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RTD to Modbus TCP Isolated

DAT 8014

FEATURES

- **Interface Ethernet 10/100 Base-T, Modbus TCP Server**
- **4 isolated input channels**
- **Input configurable for RTD, Resistance and Potentiometer**
- **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 DAT8014 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 two or three wires RTD or resistance sensors. **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 device 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

Input type	Min	Max
RTD 2 or 3 wires		
Pt100	-200 °C	850 °C
Pt1000	-200 °C	200 °C
Ni100	-60 °C	180 °C
Ni1000	-60 °C	150 °C
RES. 2 or 3 wires		
Low	0 Ω	500 Ω
High	0 Ω	2000 Ω
POT. (nom. value)	20 Ω	50 kΩ

Input Accuracy (1)	
RTD	±0.05 % f.s.
Resistance	±0.05 % f.s.
Potentiometer	±0.05 % f.s.
Linearity (1)	
RTD	± 0.1 % f.s.
Lead wire resistance influence (1)	
RTD/res.3 wires (50 Ω max balanced)	0.05% f.s./Ω
RTD excitation current	
Typical	0.370 mA
Thermal drift (1)	
Full Scale	± 0.01 %/°C
Sampling time (4 channels)	150 ms
Warm-up time	3 min

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

ETHERNET INTERFACE

In compliance with Ethernet IEEE 802.3

Network interface	Ethernet 10/100Base-T
Protocol	Modbus TCP
Max. cable length	100 meters
Number of socket	16

GENERAL SPECIFICATIONS

Power supply voltage	14 .. 30 Vdc
Reverse polarity protection	60 Vdc max
Current Consumption	150 mA max
ISOLATION (test time : 1 minute)	
Power Supply / Ethernet	1500 Vac, 50 Hz
Inputs / Power supply	1500 Vac, 50 Hz
Inputs / Ethernet	1500 Vac, 50 Hz
Input / Input	1500 Vac, 50 Hz
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
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

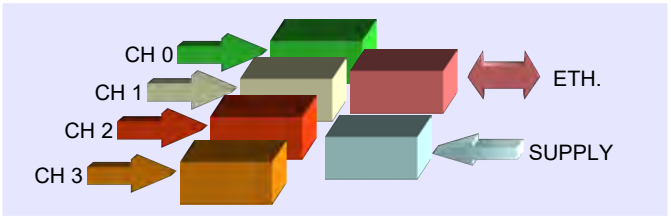
INSTALLATION INSTRUCTIONS

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

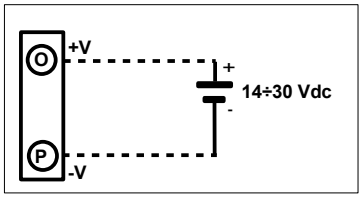
LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINK	Watchdog alarm
STS	YELLOW	OFF	Device in RUN modality
		BLINK	Device in INIT modality

ISOLATIONS STRUCTURE

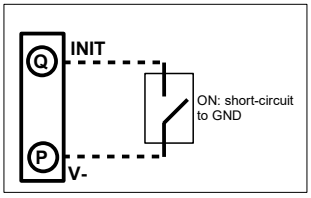


WIRING

POWER SUPPLY(*)



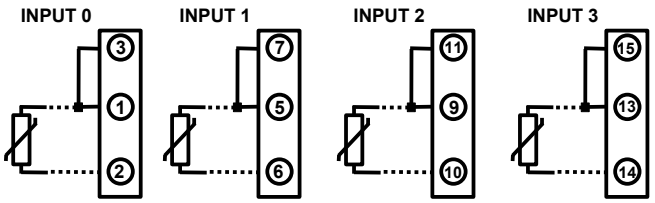
INIT



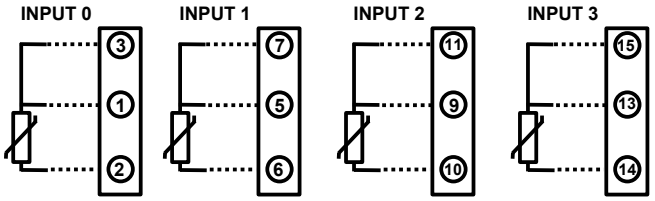
(*) Note: for UL installation the device must be powered using a power supply unit classified NEC class 2 or SELV and Limited Energy

ANALOGUE INPUTS

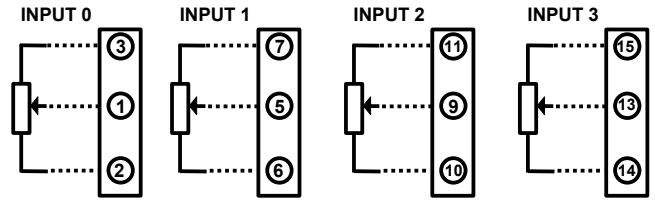
RTD/RES 2 WIRES



RTD/RES 3 WIRES

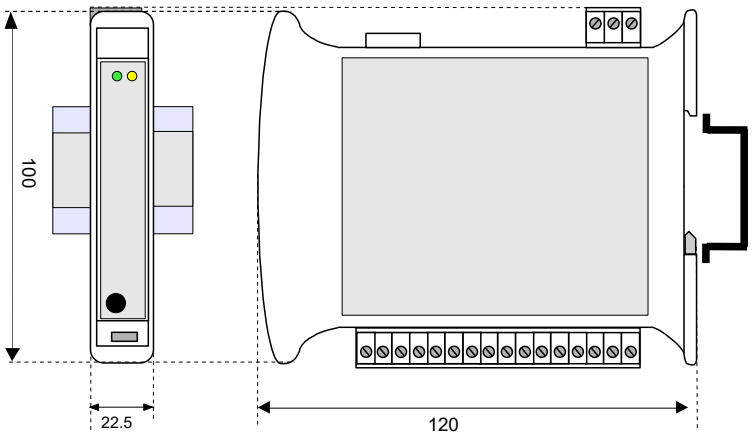


POTENTIOMETER



NOTES:
All input channels are isolated between them.

MECHANICAL DIMENSIONS (mm)



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 8014 “
Note: the device is provided with default configuration as:
IP address : 192.168.1.100
Modbus address: 1

Datexel s.r.l. reserves its right to modify the characteristics of its products totally or in part without warning at any time.