Z109REG
UNIVERSAL CONVERTER WITH GALVANIC SEPARATION

GENERAL CHARACTERISTICS

- Universal input: voltage (cc), current (cc), thermocouples, PT100, potentiometer.
- Sensor powered by 2-wire technique: 20Vcc 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, zero and span, output mode (zero elevation, scale inversion), output voltage span (5 or 10 V).
- Front panel indicating: power on, off scale or setting error.
- Facility for programming the following with a PC: zero, span, square root extraction, filter, burn-out etc.
- 3-point insulation: 1500Vac.

TECHNICAL SPECIFICATIONS

Power supply:	19 - 40 Vdc, 19-28 Vac 50-60Hz, max 2.5W; 1.6W @ 24Vcc with 20mA output.
Voltage input:	Bipolar up to 10Vcc in 4 scales: 200mV, 2V, 5V, 10V, input impedance 1 Mohm, resolution 0.01%.
Current input:	Bipolar up to 20mAcc, input impedance 2.5 ohm, resolution 2uA.
Thermal-resistor input (RTD) PT100:	3-wire measurement, range -200..+600 °C, energising current 0.56mA, resolution 0.035 ohm, automatic detection of cable interruption or RTD.
Thermocouple input:	Type J,K,R,S,T,B,E,N; resolution 5uV, automatic detection of TC interruption.
Potentiometer input:	Full scale min 500 ohm, max 15 Kohm, resolution 0.01%.
All inputs:	Sampling frequency : 3 samples/second.

Output:	Generated current 0..20 / 4..20mA, max load resistance 600 ohm Voltage 0..5V / 0..10V / 1..5V / 2..10V, min load resistance 2500 ohm Resolution 0.025% (0..20mA/0..10V/0..5V) / 0.032% (4..20mA/2..10V/1..5V).			
Environmental conditions:	Temperature: 0..50°C, Humidity min: 30%, max: 90% a 40°C non condensing (also see section ***Installation instructions***).			
Errors referred to max measuring range:	Calibration	Thermal Coefficient	Linearity error	Others
Input for voltage/current:	0.2%	0.02%/°C	0.05%	EMI(4): <1%
Input for thermocouple J,K,E,T,N:	0.2%	0.02%/°C	t<0°C 0.4% t>0°C 0.05%	+/-1°C + (2) EMI: <1%
Input for thermocouple R,S:	0.2%	0.02%/°C	t<100°C 0.3% t>100°C 0.05%	+/-2°C + (2) EMI: <1%
Input for thermocouple B (5):	0.2%	0.02%/°C	t<600°C 0.3% t>600°C 0.1%	+/-4°C + (2) EMI: <1%
Cold junction compens.:	1.5°C in ambient range 10 to 40°C.			
Potentiometer (resitor):	0.2%	0.02%/°C	0.05%	EMI(4): <1%
Input for thermal resistor PT100:	0.2%	(0.015+ 0.01%d.l.)°C/°C	t > 0°C 0.05% t < 0°C 0.15%	(1) EMI: <1%
Voltage output (3):	0.1%	0.01%/°C	0.1%	
Protection for inputs:	except current: 60V continuous; current 200mA continuous.			
Protection for outputs/power supply:	against impulsive over-voltages 400W/ms.			
Data memory	EEPROM for all configuration data; storage time: 10 years			
The instrument conforms to the following standards: CE	EN50081-2 (electromagnetic emission, industrial environment) EN50082-2 (electromagnetic immunity, industrial environment) EN61010-1 (safety) All circuits are to be safely isolated from hazardous live by double insulation. The power supply transformer must comply with EN60742: isolating trasformers and safety isolating transformers requirements			

(1) influence of cable resistance 0.005%/ohm max 10ohm.
(2) influence of cable resistance 0.5uV/ohm.
(3) values to be added to the errors of the selected input.
(4) EMI: electromagnetic interferences.
(5) Output stops at 360 °C t < 360 °C.

SELECTION: INPUT / MEASURING SPAN

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 commencement and full-scale values which can be selected with the SW2 group.
The table below lists possible zero and span values according to the type of input selected.
The left hand column in the table indicates the dip-switch combination to be set for zero and for the selected span.

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

SW1

INPUT TYPE 1 2 3 4	
	V
	ohm
	mA
	PT100
	Tc J
	Tc K
	Tc R
	Tc S
	Tc T
	Tc B
	Tc E
	Tc N

SW2

ZERO 1 2 3	SPAN 4 5 6
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

SW2 1 2 3 4 5 6 7 8 ← DIP-Switch OFF status

	Voltage input		Resistor Potentiometer		Current input		Pt100 (RTD) input	
	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN
1	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
2	0V	100mV	0	1K	0mA	1mA	-200°C	50°C
3	400mV	200mV	1K	2K	1mA	2mA	-100°C	100°C
4	1V	500mV	2K	3K	4mA	3mA	-50°C	200°C
5	2V	1V	3K	5K	-1mA	4mA	0°C	300°C
6	-2V	2V	5K	7K	-5mA	5mA	50°C	400°C
7	-5V	5V	7K	10K	-10mA	10mA	100°C	500°C
8	-10V	10V	10K	15K	-20mA	20mA	200°C	600°C

	Thermocouple J		Thermocouple K		Thermocouple R		Thermocouple S	
	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN
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		Thermocouple B		Thermocouple E		Thermocouple N	
	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN	ZERO	SPAN
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

(*) SPAN or ZERO are set in the memory with the PC or with the programming push-buttons

SETTING ZERO AND SPAN AT WILL

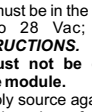
The ZERO and SPAN push-button under the SW2 DIP-switch group enables you to set zero or span at will within the pre-set zero/span values for the type of input selected.

To obtain this facility, the following operations must be carried out:
1. Set the type of input, zero and measurement span on SW2 which include the required zero and measuring span.
2. Power up the module.
3. Supply a calibrator or simulator of the signal you wish to measure or re-transmit.
4. Set the required zero value on the calibrator (or other instrument).
5. Press the ZERO 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 SPAN value.
7. Cut power to the module and set ZERO n°1 and SPAN n°1 on group SW2 (position (*) in table).

The module is now configured for the required span and zero. To re-program it (e.g. for a different type of input) repeat the whole procedure.

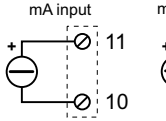
ELECTRICAL CONNECTIONS

POWER SUPPLY

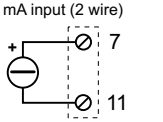


Power supply voltage must be in the range 19 to 40 Vdc (at any polarity), 19 to 28 Vac; also see section; ***INSTALLATION INSTRUCTIONS.***
The upper limits must not be exceeded, to avoid serious damage to the module.
Protect the power supply source against possible damage of the module by using a fuse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

CURRENT INPUT

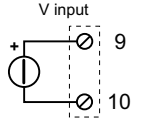


The loop is powered by the sensor

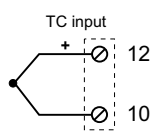


The loop is powered by the module

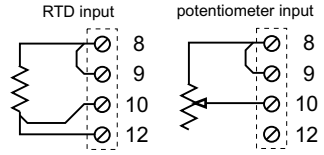
VOLTAGE INPUT



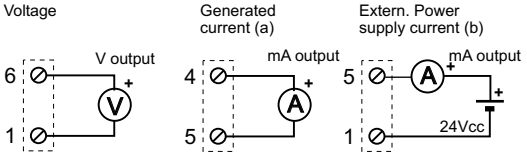
THERMOCOUPLE INPUT



RTD / POTENTIOMETER INPUT



RE-TRANSMITTED OUTPUT



A) Powered active output, to be conected to passive inputs.
B) Unpowered passive output, to be connected to active inputs.

SELECTING THE OUTPUT

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

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

SW2

OUTPUT MODE 7	
	0..20mA / 0..5V / 0..10V
	4..20mA / 1..5V / 2..10V
8	
	NORMAL
	REVERSED

SW3

OUTPUT VOLTAGE 1 2	
	0/1..5V
	0/2..10V

SETTING WITH A PC

By using a PC and ZSETUP software, you can set other normally fixed parameters in addition to zero and span:
- Digital filter (normally disabled);
- Square root extraction (normally disabled);
- Negative burn-out (normally positive);

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

INSTALLATION INSTRUCTIONS

Module Z109REG was designed for fitting to guide DIN 46277, in a vertical position.
For optimum operation and long life, make sure adequate ventilation is provided for the module/s, avoiding placing raceways or other objects which could obstruct the ventilation grilles.
Do not install the modules above appliances generating heat we advise you to install in the lower part of the panel.

SEVERE OPERATING CONDITIONS:

Severe operating conditions are as follows:
- *High power supply voltage (> 30Vcc / > 26 Vac).*
- *Power supply of the sensor at input.*
- *Use of the output on generated current.*

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.

ELECTRICAL CONNECTIONS

We advise 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, motors, induction ovens, etc.

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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