

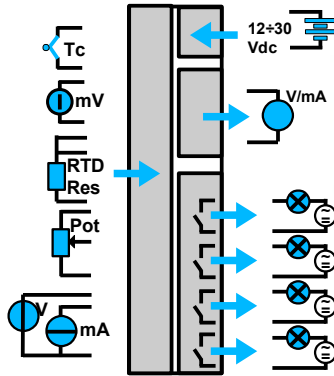
# Universal Analogue Input Configurable Trip Amplifier with display

## DAT 5028



### FEATURES

- Universal Analogue Input
- Relay Outputs: 2 SPDT + 2 SPST (version with 4 thresholds)
- Relay Outputs: 2 SPDT (version with 2 thresholds)
- 1 V/mA Analogue Output for signal transmission
- 1500 Vac galvanic isolation on all ways
- High Accuracy
- EMC compliance – CE Mark
- DIN rail suitable mounting (EN-50022)



### GENERAL DESCRIPTION

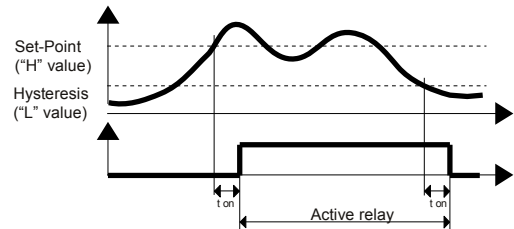
The DAT 5028 device is able to acquire RTD or Tc sensors, mV, V or mA input signals connected to the universal analogue input. By means of push-button and 4-digit display on the front panel, four different trip alarms are configurable. Each alarm threshold commands an output relay. Input signal can be retransmitted on the analogue output in a Voltage or Current signal, configurable by means of dip-switch on the side of the device. By means of an internal 16 bit converter, the device guarantee a high accuracy and a stable measure versus time and temperature. The 1500 Vac isolation on all ways removes eventual ground-loop effects, allowing the use of the device even in the heavy environmental conditions. In function of the number of thresholds necessary to the user, the device can be supplied in two different versions: DAT5028-4 with 4 thresholds (2 SPDT + 2 SPST); DAT5028-2 con with 2 thresholds (2 SPDT). The device is housed in a rough self-extinguishing plastic container which, thanks to its thin profile of 22.5mm only, allows a high density mounting on EN-50022 standard DIN rail.

### USER INSTRUCTIONS

Before to install the device, please read the "Installation Instruction" section. Connect power supply, analogue input, relay outputs and analogue output as shown in the "Wiring" section. In normal conditions, the display must always show a value. To simplify handling or replacing of the device, it is possible to change configuration or remove the wired terminals even with the device powered.

### TRIP OPERATION MODE

The relay goes on when the input signal is higher than the set-point level for at least the delay time "t on" (ms). The relay goes off only when the input signal is lower than the hysteresis value for at least delay time.

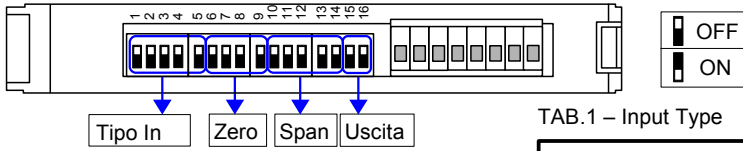


### TECHNICAL SPECIFICATIONS (Typical @ 25 °C and in the nominal conditions)

INPUT		Min		Max	
<b>Input types</b>					
<b>Voltage</b>					
100 mV	-100 mV			100 mV	
10 Volt	-10 V			10 V	
<b>TC</b>					
J	-210°C			1200°C	
K	-210°C			1370°C	
R	-50°C			1760°C	
S	-50°C			1760°C	
B	400°C			1825°C	
E	-210°C			1000°C	
T	-210°C			400°C	
N	-210°C			1300°C	
<b>RTD 2,3 wires</b>					
Pt100	-200°C			850°C	
Pt1000	-200°C			200°C	
Ni100	-60°C			180°C	
Ni1000	-60°C			150°C	
<b>Resistance 2,3 wires</b>					
Low	0 Ω			500 Ω	
High	0 Ω			2000 Ω	
<b>Potentiometer</b>					
	20 Ω			2000 Ω	
<b>Current</b>					
20 mA	-20 mA			20 mA	
<b>Accuracy (1)</b>					
mV, Volt, mA				± 0.05 % f.s.	
Pot, RTD, Res.				± 0.05 % f.s.	
TC				> ± 0.05 % f.s. or 5 μV	
<b>Linearity (1)</b>					
mV, Volt, mA				± 0.05 % f.s.	
Pot, RTD, Res.				± 0.1 % f.s.	
TC				± 0.2 % f.s.	
<b>Sensor Excitation current RTD, Res, Pot</b>					
Typical				0.700 mA	
<b>CJC Compensation</b>					
Typical				± 1 °C	
<b>Lead wire resistance influence</b>					
RTD 3 wires	(50 Ω max balanced)			0.05 %/Ω	
mV, Tc				< 0.8 μV/Ohm	
<b>Input impedance</b>					
mV, TC				10 MΩ	
Volt				1 MΩ	
mA				22 Ω	
<b>Thermal drift (1)</b>					
Input - Full Scale				± 0.01 % / °C	
<b>CJC Thermal drift</b>					
Full Scale				± 0.02 °C / °C	
<b>Sample time</b>					
				1 sec.	
<b>Warm-up time</b>					
				3 minutes	
<b>ANALOGUE OUTPUT</b>					
<b>Output type</b>					
Current	0 mA			20 mA	
Voltage	0 V			10 V	
<b>Accuracy (2)</b>					
				± 0.1 % f.s.	
<b>Linearity (2)</b>					
				± 0.05 % f.s.	
<b>Thermal Drift (2)</b>					
				± 0.01 % / °C	
<b>Load Resistance</b>					
Current output				< 500 Ohm	
Voltage output				> 5 KOhm	
<b>Auxiliary Voltage</b>					
				> 12V @ 20 mA	
<b>DIGITAL OUTPUTS</b>					
<b>N.2 SPST Relays + N.2 SPDT Relays</b>					
Max Load (resistive)				2 A @ 250 Vac	
				2 A @ 30 Vdc	
Min Load				5Vdc, 10mA	
Max Voltage				250Vac (50 / 60 Hz) , 110Vdc	
Dielectric strength between contacts				1000 Vac, 50 Hz, 1 min.	
Dielectric strength between coil and contacts				4000 Vac, 50 Hz, 1 min	
<b>POWER SUPPLY</b>					
Supply Voltage				12 .. 30 Vdc	
Rev. Polarity protection				60 Vdc max	
Current consumption @ 24Vdc				120 mA max	
Current consumption				200 mA max	
<b>ISOLATIONS</b>					
(among all of the ways)				1500 Vac, 50 Hz, 1 min	
<b>ENVIRONMENTAL CONDITIONS</b>					
Operative temperature				-30°C .. +60°C	
Storage temperature				-40°C.. +85°C	
Relative humidity (not cond.)				0 .. 90 %	
Maximum Altitude				2000 m	
Installation				Indoor	
Category of installation				II	
Pollution Degree				2	
<b>MECHANICAL SPECIFICATIONS</b>					
Material				Self-extinguish plastic	
IP Code				IP20	
Wiring				wires with diameter 0.8÷2.1 mm <sup>2</sup> /AWG 14-18	
Tightening Torque				0.8 N m	
Mounting				in compliance with DIN rail standard EN-50022	
Weight				about 150 g.	
<b>CERTIFICATIONS</b>					
<b>EMC ( for industrial environments )</b>					
Immunity				EN 61000-6-2	
Emission				EN 61000-6-4	

NOTES:  
(1) referred to input span (difference between Val. max. and Val. min.); (2) referred to output span (difference between Val. max. and Val. min.)

**CONFIGURATION BY DIP-SWITCHES**



**TAB.1 – Input Type**

1 2 3 4 5	Default	1 2 3 4 5	Res. 500Ω
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	100 mV	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pt 100
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	10 V	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pt 1K
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	20 mA	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Ni 100
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc J	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Ni 1K
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc K	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Pot.
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc R	<b>TAB.3 - Out</b> 15 16 <input type="checkbox"/> <input type="checkbox"/> 0-20 mA <input type="checkbox"/> <input type="checkbox"/> 4-20 mA <input type="checkbox"/> <input type="checkbox"/> 0-10 V <input type="checkbox"/> <input type="checkbox"/> 0-5 V	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc S		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc T		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc B		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc E		
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Tc N		

**TAB.2a - Range selection for RTD**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	170	180
0	0	190	200
10	10	250	300
20	20	400	500
30	30	700	800
40	40	900	1000
50	50		
-20	60		
-10	70		
0	80		
5	90		
10	100		
20	120		
30	140		
50	150		
100	160		

1) Set the input type by the dip-switch [1..5] (see TAB.1)

2) Set the minimum input scale value (Zero) by the dip-switch [6..9] (see TAB.2 \*)

2) Set the maximum input value (Span) by the dip-switch [10..14] (see TAB.2 \*)

4) Set the output type by the dip-switch [15..16] (see TAB.3)

\* Refer to the proper input type range. Needed only if Analog Out retransmission is used.

**TAB.2b - Range selection for Res.**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	170	180
0	0	190	200
10	10	250	300
20	20	400	500
30	30	700	800
40	40	900	1000
50	50		
75	60		
100	70		
125	80		
150	90		
175	100		
200	120		
225	140		
250	150		
300	160		

**TAB.2c - Range selection for Tc, RTD**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> °C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	170	180
-200	0	190	200
-100	10	250	300
-80	20	400	500
-60	30	700	800
-50	40	900	1000
-40	50		
-30	60		
-20	70		
-10	80		
0	90		
10	100		
20	120		
50	140		
100	150		
150	160		

**TAB.2d - Range selection for 100mV**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> mV	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> mV	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	17	18
-20	0	19	20
-10	1	25	30
-8	2	40	50
-6	3	70	80
-5	4	90	100
-4	5		
-3	6		
-2	7		
-1	8		
0	9		
1	10		
2	12		
5	14		
10	15		
15	16		

**TAB.2e - Range selection for mA**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> mA	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> mA	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	13.0	13.5
0	5	14.0	15.0
1.5	5.5	15.5	16.0
2.0	6.0	16.5	17.0
2.5	6.5	17.5	18.0
3.0	7.0	18.5	19.0
3.5	7.5	19.5	20.0
4.0	8.0		
4.5	8.5		
5.0	9.0		
5.5	10.0		
6.0	10.5		
6.5	11.0		
7.0	11.5		
7.5	12.0		
8.0	12.5		

**TAB.2f - Range selection for Pot.**

Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> %	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> %	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	80	85
0	5	90	95
15	10	100	
20	15		
25	20		
30	25		
35	30		
40	35		
45	40		
50	45		
55	50		
60	55		
65	60		
70	65		
75	70		
80	75		

**TAB.2g - Range selection for 10 V**

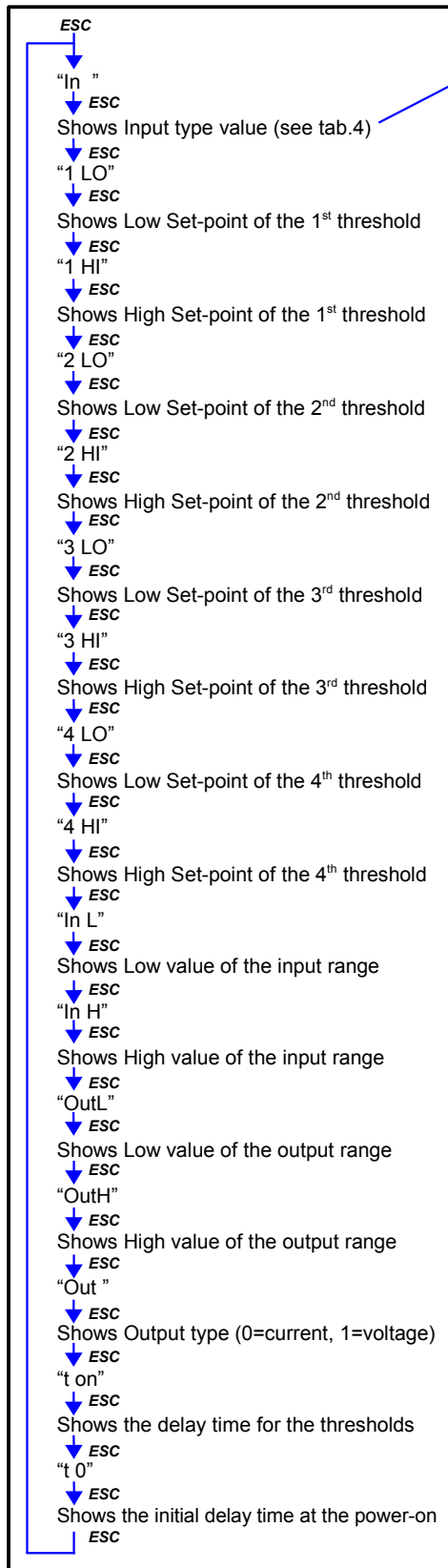
Zero		Span	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> V	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> V	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Def.	Def.	1.7	1.8
-2.0	0	1.9	2.0
-1.0	0.1	2.5	3.0
-0.8	0.2	4.0	5.0
-0.6	0.3	7.0	8.0
-0.5	0.4	9.0	10.0
-0.4	0.5		
-0.3	0.6		
-0.2	0.7		
-0.1	0.8		
0	0.9		
0.1	1.0		
0.2	1.2		
0.5	1.4		
1.0	1.5		
1.5	1.6		

## CONFIGURATION OVERVIEW

The configuration of the device, can be controlled by means of the push buttons and the 4-digit display on the front side of the device.

In normal operation, the display shows the actual value of the analog input. To enter in the view mode, follow the next procedure:

- 1) press the "ESC" button : it will be displayed the label "In "
- 2) press the "ESC" button again, it will be displayed the input type value (see tab.4).
- 3) Keep to press the "ESC" button to visualize all of the setting values of the device (follow the next list):



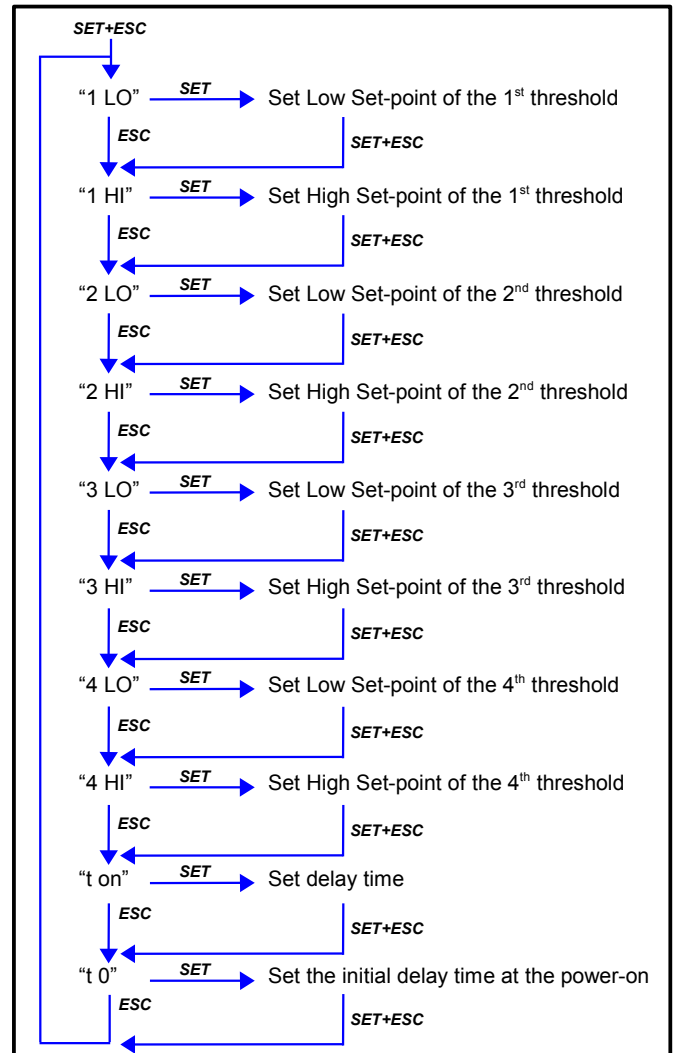
TAB.4 – Input Type

100 mV	1
10 V	2
20 mA	3
Tc J	4
Tc K	5
Tc R	6
Tc S	7
Tc T	8
Tc B	9
Tc E	10
Tc N	11
Res	12
Pt 100	13
Pt 1K	14
Ni 100	15
Ni 1K	16
Pot	17

## THRESHOLD CONFIGURATION

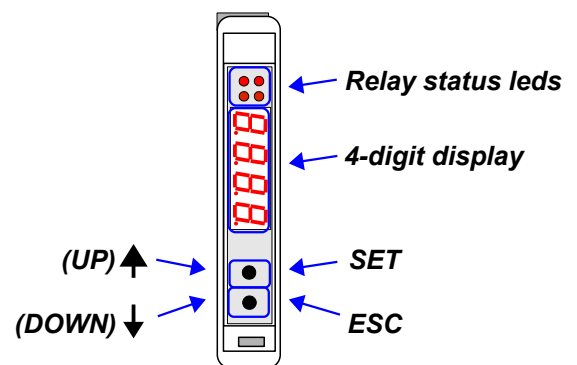
To configure the threshold values press both the buttons ("SET"+"ESC") for at least 5 seconds.

- 1) Press the button "ESC" to scroll through to the list until the desired parameter to be configured appears.
- 2) Press the button "SET" to confirm the selection of the parameter; the display shows the value currently programmed.
- 3) Press the button "UP" or "DOWN" to modify the value: keeping pressed the button "UP" or "DOWN" to increase the speed of variation of the numbers.
- 4) When the desired value has been reached press both the buttons for at least 4 seconds. Don't press any button for 5 second to discard the changes.



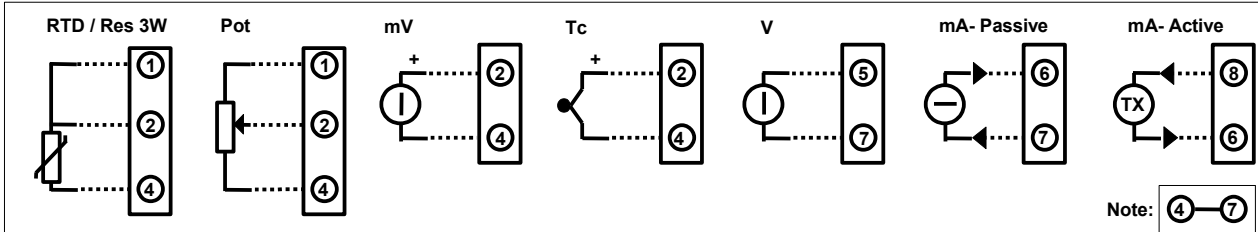
- 5) Repeat the step from 1 up to 4 for each parameter to configure. To exit from the threshold configuration don't press any button for 5 second: the device will automatically visualize the actual input measure in function of the programming performed.

- 4) To exit from the view mode don't press any button for 5 second: the device will automatically visualize the actual input measure.

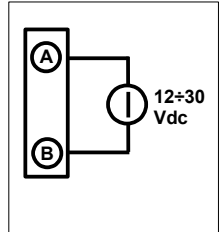


## WIRING

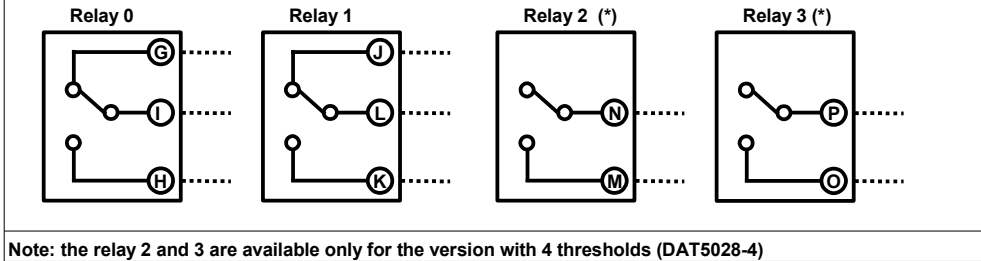
### ANALOG INPUT



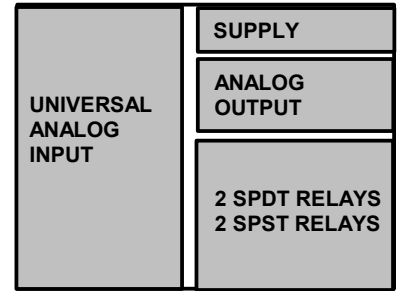
### SUPPLY



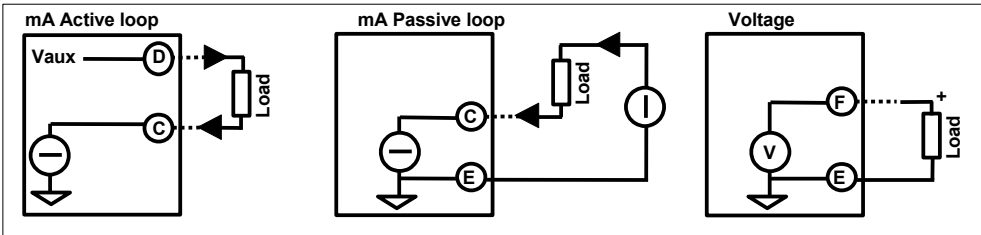
### RELAY OUTPUT



### ISOLATIONS



### ANALOG OUTPUT



## 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 case:**

- If panel temperature exceeds 45°C and at least one of the overload conditions exist.

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.

## LIGHT SIGNALLING

LED	COLOR	STATE	DESCRIPTION
Rn	RED	ON	Relay [n] excited
		OFF	Relay [n] released

### HOW TO ORDER

DAT 5028 can be supplied with the configuration specified by the customer. It is necessary to specify the number of necessary thresholds ( 2 or 4). Refer to the "Technical Specification" section for the output type available.

### ORDER CODE EXAMPLE:

DAT 5028 - 2

Number of thresholds : DAT 5028-2 (2 SPDT relay)  
DAT 5028-4 (2 SPDT relay + 2 SPST relay)

- = Requested
- = Optional

## MECHANICAL DIMENSIONS (mm)

