DATEXEL

UNI EN ISO 9001:2008

Modbus RTU with Data Logger and Digital IO
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Intelligent Unit with Data-logger, Ethernet interface and digital I/O

DAT 9000-DL-IO

FEATURES

- **N.1 serial interface RS-485 Modbus RTU Master**
- **N.1 serial interface RS-485/232 Modbus RTU Slave**
- **N.1 slot for microSD card**
- **Interface Ethernet 10Base-T, Modbus TCP Server**
- **N.4 Digital Inputs + N.2 SPDT Relays**
- **Functional Block programming software**
- **Remotely programmable**
- **Connection by removable screw-terminals**
- **LED signalling for Link/Act Ethernet, serial RX-TX, power supply**
- **LED signalling for digital input and output state**
- **Galvanic Isolation on all the ways**
- **EMC compliance – CE mark**
- **Suitable for DIN rail mounting in compliance with EN-50022 standard**

GENERAL DESCRIPTION

The device DAT9000-DL-IO is an Intelligent unit able to control a network of slave Modbus RTU devices connected on serial line RS-485 Master executing the reading and writing of the field values and performing the logical and mathematical functions necessary for the system working, managing up to 8 task of recording memorized on files saved on the microSD card. The device is equipped with 4 digital inputs channels and 2 relay outputs. For the digital inputs, are also available 32 bit counters and the measure of the frequency up to 300 Hz. By means of the Ethernet interface or the RS-485 "SLAVE" or RS-232 ports it is possible to read and write, in real time, the internal registers value. By Ethernet it is possible to get access to the files saved on the microSD card when the Data-Logger function is active. Moreover, by means of the Ethernet interface, or by the RS-485 "SLAVE" or RS-232 ports it is possible to:

- Programming of the Control Logic
- Monitor, request of data, programming in real time the Intelligent Unit
- Direct programming and request of data from the Slave devices connected on the RS-485 Master.

The device DAT9000-DL-IO is configurable by the software *DEV9K* developed by DATEXEL and running under Windows.

The device DAT9000-DL-IO realizes a full electrical isolation between the lines, introducing a valid protection against the effects of all ground loops eventually existing in industrial applications.

LED signalling of Ethernet activity and data rx-tx flow on the serial line allows a direct monitoring of the system functionality. The connection is made by removable screw-terminals (supply and RS-485) and RJ45 plug (Ethernet and RS-232).

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.

LIST OF SUPPORTED FUNCTION

Communication:	- Read data from "slave" devices (Modbus function 04)
	- Write data to "slave" devices (Modbus function 16)
Logical:	- Boolean(And, Or, ….)
	- Compare (>, <, =, ……)
	- Arithmetical (Sum, Subtraction, Multiplication, Division ……)
	- Calculation (Scaling, Exponential functions, Square root extraction, Arithmetic mean, …..)
Process:	- Conditional statements (IF)
	- Flow control (Goto, Call, ……)
Scheduler:	- Data-Logger

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)

Compliant to the standard
Ethernet IEEE 802.3 EIA RS485 and RS232

Ethernet interface	Ethernet 10Base-T
Protocol	Modbus TCP Server
RS-485 Interface	
Baud rate	up to 38.4 Kbps
Max distance (1)	1.2 Km @ 38.4 Kbps
Number of models in multipoint	32 max.
Internal termination resistance	120 Ohm (optional)
Compatible SD card	
Type	microSD
Memory size	Up to 16 GB
Format	FAT16 or FAT32

(1) – The maximum distance depends of: number of devices connected, type of cabling, noises, etc...

Digital inputs

Channels	4
Input voltage (bipolar)	
OFF state	0 ÷ 3 V
ON state	10 ÷ 30 V
Impedance	4.7 KΩ
Frequency	up to 300 Hz

Digital Outputs

Channels	2
Type	SPDT relay

Switching Power (max.)
2 A @ 250 Vac (resistive load) per contact
2 A @ 30 Vdc (resistive load) per contact

Minimum load 5Vdc , 10mA
Max. voltage 250Vac (50 / 60 Hz) , 30Vdc

Dielectric strength between contacts
1000 Vac, 50 Hz, 1 min.

Dielectric strength between coil and contacts
4000 Vac, 50 Hz, 1 min.

Power supply	18 ÷ 30 Vdc
Current consumption	45 mA typ. @ 24Vdc(standby)
	100 mA max
Isolations	
Power supply / Ethernet	1500 Vac, 50 Hz, 1 min.
Power supply / RS485	1500 Vac, 50 Hz, 1 min.
Ethernet / RS485	1500 Vac, 50 Hz, 1 min.
Inputs / RS485	2000 Vac, 50 Hz, 1 min.
Inputs / Power supply	2000 Vac, 50 Hz, 1 min.
Connections	
Ethernet	RJ-45 (on terminals side)
RS-232D	RJ-45 (on front side)
RS-485 / Supply / In / Out	Removable screw terminals
Environmental Conditions	
Operative temperature	-20 ÷ +60 °C
Storage temperature	-40 ÷ +85 °C
Relative humidity (not cond.)	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	0.8 N m
Mounting	in compliance with DIN rail standard EN-50022
Dimensions in mm.(WxHxT)	100 x 120 x 22.5
Weight	about 160 gr.
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

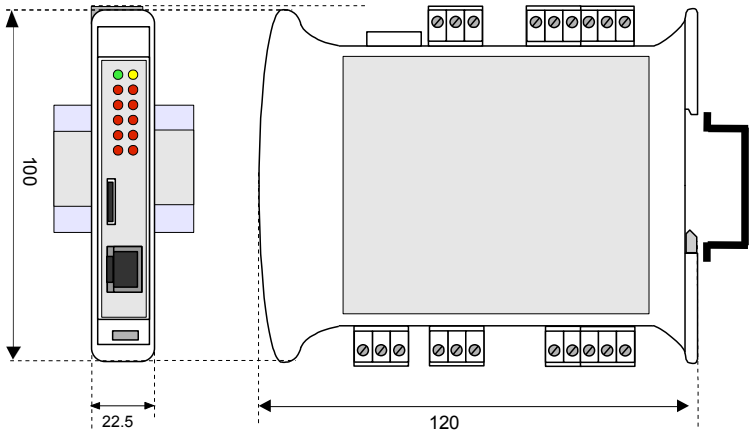
INSTALLATION INSTRUCTIONS

The Intelligent Unit DAT9000-DL-IO 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.

MODBUS REGISTERS MAPPING

Register	Description	Access
%R0	--Reserved--	R/W
%R1	Firmware [0]	R
%R2	Firmware [1]	R
%R3	Name [0]	R/W
%R4	Name [1]	R/W
%R5	Port 1 [BaudRate]	R/W
%R6	Node ID	R/W
%R7	Port 1 [Timeout RX]	R/W
%R8	Digital Inputs	R/W
%R9	Digital Outputs	R/W
%R10	System Flags	R/W
%R11	--Reserved--	-
%R12	--Reserved--	-
%R13	PC	R
%R14	Status [0]	R
%R15	Status [1]	R
%R16	COM Errors	R/W
%R17	Gateway Mask [L-H]	R/W
%R18	Port 0 [Settings]	R/W
%R19	Port 0 [Settings]	R/W
%R20	Timers Enable	R/W
%R21	--Reserved--	-
%R22	--RTC(0)	R/W
%R23	--RTC(1)	R/W
%R24	--RTC(2)	R/W
%R25	--RTC(3)	R/W
%R26 %R927	General Purpose Registers	R/W
%R928 %R929 %R930 %R931	Freq [0] Freq [1] Freq [2] Freq [3]	R
%R932-933 %R934-935 %R936-937 %R938-939	Counter [0] Counter [1] Counter [2] Counter [3]	R/W
%R960 %R1023	Memory Registers	R/W

MECHANICAL DIMENSIONS (mm)



MicroSD card HANDLING

Warning: execute this operation only if necessary; to get access to the data on the card it is suggested, if possible, to use the Ethernet interface.

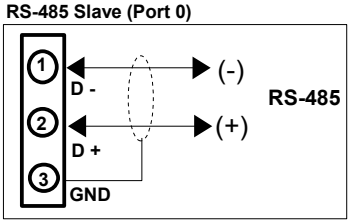
Insertion and removing

Power off the device.
Open the plastic door located on the front of the device.
Insert the card into the slot in the correct way and push the card to block it inside the connector; to extract the card, push slightly the card on the border to unblock the connector and pull out the card.
Close the plastic door located on the front of the device.
Power-on the device.

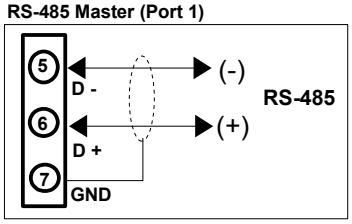
WIRING

SERIAL PORTS

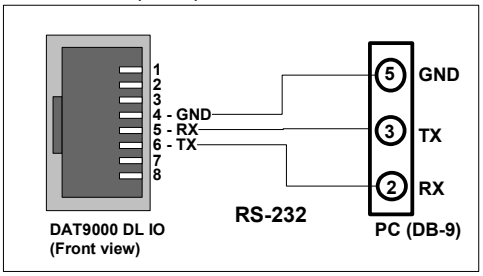
RS-485 Slave (Port 0)



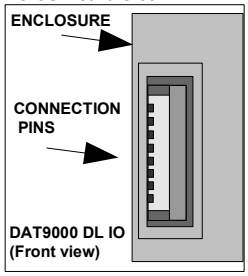
RS-485 Master (Port 1)



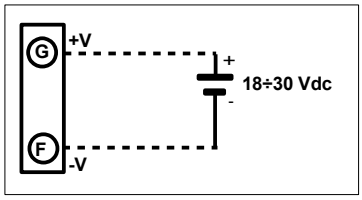
RS-232D Slave (Port 0)



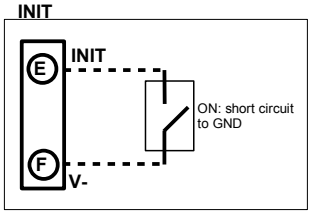
MicroSD card slot



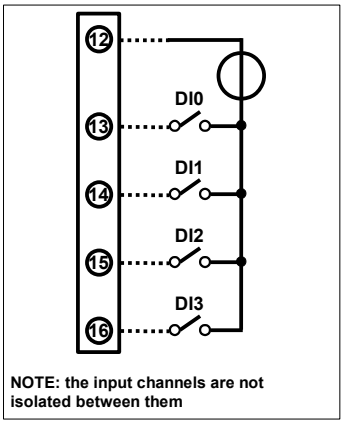
POWER SUPPLY



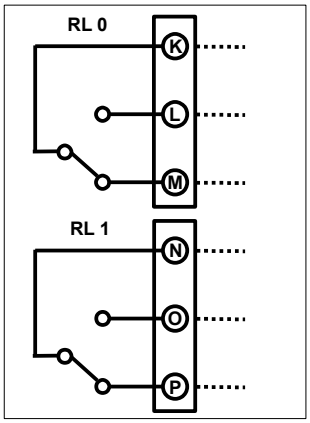
INIT



DIGITAL INPUTS



DIGITAL OUTPUTS



LIGHT SIGNALLING

LED	COLOR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered / Wrong RS-485 connection
STS	YELLOW	BLINK	DEBUG Modality
		OFF	RUN Modality
RX1	RED	BLINK	PORT 0 – Data received (the blink frequency depends on Baud-rate)
		OFF	No reception in progress
TX1	RED	BLINK	PORT 0 – Data transmitted (the blink frequency depends on Baud-rate)
		OFF	No reception in progress
RX2	RED	BLINK	PORT 1 – Data received (the blink frequency depends on Baud-rate)
		OFF	No reception in progress
TX2	RED	BLINK	PORT 1 – Data transmitted (the blink frequency depends on Baud-rate)
		OFF	No reception in progress
I *n*	RED	ON	Digital input logic state 1
		OFF	Digital input logic state 0
O *n*	RED	ON	Digital output logic state 1
		OFF	Digital output logic state 0

HOW TO ORDER

“ DAT9000-DL-IO “

= Requested
= Optional