INSTALLATION MANUAL

Z109TC2-1

Galvanic separation thermocouple converter module

EN

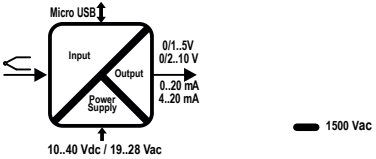
LISTED
3LUT

ISO 9001:2008

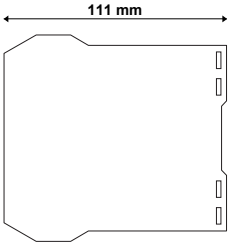
SENECA s.r.l.
Via Austria, 26 – 35127 – PADOVA – ITALY
Tel. +39.049.8705355 - 8705359 - Fax +39.049.8706287

For manuals in other languages and the configuration software, visit www.seneca.it/products/z109tc2-1

TECHNICAL SPECIFICATIONS

STANDARDS	**EN61000-6-4** Electromagnetic emissions, industrial environment. **EN61000-6-2**. Electromagnetic immunity, industrial environment. **EN61010-1** Safety **Notes:** use copper conductors; use in environments with pollution level 2; the power supply must belong to Class 2. A fuse with 2.5 A maximum capacity must be installed in series at the power supply connection near the module.
INSULATION	
ENVIRONMENTAL CONDITIONS	Temperature:-10 – + 60 °C (UL: -10 - +60 ° C) Humidity: 30% – 90% at 40 °C non condensing. Storage temperature: -20 – + 85 °C Protection rating: IP20. Pollution rating: 2 (maximum environmental pollution during operation)
ASSEMBLY	35 mm DIN rail IEC EN60715 in vertical position.
CONNECTIONS	Removable 3-way screw terminals, 5 mm pitch for cable up to 2.5 mm_2, front microUSB
POWER SUPPLY	Voltage: 10 – 40 Vdc or 19 – 28 Vac 50 – 60 Hz. Power supply: Class 2 Absorption: 1.6 W @ 24 Vdc with 20 mA output; Max: 2.5 W
COLD JOINT COMPENSATION	2 °C in the 0 - 50 °C ambient temperature range.
ANALOGUE INPUTS	Thermocouple types: J,K,R,S,T,B,E,N; resolution 2.5 µV, automatic TC interruption detection and input impedance > 5 MΩ. Sampling frequency: from 240 sps, resolution 11 bit + sign, to 15 sps, resolution 15 bit + sign (typical values). Response time: 35 ms with resolution 11 bit, 140 ms with resolution 16 bit.
ANALOGUE OUTPUTS	I: 0 - 20 / 4 - 20 mA, max load resistance 600Ω 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: storage time: 40 years.
COMMUNICATION	front microUSB

MODULE LAYOUT



Dimensions: 17.5 x 102.5 x 111 mm, **Weight:** 120 g; **Enclosure:** PA6, black

PRELIMINARY WARNINGS

The word **WARNING** preceded by the ⚠ symbol indicates conditions or actions that put the user's safety at risk. The word **CAUTION** preceded by the symbol ⚠ indicates conditions or actions that might damage the instrument or the connected equipment.
The warranty shall become null and void in the event of improper use or tampering with the device or any accessories supplied by the manufacturer required for its correct operation, and if the instructions contained in this manual are not followed.

⚠	**WARNING: The full content of this manual must be read before operation.** The module must only be used by qualified electricians. Specific documentation is available from www.seneca.it/prodotti/ Z204-1
	The module must be repaired and damaged parts replaced by the Manufacturer. The product is sensitive to electrostatic discharges. Take appropriate measures during any operation.
⚠	**Important: Obstructing ventilation slots with any object is prohibited. Installing the module next to devices that generate heat is prohibited.**
	Electrical and electronic waste disposal (applicable in the European Union and other countries with recycling). The symbol on the product or its packaging shows that the product must be disposed of at a collection centre authorised to recycle electrical and electronic waste.

ASSEMBLY STANDARDS

The module has been designed for vertical installation on an IEC EN 60715 omega guide. For optimal operation and long life, adequate ventilation must be provided. Avoid positioning channels or other objects that obstruct the ventilation slots. Avoid mounting modules over equipment generating heat. Installation in the bottom part of the switchboard is recommended.

TYPES OF ERRORS

Maximum measurement field errors	Calibration error	Thermal coefficient	Linearity error	EMI
TC Input: J, K, E, T, N	**0.1%**	**0.01%/°K**	**0.2°C**	**<1% (1)**
TC Input: R, S	**0.1%**	**0.01%/°K**	**0.5°C**	**<1% (1)**
TC Input: B (2)	**0.1%**	**0.01%/°K**	**1.5°C**	**<1% (1)**
Voltage output (3)	**0.3%**	**0.01%/°K**	**0.01%**	

(1) Influence of the resistance of the wires: 0.1 µV/Ω.
(2) Zero output for t < 250 °C.
(3) Values to be added to the errors for the selected input.

ELECTRICAL CONNECTIONS

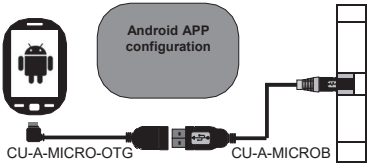
⚠ CAUTION

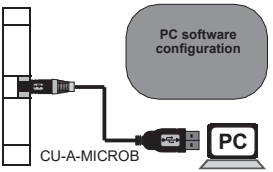
The upper power supply limits must not be exceeded, as this could cause serious damage to the module. Switch the module off before connecting inputs and outputs.
To meet the electromagnetic immunity requirements:

- use shielded signal cables;
- connect the shield to a preferential instrumentation earth system;
- separate shielded cables from other cables used for power installations (inverters, motors, induction ovens, etc...).
- **Make sure** that the power supply voltage to the module does not exceed: 40 Vdc or 28 Vac, otherwise the module will be damaged.

USB INTERFACE

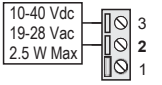
The module has a microUSB connector on the front panel and can be configured using applications and/or software programs.
For more information, visit www.seneca.it/products/z109tc2-1



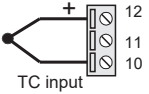


ELECTRICAL CONNECTIONS

POWER SUPPLY

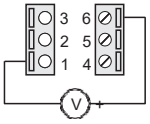


THERMOCOUPLE INPUTS

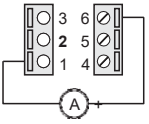


ANALOGUE OUTPUT

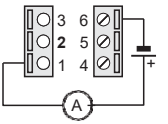
Voltage



Applied current (1)



External power supply current (2)



(1) Already powered active output to be connected to passive inputs
(2) Non powered passive output to be connected to active inputs

UL electrical standards: Output: 10 Vdc, 20 mA; Input: 20 Vdc, 20 mA; Working temp.: -20 – +60 °C

SETUP USING THE DIP-SWITCHES

The type of input is selected using DIP-switch SW1 at the side of the module.
Each type of input corresponds to a certain number of scale start and end values that can be selected through the Sw2 group.
The table below shows the possible START and END values based on the selected input type; the left column shows the DIP-switch combination to set for the selected START and END.

⚠ CAUTION

The DIP-switches must be set with the power supply disconnected, to avoid electrostatic discharges and damage to the module.

KEY	ON	OFF

SW1: SELECT THE THERMOCOUPLE TYPE			
POSITION	INPUT	POSITION	INPUT
1 2 3 4	TYPE	1 2 3 4	TYPE
	Tc J		Tc T
	Tc K		Tc B
	Tc R		Tc E
	Tc S		Tc N

(*)START and END set in the memory using the PC or programming buttons;

SW2:START	THERMOCOUPLE TYPE							
1 2 3	Tc J	Tc K	Tc R	Tc S	Tc T	Tc B (2)	Tc E	Tc N
	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	-200 °C	-200 °C	0 °C	0 °C	-200 °C	0 °C	-200 °C	-200 °C
	-100 °C	-100 °C	100 °C	100 °C	-100 °C	500 °C	-100 °C	-100 °C
	0 °C	0 °C	200 °C	200 °C	-50 °C	600 °C	0 °C	0 °C
	100 °C	100 °C	300 °C	300 °C	0 °C	700 °C	100 °C	100 °C
	200 °C	200 °C	400 °C	400 °C	50 °C	800 °C	150 °C	200 °C
	300 °C	300 °C	600 °C	600 °C	100 °C	1000 °C	200 °C	300 °C
	500 °C	500 °C	800 °C	800 °C	150 °C	1200 °C	400 °C	500 °C

(2) Zero output for t < 250°C.

SW2:END	THERMOCOUPLE TYPE							
4 5 6	Tc J	Tc K	Tc R	Tc S	Tc T	Tc B (2)	Tc E	Tc N
	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
	100 °C	200 °C	400 °C	400 °C	50 °C	500 °C	50 °C	200 °C
	200 °C	400 °C	600 °C	600 °C	100 °C	600 °C	100 °C	400 °C
	300 °C	600 °C	800 °C	800 °C	150 °C	800 °C	200 °C	600 °C
	400 °C	800 °C	1000 °C	1000 °C	200 °C	1000 °C	300 °C	800 °C
	500 °C	1000 °C	1200 °C	1200 °C	250 °C	1200 °C	400 °C	1000 °C
	800 °C	1200 °C	1400 °C	1400 °C	300 °C	1500 °C	600 °C	1200 °C
	1000 °C	1300 °C	1750 °C	1750 °C	400 °C	1800 °C	800 °C	1300 °C

⚠ CAUTION

The set START values (scale start) must never be higher than the set END values (scale end). Otherwise an error status will occur, indicated by the yellow LED.

SETUP OF CUSTOM MEASURE START AND END

The START and END buttons underneath the SW2 DIP-switch group can be used to set the scale start and end as desired, within the scale set using the DIP-switches. In order to do this, it is necessary to have an appropriate signal generator capable of providing the desired scale start and end values. The procedure is as follows:

1. Using DIP-switch SW1 set the desired thermocouple type and using DIP-switch Sw2i set the START and END measurement values, which must include the desired measurement scale start and end values.

2. Power the module.

3. Use a generator to simulate the signal to measure.

4. Set the desired scale start value on the generator.

5. Press START for at least 3 seconds. The green LED at the front of the device will flash to indicate that the value has been saved.

6. Repeat 4 and 5 for the desired END value.

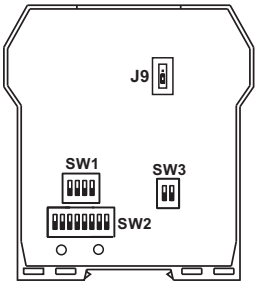
7. Disconnect the power supply to the module and move the DIP-switches of the SW2 group for the setup of the START and END values to the OFF position.

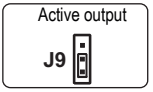
The module is now configured for the required scale start and end values; if a new programming is required, including for a different input type, repeat the operation.

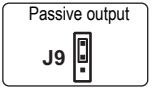
PC SETUP

Using the PC and the EASY SETUP software it is possible to set: the type of input, the input scale start and end, the rejection filter, the resolution, the output type, the output scale start and end, the conversion value, the upper and lower limits, the output value in case of error and the output digital filter.

OUTPUT SELECTION







OUTPUT SELECTION

DIP-switches 7 and 8 of the SW2 group can be used to set the output with or without zero elevation, and the normal or inverted output respectively. DIP-switch SW3 can be used to select the output type. **Note: the DIP-switches must be set with the power supply disconnected from the module, to avoid electrostatic discharges and damage to the module.**

SW2: OUTPUT MODE AND SCALE			
POSITION	OUTPUT	POSITION	OUTPUT
7	RANGE	8	MODE
	0..20mA / 0..10V		NORMAL
	4..20mA / 2..10V		REVERSE

SW3: OUTPUT TYPE			
POSITION	OUTPUT	POSITION	OUTPUT
1 2	TYPE	1 2	TYPE
	VOLTAGE		CURRENT

KEY		ON		OFF

LED SIGNALS ON THE FRONT PANEL

LED	Status	LED meaning
PWR/FAIL Green	On	The device is powered correctly
	Flashing (1 flash/sec.)	Out of scale, Burn Out or internal fault
	Flashing ("2 flashes/sec.)	DIP-switch setup error

ACCESSORIES

Code	Description
CU-A-MICROB	USM - microUSB 1 metre communication cable
CU-A-MICRO-OTG	Mobile phone adapter cable

CONTACT INFORMATION

Technical support	supporto@seneca.it	Product information	commerciale@seneca.it