

Rack Input Module Installation Instructions



Regulatory Compliance

Safety

This device has been tested and found to be in compliance with the requirements set forth in UL 873, Energy Management Equipment, and is listed by Underwriters Laboratories, Inc., for installations in the United States.

This device has been tested and found to be in compliance with the requirements set forth in C22.2, No. 205-M1983, Signal Equipment, and is Certified by Underwriters Laboratories, Inc., for installations in Canada.

Electromagnetic Compatibility (EMC)

Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE! This device has been tested and found to comply with the limits established for Class A digital devices. It is intended to be used in a commercial environment. Operation of this equipment in residential environments may cause harmful interference, in which case the user may be required to correct the interference at his own expense.

CAUTION! Any changes or modifications not expressly approved by Novar Controls Corporation could void your authority to operate this equipment.

Industry Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled *Digital Apparatus*, ICES-003, of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouiller: *Appareils Numériques*, NMB-003, édictée par l'Industrie Canada.

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Novar Controls Corporation
6060 Rockside Woods Blvd., Cleveland, OH 44131
Tel.: 800.348.1235 www.novarcontrols.com

Description

The Rack Input Module is a component of Novar Controls' Spectrum[®] Refrigeration Control System. The module provides connections for inputs used by other Refrigeration Control System modules and processes those inputs through the Refrigeration Controller.

This document provides instructions for mounting and wiring the module, setting the module address, and checking the installation.

Specifications

Agency Approvals

Recognized component:	CUL/UL E134292
Standards used:	UL 873 & CSA C22.2, No. 24, Temperature-Indicating and Temperature-Regulating Equipment

Power Requirements

Voltage:	24 VAC, Class 2
Consumption:	7 VA
Fuse rating:	1 A

NOTE! The Rack Input Module does not require a dedicated power transformer. The transformer can be shared with other Novar Controls Refrigeration Control Modules

Operating Environment

Temperature:	32° to 158°F (0° to 70°C)
Humidity:	0 to 95% Relative, noncondensing

Physical Dimensions

Height:	4 inches
Width:	14 inches
Depth:	1.5 inches
Weight:	1 lb 2 oz

Precautions

Take the following precautions during installation:

- Observe all national and local electrical codes.
 - Turn off the power before installing this module.
 - Do *not* ground the transformer for this module on the secondary side.
 - Do *not* use this module as a final safety device.
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Mounting the Module

The Rack Input Module is made up of a circuit board mounted to a plastic snap track.

Use the following procedure to mount the Rack Input Module.

Step	Procedure
1	Turn off all power before mounting the module.
2	Position the plastic snap track against the mounting surface and mark the surface to show the location of the two mounting holes.
3	Drill holes in the locations marked on the mounting surface.
4	Insert screws through the mounting holes in the plastic track and into the drilled mounting holes and tighten to secure the unit to the mounting surface.

Wiring the Rack Input Module

Use the procedures outlined below and refer to Figure 1, as necessary, to make the wiring connections.

Control Inputs

NOTE! The inputs are software-definable. Therefore, the wiring scheme must match the software configuration.

All analog inputs (temperature, pressure, and current) are designed for use with Novar Controls–provided sensors.

Compressor Current Inputs

For the compressor current inputs (Terminals 1–16), Novar Controls' Current-Sensor Transformers (Ratio: 100:5; Novar Controls Part No. 733080000) should be used.

Use the following procedure to wire the current inputs.

Step	Procedure
1	Connect the white wire to the even numbered terminal of the input.
2	Connect the black wire to the odd numbered terminal of the input.

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Compressor Oil Protection Inputs

Wire the compressor oil protection inputs (Terminals 22–33) to dry contact closures from the compressor oil protection switches.

NOTE! These inputs are *not* intended to be a final safety device.

Step	Procedure
1	Connect the normally open contact wire (alarm) to the designated input terminal.
2	Connect the common contact wire to any of the COM input terminals (Terminals 23, 26, 29, or 32).

Digital Inputs

The digital inputs (Terminals 24–42) are for miscellaneous dry contact closures.

Step	Procedure
1	Connect the normally open contact wire to the designated input terminal.
2	Connect the common contact wire to any of the COM terminals (Terminals 35, 38, or 41).

Hot Gas Inputs

Wire each hot gas input (Terminals 43–54) to the software-designated input and to any of the common terminals.

These inputs are designed for use with Novar Controls' High-Range Temperature sensor (Novar Controls Part No. 733001000). The sensor contains Teflon™ wire near the sensing probe to withstand high temperatures.

NOTE! When the high temperature sensors are installed, at least 4 inches of the Teflon wire should be in contact with the hot gas line.

Use the following procedure to wire the High-Range Temperature Sensors.

Step	Procedure
1	Connect the red sensor lead to the positive (+) terminal of the designated input.
2	Connect the black sensor lead to the common terminal. <ul style="list-style-type: none"> ■ Any common may be used.
3	Insert the sensing element into the well and insulate. <ul style="list-style-type: none"> ■ Refer to the installation instructions provided with Novar Controls' High-Range Temperature Sensor (Part No. 733001000).

Suction Temperature Inputs

Suction temperature inputs (Terminals 55–62) can be used for analog temperature sensors that have a range of –40° to 150°F. These inputs are designed for use with Novar Controls' Low-Range Temperature Sensors (Novar Controls Part No. 733000000).

Use the following procedure to wire the Low-Range Temperature Sensors.

Step	Procedure
1	Connect the sensor's red lead to the positive (+) (Labeled) designated input terminal.
2	Connect the sensor's black lead to either of the common terminals (Terminals 58 or 61).

Suction Pressure Inputs

The suction pressure inputs (Terminals 62–67) are three-wire connections. These inputs are designed to be used with Novar Controls' Low-Pressure Sensor at 0–100 psig (Novar Controls Part No. 733090000).

Use the following procedure to connect them.

Step	Procedure
1	Connect the black wire to Terminal 66 (Common).
2	Connect the red wire to Terminal 67 (+24V Sensor Power).
3	Connect white wire to the designated suction pressure terminal (Terminal 63, 64, or 65).

Analog Output

This terminal is not used at this time. Do *not* make any connections to Terminal 56.

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Module Communication Connection

Module communication Terminals 19–21 establish communications with a Refrigeration Controller. Use the following procedure to make the connections.

Step	Procedure
1	<p>Connect a shielded two-conductor cable (Novar Controls WIR-1010, Belden #8761, or equivalent) to the module communication connection located in the upper left corner of the circuit board, next to the power connection.</p> <ul style="list-style-type: none">■ Be sure to observe proper polarity.
2	<p>Connect the other end of the cable to the Module A or Module B communication port on the Refrigeration Controller.</p> <hr/> <p>NOTE! A light-emitting diode (LED) is located below the Rack Input Module's communication connection (see Figure 1). When the power is turned on, the LED should blink intermittently if proper communication is occurring. If the LED is not blinking, there is a loss of communication.</p> <hr/>

Power Connection

Connect the wires from the 24-VAC power source to the power connection (Terminals 17–18) located in the upper left corner of the Rack Input Module's circuit board, next to the module communications connection.

A power LED is located below the power connection. This LED should be on when power is turned on for the system.

A 1A fuse is provided on the Rack Input Module circuit board to protect the module electronics.

Setting the Module's Address

Each module must have a unique address so the Refrigeration Controller can identify it.

The address jumpers are located on the module's circuit board below the power and communication connections. Both the A1 and A0 jumpers have three pins that should be set as shown in Figure 2.

NOTE! A maximum of four Rack Input Modules can be connected to each Refrigeration Controller.

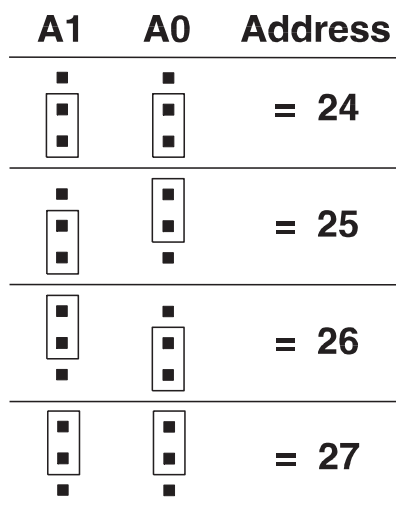


Figure 2. Rack Input Module address settings

Checking the Operation

When the module has been mounted and the wiring connections have been completed, the following items should be checked to ensure proper operation.

- Double check all wiring connections to make sure they are correct and secure.
- Connect the Refrigeration Controller, apply power to the system, and observe the communication LED. It should blink intermittently to indicate proper communication is taking place.
- Check the Refrigeration Controller display for alarm messages that indicate faults or malfunctions. Use the controller's keypad to change the control settings and observe the equipment for proper response.

Model and Part Numbers

Use the part numbers shown in Table 1 to order the necessary Novar Controls parts.

Table 1. Novar Controls Part Numbers		
PRODUCT	MODEL NO.	PART NO.
Rack Input Module	—	733014000
Two-conductor shielded cable (Belden #8761 equivalent)	WIR-1010	709001000
Current-Sensing Transformer (Ratio: 100:5)	—	733080000
High-Range Temperature Sensor	—	733001000
Low-Range Temperature Sensor	—	733000000
Pressure Sensor (0–100 psig)	—	733090000

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