

## Thermocouple to Modbus TCP Isolated

**DAT 8016**

### FEATURES

- Interface Ethernet 10/100 Base-T, Modbus TCP Server
- 4 isolated input channels
- Input configurable for mV and Tc
- Integrated web server for acquiring the status of the analogue inputs via browser
- Remotely programmable
- Connection by removable screw-terminals
- LED signalling for Link/Act Ethernet, power supply
- Galvanic isolation on all the ways
- UL / CE / UKCA mark
- In compliance to EN-50022 DIN rail mounting



### GENERAL DESCRIPTION

The device DAT8016 is a Modbus TCP server unit that can convert up to 4 analogue signals applied to the input in engineering units in digital format. The inputs can be connected to sensors with mV output or thermocouple. **The input channels are electrically isolated from each other.** The device guarantees high accuracy and a stable measure versus time and temperature. In order to ensure the safety plant, the device is equipped with a Watch-Dog Timer system. The Ethernet interface allows reading and writing in real time the values of the internal registers of the device. The LEDs of signalling of Ethernet activity and power supply allow a direct monitoring of the system functionality. The built-in Web Server allows the remote visualization, acquisition of the analogue inputs and the access to the main Ethernet programming parameters. The device is also configurable by the software Dev9K, a free IDE developed by DATEXEL. The connection is made by removable screw-terminals (inputs and power supply) and RJ45 plug (Ethernet). The DAT8016 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 realizes a full electrical isolation between the lines, introducing a valid protection against the effects of all ground loops eventually existing in industrial applications. The device is housed in a rough self-extinguishing plastic enclosure which, thanks to its thin profile of 22.5 mm only, allows a high density mounting on EN-50022 standard DIN rail.

### USER INSTRUCTIONS

Before to install the device, please read the "Installation Instruction" section. To configure the device use the INIT modality (refer to the User Guide of the device). Connect power supply, Ethernet 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			ETHERNET INTERFACE		GENERAL SPECIFICATIONS	
Input type	Min	Max	In compliance with Ethernet IEEE 802.3		Power supply voltage	14 .. 30 Vdc
Voltage			Network interface Ethernet 10/100Base-T Protocol Modbus TCP Max. cable length 100 meters Number of socket 16		Reverse polarity protection	60 Vdc max
mV	-250 mV	+250 mV			Current Consumption	150 mA max
Thermocouple					ISOLATION (test time : 1 minute)	
J	-210 °C	+1200 °C			Power Supply / Ethernet	1500 Vac, 50 Hz
K	-210 °C	+1372 °C			Inputs / Power supply	1500 Vac, 50 Hz
R	-50 °C	+1767 °C			Inputs / Ethernet	1500 Vac, 50 Hz
S	-50 °C	+1767 °C			Input / Input	1500 Vac, 50 Hz
B	+400 °C	+1825 °C			ENVIRONMENTAL CONDITIONS	
E	-210 °C	+1000 °C			Operative Temperature	-10°C .. +60°C
T	-210 °C	+400 °C			UL Operative Temperature	-10°C .. +40°C
N	-210 °C	+1300 °C	Storage Temperature	-40°C .. +85°C		
Input Accuracy (1) The greater than  ± 0.05% f.s. and ± 5uV  Max linearity error (1) mV ± 0.1 % f.s. Tc ± 0.2 % f.s.  Max Cold junction compensation error (CJC) ± 2°C  Input impedance mV, Tc ≥ 1 MΩ  Lead wire resistance influence (1) mV, Tc < 0.8 uV/Ohm  Thermal drift (1) Full Scale ± 0.005 %/°C  Thermal drift CJC Full Scale ± 0.02 %/°C  Sampling time (4 channels) 150 ms  Warm-up time 3 min.			Humidity (not condensed)		0 .. 90 %	
			Maximum Altitude		2000 m	
			Installation		Indoor	
			Category of installation		II	
			Pollution Degree		2	
			CONNECTIONS			
			Ethernet		RJ-45 (on side)	
			Inputs		Screw terminal block	
			Power Supply		Screw terminal block	
			MECHANICAL SPECIFICATIONS			
Material		Self-extinguish plastic				
IP Code		IP20				
Wiring		wires with diameter 0.8+2.1 mm² / AWG 14-18				
Tightening Torque		0.5 N m				
Mounting		in compliance with DIN rail standard EN-50022				
Weight		about 160g				
EMC ( for 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				
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				

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

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## INSTALLATION INSTRUCTIONS

The device is suitable for fitting to DIN rails in vertical position.

For optimum operation and long life follow these instructions:

**When the devices are installed side by side it is necessary to separate them by at least:**

- 10 mm if the UL certification is required.

- 5 mm if the UL certification is not required.

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.

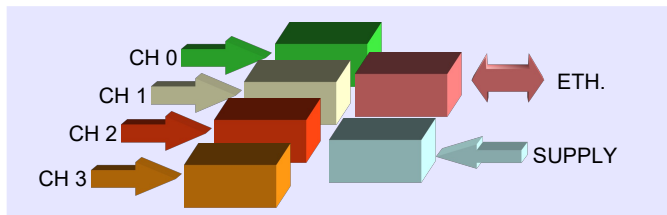
Install the device in a place without vibrations.

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.

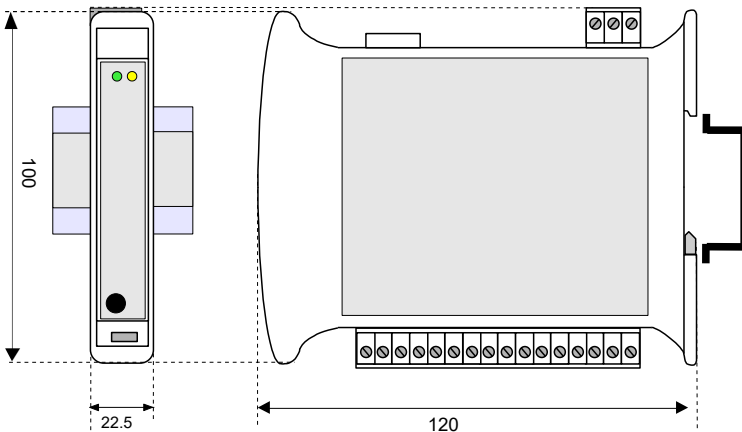
## LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINK	Watchdog alarm
STS	YELLOW	OFF	Device in RUN modality
		BLINK	Device in INIT modality

## ISOLATIONS STRUCTURE

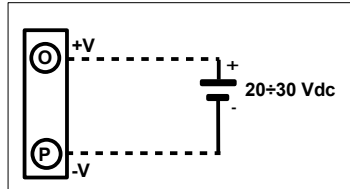


## MECHANICAL DIMENSIONS (mm)

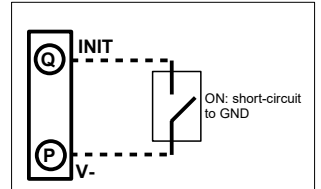


## WIRING

### POWER SUPPLY(\*)



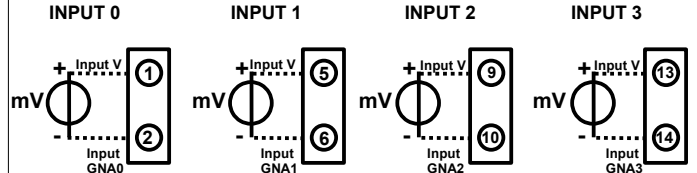
### INIT



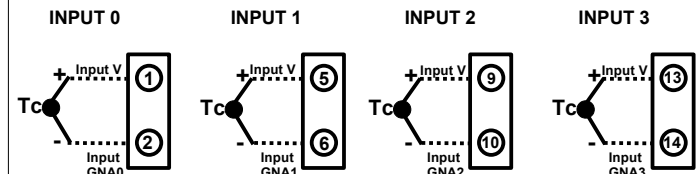
(\*) Note: for UL installation the device must be powered using a power supply unit classified NEC class 2 or SELV and Limited Energy

### ANALOGUE INPUTS

#### VOLTAGE



#### THERMOCOUPLE



#### NOTES:

"GNA0", "GNA1", "GNA2" and "GNA3" are isolated between them.

## MAPPING MODBUS REGISTERS

Register Position	Description	Access
40002	Firmware [0]	RO
40003	Firmware [1]	RO
40004	Name [0]	R/W
40005	Name [1]	R/W
40007	Node ID	R/W
40011	System Flags	R/W
40013	Watchdog timer	R/W
40031	Input type Channel 0	R/W
40032	Input type Channel 1	R/W
40033	Input type Channel 2	R/W
40034	Input type Channel 3	R/W
40041	Analogue Input (0) - Ch0	RO
40042	Analogue Input (1) - Ch1	RO
40043	Analogue Input (2) - Ch2	RO
40044	Analogue Input (3) - Ch3	RO
40050	Break status	RO



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

**" DAT 8016 "**

Note: the device is provided with default configuration as:

IP address : 192.168.1.100

Modbus address: 1