RTD Splitter

DAT 4631 B

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

GENERAL DESCRIPTION
The isolated doubler/converter DAT 4631 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; the configuration by PC allows to program the two outputs with two independent settings. 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, 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 4631 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				OUTPUT (2 CHANNELS)				GENERAL SPECIFICATIONS	
Input type	**Min**	**Max**	**Span min**	**Output type**	**Min**	**Max**	**Span min**	Power supply voltage	18 .. 30 Vdc
RTD (2, 3 wires)								Reverse polarity protection	60 Vdc max
Pt100	-200°C	850°C	50°C	Current	0 mA	20 mA	4 mA	**Current consumption**	
Pt1000	-85°C	185°C	30°C	Voltage	0 V	10 V	1 V	Current output	55 mA max.
Ni100	-60°C	180°C	50°C					Voltage output	25 mA max.
Ni1000	-60°C	150°C	30°C	**Output resolution**				**ISOLATION**	
				Current		± 7 uA		Among all the ways	1500 Vac,
RES. (2, 3 wires)	0 Ω	500 Ω	50 Ω	Voltage		± 4 mV			50 Hz, 1 min
	0 Ω	2000 Ω	50 Ω	**Burn-out values**				**ENVIRONMENTAL CONDITIONS**	
				Max. output value		22 mA or 10.6 V		Operative Temperature	-20°C .. +60°C
				Min. output value		0 mA or -0.6 V		UL Operative Temperature	-10°C .. +60°C
								Storage Temperature	-40°C.. +85°C
Accuracy (1)				**Output load Resistance - Rload**				Humidity (not condensed)	0 .. 90 %
RTD	the higher of ±0.1% and ±0.2°C			Current output		< 500 Ω		Maximum Altitude	2000 m
Low Res.	the higher of ±0.1% and ±0.15 Ω			Voltage output		> 10 KΩ		Installation	Indoor
High Res.	the higher of ±0.2% and ± 1 Ω			Short circuit current		26 mA max.		Category of installation	II
Linearity (1)								Pollution Degree	2
RTD	± 0.1 % f.s.			**Response time (10÷ 90%)**		about 500 ms		**MECHANICAL SPECIFICATIONS**	
Sensor excitation current								Material	Self-extinguish plastic
RTD,Res	500 uA							IP Code	IP20
Line resistance influence (1)								Wiring	wires with diameter
RTD 3 wires	0.05%/Ω (50 Ω max balanced)								0.8÷2.1 mm² /AWG 14-18
Thermal drift (1)								Tightening Torque	0.8 N m
Full scale	± 0.01% / °C							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
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

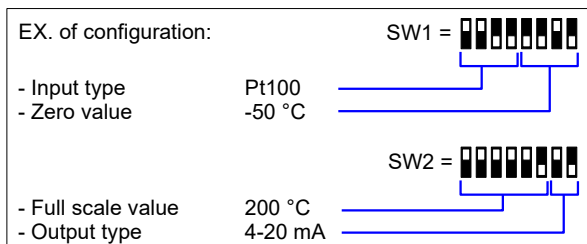(1)referred to the input Span (difference between max. and min.)

CONFIGURATION BY DIP-SWITCHES

| Full scale | Output |

OFF
ON
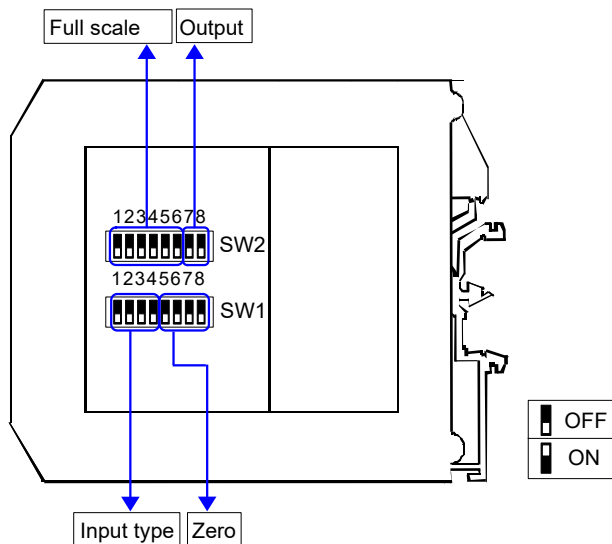
| Input type | Zero |

PROGRAMMING

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

TAB.2
Output setting

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

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

NOTES:
* **For all the input types selected by dip-switches, the compensation of wires is fixed at 3. If the measurement is made by 2-wire RTD or resistor, it is necessary to make a short-circuit between the terminals G and L.**
* 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 signaled by the blinking of the led "PWR".

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 its user guide.

DAT   micro USB   USB   P.C.

CVPROG cable
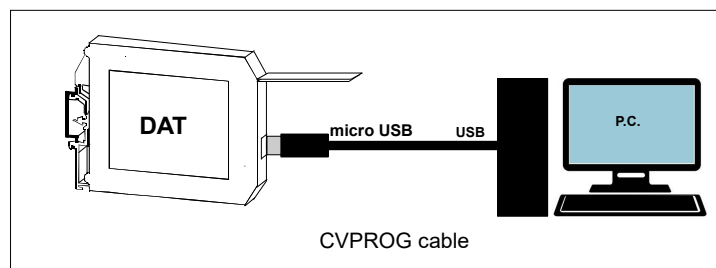
TAB.3a – Settings for Resistance < 2KOhm

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

Zero SW1 (5 6 7 8)	Ω	Full scale SW2 (1 2 3 4 5 6)	Ω	SW2	Ω	SW2	Ω	SW2	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 SW1 (5 6 7 8)	°C	Full scale SW2 (1 2 3 4 5 6)	°C	SW2	°C	SW2	°C	SW2	°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:
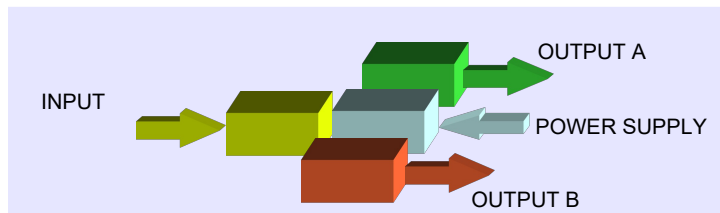- If panel temperature exceeds 45°C.
- Use of high power supply value (> 27 Vdc).
- Use of output current.

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.
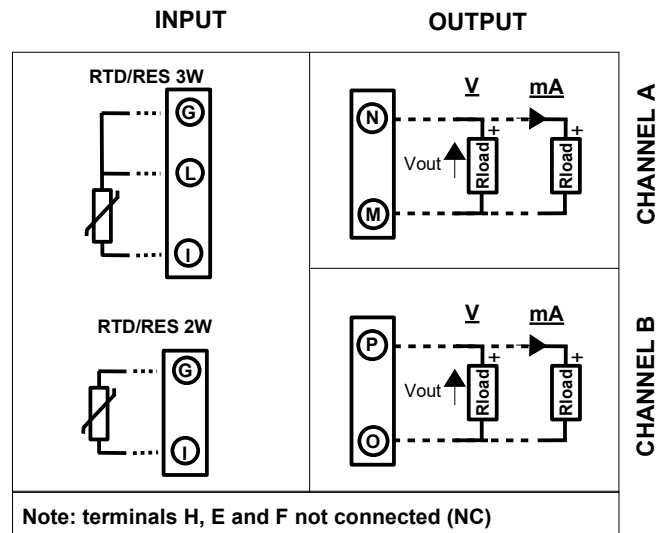
CONNECTIONS

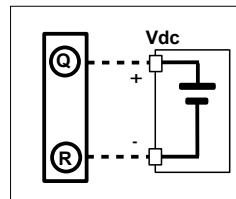### INPUT   OUTPUT

RTD/RES 3W

RTD/RES 2W

CHANNEL A

CHANNEL B

Note: terminals H, E and F not connected (NC)

POWER SUPPLY(*)

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

ISOLATION STRUCTURE

INPUT

OUTPUT A

POWER SUPPLY

OUTPUT B

LIGHT SIGNALLING

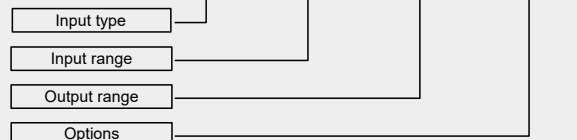| LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switches setting

DIMENSIONS (mm)

90

PGRM

12.5

112
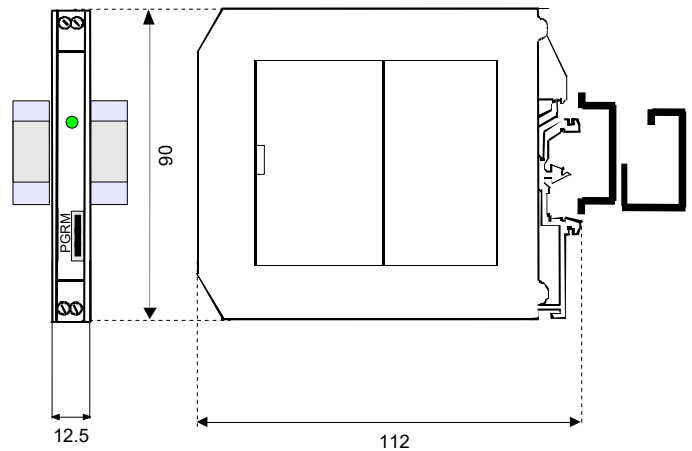
HOW TO ORDER
The device is provided as requested on the Customer's order.
Refer to the section "Programming" to determine the input and output ranges.
In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 4631B / Pt100 / 0 ÷ 200 °C / 4 ÷ 20 mA / 3 wires

Input type
Input range
Output range
Options

ED.02.15-R.06