

TDLPRT
2 WIRE - LOOP POWERED TRANSMITTER FOR PT100 AND NI100 PROBES

General Description
The TDLPRT transmitter converts a temperature signal read by a PT100 (EN 60 751) or NI100 probe with connection by 2, 3 or 4 wires into a signal normalised in current for 4-20 mA loop (2 wire technology).

- The module's main features are:
- High precision
 - Extremely compact size (6.2 mm)
 - 35mm DIN rail mounting
 - 16 bit resolution.
 - Configurable by PC with TXPROG dedicated software
 - Configurable by DIP-switch

Technical Features
PT100 Input- EN 60751/A2 (ITS-90)

Measurement Range :	-200 to +650 °C
Resistance Range :	18,5 Ω to 330 Ω
Minimum span :	20 °C
Current on sensor :	750 µA rated
Cable resistance :	Max 25 Ω per wire
Connection :	2, 3 or 4 wires
Resolution :	~ 6 mΩ

NI100 Input

Measurement Range :	-60 to +250 °C
Resistance Range :	69 Ω to 290 Ω
Minimum span :	20 °C
Current on sensor :	750 µA rated
Cable resistance :	Max 25 Ω per wire
Connection :	2, 3 or 4 wires
Resolution :	~ 6 mΩ

Output/Power Supply

Functioning Voltage :	5.30 V _{DC}
Current output :	4 - 20 mA, 20 - 4 mA (2 wires)
Load resistance :	1 kΩ at 26 V _{DC} , 21 mA (see load resistance vs. Minimum voltage diagram on page 2)
Resolution :	1 µA (>14 bits)
Output in case of over-range :	102,5% of full scale value (see table on page 5)
Output in case of fault :	105% of full scale value (see table on page 5)
Current output protection :	Approximately 30 mA

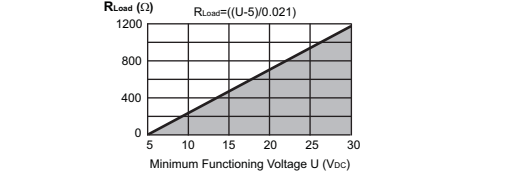
Other Features

Network Freq. Rejection :	50 Hz or 60 Hz (settable)
Transmission error :	Max of 0.1% (of measurement range) or 0.1 °C
Error caused by EMI (*) :	< 0,5 %
Influence of cable resistance :	0.005 Ω/Ω
Temperature Coefficient :	< 100 ppm, Typically 30 ppm
Sampling Time :	100 ms (without 50/60 Hz rejection) 300 ms (with 50/60 Hz rejection enabled)
Response time (10 - 90 %) :	< 220 ms (without 50/60 Hz rejection) < 620 ms (with 50/60 Hz rejection enabled)

Protection Index :	IP20
Operating Conditions :	Temperature -20 to +65 °C Humidity 30 to 90 % at 40 °C (non-condensing) Altitude: up to 2000 m.a.s.l -40 to +85 °C
Storage Temperature:	Setting error, connection fault, internal fault
LED Signalling :	Spring terminals
Connections :	0,2 to 2,5 mm ²
Conductor Section :	8 mm
Wire stripping :	PBT (black colour)
Case:	6,2 x 93,1 x 102,5 mm, 45 g
Dimensions, Weight :	
Standards :	EN61000-6-4/2002-10 (electromagnetic emission, industrial surroundings) EN61000-6-2/2006-10 (electromagnetic immunity, industrial surroundings)



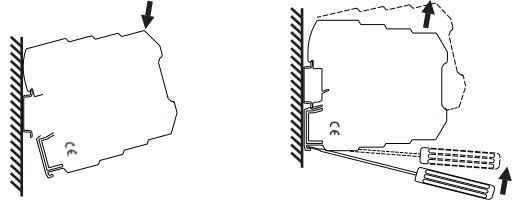
Diagram: Load Resistance vs Minimum Functioning Voltage



(*) EMI: electromagnetic interferences.

Installation rules

This module has been designed for assembly on a DIN 46277 rail. Inserting the module in the rail Removing the module from the rail



- 1 - Attach the module in the upper part of the rail.
- 2 - Press the module downwards.
- 1 - Apply leverage using a screwdriver (as shown in the figure).
- 2 - Rotate the module upwards.

Mounting in a vertical position is recommended in order to increase the transmitter's Ventilation. No raceways or other objects that compromise aeration must be positioned in the vicinity.
Do not position the module above equipment that generates heat; we recommend positioning the module in the lower part of the control panel or container compartment.

MODULE CONFIGURATION
The module can be configured both by DIP-switch and by PC.

SETTING BY DIP-SWITCHES
Configuration from memory
The module leaves the factory with all the DIP-switches in the OFF position. In this position the transmitter uses the configuration saved in memory. This configuration can be modified by PC (see page 5/6).
The default configuration is as follows (unless otherwise indicated on the instrument):

- | | |
|--------------------------------|--|
| RTD wiring | → 3 wires |
| 50 / 60 Hz Rejection filter | → present |
| Reversed Output | → NO |
| Input Type | → PT100 |
| Measurement Range Start | → 0 °C |
| Measurement Full-Scale | → 100 °C |
| Output signal in case of fault | → Towards the top of the output range |
| Over-Range | → YES: a 2.5% over-range value is acceptable; a 5% over-range value is considered a fault. |

If any DIP-switch is not in the OFF position, the configuration saved in memory is not used (the settings revert to the DIP-switches as shown in the following section).

DIP Switch Setting

To customise the transmitter settings in the field, the positions of the DIP-switch are shown in the following tables.
Note:
The indication ● indicates that the DIP-switch is set in ON Position.
No indication is provided when the DIP-switch is set in OFF Position.

RTD WIRING

SW1 1	● 2 / 4 wires connection 3 wires connections
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50 / 60 Hz REJECTION FILTER (*)

SW1 2	● Absent Present
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(*) The filter slows down the response time to around 620 ms and guarantees the repeating of the disturbance signal at 50/60 Hz overlapping the measurement signal.

REVERSED OUTPUT

SW1 3	● Reversed: 20 - 4 mA Normal: 4 - 20 mA
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RTD TYPE

SW1 4	● NI100 PT100
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NOT USED

SW1 5	Not used
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MEASUREMENT RANGE START

SW1 6 7 8	°C
●	0
●	-10
●	-20
●	-40
●	-50
●	-100
●	-150
●	-200

MEASUREMENT FULL SCALE

SW2 1 2 3 4 5 6	°C
●	120
●	130
●	140
●	150
●	160
●	170
●	180
●	190
●	200
●	210
●	220
●	230
●	240
●	250
●	260
●	270
●	280
●	290
●	300
●	310
●	320
●	330

OUTPUT SIGNAL IN CASE OF FAULT

SW2 7	● Towards the bottom of the output range Towards the top of the output range
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OVER-RANGE (*)

SW2 8	● NO: the fault alone causes a 2.5% over-range value. YES: a 2.5% over-range value is acceptable; a 5% over-range value is considered a fault.
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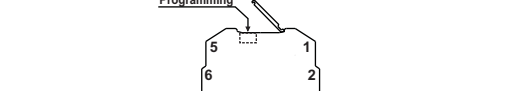
(*) See the table below for the corresponding values.

Output signal limit	Over-range / Fault ± 2,5 %	Fault ± 5 %
20 mA	20.4 mA	21 mA
4 mA	3.6 mA	< 3.4 mA

Configuration by PC

The TDLPRT can be configured by PC using the TXPROG software kit which consists of the following accessories:
- USB to RS232/TTL converter.
- USB Connection cable & TDLPRT programming cable.
- Dedicated programming software.

The transmitter may be programmed even if it is not supplied by the 4-20mA loop, since power is provided through the programming connector.
The interface to program the transmitter is available under the front cover:

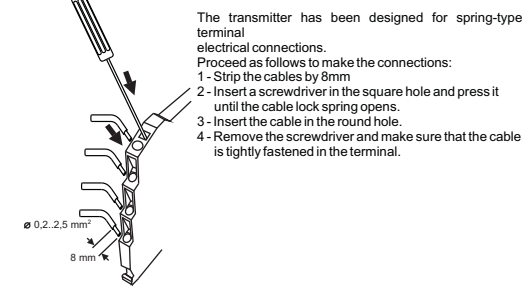


Once the user has at his disposal the above listed accessories, the following parameters may be set:

- Start and Full scale values.
- RTD Connection: 2, 3 or 4 wire
- 50/60Hz Rejection: Absent or Present.
- Measurement filter: 1, 2, 5, 10, 30, 60 seconds or OFF
- Output: Normal (4-20mA) or Reversed (20-4mA).
- RTD Type: PT100 or NI100.
- Cable resistance compensation for 2 wire measurement.
- Output signal in case of fault: upscale or downscale

The configuration may be written to memory with the DIP-switches in any position, but the saved parameters are used only when all the DIP-switches in the OFF position.

Electrical Connections

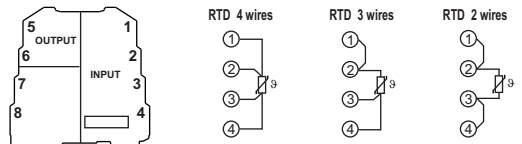


Input
The transmitter accepts input from a PT100 (EN 60 751) or NI100 temperature probe with 2, 3 or 4 wire connections.
The use of shielded cables is recommended for the connections.

2-wire connection
This configuration is used for short distances (<10m) between transmitter and probe, bearing in mind that it adds an error (which may be removed by software programming) equivalent to the resistance contributed by the connection cables to the measurement.
DIP-switch SW1-1 set in ON Position (2/4 wires) or all DIP-switches in OFF position (configuration from memory: module programmed by PC for 2 wire connection).
With bridges between terminals 1 and 2 and terminals 3 and 4.

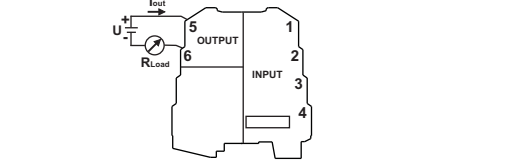
3-wire connection
This configuration is used for medium-long distances (>10m) between transmitter and probe. The instrument performs compensation for the resistance of the connection cables. In order for compensation to be correct, it is necessary that the resistance value of each conductor be the same, as the instrument measures the resistance of only one conductor and assumes the other conductors to be exactly the same.
DIP-switch SW1-1 set in OFF Position (3 wires) or all DIP-switches in OFF position (configuration from memory: module programmed by PC for 3 wire connection).
With bridge between terminals 3 and 4.

4-wire connection This configuration is used for medium-long distances (>10m) between transmitter and probe. It provides the maximum precision because the instrument measures the resistance of the sensor independently of the resistance of the connection cables. DIP-switch SW1-1 set in ON Position (2/4 wires) or all DIP-switches in OFF position (configuration from memory: module programmed by PC for 4 wire connection).



Output
Current loop connection (regulated current).

The use of shielded cables is recommended for the electronic connections.



Note: in order to reduce the instrument's dissipation, we recommend guaranteeing a load of > 250 Ω to the current output.

LED indications on the frontal panel

LED	Meaning
Rapid flashing 3 pulses/sec.	Internal fault
Slow flashing 1 pulse/sec.	DIP-switch setting error (full scale and start range limits)
Steady light	RTD connection wire fault. Measurement out of range, 3 rd wire resistance out of range.

