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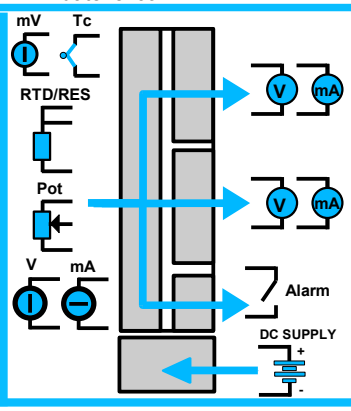
UNI EN ISO 9001:2000

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

DAT 4530

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**
- **EMC compliant – CE mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035**



GENERAL DESCRIPTION

The universal isolated converter DAT 4530 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.
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 and the trip alarm 's settings.
The 1500 Vac galvanic isolation on all ways (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 DAT 4530 is in compliance with the standard 89/336/EEC on the Electromagnetic Compatibility.
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 converter must be powered by a direct voltage applied to the terminals U and V.
The analogue channel measures the value from the sensor connected to the terminals C-D-E-F-G-H-I-L and transmits the output measures on the terminals M-N-O-P (OUT A) and the terminals Q-R-S-T (OUT B). A contact for the trip alarm is available on the terminals A-B.
The input and output 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	1850°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	0 V	10 V	1 V
Current	0 mA	20 mA	1 mA

Calibration (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	± 0.2 % f.s.
RTD	± 0.1 % f.s.
mV, V, mA	± 0.05 % f.s.

Input impedance

TC, mV	>= 10 MΩ

RTD excitation current

RTD, Res	400 uA

Aux. Voltage >18V @ 20mA

Line resistance influence (1)

TC, mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50 Ω max balanced)

Thermal drift (1)

Full scale	± 0.01% / °C
CJC	± 0.01% / °C

CJC Comp. ± 0.5°C

OUTPUT (2 CHANNELS)

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

Output calibration

Current	± 7 uA
Voltage	± 5 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 500 ms
100 ms (option HS)

ALARM TRIP

Contact	SPST (1Form A)
Max Load (resistive) :	
Voltage	48 V (ac/dc)
Current	0.4 A

POWER SUPPLY

Power supply voltage	20 .. 30 Vdc
Reverse polarity protection	60 Vdc max

Current consumption

Current output	90 mA max.
Voltage output	50 mA max.

ISOLATION

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

TEMPERATURE AND HUMIDITY

Operative temperature	-20°C .. +60°C
Storage temperature	-40°C.. +85°C
Humidity (not condensed)	0 .. 90 %

HOUSING

Material	Self-extinguishing plastic
Mounting	DIN rail in compliance with EN-50022 and EN-50035
Weight	about 100 g.

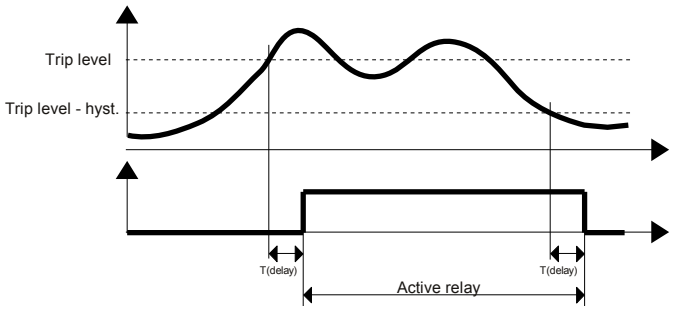
EMC (for industrial environments)

Immunity	EN 61000-6-2
Emission	EN 61000-6-4

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

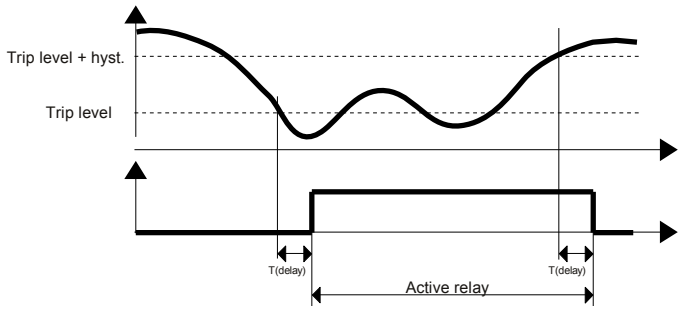
THRESHOLD OPERATION

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



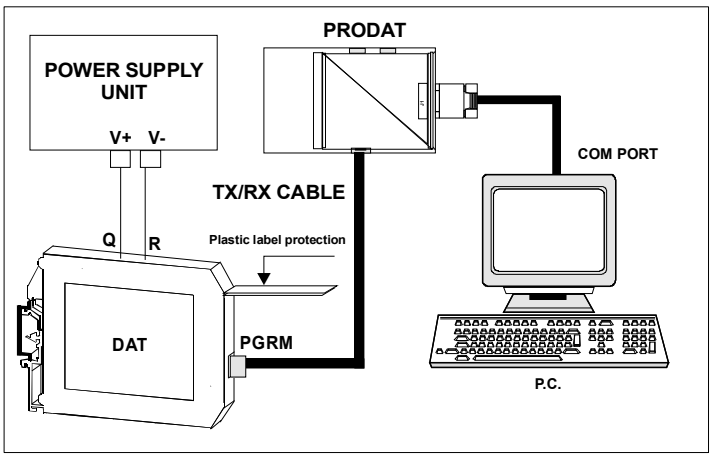
For the low alarm the relay goes on when the input signal is lower than the trip level and after the delay time. The relay goes off only when the input signal is higher than the trip level plus the hysteresis value or when reaches the maximum value of the input scale and after the delay time.

PROGRAMMING

CONFIGURATION BY PC

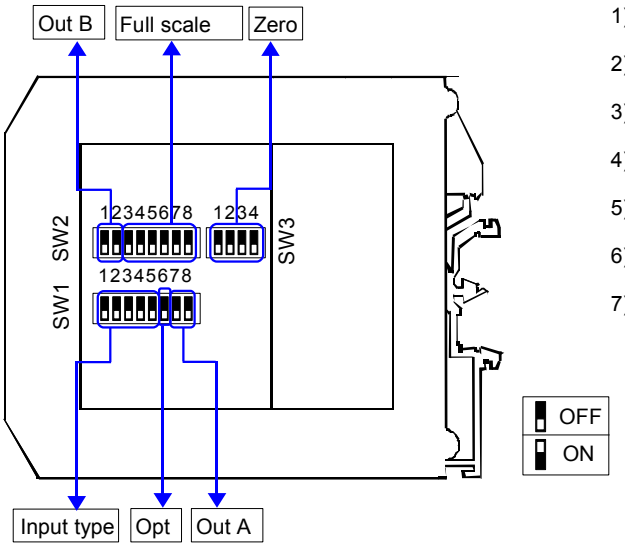
By software DATESOFT it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch;
  (burn-out level, CJC offset, trip alarm settings, fast sampling, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration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

To configure the device follow the next steps:
1) Power-on the device.
2) Open the protection plastic label on the front of the device.
3) Connect the interface PRODAT to the PC (COM port)
   and to the device (PGRM connector).
4) Open DATESOFT.
5) Select the COM port in use.
6) Click on “Open COM”.
7) Click on the icon “Program”.
8) Set the programming data.
9) Click on the icon “Write” to send the programming data to the device.



Warning: during these operations the device must always be powered and the TX/RX cable always connected.
For information about DATESOFT refer to the software's 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)

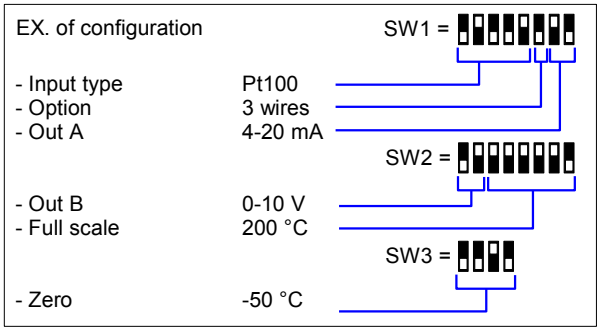
3) Set the output A type by the dip-switch SW1 [7..8] (see TAB.2)

4) Set the output B type by the dip-switch SW2 [1..2] (see TAB.2)

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

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

7) Set the minimum input scale value (Zero) by the dip-switch SW3 [1..4] (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. <2KΩ

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	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	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

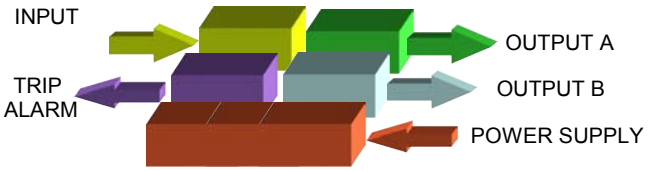
INSTALLATION INSTRUCTIONS

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

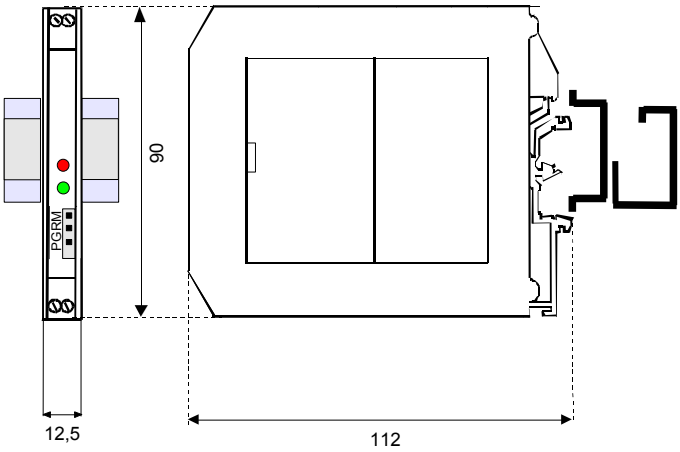
When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following cases:
- If panel temperature exceeds 45°C.
- Use of high power supply value (> 27 Vdc).
- Use of one or both current outputs.
- Use of active current input.

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.

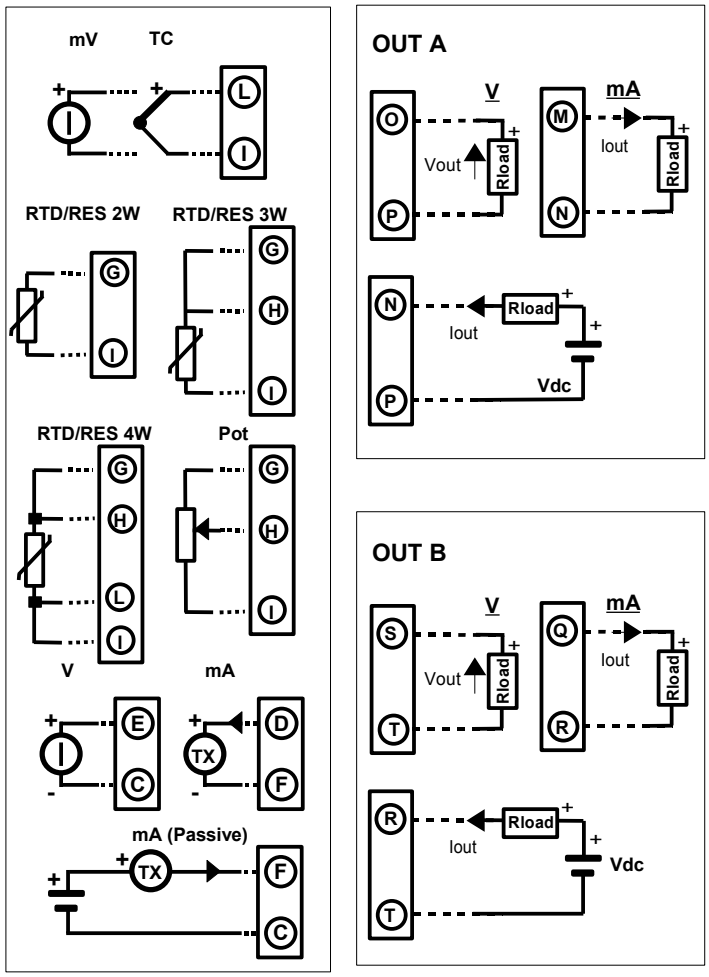
ISOLATION STRUCTURE



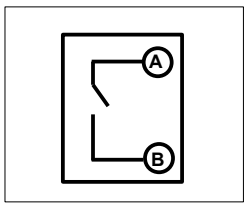
DIMENSIONS (mm)



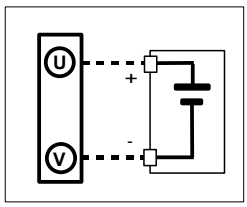
CONNECTIONS



TRIP ALARM CONTACT



POWER SUPPLY



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

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 4530 / Pt100 / 0 ÷ 200 °C / 4 ÷ 20 mA / 4 ÷ 20 mA / 3wires

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