

**FEATURES**

- N.1 serial interface RS-485 Modbus RTU Master**
- N.1 serial interface RS-485/232 Modbus RTU Slave**
- Interface Ethernet 10Base-T, Modbus TCP**
- N.4 Digital Inputs**
- N.2 SPDT Relay Outputs**
- 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 inputs and digital outputs 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 DAT9000IO 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.

Moreover, the device is equipped with 4 digital inputs channels and 2 relay outputs .

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.

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 DAT9000IO is configurable by the software *DEV9K*, an easy and intuitive free IDE developed by DATEXEL and running under Windows.

The device DAT9000IO 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 DAT 9000IO is in compliance with the Directive 2004/108/EC on the electromagnetic compatibility.

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, .....

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)**

<b>In compliance with Ethernet IEEE 802.3 EIA RS485 and RS232</b>		<b>Digital Inputs</b>		<b>Power supply</b>	
<b>Network interface Protocol</b>		Channels	4	Current consumption	18 ÷ 30 Vdc 45 mA typ. @ 24Vdc(standby) 100 mA max
Ethernet 10Base-T Modbus TCP		Input voltage	(bipolar)	<b>Isolations</b>	
<b>RS485 Interface</b>		OFF state	0 ÷ 3 V	Power supply / Ethernet	1500 Vac, 50 Hz, 1 min.
Baud-rate	up to 38.4 Kbps	ON state	10 ÷ 30 V	Power supply / RS485	1500 Vac, 50 Hz, 1 min.
Max. distance (recommended) (1)	1.2 Km @ 38.4 Kbps	Impedance	4.7 KΩ	Ethernet / RS485	1500 Vac, 50 Hz, 1 min.
Number of modules in multipoint	up to 32	<b>Digital Outputs</b>		Inputs / RS485	2000 Vac, 50 Hz, 1 min.
Internal termination resistance (optional)	120 Ohm	Channels	2	Inputs / Power supply	2000 Vac, 50 Hz, 1 min.
		Type	SPDT Relays	<b>EMC ( for industrial environments )</b>	
		Switching Power (max.)		Immunity	EN 61000-6-2
		2 A @ 250 Vac ( resistive load ) per contact		Emission	EN 61000-6-4
		2 A @ 30 Vdc ( resistive load ) per contact		<b>Temperature &amp; Humidity</b>	
		Minimum load 5Vdc , 10mA		Operative temperature	-20 ÷ +60 °C
		Max. voltage 250Vac (50 / 60 Hz) , 30Vdc		Storage temperature	-40 ÷ +85 °C
		Dielectric strength between contacts		Relative humidity (not cond.)	0 ÷ 90 %
		1000 Vac, 50 Hz, 1 min.		<b>Connections</b>	
		Dielectric strength between coil and contacts		Ethernet	RJ-45 (on terminals side)
		4000 Vac, 50 Hz, 1 min.		RS-232D	RJ-45 (on front side)
				RS-485 / Supply	Removable screw terminals
				<b>Housing</b>	
				Material	Self-extinguishing plastic
				Mounting	DIN rail EN-50022
				Dimensions in mm.(WxHxT)	100 x 120 x 22.5
				Weight	about 160 gr.

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

## INSTALLATION INSTRUCTIONS

The Intelligent Unit DAT9000IO 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).

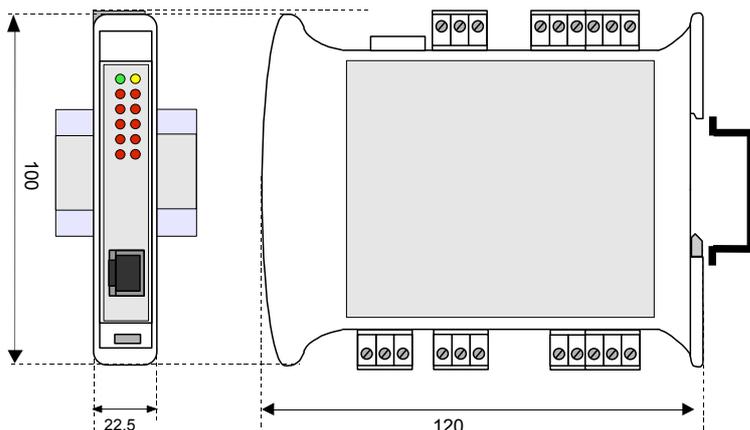
Make sure that sufficient air flow is provided for the device avoiding to place raceways or other objects which could obstruct the ventilation slits. Moreover it is suggested to avoid that devices are mounted above appliances generating heat; their ideal place should be in the lower part of the panel. 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
%S0	--Reserved--	R/W
%S1	Firmware [0]	R
%S2	Firmware [1]	R
%S3	Name [0]	R/W
%S4	Name [1]	R/W
%S5	Port 1 [BaudRate]	R/W
%S6	Node ID	R/W
%S7	Port 1 [Timeout RX]	R/W
%S8	Digital Inputs	R/W
%S9	Digital Outputs	R/W
%S10	System Flags	R/W
%S11	--Reserved--	-
%S12	--Reserved--	-
%S13	PC	R
%S14	Status [0]	R
%S15	Status [1]	R
%S16	COM Errors	R/W
%S17	Gateway Mask [L-H]	R/W
%S18	Port 0 [Settings]	R/W
%S19	Port 0 [Settings]	R/W
%S20	Timers Enable	R/W
%S21	--Reserved--	-
%R22	--Reserved--	-
%R23	--Reserved--	-
%R24	--Reserved--	-
%R25	--Reserved--	-
%R26		
	General Purpose Registers	R/W
%R959		
%R960		
	Memory Registers	R/W
%R1023		

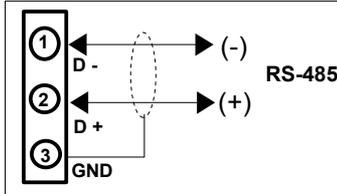
## MECHANICAL DIMENSIONS (mm)



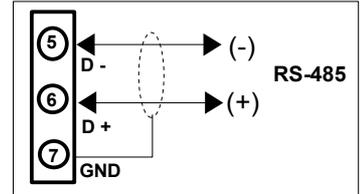
## WIRING

### SERIAL PORTS

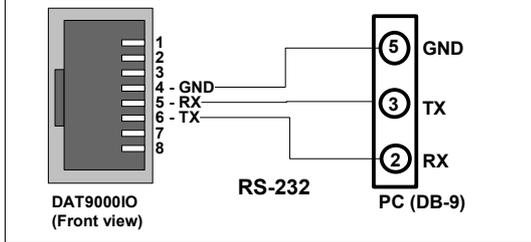
#### RS-485 Slave (Port 0)



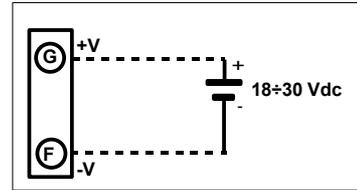
#### RS-485 Master (Port 1)



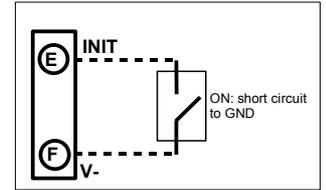
#### RS-232D Slave (Port 0)



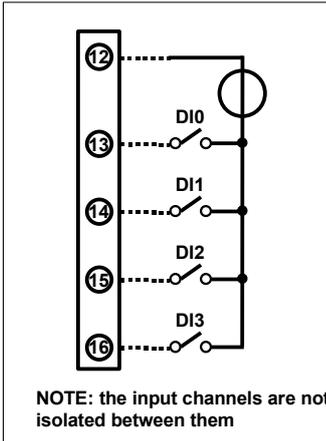
### POWER SUPPLY



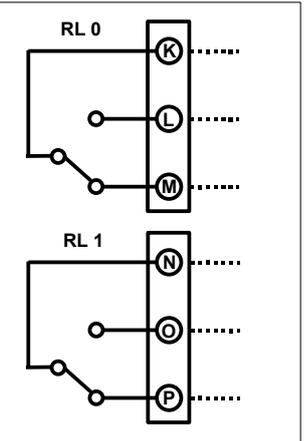
### INIT



### DIGITAL INPUTS



### RELAY 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
RX <i>n</i>	RED	BLINK	PORT <i>n</i> - Data received ( the blink frequency depends on Baud-rate)
		OFF	No reception in progress.
TX <i>n</i>	RED	BLINK	PORT <i>n</i> - Data transmitted ( the blink frequency depends on Baud-rate)
		OFF	No reception in progress.
I <i>n</i>	RED	ON	State 1 Digital Inputs.
		OFF	State 0 Digital Inputs.
O <i>n</i>	RED	ON	State 1 Digital Outputs.
		OFF	State 0 Digital Outputs.

### HOW TO ORDER

“ DAT 9000IO “

■ = Requested  
□ = Optional