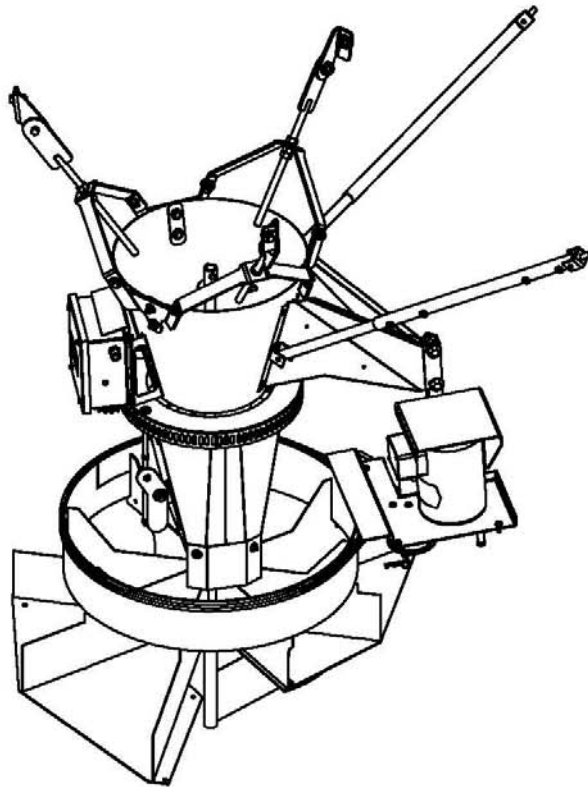


# CONTROLLED FLOW GRAIN SPREADER

For 8" to 13" Transport Augers



## INSTALLATION INSTRUCTIONS

MODEL 653E-001A MECHANICAL PARTS, 2 HP  
MODEL 653F-001A VARIABLE SPEED CONTROLLER (ABB Drive)



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# INTRODUCTION

Congratulations on the purchase of your state-of the art grain spreader. We want to thank you for your purchase and take this time to let you know that we at Shivers are here to help you with your grain moving and drying needs.

To fulfill your expectations we want you to start out with your unit operating to it's full potential.

To reduce your installation and set up time we have assembled most of the unit and preset adjustments at our plant.

Shipment will come as two pallets and two boxes for ease of customer unloading and storage.

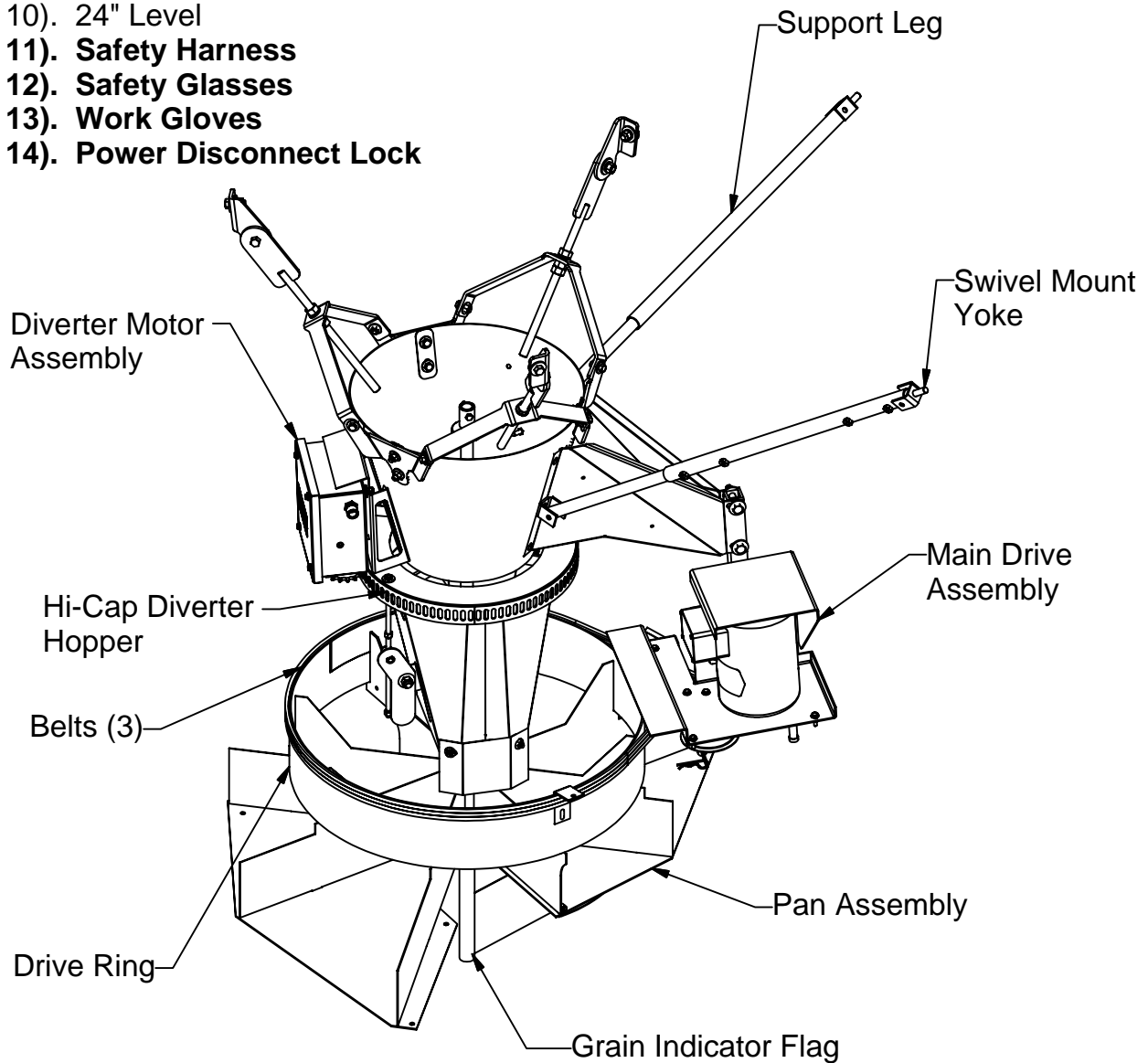
- 1). Spreader Assembly
- 2). Pan Assembly
- 3). Control Box
- 4). Parts Box

**NOTE: SAFETY CONCERNS ARE IN BOLD PRINT**

# MECHANICAL INSTALLATION

## TOOLS NEEDED

- 1). Hand Drill
- 2). Open End Wrench
- 3). 3/8" Socket Wrenches
- 4). 12" Crescent Wrench
- 5). Overhead winch/hoist
- 6). Guide Ropes
- 7). Hammer and Punch
- 8). Allen Wrenches
- 9). Tube of Sealer
- 10). 24" Level
- 11). **Safety Harness**
- 12). **Safety Glasses**
- 13). **Work Gloves**
- 14). **Power Disconnect Lock**



# MECHANICAL INSTALLATION

- \* To help avoid accidents please review all safety information in all manuals that came with this unit.
- \* Review safety information included in the variable frequency drive manual.
- \* Do not try to operate this unit if it is not secured in its operational location. The rotating pan will cause injury if anyone is caught in its rotational sweep area.
- \* When servicing unit be sure that all electrical power is locked out at power box. This would include other equipment as well as the unit you are working on. (Refer to electrical section for more details.)
- \* Never try to do any adjustments while unit is running or when electrical power is not locked off.
- \* Do not try to install unit by yourself.
- \* Use safety harness while working on roof during set-up and maintenance.

## SET UP AN ASSEMBLY AREA

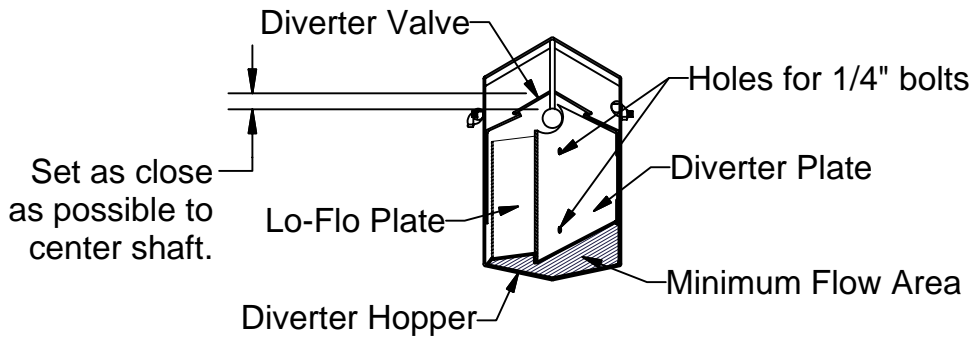
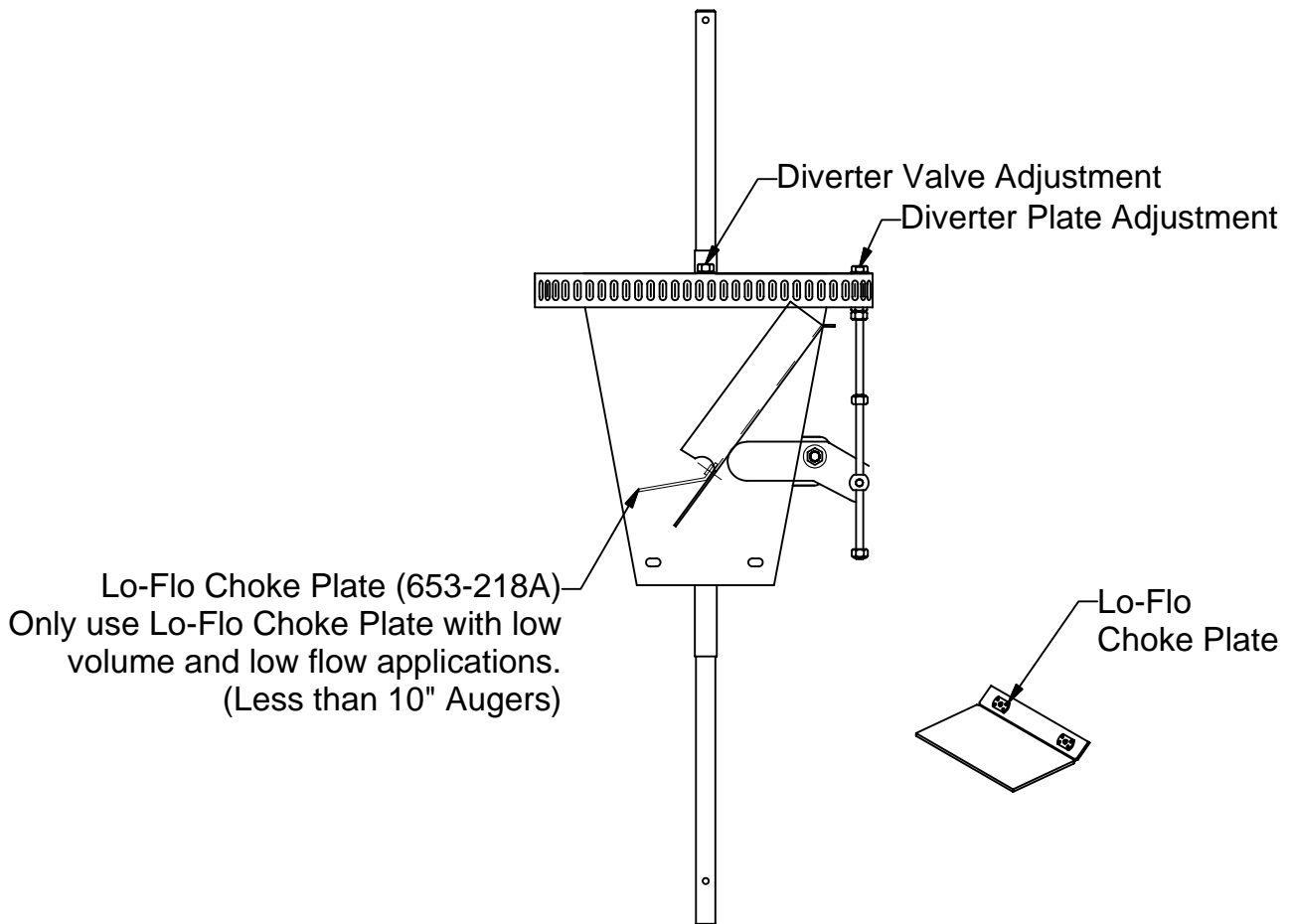
- 1). Secure overhead hoist in place above the center opening of the bin.  
(Secure hoist to make sure that it cannot slide or move from center of opening.)
- 2). Remove spreader from shipping pallet and with help, carry it into bin and place it under hoist.  
NOTE: You may have to remove the motor assembly unit to get into some bin doors.

# MECHANICAL INSTALLATION

## INSTALLING LO-FLO CHOKE PLATE

**(8" OR SMALLERS AUGERS ONLY, LESS THAN 2500 BU/HR)**

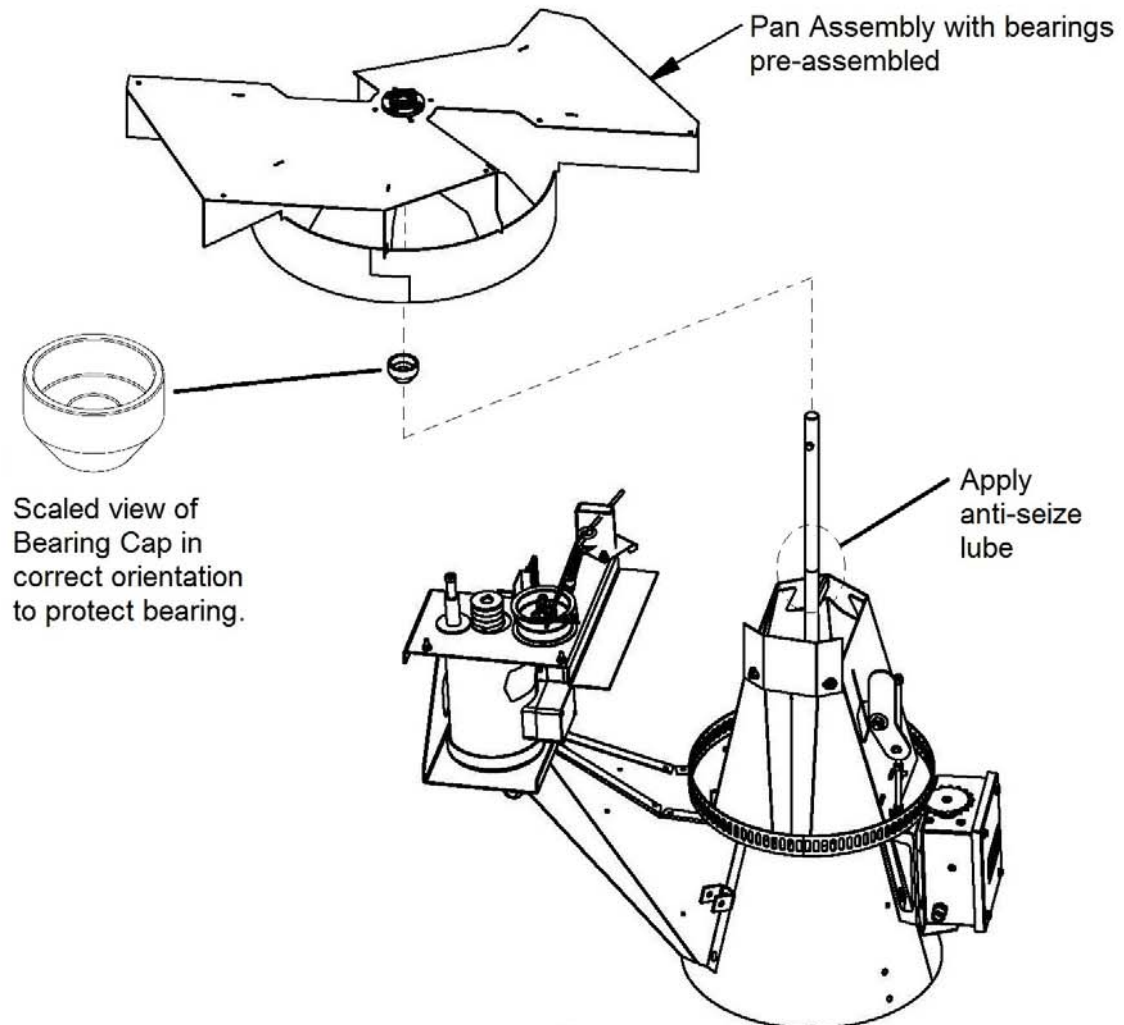
This plate, as shown installed, will allow you to properly spread grain at a lower rate than possible with the standard unit. This was developed to allow use of smaller, slower augers. Do not install this plate for 10" or larger input augers. Set diverter valve so it is as close to center shaft as possible. Use the 1/4-20 bolts (2) and lockwashers from kit to install plate before installing pan. Set diverter plate to an opening that looks like it will take the flow from your input auger.



# MECHANICAL INSTALLATION

## INSTALLING PAN ASSEMBLY

- 1). Set hopper assembly upside down on bin floor.
- 2). Note that drive belts are wrapped around drive pulley; the excess is wire-tied to the motor mount. Remove wire tie and stretch out belts.
- 3). The bearings are pre-assembled onto the Pan. Apply anti-seize to the shaft and slide the Bearing Cap from hardware sack, 653-173A onto the shaft past the small shoulder. Slide the Pan Assembly onto the shaft until it stops at the shoulder. Using a 3mm hex key wrench, tighten the setscrews on the pan bearing. Slide the Bearing Cap up until it stops against the pan bearing. Using a 5/32 hex key wrench, tighten the setscrews in the Bearing Cap.
- 4). See pages 8-9 for final assembly.

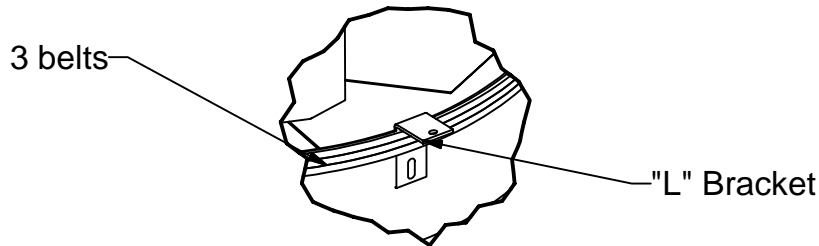




# MECHANICAL INSTALLATION

## INSTALLING AND ADJUSTING BELTS

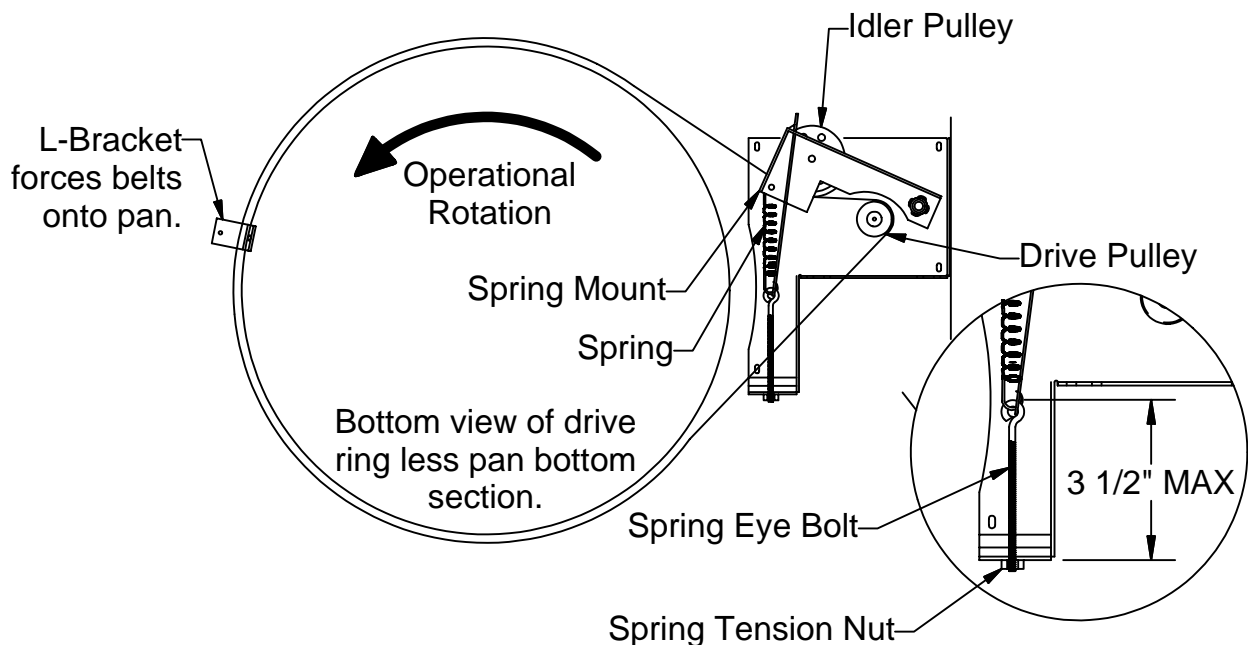
- 1). Clamp "L" bracket that held unit to pallet to the edge of the pan as shown.
- 2). Loop all three belts over bracket.



- 3). Turn pan in the operational direction until the belts pop into place. Remove "L" Bracket.
- 4). Springs and pulleys are set at the factory and should not need adjustment.

### **CRITICAL STEPS**

5). Check that the three V-Belts run centered on the idler pulley. Lift idler pulley spring mount while turning pan to remove any resistance which may exist in the idler pivot bearing (to simulate gravity when the unit is hanging in the grain bin). Be sure that the belts do not rub sides of idler pulley. NOTE: Belts run true only when pan is rotated in the operational direction.



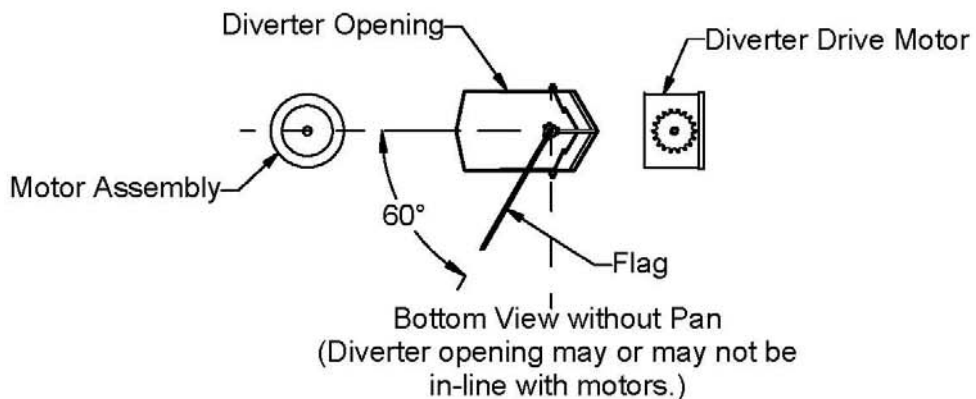
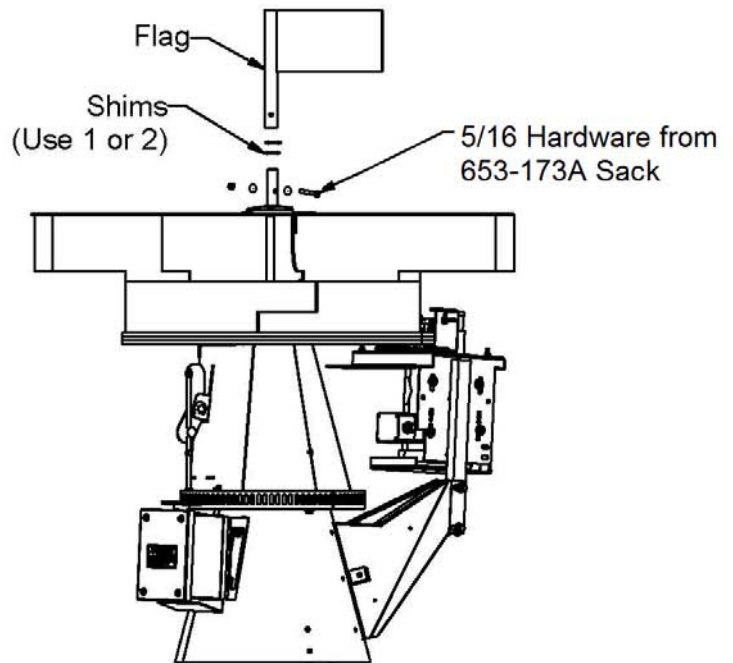
# MECHANICAL INSTALLATION

## INSTALLING FLAG

- 1). Place shims as required onto shaft, slide on flag and bolt in place with 5/16 hardware. Shims should take up room between flag and pan bearing. There should be no more than 1/16-1/8" vertical end play.

**NOTE: DO NOT OPERATE UNIT WITHOUT FLAG BOLTED SECURELY IN PLACE.**

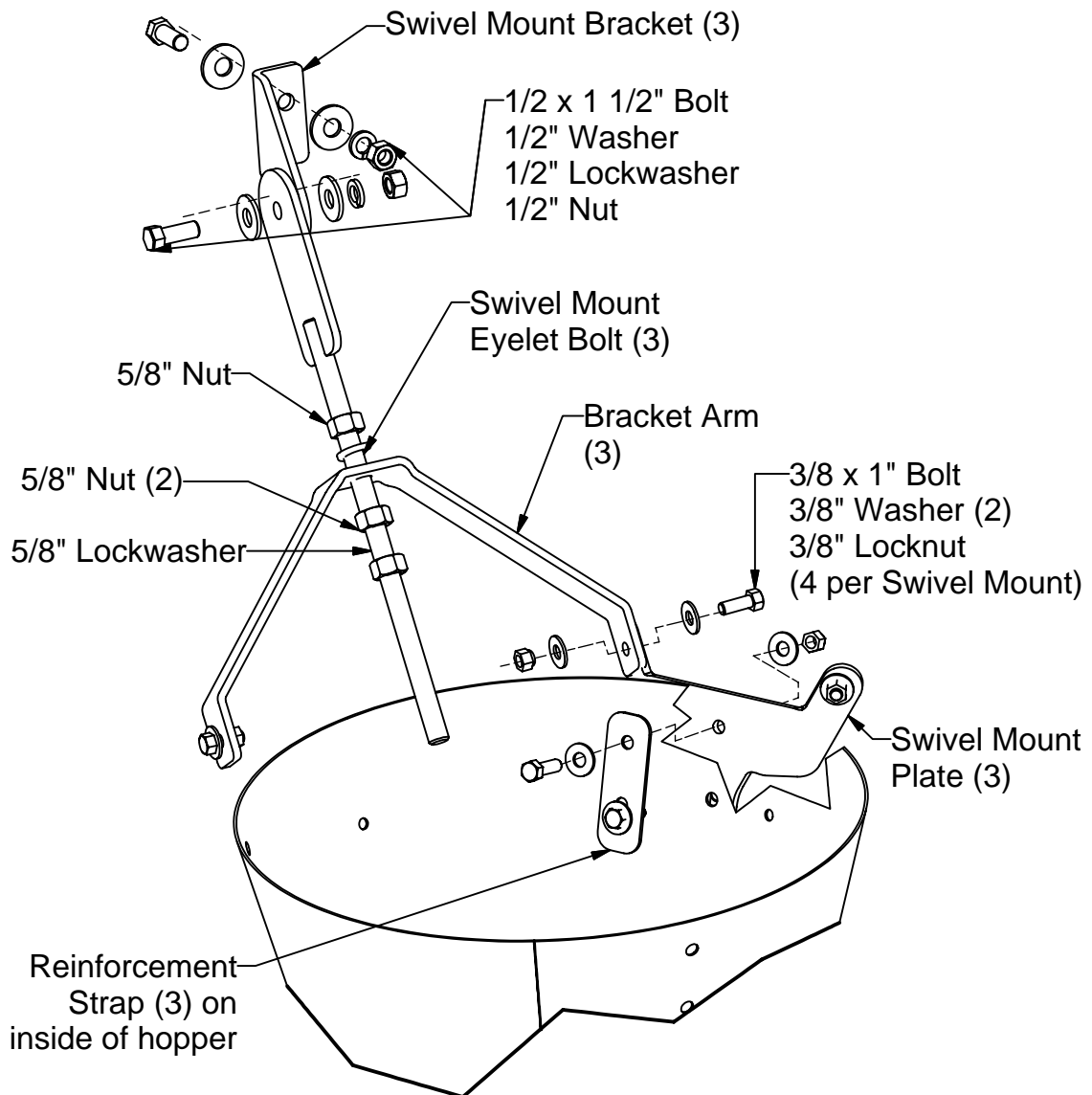
Flag should point 60° counter-clockwise of the diverter opening when looking down at your grain spreader. (Flag will point to area of bin where most of the grain will go).



# MECHANICAL INSTALLATION

## ATTACHING SWIVEL MOUNT KIT (653-241A)

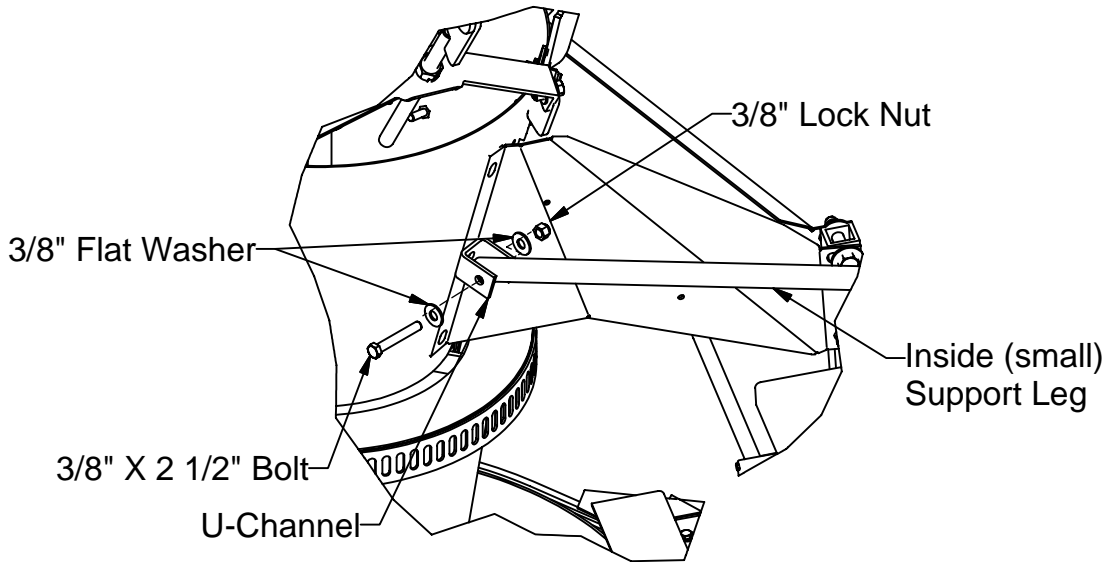
- 1). Carefully lay spreader on its side on the bin floor.
- 2). Attach the (3) swivel mount plates to the outside of the hopper and the (3) reinforcement straps to the inside of the hopper with  $3/8 \times 1 \ 1/4$ " bolts, washers and locknuts. The nuts should be fastened on the outside of the swivel mount plates.
- 3). Bolt on (3) bracket arms with  $3/8 \times 1 \ 1/4$ " bolts, washers, and nuts and do not tighten completely until the assembly is in place.
- 4). Attach (3) swivel mount eyelet bolts and swivel mount brackets. Finger tighten the  $5/8$ " nuts on the bolts with about 1" of the bolt extending past the double-locking nuts.



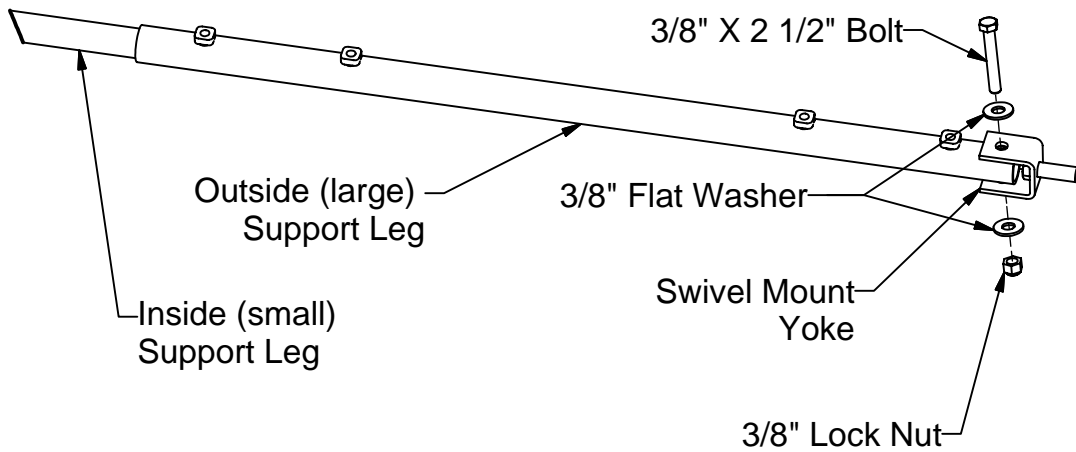
# MECHANICAL INSTALLATION

## BRACE MOUNT KIT (653-039A, includes parts for 2 complete support legs)

- 1). Bolt inside (small) support leg to U-channel on hopper. Sides of U-channel should be in contact with tube sides, holding support legs in place, yet able to move when nominal force is applied.



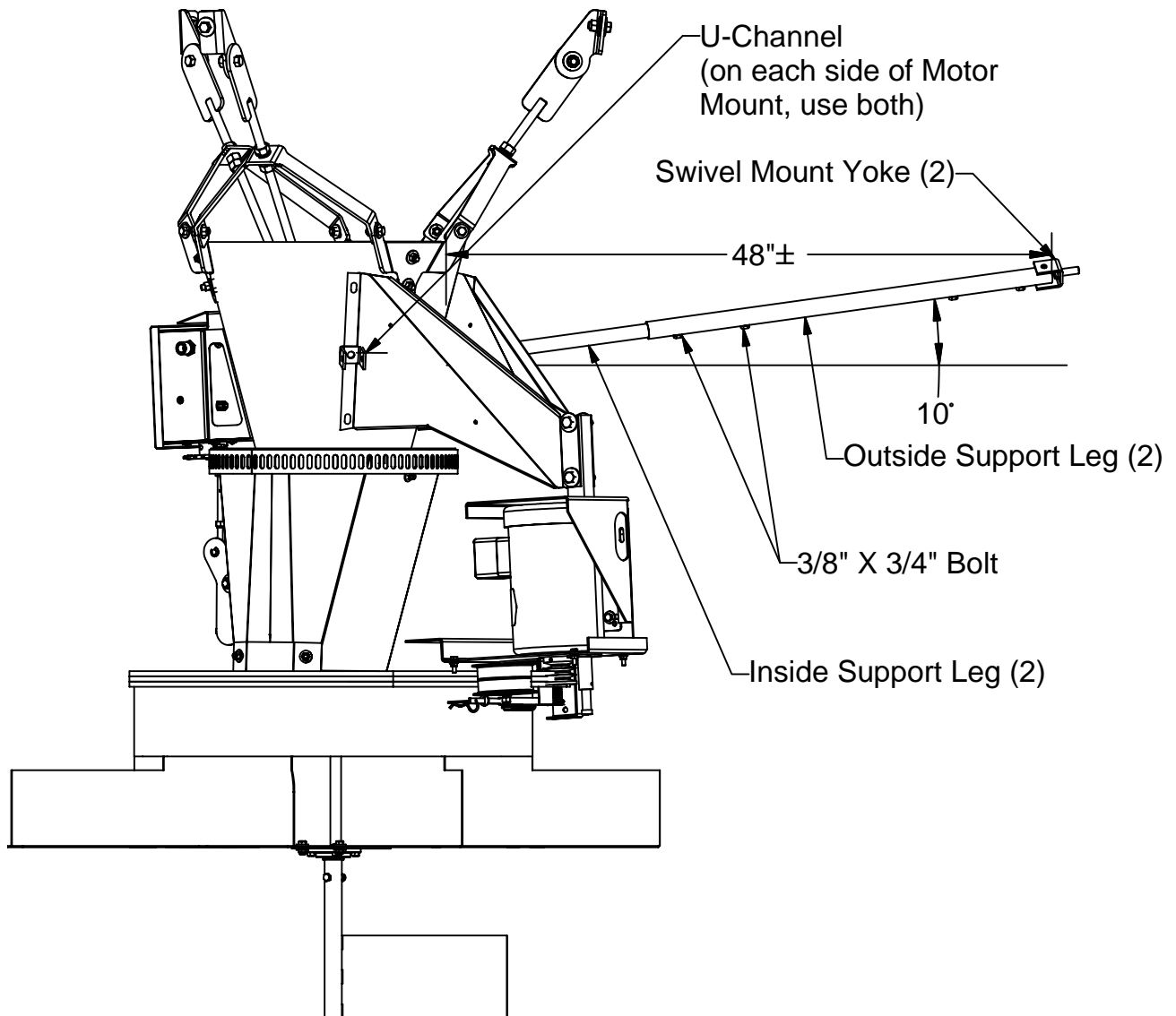
- 2). Bolt the swivel mount yoke to the outside (large) support leg with an angle that will approximately match your roof line.



# MECHANICAL INSTALLATION

- Secure support leg assembly using 3/8" X 3/4" bolts screwed into the weld nuts on the outside support leg to about 48" length. Set at about 10' from horizontal.

**Adjust swivel mount yoke so that threaded bolt will be approximately perpendicular to your bin roof.**

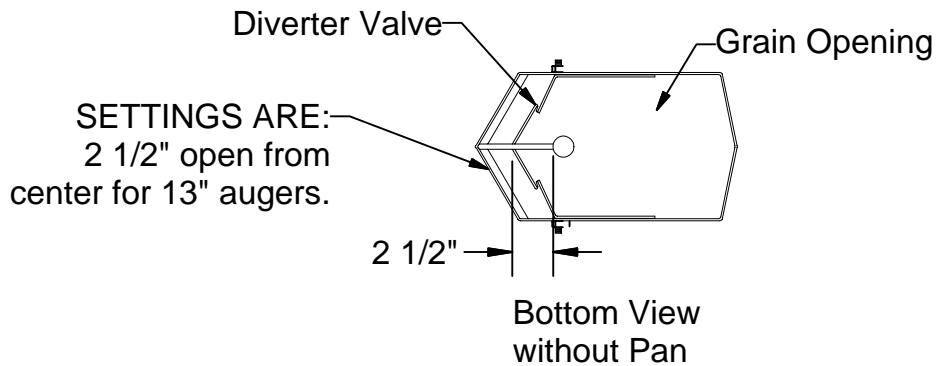
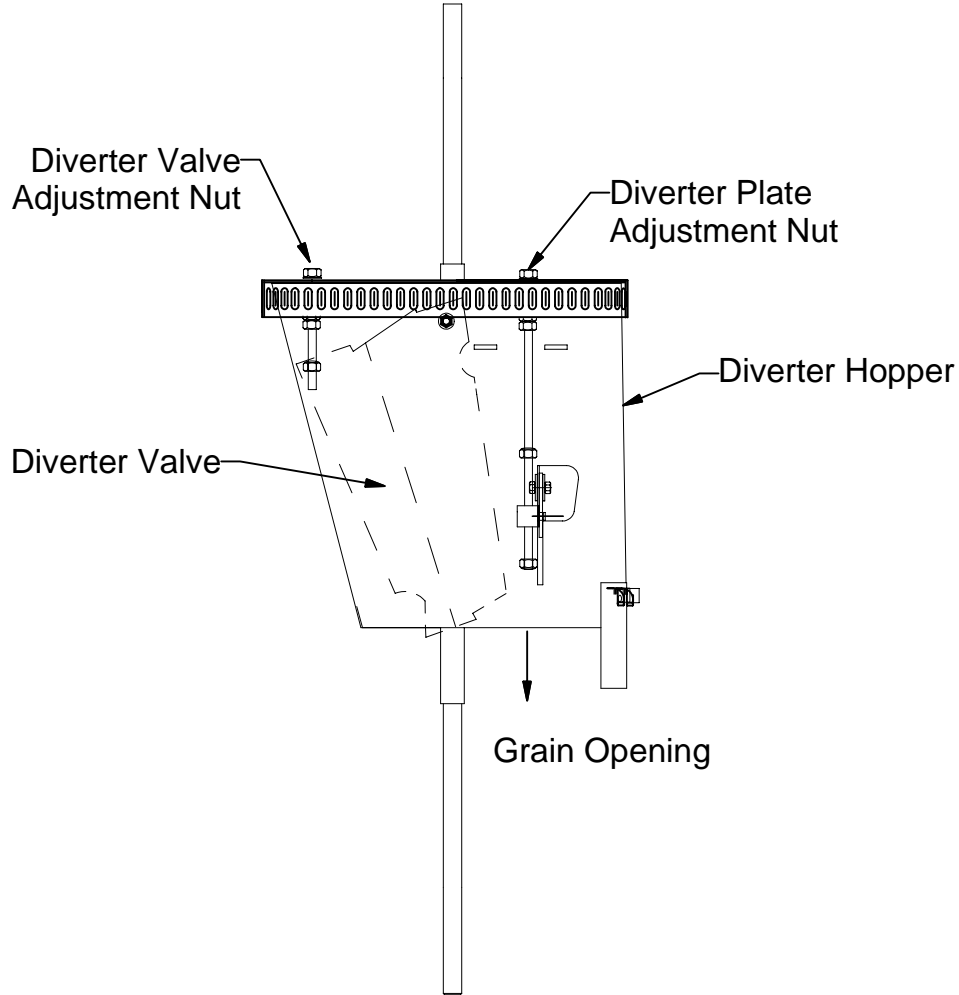


# DIVERTER ADJUSTMENTS

## INITIAL ADJUSTMENT OF DIVERTER VALVE **13" AUGERS ONLY**

The diverter valve comes from the factory pre-set for 13" transport augers, with an opening of 2 1/2". It will need to be adjusted for 10" augers.

The diverter plate comes from the factory set wide open.



# DIVERTER ADJUSTMENTS

## INITIAL ADJUSTMENT OF DIVERTER VALVE **10" OR SMALLER AUGERS ONLY**

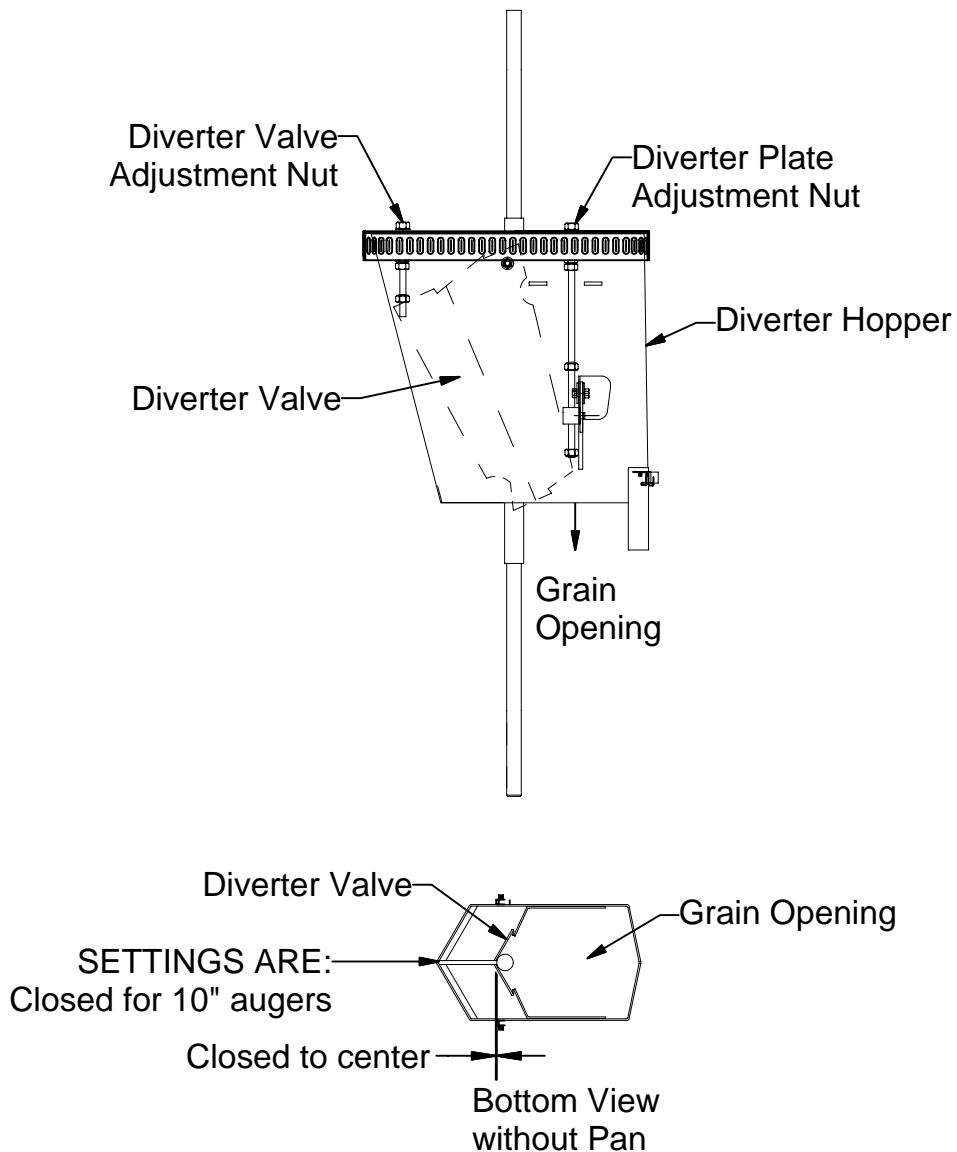
The diverter valve comes from the factory preset for 13" transport augers with an opening of 2 1/2". It will need to be adjusted closed for 10" or smaller augers.

Use the diverter valve adjustment and completely close the diverter valve against the center shaft.

The diverter plate comes from the factory set wide open.

### **For 8" OR SMALLER AUGERS ONLY**

Make sure the Lo-Flo choke plate has been installed (See Page 5)



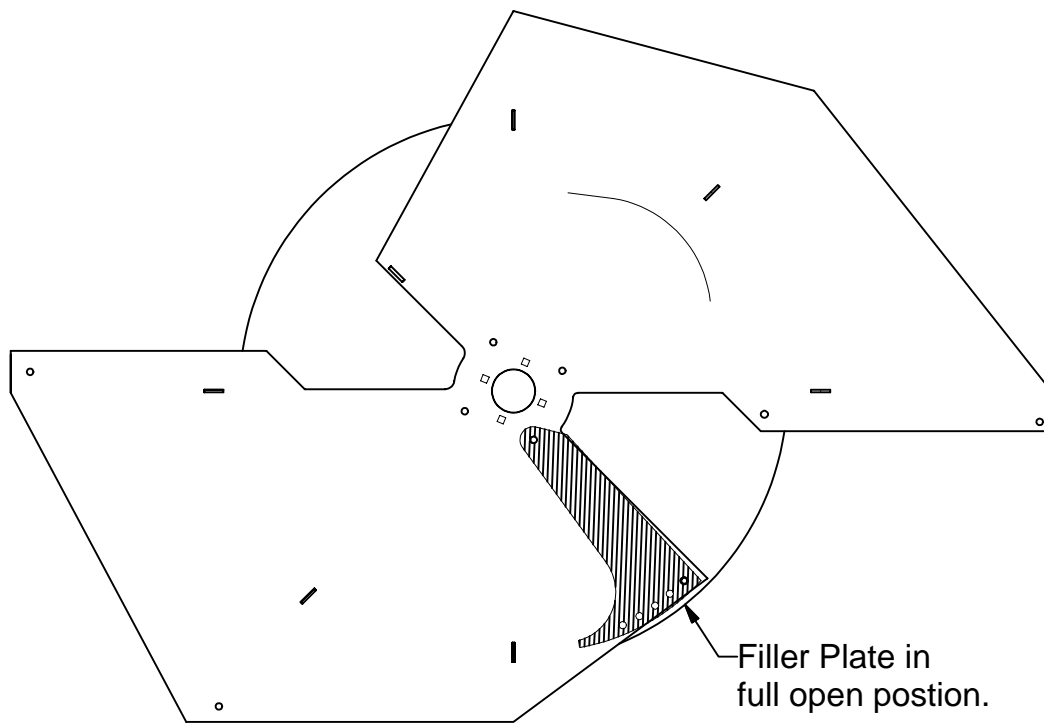
# CENTER FILL ADJUSTMENT

## FILLER PLATE

This plate, as shown installed, will allow you to properly spread grain and regulate the center distribution of grain.

It is shipped in the full open position, which should work in most applications.

The only reason to change position of the plate is if you are getting a large amount of grain in the center of the bin. This may also indicate a rotation speed that is too slow. Review operation instructions before making changes.



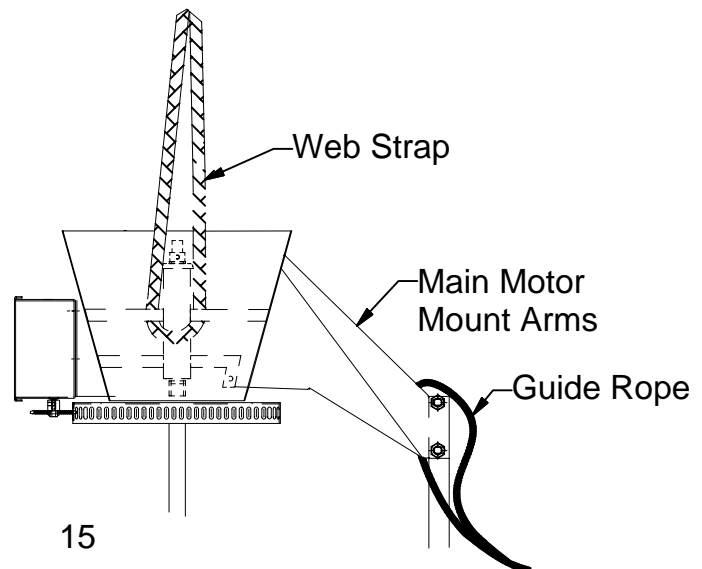
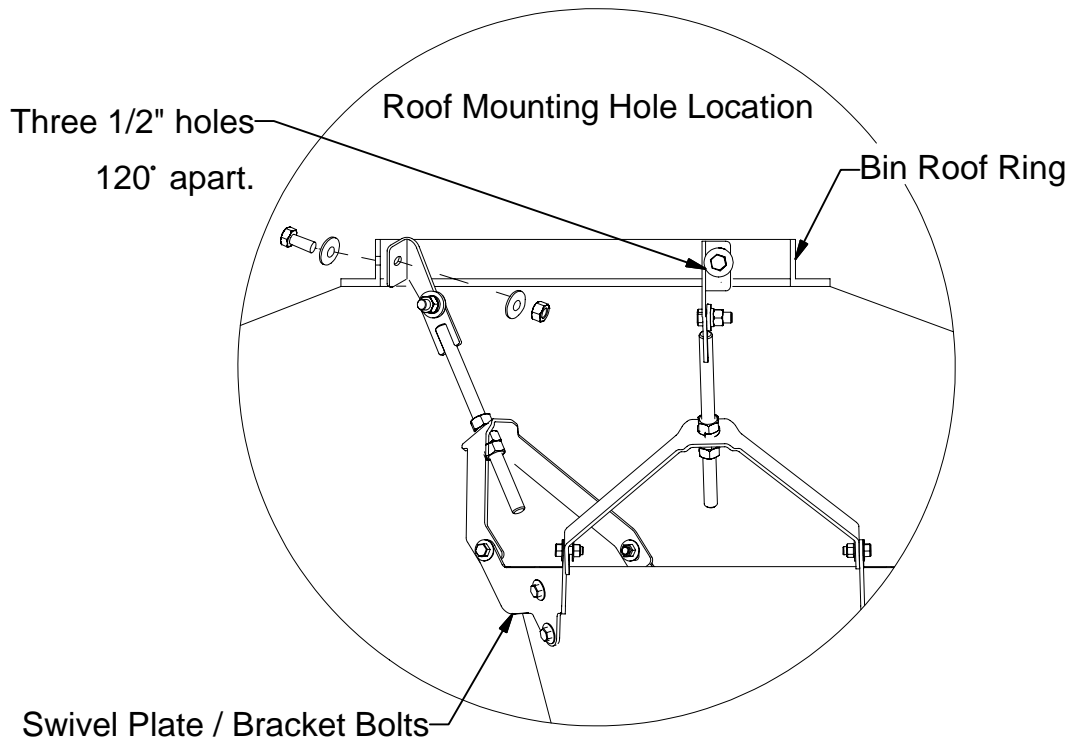
Bottom View



# BIN INSTALLATION

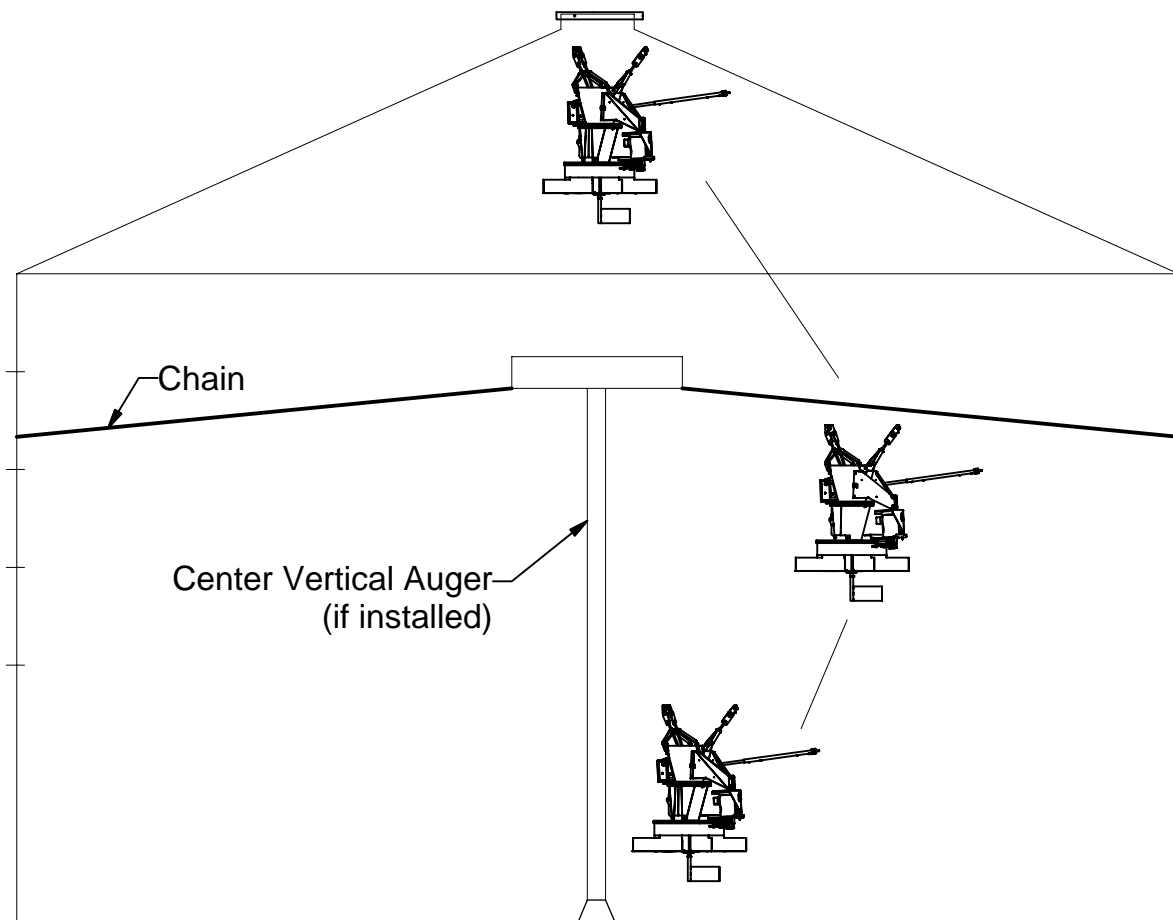
## MOUNTING SPREADER

- 1). Drill three 1/2" holes equally spaced at 120° intervals in the bin roof ring.
- 2). Attach cable end of hoist **with a winch web strap** to the inside cross members and center it so that the spreader will hang as perpendicular as possible.
- 3). Attach guide rope to the main motor mount arms. Do not attach guide rope to flag as damage to the main center shaft may result.



# BIN INSTALLATION

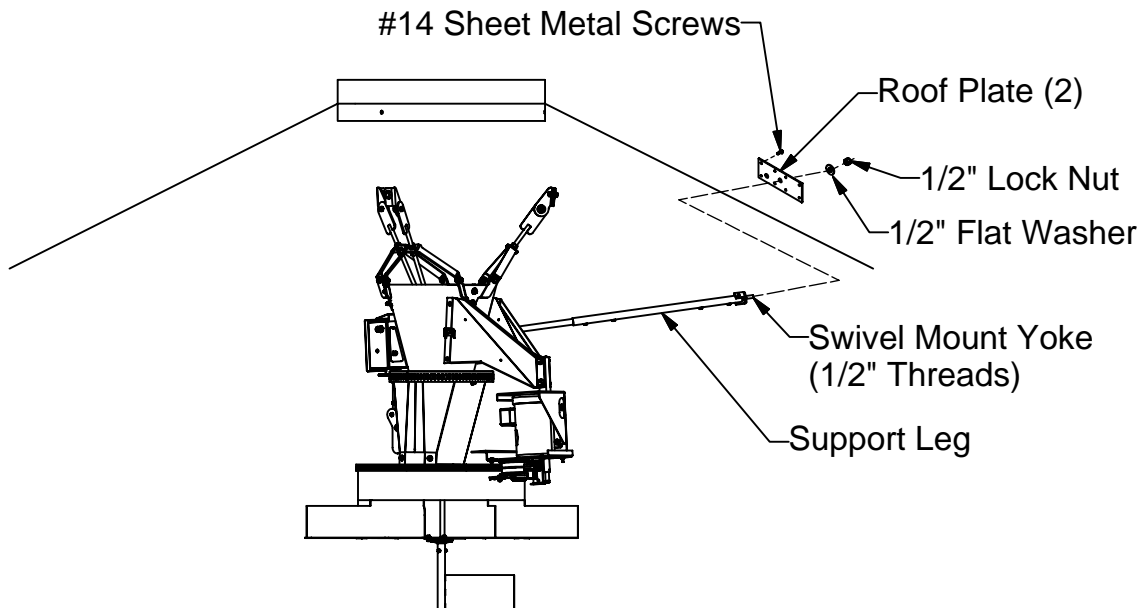
- 4). Hoist unit to roof. A person on the floor will need to move spreader around augers and any chains or cables with the guide rope. One or two chains may need to be removed to make it easier to get the spreader up past the center vertical.
- 5). Bolt unit to the bin roof ring with the three swivel mount brackets. Use washers on both sides of ring to prevent pull-through. (See page 9)
- 6). Level the spreader by adjusting nuts on the eyebolts. Check level on the rim of the hopper.
- 7). Tighten all mounting bolts and nuts securely. Do not forget the swivel plate/bracket bolts. (See page 9)



# BIN INSTALLATION

## ATTACHING SUPPORT LEGS

- 1). Be sure you have leveled the spreader, (See page 16)
- 2). Force the support legs to line up between ribs of the roof. To mark location in bin roof for mounting of support legs, reach down from the center fill hole, pull up hard on the support leg so the end of the swivel mount yoke bolt will leave a dent in the roof of the bin.
- 3). Mark dent with a center punch and drill a 1/2" hole through the roof.
- 4). Put swivel mount yoke bolt through hole.
- 5). Place roof plate on bolt after placing a bead of sealer around edge of plate and tighten 1/2" washer and lock nut on bolt securely.
- 6). Use the supplied sheet metal screws (8 per plate) to secure roof plates to bin roof.



## VIEWING PLATFORM

Bin stairs or platform with rail are recommended to allow safe viewing and control of the spreader at the manhole entrance.

# ELECTRICAL INSTALLATION

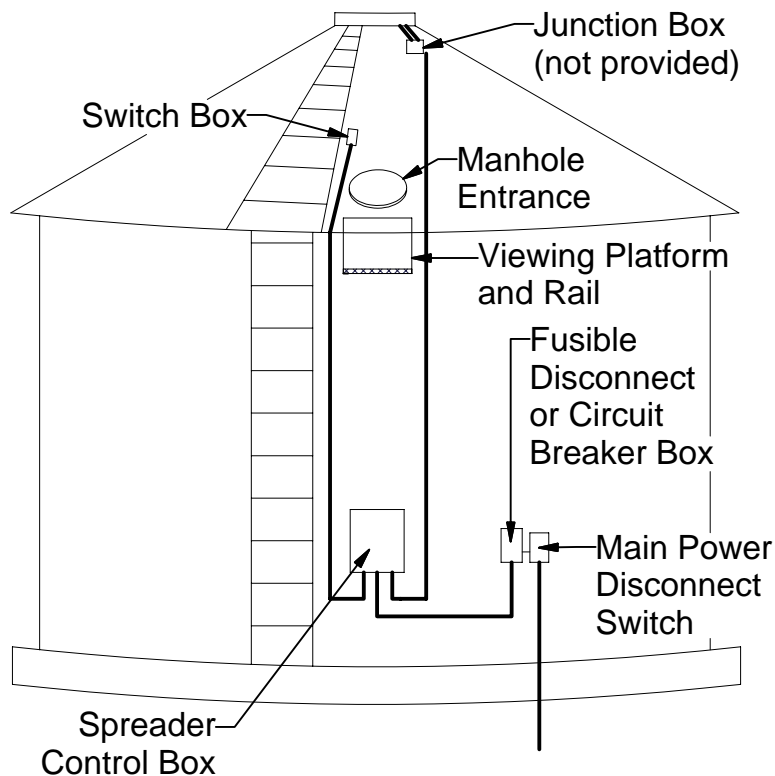
## **⚠ WARNING**

### TYPICAL ELECTRICAL LAYOUT

**ALL ELECTRICAL WIRING SHALL BE INSTALLED IN COMPLIANCE WITH THE LATEST EDITION OF THE ANSI/NFPA STANDARD 70, NATIONAL ELECTRICAL CODE, AS A MINIMUM REQUIREMENT, AND IN COMPLIANCE WITH LOCAL WIRING CODES AS APPLICABLE.**

**WIRING MUST BE DONE BY A COMPETENT ELECTRICIAN. A LICENSED ELECTRICIAN IS RECOMMENDED, AND MUST BE USED WHEN REQUIRED BY LOCAL OR STATE STATUTES.**

Do not run spreader pan motor wires through any other control box, including a Compudry box. It will make a Compudry ERROR and not work properly.



### **CRITICAL STEP**

Rotating spreader pan backwards has the potential to force the V-belts off the idler!! Start unit only momentarily while checking for proper spreader pan rotation. After proper rotation is ascertained, run spreader for 2-3 minutes and then visually check that all V-belts are still properly installed.

# ELECTRICAL INSTALLATION



**Disconnect and lock out all power before wiring. See the Adjustable Frequency Drive instruction manual for more safety and wiring information.**

- 1). Mount the spreader control box in a convenient location, but try to keep it out of direct sunlight as much as possible, especially if it will be operated in ambient temperatures above 60 degrees Fahrenheit. The variable speed drive will not operate if it gets too hot. A shade may have to be installed if the control box gets too warm from sunlight.
- 2). A circuit breaker or fusible disconnect switch must be installed in line with the incoming power to the spreader control box. This will also function as the power switch for the spreader. It should be sized for the motor on the spreader. A power switch is not provided with the unit because it is recommended to use the stop button on the variable frequency drive to slow down and stop the spreader instead of shutting off the incoming power while the spreader motor is running. The frequency drive will take the single phase input power and convert it to 3 phase power for the spreader motor. Only 208-240 volt single phase power is to be provided to the ABB ACS150 Frequency Drive. The drive manufacturer recommends Class T, gG, or aR fuses instead of circuit breakers to protect the drive electronics.

Hp	Phase	Fuse	Wire Size to Control Box	Wire Size to Spreader Motor
2	1	20-30 Amp	10 AWG	12 AWG

WIRING FOR ABB ACS150 V/F DRIVE (653-255A)  
(Starting January 2013)

- 3). Make sure there is no power coming into the panel. If power has been connected, wait at least five minutes after power-down before removing the front cover. Unhook the spring from the front cover of the spreader control box.

Remove 5 screws holding the front panel on to gain access to the wiring terminal strips.

# ELECTRICAL INSTALLATION

- 4). Wire incoming power, in conduit, 208-240 Volts AC, Single Phase into the spreader control box using the right hand knockout hole. See incoming wiring diagrams for ABB ACS150 V/F Drive. Don't forget to place a wire from V/F Drive terminal L1 to terminal 12 of the 12 pole terminal strip. This is 115 VAC power for the diverter motor. For three phase installations, make sure this is not the wild leg. If it is not possible to obtain 115 VAC from one leg of the three phase, be sure to use the optional control transformer (E-6353) to derive the 115 VAC or get it from another source.
- 5). Wire power, in conduit, to the spreader pan motor and diverter motor, from the spreader control box, using the knockout hole in the center of the box. A junction box will need to be provided near the peak of the bin for making connections to the flexible cords coming from the motors. See outgoing wiring diagrams for ABB ACS150 V/F Drive.
- 6). Wire the 4 conductor shielded control cable, in conduit, to the switch box, from the spreader control box, using the knockout hole on the left side of the box. See outgoing wiring diagrams for ABB ACS150 V/F Drive (Switch Box). The switch box should be located near the manhole opening in the bin roof.
- 7). Re-install the front panel on the spreader control box. Apply power to the spreader control box. The display should show 0%. Under 0%, FWD should be flashing. The left hand side of the display should show REM on top, and OUTPUT on the bottom of the display. The display is programmed to show percentage of speed, from 0 to 100%, when the spreader is running.
- 8). Position someone at the top of the bin to observe the spreader pan rotation. When looking down on the spreader from above, rotation should be clockwise. **IF ROTATION IS NOT CORRECT, BELTS MAY BECOME MISALIGNED!** Press the start switch on the drive and then press the stop switch to momentarily start and stop the spreader while checking for spreader rotation. (The display should ramp up to the last set speed. If it stays at 0%, toggle the pan speed up switch. Press the Stop switch on the drive and the speed will ramp down to 0%). Check for proper rotation. If pan rotation is not correct, power the drive down, lock out the power, wait at least 5 minutes, then exchange any two wires going to the spreader pan motor.

## **CRITICAL STEP**

Rotating spreader pan backwards has the potential to force the V-belts off the idler!! Start unit only momentarily while checking for proper spreader pan rotation. After proper rotation is ascertained, run spreader for 2-3 minutes and then visually check that all V-belts are still properly installed.

# ELECTRICAL INSTALLATION

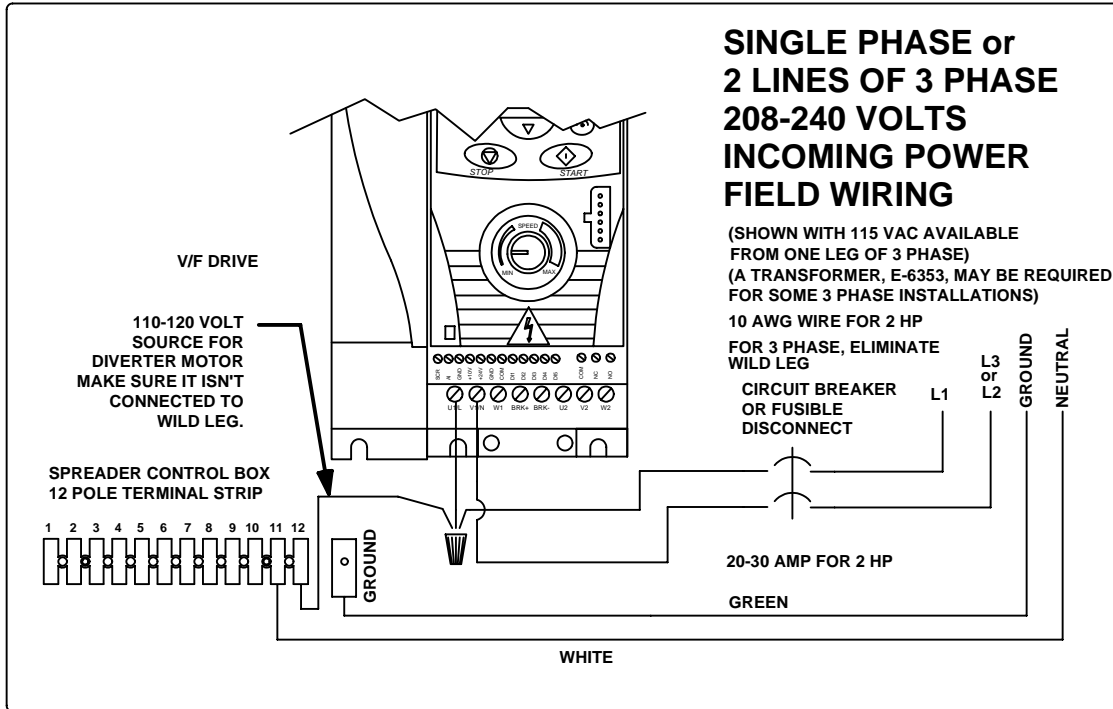


**Disconnect and lock out all power before changing wiring. Wait at least 5 minutes after locking out incoming power before opening access to terminals. Otherwise there is the danger of electrical shock.**

- 9). Once the rotation is OK, slowly increase speed and check for excessive vibration. It may be necessary to add additional support.
- 10). Check for diverter operation. If the diverter motor switch is ON at the switch box, the diverter ON light should come on and the diverter will slowly rotate whenever the drive is started. Make sure that shutting the diverter switch off at the switch box causes the light to go off, and that the diverter stops rotating.
- 11). Check for spreader pan speed control at the switch box by toggling the switch up and down. The drive has to be started first.
- 12). The V/F drive is configured at the factory for a 2 Hp motor. To program the drive for other motor horsepowers, consult the factory.
- 13). Reconnect the spring from the spreader control box access panel to the outer door.
- 14). A small screwdriver (H-2685) is shipped with each control box. It is required should maintenance be needed on the ABB 24VDC terminals. The screwdriver has a straight tip, 0.090" - 0.100" wide. Store the screwdriver inside the control box.

# ELECTRICAL INSTALLATION

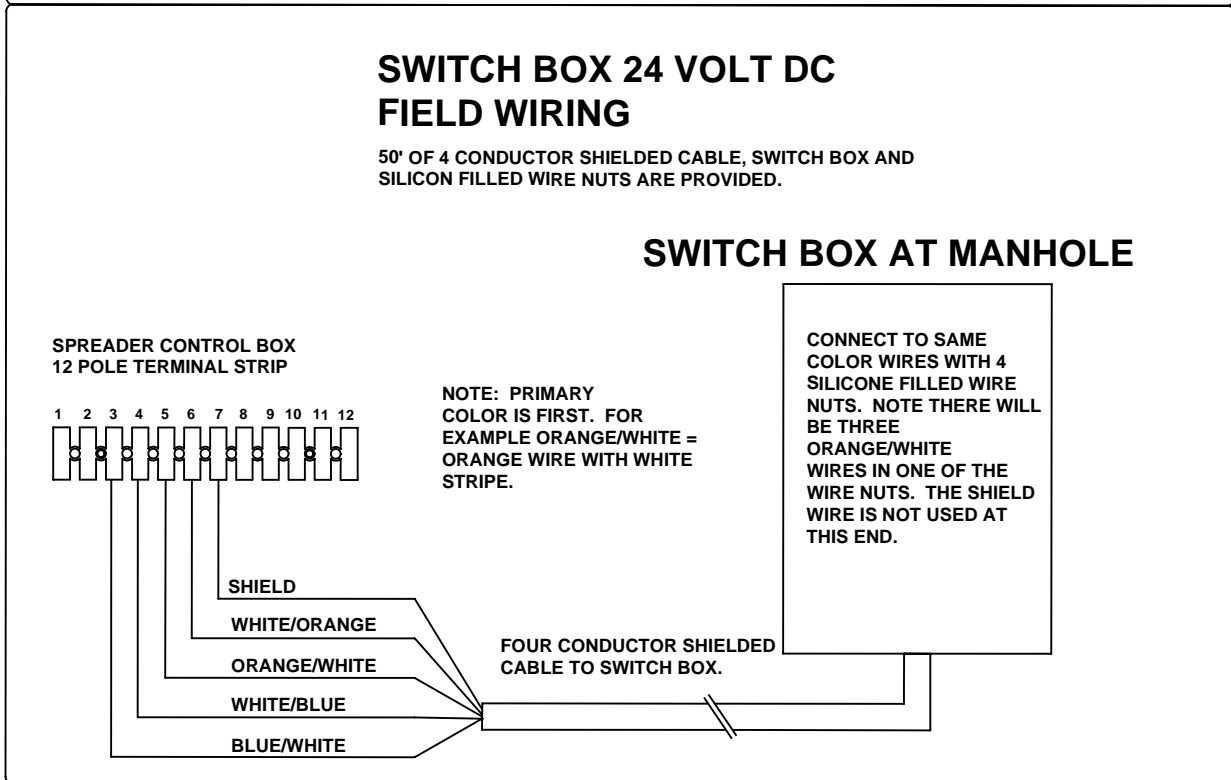
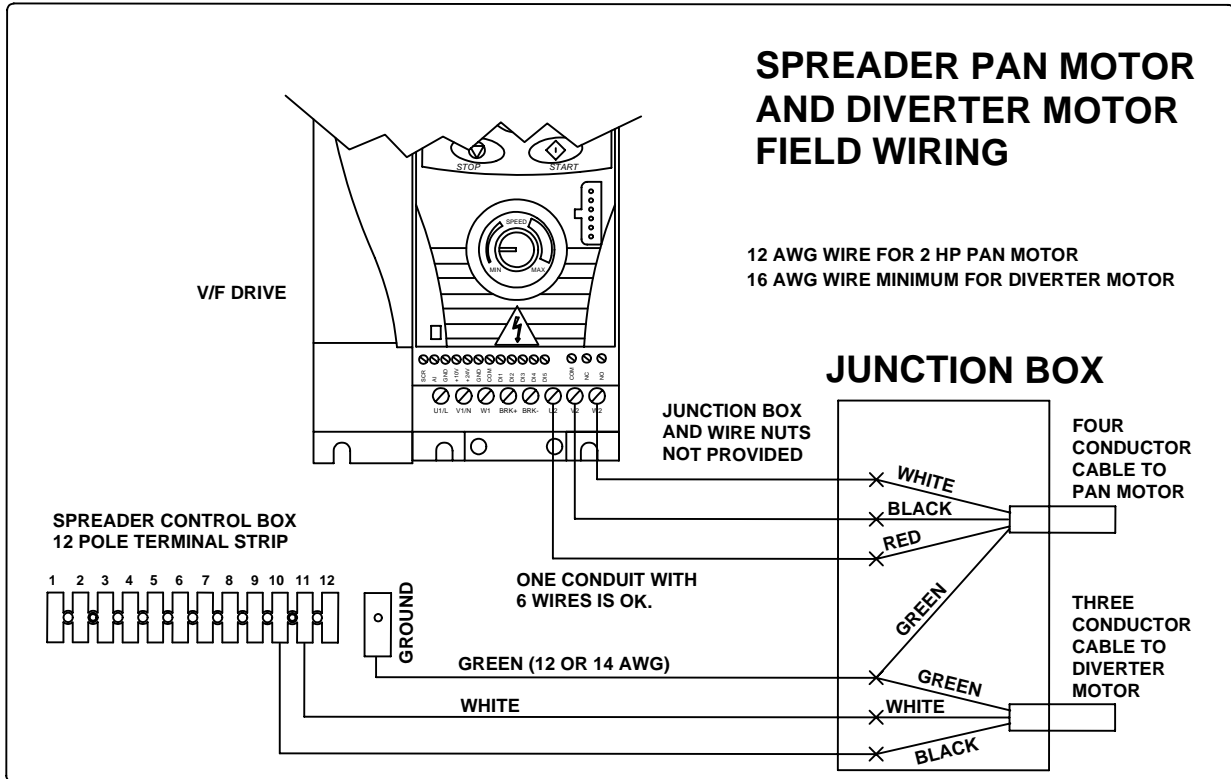
## INCOMING WIRING DIAGRAM FOR ABB ACS150 V/F DRIVE (653-255A)





# ELECTRICAL INSTALLATION

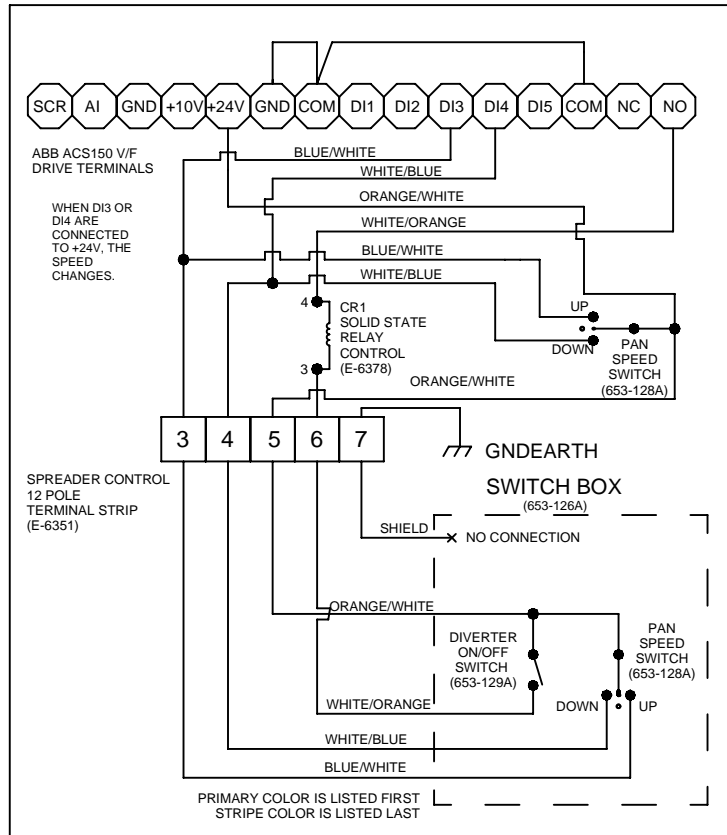
## OUTGOING WIRING DIAGRAM FOR ABB ACS150 V-F DRIVE (653-255A)



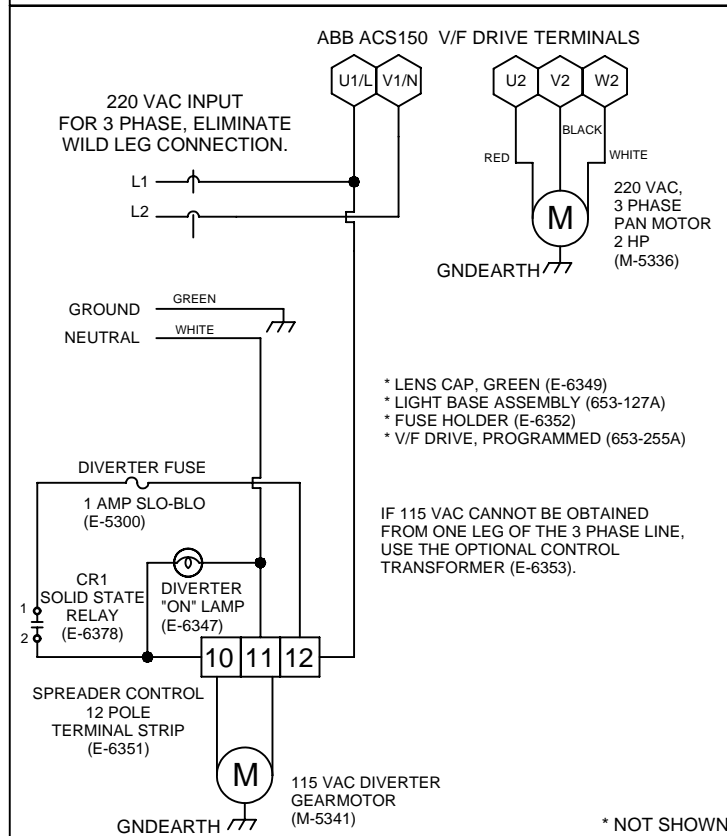
# ELECTRICAL APPENDIX

## SCHEMATICS FOR ABB ACS150 V/F DRIVE (653-255A)

SPREADER CONTROL SCHEMATIC (24 VDC SECTION)



SPREADER CONTROL SCHEMATIC (220 & 115 VAC SECTION)



# ELECTRICAL APPENDIX

## REMOTE RUN SWITCH OPTIONS FOR ABB DRIVE

### OPTION #1.

Single pole on/off remote run switch. (2 wires)

With this option, if drive loses incoming power, the drive will start back up when power is restarted. The START & STOP buttons on the drive are disabled. If they are pressed, display will show A5011.

Change drive parameter 1001 from 8 to 1.

Power up drive

**PRESS**

MENU/ENTER

Up Arrow until PAR

MENU/ENTER

Up Arrow until -10-

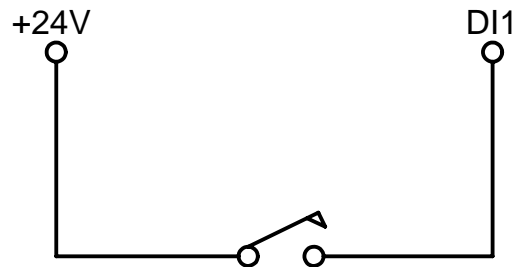
MENU/ENTER so display shows 1001

Hold MENU/ENTER until 8 SET

Down Arrow until 1

MENU/ENTER (display will show 1001)

RESET/EXIT until OUTPUT 0%



It may be necessary to use a wire nut and a short piece of wire if there is already a wire in the +24V terminal.

### OPTION #2.

Momentary start and stop push button switch station for remote control (3 wires).

With this option, if the drive loses incoming power, the drive will not start back up when power is restored. The START & STOP buttons on the drive are disabled. If they are pressed, display will show A5011.

Change drive parameter 1001 from 8 to 3.

Power up drive

**PRESS**

MENU/ENTER

Up Arrow until PAR

MENU/ENTER

Up Arrow until -10-

MENU/ENTER so display shows 1001

Hold MENU/ENTER until 8 SET

Down Arrow until 3

MENU/ENTER (display will show 1001)

RESET/EXIT until OUTPUT 0%

