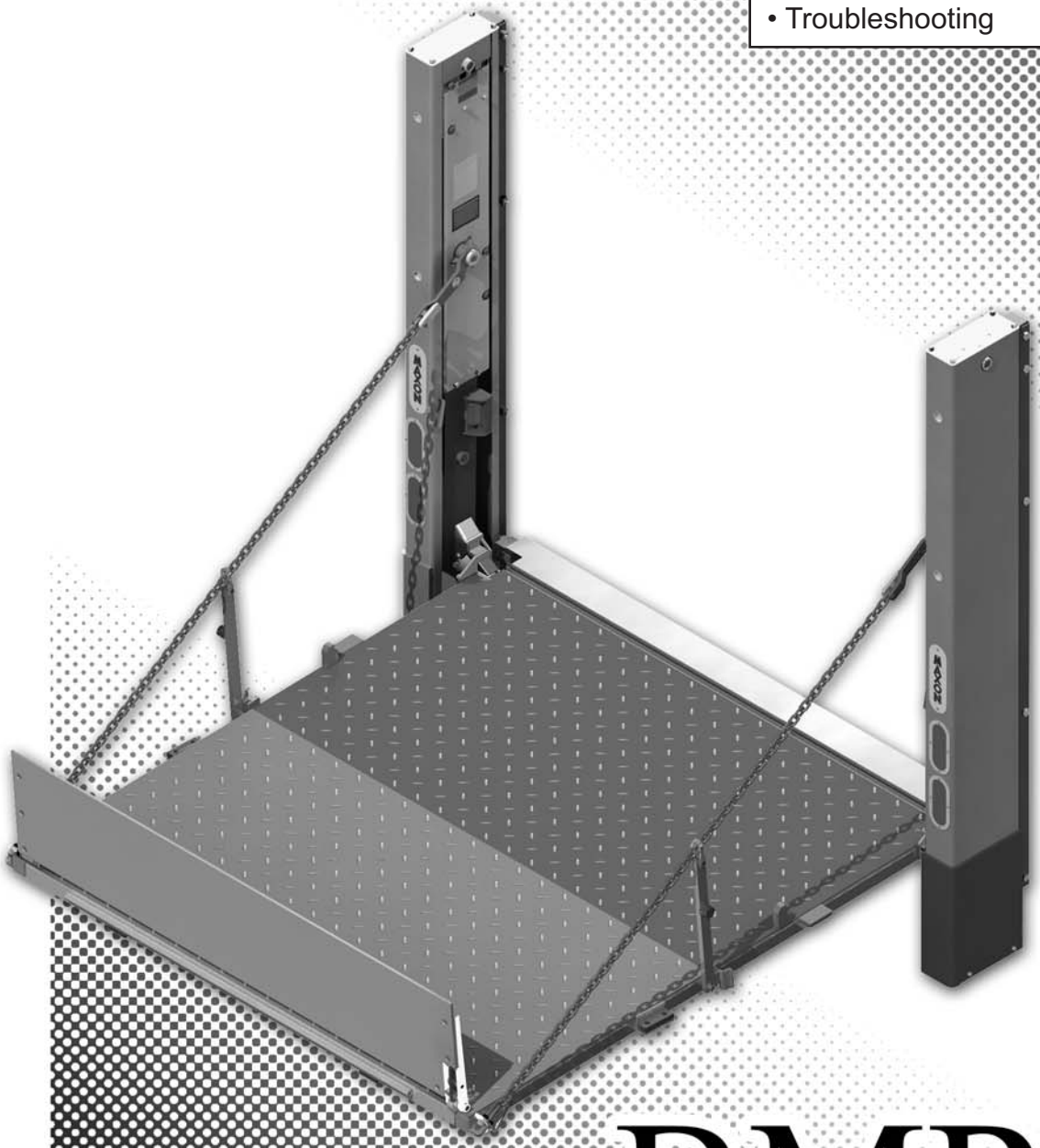
M-07-15
REV. E
MARCH 2010

Maintenance Manual Contains:

- Warranty Information
- Warnings & Safety Instructions
- Periodic Maintenance Checklist
- Service and Maintenance Instructions
- Decals
- Hydraulic & Electrical System Diagrams
- Troubleshooting



MAXON® LIFT CORP.

BMRSD

MAINTENANCE MANUAL

MAXON®
LIFT CORP.

11921 Slauson Ave.
Santa Fe Springs, CA. 90670

CUSTOMER SERVICE:
TELEPHONE (562) 464-0099 TOLL FREE (800) 227-4116
FAX: (888) 771-7713

NOTE: For latest version of all Manuals (and replacements), download the Manuals from Maxon's website at www.maxonlift.com.

WARRANTY/ RMA POLICY & PROCEDURE

LIFTGATE WARRANTY

Type of Warranty: Full Parts and Labor

Term of Warranty: Standard Liftgates - 2 years from ship date or 6,000 cycles
Premium Liftgates - 2 years from ship date or 10,000 cycles

This warranty shall not apply unless the product is installed, operated and maintained in accordance with MAXON Lift's specifications as set forth in MAXON Lift's Installation, Operation and Maintenance manuals. This warranty does not cover normal wear, maintenance or adjustments, damage or malfunction caused by improper handling, installation, abuse, misuse, negligence, or carelessness of operation. In addition, this warranty does not cover equipment that has had unauthorized modifications or alterations made to the product.

MAXON agrees to replace any components which are found to be defective during the first 2 years of service, and will reimburse for labor based on MAXON's Liftgate Warranty Flat Rate Schedule. (Copy of the Flat Rate is available at **www.maxonlift.com**.)

All warranty repairs must be performed by an authorized MAXON warranty facility. For any repairs that may exceed $500, including parts and labor, MAXON's Technical Service Department must be notified and an "Authorization Number" obtained.

All claims for warranty must be received within 30 Days of the repair date, and include the following information:

1. Liftgate Model Number and Serial Number
2. The End User must be referenced on the claim
3. Detailed Description of Problem
4. Corrective Action Taken, and Date of Repair
5. Parts used for Repair, Including MAXON Part Number(s)
6. MAXON R.M.A. # and/or Authorization # if applicable (see below)
7. Person contacted at MAXON if applicable
8. Claim must show detailed information i.e. Labor rate and hours of work performed

Warranty claims can also be placed online at **www.maxonlift.com**. Online claims will be given priority processing.

All claims for warranty will be denied if paperwork has not been received or claim submitted via Maxon website for processing by MAXON's Warranty Department within 30 days of repair date.

All components may be subject to return for inspection, prior to the claim being processed. MAXON products may not be returned without prior written approval from MAXON's Technical Service Department. Returns must be accompanied by a copy of the original invoice or reference with original invoice number and are subject to a credit deduction to cover handling charges and any necessary reconditioning costs. **Unauthorized returns will be refused and will become the responsibility of the returnee.**

Any goods being returned to MAXON Lift must be pre-approved for return, and have the R.M.A. number written on the outside of the package in plain view, and returned freight prepaid. All returns are subject to a 15% handling charge if not accompanied by a detailed packing list. Returned parts are subject to no credit and returned back to the customer. Defective parts requested for return must be returned within 30 days of the claim date for consideration to:

MAXON Lift Corp.
10321 Greenleaf Ave., Santa Fe Springs, CA 90670
Attn: RMA#__

MAXON's warranty policy does not include the reimbursement for travel time, towing, vehicle rental, service calls, oil, batteries or loss of income due to downtime. Fabrication or use of non Maxon parts, which are available from MAXON, are also not covered.

MAXON's Flat Rate Labor Schedule takes into consideration the time required for diagnosis of a problem.

All Liftgates returned are subject to inspection and a 15% restocking fee. Any returned Liftgates or components that have been installed or not returned in new condition will be subject to an additional reworking charge, which will be based upon the labor and material cost required to return the Liftgate or component to new condition.

PURCHASE PART WARRANTY

Term of Warranty: 1 Year from Date of Purchase.

Type of Warranty: Part replacement only. MAXON will guarantee all returned genuine MAXON replacement parts upon receipt and inspection of parts and original invoice.
All warranty replacements parts will be sent out via ground freight. If a rush shipment is requested, all freight charges will be billed to the requesting party.

TABLE OF CONTENTS

WARNINGS 6

PERIODIC MAINTENANCE 8

DECAL - WELDING CAUTION 8

DECALS 9

MAXON BMRSD LIFTGATES WITH STEEL PLATFORMS 11

MAXON BMRSD LIFTGATES WITH ALUMINUM PLATFORMS 12

PERIODIC MAINTENANCE CHECKS 13

BMRSD LUBRICATION DIAGRAM 14

CHECKING HYDRAULIC FLUID 16

CHANGING HYDRAULIC FLUID 18

BLEEDING HYDRAULIC SYSTEM 21

ADJUSTMENT 22

PLATFORM CHAIN ADJUSTMENT 22

REPLACING PARTS 26

OPENING/CLOSING CYLINDER REPLACEMENT 26

LIFTING CYLINDER REPLACEMENT 29

RUNNER REPLACEMENT 32

HYDRAULIC SYSTEM DIAGRAMS 45

PUMP & MOTOR SOLENOID OPERATION - POWER DOWN 45

PUMP & MOTOR SOLENOID OPERATION - GRAVITY DOWN 46

SINGLE PUMP BOX HYDRAULIC SCHEMATIC 47

DUAL PUMP BOX HYDRAULIC SCHEMATIC 48

ELECTRICAL SYSTEM DIAGRAMS 49

INTERCONNECTING ELECTRICAL SCHEMATIC 49

SINGLE PUMP BOX ELECTRICAL SCHEMATIC 50
DUAL PUMP BOX ELECTRICAL SCHEMATIC 51
TROUBLESHOOTING 52
PLATFORM WILL NOT RAISE & MOTOR WILL NOT RUN 52
PLATFORM WILL NOT RAISE, BUT MOTOR RUNS 53
PLATFORM WILL NOT RAISE LOAD AT RATED CAPACITY 55
PLATFORM RAISES AND LOWERS UNEVENLY 56
PLATFORM WILL NOT FOLD 57
PLATFORM WILL NOT UNFOLD 59
PLATFORM WILL NOT UNFOLD - Continued 60
POWER OPEN/CLOSE RELIEF VALVE PRESSURE SETTING 61
LIFTING LINE RELIEF VALVE PRESSURE SETTING 62
POWER DOWN RELIEF VALVE PRESSURE SETTING 63
PLATFORM WILL NOT LOWER 64
PLATFORM LOWERS SLOWLY 66

Comply with the following WARNINGS and SAFETY INSTRUCTIONS while maintaining Liftgates. See Operation Manual for operating safety requirements.

⚠ WARNING

- Do not stand, or allow obstructions, under the platform when lowering the Liftgate. **Be sure your feet are clear of the Liftgate.**
- **Keep fingers, hands, arms, legs, and feet clear of moving Liftgate parts (and platform edges) when operating the Liftgate.**
- **Correctly stow platform when not in use. Extended platforms could create a hazard for people and vehicles passing by.**
- **Disconnect Liftgate power cable from battery** before repairing or servicing Liftgate.
- If it is necessary to stand on the platform while maintaining the Liftgate, keep your feet and any objects clear of the inboard edge of the platform. Your feet or objects on the platform can become trapped between the platform and the Liftgate extension plate.
- Recommended practices for welding on steel parts are contained in the current **AWS (American Welding Society) D1.1 Structural Welding Code - Steel**. Damage to Liftgate and/or vehicle, and personal injury could result from welds that are done incorrectly.
- Recommended practices for welding on aluminum parts are contained in the current **AWS (American Welding Society) D2.1 Structural Welding Code - Aluminum**. Damage to Liftgate and/or vehicle, and personal injury could result from welds that are done incorrectly.

SAFETY INSTRUCTIONS

- Read and understand the instructions in this **Maintenance Manual** before performing maintenance on the Liftgate.
- Before operating the Liftgate, read and understand the operating instructions in **Operation Manual**.
- Comply with all **WARNING** and instruction decals attached to the Liftgate.
- Keep decals clean and legible. If decals are illegible or missing, replace them. Free replacement decals are available from **Maxon Customer Service**.
- Consider the safety and location of bystanders and location of nearby objects when operating the Liftgate. Stand to one side of the platform while operating the Liftgate.
- Do not allow untrained persons or children to operate the Liftgate.
- Wear appropriate safety equipment such as protective eyeglasses, faceshield and clothing while performing maintenance on the Liftgate and handling the battery. Debris from drilling and contact with battery acid may injure unprotected eyes and skin.
- Be careful working by an automotive type battery. Make sure the work area is well ventilated and there are no flames or sparks near the battery. Never lay objects on the battery that can short the terminals together. If battery acid gets in your eyes, immediately seek first aid. If acid gets on your skin, immediately wash it off with soap and water.

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- If an emergency situation arises (vehicle or Liftgate) while operating the Liftgate, release the control switch to stop the Liftgate.

- A correctly installed Liftgate operates smoothly and reasonably quiet. The only noticeable noise during operation comes from the power unit while the platform is raised. Listen for scraping, grating and binding noises and correct the problem before continuing to operate Liftgate.

- Use only **Maxon Authorized Parts** for replacement parts. Provide Liftgate model and serial number information with your parts order. Order replacement parts from:

MAXON LIFT CORP. Customer Service
11921 Slauson Ave., Santa Fe Springs, CA 90670

Online: www.maxonlift.com
Express Parts Ordering: Phone (800) 227-4116 ext. 4345
Email: Ask your Customer Service representative

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PERIODIC MAINTENANCE

DECAL - WELDING CAUTION

CAUTION

Comply with welding CAUTION decals on Liftgate runners.

NOTE: See following pages to find the other decals on Liftgate.

! CAUTION !

When performing any electrical welding operations to the structure of this Lift, be careful to connect the ground lead to the Liftgate component being welded (e.g. runner assembly, column assembly, platform assembly), and as close to the area being welded as possible.

Because the separate assemblies on the BMR series Lifts are insulated by self-lubricated bearings, failure to do so will cause severe damage to electrical components and metal parts.

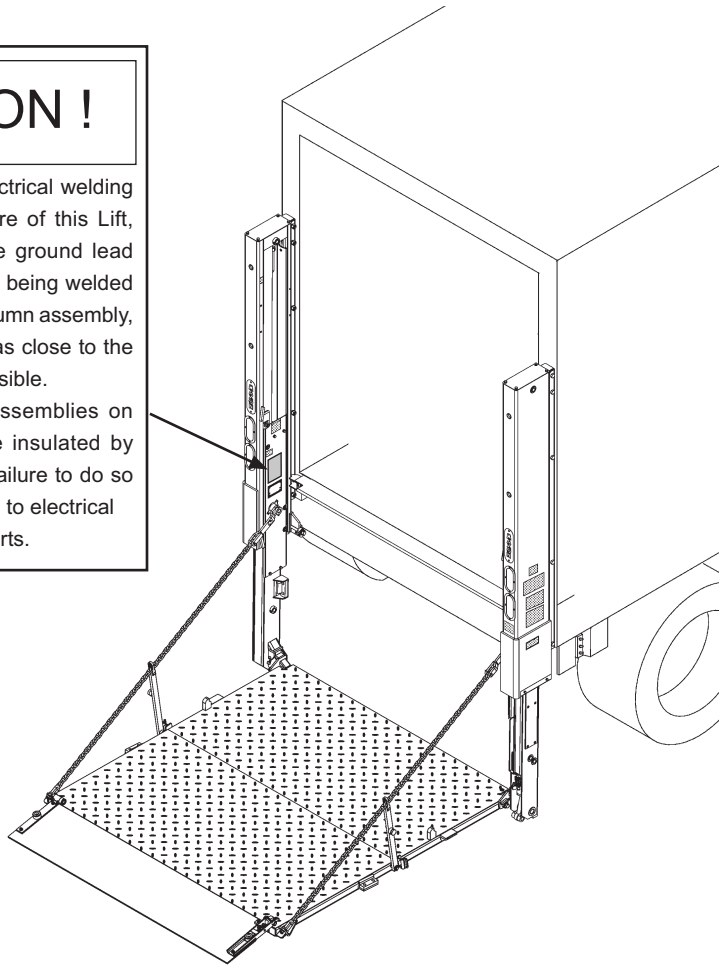
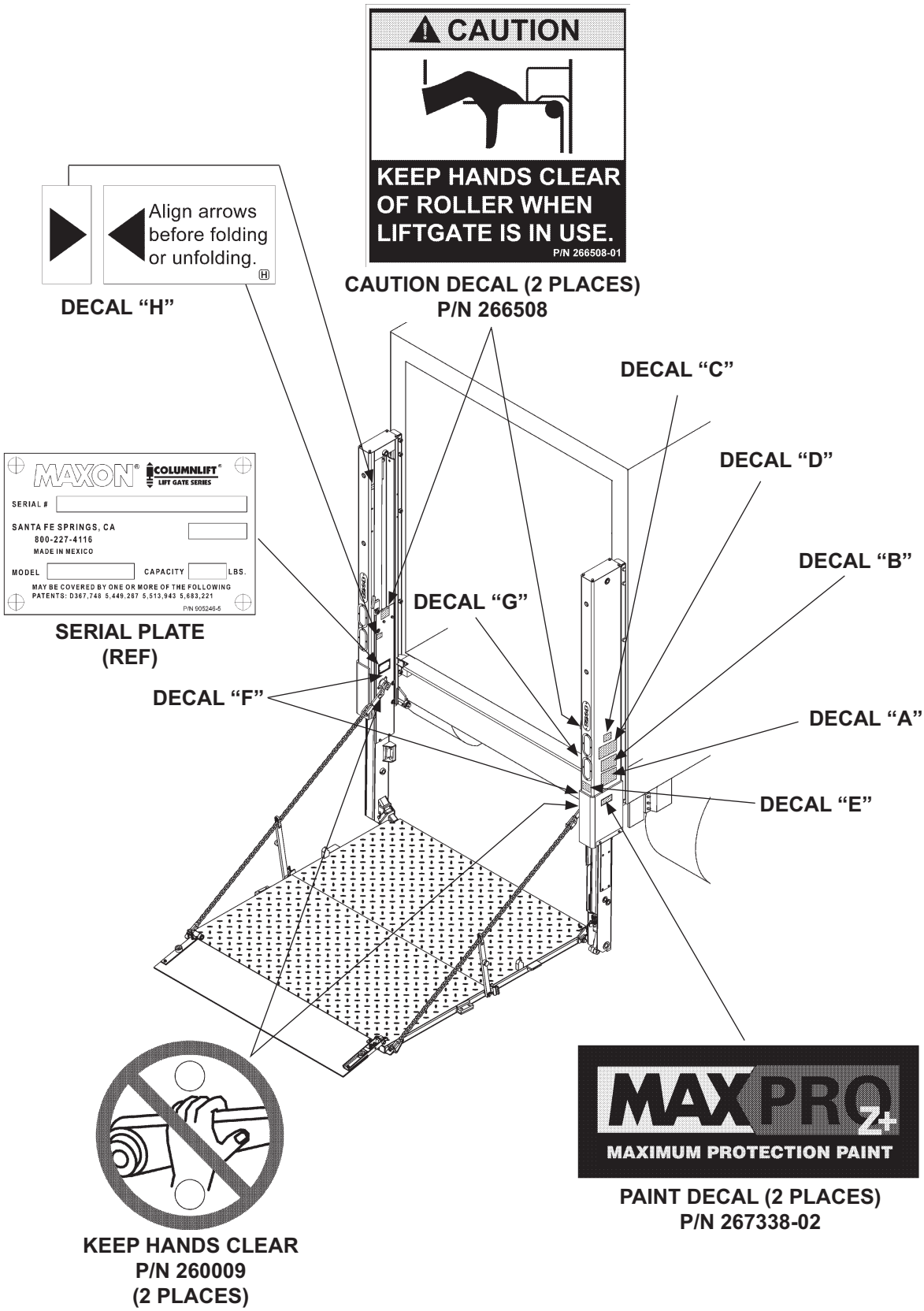


FIG. 8-1

DECALS



DECAL "H"

CAUTION DECAL (2 PLACES)
P/N 266508

DECAL "C"

DECAL "D"

DECAL "B"

DECAL "G"

SERIAL PLATE
(REF)

DECAL "F"

DECAL "A"

DECAL "E"

PAINT DECAL (2 PLACES)
P/N 267338-02

KEEP HANDS CLEAR
P/N 260009
(2 PLACES)

FIG. 9-1

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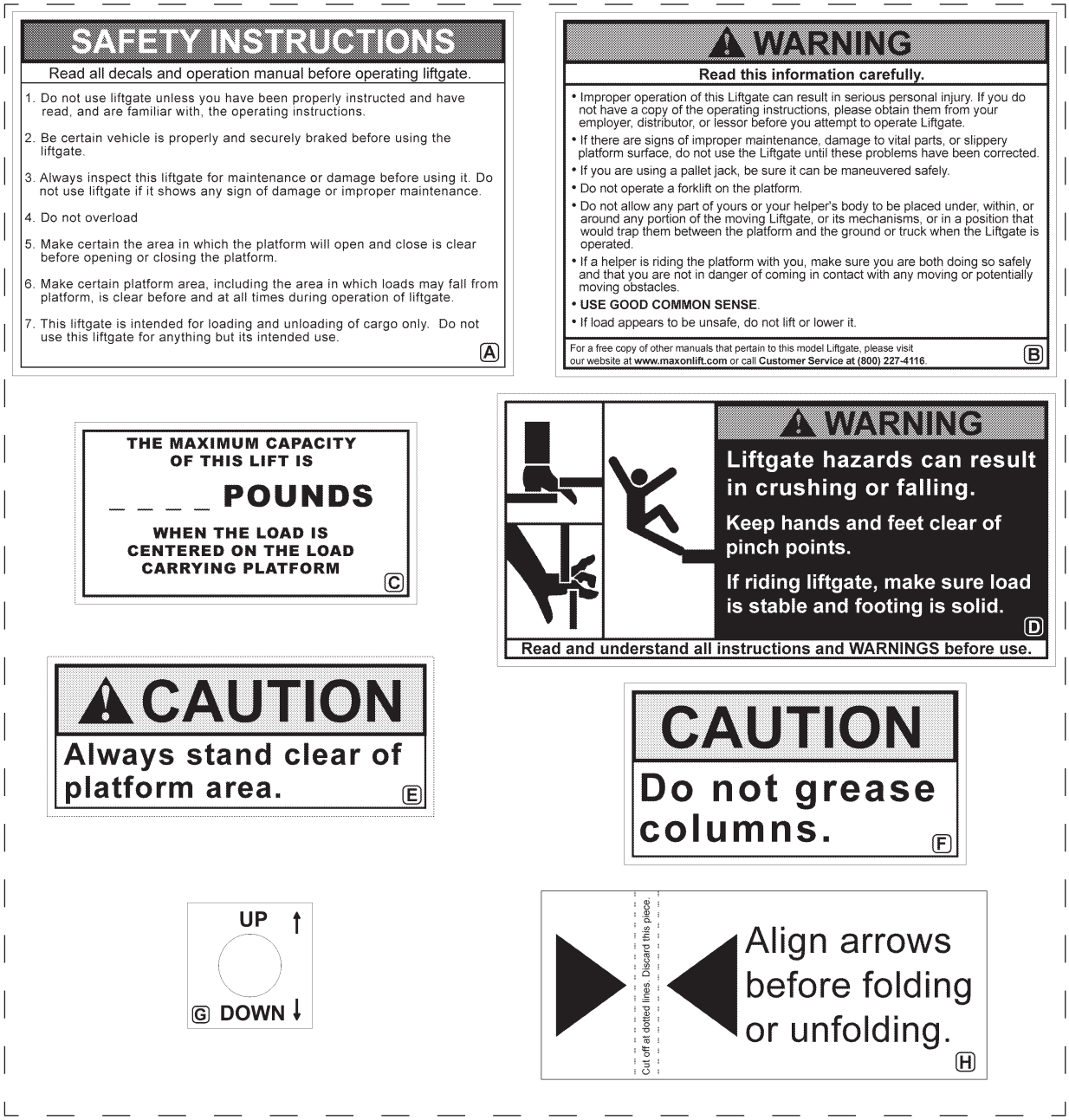
PERIODIC MAINTENANCE

DECALS - Continued



DECAL SHEET
FIG. 10-1

MODEL	ORDER P/N	DECAL "C"
BMRSD35	268309-01	3500 LBS.
BMRSD44	268309-02	4400 LBS.
BMRSD55	268309-03	5500 LBS.
BMRSD66	268309-04	6600 LBS.

DECAL SHEET PART NUMBERS
TABLE 10-1

PERIODIC MAINTENANCE
MAXON BMRSD LIFTGATES WITH STEEL PLATFORMS
PREVENTATIVE MAINTENANCE CHECKLIST

PM Interval: Quarterly / Annual Date: ___/___/___

Equipment: W/O # Location:

Mechanic: Serial # Model #

Check Appropriate Box. "□"

NOTE: Unfold, fold, lower, and raise times are for 56" bed height, steel platform and flipover 86" W x 42" + 42" L, Exxon Univis HVI-13 oil, & temperature at 70°F. Times are for reference only and may vary for larger platforms, smaller platforms, or temperature changes. Refer to **CHECKING HYDRAULIC FLUID** procedure for information about temperature and recommended oil.

MAXON Quarterly Liftgate PM Procedures				
Satisfactory	Repair Required	Corrected	1	Check your company's maintenance records to verify when quarterly and annual PM's are due.
Satisfactory	Repair Required	Corrected	2	Check for oil leaks: cylinders, fittings, hoses, valves, oil filter and fittings inside of pump box.
Satisfactory	Repair Required	Corrected	3	Check for damage: bent ramps, platform, columns, runners & hydraulic tubes.
Satisfactory	Repair Required	Corrected	4	Check for sealant separating/missing from platform & extension plate.
Satisfactory	Repair Required	Corrected	5	Check for loose or missing nuts, bolts, covers, roll pins, screws and pins.
Satisfactory	Repair Required	Corrected	6	Check for cracked welds: columns, runners, platform, chain arms, pump box and door frame.
Satisfactory	Repair Required	Corrected	7	Check platform lowering speed unloaded. BMRSD-35/-44: **10 sec**; BMRSD-55/-66: **18 sec**. Check "D" valves for proper operation.
Satisfactory	Repair Required	Corrected	8	Check platform lowering speed loaded with 1000 lb (plus). BMRSD-35/-44: **8 sec**; BMRSD-55/-66: **13 sec**. Check "D" valves for proper operation.
Satisfactory	Repair Required	Corrected	9	Check platform raising speed unloaded. BMRSD-35/-44: **19 sec**; BMRSD-55/-66: **24 to 25 sec**.
Satisfactory	Repair Required	Corrected	10	Check open **(UNFOLD)** and close **(FOLD)** speed: **4 to 6 sec**. (all models).
Satisfactory	Repair Required	Corrected	11	Check platform pins and couplers. Check roller assemblies on the runners.
Satisfactory	Repair Required	Corrected	12	Check switches, circuit breaker and wiring connections on Liftgate as well as inside pump box. Also check that ground strap connections are tight.
Satisfactory	Repair Required	Corrected	13	Check the gear pump for unusual noise (i.e. squealing or excessive RPM).
Satisfactory	Repair Required	Corrected	14	Check oil level with platform stowed. Refer to oil decal inside pump cover. The sight glass should be half full. Check oil for contamination. Change if needed.
Satisfactory	Repair Required	Corrected	15	Check batteries: load test, corrosion, cables, hold downs and water level.
Satisfactory	Repair Required	Corrected	16	Dual pump boxes: Please switch the selector switch to opposite pump at each PM.
Satisfactory	Repair Required	Corrected	17	Check platform chains for wear each time maintenance is performed.
Satisfactory	Repair Required	Corrected	18	Check operation of cart stop ramps (if equipped).
Satisfactory	Repair Required	Corrected	19	Check all charging and ground cable connections.
Satisfactory	Repair Required	Corrected	20	Pump EP chassis grease in each lube fitting at 2 platform pivots and the 2 roller axels on the 4 tandems (if equipped with fittings). Wipe away grease seepage. Ensure each of the tandem rollers is clean and free of grease.
Satisfactory	Repair Required	Corrected	21	Follow your company's guidelines for completing PM stickers and maintenance records for the Liftgate.

For more detailed information, please refer to the applicable sections in this Maintenance Manual and the separate Parts Manual. Use only genuine Maxon replacement parts for all repairs.

MAXON Annual Liftgate PM Procedures				
Satisfactory	Repair Required	Corrected	22	Replace spin-on filter in pump box. Change hydraulic fluid if contaminated.
Satisfactory	Repair Required	Corrected	23	Inspect wear on slide pads, on the RH and LH runners.

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PERIODIC MAINTENANCE
MAXON BMRSD LIFTGATES WITH ALUMINUM PLATFORMS
PREVENTATIVE MAINTENANCE CHECKLIST

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PM Interval: Quarterly / Annual Date: ___/___/___

Equipment: W/O # Location:

Mechanic: Serial # Model #

Check Appropriate Box. "□"

NOTE: Unfold, fold, lower, and raise times are for 56" bed height, aluminum platform and flipover 86" W x 42" + 42" L, Exxon Univis HVI-13 oil, & temperature at 70°F. Times are for reference only and may vary for larger platforms, smaller platforms, or temperature changes. Refer to **CHECKING HYDRAULIC FLUID** procedure for information about temperature and recommended oil.

MAXON Quarterly Liftgate PM Procedures				
Satisfactory	Repair Required	Corrected	1	Check your company's maintenance records to verify when quarterly and annual PM's are due.
Satisfactory	Repair Required	Corrected	2	Check for oil leaks: cylinders, fittings, hoses, valves, oil filter and fittings inside of pump box.
Satisfactory	Repair Required	Corrected	3	Check for damage: bent ramps, platform, columns, runners & hydraulic tubes.
Satisfactory	Repair Required	Corrected	4	Check for sealant separating/missing from platform & extension plate.
Satisfactory	Repair Required	Corrected	5	Check for loose or missing nuts, bolts, covers, roll pins, screws and pins.
Satisfactory	Repair Required	Corrected	6	Check for cracked welds: columns, runners, platform, chain arms, pump box and door frame.
Satisfactory	Repair Required	Corrected	7	Check platform lowering speed unloaded. BMRSD-35/-44: **11 sec**; BMRSD-55/-66: **16 sec**. Check "D" valves for proper operation.
Satisfactory	Repair Required	Corrected	8	Check platform lowering speed loaded with 1000 lb (plus). BMRSD-35/-44: **8 to 9 sec**; BMRSD-55/-66: **12 to 13 sec**. Check "D" valves for proper operation.
Satisfactory	Repair Required	Corrected	9	Check platform raising speed unloaded. BMRSD-35/-44: **18 sec**; BMRSD-55/-66: **24 to 25 sec**.
Satisfactory	Repair Required	Corrected	10	Check open **(UNFOLD)** and close **(FOLD)** speed: **4 to 6 sec**. (all models).
Satisfactory	Repair Required	Corrected	11	Check platform pins and couplers. Check roller assemblies on the runners.
Satisfactory	Repair Required	Corrected	12	Check switches, circuit breaker and wiring connections on Liftgate as well as inside pump box. Also check that ground strap connections are tight.
Satisfactory	Repair Required	Corrected	13	Check the gear pump for unusual noise (i.e. squealing or excessive RPM).
Satisfactory	Repair Required	Corrected	14	Check oil level with platform stowed. Refer to oil decal inside pump cover. The sight glass should be half full. Check oil for contamination. Change if needed.
Satisfactory	Repair Required	Corrected	15	Check batteries: load test, corrosion, cables, hold downs and water level.
Satisfactory	Repair Required	Corrected	16	Dual pump boxes: Please switch the selector switch to opposite pump at each PM.
Satisfactory	Repair Required	Corrected	17	Check platform chains for wear each time maintenance is performed.
Satisfactory	Repair Required	Corrected	18	Check operation of cart stop ramps (if equipped).
Satisfactory	Repair Required	Corrected	19	Check all charging and ground cable connections.
Satisfactory	Repair Required	Corrected	20	Pump EP chassis grease in each lube fitting at 2 platform pivots and the 2 roller axels on the 4 tandems (if equipped with fittings). Wipe away grease seepage. Ensure each of the tandem rollers is clean and free of grease.
Satisfactory	Repair Required	Corrected	21	Follow your company's guidelines for completing PM stickers and maintenance records for the Liftgate.

For more detailed information, please refer to the applicable sections in this Maintenance Manual and the separate Parts Manual. Use only genuine Maxon replacement parts for all repairs.

MAXON Annual Liftgate PM Procedures				
Satisfactory	Repair Required	Corrected	22	Replace spin-on filter in pump box. Change hydraulic fluid if contaminated.
Satisfactory	Repair Required	Corrected	23	Inspect wear on slide pads, on the RH and LH runners.

PERIODIC MAINTENANCE CHECKS

⚠ WARNING

Never operate the Liftgate if parts are loose or missing.

NOTE: Photocopy the **PM CHECKLIST** on the preceding page to help keep track of periodic maintenance on the Liftgate. Keep completed form with maintenance records.

NOTE: When replacing parts, refer to Parts Manual for genuine MAXON replacement parts.

Annually

- Change spin-on oil filter.
- Inspect for wear on slide pads on the RH & LH runners.

Quarterly

Check the hydraulic fluid level in the pump reservoir. Refer to the **CHECKING HYDRAULIC FLUID** procedure in the **PERIODIC MAINTENANCE** section.

- If hydraulic fluid appears contaminated, refer to the **CHANGING HYDRAULIC FLUID** procedure on following page.
- Keep track of the grade of hydraulic fluid in the pump reservoir. Never mix two different grades of fluid.
- Check pump box cover seal. Replace seal if damaged.
- Check hoses and fittings for chaffing and fluid leaks. Replace if necessary.
- Check electrical wiring for chaffing and make sure wiring connections are tight and free of corrosion. **MAXON** recommends using dielectric grease on all electrical connections.
- Check that all **WARNING** and **instruction decals** are in place and legible.
- Check that all roll pins are in place and protrude evenly from both sides of hinge pin collar. Replace roll pins if necessary.
- Check each end of the two platform chains to make sure they are fastened properly.
- Check for worn out links on each of the two platform chains.
- Pump EP chassis grease in fitting on 2 platform pivots and roller axels on the 4 tandems.

CAUTION

Damaged cylinder seals and contaminated hydraulic fluid can result from painting the polished portion of the cylinder rod. To prevent damage, protect the exposed polished portion of the cylinder rod while painting.

CAUTION

Pressure washing can separate sealant from the platform and extension plate and allow water to collect inside. To prevent damage to the sealant, do not aim the direct spray of water at the sealant.

- Check for rust and oily surfaces on Liftgate. If there is rust or oil on the Liftgate, clean it off. Touch up the paint where bare metal is showing. MAXON recommends using the zinc primer touchup paint kit, P/N 908135-01.
- Check for sealant separating from platform or extension plate. If required, remove loose sealant & clean affected area. Reseal the affected area with sealant P/N 264003.

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PERIODIC MAINTENANCE

PERIODIC MAINTENANCE CHECKS - Continued

BMRSD LUBRICATION DIAGRAM

NOTE: Lube fittings are shown for the tandem roller axels on the LH runner and the pivot on the LH side of platform. Runner cover must be removed to access the lube fittings on the tandem roller axels. There are also lube fittings on the tandem roller axels for the RH runner and the pivot on the RH side of the platform. Refer to the **PERIODIC MAINTENANCE CHECKS** and **PREVENTATIVE MAINTENANCE CHECKLIST** for the recommended grease and maintenance interval.

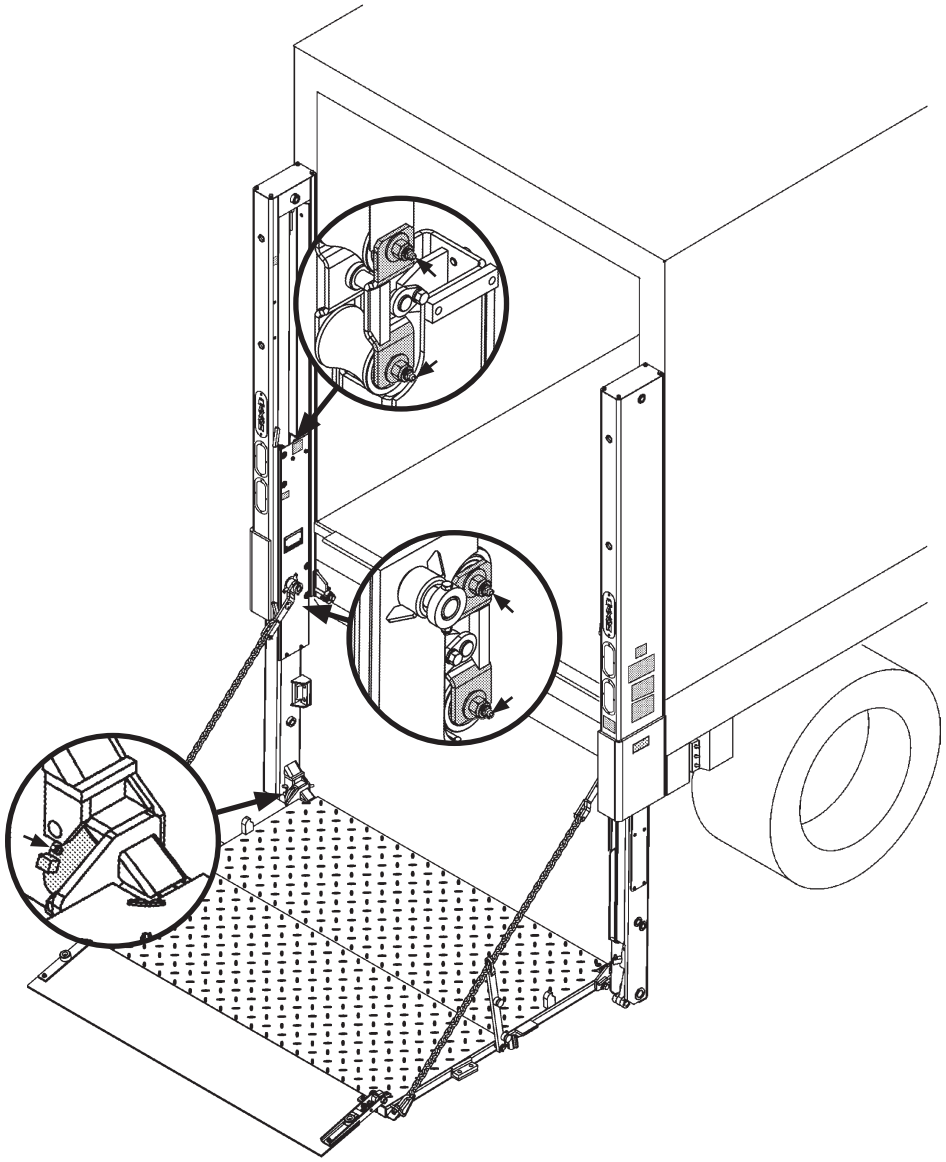

FIG. 14-1

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PERIODIC MAINTENANCE

CHECKING HYDRAULIC FLUID

CAUTION

Keep dirt, water and other contaminants from entering the hydraulic system. Before opening the hydraulic fluid reservoir filler cap, drain plug and hydraulic lines, clean up contaminants that can get in the openings. Also, protect the openings from accidental contamination.

NOTE: Exxon Univis HVI-13 hydraulic fluid is recommended for operating temperatures of **-40 to +120° F**. Refer to decal in pump box. The **ISO-15** fluids in **TABLE 17-1** may be used if the recommended fluids are unavailable. If necessary, the **ISO-32** fluids in **TABLE 17-2** may be used where ordinary seasonal temperatures are near **+100° F** or higher**.**

NOTE: If the hydraulic fluid in the reservoir is contaminated, do the **CHANGING HYDRAULIC FLUID** procedure in this section.

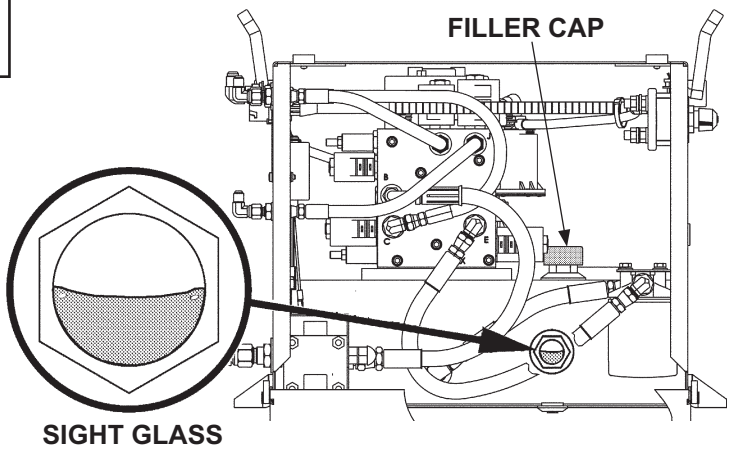
1. Stow the platform in the up position. Refer to **Operation Manual** for instructions.

2. Open the pump box cover to gain access to sight glass and filler cap **(FIG. 16-1)**.

NOTE: Information for checking hydraulic fluid level is also shown on a decal inside the pump box cover.

3. Check the hydraulic fluid level in sight glass **(FIG. 16-1)**. Hydraulic fluid level should be at the center of sight glass. If fluid is below the center, add fluid to the reservoir as follows. Remove filler cap **(FIG. 16-1)**. Add the correct grade of hydraulic fluid to reservoir until the level is at the center of the sight glass **(FIG. 16-1)**.

4. Reinstall filler cap **(FIG. 16-1)** and close the pump box cover.



CHECKING HYDRAULIC FLUID LEVEL
FIG. 16-1

ISO-15 OR MIL-H-5606 HYDRAULIC OIL	
BRAND	**PART NUMBER**
AMSOIL	AWF-05
CHEVRON	FLUID A, AW-MV-15
KENDALL	GLACIAL BLU
SHELL	TELLUS S2 V15
MOBIL	DTE-11M
ROSEMEAD	THS FLUID 17111

TABLE 17-1

ISO-32 HYDRAULIC OIL	
BRAND	**PART NUMBER**
AMSOIL	AWH-05
CHEVRON	HIPERSYN 32
KENDALL	GOLDEN MV
SHELL	TELLUS S2 V32
EXXON	UNIVIS N-32
MOBIL	DTE-13M, DTE-24, HYDRAULIC OIL-13

TABLE 17-2

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PERIODIC MAINTENANCE

CHANGING HYDRAULIC FLUID

CAUTION

Keep dirt, water and other contaminants from entering the hydraulic system. Before opening the hydraulic fluid reservoir filler cap, drain plug and hydraulic lines, clean up contaminants that can get in the openings. Also, protect the openings from accidental contamination.

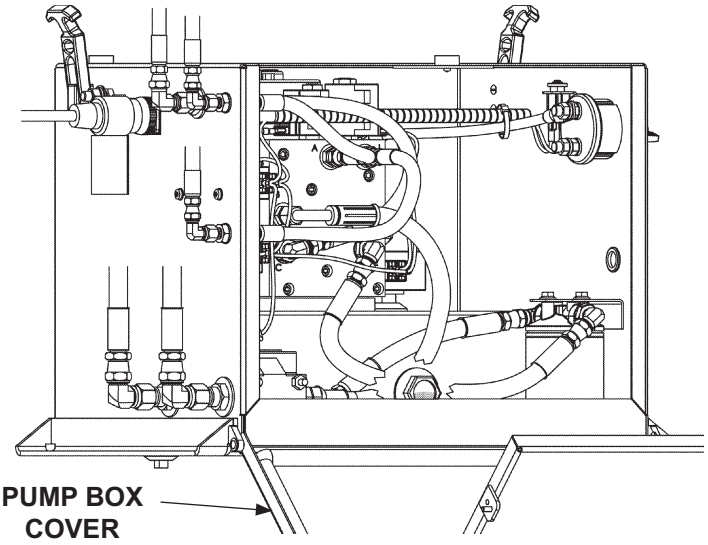
NOTE: Exxon Univis HVI-13 hydraulic fluid is recommended for operating temperatures of **-40 to +120° F**. Refer to decal in pump box. The **ISO-15** fluids in **TABLE 15-1** may be used if the recommended fluids are unavailable. If necessary, the **ISO-32** fluids in **TABLE 15-2** may be used where ordinary seasonal temperatures are near **+100° F** or higher**.**

NOTE: On Liftgates installed below 56” bed height, the most hydraulic fluid can be removed by parking vehicle so bed height is at least 56” above the ground. If vehicle is equipped with air-ride system, MAXON recommends pumping up the system to get maximum vehicle height. Raising the vehicle allows cylinders to reach full stroke. For example, raise vehicle 1” if bed height is 55”. If vehicle bed height is 44”, raise vehicle 12”. Also, raising the front of the vehicle a little higher than the back will help open the platform without running the pump. By opening the platform, fluid will be pushed out of the opening/closing cylinder into the reservoir.

NOTE: Refer to **Operation Manual** for instructions to operate Liftgate.

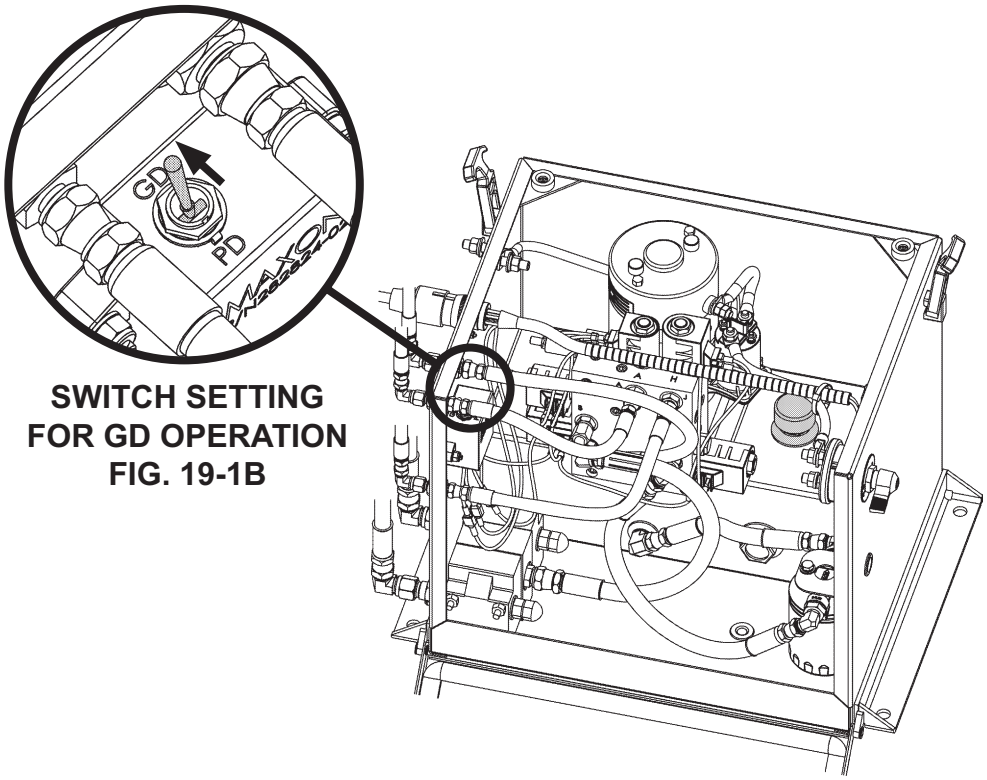
1. Stow platform in the up position. Refer to operating instructions in the **Operation Manual**.

2. Open pump box cover to gain access **(FIG. 18-1)**.



PUMP BOX COVER OPENED FOR ACCESS
FIG. 18-1

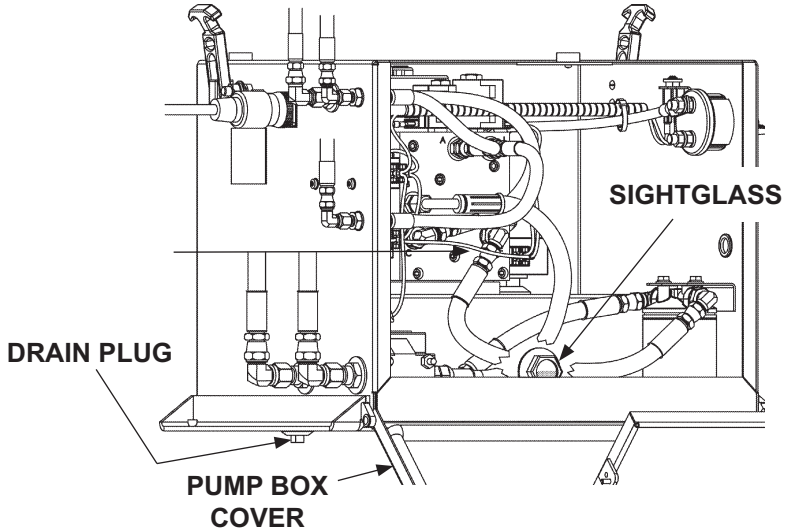
3. Set power down on demand switch to **GD** (Gravity Down) **(FIG. 19-1B)**.



SWITCH SETTING FOR GD OPERATION FIG. 19-1B

FIG. 19-1A

4. Place a 3 gallon bucket under pump box drain plug **(FIG. 19-2)**. Remove drain plug.



PUMP BOX COVER OPENED FOR ACCESS FIG. 19-2

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5. Disconnect the power down hose from bulkhead fitting **(FIG. 20-1)**. Then, place end of the hose in the 3 gallon bucket. If necessary, connect an extension hose to reach the bucket.

> **NOTE:** Unfolding and lowering the platform pushes hydraulic fluid, out of the power opening/closing cylinder and lifting cylinders, to the reservoir.

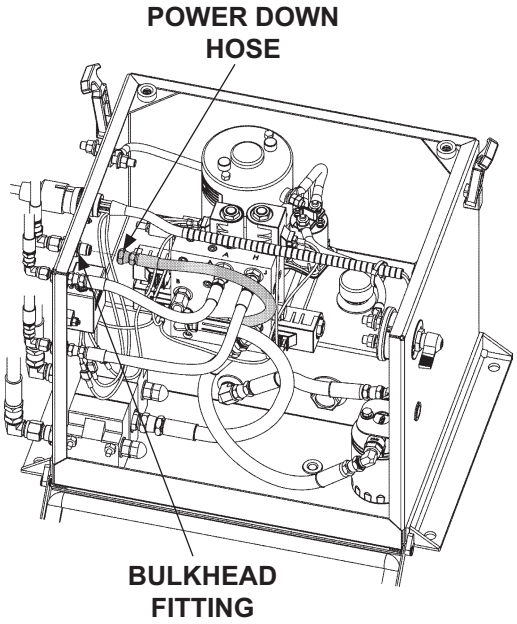
6. Unfold and lower platform to the ground.

7. When hydraulic fluid stops draining from hose, reconnect the power down hose **(FIG. 20-2)**. Then, reinstall drain plug **(FIG. 16-2)**.

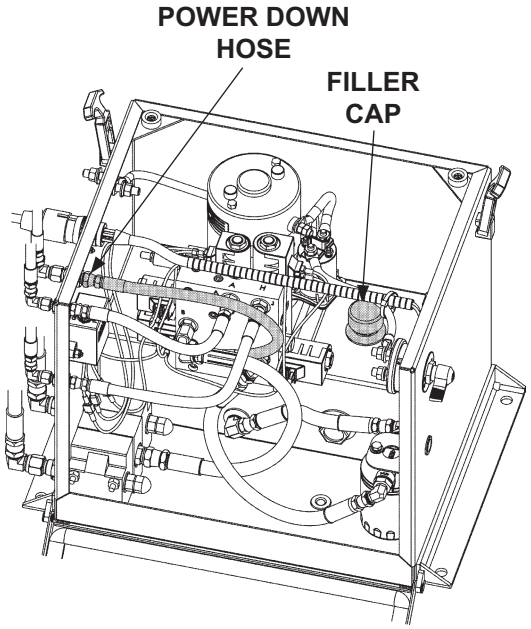
8. Remove filler cap **(FIG. 20-2)**. Then, add the correct grade of hydraulic fluid to reservoir until fluid level is at middle of sight glass **(FIG. 16-2)**. Reinstall filler cap **(FIG. 20-2)**.

9. Raise platform to vehicle floor level. Then, lower it back to ground level. Hydraulic fluid level should be at the middle of sight glass **(FIG. 16-2)**. If necessary, add more hydraulic fluid to bring fluid level up to middle of sight glass **(FIG. 16-2)**.

10. Close pump box cover **(FIG. 18-2)**.



DISCONNECTING POWER DOWN HOSE TO DRAIN CYLINDERS
FIG. 20-1



POWER DOWN HOSE RECONNECTED
FIG. 20-2

BLEEDING HYDRAULIC SYSTEM

CAUTION

Keep dirt, water and other contaminants from entering the hydraulic system. Before opening the hydraulic fluid reservoir filler cap, drain plug and hydraulic lines, clean up contaminants that can get in the openings. Also, protect the openings from accidental contamination.

NOTE: Perform this procedure at a place where platform can be lowered to lowest point of travel. Get a helper to operate Liftgate control switch.

NOTE: Refer to **Operation Manual** for instructions to operate Liftgate.

1. Do the **CHECKING HYDRAULIC FLUID** procedure to ensure hydraulic fluid is at the correct level.

2. Use **UP/DOWN** switch on the RH runner to lower the opened platform to the ground.

3. Loosen, but do not disconnect, the lifting line fitting from the flow control valve **(FIG. 21-1)** on each cylinder.

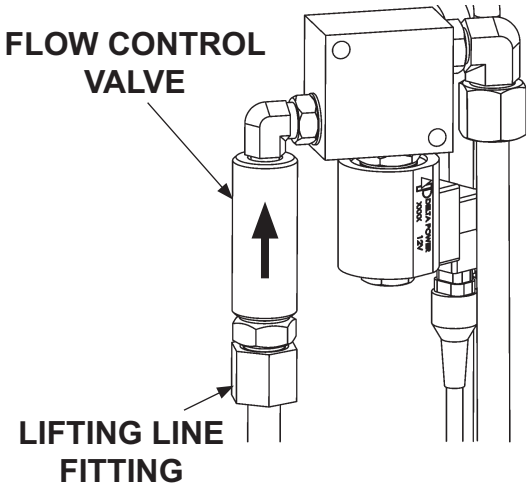


FIG. 21-1

4. Hold the **UP/DOWN** switch in the **UP** position for one second and release the switch. Immediately tighten the lifting line fitting **(FIG. 21-1)** to prevent more air from getting in the line.

5. Use the **UP/DOWN** switch to lower the platform to the ground. Then, repeat steps 3 and 4 until air stops bubbling from the loosened line fitting.

6. Use the **UP/DOWN** switch to raise and lower the platform to make sure the Liftgate operates correctly.

7. Do the **CHECKING HYDRAULIC FLUID** procedure again to ensure hydraulic fluid is at the correct level.

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ADJUSTMENT
PLATFORM CHAIN ADJUSTMENT

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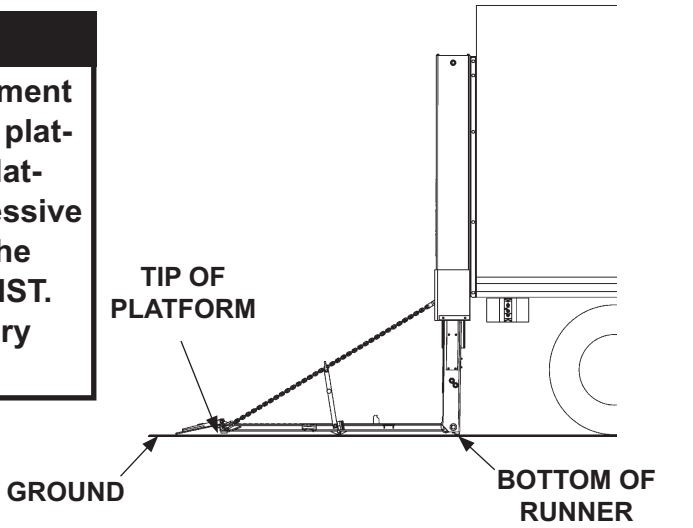
⚠ WARNING

Personal injury and damaged equipment could result if chains separate from platform under load. Never adjust the platform chains to compensate for excessive wear. Refer to chain inspection on the PERIODIC MAINTENANCE CHECKLIST. Adjustment should only be necessary when new chains are installed.

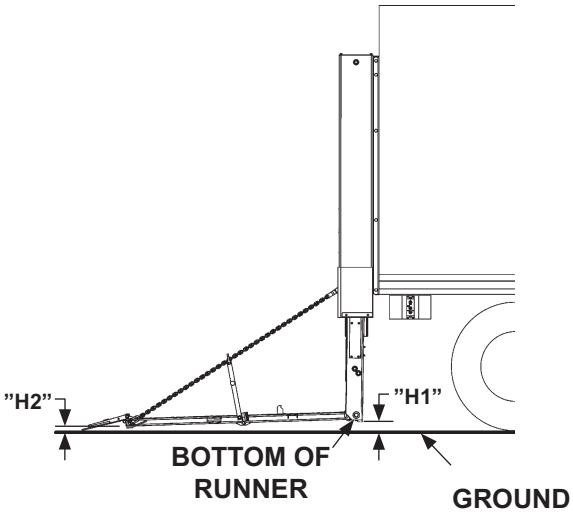
1. Lower the platform to ground level. Check if tip of the flipover and bottom of the runners touch the ground at the same time **(FIG. 22-1)**.



TIP AND RUNNER TOUCHING GROUND
FIG. 22-1

2. If the bottom of the runners are off the ground, measure the distance "**H1**" **(FIG. 22-2)** from the ground to the bottom of the runners.

- Adjustment is not required if distance **"H1"** is 1" or less.
- If distance **"H1"** is more than 1", refer to the steps that follow to adjust the platform chains.



RUNNERS NOT TOUCHING
FIG. 22-2

3. Refer to measured distance **"H1"** at the runners and **TABLE 22-1**. Note the method(s) that will be required to raise the tip of platform (or retention ramp) the expected distance.

MEASURED "H1" (AT RUNNER)	ADJUSTMENT METHODS (● REQUIRED FOR EXPECTED RISE AT TIP)			EXPECTED RISE "H2" (AT TIP)
	ADJUST U-BOLT (RAISES TIP 0" TO 1-1/4")	REMOVE 1 LINK OF BOTH CHAINS (RAISES TIP 1-1/2")	REMOVE 2 LINKS OF BOTH CHAIN (RAISES TIP 3")	
1" - 2-1/4"	●	-	-	0" - 1-1/4"
2-1/2" - 3-3/4"	●	●		1-1/2" - 2-3/4"
4"	●	●	●	3" - 4"

TABLE 22-1

⚠ WARNING

Personal injury and damaged equipment could result if chains separate from platform under load. Ensure each leg of u-bolts extends minimum of 1/8” from lock nut. When adjustment is complete, ensure jam nuts are tightened securely.

4. To adjust with the u-bolt, do the following. If necessary, raise platform enough to gain access to the adjusting nuts on both u-bolts. Next, loosen the jam nuts on both u-bolts **(FIG. 23-1B)**. Alternately and equally tighten the lock nuts on each u-bolt **(FIGS. 23-1B & 23-1C)**. Then, measure distance **“H2”** at the tip of the platform **(FIG. 23-1A)**. When distance **“H2”** is equal to distance **“H1”** (+0” / -1”), or u-bolt is at maximum adjustment **(FIG. 23-1C)**, securely tighten jam nuts on both u-bolts.

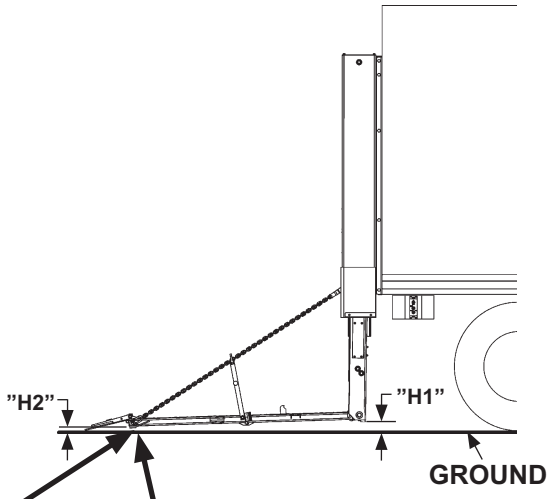
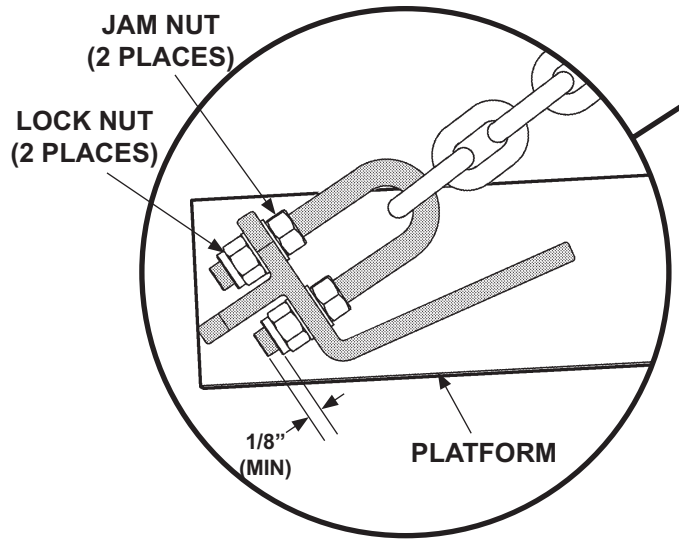
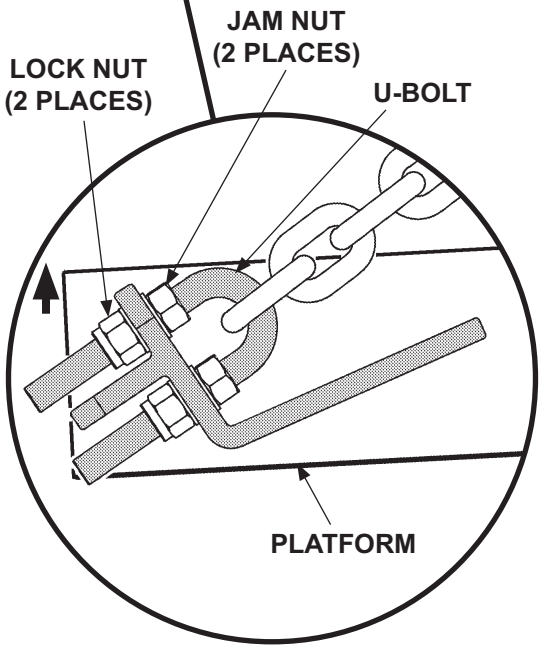


FIG. 23-1A



U-BOLT AT MINIMUM LIMIT (RH SIDE SHOWN) FIG. 23-1B



U-BOLT ADJUSTED TO MAXIMUM LIMIT (RH SIDE SHOWN) FIG. 23-1C

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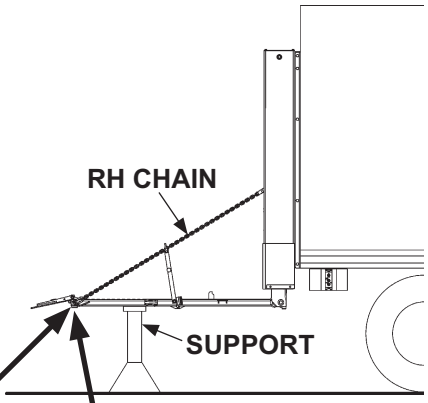
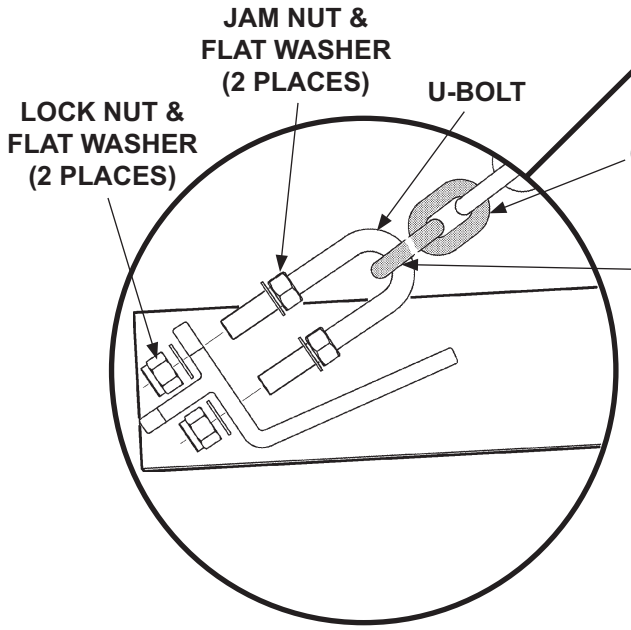
NOTE: Remove links from platform chains only if required. Skip instruction 5 if u-bolts raised tip of the platform (or retention ramp) to correct height.

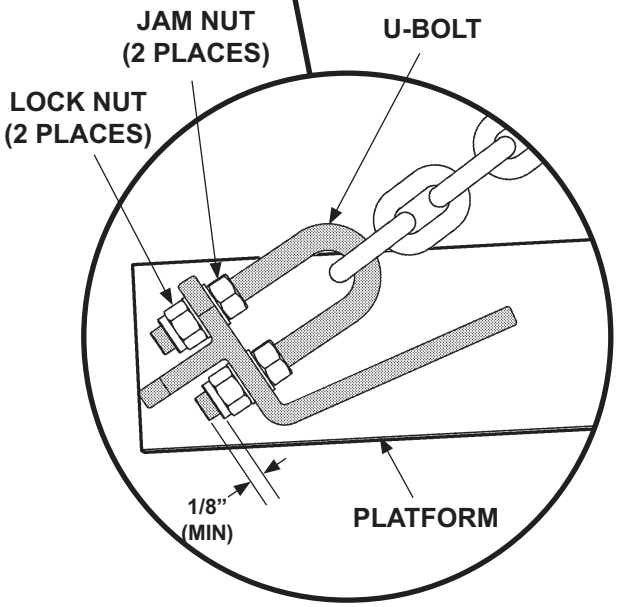
5. To remove links from each platform chain, do the following. Raise platform to a comfortable work height **(FIG. 24-1A)**. Support the bottom of platform to remove tension from LH and RH chains. Next, unfasten both u-bolts from platform **(FIG. 24-1B)**. Remove 1 or 2 links (as required) from both chains. Then, fasten u-bolts to platform as shown in **FIG. 24-1C**. Tighten jam nuts securely.



PLATFORM RAISED & SUPPORTED
FIG. 24-1A

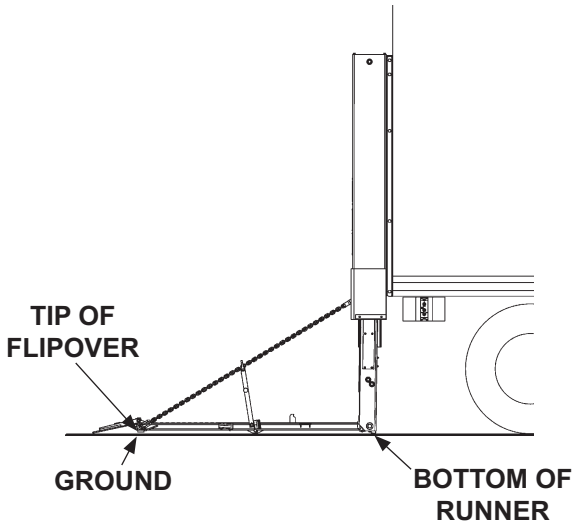


REMOVING CHAIN LINK
FIG. 24-1B



U-BOLTS FASTENED TO PLATFORM
(RH SIDE OF PLATFORM SHOWN)
FIG. 24-1C

6. Raise platform enough to remove supports. Then, lower platform to the ground **(FIG. 25-1)**. Tip of flipover and runners should touch the ground at the same time as shown in **FIG. 25-1**. If necessary, repeat instructions 3 through 5 until tip of platform and runners touch ground at the same time.



TIP AND RUNNER TOUCHING GROUND
FIG. 25-1

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REPLACING PARTS

OPENING/CLOSING CYLINDER REPLACEMENT

CAUTION

Keep dirt, water and other contaminants from entering the hydraulic system. Before opening the hydraulic fluid reservoir filler cap, drain plug and hydraulic lines, clean up contaminants that can get in the openings. Also, protect the openings from accidental contamination.

NOTE: Refer to **Operation Manual** for instructions to operate Liftgate.

1. **UNFOLD** the platform. Lower the platform **(DOWN)** to comfortable work height. Ensure upper pin is positioned below the bottom of the column **(FIG. 26-1)**.

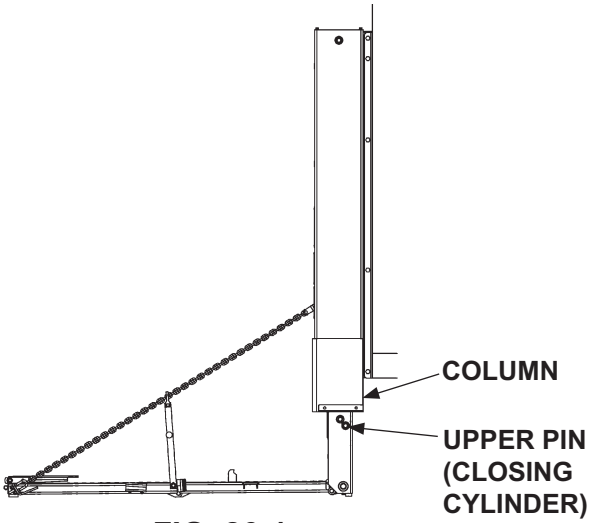
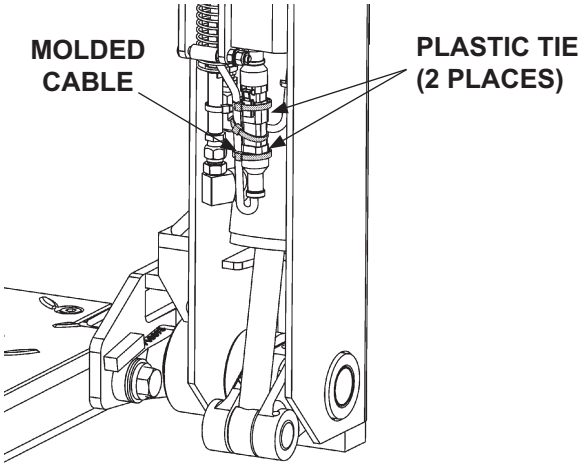


FIG. 26-1

2. Gain access to the hydraulic hose connections on the opening/closing cylinder as follows. Remove 2 plastic ties securing connectors to molded cable **(FIG. 26-2)**.



REMOVING PLASTIC TIES
FIG. 26-2

3. Disconnect power open hydraulic hose and elbow from upper end of cylinder **(FIG. 27-1)**. Plug elbow to prevent spills.

4. Disconnect power close hydraulic hose from lower end of cylinder **(FIG. 27-1)**. Plug hose to prevent spills.

5. Remove the lower roll pin from inside coupling **(FIG. 27-1)** and then remove the lower pin.

6. Remove the upper roll pin **(FIG. 27-1)** from the runner and then remove the upper pin.

7. Remove cylinder from runner **(FIG. 27-1)**.

8. Place replacement cylinder in the correct position as shown in **FIG. 27-1**.

9. Install upper pin **(FIG. 27-1)** and roll pin in upper end of cylinder and runner.

10. Install lower pin **(FIG. 27-1)** and roll pin in lower end of cylinder and inside coupling.

11. Remove plug from power open hose. Reconnect hose finger-tight to upper end of cylinder **(FIG. 27-1)**.

12. Remove plug from power close hose. Reconnect hose finger-tight to lower end of cylinder **(FIG. 27-1)**.

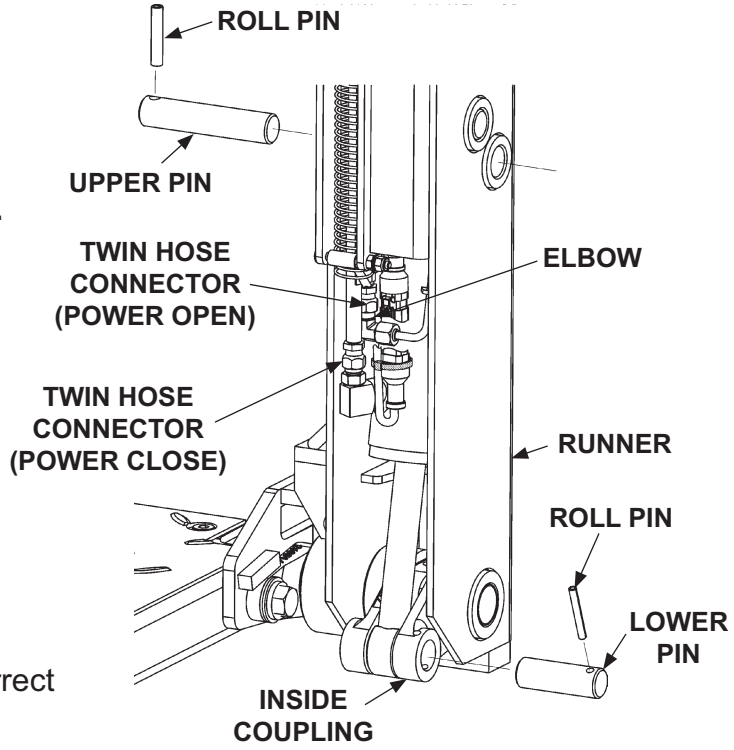


FIG. 27-1

CAUTION

To prevent damage to twin hose assembly, ensure the twin hoses are prevented from twisting inside the spring guard. Also, prevent each hose from twisting while tightening connectors to cylinder fittings. Do not over-tighten.

NOTE: Before tightening the power close hose connector on cylinder, bleed air from cylinder.

13. Tighten and torque the twin hose connectors **(FIG. 27-1)** 25 to 27.5 lb-ft.

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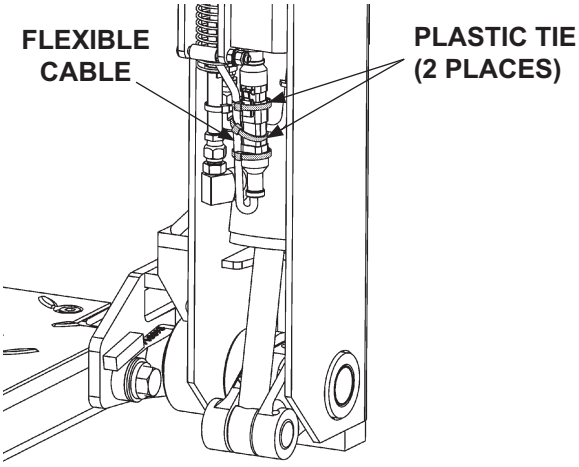
REPLACING PARTS
OPENING/CLOSING CYLINDER REPLACEMENT - Continued

14. Secure the flexible cable connector with 2 plastic ties as shown in **FIG. 28-1**.



INSTALLING PLASTIC TIES
FIG. 28-1

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LIFTING CYLINDER REPLACEMENT

⚠ WARNING

Use floor jack and jack stands to support platform while performing this procedure.

CAUTION

Keep dirt, water and other contaminants from entering the hydraulic system. Before opening the hydraulic fluid reservoir filler cap, drain plug and hydraulic lines, clean up contaminants that can get in the openings. Also, protect the openings from accidental contamination.

NOTE: Refer to **Operation Manual** for instructions to operate Liftgate.

1. Raise the open platform about 20” above the ground. Then, place jack stands under the platform **(FIG. 29-1)** for support. Measure and record the distance between the centers of upper and lower cylinder pins. Keep measurement for reference when installing new cylinder.

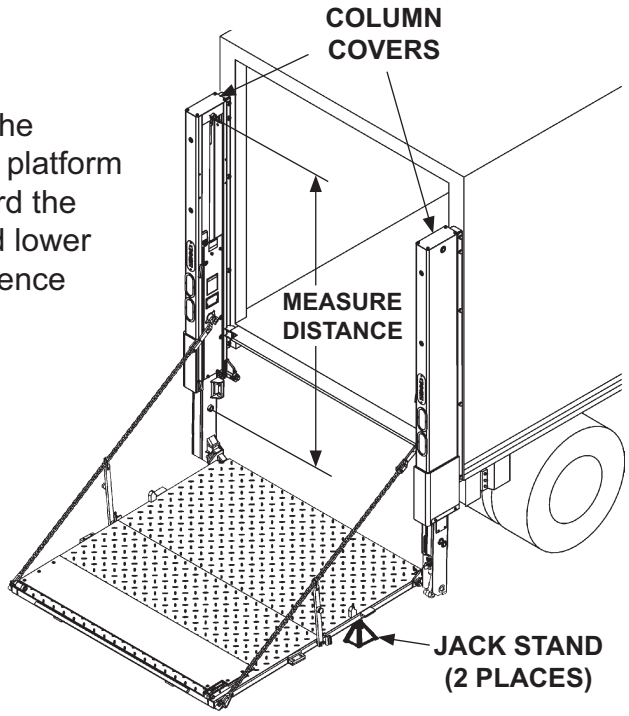

FIG. 29-1

2. Remove cover from the top of the column **(FIG. 29-1)**. Put empty 3 gallon container under column for hydraulic fluid.

3. Loosen and disengage nut #1 **(FIG. 29-2)** from elbow on top of cylinder. Remove elbow from cylinder **(FIG. 29-2)**. Keep elbow to reinstall on new cylinder. Loosen and disengage nut #2 from bottom of flow control valve.

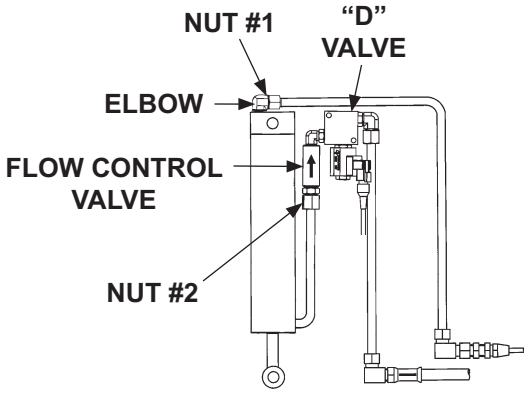

FIG. 29-2

REPLACING PARTS
LIFTING CYLINDER REPLACEMENT - Continued

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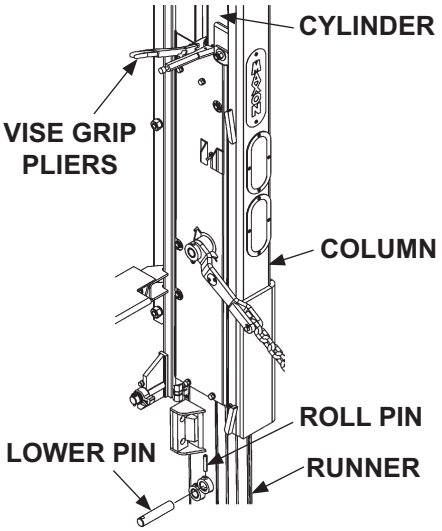
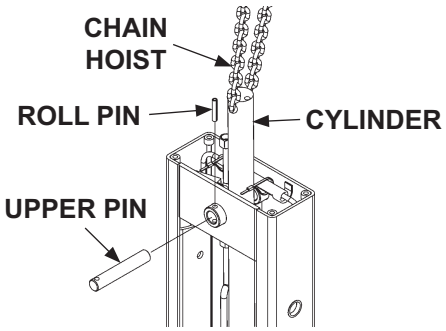
4. Remove lower roll pin & lower pin from lifting cylinder **(FIG. 30-1)**. Then, clamp large, curved vise grip pliers around the cylinder just above the top of the runner as shown in **FIG. 30-1**.

5. Remove upper roll pin & upper pin from cylinder **(FIG. 30-2)**. Lift cylinder about 4" above top of column.

6. Remove cylinder from column as follows. Attach a chain hoist or equivalent lifting device to support the upper end of cylinder **(FIG. 30-2)**. Remove vise grip pliers from cylinder. Hoist the cylinder until it clears the top of column. Then, lower cylinder to the ground.



SECURING CYLINDER
FIG. 30-1



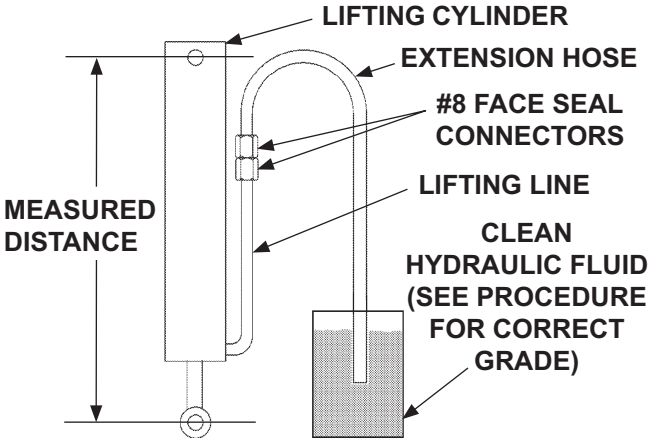
REMOVING CYLINDER
FIG. 30-2

⚠ CAUTION

Move old cylinder out of the way to prevent possible trip hazard.

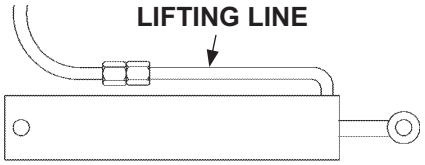
7. Remove plastic plugs from line fittings on new cylinder. Then, fasten a long clean extension hose, with #8 face seal connector, to lifting line as shown in **FIG. 30-3**.

8. Fully extend cylinder rod. Then, place open end of hose in gallon container of clean hydraulic fluid. Next, push cylinder rod into cylinder until distance measured between butt-end and rod-end pin bores is the same as distance recorded in **Step 1**. Replace plastic plug on top of cylinder housing.



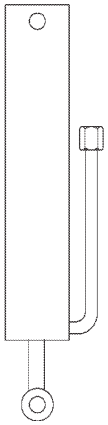
PREPARING NEW CYLINDER FOR INSTALLATION
FIG. 30-3

9. To help remove air from rod end of housing, position cylinder on its side with the lifting line on top **(FIG. 31-1)**. Then, slowly return cylinder to vertical position **(FIG. 28-2)**.



CYLINDER POSITIONED ON SIDE
FIG. 31-1

10. Remove extension hose and plug the lifting line **(FIG. 31-1)**.



CYLINDER WITH HOSE REMOVED
FIG. 31-2

NOTE: Before installing a new cylinder, get a helper. Have the helper look through square inspection hole on back of runner while cylinder is lowered. The helper can inform installer when rod end of cylinder is lined up with lower pin.

NOTE: To install cylinder correctly, make sure hydraulic lines on cylinder are facing the vehicle body.

11. To install new Lifting cylinder, reverse **Steps 6, 5, 4, 3, and 2**.

12. Raise platform enough to remove jack stands **(FIG. 31-3)**. Then, lower platform all the way. Pressurize hydraulic system by pushing control switch to **UP** position. Release switch when platform is raised to bed height.

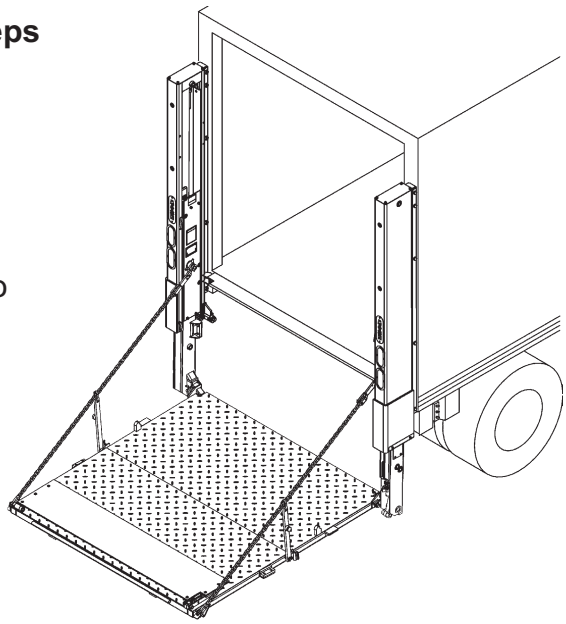


FIG. 31-3

13. If necessary, do the **BLEEDING HYDRAULIC FLUID** procedure in this manual.

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REPLACING PARTS

RUNNER REPLACEMENT

NOTE: Refer to **Operation Manual** for instructions to operate Liftgate.

1. Use control box to lower the platform **(DOWN)** to approximately 12” above the ground. Support platform with 2 jack stands **(FIG. 32-1)**. Make sure ramp edge is 4” higher than inboard edge of platform.

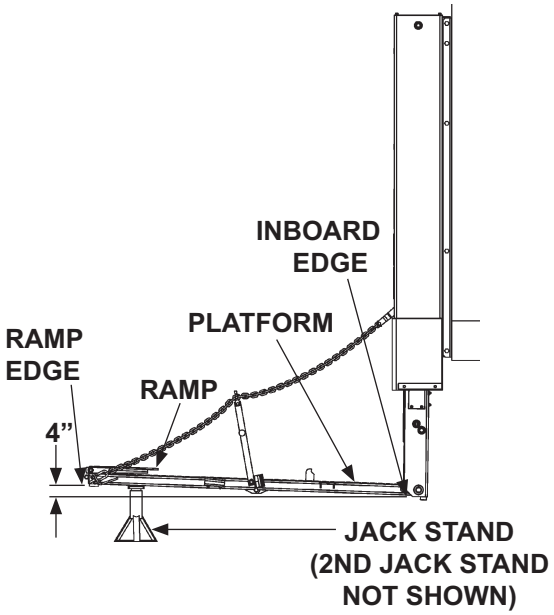

FIG. 32-1

2. Unbolt pin collar from RH runner to remove chain arm **(FIG. 32-2)**. Then, unbolt and remove cover from runner. Repeat for LH chain arm and LH runner.

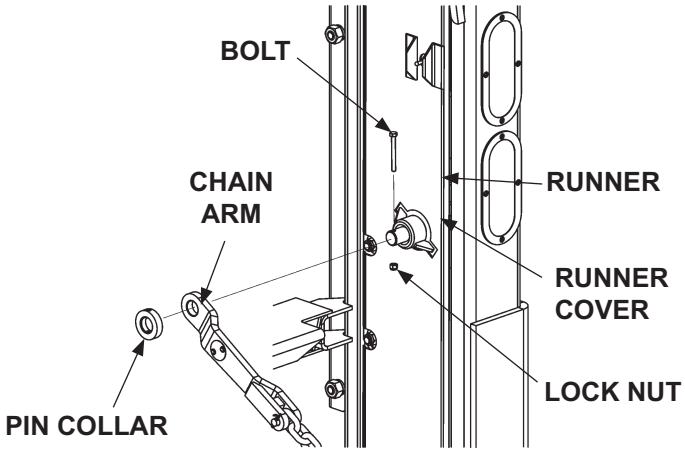

FIG. 32-2

3. Raise the platform **(UP)** slightly and place 2 more jack stands near the inboard edge **(FIG. 33-1)**.

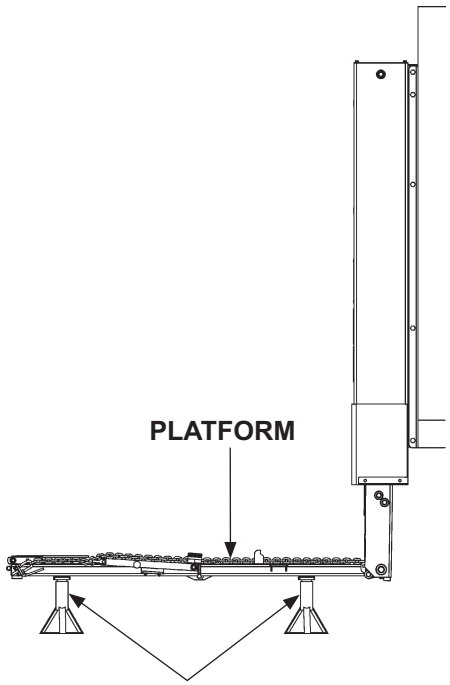

FIG. 33-1

4. Unbolt platform and connector bar from pin at the RH runner **(FIG. 33-2)**. Then, remove pin. Repeat for LH runner.

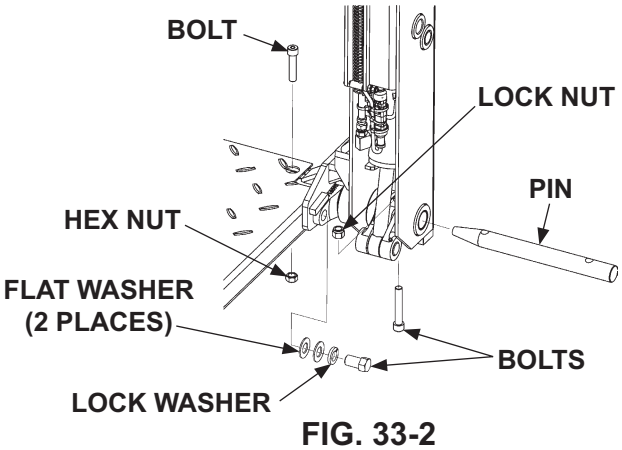

FIG. 33-2

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5. Use a forklift or equivalent lifting device to move the platform approximately 6” towards the front of the vehicle to clear the platform away from the attaching points on the runners **(FIG. 34-1)**. When platform is clear of the runners, raise the runners **(UP)** a few inches. Then, move platform away from Liftgate and the back of the vehicle.

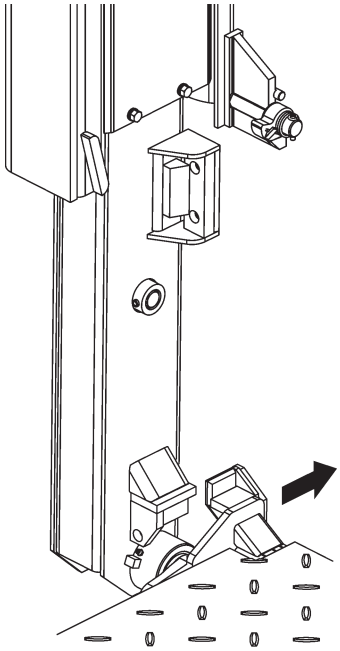


FIG. 34-1

6. Use the control box to lower runners **(DOWN)** to the ground.

NOTE: If replacing LH runner, skip steps 7, 8, and 9.

7. Do the opening/closing cylinder removal steps in the **OPENING/CLOSING CYLINDER REPLACEMENT** procedure in this manual.

8. Disconnect runner switch cable from flexible cable near bottom of runner as shown in **FIG. 34-2**. Then, unfasten runner switch cable clamp from runner by removing lock nut **(FIG. 34-2)**. Remove clamp from cable connector.

9. Pull spring guard, flexible cable, and twin hydraulic hoses away from the channel at bottom of runner **(FIG. 34-2)**.

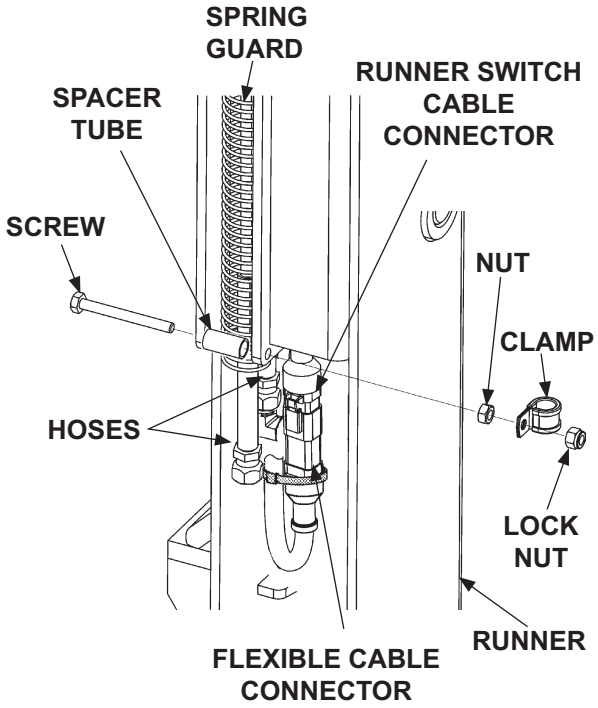
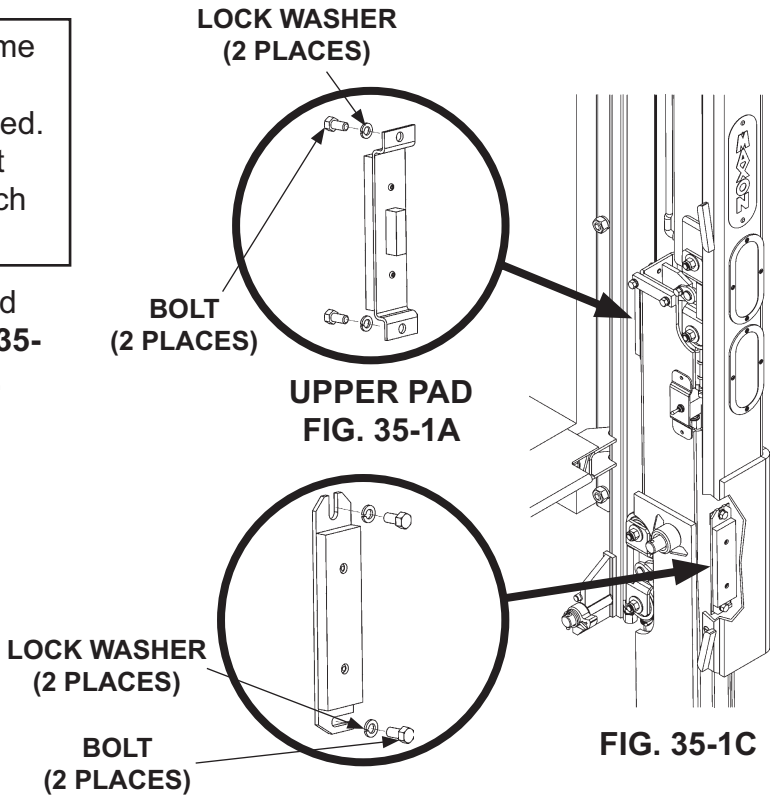


FIG. 34-2

NOTE: Keep shims in the same position on each pad when pads are removed. The same shims must be reinstalled with each pad.

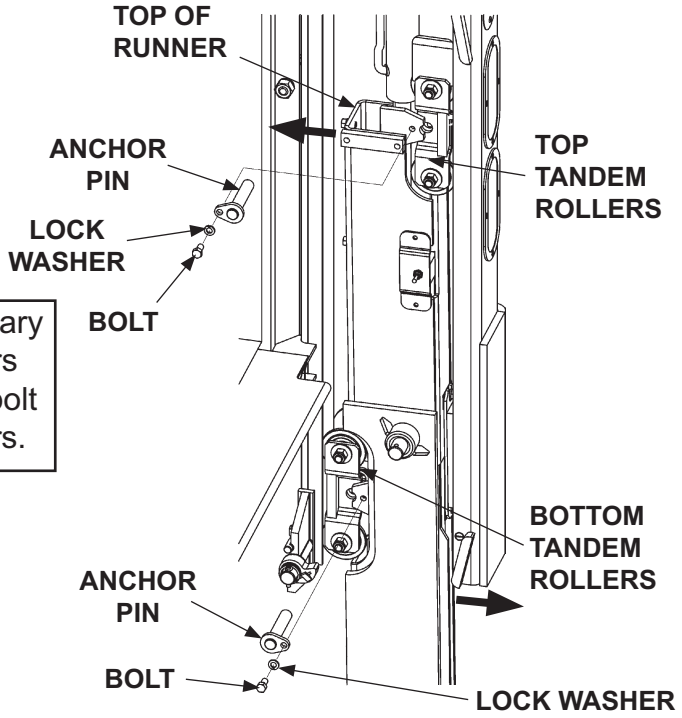
10. Unbolt the upper and lower pad assemblies and shims **(FIGS. 35-1A & 35-1B)** from runner **(FIG. 35-1C)**.



11. Unbolt the anchor pin from the tandem roller at the top of runner **(FIG. 35-2)**. Next, move top of runner toward vehicle body for enough clearance to remove tandem rollers. Then, remove the tandem rollers **(FIG. 35-2)**.

NOTE: If more clearance is necessary to remove the tandem rollers at the bottom of runner, unbolt roller bracket from the rollers.

12. For the tandem rollers at the bottom of runner, unbolt the anchor pin **(FIG. 35-2)**. Next, move bottom of runner away from vehicle body for enough clearance to remove tandem rollers. Then, remove the tandem rollers **(FIG. 35-2)**.



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REPLACING PARTS
RUNNER REPLACEMENT - Continued

13. Disconnect lifting hydraulic line from flow control valve near top of lifting cylinder. Hold cylinder firmly and remove roll pin and upper pin **(FIG. 36-1)**.

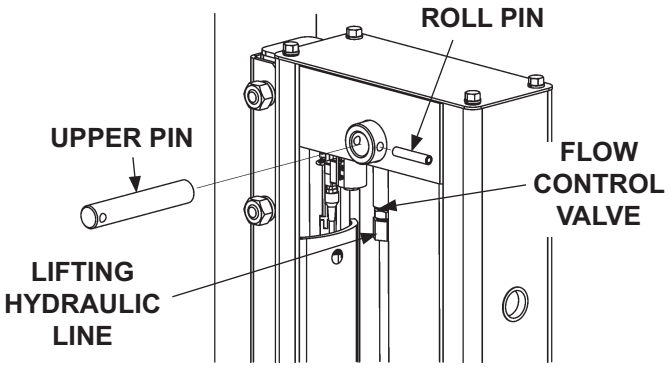

FIG. 36-1

14. Lower cylinder slowly a few inches to gain access to power down hydraulic line connector. Plug the lifting line to prevent cylinder from compressing.

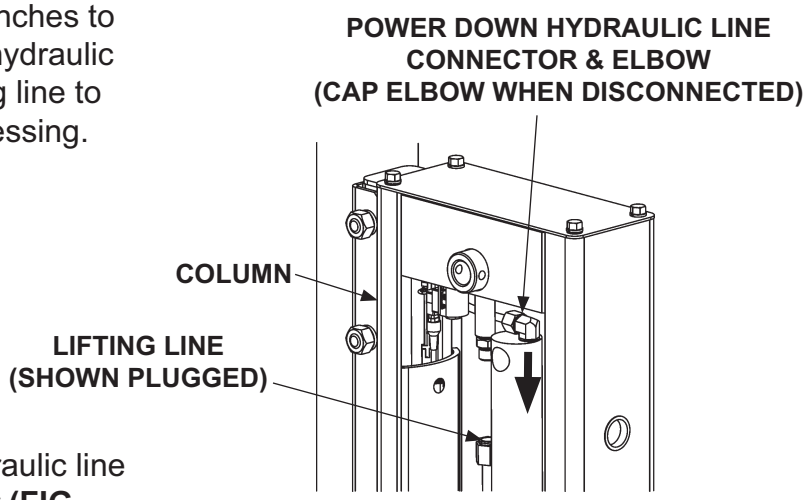

FIG. 36-2

15. Disconnect power down hydraulic line from elbow on top of cylinder **(FIG. 36-2)**. Then, cap the elbow.

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16. Twist and walk runner out of column **(FIG. 37-1)**. Then, lay runner and cylinder on the ground.

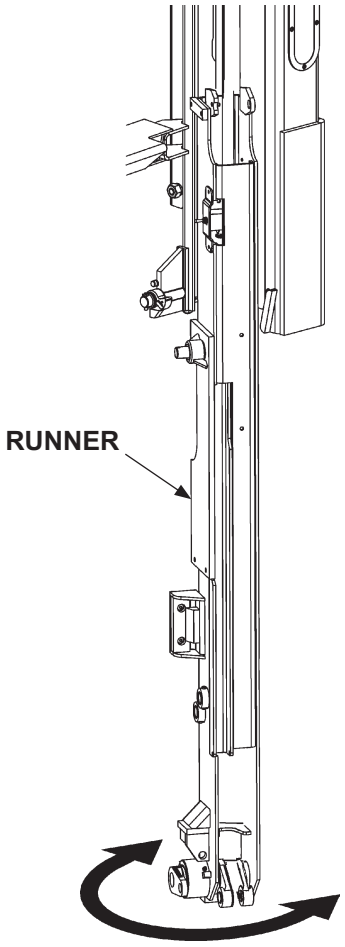

FIG. 37-1

CAUTION

Prevent damage to cylinder rod. Be careful removing cylinder from runner.

17. Remove roll pin and lower pin from runner **(FIG. 37-2)**. Pull cylinder from runner.

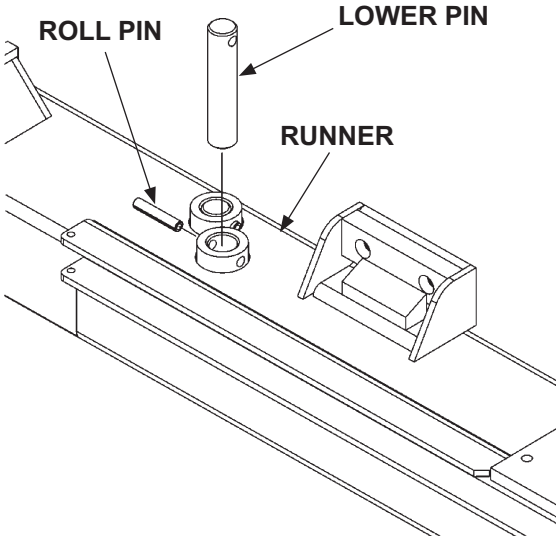

FIG. 37-2

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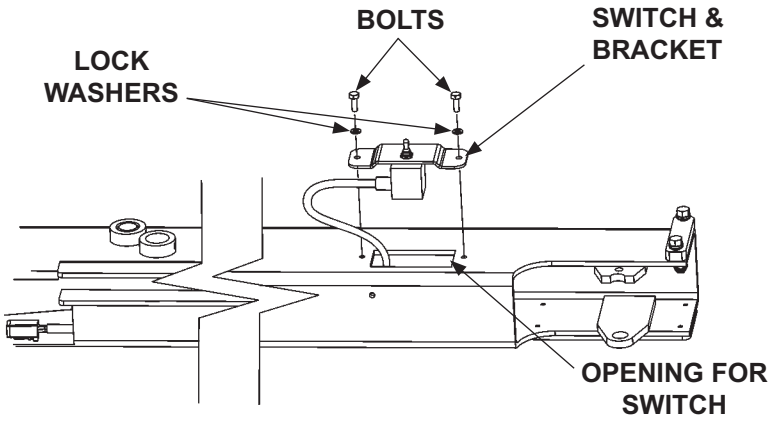
REPLACING PARTS
RUNNER REPLACEMENT - Continued

18. If RH runner is being replaced, unbolt switch mounting bracket as shown in **FIG. 38-1**. Pull switch, bracket, and cable from the runner.



REMOVING SWITCH FROM RH RUNNER
FIG. 38-1

CAUTION

Avoid making sharp bends in wiring.

19. If RH runner is being replaced, reinstall switch, bracket, and cable in runner as follows. Make a wire fish by feeding 8 feet of small gauge wire through switch opening in runner **(FIG. 38-1)**. Pull wire through channel at lower end of runner. Leave enough wire at the switch opening to attach to switch cable, and enough wire to pull at the lower end of runner. Tie upper end of wire fish to switch cable connector. Pull connector and cable through runner until connector exits lower end of runner. Then, bolt switch mounting bracket to runner **(FIG. 38-1)**.

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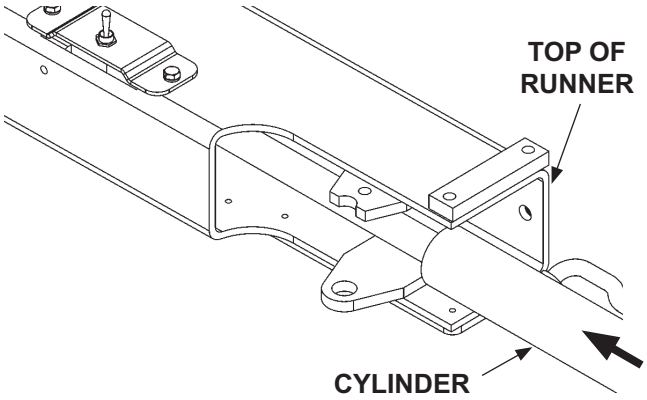
CAUTION

Prevent damage to cylinder rod. Be careful inserting cylinder in runner.

20. Slide rod end of lifting cylinder in top of runner **(FIG. 39-1)**. Then, reinstall lower pin and roll pin **(FIG. 39-2)**.



INSERTING CYLINDER IN RUNNER
FIG. 39-1

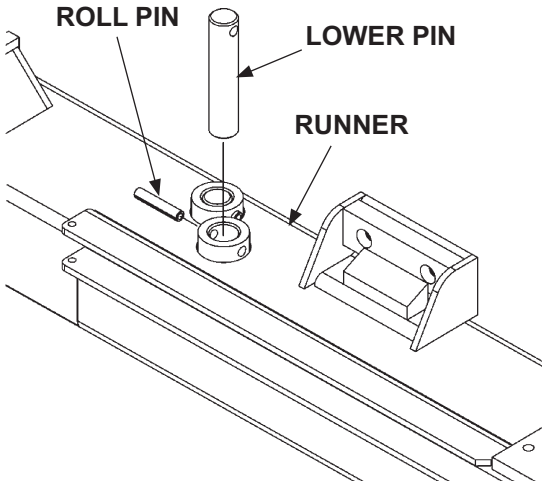


FIG. 39-2

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REPLACING PARTS
RUNNER REPLACEMENT - Continued

21. Stand the runner and cylinder upright. Twist and walk runner into column **(FIG. 40-1)**.

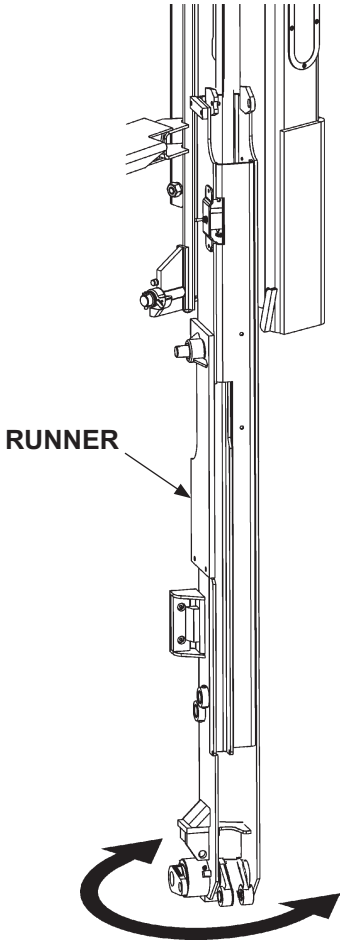

FIG. 40-1

22. Remove cap from elbow on top of cylinder **(FIG. 40-2)**. Then, reconnect power down line to elbow.

23. Remove plug from lifting line **(FIG. 40-2)**. Then, raise the cylinder to line up the holes on cylinder and column.

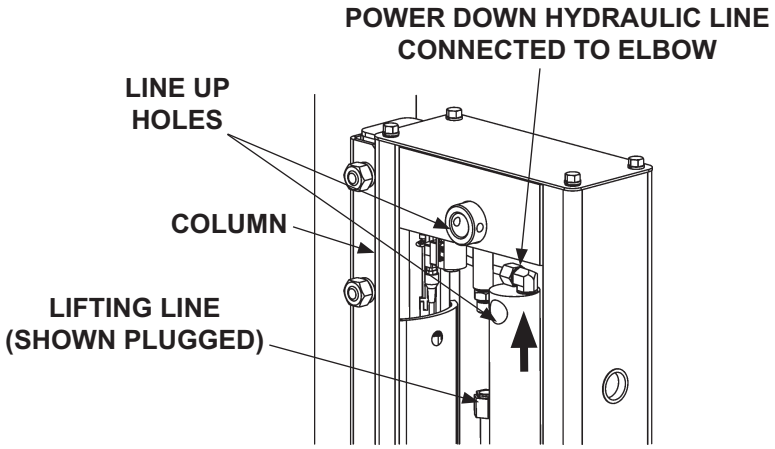

FIG. 40-2

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24. Holding the cylinder firmly, reinstall upper pin and roll pin **(FIG. 41-1)**. Then, reconnect lifting line to flow control valve **(FIG. 41-1)**.

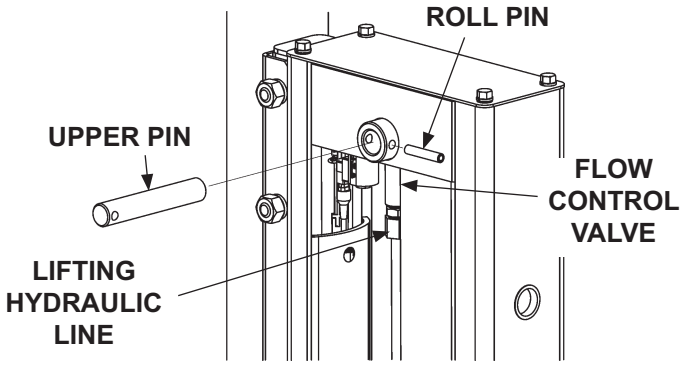

FIG. 41-1

NOTE: If roller bracket was unbolted from tandem rollers, reinstall bracket when tandem rollers are reinstalled at bottom of runner.

25. Reinstall tandem rollers at the bottom of runner as follows. Move bottom of runner away from vehicle body for enough clearance to insert tandem rollers **(FIG. 41-2)**. Insert the tandem rollers in correct position. Then, bolt anchor pin to runner **(FIG. 41-2)**.

26. To reinstall tandem rollers at top of runner, do the following. Move top of runner toward vehicle body for enough clearance to insert tandem rollers **(FIG. 41-2)**. Insert the tandem rollers in correct position. Then, bolt anchor pin to runner **(FIG. 41-2)**.

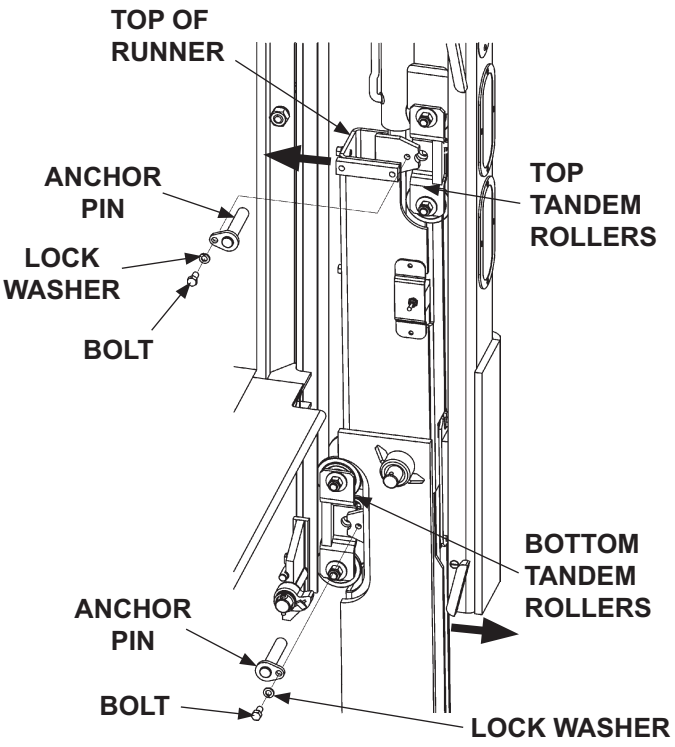

FIG. 41-2

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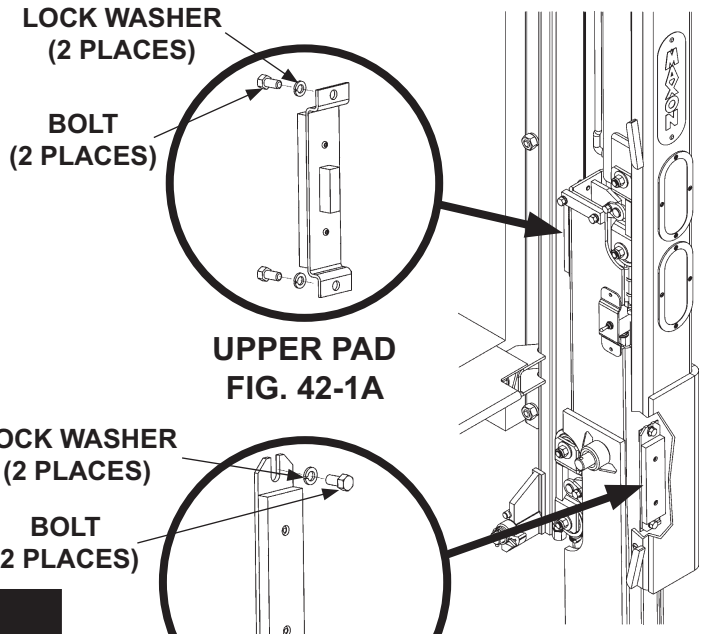
NOTE: To reinstall the pads, use the same shim setup that was removed with the pads. Maintain .030" clearance between pad and guide in the column.

27. Bolt the upper and lower pads **(FIGS. 42-1A & 42-1B)** on the runner **(FIG. 42-1C)**.



UPPER PAD
FIG. 42-1A

FIG. 42-1C

LOWER PAD
FIG. 42-1B

CAUTION

To prevent damage to twin hydraulic hoses and flexible cable, ensure the hoses and cable are routed correctly inside the spring guard and are not twisted. Cable must not be wrapped around the hydraulic hoses.

NOTE: If replacing LH runner, skip steps 28, 29, 30, & 31.

28. Place spring guard with flexible cable and twin hydraulic hoses in channel at bottom of runner **(FIG. 42-2)**.
29. Position spacer at the 3rd and 4th coils of the spring guard **(FIG. 42-2)**. Then, screw the spacer to runner.

CAUTION

Avoid making sharp bends in wiring.

NOTE: MAXON recommends using dielectric grease on all electrical connections.

30. Reconnect runner switch cable to flexible cable at bottom of runner **(FIG. 42-2)**. Use clamp and lock nut to fasten molded portion of connector to runner **(FIG. 42-2)**.

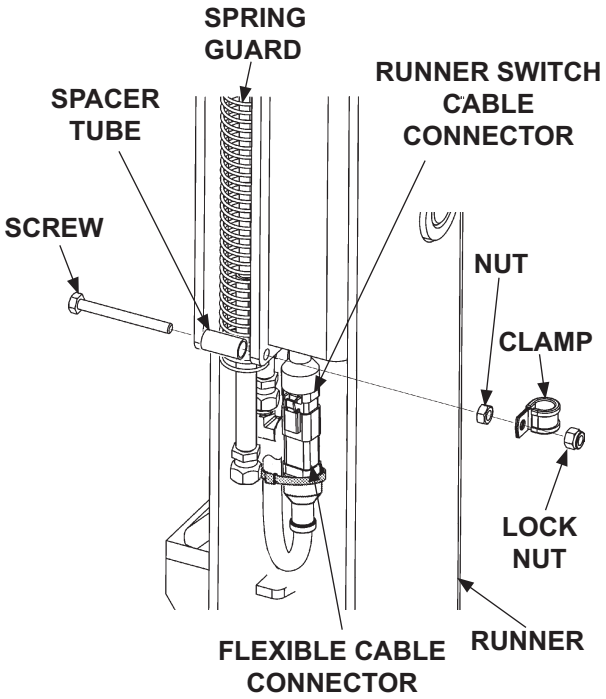


FIG. 42-2

31. To reinstall opening/closing cylinder, do the opening/closing cylinder replacement steps in the **OPENING/CLOSING CYLINDER REPLACEMENT** procedure in this manual.

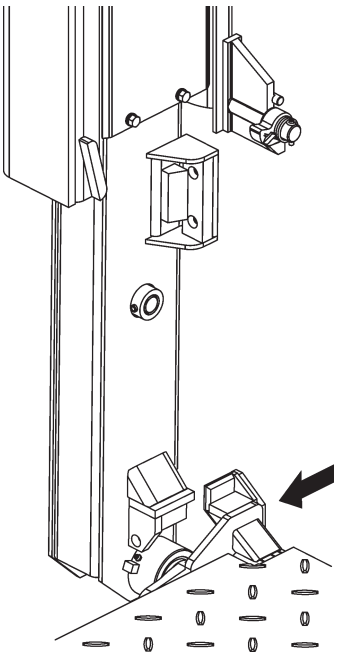


FIG. 43-1

32. Use a forklift or equivalent lifting device to lift platform and line it up with attaching points on the LH runner **(FIG. 43-1)** and RH runner.

33. Insert pin through runner, couplings and connector bar at the RH runner. Then, bolt platform and connector bar to pin **(FIG. 43-2)**. Repeat for LH runner.

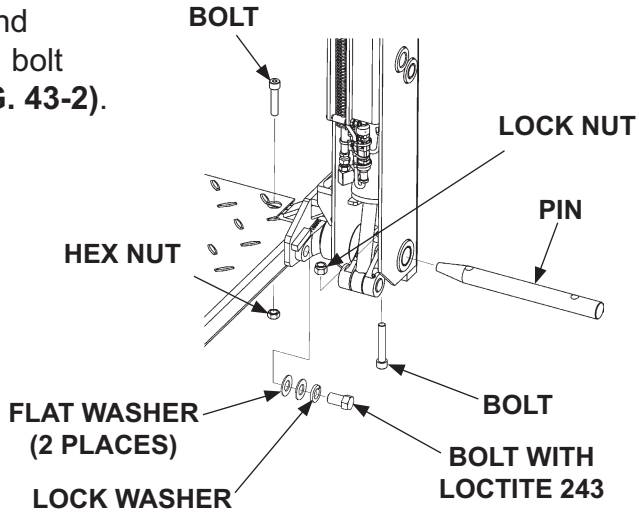


FIG. 43-2

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34. Use control box to raise the platform **(UP)** slightly and remove 2 jack stands near the inboard edge **(FIG. 44-1)**.

35. Use control box to lower **(DOWN)** platform on jack stands **(FIG. 44-1)** so inboard edge is 4” below ramp edge.

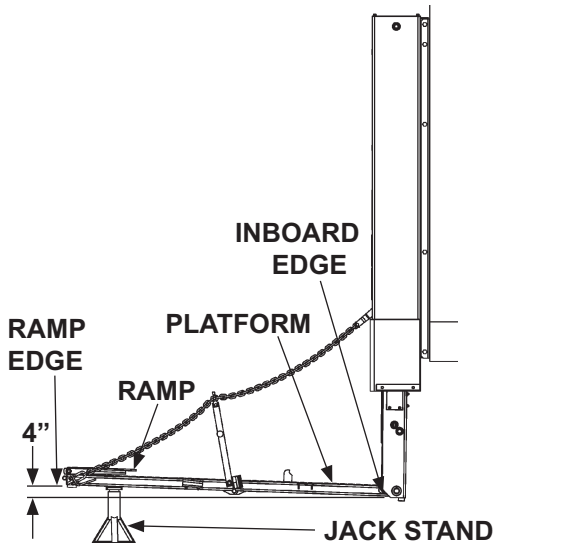


FIG. 44-1

NOTE: The runner cover, with the “ALIGN ARROWS” decal, is installed on the LH runner.

NOTE: If a new cover is being bolted on the LH runner, the serial plate must be transferred from old cover to new cover. Also, a new “ALIGN ARROWS” decal must be installed on the new cover.

36. Bolt the runner cover to RH runner **(FIG. 44-2)**. Next, reattach chain arm to RH runner. Then, bolt on the pin collar to secure chain arm **(FIG. 44-2)**. Repeat for LH runner.

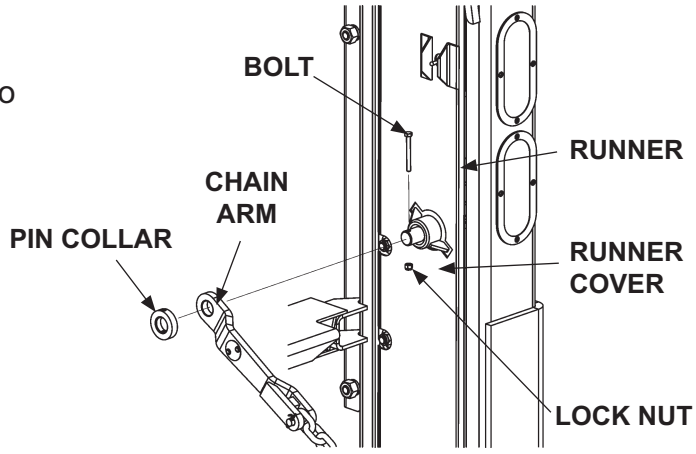
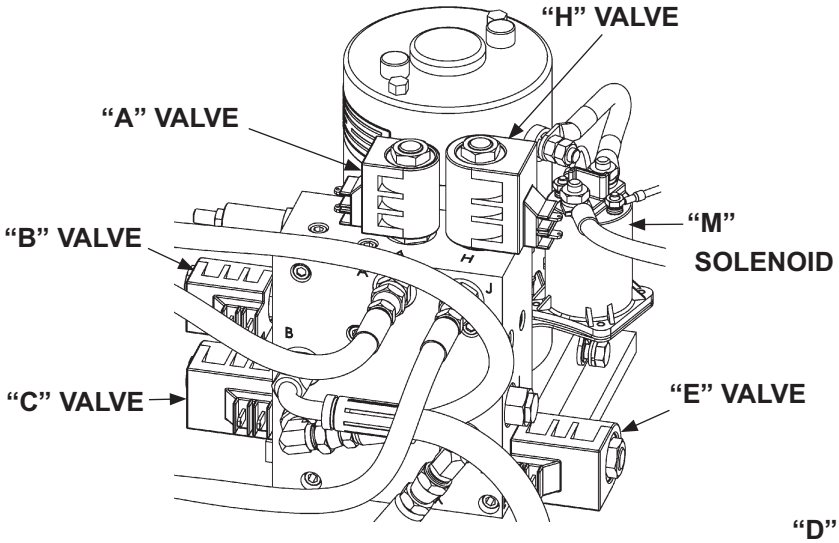


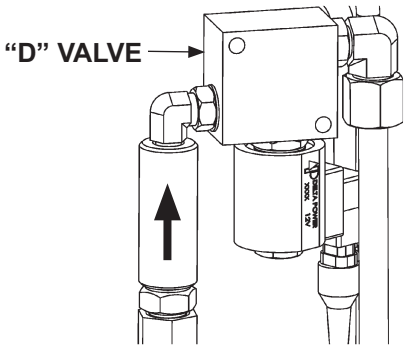
FIG. 44-2

37. If necessary, do the **BLEEDING HYDRAULIC FLUID** procedure in this manual.

HYDRAULIC SYSTEM DIAGRAMS
PUMP & MOTOR SOLENOID OPERATION - POWER DOWN



PUMP ASSEMBLY
FIG. 45-1



"D" VALVES
(TOP OF EACH COLUMN)
FIG. 45-2

POWER UNIT MOTOR & SOLENOID OPERATION - POWER DOWN										
LIFTGATE FUNCTION	PORT	SOLENOID OPERATION (✓ MEANS ENERGIZED)								
		SWITCH	RELAY	MOTOR	VALVE "A"	VALVE "B"	VALVE "C"	VALVE "D"	VALVE "E"	VALVE "H"
LIFT	B	"PD"	-	✓	-	-	-	-	-	-
LOWER	C		-	✓	-	✓	✓	✓	-	-
OPEN	J		-	✓	✓	-	-	-	✓	✓
CLOSE	A		-	✓	-	-	-	-	✓	-
REFER TO VALVES SHOWN ON HYDRAULIC SCHEMATIC										

TABLE 45-1

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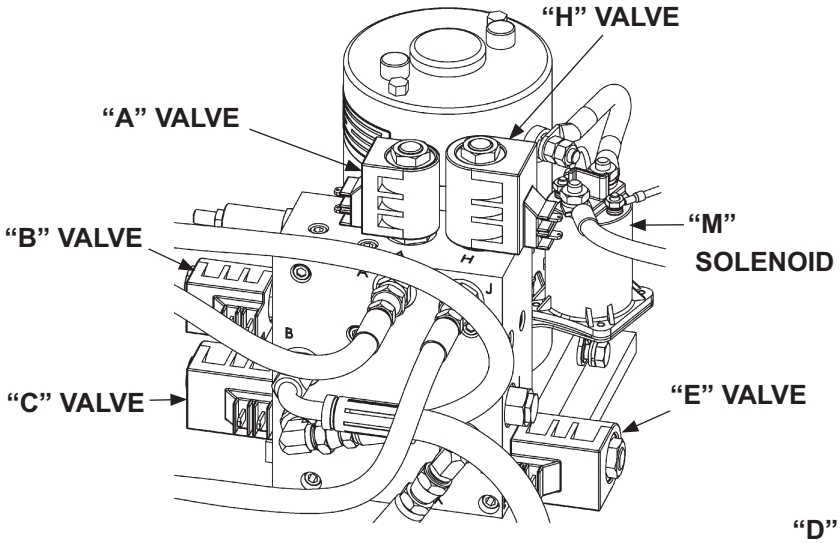
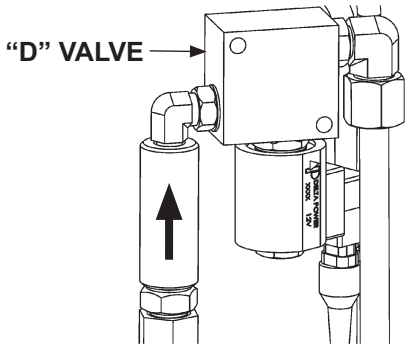
PUMP & MOTOR SOLENOID OPERATION - GRAVITY DOWN



PUMP ASSEMBLY
FIG. 46-1



"D" VALVES
(TOP OF EACH COLUMN)
FIG. 46-2

POWER UNIT MOTOR & SOLENOID OPERATION - GRAVITY DOWN										
LIFTGATE FUNCTION	PORT	SOLENOID OPERATION (✓ MEANS ENERGIZED)								
		SWITCH	RELAY	MOTOR	VALVE "A"	VALVE "B"	VALVE "C"	VALVE "D"	VALVE "E"	VALVE "H"
LIFT	B	"GD"	-	✓	-	-	-	-	-	-
LOWER	C		✓	-	-	✓	-	✓	-	-
OPEN	J		-	✓	✓	-	-	-	✓	✓
CLOSE	A		-	✓	-	-	-	-	✓	-
REFER TO VALVES SHOWN ON HYDRAULIC SCHEMATIC										

TABLE 46-1

SINGLE PUMP BOX HYDRAULIC SCHEMATIC

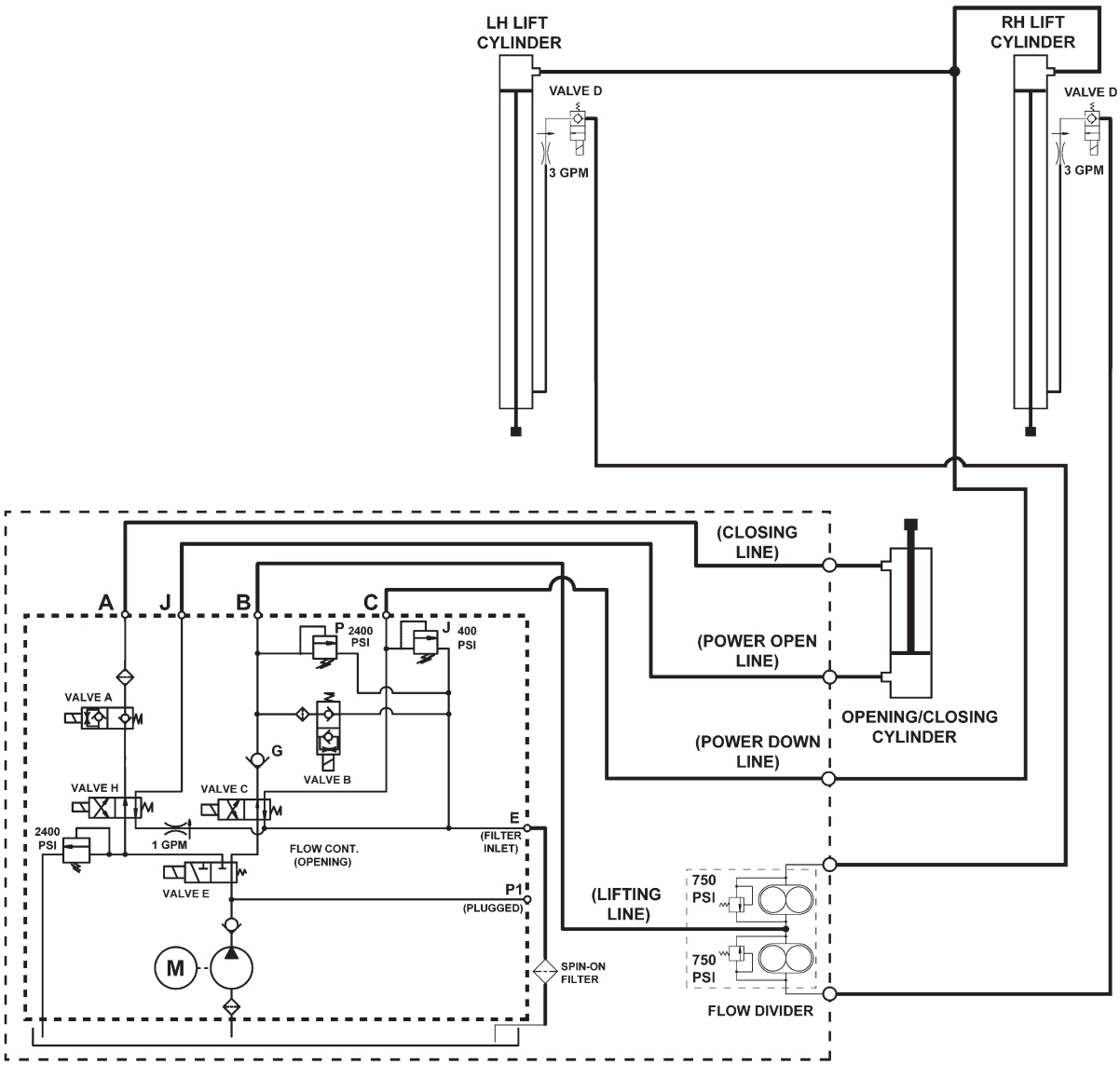


FIG. 47-1

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DUAL PUMP BOX HYDRAULIC SCHEMATIC

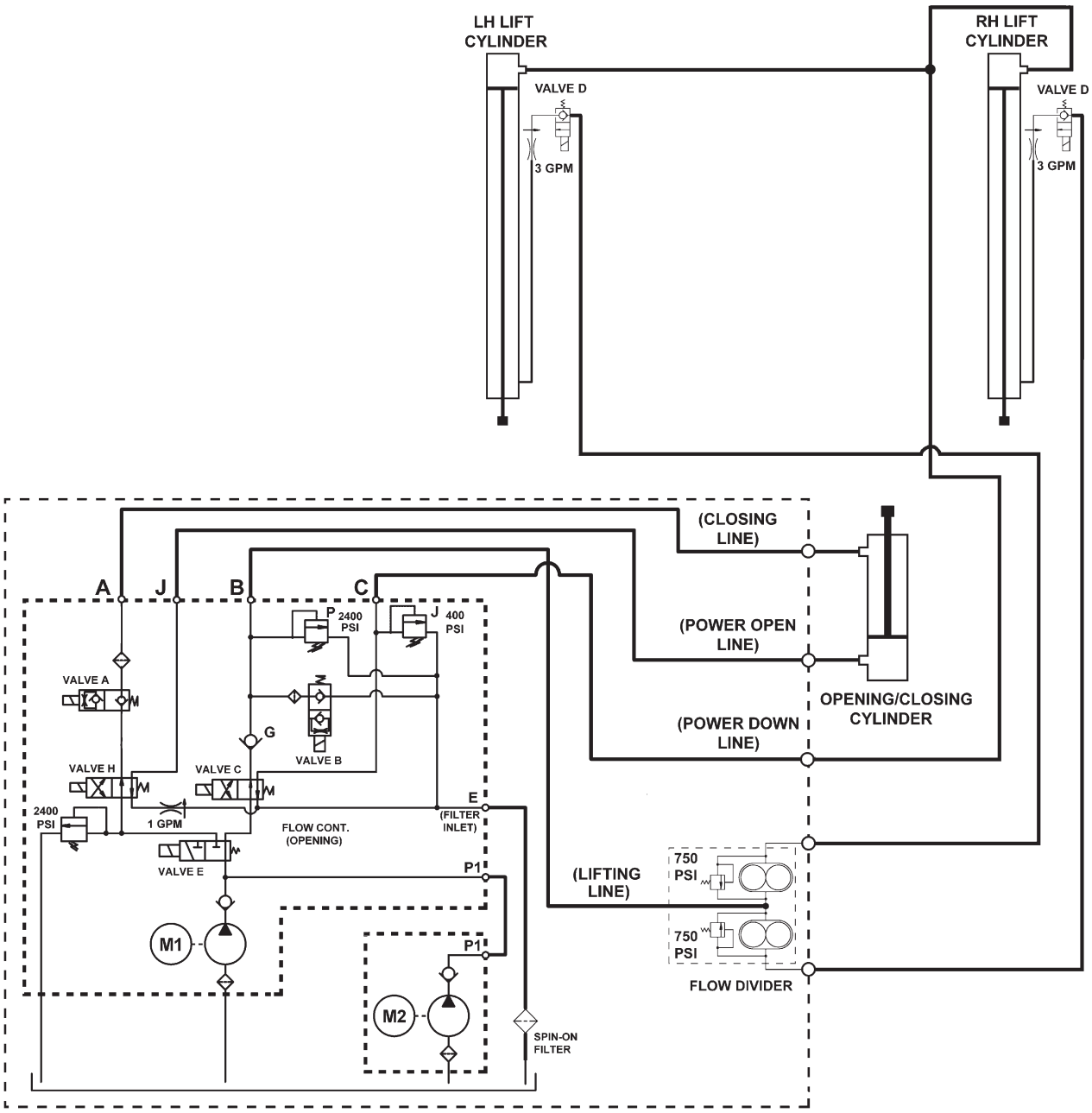

FIG. 48-1

ELECTRICAL SYSTEM DIAGRAMS
INTERCONNECTING ELECTRICAL SCHEMATIC

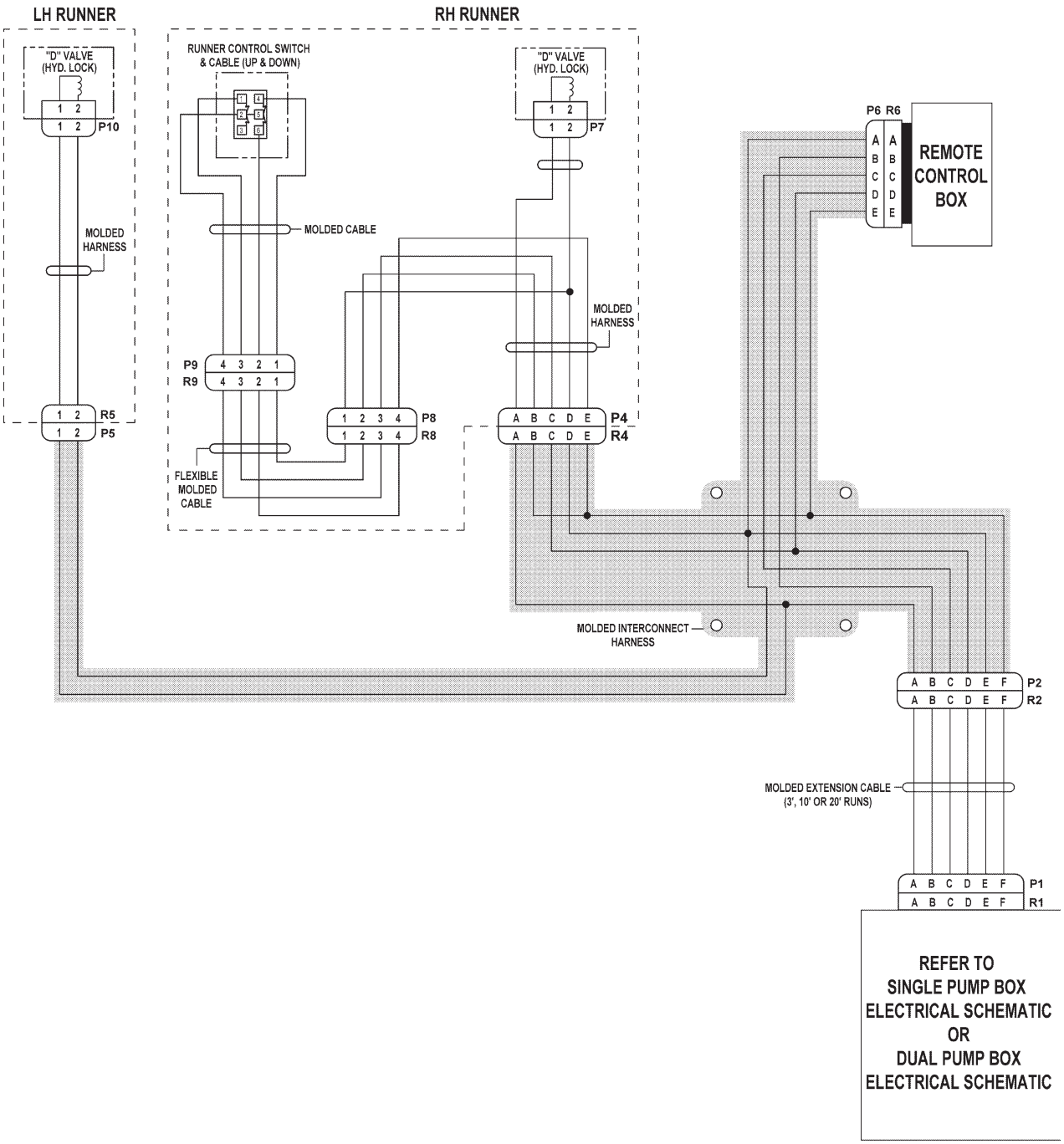

FIG. 49-1

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SINGLE PUMP BOX ELECTRICAL SCHEMATIC

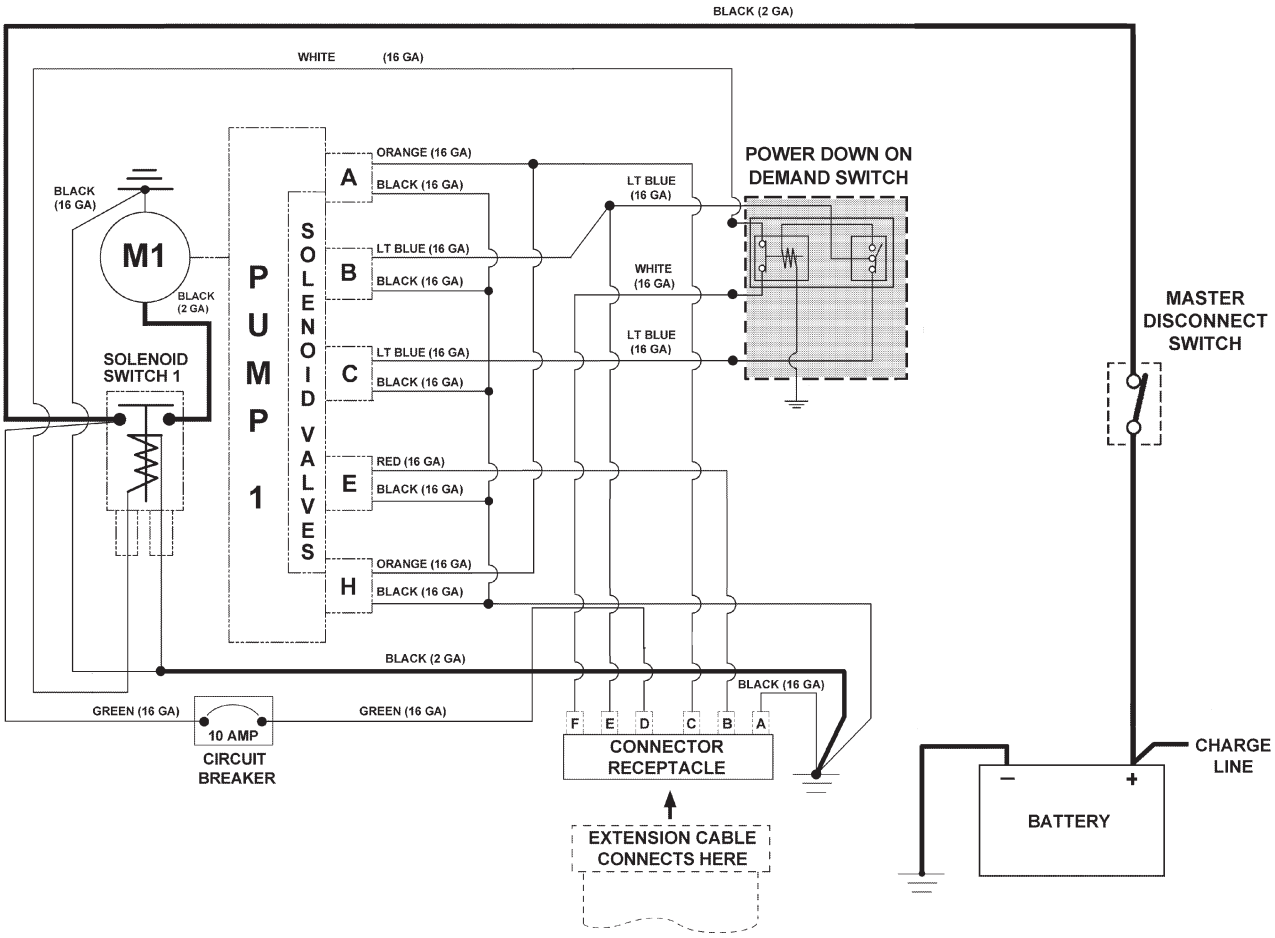

FIG. 50-1

DUAL PUMP BOX ELECTRICAL SCHEMATIC

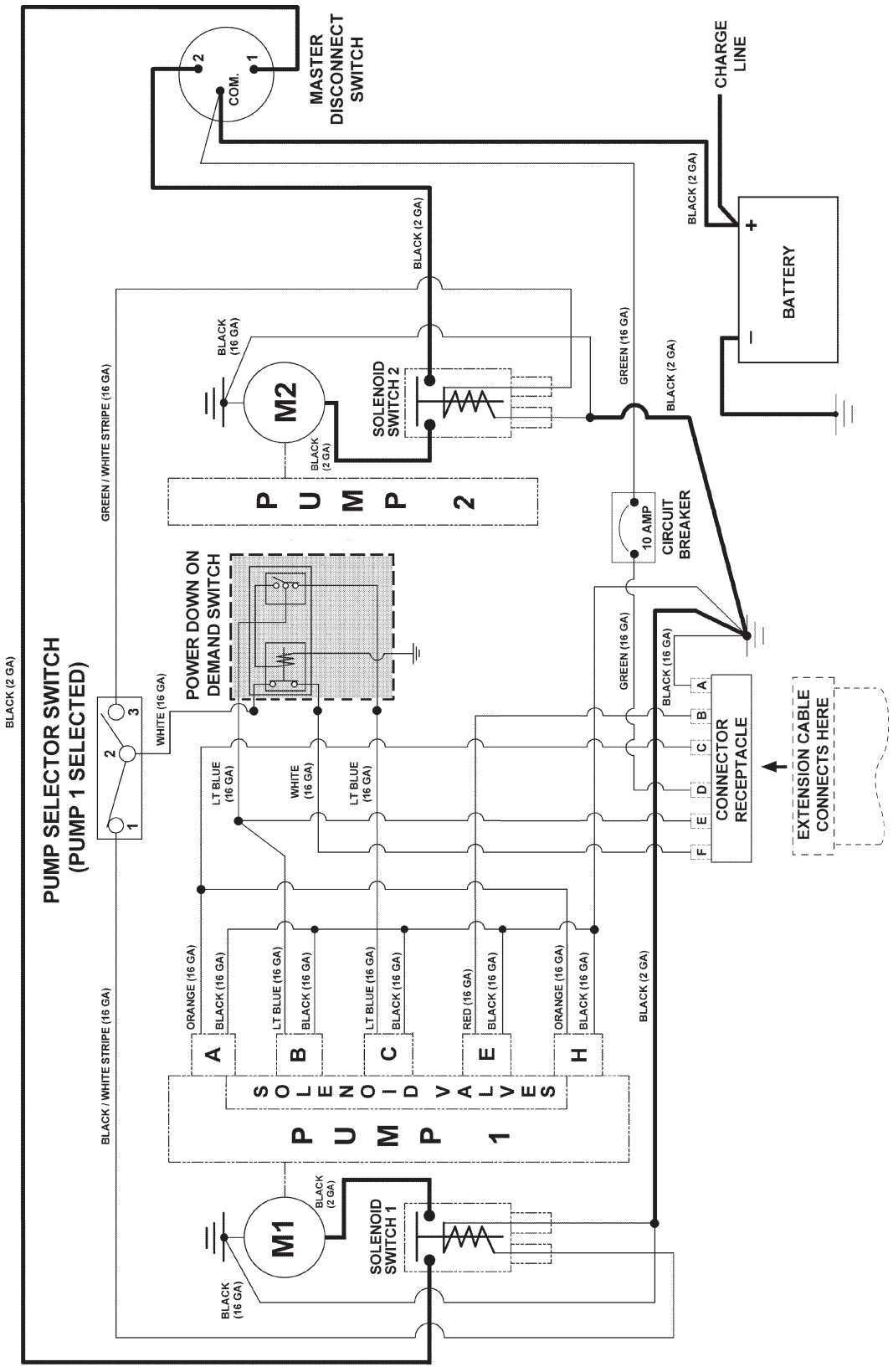

FIG. 51-1

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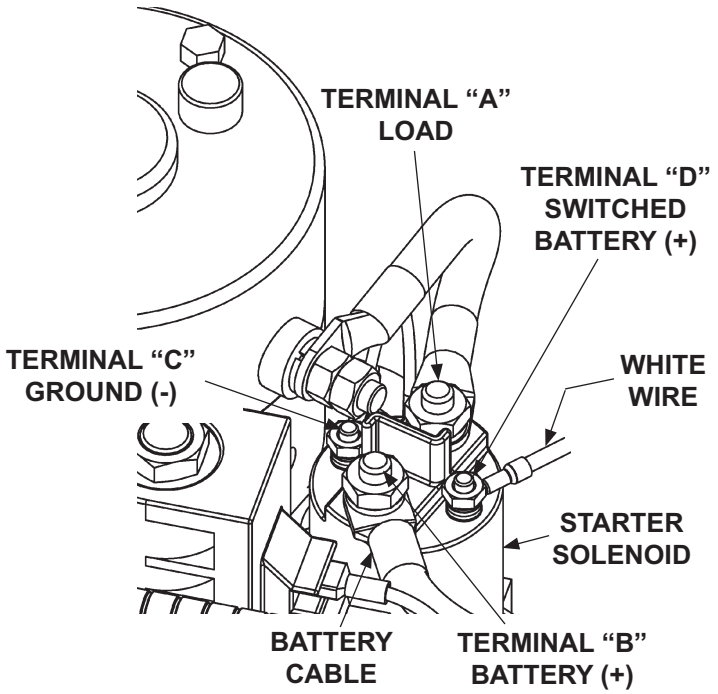
TROUBLESHOOTING

PLATFORM WILL NOT RAISE & MOTOR WILL NOT RUN

NOTE: For dual pump system, first check the pump and motor for **PUMP 2**.

1. Check for 12.6 volts dc input to starter solenoid by using voltmeter between terminal B **(FIG. 52-1)** and ground. If there is no power to the motor solenoid, make sure pump box master disconnect switch is **ON** and circuit breaker is set.

2. Find out if vehicle is equipped with optional battery box, truck charge line, tractor charge line, or trailer charge line. Check optional battery box cables and charge line cables for damage, dirty connections and loose connections. Replace damaged battery cables, clean dirty connections, and tighten loose connections.



TYPICAL PUMP MOTOR SOLENOID
FIG. 52-1

3. Check if vehicle batteries and optional battery box batteries are fully charged. If required, fully charge batteries with a battery charger. Replace batteries that cannot be fully charged. If battery charger fully charges batteries, use vehicle manufacturer's specifications to check the vehicle battery charging system. Do not operate Liftgate if vehicle charging system needs repair.

4. Use a 6" long, 10 gauge insulated wire as a jumper to connect starter solenoid terminal B and terminal D. Check for 12.6 volts dc output from starter solenoid by using voltmeter between terminal A **(FIG. 52-1)** and ground. If a low voltage or 0 volts is indicated on terminal A, replace starter solenoid. Also, check electrical cable to motor for damage, dirty connections, and loose connections. Replace damaged electrical cable to motor, clean dirty connections, and tighten loose connections. If necessary, use multimeter and applicable electrical schematics in this manual to check switch controls and interconnecting wiring.

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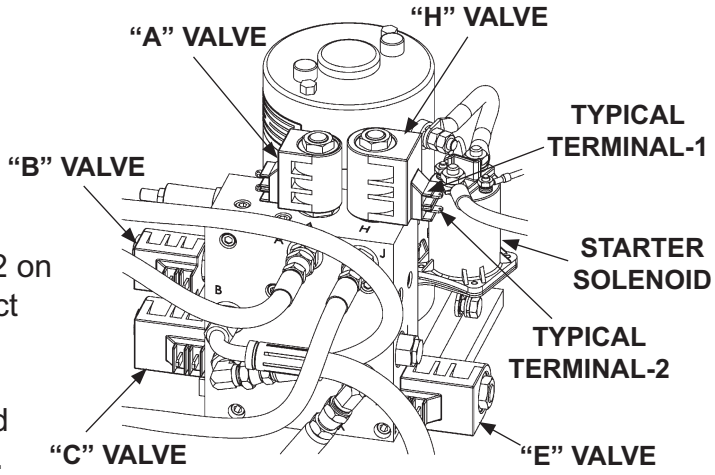
PLATFORM WILL NOT RAISE, BUT MOTOR RUNS

1. Check the hydraulic fluid level in the reservoir. Refer to the **CHECKING HYDRAULIC FLUID** procedure in this manual.

> **NOTE:** For dual pump system, first check the pump and motor for **PUMP 2**.

> **NOTE:** Numbers for the electrical terminals shown in the illustration are not stamped on valve coil. Numbers shown are for reference only.

2. Try raising platform (activate **UP** toggle switch). Only the motor solenoid **(FIG. 53-1)** should be energized while raising platform. Refer to **HYDRAULIC SYSTEM DIAGRAMS** in this manual. Connect voltmeter to Terminal-1 and Terminal-2 on each valve shown in **FIG. 53-1**. Correct indication is 0 volts dc. If voltmeter indicates +11 to +12.6 volts dc for any of the valves, check control switch and wiring to the valve. Refer to the **DUAL PUMP BOX** or **SINGLE PUMP BOX ELECTRICAL SCHEMATIC**. Replace faulty wiring or control switch as required.



POWER DOWN PUMP/MOTOR VALVES & ELECTRICAL CONNECTIONS
FIG. 53-1

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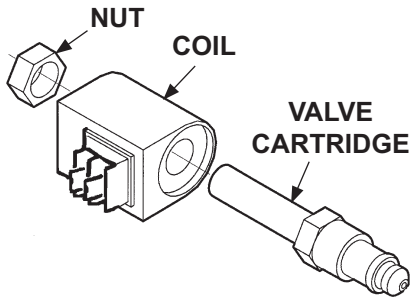
⚠ WARNING

Make sure Liftgate platform is open and resting on the ground before performing the following step.

CAUTION

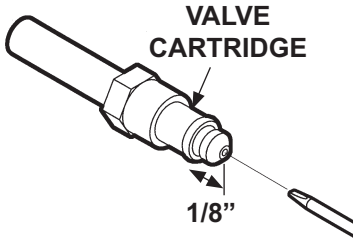
To prevent damage when installing valve cartridges & coils, torque valve cartridge nut to 30 lbs.-in. max.

3. The “E” solenoid valve **(FIG. 52-1)** may be stuck in the “open” position. Remove the “E” solenoid valve **(FIG. 54-1)**. Next, check the valve cartridge as follows. Push on the plunger in the valve by inserting a small screwdriver in the open end **(FIG. 54-2)**. If the plunger does not move with a smooth, spring-loaded action (approximately 1/8”) **(FIG. 54-2)**, replace the valve cartridge.



TYPICAL SOLENOID VALVE REMOVED & DISASSEMBLED FIG. 54-1

4. Reinstall “E” solenoid valve (if good) or a replacement. **Torque valve cartridge to 30 lbs.-ft. and hex nut to 30 lbs.-in.**



CHECKING VALVE CARTRIDGE FIG. 54-2

5. Check for bent and broken parts on the Liftgate that could interfere with normal operation.

PLATFORM WILL NOT RAISE LOAD AT RATED CAPACITY

⚠ WARNING

To prevent possible injury and equipment damage, ensure platform is supported before disconnecting hydraulic lines.

1. Check for unequal cylinder operation (lagging cylinder first) as follows.

Unfold the platform and raise to vehicle bed height. Disconnect **POWER DOWN** hose from hydraulic line at the bottom of RH column. Place a 3 gallon bucket under column to catch fluid from the open lines. Set control box toggle switch to **UP** position. Check if fluid is streaming from the open hydraulic line. A few drops of hydraulic fluid is okay; however, if fluid streams steadily from a line, replace piston seals in the cylinder connected to that line. Repeat this step for the LH column.

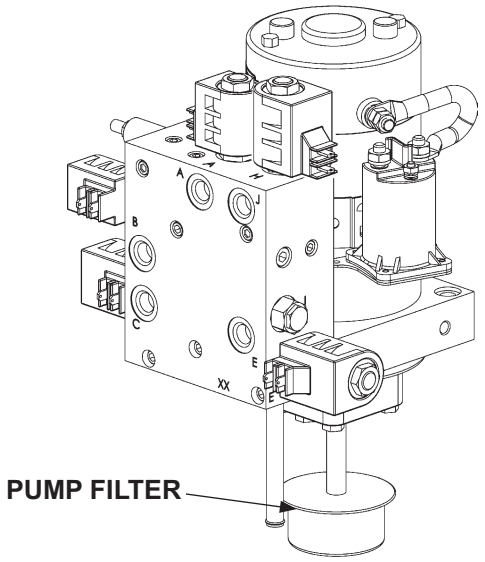
2. Check vehicle charge line cables for damage, dirty connections and loose connections. If Liftgate battery box is installed, check for damaged battery cables, dirty cable connections and loose cable connections in battery box. Replace damaged cables, clean dirty connections and tighten loose connections.

3. Check for bent parts on the Liftgate that could interfere with normal operation.

4. Verify that relief valve pressure settings are correct. Refer to **LIFTING LINE RELIEF VALVE PRESSURE SETTING** procedure. If pressure settings cannot be corrected or if pump runs hot with excessive noise, replace pump.

NOTE: Do the **BLEEDING HYDRAULIC SYSTEM** procedure in this manual after doing the following step.

5. Remove pump/motor assembly from reservoir **(FIG. 55-1)**. Check if pump filter is clogged. If clogged, clean filter and flush contaminated fluid from reservoir. Replace spin-on filter in pump box. Reinstall pump/motor assembly.



TYPICAL PUMP/MOTOR REMOVED TO CHECK FILTER
FIG. 55-1

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TROUBLESHOOTING

PLATFORM RAISES AND LOWERS UNEVENLY

⚠ WARNING

To prevent possible injury and equipment damage, ensure platform is supported before disconnecting hydraulic lines.

NOTE: Do the **BLEEDING HYDRAULIC SYSTEM** procedure in this manual after any hydraulic hoses & flow control valves are disconnected and reconnected.

1. Unfold the platform and lower to the ground.

2. Reverse the two 3/8" high pressure hose connections on output side of flow divider as shown in **FIG. 56-1**. Raise the platform. If the uneven platform position is reversed from the original symptom, replace flow divider.

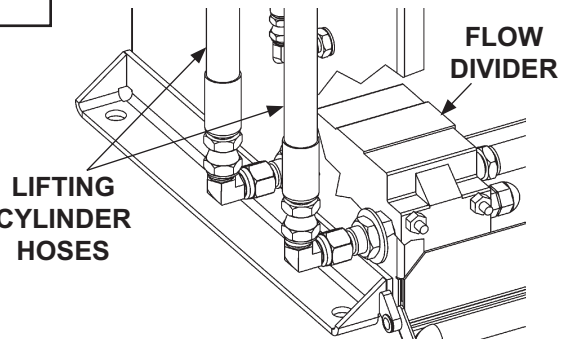


FIG. 56-1

NOTE: When platform is being raised or lowered, 1" maximum distance from side to side is acceptable.

3. Check for unequal cylinder operation (lagging cylinder first) as follows.

Raise platform to vehicle bed height. Disconnect **POWER DOWN** hose from hydraulic line at the bottom of RH or LH column. Place a 3 gallon bucket under column to catch fluid from the open lines. Set control box toggle switch to **UP** position. Check if fluid is streaming from the open hydraulic lines. A few drops of hydraulic fluid is okay; however, if fluid streams steadily from a line, replace piston seals in the cylinder connected to that line. Repeat this step for the 2nd lifting cylinder.

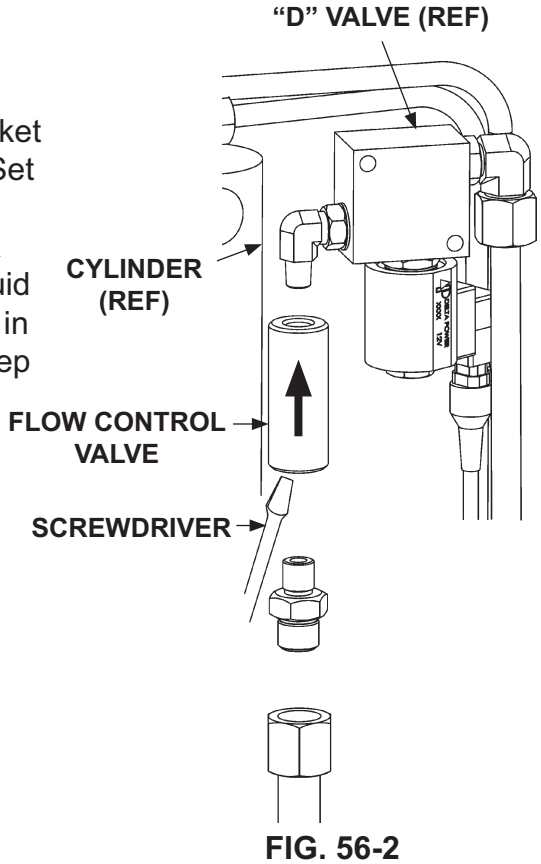


FIG. 56-2

4. Lower the platform to the ground and remove the flow control valve **(FIG. 56-2)** at the top of each column. Check if flow control valves are contaminated. Try to move plunger with a small screwdriver. If necessary, clean the valve **(FIG. 56-2)**. Reinstall clean flow control valve or replace if necessary.

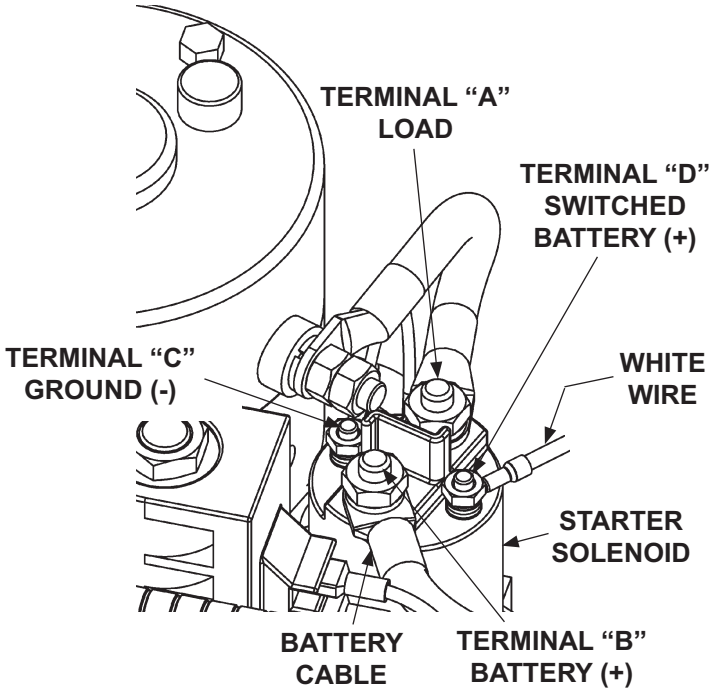
5. Check for bent parts on the Liftgate that could interfere with normal operation.

PLATFORM WILL NOT FOLD

1. Check the hydraulic fluid level in the reservoir. Refer to the **CHECKING HYDRAULIC FLUID** procedure in this manual.

> **NOTE:** For dual pump system, first check the pump and motor for **PUMP 2**.

2. Check starter solenoid **(FIG. 57-1)** and the electrical cable connections in pump box. Make sure electrical cable connections are clean and tight. Use a 6” long, 10 gauge insulated wire as a jumper between motor solenoid terminals “B” and “D” to activate solenoid. Replace solenoid if it fails to activate.



TYPICAL PUMP MOTOR SOLENOID
FIG. 57-1

3. Verify that relief valve pressure settings are correct. Refer to **POWER OPEN/CLOSE RELIEF VALVE PRESSURE SETTING** procedure in this manual. Also, make sure closing flow control valve (in pump) is open. If correct pressure settings cannot be made or if pump runs hot with excessive noise, replace pump.

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⚠ WARNING

Make sure Liftgate platform is open and resting on the ground before performing the following step.

CAUTION

To prevent damage when installing valve cartridges & coils, torque valve cartridge nut to 30 lbs.-in. max.

4. The “E” solenoid valve **(FIG. 58-1)** may be stuck in the “open” position. Remove the “E” solenoid valve **(FIG. 58-2)**. Next, check the valve cartridge as follows. Push on the plunger in the valve by inserting a small screwdriver in the open end **(FIG. 58-3)**. If the plunger does not move with a smooth, spring-loaded action (approximately 1/8”) **(FIG. 58-3)**, replace the valve cartridge.

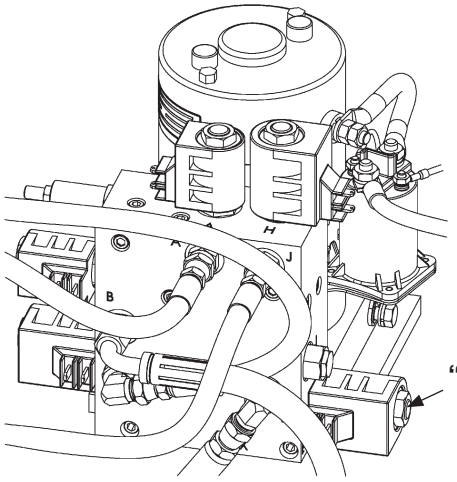
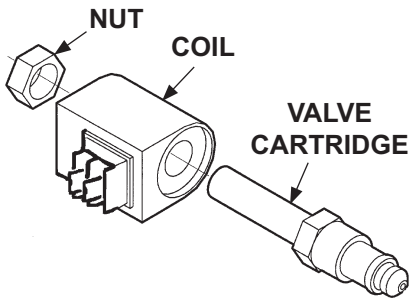


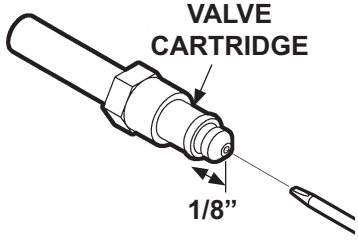
FIG. 58-1

5. Reinstall “E” solenoid valve (if good) or a replacement. **Torque valve cartridge to 30 lbs.-ft. and hex nut to 30 lbs.-in.**



TYPICAL SOLENOID VALVE REMOVED & DISASSEMBLED FIG. 58-2

6. Check for bent parts on the Liftgate that could interfere with normal operation.



CHECKING VALVE CARTRIDGE FIG. 58-3

7. Check if hydraulic fluid is streaming from breather plug.

PLATFORM WILL NOT UNFOLD

⚠ WARNING

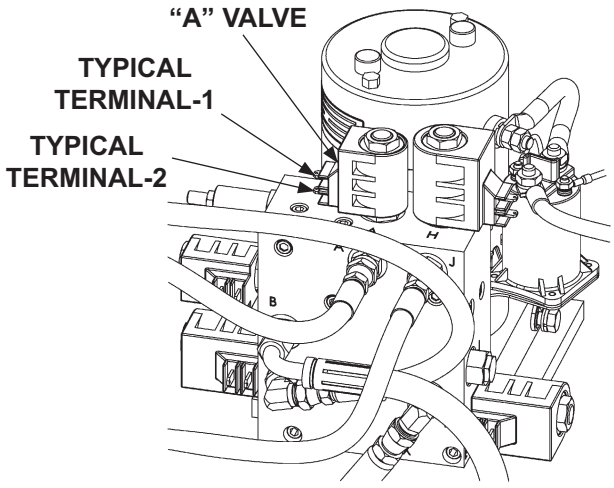
Before doing the following procedure, set up guarded area around the platform to keep people from entering.

NOTE: For dual pump system, first check the pump and motor for **PUMP 2**.

1. Check if the "A" valve **(FIG. 59-1)** is energized. Refer to **HYDRAULIC SYSTEM DIAGRAMS** in this manual.

NOTE: Numbers for the electrical terminals are not stamped on the valve coil. Numbers shown in illustration are for reference only.

2. Connect voltmeter to Terminal-1 and Terminal-2 as shown in **FIG. 59-1**. Set control switches to **FOLD/UNFOLD** and **UNFOLD**. Correct indication is +11 to +12.6 volts dc. If indication is incorrect, check control switch and wiring to "A" valve. Refer to **ELECTRICAL SYSTEM DIAGRAMS** in this manual. Replace faulty wiring or control switch as required. If the voltmeter indicates +11 to +12.6 volts dc and "A" valve does not operate, replace "A" valve **(FIG. 59-1)**.



TYPICAL PUMP/MOTOR VALVES & ELECTRICAL CONNECTIONS
FIG. 59-1

TROUBLESHOOTING
PLATFORM WILL NOT UNFOLD - Continued

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⚠ WARNING

Make sure Liftgate platform is open and resting on the ground before performing the following step.

CAUTION

To prevent damage when installing valve cartridges & coils, torque valve cartridge nut to 30 lbs.-in. max.

3. The “E” solenoid valve **(FIG. 60-1)** may be stuck in the “open” position. Remove the “E” solenoid valve **(FIG. 60-2)**. Next, check the valve cartridge as follows. Push on the plunger in the valve by inserting a small screwdriver in the open end **(FIG. 60-3)**. If the plunger does not move with a smooth, spring-loaded action (approximately 1/8”) **(FIG. 60-3)**, replace the valve cartridge.

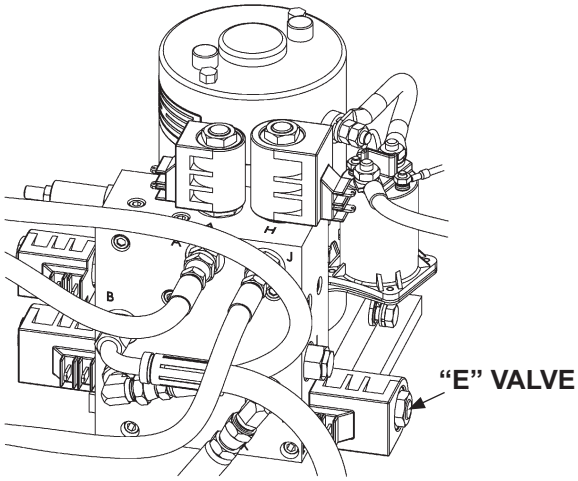
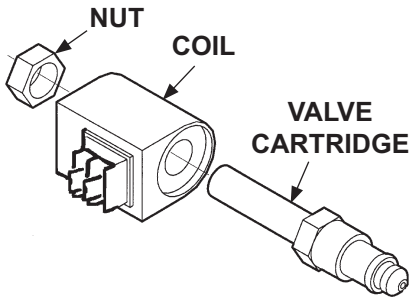


FIG. 60-1

4. Reinstall “E” solenoid valve (if good) or a replacement. **Torque valve cartridge to 30 lbs.-ft. and hex nut to 30 lbs.-in.**

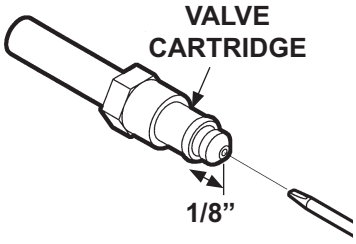
5. Verify that relief valve pressure settings are correct. Refer to **POWER OPEN/CLOSE RELIEF VALVE PRESSURE SETTING** procedure in this manual. Also, make sure opening flow control valve (in pump) is open. If correct pressure settings cannot be made or if pump runs hot with excessive noise, replace pump.



TYPICAL SOLENOID VALVE REMOVED & DISASSEMBLED
FIG. 60-2

6. Check for damage and corrosion at platform pivot points. Steam clean corrosion from pivot points. Replace bushings at pivot points if required.

7. Check for bent and broken parts on the Liftgate that could interfere with normal operation. Look at columns, runners, tandem rollers and platform (bent pins).



CHECKING VALVE CARTRIDGE
FIG. 60-3

POWER OPEN/CLOSE RELIEF VALVE PRESSURE SETTING

NOTE: The relief valve pressure is set at the factory; however, if adjustment is needed, use the following procedure to set the pressure. At first, adjust pressure to **2100 PSI**. Then slowly adjust pressure up to correct reading.

NOTE: To adjust a dual pump system, set selector switch to **PUMP 1**.

1. Open the platform.

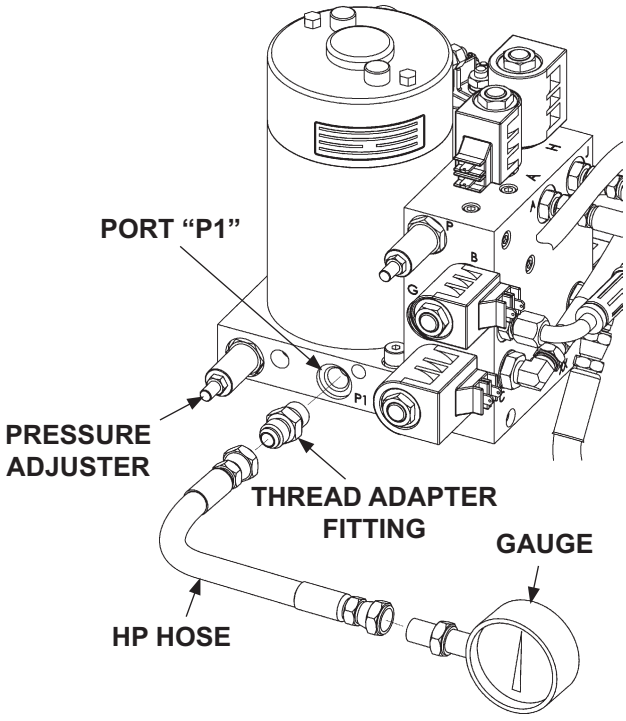
2. Remove plug from pump pressure port **P1 (FIG. 61-1)**.

3. Attach a 0-3000 PSI pressure gauge with high pressure hose, thread adapter fitting, and swivel fitting (if needed) to pump pressure port **P1 (FIG. 61-1)**.

4. Set control switch to **FOLD** (power close).

5. Turn the **P** adjuster **(FIG. 61-1)** for a **2100 PSI** reading on the gauge. Then, slowly adjust valve for a **2400 PSI** reading.

6. After adjustments are complete, remove gauge, hose, and fittings. Then, reinstall plug in pressure port **P1 (FIG. 61-1)**.



GAUGE CONNECTION AND PRESSURE ADJUSTER ON PORT PLATE
FIG. 61-1

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TROUBLESHOOTING

LIFTING LINE RELIEF VALVE PRESSURE SETTING

NOTE: The relief valve pressure is set at the factory; however, if adjustment is needed, use the following procedure to set the pressure. At first, adjust pressure to **2100 PSI**. Then, slowly adjust pressure up to correct reading.

NOTE: To adjust a dual pump system, set selector switch to **PUMP 1**.

1. Stow the platform.

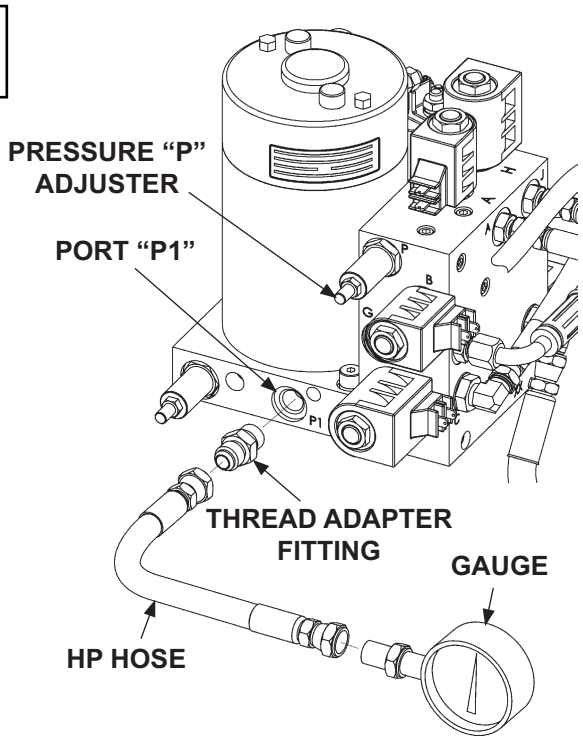
2. Remove plug from pump pressure port **P1 (FIG. 62-1)**. If pump box is a dual pump, disconnect hose from pump 2, pressure port **P1**. Plug port **P1** with a temporary plug **(FIG. 62-2)**.

3. For single pump system, attach a 0-3000 PSI pressure gauge with high pressure hose, thread adapter fitting, and swivel fitting (if needed) to pump pressure port **P1 (FIG. 62-1)**. If system is dual pump, connect adapter and gauge to disconnected system hose.

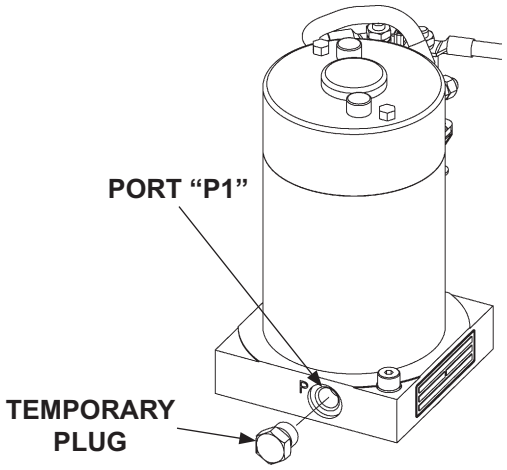
4. Set control switch to **UP** position to run pump motor.

5. Turn the pressure **P** adjuster **(FIG. 62-3)** for a **2100 PSI** reading on the gauge **(FIG. 62-1)**. Then, slowly adjust valve for a **2400 PSI** reading.

6. After adjustments are complete, remove gauge and any temporary hoses, adapters and plugs. For single pump, reinstall plug securely in pressure port **P1 (FIG. 62-1)**. For dual pump, remove temporary plug from pump 2, pressure port **P1 (FIG. 62-2)**. Then, reconnect system hose securely to pressure port **P1 (FIG. 62-2)**.



GAUGE CONNECTION AND PRESSURE ADJUSTER ON PORT PLATE
FIG. 62-1



PRESSURE PORT P1 ON PUMP 2
FIG. 62-2

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POWER DOWN RELIEF VALVE PRESSURE SETTING

NOTE: The relief valve pressure is set at the factory; however, if adjustment is needed, use the following procedure to set the pressure.

NOTE: Ensure the power down shut off switch is set to **PD**.

NOTE: For dual pump system, set **PUMP 1** and **PUMP 2** as follows. First set **PUMP 1**. Then, select pump 2 with the selector switch. Repeat the instructions for **PUMP 2**.

1. Open the platform.

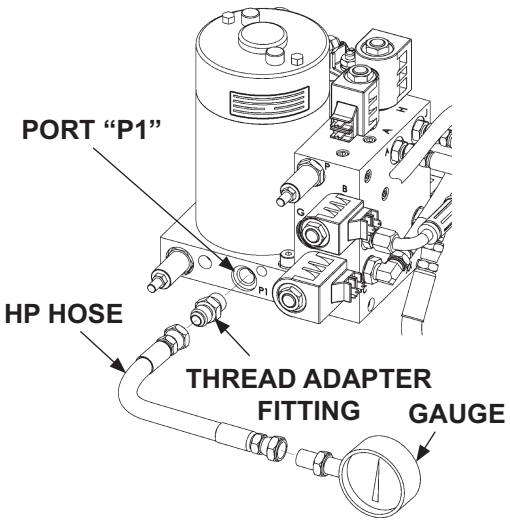
2. Remove plug from pump pressure port **P1 (FIG. 63-1)**.

3. Attach a 0-3000 PSI pressure gauge with high pressure hose, thread adapter fitting, and swivel fitting (if needed) to pump pressure port **P1 (FIG. 63-1)**.

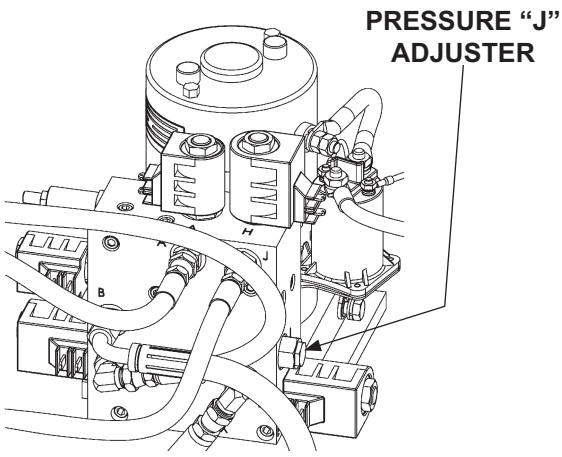
4. Set control switch to **FOLD** (power close).

5. Turn the **J** adjuster **(FIG. 63-2)** for a **1200 PSI** reading on the gauge **(FIG. 63-1)**.

6. After adjustments are complete, remove gauge, hose, and fittings. Then, reinstall plug in pressure port **P1 (FIG. 63-1)**.



CONNECTING GAUGE TO PORT PLATE ON SINGLE PUMP FIG. 63-1



PRESSURE ADJUSTER ON PUMP MANIFOLD FIG. 63-2

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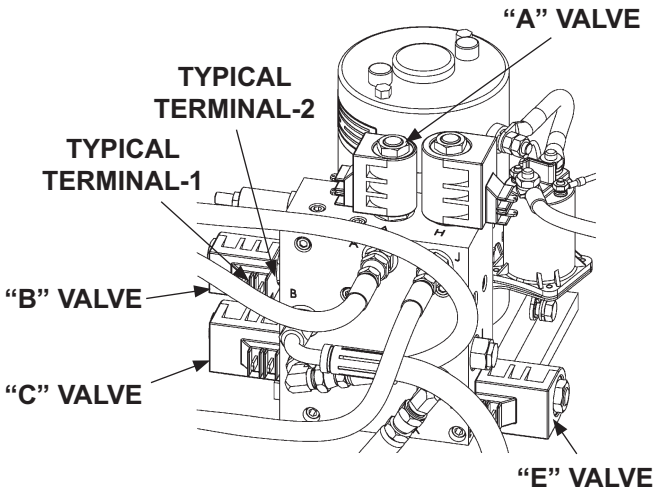
TROUBLESHOOTING
PLATFORM WILL NOT LOWER

NOTE: For dual pump system, first check the pump and motor for **PUMP 2**.

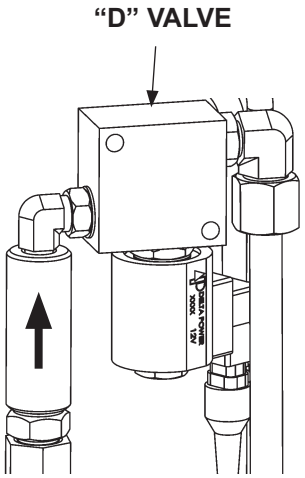
NOTE: Numbers for the electrical terminals shown in the illustration are not stamped on valve coil. Numbers shown are for reference only.

1. Try lowering platform (control switch **DOWN**). Only the starter solenoid, "B" valve, "C" valve **(FIG. 64-1)** and "D" valve (on top of LH and RH columns) **(FIG. 64-2)** should be energized while lowering platform. The "A" and "E" valves should not be energized. Refer to **HYDRAULIC SYSTEM DIAGRAMS** in this manual.



STARTER SOLENOID, VALVES & ELECTRICAL CONNECTIONS
FIG. 64-1

2. Connect voltmeter to Terminal-1 and Terminal-2 on each valve shown in **FIG. 64-1**. Correct indication for "A" and "E" valves is 0 volts dc. For "B", "C" and "D" valves, correct indication is +11 to +12.6 volts dc. If any indications are incorrect, check control switch and wiring to that valve. Refer to **ELECTRICAL SYSTEM DIAGRAMS** in this manual. Replace faulty wiring or control switch as required.



"D" VALVE
FIG. 64-2

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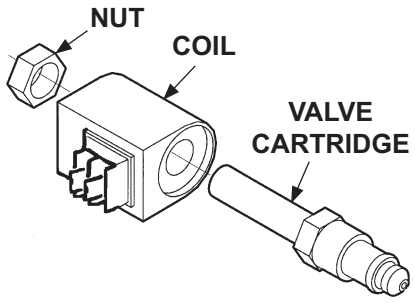
⚠ WARNING

Make sure Liftgate platform is open and resting on the ground before performing the following step.

CAUTION

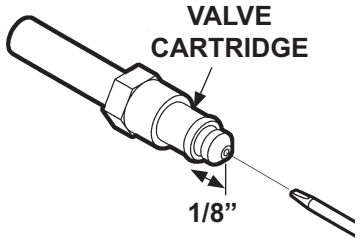
To prevent damage when installing valve cartridges & coils, torque valve cartridge nut to 30 lbs.-in. max.

3. The “D” solenoid valve **(FIG. 63-2)** may be stuck in the “open” position. Remove the “D” solenoid valve **(FIG. 65-1)**. Next, check the valve cartridge as follows. Push on the plunger in the valve by inserting a small screwdriver in the open end **(FIG. 65-2)**. If the plunger does not move with a smooth, spring-loaded action (approximately 1/8”) **(FIG. 65-2)**, replace the valve cartridge.



TYPICAL SOLENOID VALVE REMOVED & DISASSEMBLED FIG. 65-1

4. Reinstall “D” solenoid valve (if good) or a replacement. **Torque valve cartridge to 30 lbs.-ft. and hex nut to 30 lbs.-in.**



CHECKING VALVE CARTRIDGE FIG. 65-2

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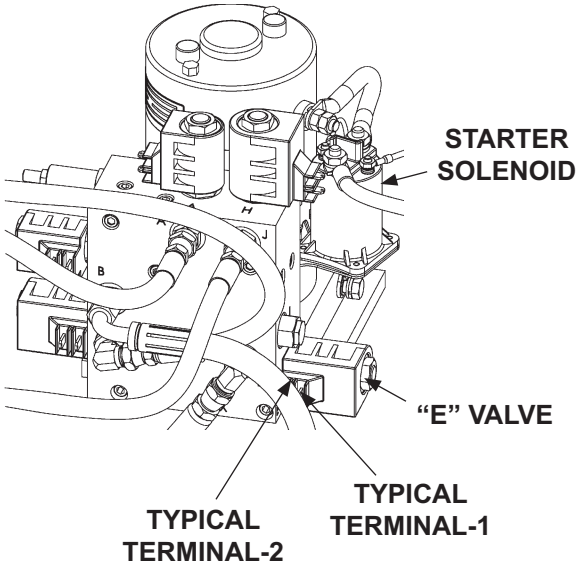
TROUBLESHOOTING
PLATFORM LOWERS SLOWLY

NOTE: For dual pump system, first check the pump and motor for **PUMP 2**.

NOTE: Numbers for the electrical terminals shown in the illustration are not stamped on valve coil. Numbers shown are for reference only.

1. Try lowering platform (control switch **DOWN**). Make sure starter solenoid **(FIG. 66-1)** is energized and "E" valve is not energized while lowering platform. Refer to **HYDRAULIC SYSTEM DIAGRAMS** in this manual.

2. Connect voltmeter to Terminal-1 and Terminal-2 on "E" valve shown in **FIG. 66-1**. The correct indication on voltmeter is 0 volts dc when "E" valve is not energized. If the voltmeter indicates +11 to +12.6 volts dc, check control switch and wiring to "E" valve. Refer to **ELECTRICAL SYSTEM DIAGRAMS** in this manual. Replace faulty wiring or control switch as required.



STARTER SOLENOID, VALVES & ELECTRICAL CONNECTIONS
FIG. 66-1

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⚠ WARNING

Make sure Liftgate platform is open and resting on the ground before performing the following step.

CAUTION

To prevent damage when installing valve cartridges & coils, torque valve cartridge nut to 30 lbs.-in. max.

3. The “E” solenoid valve **(FIG. 67-1)** may be stuck in the “open” position. Remove the “E” solenoid valve **(FIG. 67-2)**. Next, check the valve cartridge as follows. Push on the plunger in the valve by inserting a small screwdriver in the open end **(FIG. 67-3)**. If the plunger does not move with a smooth, spring-loaded action (approximately 1/8”) **(FIG. 67-3)**, replace the valve cartridge.

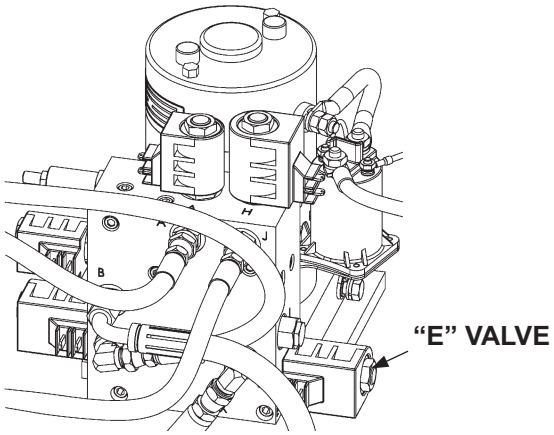
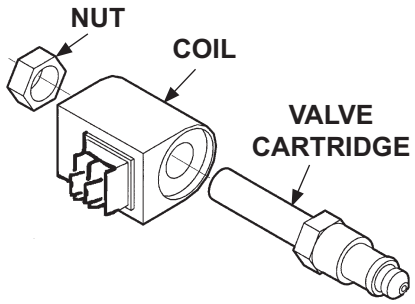


FIG. 67-1

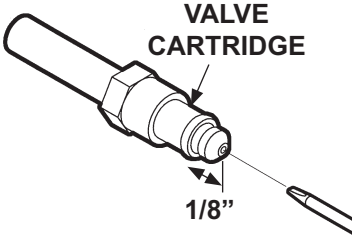
4. Reinstall “E” solenoid valve (if good) or a replacement. **Torque valve cartridge to 30 lbs.-ft. and hex nut to 30 lbs.-in.**



TYPICAL SOLENOID VALVE REMOVED & DISASSEMBLED FIG. 67-2

5. Check for bent and broken parts on the Liftgate that could interfere with normal operation.

6. Check both flow control valves. Refer to the flow control valve instructions in the procedure for **PLATFORM RAISES AND LOWERS UNEVENLY**.



CHECKING VALVE CARTRIDGE FIG. 67-3

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