RTD Temperature Converter

DAT 2165

FEATURES
- **Pt100 input**
- **Input range programmable either with °C or °F unit measure**
- **Zero e Span values programmable by DIP-switches**
- **Voltage or current linearised outputs**
- **Good accuracy and performance stability**
- **EMC compliant – CE / UKCA mark**
- **DIN rail mounting in according to EN-50022 and EN-50035 standards**

GENERAL DESCRIPTION
The converter DAT 2165 is designed to provide on the output two linearised voltage or current signals proportional with the temperature characteristics of the Pt100 sensors connected on its inputs. It is possible to connect on the input both 3 wire Pt100 and 2 wire Pt100.
The user can program the input ranges and the output signal type by the proper DIP-switches available after opening the suitable door located on the side of device.
The regulation of Zero and Span values is made by the ZERO and SPAN potentiometers located on the front side of device.
It is housed in a plastic enclosure of 12.5 mm thickness suitable for DIN rail mounting in according to EN-50022 and EN-50035 standards .

OPERATIVE INSTRUCTIONS
The connections must be made as shown in the section "Wiring".
The configuration of input and output ranges values is made by DIP-switches (refer to the sections "Input ranges table" and "Output ranges table").
After the converter configuration, it is necessary to calibrate it using the ZERO and SPAN; this operation is illustrated in the section "DAT 2165: Configuration and calibration ".
To install the device refer to the section "Installation instructions".

TECHNICAL SPECIFICATIONS (Typical @ 25 °C and in nominal conditions)

INPUT		OUTPUT		GENERAL SPECIFICATIONS	
RTD Pt100 2 or 3 wires in compliance to IEC 60751		**Signal type**		Power supply voltage	18 .. 30 Vdc
		Configurable:	4 ÷ 20 mA, 0 ÷ 20 mA	Reverse polarity protection	60 Vdc max
Configurability for Span			0÷10 V	Current consumption max.	Current: 40 mA
					Voltage:10 mA
Minimum value	50 °C	**Load resistance**			
	122 °F		Current: ≤ 500 Ω	**ENVIRONMENTAL CONDITIONS**	
			Voltage: ≥ 5 KΩ	Operative temperature	-20°C .. +70°C
Configuration	From 50 °C to 650 °C			Storage temperature	-40°C .. +85°C
	From 122 °F to 1202 °F	**Thermal drift (1)**		Humidity (not condensing)	0 .. 90 %
		Full Scale	± 0.03 % of full scale /°C	Maximum Altitude	2000 m slm
Configurability for Zero				Installation	Indoor
		Out of scale values		Category of Installation	II
Configuration	From -50 °C to 50 °C	Type positive	Current: > 20 mA	Pollution Degree	2
	From - 58 to 122 °F		Voltage: > 10 Vdc		
				MECHANICAL SPECIFICATIONS	
Input calibration (1)		**Maximum value**		Material	Self-extinguish plastic
Pt100	± 0.1% f.s.			IP Code	IP20
		Current	> 21 mA, 35 mA max	Wiring	wires with diameter
Linearity (2)		Voltage	> 10.5 Vdc, 18 Vdc max		0.8÷2.1 mm^2
Pt100	± 0.15 % f.s.				AWG 14-18
		Response time (10÷ 90%) 300 ms circa		Tightening Torque	0.8 N m
Line resistance influence (1)				Mounting	in compliance with DIN
Pt100	0.05 % f.s./ohm (100 ohm max. balanced on each wire)	**Warm-up time**	1 minute		rail standard EN-50022 and EN-50035
				Weight	about 90 g.
RTD Excitation current					
	Typical 1 mA			**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
(1)referred to input Span (difference between Val. max. and min.)					
(2)inclusive of hysteresis and variations of power supply voltage					

DAT 2165: CONFIGURATION & CALIBRATION

1) Calculate the difference between the maximum and the minimum value of the input range (Span).

2) Refer to the " Input ranges table " and determine in the column " SPAN " the position where the calculated value is included, then referring to the position obtained, determine in the column "ZERO", the line in which the minimum value is included .

Refer to the " Output ranges table " and determine in the column " Output signal " the position of the output value.

In the correspondent lines is shown as to set the DIP-switches .

3) Set the DIP-switches as indicated .

4) Connect on input a 3 wires Pt100 simulator programmed to supply the maximum and minimum values of the input range or a fixed resistor of the same values.

5) Set the simulator at the minimum temperature or to connect a fixed resistor correspondent to the minimum value .

6) By the ZERO potentiometer calibrate the output at the minimum value .

7) Set the simulator at the maximum temperature or to connect a fixed resistor correspondent to the maximum value .

8) By the SPAN potentiometer calibrate the output at the maximum value .

9) Repeat the operation from the step 5 to the step 8 until the output value will be correct (3 attempts typically required).

Configuration ex. : -30/200 °C out 0÷10 Vdc
Span => 200°C - (-30°C) = 230°C;
Input switches configuration (DSI): Off, Off, Off, Off.
Output switches configuration (DSO): Off, On, Off, On, Off.

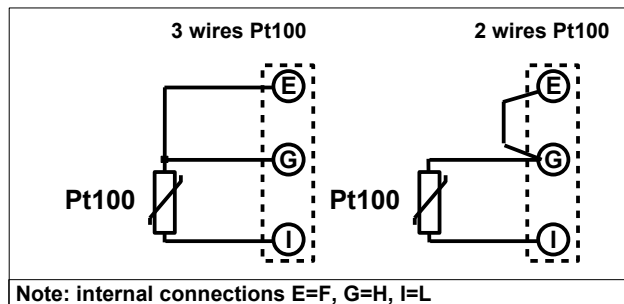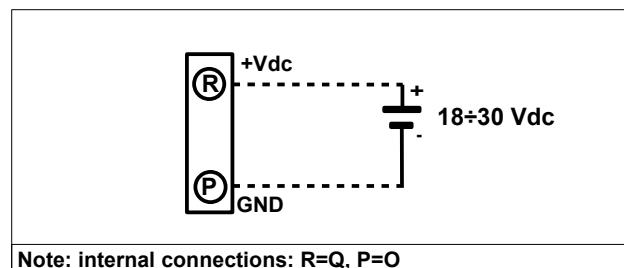## INSTALLATION INSTRUCTIONS

The device DAT 2165 is suitable for DIN rail mounting in vertical position.
It is necessary to install the device in a place without vibrations .
Moreover, it is recommended to use shielded cable to connect signals and to avoid routing conductors near power signal cables.
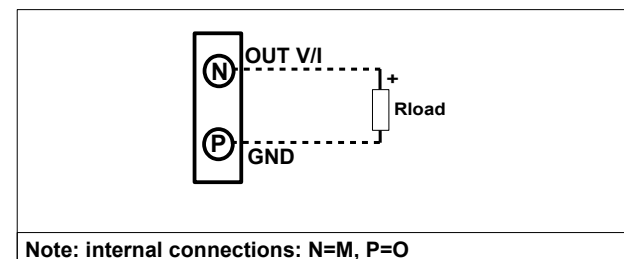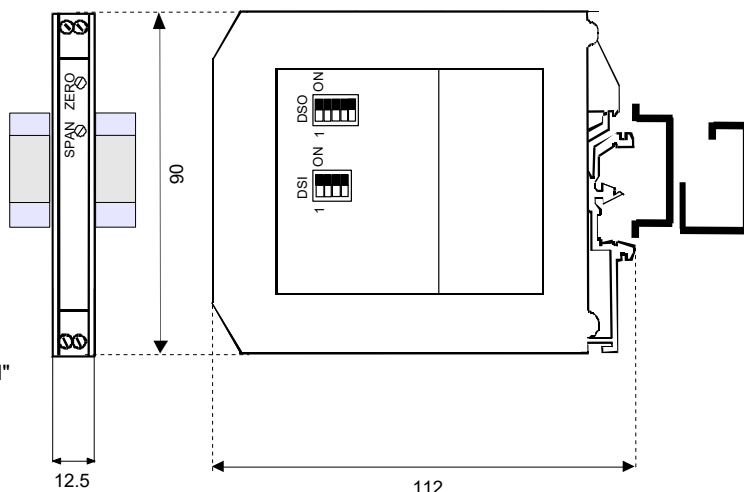
WIRING

INPUT CONNECTIONS

3 wires Pt100   2 wires Pt100

E

G

Pt100   Pt100   I

Note: internal connections E=F, G=H, I=L

POWER SUPPLY CONNECTIONS

R +Vdc

+

18÷30 Vdc

-

P GND

Note: internal connections: R=Q, P=O

OUTPUT CONNECTIONS

N OUT V/I

+

Rload

P GND

Note: internal connections: N=M, P=O

INPUT RANGES TABLE

INPUT		DSI			
SPAN	ZERO	1	2	3	4
< 80°C (176°F)	- 50 to -25°C(-58 to -13°F)		●		
< 80°C (176°F)	- 25 to 12°C(-13 to 53°F)		●		●
< 80°C (176°F)	12 to 50°C(53 to 122 °F)		●	●	●
80 to 200°C(176 to 392°F)	- 50 to -25°C(-58 to -13°F)	●	●		
80 to 200°C(176 to 392°F)	- 25 to 12°C(-13 to 53°F)	●	●		●
80 to 200°C(176 to 392°F)	12 to 50°C(53 to 122 °F)	●	●	●	●
200 to 250°C(392 to 482°F)	- 50 to 50°C(-58 to 122°F)				
250 to 650°C(482 to 1202°F)	- 50 to 50°C(-58 to 122°F)	●			

OUTPUT RANGES TABLE

OUTPUT SIGNAL	DSO				
	1	2	3	4	5
0÷20 mA			●	●	●
4÷20 mA	●		●		●
0÷10 V		●		●	

● = DIP SWITCHES: " ON"

DIMENSIONS (mm) & SETTINGS

SPAN ZERO

DSO ON
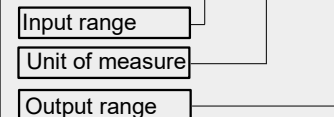
DSI ON

90

12.5   112

HOW TO ORDER

The device is supplied regulated as requested on the order.
In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT2165 | 0÷200 | °C | 4÷20mA

Input range
Unit of measure
Output range