



# **OMNIR**

**BY FINNA SENSORS**

## **SENSOR MANUAL**

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This guide applies to the following versions:

Hardware: NIR-XXX X - XXX

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## OVERVIEW

The OMNIR sensor is an industrially rugged Near-InfraRed (NIR) sensor designed to non-invasively measure the moisture content (MC) of material. The sensor continuously samples readings 3000 times per second and uses an advanced algorithm to calculate a highly accurate MC%. In addition to measuring MC, it also has multiple onboard sensors to self-monitor critical functions and notify users of any maintenance required.

Although the sensor can be used to measure material in a lab, it is designed for industrial applications that may be in high humidity and/or high temperature (up to 80° C) environments (see **Specifications**).

This guide contains information about how to mount, install, and setup the OMNIR sensor for three primary installation types: (1) belt conveyor, (2) screw conveyor, or (3) pneumatic and/or gravity feed.

## Features

- Industrial M12 connector for input power
- Industrial M12 connector for communications
- IP69 rated
- Temperature range 0-80° C
- Over 20 diagnostic sensors continuously monitoring sensor health
- Available in two finishes: (a) power coated aluminum or (b) 316 Stainless Steel
- Optional temperature sensor to measure product temperature

## Installation Types

This section describes the three primary installation options available: (1) belt conveyor, (2) screw conveyor, or (3) pneumatic/gravity feed.

### Belt Conveyor

In this installation the sensor is mounted above a belt conveyor with material passing below the sensor. The sensor shines a light on the passing material and calculates the moisture content.

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*With over 3000 measurements per second, the OMNIR sensor is capable of reporting accurate results regardless of belt speed*

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*The moisture content is measured under the illuminated light only, which is approximately 1 in<sup>2</sup>*

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*The material being measured should not exceed 2" in diameter*

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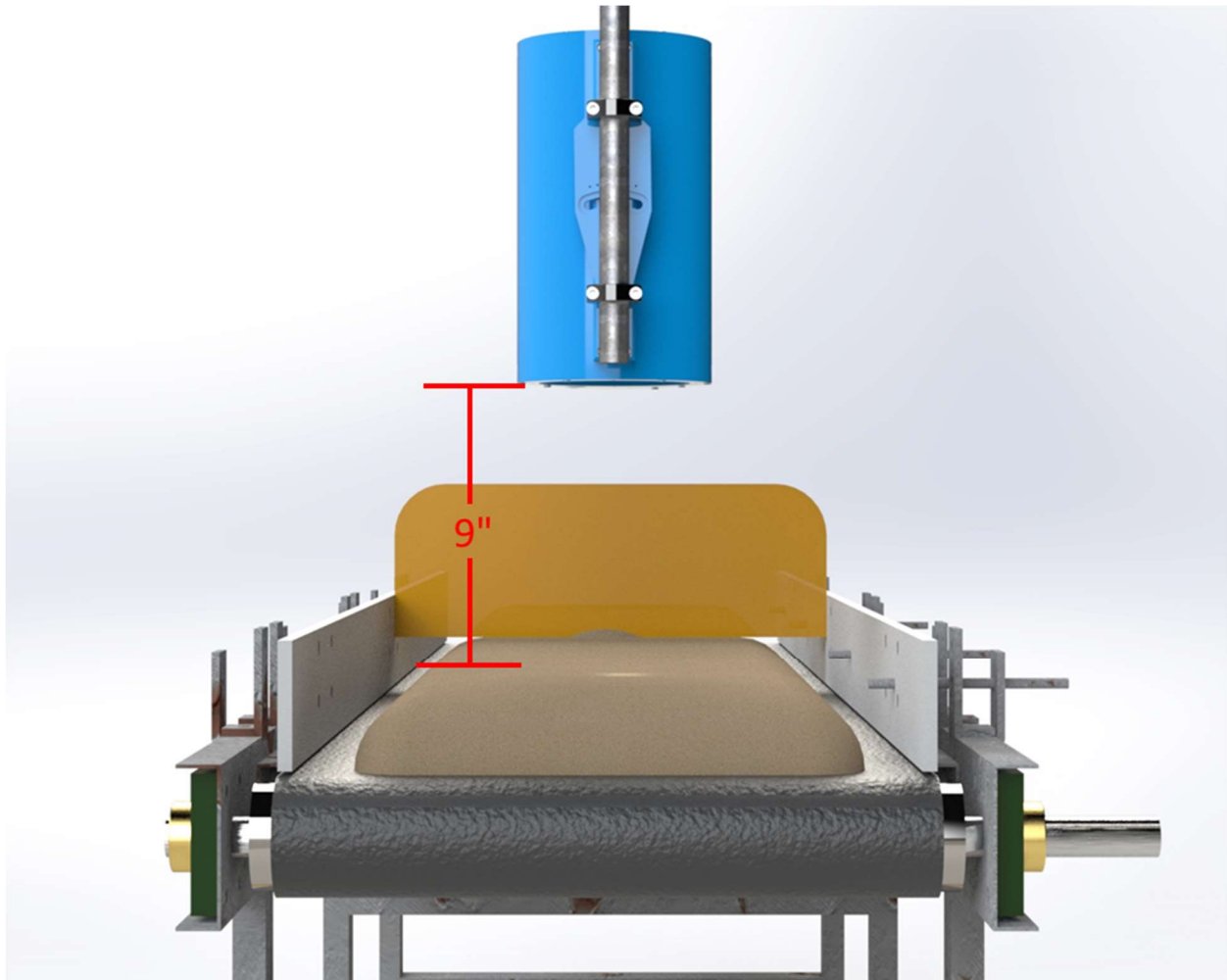
*In highly dusty environments, install the Dust Shield accessory to minimize dust collection on the OMNIR lens*

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### Sensor Height

The sensor is designed to be placed approximately 9" away from the material being measured, mounted on a 7/8" diameter pipe with lens towards the material.

*Figure 1- Distance between sensor and material*



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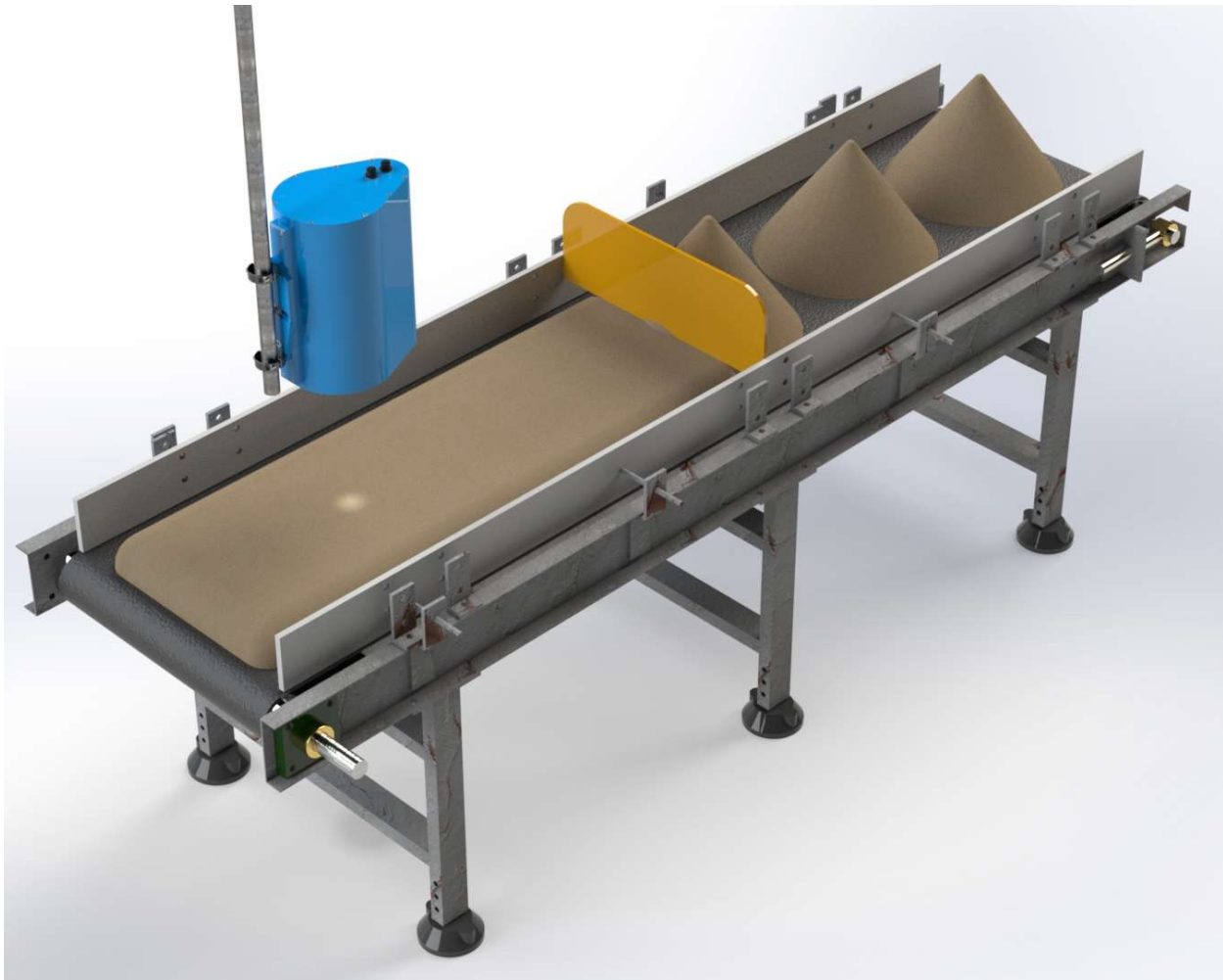
*Although 9" distance is optimal, each installation is unique, and the distance may be changed to anywhere between 7-14"*

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### Product Height Variation

In the case of intermittent product flow or in situations where the product level changes drastically, it may be necessary to install a plow to obtain a more uniform product height (see Figure 2- Plow to even height).

*Figure 2- Plow to even height*



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*For maximum accuracy, the product height should not vary by more than  $\pm 1''$*

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## Screw Conveyor

In this type of installation, a 4-5" diameter hole is cut in the screw conveyor cover half-way between the center shaft and side wall. The light from the OMNIR shines through the hole illuminating the material as it is transported.

*Figure 3- View port for screw conveyor*



If the auger is visible to the OMNIR system, this may negatively impact the results of the measurement. If this is the case, it is recommended to cut out a section of the auger where the OMNIR is measuring product (see Figure 4 -Screw conveyor measurement location).

*Figure 4 -Screw conveyor measurement location*



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*Remove section of screw conveyor so the OMNIR only measures the material*

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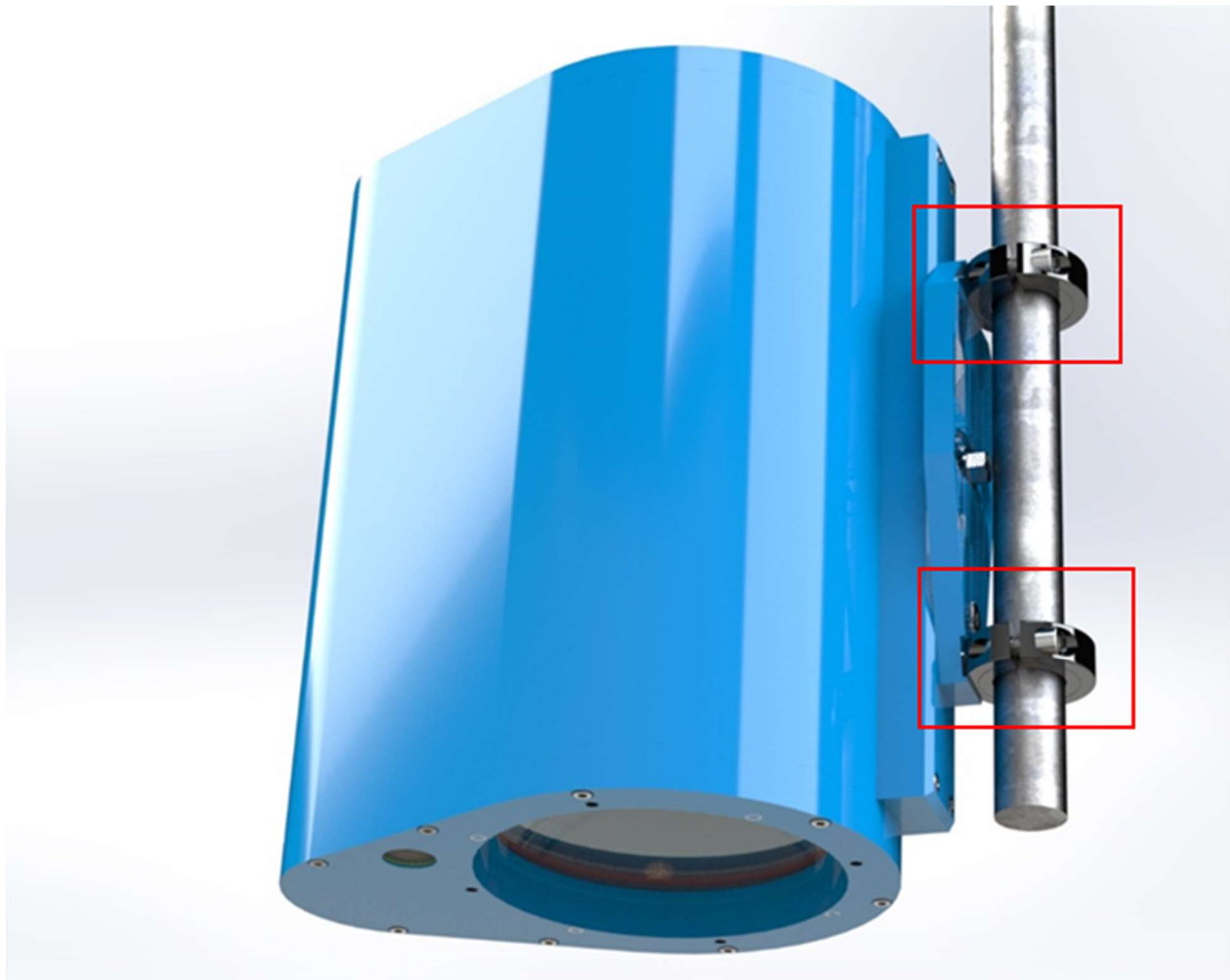
## Pneumatic/Gravity Feed

The last type of installation is known as a gravity feed or pneumatic conveyance. Typically a powder or fine particulate is conveyed in a tube using gravity and/or air. The OMNIR system can measure this material using an OptoPort accessory to collect samples, measure the results, and blow off the collection window. For more information on this installation, see the OptoPort Manual.

## Mounting

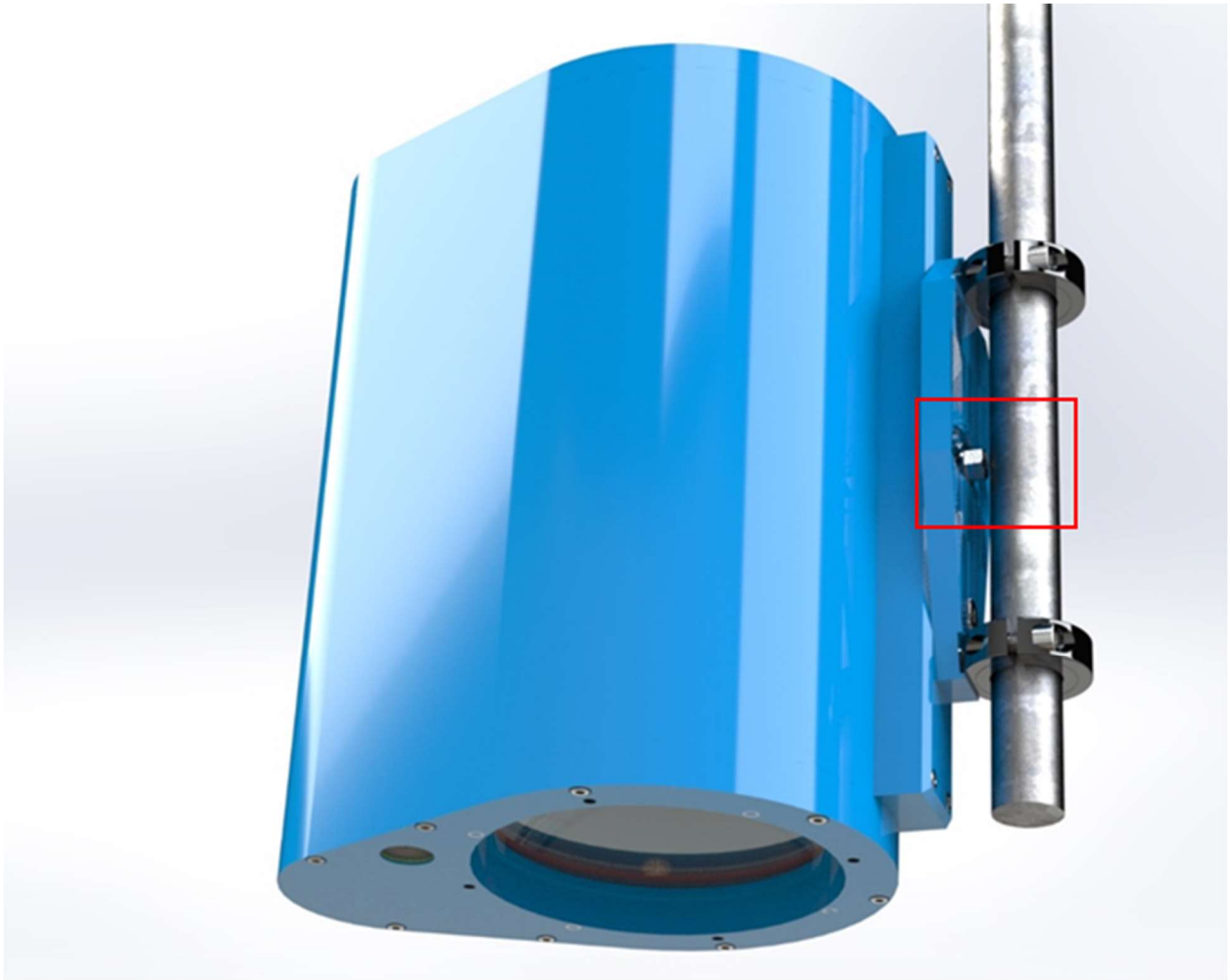
The sensor should be mounted in an area that is accessible and over the product, but does not exceed the environmental specifications (see [SPECIFICATIONS](#) for more information). The recommended solution is to install the sensor on a 7/8" diameter pipe, then tighten the two clamp collars using a 3/16" Allen wrench.

Figure 5 - Clamp collars



After securing the sensor to the pipe, it may be necessary to rotate the sensor angle to prevent the sensor signal from being saturated due to a shiny, wet, or very reflective surface (e.g. a stainless steel idler roller beneath clear film). It can be rotated  $\pm 30^\circ$  while in-situ to reduce the signal response. Loosen the locking bolt near the clamp collars with a 3/8" open ended wrench, rotate the sensor and re-secure with the locking bolt.

Figure 6 - Pivot locking bolt



## Electrical Connections

### Supply Power

The sensor input power is typically supplied from the OMNIR controller cabinet; however, it may be supplied from an alternate power supply.

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*The minimum voltage required by the sensor is 23.5VDC and 4.8VDC. Care must be taken to ensure the voltage drop does not exceed these limits.*

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The input power port is an M12 4-pin male connector mounted on the top of the sensor using the following pin configuration:

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

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*The M12 connector is keyed so the power cable can ONLY be plugged into the power port*

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### Communications

The second M12 port on the top of the sensor is dedicated for communication and should route back to the OMNIR controller cabinet.

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*The maximum length of the communication cable is 2500'*

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The pin configuration for this connection is:

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

## Specifications

Feature	
Power	23.5 VDC (0.75 A), 5 VDC (3.0 A)
Temperature	0 to 80C
Humidity	5-95% non-condensing
Weight	12 lbs. (5.4 kg)
Rating	IP69
Distance to product	7-14"
Measurement area	1 in <sup>2</sup>

Figure 7 – Physical Dimensions

