



OMNIR

BY FINNA SENSORS

CONTROLLER MANUAL

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This guide applies to the following versions:

Hardware: MCU-0 XX, MCU-1 XX

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OVERVIEW

The OMNIR controller is a real-time processing unit that is the 'brain' of the OMNIR NIR system. It stores the configuration of the system, communicates to the sensors, performs all calculations, and shares information to compatible devices via Ethernet. In addition, any field wiring for IO alarms, analog outputs, and factory floor integrations are terminated in this cabinet. As such, it is designed to be mounted on the factory floor in an electrical room or nearby.

This guide contains information about how to mount, install, and setup the OMNIR controller for initial usage.

Features

- Two 4-20mA analog outputs.
- 2G *micro*SD card used to store reports
- Battery backup
- Network interface 10/100Base-T with LEDs
- 4-line LCD display for status and configuration
- Factory floor integration hardware (optional accessory)
- Eight isolated discrete IO using Opto22 G4 modules (optional accessory)
 - Available input voltages: 10-32 VDC, 90-140 VAC, 180-280 VAC
 - Available output voltages: 5-60 VDC, 12-140 VAC, 24-280 VAC

Hardware Components

This section describes the primary components in the OMNIR controller.

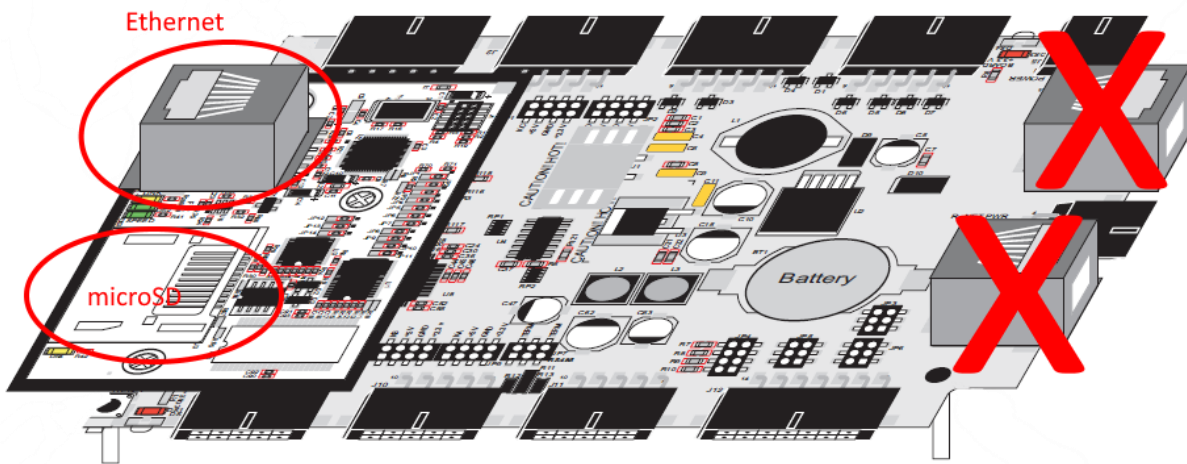
Display

The 4-line LCD display mounted to the enclosure is used to set the IP address of the controller and view the current readings. Press the **Mode** and **Select** buttons to navigate through the display configuration.

Processor

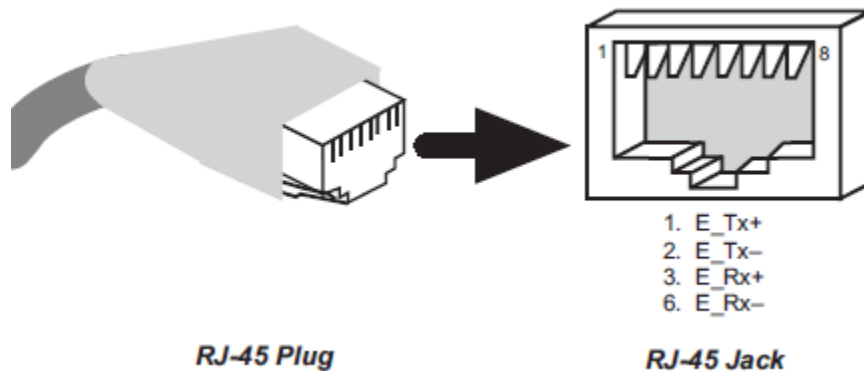
The processor is a daughter card that is mounted on the motherboard which performs all calculations and generates reports. Mounted to the processor board is the Ethernet port and the *microSD* slot.

Figure 1 - Ethernet and microSD locations



The processor should be connected to the local network to enable communication with the other OMNIR peripheral equipment (See Figure 2 - Ethernet Connection).

Figure 2 - Ethernet Connection



The *microSD* is used to store reports that can be uploaded via the Windows interface to a SQL database for archiving.

The microSD card requires FAT16 formatting to function correctly

If the processor card is replaced, it may be necessary to re-calibrate the analog outputs and install firmware on the processor. Please consult Finna Sensors prior to replacing.

Motherboard

The motherboard supports the processor and provides the termination points for IO and communication channels.

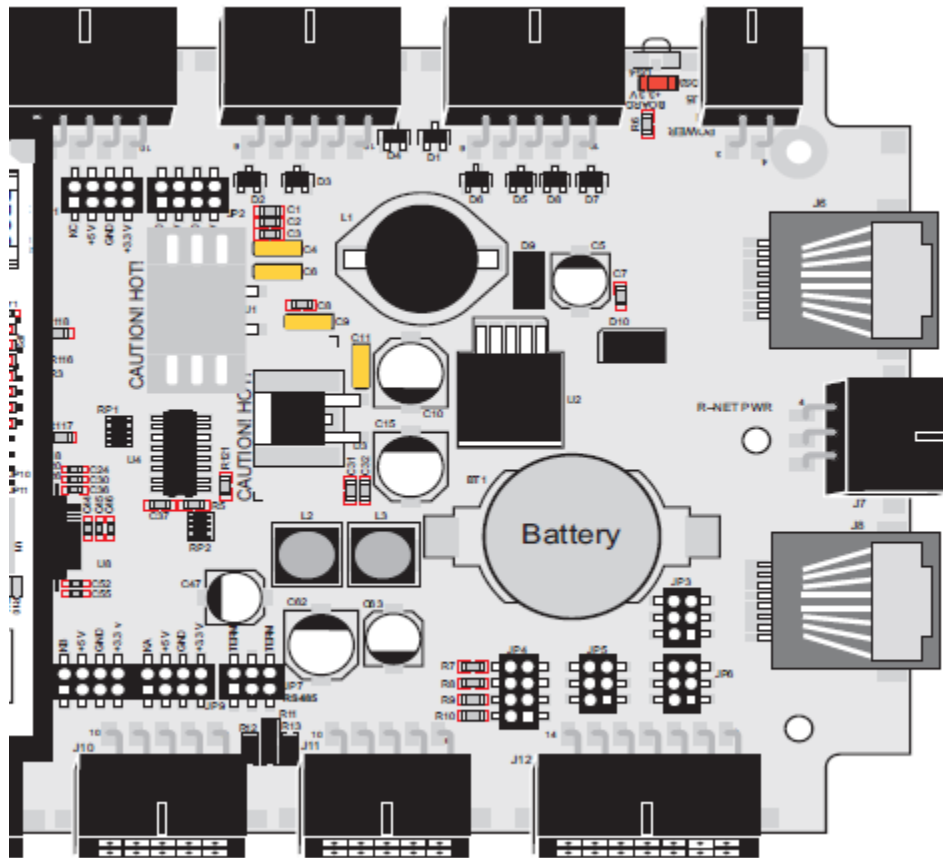
Battery Backup

The controller uses a battery to retain settings during power outages which may need to be replaced periodically. Average estimated life for the battery is 2.7 years without power to the controller, the actual service life of the battery will be longer since it would normally be powered from an external power source. See OMNIR software manual on how to perform a backup and restore of the system in the case of catastrophic failure.

Prior to replacing the battery, perform a backup of the system.

To replace the battery (see Figure 3 - Battery Location), lift the battery spring clip and slide out the old battery. Install the new CR2032 battery in the holder with the + side facing up. Cycle power to the controller after replacing the battery for the first time and confirm the system is operating correctly (note: this can be confirmed by checking to see that the IP address did not change on the 4-line LCD display).

Figure 3 - Battery Location



Exercise care if the battery is replaced with external power applied

Analog Outputs

The system has two 4-20mA analog outputs available to transmit measurement results.

The analog outputs are self-powered and cannot be powered via an external power source.

The customer can connect to the analog outputs via the terminal blocks shown on the wiring schematic (see [Wiring Schematic](#)).

Power Supply

The power supply provides +24 VDC and +5 VDC to the controller components. It can also be used to power external displays and sensors via the M12 connector on the bottom of the enclosure.

Opto22 (Optional Accessory)

The optional discrete IO package allows a user to connect to the following discrete signals:

DIO	Description
0	Low-Low Alarm
1	Low Alarm
2	High Alarm
3	High-High Alarm
4	Loss of Product Alarm
5	Dirty Lens Alarm
6	OptoPort Output. Used when an OptoPort accessory is used to catch powders in a chute application.
7	External Trigger. When user sets the input high, the system does not take any readings.

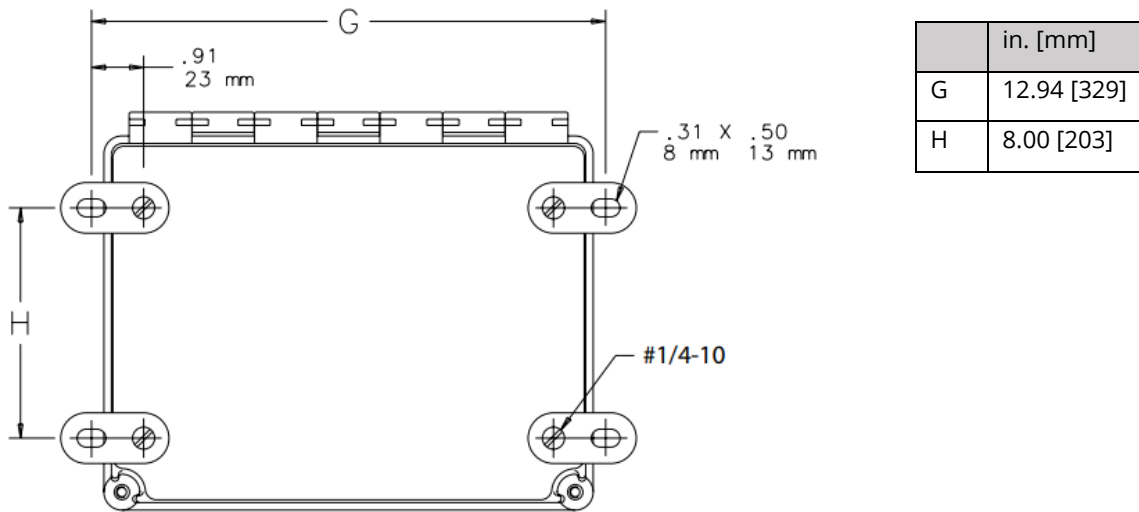
Factory Floor Module (Optional Accessory)

If an optional factory floor accessory is purchased, refer to the accessory documentation for termination instructions.

Mounting

The unit should be mounted in an area that is accessible, but does not exceed the environmental specifications (see [SPECIFICATIONS](#) for more information). The recommended solution is to use the brackets included with the controller (see Figure 4 - Mounting Dimensions)

Figure 4 - Mounting Dimensions



Electrical Connections

Power Source

Power should be provided to the controller and terminated to the terminal blocks per the wiring schematic (see [Wiring Schematic](#)). The supply voltage is 90-264 VAC (47 to 63 Hz) with a maximum current of 2.0A.

Finna Sensors recommends a dedicated circuit be supplied to the controller and the power wires are provided mechanical protection, e.g. wires are contained in conduit. A qualified electrician should be contracted to install conduit, wiring, and terminate all connections per local electrical code.

The Line and Neutral (TB13 and TB14) are installed on terminal blocks with a disconnect. To remove power, insert an 1/8" flat screwdriver in the orange slot and lift.

If a short circuit or over-voltage condition occurs, the power supply's automatic trip circuit will disconnect power. To reset, power must be cycled to the unit.

Battery

Remove the pull tab on the battery to enable the battery backup.

Ethernet

The controller should be connected to local area network using an Ethernet cable plugged into the processor's Ethernet port (see [Processor](#) for more information)

Analog Outputs

The field connection points for the two 4-20mA analog outputs are on the blue terminal blocks and should be wired per the table below:

AO Channel	Field Terminal Number
0	TB4 (+) and TB5 (Gnd)
1	TB6 (+) and TB7 (Gnd)

Discrete IO

To connect the discrete IO to their desired device, install the Opto22 G4 module into the DIO port desired (0-7); secure the G4 module to the backplane. Terminate the wires (10 AWG max.) to the Opto22 field terminations using the following table:

DIO Position	Field Terminal Number
0	1 and 2
1	3 and 4

2	5 and 6
3	7 and 8
4	9 and 10
5	11 and 12
6	13 and 14
7	15 and 16

All G4 modules MUST use 5VDC logic or permanent damage may occur to the controller

Connection Ports

On the bottom of the controller are three circular bulkhead ports. The 4-pin female port is used to supply power to sensors and displays. All OMNIR peripheral equipment is supplied power using the same circular ports with this pin configuration:

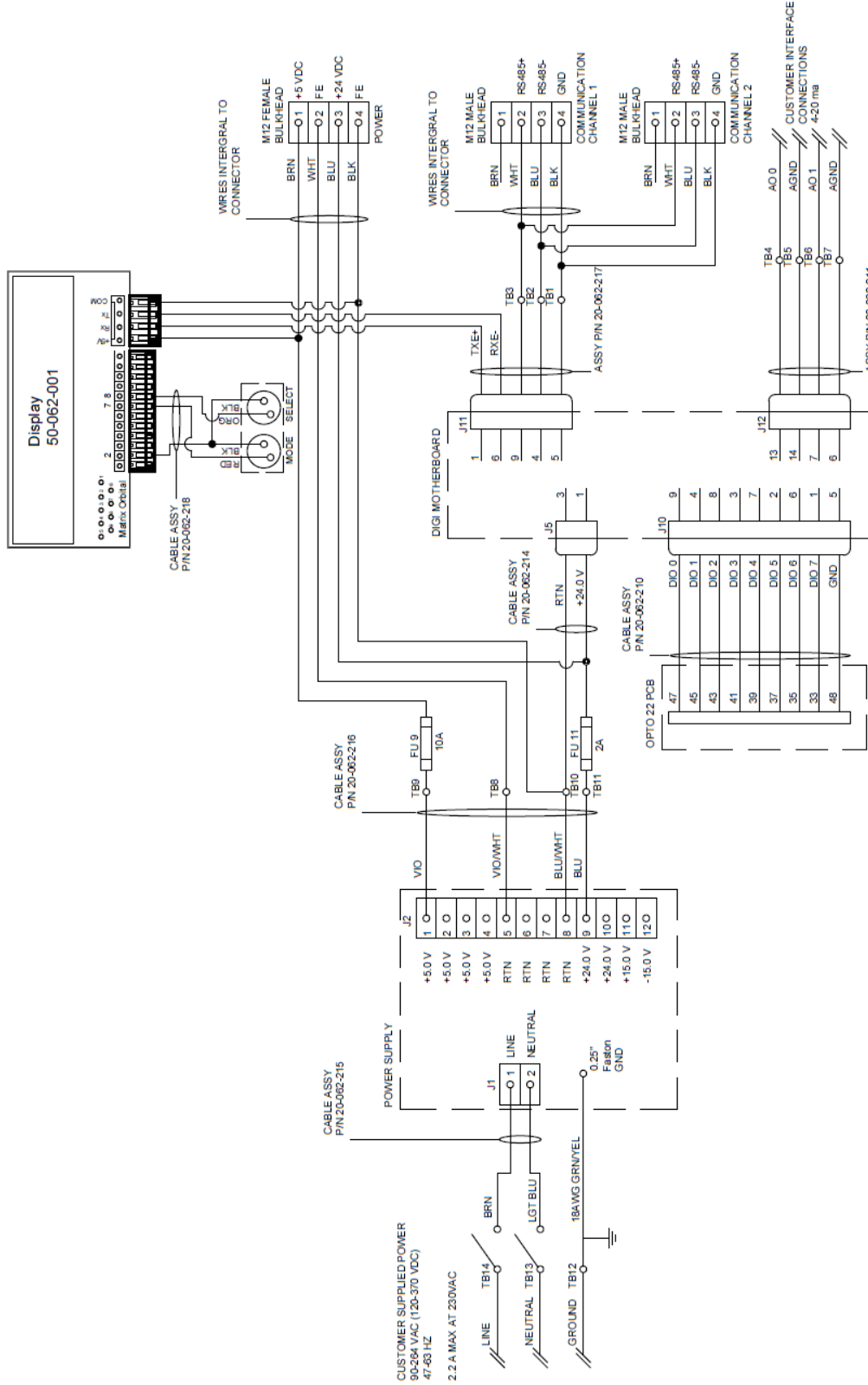
Pin	Description
1	+5 VDC
2	Ground
3	+24 VDC
4	Ground

The other two male ports are for the communication line to the sensors. Both connections are identical, a sensor can be connected to either port (max. of two sensors per controller). The pin configuration for this connection is:

Pin	Description
1	NC
2	RS 485+
3	RS 485-
4	Ground

See [Wiring Schematic](#) for more detailed wiring information.

Wiring Schematic

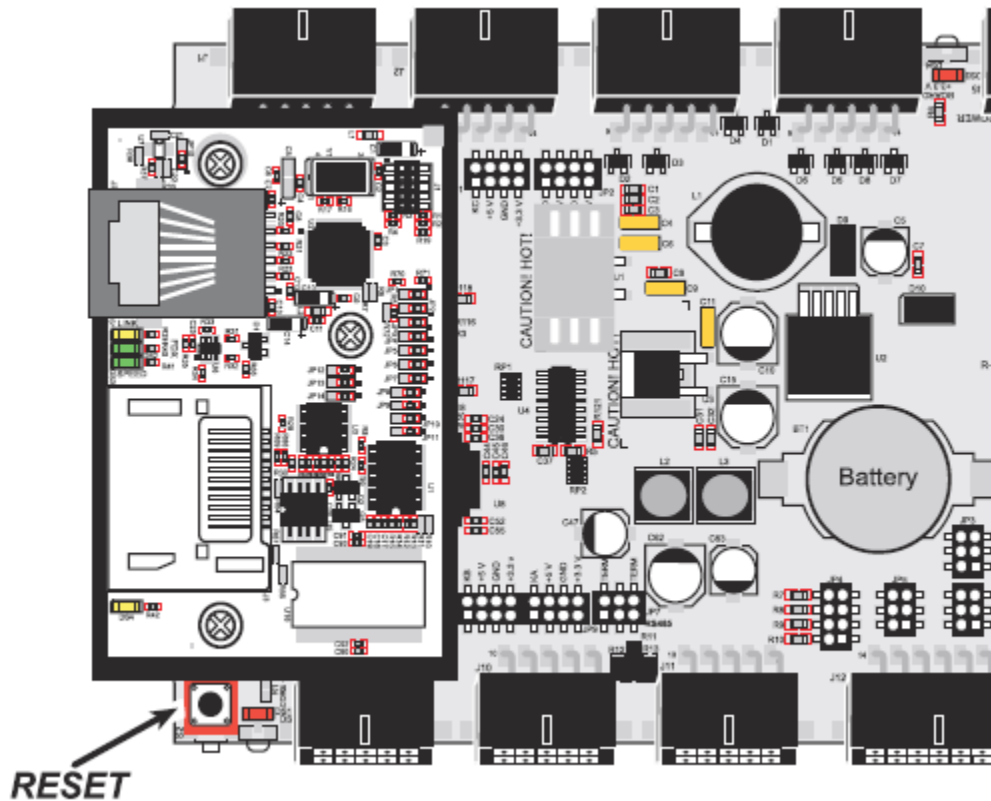


Setup Network IP

After connecting the Ethernet cable to the processor, the controller IP needs to be changed to a valid address. Using the LCD display on the front of the panel perform the following:

1. Press the **Select** button to view the Net Info
2. Press the **Select** button to change the IP
3. The first digit is identified with a caret, pressing the **Select** button changes the value and pressing the **Mode** button advances the caret to the next digit.
4. Enter a valid IP address and Subnet mask.
5. After entering the values, accept the changes by pressing **Mode**. To cancel the changes, press **Select**.
6. After entering the IP address, the controller must be rebooted by pressing the reset button on the Motherboard (see Figure 5 - Reset button location).

Figure 5 - Reset button location



After changing the network settings, the system must be reset to apply the changes

Specifications

Feature	
Power	90-264 VAC, 47-63Hz, 120 Watt max.
Temperature	0 to 50C
Humidity	5-90% non-condensing
Weight	9 lbs. (4.0 kg)
Rating	NEMA 12
Battery	CR2032

Figure 6 – Physical Dimensions

