

## Feed Level Sensor installation guide

The Feed Level Sensor works with OMNI-Feed or BinBoss to measure the feed level in feed bins. The Feed Level Sensor uses ultrasonic technology to accurately measure the feed levels. The sensor emits ultrasonic pulses that are reflected by the feed. The sensor measures the time the pulses take to reflect back to the sensor, determines the distance, and then sends the information to the software.



To detect a feed delivery, the Feed Level Sensor needs to be tilted (the bin lid opened) while the bin is being filled. If you are using a feed delivery system that does not require the bin lid to be opened (such as pneumatic fill), you must install an external fill detection switch.

For more information, contact your dealer or Phason.

### Features

- ◆ Low-maintenance design
- ◆ Easy installation in new or existing bins
- ◆ Auger or pneumatic delivery compatibility
- ◆ Reliable, accurate ( $\pm 2\%$  of full bin, typical) ultrasonic technology
- ◆ Operating range of  $-22$  to  $104^{\circ}\text{F}$  ( $-30$  to  $40^{\circ}\text{C}$ )
- ◆ Rugged enclosure (corrosion resistant, water resistant, and fire retardant)
- ◆ Two-year limited warranty

### Electrical ratings


- ◆ 10 to 14 VDC
- ◆ 125 mA

The Phason Regulated Power Supply (RPS) is the required power supply. For information, contact your dealer.

## Precautions, guidelines, and warnings

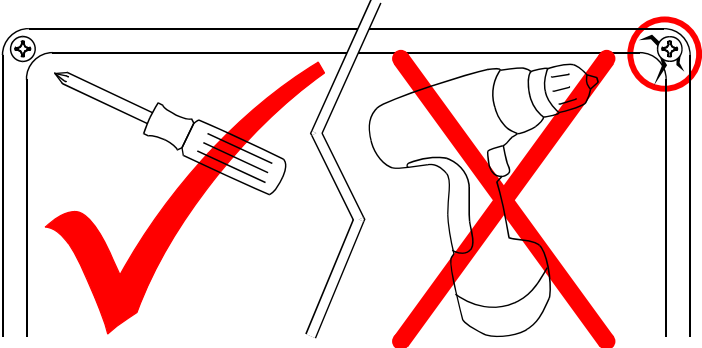
The Feed Level Sensor requires careful installation for proper long-term operation. Carefully read and follow *all* the instructions in the order they are listed. If you do not follow the instructions and install the Feed Level Sensor properly, the Feed Level Sensor might not operate properly.

- ◆ Phason recommends using conduit to protect all communication and power cables.
- ◆ Make sure the communication and sensor cables do not become pinched or bent.
- ◆ Make sure you can completely open the bin lid without damaging the cables.



Mount the control unit with the electrical knockouts facing down.

Use a screwdriver to tighten the screws in the enclosure. Do not use a drill or over tighten the screws; this can crack the enclosure and ruin the watertight seal.



Do not open the sensor unit. This will damage the seal and void the warranty.

Use the electrical knockouts for bringing wires or cables into or out of the enclosures. Use watertight strain reliefs or conduit connectors at all cable-entry points.

### Routing data wires

Routing data wires in the same conduit as, or beside AC power cables, can cause electrical interference, erratic readings, and/or improper operation. Data wires include **all** of the following:

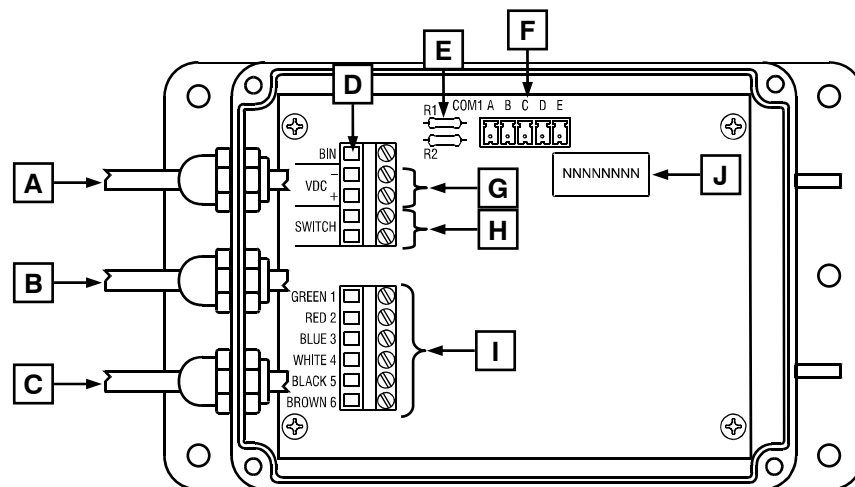
- ◆ Temperature probe and humidity sensor cables
- ◆ Actuator feedback (potentiometer) wires
- ◆ Data communication wires, including RS-232/RS-485
- ◆ Any cable or wire that does not provide AC power

### Guidelines for routing data wires

- ◆ Do not run the wires in the same conduit as AC power cables.
- ◆ Do not run the wires beside AC power cables or near electrical equipment.
- ◆ When crossing other cables or power lines, cross them at a 90-degree angle.

If in doubt, **do not run any wire or cable that is not an AC-power wire** inside the same conduit or beside other AC-power wires.

### Control unit layout



- A** Communication cable—run the communication cable through this knockout.
- B** Power cable—run the incoming power cable through this knockout.
- C** Sensor cable—run the sensor cable through this knockout.
- D** Bin connection—connect a wire from the feed bin to this terminal block.
- E** Termination resistors—if there are any devices on the communication channel after this Feed Level Sensor, then use wire cutters to remove only these two resistors.
- F** Communication socket—plug the communication connector into this socket.
- G** Incoming power *and* heater connection—connect the incoming DC power *and* the orange wire from the sensor cable to this terminal block.
- H** Pneumatic Fill Switch—if the Feed Level Sensor will not be tilted during feed fills (pneumatic fill), connect the pneumatic fill switch to this terminal block.
- I** Sensor unit—connect the sensor unit wires to these terminal blocks.
- J** Address label—this is the Feed Level Sensor's address in the software. Write down this address, the person installing the software will need it.

## Before installing the FLS

Before installing the Feed Level Sensor, carefully read *all* the instructions and collect all necessary items. Follow all the steps in the order they are listed.

### Parts included

The Feed Level Sensor (FLS) hardware consists of the control unit, sensor unit, and mounting hardware. The sensor unit has a cable attached to it that connects to the control unit.

The following parts are included with your Feed Level Sensor

- ◆ Control unit
- ◆ Sensor unit
- ◆ Drill template
- ◆ Ground cable and self-tapping screw
- ◆ 3/4-inch screws (4)
- ◆ 1/4 × 1-inch bolts (4)
- ◆ 1/4-inch locknuts (4)

### Parts required

In addition to the parts included with the Feed Level Sensor, you need to provide the following items.

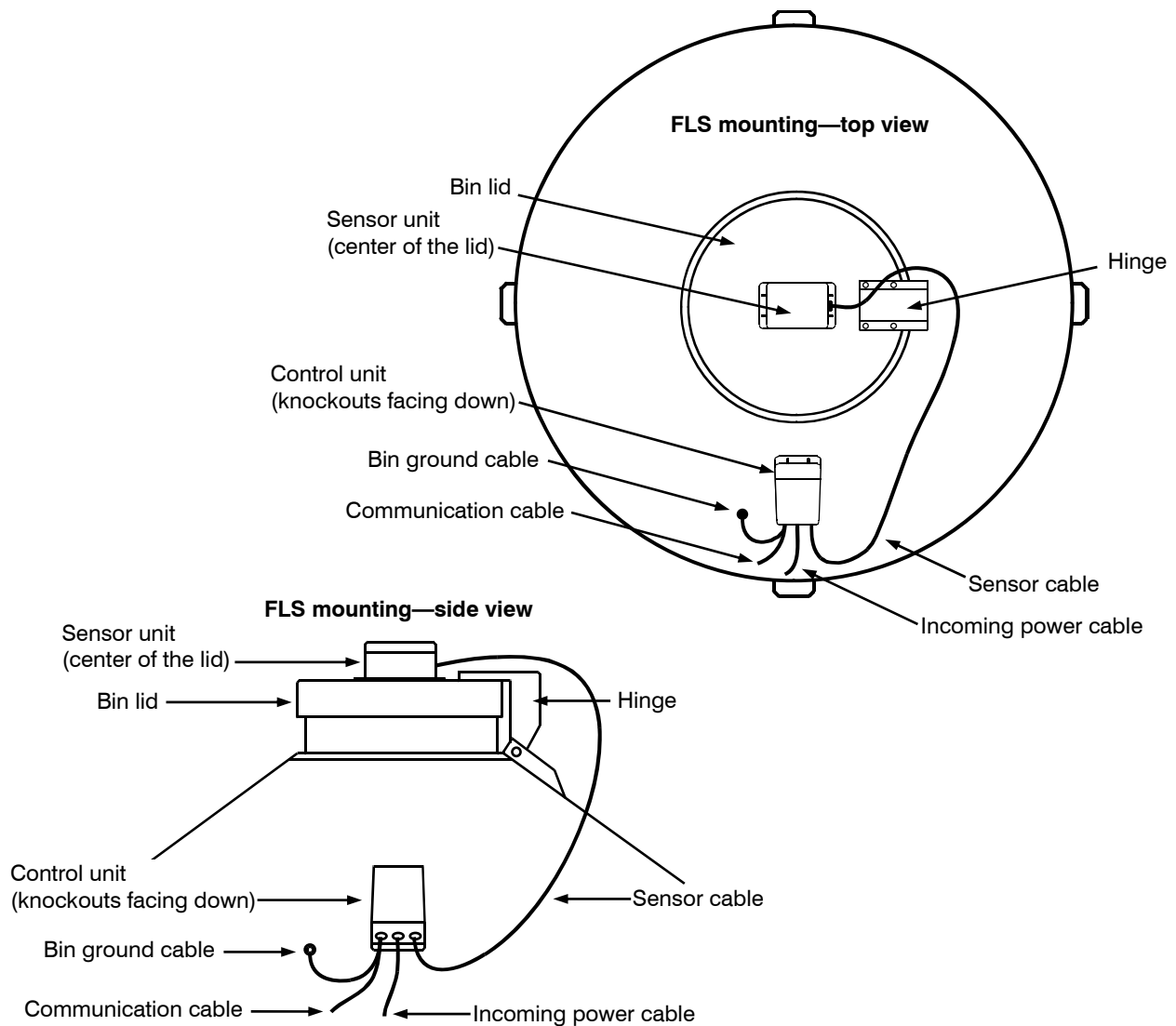
Item	Notes
Regulated Power Supply (RPS)	◇ For information, contact your dealer.
Power cable	◇ 20 AWG or larger, weather resistant ◇ Longer distances require larger wire
Communication cable	◇ Unshielded twisted pair (UTP), category 3 or higher (category 5 recommended)
Conduit (recommended)	
Strain reliefs or conduit connectors	◇ Use watertight strain reliefs or conduit connectors at all cable entry points

## Mounting the sensor

Use the drill template and refer to the diagrams below when mounting the sensor.

### To mount the sensor

1. Using the drill template, drill and cut the holes in the center of the lid.
2. Carefully place the horn (the round part on the bottom of the sensor unit) in the hole in the lid. The sensor should lay flat against the bin lid and the cable should be on the end facing the hinge.
3. Fasten the sensor to the lid using the four bolts and locknuts. Do not over tighten the nuts. Do not compress the gasket more than 50 percent.



## Mounting the control unit

Mounting the control unit under the ladder helps protect it from damage.

### To mount the control unit

1. Select a location on the top of the bin (not on the lid) to mount the control unit. Select a location where the feed truck will not damage it.
2. Use the four screws to fasten the control unit to the bin. The knockouts must face down.

## Connecting the sensor cable

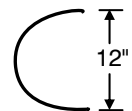


DO NOT cut, splice, or add onto the sensor cable.

Make sure you can completely open the bin lid without bending or pinching the sensor cable.

### To connect the sensor cable

1. Run the cable from the sensor unit toward the hinge and then to the control unit.
2. Open the bin lid and make sure the hinge does not pinch the cable and that the cable does not bend at a sharp angle. The diameter of the bend must be more than 12 inches.
3. Adjust the position of the cable if necessary and then fasten it to the bin using a cable tie.
4. Insert the cable through the strain relief in the control unit.
5. Connect the orange wire to the **VDC +** terminal. Do not tighten the terminal screw at this time; you will need to insert another wire when you connect the incoming DC power.
6. Connect the remaining sensor wires to their terminal blocks according their color (for example, brown sensor wire to **BROWN** terminal block). See the drawing on page 3 for locations.
7. Tighten the strain relief nut for the sensor cable.



## Connecting the bin wire

The bin ground wire helps eliminate electrical noise. The wire must have good electrical contact with the bin. Connect the wire to the bin in a location where it will not be torn off during feed delivery.

### To connect the bin wire

1. Insert one end of the ground wire through a strain relief.
2. Connect the wire to the **BIN** terminal block. See the drawing on page 3 for location.
3. Connect the other end of the wire to the bin using the self-tapping screw.

## Connecting the communication wiring

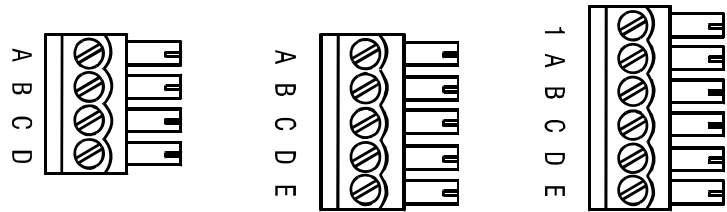
Read **Proper connector alignment and wiring** below and **Common mistakes in communication wiring** on page 8 before connecting the communication wiring.

- ◆ If you are using conduit for the communication and power cables, run all the cables in a single conduit and into the enclosure through the middle electrical knockout.
- ◆ If you are using strain reliefs, remove the left electrical knockout and insert the communication cable into the enclosure through a watertight strain relief. See the diagram on page 3 for the location.

### Proper connector alignment and wiring

There are three possible connector types on Phason devices. The four-positions, **A B C D**, are common to all models. Some models, such as the FLS, have five positions and include **E** for common reference wiring. The six-position connectors that include position **1** are included on the RS-485A and OMNI Alarm Manager (OAM) only.

Using consistent wiring helps eliminate communication connection errors and makes troubleshooting much easier. Use the wire colors shown below when connecting all devices to the communication system.



Wire function	RS-485A wire colors	First device	All remaining devices
1 alarm signal <sup>①</sup>	1 white/green	1 white/green	1 white/green
A communication	A blue	A blue	A blue
B communication	B white/blue	B white/blue	B white/blue
C communication	C orange	C orange	C orange
D communication	D white/orange	D white/orange	D white/orange
E common reference <sup>②</sup>	E green	E green	E green

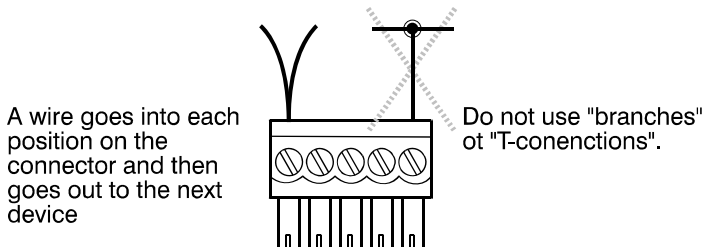
① Only for OMNI systems with an OMNI Alarm Manager  
 ② Not available on all models

**Common mistakes in communication wiring**

- ◆ **Not using the correct type of communication cable**—the communication cable must be twisted pair cable, category 3 (CAT3) or category 5 (CAT5). You can use either unshielded twisted pair (UTP) or shielded twisted pair (STP) cable. Phason does not recommend other types of wire.

**NOTE** If you are using STP cable, you must follow the specific instructions in **Service Bulletin 24—Using shielded twisted pair (STP) cable to connect Phason networkable devices.**

- ◆ **Not continuing the communication wiring properly**—all the devices on the communication channel must be connected in series (in a daisy-chain) and the wire must be continued properly from one device to the next. When continuing the communication wiring from one device to the next, the wires must be connected as shown below.



- ◆ **Not terminating the last device on the communication channel**—on all systems, the last device on the communication channel must have the termination resistors in place or a termination module installed.

The termination resistors are located on the circuit board of all networkable devices, except the Supra (the Supra uses a Termination Module). You must remove the termination resistors from all devices, except the last one on the communication channel.

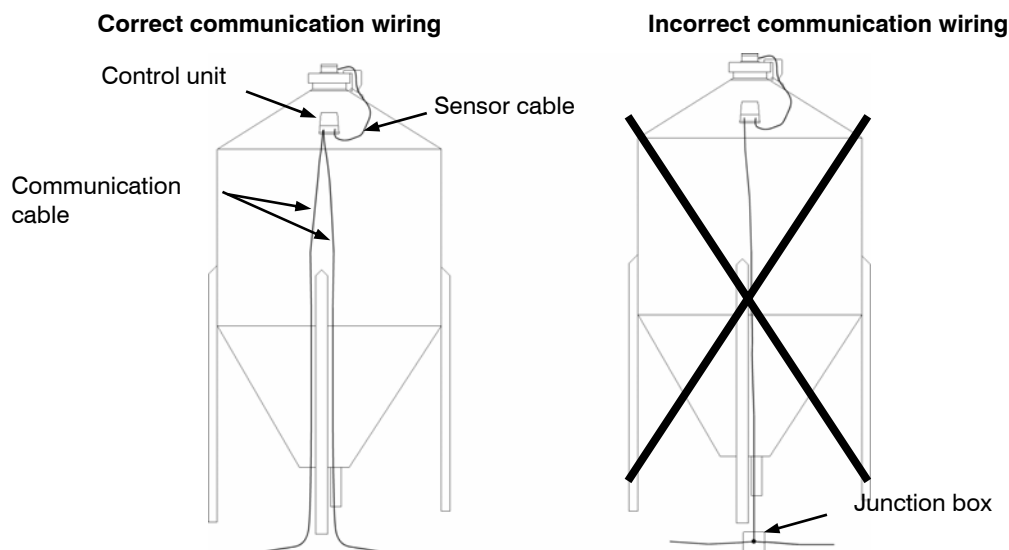
The termination resistors on OMNI Power Blocks are in sockets on the Micro Board and can be removed and replaced if necessary. Termination resistors on all other models must be removed using wire cutters. For more information about the location of termination resistors, see the installation guide for your specific product.

If you remove the termination resistors from the last device by mistake, you will have to install a Termination Module on that device. The Termination Module connects to the communication socket on the last device. For information about Termination Modules, contact your dealer or Phason Customer Support.

- ◆ **Running the communication cable in the same conduit as, or beside AC power cables**—routing communication cable in the same conduit as, or beside AC power cables, can cause electrical interference and communication failures. For more information, see **Routing data wires** on page 2.

### Connecting the communication and common reference wiring

Follow the instructions below to connect the communication wiring (A, B, C, and D). The ‘E’ position on the connector is for common reference wiring. The common reference wire helps eliminate communication problems.



**To connect the communication wiring**

1. Connect all the devices in series. For example, 'A' on the RS-485A to 'A' on the first device, to 'A' on the second device, and so on.
2. Remove the termination resistors from each Feed Level Sensor, *except for the last one on the communication channel*. The last sensor *must* have the termination resistors in place.

**Connecting the incoming power**

The Phason Regulated Power Supply (RPS) is the required power supply. For information, contact your dealer.

If you are using strain reliefs, use the 1/2-inch hole in the middle electrical knockout and insert the power cable into the enclosure through a watertight strain relief. For more information, see the diagram on page 3.

**To connect the incoming power**

1. Connect the negative DC power wire to the **VDC -** terminal.
2. Connect the positive DC power wire to the **VDC +** terminal.

**Fasten the cover to the control unit**

1. Make sure all the wires are connected to their proper locations.
2. Write down the Feed Level Sensor address (see the diagram on page 3 for the location) and bin description; the person configuring the software will need this information.
3. Fasten the cover to the control unit using the four screws.

## Maintaining the FLS

Proper care and maintenance will help your FLS last longer. To prevent damage to the control unit, perform the following steps after the first two weeks of operation, and once a year after that.



You can remove the cover from the control unit only. Do not open the sensor unit. This will damage the seal and void the warranty.

If you need to seal the enclosure, use a sealant that is labelled as 'non-corrosive', 'electronics grade', or 'neutral cure', such as GE Silicone RTV6780B, RTV 142, or RTV 162.

*Do not* use a sealant that is labelled as 'acetic acid cure' or 'acetoxo cure'. These sealants release acetic acid while curing, which can damage the control and will void the warranty.

1. Remove the cover from the control unit and then check inside for moisture. If there is any moisture, wipe it away using a dry cloth.
2. Check all cable entry points to make sure they are properly sealed. If they are not properly sealed, apply silicone sealant around the entry points.
3. Check all wires to make sure they are properly connected and that they are in good condition.
4. Fasten the cover to the enclosure.

### Hints and tips

- ◆ Inspect the sensor face every three months or if the sensor is not measuring bin levels accurately. Use a soft brush to gently remove any feed or dust from the screen. **Do not use sharp tools, wire brushes, or compressed air to clean the sensor face. These will damage the sensor and void the warranty.**
- ◆ Do not let the feed level in the bins get too low before ordering feed. We recommend there be at least three feet of feed in the bottom cone section.
- ◆ Do not overfill the bin. The Sensor cannot measure feed that is within one foot of the sensor. If the bin is too full, feed can get into the sensor face and prevent the sensor from operating.
- ◆ Make sure your feed delivery drivers know the Feed Level Sensor is mounted on the bin lid and that they should be careful when filling the bins.
- ◆ Make sure the bin lid is closed after each feed delivery. The Feed Level Sensor cannot measure the feed level if the bin lid is open. When the bin lid is open for long periods, rain can get into the sensor face and damage the components and the feed. The software displays a message in the Communication Center when it detects an open bin lid.

- ◆ When your delivery drivers fill the feed bins, make sure they open the lids all the way. This allows the Feed Level Sensor to properly detect the fill and provide accurate fill measurements.
- ◆ If your feed delivery truck is using a pneumatic feed delivery system, use a cyclone to reduce the dust levels while the bin is being filled. Dust can block the sensor face and prevent the sensor from accurately detecting feed.

### **Limited warranty**

This warranty applies only to the Phason Feed Level Sensor (FLS). If you need warranty service, return the product and original proof of purchase to your dealer.

Phason Inc. (Phason) warrants the FLS subject to the following terms and conditions.

This warranty is valid only to the original purchaser of the product, for two years from the manufacturing date. The manufacturing date is stated in the first eight digits of the serial number in the form year-month-day.

Phason hereby warrants that should the FLS fail because of improper workmanship, Phason will repair the unit, effecting all necessary parts replacements without charge for either parts or labor.

#### **Conditions**

- ◆ Installation must be done according to our enclosed installation instructions.
- ◆ The product must not have been previously altered, modified, or repaired by anyone other than Phason.
- ◆ The product must not have been involved in an accident, misused, abused, or operated or installed contrary to the instructions in our user and/or installation manuals. Phason's opinion about these items is final.
- ◆ The person requesting warranty service must be the original purchaser of the unit, and provide proof of purchase upon request.
- ◆ All transportation charges for products submitted for warranty must be paid by the purchaser.

Except to the extent prohibited by applicable law, no other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose, shall apply to the FLS. Any implied warranties are excluded.

Phason is not liable for consequential damages caused by the FLS.

Phason does not assume or authorize any representatives, or other people, to assume any obligations or liabilities, other than those specifically stated in this warranty.

Phason reserves the right to improve or alter the FLS without notice.

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