

4 Channel Thermocouple to Modbus RTU DAT10016

DAT 10016

FEATURES

- Modbus Server device on RS-485
- Modbus RTU/ Modbus ASCII protocol
- 4 input channels for voltage up to ± 250 mV and thermocouples sensor type B, E, K, J, N, R, S, T
- Communication parameters configurable by dip-switches
- Watch-Dog Alarm
- Remotely Configurable
- 1500 Vac 3-ways Galvanic Isolation
- LEDs of signalling on front side for power supply and communication
- Connection by removable screw terminals
- High Accuracy
- CE/UKCA mark
- DIN rail mounting in compliance with EN-50022



GENERAL DESCRIPTION

The device DAT10016 converts up to 4 analogue input signals into engineering units in digital format. The data are transmitted with MODBUS RTU / MODBUS ASCII protocol over the RS-485 network.

It is possible to connect on input 4 voltage signals up to ± 250 mV or thermocouples sensor type B, E, K, J, N, R, S, T. By programming, it is possible to execute the scaling of the measure of input up to ± 32768 points obtaining in the dedicated registers the measure of the channel in the desired format (ref. User Guide).

The device guarantees high accuracy and stable measure versus time and temperature.

To ensure the plant safety, a Watch-Dog timer alarm is 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 device is housed in a 6 module DIN rough self-extinguishing plastic box for mounting on EN-50022 standard DIN rail.

USER INSTRUCTIONS

Before to install the device, please read the "Installation Instruction" section.

It is possible to configure the device in two modes: by the dip-switches located on the front of the device or via software using the INIT modality.

Connect the terminal INIT to the terminal REF; at the power-on the device will be automatically set in the configuration set-up (refer to the User Guide of the device).

Connect power supply, serial bus and analogue inputs as shown in the "Wiring" section.

The LEDs 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			OUTPUT	GENERAL SPECIFICATIONS	
Input Type	Min	Max	Data Transmission RS-485 asynchronous serial Baud Rate 115.2 Kbps Max. distance 1.2 Km – 4000 ft	Power supply voltage	10 .. 30 Vdc
Voltage				Reverse polarity protection	60 Vdc max
50 mV	-50 mV	+50 mV		Current consumption @ 24 Vdc	
100 mV	-100 mV	+100 mV			35 mA max.
250 mV	-250 mV	+250 mV		Max. Current consumption	45 mA
Thermocouple				ISOLATION	
J	-210 °C	+1200 °C		Among all the ways	1500 Vac, 50 Hz, 1 min
K	-210 °C	+1372 °C		ENVIRONMENTAL CONDITIONS	
R	-50 °C	+1767 °C		Operative temperature	-10°C .. +60°C
S	-50 °C	+1767 °C		Storage temperature	-40°C .. +85°C
B	+400 °C	+1825 °C		Humidity (not condensing)	0 .. 90 %
E	-210 °C	+1000 °C		Maximum Altitude	2000 m slm
T	-210 °C	+400 °C		Installation	Indoor
N	-210 °C	+1300 °C		Category of Installation	II
Input Accuracy (1) mV, TC				Pollution Degree	2
> of ± 0.05% f.s. or 5 uV			MECHANICAL SPECIFICATIONS		
Linearity (1) mV			Material	Self-extinguish plastic	
TC			IP Code	IP20	
CJC Compensation			Wiring	wires with diameter 0.8+2.1 mm ² AWG 14-18	
± 1 °C			Tightening Torque	0.8 N m	
Input impedance mV,TC			Mounting	in compliance with DIN rail standard EN-50022	
>= 1 MΩ			Weight	about 200 g.	
Thermal drift (1) Full scale			CERTIFICATIONS		
± 0.005 % / °C			EMC (for the Industrial Environments)		
Thermal drift CJC Full scale			Immunity	EN 61000-6-2	
± 0.02 % / °C			Emission	EN 61000-6-4	
Line resistance influence (1) mV, TC			UKCA (ref S.I. 2016 N°1091)		
< 0.8 uV/Ohm			Immunity	BS EN 61000-6-2	
Sample time			Emission	BS EN 61000-6-4	
0.5 ÷ 1 sec.					
Warm-up time					
3 min.					
(1) referred to the input Span (difference between max. and min.)					

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

INSTALLATION INSTRUCTIONS

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

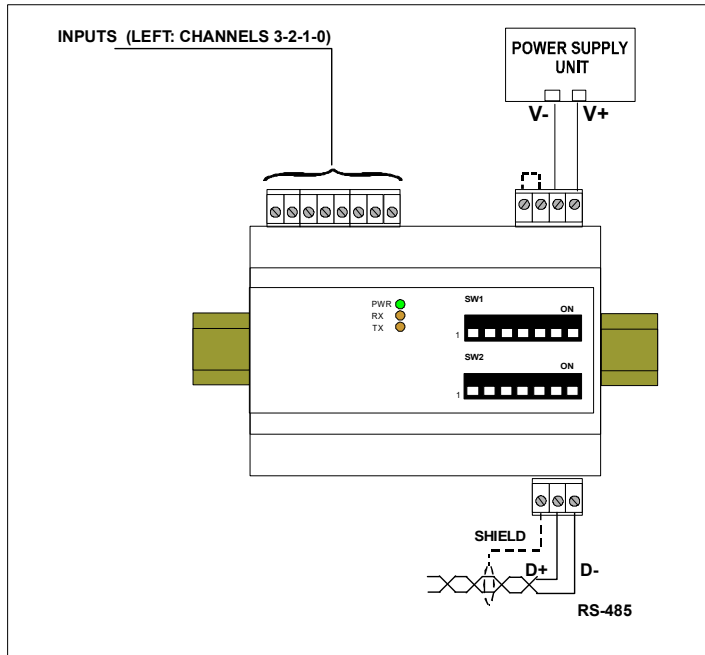
When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following case:
- If panel temperature exceeds 45°C and power supply voltage 10 Vdc.

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.

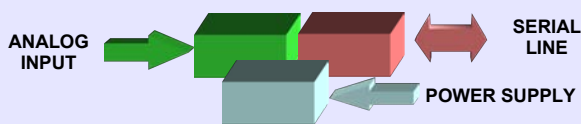
TERMINALS OVERVIEW



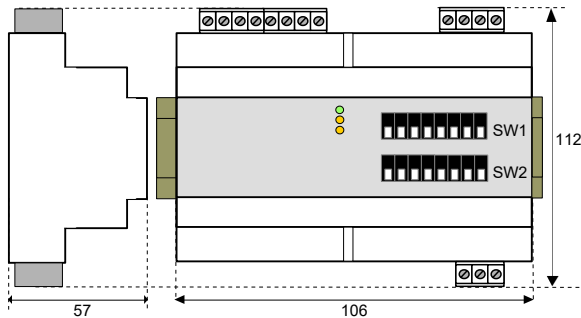
LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINK	~1 sec. - Watch-Dog alarm condition occurred
RX	ORANGE	BLINK	Stream of data over receiving line of RS-485
		OFF	No data over receiving line of RS-485
TX	ORANGE	BLINK	Stream of data over transmission line of RS-485
		OFF	No data over transmission line of RS-485

ISOLATION STRUCTURE



MECHANICAL DIMENSIONS (mm)

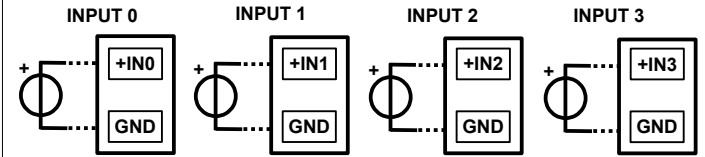


The symbol reported on the product indicates that the product itself must not be considered as a domestic waste.
It must be brought to the authorized recycle plant for the recycling of electrical and electronic waste.
For more information contact the proper office in the user's city, the service for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

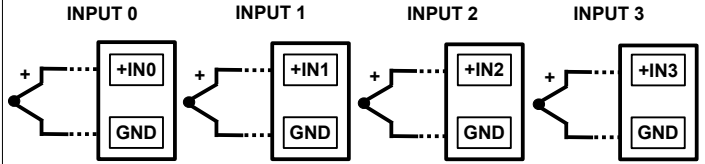
WIRING

ANALOGUE INPUTS

VOLTAGE



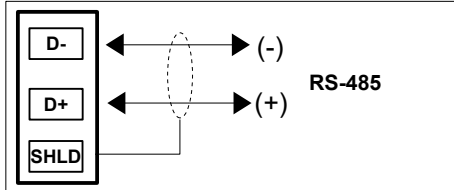
THERMOCOUPLES



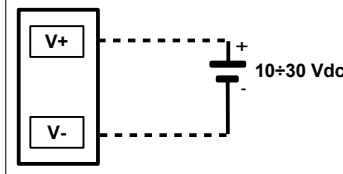
NOTE:

the input channels are not isolated between them (terminal GND is common)

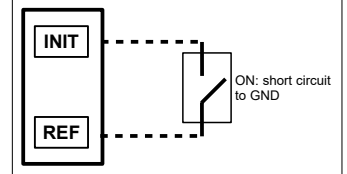
SERIAL LINE RS-485



POWER SUPPLY



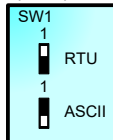
INIT



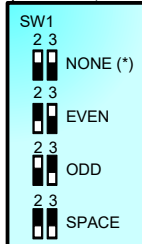
DIP-SWITCHES : TABLES OF CONFIGURATION

Warning: set all the dip-switches in OFF position to access to the device in EEPROM modality (the device will follow all the communication parameters set by software) or INIT. Power-off the device before to change the set of the dip-switches.

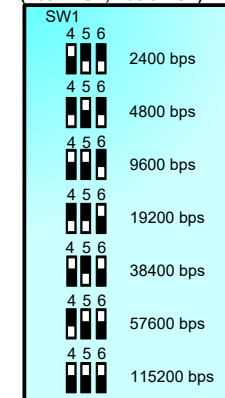
TAB.1 Modality settings
(Pos.1)



TAB.2 Parity settings
(Pos.2 LSB; Pos.3 MSB)



TAB.3 Baud rate settings
(Pos.4 LSB; Pos.6 MSB)



Note (*):

- in Modbus RTU Modality the setting is NONE; number of bit = 8
- in Modbus ASCII Modality the setting is MARK; number of bit = 7

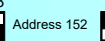
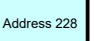
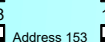
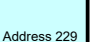
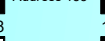
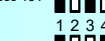
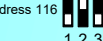
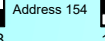
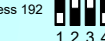
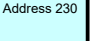
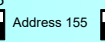
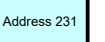
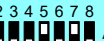
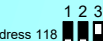
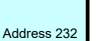
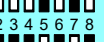
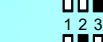
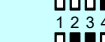
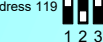
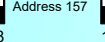
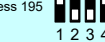
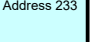
DIP POSITION

ON OFF

HOW TO ORDER

The DAT10016 could be supplied as requested from the customer.
Refer to the section "Technical Specifications" for the input type available.

DAT 10016 / TCK — Input type

SW2	1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8	
		EEPROM		Address 38		Address 76		Address 114		Address 152		Address 190		Address 228
	1 2 3 4 5 6 7 8	Address 1	1 2 3 4 5 6 7 8	Address 39	1 2 3 4 5 6 7 8	Address 77	1 2 3 4 5 6 7 8	Address 115	1 2 3 4 5 6 7 8	Address 153	1 2 3 4 5 6 7 8	Address 191	1 2 3 4 5 6 7 8	Address 229
		Address 2		Address 40		Address 78		Address 116		Address 154		Address 192		Address 230
	1 2 3 4 5 6 7 8	Address 3	1 2 3 4 5 6 7 8	Address 41	1 2 3 4 5 6 7 8	Address 79	1 2 3 4 5 6 7 8	Address 117	1 2 3 4 5 6 7 8	Address 155	1 2 3 4 5 6 7 8	Address 193	1 2 3 4 5 6 7 8	Address 231
		Address 4		Address 42		Address 80		Address 118		Address 156		Address 194		Address 232
	1 2 3 4 5 6 7 8	Address 5	1 2 3 4 5 6 7 8	Address 43	1 2 3 4 5 6 7 8	Address 81	1 2 3 4 5 6 7 8	Address 119	1 2 3 4 5 6 7 8	Address 157	1 2 3 4 5 6 7 8	Address 195	1 2 3 4 5 6 7 8	Address 233
		Address 6		Address 44		Address 82		Address 120		Address 158		Address 196		Address 234
	1 2 3 4 5 6 7 8	Address 7	1 2 3 4 5 6 7 8	Address 45	1 2 3 4 5 6 7 8	Address 83	1 2 3 4 5 6 7 8	Address 121	1 2 3 4 5 6 7 8	Address 159	1 2 3 4 5 6 7 8	Address 197	1 2 3 4 5 6 7 8	Address 235
		Address 8		Address 46		Address 84		Address 122		Address 160		Address 198		Address 236
	1 2 3 4 5 6 7 8	Address 9	1 2 3 4 5 6 7 8	Address 47	1 2 3 4 5 6 7 8	Address 85	1 2 3 4 5 6 7 8	Address 123	1 2 3 4 5 6 7 8	Address 161	1 2 3 4 5 6 7 8	Address 199	1 2 3 4 5 6 7 8	Address 237
		Address 10		Address 48		Address 86		Address 124		Address 162		Address 200		Address 238
	1 2 3 4 5 6 7 8	Address 11	1 2 3 4 5 6 7 8	Address 49	1 2 3 4 5 6 7 8	Address 87	1 2 3 4 5 6 7 8	Address 125	1 2 3 4 5 6 7 8	Address 163	1 2 3 4 5 6 7 8	Address 201	1 2 3 4 5 6 7 8	Address 239
		Address 12		Address 50		Address 88		Address 126		Address 164		Address 202		Address 240
	1 2 3 4 5 6 7 8	Address 13	1 2 3 4 5 6 7 8	Address 51	1 2 3 4 5 6 7 8	Address 89	1 2 3 4 5 6 7 8	Address 127	1 2 3 4 5 6 7 8	Address 165	1 2 3 4 5 6 7 8	Address 203	1 2 3 4 5 6 7 8	Address 241
		Address 14		Address 52		Address 90		Address 128		Address 166		Address 204		Address 242
	1 2 3 4 5 6 7 8	Address 15	1 2 3 4 5 6 7 8	Address 53	1 2 3 4 5 6 7 8	Address 91	1 2 3 4 5 6							