



INSTALLATION AND OPERATION MANUAL



Wilson AG Trailer with 27" x 31" Hopper Doors KIT #100627

> Thunderstone Manufacturing, LLC. 3400 West O Street Lincoln, NE 68528 402-435-4249 (Fax) 402-438-3918 www.thunderstonemfg.com

THUNDERSTONE PART #100659

REVISION 0

January 21, 2014

INSTAL	LATION INSTRUCTIONS	3	
1.	REMOVE EXISTING MANUAL DOOR OPENERS	3	
2.	VERIFY THAT THE DOORS ROLL SMOOTHLY.	3	
3.	REMOVE THE DOOR ROLLERS.	3	
4.	INSTALL HYDRAULIC CYLINDERS	4	
5.	INSTALL DOOR BRACKETS.	4	
6.	Install the pump and double blocking valve brackets	5	
7.	Install the pump and hydraulic blocking valve	5	
8.	INSTALL HYDRAULIC FITTINGS.	6	
b.	Proper way to install hydraulic fittings and hoses	6	
	i. 37 Degree JIC Fitting Assembly Instructions	6	
	ii. SAE O-Ring Adapter Assembly Instructions	6	
H	YDRAULIC FITTING CHART	7	
9.	INSTALL HOSE BRACKETS.	8	
10.	INSTALL HYDRAULIC HOSES AG TUBS.	9	
11.	INSTALL CONTROL BOX AND WIRING	1	
12.	FINISH INSTALL	6	
OPERA	TION INSTRUCTIONS	7	
Programming Remote to the Easy Flow Hopper Doors:			
Setting	; Functions on Remote:1	8	
Contro	l Box Operation, Manual Operation:1	8	
Contro	Control Box Operation, Wireless Operation:		

Notes:

Recommended hydraulic oil (*not included*): Hydrex Extreme – P/N 038-55087 – Approximately 1-1/2 gallons required

- 1. This kit you purchased either converts a Wilson AG style trailer with a 27" x 31" door from existing manual crank hopper doors to Easy Flow hydraulic doors.
- 2. It is recommended to use Hydrex Extreme which is a biodegradable, all season soy based hydraulic fluid rated to be fluid down to -65°F.

INSTALLATION INSTRUCTIONS

- 1. REMOVE EXISTING MANUAL DOOR OPENERS.
 - a. Remove the three fasteners that hold the manual crank shaft to the knock rail of the trailer.
 - b. Remove the cross shaft by removing the two side brackets from door rails. There are two bolts per side of door. Repeat for both doors.
 - c. Remove the two front strap brackets from the front lip of the door. There are two bolts per side of door. Repeat for both doors.
 - d. Remove the rear strap bracket from the rear of the door. There are four fasteners per bracket holding it to the bottom of the door.



2. VERIFY THAT THE DOORS ROLL SMOOTHLY.

- a. Pull the doors open and closed a few times and determine if they are operating smoothly.
- b. If there is binding on the doors, determine why they are not operating smoothly and adjust the doors if necessary.
- 3. REMOVE THE DOOR ROLLERS.
- a. Remove three rollers per door rail. Save the roller for reinstalling with the hydraulic cylinders.



Remove these door rollers and fasteners, three per side rail.

4. INSTALL HYDRAULIC CYLINDERS.

- a. Hold the hydraulic cylinders up to the trap frame and insert a bolt into the front foot and the rear foot to hold it loosely in place.
- b. Make a mark on the frame rail on the front foot where a hole needs to be drilled.
- c. Remove the hydraulic cylinder and drill a .390 hole into the trap frame where marked.
- d. Install the hydraulic cylinders using the 3/8-16 X 1 1/2" long stainless steel bolts and hardware and the rollers removed from the previous step. Hydraulic cylinder rods need to point toward the center of the trailer. Do not completely tighten the bolts until the door brackets are installed.
- e. Repeat steps a-d for all four of the cylinders.



Hold hydraulic cylinders with the 3/8" X 1 1/2" bolt



1/2" bolt



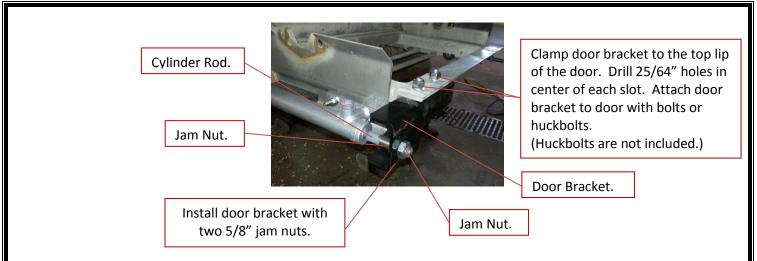
Remove the cylinder and drill hole in the trap frame rail where marked



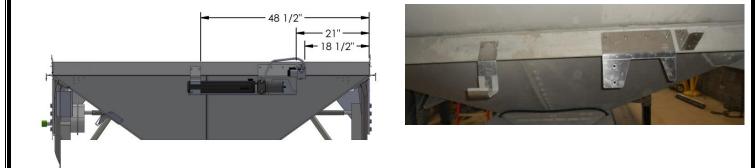
Install the hydraulic cylinders using rollers and provided hardware

5. INSTALL DOOR BRACKETS.

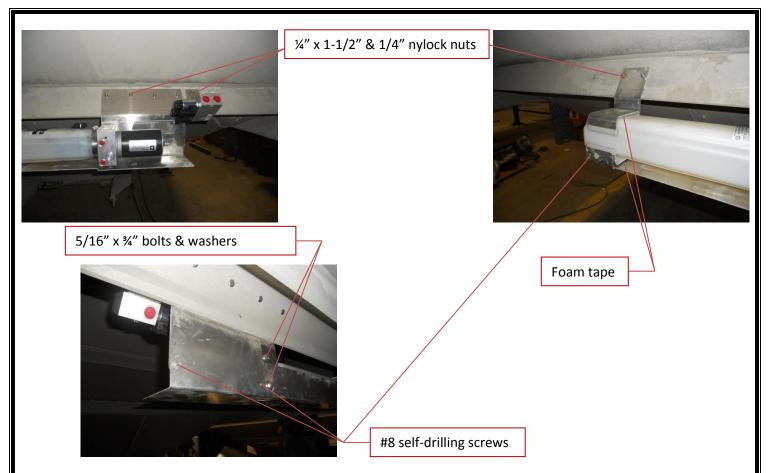
- a. With the doors completely closed, install the door brackets the hydraulic cylinders with the 5/8"-11 Jam nuts.
- b. Screw one Jam nut onto the cylinder rod, then place the door bracket onto the cylinder rod and screw a second jam nut onto the cylinder rod to capture the door bracket.
- c. Screw the inner jam nut down until the door bracket is flush with the door.
- d. Position and clamp the door bracket to the door flange.
- e. Drill two 25/64" holes in the door thru the slots in the door bracket.
- f. Install the two 3/8" X 1-1/4" bolts and flanged locking nuts. If Huck bolts are available, they can be used instead of the standard bolts. Huck bolts are not included in this kit. Use Timpte part numbers 032-01512 Huckbolt 3/8 uncapped #8, and 032-37347 Collar Huck 3/8".
- g. After the brackets are attached to the doors, tighten the jam nuts on the door brackets and tighten the bolts attaching the cylinders to the door frame.



- 6. Install the pump and double blocking valve brackets.
 - a. Clamp the pump mount bracket (041-51260) to the cross c-channel that is even with the bottom rail of the trailer. Position it at the start of the radius of the bend and the edge 21" from the curb side rail.
 - b. Drill four 9/32" holes in the cross c-channel. Install the bracket with ¼" X 1-1/2" bolts and ¼" nylock nuts.
 - c. Position the hydraulic blocking valve bracket (041-51262) 18-1/2" from the curb side rail. Position the top edge of the bracket even with the top of the pump mount bracket.
 - d. Drill two 9/32" holes in the cross c-channel. Install the bracket with ¼" x 1-1/2" bolts and ¼" nylock nuts.
 - e. Position the reservoir bracket (041-51261) 48-1/2" from the curb side rail, and the start of the radius at the edge of the cross c-channel.
 - f. Drill two 9/32" holes in the cross c-channel. Install the bracket with ¼" x 1-1/2' bolts and ¼" nylock nuts.

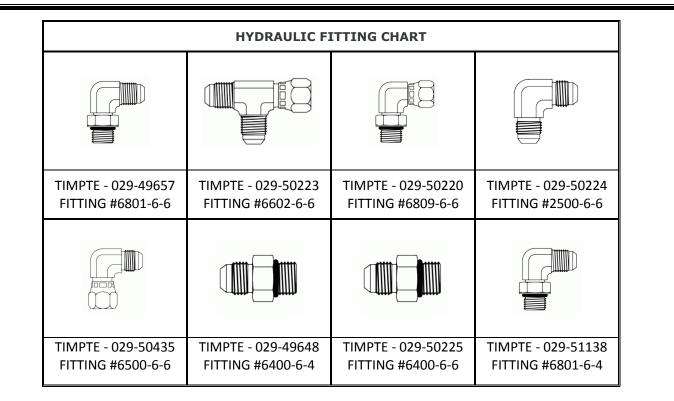


- 7. Install the pump and hydraulic blocking valve.
 - a. Install the reservoir bracket top strap (041-49999) with ¼" x 1-1/2" bolts and ¼" nylock nuts. Verify that the bracket has foam tape installed to protect the hydraulic reservoir is protected from rubbing.
 - b. Fill the hydraulic reservoir with hydraulic oil. Soy fluid (038-49664) is recommended.
 - c. Install the hydraulic pump with two 5/16" x $\frac{3}{4}$ " bolts and washers.
 - d. Install the hydraulic blocking valve with ¼" x 2" bolts and ¼" nylock nuts.
 - e. Install the pump cover panel (041-51259) with #8 self-drilling screws.

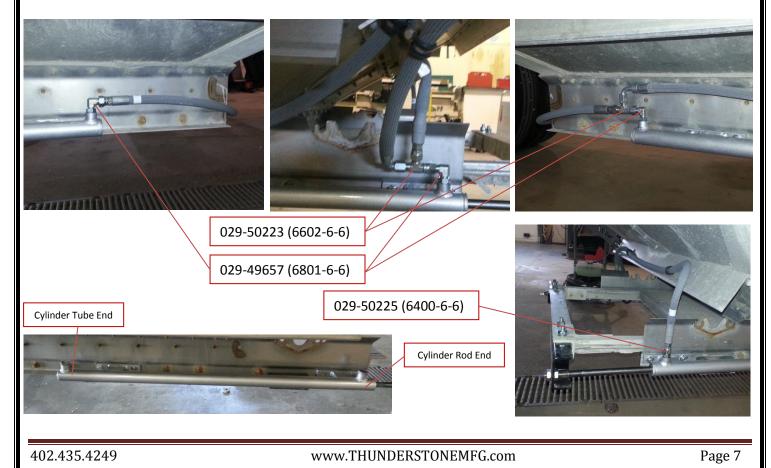


8. INSTALL HYDRAULIC FITTINGS.

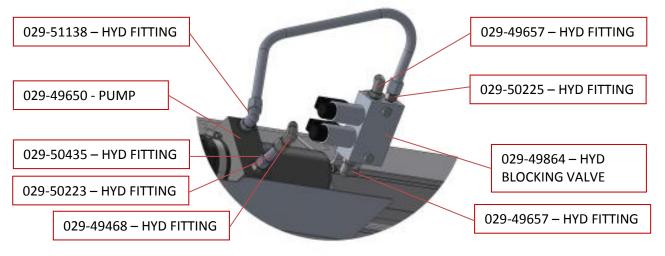
- a. When installing hydraulic fittings, hand tighten all fittings until all of the fittings and hoses are installed. When all connections are made, then go back and tighten all the fittings.
- b. Proper way to install hydraulic fittings and hoses.
 - i. 37 Degree JIC Fitting Assembly Instructions
 - 1. Lubricate threads and the entire surface of the cone with hydraulic/system fluid.
 - 2. Align mating components for hand connection and turn flare nut until sealing surface makes full contact.
 - 3. Torque flare nut to the 18-20 foot/lbs. for (-6) fittings. All torques are wet torques. Do not tighten dry.
 - 4. Alternative to torque method in Step 3 is to tighten nut until firm resistance is felt. Turn Flare nut clockwise at least 30 degrees and no more than 90 degrees. Again lubrication of fitting is required before tightening.
 - ii. SAE O-Ring Adapter Assembly Instructions
 - 1. Lubricate o-ring and treads of fitting with hydraulic/system fluid.
 - 2. Looking at fitting from end with nut/washer/o-ring assembly, back off lock nut far as possible by turning nut clockwise as far as possible on fitting.
 - 3. Turn fitting into port until the washer touches the highest spot on the fitting and sudden resistance is felt.
 - 4. Back off fitting counterclockwise for proper alignment but do not exceeding one revolution.
 - 5. Tighten lock nut to 8-10 ft/lbs for (-4) and 12-16 ft/lbs for (-6). All torques are wet torques. Do not tighten dry.
 - 6. Alternative to torque method in Step 5 is to tighten nut until firm sudden resistance is felt while holding fitting in place. Turn lock nut clockwise an additional 1 to 1-1/4 revolution. Again lubrication of fitting is required before tightening.



- c. Hydraulic cylinder fittings.
 - i. Install part number 029-49657 adapter 6801-6-6, 90 degree JIC to O-RING into each of the four curbside cylinder ports and the two roadside cylinder tube end ports.
 - ii. Install part number 029-50225 adapter 6400-6-6 straight JIC to O-RING into the two remaining ports.
 - iii. On the curb side of the trailer, install part number 029-50223 adapter 6602-6-6-6, Tee, JIC female swivel to JIC onto each of the 90 degree adapters.



- d. Hydraulic pump and blocking valve fittings.
 - i. Install 90° O-Ring to MJIC fitting, part #029-51138 into the port "C1" on the pump.
 - ii. Install O-Ring to MJIC fitting, part #029-49468 into the port "C2" on the pump.
 - iii. Install Tee MJIC-MJIC-FJIC fitting, part #029-50223 onto part number 029-49468.
 - iv. Install 90° FJIC-MJIC fitting, part #029-50435 onto part number 029-50223.
 - v. Install 90° O-Ring to MJIC fitting, part #029-49657 into the port "3" blocking valve.
 - vi. Install O-Ring to MJIC fitting, part #029-50225 into the port "4" blocking valve.
- vii. Install 90° O-Ring to MJIC fitting, part #029-49657 into the port "2" blocking valve. The blocking valve might need to be removed to install this fitting.
- viii. Install part number 029-49648, 3/8" diameter x 18-1/2" long hose from part number 029-51138 to 029-50225.



9. INSTALL HOSE BRACKETS.

- a. All hose brackets are to be installed on the curb side of the trailer.
- b. Brackets are to be installed with the included ¼" x 1-1/2" bolts and ¼" nylock nuts. If installer has access to Huck guns and bolts, optional use of 032-02087 HUCKBOLT ¼ #10 UNCAPPED and 032-02000 COLLAR HYUCK ¼" STD FLANGE is approved.
- c. On the curbside of the upper and lower knock rail, install one 041-51077 bracket per rail.
- d. Total of 4 brackets to be installed.
- e. Install bracket with longer leg against the rail. They will need to be bent slightly to align the hoses.





Page 8

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10. INSTALL HYDRAULIC HOSES AG TUBS.

- a. Attach hydraulic hoses to the cylinders as shown below.
 - i. 029-51239 104" hydraulic hose. Front hopper cylinder rod end.
 - ii. 029-51087 132" hydraulic hose. Front hopper cylinder tube end.
 - 1. Attach hose to brackets as shown.
 - a. ¼" bolts, nylock nuts, and 5/8" Jiffy clips.
 - iii. 029-51241 152" hydraulic hose. Rear hopper cylinder rod end.
 - iv. 029-51242 176" hydraulic hose. Rear hopper cylinder tube end.
 - 1. Attach hose to brackets as shown.
 - a. ¼" bolts, nylock nuts, and 5/8" Jiffy clips.
 - v. 029-53991 56-1/2" hydraulic hose. Cross rear of hopper cylinder tube end.
 - 1. One hose for each hopper. Two total hoses.
 - 2. Attach hose to hopper as shown.
 - a. ¼" bolts, nylock nuts, and 5/8" Jiffy clips.
- vi. 029-53989 46-1/2" hydraulic hose. Cross front of hopper cylinder rod end.
 - 1. One hose for each hopper. Two total hoses.
 - 2. Attach hose to hopper as shown.
 - a. ¼" bolts, nylock nuts, and 5/8" Jiffy clips.



Front hopper 029-51239 – 104" hydraulic hose 40'/42' trailer. End with 45 degree fitting attaches to cylinder rod end.



Rear hopper 029-51242 – 176" hydraulic hose 40'/42' trailer. End with 90 degree fitting attaches to cylinder rod end.



 $\label{eq:Front hopper} Front hopper \\ 029-51087-132'' \ hydraulic \ hose \ 40'/42' \ trailer. \ End \ with \ 90 \ degree \ fitting \ attaches \ to \ cylinder \ tube \ end. \\$



Rear hopper 029-51241 – 152" hydraulic hose 40'/42' trailer. End with 45 degree fitting attaches to cylinder tube end.



Use 029-53989 – 46-1/2" hydraulic hose. Hose goes across hopper to other cylinder. Use clips to mount as shown. Front of hopper, cylinder rod end

Use 029-53991 – 56-1/2" hydraulic hose. Hose goes across hopper to other cylinder. Use clips to mount as shown. Rear of hopper, cylinder tube end

- a. Attach hoses to hydraulic pump and blocking valve.
 - i. Attach hose 029-51242 176" hose to pump port "C2.
 - ii. Attach hose 029-51087 132" hose to pump port "C2".
 - iii. Attach hose 029-51241 152" hose to blocking valve port "3".
 - iv. Attach hose 029-51239 104" hose to blocking valve port "2".

Front hopper 029-51087 – 132" hydraulic hose opposite end from the 90 degree fitting that attaches to the cylinder tube end. Rear hopper 029-51240 – 152" hydraulic hose opposite end from the 45 degree fitting that attaches to the cylinder rod end.



Rear hopper

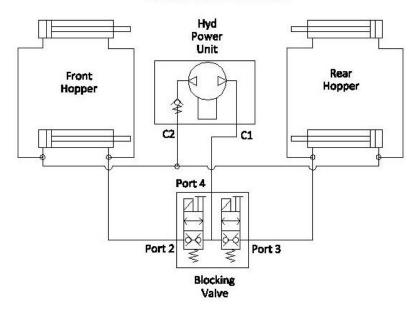
029-51242 – 176" hydraulic hose opposite end from the 90 degree fitting that attaches to the cylinder tube end.

Front hopper 029-51239 – 104" hydraulic hose opposite end from the 45 degree fitting that attaches to the cylinder rod end.

Page 10

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v. Verify all hose hydraulic hose connections with the following schematic.



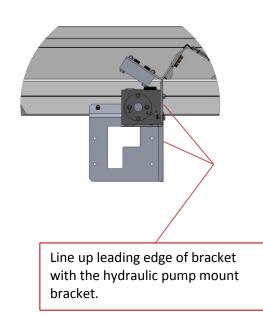
HYDRAULIC SCHEMATIC

- vi. After all hoses are mounted and secured, tighten all fittings.
- 11. INSTALL CONTROL BOX AND WIRING.
 - b. Mount control box bracket part number 100630.
 - i. 032-01284 1/4" x 1-1/2" stainless steel bolt.
 - ii. 032-44653 ¼" stainless steel nylock nut.
 - c. Mount leading edge of the bracket in line with the pump mount bracket as shown.
 - d. Mount control box with (4) ¼" x 1-1/2" stainless steel bolts and ¼" stainless steel nylock nuts.

Locate bracket ¼" from bottom of side rail.



Mount control box with $\frac{1}{4}$ " bolts and $\frac{1}{4}$ " nylock nuts.



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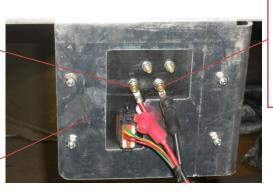
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Page 11

- e. Install 031-50470 Wiring Harness, Solenoids from control box to hydraulic pump and blocking valve as shown.
 - i. On all terminal ends, please use 035-52548 Corrosion Protection Grease.
 - ii. Connect the plug on the 031-50470 wiring harness to the socket on the back of the control box.
 - iii. Connect the red wire on wiring harness 031-50470 to the left "W" terminal on the back of the control box.
 - iv. Connect the black wire on the wiring harness 031-50470 to the right "W" terminal on the back of the control box.

Connect red wire of wiring harness 031-50470 to terminal left "W" on the back of the control box.

Connect plug of wiring harness 031-50470 to socket on the back of the control box.



Connect black wire of wiring harness 031-50470 to terminal right "W" on the back of the control box.

- v. Connect the red wire of 031-50470 wiring harness to terminal "2" of the hydraulic pump.
- vi. Connect the black wire of 031-50470 wiring harness to terminal "2" of the hydraulic pump.

Connect black wire of wiring harness 031-50470 to terminal "1" on the hydraulic pump.



Connect red wire of wiring harness 031-50470 to terminal "2" on the hydraulic pump.

- vii. Connect the plug with the yellow/brown wires of wiring harness 031-50470 to the lower valve on the hydraulic blocking valve.
- viii. Connect the plug with the red/green wires of wiring harness 031-50470 to the upper valve on the hydraulic blocking valve.

Connect the plug with yellow/brown wires of wiring harness 031-50470 to the lower valve on the hydraulic blocking valve.



Connect the plug with red/green wires of wiring harness 031-50470 to the upper valve on the hydraulic blocking valve.

Page 12

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- f. Attach control wiring harness to trailer.
 - i. Attach wiring harness with 021-35989 Tyrap w/push in barb.
 - ii. Drill ¼" hole for each tyrap location. Space evenly so that the wiring harness is held securely in place.



- g. Install the ground wire to the control box.
 - i. Drill a 7/16" hole in the tub rail as shown.
 - ii. Mount ground stud and wire to tub rail in the following order.
 - 1. 032-44809 3/8" stainless steel bolt from the underside of the tub rail with 032-44905 3/8" stainless steel flat washer.
 - 2. Tub rail.
 - 3. 032-03271 3/8" flanged locking nut.
 - 4. 031-51477 Black battery boot installed on wire.
 - 5. 031-51038-00288 Black 4 gage x 18" long ground wire.
 - 6. 032-43238 3/8" Jam nut.
 - 7. 035-52548 Corrosion Protection Grease.
 - iii. Attach other end of 031-51038-00288 ground wire to terminal "-"on back of control box with 031-51477 black battery boot.

031-51038-00288 – Black 4 gage x 18" ground wire with a 031-51477 black battery boot on each end.

031-50504 – red 4 gage x 28 foot power wire with ½" wire loom installed on it, pulled thru the side rail and attached to the "+" terminal on the back of the control box.



Drill 7/16" hole and connect wire as described in step g-i.

Connect black ground wire to terminal "-" to the back of control box.

- h. Install power wire.
 - i. Using a fish tape, pull 031-50504 Red 4 gage x 28 feet long power wire thru side rail guide by the control box. Pull enough wire thru the hole so that it reaches the control box.
 - 1. Pull enough wire (approximately 16") thru the hole so that it reaches the control box.
 - 2. Install $031-19057 \frac{1}{2}$ " Black convoluted wire loom on the wire so that the loom goes thru the hole in the side rail to protect the wire.
 - 3. Install 031-51479 Red battery boot onto the end of the wire.
 - 4. Attach the wire end to the "+" terminal on the back of the control box.
 - 5. Apply 035-52548 Corrosion protection grease to the terminal.
 - 6. Cover terminal with the red battery boot.





031-50504 – red 4gauge x 28 foot power wire in side rail.

031-50504 – red 4-gauge x 28 foot power wire in nose of trailer under plastic wire raceway.

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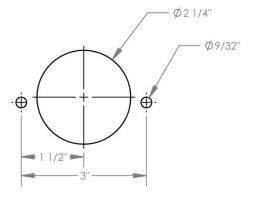
i. Install plug receptacle in nose of trailer.

i.

- Determine best location for plug receptacle in relation to the other attachments that are on the nose plate.
 - 1. Drill a 2-1/4" hole in the nose plate where there is access to it. Exact location to be determined as "best fit".
 - 2. Insert receptacle into hole and drill bolt holes.
 - 3. Attach receptacle to trailer with:
 - a. 032-43152 ¼" stainless steel screws.
 - b. 032-44653 ¼" stainless steel nylock nuts.

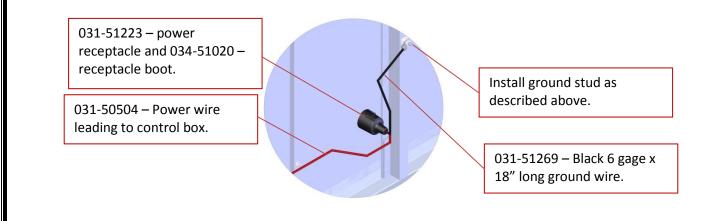


031-51223 – 2 pole vertical receptacle placement



Hole pattern for 031-51223 – 2 pole, vertical, receptacle placement.

- j. Install ground wire and wire receptacle.
 - i. Drill a 7/16" hole in the z-post as shown approximately 8" above the receptacle hole.
 - ii. Mount ground stud and wire to z-post.
 - 1. 032-44809 3/8" stainless steel bolt.
 - 2. 032-44905 3/8" stainless steel flat washer.
 - 3. Z-post.
 - 4. 032-03271 3/8" flanged locking nut.
 - 5. 031-51477 Black battery boot installed on wire.
 - 6. 031-51269 Black 6 gage x 18" long ground wire.
 - 7. 032-43238 3/8" Jam nut.
 - 8. 035-52548 Corrosion Protection Grease.
 - iii. Wire receptacle with power wire and ground wire.
 - 1. Push both wires thru 034-51020 2 pole receptacle boot.
 - 2. Install power wire on the receptacle.
 - 3. Install ground wire on the receptacle.
 - 4. Push boot over the plug.



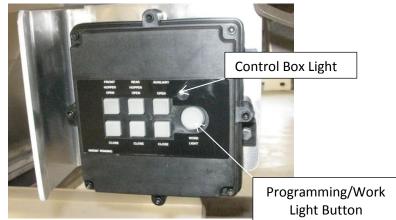
12. FINISH INSTALL

- k. Apply power to the unit by plugging into a 12 volt power supply.
- I. Program the remote to the control box per included instructions.
- m. Bleed all hydraulic lines.
 - i. Slightly loosen hydraulic fittings at the cylinders one at a time.
 - ii. Run pump until oil is seen at the fittings.
 - iii. Re-tighten the fitting.
 - iv. Repeat for all fittings at all the cylinders.
 - v. Run doors open and closed a few times to make sure all air is out of lines.
 - vi. Refill the hydraulic reservoir to the full line.

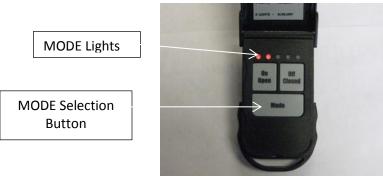
OPERATION INSTRUCTIONS

Programming Remote to the Easy Flow Hopper Doors:

1. Power up the control box. Hold the "**Open**" and "**Close**" buttons on the control box for 3 seconds or until control box light comes on to indicate the control box is activated.



- 2. Open transmitter and observe flashing light.
- 3. Push "MODE" button to select "Front Hopper" Mode (First two lights flashing).



- 4. One to four transmitters can be programmed. All transmitters are to require to be programmed while light is flashing.
- 5. Push and hold "**Programming /Work Light**" button on control box, for approximately 8 seconds, until the illuminated light on the control box starts flashing.
- 6. Press the On/Open button on the flip style for the first remote control to be programmed for 1 second (see Figure 2.1 below). The red light on the control box will stop flashing for a moment and then start flashing again. Repeat this for all the remote controls that need to be programmed while the light on the control box is still flashing. If one transmitter is being programmed, the "ON/OPEN" button will be pushed four times. If two transmitters are being programmed then the "ON/OPEN" button of the second transmitter will be pushed three times. If three transmitters are being programmed then the "ON/OPEN" button of the third transmitter will be pushed two times. When four transmitters are programmed press the "ON/OPEN" button of each transmitter once. The light on the control module will stop flashing when the four inputs have been received. Close lid of programmed transmitters to power down transmitters.
- 7. Power down control box. Hold the Front Hopper "**Open**" and "**Close**" buttons for 3 seconds or until control box light goes off.

Setting Functions on Remote:

Setting function allows functions to be blocked if not required /not going to be used.

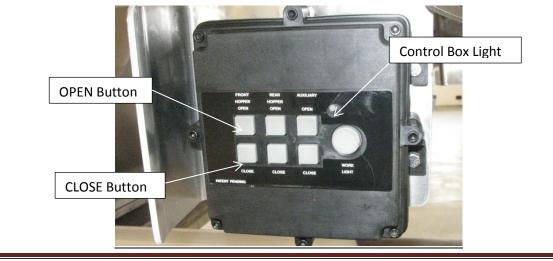
- 1. Open transmitter. Observe flashing light.
- 2. Press and hold "MODE" button for 10 12 seconds until the top light stays lit.
- 3. Press the "**ON/OPEN**" button if this function will be used. Select and press the "**OFF/CLOSE**" button if you want this function to be skipped.



- 4. Repeat Step 3 for all five functions.
 - a.1 LIGHT-TARP SYSTEMb.2 LIGHTS-FRONT HOPPERc.3 LIGHTS-REAR HOPPER
 - d. 4 LIGHTS AUXILIARY
 - e. 5 LIGHTS AUXILARY
- 5. When the last function has been selected, the light on the first mode function will stay lit for approximately 3 seconds to indicate active and return to flashing when process is complete.

Control Box Operation, Manual Operation:

- 1. Turn on Master Disconnect Switch in the tractor. (when applicable)
- 2. Power up Control Box. Push and hold the **Front Hopper** "**Open**" and "**Close**" buttons on the control box simultaneously for 3 seconds or until control box light comes on to indicate the control box is activated.
- 3. Select button to perform the required operations.
- 4. Power off Control Box when finished. Push and hold the **Front Hopper "Open"** and **"Close**" buttons on the control box simultaneously for 3 seconds or until control box light goes off.)



Control Box Operation, Wireless Operation:

- 1. Turn on Master Disconnect Switch in the tractor. (when applicable)
- Power up Control Box using transmitter. Open transmitter and Push "MODE" button to select the "Front Hopper" Mode (First two lights flashing).
- 3. Push and hold the **"ON/Open"** and **"OFF/CLOSE**" buttons on the transmitter simultaneously for 3 seconds or until control box light comes on to indicate the control box is activated.
- 4. Select button to perform the required operations for the front hopper.
- 5. To use the rear hopper, push "MODE" button to select Rear Hopper (First three lights flashing).
- 6. Select button to perform the required operations for the rear hopper.
- Power off Control Box when finished. Push "MODE" button to select "Front Hopper" Mode (First two lights flashing). Push and hold the "ON/OPEN" and "OFF/CLOSE" buttons on the transmitter simultaneously for 3 seconds or until control box light goes off.

