Isolated configurable conditioner for Thermocouple

DAT 2050

FEATURES
TC input for J, K, S, R e T type
Input range and output signal configurable
Configurable by means of DIP switches
Good accuracy and performance stability
2000Vac galvanic isolation
Conform to EMC standards - CE mark
12,5 mm only enclosure thickness
DIN rail mounting

APPLICATIONS
Temperature monitoring and controlling in:
- Process controls
- Automation systems
- Energy sources management

GENERAL INFORMATION

The DAT2050 signal conditioner has been designed to give an output signal, current or voltage, perfectly linear and proportional to the voltage generated by the thermocouple sensor connected to its input. Moreover it operates at 2000Vac full isolation among input and output . This allows to eliminate the problems coming from the reciprocal influence of the various circuits, and coming from the induced noise through the ground loops.
When the "linearization" of the thermocouple is not necessary or it is made by the acquisition system following the transmitter, the DAT2045 transmitter represents a very economical solution.input signal range and the type and the value of the output signal are configurable in a wide range of combinations (see " Input configuration " and " Output Configuration " sections). The accurate adjustment of the programmed value is realized by means of the zero and span potentiometers.
The maximum accuracy and reliability are ensured for all the functions (conditioning, cold junction compensation and current transmission) thanks to the employement of high precision and high-quality components and to the use of the SMT technology. The DAT 2050 unit, developped, manufactured and tested in strict accordance with the quality assurance standard UNI EN ISO 9001/2000, is in compliance with the directive 89/336/CEE on the electromagnetic compatibility. It is packaged into a strong plastic enclosure of only 12,5 mm thickness, allowing an high density mounting capability on DIN rail.

TECHNICAL SPECIFICATIONS
(Typical @ 25°C and in the nominal conditions)

INPUT

Type of sensor	TC type K, J, S, T and R according to SIPT68
Minimum input range	15 mV
Zero regulation	± 5% min.
Span regulation	± 5% min.
Input impedence	>/= 10 MΩ
Influence of line resistance	0,2 µV / Ω

OUTPUT

Sensor interruption signaling	High alarm : 30 mA or 15 Vdc max.
Response time (from 10 % to 90% e.s.)	0.5 s.
Warm-up time	3 minutes
Reverse polarity protection	60 V reverse max.
Output signal	configurable: V, +/- V , mA
Load resistance	>/=5 KOhm for Voltage </=500 Ohm for Current

PERFORMANCES

Linearity error	± 0.05% of full scale
Calibration error (inclusive of hysteresis and supply voltage variations)	± 0.1% of full scale
Thermal drift	0.03% of full scale/°C
Cold junction compensation error	± 0,5°C
Electromagnetic Compatibility (EMC)	According to EN50081-2 and EN50082-2
Power supply voltage	18 ÷ 30 Vdc
Current consumption	Voltage : </= 50 mA ; Current : </= 80 mA
Isolation among the ways	2000 Vac, 50 Hz, 1 min.
Operating temperature	- 20 ÷ 70 °C
Storage temperature	- 40 ÷ 100 °C
Relative humidity (non-condensing)	0 ÷ 90 %
Weight	90 grams

OPERATING INSTRUCTIONS

The conditioner must be powered with a voltage value ranging from 18 to 30Vdc, applied beetwen the terminal R (+24Vdc) and the terminal Q (GND2). The green LED switched on indicates the situation of a correct power supply. The output signal, voltage or current, is available between the terminals N(OUT V/I) and M (GND2). The thermocouple sensor must be connected between the terminals I (-TC) and L (+TC) .
The input signal range and the type and the value of the output signal are configurable in a wide range of combinations .They are selected by means of suitable DIP switches.They are accessible only after opening the door on the side of the enclosure.
The sections " Input configuration " and " Output Configuration " shows the lists of the possible input measuring ranges and the output signals and the indication of how to set the DIPswitches to obtain the selected configuration.Once such operation is completed, it is necessary to proceed to the calibration of the transmitter by means of the ZERO and SPAN regulations placed on the top of the enclosure.
The DAT 2050 is supplied with the calibration requested by the Customer's order. In case such calibration is not indicated, the device is supplied with the standard configuration. (See here after)
When it is necessary to calibrate the converter, this can be done using the instruction in the " Input & output range configuration " section.

INSTALLATION INSTRUCTIONS

The DAT 2050 device is suitable for fitting to DIN rails in the vertical position. For optimum operation and long life, make sure that sufficient air flow is provided for the device avoiding to place racewais or other objets which could obstruct the ventilation slits.
Moreover it is suggested to avoid that devices are mounted above appliances generating heat; their ideal place should be in the lower part of the panel.
When devices are installed side by side, it may **be necessary to separate them by at least 5 mm** in the following cases:

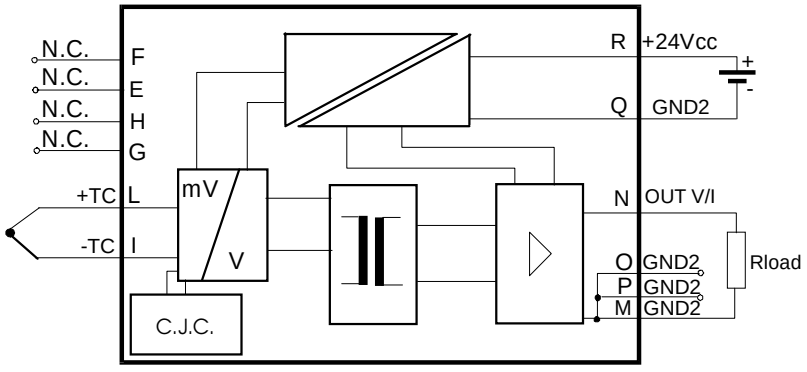
- If panel temperature exceeds 45°C and at least one of the overload condition exists.
- If panel temperature exceeds 35°C and both of the overload condition exists.

The overload conditions are the following:

- High power supply voltage: >27Vdc
- Output current active.

It is recommended to use shielded cable for connecting signals. The shield must be connected to an earth wire provided for this purpose.
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc..)

WIRING DIAGRAM



HOW TO ORDER:

DAT 2050 0/1200 °C TC "K" 4 / 20 mA

Input range

J
R
S
T

TC type

Output range: **4 - 20 mA**
0 - 20 mA
0 - 10 V

STANDARD CONFIGURATION :

Thermocouple K, Range : 0 / 1200°C Out 4 / 20 mA

INPUT AND OUTPUT RANGE CONFIGURATION.

1)Calculate the difference (Span) between the full-scale value and the zero value .

2)See the " Input Configuration " section and find the table regarding the thermocouple in use. Determine in the column "span" the position where the calculated value (*) is included .In the line corresponding to such position the configuration of the input switches is shown .

3)Determine in the column " zero " the position where the " zero " value is included . Beside it there is the indication of the switch setting.

4)Set the switches as indicated.

5)See the " Output Configuration " section and find in the table the desired output in use . In the line corresponding to such position the configuration of the output switches is shown .

6)Set the switches as indicated.

7)Set the simulator at the minimum temperature.

8) Regulate the minimum value of output with the zero potentiometer.

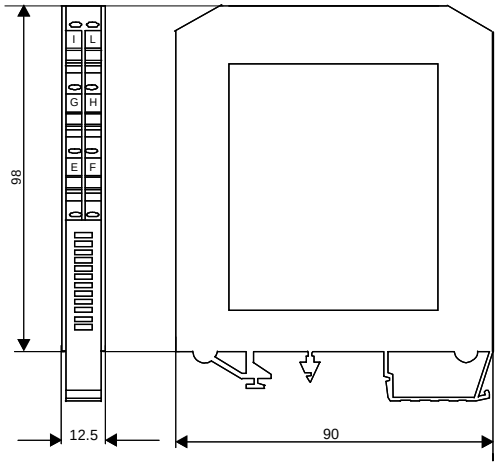
9) Set the simulator at the maximum temperature.

10) Regulate the maximum value of output with the span potentiometer.

11) Repeat the operations number 7-8-9-10 until the output values are sufficiently accurate.

(*) Note : if the value is a limit of the input range (example 800 °C) select the next one.

DIMENSIONS (mm.)



TERMINAL ASSIGNEMENT			
E	N.C.	M	GND2
F	N.C.	N	OUT V/I
G	N.C.	O	GND2
H	N.C.	P	GND2
I	-TC.	Q	GND2
L	+TC.	R	+24Vcc

INPUT CONFIGURATION

THERMOCOUPLE "J"

PROG. SPAN	SW 1	SW 2	SW 3	SW 5
<115 °C		●		
115°C-200°C		●		
200°C-600°C		●	●	
600°C-950°C			●	

THERMOCOUPLE "K"

PROG. SPAN	SW 1	SW 2	SW 3	SW 5
<150 °C	●	●		
150°C- 505°C	●	●	●	
505°C-1400°C	●		●	

ZERO PROGRAMMING
Thermocouples J-K

PROG. ZERO	SW 4
-50°C/-10°C	
-10°C/50°C	●

THERMOCOUPLES "R/S"

PROG. SPAN	SW 1	SW 2	SW 3	SW 4	SW 5
700°C-800°C		●		●	
800°C-1760°C		●	●	●	

ZERO PROGRAMMING
Thermocouples R-S-T
Not necessary.
Zero is adjustable from -50 °C to + 50 °C

THERMOCOUPLE "T"

PROG. SPAN	SW 1	SW 2	SW 3	SW 4	SW 5
<150°C		●		●	
150°C-450°C		●	●	●	

OUTPUT CONFIGURATION

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
0 - 20 mA	●	●	●	●		
4 - 20 mA		●	●	●		
0 - 10 V	●	●			●	
0 - 2 V	●	●		●		
+/- 1 V	●			●		
+/- 5 V	●				●	
+/-10 V	●					●

● = DIPSWITCH " ON "

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