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Isolated converter for DIN-B in head mounting communicating on RS485 network

DAT1485

FEATURES

- **Configurable input for RTD, TC, mV, Resistance and Potentiometer**
- **1500 Vac 3-ways Galvanic Isolation**
- **Modbus Slave device over RS-485**
- **MODBUS RTU / MODBUS ASCII protocol**
- **High accuracy**
- **Remotely Configurable**
- **On-field reconfigurable**
- **EMC compliant – CE mark**
- **Suitable for DIN B in-head mounting**
- **Option for DIN rail mounting in compliance with EN 50022 (DIN RAIL Option)**

GENERAL DESCRIPTION

The isolated converter DAT1485 is able to execute many functions such as measure and linearisation of the temperature characteristic of RTDs sensors, conversion of a linear resistance variation, conversion of an mV signal and conversion of a signal from a potentiometer connected to its input. The DAT1485 is able to measure and linearise the standard thermocouples with internal cold junction compensation. The measured values are converted into engineering units in digital format. The data are transmitted with MODBUS RTU / MODBUS ASCII protocol over the RS-485 network. The device guarantees high accuracy and performance stability both in time and in temperature.
The programming of the DAT1485 is made by a Personal Computer using the software “MODBUS_3000_1000” developed and provided by DATEXEL.
The isolation between the parts of circuit removes the effects of all ground loops eventually existing and allows the use of the converter in heavy environmental conditions found in industrial applications.
It is housed in a self-extinguish plastic enclosure suitable for DIN B in-head mounting.
Moreover, it is possible to mount the DAT1485 on DIN rail by proper mounting kit (**only on request**).

COMMUNICATION PROTOCOLS

The device is designed to work with the MODBUS RTU/MODBUS ASCII protocol: standard protocol in field-bus; allows to directly interface DAT1485 device to the larger part of PLCs and SCADA applications available on the market.
For the protocol instructions, refer to the User Guide of the device.

USER INSTRUCTIONS

Before to install the device, please read the “Installation Instruction” section.
It is possible to configure the device via software using the INIT modality. By setting the dip switch in INIT mode, the device will automatically be set in the set-up configuration when the device is turned on (refer to the User Guide of the device).
Connect power supply, serial bus and analogue inputs as shown in the “Wiring” section.

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

Input type	Min	Max
TC (*) CJC int.		
J	-200°C	1200°C
K	-200°C	1300°C
S	0°C	1750°C
R	0°C	1750°C
B	400°C	1800°C
E	-200°C	1000°C
T	-200°C	400°C
N	-200°C	1300°C
RTD (*) 2,3 wires		
Pt100	-200°C	850°C
Pt1000	-200°C	185°C
Ni100	-60°C	180°C
Ni1000	-60°C	150°C
Voltage		
mV	-100 mV	+90 mV
mV	-100 mV	+200 mV
mV	-100 mV	+800 mV
Potentiometer (R nom. < 50 KΩ)	0 %	100 %
RES. 2,3 wires		
Res 500 Ω	0 Ω	500 Ω
Res 2000 Ω	0 Ω	2000 Ω

Input calibration (1)

RTD	> of ±0.1% f.s. or ±0.2°C
Low res.	> of ±0.1% f.s. or ±0.15 Ω
High res.	> of ±0.2% f.s. or ±1 Ω
mV, TC	> of ±0.1% f.s. or ±10 uV

Input impedance

TC, mV	≥ 10 MΩ

Linearity (1)

TC, mV	± 0.2 % f.s.
RTD	± 0.1 % f.s.

Line resistance influence

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

RTD excitation current

Typical	0.400 mA

CJC comp. ± 1.5°C

Thermal drift (1)

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

Warm-up time 3 min

Data Transmission (RS-485 asynchronous serial)

Baud Rate	115.2 Kbps
Max. distance	1.2 Km – 4000 ft
Interface	RS485 (2 wires)
Protocol	Modbus RTU / Modbus ASCII

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

Sample time about 200 ms

Power supply

Power supply voltage	18 .. 30 Vdc
Current consumption @24Vdc	14 mA typ.
Current consumption @18Vdc	16 mA max
Reverse polarity protection	60 Vdc max

Isolation voltage

Input - Pow. Supply	1500 Vac, 50 Hz, 1min
Input - RS485	1500 Vac, 50 Hz, 1min
Pow. Supply - RS485	1500 Vac, 50 Hz, 1min

Temperature & humidity

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

Housing

Material	PC + ABS V0
Mounting	DIN B head or bigger
Weight	about 50 g.
Dimensions	Ø = 43 mm; H = 24 mm

EMC (for industrial environments)

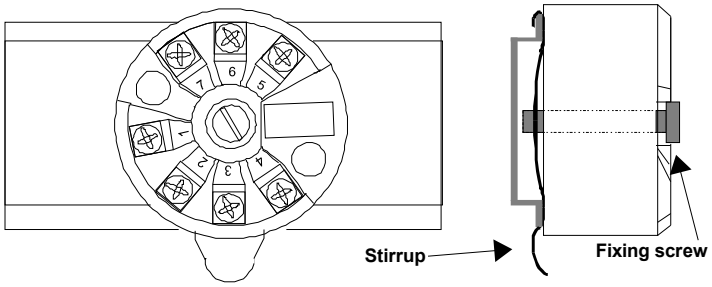
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

(*) For temperature sensors it is possible to set the input range also in °F or K degrees.

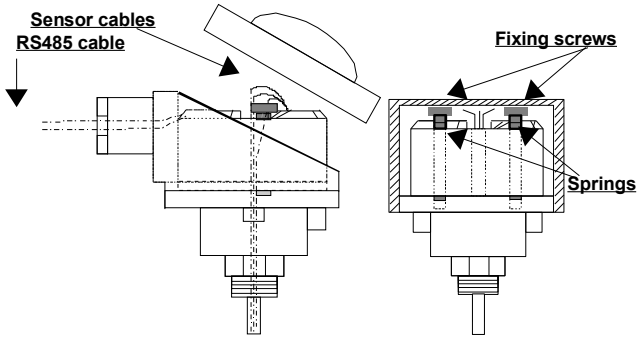
INSTALLATION INSTRUCTIONS

The device DAT1485 is suitable for direct DIN B in-head mounting. The converter must be fixed inside the probe by the proper kit. By apposite stirrup, provided on request, it is possible to mount the device on DIN rail in compliance with EN-50022. It is necessary to install the device in a place without vibrations and avoid to routing conductors near power signal cables.
To avoid passive current loops, the shield of the communication cable (RS485) must only be connected at one point on the network.

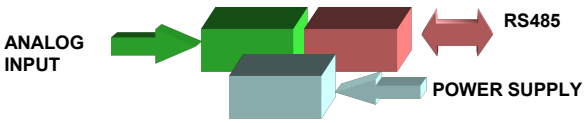
DIN rail mounting (DIN RAIL Option)



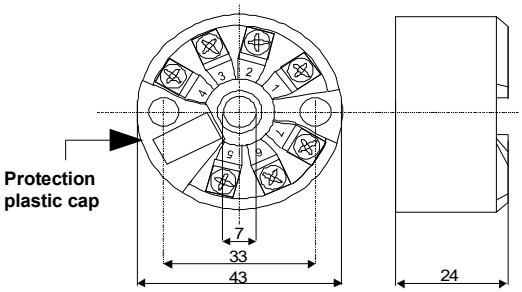
DIN B in-head mounting



ISOLATIONS STRUCTURE

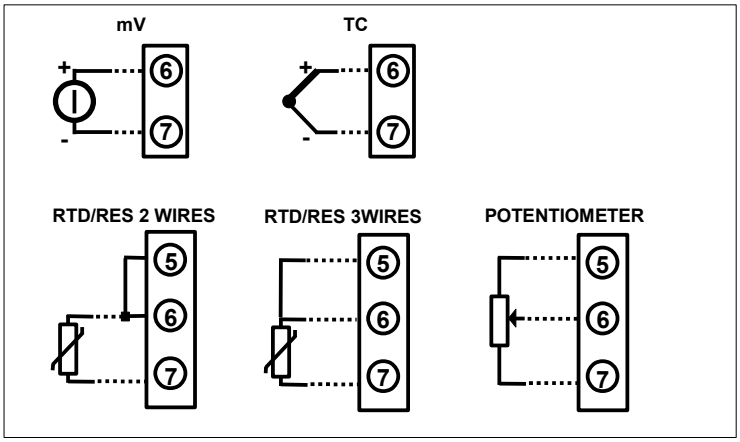


MECHANICAL DIMENSIONS (mm)

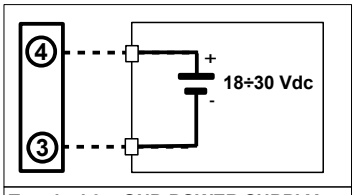


WIRING

INPUT CONNECTIONS

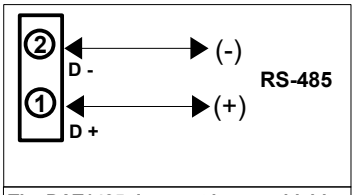


POWER SUPPLY CONNECTIONS



Terminal 3 = GND POWER SUPPLY

RS485 CONNECTIONS



The DAT1485 does not have a shield terminal which must be connected only in one point of the network.

REGISTERS TABLE

Register	Description	Access
40001	Test	R/W
40002	Firmware [0]	RO
40003	Firmware [1]	RO
40004	Name [0]	R/W
40005	Name [1]	R/W
40006	Communication	R/W
40007	Address	R/W
40008	Delay RX/TX	R/W
40009	WatchDog timer	R/W
40010	System Flags	R/W
40011	Input type	R/W
40012	Degree Type	R/W
40013	Offset CJC	R/W
40014	Measure CJC	RO
40015	Input Value	RO
40023	Sync Input value	RO
40031	Input Offset	R/W

The symbol reported on the product indicates that the product itself must not be considered as a domestic waste.
It must be brought to the authorized recycle plant for the recycling of electrical and electronic waste.
For more information contact the proper office in the user's city , the service for the waste treatment or the supplier from which the product has been purchased.

HOW TO ORDER

The DAT1485 is provided as requested on the Customer's order.
The mounting kit for DIN rail is provided **only on request** with code DIN RAIL.

ORDER CODE EXAMPLE:

DAT1485 / Tc K

Input type