ACCUBIN
INVENTORY MANAGEMENT

INVENTORY MANAGEMENT SYSTEM
Installation & Operation Manual

CREATING A **SMARTER** INVENTORY FUTURE

Installation & Operation Manual

Table of Contents

SAFETY SYMBOLS

WARNING:

IDENTIFIES CONDITIONS OR PROCEDURES, WHICH IF NOT FOLLOWED, COULD RESULT IN SERIOUS INJURY. RISK OF ELECTRICAL SHOCK.

CAUTION:

IDENTIFIES CONDITIONS OR PROCEDURES, WHICH IF NOT FOLLOWED, COULD RESULT IN SERIOUS DAMAGE OR FAILURE OF THE EQUIPMENT.

Section 1 - Handling and Storage

SAVE THESE INSTRUCTIONS

INSPECTION AND HANDLING

Do not dispose of the carton or packing materials.

Each package should be inspected upon receipt for damage that may have occurred due to mishandling during shipping. If the unit is received damaged, notify the carrier or the factory for instructions. Failure to do so may void your warranty. If you have any problems or questions, consult Customer Support at 800-778-9242.

DISPOSAL AND RECYCLING

This product can be recycled by specialized companies and must not be disposed of in a municipal collection site. If you do not have the means to dispose of properly, please contact for return and disposal instructions or options.

STORAGE

If the device is not scheduled for immediate installation following delivery, the following steps should be observed:
1. Following inspection, repackage the unit into its original packaging
2. Select a clean, dry site, free of vibration, shock, and impact hazards
3. If storage will be extended longer than 30 days, the unit must be stored at temperatures between 32° and 104° F (0° to 40° C) in non-condensing atmosphere with humidity less than 70%

⚠️ **CAUTION: DO NOT STORE A NON-POWERED UNIT OUTDOORS FOR A PROLONGED PERIOD**

Section 2 - GENERAL SAFETY

AUTHORIZED PERSONNEL

All instructions described in this document must be performed by authorized and qualified service personnel only. Before installing the unit, please read these instructions and familiarize yourself with the requirements and functions of the device. The required personal protective equipment must always be worn when servicing this device.

USE

The device is solely intended for use as described in this manual. Reliable operation is ensured only if the instrument is used according to the specifications described in this document. **For safety and warranty reasons, use of accessory equipment not recommended by the manufacturer or modification of this device is explicitly forbidden.** All servicing of this equipment must be performed by qualified service personnel only. This device should be mounted in locations where it will not be subject to tampering by unauthorized personnel.

MISUSE

Improper use or installation of this device may cause the following:

- Personal injury or harm
- Damage to the device or system

If any questions or problems arise during installation of this equipment, please contact Customer Support at 800-778-9242.

Section 3 - PRODUCT DESCRIPTION

FUNCTION

AccuBin™ is a comprehensive, cloud-based, materials management system that allows you to remotely monitor inventory through a user-friendly dashboard. Inventory values are measured by new or existing weight sensor or level sensor attached to your facility's silos. AccuBin™ offers the flexibility of providing the best sensor solution for your application or configuring to pre-existing sensors. The system then transmits data such as weight, temperature, consumption rate, and sensor status to the Gateway through a device called Smart Node. The Gateway manages all messages between the Smart Nodes and the cloud by cellular data. Users gain remote access to this critical inventory data through their browser or the AccuBin™ app on mobile devices.

FEATURES

The AccuBin™ Inventory Management Home screen provides a snapshot view of all your facility's bins. You can track bin level measurement, time to empty, and consumption rate. Each bin is color coded (green, orange, or red) based on your customized level presets. With the ability to sort inventory by inventory level, material or location, everything you need is available on one page!

AccuBin™ Inventory Management gives you access to granular data for each bin in terms of inventory level, time to empty, and consumption rate and stem status of the silo level monitoring system. Inventory history and scheduling tools are also provided.

AccuBin™ Inventory Management provides a user-friendly dashboard, to view all existing bin and add new ones when necessary. The bin list displays critical bin level measurement information such as bin name, serial number, material type, bin location, bin capacity, current inventory level (color coded based on custom presets), time to empty, consumption rate, sensor status, and time of last update. The same screen is available for each of your facility's locations.

AccuBin™ Inventory Management provides control and accountability for your team. Know who has access to your inventory information and give new individuals access to your bins or site locations. The Manage Users screen lists the name, title, access level, and contact information to everyone with access to your portal. Only the account's Admin users will have rights to adding/ subtracting users and their access to the inventory information.

TECHNICAL SPECIFICATIONS

Gateway

FUNCTIONAL

Power Requirements	
Standard	9-36 VDC; 2.5W
Optional AC/DC Converter	85-265 VAC 50/60 Hz; 22W
Connections	Screw Terminal Block, 12-30 AWG
Operating Temperature	-4°F to 122°F (-20°C to +50°C)
COMMUNICATION	
CAT-M1 Cellular	
Transmission Rate	Field Adjustable; 5-30 minutes
Minimum Required Signal	-78dB
LoRa Communication	
Max. Number of Nodes	50
Max. Distance to Node	¼ mile (line of sight)
Min. Distance between Nodes/Gateway	Minimum 6'
ENCLOSURE	
Material	ABS
Rating	IP66
Conduit Entry	PG16 Liquid Tight Connector; Qty. 2
Shipping Weight	
Pollution Degree	2
Installation Category	II
Altitude	6,562 ft (2,000 m)

4...20mA Smart Node

FUNCTIONAL

Power Requirements	
Standard	9-36 VDC; 1W
Optional AC/DC Converter	85-265 VAC 50/60 Hz; 22W
Connections	Screw Terminal Block, 12-30 AWG
Operating Temperature	-4°F to 122°F (-20°C to +50°C)
Fail-Safe	22.5 mA
LoRa COMMUNICATION	
Transmission Rate	Field Adjustable; 5-30 minutes
Max. Number of Nodes	50
Max. Distance to Gateway	¼ mile (line of sight)
Min. Distance between Nodes/Gateway	Minimum 6'
ENCLOSURE	
Material	ABS
Rating	IP66
Conduit Entry	PG16 Liquid Tight Connector; Qty. 2 PG-7 Liquid Tight Connector; Qty. 1
Shipping Weight	
Pollution Degree	2
Installation Category	II
Altitude	6,562 ft (2,000 m)

4 Channel Smart Node

FUNCTIONAL

Power Requirements	
Standard	9-36 VDC; 1W
Optional AC/DC Converter	85-265 VAC 50/60 Hz; 22W
Connections	Screw Terminal Block, 12-30 AWG
Operating Temperature	-4°F to 122°F (-20°C to +50°C)
Fail-Safe	22.5 mA
LoRa COMMUNICATION	
Transmission Rate	Field Adjustable; 5-30 minutes
Max. Number of Nodes	50
Max. Distance to Gateway	¼ mile (line of sight)
Min. Distance between Nodes/Gateway	Minimum 6'
ENCLOSURE	
Material	ABS
Rating	IP66
Conduit Entry	PG16 Liquid Tight Connector; Qty. 2
	PG-7 Liquid Tight Connector; Qty. 4
Shipping Weight	
Pollution Degree	2
Installation Category	II
Altitude	6,562 ft (2,000 m)

Section 4 - MECHANICAL INSTALLATION

⚠ WARNING: HIGH VOLTAGE MAY BE PRESENT.
REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING,
OR MAKING ADJUSTMENTS

⚠ WARNING: TO PREVENT WATER INGRESS, UNITS ARE PROVIDED WITH
LIQUID TIGHT CONNECTORS. IF CONDUIT IS USED, REPLACE POWER
CONNECTORS WITH ½" NPT IP66 CONDUIT FITTING.

GUIDELINES

The following precautions should be observed when installing Smart Nodes and Gateways:

- The installation and wiring of this product must comply with all national, federal, state, municipal and local codes that apply.
- Do not allow moisture to enter the electronics enclosure. When used, conduit should slope downward from the enclosure. Install drip loops (or drain fitting) and seal conduit with silicone rubber product.
- The Smart Nodes and Gateways are precision devices - handle carefully to prevent damage.
- Gateway and Smart Nodes should be mounted in a location that provides protection from unintentional mechanical damage to the enclosures and antennas.

To ensure reliable cellular operation, observe the following guidelines when mounting the Gateway:

- Gateway should be mounted in a location that provides the best cellular reception
- Do not mount the Gateway inside a metal structure
- While installing the antenna, avoid cross threading to prevent damage to the connector
- Mount the Gateway as shown in Figure 1 using hardware provided

To ensure reliable operation, observe the following guidelines when mounting the Smart Node:

- Smart Node should be mounted in a location that provides line of sight to the Gateway if possible
- Smart Nodes should be mounted a minimum of six feet from the Gateway and other Smart Nodes
- Avoid structures between the Smart Nodes and Gateway
- Do not mount the Smart Node inside a metal structure if the Gateway is on the outside
- When installing the antenna, avoid cross threading to prevent damage to the connector
- Mount the Smart Node as shown in Figure 1 using hardware provided
- 4 Channel Smart Nodes should be mounted as close to the sensors as possible
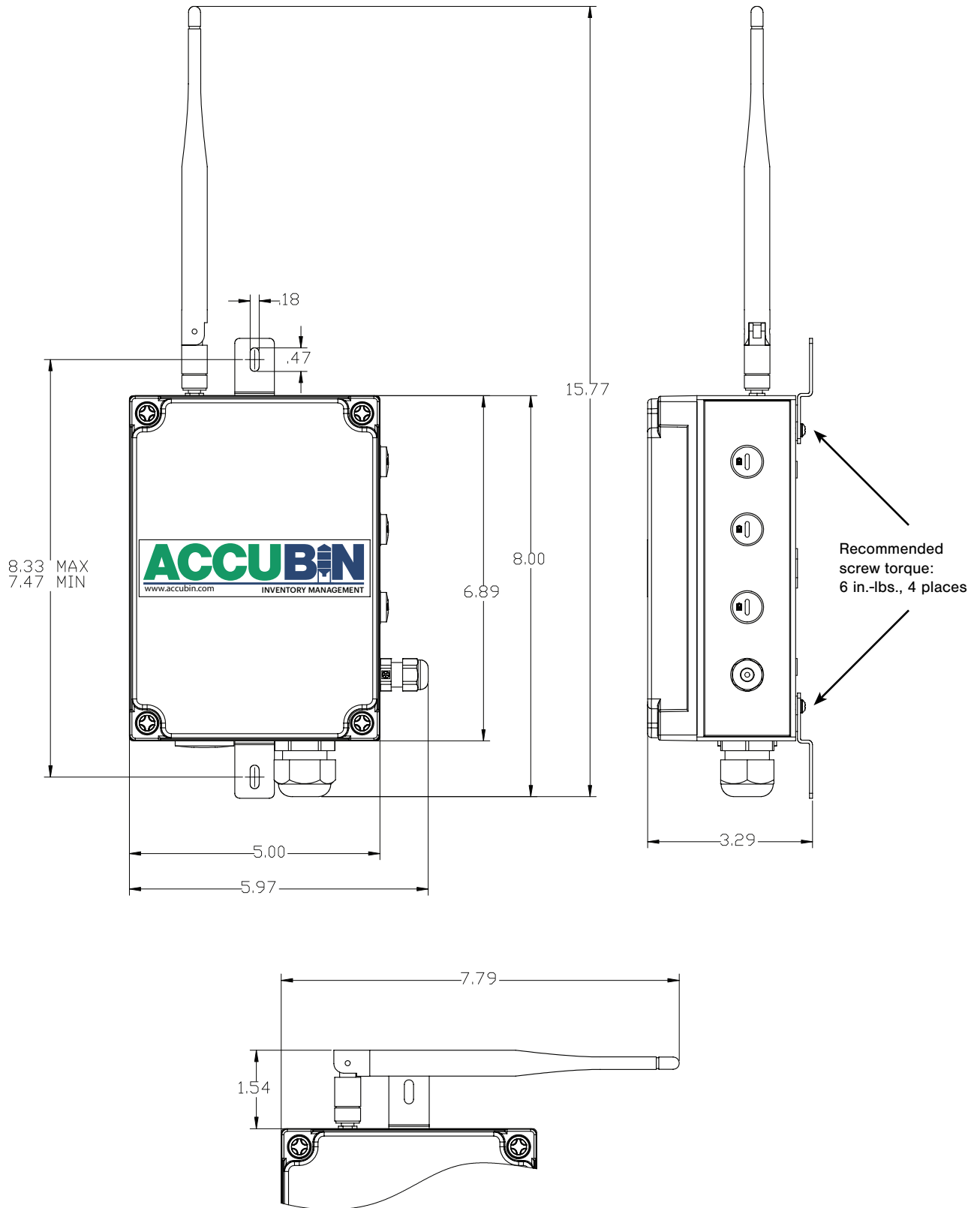
Recommended
screw torque:
6 in.-lbs., 4 places

Figure 1
(Dimensions in inches)

Section 5 - ELECTRICAL INSTALLATION

⚠ **WARNING: HIGH VOLTAGE IS PRESENT. REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS**

⚠ **WARNING: TO PREVENT WATER INGRESS, UNITS ARE PROVIDED WITH LIQUID TIGHT CONNECTORS. IF CONDUIT IS USED, REPLACE POWER CONNECTORS WITH ½" NPT IP66 CONDUIT FITTING.**

⚠ **CAUTION: UNITS ARE SUPPLIED WITH A GASKET, AVOID FOLDING, CUTTING OR TEARING THE GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

⚠ **CAUTION: PROPER AND SAFE OPERATION REQUIRES THE COVER MUST BE PROPERLY INSTALLED WHEN POWER IS APPLIED**

GENERAL SAFETY

When using electrical equipment, you should always follow basic safety precautions, including the following:

- The installation and wiring of this product must comply with all national, federal, state, municipal, and local codes that apply.
- Do not modify any factory wiring. Connections should only be made to the terminals described in this section.
- All connections to the Gateways and Smart Nodes must use conductors with an insulation rating of 300 V minimum, rated for 212° F (105° C), a minimum flammability rating of VW-1, and be of appropriate gauge for the voltage and current required (see Specifications).
- Do not allow moisture to enter the electronics enclosure. When used, conduit should slope downward from the enclosure housing. Install drip loops and seal conduit with silicone rubber product.
- To prevent water ingress, use only one cable per liquid tight connector and ensure cables point downward.

DISCONNECT REQUIREMENTS FOR PERMANENTLY INSTALLED EQUIPMENT

A dedicated disconnecting device (circuit breaker) must be provided for the proper installation of the unit. Disconnects must meet the following requirements:

- Located in close proximity to the device
- Easily accessible to the operator
- Appropriately marked as the disconnect for the device
- Sized appropriately to the requirements of the protected circuit

CONDUIT CABLE CONNECTION

Two liquid tight connectors are provided in the housing for input and output power wiring. When only one conduit opening is used for installation, the unused opening must be sealed with a suitable IP66 plug (provided).

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_____
ELECTRICAL CONNECTIONS

Gateway (DC Version)

Input Power Connections

1. Refer to Figure 2 and 3 when making connections to the unit
2. Loosen the housing cover screws and remove cover

> ⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm).
4. Attach power leads to PWR IN terminal block as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 10)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

6. Remove plug for Power Out and replace with cable gland provided or conduit
7. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
8. Attach leads to PWR OUT terminal block as shown, observing polarity
9. Check that all wires are held tightly in place by lightly pulling each conductor
10. Reinstall the gasket, if necessary
11. Replace cover and tighten screws
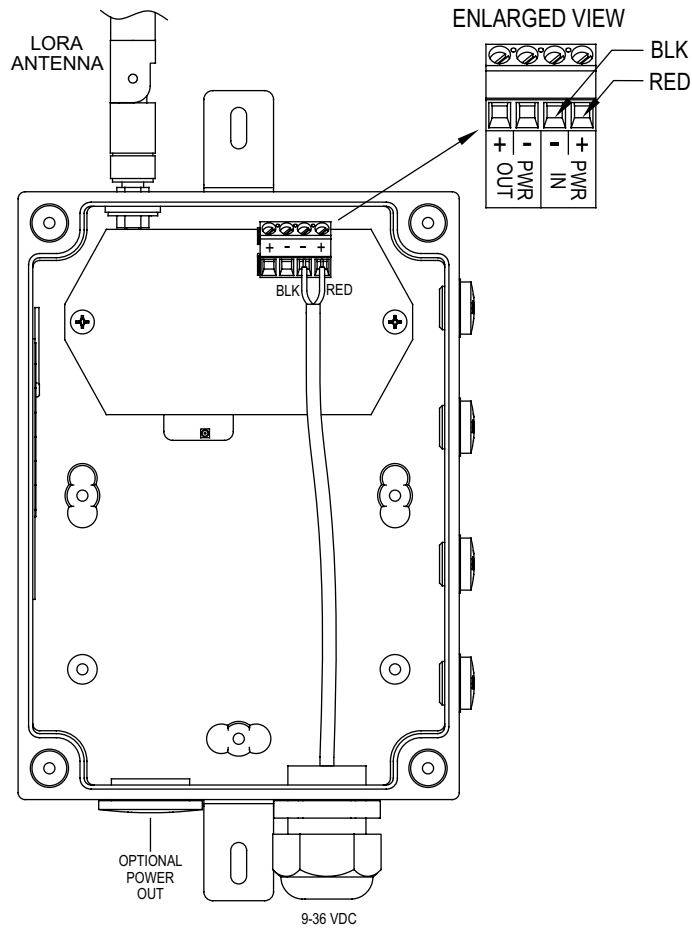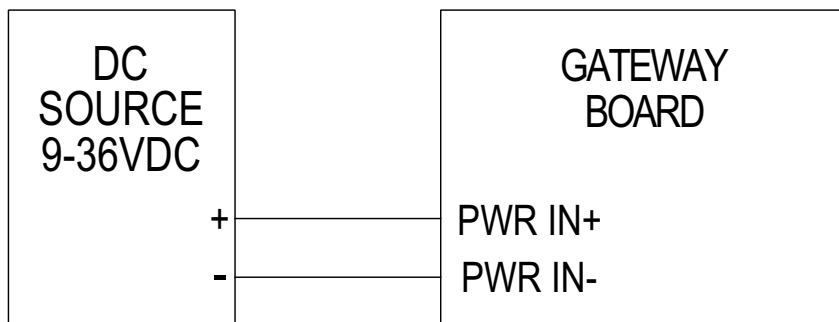
Figure 2. Gateway (DC Version) Cover Removed

Figure 3. Gateway (DC Version) Connections

Gateway (AC Version)

Input Power Connections

1. Refer to Figures 4 and 5 when making connections to the unit

2. Loosen the housing cover screws and remove cover

> ⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)

4. Attach power leads to N and L terminals as shown, observing polarity

5. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 10)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

6. Remove plug for Power Out and replace with cable gland provided or conduit

7. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)

8. Attach leads to Power Out terminal block as shown, observing polarity

9. Check that all wires are held tightly in place by lightly pulling each conductor

10. Reinstall the gasket, if necessary

11. Replace cover and tighten screws

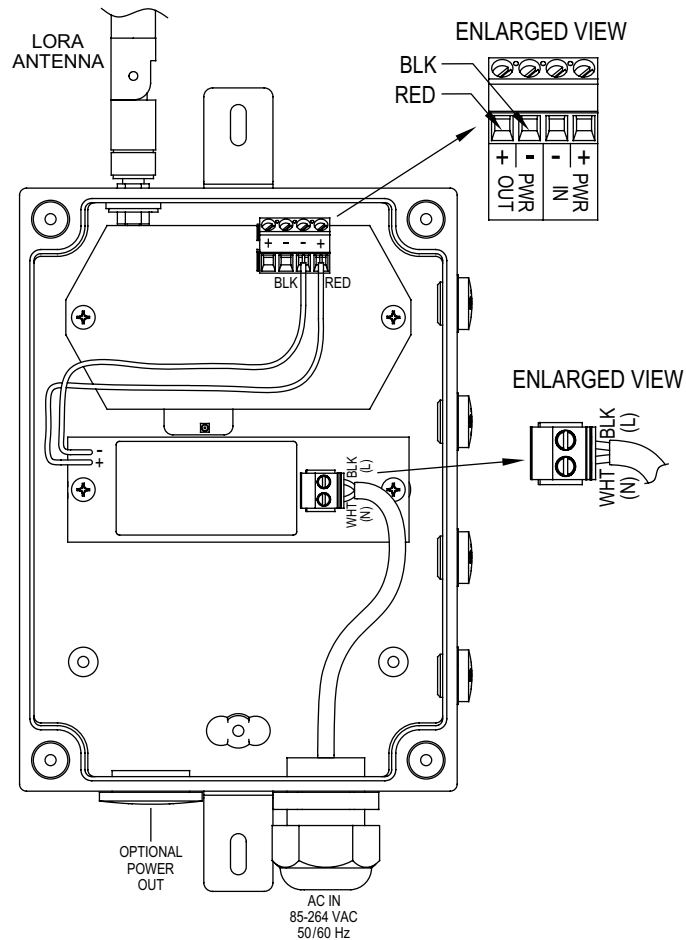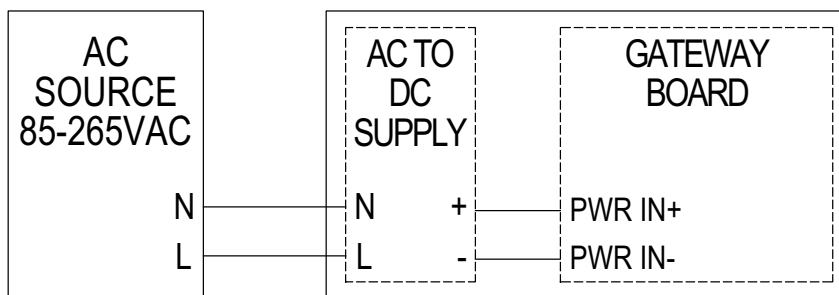# Figure 4. Gateway (AC Version) Cover Removed

Figure 5. Gateway (AC Version) Connections

4...20mA Smart Node Loop Powered (DC Version)

⚠️ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR LOOP POWERED DEVICES ONLY SUCH AS BINDICATOR F78MP RADAR**

Input Power Connections

1. Refer to Figures 6 and 7 when making connections to the unit
2. Loosen the housing cover screws and remove cover

⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to PWR IN terminal block as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach 4-20 Loop + from sensor to 4-20 IN terminal as shown
8. Attach 4-20 Loop – from sensor to V24 OUT terminal as shown
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

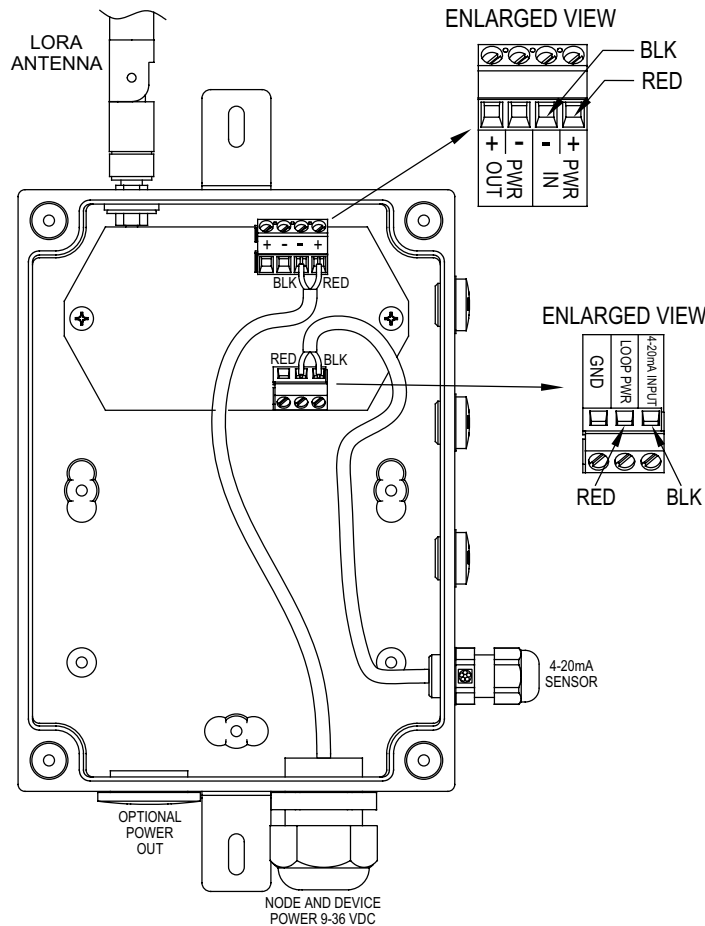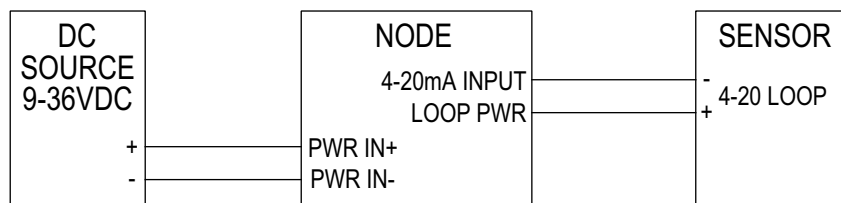## Figure 6. 4...20mA Smart Node Loop Powered (DC Version) Cover Removed

Figure 7. 4...20mA Smart Node (Loop Powered) Connections

NOTE: DC SOURCE MUST MATCH THE VOLTAGE OF BOTH THE
NODE AND SENSOR.

4...20mA Smart Node Loop Powered (Isolated DC Version)

> ⚠ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR LOOP POWERED DEVICES ONLY SUCH AS BINDICATOR F78MP RADAR**

Input Power Connections

1. Refer to Figures 8 and 9 when making connections to the unit
2. Loosen the housing cover screws and remove cover

> ⚠ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to +Vin and -Vin terminals as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach 4...20 Loop + from sensor to 4...20 IN terminal as shown
8. Attach 4...20 Loop - from sensor to V24 OUT terminal as shown
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
  Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

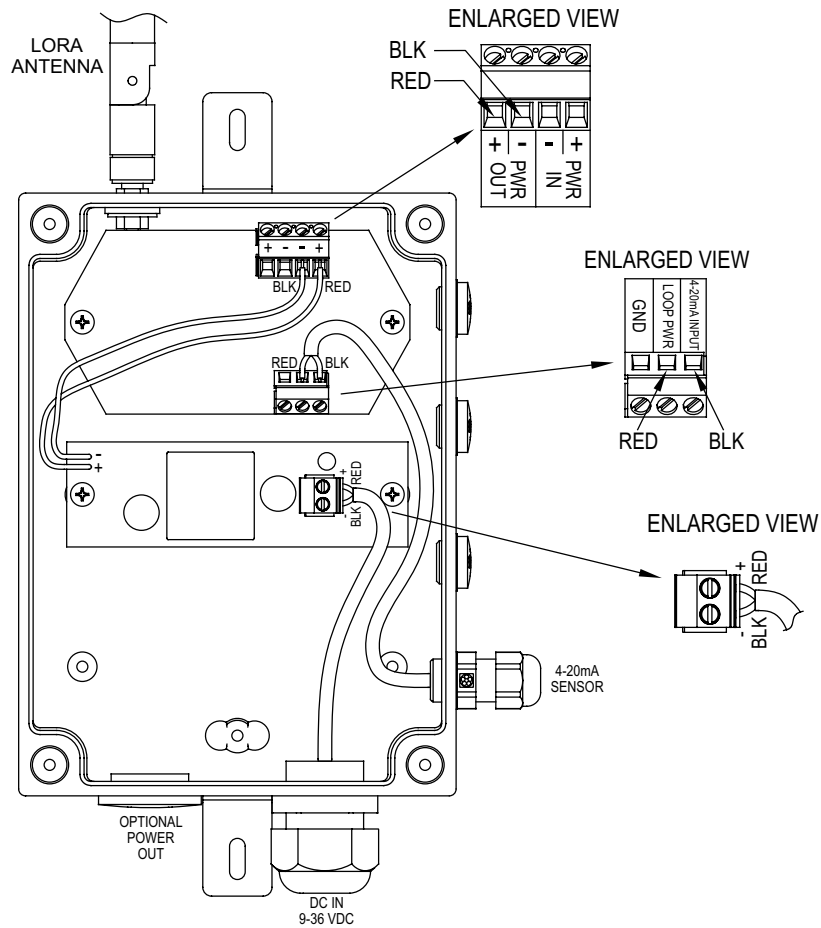# Figure 8. 4...20mA Smart Node Loop Powered (Isolated DC Version) Cover Removed
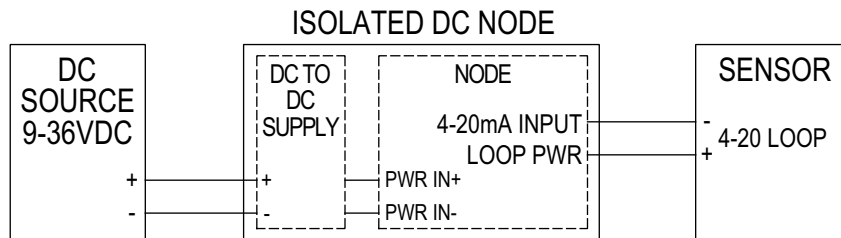

Figure 9. 4...20mA Smart Node Loop Powered (Isolated DC Version) Connections

NOTE: SENSOR MUST BE COMPATIBLE WITH 24VDC.

4...20mA Smart Node Loop Powered (Isolated AC Version)

> ⚠️ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR LOOP POWERED DEVICES ONLY SUCH AS BINDICATOR F78MP RADAR**

Input Power Connections

1. Refer to Figures 10 and 11 when making connections to the unit
2. Loosen the housing cover screws and remove cover

> ⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to N and L terminals as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach 4...20 Loop + from sensor to 4...20 IN terminal as shown
8. Attach 4...20 Loop - from the sensor to V24 OUT terminal as shown
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary.
15. Replace cover and tighten screws

Figure 10. 4...20mA Smart Node Loop Powered (Isolated AC Version) Cover removed
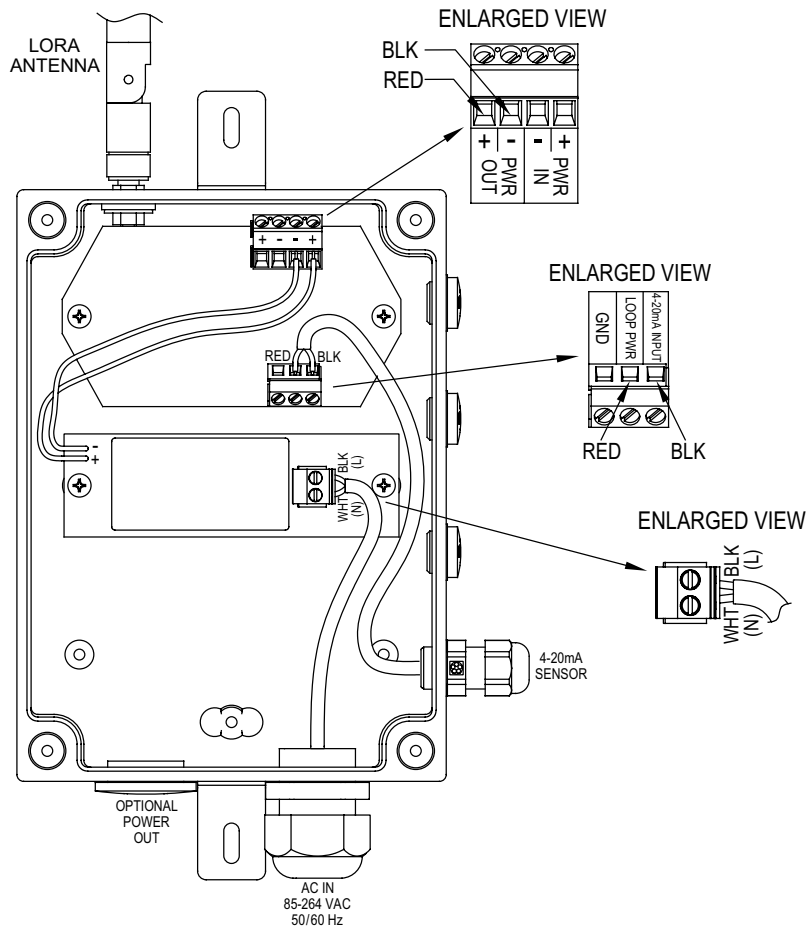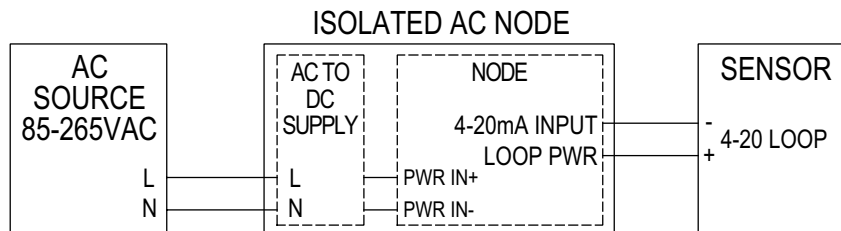

Figure 11. 4...20mA Smart Node Loop Powered (Isolated AC Version) Connections

NOTE: SENSOR MUST BE COMPATIBLE WITH 24VDC.

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4...20mA Smart Node with External Power (DC Version)

> ⚠ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR NON-LOOP POWERED DEVICES ONLY**

Input Power Connections

1. Refer to Figures 12 and 13 when making connections to the unit
2. Loosen the housing cover screws and remove cover

> ⚠ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to PWR IN terminal block as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6 to 7 mm)
7. Attach 4-20 Loop + from sensor to 4-20 IN terminal as shown
8. Attach 4-20 Loop – from sensor to GND terminal as shown.
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

Figure 12. 4...20mA Smart Node with External Power (DC Version) Cover Removed
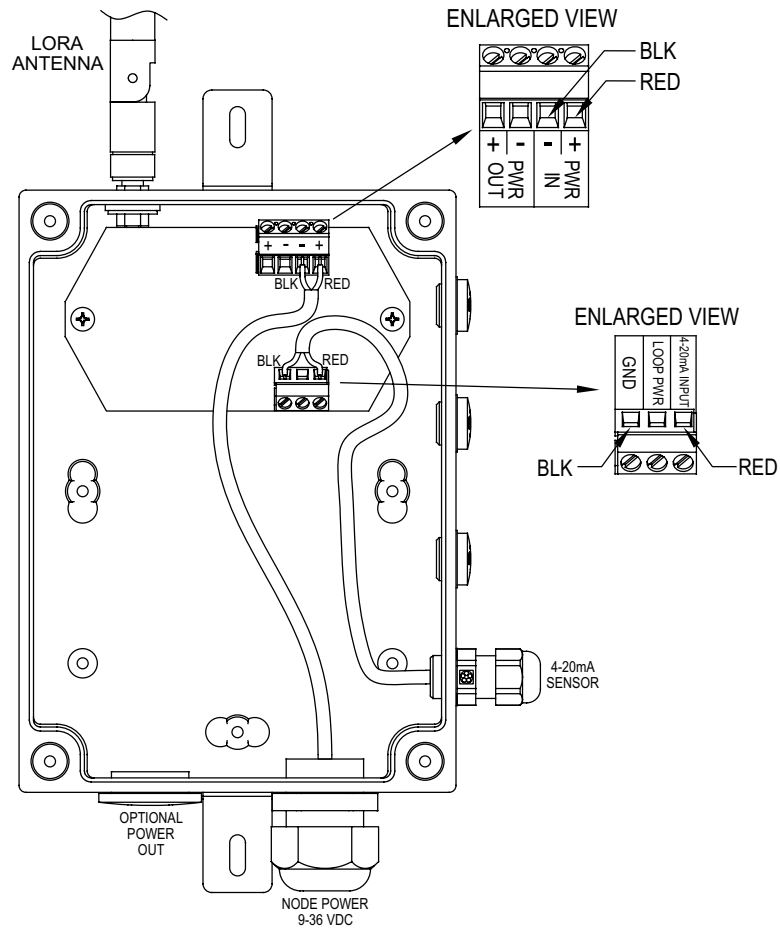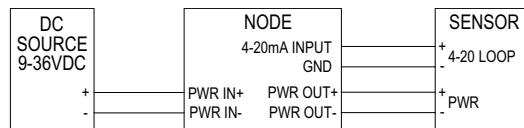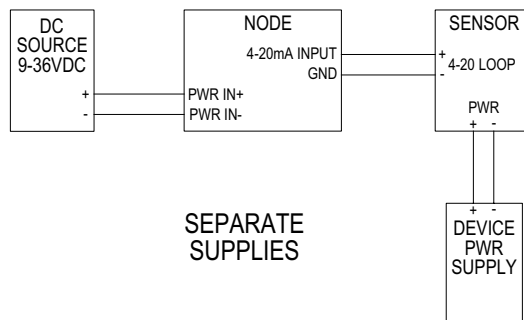

Figure 13. 4...20mA Smart Node with External Power (DC Version) Connections

NOTE: DC SOURCE MUST MATCH THE VOLTAGE OF BOTH THE NODE AND SENSOR.

— OR —

SEPARATE SUPPLIES

4...20mA Smart Node with External Power (Isolated DC Version)

⚠️ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR NON-LOOP POWERED DEVICES ONLY**

Input Power Connections

1. Refer to Figures 14 and 15 when making connections to the unit
2. Loosen the housing cover screws and remove cover

⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to +Vin and -Vin terminals as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach 4...20 Loop + from sensor to 4...20 IN terminal as shown
8. Attach 4...20 Loop - from sensor to GND terminal as shown
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

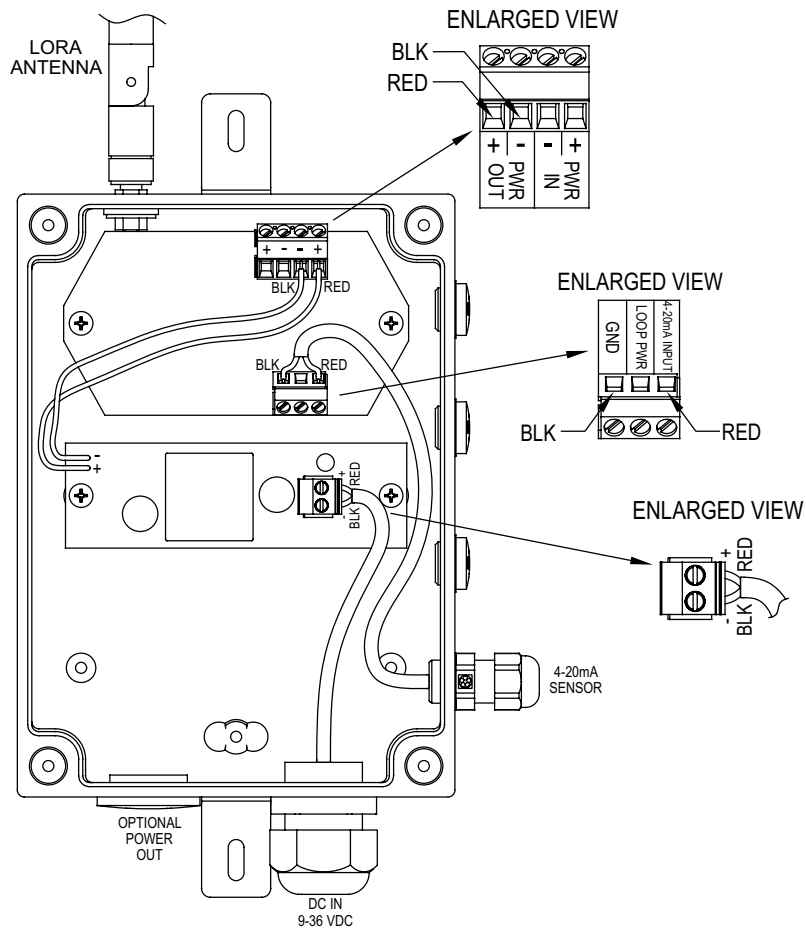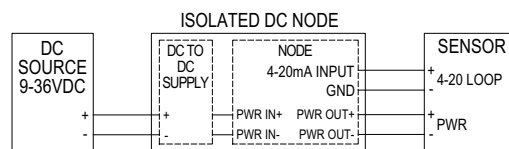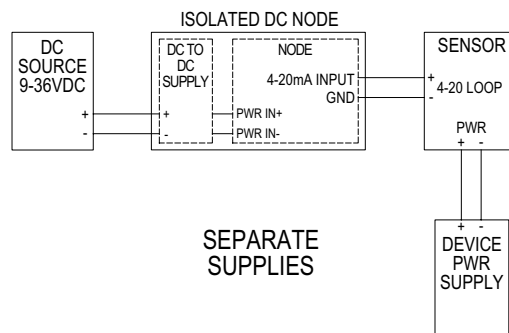## Figure 14. 4...20mA Smart Node with External Power (Isolated DC Version) Cover Removed

Figure 15. 4...20mA Smart Node with External Power (Isolated DC Version) Connections

4...20mA Smart Node with External Power (Isolated AC Version)

⚠️ **CAUTION: THE FOLLOWING CONNECTIONS ARE FOR NON-LOOP POWERED DEVICES ONLY**

Input Power Connections

1. Refer to figures 16 and 17 when making connections to the unit
2. Loosen the housing cover screws and remove cover

⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to N and L terminals as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor
6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach 4...20 Loop + from sensor to 4...20 IN terminal as shown
8. Attach 4...20 Loop - from sensor to GND terminal as shown
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
   Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

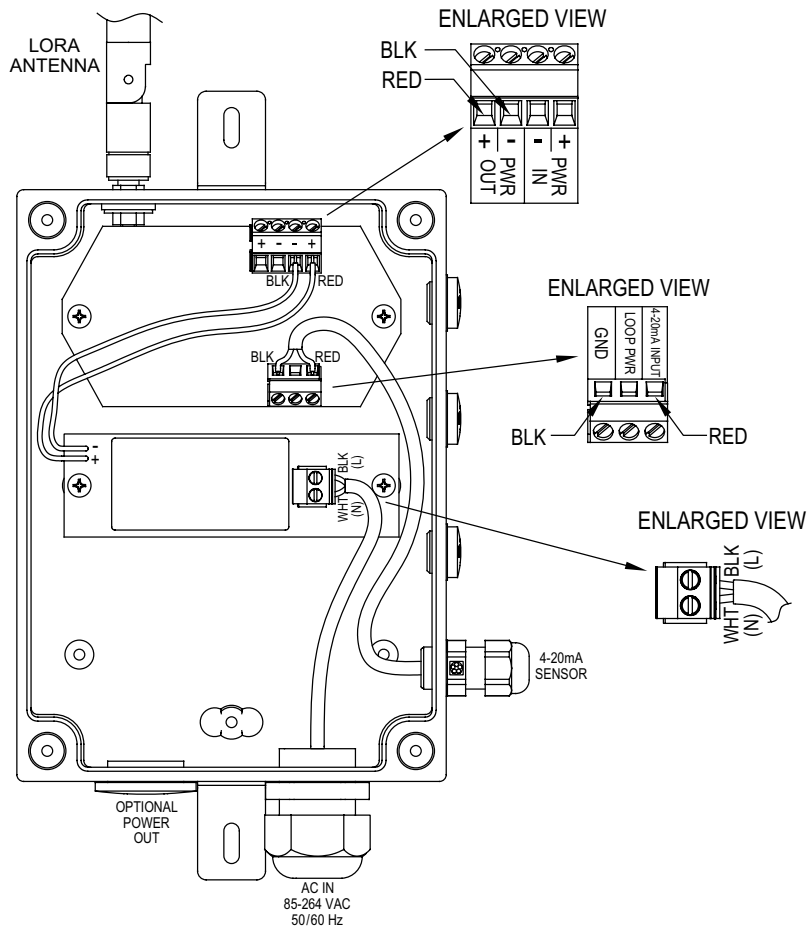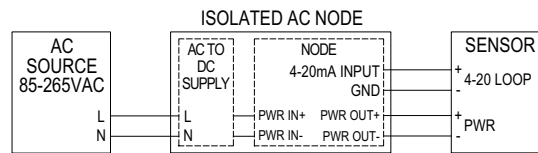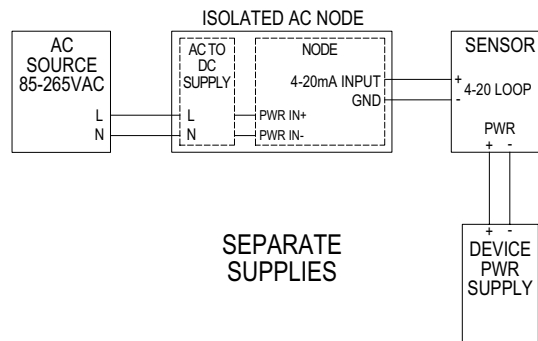## Figure 16. 4...20mA Smart Node with External Power (Isolated AC Version) Cover Removed

LORA ANTENNA

ENLARGED VIEW

BLK
RED

+ − − +
PWR OUT | PWR IN

BLK RED

ENLARGED VIEW

GND
LOOP PWR
4-20mA INPUT

BLK — RED

BLK RED

ENLARGED VIEW

WHT (N)
BLK (L)

WHT (N)
BLK (L)

4-20mA SENSOR

OPTIONAL POWER OUT

AC IN
85-264 VAC
50/60 Hz

Figure 17. 4...20mA Smart Node with External Power (Isolated AC Version) Connections

ISOLATED AC NODE

| AC SOURCE 85-265VAC | AC TO DC SUPPLY | NODE 4-20mA INPUT / GND | SENSOR 4-20 LOOP |

L
N

L
N

PWR IN+   PWR OUT+
PWR IN−   PWR OUT−

+ 4-20 LOOP −
+ PWR −

NOTE: SENSOR MUST BE COMPATIBLE WITH 24VDC.

— OR —

ISOLATED AC NODE

AC SOURCE 85-265VAC

AC TO DC SUPPLY

NODE
4-20mA INPUT
GND

SENSOR
4-20 LOOP

L
N

L
N

PWR IN+
PWR IN−

PWR
+ −

SEPARATE SUPPLIES

DEVICE PWR SUPPLY
+ −

4 Channel Smart Node (DC Version)

Input Power Connections

1. Refer to figures 18 and 19 when making connections to the unit
2. Loosen the housing cover screws and remove cover

> ⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to PWR IN terminal block as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach the 3 leads from sensor to SENSOR 1 terminal block as shown, observing polarity (colors)
8. Repeat steps 6 and 7 for SENSOR 2, SENSOR 3, and SENSOR 4 as required
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

> ⚠️ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

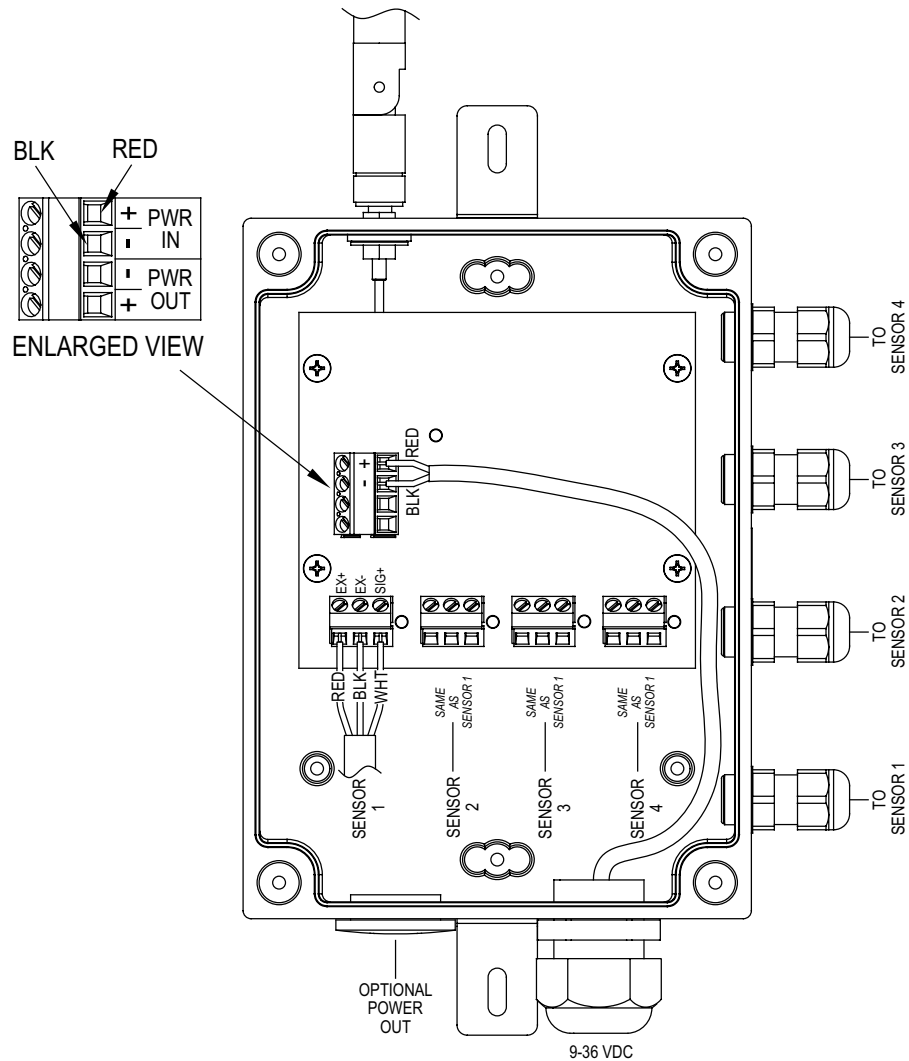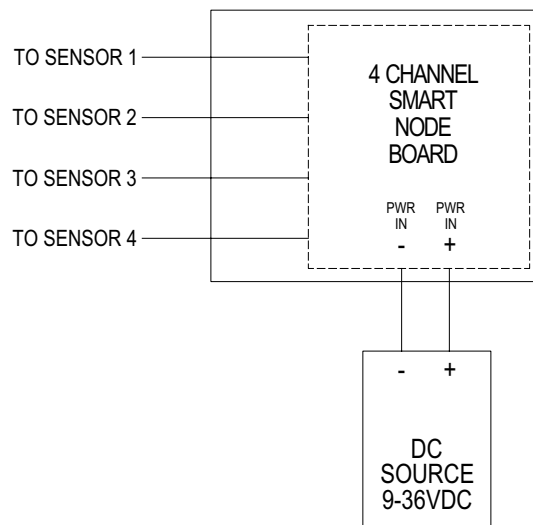## Figure 18. 4 Channel Smart Node (DC Version) Cover Removed

Figure 19. 4 Channel Smart Node (DC Version) Connections

4 Channel Smart Node Loop Powered (AC Version)

Input Power Connections

1. Refer to Figures 20 and 21 when making connections to the unit
2. Loosen the housing cover screws and remove cover

⚠ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

3. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
4. Attach power leads to N and L terminals as shown, observing polarity
5. Check that all wires are held tightly in place by lightly pulling each conductor

Sensor Connections

6. Pull approximately 6" (15.3 cm) cable through conduit and strip leads 1/4" (6.3 mm)
7. Attach the 3 leads from sensor to SENSOR 1 terminal block as shown, observing polarity (colors)
8. Repeat step 6 and 7 for SENSOR 2, SENSOR 3, and SENSOR 4 as required
9. Check that all wires are held tightly in place by lightly pulling each conductor

Power Out Connections (if not being used skip to step 14)
Note: Two threaded female conduit openings are provided in the housing to separate input and output wiring

⚠ **CAUTION: WHEN INSTALLING CABLE GLAND, PROPERLY COMPRESS THE FLAT GASKET. RECOMMEND TORQUE 18-20 IN-LBS. EXCESSIVE TORQUE CAN DAMAGE GASKET AND COMPROMISE SEAL**

10. Remove plug for Optional Power Out and replace with cable gland provided or conduit
11. Pull approximately 6" (15.3 cm) of cable through conduit and strip 1/4" (6.3 mm)
12. Attach leads to Power Out terminal block as shown, observing polarity
13. Check that all wires are held tightly in place by lightly pulling each conductor
14. Reinstall the gasket, if necessary
15. Replace cover and tighten screws

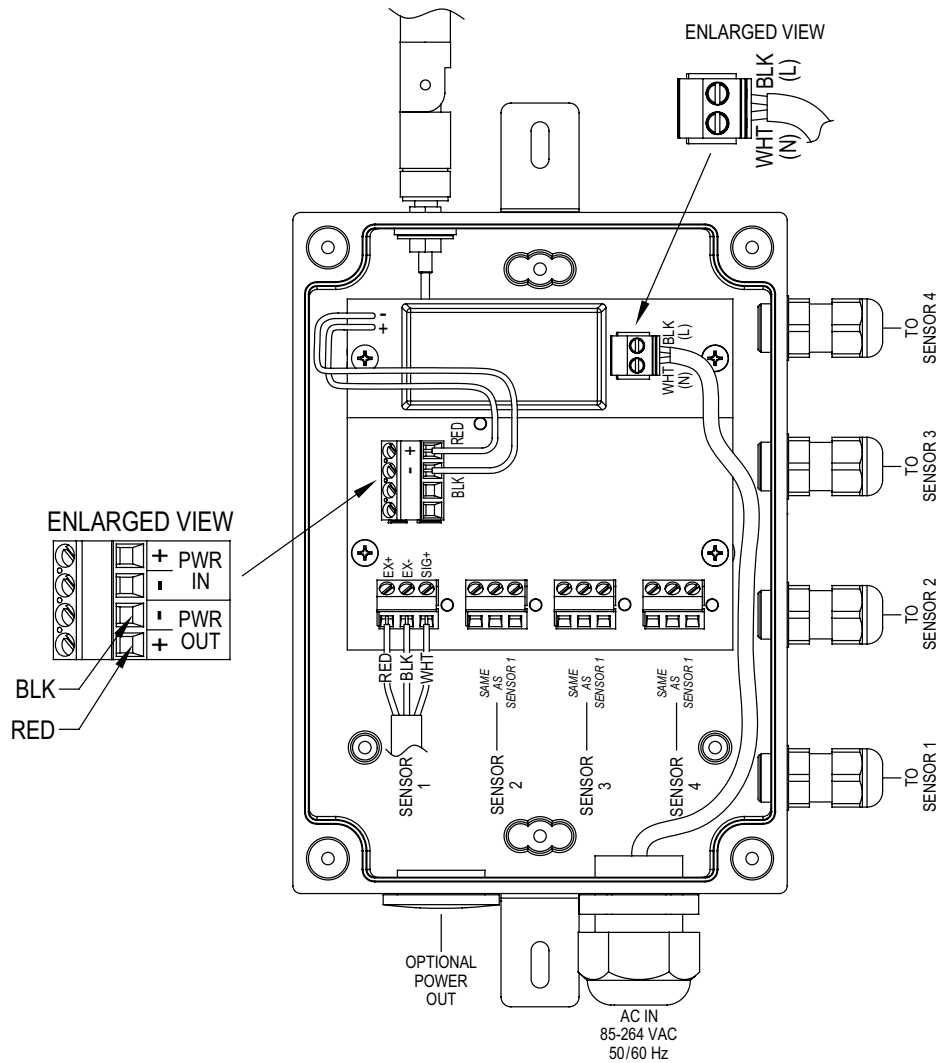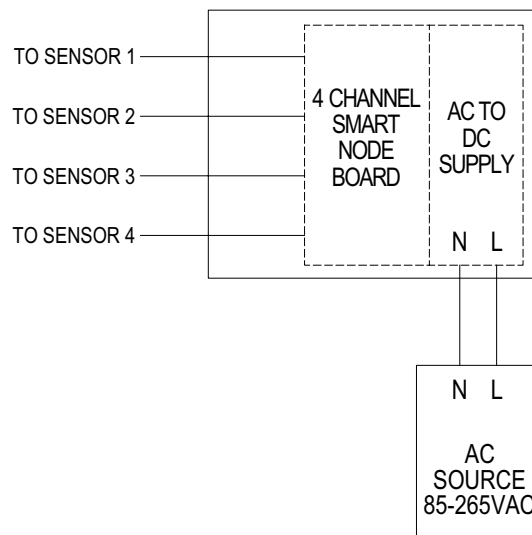# Figure 20. 4 Channel Smart Node Loop Powered (AC Version) Cover Removed

ENLARGED VIEW

ENLARGED VIEW

PWR IN

PWR OUT

BLK

RED

TO SENSOR 4

TO SENSOR 3

TO SENSOR 2

TO SENSOR 1

OPTIONAL POWER OUT

AC IN
85-264 VAC
50/60 Hz

Figure 21. 4 Channel Smart Node (AC Version) Connections

TO SENSOR 1

TO SENSOR 2

TO SENSOR 3

TO SENSOR 4

4 CHANNEL SMART NODE BOARD

AC TO DC SUPPLY

N L

N L

AC SOURCE 85-265VAC

Section 6 - SETUP

Once the Gateway and Smart Nodes have been installed, the AccuBin™ Mobile App. can be used to get weight readings and sensor status from Smart Node and ensure the Gateway is connected to cellular. Each bin can also be set-up to the users' requirements.

NOTE: Before proceeding, download the Free AccuBin™ Mobile App from either Google Play for Android or the App Store for iOS, or use the QR Code:

GATEWAY STATUS

Note: After applying power to the system allow 15 minutes for the Gateway to cellular

1. Open the AccuBin™ App
2. Tap the Bluetooth Icon (Figure 22)
3. Tap on the Gateway (GW_XXXXXX) (Figure 23)
4. Enter the password (Figure 24)
5. The Gateway connection status is displayed (Figure 25)
6. Select Done or Back Arrow to exit
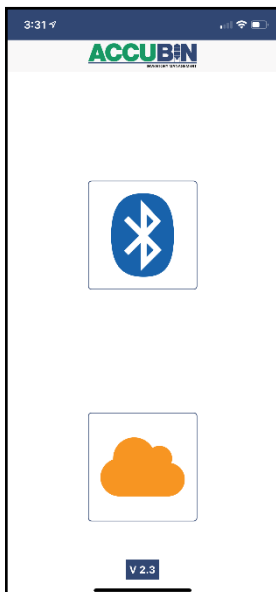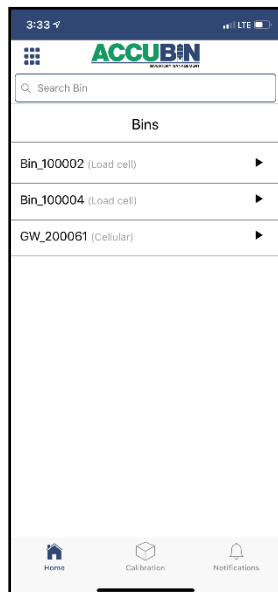
Figure 22	Figure 23	Figure 24	Figure 25
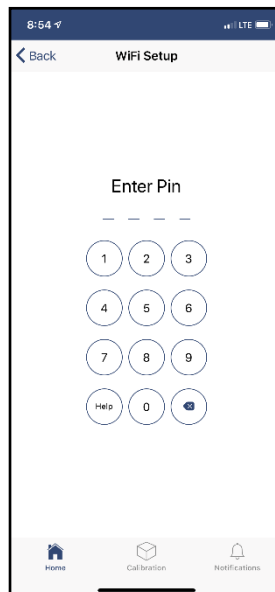
BIN SETUP

Note: After applying power to the system allow 15 minutes for the Gateway to cellular

7. Tap on a Bin (Bin_XXXXXX) (Figure 26)
8. Smart Node status is displayed
    a. Figure 29: 4...20mA Smart Node
    b. Figure 30: 4 Channel Smart Node
9. Sensor Status
    a. Green: Sensor is functioning normally
    b. Red: Sensor fault
    c. Gray: Sensor is not being used (disabled)
10. Network Status: Quality of the communication between the Smart Node and Gateway
    a. Green: Good
    b. Yellow: Fair
    c. Orange: Poor; consider repositioning the Smart Node in relation to the Gateway
    d. Red: Unreliable; reposition the Smart Node in relation to the Gateway
11. Tap Bin Settings (Figure 27 or 28)

Figure 26
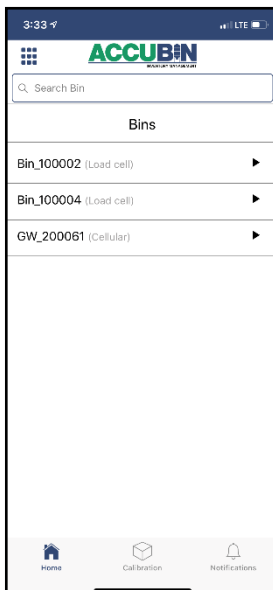
Figure 27
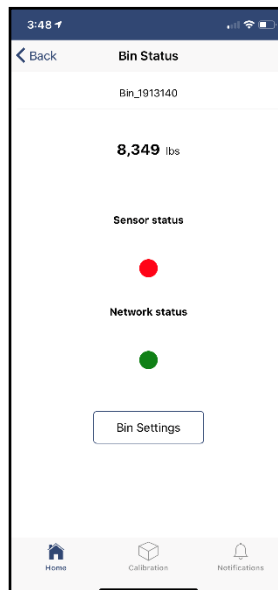
Figure 28
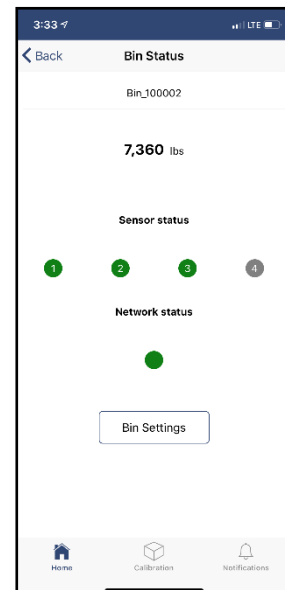
12. Enter password (Figure 29)
    Note: Bin ID cannot be changed

13. Tap on Bin Name (Figure 30)

14. Tap on the edit window and type in the desired Bin Name (Figure 31)

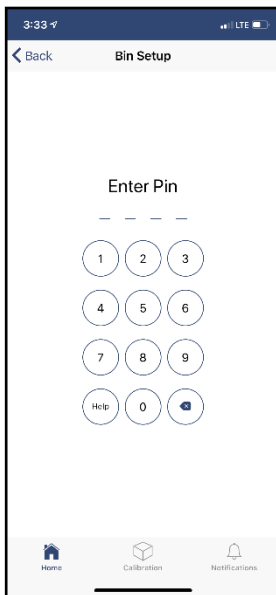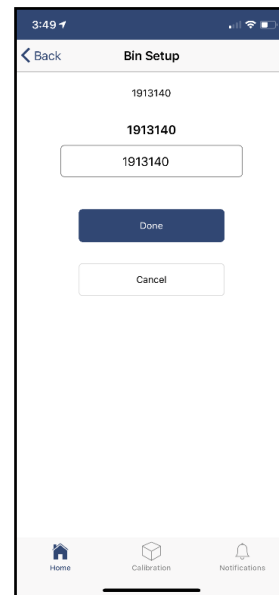15. Press Done to complete naming process or cancel to abort the change

Figure 29	Figure 30	Figure 31

Section 7 - CALIBRATION

4...20mA SMART NODE

1. From the Home Screen select Calibrate (Figure 32)
2. Enter the password (Figure 33)
3. The instruction screen appears (Figure 33)
4. Select Got It
5. Enter the 4...20 calibration parameters
   a. Tap the 4 mA Weight edit window and enter the weight that represents 4 mA
   b. Tap the 20 mA Weight window and enter the weight that represents 20 mA
6. Press Calibrate to proceed or Cancel to abort the calibration
7. If the calibration was successful, press OK when prompted
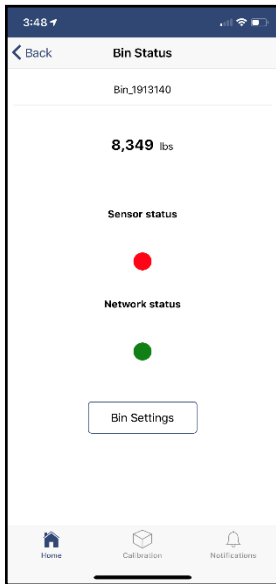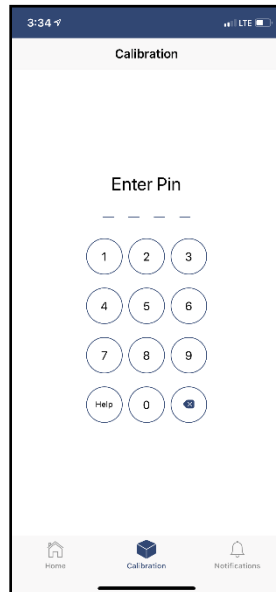
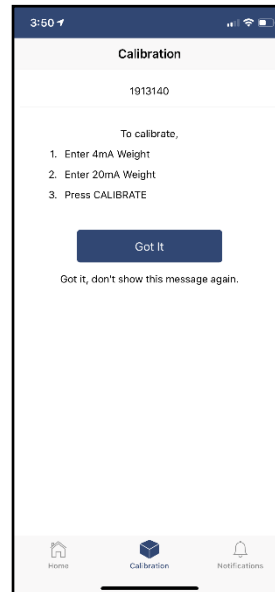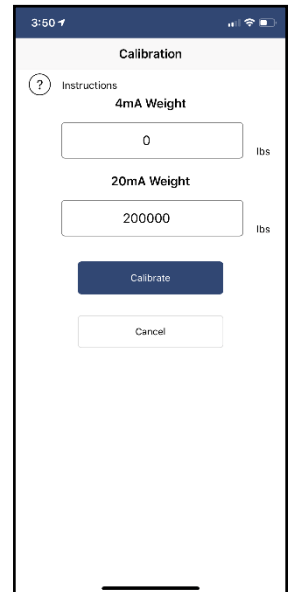| Figure 32	Figure 33	Figure 34	Figure 35

![ACCUBIN INVENTORY MANAGEMENT]

⚠️ **CAUTION: TO ENSURE PROPER OPERATION, CALIBRATION SHOULD BE DONE WITH A MINIMUM OF 25% WEIGHT CHANGE. LESSER WEIGHTS COULD HAVE A NEGATIVE IMPACT ON ACCURACY**

4 CHANNEL SMART NODE

1. From the Home Screen select Calibrate (Figure 36)
2. Enter the password (Figure 37)
3. The instruction screen appears (Figure 38)
4. Select Got It
5. Enter the current weight (Figure 39)
6. Press Enter to proceed to step 2 or Cancel to abort the calibration
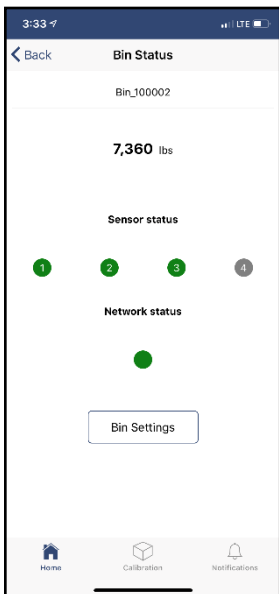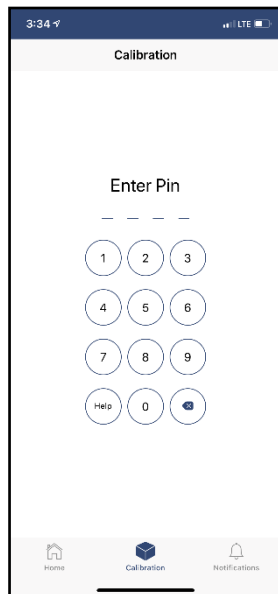7. When prompted, press Sent to proceed or Cancel

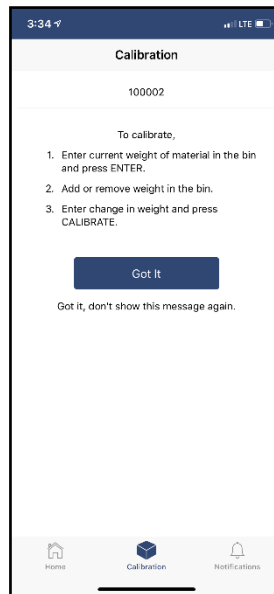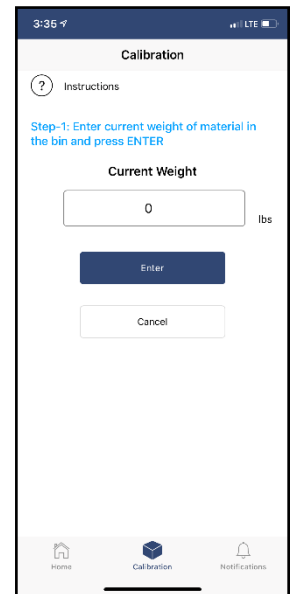| Figure 36	Figure 37	Figure 38	Figure 39

Note: At this point calibration can be suspended if adding or removing weight is a lengthy process. Suspending calibration allows you to disconnect from the AccuBin™ App until calibration is completed. The bin will show IN CAL until the process is completed. When the App is reconnected, the user will be prompted to continue the calibration process.

8. Press Continue to move to step 2 of the calibration, disconnect to suspend, or Cancel to abort the calibration. (Figure 40)

⚠ **CAUTION: CHANGE IN WEIGHT REFERS TO THE AMOUNT OF WEIGHT ADDED OR REMOVED, NOT THE NEW TOTAL WEIGHT**

9. Enter the Change in Weight (Figure 41)

10. Press Calibrate to complete the process or Cancel to abort the calibration

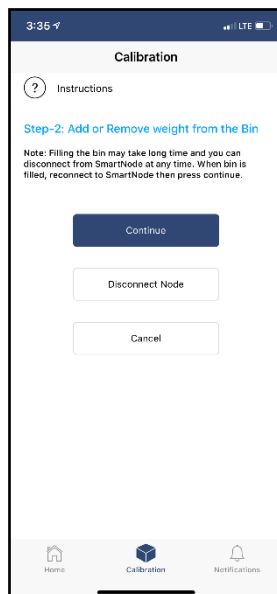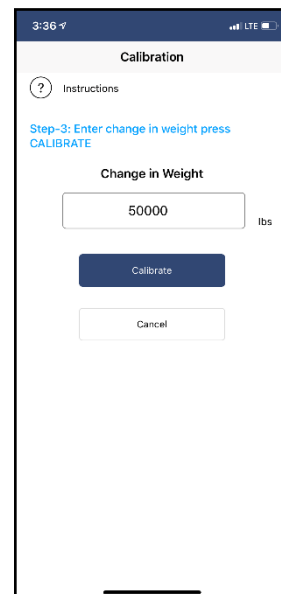11. When prompted, press Send to confirm or Cancel to abort the calibration

Figure 40

Figure 41

Section 8 - MAINTENANCE

PREVENTATIVE MAINTENANCE

⚠️ **CAUTION: THE UNIT IS SUPPLIED WITH A GASKET. AVOID FOLDING, CUTTING OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT**

No scheduled preventative maintenance is required for the Gateway or Smart Nodes when properly applied and installed correctly. There is no cleaning required for the unit before or during installation.

If the cover is removed after the unit has been in service, it is recommended to replace the gasket to prevent the ingress of water or dust. At a minimum the gasket should be inspected for folds, cracks, and tears.

Section 9 - TROUBLESHOOTING

DIAGNOSTICS

The AccuBin™ App gives access to extensive built-in diagnostics to ensure optimum performance of the system. If the Gateway and Smart Nodes detect a problem, it will be indicated on bin status screen.

NETWORK STATUS

The Network status indicates the reliability of communication between the Smart Node and Gateway. The color code for the Network status is detailed in the table below:

Code	Communication Quality	Action Required
Green	Good	None
Yellow	Fair	None
Orange	Poor	Consider repositioning the Smart Node in relation to the Gateway
Red	Unreliable	Reposition the Smart Node in relation to the Gateway

4...20mA SENSOR STATUS

The Sensor status indicates the health of the sensor attached to the Smart Node. The color code for the Sensor status is detailed in the table below:

Code	Communication Quality	Action Required
Green	Good	None
Red	Unreliable	Refer to sensor manual to determine cause of failure
Grey	No Sensor Enabled	Replace Smart Node

4 CHANNEL SENSOR STATUS

Note: If a sensor fails in the 4 Channel Smart Node; that sensor will be ignored, and the weight will be calculated with the remaining channels. The 4 Channel Smart Node will continue to calculate weight until all sensors have failed. This allows the system to operate and allow maintenance to be delayed.

⚠️ **CAUTION: OPERATING A 4 CHANNEL SMART NODE WITH A FAULTY SENSOR MAY AFFECT ACCURACY. FOR THIS REASON, THE SENSOR SHOULD BE REPLACED AT THE EARLIEST OPPORTUNITY**

The Sensor status indicates the health of the sensors attached to the Smart Node. The color code for the Sensor status is detailed in the table below:

Code	Sensor Status	Action Required
Green	Normal Operation	None
Red	Failure	1. Remove the cover of the corresponding Smart Node 2. Check status of the corresponding channel terminal block LED: 1 Red flash = short 2 Red flashes = open 3. Check sensor wiring 4. Repair wiring or replace sensor
Grey	Sensor Disabled	If the channel is unused (not connected) no action required. If the channel is in use (connected) replace Smart Node

Section 10 - APPENDICES

Appendix 1

CONNECTION CONSIDERATIONS

Optimal benefits are achieved when each weigh sensor is connected to a channel which allows each cell to be diagnosed individually. Multiple sensors can be used per channel however, this creates a weight equal to the sum of averages that is less accurate than the average of each cell.

NOTE: The 4 Channel Smart Node can handle a maximum of 8 weigh sensors at a minimum of 350 ohms

NOTE: Sensors in full bridge configuration are supplied with full to half bridge converters

WEIGHING SENSOR LIMITATIONS

Sensor	Output	Impedance (ohms)	Configuration	Max. Sensors per Node
L-Cell	+/- 1V	1.2K +/- 1%	Half Bridge	24
M-Cell (3")	+/- 1V	3.8K +/- 1%	Half Bridge	32
M-Cell (2")	+/- 1V	4.4K +/- 1%	Half Bridge	32
LD3/LD360	30 mV/V	5.8K +/- 1%	Half Bridge	32
LDII	30 mV/V	4.7K +/- 1%	Half Bridge	32
LD3xi/LD3xic	2 mv/V	500 +/- 2%	Full Bridge	16
Load Stand II	26.7 mV/V	600 +/- 1%	Half Bridge	12
TC1-S	3 mV/V	350 +/- 1%	Full Bridge	8
TC2-S	1 mV/V	700 +/- 0.5%	Full Bridge	16

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MEASUREMENT