Signal Converter to RS485 DAT3011
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UNI EN ISO 9001:2008

Remote I/O module Universal I/O on RS-485 network

DAT 3011

FEATURES
- **Field-Bus remote data acquisition**
- **Modbus Slave device on RS-485**
- **Modbus RTU Protocol**
- **1 Universal Analogue Input + 1 Analogue Input V/mA**
- **2 Analogue Outputs 0-20mA**
- **3 Digital Inputs**
- **1 SSR Digital Output + 2 SPST Relay Outputs**
- **Watch-Dog Alarm**
- **Remotely Configurable**
- **1500 Vac galvanic isolation on all the ways**
- **High Accuracy**
- **UL / CE mark**
- **DIN rail mounting in compliance with EN-50022**

GENERAL DESCRIPTION

The DAT 3011 device is able to acquire RTD or Tc sensors, mV, V or mA input signals connected to the universal analogue input in engineering units in digital format. Moreover it is available a second isolated analogue input for V or mA . The device is able to acquire up to 3 digital inputs and to drive one solid-state relay and two SPST relays. The Data are transmitted with MODBUS RTU protocol on the RS-485 network.
The device guarantees high accuracy and a stable measure versus time and temperature. To ensure the plant safety two Watch-Dog timer alarms are provided.
The isolation between the parts of circuit removes eventual ground-loop effects, allowing the use of the device even in the heavy environmental conditions.
The DAT 3011 is in compliance with the Directive UL 61010-1 for US market and with the Directive CSA C22.2 No 61010-1 for the Canadian market.
The device is housed in a rough self-extinguishing plastic container which, thanks to its thin profile of 22.5mm only, allows a high density mounting on EN-50022 standard DIN rail.

USER INSTRUCTIONS

Before to install the device, please read the “Installation Instruction” section.
If the module configuration is unknown, with device powered off, connect the INIT terminal to the GND terminal (ground), at the next power on the device will be auto-configured in the default settings (refer to the User Guide of the device).
Connect power supply, serial bus, analogue and digital inputs and outputs as shown in the “Wiring” section.
When the device is powered, the green LED “PWR” is fixed in ON condition, the yellow LED “STS” changes state and depends on the working condition of the device: refer to the "Light Signalling" section to verify the device working state.
To perform configuration and calibration operations, read the instructions in the User Guide of the device.
To simplify handling or replacing of the device, it is possible to remove the wired terminals even with the device powered.

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	0.700 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

(1) Referred to input Span (difference between max. and min. values)
(2) Referred to output Span (difference between max. and min. values)

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	0 mA	20 mA

Accuracy (2)	± 0.05 % f.s.
Linearity (2)	± 0.05 % f.s.
Thermal Drift (2)	± 0.01 % / °C
Load resistance	< 500 Ohm
Auxiliary Voltage	> 12V @ 20 mA

Data Transmission	
Baud Rate	115.2 Kbps
Max. distance	1.2 Km – 4000 ft

DIGITAL INPUTS	
Number of Channels	3
Input voltage	OFF State : 0÷3 V
(bipolar)	ON State : 10÷30 V
Input Impedance	4.7 KOhm

DIGITAL OUTPUTS	
N.1 SSR Output	
Voltage	30 Vac / 48 Vdc
Current (resistive load)	0.4 A max
N.2 Relays SPST	
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.

POWER SUPPLY	
Power supply voltage	18 .. 30 Vdc
Reverse polarity protection	60 Vdc max
Current consumption	100 mA max.

ISOLATION	
(Power supply - RS485 – Universal input – V mA Input – Digital Inputs – Analogue Outputs)	
.	1500 Vac, 50 Hz, 1 min

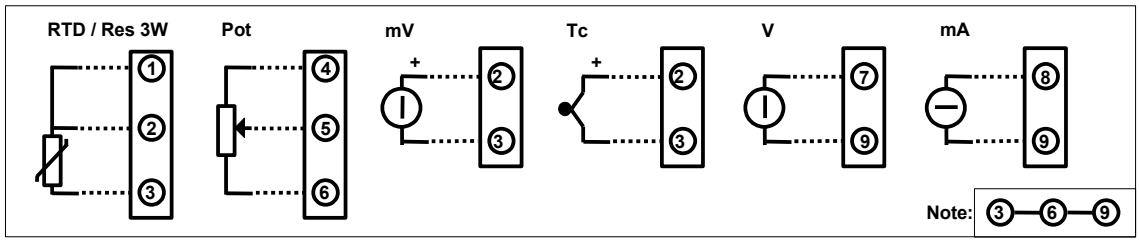
ENVIRONMENTAL CONDITIONS	
Operative Temperature	-10°C .. +60°C
UL Operative Temperature	-10°C .. +40°C
Storage Temperature	-40°C.. +85°C
Humidity (not condensed)	0 .. 90 %
Maximum Altitude	2000 m
Installation	Indoor
Category of installation	II
Pollution Degree	2

MECHANICAL SPECIFICATIONS	
Material	Self-extinguish plastic
IP Code	IP20
Wiring	wires with diameter 0.8÷2.1 mm^2 /AWG 14-18
Tightening Torque	0.5 N m
Mounting	in compliance with DIN rail standard EN-50022
Weight	about 150 g.

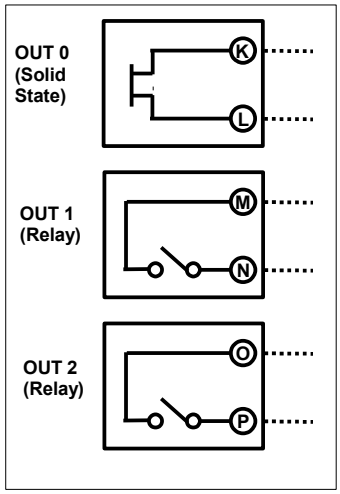
CERTIFICATIONS	
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4
UL	
US Standard	UL 61010-1
Canadian Standard	CSA C22.2 No 61010-1
CCN	NRAQ/NRAQ7
Typology	Open Type device
Classification	Industrial Control Equipment
File Number	E352854

WIRING

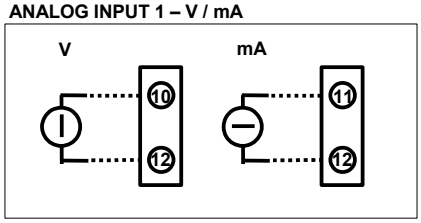
ANALOG INPUT 0 - UNIVERSAL



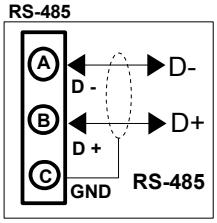
DIGITAL OUTPUTS



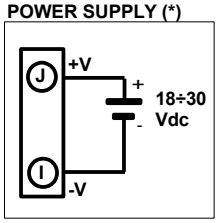
ANALOG INPUT 1 – V / mA



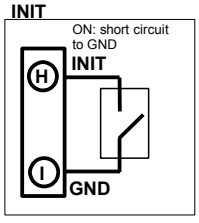
RS-485



POWER SUPPLY (*)

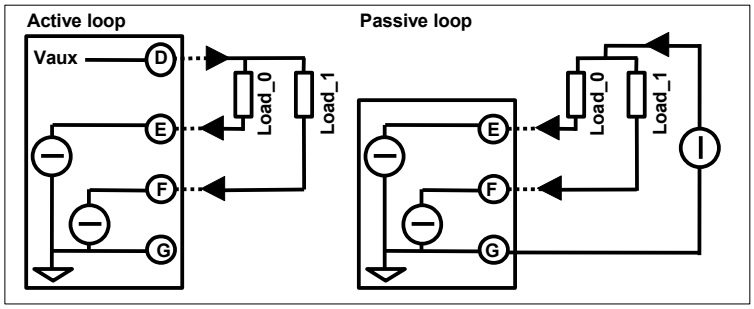


INIT

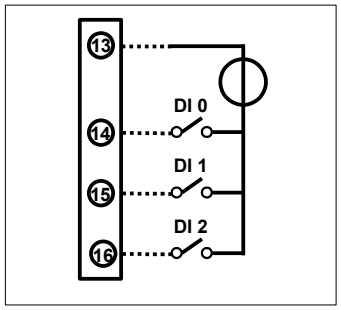


(*) Note: for UL installation the device must be powered using a power supply unit classified NEC class 2 or SELV

ANALOG OUTPUTS - mA



DIGITAL INPUTS



ISOLATIONS

1 UNIVERSAL ANALOG INPUT	RS485 LINE
1 V / mA INPUT	2 ANALOGUE OUTPUTS
3 DIGITAL INPUTS	SUPPLY
	1 SOLID STATE RELAY
	2 SPST RELAYS

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 at least one of the overload conditions exist.

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 OFF	Device powered Device not powered
STS	YELLOW	ON OFF	System Error Correct working
RX	RED	BLINK OFF	Data receiving from RS-485 No Data receiving
TX	RED	BLINK OFF	Data Transmission on RS-485 No Data Transmission
I(n)	RED	ON OFF	Digital Input 'n' : ON State Digital Input 'n' : OFF State
Q(n)	RED	ON OFF	Digital Output 'n' : ON State Digital Input 'n' : OFF State

HOW TO ORDER

DAT3011 can be supplied with the configuration specified by the customer.

ORDER CODE:

DAT 3011 / Pt100 / 20 mA

- Input type channel 1
- Input type channel 2

=Requested
= Optional

MODBUS REGISTERS MAPPING

Register	Description	Access
40001	--Reserved--	R/W
40002	Firmware [0]	R
40003	Firmware [1]	R
40004	Name [0]	R/W
40005	Name [1]	R/W
40006	--Reserved--	R/W
40007	Node ID	R/W
40008	--Reserved--	R/W
40009	Digital Inputs	R/W
40010	Digital Outputs	R/W
40011	System Flags	R/W
40012 --- 40018	--Reserved--	-
40019	COM Settings	R/W
40020 --- 40026	--Reserved--	-
40027	Analogue In 0	R
40028	Analogue In 1	R
40029 --- 40032	--Reserved--	-
40033	Analogue Out 0	R/W
40034	Analogue Out 1	R/W

MECHANICAL DIMENSIONS (mm)