Z109REG1

UNIVERSAL CONVERTER
WITH GALVANIC SEPARATION

EN

GENERAL CHARACTERISTICS

- Universal input: voltage (dc), current (dc), thermocouples, PT100, rheostat, potentiometer.
- Sensor powered by 2-wire technique: 20 Vdc stabilised, 20mA max with short-circuit protection.
- Measurement and re-transmission on isolated analog output, with voltage and current output .
- DIP-switch for selecting: type of input, START-END, output mode (zero elevation, scale inversion), full scale output voltage (5V or 10V),type of output (mA o V).
- Front panel indicating: power on, out of range or setting error.
- Facility for programming the following with a PC: beginning and end scale, additional input types, square root extraction, filter, burn-out etc.
- 3-point insulation: 1500 Vac.

TECHNICAL SPECIFICATIONS

Power supply:	10 - 40 Vdc, 19-28 Vac 50-60Hz, max 2.5 W; 1.6W @ 24Vdc with 20mA output.
Voltage input:	Bipolar from 75 mV up to 20 V in 9 scales, input impedance 1 MΩ, resolution max 15 bit + sign.
Current input:	Bipolar up to 20 mA, input impedance ~50 Ω, max resolution: 1μA.
Thermoresistance (RTD) input PT100, KTY81, KTY84-130/-150 and NTC.	2, 3 or 4 wires measurement, energising current 0.56 mA, resolution 0.1 °C, automatic detection of cable interruption or RTD. Resistive value for NTC: < 25 kΩ. KTY81, KTY84 an NTC may be set only by software.
Thermocouple input:	Type J,K,R,S,T,B,E,N; resolution: 2.5 μV, automatic detection of TC interruption, input impedance >5 MΩ
Rheostat input:	Full scale min 1k Ω, max 15 kΩ.
Potentiometer input:	Excitation voltage 300 mV, input impedance > 5 MΩ, potentiometer value from 500 Ω to 100 kΩ (with the aid of a parallel resistence equal to 500 Ω). This input may be set only by software.

Sampling frequency:	Variable from 240 sps with 11 bits resolution + sign to 15 sps with 15 bits + sign resolution (typical values).			
Response Time:	35 ms with 11 bits resolution, 140 ms with 16 bits resolution (measurement of voltage, current, potentiometer).			
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.			
Environmental conditions:	Temperature: -20 – 60 °C, Humidity min: 30%, max: 90% a 40°C non condensing (see ***Installation instructions***).			
Errors referred to max measuring range:	Calibration Error	Thermal Coefficient	Linearity error	Others
Voltage/Current Input:	0.1%	0.01%/°K	0.05%	EMI :<1% (2)
PTCs J,K,E,T,N Input:	0.1%	0.01%/°K	0.2 °C	EMI: <1% (2)
PTCs R,S Input:	0.1%	0.01%/°K	0.5 °C	EMI: <1% (2)
PTC B (4) Input:	0.1%	0.01%/°K	1.5 °C	EMI: <1% (2)
Cold junction compens.:	2°C in ambient range 0 to 50°C.			
Potentiometer/resistor :	0.1%	0.01%/°K	0.1%	EMI: <1%
Input for thermoresistance (5):	0.1%	0.01%/°K	t > 0°C 0.02% t < 0°C 0.05%	(1) EMI: <1%
Voltage output (3):	0.3%	0.01%/°K	0.01%	
Data Memory	EEPROM for all configuration data; storage time: 40 years.			
Standards CE	EN61000-6-4 (electromagnetic emission, industrial environment) EN61000-6-2 (electromagnetic immunity, industrial environment) EN61010-1 (safety).			

(1) Influence of cable resistance 0.005%/Ω max 20 Ω.
(2) Influence of cable resistance 0.1 μV/Ω.
(3) Values to be added to the errors of the selected input.
(4) Output zero if t < 400 °C.
(5) All the values have to be calculated on the resistive value.

SELECTION: INPUT / MEASURING SCALE

The type of input is selected by setting the SW1 dip-switch group at the side of the module.
Every type of input is matched to a certain number of scale beginnings START and ends END values which can be selected with the SW2 group.
The next page table lists possible START and END values according to the type of input selected.
The columns below show the dip-switch combination for the type of input and for the START and END chosen.

SW1

INPUT TYPE (1234)
V
ohm
mA
PT100
Tc J
Tc K

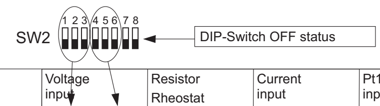
SW1

INPUT TYPE (1234)
Tc R
Tc S
Tc T
Tc B
Tc E
Tc N

SW2

START (123)	END (456)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

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



	Voltage input START	Voltage input END	Resistor Rheostat START	Resistor Rheostat END	Current input START	Current input END	Pt100 (RTD) input START	Pt100 (RTD) input END
1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
2	0V	100mV	0 Ω	1KΩ	0mA	1mA	-200°C	50°C
3	400mV	200mV	1KΩ	2KΩ	1mA	2mA	-100°C	100°C
4	1V	500mV	2KΩ	3KΩ	4mA	3mA	-50°C	200°C
5	2V	1V	3KΩ	5KΩ	-1mA	4mA	0°C	300°C
6	-2V	2V	5KΩ	7KΩ	-5mA	5mA	50°C	400°C
7	-5V	5V	7KΩ	10KΩ	-10mA	10mA	100°C	500°C
8	-10V	10V	10KΩ	15KΩ	-20mA	20mA	200°C	600°C

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

	Thermocouple T START	Thermocouple T END	Thermocouple B START	Thermocouple B END	Thermocouple E START	Thermocouple E END	Thermocouple N START	Thermocouple N 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 the memory by PC or by push-buttons

SETTING START AND END AT WILL

The START and END push-buttons under the SW2 dip-switch allow to set the beginning and full scale at will within the by dip-switches selected scale.
To obtain this facility use a signal generator, enabled to give the desired values of beginning and full scale.
Please follow this procedure:
1. Set by dip-switches SW1 the input type and by SW2 a START and a END which include the desired beginning and fullscale values.
2. Power up the module.
3. Supply a calibrator or simulator to the signal you wish to measure and re-transmit.
4. Set the required START value on the calibrator (or other instrument).
5. Press the START push-button for at least 3 sec. The yellow LED on the front panel flashes to indicate the value has been stored.
6. Repeat points 4 and 5 for the required END value.
7. Shut off the module and set to OFF position the SW2 dip-switches, where you selected the START and END values.
The module is, now, configured to the required beginning and full scale.
In order to re-program it (e.g. for a different type of input) repeat the whole procedure.

SELECTING OUTPUT

SW2 DIP-switches numbers 7 and 8 enable you to set the output with or without zero elevation, and as a normal or reversed.
The SW3 DIP-switch group enables you to select the voltage or current output type.

NOTICE: Before change the DIP-switches setting shut off module, otherwise, the module may be damaged.

SW2

OUTPUT MODE
7: 0-20mA / 0-10V
4-20mA / 2-10V
8: NORMAL
REVERSED

SW3

OUTPUT VOLTAGE (12)
0/1..5V
0/2..10V

KEY
ON

SETTING BY PC

By a PC and *Easy Setup* software, it's possible to set other normally factory fixed parameters in addition to start and end:
Additional input types not selectable by DIP-Switches;
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).
Action of the digital output alarm in case of fault;

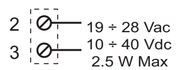
Instructions for setting and for the connection cable are supplied with the software (to be requested as an accessory item).

Front panel LED Indication

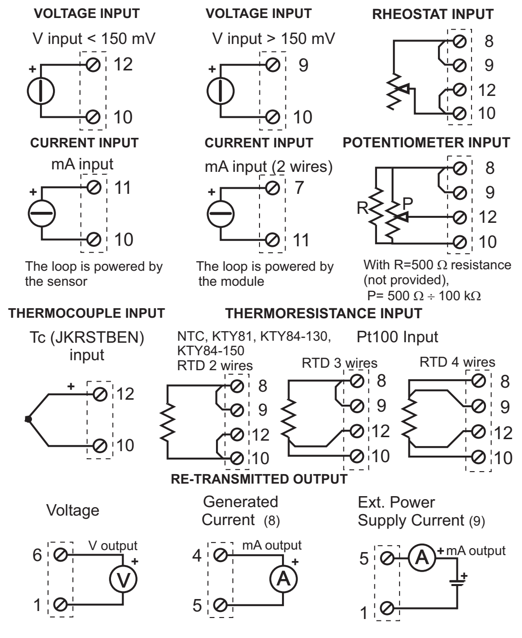
Green LED	Meaning
Steady ON	Indicates the power supply presence
Yellow LED	**Meaning**
Flashing (freq: 1 Flash./sec)	Out Range, Burn Out or Internal fault
Flashing (freq ≈ 2 Flash./sec)	Dip-switches setting error

ELECTRICAL WIRING

POWER SUPPLY



Power supply voltage must be from 10 to 40 Vdc (at any polarity) and from 19 to 28 Vac; see also ***INSTALLATION INSTRUCTIONS*** section.
The upper limits must not be exceeded, to avoid serious damage to the module.
Protect the power supply source against possible damage of the module by using a fuse of suitable size.



(8) Active Output (powered) to connect to passive inputs.
(9) Unpowered passive output to be connected to active inputs.

INSTALLATION INSTRUCTIONS

The module was DIN 46277guide designed, for a vertical position fixing.
For working properly and long life, make sure that adequate ventilation is provided for the module, avoiding placing raceways or other objects which could obstruct the ventilation grilles. Don't install modules above equipment that generates heat.
We suggest you to install in the lower part of the cabinet.

ELECTRICAL CONNECTIONS

We suggest you to use shielded cables for connecting signals. The shield must be connected to an earth wire used specifically for instrumentation. Moreover, it is good practice to avoid routing conductors near power appliances such as inverters, transformers, motors, induction ovens, etc.

SEVERE OPERATING CONDITIONS:

Severe operating conditions are as follows:
- *High power supply voltage (> 30 Vdc / > 26 Vac).*
- *Input sensor powered by module.*
- *Use of active current output.*

When modules are installed side by side, it may **be necessary to separate them by at least 5 mm** in the following cases:
- If panel temperature exceed 45°C and at least one of the severe operating conditions exists.
- If panel temperature exceed 35°C and at least two of the severe operating conditions exist.

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 thè retail store where you purchased this product.

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