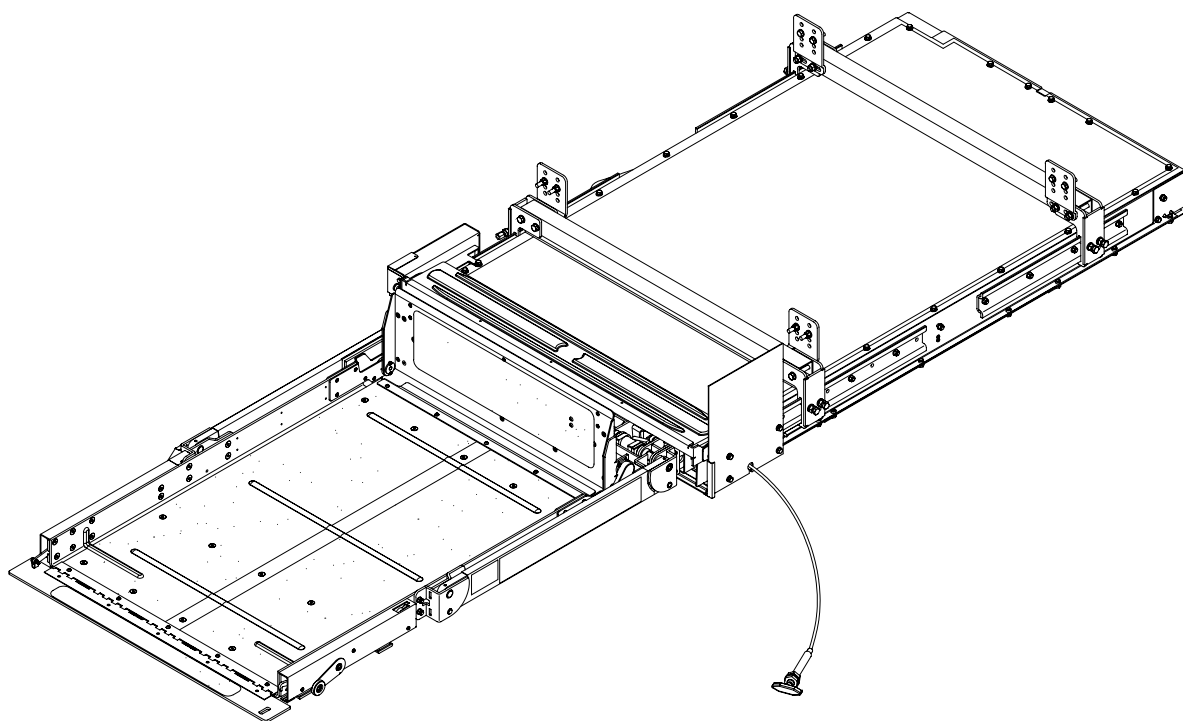




MARK 1

Under Vehicle Cassette Lift

Personal Wheelchair Lift
DOT – Private Use Lift



SERVICE MANUAL



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

Qualified service technicians have the training and knowledge to perform maintenance work properly and safely. For the location of a VMI authorized service technician in your area, call VMI Technical Support at 1-800-348-8267.

“DOT–Private Use Lift” verifies that this platform lift meets only the “private use lift” requirements of FMVSS No. 403. This lift may be installed on all vehicles appropriate for the size and weight of the lift, except for busses, school busses, and multi-purpose passenger vehicles other than motor homes with a gross vehicle weight rating (GVWR) that exceeds 4,536 kg (10,000 lb).

REVISION RECORD

REV	PAGES	DESCRIPTION OF CHANGE	ECO
32DPH06. E 10/20/06	4-2	Added 36905 and card sign to Figure 4-1.	6017
	4-8; 4-9	Added item 14 p/n 31138 to Figure and Table 4-4.	
	4-10 4-11	Added item 22b p/n 19037 for serial numbers 00000183 and up; added item 36 p/n 35752 for serial numbers 00000183 and up; added item 37 p/n 15347 to Figure and Table 4-5.	
	4-14	Added item 18 p/n 27060 and item 19 p/n 29393 to Figure and Table 4-7.	

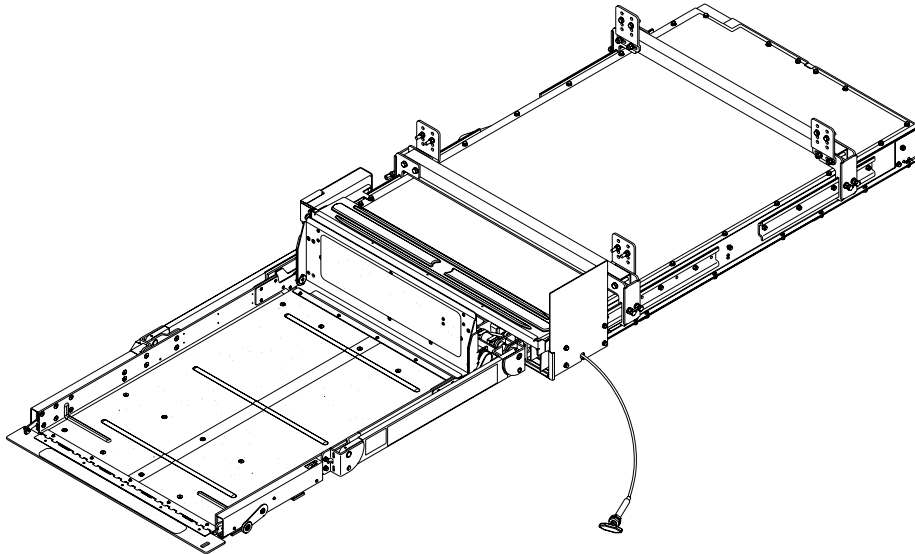
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I. INTRODUCTION

This manual provides operating instructions and maintenance procedures for the Vantage Mobility International (VMI) MARK 1 wheelchair lift. The MARK 1 provides safe and easy access to full size vans for an individual using a wheelchair or scooter.



The MARK 1 is typically installed in the side of the van, below the frame. The vehicle operator or a trained attendant operates the lift.

A hydraulic pump, driven by an electric motor, supplies lifting force to a pair of hydraulic cylinders. Maximum lifting capacity is 600 pounds (273 kilograms).

The operator uses the control pendant to withdraw the platform from the vehicle and lower it to the ground. The passenger moves onto the large non-skid platform and is then raised to floor height. After the passenger enters the vehicle, the operator lowers the platform and retracts it back into the vehicle.

When a passenger exits, the operator uses the control pendant to withdraw the platform from the vehicle and raise it to floor height. The passenger moves onto the platform, and is then lowered to the ground. After the passenger departs the platform, the platform is stowed.

One individual can manually operate the lift when normal power is not present. A manual release mechanism is provided to ease the task of pulling the platform out of the enclosure by hand. The hydraulic pump assembly includes a manually operated back-up pump to raise the platform, and a pressure release valve to lower it.

This manual contains instructions for installation, maintenance, and service of major components, plus a chapter listing available spare parts. For safety reasons, it is important that service personnel be familiar with the Operating Instructions chapter in the MARK 1 operator manual 32DPH05.

A. VMI SERVICE SUPPORT

If there are questions about this manual, or you need copies, please contact VMI Product Support at the following location:

VMI	
5202 S. 28th Place	
Phoenix, AZ 85040	(602) 243-2700
Outside 602 area code	(800) 348-8267
World Wide Website	www.vantagemobility.com

B. WARRANTY INFORMATION

Refer to the following page for detailed coverage of the one-year limited warranty. Complete the warranty and owner registration cards, and return them to VMI within 20 days to validate the warranty.

VANTAGE MOBILITY INTERNATIONAL ONE-YEAR LIMITED WARRANTY

Vantage Mobility International (VMI) warrants to original purchaser of this product that VMI will repair or replace, at its option, any part that fails by reason of defective material or workmanship as follows:

- Repair or replace parts for a period of one year from date of purchase. A complete list of parts covered by this warranty can be obtained from VMI Product Support.
- Labor costs for specified parts replace under this warranty for a period of one year from date of purchase. A VMI rate schedule determines the parts covered and labor allowed.

If you need to return a product: Return this product to VMI. 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, mechanical condition of vehicle, road hazards, overloading, failure to follow operating instructions, or acts of nature (i.e., weather, lightning, flood).

Note: VMI requires that this product be inspected by an authorized VMI 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:

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

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

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

VMI 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 VMI within 20 days after installation of this VMI 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.

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, or adjustments be attempted without immediate access to competent first aid.
- An injury, no matter how slight, must be attended to. Always administer first aid or seek medical attention immediately.
- Protective eye-shields and appropriate clothing should be worn at all times.
- To avoid injury, exercise caution when operating the 1 wheelchair lift, and be certain that hands, feet, legs, and clothing are not in the path of platform movement.
- Work in a properly ventilated area.
- Do not place anything metallic on top of battery. Do not smoke or use an open flame near battery. Batteries contain acid that can burn. If acid comes in contact with skin, flush affected area with water and wash with soap immediately.
- Check under vehicle before drilling to avoid drilling into frame, sub-frame members, wiring, hydraulic lines, fuel lines, fuel tank, etc.
- Read and understand the operating instructions before operating the wheelchair lift.
- Inspect the lift before each use. If any unsafe condition exists, such as unusual noises or movements, do not use the lift until the problem is corrected.
- Do not load or stand on the platform until installation is complete.
- Stand clear of doors and platform and keep others clear during operation.

The product requires regular periodic maintenance. A thorough inspection is recommended at least every six months. The product must be maintained at its highest level of performance.

D. MAJOR LIFT COMPONENTS

The component references used throughout this manual are illustrated in **Figure 1-1** and defined in **Table 1-1**. Refer to Chapter IV Spare Parts, for a complete list of parts.

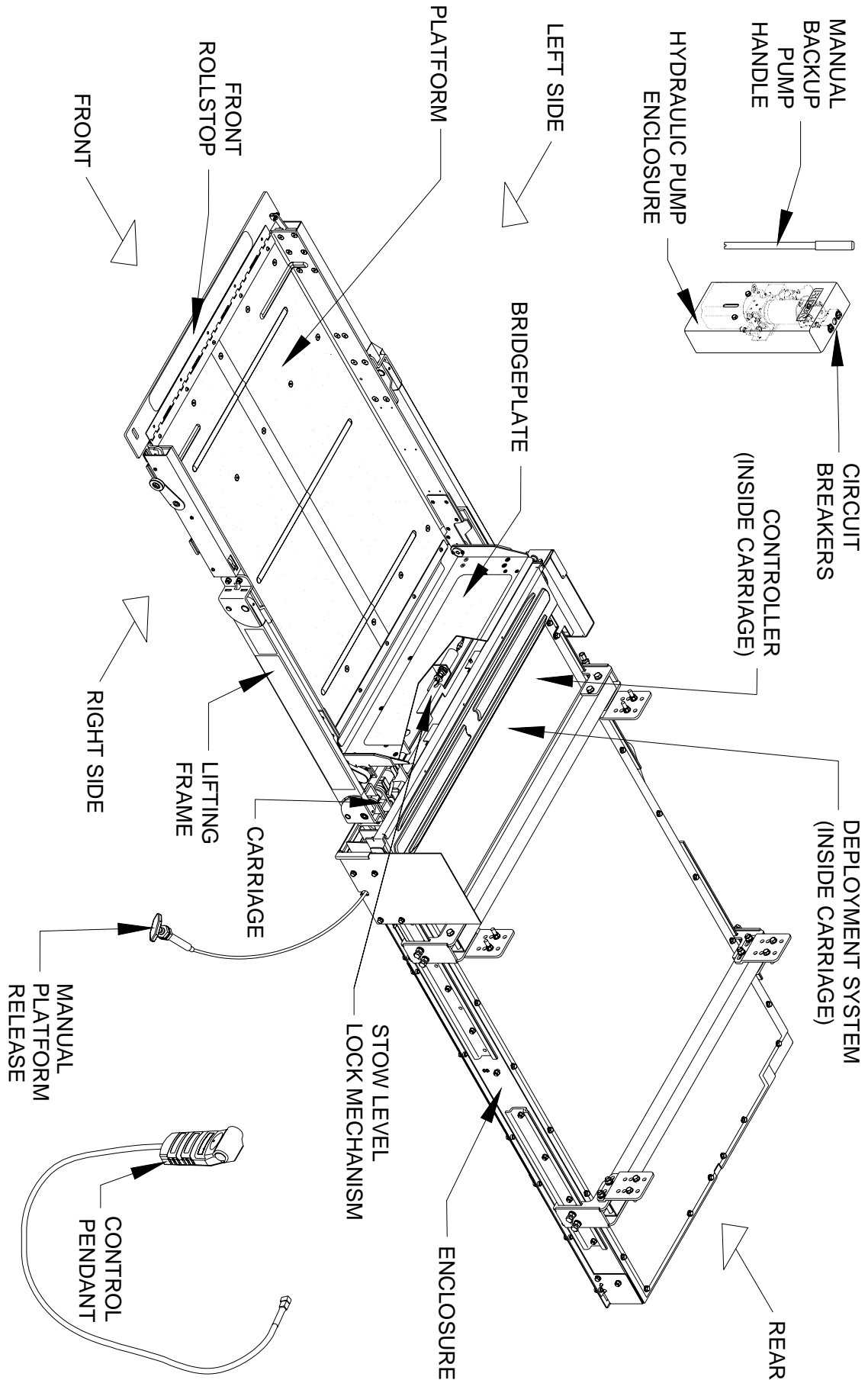


FIGURE 1-1: MARK 1 LIFT COMPONENTS

TABLE 1-1: MARK 1 WHEELCHAIR LIFT TERMINOLOGY

NAME	DESCRIPTION
Left, Right, Front, Rear	Lift references when viewing installation from outside of vehicle.
Lifting frame	Hinged arms that lift or lower platform; arms are raised by hydraulic cylinders anchored to carriage.
Carriage	Rear part of traveling frame that is mounted on rollers; moves on rails located inside enclosure. Supports lifting frame.
Platform	Curbed area occupied by passenger during lift operations.
Travelling frame	Major assembly that consists of the carriage, lifting frame, and platform and moves in and out of enclosure as a unit.
Front rollstop	Front barrier prevents wheelchair from inadvertently rolling off the platform during lift use. Rollstop is hydraulically actuated.
Bridgeplate (rear rollstop)	Plate unfolds when platform is at floor height to bridge gap between platform and vehicle interior. Functions as a rear rollstop when platform is in motion.
Hydraulic power unit	Electro-hydraulic unit provides hydraulic pressure used to raise platform; also contains a backup pump and pressure relief valve to raise and lower platform manually.
Control pendant	Hand-held device used to control lift operations.
Manual backup pump handle	Used to operate the manual hydraulic back-up pump and the hydraulic pressure relief valve.
Enclosure	Housing for wheelchair platform that is rigidly attached to vehicle chassis.
Pump enclosure	Contains electrical and hydraulic power and control components; also referred to as the "pump box".
Deployment system	Employs an electric gear-motor and toothed belt to propel platform out of enclosure, or to pull it back into the enclosure. Located at top center of carriage.
Controller	Electronic module translates pendant commands into signals that control lift electrical and hydraulic components. Also monitors lift electrical activity and position of platform.
Stow level lock mechanism	A mechanical mechanism that establishes the correct platform height before the platform is retracted into enclosure.
Circuit breakers	Small circuit breakers that protect the pendant and lift control circuits.
Manual platform release handle	Disengages traveling frame from enclosure, thus allowing platform to be pulled from enclosure by hand.
END OF TABLE	

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II. MARK 1 INSTALLATION

The VMI MARK 1 wheelchair lift is typically installed by a van conversion specialist. Detailed installation instructions covering mechanical, electrical, hydraulic, component adjustments, and the Threshold Warning System are available in Appendix 2 of this manual. Additional detailed instructions for installing the lift into specific vehicles are supplied with the lift installation kits. After mechanical and electrical installation, it may be necessary to adjust the platform vertical travel limit. Other adjustments given here can be necessary as part of routine maintenance or when major lift disassembly is performed. It should not be necessary to bleed the hydraulic system or reset the controller calibration for stow height and floor height, as these have been done at the factory.

A. FINAL ADJUSTMENTS



WARNING

IMPROPER ADJUSTMENT MAY RESULT IN UNSAFE OPERATING CONDITIONS FOR THE LIFT USER.

This section contains procedures that may be needed after the lift is installed in the vehicle, however, it is not necessary to perform all procedures if they are not needed.

• ADJUSTING PLATFORM VERTICAL TRAVEL LIMIT

The platform wheelchair surface must be 1–1½" above the vehicle floor when the platform is at its maximum height (hydraulic cylinders fully extended). Use the following procedure to correct the height if it is lower or higher.



CAUTION

The following procedure checks and sets the platform height when at floor level. The actual adjustment to the platform height is made at a lower height to reduce loading on the hydraulic cylinder and pistons. Do not attempt to rotate the hydraulic cylinder piston rods if excessive resistance is felt. Determine the cause of resistance and correct it before rotating piston rod.

- Raise platform until both hydraulic cylinders are fully extended.
- Measure vertical distance between vehicle floor and rear edge of platform floor. Note the position and whether platform needs to be raised or lowered.
- Lower the platform to a height about one foot below vehicle floor level, and support it.
- Loosen jam nuts on both hydraulic cylinder piston rods.
- Rotate both piston rods equally to raise or lower platform the required amount; rotate CW to raise platform and CCW to lower. Do not rotate piston rod more than ¼ turn without checking result.
- Return platform to floor height (fully extend both hydraulic cylinders), and re-measure the distance between floor and platform. If readjustment is necessary, repeat steps c through f.
- Tighten jam nuts. Refer to following section.

• ADJUSTING MECHANICAL STOW HEIGHT

When vertical travel limit is adjusted, it will also be necessary to readjust mechanical stow height.



CAUTION

The following procedure checks and sets the mechanical stow height. Use caution around all moving parts.

The mechanical stow height is properly set when the hex shaped collars (threaded onto shafts of hydraulic piston rods) contact the stow level latch plates and hold the platform at the correct stow height. At this height the platform can be easily moved by hand into the enclosure.

- Refer to **Figure 2-1** on following page. Lower the platform to stow height (hex-shaped collars bearing against stow level latch plates). If the platform cannot be easily moved into the enclosure, then adjustment is required.
- Refer to **Figure 2-2** on following page. Verify the platform height by looking at the vertical height of the carriage rollers relative to the guide rails. Note whether the gap between the roller and guide rail is unequal at the top and bottom of the roller.
- To adjust the height, raise the platform to the upper most position.
- Loosen the four setscrews in both hex collars. If the platform is low, rotate collar clockwise. If the platform is high, rotate collar counterclockwise. Move both collars the same amount in quarter turn increments.
- Lower the platform to the stow height. Verify the platform height by looking at the vertical height of the carriage rollers relative to the guide rails while the carriage travels into the guide rails.

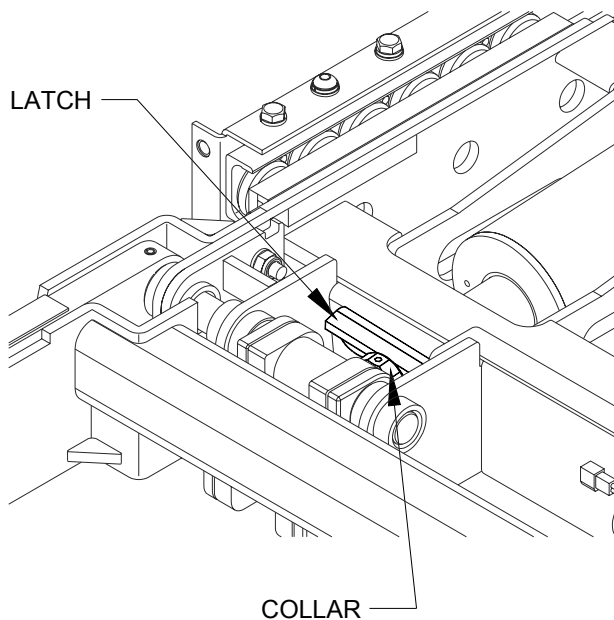


FIGURE 2-1: PLATFORM HELD BY LATCH

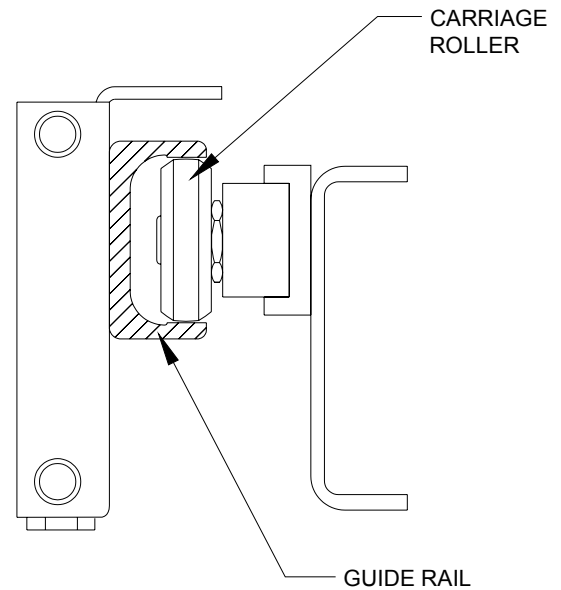


FIGURE 2-2: ROLLER ALIGNMENT AT STOW HEIGHT

- f. Once the proper height is achieved, tighten the four hex setscrews. Both collars should apply equal loads to the stow latch plates.

● **CONTROLLER CALIBRATION FOR STOW HEIGHT AND FLOOR HEIGHT**

This procedure programs the controller to recognize the platform when it is at stow height or at floor height. This procedure is typically necessary when a lift is first installed or when major lift disassembly has been done. Procedure should be followed in the order in which it is presented. Failure to calibrate the controller in this order will render the controller inoperable.

- NOTE:**
- Floor height and stow height calibrations must be done together in a single calibration process.
 - The floor height must be set at least seven inches above the stow height.
 - Perform the Platform Vertical Travel Limit Adjustment AND the Mechanical Stow Height adjustment described previously before proceeding.

CAUTION
Calibrate controller with vehicle engine running. This will provide full voltage and avoid miscalibration.

CAUTION
During the calibration procedure, the floor height is calibrated first and stow height last. Failure to calibrate controller in this order will render the controller inoperable.

- a. Apply power to the lift and fully deploy the platform.
- b. Refer to **Figure 2-3**. The calibration fuse block is located at the right front of the carriage frame. Remove Calibration Caution card sign (if applicable). Remove power to the controller by removing the fuse from the controller power fuse holder.
- c. Put the controller in calibration mode by removing the fuse from the spare fuse holder and installing it in the calibration fuse holder.
- d. Reinstall the fuse in the controller power fuse holder.
- e. Press and hold the UP button until the platform stops at floor height. Release the UP button and press the DEPLOY button once for five seconds to program the floor height value in the controller.
- f. Manually hold the stow locks closed. Use caution around moving parts.
- g. Press and hold the DOWN button until the platform is stopped by the stow level latch mechanism. Release the DOWN button and press the DEPLOY button once for five seconds to program the stow height value in the controller.

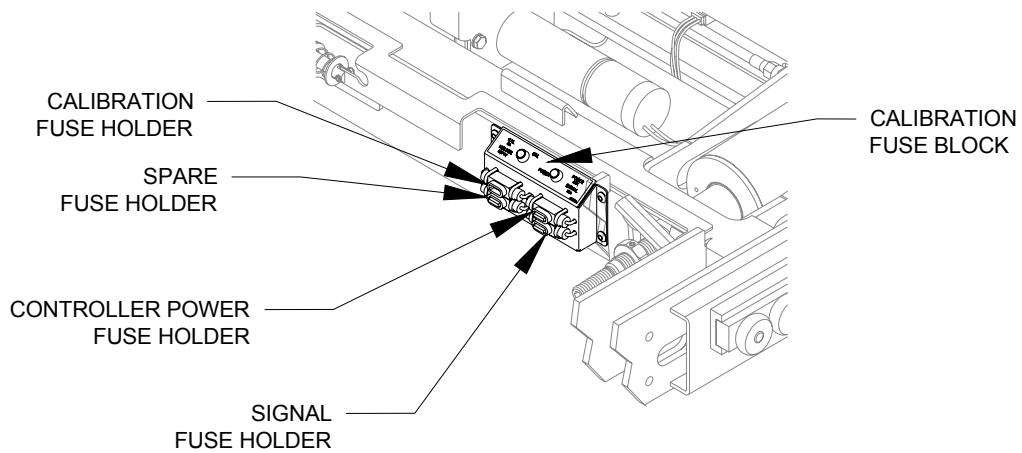


FIGURE 2-3: CALIBRATION FUSE HOLDER

- h. Remove controller from calibration mode by removing the fuse from the power fuse holder. Remove the calibration fuse and install it in the spare fuse holder. Re-install the power fuse in the power fuse holder.
- i. Cycle the platform from ground to floor height and verify that the platform stops 1 – 1½” above the floor. Press and hold the STOW button and verify that the platform lowers to stow level and then is fully withdrawn into enclosure.

• **BRIDGEPLATE DRIVE CHAIN ADJUSTMENT**

The chain that drives the bridgeplate requires a small amount of slack to prevent binding when the bridgeplate is raised and lowered.

- a. Raise bridgeplate to vertical position.
- b. Refer to **Figure 2-4**. Place a straight edge along chain and deflect chain at its midpoint as shown. The measured gap should be between 1/8th inch and 3/16th inch. Continue with procedure if gap is outside of this range.

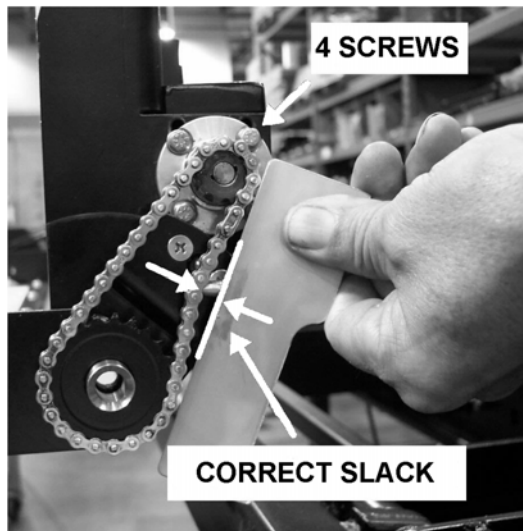


FIGURE 2-4: BRIDGEPLATE DRIVE CHAIN SLACK

- c. Remove the side plate and plastic chain cover.
- d. Slightly loosen the four screws that hold the bridgeplate motor to allow the motor to be moved in its mounting slots. Move the motor up or down to correct the gap. Tighten the four screws.
- e. Verify that gap is correct. Repeat previous step if gap is not correct.

• **INTERLOCK SYSTEM INSTALLATION**

A separate interlock installation document is provided in the documentation kit that is shipped with each lift. It is part number 32ii346e. In addition, a brief description of the system is available in chapter two of the operator manual 32DPH05.

B. VERIFY INSTALLATION

The installer must verify that the lift operates without interference, and must also load test the lift.

- ◆ Be certain there is no interference with operation of lift by interior or exterior components. All parts of installed lift must have a minimum clearance to any vehicle surface of .25" and moving parts of lift must have a minimum clearance .50".



CAUTION

- Do not operate lift during load test. The load test is intended to test lift installation mounting points, not lifting capacity. Remove test weight immediately after test.
 - When test weight is placed on platform, the vehicle suspension will compress and vehicle will lean. If weighted platform touches ground, remove weight, raise platform, and retest.
- ◆ The installed lift must be load tested to 125% of its rated 600-pound load capacity to verify the integrity of the installation. Position the platform from 2" to 6" above ground, and place 750 pounds in center of platform. Inspect the mounting brackets and hardware at the points where the lift is attached to the vehicle.
 - ◆ REMOVE TEST WEIGHT. Run lift through several complete deploy-raise-lower-stow cycles to verify proper operation.

III. MARK 1 WHEELCHAIR LIFT MAINTENANCE

Regular maintenance of the VMI MARK 1 wheelchair lift optimizes lift performance and reduces the need for repair. This chapter contains a lift maintenance schedule, a maintenance checklist, plus lift hydraulic and electrical diagrams.

 CAUTION
This VMI product is highly specialized. Maintenance and repair work must be performed by a VMI authorized service technician, using VMI replacement parts.

 WARNING
MODIFYING OR FAILING TO PROPERLY MAINTAIN THIS PRODUCT WILL VOID THE WARRANTY AND MAY RESULT IN UNSAFE OPERATING CONDITIONS.

A. MAINTENANCE SCHEDULE

Climate (weather) and lift usage (rate of lift cycling) determine the maintenance interval for a specific lift. VMI requires carrying out the inspection tasks listed on the Maintenance Checklist on page 3-3. During the VMI warranty period, an authorized VMI service technician must perform the inspection tasks listed on the Maintenance Checklist. VMI recommends that an authorized VMI service technician continue maintenance when the warranty expires.

The lift cycle counter is mounted inside the carriage, on the rear frame member, just to the right of the hydraulic cylinder (refer to Figure 1-1 in Chapter I). The counter advances each time the platform moves through a complete cycle, which consists of the platform moving from the vehicle floor to the ground and back to the floor.

TO DETERMINE MAINTENANCE INTERVAL:

The Maintenance Interval Charts below represent vehicle types in terms of their maintenance needs. Choose the chart that contains the combination of lift usage (low, normal, high) and climate type (mild, average, severe) that applies to your vehicle. Note the number of cycles at the top of your chart. Then refer to the Maintenance Checklist on page 3-3 and do the maintenance tasks at the noted interval. At a minimum, all lifts must have maintenance performed every six months.

MAINTENANCE INTERVAL CHARTS

Low Usage in Mild and Average Climates:

1800 cycles
Low usage (0 - 180 cycles per month)
Mild & average climates (little or no snow)

Low to Normal Usage in Mild to Average Climates:

1300 cycles
Normal usage (180 - 360 cycles per month)
Mild & average climates (little or no snow)

High Usage in Mild Climate:

1000 cycles
High usage (360+ cycles per month)
Mild climate (little or no snow)

High Usage in Average Climate:

800 cycles
High usage (360+ cycles per month)
Average climate (light snow)

Low, Average, and High Usage in Severe Climate:

400 cycles
Low, normal and high usage (0 – 360+ cycles per month)
Severe climate (medium to heavy snow)

B. MAINTENANCE CHECKLIST

The Maintenance Checklist is on the following page, and can be copied for routine use. Enter information in the Date, Vehicle #, and Lift serial # boxes. Inspect each item listed in the Inspection Items column of the Maintenance Checklist. Initial the appropriate box after inspecting each item. Print name, sign, and write notes as appropriate.

VMI suggests using these solvents, cleaners, and lubricants:

- Zep Formula 50 R.T.U, part #599A, or equivalent; use to clean decals and platform
- Zep PLS, part #497C, or equivalent; use to lubricate carriage assembly
- Zep I.D. Red, part #399C, or equivalent; use to clean carriage assembly
- Aeroshell grease #22, or equivalent; use to lubricate carriage rollers



MARK 1 WHEELCHAIR LIFT MAINTENANCE CHECKLIST

Date:

Vehicle #:

Lift serial #:

*A checked safety issue requires repairing before the vehicle is returned to service.
Initial appropriate boxes ☒*

Inspection Items	OK	Requires repair	Repair at next service	Repair before returning to service
Platform is clean. Non-skid strips in good condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Platform deploys and lowers to ground.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check manual pump operation, and hydraulic fluid level. Use Texaco No.1554 aircraft hydraulic fluid (or equivalent U.S. mil spec H5606G oil).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front roll stop is open (down).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety issue Raise platform; verify that front rollstop is closed (up). Verify that it is locked by pulling on rollstop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Check all decals. Decals should be readable and securely attached.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety issue Bridgeplate is up (vertical).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Safety issue Raise platform to floor level; bridgeplate must overlap floor 1"– 2".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Stow platform from floor level. Platform must stow smoothly and completely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check hydraulic system for leaks (lines, cylinder, and connections).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean carriage assembly with Zep I.D. Red degreaser.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect and clean twelve side carriage rollers and tracks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect trunnions and their pivot pins; lube with Zep PLS lubricating spray.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove rollstop covers from both sides of platform; clean rollstop pivot points with Zep I.D. Red degreaser. Replace covers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Raise bridgeplate and measure amount of slack in drive chain. Refer to chapter 2 for details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean and re-lubricate stow lock pin and UHMW wedges.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect, clean, and lubricate front stow door.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check and verify that the platform securely locks in the Stow position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check and verify that the platform securely locks in the Deploy position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Verify proper operation of vehicle interlock.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued next page

All weather seals in good condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove bottom cover at front of enclosure. Put lift in deploy position. Clean, inspect, and lubricate stow locks and rails. Verify all wiring is in good condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove bottom cover at rear of enclosure. Put lift in stow position. Clean, inspect and lubricate rear stow locks and rails. Verify all wiring is in good condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect the over-travel straps at rear axle. Verify there is sufficient clearance between driveshaft and lift enclosure when axle is fully raised.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES:	Print name: _____ Signature: _____				

C. HYDRAULIC SYSTEM DIAGRAM

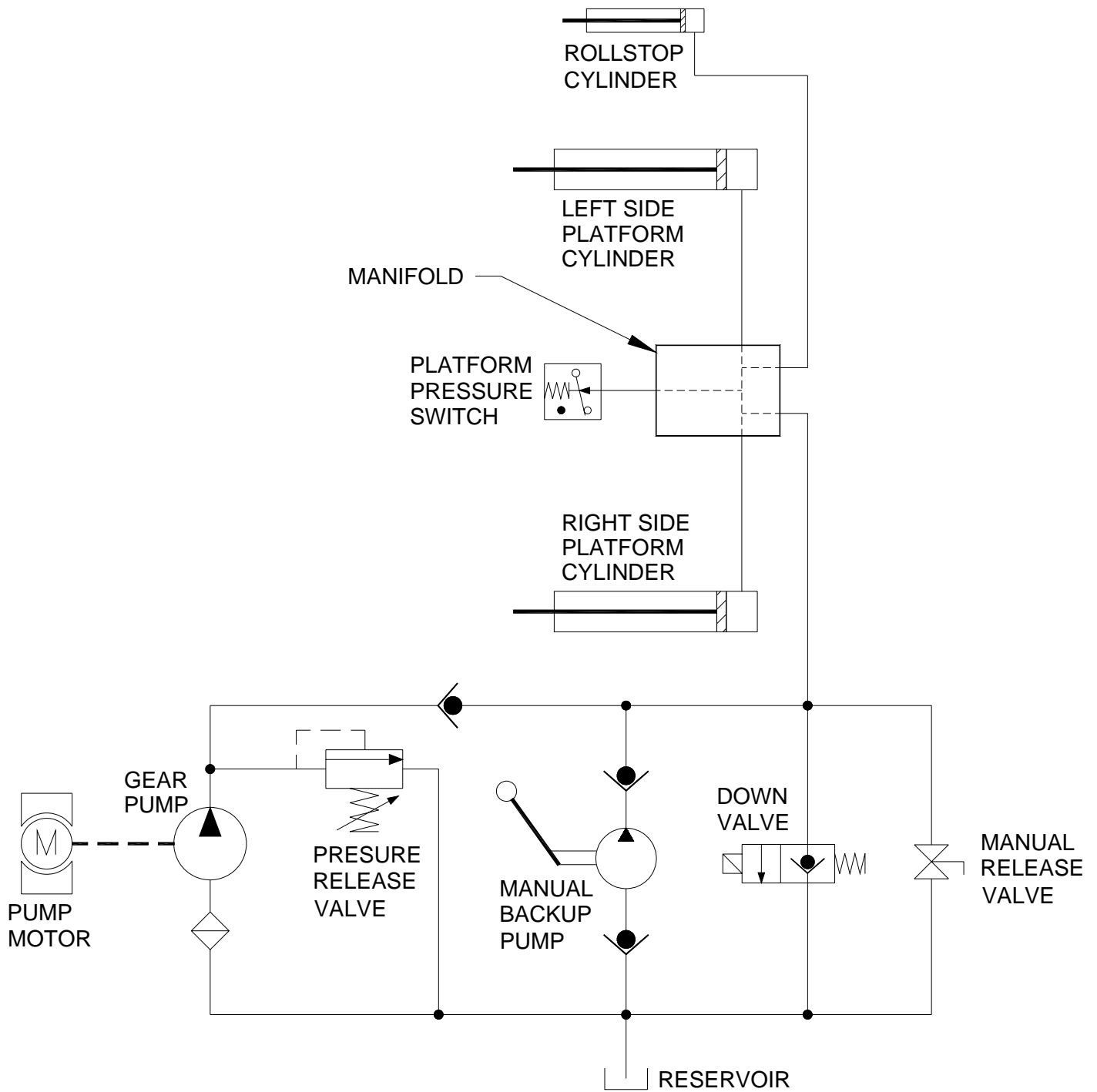


FIGURE 3-1: MARK 1 HYDRAULIC SYSTEM

D. POSITION SENSOR ACTIVITY DESCRIPTION

The following sections explain the platform motions that occur when a button is pressed on the control pendant, and how the lift proximity sensor, limit switches, and potentiometers are involved in the resulting motions. Refer to **Figure 3-2** for locations of the position sensors referred to below. Refer to the two electrical diagrams at the end of this chapter for schematic illustrations of the sensor connections. Keep in mind that upward movement of the platform is achieved with hydraulic pressure and lowering the platform is done by releasing the pressure. Also, remember that the traveling frame is an assembly consisting of the carriage + lifting frame + platform.

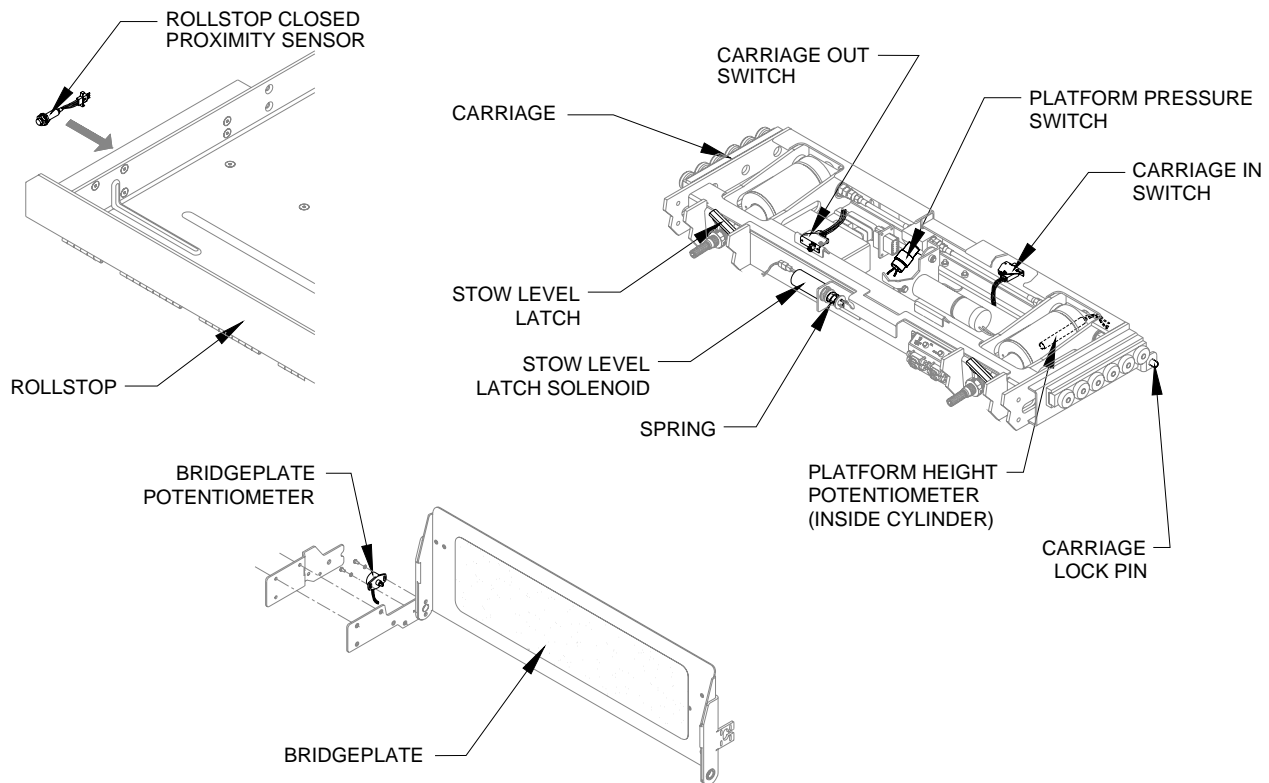


FIGURE 3-2: LIFT POSITION SENSOR LOCATIONS

NOTE: In the following sections references to control pendant buttons are in **bold** and references to position sensors are underlined.

CAUTION

In the following sections where a button is pressed it is mandatory that the button be held depressed until all platform, rollstop, and bridgeplate activity is completed. If a button is released early you will have to move the platform back to the position it was in when the button was first pressed.

1. PRESSING THE DEPLOY BUTTON

From stowed position:

Pressing and holding the **Deploy button** causes the exterior cover to open. The platform will initially move inward slightly to allow the carriage lock pin to move freely, and then the pin is withdrawn from the enclosure by the carriage lock solenoid. The platform now moves out of the enclosure. Outward movement is stopped when the carriage contacts mechanical stop blocks inside the enclosure and actuates the Carriage Out switch. When the platform is fully deployed the carriage lock pin drops into a recess in the front right side of the enclosure. The traveling frame is now locked in the deployed position and the **Deploy button** can be released.

2. PRESSING THE UP BUTTON

a. From stow level:

- 1) Pressing and holding the **Up button** causes the bridgeplate to rise to the vertical position, where it is latched in place. When the Bridgeplate potentiometer confirms that the bridgeplate is vertical the platform moves upward.
- 2) Upward movement is stopped mechanically when the hydraulic cylinders reach full extension (the platform is at its maximum height). The hydraulic pump will continue to operate for a few seconds.

- 3) When the Platform Height potentiometer detects the platform at its maximum height the bridgeplate is unlatched and lowered to the vehicle floor. The **Up button** can be released.

b. From Ground Level:

- 1) Pressing and holding the **Up button** causes the front rollstop to rise to the vertical position and then the platform moves upward. When the rollstop is vertical it is latched in place and the Rollstop Closed proximity sensor changes state.
- 2) When the platform is just above ground level the electronic controller verifies that the Rollstop Closed proximity sensor has changed state. If it has not changed state then platform movement is halted. If the sensor has changed state, the platform continues to move upward.
- 3) Upward movement is stopped mechanically when the hydraulic cylinders reach full extension (the platform is at its maximum height). The hydraulic pump will continue to operate for a few seconds.
- 4) When the Platform Height potentiometer detects the platform at its maximum height the bridgeplate is unlatched and lowered to the vehicle floor. The **Up button** can be released.

3. PRESSING THE DOWN BUTTON

a. From Stowed Position:

- 1) Pressing and holding the **Down button** causes the bridgeplate to rise to the vertical position, where it is latched in place. The platform then rises about six inches and hesitates briefly. This removes weight from the stow level latch mechanism and allows the spring on the stow level latch solenoid to disengage the latch mechanism. The platform now moves downward (if the Carriage Out switch remains actuated, the Bridgeplate potentiometer confirms the bridgeplate is up, and the Rollstop Closed proximity sensor confirms the rollstop is up).
- 2) Downward movement of the platform stops when it settles on the ground. When the platform contacts the ground the rollstop is mechanically unlatched and allowed to lower to the ground. The **Down button** can be released.

b. From Floor Level Position

- 1) Pressing and holding the **Down button** causes the bridgeplate to rise to the vertical position, where it is latched in place.
- 2) The platform begins to move downward (if the Rollstop Closed proximity sensor confirms that the rollstop is up, and the Bridgeplate potentiometer confirms the bridgeplate is up). The spring on the stow level latch solenoid holds the latch mechanism disengaged while the platform passes through stow level.
- 3) Downward movement of the platform stops when it settles on the ground. When the platform contacts the ground the rollstop is mechanically unlatched and allowed to lower to the ground. The **Down button** can be released.

4. PRESSING THE STOW BUTTON

a. From Floor Level Position:

- 1) Pressing and holding the **Stow button** causes the bridgeplate to rise to the vertical position, where it is latched in place.
- 2) The platform begins to move downward (if the Bridgeplate potentiometer confirms the bridgeplate is vertical and the Rollstop Closed proximity sensor confirms the rollstop is up).
- 3) Downward movement pauses when the platform is about six inches above stow height to allow the electronic controller to verify that a load is not present on the platform (which it does by monitoring the Platform Pressure switch in the hydraulic system). If a load is present, the platform remains where it is to safeguard against stowing the platform with a passenger onboard.
- 4) If a load is not present, the bridgeplate pivots 90⁰ to the front where it rests on the rear portion of the platform. The platform begins to move downward while the stow level latch solenoid engages the latching mechanism. Downward movement of the platform is stopped when it reaches stow level.
- 5) When the Platform Height potentiometer confirms that the platform is at stow level the carriage lock pin is withdrawn from the enclosure and the platform moves into the enclosure. Inward movement stops when the carriage contacts mechanical stop blocks inside the enclosure and actuates the Carriage In switch. When the traveling frame is fully stowed the carriage lock pin drops into a recess in the right rear side of the enclosure and actuates the Carriage Lock switch. The traveling frame is now securely retained in the enclosure and the **Stow button** can be released.

b. From Ground Level:

- 1) Pressing and holding the **Stow button** causes the bridgeplate to rise to the vertical position, where it is latched in place.

- 2) The front rollstop rises to the vertical position, locks in place, and then the platform moves upward (if the Bridgeplate potentiometer confirms the bridgeplate is vertical and the Rollstop Closed proximity sensor confirms the rollstop is up).
- 3) Upward movement continues until the platform rises to a height about six inches above stow level and then pauses. During the pause, the electronic controller verifies that a load is not present on the platform (which it does by monitoring the Platform Pressure switch in the hydraulic system). If a load is present, the platform remains where it is to safeguard against stowing the platform with a passenger onboard.
- 4) If a load is not present, the bridgeplate pivots 90⁰ to the front where it rests on the rear portion of the platform. The platform begins to move downward while the stow level latch solenoid engages the latching mechanism. Downward movement of the platform is stopped when it reaches stow level.
- 5) When the Platform Height potentiometer confirms that the platform is at stow level, the carriage lock pin is withdrawn from the enclosure and the platform moves into the enclosure. Inward movement stops when the carriage contacts mechanical stop blocks inside the enclosure and actuates the Carriage In switch. When the traveling frame is fully stowed, the carriage lock pin drops into a recess in the right rear side of the enclosure. Finally, with the platform securely stowed, the exterior cover will move to the closed position. The traveling frame is now securely retained in the enclosure and the **Stow button** can be released.

E. ELECTRICAL SYSTEM DIAGRAM

Refer to **Figures 3-4, 3-5, and 3-6** near the end of this chapter for an electrical schematic of the lift; the electrical schematic is divided across three pages and is sub-divided into several major lift areas. An internal schematic for the controller is not shown because it is serviced by VMI. Refer to **Table 3-1** for wire color codes used on the schematic. Refer to **Figure 3-3** for a list of symbols used on the schematic. Refer to **Table 3-2** for descriptions of the individual signals appearing at each pin of the controller connector. Refer to **Table 3-3** for an explanation of labels used on the schematic.

Refer to **Figure 3-7** at the end of this chapter for a simplified diagram illustrating how the major lift components are interconnected. Also shown are interlock and door operator components and harnesses.

1. DIAGRAM LEGENDS

a. Color Codes

TABLE 3-1: WIRE COLOR CODES			
CODE	COLOR	CODE	COLOR
BLK	Black	RED	Red
BLU	Blue	VIO	Violet
BRN	Brown	GRA	Gray
GRN	Green	WHT	White
ORN	Orange	YEL	Yellow

b. Electrical Diagram Symbols

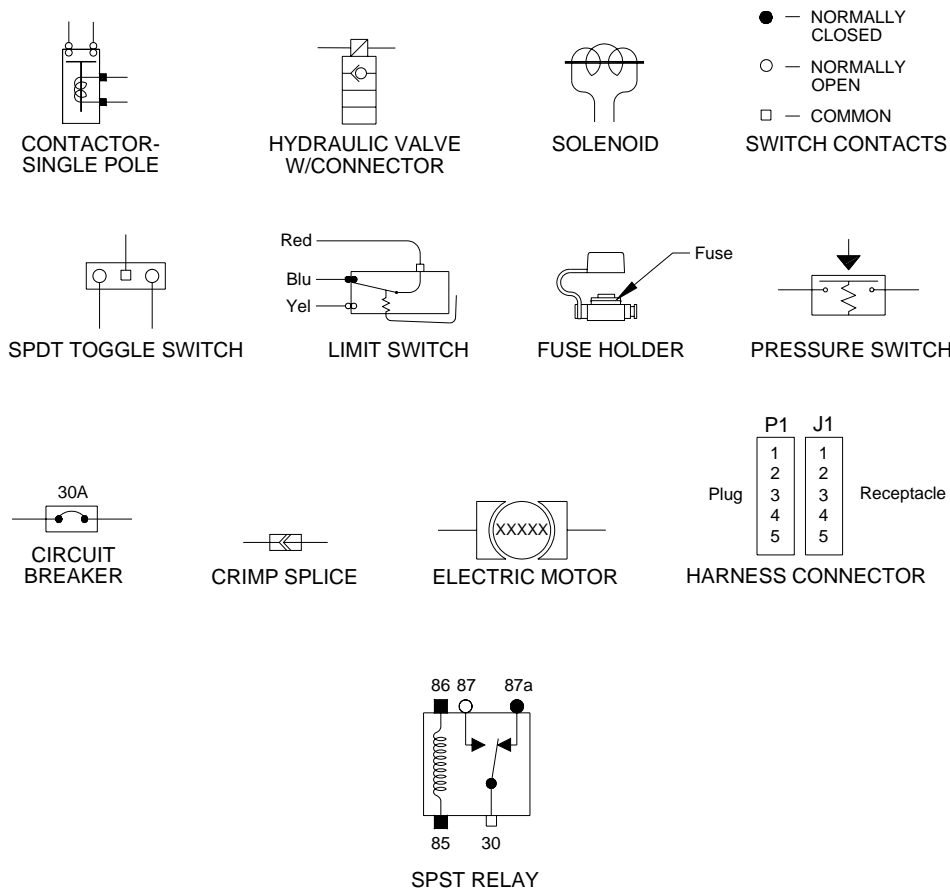


FIGURE 3-3: ELECTRICAL SYMBOL DESCRIPTIONS

TABLE 3-2: ELECTRONIC CONTROLLER CONNECTOR PIN SIGNAL DESCRIPTIONS

PIN	COLOR	DESCRIPTION	AT REST	IN ACTION	
J11	1	Black	Signal to bridgeplate motor negative terminal	0 VDC	12 VDC to raise bridgeplate; ground to lower bridgeplate
	3	Red	Signal to bridgeplate motor positive terminal	0 VDC	12 VDC to lower bridgeplate; ground to raise bridgeplate
	5	White	Signal to bridgeplate latch solenoid	0 VDC	12 VDC to unlock bridgeplate from vertical or horizontal positions
	6	Yellow	Signal to stow level latch solenoid	0 VDC	12 VDC to engage stow level latch mechanism (stopping platform movement at stow level)
	7	Yellow	Signal to carriage lock solenoid	0 VDC	12 VDC when platform is fully extended or retracted
	8	Red	Signal to hydraulic down valve	0 VDC	12 VDC when DOWN button is pressed and platform is deployed
	9	Brown	Signal to hydraulic pump relay	0 VDC	12 VDC when UP button is pressed and platform is deployed
	10	Black	Signal to carriage motor negative terminal	0 VDC	0 volts when DEPLOY button is pressed; 12 VDC when STOW button is pressed
	13	Green	Bridgeplate position potentiometer B+	12 VDC	12 VDC
	14	Blue	Signal from bridgeplate position potentiometer	0 VDC; bridge plate is down	0 to 12 VDC as bridgeplate rises
	15	Brown	Bridgeplate position potentiometer B-	0 VDC	0 volts
	16	Black	System ground (common)	0 VDC	0 volts
	17	Black	System ground (common)	0 VDC	0 volts
	18	Red	Signal to controller power LED	0 VDC	12 VDC when power is supplied to controller
	20	Brown	Signal to carriage motor negative terminal	0 VDC	0 volts when DEPLOY button is pressed; 12 VDC when STOW button is pressed
	21	Red	12VDC buss	12 VDC	12 VDC supply for switches and sensors
	22	Brown	Signal from platform load sensor pressure switch	0 VDC	12 VDC when a load of 75 lbs is on platform
	23	Violet	Threshold Warning System	0 VDC	12 VDC when passenger is in vehicle threshold area
	24	Yellow	Signal from carriage out switch	0 VDC when carriage not deployed	12 VDC when carriage is fully extended
	25	Black	Ground buss	0 VDC	Ground supply for switches and sensors
26	Black	Cycle counter	0 VDC	12 VDC pulse when platform moves through one complete cycle	
27	Violet	Calibration mode select input	0 VDC	12 VDC when fuse is in calibration fuse holder	
28	Blue	Signal from carriage in and carriage lock limit switches	0 VDC when carriage not stowed	12 VDC when carriage is fully stowed and carriage lock pin is engaged with enclosure	
29	Blue	Signal to carriage motor positive terminal	0 VDC	12 VDC when DEPLOY button is pressed; 0 volts when STOW button is pressed	
30	White	Signal to carriage motor positive terminal	0 VDC	12 VDC when DEPLOY button is pressed; 0 volts when STOW button is pressed	

TABLE 3-2: ELECTRONIC CONTROLLER CONNECTOR PIN SIGNAL DESCRIPTIONS

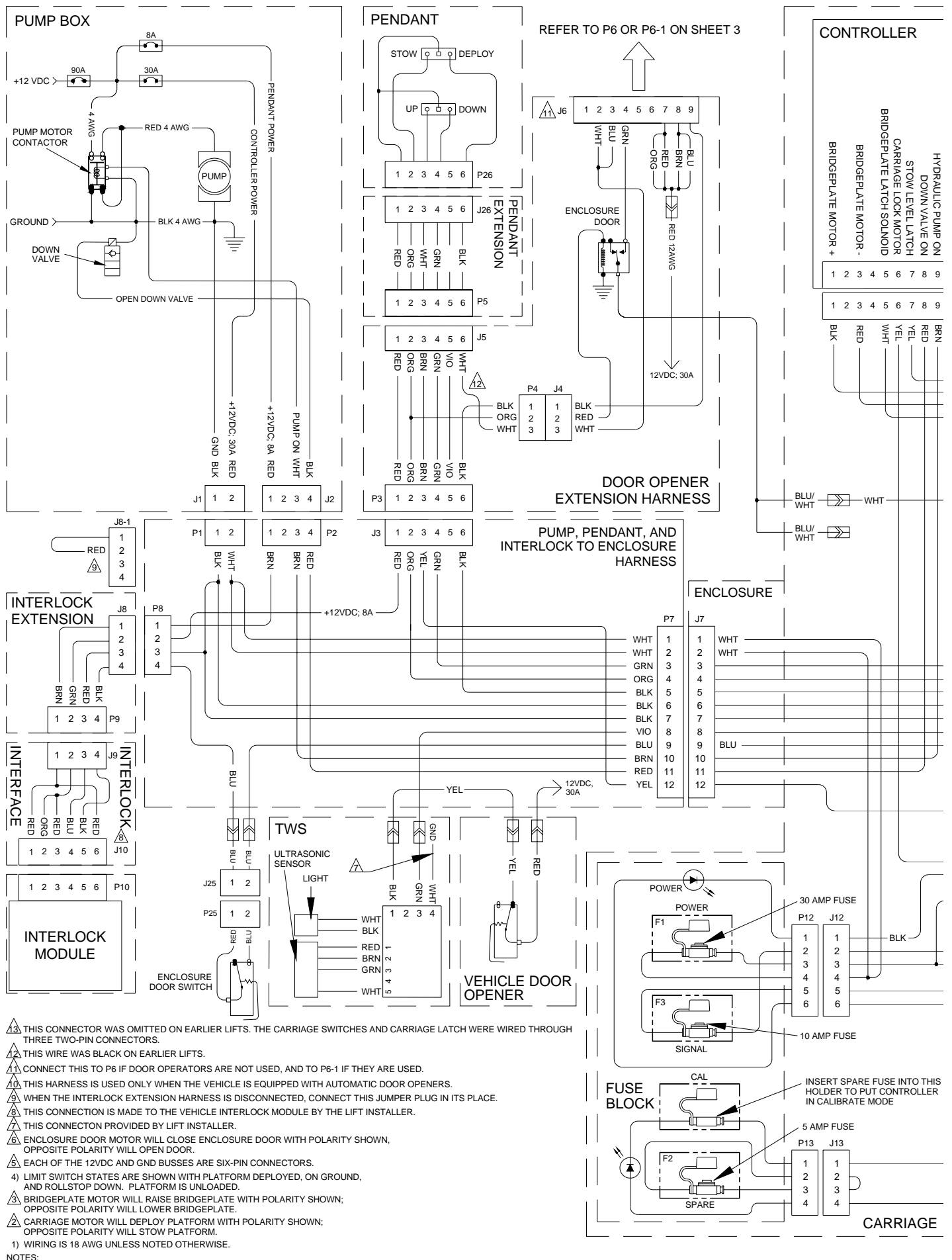
PIN	COLOR	DESCRIPTION	AT REST	IN ACTION
31	White	12VDC; 30A supply to controller	12 VDC	12 VDC from 30A circuit breaker in pump box
32	Green	Signal from rollstop sensor	0 VDC when rollstop is open	12 VDC when rollstop is closed (raised)
33	Green	Platform height potentiometer B+	12 VDC	12 VDC
34	Orange	Signal from platform height potentiometer	0 VDC when platform is on ground	0 to 12 VDC as platform rises
35	Brn	Platform height potentiometer B-	0 VDC	0 VDC
36	White	12VDC; 30A supply to controller	12 VDC	12 VDC from 30A circuit breaker in pump box
37	Gray	UP signal from control pendant	0 VDC	12 VDC when UP button is pressed
38	Green	DOWN signal from control pendant	0 VDC	12 VDC when DOWN button is pressed
39	Orange	STOW signal from control pendant	0 VDC	12 VDC when STOW button is pressed
40	Black	DEPLOY signal from control pendant	0 VDC	12 VDC when DEPLOY button is pressed
END OF TABLE				

TABLE 3-3: WIRING DIAGRAM LABEL DEFINITIONS

LABEL	DESCRIPTION
+12 VDC	System power for control pendant, limit switches, and electronic controller.
BRIDGEPLATE LATCH	Solenoid operated latch that holds bridgeplate in either raised or lowered positions.
BRIDGEPLATE MOTOR	Electric gearmotor that raises and lowers bridgeplate.
CALIBRATION	Fuse holder used when calibrating controller; contains no fuse during normal operation.
CALIBRATION MODE	LED that illuminates when controller is in calibration mode.
CALIBRATION FUSE BLOCK	Four-position fuse holder located at right front face of carriage frame. Used to calibrate stow height and floor height into controller.
CALIBRATION FUSE - F2	Fuse holder in series with the +12VDC supply and calibration input to controller; contains 5-amp fuse.
CARRIAGE	Major lift subassembly mounted on rollers.
CARRIAGE IN #1	Limit switch located on carriage that changes state when carriage is fully stowed.
CARRIAGE IN #2	Limit switch located on carriage that changes state when carriage is fully stowed. It provides a signal, via Enclosure Door switch, to Interlock Module.
CARRIAGE MOTOR	Electric gearmotor that moves traveling frame in and out of enclosure.
CARRIAGE OUT	Limit switch located on carriage that changes state when carriage is fully deployed.
CARRIAGE LOCK	Solenoid driven pin that locks carriage to enclosure in either fully stowed or fully deployed positions.
CONTROLLER	Translates pendant commands into signals that control lift electrical and hydraulic components. Also monitors lift electrical activity and position of platform and bridgeplate.
DOWN VALVE	Solenoid controlled hydraulic valve that releases fluid from hydraulic cylinders to lower platform.
ENCLOSURE DOOR	Switch monitoring open position of enclosure door.
GROUND; GND	System electrical common; 0 volts.
INTERLOCK MODULE	Provides electronic safety interlock between lift and vehicle. Manages power to pendant and movement of vehicle.
PENDANT	Control pendant used to control platform motions.
PLATFORM	Major lift subassembly where a passenger resides during lift operations.
PLATFORM HEIGHT	Linear potentiometer located inside RH hydraulic cylinder; translates platform height.
PLATFORM LOAD	Pressure sensitive switch changes state when a load of 75lbs, or greater, is on platform.
POWER FUSE - F1	Fuse holder in series with the +12VDC supply and controller; contains 30 amp fuse.
PUMP MOTOR	Electric motor that drives hydraulic pump.
PUMP MOTOR RELAY	Electrical relay (contactor) that controls heavy current to pump motor.
ROLLSTOP CLOSED	Proximity sensor that changes state when rollstop is fully closed (raised).
SIGNAL FUSE - F3	Fuse holder in series with the +12VDC supply and 12VDC buss; contains 10-amp fuse.
SPARE FUSE - F2	Fuse holder that contains spare 5-amp fuse that is used when calibrating controller.
STOW LEVEL LATCH	Solenoid operated mechanical latch that holds platform at stow level.
TWS	(Threshold Warning System) Safety system monitoring presence of a passenger in threshold area.
VEHICLE DOOR SWITCH	Switch monitoring open position of vehicle door. Provides signal to TWS module.

END OF TABLE

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- ⚠ THIS CONNECTOR WAS OMITTED ON EARLIER LIFTS. THE CARRIAGE SWITCHES AND CARRIAGE LATCH WERE WIRED THROUGH THREE TWO-PIN CONNECTORS.
 - ⚠ THIS WIRE WAS BLACK ON EARLIER LIFTS.
 - ⚠ CONNECT THIS TO P6 IF DOOR OPERATORS ARE NOT USED, AND TO P6-1 IF THEY ARE USED.
 - ⚠ THIS HARNESS IS USED ONLY WHEN THE VEHICLE IS EQUIPPED WITH AUTOMATIC DOOR OPENERS.
 - ⚠ WHEN THE INTERLOCK EXTENSION HARNESS IS DISCONNECTED, CONNECT THIS JUMPER PLUG IN ITS PLACE.
 - ⚠ THIS CONNECTION IS MADE TO THE VEHICLE INTERLOCK MODULE BY THE LIFT INSTALLER.
 - ⚠ THIS CONNECTION PROVIDED BY LIFT INSTALLER.
 - ⚠ ENCLOSURE DOOR MOTOR WILL CLOSE ENCLOSURE DOOR WITH POLARITY SHOWN, OPPOSITE POLARITY WILL OPEN DOOR.
 - ⚠ EACH OF THE 12VDC AND GND BUSES ARE SIX-PIN CONNECTORS.
 - 4) LIMIT SWITCH STATES ARE SHOWN WITH PLATFORM DEPLOYED, ON GROUND, AND ROLLSTOP DOWN. PLATFORM IS UNLOADED.
 - ⚠ BRIDGEPLATE MOTOR WILL RAISE BRIDGEPLATE WITH POLARITY SHOWN; OPPOSITE POLARITY WILL LOWER BRIDGEPLATE.
 - ⚠ CARRIAGE MOTOR WILL DEPLOY PLATFORM WITH POLARITY SHOWN; OPPOSITE POLARITY WILL STOW PLATFORM.
- 1) WIRING IS 18 AWG UNLESS NOTED OTHERWISE.
- NOTES:

FIGURE 3-4: MARK 1 ELECTRICAL DIAGRAM – SHEET 1

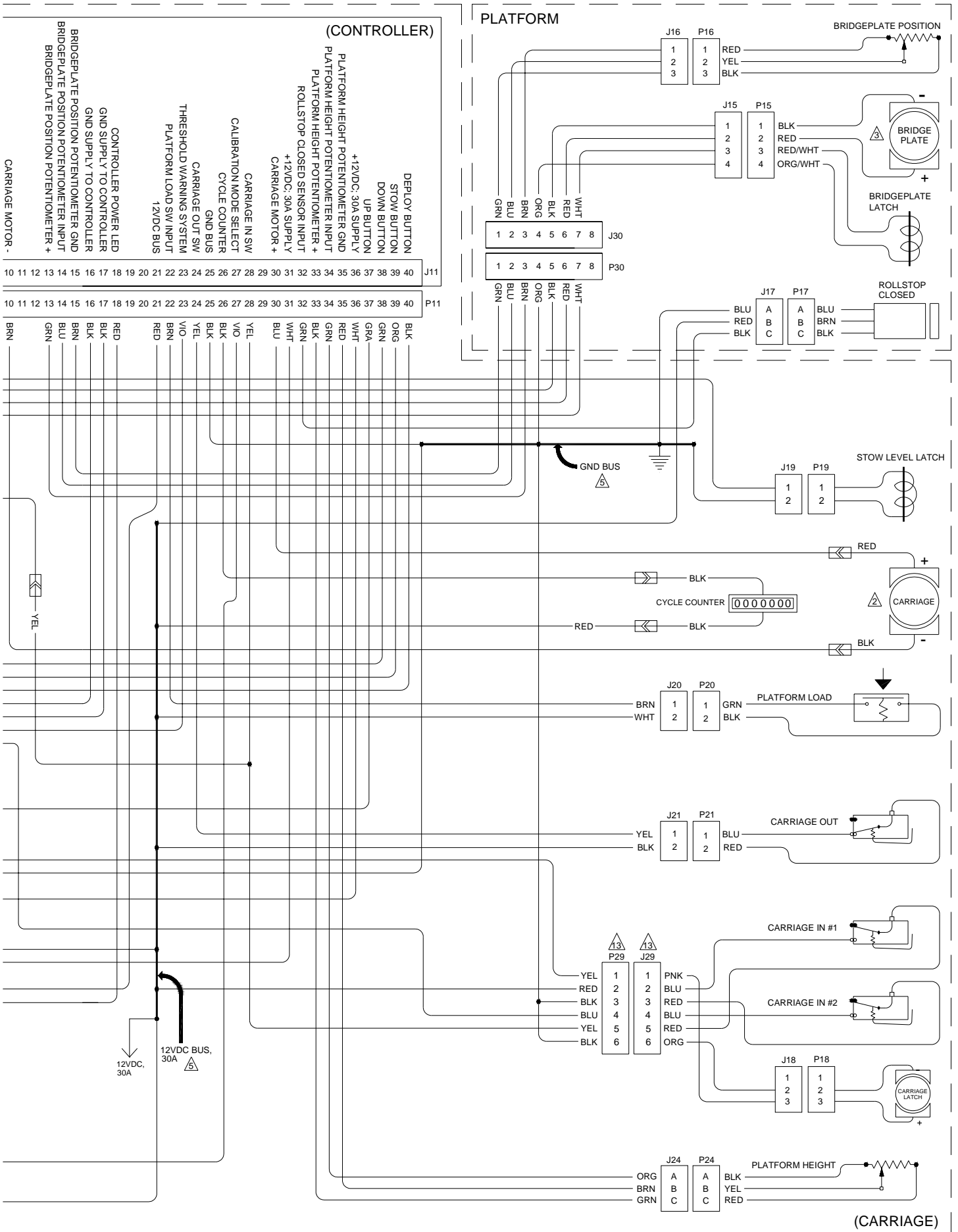


FIGURE 3-6: MARK 1 ELECTRICAL DIAGRAM – SHEET 3

REFER TO DOOR OPERATOR SERVICE MANUAL FOR SCHEMATIC

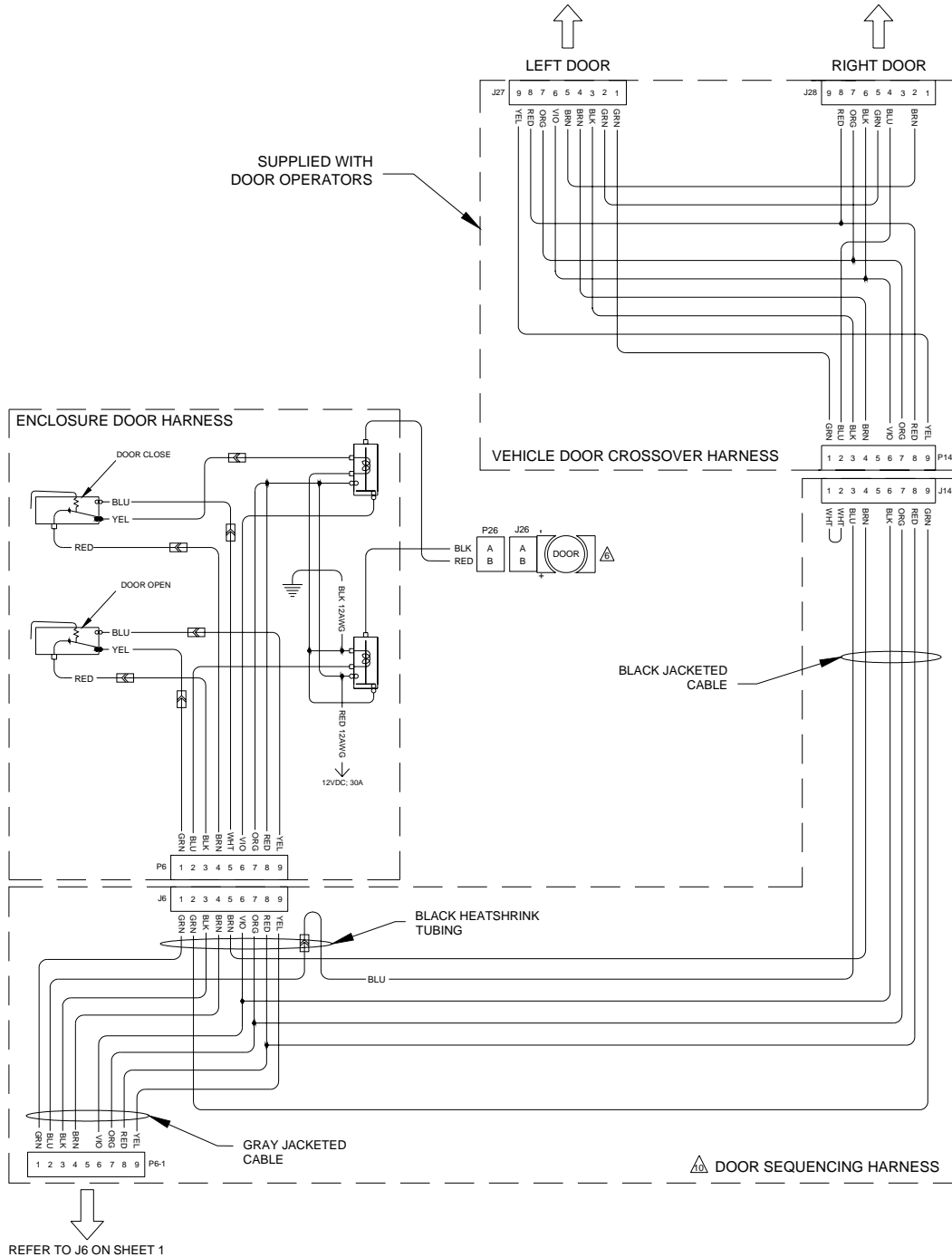


FIGURE 3-9: MARK 1 ELECTRICAL DIAGRAM – SHEET 3

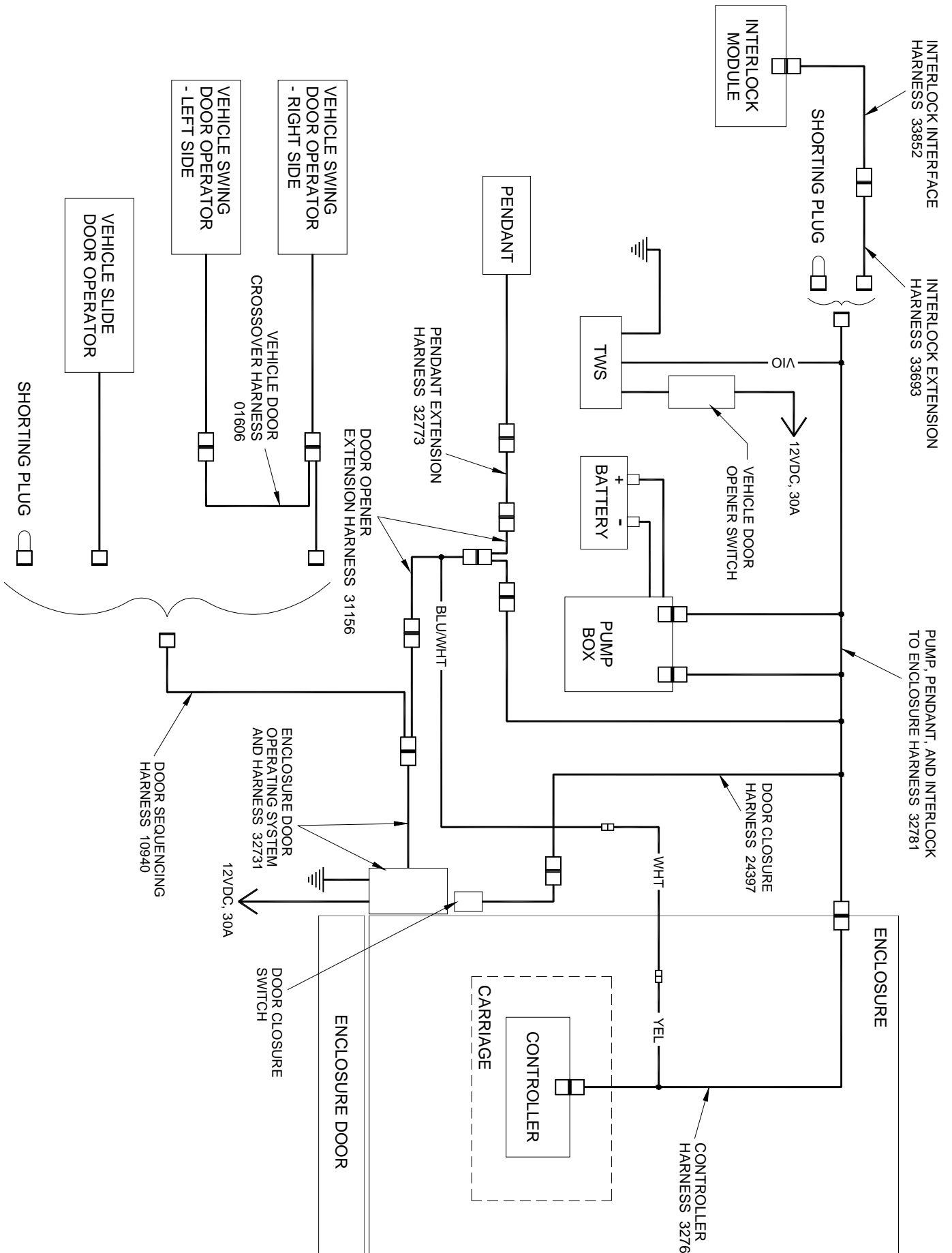


FIGURE 3-7: MARK 1 ELECTRICAL INTERCONNECTION DIAGRAM

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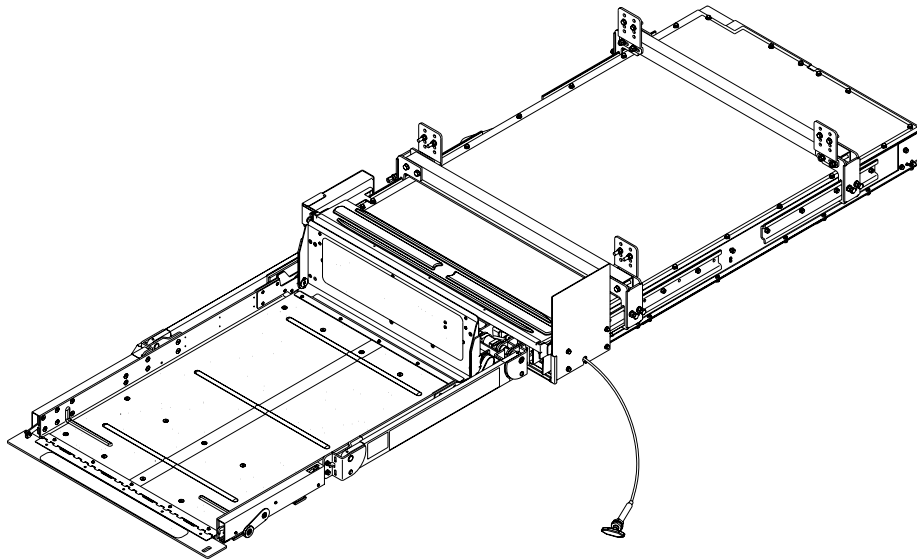
IV. MARK 1 WHEELCHAIR LIFT SPARE PARTS

This chapter contains parts illustrations and parts lists for the VMI MARK 1 wheelchair lift. Each exploded view of a major lift assembly shows smaller assemblies, components, and kits referenced with numbers. The exploded view is followed by an associated parts list that contains the reference numbers, part descriptions, quantities required for the major assembly shown, and VMI part numbers.

To order a part: Locate the part or assembly on an exploded view, and note its reference number. Find this number on the associated parts list (following page), and order the VMI part number in the far right column.

NOTE:

- Most items that are described as “kits” contain a single part (plus hardware). Therefore, you may need to order more than one kit if the part is used more than once on the assembly shown.
- Small, inexpensive hardware items are supplied in a minimum quantity of ten, and are packaged in a bag. A single bag may provide more parts than you need, or you may need multiple bags when working on a large assembly. The QTY/ASSY column indicates how many individual parts are used on the assembly shown; you will need to determine the number of bags required for your task.



PARTS DIAGRAMS

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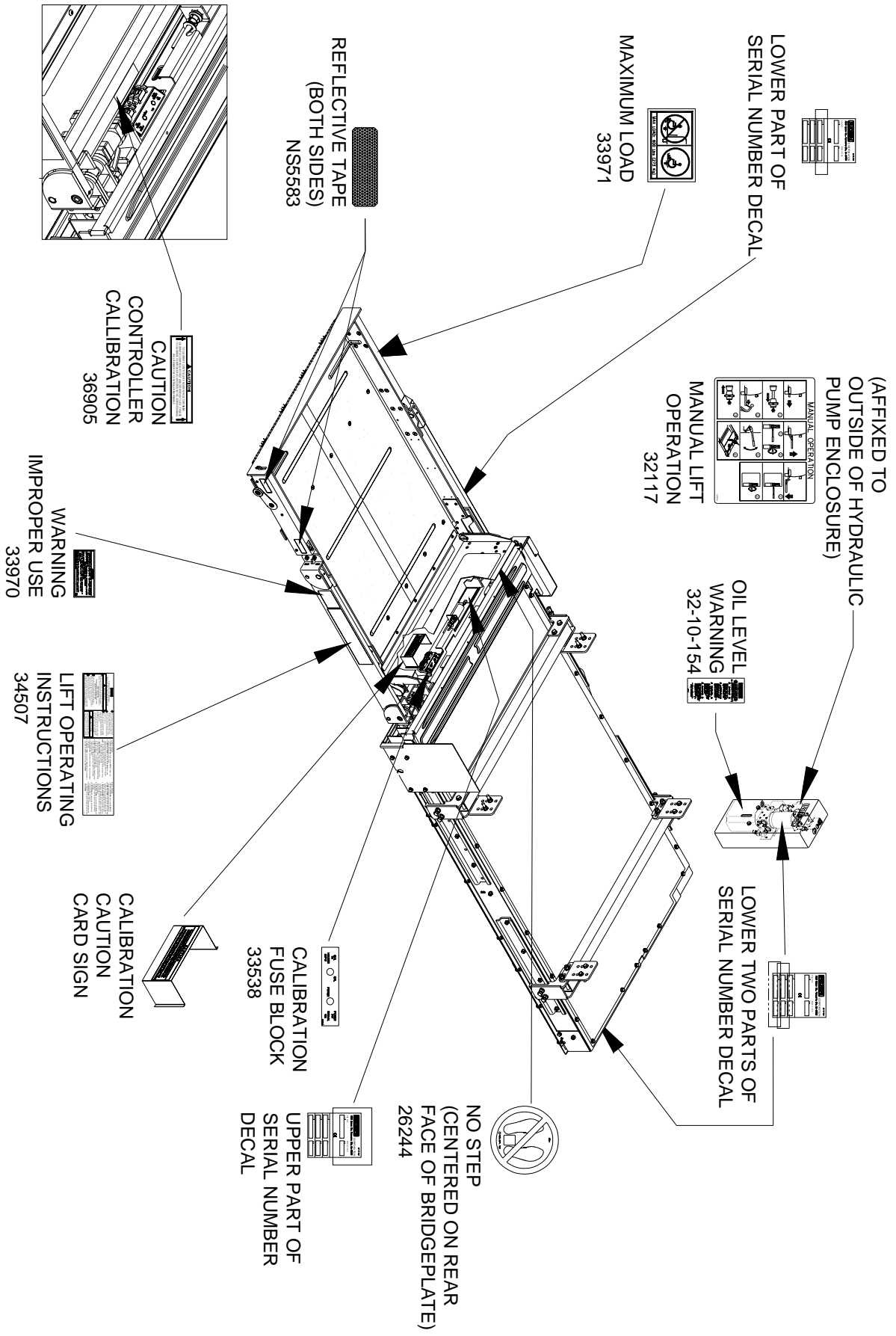


FIGURE 4-1: MARK 1 DECAL LOCATIONS AND PART NUMBERS

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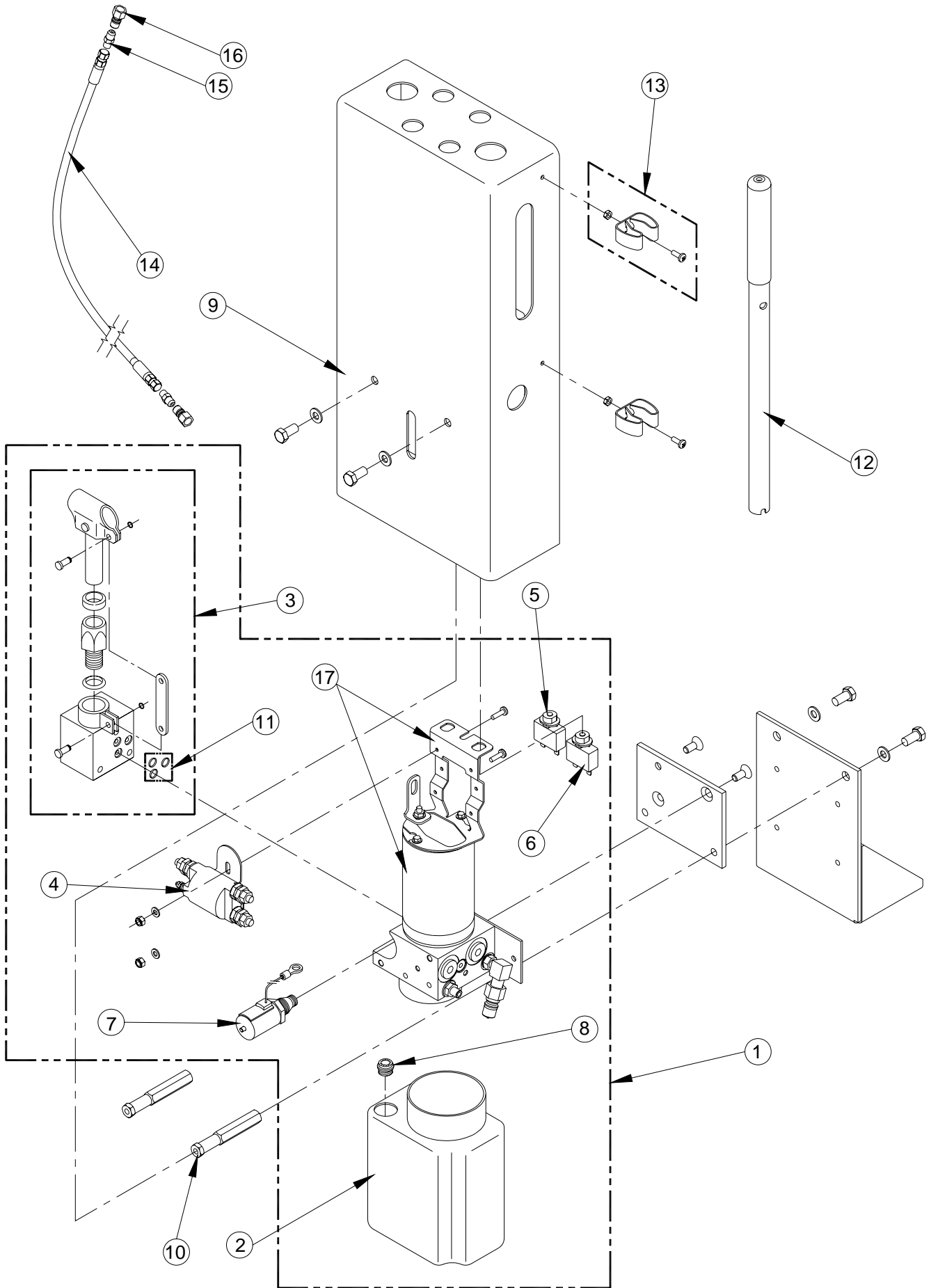


FIGURE 4-2: HYDRAULIC PUMP ASSEMBLY

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FIGURE 4-2: HYDRAULIC PUMP ASSEMBLY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	HYDRAULIC PUMP ASSY	1	PM212072007
2	HYDRAULIC PUMP RESERVOIR	1	30938
3	MANUAL BACK-UP PUMP ASSY	1	V2-SH-210
4	PUMP MOTOR RELAY, 12V	1	20670
5	CIRCUIT BREAKER, 30 AMP	1	26510
6	CIRCUIT BREAKER, 8 AMP	1	265108
7	HYDRAULIC DOWNVALVE, 12V	1	V2-SH-105
8	BREATHER PLUG, RESERVOIR	1	10333
9	HYDRAULIC PUMP ASSY COVER	1	10346
10	PUMP MOUNTING STANDOFF	2	V2-CV-015
11	SEAL KIT, MANUAL BACK-UP PUMP	1	V2-SH-220
12	MANUAL PUMP HANDLE	1	V2-SH-111
13	KIT, TOOL CLIP	2	01267
14	HYDRAULIC HOSE, PUMP TO PULLBOX, 23 FEET	1	F9-HH-23
15	FITTING, MCN, 1/4J, 1/4P, STL	2	V2-SH-84
16	FITTING, QUICK DISCONNECT, 1/4	2	UV-SH-003
17	KIT, MOTOR ASSY, W/BRKT, 12V	1	14345

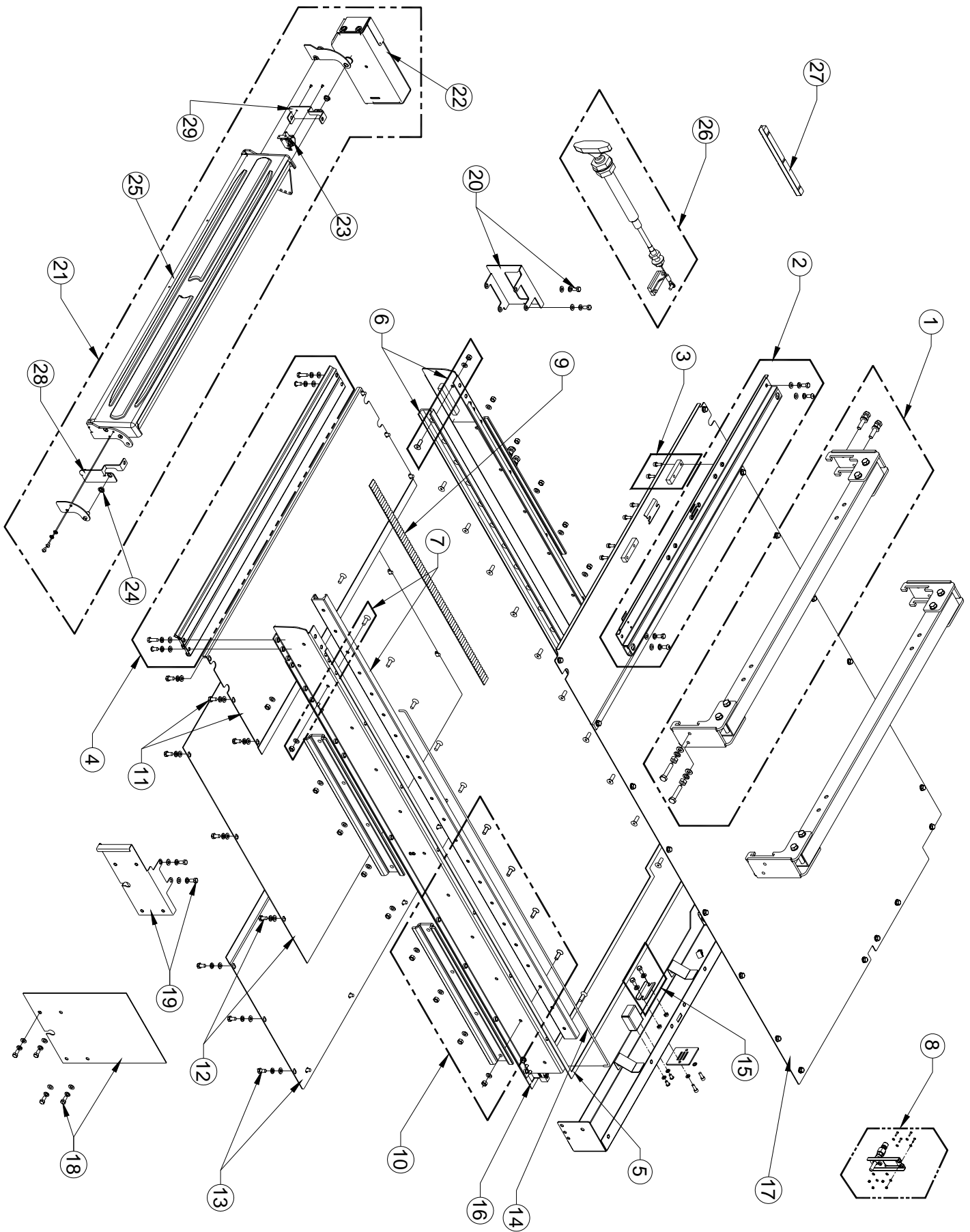


FIGURE 4-3: ENCLOSURE ASSEMBLY

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FIGURE 4-3: ENCLOSURE ASSEMBLY

REF	DESCRIPTION	QTY/ASSY	PART NO
1	KIT, LIFT MOUNTING BRACKET ASSY, W/HDWR	2	30155
2	KIT, FRONT REINFORCEMENT PANEL W/HDWR	1	32186
3	KIT, STOP BLOCK, W/HDWR	2	30157
4	KIT, ENCLOSURE SUPPORT BEAM, W/HDWR	1	32187
5	ENCLOSURE TOP COVER SEAL	2	31304
6	KIT, CARRIAGE GUIDE RAIL, LH, W/HDWR	1	32123
7	KIT, CARRIAGE GUIDE RAIL, RH, W/HDWR	1	32124
8	KIT, CONNECTOR ASSY, ENCLOSURE	1	32188
9	DRIVE BELT, .375 PITCH X 1.00, 90" LONG	1	23172
10	KIT, LIFT MOUNTING RAIL, W/HDWR	4	30165
11	KIT, FRONT BOTTOM COVER, W/HDWR	1	32189
12	KIT, MIDDLE BOTTOM COVER, W/HDWR	1	32125
13	KIT, REAR BOTTOM COVER, W/HDWR	1	32190
14	ROD, ACTUATOR RELEASE	1	33964
15	KIT, BELT RETAINER PLATE, W/HDWR	2	30979
16	ENCLOSURE BOTTOM COVER SEAL	1	31305
17	KIT, TOP COVER, W/HDWR	1	32191
18	KIT, SPLASH GUARD PLATE, W/HDWR	1	34015
19	KIT, BRACKET, SPLASH GUARD, W/HDWR	1	34022
20	KIT, BRACKET, DOOR DRIVE, W/HDWR	1	33121
21	KIT, POWERED DOOR ASSEMBLY	1	33152
22	DOOR DRIVE ASSEMBLY	1	33125
23	DOOR HARNESS, W/SWITCH	1	32732
24	BEARING, FLANGED, 3/8ID X 1/4W	2	253845
25	DOOR ASSEMBLY	1	33127
26	KIT, MANUAL PLATFORM RELEASE CABLE ASSY	1	32256
27	BLOCK, HARNESS GUIDE	1	34024
28	BRACKET, DOOR PIVOT, LH	1	32697
29	BRACKET, DOOR PIVOT, RH	1	32698
*	HARNESS, ENCLOSURE DOOR OPERATING SYSTEM	1	32731
*	HARNESS, DOOR SEQUENCING	1	10940
*	HARNESS, DOOR OPENER EXTENSION	1	31156
*	HARNESS, ENCLOSURE DOOR, W/SWITCH	1	24397

* Not shown

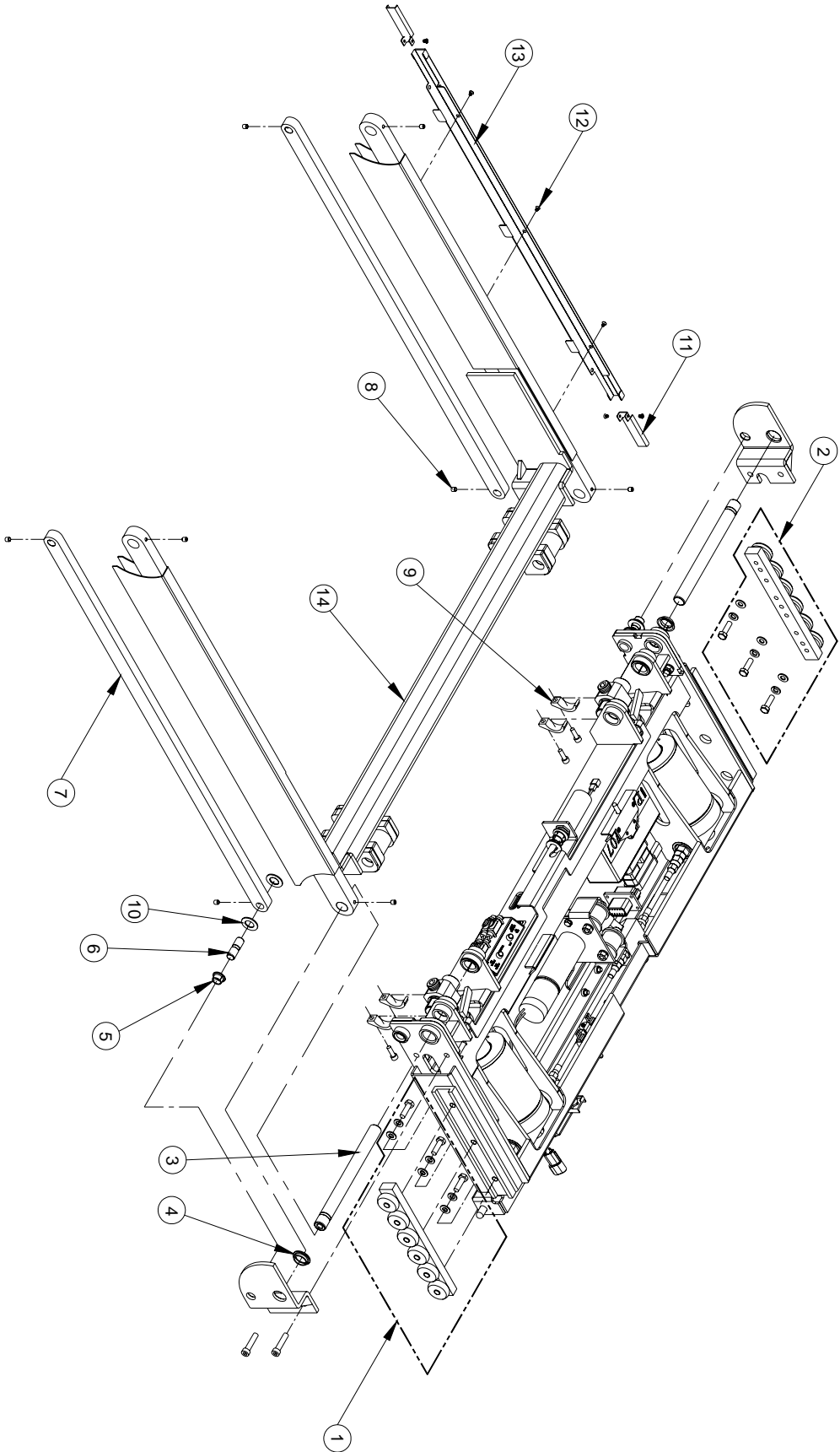


FIGURE 4-4: TRAVELING FRAME ASSEMBLY

FIGURE 4-4: TRAVELING FRAME ASSEMBLY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	KIT, ROLLER ASSY, RH, W/HDWR	1	30903
2	KIT, ROLLER ASSY, LH, W/HDWR	1	30905
3	PIN, PIVOT, UPPER ARM	2	31188
4	KIT, FLANGED BEARING, ¾ ID, BAG OF 10	2	19576
5	BUSHING, .50IDX.38W	2	25384
6	PIN, PIVOT, LOWER ARM	2	31145
7	LOWER ARM	2	31150
8	SETSCREW, M6-1.0X6MM, SST, BAG OF 10	8	20907
9	RETAINING CAP, TRUNNION	4	34017
10	WASHER, FLAT, .578 X 1.067 X .062 NYLON, BAG OF 10	4	13343
11	BRACKET, CABLE SHIELD	2	33543
12	SCREW, FHP, M4-.7X6MM, SST, BAG OF 10	2	32251
13	COVER, HOSE GUARD	1	19721
14	ARMS WELDMENT	1	31138

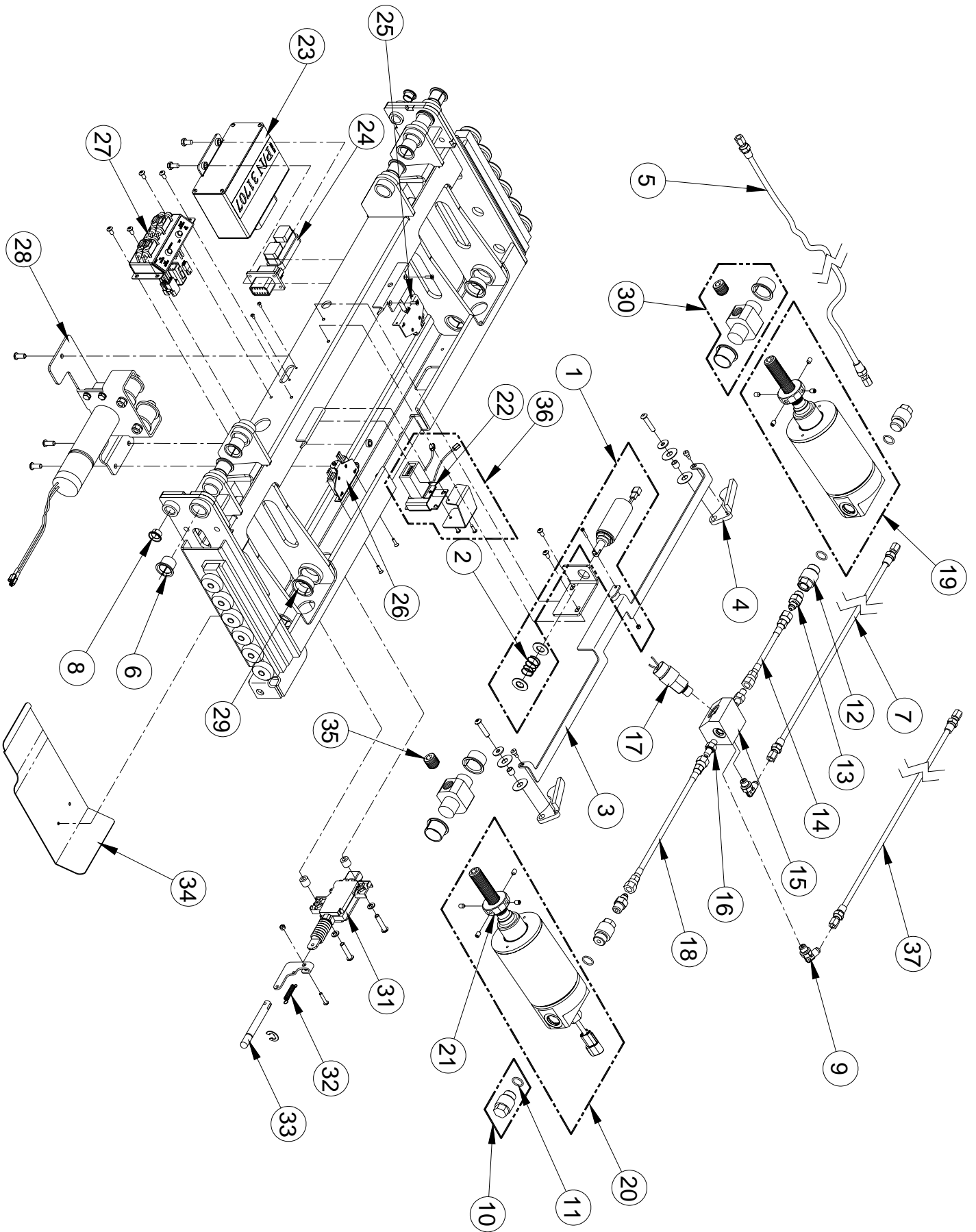


FIGURE 4-5: CARRIAGE ASSY

FIGURE 4-5: CARRIAGE ASSY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	KIT, STOW HEIGHT SOLENOID ASSY	1	30906
2	COMPRESSION SPRING, TAPERED, SST	1	29575
3	SLIDER, STOW LEVEL LOCKING MECHANISM	1	31351
4	LATCH, STOW LEVEL LOCKING MECHANISM	2	31360
5	HYDRAULIC HOSE, 3/16ID X 5/16OD X 72.5"L (TO ROLLSTOP CYLINDER)	1	32240
6	BUSHING, 3/4 DIA X 3/4W	1	25383
7	HYDRAULIC HOSE ASSY, 5/16ID X 3/8OD X 72"L	2	30689
8	BUSHING, 1/2" X 3/8", BAG OF 10	1	32194
9	FITTING, ELBOW, #4, STD THD, #4 JIC	2	18235
10	KIT, FITTING, PIVOT ASSY W/O-RING	2	20658
11	O-RING, NITRILE, .644ID X .087W, BAG OF 10	1	20662
12	FITTING, PIVOT, O-RING	2	15519
13	ADAPTER, ORB, 6 X JIC, 4STL	2	26591
14	HYDRAULIC HOSE, .125ID X 7.88L	1	27729
15	DISTRIBUTION MANIFOLD	1	31363
16	ADAPTER, ORB, 4 X JIC, 4STL	2	17208
17	SENSOR ASSY, PRESSURE	1	24399
18	HYDRAULIC HOSE, .25ID X 10.72L	1	27728
19	KIT, HYDRAULIC CYLINDER ASSY, W/HDWR	1	32120
20	KIT, HYDRAULIC CYLINDER ASSY W/POT, W/HDWR	1	32121
21	NUT, HEX, 1-12 UNF-2B, SST	2	31771
22a	COUNTER, 12VDC	1	26580
22b	COUNTER ASSEMBLY (SERIAL NO. 00000183 AND UP)	1	19037
23	CONTROLLER ASSY	1	30376
24	HARNESS, CONTROLLER	1	32760
25	SWITCH ASSY, DEPLOY, W/PLUNGER	1	33918
26	SWITCH ASSY, STOWED, W/PLUNGER	1	33910
27	FUSE BLOCK, CALIBRATION	1	33536
28 *	MOTOR DRIVE ASSY	1	30542
29	KIT, FLANGED BEARING, 1"ID, BAG OF 10	1	19579
30	KIT, TRUNNION, W/HDWR	2	30199
31	ACTUATOR, STOW LOCK	1	17664
32	SPRING, TENSION, .25OD X 1.88L	1	25447
33	PLUNGER, STOW LOCK	1	33294
34	DEFLECTOR, HARNESS	1	33182
35	SCREW, SET, HEX RECESS, 3/4-16 X .75, BAG OF 10	2	34530
36	KIT, COUNTER ASSEMBLY (SERIAL NO. 00000183 AND UP)	1	35752
37	HOSE ASSEMBLY, HYDRAULIC, 98" X 1/4 JIC X 1/8ID, SST, BRD	1	15347

* Refer to the following figure for detail.

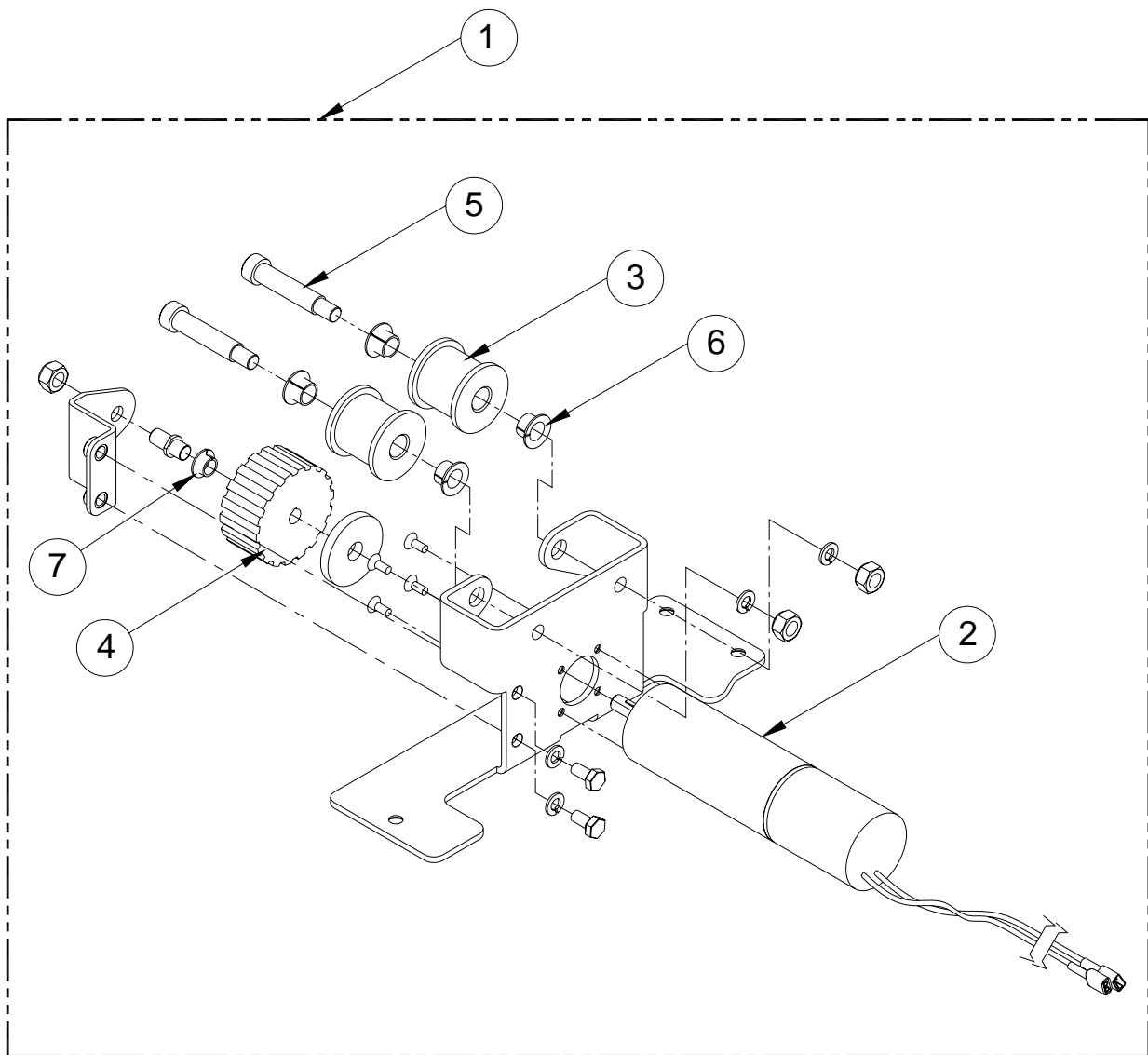


FIGURE 4-6: CARRIAGE MOTOR ASSEMBLY

FIGURE 4-6: CARRIAGE MOTOR ASSEMBLY

REF	DESCRIPTION	QTY	PART NO
1	MOTOR DRIVE ASSY	1	30542
2	GEARMOTOR ASSY	1	30551
3	DRIVE BELT ROLLER	2	30535
4	TIMING BELT PULLEY	1	24081
5	SCREW, SHOULDER, 10MM X 40MM, M8-1.25 SST	2	30540
6	BEARING, FLANGED, 10MMID X 6MM W	4	29402
7	BEARING, FLANGED, 8MMID X 6MM W	1	24611

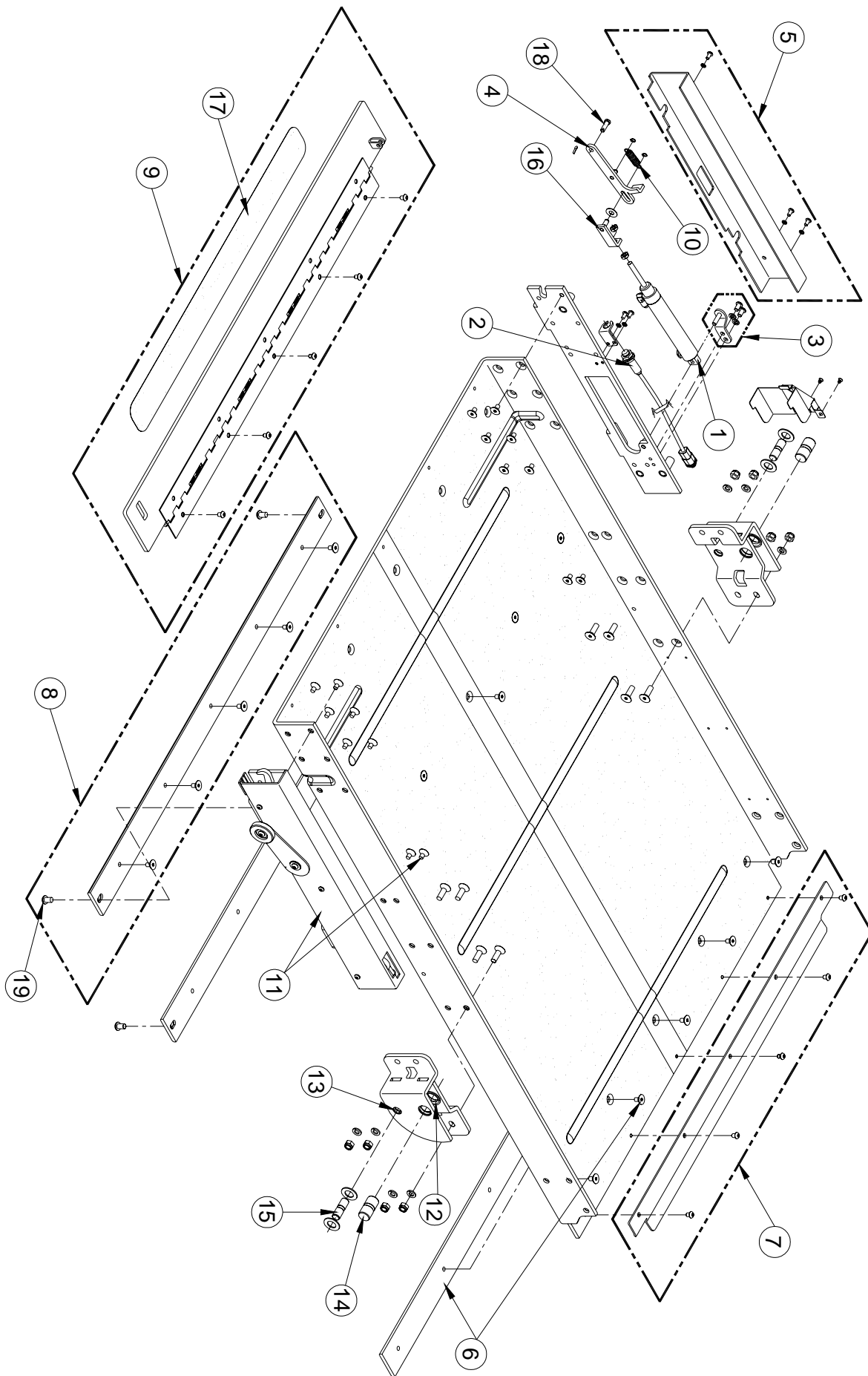


FIGURE 4-7: PLATFORM ASSEMBLY

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FIGURE 4-7: PLATFORM ASSY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	CYLINDER ASSY, ROLLSTOP ACTUATOR	1	33961
2	SENSOR, PROXIMITY	1	31198
3	KIT, BRACKET, ROLLSTOP ACTUATOR, W/HDWR	1	30916
4	LINK, ROLLSTOP ACTUATOR	1	33914
5	KIT, COVER, ROLLSTOP ACTUATOR, W/HDWR	1	32199
6	KIT, REINFORCEMENT BAR, REAR	1	30983
7	KIT, TRANSITION PLATE, W/HDWR	1	30179
8	KIT, REINFORCEMENT BAR, FRONT	2	32195
9	KIT, ROLLSTOP ASSY, W/HINGE	1	32197
10	SPRING, TENSION, ROLLSTOP LINK	1	33962
11	ROLLSTOP LATCH ASSEMBLY, W/HDWR	1	32291
12	KIT, FLANGED BEARING, .75 ID, BAG OF 10	1	19576
13	KIT, FLANGED BEARING, .50 ID, BAG OF 10	1	32198
14	PIN, PIVOT, UPPER ARMS	2	31144
15	PIN, PIVOT, LOWER ARMS	2	31145
16	ADAPTER, ROLLSTOP ACTUATOR	1	33912
17	SAFETREAD, 25.5 X 3, YELLOW	1	25664
18	PIN, CLEVIS, .25OD X .656L	1	27060
19	SCREW, BHS, M8X1.25X12MM,SST, BAG OF 10	1	29393

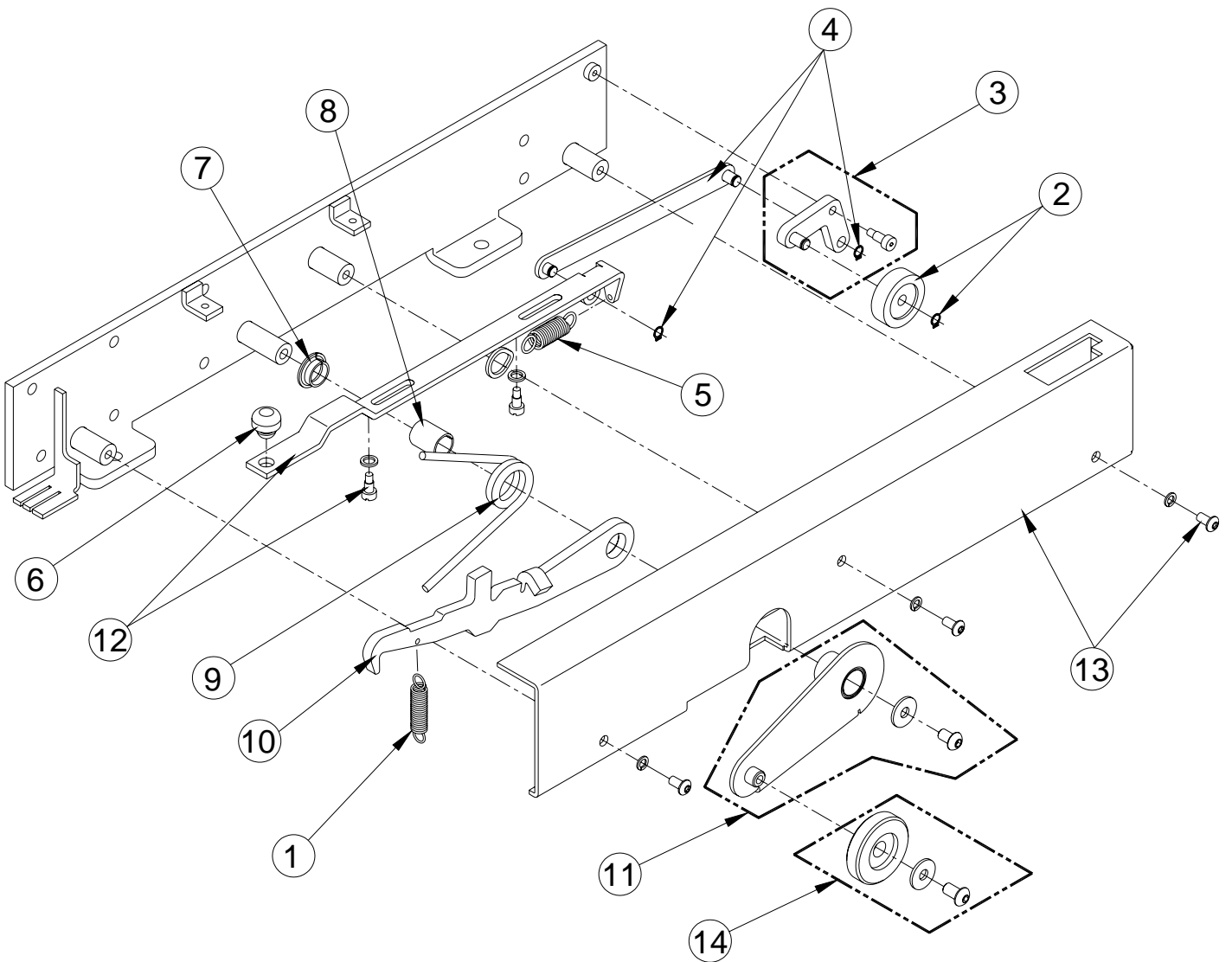


FIGURE 4-8: ROLLSTOP LATCH ACTUATOR ASSEMBLY

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FIGURE 4-8: ROLLSTOP LATCH ACTUATOR ASSEMBLY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	SPRING, TENSION, .36OD X 1.38L, SST	1	32267
2	KIT, ROLLER, ROLLSTOP LATCH	1	30992
3	KIT, BELL CRANK, ROLLSTOP LATCH	1	30994
4	KIT, LINK, ROLLSTOP LATCH	1	34502
5	SPRING, TENSION, .42OD X 1.5L, SST	1	31774
6	BUMPER, .63OD X .31H, RUBBER, BAG OF 10	1	29851
7	BEARING, FLANGED, .50ID X .25W, BAG OF 10	1	32198
8	BUSHING, .50ID X .75L	1	32294
9	SPRING, TORSION, LH	1	31797
10	LATCH, ROLLSTOP	1	32279
11	KIT, ARM, ACTUATOR FOOT, W/HDWR	1	34505
12	KIT, LOCKING LINK W/HDWR	1	34503
13	KIT, COVER, ROLLSTOP LATCH, W/HDWR	1	34506
14	KIT, ACTUATOR FOOT ROLLER	1	30173

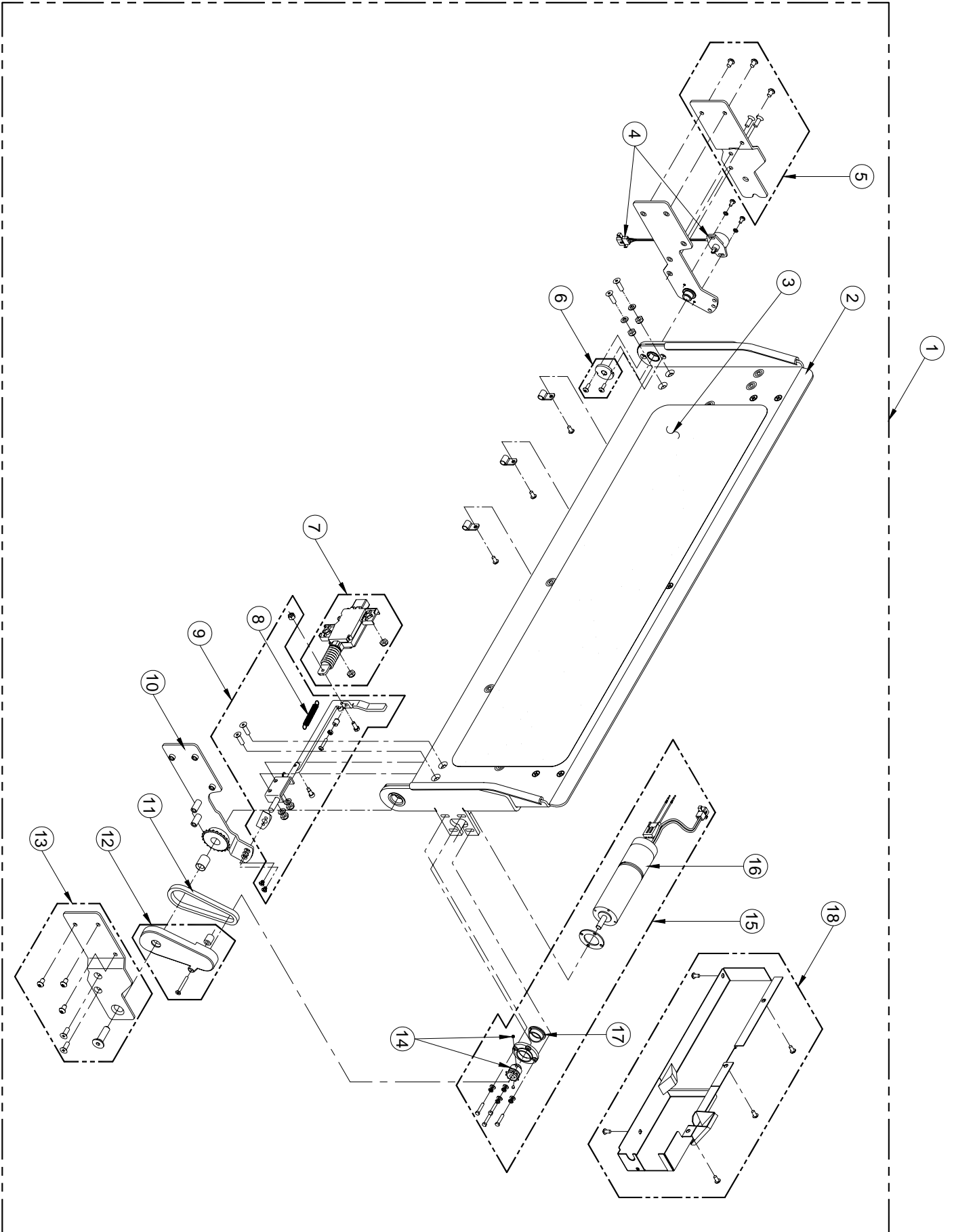


FIGURE 4-9: PLATFORM BRIDGEPLATE ASSEMBLY

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FIGURE 4-9: PLATFORM BRIDGEPLATE ASSY

REF	ITEM DESCRIPTION	QTY/ASSY	PART NO
1	KIT, BRIDGEPLATE ASSY	1	32129
2	KIT, BRIDGEPLATE WITH SAFETREAD	1	32130
3	SAFETREAD, 25.5X7 YELLOW, SAFETY	1	25665
4	HARNESS, POTENTIOMETER	1	30815
5	KIT, OUTER BRIDGEPLATE PIVOT BRACKET, LH, W/HDWR	1	32103
6	KIT, POTENTIOMETER SHAFT PLATE	1	30988
7	KIT, RELEASE MECHANISM SOLENOID	1	30184
8	TENSION SPRING	1	29577
9	KIT, BRIDGEPLATE RELEASE MECHANISM, W/HDWR	1	30185
10	KIT, INNER BRIDGEPLATE PIVOT BRACKET ASSY, RH	1	30989
11	DRIVE CHAIN, #25	1	29413
12	KIT, CHAIN COVER, W/HDWR	1	30186
13	KIT, OUTER BRIDGEPLATE PIVOT BRACKET, RH, W/HDWR	1	30187
14	KIT, BRIDGEPLATE MOTOR SPROCKET	1	30188
15	KIT, BRIDGEPLATE MOTOR ASSY	1	30189
16	BRIDGEPLATE GEARMOTOR	1	30216
17	BUSHING, 3/4" ID X 3/8W	1	25381
18	KIT, MOTOR COVER, W/HDWR	1	30190

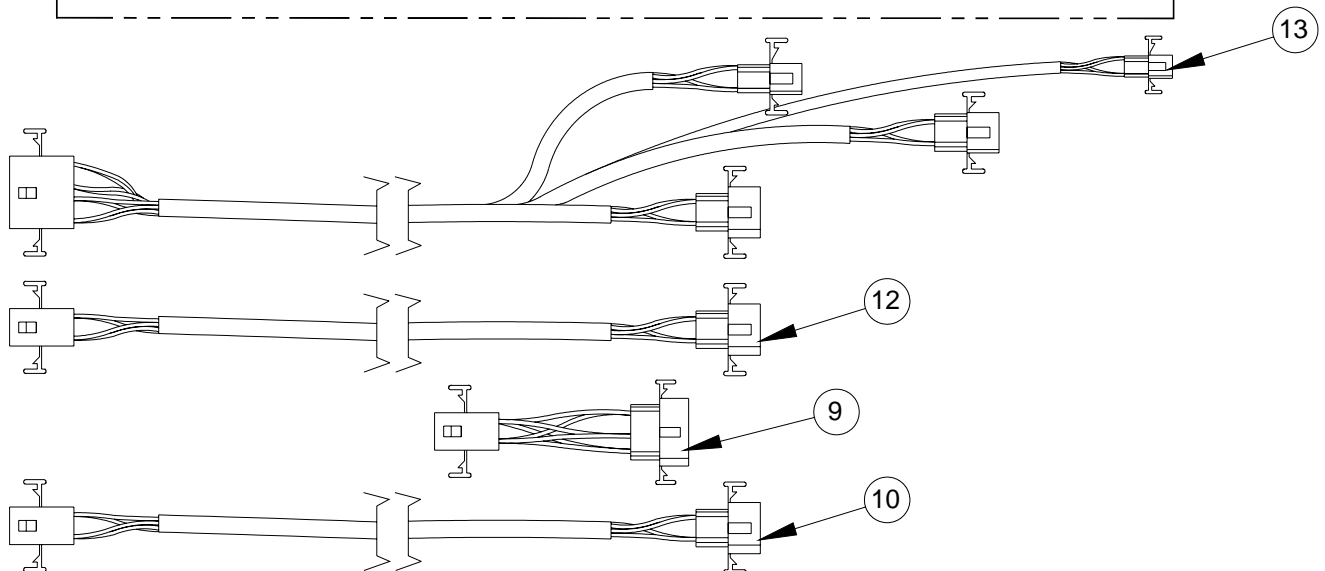
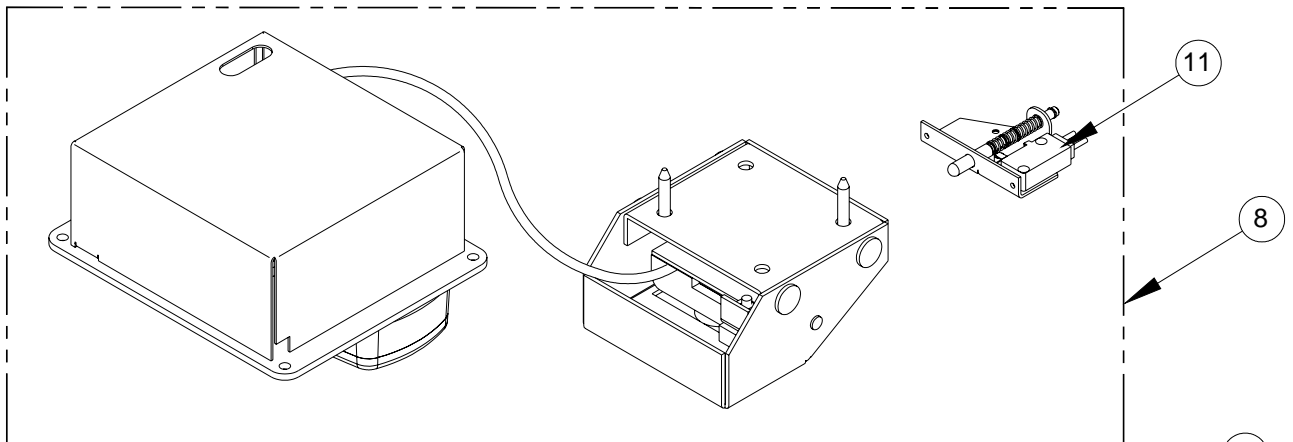
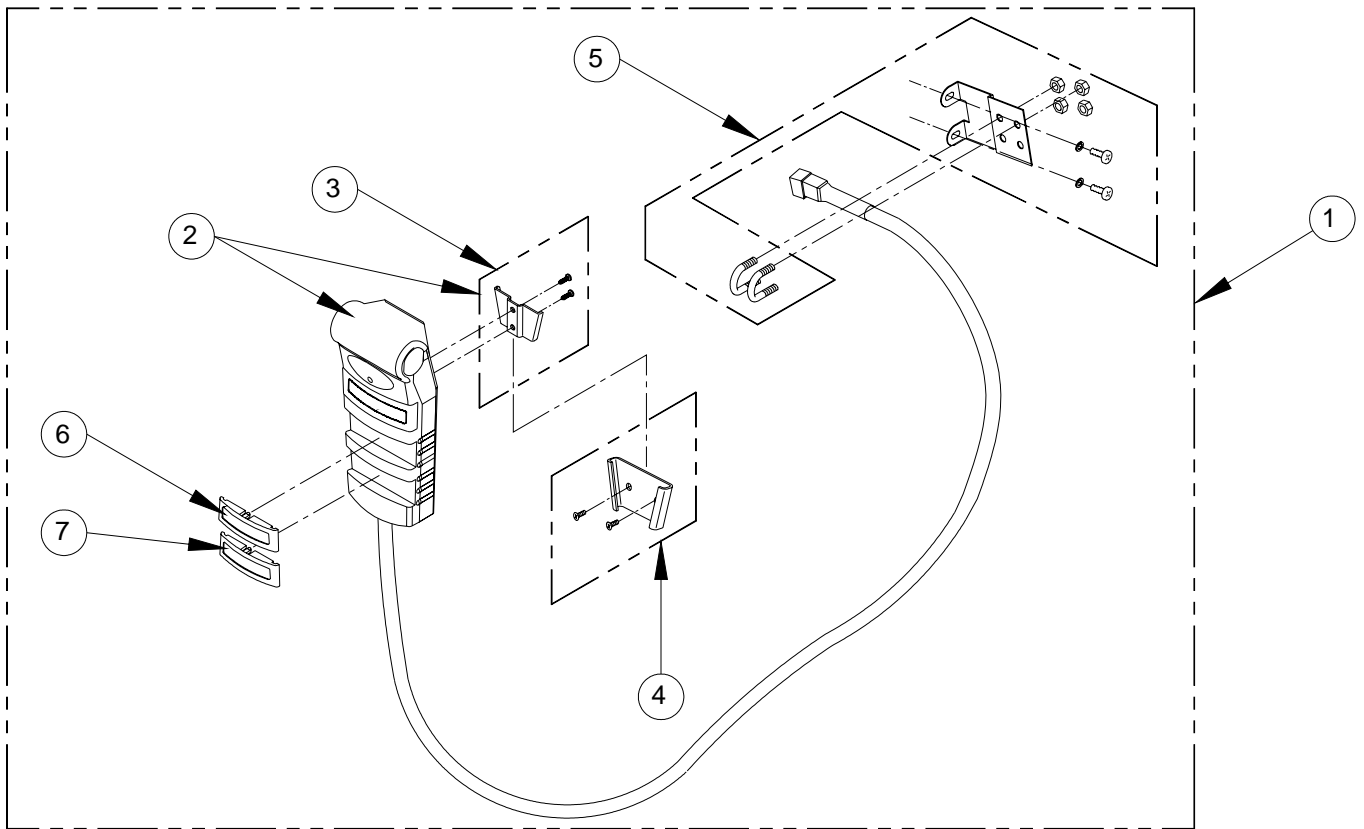


FIGURE 4-10: PENDANT, TWS KIT, AND INTERLOCK MODULES AND HARNESSSES

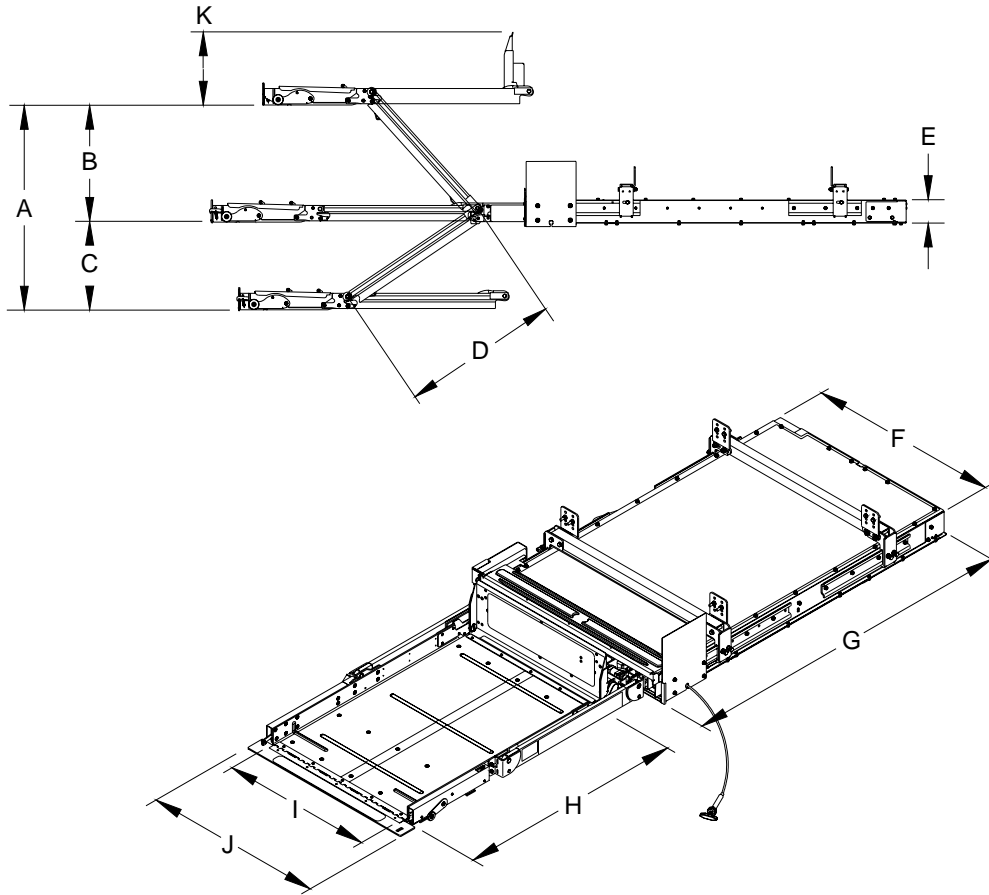
FIGURE 4-10: PENDANT, TWS KIT, INTERLOCK MODULES, AND HARNESSSES

REF	DESCRIPTION	QTY	PART NO
1	KIT, HAND CONTROL PENDANT	1	14727
2	PENDANT, W/CORD AND MOUNTING CLIP	1	12848
3	KIT, PENDANT MOUNTING CLIP, PENDANT	1	14733
4	KIT, PENDANT MOUNTING CLIP, VEHICLE	1	14709
5	KIT, STRAIN RELIEF, W/HDWR	1	14721
6	STOW/DEPLOY BUTTON	1	14731
7	UP/DOWN BUTTON	1	14732
8	KIT, THRESHOLD WARNING SYSTEM	1	33944
9	HARNESS, INTERLOCK INTERFACE	1	33852
10	HARNESS, INTERLOCK EXTENSION	1	33693
11	SWITCH ASSEMBLY, VEHICLE DOOR	1	33568
12	HARNESS, EXTENSION, PENDANT	1	32773
13	HARNESS, PUMP, PENDANT, AND INTERLOCK TO ENCLOSURE	1	32781

APPENDIX 1 LIFT SPECIFICATIONS

MARK 1 WHEELCHAIR LIFT

Power source: Platform up.....electro-hydraulic Platform down.....gravity Pump rating:.....1800psi (12,411kPa) @ 12 VDC 1800 psi (12,411kPa), 1250 watts (75kJ) Hydraulic cylinders.....2ea, Ø3.0", single acting	Rated load capacity600 lbs (273kg) Manual backup-uphand pump Manual backup-down..... pressure release valve Lift weightapprox 425 lbs (193kg)
--	--



DIMENSIONS – inches (millimeters)

Model	A	B	C	D	E	F	G
MARK 1-01112000	Floor to ground travel	Travel above	Travel below	Arm length	Enclosure height	Enclosure width	Enclosure length
	40.0 (1016)	23.0 (584)	17.0 (432)	31.0 (787)	4.3 (109)	40.0 (1016)	77.0 (1956)
	Usable platform length	Usable platform width	Traveling frame width	Bridgeplate height			
	48.0 (1219)	32.0 (813)	38.0 (965)	9.9 (251)			

APPENDIX 2

INSTALLATION INSTRUCTIONS DOT - PRIVATE USE LIFT MARK I WHEELCHAIR LIFT MANUFACTURER RATED LOAD FOR THIS LIFT IS 600 LBS

Be certain these supplemental instructions are read and understood completely before installation is attempted. You should also refer to the Service Manual for additional installation instructions and safety precautions.

Applications:

Make	Model
Ford w/ Swing Doors	250/350"
Ford w/ Slider Door	250/350"
Chevrolet	2500/3500"

NOTE: Ford 150 and GM 1500 vehicles are excluded due to insufficient vehicle load capacity.

MECHANICAL INSTALLATION OF LIFT

For ease of installation, raise vehicle and safely position on jack stands. Do not begin installation until the vehicle is safely supported. Position jack stands under the rear axle so that the rear suspension is being compressed while completing the installation.

Evenly raise the lift into position. When lifting the enclosure, use something to span the complete width of the enclosure. This will allow the lift to be raised by the side frames. Without spanning to the edge of the frame for support, the covers will be damaged. Lift evenly without "twisting" the enclosure during installation. This will allow the internal rail system to operate smoothly as designed. Install the mounting brackets into the 2"x2" crossover tube as shown. Refer to **Figure 1**. Select the mounting position that is ideal for your application.

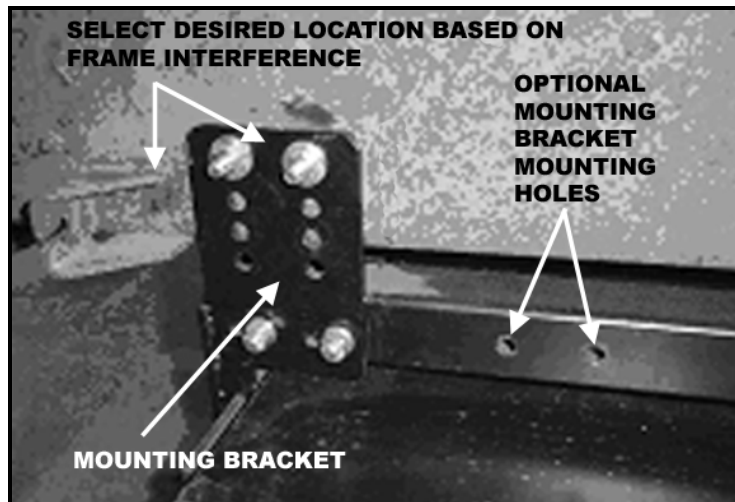


FIGURE 1: MOUNTING BRACKET OPTION

Refer to **Figure 2**. Measure the lateral position of the lift enclosure as shown. Use the chart below for approximate lift locations.

Make	Model	Mounting Dimension
Ford w/ Swing Doors	250/350	6"
Ford w/ Slider Door	250/350	10-1/2"
Chevrolet	2500/3500	5"

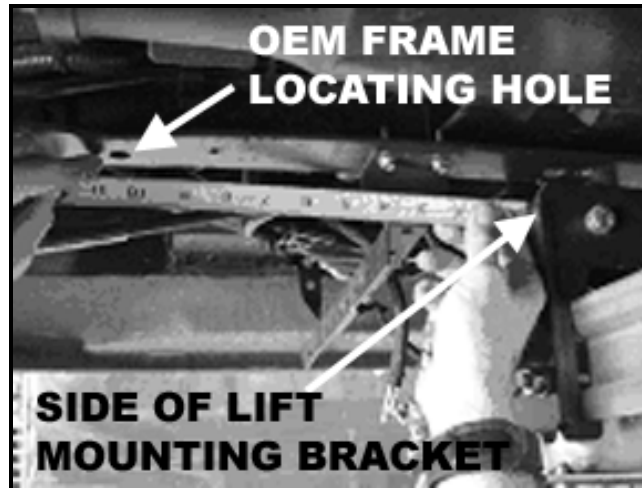


FIGURE 2: LATERAL POSITIONING DETAIL

NOTE: Refer to **Figure 3**. Verify both frame rail dimensions are correct to help verify that the front of the Mark 1 is parallel with the side of the vehicle. These are approximate mounting locations. The installer must verify the lift is centered in the doorway with the doors open to avoid contact (particularly when using swing door operators).

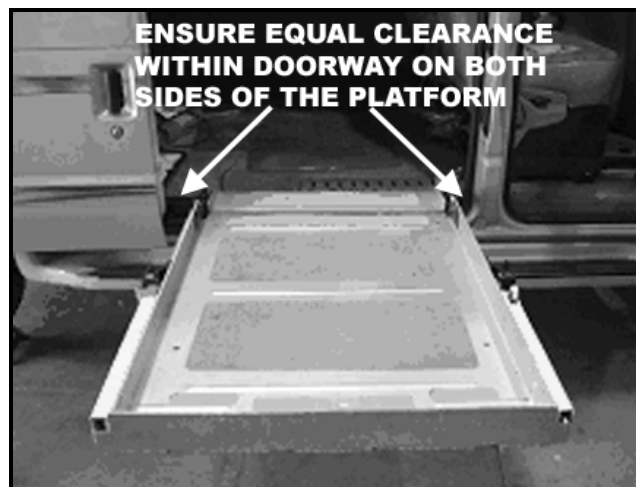


FIGURE 3: DOORWAY CLEARANCE DETAIL

Refer to **Figures 4, 5, and 6** on following page. To obtain the maximum amount of ground clearance, position the lift as high as possible while maintaining the minimum allowable clearance.

- Maintain at least 1/2" of muffler clearance.
- Maintain 1-1/4" of drive shaft clearance when the vehicle is at ride height.
- Verify sufficient space above the flare to allow the Mark 1's cover to operate.



FIGURE 4: MUFFLER CLEARANCE



FIGURE 5: DRIVESHAFT CLEARANCE



FIGURE 6: COVER CLEARANCE

Refer to **Figure 7**. Position the face of the lift door to allow 1-1/2" flare overhang as shown. When adjusting the lift's position, remove the slider lock bolts and slide lift forward or backward.

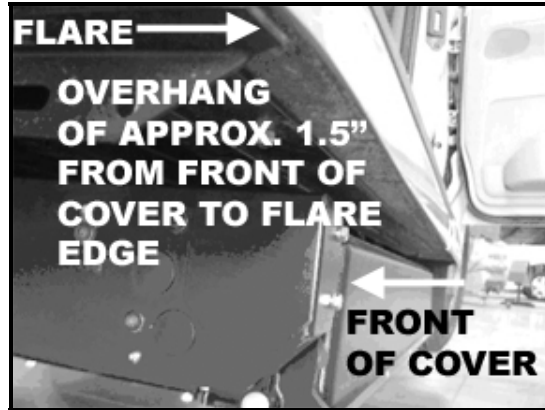


FIGURE 7: OVERHANG DETAIL

With the lift positioned as high in the vehicle as possible, the front of the lift is parallel with the side of the vehicle, the lift is centered in the doorway, and the flare overhangs the front cover by about 1", mark and drill the mounting holes into the frame. If the lift is clamped in place, the brackets can be used as a drill guide. Each bracket should receive 2 Gr. 8, 3/8"-16 bolts and torque dry to 35 ft lbs. Refer to back to **Figure 1**. (Caution - once these holes are drilled and bolted, the enclosure can be adjusted in and out for flare clearance, but not side-to-side.)

Refer to **Figure 8**. Mount the T-handle of the manual release cable in the floor of the van. A location near the door is suggested to make it accessible during the manual release process. With non-lowered floor vehicles, it is common to mount the T-handle in the side of the step well. With lowered floor vehicles, it is common to mount the T-handle near the door next to the third row seat.

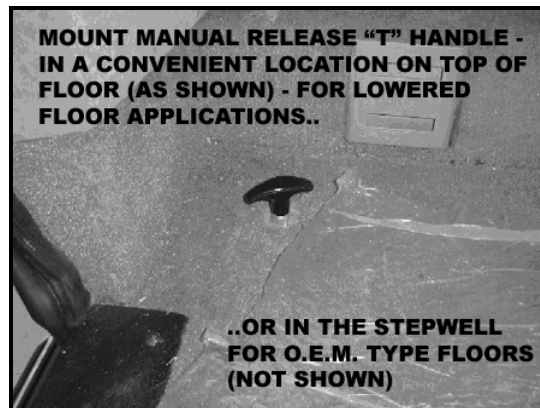


FIGURE 8: MANUAL RELEASE HANDLE

INITIAL ELECTRICAL INSTALLATION

CAUTION

- Do not route a wire while it is connected to the battery.
- Route wires clear of moving parts, brake lines, and the exhaust system. Secure to the vehicle.
- When routing an electrical wire through vehicle floor or walls, use a grommet to protect wires from chafing.
- Check underside of vehicle before drilling to avoid damage to fuel lines, vent lines, brake lines, or wiring.

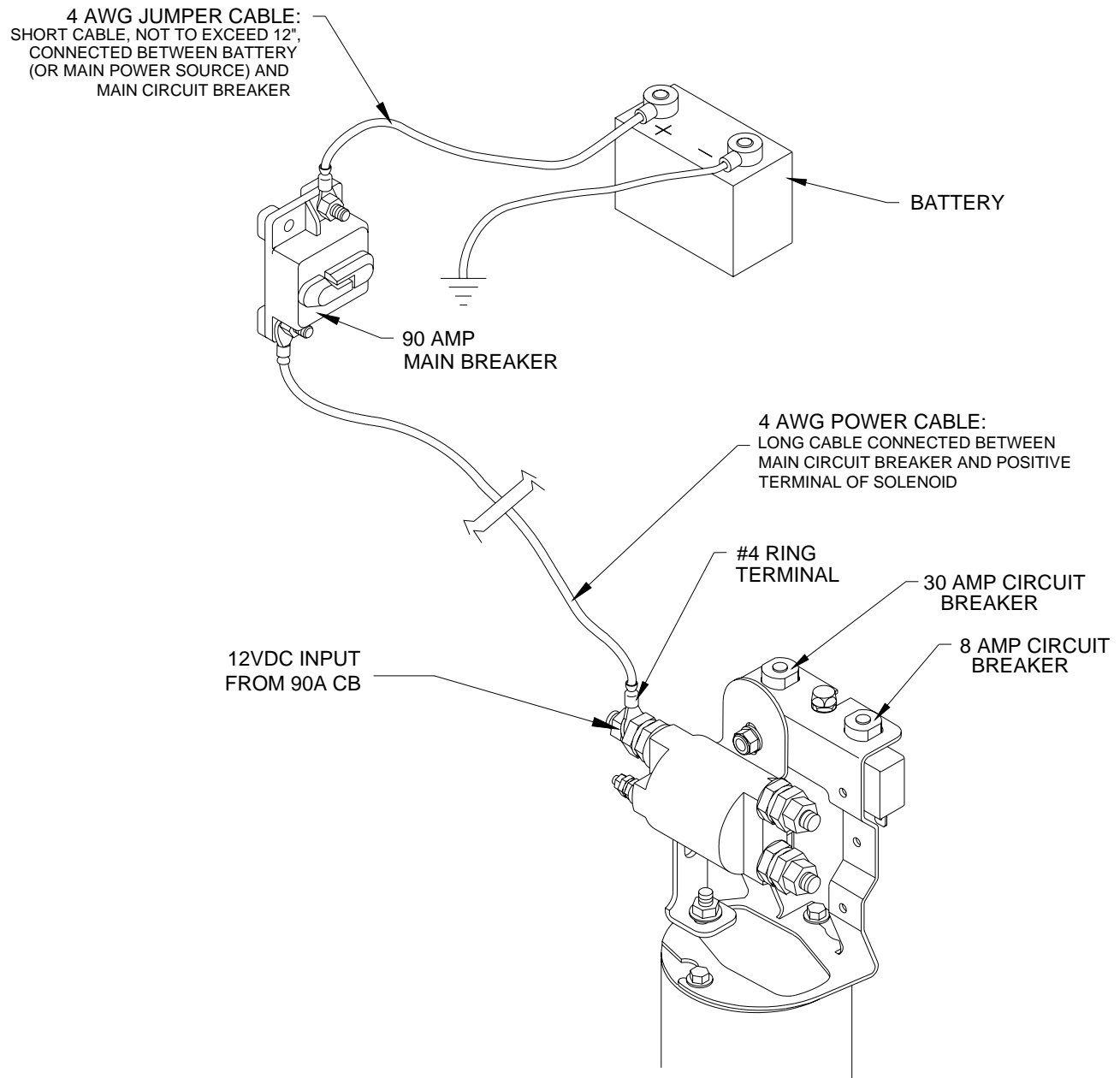


FIGURE 9: ELECTRICAL INSTALLATION DIAGRAM

INSTALL MAIN CIRCUIT BREAKER

Disconnect battery.

Mount main circuit breaker inside engine compartment near battery. Mount within 12 inches to minimize amount of unprotected cable. Avoid installing near a heat source.

ROUTE AND CONNECT MAIN POWER CABLE



Check underside of vehicle before drilling to avoid damage to fuel lines, vent lines, brake lines, or wiring.

For applications where power cable is to pass through sheet metal, drill a 3/4" hole and use wire clamp provided. For applications where cable is to pass through plywood, drill a 1" hole and use black plastic grommet provided.

Refer to **Figure 10** on the following page. Drill a hole through vehicle floor near or under pump solenoids so power cable can reach positive side of solenoid (side that also has two small coil studs, and strap down to positive terminal of motor). Drill hole where the pump cover will cover it.

An 8 amp circuit breaker is provided for lift as a circuit protection device. Circuit interfaces supplied by the OEM should be capable of carrying 8 amps of continuous current.

Install ring terminals (supplied) to each end of short jumper cable (12" long), and one ring terminal to one end, and one end only, of long power cable using an appropriate crimp tool (such as Ricon P/N 26553).

Connect end of long power cable (with ring terminal) to main circuit breaker terminal that is furthest from battery, then route power cable underneath vehicle floor and up through hole in floor.

Verify that power cable is secure. Bind power cable to pump assembly harness and to pump motor using cable ties. Avoid pinch points, exhaust system, moving parts, and brake lines.



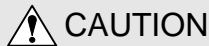
Be sure that there is no interference with any parts that could damage power cable or other wires in any way.

Refer to **Figure 10** on the following page. Cut excess wire from long power cable, install remaining heavy ring terminal to un-terminated end of cable, and connect it to upper terminal on positive side of solenoid.

Install pendant strain relief per instructions supplied with pendant.

Connect the 12" cable from positive battery terminal to unused main breaker terminal.

Install wall portion of pendant dovetail clip in an appropriate safe location.



Be sure that harness does not interfere with any moving parts, or binds against any parts, or is pinched in any way.

GROUND CONNECTION

Refer to **Figure 10**. The lift requires a chassis ground. Connect grounding strap from pump bracket to vehicle chassis. If lift electrical system is connected to chassis with a cable, as shown, the cable must be attached in a manner that provides a reliable electrical connection. If ground cable is attached to an existing ground circuit, the circuit must be capable of conducting an additional 90 amps to the negative battery terminal.

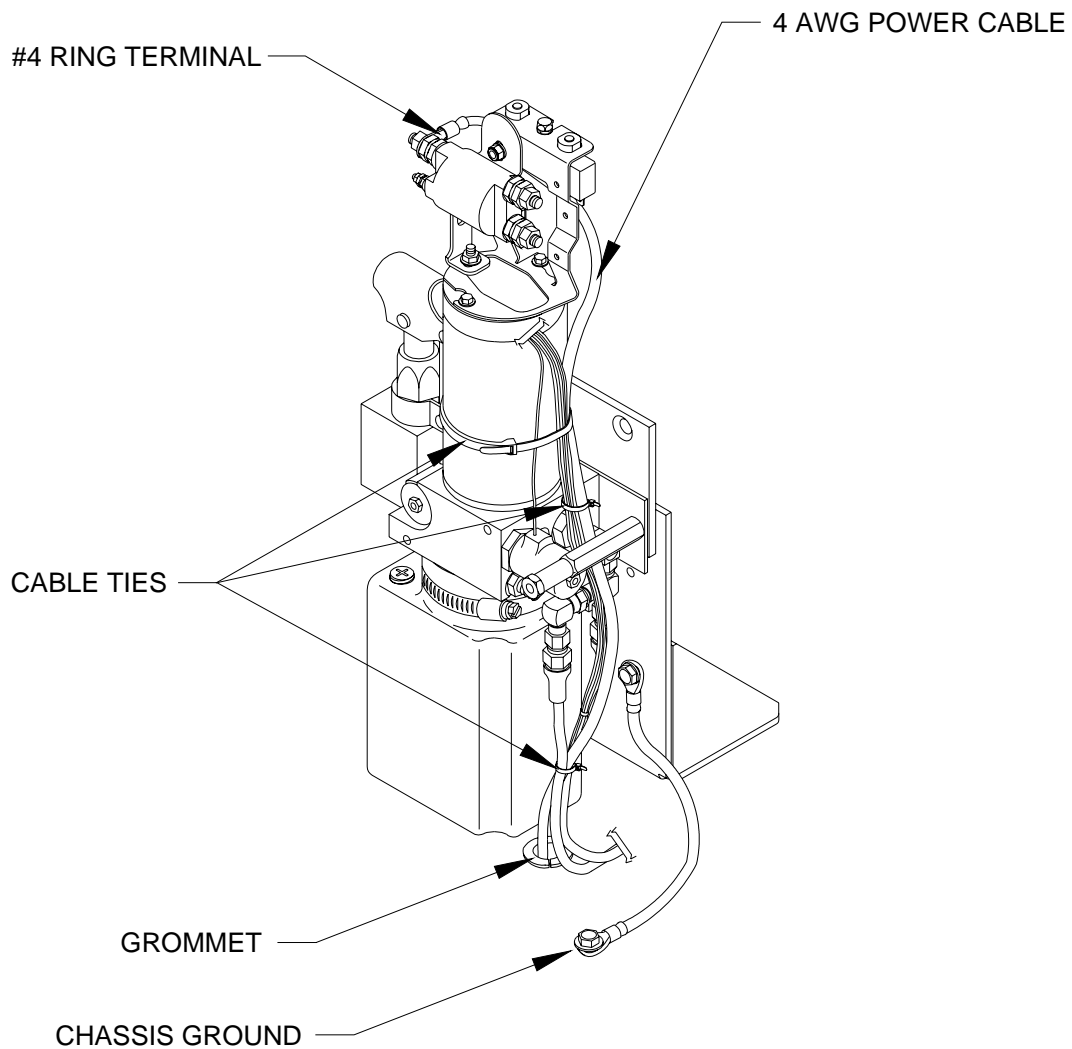


FIGURE 10: 12VDC CABLE ROUTING

HYDRAULIC HOSE CONNECTION AND PLATFORM ADJUSTMENTS

Connect hose to pump. Loosen hydraulic fitting on free end of hose to allow trapped air to escape. Using the manual hydraulic pump handle, pump hydraulic fluid into hose until leakage is detected at free end. Tighten hydraulic fitting on free-end of hose to stop leakage. Attach hose to quick-disconnect fitting on enclosure.

Refer to **Figure 11**. While pulling the manual release T-handle, pull on the top center of the front rollstop. After the platform travels about 3", you can release the T-handle and continue to pull the platform out until it locks in the out position. Once all the way out, slightly push in on the platform to insure it is locked in the out position.



FIGURE 11: MANUAL RELEASE HANDLE

Refer to **Figure 12**. Using the manual hydraulic pump handle, verify the relief valve is closed and manually operate the hydraulic pump to raise the platform to the full up position.

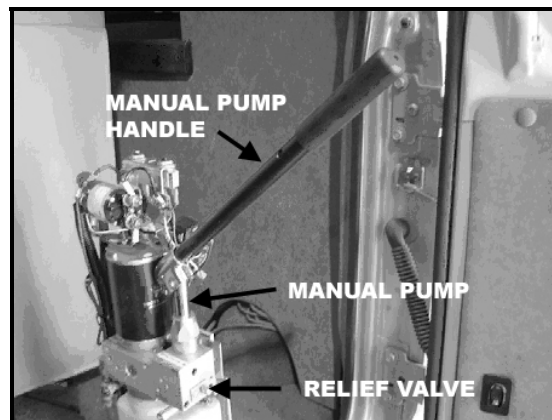


FIGURE 12: MANUAL PUMP HANDLE

NOTE: Refer to **Figure 13**. While raising platform, verify the lifting arms do not contact vehicle.

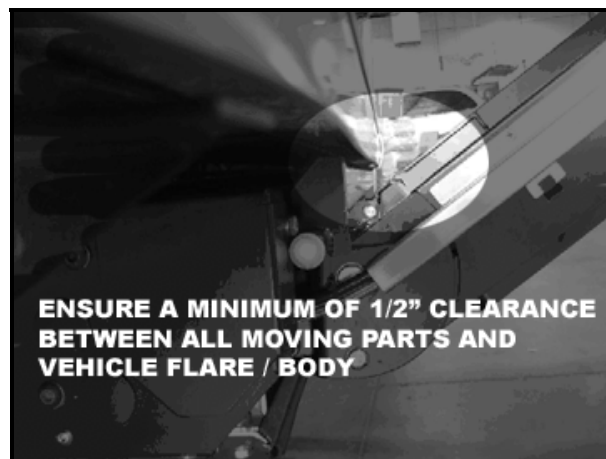


FIGURE 13: LIFTING ARM CLEARANCE

Refer to **Figure 14**. Manually operate the bridgeplate to the open position and compare to the vehicle floor.

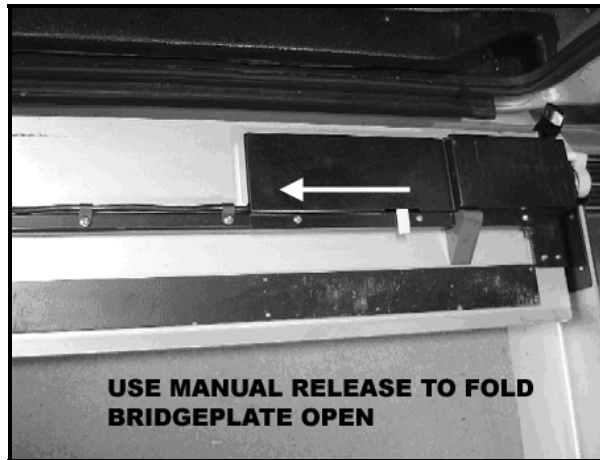


FIGURE 14: MANUAL RELEASE DETAIL

Refer to **Figure 15**. The surface of the lift platform should be $\frac{3}{4}$ " above the vehicle floor level. If the platform is too high or too low, an adjustment to the platform height is necessary.



FIGURE 15: PLATFORM HEIGHT DETAIL

Refer to **Figures 16 and 17**. Remove the locking set screw to gain access to the hex recess (on end of piston) used to adjust the platform height.



FIGURE 16: LOCKING SET SCREW DETAIL




FIGURE 17: ADJUST PLATFORM HEIGHT

Place a support under the platform that will securely hold the platform about 18" off the ground. Manually raise bridgeplate and lower the platform onto the support. This will remove the load from the adjustment locations.

To raise the platform level, adjust the Allen head clockwise. To lower the platform level, adjust the piston hex recess counterclockwise. One full turn adjusts the platform height approximately 1". Make adjustments in ¼ turn increments. Be sure to adjust both cylinder rods evenly. Note number of turns. After adjustments has been made, raise the platform manually to the full up position and once again check the upper platform position. After the height is correctly set at ¾" above the vehicle floor level the upper platform height adjustment is complete and the Allen set screw plugs can be reinstalled.

When the vertical platform height is adjusted, it will be necessary to adjust the mechanical stow height.

 CAUTION
The following procedure checks and sets the mechanical stow height. Use caution around all moving parts.

The goal of adjusting the mechanical stow latch height is to have the hex-shaped collars on the piston rods contact the stow latch plates just as the platform is at stow height.

Check the stow height by lowering the platform to the stow position.

If the platform is too low or too high to travel into the enclosure, an adjustment is required.

Refer to **Figure 18**. Verify the platform height by looking at the SST wire raceway alignment while platform travels in the left side rail. It will be necessary to pull the manual release T-handle to get the platform to travel inward.

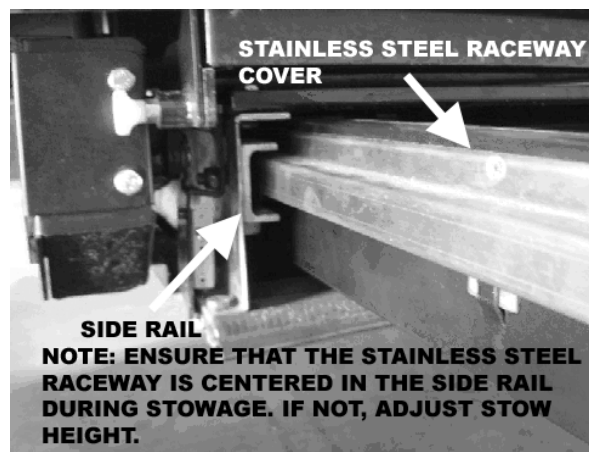


FIGURE 18: STOW HEIGHT ADJUSTMENT DETAIL

Refer to **Figure 19**. To adjust the height, manually raise the platform to the upper most position.

Loosen the setscrews in both hex collars. If the platform is low, adjust hex collars clockwise. If the platform is high, adjust hex collars counter-clockwise. Adjust hex collars to the same number of turns made on the cylinders during the adjustment to set platform height ¾" above the floor. Move both hex collars the same amount in one-quarter turn increments.

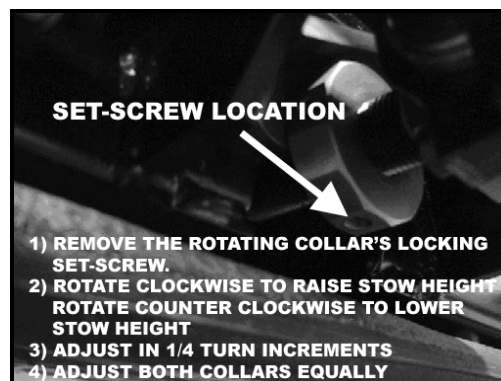


FIGURE 19: PLATFORM HEIGHT ADJUSTMENT

Refer to **Figure 20** on the following page. Manually lower the platform to stow height. Verify the platform height by looking at the SST wire raceway alignment while it manually travels into the left rail. It will be necessary to pull the manual release T-handle to get the platform to travel inward.

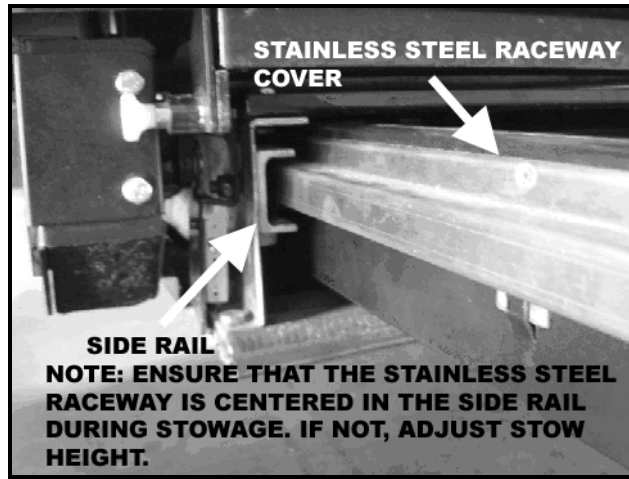


FIGURE 20: STOW HEIGHT ADJUSTMENT DETAIL

Once the proper height is achieved, re-install the hex set screws. Both hex nuts should apply equal loads to the stow latch plates.

Refer to **Figure 21**. With the mechanical platform levels set for both the full up position and the stow height position, the in/out position of the platform will now be adjusted. With the platform in the full up position, verify that there is a minimum 1/2" of clearance between the lifting arms and the vehicle body or flare.

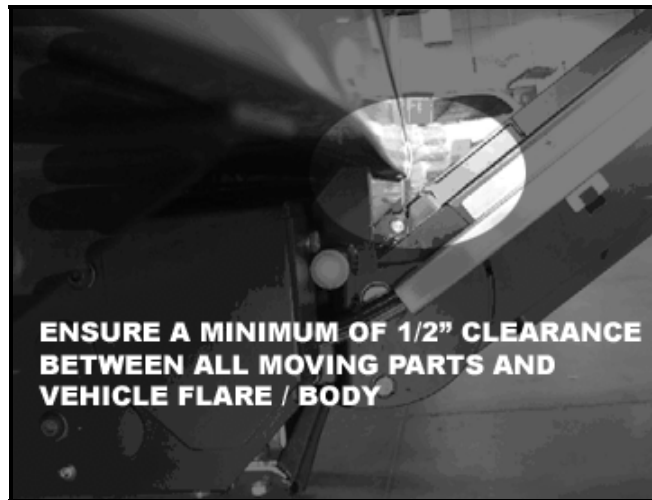


FIGURE 21: LIFTING ARMS CLEARANCE

Refer to **Figure 22**. Manually operate the bridgeplate to the open position. Verify the bridgeplate overlaps the vehicle floor by a minimum of 1".

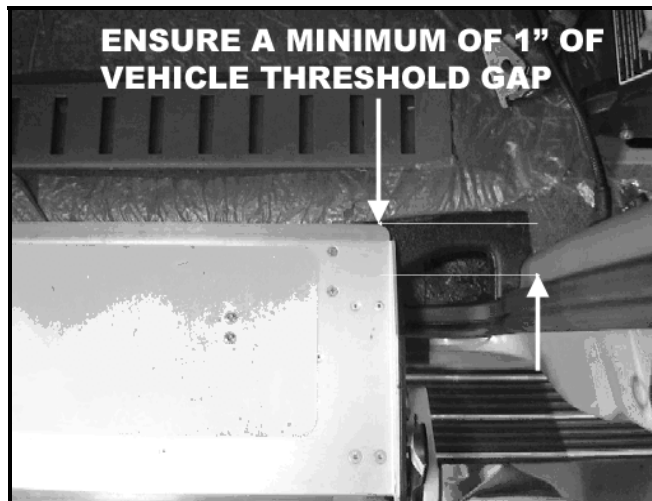


FIGURE 22: BRIDGEPLATE OVERLAP DETAIL

Refer to **Figure 23**. To adjust the in and out position of the platform, remove the jam nuts and bolts that secure the enclosure slides.

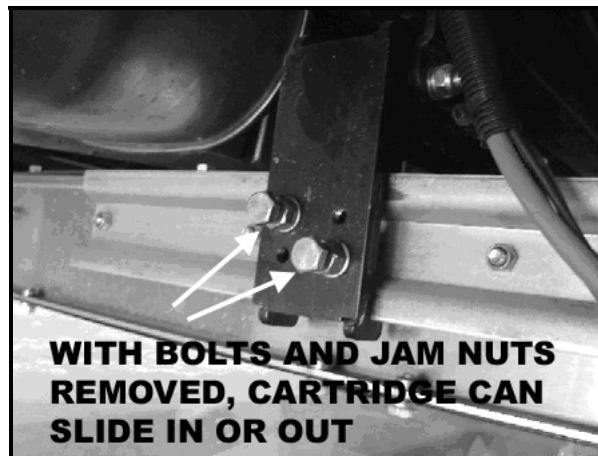


FIGURE 23: ENCLOSURE ADJUSTMENT

Manually lower the platform until it is no longer contacting the vehicle. Gently tap on the black frame of each slide bracket to “walk” the lift enclosure forward or backward in the slide assembly. Manually raise the platform to the up position and again check for the minimum 1” floor overlap and the minimum 1” flare clearance.

Refer to **Figures 24** and **25**. After all adjustments are made reinstall and tighten the slider assembly securing bolts and jam nuts.

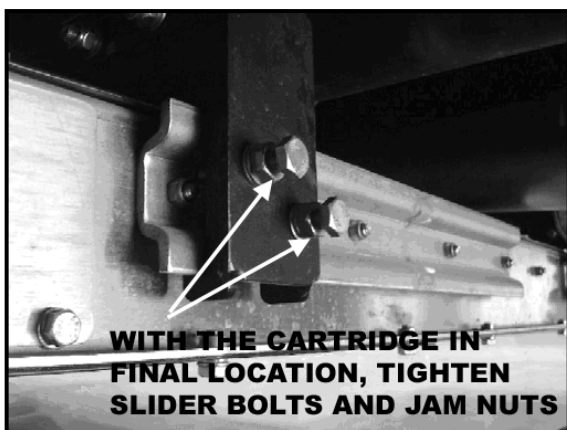


FIGURE 24: SLIDER BOLT DETAIL

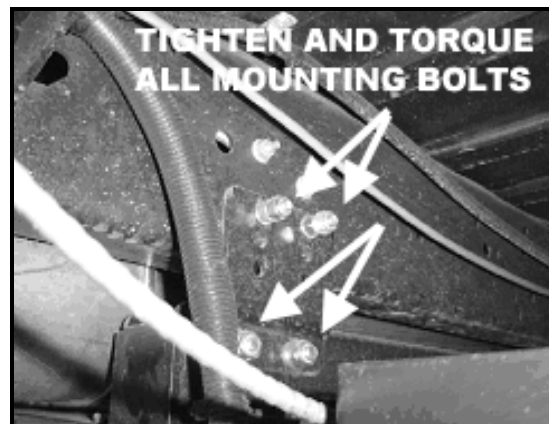


FIGURE 25: TIGHTEN AND TORQUE ALL BOLTS

OVER-TRAVEL STRAP INSTALLATION

Over-travel straps, installed on the rear suspension, limit the distance the driveshaft can move downward. This reduces the possibility of the driveshaft hitting the top of the enclosure and causing damage to the enclosure or its mounting hardware.

1. Remove any heavy cargo from inside of vehicle. Place vehicle on a solid and level surface.

 WARNING
POSITION OF JACK STANDS IS CRITICAL TO SAFETY. VERIFY THAT STANDS ARE PROPERLY LOCATED ON AXLES AND WILL NOT BE PRONE TO TIPPING WHILE VEHICLE IS WORKED ON.

2. Refer to **Figure 26** on following page. Raise vehicle and securely support at front and rear axles. Position lift in a to achieve a minimum of 1 ¼” of clearance between lift enclosure and driveshaft, as shown.

3. Refer to **Figure 26**. Locate a floor jack beneath rear axle differential to support axle at lift installation height.

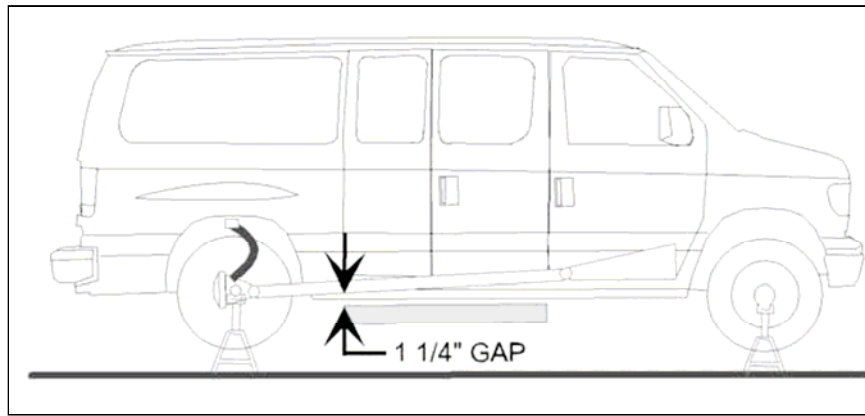


FIGURE 26: LIFT INSTALLED WHILE AXLES ARE SUPPORTED

4. Refer to **Figure 27**. Reposition rear stands so that vehicle height is maintained. Lower rear axle until the gap between enclosure and driveshaft is reduced to 3/8".

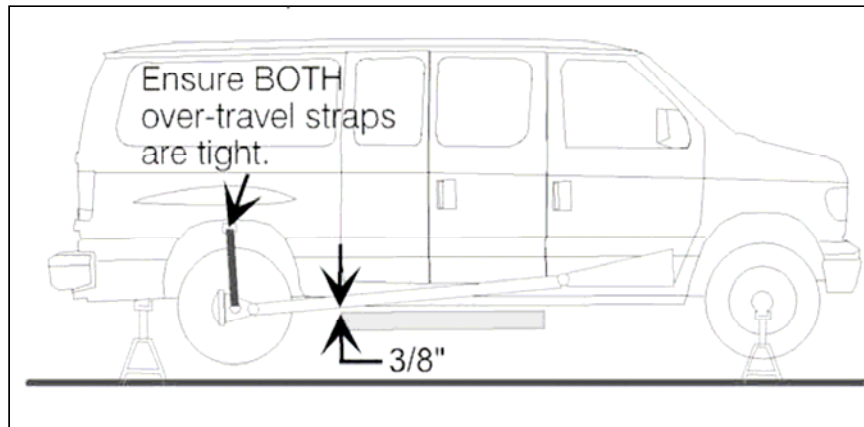


FIGURE 27: DRIVESHAFT ALLOWED TO DROP TO WITHIN 3/8" OF ENCLOSURE

5. Refer to **Figure 28**. Install straps at the outer ends of the axle. Connect each strap between one of the nuts on the axle U-bolts and the frame channel above. Locate the upper end of the strap on the side or top of channel to maintain the 3/8" clearance between the enclosure and driveshaft. Remove floor jack and verify clearance has not changed.

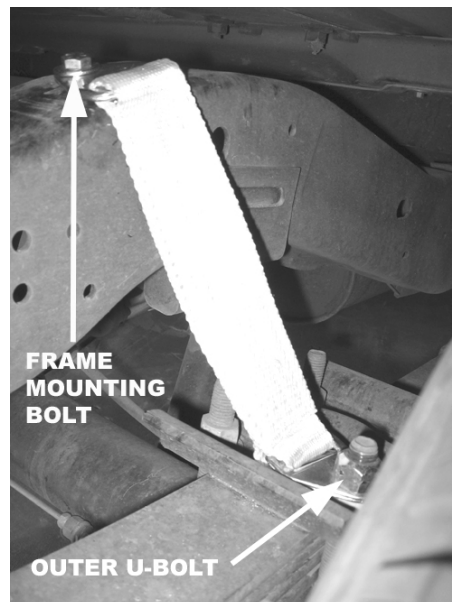


FIGURE 28: TYPICAL LOCATION OF OVER-TRAVEL STRAP

FINAL ELECTRICAL INSTALLATION AND SCHEMATICS

Refer to **Figure 29**. Route harness neatly, secure wiring, and verify connectors are secure.

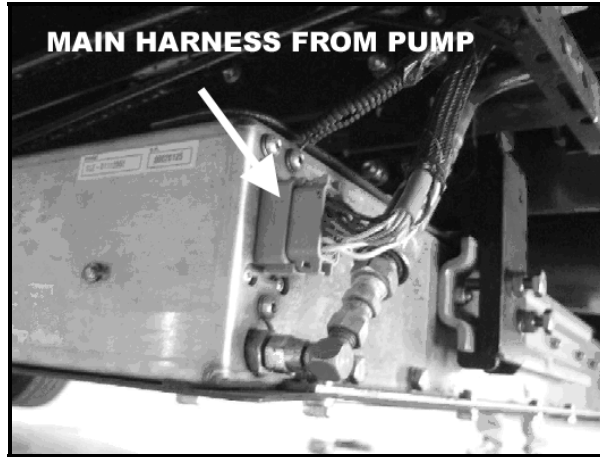


FIGURE 29: MAIN HARNESS FROM PUMP DETAIL

Refer to **Figures 31, 32, and 33** on the following pages for the Mark 1 electrical schematic. Refer to **Figure 30** for an explanation of the symbols used on the schematic.

Refer to **Figure 34** for a simplified diagram illustrating how the major lift components are interconnected. Also shown are interlock and door operator components and harnesses.

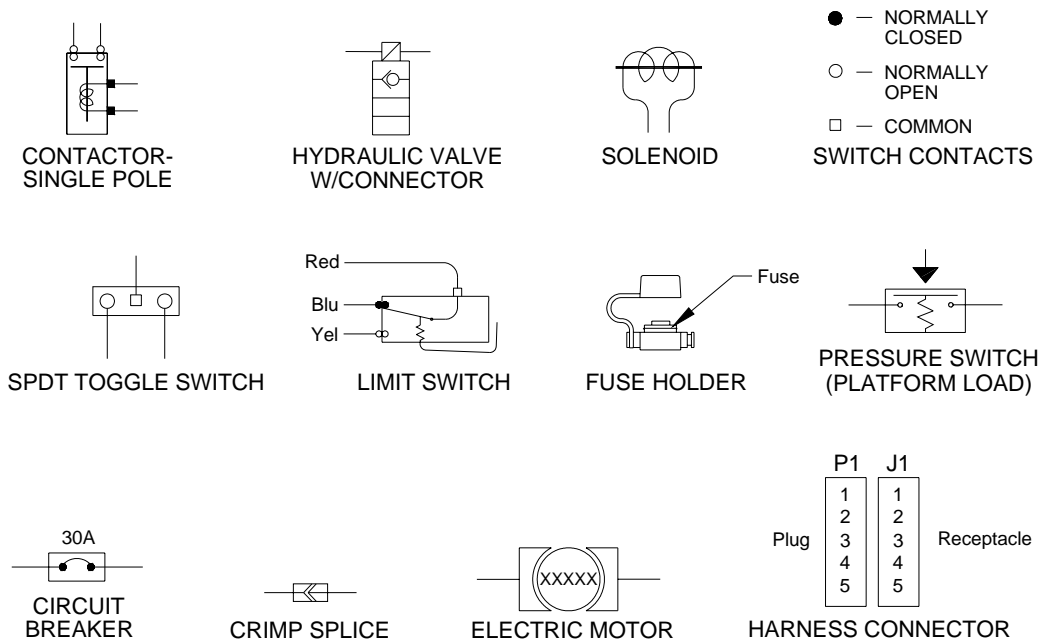
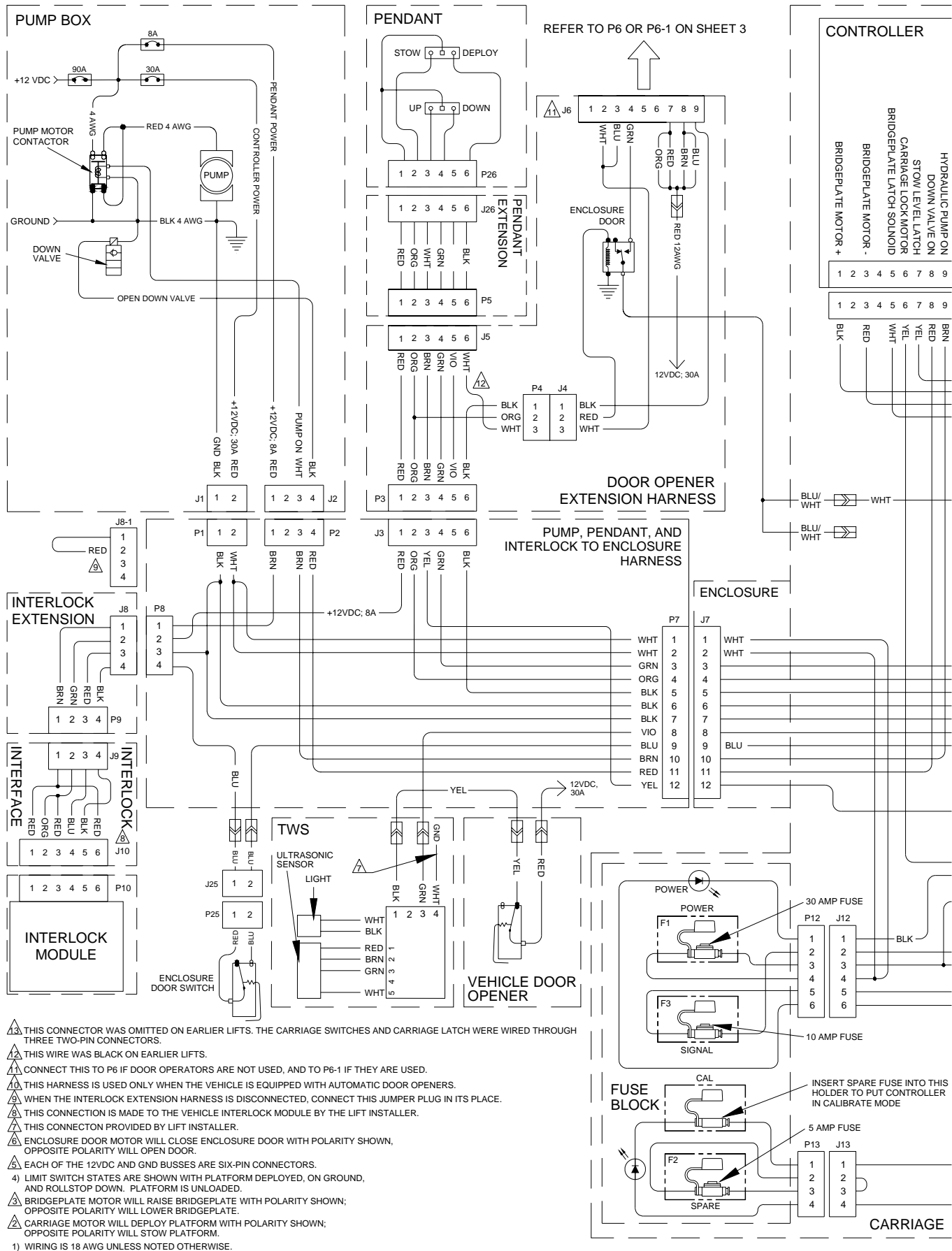


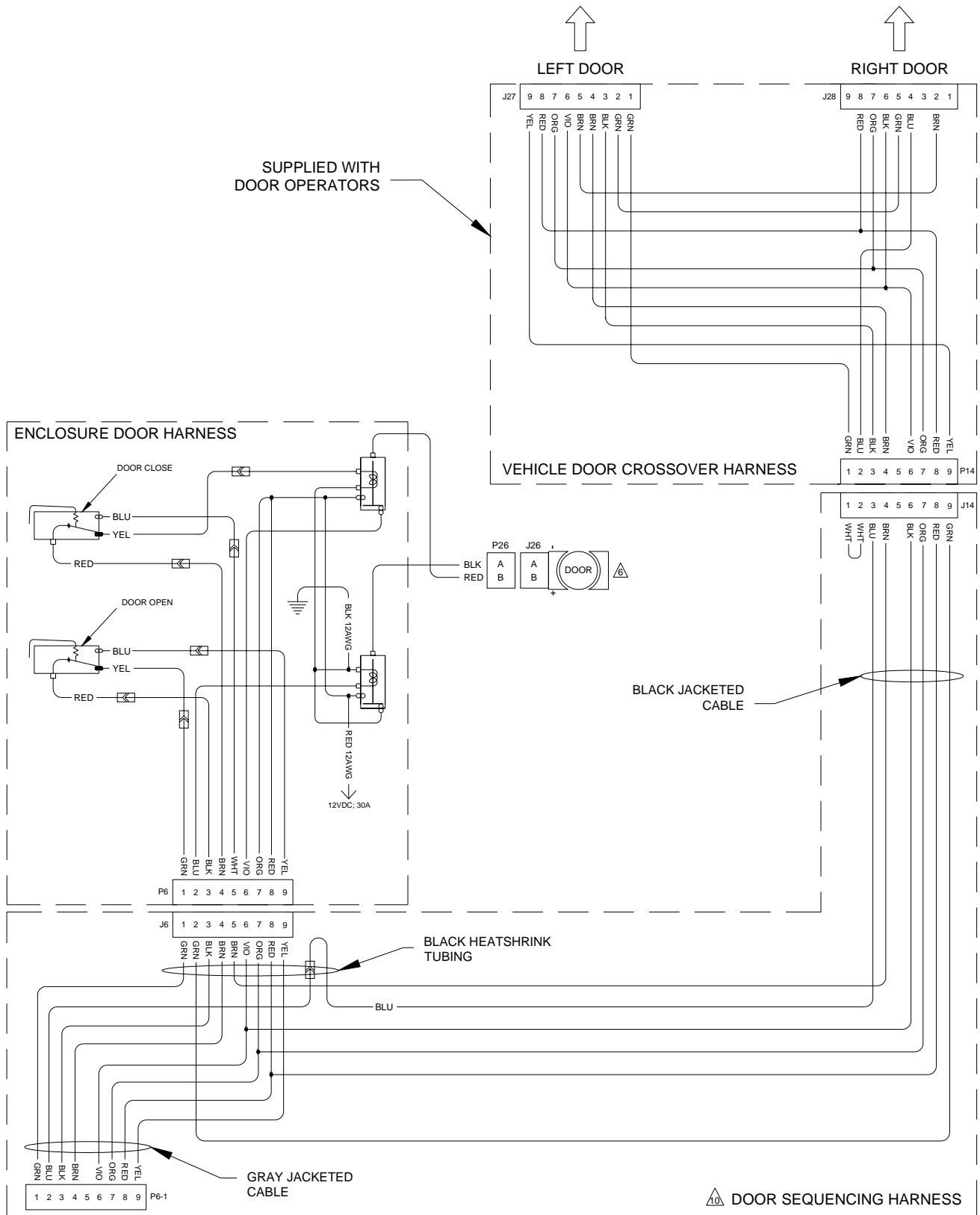
FIGURE 30: ELECTRICAL SYMBOLS



- 13 THIS CONNECTOR WAS OMITTED ON EARLIER LIFTS. THE CARRIAGE SWITCHES AND CARRIAGE LATCH WERE WIRED THROUGH THREE TWO-PIN CONNECTORS.
 - 12 THIS WIRE WAS BLACK ON EARLIER LIFTS.
 - 11 CONNECT THIS TO P6 IF DOOR OPERATORS ARE NOT USED, AND TO P6-1 IF THEY ARE USED.
 - 10 THIS HARNESS IS USED ONLY WHEN THE VEHICLE IS EQUIPPED WITH AUTOMATIC DOOR OPENERS.
 - 9 WHEN THE INTERLOCK EXTENSION HARNESS IS DISCONNECTED, CONNECT THIS JUMPER PLUG IN ITS PLACE.
 - 8 THIS CONNECTION IS MADE TO THE VEHICLE INTERLOCK MODULE BY THE LIFT INSTALLER.
 - 7 THIS CONNECTION PROVIDED BY LIFT INSTALLER.
 - 6 ENCLOSURE DOOR MOTOR WILL CLOSE ENCLOSURE DOOR WITH POLARITY SHOWN, OPPOSITE POLARITY WILL OPEN DOOR.
 - 5 EACH OF THE 12VDC AND GND BUSES ARE SIX-PIN CONNECTORS.
 - 4 LIMIT SWITCH STATES ARE SHOWN WITH PLATFORM DEPLOYED, ON GROUND, AND ROLLSTOP DOWN. PLATFORM IS UNLOADED.
 - 3 BRIDGEPLATE MOTOR WILL RAISE BRIDGEPLATE WITH POLARITY SHOWN; OPPOSITE POLARITY WILL LOWER BRIDGEPLATE.
 - 2 CARRIAGE MOTOR WILL DEPLOY PLATFORM WITH POLARITY SHOWN; OPPOSITE POLARITY WILL STOW PLATFORM.
- 1) WIRING IS 18 AWG UNLESS NOTED OTHERWISE.
- NOTES:

FIGURE 31: ELECTRICAL DIAGRAM – SHEET 1

REFER TO DOOR OPERATOR SERVICE MANUAL FOR SCHEMATIC



REFER TO J6 ON SHEET 1

FIGURE 33: ELECTRICAL DIAGRAM – SHEET 3

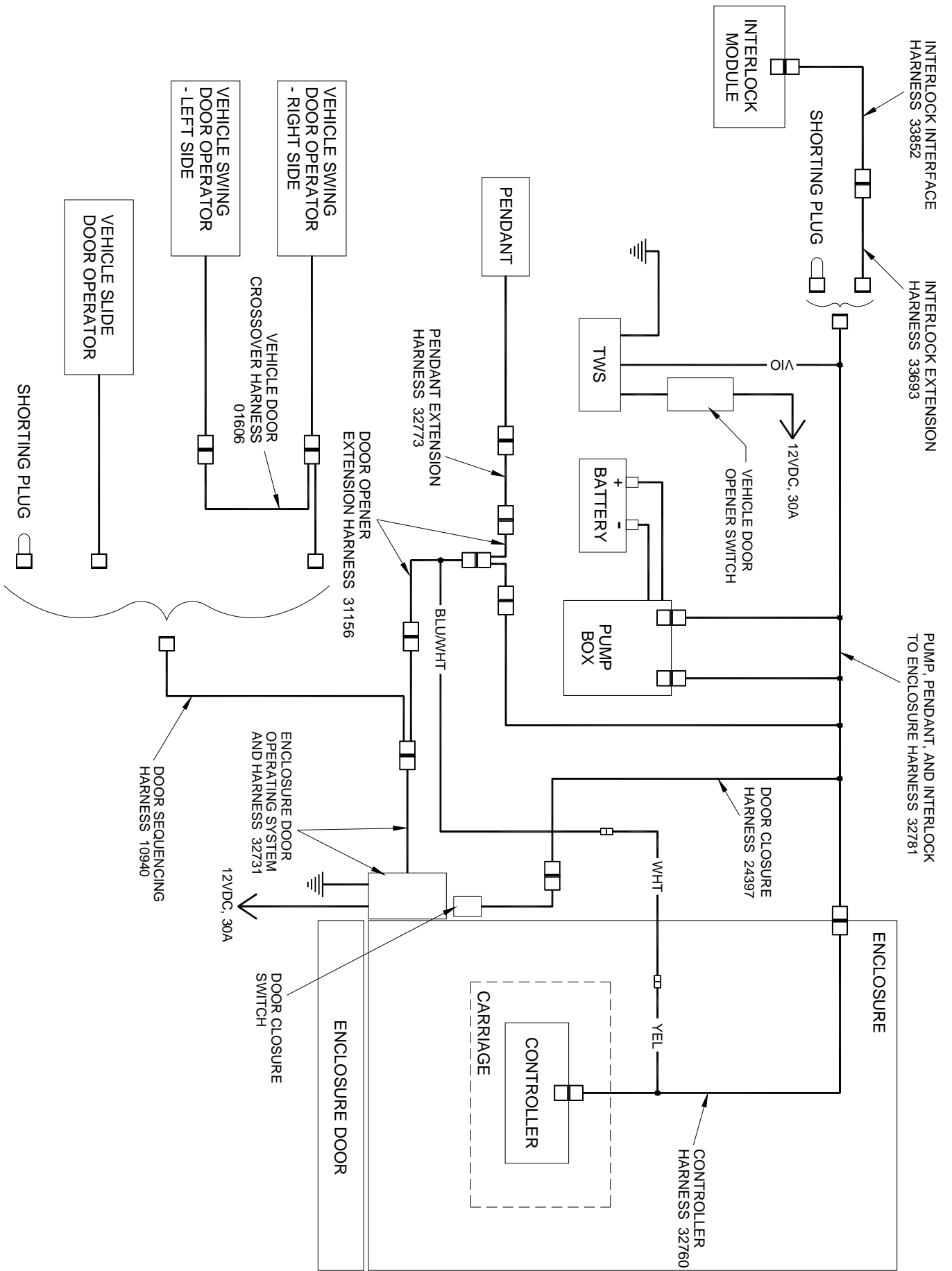


FIGURE 34: INTERCONNECT DIAGRAM

THRESHOLD WARNING DEVICE INSTALLATION

The TWS is provided in three parts; the PCB housing, UltraSonic Sensor, and door switch.

Mount Ultrasonic Sensor directly above door opening centered on platform threshold area.

PCB housing must be installed within 42" of the Ultrasonic sensor.

Refer to **Figure 35**. To be certain the TWS System is deactivated when the vehicle door is closed, the door switch must be located where shown.

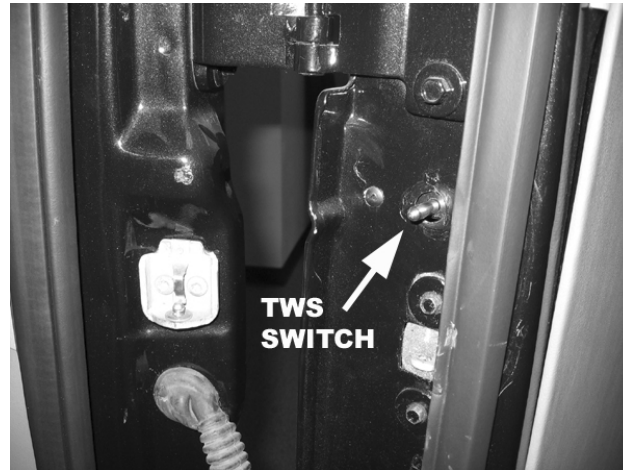


FIGURE 35: LOCATION OF SWITCH IN DOORJAMB

THRESHOLD WARNING DEVICE ADJUSTMENT

There are three sections presented here. The first section adjusts where the acoustic beam is pointed, the second tests the accuracy of the adjustment, and the third provides a procedure for adjusting the timing of the sensors.

NOTE: Adjustment of the sensor timing is done at the factory and should not need to be repeated in the field.

Readjustment should only be considered if the sensor aiming could not be adjusted to ignore both the wheelchair in the vehicle and the platform during its normal movement.

ADJUST AIMING OF ACOUSTIC SENSOR BEAM:

Refer to **Figure 36**. Place wheelchair with passenger in center of the vehicle, pointed at doorway where Threshold Warning System (TWS) is installed. The TWS should not detect a wheelchair and passenger when they are located this far from doorway.

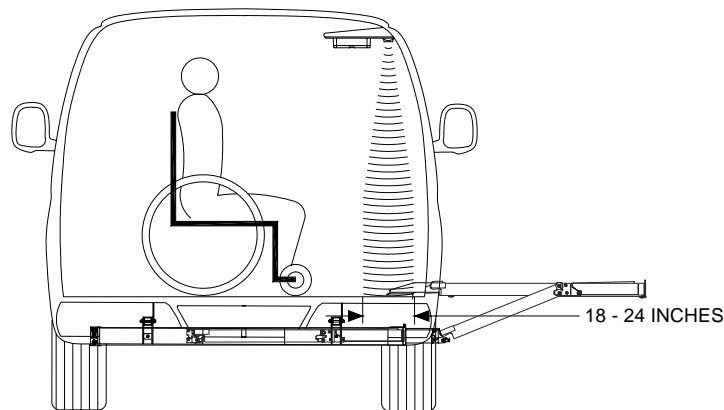


FIGURE 36: TWS AREA

Turn power to lift on (LED on TWS module will light steady) and enable power to lift. If wheelchair and passenger are detected by acoustic sensors the LED will flash and the red light will flash. If this occurs it is necessary to adjust aiming of sensors.

Refer to **Figure 37**. Turn sensor angle adjustment screw clockwise to move direction of beam away from center aisle and towards doorway. Stop adjustment when LED ceases to flash.

NOTE: Only in rare instances will adjustment be needed in the counterclockwise direction.

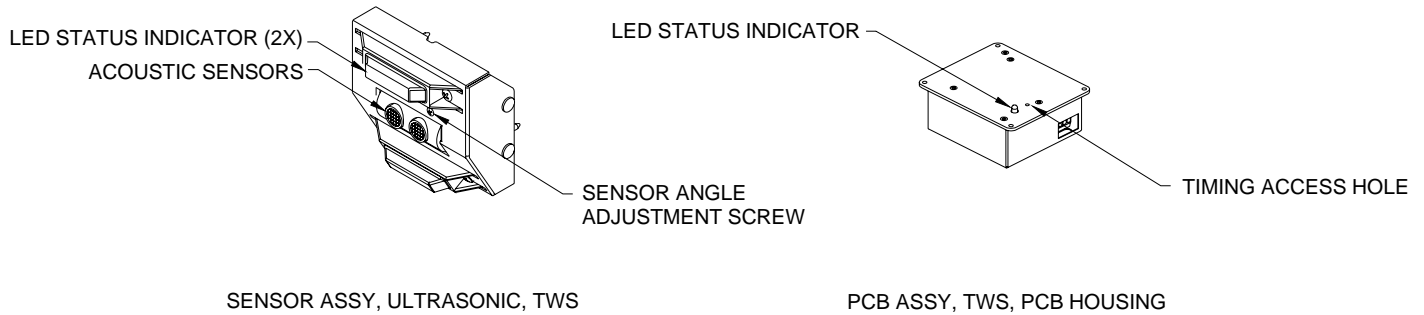


FIGURE 37: TWS MODULE DETAIL

Move centerline of small front wheels of wheelchair, with passenger, to within 24 inches of doorway and repeat aiming procedure in previous step.

TEST AIM OF ACOUSTIC SENSOR BEAM:

Move wheelchair and passenger slowly towards doorway. TWS should detect wheelchair and passenger (LED will flash and the large red light will flash) when centerline of front wheels is between 18 and 24 inches from doorway. Refer to **Figure 38**. Open the vehicle door located above lift. Lower platform to ground and place wheelchair and passenger at rear of platform. Bridgeplate (rear barrier) should be up. Raise platform to floor level. This normal platform motion with wheelchair and passenger aboard should not actuate TWS. If LED does flash (large red light will also flash), turn sensor adjustment screw slightly counterclockwise.

NOTE: If an adjustment is made, repeat the previous step where wheelchair is between 18 and 24 inches from doorway.

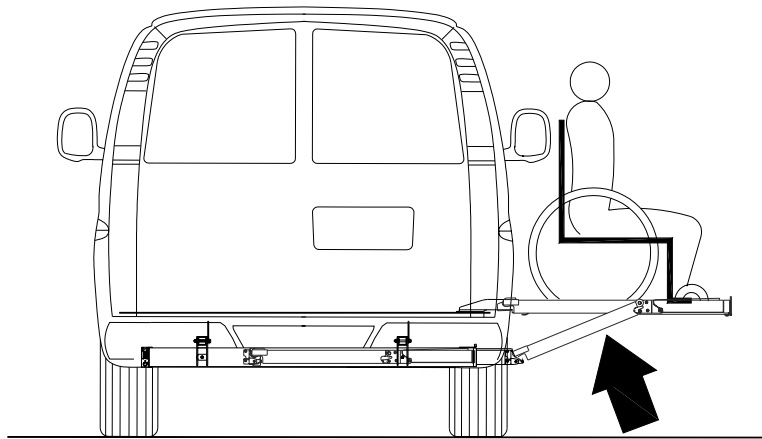


FIGURE 38: CHECKING NORMAL PLATFORM POSITION

ADJUST ACOUSTIC SENSOR TIMING:

Support a flat sheet of cardboard, or similar material, directly beneath TWS module and at a distance of 18" above floor. Sheet must be facing sensors.

NOTE: Before proceeding, visually inspect sensors to verify that they are pointed directly at floor, or nearly, and are not pointed off at an extreme angle.

Refer to **Figure 37**. Note the sensor timing access hole. This hole provides access to a plunger-actuated switch that sets the sensor timing. Insert a 1/16-inch diameter wire-like object into the access hole and press the plunger inward. The LED will flash momentarily while the module establishes the distance and then remain on steady. Release the plunger when the LED ceases to flash.

NOTE: It is important that objects, such as your body, tools, seats, etc, do not interfere with the beam while the adjustment is being made.

Interlock Installation

Please refer to manufacturer installation instructions for additional details.

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