

1. General information



Warning!
Protection against electric shock

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



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

Caution!
Installation of the PolyTrans® P 32000 universal 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.

2. Application

The PolyTrans P 32000 universal transmitters provide connection possibilities for all standard thermocouples, resistance thermometers, strain gage sensors, resistors, potentiometers, and resistive sensors.
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. Alternatively, the devices can be configured via an IrDA interface located in the upper part of the unit. The device provides a broad-range power supply and galvanic 3-port isolation.

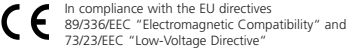
3. Configuration

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. Then 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. Then 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.
For information on configuration via IrDA interface, please refer to the instruction manual for the Paraly® 111 software.

4. Mounting, electrical connection

The standard-signal isolators are snapped onto TS 35 standard rails and are 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"

5. Functional safety according to IEC/EN 61508


The Professional Series P32000P0/1x devices can be used for monitoring safety-relevant points of measurement up to SIL2 (or SIL3 in the case of redundant configuration).
The safety-relevant characteristics and further information concerning functional safety are to be taken from the Safety Manual.

6. Specifications

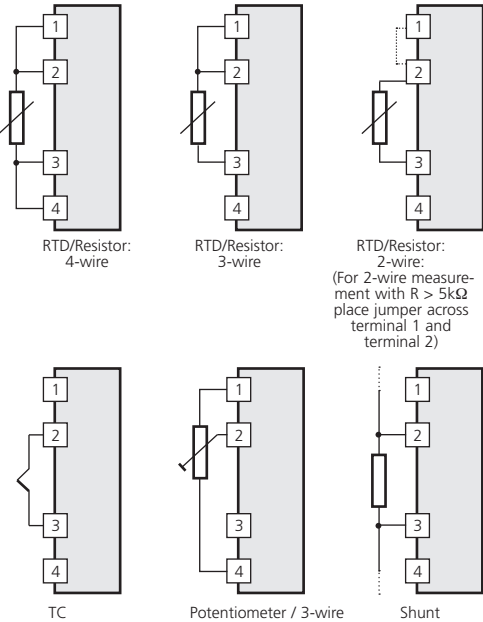
Input data RTD / R		
Sensor type	(Standard)	Measurement range [°C]
Pt100	(DIN 60751)	-200 ... 850
Pt 1000	(DIN 60751)	-200 ... 850
Ni100	(DIN 43760)	-60 ... 180
Connection	2-, 3- or 4-wire (automatic identification)	
Resistance range (incl. line resistance)	Temperature measurement: 0 ... 5 kΩ Resistance measurement: 0 ... 5 kΩ or 5 ... 100 kΩ	
Max. line resistance	100 Ω	
Supply current	Max. 500 µA	
Line monitoring	Open circuit	
Input error limits	For resistances < 5 kΩ: ± (50 mΩ + 0.05 % meas.val.) for spans > 15 Ω For resistances > 5 kΩ: ± (1 Ω + 0.2 % meas.val.) for spans > 50 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)	Range [°C]	selectable via IrDA only:
B	(DIN 60584-1)	250 ... 1820	x
E	(DIN 60584-1)	- 200 ... 1000	x
J	(DIN 60584-1)	- 210 ... 1200	
K	(DIN 60584-1)	- 200 ... 1372	
L	(DIN 43710)	- 200 ... 900	x
N	(DIN 60584-1)	- 200 ... 1300	x
R	(DIN 60584-1)	- 50 ... 1767	x
S	(DIN 60584-1)	- 50 ... 1767	x
T	(DIN 60584-1)	- 200 ... 400	x
U	(DIN 43710)	- 200 ... 600	x
W3Re/W25Re (ASTM E988-96)		0 ... 2315	x
W3Re/W25Re (ASTM E988-96)		0 ... 2315	x
Input resistance	> 10 MΩ		
Max. line resistance	1 kΩ		
Line monitoring	Open circuit		
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)		
Cold junction compensation	Internal Via IrDA: external or fixed value		
Error of external cold junction compensation	Via Pt100 for T _{comp} = 0 ... 80 °C: ± (80 mΩ + 0.1 % meas.val.)		
Error of internal cold junction compensation	± 1.5 °C		

Potentiometer input data	
Input	200 Ω ... 50 kΩ
Connection	3- or 4-wire (4-wire w/IrDA only)
Supply current	0 ... 5 mA
Line monitoring	Open circuit
Input error limits	± (0.2 % f.s. +0.05 % meas.val.) for spans > 5 %
Temperature coefficient at the input	50 ppm/K of adjusted end value (average TC in permitted operating temp range, reference temp 23 °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 circuit
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
Strain gage input data – via IrDA only –	
Input	-7.5 mV/V ... 7.5 mV/V
Bridge resistance	200 Ω ... 10 kΩ
Zero adjustment	Within input range
Supply current (int. supply)	0 ... 5 mA
Supply voltage (external supply)	1 ... 3 V 1 ... 2.8 V for T > 55 °C
Line monitoring	For short circuits or open circuits
Input error limits	± (2 µV/V ± 0.1 % meas.val.) for spans ≥ 0.5 mV/V
Temperature coefficient at the input	50 ppm/K of configured sensitivity (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 -1.25 % ... approx. 102.5 % of span for 4 ... 20 mA output
Resolution	16 bits
Load	Current output Voltage output
Load (SIL)	Current output Voltage output
Output error limits	Current output Voltage output
Residual ripple	Current output Voltage output
Temperature coefficient at the output	
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; via IrDA: curve defined by interpolation points or polynomials
Measurement rate	Approx. 3/s
Response time t ₉₉	300 ms
Power supply	
Broad-range power supply P 32xxx / x1	24 V...110 V DC (± 20%), appr. 1.0 W 110 V ... 230 V AC (± 10 %), 48 ... 62 Hz, approx. 2.3 VA
24 V DC power supply unit P 32xxx / x0	24 V DC (- 20%, + 25 %), appr. 0.8 W
Power supply unit P32xxx / x2	110 V ... 230 V AC (± 10 %), 48 ... 62 Hz, approx. 1,8 VA
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 electric shocks.
Protection against electric 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 electric shocks.
Standards and approvals	
Functional safety (SIL types to IEC/EN 61508)	SIL 2 SIL 3 with redundant configuration
EMC	Product standard EN 61326 Emitted interference: Class B Immunity to interference*: Industry EMC-requirements for devices with safety-related functions IEC 61326-3 * Slight deviations are possible while there is interference
	Standards: UL 508 and CAN/CSA 22.2 no. 14-95
KTA	KTA 3503:11/05 (only P32000P0/11 with test certificate, accessory ZU0541)
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

7. Input wiring (more via IrDA)



8. LED and error signaling on device

Notice: Green and red LED flash briefly when the device is started.
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)
Blinking: IrDA active
Permanent light: IrDA connected
Red: Error status; LED flashing indicates error number

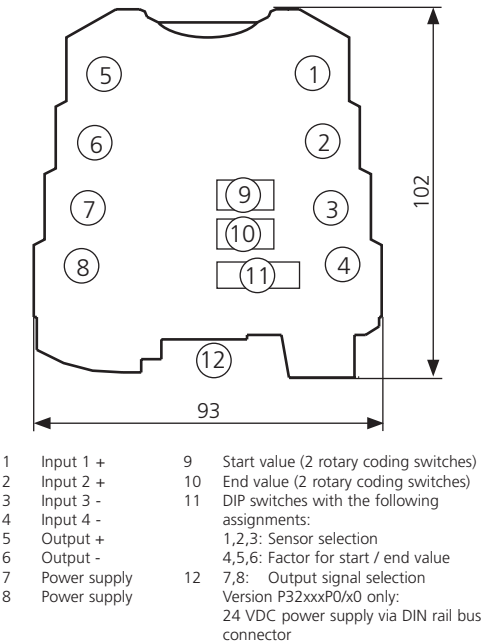
No. Error	Output [mA]				Output [V]			
	4 ... 20	0 ... 20	0 ... 5	0 ... 10	0 ... 5	0 ... 10	0 ... 5	0 ... 10
1 Value below range limit*	3.6	0	0	0	0	0	0	0
2 Value above range limit*	21	21	5.25	10.5	5.25	10.5	5.25	10.5
3 Sensor short circuit*	21	21	5.25	10.5	5.25	10.5	5.25	10.5
4 Sensor open	21	21	5.25	10.5	5.25	10.5	5.25	10.5
5 Pot/strain gage: resistance error	21	21	5.25	10.5	5.25	10.5	5.25	10.5
6 Output load error**	3.6	0	0	0	0	0	0	0
7 Identification of connection	21	21	5.25	10.5	5.25	10.5	5.25	10.5
8 Switch misadjusted	21	21	5.25	10.5	5.25	10.5	5.25	10.5
9 Adjustment error	21	21	5.25	10.5	5.25	10.5	5.25	10.5
10 Device error, self-locking	21	21	5.25	10.5	5.25	10.5	5.25	10.5
SIL	< 3.6	< 3.6	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Without SIL	3.6	0	0	0	0	0	0	0

* Self-locking error for P32000P0/1x version only
** Output load error for P32000P0/1x version only

Operation via IrDA interface

DIP switch	Rotary coding switch				Function
All (1 ... 8):	1	2	3	4	
ON	0	0	0	0	IrDA configuration, read / write
OFF	0	0	0	0	IrDA configuration, read only

9. Dimension drawing and switching elements



10. 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

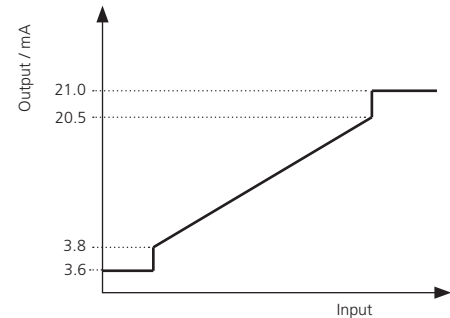
Adjust start value:
200 °C
This start value is composed of: numeric value = 20, factor = x10.
Adjust the numeric value at the coding switches (see fig. above, pos. 9): 20
Adjust factor x10: DIP4 = 0, DIP5 = 1

Adjust end value:
1200 °C
For end values above 1000 °C, adjust factor x10+1000
Adjust the numeric value at the coding switches (see fig. above, pos. 10): 20
Adjust factor x10+1000: DIP6 = 1

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.

11. Behavior of output current (4 ... 20 mA) in the case of overrange



12. Order information

Type	Order No.
Universal transmitter, adjustable, without SIL	P32000P0/0
Universal transmitter, adjustable, with SIL	P32000P0/1
Power supply 110...230 V AC via screw terminals only	2
Power supply Broad-range power supply 24...110 V DC / 110...220 V AC via screw terminals only	1
Power supply 24 V DC via screw terminals or DIN rail bus connector	0
Accessories	Order No.
DIN rail bus connector: power supply bridging for 2 P 32000P0/x0 devices each	ZU 0628
IsoPower® A 20900 power supply 24 V DC, 1 A A 20900 H4 power supply	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 connectors ZU 0628	ZU 0677
Paraly® SW 111 communication software	SW111
Test certificate according to KTA 3507	ZU 0541

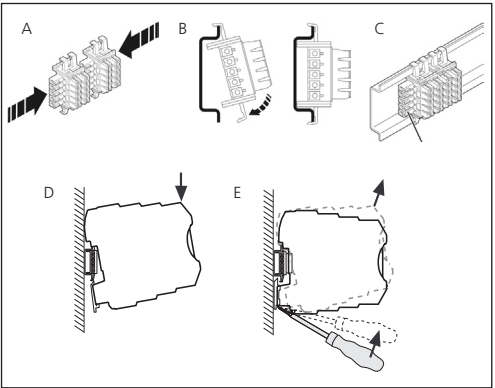


Fig: A Mounting ZU 0628 DIN rail bus connectors in a row
B Snapping the bus connectors onto a DIN rail
C Bus connectors on a DIN rail
D Snapping a universal transmitter onto a DIN rail
E Removing a universal transmitter from a DIN rail

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PolyTrans® P 32000
Universal Transmitters

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TA-254.111-KNE01 20090115