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Universal isolated converter configurable by Dip-Switch or PC double output & trip amplifier

DAT 4530/AC

FEATURES

- **Universal configurable input for mV, Tc, RTD, Res, Potentiometer, V and mA**
- **Two outputs configurable in current or voltage**
- **Trip alarm**
- **Configurable by dip-switch or PC**
- **High accuracy**
- **On-field reconfigurable**
- **Galvanic isolation among all the ways**
- **CE / UKCA mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035**

GENERAL DESCRIPTION

The universal isolated converter DAT 4530/AC is able to measure and linearise voltage, current and resistance signals, potentiometers and the standard thermocouples and RTDs with, if required, the cold junction compensation, the wires compensation. For mV, V and mA input it is possible to set an option for the fast sampling (option HS) or to extract the square root of the measured signal (option SQRT). In function of programming, the measured values are converted in a current or voltage signal on the two outputs. Moreover an output contact is available as trip alarm.
By dip-switches, it is possible to select the input type and range and the output type without recalibrate the device.
By Personal Computer the user can set the two outputs with independent settings, the parameters of the Trip Alarm and the optional parameters for his own necessity.
The galvanic isolation between input, outputs 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 device guarantees high accuracy and performances stability both versus time and temperature.
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 @ 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
RTD (2, 3, 4 wires)			
Pt100	-200°C	850°C	50°C
Pt1000	-85°C	185°C	30°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	30°C
RES. (2, 3, 4 wires)	0 Ω	500 Ω	50 Ω
	0 Ω	2000 Ω	50 Ω
Pot. (Rnom.< 50KΩ)	0 %	100 %	10 %
Voltage	-10 V	10 V	1 V
Current	0 mA	20 mA	1 mA

Input Accuracy (1)	
mV, TC	the higher of ±0.1% and ±12 uV
RTD	the higher of ±0.1% and ±0.2°C
Res.	the higher of ±0.1% and ±0.15
Potentiometer	± 0.05 % f.s.
Voltage	the higher of ±0.1% and ± 2 mV
mA	the higher of ±0.1% and ± 6 uA
mV, V, mA	± 0.5 % f.s (opt. HS)
Linearity (1)	
TC, RTD	± 0.1 % f.s.
mV, V, mA	± 0.05 % f.s.
Input impedance	
TC, mV	>= 10 MΩ
mA	~22 Ω
Line resistance influence (1)	
TC, mV	<=0.8 uV/Ohm
RTD 3w	0.05%/Ω (50Ω max balanced)
RTD 4w	0.005%/Ω(100Ω max balanced
RTD,Res current	400 uA
Thermal drift (1)	
Full scale	± 0.01% / °C
CJC	± 0.01% / °C
CJC Comp.	± 1 °C
Aux. Voltage	>18V @ 20mA

OUTPUT (2 CHANNELS)

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
Aux. Voltage	>12V @ 20mA
Burn-out values	
Max. output value	22 mA or 11 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	30 mA max.
Response time (10÷ 90%)	about 400 ms
	100 ms (option HS)

ALARM TRIP– SSR TYPE

Contact	SPST
Max Load (resistive) :	
Voltage	48 Vdc / 30 Vac
Current	0.4 A

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

GENERAL SPECIFICATIONS

Power supply voltage	20 .. 28 Vac
Current consumption	
Current output	90 mA max.
Voltage output	30 mA max.

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

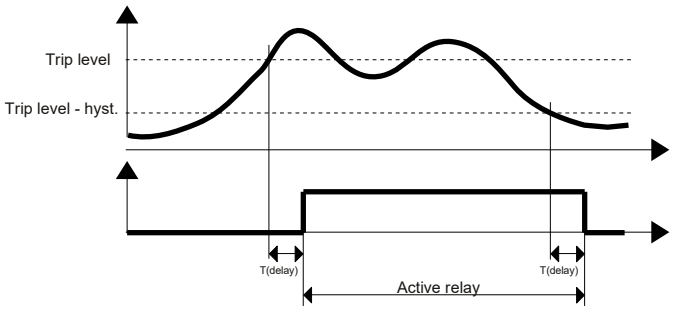
ENVIRONMENTAL CONDITIONS	
Operative Temperature	-20°C .. +60°C
Storage Temperature	-40°C.. +85°C
Humidity (not condensed)	0 .. 90 %
Maximum Altitude	2000 m
Installation	Indoor
Category of installation	II
Pollution Degree	2

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

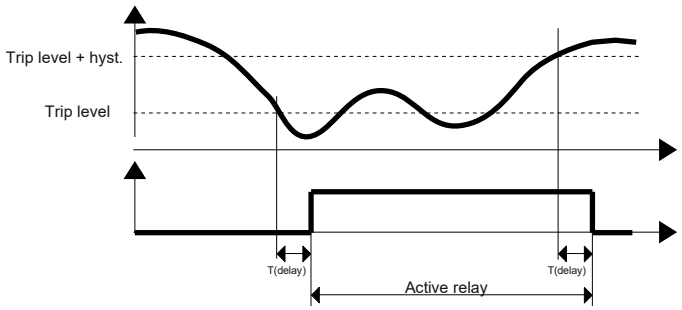
THRESHOLD OPERATION

HIGH ALARM THRESHOLD



For the high alarm the relay goes on when the input signal is higher than the trip level and after the delay time. The relay goes off only when the input signal is lower than the trip level minus the hysteresis value or when reaches the minimum value of the input scale and after the delay time.

LOW ALARM THRESHOLD



For the low alarm the relay goes on when the input signal is lower than the trip level and after the delay time. The relay goes off only when the input signal is higher than the trip level plus the hysteresis value or when reaches the maximum value of the input scale and after the delay time.

PROGRAMMING

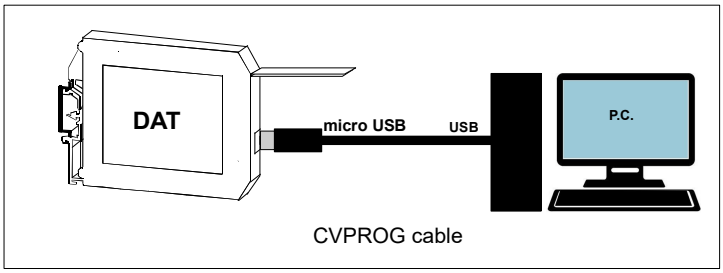
CONFIGURATION BY PC

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.

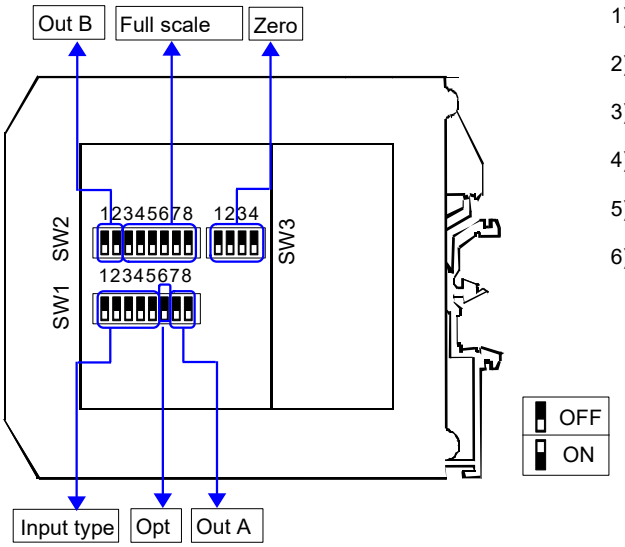
By software DATAPRO it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch;
  (burn-out level, CJC offset, trip alarm settings, delay on output, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration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



CONFIGURATION BY DIP-SWITCHES



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

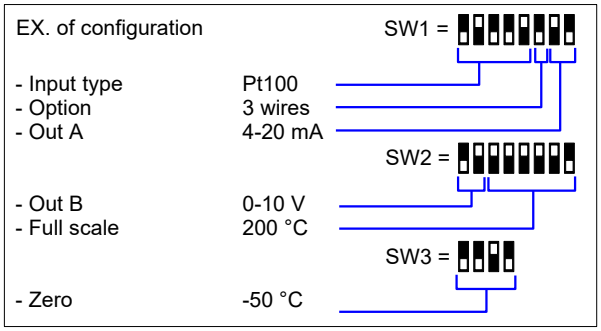
2) Set the input type by the dip-switch SW1 [1..5] (see TAB.1)

3) Set the output A type by the dip-switch SW1 [7..8] and SW2 [1..2] (see TAB.2)

4) Set, if available, the input option by the dip-switch SW1 [6] (see TAB.3)

5) Set the minimum input scale value (Zero) by the dip-switch SW3 [1..4] (see TAB.4)*

6) Set the maximum input value (Full scale) by the dip-switch SW2 [3..8] (see TAB.4)*



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 icon “Switch”.

DIP-SWITCH CONFIGURATION TABLES

TAB.1 – Input type settings

SW1 1 2 3 4 5		SW1 1 2 3 4 5		SW1 1 2 3 4 5	
	EPROM *		Tc J		Res. 2KΩ
	90 mV		Tc K		Res. 500Ω
	200 mV		Tc R		Pt100
	800 mV		Tc S		Ni100
	10 V		Tc T		Pt 1K
	20 mA		Tc B		Ni 1K
			Tc E		Pot. <500Ω
			Tc N		Pot. <50KΩ

NOTES:

* To set the input range refer to the TAB.4 (next pages) referred to the input type selected by the TAB.1.

* If the dip-switches SW1 [1..5] 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, trip alarm 's settings and options).

* If the dip-switches SW2 [3..8] and SW3 [1..4] 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..5]

* Eventual wrong dip-switches settings will be signalled by the blinking of the led “PWR”.

* **If the dip-switch SW1 [6] is set in the ON position and is in progress a measure by Resistance or RTD 2 wires sensor, it is necessary to connect the terminal I to the terminal L and the terminal G to to the terminal H.**

TAB.2

Out A

SW1 7 8	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

Out B

SW2 1 2	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

TAB.3

Options

SW1 6	CJC	RTD/RES
	External	3 wires
	Internal	2/4 wires

TAB.4a – mV, Tc input scale settings

Zero		Full scale							
SW3 1 2 3 4	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C
	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

TAB.4b – Pt100, Pt1K, Ni100, Ni1K input scale settings

Zero		Full scale							
SW3 1 2 3 4	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C
	Default		Default		75		210		370
	-200		0		80		220		380
	-150		5		85		230		390
	-100		10		90		240		400
	-50		15		95		250		425
	-40		20		100		260		450
	-30		25		110		270		475
	-20		30		120		280		500
	-10		35		130		290		525
	0		40		140		300		550
	5		45		150		310		600
	10		50		160		320		650
	20		55		170		330		700
	30		60		180		340		750
	50		65		190		350		800
	100		70		200		360		850

TAB.4c – Resistance < 2 Kohm input scale settings.

Zero		Full Scale							
SW3 1 2 3 4	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω
	Default		Default		800		1150		1600
	0		500		820		1175		1650
	150		520		840		1200		1700
	200		540		860		1225		1750
	250		560		880		1250		1800
	300		580		900		1275		1850
	350		600		920		1300		1900
	400		620		940		1325		1950
	450		640		960		1350		2000
	500		660		980		1375		2000
	550		680		1000		1400		2000
	600		700		1025		1425		2000
	650		720		1050		1450		2000
	700		740		1075		1475		2000
	750		760		1100		1500		2000
	800		780		1125		1550		2000

TAB.4d – Resistance < 500 ohm input scale settings

Zero		Full Scale							
SW3 1 2 3 4	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω
	Default		Default		125		210		370
	0		50		130		220		380
	10		55		135		230		390
	20		60		140		240		400
	30		65		145		250		410
	40		70		150		260		420
	50		75		155		270		430
	75		80		160		280		440
	100		85		165		290		450
	125		90		170		300		460
	150		95		175		310		470
	175		100		180		320		480
	200		105		185		330		490
	225		110		190		340		500
	250		115		195		350		500
	300		120		200		360		500

TAB.4e – Potentiometer input scale settings

Zero		Full Scale							
SW3 1 2 3 4	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%
	Default		Default		34		66		98
	0		5		36		68		100
	15		6		38		70		100
	20		8		40		72		100
	25		10		42		74		100
	30		12		44		76		100
	35		14		46		78		100
	40		16		48		80		100
	45		18		50		82		100
	50		20		52		84		100
	55		22		54		86		100
	60		24		56		88		100
	65		26		58		90		100
	70		28		60		92		100
	75		30		62		94		100
	80		32		64		96		100

TAB.4f – Current input scale settings

Zero		Full Scale									
SW3 1 2 3 4	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA
Default	Default	Default	8	11.5	16
0	5	8.2	11.75	16.5
1.5	5.2	8.4	12	17
2	5.4	8.6	12.25	17.5
2.5	5.6	8.8	12.5	18
3	5.8	9	12.75	18.5
3.5	6	9.2	13	19
4	6.2	9.4	13.25	19.5
4.5	6.4	9.6	13.5	20
5	6.6	9.8	13.75	20
5.5	6.8	10	14	20
6	7	10.25	14.25	20
6.5	7.2	10.5	14.5	20
7	7.4	10.75	14.75	20
7.5	7.6	11	15	20
8	7.8	11.25	15.5	20

TAB.4g – Voltage input scale settings

Zero		Full Scale									
SW3 1 2 3 4	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt
Default	Default	Default	3.4	6.6	9.8
0	0.5	3.6	6.8	10
1.5	0.6	3.8	7	10
2	0.8	4	7.2	10
2.5	1	4.2	7.4	10
3	1.2	4.4	7.6	10
3.5	1.4	4.6	7.8	10
4	1.6	4.8	8	10
4.5	1.8	5	8.2	10
5	2	5.2	8.4	10
5.5	2.2	5.4	8.6	10
6	2.4	5.6	8.8	10
6.5	2.6	5.8	9	10
7	2.8	6	9.2	10
7.5	3	6.2	9.4	10
8	3.2	6.4	9.6	10

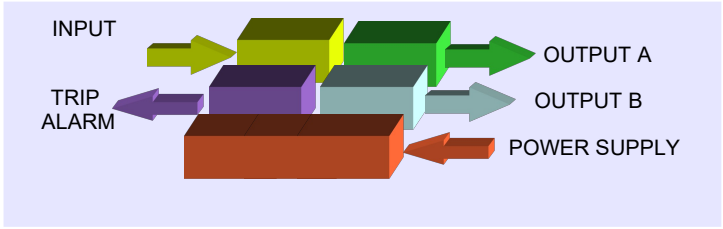
INSTALLATION INSTRUCTIONS

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

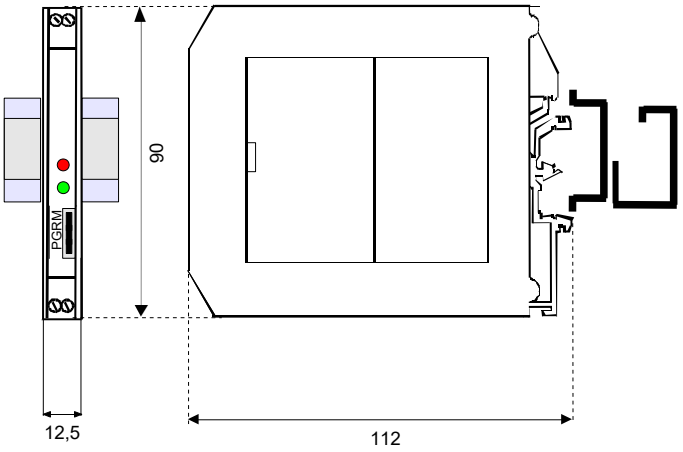
When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following cases:
- If panel temperature exceeds 45°C.
- Use of high power supply value (> 27 Vdc).
- Use of one or both current outputs.
- Use of active current input.

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



DIMENSIONS (mm)

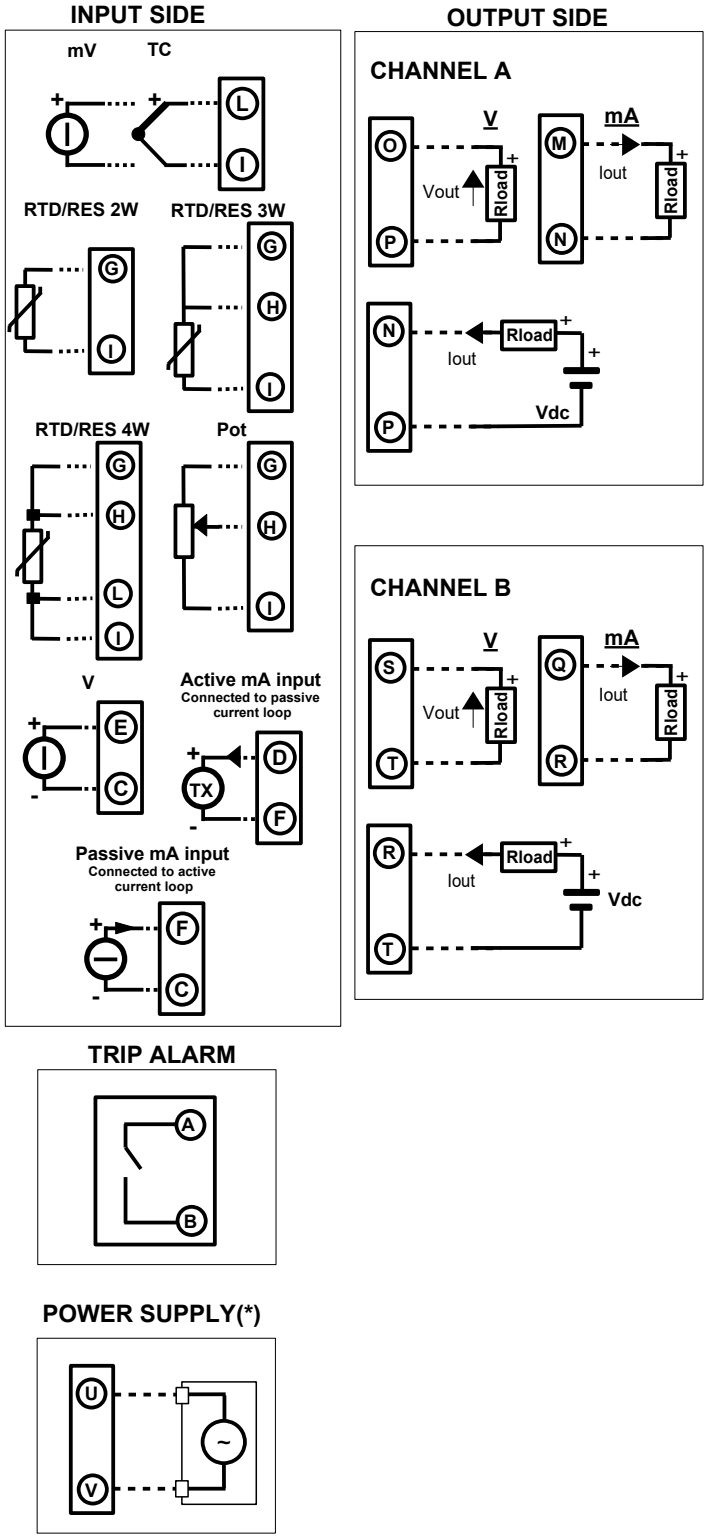


LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switches settings
ALARM	RED	ON	Trip alarm active
		OFF	Trip alarm not active

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.

CONNECTIONS



HOW TO ORDER

The device is supplied 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 4530/AC / Pt100 / 0 ÷ 200 °C / 4 ÷ 20 mA / 4 ÷ 20 mA / 3wires

- Input type
- Input scale
- Out A scale
- Out B scale
- Options