



Serie Z



EN

Z109REG-BP

UNIVERSAL CONVERTER WITH ISOLATED BIPOLAR OUTPUT

Installation Manual

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Manuals and configuration software are available at www.seneca.it

CERTIFICATE N. 11115 SENEC - INGEGNERIA E SERVIZI



adotta con sistema di gestione per la qualità certificato

ISO 9001:2008

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GENERAL SPECIFICATIONS

- Universal input: voltage (mV \rightleftharpoons), current (mA \rightleftharpoons), thermocouples TC, thermoresistances RTD, potentiometer, rheostat, NTC.
- Measurement and re-transmission on isolated analog bipolar output, with voltage output or current.
- DIP-switch for selecting: type of input, START-END, output mode (zero elevation, scale inversion), output voltage type (mA or V).
- Removable terminals with section of 2.5 mm²
- Possibility of USB configuration.
- Sensor powered by 2 / 3 wire technique is available: 20V \rightleftharpoons Max stabilised, 20mA Max with short-circuit protection (terminal 7).
- 3-point insulation: 1500V \sim .
- Front panel indicating: power on, off scale or setting error and alarm status.
- Facility for programming the following through PC: START-END scale, additional input types, square root extraction, filter, burn-out etc. (See: www.seneca.it)

TECHNICAL SPECIFICATIONS

Universal Input

Sampling frequency	Variable from 240 sps with 11 bit + sign resolution to 15 sps with 15 bit + sign resolution (typical values).
Filter	The input signal filter level can be enabled and configured: from 0.5 to 60 sec.
Response time	35 ms with 11 bit resolution, 140 ms with 16 bit resolution (for measures: voltage, current and potentiometer)
Voltage input mode	Bipolar from 75 mV to 20 V with 9 scales, input impedance: 1 M Ω . Max resolution 15 bit + sign.
Current input mode	Bipolar up to 20 mA. Internal shunt \sim 50 Ω . Max resolution 1 μ A. Powered sensor loop: from sensor to module (passive module) or from module to sensor(active module) by terminal 7 (Max 25 mA \rightleftharpoons a Max 20 V \rightleftharpoons) with short-circuit protection. Automatic input out of range detection.
thermoresistances (RTD) input mode	RTD type: PT100, PT500, PT1000, NI100, KTY81, NTC, KTY84 -130/-150. Resistance measure 2, 3 or 4 wires and resistance wire measure. Energising current: 0.56 mA. Resolution 0.1 $^{\circ}$ C. Automatic burn-out detection. For NTC resistance value < 25k Ω . NTC, KTY81 and KTY84 configurable only by software.
thermocouples (TC) input mode	TC type: J, K, R, S, T, B, E, N. Input impedance: > 5 M Ω . Automatic burn-out's detection. Resolution 2.5 μ V.
Potentiometer input mode	Excitation voltage of 300mV. Potentiometer input value from 500 Ω to 100 k Ω (a R = 500 Ω parallel circuit must be added). Automatic input out of range detection.
Rheostat input	Input rheostat value: from 500 Ω to Max 25 k Ω

Errors related to max measuring range	Accuracy	Thermal stability	Linearity error	EMI
TC input type: J, K, E, T, N	0.1%	0.01%/°K	0.2°C	<1% (1)
TC input type: R, S	0.1%	0.01%/°K	0.5°C	<1% (1)
TC input type: B (2)	0.1%	0.01%/°K	1.5°C	<1% (1)
Cold junction compensation (for all TC inputs type)	2°C from 0°C to 50°C environment	/	/	/
Thermoresistance input type (RTD) (3)	0.1%	0.01%/°K	t>0°C 0.02% t<0°C 0.05%	<1% (4)
Potentiometer or rheostat input type	0.1%	0.01%/°K	0.1%	<1%
Voltage or current input type	0.1%	0.01%/°K	0.05%	<1% (1)

(1) Influence of wire resistances: 0.1 $\mu\text{V}/\Omega$

(2) Output zero if $t < 250^\circ\text{C}$

(3) RTD type: PT100, PT500, PT1000, NI100

All the errors have to be calculated with reference to resistive value.

(4) Influence of wire resistances: 0.005 %/ Ω , max 20 Ω

Outputs	
Channel numbers	1
Output type	Current: -20 – +20 mA, Maxium load resistance 500 Ω Voltage: -10 – +10 V, minimum load resistance 1 k Ω
Resolution	5 $\mu\text{A}/2.5 \text{ mV}$.

Errors	Accuracy	Thermal stability
Voltage output	10 mV	0.5mV/K
Current output	20 μA	1 $\mu\text{A}/\text{K}$

Environmental conditions	
Temperature	-20 – +65°C
Humidity	30 – 90% a 40°C not condensing
Altitude	Up to 2000m a.s.l.
StorageTemperature	-20 – +85°C
Protection degree	IP20
Data Memory	EEPROM for all configuration data; storage time: 40 years.

Power supply

Voltage	10 – 40 V $\overline{\text{=}}$; 19 - 28 V \sim 50 – 60 Hz
Consumption	Max: 2W

Electrical connections

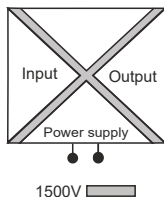
Removable 3-way screw terminals 5 mm pitch

MicroUSB frontal plug

Dimensions / Module box

Dimensions	L: 100 mm; H: 112 mm; W: 17,5 mm
Module box	PA6, black

Isolations 1500 V



Standards

The module complies with the following standards:



EN61000-6-4 (electromagnetic emission, industrial environment).

EN61000-6-2 (electromagnetic immunity, industrial environment).

EN61010-1 (safety).

ADDITIONAL NOTES:

One max 2.5A fuse must be installed near the module.

INSTALLATION RULES

The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best module performance and long life, avoid to place cables raceways and other objects that could obstruct ventilation slits.





Never install the modules near heat sources. We suggest to install the module in the bottom of the control panel.

SELECTION: INPUT / MEASURING SCALE

The type of input is selected by setting the SW1 DIP-Switches group at the side of the module.

Each type of input is matched with a number of beginnings scale (START) and full scale (END) selectables with the SW2 DIP-Switches group.

The frames above show the START or END values for every selected input.

SW1	INPUT TYPE	SW1	INPUT TYPE	SW2	START	SW2	END
<div style="display: flex; justify-content: space-around;"> 1234 </div> 	V Ω / Rheostat mA NI100 PT100 PT500 PT1000 Tc J	<div style="display: flex; justify-content: space-around;"> 1234 </div> 	Tc K Tc R Tc S Tc T Tc B Tc E Tc N Potentiometer	<div style="display: flex; justify-content: space-around;"> 123 </div> 	1 2 3 4 5 6 7 8	<div style="display: flex; justify-content: space-around;"> 456 </div> 	1 2 3 4 5 6 7 8



SW2 DIP	N°	Voltage		Resistance / Rheostat		Current		Potentiometer		NI100 (RTD)		PT100 (RTD)	
		START	END	START	END	START	END	START	END	START	END	START	END
	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	2	0 V	100 mV	0 Ω	1 kΩ	0 mA	1 mA	0 %	40 %	-50°C	20°C	-200°C	50°C
	3	400 mV	200 mV	0.5 kΩ	2 kΩ	1 mA	2 mA	10 %	50 %	-30°C	40°C	-100°C	100°C
	4	1 V	500 mV	1 kΩ	3 kΩ	4 mA	3 mA	20 %	60 %	-20°C	50°C	-50°C	200°C
	5	2 V	1 V	2 kΩ	5 kΩ	-1 mA	4 mA	30 %	70 %	0°C	80°C	0°C	300°C
	6	-5 V	5 V	5 kΩ	10 kΩ	-5 mA	5 mA	40 %	80 %	20°C	100°C	50°C	400°C
	7	-10 V	10 V	10 kΩ	15 kΩ	-10 mA	10 mA	50 %	90 %	30°C	150°C	100°C	500°C
	8	-20 V	20 V	15 kΩ	25 kΩ	-20 mA	20 mA	60 %	100 %	50°C	200°C	200°C	600°C

SW2 DIP	N°	PT500 (RTD)		PT1000 (RTD)		Thermocouple J		Thermocouple K		Thermocouple R		Thermocouple S	
		START	END	START	END	START	END	START	END	START	END	START	END
	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	2	-200°C	0°C	-200°C	0°C	-200°C	100°C	-200°C	200°C	0°C	400°C	0°C	400°C
	3	-100°C	50°C	-100°C	50°C	-100°C	200°C	-100°C	400°C	100°C	600°C	100°C	600°C
	4	-50°C	100°C	-50°C	100°C	0°C	300°C	0°C	600°C	200°C	800°C	200°C	800°C
	5	0°C	150°C	0°C	150°C	100°C	400°C	100°C	800°C	300°C	1000°C	300°C	1000°C
	6	50°C	200°C	50°C	200°C	200°C	500°C	200°C	1000°C	400°C	1200°C	400°C	1200°C
	7	100°C	300°C	100°C	300°C	300°C	800°C	300°C	1200°C	600°C	1400°C	600°C	1400°C
	8	150°C	400°C	200°C	400°C	500°C	1000°C	500°C	1300°C	800°C	1750°C	800°C	1750°C

SW2 DIP	N°	Thermocouple T		Thermocouple B		Thermocouple E		Thermocouple N	
		START	END	START	END	START	END	START	END
	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	2	-200°C	50°C	0°C	500°C	-200°C	50°C	-200°C	200°C
	3	-100°C	100°C	500°C	600°C	-100°C	100°C	-100°C	400°C
	4	-50°C	150°C	600°C	800°C	0°C	200°C	0°C	600°C
	5	0°C	200°C	700°C	1000°C	100°C	300°C	100°C	800°C
	6	50°C	250°C	800°C	1200°C	150°C	400°C	200°C	1000°C
	7	100°C	300°C	1000°C	1500°C	200°C	600°C	300°C	1200°C
	8	150°C	400°C	1200°C	1800°C	400°C	800°C	500°C	1300°C

(*) START or END are set in memory with the PC or with a programming push buttons.

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

SELECTION: OUTPUT TYPE

SW2 DIP-switches group numbers 7 and 8 enable you to set the output mode: voltage or current and the output mode: normal or reversed.

SW2	OUTPUT TYPE
7 	Current Voltage

SW2	OUTPUT TYPE
8 	Normal Reversed

SETTING START AND END AT WILL

The START and END push-buttons under the SW2 DIP-switch group allow to set the beginning and end scale at will within the scale pre-set through the dip-switches.

To obtain this facility it is necessary to use a suitable signal generator, able to furnish the desired values of beginning and end scale.

The procedure is following:

- Set to SW1 the type of input desired, set to SW2 a START and END measurement which include the required beginning and end values.
- Power up the module.
- Supply a calibrator or simulator of the signal you wish to measure and re-transmit.
- Set the required START value on the calibrator (or other instrument).
- Press the START push-button for at least 3 sec.

The green LED on the front panel flashes to indicate the value has been stored.

- Set the required END value on the calibrator (or other instrument)
- Press the END push-button for at least 3 sec.

The green LED on the front panel flashes to indicate the value has been stored.

- Cut power to the module and set to OFF position the dip-switches of group SW2, like in **SW2 DIP** frame: START and END values row n°1 (*).

The module is now configured for the required start and end scale.

To reprogram it (e.g. for a different type of input) repeat the whole procedure.

FRONTAL LED'S INDICATIONS'S

LED	STATE	MEANING OF LED'S
PWR Green	On	Power supply presence
PWR Green	Flashing (freq: 1 Flash./sec)	Out of range, Burn Out
PWR Green	Flashing (freq ≈ 2 Flash./sec)	DIP-Switch setting Error's
ALARM Yellow	On	Internal fault

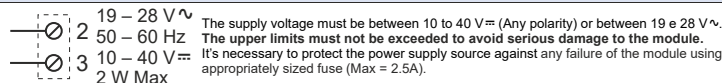
ADVANCED SETTINGS

By using a PC and downloadable softwares from www.seneca.it, it is possible to set other normally fixed parameters in addition to start and end scale:

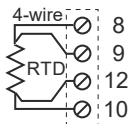
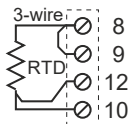
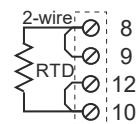
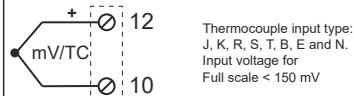
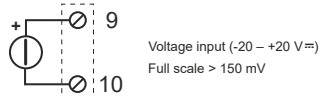
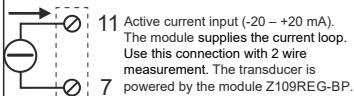
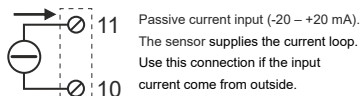
- Additional input types.
- Digital filter (normally disabled).
- Square root extraction (normally disabled).
- Negative burn-out (normally positive).
- Start and end scale of the analog output.
- Value of the analog output in case of error.
- Rejection programmable for 50 or 60 Hz mains frequency (normally set to 50 Hz).
- Sampling frequency/resolution (normally set to 15 sps/16 bit).
- 3 or 4 wires measure for thermal resistance (normally set to 3 wires).
- The instructions for setting and USB cable are supplied as a KIT available on request.

ELECTRICAL CONNECTIONS

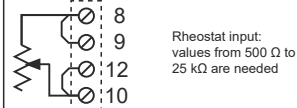
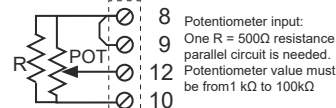
Power supply



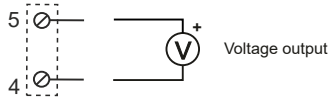
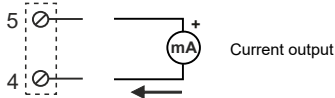
Universal input



Thermoresistance input type:
PT100, NI100, PT500 and PT1000.
The two-wire connection can also be used for NTC and KTY



Output



DEFAULT CONDITIONS

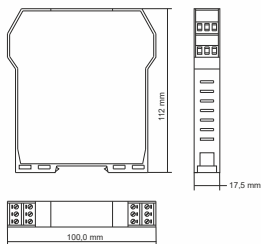
Input type / Start – End range	Voltage / -10 V – +10 V
Input filter (acquired signal)	Disabled
Output type / Start – End range	Voltage / -10 V – +10 V
Rejection at mains frequency / Sampling time	Rejection = 50Hz / Sampling time = 20ms
Cold junction compensation (for RTc input)	Disabled

PURCHASE ORDER CODE

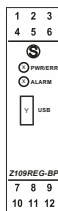
Order code	Description
Z109REG-BP	Bipolar universal converter with galvanic separation
KIT-USB	USB cable and configuration software
CAVO-USB-A-MICRO-B	USB / microUSB cable

MODULE LAYOUT

MODULE DIMENSIONS



FRONT PANEL



Variations of standard parameters are possible by software (see www.seneca.it).
For more information about a list of all register and their function consult the USER manual.

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.