

DigiRail-2A

Universal Analogical Input Modules

INSTRUCTION MANUAL



INTRODUCTION

The Universal Analogical Input Modbus Module - **DigiRail-2A** is a remote measuring unit with two configurable analogical 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*) are included in the CD-ROM which accompanies the product. They are also available for download at www.novus.com.br.

SPECIFICATIONS

Inputs: 2 universal analogical inputs.

Input signals: Configurable. Refer to Table 1.

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

Pt100: 3 wires type, $\alpha = .00385$, NBR 13773, Excitation of 700 μ A. 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: 700 μ A.

Other Signals:

- 0 to 20 mV, -10 to 20 mV, 0 to 50 mV.
Impedance >> 1 M Ω
- 0 to 5 Vdc, 0 to 10 Vdc. Impedance >> 1 M Ω
- 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;



The 0-5 Vdc and 0-10 Vdc inputs in the Standard model are not factory calibrated and provide an accuracy of about 5%. When gauged properly, they can provide an accuracy of up to 0.15%.

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 1 – Sensors and signals accepted by the module

Sampling rate: from 2.5 to 10 samples per second

Internal compensation of cold junction for thermocouples

Feed: 10 to 35 Vdc / 50 mA maximum. 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.

Electromagnetic compatibility: EN 61326:2000

Operating temperature: 0 to 70 °C

Operational relative humidity: 0 to 90% RH

Envelope of the terminals: Polyamide

Assembly: DIN 35 mm rail

Dimensions: Refer to figure 1.

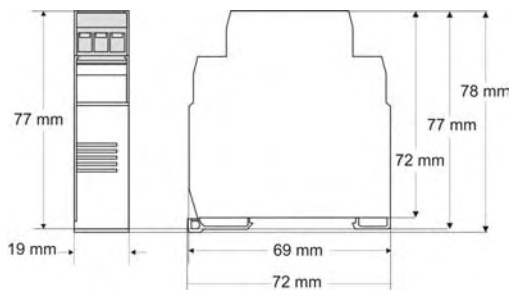


Figure 1 – Dimensions

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 (47 Ω and 100nF, series) in parallel with contactor and solenoid coils which are close or connected to **DigiRail**.

ELECTRICAL CONNECTIONS

Figure 2 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 mm², not exceeding 4.00 mm².



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.

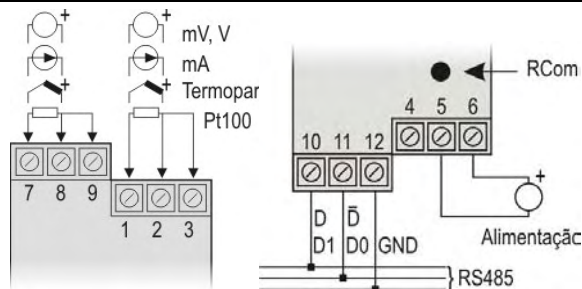


Figure 2 – Electrical Connections

ELECTRICAL CONNECTIONS – INPUT 0-5 VDC / 0-10 VDC

For using the 0-5 Vdc and 0-10 Vdc input types, the user must beforehand provide a small intervention at the internal circuit of the module. To this end, it must be opened and the jumpers J1 and J2 (input 1 and input 2, respectively) must be changed:

- For the 0-10 Vdc and 0-10 Vdc input type, the positions 1 and 2 must be joined by welding.
- For the other input types, the positions 2 and 3 must be joined by welding (factory position).

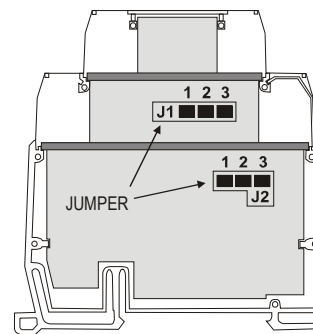


Figure 3 – Jumper for 0-10 Vdc and 0-5 Vdc input



You may request models which already come with the 0-5 Vdc and 0-10 Vdc types selected and calibrated.

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 from the CD-ROM of the product 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.

If you do not have the CD-ROM which comes together with the product, go to www.novus.com.br in order to obtain the installer for **DigiConfig** and the additional product manuals.

GUARANTEE

The manufacturer will guarantee to the buyer of his equipment, identified through the purchase invoice, a twelve-month guarantee, under the following terms:

- The guarantee period will begin from the date of the invoice issued by the manufacturer.
- Within the guarantee period, costs for labor and components used for repair of defects occurred within normal use will be free of charge.
- For any necessary repair, send the equipment, together with the shipping invoices for repair purposes, to the manufacturer's address. Expenses and shipping risks for sending and returning shall be borne by the buyer.
- Any repair of defects caused by mechanical impact or exposure of the equipment to improper temperature and humidity conditions, will be charged, even during the guarantee period.