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 mAloop (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) -200 to +650 °C Measurement Range

Resistance Range 18.5 O to 330 Minimum snan 20°C Current on sensor 750 uA rated Cable resistance : Max 25 Q per wire Connection

2 3 or 4 wires Resolution ~ 6 mO

NI100 Input Measurement Range

Resistance Range 69 Ω to 290 0 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

5-30 VDC Functioning Voltage

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 .. Δ (>14 hite)

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

-60 to +250 °C

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Other Features 50 Hz or 60 Hz (settable) Network Freq. Rejection:

Transmission error Max of 0.1% (of measurement range) or 0.1 °C

Error caused by EMI (*) < 0.5%

Influence of cable resistance : $0.005 \Omega/\Omega$ 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

Storage Temperature: -40 to +85°C

LED Signalling Setting error, connection fault, internal fault Connections : Spring terminals

Conductor Section 0.2 to 2.5 mm²

Wire stripping

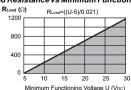
PBT (black colour) 6,2 x 93,1 x 102,5 mm, 45 g

Dimensions, Weight

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



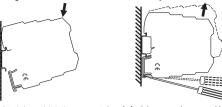
(*) EMI: electromagnetic interferences

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

2 - Press the module downwards

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 position in the

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 50 / 60 Hz Rejection filter → presen → NO Reversed Output Input Type PT100 Measurement Range Start 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.

2 - Rotate the module upward

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).

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DIP Switch Setting

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To customise the transmitter settings in the field, the positions of the DIP-switch are shown in the following tables.

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.

W	RING
1	
•	2 / 4 wires connection
П	3 wires connections
0 1	Hz REJECTION FILTER (*)
2	
•	Absent
٦	Present
	0 2

(*) 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

REV	VERSED OUTPUT									
SW1	3									
	•	Reversed: 20 - 4 mA								
	П	Normal: 4 - 20 mA								
	_	Horman, 4 - 20 mps								

RTD	T١	/PE
SW1	4	
	•	NI100
		PT100

NOT USED			
SW1 5 Not	used		
MEASURE	MENT RANGE STAI	₹T	
CIA/1 6 7 0	0.0		

MEAS	SU	RE	ΞM	ENT RANGE START	
SW1	6	7	8	°C	
				0	
	•			-10	
		•		-20	
	•	•	П	-40	
	Г	П	•	-50	
	•	П	•	-100	
	Г	•	•	-150	
	•	•	•	-200	

MI002330-E

ENGLISH - 4/8

MEASUREMENT FULL SCALE																									
SW2				4			°C		SW2	1	2	3	4	5	6	°C	Г	SW2	1	2	3	4	5	6	°C
	Ė	Ē	Ť	Ė	Ť	Ť	0	1		Ė	•		Ė	•	Ť	120	1		Ė	Ē	•	•	Ť	•	340
	•	Г	Г	П	Г	П	5	1		•	•	•	Г	•	П	130	1		•	Г	•	•	П	•	350
		•					10	1					•	•		140	1			•	•	•		•	360
	•	•					15			•			•	•		150			•	•	•	•		•	370
			•				20				•		•	•		160							•	•	380
	•		•				25			•	•		•	•		170			•				•	•	390
		•	•				30					•	•	•		180				•			•	•	400
	•	•	•		L	Ш	35			•	L	•	•	•		190			•	•	L	L	•	•	410
		L	L	•	L	Ш	40			L	•	•	•	•		200			L	L	•		•	•	420
	•	L	L	•	L	Ш	45			•	•	•	•	•		210			•	L	•		•	•	430
		•	L	•	L	Ш	50			L	L	L	L	Ц	•	220			L	•	•	L	•	•	440
	•	•	L	•	L	Ш	55			•	L	L	L	Ц	•	230	1		•	•	•	L	•	•	450
	Ш	L	•	•	L	Ш	60			L	•	L	L	Ш	•	240	1		L	L	L	•	•	•	480
	•	L	•	•	L	Ш	65			•	•	L	L	Ш	•	250	1		•	L	L	•	•	•	500
		•	•	•	L	Ц	70			L	L	•	L	Ш	•	260	1		L	•	L	•	•	•	520
	•	•	•	•	L	Ц	75			•	L	•	L	Ц	•	270	1		•	•	L	•	•	•	550
		L	L	Ш	•	Ц	80			L	•	•	L	Ц	•	280	1		L	L	•	•	•	•	580
	•	L	L	Ш	•	Ц	85			•	•	•	L	Ц	•	290			•	L	•	•	•	•	600
	Ш	•	L	Ш	•	Ш	90			L	L	L	•	Ц	•	300			L	•	•	•	•	•	620
	•	•	L	Ш	•	Ш	95			•	L	L	•	Ц	•	310	1		•	•	•	•	•	•	650
			•		•		100			L	•		•		•	320	1								
	•		•	Ш	•	П	110			•	•		•		•	330		l							

OUT	DUTPUT SIGNAL IN CASE OF FAULT										
SW2											
	Towards the bottom of the output range										
	Towards the top of the output range										
OVE	₹-I	RANGE (*)									
SW2	8										
	NO: the fault alone causes a 2.5% over-range value.										
		ES: a 2.5% over-range value is acceptable;									
		a 5% over-range value is considered a fault.									

a 570 Over-lange value is considered a lault.	
(*) 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.

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The transmitter may be programmed even if it is not supplied by the 4-20mA loop, since power is provided through the programming connector.

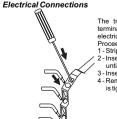
The interface to program the transmitter is available under the front cover



Once the user has at his disposal the above listed accessories, the following parameters

- -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.



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The transmitter has been designed for spring-type terminal electrical connections.

- Proceed as follows to make the connections: 1 - Strip the cables by 8mm
- 2 Insert a screwdriver in the square hole and press it

MI002330-E

- until the cable lock spring opens. 3 - Insert the cable in the round hole
- 4 Remove the screwdriver and make sure that the cable
- is tightly fastened in the terminal.

ENGLISH - 6/8

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 measuremen DIP-switch SW1-1 set in ON Position (2/4 wires) or all DIP-switches in OFF position (configuration from memory: module programmed byPC 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).

RTD 4 wires



RTD 3 wires

(1)

1

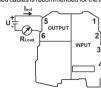
RTD 2 wires

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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 \(\Omega \) 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.



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