

TPP, TPR Thermocouples

Entered into the State Register of measuring instruments under # #13701-93, 13703-93, 13320-92, 13634-93

GENERAL-PURPOSE APPLICATION

Table 1

TC Type and Version	Measured Media	Design Features
TPP/TPR-0192	Neutral and oxidizing fluid, not contacting with thermoelectrodes material and not destructive for protection fitting material	Protection fitting casing: no connector, fitting diameters D/d = 30/20 mm, metal part material: steel 12Cr18Ni10Ti / submersible part material: corundum KTVP; head material: aluminium alloy; non-hermetic to measured media. Hot junction: insulated
TPP/TPR-0192-01		Same as above, except metal part material: steel CrNi78Ti (CrNi45Al) or 15Cr25Ti/ submersible part material: corundum KTVP; (for TPR) or MKRTs (for TPP)
TPP/TPR-0192-02		Same as -01, but leakproof to measured media (hermetic seal)
TPP/TPR-0192-03		Same as TPP/TPR-0192, -01, but fitting diameters D/d = 25/15 mm
TPP/TPR-0192-04		Same as -03, but leakproof to measured media, D/d=25/15 mm
TPP/TPR-0192-05		Same as -01, but fitting diameters D/d = 34/25 mm and submersible part material: self-bonded silicon carbide SKK(d)
TPP/TPR-0192-06		Same as -05, but leakproof to measured media
TPR-0292		Same as TPR-0192, but leakproof to measured media
TPR-0292-01		Same as TPR-0292, but D/d=25/15 mm
TPP/TPR-0192-A		Same as TPP/TPR-0192, but D/d = 14/8 mm; metal part material: steel 12Cr18Ni10Ti / submersible part material: corundum KVPT;
TPP/TPR-0392		Clean air, inert gases without corrosive substances destructive for thermoelectrodes material
TPP/TPR-0392-01	Same, but thermoelectrode diameter: $\phi 0.3$ mm	

SPECIFIC-PURPOSE APPLICATION

Table 2

TPR-0492	Blast-furnace hot blow, chemically-corrosive and high-temperature media	Protection fitting casing: no connector, D/d=34/25 mm, metal part material: CrNi45Al (CrNi78Ti) / submersible part material: SKK. Hot junction: insulated. Leakproof; intensified thermoelectrode protection. Can be supplied with extra support ring if protection fitting variation is 1 mm bending
TPR-0792	Hydrogen, carbon oxide, water and higher hydrocarbons vapors, chemically-corrosive high-temperature media	Extra-strong. Casing: with M39x2 connector, head: aluminium alloy D/d=28/20 mm, metal part material: 15Cr25Ti / submersible part material: KVPT. Hot junction: insulated. Leakproof to measured media. Gas (nitrogen) boost is available to prevent hazardous substances penetration into protection fitting.

MEASURED TEMPERATURE RANGES

Measured temperature ranges:
 from 0 to 1300°C($t_{nom}=1000^{\circ}\text{C}$) for TPP,
 from 600 to 1600°C($t_{nom}=1300^{\circ}\text{C}$) for TPR;
 from 600 to 1350°C($t_{nom}=1000^{\circ}\text{C}$) for TPR-0192-05, -06;
 TPR-0492.

TC TYPE

Standard curve per GOST R 50431:
S or R for TPP;
B for TPR.

TOLERANCE CLASS

Tolerance class: **2**.

ACCURACY LIMITS

Table 3

TC Type	Accuracy Limits, $\pm^{\circ}\text{C}$	Temperature Range, $^{\circ}\text{C}$
S, R	2.4	0...600
S, R	0.004 $t^{(*)}$	600...1300
S, R (TPP-0392)	1.5	0...600
S, R (TPP-0392)	0.0025 $t^{(*)}$	600...1300
B	4	300...800
B	0.005 $t^{(*)}$	800...1600
B (TPR-0392)	2	300...800
B (TPR-0392)	0.0025 $t^{(*)}$	800...1600
B (TPR-0492)	0.005 $t^{(*)}$	300...1350
B (TPR-0192-05;-06)	4	300...800
B (TPR-0192-05;-06)	0.005 $t^{(*)}$	800...1350

$t^{(*)}$: measured temperature value.

SPECIFICATIONS, DIMENSIONS, WEIGHT

Table 4

TC Type and Version	Thermal Inertia Index, s, max	Thermoelectrode Diameters (d-d1), mm	Protection Fitting Material	Fig.	Immersion Length L (length l), mm	Weight, kg	
TPP-0192	90	0.5-0.5	KTVP corundum (part of l length); remaining part: steel 12Cr18Ni10Ti	1	500, 800, 1000, 1250, 1600, 2000 (l=400)	0.97...4.3	
TPR-0192		0.5-0.5 or 0.4-0.5					
TPP/TPR-0192-01	90	0.5-0.5/0.5-0.5 or 0.4-0.5	ceramics MKRTs for TPP, KTVP corundum for TPR (part of l length); remaining part: steel CrNi78Ti (CrNi45Al) or steel 15Cr25Ti	3	500 (400), 800 (600), 1000 (800), 1250, 1600, 2000 (l = 900)	2.4...7.5	
TPP/TPR-0192-02						2.5...7.6	
TPP/TPR-0192-03						2.0...5.7	
TPP/TPR-0192-04						2.1...5.8	
TPP/TPR-0192-05	300	0.5-0.5/0.5-0.5	self-bonded SKK silicon carbide (part of l length); remaining part: steel CrNi78Ti (CrNi45Al) or steel 15Cr25Ti	4	800, 1000, 1250, 1600, 2000 (l = 600)	4.6...8.0	
TPP/TPR-0192-06						4.7...8.1	
TPP/TPR-0192-A	90	0.5-0.5/0.5-0.5 or 0,4-0,5	KVPT corundum (part of l length); remaining part: steel 12Cr18Ni10Ti	1	320(250), 500(400), 800 (400)	0.28...0.33	
TPR-0292 TPR-0292-01		0.5-0.5 or 0.4-0.5				1250, 1600, 2000 (l = 400)	3.13...4.43
TPP-0392	5	0.5-0.5	ceramic "beads" KVPT	5	40, 50, 60, 80, 100, 120, 160, 200, 250, 320, 400, 500, 630, 800, 1000 (l = 20) 1250, 1600, 2000, 2500, 3150, 4000, 4500, 5000, 5600, 6300, 7100, 8000, 9000, 10000 (l = 50)	0.0025... 0.54	
TPR-0392		0.4-0.5				the same, from 40 to 3150	0.0025... 0.154
TPP/TPR-0392-01		0.3-0.3					
TPR-0492	500	0.5-0.5 or 0.4-0.5	self-bonded SKK silicon carbide (part of l length); remaining part: steel CrNi45Al (CrNi78Ti) to hermetic seal, remaining part: 12Cr18Ni10Ti	2	1000, 1250, 1600, 2000 (l=608)	3.5...5.0	
TPR-0792	90	0.5-0.5	KTVP corundum (part of l length); remaining part: steel 15Cr25Ti	6	630(320), 800(400), 1000(400), 1250(630), 1600 (1000)	2.5...3.5	

RESISTANCE TO EXTERNAL EFFECTS

Version according to resistance to mechanical effects: vibration-resistant, Group #2 per GOST 12997.

Version according to resistance to ambient temperature and relative humidity effects:

V4 (D3 for TPR-0492) per GOST 12997, up to t=85°C: for traditional and export versions,

T3 per GOST 15150, up to 85°C and up to 95% humidity at 35°C: for tropical version.

LEAKPROOF VERSIONS

TPP/TPR-0192-02,-04,-06, TPR-0292, TPR-0292-01, TPR-0792: leakproof to measured media, made for maximum pressure: Pmax=0.4 MPa; TPR-0492 for Pr=1.0 MPa; the other are not leakproof.

THERMOELECTRODE MATERIAL

Thermoelectrode material per GOST 10821:

for all TPP(S):

PR10 φ0.5 mm (+), PITφ0.5 mm (-);

for all TPP(R):

PR13 φ0.5 mm (+), PITTφ0.5 mm (-);

for all TPR(B):

PR30 φ0.5 mm (+), PR6φ0.5 mm (-),

PR30 φ0.4 mm (+), PR6φ0.5 mm (-);

for TPR-0192-05, -06:

only PR30 φ0.5 mm (+), PR6φ0.5 mm (-),

for TPR-0392:

only PR30 φ0.4 mm (+), PR6φ0.5 mm (-),

for TPP/TPR-0392-01:

for TPP(S) - PR10 φ0.3 mm (+) - PITφ0.3 mm (-);

for TPP(R) - PR13 φ0.3 mm (+) - PITφ0.3 mm (-);

for TPR(B) - PR30 φ0.3 mm (+) - PR6φ0.3 mm (-).

EXPECTED LIFE

Expected life: 6000 hours minimum (at t measurement=trated value),

for TPR-0492: 1500 hours minimum (at tmeas=trated value).

VERIFICATION

Interval: one year.

Verification Procedure: per GOST 8.338.

WARRANTY

Warranty period: 18 months from the date of commissioning (but within expected life limits).

Storage warranty period: 6 months maximum from the date of production.

DELIVERY SET

- Thermocouple;
- Product Data Sheet.

ORDERING INFORMATION

TPR-0192-01 - 1000 mm; B; φ0.4-0.5 mm; CrNi78Ti; V4; TU...; GP							
1	2	3	4	5	6	7	8

1. TC model type and version (Table 4).
2. Immersion length L (when required: l) per Table 4.
3. Standard curve: for TPP: S or R
for TPR: B (not obligatory to indicate).
4. Thermoelectrode diameter:
for TPR (if the diameter is not defined by sensor type) φ0.4-0.5 mm or φ0.5-0.5 mm (supplied φ0.5-0.5 mm unless otherwise specified in the order);
for TPP is defined by the type (not obligatory to indicate);
for TPP/TPR-0392-01, φ0.3-0.3 mm.
5. Material of protection fitting metal part (for TPP/TPR-0192, -0192A, -0392, -0392-01, TPR-0292, -0292-01, -0792: not indicated).
6. Climatic type:
- traditional V4 (D3 for TPR-0492);
- tropical T3.
7. Specifications:
TU 311-0226258.022-91 for TPP/TPR-0192, -01...-06, 0292, TPR-0792;
TU 311-0226253.029-92 for TPP/TPR-0392;
TU 311-0226253.028-92 for TPR-0492.
8. Metrological verification:
GP - verification by GosStandard Authorities;
P - Metrological verification by manufacturer.

OVERALL AND MOUNTING DIMENSIONS

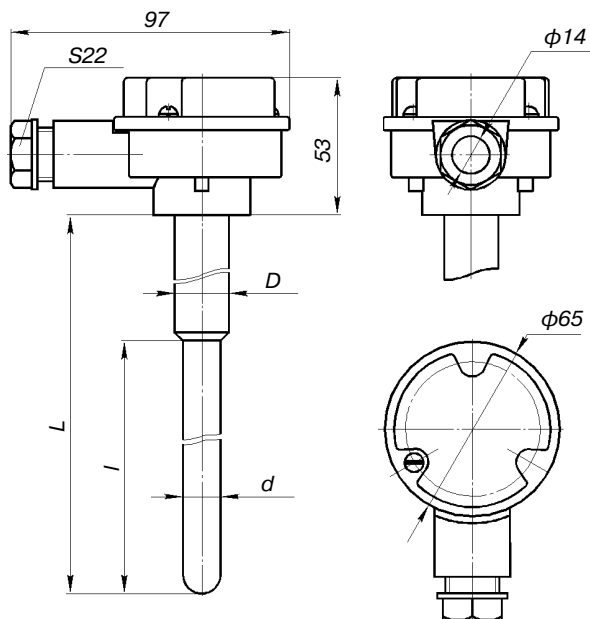


Fig. 1

TPP/TPR-0192, D/d=30/20 mm
 TPR-0292, D/d=30/20 mm
 TPR-0292-01, D/d=25/15 mm
 TPP/TPR-0192-A, D/d=14/8 mm

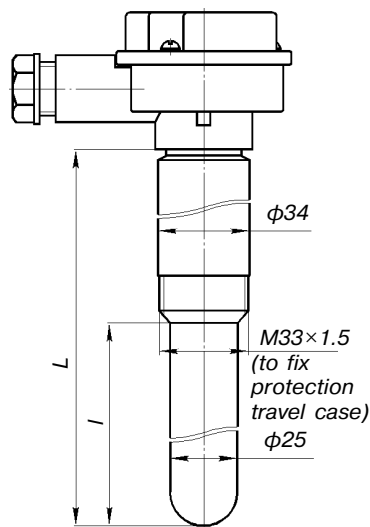


Fig. 2

TPR-0492, D/d=34/25 mm
 refer to Fig.1

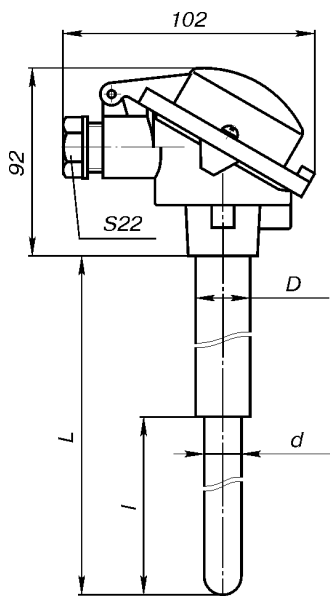


Fig. 3

TPP/TPR-0192-01, -02, D/d=30/20 mm
 TPP/TPR-0192-03, -04, D/d=25/15 mm

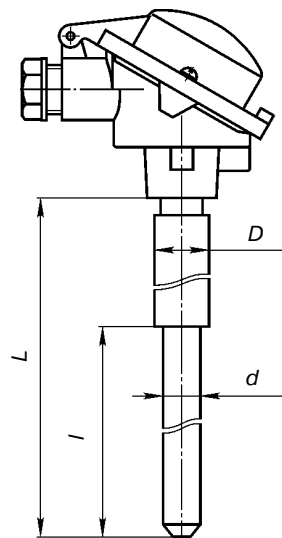


Fig. 4

TPP/TPR-0192-05; -06, D/d=34/25 mm
 refer to Fig.3

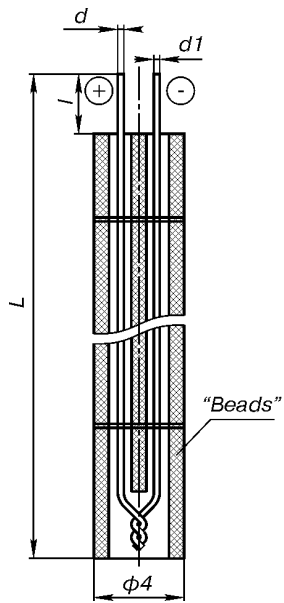


Fig.5
TPP/TPR-0392, 0392-01

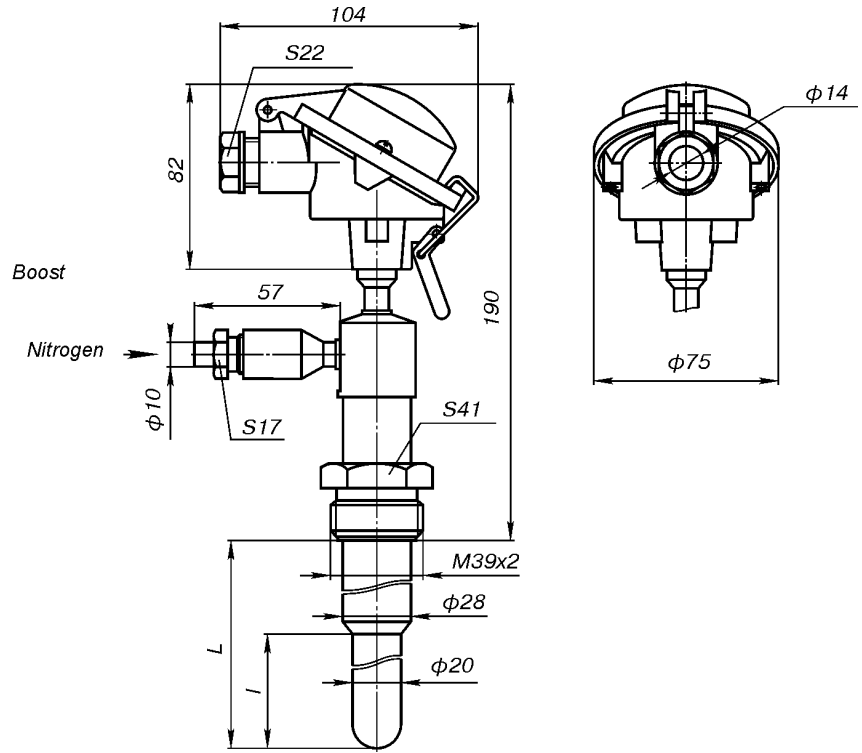


Fig.6
TPR-0792