

MANUAL

P5201

Universal Programmable Transmitters with Galvanic Isolation









- One type of transmitter for all regular resistance and thermocouple sensors.
- Linearized output signal 4 to 20 mA, 0 to 20 mA or 0 to 10 V according to the version.
- Accuracy up to 0.05 % of set range.
- Adjustable span 1 to 100 % of input range.
- Galvanic isolation of input from output (1000 V AC).
- Current loop supply or galvanic isolated supply 24 V DC.
- Temperature indication on optional LCD in the whole input range with 0.1 or 1 °C resolution.
- Two limit comparators and up to two switch relays.
- Adjusting by set-up unit or PC software.
- Optional RS232C interface communication.
- High immunity against interference (industrial environment).

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1. General instructions and information

1.1 Symbols used


-  - Warning symbol; for safe use proceed according to the instructions.
-  - The symbol CE approves conformity of the product with legal requirements.
-  - Symbol "Output"
-  - Symbol "Power supply"
-  - The product does not belong to public waste and it is subjected to separate collection
-  - Arrow in the upper left corner indicates, that at least one comparator is switched.

1.2 Scope of delivery

Make sure, that all parts of the delivery corresponds to the delivery note and your order:

- transmitter
- manual
- delivery note
- setup protocol

1.3 Safety cautions and warnings

 The transmitter shall be supplied from a safe voltage source that meets all requirements of the standard EN 61010-1 and installed in compliance with national requirements and standards providing safety.


The equipment may only be installed by a qualified personnel who are familiar with national and international laws, directives, standards and with the instructions manual. The instrument may not be used for other purposes than as specified in this instructions manual.

For elimination of risk of injury from electric shock or fire the maximum operational parameters of the instrument may not be exceeded, particularly range of operating temperature because of exposure to heat from connected or surrounding technological equipment must not be exceeded!

The transmitter should be installed in suitable environment without any direct sunlight, occurrence of dust, high temperatures, mechanical vibrations and shocks and protected against rain and excessive moisture.

1.4 Mounting and connection

Electrical connection can be done only by qualified personnel. Screw terminals are used to connect wires with cross-section of 0.5 to 1.5 mm².

 For version S1x and S2x, outer diameter of wires has to be in range 5 to 8 mm and the cable glands PG9 should be carefully tightened and sealed in order to maintain housing IP 55. Plugs are used to seal unused cable glands. For version H1x, outer diameter of wires is selected according to directions of the manufacturer. Version L0x to L5x is designed for rail mounting within an installation cabinet.

Transmitters are designed for continuous operation and have to be supplied from safe power supply with limited current output. If more transmitters are supplied from one power supply with high output current, then it is recommended to connect each transmitter over fuse F50 mA or suitable resistor.

The device is protected against inversion polarity of supply voltage, against short-term output overvoltage 600 W / 1 ms and against long-term input overvoltage max. 7 VDC or long-term current max. 18 mA between any inputs.

For version L4x and L5x, power supply must not be led together with input and output signals. For supply should be used separate supply cable and lead it away from the signal wires.

1.5 Description of the delivery and packing

The device is delivered in a PE bag and of micro corrugated cardboard box with thickness 2 mm. Box is provided with an identification label with a mark of the output control.

1.6 Storage

Products should be stored at temperatures from 0 to +50 °C and relative humidity up to 80 %, in places, where condensation onto the products is excluded. Products must not be exposed to any crash, shock and any action or harmful vapour and gasses.

1.7 Installation and commissioning

After connection of the mains power to the terminals, the device is ready for operation.

1.8 Operation and maintenance

The product is attendance- and maintenance-free. Recommended time period for re-calibration is 2 years.

1.9 Spare parts

Not delivered.

1.10 Repairs

Warranty and post-warranty repairs are carried out by the manufacturer. The products for repair should be sent in a packing that guarantees damping of shocks and vibrations and protects against damage during transport.

1.11 Warranty


Products are covered by a warranty for a period of 5 (five) years from the delivery date on the delivery note. In the sense of Act no. 513/1991 Coll. the manufacturer guarantees technical and operational parameters of the products within cope of the applicable documentation. Warranty period is specified with individual items and begins from the day of takeover of the goods by the purchaser or delivery to the forwarder. Any claims concerning to defects of the goods together can be filed with the seller within the warranty period and the claimed product shall be presented. The claiming party shall give identification of the product, number of the delivery note and description of the fault or defect. The seller is not responsible for any defects caused by improper storage, incorrect connection, damages caused by external effects, in particular by effects of factors with excessive values, unqualified installation, improper operation or common wearing.

1.12 Lifetime


Minimal lifetime of the device is 10 years.

2. End of service and disposal

2.1 End of service

 Dismounting and disposal of the device is possible after disconnecting of supply voltage.

2.2 Disposal

 The product does not contain any environmentally harmful parts. When disposing the packing and destroyed or irreparably damaged product proceed according to the local regulations

3. Product description

P5201 Universal Programmable Transmitters with Galvanic Isolation

- One type of transmitter for all regular resistance and thermocouple sensors.
- Linearized output signal 4 to 20 mA, 0 to 20 mA or 0 to 10 V according to the version.
- Accuracy up to 0.05 % of set range.
- Adjustable span 1 to 100 % of input range.
- Galvanic isolation of input from output (1000 V AC).
- Current loop supply or galvanic isolated supply 24 V DC.
- Temperature indication on optional LCD in the whole input range with 0.1 or 1 °C resolution.
- Two limit comparators and up to two switch relays.
- Adjusting by set-up unit or PC software.
- Optional RS232C interface communication.
- High immunity against interference (industrial environment).



3.1 Application

P5201 transmitters convert a resistance or a voltage signal from a sensor into a current, linear output signal of 4 to 20 mA, 0 to 20 mA, 0 to 10 V or other output signals within the range of standard output signal (0 to 5 mA, 1 to 6 V and others). They include up to two switch relays (depending on a version) which can be used for a limit status alarm. The limit status can be also indicated by an error current.

3.2 Description

A resistance sensor can be connected in a two-, three- or four-wire connection. Lead resistance is fully compensated by the four-wire connection. The three-wire connection must have for compensation all leads to the sensor with identical resistance values. With the two-wire connection of a resistance sensor the lead resistance can be compensated by entering a constant of resistance value in a configuration sheet with the order or by a set-up program.

A voltage sensor (a thermocouple) should be connected with a two-wire connection. A temperature compensation of cold junction can be selected in the ordering table either as internal or as external. It is done by a Pt1000A sensor which guarantees a maximum accuracy and stability of the temperature measurement. The transmitter also enables using other means for temperature compensation of cold junction (compensation box, thermostat). The compensating temperature must be then specified in the configuration sheet or configured by the set-up program.

A potentiometer position is measured in percent. The start position is 0 % and the end position is 100 % independently on the total resistance value. After consultation with the manufacturer and on certain conditions it is possible to measure also a potentiometer with value out of the specified input range. If it is necessary to measure a position of the potentiometer as resistance, it is possible to use a connection for measuring of resistance.

The input signal is converted by an A/D converter to a digital signal which is converted by a microprocessor to a primary value (temperature) according to the set parameters and then to an output current or voltage according to the set range. At the same time positions of particular comparators are calculated and particular relays are set. A version with a display indicates a primary variable in the whole input range independently on the current output status. Comparators also work both in the whole input range and independently of the set range.

Transmitters with input setting for codes R7x to R8x have firm configuration of the input circuits. The input is not universal therefore it is unable to change the code of the input setting and the code of the sensor connection by the set-up program. The other codes can be changed. Codes for input setting R7x to R8x must be specified during the order.

If the transmitter includes a relay the relay 1 is adjoined the comparator 1 and the relay 2 is adjoined the comparator 2. Each relay has one switch-on contact which can be also set as a switch-off contact by entering in the configuration sheet, by the set-up unit or by the set-up program. Positions of the comparators in transmitter error state can be chosen by the set-up unit, the set-up program or by entering in the configuration sheet. Positions of the comparators can be also indicated by the error output current, even if the comparator doesn't include a relay. For example, if you set the comparator to 200 °C for the range 0 to 100 °C the output current or voltage will have a linear increase within this range. After exceeding the range it continues to increase and it stops at approximately 20.5 mA (10.25 V). If the temperature exceeds 200 °C, the output signal will change to an error signal, which can be either above 21 mA (10.5 V) or below 3.6 mA (0 mA, 0 V). For detailed description of setting of comparators see further instructions in this manual or see configuration sheet.

Input and output circuits are galvanically isolated by a transformer. Supply circuit of L4x and L5x versions is galvanically isolated from the others.

Table 1

Code of input setting	Configuration of input	Linearization standard	Input range	Minimal span	Digital accuracy	Display resolution	units
R01	Resistor		0 to 400 Ω	4	0.08	0.1	Ω
R02	Resistor		0 to 4000 Ω	40	0.8	1	Ω
R03	Potentiometer max. 400 Ω		0 to 100 %	1	0.1	0.1	%
R04	Potentiometer max. 4000 Ω		0 to 100 %	1	0.1	0.1	%
R05	Voltage		-15 to 60 mV	0.75	0.02	0.01	mV
R11	Pt100	IEC 751	-200 to 850 °C	11	0.2	0.1	°C
R12	Pt500	IEC 751	-200 to 850 °C	11	0.2	0.1	°C
R13	Pt1000	IEC 751	-200 to 850 °C	11	0.2	0.1	°C
R14	Ni100	DIN 43760	-60 to 250 °C	4	0.2	0.1	°C
R15	Ni1000	DIN 43760	-60 to 250 °C	4	0.2	0.1	°C
R57	Thermocouple B	IEC 584	100 to 1000 °C 1000 to 1800 °C	18 1	3 1	1	°C
R58	Thermocouple E	IEC 584	-200 to 0 °C 0 to 800 °C	12	1 0.3	1	°C
R51	Thermocouple J	IEC 584	-200 to 0 °C 0 to 1000 °C	12	1 0.3	1	°C
R52	Thermocouple K	IEC 584	-200 to 0 °C 0 to 1300 °C	15	1 0.6	1	°C
R59	Thermocouple L	DIN 43710	-200 to 900 °C	11	0.5	0.1	°C
R53	Thermocouple N	IEC 584	-200 to 0 °C 0 to 1300 °C	15	1 0.6	1	°C
R54	Thermocouple R	IEC 584	-50 to 1700 °C	18	2	1	°C
R55	Thermocouple S	IEC 584	-50 to 1700 °C	18	2	1	°C
R56	Thermocouple T	IEC 584	-250 to -100 °C -100 to 400 °C	7	2 0.5	0.1	°C
R11 C8	Difference of two Pt100 (max. sum of resistors 400 Ω)	IEC 751	-200 to 850 °C	11	0.4	0.1	°C
R13 C8	Difference of two Pt1000 (max. sum of resistors 4000 Ω)	IEC 751	-200 to 850 °C	11	0.4	0.1	°C
R71 *	Current input (input resistance 1000 Ω)		-15 to 60 μA	0.75	0.02	0.01	μA
R72 *	Current input (input resistance 100 Ω)		-150 to 600 μA	7.5	0.2	0.1	μA
R73 *	Current input (input resistance 10 Ω)		-1500 to 6000 μA	75	2	1	μA
R74 *	Current input (input resistance 2.5 Ω)		-6 to 24 mA	0.19	0.008	0.01	mA
R75 *	Current input (input resistance 1 Ω)		-15 to 60 mA	0.75	0.02	0.01	mA
R81 *	Voltage input (input resistance 1 MΩ)		-250 to 1000 mV	12	0.35	1	mV
R82 *	Voltage input (input resistance 2 MΩ)		-2.5 to 10 V	0.12	0.0035	0.01	V
R85 *	Potentiometer max. 25 kΩ		0 to 100 %	1	0.1	0.1	%

Digital accuracy specifies an error of measured value at the RS232 digital output. Display of the transmitter indicates digital value rounded according to the resolution of the display.

* It is not possible to change the configuration of the input (code input setting and sensor connection).

Communication with the transmitter through the RS232C interface requires a KA-01 communication cable with a galvanic isolation. For the interface and protocol description see the data sheet No. 0406. The configuration can be done by a PC and by NPT-02 set-up program. Changing of range and calibration can be done by a simple set-up unit NJ-14 or with optional display by push-buttons on the transmitter directly in the field. Changing of parameters by the set-up unit can be disabled.

4. Product specifications

4.1 Technical specifications

Input ranges:

see table 1

Input accuracy:

see digital accuracy in table 1

Input signal:

- resistance signal of temperature sensor or potentiometer
- voltage signal of thermocouple
- voltage or current signal
- resistance signal of compensating temperature sensor (Pt1000A)

Sensor connection:

- resistance range two, three and four-wire
- voltage range two-wire
- potentiometer three or four-wire
- compensating temperature sensor

two-wire (only with external compensation version)

Maximum wire resistance for resistance ranges:

20 Ω (each connecting wire)

Current through resistance sensor:

< 0.15 mA

Output signal:

- P5201 H1x, L0x-L3x, S1x, S2x 4 to 20 mA
- P5201 L4x 0 to 20 mA
- P5201 L5x 0 to 10 V

D/A conversion error:

≤ ±0.05 % SR

Current output total error:

$$\leq \pm \left(\frac{\text{digital accuracy}}{\text{SR}} \times 100 + 0.05 \right) [\%]$$

Transfer function:

linear with temperature or linear with input variable, other on request

Cold junction compensation error:

- internal compensation < ±0.5 °C (within range -30 to 80 °C)
- external compensation < ±0.3 °C (within range -30 to 80 °C, Pt1000A sensor)
- < ±0.7 °C (within range -50 to 150 °C, Pt1000A sensor)

Range of span setting:

±1% to ±100 % of input range span

Start setting:

within input range, see table 1

Damping (95%):

adjustable 0.5 to 60 s (4 measurements per second)

Supply voltage:

11 to 36 V DC (H1x, L0x-L3x, S1x, S2x)
 24 V AC $\pm 15\%$ (L4x, L5x)
 current consumption max 23 mA

Recommended power supply:

standard version ZS-010, ZS-011, ZS-020,

Load resistance:

$R_L [\Omega] \leq (U_N [V] - 11) / 0.022$ (H1x, L0x-L3x, S1x, S2x)
 max 500 Ω (L4x)
 min. 10 k Ω (L5x)

Galvanic isolation of input from output:

input - output 1000 V AC / 1 min
 input - supply 1000 V AC / 1 min (L4x, L5x)
 output - supply 500 V AC / 1 min (L4x, L5x)

Sensor break indication:

display indication of error code
 (H1x, L0x-L3x, S1x, S2x)
 output selectable > 21 mA or < 3.6 mA
 L4x selectable > 21 mA or < 0 mA
 L5x selectable > 10,5 V or < 0 V

Switch contact relay parameters:

max. switched voltage 150 V DC or 125 V AC
 max. switched current 1 A
 max. switched direct power 30 W
 max. switched alternate power 60 VA
 switch-on resistance <100 m Ω
 isolation: contact - other circuits 1500 V AC

4.2 Supplementary parameters

Output limit:

H1x, L0x-L3x, S1x, S2x
 signal approximately 3.8 to 20.5 mA
 L4x signal approximately 0 to 20.5 mA
 L5x signal approximately 0 to 10.25 V
 error current limit approx. 23 mA

Error Output Limits:

H1x, L0x-L3x, S1x, S2x approx. 23 mA
 L4x approx. 23 mA
 L5x approx. 11.5 V

Display (only for L2x, S2x)

4-digit LCD with sign

Effect of supply voltage:

H1x, L0x-L3x, S1x, S2x $\leq \pm 0.002\%$ of span / V
 L4x, L5x $\leq \pm 0.01\%$ of span / V

Effect of ambient temperature:

$\leq \pm 0.05\%$ SR / 10 °C

Effect of ambient temperature:

$\leq \pm 0.05\%$ SR / 10 °C

Effect of wire resistance for resistance ranges:

two-wire connection
 can be compensated by constant value
 three-wire connection
 no effect with identical values of wire resistance
 four-wire connection
 no effect with specified wire resistance range

Effect of sensor inner resistance for voltage input:

≤ 0.004 mV / 1 k Ω (for code R05)

Long-term stability:

$\leq \pm 0.1\%$ SR / 2 years

EMC (Electromagnetic compatibility):

according to EN 61326-2-3

SR ... Span of set range

4.3 Operating conditions

Transmitters must be powered by safe power supplies. They are protected against reversing of polarity and peak voltage overload. Their input and output circuits are not galvanically isolated, therefore with powering of more transmitters from a common power supply it is necessary that connected sensors and cables have a high insulation resistance. However, with this type of connection it is recommended to insert a galvanic isolation into supply circuits. If the power supply is designed for a higher load current (>100 mA) it is recommended to insert FAST 50mA fuse or a current-limiting resistor into supply circuits.

Operating temperature:

P5201 H1x, L0x, L1x, L3x, S1x -40 to 85 °C
 P5201 L2x, S2x -10 to 55 °C
 P5201 L4x, L5x -30 to 60 °C
 Pt1000A compensating resistor -50 to 150 °C

Humidity:

P5201 H1x 0 to 100 % rh with condensation
 (after headmounting)
 P5201 L0x, L1x, L2x, L3x, L4x, L5x
 5 to 95 % rh
 P5201 S1x, S2x 0 to 100 % rh with condensation

Elevation:

up to 2000 m above sea level

4.4 Other parameters

Housing:

P5201 H1x IP 40, terminals IP 00
 (after headmounting according to the head)
 P5201 L1x, L2x IP 40, terminals IP 20
 P5201 L2x, S2x IP 55

Weight:

P5201 H1x 40 g
 P5201 L0x, L1x, L4x, L5x 80 g
 P5201 L2x, L3x 180 g
 P5201 S1x, S2x 250 g

Material of boxes:

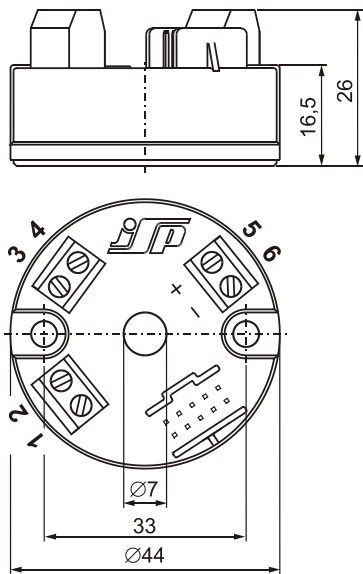
Polycarbonate

Warranty:

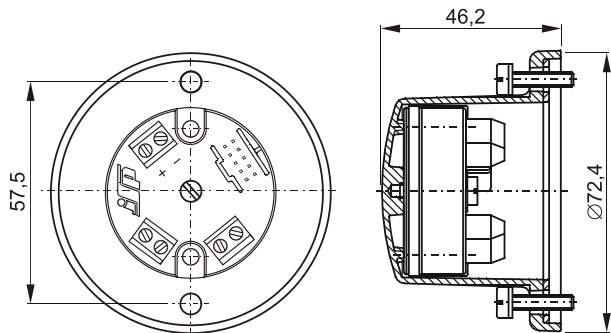
5 years

4.5 Dimensional drawings

Version P5201 H10, H11



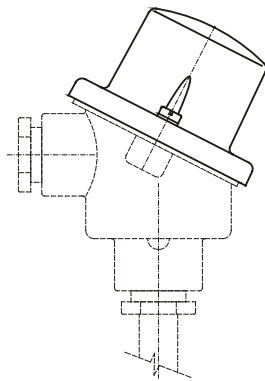
P5201 H10, H11 in cap VH1 for head form B acc. to DIN
(mounting bolts M5 for pitch 57 to 58 mm)



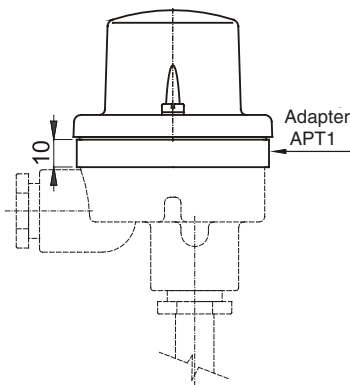
Screw terminals are used for connection of wires with cross-section 0.5 to 1.5 mm².

Installation of P5201 H1x in cap VH1 for different types of heads

oblique head



Straight head with asymmetric position of terminal board

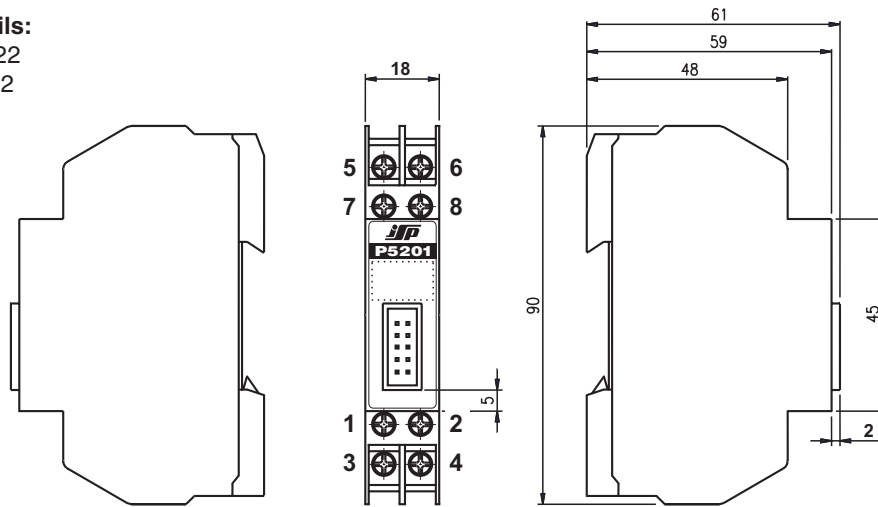


Universal Programmable Transmitters with Galvanic Isolation P5201

Version P5201 L0x, L1x, L4x, L5x

Appropriate mounting rails:

- 35 x 27 x 7.5 mm EN 50022
- 35 x 24 x 15 mm EN 50022
- 35 x 27 x 15 mm
- 32 mm EN 50035 G-32



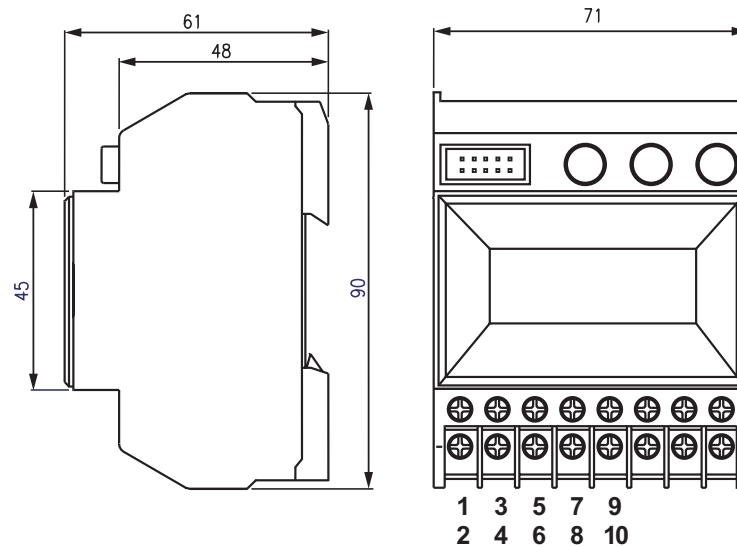
Screw terminals are used for connection of wires with cross-section 0.5 to 1.5 mm².

version P5201 L2x, L3x

(version L3x is without display and buttons)

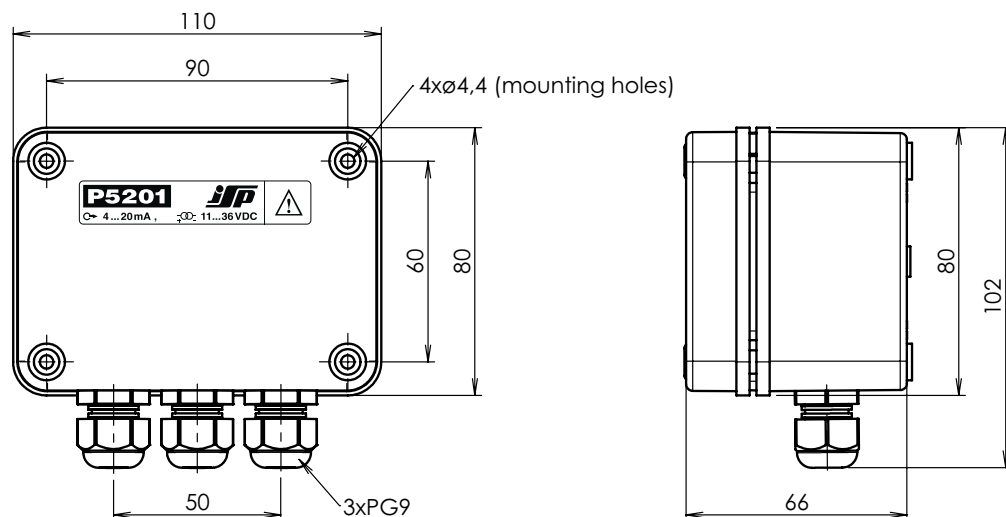
Appropriate mounting rails:

- 35 x 27 x 7.5 mm EN 50022
- 35 x 24 x 15 mm EN 50022
- 35 x 27 x 15 mm
- 32 mm EN 50035 G-32



Screw terminals are used for connection of wires with cross-section 0.5 to 1.5 mm².

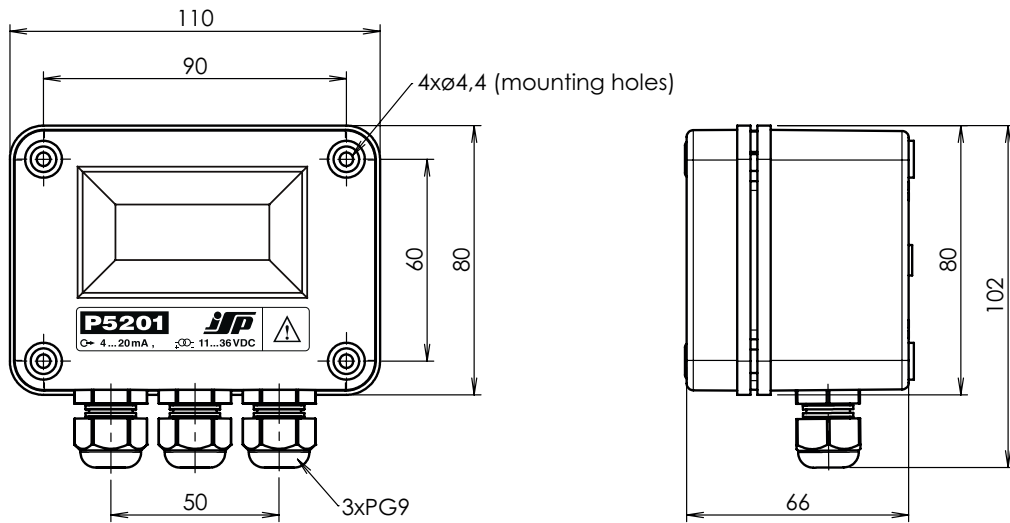
Version P5201 S1x



Screw terminals are used for connection of wires with cross-section 0.5 to 1.5 mm²

Universal Programmable Transmitters with Galvanic Isolation P5201

Version P5201 S2x



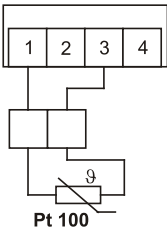
Screw terminals are used for connection of wires with cross-section 0.5 to 1.5 mm²

5. Installation and operation instructions

5.1 Electrical connection

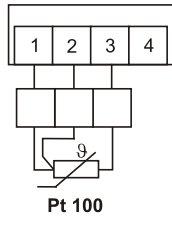
Input connection

Two-wire Connection of Resistance Sensor (Code C1)

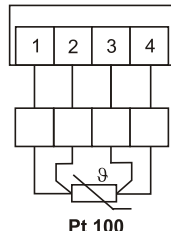


Possibilities of Wire Resistance Compensation: Enter total wire resistance R_t (included in the set-up program or in the configuration sheet).

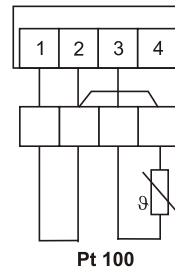
Three-wire Connection of Resistance Sensor (Code C2)



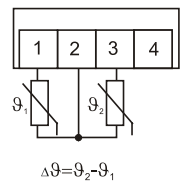
Four-wire Connection of Resistance Sensor (Code C3)



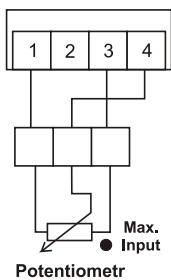
Three-wire Sensor Connection with Compensating Loop (Code C2)



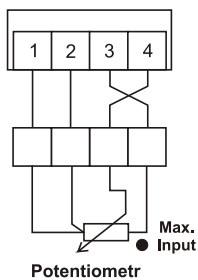
Temperature Difference of Two Two-wire Resistance Sensors (Code C8)



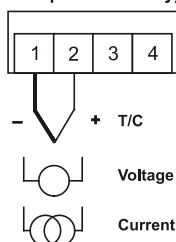
Potentiometer Connection without Lead Resistance Compensation (Code C4)



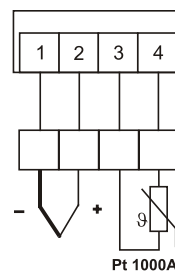
Potentiometer Connection with Lead Resistance Compensation (Codes C3, C5)



Voltage sensor or T/C Connection (Codes C6, C7) (Version with Internal Compensation Only)

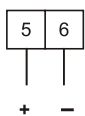


T/C Connection with External Cold Junction Compensation on Auxiliary Terminal Board (Code C7) (Version with External Compensation Only)



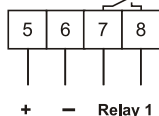
Output, supply and relay connection

5201 H1x, L0x



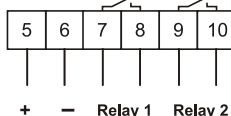
Output signal 4 to 20 mA
Supply from current loop

P5201 L1x



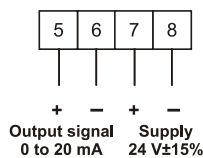
Output signal 4 to 20 mA
Supply from current loop

P5201 L2x, L3x, S1x, S2x

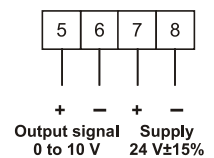


Output signal 4 to 20 mA
Supply from current loop

P5201 L4x



P5201 L5x



6. Setup of the transmitter

6.1 Setup of the transmitter with display

There are three buttons on the transmitter with display or on the set-up unit. Their function is as follows:

- Button ← setting mode menu entry
value setting entry
- Button → next menu item
scrolls to the next figure to the right
- Button ↑ previous menu item
increases number by 1

First press and hold the button ← for 2 s. On display will appear flashing SEP. After the button is released, first menu item appears. It is possible to scroll through the menu by other two buttons →, ↑. During the setup is not possible to use serial communication.

Menu items are as follows:

- 'LO' lower range value
- 'HI' upper range value
- 'LO-E' correction of lower range value
- 'HI-E' correction of upper range value
- 'dp','DP' damping time constant and selection of error reporting by means of error output current
- 'End' end and exit from setup menu

Other items are active, only if comparators are permitted:

- 'SL-1' switching level - comparator 1
- 'HS-1' hysteresis of switching level - comparator 1 and idle position selection of comparator 1
- 'SL-2' switching level - comparator 2
- 'HS-2' hysteresis of switching level - comparator 2 and idle position selection of comparator 2

Choose the item to be changed, and then press the button ←. A numerical value appears, and first digit flashes. The value is possible to change by digits using the buttons →, ↑. The sign of number changes when you shift the flashing digit to the first place on the left using the button →. In this manner, the number changes for negative number; repeating the whole procedure changes the number for positive number. It is important to pay attention to the number sign as it often causes wrong setting of the transmitter.

All set points are displayed in the same form and with the same units as the measured physical variable, except for damping value. This value is displayed in the form xxx.x.

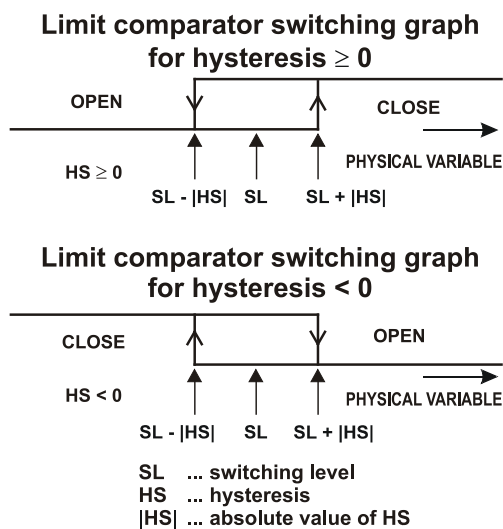
If no error occurs during setup, the set value is stored in EPROM memory in the transmitter after pressing the button ← (see Transmitter Error Messages).

The lower range value, upper range value and switching level of comparators are limited by the boundaries of the input range. Values of sensor error at lower range value, upper range value and switching level hysteresis can be maximally 5% of the span of the input range. The minimum span of the set range is 1% of the span of the input range (see table below).

Selection of error indication of sensor connection or internal error of the transmitter should be done together with setting of damping value. Positive value of damping means high output current or voltage, negative value of damping means low (or zero) output current or voltage. When no error is reported, the value of output current ranges is in defined limits (see output limitation).

The transmitter contains two comparators. According to version, one, two, or no switching relay is assigned to comparators. The comparator state is determined by switching

level, hysteresis value, and the hysteresis sign. Closed relay contact or error current signal, or both, corresponds to closed comparator state. Relay state at power failure of transmitter is possible to select by means of the switch RELAY 1 STATE WITHOUT VOLTAGE (for relay 1). If this switch is in position 1, the relay contact during the dump period does not change its position. It means, if the relay contact was closed, it is left closed when the supply is out; if the relay contact was opened, it is left opened. In the position 2 of the switch, when the supply dump occurs, the contact relay opens; or, when opened it is left without any change. In the position 3 of the switch, when the supply dump occurs, the relay contact closes; or when closed it is left closed. The immediate switch response is possible only on condition that in previous 10 s. the position of the switch was not changed. If it is not this case, the position changes with maximum delay 10 s.



The positive value of hysteresis means that if the measured physical variable is below switching level, the comparator will be opened, if the measured variable is above the switching level, the comparator will be closed. The negative value of hysteresis means that if the measured physical variable is below switching level, the comparator will be closed; and if the measured variable is above the switching level, the comparator will be opened. The absolute value of hysteresis determines hysteresis band. The hysteresis bandwidth equals double value of hysteresis (see the graph).

6.2 Error messages

Following error messages can appear on display during operation:

Errors reported at the same time by error output current:

- 'Er-1' incorrectly connected sensor or faulty sensor
- 'Er-2' primary variable out of the input range
- 'Er-3' EEPROM error (write error)
- 'Er-4' EEPROM error (crc error)
- 'Er-5' misconfiguration (incorrect connection code)
- 'Er-6' internal error (divide by zero)
- 'Er-7' limit comparator current signaling

Errors reported only on display at configuration by the setup unit:

- 'Er11' EEPROM error (write error during editing)
- 'Er12' value out of range
- 'Er13' disallow changing transmitter configuration by the set-up unit (set by means of NPT-02, or when ordering the product.)

7. Ordering information

7.1 Ordering table

Type	Description	
• P5201	Universal Programmable Transmitter with Circuit Isolation	
Code	Version	
H1	Mounting into head form B according to DIN, supply from current loop, output 4 to 20 mA, 2 limit comparators, no switch relay	
• L0	Rail mounted transmitter, DIN rail TS 35, supply from current loop, output 4 to 20 mA, 2 limit comparators, no switch relay	
• L1	Rail mounted transmitter, DIN rail TS 35, supply from current loop, output 4 to 20 mA, 2 limit comparators, 1 switch relay	
• L2	Rail mounted transmitter, DIN rail TS 35, supply from current loop, output 4 to 20 mA, 2 limit comp., 2 switch relays, LCD disp.	
• L3	Rail mounted transmitter, DIN rail TS 35, supply from current loop, output 4 to 20 mA, 2 limit comparators, 2 switch relays	
• L4	Rail mounted transmitter, DIN Rail TS 35, isolated Supply 24 VDC, output 0 to 20 mA, 2 limit comparators, no switch relay	
• L5	Rail mounted transmitter, DIN Rail TS 35, isolated Supply 24 VDC, output 0 to 10 V, 2 limit comparators, no switch relay	
S1	Wall mounted transmitter, DIN Rail TS 35, isolated Supply 24 VDC, output 0 to 20 mA, 2 limit comparators, 2 switch relays, IP 55	
S2	Wall mounted transmitter, DIN Rail TS 35, isolated Supply 24 VDC, output 0 to 20 mA, 2 limit comp., 2 switch relays, IP 55. LCD disp.	
Code	Temperature compensation of terminal board	
• 0	Internal compensation (not for input setting R7x, R8x)	
1	External compensation (order Pt1000A in accessories.)	
Code	Input setting	
• NR	Presetting of range and input (R11 C3 RL-200 °C RH 850 °C ECH)	
• QR	Detailed customer specified setting according to configuration sheet (configuration sheet required with order)	
• R01	Resistance sensor (0 to 400 Ohm) without conversion to temperature	
• R02	Resistance sensor (0 to 4000 Ohm) without conversion to temperature	
• R03	Potentiometer (total resistance 40 to 400 Ohm, range in %, limit values 0 % and 100 %)	
• R04	Potentiometer (total resistance 400 to 4000 Ohm, range in %, limit values 0 % and 100 %)	
• R05	Voltage sensor (-15 to 60 mV) without conversion to temperature	
• R06	Difference of two resistance sensors (max. total resistance 400 Ohm)	
• R07	Difference of two resistance sensors (max. total resistance 4000 Ohm)	
• R11	Pt100 (-200 to 850 °C) with linearization	
• R12	Pt500 (-200 to 850 °C) with linearization	
• R13	Pt1000 (-200 to 850 °C) with linearization	
• R14	Ni100 (-60 to 250 °C) with linearization	
• R15	Ni1000 (-60 to 250 °C) with linearization	
• R51	Thermocouple "J" (-200 to 1000 °C) with linearization	
• R52	Thermocouple "K" (-200 to 1300 °C) with linearization	
• R53	Thermocouple "N" (-200 to 1300 °C) with linearization	
• R54	Thermocouple "R" (-50 to 1700 °C) with linearization	
• R55	Thermocouple "S" (-50 to 1700 °C) with linearization	
• R56	Thermocouple "T" (-250 to 400 °C) with linearization	
• R57	Thermocouple "B" (0 to 1800 °C) with linearization from 50 °C	
• R58	Thermocouple "E" (-200 to 800 °C) with linearization	
• R59	Thermocouple "L" (-200 to 900 °C) with linearization	
R91 ***	Other linearization for resistance sensor (0 to 400 Ohm)	
R92 ***	Other linearization for resistance sensor (0 to 4000 Ohm)	
R93 ***	Other linearization for potentiometr (R <= 400 Ohm)	
R94 ***	Other linearization for potentiometr (R <= 4000 Ohm)	
R95 ***	Other linearization for other voltage sensor (thermocouple -15 to +60 mV)	
R96 ***	Other linearization for difference of two resistance sensors (max. total resistance 400 Ohm)	
R97 ***	Other linearization for difference of two resistance sensors (max. total resistance 4000 Ohm)	
Code	Optional input setting	
R71 *	Current input -15 to 60 µA	
R72 *	Current input -150 to 600 µA	
R73 *	Current input -1500 to 6000 µA	
R74 *	Current input -6 to 24 mA	
R75 *	Current input -15 to 60 mA	
R81 *	Voltage input -250 to 1000 mV	
R82 *	Voltage input -2.5 to 10 V	
R85 ****	Potentiometer (total resistance 0.4 to 25 kOhm)	
Code	Sensor connection	For input setting
• C1	Two-wire connection of resistance sensor	R01, R02, R11-15, R91, R92
• C2	Three-wire connection of resistance sensor	R01, R02, R11-15, R91, R92
• C3	Four-wire connection of resistance sensor	R01, R02, R11-15, R91, R92
• C4	Connection of potentiometer without wire resistance compensation	R03, R04, R93, R94, R85
• C5	Connection of potentiometer with wire resistance compensation	R03, R04, R93, R94, R85
• C6	Connection of voltage or current sensor or T/C without compensation	R05, R51-59, R71-75, R81, R82, R95
• C7	Connection of T/C with compensation of terminal board temperature	R51-59, R95
• C8	Connection of two two-wire resistance sensors	R06, R07, R11-15, R96, R97
Code	Setting range	
• RL **	Start of range (fill in value and units)	
• RH **	End of range (fill in value and units)	
Code	Error current selection	
• ECL	Error current below 3.6 mA (H, L0-L3, S versions) or 0 mA (L4 version) or 0 V (L5 version) (fill in value and units)	
• ECH	Error current above 21 mA (H, L0-L4, S versions) or > 10.5 V (L5 version) (fill in value and units)	
Code	Definition of lower range value of output (special range)	
• ROL **	Start of range of output signal (L4, L5 version only) (fill in value and units)	
ROH **	End of range of output signal (L4, L5 version only) (fill in value and units)	

Universal Programmable Transmitters with Galvanic Isolation P5201

Code	Calibration
KPP5	Transmitter calibration in five equally spaced points of input range
Code	Optional accessories
Q1	Increased accuracy up to 0.05 % of factory set range
S IPZK	Earthquake-resistance, manufactured according to individual program of quality assurance
• NJ-14	Set-up unit (see data sheet No. 0325)
• USB-RS232C	Communication interface for connecting KA-01 to USB port of the PC
• NPT-02	Set-up PC program (for WIN95 And Higher), cable KA-01 (see data sheet No. 0326)
• KA-01	Communication adapter for connecting the transmitter to PC (RS232C)
• Pt1000A	Compensation resistor Pt1000 (-30 to 150 °C) for external compensation of thermocouple
• VH1	Cap for head B for mounting of transmitter (H versions)
• APT1	Adapter for straight head
5-year warranty	
Example of order:	P5201 L10 R11 C2 RL 0 °C RH 350 °C ECL P5201 L10 NR (Presetting: R11 C3 RL-200 °C RH 850 °C ECH) P5201 L10 QR (Configuration sheet No. DB345 is required with order.)

- ... Ex stock version ° ... Marked version can be dispatched up to 10 working days
- ** Fill in value and units (for ranges of potentiometr in percent)
- * Not for version Hxx, Lx0 and Sx0, It is not possible to change configuration of input and sensor connection by NPT-02 Set-up program
- *** Linearization chart in required range must be added
- **** Not for version Hx0, Lx0, Sx0; it is not possible to change configuration of input and sensor connection by NPT-02 Set-up program

JSP, s.r.o. - Czech Republic

**Company and Sales Management
Jičín**

Raisova 547, 506 01 Jičín, tel.: +420 493 760 811, fax: +420 493 760 820
e-mail: jsp@jsp.cz, <http://www.jsp.cz>

Ústí nad Labem Office

Klíšská 977/77, 400 01 Ústí nad Labem, tel.: +420 475 208 650, fax: +420 475 208 659
e-mail: jsp.usti@jsp.cz

Plzeň Office

Lobezská 15, 326 00 Plzeň, tel.: +420 377 431 112, fax: +420 377 431 115
e-mail: jsp.plzen@jsp.cz

Brno Office

Tuřanka 115, 627 00 Brno, tel.: +420 549 216 901, +420 603 521 898, fax: +420 549 216 904
e-mail: jsp.brno@jsp.cz

Praha Office

Vyskočilova 741/3, 140 00 Praha 4 - Michle, tel.: +420 241 408 404, fax: +420 493 760 820
e-mail: jsp.praha@jsp.cz

Ostrava Office

Plzeňská 18 (building of Feron), 709 65 Ostrava - Zábřeh, tel.: +420 604 628 308
e-mail: jsp.ostrava@jsp.cz

JSP Slovakia s.r.o. - Slovak Republic

**Company and Sales Management
Bratislava**

Karloveská 63, 841 04 Bratislava, tel.: +421 2 6030 1080, fax: +421 2 6030 1089
e-mail: predaj@jsp.sk, <http://www.jsp.sk>

Košice Office

Krivá 23, 040 01 Košice, tel.: +421 55 728 9811, +421 903 282 484, fax: +421 55 728 9812
e-mail: jsp.kosice@jsp.sk

**JSP SERVICE LINE
+420 605 951 061**

www.jsp.cz