Modbus Datalogger to USB
Phone: 561 779 5660 - e-mail:datexel@datexel.Com - www.datexel.Com

UNI EN ISO 9001:2008

Intelligent Unit with Data-Logger function, Ethernet Interface + Digital And Analogue I/O

DAT 9011-USB

FEATURES
- **N°1 serial interface RS-485 Modbus RTU Master**
- **N°1 serial interface RS-485/232 Modbus RTU Slave**
- **N°1 Slot for USB memory stick**
- **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-USB 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 and managing up to 8 tasks of storage data. The data are saved on USB memory stick; it is possible to get access to the saved files by means of the Ethernet connection .
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/USB 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/USB 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 type	Min	Max
Voltage		
100 mV	-100 mV	100 mV
10 Volt	-10 V	10 V
TC		
J	-210°C	1200°C
K	-210°C	1370°C
R	-50°C	1760°C
S	-50°C	1760°C
B	400°C	1825°C
E	-210°C	1000°C
T	-210°C	400°C
N	-210°C	1300°C
RTD 2,3 wires		
Pt100	-200°C	850°C
Pt1000	-200°C	200°C
Ni100	-60°C	180°C
Ni1000	-60°C	150°C
Resistance 2,3 wires		
Low	0 Ω	500 Ω
High	0 Ω	2000 Ω
Potentiometer	20 Ω	2000 Ω
Current		
20 mA	-20 mA	20 mA

Accuracy (1)	
mV, Volt, mA	± 0.05 % f.s.
Pot, RTD, Res.	± 0.05 % f.s
TC	> ± 0.05 % f.s. or 5 uV
Linearity (1)	
mV, Volt, mA	± 0.05 % f.s.
Pot, RTD, Res.	± 0.1 % f.s
TC	± 0.2 % f.s.
RTD, Res, Pot excitation current	
Typical	0.400 mA
Lead wire resistance influence	
RTD/Res 3 wires(50 Ω max balanced)	0.05 f.s. %/Ω
mV, Tc	< 0.8 uV/Ohm
CJC Compensation error	± 1 °C
Auxiliary voltage	> 14 Vdc @ 20 mA

NOTES:
(1) Referred to input Span (difference between max. and min. values)
(2) Referred to output Span (difference between max. and min. values)
(3) – The maximum distance depends of: number of devices connected, type of cabling, noises, etc...

Input Impedance	
mV, TC	10 MΩ
Volt	1 MΩ
mA	22 Ω
Thermal Drift (1)	
Inputs - Full Scale	± 0.01 % / °C
Thermal Drift CJC	
Full Scale	± 0.02 °C/ °C
Sample time	1 sec.
Warm-up time	3 minutes

OUTPUT (2 channels)

Output type	Min	Max
Current	4 mA	20 mA

Accuracy (2)	± 0.05 % f.s.
Linearity (2)	± 0.05 % f.s.
Thermal Drift (2)	± 0.01 % / °C
Load resistance	see “Load Characteristic”

DIGITAL INPUTS

Number of Channels	2
Input voltage	OFF State : 0÷3 V
(bipolar)	ON State : 10÷30 V
Input Impedance	4.7 Kohm
N°2 Digital counter	32 bit (up to 300 Hz)

DIGITAL OUTPUTS
N.2 Relays SPDT

Maximum switching power per contact (resistive load)	
	2 A @ 250 Vac
	2 A @ 30 Vdc
Minimum load	5Vdc, 10mA
Max. voltage	250Vac (50 / 60 Hz) , 110Vdc
Dielectric Strength between contacts	1000 Vac, 50 Hz, 1 min.
Dielectric Strength between coil and contacts	4000 Vac, 50 Hz, 1 min.

In compliance with Ethernet IEEE 802.3 EIA RS485 and RS232

Network interface	Ethernet 10/100Base-T
Protocol	Modbus TCP Server

Compatible USB devices

Type	Pen Drive
Memory size	up to 16 GB
Format	FAT16 or FAT32

Serial Ports RS-485 (Master & Slave)

Protocol	Modbus RTU
Baud Rate	up to 115200 bps
Max. recommended distance (3)	1.2 Km @ 38.4 Kbps
Number of modules in multipoint	32 max.
Internal termination resistance (optional)	120 Ohm (optional)

POWER SUPPLY

Supply voltage	9 ÷ 30 Vdc
Current cons. @ 24 V	60 mA (170 mA max)
Current cons. @ 10 V	147 mA (300 mA max)
Polarity rev. protection	60 Vdc max.

ISOLATION
1500 Vac, 50 Hz, 1 min

CONNECTIONS

Ethernet	RJ-45 (on term. side)
RS-232D	RJ-45 (on front side)
RS-485 Master / Slave	Screw term. 5.08mm
Relay Outputs	Screw term 5.08mm
Supply/In/Analogue out	Screw term. 3.81mm

ENVIRONMENTAL CONDITIONS

Operative Temperature	-20°C .. +60°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

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 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.

INSTALLATION INSTRUCTIONS

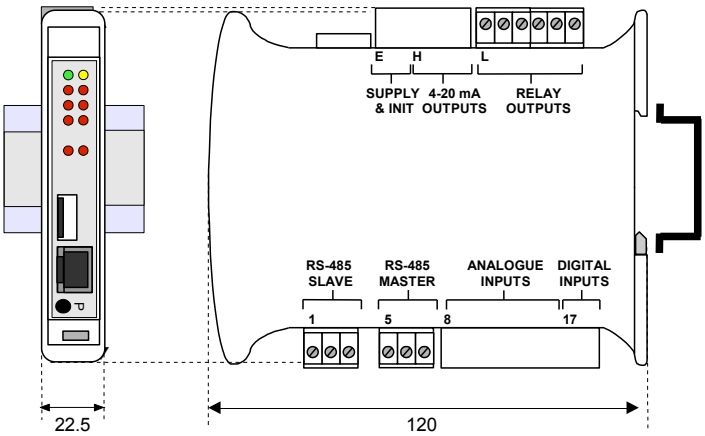
The Intelligent Unit DAT9011-USB is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:
When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following case:
- If panel temperature exceeds 35°C
- 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 *n*	RED	BLINK	PORT *n* – Data received (the blink frequency depends on Baud-rate)
		OFF	No reception in progress.
TX *n*	RED	BLINK	PORT *n* – Data transmitted (the blink frequency depends on Baud-rate)
		OFF	No reception in progress.
I *n*	RED	ON	State 1Digital Inputs.
		OFF	State 0 Digital Inputs.
O *n*	RED	ON	State 1Digital Outputs.
		OFF	State 0 Digital Outputs.

MECHANICAL DIMENSIONS (mm)

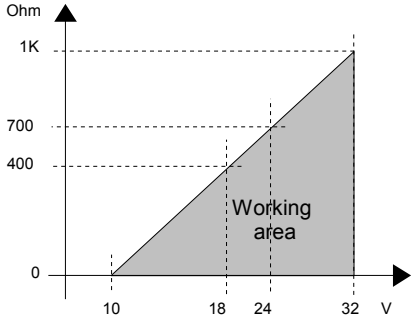


PUSH-BUTTON “P” FUNCTIONALITY

On the front side of the device it is available a push-button that allows to the user in case of necessity to re-load the following factory default settings in the following modalities:
- Push the button for 5 seconds with device powered to load the factory default settings (IP address, node ID).
-Power on the device keeping pushed the button for 5 seconds to load the factory default firmware.

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.



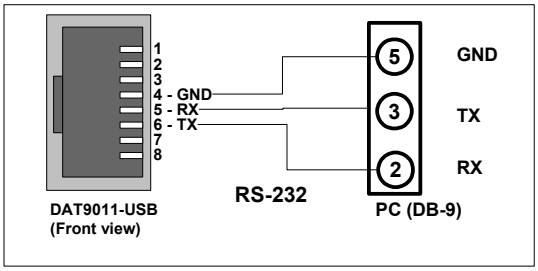
MODBUS REGISTERS MAPPING

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 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	Analogue input ch. 0	R
%R27	Analogue input ch. 1	R
%R28 --- %R31	--Reserved--	-
%R32	Analogue output ch. 0	R/W
%R33	Analogue output ch. 1	R/W
%R34	Program. sensor ch. 0 & 1	R/W
%R35 --- %R927	“General Purpose” Registers	R/W
%R928	Frequency Digital input 0	R
%R929	Frequency Digital input 1	R
%R930	--Reserved--	-
%R931	--Reserved--	-
%R932-933	Counter Digital input 0	R/W
%R934-935	Counter Digital input 1	R/W
%R936 --- %R940	--Reserved--	-
%R941 --- %R959	“General Purpose” Registers	R/W
%R1023 --- %R1275	Retentive Registers	R/W

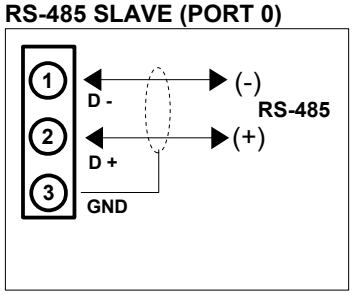
CONNECTIONS

SERIAL PORTS CONNECTION

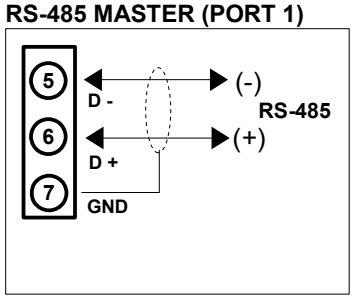
RS-232D SLAVE (PORT 0)



RS-485 SLAVE (PORT 0)

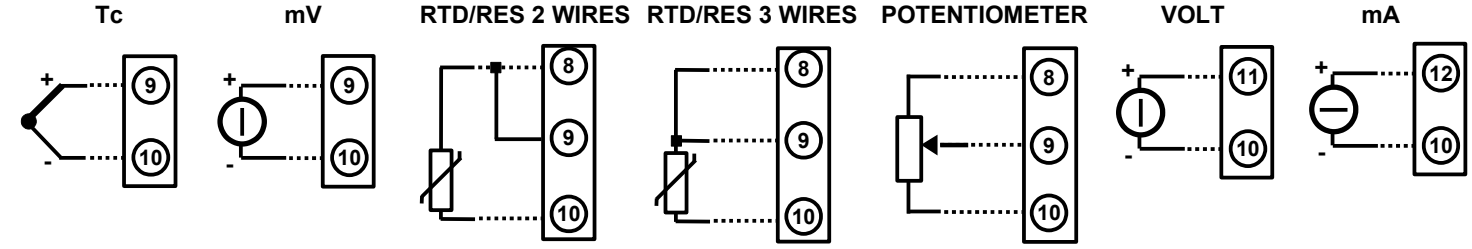


RS-485 MASTER (PORT 1)

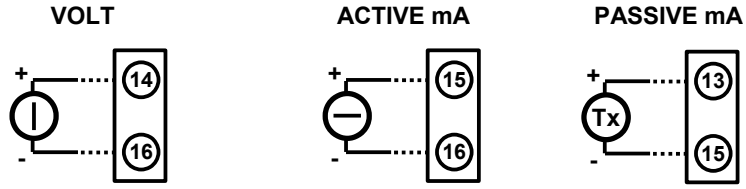


ANALOGUE INPUTS CONNECTION

CHANNEL 0 - UNIVERSAL INPUT

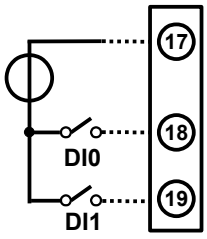


CHANNEL 1 - VOLT / mA INPUT



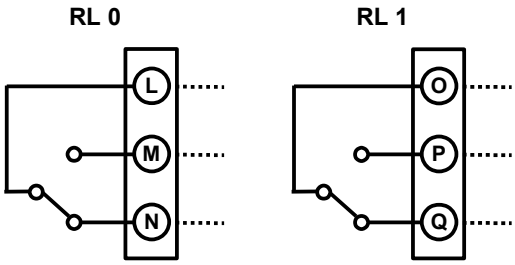
NOTE: the analogue input channels are not isolated between them.

DIGITAL INPUTS CONNECTION

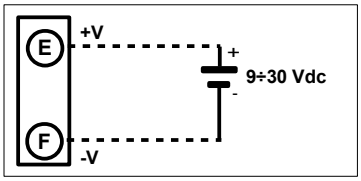


NOTE: the analogue input channels are not isolated between them.

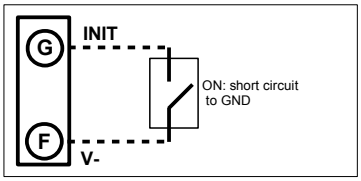
RELAY OUTPUTS CONNECTION



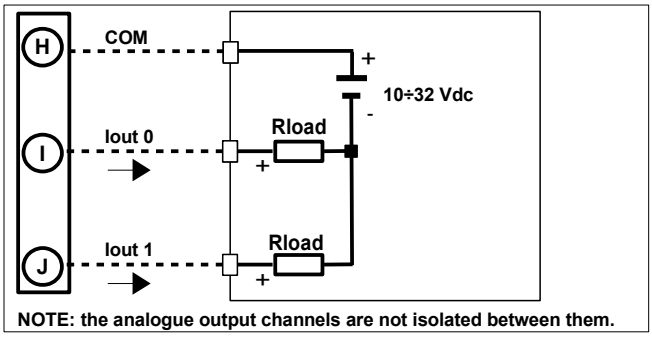
POWER SUPPLY CONNECTION



INIT CONNECTION



ANALOGUE OUTPUT CONNECTION



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

HOW TO ORDER

“ DAT 9011-USB “