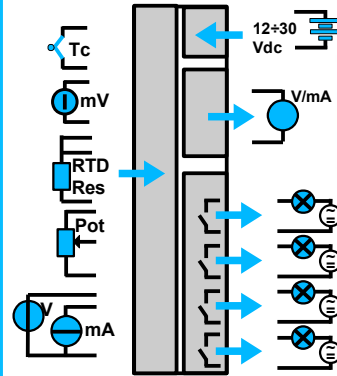


## FEATURES

- 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 analogue 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.

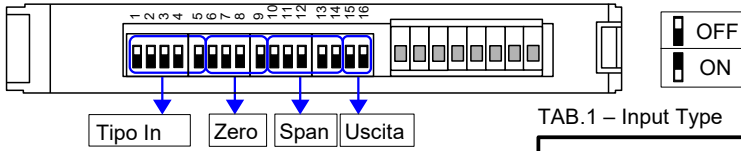
To simplify handling or replacing of the device, it is possible to change configuration or remove the wired terminals even with the device powered.

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

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

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



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.1 – Input Type

1	2	3	4	5		1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Default	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Res. 2kΩ
<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"/>	
<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"/>	
<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"/>	
<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"/>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tc N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

TAB.3 - Out

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

TAB.2a - Range selection for RTD

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
°C	°C	°C	°C
Def.	Def.	170	
-200	0	180	
-150	10	190	
-100	20	200	
-50	30	250	
-40	40	300	
-30	50	350	
-20	60	400	
-10	70	450	
0	80	500	
5	90	550	
10	100	600	
20	120	650	
30	140	700	
50	150	800	
100	160	850	

TAB.2b - Range selection for Tc

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
°C	°C	°C	°C
Def.	Def.	170	
-200	0	180	
-100	10	190	
-80	20	200	
-60	30	250	
-50	40	300	
-40	50	400	
-30	60	500	
-20	70	700	
-10	80	800	
0	90	900	
10	100	1000	
20	120	1300	
50	140	1500	
100	150	1700	
150	160	1850	

TAB.2c - Range selection for 100mV

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
mV	mV	mV	mV
Def.	Def.	35	
-100	0	40	
-90	1	45	
-80	2	50	
-70	3	55	
-60	4	60	
-50	5	65	
-40	6	70	
-30	7	75	
-20	8	80	
-15	9	85	
-10	10	90	
-5	15	92	
0	20	95	
10	25	97	
20	30	100	

TAB.2d - Range selection for mA

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
mA	mA		
Def.	Def.	13.0	
0	5	13.5	
1.5	5.5	14.0	
2.0	6.0	15.0	
2.5	6.5	15.5	
3.0	7.0	16.0	
3.5	7.5	16.5	
4.0	8.0	17.0	
4.5	8.5	17.5	
5.0	9.0	18.0	
5.5	10.0	18.5	
6.0	10.5	19.0	
6.5	11.0	19.5	
7.0	11.5	20.0	
7.5	12.0	20.0	
8.0	12.5	20.0	

TAB.2e - Range selection for Pot.

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
%	%	%	%
Def.	Def.	80	
0	5	85	
15	10	90	
20	15	95	
25	20	100	
30	25		
35	30		
40	35		
45	40		
50	45		
55	50		
60	55		
65	60		
70	65		
75	70		
80	75		

TAB.2f - Range selection for 10 V

Zero		Span	
0	1	0	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V	V	V	V
Def.	Def.	3.5	
-10.0	0	4.0	
-9.0	0.1	4.5	
-8.0	0.2	5.0	
-7.0	0.3	5.5	
-6.0	0.4	6.0	
-5.0	0.5	6.5	
-4.0	0.6	7.0	
-3.0	0.7	7.5	
-2.0	0.8	8.0	
-1.5	0.9	8.5	
-1.0	1.0	9.0	
-0.5	1.5	9.2	
0	2.0	9.5	
1.0	2.5	9.7	
2.0	3.0	10.0	

TAB.2g - Range selection for Res 500Ω.

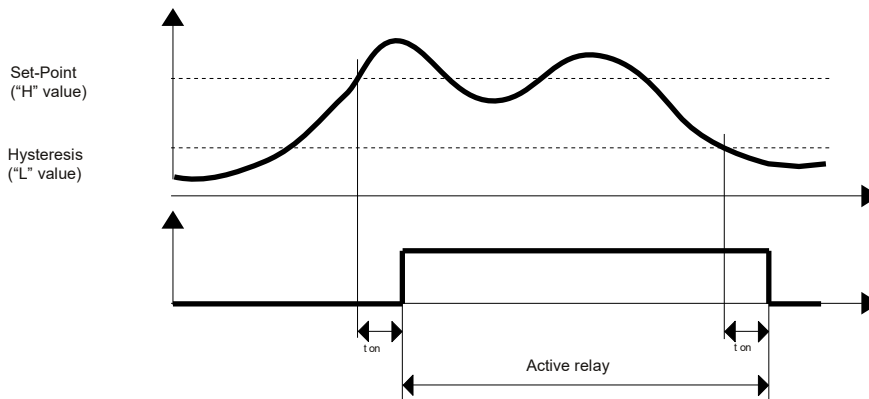
Zero		Span	
Ω	Ω	Ω	Ω
Def.	Def.	220	
0	10	240	
10	20	260	
20	30	280	
30	40	300	
40	50	320	
50	60	340	
60	70	360	
70	80	380	
80	90	400	
90	100	420	
100	120	440	
120	140	460	
140	160	480	
150	180	490	
200	200	500	

TAB.2h - Range selection for Res 2kΩ.

Zero		Span	
Ω	Ω	Ω	Ω
Def.	Def.	1250	
0	500	1300	
50	550	1350	
100	600	1400	
150	650	1450	
200	700	1500	
250	750	1550	
300	800	1600	
350	850	1650	
400	900	1700	
450	950	1750	
500	1000	1800	
550	1050	1850	
600	1100	1900	
650	1150	1950	
700	1200	2000	

### 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.



### 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.

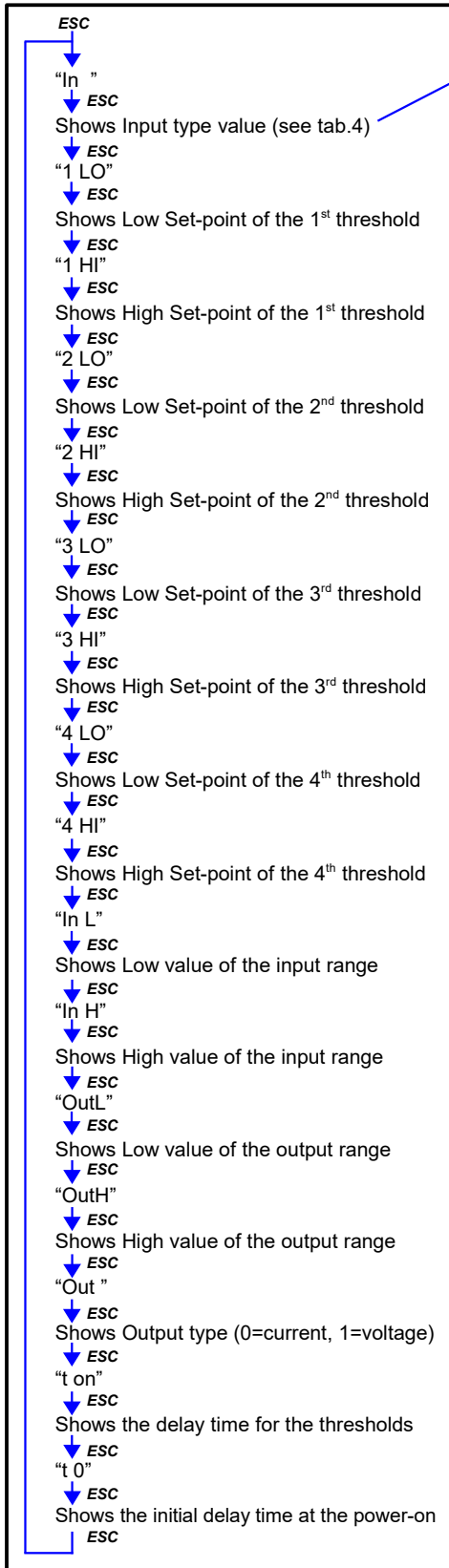
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc...) and to use shielded cable for connecting signals.

## 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):



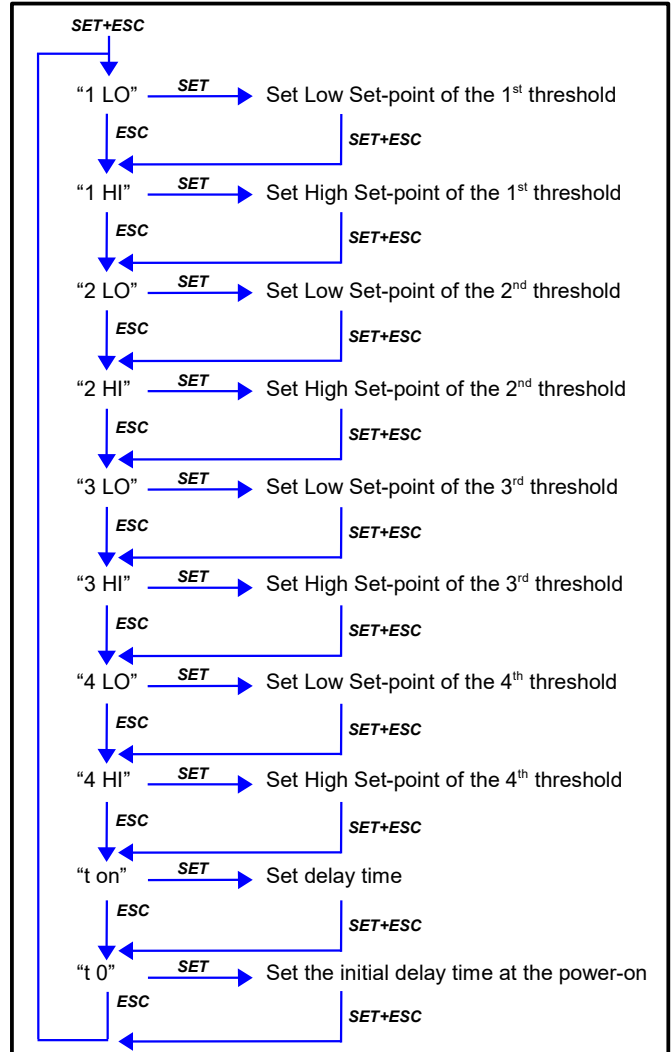
TAB.4 – Input Type

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 500Ω	12
Pt 100	13
Pt 1K	14
Ni 100	15
Ni 1K	16
Pot	17
Res 2kΩ	18

## THRESHOLD CONFIGURATION

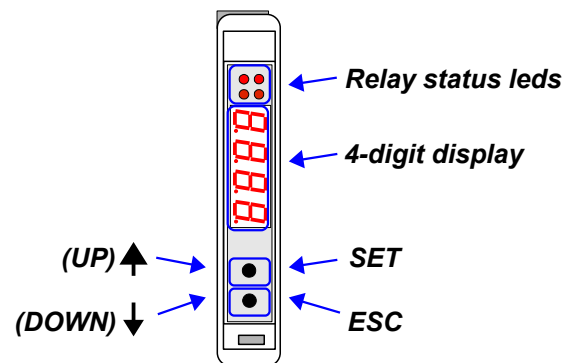
To configure the threshold values press both the buttons ("SET"+"ESC") for at least 5 seconds.

- 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.



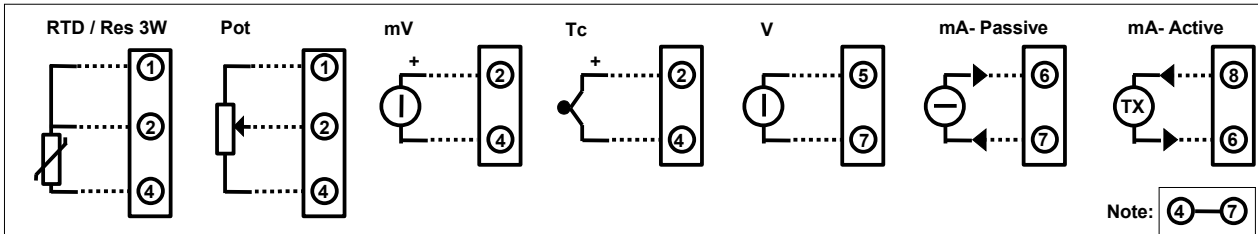
- 5) Repeat the step from 1 up to 4 for each parameter to configure. To exit from the threshold configuration don't press any button for 5 second: the device will automatically visualize the actual input measure in function of the programming performed.

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

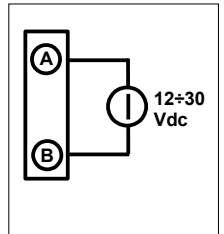


# WIRING

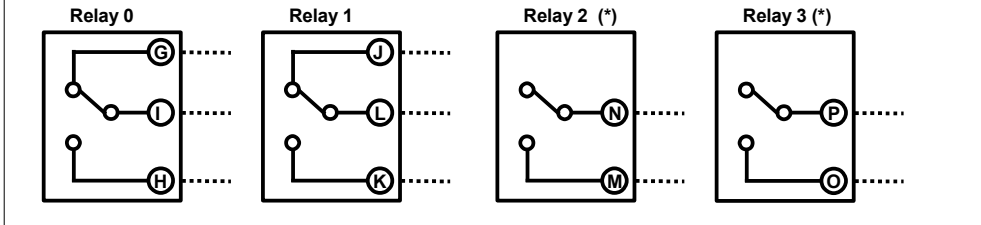
## ANALOGUE INPUT



## SUPPLY

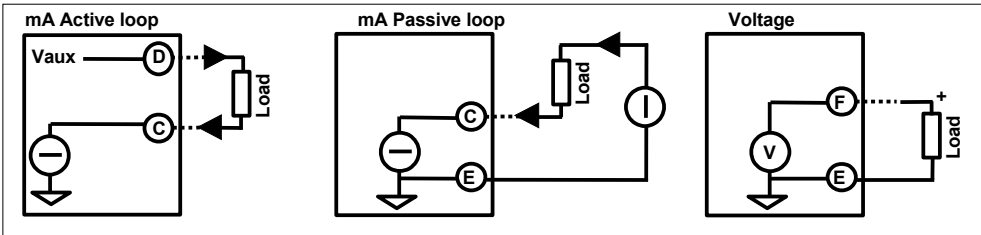


## RELAY OUTPUT



Note: the relay 2 and 3 are available only for the version with 4 thresholds (DAT5028-4)

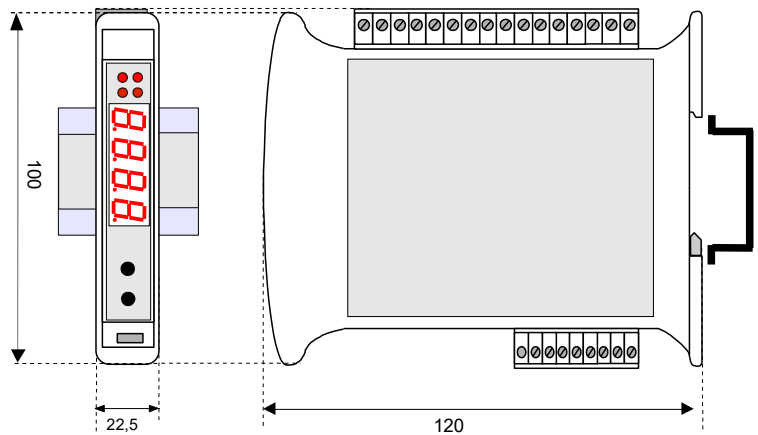
## ANALOGUE OUTPUT



## INSULATION STRUCTURE



## MECHANICAL DIMENSIONS (mm)



## LIGHT SIGNALLING

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

## HOW TO ORDER

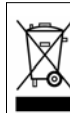
DAT 5028 can be supplied with the configuration specified by the customer. It is necessary to specify the number of necessary thresholds ( 2 or 4). Refer to the "Technical Specification" section for the output type available.

### 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



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.