

1. General information



Warning!

Protection against electrical shock

For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electrical shocks.



Caution!

Be sure to take protective measures against electrostatic discharge (ESD) when handling the devices!

Caution!

Installation of the ThermoTrans® A 20210 temperature transmitters must be performed by trained and qualified personnel only. Do not connect the device to power supply before it is professionally installed. Do not change the measurement range during operation! Be sure to observe the national codes and regulations during installation and selection of cables and lines. A two-pole circuit breaker must be installed between device and mains supply.

Information on explosion protection:

The device is a category 3 electrical apparatus for application in Zone 2. The device must be installed in a housing with IP 54 protection according to EN 60529. The specified limits for mechanical or thermal loads must be observed. Only devices designed for operation in the hazardous areas of Zone 2 may be connected.

2. Application

The ThermoTrans® A 20210 temperature transmitters provide connection possibilities for most of the common thermocouples and resistance thermometers. When a resistive sensor is connected, 2-, 3-, or 4-wire configuration is automatically recognized at device startup. Note: When the configuration is changed from 2-wire to 3-wire (or 4-wire) or from 3-wire to 4-wire, this is only recognized after device's next restart. The output signal is adjustable to 0 / 4 ... 20 mA or 0 ... 5 / 10 V. The calibrated range selection is performed using DIP and rotary coding switches. The device provides a 24 V CC power supply and galvanic 3-port isolation.

3. Configuration


Set the DIP and rotary coding switches according to the table on the housing. An example is shown on the back. **Sensor type:** Adjust the connected sensor using the switches DIP1 to DIP3. **Start value:** Adjust the numeric value (00 ... 99) using the "Start" coding switches. Adjust the factor using the switches DIP4, DIP5. A falling curve is obtained with the setting "start value">"end value". **End value:** Adjust the numeric value (00 ... 99) using the "End" coding switches. Adjust the factor using the switch DIP6. **Output signals:** Adjust the output signal using the switches DIP7, DIP8.

Caution! Important notice!

After completion of configuration you must cover the switches with the included self-adhesive polyimide tape.

4. Mounting, electrical connection

The temperature transmitters are snapped onto TS 35 standard rails and laterally fixed by suitable end brackets. See dimension drawing for terminal assignments. Conductor cross-section: 0.2 mm² ... 2.5 mm² (AWG 24-14).

 In compliance with the EU directives 89/336/EEC "Electromagnetic Compatibility" and 73/23/EEC "Low-Voltage Directive", 94/9/EC "ATEX directive" coming soon

5. Specifications

Input data RTD / R		
Sensor type (Standard)	Measurement range [°C]	
Pt100 (DIN 60751)	- 200 ... +850	
Pt 1000 (DIN 60751)	- 200 ... +850	
Ni100 (DIN 43760)	- 60 ... +180	
Connection	2-, 3- or 4-wire (automatic identification)	
Resistance range (incl. line resistance)	Temperature measurement: 0 ... 5 kΩ	
Max. line resistance	100 Ω	
Supply current	Max. 500 µA	
Line monitoring	Open circuits	
Input error limits	For resistances < 5 kΩ: ± (50 mΩ + 0.05 % meas.val.) for spans > 15 Ω	
Temperature coefficient at the input	50 ppm/K of adjusted end value (average TC in permitted operating temp range, reference temp 23 °C)	

Thermocouple input data		
Sensor type (Standard)	Measurement range [°C]	
J (DIN 60584-1)	-210 ... +1200	
K (DIN 60584-1)	-200 ... +1372	
Input resistance	> 10 MΩ	
Max. line resistance	1 kΩ	
Line monitoring	Open circuits	
Input error limits	± (10 µV + 0.05 % meas.val.) for spans > 2 mV	
Temperature coefficient at the input	50 ppm/K of adjusted end value (average TC in permitted operating temp range, reference temp 23 °C)	
Ref. junction compensation	Internal or external (Pt 100)	
Error of external reference junction compensation	Via Pt100 for T _{comp} = 0 ... 80 °C: ± (80 mΩ + 0.1 % meas.val.)	
Error of external reference junction compensation	± 1.5 °C	


Shunt voltage input data		
Input	-1000 ... 1000 mV unipolar/bipolar	
Input resistance	> 10 MΩ	
Input error limits	± (200 µV + 0.05 % meas.val.) for spans > 50 mV	
Line monitoring	Open circuits	
Temperature coefficient at the input	50 ppm/K of adjusted end value (average TC in permitted operating temp range, reference temp 23 °C)	
Overload	5 V across all inputs	

Output data		
Outputs	0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V or 0 ... 5 V, calibrated selection	
Control range	0 % to approx. 102.5% of span for 0 ... 20 mA, 0 ... 10 V or 0 ... 5 V output	
Resolution	16 bits	
Load	Current output Voltage output	
Output error limits	Current output Voltage output	
Residual ripple	< 10 mV _{rms}	
Temperature coefficient at the output	50 ppm/K of end value (average TC in permitted operating temp range, reference temp 23 °C)	
Error signaling	Output: 4 ... 20 mA: Current ≤ 3.6 mA or ≥ 21 mA (see table on back for more data)	

Transmission behavior	
Characteristic	Rising / falling linearly
Meas. rate	Approx. 3/sec
Response time t ₉₉	300 mS

Power supply	
Power supply	24 V DC (- 20%, + 25 %), appr. 1.2 W

Isolation	
Test voltage	2.5 kV, 50 Hz: Power supply against input against output
Working voltage (basic insulation)	Up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electrical shocks.
Protection against electrical shock	Safe Isolation to EN 61140 by reinforced insulation according to EN 61010-1. Working voltage up to 300 V AC/DC across all circuits with overvoltage category II and pollution degree 2. For applications with high working voltages, you should ensure there is sufficient spacing or isolation from neighboring devices and protection against electrical shocks.

Standards and approvals		
EMC	Product standard EN 61326	Class B
	Emitted interference:	Immunity to interference*:
		Industry
	* Slight deviations are possible while there is interference	
 (coming soon)	Standards: UL 508 and CAN/CSA 22.2 no. 14-95	
Explosion protection (coming soon)	ATEX Zone 2 (EN 60079-15) Class 1, Div 2 / Zone 2 (UL 1604)	

Other data	
Ambient temperature during operation	0 ... +55 °C (mounted in row) 0 ... +65 °C (spacing ≥ 6 mm)
during storage	-25 ... +85 °C
Ambient conditions	Stationary application, weather-protected Rel. air humidity 5 ... 95 %, no condensation Barometric pressure: 70 ... 106 kPa Water or wind-driven rain, snow, or hail excluded
Protection	Terminal IP 20, housing IP 40
Fastening	For 35 mm top hat rail (EN 50022)
Weight	Approx. 60 g

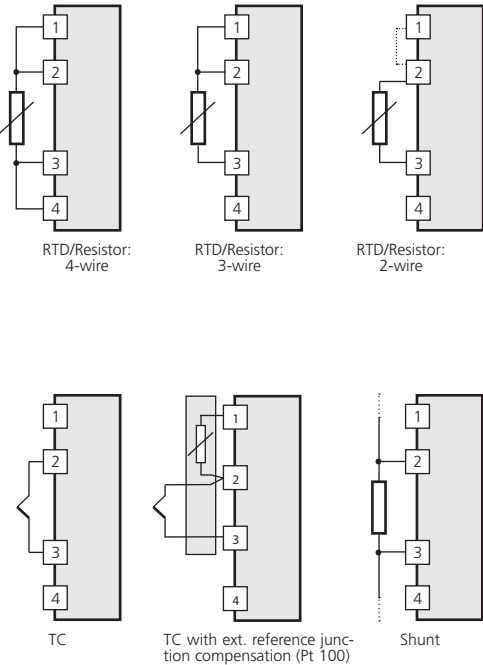
6. LED and error signaling on device

Note: Green and red LEDs flash momentarily at device startup.

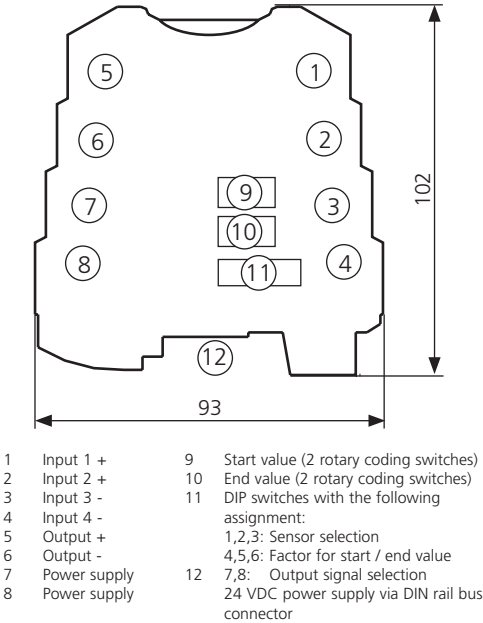
Green: Supply voltage provided
Yellow: The identified connection type is signaled once at the start of RTD measurement (2/3/4-time flashing corresponds to 2/3/4-wire measurement)
Red: Error status; LED flashing indicates error number

		Output [mA]		Output [V]	
No.	Error	4 ... 20	0 ... 20	0 ... 5	0 ... 10
1	Value below range limit	3.6	0	0	0
2	Value above range limit	21	21	5.25	10.5
3	Sensor short circuit	21	21	5.25	10.5
4	Sensor open	21	21	5.25	10.5
5	- not connected for A 20210 -				
6	- not connected for A 20210 -				
7	Identification of connection	21	21	5.25	10.5
8	Switch misadjusted	21	21	5.25	10.5
9	Parameter error	21	21	5.25	10.5
10	Device error	3.6	0	0	0

7. Input wiring



8. Dimension drawing and switching elements



9. Typical configuration

Sensor: Thermocouple type J
Range: 200 ... 1200 °C
Output signal: 4 - 20 mA

Adjust sensor type:
TC Type J: DIP1 = 1, DIP2 = 0, DIP3 = 0

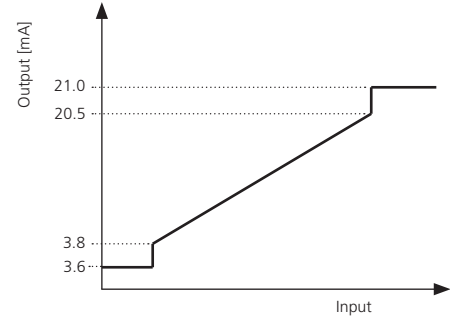
Adjust start value:
200 °C
This start value is composed of: numerical value = 20, factor = 10.
Adjust the numeric value at the coding switches (see dimension drawing, pos. 9): 20
Adjust factor 10: DIP4 = 0, DIP5 = 1

Adjust end value:
1200 °C
For end values above 1000 °C, adjust "factor 10+1000"
Adjust the numeric value at the coding switches (see dimension drawing, pos. 10): 20
Adjust factor 10+1000: DIP6 = 1 (factor 10 + 1000)

Adjust output signal:
4 ... 20 mA: DIP7 = 0, DIP8 = 1

Caution!
After completion of configuration you must cover the switches with the included self-adhesive polyimide tape.

10. Output current (4 ... 20 mA) response to out-of-range conditions



11. Order information

Model	Order No.
Temperature transmitter, adjustable	A20210P0
Order code for fixed-range models:	
A20210P0 /	
further customer-specific settings	
Output:	
A 0 ... 20 mA	
B 4 ... 20 mA	
C 0 ... 10 V	
D 0 ... 5 V	
End of range (4 digits with sign)	
Start of range (4 digits with sign)	
Input:	
P	Pt100 (-200 ... +850 °C)
Q	Pt 1000 (-200 ... +850 °C)
N	Ni100 (-60 ... +180 °C)
J	TC / J (-210 ... +1200 °C)
K	TC / K (-270 ... +1372 °C)
X	TC / J (-210 ... +1200 °C) *
Y	TC / K (-270 ... +1372 °C) *
U	U (-1000 mV ... +1000 mV)

* with ext. reference junction compensation (Pt100)

Accessories	Order No.
DIN rail bus connector: power supply bridging for 2 A20210P0 modules each	ZU 0628
IsoPower® A 20900 current supply 24 V DC, 1 A	A 20900 H4
DIN rail bus connector: tapping of supply voltage, routing to ZU 0628	ZU 0678
Power terminal block Feeding the supply voltage to the DIN rail bus connector ZU 0628	ZU 0677

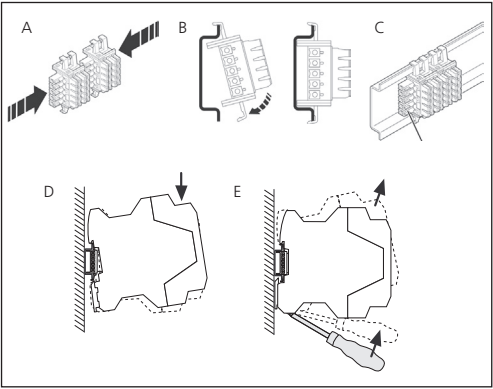


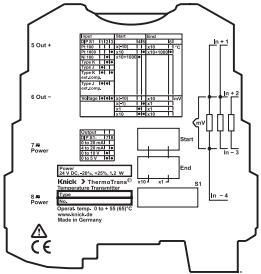
Fig.: A Mounting ZU 0628 DIN rail bus connectors in a row
B Snapping the bus connectors onto a DIN rail
C Bus connectors on a DIN rail
D Snapping a temperature transmitter onto a DIN rail
E Removing a temperature transmitter from a DIN rail

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ThermoTrans® A 20210

Temperature transmitter



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