



HIRED-HAND®



Feed Management System



**Hired Hand Manufacturing, Inc.
1733 County Road 68
PO Box 99
Bremen, Alabama 35033**

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1. Ratings and Specifications

| HHI Part Number | Description | Power Supply | Temperature | Sensing Range |
|-----------------|-----------------------|------------------|----------------------|------------------|
| 6407-6036 | Feed Bin Level Sensor | 12Vdc, 100mA | 0° F thru 130°F | 0 thru 30.67 ft. |
| 6407-6070 | Current Sensor | 1.5 Vdc @ 120 mA | (-18° C thru +54° C) | .35 thru 100A AC |

2. Warnings

Warning!

Only a certified electrician should install or maintain electrical connections.

Warning!

Proper safety equipment must be used during installation of Feed Level Monitor.

Warning!

Do not install or maintain equipment during a lightning storm.

Warning!

Maximum operating temperature of Feed Level Sensor is -18° to +54° C (0° to 130° F).

Warning!

When this system is used in a life sustaining application where failure could result in loss or injury, the user should provide adequate back-up, or accept the risk of such loss or injury!

3. Limited Warranty

All products are warranted to be free from defects in material and workmanship for a period of one year from the date of purchase if installed and used in strict accordance with the installation instructions. Liability is limited to the sale price of any products proved to be defective or, at manufacturers' option, to the replacement of such products upon their return. No products are to be returned to the manufacturer, until there is an inspection and/or a return-goods authorization (RGA) number is issued.

All complaints should be directed first to the authorized distributor who sold the product. If satisfaction is not obtained or the name of the distributor is not known, write the manufacturer that appears below, directed to the attention of Customer Service Manager.

This limited warranty is expressly in lieu of any and all representations and warranties expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose. The remedy set forth in this limited warranty shall be the exclusive remedy available to any person. No person has authority to bind the manufacturer to any representation or warranty other than this limited warranty. The manufacturer shall not be liable for any consequential damages resulting from the use of our products or caused by any defect, failure or malfunction of our products. (Some areas do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.)

This warranty gives you specific legal rights and you may also have other rights that vary from area to area.

Warrantor:

Hired-Hand MFG., Inc.
1733 County Road 68
PO Box 99
Bremen, Alabama 35033

4. Introduction

The Feed Management System is the latest technology in the Evolution family. This technology adds the capability for monitoring feed levels in bins, run times of feed augers, egg belts, or any AC Motor pulling between .35A and 100A. Beyond monitoring, it also adds alarm features to help prevent feed spills or running out of feed. The Feed Management I/O module adds the inputs to the Evolution control. The Current Sensor is used to monitor runtimes of Feed Augers or Egg Belts for recording history and Alarm features. The ultrasonic Feed Level Sensors are used to monitor the feed inventory in the feed bins.

4.1 System Limitations

The ultrasonic Feed Level System is intended to provide a low-cost alternative to load-cell systems for tracking feed inventory. It is not an accurate way to track feed consumption or to accomplish restrictive feeding.

This system will provide an estimated daily consumption although it is simply estimated. There are many factors which will cause day to day errors in this estimate. These factors include coning and inaccurate feed density.

It is important to understand that errors in level will occur from time to time due to coning. These errors should be limited to damp starter feed, therefore, the system should provide accurate readings in almost all cases.

5. Tools Required

| | | | |
|--------------|---------------|-----------------------------|----------------|
| Drill | 7/16" Wrench | Flat-head screwdriver | Wire Strippers |
| ¼" Drill Bit | 7/16" Ratchet | Small Flat-head Screwdriver | |

6. Feed Management I/O Module Installation

IMPORTANT: Controller software Version 0.20 or higher must be installed in the EV3000/EV3001 to allow compatibility with this kit.

6.1 I/O Module Kit: 6407-6035

| | |
|----------------------------|--------------|
| Feed Management I/O Module | Ribbon Cable |
|----------------------------|--------------|

6.2 Installation

The I/O Module must be mounted to the inside of the Evolution 3000/3001 enclosure and connected by ribbon cable to PCB 170.

WARNING: Disconnect and ensure that all power is removed from the Evolution 3000/3001 controller before proceeding with installation.

1. Loosen the Front Panel Screw and open the Evolution controller front panel.
2. Connect the ribbon cable to the Feed Management I/O Module as shown in **Figure 1**.
3. Refer to **Figure 1** for I/O Module mounting placement and clean the enclosure surface with alcohol and ensure the surface is completely dry.

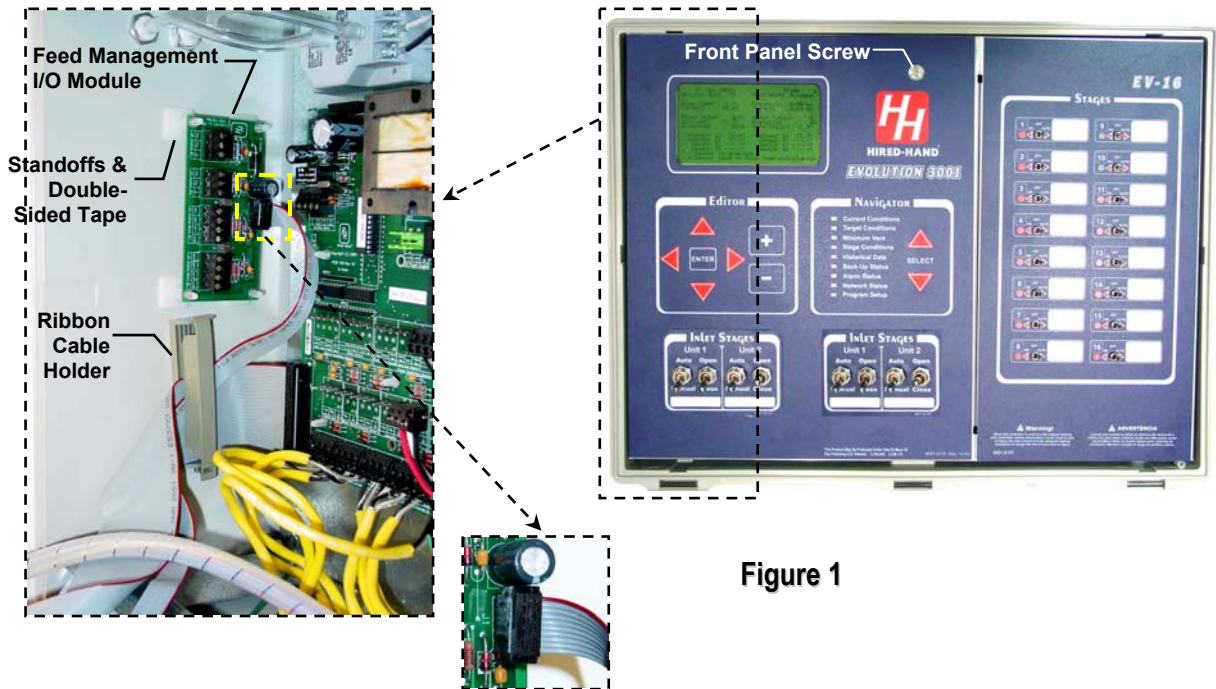
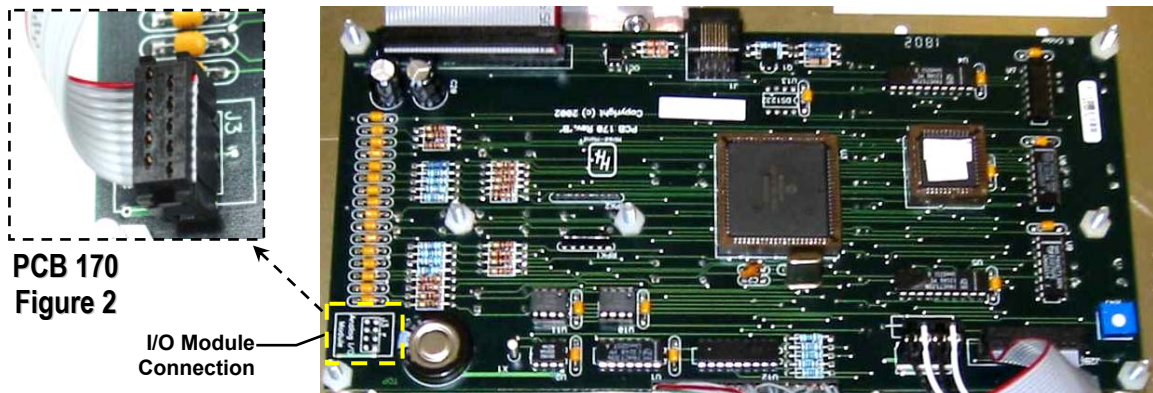


Figure 1

- Remove the paper backing from the standoff double-sided tape attached to the I/O Module and apply the I/O Module to the inside, left side of the enclosure as shown in **Figure 1**. Ensure that the I/O Module is not placed excessively low which will prevent ribbon cable removal OR excessive high which may contact the front panel circuit boards and interfere with closure of the control front panel.

NOTE: The standoff tape is difficult to remove once applied to the enclosure surface. Ensure the I/O Module is positioned properly before making contact with the enclosure.

- Route the ribbon cable through the ribbon cable holder and connect the remaining end of the ribbon cable to PCB 170 in the orientation shown in **Figure 2**. Ensure the ribbon cable is placed and secured so that it can not be pinched during closure or opening of the front panel.



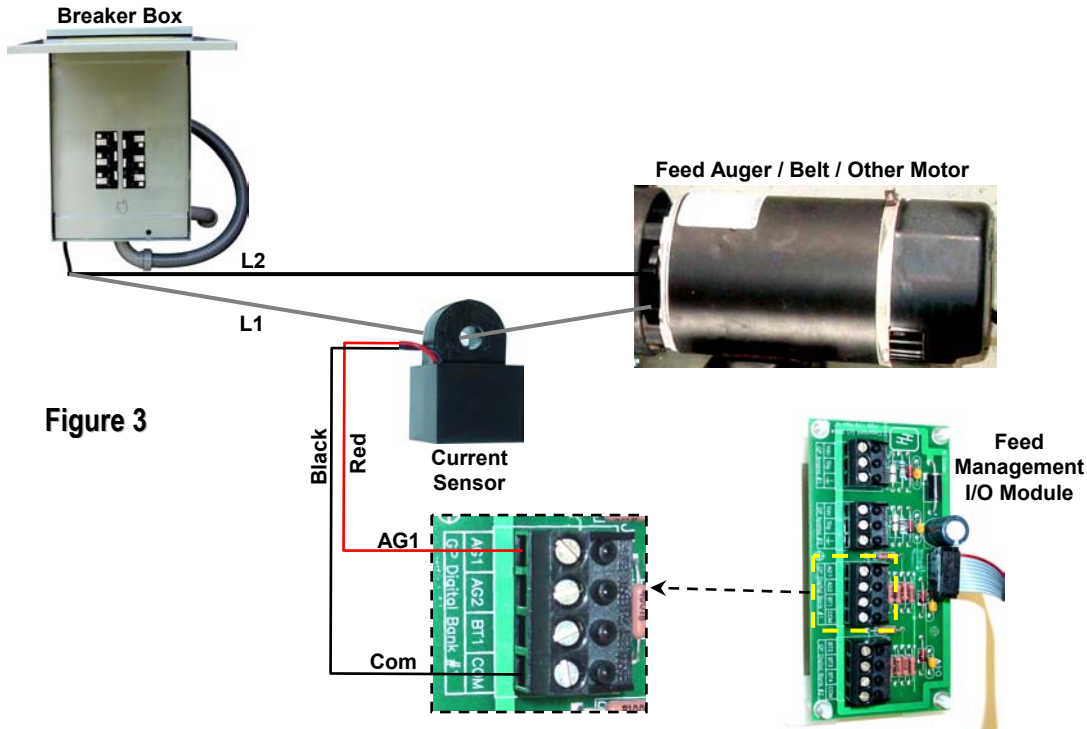
- Ensure all wires are out of the front panel hinge and closure areas, close the front panel, and secure with the front panel screw.

7. Current Sensor Installation on Feed Augers or Egg Belts

The Current Sensor is designed to provide an ON-OFF indication of current flow. Current levels above .35 Amps turn the switch ON. This Current Sensor is recommended only for applications with a continuous operating current above .35 Amps. The Current Sensor will not turn completely ON if the application has a current level below .35 Amps.

7.1 Sensor Connection to Motor Wires and Feed Management I/O Module

The current sensor must be within 9 feet of the control. The sensor may be placed inside the control or breaker box. The wires from the Current Sensor to the Feed Management I/O Module should be shielded, twisted pair, 20 AWG minimum (HHI P/N: 1503-2427 must be ordered separately).



8. Feed Level Sensor Installation

The Feed Level Sensor is an ultrasonic sensor designed to monitor the feed level inside a feed bin.

8.1 Feed Level Sensor Wiring

Wiring Requirements: A customer supplied shielded, 3 conductor, 20 AWG minimum cable must be used to run from the top of the feed bin to the Evolution controller. (HHI P/N 1503-2963 cable must be ordered separately.)

1. Loosen the enclosure bottom screw and open the enclosure cover.
2. Observe the orientation of the 3-pin connector and remove the connector from the PCB header. **Refer to Figure 4.**
3. Loosen the dome-shaped nut from around the existing sensor cable and run the customer supplied cable first through the supplied cable sleeve then through the dome-shaped nut and into the enclosure. Use care to prevent damage to existing sensor wire connections.

NOTE: The cable protection sleeve must be placed over the 3 conductor cable at this point although will remain loose until the Feed Level Sensor is mounted and secured in the Feed Sensor Mounting section.

4. Strip the three-conductor cable wires $\frac{1}{4}$ ".
5. Insert the three wires into the 3-pin connector slots and tighten the three screws securely by hand. Do not over tighten.
6. Place the 3-pin connector onto the PCB header in the same orientation as removed while taking some of the slack out of the 3-conductor cable. Do not stress the wires or connector by pulling wires or cable excessively tight.
7. Tighten the dome-shaped nut securely around the cables.
8. **IMPORTANT:** Record the wire colors to each of the 3 connections (Gnd, Sig, & Vdc) and retain for connections to the Evolution controller's Feed Management I/O Module.

- Close the enclosure cover, place the rubber seal, and tighten the enclosure bottom screw securely by hand. Do not over tighten.

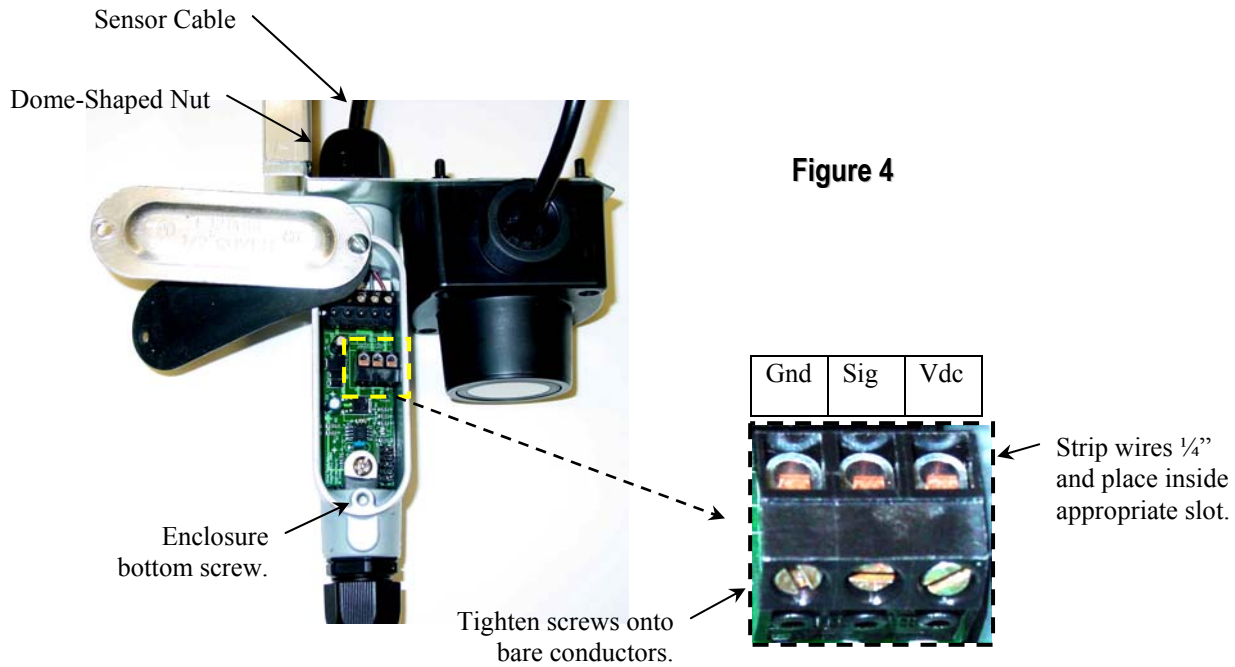


Figure 4

8.2 Feed Level Sensor Mounting

Tools and Parts Required For This Section:

| | | | |
|----------------|---------------|-----------------------|---------|
| Drill | 7/16" Wrench | 1/4-20 x 1/2" Bolt | Qty = 2 |
| 1/4" Drill Bit | 7/16" Ratchet | 1/4-20 Nylon Lock Nut | Qty = 2 |

WARNING!

- Proper safety equipment must be used during installation of Feed Level Monitor.
- Do not install or maintain equipment during a lightning storm.

Failure To Follow These Instructions May Result In Property Damage, Serious Injury, Or Death.

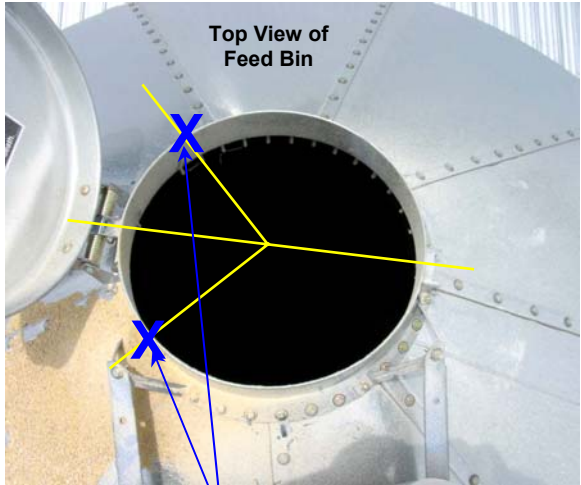
Mounting Requirements: The Feed Level Sensor should be mounted approximately 45° away from the feed bin cover hinge as shown in **Figure 5**. Sensor placement and securing the 3 conductor cable should help prevent accidental contact during feed replacement.

- Select the location for mounting the Feed Level Sensor. The mounting location should be 45° to either side of the feed bin cover hinge. **Refer to Figure 5**.
- Carefully hang the Feed Level Sensor over the feed bin flange as shown in **Figure 6**. Mark the location for the top bolt hole and remove the sensor. Use a 1/4" drill bit and drill the marked hole location through the feed bin cover flange.

CAUTION: Extreme Care must be taken to avoid dropping tools or parts into the feed bin. If parts or tools are dropped into the feed bin, contact qualified personnel for procedures and assistance. **DO NOT ATTEMPT RETRIEVAL** without proper procedures and assistance.

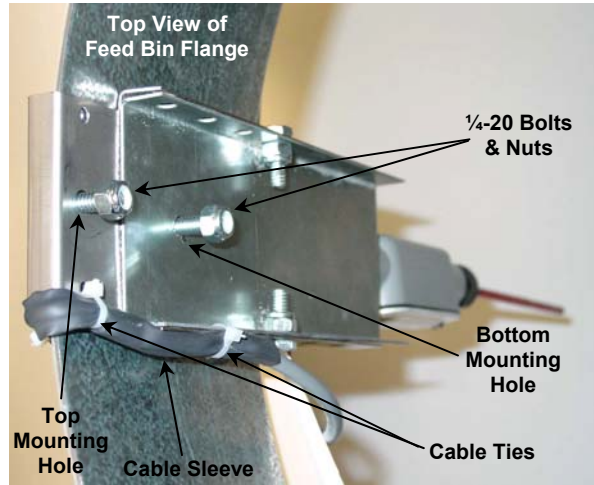
3. Mount the Feed Level Sensor to the feed bin flange using the supplied 1/4-20 x 1/2" bolt and 1/4-20 nylon lock nut. Tighten the top bolt and nut securely. **Refer to Figure 6.**
4. Measure 2" downward from the top bolt and mark the location for the bottom bolt hole. Use a 1/4" drill bit and drill the marked hole location through the feed bin cover flange and sensor mounting bracket.
5. Install the supplied 1/4-20 x 1/2" bolt and 1/4-20 nylon lock nut in the bottom drilled hole. Tighten the bolt and nut securely.

Figure 5



X = Feed Level Sensor
Mounting Locations
(45° to either side of the Cover)

Figure 6



6. Position the Cable Sleeve as shown in **Figures 6, 7, & 8.**
7. Secure the cable sleeve to the Mounting Bracket using cable ties as shown.
8. Position and secure the sensor 3 conductor wiring to the back side of the feed bin to prevent damage during feed replacement. The wiring should be secured to prevent excessive wind movement. Sharp edges should be avoided to prevent cable damage.

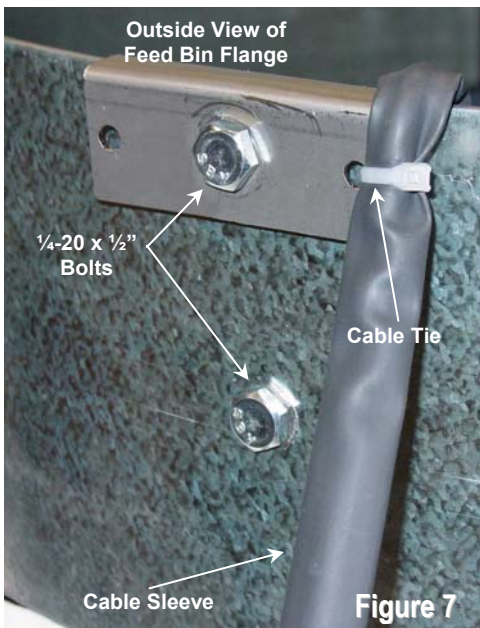


Figure 7

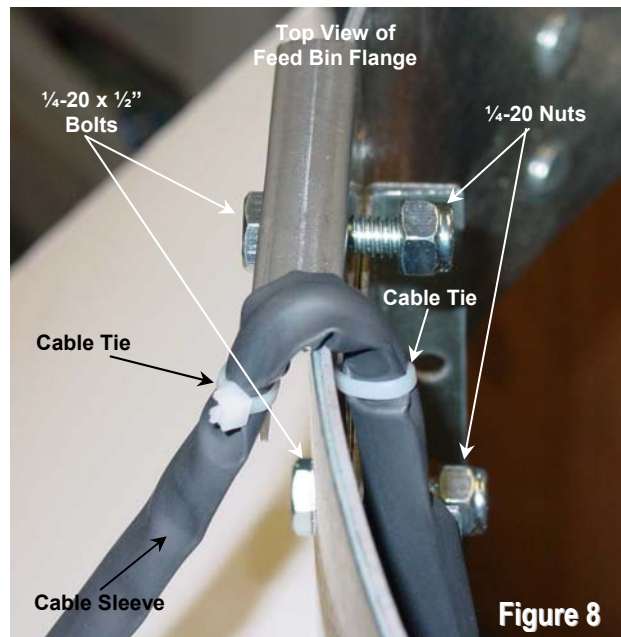
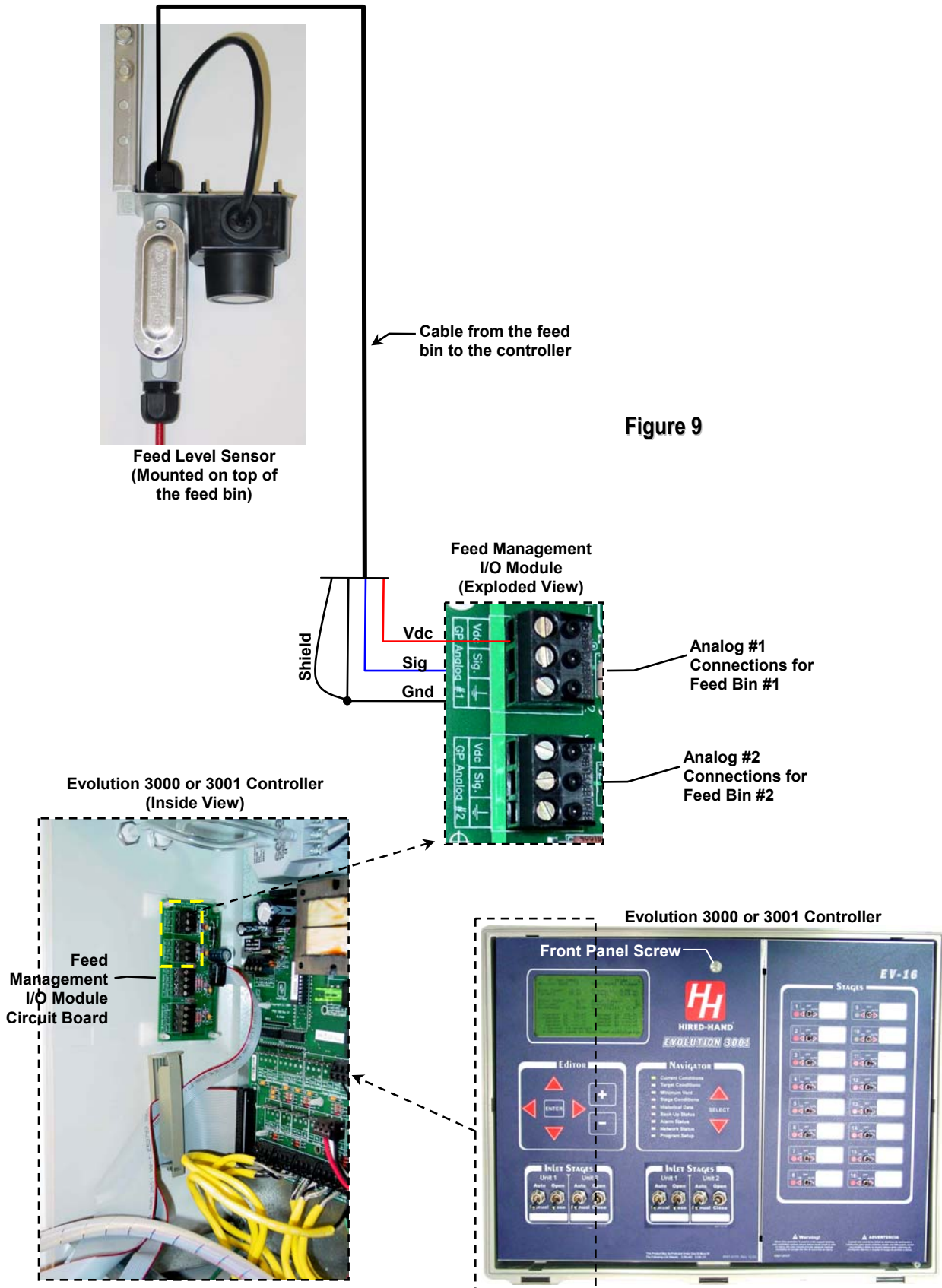


Figure 8

8.3 Feed Level Sensor Wiring to the Feed Management I/O Module



9. Feed Management Software Programming

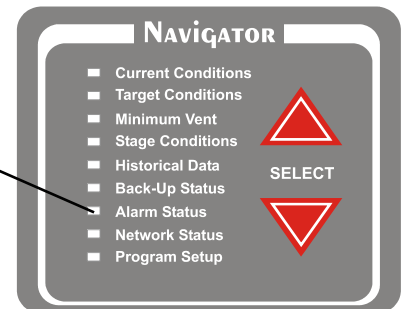
This section introduces the Feed Management software. The Evolution controller software allows the use of two ultrasonic feed level sensors and two current sensors. The feed level sensors are used to monitor the feed inventory in the feed bins. The current sensors are used primarily to monitor the runtime of the cross-fill auger motors. The following screen shows the Evolution controller 100 day Feed History that is generated through the use of these sensors. The Usage column shows the daily estimated usage in lbs., or kg. The Auger1 and Auger2 columns display the daily runtimes for the current sensors (hours: minutes). Notice that the first row indicates the present status of the current sensors.

| (1) Day | (2) Usage | (3) Auger1 | (4) Auger2 |
|------------|-----------|------------|------------|
| (5) Status | | On | On |
| 41 | 2100 lb | 4:10 | 9:10 |
| 40 | 2000 lb | 3:00 | 8:00 |
| . | . | . | . |
| 35 | 1500 lb | 3:00 | 8:00 |
| . | . | . | . |
| . | . | . | . |
| 24 | 1000 lb | 1:30 | 6:30 |
| . | . | . | . |
| . | . | . | . |
| 1 | 150 lb | 1:10 | 6:10 |

In addition to the history capabilities, the addition of the current sensors adds two new alarm features. The alarms allow you to place a runtime limit on each current sensor to help the user detect feed spills or protect against running out of feed. The updated **Alarm Status** screen is shown below.

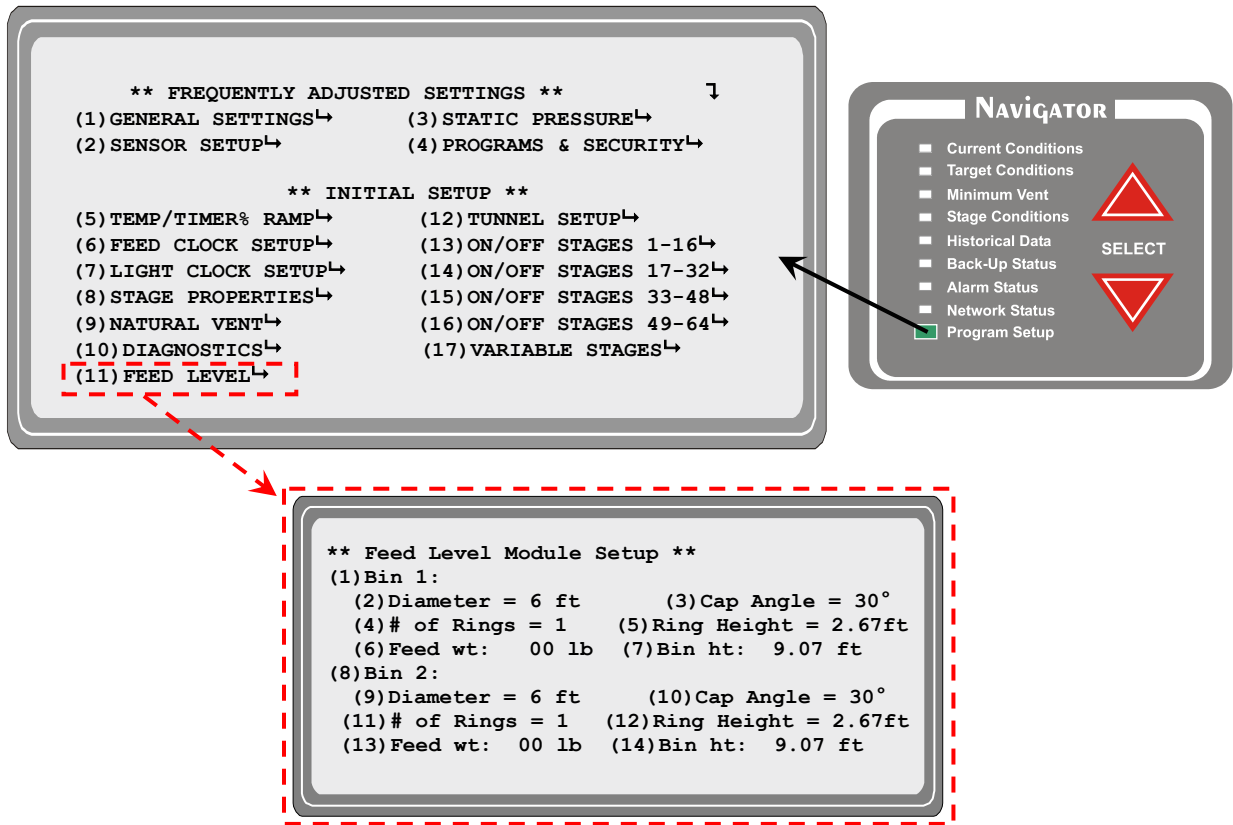
↳ Proceed to Detail Screens

| TEMPERATURE | LIMIT | STATUS | LAST ALARM |
|---------------------|--------|------------|--------------|
| (1) High Temp↳ | 85.0° | OK | 08/15-10:36p |
| (2) Low Temp↳ | 65.0° | OK | 08/10-03:36p |
| PRESSURE | LIMIT | STATUS | LAST ALARM |
| (3) Cycle Press | 0.04 | Off | 08/09-07:36p |
| (4) High Press | 0.15 | Off | 07/22-01:36p |
| (5) Low Press | 0.03 | Off | 07/13-06:36p |
| WATER ALARMS | LIMIT | STATUS | LAST ALARM |
| (6) High Rate #1 | 100/hr | OK | 01/01-12:00a |
| (7) Low Rate #1 | 25/hr | OFF | 01/01-12:00a |
| (6) High Rate #2 | 100/hr | OK | 01/01-12:00a |
| (7) Low Rate #2 | 25/hr | OFF | 01/01-12:00a |
| FEEED ALARMS | LIMIT | STATUS | LAST ALARM |
| (8) Auger Run1 | 10min | OFF | 01/01-12:00a |
| (9) Auger Run2 | 10min | OFF | 01/01-12:00a |
| SYSTEM STATUS | STATUS | LAST ERROR | |
| (10) Tunnel Vent↳ | ---- | OK | 07/12-02:36p |
| (11) Growout Day | ---- | OK | 07/31-05:36p |
| (12) Local Network | --- | OK | 07/27-05:36p |
| (13) Back-Up Limits | -- | OK | 07/31-05:36p |
| (14) Sensor 1 | ---- | OK | 07/27-05:36p |
| (14) Sensor 2 | ---- | OK | 06/10-09:36p |
| (14) Sensor 3 | ---- | OK | 06/11-01:36p |
| (14) Sensor 4 | ---- | OK | 06/13-06:36p |
| (14) Sensor 5 | ---- | OK | 06/13-03:36p |
| (14) Sensor 6 | ---- | OK | 06/21-03:36p |
| (14) Sensor 7 | ---- | OK | 06/17-02:36p |
| (14) Sensor 8 | ---- | OK | 06/13-10:36p |
| (15) Outside | ---- | OK | 07/13-02:31p |



NOTE: The High and Low temperature reading is taken from the Sensors for Display in "Sensor Setup" of the Program Setup Screen.

For the Ultrasonic Feed Level sensors, we have created a **Setup Wizard** that allows the installer easy setup. The following screen shows the **Feed Level Setup Wizard** screen.



The user enters the “**Bin Diameter**” (6’, 7’, 9’, or 12’), the “**Cap Angle**” (30 or 40 degree), the “**# of Rings**” (1 – 5), and the “**Ring Height**” which should typically be 2.67’ (2’ 8”). The “**Ring Height**” can be used to adjust any errors in calculation that the controller might make. The EV will then calculate the “**Bin ht**” (Bin Height). You can verify this by measuring from the top of the boot to the top of the cap (excluding the lid ring). **Refer to Figure 10.** If the “**Bin ht**”, is incorrect, adjustments can be made to the “**Ring Height**” for correction. In addition, “**Feed wt.**” displays the estimated weight of the feed currently in the bin based on a feed density of 40 lbs/cu. ft.

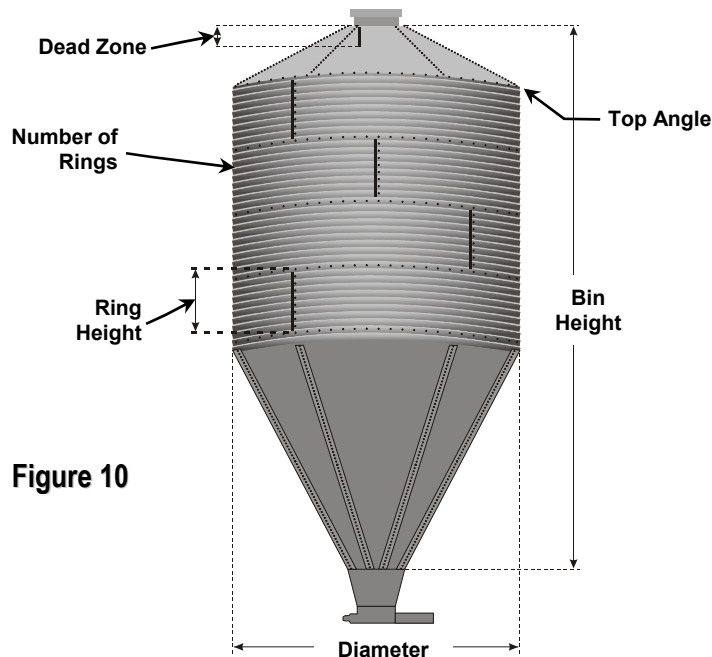
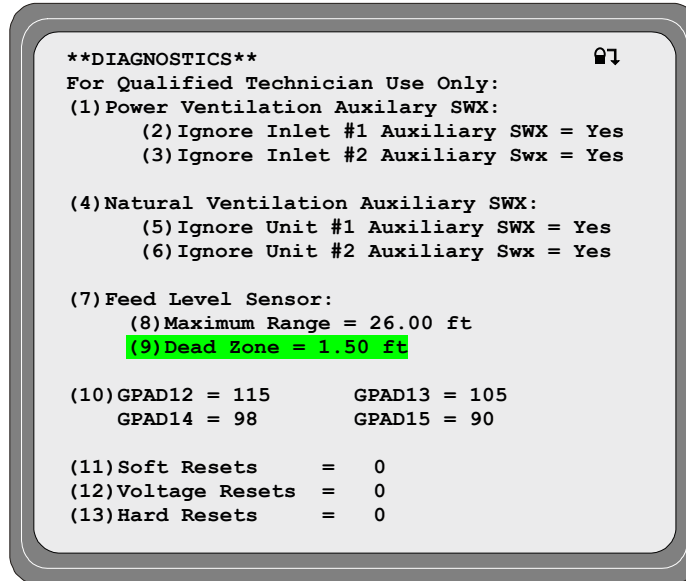


Figure 10

One other setting has to be verified by going to the **Diagnostic** screen.



Under **Feed Level Sensor** you will find the term **Dead Zone**. This refers to the area that the sensor is hanging into the feed bin. **Figure 11** shows how to measure the **Dead Zone**.

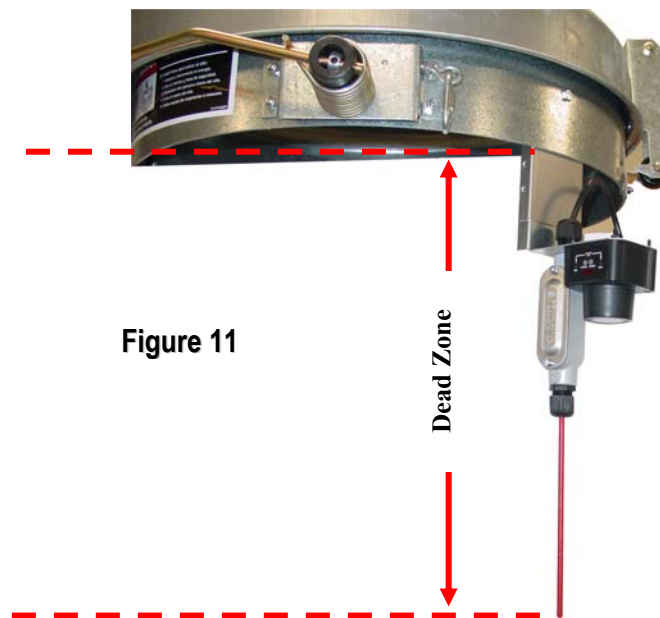


Figure 11

The measurement should be taken from the top of the cap (excluding the lid ring) to the bottom of the sensor probe. This measurement is the **Dead Zone** that should be entered.

9.1 Current Conditions Screen on the Evolution 3000/3001 Controller

The current environmental conditions of the building are shown here. Below is a table describing the variables that can appear in the Current Conditions status screen.

The numbers in brackets e.g. (1) refer to the descriptions below the sample screen displays.

(A) **Feed Level** – The Feed level is shown in number of feet from the bottom first then the percentage of feed remaining in the feed bin is shown inside (). Two feed bins may be monitored (Bin #1 & Bin #2).

The image shows two screenshots from the Evolution 3000/3001 controller. On the left is the 'Current Conditions' screen, and on the right is the 'NAVIGATOR' menu.

Current Conditions Screen:

```

Mon 14 Jun 2004  5:00 p

Vent Mode: Minimum      Growout Day: 40
Room Temp: 71.4°        Water Consumption
  Target: 70.0°          1.   240 (10/hr)
  Outside: 77.0°        2.   280 (10/hr)
Pressure: 0.00 wc      (A) Feed Levels
  Target: 0.04 wc      1.  11.2ft ( 60%)
Humidity: 0%          2.   5.0ft ( 23%)
Airspeed: 8fpm        Cooler Temp: 77.0°

√ * Sensor 1: 71.6°    √ * Sensor 2: 71.2°
√ * Sensor 3: 71.4°    Sensor 4:----.-°
Sensor 5:----.-°      Sensor 6:----.-°
Sensor 7:----.-°      Sensor 8:----.-°

√ Sensor is enabled
* Sensor used in Room Temp Calculation
    
```

NAVIGATOR Menu:

- Current Conditions
- Target Conditions
- Minimum Vent
- Stage Conditions
- Historical Data
- Back-Up Status
- Alarm Status
- Network Status
- Program Setup

SELECT

NOTE: In this manual, Reference numbers refer to descriptions given in text. These numbers do not appear on display.

10. Ultrasonic Sensor LED Indicators

The ultrasonic Feed Level Sensor includes LED indicators to display the sensor status. Refer to Figure 12.

Power LED - Indicates power is ON.

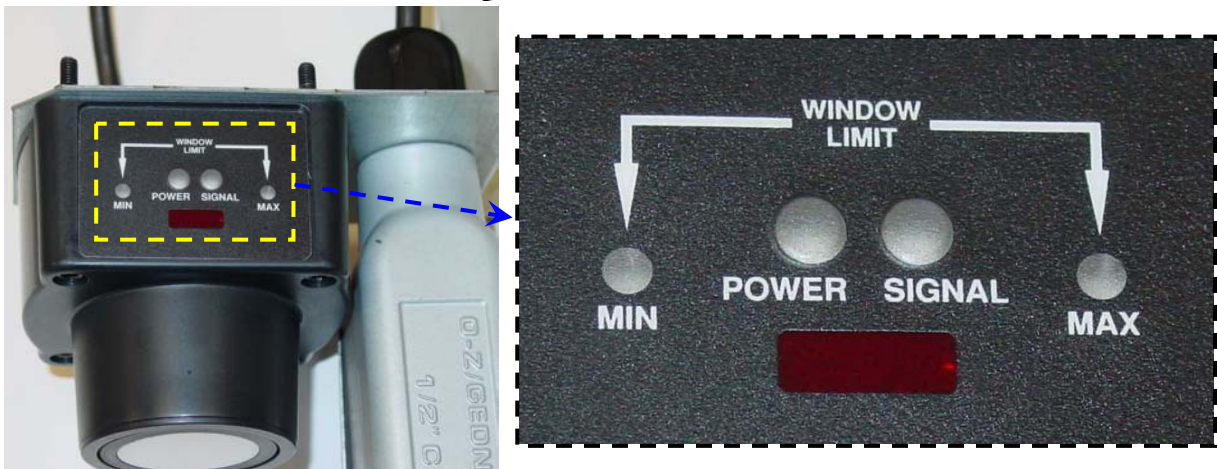
Signal LED (Red) - Indicates that the sound waves are being received back to the module.

NOTE: If the distance from the end of the ultrasonic sensor to the solid feed level surface is between 8” and 30’ 8” , both Min and Max LED’s will be ON solid. If the distance is at the Minimum or Maximum point, the Min or Max LED will flash.

Min (Flashing Yellow) - Indicates that the feed level is FULL and the ultrasonic sensor is sensing a level of 8” or less from the top.

Max (Flashing Yellow) – The ultrasonic sensor will sense a distance up to 30’ 8” . The Max LED flashes when 30’ 8” is sensed. Typical feed bins will not reach this height, therefore, the Max LED should not be used.

Figure 12



11. Parts

| HHI Part Number | Description | Notes |
|------------------------|---|-----------------------------|
| 6407-6035 | Feed Management I/O Module | |
| 6407-6036 | Feed Bin Level Sensor | |
| 1503-2963 | Cable, 20AWG-3C PVC M3273 | Use with Feed Level Sensor. |
| 6407-6070 | Current Sensor, .35 – 100 A (Feed or belt runtimes) | |
| 1503-2427 | Cable, SJT 18-2 Yellow (Sensor) | |
| | | |