Z109TC2
THERMOCOUPLE CONVERTER WITH GALVANIC SEPARATION

GENERAL SPECIFICATIONS

- Input for thermocouple type: J, K, R, S, T, B, E and N.
- Measurement and re-transmission to isolated analog output, with voltage output or with active/passive current output.
- Selection through DIP-Switches of: thermocouple type, START scale, END scale, output mode (elevation, scale inversion), output type (V, mA).
- Frontal panel LED indications: power supply presence, out of range or configuration error.
- Advanced setting thruogh PC of: START (start of scale), END (full scale), filter, burn-out, etc.
- 3-point insulation: 1500 V∿.

TECHNICAL SPECIFICATIONS

Power supply:	9 – 40 V⎓, 19-28 V∿ 50 – 60 Hz, max 2 W; 1.6 W @ 24 V⎓ with output 20 mA.
Thermocouple (TC) input:	Type J, K, R, S, T, B, E, N; resolution 2.5 µV, automatic TC burn out detection, input impedance >5 MΩ, protection up to 50V⎓
Sampling frequency:	Variable from 240 sps with 11 bit + sign resolution to 15 sps with 15 bit + sign resolution(valori tipici).
Response time:	35 ms with 11 bit resolution, 140 ms with 16 bit resolution.
Output:	I: 0 – 20 / 4 – 20mA, maximum load resistance: 600 Ω. V: 0 – 5V / 0 – 10V / 1 – 5V / 2 – 10V, minimum load resistance: 2 kΩ. Resolution 2.5 µA / 1.25 mV.
Environmental conditions:	Temperature: -20 – 60°C, Humidity min.:30%, max. 90% at 40°C non condensing (Please see: ***Installation rules***).

Errors referred to maximum measuring range:	Calibration error	Thermal coefficent	Linearity error	Others
TC J,K,E,T,N input:	0.1%	0.01%/°K	0.2 °C	EMI: <1% (1)
TC R,S input:	0.1%	0.01%/°K	0.5 °C	EMI: <1% (1)
TC B (3) input:	0.1%	0.01%/°K	1.5 °C	EMI: <1% (1)
Cold junction compensation:	2°C between 0 and 50°C ambient temperature range.			
Voltage output (2):	0.3%	0.01%/°K	0.01%	
Data memory	EEPROM; storage time: 40 years.			
The module complies with the following standards: CE c UL us LISTED 3LUT	EN61000-6-4 (electromagnetic emission, industrial environment). EN61000-6-2 (electromagnetic immunity, industrial environment). EN61010-1 (safety). Electical UL standards: Output: 10 V ,20mA Input: 20 V ,20mA Operating temperature: -20 - +60°C One maximum 2.5A fuse must be installed near the module.			

(1) Influence of cable resistance: 0.1 µV/Ω.
(2) Values to be added to the errors of the selected input
(3) Valid measurement above 250°C.

INSTALLATION RULES

The module is designed to be installed, in vertical position, on CEI EN 60715 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.

INPUT AND MEASURING SCALE SELECTION

The thermocouple type is selected by setting the SW1 DIP-Switches group placed on the side of the module.
Each type of thermocouple is matched to a certain numbers of start scale and full scale values which can be selected through the SW2 DIP-Switches group.
With the tables below you can choose the DIP Switches setting in order to select the type of thermocouple and the range of scale desired.



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	
a	a	a		Tc J
			a	Tc K
a			a	Tc R
	a		a	Tc S
a	a		a	Tc T
		a	a	Tc B
a		a	a	Tc E
	a	a	a	Tc N

KEY		
a	↑	ON
	↓	OFF

SW2  DIP-Switch at OFF position

START			END			SW2 THERMOCOUPLE TYPE			
1	2	3	4	5	6	TC J	TC K	TC R	TC S
						(*)	(*)	(*)	(*)
			●			-200°C	-200°C	0°C	0°C
		●				-100°C	-100°C	100°C	100°C
		●	●			0°C	0°C	200°C	200°C
	●					100°C	100°C	300°C	300°C
	●		●			200°C	200°C	400°C	400°C
	●	●				300°C	300°C	600°C	600°C
	●	●	●			500°C	500°C	800°C	800°C
						(*)	(*)	(*)	(*)
					●	100°C	200°C	400°C	400°C
				●		200°C	400°C	600°C	600°C
				●	●	300°C	600°C	800°C	800°C
			●			400°C	800°C	1000°C	1000°C
			●		●	500°C	1000°C	1200°C	1200°C
			●	●		800°C	1200°C	1400°C	1400°C
			●	●	●	1000°C	1300°C	1750°C	1750°C

(*) START and END stored in memory through PC or programming Push-buttons.

START			END			SW2 THERMOCOUPLE TYPE			
1	2	3	4	5	6	TC T	TC B	TE R	TC N
						(*)	(*)	(*)	(*)
			●			-200°C	0°C	-200°C	-200°C
		●				-100°C	500°C	-100°C	-100°C
		●	●			-50°C	600°C	0°C	0°C
	●					0°C	700°C	100°C	100°C
	●		●			50°C	800°C	150°C	200°C
	●	●				100°C	1000°C	200°C	300°C
	●	●	●			150°C	1200°C	400°C	500°C
						(*)	(*)	(*)	(*)
					●	50°C	500°C	50°C	200°C
				●		100°C	600°C	100°C	400°C
				●	●	150°C	800°C	200°C	600°C
			●			200°C	1000°C	300°C	800°C
			●		●	250°C	1200°C	400°C	1000°C
			●	●		300°C	1500°C	600°C	1200°C
			●	●	●	400°C	1800°C	800°C	1300°C

(*) START and END stored in memory through PC or programming Push-buttons.

SETTING START AND END AT WILL

The START and END push-buttons under the SW2 DIP-switches group allow to set the beginning and full scale at will within the scale previously selected through SW2, for the thermocouple configured by SW1 group.
To do this you need a signal generator, able to simulate the start values and the full scale value of the thermocouple desired.

The procedure is following:

1. Set through SW1 group the type of thermocouple and through SW2 the measurement range which includes the beginning and full scale values desired.
2. Power up the module.
3. Power up a calibrator or simulator for generate the signal you wish to measure and to re-transmit.
4. Set the value needed to begin the scale on the calibrator (or other instrument).
5. 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.
6. Set the value needed to simulate the full scale on the calibrator (or other instrument).
7. 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.
8. Cut power to the module and set to OFF position the dip-switches of group SW2, correspondent to the settings of START and END values.

The module is now configured for the required start and end scale. To re-program it (e.g. for a different type of thermocouple) repeat the whole procedure.

OUTPUT SELECTION

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

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

SW2 OUTPUT MODE			
7	OUTPUT	8	OUTPUT
	0 – 20mA / 0 – 10V		NORMAL
a	4 – 20mA / 2 – 10V	a	REVERSED

SW3 OUTPUT TYPE		
1	2	OUTPUT
a		VOLTAGE
	a	CURRENT

The SW3 DIP-switches group allow to select the output signal type.

ADVANCED SETTING

Ý By using a PC and the Easy Setup software you can set other normally fixed parameters more than start and full scale values:
Ý Digital filter (normally disabled);
Ý Negative burn-out (normally positive);
Ý Analog output Start and End scale;
Ý Analog output value in case of error
Ý Mains frequency selectable rejection (normally set to 50 Hz);
Ý Sampling frequency/resolution (normally set to 15 sps/16 bit);
Instructions for setting and the connection cable are supplied with the software (this software must be requested as an accessory item).

LED SIGNALLINGS		
LED	**STATE**	***Meaning of LEDs***
GREEN	On	Power supply presence.
GREEN	Blinking (freq: 1 flash/sec)	Out of range, Burn Out or Internal fault.
GREEN	Blinking (freq ≈ 2 flash/sec)	DIP Switches error setting.

ELECTRICAL CONNECTIONS

POWER SUPPLY

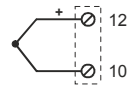


Power supply voltage must be in the range:
from 10 to 40 V⎓ (at any polarity)
or from 19 to 28 V∿;
Please see ***INSTALLATION RULES*** section.

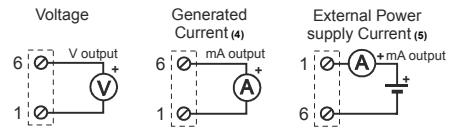
The upper limits must not be exceeded, to avoid serious damage to the module. Protect the power supply source against possible damage of the module by using a fuse of suitable size.

We suggest you to use a specific shielded cable for connecting signals, as an example BELDEN 9841. 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.

THERMOCOUPLE INPUT

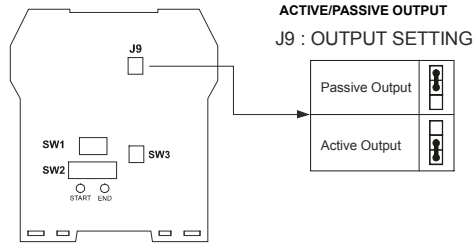


OUTPUT



(4) Active Output (powered by module) for connection to passive inputs.
(5) Passive Output (unpowered) for connection to active inputs.
To enable it, see ***SETTINGS THROUGH INTERNAL JUMPERS***.

INTERNAL JUMPERS POSITION **SETTINGS THROUGH INTERNAL JUMPERS ACTIVE/PASSIVE OUTPUT**



SEVERE OPERATING CONDITION:

Severe operating conditions are as follows:
- *High power supply voltage (> 30V⎓ / > 26 V∿).*
- *Input sensor powered by module.*
- *Use of the output on generated by module current.*

When modules are installed side by side,
it's 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.

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 to the 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 or the waste disposal service of the retail store where you purchased this product.

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