BINTRAC®

Bin Level Monitor Installation Manual

HerdStar®

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Thank you for purchasing a BinTrac bin monitoring system from HerdStar, LLC.

Installation Overview

This section covers the mounting and wiring of the BinTrac system. Anyone responsible for programming and operating the BinTrac system should also read the Operator's Manual.

⚠ This symbol means the text has extra importance since it is describing the importance of a feature or explaining a step to which you should pay close attention to avoid problems, or to which safety is a concern.

Components

A BinTrac system consists of three basic components:

BinTrac Monitor

This is the main unit of the BinTrac system. The BinTrac Monitor communicates with the Smart Summing Boxes to register the weight of feed in the bins. The feed level is computed and displayed on the LED bar graph. One bin monitor can monitor up to four feed bins.

Load Cell Bracket

Four or more load cell brackets allow the BinTrac Monitor to accurately measure the feed level in your bins. The summing box averages the signals from all brackets to minimize errors that could result from voids (holes) in the feed.

Smart Summing Box

A single Smart Summing Box per bin communicates the current reading on the leg brackets to the BinTrac monitor.

BinTrac Power Supply

This provides the power for the BinTrac system. The power supply converts the line voltage to low voltage.

Remote Radio

A Remote Radio connects to a BinTrac Monitor. It provides wireless communications for a local HerdStar Area Network between the BinTrac Monitor and a Communications Hub.

Communications Hub

A Communications Hub connects the on-site communications service (Dialup, DSL, or Cellular) to the local HerdStar Network allowing BinTrac Monitors to be remotely monitored.

BinTrac Remote Display

A BinTrac Remote Display is a standard BinTrac Monitor configured as a Remote Display. A hardwire cable must connect the Remote display to the BinTrac Monitor.

RS-232 Interface

A RS-232 interface converts HerdStar's proprietary communications interface to a commonly used RS-232. This provides a means for a PC or other serial type device to interface with the BinTrac System.

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Preparation

Before beginning the installation process you need to make sure that the area surrounding each leg is clear of dirt, ice, or any other debris that may cause the 'A' frame to not sit flat. If this is not done it could cause the bin to lift unevenly and give a false reading.

List of Parts to be Installed

- ASY-000121 – BinTrac Monitor
- ASY-000129 – 10k Ag Load Cell Assembly
- ASY-000125 – Smart Summing Box 6-Leg OR ASY-000124 – Smart Summing Box 4-Leg
- ASY-000090 – BinTrac Power Supply

Tools Needed

- 1 – 1 1/8" open-end wrench
- 2 – 3/4" wrenches
- 1/2" Drill
- 1/2" Hammer drill or Hilti cement drill
- 1/2" metal bit
- 1/2" cement bit
- 5/16" self-tapping screws
- 5/16" hex screw tip
- 1/2" cordless drill
- Impact wrench with 1 1/8" and 3/4" sockets (optional)
- Small flat-head screwdriver
- #2 Phillips screwdriver
- Center punch

Supplies Needed

- Tie Wraps (2 per leg)
- Wire Nuts (blue or orange, 4 per bin)
- Communication Wire (4 Cond. 20 – 22 awg, shielded)

Steps to Come

There are several steps to install the BinTrac bin monitoring system. To give an overview of the installation process, these steps are outlined below.

- Mount the 'A' frame
- Anchor the 'A' frame
- Lifting the bin
- Wiring the summing box
- Setting the summing box bins
- Wiring the BinTrac monitor
- Wiring the Power Supply
- Wiring a Remote Radio
- Setup and Wiring a Communications Hub

PLEASE READ THROUGH THE ENTIRE INSTALLATION PROCESS BEFORE ATTEMPTING TO INSTALL A BINTRAC BIN MONITORING SYSTEM! IF YOU HAVE ANY QUESTIONS, DO NOT HESITATE TO CONTACT HERDSTAR, LLC. OR A CERTIFIED DEALER IN YOUR AREA.

Installation

Mounting the 'A' Frame

Mounting the 'A' frame attaches this bracket to the bin. Figure 1 shows a completed 'A' frame installation, *after* anchoring and routing the cable.

FIGURE 1: A FINISHED 'A' FRAME INSTALLATION

IMPORTANT: MOUNT THE 'A' FRAMES ONE (1) LEG AT A TIME! DETACHING MORE THAN ONE LEG AT A TIME COULD ALLOW THE BIN TO TIP OVER! INJURY OR DEATH COULD RESULT!

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Step 1: Remove all bolts connecting the leg to the footpad, leaving the original anchor bolt intact at the bottom of the footpad. This will hold the footpad down and away from the leg when the bin is lifted.

REMOVE
THESE BOLTS

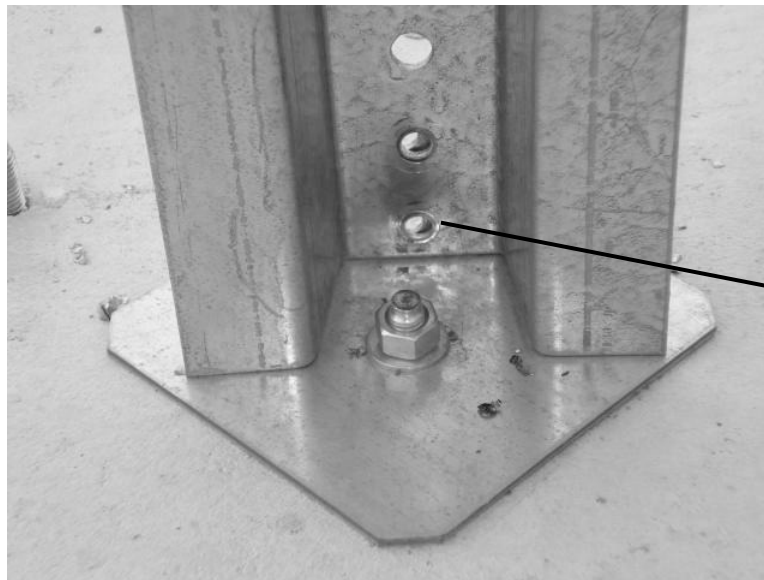FIGURE 2: FOOTPAD WITH BOLTS REMOVED

Step 2: Determine which side of the leg to mount the load cell on. The center of the leg should protrude out and have a flat side. This may face towards or away from the bin.

Step 3: Remove the ½" bolts from the U-Channel bracket of the 'A'-Frame assembly and set them aside for now.

PLACE 'A'-
FRAME NEXT
TO THIS FLAT
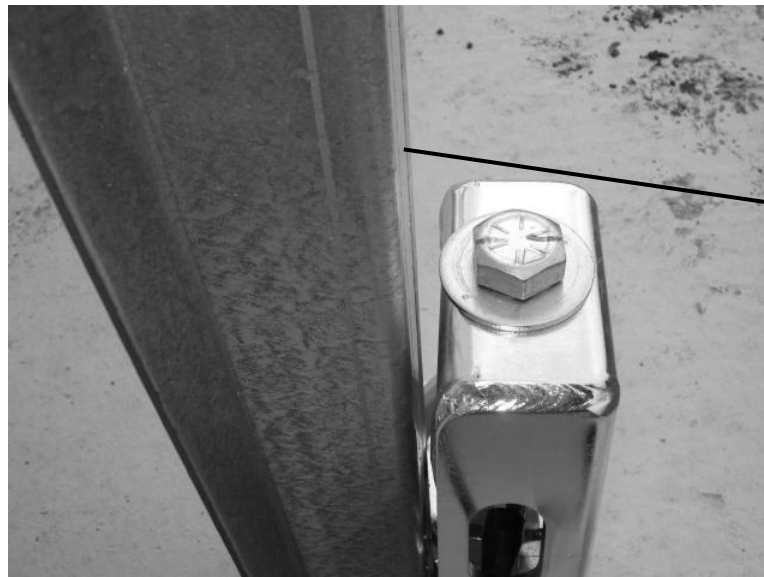
FIGURE 3: 'A' – FRAME NEXT TO BIN LEG

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MARK & DRILL
HOLES TO ½"

ADJUST TOP BOLT
UNTIL ¼" GAP HERE
BEFORE DRILLING

FIGURE 4

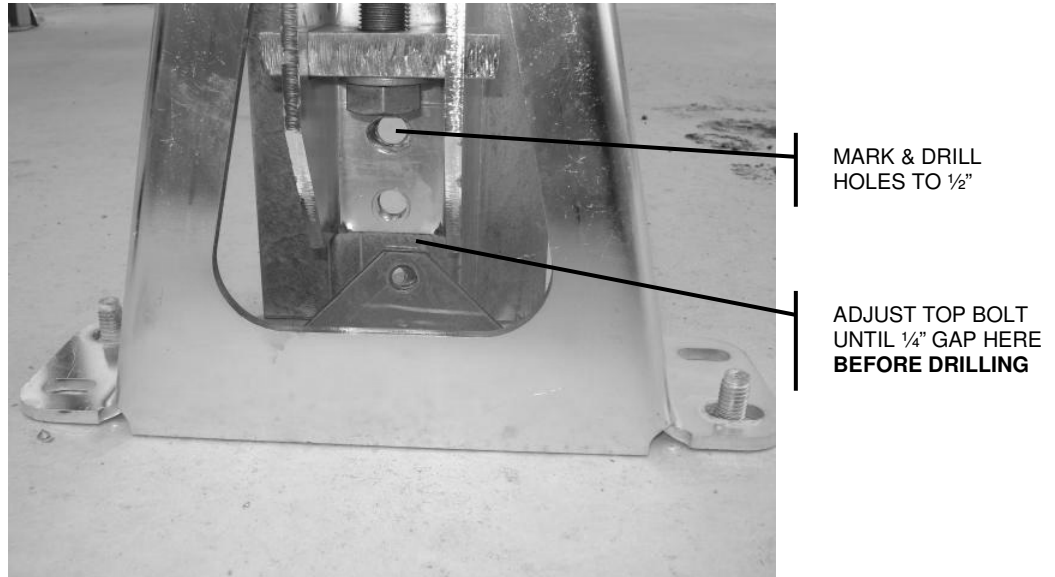**Step 4:** Set the load cell and 'A' frame in front of the flat side of the leg and adjust the top bolt on the 'A' frame assembly so that the saddle is approximately ¼" above the top of the footpad.

Step 5: IMPORTANT! Center the U-Channel bracket on the flat side of the bin leg.

Step 6: Mark the two holes of the U-Channel on the leg and drill them to ½".
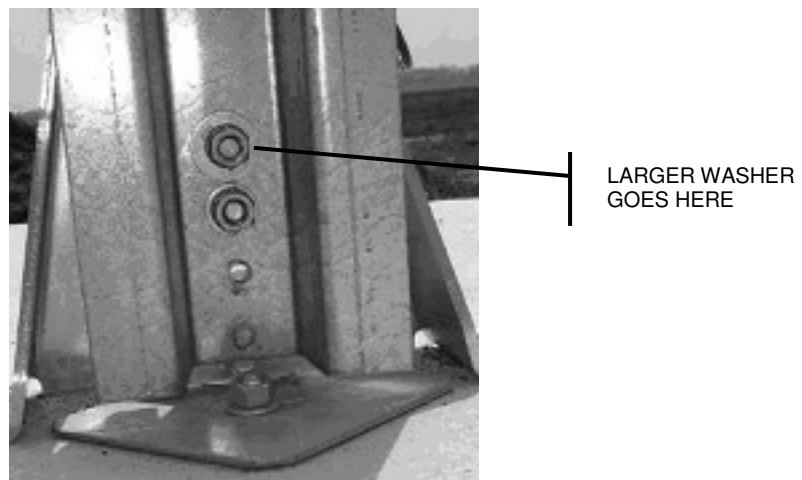

LARGER WASHER
GOES HERE

FIGURE 5

Step 7: Put the bolts in from the U-Channel side through the leg. Place a washer, lock-washer, and nut on each bolt. The larger washer is placed on the top bolt; hand-tighten.

MAINTAIN A ¼" GAP BETWEEN LEG AND 'A'-FRAME

FIGURE 6

Step 8: Set the 'A' frame so that it is ¼" away from the bin leg, and the U-Channel is centered under the loadcell.

Step 9: Snug (hand-tighten) the top bolt on the 'A' frame to straighten everything up and keep it in place.

Step 10: Tighten the two bolts attached to the bin leg using a ¾" socket.

Anchoring the 'A' Frame

Step 11: Drill two anchor bolt holes in the pad diagonally opposite of each other. You will see that the 'A' frame has four slotted holes, but only two of them are required. The other two holes are there in case it is necessary to relocate a hole. Make sure the holes are deep enough to fit the full length of the anchor bolt. See Figure 4.

Step 12: Hammer the anchor bolts into the cement, making sure they are firmly in place.

Step 13: Tighten the nuts of the anchor bolts using a socket or hammer drill to anchor the 'A'-Frame.

⚠️ ***Repeat Steps 1 – 12 for all bin legs before continuing to the next step.***

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ANCHOR BOLT

ANCHOR BOLT

FIGURE 7

Lifting the Bin

Step 14: Tighten the top bolts on the 'A' frames to the point where they just start to snug up. Mark the top of them with a marker. See Figure 8.

MARK HERE

FIGURE 8

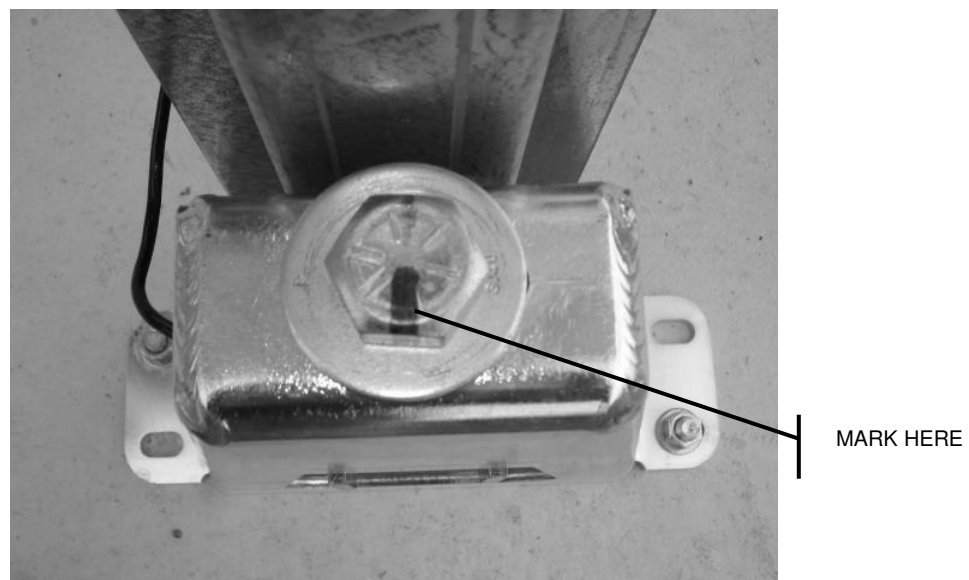**Step 15:** Tighten all the lifting bolts 1 or 2 full turns at a time until each leg is at 8 turns. You should notice about ¼" gap underneath each leg. The top of the U-Channel MUST NOT be up against the 'A' frame—a clearance of 1/16" to 3/8" must be maintained. Also, verify after every 3 or 4 turns that the lifting bolt is not pressing against the middle portion of the load cell—permanent damage could result.

AFTER LIFTING, YOU SHOULD HAVE ABOUT A ¼" GAP
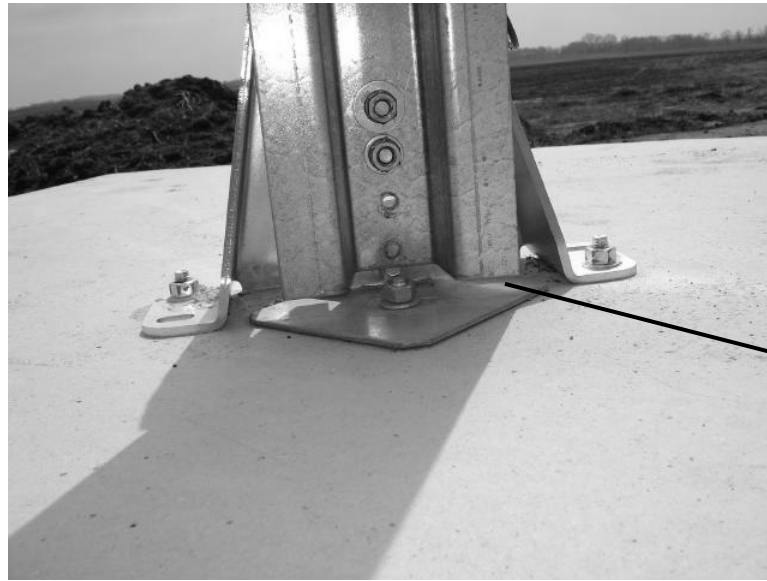
FIGURE 9

Step 16: Check each leg assembly to verify nothing is binding or caught.

Wiring the Summing Box

In order to get a reading from these load cells, you need to tie them all together into a summing box. One summing box per bin is required.

Step 17: The summing box should be mounted on the same leg on each bin, which will be called "Leg 1". This leg will also be the one where the BinTrac Pro console is mounted (if it is to be mounted on a bin). Be sure it is in a good location for the workers or feed truck driver to view and use.

SMART SUMMING BOX MOUNTED & WIRED

FIGURE 10

Step 18: Mount the box to the leg using two self-tapping screws.

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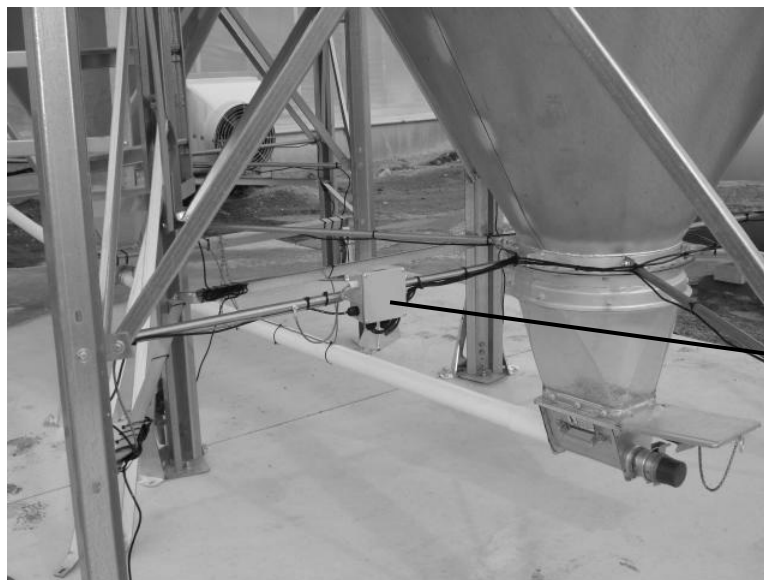**Step 19:** Run the cable from each load cell over to the summing box: inside the box will be six plug-in slots. Starting with Leg 1, the order will go clockwise 2,3,4,5 and 6. Inside the summing box is the upper left slot for Leg 1, and going clockwise will be the rest in numerical order. Before plugging the cables in, remove the black plastic lock nut from each cable strain relief. Pass the cable through the box and then the nut.
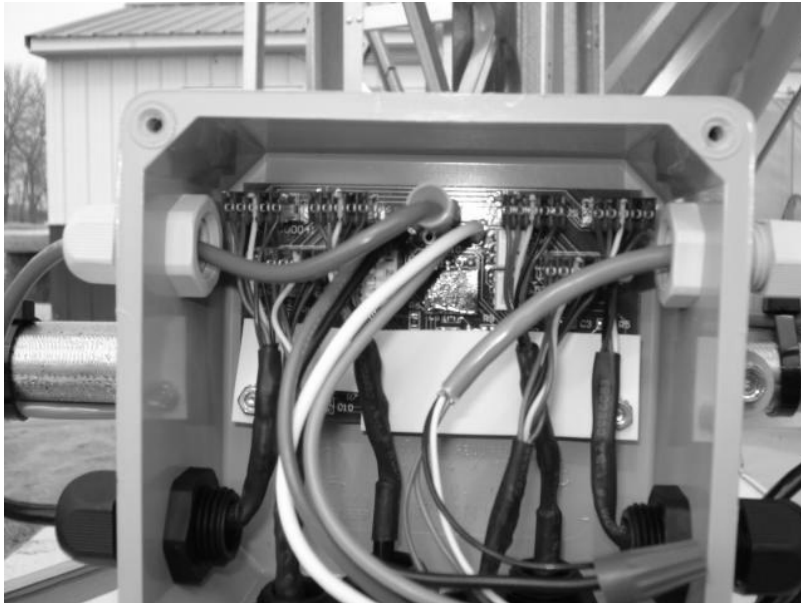

FIGURE 8

Wire Color	Description
Red	+12V
Black	-12V
Orange	+Sig
White	-Sig

Step 20: Install the communication cable starting with the bin farthest away from the BinTrac monitor for that cluster of bins if more than one bin will be connected the BinTrac monitor. Pass the communication cable through the gray liquid tight strain relief (right side of the enclosure in figure 8). Connect the red wire to the red wire on the summing box using an appropriate sized wire nut. Connect the black wire to the black wire and the green jumper wire with the black end from the summing box. Connect the green wire to the orange wire on the summing box. Connect the White wire to the white wire on the summing box. Run the communication cable to the next summing box or to the BinTrac monitor.

Note: When two or more summing boxes are being connected to the BinTrac monitor, communication wire for the next summing box or BinTrac monitor will also need to be passed through the strain relief and wires connected to the connections described in step 20.

Step 21: Firmly attach the green ground wire to the bin leg using a self-tapping screw.

Step 22: Tighten all strain-reliefs ("dome nuts") on the box. First tighten the nuts to attach the strain reliefs to the box. Then tighten the dome nut until the cable cannot be pulled out of the box.

Setting the Summing Box Bin

Each BinTrac Pro monitor can monitor up to four bins. It must know which bin is to be 'A', which will be 'B', and so on. To do this, there are four switches available in each summing box. Determine which bin you want to be which, and set the switches accordingly – refer to Table 2 below.

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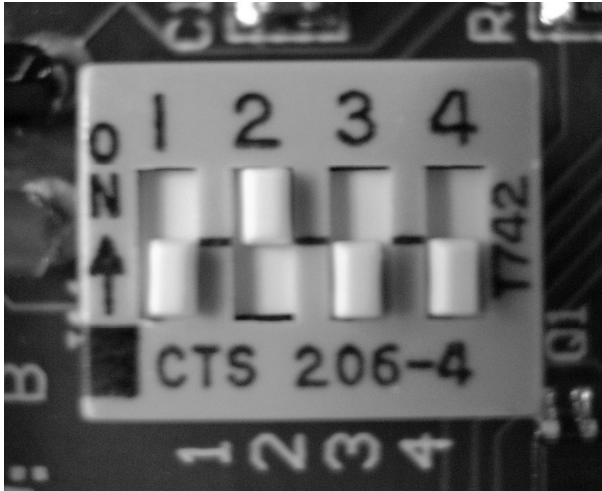
BIN	S1	S2	S3	S4
A	**OFF**	**OFF**	**OFF**	**OFF**
B	**ON**	**OFF**	**OFF**	**OFF**
C	**OFF**	**ON**	**OFF**	**OFF**
D	**ON**	**ON**	**OFF**	**OFF**

TABLE 2: SWITCH SETTINGS

Tidying Up

Step 23: Close each summing box cover. Make sure the gasket is in place.

Step 24: After plugging in all the cables, you need to tie all the cables up and out of the way with cable ties. A drip loop is necessary to keep moisture from building up inside the load cell. Where the cable comes out of the load cell, tie it downward to the side of the 'A' frame then bring back up to the cross brace on the bin.

FIGURE 10

Step 25: Pull the cables tight away from the summing box to the cross brace of the leg it came from.

Step 26: With the extra slack left over, coil it up and tie it underneath the cross brace.

FIGURE 11

Wiring the BinTrac Monitor

Step 27: There are two options for wiring the BinTrac Monitor, depicted in Figures 12 and 13. The "daisy-chain" configuration is recommended.
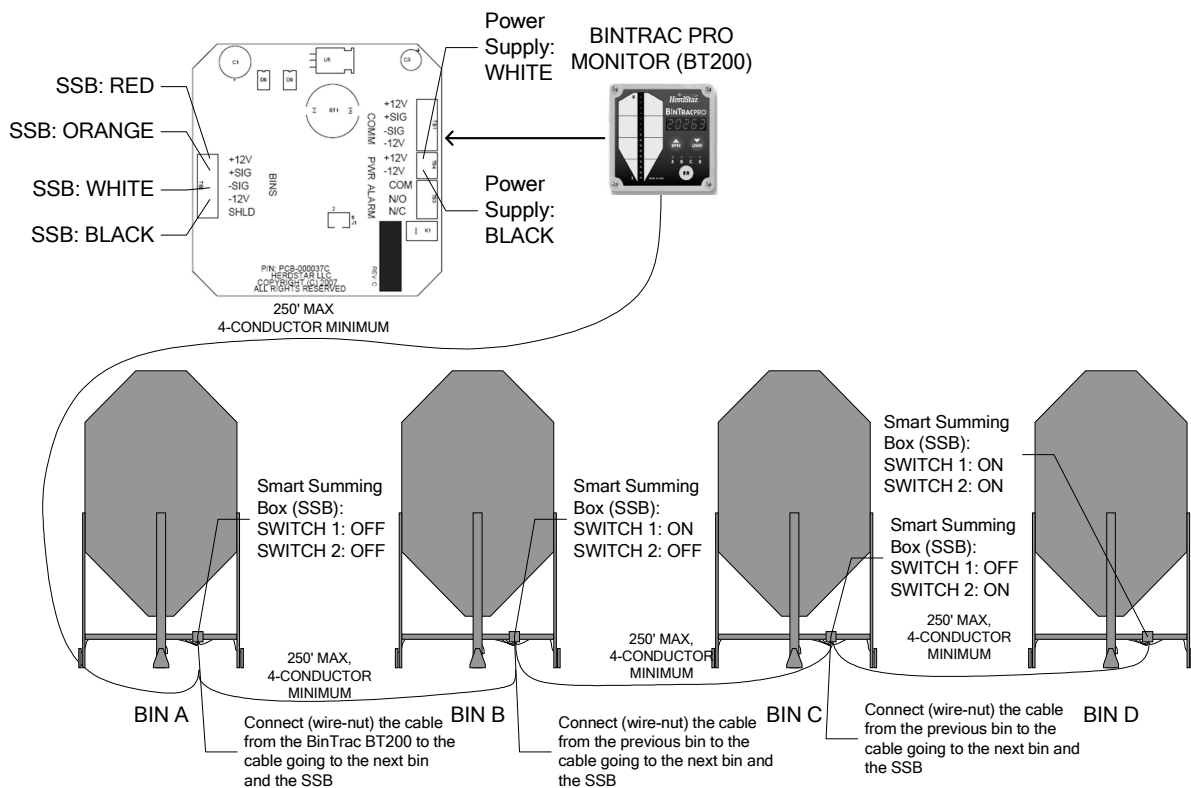
- **Daisy Chain Wiring**

FIGURE 12
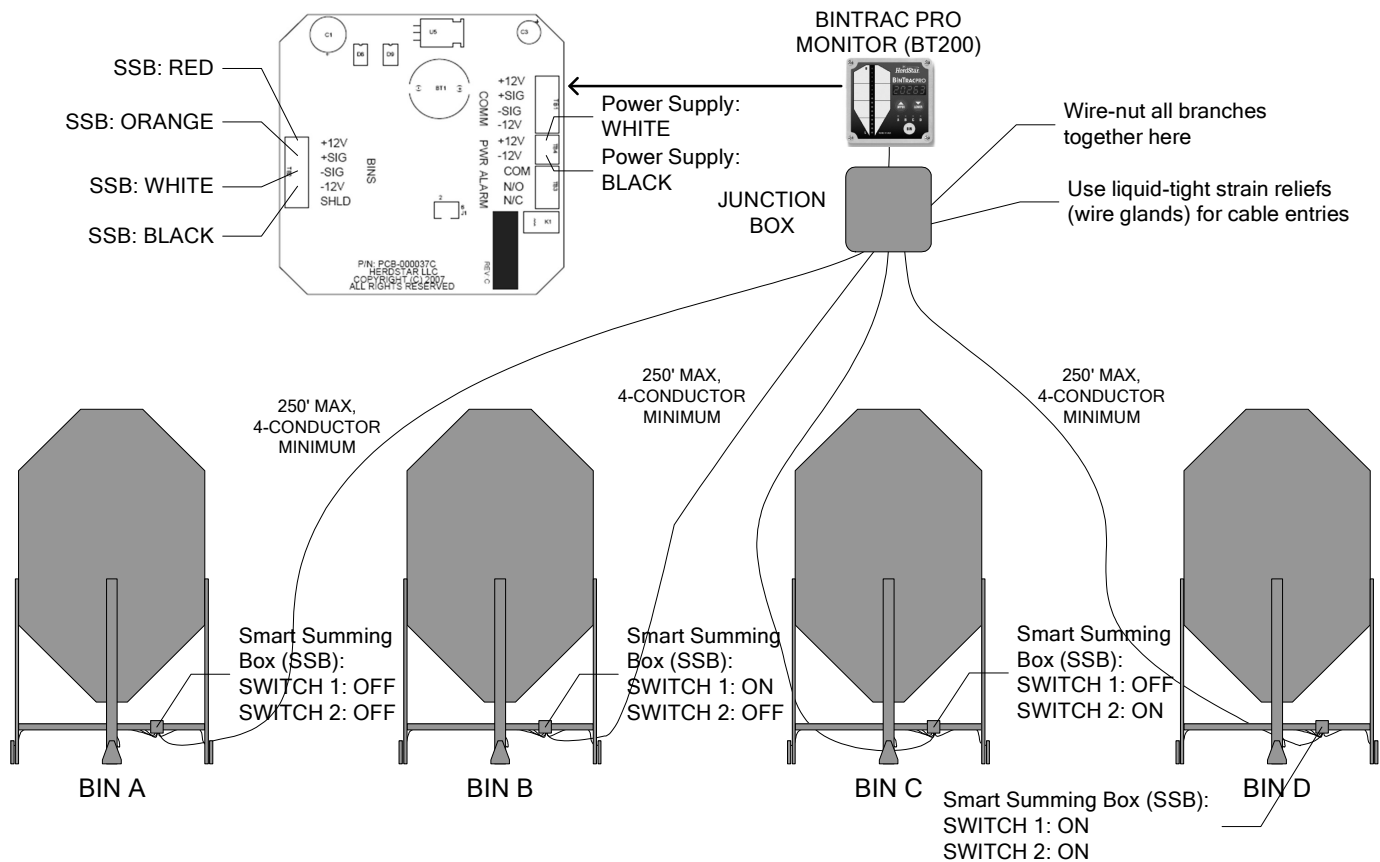
13

- **Star Wiring**

FIGURE 13

Wiring the BinTrac Power Supply

The Power Supply can be mounted on the outside of the building near an outlet. The Power Supply includes 50 feet of 18 ga. cable. Mount the Power Supply on the building in a location that allows the cable to be tied to the feed line, or other structure preventing entanglement by a person walking between the bin and building or from equipment being moved in the area.

Once the cable is routed from the Power Supply to the BinTrac Monitor and has been tied up out of the way, cut off any excess cable and connect to the PWR block as indicated in the figures for Step 27 above.

If the BinTrac monitor is installed in an office or building walkway, the Power Supply can be installed in the same area, near an outlet.

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Wiring a Remote Radio

- A Remote Radio is wired to the BinTrac Monitor when a local wireless network is used. The Radio is wired into the BinTrac Monitor port labeled COMM. (See BinTrac Monitor diagram in Step 27.)

FIGURE 14

COMM

Pin Description	Wire Color
+12V	Green
+SIG	White
-SIG	Red
-12V	Black

TABLE 3: Radio Wiring

- After the Base Radio is installed and powered, test the communications connection and signal strength by pressing the TEST button on each of the Remote Radios. Two lights should be on solid for an adequate communications connection.

Signal Test Mode - LEDs act as signal strength meter.

1 LED lit - poor
2 LEDs lit - marginal
3 LEDs lit - good
4 LEDs lit - very good

FIGURE 15

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Setup and Wiring a Communications Hub

A Communications Hub is installed when BinTrac Monitors are remotely monitored. The Communications Hub provides a central point to connect the site BinTrac Monitors to a central communications service (Dialup Phone Line, DSL Internet, or Cellular).   Multiple devices can be connected to the Communications Hub, either directly or via a Base Radio.

- • A BinTrac Monitor can be directly wired to the Communications Hub via the BinTrac COMM port to the Communications Hub CONSOLE/ROUTER port.

BinTrac ProCOMM

Pin Description	Wire Color
+12V	Green
+SIG	White
-SIG	Red
-12V	Black

TABLE 4: Communications Hub Wiring

FIGURE 16

- • When a Wireless network is used, connect a Base Radio to the BASE RADIO port on the Communications Hub using cable supplied by HerdStar. These molded end cables are available in lengths of 4',12', 25', 50' and 100'.

- • Connect the local site communications as follows. Connect to the PHONE LINE port if a dialup service is used, or connect to the SERIAL PORT if a Cellular Service or DSL Internet service is used.

Communications Service	Connected Device	Communication Hub Port
Dialup	Phone Jack	PHONE LINE
DSL Internet	Lantronix Serial to Ethernet	SERIAL
Cellular	AirLink Raven	SERIAL

TABLE 5: Communications Hub Wiring

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Setup and Wiring a BinTrac Remote Display

A Remote Display is a BinTrac Monitor programmed as a Remote Display which displays the same weight data as the local BinTrac Monitor.   The Remote Display receives all its settings with the exception of enabled Bins from the local BinTrac Monitor. Calibration and Zero must be done on the local indicator.   Follow the steps below to setup a Remote Display.

- Connect the wiring between the Remote Display and the BinTrac Monitor. Power can be supplied from the Remote Display or the BinTrac Monitor.

BinTrac Monitor	BinTrac Monitor programmed as Remote Display
BINS +12V	COMM +12V
BINS +SIG	COMM +SIG
BINS –SIG	COMM –SIG
BINS -12V	COMM -12V

TABLE 6: Remote Display Wiring

- Configure BinTrac Monitor for communications interface with a Remote display. Enable Peripheral Device Communications (BIN D LED) in SETUP Configuration menu.

Setup Configuration:
SETUP: Configure Bin LEDS; Flashing (Disabled) or Solid On (Enabled)
- ☼ BIN A - Enable Remote Display
- ☼ BIN B - Enable PC Serial Communications and Command Set
- ☼ BIN C - Enable Weight Broadcast. Transmits once every 5 seconds.
- ☼ **BIN D - Enable Peripheral Device Communications**

- Configure second BinTrac Monitor as a Remote Display. Enable Remote Display (BIN A LED) in the SETUP Configuration menu.

Setup Configuration:
SETUP: Configure Bin LEDS; Flashing (Disabled) or Solid On (Enabled)
- ☼ **BIN A - Enable Remote Display**
- ☼ BIN B - Enable PC Serial Communications and Command Set
- ☼ BIN C - Enable Weight Broadcast. Transmits once every 5 seconds.
- ☼ BIN D - Enable Peripheral Device Communications

Wiring a RS-232 Interface to a Remote Display

A RS-232 interface converts the BinTrac Pro Remote Display isolated communications to RS-232 for interface with a PC or other Serial Devices. Also see Setup and Wiring a Remote Display.

- **Important:** The RS-232 Interface cannot share power with any BinTrac component.
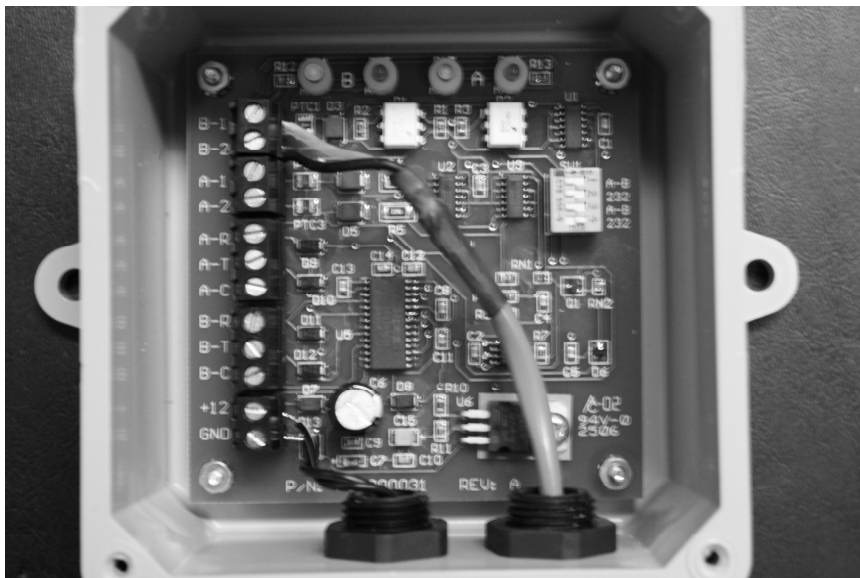
Figure 14

- Connect the wiring between the BinTrac Pro Remote Display and the RS-232 Interface.

BinTrac Pro Remote Display	RS-232 Interface
BINS +SIG	B-1
BINS –SIG	B-2

TABLE 7: RS-232 Communications Wiring

RS-232 Interface	PC Description
B-R	Data Receive
B-T	Data Transmit
B-C	Data Common

TABLE 8: RS-232 Data Interface Wiring

- Set the DipSwitch Settings on the RS-232 Interface as listed below.

RS-232 Interface DipSwitch	DipSwitch Position
S1	OFF
S2	ON
S3	OFF
S4	ON

TABLE 9: RS-232 Dipswitch Settings

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Wiring a RS-232 Interface to a BinTrac Monitor

A RS-232 interface converts the BinTrac Monitors isolated communications to RS-232 for interface with a PC or other Serial Devices.

- **Important:** The RS-232 Interface cannot share power with any BinTrac component.

- Connect the wiring between the BinTrac Pro Monitor and the RS-232 Interface.

BinTrac Pro Monitor	RS-232 Interface
COMM +SIG	A-2
COMM –SIG	A-1

TABLE 10: RS-232 Communications Wiring

RS-232 Interface	PC Description
A-R	Data Receive
A-T	Data Transmit
A-C	Data Common

TABLE 11: RS-232 Data Interface Wiring

- Set the DipSwitch Settings on the RS-232 Interface as listed below.

RS-232 Interface DipSwitch	DipSwitch Position
S1	OFF
S2	ON
S3	OFF
S4	ON

TABLE 12: RS-232 Dipswitch Settings

Configure BinTrac Monitor for PC Serial Communications

When a BinTrac Monitor (Monitor or Remote Display) is connected to a PC Serial Communications type device, its communications port needs to be configured for ASCII Serial Communications.

- Configure BinTrac Monitor (Monitor or Remote) for PC Serial Communications. Enable PC Serial Communications and Command Set (BIN B LED) in Setup Configuration.

Setup Configuration:
SETUP: Configure Bin LEDS; Flashing (Disabled) or Solid On (Enabled)
- BIN A - Enable Remote Display
- **BIN B - Enable PC Serial Communications and Command Set**
- BIN C - Enable Weight Broadcast. Transmits once every 5 seconds.
- BIN D - Enable Peripheral Device Communications

- Set PC Serial Communications Baud Rate. Baud Rate configured in the Internal Settings Menus.

Internal Configuration:
BAUD: Configure Serial Communications Baud Rate
Selectable Baud Rates: 1200, 4800, 9600, 19200, 38400, 57600

Complete Tandem Bin Setup

FIGURE 15

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Appendix A

Replacement Parts

ANT-000003	18" Dual Band Cellular Antenna
ASY-000006	Remote Radio
ASY-000028	Communication Hub
ASY-000028	Communication Hub
ASY-000032	Communication Hub DC Power
ASY-000033	Router
ASY-000036	Communication Hub Phone Jack
ASY-000079	Base Radio
ASY-000081	Bintrac Pro Console BT200
ASY-000090	Bintrac PS40
ASY-000124	Assy Smart Summing Box 4-leg
ASY-000125	Assy Smart Summing Box 6-leg
ASY-000129	10k Ag Load Cell
ASY-000136	9-Pin DSub Adapter
ASY-000142	"Always On" Power Cable
CAB-000009	Communication Cable – 22awg 4 Cond. Shielded
CAB-000004	4' Interface Cable
CAB-000005	12' Interface Cable
CAB-000013	25' Interface Cable
CAB-000014	50' Interface Cable
CAB-000010	100' Interface Cable
CAB-000011	200' Interface Cable
CAB-000015	Spliced Interface Cable
CAB-000029	6' Bintrac Radio Interface Cable
CAB-000044	2' Coaxial Cable, Male to Male
CAB-000045	20' LMR400 Coaxial Cable, Male to Male
COM-000001	The Stick
COM-000002	Selective/Distinctive Ring Processor
COM-000007	Raven Airlink CDMA – Serial
HAR-000009	Cord Grip PG-7
HAR-000024	Radio Enclosure Bracket
HAR-000042	'A' Frame Leg Bracket
HAR-000053	Raven Mounting Bracket
NUT-000005	Fiberglass Locknut PG-7
NUT-000011	1/2" x 13 Hex Nut
POW-000004	Power Supply 24V
SCR-000017	1/2" x 13 x 1" Screw Cap
SCR-000020	3/4" x 16 x 2 1/2" Screw Cap
SCR-000021	1/2" x 3 3/4" Wedge Anchor
SCR-000022	3/4" x 16 x 2 1/4" Screw Cap
TVS-000028	Lightning Arrestor N-F to N-F
WAS-000007	1/2" Flat Washer
WAS-000008	1/2" SAE Flat Washer
WAS-000011	3/4" SAE Flat Washer
WAS-000012	Flat Washer
WAS-000013	1/2" Lock Washer