

EN K109PT TEMPERATURE-INSULATED CONVERTER FOR PT100 PROBES

General Description

The K109PT converts a temperature signal read by a PT100 probe (EN 60751) 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:	19.2 - 30 Vdc
Consumption:	Max. 21 mA at 24 Vdc
Input:	PT100 probe, EN 60751/A2 (ITS90) connection by 2, 3 or 4 wires
Current on sensor:	Max. 20 mA per wire
Cable resistance:	-150 - +650 °C
Measurement Range:	20 - 350 °C
Minimum span:	50 °C
Voltage output:	0 - 5 Vdc, 1 - 5 Vdc, 0 - 10 Vdc and 10 - 0 Vdc
Current output:	0 - 20 mA, 4 - 20 mA, 20 - 0 mA e 20 - 4 mA
Output in case of malfunction:	Maximum load resistance: 500 Ω
Current output protection:	102.5% of full scale value (see table on Page 5)
Transmission error:	approximately 25 mA
Temperature Coefficient:	0.1 % (max. range), or (40 K / Δtemp + 0.05 %) (Measurement range)
Response time (10.90 %):	100 ppm
Insulation Voltage:	< 50 ms (without filter)
Protection Voltage:	< 200 ms (with repeat filter: 50 Hz)
Operating Conditions:	1.5 KV (50 Hz for 1 min)
Storage Temperature:	IP20
LED Signalling:	Temperature -20 - +65 °C
Connectors Section:	Humidity 30 - 90 % at 40 °C (non-condensing)
	40 - 85 °C
	Setting error, connection malfunction, internal malfunction
	Spring terminals
	0.2 - 2.5 mm ²

Wire stripping: 8 mm
 Box: PBT (black colour)
 Dimensions, Weight: 6.2 x 95.1 x 102.6 mm, 50 g.

Standards: EN61000-6-4 (electromagnetic emission, industrial environment) EN61000-6-2 (electromagnetic immunity, industrial environment) EN51010-1 (safety).

Notes: - Use with copper conductor.
 - Use in Pollution Degree 2 Environment.
 - Power Supply must be Class 2.
 - When supplied by an isolated, limited Voltage, limited Current power supply a fuse rated max 2.5 A shall be installed in the field.

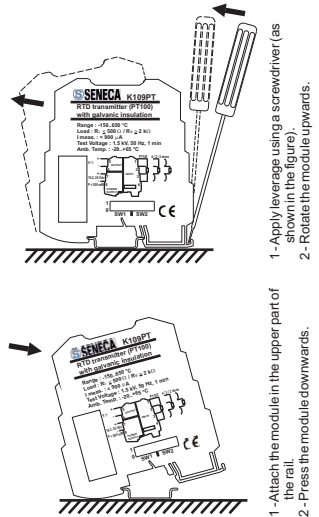
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Installation rules

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 reways 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 (Code K-BUS) that eliminates the need to connect the power supply to each module.



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

Using the K-BUS

- 1 - Compose the K-BUS connectors required in order to obtain the number of positions necessary (each K-BUS permits the insertion of 0-2 modules).
- 2 - Insert the K-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 protrudent terminals of the K-BUS. The K-BUS must be inserted in the guide with the protrudent terminals on the left (as shown in the figure) otherwise the modules are turned upside down.

⚠ 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 correspond to the following 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.

It is understood that this configuration is valid only with all the DIP switches at position 0.

If also one Dip is moved, it is necessary to set all the other parameter 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 indications provided when the DIP-switch is set in Position 0 (OFF).

PT100 WIRING	
SW1 [1, 2, 3, 4]	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
	0 - 10 mA
	0 - 10 Vdc
	0 - 5 Vdc
	1 - 5 Vdc
MEASUREMENT RANGE START	
SW1 [6, 7, 8]	0
	-10
	-20
	-30
	-40
	-50
	-100
	-150

Electrical Connections

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

Proceed as follows to make the connections:

- 1 - Strip the cables by 0.8 mm
- 2 - Insert a screwdriver in the square hole and press it until the cable lock spring opens.
- 3 - Insert the cable in the round hole.
- 4 - Rotate the screwdriver clockwise and make sure that the cable is tightly fastened in the terminal.

Power supply
 There are various ways to provide the K Series 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 K-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.
- 3 - Using the K-BUS connector accessory for the distribution of the power supply to the modules via bus connector and the K-SUPPLY accessory for the connection of the power supply.

The K-SUPPLY accessory is a 6.2 mm wide module that contains a set of protections designed to protect the modules connected via bus against over-voltage loads.

The bus connector can be provided with power using the K-SUPPLY module if the total absorption of the bus is less than 1.5A. Higher absorption values can damage both the module and the bus. An appropriately sized fuse must be connected in series to the power supply.

Output Voltage connection - Current connection (applied current)

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

Note: in order to reduce the instruments' 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	Internal malfunction
3 pulses/sec.	
Slow flashing	DIP-switch setting error
1 pulse/sec.	
Steady light	PT100 connection wire malfunction, 3" 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 its packaging, indicates that this product should not be treated as household waste. It should be disposed of separately in order to protect the environment. 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 office, waste disposal service or the retail store where you purchased this product.

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Input
 The module accepts input from a PT100 temperature probe (EN 60751) 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 equivalent to the resistance contributed by the connection cables to the measurement.

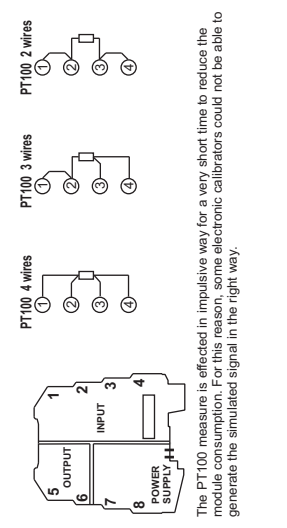
DIP-switch SW1-1 set in Position 1 (ON) (2/4 wires).
 With bridges between Terminals 1 and 2 and Terminals 3 and 4.

3-wire connection
 This connection 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 to ensure that the resistance of the cables is equal to the resistance of the instrument measurement cables. By ensuring this, the resistance of only one cable and assumes the resistance of the others cables to be exactly 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 to be used for media-long distances (> 10 m) between module and probe. This 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 Position 1 (ON) (2/4 wires).



The PT100 measure is effected in impulsive way for a very short time to reduce the module consumption. For this reason, some electronic calibrators could not be able to generate the simulated signal in the right way.