DATEXEL

Via monte Nero, 40/B – 21049 TRADATE (VA) ITALY   Tel: +39 (0)331841070 Fax:+39 (0)331841950 - e-mail:datexel@datexel.it - www.datexel.it

Universal isolated transmitter configurable by Dip-Switch or PC	DAT 4535

FEATURES
- **Universal configurable input for mV, Tc, RTD, Res, Potentiometer, V and mA**
- **Configurable current output from 4 to 20 mA**
- **Configurable by Dip-switches or by Personal Computer by cable CVPROG**
- **High accuracy**
- **On-field reconfigurable**
- **Galvanic isolation at 1500 Vac**
- **CE / UKCA mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035**

GENERAL DESCRIPTION

The universal isolated transmitter DAT4535 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 and the wires compensation.

In function of programming, the measured values are converted and transmitted on the 4÷20 mA current loop.

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 without recalibrate the device.

Moreover, by Personal Computer and the cable CVPROG the user can program all of the device's parameters for his own necessity.

The terminals of the current signal on input side must be only connected to active current loop.

The 1500 Vac galvanic isolation eliminates the effects of all ground loops eventually existing and allows the use of the transmitter in heavy environmental conditions found in industrial applications.
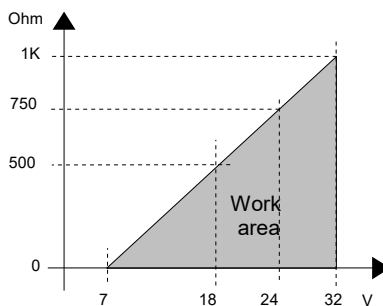
USER INSTRUCTIONS

The wiring must be made as shown in section "Connections". Rload is the input impedance of instruments on the current loop; to obtain a correct measure, its value must be calculated in function of the power supply value (see section "Technical specification – Load characteristic").

To configure and install the transmitter refer to sections "Programming", "Configuration by dip-switches", "Dip-switches configuration tables" and "Installation Instructions".

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	> of ±0.1% f.s. or ±12 uV
RTD	> of ±0.1% f.s. or ±0.2°C
Res.	> of ±0.1% f.s. or ±0.15 Ω
Potentiometer	± 0.05 % f.s.
Volt	> of ±0.1% f.s. or ± 2 mV
mA	> of ±0.1% f.s. or ± 6 uA

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 3 wires	0.05%/Ω (50Ω max balanced)
RTD 4 wires	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.	± 0.5°C

OUTPUT

Output type	Min	Max	Span min
Current	4 mA	20 mA	4 mA

Output calibration
Current	± 7 uA

Burn-out values
Max. output value	21.8 mA
Min. output value	2.4 mA

Response time (10÷ 90%)   about 400 ms

Delay on output   Programmable from 0 to 30 sec.

Load characteristic – Rload
(maximum load value on current loop per power supply value)

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

GENERAL SPECIFICATIONS

Supply voltage	7 .. 32 Vdc
Reverse polarity protection	60 Vdc max

ISOLATION
Input – Power supply/Out	1500 Vac, 50 Hz,1 min.

ENVIRONMENTAL CONDITIONS
Operative Temperature	-40°C ..+85°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

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.
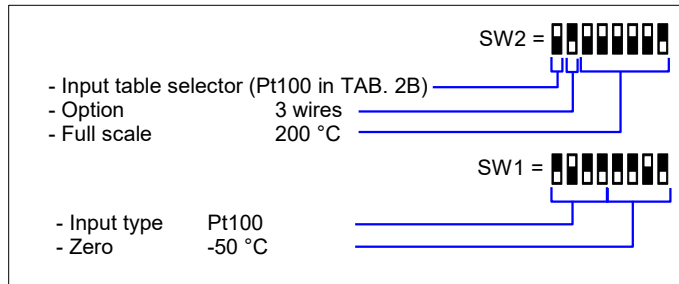*For information about the software refer to the its user guide.*

CVPROG cable
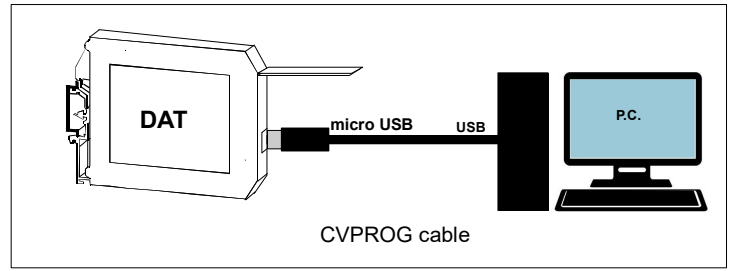
CONFIGURATION BY DIP-SWITCHES
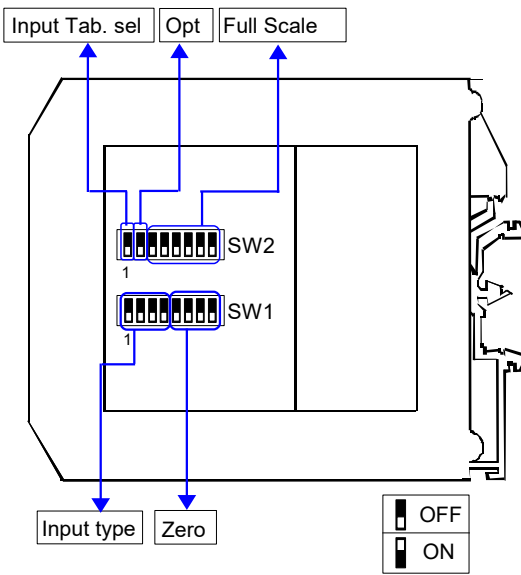
1) Open the suitable door on the side of the device.

2) Set the input table selector by the dip-switch SW2 [1] (see TAB.1)

3) Set the input type by the dip-switches SW1 [1..4] (see TAB.2A and TAB.2B)

4) Set, if foreseen, the option by dip-switch SW2 [2] (see TAB.3)

5) Set the minimum value of the input scale (Zero) by dip-switches SW1 [5..8] (see TAB.4)*

6) Set the full scale value by dip-switches SW2 [3..8] (see TAB.4)*

Ex of configuration Pt100 3 wires -50 ÷ 200 °C:

- Input table selector (Pt100 in TAB. 2B)
- Option   3 wires
- Full scale   200 °C

- Input type   Pt100
- Zero   -50 °C

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 table selection

SW2 1	TABLE
	TAB. 2A (mV, Volt, mA, TC)
	TAB. 2B (Res, RTD, Pot.)

TAB.2A – Input type selection

SW1 1 2 3 4		SW1 1 2 3 4	
	EPROM *		Tc J
	90 mV		Tc K
	200 mV		Tc R
	800 mV		Tc S
	10 V		Tc T
	20 mA		Tc B
	-------		Tc E
	-------		Tc N

TAB.2B – Input type selection

SW1 1 2 3 4		SW1 1 2 3 4	
	Res. 2KΩ		------
	Res. 500Ω		------
	Pt100		------
	Ni100		------
	Pt 1K		------
	Ni 1K		------
	Pot. <500Ω		------
	Pot. <50KΩ		------

TAB.3 - Option

SW2 2	CJC	RTD/RES
	External	3 wires
	Internal	2/4 wires

NOTES:

* To set the input range refer to the TAB.4 (next pages) referred to the input type selected by TAB.1, TAB.2A and TAB 2B.

* If the dip-switches SW1 [1..4] and SW2 [1] are all set in the position 0 ("EPROM"), the device will follow the configuration programmed by PC (input type and range, output range and options).

* If the dip-switches SW1 [5..8] and SW2 [3..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] and SW2[1] .

* **If the dip-switch SW2 [2] 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.4a – mV, Tc Input scale settings

Zero SW1 (5 6 7 8) °C	Full Scale 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	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 SW1 (5 6 7 8) °C	Full Scale 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 < 2KOhm Input scale settings

Zero SW1 (5 6 7 8) Ω	Full Scale 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 SW1 (Ω)	Full Scale SW2 (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.4e – Potentiometer Input scale settings

Zero SW1 (%)	Full Scale SW2 (%)	SW2 (%)	SW2 (%)	SW2 (%)
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 – mA Input scale settings

Zero SW1 (mA)	Full Scale SW2 (mA)	SW2 (mA)	SW2 (mA)	SW2 (mA)
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 – Volt Input scale settings

Zero SW1 5 6 7 8	Volt	Full Scale 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

CONNECTIONS

INPUT CONNECTION

mV
TC
RTD/RES 2W (*)
RTD/RES 3W

+ [L] [I]
+ [L] [I]
[G] [I]
[G] [H] [I]

RTD/RES 4W
Pot
V
Passive mA input
Connected to active current loop

[G] [H] [L] [I]
[G] [H] [I]
+ [E] [I]
+ [F] [I] -
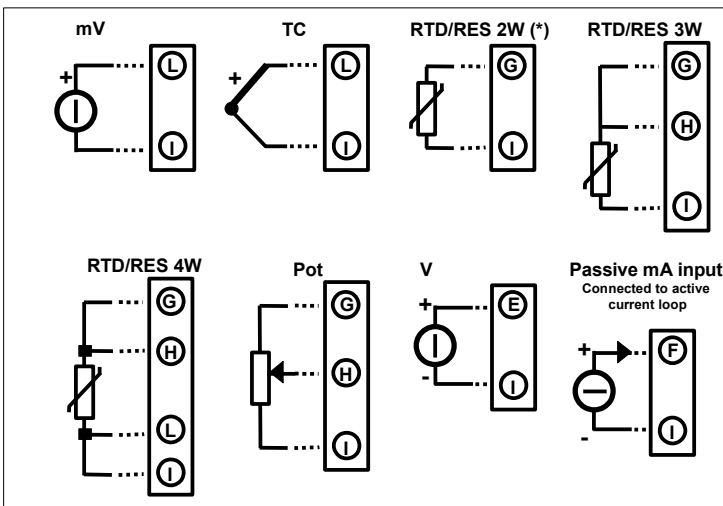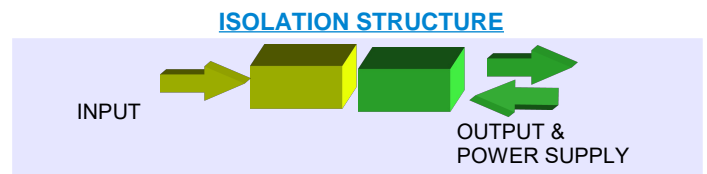
Terminal I = GND INPUT

Note: if the device is programmed by dip switches for RTD / RES with 2 wires connection make a short circuit between the terminals I and L and the terminals G and H.
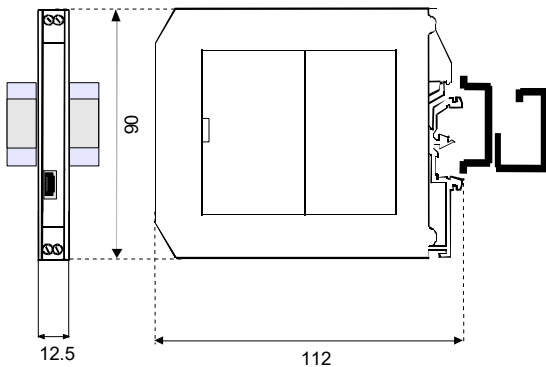
POWER SUPPLY / OUTPUT CONNECTION

[P]
[O] Iout Rload +
7÷32 Vdc
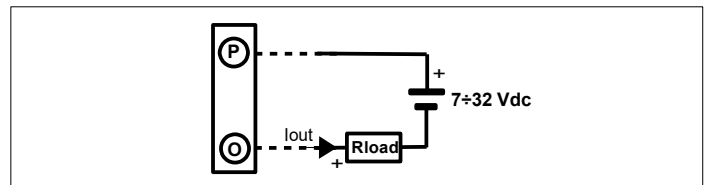
Terminal P = N; Terminal O = M

Note: Terminal R = Q = Not connected (NC)

ISOLATION STRUCTURE

INPUT
OUTPUT & POWER SUPPLY

DIMENSIONS (mm)

90
12.5
112

INSTALLATION INSTRUCTIONS

The device DAT 4535 is suitable for DIN rail mounting.
It is necessary to install the device in a place without vibrations; avoid to routing conductors near power signal cables .

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

ORDER CODE EXAMPLE

DAT4535 / Pt100 / 0 ÷ 200 °C / 3 wires / 4 ÷ 20 mA

Input type
Input range
Options
Output range

ED.04.13-R.07