

## II THERMOCOUPLES AND MEASUREMENT COUPLES WITH STANDARDIZED OUTPUT SIGNAL

### Thermocouples with Standardized Output Signal

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**THERMOCOUPLES WITH STANDARDIZED OUTPUT SIGNAL, TCMY-0198, TСПУ- 0198, TXAY- 0198 SERIES**

Designed to transduce temperature into unified output signal of direct current in the range of 4-20 mA or 0-5 mA.

Supply power, V: from 12 to 36

Load resistance, kOhm:  
 with output signal 4 - 20 mA up to 1,2  
 with output signal 0 - 5 mA up to 5

Ambient temperature, °C from minus 40 to 60 (70)

Type of thermocouple	Letter notation NSC	Range of temperature transduction, °C	Threshold for acceptable main composite error, %
TСПУ	50П, 100П	from minus 50 to 50 from minus 50 to 100 from 0 to 100 from 0 to 200 from 0 to 400 from 0 to 600 customized	±0,5 or other as requested by customer
TCMY	50M,100M	from minus 50 to 50 from 0 to 100 from 0 to 150 customized	±0,5 or other as requested by customer
TXAY	K	from 0 to 400 from 0 to 600 from 0 to 800 customized	±1,0 or other as requested by customer

The head of thermocouple includes a transducer ПВУ-0197 that may come as a separate product.

Thermocouples are powered from power blocks БЖ-24, БЖ-24-2, БЖ-18 or internal power block of PT-0102 controller.

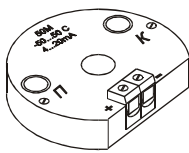
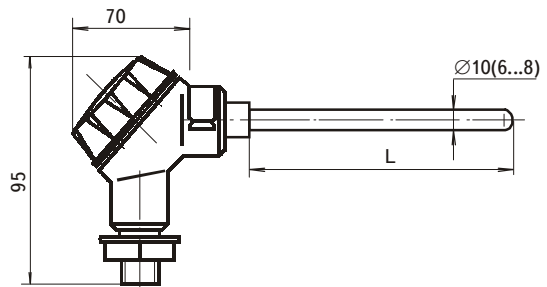
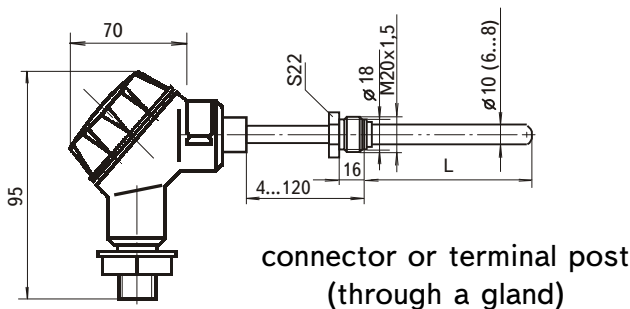


Fig 1. - ПВУ-0197



connector or terminal post (through a gland)

Fig. 3 - No-fitting option



connector or terminal post (through a gland)

Fig. 2 - Option including fitting

L = 80 - 2000mm

THERMOCOUPLES WITH STANDARDIZED OUTPUT SIGNAL  
 ТСПУ/ТСМУ/ТХАУ-0288, ТСПУ/ТСМУ/ТХАУ-0289

Designed to measure temperature by transducing temperature into a standardized output signal of DC current 4 - 20 mA or 0 - 5 mA.

Consists of primary thermocouple inside armature, into the head of which, a measurement transducer ПВ-0013 is mounted. The latter item may be supplied as a separate product.

The packaging is explosion safe ( IExdIICT6 X ) or regular.

Supply voltage, V	12 - 36
Load resistance, kOhm	
with output signal 4-20mA	up to 1,2
with output signal 0-5mA	up to 3
Threshold for acceptable value of main error, %	0,5 - 1,0
Ambient temperature, °C	from minus 40 to 70

Type of thermocouple	Letter notation NSC	Range of measured temperatures, °C	Error, %
ТСПУ-0289 ТСПУ-0288	50П 100П	from minus 50 to 50 from minus 25 to 25 from 0 to 50 from 0 to 100 from 0 to 200 from 0 to 400 customized	0,50; 0,25
ТСМУ-0289 ТСМУ-0288	50М 100М	from minus 50 to 50 from minus 25 to 25 from 0 to 50 from 0 to 100 from 0 to 150	0,50; 0,25
ТХАУ-0289 ТХАУ-0288	ХА	from 0 to 400 from 0 to 600 from 0 to 800 customized	1,00

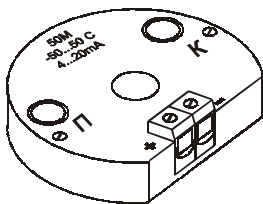


Fig. 1 -  
Thermocouples  
ПВ-0013

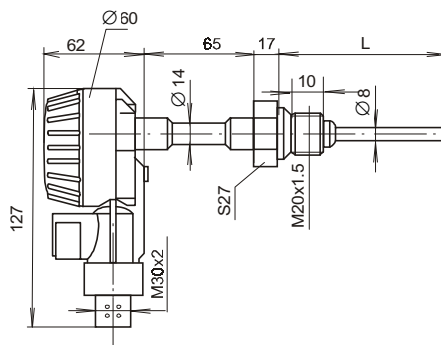


Fig. 2 -  
Thermocouples  
TXXY-0289

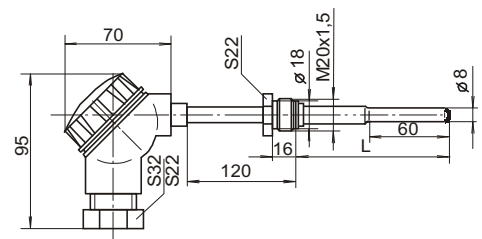


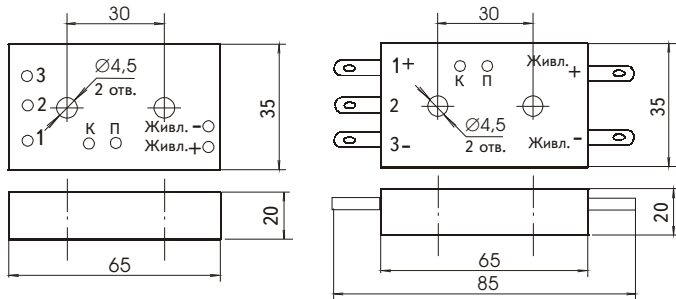
Fig. 1 -  
Thermocouples  
TXXY-0288

MEASUREMENT TRANSDUCER WITH STANDARDIZED OUTPUT SIGNAL, ПВУ-0197 SERIES  
(ТУ У 33.2-04850451-072:2006)

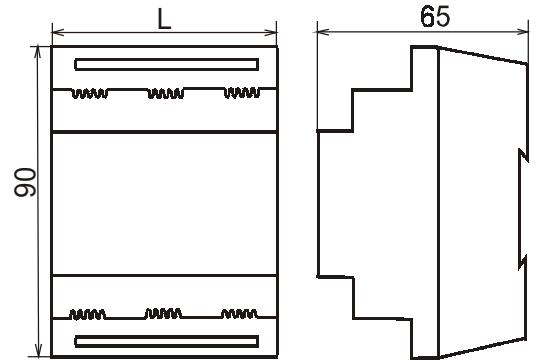
Designed to transduce signals from resistance thermocouples, thermoelectrical couples or direct current and direct voltage sources and into standardized output signal of direct voltage in the range from 4 to 20 mA.

Supply voltage	from 12 to 36 V DC
(for packaging versions 2 and 4	from 220 V AC
Load resistance, kOhm	up to 1,2
Ambient temperature, °C	from minus 40 to 60
(for transducers without galvanic connection	from minus 20 to 60)

The transducers have four packaging versions.



a – regular                      б – shakeproof  
Fig. 1 – Modular transducers



a - L=35mm                      б- L=70mm  
Fig. 2 – Transducers mountable on  
DIN rod

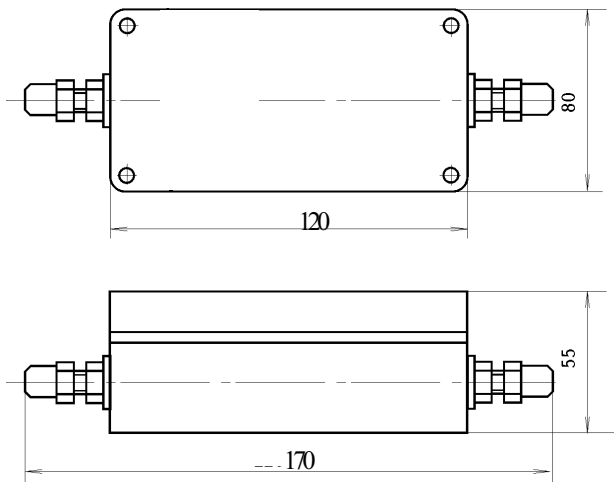


Fig. 4 – Sealed transducers

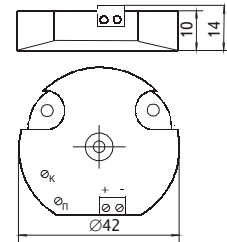


Fig. 3 – Transducers  
mountable in the thermocouple  
head.

## MEASUREMENT THERMOCOUPLE TRANSDUCER ПВ-0013

Designed to transduce signals from primary thermocouples into a standardized output signal in the ranges 4 - 20 mA, 0 - 5 mA.

Mountable into the head of a thermocouple.

Supply voltage, V

from 12 to 36

Threshold of acceptable error value, %:

for resistance thermocouples

from 0,1 to 0,25

for thermocouples

from 0,5 to 1

Ratio of output current to temperature:

for resistance thermocouples

linear

for thermocouples

non-linear

Load resistance, kOhm:

with output signal 4-20 mA

up to 1,2

with output signal 0-5 mA

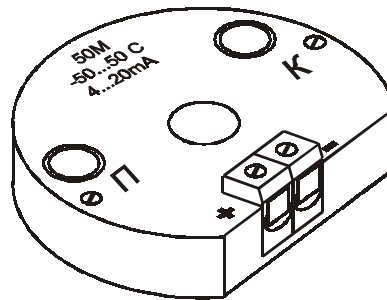
up to 3

Ambient temperature, °C

from minus 40 to 80

Size, mm

diameter 40x9



MEASUREMENT THERMOCOUPLE TRANSDUCER  
 ПБУГР-0105, ПБУГР-0205, ПБУГР-0305

Measurement thermocouple transducers ПБУГР-0105, ПБУГР-0205, ПБУГР-0305 include 16-bit ADC and microcontroller to process digital signal. Input and output are galvanically divided. The thermocouples may be mounted on a standard DIN-rod, electrical connection is implemented with the help of screw clamps. The measurement thermocouples may be programmed through SETUP option by user. Below are parameters accessible for programming:

- sensor type;
- range of input signal;
- sensor connection scheme;
- resistance of sensor connection line;
- compensation of vacant ends;
- time constant of digital filter;
- current at start of measurement range;
- current at end of measurement range;
- current at errors;
- type of input signal.

Scheme of connection for output signal:

for ПБУГР-0105	4 - 20 mA
for ПБУГР-0205	0 - 5 mA, 0 - 20 mA, 4 - 20 mA
for ПБУГР-0305	0 - 10 V

Supply voltage 12 - 36 V

Linearization of characteristics of primary thermocouples

Galvanic division between input and output circuits

Letter notation NSC, input signal	Measurement range	Threshold of main total error, %
50M, 100M, TCM гр.23	from minus 50 to 200 °C	0,25
50П, 100П, Pt 100, Pt 1000	from minus 200 to 800 °C	0,25
ТХА(K)	from minus 200 to 1300 °C	0,5
ТХК(L)	from minus 200 to 800 °C	0,5
ТЖК(J)	from minus 200 to 1100 °C	0,5
ТПП(S)	from 0 to 1700 °C	0,5
ТПР(B)	from 300 to 1800	0,5
Voltage from minus 200 - 1000 mV	from 0 to 100 %	0,5

Current through resistance thermocouple, mA	about 0,5
Resistance of connection wires	less than 25 Ohm / wire
Impact of the change of resistance in connection wires	less than 0,01 % / Ohm
Additional error due to vacant end compensation	0,5 °C / 10 °C
Resolution, °C	0,1
Minimal subrange of input signal	20 °C or 5 mV
time constant of digital filter, s	0 - 100
Output signal:	
for ПБУГР-0105	4 - 20 mA
for ПБУГР-0205	0/4 - 5/20 mA
for ПБУГР-0305	0...2/10 V
Discreteness of output, bit	12
Minimal subrange of output signal	2 mA (2 V)

