EN

T120
2 WIRE - LOOP POWERED TRANSMITTER FOR PT100 AND NI100 PROBES

General Description

The T120 instrument 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 wires technology).
The module's main features are:

- High precision
- 16 bit resolution
- Compact size
- Configuration by PC with KT120 dedicated software downloadable at www.seneca.it.

Technical Features

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

Measurement Range :	-200 - +650 °C
Resistance Range :	18,5 Ω - 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 - +250 °C
Resistance Range :	69 Ω - 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

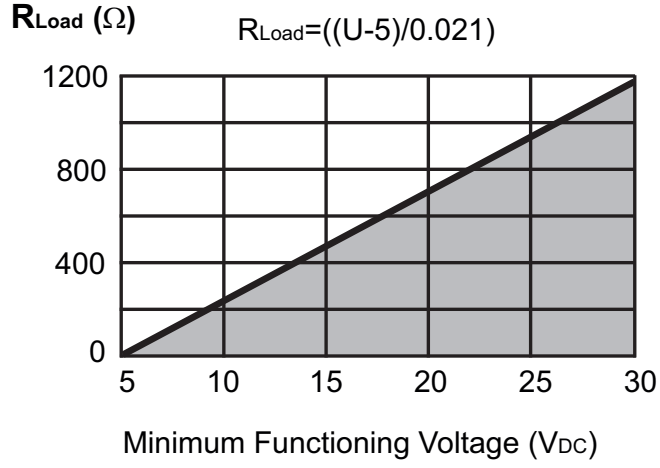
Output/Power Supply

Operating Voltage :	5 - 30 V_{DC}
Current output :	4 - 20 mA, 20 - 4 mA (2 wires technology)
Load resistance :	1 kΩ @ 26 V_{DC}, 21 mA (see on page 2, **Load Resistance vs Minimum Functioning Voltage** diagram)
Resolution :	1 μA (>14 bits)
Output in case of over-range :	102,5% of full scale value (see Table on Page 3)
Output in case of fault :	105% of full scale value (see Table on Page 3)
Current output protection :	approximately 30 mA

Other Features

Network freq. Rejection :	50 Hz and 60 Hz (settable)
Transmission error :	0.05% of the measures + 0.05% of the spam with min. 0.1 ° C
Error caused by EMI (*)	< 0,5 %
Influence of cable resistance :	0,005 Ω / Ω
Temperature Coefficient :	< 100 ppm, Typical : 30 ppm
Sampling Time:	100 ms (without 50/60 Hz Rejection) 300 ms (with 50/60 Hz Rejection)
Response time (10..90 %) :	< 220 ms (without 50/60 Hz Rejection) < 620 ms (with 50/60 Hz Rejection)
Protection Index :	IP20
Operating Conditions :	Temperature -40 - +85 °C Humidity 30 - 90 % at 40°C (non-condensing) Altitude: up to 2000 m.a.s.l
Storage Temperature:	-40 - +105 °C
Connections :	Spring terminals
Conductor Section :	0,2..2,5 mm^2
Wire stripping :	8 mm
Box:	Nylon / glass, (black colour)
Dimensions :	20.0 mm x ϕ 40.0 mm
Standards : CE	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.

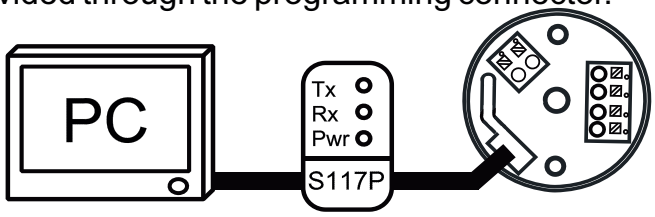
Factory setting

The instrument leaves the factory with the following configuration (except for other indications on the box):

RTD wiring	→	3 wires
Input filter	→	Enable
Reversed Output	→	NO
RTD 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.

Custumized Setting by PC and accessories

The configuration by PC use (see the drawing below) is possible with the following accessories:
S117P: USB to RS232/TTL
PM002411: connection cable between S117P and T120
KT120: Dedicated programming software.
The module may be programmed even if it is not supplied by the 4..20 mA loop, since the power supply is provided through the programming connector.



Once the user has at his disposal the above listed accessories, the following parameters may be setStart and Full scale values.

- RTD Connection: 2 wires, 3 wires o 4 wires.
- 50 / 60 Hz Rejection (*): Disable or enable.
- Measurement filter: Disable or enable (1, 2 , 5 , 10, 30, 60 seconds).
- Output: Normal (4 - 20 mA) o Reversed (20 - 4 mA).
- RTD Type: PT100 or NI100.
- Cable Resistance Compensation for 2 wires measurement.
- Output signal in case of fault: towards the bottom of the output range or towards the top of the output range.
- Over-Range (**): NO (the fault alone causes a 2.5% over-range value) or YES (a 2.5% over-range value is accettable a 5 % over-range value is considered a fault).

It is besides possible the calibration of the output scale.

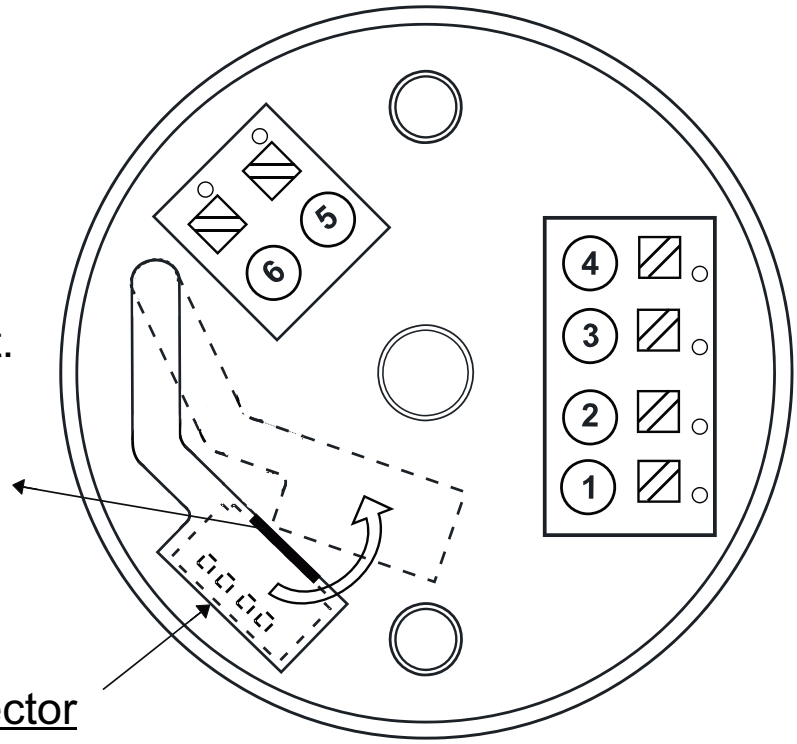
(*) The input filter slows down the response time to around 620 ms and guarantees the repeating of the disturbance signal at 50 / 60 Hz overlapping the measurement signal.

(**) 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

Frontal Side: Terminals Position and Enumeration

1. Raising the plastic protection using the appropriate slot.
2. Move the plastic protective as in the drawing.



Programming connector

Electrical Connections

Input

The module accepts input from a PT100 (EN 60 751) or NI100 temperature probe with connection by 2, 3 or 4 wires.

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

2-wire connection

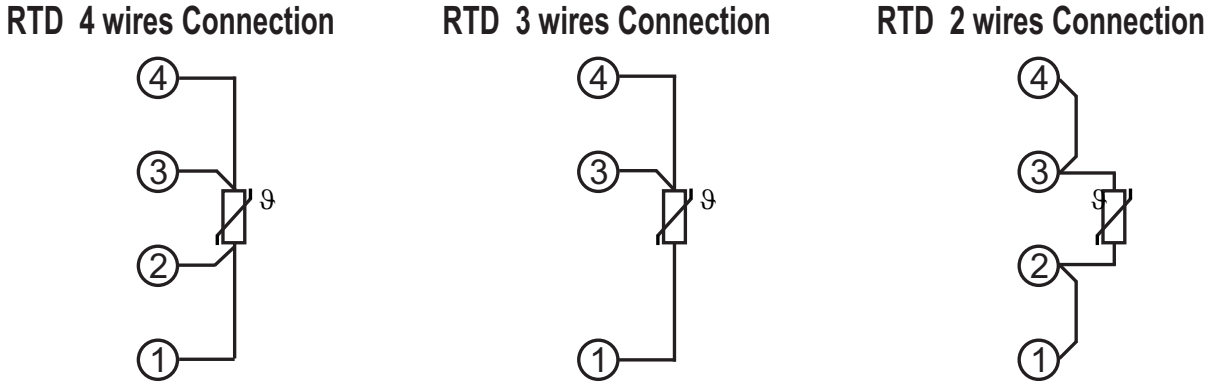
This is the connection to be used for short distances (< 10 m) between module and probe, bearing in mind that it adds an error (which may be removed by sofware programming) equivalent to the resistance contributed by the connection cables to the measurement.
The module has to be programmed by PC for 2 wires connection.

3-wire connection

This is the connection to be used for media-long distances (> 10 m) between module 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 values of each conductors be the same because in order to perform compensation the instrument measures the resistance of only one conductor and assumes the resistance of the others conductors to be exactly the same.
The module has to be programmed by PC for 3 wires connection.

4-wire connection

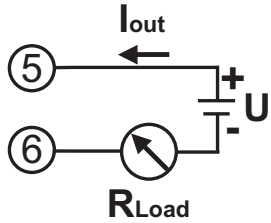
This connection to be used for media-long distances (> 10 m) between module and probe. Provides the maximum precision because the instrument measure the resistance of the sensor independently of the resistance of the connection cables.
The module has to be programmed by PC for 4 wires connection.



Output

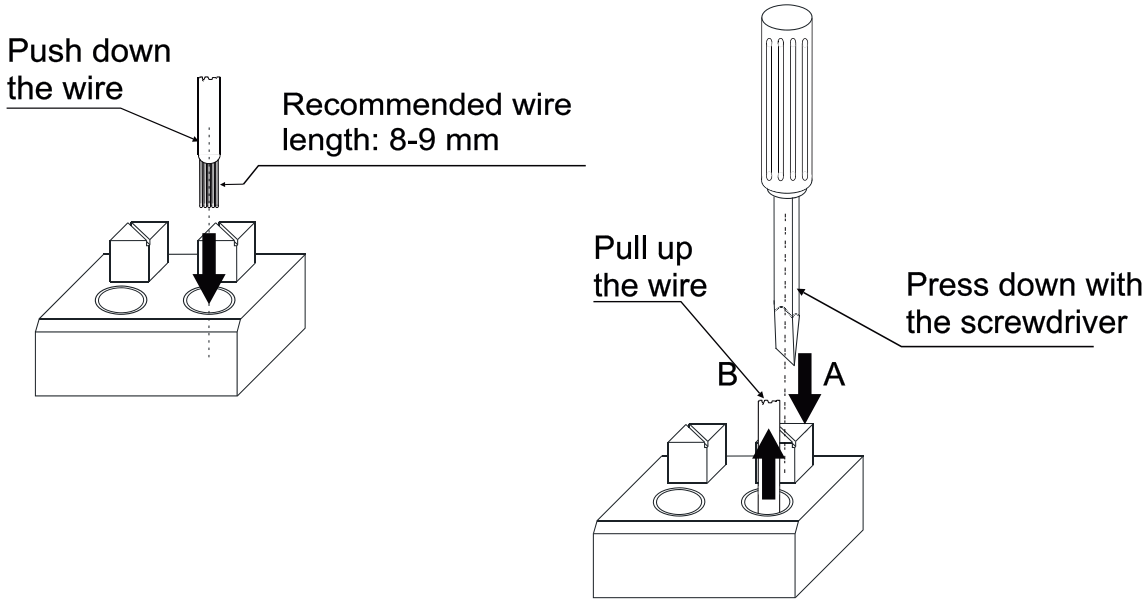
Current Loop connection (regolated current).

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

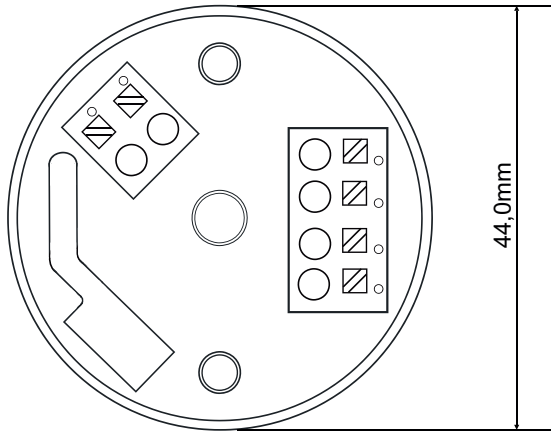


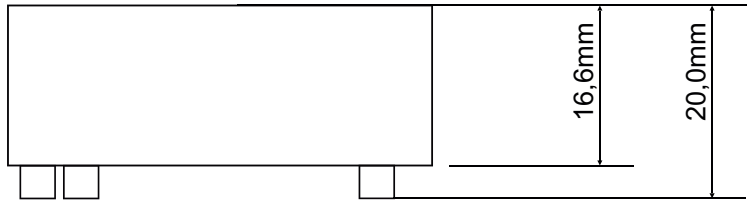
Note: in order to reduce the instrument's dissipation, we recommend guaranteeing a load of > 250 Ω to the current output.

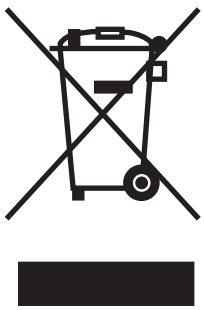
Pattern of connecting terminal with push-wire connection



Size and dimensions







Smaltimento dei rifiuti elettrici ed elettronici (applicabile nell'Unione Europea e negli altri paesi con servizio di raccolta differenziata).
Il simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non verrà trattato come rifiuto domestico. Sarà invece consegnato al centro di raccolta autorizzato per il riciclo dei rifiuti elettrici ed elettronici. Assicurandovi che il prodotto venga smaltito in modo adeguato, eviterete un potenziale impatto negativo sull'ambiente e la salute umana, che potrebbe essere causato da una gestione non conforme dello smaltimento del prodotto. Il riciclaggio dei materiali contribuirà alla conservazione delle risorse naturali. Per ricevere ulteriori informazioni più dettagliate Vi invitiamo a contattare l'ufficio preposto nella Vostra città, il servizio per lo smaltimento dei rifiuti o il fornitore da cui avete acquistato il prodotto.

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