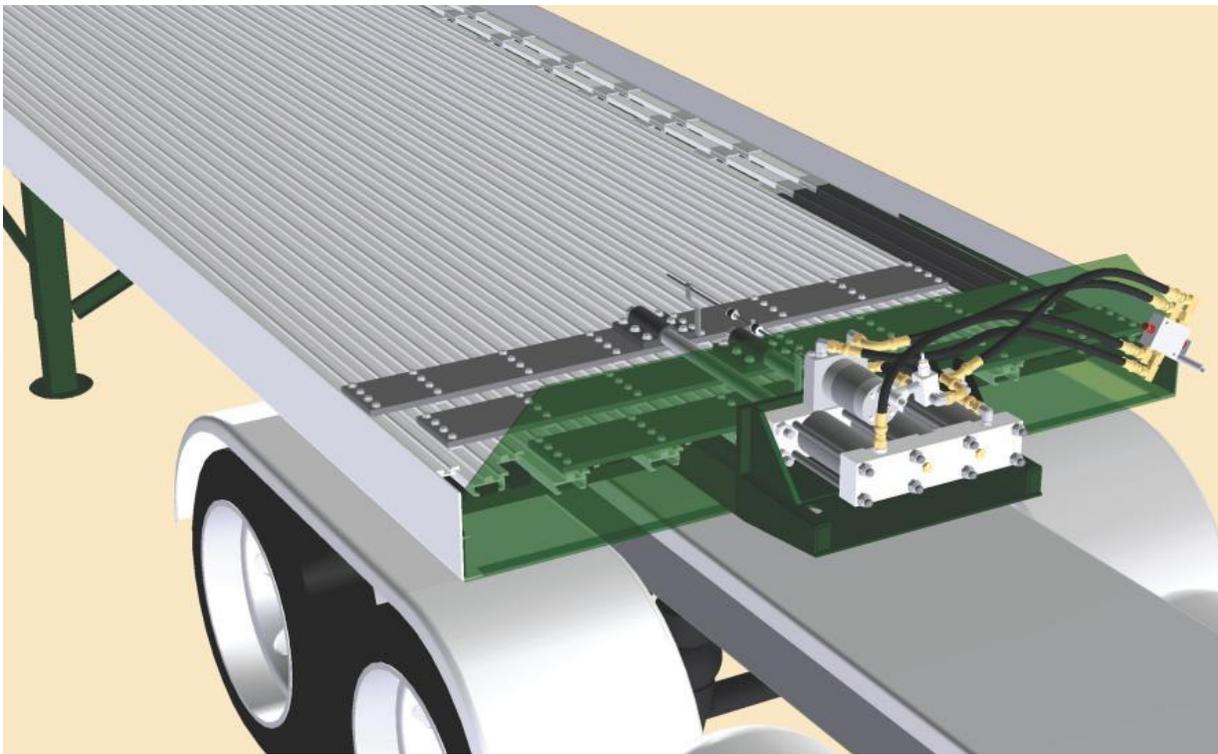


HALLCO™

INDUSTRIES, INC.

Owner's Manual:

8000 BRUTE SERIES LIVE FLOOR CONVEYING SYSTEMS



West Coast USA
6605 Ammunition Road
P.O. Box 505
Tillamook, OR 97141
Ph. 800-542-5526
Ph. 503-842-8886
Fax: 503-842-4866

Central USA
8276 Hwy. 16 North
Poteet, TX 78065
Ph. 877-425-5261
Ph. 830-742-8441
Fax: 830-742-8682

East Coast USA
480 Millrun Rd.
Salisbury, NC 28144
Ph. 800-230-0190
Ph. 704-636-4122
Fax: 704-636-1644

**-FOR YOUR SAFETY-
Read Carefully Before Operating Floor**

This floor contains moving components and carries large loads which are capable of causing injury or death, if the following precautions are not followed carefully:

- Lock out or isolate the power source from floor while performing installation, inspections, cleaning, or maintenance.
- Keep all body parts clear of the floor mechanisms while the floor is operating.
- DO NOT operate floor while a person is on the floor.
- DO NOT stand at the opening of the container while the floor is unloading or in the way of the unloading doors which may be pushed by the moving load.
- Use caution when opening container doors even when floor is not operating. The load may have shifted against the door in transit causing the door to open rapidly when unlatched.
- DO NOT operate the floor in the unloading direction with the unloading door(s) closed. DO NOT shift the load material against the forward wall with the floor. The installing activity must provide a means for the operator to visually monitor the load when shifting it forward. This floor is capable of causing serious damage to the box structure and may pose a safety hazard, if the load is shifted against the rear or forward box structure.
- DO NOT operate floor above the maximum operating pressure specified in this manual.
- Observe Hallco safety sticker instructions.

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SAFETY & OPERATIONAL DECALS

Prior to operating the LIVE FLOOR system check that the safety and operational decals are installed on the container. Refer to [Figure 1](#) (this page).



FRONT MOUNT SAFETY AND OPERATIONAL DECAL PLACEMENT GUIDE

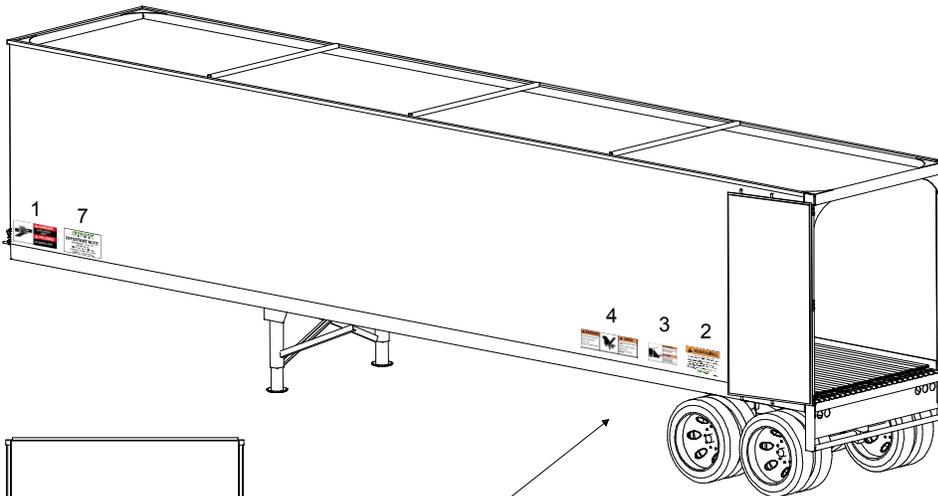
- 1 **#99-4400**

 Qty 3
- 2 **#99-4806**

 Qty 2
- 3 **#99-4807**

 Qty 2
- 4 **#99-4808**

 Qty 3

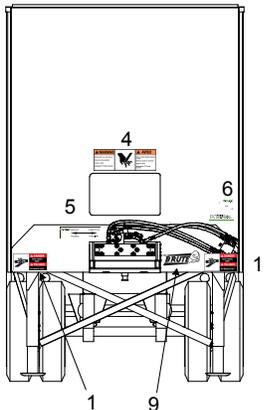


- 5 **#99-4399**

 Qty 1

- 6 **#99-4398**

 Qty 1



Rear decals must be visible with the doors completely open!

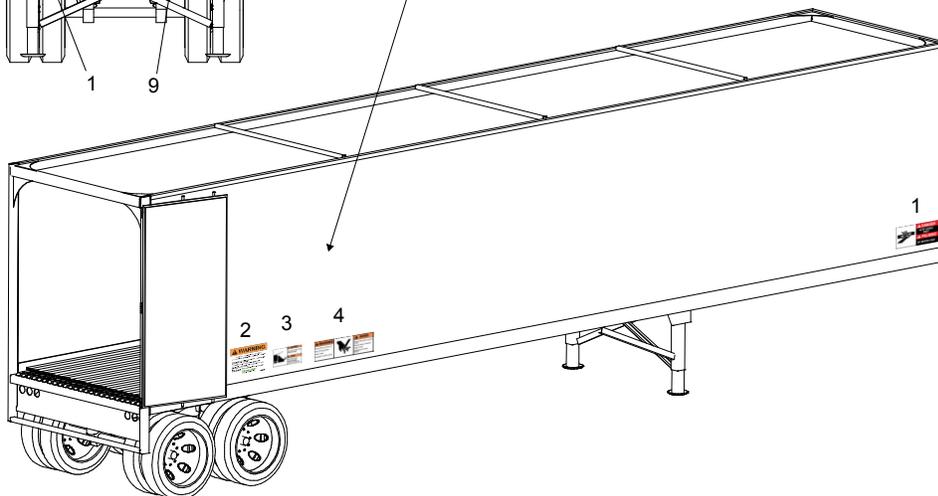
Place Hallco logo decal on rear door.

- 7 **#99-4401**

 Qty 1

- 8 **#99-4809**

 Qty 1



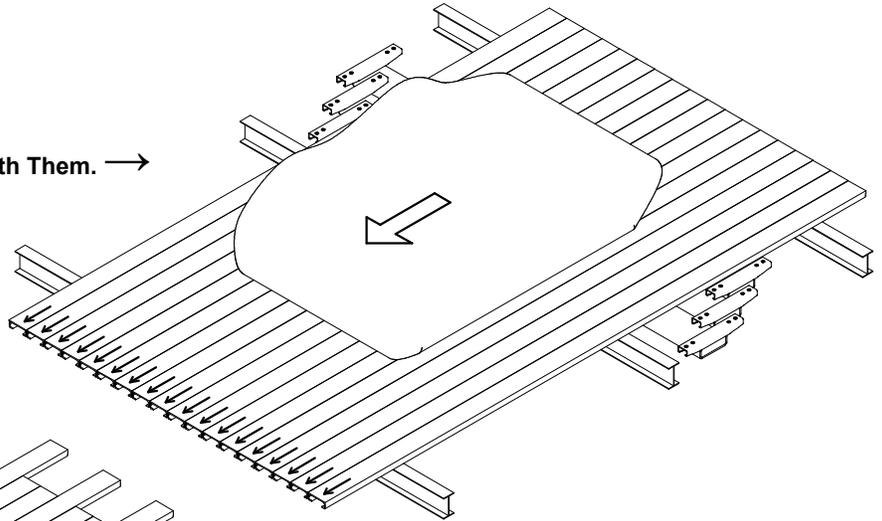
- 9 **#99-4821**

 Qty 1

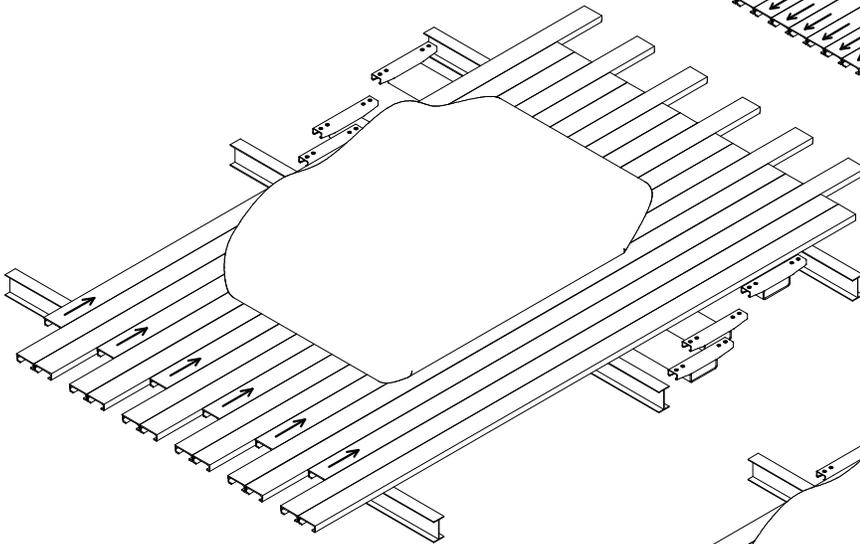
-Figure 1-
Safety & Operational Decal Placement Guide

HOW THEY WORK

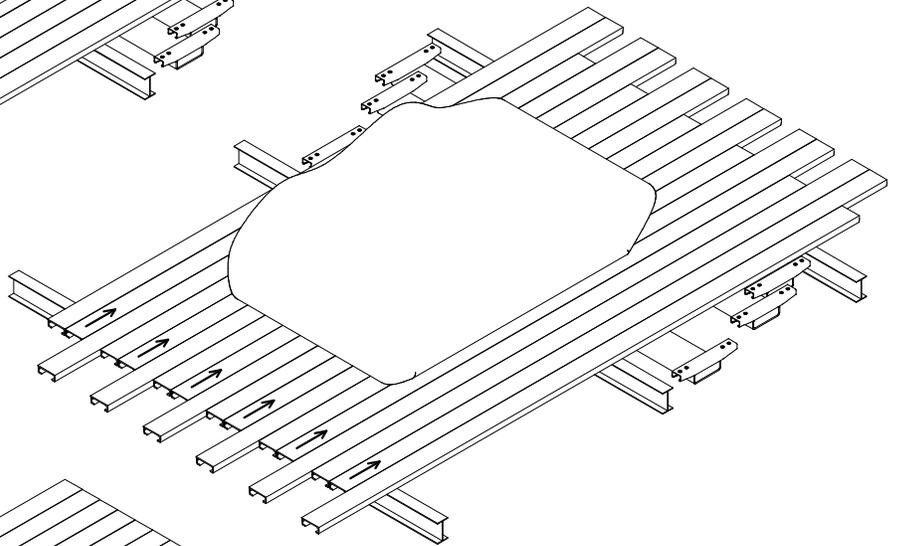
1. All Slats Move Together Moving the Load With Them. →



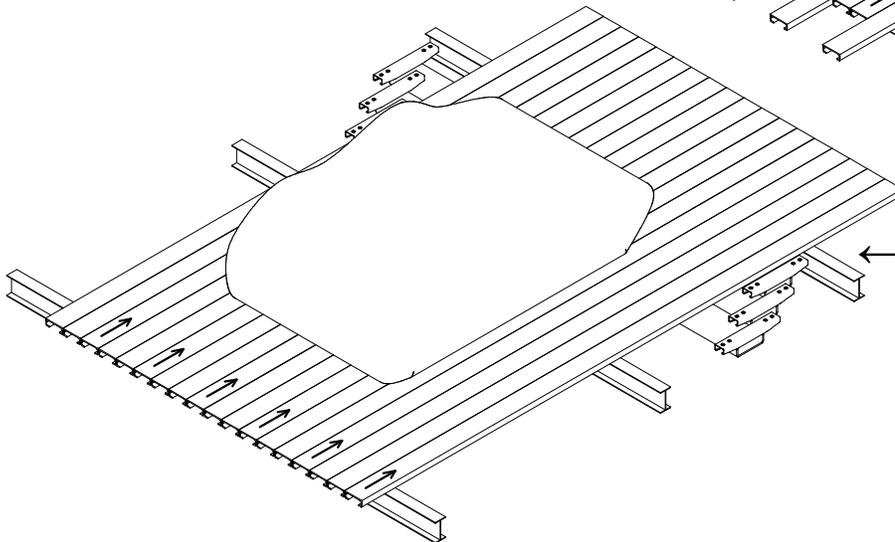
← 2. One-Third of the Slats Retract. Two-Thirds Hold the Load.



3. Next One-Third of the Slats Retract. Two-Thirds Hold the Load. →



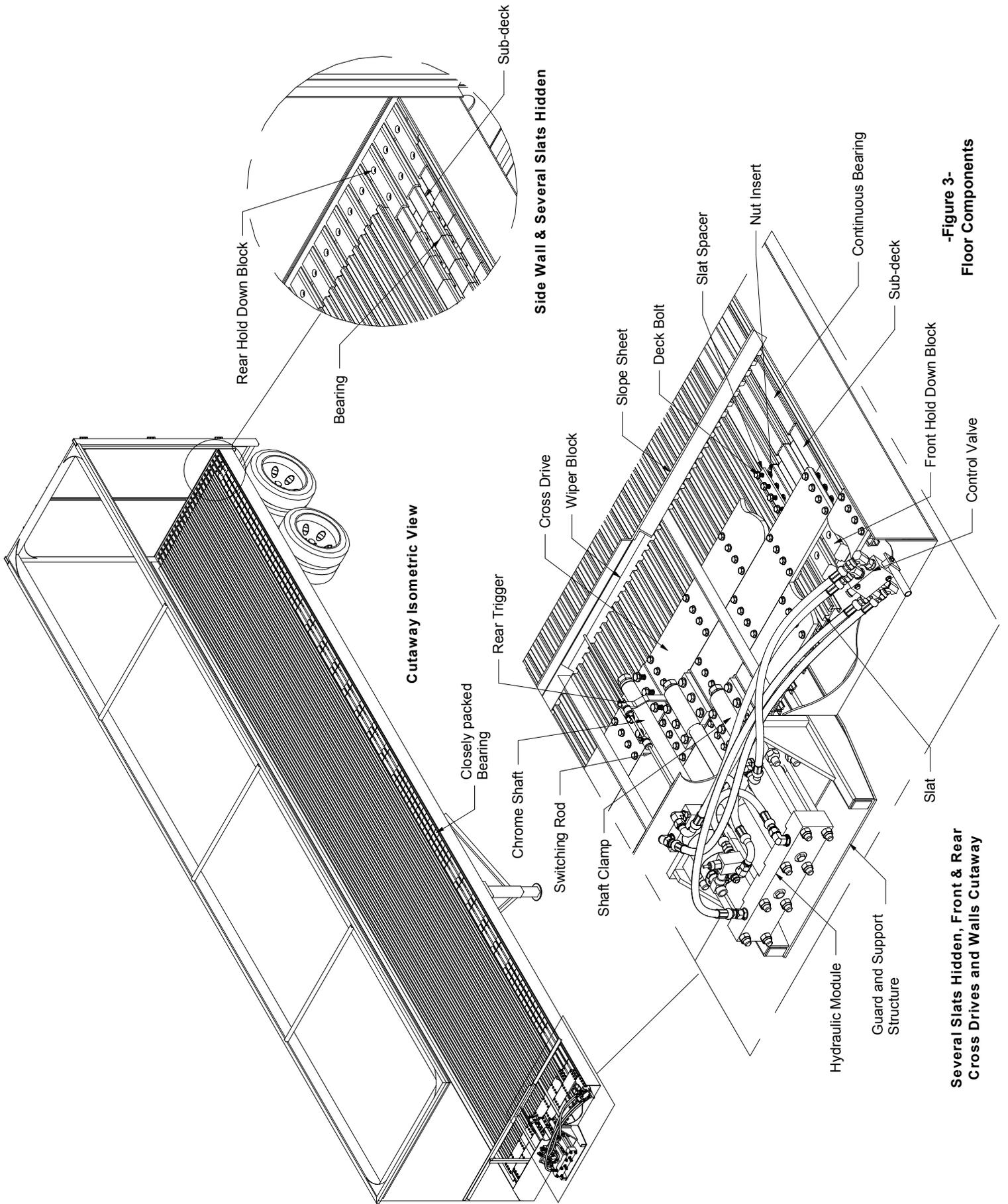
← 4. Last One-Third of the Slats Retract. Two-Thirds Hold the Load.



Cycle Repeats....

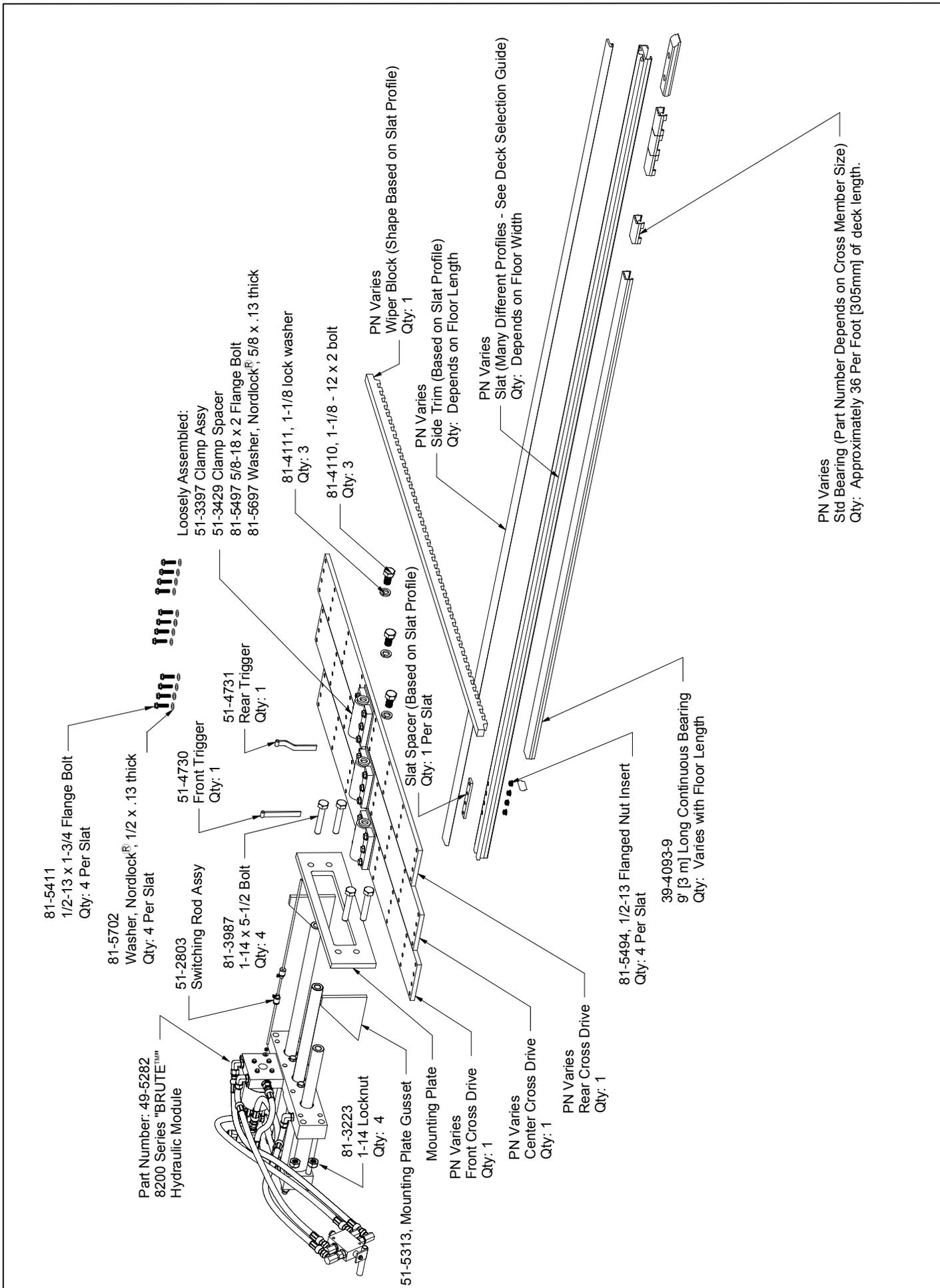
-Figure 2-
How They Work

FLOOR COMPONENTS



**-Figure 3-
Floor Components**

**Several Slats Hidden, Front & Rear
Cross Drives and Walls Cutaway**



-Figure 4-
Drive Unit--Exploded View

SPECIFICATIONS

Hydraulic Module: 8200 (Two-Way)

Maximum Hydraulic Pressure: 3000 psi [207 Bar]

Maximum Hydraulic Flow Rate: 30 gal/min [114 l/min]

Floor Stroke: 8 inches [203 mm]

Hydraulic Module Shaft Diameter: 2 inch [51 mm]

Hydraulic Module Cylinder Diameter: 4.1/2 inches [114 mm]

Load Capacity: 40 Ton [36 Tonne]

THEORETICAL UNLOAD TIMES

-Table 1- Theoretical Minimum Unload Times—45 ft. [14 m] Container			
Oil Flow (GPM [LPM])	Cycle Time (seconds)	Convey Speed* (ft./min. [m/min.])	Unloading Time* (minutes)
15 [57]	11.9	3.4 [1.02]	13.4
16 [61]	11.2	3.6 [1.09]	12.6
17 [64]	10.5	3.8 [1.16]	11.8
18 [68]	9.9	4.0 [1.23]	11.2
19 [72]	9.4	4.3 [1.30]	10.6
20 [76]	8.9	4.5 [1.36]	10.1
21 [79]	8.5	4.7 [1.43]	9.6
22 [83]	8.1	4.9 [1.50]	9.1
23 [87]	7.8	5.1 [1.57]	8.7
24 [91]	7.4	5.4 [1.64]	8.4
25 [95]	7.1	5.6 [1.71]	8.0
26 [98]	6.9	5.8 [1.77]	7.7
27 [102]	6.6	6.0 [1.84]	7.4
28 [106]	6.4	6.3 [1.91]	7.2
29 [110]	6.2	6.5 [1.98]	6.9
30 [114]	6.0	6.7 [2.05]	6.7

*Convey speeds and unload times shown are at 100% efficiency and do not account for such things as load slippage. Actual convey speeds and unload times vary by load type.

HYDRAULIC SYSTEM REQUIREMENTS

Hydraulic

Pump: This floor is rated to 3000 psi [207 Bar] operating pressure. Installing a pump which provides lower output pressure may result in poor operation. Maximum flow rate is 30 gallons [114 liters] per minute.

Hydraulic Reservoir:

30 gallons [114 liters] minimum capacity. The hydraulic reservoir must have facilities to mount the relief valve and a return line filter. Both of these items must dump the oil into the reservoir below the low level line. Hallco suggests a down draft be installed in the reservoir on the return line to limit the turbulence. The pump supply oil should be taken from 1" to 2" [25 to 51 mm] above the bottom of the reservoir. This outlet should be screened or baffled to prevent whirlpool. The whirlpool could introduce air into the system. A sight gauge or other means of visually checking oil level should be installed.

Hydraulic Oil:

Select a petroleum or mineral base anti-wear (AW) hydraulic fluid in ISO viscosity grade 46 or 68. Most synthetic and vegetable based biodegradable hydraulic fluids are also compatible provided the moisture content in the fluid is kept below 1%. Hydraulic fluid temperatures must always be kept below 200° F (93° C).

Relief Valve:

The relief valve must be external, relieved directly to tank, and set at 3000 psi [207 Bar] maximum. The relief valve must be able to handle the maximum system flow rate.

Filler Cap:

Filler cap must have a fill filter and a breather cap (sized greater than the system flow rate) unless breather cap is already provided separately.

Hydraulic Plumbing:

1" [25 mm] size hydraulic hoses are recommended for the supply and return lines which connect to the switching valve ports labeled "P" for pressure and "T" for tank/return. See [Figure 8 \(page 14\)](#).

Quick

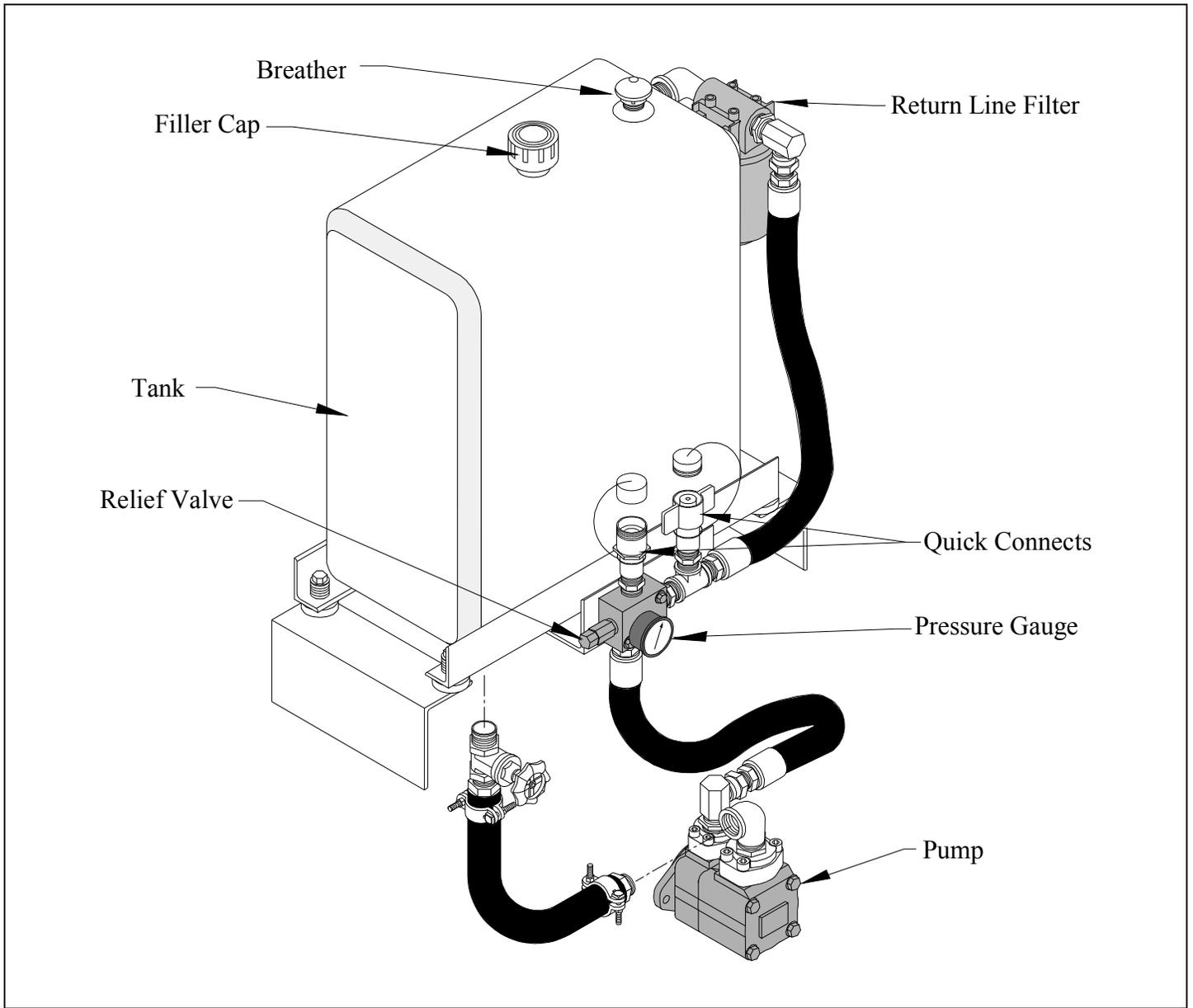
Connects: Mating quick connects must be of the same type and must be rated above the maximum system flow.

Filter:

A 25 micron (or finer) filter rated above the maximum flow rate of the system must be installed on the return line. A good filter is essential to assure clean oil for a long system life. For units where quick connects are frequently connected and disconnected (where contaminants may be introduced) a pressure line filter is recommended between the quick connect and the hydraulic module.

Pressure Gage:

0 to 5000 PSI [0 to 350 Bar] range, glycerin filled.



**-Figure 5-
Example Hydraulic Supply System**

OPERATING THE FLOOR

The hydraulic module which drives the deck slats can be configured for one-way and two-way operation. The one-way module is designed to move the load material in one direction only. The one-way module is controlled by a two-position valve, neutral and unload positions. The two-way module can move material in loading or the unloading directions. It is controlled by a three position valve (unload, neutral, load). Refer to [Figure 6](#) (this page). Two-way operation is standard. Contact Hallco, if you need information about one-way configuration.

When unloading material, or when shifting the load material in the unloading direction, make sure the exit door is fully open. When shifting the material in the load direction, be sure you have a visual means of monitoring the position of the load. The load must not be shifted against the forward wall. If the load is conveyed against the wall structure by the floor, it will more than likely cause structural damage to the box and put the operator and/or bystanders at a safety risk.

NORMAL OPERATION IN UNLOAD MODE (One-Way & Two-Way Modules):

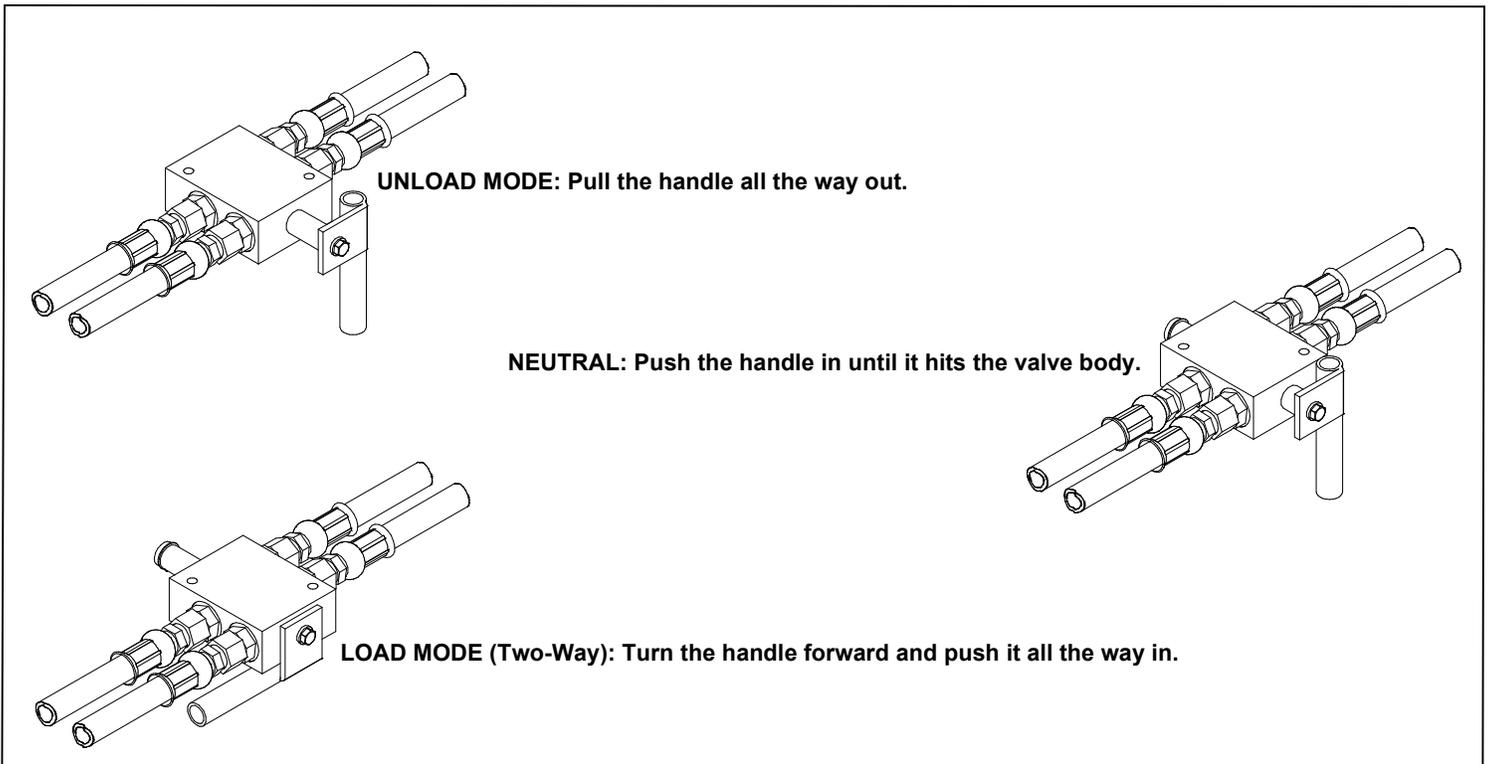
1. All deck slats move together towards the exit door.
2. First slat set (cross drive 1) moves away from the exit door.
3. Second slat set (cross drive 2) moves away from the exit door.
4. Third slat set (cross drive 3) moves away from the exit door.

Cycle repeats.

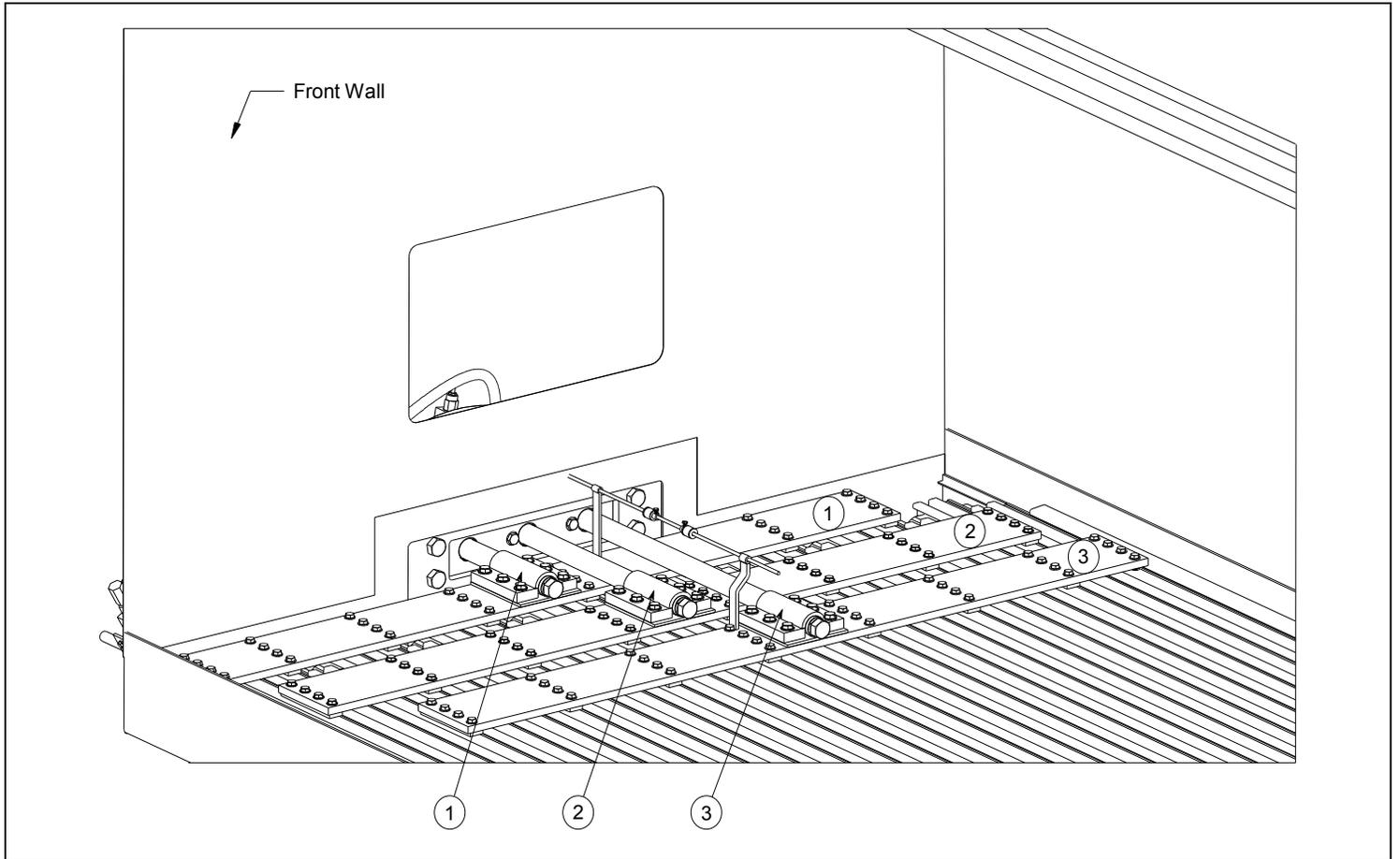
NORMAL OPERATION IN LOAD MODE (Two-Way Modules):

1. All deck slats move together away from the exit door.
2. Third slat set (cross drive 3) moves towards the exit door.
3. Second slat set (cross drive 2) moves towards the exit door.
4. First slat set (cross drive 1) moves towards the exit door.

Cycle repeats.



**-Figure 6-
Control Valve Positions**



**-Figure 7-
Cross Drives and Shafts**

VERT IMPORTANT!!! Mounting, Clamp and Deck Bolts MUST be re-torqued several times during the first few months of operation. If this is not done bolts will loosen and cause damage!

TROUBLESHOOTING

Experience has shown that most problems originate with the hydraulic supply system. If your floor is not functioning properly, first check for visible interference/damage of the floor structure or mechanisms, then check the hydraulic supply system.

Problem: Floor does not operate or operates slowly

First Check: (A) PTO. Is it fully engaged?
(B) OIL. Is the oil reservoir full?
(C) QUICK CONNECTS. Are they fully connected? Are they a matched set?
(D) PUMP. Is the pump operating? Does it deliver the specified flow rate and pressure?
(E) RELIEF VALVE. Is it set high enough (within specified limit)?
(F) PLUMBING. Is the entire system plumbed correctly?

If the problem persists...

Disconnect the pressure line from the hydraulic module. Attach a hydraulic pressure gage to the pressure line. Start up the hydraulic system (typically by engaging the PTO) and activate pressure to the pressure line. If the pressure gage shows sufficient pressure being supplied to the hydraulic module, then the hydraulic supply system is OK. If there is insufficient pressure being supplied to the hydraulic module, then the hydraulic supply system may need servicing.

Common hydraulic supply system problems are defective pump and defective relief valve. If the pump ONLY becomes hot, that is a clue to a bad pump. Another clue to a bad pump is having to rev up the engine to get enough pressure to operate the floor. If the relief valve ONLY becomes hot, that is a clue that the relief valve is defective or has debris holding it partially open.

If the hydraulic supply system checks out OK, but the floor still does not operate...

Check the setting of the switching rod stops. See [page 20](#), "Setting the Switching Rod Stops".

Problem: Floor operates correctly except that the slats do not sequence properly. Adjacent slats (cross drives) move together when they should move one set at a time.

Likely Cause: A poppet may have debris in the poppet seat, have a damaged poppet seat, or the poppet may not be seated correctly. To resolve this issue remove the poppet in question. Inspect the poppet seat for damage and debris. Remove any debris. Small amounts of debris can be flushed out by re-installing the poppet cap only (without the poppet valve and spring) and running the system, then re-install the poppet, spring, and cap. A leaky poppet seat can often be corrected with the poppet seating tool listed on [page 15](#). Place the coned end of the tool into the poppet seat and tap the other end of the tool firmly with a hammer.

If the problem is in unload mode: A poppet in the base manifold may be malfunctioning. Check the poppet between the shafts of the cross drives which move together. I.e. if cross drives 2 and 3 move forward together, remove the poppet between shafts 2 and 3 in the base manifold. Refer to [page 11](#).

If the problem is in load mode: A poppet in the head manifold may be malfunctioning. Check the poppet between the shafts of the cross drives which move together. I.e. if cross drives 2 and 3 move rearward together, remove the poppet between shafts 2 and 3 in the head manifold. Refer to [page 11](#).

If the above solutions do not bring the floor to correct operation...

Contact Hallco to talk with a technical representative and/or to make service arrangements.

CLEANING

The floor must be cleaned regularly to prevent buildup of material which could cause the floor to operate inefficiently or bind. Areas affected may include, but are not limited to, between the deck slats, between the deck slats and sub-deck, between the deck slats and the forward wall, and between the deck and the exit door. The operator/owner should establish a cleaning cycle appropriate to the type of loads which are carried. The life of the floor will be maximized by regular cleaning.

INSPECTIONS

Inspect your floor regularly in order to monitor wear of your floor and to prevent further damage, if damage has already occurred. The following are some highlighted areas to inspect:

- Bolts:** The deck bolts, clamp bolts and mounting bolts connecting the deck slats to the cross drives and the cross drives to the drive unit and the drive unit to the container must be kept tight at all times! Loose bolts will damage your system. The bolts must be checked after the first 5 to 10 loads. Torque the deck bolts to 80 ft-lbs [108 N-m] (lubricate flange and threads). Torque the clamp bolts to 215 ft-lb [290 N-m] (lubricate flange and threads). Torque the mounting bolts to 800 ft-lbs [1080 N-m]. (See Installation Manuals). The deck and clamp bolts have two piece Nord-Lock[®] washers to prevent them from loosening yet allow re-torquing.
- Decking:** Inspect for wear or damage.
- Bearings:** Inspect for wear or damage.
- Hydraulic Plumbing:** Inspect the hydraulic system for leaks and abrasion wear. Maintain reservoir minimum/maximum levels.
- Floor Structure:** Inspect floor structure including hydraulic module mount and framework, hydraulic shafts, shaft-to-cross drive connections, cross drives, and sub-deck for damage and wear.
- Hydraulic Module:** Inspect the hydraulic module for leaks, loose mounting bolts, loose manifold bolts, worn wipers and seals, and pitted/worn/damaged shafts.
- Sloped Sheet & Wiper:** Make sure the sloped sheet is in good condition and that the wiper attached to the sloped sheet is keeping the gap between the forward wall and the end of the decking clear of material which could cause the floor to bind.

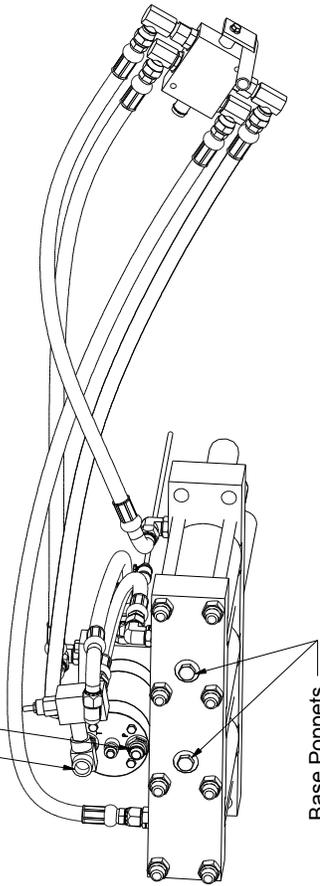
REPAIRS

Refer to the installation manual for repairs which extend beyond the scope of this owner's manual. Do not re-install defective components into your floor system. Contact Hallco for replacement components.

EXTERNAL PLUMBING

Refer to [Figure 8 \(page 14\)](#) for plumbing details. Note that some hose lengths vary based on the floor width.

Return, 3/4" Female Pipe
Pressure, 3/4" Male JIC



Base Poppets

Hose, 3/4" x 33" (STD) OR 45" (Long) Long, 3/4" Male Pipe x 3/4 FJIC Swivel 90°
86-5340 OR 86-5491

Hose, 3/4" x 26" (STD) OR 38" (Long) Long, 3/4" Male Pipe x 3/4 FJIC Swivel 90°
86-5341 OR 86-5490

2x Fitting, 3/4" Male O-Ring x 3/4" Female Pipe Swivel
#85-3952

2x Fitting, 3/4" Male Pipe x 3/4" Female Pipe Swivel 90°
#85-2662

2x Fitting, 3/4" Adj. Male O-Ring x 3/4" Female Pipe Swivel 90°
#85-3953

Hose, 3/4" x 44" (STD) OR 56" (Long) Long, 3/4" Male Pipe x 3/4 FJIC Swivel
86-5338 OR 86-2985

Hose, 3/4" x 16" Long, 3/4" FJIC Swivel x 3/4 FJIC Swivel 90°
86-5337

Hose, 3/4" x 16" Long, 3/4" Male Pipe x 3/4 FJIC Swivel
86-5339

3/4" Adj. Male O-Ring x 3/4" Male JIC 90°
#85-3369

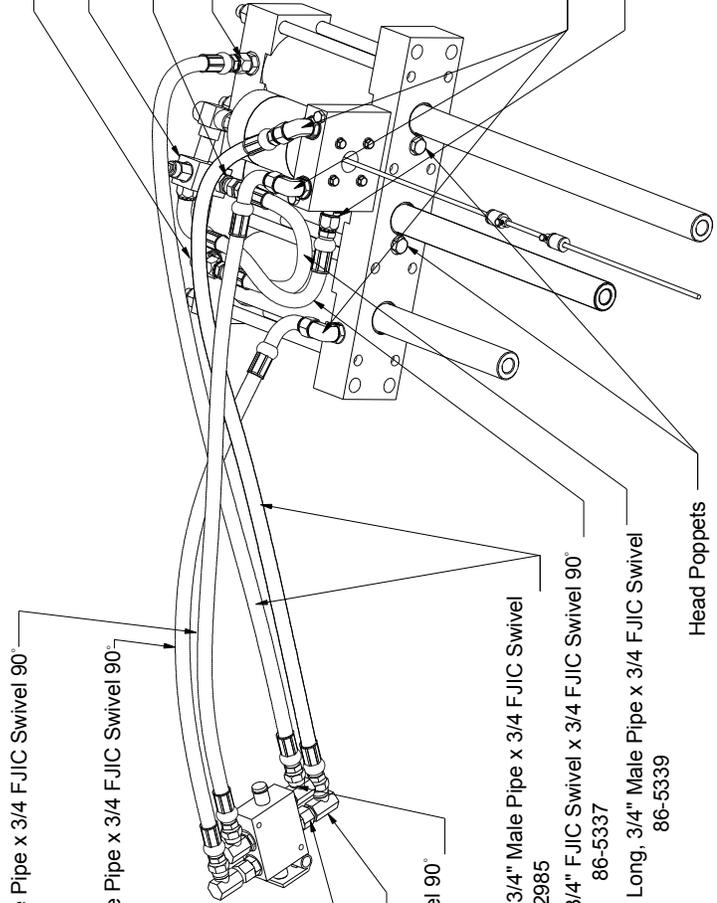
Fitting, 3/4" Male Pipe 90° x Male JIC 90°
#85-2953

3/4" Male Pipe x 3/4" Female Pipe Swivel
#85-2661

3/4" Adj. Male O-Ring x 3/4" Male JIC
#85-3371

3/4" Adj. Male O-Ring x 3/4" Male JIC 90°
#85-3369

3/4" Adj. Male O-Ring x 3/4" Male JIC
#85-3371



Head Poppets

-Figure 8-
Standard 8000 BRUTE Plumbing (Two-Way Operation)

HYDRAULIC MODULE OVERHAUL

Part Number	Description
93-5525	Head Manifold Installation Tool—8000 BRUTE Series
56-3713	Poppet Seating Tool—3000, 6000, 8000 Series
85-2972	Pressure Gauge 0-5000 PSI
93-4311	Rod Seal Insertion Tool
93-5527	Tie Bolt Installation Tool, 7/8" Tie Bolts—8000 BRUTE Series

Some hydraulic module repairs can be done with the hydraulic module in place. Other repairs and complete overhauls may require removing the hydraulic module. Hydraulic modules may be shipped to Hallco for overhaul. Hallco recommends including the switching valve for testing.

Removing the Hydraulic Module

Refer to [Figure 4 \(page 6\)](#).

- Detach the hydraulic hoses from the hydraulic module & catch the hydraulic fluid drips in a drip pan (temporary port plugs recommended).
- Remove the switching rod.
- Loosen the shaft clamps and remove the shaft end bolts.
- Support the weight of the hydraulic module.
- Remove the hydraulic module mounting bolts.
- Remove the hydraulic module by sliding it forward.
- Drain the hydraulic fluid from the hydraulic module before disassembling or shipping it.

Disassembling the Hydraulic Module

Refer to [Figure 9 \(page 17\)](#), and [Table 3 \(page 18\)](#).

Hallco recommends tagging or organizing the components as they are disassembled in such a way that they can be installed in their original positions. This will also help with inspecting for damage and wear (for example: score marks on a barrel ID may correlate with piston and seal damage as well).

- Remove the switching valve (refer to "Switching Valve Overhaul, [page 21](#)).
- Remove the switching valve mounting manifold.
- Remove the tie bolts.
- Remove the base manifold.
- Remove the barrels.
- Remove the piston nuts and pistons. Note: The piston nuts were installed with 600 ft-lbs [810 N-m] of torque. The shafts will need to be held securely to keep them from rotating. Be careful not to damage the shaft chrome in the sealing areas. Shafts of hydraulic modules rebuilt in place are kept from rotating by the cross drive clamps.
- Remove the shafts from the head manifold. Do not pull the externally exposed end of the shafts through the head manifold as roughness in the shafts could damage it.
- Remove the seals from the head manifold, base manifolds, and pistons.
- Poppet assemblies may be removed at any point.

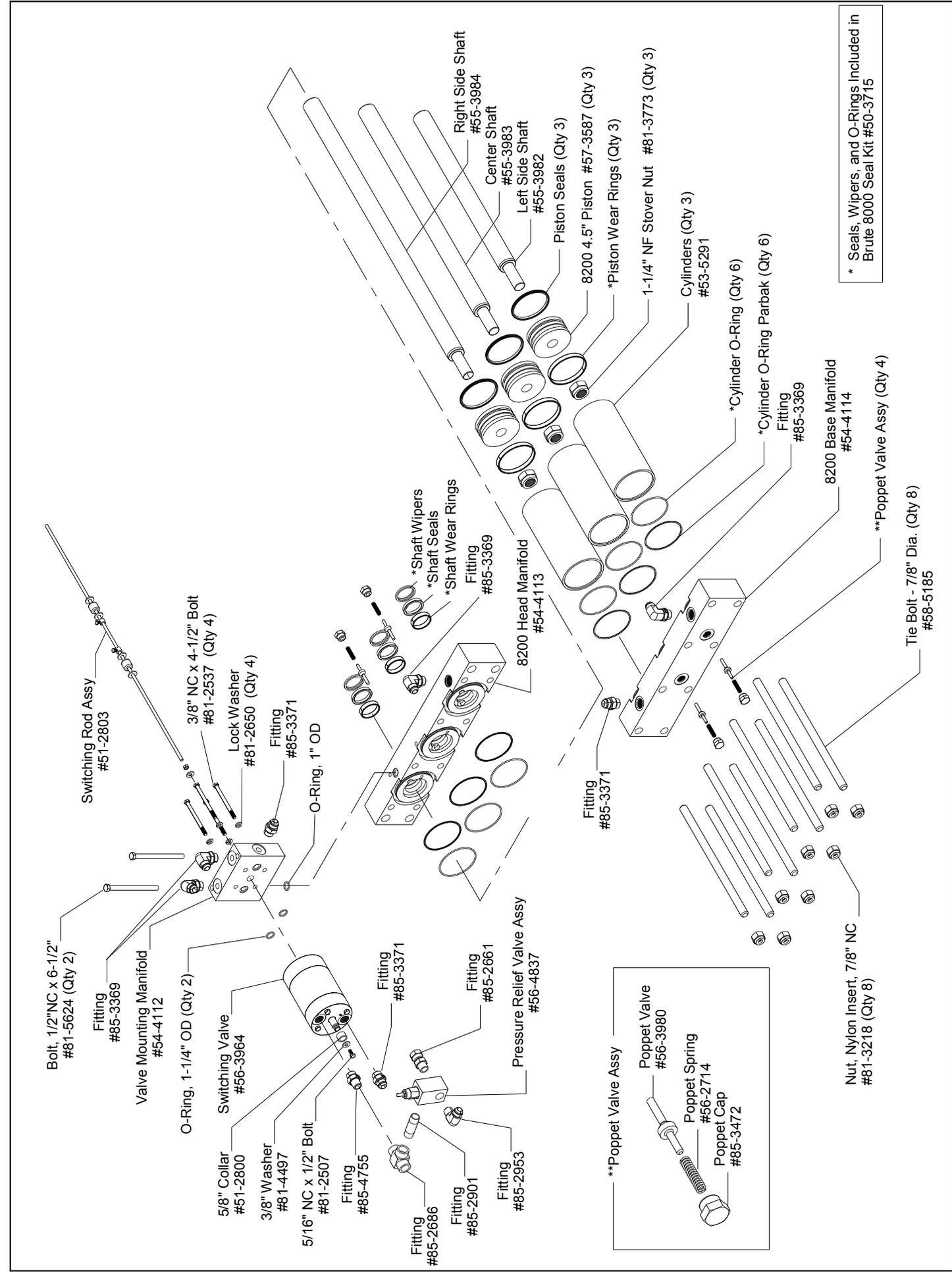
Reassembling the Hydraulic Module

Hallco recommends replacing all hydraulic module seals when overhauling a hydraulic module. Prior to reassembly inspect the components for wear and damage. Do not reassemble defective components.

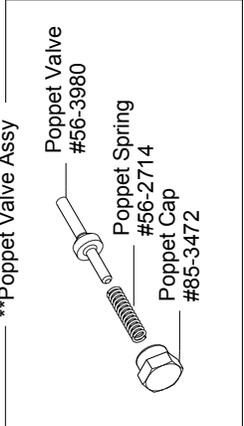
- Replace the seals (lubricate with hydraulic fluid) in the head and base manifolds and on the pistons as shown in [Figures 9 \(page 17\)](#) & [11 \(page 19\)](#). Use the shaft seal insertion tool listed in the recommended tools list, [Table 2 \(page 15\)](#), to insert the shaft seals.
- Install the poppet assemblies.
- Install seals on the head manifold, base manifold, and pistons.
- Assemble the shafts in the head manifold. Insert the piston end of the shafts into the head manifold.
- Insert the pistons (with seals) into the cylinder barrels.
- Install the cylinder barrels with pistons inserted. Note orientation of pistons.
- Secure the pistons with the 1-1/4" NF stover nuts. Lightly lubricate the threads and torque the nuts to 600 ft-lbs [810 N-m].
- Install the base manifold.
- Install the tie bolts and corresponding lock nuts. Make sure the tie bolts thread into the head manifold at least 1" [25 mm]. Snug up the lock nuts in the criss-cross pattern shown in [Figure 10 \(page 18\)](#).
- Tighten the tie bolts in the criss-cross pattern to 100 ft-lbs [136 N-m], then to 200 ft-lbs [271 N-m].
- Install the switching valve mounting manifold (with seal). Torque the mounting bolts to 55 ft-lbs [75 N-m].
- Install the switching valve (with seals). Torque the mounting bolts to 30 ft-lbs [41 N-m].

Installing the Hydraulic Module

- Install the hydraulic module into position in the reverse order of the way it was removed.
- Secure it in position with the mounting bolts and lock nuts. Snug up the lock nuts.
- Torque the hydraulic module mounting bolts to 800 ft-lbs [1080 N-m].
- Torque the shaft clamp bolts with Nord-Lock[®] washers to 215 ft-lbs [290 N-m] (Lubricate flange and threads).
- Torque the shaft end bolts to 800 ft-lbs [1080 N-m].
- Install the switching rod assembly. Note: the switching rod stops may require adjustment when the floor is ready to be operated. Refer to [page 20](#).
- Re-connect the hydraulic plumbing.

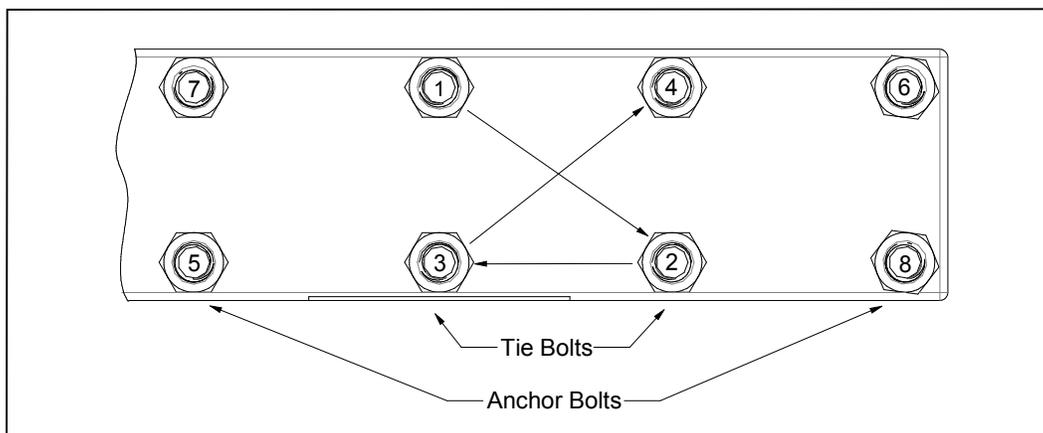


* Seals, Wipers, and O-Rings Included in Brute 8000 Seal Kit #50-3715

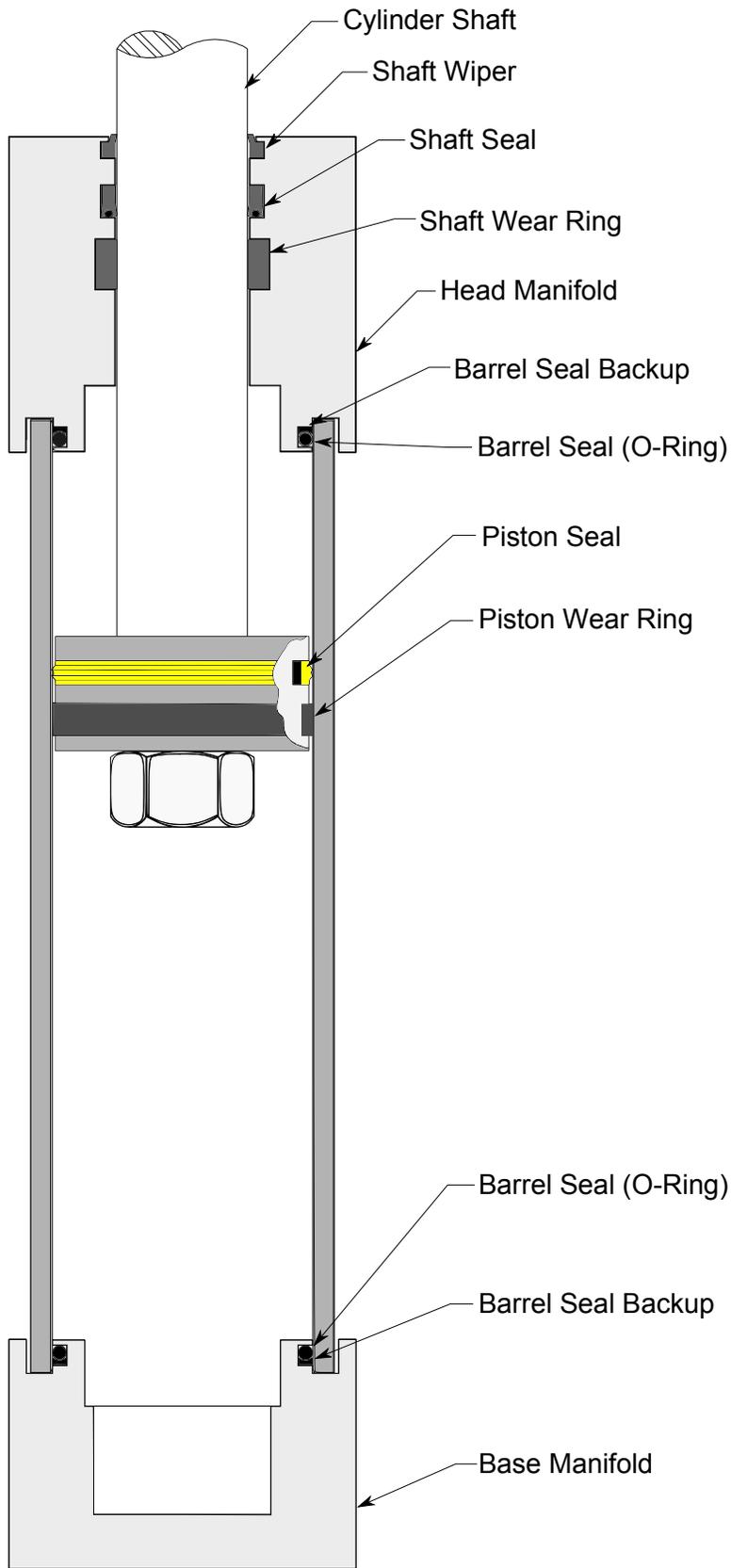


-Figure 9-
8000 BRUTE Series Hydraulic Module--Exploded View

-Table 3- Parts List 8000 BRUTE Series Hydraulic Modules		
Qty	P/N	Description
2	81-5624	Bolt, 1/2" NC x 6-1/2"
4	81-3987	Bolt, 1"-14 NF x 5-1/2", GR-8
4	81-2537	Bolt, 3/8" NC x 4-1/2"
1	81-2507	Bolt, 5/16" NC x 1/2"
1	51-2800	Collar, 5/8" Long
3	53-5291	Cylinder, 8000 Series (8" Stroke)
1	85-2661	Fitting, 3/4" Adj. Male O-Ring x 3/4" Female Swivel Pipe
4	85-3369	Fitting, 3/4" Adj. Male O-Ring x 3/4" Male JIC 90 Degrees
3	85-3371	Fitting, 3/4" Adj. Male O-Ring x 3/4" Male JIC, Straight
1	85-4755	Fitting, 3/4" Male O-Ring x 3/4" Male Pipe
1	85-2953	Fitting, 3/4" Male Pipe x 3/4" Male JIC 90 Degrees
1	85-2901	Fitting, Pipe Nipple, 3/4" x 3"
1	85-2686	Fitting, Tee, 3/4" Female Pipe
8	81-3218	Lock Nut, Nylon Insert, 7/8" NC
4	81-3223	Lock Nut, Stover, 1" NF
3	81-3773	Lock Nut, Stover, 1-1/4" NF
4	81-2650	Lock Washer, 3/8"
1	54-4114	Manifold, Base, 8000 Series
1	54-4113	Manifold, Head, 8000 Series
1	54-4112	Manifold, Valve Mounting, 8000 Series
3	57-3587	Piston, 4.5" Diameter, 8000 Series
4	85-3472	Poppet Cap, 3000, 6000, 8000 Series
4	56-2714	Poppet Spring
4	56-3980	Poppet Valve, 8000 Series
1	56-4837	Relief Valve Assembly
1	50-3715	Seal Kit, 8000 Series
1	55-3983	Shaft, Center
1	55-3982	Shaft, Left Side
1	55-3984	Shaft, Right Side
1	51-2803	Switching Rod Assembly
1	56-3964	Switching Valve
8	58-5185	Tie Bolt, 7/8" Diameter (8" Stroke Unit)
1	81-4497	Washer, 3/8" USS



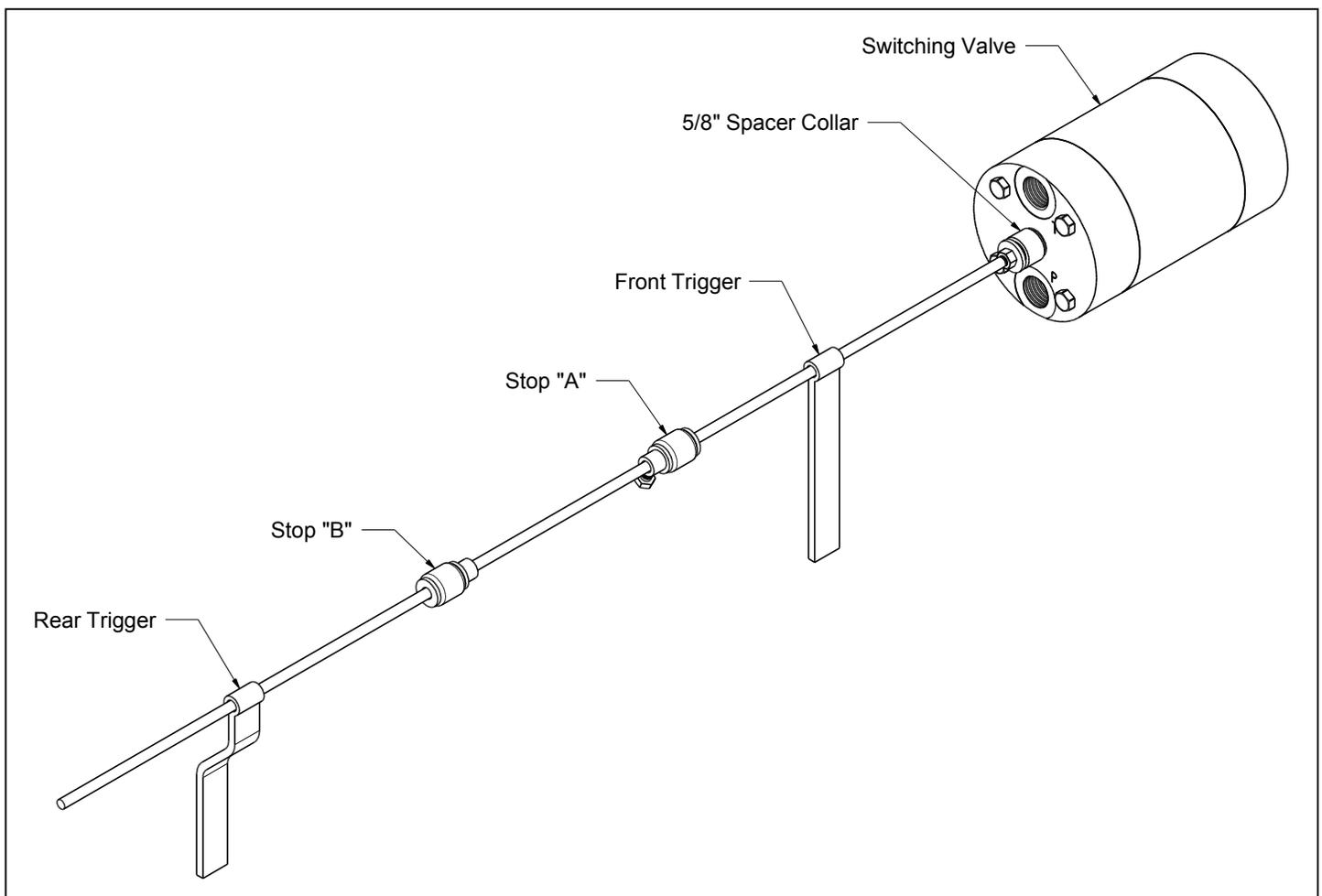
**-Figure 10-
Manifold Torque Pattern**



-Figure 11-
Seal Installation

SETTING THE SWITCHING ROD STOPS

1. Release and move stops "A" and "B" away from the front and rear triggers.
2. Move the switching rod forward toward the switching valve until it stops.
3. Apply hydraulic pressure (load or unload mode) until the shafts are fully extended rearward away from the switching valve, then shut off pressure.
4. Move the switching rod away from the switching valve until it stops. Move and set stop "A" firmly against the front trigger.
5. Apply hydraulic pressure until the shafts are fully retracted forward towards the switching valve, then shut off pressure.
6. Move the switching rod forward toward the switching valve until it stops. Move and set stop "B" firmly against the rear trigger.
7. Mark the positions of stops "A" and "B" on the switching rod.
8. Apply hydraulic pressure to the cylinders until the triggers are free from the stops by at least 3/8". Shut off the pressure. Move stop "A" 3/8" [10 mm] toward the front trigger and tighten firmly. Move stop "B" 3/8" [10 mm] toward the rear trigger and tighten firmly.



**-Figure 12-
Switching Rod Stops**

SWITCHING VALVE OVERHAUL

The switching valve can be overhauled to correct seal leakage only — not bypass. If any of the major components require replacement, the entire valve will need to be replaced.

If bypass is suspected because of overheating of the switching valve during operation, send the switching valve to Hallco for testing or replace entirely.

Refer to [Figure 9 \(page 17\)](#) and [13 \(page 22\)](#).

Removing the Switching Valve

- Disconnect the switching rod mechanism.
- Remove the switching valve stop bolt, washer and collar.
- Remove the switching valve mount bolts.

Disassembling the Switching Valve

- Remove the cap screws which attach the end caps to the valve body.
- Slide the end caps away from the valve body.
- Remove the pilot rod and the spool.
- Remove the o-rings and shaft wipers.

Inspecting the Switching Valve Components

- Inspect the spool, pilot rod, spool bore, and pilot rod bores for scoring and burrs.
- Inspect all the remaining seal areas. The seal areas must be smooth and free of scoring and burrs.
- Inspect the fasteners and threaded holes for good thread engagement.

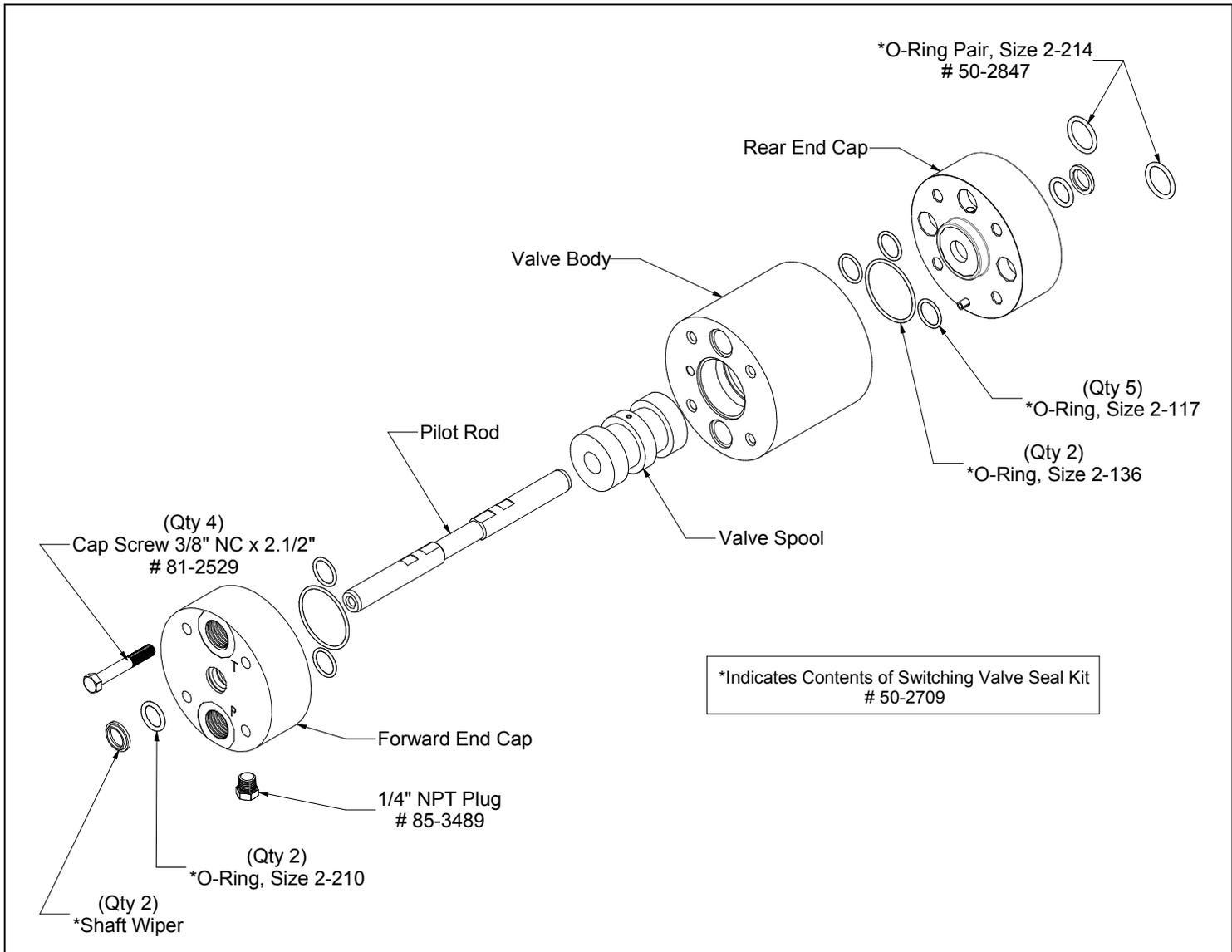
Reassembly of the Switching Valve

Hallco recommends replacing all the switching valve seals when overhauling the switching valve.

- Lubricate the shaft wipers and o-rings with hydraulic fluid and install them in the end caps.
- Lubricate the valve spool and pilot rod with hydraulic fluid and insert the spool into the valve body and the pilot rod into the spool. Center them on the valve body.
- Place the o-rings which go between one of the end caps and the body in their respective seal grooves and slide on the end cap. Note the location of the alignment pin. Repeat for the other end cap.
- Install the cap screws which hold the forward end cap on, snug them up, then torque them to 30 ft-lbs [41 N-m]. Use two of the same size cap screws to hold the rear end cap snug until it is ready to be installed on the hydraulic module.

Installing the Switching Valve

- Install the switching valve onto the hydraulic module. Note that port “P” goes below port “T”, and the 1/4” NPT Plug is on the underside of the switching valve. Torque the mount bolts to 30 ft-lbs [41 N-m].
- Reinstall the switching valve stop bolt, washer and collar.
- Reattach the switching rod mechanism making sure to include the switching rod stops (collars, rubber bumpers, washers).



**-Figure 13-
 Switching Valve--Exploded View**

CONTROL VALVE OVERHAUL

The control valve can be overhauled to correct external leakage only. If the valve has excessive internal bypass, it will need to be replaced entirely.

Refer to [Figure 14](#) (this page).

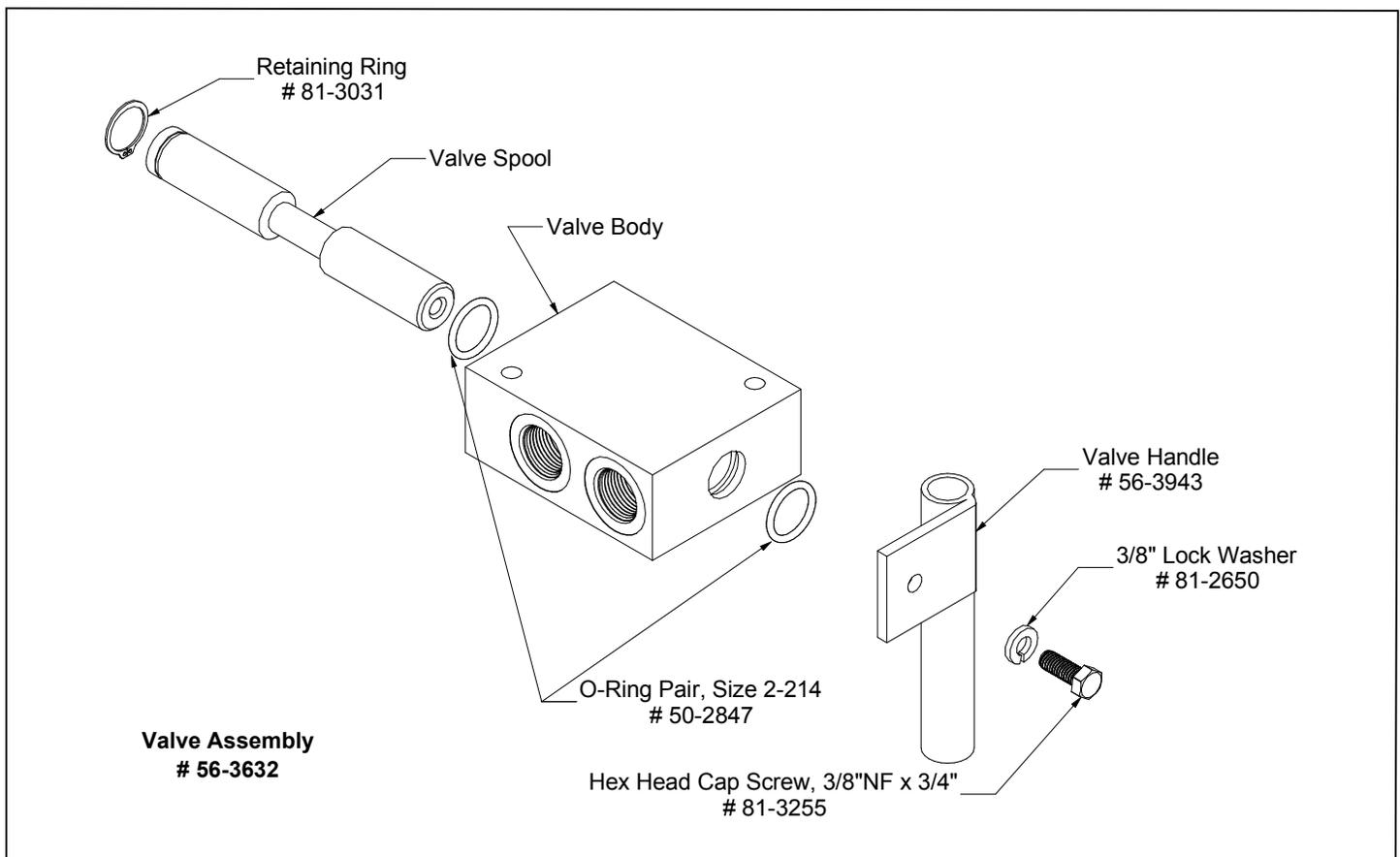
Disassembling the Control Valve

- Remove the cap screw and lock washer which attach the valve handle to the spool. Note: If the spool turns so that the screw cannot be removed, hold the end of the spool at the opposite end beyond the retaining ring with locking pliers or similar. Do not grip the area which slides in the valve body.
- Remove the spool by sliding it toward the retaining ring side. Note that the retaining ring does not have to be removed.
- Remove the two o-rings from the valve body.

Reassembling the Control Valve

Prior to reassembly inspect all components for wear and damage. Do not reinstall defective components.

- Replace the two o-rings in the valve body with new o-rings. Lubricate the o-rings with hydraulic fluid before installing them.
- Install the retaining ring on the spool, if it was removed.
- Lubricate the spool with hydraulic fluid and insert it into the valve body.
- Attach the valve handle with the cap screw and lock washer.



**-Figure 14-
Standard Control Valve, Two-Way--Exploded View**

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Hallco Industries, Inc. ("Hallco" or "Company") warrants to the original product purchaser ("Customer") each of the Hallco LIVE FLOORS® or its other floor systems manufactured and sold by it or any of its authorized distributors, when properly assembled and installed, to be free from defects in material and workmanship. This warranty expressly excludes deck seal, when used. Company's obligation to Customer under this warranty is limited to repairing or replacing, as herein provided, and at its sole option, any part or parts of the system which within twelve (12) months after delivery to Customer shall be found, upon examination by Company, to be defective, provided that such part or parts shall be returned, with insurance and shipping costs at Customer's expense, to Company's factory at 6605 Ammunition Road, Tillamook, Oregon 97141. Company must be notified in writing of any claim under this warranty within 30 days of any claimed lack of conformity of the product.

WARRANTY SERVICE OPTIONS. For service under this warranty, Customer must notify Company in writing to obtain a Returned Material Authorization Number (RMAN). When requesting your written RMAN, specify in writing the part in question by part number & applicable purchase order number. Customers in countries other than the United States should contact Company's authorized representative in such country, when applicable.

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- Products that have been modified, altered, neglected or poorly maintained, misused, abused or involved in accidents or natural disasters, or repaired other than by Company in accordance with these warranty procedures;
- Damage occurring during shipment of the product. (Such claims must be presented directly to the freight company).
- Damage to the product resulting from improper maintenance or repair, the use or installation of parts and or accessories not manufactured by Company, or which are not compatible with the system, or failure to follow product warnings and usage instructions.
- Normal wear and tear.
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HALLCO INDUSTRIES, INC. - P.O. BOX 505 - TILLAMOOK, OREGON 97141
PHONE (800) 542-5526 - FAX (503) 842-4866