



LABOR – ASTER

INDUSTRIAL AUTOMATION



PROGRAMMABLE TEMPERATURE CONVERTER Type TP-S2

- For Pt100, Ni100 temperature sensors and „J”, „K”, „S”, „N”, „T”, „B” thermocouples or according to the order
- Digital linearization of the sensors
- Automatic or constant cold junctions compensation for thermocouples
- Programmable standards of output analog signal: 0...20mA , 4...20mA, 0...10V
- High accuracy with narrow measuring ranges
- Galvanic separation of input, output and supply circuits
- Setting parameters from by using AsSETUP program



PURPOSE

TP-S2 converts input signal from temperature sensors to standard analog signal 0÷20mA, 4÷20mA or 0÷10V. The input, output and supply circuits are mutually galvanically separated.

The transducer has high accuracy even with narrow measuring ranges through digital signal processing and high versatility – the transducer works with most temperature sensors used in the industry. For thermocouples it has an internal cold junctions compensation or constant compensation temperature.

The transducer is configured by AsSETUP program and RS232 serial port. To configure the transducer use any PC with Windows and RS232 serial port.

User can program the following parameters:

- type of sensor which transducer works with;
- lower and upper range of input signal;
- digital filter of input signal;
- standard of output signal directly or reverse;
- precise calibration of measuring range;
- enable automatic cold junctions calibration or enter a constant compensation temperature.

The transducer detects if connected sensor or measuring line is damaged and shows the maximum value of the output signal.

In the case of thermoresistance sensors it is recommended to connect the sensor with three-wire line.

BASIC TECHNICAL PARAMETERS

1. Dimensions	-	22,5x99x114,5mm
2. Mounting	-	on TS35 rail
3. Supply voltage	-	22V÷28Vdc / 80mA
4. Input signal:		
Pt100	-	-200 ... 850 °C
Ni100	-	-60 ... 180 °C
Fe-CuNi „J”	-	-150 ... 1200 °C
NiCr-Ni „K”	-	-200 ... 1350 °C
Pt10Rh-Pt „S”	-	0 ... 1750 °C
NiCrSi-NiSi „N”	-	-100 ... 1300 °C
Cu-CuNi „T”	-	-200 ... 400 °C
Pt30Rh-Pt6Rh „B”	-	0 ... 1800 °C
other types of sensors	-	on request
5. Minimal span		
for Pt, Ni	-	50°C
for thermocouples	-	200°C
6. Sensor current Pt100/Ni100	-	1,0 mA
7. Output signal		programmable
current	-	0(4)÷20mA / < 550Ω
voltage	-	0÷10V / >2kΩ
8. Output update time	-	0,25 sec.
9. Class	-	0,2%
10. Nonlinearity error	-	±0,05%
11. Ambient temperature error	-	0,005% / °C
12. Accuracy of cold junctions compensation	-	1 °C in range 0... 70 °C
13. Maximum output current	-	22mA
14. Connection of object	-	0,5 ... 1,5mm ²
15. Isolation test voltage	-	2 kV
16. Operation conditions		
a. ambient temperature	-	0 ÷ +55°C
b. relative humidity	-	up to 90%
Safety requirements	-	PN-EN 61010-1:2002
EMC requirements	-	PN-EN 61000-6-1
	-	PN-EN 61000-6-3

FUNCTIONAL DESCRIPTION

The transducer measures input signal and process it according to programmed parameters (sensor type, range, digital filtering, precise calibration of measuring channel). The controller of the transducer sets the gain and offset of the input amplifiers. On this basis, the temperature value is computed and with regard to input range analog output signal is calculated. Microcontroller sets the programmed output type and controls analog output of the transducer. The transducer is operating in 0,25 sec period, which means that the analog output is updated four times per second.

Lit of the green LED indicates the power supply and correct operating of the internal processor.

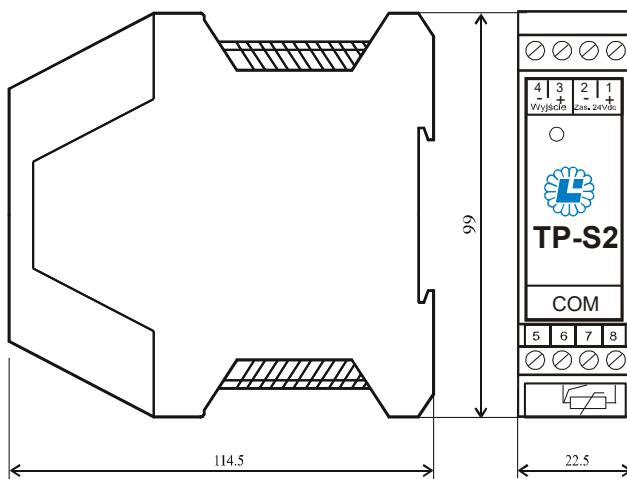
To program the parameters of the transducer use any PC equipped with serial port with program AsSETUP installed. Connect computer's RS232 port to transducer's COM connector (socket RJ11, cable sold separately: [Cable RS232 \(labor-automatyka.pl\)](#)). Supply the transducer and launch AsSETUP program.

The program allows to read the currently programmed parameters and modify them. The program should have loaded the configuration for TP-S2 transducer.

Note: the transducer checks the sending parameters. If you try to enter an incorrect value of the upper range (upper range < lower range + minimal span) the transducer automatically enters the limit value.

The design of the transducer is adapted for mounting on TS25 rail in the control cabinet.

For small input signals to reduce the impact of object interference connection cable should be shielded.



HOW TO ORDER:

TEMPERATURE CONVERTER type **TP-S2 -X**

Programmable only resistance sensors (e.g. Pt100) - R

Programmable only thermocouple sensors (e.g. „K”) - T

Programmable resistance and thermocouple sensors - RT

ORDER EXAMPLE: Programmable converter of thermocouple sensors, type: **TP-S2-T**

Production and distribution:	LABOR – ASTER
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The manufacturer reserves the right to make changes to the product. Edition 09/2022

PARAMETERS CONFIGURED IN AsSETUP PROGRAM:

For TP-S2-0 version

- Sensor type:

0 – Pt100	1 – Ni100
2 – Fe-CuNi „J”	3 – NiCr-Ni „K”
4 – Pt10Rh-Pt „S”	5 – NiCrSi-NiSi „N”
6 – Cu-CuNi „T”	7 – Pt30Rh-Pt6Rh „B”

- Upper temperature range: **0 ... 1800 °C**

- Lower temperature range: **-200 ... 1000 °C**

- Choosing measuring signal filter (time constant)

0 – no filtration	1 – 0,5 sec.	2 – 1 sec.
3 – 2 sec.	4 – 4 sec.	5 – 8 sec.
6 – 16 sec.	7 – 32 sec.	

- Analog output type:

1 – output 0...10V
2 – output 0...20mA
3 – output 4...20mA
4 – output 10...0V
5 – output 20...0mA
6 – output 20...4mA

- Top measuring signal calibration **-10,0 ... 10,0 %**

- Bottom measuring signal calibration **-10,0 ... 10,0 %**

- Cold junctions compensation:

0 – automatic internal cold junctions compensation turned ON
1...700 – constant cold junctions compensation temperature/0,1°C from range 0,1 ... 70,0°C

