SENECA

USER MANUAL

Z Line

EN **Z109PT2-1** **RTD Thermoresistance converter module with galvanic isolation**

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c(UL)us LISTED 3LUT

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1. PRELIMINARY WARNINGS

Before carrying out any operation it's mandatory to read all the content of this user Manual.
Only electrically-skilled technicians can use the module described in this user Manual.
Only the Manufacturer is authorized to repair the module or to replace damaged components.
No warranty is guaranteed in connection with faults resulting from improper use, from modifications or repairs carried out by Manufacturer-unauthorized personnel on the module, or if the content of this user Manual is not followed.

2. DESCRIPTION AND CHARACTERISTICS

2.1 MODULE DESCRIPTION

The Z109PT2-1 module acquires an RTD thermoresistance input signal, converts it to an analog format and sends it to a universal isolated output.

2.2 GENERAL CHARACTERISTICS AND FEATURES

- Thermoresistance input: **NI100, PT100, PT500 and PT1000**.
- Output powered by 2-wire technique: 20 V⎓ stabilized, 20mA max, short-circuit protected.
- Measurement with re-transmission of isolated analog voltage or current output.
- DIP-switch for selecting: type of input, START-END, output mode (zero elevation, scale inversion), output type (mA or V).
- Front panel indicators: power on, off scale or setting error.
- 3-way isolation: 1500 V∿.

3. TECHNICAL SPECIFICATIONS

3.1 INPUT

Thermoresistance input: (RTD): PT100, PT500, PT1000, NI100	2, 3 or 4 wire measurement, Energizing current 0.56 mA, Resolution 0.1 °C, Automatic detection of interruption of RTD.
Sampling frequency:	Variable from 240 sps with 11 bit resolution + sign to 15 sps with 15 bit + sign resolution (typical values).
Response time:	35 ms with 11 bit resolution, 140 ms with 16 bit resolution (measurement of voltage, current, potentiometer).

3.2 OUTPUTS

Output:	I: 0-20 / 4-20 mA, max load resistance 600 Ω V: 0-5 V / 0-10 V / 1-5 V / 2-10 V, min load resistance 2 kΩ Resolution: 2.5 μA / 1.25 mV.
Data memory:	EEPROM for all configuration data; storage time: 40 years.

INSULATIONS 1500V∿	STANDARDS

1500 V∿ isolating voltage is among:
- power supply
- analog input
- analog output

The module complies with the following standards:
EN61000-6-4 (electromagnetic emission, in industrial environment)
EN61000-6-2 (electromagnetic immunity, in industrial environment)
EN61010-1 (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 and/or Limited Current power supply, a fuse rated max 2.5 A shall be installed in the field.

Errors referred to maximum measuring range:	Calibration Error	Thermal Coefficient	Linearity Error	EMI
Thermoresistance RTD Input: PT100, PT500, PT1000, NI100 (1)	0.1%	0.01%/°K	0.02% (se t > 0°C) 0.05% (se t < 0°C)	<1% (2)
Voltage output (3)	0.3%	0.01%/°K	0.01%	

(1) All the values have to be calculated on the resistive value.
(2) Influence of cable resistance 0.005%/Ω max 20 Ω.
(3) Values to be added to the errors of the selected input.

3.3 CONNECTIONS

USB Interface	Micro USB connector (front panel)

3.4 POWER SUPPLY

Supply Voltage	10-40 V⎓, 19-28 V∿ 50-60 Hz, through screw terminals: 2 – 3
Power supply unit	Class 2
Power consumption	1.6 W @ 24 V⎓ with output 20 mA; Max: 2.5 W

3.5 MODULE CASE

Case	PA6, black color
Dimensions	Width W=17.5mm; Height H=100mm; Depth D=112mm
Board terminals	Removable 3 way screw terminals: pitch 5.08mm, section 2.5mm^2
Protection class	IP20, must be installed in a protective enclosure

3.6 ENVIRONMENTAL CONDITIONS

Operating Temperature	-10°C – +60°C (UL: -10°C – +60°C)

3.6 ENVIRONMENTAL CONDITIONS

Humidity	30 – 90% at 40°C non-condensing
Pollution degree	2 (Maximum environment pollution during operations)
Storage Temperature	-20°C – +85°C

4. PRELIMINARY INSTRUCTIONS FOR USE

The module was designed to be installed on an IEC EN 60715 rail in a vertical position.
We suggest the module installation in the lower part of the control panel.
In order to ensure best performance and longest working life module, please ensure adequate ventilation to the modules and avoid placing raceways or other objects which obstruct the ventilation slots.
It's forbidden to install the module near or above heat sources.
«Severe operating conditions» are as follows:

- High power supply voltage: >30 V⎓ , 26 V∿.
- The module supplies power to the sensor at input.
- Output used as current generator (connected to a passive module).
If the modules are installed side by side, **separate them by at least 5 mm** in the following cases:
- If the panel operating temperature exceeds 45°C and at least one of the severe operating conditions exists;
- If the panel operating temperature exceeds 35°C and at least two of the severe operating conditions exist.

5. ELECTRICAL CONNECTIONS

5.1 SAFETY MEASURES BEFORE USE

To satisfy the electromagnetic compliance requirements:
• Use shielded cables for signal transmission;
• The cable shield must be connected to an earth wire used specifically for instrumentation;
• Avoid placing signal cables near power cables and power appliances (inverters, motors, induction ovens, etc.)

5.2 USB INTERFACE

The module has a microUSB connector. You can configure it through the app and/or software. For more information please see www.seneca.it/products/z109pt2-1.

CU-A-MICRO-OTG	CU-A-MICROB	CU-A-MICROB
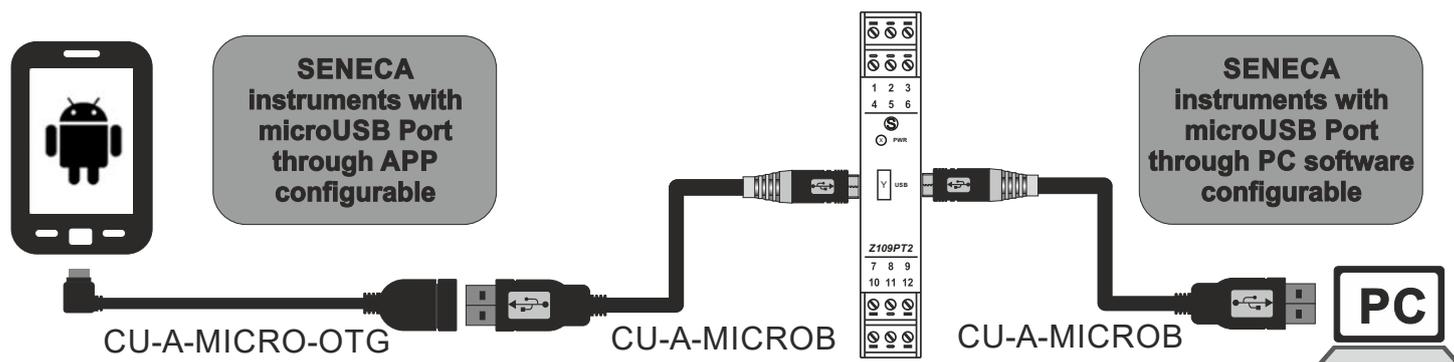
5.3 CONNECTIONS

⚠️ Please provide the module with supply voltage < 40 V⎓ or < 28 V∿.
These upper limits must not be exceeded to avoid serious damage to the module.

5.4 POWER SUPPLY

2 ⊘ — 19 – 28 V∿
        10 – 40 V⎓
3 ⊘ — 2.5 W Max

5.5 THERMORESISTANCE INPUT

RTD 2 wires

| 8 |
| 9 |
| 12 |
| 10 |

RTD 3 wires

| 8 |
| 9 |
| 12 |
| 10 |

RTD 4 wires

| 8 |
| 9 |
| 12 |
| 10 |
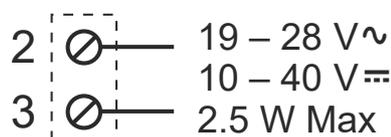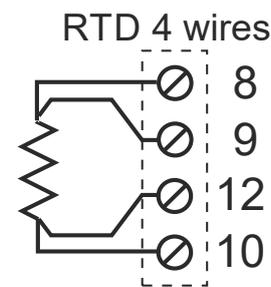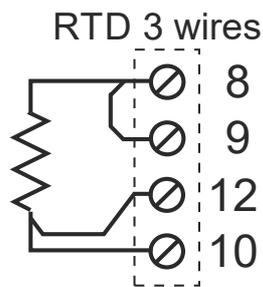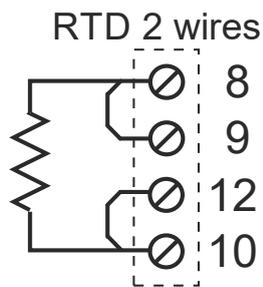
5.6 ANALOG OUTPUT

RE-TRANSMITTED OUTPUT

Voltage
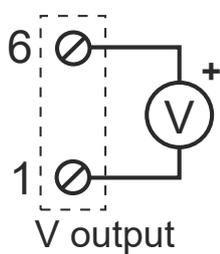
V output

Generated current **(4)**
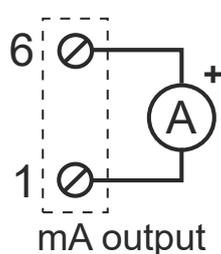
mA output

External power Supply current **(5)**
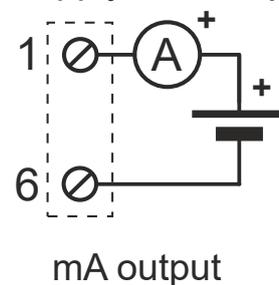
mA output

(4) Powered active output to be connected to passive inputs.
(5) Unpowered passive output to be connected to active inputs.
In order to select this feature please see: *SETTINGS THROUGH INTERNAL JUMPERS*.

Electrical ratings for UL:
Output: 10 V$=$, 20 mA
Input: 20 V$=$, 20 mA
Operating Temp.: -20 – +60°C

6.1 INPUT SELECTION / MEASURING SCALE

You can select the type of input by setting SW1 DIP switches on the side of the module.

Every type of input is matched to the beginning and end scale values which can be selected through SW2 DIP switches.

The following table lists possible START and END values according to the type of input selected. The left column show the DIP-switch settings in order to select the START and END scale desired.

⚠️ **Note: DIP-switches must be set while the module is powered down, otherwise, the module may be damaged.**

(*)START and END set in memory by a PC or by the programming push-buttons.
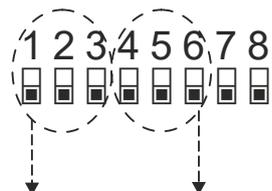
1 2 3 4 5 6 7 8   SW2 DIP-switch in OFF↓ position

SCALE n°		NI100 (RTD)		PT100 (RTD)		PT500 (RTD)		PT1000 (RTD)	
		START	END	START	END	START	END	START	END
	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	2	-50 °C	20 °C	-200 °C	50 °C	-200 °C	0 °C	-200 °C	0 °C
	3	-30 °C	40 °C	-100 °C	100 °C	-100 °C	50 °C	-100 °C	50 °C
	4	-20 °C	50 °C	-50 °C	200 °C	-50 °C	100 °C	-50 °C	100 °C
	5	0 °C	80 °C	0 °C	300 °C	0 °C	150 °C	0 °C	150 °C
	6	20 °C	100 °C	50 °C	400 °C	50 °C	200 °C	50 °C	200 °C
	7	30 °C	150 °C	100 °C	500 °C	100 °C	300 °C	100 °C	300 °C
	8	50 °C	200 °C	200 °C	600 °C	150 °C	400 °C	200 °C	400 °C

SW1: INPUT SELECTION			
Position	INPUT	Position	INPUT
1 2 3 4	TYPE	1 2 3 4	TYPE
	NI100		PT500
	PT100		PT1000

SW2: START / END			
Position	START	Position	END
1 2 3	SCALE n°	4 5 6	SCALE n°
	1		1
	2		2
	3		3
	4		4
	5		5
	6		6
	7		7
	8		8

LEGEND	↑	ON	↓	OFF

6.2 CUSTOM START AND END SETTINGS

H\Y`GH5F`H`UbX`9B8`di g\!Vi hhcbg`i bXYf`h\Y`GK &`8Đ!gk ]hW\`[fci d`U`ck `mci `hc`gYh`U`W`ghca`
VY[]bb]b[`UbX`YbX`dc]bhk ]h`]b`h\Y`dfY!gYh`8Đ!gk ]hW\`gW`UYg``Hc`Xc`h\]g`]h`]g`bYWYggUfm`hc`i gY`U`gi ]hUV`Y`
g][bU`[ YbYfUhcf`cf`WU`VfUhcf`hc`cVY`UV`Y`hc`i fb`g\]h\Y`XYg]fYX`VY[]bb]b[`UbX`YbX`gWU`Y`jU`i Yg"
H\Y`dfcWYXi fY.

  %"`GYh`h\Y`8Đ!gk ]hW\Yg`fcf`h\Y`hmdY`cZ`]bdi h"

  &"`GYh`h\Y`8Đ!gk ]hW\Yg`fcf`GH5F H`UbX`9B8`gYhh]b`g`h\Uh`cjYf`h\Y`W`ghca`fUb[Y"

  '`"`Dck Yf`i d`h\Y`a cXi `Y"

  ("`I gY`U`WU`]VfUhcf`cf`g]a U`Uhcf`hc`gi dd`mh\Y`g][bU`mci `k ]g\`hc`a YUgi fY"

)"`GYh`h\Y`fYei fYX`GH5F H`jU`i Y`cb`h\Y`WU`]VfUhcf`fcf`ch\Yf`]bghfi a Ybh"

  *"`DfYgg`h\Y`GH5F H`di g\!Vi hhcb`fcf`Uh``YUgh``gYW"H\Y`[ fYYb`@98`cb`h\Y`fcbh`dUbY``Z`Ug\Yg`hc`
    ]bX]WUhY`h\Y`jU`i Y`\Ug`VYYb`ghcfYX"

  +"`F YdYUh`ghYdg`(`UbX`)`fcf`h\Y`fYei fYX`9B8`jU`i Y"

  ,`"`Dck Yf`cZZ`h\Y`a cXi `Y"

  -"`GYh`h\Y`[ fci d`GK &`8Đ!gk ]hW\Yg`WcffYgdcbX]b[`hc`h\Y`gYhh]b`g`cZ`GH5F H`UbX`9B8`hc`h\Y`C: :
    position.

H\Y`a cXi `Y`]g`bck `Wcb`[i fYX`fcf`h\Y`fYei fYX`ghUfh`UbX`YbX`gWU`Y"`Đ`cfXYf`hc`fY!dfc[fUa `]h`
fY"`[ "`fcf`U`X]ZZYfYbh`hmdY`cZ`]bdi hcf`fUb[Y`fYdYUh`h\Y`UVcjY`dfcWYXi fY"

6.3 OUTPUT SELECTION

GK &`[ fci d`8Đ!gk]hW\Yg`+`UbX`,`YbUV`Y`mci `hc`gYh`h\Y`ci hdi h`k ]h`cf`k ]h\ci h`Yfc`Y`YjUf]cb`UbX#cf`
Ug`U`bcfa U`cf`fYjYfgYX`ci hdi h"`H\Y`GK '`8Đ!gk]hW\`[ fci d`YbUV`Yg`mci `hc`gY`YWh`h\Y`ci hdi h`hmdY"

Note: The DIP-switches must be set while the module is powered down, avoiding electrostatic discharge, otherwise the module may be damaged.

SW2: SCALE AND MODE OUTPUT			
Position	OUTPUT	Position	OUTPUT
7 8	RANGE	7 8	MODE
▪ X	0-20mA / 0-10V	X ▪	NORMAL
▪ X	4-20mA / 2-10V	X ▪	REVERSE

SW3: OUTPUT TYPE			
Position	OUTPUT	Position	OUTPUT
1 2	TYPE	1 2	TYPE
▪ ▪	VOLTAGE	▪ ▪	CURRENT
LEGEND	▪↑ ON		▪↓ OFF

6.4 CONFIGURATION THROUGH A PC

6mi g]b[`U`D7 `UbX`95GMG9HI D`gcZhk UfY`]h`]g`dcgg]V`Y`hc`gYh`]bdi h`hmdYž`]bdi h`ghUfh`UbX`YbX`cZ`gWU`Yž
a YUgi fYa Ybh`hmdYž`fYUW`cb`Zj`hYfž`fgc`i h`cb`ci hdi hg`g][bU`ži ci h`ghUfh`UbX`YbX`cZ`gWU`YžVcbj Yfg]cb`jU`i Yž
i ddYf`UbX`ck Yf``a]h`gž`ci hdi hj U`i Y`]f`h\YfY`]g`Ub`YffcfUbX`X][ [U`ci hdi h"]`hYf"

H\Y`]bghfi a Ybh`]g`Z`UWhcfm`gYh`Zcf`U`` `k ]fY`h\Y`a dYfUhifY`a YUgi fYa Yblž`\ck Yj Yf`]hg`dcgg]V`Y`hc`gY`YWh`U`&
cf`(`k]fY`Wcb`[i fUh]cb`fUX]b[ `by`fYdfc[ fUa a ]b[ `h\Y`a cXi `Y"

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6.5 JUMPER POSITIONS
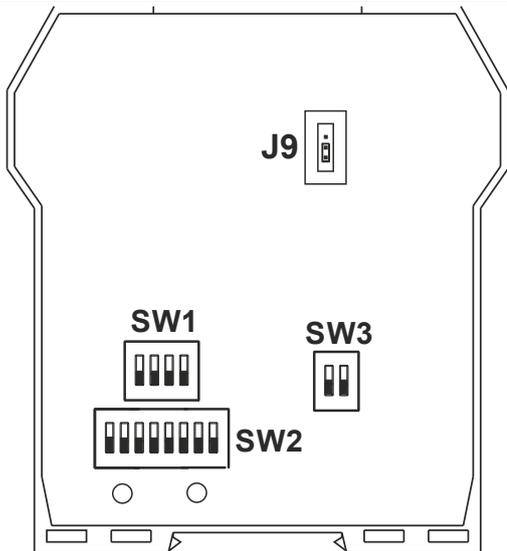
**SETTINGS THROUGH
INTERNAL JUMPERS**

ACTIVE / PASSIVE OUTPUT

Active Output	Passive Output
J9	J9

6.6 LED INDICATIONS ON THE FRONT PANEL

LED	LED STATE	LED MEANING
PWR Green	ON	Power On
	Blinking frequency: 1 flash/sec	Out of Range, Burn Out, or Internal Failure
	Blinking frequency: ≈ 2 flashes/sec	DIP-switch setting error

7. PURCHASE ORDER CODE

ORDER CODE	SPECIFICATIONS
CU-A-MICROB	USB-microUSB/ 1 meter communication cable.
CU-A-MICRO-OTG	Adapter cable for Android smartphone.

8. MODULE LAYOUT

FRONT PANEL	MODULE DIMENSIONS
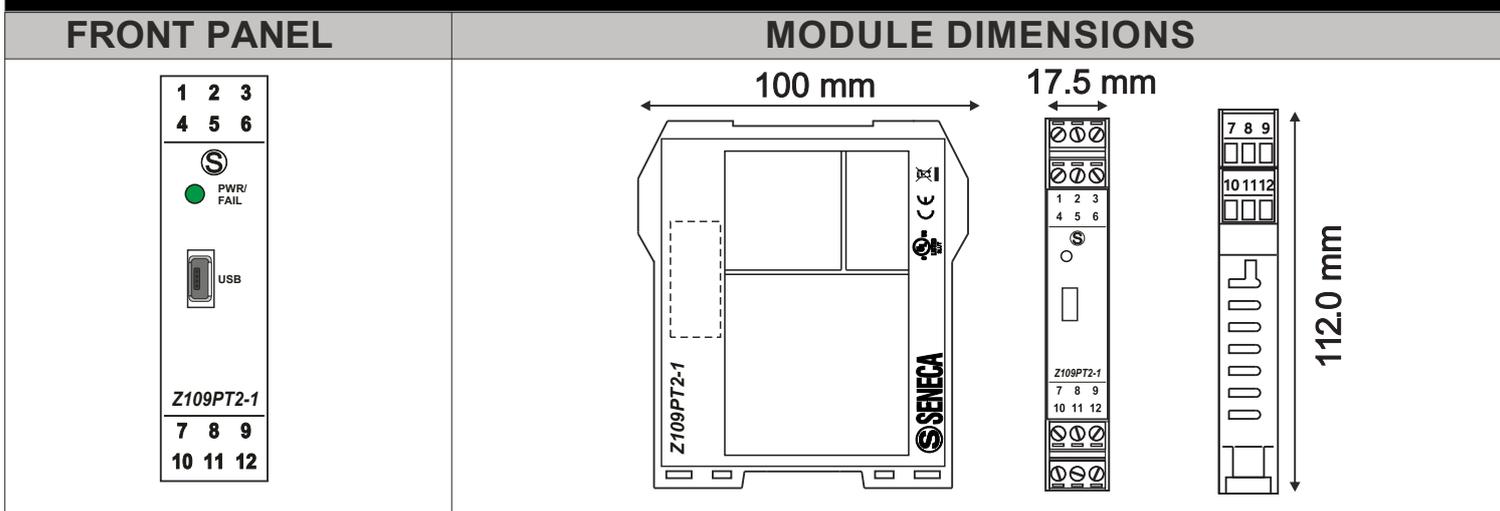
9. DECOMMISSIONING AND DISPOSAL

Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collections 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 & 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 the product, please contact your local city office, waste disposal service of the retail store where you purchased this product.