pressure decrease to $4 \cdot 10^4$ Pa at the rate of $2 \cdot 10^3$ Pa/s
   exposure to reduced pressure of $1.33 \cdot 10^{-4}$ Pa
   during 2160 hours
5) The thermometer mass is 0.001 kg max



Design:
The sensor of the thermometer is a copper wire, wound on a special device and fixed on the cital plate with the silicone-organic lacquer
The sensing element is soldered to the contact pads, to which the thermometer current leads are also soldered.

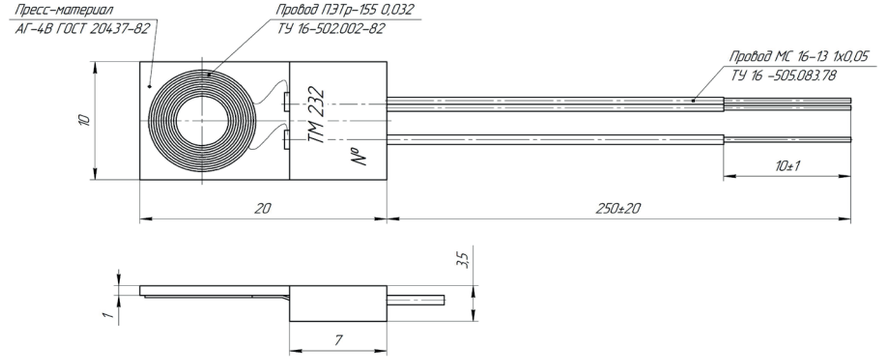
TEMPERATURE SENSORS

TM 232
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TM 232 thermometer is designed to measure the temperature of metal flat surfaces, pipeline surfaces with a diameter of 14...18 mm and above, as well as surfaces with a double curvature radius (R1≥6. R2≥30) and spherical surfaces with a diameter of 20 mm or more.

Key performance data:
1) Range of measured temperature – from -130 to +200 C;
2) Thermometer resistance R0 at 0 °C: TM 232 – 100±0.9 Ohm, TM 232 - 01 – 53±0.3 Ohm;
3) Insulation resistance of the sensitive element of the thermometer relative to the surface is at least 20 MOhm - in normal climatic conditions, 1 MOhm - in conditions of exposure to high humidity, 5 MOhm - at temperatures from -50 to +65 ° C, 0.1 MOhm - at extreme values working temperatures;
4) The thermometer is designed to operate under conditions of exposure to temperature cycles from -100 to +200 °C with a period of 80 minutes or more for 3500 hours, from -130 to +170 °C for 33000 hours.
5) The mass of the thermometer is not more than 0.0015 kg



Design:
The sensitive element of the thermometer is a copper wire wound in the form of a spiral and fixed on a plate of press material using a silicone varnish
The current leads of the thermometer are soldered to the sensitive element.

TEMPERATURE SENSORS

ТП 018
Thermometer

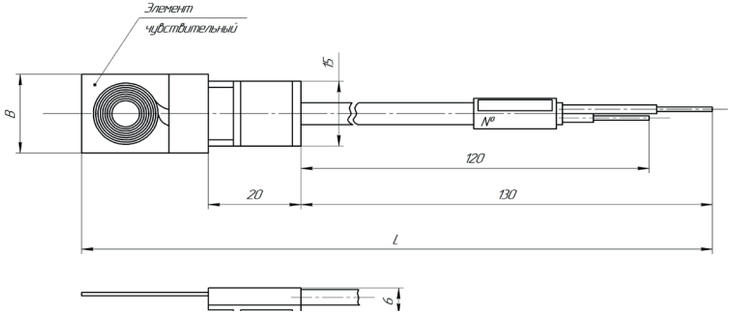
AGT AEROSPACE GLOBAL TRADE

Designation:
The TP 018 thermometer is designed to measure the surface temperature.

Key performance data:
1) The operational measuring range thermometer TP 018 is from -215 to +300 C, TP 018-01, TP 018-02, TP 018-03, TP 018-04, TP 018-05, TP 018-06 - from -260 to +300 C;
2) Resistance of the thermometer R0 at 0 °C: TP 018 - 15±0.25 Ohm, TP 018-01 - 25±0.25 Ohm, TP 018-02 - 34±0.25 Ohm, TP 018-03 - 46±0.15 Ohm, TP 018-04 - 60±0.25 Ohm, TP 018-05 - 100±0.15 Ohm, TP 018-06 - 500±1.0 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula

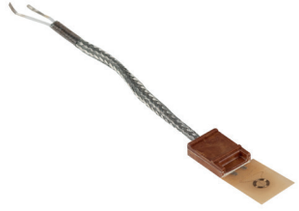
$\pm\left(\frac{12}{R_0}+2{,}2\times10^{-3}|t|\right)$, in the temperature range from 0 °C to +300 °C is determined by the formula

$\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}|t|\right)$, where t is the absolute temperature value for which the error is determined, °C;



4) The thermal inertia index is 0.01 s max;
5) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
6) The thermometer mass is 0.008 kg max

Design:
The sensor of the thermometer is a platinum wire, wound on a special device and fixed on the glass tissue plate with the silicone-organic lacquer.
Current leads are soldered to the ends of the sensor, which are sealed from above with a glass tissue plate.

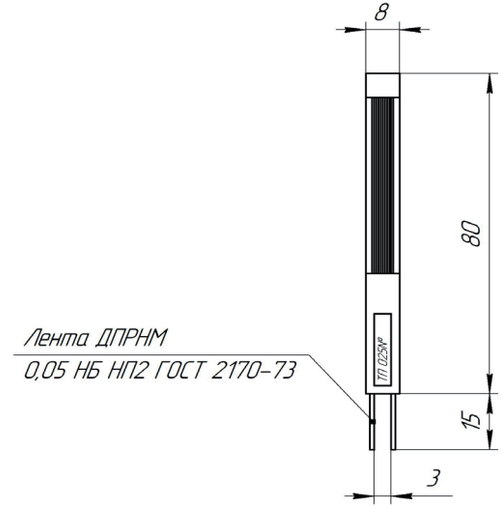


TEMPERATURE SENSORS

ТП 025
Thermometer

Designation:
The TP 025 thermometer is designed to measure the surface temperature.

Key performance data:
1) Operating range of thermometer is from –260 to +300 C;
2) Resistance of the thermometer R_0 at 0 °C: 34±0.25 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula
$\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}|t|\right)$, in the temperature range from 0 °C to +300 °C is determined by the formula
$\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}|t|\right)$, where t is the absolute temperature value for which the error is determined, °C;
4) The thermal inertia index is 0.01 s max;
5) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
6) The thermometer mass is 0.008 kg max

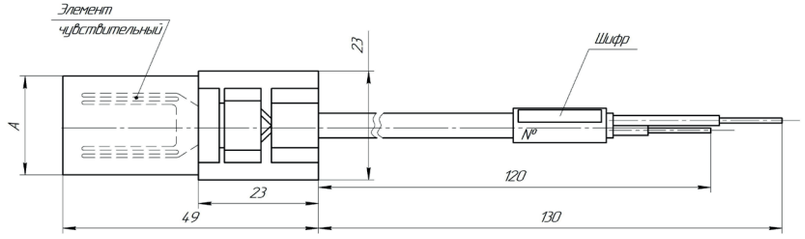


Design:
The sensor of the thermometer is a platinum wire, wound on a special device and fixed on the glass tissue plate with the silicone-organic lacquer.
Current leads are soldered to the ends of the sensor, which are sealed from above with a glass tissue plate.

TP 033
Thermometer

Designation:
The TP 033 thermometer is designed to measure the temperature of flat surfaces.

Key performance data:
1) Operating range of thermometer is from -50 to +1000 C;
2) The thermometer resistance R_0 at the temperature 0 °C: TP 033 - 12±0.25 Ohm, TP 033-01 - 15±0.25 Ohm, TP 033-02 - 25±0.25 Ohm, TP 033-03 - 34±0.25 Ohm;
3) The value $\pm(\frac{15}{R_0} + 2{,}2 \times 10^{-3}|t|)$, of the error, °C in the temperature range from minus 50 °C to 0 °C is determined by the formula $\pm(\frac{15}{R_0} + 2{,}2 \times 10^{-3}|t|)$, in the temperature range from 0 °C to +650 °C is determined by the formula $\pm(\frac{15}{R_0} + 4{,}0 \times 10^{-3}|t|)$, where t is the absolute value of the temperature, for which the error °C is determined, in the temperature range from +650 °C to +1000 °C - ±3 °C;
4) The thermal inertia index is 0.01 s max;
5) The insulation resistance of the sensitive element of thermometers relative to the current leads under normal climatic conditions - 20 MOhm min;
6) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
7) The thermometer mass is 0.01 kg max



Design:
The sensitive element of the thermometer is a platinum wire, wound on a special device and fixed on a plate with heat-resistant enamel. Platinum current leads are soldered to the ends of the sensitive element and soldered to the thermometer cable.

TEMPERATURE SENSORS

TP 041

Thermometer

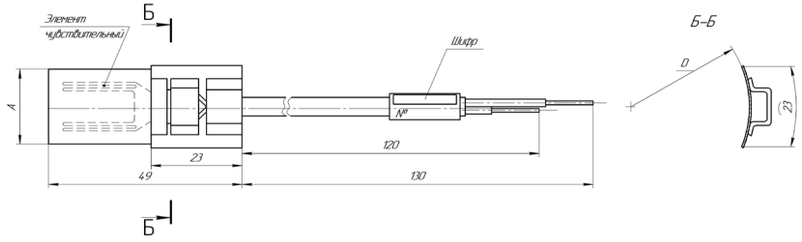
AGT AEROSPACE GLOBAL TRADE

Designation:

The TP 041 thermometer is designed to measure the temperature of pipelines with a diameter of 14...200 mm. The diameter of the pipeline where the thermometer will be installed is specified when the order is placed.

Key performance data:

1) Operating range of thermometer is from -50 to +1000 C;
2) The thermometer resistance R0 at the temperature 0 °C: TP 041 - 12±0.25 Ohm, TP 041-01 - 15±0.25 Ohm, TP 041-02 - 25±0.25 Ohm, TP 041-03 - 34±0.25 Ohm;
3) The value $\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}\,|t|\right)$, of the error, °C in the temperature range from minus 50 °C to 0 °C is determined by the formula $\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}\,|t|\right)$, in the temperature range from 0 °C to +650 °C is determined by the formula $\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}\,|t|\right)$, where t is the absolute value of the temperature, for which the error °C is determined, in the temperature range from +650 °C to +1000 °C - ±3 °C;
4) The thermal inertia index is 0.01 s max;
5) The insulation resistance of the sensitive element of thermometers relative to the current leads under normal climatic conditions - 20 MOhm min;
6) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
7) The thermometer mass is 0.01 kg max



Design:

The sensitive element of the thermometer is a platinum wire, wound on a special device and fixed on a plate with heat-resistant enamel. Platinum current leads are soldered to the ends of the sensitive element and soldered to the thermometer cable.

TEMPERATURE SENSORS

TP 062
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TP 062 thermometer is a resistance thermometer. It is designed to measure the temperature of non-aggressive and aggressive liquids and gases, as well as the "Vinyl" product.

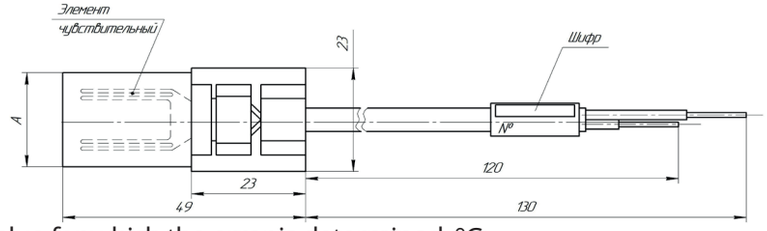
Key performance data:
1) Operating range of thermometer is from -260 to +300 C;
2) Resistance of the sensor R0 at 0 °C: TP 062 - 25±0.25 Ohm, TP 062-01 - 25±0.25 Ohm, TP 062-02 - 25±0.25 Ohm, TP 062 - 03 - 34±0.25 Ohm, TP 062 - 04 – 34±0.25 Ohm, TP 062-05 – 34±0.25 Ohm, TP 062-06 – 46±0.15 Ohm, TP 062-07 – 46±0.15 Ohm, TP 062-08 – 46 ±0.15 Ohm, TP 062-09 - 60±0.25 Ohm, TP 062-10 - 60±0.25 Ohm, TP 062-11 - 60±0.25 Ohm, TP 062-12 - 100±0 .15 Ohm, TP 062-13 - 100 ± 0.15 Ohm, TP 062-14 - 100 ± 0.15 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula

$$\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}\,|t|\right),$$

in the temperature range from 0 °C to +300 °C is determined by the formula

$$\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}\,|t|\right),$$

where t is the absolute temperature value for which the error is determined, °C;



4) The thermal inertia index in boiling water is 1 s max;
5) Insulation resistance of the thermometer sensor relative to the housing in normal climatic conditions 20 MOhm min.
6) The thermometer is designed to work under following exposure conditions:
ten temperature cycles from -260 to +300 ºC;
pressure294·105 Pa;
relative air humidity up to 98% and temperature up to 35 ºC;
dynamic head up to 5 kg/cm²
7) The thermometer mass is 0.06 kg max

Design:
The thermometer sensor is a platinum wire wound in the form of a flat tablet and glued to the thermometer body stand with heat-resistant glue.
The ends of the sensor are soldered to the thermometer leads. The top of the sensor is covered by a steel disc, which is soldered along the contour to the housing column.
The copper cable is soldered to the current leads.

TEMPERATURE SENSORS

TP 073

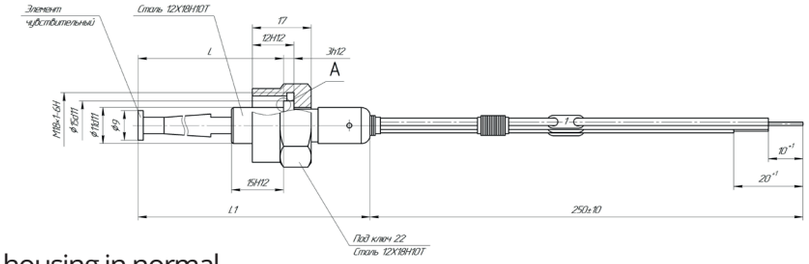
Thermometer

Designation:
The TP 073 thermometer is a resistance thermometer with an open sensor. It is designed to measure the temperature of non-aggressive and neutral liquids and gases, as well as the "Vinyl" product.

Key performance data:
1) Operating range of thermometer is from -260 to +250 C;
2) Resistance of the sensor R0 at 0 °C: TP 073 - 25±0.25 Ohm, TP 073-01 - 25±0.25 Ohm, TP 073-02 - 25±0.25 Ohm, TP 073 - 03 - 34±0.25 Ohm, TP 073 - 04 – 34±0.25 Ohm, TP 073-05 – 34±0.25 Ohm, TP 073-06 – 46±0.15 Ohm, TP 073-07 – 46±0.15 Ohm, TP 073-08 – 46 ±0.15 Ohm, TP 073-09 - 60±0.25 Ohm, TP 073-10 - 60±0.25 Ohm, TP 073-11 - 60±0.25 Ohm, TP 073-12 - 100±0.15 Ohm, TP 073-13 - 100 ± 0.15 Ohm, TP 073-14 - 100 ± 0.15 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula

$$\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}|t|\right)$$, in the temperature range from 0 °C to +250 °C is determined by the formula

$$\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}|t|\right)$$, where t is the absolute temperature value for which the error is determined, °C;



4) The thermal inertia index in boiling water is 0.3 s max;
5) Insulation resistance of the thermometer sensor relative to the housing in normal climatic conditions 20 MOhm min.
6) The thermometer is designed to work under following exposure conditions:
ten temperature cycles from -260 to +250 ºC in the sensor zone;
pressure294·105 Pa;
relative air humidity up to 98% and temperature up to 35 ºC;
dynamic head up to 5 kg/cm²
7) The thermometer mass is 0.06 kg max

Design:
The thermometer sensor is a platinum wire wound in the form of a flat tablet and glued to the thermometer body stand with heat-resistant glue.
The ends of the sensor are soldered to the current leads of the thermometer, pressed into a cone of heat-insulating material. The cable is soldered to the current leads.
The cable is fastened to the body with a nut, which is locked after installation.

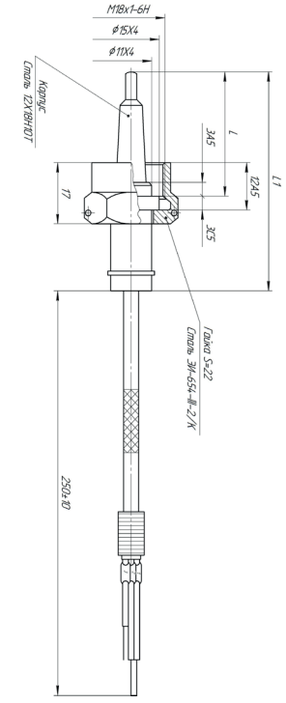
TEMPERATURE SENSORS

ТП 085

Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The ТП 085 thermometer is designed to measure the temperature of low-boiling and aggressive liquids and gases.



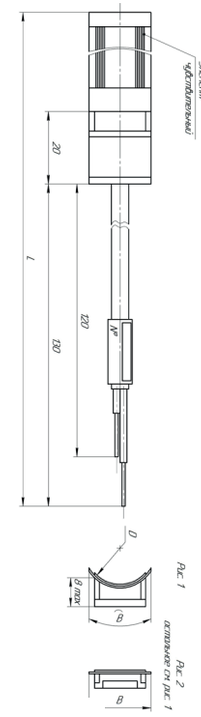
Key performance data:
1) Working range of thermometer measurement from -260 to +300 °C;
2) Resistance of the sensing element R0 at 0 °C: ТП 085 – 25±0.25 Ohm,
   ТП 085-01 – 25±0.25 Ohm, ТП 085-02 – 25±0.25 Ohm, ТП 085 - 03 – 34±0.25 Ohm,
   ТП 085 - 04 – 34±0.25 Ohm, ТП 085 - 05 – 34±0.25 Ohm,
   ТП 085-06 – 46±0.15 Ohm, ТП 085-07 – 46±0.15 Ohm, ТП 085-08 – 46±0.15 Ohm,
   ТП 085-09 – 60±0.25 Ohm, ТП 085-10 – 60±0.25 Ohm, ТП 085-11 – 60±0.25 Ohm,
   ТП 085-12 – 100±0.15 Ohm, ТП 085-13 – 100±0.15 Ohm, ТП 085-14 – 100±0.15 Ohm;
3) The index of thermal inertia in boiling water is not more than 4 s;
4) The thermometer is designed to work under the following conditions:
   when the temperature changes in the operating range from -260...+300
   during one cycle
   when exposed to dynamic pressure up to 5 kg/cm²
5) The mass of the thermometer is not more than 0.06 kg

Design:
The sensitive element of the thermometer (platinum wire) wound on a copper frame, pre-coated with electrical insulating varnish. The frame is inserted into the body and compressed, which achieves mechanical contact between the frame and the thermometer body.
The wire of the sensing element is connected to the cable by means of current leads made of silver wire.
Sealing of the thermometer is ensured by welding of the housing with the rod, as well as by filling the internal cavity of the housing.

TP 110
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TP 110 thermometer is designed to measure the surface temperature of pipelines with a diameter of 14...200 mm. The diameter of the pipeline where the thermometer will be installed is specified when the order is placed.



Key performance data:
1) Operating measurement range of the thermometer TP 110, TP 110-06 from -215 to +300 C,
TP 110-01, TP 110-02, TP 110-03, TP 110-04, TP 110-05, TP 110-07, TP 110-08, TP 110-09, TP 110-10,
TP 110-11 from -260 to +300 C;
2) Resistance of the thermometer R0 at 0 °C: TP 110, TP 110-06 - 15±0.25 Ohm, TP 110-01,
TP 110-07 - 25±0.25 Ohm, TP 110-02, TP 110-08 - 34±0.25 Ohm, TP 110-03,
TP 110-09 - 46±0.15 Ohm, TP 110-04, TP 110-10 - 60±0.25 Ohm, TP 110-05, TP 110-11 - 100±0.15 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula $\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}|t|\right)$,
in the temperature range from 0 °C to +300 °C is determined by the formula $\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}|t|\right)$,
where t is the absolute temperature value for which the error is determined, °C;
4) The thermal inertia index is 0.01 s max;
5) The thermometer is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
6) The thermometer mass is 0.008 kg max

Design:
The sensor of the thermometer is a platinum wire, wound on a special device and fixed on the glass tissue plate with the silicone-organic lacquer.
Current leads are soldered to the ends of the sensor, which are sealed from above with a glass tissue plate.

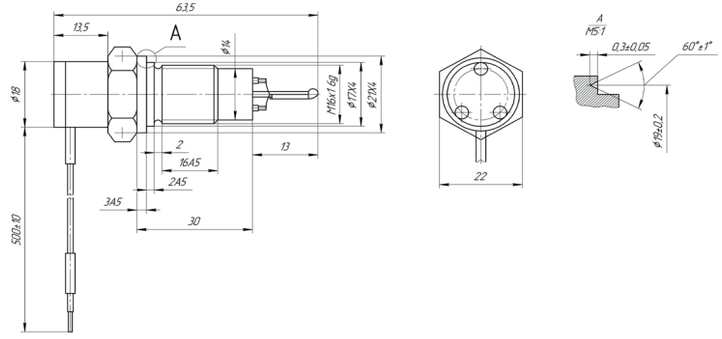
TEMPERATURE SENSORS

TP 165
Thermometer

AGT AEROSPACE GLOBAL TRADE

Designation:
The TP 165 thermometer is a resistance thermometer with an open sensor. It is designed to measure the temperature of calm non-aggressive, non-conductive liquids and gases.

Key performance data:
1) Operating range of thermometer is from -260 to +300 C;
2) Resistance of the sensor R0 at 0 °C: TP 165 - 25±0.25 Ohm, TP 165-01 - 34±0.25 Ohm, TP 165-02 - 46±0.15 Ohm, TP 165-03 - 60±0.25 Ohm, TP 165-04 - 100±0.15 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula $\pm(\frac{15}{R_0}+2{,}2\times10^{-3}|t|)$, in the temperature range from 0 °C to +300 °C is determined by the formula $\pm(\frac{15}{R_0}+4{,}0\times10^{-3}|t|)$, where t is the absolute temperature value for which the error is determined, °C;



4) Thermal inertia index of thermometers at air speed (5±0.5) m/1 is 5 s max;
5) Insulation resistance of the thermometer sensor relative to the housing at the extreme temperature values - 0.1 MOhm min.
6) The thermometer is designed to work under following exposure conditions:
ten temperature cycles from -260 to +300 ºC
relative air humidity up to 98% and temperature up to 35 ºC;
Pressure 196·105 Pa;
dynamic pressure up to 1.5-104 N/m²
7) The thermometer mass is 0.08 kg max

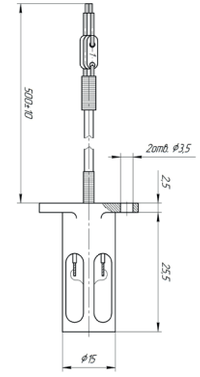
Design:
The sensor of the thermometer is a platinum wire, wound bifilarly in the form of a flat tablet, glued to a thin stainless steel plate, which is fixed on the frame to the block of thermal insulation material, which in turn is fixed to the thermometer housing.
The ends of the sensor are soldered to the thermometer leads, which are pressed into the block. A cable is soldered to the current leads and the soldering area is sealed with heat-resistant compound to secure the contact.

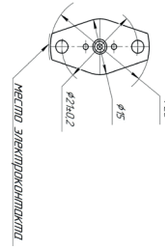
TP 175
Thermometer

AGT AEROSPACE GLOBAL TRADE

Призначення:
The TP 175 thermometer is a resistance thermometer with an open sensor. It is designed to measure the temperature of calm non-aggressive, non-conductive liquids and gases.

Key performance data::
1) Operating range of thermometer is from -260 to +300 C;
2) Resistance of the sensor R0 at 0 °C: TP 175 - 25±0.25 Ohm, TP 175-01 - 34±0.25 Ohm, TP 175-02 - 46±0.15 Ohm, TP 175-03 - 60±0.25 Ohm, TP 175-04 - 100±0.15 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4+0,13|t|-240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9+0,05|t|-230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6+0,01|t|-200), in the temperature range from minus 200 °C to 0 °C is determined by the formula $\pm\left(\frac{15}{R_0}+2{,}2\times10^{-3}|t|\right)$, in the temperature range from 0 °C to +300 °C is determined by the formula $\pm\left(\frac{15}{R_0}+4{,}0\times10^{-3}|t|\right)$, where t is the absolute temperature value for which the error is determined, °C;
4) Thermal inertia index of thermometers at air speed (5±0.5) m/1 is 6.4 s max;
5) Insulation resistance of the thermometer sensor relative to the housing at the extreme temperature values - 0.1 MOhm min.
6) The thermometer is designed to work under following exposure conditions:
ten temperature cycles from -260 to +300 ºC
relative air humidity up to 98% and temperature up to 35 ºC;
dynamic pressure up to 1.5-104 N/m²
7) The thermometer mass is 0.02 kg max





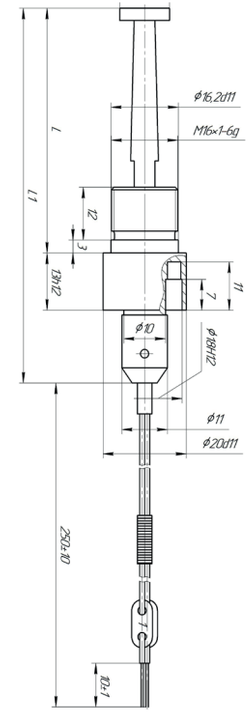
Design:
The sensor of the thermometer is a platinum wire, wound bifilarly in the form of a flat tablet, glued to a thin stainless steel plate, which is fixed on the frame to the block of thermal insulation material, which in turn is fixed to the thermometer housing.

TEMPERATURE SENSORS

ТП 203

Thermometer

Designation:
Thermometer TP 203 is designed to measure the temperature of vinyl, oxide, energen and their vapors, PMS-1.5 liquid.



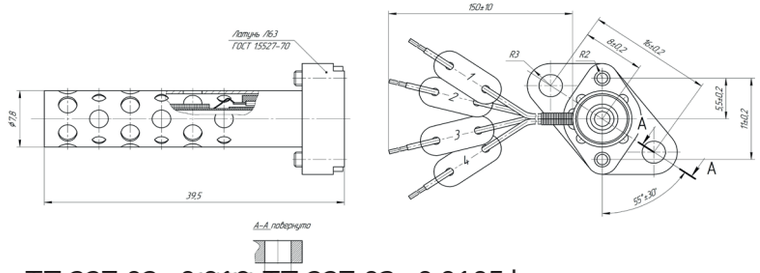
Key performance data:
1) The measured temperature range is from 13 to 453K;
2) Resistance of the thermometer R0 at 0 °C: TP 203 - 100±0.15 Ohm, TP 203-01 - 100±0.15 Ohm, TP 203-02 - 100±0.15 Ohm, TP 203-03 - 500±1.0 Ohm, TP 203-04 – 500±1.0 Ohm, TP 203-05 – 500±1.0 Ohm;
3) Calibration accuracy of thermometers in the range from 13 to 273.15 K is ± 0.1 K, in the rest of the range - ± 0.9 K;
4) Insulation resistance of the electrical circuit of the thermometer relative to the housing under normal conditions is 20 MOhm min, at a relative humidity of 98% and a temperature of 35 ºC - 1 MOhm min;
5) The thermometer is designed to work under following conditions:
   cyclic temperature change from minus -50 to +50°C;
   relative air humidity up to 98% and temperature up to 35 ºC;
   liquid or gas flow with a dynamic head not exceeding 5 kg/cm²
6) The mass of the thermometer TP 203, TP 203-03 - 0.058 kg, TP 203-01, TP 203-04 - 0.063 kg, TP 203-02, TP 203-05 - 0.074 kg

Design:
The thermometer has an open sensitive element made of platinum wire wound bifilarly in the form of a spiral, glued to the end plane of the housing. The thermometers are sealed with an insert made of fiberglass.

ТП 227
Thermometer

Designation:
Thermometer ТП 227 is designed to measure the temperature of cryogenic liquids (vinyl, oxide, energen), mixtures of their vapours with helium and air.

Key performance data:
1) Range of measured temperatures from 13 to 473K;
2) Thermometer resistance R0 at 0 °C: ТП 227 - 25±0.25 Ohm, ТП 227-01 - 46±0.25 Ohm, ТП 227-02 - 100±0.25 Ohm, ТП 227-03 - 500±1.0 Ohm;
3) The error value, K in the temperature range from 13.15 K to 33.15 K is determined by the formula ±(1,4 + 0,13(33,15 –*T*)), in the temperature range from 33.15 K to 43.15 K is determined by the formula ±(0,9 + 0,05(0,05(43,15–*T*)), in the temperature range from 43.15 K to 73 ,15 is determined by the formula ±(0,6 + 0,01(0,05(73,15–*T*)), in the temperature range from 73.15 K to 273.15 K is determined by the formula $\pm \frac{15}{R_0} + 2{,}2 \times 10^{-3}(273{,}15 - T))$, in the temperature range from 273.15 K to 923.15 K is determined by the formula $\pm \frac{15}{R_0} + 4{,}0 \times 10^{-3}(T - 273{,}15))$, where T is the temperature value for which the error is determined, K;
4) Insulation resistance of the sensitive element of the thermometer relative to the case under normal conditions is not less than 20 MOhm;
5) Index of thermal inertia of thermometers in boiling vinyl - not more than 0.5 s, in boiling oxide and energen - not more than 3 s;
6) The thermometer is designed to work in the following conditions:
relative air humidity up to 98% and temperature up to 35 °C;
7) Mass of thermometer ТП 227 - 0.009 kg, ТП 227-01 - 0.0095 kg, ТП 227-02 - 0.010, ТП 227-03 - 0.0105 kg.
ТП 227-02 – 0,010, ТП 227-03 – 0,0105 кг.

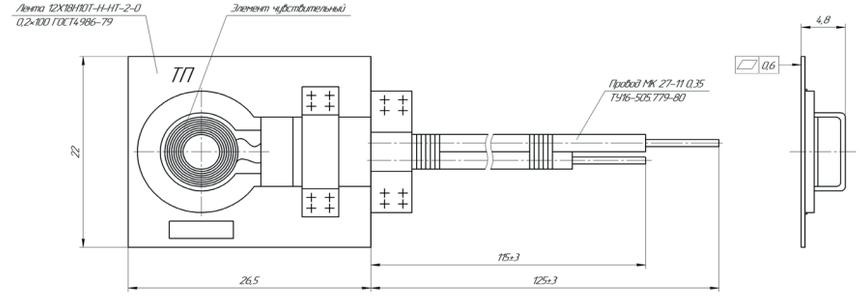


Design:
The sensitive element (platinum wire) is bifilar wound on a steel tube (previously coated with insulating varnish), which is mounted on the thermometer body. The winding of the sensitive element is covered with insulating varnish.
The current leads are soldered to the sensitive element of the thermometer, the soldering points are covered with insulating varnish.
The sensitive element of the thermometer is protected from mechanical damage by a perforated casing mounted on the thermometer body

ТП 251
Thermometer

Designation:
The ТП 251 thermometer is designed to measure the temperature of flat surfaces.

Key performance data:
1) Operating range of thermometer ТП 251, ТП 251-01 from –260 to +300 °C, ТП 251-02 from –260 to +50 °C;
2) Thermometer resistance R0 at 0 °C: ТП 251 – 46±0.15 Ohm, ТП 251-01 – 100±0.15 Ohm, ТП 251-02, – 500±1.0 Ohm;
3) Error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4 + 0,13|t|–240) , in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9 + 0,05|t|–240), in the temperature range from minus 200 °C is determined by the formula ±(0,6 + 0,01|t|–200) in the temperature range from minus 200 °C to 0 °C is determined by the formula $\pm \frac{15}{R_0} + 2{,}2 \times 10^{-3}|t|)$, in the temperature range from 0 °C to +300 °C is determined by the formula $\pm \frac{15}{R_0} + 4{,}0 \times 10^{-3}|t|)$, °C; where t is the absolute value of the temperature for which the error is determined, °C;
4) The thermometer is designed to operate under reduced pressure of $1.3 \cdot 10^{-10}$ Pa.
5) The mass of the thermometer is not more than 0.004 kg

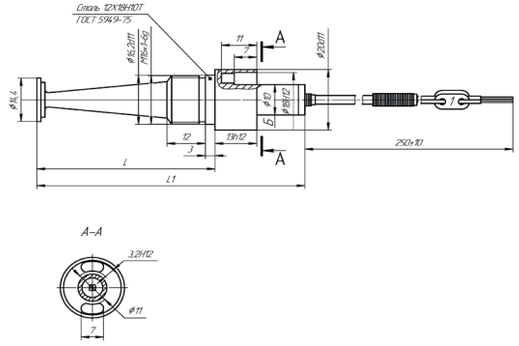


Design:
The sensitive element of the thermometer is a platinum wire wound on a special device and fixed on a substrate made of press material.
The sensitive element is welded to the current leads of the thermometer, which are rigidly fixed to the frame.
The frame of the thermometer consists of two parts: a substrate made of press material for fastening the sensitive element, leads and a metal frame for mounting the thermometer on the product.

ТП 198
Thermometer

Designation:
The ТП 198 thermometer is designed to measure the temperature of vinyl, oxide, energen and their vapours, ПМС-1,5 liquid.

Key performance data:
1) Range of measured temperatures from 13 to 453K;
2) Thermometer resistance R0 at 0 °C: ТП 198 – 100±0.15 Ohm, ТП 198-01 – 100±0.15 Ohm, ТП 198-02 – 100±0.15 Ohm, ТП 198-03 – 500±1.0 Ohm, ТП 198-04 – 500±1.0 Ohm, ТП 198-05 – 500±1.0 Ohm, ТП 198-06 – 17±0.25 Ohm, ТП 198-07 – 25±0.25 Ohm, ТП 198-08 – 34±0.25 Ohm, ТП 198-09 – 46±0.15 Ohm, ТП 198-10 – 53±0.15 Ohm, ТП 198-11 – 60±0.25 Ohm, ТП 198-12 – 100±0.15 Ohm, ТП 198-13 – 100±0.15 Ohm, ТП 198-14 – 100±0.15 Ohm, ТП 198-15 – 500±1.0 Ohm, ТП 198-16 – 500±1.0 Ohm, ТП 198-17 – 500±1.0 Ohm
3) Accuracy of calibration of thermometers in the range from 13 to 273.15 K - ± 0.1 K, in the rest of the range - ± 0.9 K;
4) Insulation resistance of the electrical circuit of the thermometer relative to the case under normal conditions is not less than 20 MOhm, at a relative humidity of 98% and a temperature of 35 °C, not less than 1 MOhm;
5) The thermometer is designed to work in the following conditions: cyclic changes in ambient temperature from -50 to +50; relative air humidity up to 98% and temperature up to 35 °C; liquid or gas flow with a dynamic head not exceeding 5 kg/cm2
6) Mass of thermometer ТП 198, ТП 198-03, ТП 198-12, ТП 198-15 - 0.058 kg, ТП 198-01, ТП 198-04, ТП 198-13, ТП 198-16 - 0.063 kg, ТП 198-02, ТП 198-05, ТП 198-06, ТП 198-07, ТП 198-08, ТП 198-09, ТП 198-10, ТП 198-11, ТП 198-14, ТП 198-17 - 0.074 kg



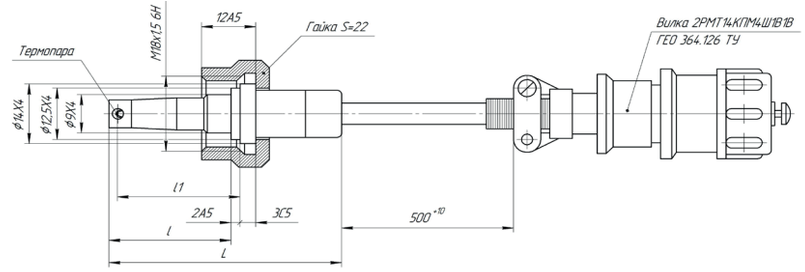
Design:
The thermometer has a closed sensitive element - an element made of platinum wire wound bifilarly in the form of a spiral, glued to the end plane of the housing and closed by a disk welded to the housing.

TEMPERATURE SENSORS

TT 135
Thermometer

Designation:
Thermometer TT 135 is designed to measure the temperature of non-aggressive, oxidizing (oxide) and aggressive liquids and gases.

Key performance data:
1) The range of measured temperatures is from 223.15 ... 1473.15 K;
2) Electrical resistance of the thermometer (1.8±0.4) Ohm;
3) Rated static characteristic complies with GOST 3044-94,
4) Insulation resistance between the electrodes and the housing is at least 3 MΩ under normal conditions;
5) The thermometer is designed to work in the following conditions:
   at working medium pressure up to 600 kg/cm²;
   with dynamic head up to 4 kg/cm²
6) The weight of the sensor is not more than 0.3 kg.



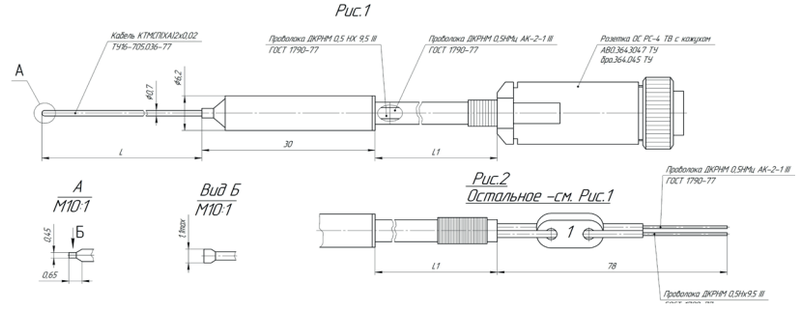
Design:
There is a thermometer inside with an open sensitive elementwhich is athermocouple, the thermoelectrodes of which are welded into a twist in a shielding gas.
The thermometer is sealed by an insert which made of flint in the form of a truncated cone with electrodes pressed into it.
The thermometer cable is shielded with a braid and ends with a 2RM14KPN4Sh1V1 plug.

TT 243

Thermometer

Designation:
Thermoelectric thermometer TT 243 is designed to measure the temperature of flat surfaces and surfaces with a curvature radius of 5 mm and above, structural elements made of different grades of steel, aluminum alloys, titanium, nonmetallic materials.

Key performance data:
1) The operating temperature range of the thermoelectric thermometer is from -200 to +1000 °C;
2) The resistance of the electrical circuit of the thermometer: TT 243 - 16.8 Ohm,
   TT 243-01 - 20.3 Ohm, TT 243-0.2 - 24.1 Ohm, TT 243-03 - 27.7 Ohm, TT 243-04 - 17.2 Ohm,
   TT 243-05 - 20.8 Ohm, TT 243-06 - 24.5 Ohm, TT 243-07 - 28.1 Ohm, TT 243-08 - 70.6 Ohm,
   TT 243-09 - 10.6 Ohm, TT 243-10 - 10.2 Ohm;
3) Rated static characteristic corresponds to GOST 3044-94,
4) Sensor mass is 0.055 kg max.



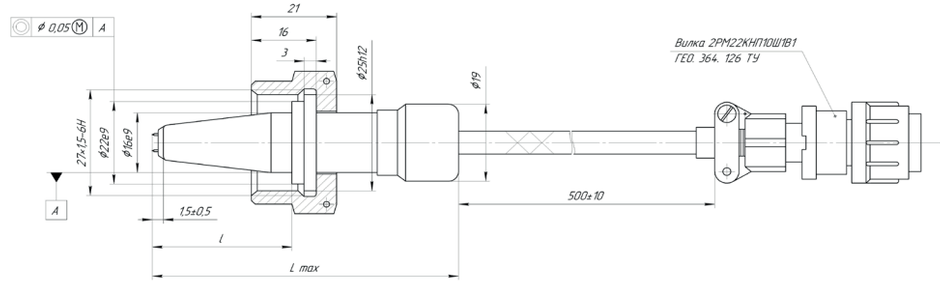
Design:
The sensing element of the thermoelectric thermometer is a thermocouple with chromel and alumel thermoelectrodes, diameter 0.16 mm, based on KTMS thermocouple cable, diameter of the sheath is 0.7 mm. Working junction of the thermocouple is soldered together with metal sheath of KTMS cable.
Current leads of chromel and alumel thermocouple wires of 0.5 mm diameter are soldered to the thermocouple ends.

TT 249

Thermometer

Designation:
The thermoelectric thermometer TT 249 is designed to control the temperature of gas in pipelines while producing a signal to the emergency protection system.

Key performance data:
1) The operating temperature range of the thermoelectric thermometer is from -200 to +850 °C;
2) The resistance of the electrical circuit of each sensitive element in normal climatic conditions TT 249, TT 249-01, TT 249-02, TT 249-03, TT 249-04, TT 249-05, TT 249-06, TT 249-07, TT 249-08, TT 249-09 - 2 Ohm, TT 249-10 - 30 Ohm;
3) Rated static characteristic corresponds to GOST 3044-94,
4) The thermal inertia index in boiling water is 0.4 s max;
5) The thermoelectric thermometer is designed to work in exposure to:
   dynamic head 1 MPa;
   pressure of gaseous oxide 60 MPa, gaseous vinyl 30 MPa;
   relative air humidity up to 98% and temperature up to 35 °C;
6) Sensor mass is 0.340 kg max.



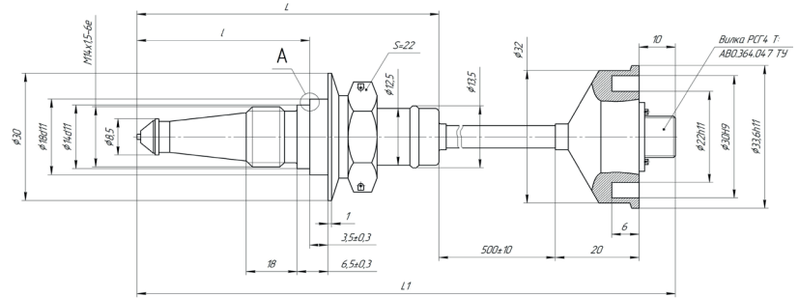
Design:
The sensing element of the thermoelectric thermometer is a thermocouple with chromel and alumel thermoelectrodes, diameter 0.16 mm, based on KTMS thermocouple cable, diameter of the sheath is 0.7 mm.
The operating junction of the thermocouple has electrical and thermal contact with the metal sheath of the KTMS cable.
Current leads of chromel and alumel thermocouple wires of 0.5 mm diameter are soldered to the thermocouple ends.

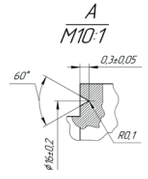
TT 253

Thermometer

Designation:
The TE 253 thermometer is designed to measure the temperature of gas flows.

Key performance data:
1) The measured temperature range of the thermometer is from -50 to +1000 ºC;
2) The electrical resistance of the thermometer is 8 Ohm max;
3) Rated static characteristic corresponds to GOST 3044-94,
4) The thermal inertia index is 0.4 s max;
5) The thermometer is designed to work in exposure to:
   dynamic head 1.5 MPa;
   ambient pressure from the side of the thermometer 80 MPa, and from the side of the cable 4.5 MPa;
6) Sensor mass is 0.200 kg max.





Шифр	l,mm	L,mm
TT 253	40	72max
TT 253-01	50	82max
TT 253-02	60	92max

Design:
As a sensitive element of the thermometer, a thermocouple with chromel and alumel thermoelectrodes with a diameter of 0.5 mm is used.
The thermometer is sealed by soldering the thermocouple together with the thermometer housing in a protective gas environment.
The thermometer cable consists of chromel and alumel thermocouple wires with a diameter of 0.5 mm, insulated from each other and placed in a steel sheath.

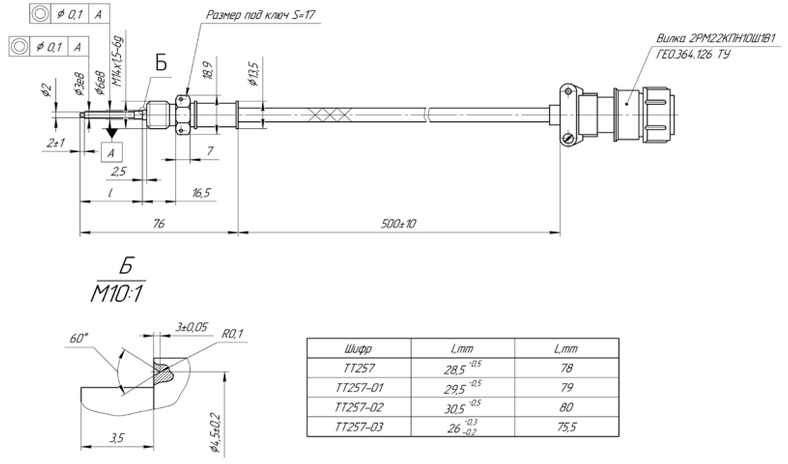
TEMPERATURE SENSORS

TT 257

Thermometer

Designation:
The thermometer TT 257 is designed to control the temperature of gas while producing a signal to the emergency protection system.

Key performance data:
1) The measured temperature range of the thermometer is from -200 to +1100 °C;
2) The electrical resistance of the sensitive element is 9 Ohm max;
3) Rated static characteristic corresponds to GOST 3044-94,
4) The thermal inertia index is 0.25 s max;
5) The thermometer is hermetic at a pressure of a controlled environment of 60 MPa;
6) Sensor mass is 0.13 kg max.



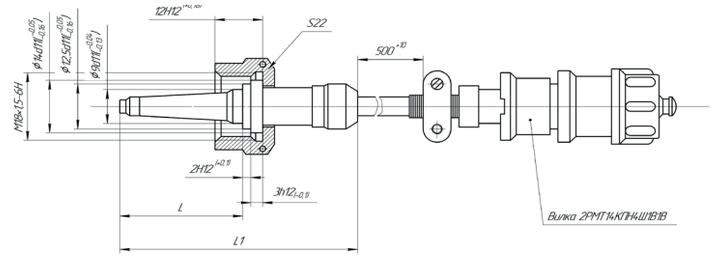
Шифр	L,mm	l,mm
TT257	$28,5^{-0,5}$	78
TT257-01	$29,5^{-0,5}$	79
TT257-02	$30,5^{-0,5}$	80
TT257-03	$26^{-0,3}_{-0,2}$	75,5

Design:
Thermocouples based on a thermocouple cable KTMS with a sheath diameter of 0.7 mm with thermoelectrodes made of chromel and alumel alloys with a diameter of 0.16 mm are used as sensitive elements of the thermometer. The thermometer cable consists of chromel and alumel alloy thermocouple wires with a diameter of 0.5 mm, insulated from each other and screened with a stainless steel braid.

TT 142
Thermometer

Designation:
Thermometer TT 142 is designed to measure the temperature of non-aggressive, oxidizing (oxide) and aggressive liquids and gases.

Key performance data:
1) The range of measured temperatures is from 223.15 ... 1473.15 K;
2) Electrical resistance of the thermometer (1.8±0.4) Ohm;
3) Rated static characteristic complies with GOST 3044-94,
4) Insulation resistance between the electrodes and the housing is at least 3 MOhm under normal conditions;
5) The thermometer is designed to work in the following conditions:
   at working medium pressure up to 600 kg/cm²;
   with dynamic head up to 4 kg/cm²
6) The mass of the sensor is not more than 0.3 kg.



Шифр	Материал термопары	L	L1
TT 14.2	хромель-алюмель ХА	30±1	60
TT 14.2-01		40±1	70
TT 14.2-02		55±1	85
TT 14.2-03		75±1	105
TT 14.2-04	Хромель-копель ХК	30±1	60
TT 14.2-05		40±1	70
TT 14.2-06		55±1	85
TT 14.2-07		75±1	105

Design:
The thermometer with a closed sensitive element is a thermocouple welded at the end together with the body in a protective gas environment.
The thermometer is sealed by an insert made of flint in the form of a truncated cone with electrodes pressed into it.
The thermometer cable is shielded with a braid and ends with a 2РМ14КПН4Ш1В1 plug.

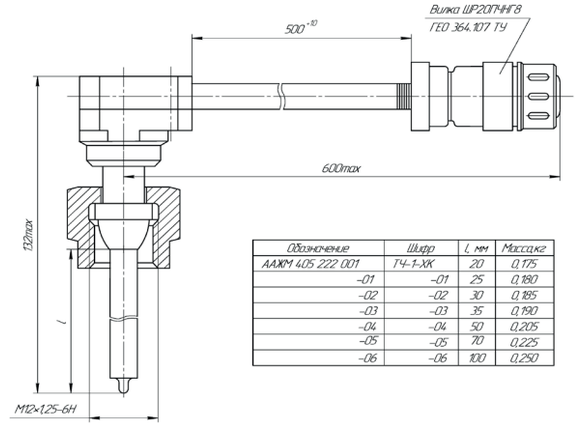
TEMPERATURE SENSORS

ТЧ-1-ХК

Thermoelectric converter

Designation:
The ТЧ-1-ХА thermoelectric converter is designed to provide the engine bench tests

Key performance data:
1) Temperature measurement range from -100 to +900 °C;
2) The electrical resistance of the thermal converter under normal climatic conditions is not more than 5 Ohm;
3) Rated static characteristic complies with GOST 3044-94,
4) The thermal inertia index of the thermal converter in boiling water is not more than 2 s;
5) The thermal converter is designed to work when exposed to: relative humidity of the ambient air up to 98% at a temperature of +25 °C external pressure up to 300·105 Pa
6) The mass of the sensor is not more than 0.3 kg.



Обозначение	Шифр	l, мм	Масса,кг
АЖКМ 405 222 001	ТЧ-1-ХК	20	0,175
-01	-01	25	0,180
-02	-02	30	0,185
-03	-03	35	0,190
-04	-04	50	0,205
-05	-05	70	0,225
-06	-06	100	0,250

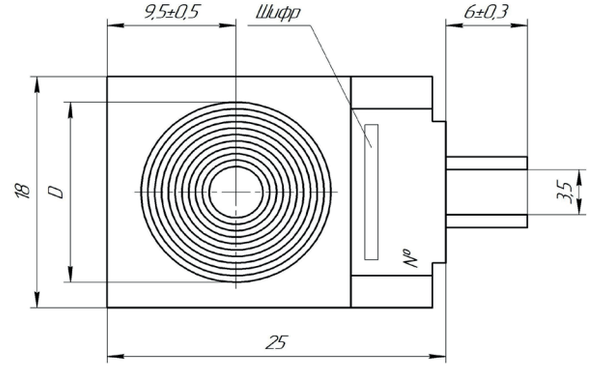
Design:
The thermoelectric thermocouple consists of the following main parts: thermocouple; frame; fork; screw.
The thermocouple of type K (chromel-alumel) is installed in the case, which is connected to the ШР20П4НГ8 plug.

TEM 006

Sensitive element

AGT AEROSPACE GLOBAL TRADE

Designation:
The TƏM 006 sensitive element is a resistance thermometer and is designed to measure the surface temperature.



Key performance data:
1) The working range of measuring the sensitive element is from -196 to +200 °C;
2) Resistance of the sensing element R0 at 0 °C:
   TƏM 006 – 17±0.25 Ohm, TƏM 006-01 – 23±0.25 Ohm,
   TƏM 006-02 – 30±0.25 Ohm, TƏM 006-03 – 53±0.25 Ohm,
   TƏM 006-04 – 60±0.25 Ohm, TƏM 006-05 – 100±0.25 Ohm;
3) Error value, °C in the temperature range from minus 196 °C to minus 50 °C - ±0.5, in the temperature range from minus 50 °C to +200 °C is determined by the formula

$$\pm \frac{24}{R_0} + 8{,}0 \times 10^{-3} |t|,$$ where t is the absolute temperature value, for which the error °C is determined;

4) The thermal inertia index of the sensing element is not more than 0.01 s;
5) Insulation resistance of the sensitive element relative to the surface on which it is installed, under normal climatic conditions, not less than 20 MOhm.
6) The sensitive element is designed to operate under conditions of tenfold exposure to the extreme temperatures of the operating measurement range.
7) The mass of the thermometer is not more than 0.0005 kg

Design:
The material of the sensing element is a copper wire wound on a special device and fixed on a fiberglass plate with a silicone varnish. Current leads are soldered to the ends of the copper wire, which are glued on top with a glass-lacquered plate.

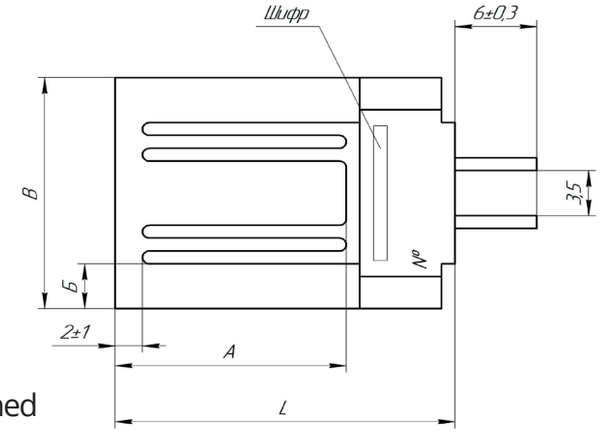
TEMPERATURE SENSORS

ТЕП 012

Sensitive element

AGT AEROSPACE GLOBAL TRADE

Designation:
The ТЭП 012 sensitive element is a resistance thermometer and is designed to measure surface temperature.



Key performance data:

1) The operating range of measuring the sensitive element ТЭП 012 from -215 to +300 °C, ТЭП 012-01, ТЭП 012-02, ТЭП 012-03, ТЭП 012-04, ТЭП 012-05 - from -260 to +300 °C;
2) Resistance of the sensing element R0 at 0 °C: ТЭП 012 - 15±0.25 Ohm, ТЭП 012-01 - 25±0.25 Ohm, ТЭП 012-02 - 34±0.25 Ohm, ТЭП 012-03 - 46±0.15 Ohm, ТЭП 012-04 - 60±0.25 Ohm, ТЭП 012-05 - 100±0.15 Ohm;
3) Error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4 + 0,13 |t| –240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9 + 0,05 |t| –230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6 + 0,01 |t| –200), in the temperature range from minus 200 °C to 0 °C is determined by the formula

$$\pm \frac{15}{R_0} + 2{,}2 \times 10^{-3} |t|,$$ in the temperature range from 0 °C to +300 °C is determined by the formula

$$\pm \frac{15}{R_0} + 4{,}0 \times 10^{-3} |t|,$$ where t is the absolute value of the temperature for which the error °C is determined;

4) The thermal inertia index of the sensing element is not more than 0.01 s;
5) The sensitive element is designed to operate under conditions of tenfold exposure to the extreme temperatures of the operating measurement range.
6) The mass of the sensitive element is not more than 0.0005 kg

Design:
The material of the sensitive element is platinum wire, wound on a special device and fixed on a fiberglass plate with the help of silicone varnish.
To the ends of the wire of the sensitive element, current leads are welded, which are sealed on top with a plate of fiberglass.

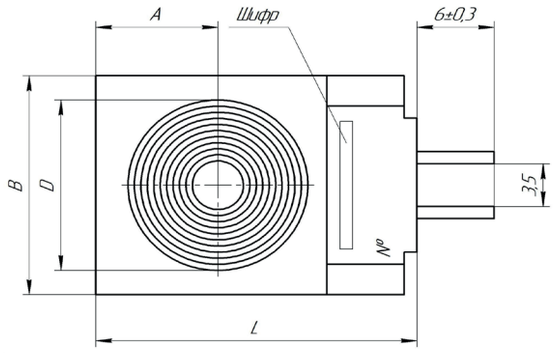
ТЕП 018

Sensitive element

AGT AEROSPACE GLOBAL TRADE

Designation:
Sensitive element TEP 018 is a resistance thermometer and is designed to measure the surface temperature.

Key performance data:



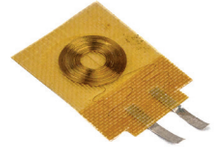
1) The operational measuring range of the sensitive element TEP 018 is from -215 to +300 C, TEP 018-01, TEP 018-02, TEP 018-03, TEP 018-04, TEP 018-05, TEP 018-06 - from -260 to +300 C;
2) Resistance of the sensor R0 at 0 °C: TEP 018 - 15±0.25 Ohm, TEP 018-01 - 25±0.25 Ohm, TEP 018-02 - 34±0.25 Ohm, TEP 018-03 - 46±0.15 Ohm, TEP 018-04 - 60±0.25 Ohm, TEP 018-05 - 100±0.15 Ohm, TEP 018-06 - 500±1.0 Ohm;
3) The error value, °C in the temperature range from minus 260 °C to minus 240 °C is determined by the formula ±(1,4 + 0,13 |t| –240), in the temperature range from minus 240 °C to minus 230 °C is determined by the formula ±(0,9 + 0,05 |t| –230), in the temperature range from minus 230 °C to minus 200 °C is determined by the formula ±(0,6 + 0,01 |t| –200), in the temperature range from minus 200 °C to 0 °C is determined by the formula

$\pm \frac{15}{R_0} + 2{,}2 \times 10^{-3} |t|$, in the temperature range from 0 °C to +300 °C is determined by the formula

$\pm \frac{15}{R_0} + 4{,}0 \times 10^{-3} |t|$, where t is the absolute temperature value for which the error is determined, °C;

4) The thermal inertia index of the sensitive element 0.01 s max;
5) The sensitive element is designed for operation in conditions of tenfold exposure to the extreme values of the temperature of the measurement range.
6) The sensitive element mass is 0.0005 kg max

Design:
Material of the sensitive element is platinum wire, wound on a special device and fixed on the glass tissue plate with the silicone-organic lacquer.
Current leads are soldered to the ends of the wire of the sensitive element, which are sealed from above with a plate of fiberglass fabric.



TEMPERATURE SENSORS

ABC 134

Vibration transducer

AGT AEROSPACE GLOBAL TRADE

Designation:
Віброперетворювач призначений для вимірювання вібраційних та ударних прискорень та розрахований на спільну роботу з підсилювачем заряду «Девіз», блоками СС-9НФ ХА2.067.032 та СС-9НФМ Іт2.067.000, блоком БПП БИ2.087.022 та іншими вторинними.

Key performance data:

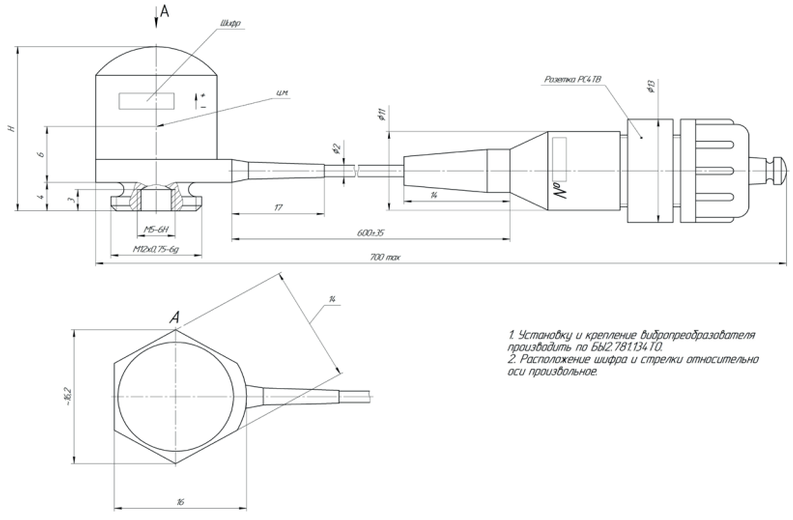
Code	ABC 134	ABC 134-01	ABC 134-02	ABC 134-03	ABC 134-04	ABC 134-05	ABC 134-06
Capacity of vibration transducer, pF	750 ± 150	4500 ± 700	4500 ± 700	4500 ± 700	4500 ± 700	4500 ± 700	4500 ± 700
Conversion coefficient in voltage amplitude value (without load), mV*s^2 /m	0,2±0,03	0,12±0,018	0,24±0,036	0,48±0,072	0,96±0,144	0,008 $^{+0,004}_{-0,008}$	2,0±0,3
Upper limit of measured vibration acceleration range, m/s2²	50000	32000	16000	8000	4000	50000	2000
Upper limit of shock acceleration range, m/s^2	300000	100000	50000	25000	10000	300000	5000
Operating frequency range, Hz	from 20 to 30000	from 20 to 20000	from 20 to 16000	from 20 to 10000	from 20 to 8000	from 20 to 30000	from 20 to 5000
Mass (without cable) g, max	16,5	17,0	18,0	20,0	25,0	16,5	30,0
Natural frequency, kHz, min	90	60	50	40	30	-	20

○ ABC 134

Vibration transducer

Design:
The vibration transducer consists of:
- housing;
- sensor (piezoceramics);
- spring loaded inertial mass;

Operating temperature range from minus 50 to +200 °C.



1. Установку и крепление вибропреобразователя производить по БЫ2.781134.ТО.
2. Расположение шифра и стрелки относительно оси произвольное.

CONVERTERS
SIGNAL

ABC 136

Vibration transducer

AGT AEROSPACE GLOBAL TRADE

Designation:

Vibration transducer is designed to measure vibration and shock accelerations and is designed for joint operation with the charge amplifier «Deviz», blocks SS-9NF HA2.067.032 and SS-9NFM It2.067.000, block BPP BY2.087.022 and other secondary devices.

Key performance data:

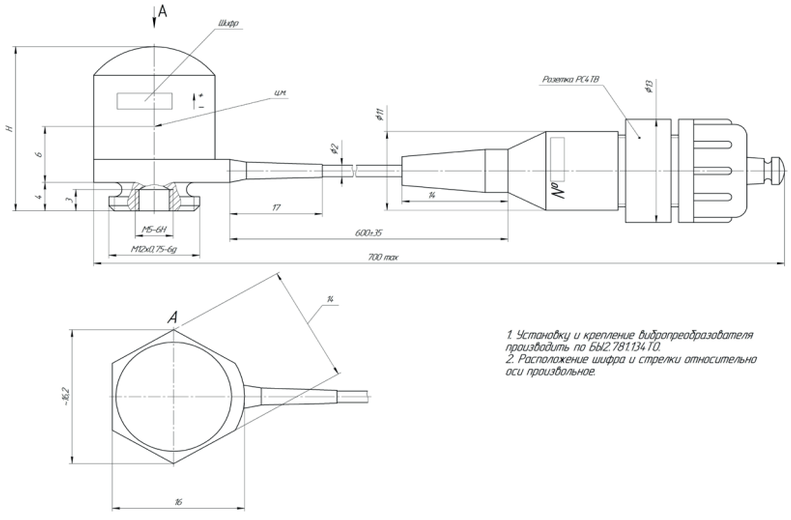
Code	ABC 136	ABC 136-01	ABC 136-02	ABC 136-03
Capacity of vibration transducer, pF	2000 ± 300	2000 ± 300	2000 ± 300	2000 ± 300
Conversion coefficient in voltage amplitude value (without load), mV*s² /m	0,17±0,026	0,35±0,053	0,7±0,105	0,01 $^{+0,005}_{-0,01}$
Upper limit of measured vibration acceleration range, m/s2²	32000	16000	8000	32000
Upper limit of shock acceleration range, m/s2²	60000	30000	15000	60000
Operating frequency range, Hz	from 20 to 20000	from 20 to 16000	from 20 to 10000	from 20 to 20000
Mass (without cable) g, max	13	14,0	17,0	13,0
Natural frequency, kHz, min	60	50	40	-

ABC 136

Vibration transducer

Design:
The vibration transducer consists of:
- housing;
- sensor (piezoceramics);
- spring loaded inertial mass;

Operating temperature range from minus 50 to +200 °C.



CONVERTERS
SIGNAL

ANS 114

Vibration transducer

AGT AEROSPACE GLOBAL TRADE

Designation:

Vibration transducer is designed to measure low-frequency, broadband vibration and shock acceleration and is designed for joint operation with P120 transducers and without them, as well as with SS-9NF KA2.067.032, SS 9NFM It2.067.000 and charge amplifier «Deviz» BY2.032.041

Key performance data:

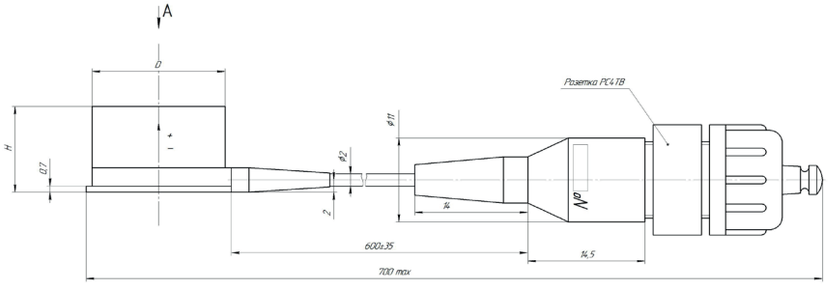
Code	Capacity of vibration transducer, pF	Conversion coefficient in voltage amplitude value (without load), mV*s² /m	Upper limit of measured vibration acceleration range, m/s²	Upper limit of shock acceleration range, m/s²	Operating frequency range, Hz	Mass (without cable) g, max	Natural frequency, kHz, minx
	1	2	3	4	5	6	7
AHC 114	3000 ± 450	1,2±0,18	3000	5000	from 20 to 2500	11,0	8,0
AHC 114-01	3000 ± 450	2,0±0,3	1500	3000	from 20 to 2000	11,0	6,0
AHC 114-02	3000 ± 450	5,0±0,75	600	1200	from 10 to 1000	14,0	3,5
AHC 114-03	3000 ± 450	10,0±1,5	300	600	from 5 to 500	19,0	2,5
AHC 114-04	3000 ± 450	20,0±3,0	150	300	from 5 to 250	22,0	1,5
AHC 114-05	3000 ± 450	$0{,}005\ ^{+0{,}00075}_{-0{,}005}$	5000	1000	from 20 to 4000	10,0	-
AHC 114-06	3000 ± 450	0,35±0,053	6000	1000	from 20 to 5000	10,0	15,0
AHC 114-07	3000 ± 450	40,0±6,0	75	150	from 1 to 125	36,0	1,0
AHC 114-08	3000 ± 450	80,0±12,0	30	60	from 1 to 63	53,0	0,8
AHC 114-09	60000 ± 9000	3,3±0,49	200	400	from 5 to 250	22,0	1,5

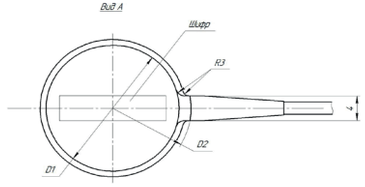
AHC 114

Vibration transducer

Design:
The vibration transducer consists of:
- housing;
- sensor (piezoceramics);
- spring loaded inertial mass;

Operating temperature range from minus 50 to +150 °C.





Обозначение	Шифр	H, мм	D, мм	D1, мм	D2, мм	Масса, г
6Ю2.781.114	АНС114	13	17	18,5	20	51,2
-01	АНС114 – 01	13	17	18,5	20	52,5
-02	АНС114 – 02	13	17	18,5	20	54,2
-03	АНС114 – 03	13	17	18,5	20	59,9
-04	АНС114 – 04	14,5	23	24,5	20	70
-05	АНС114 – 05	13	17	18,5	20	50
-06	АНС114 – 06	13	17	18,5	20	50
-07	АНС114 – 07	16	23	24,5	20	77
-08	АНС114 – 08	16	23	24,5	20	90
-09	АНС114 – 09	14,5	23	24,5	20	73
-10	АНС114 – 10	14,5	23	24,5	20	85
-11	АНС114 – 11	16	23	24,5	20	100

Установку вибропреобразователя производить по 6Ю2.781.114 ТО

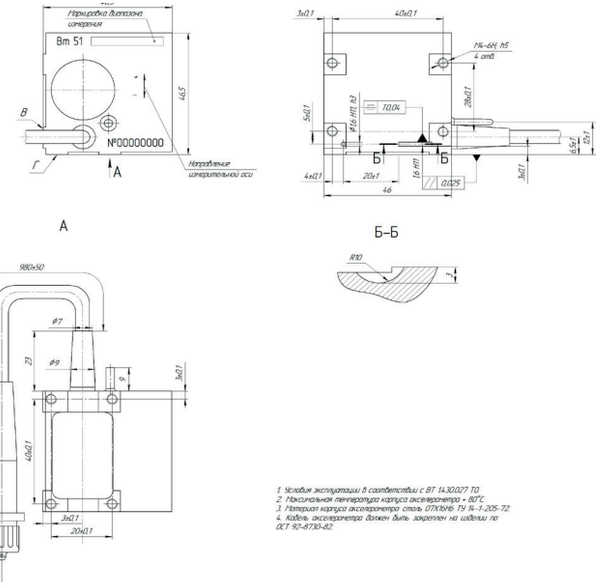
CONVERTERS
SIGNAL

○ BT 51

Accelerometer

Designation:
Accelerometer VT 51 is designed to convert low-frequency linear acceleration into DC voltage.

Key performance data:
1) Acceleration measurement range from ± 11 m/s2 to ± 4000 m/s² (depending on the version)
2) Measurement frequency range 0-8 Hz; 0-16Hz; 0-32Hz; 0-64Hz; 0-256Hz
3) Basic reduced error 3% max
4) Supply voltage in the range of 23-34
5) Output voltage in the output 1 0-6 V
   in the output 2 0-2 V
7) Zero offset in the output 1 3 ± 0.3 V
   in the output 2 1 ± 0.1 V
8) Operating temperature range from minus 50°C to + 50°C;
   sinusoidal vibrations in the frequency range
   from 20 to 2000 Hz with acceleration up to 30 m/s² for 15 minutes;
9) Linear acceleration along the axes perpendicular to the
   measuring axis, and equal in value to 1.5 of the
   accelerometer measurement limit;



Design:
The accelerometer has a monoblock design. The amplifying-converting block (block of boards) on shock absorbers and the sensitive element are placed in a common sealed housing. The sensitive element consists of an inertial load and an inductive displacement transducer. The internal cavity is filled with damping fluid with the ability to compensate for changes in the volume of the damping fluid when the ambient temperature changes.
The accelerometer has a cable jumper with a connector and is used for connection to the recording equipment.

CONVERTERS
SIGNAL

BT 1850

Rotation speed sensor

Designation:
The rotation speed sensor Vt 1850 is designed to convert the shaft speed into the frequency of electrical pulses.

Key performance data:
1) The range of controlled rotation speeds is from 3000 to 65000 rpm.
2) The amplitude of the output signal in the presence of a screen of non-magnetic material with a thickness of 1.7 mm max is 100mV min.
3) Operation clearance from 0 to 3 mm.
4) Ambient temperature from minus 60 to +100 °C
5) The overall dimensions of the sensor are 9.8x500x49.2 mm.
6) Mass is 85 g max.

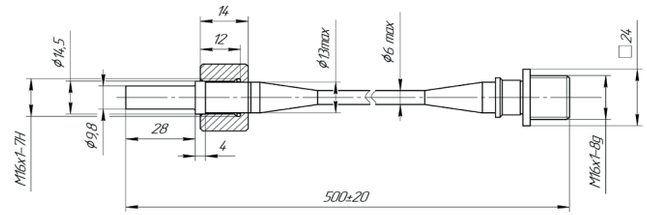
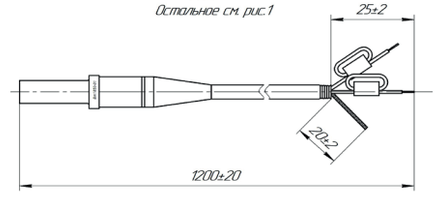


Рис.2
Остальное см. рис.1



Шифр	Масса, кг	Рис.
Вт1850	0,085	1
Вт1850-01	0,070	2

Design:
The sensor consists of a sensing element, a housing and a cable jumper with a plug (for version Vt1850-01 there are soldered ends instead of a plug). The sensing element is a permanent magnet. A coil frame with an operating winding is placed at its pole.

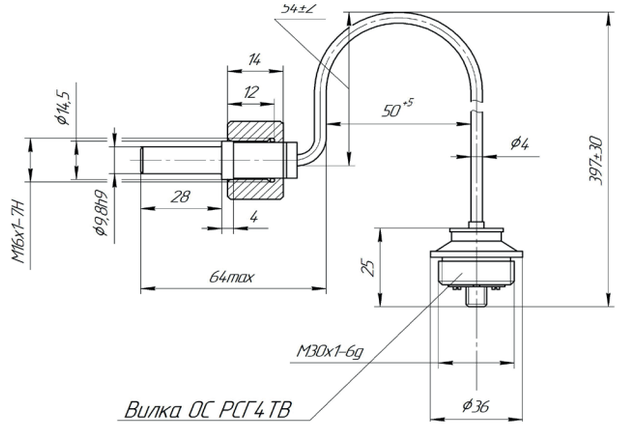
CONVERTERS SIGNAL

○ Vt 1856

Transmitter

Designation:
The transmitter Vt 1856 is designed to convert the shaft speed into the frequency of electrical pulses.

Key performance data:
1) The range of controlled rotation speeds is from 3000 to 60000 rpm.
2) The amplitude of the output signal in the presence of a screen of non-magnetic material with a thickness of 1 mm max and the gap between the rotor and the transmitter of 3+0.2 mm max is 100mV min.
3) Operation clearance from 0 to 3 mm.
4) Ambient temperature from minus 60 to +100 °C.
5) Mounting dimensions of the transducer M16x1-7N.
6) Mass is 140 g max.



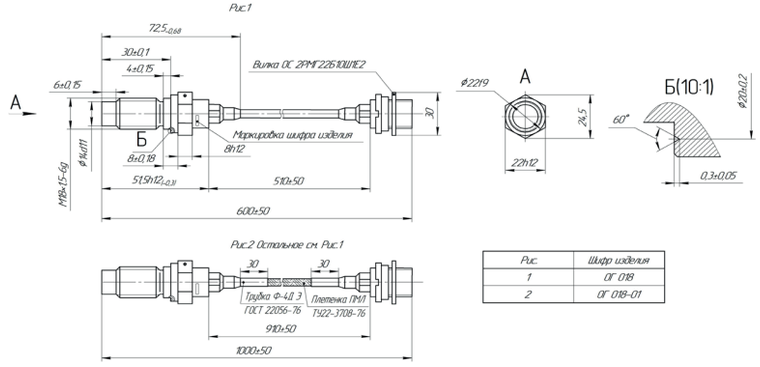
Design:
Sensor consists of sensing element placed in the casing and cable jumper with plug. The sensing element is a permanent magnet. A coil frame with an operating winding is placed at its pole.

○ OG 018

Rotation speed transmitter

Designation:
The OG 018 rotation speed transmitter is designed to convert the shaft speed into the frequency of electrical pulses.

Key performance data:
1) The range of controlled rotation speeds is from 1000 to 49000 rpm.
2) The output signal amplitude at nominal resistance of 10 kOhm min and nominal capacity of 10,000 pF max - from 0.15 V to 10 V.
3) Operation clearance from 0 to 1.5 mm
4) Ambient temperature from minus 253 to +100 °C
5) Mounting dimensions of the transducer M16x1-7N
6) Mass is 300 g max.



Design:
Sensor consists of sensing element placed in the casing and cable jumper with plug. The sensing element is a permanent magnet. A coil frame with an operating winding is placed at its pole.

CONVERTERS SIGNAL

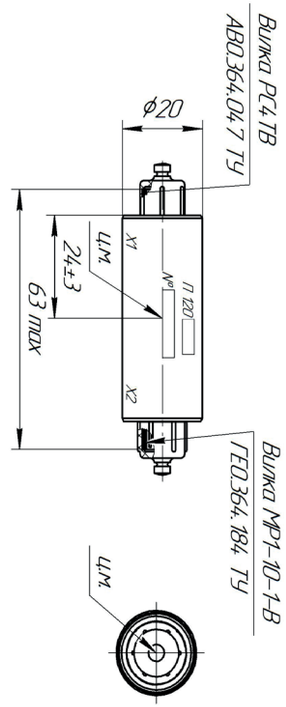
○ P120

Transducer

Designation:
The transducer is designed to match the output resistance of vibration transducers with the input resistance of amplifiers; it is designed for joint operation with vibration transducers ABC and ANS.

Key performance data:

Code	Operating frequency range, Hz	Input resistance, MOhm, min	Input capacity, pF
П120	from 1 to 63	120	300±80
П120-01	from 1 to 125	120	150±50
П120-02	from 5 to 250	24	120±40
П120-03	from 5 to 500	24	70±30
П120-04	from 10 to 1000	12	70±30
П120-05	from 20 to 2000	6	70±30
П120-06	from 20 to 4000	6	70±30
П120-07	from 30 to 8000	4	70±30
П120-08	from 50 to 16000	2,5	70±30
П120-09	from 50 to 1000	2,5	70±30
П120-10	from 1 to 250	120	120±40



1) Transducer is powered from two sources of direct current with voltage (12.6±1.2) and (minus 12.6±1.2) V.
2) Consumption current is 3 mA max for each circuit.
3) Transmission coefficient $0{,}9^{+0{,}2}_{-0{,}4}$
4) Operating temperature range from minus 50 to +50 °C.

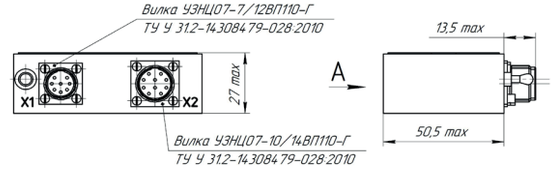
Design:
Transducer is made in the form of a cylinder with a plug PC4TV and a plug MR1-10-1-V at the ends.

P212
Transducer

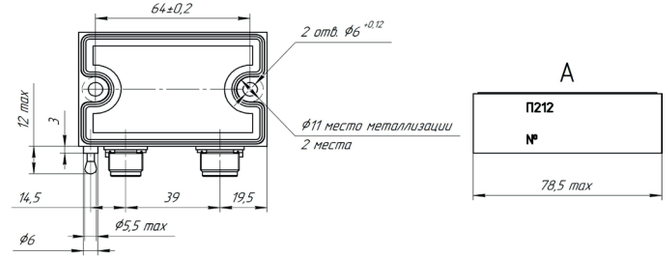
AGT AEROSPACE GLOBAL TRADE

Designation:
The P212 transducer is designed to amplify electrical signals of strain gauge (metal-film) primary pressure sensors and convert them into an analog signal (0-6) V, which is lead to the recorder.

Key performance data:
- basic error of the transducer with 0.95 confidence probability in low voltge is 0.5% max
- error from nonlinearity of calibration characteristics is 0.2% max
- additional static error from the influence of temperature and voltage changes over the whole range is 3% max
- transducer supply voltage is from 24 V to 33 V
- current consumption at 33 V supply voltage is 110mA max
- initial value of output signal in low voltage is 0.45 ± 0.1 V
- rated value of output signal in low voltage is 4.90 ± 0.3 V
- transducer supply voltage is $6.00_{-1.2}$ V
- readiness time is 30 sec max.
- input resistance of the signal recorder is 100 MOhm min



The transducer is designed to work under following conditions:
- at increased ambient operation temperature of 60 °C;
- at reduced ambient operation temperature of 40 °C;
- at relative humidity of up to 98% and temperature of (35±5) °C;
- at reduced operation atmospheric pressure up to $133*10^{-6}$ Pa (10-6 mm Hg);
- at changing of supply voltage (27^{+6}) V, amplitude of supply voltage ripple up to 4 % with frequency from 150 to 20000 Hz.



Design:
Transducer consists of measuring channel, voltage stabilizer for sensor power supply and power supply voltage source.
The measuring channel includes a DC amplifier, a low-pass filter and a filter balancing circuit.
The power supply voltage source consists of a reverse converter of DC voltage into pulse voltage and rectifiers of plus 12 V and minus 12 V voltages.

CONVERTERS SIGNAL

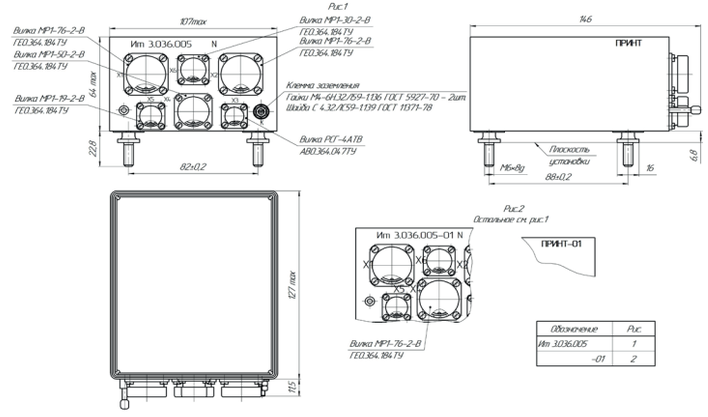
PRINT

Transducer

Designation:
The transducer is designed to convert the information of temperature sensors - resistance thermometers (RT) and thermoelectric thermometers - thermocouples (TC) into a digital 12-digit parallel binary code and analog voltage in the range from 0 to 6.2 V.

Key performance data:
The transducer is classified into classes 4 and 5 according to GOST B 20.39.301 and into groups 4.8.3 and 5.3 according to GOST B 20.39.304.

1) Ambient temperature - from minus 50 to +50°C.
2) Atmospheric pressure from 10-6 to 850 mmHg..
3) High air humidity of 98% at 30°C.
4) Cyclic temperature change from minus 60 to +65°C.
5) Number of switchable channels - 32.
6) Measurement scale:
   a) TC in the ranges: from 0 to (60 ± 2) Ohm, 0 to (240 ± 5) Ohm, 0 to (960 ± 15) Ohm, 0 to (140 ± 4) Ohm, 0 to (200 ± 5) Ohm.
   6) RC in the range from minus (5 ± 1.5) to + (60 ± 5) mV.
7) The transducer mass is 1.1 kg max.



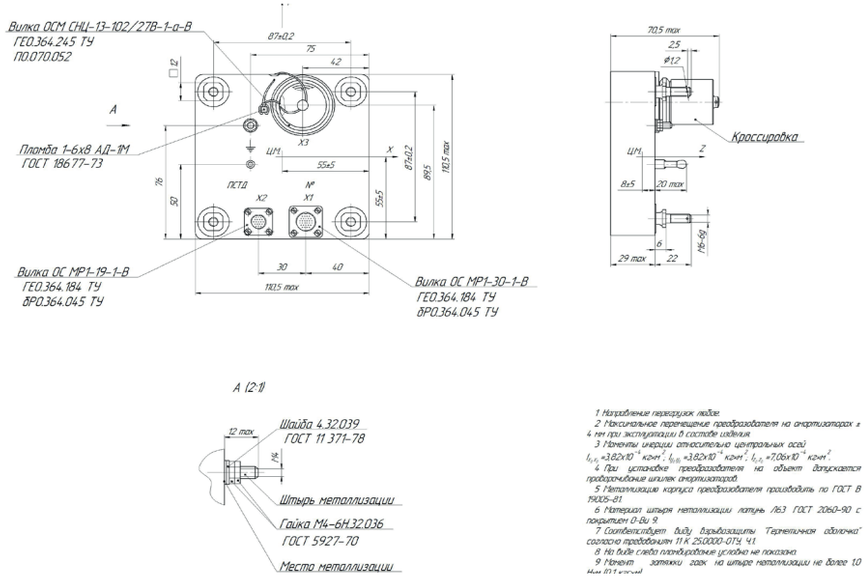
Design:
The transducer is designed as a sealed monoblock, on the front wall of which there are terminals for grounding, a spur for air pumping and technical connectors. In the lower part of the housing there are mounting points with shock-absorbing bushings for fixing on the object.

CONVERTERS SIGNAL

ПСТД
Converter

Designation:
The ПСТД converter is designed to amplify the electrical signals of tensometric (metal-film) primary pressure sensors (ВТ206,ВТ212, ВТ220, etc.) and converting them into an analogue signal (0..6) V.

Key performance data:
1) Ambient temperature from minus 50 to +50°C.
2) Reduced atmospheric pressure up to 10-6 mm Hg.
3) Increased air humidity 98% at a temperature of (30 ± 5)°C.
4) The mass of the converter is not more than 0.61 kg.

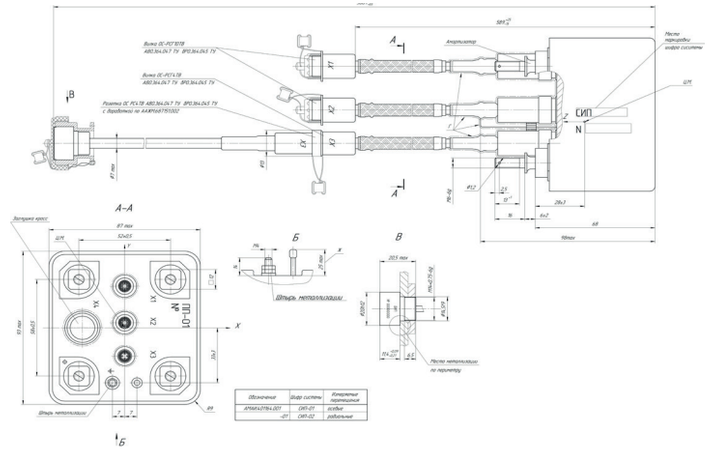


Design:
The converter is made in the form of a sealed monoblock.

System СІП

Designation:
The СІП system is designed to convert the measured value of the shaft axial clearance into a standard electrical signal for the emergency protection system (EPS).

Key performance data:
1) Measuring range from 0.1 + 0.05 to 2.8-0.05 mm;
2) The DC output voltage of each of the 2 outputs increases from 0.25 ± 0.25 to 6.0-0.5 V at a load with parameters R = 505 kOhm and C = 0.01 μF with an increase in the gap from 0.1+0.05 to 2.8-0.05 mm;
3) The output impedance of each of the two outputs is not more than 5 kOhm;
4) Supply voltage DC 27V;
5) Current consumption is not more than 0.1 A;
6) Main error is not more than ± 2%;
7) The error from the unevenness of the amplitude-frequency characteristic is not more than ± 2% in the frequency range from 0 to 500 Hz;
8) Time of continuous operation - 300 s;
9) Rated service life - 28 cycles;
10) The mass of the СІП system is not more than 1.5 kg.

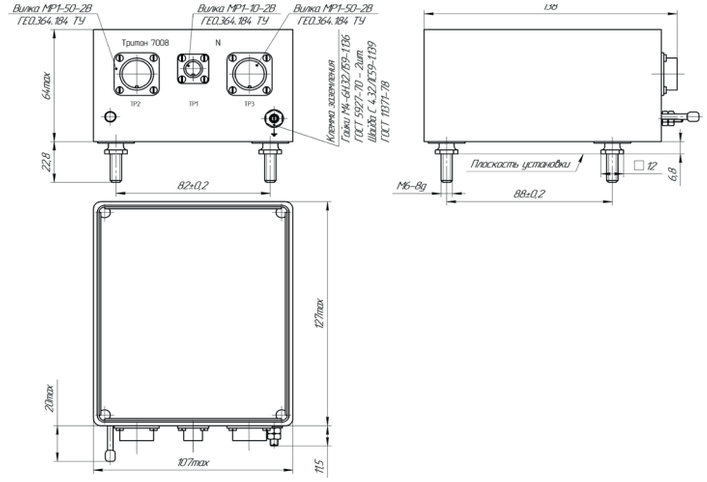


Design:
The СІП system consists of the ДИП АМАИ.402115.001 induction displacement sensor, the ПП-01 АМАИ.401261.001 intermediate transducer and the АМАИ.685631.006, АМАИ.685631.006 – 01, АМАИ.685631.007 connecting cables connected to the X1, X2, X3 converter connectors, respectively.

TRITON 7008
Converter

Designation:
The secondary converter is designed to collect, coordinate and convert information from 8 semiconductor temperature sensors connected to 8 channels and transfer the measured information to the onboard telemetry system RKN.

Key performance data:
1) Number of switched channels of temperature sensors - 8;
2) Output current of sensor supply for each channel - 100±0.1 μA;
3) Output voltage level - 0.6 - 1.15 V;
4) Converter conversion error in the range of input voltages from 1.04 V to 1.08 V - ±0.16 mV max, in the ranges from 0.6 V to 1.04 V and from 1.08 V to 1.15 V ±0.54 mV max;
5) The converter is powered from DC source with voltage from 23 V to 32 V with ripple amplitude up to 3%. Converter consumption current is 250 mA max;
6) Ambient temperature - from minus 40 to 50 °C;
7) Converter mass - 1.0 kg max.

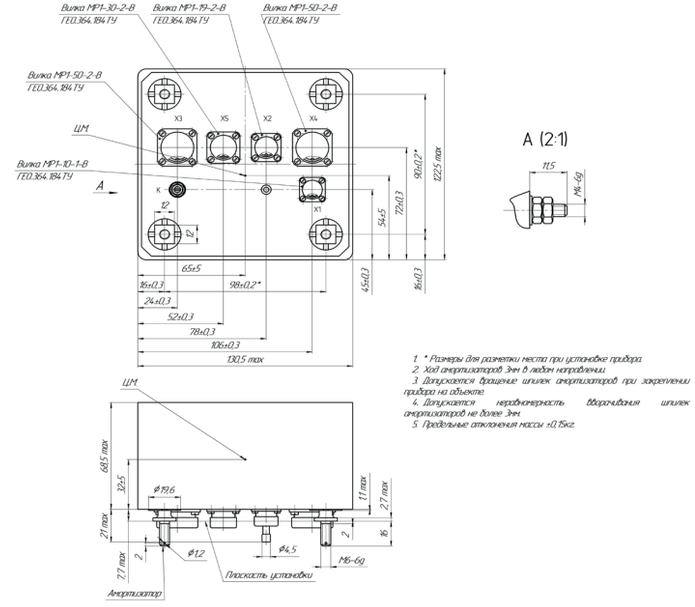


Design:
The converter structurally consists of printed circuit boards, assembled in sealed casing. Functionally, the secondary converter «Triton 7008» includes the following nodes:
- current stabilizer node CSU;
- noise filtering unit NFU;
- channel selector CC;
- scaling amplifier SA;
- analog-digital converter ADC;
- monitoring and control node;
- autonomous mode formation node AMFN;
- secondary power supply node.

URAN
Transducer

Designation:
The URAN transducer is designed (together with ultrasonic level sensors of series BY2.834.814, BY2.834.817, BY2.834.818) to measure the level of liquid media. Operating principle of the URAN transducer is based on receiving a signal from the ultrasonic level sensor and its subsequent conversion into a binary parallel code with two service level information digits of TTL.

Key performance data:
1) Ambient temperature - from minus 50 to +50°C.
2) Atmospheric pressure from 10-6 to 2300 mmHg.
3) Cyclic temperature change from minus 60 to +60°C.
4) The range of level measurement together with ultrasonic sensors from 70 to 2000 mm.
5) The transducer mass is 1.5 kg max.



Design:
The converter structurally consists of PP assembled in hermetic explosion-proof case. Studs installed in shock-absorbers are used for fixation on the object.

CONVERTERS SIGNAL

FOA

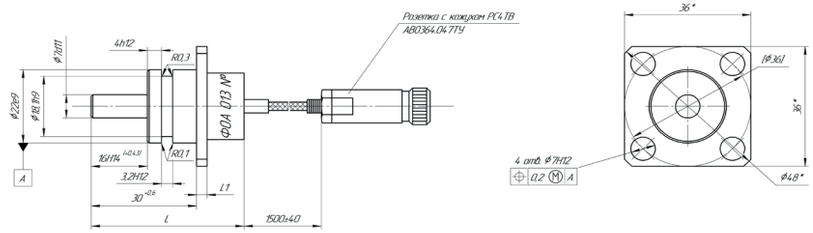
Heat receiver

Designation:

The heat receiver of the total heat flux is designed for one-time measurement of the density of the total heat flux entering the heat-receiving surface of the heat receiver.

Key performance data:

1) Range of measured radiant heat flux density, kW/m²: FOA 013, FOA 013-04 –from 0 to 224, FOA 013-01, FOA 013-05 – from 0 to 680, FOA 013-02, FOA 013-06 – from 0 to 1250, FOA 013-03, FOA 013-07 – from 0 to 2500;
2) Sensitivity, μV* m²/kW: FOA 013, FOA 013-04 –from 27,0 to 45,0, FOA 013-01, FOA 013-05 – from 9,6 to 16,0, FOA 013-02, FOA 013-06– from 4,8 to 8,0, FOA 013-03, FOA 013-07 – from 2,4 to 4,0;
3) Thermal inertia index no more than 0.3 s;
4) The heat receiver is designed to work when exposed to:
   - when exposed to cyclic temperature changes from minus 50 to 65 °C;
   - when exposed to a relative humidity of 100% at a temperature of 40 °C;
   - when exposed to ambient pressure 130*10-6 Pa at a temperature of 80 °C for 30 minutes;
   - when exposed to increased pressure of a neutral and air environment 12 105 Pa for 24 hours;
5) Ohmic resistance of the electrical circuit of the heat receiver $0,8^{+0,4}_{-0,3}$ Ohm;
6) Mass FOA 013, FOA 013-01, FOA 013-02, FOA 013-03, FOA 013-04 not more than 0,145 kg, FOA 013-05, FOA 013-06, FOA 013-07 not more than 0,265 kg



Design:

The heat receiver of the total heat flow consists of the following main parts:
- heat-receiving element, the surface of which has an absorption coefficient of 0.9-0.98
- Shell
- central thermoelectrode.

CONVERTERS SIGNAL

AGT AEROSPACE GLOBAL TRADE

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