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Isolated converter for Tc and mV configurable by Dip-Switch or PC

DAT 4531 A

FEATURES

- **Configurable input for TC and mV**
- **Configurable output in current or voltage**
- **Configurable by dip-switch or PC**
- **High accuracy**
- **On-field reconfigurable**
- **Galvanic isolation among the ways**
- **UL / CE / UKCA mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035**

GENERAL DESCRIPTION

The isolated converter DAT 4531 A is able to measure and linearise the standard thermocouples with internal or external cold junction compensation. In function of programming, the measured values are converted in a current or voltage signal. The device guarantees high accuracy and performances stability both versus time and temperature.
The programming is made by the dip-switch located in the window on the side of the enclosure. By means of dip-switches it is possible to select the input type and range and the output type without recalibrate the device.
Moreover, by Personal Computer the user can program all of the device's parameters for his own necessity. For Thermocouple sensors it is possible to set the Cold Junction Compensation (CJC) as internal or external.
Moreover it is available the option of alarm for signal interruption (burn-out) that allows to set the output value as high or low out of scale .
The 1500 Vac galvanic isolation on all ways (input, output and power supply) eliminates the effects of all ground loops eventually existing and allows the use of the converter in heavy environmental conditions found in industrial applications.
The DAT 4531 A is in compliance with the Directive UL 61010-1 for US market and with the Directive CSA C22.2 No 61010-1 for the Canadian market.
It is housed in a plastic enclosure of 12.5 mm thickness suitable for DIN rail mounting in compliance with EN-50022 and EN-50035 standards.

USER INSTRUCTIONS

The connections must be made as shown in the section "Connections".
It is possible to configure the converter on field by dip-switch or Personal Computer as shown in the section " Programming" . The configuration by dip-switches can be made also if the device is powered (note: after the configuration the device takes some seconds to provide the right output measure).

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

INPUT

Input type	Min	Max	Span min
TC (CJC int./ext.)			
J	-200°C	1200°C	100°C
K	-200°C	1300°C	100°C
S	0°C	1750°C	400°C
R	0°C	1750°C	400°C
B	0°C	1820°C	400°C
E	-200°C	1000°C	100°C
T	-200°C	400°C	100°C
N	-200°C	1300°C	100°C
Voltage			
mV	-100 mV	+90 mV	5 mV
mV	-100 mV	+200 mV	10 mV
mV	-100 mV	+800 mV	20 mV

Accuracy (1)
mV, TC the higher of ± 0.1% f.s. and ±12 uV
Linearity (1)
TC ± 0,2 % f.s.
mV ± 0,1 % f.s.
Input impedance
TC, mV >= 10 MΩ
Line resistance influence (1)
TC, mV <=0.8 uV/Ohm
Thermal drift (1)
Full scale ± 0.01% / °C
CJC ± 0.01% / °C
CJC comp. ± 1 °C

(1)referred to the input Span (difference between max. and min.)

OUTPUT

Output type	Min	Max	Span min
Current	0 mA	20 mA	4 mA
Voltage	0 V	10 V	1 V

Output resolution
Current ± 7 uA
Voltage ± 4 mV

Burn-out values
Max. output value 22 mA or 10.6 V
Min. output value 0 mA or -0.6 V

Output load Resistance - Rload
Current output < 500 Ω
Voltage output > 10 KΩ
Short circuit current 26 mA max.

Response time (10÷ 90%) about 500 ms

GENERAL SPECIFICATIONS

Power supply voltage 18 .. 30 Vdc
Reverse polarity protection 60 Vdc max
Current consumption
Current output 35 mA max.
Voltage output 20 mA max.

ISOLATION
Among all the ways 1500 Vac, 50 Hz, 1 min

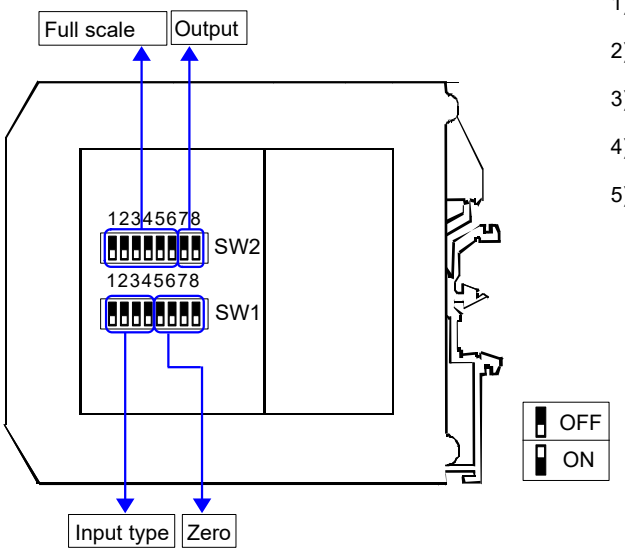
ENVIRONMENTAL CONDITIONS
Operative Temperature -20°C .. +60°C
UL Operative Temperature -10°C .. +60°C
Storage Temperature -40°C.. +85°C
Humidity (not condensed) 0 .. 90 %
Maximum Altitude 2000 m
Installation Indoor
Category of installation II
Pollution Degree 2

MECHANICAL SPECIFICATIONS
Material Self-extinguish plastic
IP Code IP20
Wiring wires with diameter 0.8÷2.1 mm² /AWG 14-18
Tightening Torque 0.8 N m
Mounting in compliance with DIN rail standard EN-50022 and EN-50035
Weight about 90 g.

CERTIFICATIONS
EMC (for the Industrial Environments)
Immunity EN 61000-6-2
Emission EN 61000-6-4
UKCA (ref S.I. 2016 N°1091)
Immunity BS EN 61000-6-2
Emission BS EN 61000-6-4
UL
US Standard UL 61010-1
Canadian Standard CSA C22.2 No 61010-1
CCN NRAQ/NRAQ7
Typology Open Type device
Classification Industrial Control Equipment
File Number E352854

PROGRAMMING

CONFIGURATION BY DIP-SWITCHES



1) Open the suitable door on the side of the device.

2) Set the input type by the dip-switch SW1 [1..4] (see TAB.1)

3) Set the minimum input scale value (Zero) by the dip-switch SW1 [5..8] (see TAB.3)

4) Set the maximum input value (Full scale) by the dip-switch SW2 [1..6] (see TAB.3)

5) Set the output type by the dip-switch SW2 [7..8] (see TAB.2)

EX. of configuration:

SW1 =

- Input type: Tc K
- Zero value: 0 °C

SW2 =

- Full scale value: 600 °C
- Output type: 4-20 mA

NOTE:
- It is also possible to set the dip-switches using the wizard of the configuration software following the procedure described in the section "Configuration by PC" until the step 6 and clicking on "Switch".

DIP-SWITCH CONFIGURATION TABLES

TAB.1
Input type setting

SW1 1 2 3 4		SW1 1 2 3 4	
	EPROM *		Tc K
	90 mV		Tc R
	200 mV		Tc S
	800 mV		Tc T
	---		Tc B
	---		Tc E
	---		Tc N
	Tc J		---

TAB.2
Output setting

SW2 7 8	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

TAB.3 – Input scale setting

Zero	Full Scale											
SW1 5 6 7 8	SW2 1 2 3 4 5 6		SW2 1 2 3 4 5 6		SW2 1 2 3 4 5 6		SW2 1 2 3 4 5 6		SW2 1 2 3 4 5 6	
Default	Default		75		225		700			
-200	0		80		250		750			
-100	5		85		255		800			
-80	10		90		275		850			
-60	15		95		300		900			
-50	20		100		325		950			
-40	25		110		350		1000			
-30	30		120		375		1100			
-20	35		130		400		1200			
-10	40		140		425		1300			
0	45		150		450		1400			
10	50		160		475		1500			
20	55		170		500		1600			
50	60		180		550		1750			
100	65		190		600		1800			
150	70		200		650		1850			

NOTES:
* If the dip-switches SW1 [1..4] are all set in the position 0 ("EPROM"), the device will follow the configuration programmed by PC (input type and range, output type and range and options).
* For all the "Tc" type selected by dip-switches, the cold junction compensation is internal.
* If the dip-switches SW1 [5..8] are all set in the position 0 ("Default"), the device will follow the input scale programmed by PC for the input type selected by the dip-switches SW1 [1..4]
* Eventual wrong dip-switches settings will be signalled by the blinking of the led "PWR".

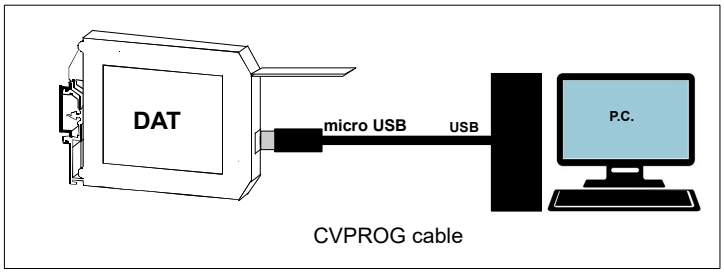
CONFIGURATION BY PC

Notice: before to execute the next operations, check that the drivers of the cable CVPROG in use have been previously installed in the Personal Computer.

By software DATAPRO it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch;
  (burn-out level, CJC offset, trip alarm settings, delay on output, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration wizard.

To configure the device follow the next steps:
1) Open the protection plastic label on the front of the device.
2) Connect the two plugs of cable CVPROG to the Personal Computer (USB plug) and to the device (uUSB plug) .
3) Run the software
4) Select the COM port in use and click on "Open COM".
5) Select the device and connect to it.
6) Set the programming data.
7) Click "Write" to send the programming data to the device.

For information about the software refer to its user guide.



CVPROG cable

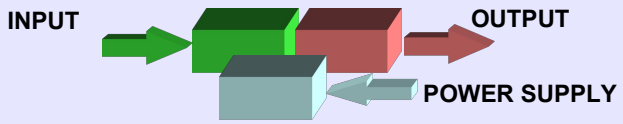
INSTALLATION INSTRUCTIONS

The device is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:

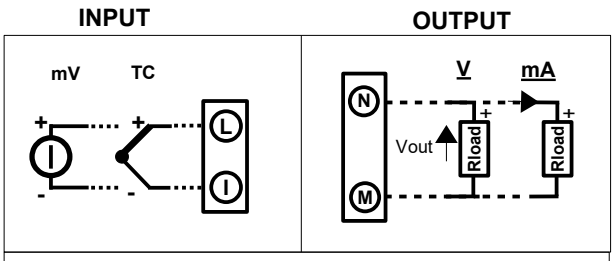
When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following cases:
- If panel temperature exceeds 45°C.
- Use of high power supply value (> 27 Vdc).
- Use of output current.

Make sure that sufficient air flow is provided for the device avoiding to place raceways or other objects 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.
Install the device in a place without vibrations.
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc...) and to use shielded cable for connecting signals.

ISOLATION STRUCTURE

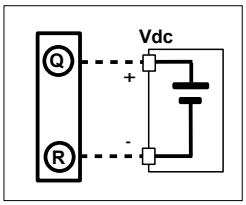


CONNECTIONS



Note: terminals G, H, E, F, P and O not connected (N.C.)

POWER SUPPLY(*)

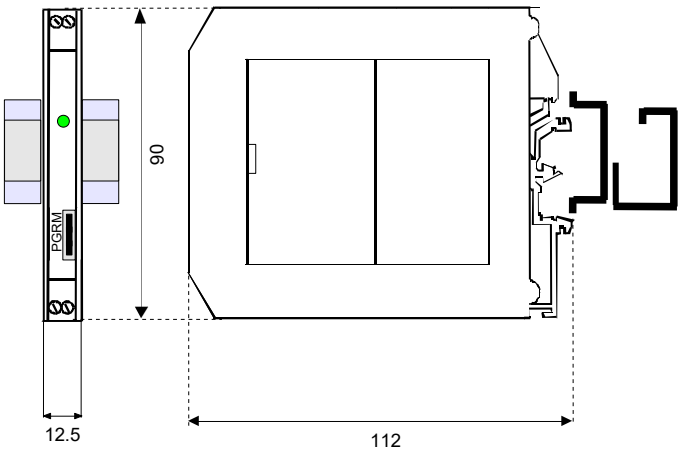


(*) Note: for UL installation the device must be powered using a power supply unit classified NEC class 2 or SELV

LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switches setting

DIMENSIONS (mm)



HOW TO ORDER

The device is provided as requested on the Customer's order.
Refer to the section “Programming” to determine the input and output ranges.
In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 4531A / Tc K / 0÷1200 °C / 4 ÷ 20 mA / CJC
Int.

- Input type
- Input range
- Output range
- Options

The symbol reported on the product indicates that the product itself must not be considered as a domestic waste.
It must be brought to the authorized recycle plant for the recycling of electrical and electronic waste.
For more information contact the proper office in the user's city , the service for the waste treatment or the supplier from which the product has been purchased.