Modbus RTU master & Modbus TCP Client

DAT9000-2.0

FEATURES

- **- N.1 serial interface RS-485 Modbus RTU Client**
- **- N.1 serial interface RS-485/uUSB Modbus RTU Server**
- **- Interface Ethernet 10/100 Base-T, Modbus TCP Client/Server**
- **- Client function both on RS-485 (Modbus RTU) and on Ethernet (Modbus TCP)**
- **- Programming software with "flow chart" structure**
- **- Remotely programmable**
- **- Connection by removable screw-terminals**
- **- Programmable without external sources via uUSB and optional cable CVPROG**
- **- LED signalling for Link/Act Ethernet, serial RX-TX, power supply**
- **- Galvanic Isolation on all the ways**
- **- CE / UKCA mark**
- **- In compliance to EN-50022 DIN rail mounting**

GENERAL DESCRIPTION

The DAT9000 device is an intelligent unit designed to control a network of Modbus RTU server devices connected via RS-485 Master or Modbus TCP through the Ethernet interface. It can read and write field values and perform the necessary logical and mathematical functions for system operation. Real-time reading and writing of internal register values are possible via the Ethernet interface, RS-485 "SLAVE" ports, or uUSB ports.
The CVPROG cable, which must be ordered separately, allows you to configure or program the device without using an external power supply. Additionally, you can program the control logic, monitor data, and perform real-time programming of the Intelligent Unit through the Ethernet interface, RS-485 "SLAVE" ports, or uUSB ports. This also enables direct programming and data requests from slave devices connected to the RS-485 Master. The DAT9000 is configurable using the DEV9K 2.0 software (and later versions) developed by DATEXEL, which runs on Windows. It provides full electrical isolation between lines, offering effective protection against ground loops common in industrial applications.
LED indicators for Ethernet activity and data Rx-Tx flow on the serial line allow for direct system functionality monitoring. Connections are made via removable screw terminals (for power supply and RS-485) and an RJ45 plug (for Ethernet). The device is housed in a rugged, self-extinguishing plastic enclosure with a slim profile of only 22.5 mm, allowing for high-density mounting on a standard EN-50022 DIN rail.

SUPPORTED FUNCTION

The DAT9000 series devices support the standard Modbus write and read functions (see Device User Guide), mathematical operations, logic operations and calculation functions (Scaling, Average, root extraction, ...)
For the complete list of functions and their operation, refer to the Programming software User Guide.

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

ETHERNET	RS-485	GENERAL SPECIFICATIONS	
In compliance with standard Ethernet IEEE 802.3	**In compliance with standard** RS485	DC power supply voltage 10 .. 30 Vdc	
		Reverse polarity protection 60 Vdc max	
		Max. Current consumption 100 mA	
Ethernet interface Ethernet 10/100Base-T	**Baud-rate** up to 115.2 Kbps		
Ethernet connection RJ-45		**ISOLATION (test time 1 min)**	
Protocol Modbus TCP	**Cable Length** 1200 m / 4000 ft max	Power supply / Ethernet 1500 Vac, 50 Hz	
TCP Port 502 (Modbus TCP)		Power supply / RS485 1500 Vac, 50 Hz	
80 (HTTP)	The reachable maximum distance depends on the number of devices connected, on the type of cable used and its immunity against noises.	Ethernet / RS485 1500 Vac, 50 Hz	
		ENVIRONMENTAL CONDITIONS	
Number of sockets		Operative temperature -20°C .. +60°C	
Modbus TCP 16	**Number of modules in multi-point**	Storage temperature -40°C .. +85°C	
HTTP 3	up to 32	Humidity (not condensing) 0 .. 90 %	
		Maximum Altitude 2000 m slm	
Modbus TCP Client function	**Switching time TX/RX** 150 us.	Installation Indoor	
IP Table Size max 8 devices (IP)		Category of Installation II	
	Connection removable screw terminals	Pollution Degree 2	
		MECHANICAL SPECIFICATIONS	
	OPTIONAL PROGRAMMING PORT	Material Self-extinguish plastic	
	Connection uUSB micro-B (on front)	IP Code IP20	
	It is requested the use of the dedicated cable CVPROG. It doesn't work with standard USB cables	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 160 g.	
		CERTIFICATIONS **EMC (for the 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	

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 high power supply value(> 27Vdc).
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.
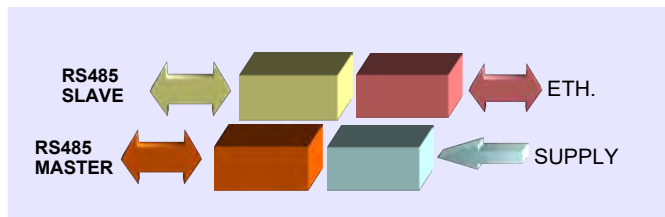Install the device in a place without vibrations.
Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters, etc...) and to use shielded cable for connecting signals.
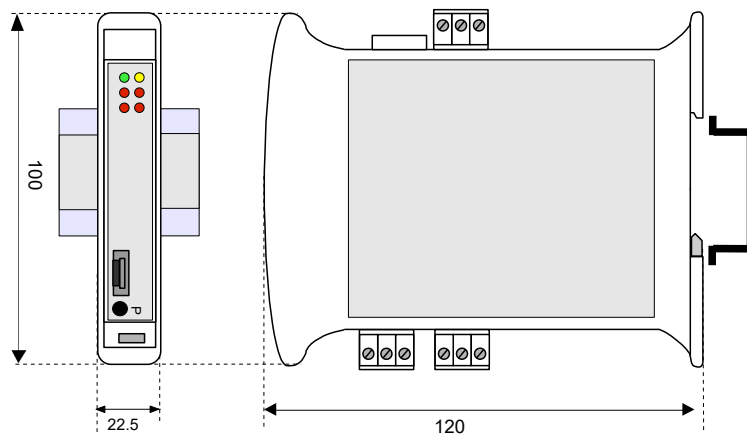
LIGHT SIGNALLING

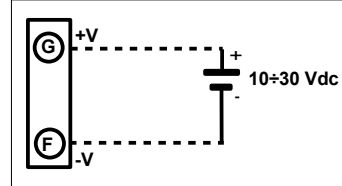| LED	COLOR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINK	Watchdog Alarm
STS	YELLOW	BLINK	DEBUG Modality
		OFF	RELEASE Modality
RXn	RED	BLINK	PORT n – Data received (the blink frequency depends on Baud-rate)
		OFF	No reception in progress
TXn	RED	BLINK	PORT n – Data transmitted (the blink frequency depends on Baud-rate)
		OFF	No reception in progress

ISOLATIONS 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.
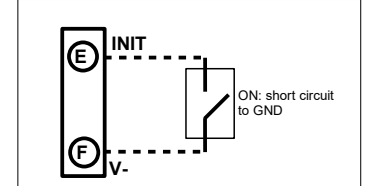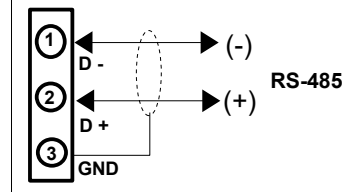
WIRING
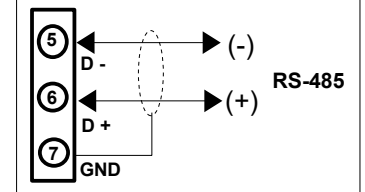
POWER SUPPLY

INIT

RS-485 Slave (Port 0)

RS-485 Master (Port 1)

Note: the device must be powered using a power supply unit classified NEC class 2 or SELV with limited energy

PUSH-BUTTON "P" FUNCTIONALITY

This button, located on the front of the device allow to load the following factory defaults in the following two modes:
A) With the device on, press the button until the green LED (PW) goes off; immediately after release it to load the factory default parameters (modbus parameters, default IP, login credentials to the web server).
B) Turn on the device by keeping the button pressed and keep the pressure until the green LED (PW) goes off; immediately after release it to load the factory firmware.

While the default parameters or the factory firmware are loaded, the yellow STS LED remains permanently switched on. At the end of the loading it switches off.
ATTENTION: do not switch off the device during the loading phase!

"CVPROG" INTERFACE CABLE

Description
The CVPROG cable is an interface consisting of the physical cable, a uUSB port that must be connected to the DATEXEL device in use, a USB port that must be connected to the user PC and a chip to recognize the USB port as VCP (Virtual Com Port).
Due to this the CVPROG interface cable is not a simple uUSB-USB cable.
Through the CVPROG cable it is possible to communicate and program the DATEXEL devices without external power.
This allows a simple use of the device.
WARNING: the uUSB port and the RS485 slave port (Port 0) cannot be used simultaneously and the communication parameters are common to both ports.
When connecting the CVPROG cable to the PC, it could be necessary to install the drivers downloaded from the website www.datexel.it

Verify of the generated COM port
When the CVPROG cable is inserted into the PC, a virtual COM port is automatically generated and it can be displayed in the "Device Management" window → Ports (COM and LPT) of the operating system in use.

ACCESS TO THE INTEGRATED WEB SERVER "

To access the integrated web server, open a browser on your PC and type the IP address of the device in the address bar of the browser.
- Factory IP Address: 192.168.1.100
WARNING: make sure that the PC is in the same subnet as the device in use (see user guide of the device).
The factory / default login credentials that are requested on the "Login" page are:
- Username: Fact_user
- Password: Fact_pwd
Once you have logged in for the first time, you can change the credentials in the "Username and Password" section.

HOW TO ORDER

" DAT9000-2.0 "
Note: the device is provided with default configuration as:
IP address : 192.168.1.100
Modbus address: 10