Thermocouple to RS485 Modbus Converter
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UNI EN ISO 9001:2008

8 Channel Thermocouple to RS-485 network

DAT 3018

FEATURES

- Field-Bus remote data acquisition
- Modbus Slave device on RS-485
- Modbus RTU/ Modbus ASCII protocol
- 8 channels input
- Input configurable for Tc J, K, R, S, B, E, T, N and voltage up to ± 1V
- Watch-Dog Alarm
- Remotely Configurable
- 2000 Vac 3-ways Galvanic Isolation
- High Accuracy
- UL / CE mark
- DIN rail mounting in compliance with EN-50022

GENERAL DESCRIPTION

The DAT 3018 device is able to acquire up to 8 analogue input signals. The data are transmitted with MODBUS RTU/MODBUS ASCII protocol on the RS-485 network (RS-232 interface is available).
It is possible to connect on input thermocouples or voltage signals up to ± 1V . The Cold Junction compensation for thermocouples is internally performed.
The device guarantees high accuracy and stable measure versus time and temperature.
To ensure the plant safety, two Watch-Dog timer alarms are provided.
The isolation between the parts of circuit removes eventual ground-loop effects, allowing the use of the device even in the heavy environmental conditions.
The DAT 3018 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.
The device is housed in a rough self-extinguishing plastic container which, thanks to its thin profile of 17.5mm only, allows a high density mounting on EN-50022 standard DIN rail.

COMMUNICATION PROTOCOLS

The DAT3018 is designed to work with the MODBUS RTU/MODBUS ASCII protocol: standard protocol in field-bus; allows to directly interface DAT3000 series devices 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.
If the module configuration is unknown, with device powered off, connect the INIT terminal to the GND terminal (ground), at the next power on the device will be auto-configured in the default settings (refer to the User Guide of the device).
Connect power supply, serial bus and analogue inputs as shown in the “Wiring” section.
The “PWR” LED state depends on the working condition of the device: see the "Light Signalling" section to verify the device working state.
To perform configuration and calibration operations, read the instructions in the User Guide of the device.
To simplify handling or replacing of the device, it is possible to remove the wired terminals even with the device powered.

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

INPUT

Input type	Min	Max
Voltage		
25 mV	-25 mV	+25 mV
100 mV	-100 mV	+100 mV
250 mV	-250 mV	+250 mV
1000 mV	-1000 mV	+1000 mV
Thermocouple		
J	-210 °C	+1200 °C
K	-210 °C	+1372 °C
R	-50 °C	+1767 °C
S	-50 °C	+1767 °C
B	+400 °C	+1825 °C
E	-210 °C	+1000 °C
T	-210 °C	+400 °C
N	-210 °C	+1300 °C

(1) Referred to input Span (difference between max. and min. Values)
(2) A pull-up resistor (10MΩ) is connected to +1V (break sensor)

Input Accuracy (1)	
mV/Tc	the higher of ± 0.05% or 5 uV(1)
Linearity (1)	
mV	± 0.1% f.s. (1)
Tc	± 0.2% f.s. (1)
Cold Junction Compensation	± 0.5 °C
Input Impedance	
mV, Tc	≥ 1 MΩ (2)
Thermal drift	
Full Scale	± 0.005 % / °C (1)
CJC Thermal drift	
Full Scale	± 0.02 %/ °C
Lead wire resistance influence	
mV, Tc	< 0.8 uV/Ohm (1)
Sample time	0.5 ÷ 2 sec.
Data Transmission	
Baud Rate	38.4 Kbps
Max. distance	1.2 Km – 4000 ft
Warm-up time	3 min.

POWER SUPPLY	
Power supply voltage	10 .. 30 Vdc
Reverse polarity protection	60 Vdc max
Current consumption	30 mA max.

ISOLATION	
Input – RS485	2000 Vac 50 Hz, 1 min.
Supply – Input	2000 Vac 50 Hz, 1 min.
Supply – RS485	2000 Vac 50 Hz, 1 min.

ENVIRONMENTAL CONDITIONS	
Operative Temperature	-10°C .. +60°C
UL Operative Temperature	-10°C .. +40°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 mm^2 /AWG 14-18
Tightening Torque	0.5 N m
Mounting	in compliance with DIN rail standard EN-50022
Weight	about 150 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

INSTALLATION INSTRUCTIONS

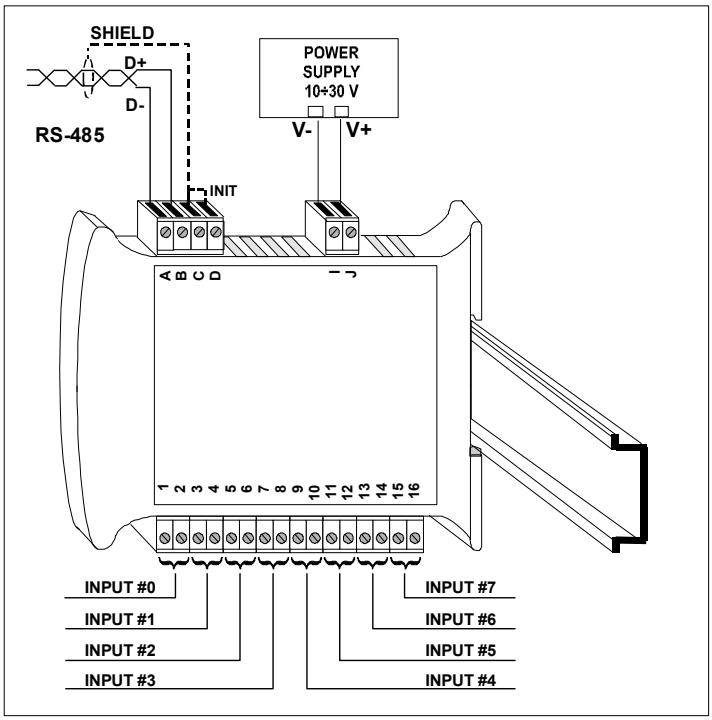
The DAT 3018 is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:

When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following case:
- If panel temperature exceeds 45°C and at least one of the overload conditions exist.

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.

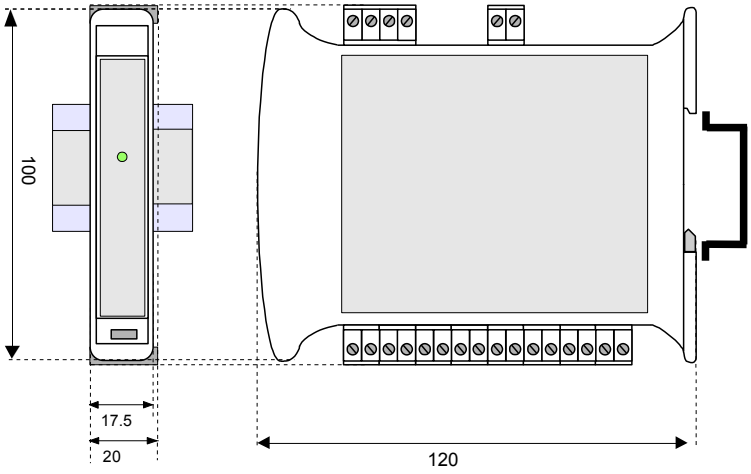
CABLING



LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered / Wrong RS-485 cabling.
		FAST BLINK	Communication in progress (blink frequency depends to baud-rate)
		1 second BLINK	Watch-Dog Alarm condition

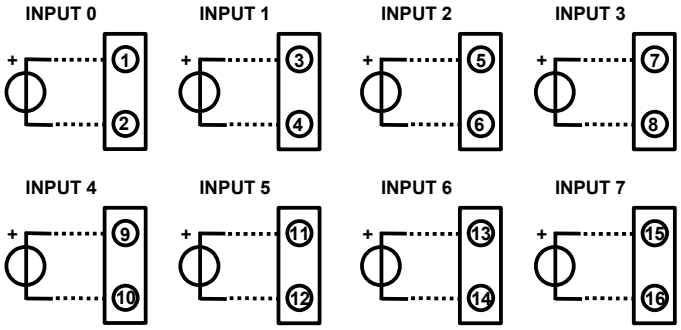
MECHANICAL DIMENSIONS (mm)



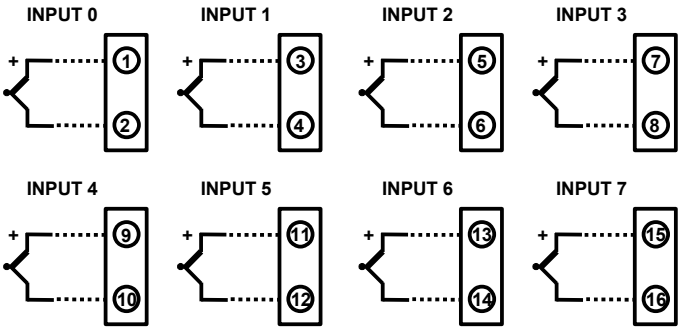
WIRING

ANALOG INPUTS

Voltage



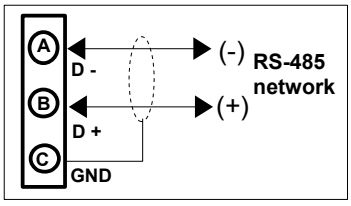
Thermocouple



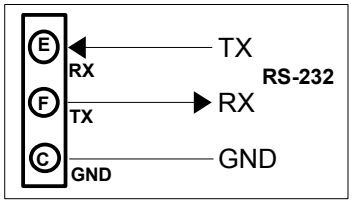
NOTE: input channels are not isolated between them.

2 — 4 — 6 — 8 — 10 — 12 — 14 — 16 = Ref.

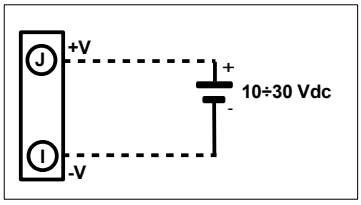
RS-485 NETWORK



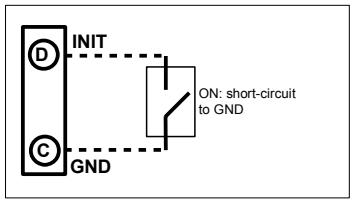
RS-232 NETWORK



POWER SUPPLY (*)



INIT



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

ISOLATION STRUCTURE

HOW TO ORDER

In the order phase, it is mandatory to specify the interface type (RS485 or RS232) .
DAT3018 can be supplied with the configuration specified by the customer.

ORDER CODE:

DAT 3018 / 485 / Tc K

- 485 — Interface type: 485 : RS-485, 232 : RS-232
- Tc K — Input type

= Requested
= Optional