



# SERVICE MANUAL

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**SJ20**

VERTICAL MAST LIFTS



**238886ABA**

November 16, 2021  
ANSI/CSA

**This manual is based on serial numbers:**

**SJ20:** A601 000 001 & above

**Please refer to the website ([www.skyjack.com](http://www.skyjack.com)) for contact information, other serial numbers, the most recent technical manuals, and USB software.**

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**THIS SAFETY ALERT SYMBOL MEANS ATTENTION!**



**BECOME ALERT! YOUR SAFETY IS INVOLVED.**

The Safety Alert Symbol identifies important safety messages on MEWPs, safety signs in manuals or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

** DANGER**

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**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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** WARNING**

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**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

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** CAUTION**

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**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

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**IMPORTANT**

**IMPORTANT** indicates a procedure essential for safe operation and which, if not followed, may result in a malfunction or damage to the MEWP.

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 **Notes**

Handwriting practice lines consisting of 28 horizontal lines.

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# Section 1 – Scheduled Maintenance

## 1.1 Read and Heed

Skyjack is continuously improving and expanding product features on its equipment, therefore, specifications and dimensions are subject to change without notice.

### 1.1-1 Mobile Elevating Work Platform (MEWP) Definition

A MEWP is a mobile device that has a positionable platform supported from ground level by a structure.

### 1.1-2 Purpose of Equipment

The Skyjack Vertical Mast lifts are designed to transport and raise personnel, tools and materials to overhead work areas.

### 1.1-3 Use of Equipment

The MEWP is a highly maneuverable, mobile work station. Work platform elevation and elevated driving must only be done on a firm, level surface.

### 1.1-4 Manual

**Operating Manual:** The operating manual is considered a fundamental part of the aerial platform. It is a very important way to communicate necessary safety information to users and operators. A complete and legible copy of this manual must be kept in the provided weather-resistant storage compartment on the aerial platform at all times.

**Service & Maintenance:** The purpose of this is to provide the customer with the servicing and maintenance procedures essential for the promotion of proper machine operation for its intended purpose.

All information in this manual should be read and understood before any attempt is made to service the machine. The updated copy of the manuals are found on the company's website: [www.skyjack.com](http://www.skyjack.com).

### 1.1-5 Service Policy and Warranty

Skyjack warrants each new product to be free of defective parts and workmanship for the first 2 years or 3000 hours, whichever occurs first. Any defective part will be replaced or repaired by your local Skyjack dealer at no charge for parts or labor. In addition, all products have a 5 year structural warranty. Contact the Skyjack Service Department for warranty statement extensions or exclusions.

### 1.1-6 Operator Safety Reminders, Warnings and Precautions

Operator safety is Skyjack's priority. The operator should comply with all applicable safety-related reminders, warnings and precautions found in the Operating Manual. They should be read and understood completely before operating the MEWP.

## 1.2 Maintenance and Inspection Schedule

The actual operating environment of the work platform governs the use of the maintenance schedule. The inspection points covered in *Table 1.2. Maintenance and Inspection Checklist*, indicates the areas of the MEWP to be maintained or inspected and at what intervals the maintenance and inspections are to be performed.

### 1.2-1 Owner's Annual Inspection Record

It is the responsibility of the owner to arrange quarterly and annual inspections of the MEWP. *Table 1.1. Owner's Annual Inspection Record* is to be used for recording the date of the inspection, owner's name, and the person responsible for the inspection of the work platform.

### 1.2-2 Replacement Parts

Use only original replacement parts. Parts such as batteries, wheels, railings, etc. with weight and dimensions different from original parts will affect the stability of the MEWP and must not be used without the manufacturer's consent.

All replacement tires must be of the same size and load rating as the originally supplied tires; to maintain safety and stability of MEWP.

Consult Skyjack's Service Department for optional tires specifications and installation.

### **WARNING**

**Any unit that is damaged or not operating properly must be immediately tagged and removed from service until proper repairs are completed.**

### 1.2-3 Maintenance and Service Safety Tips

Maintenance and repair should only be performed by personnel who are trained and qualified to service this MEWP.

All maintenance and service procedures should be performed in a well lighted and well-ventilated area.

Anyone operating or servicing this MEWP must read and completely understand all operating instructions and safety hazards in this manual and operating manual.

All tools, supports and lifting equipment to be used must be of proper rated load and in good working order before any service work begins. Work area should be kept clean and free of debris to avoid contaminating components while servicing.

Ensure personnel are clear from under unsupported components/systems that are at risk of movement during maintenance.

All service personnel must be familiar with employer and governmental regulations that apply to servicing this type of equipment.

Keep sparks and flames away from all flammable or combustible materials.

Properly dispose of all waste material such as lubricants, rags, and old parts according to the relative law provisions obtaining in the country.

Before attempting any repair work, disconnect the main power connectors.

Keep personnel clear of components, systems or unsupported loads that may move unexpectedly during maintenance procedures.

Preventive maintenance is the easiest and least expensive type of maintenance.

## 1.3 Hydraulic System & Component Maintenance and Repair

The following points should be kept in mind when working on the hydraulic system or any component:

### **WARNING**

**Escaping fluid from a hydraulic pressure leak can damage your eyes, penetrate the skin and cause serious injury. Use proper personal protection at all times.**

1. Any structure has limits of strength and durability. To prevent failure of structural parts of hydraulic components, relief valves which limit pressure to safe operating values are included in the hydraulic circuits.
2. Tolerance of working parts in the hydraulic system is very close. Even small amounts of dirt or foreign materials in the system can cause wear or damage to components, as well as general faulty operation of the hydraulic system. Every precaution must be taken to assure absolute cleanliness of the hydraulic oil.
3. Whenever there is a hydraulic system failure which gives reason to believe that there are metal particles or foreign materials in the system, drain and flush the entire system and replace the filter cartridges. A complete change of oil must be performed under these circumstances.
4. Whenever the hydraulic system is drained, check the magnets in the hydraulic reservoir for metal particles. If metal particles are present, flush the entire system and add a new change of oil. The presence of metal particles also may indicate the possibility of imminent component failure. A very small amount of fine particles is normal.
5. All containers and funnels used in handling hydraulic oil must be absolutely clean. Use a funnel when necessary for filling the hydraulic oil reservoir, and fill the reservoir only through the filter opening. The use of cloth to strain the oil should be avoided to prevent lint from getting into the system.
6. When removing any hydraulic component, be sure to cap and tag all hydraulic lines involved. Also, plug the ports of the removed components.
7. All hydraulic components must be disassembled in spotlessly clean surroundings. During disassembly, pay particular attention to the identification of parts to assure proper reassembly. Clean all metal parts in a clean mineral oil solvent. Be sure to thoroughly clean all internal passages. After the parts have been dried thoroughly, lay them on a clean, lint-free surface for inspection.
8. Replace all O-rings and seals when overhauling any component. Lubricate all parts with clean hydraulic oil before reassembly. Use small amounts of petroleum jelly to hold O-rings in place during assembly.
9. Be sure to replace any lost hydraulic oil when completing the installation of the repaired component, and bleed any air from the system when required.
10. All hydraulic connections must be kept tight. A loose connection in a pressure line will permit the oil to leak out or air to be drawn into the system. Air in the system can cause damage to the components and noisy or erratic system operation.

### 1.3-1 Maintenance Hints

Three simple maintenance procedures have the greatest effect on the hydraulic system performance, efficiency, and life. Yet, the very simplicity of them may be the reason they are so often overlooked. They are simply these:

1. Change filters annually. The filters will need to be changed more often depending on the operating conditions. Dirty, dusty, high moisture environments may cause the hydraulic system to be contaminated more quickly.
2. Maintain a sufficient quantity of clean hydraulic oil of the proper type and viscosity in the hydraulic reservoir.
3. Keep all connections tight.

## 1.4 About this Section

This section contains the maintenance and inspection schedule that is to be performed.

References are made to the procedures in Section 5 that outline detailed step-by-step instructions for checks and replacements.

### 1.4-1 Service Bulletins

Before performing any scheduled maintenance inspection procedure, refer to service bulletins found on our website: [www.skyjack.com](http://www.skyjack.com) for updates related to service and maintenance of this MEWP.

### 1.4-2 Maintenance and Inspection

Death or injury can result if the MEWP is not kept in good working order. Inspection and maintenance should be performed by competent personnel who are trained and qualified on maintenance of this MEWP.

#### **WARNING**

**Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial damage.**

#### **NOTE**

*Preventive maintenance is the easiest and least expensive type of maintenance.*

- Unless otherwise specified, perform each maintenance procedure with the MEWP in the following configuration:
  - MEWP parked on a flat and level surface
  - Disconnect the batteries by disconnecting the main power connectors.
- Repair any damaged or malfunction components before operating MEWP.
- Keep records on all inspections.

### 1.4-3 Maintenance Instructions

This manual consists of four schedules to be done for maintenance on a MEWP. The inspection schedule frequency is shown below:















Issue or Symptom		
PDI/Frequent	<b>B</b>	Perform a PDI prior to each delivery, or a Frequent Inspection every 3 months or 150 hours.
Annual	<b>B + C</b>	Perform Scheduled Maintenance Inspections every year.
Additional	*	Perform at time sensitive maintenance intervals.

- Make copies of the maintenance and inspection checklist to be used for each inspection.
- Check the schedule on the checklist for the type of inspection to be performed.
- Place a check in the appropriate box after each inspection procedure is completed.
- Use the maintenance and inspection checklist and step-by-step procedures in Section 1 to perform these inspections.
- If any inspection receives a fail, tag and remove the MEWP from service.
- If any MEWP component(s) has been repaired, an inspection must be performed again before removing the tag. Place a check in the repair column.

#### Legend

Pass	<b>P</b>
Fail	<b>F</b>
Repaired	<b>R</b>
Not applicable	<b>N/A</b>

**Table 1.5 Owner's Annual Inspection Record**

 Model _____ SN _____											
 Inspection Date											
 Inspector Signature											

**⚠ WARNING**

Do not use the MEWP if there is no inspection recorded in the last 13 months. If you do not obey, there is a risk of death or serious injury.

**IMPORTANT**

The Owner's annual inspection record is located on the scissor assembly. It must be filled out after an annual inspection has been completed. Do not use the MEWP if an inspection has not been recorded in the last 13 months.

# 1.6 Frequent/Periodic/Annual/Pre-Delivery Inspection Checklist

## SKYJACK Frequent/Periodic/Annual/PDI Checklist Vertical Mast, Electric Scissor, Micro Scissor & Rough Terrain

Serial Number: Starting with serial number A/B000 000 000 or 09 000 000 and above

Product Owner: \_\_\_\_\_

Model: \_\_\_\_\_

Product User: \_\_\_\_\_

Hourmeter Reading: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Inspection Type (Choose one): Pre-delivery    Frequent    Periodic    Annual

**Use this table for pre-delivery inspections (PDI) before each rental, lease or sale and as an instruction for all frequent inspections and annual inspections. Refer to the operation and service manuals for inspection instructions (for example, visual inspection and function tests, torque specs, engine oil, chain inspection intervals, and more).**

Inspection Type Schedule	
PDI/Frequent/Periodic	B
Annual	B+C

**B** - Do the pre-delivery inspection before the machine is sent out or during the frequent inspections at 200 days or 200 hour intervals. For more instructions, refer to the operation and service manuals. **P** - Pass  
**C** - Do the scheduled maintenance Inspections each year. For more instructions, refer to the operation and service manuals. **N/A** - Not Applicable

Put a check mark on the "Pass" column as you meet the requirements of the inspection of each item. Add a comment if the item does not pass inspection.

Items for Inspection	P	N/A
<b>Service Bulletins.</b> Make sure there are no open service bulletins.	B	
<b>Annual Inspection.</b> Make sure you complete it within 13 months.	B	
<b>Labels.</b> In place, correctly attached & you can read them.	B	
<b>Limit Switches.</b> Correctly installed & no obstructions or damage.	B	
<b>BASE/ENGINE</b>		
<b>Engine and Components.</b> Do a check on engine and components for any loose, missing, damaged, or failed items. Make sure you do not exceed the recommended fluid, oil and coolant change intervals.	B	
<b>Engine and Components.</b> Replace the engine oil and filter.	C	
<b>Engine Intake Air Filter.</b> No damage or missing component. Remove dirt & dust.	B	
<b>Engine Intake Air Filter.</b> Replace the air filter if necessary.	C	
<b>Engine Oil.</b> Oil level between "L" and "H". Make sure you do not exceed the oil change interval.	B	
<b>Radiator.</b> Correctly attached & no damage or missing components. Do a check of coolant level.	B	
<b>Radiator.</b> Do a check of coolant level & condition & replace if necessary.	C	
<b>Fuel Tank &amp; Lines.</b> Filler cap, tank, fittings and hoses are tightly closed & no damage or leaks.	B	
<b>Propane Tank &amp; Lines.</b> Straps are correctly installed to brackets & couplers are tight. Make sure there are no damage or leaks.	B	
<b>Outriggers.</b> No damage or missing components.	B	
<b>Pothole Protection.</b> Both sides have no obstructions, dirt or damage.	B	
<b>Battery/Hydraulic Tray.</b> Trays are latched tightly & no missing components.	B	
<b>Batteries.</b> No damage, tight connections & sufficient fluid levels. Clean terminals and cable ends.	B	
<b>Battery Charger.</b> Correctly attached & no damage.	B	
<b>Steer Assembly.</b> Correctly attached & no damage leaks or missing components.	B	
<b>Wheel/Tire Assembly.</b> Do a check of all tires for damage, wear & correctly aligned.	B	
<b>Wheel/Tire Assembly.</b> Wheel nuts torqued as recommended.	C	
<b>Axles.</b> Correctly attached & no missing components. Tight fittings and hoses & no leaks.	B	
<b>Axles.</b> Do a check and replace oil if necessary.	C	
<b>Hydraulic Tank, Pump, Motor &amp; Lines.</b> Filler cap, hoses, and other hydraulic components are closed tightly & no damage or leaks.	B	
<b>Hydraulic Oil.</b> Level at, or slightly above top mark.	B	
<b>Hydraulic Oil.</b> Do a check and replace oil and filters if necessary.	C	
<b>Electrical Components.</b> Do a check on all electrical components such as the motor controller if necessary. Correctly attached & no damage. Tight wire connections and fasteners.	B	

Items for Inspection	P	N/A
<b>Manifolds.</b> Tight fittings and hoses & no damage or leaks. Tight wire connections, no missing components & correctly working valves.	B	
<b>Main Power Disconnect Switch.</b> Cables tight & in working order.	B	
<b>Base Controls.</b> Operate switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Brakes.</b> Correctly attached & no damage or leaks.	B	
<b>Brakes.</b> Do a check on disc wear and replace if necessary.	C	
<b>Base Weldment.</b> No deformation or cracks.	B	
<b>Grease Points.</b> No obstructions, dirt, or damage. Add grease if necessary.	B	
<b>Ladder.</b> Correctly attached & no damage.	B	
<b>Tilt Sensor.</b> Correctly attached & no damage.	B	
<b>LIFTING MECHANISM - MAST/SCISSORS</b>		
<b>Maintenance Support(s).</b> Correctly attached & no damage.	B	
<b>Scissor Assembly &amp; Bumpers.</b> Correctly attached, no deformation/damage. Cables & wires installed with no damage.	B	
<b>Sliders &amp; Rollers.</b> Correctly attached & no obstructions, dirt, or damage/wear.	B	
<b>Lift Cylinder(s).</b> No damage or missing components. Tight fittings and hoses & no leaks. Correctly installed.	B	
<b>Angle Transducer.</b> Correctly attached & no damage.	B	
<b>Scissor Pins.</b> Correctly attached & no damage.	B	
<b>Mast Assembly.</b> No damage, cracks or deformation.	B	
<b>Mast Assembly.</b> Lubricate the mast as recommended.	C	
<b>Chains, Rollers &amp; Control Cables.</b> No damage or missing components.	B	
<b>Wear Pads.</b> No damage/wear or missing components. Fasteners tight.	B	
<b>PLATFORM</b>		
<b>Railings and Gate.</b> Correctly attached & no damage or missing components.	B	
<b>Fall-Protection Anchorage.</b> Attachment rings correctly attached & no damage.	B	
<b>AC Power Socket.</b> No obstructions, dirt, or damage.	B	
<b>Platform Control Console.</b> Operate the switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Manual Storage Box.</b> Manuals and documents are in the storage the box, in good condition, and you can read them.	B	
<b>Powered Extension Control Console.</b> Operate switches and make sure they all operate correctly. No damage or missing components.	B	
<b>Extension Platform.</b> Correctly attached & no damage or missing components.	B	
<b>Function Tests.</b> Refer to the operation manual for your serial number for information on how to run these tests.	PASS	
	FAIL	

Comments: \_\_\_\_\_

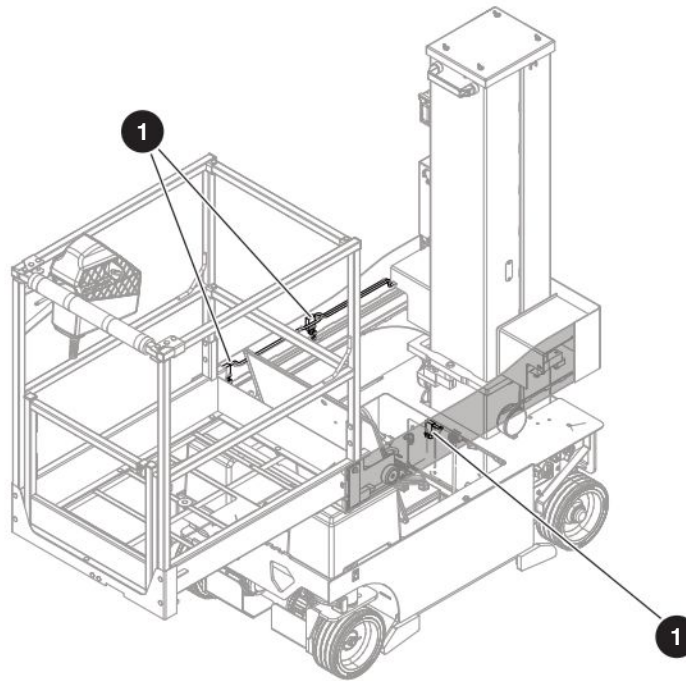
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The undersigned has made sure that all areas in the list have received an inspection.  
 The undersigned has told the machine owner of all inconsistencies in the inspection and corrected them before machine operation.

Owner: \_\_\_\_\_ Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date (DD/MM/YY) \_\_\_\_\_

User: \_\_\_\_\_ Print Name \_\_\_\_\_ Signature \_\_\_\_\_ Date (DD/MM/YY) \_\_\_\_\_





## 1.7 Visual and daily maintenance inspections

Do an inspection of the MEWP in this sequence.

### **⚠ WARNING**

Do not operate a MEWP that does not function correctly. Lock and tag the MEWP, and remove it for servicing. Only a qualified service technician must repair the MEWP. If you do not obey, there is a risk of death or serious injury.

### **⚠ WARNING**

Turn the main power disconnect switch to the off position before you do the visual and daily maintenance inspections. If you do not obey, there is a risk of death or serious injury.

### **⚠ CAUTION**

Make sure that the MEWP is on a firm, level surface before you do the visual and daily maintenance inspections. If you do not obey, there is a risk of machine damage.

### 1.7-1 Labels, **B**

Refer to your MEWP's operation manual for the labels. Make sure all the labels are in the correct location, are in good condition, and you can read them.

### 1.7-2 Electrical, **B**

Do a check on these areas for chafed, corroded, and loose wires:

- Base to platform cables and wiring harness
- Hydraulic and electrical compartment wiring harnesses.

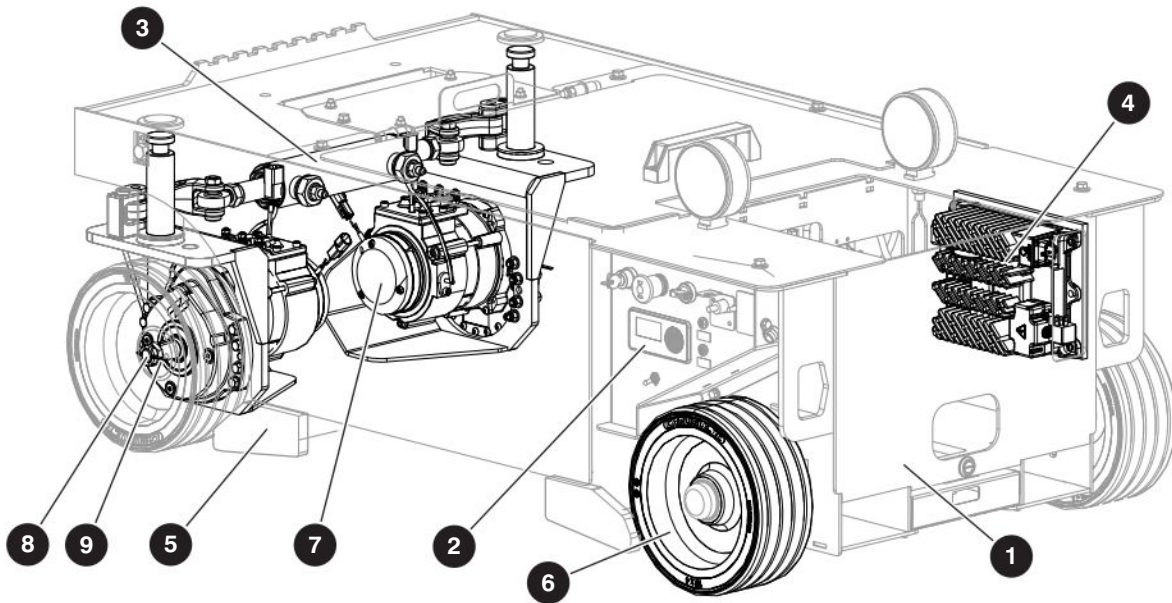
### 1.7-3 Limit Switches, **B**

Make sure the **limit switches** ① are correctly attached with no visible damage, and the movement is not blocked.

### 1.7-4 Hydraulic, **B**

Do a check on these areas and make sure there are no signs of leakage:

- Hydraulic tank, filter, fittings, hoses
- All hydraulic cylinders
- All hydraulic manifolds
- The ground area below the MEWP



### 1.7-5 Base

Do the inspection that follows:

- 1 **Base weldment, B**
  - There are no cracks in the welds or structure.
  - There are no signs of deformation
- 2 **Display Panel, B**
  - Make sure the panel is correctly attached, and there is no damage.
- 3 **Steer cylinder assembly, B**
  - The steer cylinder assembly is correctly installed.
  - There are no loose or missing fasteners.
  - There is no visible damage.
- 4 **Battery charger, B**
  - Make sure that the battery charger is correctly installed, and in good condition.
  - Make sure there is no visible damage.
- 5 **Pothole protection, B**
  - Make sure there are no visible cracks or signs of damage or deformation.

### 1.7-6 Wheel/tire assembly

A small amount of wear is permitted. But if any of the wear or damage meets the criteria mentioned below, the tire should be replaced.

#### **⚠ WARNING**

**Do not use tires other than the tires that Skyjack specifies for this MEWP. Do not mix different types of tires or use tires that are not in good condition. Only replace the tires with the same types that are approved by Skyjack. The use of other tires can make the MEWP less stable. If you do not obey, there is a risk of death or serious injury.**



The tire treads have been removed from the illustration for clarity.

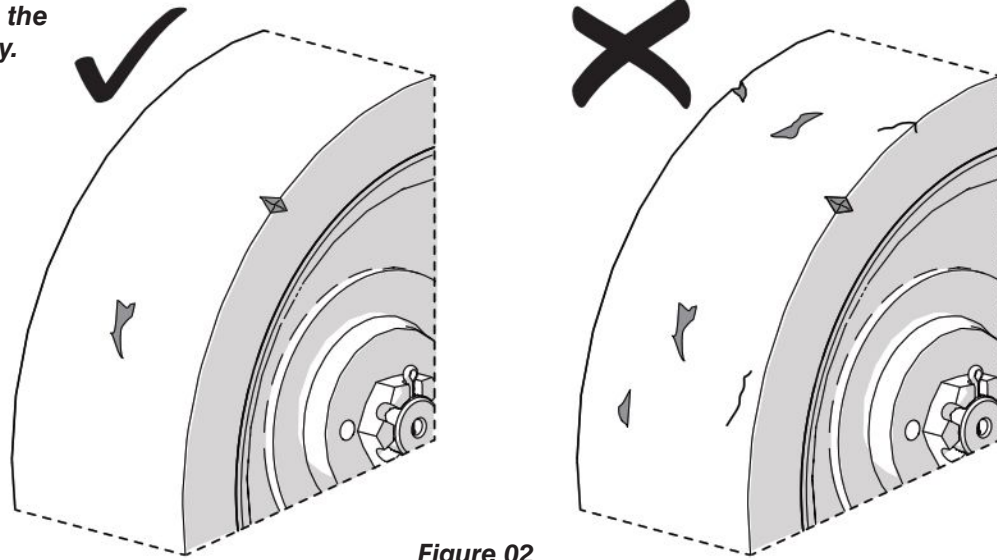


Figure 02

**6 Wheels, B**

▪ **B - Frequent/periodic/pre-delivery inspection**

Do a check for damage or wear on each tire and rim.

- Look for damage or cracked welds on each rim. The rims should be round.
- Look for uneven or unusual wear on the tire.
- Look for flat spots on the tread face of the tire.
- The tire tread should be visible and not worn down completely. Refer to Figure 01.

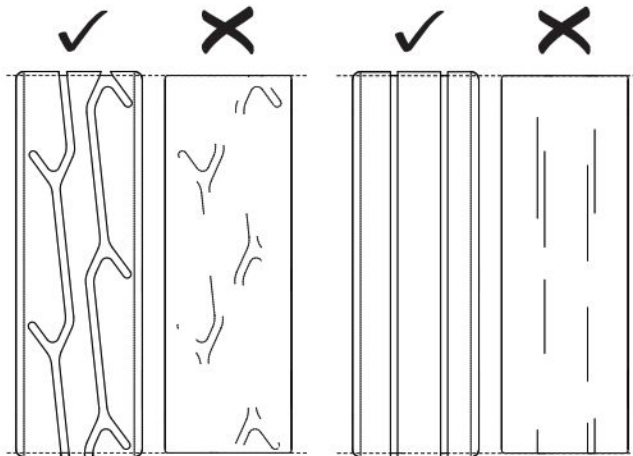


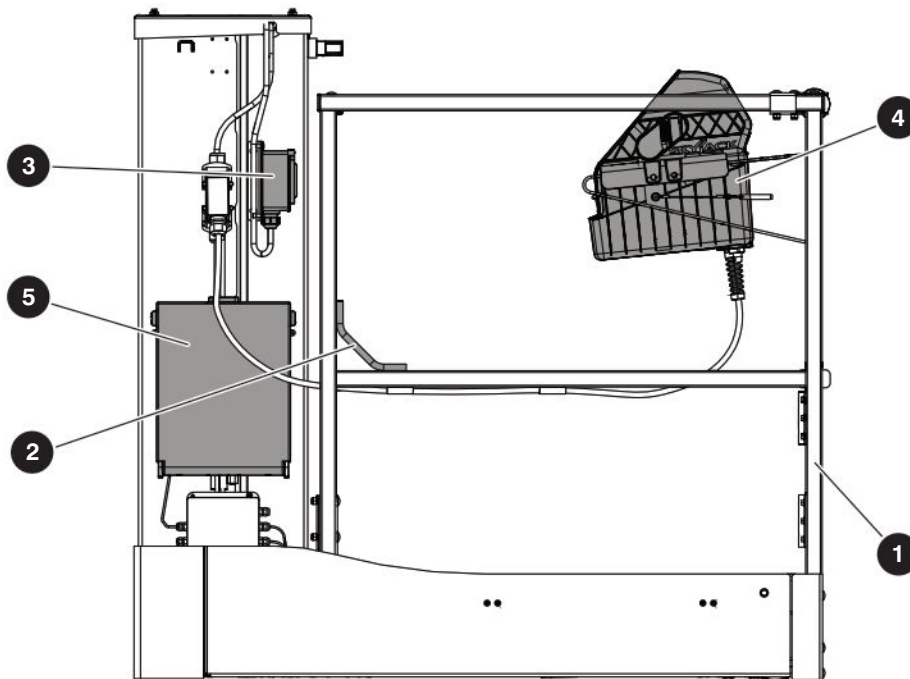
Figure 01

Do a check for cuts or missing chunks in the edges and tread face of the tire. Refer to Figure 02.

- The cut or missing chunk must not extend more than 10 mm (3/8") towards the centre of the tire.
- Each cut or chunk should not be larger than 25 mm x 10 mm (1" x 3/8"), or deeper than 20 mm (3/4").
- There should be no more than 2 cuts or chunks in each 1/4 section of the tire. There must be no more than 6 cuts or chunks in total in the tire.
- There should be no embedded debris.

Do a check of the wheel components and mounts.

- Make sure the wheels are correctly aligned vertically and horizontally.
- Make sure the **wheel motors** 7 have no loose or missing parts and there is no visible damage.
- **C - Annual inspection**
  - Make sure the **castle nuts** 8 are in position and are tight.
  - Make sure the **cotter pins** 9 are correctly installed.



### 1.7-7 Platform assembly

Do the inspection that follows in sequence:

#### **WARNING**

**Fall Hazard. Use the three points of contact principle when you use the MEWP to enter or exit the platform. If you do not obey, there is a risk of death or serious injury.**

1. Enter the platform and close the gate.

#### **1 Platform, B**

- Make sure there are no loose or missing parts, and there is no visible damage.
- Make sure that all railings are correctly installed.
- Make sure that all fasteners are tight.
- Make sure that the gate is in good condition and operates correctly.
- Make sure that the platform foot pedal is in good working order and that it has no loose or missing parts and there is no visible damage.

#### **2 Fall-protection anchorages, B**

- Make sure that the fall-protection anchorages are correctly attached.
- Make sure the fall protection anchorages show no signs of visible damage, deformation, or cracks.

#### **3 AC power socket, B**

- Make sure that the socket is free of dirt or blockages.

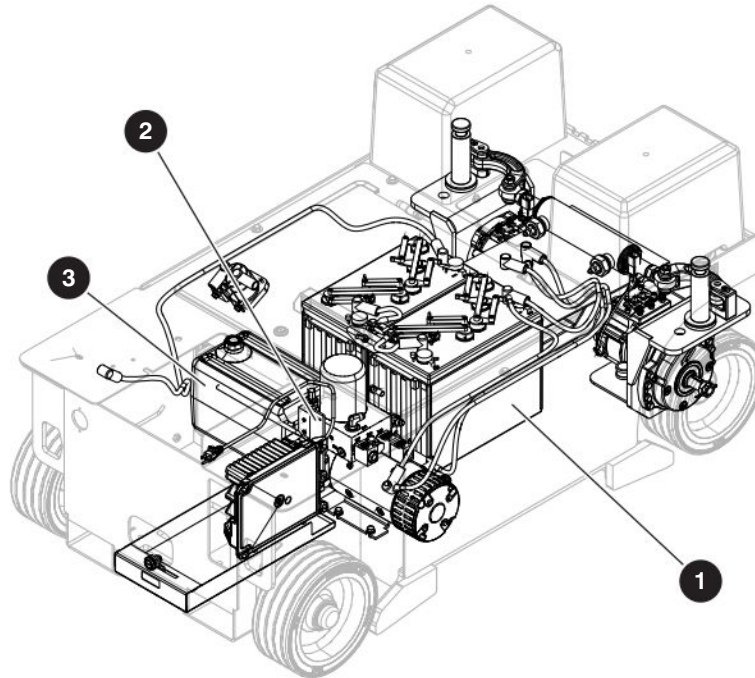
#### **4 Platform control console, B**

- Make sure the control console is locked with lock-pins.
- Make sure the platform control cable is correctly locked, and there is no visible damage.

2. Exit the platform, and close the gate.

#### **5 Manual storage box, B**

- Make sure that the operation manual and other important documents are in the manual storage box.
- Make sure that the documents are in good condition, and you can read them.
- Always put the manuals and other documents back in the storage box after use.



### 1.7-8 Hydraulic/electrical compartment

Refer to your MEWP’s operation manual on how to open the hydraulic/electrical compartment. Do the inspection that follows:

**1 Batteries, B**

**⚠ WARNING**

**Explosion hazard. Keep flames and sparks away. Do not smoke near the batteries. Batteries release explosive gas while you charge them. Charge the batteries in a well-ventilated area. If you do not obey, there is a risk of death or serious injury.**

**⚠ WARNING**

**Corrosion hazard. Do not touch battery acid. Wear the correct PPE. If the battery acid touches you, immediately flush the area with cold water and get medical aid.**

1. Do an inspection of the battery case for damage.
2. Make sure all the battery connections are tight.
3. If applicable, do a check on the battery fluid levels. If the plates do not have a minimum 13 mm (1/2 inch) of solution above them, add distilled or demineralized water.

**⚠ WARNING**

**Only use original or manufacturer-approved parts and components for the MEWP. If you do not obey, there is a risk of death, serious injury, or machine damage.**

**2 Manifold, B**

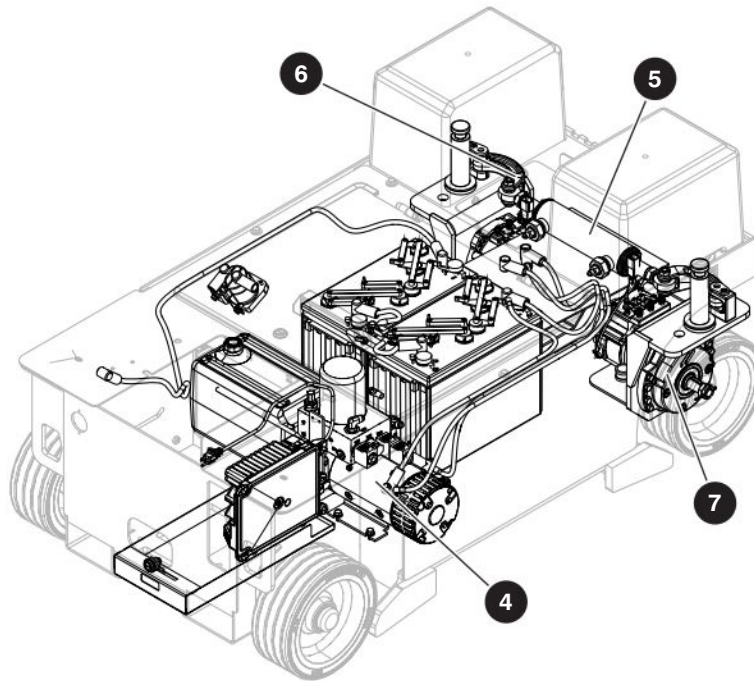
- Make sure all fittings and hoses are correctly tightened.
- Make sure there is no indication of hydraulic leakage.
- Make sure there are no loose wires or missing fasteners.

**3 Hydraulic tank, B**

- Make sure the hydraulic filler cap closes tightly.
- Make sure there is no visible damage or hydraulic leaks.

**Hydraulic oil level: , B**

1. Make sure the platform is fully lowered.
2. Do a check of the **oil level** on the side of the hydraulic oil tank. The hydraulic oil level must be at or a small distance above the top mark.

**4 Hydraulic pump and motor, B**

- Make sure there are no loose or missing fasteners.
- Make sure there is no visible damage.

**5 Steer cylinder assembly, B**

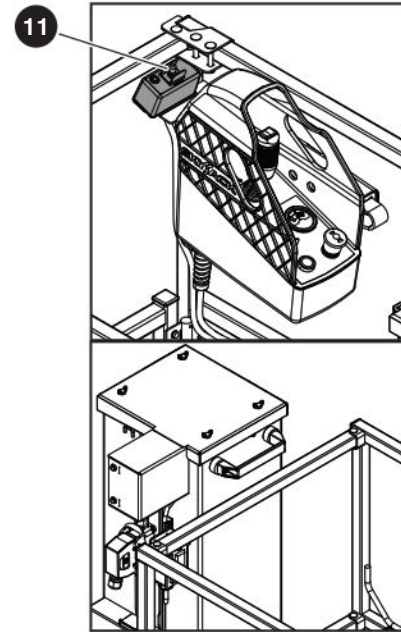
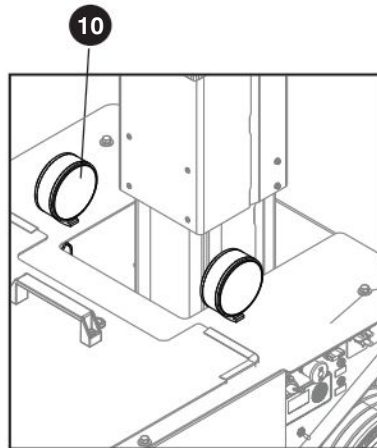
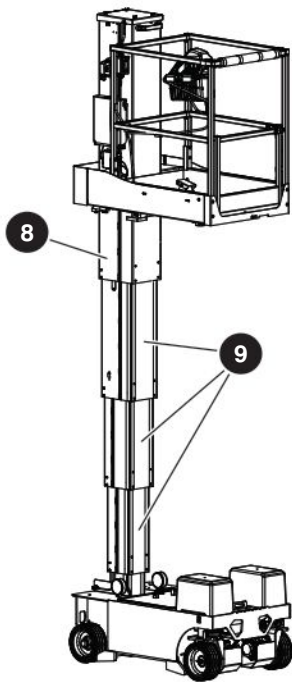
- Make sure the steer cylinder assembly is correctly installed.
- Make sure there are no loose or missing fasteners.
- Make sure there is no visible damage.

**6 Steer linkages, B**

- Make sure there are no loose or missing fasteners and lock-pins.
- Make sure the steer linkages and bushings are correctly attached.
- Make sure there is no visible damage.

**7 Wheel/motor assembly, B**

- Make sure there are no loose or missing fasteners.
- Make sure there is no visible damage.
- Make sure there are no loose or missing wires.



### 1.7-9 Lift mechanism

#### 8 Mast assembly, B

- Make sure the mast assembly shows no signs of visible damage, deformation, or cracks in the weldments.

1. Raise the platform.

#### 9 Wear pads, B

- Make sure the bolts are tight.
- Make sure there are no loose or missing parts.
- Make sure there is no visible damage.

### 1.7-10 Optional equipment and attachments

#### 10 Flashing lights, B

- Make sure there are no loose or missing parts.
- Make sure there is no visible damage.

#### 11 Dual Height Control Console, B

- Make sure all switches are in the neutral position, and are correctly attached
- Make sure there are no loose or missing parts.
- Make sure there is no visible damage.

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 **Notes**

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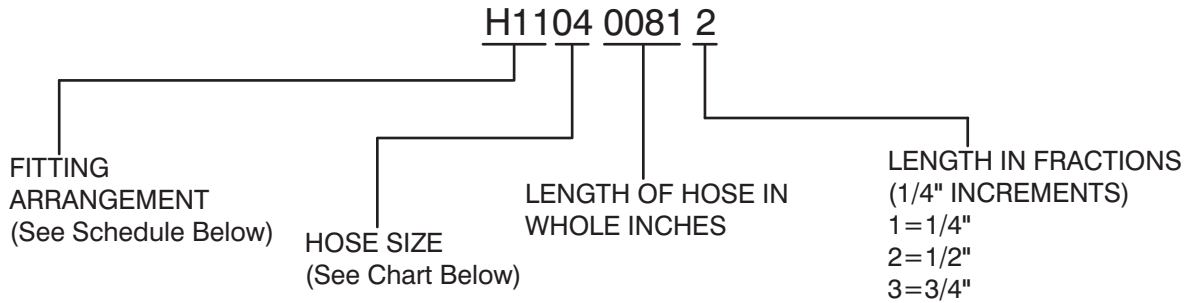
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# Section 2 – Maintenance Tables and Diagrams

**Table 2.1 Standard Hose Numbering System**



Using the number above as an example, H1104 0081 2, this hose requires a 37° JIC female swivel fitting on one end, and a medium length 90° JIC female swivel fitting for the other end. The hose must meet or exceed the S.A.E. 100R13 hose specification, and be a total of 81-1/2" long.



**NOTE**

Hose ends and hose must be from same manufacturer per S.A.E. J1273 Nov. '91, Sections 3.10 and 4.2. Hose ends and hose must be of the same size i.e. #4 size fittings must be used with #4 size hose.

Hose Size Chart														
Size	03	04	06	08	10	12	16	20	24	32	40	48	56	64
ID	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"

Fitting Arrangement Schedule			
Hose Prefix	Hose End Fitting	Hose End Fitting	S.A.E. Hose Specification
H01	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H02	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R13
H03	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R17
H04	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R13
H05	FEMALE, 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R17
H06	FEMALE, 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R17
H07	LONG 90°, FEMALE, 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R17
H08	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H09	FEMALE, 37° JIC, SWIVEL	45°, FEMALE, 37° JIC, SWIVEL	100R4
H10	FEMALE, 37° JIC, SWIVEL	MALE PIPE THREAD FITTING	100R17
H11	FEMALE, 37° JIC, SWIVEL	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	100R13
H12	SHORT 90°, FEMALE, 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R17
H13	FEMALE, 37° JIC, SWIVEL	REUSABLE MALE PIPE THREAD FITTING	300 PSI
H14	REUSABLE MALE PIPE THREAD FITTING	NO FITTING	300 PSI



Hose Prefix	Hose End Fitting	Hose End Fitting	S.A.E. Hose Specification
H15	REUSABLE FEMALE, 37° JIC, SWIVEL	REUSABLE FEMALE, 37° JIC, SWIVEL	300 PSI
H16	NO FITTING	NO FITTING	100R4
H17	NO FITTING	NO FITTING	300 PSI
H18	REUSABLE, FEMALE, 37° JIC, SWIVEL	NO FITTING	300 PSI
H19	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R13
H20	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R4
H21	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R2AT
H22	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R2AT
H23	FEMALE, LONG 37° JIC, SWIVEL	LONG 90°, FEMALE, 37° JIC, SWIVEL	100R2AT
H24	FEMALE, SHORT 37° JIC, SWIVEL	SHORT 90°, FEMALE, 37° JIC, SWIVEL	100R13
H25	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H30	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H31	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H32	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H33	MEDIUM 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H34	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H35	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H36	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H37	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H38	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H39	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R4
H40	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H43	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H51	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H52	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H53	MEDIUM 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H54	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H55	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H56	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H57	SHORT 45°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H58	FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H59	MEDIUM 90°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R13
H60	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R17
H61	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H62	SHORT 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H63	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H64	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R16
H65	MEDIUM 67°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R12
H66	FEMALE, 37° JIC, SWIVEL	NO FITTING	100R4
H67	FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H68	SHORT 45°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H69	MEDIUM 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H70	LONG 90°, FEMALE, 37° JIC, SWIVEL	FEMALE, 37° JIC, SWIVEL	100R19
H71	LONG 90°, FEMALE, SAE ORFS, SWIVEL	FEMALE, SAE ORFS, SWIVEL	100R15



**Table 2.2 Specifications and Features**

<b>Model</b>	<b>SJ20</b>
Weight *	1107 kg (2440lb)
Overall Width	0.80 m (31.5 in)
Overall Length	1.37 m (54 in)
Platform Size (Inside)	0.69 m x 0.91 m (27.13 in x 35.66 in)
Platform Traversing	0.41 m (16 in)
<b>Height</b>	
Working Height	7.77 m (25 ft 6 in)
Platform Elevated Height	5.94 m (19 ft 6 in)
Stowed Platform Height (Railings Up)	2.01 m (79.19 in)
Drive Height	Full
Stowed Platform Height	0.75 m (29.7 in)
<b>Standard Operating Times</b>	
Lift Time (Rated Load)	26 s
Lower Time (Rated Load)	26 s
<b>Chassis</b>	
Stowed Drive Speed	4 km/h (2.5 mph)
Elevated Drive Speed	0.5 km/h (0.3 mph)
Gradeability (Ramp Angle [Reverse/Forward])**	25% / 25%
Tires (Solid Rubber)	10 in x 4 in
<b>Hydraulic Oil</b>	
Type	ATF Dexron III
Tank Capacity	5.3 l (1.41 gal)

2064AA

\* Weights are approximate; refer to the serial nameplate for the specific weight.

\*\* Refer to [Section 6.4: Move the MEWP for Transport](#) in the operation manual for more details.

**Table 2.3 Maximum Platform Capacities (Evenly Distributed)**

Model		Wind Rating	Total Platform Capacity		Traversing Platform Capacity		Manual Side Force	Tilt Cutout Setting (side-to-side x front-to-back)
<b>SJ20</b>	Indoor	0 m/s (0 mph)	159 kg (350 lb)	1 person	159 kg (350 lb)	1 person	200 N (45 lbf)	1.5° x 2.5°

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**NOTE**

Occupants and materials are not to exceed the rated load. Refer to the capacity label at the entrance of the platform and the mast assembly. For additional information and models equipped with options.

**Table 2.4 Floor Loading Pressure ANSI/CSA**

Model		Total MEWP Weight	Total MEWP Load		
			Wheel**	LCP***	OFL***
SJ20	min*	1107 kg (2440 lb)	276 kg (609 lb)	792 kPa (115 psi)	9.9 kPa (207 psf)
	max*	1264 kg (2787 lb)	426 kg (940 lb)	1021 kPa (148 psi)	11.3 kPa (237 psf)

2067AA

- \* **Min:** Minimum MEWP weight (Unloaded platform, no options/attachments)  
**Max:** Maximum MEWP weight (Platform loaded to capacity with options/attachments)
- \*\* **Wheel** is the weight that can be experienced on one wheel.  
**Note:** This is more than 25% of the machine weight due to possible weight distribution over the machine and platform.
- \*\*\* **LCP:** Local Concentrated Pressure is a measure of how hard the MEWP presses on the area in direct contact with the floor/tire.  
**OFL:** Overall Floor Load (Pressure) is a measure of the average load the MEWP imparts on the whole surface directly underneath the chassis. This has been calculated by dividing the MEWP weight by the overall floor area occupied by the MEWP (on wheels).  
  
**Note:** The floor covering (e.g., tile, carpet, etc.) or the structure (e.g., beams) of the operating surface must be able to withstand more than the values indicated above.

**NOTE**

The **LCP** or **OFL** that an individual surface can withstand varies from structure to structure and is generally determined by the engineer or architect for that particular structure.

**⚠ WARNING**

**Do not use tires other than the tires that Skyjack specifies for this MEWP. Do not mix different types of tires or use tires that are not in good condition. Only replace the tires with the same types that are approved by Skyjack. The use of other tires can make the MEWP less stable. If you do not obey, there is a risk of death or serious injury.**

**Table 2.5 Torque Specifications**

<b>Location</b>	<b>Description</b>	<b>Torque (ft-lb)</b>	<b>Torque (Nm)</b>
<b>Base</b>			
Rear Axle Mounting Bolts	BOLT, Hex head (3/8"-16 x 1-1/2" Grade 5)	23	31
<b>Location</b>	<b>Description</b>	<b>Torque (ft-lb)</b>	<b>Torque (Nm)</b>
<b>Mast</b>			
Emergency Lowering Coil Washer	N/A	4.5	6
Emergency Lowering Valve	N/A	21	28
Mast to Base Mounting Bolts	BOLT, Hex head (3/8"-16 x 1" Grade 8)	35	47
Lift Cylinder Mounting Bolts	BOLT, Hex head (3/8"-16 x 1-1/4" Grade 8)	23	31
Lift Cylinder Plate Mounting Bolts	BOLT, Socket - Wire lock (1/4"-20 x 1-3/4" Grade 5)	10	14

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**Table 2.6 Torque Specifications for Fasteners (Imperial)**

Size	Torque Type	SAE2		SAE 5		SAE 8	
		Dry	Lubed	Dry	Lubed	Dry	Lubed
4-40	(in-lb)	(5)	(4)	(8)	(6)	(12)	(9)
	Nm	0.6	0.5	0.9	0.7	1.4	1.0
4-48	(in-lb)	(6)	(5)	(9)	(7)	(13)	(10)
	Nm	0.7	0.6	1.0	0.8	1.5	1.1
6-32	(in-lb)	(10)	(8)	(16)	(12)	(23)	(17)
	Nm	1.1	0.9	1.8	1.4	2.6	1.9
6-40	(in-lb)	(12)	(9)	(18)	(13)	(25)	(19)
	Nm	1.4	1.0	2.0	1.5	2.8	2.1
8-32	(in-lb)	(19)	(14)	(30)	(22)	(41)	(31)
	Nm	2.1	1.6	3.4	2.5	4.6	3.5
8-36	(in-lb)	(20)	(15)	(31)	(23)	(43)	(32)
	Nm	2.3	1.7	3.5	2.6	4.9	3.6
10-24	(in-lb)	(27)	(21)	(43)	(32)	(60)	(45)
	Nm	3.1	2.4	4.9	3.6	6.8	5.1
10-32	(in-lb)	(31)	(23)	(49)	(36)	(68)	(51)
	Nm	3.5	2.6	5.5	4.1	7.7	5.8
1/4-20	(in-lb) ft-lb	(66)	(50)	8	(75)	12	9
	Nm	7.5	5.6	11	8.5	16	12
1/4-28	(in-lb) ft-lb	(76)	(56)	10	(86)	14	10
	Nm	8.6	6.3	14	9.7	19	14
5/16-18	ft-lb	11	8	17	13	25	18
	Nm	15	11	23	18	34	24
5/16-24	ft-lb	12	9	19	14	25	20
	Nm	16	12	26	19	34	27
3/8-16	ft-lb	20	15	30	23	45	35
	Nm	27	20	41	31	61	47
3/8-24	ft-lb	23	17	35	25	50	35
	Nm	31	23	47	34	68	47
7/16-14	ft-lb	32	24	50	35	70	55
	Nm	43	33	68	47	95	75
7/16-20	ft-lb	36	27	55	40	80	60
	Nm	49	37	75	54	108	81
1/2-13	ft-lb	50	35	75	55	110	80
	Nm	68	47	102	75	149	108
1/2-20	ft-lb	55	40	90	65	120	90
	Nm	75	54	122	88	163	122

\* Inch-Pound Force = in-lb Foot-Pound Force = ft-lb  
Newton-Meter = Nm

Size	Torque Type	SAE2		SAE 5		SAE 8	
		Dry	Lubed	Dry	Lubed	Dry	Lubed
9/16-12	ft-lb	70	55	110	80	150	110
	Nm	95	75	149	108	203	149
9/16-18	ft-lb	80	60	120	90	170	130
	Nm	108	81	163	122	230	176
5/8-11	ft-lb	100	75	150	110	220	170
	Nm	136	102	203	149	298	230
5/8-18	ft-lb	110	85	180	130	240	180
	Nm	149	115	244	176	325	244
3/4-10	ft-lb	175	130	260	200	380	280
	Nm	237	176	353	271	515	380
3/4-16	ft-lb	200	150	300	220	420	320
	Nm	271	203	407	298	569	434
7/8-9	ft-lb	170	125	430	320	600	460
	Nm	230	169	583	434	813	624
7/8-14	ft-lb	180	140	470	360	660	500
	Nm	244	190	637	488	895	678
1-8	ft-lb	250	190	640	480	900	680
	Nm	339	258	868	651	1220	922
1-12	ft-lb	270	210	710	530	1000	740
	Nm	366	285	963	719	1356	1003
1-14	ft-lb	280	210	730	540	1020	760
	Nm	380	285	990	732	1383	1030
1 1/8-7	ft-lb	350	270	800	600	1280	960
	Nm	475	366	1085	813	1735	1302
1 1/8-12	ft-lb	400	300	880	660	1440	1080
	Nm	542	407	1193	895	1952	1464
1 1/4-7	ft-lb	500	380	1120	840	1820	1360
	Nm	678	515	1519	1139	2468	1844
1 1/4-12	ft-lb	550	420	1240	920	2000	1500
	Nm	746	569	1681	1247	2712	2034
1 3/8-6	ft-lb	670	490	1460	1100	2380	1780
	Nm	908	664	1979	1491	3227	2413
1 3/8-12	ft-lb	750	560	1680	1260	2720	2040
	Nm	1017	759	2278	1708	3688	2766
1 1/2-6	ft-lb	870	650	1940	1460	3160	2360
	Nm	1180	881	2630	1979	4284	3200
1 1/2-12	ft-lb	980	730	2200	1640	3560	2660
	Nm	1329	990	2983	2224	4827	3606

1612



**NOTE**

Lubed includes lubricants such as lubricizing oil, grease or uncured loctite.

**Table 2.7 Torque Specifications for Fasteners (Metric)**

Size	Torque Type	SAE2		SAE 5	
		Dry	Lubed	Dry	Lubed
M5 x 0.80	(in-lb)	(54)	(41)	(78)	(59)
	Nm	6.1	4.6	8.8	6.7
M6 x 1.00	(in-lb)	(92)	(69)	(133)	(99)
	Nm	10.4	7.8	15	11.2
M7 x 1.00	(in-lb)	(156)	(116)	(222)	(167)
	Nm	17.6	13.1	25.1	18.9
M8 x 1.25	(in-lb)	(225)	(169)	(333)	(242)
	Nm	25.4	19.1	37.6	27.3
M10 x 1.50	ft-lb	37	28	53	40
	Nm	50	38	72	54
M12 x 1.75	ft-lb	65	49	93	69
	Nm	88	66	126	94
M14 x 2.00	ft-lb	104	78	148	111
	Nm	141	106	201	150
M16 x 2.00	ft-lb	161	121	230	172
	Nm	218	164	312	233
M18 x 2.50	ft-lb	222	167	318	238
	Nm	301	226	431	323
M20 x 2.50	ft-lb	314	235	449	337
	Nm	426	319	609	457
M22 x 2.50	ft-lb	428	321	613	460
	Nm	580	435	831	624
M24 x 3.00	ft-lb	543	407	776	582
	Nm	736	552	1052	789
M27 x 3.00	ft-lb	796	597	1139	854
	Nm	1079	809	1544	1158
M30 x 3.50	ft-lb	1079	809	1543	1158
	Nm	1463	1097	2092	1570
M33 x 3.50	ft-lb	1468	1101	2101	1576
	Nm	1990	1493	2849	2137
M36 x 4.00	ft-lb	1886	1415	2699	2024
	Nm	2557	1918	3659	2744

Inch-Pound Force = in-lb Foot-Pound Force = ft-lb Newton-Meter = Nm 1613

**NOTE:** Lubed includes lubricants such as lubricizing, oil, grease, or uncured Loctite.

**Table 2.8 Torque Specifications for Hydraulic Couplings & Hoses**

<b>Hydraulic Coupling Torque Chart O-Ring Port Connectors</b>				
<b>SAE Size</b>	<b>Steel Ports</b>		<b>Non-ferrous Ports</b>	
	<b>ft-lb</b>	<b>Nm</b>	<b>ft-lb</b>	<b>Nm</b>
4	14-16	20-22	9-10	12-13
6	24-26	33-35	15-16	20-21
8	50-60	68-78	30-36	41-47
10	72-80	98-110	43-48	60-66
12	125-135	170-183	75-81	102-110
16	200-220	270-300	120-132	162-180
20	210-280	285-380	126-168	171-228
24	270-360	370-490	162-216	222-294
32	-	-	-	-

<b>Hose End Torque Chart for JIC</b>									
<b>Size</b>		<b>Steel</b>				<b>Brass</b>			
<b>Dash</b>	<b>Frac.</b>	<b>ft-lb</b>		<b>Nm</b>		<b>ft-lb</b>		<b>Nm</b>	
		<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>
-4	1/4"	10	11	13	15	5	6	6.75	9
-6	3/8"	17	19	23	26	12	15	17	20
-8	1/2"	34	38	47	52	20	24	27.66	33
-10	5/8"	50	56	69	76	34	40	46.33	55
-12	3/4"	70	78	96	106	53	60	72.33	82
-16	1"	94	104	127	141	74	82	100.5	111
-20	1 1/4"	124	138	169	188	75	83	101.5	113
-24	1 1/2"	156	173	212	235	79	87	107	118
-32	2"	219	243	296	329	158	175	214	237

<b>Hose End Torque Chart for Flat-Face O-Ring Seal (Steel)</b>					
<b>Size</b>		<b>Torque Specification</b>			
<b>Dash</b>	<b>Frac.</b>	<b>ft-lb</b>		<b>Nm</b>	
		<b>Min.</b>	<b>Max.</b>	<b>Min.</b>	<b>Max.</b>
-4	1/4"	10	12	14	16
-6	3/8"	18	20	24	27
-8	1/2"	32	40	43	54
-10	5/8"	46	56	60	75
-12	3/4"	65	80	90	110
-14	1"	65	80	90	110
-16	1 1/4"	92	105	125	240
-20	1 1/2"	125	140	170	190
-24	2"	150	180	200	245

1614



**Notes**





































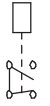
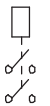
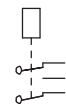
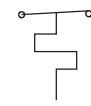
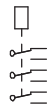


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





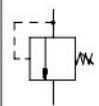





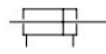


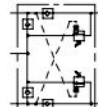







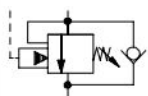





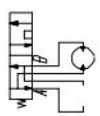


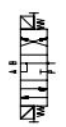



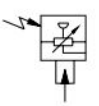


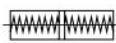
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# Section 3 – System Component Identification and Schematics

**Table 3.1 Electrical Symbol Chart**

 CIRCUITS CROSSING NO CONNECTION	 HOURMETER	 KEY SWITCH	 LIMIT SWITCH N.O.
 CIRCUITS CONNECTED	 LIGHT	 FOOT SWITCH	 LIMIT SWITCH N.O. HELD CLOSED
 BATTERY	 HYDRAULIC VALVE COIL	 TOGGLE SWITCH	 LIMIT SWITCH N.C.
 GROUND	 PROPORTIONAL HYDRAULIC VALVE COIL	 PUSH BUTTON	 LIMIT SWITCH N.C. HELD OPEN
 FUSE	 ELECTRIC MOTOR	 ROTARY SWITCH	 SILICON CONTROLLED RECTIFIER
 CIRCUIT BREAKER	 HORN	 LIMIT SWITCH	 PROXIMITY SWITCH
 VOLT METER	 EMERGENCY STOP BUTTON	 CAM OPERATED LIMIT SWITCH	 PNP TRANSISTOR
 CAPACITOR	 RESISTOR	 TILT SWITCH	 NPN TRANSISTOR
 POTENTIOMETER	 LEVEL SENSOR	 SINGLE POLE SINGLE THROW RELAY	 PRESSURE/ VACUUM SWITCH
 SINGLE POLE DOUBLE THROW RELAY	 DOUBLE POLE SINGLE THROW RELAY	 DOUBLE POLE DOUBLE THROW RELAY	 TEMPERATURE SWITCH
 TRIPLE POLE DOUBLE THROW RELAY	 DIODE	 RHEOSTAT	

**Table 3.2 Hydraulic Symbol Chart**

	LINE CROSSING		VARIABLE DISPLACEMENT PUMP		SHUTTLE VALVE		VELOCITY FUSE
	LINE JOINED		HAND PUMP		ACCUMULATOR, GAS CHARGED		SINGLE ACTING CYLINDER
	HYDRAULIC TANK		RELIEF VALVE		CUSHION CYLINDER		DOUBLE ACTING CYLINDER
	HYDRAULIC FILTER WITH BYPASS		PRESSURE REDUCING VALVE		PRESSURE SWITCH		DOUBLE ACTING DOUBLE RODDED CYLINDER
	ELECTRIC MOTOR		FIXED ORIFICE		MOTION CONTROL VALVE		SPRING APPLIED HYDRAULIC RELEASED BRAKE
	ENGINE		ADJUSTABLE FLOW CONTROL		FLOW DIVIDER COMBINER		BRAKE CYLINDER
	FIXED DISPLACEMENT PUMP		CHECK VALVE		COUNTER BALANCE VALVE		ROTARY ACTUATOR
	VARIABLE DISPLACEMENT HYDRAULIC MOTOR		OIL COOLER		VALVE COIL		BI DIRECTIONAL HYDRAULIC MOTOR
	SERIES PARALLEL HYDRAULIC MOTOR		TWO POSITION TWO WAY NORMALLY CLOSED VALVE		TWO POSITION THREE WAY VALVE		THREE POSITION FOUR WAY CLOSED CENTER OPEN PORT
	TWO POSITION TWO WAY NORMALLY OPEN VALVE		TWO POSITION THREE WAY VALVE		THREE POSITION FOUR WAY CLOSED CENTER CLOSED PORT		
	PRESSURE TRANSDUCER		MAIN LINES Solid		PILOT LINES Dashed		
	SERVO						

### 3.3 Wire Number and Color Code

WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR	WIRE NO.	WIRE COLOR
00	WHT	21	GRN/BLK	42	PNK/BLU	84	YEL/BRN	1002	RED/BLK
000	WHT	21	WHT/RED	43	PNK/RED	85	ORG/BLK/WHT	1003	ORG
B1	BLU/PINK	22	ORG/BLU	44	PNK/ORG	87	BRN/ORG	1006	BLU
01	PUR/BLK	23	BLK/WHT/RED	49	GRN	88	BRN/PNK	1008	GRY
02	WHT	23	BLK/WHT	50	BRN/WHT	89	BRN/GRN	1100	BLK
03	GRN/PUR	24	BLU/BLK	55	GRY/RED	99	PUR/RED	1103	ORG
04	RED/YEL	25	ORG/GRN	56	WHT/ORG	100	RED	2001	BRN
05	PUR/BLACK	26	GRN	57	BLK/WHT	101		2002	RED
06		27	BLK	59	ORG/BLK	102	PNK	2005	GRN/WHT
07	RED	28	GRN/RED	60	BLK/RED/GRN	103	RED	3008	GRY
08	PUR/WHT	29	BLU/YEL	71	BLU/RED	103B	BLK	4002	RED
09	ORG/RED	30	BRN	72	WHT/BLK/RED	103C	WHT	7002	RED
10	BLU/WHT	31	RED/WHT	73	WHT/RED/GRN	104	RED		
11	YEL/BLK	32	GRN/BLK	74	BLK/RED/GRN	105	GRN		
12	BRN/RED	33		75	WHT/RED/GRN	106	BLU		
13	ORG	34	GRN/WHITE	76	RED/GRN	200	BLK/WHT		
14	BLK	35	RED/BRN	77	GRN/BLK/WHT	203	ORG/BLK		
15	BLU	36	YEL	78	RED/BLK/WHT	205	GRN		
16	WHT/BLK	37	GRN/WHT	79	YEL/PNK	209	WHT/BLK		
17	BLU/RED	38		80	YEL/PUR	900	WHT		
18	RED/BLK	39	GRN/WHT	81	YEL/RED	902	WHT		
19	ORG/BLK	40	PNK/YEL	82	YEL/BLU	910	BLK		
20	BLK/WHT/RED	41	PNK	83	YEL/ORG	1001	BRN/WHT		

This table is to be used as a wire number/color reference for electrical drawings and schematics.

All wire numbers will retain their original color coding, for example if wire 7 is red, wire 7A, 7B, and 7C will also be red.

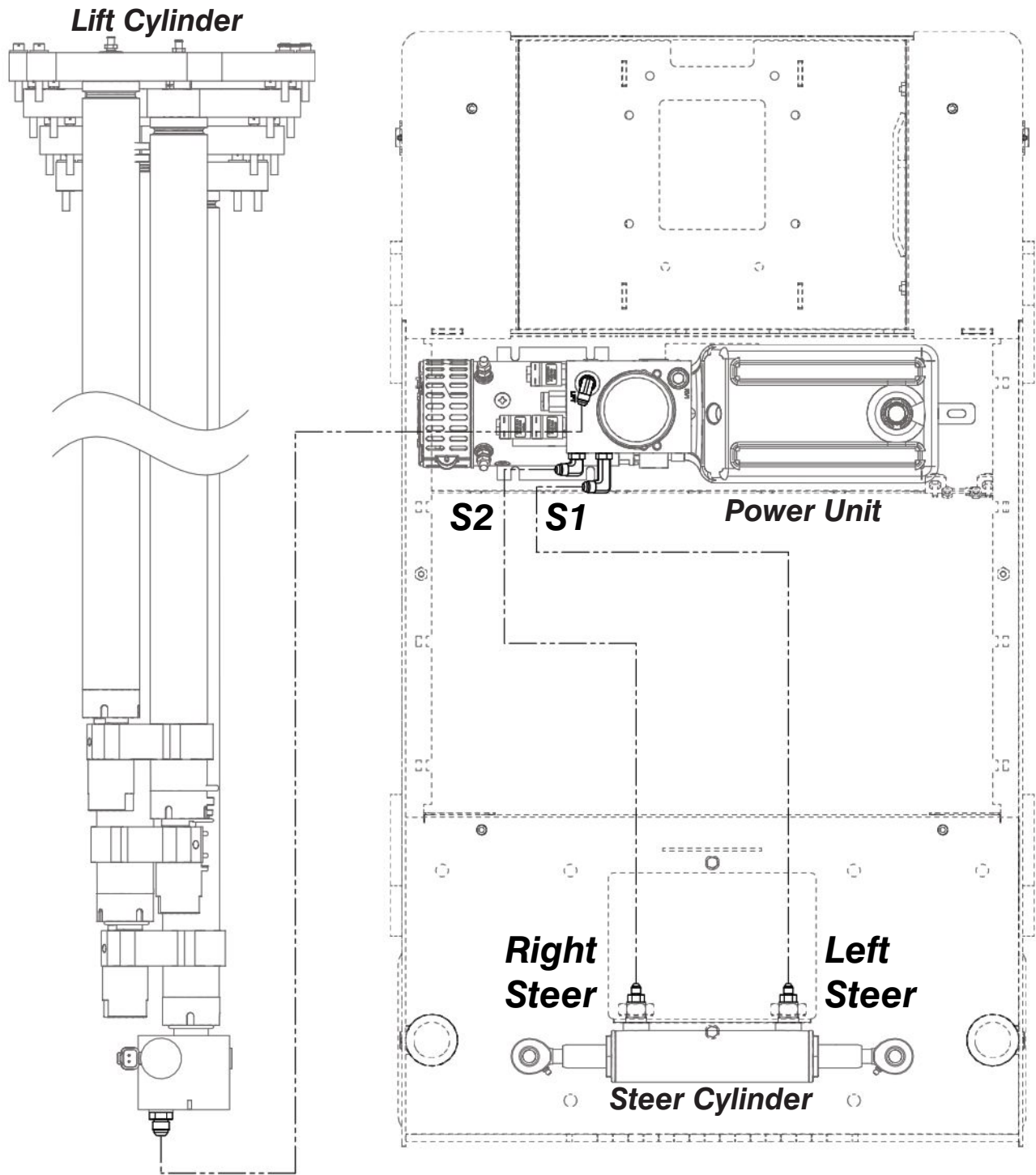
### 3.4 Hydraulic Parts List

Index No.	Skyjack Part No.	Description
2H-13	151683	COIL, 24 V DT with diode
3H-14	234717	COIL, 24 V
4H-23/24	234717	COIL, 24 V
C1-4	234130	CYLINDER, Multistage with cushion
C1-5	234078	STEER CYLINDER
CV1	234711	VALVE, Check
F1	234269	FILTER, 7 Micron return
F2	234270	FILTER, 7 Micro return
MB1	234720	MANIFOLD, SJ20 Main
OR1	234654	VALVE, Flow control
P1	234703	PUMP, 3.59 CC gear
RV1	234715	VALVE, 2000 PSI relief
RV2	234716	VALVE, 3000 PSI cross port relief
SV1	234713	VALVE, 2P3W cartridge
SV2	234714	VALVE, 2P4W cartridge
SV3	151696	VALVE, Emergency lowering

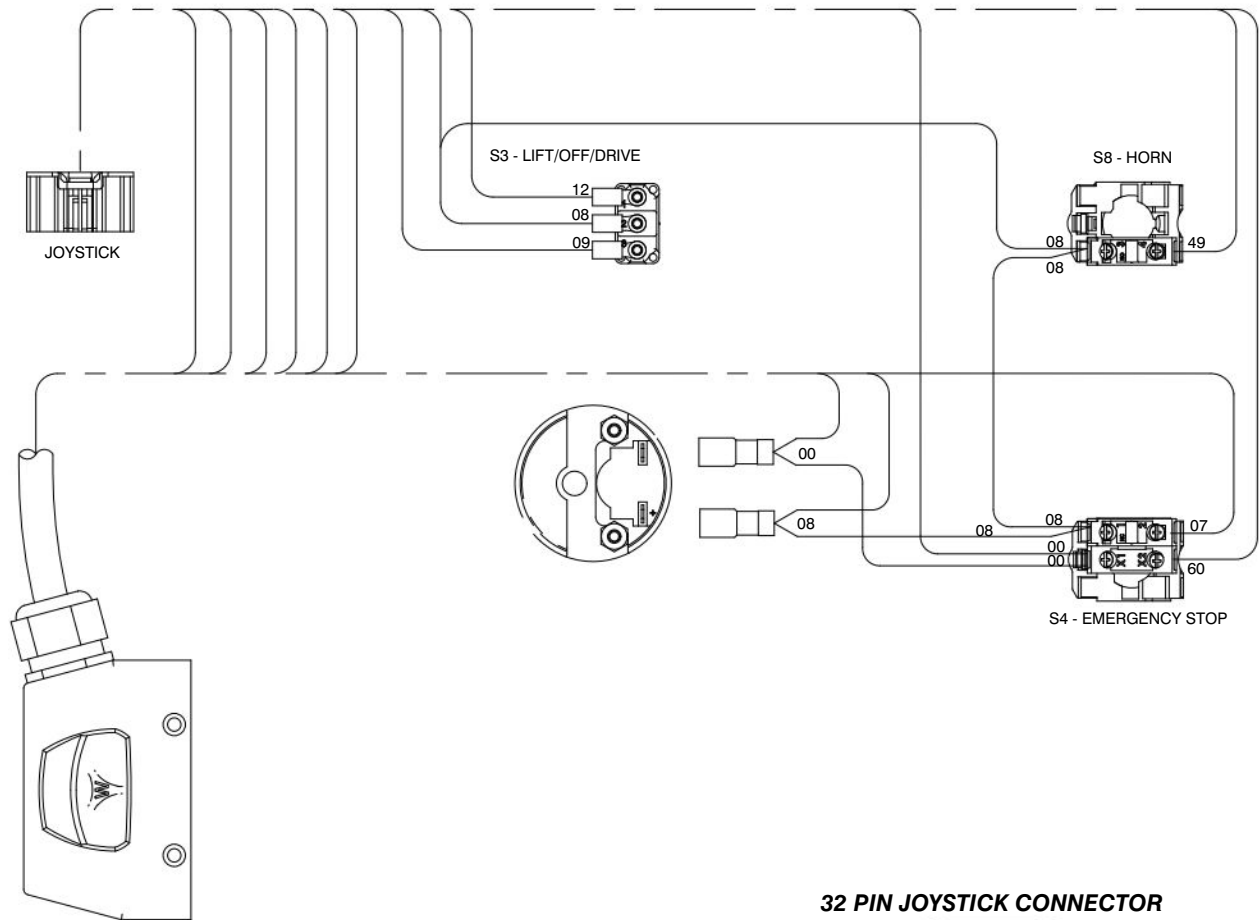
## 3.5 Electrical Parts List

Index No.	Skyjack Part No.	Description
30ACR	108589	RELAY, Brake
2H-13	151683	COIL, 24 V with Diode
3H-14	234717	COIL, 24 V -Lift
4H-23/24	234717	COIL, 24 V - Steer
B1/B2	169938	BATTERY, 12 V
	103480	BATTERY, 6 V <b>(Optional)</b>
BCI	122093	INDICATOR, Battery charge
BP-29	215817	BEEPER
C1	146475	MOTOR CONTACTOR
CB1/CB2	117325	CIRCUIT BREAKER, 15A
CHARGER	234250	DELTAQ CHARGER
CM1	234005	CONTROLLER, ZAPI 3IN1
DXX	234227	DIODE, Schottky 30V 3A
DS1	234006	ZAPI DISPLAY
F1	216103	FUSE, 300A
FL-1	234591	DUAL FLASHING LIGHTS
H1	146649	HORN, 24V - Low tone
J11	213098	TELEMATICS <b>(Optional)</b>
LS1	199405	LIMIT SWITCH, Base
LS3	234218	LIMIT SWITCH, Platform service position
LS4	234219	LIMIT SWITCH, Platform deck extended position
M1	234158	POWER UNIT
M2	234150	MOTOR, Right Traction
M3	234150	MOTOR, Left Traction
S1	119725	SWITCH, Main disconnect
S2	147054	SWITCH, Base - Lift/lower
S3	234118	SWITCH, Platform - Lift/Off/Drive
S4	147053	SWITCH, Emergency stop - Platform control
S5	115573	SWITCH, Toggle - Diagnostic
S6	115573	SWITCH, Toggle - Brake release
S7	171911	SWITCH, Toggle - Outdoor option <b>(Optional)</b>
S8	147054	SWITCH, Platform horn
S9	220494	SWITCH, SGLE option <b>(Optional)</b>
S10	149536	SWITCH, Base - Idle/Platform/Base
S28	147053	SWITCH, Emergency stop - Base control

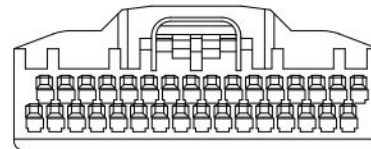
### 3.6 Hydraulic Connections



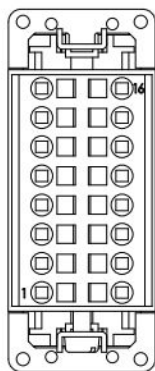
### 3.7 Platform Control Box Wiring



**32 PIN JOYSTICK CONNECTOR**



**16 PIN JOYSTICK CONNECTOR**

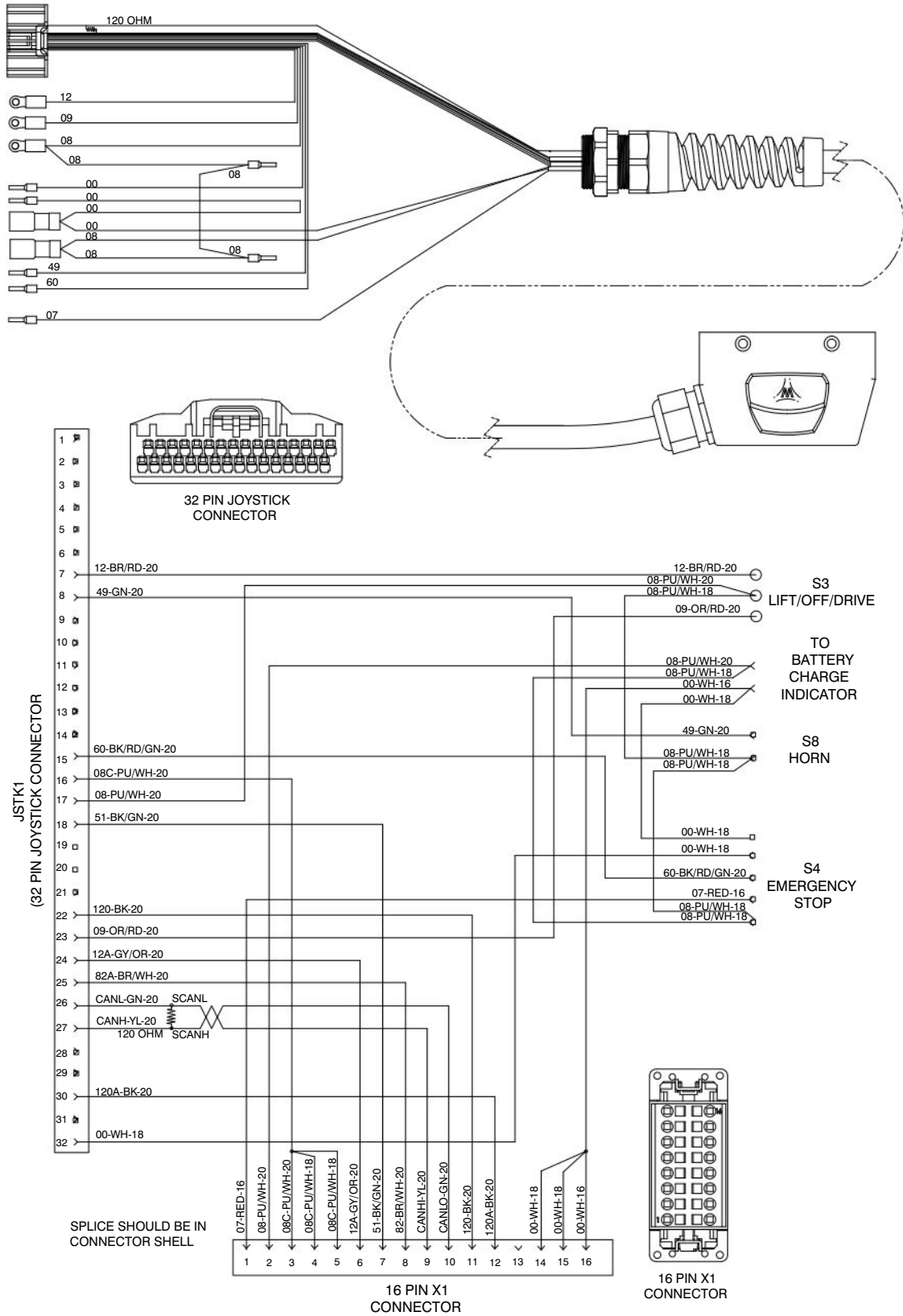


POSITION	COLOUR	CIRCUIT
1	RED	07
2	PURPLE/WHITE	08
3	PURPLE/WHITE	08C
4	PURPLE/WHITE	08C
5	PURPLE/WHITE	08C
6	GREY/ORANGE	12A
7	BLACK/GREEN	51
8	BROWN/WHITE	82
9	YELLOW	CAN HI
10	GREEN	CAN LO
11	BLACK	120
12	BLACK	120A
13	N/A	N/A
14	WHITE	00
15	WHITE	00
16	WHITE	00

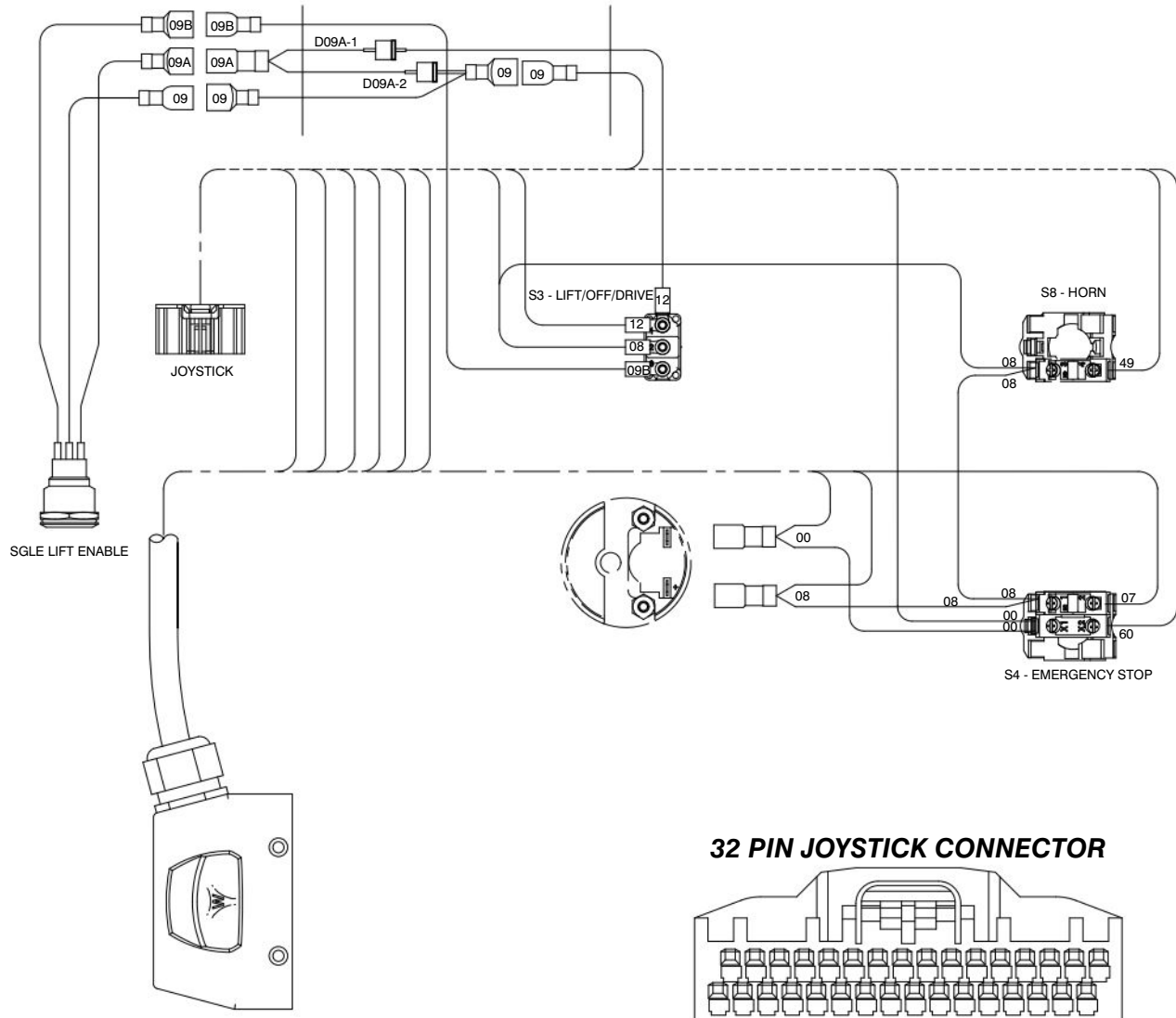
POSITION	CIRCUIT	FUNCTION	COLOUR
1-6	N/A	N/A	N/A
7	12	DRIVE	BROWN/RED
8	49	HORN	GREEN
9-14	N/A	N/A	N/A
15	60	PWR LED	BLACK/RED/GREEN
16	08C	PWR	PURPLE/WHITE
17	08	PLTFRM ENBLE	PURPLE/WHITE
18	51	SERVICE POS	BLACK/GREEN
19-21	N/A	N/A	N/A
22	120	INDOOR LIGHT	BLACK
23	09	LIFT	ORANGE/RED
24	12A	DECK EXT	GRAY/ORANGE
25	82A	LOADCELL PWR	BROWN/WHITE
26	CAN LO	CAN LOW	GREEN
27	CAN HI	CAN HIGH	YELLOW
28-29	N/A	N/A	N/A
30	120A	SPARE	BLACK
31	N/A	N/A	N/A
32	00	GND	WHITE



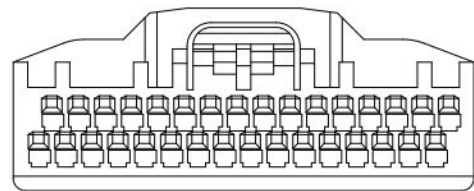
### 3.8 Platform Control Cable Wiring



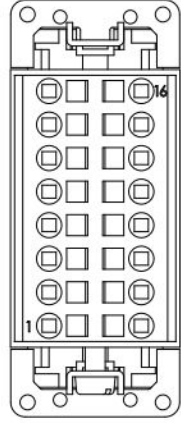
### 3.9 Platform Control Box Wiring - SGLE



**32 PIN JOYSTICK CONNECTOR**



**16 PIN JOYSTICK CONNECTOR**



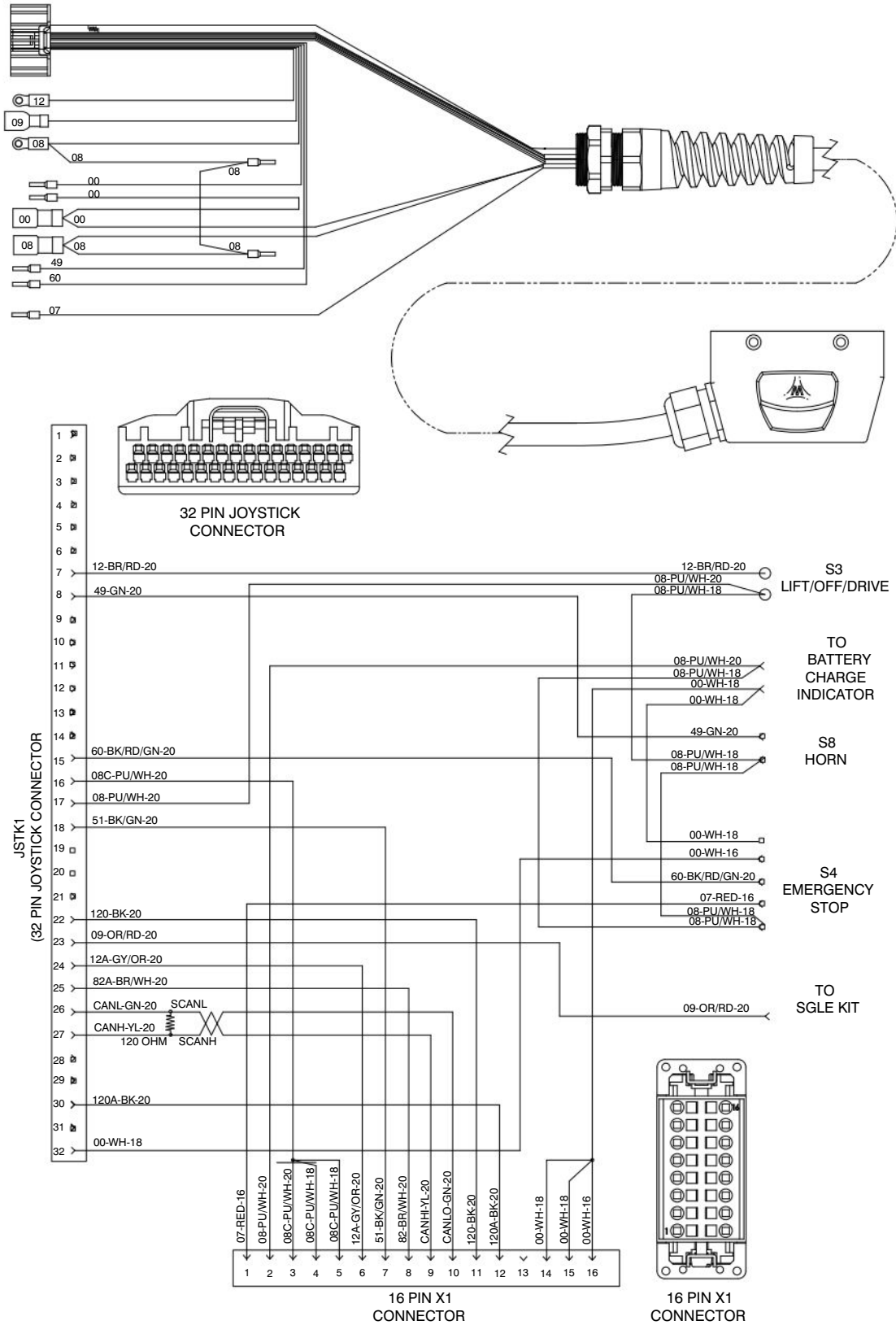
POSITION	COLOUR	CIRCUIT
1	RED	07
2	PURPLE/WHITE	08
3	PURPLE/WHITE	08C
4	PURPLE/WHITE	08C
5	PURPLE/WHITE	08C
6	GREY/ORANGE	12A
7	BLACK/GREEN	51
8	BROWN/WHITE	82
9	YELLOW	CAN HI
10	GREEN	CAN LO
11	BLACK	120
12	BLACK	120A
13	N/A	N/A
14	WHITE	00
15	WHITE	00
16	WHITE	00

POSITION	CIRCUIT	FUNCTION	COLOUR
1-6	N/A	N/A	N/A
7	12	DRIVE	BROWN/RED
8	49	HORN	GREEN
9-14	N/A	N/A	N/A
15	60	PWR LED	BLACK/RED/GREEN
16	08C	PWR	PURPLE/WHITE
17	08	PLTFRM ENBLE	PURPLE/WHITE
18	51	SERVICE POS	BLACK/GREEN
19-21	N/A	N/A	N/A
22	120	INDOOR LIGHT	BLACK
23	09	LIFT	ORANGE/RED
24	12A	DECK EXT	GRAY/ORANGE
25	82A	LOADCELL PWR	BROWN/WHITE
26	CAN LO	CAN LOW	GREEN
27	CAN HI	CAN HIGH	YELLOW
28-29	N/A	N/A	N/A
30	120A	SPARE	BLACK
31	N/A	N/A	N/A
32	00	GND	WHITE

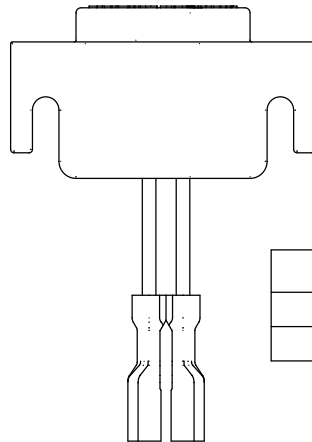
M234135AD

238886ABA

### 3.10 Platform Control Cable Wiring - SGLE

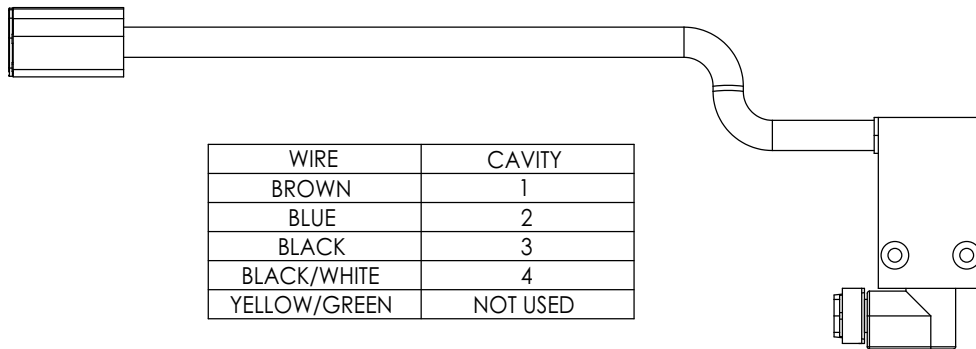


### 3.11 Beeper



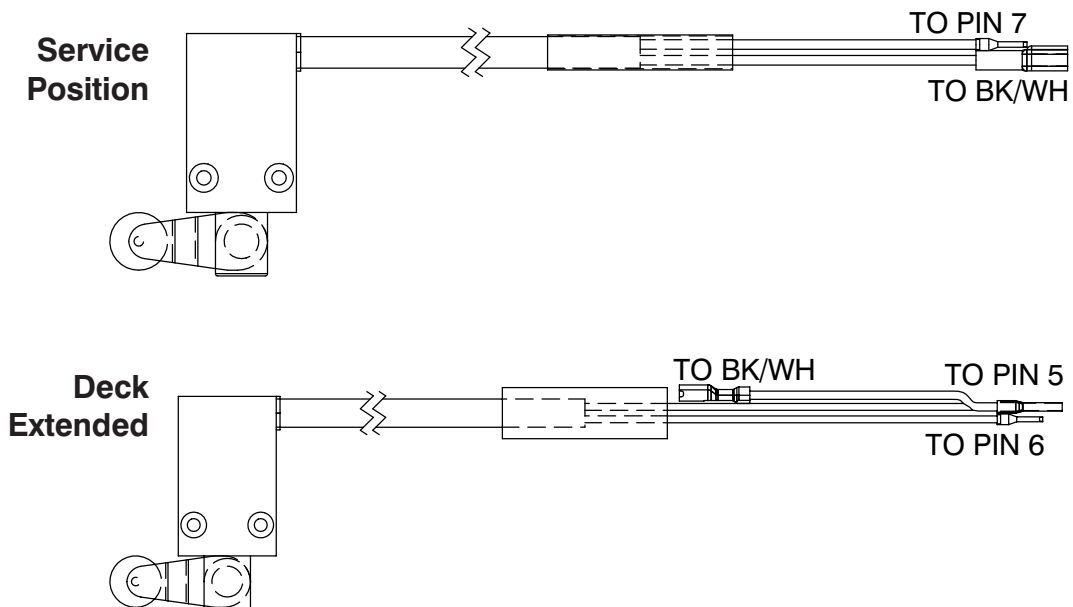
WIRE COLOUR	WIRE LABEL
RED	29
BLACK	02

### 3.12 Base Limit Switch



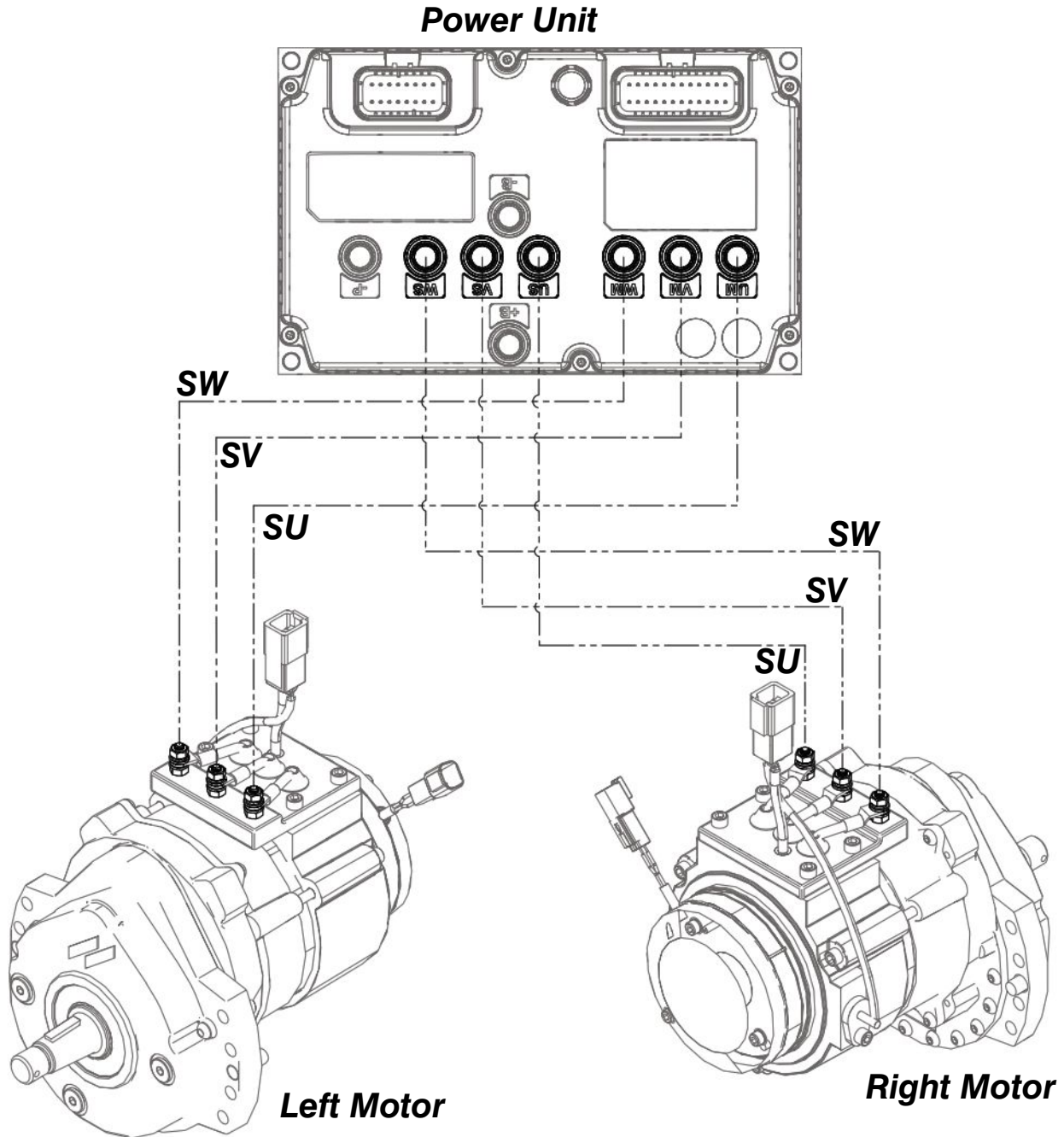
WIRE	CAVITY
BROWN	1
BLUE	2
BLACK	3
BLACK/WHITE	4
YELLOW/GREEN	NOT USED

### 3.13 Platform Limit Switches

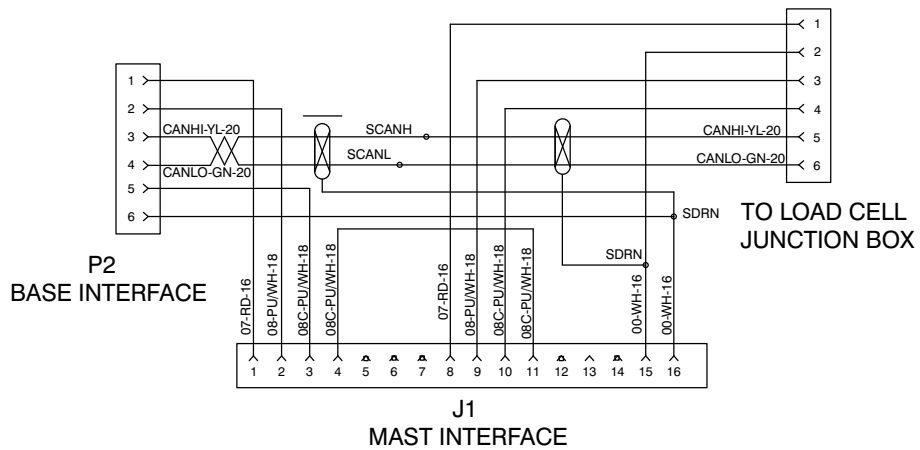
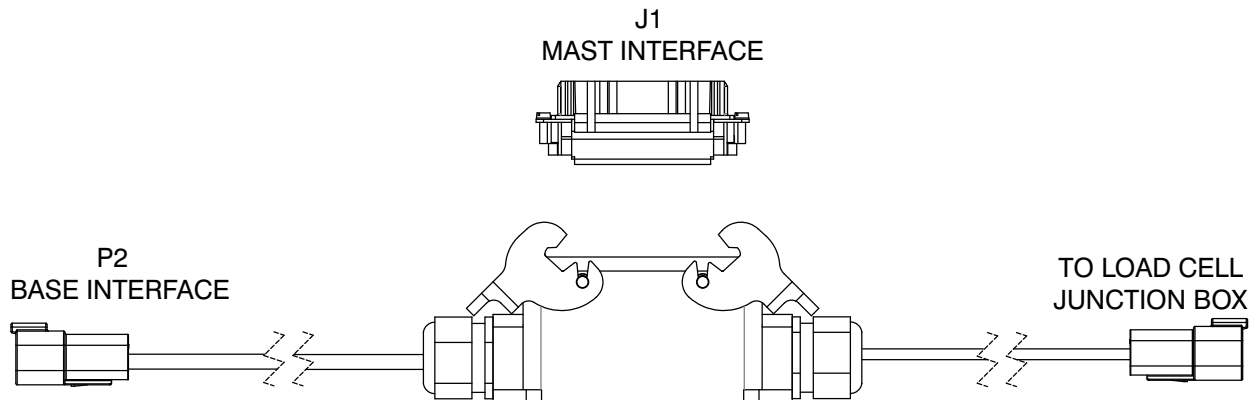


M215817AC\_M234204AC\_M234218AD\_M234219AE

### 3.14 Motor and Controller Connections



### 3.15 Mast Cable

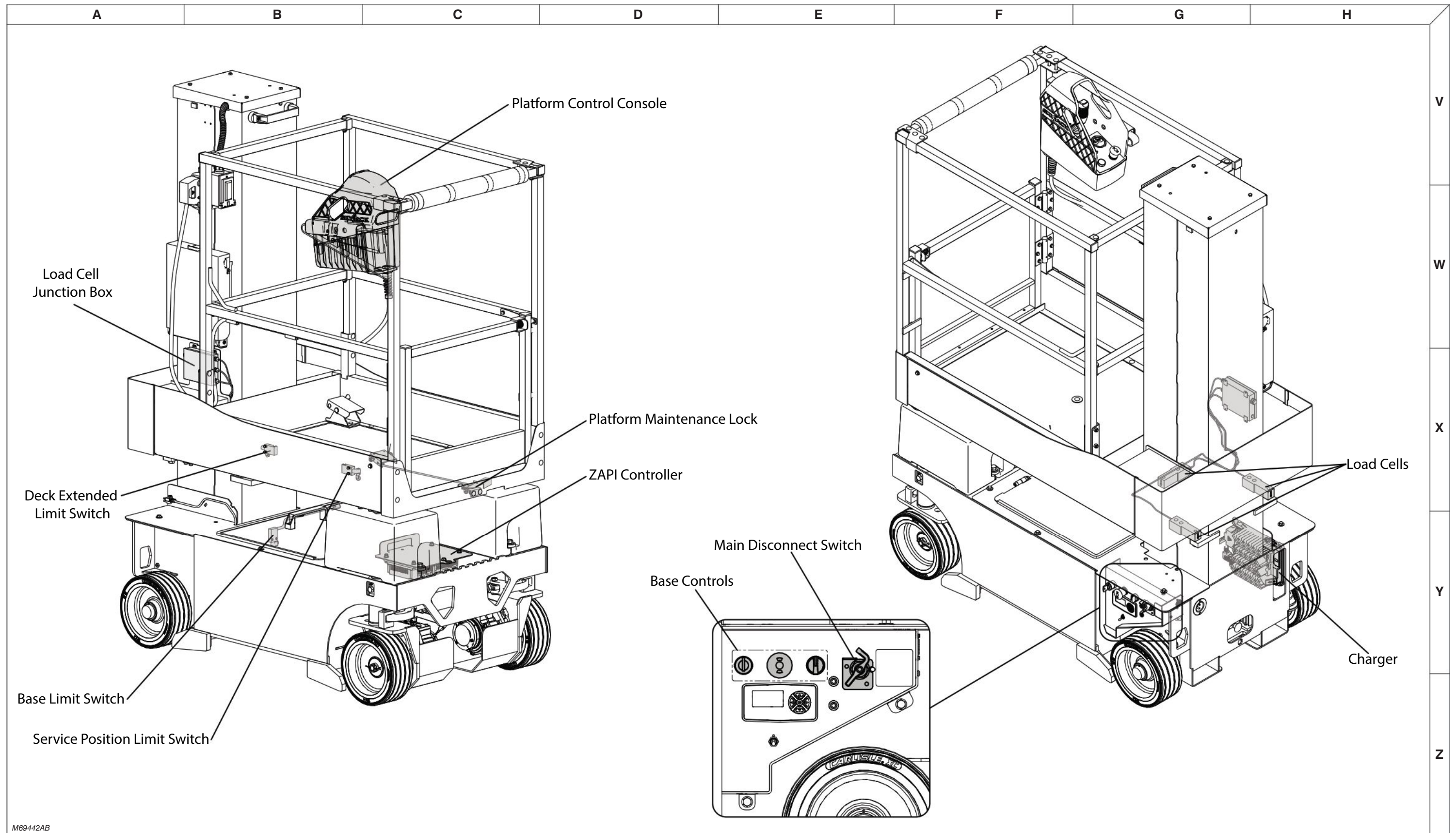


APPLY EXTRA LABEL TO J1 WIRE

POSITION	WIRE	LABEL
4	08C-PU/WH-18	OUTDR JUMPER
8	07-RD-16	82
9	08-PU/WH-18	CAN HI
10	08C-PU/WH-18	CAN LO
11	08C-PU/WH-18	OUTDR JUMPER

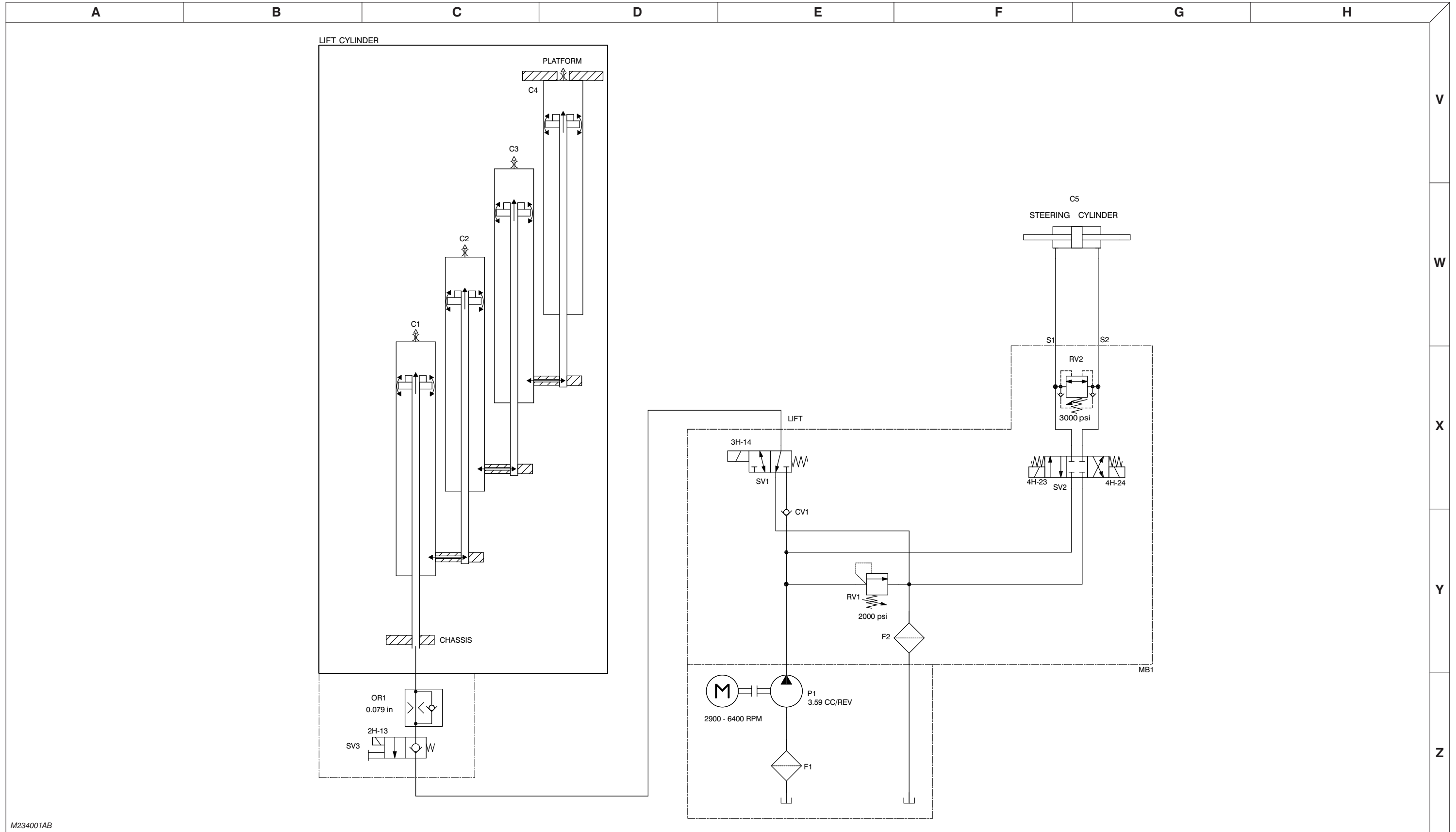


### 3.16 Major Component Identification



M69442AB

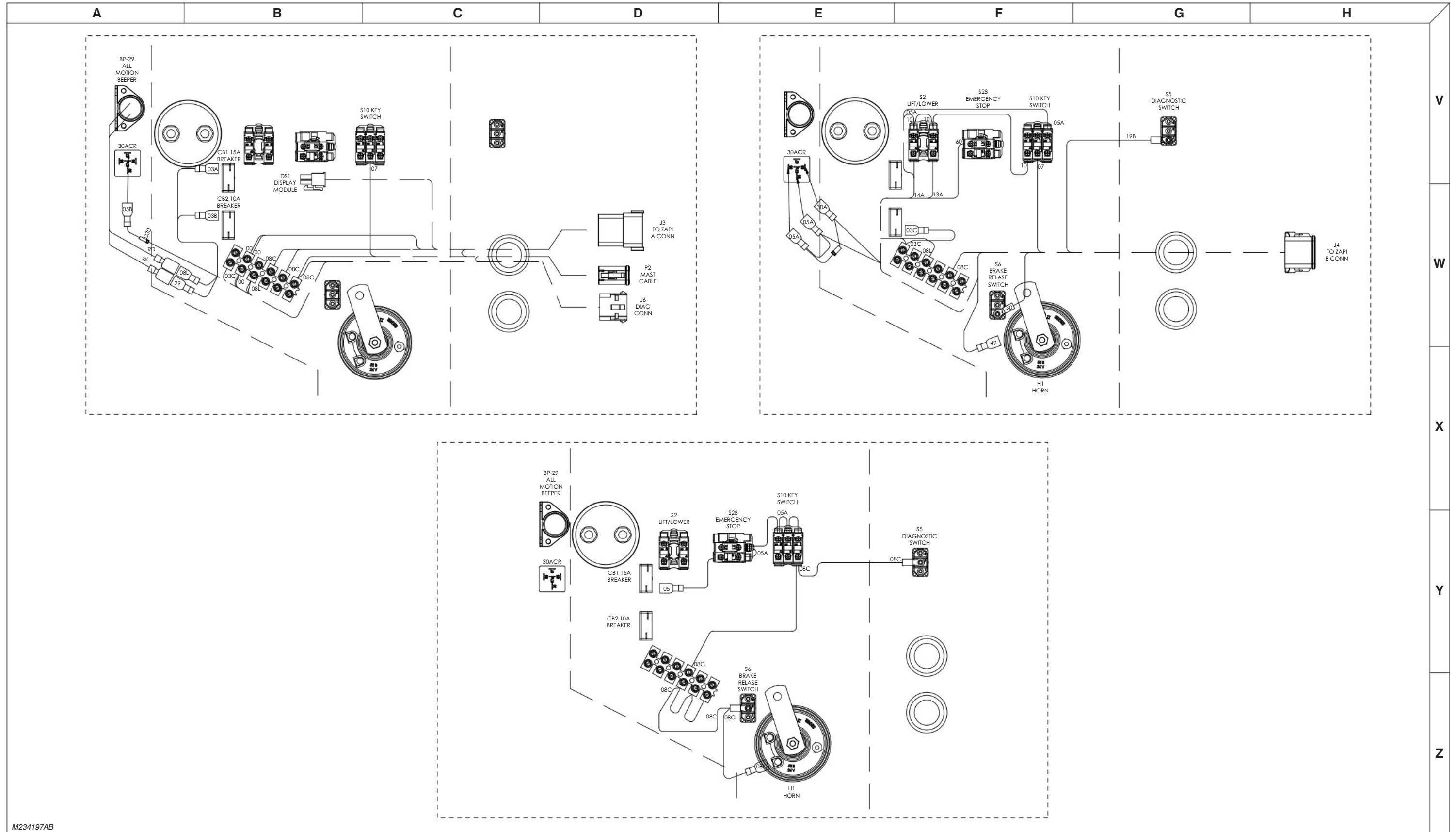
### 3.17 Hydraulic Schematic



M234001AB

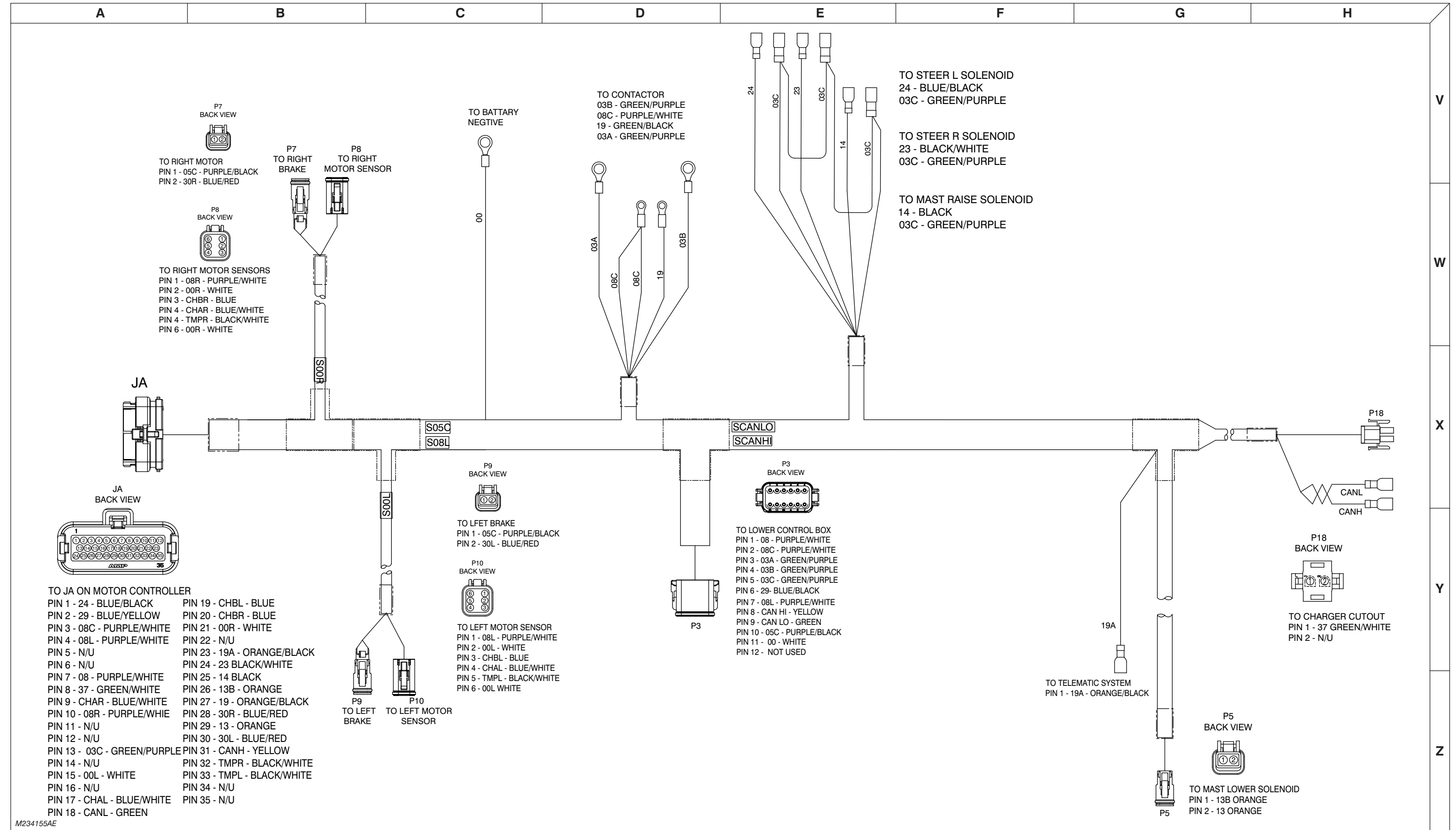


### 3.18 Base Control Wiring



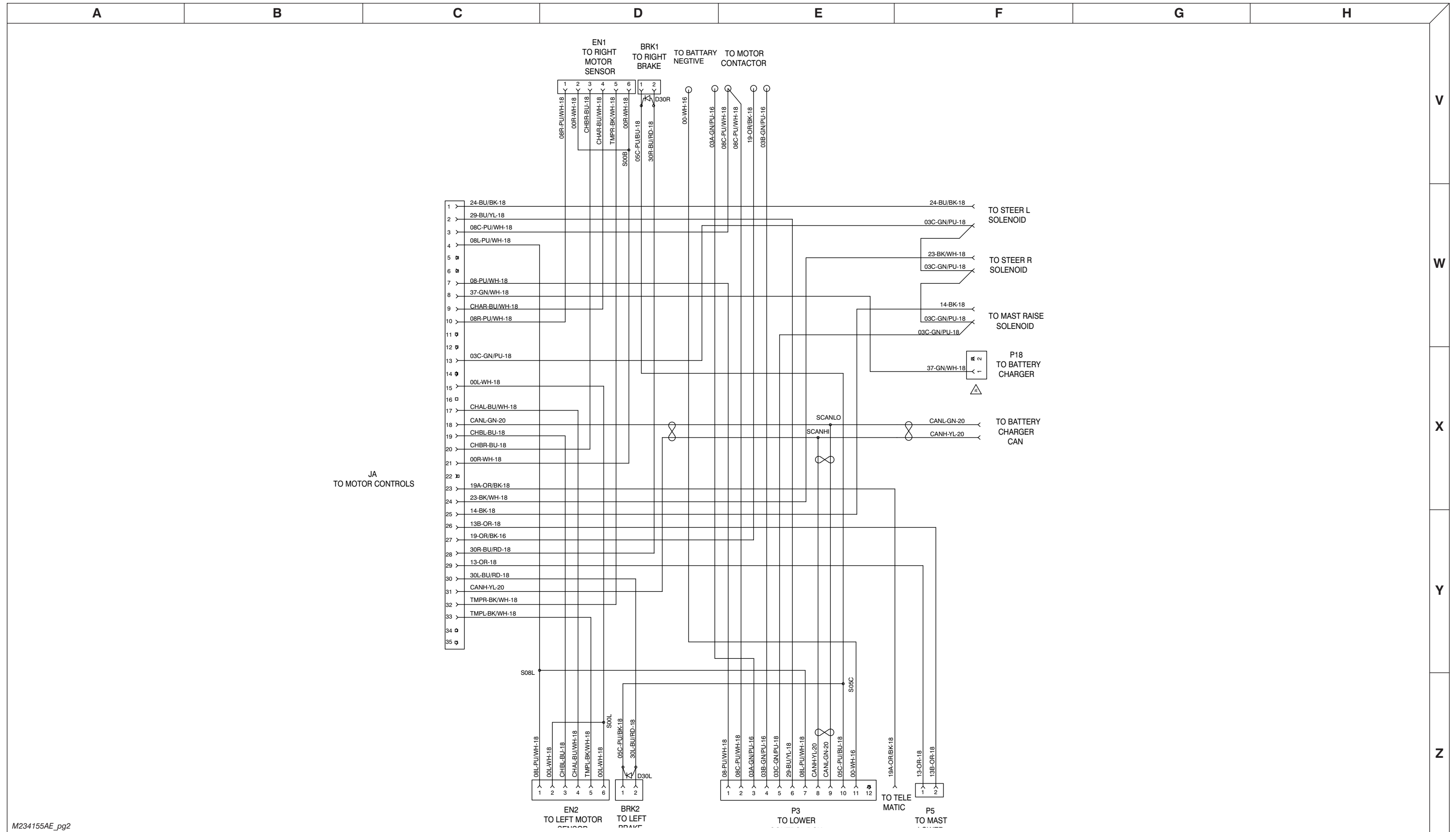
M234197AB

### 3.19 Main Harness - ZAPI A



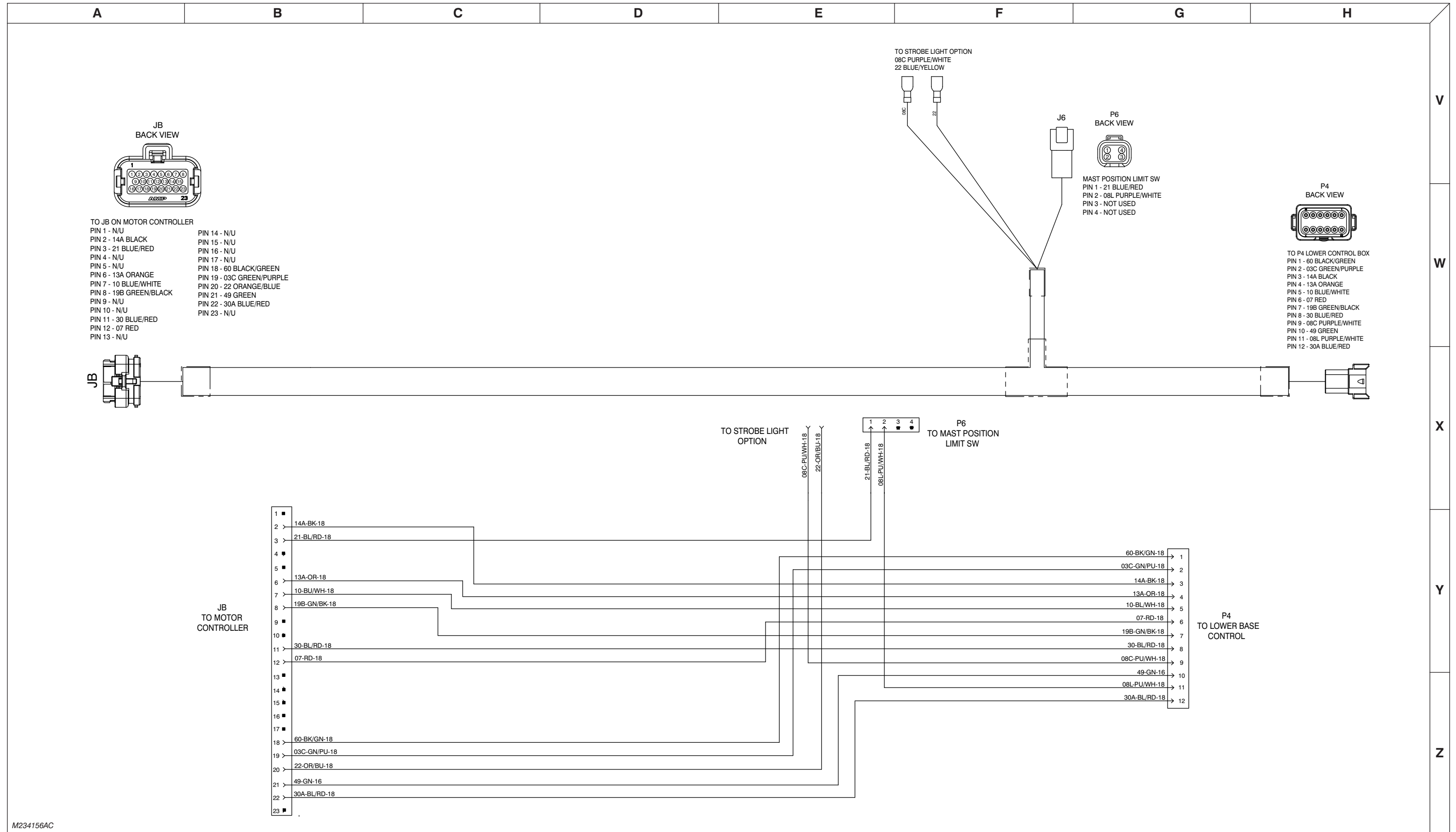
M234155AE

### 3.20 Main Harness Wiring - ZAPI A



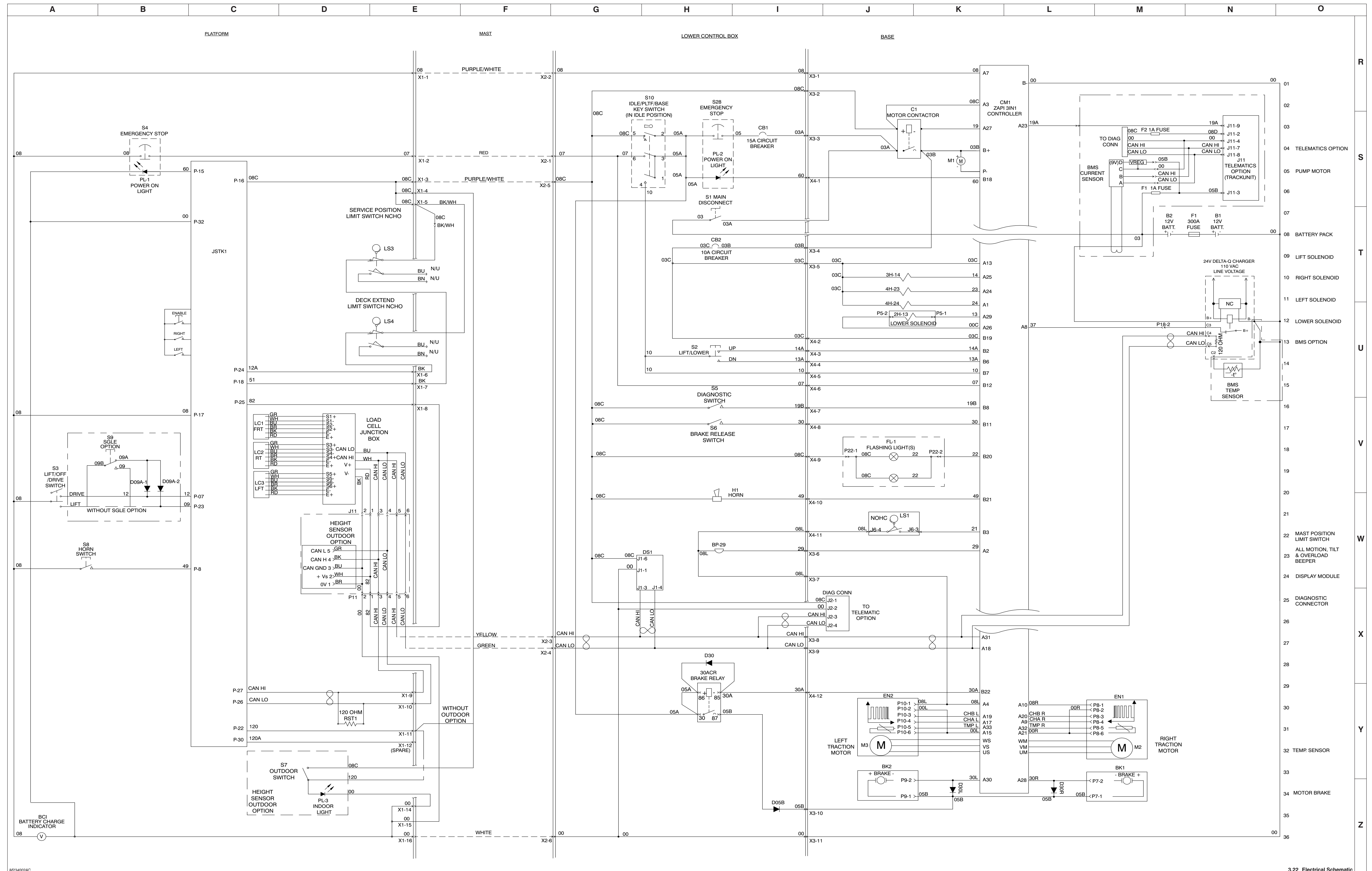
M234155AE\_pg2

### 3.21 Main Harness - ZAPI B



M234156AC

3.22 Electrical Schematic



M234002AC

3.22 Electrical Schematic



---

# Section 4 – Troubleshooting Information

## 4.1 Introduction

The following pages contain a table of Troubleshooting for locating and correcting most service trouble which can develop. Careful and accurate analysis of the systems listed in the table of Troubleshooting will localize the trouble more quickly than any other method. This manual cannot cover all possible troubles and deficiencies that may occur. If a specific trouble is not listed, isolate the major component in which the trouble occurs, isolate whether the problem is electrical or hydraulic, and then isolate and correct the specific problem.

The content of this section is separated into “probable cause” and “remedy.” The information in the left-hand column, preceded by a number, represents the “probable cause.” The information in the right-hand column, in bold text, represents the “remedy” to the “probable cause” directly beside it. See the example below for clarification.

---

1. Probable cause

**Remedy**

---



## 4.2 Electrical System

### NOTE

The MEWP functions may be disabled by the load sense system. Please first make sure that the mast is fully retracted, the platform is free of added weight and there are no faults in the load sense system.

The MEWP functions may be disabled by the machine control system. Check for any codes displayed and refer the code chart in section [5.2-1 Skycoded Display Messages..](#)

### 4.2-1 All Controls Inoperative

1. Battery cables loose/disconnected	<b>Tighten or connect battery cables</b>
2. Battery Discharged or Defective	<b>Charge battery or replace if defective</b>
3. Fuse F1 defective or open	<b>Replace fuse.</b>
4. Loose or broken B+ cable 03 from batteries to battery disconnect switch S1	<b>Check continuity. Replace if defective.</b>
5. Open or defective battery disconnect switch S1	<b>Close switch. Replace if defective</b>
6. Loose or broken wire #03A from battery disconnect switch S1 to motor contactor C1 common	<b>Check continuity. Replace if defective</b>
7. Loose or broken wire #03A from motor contactor C1 to circuit breaker CB1	<b>Check continuity. Replace if defective</b>
8. Circuit breaker CB1 tripped or defective.	<b>Reset breaker, check for defective wiring. Replace if defective.</b>
9. Loose or broken wire #05 from circuit breaker CB1 to base emergency stop switch S28.	<b>Check continuity. Replace if defective.</b>
10. Open or defective base emergency stop switch S28.	<b>Close switch. Replace if defective.</b>
11. Loose or broken wire #05A from base emergency stop switch S3 to base key switch S10.	<b>Check continuity. Replace if defective.</b>
12. Loose or broken #05A wires between base key switch S10 terminals	<b>Check continuity. Replace if defective.</b>
13. Open or defective key select switch S10	<b>Close switch. Replace if defective</b>
14. Loose or broken wire #08C from base key switch S10 to motor contactor C1 coil +	<b>Check continuity. Replace if defective.</b>
15. Loose or broken wire #08C from motor contactor C1 coil + to machine controller pin A3.	<b>Check continuity. Replace if defective.</b>
16. Loose or broken wire 07 from base key switch to machine controller pin B12	<b>Check continuity. Replace if defective.</b>
17. Loose or broken wire 07 from base key switch to upper control box E-Stop switch S4	<b>Check continuity. Replace if defective.</b>



18. Open or defective upper controll box E-stop switch S4	<b>Close switch. Replace if defective</b>
19. Loose or broken wire 08 from upper control box E-Stop switch S4 to machine controller pin A7	<b>Check continuity. Replace if defective.</b>
20. Loose or broken wire 00 from machine controller B- to battery negative	<b>Check continuity. Replace if defective.</b>
21. Loose or broken wire #08C from base key switch S10 to upper control box joystick pin P-16 and/or service position position limit switch LS3	<b>Check continuity. Replace if defective.</b>
22. Misadjusted or defective service position position limit switch LS3	<b>Adjust switch. Replace if defective</b>
23. Loose or broken wire 51 from service position position limit switch LS3 to control box joystick pin P-18	<b>Check continuity. Replace if defective.</b>

#### 4.2-2 No Lift or Steer Functions

1. Loose or broken wire 19 from motor contactor C1 coil negative to machine controller pin A27	<b>Check continuity. Replace if defective.</b>
2. Defective motor contactor C1	<b>Replace if defective</b>
3. Loose or broken wire 03B from motor contactor C1 N.O. contact to machine controller B+	<b>Check continuity. Replace if defective.</b>
4. Loose or broken wire 03B from machine controller B+ to pump motor positive terminal	<b>Check continuity. Replace if defective.</b>
5. Loose or broken ground wire from machine controller P- to pump motor negative terminal	<b>Check continuity. Replace if defective.</b>
6. Loose or broken wire 03B from motor contactor C1 N.O. contact to circuit breaker CB2	<b>Check continuity. Replace if defective.</b>
7. Defective or tripped circuit breaker CB2	<b>Check for short circuits, Reset Circuit Breaker. Replace breaker if defective.</b>
8. Loose or broken wire 03C from circuit breaker CB2 to machine controller pin B19	<b>Check continuity. Replace if defective.</b>
9. Loose or broken wire 03C from circuit breaker CB2 to lift (3H-14), right steer (4H-23) and left steer (4H-24) coils	<b>Check continuity. Replace if defective.</b>

#### 4.2-3 No Lift from Base or Platform

1. Loose or broken wire 14 from lift coil 3H-14 to machine controller pin A25	<b>Check continuity. Replace if defective.</b>
2. Defective coil 3H-14	<b>Replace coil</b>

#### 4.2-4 No Lower from Base or Platform

1. Loose or broken wire 13 from lower coil 2H-13 to machine controller pin A29	<b>Check continuity. Replace if defective.</b>
2. Loose or broken wire 00C from lower coil 2H-13 to machine controller pin A26	<b>Check continuity. Replace if defective.</b>
3. Defective coil 3H-13	<b>Replace coil</b>

#### 4.2-5 No Lift or Lower from Base Controls

1. Loose or broken wire 10 from base key switch S10 to lift/lower switch S2	<b>Check continuity. Replace if defective.</b>
2. Open or defective key select switch S10	<b>Close switch. Replace if defective</b>
3. Loose or broken wire 10 from base key switch S10 to machine controller pin B7	<b>Check continuity. Replace if defective.</b>

#### 4.2-6 No Lift from Base Controls

1. Loose or broken wire 14A from lift/lower switch S2 to machine controller pin B2	<b>Check continuity. Replace if defective.</b>
2. Open or defective lift/lower switch S2	<b>Close switch. Replace if defective</b>

#### 4.2-7 No Lower from Base Controls

1. Loose or broken wire 13A from lift/lower switch S2 to machine controller pin B6	<b>Check continuity. Replace if defective.</b>
2. Open or defective lift/lower switch S2	<b>Close switch. Replace if defective</b>

#### 4.2-8 No Functions from Platform Controls

1. Loose or broken 08 wire from E-stop switch S4 to lift/off/drive switch S3	<b>Check continuity. Replace if defective.</b>
2. Loose or broken 08 wire from E-stop switch S4 Joystick pin P-17	<b>Check continuity. Replace if defective.</b>
3. Defective enable switch or wiring on upper control joystick	<b>Check wiring and switch. Repair or replace if defective.</b>
4. Defective ground wire 00 from machine controller pin P-32 to B-	<b>Check continuity. Replace if defective.</b>
5. Defective Joystick	<b>Replace if defective</b>

### 4.2-9 No Lift/Lower from Platform Controls

- |   |   |
|---|---|
| 1. Loose or broken 09 wire from lift/off/drive switch S3 to joystick pin P-23 | Check continuity. Replace if defective. |
| 2. Open or defective lift/off/drive switch S3                                 | Close switch. Replace if defective      |

### 4.2-10 No Steer Left

- |   |  |
|---|--|
| 1. Loose or broken wire 24 from steer coil 4H-24 to machine controller pin A1 | Check continuity. Replace if defective.                  |
| 2. Defective coil 4H-24   | Replace coil   |
| 3. Defective left steer switch or wiring on upper control joystick            | Check wiring and switch. Repair or replace if defective. |

### 4.2-11 No Steer Right

- |  |  |
|--|--|
| 1. Loose or broken wire 23 from steer coil 3H-23 to machine controller pin A24 | Check continuity. Replace if defective.                  |
| 2. Defective coil 4H-23  | Replace coil   |
| 3. Defective right steer switch or wiring on upper control joystick            | Check wiring and switch. Repair or replace if defective. |

### 4.2-12 No Drive

- |  |   |
|--|---|
| 1. Loose or broken 12 wire from lift/off/drive switch S3 to joystick pin P-07              | Check continuity. Replace if defective. |
| 2. Open or defective lift/off/drive switch S3  | Close switch. Replace if defective      |
| 3. Loose or broken 05A wire from base E-stop S28 to 30ACR brake relay pin 30 and/or pin 86 | Check continuity. Replace if defective. |
| 4. Loose or broken 30A wire from 30ACR brake relay pin 85 to machine controller pin B-22   | Check continuity. Replace if defective. |
| 5. Defective 30ACR brake relay   | Check relay Replace if defective.       |
| 6. Loose or broken 05B from diode D05B to brake BK1 pin P7-1 and/or BK2 pin P9-1           | Check continuity. Replace if defective. |
| 7. Loose or broken wire 30L from BK2 pin P9-2 to machine controller pin A30                | Check continuity. Replace if defective. |
| 8. Loose or broken wire 30R from BK1 pin P7-2 to machine controller pin A28                | Check continuity. Replace if defective. |
| 9. Defective brake BRK1 or BRK2  | Check brakes. Replace if defective.     |

10. Loose or defective wiring from machine controller pins WS, VS, and/or US to left traction motor	<b>Check continuity. Replace if defective.</b>
11. Loose or defective wiring from machine controller pins WM, VM, and/or UM to right traction motor	<b>Check continuity. Replace if defective.</b>
12. Defective traction motor	<b>Check Motors. Replace if defective.</b>

## 4.3 Hydraulic System

### 4.3-1 All Hydraulic Controls Inoperative (No Lift or Steer Functions)

1. Pump motor not engaged	<b>Refer to Electrical troubleshooting. Replace pump motor if defective.</b>
2. Pump motor coupler defective	<b>Check coupler. Replace if defective</b>
3. Defective pump P1	<b>Check pump output. Replace if defective.</b>
4. System relief valve RV1 set too low or stuck open.	<b>Check and adjust valve setting. Replace if defective.</b>

### 4.3-2 No Lift Function

1. Check valve CV1 stuck closed	
2. Stuck or defective lift valve 3H-14	

### 4.3-3 No Lower Function

1. Stuck or defective lift valve 3H-14	<b>Stuck or defective lift valve 3H-14</b>
2. Stuck or defective lower valve 2H-13	<b>Stuck or defective lower valve 2H-13</b>
3. Blocked lower orifice OR1	<b>Blocked lower orifice OR1</b>

### 4.3-4 No Steer Left and/or Right

1. Stuck or defective steer valve 4H-23/4h-24	
2. Steer crossover relief valve RV2 set too low or stuck open.	<b>Check and adjust valve setting. Replace if defective.</b>
3. Steer cylinder C5 bypassing, or mechanically binding	<b>Check cylinder and all steer linkage. Repair or replace defective components as required.</b>

---

# Section 5 – Procedures




## 5.1 General

The following information is provided to assist you in the use and application of servicing and maintenance procedures contained in this chapter.

### 5.1-1 Safety and Workmanship

Your safety, and that of others, is the first consideration when engaging in the maintenance of equipment. Always be conscious of weight. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

Unless specifically noted otherwise, before beginning any procedure:

1. Park the mobile elevating work platform (MEWP) on a firm, level surface.
2. Fully lower the machine.
3. Push in the “” emergency stop buttons on the platform control console and the base control console.
4. Turn the off/platform/base key switch to the “” off position. Remove the key.
5. Turn the main power disconnect switch to the “” off position.

After completing any procedure which involves modifying, adjusting, or replacing any hydraulic or electrical components, perform all of the function tests given in your unit’s operation Manual.

---

### **WARNING**

**Fall Hazard. Use the three points of contact principle when you use the MEWP to enter or exit the platform. If you do not obey, there is a risk of death or serious injury.**

---

---

### **WARNING**

**DO NOT operate any control on the platform control console without proper fall protection secured to the designated location in the platform. Failure to avoid this hazard could result in death or serious injury!**

---

---

### **WARNING**

**Make sure there are no people or obstructions in the test area, and there is sufficient space for the scissor and drive functions required for the given procedures.**

---

## 5.2 Display Module

### 5.2-1 Display Messages

#### Diagnostics

The display module shows the machine condition and operating information during operation.

#### Alarms Visualisation

When an alarm condition occurs, the display module gives the information that shows the alarm code and the module in which the alarm occurred.

For example:

M181-M2\_ERR  
S181-M2\_ERR

- M181-M2\_ERR - This means that the alarm has been generated by the Main Uc
- S181-M2\_ERR - This means that the alarm has been generated by the Slave Uc

Display Message	Description
M8-CTRL_ERR	CONTROLLER ERROR
M17-CTRL_ERR	LOGIC FAILURE #3
M18-CTRL_ERR	LOGIC FAILURE #2
M19-CTRL_ERR	LOGIC FAILURE #1
M28-M2_VLOW	LOW Feedback VOLTAGE PUMP
M28-M2_VHI	HIGH Feedback VOLTAGE PUMP
M28-DRV_VLOW	LOW RETURN VOLTAGE
M28-DRV_VHI	HIGH RETURN VOLTAGE
M37-C1_CLOSE	CONTACTOR CLOSED
M38-C1_OPEN	CONTACTOR OPEN
M52-M2_AMP_LOW	PUMP I = 0 ALL THE TIME
M53-M2_AMP_HI	HIGH STANDBY CURRENT
M60-CTRL_ERR	CAPACITOR CHARGER
M62-CTRL_TEMP	THERMAL PROTECTION
M65-M2_TEMP	MOTOR TEMPERATURE
M66-LOW_BATT	LOW BATTERY
M74-CTRL_ERR	DRIVER SHORT CIRCUIT
M75-CTRL_ERR	CONTACTOR DRIVER FAULTY
M78-JSTK_VERR	ACCELERATOR VOLTAGE NOT OK

Display Message	Description
M79-ENABLE_ERR	INCORRECT START-UP
M80-JSTK_ERR	FORWARD + BACKWARD
M127-LOAD_ERR	LOAD CELL NO MESSAGE XX
M128-LOAD_ERR	LOAD CELLS SIGNAL NOT PAIRED
M129-JSTK_ERR	JOYSTICK SAFTEY
M130-BRK1_ERR	RELEASING THE BRAKES
M131-AO_ON	ACTIVE ANTI-LIFT
M132-AO_ERR	CHECK ANTI-LIFT
M133-TELEMATIC	TELEMATICS STOP
M134-LOW_BATT	LOW BATTERY VOLTAGE - DRIVE LOCKED
M135-OVER_TILT	TILT DRIVE LOCKED
M136-LOAD_ERR	FAULTY LOAD CELL
M137-OVERLOADED	THE PLATFORM OVERLOAD
M138-SERVICE	SERVICE MODE
M139-PL_EXT	THE DEPLOYED PLATFORM
M140-LOW_BATT	LOW BATTERY VOLTAGE - LIFT LOCKED
M141-TILT_ERXX	XX TILT SENSOR ERROR
M142-CHARGING	IN CHARGE
M144-CTRL_ERR	INTERNAL BUS ERROR

Display Message	Description
M145-TILT_ERR	NO TILT SENSOR MESSAGE
M147-SERV_MODE	FACTORY OVERRIDE
M151-KSW_ERR	THE PLATFORM AND BASE ARE ACTIVE
M152-ENABLE_ERR	REQUESTED FACILITATOR CYCLE
M153-M2_ERR_XX	XX ENCODER ERROR
M154-M2_ERR_XX	POWER NOT PAIRED XX
M155-M2_ERR_XX	SPEED NOT MATCHED XX
M156-S10_ERR	BASIC MODE + FUNCTION COMMAND
M157-M2_ERR_XX	VOLTAGE NOT MATCHED
M158-CTRL_ERR	NOT READY CONTROL DRIVER POWER
M159-CTRL_ERR	HVIL FAIL
M160-TILTED	MACHINE TILTED
M-163-M2_ERR	ED SLIP NOT MATCHED
M169-M2_ERR_XX	ENCODER ERROR XX
M170-CTRL_ERR	INCORRECT KEY voltage
M175-M2_ERR	SPEED SENSOR ERROR
M177-BRK1_ERR	SHORT CIRCUIT COIL BRAKE
M178-M2_TEMP	STOP MOTOR TEMP
M180-M2_ERR	OVERLOAD
M181-M2_ERR	INCORRECT ENCODER
M186-M2_ERR	WAIT FOR MOTOR POSITION
M187-CTRL_ERR	LIFTING + LOWERING
M188-CTRL_ERR	INTERNAL CAN BUS ERROR
M189-SEQUENCE	INCORRECT PUMP STARTING
M190-CTRL_ERR	PUMP RETURN VOLTAGE NOT GOOD
M191-A1_ERR	THE TENSION CONTROL LEVER NOT GOOD
M192-A1_ERR	THE CONTROL LEVER ACQUISITION NOT GOOD
M193-CTRL_ERR	FAULTY SMARTDRIVE
M194-CTRL_ERR	AUXILIARY BATTERY SHORT CIRCUIT
M195-BRK1_ERR	SHORT CIRCUIT POSITIVE COIL BRAKE
M196-M1_ERR	SHORT CIRCUIT MOTOR PHASE
M197-CTRL_ERR	SECONDARY INCORRECT VERSION

Display Message	Description
M198-CTRL_ERR	MAIN / SECONDARY INCORRECT CHECK PARAMETER
M199-CTRL_ERR	PARAMETER TRANSFER
M200-CTRL_ERR	VDC OFF SHORT CIRCUIT
M201-M1_ERR	TORQUE PROFILE
M202-CTRL_ERR	HIGH VOLTAGE VDC LINK
M204-BRK1_ERR	FAULTY SERVICE BRAKE
M206-CTRL_ERR	INTERNAL VOLTAGE TOO HIGH
M207-CTRL_ERR	INTERNAL VOLTAGE TOO LOW
M208-CTRL_ERR	FAULTY EEPROM
M209-CTRL_ERR	RESTORE PARAMETER
M210-CTRL_ERR	INCORRECT RAM MEMORY
M211-M2_ERR	STALL ROTOR
M212-M2_ERR	POWER NOT PAIRED
M213-C1_ERR	LC POSITIVE COIL OPEN
M214-2H-13_ERR	OPEN COIL EVP
M215-2H-13_ERR	SHORT-CIRCUIT CONTROL PILOT EVP
M216-BRK1_ERR	OPEN COIL BRAKE
M217-CB2_PWR	INCORRECT PEB
M218-M1_TEMP	ENGINE SENSOR TEMP DEFECTIVE
M219-2H-13_ERR	EVP1 POSITIVE COIL INCORRECT
M220-08C_LOW	VKEY OFF SHORT CIRCUITY
M223-C1_ERR	MC SHORT CIRCUIT COIL
M224-CHK_SECONDARY	WAITING FOR NODE
M226-JSTK_ERR	DEFECTIVE VACC
M227-CTRL_ERR	FAULT MATERIAL
M229-CTRL_ERR	FAULT MATERIAL BRAKE
M230-C1_ERR	LC OPEN COIL
M231-CTRL_ERR	CURRENT PUMP NOT ZERO
M232-CTRL_ERRXX	EV XX COMMON PILOT
M233-CTRL_ERR	SHORT CIRCUIT POWER MOSFET
M234-CTRL_ERR	EV SHORT-CIRCUIT
M235-CTRL_ERR	CTRAP THRESHOLD
M236-CTRL_ERR	CURRENT GAIN

Display Message	Description	Display Message	Description
M238-CTRL_ERR	EV FAULT MATERIAL	S79-ENABLE_ERR	INCORRECT START-UP
M239-CTRL_ERR	FAULTY CONTROLLERS	S80-JSTK_ERR	FORWARD + BACKWARD
M240-CTRL_ERR	OPEN CONTROL PILOT EVP	S127-LOADC_ERR	LOAD CELL NO MESSAGE XX
M241-COIL_ERRXX	SHORT CIRCUIT COIL EVAUX	S128-LOADC_ERR	LOAD CELLS SIGNAL NOT PAIRED
M242-COIL_ERRXX	EV OPEN COIL	S129-JSTK_ERR	JOYSTICK SAFTEY
M244-CHK_SECONDARY	SECONDARY FAULT	S130-BRK2_ERR	RELEASING THE BRAKES
M245-CTRL_ERR	IQ NOT MATCHED	S131-AO_ON	ACTIVE ANTI-LIFT
M246-CTRL_ERR	OPEN CONTROL PILOT COIL BRAKE	S132-AO_ERR	CHECK ANTI-LIFT
M248-CAN_ERRXX	NOT CAN MESSAGE	S133-TELEMATIC	TELEMATICS STOP
M249-CTRL_ERR	VERIFICATION NECESSARY	S134-LOW_BATT	LOW BATTERY VOLTAGE - DRIVE LOCKED
M250-M2_TEMP	TEMP SENSOR FAULT	S135-OVER_TILT	TILT DRIVE LOCKED
M251-CTRL_ERR	INCORRECT BATTERY	S136-LOAD_ERR	FAULTY LOAD CELL
M253-CTRL_ERR	FAULT FIELD ORIENTED CONTROL	S137-OVERLOADED	THE PLATFORM OVERLOAD
M254-CTRL_ERR	SHORT CIRCUIT CONTROL PILOT COIL BRAKE	S138-SERVICE	SERVICE MODE
S8-CTRL_ERR	CONTROLLER ERROR	S139-PL_EXT	THE DEPLOYED PLATFORM
S17-CTRL_ERR	LOGIC FAILURE #3	S140-LOW_BATT	LOW BATTERY VOLTAGE - LIFT LOCKED
S18-CTRL_ERR	LOGIC FAILURE #2	S141-TILT_ERXX	XX TILT SENSOR ERROR
S19-CTRL_ERR	LOGIC FAILURE #1	S142-CHARGING	IN CHARGE
S28-M3_VLOW	LOW Feedback VOLTAGE PUMP	S144-CTRL_ERR	INTERNAL BUS ERROR
S28-M3_VHI	HIGH Feedback VOLTAGE PUMP	S145-TILT_ERR	NO TILT SENSOR MESSAGE
S28-DRV_VLOW	LOW RETURN VOLTAGE	S147-SERV_MODE	FACTORY OVERRIDE
S28-DRV_VHI	HIGH RETURN VOLTAGE	S151-KSW_ERR	THE PLATFORM AND BASE ARE ACTIVE
S37-C1_CLOSE	CONTACTOR CLOSED	S152-ENABLE_ERR	REQUESTED FACILITATOR CYCLE
S38-C1_OPEN	CONTACTOR OPEN	S153-M3_ERR_XX	XX ENCODER ERROR
S52-M3_AMP_LOW	PUMP I = 0 ALL THE TIME	S154-M3_ERR_XX	POWER NOT PAIRED XX
S53-M3_AMP_HI	HIGH STANDBY CURRENT	S155-M3_ERR_XX	SPEED NOT MATCHED XX
S60-CTRL_ERR	CAPACITOR CHARGER	S156-S10_ERR	BASIC MODE + FUNCTION COMMAND
S62-CTRL_TEMP	THERMAL PROTECTION	S157-M3_ERR_XX	VOLTAGE NOT MATCHED
S65-M3_TEMP	MOTOR TEMPERATURE	S158-CTRL_ERR	NOT READY CONTROL DRIVER POWER
S66-LOW_BATT	LOW BATTERY	S159-CTRL_ERR	HVIL FAIL
S74-CTRL_ERR	DRIVER SHORT CIRCUIT	S160-TILTED	MACHINE TILTED
S75-CTRL_ERR	CONTACTOR DRIVER FAULTY	S161-M3_ERR	HIGH RPM
S78-JSTK_VERR	ACCELERATOR VOLTAGE NOT OK	S163-M3_ERR	ED SLIP NOT MATCHED
		S169-M3_ERR_XX	ENCODER ERROR XX



Display Message	Description
S170-CTRL_ERR	INCORRECT KEY voltage
S175-M3_ERR	SPEED SENSOR ERROR
S177-BRK2_ERR	SHORT CIRCUIT COIL BRAKE
S178-M3_TEMP	STOP MOTOR TEMP
S180-M3_ERR	OVERLOAD
S181-M3_ERR	INCORRECT ENCODER
S186-M3_ERR	WAIT FOR MOTOR POSITION
S187-CTRL_ERR	LIFTING + LOWERING
S188-CTRL_ERR	INTERNAL CAN BUS ERROR
S189-SEQUENCE	INCORRECT PUMP STARTING
S190-M1_ERR	PUMP FEEDBACK VOLTAGE NOT GOOD
S191-JSTK_ERR	CONTROL LEVER VOLTAGE NOT GOOD
S192-JSTK_ERR	THE CONTROL LEVER ACQUISITION NOT GOOD
S193-CTRL_ERR	FAULTY SMARTDRIVE
S194-CTRL_ERR	AUXILIARY BATTERY SHORT CIRCUIT
S195-BRK2_ERR	SHORT CIRCUIT POSITIVE COIL BRAKE
S196-M3_ERR	SHORT CIRCUIT MOTOR PHASE
S97-CTRL_ERR	SECONDARY INCORRECT VERSION
S198-CTRL_ERR	MAIN / SECONDARY INCORRECT CHECK PARAMETER
S199-CTRL_ERR	PARAMETER TRANSFER
S200-CTRL_ERR	VDC OFF SHORT CIRCUIT
S201-M3_ERR	TORQUE PROFILE
S202-CTRL_ERR	HIGH VOLTAGE VDC LINK
S204-BRK2_ERR	FAULTY SERVICE BRAKE
S206-CTRL_ERR	INTERNAL VOLTAGE TOO HIGH
S207-CTRL_ERR	INTERNAL VOLTAGE TOO LOW
S208-CTRL_ERR	FAULTY EEPROM
S209-CTRL_ERR	RESTORE PARAMETER
S10-CTRL_ERR	INCORRECT RAM MEMORY
S211-M3_ERR	STALL ROTOR
S212-M3_ERR	POWER NOT PAIRED
S213-C1_ERR	LC POSITIVE COIL OPEN
S214-2H-13_ERR	OPEN COIL EVP

Display Message	Description
S215-2H-13_ERR	SHORT-CIRCUIT CONTROL DRIVER EVP
S216-BRK2_ERR	OPEN COIL BRAKE
S217-CB2_PWR	INCORRECT PEB
S218-M3_TEMP	ENGINE SENSOR TEMP DEFECTIVE
S219-2H-13_ERR	EVP1 POSITIVE COIL INCORRECT
S220-08C_LOW	VKEY OFF SHORT CIRCUITY
S223-C1_ERR	MC SHORT CIRCUIT COIL
S224-CHK_SECONDARY	WAITING FOR NODE
S226-JSTK_ERR	DEFECTIVE VACC
S227-CTRL_ERR	FAULT MATERIAL
S29-CTRL_ERR	FAULT MATERIAL BRAKE
S230-C1_ERR	LC OPEN COIL
S231-CTRL_ERR	CURRENT PUMP NOT ZERO
S232-CTRL_ERR	ELECTRIC VALVE DRIVER
S233-CTRL_ERR	SHORT CIRCUIT POWER MOSFET
S234-CTRL_ERR	EV SHORT-CIRCUIT
S235-CTRL_ERR	CTRAP THRESHOLD
S236-CTRL_ERR	CURRENT GAIN
S38-CTRL_ERR	EV FAULT MATERIAL
S239-CTRL_ERR	FAULTY CONTROLLERS
S240-CTRL_ERR	OPEN CONTROL PILOT EVP
S241-COIL_ERRXX	SHORT CIRCUIT COIL EVAUX
S242-COIL_ERRXX	EV OPEN COIL
S244-CHK_SECONDARY	SECONDARY FAULT
S245-CTRL_ERR	IQ NOT MATCHED
S246-CTRL_ERR	OPEN CONTROL PILOT COIL BRAKE
S248-CAN_ERRXX	NO CAN MESSAGE
S249-CTRL_ERR	VERIFICATION NECESSARY
S50-M3_TEMP	TEMP SENSOR FAULT
S251-CTRL_ERR	INCORRECT BATTERY
S253-CTRL_ERR	FAULT FIELD ORIENTED CONTROL
S254-CTRL_ERR	SHORT CIRCUIT CONTROL PILOT COIL BRAKE

## 5.3 Wheel Reinstallation and Torquing Procedure

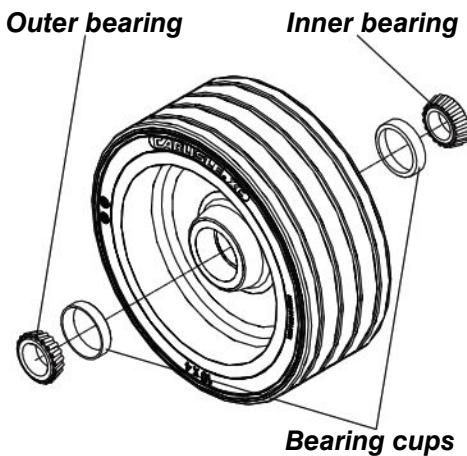
### Tools Needed

- Adjustable Torque Wrench  
Capacity 203 Nm (150 ft-lb)
- Hub Puller

### Bearing installation and grease application - Rear wheels only

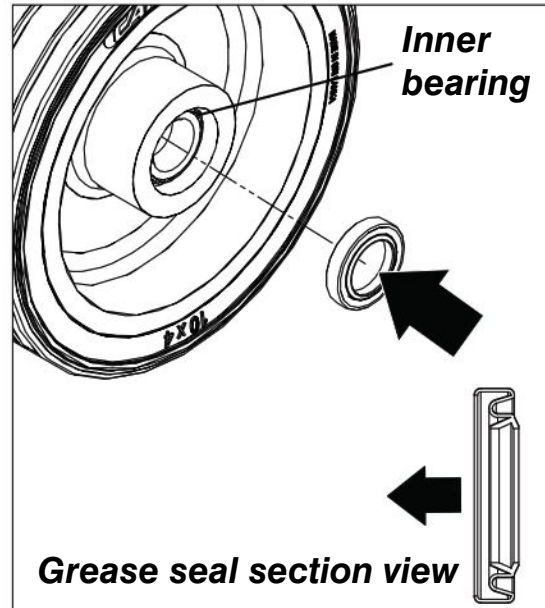
Recommended Grease Type
STARPLEX EP2
UNIREX EP2
SHELL GADUS S2

1. If the bearings are provided separately, they will need to be coated in grease before installing on the rear wheels.

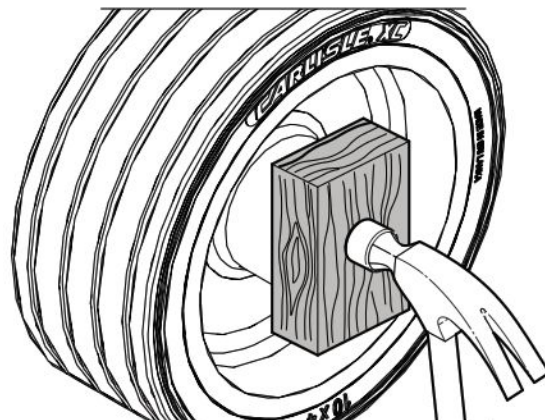


2. Thoroughly clean the bearings using solvent and allow them to dry.
3. Coat the inner and outer bearings with grease completely. Be careful not to contaminate the grease. This could cause internal damage and shorten the life span of the bearings. Contaminants include dust, dirt, sand, water or other foreign particles.
4. Install the inner and outer bearings with the tapered end first. The grease should allow the bearings to stick to the bearing cups inside the wheel assembly.

5. From the back side of the wheel, place the grease seal on the hub with the tapered end facing inwards.

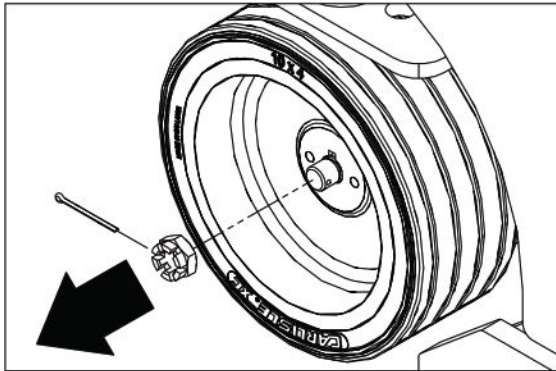


6. Lightly tap the grease seal into place using a hammer, protecting the grease seal with a flat piece of wood.

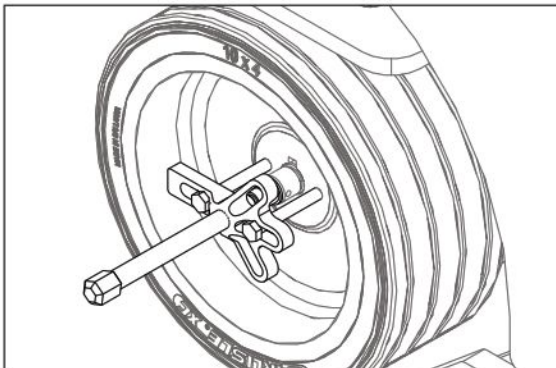


**Front Wheel Removal**

1. Use an appropriately rated lifting device to raise up the MEWP until all the wheels are off the ground. Set the MEWP on stands adequately rated to support the weight of the machine.
2. Remove and discard the cotter pin.
3. Remove and set aside the castle nut.

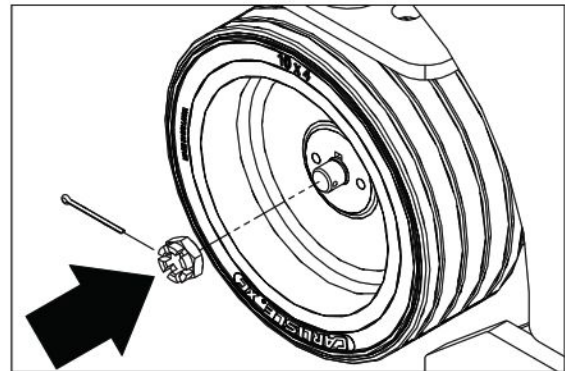


4. Use two 3/8"-24 bolts with a hub puller to remove the wheel.
5. Use a hub puller to remove the wheel from the motor.

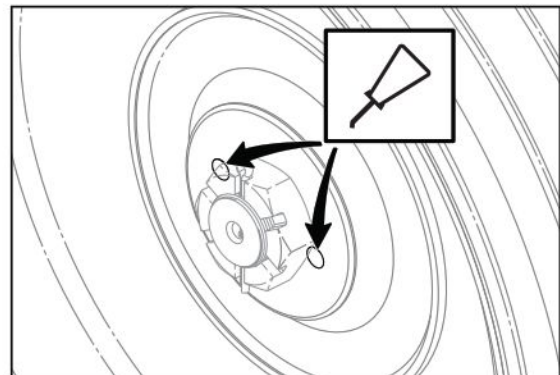


**Front Wheel Install**

1. Install the new wheel onto the spindle.
2. Install the castle nut. Finger tighten the nut.
3. Torque the castle nut to 203 Nm (150 ft-lb).
4. Insert a 1/8" x 2" cotter pin.
5. If the holes do not align to install the cotter pin, continue to torque the castle nut clockwise until the next hole is visible.
6. Make sure the cotter pin is pushed in completely.
7. Bend the ends of the cotter pin to secure the castle nut.

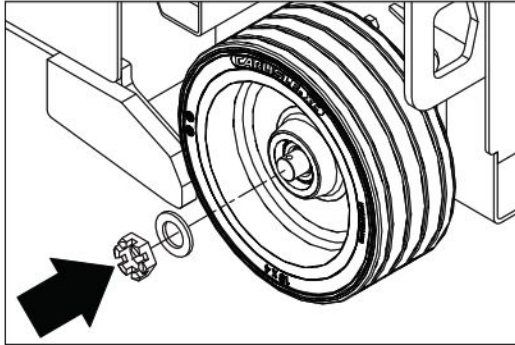


8. To limit rust bleed, it is recommended that a few drops of grease be applied to the two small tapped holes on the front wheels.



### Rear Wheel Installation

1. Install the new wheel onto the rear axle.
2. Install the castle nut and flat washer. Finger tighten the nut.

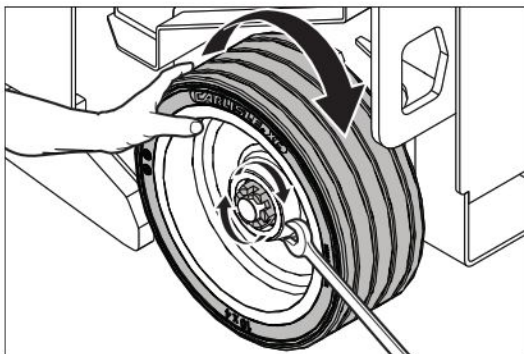


3. Rotate the wheel slowly while tightening the castle nut to approximately 68 Nm (50 ft-lb). This is to seat all the bearings in the wheel assembly.



#### NOTE

*Do not over-torque the castle nut as the bearing life would be reduced.*



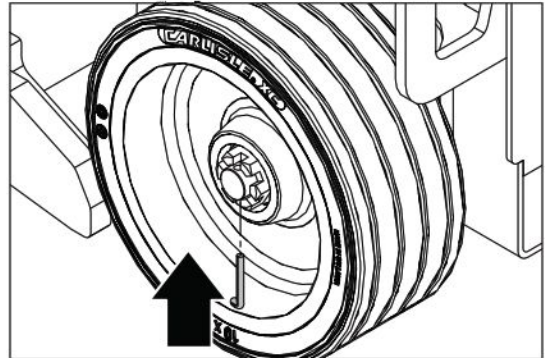
4. Loosen the castle nut to remove the torque. Do not rotate the wheel.
5. Finger tighten the castle nut until it is snug.



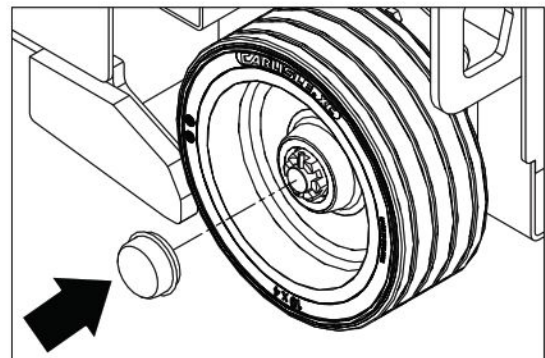
#### NOTE

*The castle nut should be free to rotate, with the only restraint being the cotter pin.*

6. Turn the castle nut back slightly until the next cotter pin hole is visible on the spindle.
7. Install a 3/16" x 1-1/2" cotter pin. Make sure the cotter pin is pushed in completely to allow the dust cap to fit.
8. Bend the ends of the cotter pin to secure the castle nut.



9. Install the dust cap over the castle nut. Be sure not to damage the castle nut while installing the dust cap.





## 5.5 Battery Maintenance

This section provides the operator with procedures on how to service and charge the battery. This also provides the charger operation instructions.

### Servicing the battery

#### **WARNING**



**Explosion hazard. Keep flames and sparks away. Do not smoke near batteries. Battery acid releases explosive gas while charging. Charge batteries in a well-ventilated area.**

#### **WARNING**

**Battery acid is extremely corrosive – wear proper eye and facial protection as well as appropriate protective clothing. If contact occurs, immediately flush with cold water and seek medical attention.**

1. Turn the main power disconnect switch to the off position.
2. Check the battery case for damage.
3. Check the battery fluid level in each battery. If the plates are not covered by at least 13 mm (1/2 in) of solution, add distilled or demineralized water.
4. Make sure all the battery connections are tight.

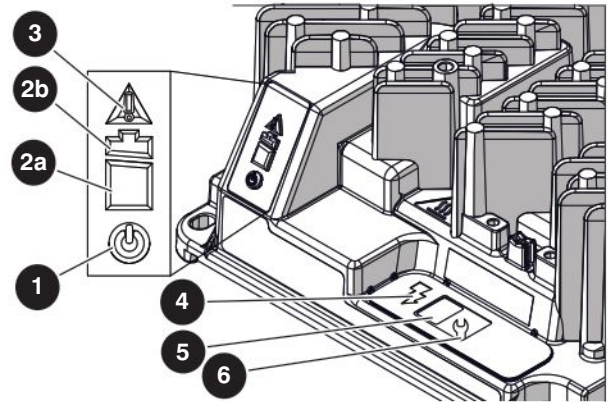
#### **NOTE**

*Do not use any batteries other than the flooded lead-acid batteries of the proper Ah rating.*

#### **WARNING**

**Use the original or equivalent to the original parts and components for the MEWP.**

## 5.5-1 Charger Maintenance



No.	Indicator type	State	Description/action required
1	AC power	Blue	Battery charger is connected to the AC power.
2a	Battery charging <80%	Flashing green	Low charge— continue charging.
		Solid green	High charge— continue charging.
2b	Battery charging >80%	Flashing green	High charge— can discontinue charging.
		Solid green	Charge complete— discontinue charging.
3	Fault/error	Solid red	Charger fault—refer to the service manual.
		Flashing amber	Error encountered— refer to the service manual.
4	Charging output	Solid yellow	Charger output is active.
5	Charge profile/error display	Current algorithm or fault/error code	N/A.
6	Select charge profile	Current charging algorithm	N/A.

### 5.5-2 Charger Profiles

#### IMPORTANT

Charge profiles differ depending on the battery type and manufacturer. Only use charge profiles with the batteries they were designed for. Using other incompatible batteries may cause poor charging performance and a decreased battery health.

1. Place the charger near a power outlet, but leave it unplugged.
2. Find your battery type in the following chart, and make a note of the profile number (starting with P).
3. Press and hold the Select Charger Profile button (wrench icon) on the Delta-Q charger. You will hear a small click when you press the button.
4. Continue to hold the Select Charger Profile button, and connect the charger to a power outlet.

5. Continue to hold the button for approximately 10 seconds or until the Error Indicator turns orange and the Battery Charging Indicator starts flashing green.
6. The current charger profile displays up to three times.



#### NOTE

*The process times out and the profile remains unchanged if there are 15 seconds of inactivity, or if the charging profile is allowed to display three times.*

7. Press and release the button to scroll through the charging profiles.
8. Select a profile, and press and hold the button for 10 seconds or until the Error Indicator and Battery Charging Indicator lights turn off.
9. Press the button again to confirm the selected profile.
10. Disconnect the charger from the power outlet.

Battery Brand	Compatible with	Profiles
U.S. Battery - US 2200 XC/XC2 Flooded, 6V, 232 Ah	200 - 255 Ah flooded	#11 (P-0-1-1)
East Penn - 8GGC2 Gel, 6V, 180 Ah	150 - 230 Ah gel	#26 (P-0-2-6)
Discover Energy - EVGC6A-A AGM, 6V, 220 Ah	220 - 400 Ah AGM	#43 (P-0-4-3)
Discover Energy - EV12A-A AGM, 12V, 140 Ah*		
U.S. Battery - US 12V XC2 Flooded, 12V, 155 Ah*	330 - 425 Ah flooded	#71 (P-0-7-1)
U.S. Battery - US 250 XC/XC2 Flooded-lead, 6V, 255 Ah	330 - 425 Ah flooded	#73 (P-0-7-3)
Trojan - T105 ELPT Flooded, 6V, 225 Ah	150 - 250 Ah 6V, 8V, 12V flooded	#3 (P-0-0-3)

\*The batteries used for these charger profiles are connected in a series-parallel circuit.  
Delta-Q IC-650 Charger Profiles

### 5.5-3 Charger Troubleshooting

The IC Series charger is continuously monitoring itself and its environment for unusual conditions. There are a few indications that may require the user's attention.

Symptom	Recommended Action
No Indicator Lights	Check AC voltage and connection to wall power.
Only Blue AC Light On	Charger is connected to AC and is waiting for a battery to be connected, or for CAN remote control commands. Battery voltage must rise over 0.1V/cell before charging will begin. Some charging algorithms require a higher battery voltage to begin.
Solid Red Fault/Error Indicator	Read fault code (e.g., F-0-0-1) number on the Charge Algorithm/Error Display and refer to the fault code table.
Flashing Amber Fault/Error Indicator	Read error code (e.g., E-0-0-1) number on the Charge Algorithm/Error Display and refer to the error code table.

### Charger Fault Codes

Fault Code	Description	Troubleshooting/Customer Actions
F-0-0-1	DC-DC Failure: LLC excessive leakage fault.	Internal charger fault. Disconnect AC and battery from charger for a minimum of 30 seconds. If it fails again, contact Skyjack service.
F-0-0-2	Power Factor Correction (PFC) Failure: PFC excessive leakage fault.	
F-0-0-3	PFC has taken too long to boost.	
F-0-0-4	The charger has been unable to calibrate the current offset.	
F-0-0-5	The voltage drop across the DC relay is too high while the relay is closed.	
F-0-0-6	Large difference between internal DC-DC and battery sense currents.	

### 5.5-4 Charger Error Codes

Fault Code	Description	Troubleshooting/Customer Actions
E-0-0-1	Battery voltage over limit in software. Typically 2.5V/cell. At the start of a charger cycle only and only for lead acid batteries. It is acceptable for the voltage to go above this during charging and when charging Lithium batteries.	<ul style="list-style-type: none"> <li>▪ Check the battery voltage and cable connections.</li> <li>▪ Check charger voltage model is appropriate for batteries.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-0-2	Battery voltage too low to start a charge cycle. Algorithm dependent. Typically 0.1V/cell.	<ul style="list-style-type: none"> <li>▪ Check the battery voltage and cable connections.</li> <li>▪ Check the charger is the correct voltage for the batteries it is connected to.</li> <li>▪ Check battery size and condition. Batteries may be overdischarged. Use another charger to bring the batteries above the minimum voltage.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-0-3	Charge time limit reached. Algorithm dependent.	<ul style="list-style-type: none"> <li>▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature.</li> <li>▪ Charger output reduced due to low AC voltages. Check AC voltages.</li> <li>▪ Check for shorted or damaged cells.</li> <li>▪ Poor battery health. Replace the battery.</li> <li>▪ Batteries too large for the charger. Replace batteries.</li> <li>▪ Very deeply discharged battery. Retry charge.</li> <li>▪ Battery connections are loose or corroded. Check connections.</li> <li>▪ Extra loads. Turn off other devices running on the battery</li> <li>▪ This error automatically clears once the charger is reset by cycling DC or by loss of AC for over 10 minutes.</li> </ul>
E-0-0-4	Battery could not be trickle charged up to the minimum voltage. May also be used for other battery-related errors depending on the algorithm.	<ul style="list-style-type: none"> <li>▪ Check for shorted or damaged cells.</li> <li>▪ Poor battery health. Replace the battery.</li> <li>▪ Check DC connections.</li> <li>▪ May be caused because of output reduced due to high temperature.</li> <li>▪ Some new batteries may trigger these alarms as there voltage dips</li> <li>▪ when charging starts before it goes onto rise.</li> </ul>
E-0-0-7	Charge amp-hour Limit reached. Algorithm dependent.	<ul style="list-style-type: none"> <li>▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature</li> <li>▪ Charger output reduced due to low AC voltages. Check AC voltage.</li> <li>▪ Check for shorted or damaged cells.</li> <li>▪ Poor battery health. Replace the battery.</li> <li>▪ Very deeply discharged battery. Retry charge.</li> <li>▪ Battery connections are loose or corroded. Check connections.</li> <li>▪ Extra loads. Turn off other devices running on the battery</li> <li>▪ This error automatically clears once the charger is reset by cycling</li> <li>▪ DC or by loss of AC for over 10 minutes.</li> </ul>



E-0-0-8	Battery temperature out of range. Algorithm dependent.	<ul style="list-style-type: none"> <li>▪ Cool or warm batteries as needed.</li> <li>▪ Check temperature sensor and connections.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-1-1	Charge disabled by external command	<ul style="list-style-type: none"> <li>▪ Charger has been disabled by an external controller over the CANbus network.</li> <li>▪ This error automatically clears once the command has been removed.</li> </ul>
E-0-1-2	Reverse polarity	<ul style="list-style-type: none"> <li>▪ Battery is connected the wrong way around. Check the battery connections.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-1-3	Battery does not take current	<ul style="list-style-type: none"> <li>▪ Check for an electrical component or loose connection between the charger and the battery.</li> <li>▪ When charging lithium batteries, make sure the charger is properly connected to the battery and battery management system.</li> <li>▪ This error automatically clears once the charger is disconnecting DC or AC.</li> </ul>
E-0-1-9	Hardware build does not support software version	<ul style="list-style-type: none"> <li>▪ The charger hardware does not support the new software version.</li> <li>▪ Existing SW is left running. Contact Delta-Q Technologies.</li> </ul>
E-0-2-0	No active algorithm selected	<ul style="list-style-type: none"> <li>▪ Reprogram the charger with its original software, algorithms, and settings.</li> <li>▪ Use the wrench button to select the correct algorithm if still available on the charger.</li> <li>▪ The problem clears automatically when an available algorithm is set on the charger, as default.</li> </ul>
E-0-2-1	High battery voltage while charging. Algorithm dependent. Typically 2.8V/cell.	<ul style="list-style-type: none"> <li>▪ When already charged, some new batteries may exhibit this error.</li> <li>▪ Disconnect the battery connection and wait for the battery voltage to fall. Reconnect the batteries to see if the condition reoccurs.</li> <li>▪ Check battery size and condition. Batteries in poor condition, with a high internal resistance, may cause this error. New batteries, if charged when already full, may also cause this error. Disconnect and reconnect the batteries a few times.</li> <li>▪ Check the battery voltage and cable connections.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>

E-0-2-2	Low battery voltage while charging. Algorithm dependent. Typically 0.1V/cell.	<ul style="list-style-type: none"> <li>▪ Another device may be drawing current from the battery.</li> <li>▪ Check the battery voltage and cable connections.</li> <li>▪ Check battery size and condition. Batteries may be overdischarged.</li> <li>▪ Use another charger to bring the batteries above the minimum voltage.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-2-3	High AC voltage error (>270 VAC)	<ul style="list-style-type: none"> <li>▪ AC voltage is too high. Connect charger to an AC source that has a stable AC voltage between 85 and 270 VAC/45-65 Hz.</li> <li>▪ In newer software versions this does not prevent charging.</li> <li>▪ This error will automatically clear once the condition has been corrected.</li> </ul>
E-0-2-4	Charger failed to turn on properly	<ul style="list-style-type: none"> <li>▪ Disconnect AC input and battery for 30 seconds. If the error persists, contact Delta-Q Technologies.</li> </ul>
E-0-2-5	AC voltage has dipped below 80 VAC 3 times in 30 seconds	<ul style="list-style-type: none"> <li>▪ AC source is unstable. This could be caused by an undersized generator and/or input cables that are too long or too small.</li> <li>▪ Connect the charger to an AC source with a stable AC voltage between 85 and 270 VAC/45-65 Hz.</li> <li>▪ This error will automatically clear once the condition has been corrected.</li> </ul>
E-0-2-8	Attempt to select algorithm incompatible with this software	<ul style="list-style-type: none"> <li>▪ Update charger software, continue to use existing algorithm* or select a different charging algorithm that is compatible.</li> </ul> <p><b>* Notes</b></p> <ul style="list-style-type: none"> <li>▪ If selecting a different algorithm, the existing algorithm will remain in the charger.</li> <li>▪ If upgrading an existing algorithm, the existing algorithm will be deleted. Contact Delta-Q Technologies for a software upgrade to run the new algorithm.</li> </ul>
E-0-2-9	Cannot transmit on CAN bus	<ul style="list-style-type: none"> <li>▪ Check the physical CAN connector, electrical bus conditions, and other CAN modules for correct functioning. For example, check that termination resistance is approximately 60 ohms.</li> </ul>
E-0-3-0	CAN heartbeat timeout on Battery module	<ul style="list-style-type: none"> <li>▪ May be caused by a missing heartbeat message. Check the CAN bus battery module for correct function.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-3-1	The Vref for the ADC measurements has triggered an alarm	<ul style="list-style-type: none"> <li>▪ Internal charger error. Disconnect AC and the battery for a minimum of 30 seconds and retry.</li> <li>▪ If the problem persists, contact Delta-Q Technologies.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>

E-0-3-2	CAN Heartbeat Lost	<ul style="list-style-type: none"> <li>▪ An error was detected with the CAN heartbeat communications with a registered node being guarded.</li> <li>▪ Check the networked CANbus device(s) for correct functioning.</li> <li>▪ This alarm does not display or get logged on the charger but does appear on the CAN bus via an emergency message.</li> </ul>
E-0-3-6	Battery temperature sensor is missing or shorted	<ul style="list-style-type: none"> <li>▪ Check sensor connections.</li> <li>▪ The charger behavior when this fault occurs can be configured. OEMs may contact Delta-Q Technologies for more information.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-3-8	Fan will not turn	<p>(Fan-equipped models only)</p> <ul style="list-style-type: none"> <li>▪ Check fan connections.</li> <li>▪ Check to make sure the fan turns freely and is not obstructed.</li> <li>▪ This error automatically clears once the condition has been corrected.</li> </ul>
E-0-4-0	Fan voltage pulled low	<p>(Fan-equipped models only)</p> <ul style="list-style-type: none"> <li>▪ Check to make sure the fan turns freely.</li> </ul>
E-0-4-5	Battery disconnected	<ul style="list-style-type: none"> <li>▪ Battery disconnected</li> <li>▪ Reconnect the battery or check the wiring</li> </ul>
E-0-4-6	Invalid PDO Length	<ul style="list-style-type: none"> <li>▪ Check to make sure all PDOs are valid length.</li> <li>▪ This error automatically clears once the condition has been corrected</li> </ul>
E-0-4-7	Platform overvoltage alarm	<ul style="list-style-type: none"> <li>▪ A battery or some other source has been connected to the charger that exceeds the hardware's design limits.</li> </ul>

## 5.6 Mast Lubrication

### **⚠ CAUTION**

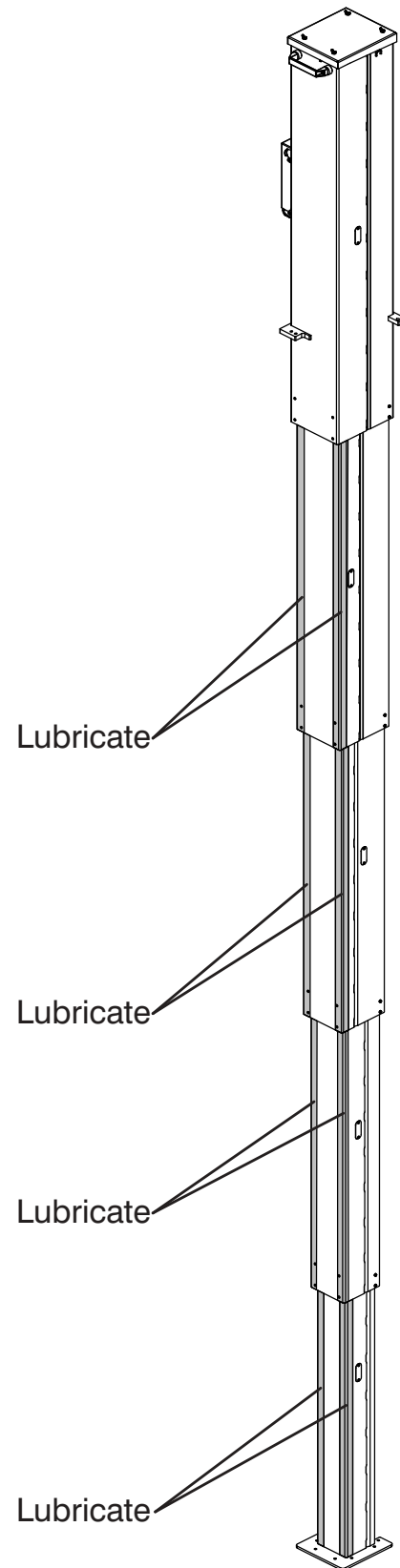
Risk of personal injury or equipment damage. Always use suitable lifting equipment and safe lifting practices when performing the following procedure.

### **⚠ WARNING**

Risk of personal injury. Do not stand or pass under a suspended load.

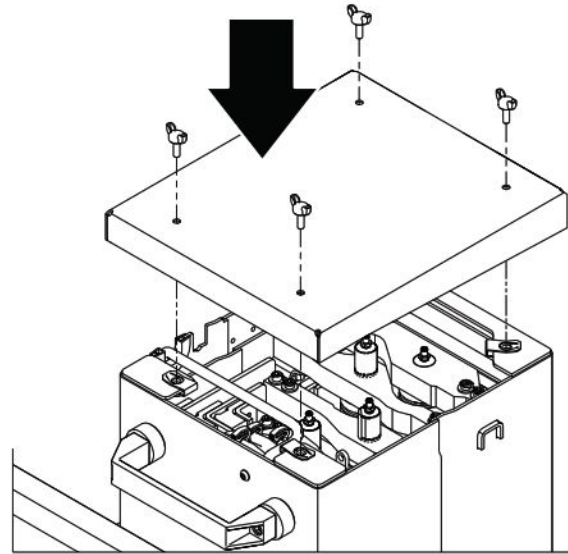
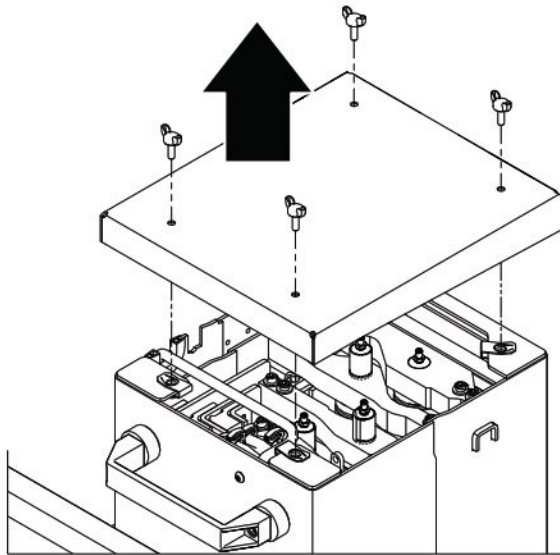
#### 5.6-1 Outer Mast Lubrication

1. Use the base controls to fully extend the mast.
2. Turn the main disconnect switch to the off position.
3. Clean any existing lubricant off of the sides of the vertical mast.
4. Apply DuPont Multi-Use Lubricant (**158692**) or any PTFE wax-based dry lubricant, in a 38 mm (1-1/2") wide strip along the outside front corners of each mast section. Do not apply lubricant to the topmost outer mast.
5. Wait 10 minutes for the lubricant to dry.
6. Use the base controls to retract the mast.

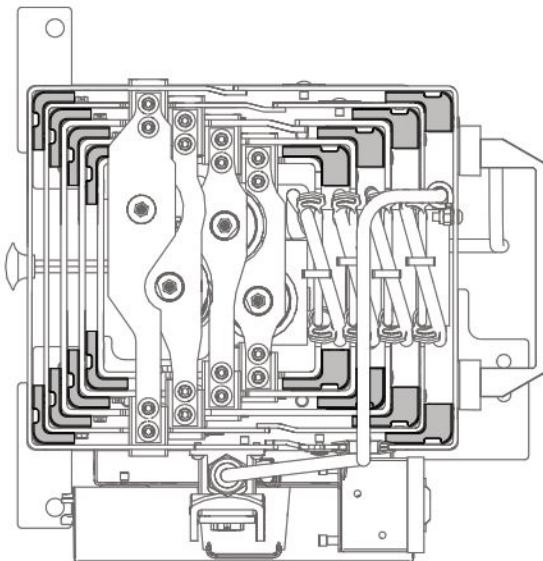


### 5.6-2 Inner Mast Lubrication

1. Use the base controls to retract the mast almost completely.
2. Turn the main disconnect switch to the off position.
3. Enter the platform.
4. Remove and set aside the top mast cover and wing screws.
5. Apply DuPont Multi-Use Lubricant (**158692**) or any PTFE wax based dry lubricant, behind and around all top wear pads in each section of the mast.
6. Exit the platform.
7. Use the base controls to fully raise and lower the platform three times to spread the lubricant.
8. Install the the top cover and wing screws onto the top of the mast.

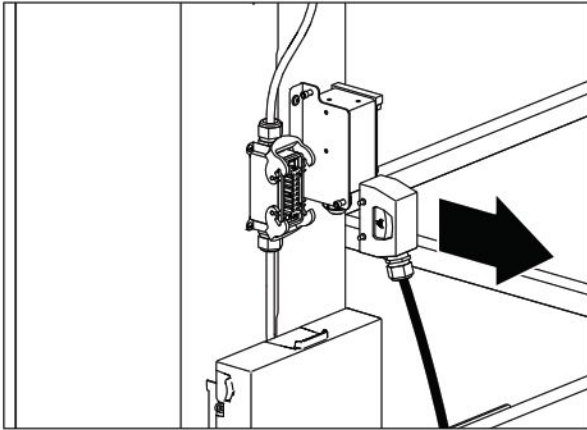


5. Apply DuPont Multi-Use Lubricant (**158692**) or any PTFE wax based dry lubricant, behind and around all top wear pads in each section of the mast.

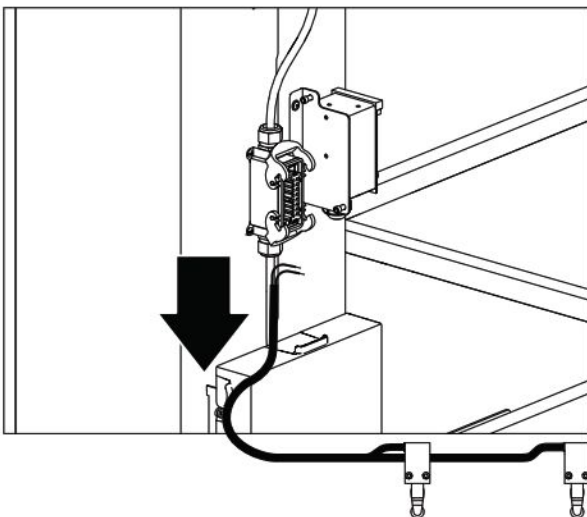


## 5.7 Platform Removal

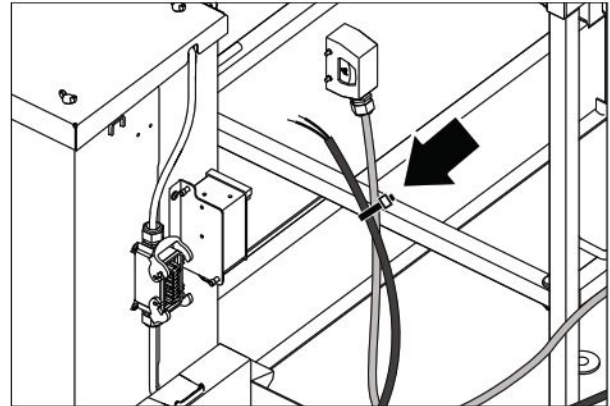
1. Disconnect the platform control cable from the mast electrical housing.



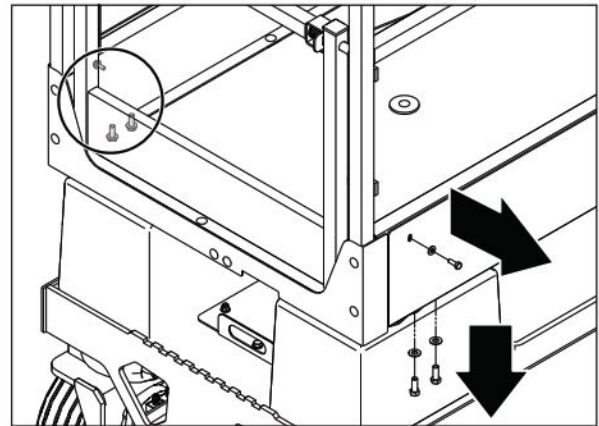
2. Use a screwdriver to open the housing so you can see the wire connections.
3. Remove the limit switch connections from the mast electrical housing.
4. Loosen the strain relief from the bottom of the housing and pull out the limit switch wires.



5. Attach the platform control and limit switch cables to the platform railing using tie wraps.

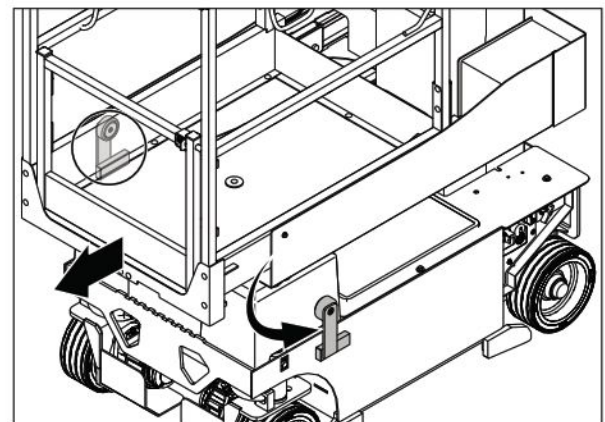


6. Remove and set aside the three bolts that secure the traverse platform to the lower platform.



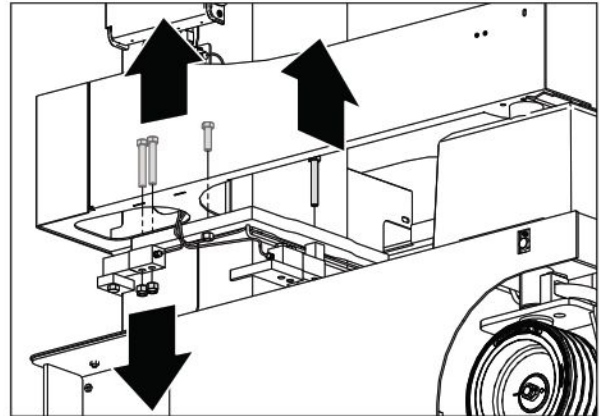
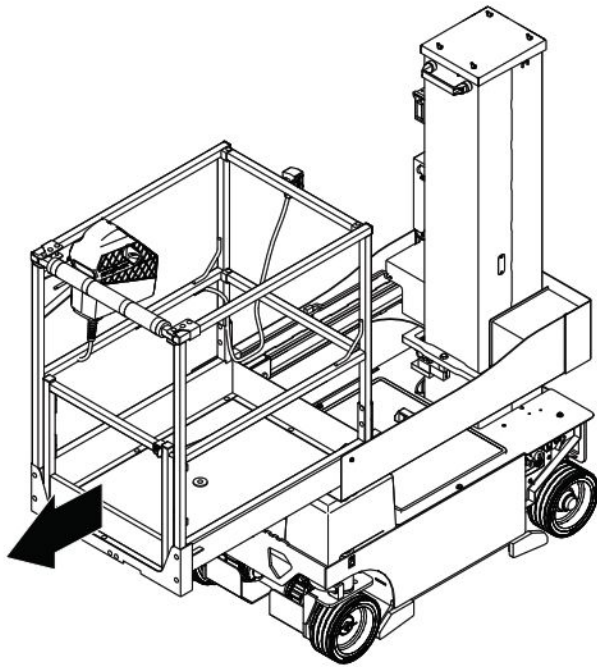
7. Extend the platform a little bit so you can access the front rollers.

8. Remove and set aside the two front rollers.

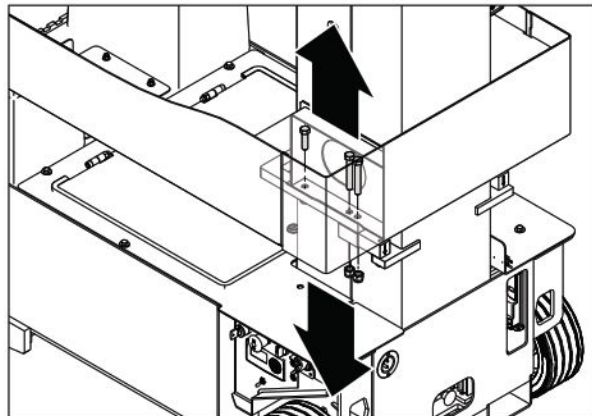




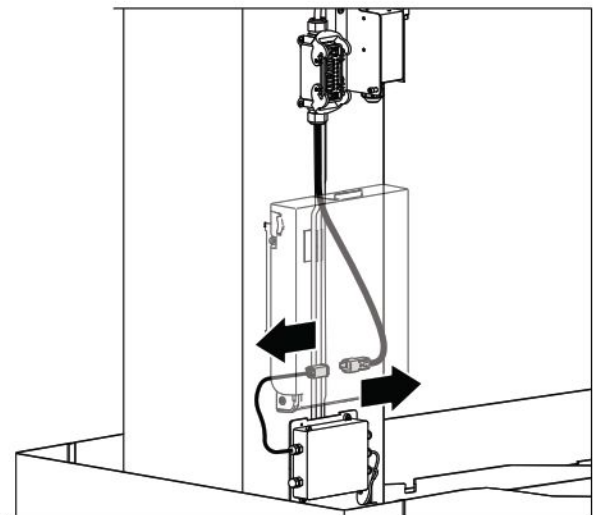
9. Use a suitably rated lifting device to pull out the platform fully and set it aside on a protective surface.



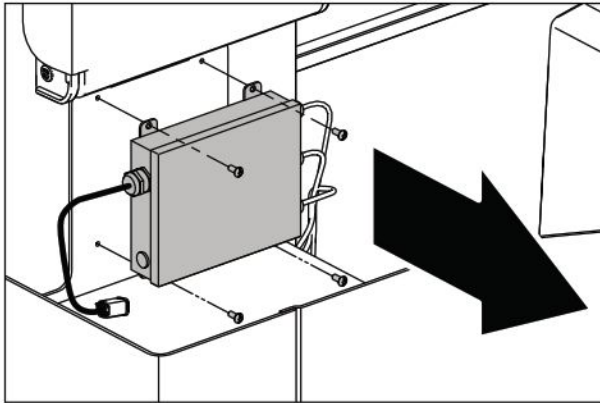
10. Remove the bolts and nuts that secure the lower platform to the mast.
11. Make sure the load cells stay attached to the mast.



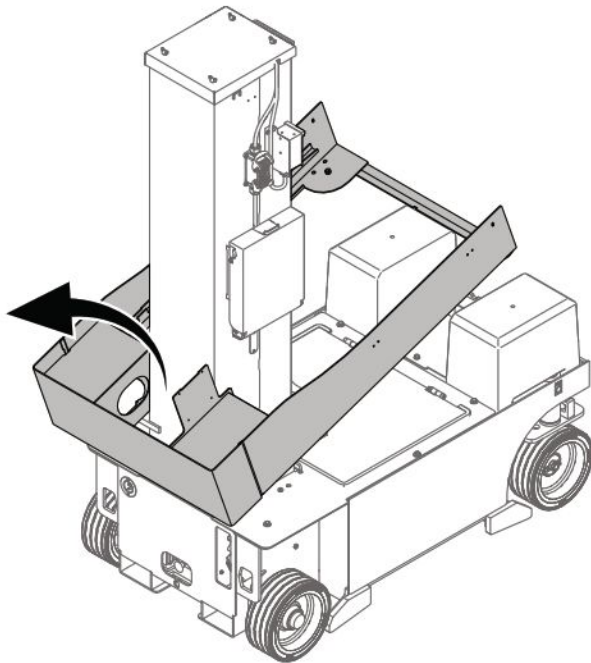
12. Disconnect the connection from the junction box to the mast cable.



13. Remove and set aside the hardware from the junction box.
14. Put the junction box on the chassis.



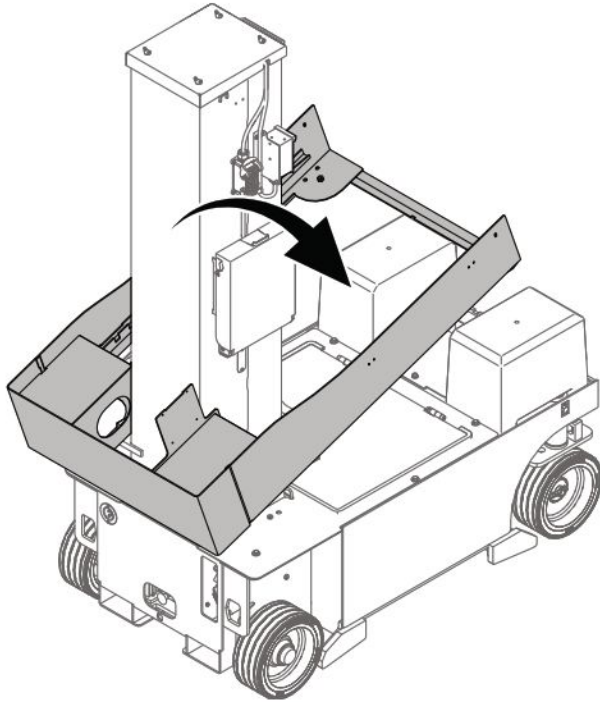
15. Tilt the lower platform backwards.
16. Use an appropriate lifting device or a second person to help remove the lower platform.



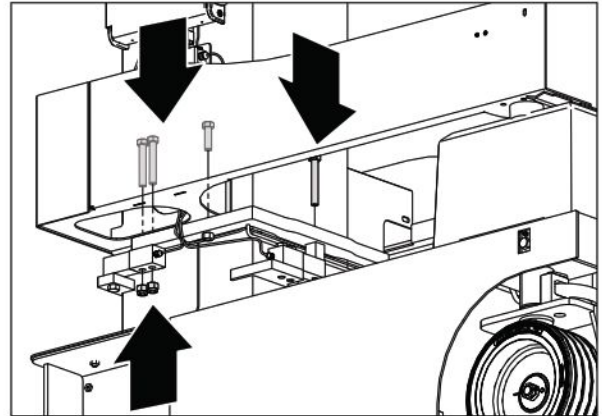
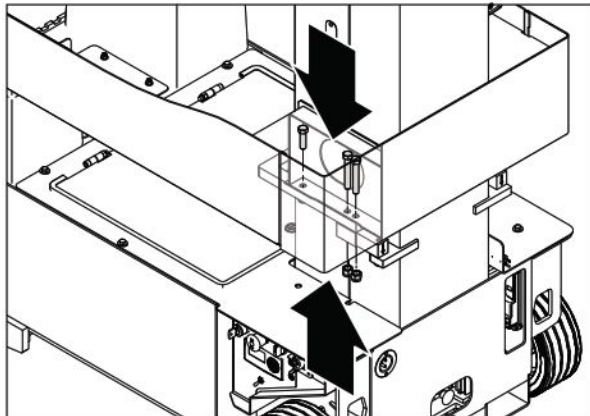


## 5.8 Platform Installation

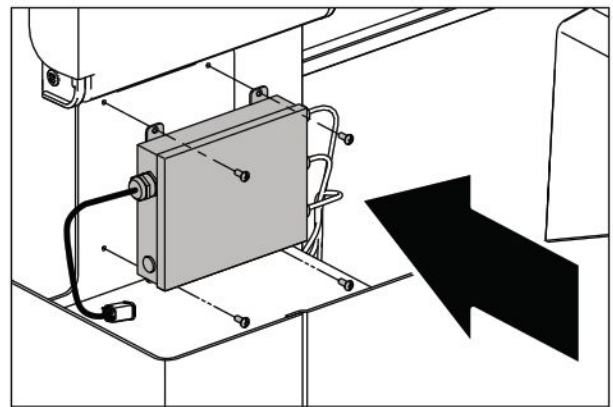
1. Use an appropriate lifting device or a second person to help install the lower platform.
2. Tilt the platform towards the chassis.



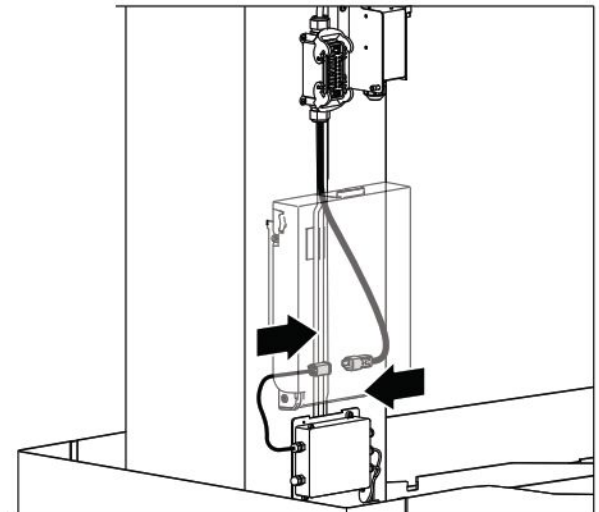
3. Use the bolts and nuts removed earlier to secure the lower platform to the mast load cells.



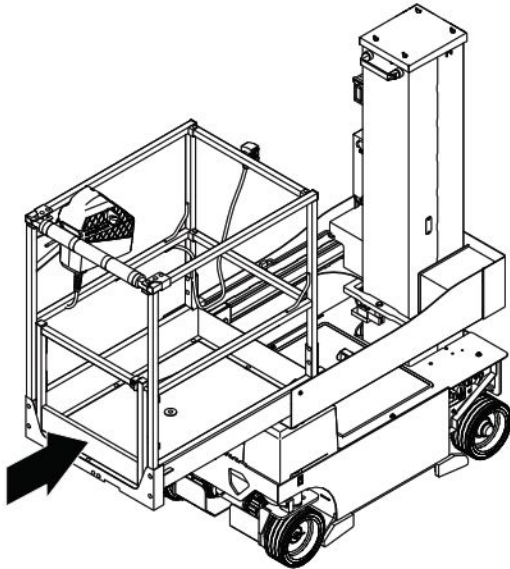
4. Use the screws removed earlier to secure the junction box to the lower platform.



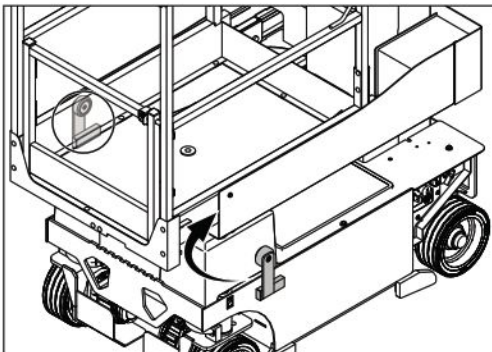
5. Connect the junction box connector to the mast electrical connector.



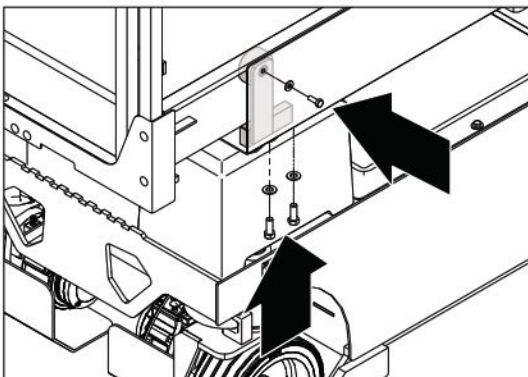
6. Install the traverse platform onto the lower platform. Do not push in the platform fully so you can install the front rollers.



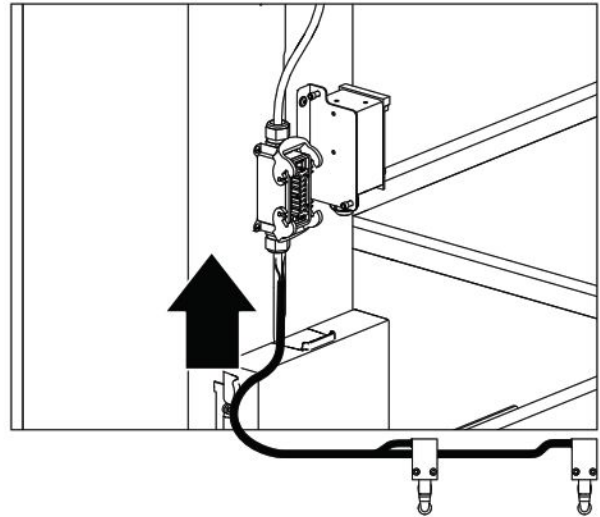
7. Insert the front rollers between the traverse platform and the lower platform.



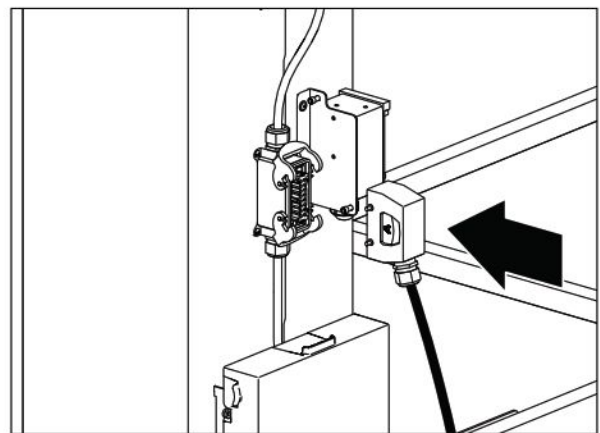
8. Use the bolts and washers removed earlier to secure the front rollers.  
9. Push the platform in fully.



10. Use a screwdriver to open the mast electrical housing so you can see the wire connections.  
11. Loosen the strain relief from the bottom of the housing and insert the limit switch wires.  
12. Connect the limit switch wires to the mast electrical housing. Refer to section 3.12 Base Limit Switch for the correct wire connections.

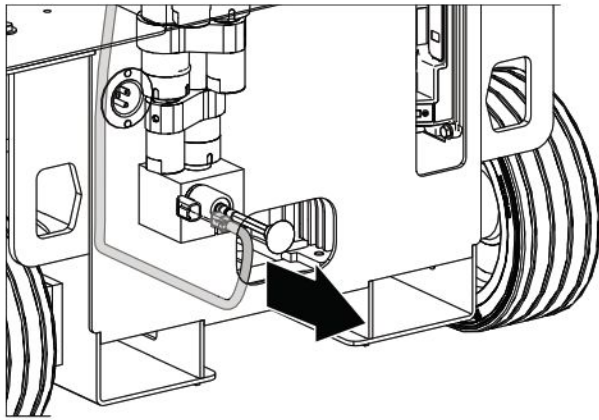


13. Connect the platform control cable to the mast electrical housing.

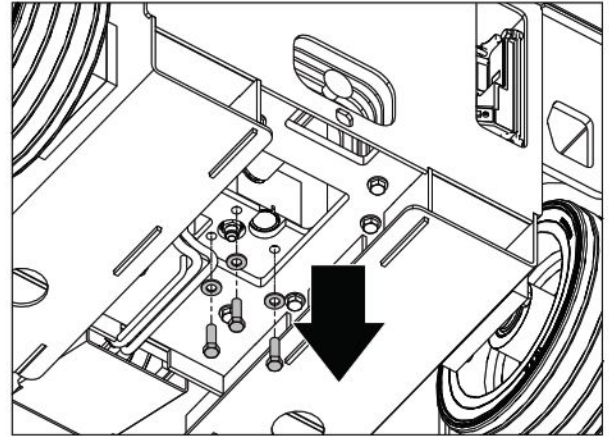


## 5.9 Lift Cylinder Removal

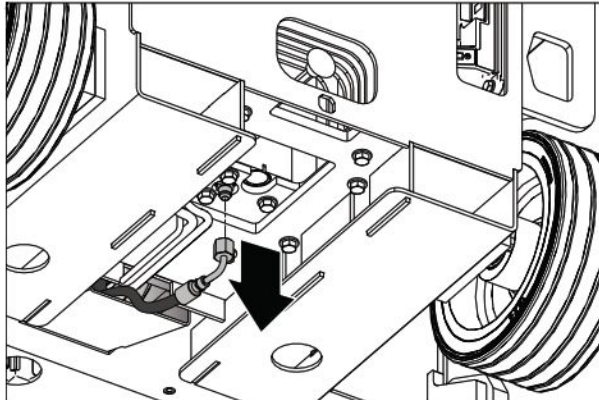
1. Disconnect the electrical connector from the holding valve coil at the bottom of the lift cylinder.



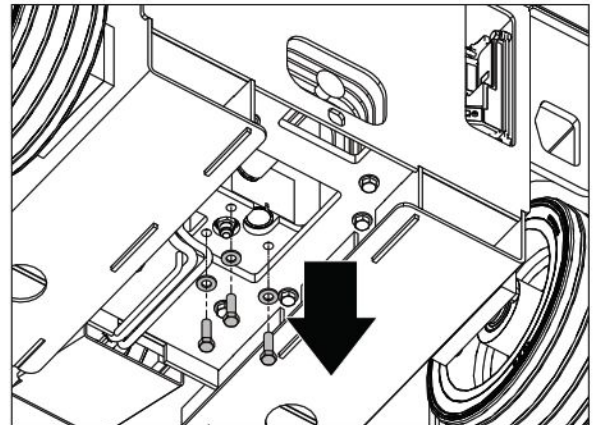
3. Remove and set aside the hardware from the bottom of the chassis that secures the lift cylinder.



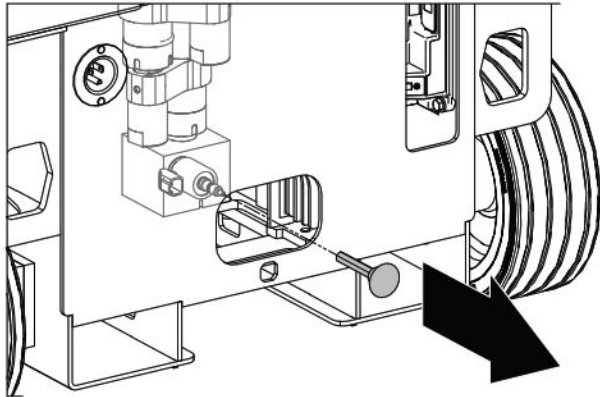
2. Disconnect the hydraulic hose from the bottom of the holding valve manifold. Put a cap and plug on all open hydraulic ports and fittings.



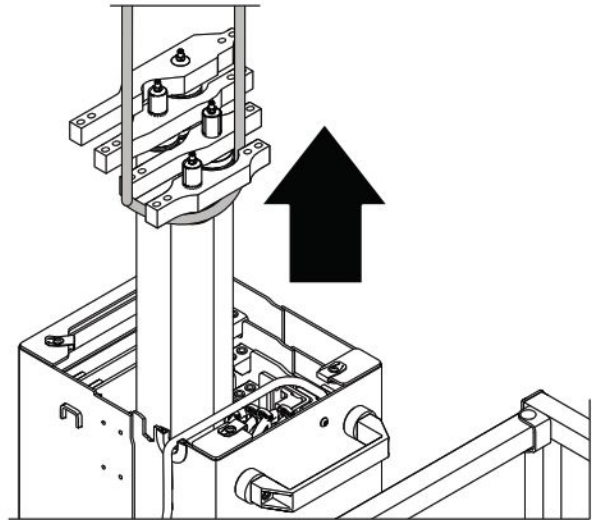
4. Remove and set aside the hardware from the bottom of the chassis that secures the lift cylinder.



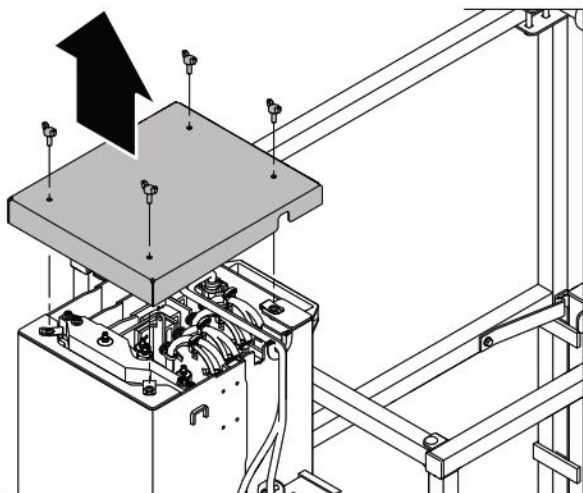
- 5. Remove and set aside the hex standoff and red knob from the holding valve manifold.



- 7. Use lifting straps to raise the lift cylinder out of the mast.
- 8. Set aside the lift cylinders on a protective surface.



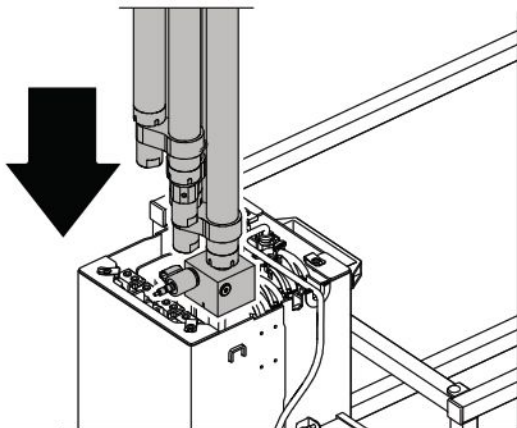
- 6. Remove and set aside the mast cover and wing screws.



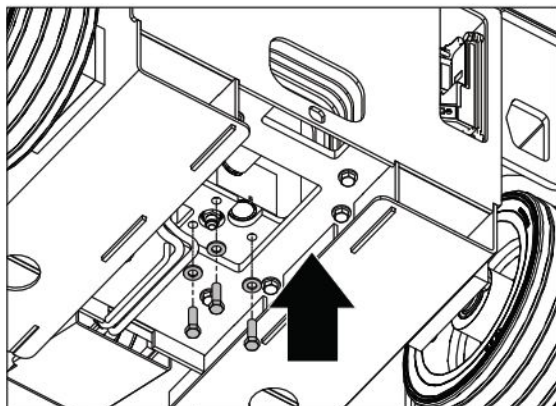


## 5.10 Lift Cylinder Installation

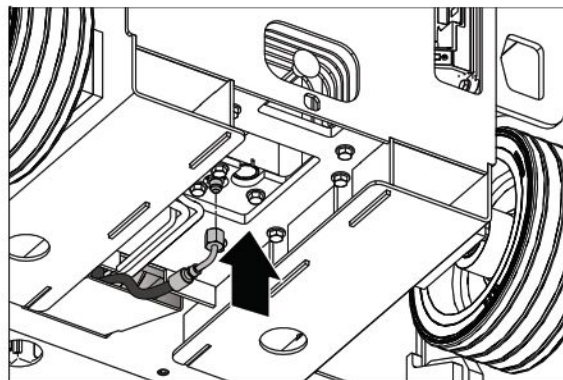
1. Use lifting straps to raise the lift cylinder and install it inside the mast. Make sure the holding valve coil faces the rear of the machine.



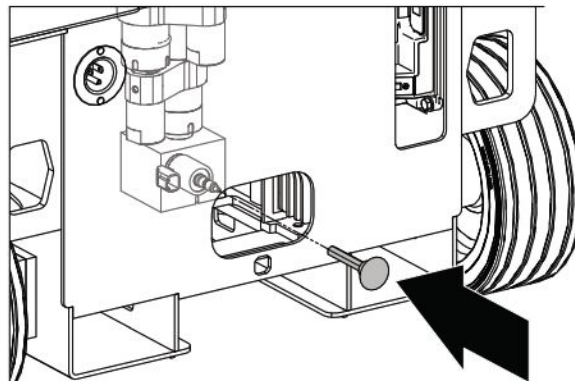
2. Use the bolts and washers removed earlier to secure the lift cylinder from the bottom of the chassis.



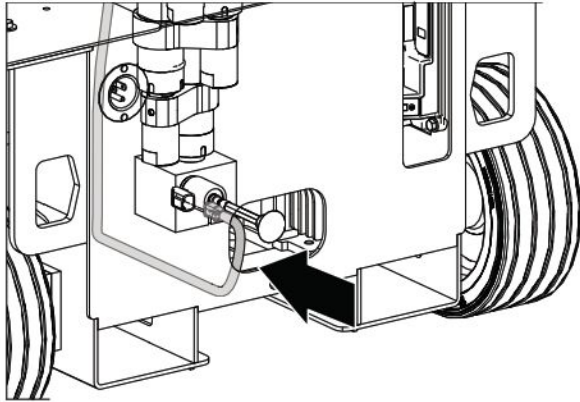
3. Connect the hydraulic hose to the holding valve fitting.



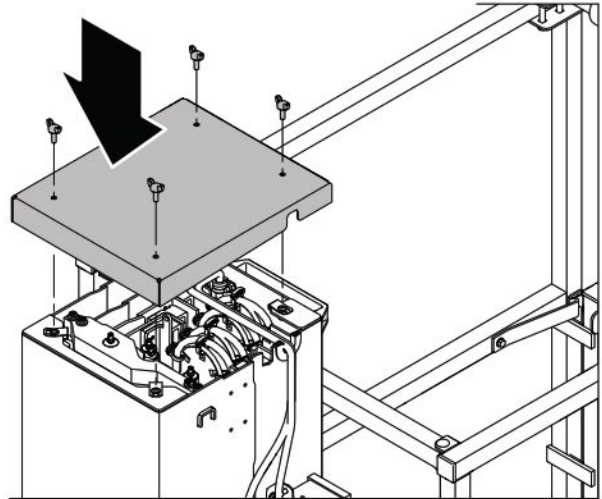
4. Install the hex standoff and red knob on the holding valve manifold.



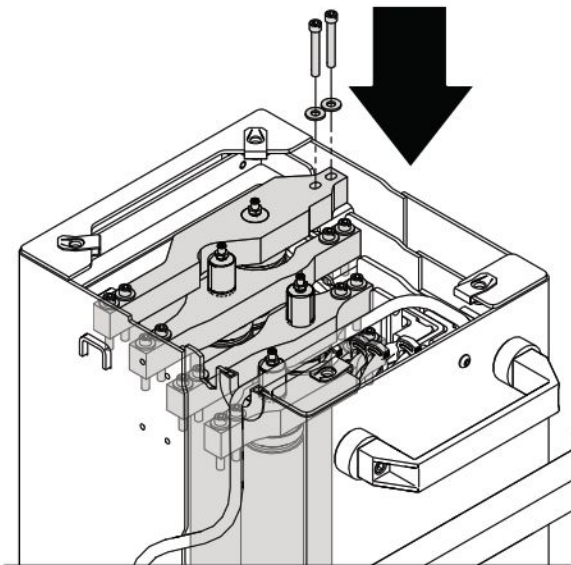
- 5. Connect the electrical connector to the holding valve coil.



- 7. Put the mast cover on top of the mast.
- 8. Fasten it in place with the wing screws removed earlier.

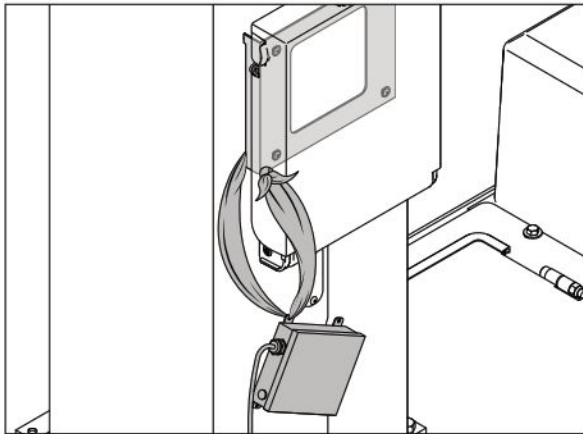


- 6. Use the bolts and washers removed earlier to secure the lift cylinder to the mast.

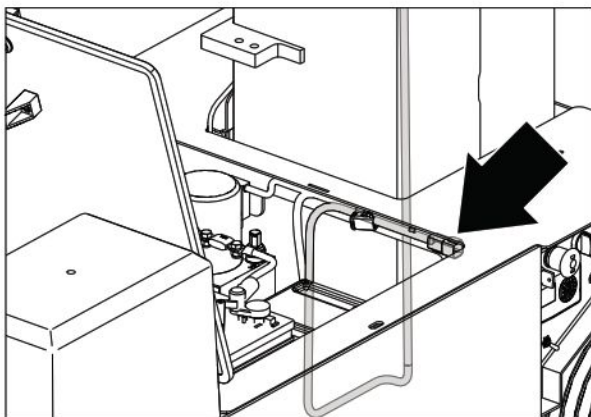


## 5.11 Mast and Lift Cylinder Removal

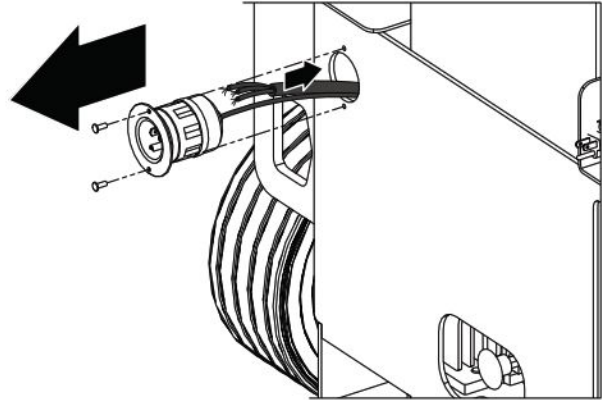
1. Remove the platform and set it aside on a protective surface. Refer to section [5.7 Platform Removal](#).
2. Use a sling to secure the junction box to the manual box bracket. Make sure the junction box does not hang from the load cell wires when the mast assembly is removed later.



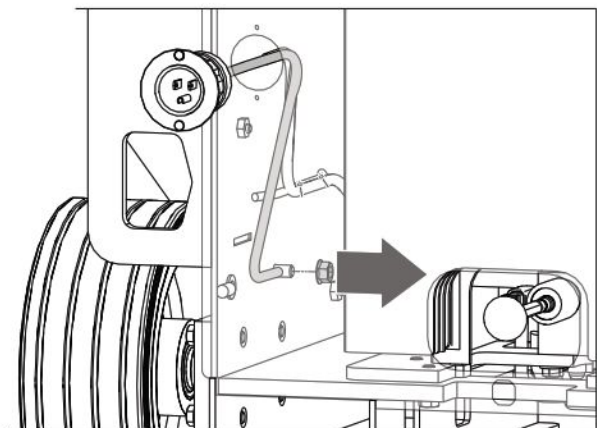
3. Open the service compartment cover.
4. Disconnect the mast connector from the main harness.
5. Cut zip ties along the cable bundles to free the mast cable.



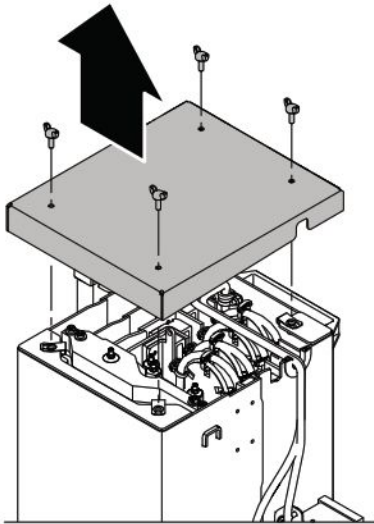
6. At the rear of the machine, drill out the rivets that secure the AC inlet to the chassis.
7. Pull out the AC inlet.
8. Disconnect the wires from the back of the AC inlet.



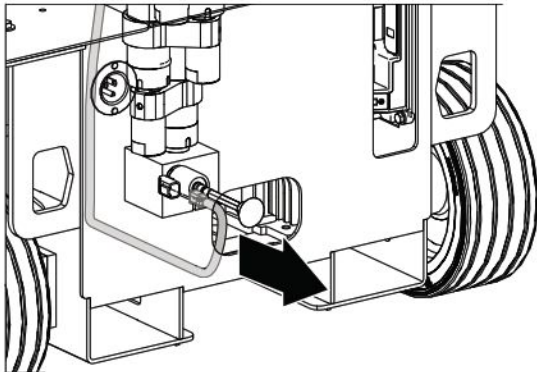
9. Remove and set aside the nut that secures the ground wire to the chassis. You may need to remove the chassis cover to access the wire.
10. Cut the tie wraps that secure the AC power cable to the cable carrier and existing cable bundles.



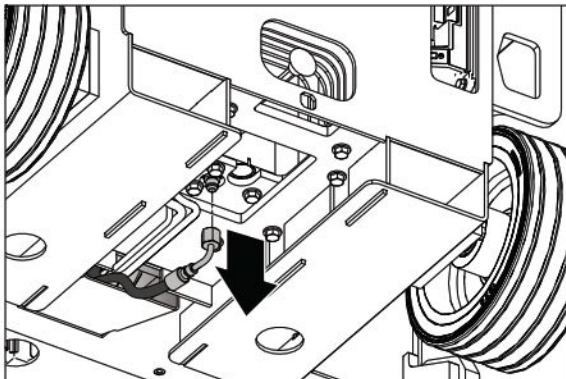
11. Remove and set aside the mast cover and wing screws.



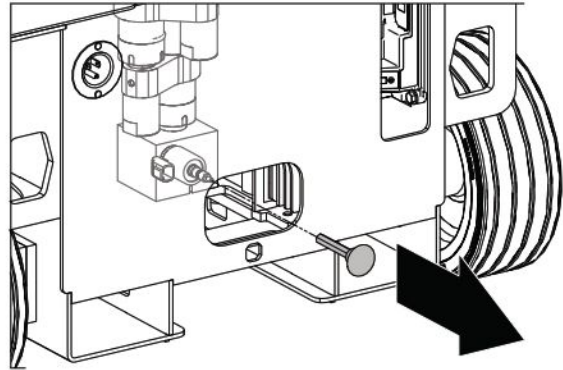
12. Disconnect the electrical connector from the holding valve coil at the bottom of the lift cylinder.



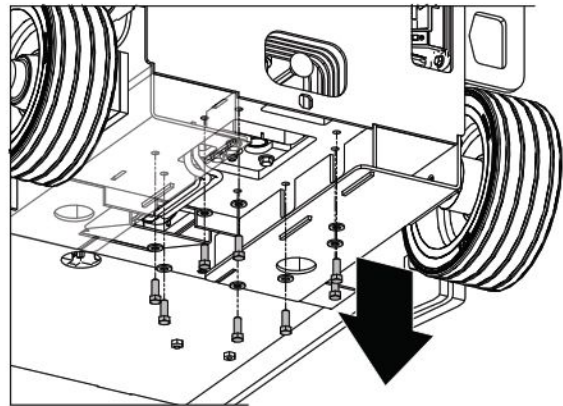
13. Disconnect the hydraulic hose from the bottom of the holding valve manifold. Put a cap and plug on all open hydraulic ports and fittings.



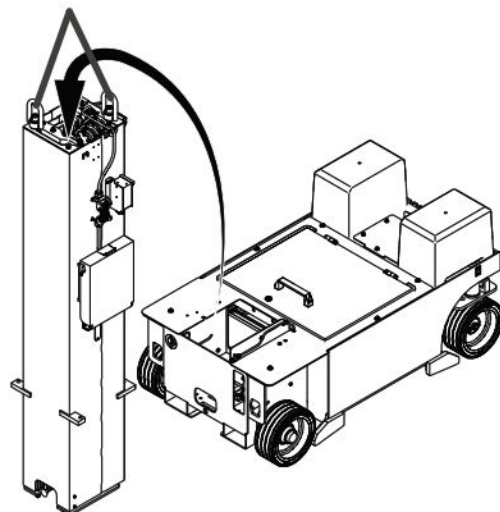
14. Remove and set aside the hex standoff and red knob from the holding valve manifold.



15. Remove and set aside the bolts and washers that secure the mast to the chassis.



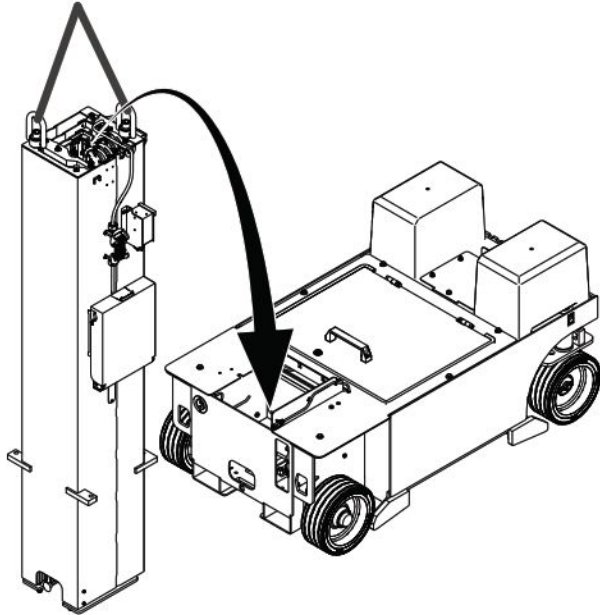
16. Attach hoist rings to mast #5.  
 17. Use lifting straps to raise the mast assembly above the chassis.  
 18. Set aside the mast assembly.



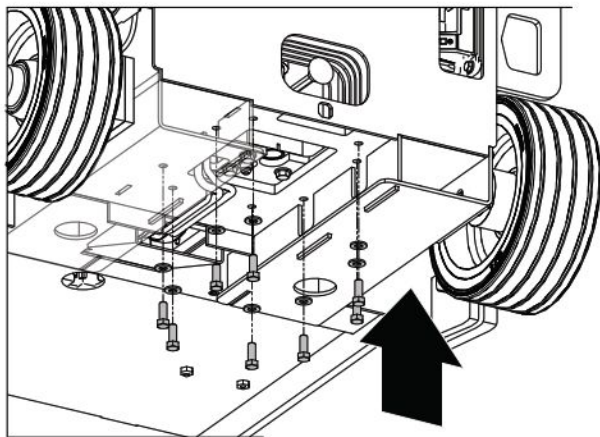


## 5.12 Mast and Lift Cylinder Installation

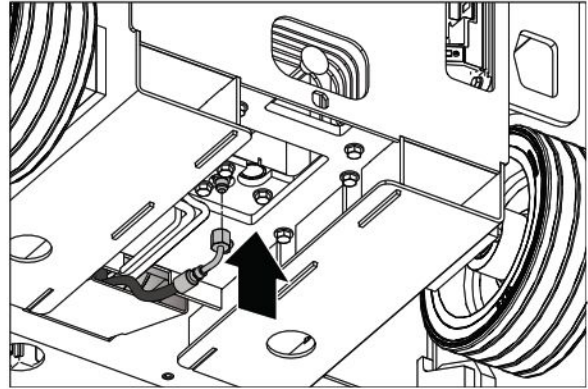
1. Use lifting straps and hoist rings to raise the mast and lift cylinder and install it onto the chassis. Make sure the holding valve coil faces the rear of the machine.



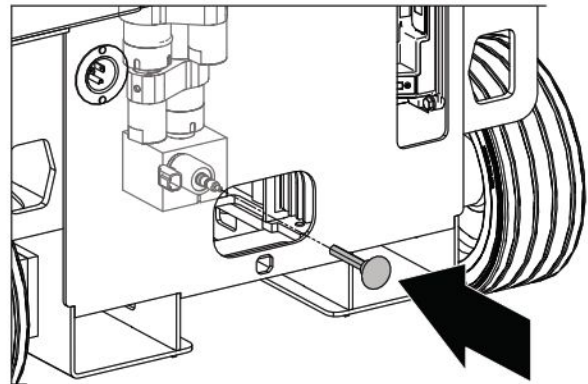
2. Use the bolts and washers removed earlier to secure the mast assembly to the chassis.



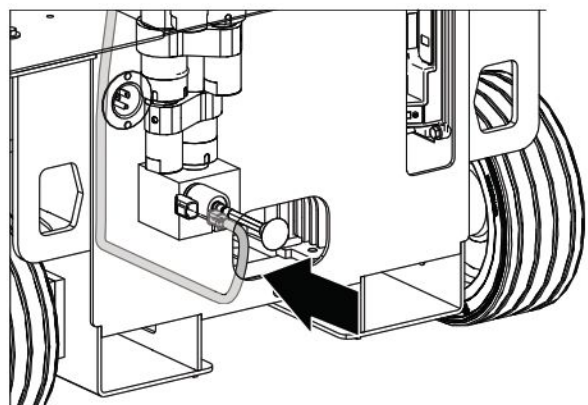
3. Connect the hydraulic hose to the holding valve fitting.



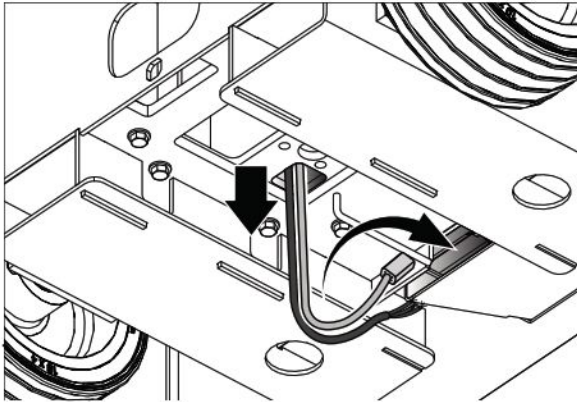
4. Install the hex standoff and red knob on the holding valve manifold.



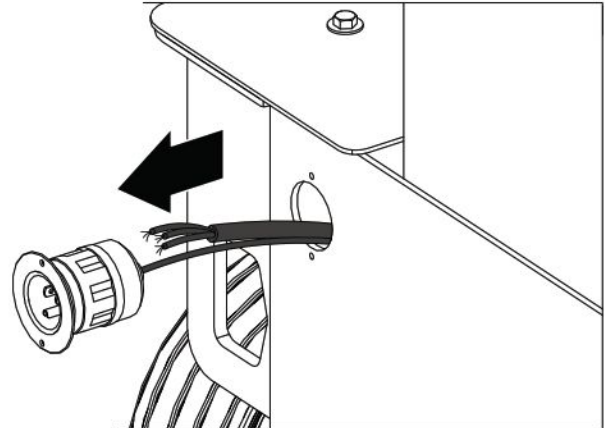
5. Connect the electrical connector to the holding valve coil.



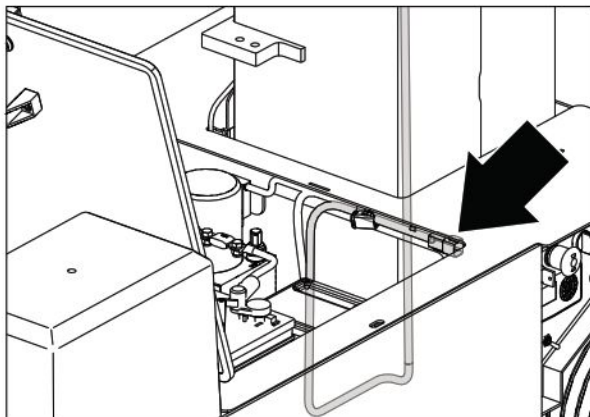
6. Route the mast cable and AC power cable towards the hole below the chassis.



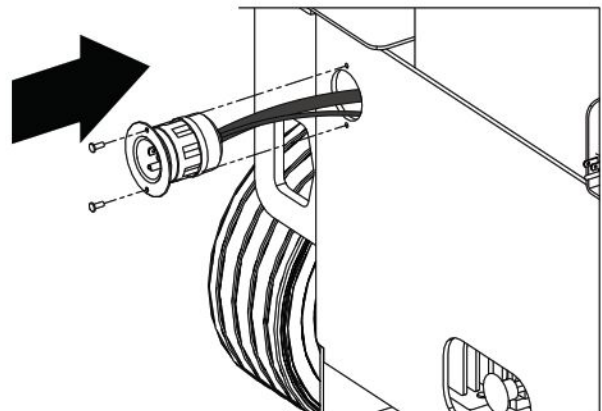
10. Route the AC power cable towards the rear of the machine and out the AC inlet hole.
11. Connect the AC power cable to the inlet.
  - Green wire to the green terminal
  - Black wire to the bronze terminal
  - White wire to the silver terminal



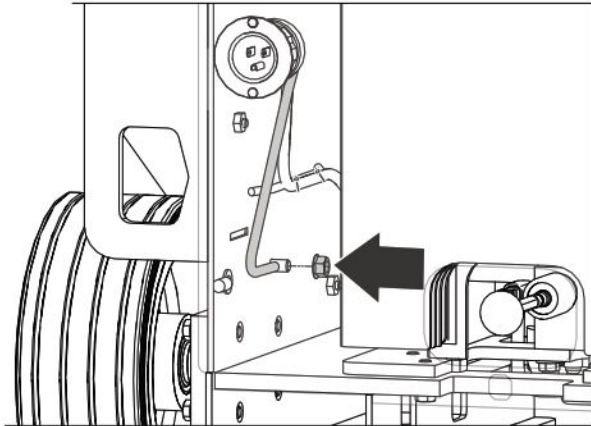
7. Open the service compartment cover.
8. Connect the mast electrical connector to the main harness.
9. Use tie wraps to secure the mast cable to the existing cable bundles.



12. Use new pop rivets to secure the AC inlet to the chassis.



13. Use the nut removed earlier to secure the green ground wire from the AC inlet to the chassis
14. Use tie wraps to secure the AC power cable to the existing cable bundles.



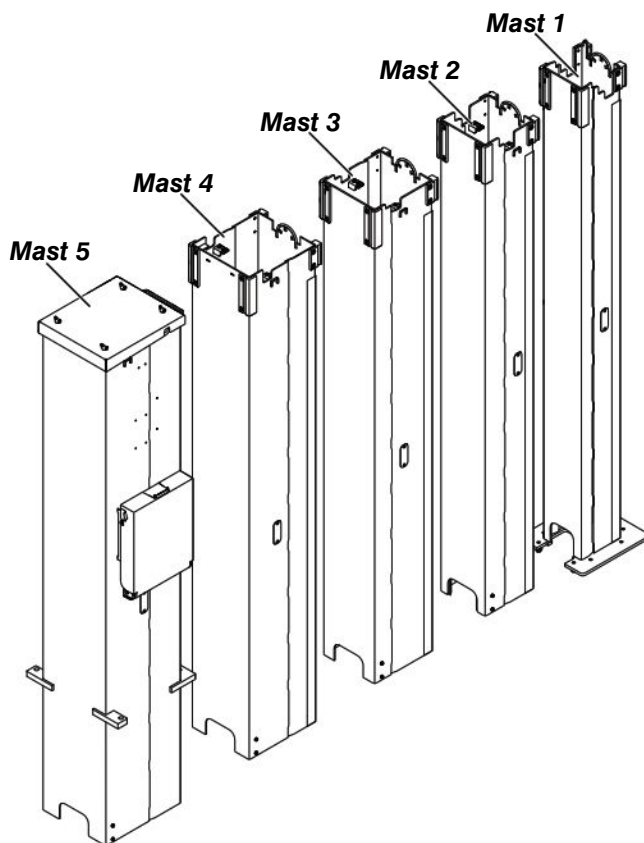
15. Install the platform. Refer to section [5.8 Platform Installation](#).

## 5.13 Wear Pad Replacement

1. Remove and set aside the platform. Refer to section [5.7 Platform Removal](#).
2. Remove and set aside the lift cylinder. Refer to section [5.9 Lift Cylinder Removal](#).

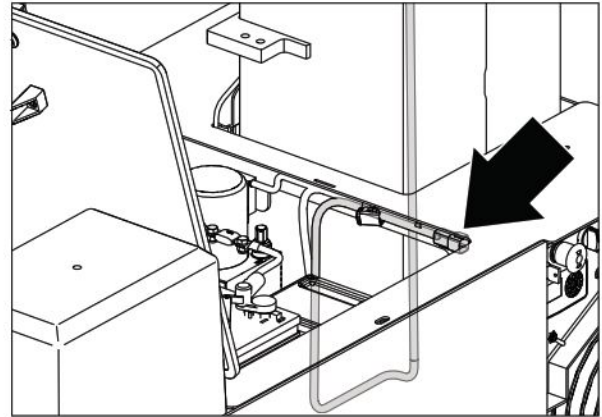
### 5.13-1 Mast identification

The masts will need to be removed one section at a time. Refer to the image below for the mast identification number when following this procedure..

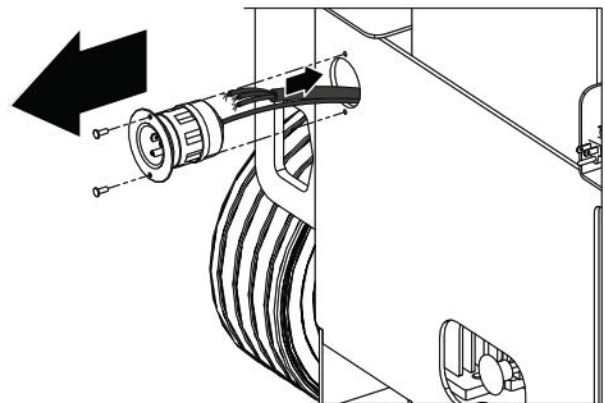


### 5.13-2 Remove mast 5 and wear pads

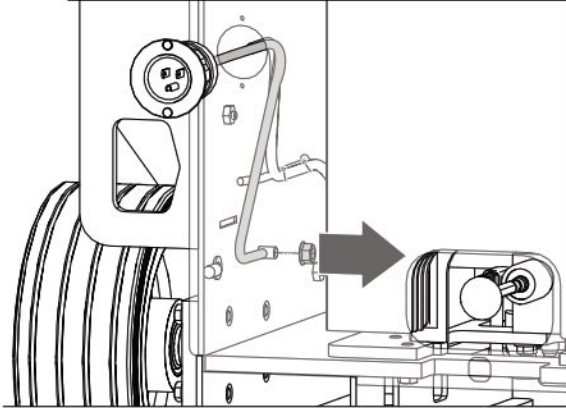
1. Open the service compartment cover.
2. Disconnect the mast connector from the main harness.
3. Cut zip ties along the cable bundles to free the mast cable.



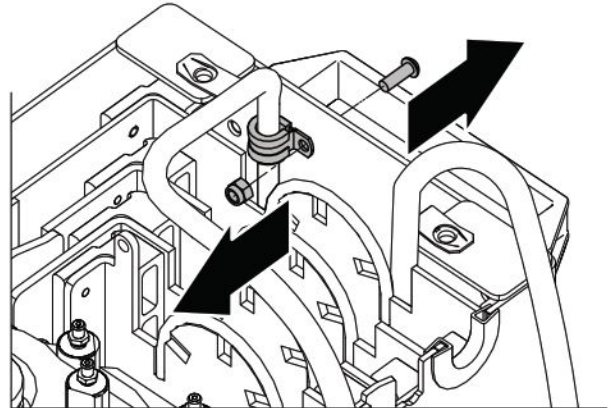
4. At the rear of the machine, drill out the rivets that secure the AC inlet to the chassis.
5. Pull out the AC inlet.
6. Disconnect the wires from the back of the AC inlet.



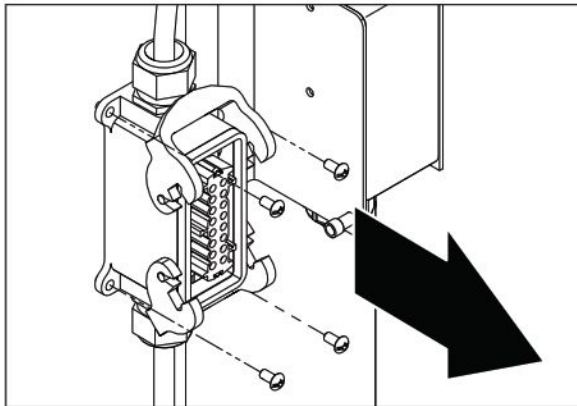
7. Remove and set aside the nut that secures the ground wire to the chassis. You may need to remove the chassis cover to access the wire.
8. Cut the tie wraps that secure the AC power cable to the cable carrier and existing cable bundles.



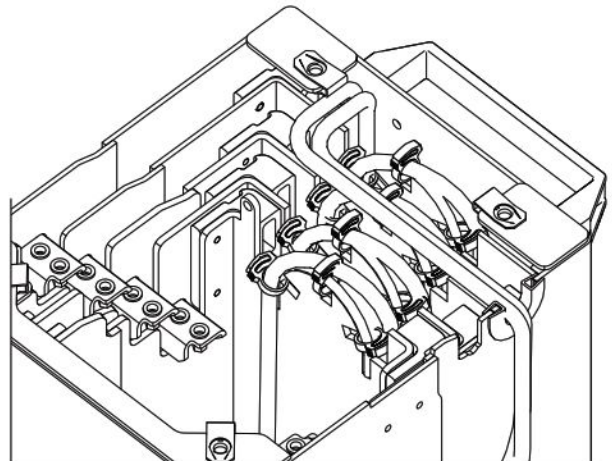
11. Remove and set aside the cable clamp and hardware.



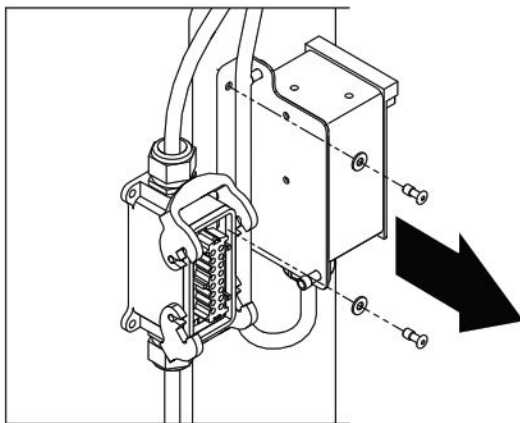
9. Remove and set aside the screws that secure the mast electrical housing to the mast.



12. Remove and set aside the cable clips from the mast cable.

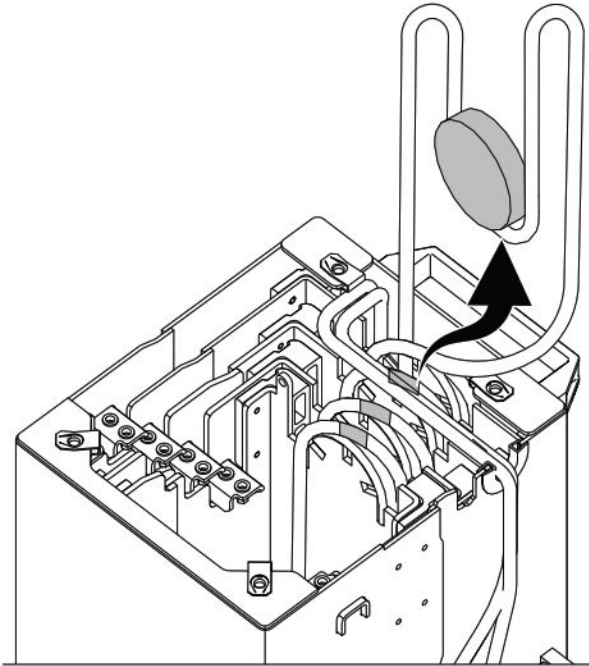


10. Remove the rivets and washers that secure the AC outlet to the mast. Set aside the washers.

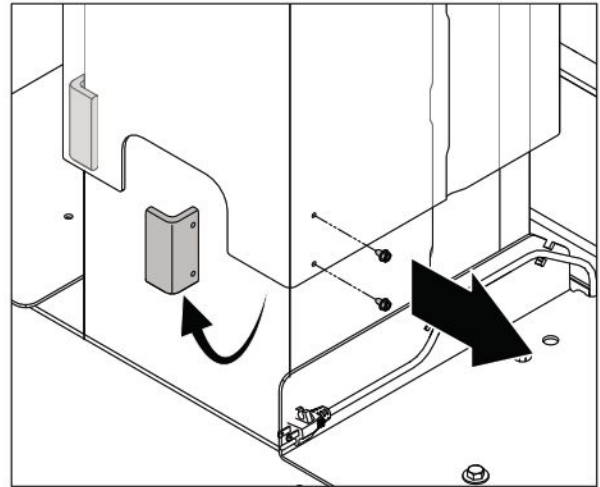




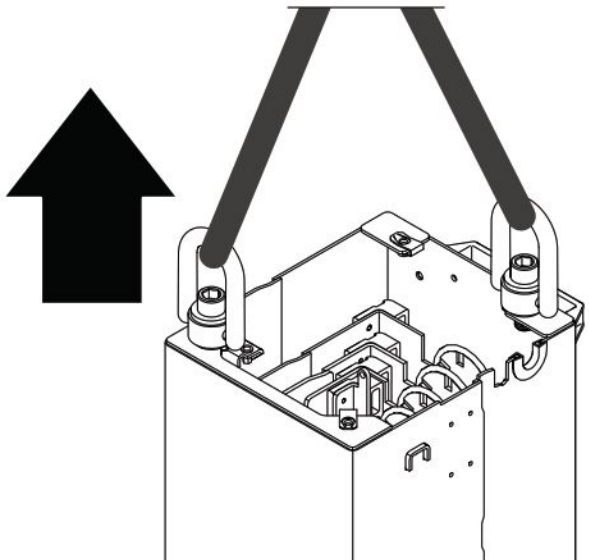
- 13. Slowly pull the loose mast cable upwards. There will be four steel weighted rollers at the bottom of each cable coil. Set the steel weights and mast cable aside.



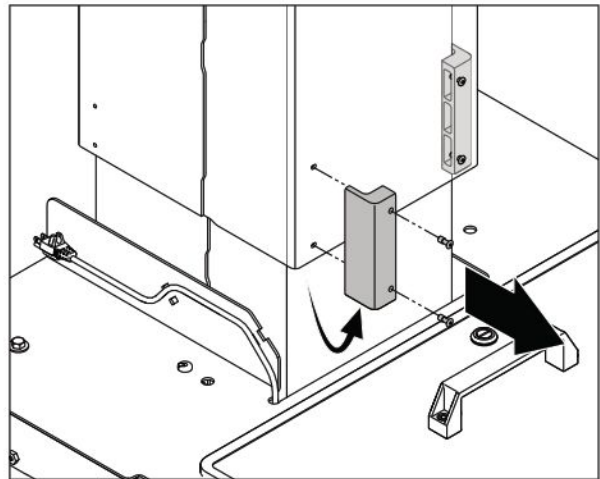
- 15. Remove and discard the rear wear pads and thread rolling screws from the bottom of the mast.



- 14. Use hoist rings and lifting straps to raise mast 5 until the bottom wear pads are visible.



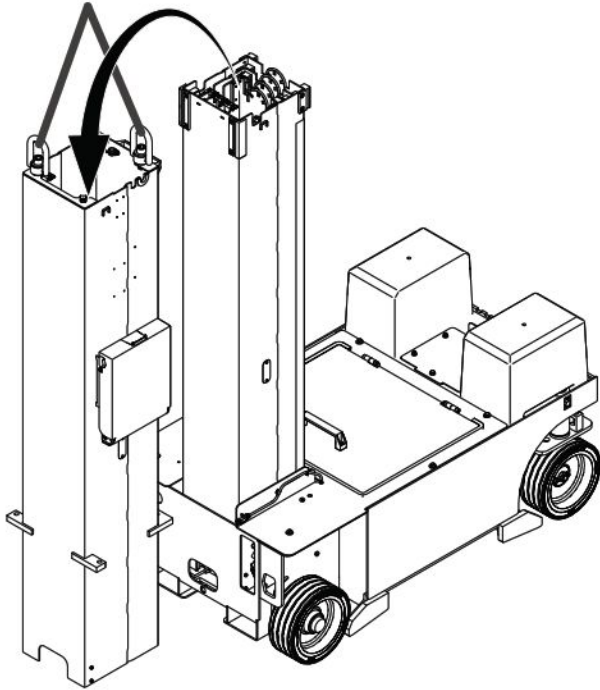
- 16. Remove and discard the front wear pads and pop rivets from the bottom of the mast.



## **⚠ CAUTION**

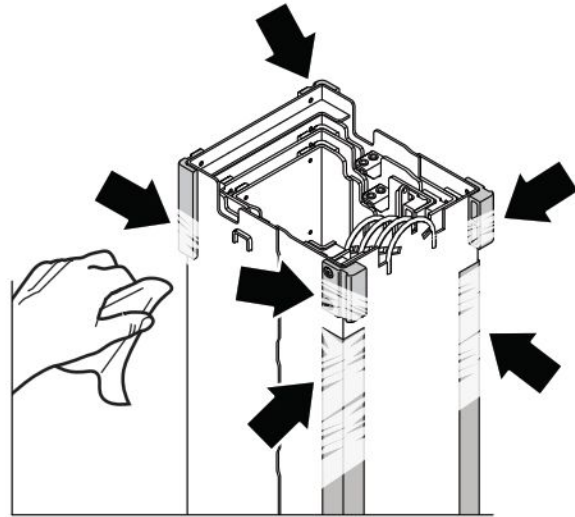
**Crush hazard. Personnel on the ground must stay away from the mast while it is being moved. If you do not obey, there is a risk of minor or moderate injury.**

17. Remove mast 5 completely and set it aside on a protective surface.

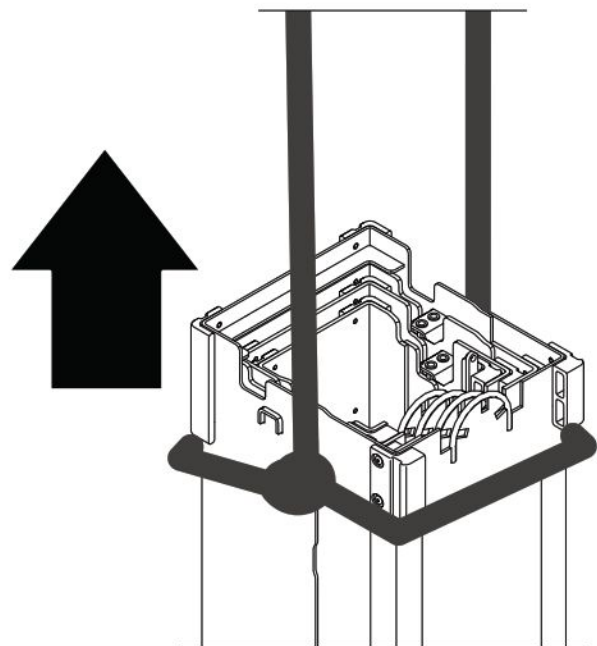


### 5.13-3 Remove mast 4 through 2 and wear pads

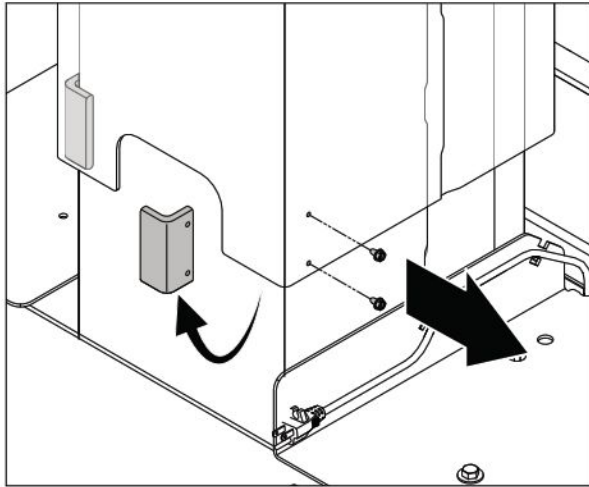
1. Wipe away the lubricant around the four wear pads at the top and the two front corners of the mast.



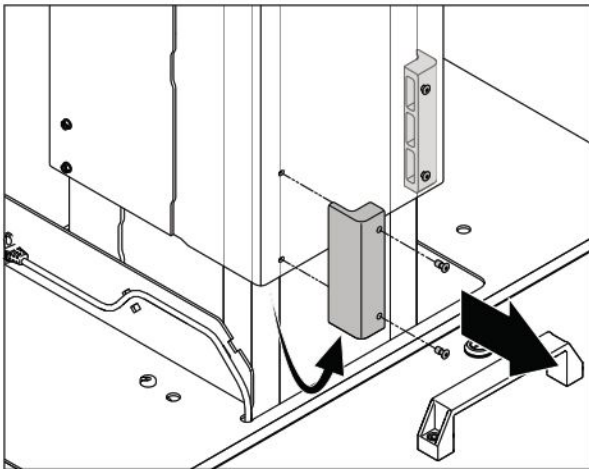
2. Wrap lifting straps around the mast below the top wear pads.
3. Raise the mast until the bottom wear pads are visible.



4. Remove and discard the rear wear pads and thread rolling screws at the bottom of the mast.



5. Remove and discard the pop rivets and front wear pads at the bottom of the mast.



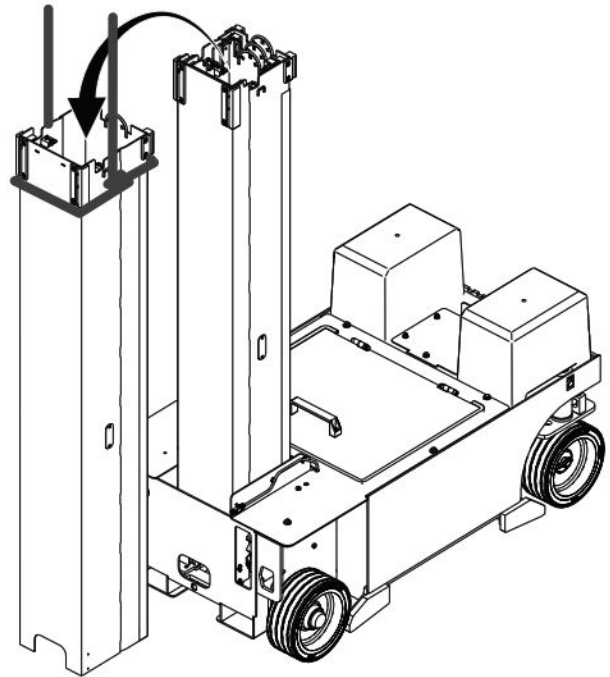
### **CAUTION**

**Crush hazard. Personnel on the ground must stay away from the mast while it is being moved.**

**Make sure the wear pads are dry and do not have lubricant before you raise the mast.**

**If you do not obey, there is a risk of minor or moderate injury.**

6. Remove mast 4 completely and set it aside on a protective surface.

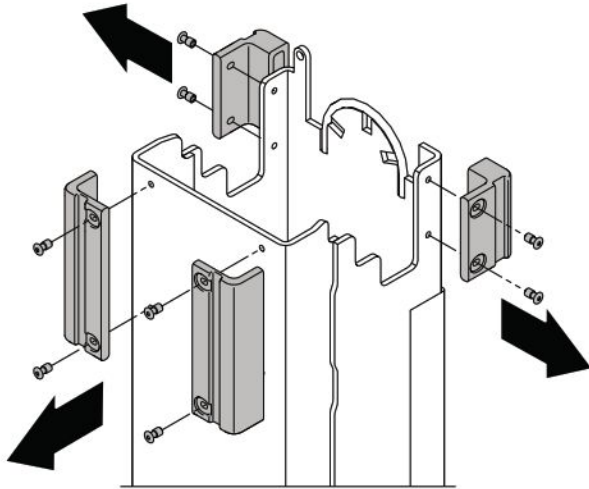


7. Repeat steps 1 through 6 with the remaining masts until there is only one mast left.

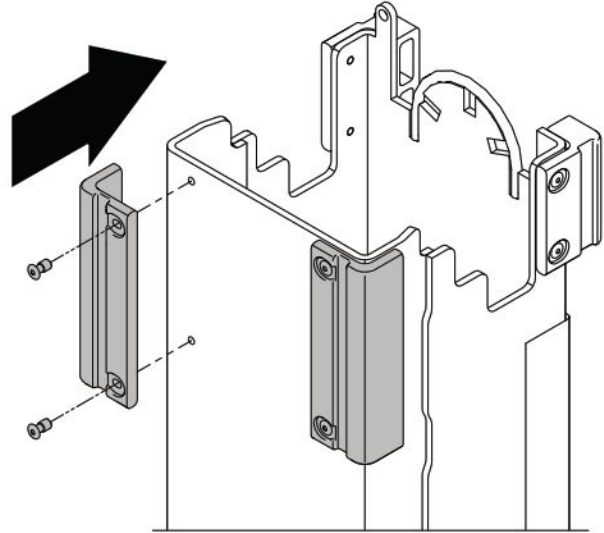


### 5.13-4 Replace the top wear pads

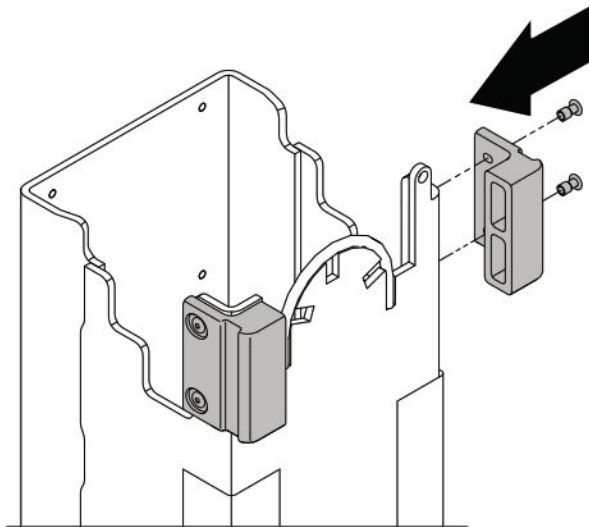
1. Remove and discard the wear pads at the top of mast 1.



3. Use new pop rivets to attach two new thin and long wear pads (234168) to the rear of the mast.



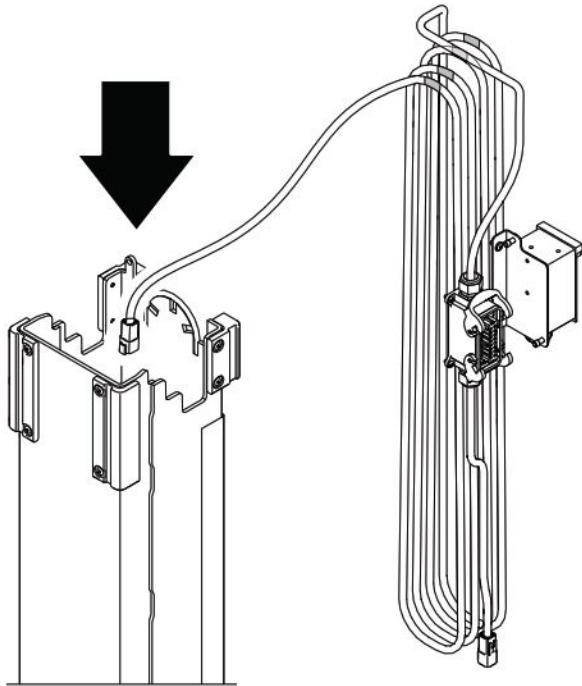
2. Use new pop rivets to attach two new thick and short wear pads (234170) to the front of the mast.



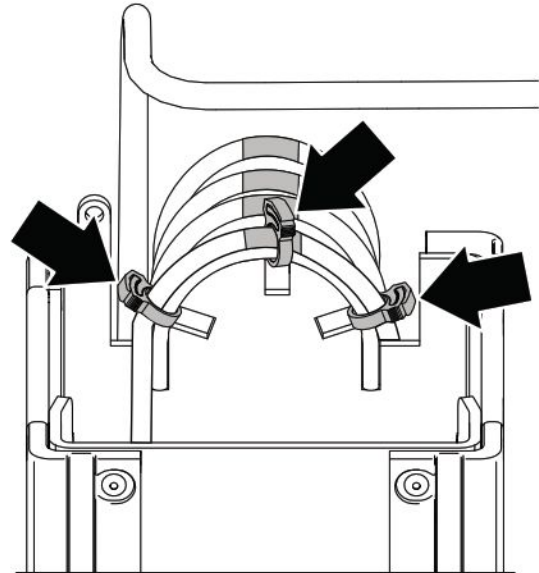
4. Repeat steps 2 and 3 for masts 2 through 4.

### 5.13-5 Install the mast cable

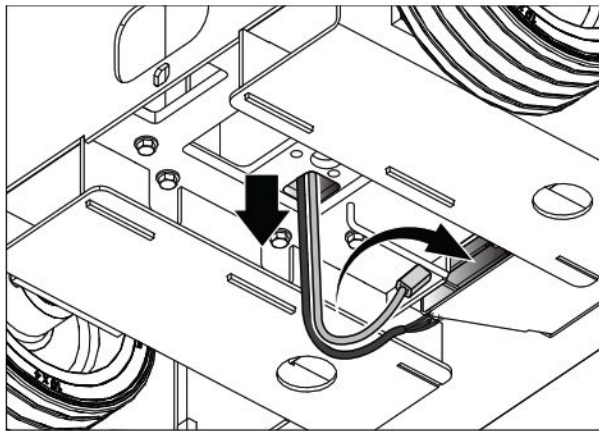
1. Insert the end of the mast cable without the housing down mast 1 and out through the base of the mast.



2. The mast cable has tape markers at specific intervals so you know where to clamp it on the cable carriers at the top of each mast.
3. Use the three cable clamps removed earlier to secure the mast cable to the cable carrier in three places.

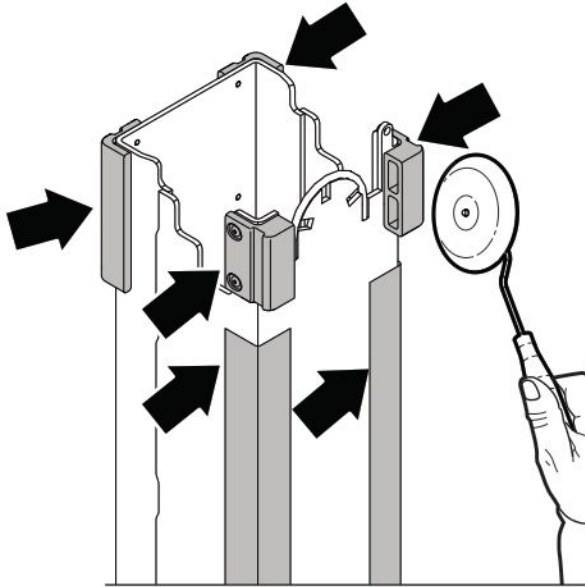


4. Lower the rest of the mast cable down mast 1 while you install the next mast section.

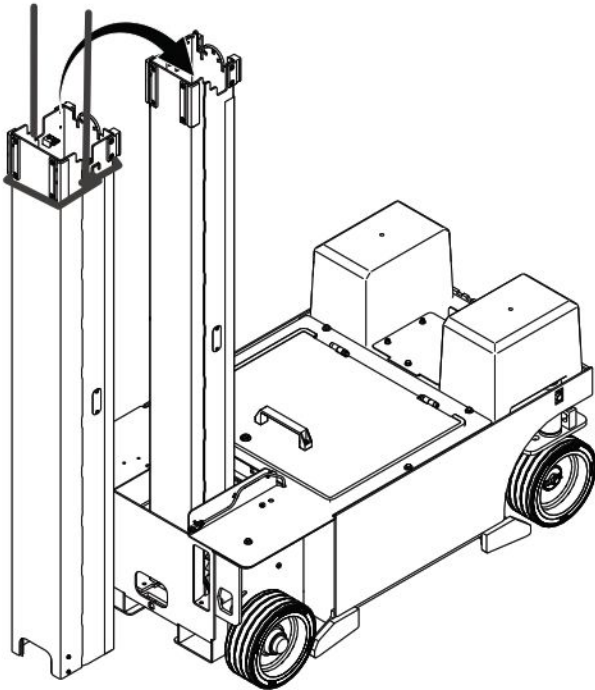


### 5.13-6 Install the masts 2 through 4 and bottom wear pads

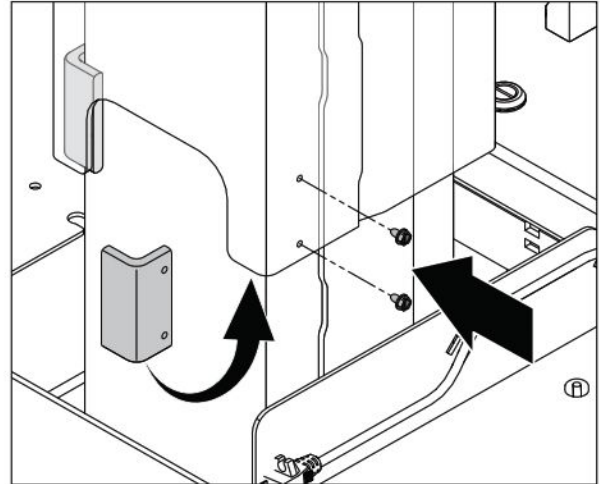
1. Lubricate the four wear pads and the two front corners all the way down mast 1.



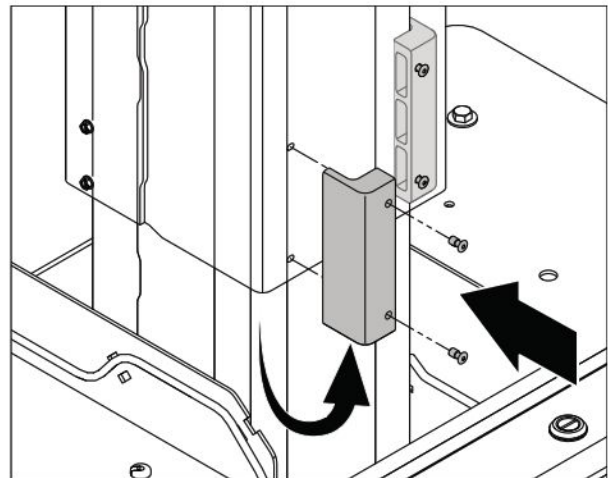
2. Use lifting straps to put mast 2 onto mast 1. Make sure the holding valve cutout faces the rear of the machine.



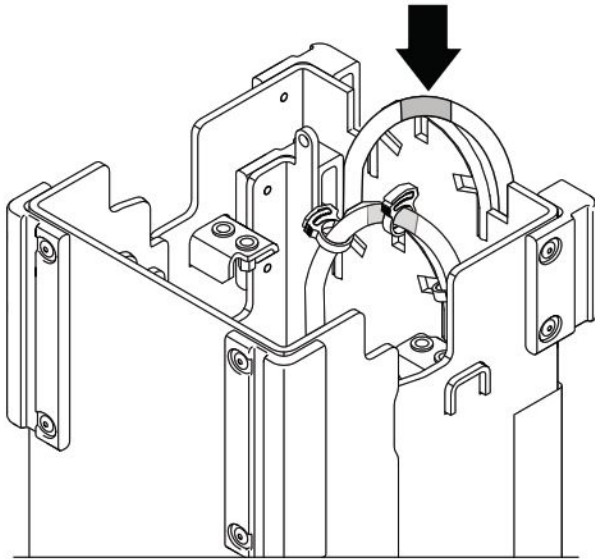
3. Keep mast 2 raised so that the bottom part is visible.
4. Use new thread rolling screws to attach two new thin and short wear pads (234169) to the rear of the mast.



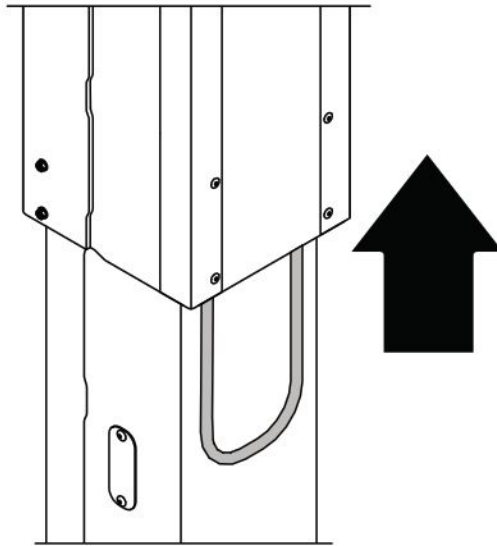
5. Use new pop rivets to attach two new thick and long wear pads (234171) to the front of the mast.



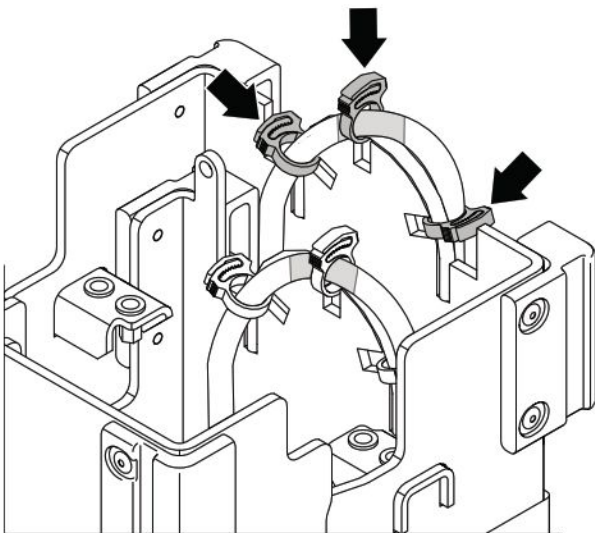
- 6. Pull the mast cable out of mast 1 and start to lower it between mast 1 and mast 2 until the next tape marker is at the top of the cable carrier.



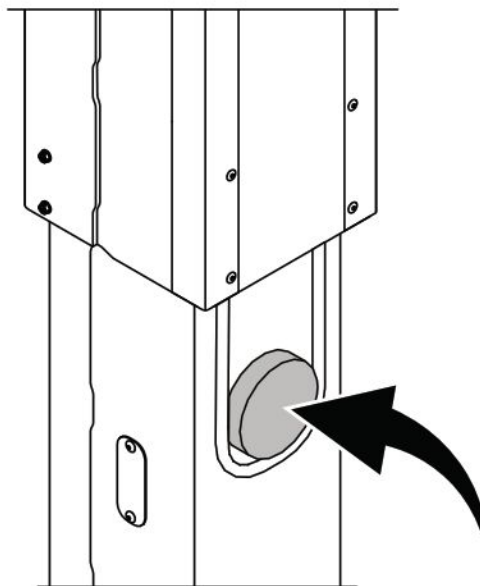
- 8. Raise mast 2 so that the cable loop is visible from the bottom of the mast.



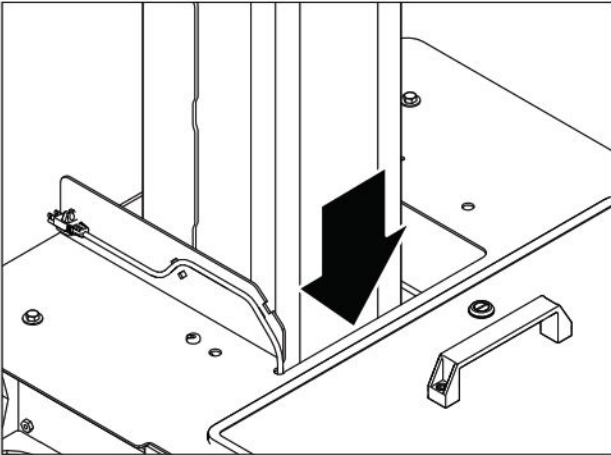
- 7. Use the three cable clamps removed earlier to secure the cable to the mast 2 cable carrier.



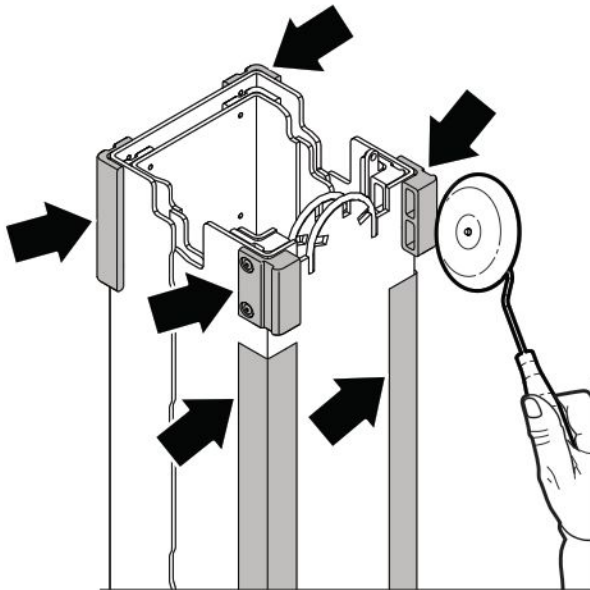
- 9. Put a weighted roller into the cable loop.



10. Fully lower mast 2 onto the chassis.



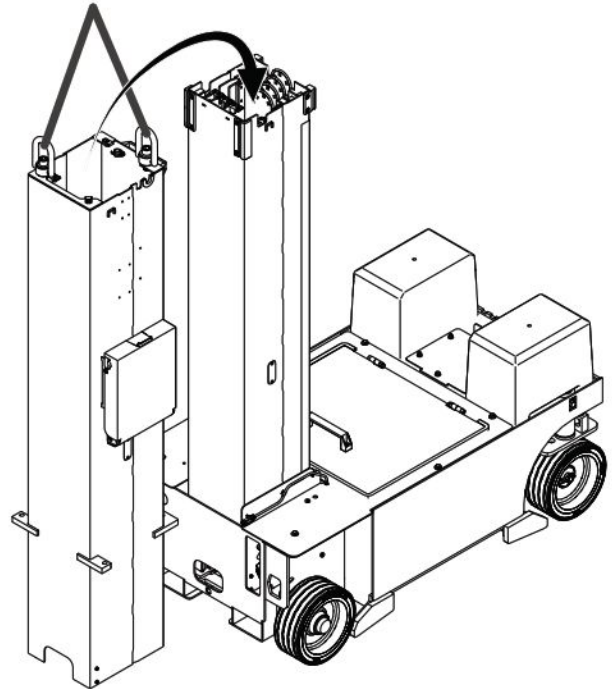
11. Lubricate the four wear pads and the two front corners all the way down mast 2.



12. Repeat steps 2 through 11 for masts 3 to 4.

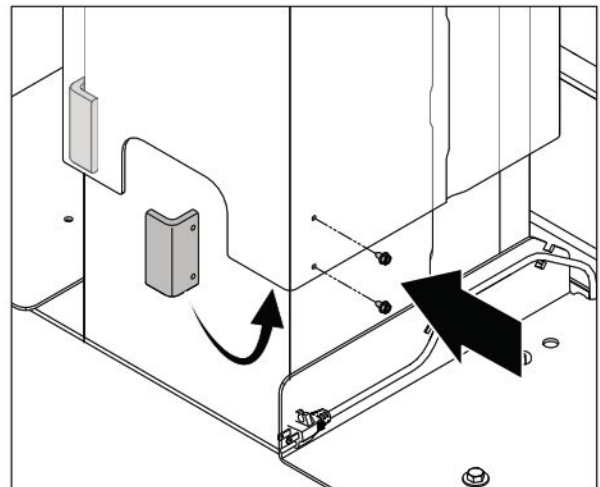
### 5.13-7 Install the mast 5 and bottom wear pads

1. Use hoist rings and lifting straps to put mast 5 onto the chassis.

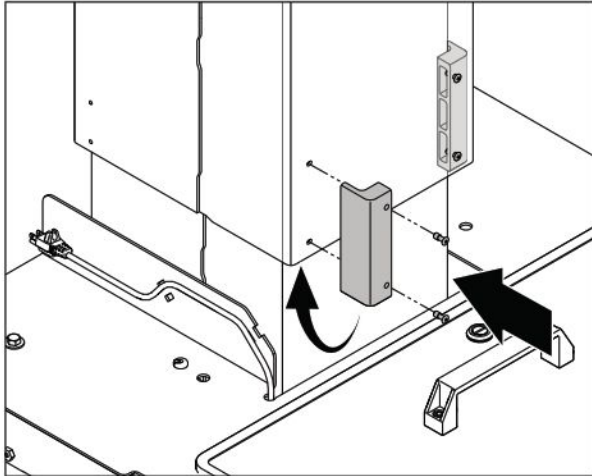


2. Keep the mast 5 raised so that the bottom part is visible.

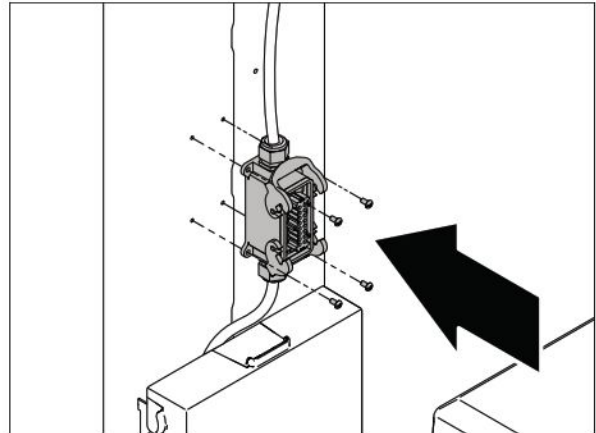
3. Use new thread rolling screws to attach two new thin and short wear pads (234169) to the rear of the mas.



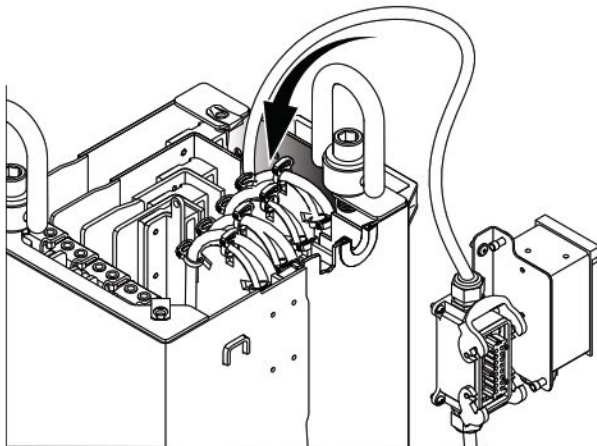
- 4. Use new pop rivets to attach two new thick and long wear pads (234171) to the front of the mast.



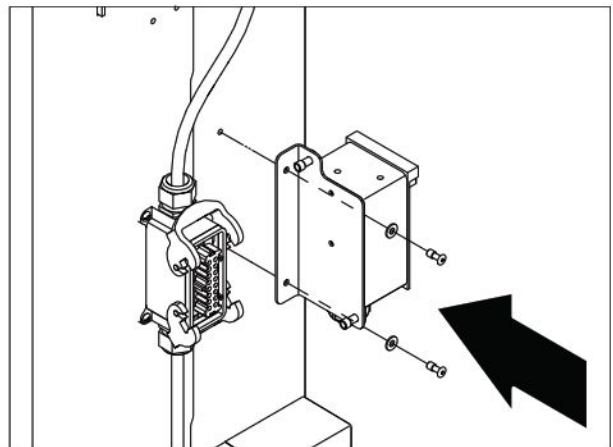
- 6. Use the screws removed earlier to mount the mast electrical housing to the side of mast 5.



- 5. Pull the mast cable out of mast 1 and lower it between mast 4 and mast 5.

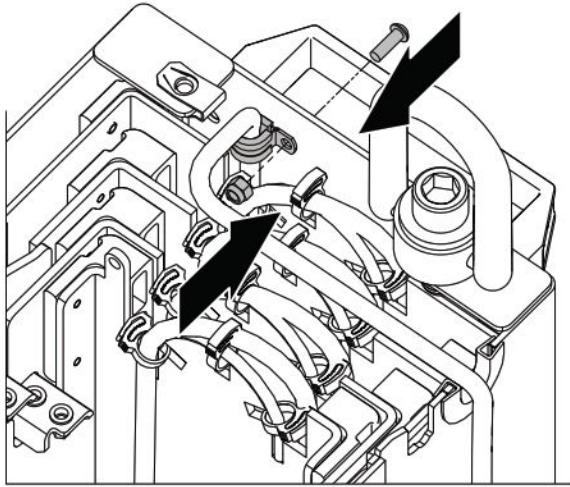


- 7. Use new pop rivets and the washers removed earlier to mount the AC outlet box to the side of mast 5.

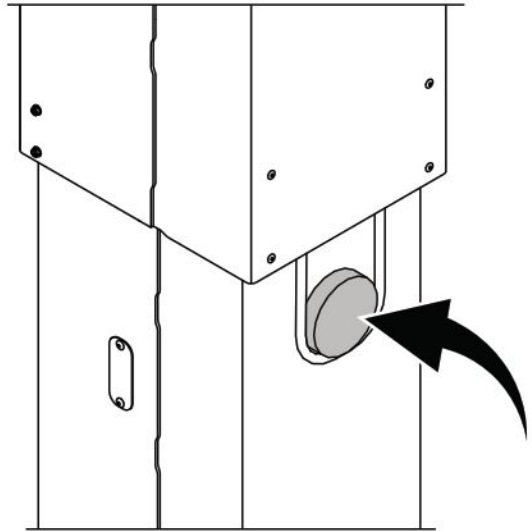




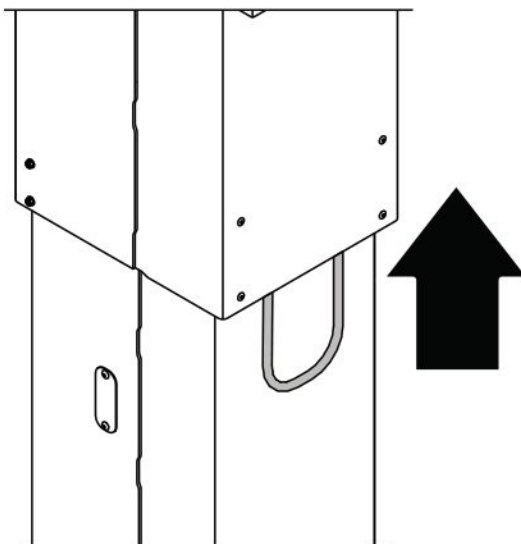
- 8. Use the cable clamp, nut and bolt removed earlier to attach the mast cable to the inner face of mast 5.



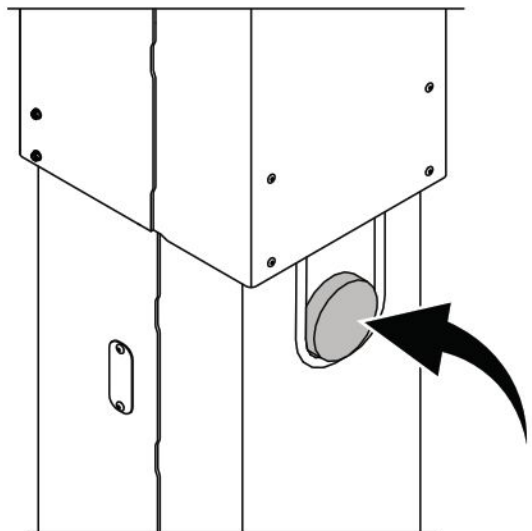
- 10. Insert the weighted roller into the cable loop.



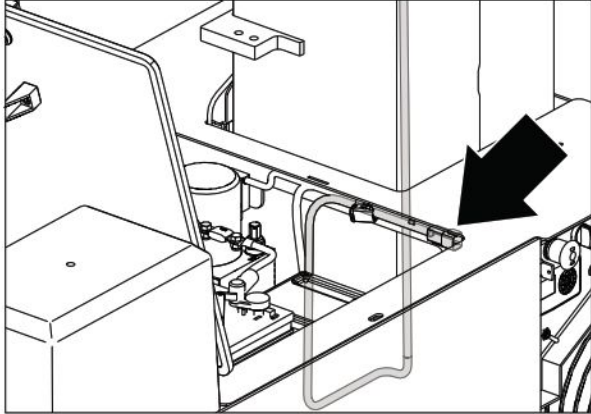
- 9. Raise mast 5 until the cable loop is visible.



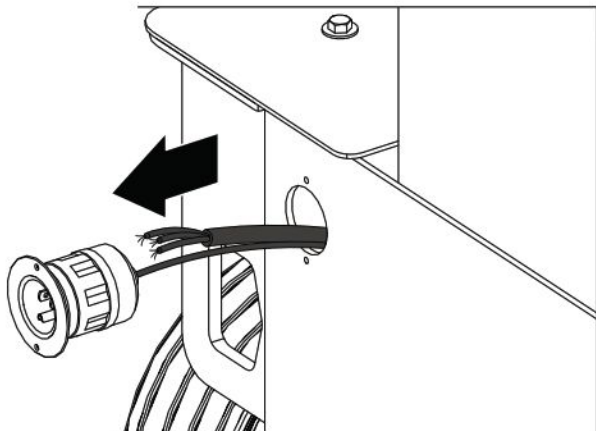
- 11. Fully lower mast 5 onto the chassis.



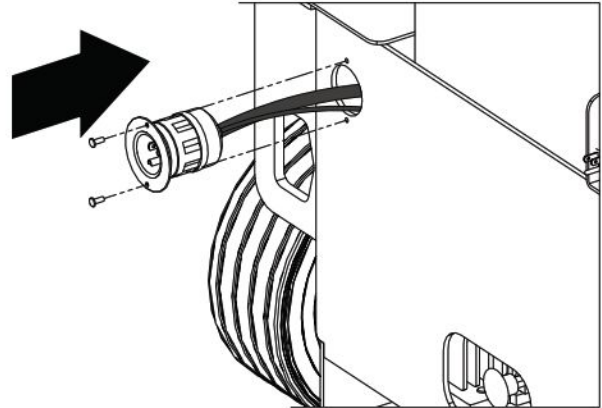
12. Open the service compartment cover.
13. Connect the mast connector to the main harness.
14. Use tie wraps to secure the mast cable to the existing cable bundles.
15. Close the service compartment cover.



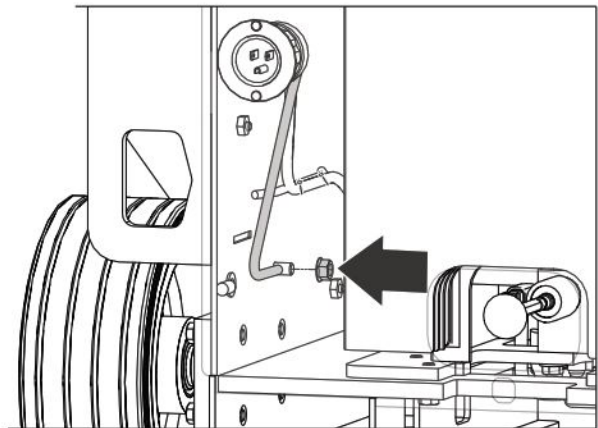
16. Route the AC power cable towards the rear of the machine and out the AC inlet hole.
17. Connect the AC power cable to the inlet.
  - Green wire to the green terminal
  - Black wire to the bronze terminal
  - White wire to the silver terminal



18. Use new pop rivets to mount the AC inlet to the chassis.



19. Use the nut removed earlier to secure the green ground wire from the AC inlet to the chassis.
20. Use tie wraps to secure the AC power cable to the existing cable bundles.



### 5.13-8 Install the lift cylinders and platform

1. Install the lift cylinders. Refer to section [5.10 Lift Cylinder Installation](#).
2. Install the platform. Refer to section [5.8 Platform Installation](#).



## 5.14 Railing Maintenance and Repair

Skyjack MEWPs have been designed to make sure compliance with the relevant design standards applicable for that particular unit at the time of manufacture. As such, any repairs made to the guardrail or basket structure need to make sure this compliance is not compromised and must return the structure to its original condition.

Any damage must be repaired by returning the railing assembly to its undamaged state. Damage includes, but is not limited to, the items listed below:

- bent/deformed guardrail sections
- cracks or broken welds in railing sections
- damaged pin connections
- missing pins or broken pin lanyards
- missing railing hardware
- loose or missing parts
- additional holes in guardrail sections other than those approved by Skyjack

Additionally, the guardrails must be properly positioned and secured, and the entry gate must be in good working order.

The strength of the guardrail system, and therefore its ability to provide fall protection for platform occupants, depends upon the design being secure and undamaged.

Skyjack railings are designed for modular replacement, and Skyjack recommends replacement of any damaged railing section. Skyjack-approved replacement parts will meet this requirement.





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