

Tolerance Classes for Thermocouples

1. Sensor types per GOST R 8.585:

- for THA K
- for THK L
- for TPP R, S
- for TPR B

2. Tolerance class per GOST R 8.585

Thermocouples has three classes according to value of permissible deviation from standard curve. Deviation value depends on thermocouple type and measurement limits.

Permissible deviations of thermo-emf from standard curve in terms of temperature equivalent for TPP and TPR in operating temperature range

Thermocouple Type	Sensor Type	Tolerance Class	Operating Temperature Range, °C	Permissible Deviation from Standard Curve, ±°C
TPP	R, S	1	from 0 to 1100	1.0
			over 1100 to 1300	$1+0.003(t -1100)$
		2	from 0 to 600	1.5
			over 600 to 1300	$0.0025 t $
TPR	B	2	over 600 to 1600	$0.0025 t $
			3	from 600 to 800
		over 800 to 1600		$0.005 t $

* t value of measured temperature, °C.

Permissible deviations of thermo-emf from standard curve in terms of temperature equivalent for THA and THK in operating temperature range

Thermocouple Type	Sensor Type	Tolerance Class	Operating Temperature Range, °C	Permissible Deviation from Standard Curve, ±°C
THA	K	1	from -40 to 375	1.5
			over 375 to 1100	$0.004 t $
		2	from -40 to 333	2.5
			over 333 to 1100	$0.0075 t $
THK	L	2	from -40 to 360	2.5
			from 360 to 600	$0.7+0.005 t $

* t value of measured temperature, °C.

THA Metran-201 and THK Metran -202 Thermocouples

THA Metran-201 is entered into the State Register of Measuring Instruments under No. 19985-00, Certificate No. 8360. OKPO Code 42 1152.

THK Metran-202 is entered into the State Register of Measuring Instruments under No. 19984-00, Certificate No. 8359. OKPO Code 42 1153.

Application: THA Metran-201 and THK Metran-202 (Fig.1-6) are designed to measure temperature of non-corrosive and corrosive liquids and gases that do not destroy material of protection fitting.

Thermocouples have modular design that consists of the internal sensing elements made of KTMS-HA(HK) or KTMSp-HA TU 16-505.757-75 cables.

Number of sensing elements: 1 or 2.

Sensor type: K for THA Metran-201, L for THK Metran-202.

Tolerance class: 2 per GOST R 8.585.

Temperature range:

-40...600°C for THK Metran-202-01...06,

-40...800°C, -40...1000°C for THA Metran-201-01...06.

Hot junction: isolated.

Ingress protection of connection head housing is IP65 per GOST 14254.

Climatic type: U1.1 GOST 15150 for ambient temperature from -45°C to 85°C; T3 GOST 15150 for ambient temperature from -10°C to 85°C with relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.338.

Average life time: 3 years minimum.

Serviceability: maintainable item.

Average recovery period: 20 min.

Warranty period: 18 months from the date of commissioning.

Material of connection head: Technamid® polyamide A-SV30-L (Fig.1-3).

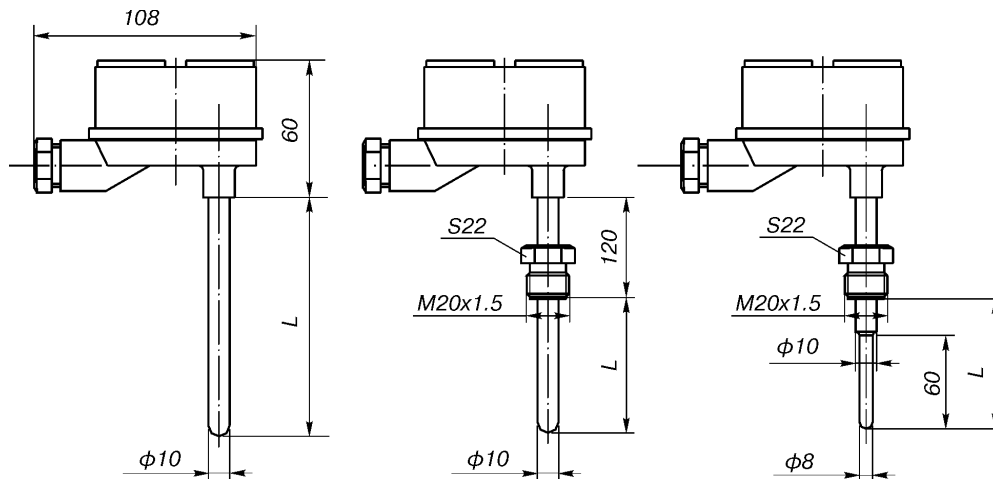


Fig. 1.

Fig. 2 (also refer to Fig. 1).

Fig. 3 (also refer to Fig. 1).

Material of connection head: aluminum alloy (Fig. 1a-3a).

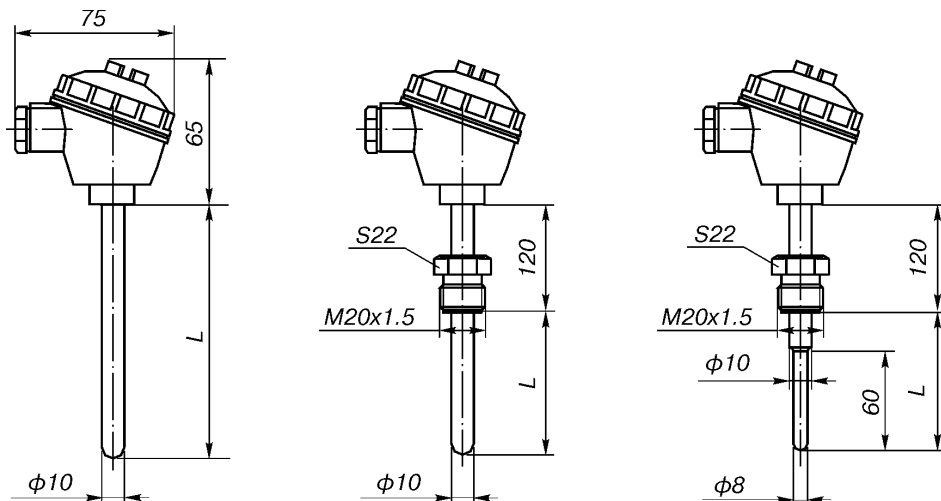


Fig. 1a.

Fig. 2a (also refer to Fig. 1a).

Fig. 3a (also refer to Fig. 1a).

Standard Sensor Lengths

Table 1

L, mm	60	80	100	120	160	200	250	320	400	500	630	800	1000	1250	1600	2000	2500	3150
Fig.1,1A				+	+	+	+	+	+	+	+	+	+	+	+	+		
Fig.2,2A	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.3,3A			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Weight, kg	0.5				0.6						0.8			1.1			1.5	

Material of Protection Tube

Table 2

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	600(THK), 800(THA)	N10
10Cr17Ni13Mo2Ti	600(THK), 800(THA)	N13
CrNi78Ti	1000(THA)	N78

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 3

Fig.	Pmax, MPa	T, s	Vs according to GOST 12997
1, 1A	0.4	40	V1
2, 2A	6.3	40	
3, 3A	6.3	30	

Material of connection head: AK12 alloy (Fig.4-6).

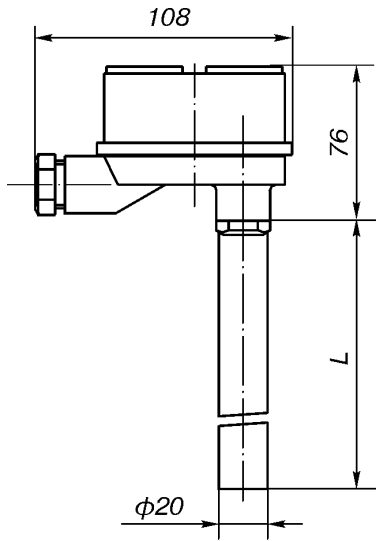


Fig.4.

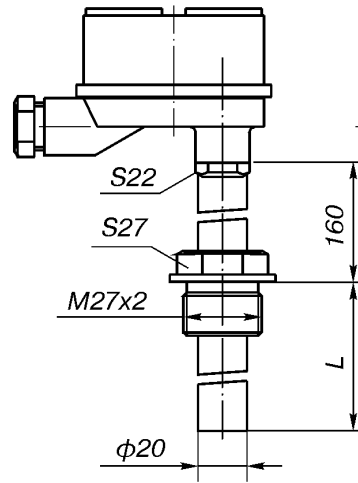


Fig.5.
also refer to Fig.4.

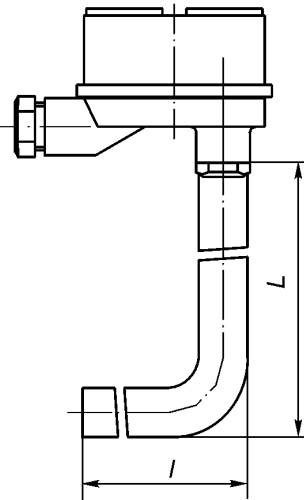


Fig.6*.
also refer to Fig.4.

* THA Metran-201 (Fig.6) are designed to measure temperature in baths with metal and salt melts that do not destroy material of protection tube.

Standard Sensor Lengths L
(Fig.4, 5)

Table 1a

L, mm	160	200	250	320	400	500	630	800	1000	1250	1600	2000	2500	3150
Fig.4					+	+	+	+	+	+	+	+	+	+
Fig.5	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Weight, kg	1.13				0.68...1.4			0.94...2.5			1.6...3.15		2.95...4.50	

(Fig.6)

Table 1a continued

L, mm	400	800	1250
l, mm	500	1000	1600
Fig.6	+	+	+
Weight, kg	2.1	3.1	4.3

Material of Protection Tube

Table 2a

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	600(THK), 800(THA)	N10
CrNi45Al (except Fig.6)	1100(THA)	N45
10Cr23Ni18	1000(THA)	N18
15Cr25Ti	1000(THA)	H25

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 3a

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
4	0.4	180	V1
5	6.3		
6	0.4		

Application: THA Metran-201 (Fig.7, 8) are designed to measure temperature of high-temperature gaseous media, e.g. in burning furnaces. Thermocouples have modular design that includes replaceable sensing element made of thermocouple cable KTMSp(HA). Immersion length is KTVP gasproof corundum case. Internal space of tube is sealed.

Number of sensing elements: 1 or 2.

Sensor type: K.

Tolerance class: 2 per GOST R 8.585.

Temperature range: 0...1100°C.

Hot junction: isolated.

Head material: AK12 alloy.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Average life time: 3 years minimum.

Warranty period: 18 months from the date of commissioning.

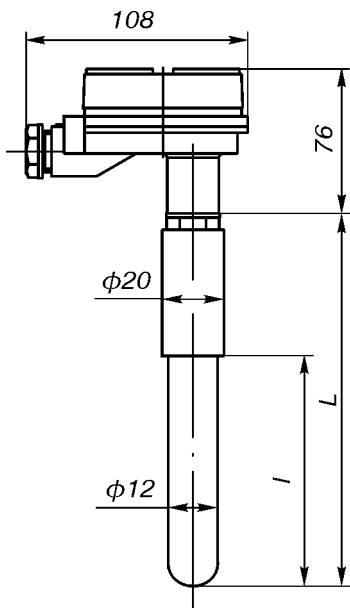


Fig.7.

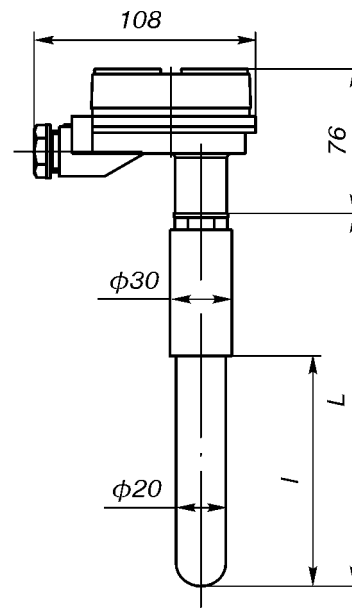


Fig.8.

Standard Sensor Lengths
(Fig.7, 8)

Table 1b

L, mm	500	800	1000	1250	1600	2000
l, mm	400	600	800	900	900	900
Material of immersion length of protection tube*	KTVP (Kv)					
Material of metal length of protection tube*	15Cr25Ti (Cr25) CrNi45Al (Ni45)					
Weight, kg	0.55...2.8		1.8...4.0		3.5...7.2	

* Material code is given in brackets.

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibro-stability Group (Vs)

Table 2b

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
7	1.0	80	V1
8		150	

ORDERING INFORMATION

THA Metran-201 - 02 - 160 - 2 - I - 1 - N10 - U1.1 - TU... - P									
1	2	3	4	5	6	7	8	9	10

1. Thermocouple

THA Metran-201 type K
THK Metran-202 type L

2. Code of protection tube

01 Fig.1
02 Fig.2
03 Fig.3
31 Fig.1A
32 Fig.2A
33 Fig.3A
04 Fig.4
05 Fig.5
06 Fig.6 (THA Metran-201 only)
07 Fig.7 (THA Metran-201 only)
08 Fig.8 (THA Metran-201 only)

3. Sensor length, L, mm (Table 1, 1a, 1b).

4. Code of tolerance class

2 tolerance class 2

5. Isolation type of hot junction

I isolated

6. Number of sensing elements(SE)

1 one SE
2 two SE

7. Code of protection tube by material

Table 2 **for Fig.1-3, 1A-3A,**
Table 2a **for Fig.4-6,**
Table 1b **for Fig.7, 8**

(code of immersion length material of protection tube/code of material of protection tube metal length).

8. Climatic type (per GOST 15150)

U1.1
T3

9. Specification TU 4211-001-12580824-2002.

10. Metrological verification:

GP verification by Gosstandart;
P verification by manufacturer.

THA Metran-231 and THK Metran-232 Thermocouples

THA Metran-231 entered into the State Register of Measuring Instruments under No. 19985-00, Certificate No.8360. OKPO Code 42 1152.

THK Metran-232 entered into the State Register of Measuring Instruments under No. 19984-00, Certificate No.8359. OKPO Code 42 1153.

Application: THA Metran-231 and THK Metran-232 (Fig. 1, 2, 3 (cable)) are designed to measure temperature of non-corrosive and corrosive liquids and gases that do not destroy cable sheath.

THA Metran-231, THK Metran-232 are made of KTMS-HA (HK) TU16-505.757-75 thermocouple cable with a steel sheath 12Cr18Ni10Ti or KTMSp-HA with CrNi78Ti alloy sheath.

When mounting, cable thermocouples can be bent, placed in hard-to-reach places and forced against surface to measure its temperature.

Number of sensing elements: 1 or 2.

Sensor type: K for THA Metran-231, L for THK Metran-232.

Temperature range:

- 40...600°C for THK Metran-232-01...03,
- 40...800°C, -40...1000°C for THA Metran-231-01...03.

Tolerance class: 2 per GOST R 8.585.

Hot junction: isolated, non-isolated.

Head material: Technamid® polyamide A-SV30-L for Fig.1.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.338.

Average life time: 3 years minimum.

Warranty life: 18 months from the date of commissioning.

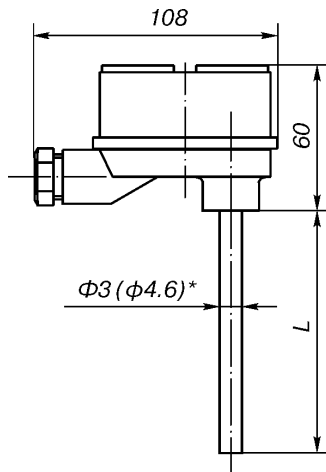


Fig. 1.

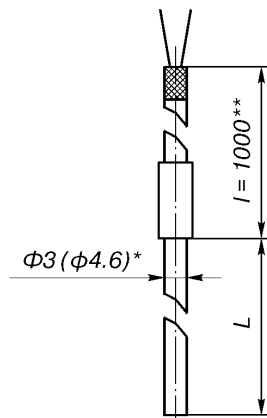


Fig. 2.

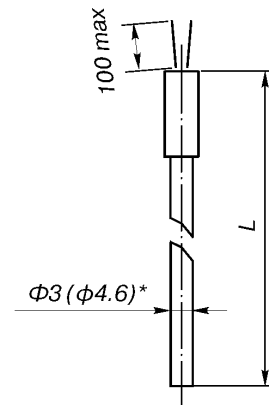


Fig. 3.

* The dimensions are indicated for thermocouple produced of thermocouple cable with two sensing elements.

** Thermoelectrodes outputs of KTMS-HA(HK) thermocouple cable are extended with SFKE-HA(HA) cable of length l. Junction is put into adaptor and sealed. Output cable length over 1000 mm shall be specified in the order.

Standard Sensor Lengths L

320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 3550, 4000, 5000, 5600, 6300, 7100, 8000, 9000, 10000, 11 200, 12 500, 14 000, 16 000, 18 000, 20 000 mm.

Lengths over 20 m must be agreed before ordering.

Weight:

0.1...1.7 kg depending on sensor length.

Material of Cable Sheath

Table 1

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	600(THK), 800(THA)	N10
CrNi78Ti	1000(THA)	N78

Maximum Pressure (Pmax), Thermal Inertia (T), Vibro stability Group (Vs), Ingress Protection

Table 2

Fig.	Pmax, MPa	T, s	Vs by GOST 12997	Ingress Protection GOST 14254
1	0.1	4 (5*)	V1	IP65
2				IP5X
3				

* For two-sensor version.

Application: THA Metran-231 and THK Metran-232 (Fig.4, 5) are designed to measure temperature of liquid or gaseous combustion products in pulsating flow with the rate up to 170 m/s and pressure up to 3 MPa; rate of fluid temperature change is up to 150°C/min.

Number of sensing elements: 1 or 2. Sensing element is made of KTMS-HA(HK), KTMSp-HA thermocouple cable TU 16-505.757-75.

Sensor type: K for THA Metran-231, L for THK Metran-232.

Temperature range:

0...600°C for THK Metran-232-04, -05;

0...800°C, 0...900°C for THA Metran-231-04, -05.

Tolerance class: 2 per GOST 8.585.

Hot junction: non-isolated.

Material of head: AK12 alloy.

Ingress protection: IP65 per GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Average life time: 3 years minimum.

Warranty life: 18 months from the date of commissioning.

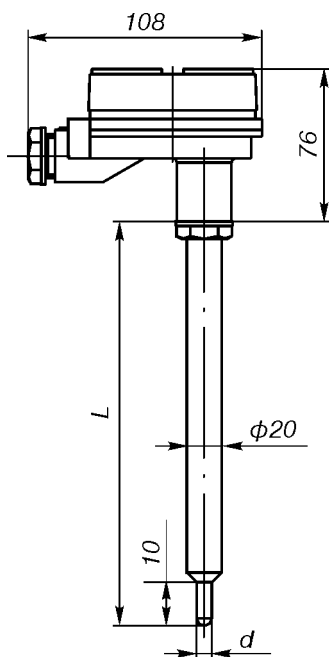


Fig.4.

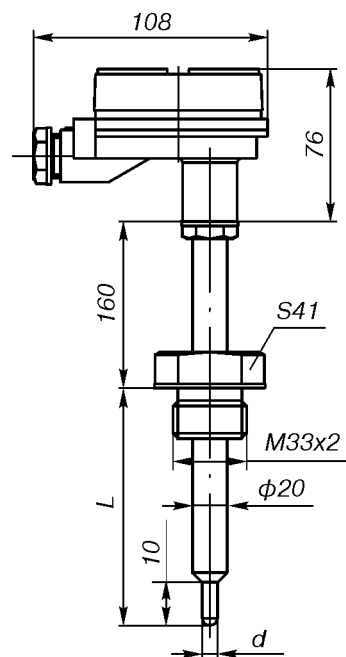


Fig.5.

Standard Sensor Length L

250, 320, 400, 500, 630, 800, 1000 mm.

Weight

0.42...1.87 kg depending on sensor length and version

Material of Protection Tube

Table 1a

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	600(THK); 800(THA)	N10
10Cr17Ni13Mo2Ti	800(THA)	N13
CrNi45Al	900(THA)	N45

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibro Stability Group (Vs)

Table 2a

Fig.	Pmax, MPa	Number of sensing elements	d, mm	T, s	Vs GOST 12997
4	0.4	1	5.5	4	V1
		2	7	5	
5	6.3	1	5.5	4	
		2	7	5	

Application: THA Metran-231 (Fig.6, 7, 8, 9) are designed to measure temperature of gaseous fluids, combustion products of natural gas, gas flows in compressor stations at gas-mains pipelines where gas flow rate near hot junction shield is up to 70 m/s.

Number of sensing elements:

- 1 or 2 for THA Metran-231-06, -08;
- 1 for THA Metran-231-07, -09.

Sensing element is made of KTMS-HA thermocouple cable TU 16-505.757-75.

Sensor type: K for THA Metran-231.

Temperature range: 0...900°C.

Tolerance class: 2 per GOST R 8.585.

Hot junction: isolated (I), non-isolated (N).

Material of head (Fig.6, 8): AK12 alloy.

Ingress protection: for Fig. 6, 8 - IP65, for Fig. 7, 9 - IP5X for GOST 14254.

Cable entry length l for Fig. 7, 9 select from 1000, 1600, 2000, 3000, 5000 mm.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Average life time: 3 years minimum.

Warranty life: 18 month from the date of commissioning.

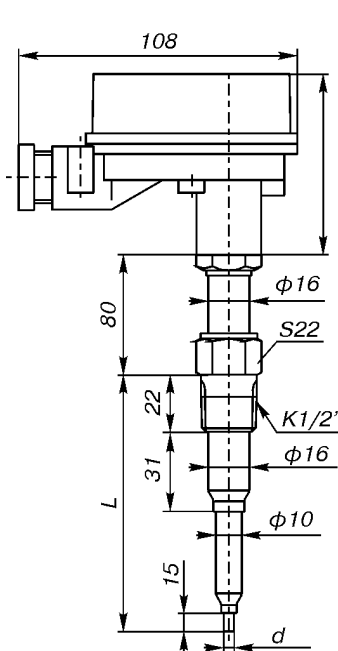


Fig.6.

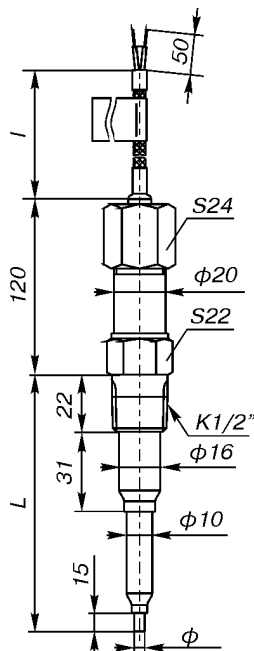


Fig.7.

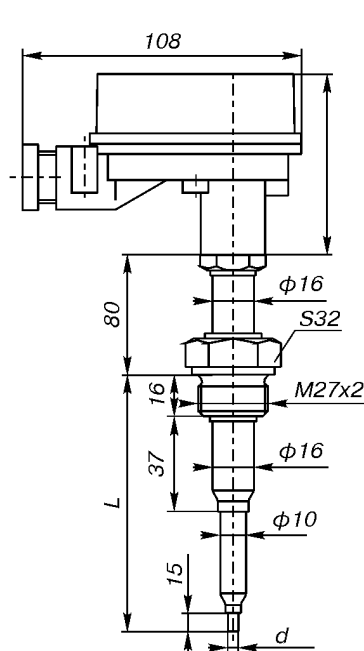


Fig.8.

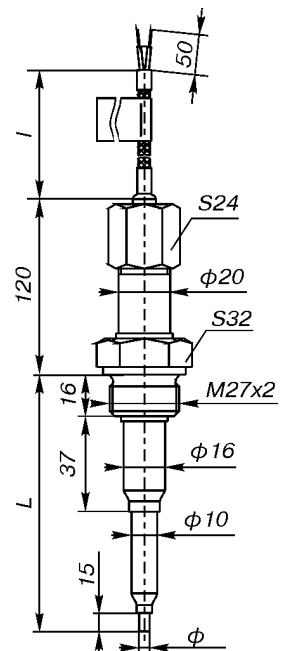


Fig.9.

Sensor Length L:

280, 320, 420 mm.

Weight

0.52...1.18 kg depending on sensor length and version

Material of Protection Tube

Table 1b

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	800	N10
CrNi78Ti	900	N78

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 2b

d, mm	Number of Sensing Elements	Pmax, MPa	T, s (I/N)	Vs per GOST 12997
3	1	4	5/3	V1
4.6	2		6/4	

Application: THA Metran-231 and THK Metran-232 thermocouples (Fig. 10, 11, 12, 13) are designed to measure temperature of overheated steam at flow rate up to 60 m/s and operating pressure up to 25.5 MPa at heat power industry facilities, and gas and steam turbine plants.

Number of sensing elements:

- 1 (Fig.10, 11, 12, 13);
- 2 (Fig.10, 11).

Replaceable insert is KTMS-HA(HK) thermocouple cable TU 16-505.757-75.

Sensor type: K for THA Metran-231, L for THK Metran-232.

Temperature range: 0...600°C.

Nominal process temperature: 585°C.

Tolerance class: 2 per GOST 8.585.

Hot junction: isolated (Fig.10, 11), non-isolated (Fig.12, 13).

Material of head (Fig.10, 12): AK12 alloy.

Standard sensor length L: 80, 100, 120, 160, 200 mm.

Ingress protection: for Fig. 10, 12 - IP65, for Fig. 11, 13 - IP5X per GOST 14254.

Serviceability:

Fig.10, 11 - maintainable item;

Fig.12, 13 - unmaintainable item.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Weight: 1.25...3.6 kg depending on sensor length and version.

Average life time: 3 years minimum.

Warranty life: 18 months from the date of commissioning.

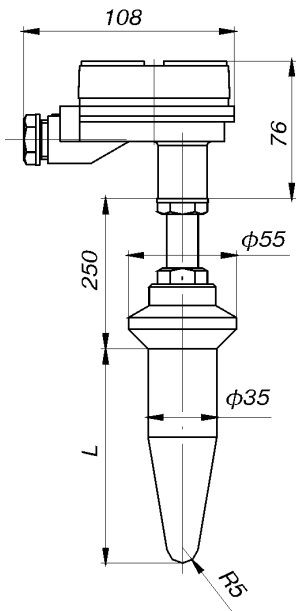


Fig. 10.

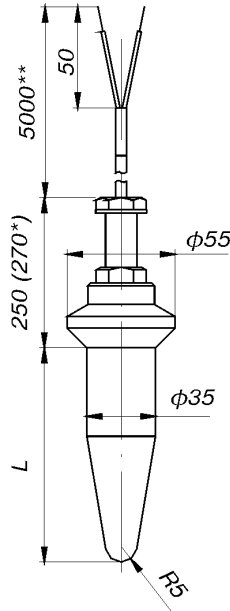


Fig. 11.

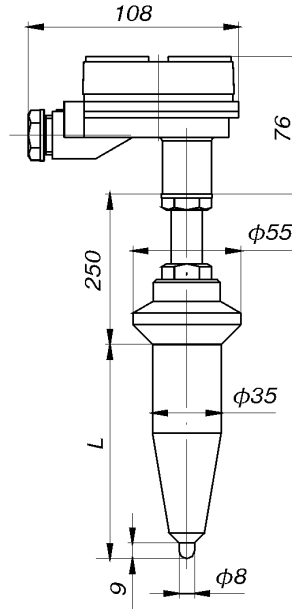


Fig. 12.

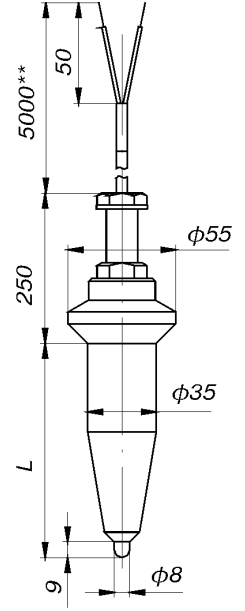


Fig. 13.

* Size for thermocouple with two sensing elements.

** Other cable lengths must be agreed before ordering.

Material of Protection Tube

Table 1c

Material	Code of Material
12Cr1MoV	MF

Maximum Pressure (Py), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 2c

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
12, 13	60	10	V1
10, 11	25.5	50	

Application: THK Metran-232 (Fig. 14) are designed to measure temperature of various armor surfaces of blast furnace.

Number of sensing elements: 1. Sensing element is made of KTMS-HK thermocouple cable TU 16-505.757-75.

Sensor type: L.

Temperature range: 0...400°C.

Tolerance class: 2 per GOST 8.585.

Hot junction: non-isolated.

Ingress protection: IP5X per GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Weight: 0.3 kg max.

Average life time: 3 years minimum.

Warranty life: 18 months from commissioning.

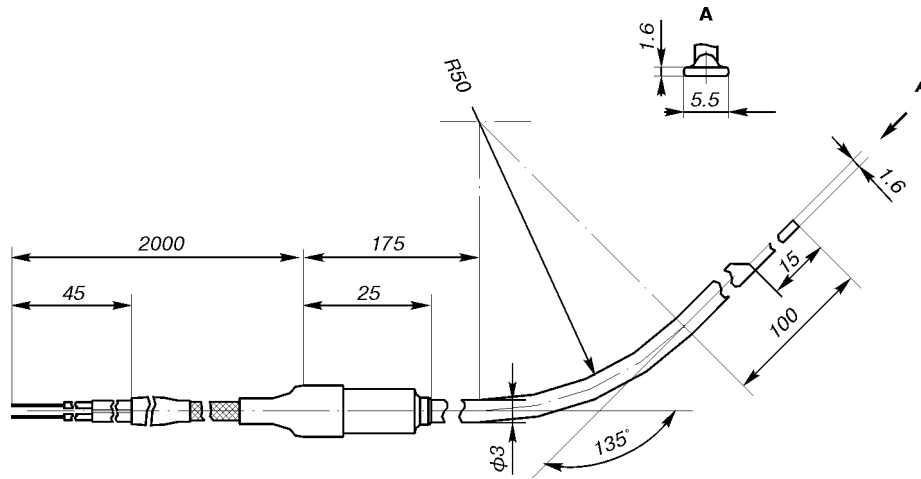


Fig. 14.

Cable Sheath Material

Table 1d

Material	Code of Material
12Cr18Ni10Ti	N10

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 2d

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
14	0.1	4	V1

ORDERING INFORMATION

THA Metran-231 - 02 - 630/2000 - 2 - I - 1 - N10 - U1.1 - TU... - P									
1	2	3	4	5	6	7	8	9	10

1. Thermocouple

THA Metran-231 type K

THK Metran-232 type L

2. Code of protection tube*

- 01** Fig. 1
- 02** Fig. 2
- 03** Fig. 3
- 04** Fig. 4
- 05** Fig. 5
- 06** Fig. 6 (for THA Metran-231 only)
- 07** Fig. 7 (for THA Metran-231 only)
- 08** Fig. 8 (for THA Metran-231 only)
- 09** Fig. 9 (for THA Metran-231 only)
- 10** Fig. 10
- 11** Fig. 11
- 12** Fig. 12
- 13** Fig. 13
- 14** Fig. 14 (for THK Metran-232 only)

3. Sensor length, L, mm / cable entry length l, mm - for Fig. 2, 7, 9, 11, 13.

4. Code of tolerance class

2 tolerance class 2

5. Isolation of hot junction

I isolated

H non-isolated

6. Number of sensing elements (SE)

1 one

2 two

7. Code of protection tube by material (Table 1, 1a, 1b, 1c, 1d).

8. Climatic type (per GOST 15150)

U1.1

T3

9. Specifications TU 4211-001-12580824-2002.

10. Metrological verification:

GP verification by Gosstandart;

P verification by manufacturer.

* Acc. to Fig. 1 thermocouple with customary mini-head is available, code of protection tube is 01L.

THA Metran-241 and THK Metran-242 Thermocouples

THA Metran-241 entered into the State Register of Measuring Instruments under No.19985-00, Certificate No.8360. OKPO Code 42 1152.

THK Metran-242 entered into the State Register of Measuring Instruments under No.19984-00, Certificate No.8359. OKPO Code 42 1153.

Application: to measure temperature of small-size bearings, solid surfaces, housing and heads of automatic molding machines, extruding presses for plastic and rubbers.

Number of sensing elements: 1.

Sensing element: KTMS (HA), KTMS (HK) thermocouple cable TU16-505.757-75.

Sensor type: K for THA Metran-241; L for THK Metran-242.

Tolerance class: 2 per GOST R 8.585.

Temperature range: -40...200°C (for Fig.1, 2); -40...400°C (for Fig.3, 4, 5, 6, 7).

Hot junction: isolated.

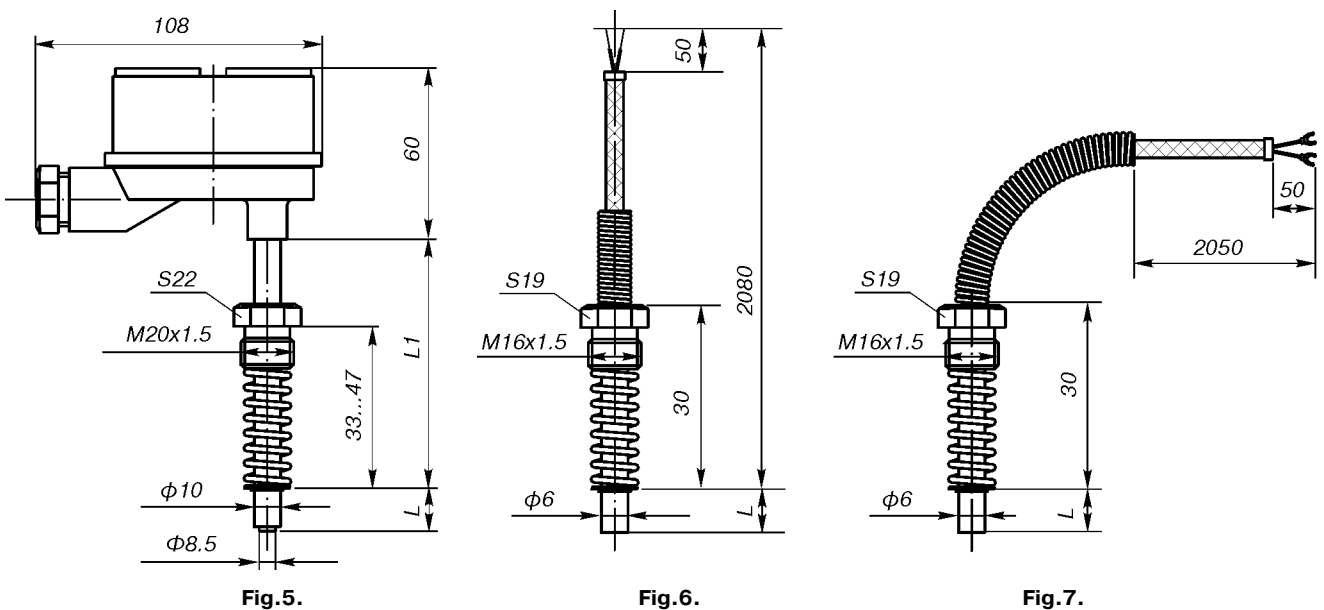
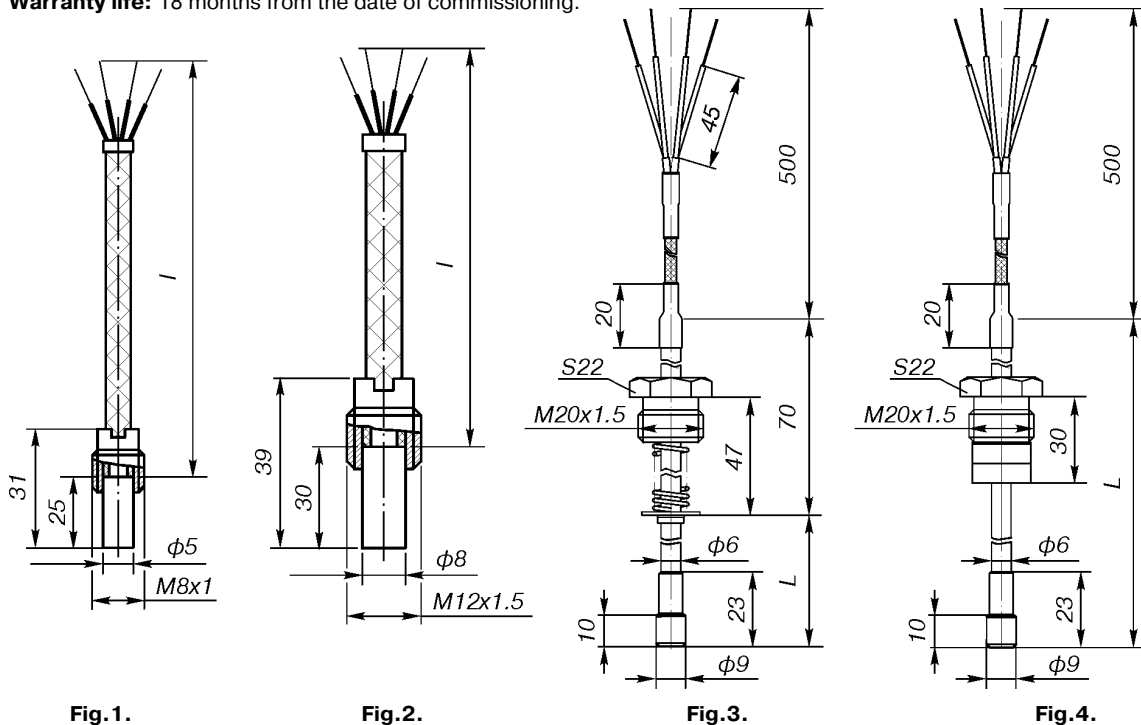
Material of head (Fig.5): plastic ABS.

Verification interval: one year, verification procedure conforms to GOST 8.338.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Average life time: 3 years minimum.

Warranty life: 18 months from the date of commissioning.



Extension wire lengths l: 120, 250, 500, 800, 1000, 1600, 2000, 2500, 3150 mm.

Standard Sensor Lengths

Table 1

L, mm	10	32	60	80	100	120	160	200	250	320	400	500
Fig.3			+	+	+	+	+	+	+	+	+	+
Fig.4			+	+	+	+	+	+	+	+	+	+
Fig.6	+	+	+	+	+	+	+	+	+	+		
Fig.7	+	+	+	+	+	+	+	+	+	+		
Weight, kg	0.4		0.5					0.6				

Sensor Lengths for Thermocouples (Fig. 5)

Table 1a

L, mm	10	20	40	80	100	160	200	250	320	400	500	630	800	1000	1250	1600
L1, mm	100	80	120	160	160	100	200	160	320	250	120	170	200	200	200	200
Weight, kg	0.6													0.8		

Material of Protection Tube

Table 2

Material	Fig.	Code of Material
Brass L63 or L96	1, 2	L
12Cr18Ni10Ti	3, 4, 5, 6, 7	N10

Max Pressure (Pmax), Thermal Inertia (T), Vibrostability Group (Vs), Ingress Protection

Table 3

Fig.	Pmax, MPa	T, s	Vs per GOST 12997	Ingress Protection per GOST 14254
1	0.1	2,5	V1	IP5X
2	0.1	2,5		
3	0.4	6		
4	0.4	6		IP65
5	0.1	40		IP5X
6	0.1	8		
7	0.1	8		

ORDERING INFORMATION

THA Metran-241 - 01 - 500 - 2 - I - 1 - L - U1.1 - TU... - GP <i>1 2 3 4 5 6 7 8 9 10</i>

1. Thermocouple

THA Metran-241 type K

THK Metran-242 type L

2. Code of protection tube*

01 Fig.1

02 Fig.2

03 Fig.3

04 Fig.4

05 Fig.5

06 Fig.6

07 Fig.7

* Acc. to Fig.5 thermocouples with a customary mini-head is available, code of protection tube is 05L.

3. Sensor length, L, mm (Table 1, 1a) or extension wire length l (for Fig. 1, 2).

4. Code of tolerance class

2 tolerance class 2

5. Hot junction isolation

I isolated

6. Number of sensing elements (SE)

1 one

7. Code of protection tube by material (Table 2)

8. Climatic type (per GOST 15150)

U1.1

T3

9. Specifications TU 4211-001-12580824-2002.

10. Metrological verification:

GP verification by Gosstandart;

P verification by manufacturer (for THK Metran-

242 only).

THA Metran-251 and THK Metran-252 Explosion-proof Thermocouples

OKPO Code 42 1152, 42 1153.

Entered into the State Register of Measuring Instruments under No.21970-01, Certificate No.0995.

Explosion Protection Certificate for Electrical Equipment No.01.130.

Application: to measure temperature of liquid and gaseous non-corrosive and corrosive fluids that do not destroy the protection tube in hazardous areas containing ammonia, nitrogen-hydrogen mixtures, carbonic or natural gases. Sensor length of THA Metran-251-04, -05, -06, -07 is KTMS-HA thermocouple cable, therefore during mounting they can be put into hard-to-reach places and forced against surface to measure its temperature.

Explosion protection marking: 1ExdIICT5 X or 1ExdIICT6 X per GOST R 51330.0.

Number of sensing elements: 1 or 2.

Sensing element: KTMS-HA, KTMS-HK thermocouple cable TU16-505.757-75.

Sensor type: K for THA Metran-251; L for THK Metran-252.

Temperature range: 0...600°C for THK Metran-252, 0...800°C for THA Metran-251.

Tolerance class: 2 per GOST R 8.585.

Material of head: AK12 alloy.

Hot junction: isolated.

Ingress protection IP65 per GOST 14254.

Climatic type:

- U1.1 per GOST 15150 for ambient temperature from -20° to 40°C for temperature class **T6**;
from -45° to 70°C for temperature class **T5**;

- T3 per GOST 15150 for ambient temperature from -10° to 40°C for temperature class **T6**;
from -10° to 70°C for temperature class **T5**. Upper value of relative humidity is up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.338.

Average life time: 2 years minimum.

Warranty life: 18 months from the date of commissioning.

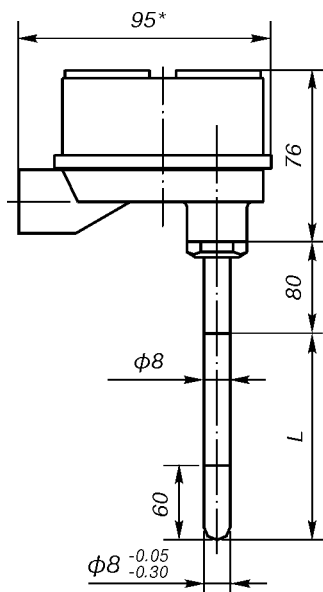


Fig. 1.

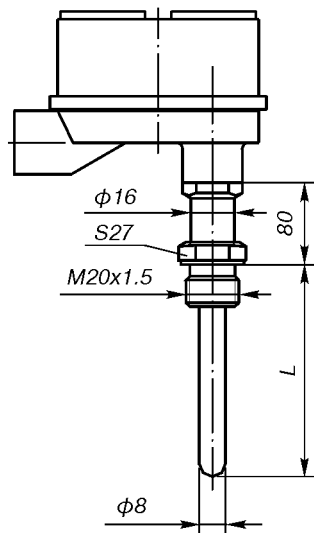


Fig. 2.

also refer to Fig. 1
(fixed connector).

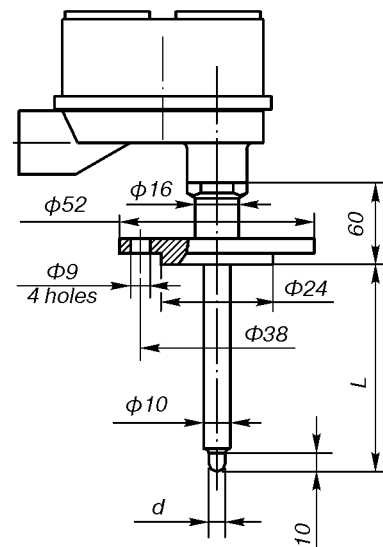


Fig. 3.

also refer to Fig. 1.
(d=6 mm for 1 SE,
d=6,6 mm for 2 SE)

* 175 mm with mounting set for armored cable;
189 mm with mounting set for pipe mounting.

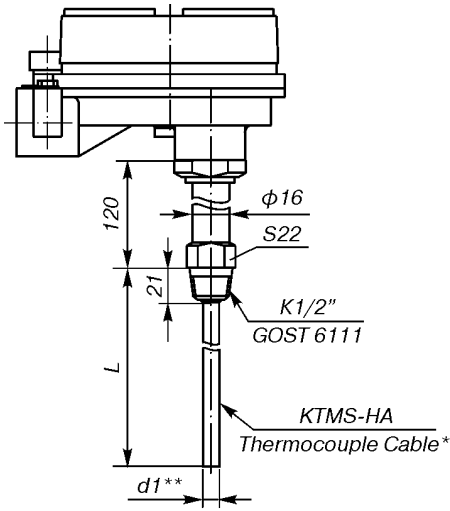


Fig.4.
(also refer to Fig.1)

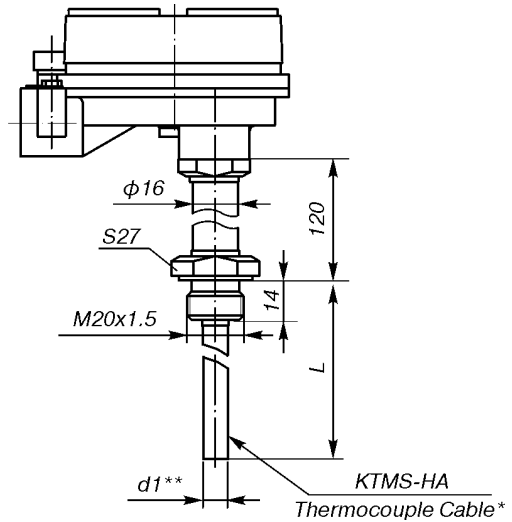


Fig.5.
(also refer to Fig.1)

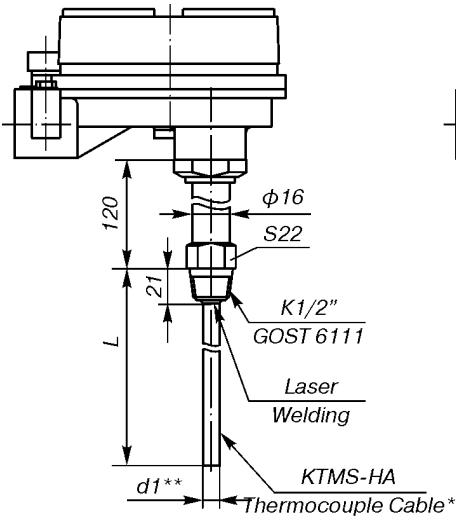


Fig.6.
(also refer to Fig.1)

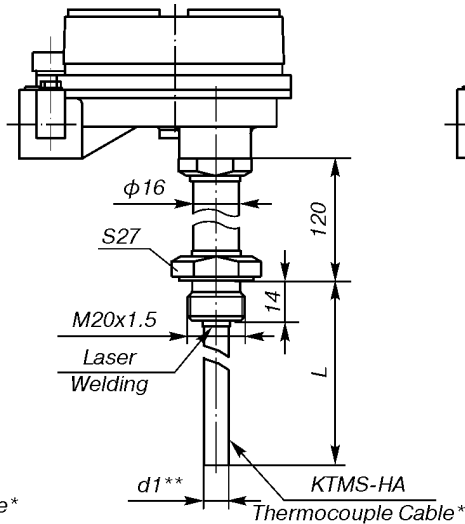


Fig.7.
(also refer to Fig.1)

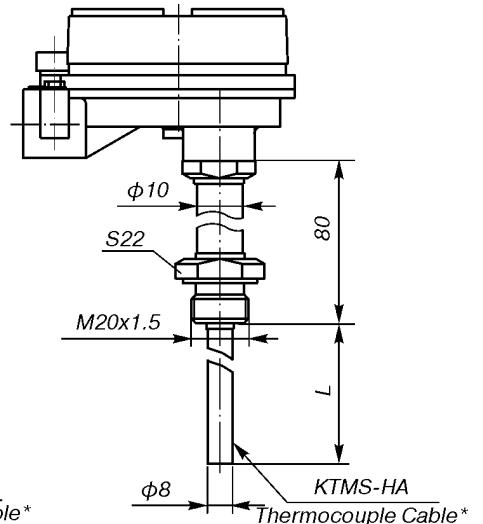


Fig.8.
(also refer to Fig.1)
(adjustable connector).

* Immersion length is made of KTMS-HA thermocouple cable. When mounting the immersion length can be bent, put into hard-to-reach places and forced against surfaces to measure its temperature.

** d1 - KTMS-HA thermocouple cable diameter
d1 = 3 mm for 1 SE; d1 = 4.6 mm for 2 SE.

Standard Sensor Lengths

Table1

L, mm	60	80	100	120	160	200	250	320	400	500	630	800	1000	1250	1600	2000
Fig.1				+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.2, 8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.3	+	+	+	+	+	+	+	+								
Fig.4, 5, 6, 7			+	+	+	+	+	+	+	+	+	+	+	+	+	+
Weight, kg	0.89		0.90-1.10						0.86-1.15			0.96-1.24		1.08-1.65		

**Material of Protection Tube
(Fig. 1, 2, 3, 8)**

Table 2

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	800	N10
10Cr17Ni13Mo2Ti		N13

**Material of Cable Sheath
(Fig.4, 5, 6, 7)**

Table 2a

Material	Max Process Temperature, °C	Code of Material
12Cr18Ni10Ti	800	N10

**Maximum Pressure (Pmax), Thermal Inertia (T) and
Vibrostability Group (Vs)**

Table 3

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1	1	30	V2
2, 8	2.5	30	
3	2.5	20	
4, 5, 6, 7	0.4	8	

ORDERING INFORMATION

THA Metran-251 - 02 - 320 - 2 - I - 1 - N10 - BK - T6 - U1.1 - TU... - GP											
1	2	3	4	5	6	7	8	9	10	11	12

- 1. Thermocouple
 - THA Metran-251** type K
 - THK Metran-252** type L
- 2. Code of protection tube
 - 01** Fig.1
 - 02** Fig.2
 - 03** Fig.3
 - 04** Fig.4 (for THA Metran-251 only)
 - 05** Fig.5 (for THA Metran-251 only)
 - 06** Fig.6 (for THA Metran-251 only)
 - 07** Fig.7 (for THA Metran-251 only)
 - 08** Fig.8
- 3. Sensor length, L, mm (Table 1).
- 4. Tolerance class
 - 2** tolerance class 2.
- 5. Hot junction isolation
 - I** isolated.
- 6. Number of sensing elements (SE)
 - 1** one
 - 2** two
- 7. Code of protection tube (cable sheath) by material (Table 2, 2a).
- 8. Mounting set of cable entry (see "Mounting Sets for Cable Entry" Section):
 - BK** armored cable
 - TB** pipe mounting
- 9. Temperature class (per GOST R 51330.0):
 - T5**
 - T6**
- 10. Climatic type (per GOST 15150):
 - U1.1**
 - T3**
- 11. Specifications TU 4211-005-12580824-2001.
- 12. Metrological verification:
 - GP** verification by Gosstandart.

THA Metran-261 and THK Metran-262 Thermocouples

THA Metran-261, THK Metran-262 are entered into the State Register of Measuring Instruments under No.26223-03, Certificate No.16719.

Code of OKPO 42 1152 (for THA Metran-261),
42 1153 (for THK Metran-262).

Application: to measure temperature in reactors of catalytic reforming and hydrofining plants, and also to measure temperature of air in mines, wells and chambers at several different depths.

Number of measurement zones: 3 to 10.

Sensor type: K for THA Metran-261; L for THK Metran-262.

Sensing element: KTMS-HA or KTMS-HK thermocouple cable TU16-505.757.

Number of sensing elements: one for each measurement zone.

Tolerance class: 2 per GOST R 8.585.

Temperature range:

-40...600°C for THA Metran-261-01, -02; THK Metran-262-01,-02,-03;
-40...800°C for THA Metran-261-03.

Hot junction: isolated (Fig.1, 2, 3), non-isolated (Fig.1, 2).

Material of head: AK12 alloy (Fig.3).

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 85°C; T3 per GOST 15150 for ambient temperature from -10° to 85°C with relative humidity up to 98% at 35°C.

Weight: from 0.35 to 6 kg depending on number and length of operating area.

Verification interval: one year, verification procedure conforms to GOST 8.338.

Average life time: 3 years minimum.

Warranty life: 18 months from the date of commissioning.

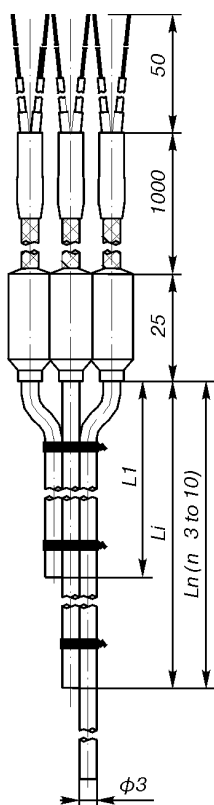


Fig. 1.

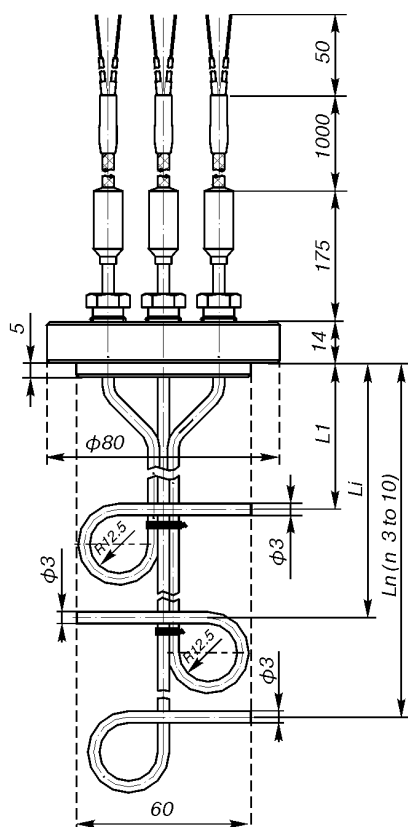


Fig. 2.

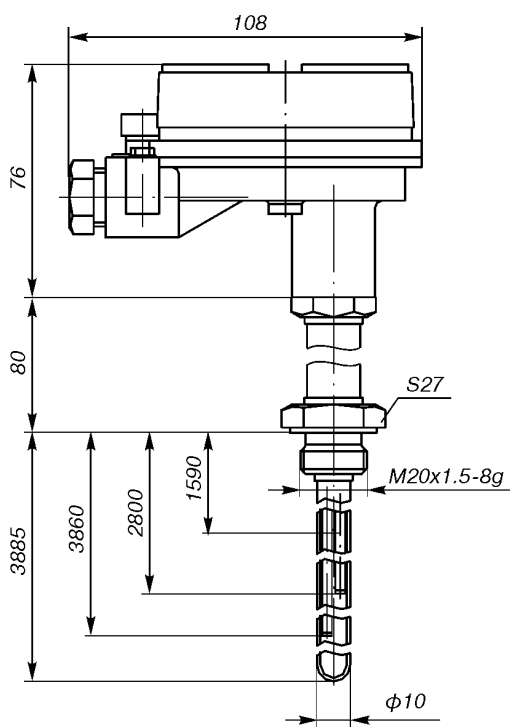


Fig. 3.

Lengths of Measurement Zones*

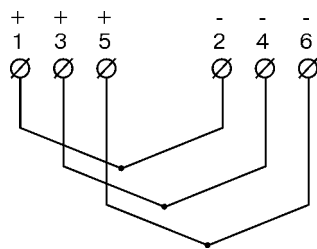
Table 1

Fig.	Number of Zones	Length of Measurement Zone, mm									
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
1	3 to 10	1200 to	1600 to	2000 to	2400 to	2800 to	3200 to	3600 to	4000 to	5400 to	10000 to
2**		2200	3000	3500	4000	4500	5600	8100	10000	12500	19800

* Number and length of measurement zones shall be specified in the order.

** Order for THA/THK Metran-261/262-02 with over 10 000 mm zone length shall be agreed individually.

Internal Wiring Diagram of THA Metran-261-03



Material of Cable Sheath (Fig. 1, 2) and Protection Tube (Fig. 3)

Table 2

Material	Code of Material
12Cr18Ni10Ti	N10

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 3

Fig.	Pmax, MPa	T, s		Vs per GOST 12997	Ingress Protection per GOST14254
		Hot Junction Type*			
		I	NI		
1	0.1	5	4	V1	IP5X
2	0.1				
3	16	90	-		IP65

* I - isolated;
NI - non-isolated.

ORDERING INFORMATION

THA Metran-261 - 02 - 1400/2100/3200 - 2 - I - 3 - N10 - U1.1 - TU... - GP									
1	2	3	4	5	6	7	8	9	10

1. Thermocouples
THA Metran-261 type K
THK Metran-262 type L
2. Code of protection tube
01 Fig.1
02 Fig.2
03 Fig.3
3. Length of measurement zone, mm (Table 1).
4. Code of tolerance class
2 tolerance class 2.
5. Isolation of hot junction
I isolated;
NI non-isolated
6. Number of measurement zones (3 to 10)
7. Code of material (Table 2):
 - protection cable sheath (Fig.1, 2);
 - protection tube (Fig.3).
8. Climatic type (per GOST 15150):
U1.1
T3
9. Specifications TU 4211-012-12580824-2003.
10. Metrological verification:
GP verification by Gosstandart.

TPP Metran-211 and TPR Metran-212 Thermocouple

TPP Metran-211, TPR Metran-212 are entered into the State Register of Measuring Instruments under No.24308-03, Certificate No.14116.

Code of OKPO 42 1151

Application: **TPP Metran-211 and TPR Metran-212** are designed to measure temperature in neutral and oxydizing gaseous fluids that do not contact with thermoelectrode material and do not destroy material of protection tube. Leakproof to measured fluid up to $P_{max}=0.4$ MPa.

Sensor type: S or R for TPP Metran-211, B for TPR Metran-212.

Temperature range

Таблица 1

TC Version	Operating Temperature Range, °C	Nominal Measured Temperature, °C
TPP Metran-211-01, -02, -03 with S type	0...1300	1000
TPP Metran-211-01, -02, -03 with R type		1100
TPR Metran-212-01, -02, -03	600...1600	1300
TPP Metran-211-13 with S type	600...1300	1100
TPR Metran-212-13		1200
TPR Metran-212-20	600...1350	1300

Tolerance class: 2.

Hot junction: isolated.

Number of sensing elements: 1.

Thermoelectrode material:

for TPP Metran-211:

type (S) PR10 $\phi 0.4$ mm (+), PIT $\phi 0.5$ mm (-),

type (R) PR13 $\phi 0.4$ mm (+), PIT $\phi 0.5$ mm (-);

for TPR Metran-212:

type (B) PR30 $\phi 0.4$ mm (+), PR6 $\phi 0.4$ mm (-).

Material of head: AK12 alloy.

Material of protection tube: as per Table 2.

Mounting: slot.

Ingress protection connection head housing IP65 per GOST 14254.

Climatic type: U3 per GOST 15150 for ambient temperature from -30° to 85° C; T3 per GOST 15150 for ambient temperature from -10° to 85° C with relative humidity up to 98% at 35° C.

Mean life at rated temperature is 6000 h minimum.

Verification procedure: conforms to GOST 8.338.

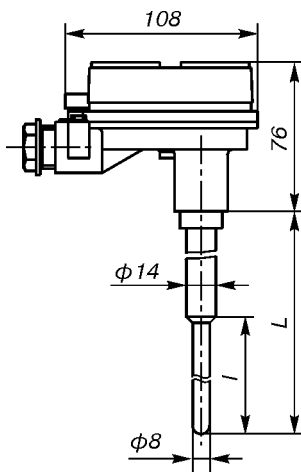


Fig. 1.

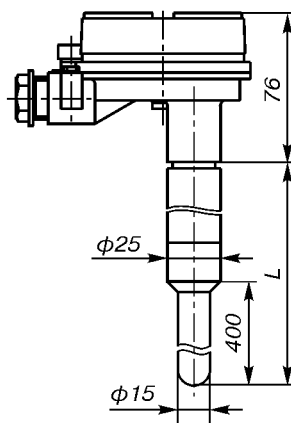


Fig. 2 (also refer to Fig. 1).

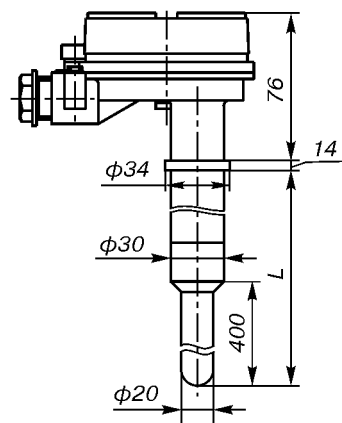
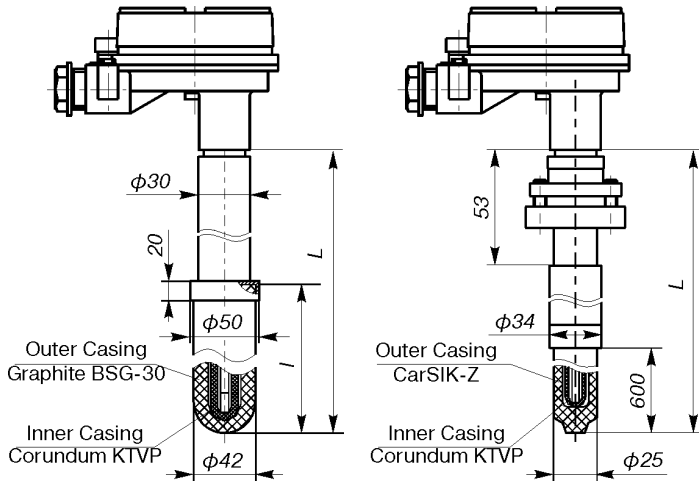


Fig. 3 (also refer to Fig. 1).



Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 2

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1, 2, 3	0.4	90	N2
4, 5		500	

Fig. 4 (also refer to Fig. 1).

Fig. 5 (also refer to Fig. 1).

Sensor Length (L), Immersion Length (l), Diameters (D/d), Material of Protection Tube and Weight

Table 3

Thermocouple	Fig.	Code of Protection Tube	Protection Tube					Weight, kg
			D/d, mm	L, mm	l, mm	Material of Immersion Length*	Material of Metal Length*	
TPP Metran-211 TPR Metran-212	1	01	14/8	320 500, 800	250 400	KVPT Corundum (Kv)	12Cr18Ni10Ti (N10)	0.44...0.70
TPP Metran-211 TPR Metran-212	2	02	25/15	500, 800, 1000, 1250, 1600, 2000		KTVP Corundum (Kt)		0.73...3.60
TPP Metran-211 TPR Metran-212	3	03	30/20					1.03...5.13
TPP Metran-211 TPR Metran-212	4	13	30/42	1600	1100	external case d=42 mm boron-siliconized graphite BSG-30 (Bs); internal case d=20 mm KTVP Corundum (Kt)	12Cr18Ni10Ti (N10)	4.0
				1250	740			4.6
				1000	500			5.3
TPR Metran-212	5	20	34/25	2000	600	external case d=25 mm silicon carbide CarSIK-Z** (Car); internal case corundum d=12 mm KTVP (Kt)	CrNi45Al(N45)	5.3
				1600				4.4
				1250				3.9
				1000				3.6

* Code of material is given in brackets.

** Self-bonded silicon carbide SKK d=25 mm is also allowed.

ORDERING INFORMATION

TPP Metran-211 - 02 - 1600 - S - ϕ0.4-0.5 - 2 - Kt/N10 - U3 - TU... - GP									
1	2	3	4	5	6	7	8	9	10

1. Thermocouple

TPP Metran-211
TPR Metran-212

2. Code of protection tube (Table 3)

- 01** Fig.1
- 02** Fig.2
- 03** Fig.3
- 13** Fig.4
- 20** Fig.5 (TPR Metran -212 only)

3. Sensor length, L, mm (Table 3).

4. Sensor type:

S or **R** for TPP Metran-211,
B for TPR Metran-212

5. Thermoelectrode diameter:

ϕ 0.4-0.4 mm - for TPR Metran-212;
 ϕ 0.4-0.5 mm - for TPP Metran-211

6. Code of tolerance class

2 tolerance class

7. Code of immersion length material of protection tube / Code of metal length material of protection tube (Table 3).

8. Climatic type per GOST 15150:

U3

T3

9. Specifications TU 4211-008-12580824-2002.

10. Metrological verification:

GP verification by Gosstandart.

Tolerance Classes for Resistance Temperature Detectors

1. RTD are produced with sensor type and permissible resistance deviation from rated value at 0°C (R0) per GOST 6651.

Sensor Type per GOST 6651		Tolerance Class	Rated Resistance at 0°C, R0, Ohm	Permissible Variation from Rated Resistance at 0°C	
for CIS Countries	International			±%	±Ohm
50P	Pt50	A	50	0.05	0.025
100P, 100M	Pt100, Cu100		100		
50P, 50M	Pt50, Cu50	B	50	0.1	0.05
100P, 100M	Pt100, Cu100		100		
50P, 50M	Pt50, Cu50	C	50	0.2	0.1
100P, 100M	Pt100, Cu100		100		

2. W_{100} value is calculated as ratio of RTD resistance at 100°C (R_{100}) to temperature transmitter resistance at 0°C (R_0), per GOST 6651.

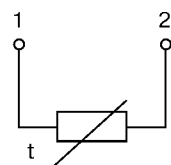
RTD Type	Tolerance Class	For CIS Countries		International	
		Rated Value W_{100}	Minimum Permissible Value W_{100}	Rated Value W_{100}	Minimum Permissible Value W_{100}
TSP	A	1.3910	1.3905	1.3850	1.3845
	B		1.3900		1.3840
	C		1.3895		1.3835
TSM	B	1.4280	1.4270	1.4260	1.4250
	C		1.4260		1.4240

3. Permissible resistance variations from standard curve depending on tolerance class per GOST 6651.

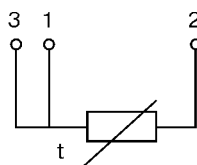
RTD Type	Tolerance Class	Permissible Variation from Standard Curve, ±°C*
TSP	A	$0.15+0.002 t $
	B	$0.3+0.005 t $
	C	$0.6+0.008 t $
TSM	A	$0.15+0.002 t $
	B	$0.25+0.0035 t $
	C	$0.5+0.0065 t $

* t value of measured temperature, °C.

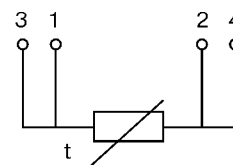
4. Wiring diagram for RTD internal conductors and sensing element per GOST 6651.



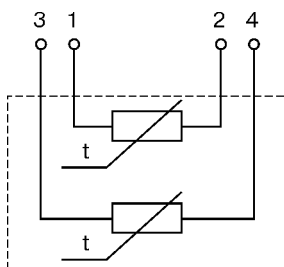
2-wire



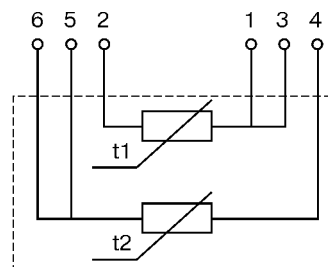
3-wire



4-wire



**2 Sensing Elements
2-wire 2x2**



**2 Sensing Elements
3-wire 2x3**

TSM Metran-203 (50M) and TSM Metran-204 (100M) Copper Resistance Temperature Detectors

Entered into the State Register of Measuring Instruments under No.19983-00, Certificate No.8358. Code of OKPO 42 1141.

Application: TSM Metran-203 and TSM Metran-204 (Fig. 1, 2, 3, 6, 7) are designed to measure temperature of non-corrosive and corrosive liquids and gases that do not destroy material of protection tube.

Number of sensing elements: 1, 2.

Sensor type: 50M for TSM Metran-203;
100M for TSM Metran-204.

Tolerance class: B or C.

Wiring diagram (refer to Table 1, 2):
2-, 3-, 4-wire for one sensing element;
2-, 3-wire for two sensing elements.

Temperature range: -50...150°C (for tolerance class B), -50...180°C (for tolerance class C).

Ingress protection: IP65 per GOST 14254.

Weight: from 0.2 to 1.3 kg depending on sensor length.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 45°C with relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Average life time: 5 years minimum.

Warranty life: 18 months from the date of commissioning.

Material of connection head: ABS plastic (Fig.1-3).

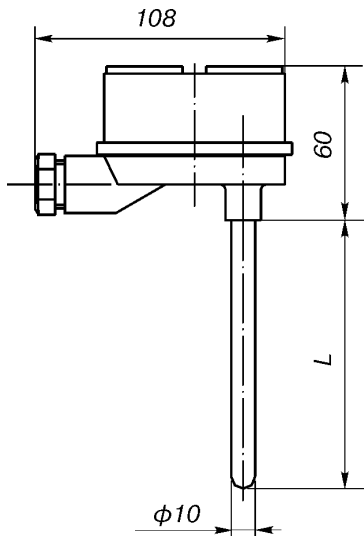


Fig. 1.

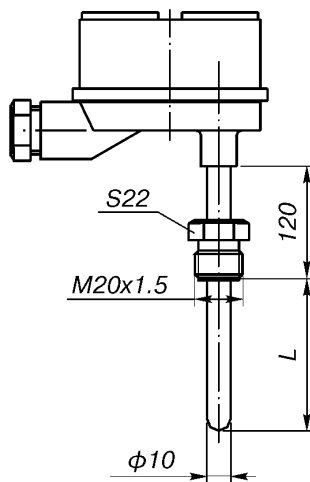


Fig.2 (also refer to Fig.1).

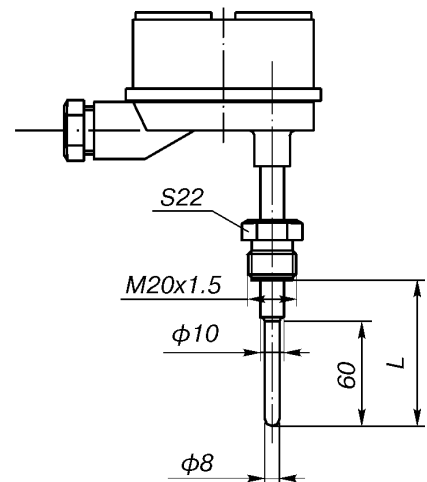


Fig.3 (also refer to Fig.1).

Material of connection head: aluminum alloy (Fig.1a-3a, 1b-3b).

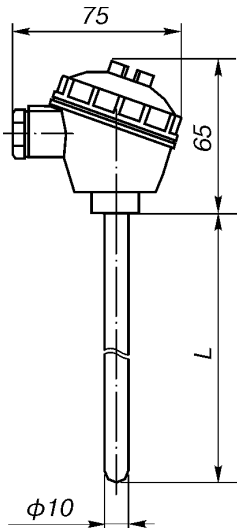


Fig. 1a.

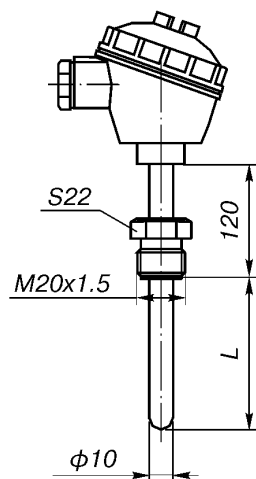


Fig.2a (also refer to Fig.1a).

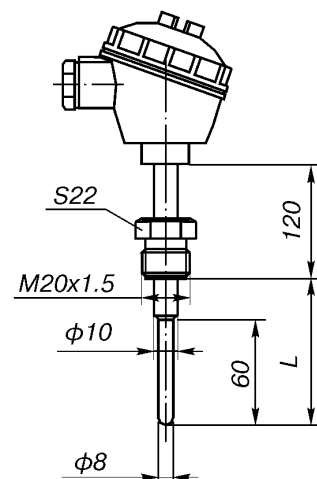


Fig.3a (also refer to Fig.1a).

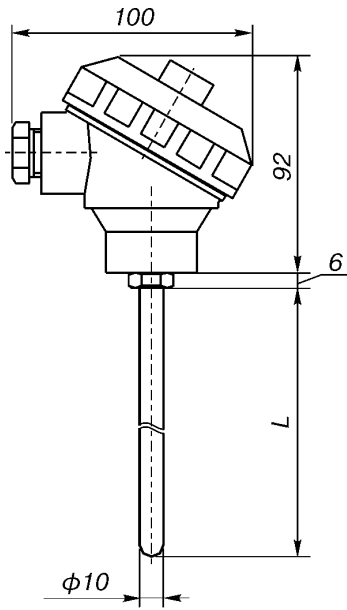


Fig. 1b*.

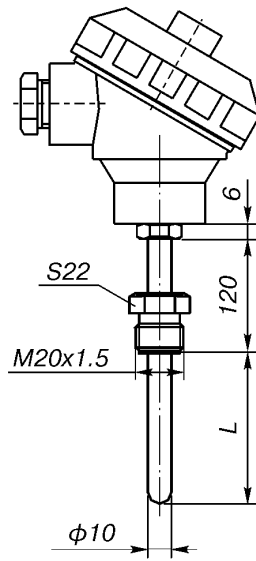


Fig.2b* (also refer to Fig.1b).

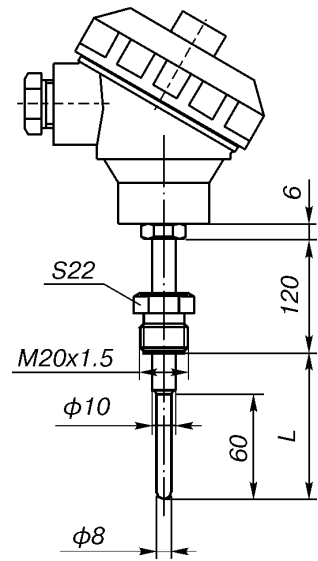


Fig.3b* (also refer to Fig.1b).

* For TSM Metran-203/204 with wiring diagram 2x3.

**Sensor Length, Number of Sensing Elements, Wiring Diagram
(for Fig. 1, 2, 3; 1a, 2a, 3a; 1b, 2b, 3b)**

Table 1

RTD	Fig.	Number of SE	Wiring Diagram	Sensor Elements, mm*
Metran-203 Metran-204	1, 1a	1	2, 3, 4	120...2000
	2, 2a			60...3150
	3, 3a			100...1250
Metran-203 Metran-204	1, 1b	2	3	120...2000
Metran-203	1, 1a		2	120...1250
Metran-204				120...2000
Metran-203 Metran-204	2, 2b		3	60...3150
Metran-203	2, 2a		2	60...1250
Metran-204				60...2500
Metran-203 Metran-204	3, 3b		3	100...1250
Metran-203	3, 3a		2	100...800
Metran-204				100...1250

* Sensor length is selected from standard sensor lengths: 60, 80, 100, 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150 mm.

Material of connection head:

- Technamid polyamide A-SV-30-L (Fig.6);
- aluminum alloy AK12 (Fig.7).

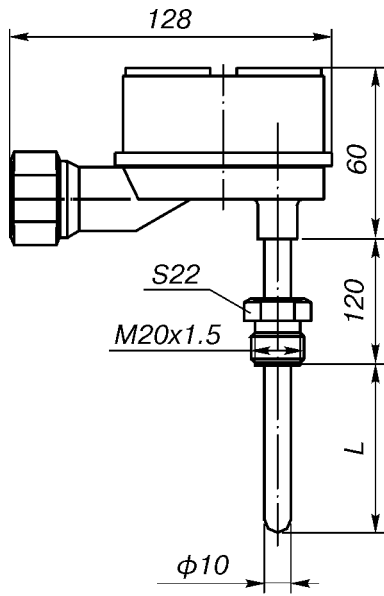


Fig.6*.

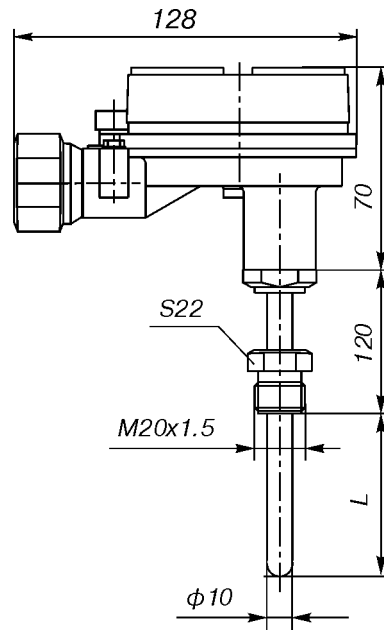


Fig.7*.

* Version with cable entry connector with internal cylinder thread G3/4" (refer to Fig.8).

**Sensor Length, Number of Sensing Elements, Wiring Diagram
(for Fig.6, 7)**

Table 2

RTD	Fig.	Number of SE	Wiring Diagram	Sensor Length, mm**
Metran-203 Metran-204	6, 7	1	2, 3, 4	120...2000
Metran-203		2	2	120...500
Metran-204			2	120...1250
Metran-203 Metran-204			3	120...2000

** Sensor length is selected from standard sensor lengths: 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000 mm.

**Cable Entry with Internal Cylinder Thread G3/4
(Fig.8)**

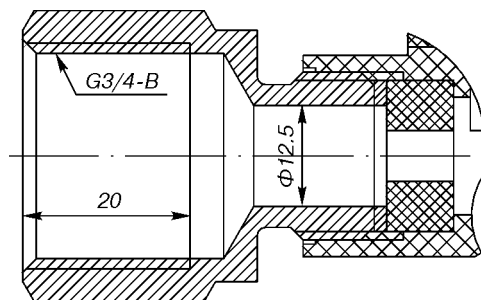


Fig.8.

Material of Protection Tube

Table 3

Material	Code of Material
12Cr18Ni10Ti	N10
10Cr17Ni13Mo2Ti	N13

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 4

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1	0.4	40	V1
2, 6, 7	10	40	
3	6.3	20	

Application: TSM Metran-203, TSM Metran-204 (Fig.4) are designed to measure temperature of air in various premises.

Number of sensing elements: 1.

Standard curve: 50M for TSM Metran-203, 100M for TSM Metran-204.

Tolerance class: B or C.

Wiring diagram: 4-wire.

Temperature range: -50...150°C.

Thermal inertia: less than 20 s.

Material of protection tube: 12Cr18Ni10Ti Steel (code of material N10).

Material of head: ABS plastic.

Ingress protection: IP65 per GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C with relative humidity up to 98% at 35°C.

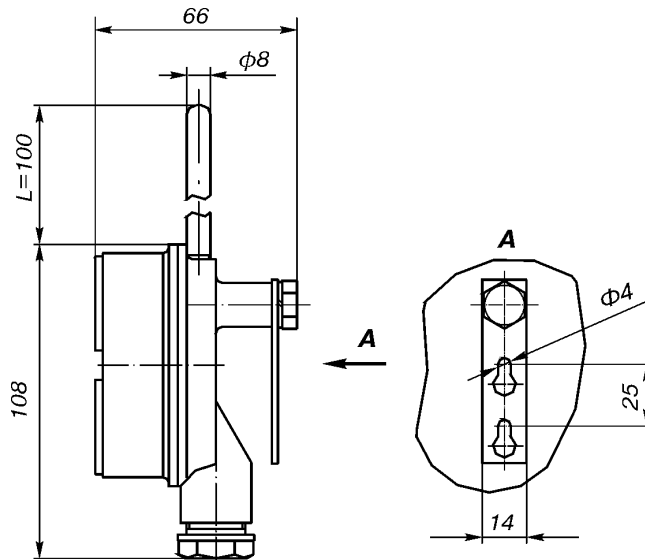


Fig.4.

ORDERING INFORMATION

TSM Metran-203 - 02 - 320 - B - 2 - 1 - N10 - U1.1 - TU... - GP
 1 2 3 4 5 6 7 8 9 10

1. RTD

TSM Metran-203 type 50M
 TSM Metran-204 type 100M

2. Code of protection tube*

- 01 Fig.1
- 02 Fig.2
- 03 Fig.3
- 31 Fig.1a, 1b
- 32 Fig.2a, 2b
- 33 Fig.3a, 3b
- 04 Fig.4
- 06 Fig.6
- 07 Fig.7

3. Sensor length, L, mm (Table 1, 2, Fig.4).

4. Code of tolerance class

- B Tolerance class B
- C Tolerance class C

5. Wiring diagram

- 2 2-wire
- 3 3-wire
- 4 4-wire (for one SE)

6. Number of sensing elements (SE)

- 1 one SE
- 2 two SE

7. Code of protection tube by material (Table 3).

8. Climatic type (per GOST 15150)

- U1.1
- T3

9. Specifications TU 4211-002-12580824-2002.

10. Metrological verification:

- GP verification by Gosstandart.

TSM Metran-243 (50M) Copper Resistance Temperature Detector

Entered into the State Register of Measuring Instruments under No.19983-00, Certificate No.8358. Code of OKPO 42 1141.

Application: to measure temperature of small-size bearings and solid surfaces.

Number of sensing elements: 1.

Sensor type: 50M.

Tolerance class: C.

Wiring diagram: 4-wire.

Temperature range: -50...120°C .

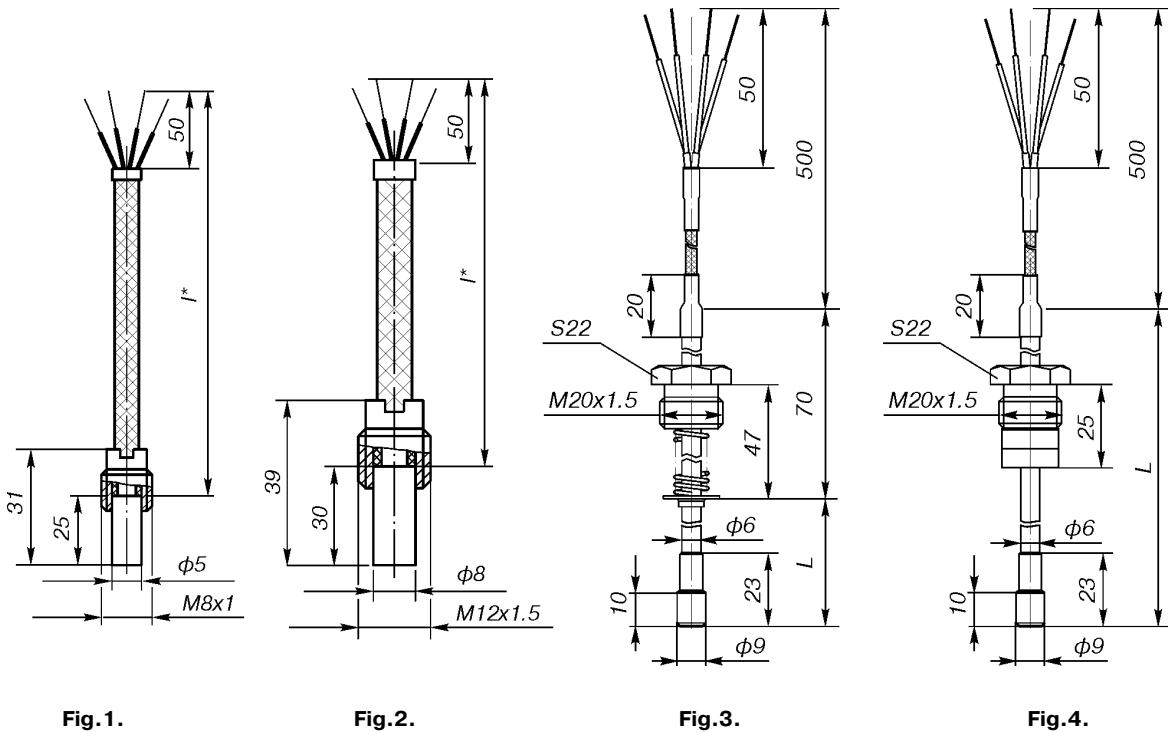
Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C with relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Weight: 0.3 kg maximum (Fig.1, 2); 0.5-0.6 kg (Fig.3, 4).

Average life time: 5 years minimum.

Warranty life: 18 months from the date of commissioning.



Extension Wire Length l*

Table 1

Fig.	Ingress Protection per GOST 14254	Type of Extension Length	l, mm
1	IP65	KMM SE 0.12x4 (copper multicore cable with silicon insulation, shielded)	120...15000
2			120...3150
1	IP5X	Bundle - 4-wire MS 16-13 0.12 in PML 2x4 twist	120...3150
3, 4			500
2		KSFE Cable 4x0.35	120...3150

* Extension wire length l is selected from:

120, 250, 500, 800, 1000, 1600, 2000, 2500, 3150, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 11000, 12000, 15000 mm.

Standard Sensor Length

Table 2

L, mm	60	80	100	120	160	200	250	320	400	500
Fig.3	+	+	+	+	+	+	+	+	+	+
Fig.4	+	+	+	+	+	+	+	+	+	+

Material of Protection Tube

Table 3

Material	Fig.	Code of Material
Brass L96 or L63	1, 2	L
Brass L96 or L63 (12Cr18Ni10Ti is allowed) - for thimble $\phi 9 \times 23$ mm; 12Cr18Ni10Ti for tube of $\phi 6$ mm	3, 4	

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 4

Fig.	Pmax, MPa	T, s	Vs per GOST12997	Ingress Protection 14254
1	0.1	8	F2 for frequency from 120 to 300 Hz	IP5X, IP65
2	0.1	8	F3 for frequency from 60 to 250 Hz	
3	0.4	20	V1	IP5X
4	0.4	20	V1	

ORDERING INFORMATION

TSM Metran-243 - 01 - IP65 - 500 - C - 4 - 1 - L - U1.1 - TU... - GP

1 2 3 4 5 6 7 8 9 10 11

1. RTD

TSM Metran-243 type 50M

2. Code of protection tube

01 Fig.1
02 Fig.2
03 Fig.3
04 Fig.4

3. Ingress protection conforms to GOST 14254

IP5X Fig.1, 2, 3, 4
IP65 Fig.1, 2

4. Sensor length, L, mm (Fig. 3, 4 - refer to Table 2) or extension wire length l (Fig. 1, 2 refer to Table 1).

5. Code of tolerance class

C tolerance class C

6. Wiring diagram

4 4-wire

7. Number of sensing elements (SE)

1 one SE

8. Code of protection tube by material (Table 3)

9. Climatic type (per GOST 15150)

U1.1**T3**

10. Specifications TU 4211-002-12580824-2002.

11. Metrological verification:

GP verification by Gosstandart.

TSM Metran-253 (50M) and TSM Metran-254 (100M) Explosion-proof Resistance Temperature Detectors

Entered into the State Register of Measuring Instruments under No.21969-01, Certificate No.10994.

Code of OKPO 42 1141.

Explosion Protection Certificate for Electrical Equipment No.01.130.

Application: to measure non-corrosive and corrosive liquids and gases that do not destroy protection tube material in hazardous areas and premises containing ammonia, nitrogen-hydrogen mixtures, carbonic or natural gases.

Explosion protection marking: 1ExdIICT6 X.

Sensor type: 50M for TSM Metran-253,
100M for TSM Metran-254.

Tolerance class: B or C.

Material of head: AK12 alloy.

Number of sensing elements: 1.

Wiring diagram: 2-, 3-, 4-wire.

Temperature range: -50...150°C (for tolerance class B); -50...180°C (for tolerance class C).

Ingress protection of connection head housing IP65 per GOST 14254.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C with relative humidity up to 98% at 35°C.

Average life time: 8 years minimum.

Warranty life: 18 months from the date of commissioning.

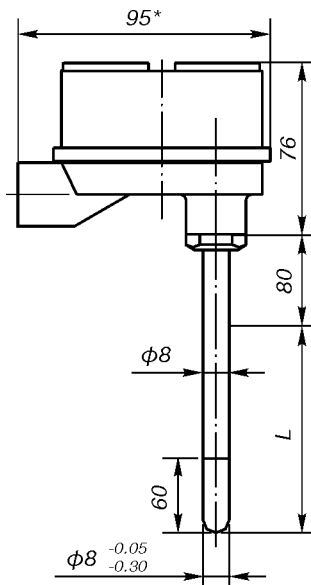


Fig. 1.

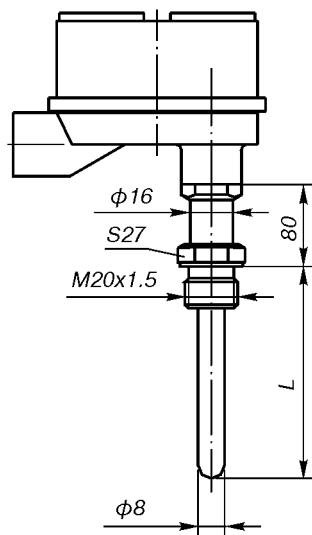


Fig. 2. also refer to Fig.1
(fixed connector).

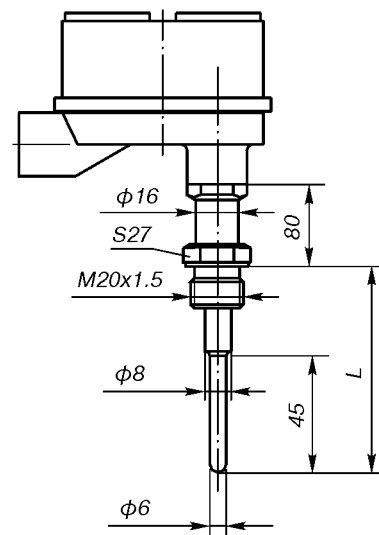


Fig. 3. also refer to Fig.1
(fixed connector).

* 175 mm with mounting set for armored cable;
189 mm with mounting set for pipe mounting.

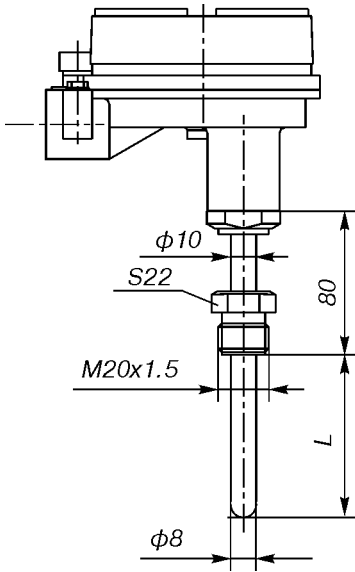


Fig.4. also refer to Fig.1 (adjustable connector).

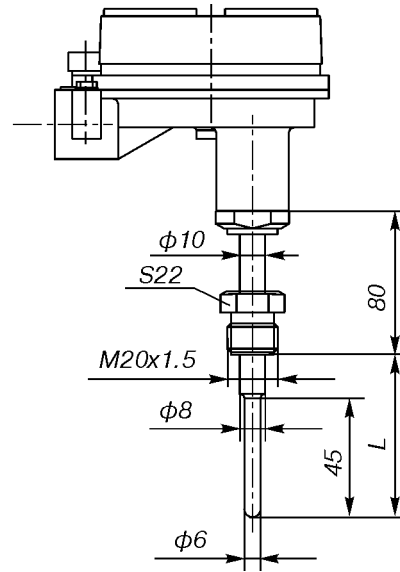


Fig.5. also refer to Fig.1 (adjustable connector).

Standard Sensor Length

Table 1

L, mm	60	80	100	120	160	200	250	320	400	500	630	800	1000	1250	1600	2000
Fig.1				+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.2, 4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.3, 5			+	+	+	+	+	+								
Weight, kg	0.9			0.84-0.7				0.92-1.12				1.08-1.37				

Material of Protection Tube

Table 2

Material	Code of Material
12Cr18Ni10Ti	N10
10Cr17Ni13Mo2Ti	N13

Maximum Pressure (P,max), Thermal Inertia (T) and Vibrostability (Vs)

Table 3

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1	1	20	V2
2, 4	16	20	
3, 5	32	8	

ORDERING INFORMATION

TSM Metran-253 - 02 - 320 - B - 2 - 1 - N10 - TB - U1.1 - TU... - GP										
1	2	3	4	5	6	7	8	9	10	11

- 1. RTD
 - TSM Metran-253** type 50M
 - TSM Metran-254** type 100M
- 2. Code of protection tube
 - 01** Fig.1
 - 02** Fig.2
 - 03** Fig.3
 - 04** Fig.4
 - 05** Fig.5
- 3. Sensor length, L, mm (Table 1).
- 4. Tolerance class
 - B** tolerance class B
 - C** tolerance class C
- 5. Wiring diagram
 - 2** 2-wire
 - 3** 3-wire
 - 4** 4-wire
- 6. Number of sensing elements (SE)
 - 1** one SE
- 7. Code of protection tube by material (Table 2).
- 8. Type of mounting set for cable entry (refer to "Mounting Sets for Cable Entry" Section).
 - BK** armored cable
 - TB** pipe mounting
- 9. Climatic type (per GOST 15150)
 - U1.1**
 - T3**
- 10. Specifications TU 4211-006-12580824-00.
- 11. Metrological verification:
 - GP** verification by Gosstandart.

TSP Metran-205 (50P) and TSP Metran-206 (100P) Platinum Resistance Temperature Detector

Entered into the State Register of Measuring Instruments under No.19982-00, Certificate No.8357. Code of OKPO 42 1142.

Application: TSP Metran-205 and TSP Metran-206 (Fig. 1, 2, 3, 6, 7) are designed to measure temperature of non-corrosive and corrosive liquids and gases that do not destroy material of protection tube.

Number of sensing elements: 1 or 2.

Sensor type: 50P for TSP Metran-205;
100P for TSP Metran-206.

Rated value $W_{100}=1.3910$.

Tolerance class: A, B.

Wiring diagram:

2-, 3- or 4-wire for one SE.

2- or 3-wire for two SE;

Temperature range:

-50...500°C (for tolerance class A);

-200...500°C, -50...200°C (for tolerance class B).

Ingress protection: IP65 per GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C with relative humidity up to 98% at 35°C.

Verificaton interval: one year, verification procedure conforms to GOST 8.461.

Average life time: 5 years.

Warranty period: 18 months from the date of commissioning.

Material of connection head: Technamid® polyamide A-SV30-L (Fig.1-3).

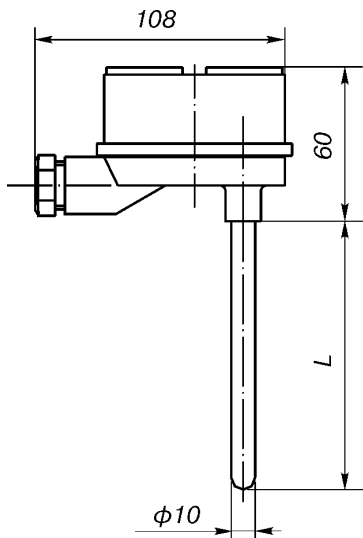


Fig.1.

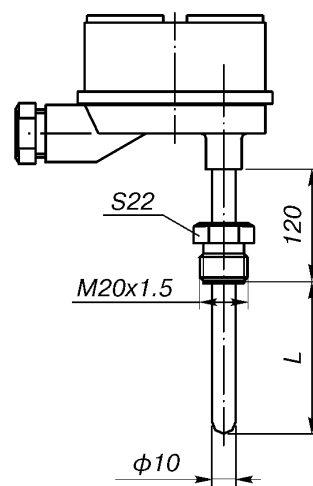


Fig.2 (also refer to Fig.1).

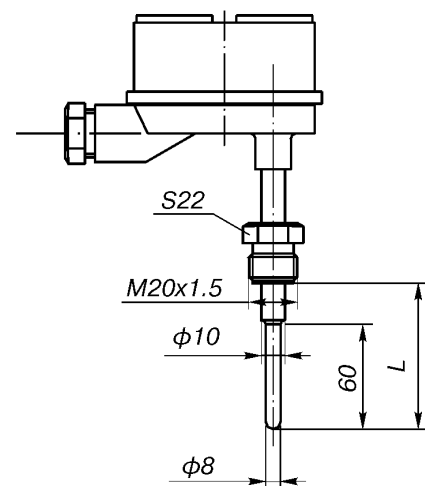


Fig.3 (also refer to Fig.1).

Material of connection head: aluminum alloy (Fig. 1a-3a, 1b-3b).

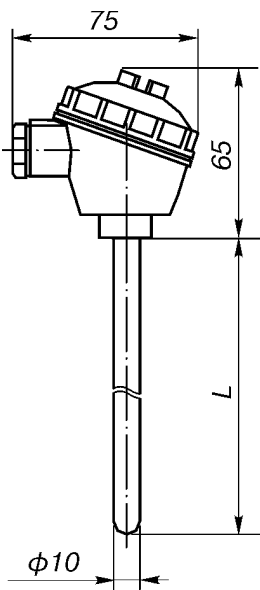


Fig. 1a.

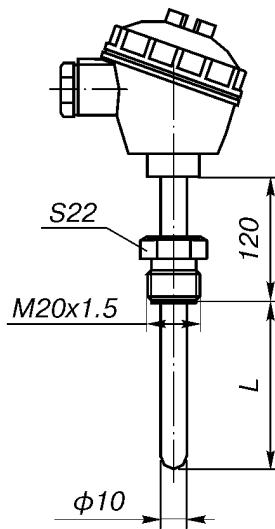


Fig. 2a (also refer to Fig. 1a).

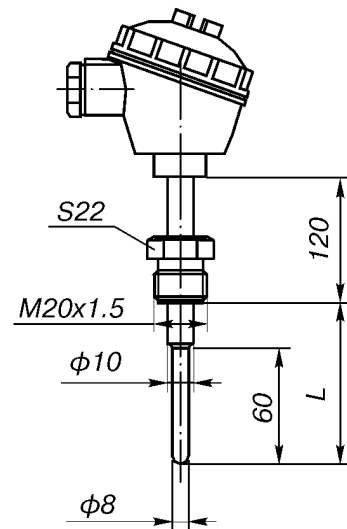


Fig. 3a (also refer to Fig. 1a).

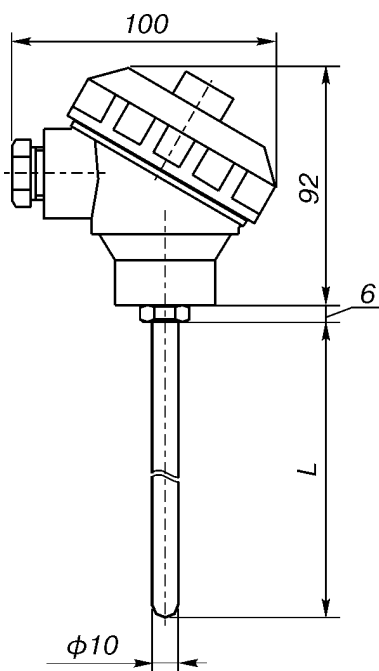


Fig. 1b*.

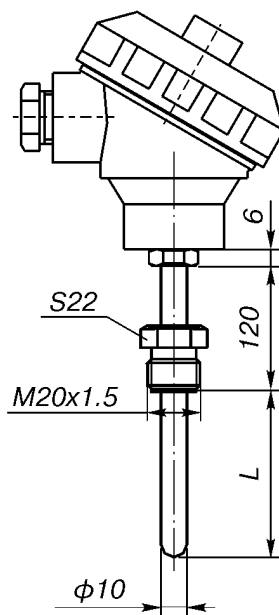


Fig. 2b* (also refer to Fig. 1b).

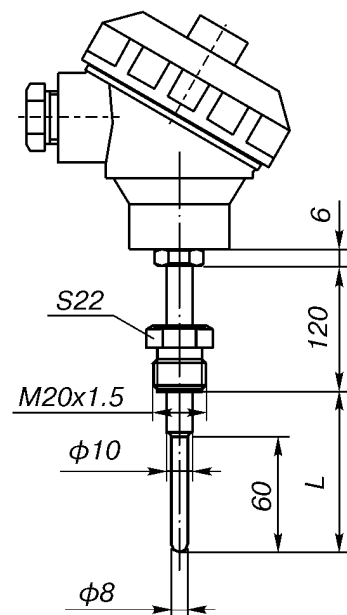


Fig. 3b* (also refer to Fig. 1b).

* For TSP Metran-205/206 with wiring 2x3.

Temperature Range, Tolerance Class, Wiring Diagram, Number of Sensing Elements, Sensor Length (for Fig. 1, 2, 3; 1a, 2a, 3a; 1b, 2b, 3b).

Table 1

Fig.	Temperature Range, °C	Tolerance Class	Wiring Diagram	Number of Sensing Elements	Sensor Length L, mm*
1, 1a	-50...500	A	3, 4	1	120...2000
	-200...500	B			
	-200...500	B	2	1, 2	120...800
1, 1a	-50...200	B	2, 4	1	120...2000
1, 1b			3	2	
1, 1a			2	2	120...1250
2, 2a	-50...500	A	3, 4	1	60...3150
	-200...500	B			
	-200...500	B	2	1, 2	60...630
2, 2a	-50...200	B	2, 4	1	60...3150
2, 2b			3	2	
2, 2a			2	2	60...1250
3, 3a	-50...500	A	3, 4	1	100...3150
	-200...500	B			
3, 3a	-200...500	B	2	1, 2	100...630
			2, 4	1	
3, 3a	-50...200	B	2	2	100...1250
3, 3b			3		

* Sensor length is selected from standard sensor lengths: 60, 80, 100, 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150 mm.
For 2-wire wiring diagram, sensor length L is not over 800 mm.

Material of connection head:

- Technamid polyamide A-SV-30-L (Fig.6);
- AK12 aluminum alloy (Fig.7).

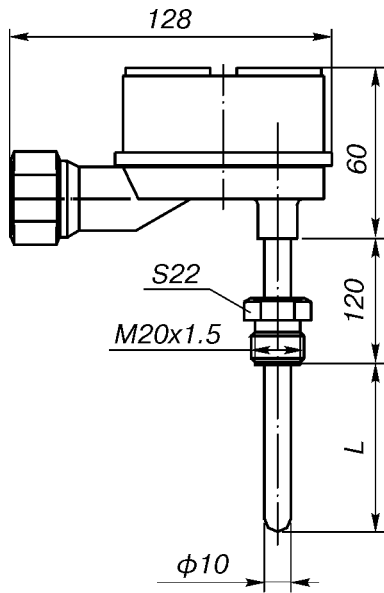


Fig.6**.

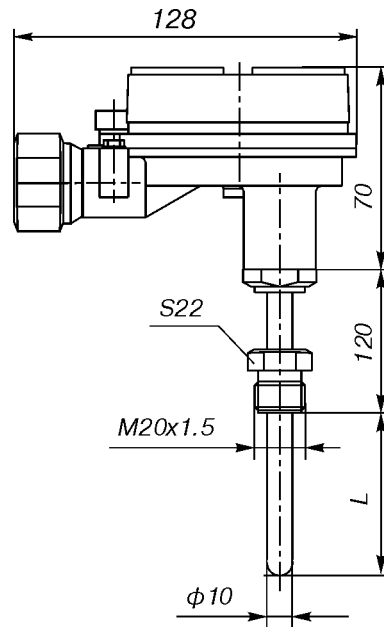


Fig.7**.

** Version with connecting pipe of cable entry with internal cylinder thread G3/4" (refer to Fig.8).

Temperature Range, Tolerance Class, Wiring Diagram, Number of Sensing Elements, Sensor Length (for Fig. 6, 7)

Table 2

Fig.	Temperature Range, °C	Tolerance Class	Wiring Diagram	Number of Sensing Elements	Sensor Length L, mm*
6, 7	-200...500	B	2	1	60...630
			3		60...3150
			4		
	-50...500	A	3	1	60...3150
			4		
	-200...500	B	2	2	60...630
	-50...200		2	1	60...800
			4		60...3150
			2	2	60...800
	3		60...2000		

* Sensor length is selected from standard sensor lengths: 60, 80, 100, 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150 mm.

Cable Entry with Internal Cylinder Thread G3/4 (Fig.8)

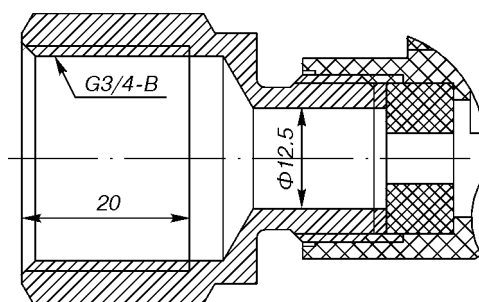


Fig.8.

Material of Protection Tube

Table 3

Material	Code of Material
12Cr18Ni10Ti	N10
10Cr17Ni13Mo2Ti	N13

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 4

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1	0.4	40	V1
2, 6, 7	10	40	
3	6.3	20	

Application: TSP Metran-205, TSP Metran-206 (Fig.4) are designed to measure temperature of air in various premises.

Number of sensing elements: 1.

Sensor type: 50P for TSP Metran-205, 100P for TSP Metran-206 ($W_{100}=1.3910$).

Tolerance class: B, C.

Wiring: 4-wire.

Temperature range: -50...150°C.

Thermal inertia: not over 20 s.

Material of protection tube: 12Cr18Ni10Ti Steel (code of material N10).

Material of head: ABS plastic.

Ingress protection: IP65 GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C with relative humidity up to 98% at 35°C.

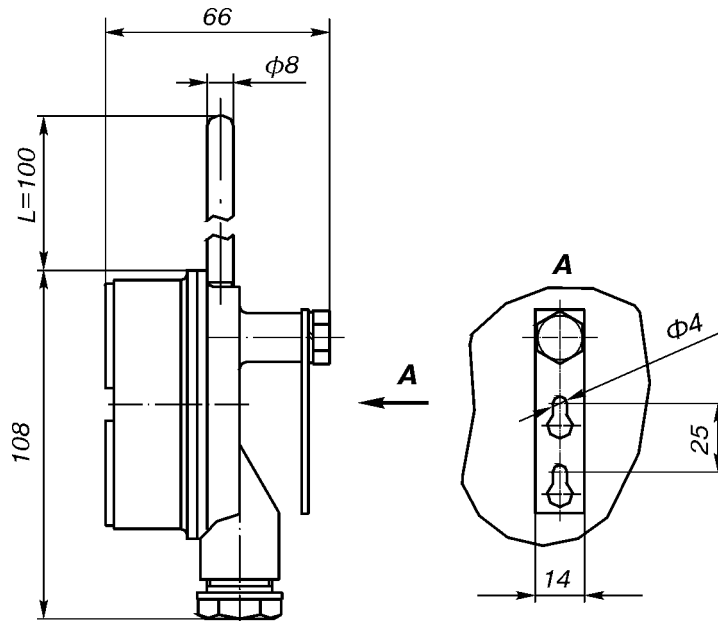


Fig.4.

ORDERING INFORMATION

TSP Metran-206 - 03 - 320 - A - 3 - 1 - N10 - (-50...500)°C - U1.1 - TU... - GP

1 2 3 4 5 6 7 8 9 10 11

- | | |
|---|--|
| <p>1. RTD
 TSP Metran-205 type 50P
 TSP Metran-206 type 100P</p> <p>2. Code of protection tube*
 01 Fig.1
 02 Fig.2
 03 Fig.3
 31 Fig.1a; 1b (for 2x3 wiring only)
 32 Fig.2a; 2b (for 2x3 wiring only)
 33 Fig.3a; 3b (for 2x3 wiring only)
 04 Fig.4
 06 Fig.6
 07 Fig.7</p> <p>3. Sensor length, L, mm (Table 1, 2 and Note; Fig.4).</p> <p>4. Tolerance class (Table 1, 2)
 A tolerance class A
 B tolerance class B</p> <p>5. Wiring diagram (Table 1, 2)
 2 2-wire
 3 3-wire
 4 4-wire (for one SE)</p> | <p>6. Number of sensing elements (SE)
 1 one SE
 2 two SE</p> <p>7. Code of protection tube by material (Table 3).</p> <p>8. Temperature range (Table 1, 2)
 -50...150°C (for Fig.4 only)
 -50...200°C
 -50...500°C
 -200...500°C</p> <p>9. Climatic type (per GOST 15150)
 U1.1
 T3</p> <p>10. Specifications TU 4211-002-12580824-2002.</p> <p>11. Metrological verification
 GP verification by Gosstandart.</p> |
|---|--|

TSP Metran-226 (Pt100), TSP Metran-227 (Pt500), TSP Metran-228 (Pt1000) Platinum Resistance Temperature Detectors

Entered into the State Register of Measuring Instruments under No.26224-03, Certificate No.16720. Code of OKPO 42 1141.

Application: to measure temperature of liquids, gases and granular media that do not destroy material of protection tube.

Number of sensing elements: 1 or 2.

Sensor type: Pt100 for TSP Metran-226;

Pt500 for TSP Metran-227;

Pt1000 for TSP Metran-228;

Rated value $W_{100}=1.3850$.

Tolerance class: A, B.

Wiring diagram:

2-, 3- or 4-wire for one SE;

2- or 3-wire for two SE.

Temperature range:

-30...200°C, -30...350°C (for tolerance class A);

-50...200°C, -70...500°C (for tolerance class B).

Material of head:

ABS plastic - Fig.1, 2, 3 for temperature range up to 200°C;

Technamide® A polyamide-SV30-L Fig.1, 2, 3 for temperature range up to 350°C, 500°C;

Fig.4, 5, 6 for all temperature ranges;

AK12 alloy Fig.7-15.

Ingress protection: IP65 per GOST 14254.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C and relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Average life time: 5 years.

Warranty life: 18 months from the date of commissioning.

Sensor length, tolerance class, wiring diagram, number of sensing elements, temperature range are given in Table 1.

Table 1

Temperature Range, °C	Tolerance Class	Wiring	Number of SE	Sensor Length L, mm*					
				Fig.1,4,7,10	Fig.13,16	Fig.2,5,8,11	Fig.14,17	Fig.3,6,9,12	Fig.15,18
-70...500	B	2	1,2	120...1000		60...1000		100...1000	
		3		120...2000		60...3150**		100...3150**	
		4	1	120...800	80...500	120...500			
-30...350	A	3	1,2	120...2000	120...800	60...3150**	80...500	100...3150**	120...500
		4	1						
-50...200	B	2	1,2	120...1000		60...1000		100...1000	
		3		120...2000		60...3150**		100...3150**	
		4	1	120...800	80...500	120...500			
-30...200	A	3	1,2	120...2000	120...800	60...3150**	80...500	100...3150**	120...500
		4	1						

* Sensor length is selected from standard sensor lengths: 60, 80, 100, 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500**, 3150** mm.

** Sensor length 2500, 3150 mm is made per special order.

Material of Protection Tube

Table 2

Material	Code of Material
12Cr18Ni10Ti	N10
10Cr17Ni13Mo2Ti	N13

Material of Cable Entry Connector

(for Fig.4, 5, 6, 10, 11, 12)

Table 3

Material	Code of Material
12cr18Ni10Ti	N10
Steel 20 N6 Coating	Steel 20

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 4

Fig.	Pmax, MPa	T, s	Vs per GOST 12997
1, 4, 7, 10	0.4	30	V1
2, 5, 8, 11	10		
3, 6, 9, 12	6.3	15	
13, 16	0.4	20	
14, 17	10		
15, 18	6.3		

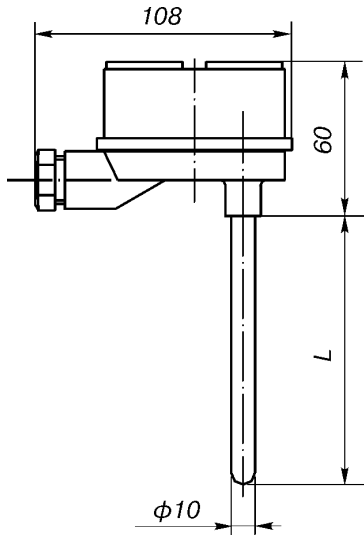


Fig. 1.

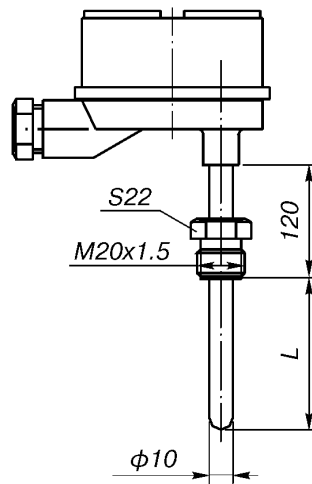


Fig. 2.

(also refer to Fig.1)

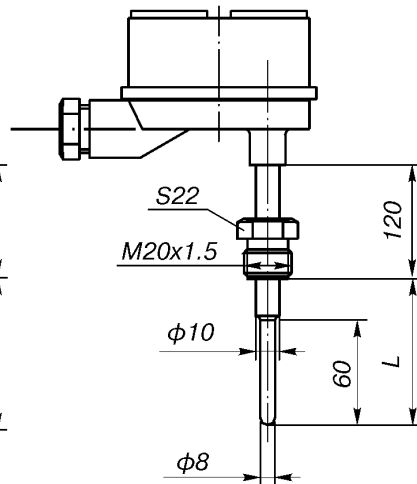


Fig. 3.

(also refer to Fig.1)

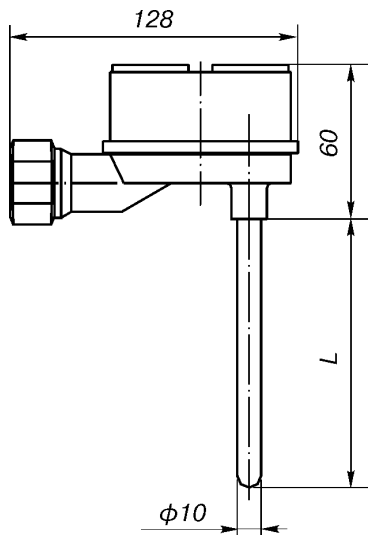


Fig. 4*.

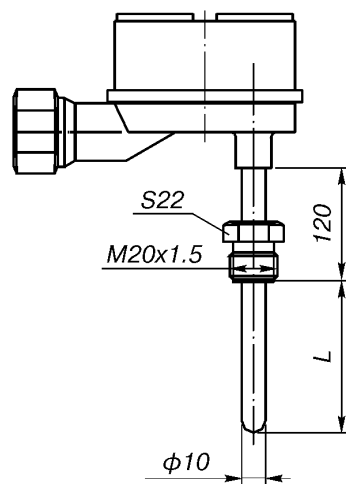


Fig. 5*.

(also refer to Fig.4)

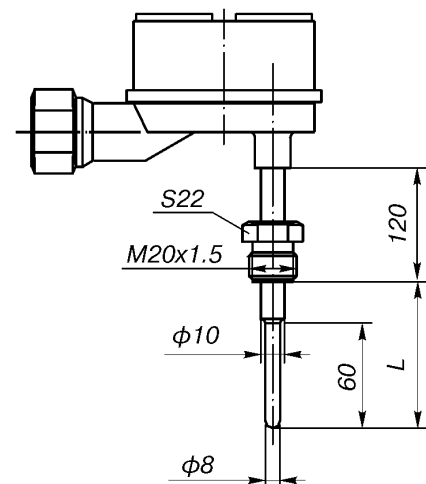


Fig. 6*.

(also refer to Fig.4)

* Version with cable entry connector with internal cylinder thread G3/4 (refer to Fig. 16).

Material of connection head: AK12 aluminum alloy (Fig.7-15).

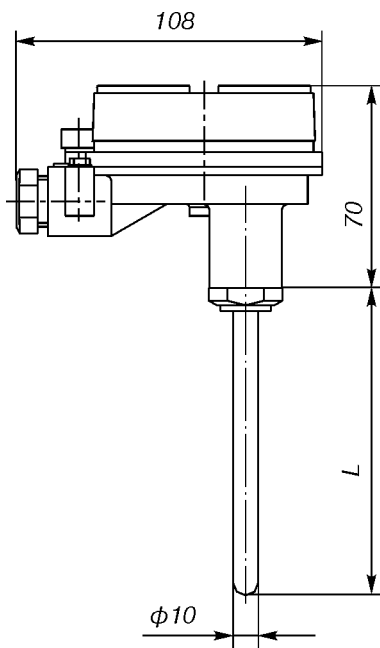


Fig. 7.

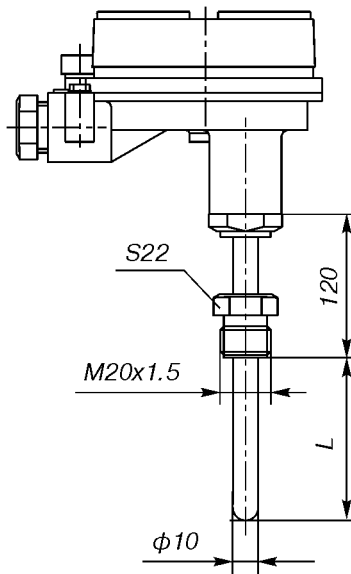


Fig. 8.
(also refer to Fig.7)

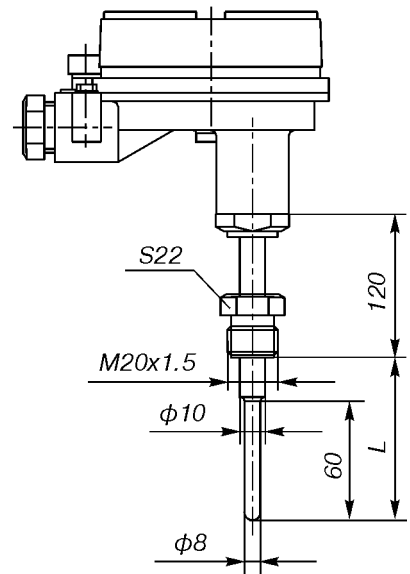


Fig. 9.
(also refer to Fig.7)

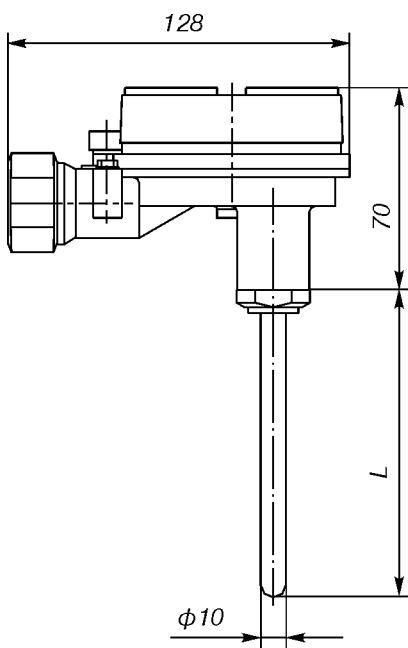


Fig. 10*.

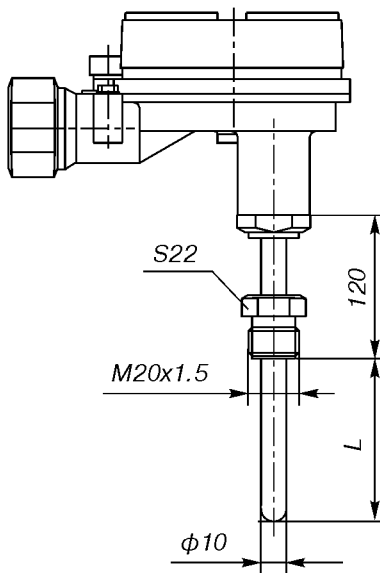


Fig. 11*
(also refer to Fig.10)

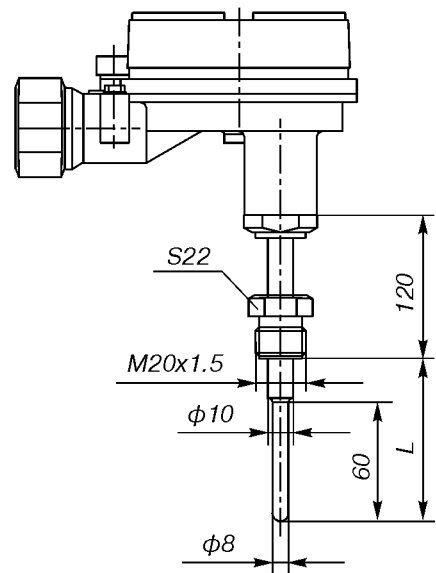


Fig. 12*
(also refer to Fig. 10)

* Version with cable entry connector with internal cylinder thread G3/4 (refer to Fig. 16).

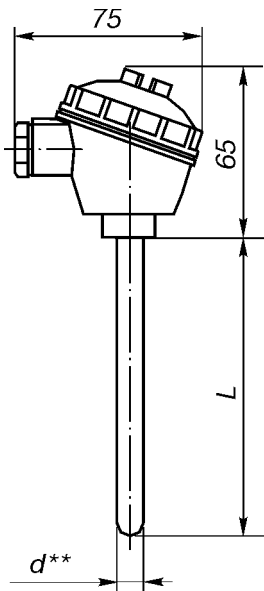


Fig. 13.

TSP Metran-226/227/228-13, -16.

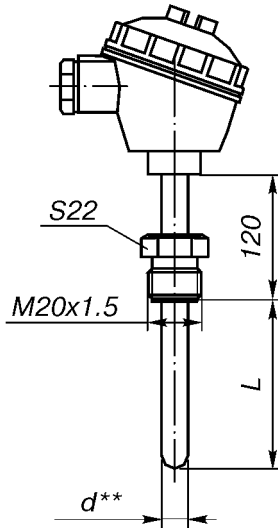


Fig. 14

TSP Metran-226/227/228-14, -17.
(also refer to Fig. 13)

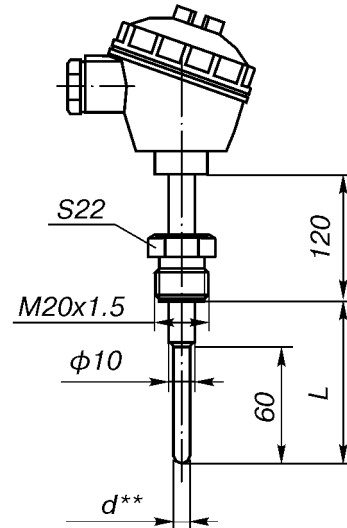


Fig. 15

TSP Metran-226/227/228-15, -18.
(also refer to Fig. 13)

Cable Entry with Internal Cylinder Thread G3/4

** Diameter of Protection Tube *d*, mm (for Fig. 13, 14, 15)

Version	<i>d</i> , mm
-13, -14, -15	6
-16, -17, -18	8

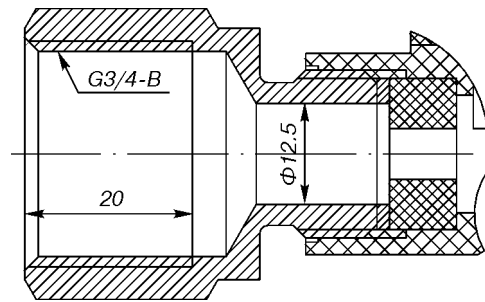


Fig. 16.

ORDERING INFORMATION

TSP Metran-226 - 05 - 400 - B - 4 - 1 - N10 - N10 - (-70...500)°C - U1.1 - TU... - GP											
1	2	3	4	5	6	7	8	9	10	11	12

1. RTD

- TSP Metran-226** type Pt100
- TSP Metran-227** type Pt500
- TSP Metran-228** type Pt1000

2. Code of protection tube

- 01** Fig. 1
- 02** Fig. 2
- 03** Fig. 3
- 04** Fig. 4
- 05** Fig. 5
- 06** Fig. 6
- 07** Fig. 7
- 08** Fig. 8
- 09** Fig. 9
- 10** Fig. 10
- 11** Fig. 11
- 12** Fig. 12
- 13, 16** Fig. 13
- 14, 17** Fig. 14
- 15, 18** Fig. 15

3. Sensor length, *L*, mm (Table 1 and Note).

4. Tolerance class (Table 1)

- A** tolerance class A
- B** tolerance class B

5. Wiring (Table 1)

- 2** 2-wire
- 3** 3-wire
- 4** 4-wire (for one SE)

6. Number of sensing elements (SE)

- 1** one
- 2** two

7. Code of protection tube by material (Table 2).

8. Code of cable entry connector by material (Table 3) - for Fig. 4, 5, 6, 10, 11, 12 only.

9. Temperature range (Table 1)

- 70...500°C**
- 30...350°C**
- 50...200°C**
- 30...200°C**

9. Climatic type (per GOST 15150)

- U1.1**
- T3**

10. Specifications TU 4211-011-12580824-2003.

11. Metrological verification

- GP** verification by Gosstandart.

TSP Metran-245 (50P, 100P), TSP Metran-246 (Pt50, Pt100) Platinum Resistance Temperature Detectors

Entered into the State Register of Measuring Instruments:

No.19982-00, Certificate No.8357 (TSP Metran-245).
No.26224-03, Certificate No.16720 (TSP Metran-246).
Code of OKPO 42 1142.

Application: to measure temperature of small-size bearings and surface of solids.

Number of sensing elements: 1.

Sensor type: 50P, 100P for TSP Metran-245;
Pt50, Pt100 for TSP Metran-246;
50P for TSP Metran-245-01, -02, -03*, -04*;
Pt50 for TSP Metran-246-01, -02, -03, -04;
100P for TSP Metran-245-01, -02;
Pt100 for TSP Metran-246-01, -02, -03, -04.

* Special order.

Rated value $W_{100}=1.3910$ for 50P, 100P; $W_{100}=1.3850$ for Pt50, Pt100.

Tolerance class: B, C.

Wiring: 4-wire.

Temperature range: -50...120°C.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Climatic type: U1.1 per GOST 15150 for ambient temperature from -45° to 60°C; T3 per GOST 15150 for ambient temperature from -10° to 60°C and relative humidity up to 98% at 35°C.

Weight: 0.09...0.3 kg depending on version.

Average life time: 5 years minimum.

Warranty life: 18 months from the date of commissioning.

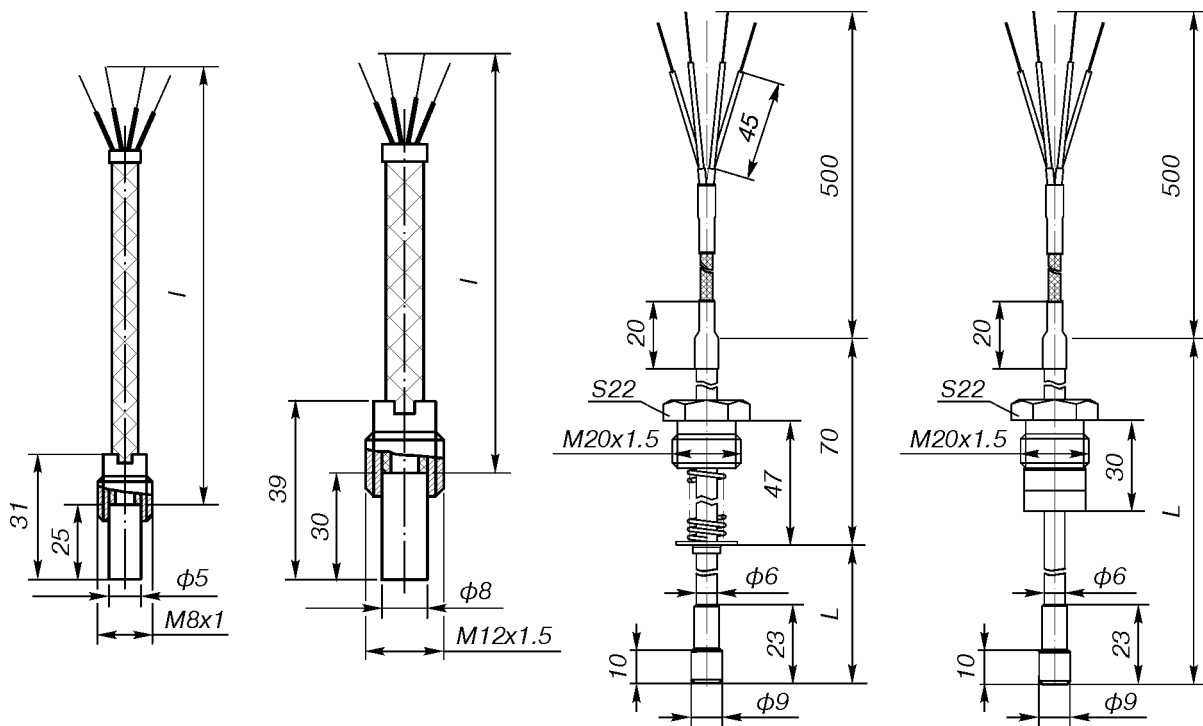


Fig.1.

Fig.2.

Fig.3.

Fig.4.

Extension Wire Length l*

Table 1

Fig.	Ingress Protection per GOST 14254	Type of Extension Wire	l, mm
1	IP65	KMM SE 0.12x4 (copper multicore cable with silicone insulation, shielded)	120...3150
2			
3, 4	IP5X	Bundle - 4 wires MS 16-13 0.12 in PML 2x4 twist	500
1			120...3150
2		Cable KSFE 4x0.35	

Select extension length l from: 120, 250, 500, 800, 1000, 1600, 2000, 2500, 3150 mm.

Standard Sensor Lengths

Table 2

L, mm	60	80	100	120	160	200	250	320	400	500
Fig.3	+	+	+	+	+	+	+	+	+	+
Fig.4	+	+	+	+	+	+	+	+	+	+

Material of Protection Tube

Table 3

Material	Fig.	Code of Material
Brass L96 or L63	1, 2	L
Brass L96 or L63 (permissible 12Cr18Ni10Ti) - for thimble φ9x23 mm; 12Cr18Ni10Ti for tube φ6 mm	3, 4	L

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibro Stability Group (Vs)

Table 4

Fig.	Pmax, MPa	T, s	Vs per GOST12997	Ingress Protection GOST 14254
1	0.1	8	F2, for frequency from 120 to 300 Hz	IP5X, IP65
2	0.1	8	F3 for frequency from 60 to 250 Hz	
3	0.4	20	V1	IP5X
4	0.4	20	V1	

ORDERING INFORMATION

TSP Metran-246(Pt100) - 01 - IP65 - 250 - C - 4 - 1 - L - U1.1 - TU... - GP										
1	2	3	4	5	6	7	8	9	10	11

1. RTD

- TSP Metran-245(50P)** type 50P
- TSP Metran-245(100P)** type 100P
- TSP Metran-246(Pt50)** type Pt50
- TSP Metran-246(Pt100)** type Pt100

2. Code of protection tube

- 01** Fig.1
- 02** Fig.2
- 03** Fig.3
- 04** Fig.4

3. Ingress protection GOST 14254

- IP5X** Fig.1, 2, 3, 4
- IP65** Fig.1, 2

4. Extension wire length l, mm (for Fig.1, 2 - Table 1) or sensor length, L, mm (for Fig.3, 4 - Table 2).

5. Code of tolerance class

- B**
- C**

6. Wiring

- 4** 4-wire

7. Number of sensing elements (SE)

- 1** one SE

8. Code of protection tube by material (Table 3).

9. Climatic type (GOST 15150):

- U1.1**
- T3**

10. Specifications

- TU 4211-002-12580824-2002 for TSP Metran-245,
- TU 4211-011-12580824-2003 for TSP Metran-246.

11. Metrological verification:

- GP** verification by Gosstandart.

TSP Metran-255 (50P) and TSP Metran-256 (100P) Platinum Explosion-proof Resistance Temperature Detector

Entered into the State Register of Measuring Instruments under No.21969-01, Certificate No.10994. Code of OKPO 42 1143. Explosion Protection Certificate for Electrical Equipment No.01.130.

Application: to measure temperature of non-corrosive and corrosive liquids and gases that do not destroy material of protection tube in hazardous areas containing ammonia, nitrogen-hydrogen mixtures, carbonic or natural gas.

Explosion protection marking: 1ExdIICT6 X.

Number of sensing elements: 1.

Sensor type: 50P for TSP Metran-255;
100P for TSP Metran-256.

Tolerance class: B.

Wiring: 2-, 3- or 4-wire.

Temperature range: -50...500°C, -50...200°C.

Material of head: AK12 alloy.

Ingress protection: IP65 GOST 14254.

Climatic type: U1.1 GOST 15150 for ambient temperature from -45° to 60°C; T3 GOST 15150 for ambient temperature of air from -10° to 60°C and relative humidity up to 98% at 35°C.

Verification interval: one year, verification procedure conforms to GOST 8.461.

Average life time: 8 years minimum.

Warranty life: 18 months from the date of commissioning.

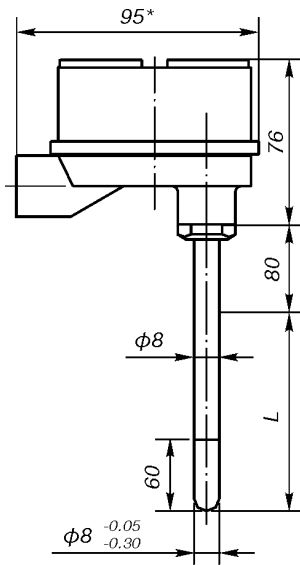


Fig. 1.

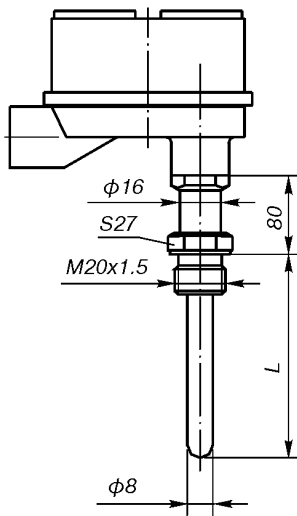


Fig.2. also refer to Fig.1
(fixed connector).

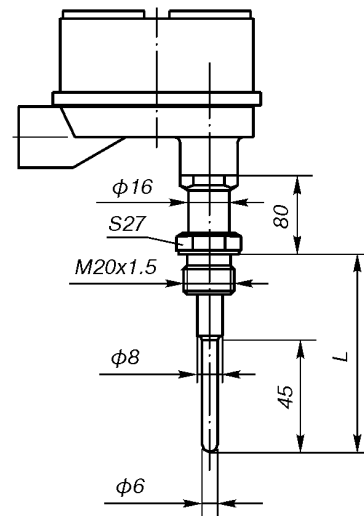


Fig.3. also refer to Fig.1
(fixed connector).

* 175 mm with mouting set for armored cable;
189 mm with mounting set for pipe mounting.

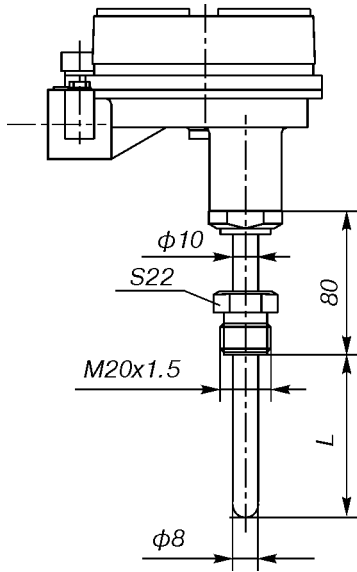


Fig.4. also refer to Fig.1 (adjustable connector).

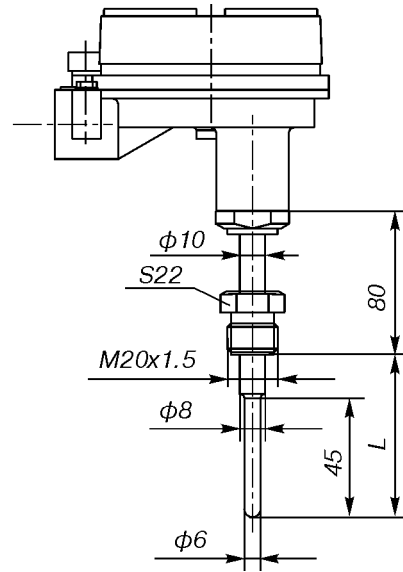


Fig.5. also refer to Fig.1 (adjustable connector).

Standard Sensor Lengths

Table 1

L, mm	60	80	100	120	160	200	250	320	400	500	630	800	1000	1250	1600	2000
Fig.1*				+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.2*, 4*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fig.3, 5			+	+	+	+	+	+								
Weight, kg	0.9			0.84-0.97				0.92-1.12				1.08-1.37				

* For 2-wire digram Fig.1 and 2, maximum length is 630 mm when temperature range is -50...500°C.

Material of Protection Tube

Table 2

Material	Code of Material
12Cr18Ni10Ti	N10
10Cr17Ni13Mo2Ti	N13

Maximum Pressure (Pmax), Thermal Inertia (T) and Vibrostability Group (Vs)

Table 3

Fig.	Pmax, MPa	T, s	Vs GOST 12997
1	1	20	V2
2, 4	16	20	
3, 5	32	8	

ORDERING INFORMATION

TSP Metran-256 - 02 - 320 - B - 2 - 1 - N10 - (-50...500)°C - BK - U1.1 - TU... - GP											
1	2	3	4	5	6	7	8	9	10	11	12

1. RTD

TSP Metran-255 type 50P
TSP Metran-256 type 100P

2. Code of protection tube

01 Fig.1
02 Fig.2
03 Fig.3
04 Fig.4
05 Fig.5

3. Sensor length, L, mm (Table 1).

4. Tolerance class

B tolerance class B.

5. Wiring

2 2-wire
3 3-wire
4 4-wire

6. Number of sensing elements (SE)

1 one SE

7. Code of protection tube by material (Table 2).

8. Temperature range

-50...500°C
-50...200°C

9. Type of mounting set for cable entry (refer to "Mounting Set for Cable Entry" Section).

BK armored cable
TB pipe mounting

10. Climatic type (GOST15150)

U1.1
T3

11. Specifications TU 4211-006-12580824-00.

12. Metrological verification:

GP verification by Gosstandart.

Set of Resistance Temperature Detectors KTSM Metran-204, KTSP Metran-206, KTSP Metran-226, KTSP Metran-227, KTSP Metran-228

Application: to measure temperature and differential temperature of water in direct and return pipe of heat supply water systems as a component of heat meters.

The set includes two RTDs.

Sensor type: 100M ($W_{100}=1.4280$) for TSM Metran-204;

100P ($W_{100}=1.3910$) for TSP Metran-206;

Pt 100 ($W_{100}=1.3850$) for TSP Metran-226;

Pt 500 ($W_{100}=1.3850$) for TSP Metran-227;

Pt 1000 ($W_{100}=1.3850$) for TSP Metran-228.

Temperature range of thermometers: 0...150°C (for KTSM), 0...180°C (for KTSP).

Differential temperature range: from 5 to 145°C.

Tolerance class of RTD: A (for TSP only), B.

Wiring: 4-wire.

Accuracy of temperature measurement, t, °C:

$\pm(0.15+0.002|t|)$ for TSP, tolerance class A;

$\pm(0.3+0.005|t|)$ for TSP, tolerance class B;

$\pm(0.25+0.0035|t|)$ for TSM, tolerance class B

Accuracy of differential temperature measurement (Δt) of "hot" and "cold" thermometer, °C:

$\pm(0.05+0.001\Delta t)$ for TSP, tolerance class A;

$\pm(0.10+0.002\Delta t)$ for TSP, tolerance class B;

$\pm(0.10+0.002\Delta t)$ for TSM, tolerance class B

W_{100} values for RTDs in the set should not differ from one another by 0.0004 as maximum.

The difference of RTDs resistance in the set should not differ from one another by 0.02% at 0°C (R0).

Material of protection tube: 12Cr18Ni10Ti.

Ingress protection IP65 GOST 14254.

Climatic type: U1.1 GOST 15150 for ambient temperature from -45° to 60°C; T3 GOST 15150 for ambient temperature from -10° to 60°C and relative humidity up to 98% at 35°C.

Verification interval: 2 years for KTSP, 1 year for KTSM.

Average life time: 5 years minimum.

Warranty life: 18 months from the date of commissioning.

Material of connection head (Fig. 1, 2):

ABS plastic for KTSM Metran-204,

Technamide® polyamide A-SV30-L for KTSP Metran-206, -226, -227, -228.

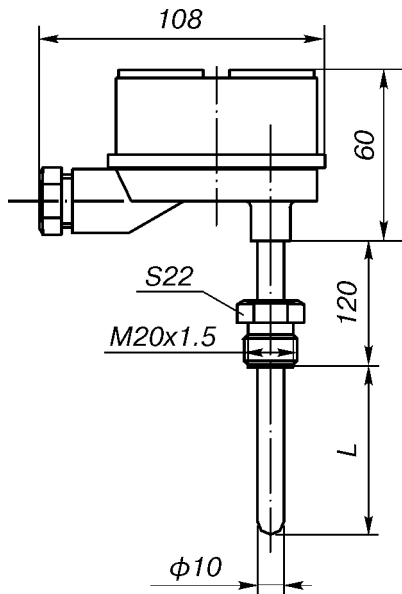


Fig. 1.

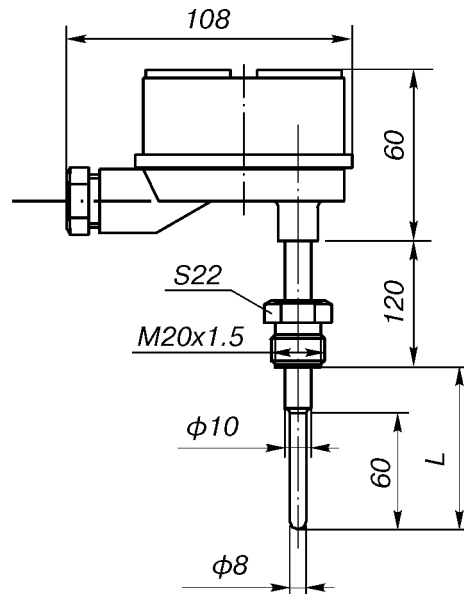


Fig. 2.

Material of connection head: aluminum alloy (Fig. 1a-2a).

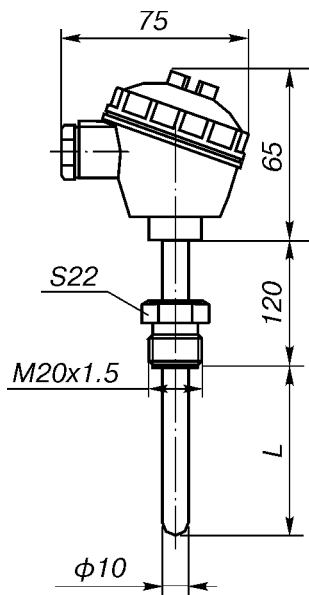


Fig. 1a.

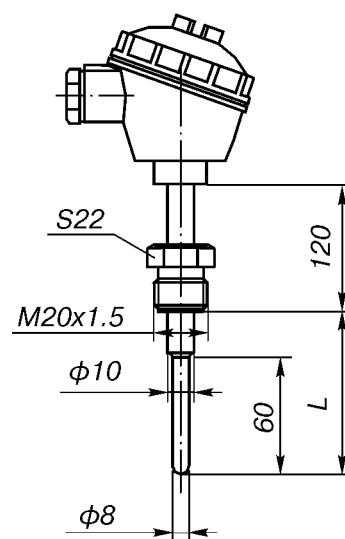


Fig. 2a (also refer to Fig. 1a).

**Maximum Pressure (Pmax), Thermal Inertia (T) and
Vibrostaibility Group (Vs)**

Table1

Fig.	Sensor Type	Pmax, MPa	T, s	Vs per GOST 12997
1, 1a	100M, 100P	10	40	V1
	Pt100, Pt500, Pt1000		20	
2, 2 a	100M, 100P	6.3	20	
	Pt100, Pt500, Pt1000		15	

Standard Sensor Lengths

Table2

L, mm	60	80	100	120	160	200	250	320	400
Fig. 1, 1 a	+	+	+	+	+	+	+	+	+
Fig. 2, 2 a			+	+	+	+	+	+	+
Weight, kg	0.4...0.45								

ORDERING INFORMATION

KTSM Metran-204 - 02 - 120 - B - U1.1 - TU... - GP

1 2 3 4 5 6 7

1. Set of RTDs

KTSM Metran-204 type 100M
KTSP Metran-206 type 100P
KTSP Metran-226 type Pt100
KTSP Metran-227 type Pt500
KTSP Metran-228 type Pt1000

2. Code of protection tube*

02 Fig.1
03 Fig.2
32 Fig.1a
33 Fig.2a

3. Sensor length, L, mm (Table 2).

4. Tolerance class

A for TSP tolerance class A

B for TSP, TSM tolerance class B

5. Climatic type (GOST 15150)

U1.1

T3

6. Specifications TU 4211-004-12580824-2001.

7. Metrological verification:

GP verification by Gosstandart.