

# DigiRail-2A

## Universal Analog Input Modules

### INSTRUCTION MANUAL

V1.0x E



#### INTRODUCTION

The Universal Analog Input Modbus Module - **DigiRail-2A** is a remote measuring unit with two configurable analog inputs. An RS485 serial interface allows reading and configuration of these inputs, through communication network. It's appropriate for mounting on DIN 35 mm rails.

The inputs are electrically insulated from the serial interface and the module supply. There is no electrical insulation between inputs. There is also no electrical insulation between serial interface and supply.

Configuration of the **DigiRail-2A** is performed through the RS485 interface by using Modbus RTU commands. The **DigiConfig** software allows the configuration of all features of the **DigiRail** as well as its diagnostics. The **DigiConfig** offers features for detecting the devices present in the Modbus network and for configuring the communication parameters of the **DigiRail-2A**.

This manual provides the instructions for installation and connection of the module. The installer for **DigiConfig** and the documentation regarding Modbus communication for the **DigiRail-2A** (*Communication Manual of the DigiRail-2A*) they are available for download at [www.novusautomation.com](http://www.novusautomation.com).


#### ELECTRICAL INSTALLATION

##### RECOMMENDATIONS FOR INSTALLATION

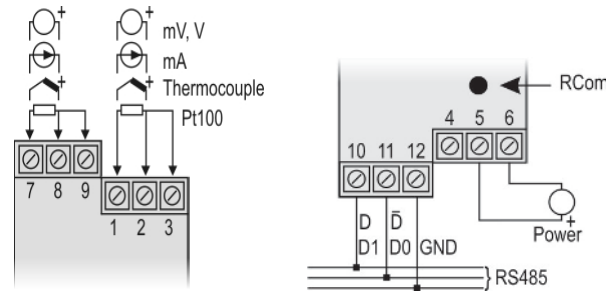
- Input and communication signal conductors must pass through the system plant separated from the electrical network conductors, if possible, in grounded conduits.
- The supply for the instruments must be provided from a proper network for instrumentation.
- In control and monitoring applications, it is essential considering what may occur if any of the system parts should fail.
- We recommend the use of RC FILTERS (47Ω and 100nF, series) in parallel with contactor and solenoid coils which are close or connected to **DigiRail**.

##### ELECTRICAL CONNECTIONS

**Figure 1** shows the necessary electrical connections. The terminals 1, 2, 3, 7, 8 and 9 are intended for the input connections, 5 and 6 for the module supply and 10, 11 and 12 for the digital communication. For obtaining a better electrical contact with the connectors, we recommend the use of pin terminals at the conductors' end. For direct wire connection, the minimum gage recommended is 0.14 mm<sup>2</sup>, not exceeding 4.00 mm<sup>2</sup>.



Be careful when connecting the supply terminals to the **DigiRail**. If the positive conductor of the supply source is connected, even momentarily, to one of the communication connection terminals, the module may be damaged.



**Figure 1** – Electrical Connections

**Table 1** shows how to connect the connectors to the RS485 communication interface:

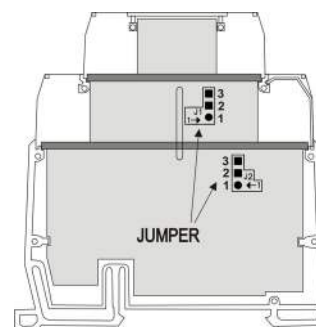
|     |           |    |   |                                   |             |
|-----|-----------|----|---|-----------------------------------|-------------|
| D1  | D         | D+ | B   | Bidirectional data line.          | Terminal 10 |
| D0  | $\bar{D}$ | D- | A   | Inverted bidirectional data line. | Terminal 11 |
| C   |           |    | Optional connection which improves the communication performance. | Terminal 12                       |             |
| GND |           |    |   |                                   |             |

**Table 1** – RS485 Connections

##### CONNECTIONS – INPUT 0-5 Vdc / 0-10 Vdc

For using the 0-5 Vdc and 0-10 Vdc input types, the user must beforehand switch the position of the inner module jumpers. To this end, the module must be opened and jumpers J1 and J2 (input 1 and input 2, respectively) must be changed due to the following options:

- For 0-5 Vdc and 0-10 Vdc input types, positions 1 and 2 must be strapped.
- For all other input types, positions 2 and 3 must be strapped (factory position).



**Figure 2** – Jumper for 0-5 Vdc and 0-10 Vdc input

## CONFIGURATION

The user will receive the module perfectly calibrated, no adjustment will be required. The original configuration features the following characteristics:

**Sensor thermocouple wire J, Indication °C, Filter = 0**  
**Address=247, BaudRate=1200, Parity Even,**  
**1 Stop Bit**

The application **DigiConfig** is a program for Windows® used for configuration of the modules **DigiRail**. For its installation, run the **DigiConfigSetup.exe** file, available on our website and follow the instructions as shown.

**DigiConfig** is provided with a complete help file, giving all the information necessary for its full use. For using the help feature, start the application and chose the "Help" menu or press the F1 key.

Go to [www.novusautomation.com](http://www.novusautomation.com) in order to obtain the installer for **DigiConfig** and the additional product manuals.


## SPECIFICATIONS

**Inputs:** 2 universal analog inputs.

**Input signals:** Configurable. Refer to **Table 2**.

**Thermocouples:** Types J, K, T, R, S, B, N and E, according to NBR 12771. Impedance >> 1MΩ

**Pt100:** 3 wires type, α= .00385, NBR 13773, Excitation of 700µA. For using Pt100 2 wires, interconnect terminals 2 and 3.



When gauging the module using the calibrator for Pt100, be sure that the minimum current required for it is compatible with the specified excitation current: 700µA.

**Other Signals:**

- 0 to 20 mV, -10 to 20 mV, 0 to 50 mV.  
Impedance >> 1 MΩ
- 0 to 5 Vdc, 0 to 10 Vdc. Impedance >> 1 MΩ
- 0 to 20 mA, 4 to 20 mA.  
Impedance = 100 Ω (+ 1.7 Vdc)

**Overall accuracy (at 25°C): Thermocouples:** 0.25 % of the maximum range, ± 1 °C; Pt100, voltage and current: 0.15 % of the maximum range;

| Input Signal   | Maximum Measuring Range              |
|----------------|--------------------------------------|
| Thermocouple J | -130 to 940 °C (-202 to 1724 °F)     |
| Thermocouple K | -200 to 1370 °C (-328 to 2498 °F)    |
| Thermocouple T | -200 to 400 °C (-328 to 752 °F)      |
| Thermocouple E | -100 to 720 °C (-148 to 1328 °F)     |
| Thermocouple N | -200 to 1,300 °C (-328 to 2372 °F)   |
| Thermocouple R | 0 to 1760 °C (-32 to 3200 °F)        |
| Thermocouple S | 0 to 1760 °C (-32 to 3200 °F)        |
| Thermocouple B | 500 to 1800 °C (932 to 3272 °F)      |
| Pt100          | -200 to 650 °C (-328 to 1202 °F)     |
| 0 to 20 mV     | Adjustable between -31000 and +31000 |
| -10 to 20 mV   |                                      |
| 0 to 50 mV     |                                      |
| * 0 to 5 Vdc   |                                      |
| * 0 to 10 Vdc  |                                      |
| 0 to 20 mA     |                                      |
| 4 to 20 mA     |                                      |

**Table 2** – Sensors and signals accepted by the module

**Sampling rate:** from 2.5 to 10 samples per second

**Internal compensation of cold junction for thermocouples**

**Power:** 10 to 35 Vdc. Typical consumption: 50 mA @ 24 V. Internal protection against polarity inversion.

**Electrical insulation between inputs and supply/serial port:** 1000 Vac

**Serial communication:** RS485 at two wires, Modbus RTU protocol. Configurable parameters: Communication speed: from 1200 to 115200 bps; Parity: even, odd or none

**Key for restoring communication parameters:** The RCom key, at the front panel, will set the device in diagnostics mode (address 246, baud rate 1200, parity even, 1 stop bit), able to be detected and configured by the DigiConfig software.

**Frontal light indicators for communication and status:**

**TX:** Signalizes that the device is sending data on the RS485 line;

**RX:** Signalizes that the device is receiving data on the RS485 line;

**Status:** When the light is permanently on, this means that the device is in normal operation; when the light is flashing in a second interval (approximately), this means that the device is in diagnostics mode; when the light is flashing fast, this means that there is an internal error.

**Operating temperature:** 0 to 70 °C

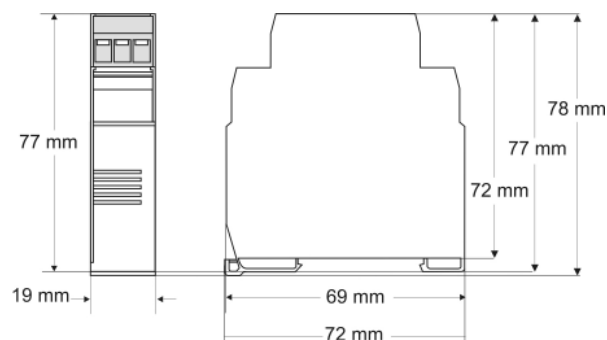
**Operational relative humidity:** 0 to 90 % RH

**Envelope of the terminals:** Polyamide

**Assembly:** DIN 35 mm rail

**Certification:** CE

**Dimensions:** Refer to **Figure 3**.



**Figure 3** – Dimensions

## WARRANTY

Warranty conditions are available on our website [www.novusautomation.com/warranty](http://www.novusautomation.com/warranty).