



Z109TC CONVERTER FOR THERMOCOUPLE WITH GALVANIC SEPARATION

GENERAL CHARACTERISTICS

- Converts thermocouples J,K,R,S,T,B,E,N;
- Measurement and re-transmission on isolated analog output, with voltage and current output.
- DIP-switch for selecting: thermocouple type, 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.
- 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.
Thermocouple input:	Type J,K,R,S,T,B,E,N; resolution 5uV, automatic detection of TC interruption.
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).

SELECTION: TC TYPE / 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	SW2	
INPUT TYPE	ZERO	SPAN
1 2 3 4 Tc J	1 2 3 1	4 5 6 1
Tc K	2 2	2 2
Tc R	3 3	3 3
Tc S	4 4	4 4
Tc T	5 5	5 5
Tc B	6 6	6 6
Tc E	7 7	7 7
Tc N	8 8	8 8

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 SW2s 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.

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
8	4..20mA / 1..5V / 2..10V
8	NORMAL
8	REVERSED
SW3	
OUTPUT VOLTAGE	
1 2	0/1..5V
1 2	0/2..10V

Errors referred to max measuring range:	Calibration	Thermal Coefficient	Linearity error	Others
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 + (1) EMI: <1%
Input for thermocouple R,S:	0.2%	0.02%/°C	t<100°C 0.3% t>100°C 0.05%	+/-2°C + (1) EMI: <1%
Input for thermocouple B (2):	0.2%	0.02%/°C	t<600°C 0.3% t>600°C 0.1%	+/-4°C + (1) EMI: <1%
Cold junction compens.: Voltage output (3):	1.5°C in ambient range 10 to 40°C.	0.1% / 0.01%/°C	0.1%	
Protection for inputs:	60V 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:	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 transformers and safety isolating transformers requirements			

(1) influence of cable resistance 0.5uV/ohm.
(2) Output stops at 360 °C t < 360 °C.
(3) values to be added to the errors of the selected input.

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

	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

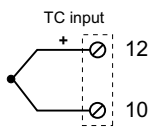
ELECTRICAL CONNECTIONS

POWER SUPPLY

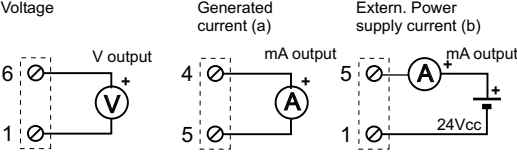
19-40Vcc
19-28Vca

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.

THERMOCOUPLE INPUT



RE-TRANSMITTED OUTPUT



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

INSTALLATION INSTRUCTIONS

Module Z109TC 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).
 - 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.

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