

General Description

The TDMPRT instrument converts a temperature signal read by a PT100 probe (EN 60 751) with connection by 2, 3 or 4 wires into a signal normalised in voltage or current. Resolution 14 bit.

The module's main features are its compact size (6.2 mm), attachment to a 35 mm DIN rail, bus-conductor power supply option, quick connection by spring terminals, 3-point insulation, and easy configuration in the field by DIP-switch.

Technical Features

Power supply: Consumption:	19.2..30 Vdc Max 21 mA at 24 Vdc
Input:	PT100 probe, EN 60751/A2 (ITS90) connection by 2, 3 or 4 wires < 900 uA
Current on sensor: Cable resistance: Measurement Range: Resistance Range: Minimum span :	Max. 20 Ω per wire -150..650 °C 20..350 Ω 50 °C
Voltage output:	0..5 Vdc, 1..5 Vdc, 0..10 Vdc and 10..0 Vdc Minima load resistance: 2 KΩ
Current output:	0..20 mA, 4..20 mA, 20..0 mA e 20..4 mA Maximum load resistance: 500 Ω
Output in case of over-range: Output in case of malfunction:	102.5% of full scale value (see Table on Page 5) 105% of full scale value (see Table on Page 5)
Current output protection:	approximately 25 mA
Transmission error:	0.1% (max. range), or (40 K / Δtemp + 0.05) % (Measurement range)
Temperature Coefficient: Response time (10..90 %):	100 ppm < 50 ms (without filter) < 200 ms (with repeat filter 50 Hz)
Insulation Voltage: Protection Index: Operating Conditions:	1.5 KV (50 Hz for 1 min) IP20 Temperature -20..+65 °C Humidity 30..90% at 40°C (non-condensing) -40..+85 °C
Storage Temperature: LED Signalling:	Setting error, connection malfunction, internal malfunction
Connections: Conductor Section:	Spring terminals 0.2..2.5 mm ²

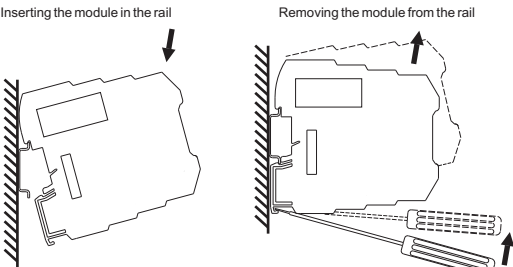
Wire stripping: Box: Dimensions, Weight:	8 mm PBT (black colour) 6,2 x 93,1 x 102,5 mm, 50 g.
Standards:	EN61000-6-4/2002 (electromagnetic emission, industrial environment) EN61000-6-2/2005 (electromagnetic immunity, industrial environment) EN61010-1/2001 (safety). All circuits must be insulated from the other circuits under dangerous voltage with double insulation. The power supply transformer must comply with EN60742: "Insulated transformers and safety transformers".



Installation rules

This module has been designed for assembly on a DIN 46277 rail. Assembly in vertical position is recommended in order to increase the module's ventilation, and 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. We recommend rail-type assembly using the corresponding bus connector that eliminates the need to connect the power supply to each module.



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

Using the BUS connector



- 1 - Compose the BUS connectors as required in order to obtain the number of positions necessary (each BUS connector permits the insertion of no. 2 modules).
- 2 - Insert the BUS connectors in the rail by positioning them on the upper side of the rail and then rotating them downwards.

IMPORTANT! Pay particular attention to the position of the protruding terminals of the BUS connector. The BUS connector must be inserted in the guide with the protruding terminals on the left (as shown in the figure) otherwise the modules are turned upside downs.

⚠ - Never connect the power supply directly to the bus connector on the DIN rail.
- Never tap power supply from the bus connector either directly or by using the module's terminals.

SETTING OF THE DIP-SWITCHES

Factory setting

All the module DIP switches are at pos. 0 as default configuration. This set corresponds to the following default configuration :

PT100 wiring → 3 wires
Input Filter → present
Output Signal → 4..20 mA
Measurement Range Start → 0 °C
Measurement Full-Scale → 100 °C
Output signal in case of Malfunction → 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 malfunction.

This configuration is valid only with all the DIP switches at position 0. If one Dip is moved it is necessary to set all the other parameters as indicated on the following tables.

Note: for all following tables
The indication ● indicates that the DIP-switch is set in Position 1 (ON). No indication is provided when the DIP-switch is set in Position 0 (OFF).

PT100 WIRING	
SW1 1	● 2 / 4 wires 3 wires

INPUT FILTER (*)	
SW1 2	● Absent Present

(*) The input filter slows down the response time to around 200 ms and guarantees the repeating of the disturbance signal at 50 Hz overlapping the measurement signal.

OUTPUT SIGNAL	
SW1 3 4 5	● 4..20 mA ● 0..20 mA ● 20..4 mA ● 20..0 mA ● 0..10 Vdc ● 10..0 Vdc ● 0..5 Vdc ● 1..5 Vdc

MEASUREMENT RANGE START	
SW1 6 7 8 °C	● 0 ● -10 ● -20 ● -30 ● -40 ● -50 ● -100 ● -150

MEASUREMENT FULL SCALE													
SW2 1	2	3	4	5	6	°C	SW2 1	2	3	4	5	6	°C
●	●	●	●	●	●	0	●	●	●	●	●	●	340
●	●	●	●	●	●	5	●	●	●	●	●	●	350
●	●	●	●	●	●	10	●	●	●	●	●	●	360
●	●	●	●	●	●	15	●	●	●	●	●	●	370
●	●	●	●	●	●	20	●	●	●	●	●	●	380
●	●	●	●	●	●	25	●	●	●	●	●	●	390
●	●	●	●	●	●	30	●	●	●	●	●	●	400
●	●	●	●	●	●	35	●	●	●	●	●	●	410
●	●	●	●	●	●	40	●	●	●	●	●	●	420
●	●	●	●	●	●	45	●	●	●	●	●	●	430
●	●	●	●	●	●	50	●	●	●	●	●	●	440
●	●	●	●	●	●	55	●	●	●	●	●	●	450
●	●	●	●	●	●	60	●	●	●	●	●	●	480
●	●	●	●	●	●	65	●	●	●	●	●	●	500
●	●	●	●	●	●	70	●	●	●	●	●	●	520
●	●	●	●	●	●	75	●	●	●	●	●	●	550
●	●	●	●	●	●	80	●	●	●	●	●	●	580
●	●	●	●	●	●	85	●	●	●	●	●	●	600
●	●	●	●	●	●	90	●	●	●	●	●	●	620
●	●	●	●	●	●	95	●	●	●	●	●	●	630
●	●	●	●	●	●	100	●	●	●	●	●	●	650
●	●	●	●	●	●	110	●	●	●	●	●	●	650

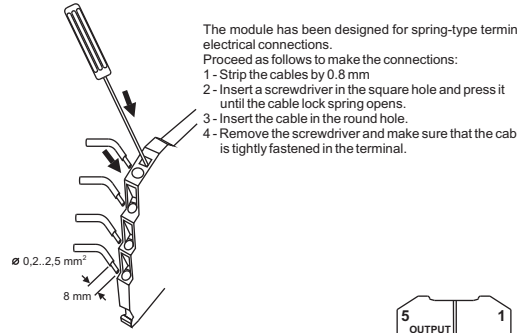
OUTPUT SIGNAL IN CASE OF MALFUNCTION	
SW2 7	● Towards the bottom of the output range Towards the top of the output range

OVER-RANGE (*)	
SW2 8	● NO: the malfunction 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 malfunction.

(*) See the table below for the corresponding values.

Output signal limit	Over-range / Malfunction ± 2.5 %	Malfunction ± 5 %
20 mA	20.5 mA	21 mA
4 mA	3.5 mA	3 mA
0 mA	0 mA	0 mA
10 Vdc	10.25 Vdc	10.5 Vdc
5 Vdc	5.125 Vdc	5.25 Vdc
1 Vdc	0.875 Vdc	0.75 Vdc
0 Vdc	0 Vdc	0 Vdc

Electrical Connections



Power supply
There are various ways to provide the modules with power:

- 1 - Direct power supply to the modules by connecting 24 Vdc power supply directly to Terminals 7 (+) and 8 (-) of each module.
- 2 - Using the BUS connector accessory for the distribution of the power supply to the modules via bus connector, in this way eliminating the need to connect power supply to each module.

The bus can be supplied from any of the modules; the total absorption of the bus must be less than 400 mA. Higher absorption values can damage the module. An appropriately sized fuse must be connected in series to the power supply.

Input

The module accepts input from a PT100 temperature probe (EN 60 751) with connection by 2, 3 or 4 wires.

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

2-wire connection

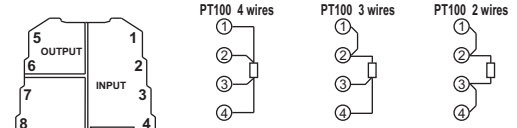
This connection can be used for short distances (< 10 m) between module and probe, you should be note that it adds an error equivalent to the resistance contributed by the connection cables to the measurement.
DIP-switch SW1-1 set in Position 1 (ON) (2 / 4 wires).
With bridges between Terminals 1 and 2 and Terminals 3 and 4.

3-wire connection

This connection can be used for medium-long distances (> 10 m) between module and probe. The instrument performs compensation for the resistance of the connection cables. For a correct compensation the resistance values of each conductor must be the same. DIP-switch SW1-1 set in Position 0 (OFF) (3 wires).
With bridge between Terminals 3 and 4.

4-wire connection

This connection can be used for medium-long distances (> 10 m) between module and probe. Provides the maximum precision because the instrument measure the resistance of the sensor independently of the resistance of the connection cables.
DIP-switch SW1-1 set in Position 1 (ON) (2 / 4 wires).

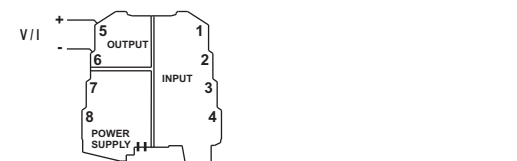


Note: The PT100 reading is taken in an impulsive way for a very short time to reduce the module consumption. For this reason, some electronic calibrators cannot simulate the signal in the right way.

Output

Voltage connection - Current connection (applied current)

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



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

LED indications on the front

LED	Meaning
Rapid flashing 1 pulse/sec.	Internal malfunction
Slow flashing 3 pulses/sec.	DIP-switch setting error
Steady light	PT100 connection wire malfunction. 3 rd wire resistance over-range



Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs)
This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.