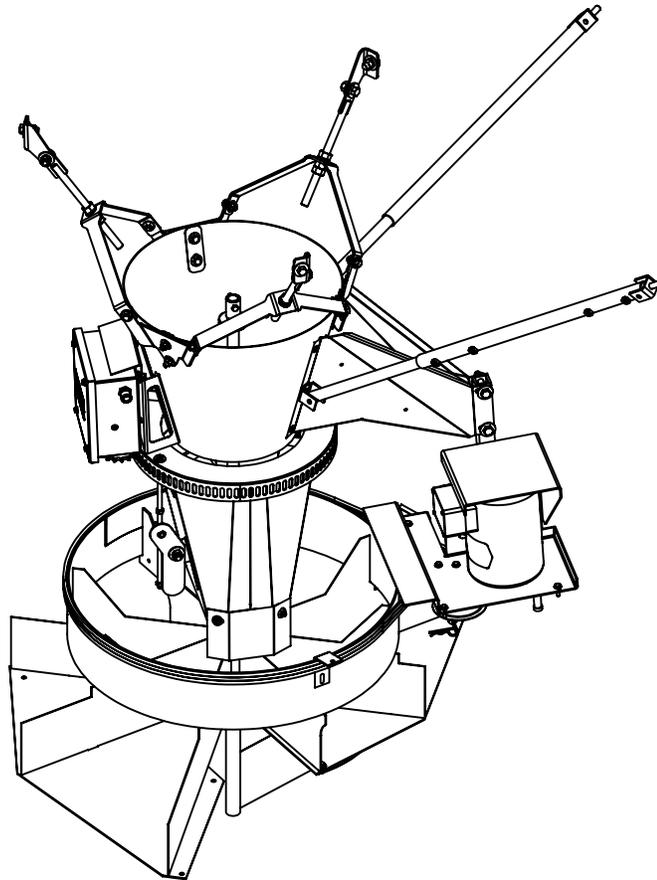


CONTROLLED FLOW GRAIN SPREADER

For 8" to 13" Transport Augers



INSTALLATION INSTRUCTIONS

MODEL 653E-001A MECHANICAL PARTS, 2 HP
MODEL 653F-001A VARIABLE SPEED CONTROLLER



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P-11649
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CONTENTS

2.....	INTRODUCTION
3-10.....	MECHANICAL INSTALLATION
	TOOLS NEEDED
	SAFETY PROCEDURES
	SET-UP PROCEDURE
	LO-FLO CHOKE PLATE
	INSTALLATION
	PAN
	BELT
	FLAG
	SWIVEL MOUNT
	BRACE MOUNT
11-12.....	DIVERTER ADJUSTMENTS
13.....	CENTER FILL ADJUSTMENTS
14-16.....	BIN INSTALLATION
	MOUNTING INSTALLATION
	ATTACHING SUPPORT LEGS
	VIEWING PLATFORM
18-28.....	ELECTRICAL INSTALLATION
	WIRING FOR MVX9000
	WIRING FOR AF91

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 Shivvers 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.

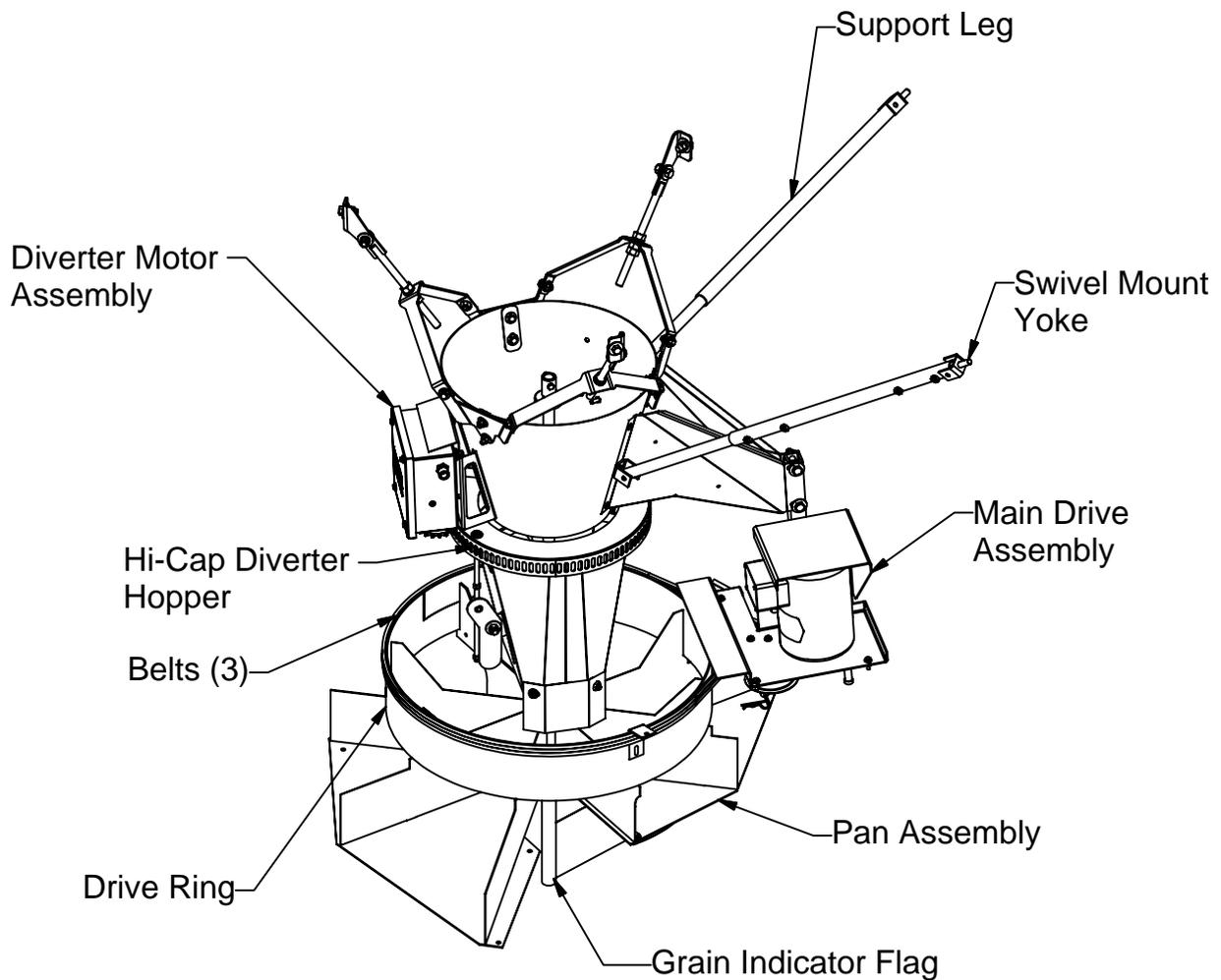
- 1). Spreader Assembly
- 2). Pan Assembly
- 3). Control Box
- 4). Parts Box

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**



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 Procedure

I. First 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.)

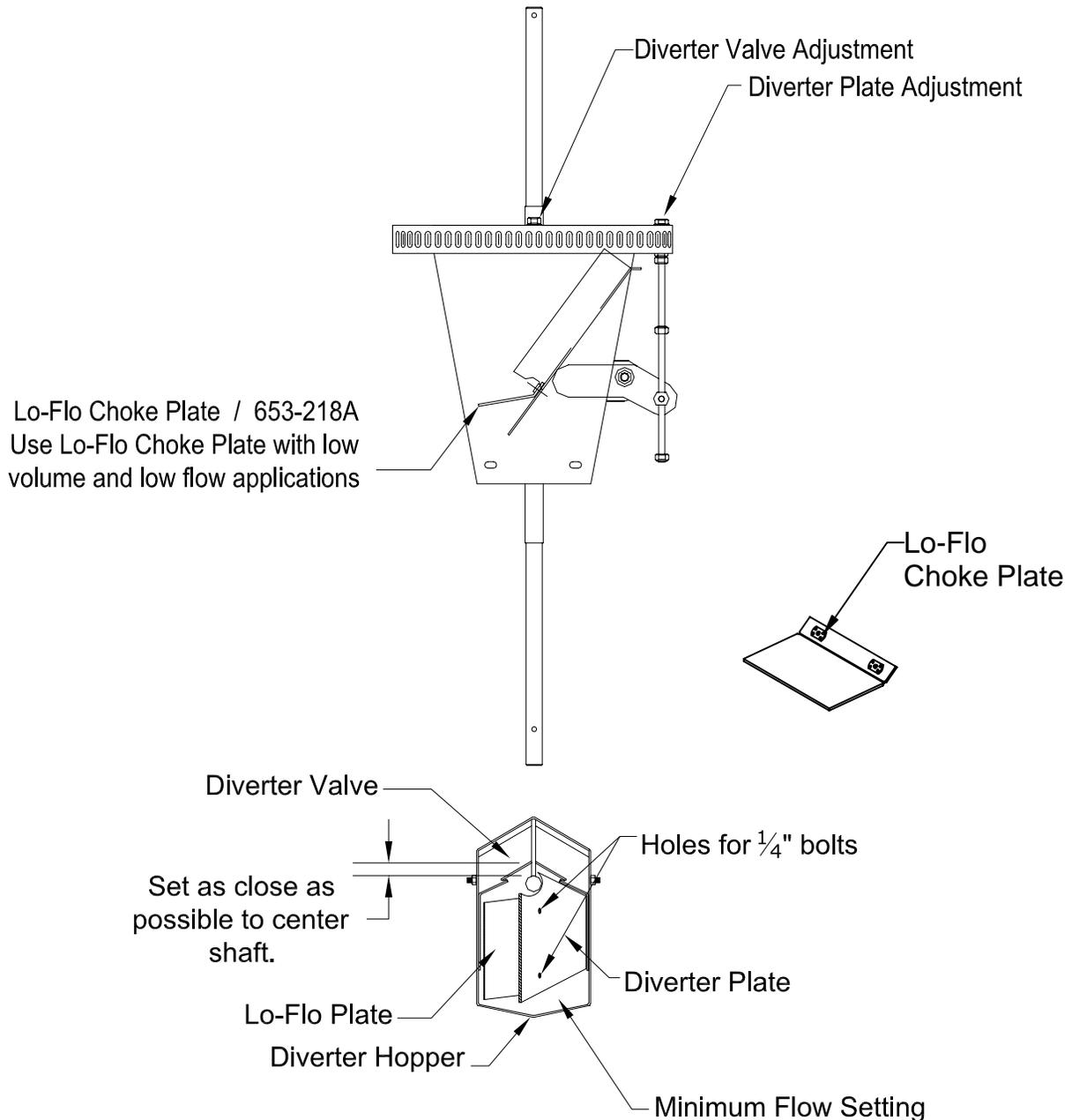
2) Remove spreader from shipping pallet and with help, carry it into bin and place it under hoist.

NOTE: You may have to remove the motor assembly unit to get into some bin doors.

MECHANICAL INSTALLATION

Lo-Flo Choke Plate (8" or Smaller Augers only) (Less than 2500 bu/hr)

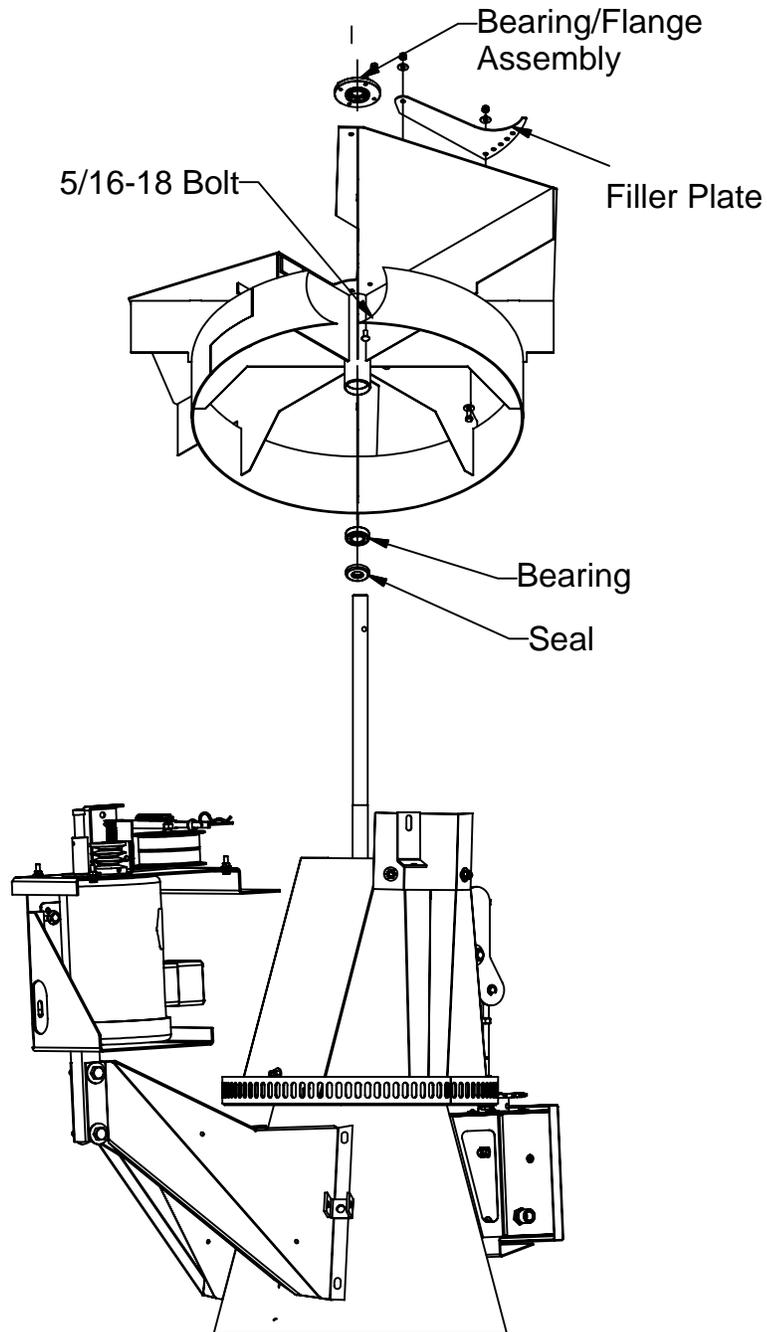
This plate, as shown installed, will allow you to properly spread grain at a lower rate than possible with the standard unit. This was developed to allow use of smaller, slower augers. Do not install this plate for 10" or larger input augers. Set Diverter Valve so it is as close to center shaft as possible.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



MECHANICAL INSTALLATION

II. Installing pan assembly

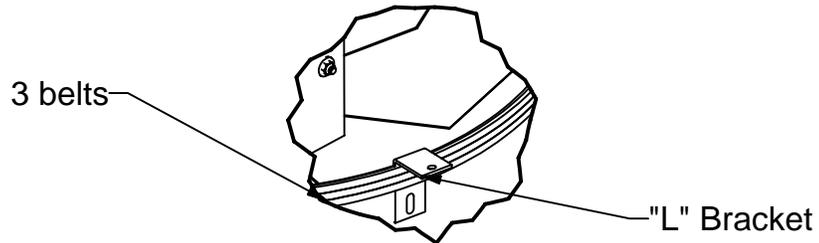
- 1). Set hopper assembly upside down on bin floor.
- 2). Note that drive belts are wrapped around drive pulley; the excess is wire-tied to inside of pan.
- 3). Remove wire tie and stretch out belts.
- 4). Slide bearing seal onto and past shoulder on shaft
- 5). Slide pan assembly onto the hopper assembly shaft.



MECHANICAL INSTALLATION

III. INSTALLING AND ADJUSTING BELTS

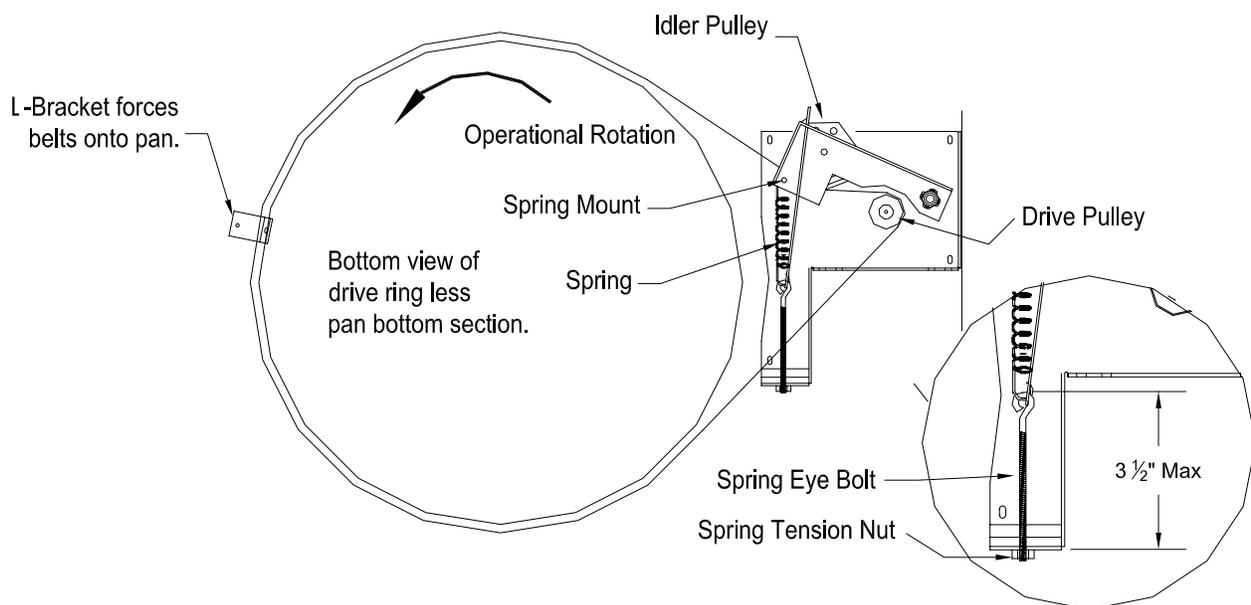
- 1). Clamp "L" bracket that held unit to pallet to the edge of the pan as shown.
- 2). Loop all three belts over bracket.



- 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.



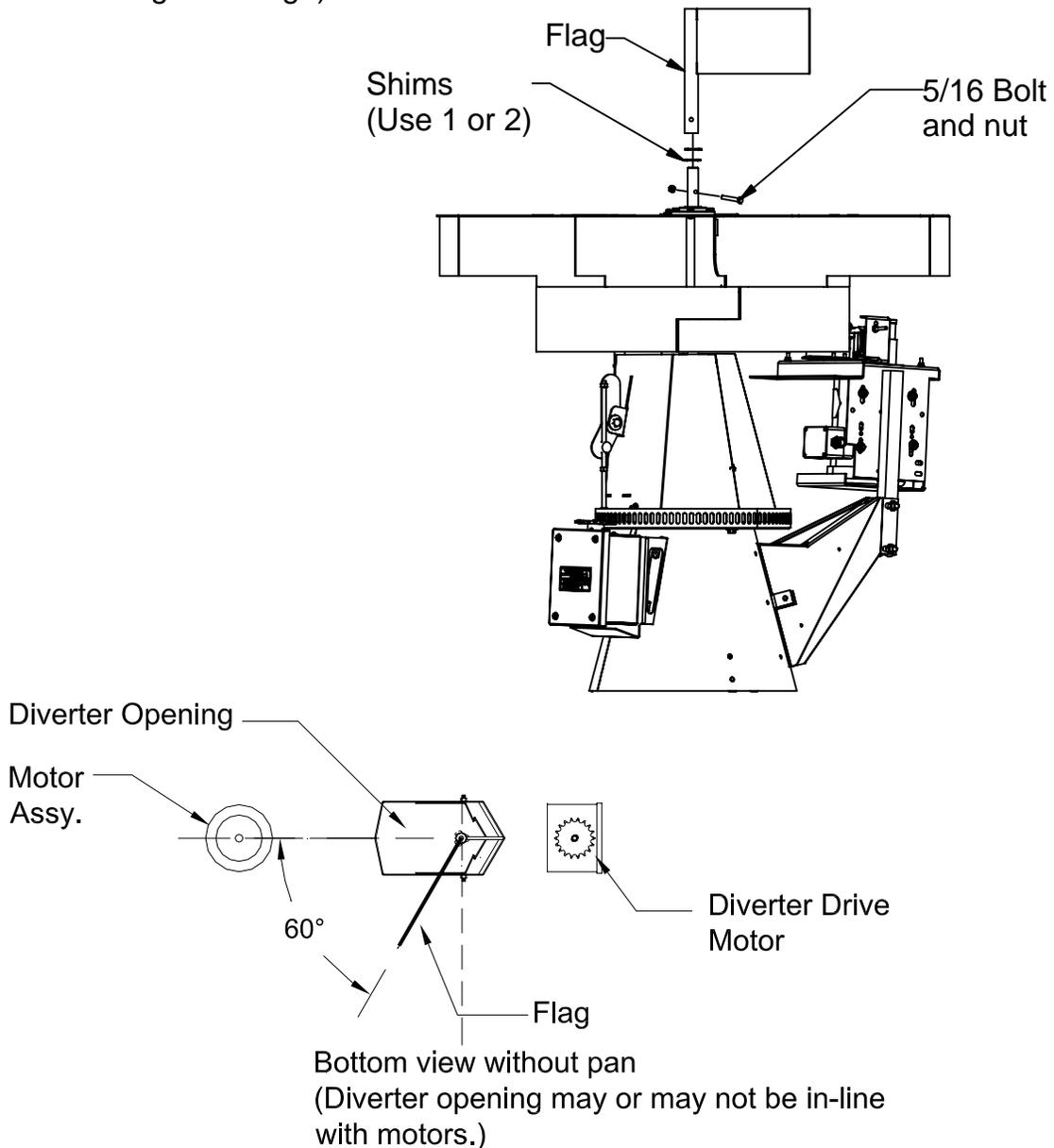
MECHANICAL INSTALLATION

IV. INSTALLING FLAG

1). Place shims as required onto shaft, slide on flag and bolt in place with 5/16 bolt and nut. See drawing for proper orientation of Flag. 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.

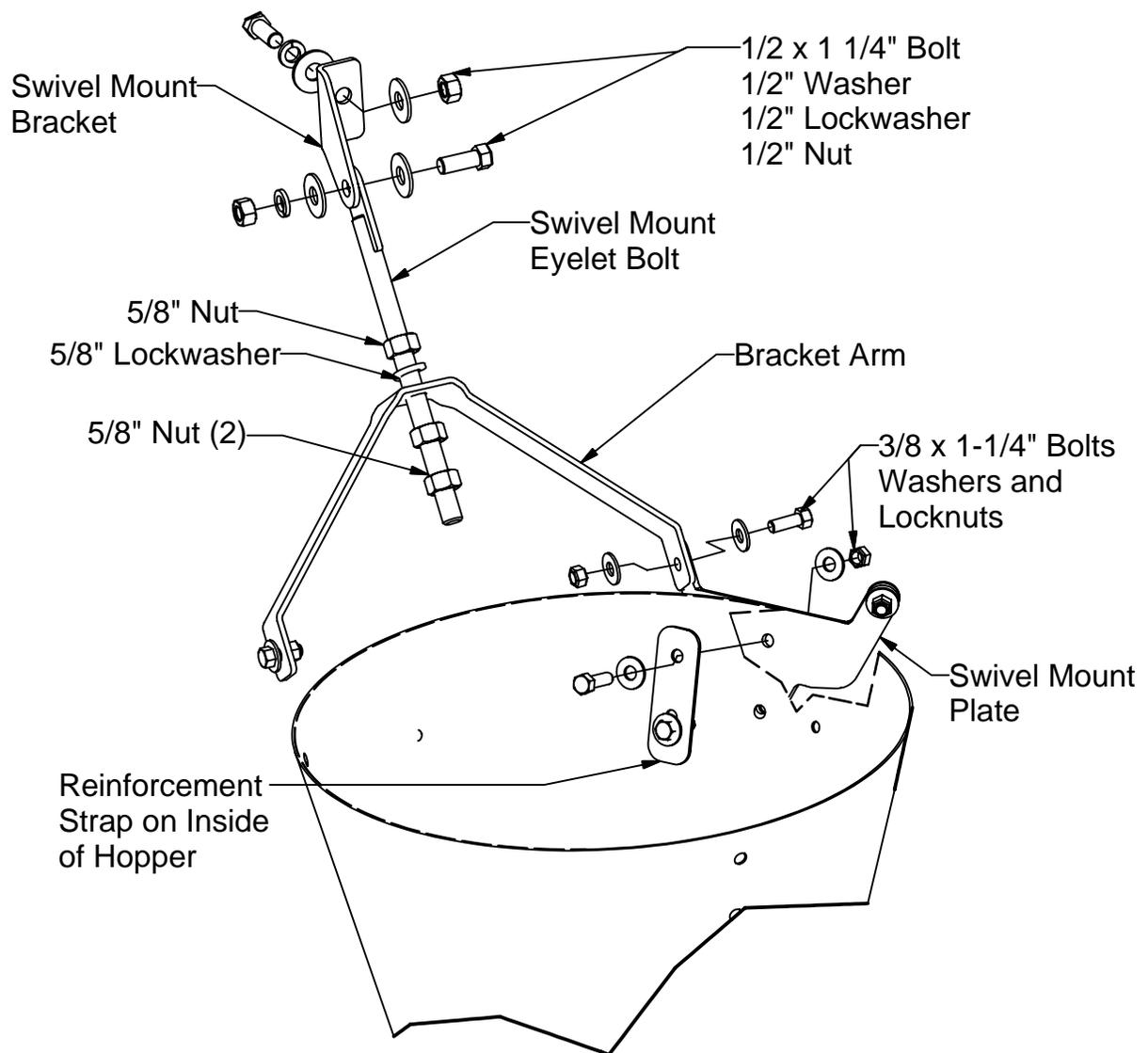
Flag should point 60° counter-clockwise of the Diverter opening when looking down at your grain spreader. (Flag will point to area of bin where most of the grain will go).



MECHANICAL INSTALLATION

V. 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 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 Swivel Mount Eyelet Bolts and Swivel Mount Brackets. Finger tighten the bolt with about 1" of the bolt extending past the double-locking nuts.

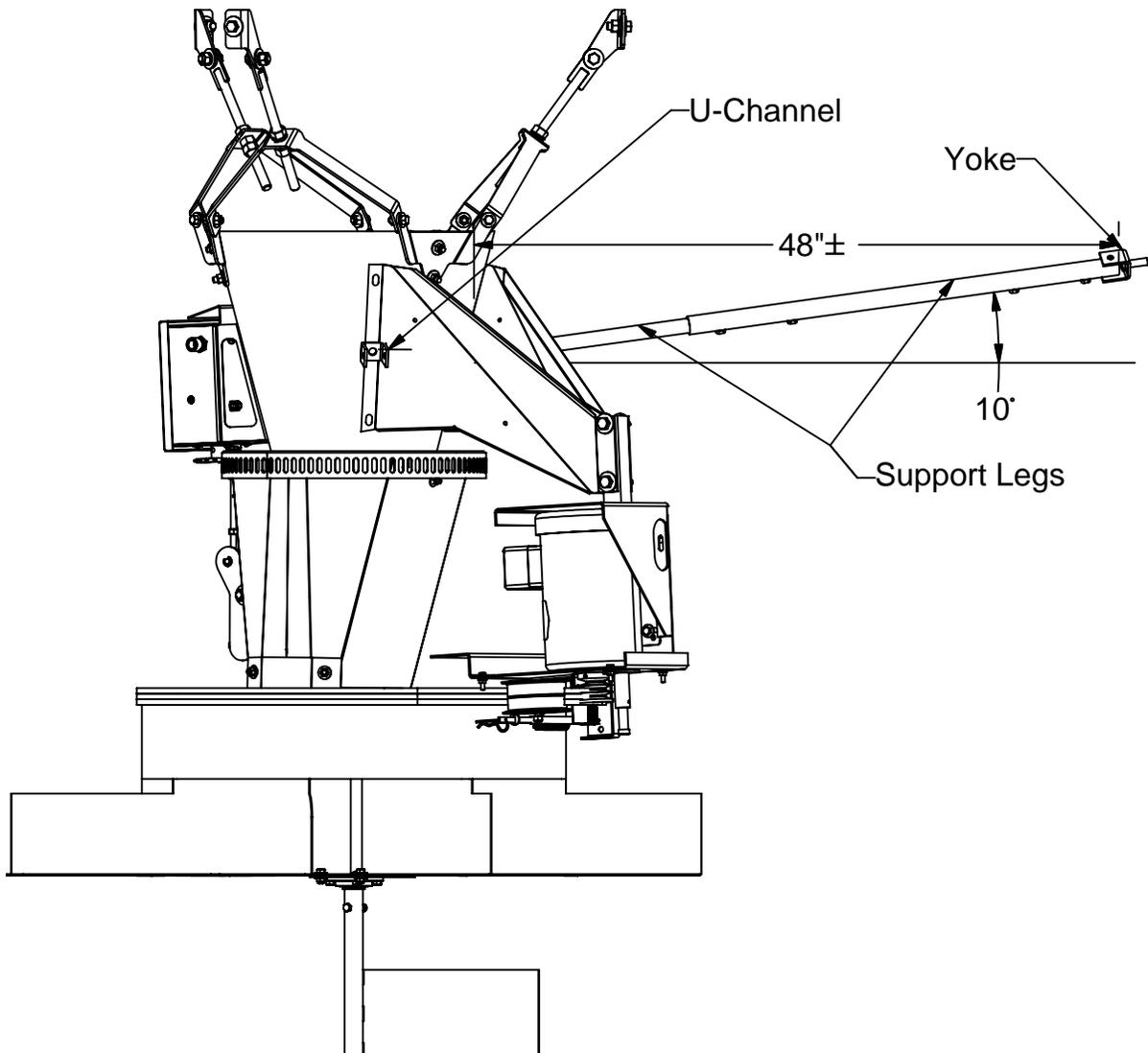


MECHANICAL INSTALLATION

VI. BRACE MOUNT KIT, 653-039A

- 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.
- 3). Secure Support Leg Assembly together with lock bolts at 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.



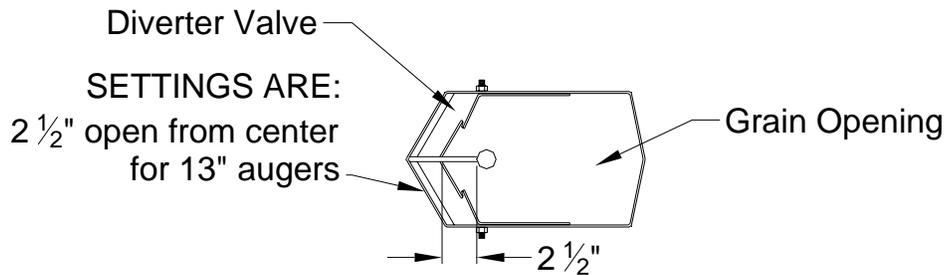
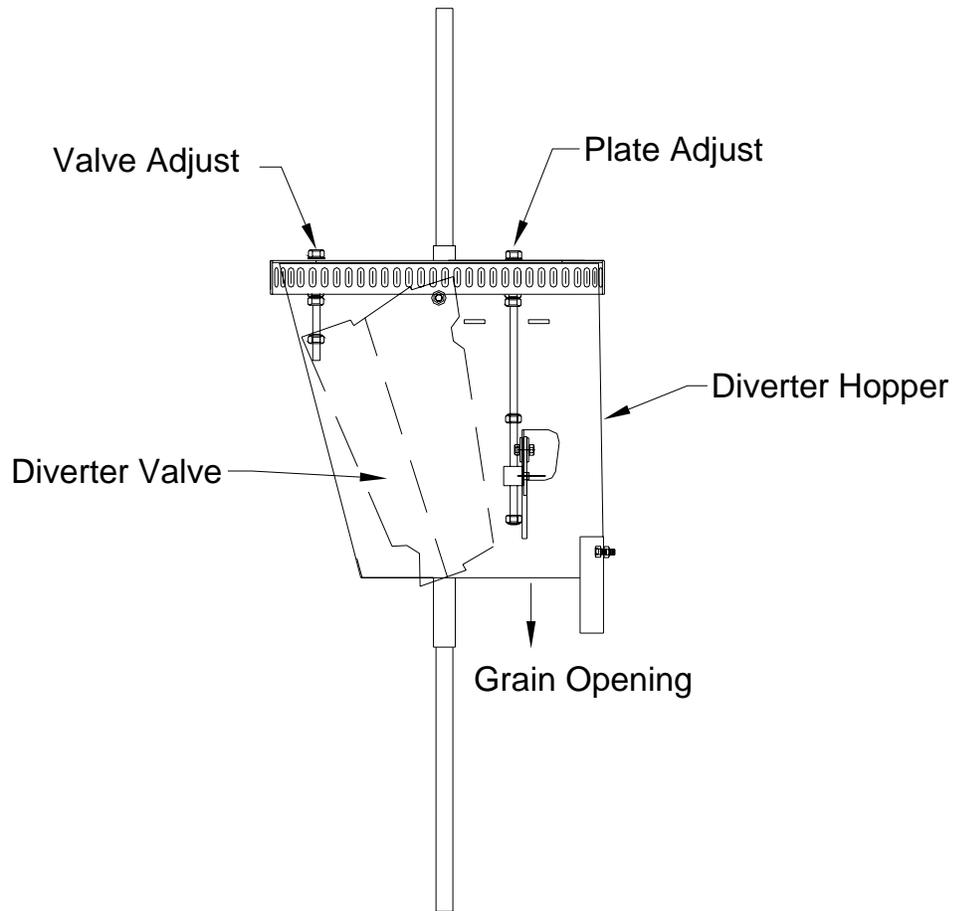
DIVERTER ADJUSTMENTS

INITIAL ADJUSTMENT OF DIVERTER VALVES

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 plate adjust comes from the factory set wide open.



Bottom view without pan

DIVERTER ADJUSTMENTS

Initial Adjustment of Diverter Valve

10" or Smaller Augers Only

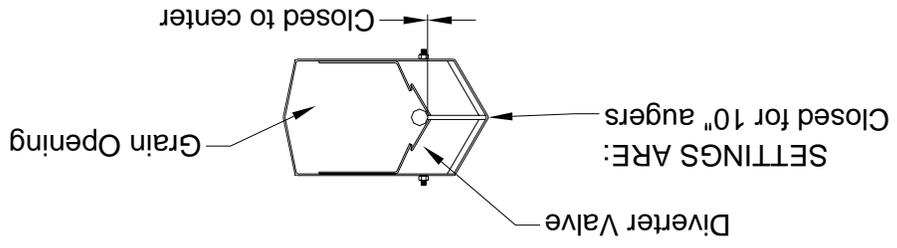
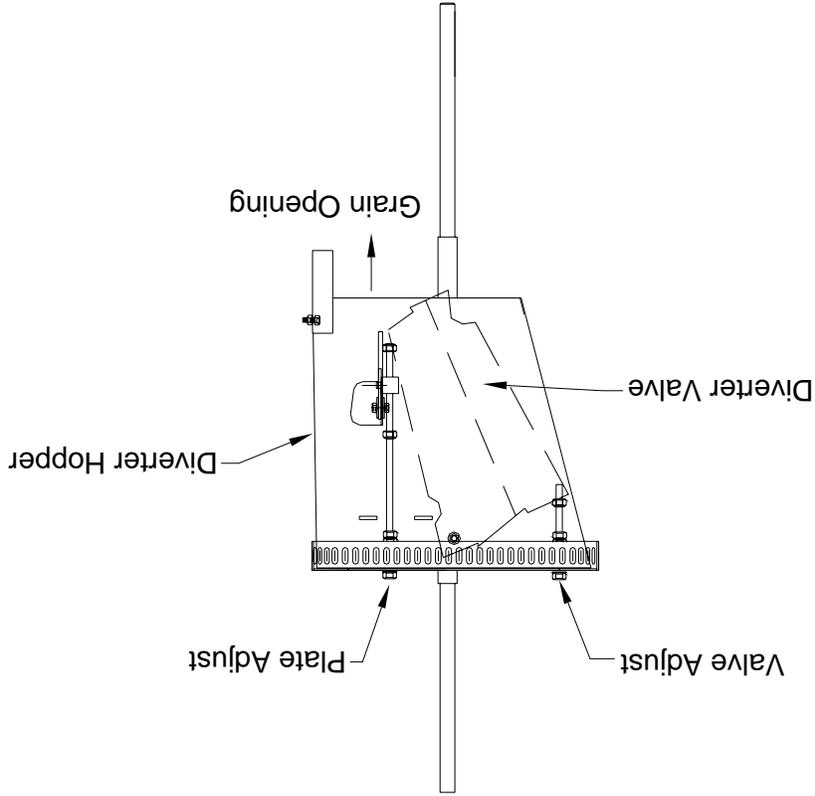
The Diverter Valve comes from the factory preset for 13" transport augers with an opening of 2 1/2". It will need to be adjusted closed for 10" or smaller augers.

Use the Diverter Valve adjustment and completely close the Diverter Valve against the center shaft.

The plate adjust comes from the factory set wide open.

8" or Smaller Augers

Make sure the Lo-Flo Choke Plate has been installed (See Page 6)



Bottom view without pan

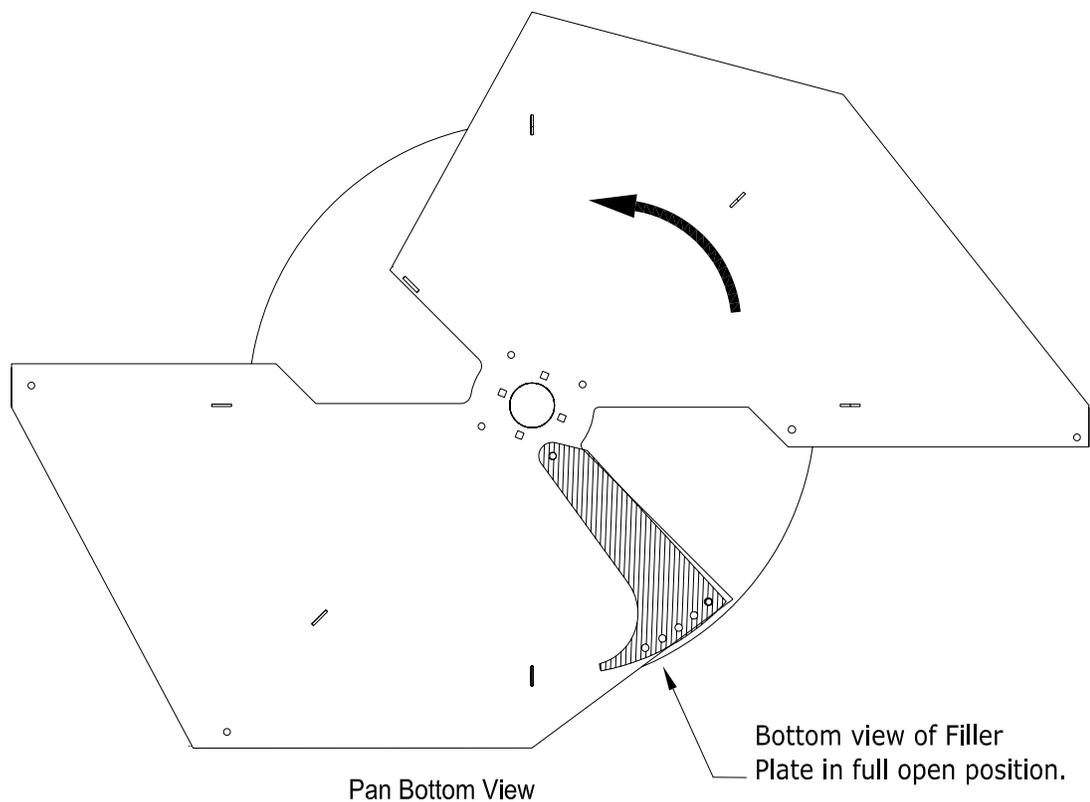
CENTER FILL ADJUSTMENT

Filler Pan 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.

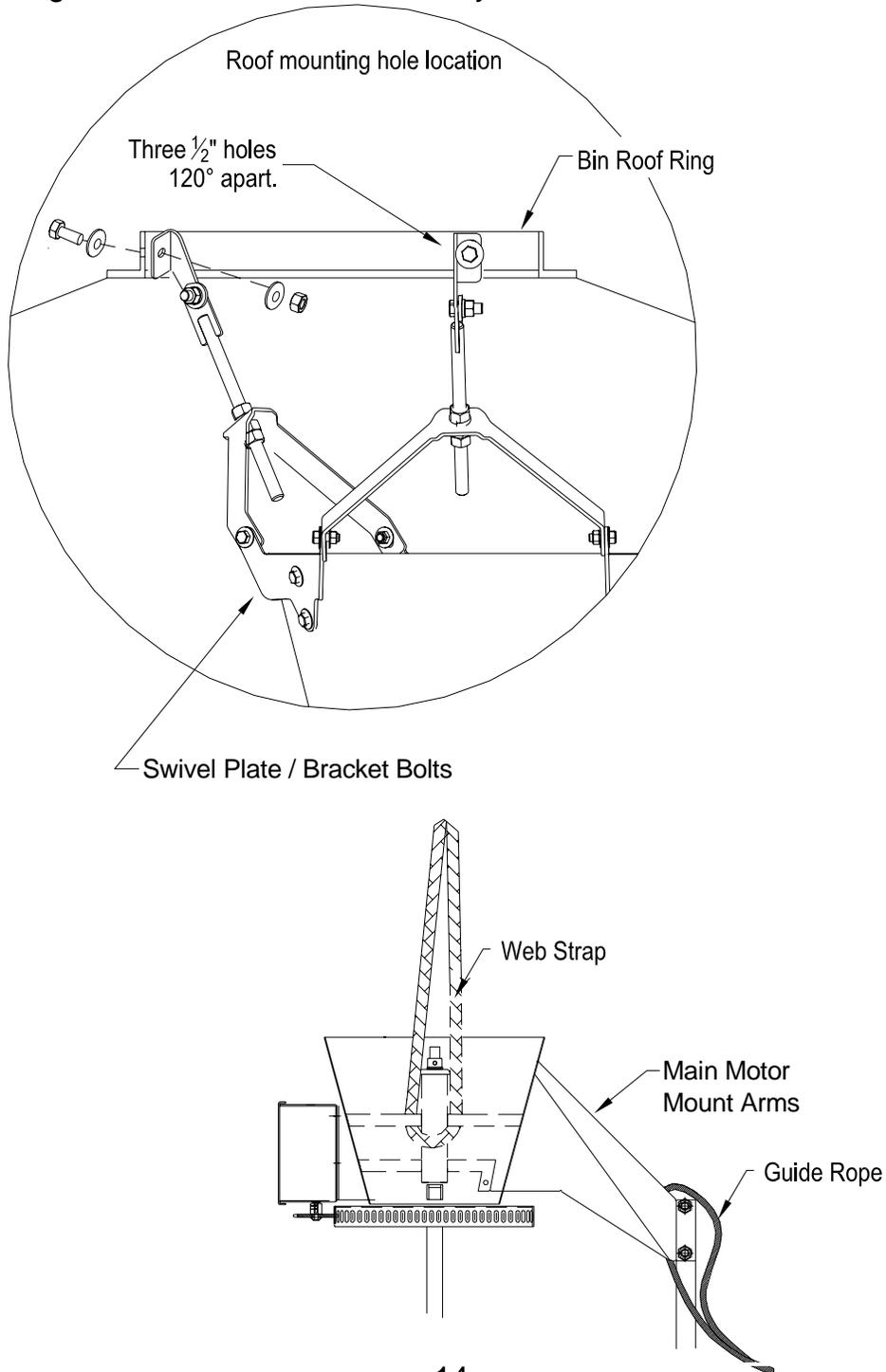
The only reason to change position of the plate is if you are getting a large amount of grain in the center of the bin. This may also indicate a rotation speed that is too slow. Review operation instructions before making changes.



BIN INSTALLATION

I. 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.



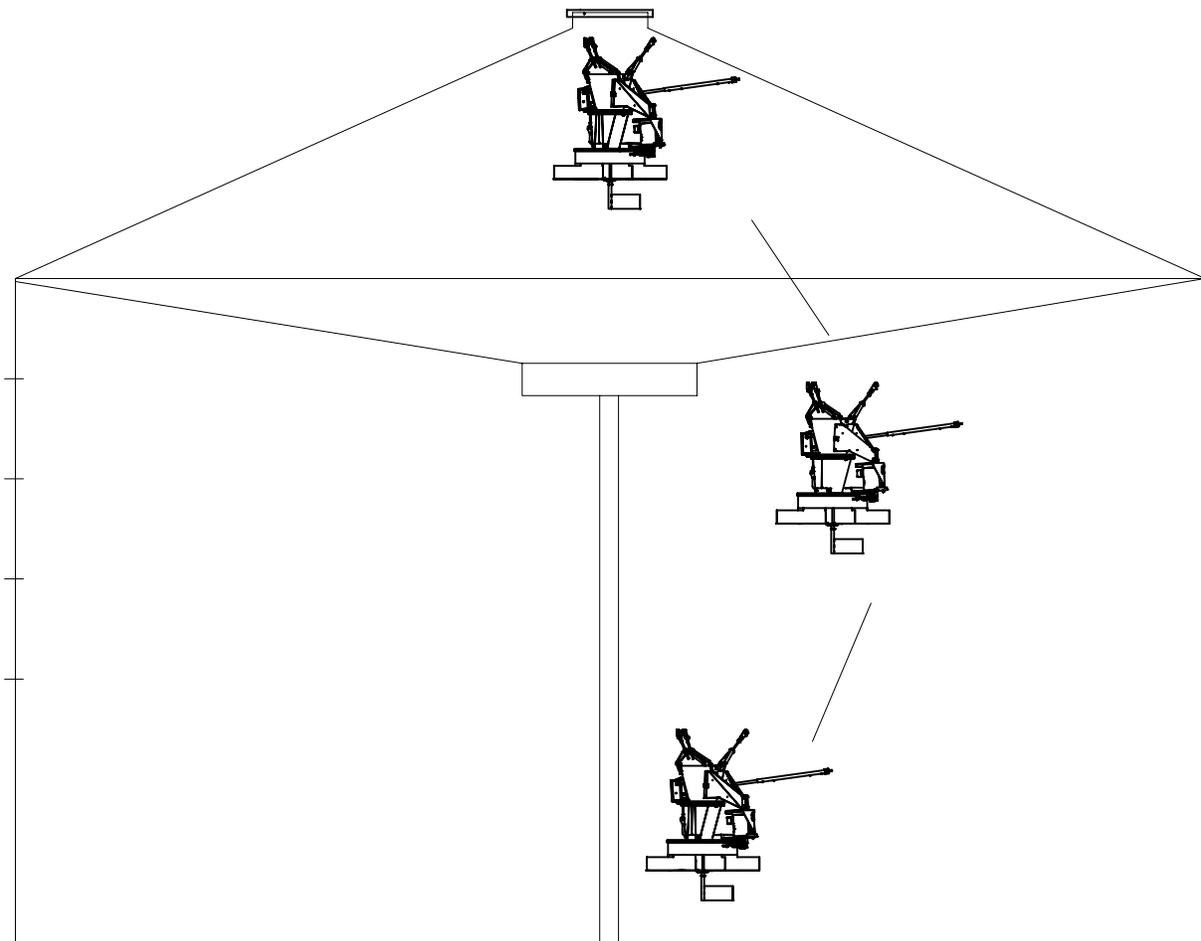
BIN INSTALLATION

4). Hoist unit to roof. Person on floor will need to move spreader around augers and any chains or cables with the guide rope.

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.

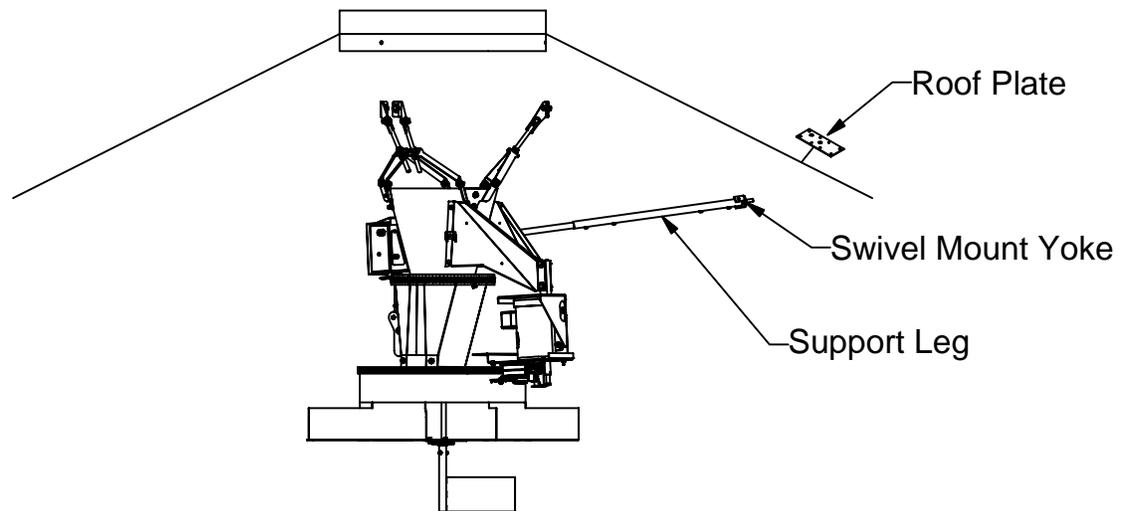
7). Tighten all mounting bolts and nuts securely. Do not forget the swivel plate/bracket bolts. (See page 9)



BIN INSTALLATION

II. Attaching Support Leg

- 1). Be sure you have leveled the spreader, (See page 15)
- 2). Force the support leg 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). Pull 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" bolt down securely.
- 6). Use the supplied self-drilling screws to secure roof plate to bin roof.



III. 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

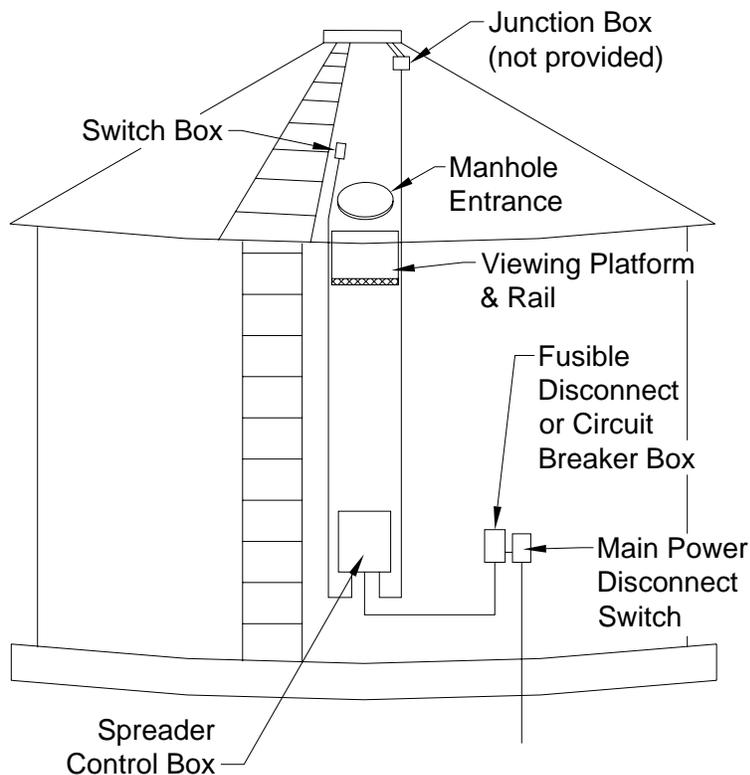
! WARNING

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 and for either single phase or three phase power. 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.

Hp	Phase	Fuse/Breaker	Wire Size to Control Box and Spreader Motor
2	1	20 Amp	12 AWG
2	3	15 Amp	12 AWG

Wiring for Cutler-Hammer MVX9000 V/F Drive (E-6377)
(Starting approximately Mid-2004)

See next section for wiring Cutler-Hammer AF91 V/F Drive (E-6342)

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. Lift on the top and bottom of the MVX9000 drive and swing open the doors to reveal the internal components of the drive. This will allow full access to the drive terminals for wiring incoming power to the drive and to wire from the drive to the motor. Never operate the drive with the frequency drive doors open.

ELECTRICAL INSTALLATION

4). Wire incoming power, in conduit, 220 Volts AC, Single or Three Phase into the spreader control box using the right hand knockout hole. See incoming wiring diagrams for Cutler-Hammer MVX9000 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 to derive the 115 VAC.

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 Cutler-Hammer MVX9000 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 Cutler-Hammer MVX9000 V/F Drive. The switch box should be located near the manhole opening in the bin roof.

7). Re-close the V/F Drive doors. Re-install the front panel on the spreader control box. Apply power to the spreader control box. The red indicator lights for "STOP", "FWD", and "U", on the V/F Drive should be on. The 4 digit display should show "000.0". The 4 digit display is programmed to show percentage of speed, from 0 to 100.2%.

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 "RUN" indicator light should come on. (The display should ramp up to the last set speed. If it stays at 00.0, toggle the pan speed up switch. Press the Stop switch on the drive and the speed will ramp down to 00.0). 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 spreader pan is running at a speed above 00.0. 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. The drive has to be started first.

12). The V/F drive is configured at the factory for a 2 Hp motor. It can also control a 1 Hp motor. Only if the drive is connected to a 1 Hp motor, reprogram the drive as follows, or go to Step 13.

With the drive powered up and not running, the display will show 00.0.

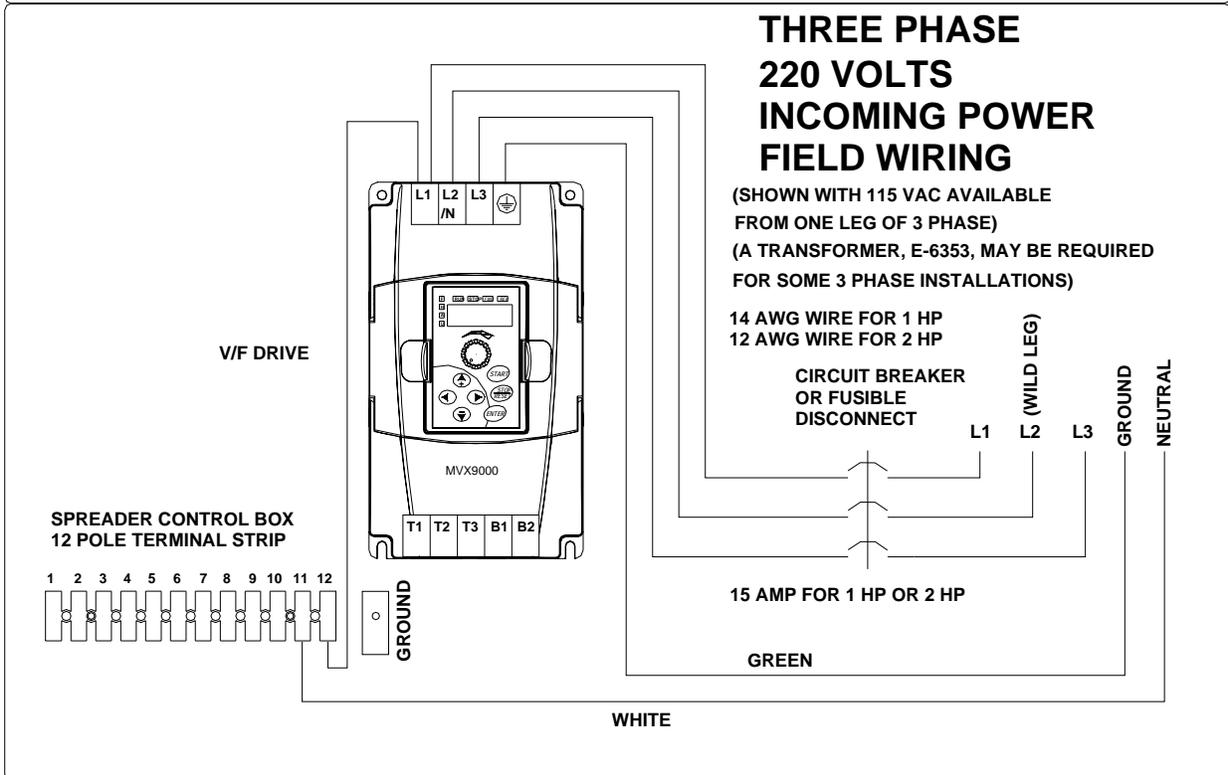
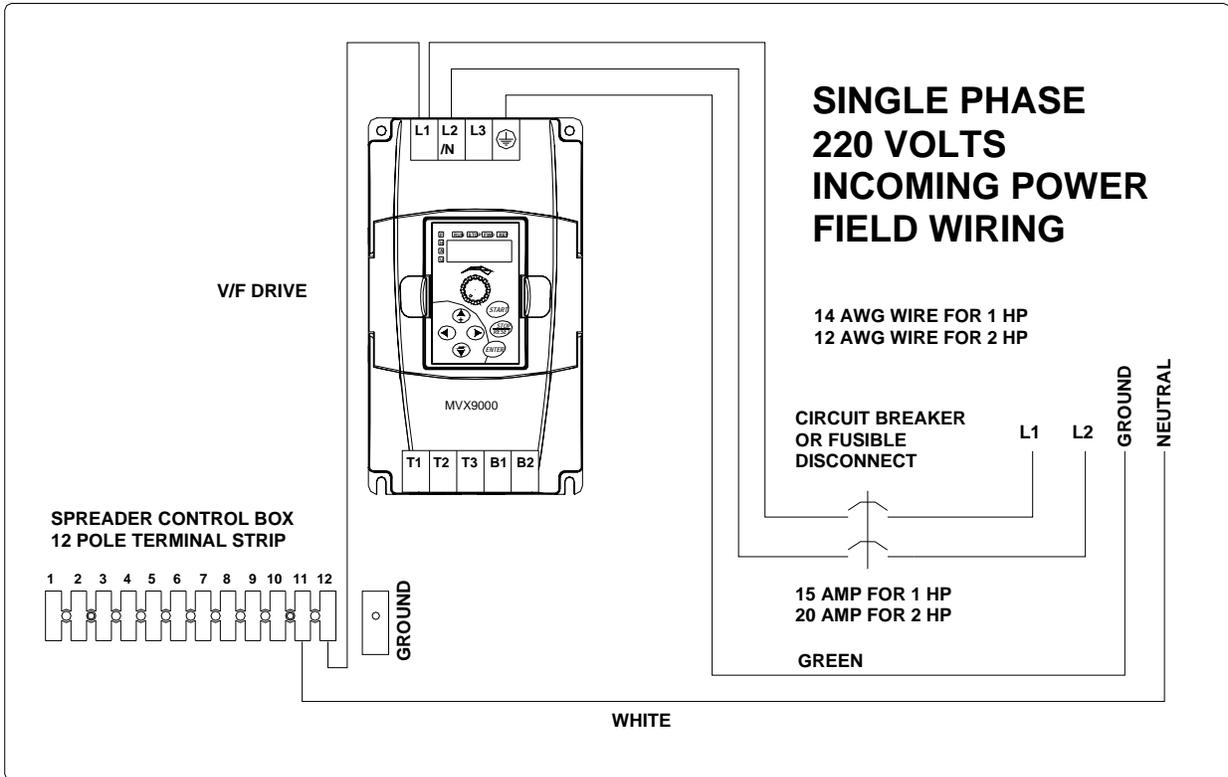
<u>PRESS</u>	<u>DISPLAY</u>
Right arrow	20.____
If the display shows something else press the up or down arrows until it shows 20.____	
Right arrow	20.01
Up arrow until display shows	20.05
Right arrow (Motor FLA)	__5.4
Enter	__5.4 Flashing
Down arrow until display shows (This is motor nameplate amps.) (4.0 is the lowest setting.)	__4.0 Flashing
Enter	"_End" will flash then __4.0
Left arrow	20.05
Left arrow	20.____
Left arrow	__0.0

If a number or display is passed, press the Down arrow to go back to the proper number or display. The drive is now configured for a 1 Hp motor or motor with a nameplate full load amp rating of 4.0 amps. Start the drive to confirm proper operation.

13). Reconnect the spring from the spreader control box access panel to the outer door.

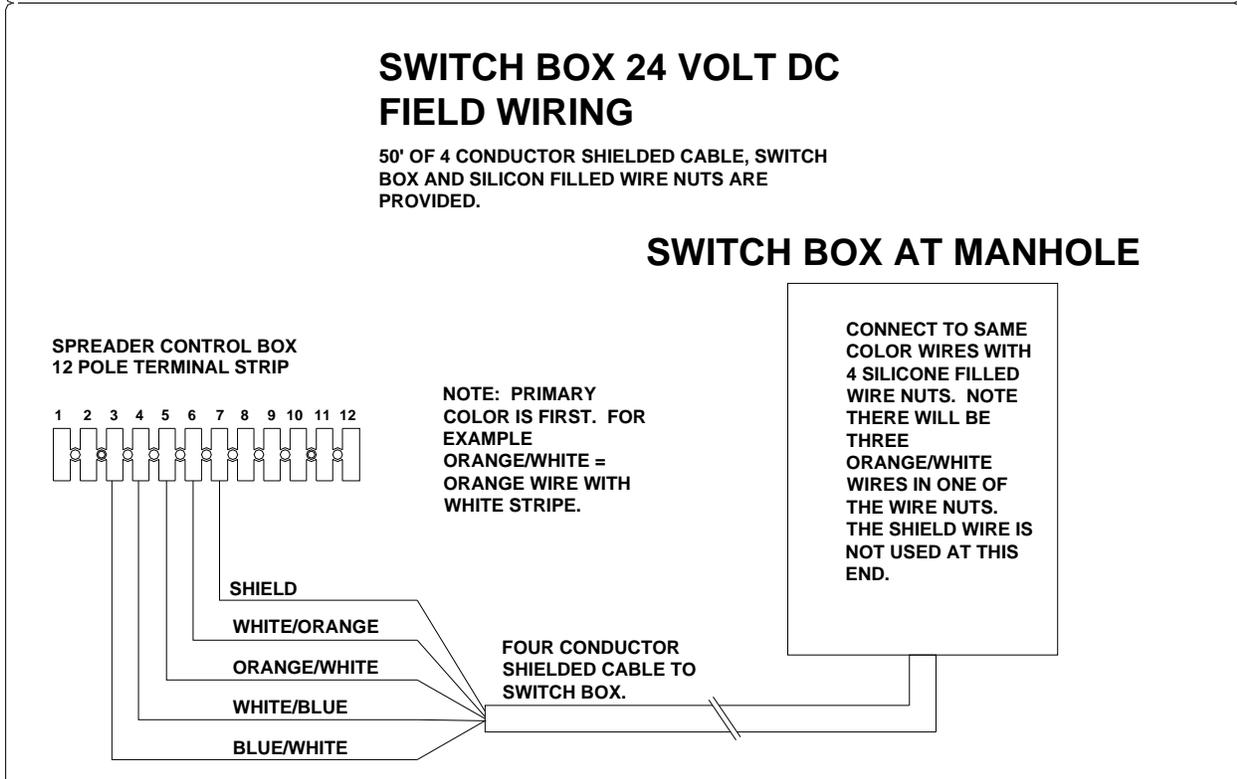
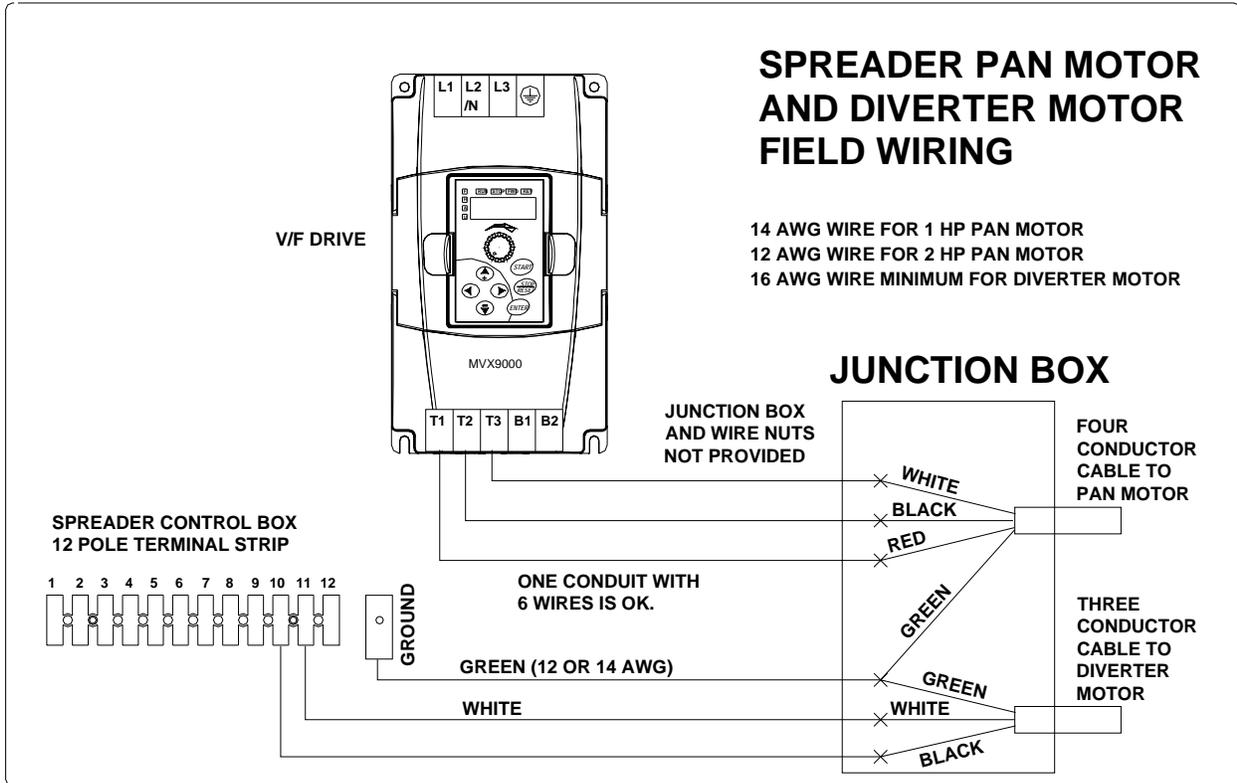
ELECTRICAL INSTALLATION

INCOMING WIRING DIAGRAMS FOR CUTLER-HAMMER MVX9000 V/F DRIVE (E-6377)



ELECTRICAL INSTALLATION

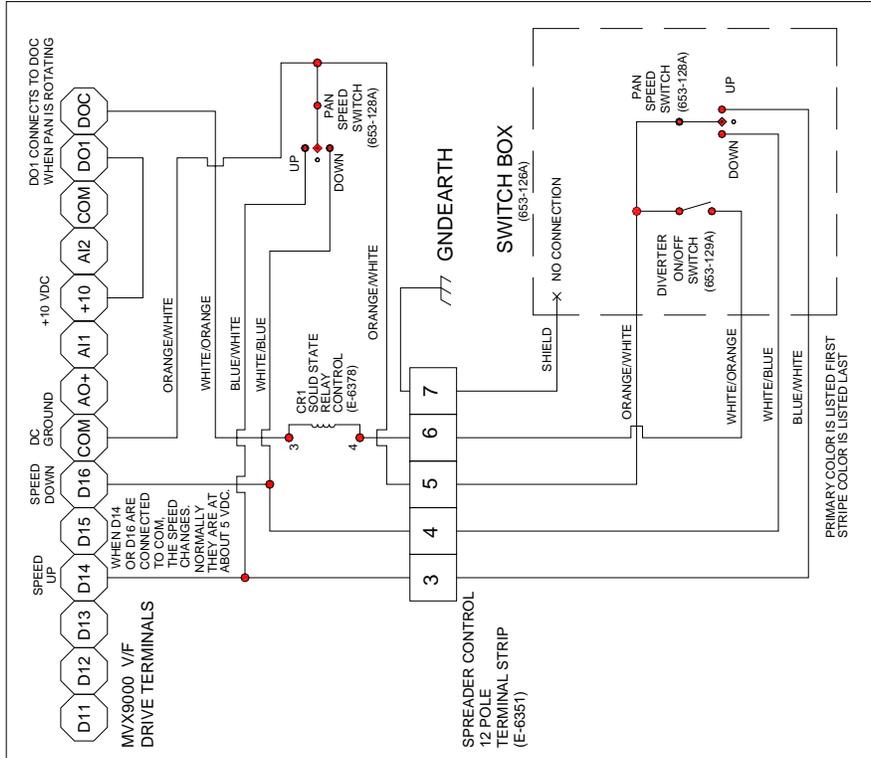
OUTGOING WIRING DIAGRAM FOR CUTLER-HAMMER MVX9000 V-F DRIVE (E-6377)



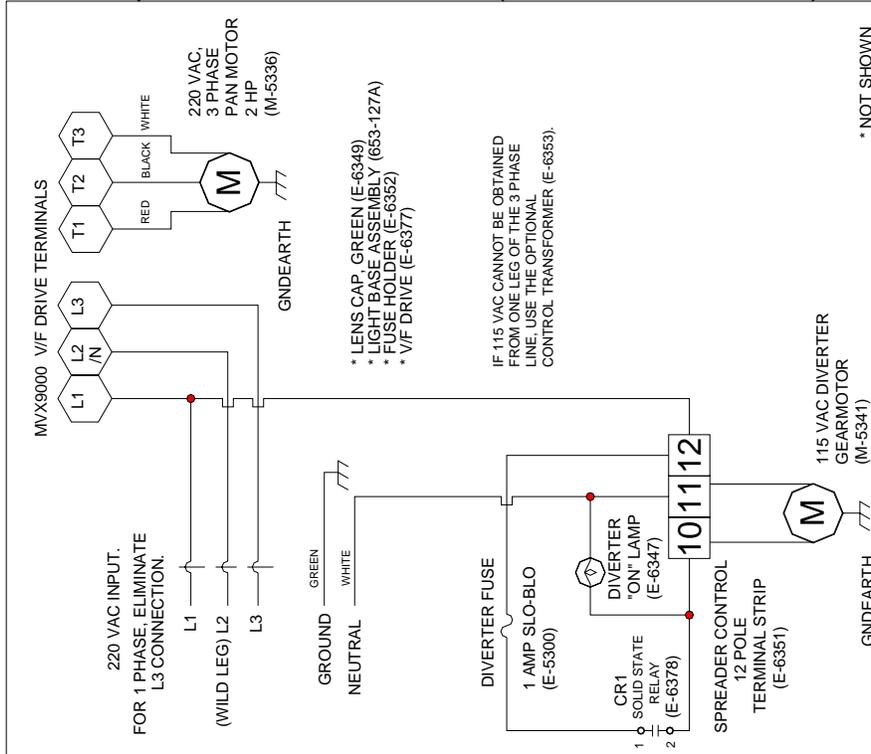
ELECTRICAL INSTALLATION

SCHEMATICS FOR CUTLER-HAMMER MVX9000 V/F DRIVE (E-6377)

Spreader Control Schematic (24 VDC section)



Spreader Control Schematic (220 & 115 VAC section)



ELECTRICAL INSTALLATION

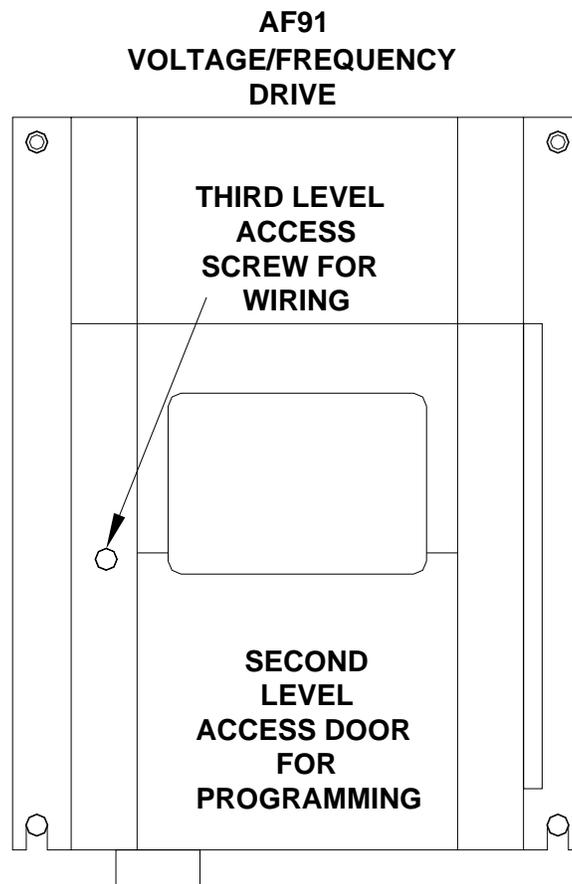
Wiring for Cutler-Hammer AF91 V/F Drive (E-6342)

(Before approximately Mid-2004)

See previous section for wiring Cutler-Hammer MVX9000 V/F Drive (E-6377)

For Steps 1 and 2, see beginning of Electrical Installation Section.

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 access cover. Unhook the spring from the front cover of the spreader control box and remove 5 screws holding the front access cover on, to gain access to the wiring terminal strips. Remove the rubber grommet around the drive control cable assembly from the access panel. Locate the recessed retention screw on the left side main front panel of the drive. Loosen the screw and swing the door to the right to reveal the internal components of the drive. The housing partition will lift out to allow full access to the terminals for wiring incoming power and power to the motor. Never operate the drive with the partition removed or with the full access door opened



ELECTRICAL INSTALLATION

4). Wire incoming power, in conduit, 220 Volts AC, Single or Three Phase into the spreader control box using the center knockout hole. 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 3 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 to derive the 115 VAC.

5). Wire power, in conduit, to the spreader pan motor and diverter motor, from the spreader control box, using the knockout hole on the right side 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.

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. The switch box should be located near the manhole opening in the bin roof.

7). Re-close the V/F Drive cover remembering to insert the housing partition first. Re-install the access panel on the spreader control box. Be sure to press the rubber grommet from the drive control cable assembly into the access panel. Apply power to the spreader control box. The red power indicator light on the V/F Drive should be on. The green indicator light above the start switch will also be on indicating the drive is ready to be started. The 3 digit display should show "00.0". The 3 digit display is programmed to show percentage of speed, from 0 to 102%.

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 run indicator light should come on. (The display should ramp up to the last set speed. If it stays at 00.0, toggle the pan speed up switch. Press the Stop switch on the drive and the speed will ramp down to 00.0). Check for proper rotation. If pan rotation is not correct, 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 five minutes after locking out incoming power before opening access to terminals. Otherwise there is the danger of electric 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 spreader pan is running at a speed above 00.0. 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. The drive has to be started first.

12). The drive is configured at the factory for a 2 Hp motor. It can also control a 1 Hp motor. Only if the drive is connected to a 1 Hp motor, reprogram the drive as follows.

- a) Open the 2nd Level access door under the drive start/stop buttons.
- b) With the drive powered up and not running, the display will show 0.00.

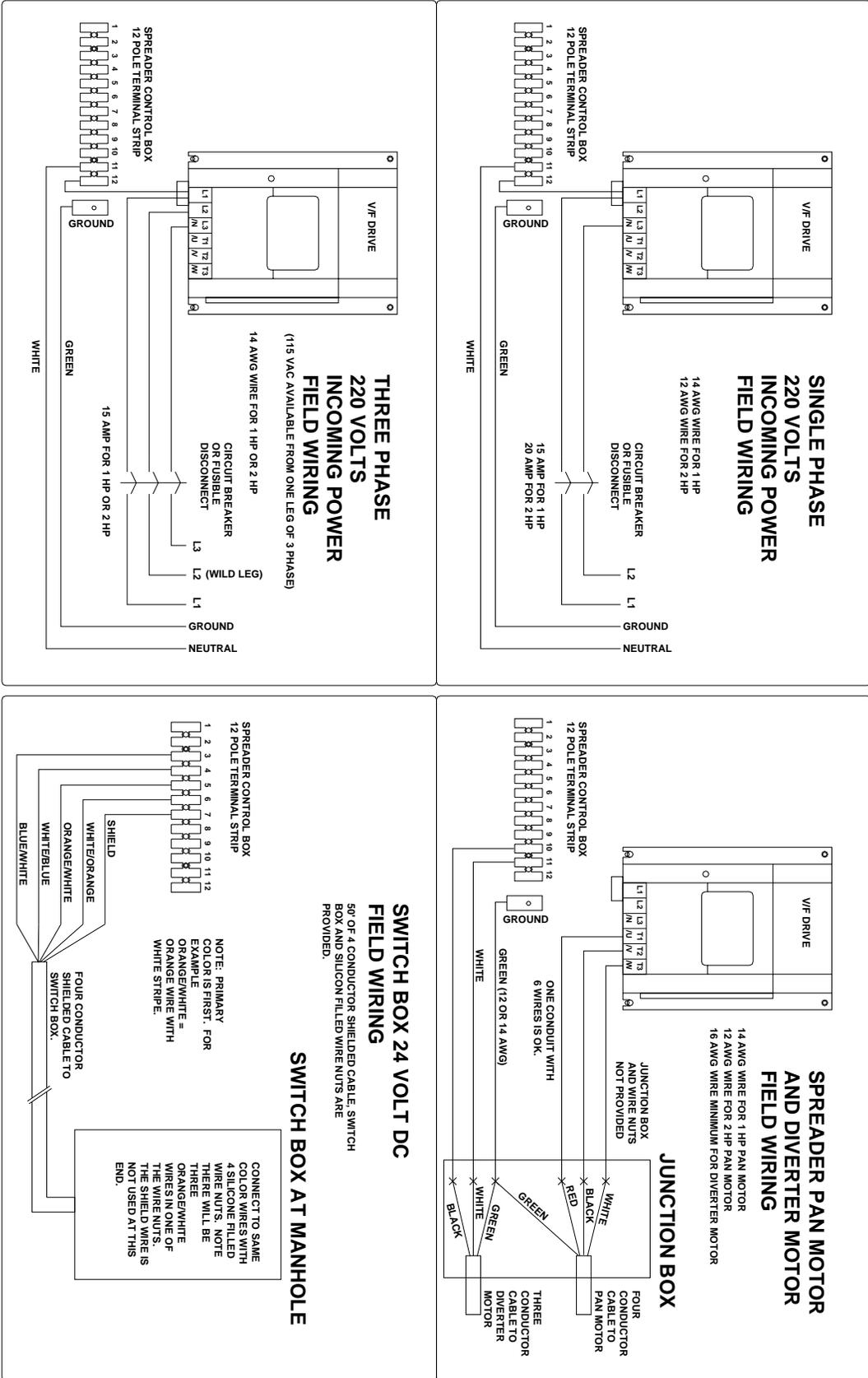
<u>PRESS</u>	<u>DISPLAY</u>
Setup	d 07
Up, until display shows	b --
Setup	b 01
Up, until display shows	b 12
Setup	8.00
Down, until display shows	4.00
Enter	b 12
Setup	b --
Up, until display shows	d 07
Setup	0.00

If a number or display is passed, press the Down button to go back to the proper number or display. The drive is now configured for a 1 Hp motor. Close the 2nd Level access door and start the drive to confirm proper operation.

13) Reconnect the spring from the spreader control box access panel to the outer door.

ELECTRICAL INSTALLATION

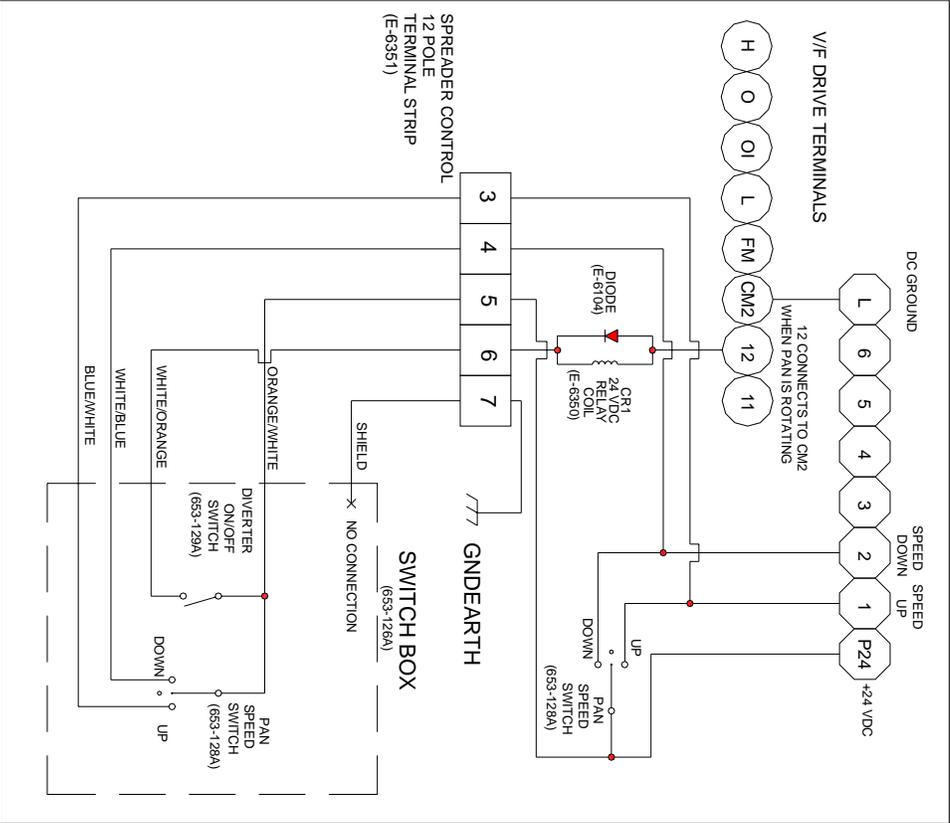
WIRING DIAGRAM FOR CUTLER-HAMMER AF91 V/F DRIVE (E-6342)



ELECTRICAL INSTALLATION

CUTLER-HAMMER AF91 V/F DRIVE (E-6342)

Spreader Control Schematic (24 VDC section)



Spreader Control Schematic (220 & 115 VAC section)

