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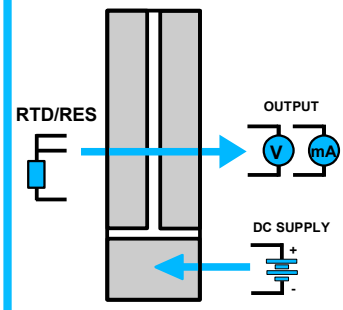
UNI EN ISO 9001:2008

Isolated converter for RTD and resistance configurable by Dip-Switch or PC

DAT 4531 B

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



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GENERAL DESCRIPTION

The isolated converter DAT 4531 B is able to measure and linearise the standard RTDs and resistances with 2 or 3 wires cable 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 all the sensors it is possible to set the cable compensation with 2 or 3 wires.
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 B 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	Min.Span
RTD (2, 3 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 wires)	0 Ω	500 Ω	50 Ω
	0 Ω	2000 Ω	50 Ω

Accuracy (1)
RTD the higher of ±0.1% and ±0.2°C
Low Res. the higher of ±0.1% and ±0.15 Ω
High Res. the higher of ±0.2% and ± 1 Ω

Linearity (1)
RTD ± 0.1 % f.s.

Sensor excitation current
RTD,Res 500 uA

Line resistance influence (1)
RTD 3 wires 0.05%/Ω (50 Ω max balanced)

Thermal drift (1)
Full scale ± 0.01% / °C

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

OUTPUT

Output type	Min	Max	Min Span
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

POWER SUPPLY

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 industrial environments)

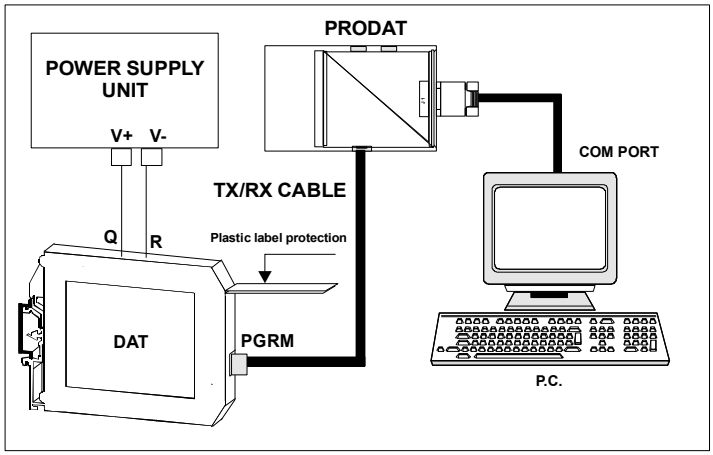
Immunity	EN 61000-6-2
Emission	EN 61000-6-4
UL	
US Standard	UL 61010-1
Canadian Standard	CSA C22.2 No 61010-1
CCN	NRAQ/NRAQ7
Typology	Open Type device
Classification	Industrial Control Equipment
File Number	E352854

PROGRAMMING

CONFIGURATION BY PC

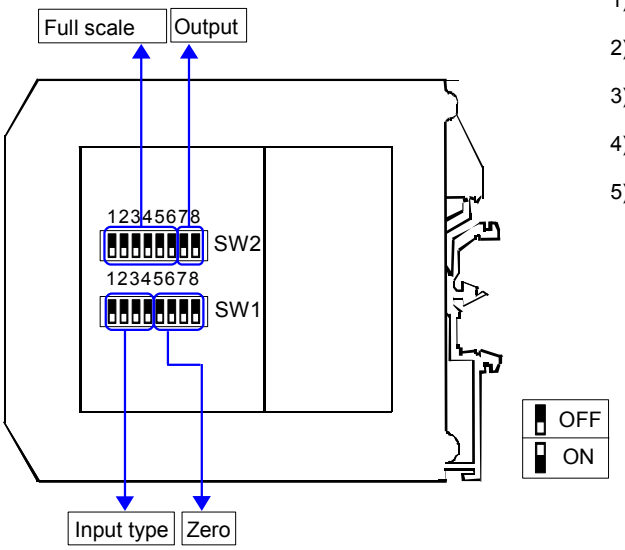
By software DATESOFT it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch;
  (burn-out level, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration wizard.

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 “Program”.
8) Set the programming data.
9) Click on “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..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 Pt100
- Zero value -50 °C

SW2 =

- Full scale value 200 °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 settings

SW1 1 2 3 4		SW1 1 2 3 4	
	EPROM *		---
	R 2KΩ		---
	R 500Ω		---
	Pt100		---
	Ni100		---
	Pt1000		---
	Ni1000		---
	---		---

TAB.2
Output settings

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

NOTES:

* For all the input type selected by dip-switches, the compensation of wires is fixed at 3.

* To configure the range for the input type selected (TAB.1) refer to the section of the TAB.3 on next page relative to it (ex: for Pt100 use the table TAB.3c).

* 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).

* 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”.

TAB.3a – Settings for Resistance < 2KOhm

Zero		Full scale							
SW1 5 6 7 8	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	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.3b – Settings for Resistance < 500 ohm

Zero		Full scale							
SW1 5 6 7 8	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	Ω	SW2 1 2 3 4 5 6	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.3c – Settings for Pt100, Pt1K, Ni100, Ni1K

Zero		Full scale							
SW1 5 6 7 8	°C	SW2 1 2 3 4 5 6	°C	SW2 1 2 3 4 5 6	°C	SW2 1 2 3 4 5 6	°C	SW2 1 2 3 4 5 6	°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

INSTALLATION INSTRUCTIONS

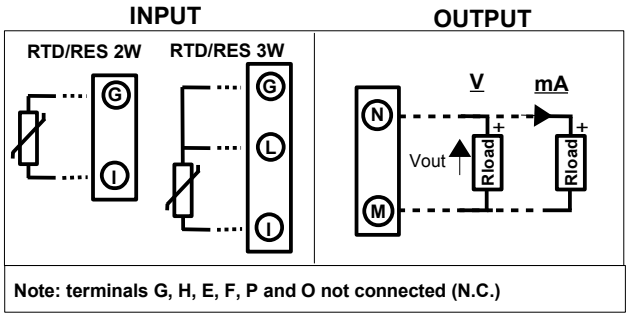
The device is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:

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.

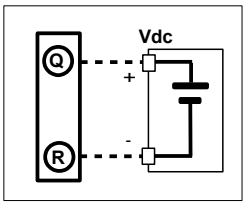
ISOLATION STRUCTURE

CONNECTIONS



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

POWER SUPPLY(*)

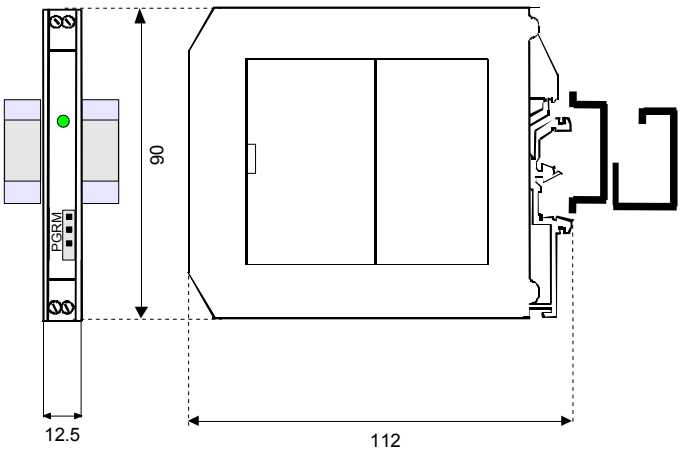


(*) Note: for UL installation the device must be powered using a power supply unit classified NEC class 2 or SELV

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 4531B / Pt100 / 0 ÷ 200 °C / 4 ÷ 20 mA / 3 wires

- Input type
- Input range
- Output range
- Options