



INNOVATION IN MOBILITY™

***Mirage™
F9A Series
Transit use
Wheelchair and Standee Lift***

PRINT

Service Manual

01/13/03

32DF9AS02.A

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U.S. Patent Nos: 5,228,538; 5,253,973; 5,373,915; 5,556,250;
Australia Patent Nos: 661127, 680501; Canadian Patent No. 2,129,821; French Patent No. 0-446-224;
German Patent Nos. 68925368.0-08, EP 0625896 B1; U.K. Patent Nos. EP 0625896 B1, EP 0703766,
GB 2,224,992 B; Other U.S. and foreign patents pending

Printed in the United States of America

This Ricon service manual is for use by qualified service technicians, and is not intended for use by non-professionals (do-it-yourselfers). The manual provides essential instructions and reference information, which supports qualified technicians in the correct installation and maintenance of Ricon products.

Qualified service technicians have the training and knowledge to perform maintenance work properly and safely. For the location of a Ricon authorized service technician in your area, call Ricon Product Support at 1-800-322-2884.

Customer Name:	_____
Installing Dealer:	_____
Date Installed:	_____
Serial Number:	_____

REVISION RECORD

REV	PAGES	DESCRIPTION OF CHANGE	ECR / ECO
32DF9AS02. A	All	New release, in two-book format.	3776/4805
	2-9	Added anti-stow pressure switch.	NONE
	5-25	Changed reference 12 (#25436) quantity from 2 to 1.	3850/4836
	5-17	Added trunnion w/bushings 15761 and trunnion reinforcement kit 20185.	NA
	Inside cover	Updated disclaimer on inside cover.	4918
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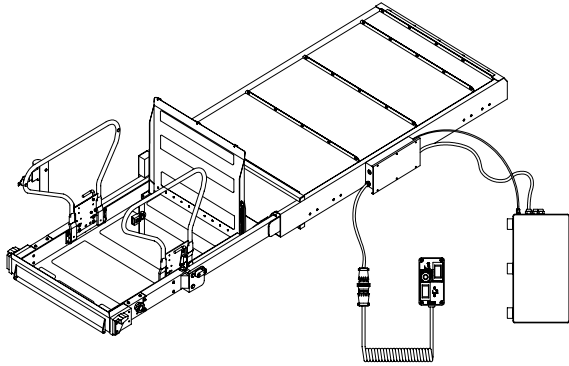
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I. INTRODUCTION

The RICON Mirage F9A Series Transit Use Wheelchair and Standee Lift provides wheelchair access to mass transit vehicles. The patented movement ensures smooth, safe entry and exit and easily lifts up to 660 pounds (300 kilograms). It is designed to be operated by a trained attendant or vehicle driver. After activating the vehicle manufacturer installed safety interlock and by using the lift control switches, the lift extends OUT (or deploys) from the vehicle and rises to the vehicle floor height. The user boards the large non-skid platform and the operator uses the control switches to gently lower the platform to the ground. After the user departs, the platform is raised and retracted IN (stowed).



The F9A Series Lift is an underfloor, electro-hydraulic wheelchair lift with a powerful electric motor and electrical hydraulic pump, and a powered rollstop. The lift also contains a built-in manual backup pump and rollstop manual control knob. If the lift loses electrical power, two or more people can extend the lift and raise and/or lower the lift manually.

This manual contains operation and maintenance instructions and a troubleshooting guide for the lift. It is important to user safety that the lift operator(s) be completely familiar with the Operating Instructions given in **Chapter II** of the **Operator Manual**. Once the lift is installed, it is very important that the lift be properly maintained by following the Ricon recommended cleaning, lubrication, and inspection instructions.

If there are questions about this manual, or additional copies are needed, please contact the Ricon Product Support Department at one of the following locations:

Ricon Corporation
7900 Nelson Road
Panorama City, CA 91402(818) 267-3000
Outside (818) Area Code(800) 322-2884
World Wide Website..... www.riconcorp.com

Ricon U.K. Ltd.
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Droylsden, Manchester
United Kingdom, M43 7EF(+44) 161 301 6000

A. RICON ONE-YEAR LIMITED WARRANTY

RICON CORPORATION ONE-YEAR LIMITED WARRANTY

Ricon Corporation (Ricon) warrants to original purchaser of this product that Ricon will repair or replace, at its option, any part that fails due to defective material or workmanship as follows:

- Repair or replace parts for a period of one year from date of purchase.
- Labor costs for specified parts replace under this warranty for a period of one year from date of purchase. A Ricon rate schedule determines the parts covered and labor allowed.

If You Need to Return a Product: Return this product to Ricon. Please give as much advance notice as possible and allow a reasonable amount of time for repairs.

This Warranty does not Cover:

- Malfunction or damage to product parts caused by accident, misuse, lack of proper maintenance, neglect, improper adjustment, modification, alteration, the mechanical condition of vehicle, road hazards, overloading, failure to follow operating instructions, or acts of Nature (i.e., weather, lightning, flood).

Note: Ricon recommends that this product be inspected by an authorized Ricon service technician at least once every six months, or sooner if necessary. Any required maintenance should be performed at that time.



WARNING

**THIS PRODUCT HAS BEEN DESIGNED AND MANUFACTURED TO EXACT SPECIFICATIONS.
MODIFICATION OF THIS PRODUCT IN ANY RESPECT CAN BE DANGEROUS**

This Warranty is Void if:

- The product has been installed or maintained by someone other than an authorized Ricon service technician.
- The product has been modified or altered in any respect from its original design without written authorization by Ricon.

Ricon disclaims liability for any personal injury or property damage that results from operation of a Ricon product that has been modified from the original Ricon design. No person or company is authorized to change the design of this Ricon product without written authorization by Ricon.

Ricon's obligation under this warranty is exclusively limited to the repair or exchange of parts that fail within the applicable warranty period.

Ricon assumes no responsibility for expenses or damages, including incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

Important: The warranty registration card must be completed and returned to Ricon within 20 days after installation of this Ricon product for the warranty to be valid. The warranty is not transferable.

The warranty gives specific legal rights, and there may be other rights that vary from state to state.

B. SHIPMENT INFORMATION

Because of the specialized nature of the product, Ricon does not sell directly to the user. Instead, the product is distributed through the worldwide network of authorized Ricon dealers, who perform the actual sale and installation.

- When the product is received unpack the product and check for freight damage. Claims for any damage should be made to the carrier immediately.
- Be sure the installation kit contains all items listed on the kit packing list. Please report any missing items immediately to Ricon Product Support. The warranty and owner's registration cards must be completed and returned to Ricon within 20 days for the warranty to be valid.

NOTE: The Sales/Service Personnel must review the Warranty and this Service Manual with the user to be certain that they understand the safe operation of the product. Instruct the user to follow the operating instructions without exception.

C. GENERAL SAFETY PRECAUTIONS

The following general safety precautions must be followed during installation, operation, service and maintenance:

- Under no circumstances should installation, maintenance, repair, and adjustments be attempted without the immediate presence of a person capable of rendering aid.
- An injury, no matter how slight, should always be attended. Always administer first aid or seek medical attention immediately.
- Protective eye shields and appropriate clothing should be worn at all times.
- To avoid injury, always exercise caution when operating and be certain that hands, feet, legs, and clothing are not in the path of product movement.
- Batteries contain acid that can burn. If acid comes in contact with skin, flush affected area with water and wash with soap immediately.
- Always work in a properly ventilated area. Do not smoke or use an open flame near a battery.
- Do not lay anything on top of a battery.
- Check under vehicle before drilling so as not to drill into frame, subframe members, wiring, hydraulic lines, fuel lines, fuel tank, etc.
- Read and thoroughly understand the operating instructions before attempting to operate.
- Inspect the product before each use. If an unsafe condition, unusual noises or movements, exists, do not use it until the problem is corrected.
- Keep others clear during operation.
- The product requires regular periodic maintenance. A thorough inspection is recommended at least once every six months. The product must always be maintained at the highest level of performance.

D. MAJOR LIFT COMPONENTS

The references used throughout this manual are illustrated in **Figure 1-1** and defined in **Table 1-1**. Refer to **Chapter IV** for more details.

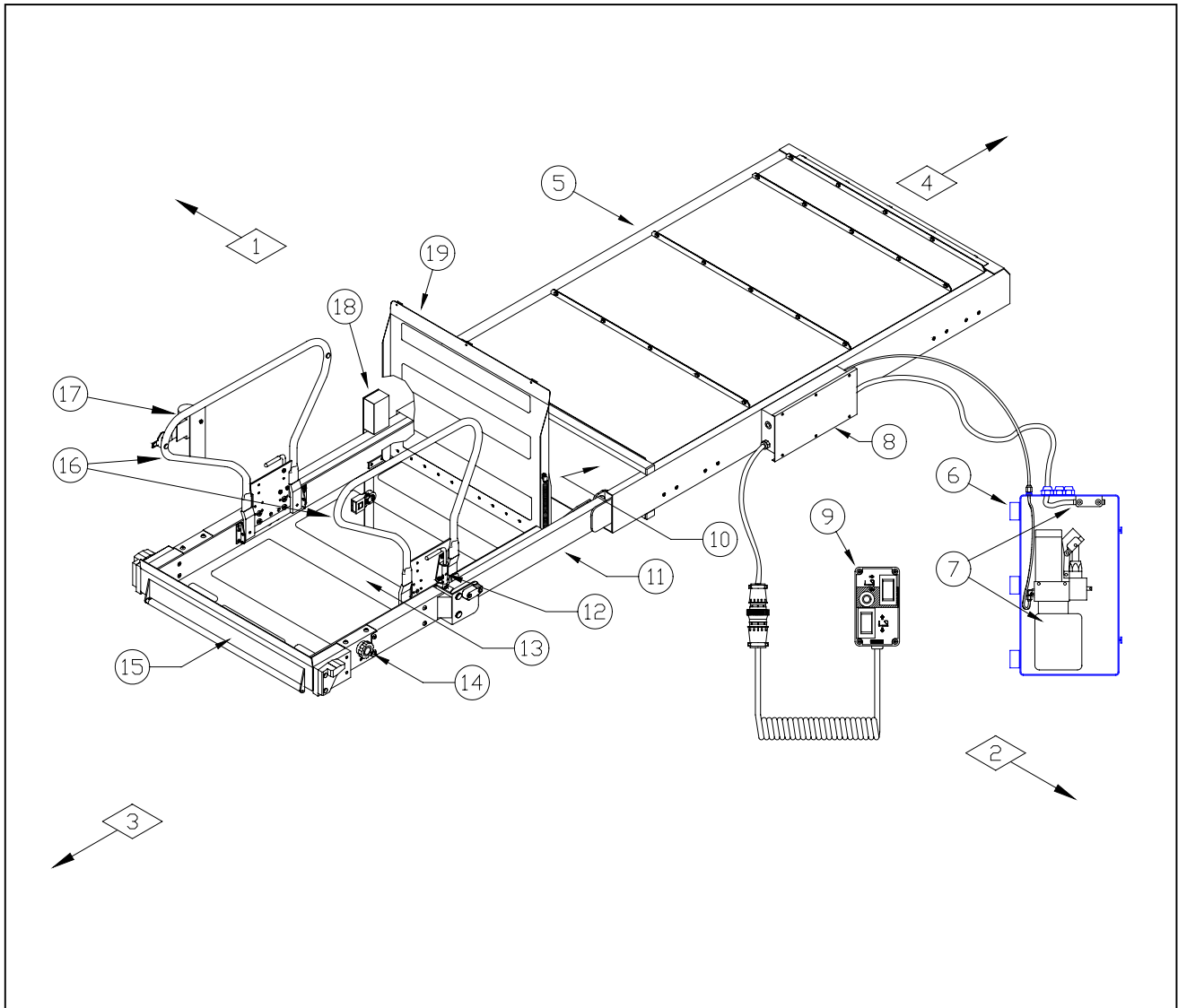


FIGURE 1-1: F9A SERIES TRANSIT USE WHEELCHAIR AND STANDEE LIFT

TABLE 1-1: F9A SERIES TRANSIT LIFT TERMINOLOGY

REF	NAME	DESCRIPTION
1	Left	Reference points from outside the vehicle looking inward at the platform.
2	Right	
3	Front	
4	Rear	
5	Lift Enclosure	Cassette type structure, rigidly attached to the vehicle, that contains the lift.
6	Pump Enclosure	Optional enclosure that contains the lift electrical and hydraulic control components.
7	Electrical Circuit Breakers and Hydraulic Pump	Circuit breakers that protect the lift in the event of an electrical short circuit and electro-hydraulic pump that performs the lift raise/UP and lower/DOWN functions.
8	Pull Box	Contains electrical connections/terminals.
9	Control Pendant	Hand-held device used to control the lift operating functions.
10	Carriage	(Not shown) Part of traveling frame that contains the necessary components to extend/deploy the platform OUT and retract/stow the platform IN.
	Deployment System	(Not Shown) The electrical gear-motor and associated mechanical hardware used to extend/deploy the platform OUT and retract/stow the platform IN.
	Lower Parallel Arm(s)	(Not Shown) Located within the lifting frame, these arms connect the platform to the carriage to maintain the platform horizontal position.
11	Lifting Frame	Part of the frame that connects the platform to the hydraulic cylinder for raising/UP and lowering/DOWN.
12	Slam Lock Assembly	Manually activated mechanism used to lock the retractable handrail in the upright position.
13	Platform	Component where the occupant sits or stands during lift operations.
14	Rollstop Manual Control Knob	Provides manual control of the rollstop in the event of a loss of electrical power.
15	Platform Roll-stop	Front barrier to prevent the wheelchair from slow, inadvertent rolling off the platform during lift operation.
16	Handrails	Provide a hand-hold for the platform occupant.
17	Occupant Safety Belt	Electrically interlocked safety belt that when properly engaged helps prevent unintentional acceleration of wheelchair from platform. The lift will not operate using the "UP" or "DOWN" switches unless the belt is properly engaged.
18	Sto-Loc	Electrical solenoid that "safety-locks" the lift in the stowed IN position.
19	Bridgeplate	Plate that bridges across the platform and the vehicle threshold. Also serves as a rear rollstop when the platform is at the deployed/OUT and ground level positions.
END OF TABLE		

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II. INSTALLATION

The RICON Mirage F9A Series Transit Use Wheelchair and Standee Lift is installed in a cassette mounted to the underside of the vehicle and behind the bottom step riser. Due to the wide range of applications for the lift, specific information for about every possible application is not available. The following general procedures will apply to most installations. Contact the Ricon Product Support Department for instruction about installations not covered.

Lift installation is performed in four basic procedures:

- A. **Mechanical**
- B. **Electrical**
- C. **Final Adjustments**
- D. **Installation Verification**

To install the lift, refer to the following sections and perform the procedures carefully and in the order that they are presented. Be certain that the installation instructions are followed exactly and do not eliminate any steps or modify the product.

A. MECHANICAL

To install the lift, follow this procedure:

1. LIFT LOCATION

The location of the lift depends on the motion path of the platform. The lift must be located so that the platform can move unobstructed through its required range of travel.

2. LIFT MOUNTING

- a. Refer to Figure 2-1. Mechanical support of the lift will be provided at four (two on each side) attachment points. Each attachment point consists of two 5/16-18 tapped bolt inserts.

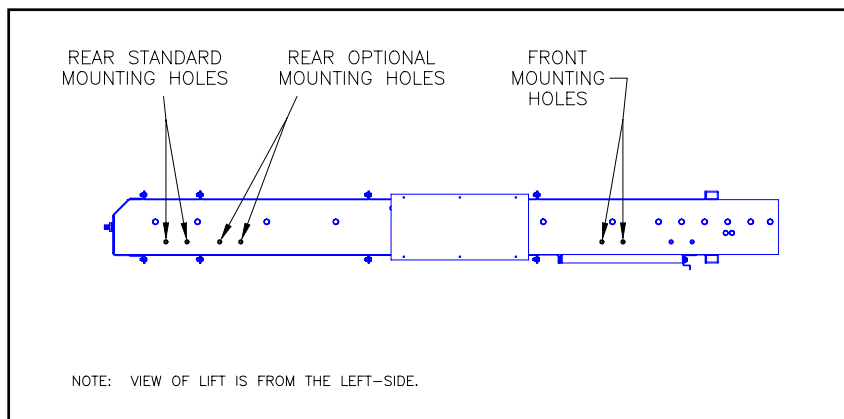


FIGURE 2-1: LIFT (LEFT-SIDE) MOUNTING HOLES

- b. Since lift mounting varies from one model to another, the vehicle mounting brackets for attachment of the lift are not supplied. When fabricated, the mounting brackets must meet the criteria listed in Table 2-1.

TABLE 2-1: LIFT MOUNTING BRACKET LOAD CAPACITIES		
Loading Direction	Front Supports (total capacity for both left and right support points)	Rear Supports (total capacity for both left and right support points)
Vertical	4500 lbs	3500 lbs
Longitudinal (perpendicular to vehicle drive axles)	3000 lbs	3000 lbs
Lateral (parallel to vehicle drive axles)	1500 lbs	1500 lbs
END OF TABLE		

- c. Fasteners for mounting lift must be a minimum of 5/16" diameter, with a grade of 5 or higher. They must be threaded inserts at least 5/16" and no more than 7/16".

3. HYDRAULIC POWER UNIT

a. Unit Mounting

- 1) The hydraulic power unit must be located so that the operator has an unobstructed view of the platform surface while operating the manual back-up system.
- 2) The design capacity of the bracketry used to mount the hydraulic power unit should meet the following criteria. Refer to Table 2-2:

TABLE 2-2: HYDRAULIC POWER UNIT BRACKET LOAD CAPACITIES	
LOADING DIRECTION	BRACKET CAPACITY
Vertical	125 lb
Longitudinal (perpendicular to vehicle drive axles)	200 lb
Lateral (parallel to vehicle drive axles)	100 lb
END OF TABLE	

- 3) Meeting these criteria will assure that the pump mounting will withstand loads applied during manual pump operation.

b. Unit-to-Cylinder Connection

- 4) Connect the main hydraulic hose to the hydraulic power unit if not already done.
- 5) Operate the manual backup pump until hydraulic fluid flows out of the open end of the main hydraulic hose.
- 6) Connect the open end of the hose to the pull-box hydraulic fitting.
- 7) Lower the platform to ground level.
- 8) Remove the plug on the top of the hydraulic pump tank. Make sure that the hydraulic fluid in the tank is at the FULL level. Fill only with Texaco No. 15 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606E/F oil) and reinstall the plug.

B. ELECTRICAL

Whether the vehicle electrical system is +12VDC or +24VDC, insulated return or chassis ground, the electrical installation is similar. To install electrical power to the lift, follow this procedure:

 **CAUTION**

CHECK VEHICLE BEFORE DRILLING. DO NOT DRILL INTO FACTORY WIRING, HYDRAULIC LINES, FUEL LINES, FUEL TANK, ETC.

1. At vehicle engine or battery compartment, mount supplied Main Circuit Breaker within 10" - 12 (25 - 30 cm) of battery.
2. Adjacent to lift hydraulic pump unit, drill one 3/4" (19.5-mm) hole through vehicle floor, deburr hole, and install grommet.
3. Insert lift power cable harness through drilled hole.

 **CAUTION**

WHEN ROUTING POWER CABLE, AVOID HAZARDS SUCH VEHICLE DRIVE SHAFTS, MOVING SUSPENSION PARTS, EXHAUST SYSTEMS, ETC.

4. From beneath vehicle, run harness along vehicle frame to circuit breaker. Make sure harness does not interfere with moving or hot parts and secure with cable ties every 18" (45 cm).
5. At engine compartment, cut and retain 12" (30 cm) section from end of harness RED wire.
6. Measure RED wire to reach circuit breaker and cut and remove any excess wire from harness.
7. Using wire crimpers, crimp supplied terminal to end of RED harness wire and connect to circuit breaker AUX terminal.
8. Crimp supplied terminals to both ends of previously cut 12" (30 cm) section of RED wire.
9. Connect end of 12" (30 cm) section of RED wire to circuit breaker BAT terminal.

 **WARNING**

WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.

DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.

DO NOT LAY ANYTHING ON TOP OF A BATTERY.

10. Connect other end of 12" (30 cm) section of RED wire to POSITIVE (+) terminal of vehicle battery.

C. SAFETY INTERLOCKS

WARNING

THE LIFT CONTROLS MUST BE DISABLED ANYTIME THE VEHICLE IS **NOT** SAFELY PARKED. ENSURE THAT LIFT OPERATION CONFORMS TO ADA CODE 49 CFR.

INSTALLATION OF SAFETY INTERLOCKS FOR COMPLIANCE WITH ADA REQUIREMENTS IS THE RESPONSIBILITY OF THE INSTALLER.

Refer to wiring diagram located in **Chapter IV** of this manual. To comply with ADA interlock requirements, vehicle voltage (+12VDC or +24VDC) must be applied to **Terminal-5** of the terminal strip located on the pump assembly **ONLY WHEN THE VEHICLE IS SAFELY PARKED** before the lift is allowed to operate.

D. FINAL ADJUSTMENTS

WARNING

FAILURE TO PROPERLY ADJUST EQUIPMENT MAY RESULT IN UNSAFE OPERATING CONDITIONS FOR THE LIFT USER.

1. HYDRAULIC BLEEDING

The hydraulic system of the lift may have air introduced into the system and must be removed. The following procedure to remove the air from the system is known as "bleeding".

NOTE: The following procedure is best performed by two people and can cause spillage of hydraulic fluid.

- a. Fully deploy the lift.
- b. Raise the lift platform to a comfortable working height and support the platform.

WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- c. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.

WARNING

WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.

DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.

DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- d. At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- e. Locate the air bleeder valve on the top side of the lift cylinder. Access to this valve is through a hole in the rear of the carriage rear channel.
- f. Raise the lift to vehicle floor level.
- g. Open the air bleeder valve with a screwdriver to let air and hydraulic fluid out of the cylinder.
NOTE: This step will cause oil loss. Have dry rags on hand to clean-up spilled hydraulic fluid.
- h. Close the air bleeder valve.
- i. Lower the platform to ground level.
- j. Remove the plug on the top of the hydraulic pump tank. Make sure that the hydraulic fluid in the tank is at the FULL level. Fill only with Texaco No. 15 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606E/F oil) and reinstall the plug.
- k. Repeat the previous FIVE steps until the fluid coming out of the air bleeder valve does not contain any air bubbles.

- l. Verify that the air bleeder valve is fully closed.
- m. At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

 WARNING
<p>WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.</p> <p>DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.</p> <p>DO NOT LAY ANYTHING ON TOP OF A BATTERY.</p>

- n. At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- o. Remove the platform support and stow the lift.

2. PLATFORM VERTICAL TRAVEL LIMIT ADJUSTMENT

This procedure details setting the Vertical Travel Limit Switch (labeled TOP) to stop the lift platform at the vehicle floor level during the ↑/UP function. The Vertical Travel Limit Switch is located on the switch plate assembly within the carriage assembly. To adjust the platform vertical travel limit, follow this procedure:

- p. Using the control pendant, deploy the platform →/OUT.
- q. Raise the lift platform ↑/UP to vehicle floor level.
- r. At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- s. Using the manual backup pump, manually raise (or lower) the lift so that the platform top surface is between 1" and 1-1/2" above the vehicle floor and support the platform.

 WARNING
<p>THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE OPENING OR CLOSING TO PREVENT THE PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.</p>

- t. Refer to **Figure 2-2**. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.

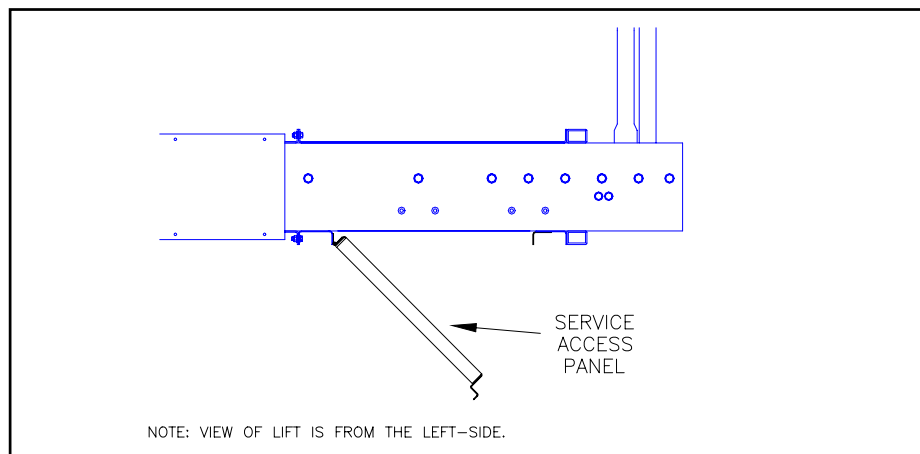


FIGURE 2-2: SERVICE ACCESS PANEL (OPEN)

- u. Refer to **Figures 2-3 and 2-4**. At the switch plate assembly, use a pencil to mark the position of the vertical travel limit (TOP) switch. Loosen the two mounting screws only enough to allow the switch to be adjusted left or right.

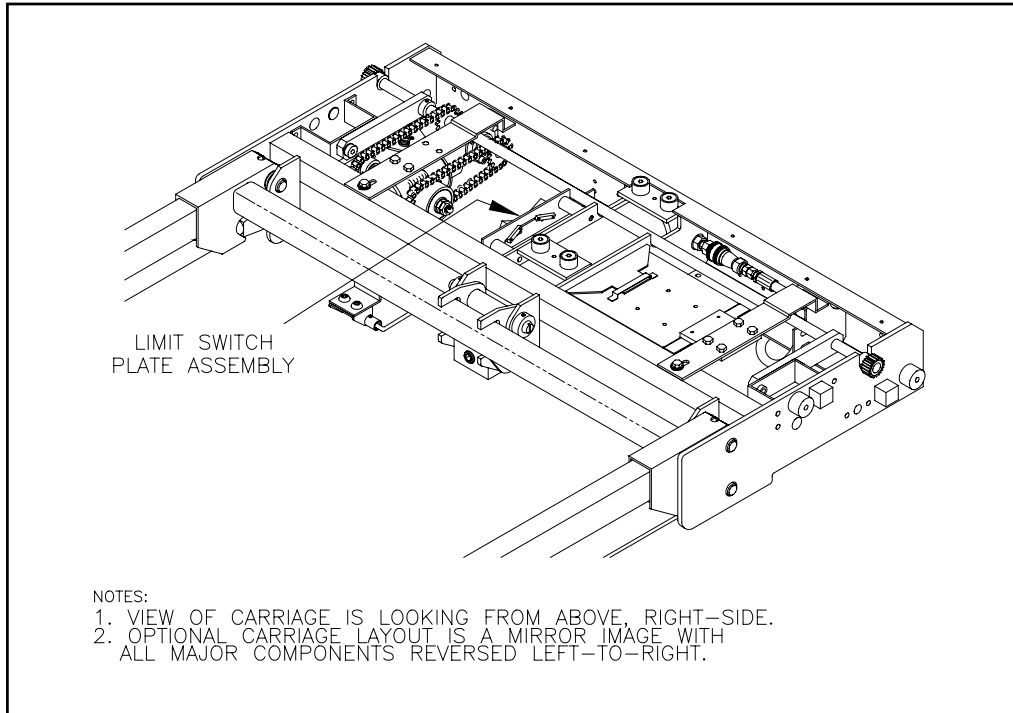


FIGURE 2-3: LIMIT SWITCH PLATE ASSEMBLY LOCATION

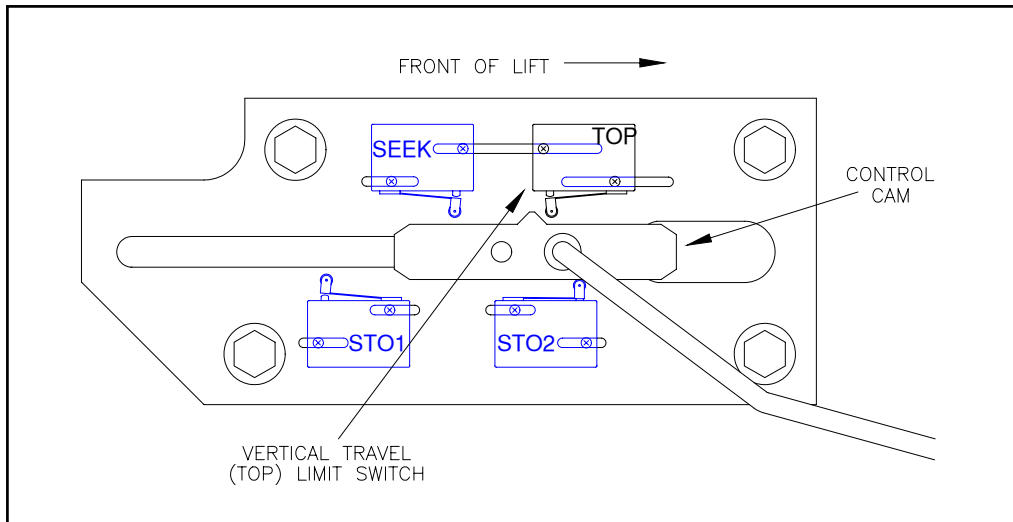


FIGURE 2-4: LIMIT SWITCH (TOP) LOCATION

- v. Slide the TOP switch all the way to the RIGHT. Slide the switch LEFT until it contacts the Control Cam with a faint “click”.



CAUTION

SWITCH MOUNTING SCREWS ARE THREADED INTO PLASTIC SLIDER BLOCKS. TO PREVENT STRIPPING, DO NOT OVER-TIGHTEN.

- w. Tighten the switch mounting screws until snug.
- x. Remove platform support, reconnect battery cable, and operate the lift ↑/UP and ↓/DOWN to verify that the lift stops at the correct vehicle floor level. Readjust the Vertical Travel Limit Switch if necessary.
- y. At the underside of the lift, hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

3. BRIDGEPLATE ADJUSTMENT

The bridgeplate deployment is controlled by the bridgeplate actuator rod. The length of the rod determines the position of the bridgeplate relative to the platform as it moves through its vertical travel. The actuator rod must be adjusted to allow the bridgeplate to fully deployed as the platform reaches the vehicle floor level.



WARNING

INCORRECT DEPLOYMENT OF THE BRIDGEPLATE CAN CREATE A POTENTIALLY DANGEROUS SITUATION FOR A LIFT USER, AND CAUSE DAMAGE TO THE BRIDGE PLATE AND/OR PLATFORM. MAKE SURE THAT THE BRIDGEPLATE IS ADJUSTED CORRECTLY.

- a. Using the control pendant, deploy the platform →/OUT
- b. Raise the lift platform ↑/UP to vehicle floor level and support the platform.



WARNING

WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.

DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.

DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- c. At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

- d. Refer to **Figure 2-5**. On the RIGHT-SIDE of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.

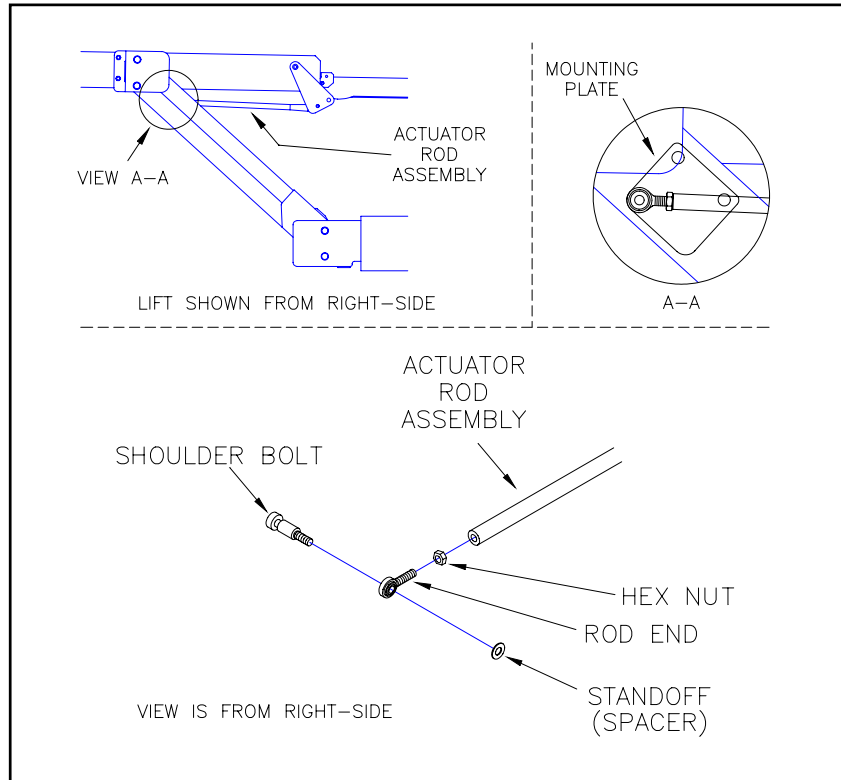


FIGURE 2-5: BRIDGEPLATE ACTUATOR ROD ASSEMBLY

- e. Using one hand to catch the standoff/spacer as it falls, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate.
- f. On the LEFT-SIDE of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.
- g. Using one hand to catch the standoff/spacer as it falls and an assistant to hold the bridgeplate, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate. By hand, lower the bridgeplate to the vehicle floor.

NOTE: The actuator rod end is left-hand thread. Turning the rod end clockwise lengthens the rod or counter-clockwise shortens the rod.

- h. Refer to **Figure 2-6**. Turn the rod end to shorten or lengthen the actuator rod assembly so that the bridgeplate cam follower is between $1/8"$ - $3/16"$ from the cam of the bridgeplate when the shoulder bolt is reinstalled. Measure and note the distance between the rod end mounting hole and the actuator rod. Reinstall the standoff/ spacer, the shoulder bolt, and tighten the rod end hex-nut.

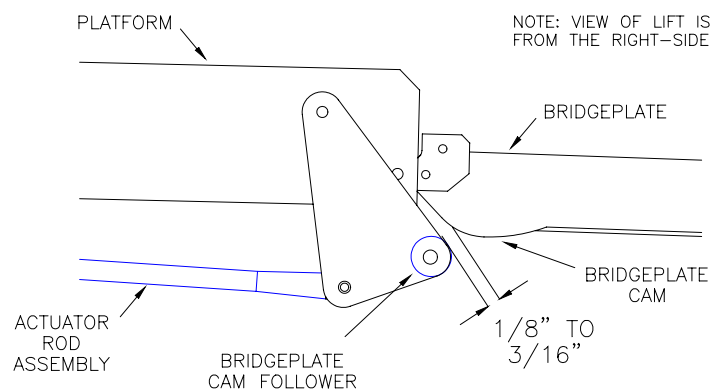



FIGURE 2-6: BRIDGEPLATE ADJUSTMENT DIAGRAM

- i. On RIGHT-SIDE of lift, turn rod end to shorten or lengthen actuator rod assembly so that distance between rod end mounting hole and actuator rod is the same as measured in above step. Reinstall standoff/spacer, shoulder bolt, and then tighten the rod end hex-nut.

 WARNING
<p>WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.</p> <p>DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.</p> <p>DO NOT LAY ANYTHING ON TOP OF A BATTERY.</p>

- j. At the vehicle engine/battery compartment, connect the cable to the battery positive (+) terminal.
- k. Remove platform support and operate the lift ↑/UP and ↓/DOWN to verify that the bridge-plate deploys correctly. Readjust the actuator rod assemblies if necessary.

4. ANTI-STOW PRESSURE SWITCH ADJUSTMENT

An adjustable, pressure sensing, electrical switch is installed in the hydraulic line that is connected to the hydraulic cylinder. The switch will detect the presence of a 75 lb. load, or greater, on the deployed platform. Correct adjustment of anti-stow switch inhibits horizontal movement of loaded platform, providing an element of safety for lift users.

CHECK:

- a. Refer to **Figure 2-7**. The pressure switch adjusting screw is located at the top of the body, between the two lead wires. There is a locking set-screw (requires hex key) above the adjusting screw, which must be removed to carry out pressure switch adjustments.

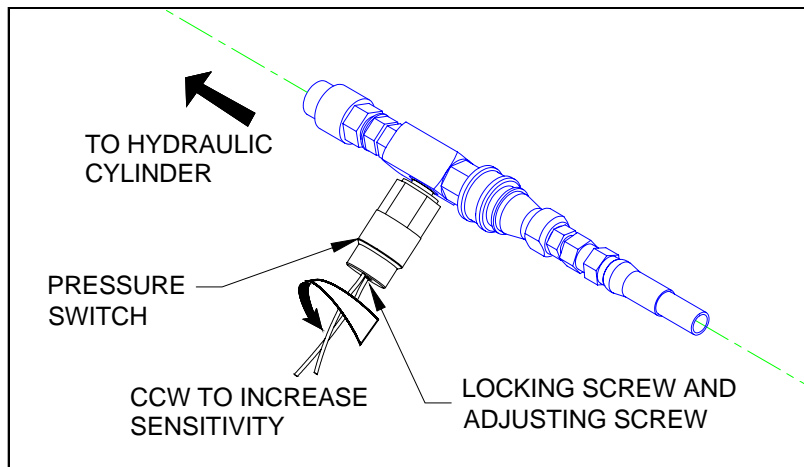


FIGURE 2-7: ANTI-STOW PRESSURE SWITCH

- b. Apply power to lift and deploy platform.
- c. Lower platform to ground, and place a 75 lb. weight in center of platform.
- d. Press ← /IN button plus red STO-GARD LOCKOUT button until platform reaches STOW height. Platform should stop at stow height and not enter enclosure. Proceed to next step if platform attempts to enter enclosure.

ADJUST:

- e. Remove locking set-screw and turn adjusting screw 1/8 turn CCW to increase sensitivity.
- f. Repeat above steps until the 75 lb. weight inhibits stowing of platform. Repeat test from floor height; platform should stop at stow height and not enter enclosure.
- g. Remove test weight and then check platform stow function from ground height and from floor height. Platform should stow properly from either level. Replace locking set-screw.

NOTE: Normal platform operation may not occur if pressure switch adjustment is too sensitive (inhibits stow function when a weight that is significantly less than 75 lb. is present). Turn adjusting screw CW to decrease sensitivity.

Also, erratic platform movement may occur if setting of pressure switch is marginal. Correct this by turning adjusting screw 1/16 turn in appropriate direction.

E. VERIFY INSTALLATION

- Be certain there is no interference with operation of the lift by interior or exterior components.
- The lift is designed to carry the weight of a wheelchair and its passenger. The vehicle structure must be adequate to support all loads produced during lift operation, as well as forces incurred by the motion of the vehicle during driving.



CAUTION

DO NOT OPERATE THE LIFT ELECTRICALLY OR MANUALLY DURING THE LOAD TEST. THE LOAD TEST IS DESIGNED TO TEST THE INSTALLATION MOUNTING OF THE LIFT **NOT** ITS LIFTING CAPACITY. REMOVE THE TEST WEIGHT IMMEDIATELY AFTER THE TEST.

WHEN THE TEST WEIGHT IS PLACED ON THE PLATFORM, THE VEHICLE SUSPENSION WILL COMPRESS AND THE VEHICLE WILL LEAN. IF THE WEIGHTED PLATFORM TOUCHES THE GROUND, REMOVE THE WEIGHT, RAISE THE PLATFORM, AND RETEST.

- The lift must be test loaded to 125% of its rated 660 pound load capacity to verify the integrity of the installation. Position the lift platform 2" - 6" above the ground, place **825** pounds in the center of the platform, and inspect the lift mounting points. REMOVE THE TEST WEIGHT.
- Run the lift through several complete cycles to ensure proper operation.

F. CUSTOMER ORIENTATION

IMPORTANT
- Customer Orientation -
Ricon Sales/Service Personnel must review the Warranty and Operator Manual with the customer to be certain he/she understands the safe operation of the lift. Instruct the customer to always follow the operating instructions without exception.

- Refer to **Figure 2-7**. Ensure that all decals are properly located and affixed as shown.
NOTE: The installing service agent must affix the Series Operating Instruction decal to the vehicle in a location clearly visible to the operator.

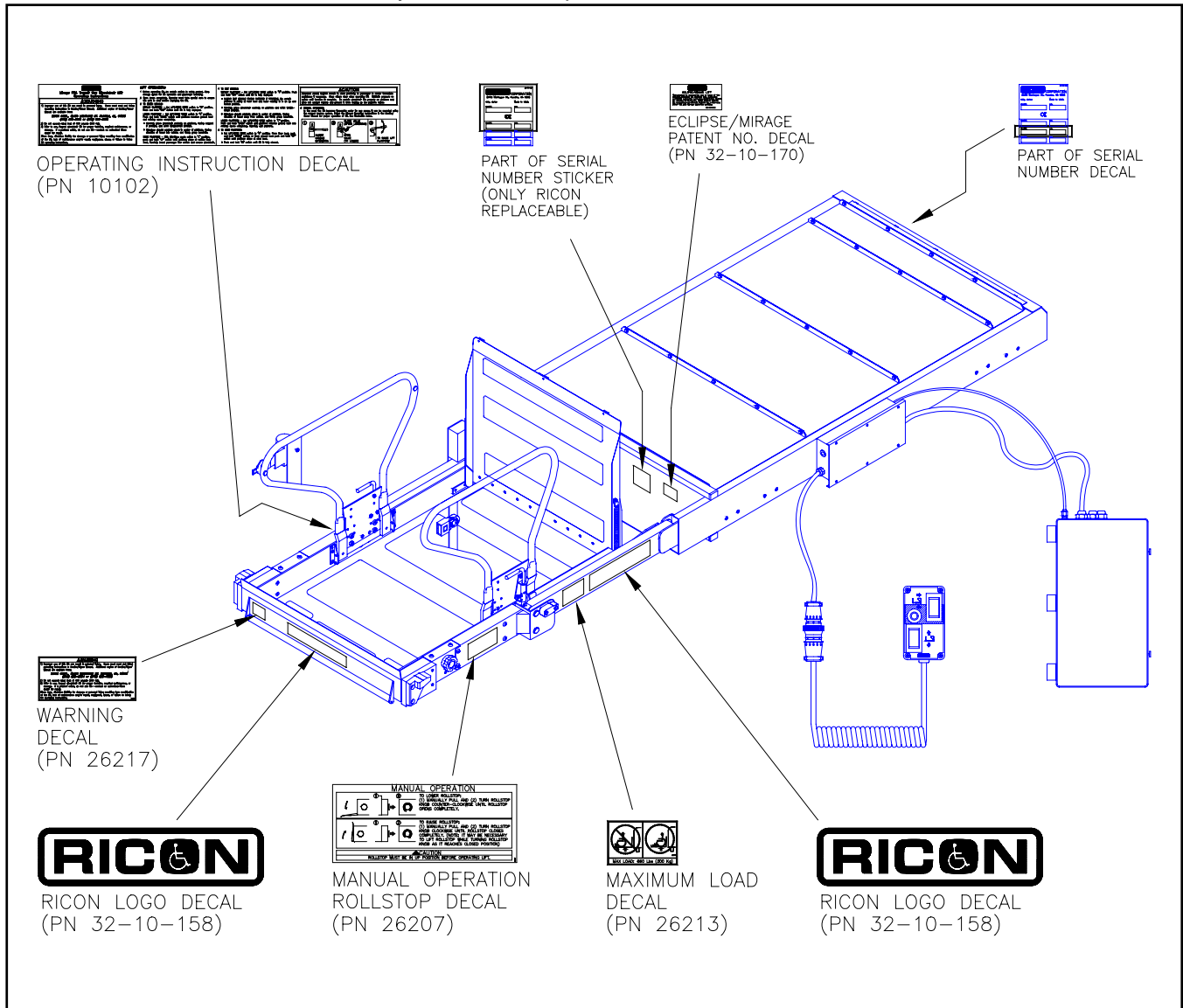


FIGURE 2-7: DECAL LOCATIONS AND PART NUMBERS

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III. MAINTENANCE AND TROUBLESHOOTING

Regular maintenance of the RICON Mirage F9A Series Transit Use Wheelchair and Standee Lift will provide optimum performance and reduce the need for repairs. This chapter contains a list of daily inspection checkpoints, a recommended maintenance schedule, and a troubleshooting section that utilizes the control pendant power indicator.

 WARNING
THIS RICON PRODUCT IS HIGHLY SPECIALIZED. MAINTENANCE AND REPAIRS MUST BE PERFORMED BY AN AUTHORIZED RICON SERVICE TECHNICIAN USING RICON REPLACEMENT PARTS. MODIFYING OR FAILING TO PROPERLY MAINTAIN THIS PRODUCT WILL VOID THE WARRANTY AND MAY RESULT IN UNSAFE OPERATING CONDITIONS.

A. DAILY INSPECTIONS





TABLE 3-1: DAILY SAFETY CHECK (or @ 10 - 20 cycles of operation)	
SERVICE POINT	DESCRIPTION
LIFT AT STOWED POSITION	
Control Pendant	Check that control pendant is not damaged and cable connectors are tight.
Hydraulic Power Unit	<div style="text-align: center;"> CAUTION</div> <p>DO NOT ADD FLUID UNTIL PLATFORM IS LOWERED TO GROUND LEVEL. ADDING FLUID WHILE LIFT IS FOLDED WILL CAUSE TANK TO OVERFLOW WHEN PLATFORM IS LOWERED TO GROUND LEVEL.</p> <ol style="list-style-type: none"> 1. Check for visible hydraulic fluid leakage. 2. Ensure backup pump manual release valve is slightly snug.
Vehicle Interlock	Place vehicle in a NON-INTERLOCK mode and attempt to operate lift.
LIFT AT DEPLOYED POSITION	
Lift Operation	<ol style="list-style-type: none"> 1. Listen for any abnormal noises as the lift operates (i.e, grinding or binding noises). 2. Torque Limit Clutch overloads properly (clicks) at the end of travel. 3. Carriage stops are in place and stop lift squarely.
Decals	Ensure that all decals are affixed properly, clearly visible and legible.
Main Lifting Pivots	Ensure carriage/lifting frame/platform pivot pins are free from damage and locked in position with fasteners.
Platform	Check that platform mounting brackets are properly fastened to both sides of the platform.
Handrails	Check that handrail mounting bolts are tight.
RAISE PLATFORM TO VEHICLE FLOOR LEVEL	
Lift Operation	Listen for any abnormal noises as the lift operates (i.e, grinding or binding noises).
Platform Level	Check that the lift platform stops at vehicle floor level.
Bridgeplate	Check that bridgeplate operates without obstruction(s), and rests squarely on vehicle floor.
LOWER PLATFORM TO GROUND LEVEL	
Lift Operation	Listen for any abnormal noises as the lift operates (i.e, grinding or binding noises).
Rollstop	Ensure that rollstop opens and locks properly without obstruction(s) when it contacts the ground.
Hydraulic Power Unit	While platform is at the ground level, check that hydraulic fluid level is at the FULL level.

TABLE 3-1: DAILY SAFETY CHECK (or @ 10 - 20 cycles of operation)	
SERVICE POINT	DESCRIPTION
STOW LIFT	
Rollstop	Ensure that rollstop closes and locks properly without obstruction(s) when the platform leaves ground level.
Lift Operation	Listen for any abnormal noises as the lift operates (i.e, grinding or binding noises).
Stow Level	Check that platform seeks proper stow level.
Torque Limit Clutch	Torque Limit Clutch overloads properly (clicks) at the end of travel.
Sto-Loc	 WARNING MANUALLY DEPLOYING AND/OR STOWING OF THIS LIFT REQUIRES FORCES GREATER THAN 100 LBS. DO NOT ATTEMPT TO MANUALLY DEPLOY OR STOW THE LIFT USING LESS THAN TWO PEOPLE.
	Check that sto-loc engages and lift will not deploy manually
END OF TABLE	

B. MAINTENANCE SCHEDULE

Maintenance inspections must be performed by an authorized Ricon service technician at least once every six months or sooner, depending on usage. Maintenance inspections are required at least every six months and a thorough inspection should be performed at the service intervals referenced in **Table 3-1**. Under conditions of excessive use (more than 10 cycles per day), service should be increased.

TABLE 3-2: MAINTENANCE SCHEDULE	
SERVICE POINT	DESCRIPTION
TWO-WEEK SAFETY CHECK (or @ 140 - 180 cycles of operation)	
Decals and Cleaning	<ol style="list-style-type: none"> 1. Ensure that all decals are affixed properly, clearly visible and legible. Replace if necessary. 2. Ensure that serial number is clearly marked and legible. 3. Ensure that rollstop pivot points and springs, and bridgeplate pivot points, actuator pivot points, and cam followers are lubricated.
IN/OUT Drive	Ensure that there are no obstructions in the side channels.
THREE-MONTH SAFETY CHECK (or @ 900 - 1000 cycles of operation)	
Stow Level	Perform Stow Level Alignment Check
Drive Chains and Shafts	Following labeled directions on container, spray lubricant (Curtisol7 Red Grease No.88167) on final and primary drive chains and drive shafts. Wipe clean any excess grease from drive chains and surrounding areas.
Main Lifting Arm and Bridgeplate Pivot Points.	Following labeled directions on container, spray lubricant (Curtisol7 Red Grease No.88167) on ball and socket joints at bridgeplate actuator rod assemblies, bridgeplate pivot points and rod endpoints. Wipe clean any excess grease from parts and surrounding areas.
Hydraulic Power Unit	While platform is at the GROUND LEVEL, ensure that the pump hydraulic fluid level is maintained at the required FULL level. Add only Texaco #15 hydraulic fluid or equivalent U.S. mil spec H5606E (or F) fluid.

TABLE 3-2: MAINTENANCE SCHEDULE	
SERVICE POINT	DESCRIPTION
 CAUTION THIS SAFETY CHECK MUST BE PERFORMED ONLY BY AN AUTHORIZED RICON SERVICE TECHNICIAN.	
ANNUAL SAFETY CHECK (or @ 3600 - 4000 cycles of operation)	
IN/OUT Drive	Perform Torque Limit Clutch Adjustment
Cam Followers	Grease cam followers with an approved grease and wipe clean any excess grease from cam followers and surrounding areas.
Drive Chains and Shafts	<ol style="list-style-type: none"> 1. Perform Drive Chain Adjustment 2. Ensure that spur gears and final drive sprocket are securely pinned to main drive shaft. 3. Ensure that torque limit clutch and final drive sprocket are securely pinned to idler shaft. 4. Following labeled directions on container, spray lubricant (Curtisol7 Red Grease No.88167) on final and primary drive chains and drive shafts. Wipe clean any excess grease from drive chains and surrounding areas.
Hydraulic Cylinder, Flow Control Valve, Hoses and Fittings	<ol style="list-style-type: none"> 1. Inspect hydraulic hoses for damage. 2. Ensure that all fittings are tightly secured. 3. Check Hydraulic Cylinder and Flow Control Valve for evidence of leaks.
Hydraulic Power Unit	Perform Hydraulic Power Unit Fluid Flush and Renewal
 CAUTION THIS SAFETY CHECK MUST BE PERFORMED ONLY BY AN AUTHORIZED RICON SERVICE TECHNICIAN.	
SEVEN-YEAR SAFETY CHECK (or @ 25,000 - 26,000 cycles of operation)	
Control Pendant	Replace UP/DOWN, IN/OUT, and IN-LOCKOUT switches.
Hydraulic Power Unit	Perform Hydraulic Pump Motor Removal and Installation
TEN-YEAR SAFETY CHECK (or @ 36,000 - 38,000 cycles of operation)	
RICON CORP. recommends that lift be refit after ten years of service.	
END OF TABLE	

C. POWER INDICATOR DIAGNOSTICS

The lift is equipped with a power cut-off solenoid that removes electrical power to the lift when it is not in use. The solenoid is part of the lift electrical system that is located on the hydraulic power unit of the lift. A related component is the power indicator that is mounted on the top of the control pendant. This indicator shows when this power is supplied and illuminates only when the lift is in operation. While troubleshooting the lift, the following conditions apply:

NOTE: THE POWER INDICATOR SHOULD PROPERLY ILLUMINATE ONLY WHEN THE LIFT IS IN OPERATION. IF THE INDICATOR DOES NOT ILLUMINATE **DURING** OPERATION OF THE LIFT OR REMAINS ILLUMINATED WHEN THE LIFT **IS NOT** IN OPERATION, CONTACT AN AUTHORIZED RICON SERVICE TECHNICIAN FOR REPAIR.

- If the lift **DOES NOT** operate and the power indicator **DOES NOT** illuminate, the solenoid contacts are not properly closing and there is no power being supplied to the lift.
- If the lift **DOES NOT** operate and the power indicator **DOES** illuminate, power is being supplied through the solenoid but there is a control circuitry problem in the lift.
- If the lift **OPERATES** but the power indicator **STAYS** illuminated, the solenoid contacts are not properly opening and there is continuous power being supplied to the lift.

NOTE: In all cases, return the lift to an authorized Ricon service technician immediately for repair.

D. ELECTRICAL WIRING DIAGRAM

1. DIAGRAM LEGEND

a. Color Codes

NOTE: The electrical diagram may not employ all of the colors listed in the following table.

TABLE 3-3: COLOR CODE ABBREVIATIONS			
ABR.	COLOR	ABR.	COLOR
BLK	Black	PNK\VIO	Pink w\ Violet
BLK\BLU	Black w\ Blue	PNK\WHT	Pink w\ White
BLU	Blue	RED	Red
BLU\PNK	Blue w\ Pink	RED\BLK	Red w\ Black
BLU\WHT	Blue w\ White	RED\WHT	Red w\ White
BLU\YEL	Blue w\ Yellow	TAN	Tan
BRN	Brown	TAN\RED	Tan w\ Red
BRN\BLU	Brown w\ Blue	VIO	Violet
BRN\ORG	Brown w\ Orange	VIO\BLK	Violet w\ Black
BRN\YEL	Brown w\ Yellow	VIO\BRN	Violet w\ Brown
GRN	Green	VIO\GRN	Violet w\ Green
GRN\BLK	Green w\ Black	VIO\WHT	Violet w\ White
GRN\BRN	Green w\ Brown	VIO\YEL	Violet w\ Yellow
GRN\RED	Green w\ Red	WHT	White
GRN\WHT	Green w\ White	WHT\BLK	White w\ Black
GRY	Grey	WHT\ORG	White w\ Orange
GRY\YEL	Grey w\ Yellow	WHT\RED	White w\ Red
ORG	Orange	WHT\YEL	White w\ Yellow
ORG\BLK	Orange w\ Black	YEL	Yellow
ORG\YEL	Orange w\ Yellow	YEL\BLK	Yellow w\ Black
PNK\BLK	Pink w\ Black	YEL\PNK	Yellow w\ Pink
PNK\RED	Pink w\ Red	YEL\RED	Yellow w\ Red
END OF TABLE			

b. Symbols

Figure 3-1 defines symbols used in the electrical wiring diagram.

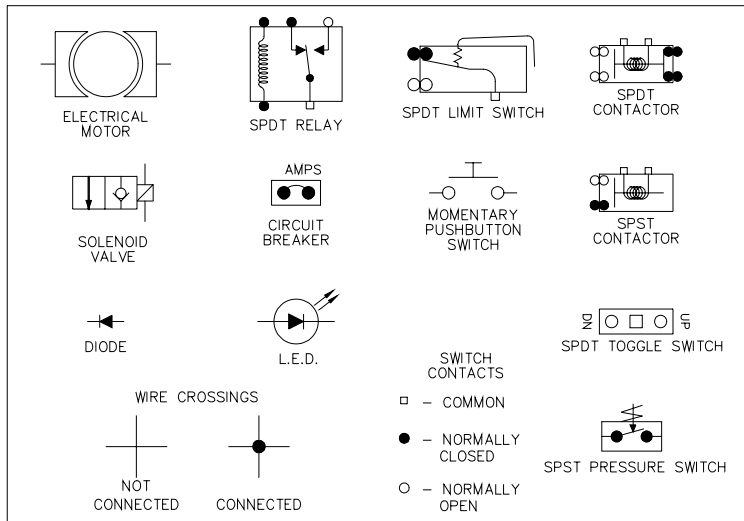


FIGURE 3-1: ELECTRICAL DIAGRAM SYMBOLS

c. Labels

+VDC(rating)	Supply voltage (12 or 24 volt). Circuit rating is also given.
C OUT	Carriage out signal.
CRRO	Rollstop Open Control Relay
CRIN	In Control Relay.
CROUT	Out Control Relay.
CRPMP	Pump Control Relay.
CRRC	Rollstop Close Control Relay
CS	Carriage stow signal.
CS1-CS3	Control switches located on Interior & Exterior Control Panels.
CTR	Cycle counter.
DWN SQ	Down Sequence – Lift lowering, followed by flap opening.
DWNSV	Down Solenoid Valve.
RS O SG	Rollstop Open Signal
RS O	Rollstop Open – Provides power to rollstop motor.
RS C	Rollstop Close – Provides power to rollstop motor.
RS C SG	Rollstop Close Signal
GND	Ground (Electrical).
GRND	Ground Switch.
I/O COM	Common terminal of IN/OUT switch
I/O M I	IN/OUT Motor In – Power to the IN side of the IN/OUT motor.
I/O M O	IN/OUT Motor Out – Power to the OUT side of the IN/OUT motor.
I/O MOT	IN/OUT Motor.
IN	In function.
OUTSW	Out Switch.
OUT	Out Signal.
P UP SG	Pump UP Signal – Signal to the pump solenoid.
PMOT	Pump Motor.
RSMOT	Roll Stop Motor.
RSTP	Roll Stop Switch.
SEEK	Seek level detector – Determines the level at which the lift will stop when raising or lowering the lift while stowing. Horizontal platform travel is only permitted while the SEEK level is detected. To prevent the disabling of horizontal platform travel while the platform is still in the mounting frame, the SEEK detection range is wider than the range of physically possible horizontal travel heights. When properly adjusted, the detection range center coincides with the center of the horizontal travel path. Switches ST01 and ST02 are used to define a "tighter" range around this center.
ST01	Bottom of STOW range detector. If while stowing or deploying the lift the platform is ABOVE this detection range, the platform will lower. The intersection of ranges ST01 & ST02 define the normal traveling height.
ST02	Top of STOW range detector. If while stowing or deploying the lift the platform is BELOW this detection range, the platform will rise. The intersection of ranges ST01 & ST02 define the normal traveling height.
STWD	Carriage Stowed Switch.
TOP	Top of travel detector.
U/D COM	Common terminal of the UP/DOWN switch.
UP SQ	UP Sequence – Signal which enables the UP sequence (flap up followed by platform up).
UP	Up function.
DWN	Down function.
PCSOL	Power Cut-off Solenoid.
MTR IN SG	Motor In Signal.
MTR OUT SG	Motor Out Signal.
UPA	Up Attempt.
RST O SG	Rollstop Open Signal.
RST C SG	Rollstop Close Signal.

d. Connectors

Refer to **Figure 3-2**. The standard electrical connectors used by Ricon have terminal numbers molded into the back; use these numbers and colors to identify all wires.

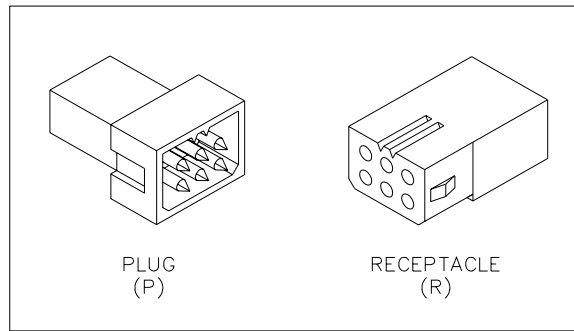


FIGURE 3-2: ELECTRICAL CONNECTORS

2. LIMIT SWITCH STATE DESCRIPTION

Refer to **Figure 3-3**. The limit switch actuation diagram shows the state of all limit switches as the platform travels from ground level, to stow level, and to vehicle floor level. The solid (O) line indicates the normally CLOSED portion of the switch is operational, while the two thin lines (=) indicates the normally OPEN portion of the switch is operational. The dotted lines (O O O) are used to show the switch states beyond the normal travel boundaries of the platform. This is useful in showing the operation of the TOP switches which change states at vehicle floor level. For proper operation of the lift, the SEEK, STO1, and STO2 switch actuations must overlap as shown.

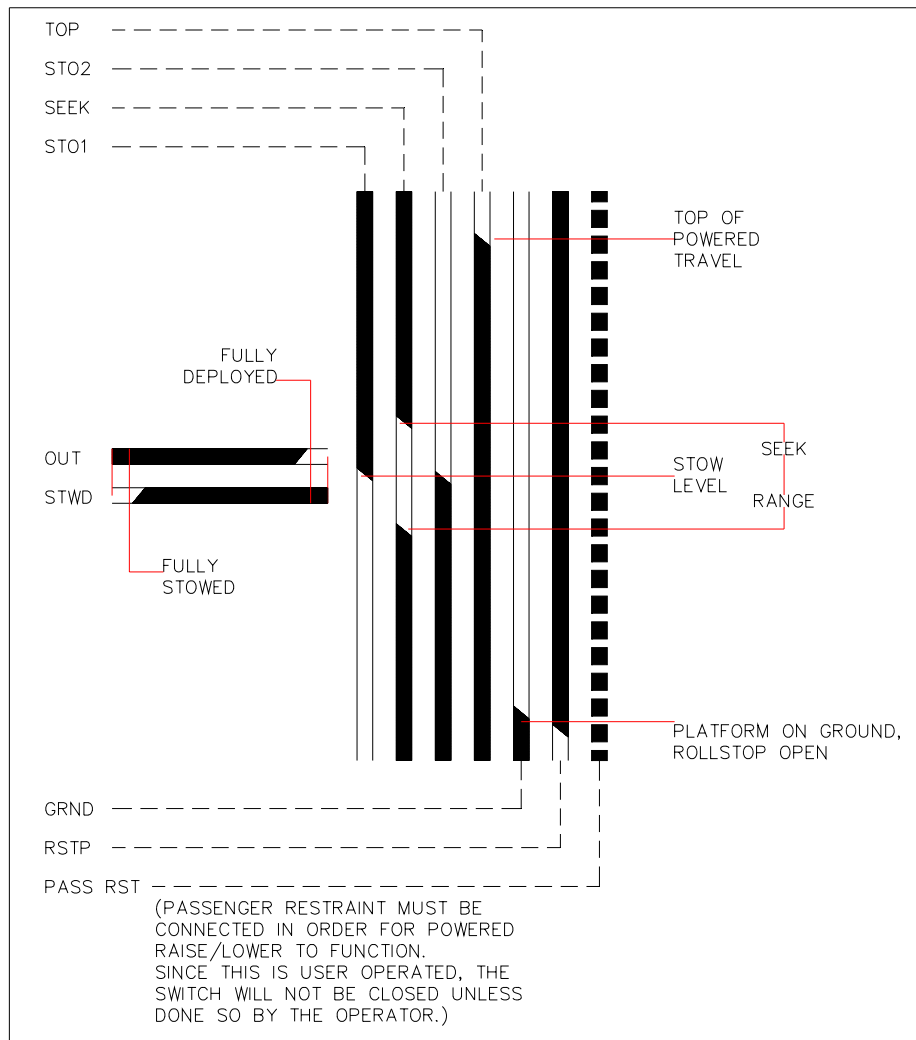


FIGURE 3-3: LIMIT SWITCH ACTUATION DIAGRAM

3. WIRING DIAGRAM

For lift electrical system schematics, refer to **Figures 3-4, 3-5, and 3-6** on the following pages.

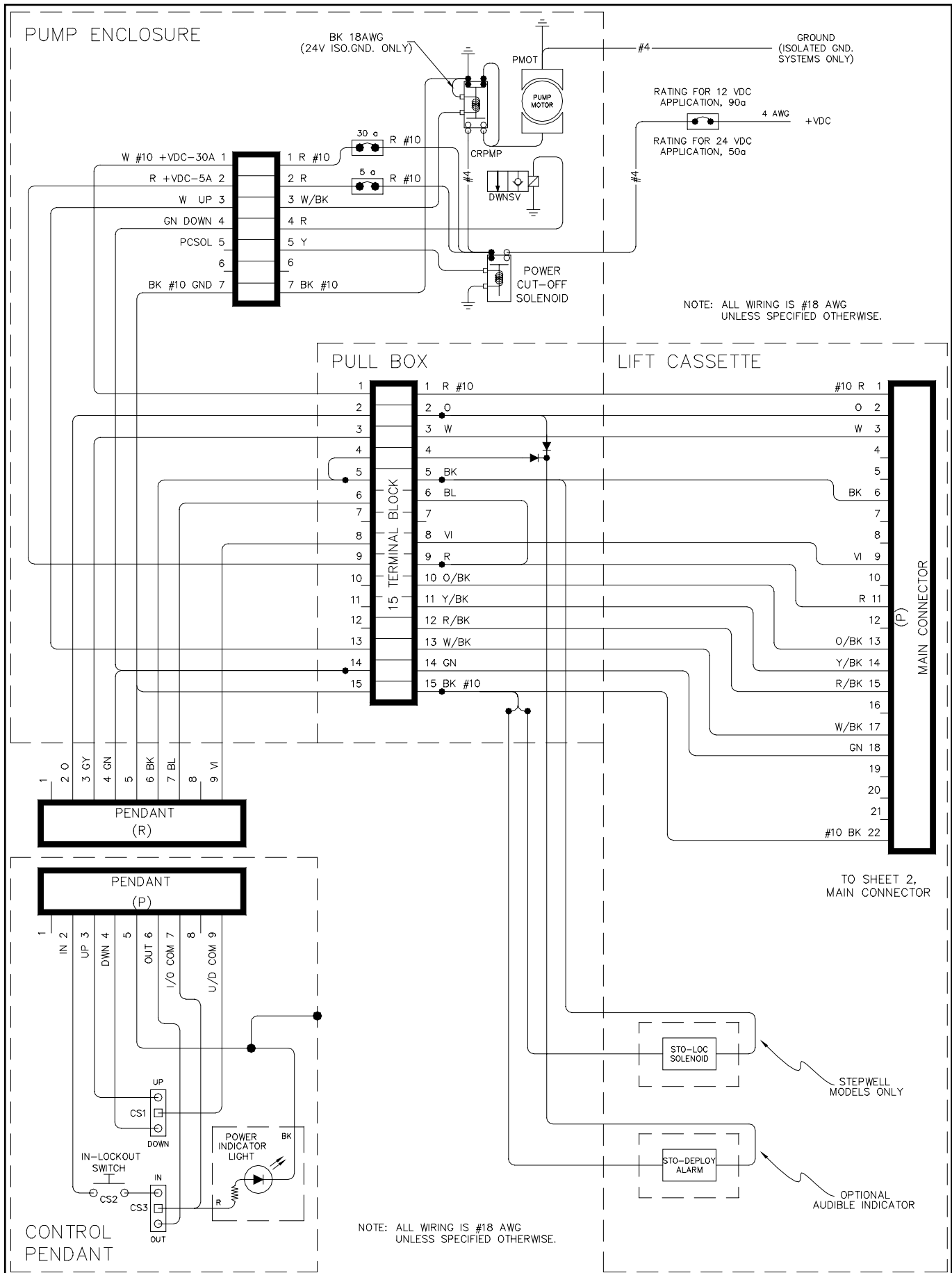


FIGURE 3-4: WIRING DIAGRAM – SHEET 1 OF 3

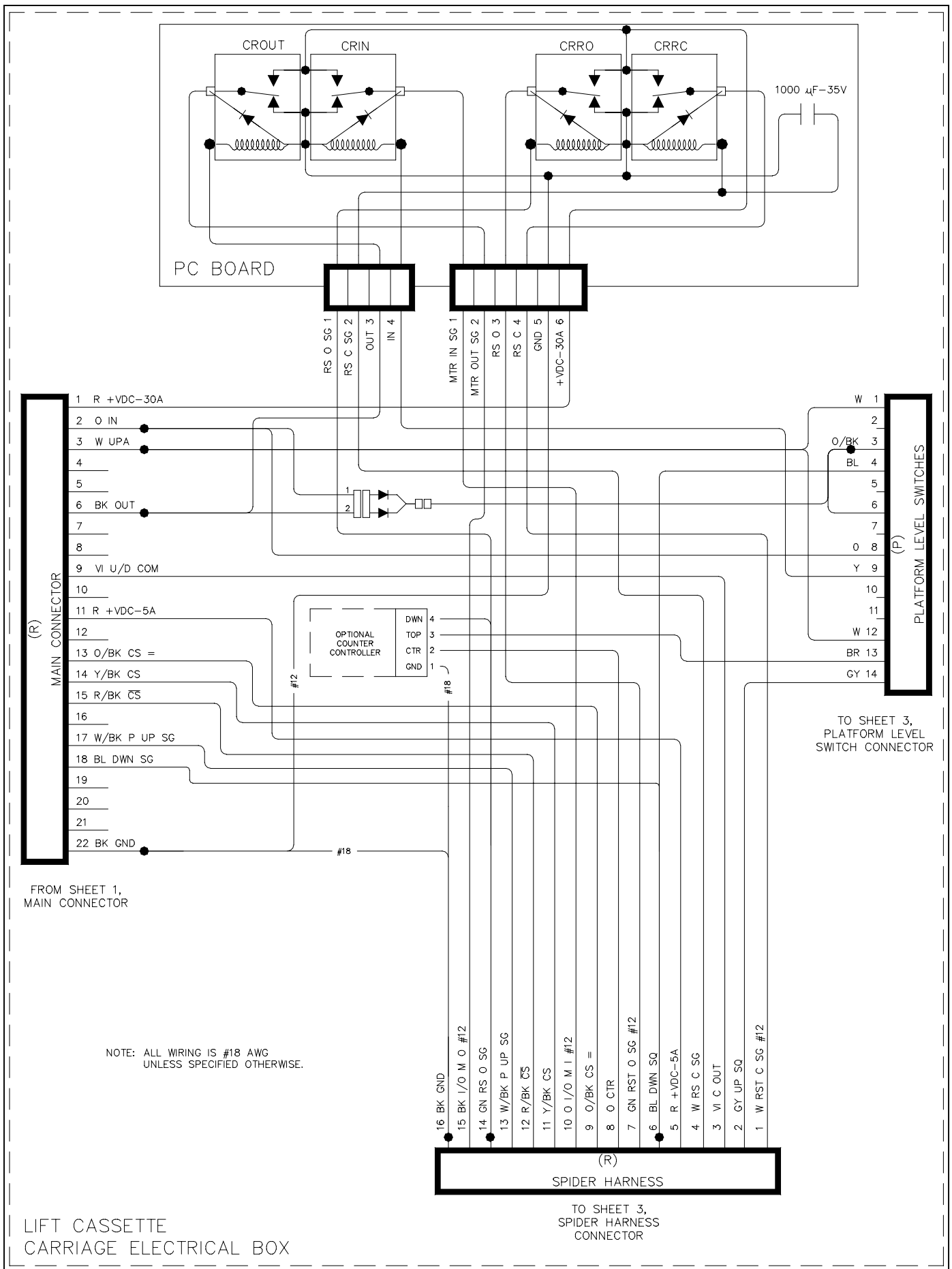


FIGURE 3-5: WIRING DIAGRAM – SHEET 2 OF 3

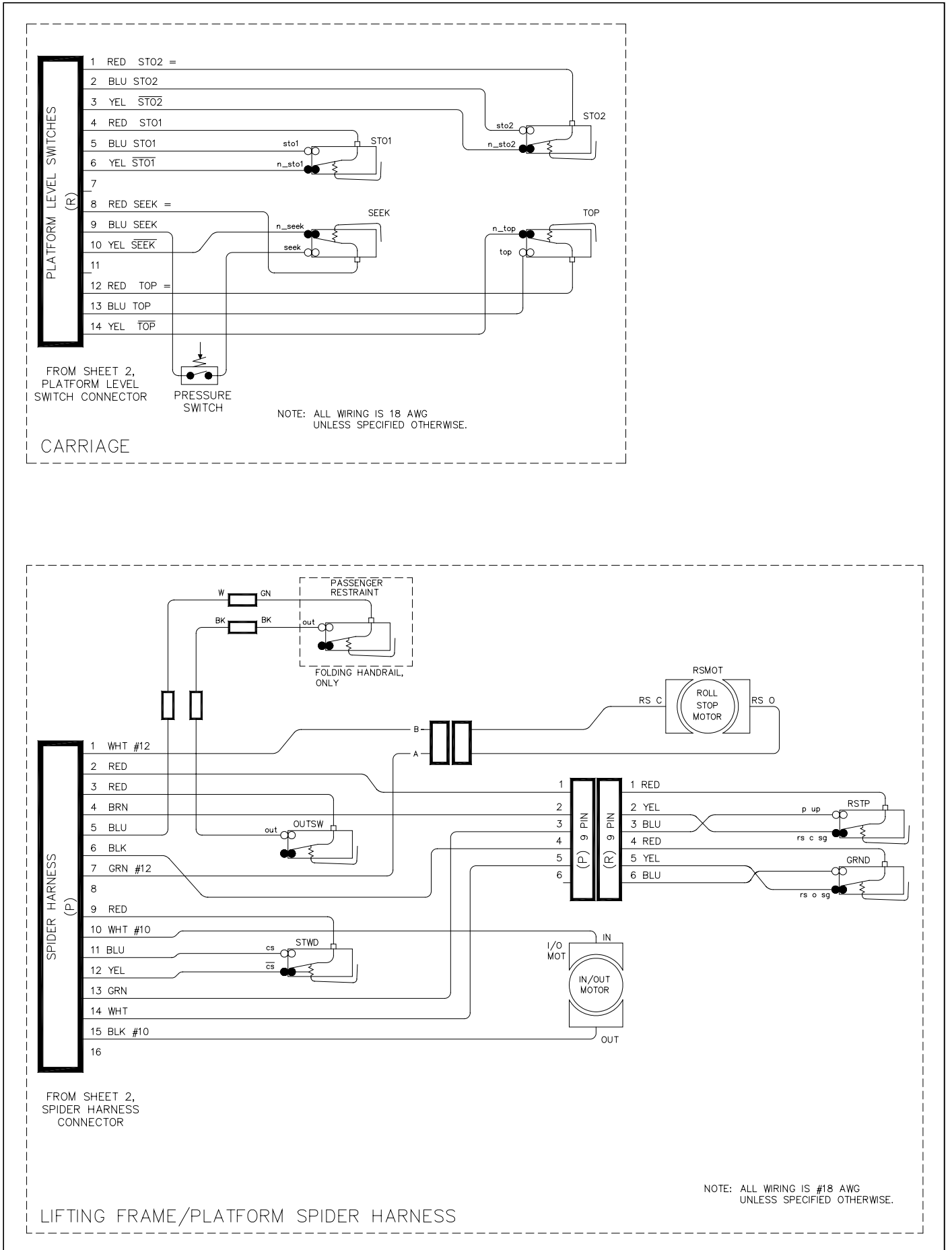


FIGURE 3-6: WIRING DIAGRAM – SHEET 3 OF 3

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IV. REPAIR

This chapter provides instructions for the major systems adjustment, repair, and replacement of the RICON Mirage F9A Series Transit Use Wheelchair and Standee Lift.

A. GENERAL SAFETY PRECAUTIONS AND WARNINGS

WARNING

THIS RICON PRODUCT IS HIGHLY SPECIALIZED. MAINTENANCE AND REPAIRS MUST BE PERFORMED ONLY BY AN AUTHORIZED RICON SERVICE TECHNICIAN USING ONLY RICON REPLACEMENT PARTS. MODIFYING OR FAILING TO PROPERLY MAINTAIN THIS PRODUCT WILL VOID THE WARRANTY AND MAY RESULT IN UNSAFE OPERATING CONDITIONS.

The following general safety precautions must be followed during service and maintenance:

- Under no circumstances should installation, maintenance, repair, and adjustments be attempted without the immediate presence of a person capable of rendering aid.
- An injury, no matter how slight, should always be attended. Always administer first aid or seek medical attention immediately.
- Protective eyeshields and appropriate clothing should be worn at all times.
- To avoid injury, always exercise caution when operating and be certain that hands, feet, legs, and clothing are not in the path of product movement.
- Batteries contain acid that can burn. If acid comes in contact with skin, flush affected area with water and wash with soap immediately.
- Always work in a properly ventilated area. Do not smoke or use an open flame near a battery.
- Do not lay anything on top of a battery.
- Check under vehicle before drilling so as not to drill into frame, subframe members, wiring, hydraulic lines, fuel lines, fuel tank, etc.
- Read and thoroughly understand the operating instructions before attempting to operate.
- Keep others clear during operation.

WARNING

- **WHEN PERFORMING SYSTEM REPAIR, DISCONNECT THE CABLE FROM THE BATTERY POSITIVE (+) TERMINAL AND/OR SAFETY TAG THE CONTROL PENDANT TO PREVENT UNWANTED OPERATION OF THE LIFT.**
- **WHEN PERFORMING SYSTEM REPAIR UNDER A RAISED PLATFORM, PROP/SUPPORT THE PLATFORM TO PREVENT UNWANTED MOVEMENT.**

CAUTION

WHEN INSTALLING MOUNTING PINS, MAKE SURE THAT THE INSTALLATION HOLES ARE PROPERLY ALIGNED AND DRIVE THE PINS WITH A SOFT, HEAVY HAMMER.
REINSTALL SET SCREWS USING THREAD SEALANT, LOctite OR omniFIT BLUE.

B. LIFT SERVICE ACCESS

Access to the internal components of the lift is from the underside. A hinged service access panel is located at the front of the lift just behind the vehicle step-riser. This procedure details how to gain access to the internal components and is referenced by procedures in this section as necessary. To gain access, follow this procedure:

1. Using the control pendant, deploy the platform →/OUT.

WARNING

- **WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.**
- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE OPENING OR CLOSING TO PREVENT THE PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- Refer to **Figure 4-1**. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.

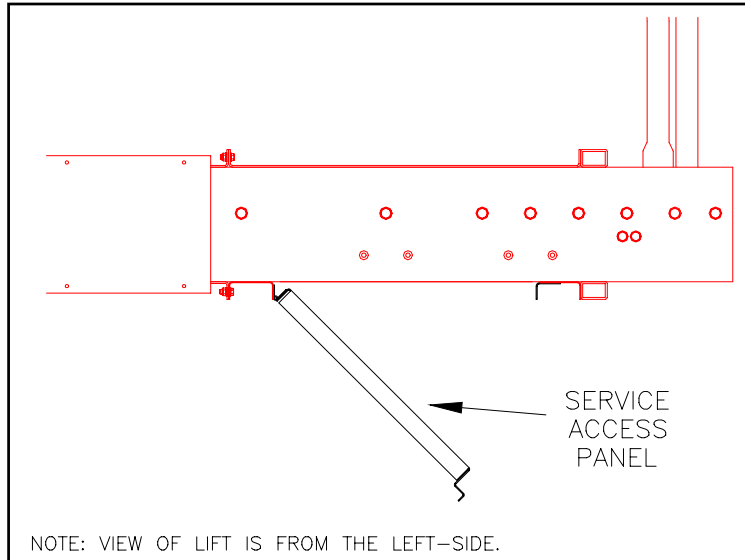


FIGURE 4-1: SERVICE ACCESS PANEL (OPEN)

C. ROLLSTOP, PLATFORM AND FRAMES

For platform and frame repair, refer to **Figure 4-2** and the following sections:

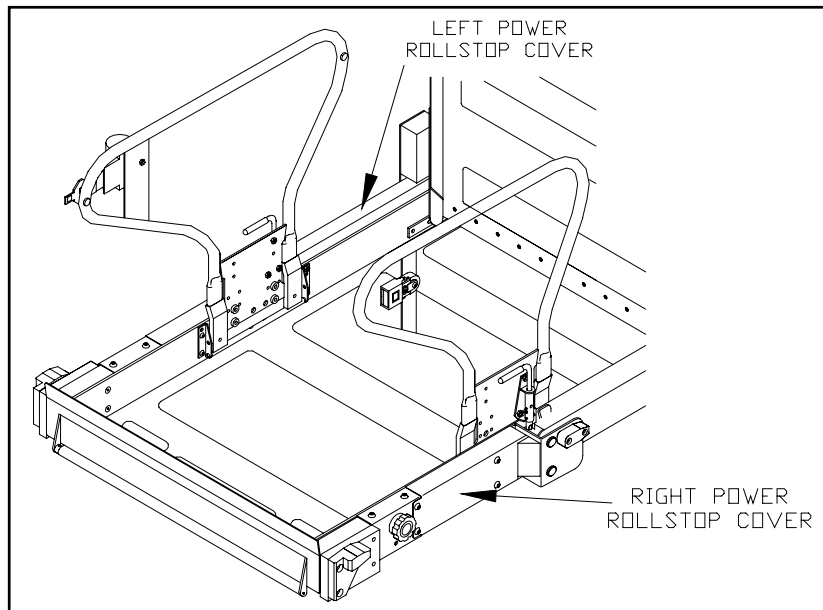



FIGURE 4-2: POWER ROLLSTOP COVERS

1. ROLLSTOP MAINTENANCE

a. Rollstop Lubrication

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.

 WARNING
<ul style="list-style-type: none">• WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.• DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.• DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 3) Remove the platform left and right side channel covers.
- 4) At the RIGHT-SIDE of the platform, remove the four mounting bolts and washers, guide block if applicable, cover (spacer), and shims from the housing channel. Repeat this step for the left-side.
- 5) At the rollstop manual control knob, use a 1/8" punch and small hammer to remove the knob retaining roll pin. Remove the control knob.
- 6) Remove the right and left manual release bracket assemblies.
- 7) Refer to **Figure 4-3**. Lubricate the pivot points of the rollstop mechanism on both sides of the platform using a light grease (Curtisol Red Grease No.88167). Wipe away excess grease.
- 8) Reinstall the shims, cover (spacer), guide block if applicable, washer and mounting bolts, and

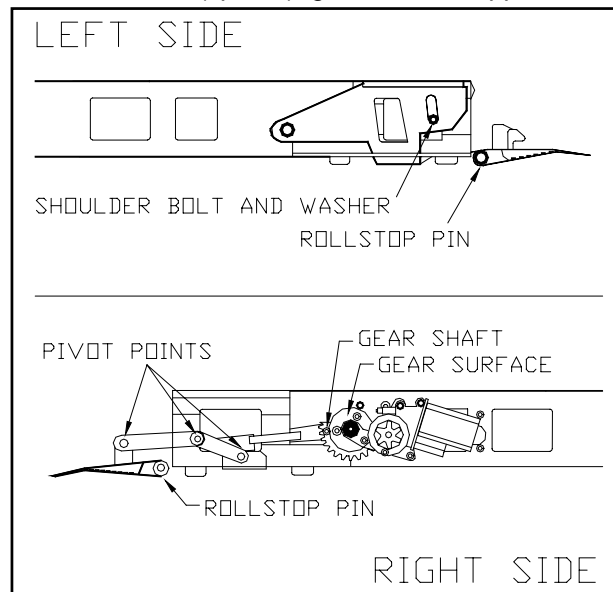



FIGURE 4-3: ROLLSTOP LUBRICATION POINTS


side channels.

 WARNING
<ul style="list-style-type: none">• WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.• DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.• DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- 9) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 10) Remove platform support and stow the lift.

b. Rollstop Opening/Actuation Point Adjustment

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.

 WARNING	
<ul style="list-style-type: none">• WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.• DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.• DO NOT LAY ANYTHING ON TOP OF A BATTERY.	

- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 3) Refer to **Figure 4-4**. Loosen motor actuator cam retaining screws and rotate the cam as far away from the switch as possible.

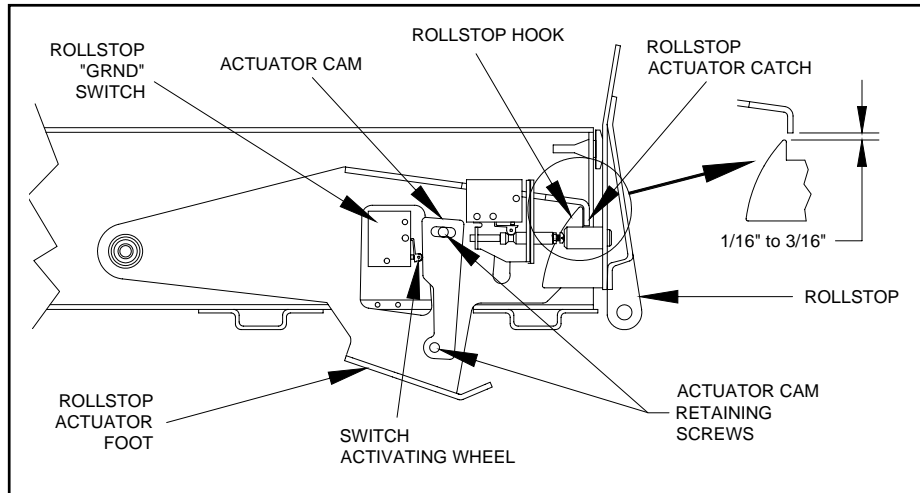



FIGURE 4-4: ROLLSTOP ACTUATION

- 4) Raise the rollstop actuator foot manually until the catch is approximately 1/16" to 3/16" above the rollstop hook.
- 5) Move the cam toward the switch, deflecting the switch actuator wheel until a faint click is heard. This indicates the actuation point.
- 6) Tighten the cam retaining screws to prevent further movement of the cam. Release the rollstop actuator foot to its fully extended position.
- 7) Raise the actuator foot and listen for the faint click of the actuation point. The actuation point must occur as indicated. Move the cam toward the switch to increase the gap and away to decrease the gap.
- 8) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 9) Remove the platform support and stow the lift.

c. Rollstop Closing/Actuator Link Adjustment

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.

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- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

- 3) At the RIGHT-SIDE of the platform, remove the four mounting bolts and washers, guide block if applicable, cover (spacer), and shims from the housing channel.
- 4) Refer to **Figure 4-5**. Loosen the lock-nut and adjust the length of the link by turning the center section. Turning the top of the center section toward the platform will shorten the adjustable link and turning it away from the platform will lengthen it. The link must be adjusted so the rollstop closes to within 1/32" of the rubber bumpers.
- 5) Reinstall the shims, cover (spacer), guide block if applicable, washer and mounting bolts.
- 6) At the vehicle battery/engine compartment, reconnect the cable to the battery positive (+) terminal.
- 7) Remove the platform support and stow the lift.

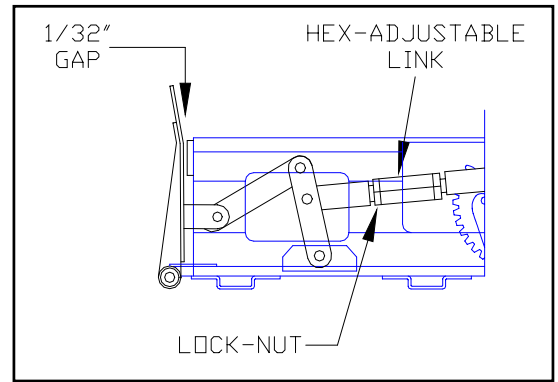


FIGURE 4-5: ROLLSTOP CLOSE ADJUSTMENT

d. "Rollstop Up" / "Raise" Function Transition (RSTP switch.)

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.
- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 3) At the LEFT-SIDE of the platform, remove the four mounting bolts and washers, guide block if applicable, cover (spacer), and shims from the housing channel.
- 4) Have an assistant hold the rollstop actuator foot UP. Using the rollstop manual control knob and one hand on the rollstop, OPEN the rollstop.
- 5) Refer to **Figure 4-6**. Adjust the RSTP switch by loosening the locking nut and turning the adjusting screw protruding from the end of the switch plunger. Turn the screw clockwise to delay activation of the switch, and counter-clockwise to accelerate activation of the switch. The lock nut should be firmly locked against the plunger in order for the switch to maintain adjustment.

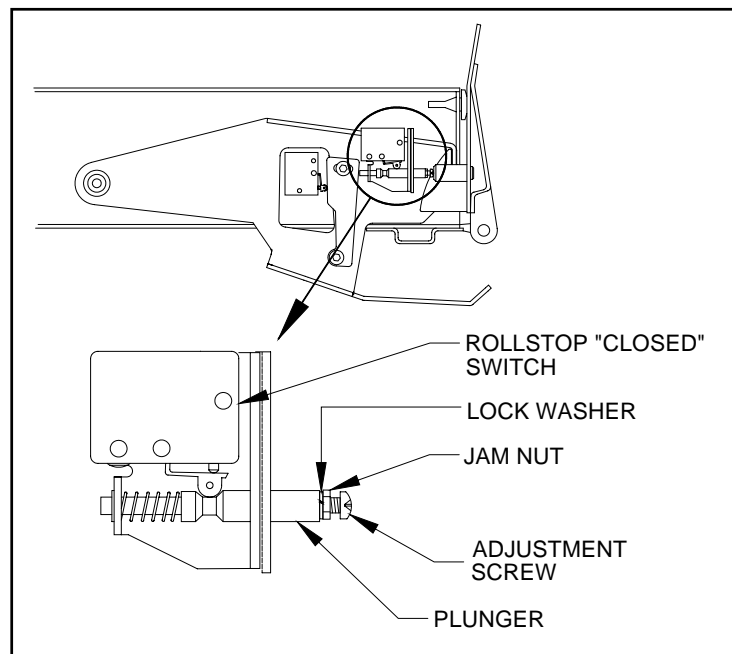


FIGURE 4-6: RSTP SWITCH ADJUSTMENT

NOTE: In order to turn the locking nut and the screw relative to the plunger, the plunger may need to be held with a small pair of pliers. If so, use care not to place grooves or burrs on the plunger surface, as they could cause the switch to function improperly.

- 6) Close the rollstop and reinstall the cover (spacer), guide block if applicable, washer and mounting bolts.

- 7) At the vehicle battery/engine compartment, reconnect the cable to the battery positive (+) terminal.
- 8) Stow the lift.

2. PLATFORM

a. Platform Removal

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.
- 2) Refer to **Figure 4-7**. On the RIGHT-SIDE of the lift at the junction of the traveling frame and platform, remove the traveling frame and lower arm assembly set screws. Repeat this step for the LEFT-SIDE.

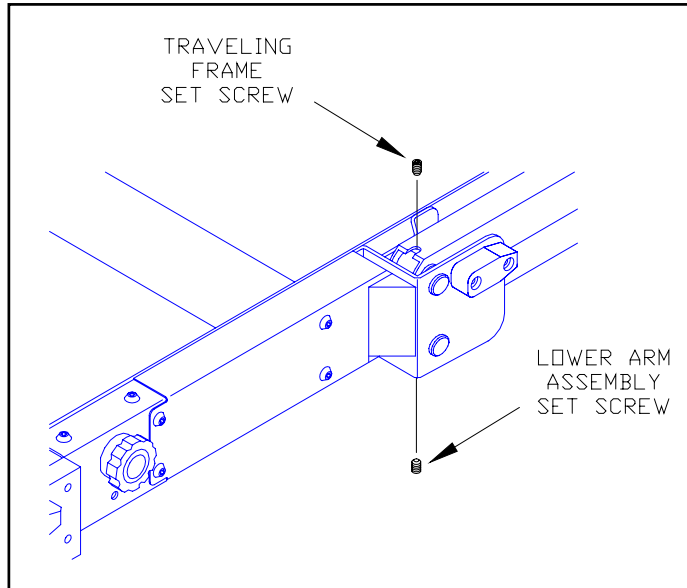


FIGURE 4-7: TRAVELING FRAME/PLATFORM SET-SCREWS

- 3) Raise the lift platform ↑/UP to vehicle floor level and support the platform.



WARNING

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- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 4) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

- 5) Refer to **Figure 4-8**. On the **RIGHT-SIDE** of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.

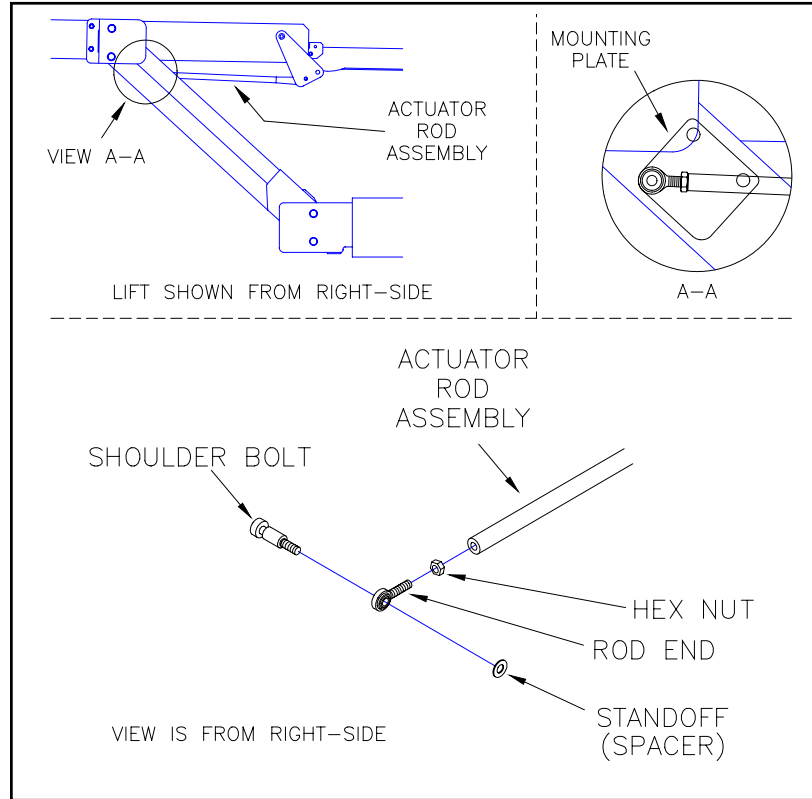


FIGURE 4-8: BRIDGEPLATE ACTUATOR ROD REMOVAL

- 6) Using one hand to catch the standoff/spacer as it falls, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate.
- 7) On the **LEFT-SIDE** of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.
- 8) Using one hand to catch the standoff/spacer as it falls and an assistant to hold the bridgeplate, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate. By hand, fold bridgeplate over onto lift platform and rotate bridgeplate actuator arms parallel to platform. Secure bridgeplate and actuator arms to the platform with cable ties.
- 9) At the **RIGHT-SIDE** of the platform, remove the four mounting bolts and washers, guide block if applicable, cover (spacer), and shims from the housing channel. Repeat this step for the left-side.
- 10) Remove platform side channel covers.
- 11) Disconnect the electrical cables on both sides of the platform. Remove any cable ties holding the cables in place. Remove the connector housings from the cables on both sides of the lift platform, noting the proper pin positions for each wire (this will be used during platform installation), refer to wiring schematic.

CAUTION

- **SUPPORT THE PLATFORM BECAUSE IT WILL BE FREE TO ROTATE WHEN THE LOWER MOUNTING PINS ARE REMOVED.**
- **THE PLATFORM MOUNTING PINS ARE REMOVED BY PLACING A SMALL PRY BAR BETWEEN THE PLATFORM AND THE END OF THE PIN, PUSHING THE PIN OUT UNTIL IT IS FLUSH WITH THE BRACKET, AND PULLING THE PIN OUT.**
- **DO NOT DAMAGE THE SURFACE OF THE PIN DURING REMOVAL. IF THE PIN'S OUTER SURFACE IS DAMAGED (PITTED OR GROOVED) DURING REMOVAL, THE PIN SHOULD BE DISCARDED AND REPLACED.**

- 12) Refer to **Figure 4-9**. Remove the bottom platform mounting pins from the mounting brackets and lower the parallel arms out of the platform mounting brackets.

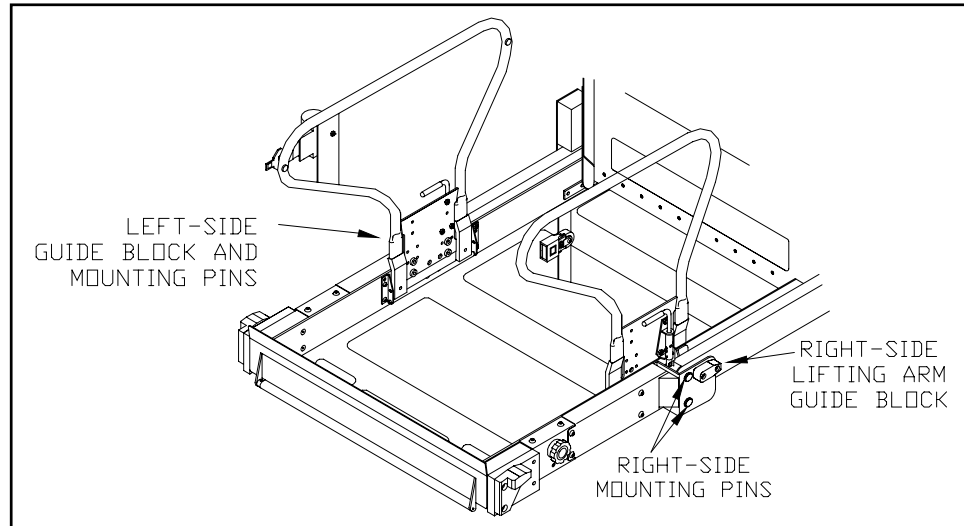


FIGURE 4-9: PLATFORM MOUNTING PINS AND GUIDE BLOCKS

- 13) Pass the free end of the electrical cables through the platform mounting brackets.
- 14) Remove the upper pins in the platform mounting brackets. These pins are removed in a manner similar to the removal of the lower parallel arm pins.
- 15) Removed the platform from the lifting frame.


b. Platform Installation

Installation is performed by repeating the removal steps in reverse order, with a few minor considerations. Be certain that the bracket and lifting frame holes are properly aligned and drive the mounting pins into place using a soft, heavy hammer. Reinstall the set screws using a thread sealant (loc-TITE or omniFIT blue is recommended) and tightened.

3. BRIDGEPLATE LUBRICATION AND ADJUSTMENT

a. Bridgeplate Lubrication

- 1) Using the control pendant, deploy the platform →/OUT and support the platform.

 WARNING
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- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

- 3) Refer to **Figure 4-10** (DISASSEMBLY IS NOT REQUIRED). Lubricate the spring pivot points, cam followers, and the actuator rod pivot points using a light grease (Curtisol Red Grease No.88167). Wipe clean any excess grease.
- 4) At the vehicle battery/ engine compartment, re-connect the cable to the battery positive (+) terminal.
- 5) Remove the platform support and stow the lift.

b. Bridgeplate Adjustment

The bridgeplate deployment is controlled by the bridgeplate actuator rod. The length of the rod determines the position of the bridgeplate relative to the platform as it moves through its vertical travel. The actuator rod must be adjusted to allow the bridgeplate to fully deployed as the platform reaches the vehicle floor level.

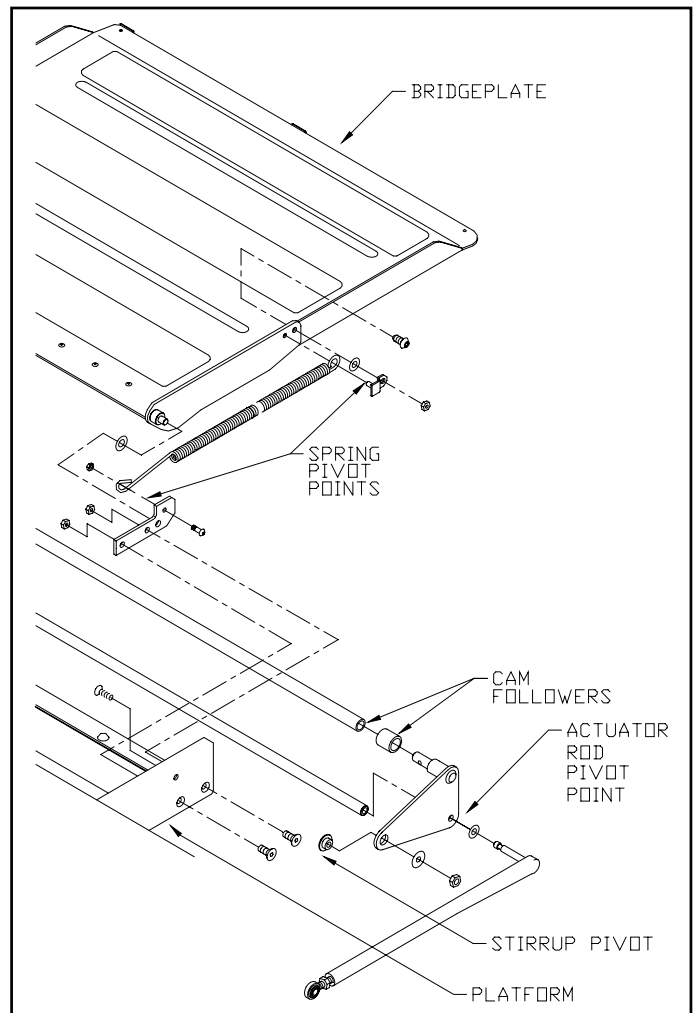


FIGURE 4-10: BRIDGEPLATE LUBRICATION POINTS

! WARNING

INCORRECT DEPLOYMENT OF THE BRIDGEPLATE CAN CREATE A POTENTIALLY DANGEROUS SITUATION FOR A LIFT USER, AND CAUSE DAMAGE TO THE BRIDGE PLATE AND/OR PLATFORM. MAKE SURE THAT THE BRIDGEPLATE IS ADJUSTED CORRECTLY.

- 1) Using the control pendant, deploy the platform →/OUT.
- 2) Raise the lift platform ↑/UP to vehicle floor level and support the platform.

! WARNING

- **WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.**
- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 3) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.

- 4) Refer to **Figure 4-11**. On the **RIGHT-SIDE** of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.

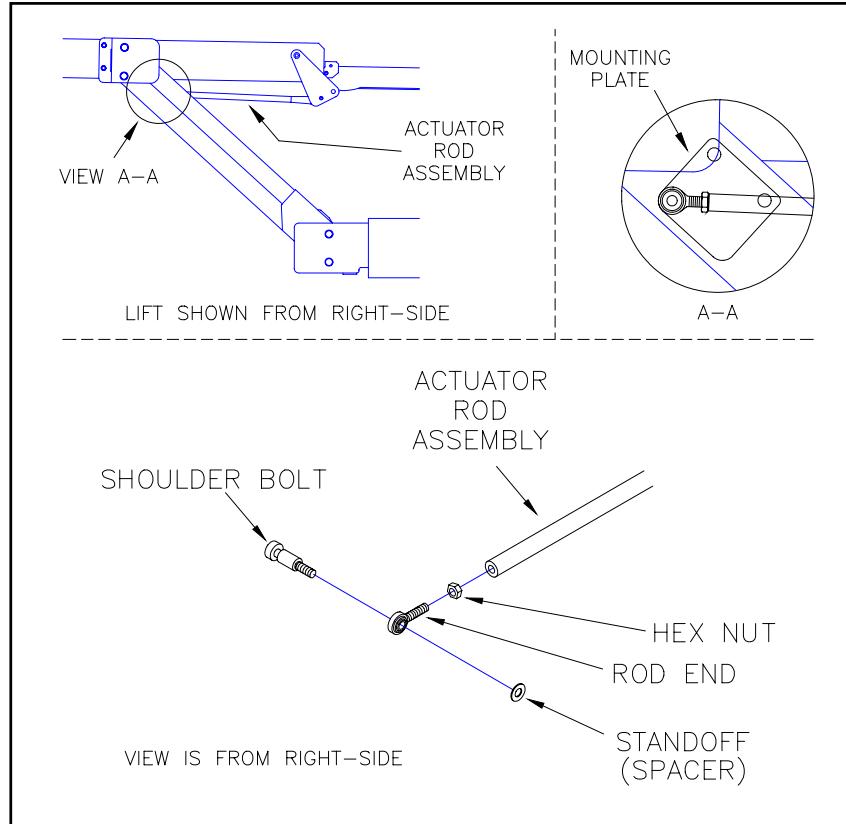


FIGURE 4-11: BRIDGEPLATE ACTUATOR ROD ASSEMBLY

- 5) Using one hand to catch the standoff/spacer as it falls, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate.
- 6) On the **LEFT-SIDE** of the lift between the junction of the traveling frame and the platform assembly, locate the rod end of the actuator rod assembly. Loosen the rod end hex-nut.
- 7) Using one hand to catch the standoff/spacer as it falls and an assistant to hold the bridgeplate, loosen and remove the shoulder bolt fastening the actuator rod assembly to the mounting plate. By hand, lower the bridgeplate to the vehicle floor.

NOTE: THE ACTUATOR ROD END IS LEFT-HAND THREAD. TURNING THE ROD END CLOCKWISE LENGTHENS THE ROD OR COUNTER-CLOCKWISE SHORTENS THE ROD.

- 8) Refer to **Figure 4-12**. Turn the rod end to shorten or lengthen the actuator rod assembly so that the bridgeplate cam follower is between 1/8" - 3/16" from the cam of the bridgeplate when the shoulder bolt is reinstalled. Measure and note the distance between the rod end mounting hole and the actuator rod. Reinstall the standoff/spacer, the shoulder bolt, and tighten the rod end hex-nut.

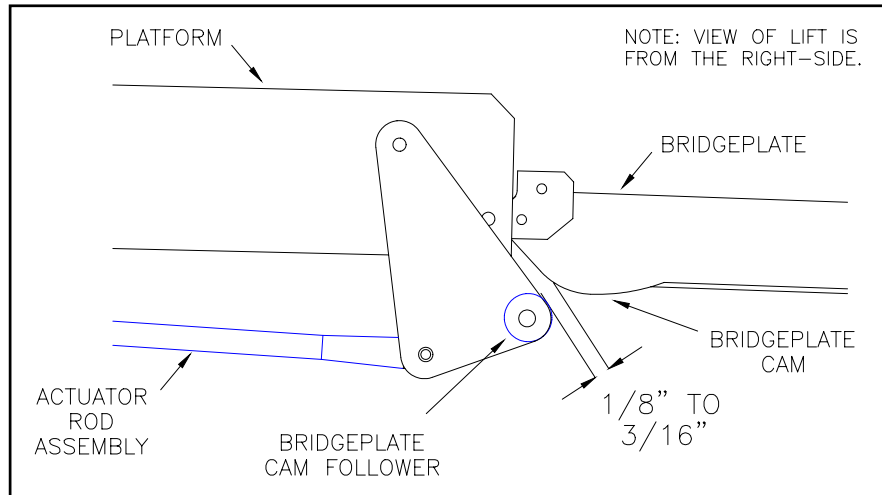



FIGURE 4-12: BRIDGEPLATE ADJUSTMENT DIAGRAM

- 9) On the RIGHT-SIDE of the lift, turn the rod end to shorten or lengthen the actuator rod assembly so that the distance between the rod end mounting hole and the actuator rod is the same as measured in the above step. Reinstall the standoff/spacer, the shoulder bolt, and tighten the rod end hex-nut.

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- 10) At the vehicle engine/battery compartment, connect the cable to the battery positive (+) terminal.
- 11) Remove platform support and stow lift.

4. LIFTING FRAME

a. Lifting Frame Removal

- 1) Refer to PLATFORM REMOVAL. Remove the lift platform.
- 2) Using the manual backup pump, raise the lifting frame as far as possible.

- 3) Refer to **Figure 4-13**. Remove the set screws that secure the lifting frame and center pivot pins to the carriage.

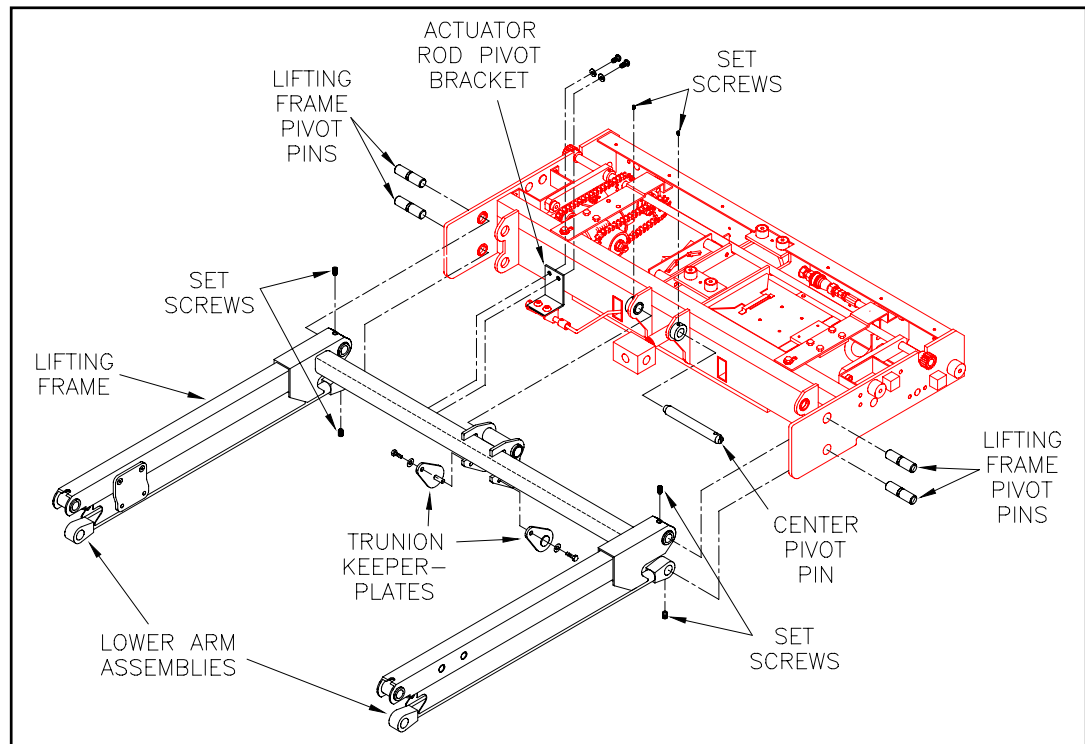


FIGURE 4-13: LIFTING FRAME REFERENCE DIAGRAM

- 4) Using a drift and a hammer, remove the BOTTOM pivot pins on each side of the carriage and remove the lower arm assemblies.
- 5) Remove the trunion keeperplate assemblies.
- 6) Remove the actuator rod pivot bracket bolts and allow the bracket to swing down.
- 7) Have an assistant raise and hold the lifting frame as far up as it will go.
- 8) Using a drift and a hammer, remove the UPPER lifting frame and CENTER pivot pins from the carriage.
- 9) Pull the lifting frame away from the carriage.

b. Lifting Frame Installation

Installation is performed by reversing the removal steps, with a few minor considerations. Be certain that the bracket and lifting frame holes are properly aligned and drive the pivot pins into place using a soft, heavy hammer. Reinstall the set screws using a thread sealant (loc-TITE or omni-FIT blue is recommended).

5. TRAVELING FRAME

The lifting system is operated whenever the hydraulic pump unit is activated either electrically or manually. The pump unit creates pressure as hydraulic fluid is pumped into the cylinder. The hydraulic cylinder moves the lifting arm structure which raises the platform.

a. Traveling Frame Removal

- 1) Perform LIFT ACCESS SERVICE located in the beginning of this section.
- 2) Manually raise the platform to a comfortable working height and support the platform.
- 3) Manually lower the platform until it rests on the support. Close the manual release valve until lightly-snug.

- 4) Refer to **Figure 4-14**. The two bolts fastening each carriage stop block to the mounting frame channel are accessible from under the vehicle or from the front of the lift, inside the step well. Remove the bolts and both carriage stop blocks.

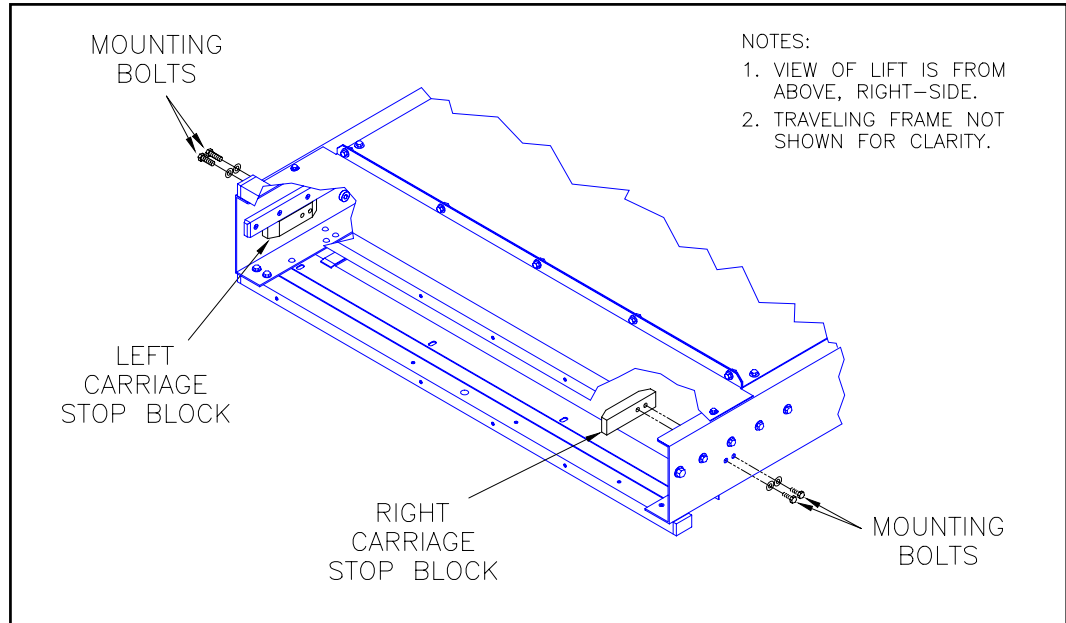


FIGURE 4-14: CARRIAGE STOP BLOCKS

- 5) Refer to **Figure 4-15**. Pull the final drive shaft DOWN (to disengage the gear rack) and tie it down with cable ties.

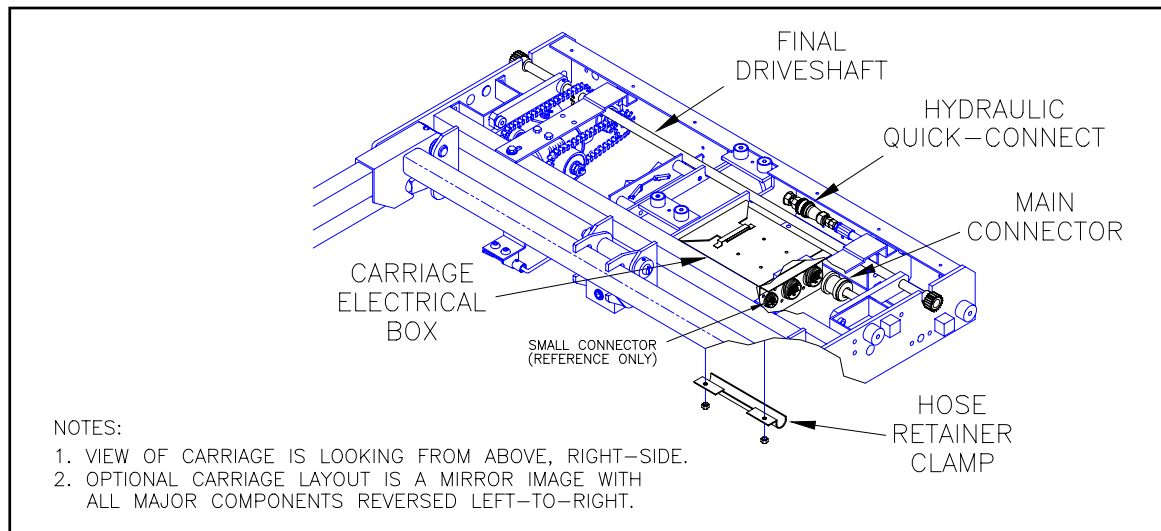


FIGURE 4-15: TRAVELING FRAME (CARRIAGE) REFERENCE DIAGRAM

- 6) Remove the two lock-nuts fastening the hose retainer clamp (located at the bottom, rear-center of the carriage) and remove the clamp.
- 7) Have rags available to clean-up spilled hydraulic fluid and disconnect the hydraulic quick-disconnect from the hydraulic cylinder.
- 8) Disconnect the main electrical connector from the carriage electrical box.
- 9) Position a small cart or table, with a height slightly lower than the platform, in front of the lift enclosure onto which the traveling frame can be placed.

WARNING

THE TRAVELING FRAME ASSEMBLY IS LARGE AND HEAVY. REMOVAL REQUIRES AT LEAST TWO (PREFERABLY THREE) PEOPLE.

- 10) While providing support on each side of the traveling frame, pull the traveling frame out of the lift enclosure.

b. Traveling Frame Installation

Installation of the traveling frame is performed by repeating the removal steps in reverse order, with a few minor considerations. Before inserting the traveling frame, pull the hydraulic hose and the electrical cable down through the service access panel. After insertion of the traveling frame, route the hose and cable through the carriage in the original position.

D. DEPLOYMENT SYSTEM

Refer to **Figure 4-16**. The deployment system of the lift moves the platform and lifting frame out of and into the lift cassette. This section describes the major components of the deployment system, how they operate, how to remove and replace them, and (where applicable) adjustment procedures.

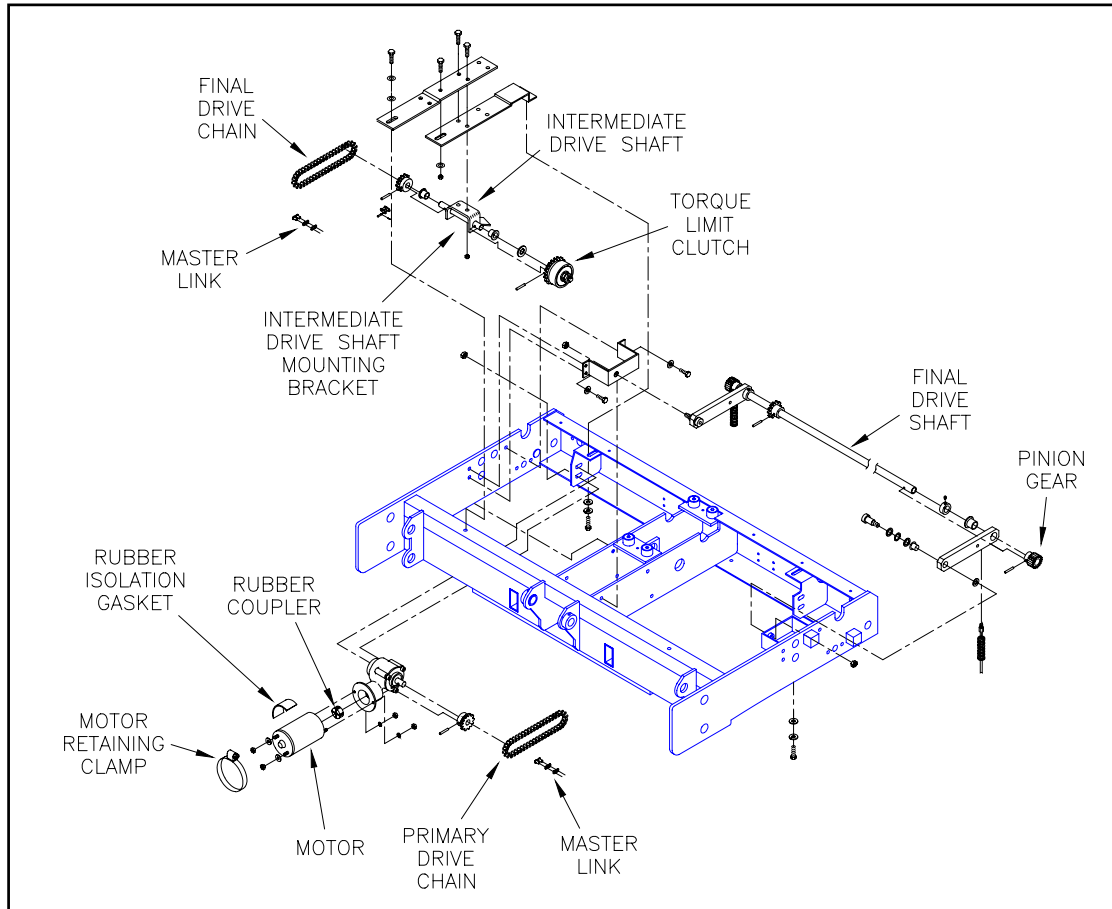


FIGURE 4-16: DEPLOYMENT COMPONENTS REFERENCE DIAGRAM

1. IN/OUT MOTOR AND GEARBOX

The In/Out Motor powers the deployment system. The motor receives electrical power from the on-board carriage control box with a polarity which determines a direction of movement. The motor rotates the input shaft to the gear box which reduces the output of the motor to a usable speed, and also increases the motor torque. The input shaft drives the output shaft which drives the primary drive chain.

a. In/Out Motor and Gearbox Removal

- 1) Using the control pendant, deploy the platform →/OUT.

WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 2) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 3) Move the carriage IN or OUT to position the primary drive chain master-link at the bottom-center of the chain.

- 4) Support the lift platform.

 **WARNING**

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- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 5) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 6) Loosen, but do not remove, nuts fastening the gear box to the lift carriage.
- 7) Label and remove the motor leads located at the platform end of the motor.
- 8) Remove the motor retaining clamp fastening the motor to the intermediate drive shaft mounting bracket.
- 9) Slide the gearmotor assembly toward the lift platform.
- 10) Remove the primary drive chain master link and primary drive chain.
- 11) Remove the nuts and lock washers fastening the gearbox to the lift carriage with one hand, while supporting the gearmotor assembly with the other hand.
- 12) Remove the rubber isolation gasket from between the gearmotor and idlershaft assembly and remove the gearmotor assembly from the carriage.
- 13) Remove the nuts and washers fastening the motor to the gear box (these are located on the mating flange of the gear box).
- 14) Separate the motor from the gear box by pulling them apart, being careful not to damage or loose the rubber coupler mating the motor output shaft to the gear box input shaft.

NOTE: This procedure assumes that the In/Out Motor and Gearbox will be reinstalled and does not contain any closing/completion steps.

b. In/Out Motor and Gearbox Installation

NOTE: This procedure assumes that the In/Out Motor and Gearbox have been removed and does not contain any opening/preliminary steps.

- 1) Install coupler mating the gear box input shaft to the motor output shaft onto the gear box input shaft.
- 2) Place the motor output shaft onto the coupler and twist motor to its proper alignment position. Push the motor studs through the gear box holes until the motor surface and gear box flange are in contact.
- 3) To achieve proper alignment of the motor and gear box:
 - Hold motor with electrical connector studs pointing towards you, and the output shaft pointing away.
 - Rotate motor about its shaft so that the electrical connectors are on the bottom.
 - old gear box with its input shaft pointing towards you.
 - Align motor studs with holes in gear box flange.
- 4) Install the star washers and nuts onto the motor studs.
- 5) Place the gearmotor assembly into the lift carriage, with the gear box studs placed through the slots in the mounting tab welded to the carriage.
- 6) Install the lock washers and nuts that fasten the gear box onto the carriage. Leave the nuts loose enough such that the gearmotor assembly position can still be adjusted.
- 7) Install the motor retaining clamp, being sure to reinstall the vibration isolation gasket between the Stow/Deploy motor and the intermediate drive shaft mounting bracket. Allow enough slack to permit drive chain adjustment.
- 8) Refer to PRIMARY DRIVE CHAIN INSTALLATION. Install the primary drive chain connecting the gear box to the clutch assembly.

- 9) Connect the motor electrical connectors using the nuts and washers removed during removal of the motor.

 **WARNING**

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 10) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

 **WARNING**

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- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 11) At the vehicle battery/engine compartment, connect the cable to the battery positive terminal.

2. DRIVE CHAINS

The drive chains transfer power from the gear box, through the clutch mechanism, to the final drive shaft. The drive line from the gear box to the final drive system consists of a primary drive chain, an intermediate drive shaft and a secondary drive chain.

a. Final Drive Chain Removal

- 1) Fully deploy the lift.
- 2) Raise the lift platform to a comfortable working height and support the platform.

 **WARNING**

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 3) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 4) Move the carriage assembly forward or backward using the DEPLOY or STOW function to orient the final drive chain master link near the bottom-center of the chain for removal.

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- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 5) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 6) Loosen the nuts fastening the gear box to the lift carriage.
- 7) Loosen the bolts fastening the intermediate drive shaft mounting bracket to the carriage. The front bolt is accessible from the top of the lift unit. The rear bolt is accessible from below through the service access panel. Place an open end wrench over the top of the intermediate drive shaft mounting bracket.
- 8) Move the gearmotor assembly away from the lift platform. A small pry bar may be inserted between the motor and the front of the carriage to gain leverage.

NOTE: **DO NOT FORCE THE GEARMOTOR.** If it does not move easily, loosen the retaining studs or the motor retaining clamp to attain more freedom of movement.

- 9) Remove the final drive chain master link and final drive chain.

NOTE: This procedure assumes that a final drive chain will be reinstalled and does not contain any closing/completion steps.


b. Primary Drive Chain Removal

- 1) Fully Deploy the lift.
- 2) Raise the lift platform to a comfortable working height and support the platform.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 3) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 4) Move the master link of the primary drive chain to the bottom by pressing the DEPLOY switch. With the final drive chain removed, the intermediate drive shaft will rotate.

NOTE: If both chains are being removed, electric power to lift will need to be restored in order for the DEPLOY button to move the chain.

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- 5) Disconnect the battery positive (+) cable.
- 6) Loosen the motor retaining clamp that fastens the stow/deploy motor to the intermediate drive shaft mounting bracket.
- 7) Loosen the nuts fastening the gear box to the lift carriage.
- 8) Move the gearmotor assembly away from the lift platform. A small pry bar may be inserted between the motor and the front of the carriage to gain leverage.

NOTE: **DO NOT FORCE THE GEARMOTOR.** If it does not move easily, loosen the retaining studs or the motor retaining clamp to attain more freedom of movement.

- 9) Remove the primary drive chain master link and primary drive chain.

NOTE: This procedure assumes that a primary drive chain will be reinstalled and does not contain any closing/completion steps.

3. DRIVE CHAIN INSTALLATION

a. Final Drive Chain Installation

NOTE: This procedure assumes that a final drive chain has been removed and does not contain any opening/preliminary steps.

- 1) Install the final drive chain over the sprocket on the final drive shaft and over the sprocket on the intermediate drive shaft. (This should be done with the intermediate drive shaft mounting bracket in such a position that the final drive chain will be slack.)
- 2) Install the master link into the final drive chain.
- 3) Refer to FINAL DRIVE CHAIN ADJUSTMENT. Adjust the final drive chain.

b. Primary Drive Chain Installation

NOTE: This procedure assumes that a primary drive chain has been removed and does not contain any opening/preliminary steps.

- 4) Install the primary drive chain over the sprocket on the gear box output shaft and over the clutch assembly.
- 5) Install the master link into the primary drive chain. (This should be done with the gearmotor assembly and intermediate drive shaft mounting bracket in such positions that the primary drive chain will be slack.)

6) Refer to PRIMARY DRIVE CHAIN ADJUSTMENT. Adjust the primary drive chain.

4. DRIVE CHAIN ADJUSTMENT

For adjustment of the drive chains, refer to **Figure 4-17** and the following sections:

NOTE: When adjusting both drive chains, adjust the final drive chain first. This allows for tightening of the intermediate drive shaft mounting bracket. The primary drive chain adjustment may then be set.

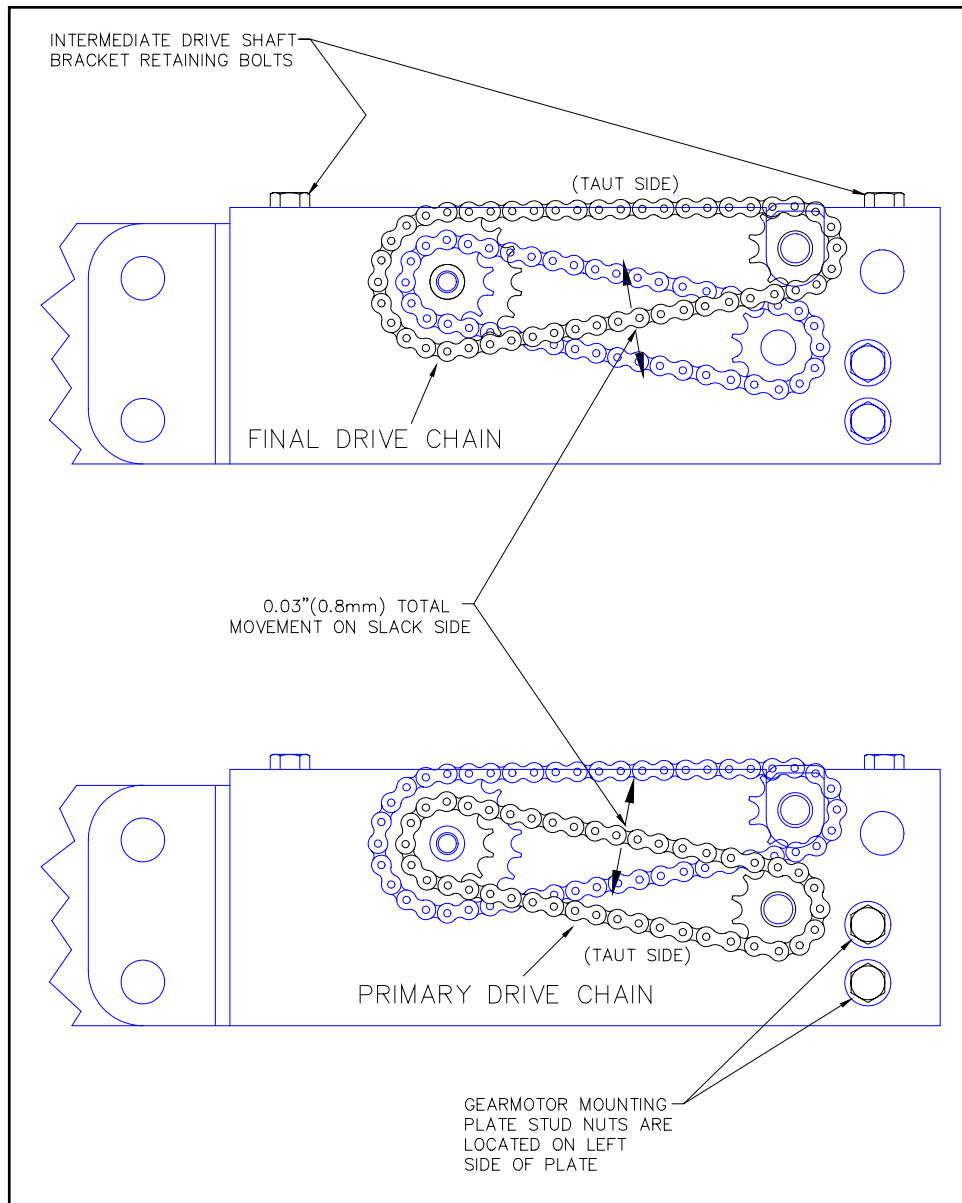


FIGURE 4-17: DRIVE CHAIN ADJUSTMENT DIAGRAM

a. Final Drive Chain Adjustment

NOTE: This procedure assumes that the lift is in a raised position and the access service panel is open. If not refer to LIFT SERVICE ACCESS.

- 1) Loosen the bolts fastening the intermediate drive shaft mounting bracket to the lift carriage.
- 2) Loosen the nuts fastening the gearmotor assembly to the lift carriage.
- 3) Make sure that the motor retaining clamp fastening the motor to the intermediate drive shaft mounting bracket is tight.
- 4) Move the intermediate drive shaft mounting bracket and gearmotor assembly toward the lift platform. A small pry bar may be inserted between the gearbox and the back of the carriage to gain leverage.

NOTE: **DO NOT FORCE THE GEARMOTOR.** If it does not move easily, loosen the gearmotor assembly retaining nuts to attain more freedom of movement.

- 5) Adjust tension in the final drive chain so that there is .08" (.8mm) movement of the slack (lower) side.
- 6) Tighten the bolts fastening the intermediate drive shaft mounting bracket to the lift carriage.
- 7) If applicable, refer to PRIMARY DRIVE CHAIN ADJUSTMENT. Otherwise, continue.
- 8) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

 **WARNING**

- **WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.**
- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 9) Disconnect the battery positive (+) cable.
- 10) Remove the platform support and stow the lift.

b. Primary Drive Chain Adjustment

NOTE: This procedure assumes that the lift is in a raised position and the access service panel is open. If not refer to LIFT SERVICE ACCESS.

- 1) Loosen the motor retaining clamp.
- 2) Loosen the nuts fastening the gear box to the lift carriage (if not already loose).
- 3) Move the gearmotor assembly, relative to the intermediate drive shaft, away from the lift platform. A small pry bar may be inserted between the motor and the front of the carriage, but care must be exercised not to damage the motor electrical connectors.
- 4) Adjust the primary drive chain tension so that there is .08" (.8mm) movement of the slack (upper) side.
- 5) Tighten the nuts fastening the gearmotor to the lift carriage.
- 6) Tighten the motor retaining clamp.
- 7) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 8) Disconnect the battery positive (+) cable.
- 9) Remove the platform support and stow the lift.

5. TORQUE LIMIT CLUTCH REMOVAL

The torque limit clutch allows the traveling portion of the lift to come to a complete stop without stalling the Deploy/Stow motor. Torque limit clutch overload occurs normally at both extremes of travel and is characterized by a loud clicking noise. The Torque Limit Clutch is set at the factory. However, there is a "break-in" period that varies with usage, which makes adjustment necessary after approximately 500 cycles.

Proper stowing and deployment of the lift depend on the proper setting of the torque limit clutch. The torque limit clutch should be set so the lift stows and deploys normally without overloading prematurely.

- a. Fully deploy the lift.
- b. Raise the lift platform to a comfortable working height and support the platform.

 **WARNING**

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE OPENING OR CLOSING TO PREVENT THE PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- c. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.



WARNING

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DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.

DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- d. Disconnect the battery positive (+) cable.
- e. Refer to DRIVE CHAIN REMOVAL. Remove both drive chains.
- f. Refer to STOW/DEPLOY MOTOR REMOVAL. Remove the gearmotor assembly.
- g. Remove the bolts fastening the intermediate drive shaft mounting bracket to the lift carriage.
- h. Slide the intermediate drive shaft mounting bracket away from the lift platform.
- i. Drop the end of the intermediate drive shaft mounting bracket closest to the lift platform down into the carriage assembly.
- j. Remove the intermediate drive shaft mounting bracket down through the carriage by sliding it forward and twisting it to clear the carriage assembly.
- k. Place the intermediate drive shaft mounting bracket flat side down onto a work bench.
- l. Remove the roll pin fastening the clutch assembly to the intermediate drive shaft by driving the pin out with a small drift or punch and a light hammer.
- m. Slide the clutch assembly off the intermediate drive shaft. Twisting the clutch assembly relative to the drive shaft may ease removal.

NOTE: This procedure assumes that a torque limit clutch will be reinstalled and does not contain any closing/completion steps.

6. TORQUE LIMIT CLUTCH INSTALLATION

NOTE: This procedure assumes that a torque limit clutch has been removed and does not contain any opening/preliminary steps.

- a. Slide clutch assembly onto the intermediate drive shaft (mounted to intermediate drive shaft mounting bracket). Twisting the clutch assembly relative to the drive shaft may ease removal.
- b. Drive roll pin through clutch assembly and intermediate shaft using a light hammer and a small drift.
- c. Place intermediate drive shaft mounting bracket onto carriage by inserting the bracket up through the carriage. This may require twisting the bracket relative to the carriage, and inserting the rear end of the bracket over the carriage first, then sliding the bracket rearward, and finally placing the front of the bracket over the carriage while sliding forward. Be sure that the bracket is placed in the correct orientation (with the clutch assembly located closer to the lift platform).
- d. Insert the bolts and lock washers fastening the intermediate drive shaft mounting bracket into the appropriate slots in the motor mounting bracket and holes in the lift carriage. Tighten sufficiently lock the washers.
- e. Refer to STOW/DEPLOY MOTOR INSTALLATION. Install the gearmotor assembly.
- f. Refer to DRIVE CHAIN INSTALLATION. Install and adjust both drive chains.

7. TORQUE LIMIT CLUTCH ADJUSTMENT


- a. Fully deploy the lift.
- b. Raise the lift platform to a comfortable working height and support the platform.



WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE OPENING OR CLOSING TO PREVENT THE PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- c. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.

 WARNING
WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.
DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.
DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- d. At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- e. Refer to FINAL DRIVE CHAIN REMOVAL. Remove final drive chain.
- f. Measure the clutch breakaway torque. A torque wrench that retains the maximum reading (i.e. Snap-On "Torqometer" part number TE25FFUA or equivalent) is required.
- 1) Engage the sprocket on the intermediate drive shaft with the Torque Wrench in preparation of turning the intermediate shaft.
 - 2) Slowly torque the sprocket until the clutch overloads (be sure that the direction of turn is properly indicated by the torque wrench maximum reading indicator). Maximum torque will be at the point where the clutch first begins to slip. A properly set clutch will breakaway between:
 - 8-10 ft. lbs for s/n 2500 and above.
 - 13-16 ft. lbs for s/n 2499 and below.
- g. Refer to **Figure 4-18**. Adjust the torque limit clutch if required.

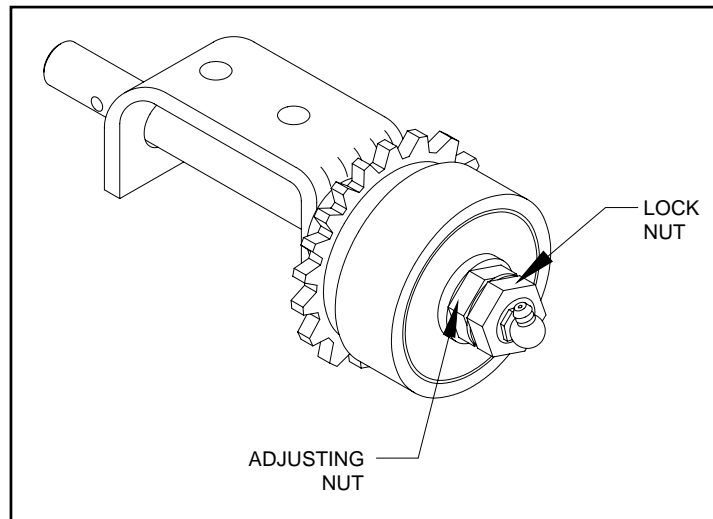


FIGURE 4-18: TORQUE LIMIT CLUTCH

- 1) Loosen the 15/16" locking nut.
 - 2) Adjust the clutch in small increments. Clockwise to increase torque, counter-clockwise to decrease torque. Check the breakaway torque each time.
 - 3) While holding the adjusting nut, tighten the locking nut to 40 - 50 ft-lbs.
- h. Refer to FINAL DRIVE CHAIN INSTALLATION. Install and adjust the final drive chain.

8. DRIVE SHAFT REMOVAL

The drive shafts transfer power between the drive chains, and from the drive chains to the final drive system (gear rack and pinion). The intermediate drive (idler) shaft, mounted on the intermediate drive shaft support bracket, is driven by the clutch mechanism. The intermediate drive shaft carries a sprocket, which drives the final drive chain.

a. Intermediate Drive (Idler) Shaft and Bearing Removal

- 1) Refer to TORQUE LIMIT CLUTCH REMOVAL. Remove the clutch assembly.
- 2) Remove the intermediate drive shaft by sliding it out of the intermediate drive shaft mounting bracket.

- 3) Remove the bearings from mounting bracket and renew if necessary.

NOTE: This procedure assumes that the intermediate drive shaft and bearings will be reinstalled and does not contain any closing/completion steps.

b. Final Drive Shaft and Bearing Removal

- 1) Refer to TRAVELING FRAME REMOVAL. Remove the carriage from the lift cassette.
- 2) Refer to DRIVE CHAIN REMOVAL. Remove both drive chains.
- 3) Remove the bolts fastening the intermediate drive shaft mounting bracket to the lift carriage.
- 4) Slide the intermediate drive shaft mounting bracket away from the lift platform.
- 5) Remove the final drive shaft compression spring by rotating the power shaft support arms away from the carriage (upward).
- 6) Remove the pivot bolts fastening the power shaft support arms to the lift carriage.
- 7) Remove the final drive shaft and power shaft support arms from the carriage.
- 8) Remove the roll pin fastening the pinion gears to the final drive shaft by driving the pin out with a small drift or punch and a light hammer.
- 9) Slide the pinion gears off the final drive shaft. Twisting the gears relative to the drive shaft may ease removal.
- 10) Slide the power shaft support arms off the final drive shaft.
- 11) Press the bearings out of the power shaft support arms.

NOTE: This procedure assumes that the final drive shaft and bearings will be reinstalled and does not contain any closing/completion steps.

9. DRIVE SHAFT INSTALLATION

a. Intermediate Drive Shaft Installation

NOTE: This procedure assumes that the intermediate drive shaft and bearings have been removed and does not contain any opening/preliminary steps.

- 1) Press bearings into intermediate drive shaft mounting bracket, with the bearing flange located toward the outside of the bracket.
- 2) Slide intermediate drive shaft through bearings. Be sure to place the shaft in the correct orientation. (Hold the bracket with the shaft mount close to you and pointing down. The clutch end of the intermediate shaft should be to the right side of the bracket.)
- 3) Place intermediate drive shaft mounting bracket onto carriage by inserting the bracket up through the carriage. This may require twisting the bracket relative to the carriage, and inserting the rear end of the bracket over the carriage first, then sliding the bracket rearward, and finally placing the front of the bracket over the carriage while sliding forward. Be sure that the bracket is placed in the correct orientation (with the clutch assembly located closer to the lift platform).
- 4) Insert the bolts and lock washers fastening the intermediate drive shaft mounting bracket into the appropriate slots in the motor mounting bracket and holes in the lift carriage. Tighten sufficiently to lock the washers.
- 5) Refer to TRAVELING FRAME INSTALLATION. Install the lift carriage into the lift cassette.

b. Final Drive Shaft and Bearing Installation

NOTE: This procedure assumes that the final drive shaft and bearings have been removed and does not contain any opening/preliminary steps.

- 1) Press bearings into the power shaft support arms, with the bearing flange located toward the inside of the power shaft support arms. (Spring retaining tabs must point down.)
- 2) Slide the power shaft support arms onto the final drive shaft.
- 3) Install pinion gears onto the final drive shaft.
- 4) Fasten power shaft support arms to lift carriage using the hardware that was removed.
- 5) Place compression springs onto tabs of carriage. Rotate the power shaft support arms down onto the springs, making sure that both ends of the springs are located around the spring retention tabs.
- 6) Refer to FINAL DRIVE CHAIN INSTALLATION. Install the final drive chain.

- 7) Insert the bolts and lock washers fastening the intermediate drive shaft mounting bracket into the appropriate slots in the motor mounting bracket and holes in the lift carriage. Tighten sufficiently to lock the washers.
- 8) Refer to TRAVELING FRAME INSTALLATION. Install the lift carriage into the lift cassette.

10. PINION GEAR REMOVAL

The pinion gear and gear rack comprise the final drive system of the lift. The pinion gear is mounted on the final drive shaft, and the gear rack is mounted to the mounting frame of the lift cassette. The final drive shaft is driven by the final drive chain. The rotation of the final drive shaft turns the pinion gears meshing with the gear rack. This rotation moves the traveling frame out of or into the lift cassette.

- a. Refer to FINAL DRIVE SHAFT AND BEARING REMOVAL, if not already done.
- b. Remove the roll pin fastening the pinion gears to the final drive shaft by driving the pin out with a small drift or punch and a light hammer.
- c. Slide the pinion gears off the final drive shaft. (Twisting the gears relative to the drive shaft may ease removal.)

11. PINION GEAR INSTALLATION

NOTE: This procedure assumes that the pinion gear has been removed and does not contain any opening/preliminary steps.

- a. With the final drive shaft installed in the power shaft support arms, slide the pinion gear onto the final drive shaft, making sure the gear is oriented properly.
- b. Drive roll pins into pinion gear using a small drift or punch and a light hammer.
- c. Refer to FINAL DRIVE SHAFT AND BEARING INSTALLATION.

12. GEAR RACK REMOVAL AND INSTALLATION

The replacement of the gear rack requires disassembly of the lift enclosure cassette. The re-assembly of the cassette requires careful alignment of the mounting frame. This procedure must be performed by the manufacturer using the proper assembly fixture.

E. HYDRAULIC SYSTEM

The hydraulic system of the lift consists of three major components; the hydraulic pump, hydraulic cylinder and hydraulic hoses. **Figure 4-19** and the following sections describe how to service the hydraulic system.

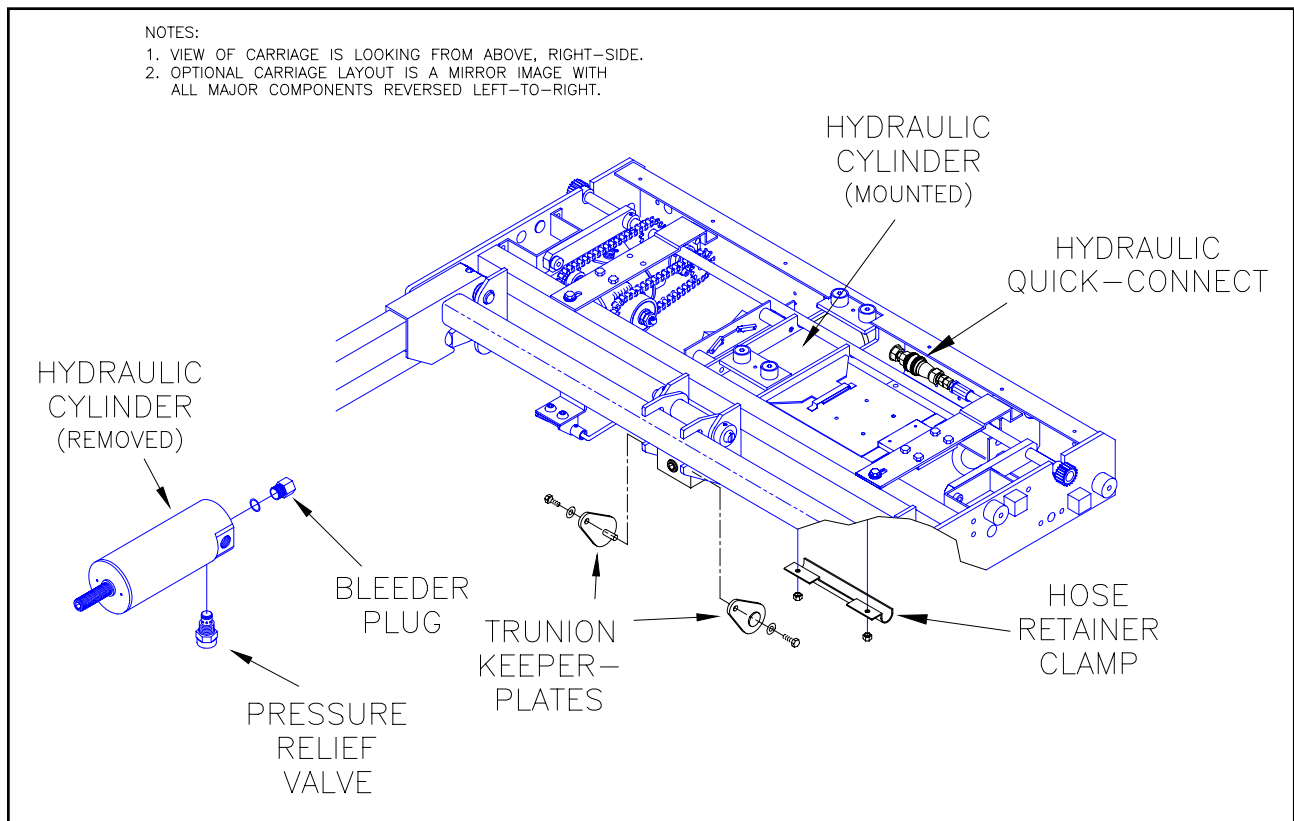


FIGURE 4-19: CARRIAGE HYDRAULIC COMPONENTS


1. HYDRAULIC POWER UNIT FLUID FLUSH AND RENEWAL

- a. Fully deploy the lift.
- b. Slowly open the manual release valve to release the hydraulic pressure. (This will lower the lift platform).
- c. Loosen clamp fastening the tank to the pump.
- d. Carefully pull tank from the bottom of the pump, and empty the tank into a proper waste fluid container.
- e. Reinstall tank onto the pump and tighten the tank clamp.
- f. Remove the plug on the top of the tank. Fill the tank with new hydraulic fluid. Fill only with Texaco No. 15 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606E/F oil).
- g. Close manual release valve.
- h. Raise lift platform to vehicle level and lower platform to ground level. Repeat this cycle three times.
- i. Slowly open the manual release valve to release the hydraulic pressure.
- j. Repeat steps **b** through **d** and proceed to step **i**.
- k. Close manual release valve.
- l. Refer to BLEEDING THE HYDRAULIC SYSTEM.

2. HYDRAULIC PUMP MOTOR

a. Pump Motor Removal

- 1) Fully deploy the lift.


 WARNING
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- 2) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 3) Disconnect pump electrical connectors.
- 4) Remove pump motor from the hydraulic pump by removing the two bolts that pass down through the top of the pump motor to the pump unit. Use caution when removing the pump motor, as the bolts that fasten the motor to the pump also fasten the end caps to the motor housing.

b. Pump Motor Installation

NOTE: This procedure assumes that the pump motor has been removed and does not contain any opening/preliminary steps.

- 1) Place the pump motor onto the pump body while holding the motor assembly together.
- 2) Align holes in the end caps, motor body, and pump body; then insert the two (2) attaching bolts through holes.
- 3) Screw bolts into the top end cap until the motor assembly is held together without tightening the bolts.
- 4) Connect the electrical connectors to the pump unit.

 CAUTION
MAKE SURE THAT THE POSITIVE CABLE IS CONNECTED TO THE PUMP MOTOR, AND, IF CONFIGURED FOR 24 VOLTS, THAT THE NEGATIVE CABLE IS CONNECTED TO THE BODY OF THE PUMP UNIT. IF CONFIGURED FOR 12 VOLTS, MAKE SURE THE NEGATIVE CABLE IS CONNECTED TO THE BARE METAL OF THE VEHICLE CHASSIS.

- 5) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 6) Apply power so that the armature can spin and find its own turning axis within the motor body.

- 7) As the motor spins, carefully tighten attaching bolts while holding the top end cap. Do not over tighten bolts.
- 8) Raise the lift platform to the vehicle floor level.
- 9) Check all hydraulic connections for leaks. Tighten as required.
- 10) Refer to BLEEDING THE HYDRAULIC SYSTEM.

3. HYDRAULIC CYLINDER

a. Hydraulic Cylinder Removal

- 1) Fully deploy the lift.
- 2) Raise the lift platform to vehicle floor level.



WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE OPENING OR CLOSING TO PREVENT THE PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 3) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.



WARNING

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- **DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.**
- **DO NOT LAY ANYTHING ON TOP OF A BATTERY.**

- 4) At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
- 5) Manually raise and SUPPORT THE LIFT PLATFORM.



WARNING

OPENING THE HYDRAULIC PUMP MANUAL RELEASE VALVE WILL ALLOW THE LIFT PLATFORM TO LOWER. STAND CLEAR AND CHECK OF OBSTRUCTIONS TO PREVENT INJURY OR DAMAGE.

- 6) Open the hydraulic pump manual release valve to lower the platform onto the support. LEAVE THE MANUAL RELEASE VALVE OPEN.
- 7) Remove the trunnion keeperplate assemblies.
- 8) Disconnect the hydraulic Quick-connect.
- 9) Remove the hydraulic Quick-connect fitting/pivot pin from the right-side of the cylinder.
- 10) Remove the pivot pin/plug from the left-side of the cylinder.
- 11) Remove cylinder out of the lift carriage.
- 12) Refer to HYDRAULIC CYLINDER INSTALLATION.

b. Hydraulic Cylinder Installation

NOTE: This procedure assumes that the hydraulic cylinder has been removed and does not contain any opening/preliminary steps.

- 1) Insert the rear end of the hydraulic cylinder into the carriage.
- 2) Push the rear end of the cylinder up as far as possible and rotate the front of the cylinder up into the carriage.
- 3) Install the pivot pin/plug into the left-side of the cylinder.
- 4) Install the hydraulic Quick-connect fitting/pivot pin into the right-side of the cylinder.
- 5) Connect the hydraulic hose to the hydraulic Quick-connect.
- 6) Hold the trunnion and cylinder rod in alignment.
- 7) Be certain that the hydraulic pump manual release valve is closed. Extend the cylinder rod by manually pumping the hydraulic backup pump until the trunion is in its proper position.

- 8) Install the trunnion keeperplate assemblies.
- 9) Using the manual backup pump, raise the lift to vehicle floor level.
- 10) Refer to BLEEDING THE HYDRAULIC SYSTEM. Bleed the hydraulic system.
- 11) Refer to HYDRAULIC CYLINDER ALIGNMENT.


c. Hydraulic Cylinder Alignment

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- 1) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 2) Be certain that the lift is fully deployed.
- 3) Raise the lift to the vehicle floor level.
- 4) Using the control pendant, press and hold the STOW and IN-LOCKOUT switches. Observe the platform lower and stop at the stow level and then release the switches.

NOTE: THE EXACT STOW LEVEL IS ACHIEVED WHEN THE BOTTOM OF THE STOW GUIDE BLOCK IS BETWEEN 0.03" - 0.06" ABOVE THE TOP OF THE GUIDE RAIL.

- 5) Provide an adjustable support for the platform. Be certain that the lifting frame is parallel with the traveling frame.
- 6) Slightly loosen the trunnion keeperplate assemblies.
- 7) Adjust the cylinder rod lock-nut until snug against the trunnion.
- 8) Tighten the trunnion keeperplate assemblies.
- 9) Repeat steps 3 and 4 to verify that the bottom of the stow guide block is between 0.03" - 0.06" above the top of the guide rail. If not, repeat steps 5 - 9.
- 10) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

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- 11) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 12) Remove the platform support and stow the lift.

4. CARRIAGE HYDRAULIC HOSE REMOVAL

- a. Refer to TRAVELING FRAME REMOVAL. Remove the traveling frame from the lift cassette.
- b. Disconnect the hydraulic hose from the quick-connect fitting inside the lift carriage.
- c. Remove the hydraulic hose from the lift enclosure.
- d. Refer to MAIN HYDRAULIC HOSE INSTALLATION.

5. MAIN HYDRAULIC HOSE INSTALLATION

NOTE: This procedure assumes that the hydraulic hose has been removed and does not contain any opening/preliminary steps.

- a. Connect the hydraulic hose to the quick-connect fitting inside the lift carriage.
- b. Refer to TRAVELING FRAME INSTALLATION. Install the traveling frame.
- c. Refer to BLEEDING THE HYDRAULIC SYSTEM.

6. BLEEDING THE HYDRAULIC SYSTEM

The hydraulic system of the lift may have air introduced into the system. If air does enter the hydraulic system, the hydraulic system may appear to soften. This is most noticeable when (un)loading the platform at vehicle floor level. The air in the hydraulic system must then be removed. The following procedure to remove the air from the system is known as "bleeding".

NOTE: The following procedure is most easily performed by two people and can be very messy.

- a. Fully deploy the lift.
- b. Raise the lift platform to a comfortable working height and support the platform.



WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- c. To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.



WARNING

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- DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.
- DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- d. At the vehicle battery/engine compartment, disconnect the cable from the battery positive (+) terminal.
 - e. Locate the air bleeder valve on the top side of the lift cylinder. Access to this valve is through a hole in the rear of the carriage rear channel.
 - f. Raise the lift to vehicle floor level.
 - g. Open the air bleeder valve with a screwdriver to let air and hydraulic fluid out of the cylinder.
- NOTE:** This step will cause oil loss. Have dry rags on hand to clean-up spilled hydraulic fluid.
- h. Close the air bleeder valve.
 - i. Lower the platform to ground level.
 - j. Remove the plug on the top of the hydraulic pump tank. Make sure that the hydraulic fluid in the tank is at the FULL level. Fill only with Texaco No. 15 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606E/F oil) and reinstall the plug.
 - k. Repeat the previous FIVE steps until the fluid coming out of the air bleeder valve does not contain any air bubbles.
 - l. Verify that the air bleeder valve is fully closed.
 - m. At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.



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- DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.
- DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- n. At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- o. Remove the platform support and stow the lift.

F. ELECTRICAL CONTROL SYSTEM

Control of the lift is effected by three major control circuits, the lift mode enable and stow level control circuits, and the carriage control box. This section provides a description of how the circuit operates and, where applicable, how they are adjusted. Refer to **Figure 4-20** for references used throughout this section.

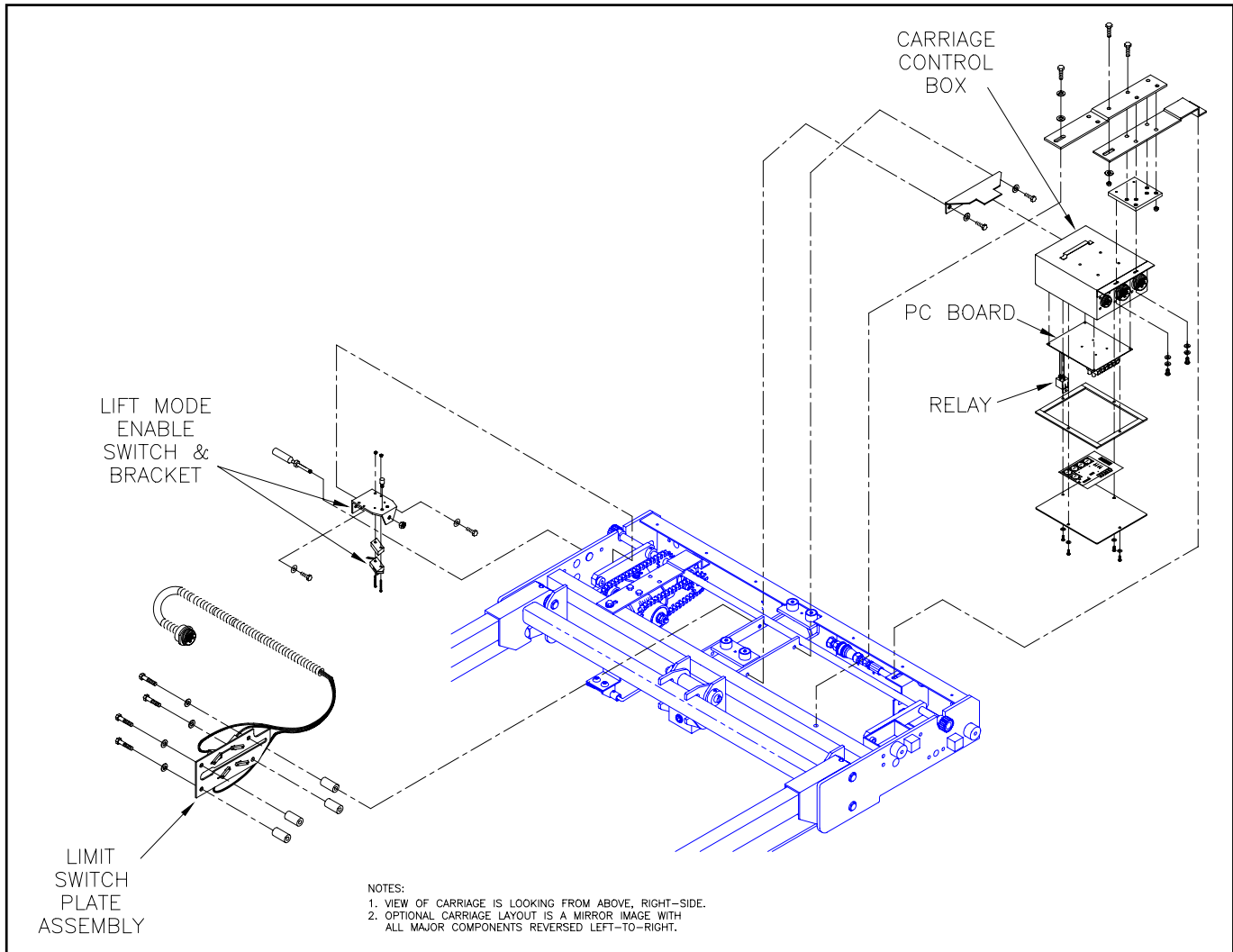


FIGURE 4-20: CARRIAGE CONTROL COMPONENTS

1. LIFT MODE ENABLE CIRCUIT (OUT)

The LIFT mode (Raise and Lower functions) of the lift control circuit is activated only when the lift is completely deployed. A limit switch labeled OUT fastened to a spring loaded plunger located inside the carriage on the right side senses when the lift is completely deployed. The switch changes state when the plunger encounters the carriage stop on the side of the enclosure.

a. Switch Replacement

- 1) Refer to LIFT SERVICE ACCESS.
- 2) At the OUT switch, cut the leads to the switch leaving enough wire coming of sufficient length to be spliced. Strip the wire ends 1/4" - 3/8".
- 3) Cut the leads of the replacement switch to length. This length should be equal to the length of wire coming out of the switch that was removed. Strip the ends of the switch wires 1/4" - 3/8".
- 4) Slide a 1" long piece of heat shrink (of the appropriate diameter) around each wire. The heat shrink should be temporarily placed near the connector.
- 5) Solder each of the leads from the original switch to the corresponding lead on the replacement switch. Match the leads color for color.
- 6) Slide the heat shrink tubing over the soldered connections and shrink with a heat gun.
- 7) Push the spring plunger IN to its retracted position.

- 8) Remove the original switch from the lift and loosely mount the replacement switch in its place using the existing hardware.
- 9) Refer to SWITCH ADJUSTMENT. Adjust switch.

b. Switch Adjustment

- 1) Refer to LIFT SERVICE ACCESS.
- 2) Locate switch relative to the spring plunger. With the lift PARTLY deployed, the plunger will be extended, exposing the switch roller to the narrowest part of the plunger. Manually press and hold the plunger in the retracted position, then slide the switch along the adjustment slots until a faint but audible click is heard.
- 3) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.
- 4) Verify operation of switch. Move the lift carriage to a point where the plunger is completely extended and off the carriage stop (use the IN and OUT functions as required). Change the mode switch to Lift and operate a function either UP or DOWN. Proper operation is verified if these functions do not operate with the plunger in the extended position.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 5) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 6) Remove the platform support and stow the lift.

2. AUTOMATIC STOW LEVEL CONTROL CIRCUIT DESCRIPTION

Refer to **Figure 4-21**. All F9A Series Wheelchair Lifts are equipped with an automatic stow leveling circuit to align the lift platform at the proper stowing level upon completion of a lifting cycle. The automatic stow level control system is comprised of a switch plate, three switches and a control cam. The control cam is mechanically linked to the lifting frame via the control rod and slides along a slot in the switch plate as the lift platform moves up and down. The system is located inside the carriage on the left side of the hydraulic cylinder. To replace any of the switches, refer to LIMIT SWITCH REPLACEMENT. The stow level control limit switches are accessible from underneath the lift. Please note that access to the stow level limit switches is not required to check the operation of the automatic stow level alignment system.

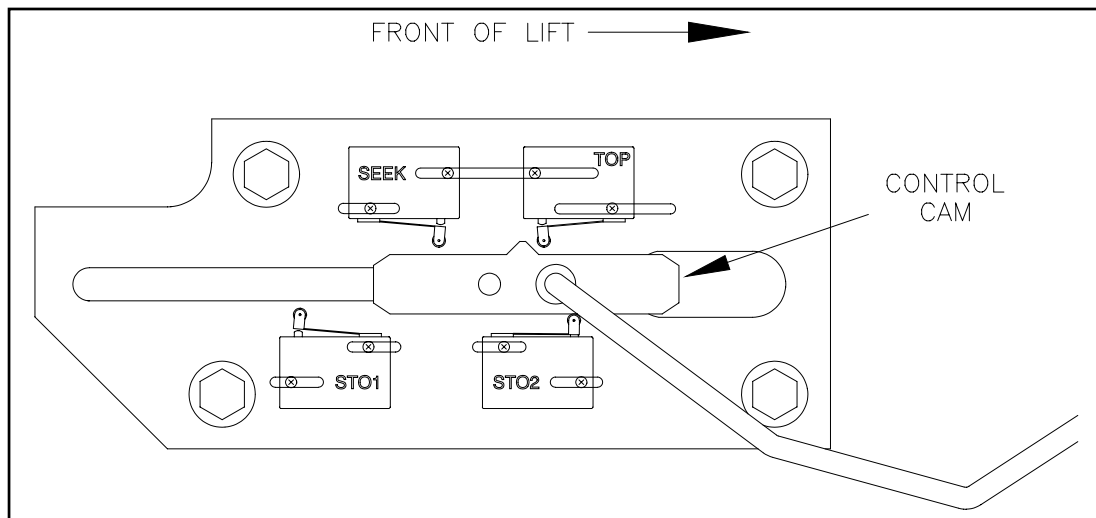


FIGURE 4-21: LIMIT SWITCH PLATE ASSEMBLY

3. STOW LEVEL ALIGNMENT CHECK PROCEDURES

The automatic stow level alignment system permits proper platform location when approaching stow level from above or below. To check the alignment switch settings, refer to **Figure 4-22** and the following paragraphs:

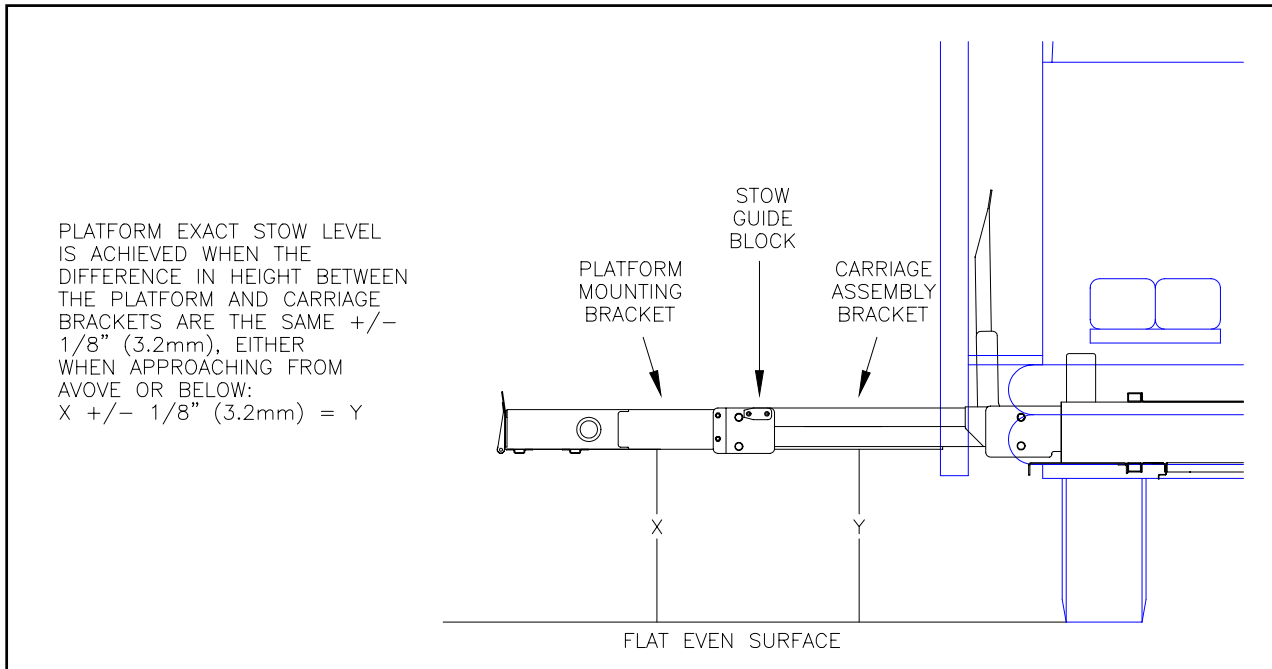


FIGURE 4-22: STOW LEVEL ALIGNMENT

a. Stow Level from Vehicle Floor Level Alignment Check

- 1) Fully deploy the lift.
- 2) Raise the lift to the vehicle floor level.
- 3) Using the control pendant, press and hold the STOW and IN-LOCKOUT switches. Observe the platform lower and stop at the stow level and then release the stow switches.
- 4) The exact stow level is achieved when the lifting frame is parallel with the lift guide rails. This can be verified by measuring from a flat even surface up to the bottoms of both the platform mounting bracket and the carriage bracket.
- 5) If adjustment is required, refer to ADJUSTMENT OF AUTOMATIC STOW LEVEL (STO1). If adjustment is not required, refer to the next procedure, STOW LEVEL FROM GROUND LEVEL ALIGNMENT CHECK.

b. Stow Level from Ground Level Alignment Check

- 1) Fully deploy the lift.
- 2) Lower the lift to ground level.
- 3) Using the control pendant, press and hold the STOW and IN-LOCKOUT switches. Observe the platform rise and stop at the stow level and then release the stow switches.
- 4) The exact stow level is achieved when the bottom of the stow guide block is between 0.03" - 0.06" above the top of the guide rail.
- 5) If adjustment is required, refer to ADJUSTMENT OF AUTOMATIC STOW LEVEL (STO2). If adjustment is not required, refer to the next procedure, AUTOMATIC STOW LEVEL SEEK RANGE CHECK.

4. ADJUSTMENT OF THE AUTOMATIC STOW LEVEL ALIGNMENT SYSTEM

NOTE: While adjusting the position of STO1 and/or STO2, if the two switches become too far apart, the platform will oscillate such that the control cam will bounce between the positions of STO1 and STO2. If this occurs during the adjustment of one of the switches, move the other switch toward the one being adjusted and repeat the adjustment process.

a. **Adjustment of Automatic Stow Level (STO1)**

- 1) Fully deploy the lift.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 2) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 3) Loosen retaining screws on switch STO1 so that the switch will slide along with light tapping.
- 4) Lower lift platform to the stow level.
- 5) Move STO1 to achieve proper stow level as required, tapping the switch toward the back of the unit to lower the stow level or tap the switch toward the front of the unit to raise the stow level.
- 6) Refer to STOW LEVEL FROM VEHICLE FLOOR LEVEL ALIGNMENT CHECK. Verify proper adjustment.
- 7) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 8) Stow the lift.

b. **Adjustment of Automatic Stow Level (STO2)**

- 1) Fully deploy the lift.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 2) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 3) Loosen retaining screws on switch STO2 so that the switch will slide along with light tapping.
- 4) Lower lift platform toward to the stow level.
- 5) Move STO2 to achieve proper stow level as required, tapping the switch toward the back of the unit to lower the stow level or tap the switch toward the front of the unit to raise the stow level.
- 6) Refer to STOW LEVEL FROM GROUND LEVEL ALIGNMENT CHECK. Verify proper adjustment.
- 7) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 8) Stow the lift.

c. **Adjustment of Automatic Stow Level Seek Range (SEEK)**

- 1) Fully deploy the lift.

 WARNING
THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 2) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 3) Adjust Seek range as required by moving the switch toward the back of the unit to decrease the distance or moving the switch toward the front to increase the distance.
- 4) Refer to AUTOMATIC STOW LEVEL SEEK RANGE CHECK. Verify proper adjustment.
- 5) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 6) Stow the lift.

5. VERTICAL TRAVEL LIMIT CIRCUIT

a. Vertical Travel Limit Alignment Check

- 1) Fully deploy the lift.
- 2) Raise the lift to the vehicle floor level.
- 3) The platform travel limit should be set so that the platform top surface is between 1" and 1.6" above the vehicle floor.
- 4) If adjustment is required, refer to the next procedure ADJUSTMENT OF VERTICAL TRAVEL LIMIT (TOP) SWITCH.

b. Adjustment of Vertical Travel Limit (TOP) Switch

- 1) Fully deploy the lift.



WARNING

THE SERVICE ACCESS PANEL IS HINGED. HOLD PANEL UP WHILE REMOVING THE RETAINING BOLTS TO PREVENT PANEL FROM SWINGING-DOWN UNCONTROLLABLY AND POSSIBLY CAUSING INJURY OR DAMAGE.

- 2) To gain access to the underside of the lift, hold the service access panel up, remove the two retaining bolts and lock-nuts from the front edge of the panel, and lower the panel.
- 3) Move TOP to achieve proper platform level as required, tapping the switch toward the rear to lower the platform or toward the front to raise the platform.
- 4) Refer to VERTICAL TRAVEL LIMIT ALIGNMENT CHECK. Verify proper adjustment.
- 5) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.
- 6) Stow the lift.

6. LIMIT SWITCH REPLACEMENT

- a. Refer to LIFT SERVICE ACCESS.
- b. At the switch, cut the leads to the switch leaving enough wire coming of sufficient length to be spliced. Strip the wire ends 1/4" - 3/8".
- c. Cut the leads of the replacement switch to length. This length should be equal to the length of wire coming out of the switch that was removed. Strip the ends of the switch wires 1/4" - 3/8".
- d. Slide a 1" long piece of heat shrink (of the appropriate diameter) around each wire. The heat shrink should be temporarily placed near the connector.
- e. Solder each of the leads from the original switch to the corresponding lead on the replacement switch. Match the leads color for color.
- f. Slide the heat shrink tubing over the soldered connections and shrink with a heat gun.
- g. Remove the original switch from the lift and loosely mount the replacement switch in its place using the existing hardware.
- h. Refer to the appropriate ALIGNMENT CHECK procedure.

7. CARRIAGE CONTROL BOX

The Carriage Control Box contains a circuit board that controls the operation of the lift. If it has been determined that there is a problem with the circuit board itself, or part of the harness inside the box, then the box must be replaced. The main circuit board in the Carriage Control Box contains five relays that control the operation of the stow/deploy motor, the power rollstop, and the auto-level feature of the lift. The relays are installed in sockets on the main circuit board for easy replacement.

a. Carriage Control Box Replacement

- 1) Refer to LIFT SERVICE ACCESS.
- 2) Disconnect the three cables that connect to the Carriage Control Box by turning the fastening ring counter-clockwise.
- 3) Remove the two screws fastening the control box to the control box mounting bracket.
- 4) Slide the box away from the center of the carriage and remove from mounting bracket.


- 5) Position the replacement carriage control box inside the lift carriage, and slide the loop on the back of the box onto the two tabs of the mounting bracket.

NOTE: It may be necessary to bend the two tabs away from the bracket to give the tabs some spring. This will prevent the box from rattling on the bracket.

- 6) Reinstall the two screws that fasten the carriage control box to the mounting bracket.
- 7) Connect each of the electrical connectors to the carriage control box, and securely fasten each by turning the knurled ridge around each connector.

NOTE: The connectors can only be connected to the correct mating connector, as the pin configurations are different. Forcing a connector onto the incorrect mating connector could damage either of the connectors. Take note of which box connector and which cable connector has only two large pins, and which has four large pins. The connectors have small ridges that align the pins. Careful inspection and orientation of the connectors is necessary when connecting the control box.

- 8) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.


 WARNING
<ul style="list-style-type: none">• WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.• DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.• DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- 9) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.

- 10) Remove the platform support and stow the lift.

b. Carriage Control Box Relay Replacement

- 1) Refer to LIFT SERVICE ACCESS.
- 2) Remove the carriage control box cover by removing the four screws around the edges of the cover.
- 3) Identify the relay to be replaced using the diagram on the inside of the carriage control box cover.
- 4) Remove the relay to be replaced by gently rocking the relay from side to side and pulling it from the socket.
- 5) Insert the replacement relay into the socket.
- 6) Reinstall cover on carriage control box, fastening it with the screws that were removed.
- 7) At the underside of the lift, raise and hold the service access panel up, and install the two retaining bolts and lock-nuts to the front edge of the panel.

 WARNING
<ul style="list-style-type: none">• WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.• DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.• DO NOT LAY ANYTHING ON TOP OF A BATTERY.

- 8) At the vehicle battery/engine compartment, connect the cable to the battery positive (+) terminal.

- 9) Remove the platform support and stow the lift.

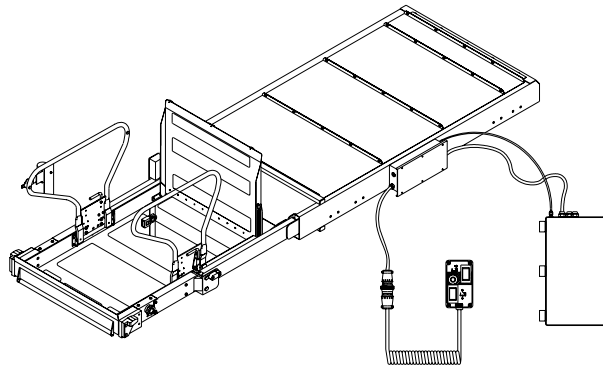
8. PUMP MOTOR CONTACTOR

The pump motor contactor applies electrical power to the hydraulic pump unit. The contactor is located on the hydraulic pump unit bracket, which also contains two circuit breakers. The bracket is located on top of the hydraulic power unit.

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V. SPARE PARTS

This chapter contains parts diagrams and lists for the RICON Mirage F9A Series Transit Use Wheelchair and Standee Lift. The diagrams are exploded views of major lift assemblies, with components referenced by numbers. Each accompanying parts list contains the part reference number, a description, the quantity used, and the Ricon stock number. For parts identification, locate the part on the appropriate drawing and note the reference number. The parts list that accompanies each drawing will list the stock number of the desired part. For part numbers of lift decals, refer to the Decal Locations and Part Numbers figure in Chapter II of this manual.



LIFT MODEL AND KIT NUMBERS

PRODUCT NUMBER	F9A-S000 thru F9A-S025
DOCUMENTATION KIT NUMBER	F9A-D001
PRODUCTION DECAL SET NUMBER	11018
SPARE DECAL KIT NUMBER	26022

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PUMP ENCLOSURE ASSEMBLY
 F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
 SERIAL NO's. 4000 and HIGHER

DATE: 11/06/97
DWG. F9AXX007
REV NO. B

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- 53-1
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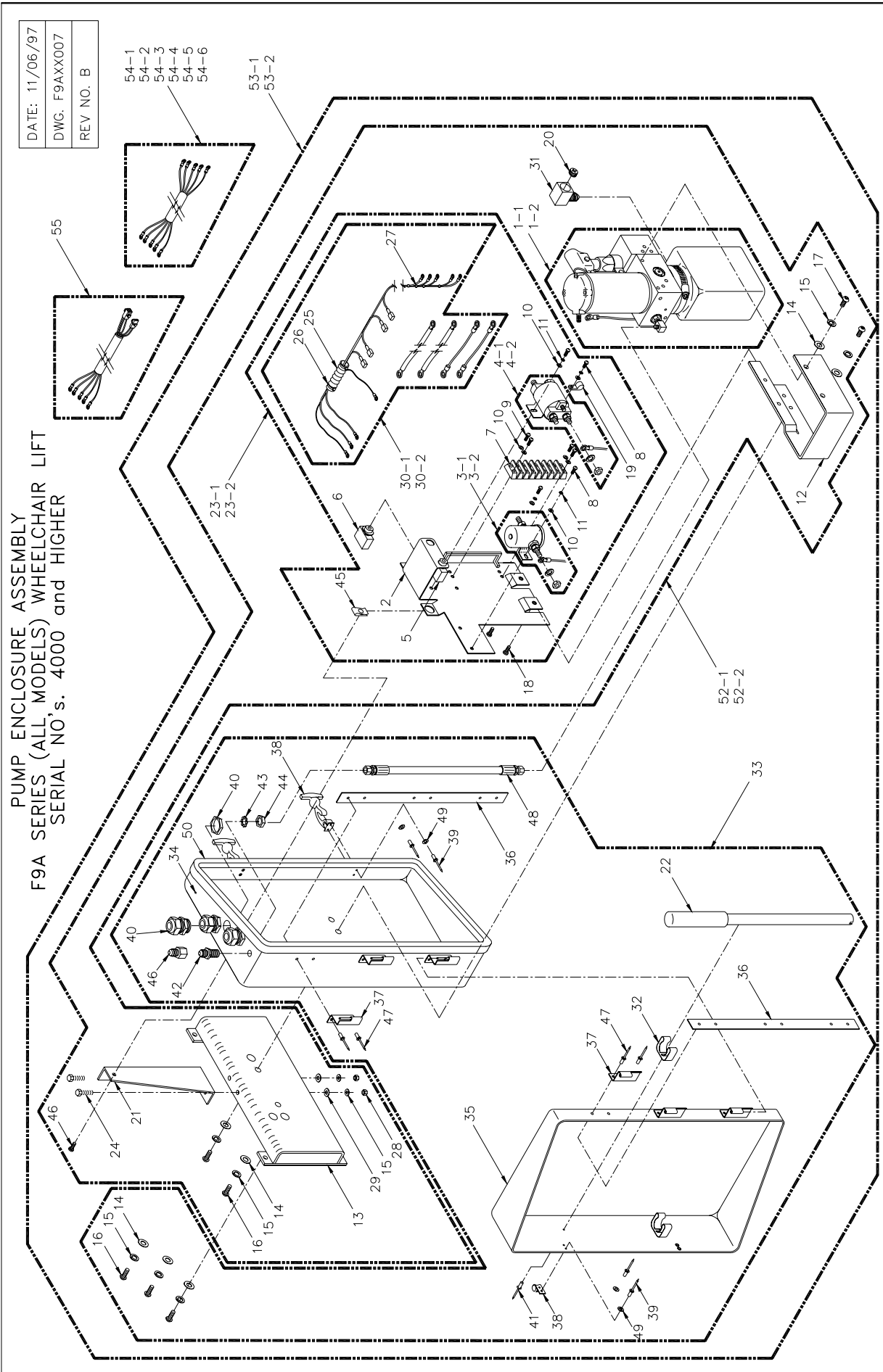


FIGURE 5-1: PUMP ENCLOSURE ASSEMBLY
 32DF9AS02.B

**FIGURE 5-1: PUMP ENCLOSURE ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFTS
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1-1	PUMP, NO TOP, UV RES W/HORIZ, 2K PSI	1	PM212003007
1-2	PUMP, NO TOP, UV RES W/HORIZ, 2K PSI	1	PM224003007
2	PLATE-WASSY. SOLENOID	1	F9-0205
3-1	SOLENOID-SPST,12V	1	26444
3-2	SOLENOID, SP 24V ISOLATED GROUND	1	264492
4-1	SOLENOID-12V, DP LARGE	1	26447
4-2	SOLENOID-24V, DP LARGE ISOLATED GROUND	1	26450
5	CIRCUIT BREAKER-8AMP	1	265108
6	CIRCUIT BREAKER-30AMP	1	26510
7	TERMINAL STRIP, 10-18 GA, ALTECH	1	26566
8	MS-10-32 X 0.313 PAN PHIL SST. (BAG OF 10)	4	15923
9	MS-10-32 X 0.75 PAN PHIL (BAG OF 10)	4	19717
10	WASHER-#10 FLAT SST. (BAG OF 10)	8	14409
11	WASHER-#10 SPLIT LOCK SST. (BAG OF 10)	4	14432
12	BRACKET-PUMP MOUNTING	1	F9-0204
13	BRACKET-WASSY., PUMP MOUNTING	1	UV-PF-945
14	WASHER-0.32ID X 0.75OD X 0.08 SST. (BAG OF 10)	7	17503
15	WASHER-5/16 SPLIT LOCK (BAG OF 10)	11	17509
16	SCS-5/16-24 X 0.75 BTN. SKT. SST.	5	28702
17	SCREW, BHS, 5/15-18X 3/4 SST. (BAG OF 10)	2	13381
18	SCS-10-32 X 0.50 BTN. SKT. SST. (BAG OF 10)	2	14408
19	CLAMP, CABLE-3/8" (BAG OF 10)	1	18660
20	PLUG-RESERVOIR, BREATHER FILLER	1	V2-SH-106
21	BRACKET-STIFFENER	1	F9-0378
22	HANDLE-MANUAL BACKUP PUMP	1	VS-SH-111
23-1	SOLENOID PLATE-ASSY. 12VDC	1	F9-0243
23-2	SOLENOID PLATE-ASSY. 24VDC	1	F9-0246
24	CS-5/16-18 X 0.75 HEX SST. (BAG OF 10)	2	17508
25	CONDUIT-1/2" PLASTIC	0.17ft	27200
26	CABLE TIE-5.5" (NAT)	2	25520
27	CABLE TIE-4.0" (NAT)	9	25519
28	NUT-5/16-18 NYLON SST. (BAG OF 10)	2	14415
29	NUT-5/16-18 FLAT SST. (BAG OF 10)	2	25345
30-1	HARNESS-ASSY., PUMP SOLENOID PLATE, 12V	1	F9-0358
30-2	HARNESS-ASSY., PUMP SOLENOID PLATE, 24V	1	F9-0370
31	FITTING-STREET ELBOW, FEMALE	1	V2-SH-013
32	CLIP-EMERGENCY TOOLS	2	25543
33	PUMP ENCLOSURE-ASSY.	1	F9-0371
34	BASE-PUMP ENCLOSURE	1	F9-0216
35	DOOR-PUMP ENCLOSURE	1	F9-0217
36	PLATE REINFORCEMENT-PUMP ENCLOSURE	2	F9-0255
37	HINGE-2.50 X 2.00 SST.	6	F9-0218
38	LATCH, DRAW - FLEXIBLE T-HANDLE	2	25089
39	RIVET-1/8 X 3/8 BLIND AL. (BAG OF 10)	8	14490
40	STRAIN RELIEF-STRAIGHT THRU., LIQ. TIGHT	3	26284
41	RIVET-5/32 X 0.19-0.25 BLIND (ASD5-4) (BAG OF 10)	2	15910
42	ADAPTER-STR. 7/16M 7/16M JIC/JIC BHD 2.08L	1	V2-SH-981
43	WASHER-7/16 EXTERNAL STAR SST. (BAG OF 10)	1	13344
44	NUT-7/16-20 HEX PLATED JAM (BAG OF 10)	1	13342
45	SPRING NUT-1/4-20 SST.	1	283105
46	SCS-1/4-20 X 0.75 BTN. SKT. SST. (BAG OF 10)	1	13313
47	RIVET-3/16 X 0.45 BLIND AL. (BAG OF 10)	12	19735
48	HOSE-ASSY., 11" X 1/4 JIC X 1/4 JIC	1	F9-0333
49	WASHER-#8 FLAT (BAG OF 10)	8	15917
50	SEAL, DOOR-7/16 X 53/64	5.33ft	26679
51	WASHER-1/4 FLAT SST. (BAG OF 10)	1	13398
52-1	PUMP W/ BRACKETS, 12V	1	F9-0237
52-2	PUMP W/ BRACKETS, 24V	1	F9-0238
53-1	PUMP W/ ENCLOSURE, 12V	1	F9-0235
53-2	PUMP W/ ENCLOSURE, 24V	1	F9-0236
54-1	HARNESS, PUMP-PULLBOX, 9' REAR	1	F9-EHR-09
54-2	HARNESS, PUMP-PULLBOX, 11' REAR	1	F9-EHR-11
54-3	HARNESS, PUMP-PULLBOX, 12' REAR	1	F9-EHR-12
54-4	HARNESS, PUMP-PULLBOX, 17' REAR	1	F9-EHR-17
54-5	HARNESS, PUMP-PULLBOX, 23' REAR	1	F9-EHR-23
54-6	HARNESS, PUMP-PULLBOX, 26' REAR	1	F9-EHR-26
55	HARNESS ASSY, PUMP TO PULLBOX, RING-MOLEX	1	F9-0342

MONARCH HYDRAULIC POWER UNIT
SERIAL NO's. 4000 and HIGHER

DATE: 10/06/99

DWG. F9AXX000

REV. B

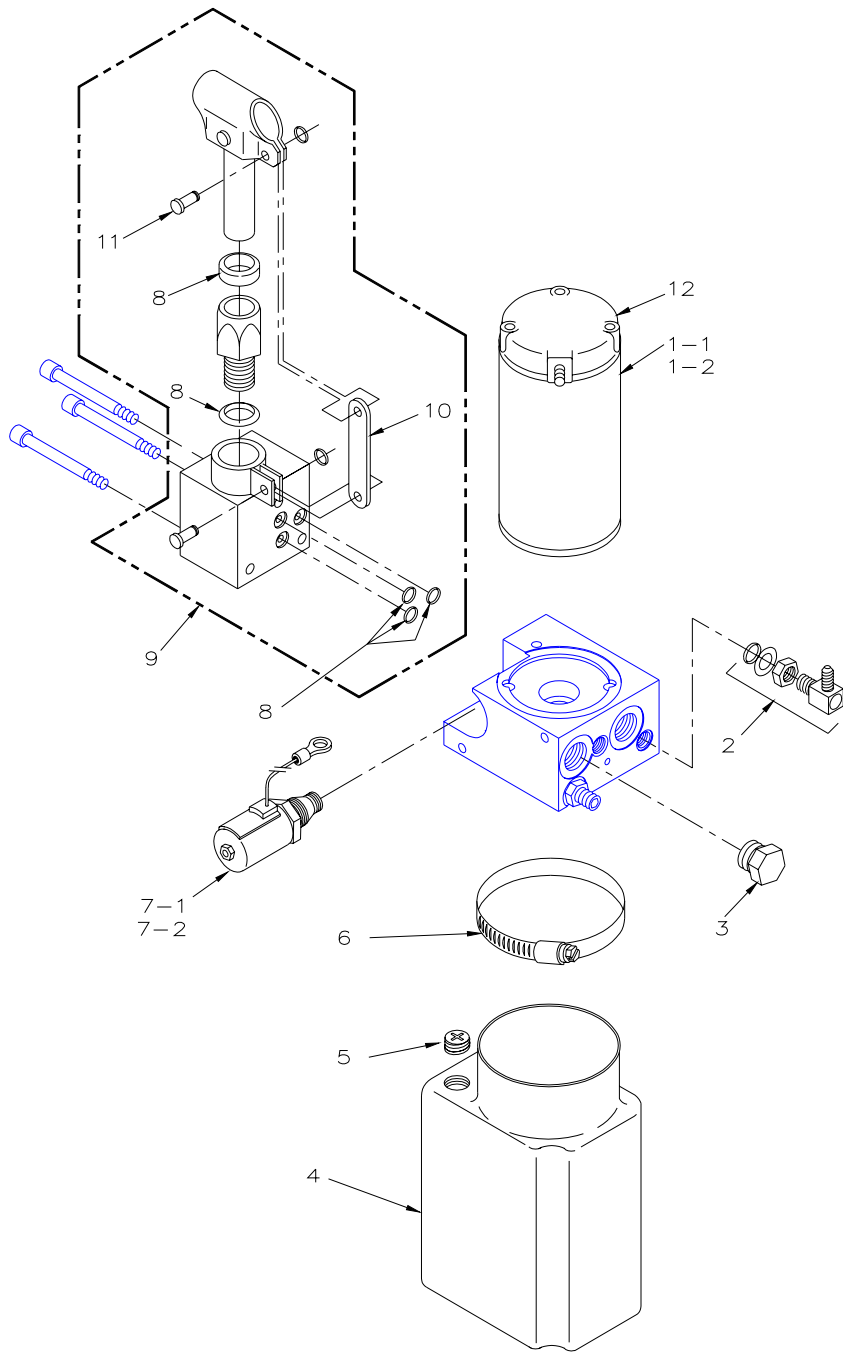


FIGURE 5-2: MONARCH HYDRAULIC POWER UNIT

**FIGURE 5-2: MONARCH HYDRAULIC POWER UNIT
SERIAL NO's. 31000 - 31999
SERIAL NO's. 35000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1-1	MOTOR ASSY., 12V, 3" MONARCH PUMP	1	V2-SH-115
1-2	MOTOR ASSY., 24V, 3" MONARCH PUMP	1	V2-SH-116
2	FITTING, "L" 1/4 SAE O-RING BOSS 1/4" JIC	1	V2-SH-011
3	PLUG, 3/4-16 CAVITY, W/O-RING	2	V2-SH-001
4	RESERVOIR, RICON POWER UNIT, PLASTIC	1	V2-SH-108
5	PLUG, RESERVOIR, BREATHER FILLER	1	V2-SH-106
6	CLAMP HOSE	1	V2-SH-109
7-1	HYD. POPPET VALVE ASSY., 12V DELTROL	1	V2-SH-105
7-2	HYD. POPPET VALVE ASSY., 24V DELTROL	1	V2-SH-136
8	SEAL KIT, MANUAL BACK-UP PUMP	1	V2-SH-220
9	BACK-UP PUMP, MANUAL W/O HANDLE	1	V2-SH-210
10	BRACKET, TENSION LINK, MONARCH PUMP	1	V2-SH-149
11	PIN & RETAINING RING-BACKUP PUMP	2	V2-SH-017
12	KIT, PUMP MOTOR BRUSH SET	1	V2-SH-115B

LIFT ENCLOSURE ASSEMBLY
 F9A SERIES AUTOMATIC WHEELCHAIR LIFT
 SERIAL NO's. 4000 and HIGHER

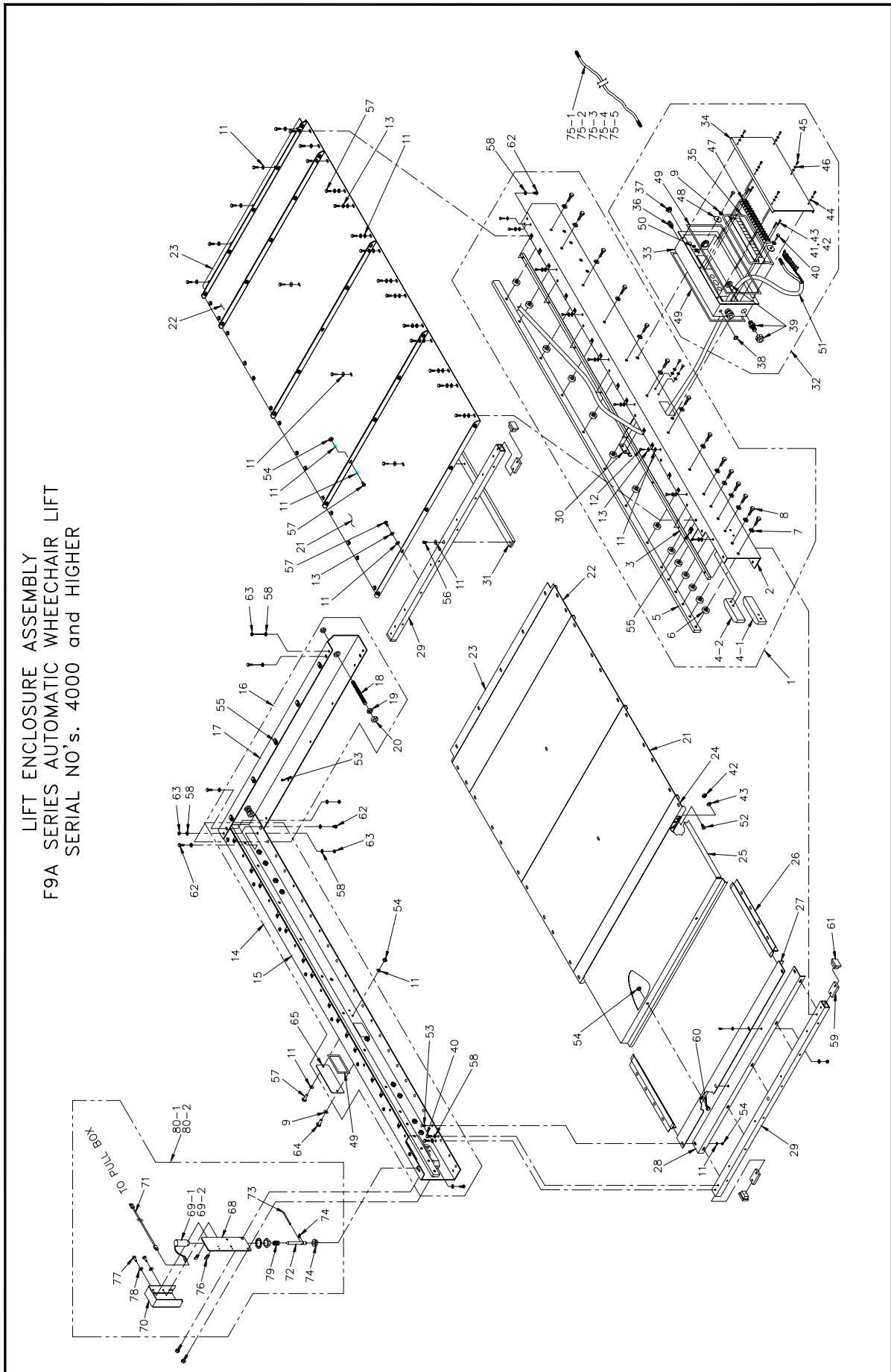


FIGURE 5-3: LIFT ENCLOSURE ASSEMBLY

**FIGURE 5-3: LIFT MOUNTING ENCLOSURE
F9A SERIES (ALL MODELS) WHEELCHAIR LIFTS
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1	CHANNEL, MTG FRAME, 78.81, R.H. MECH ASSY	1	F9-0009
2	CHANNEL, MTG FRAME, 78.81 WELD ASSY	1	F9-0013
3	GEAR RACK	2	F9-0028
4-1	STOP BLOCK	2	13572
4-2	STOP BLOCK	2	F9-0067
5	RAIL - STAINLESS	2	F9-0101
6	SPACER, 0.40 THK W/O .60 CS	28	UV-MF-102
7	WASHER, SS, 0.40 ID X 0.75000 X 0.06	28	28629
8	BOLT-HEX, 3/8 X 16 X 1.00 SST	1	282354
9	WASHER, 5/16 SPLIT LOCK, SST (BAG OF 10)	14	17509
10	BOLT-HEX, 5/10 - 18 X 7/8 SST (BAG OF 10)	4	13385
11	WASHER, 1/4 FLAT, SAE, SST (BAG OF 10)	141	13398
12	BOLT-HEX 1/4 X 1/2 SST-20 X 1.00, SST (BAG OF 10)	16	13307
13	WASHER, 1/4 SPLIT LOCK SST (BAG OF 10)	58	13399
14	CHANNEL, MTG FRAME, 78.81 L.H. MECH ASSY	1	F9-0008
15	CHANNEL, MTG FRAME, L.H. 78.81, WELD ASSY	1	F9-0012
16	CHANNEL, MTG FRAME, REAR ASSY	1	F9-0032
17	CHANNEL, MTG FRAME, REAR WELD ASSY	1	F9-0015
18	SOC SET 1/2 -20 X 2.00, FLAT POINT, SST (BAG OF 10)	2	19722
19	NUT-HEX 1/2-20 THIN (BAG OF 10)	4	19723
20	BUMPER, CARRIAGE STOP	2	F9-0046
21	COVER, 19.98"	5	F9-0018
22	COVER, 6.67"	2	F9-0017
23	BRACKET, COVER MOUNTING	2	F9-0016
24	BRACKET, ACCESS DOOR MOUNTING	1	F9-0019
25	PANEL, BOTTOM ACCESS COVER, TRAIN LIFT	1	UV-MF-808
26	BRACKET, ACC, DOOR SIDE SHIELD, WELD ASSY	2	F9-0022
27	FLANGE, ACCESS DOOR ADJUSTMENT	1	F9-0024
28	FLANGE, ACCESS DOOR MOUNTING	1	F9-0023
29	TUBE, FORWARD CROSS MEMBER	2	F9-0025
30	BRACKET, HOSE/CABLE CLAMP ASSEMBLY	1	F9-0027
31	RAIL, CARRIAGE GUIDE, SW	1	F9-0141
32	PULL BOX, MECHANICAL ASSY	1	F9-0052
33	BOX, PULL BOX	1	F9-0040
34	COVER, PULL BOX	1	F9-0041
35	TIE BAR, PULL BOX, WELD ASSY	1	F9-0042
36	FITTING - 1/4 JIC BULKHEAD W/HEX NUT	1	V2-SH-981
37	HOLE, PLUG, HEYCO	1	26285
38	PLUG, 0.43 - 0.45 DIA, UP TO 0.06 THK, BLK	1	26287
39	STRAIN RELIEF, STR THRU LIQ TIGHT	3	26284
40	BOLT-HEX 5/16 - 18 X 5/8 GR5 (BAG OF 10)	10	14495
41	SOC BUTTON 10-24 X 7/8 SST (BAG OF 10)	4	13387
42	NUT-HEX 10-24 NYLON INSERT, SST (BAG OF 10)	9	14416
43	WASHER, #10 FLAT SAE, SST (BAG OF 10)	13	14409
44	WASHER, #8 FLAT SAE, SST (BAG OF 10)	6	19726
45	SOC BUTTON 8-32 X 1/2, SST (BAG OF 10)	6	15975
46	WASHER, #8 SPLIT LOCK, SST (BAG OF 10)	6	15974
47	TERMINAL STRIP, 15 THERM, KULKA 672 SER	1	26568
48	WASHER, FENDER - 0.3110 X 1.2500 X 0.05, SST (BAG OF 10)	2	14431
49	FOAM, RUBBER, BLK 1/8" X 1/4" X 100", ADA	9.07	06-06-108
50	WASHER, 7/16, EXTERNAL STAR, SST (BAG OF 10)	1	13344
51	HARNESS, MAIN, WITH HYDRAULIC	1	F9-0070
52	SOCKET, FLAT 10-24 X 1/2 SST (BAG OF 10)	5	14426
53	BOLT-CARRIAGE 1/4 - 20 X 5/8, SST (BAG OF 10)	39	19707
54	NUT-HEX, 1/4-20, NYLON INSERT, SST (BAG OF 10)	56	14414
55	NUT-SPRING 1/4-20 MULTI THREAD (BAG OF 10)	36	15952
56	SOCKET BUTTON, 1/4-20 X 5/8 SST (BAG OF 10)	3	14423
57	BOLT-HEX 1/4-20 X 5/8, SST (BAG OF 10)	93	13306
58	WASHER - 5/16, FLAT, SST (BAG OF 10)	14	19737
59	PLATE - FORWARD CROSS MEMBER MOUNTING	4	F9-0049
60	BOLT-HEX, 1/4 -20 X 0.75, SST (BAG OF 10)	2	13389
61	CAP-RECTANGLE, BLACK	4	25564
62	BOLT-HEX 5/16 - 18 X 0.75, SST (BAG OF 10)	4	17508
63	NUT-HEX 5/16 - 18 - NYLOCK, SST (BAG OF 10)	4	14415
64	BOLT - HEX 5/16 - 18 X 1/2 SST	1	282156

65	PLATE, PLUG, ENCLOSURE	1	F9-0072
68	BRACKET-WASSY, STOW LOCK, F9A	1	F9-0186
69-1	SOLENOID, 12V STO LOC, 3+ 1lb @ 1"	1	264503
69-2	SOLENOID, 24V STO LOC, 3+ 1lb @ 1"	1	264504
70	COVER-STOW LOCK MIRAGE	1	F9-0184
71	HARNESS - L PULL BOX TO STOW LOCK	1	F9-0229
72	PIN-STOW LOCK, MIRAGE	1	F9-0187
73	PIN-5/32 X 2.50 ROLL SST (BAG OF 10)	1	25695
74	BUSHING-FLANGE, 0.50 ID X 0.25 L	1	253846
75-1	HYDRAULIC HOSE ASSY, 12 ft, SYNFLEX	1	F9-HH-12
75-2	HYDRAULIC HOSE ASSY, 15 ft, SYNFLEX	1	F9-HH-15
75-3	HYDRAULIC HOSE ASSY, 17 ft, SYNFLEX	1	F9-HH-17
75-4	HYDRAULIC HOSE ASSY, 23 ft, SYNFLEX	1	F9-HH-23
75-5	HYDRAULIC HOSE ASSY, 26 ft, SYNFLEX	1	F9-HH-26
76	NUT, SPRING, 10-24 U TYPE (BAG OF 10)	2	11799
77	SCREW, BHS, 10-24 X1/2 SST (BAG OF 10)	2	14424
78	WASHER, FLT, .219X.50X.049 SST (BAG OF 10)	2	14409
79	PLUG, (.062) 2-PIN MOLEX	1	26531
80-1	SOLENOID ASSY, STOW LOCK, 12V	1	F9-0339
80-2	SOLENOID ASSY, STOW LOCK, 24V	1	F9-0348

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DATE: 02/22/99
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PLATFORM ASSEMBLY
 F9A SERIES TRANSIT USE WHEELCHAIR LIFT
 SERIAL NO's. 4000 - PRESENT

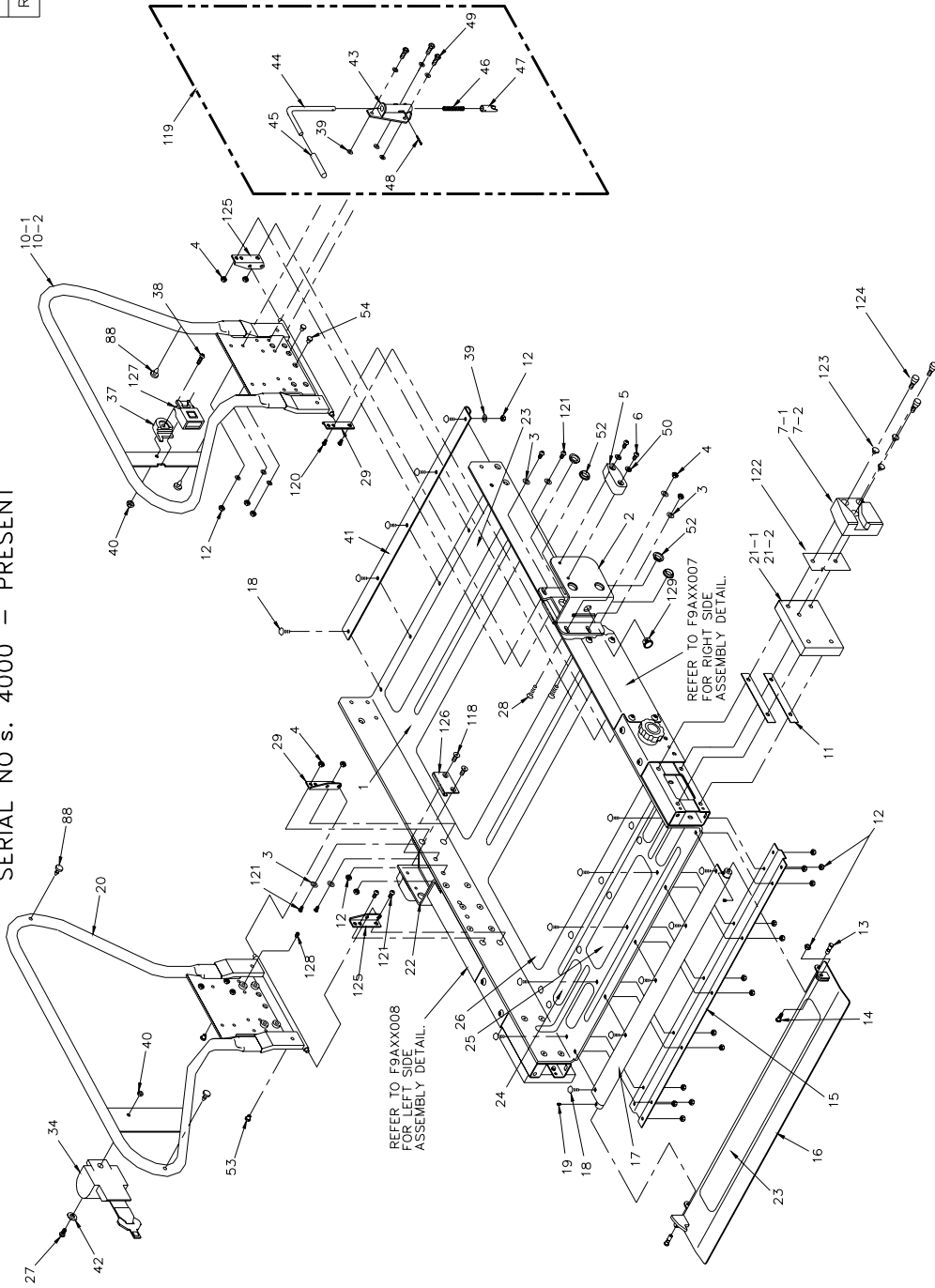


FIGURE 5-4: PLATFORM ASSEMBLY

DATE: 02/22/99
DWG. 16048
REV. C

PLATFORM ASSEMBLY, RIGHT SIDE DETAIL
 F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
 SERIAL NO's. 4000 - PRESENT

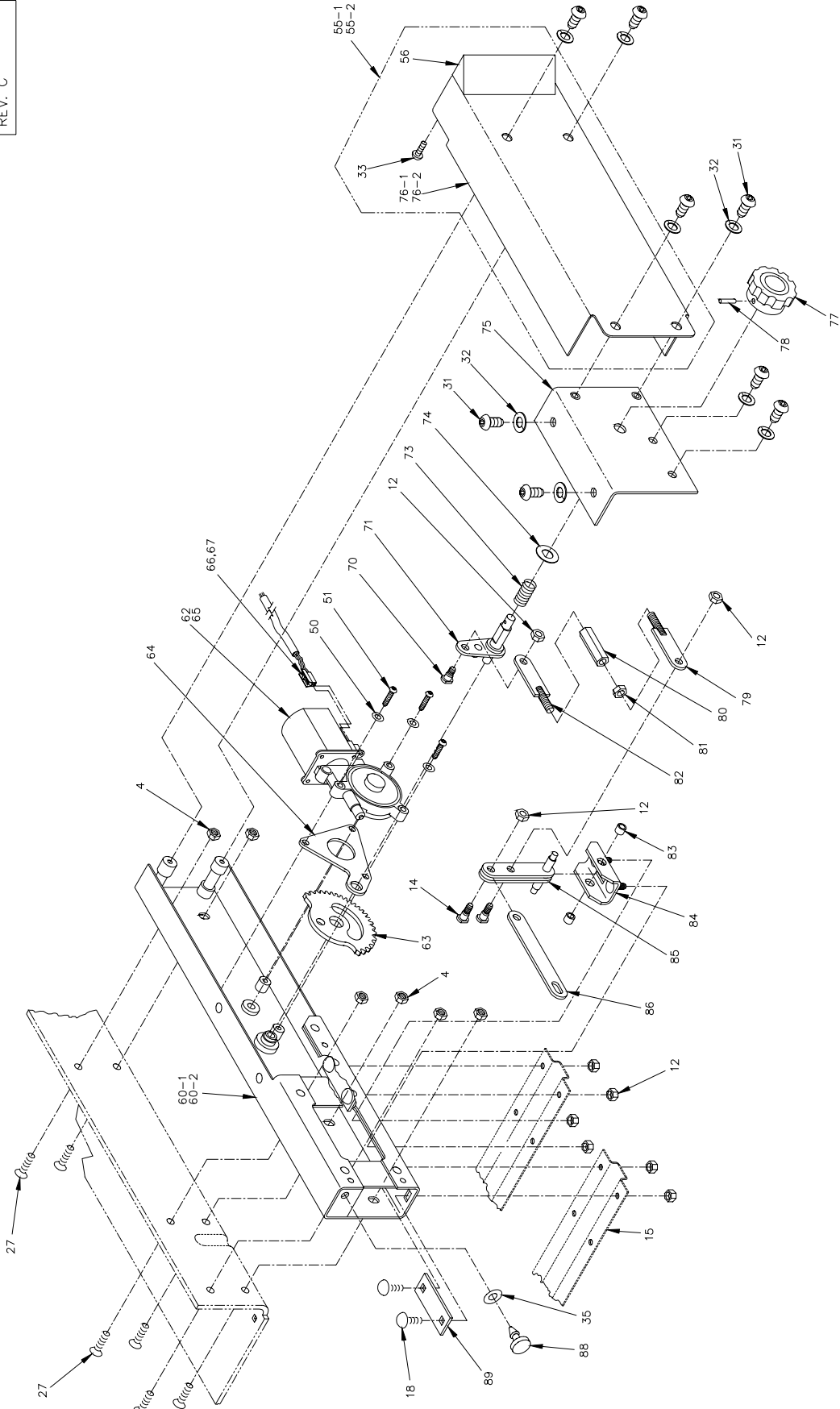


FIGURE 5-5: PLATFORM ASSEMBLY, RIGHT SIDE DETAIL

PLATFORM ASSEMBLY, LEFT SIDE DETAIL
F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
SERIAL NO'S. 4000 - PRESENT

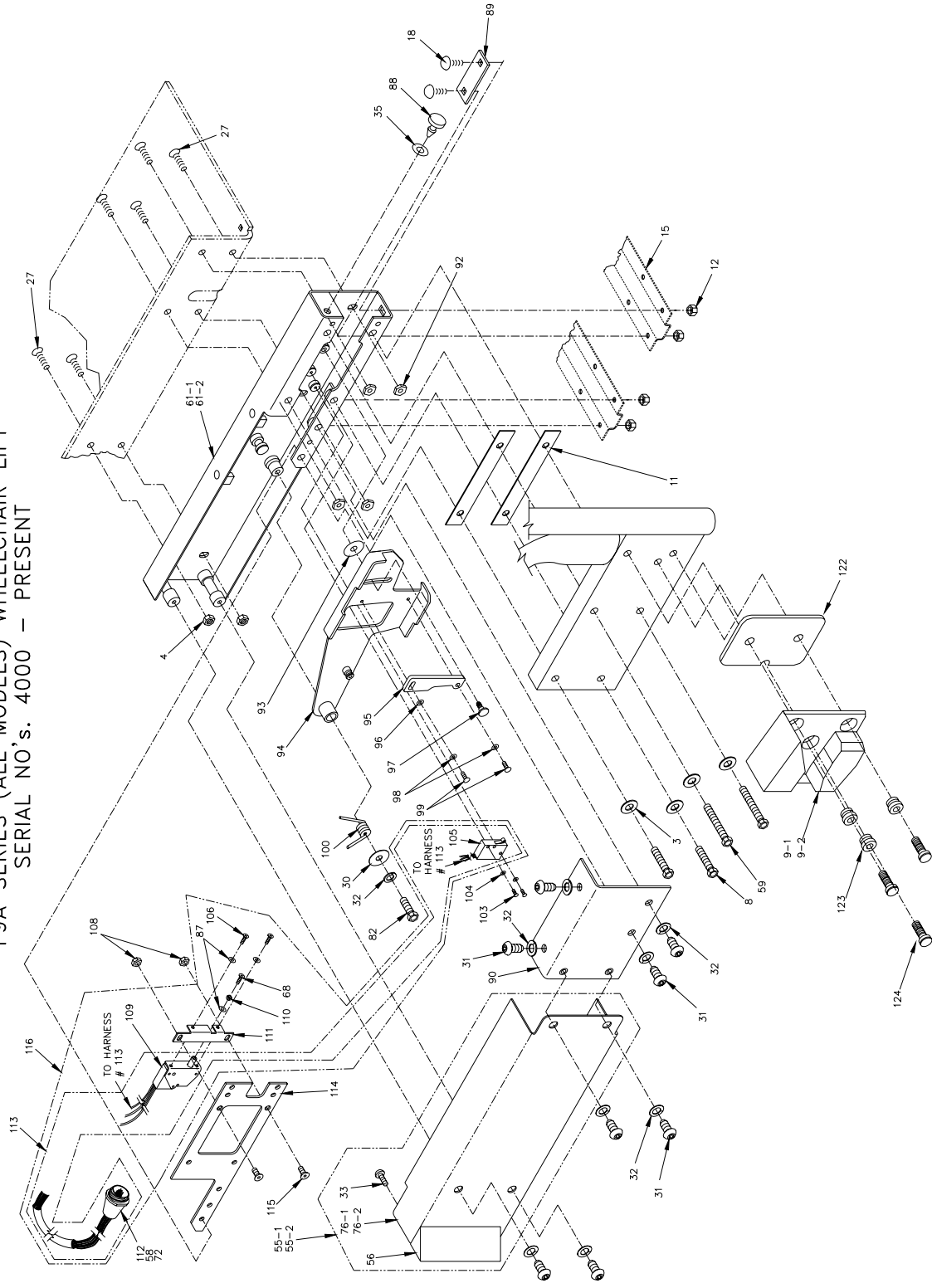


FIGURE 5-6: PLATFORM ASSEMBLY, LEFT SIDE DETAIL

**FIGURES 5-4, 5-5, 5-6: PLATFORM ASSEMBLY
F9A SERIES TRANSIT USE WHEELCHAIR LIFT
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1	PLATFORM, 32.25 X 47.00, PRS.	1	F9-0275
2	BRACKET-WASSY.,PLATFORM PIVOT RH.	1	F9-0107
3	WASHER, FLAT, 0.32 ID X 0.75 OD X 0.080 SST. (BAG OF 10)	16	17503
4	NUT-HEX, 5/16-18, JAM, NYLON INSERT, SST (BAG OF 10)	20/16	14411
5	STOW GUIDE	2	14344
6	MS-1/4-20 X 0.75, SOC, BUTTON, SST (BAG OF 10)	4	13313
7	BLOCK, PLATFORM GUIDE, RH	1	F9-0197
8	BOLT-HEX, 5/16-18 X 1 1/2, SST. (BAG OF 10)	4	14413
9	BLOCK, PLATFORM GUIDE, LH	1	F9-0198
10-1	HANDRAIL, WELD ASSEMBLY, FOLDING, RH.	1	F9-0283
10-2	HANDRAIL-WASSY.,FOLDING, RIGHT HAND	1	F9-0427
11	SHIM, HANDRAIL 0.50 THK.	4	UV-PF-881
12	NUT-HEX, 1/4-20, JAM , NYLON INSERT, SST. (BAG OF 10)	47	13339
13	PIN-CLEVIS, 5/16 OD X 1.00, SST.	2	UV-PI-016
14	BOLT, SHOULDER, 0.250 X 0.313 OD, PRS	3	UV-PF-899
15	KIT, STIFFENER, RIB, PRS., SW	2	20622
16	ROLLSTOP, WELD ASSY., PRS., SW	1	UV-PF-234
17	STIFFENER, TUBE, PRS. PIVOT, WELD ASSY., SW	1	UV-PF-231
18	BOLT, CARRIAGE, 1/4-20 X 3/4, SST. (BAG OF 10)	31	13395
19	SOCKET SET, 1/4-20 X 1/4, SST. (BAG OF 10)	2	17505
20	HANDRAIL, WELD ASSEMBLY, FOLDING , LH.	1	F9-0282
21-1	COVER-WASSY., RS	2	F9-0298
21-2	COVER-WASSY., RS	2	F9-0569
22	BRACKET-WASSY., PLATFORM PIVET, LH.	1	F9-0110
23	SAFETY TREAD, 25 1/2 X 3, SAFETY YELLOW	2	25664
24	SAFETY TREAD, 5.50 X 1.50, SAFETY YELLOW	4	25674
25	SAFETY TREAD, 12.75 X 3.00, SAFETY YELLOW	1	25673
26	SAFETY TREAD, 25 1/2 X 12.00, OCEAN GREY	2	25661
27	SOCKET FLAT, 5/16-18 X 3/4 SST. (BAG OF 10)	9/5	14420
28	MS-5/16-18 X 1.00, SOC, PLAT, SST. (BAG OF 10)	4/8	14421
29	BRACKET-HANDRAIL PIVOT, RH.	2	F9-0248
30	WASHER, FENDER 0.31 ID X 1.25 OD X 0.05, SST. (BAG OF 10)	1	14431
31	MS 5/16 - 18 X 0.5D SOC BUTTON, SST (BAG OF 10)	16	17506
32	WASHER - 5/16 SPLIT LOC, SST (BAG OF 10)	17	17509
33	SMS - #8 X 0.063 PHIL PAN SST (BAG OF 10)	4	19732
34	RETRACTOR-RESTRAINT BELT	1	F9-0303
35	WASHER, NYLON, 0.375 ID X 0.630 OD X 0.032 (BAG OF 10)	2	14435
37	BLOCK-BUCKLE MOUNT	1	F9-0301
38	MS-5/16-18 X 1.38 SOC, BUTTON, SST. (BAG OF 10)	1	25631
39	WASHER, 1/4 FLAT, SAE., SST. (BAG OF 10)	23	13398
40	NUT-5/16-18 ACRON SST.	2	283133
41	STIFFENER, PLATFORM REAR, SW-T	1	UV-PF-898
42	WASHER-5/16 COUNTER SINK	1	VT-AC-23
43	BRACKET-WASSY., LATCH	2	UV-PF-106
45	CAP-VINYL YLW .375-2.5 BLK LETTER.	2	01653
46	SPRING-2.5 X 0.50 OD X 0.52	2	UV-PF-008
47	STRIKER-HANDRAIL LATCH	2	UV-PF-057
48	ROLL PIN-1/8 X 1.00 SST.	2	28354
49	BOLT-1/4-20 X 0.75HEX SST. (BAG OF 10)	6	13389
50	WASHER, 1/4 SPLIT LOCK, SST (BAG OF 10)	10	13399
51	SOCKET, BUTTON 1/4 - 20 X 1.13 SST (BAG OF 10)	3	17507
52	BEARING-0.75 X 0.25 DU FLANGED (BAG OF 10)	8	19576
53	BUMPER-RUBBER 0.50 X 0.31 X 0.31 POST	2	284082
54	BUMPER-RUBBER (BAG OF 10)	3	29851
55-1	COVER-ASSY., PRS	2	F9-0115
55-2	COVER-ASSY., EXT	2	F9-0254
56	BLOCK-PRS COVER	2	F9-0437
57	THIS NUMBER NOT REFERENCED ON FIXED HANDRAIL UNITS		
58	PIN MALE TAPE 66098-7, BAG OF TEN	6	19760
59	BOLT-HEX 5/16-18 X 2.00, SST. (BAG OF 10)	4	19711
60-1	CHANNEL-WASSY., HOUSING, PRS, RH..	1	UV-PF-227
60-2	CHANNEL-WASSY., HOUSING, SHORT PRS, RH.	1	F9-0241
61-1	CHANNEL-WASSY., HOUSING,, PRS, LH.	1	UV-PF-229
61-2	CHANNEL-WASSY., HOUSING,, SHORT PRS, RH.	1	F9-0242

62	GEAR MOTOR DELCO PH3, 9T RH, MED-TORQ 24V	1	25483
63	GEAR, PRS.	1	UV-PF-880
64	PLATE, KEEPER, PRS., GEAR	1	UV-PF-875
65	GEAR MOTOR, DELCO PH3, 9T RH. MED-TORQ. 12V	1	25486
66	TERMINAL, CONNECTOR-2 CIRCUIT, PACK-CON	1	25481
67	TERMINAL, PACK-CON SERIES 1, HD. FEM	2	26551
68	MS 6-32 X 5/8 PHIL PAN, SST (BAG OF 10)	1	14428
69	SOCKET, BUTTON, 1/4-20 X 1.13, SST. (BAG OF 10)	3	17507
70	BOLT-SHOULDER PRS.	1	UV-PF-937
71	RELEASE TRIGGER, WELD ASSY., PRS.	1	UV-PF-889
72	STRAIN RELIEF	1	26468
73	SPRING, MANUAL RELEASE TRIGGER, PRS.	1	UV-SP-019
74	WASHER, 1/2 ID D/SHAPE X 1.00 OD X 0.30 (BAG OF 10)	1	13322
75	BRACKET, MANUAL RELEASE, RH., WELD ASSY.	1	UV-PF-804
76-1	COVER, PRS., SW	2	F9-0113
76-2	COVER, PRS., EXT	2	F9-0253
77	KNOB, PWR. ROLL STOP, MIRAGE	1	UV-PF-936
78	ROLL PIN, 1/8 X 1 1/4, SST. (BAG OF 10)	1	14438
79	LINK, GEAR, WELD ASSEMBLY, RH.	1	UV-PF-892
80	LINK, HEX, ADJUSTABLE, PRS	1	UV-PF-863
81	NUT-HEX, JAM, 5/16-18, SST. (BAG OF 10)	1	14412
82	LINK, GEAR, WELD ASSEMBLY, LH. THD.	1	UV-PF-893
83	BUSHING, PIVOT SHAFT, PRS.	2	UV-PF-883
84	BRACKET, MTG., COMP. LINK, WELD ASSY.	1	UV-PF-894
85	LINK, COMPENSATOR, WELD ASSY., PRS.	1	UV-PF-888
86	LINK, ROLL STOP, PRS.	1	UV-PF-860
87	WASHER #6, SPLIT LOCK, SST (BAG OF 10)	3	14433
88	BUMPER, RUBBER B-1220 (KIT OF 10)	2	20653
88-1	BUMPER, RUBBER, 1.00ODX.50THK (KIT OF 10)	2	30912
88-2	BUMPER, RUBBER, 1.00ODX.40THK (KIT OF 10)	2	30913
89	KEEPER, REINFORCEMENT	4	UV-PF-855
90	BRACKET, MANUAL RELEASE, LH., WELD ASSY.	1	UV-PF-802
91	MS. SOC., FLAT HD., 5/16-18 X 0.50, SST. (BAG OF 10)	4	14441
92	T-NUT 5/16-18, SST.	4	UV-PF-934
93	WASHER, NYLON, 0.315 ID X 1.156 OD X 0.062 (BAG OF 10)	1	14443
94	FOOT, PRS. ACTUATOR, WELD ASSY.	1	UV-PF-909
95	CAM, PRS. SWITCH ACTUATOR	1	UV-PF-918
96	WASHER #10 FLAT SAE., SST. (BAG OF 10)	1	14409
97	SHOULDER SCREW, FLAP LATCH	1	UL-PF-034
98	WASHER #10 SPLIT LOCK, SST. (BAG OF 10)	2	14432
99	MS.SOC., BUTTON, 10-24 X 3/8, SST. (BAG OF 10)	2	14425
100	SPRING, LH., ROLLSTOP ACTUATOR RETURN	1	UV-SP-002
101	THIS NUMBER NOT REFERENCED ON FIXED HANDRAIL UNITS		
102	BOLT-HEX, 5/16-18 X 3/4, SST. (BAG OF 10)	1	17508
103	MS. 4-40 X 5/8, PHIL PAN (BAG OF 10)	2	14429
104	WASHER #4, SPLIT LOCK (BAG OF 10)	2	14434
105	LIMIT SWITCH, SEALED, PRS.	1	264104
106	MS. 6-32 X 1/4, PHIL PAN HD., SST. (BAG OF 10)	2	14427
107	THIS NUMBER NOT REFERENCED ON FOLDING HANDRAIL UNITS		
108	NUT-HEX 10-24, NYLON INSERT, SST. (BAG OF TEN)	2	14416
109	PLUNGER SWITCH, SEALED, TAPPED 6-32	1	15767
110	NUT-HEX 6-32, SST. (BAG OF 10)	1	14419
111	BRACKET, MOUNTING, LIMIT SWITCH, PRS.	1	UV-PF-911
112	RECEPTACLE, 9 PIN WO/FLANGE	1	26472
113	HARNESS, ROLLSTOP SWITCH	1	UV-ES-221
114	PLATE, REINF. LH., WELD ASSY., PRS., SW-T	1	UV-PF-908
115	SOCKET, FLAT 10-24 X 1/2, SST. (BAG OF 10)	2	14426
116	ASSY., HARNESS, ROLLSTOP SWITCH	1	UV-ES-852
117	MS. SOC. BUTTON 5/16-18 X 1/2, SST. (BAG OF 10)	16	17506
118	MS-1/4-20 X 0.75, SOC. FLAT, SST. (BAG OF 10)	4	13310
119	MECH. ASSY. - LATCH	1	UV-PF-107
120	SCREW, BHS, 5/16-18X 3/4 SST (BAG OF 10)	2	13381
121	SCREW, BHS, 5/16-18X1 SST (BAG OF 10)	6	25634
122	THIS NUMBER NOT REFERENCED ON FOLDING HANDRAIL UNITS		
123	THIS NUMBER NOT REFERENCED ON FOLDING HANDRAIL UNITS		
124	SCREW, HEX, 5/16 - 18 X 1/2, SST (BAG OF 10)	6	14418
125	BRACKET-HANDRAIL PIVOT, LH	2	F9-0249
126	PLATE-HANDRAIL LOCK, STRICKER	2	F9-0256
127	BUCKLE-RESTRAINT BELT W/O SWITCH	1	F9-0472
128	MS 5/16 - 18 X 0.50 SOC. SET SST (BAG OF 10)	2	19734
129	BUSHING 0.750 X 0.25 THK SNAP IN (KIT OF 10)	1	28780

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DATE: 11/20/01
DWG. F9AXX003
REV NO. B

TRAVELING FRAME ASSEMBLY
 F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
 SERIAL NO's. 4000 and HIGHER

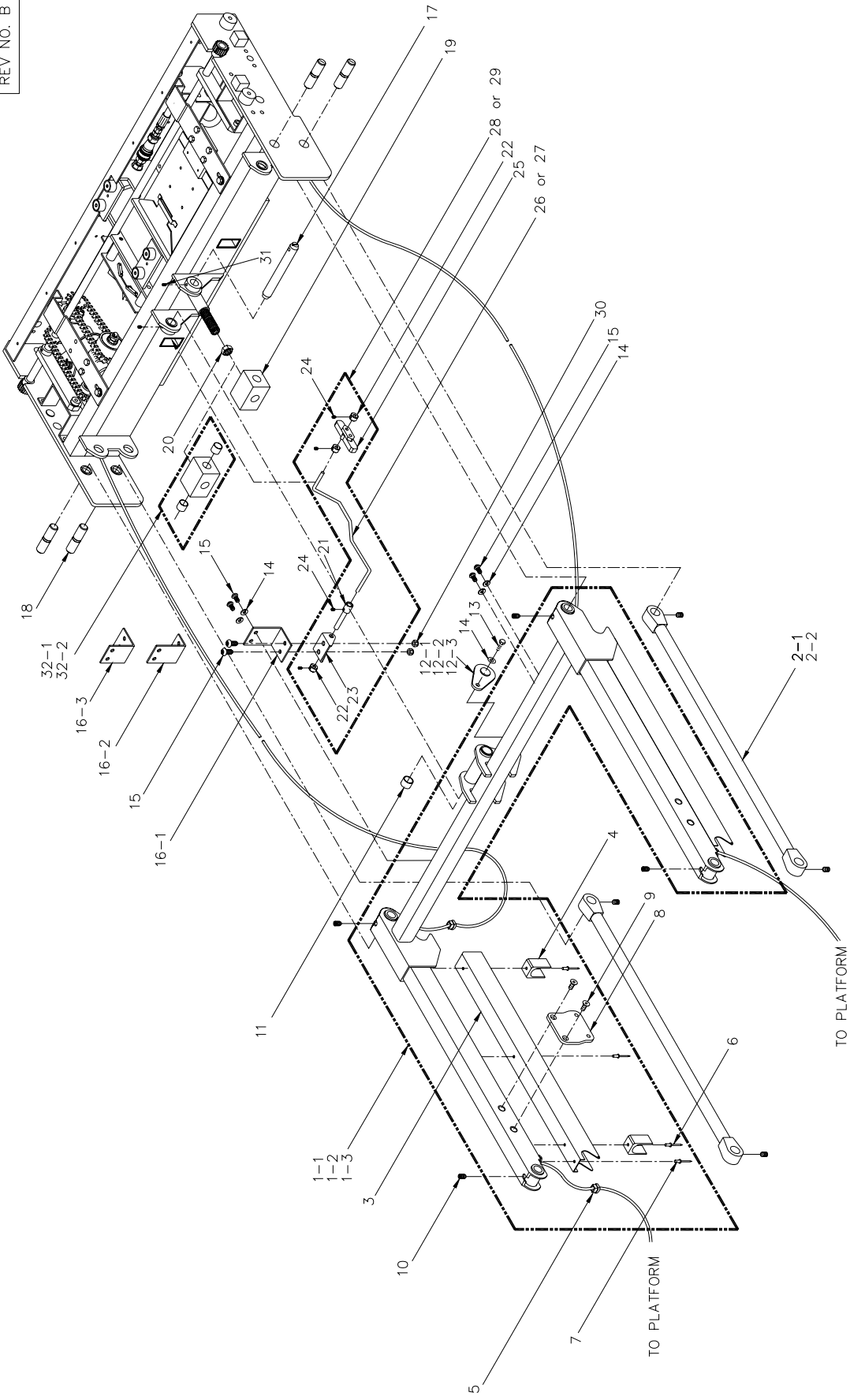
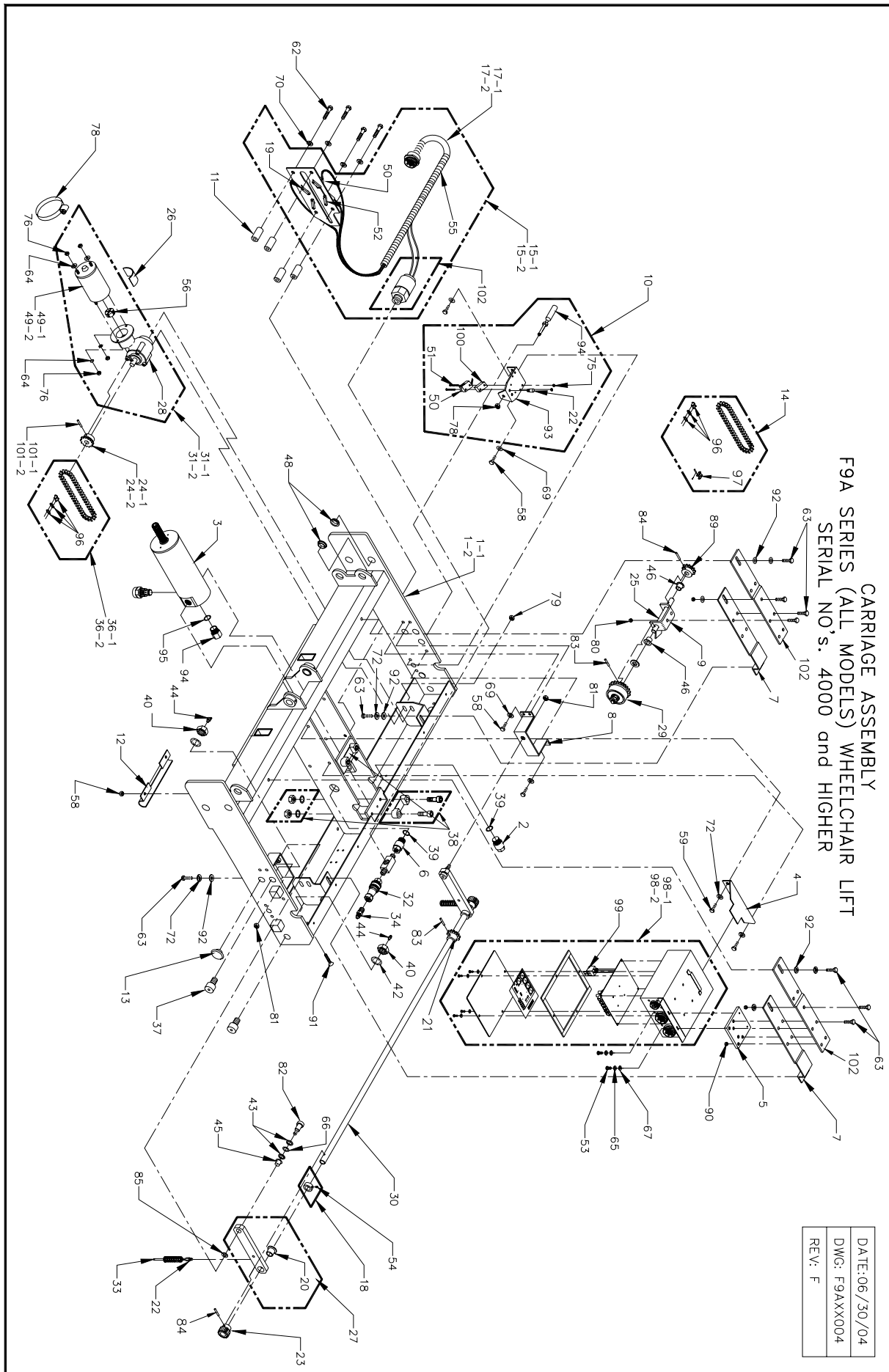


FIGURE 5-7: TRAVELING FRAME ASSEMBLY

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**FIGURE 5-7: TRAVELING FRAME ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1-1	LIFTING FRAME-ASSY., 30.313 CENTERS, SW	1	F9-0165
1-2	LIFTING FRAME-ASSY., 30.313 CENTERS, DA	1	F9-0224
1-3	LIFTING FRAME-ASSY., 43.00 CENTERS, EXT	1	F9-0245
2-1	ARM-WASSY, LOWER, 30.313 CENTERS	2	F9-0155
2-2	ARM-WASSY, LOWER, 43.000 CENTERS	2	F9-0166
3	COVER-ARM 30.313 CENTERS	2	F9-0098
4	BLOCK-ARM GUIDE	4	F9-0179
5	STRAIN RELIEF	4	262821
6	RIVET-3/16 X 5/8 , STEEL	4	14-30-410
7	RIVET-3/16 X 3/8 , STEEL	4	14-30-411
8	PLATE-BRIDGE PLATE ACTUATOR MOUNT	2	F9-0164
9	MS-1/4-20 X 5/8 SOC FLAT S/S (BAG OF 10)	4	19739
10	MS-SOC SET 5/16 -18 X 1/2, CUP, SST (BAG OF 10)	8	19734
11	BEARING DU, 0.75 ID X 0.875 OD X 0.63 (KIT OF 6)	6	20600
12-1	KEEPER PLATE-WASSY	2	F9-0099
12-2	KEEPER PLATE-WASSY	2	F8-0043
12-3	KEEPER PLATE-WASSY.	2	F8-0043
13	BOLT-5/16-18 X .625 HEX, SST (BAG OF 10)	2	19708
14	WASHER 5/16 SPLIT LOCK, SST (BAG OF 10)	6	17509
15	MS-5/16-18 X 0.63, BUTTON HD., SST (BAG OF 10)	6	14442
16-1	BRACKET-ACTUATOR ROD PIVOT, SW	1	F9-0149
16-2	BRACKET-ACTUATOR ROD PIVOT, DA	1	F9-0148
16-3	BRACKET-ACTUATOR ROD PIVOT, EXT	1	F9-0150
17	PIN-PIVOT, 0.75 X 6.00	1	F8-0041
18	PIN-PIVOT, LIFTING FRAME	4	F9-0089
19	TRUNNION, HYDRAULIC CYLINDER	1	F9-0116
20	NUT, HEX 3/4-16 JAM SST (BAG OF 10)	1	25610
21	COLLAR-ACTUATOR ROD	1	UV-ES-036
22	COLLAR-0.25 X 0.63 X 0.38	3	V3-BU-15
23	BRACKET-F9000 SERIES ELECT. SYSTEM	1	UV-ES-027
24	SCREW, SOCKET SET, 10-32 X 1/4 SST (BAG OF 10)	6	13397
25	BLOCK-SWITCH ACTUATOR CAM	1	F9-0206
26	ROD-SWITCH CAM ACTUATOR LH	1	F9-0058
27	ROD-SWITCH CAM ACTUATOR RH	1	F9-0059
28	SWITCH ACTUATOR-ASSY., LH	1	F9-0167
29	SWITCH ACTUATOR-ASSY., RH	1	F9-0222
30	NUT-HEX 5/16-18 NY LOCK THIN (BAG OF 10)	2	14411
31	MS-1/4-20 X 1/4 SOC. SET SST (BAG OF 10)	2	17505
32-1	TRUNNION w/BUSHINGS	1	19878
32-2	KIT, CLEVIS REINFORCEMENT PLATES, RETROFIT (NOT SHOWN)	1	19873



CARRIAGE ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
SERIAL NO.'s. 4000 and HIGHER

DATE: 06/30/04
DWG: F9AXX004
REV: F

FIGURE 5-8: CARRIAGE ASSEMBLY

32DF9AS02.B

**FIGURE 5-8: CARRIAGE ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFTS
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1-1	CARRIAGE - WASSY EXTENDED	1	F9-0100
1-2	CARRIAGE - WASSY STANDARD	1	F9-0106
2	FITTING, PIVOT	1	F8-0009
3	CYLINDER, HYDRAULIC, WITHOUT INTERNAL POT	1	F9-0035
4	BRACKET - CARRIAGE ELECTRICAL BOX MTG	1	F9-0057
6	FITTING, PIVOT, 1/4 NPT	1	F8-0008
7	BRACKET - ASSY, IDLER SHAFT	2	F9-0123
8	BRACKET - ASSY, DRIVE SHAFT ARM, PIVOT	2	F9-0125
9	SUPPORT, WASSY, IDLER SHAFT	1	F9-0126
10	ASSY - MICRO SWITCH	2	F9-0138
11	SPACER - SWITCH PLATE, STAND OFF	3	F9-0140
12	CLAMP - HARNESS	1	F9-0143
13	BUTTON, CARRIAGE, GUIDE	2	F9-0157
14	CHAIN DRIVE, PRIMARY; TRAIN LIFT	1	UV-DS-816
15-1	SWITCH PLATE ASSY, ON BOARD ELECT	1	F9-0172
15-2	SWITCH PLATE ASSY, ON BOARD ELECT W/PRESS. SWITCH*	1	17704
16	SWITCH PLATE	1	F9-0173
17-1	HARNESS - ASSY SWITCH PLATE ON BOARD ELECT	1	F9-0174
17-2	HARNESS- ASSY SWITCH PLATE ON BOARD ELECT W/PRESS. SWITCH*	1	17703
18	COLLAR SET SCREW	2	R5-AC-503
19	BLOCK, SWITCH RETAINER, PLASTIC	4	UL-AC-011
20	BEARING - DU, 0.625 ID X 0.719 OD X 0.38 FL	2	UV-BU-014
21	SPROCKET, #35, 12 TEETH, 0.625 BORE	1	UV-DS-002
22	BUTTON, SPRING SUPPORT	2	UV-DS-003
23	GEAR, 1.125 PD, .63 FACE W/HUB	2	UV-DS-005
24-1	SPROCKET, #35, 8 TEETH, 0.5 BORE (USE WITH 36-1 AND 101-1)	1	F9-0450
24-2	SPROCKET, SYNC - #35 (USE WITH 36-2 AND 101-2)	1	UV-DS-006
25	SHAFT, INTERMEDIATE DRIVE, 0.50 OD X 5.0	1	F9-0312
26	GASKET, RUBBER, 1/8 X 1 X 2	1	UV-DS-016
27	LINK, DRIVE SHAFT, PIVOT, ASSY	2	UV-DS-052
28	GEAR BOX, 24:1 RATIO	1	UV-DS-200
29	CLUTCH, TORQUE LIMIT RICON	1	UV-DS-202
30	SHAFT, FINAL DRIVE - DS200	1	F9-0151
31-1	GEAR-MOTOR ASSY., 12V	1	UV-DS-205
31-2	GEAR-MOTOR ASSY., 24V	1	UV-DS-207
32	FITTING, QUICK-DISCONNECT, 1/4	1	UV-SH-003
33	SPRING, COMPRESSION, 0.44ID X 2.1	2	254537
34	ADAPTER, STRT, 1/4 NPT MALE - 1/4 JIC MAL	1	V2-SH-84
36-1	CHAIN-DRIVE, PRIMARY; TRAIN LIFT (USE WITH 24-1 AND 101-1)	1	19574
36-2	CHAIN, FINAL DRIVE (USE WITH 24-2 AND 101-2)	1	UV-DS-009
37	CAM FOLLOWER, 1-1/4 OD X 3/4 CRWND	4	40-20-006
38	KIT, GUIDE BLOCKS, CARRIAGE	1	22517
39	O-RING, NIITRILE, 0.644 ID 0.87W	2	24908
40	NUT, HEX, 3/16 JAM (BAG OF 10)	5	15924
42	WASHER, 3/4 INTERNAL STAR (BAG OF 10)	4	15925
43	WASHER, NYLON (BAG OF 10)	4	19712
44	FITTING, GREASE, 65 DEG PRESS-IN (BAG OF 10)	4	13326
45	BUSHING, NY LINER .50 X .50	2	25298
46	BUSHING, 12 EDU08, 3/4 D X 1/2	2	25384
47	BUSHING, 16 FDU08 1" D X 1/2	2	25382
48	BEARING - DU FLG 3/4 ID X 1/4 L (BAG OF 10)	8	19576
49-1	MOTOR, 1/4 HP, 12 VOL SHORT SHAFT	1	25477
49-2	MOTOR-1/4 HP, 24 VDC. SHORT SHAFT	1	25478
50	LIMIT SWITCH, SEALED, ROLLER	1	264103
51	MS 4-40 X 1 125 PHIL PAN (BAG OF 10)	4	14406
52	SMS #4 X 1. PHIL PAN, TYPE AB, ZINC (BAG OF 10)	8	14402
53	MS 8-32 X 1/2, PHIL PAN, SST	2	280705
54	SOCKET SET 10-24 X 1/4 (BAG OF 10)	2	14410
55	CONDUIT- PLASTIC 1/2	4	27200
56	COUPLING-ACTUATOR	1	25396
58	BOLT-HEX 1/4-20 X 1/2, SST	10	282735
59	BOLT-HEX 5/16-18 X1/2, SST	2	282516
61	BOLT-HEX, 5/16 -18 7/8 GR5, SST (BAG OF 10)	2	13385
62	BOLT-HEX, 5/16 - 18 X 2 1/2 GR5	3	28219
63	BOLT-HEX, 5/16 - 18 X 0.75 SST (BAG OF 10)	4	17508
64	WASHER #10 INTERNAL STAR	4	28249

65	WASHER, #8 SPLIT LOCK, SST (BAG OF 10)	2	15974
66	WASHER, 1/2" WAVE SHAKE PROOF	2	28261
67	WASHER #8, FLAT SAE SST (BAG OF 10)	22	19726
68	WASHER 1/4 FLAT SAE, SST (BAG OF 10)	6	13398
69	WASHER 1/4 SPLIT LOCK, SST (BAG OF 10)	10	13399
70	WASHER 5/16 FLAT SAE (BAG OF 10)	3	13350
72	WASHER, 5/16 SPLIT LOCK, SST (BAG OF 10)	10	17509
73	WASHER, 5/8 INTERNAL STAR,	1	28958
75	NUT-HEX 4-40 NYLON INSERT (BAG OF 10)	4	14407
76	NUT-HEX, 10-32 (BAG OF 10)	4	13400
77	NUT-HEX, 1/4 - 2-, NYLON INSERT, SST (BAG OF 10)	4	14414
78	NUT-HEX 1/4 - 20, JAM NYLON INSERT, SST (BAG OF 10)	2	13339
79	NUT-HE X 5/16 - 18, SST (BAG OF 10)	2	19703
80	NUT-HEX 5/16 - 18, NYLON INSERT, SST (BAG OF 10)	2	14415
81	NUT-HEX 3/18 - 16 JAM, NYLON INSERT (BAG OF 10)	2	13348
82	BOLT-SHOULDER, 1/2 X 3/4	2	28381
83	PIN, "SPIROL", 5/32 X 1 1/4 (BAG OF 10)	2	13329
84	PIN, "SPIROL", 5/32 X 1 (BAG OF 10)	3	13324
85	WASHER, NYLON, 0.578 ID X 1.06 OD X 0.31 (BAG OF 10)	2	15916
86	CLUTCH, TORQUE LIMITING, WARNER	1	28600
90	NUT-HEX 5/16 - 18, JAM NYLON INSERT, SST (BAG OF 10)	4	14411
91	MS 1/4 - 20 X 5/8 SOC FLAT S/S (BAG OF 10)	2	19739
92	WASHER - FLAT, 0.32 ID X 0.75 OD X 0.08 SST (BAG OF 10)		17503
93	BRACKET - PLUNGER, MICRO SWITCH	3	F9-0136
94	PLUG, 3/4 - 16 CAV, O-RING SEAL, HEX HEAD	1	V2-SH-132
95	SPACER - IMMEDIATE DRIVE	1	F9-0313
96	LINK-MASTER NICKEL #35 (USE WITH 24-1 AND 36-1) (KIT OF 10)	2	13328
97	OFFSET - LINK #35 - 1/2 LINK	1	25045
98-1	ELECTRIC BOX ASSY., ON BOARD, TAB MOUNT, 12V	1	UV ES 830
98-2	ELECTRIC BOX ASSY., ON BOARD, TAB MOUNT, 24V	1	18020
99	RELAY, 12V	1	28-36-405
100	BRACKET, ALUM.-LIMIT SWITCH	1	V2-ES-79
101-1	ROLL PIN, 5/32 X 3/4 (USE WITH 24-1 AND 36-1), (BAG OF TEN)	1	15991
101-2	ROLL PIN, 5/32 X 1 (USE WITH 24-2 AND 36-2) (BAG OF 10)	1	19756
102	BRACKET, IDLER SHAFT, EXTENSION	2	F9-0139

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DATE: 11/06/97
DWG: F9AXX009
REV: B

9" BRIDGEPLATE ASSEMBLY
 F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
 SERIAL NO's. 4000 and HIGHER

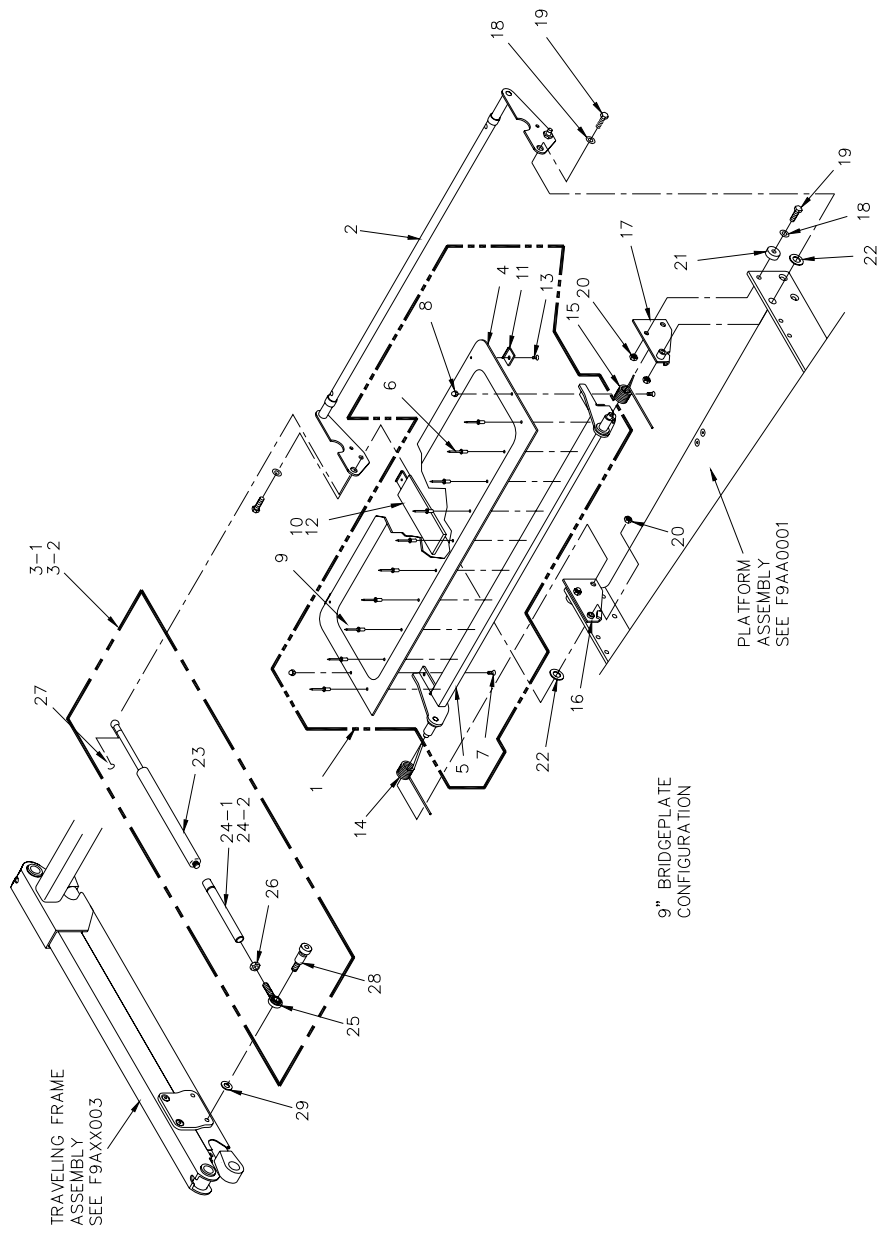


FIGURE 5-9: 9" BRIDGEPLATE ASSEMBLY

**FIGURE 5-9: 9" BRIDGEPLATE ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1	BRIDGEPLATE-ASSY., 9.00" SPAN	1	F9-0291
2	STIRRUP-W-ASSY., BRIDGEPLATE	1	F9-0294
3-1	ROD-ASSY., BRIDGEPLATE ACTUATOR 26" UTS	2	F9-0267
3-2	ROD-ASSY., BRIDGEPLATE ACTUATOR 18.5"-23.5 UTS	2	F9-0346
4	PLATE-BRIDGE BLANK 9.00"	1	F9-0288
5	ASSY., WELD B-PLATE SUPPORT	1	F9-0295
6	RIVET- BLIND AL, 3/16 X 3/8 (BAG OF 10)	10	15918
7	SCREW, FHH, 10-24 X 1/2 SST (BAG OF 10)	2	14426
8	NUT-10-24, HEX, ACORN. (BAG OF 10)	2	19799
9	SAFETY TREAD-25.560 X 7.00, SAFETY YELLOW	1	25665
10	KIT, BLOCK-BRIDGEPLATE GUIDE, BUMPER WITH TAPE	1	22072
11	SKID-BRIDGEPLATE (KIT OF 10)	3	20643
12	TAPE-ADHESIVE, TRANSFER 10 MIL X 1." WIDE	12"	263110
13	SCREW, FHP, 10-24 X 1/4 UNDERCUT (BAG OF 10)	3	13302
14	SPRING-LH., B-PLATE	1	UV-SP-010
15	SPRING-RH., B-PLATE	1	UV-SP-011
16	BRACKET-B-PLATE MOUNT, LH	1	UV-PF-308
17	BRACKET-B-PLATE MOUNT, RH	1	UV-PF-309
18	WASHER, FLT-32 X .59 X .06 SST (BAG OF 10)	4	25345
19	SCREW, HEX, 5/16 - 18 X 1 1/4 SST	4	282233
20	NUT, ESN, 5/16-18ST (BAG OF 10)	4	14415
21	BUSHING-0.75 OD X 0.32 ID X 0.38 (KIT OF 10)	2	20602
22	WASHER, FLT, .578 X 1.067 X .062 NYL (BAG OF 10)	2	13343
23	SPRING-PNEUMATIC, 100 LBF, 16.75	2	UV-SP-014
24-1	ROD-WASSY., B-PLATE ACTUATOR, 26" UTS	2	F9-0266
24-2	ROD-WASSY., B-PLATE ACTUATOR, 18.5"-23.5" UTS	2	F9-0345
25	ROD END-(M) LT. THD. R1700	2	25501
26	NUT-3/8-24 LH., HEX (BAG OF 10)	2	14417
27	CLIP-BALL RETAINER	2	UV-SP-015
28	SCREW, SSS, 3/8 X 3/8 SST (BAG OF 10)	2	14418
29	STANDOFF-BRIDGEPLATE ACTUATOR	2	F9-0234

DATE: 04/22/97
DWG. F9AXX010
REV. A

15" BRIDGEPLATE ASSEMBLY
 F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
 SERIAL NO's. 4000 and HIGHER

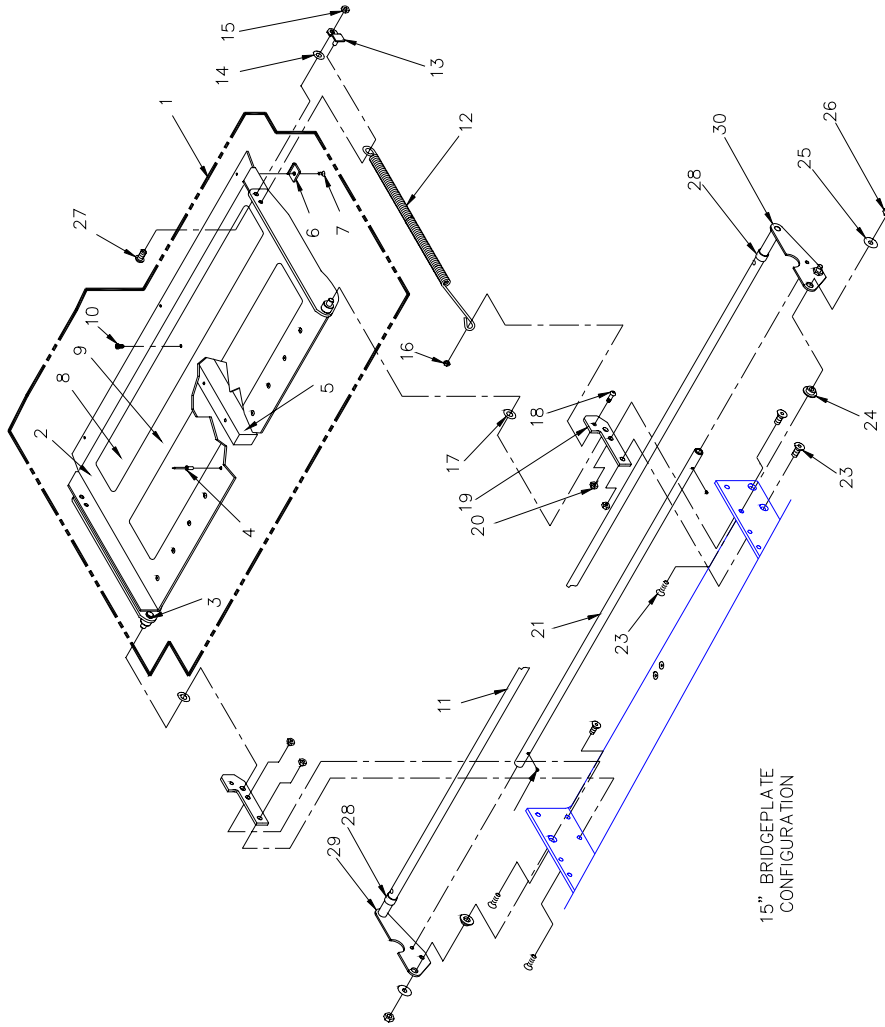


FIGURE 5-10: 15" BRIDGEPLATE ASSEMBLY

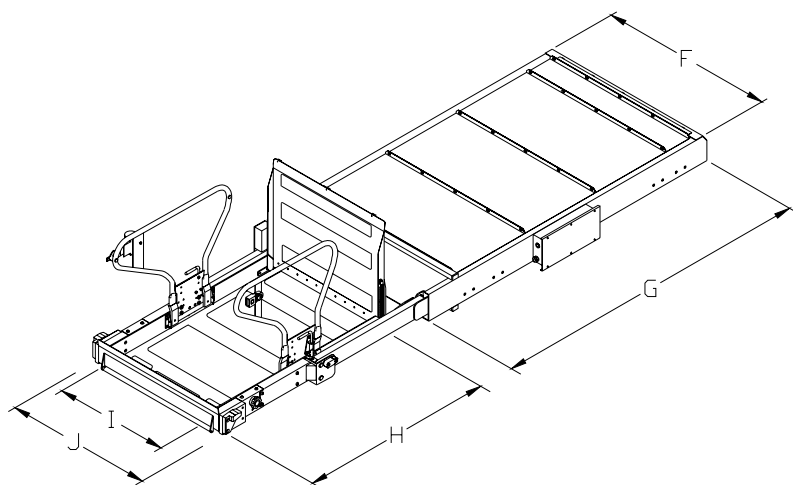
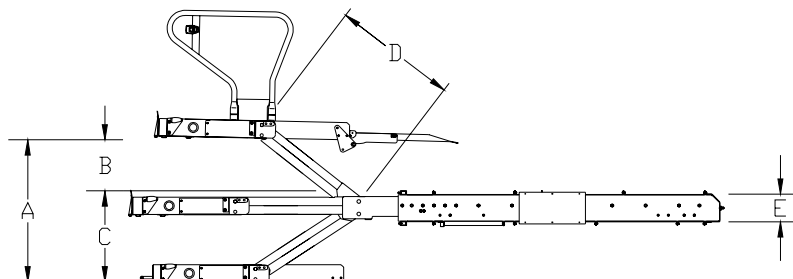
**FIGURE 5-10: 15" BRIDGEPLATE ASSEMBLY
F9A SERIES (ALL MODELS) WHEELCHAIR LIFT
SERIAL NO's. 4000 and HIGHER**

REF.	DESCRIPTION	QTY.	PART NO.
1	BRIDGE PLATE-ASSY., S'WELL X-SPAN 26"	1	F9-0314
2	BRIDGE PLATE - EXTENDED 15"	1	F9-0258
3	WASSY - BRIDGE PLATE FRAME	1	UV-PF-779
4	RIVET, POP, 3/16 x 3/8 A/S # AD66BS	11	14-30-309
5	BLOCK-BRIDGEPLATE, GUIDE F9A	1	13878
6	SKID-BRIDGE PLATE	3	UL-BA-021
7	SCREW, FHP, 10-24 X 1/4 UNDER CUT	3	28106
8	SAFETHREAD, 25.5 X 3, YELLOW, SAFETY	1	25664
9	SAFETHREAD, 25.5 X 7, YELLOW, SAFETY	1	25665
10	STS-10-12 x 0.625 HI-LO SST	3	28112HL
11	ROD B-PLATE CAM FOLLOWER	1	UV-PF-770
12	SPRING-UNFOLD KICKOUT-3317	1	25436
13	RETAINER-BP RETURN SPRING, WASSY	2	UV-PF-420
14	WASHER,FLT, 0.3210x0.80 SST	2	282776
15	NUT, ESN, 5/16-18 SST	6	283146
16	NUT, S.S. TEE, 5/16 OD x 1/4 L NECK	2	V2-PF-99
17	WASHER,FLT, .375 X .63 X .072 NYL	2	28565
18	SCREW, BHS, 1/4 - 20 X 1/2 SST (BAG OF 10)	2	13311
19	BRACKET-BRIDGEPLATE	2	UV-PF-768
20	NUT, ESN, 5/16-18 SST	6	283146
21	ROD, B-PLATE ACTUATOR RETAINER	1	UV-PF-772
22	SCREW, FHH, 5/16-18 X 1 SST	2	282251
23	SCREW, FHH, 5/16-18 X 3/4 SST	4	282245
24	BUSHIING, STIRRUP PIVOT	2	UV-PF-039
25	WASHER, FDR, .31 X 1.25 X .05 SST	2	283715
26	NUT, ESN, 5/16-18 SST (BAG OF 10)	2	14415
27	SCREW, BHS, 5/16-18 X 3/4 SST (BAG OF 10)	2	13381
28	ROLLER, CAM FOLLEWER, BRGPLT ; METRA	2	UV-PF-842
29	STIRRUP WLDT, XSPAN DA, LH	1	F9-0552
30	STIRRUP WLDT, XSPAN DA, RH	1	F9-0553

APPENDIX 1 LIFT SPECIFICATIONS

MIRAGE F9A TRANSIT USE WHEELCHAIR AND STANDEE LIFT

Power.....electro-hydraulic motor Pump rating @ 12 volts DC 1800 psi, 1250 watt @ 24 volts DC 1800 psi, 1250 watt Hydraulic cylinder.....3.0", single acting	Rated load capacity.....660 lbs. Manual backup - upward..... hand pump Manual backup - downward pressure release valve Lift weight.....approx. 700 lbs.
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DIMENSIONS (inches)

	A	B	C	D	E	F	G	H	I	J	K
Model	Floor-to-ground travel	Travel Above	Travel Below	Arm Length	Stowed Height	Stowed Width	Stowed Length	Useable Platform Length	Useable Platform Width	Clear Entry Width	Width Traveling Frame
F9A-SW 1,2	39.3	17.5	21.8	30.3	8.5	42	72.2	48	31.8	30/35.5 7	41.4
F9A-SW (S/G) 1,2,3	39.3	17.5	21.8	30.3	8.5	42	78.9	48	31.8	30/35.5 7	41.4
F9A-DA 1,4,6	46.8	17.5	29.3	30.3	8.5	42	78.9	48	30.9	30	41.4
F9A-DA/EX 1,4,5,6	65.0	26.0	38.9	43.0	8.5	42	78.9	48	30.9	30	41.4

- NOTES:**
1. Does not include mounting bracket.
 2. Fixed or folding handrails.
 3. Stepwell with slide/glide door.
 4. Folding handrail.
 5. Motor coach (extended travel is 65").
 6. Includes electrically interlocked occupant restraint belt.
 7. Fixed handrail dimension is 35.5"; folding handrail dimension is 30".

