



FEATURES

- N°1 serial interface RS-485 Modbus RTU Master
- N°1 serial interface RS-485/232 Modbus RTU Slave
- Interface Ethernet 10/100Base-T, Modbus TCP server
- N°1 universal analogue input + N°1 current and voltage analogue input
- N°2 digital Inputs
- Auxiliary supply to power sensors on field
- N°2 passive 4-20 mA analogue outputs
- 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 DAT9011 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.

The device is equipped with one universal analogue input channel, one channel for Volt and mA input, two digital inputs and 2 relay outputs . On input an Auxiliary source is available to supply passive sensors on the field. 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 program the Control Logic, to monitor, to request data and programming in real time the Intelligent Unit, to program directly the Slave devices connected on the RS-485 Master and to request data from them. The device DAT9011 is configurable by the software DEV9K developed by DATEXEL and running under Windows. The LED of signaling 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 DAT9011 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.

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

INPUT			Input Impedance		Serial Ports RS-485 (Master & Slave)		
Input type	Min	Max	mV, TC	10 MΩ	Protocol	Modbus RTU	
Voltage	100 mV	-100 mV	Volt	1 MΩ	Baud Rate	up to 115200 bps	
	10 Volt	-10 V	mA	22 Ω	Max. recommended distance (3)	1.2 Km @ 38.4 Kbps	
TC	J	-210°C	1200°C	Thermal Drift (1)	Number of modules in multipoint	32 max.	
	K	-210°C	1370°C	Inputs - Full Scale	± 0.01 % / °C	Internal termination resistance (optional)	
	R	-50°C	1760°C	Thermal Drift CJC	Full Scale	± 0.02 °C / °C	
	S	-50°C	1760°C	Sample time	1 sec.	120 Ohm (optional)	
	B	400°C	1825°C	Warm-up time	3 minutes		
	E	-210°C	1000°C	OUTPUT (2 channels)			
	T	-210°C	400°C	Output type	Min	Max	
	N	-210°C	1300°C	Current	4 mA	20 mA	
RTD 2,3 wires			Accuracy (2)	± 0.05 % f.s.		POWER SUPPLY	
Pt100	-200°C	850°C	Linearity (2)	± 0.05 % f.s.		Supply voltage	
Pt1000	-200°C	200°C	Thermal Drift (2)	± 0.01 % / °C		Current cons. @ 24 V	
Ni100	-60°C	180°C	Load resistance	see "Load Characteristic"		Current cons. @ 10 V	
Ni1000	-60°C	150°C	DIGITAL INPUTS			Polarity rev. protection	
Resistance 2,3 wires			Number of Channels	2		ISOLATION	
Low	0 Ω	500 Ω	Input voltage	OFF State : 0÷3 V		1500 Vac, 50 Hz, 1 min	
High	0 Ω	2000 Ω	(bipolar)	ON State : 10÷30 V			
Potentiometer			Input Impedance	4.7 Kohm		CONNECTIONS	
	20 Ω	2000 Ω	N°2 Digital counter	32 bit (up to 300 Hz)		Ethernet	
Current			DIGITAL OUTPUTS			RS-232D	
20 mA	-20 mA	20 mA	N.2 Relays SPDT	Maximum switching power per contact (resistive load)		RS-485 Master / Slave	
Accuracy (1)			2 A @ 250 Vac		RJ-45 (on term. side)	Relay Outputs	
mV, Volt, mA	± 0.05 % f.s.		2 A @ 30 Vdc			Screw term. 5.08mm	Supply/In/Analogue out
Pot, RTD, Res.	± 0.05 % f.s.		Minimum load		Screw term. 5.08mm		
TC	> ± 0.05 % f.s. or 5 uV		5Vdc, 10mA		Screw term. 3.81mm		
Linearity (1)			Max. voltage		250Vac (50 / 60 Hz) ,	ENVIRONMENTAL CONDITIONS	
mV, Volt, mA	± 0.05 % f.s.		110Vdc		110Vdc	Operative Temperature	
Pot, RTD, Res.	± 0.1 % f.s.		Dielectric Strength between contacts		1000 Vac, 50 Hz, 1 min.	-20°C .. +60°C	
TC	± 0.2 % f.s.		Dielectric Strength between coil and contacts		4000 Vac, 50 Hz, 1 min.	Storage Temperature	
RTD, Res, Pot excitation current			In compliance with Ethernet IEEE 802.3 EIA RS485 and RS232				-40°C .. +85°C
Typical	0.400 mA		Network interface		Ethernet 10/100Base-T	Humidity (not condensed)	
Lead wire resistance influence			Protocol		Modbus TCP Server	0 .. 90 %	
RTD/Res 3 wires(50 Ω max balanced)	0.05 f.s. %/Ω						Maximum Altitude
mV, Tc	< 0.8 uV/Ohm						2000 m
CJC Compensation error							Installation
± 1 °C							Indoor
Auxiliary voltage							Category of installation
> 14 Vdc @ 20 mA							II
							Pollution Degree
							2
NOTES:							MECHANICAL SPECIFICATIONS
(1) Referred to input Span (difference between max. and min. values)							Material
(2) Referred to output Span (difference between max. and min. values)							Self-extinguish plastic
(3) – The maximum distance depends of: number of devices connected, type of cabling, noises, etc...							IP Code
							IP20
							Wiring
							wires with diameter
							0.8÷2.1 mm ² /AWG 14-18
							0.5 N m
							in compliance with DIN rail standard EN-50022
							about 190 g.
							CERTIFICATIONS
							EMC (for industrial environments)
							Immunity
							EN 61000-6-2
							Emission
							EN 61000-6-4

LIST OF SUPPORTED FUNCTION

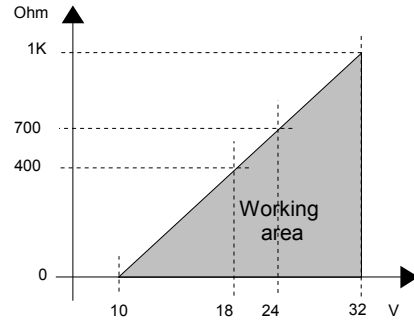
- Communication:
- Read data from "slave" devices (Modbus function 04)
 - Write data to "slave" devices (Modbus function 16)
- Logical:
- Boolean(And, Or,)
 - Compare (>, <, =,
 - Arithmetical (Sum, Subtraction, Multiplication, Division
 - Calculation (Scaling, Exponential functions, Square root extraction, 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.

LOAD CHARACTERISTIC

Rload: express the value of load in the current loop and it is calculated as function of the power supply value of the output loop.

The 4-20 mA output signal is measurable in series to the output loop as shown in the section "Analogue output connection"; Rload is the input impedance of the instruments on the loop; to obtain a correct measure it is recommended that the maximum value of Rload will be calculated in function of the value of loop supply voltage.



INSTALLATION INSTRUCTIONS

The Intelligent Unit DAT9011 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 35°C;
- high power supply value(< 15 Vdc).

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.

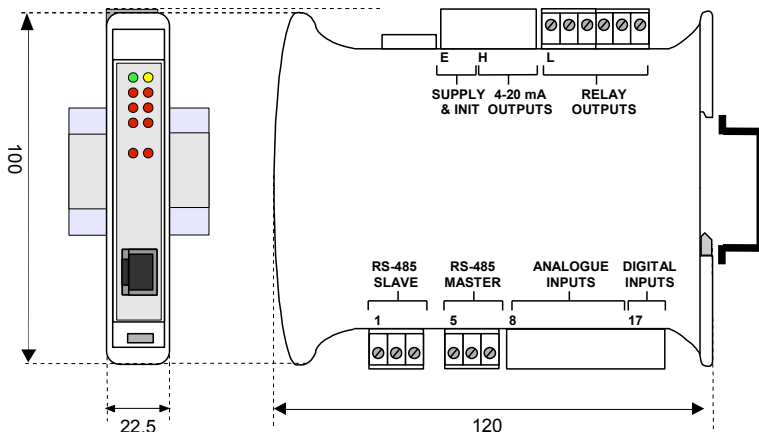
Install the device in a place without vibrations.

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 / 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.

MECHANICAL DIMENSIONS (mm)



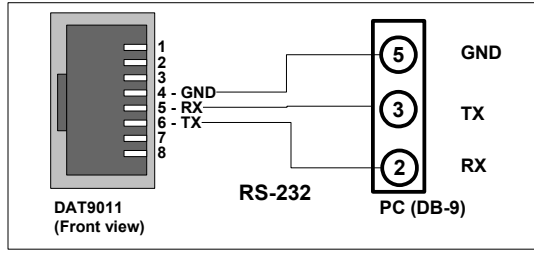
MODBUS REGISTERS MAPPING

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 2 [Settings]	R/W
%R20	Timers Enabled	R/W
%R21	--Reserved--	-
%R22	--Reserved--	-
----	--Reserved--	-
%R25	--Reserved--	-
%R26	Analogue input ch. 0	-
%R27	Analogue input ch. 1	-
%R28	--Reserved--	R
----	--Reserved--	-
%R31	--Reserved--	-
%R32	Analogue output ch. 0	-
%R33	Analogue output ch. 1	R/W
%R34	Program. sensor ch. 0 & 1	R/W
%R35	"General Purpose" Registers	R/W
----	--Reserved--	-
%R927	--Reserved--	-
%R928	Frequency dig. input 0	R
%R929	Frequency dig. input 1	R
%R930	--Reserved--	-
%R931	--Reserved--	-
%R932-933	Counter dig. input 0	R/W
%R934-935	Counter dig. input 1	R/W
%R936	--Reserved--	-
----	--Reserved--	-
%R940	--Reserved--	-
%R941	"General Purpose" Registers	R/W
----	--Reserved--	-
%R959	--Reserved--	-
%R91024	Retentive Registers	R/W
----	--Reserved--	-
%R1275	--Reserved--	-

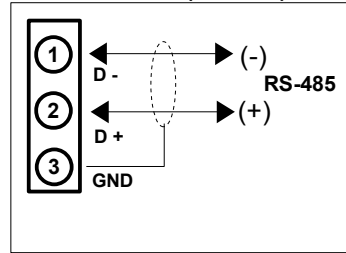
CONNECTIONS

SERIAL PORTS CONNECTION

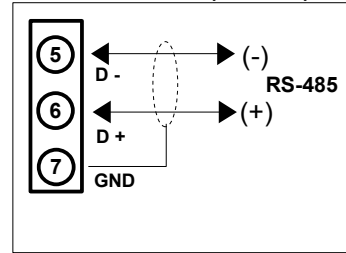
RS-232D SLAVE (PORT 0)



RS-485 SLAVE (PORT 0)

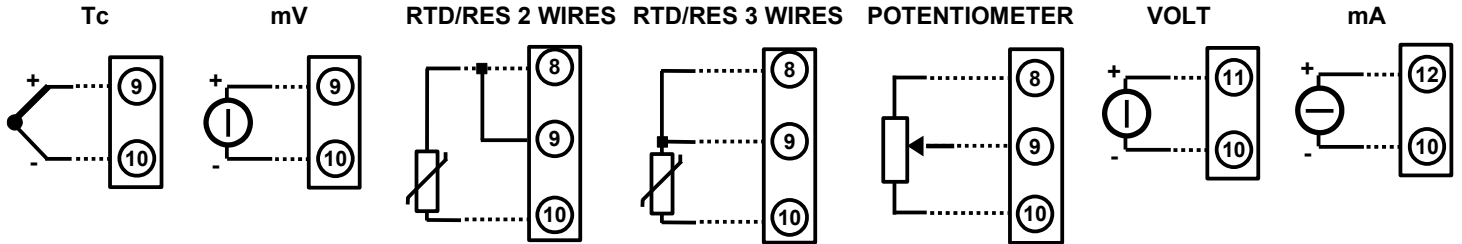


RS-485 MASTER (PORT 1)

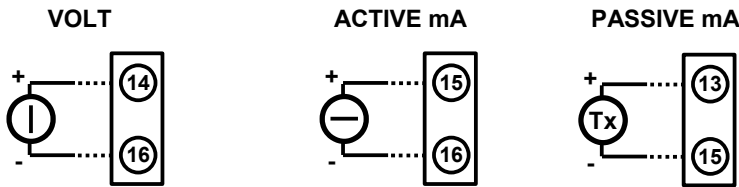


ANALOGUE INPUTS CONNECTION

CHANNEL 0 - UNIVERSAL INPUT

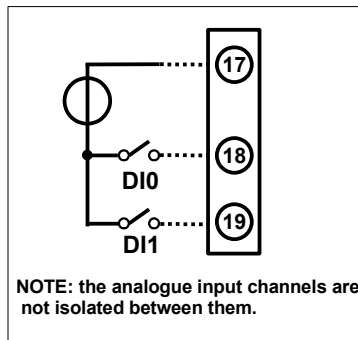


CHANNEL 1 - VOLT / mA INPUT

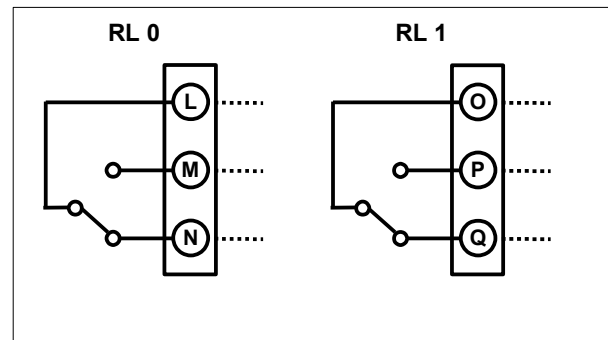


NOTE: the analogue input channels are not isolated between them.

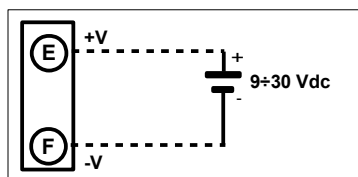
DIGITAL INPUTS CONNECTION



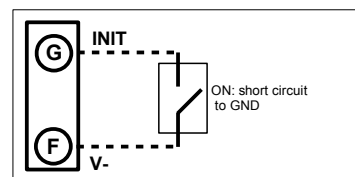
RELAY OUTPUTS CONNECTION



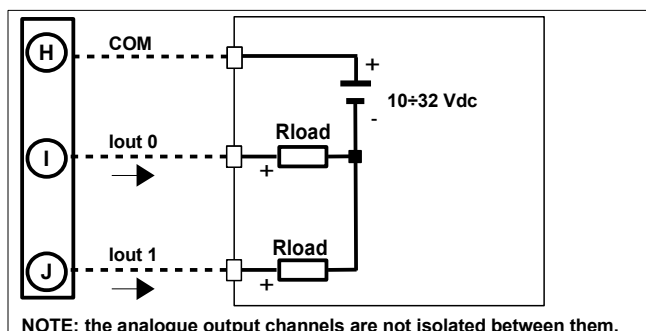
POWER SUPPLY CONNECTION



INIT CONNECTION



ANALOGUE OUTPUT CONNECTION



ISOLATION STRUCTURE



HOW TO ORDER

" DAT 9011 "