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SERVICE MANUAL

SJ12, SJ16

VERTICAL MAST

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January 2021
ANSI/CSA, CE , AS

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This manual is for MEWPs with serial numbers:

SJ12 & SJ16: A600 000 001 - A600 999 999

Please refer to the website (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

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

⚠ WARNING

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

⚠ CAUTION

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.

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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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 mobile machine intended for moving persons, tools, and material to working positions, consisting of a work platform with controls, an extending structure and a chassis.

1.1-2 Purpose of equipment

The Skyjack Vertical Mast lifts are designed to move personnel, tools, and materials to working positions.

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 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.

1.1-5 Ownership of MEWP

Notify Skyjack of MEWP ownership. If you sell or transfer the ownership of a MEWP, promptly notify Skyjack of the new owner's contact information.

Skyjack needs this information to inform the owner of any updates or additional activities that are necessary to keep the machine in proper working condition.

1.1-6 Optional equipment

This MEWP is designed to accept a variety of optional accessories. Refer to the operation manual for a list of the optional accessories. Operating instructions for these options are located in Operation manual.

For components or systems that are not standard, speak to the Skyjack Service Department. Give the model and serial number for each applicable 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. (1.3 [Owner's Annual Inspection Record](#)). 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 stability of the MEWP and must not be used without manufacturer's consent.

All replacement tires must be of the same size and load rating as 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 lit 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.

Make sure 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.

1.2-4 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.

1.2-5 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.

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1.2-6 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.

Service Bulletins

Before performing any scheduled maintenance inspection procedure, refer to service bulletins found in our web site: www.skyjack.com for updates related to service and maintenance of this MEWP.

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.

Maintenance Instructions

This manual consists of four schedules to be done for maintaining on an MEWP. Inspection schedule frequency is shown below:

Task Frequency


PDI/Frequent	B	Perform PDI prior to each delivery, or Frequent Inspection every 200 days or 200 hours.
Annual	C	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 the item meets the inspection requirements.
- Use the maintenance and inspection checklist and step-by-step procedures in [Section 1](#) to perform these inspections.
- If any inspection receives a fail, write the issue in the comments section. 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.

Legend















Pass	P
Not applicable	N/A

1.3 Owner's Annual Inspection Record



Model _____

SN _____

<div style="border: 1px solid black; padding: 5px; display: inline-block;">31</div> <i>Inspection Date</i>											
 <i>Inspector Signature</i>		20	20	20	20	20	20	20	20	20	20
											

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 mast 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.

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1.4 Frequent/Periodic/Annual/Pre-Delivery Inspection Checklist



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

Serial Number: Starting with serial number A000 000 000 or B000 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
N/A - Not Applicable

C - Do the scheduled maintenance inspections each year. For more instructions, refer to the operation and service manuals.

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
Service Bulletins. Make sure there are no open service bulletins.	B	
Annual Inspection. Make sure you complete it within 13 months.	B	
Labels. In place, correctly attached & you can read them.	B	
Limit Switches. Correctly installed & no obstructions or damage.	B	
BASE/ENGINE		
Engine and Components. 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	
Engine and Components. Replace the engine oil and filter.	C	
Engine Intake Air Filter. No damage or missing component. Remove dirt & dust.	B	
Engine Intake Air Filter. Replace the air filter if necessary.	C	
Engine Oil. Oil level between "L" and "H". Make sure you do not exceed the oil change interval.	B	
Radiator. Correctly attached & no damage or missing components. Do a check of coolant level.	B	
Radiator. Do a check of coolant level & condition & replace if necessary.	C	
Fuel Tank & Lines. Filler cap, tank, fittings and hoses are tightly closed & no damage or leaks.	B	
Propane Tank & Lines. Straps are correctly installed to brackets & couplers are tight. Make sure there are no damage or leaks.	B	
Outriggers. No damage or missing components.	B	
Pothole Protection. Both sides have no obstructions, dirt or damage.	B	
Battery/Hydraulic Tray. Trays are latched tightly & no missing components.	B	
Batteries. No damage, tight connections & sufficient fluid levels. Clean terminals and cable ends.	B	
Battery Charger. Correctly attached & no damage.	B	
Steer Assembly. Correctly attached & no damage leaks or missing components.	B	
Wheel/Tire Assembly. Do a check of all tires for damage, wear & correctly aligned.	B	
Wheel/Tire Assembly. Wheel nuts torqued as recommended.	C	
Axles. Correctly attached & no missing components. Tight fittings and hoses & no leaks.	B	
Axles. Do a check and replace oil if necessary.	C	
Hydraulic Tank, Pump, Motor & Lines. Filler cap, hoses, and other hydraulic components are closed tightly & no damage or leaks.	B	
Hydraulic Oil. Level at, or slightly above top mark.	B	
Hydraulic Oil. Do a check and replace oil and filters if necessary.	C	
Electrical Components. 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
Manifolds. Tight fittings and hoses & no damage or leaks. Tight wire connections, no missing components & correctly working valves.	B	
Main Power Disconnect Switch. Cables tight & in working order.	B	
Base Controls. Operate switches and make sure they all operate correctly. No damage or missing components.	B	
Brakes. Correctly attached & no damage or leaks.	B	
Brakes. Do a check on disc wear and replace if necessary.	C	
Base Weldment. No deformation or cracks.	B	
Grease Points. No obstructions, dirt, or damage. Add grease if necessary.	B	
Ladder. Correctly attached & no damage.	B	
LIFTING MECHANISM - SCISSORS		
Maintenance Support(s). Correctly attached & no damage.	B	
Scissor Assembly & Bumpers. Correctly attached, no deformation/damage. Cables & wires installed with no damage.	B	
Sliders & Rollers. Correctly attached & no obstructions, dirt, or damage/wear.	B	
Lift Cylinder(s). No damage or missing components. Tight fittings and hoses & no leaks. Correctly installed.	B	
Angle Transducer. Correctly attached & no damage.	B	
Scissor Pins. Correctly attached & no damage.	B	
LIFTING MECHANISM - MAST		
Mast Assembly. No damage, cracks or deformation.	B	
Mast Assembly. Lubricate the mast as recommended.	C	
Chains, Rollers & Control Cables. No damage or missing components.	B	
Wear Pads. No damage/wear or missing components. Fasteners tight.	B	
Tilt Sensor. Correctly attached & no damage.	B	
PLATFORM		
Railings and Gate. Correctly attached & no damage or missing components.	B	
Fall-Protection Anchorage. Attachment rings correctly attached & no damage.	B	
AC Power Socket. No obstructions, dirt, or damage.	B	
Platform Control Console. Operate the switches and make sure they all operate correctly. No damage or missing components.	B	
Manual Storage Box. In storage box, in good condition and you can read them.	B	
Powered Extension Control Console. Operate switches and make sure they all operate correctly. No damage or missing components.	B	
Extension Platform. Correctly attached & no damage or missing components.	B	
Function Tests. Refer to the operation manual for your serial number for information on how to run these tests.		PASS FAIL

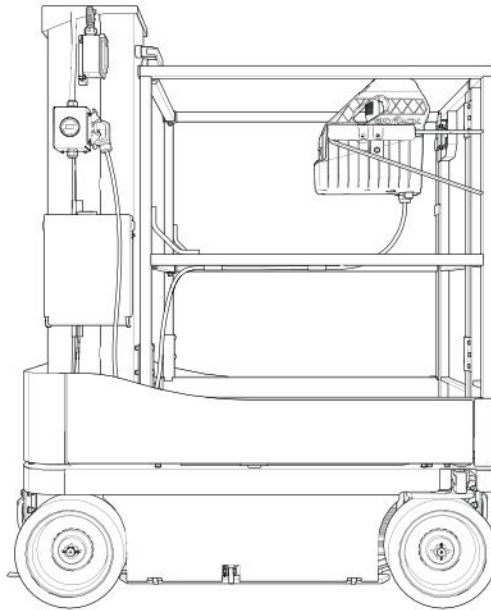
Comments: _____

199341AA

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) _____



1.5 General 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.

1.5-1 Service Bulletins (B)

Go to www.skyjack.com and use your machine's serial number to find related open service bulletins.

1.5-2 Annual Inspection (B)

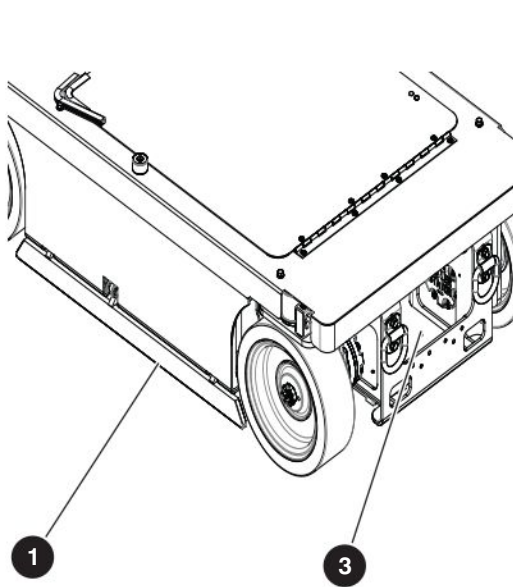
Do a check on the machine's service record to find information about previous service performed.

1.5-3 Labels (B)

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

1.5-4 Limit switches (B)

Make sure the limit switches are correctly attached, there is no visible damage, and the movement is not obstructed.



1.6 Base inspections

1 Pothole protection device (B)

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

2 Batteries (B)

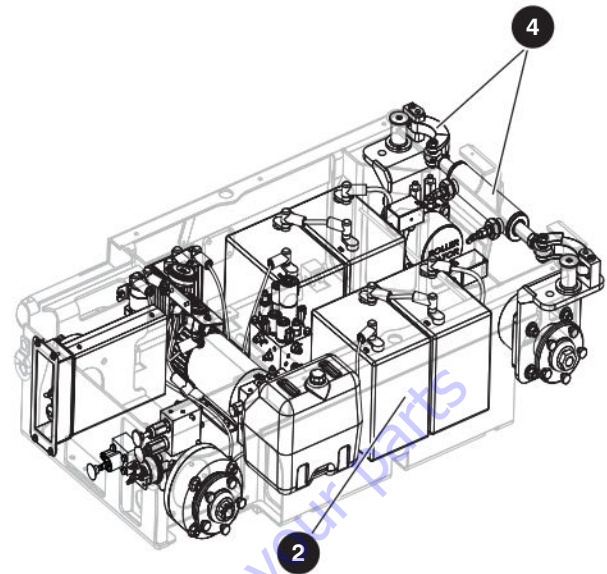
⚠ WARNING

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. Clean the battery terminals and cable ends thoroughly with a terminal cleaning tool or wire brush.



4. 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.
5. Replace battery if damaged or incapable of holding a lasting charge.

⚠ WARNING

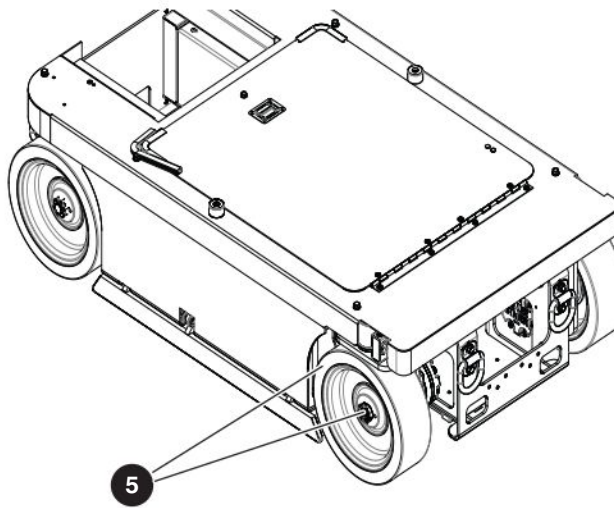
Only use original or manufacturer-approved parts and components for the MEWP. If you do not obey, there is a risk of death, serious injury, or machine damage.

3 Battery charger (B)

- Make sure that the battery charger is correctly installed, and in good condition.
- Make sure there is no visible damage.

4 Steer assembly (B)

- **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.
- **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.



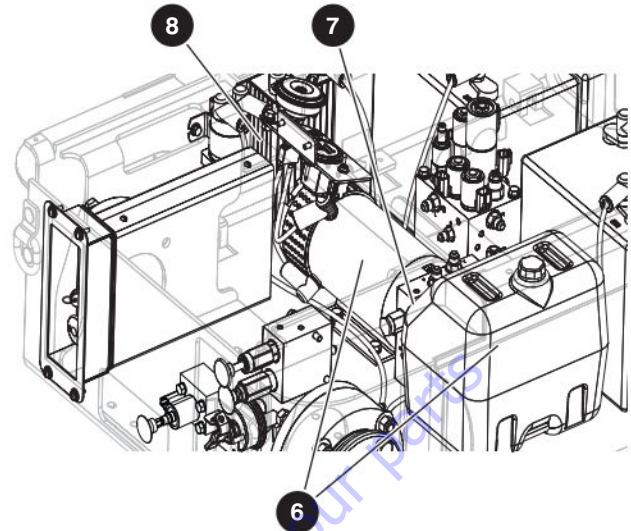
5 Wheel/tire assembly (B, C)

- **B - Frequent/periodic/pre-delivery Inspection**
 - Do a check on all the tire treads and sidewalls for cuts, cracks, and unusual wear.
 - Do a check on each wheel for damage, and cracked welds.
 - Make sure the wheels are correctly aligned vertically and horizontally.
 - Make sure there is no visible damage.
 - Do a check on wheel motor assembly for loose or missing parts and no visible damage.

⚠ 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.

- **C - Annual Inspection**
 - Make sure the castle nut is in position and is tight.
 - Make sure the cotter pin is correctly installed.
 - If the cotter pin is not installed then refer to [2.8 Torque Specifications](#) for proper torque information.



6 Hydraulic tank (B)

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

Hydraulic pump and motor (B)

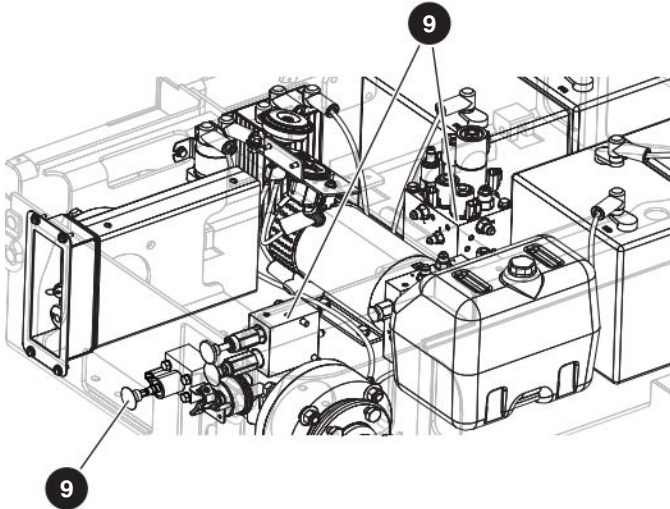
- Make sure there are no loose or missing fasteners.
- Make sure there is no visible damage.

7 Hydraulic oil level (B, C)

- **B - Frequent/periodic/pre-delivery Inspection**
 - Make sure the platform is fully lowered.
 - Do a check on the gauge on the side of the hydraulic oil tank. The hydraulic oil level must be at or a small distance above the top mark of the gauge.
- **C - Annual Inspection**
 - Do a check on the hydraulic oil and filters
 - Replace the hydraulic oil and filters if necessary.

8 Electrical components (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.
- **Motor controller (B)**
 - Make sure the motor controller has no damage and is correctly attached.
 - Make sure there are no loose wires or missing fasteners.



9 Manifolds (B)

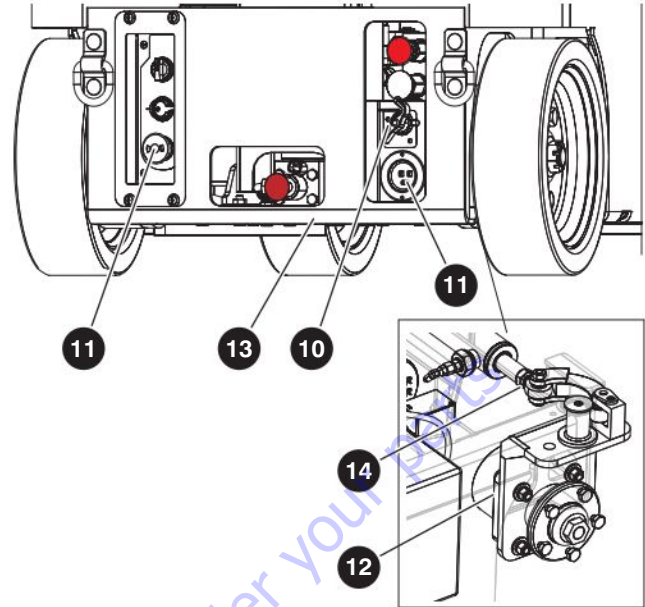
- Make sure all fittings and hoses are correctly tightened.
- Make sure there is no indication of hydraulic leakage.
- Make sure there are no loose wires or missing fasteners.

10 Main Power Disconnect Switch (B)

- Turn main power disconnect switch to off position.
- Make sure all cables are secure and switch is in proper working condition.

11 Base Controls (B)

- Make sure there are no signs of visible damage and all switches operate correctly.
- **AC power socket (B)**
 - Make sure there is no visible damage.



12 Brakes (B, C)

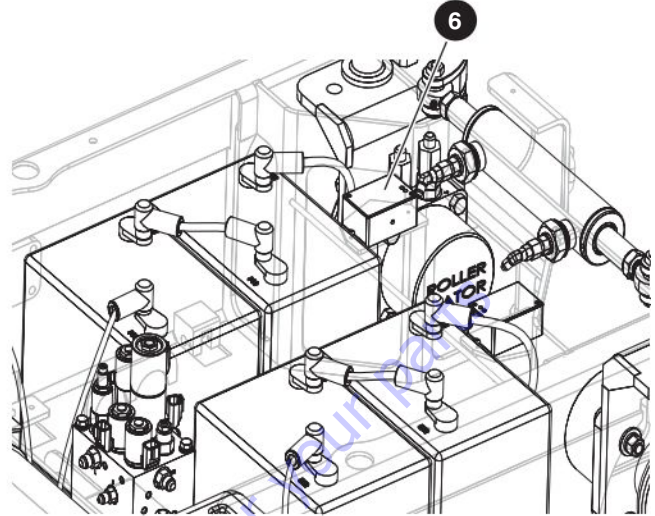
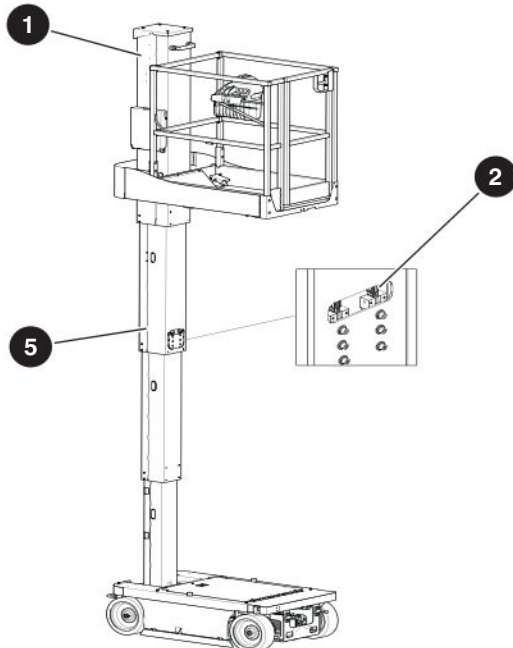
- **B - Frequent/periodic/pre-delivery Inspection**
 - Make sure there are no loose or missing fasteners.
 - Make sure there is no visible damage.
- **C - Annual Inspection**
 - Make sure that the disc show no signs of wear and/or physical damage
 - Replace the disc or pin brakes if necessary.

13 Base Weldment (B)

- There are no cracks in the welds or structure.
- There are no signs of deformation.

14 Grease points (B)

- Make sure there is no visible damage.
- Make sure there is no dirt or blockages.



1.7 Mast inspections

1 Mast assembly (B, C)

- **B - Frequent/periodic/pre-delivery Inspection**
 - Make sure the mast assembly shows no signs of visible damage, deformation, or cracks in the weldments.
 - Make sure the lift cylinder is properly secured, there are no loose or missing parts and there is no sign of damage.
 - Make sure there are no loose or missing fittings and there is no sign of hydraulic leaks.
 - Mast lubrication is an annual requirement as a minimum. Based on machine use, the mast may need to be lubricated more frequently. Examples include:
 - It is used in very dusty environments.
 - The mast does not move freely.
 - Refer to [5.8 Mast Lubrication Procedure](#) for the mast lubrication procedure.
- **C - Annual Inspection**
 - Lubricate the mast.
 - Refer to [5.8 Mast Lubrication Procedure](#) for the mast lubrication procedure.

2 Chains (C)

- Make sure the chains are correctly attached.
- Make sure the bolts are tight.
- Make sure there are no loose or missing parts.
- Make sure there is no visible damage.
- Refer to [5.10 Mast Chain Visual Inspection](#) for a mast chain inspection.

3 Rollers (B)

- Make sure the rollers are correctly attached and not obstructed.
- Make sure there are no loose or missing parts.
- Refer to [5.9 Mast Roller Inspection/Maintenance](#) for roller and roller mount inspection details and instructions.

4 Control Cables (B)

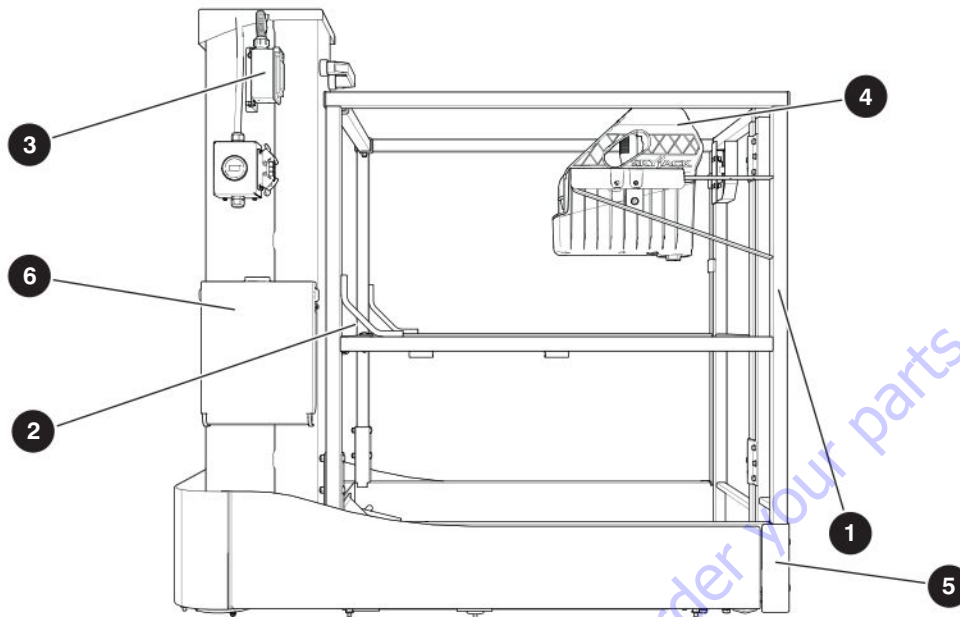
- Make sure the cables are secure.
- Make sure there is no visible damage.

5 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.

6 Tilt sensor (B)

- Make sure the tilt sensors are correctly attached and there is no visible damage.



1.8 Platform inspections

⚠ 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 Railings and gate (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.
- Refer to [5.15 Railing Maintenance and Repair](#) for the railing maintenance information.

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 there is no visible damage.

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.
- Make sure all switches operate correctly.

5 Extension platform (B)

- Make sure that the extension deck is correctly installed.
- Make sure there is no visible damage or missing components.
- 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. Exit the platform, and close the gate.

6 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.

1.9 Function Tests

Do the function tests to find malfunctions in the MEWP before it is put into service. The operator must understand and follow the step-by-step instructions in the operation manual to do all the MEWP functions.

IMPORTANT

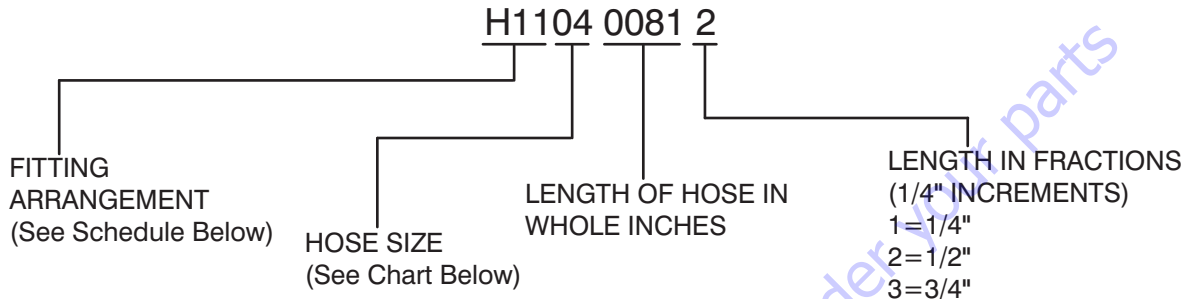
Do not operate a MEWP that does not function correctly. Lock and tag the MEWP, and remove it for servicing. Only a qualified service technician must repair the MEWP. If you do not obey, there is a risk of death or serious injury.

- After repairs are completed, the operator must do a pre-operation inspection and a series of function tests again before putting MEWP into service.
- Before you do the function tests, read and understand the “Start Operation” section of the operation manual.
- Before you do the function tests, look for the operation manual with the same serial number as your MEWP. The operation manual has the instructions on which tests to do and how to do them correctly and successfully.

Go to Discount-Equipment.com to order your parts

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 - ANSI/CSA

Model	SJ12	SJ16
Weight *	863 kg (1905 lb)	980 kg (2160 lb)
Overall Width	0.78 m (30.50 in)	0.78 m (30.50 in)
Overall Length	1.40 m (55.14 in)	1.40 m (55.14 in)
Platform Size (Inside)	0.68 m x 0.85 m (26.96 in x 33.31 in)	0.68 m x 0.85 m (26.96 in x 33.31 in)
Platform Traversing	0.41 m (16.00 in)	0.41 m (16.00 in)
Height		
Working Height	5.49 m (18 ft)	6.58 m (21.7 ft)
Platform Elevated Height	3.66 m (12 ft)	4.75 m (15.7 ft)
Stowed Height	1.78 m (70.19 in)	1.78 m (70.19 in)
Drive Height	Full	Full
Lowered Platform Height	0.45 m (17.66 in)	0.45 m (17.66 in)
Standard Operating Times		
Lift Time (Rated Load)	13 s - 16 s	16 s - 25 s
Lower Time (Rated Load)	13 s - 17 s	17 s - 19 s
Chassis		
Normal Drive Speed	3.1 km/h - 4.0 km/h (2.0 mph - 2.5 mph)	3.1 km/h - 4.0 km/h (2.0 mph - 2.5 mph)
Elevated Drive Speed	0.6 km/h - 0.8 km/h (0.4 mph - 0.5 mph)	0.6 km/h - 0.8 km/h (0.4 mph - 0.5 mph)
Gradeability (Ramp Angle [Reverse/Forward])**	30% / 25%	30% / 25%
Tires (Solid Rubber)	309 mm x 100 mm (12 in x 4 in)	309 mm x 100 mm (12 in x 4 in)
Hydraulic Oil		
Type	ATF Dexron III	ATF Dexron III
Tank Capacity	4.9 L (1.3 gal)	4.9 L (1.3 gal)

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

** Refer to Section 6.4 Move the MEWP for Transport in the Operation manual for more details.

1835AB

Table 2.3 Specifications and Features - CE, AS

Model	SJ12	SJ16
Weight *	863 kg	980 kg
Overall Width	0.78 m	0.78 m
Overall Length	1.40 m	1.40 m
Platform Size (Inside)	0.68 m x 0.85 m	0.68 m x 0.85 m
Platform Traversing	0.41 m	0.41 m
Height		
Working Height	5.66 m	6.75 m
Platform Elevated Height	3.66 m	4.75 m
Stowed Height	1.78 m	1.78 m
Drive Height	Full	Full
Lowered Platform Height	0.45 m	0.45 m
Standard Operating Times		
Lift Time (Rated Load)	13 s - 16 s	16 s - 25 s
Lower Time (Rated Load)	13 s - 17 s	17 s - 19 s
Chassis		
Normal Drive Speed	3.1 km/h - 4.0 km/h	3.1 km/h - 4.0 km/h
Elevated Drive Speed	0.6 km/h - 0.8 km/h	0.6 km/h - 0.8 km/h
Gradeability (Ramp Angle [Reverse/Forward])**	30% / 25%	30% / 25%
Tires (Solid Rubber)	309 mm x 100 mm	309 mm x 100 mm
Hydraulic Oil		
Type	ATF Dexron III	ATF Dexron III
Tank Capacity	4.9 L	4.9 L

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

1838AB

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

Table 2.4 Maximum Platform Capacities (Evenly Distributed) ANSI/CSA

Model		Wind Rating	Total Platform Capacity		Extension Platform Capacity		Manual Side Force	Tilt Cutout Setting (side-to-side x front-to-back)
SJ12	Indoor	0 m/s (0 mph)	227 kg (500 lb)	2 person(s)	227 kg (500 lb)	2 person(s)	400 N (90 lbf)	1.5° x 3°
	Outdoor	12.5 m/s (28 mph)		1 person(s)		1 person(s)	200 N (45 lbf)	
SJ16	Indoor	0 m/s (0 mph)	227 kg (500 lb)	1 person(s)	227 kg (500 lb)	1 person(s)	200 N (45 lbf)	1.5° x 3°
	Outdoor Option	12.5 m/s (28 mph)						

2072AA

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 2.5 Maximum Platform Capacities (Evenly Distributed) CE,AS

Model		Wind Rating	Total Platform Capacity		Extension Platform Capacity		Manual Side Force	Tilt Cutout Setting (side-to-side x front-to-back)
SJ12	Indoor	0 m/s	227 kg	2 person(s)	227 kg	2 person(s)	400 N	1.5° x 3°
	Outdoor	12.5 m/s		1 person(s)		1 person(s)	200 N	
SJ16	Indoor	0 m/s	227 kg	1 person(s)	227 kg	1 person(s)	200 N	1.5° x 3°
	Outdoor Option	12.5 m/s						

2073AA

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 2.6 Floor Loading Pressure ANSI/CSA

Model	Total MEWP Weight	Total MEWP Load			
		Wheel**	LCP***	OFL***	
SJ12	min*	863 kg (1905 lb)	275 kg (610 lb)	647 kPa (94 psi)	7.8 kPa (162 psf)
	max*	1090 kg (2405 lb)	430 kg (950 lb)	891 kPa (129 psi)	9.8 kPa (205 psf)
SJ16	min*	980 kg (2160 lb)	355 kg (783 lb)	774 kPa (112 psi)	8.8 kPa (184 psf)
	max*	1207 kg (2660 lb)	510 kg (1125 lb)	1010 kPa (146 psi)	10.8 kPa (226 psf)

* **Min:** Minimum MEWP weight (Unloaded platform, no options/attachments) 1836AB
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.

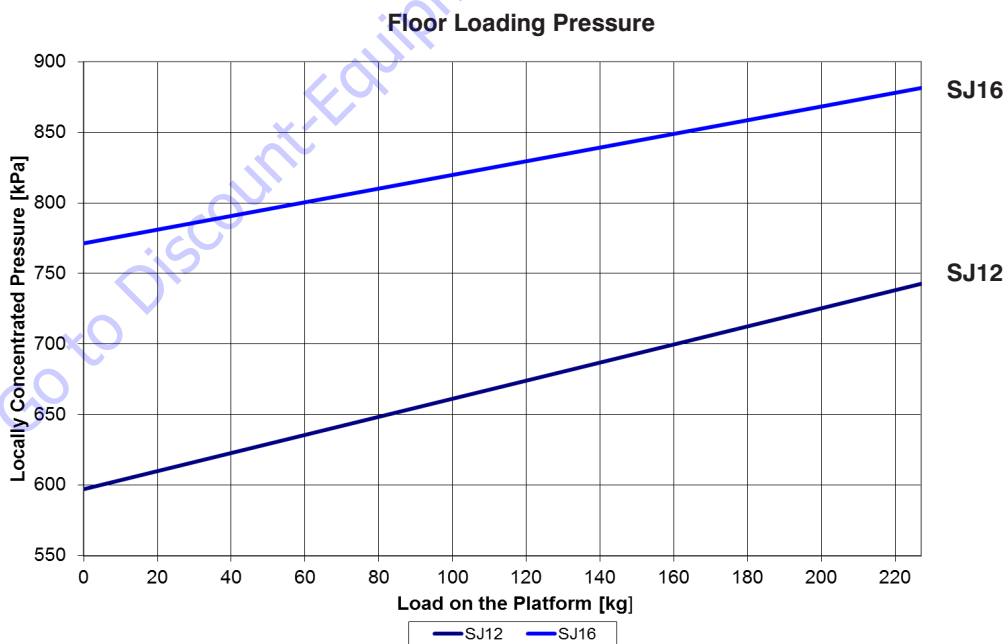


Table 2.7 Floor Loading Pressure - CE, AS

Model		Total MEWP Weight	Total MEWP Load		
			Wheel**	LCP***	OFL***
SJ12	min*	863 kg	275 kg	647 kPa	7.8 kPa
	max*	1090 kg	430 kg	891 kPa	9.8 kPa
SJ16	min*	980 kg	355 kg	774 kPa	8.8 kPa
	max*	1207 kg	510 kg	1010 kPa	10.8 kPa

* **Min:** Minimum MEWP weight (Unloaded platform, no options/attachments) 1840AB
Max: Maximum MEWP weight (Platform loaded to capacity with options/attachments)

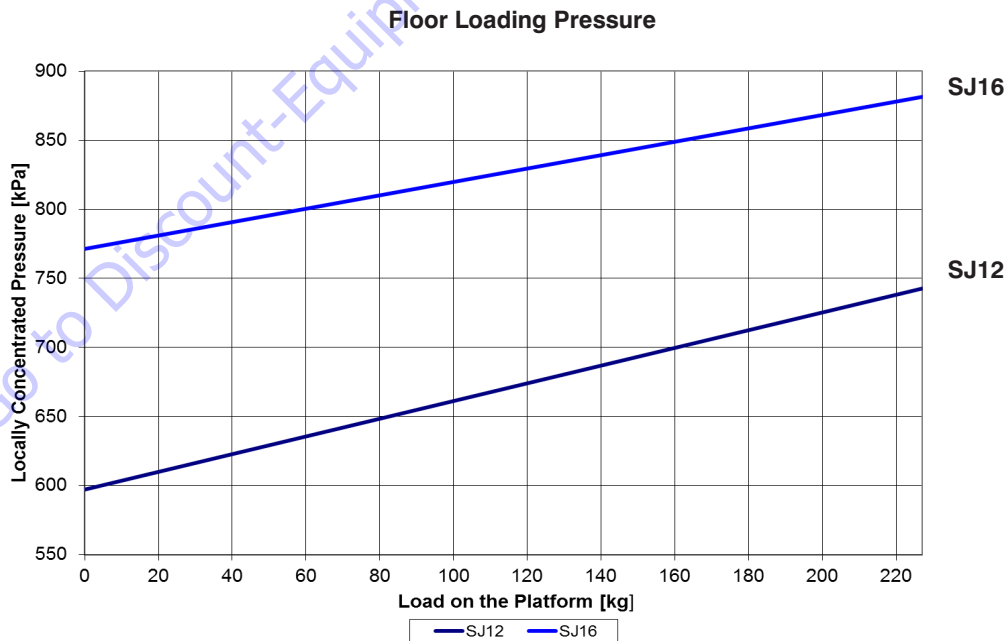
** **Wheel** is the weight that can be experienced on one wheel.
Note: This is more than 25% of the machine weight due to possible weight distribution over the machine and platform.

*** **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.



Floor Loading Pressure

Locally Concentrated Pressure (LCP):

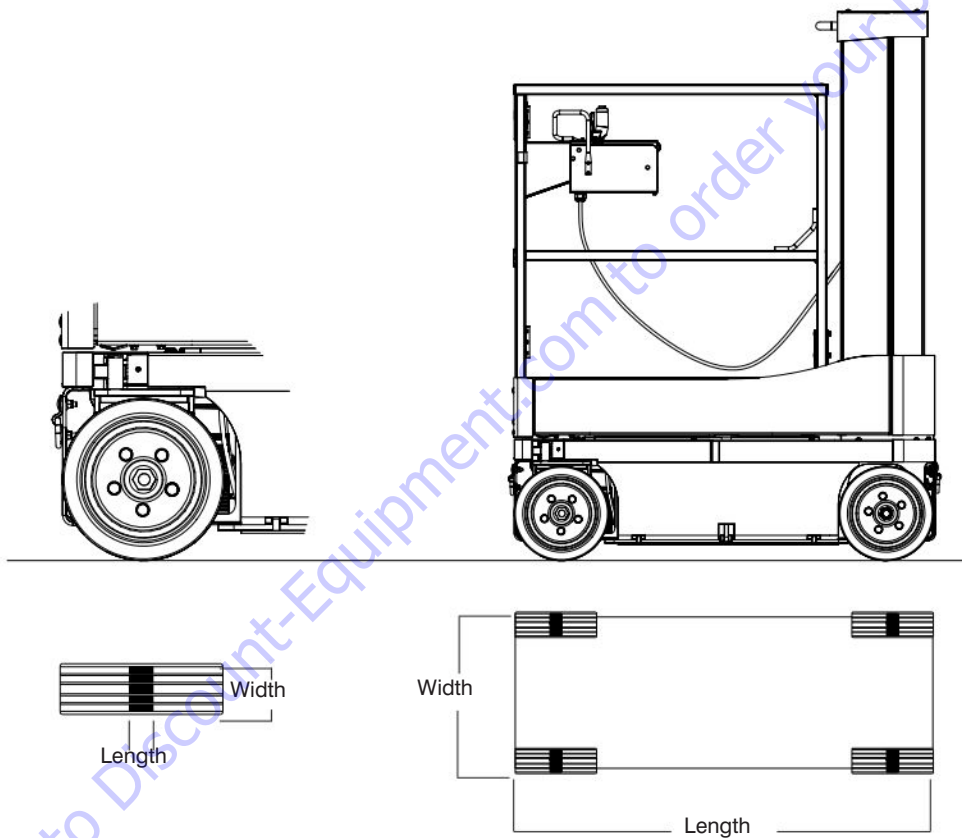
Foot Print Area = Length x Width

$$LCP = 0.4 \times \frac{\text{Weight of MEWP} + \text{Capacity}}{\text{Foot Print Area}}$$

Overall Uniform Pressure (OUP):

Base Area = Length x Width

$$OUP = \frac{\text{Weight of MEWP} + \text{Capacity}}{\text{Base Area}}$$



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⚠ WARNING

Intermixing tires of different types or using tires of types other than those originally supplied with this equipment can adversely affect stability. Therefore, replace tires only with the exact original Skyjack-approved type. Failure to operate with matched approved tires in good condition may result in death or serious injury.

Table 2.8 Torque Specifications

Location	Description	Torque (ft-lb)	Torque (Nm)
Base			
Wheel Mounting Bolts on Hub	BOLT, Wheel (1/2"-20 x 1-1/2")	90	122
Wheel Mounting Castle Nut on Integrated Hub	NUT, Slotted Hex (1-1/8"-18)	70	95
Power Pack Mounting Bolts	BOLT, Hex head (5/16"-18 x 3/4", Grade 5)	13	18
Hydraulic Motor Mounting Bolts	BOLT, Hex head (1/2"-13 x 2-3/4" Grade 8)	80	108
Wheel Brake Mounting Bolts	BOLT, Hex head (1/2"-13 x 3" Grade 8)	90	122
Location	Description	Torque (ft-lb)	Torque (Nm)
Mast			
Chain Tensioner Assembly (Mast 1)	BOLT, Hex head (5/16"-18 x 1", Grade 8)	18	24
Roller Support (Mast 2)	BOLT, Hex head (5/16"-18 x 1", Grade 8)	18	24
Roller Support Left/Right (Mast 2)	SCREW, Socket Head Cap (10-32 x 3/4")	4.25	5.8
Chain Tensioner Assembly (Mast 3)	BOLT, Hex head (5/16"-18 x 3/4", Grade 8)	18	24
Roller Mount Left/Right (Mast 3)	BOLT, Hex head (5/16"-18 x 1", Grade 8)	18	24
Roller Mount Right (Mast 3)	SCREW, Socket Head Cap (10-32 x 1-3/4")	4.25	5.8
Chain Tensioner Assy (Mast 4, SJ16)	BOLT, Hex head (5/16"-18 x 3/4", Grade 8)	18	24
Roller Mount Left/Right (Mast 4, SJ16)	BOLT, Hex head (5/16"-18 x 3/4", Grade 8)	18	24
Chain Mount Assy (Mast 5, SJ16)	BOLT, Hex head (5/16"-18 x 3/4", Grade 8)	18	24

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Table 2.9 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



NOTE

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

Table 2.10 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 2.11 Torque Specifications for Hydraulic Couplings & Hoses

Hydraulic Coupling Torque Chart O-Ring Port Connectors				
SAE Size	Steel Ports		Non-ferrous Ports	
	ft-lb	Nm	ft-lb	Nm
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	-	-	-	-

Hose End Torque Chart for JIC									
Size		Steel				Brass			
Dash	Frac.	ft-lb		Nm		ft-lb		Nm	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
-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

Hose End Torque Chart for Flat-Face O-Ring Seal (Steel)					
Size		Torque Specification			
Dash	Frac.	ft-lb		Nm	
		Min.	Max.	Min.	Max.
-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

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Section 3 – System Component Identification and Schematics

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Table 3.1 Electrical Symbol Chart





































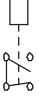
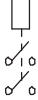
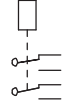






















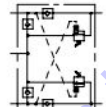







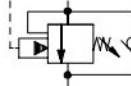





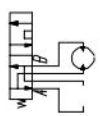


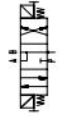
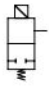





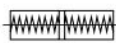
 CIRCUITS CROSSING NO CONNECTION	 HOURMETER	 KEY SWITCH	 LIMIT SWITCH N.O.
 CIRCUITS CONNECTED	 LIGHT	 FOOT SWITCH	 LIMIT SWITCH N.O. HELD CLOSED
 BATTERY	 HYDRAULIC VALVE COIL	 TOGGLE SWITCH	 LIMIT SWITCH N.C.
 GROUND	 PROPORTIONAL HYDRAULIC VALVE COIL	 PUSH BUTTON	 LIMIT SWITCH N.C. HELD OPEN
 FUSE	 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		

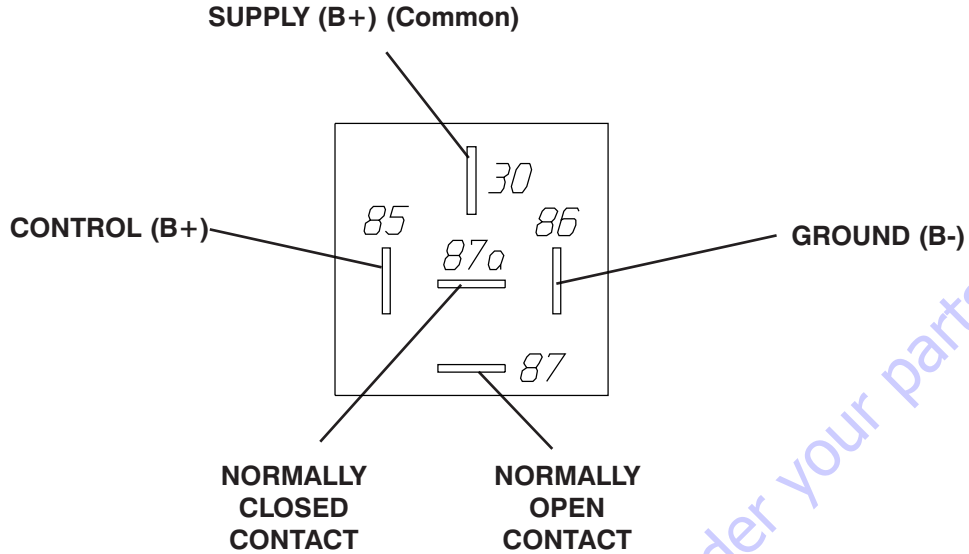
This table is to be used as a wire number/color reference for electrical drawings and schematics.

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 Component Parts List

Index No.	Skyjack Part No.	Description
2H-13	151696	VALVE, Control (Emergency lowering)
2H-21	103655	VALVE, Pothole release
4H-14A	158185	VALVE, Lift
2H-17	103656	VALVE, Control (Brake)
4H-15	156850	VALVE, Control (Reverse drive) (Includes 4H-16)
4H-16	-	VALVE, Control (Forward drive) (Includes 4H-15)
4H-23	158186	VALVE, Control (Right steer) (Includes 4H-24)
4H-24	-	VALVE, Control (Left steer) (Includes 4H-23)
BR1	154839	MOTOR, Brake (Right)
BR2	154839	MOTOR, Brake (Left)
C1	151733	CYLINDER (Steer)
C2	159471	CYLINDER (Lift)
C3	211118	CYLINDER (Pothole)
CB1	147889	MOTOR, Counterbalance
R1	N/A	VALVE, Relief (System)
R2	158853	VALVE, Relief (Steering)
R3	151684	VALVE, Relief (Lift)
V1	146561	VALVE, Override(Brake)
F1	N/A	FILTER, Strainer
MB1	151270	BLOCK, Manifold (Powerpack)
MB2	210426	BLOCK, Manifold (Main)
MB3	136540	BLOCK, Manifold (Brake)
MB4	159802	BLOCK, Manifold (Holding)
M1	139412	MOTOR, Drive (Right)
M2	139412	MOTOR, Drive (Left)
P1	151270	PUMP, DC motor
P2	146559	PUMP, Hand
QD1	122420	QUICK DISCONNECT
O1	108721	ORIFICE (0.055") (Lowering speed) (SJ12)
	159416	ORIFICE (0.043") (Lowering speed) (SJ16)
O2	141518	ORIFICE (0.031")
FC1	158852	CONTROLLER (Priority flow)

3.5 Electrical Component Parts List

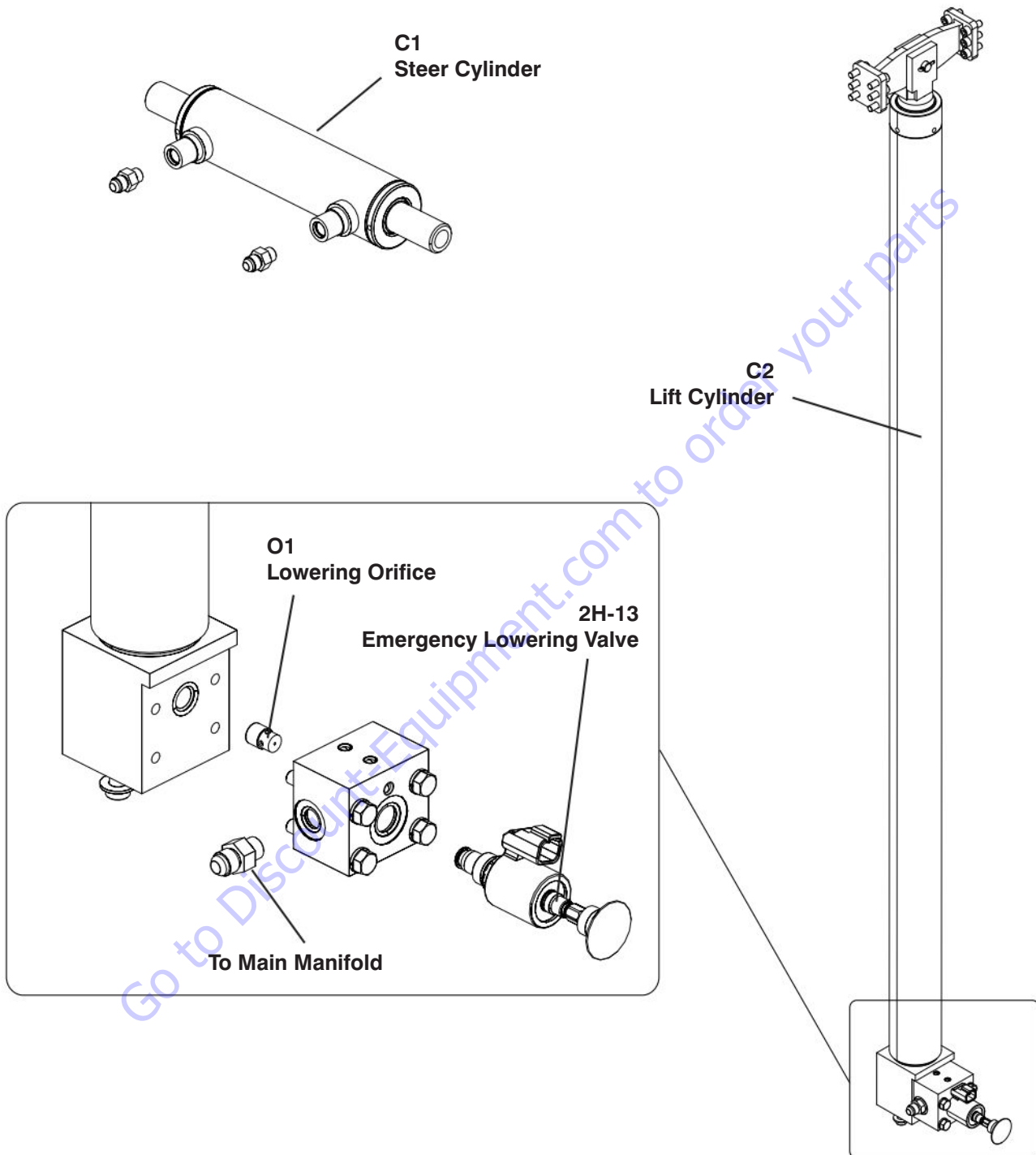


Index No.	Skyjack Part No.	Description
14CR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Lift speed)
14CR1	108589	RELAY, 24 Volt 40 Amp (Base control centre - Lift speed 2)
15BCR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Reverse cutout)
16BCR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Forward cutout)
17CR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Steer)
21CR	108589	RELAY, 24 Volt 40 Amp (Base control centre - High speed)
28CR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Tilt)
59ACR	108589	RELAY, 24 Volt 40 Amp (Base control centre - Base control)
2H-13	151683	COIL, 24 Volt (Emergency lowering valve)
4H-14A	105610	COIL, 24 Volt (Lift valve)
2H-17	103605	COIL, 24 Volt (Brake valve)
4H-15A	105610	COIL, 24 Volt (Reverse drive valve)
4H-16A	105610	COIL, 24 Volt (Forward drive valve)
4H-23	103605	COIL, 24 Volt (Right steer valve)
4H-24	103605	COIL, 24 Volt (Left steer valve)
B1	103480	BATTERY, 6V
B2	103480	BATTERY, 6V
B3	103480	BATTERY, 6V
B4	103480	BATTERY, 6V
BC1	122093	BATTERY CHARGER INDICATOR (Platform control console)
BP-29	103057	BEEPER, 4-28 VDC Slow pulsing (Base control centre)
BP-49	146649	HORN, 24V (Low tone)
CB1	117325	CIRCUIT BREAKER (15 Amp)
CB2	117325	CIRCUIT BREAKER (15 Amp)
		Parts list continued on following page.

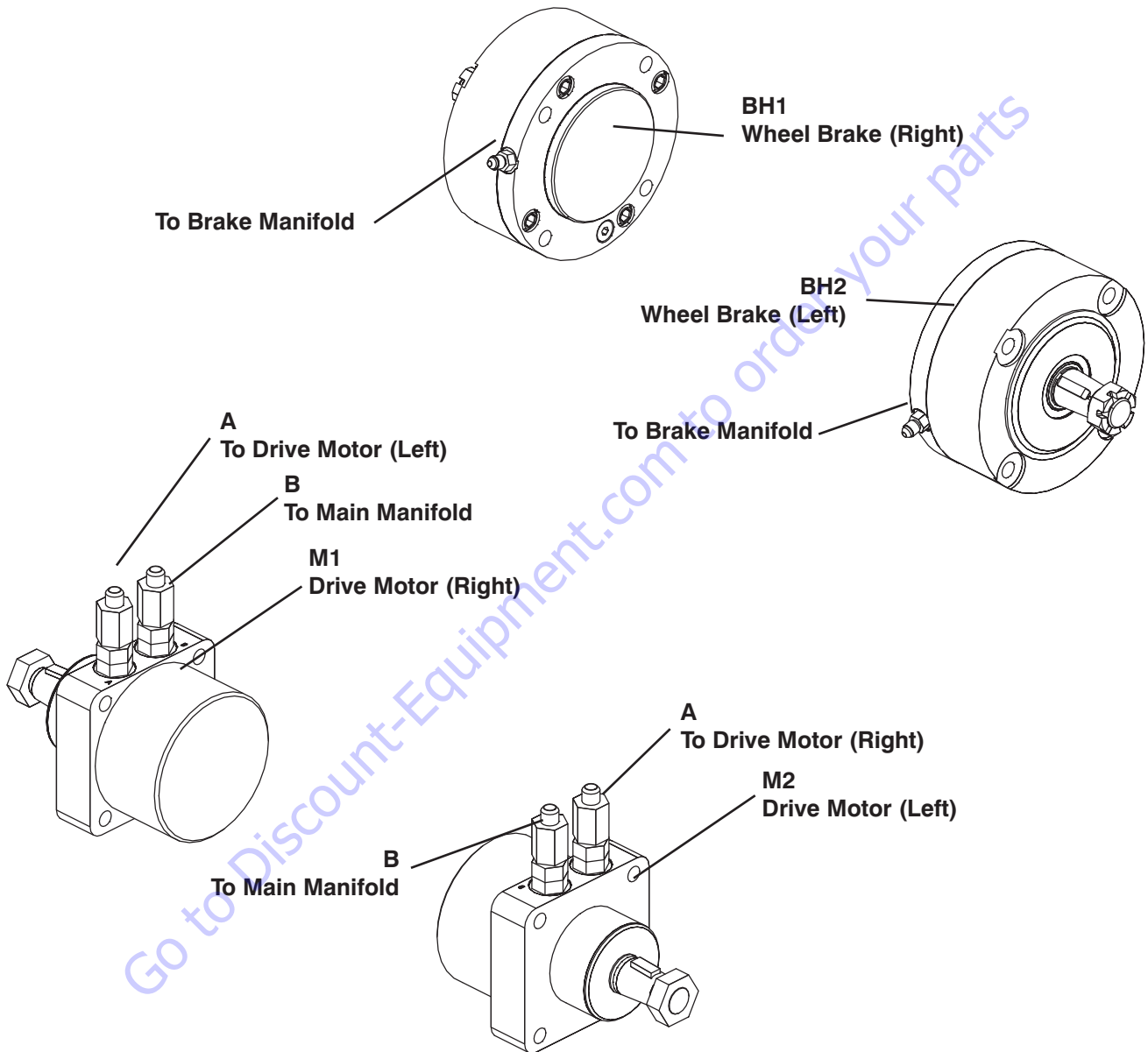
3.5 Electrical Component Parts List

Index No.	Skyjack Part No.	Description
		Parts list continued from previous page.
C1	165865	CONTACTOR
	164671	• Kit, Diode
D12B	129258	DIODE (8 Amp)
DA	102921	DIODE (6 Amp)
DB	102921	DIODE (6 Amp)
DCM1	156877	MOTOR
F1	310517	FUSE (300 Amp)
LED-1	147061	POWER INDICATOR LIGHT (Platform control console)
LED-2	147061	POWER INDICATOR LIGHT (Base control centre)
LS1	199406	LIMIT SWITCH (High speed)
LS2	199401	LIMIT SWITCH (Pothole protection)
LS3	229309	LIMIT SWITCH (Service position)
LS4	229308	LIMIT SWITCH (Drive cutout)
RST1	119629	RESISTOR (2.7k ohm) (Platform control console)
RST2	158707	RESISTOR (845 ohm, 1 watt) (Base control centre)
RST3	156515	RESISTOR (220 ohm, 3/4 watt) (Base control centre)
RST4	151645	RESISTOR (4.7k ohm, 1 watt) (Base control centre)
RST5	156527	RESISTOR (2k ohm, 2 watt) (Base control centre)
RST6	151643	RESISTOR (250 ohm, 1 watt) (Base control centre)
RST7	156564	RESISTOR (1.5 ohm, 1 watt) (Base control centre)
RST8	151647	RESISTOR (68 ohm, 1 watt) (Base control centre)
S1	119725	SWITCH, Main power disconnect
S2	147054	N.O. CONTACT, Lift/Drive (Base control centre)
S3	147053	N.C. CONTACT, Lift/Drive (Platform control console)
	147054	N.O. CONTACT, Lift/Drive (Platform control console)
S4	147053	N.C. CONTACT, Emergency stop (Platform control console)
S5	115573	SWITCH, Diagnostic
S7	151201	CONTROLLER ASSEMBLY
S8	147054	N.O. CONTACT, Horn (Platform control console)
S10	147053	N.C. CONTACT, Off/Platform/Base (Base control centre)
	147054	N.O. CONTACT, Off/Platform/Base (Base control centre)
S28	147053	N.C. CONTACT, Emergency stop (Base control centre)
TT1	195940	HOUR METER
TS1	157375	SWITCH, Tilt

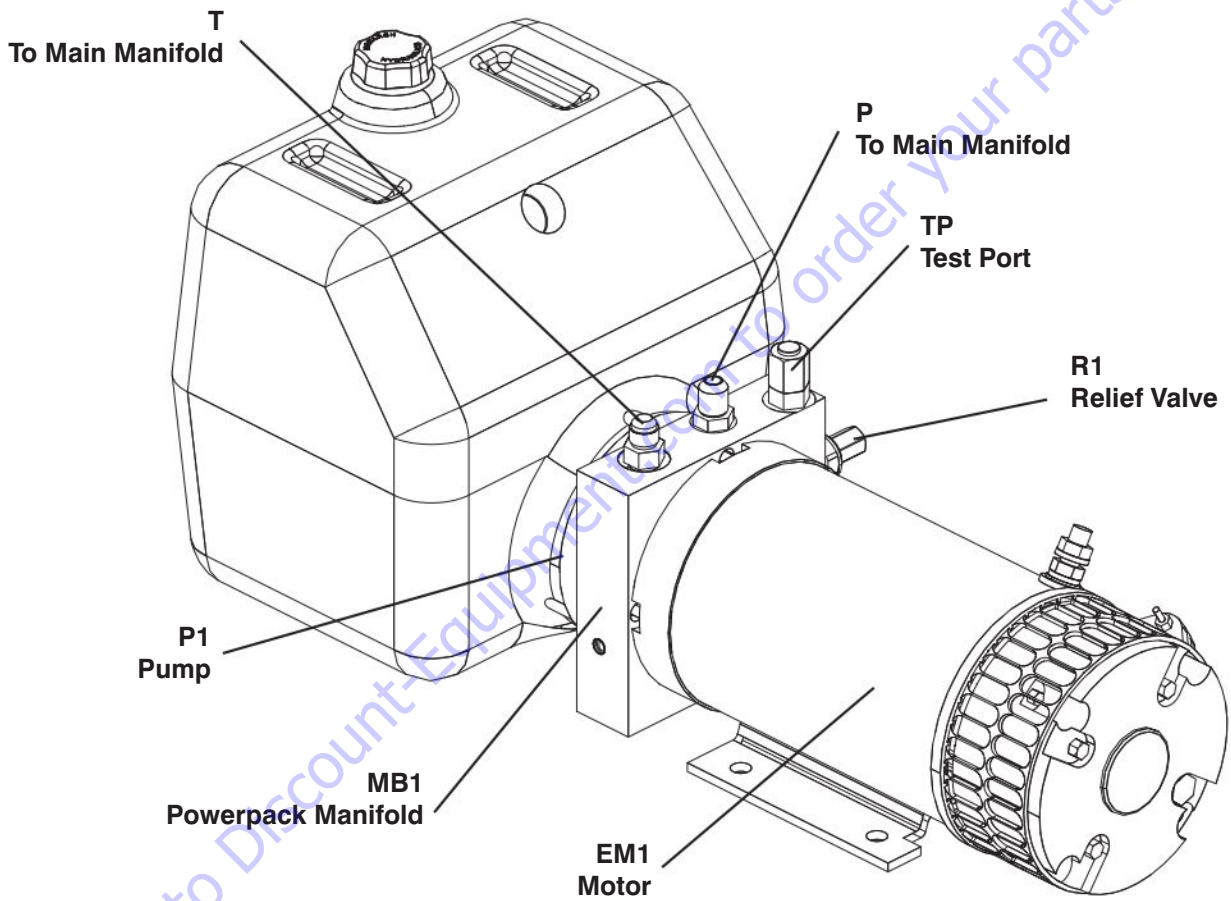
3.6 Cylinders and Port Identifications



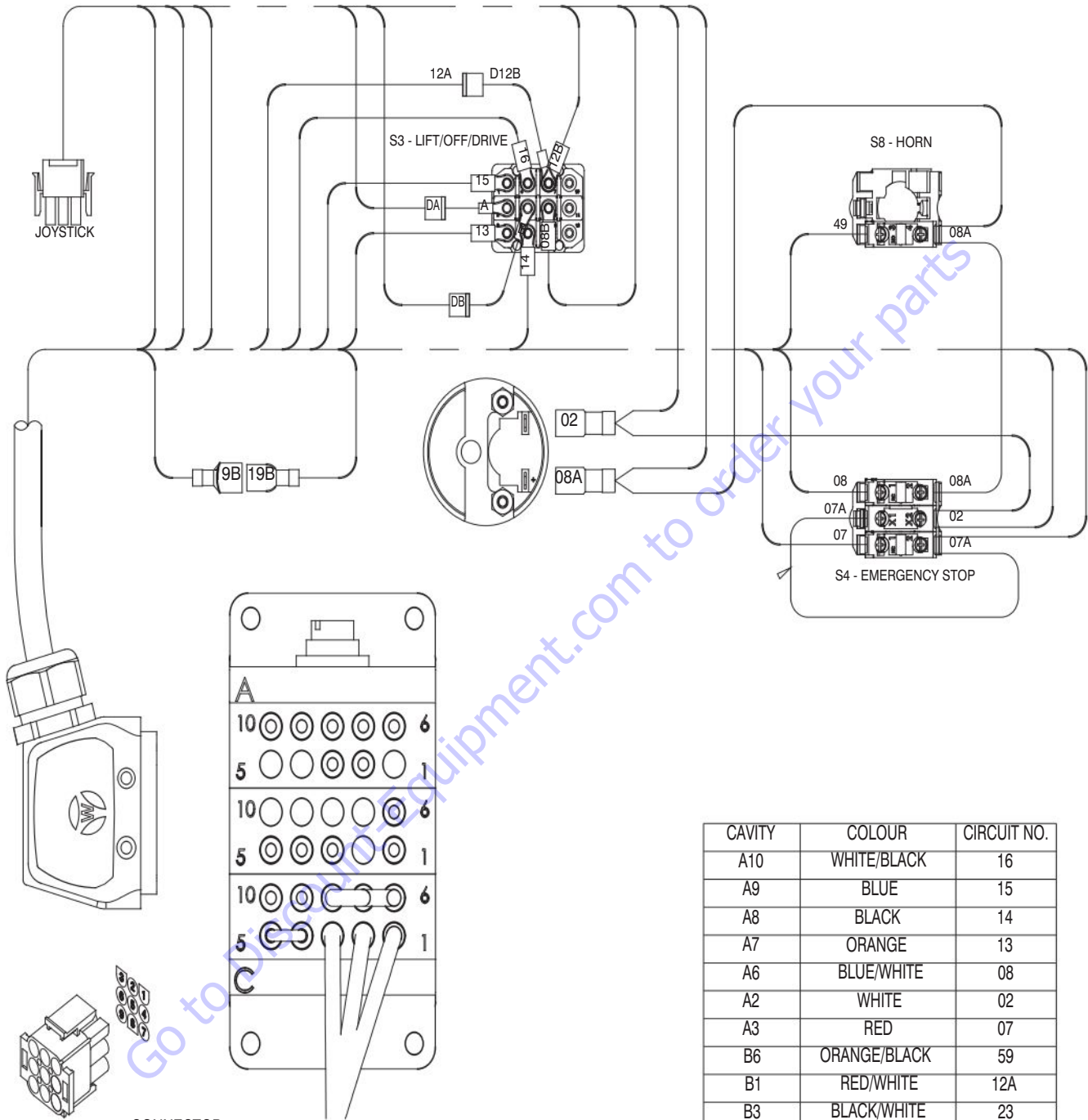
3.7 Wheel Brake and Port Identifications



3.8 Powerpack and Port Identifications



3.9 Platform Control Box Wiring

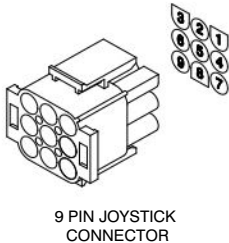
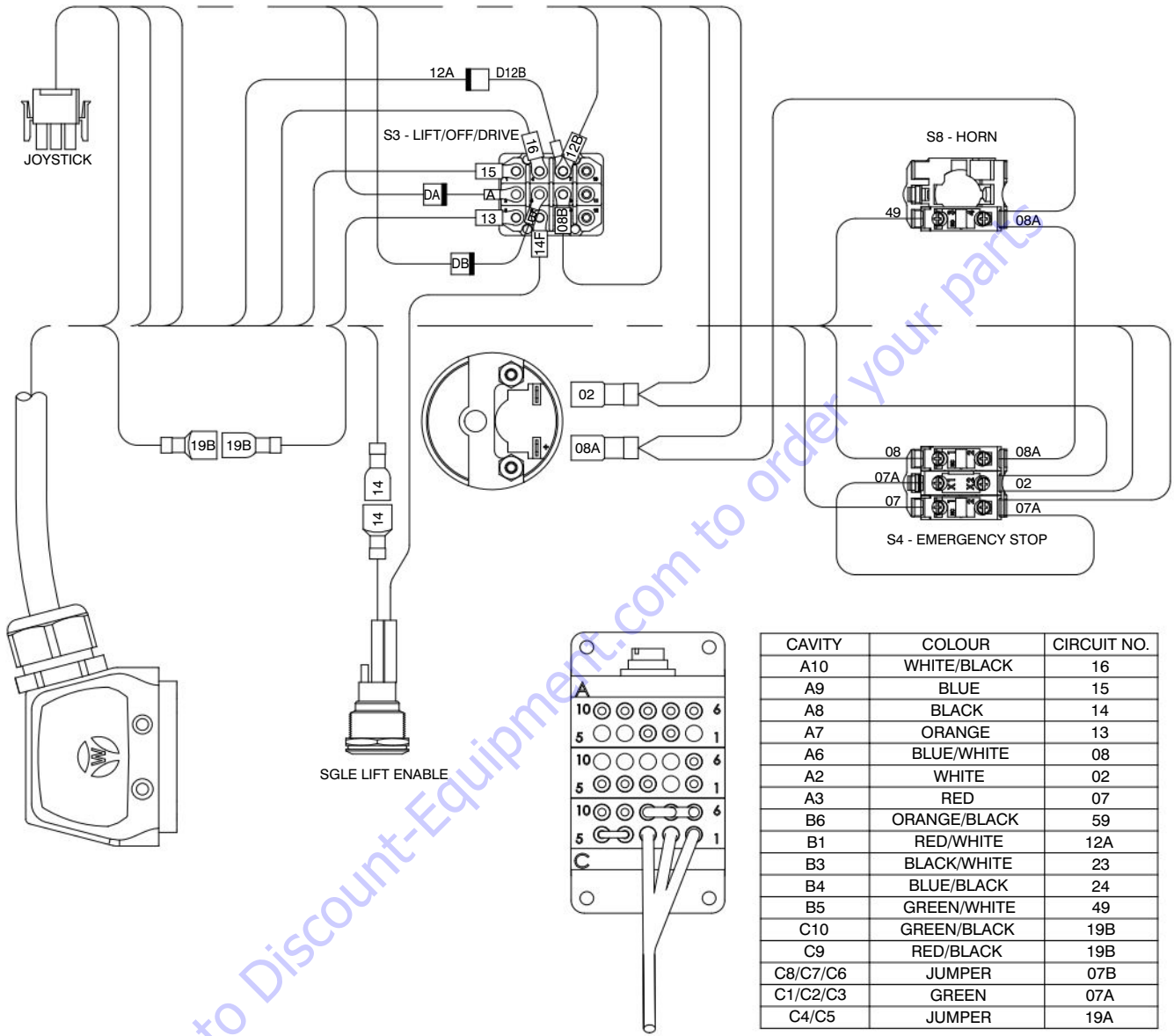


9 PIN JOYSTICK CONNECTOR

PIN NO.	LABEL	DESCRIPTION	CONTROL BOX HARNESS	JOYSTICK HARNESS
1	24	LEFT	BLUE/BLACK	WHITE/RED
2	12B	STEERING VS+	BROWN/RED	WHITE/GREEN
3	23	RIGHT	BLACK/WHITE	WHITE
4	B	FWD/UP	RED	YELLOW
5	08A	JOYSTICK VS+	PURPLE/WHITE	WHITE/BLACK
6	A	REV/DOWN	PURPLE/WHITE	GREY
7	59	PROP. OUT	ORANGE/BLACK	BLUE
8	02	GND	WHITE	BLACK
9	08B	ENABLE VS+	PURPLE/WHITE	WHITE/BLUE

CAVITY	COLOUR	CIRCUIT NO.
A10	WHITE/BLACK	16
A9	BLUE	15
A8	BLACK	14
A7	ORANGE	13
A6	BLUE/WHITE	08
A2	WHITE	02
A3	RED	07
B6	ORANGE/BLACK	59
B1	RED/WHITE	12A
B3	BLACK/WHITE	23
B4	BLUE/BLACK	24
B5	GREEN/WHITE	49
C10	GREEN/BLACK	19B
C9	RED/BLACK	19B
C8/C7/C6	JUMPER	07B
C1/C2/C3	GREEN	07A
C4/C5	JUMPER	19A

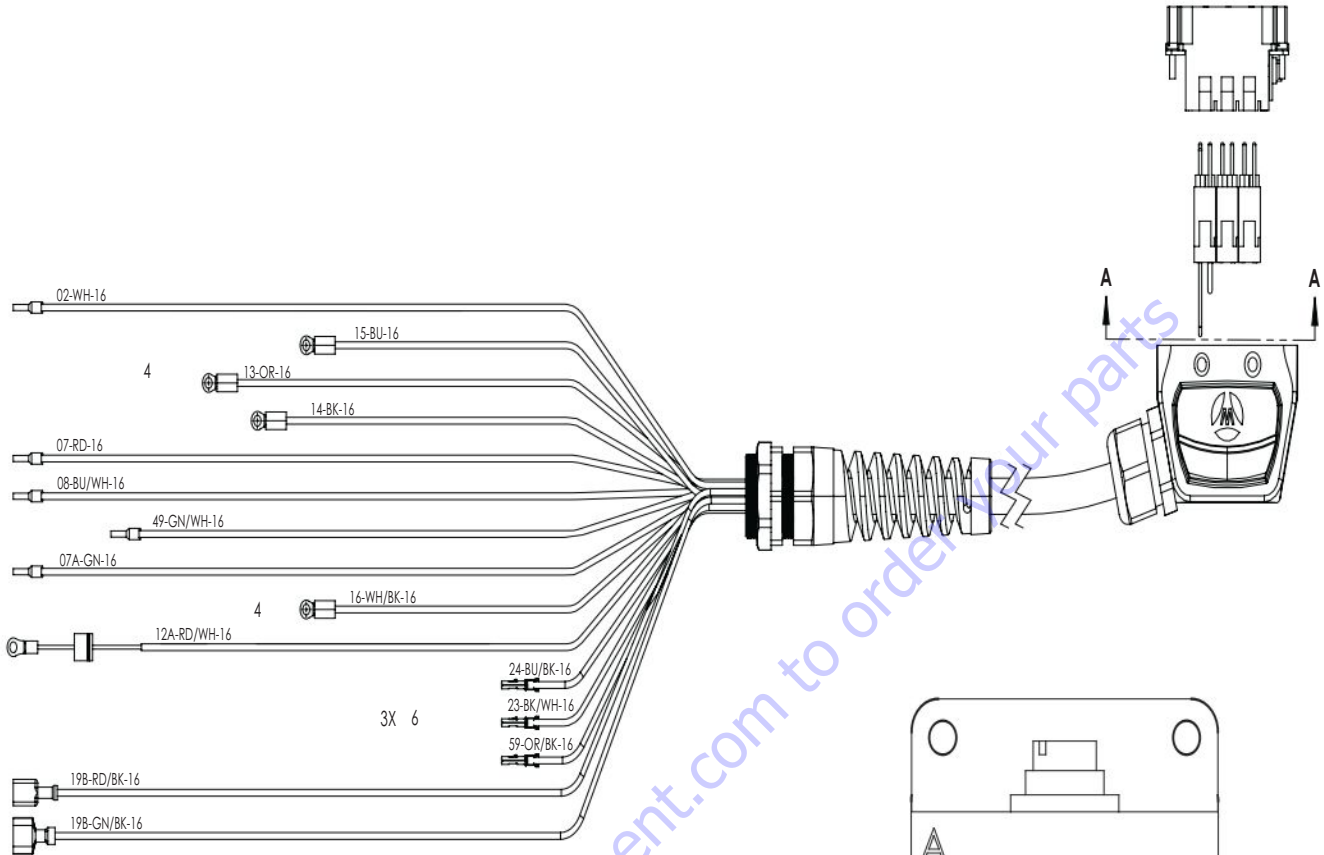
3.10 Platform Control Box Wiring - SGLE



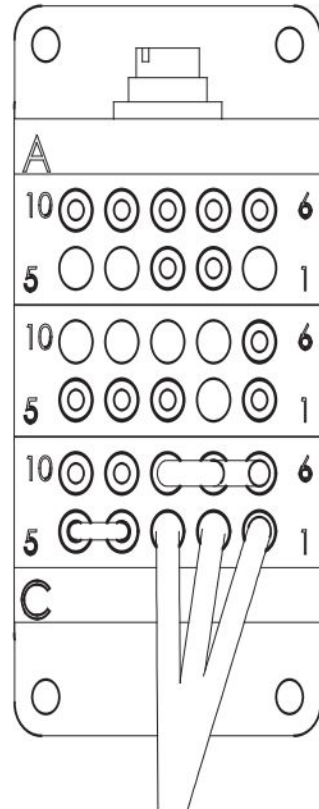
PIN NO.	LABEL	DESCRIPTION	CTRL BOX HARNESS	JOYSTICK HARNESS
1	24	LEFT	BLUE/BLACK	WHITE/RED
2	12B	STEERING VS+	BROWN/RED	WHITE/GREEN
3	23	RIGHT	BLACK/WHITE	WHITE
4	B	FWD/UP	RED	YELLOW
5	08A	JOYSTICK VS+	PURPLE/WHITE	WHITE/BLACK
6	A	REV/DOWN	PURPLE/WHITE	GREY
7	59	PROP. OUT	ORANGE/BLACK	BLUE
8	02	GND	WHITE	BLACK
9	08B	ENABLE VS+	PURPLE/WHITE	WHITE/BLUE

M223599AB

3.11 Platform Control Box Cable



CAVITY	COLOUR	CIRCUIT NO.	TERMINATION	CUT LENGTH
A10	WHITE/BLACK	16	#6 RING	10
A9	BLUE	15	#6 RING	9
A8	BLACK	14	#6 RING	10
A7	ORANGE	13	#6 RING	11
A6	BLUE/WHITE	08	16GA FERRULE	15
A1	NOT USED			
A2	WHITE	02	16GA FERRULE	15
A3	RED	07	16GA FERRULE	15
A4	NOT USED			
A5	NOT USED			
B10	NOT USED			
B9	NOT USED			
B8	NOT USED			
B7	NOT USED			
B6	ORANGE/BLACK	59	FEMALE WIRE PIN	6
B1	RED/WHITE	12A	#6 RING W/ DIODE	15
B2	NOT USED			
B3	BLACK/WHITE	23	FEMALE WIRE PIN	6
B4	BLUE/BLACK	24	FEMALE WIRE PIN	6
B5	GREEN/WHITE	49	16GA FERRULE	13
C10	GREEN/BLACK	19B	MALE SPADE	15
C9	RED/BLACK	19B	FEMALE SPADE	15
C8		07B	JUMPER	
C7		07B	JUMPER	
C6		07B	JUMPER	
C1	GREEN (SPICED)	07A	N/A	
C2	GREEN (SPICED)	07A	N/A	
C3	GREEN	07A	16GA FERRULE	15
C4		19A	JUMPER	
C5		19A	JUMPER	



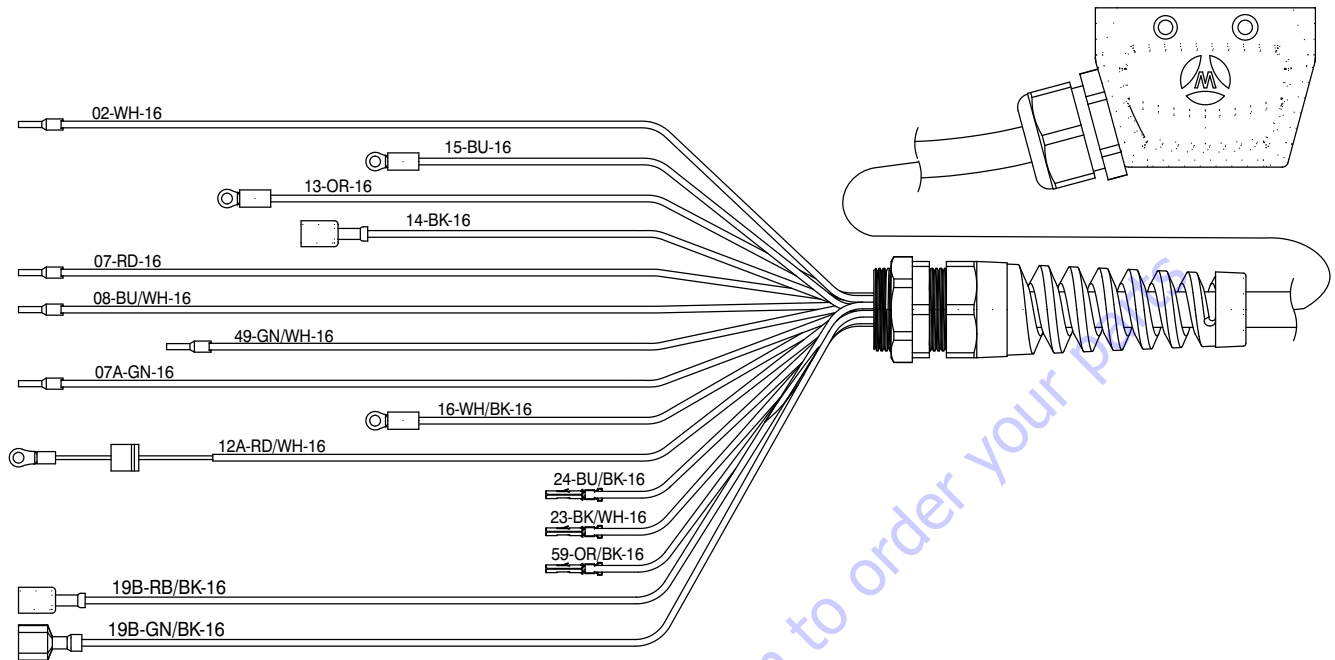
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SJ12, SJ16

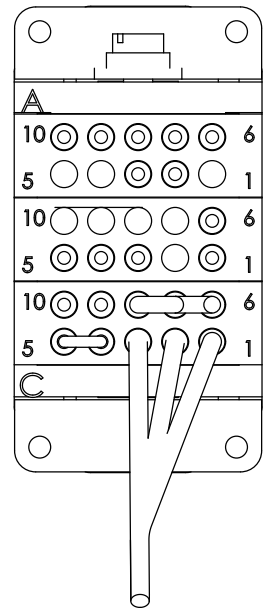
SKYJACK

213558ACA

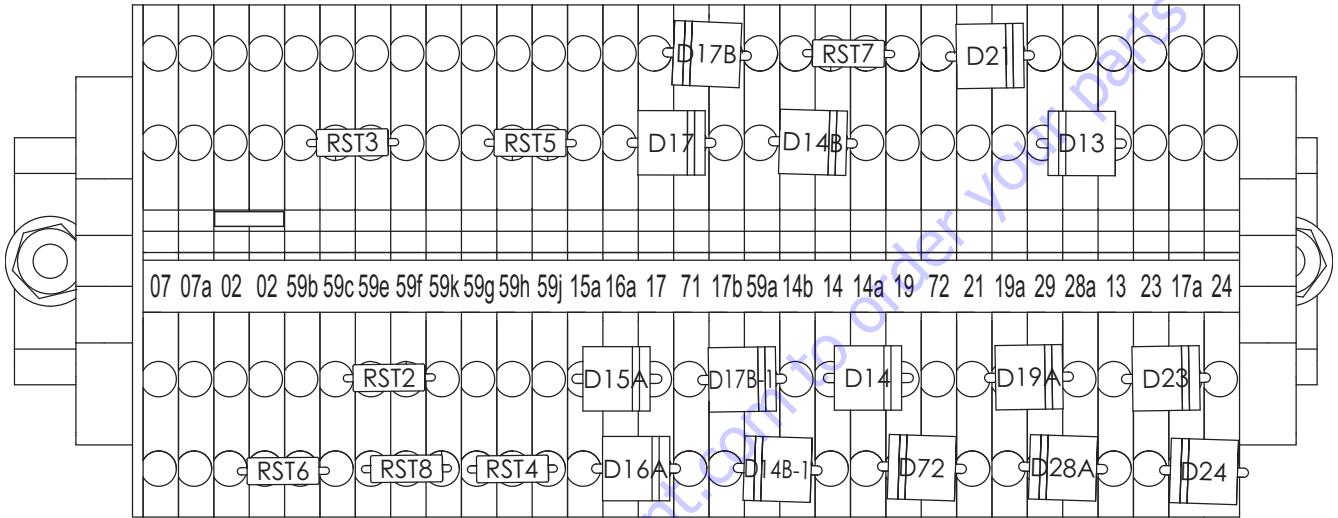
3.12 Platform Control Box Cable - SGLE



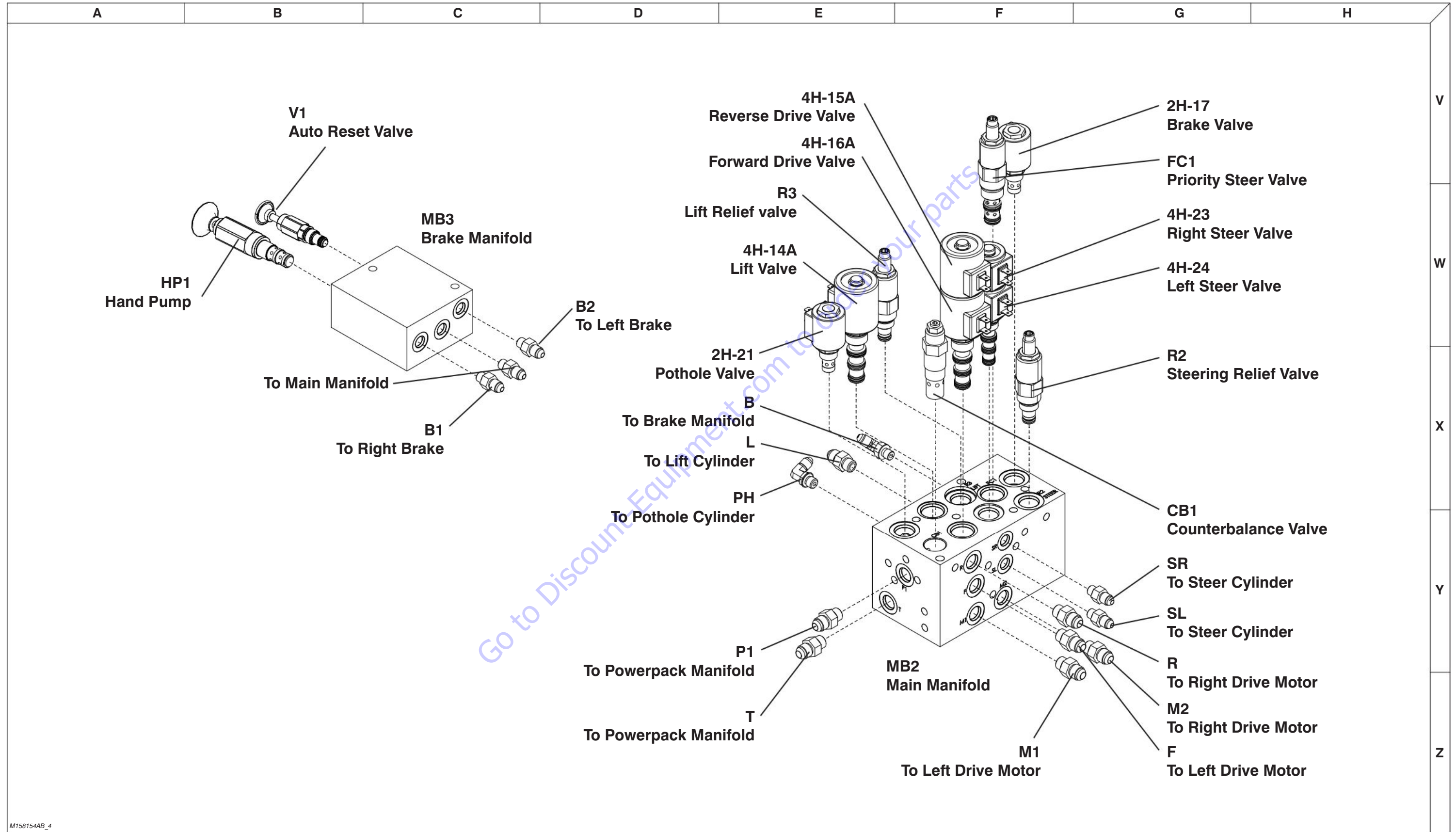
CAVITY	COLOUR	CIRCUIT NO.	TERMINATION	CUT LENGTH
A10	WHITE/BLACK	16	#6 RING	10
A9	BLUE	15	#6 RING	9
A8	BLACK	14	#6 RING	10
A7	ORANGE	13	#6 RING	11
A6	BLUE/WHITE	08	16GA FERRULE	15
A1	NOT USED			
A2	WHITE	02	16GA FERRULE	15
A3	RED	07	16GA FERRULE	15
A4	NOT USED			
A5	NOT USED			
B10	NOT USED			
B9	NOT USED			
B8	NOT USED			
B7	NOT USED			
B6	ORANGE/BLACK	59	FEMALE WIRE PIN	6
B1	RED/WHITE	12A	#6 RING W/ DIODE	15
B2	NOT USED			
B3	BLACK/WHITE	23	FEMALE WIRE PIN	6
B4	BLUE/BLACK	24	FEMALE WIRE PIN	6
B5	GREEN/WHITE	49	16GA FERRULE	13
C10	GREEN/BLACK	19B	MALE SPADE	15
C9	RED/BLACK	19B	FEMALE SPADE	15
C8		07B	JUMPER	
C7		07B	JUMPER	
C6		07B	JUMPER	
C1	GREEN (SPLICED)	07A	N/A	
C2	GREEN (SPLICED)	07A	N/A	
C3	GREEN	07A	16GA FERRULE	15
C4		19A	JUMPER	
C5		19A	JUMPER	



3.13 Terminal Strip

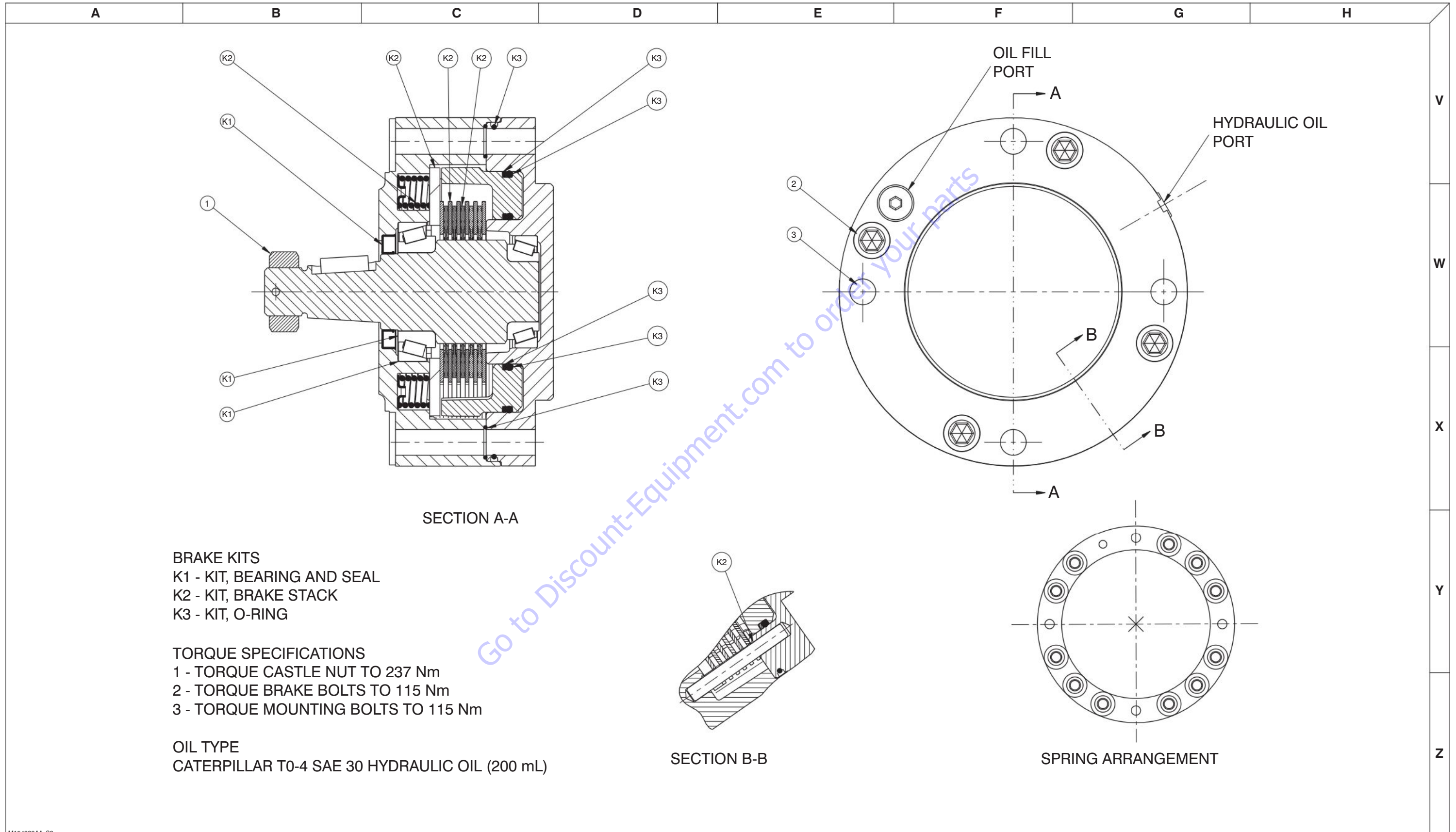


3.14 Brake and Main Manifold and Hydraulic Identifications



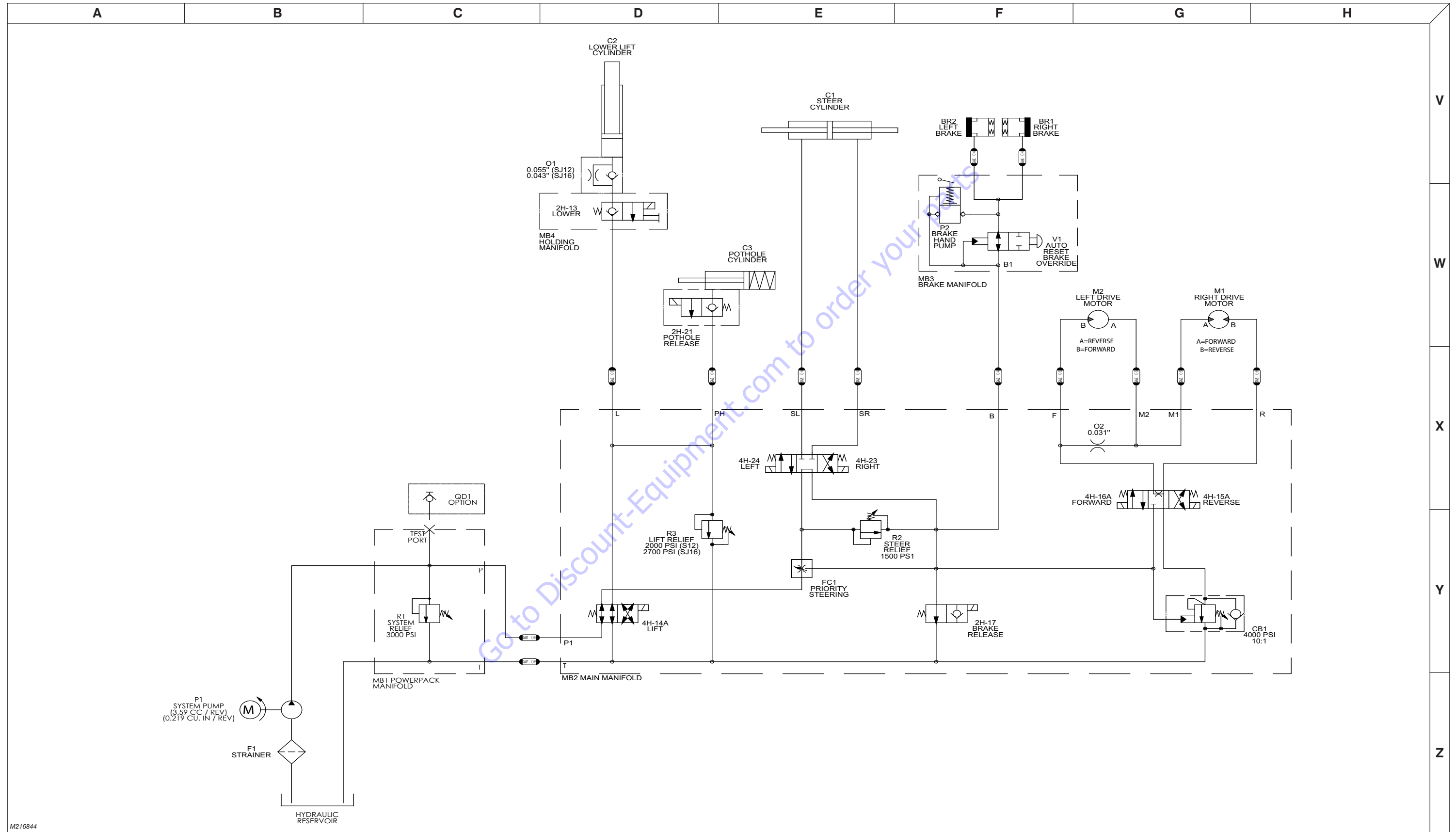
M158154AB_4

3.15 Disc Brake Kits and Torque Specifications



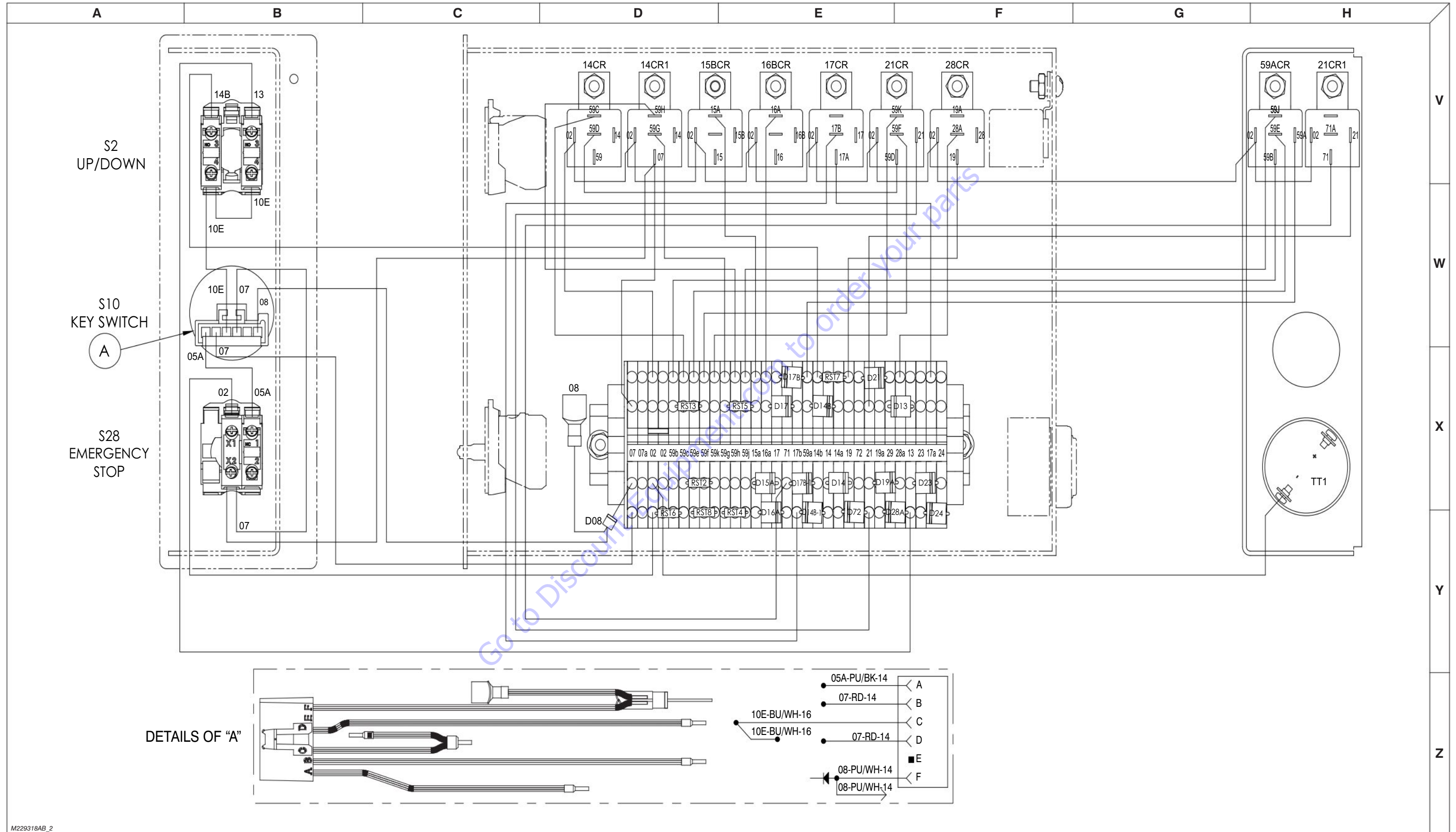
M154839AA_S3

3.16 Hydraulic Schematic



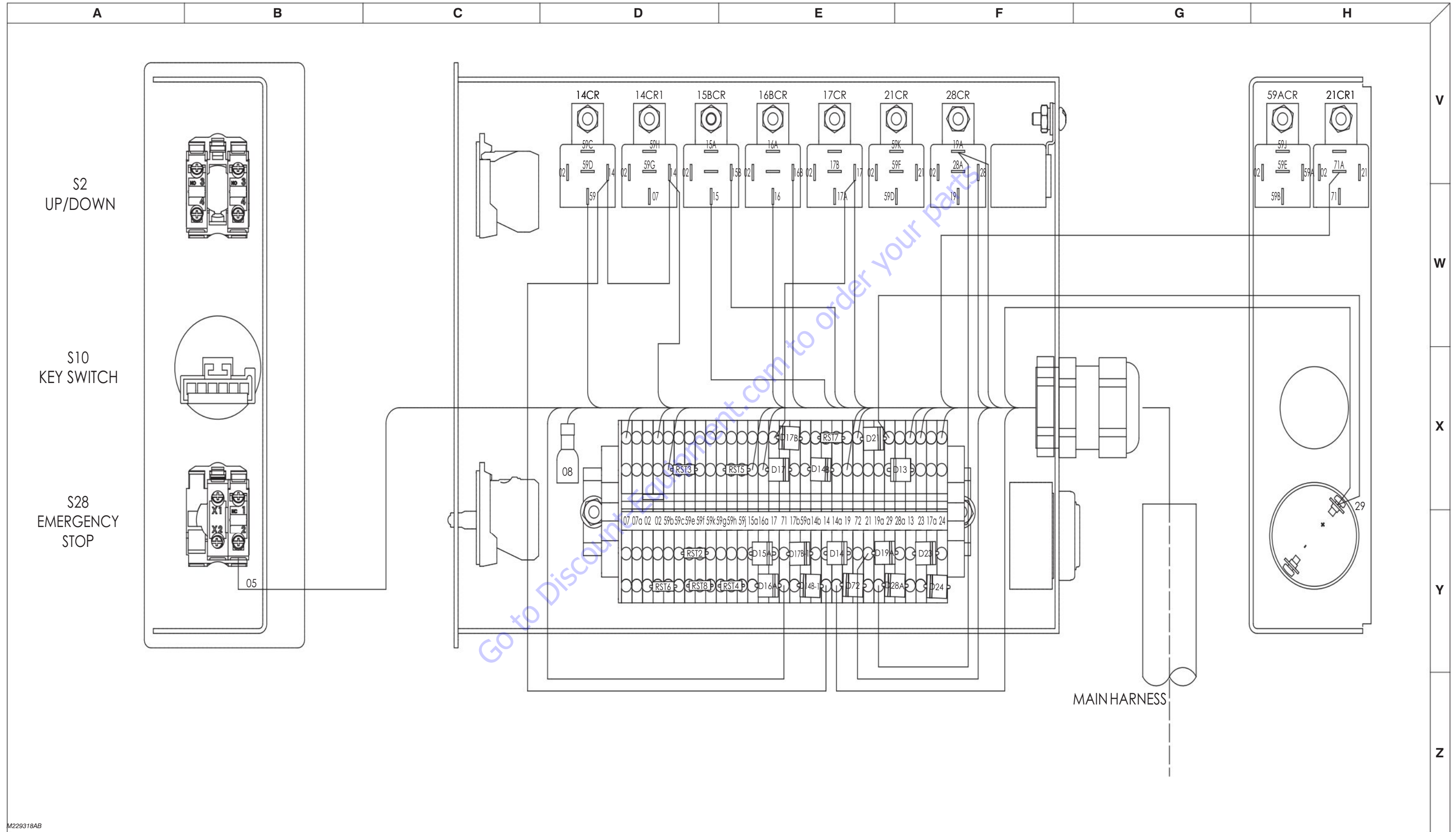
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3.17 Base Control Wiring Diagram (Page 1 of 2)



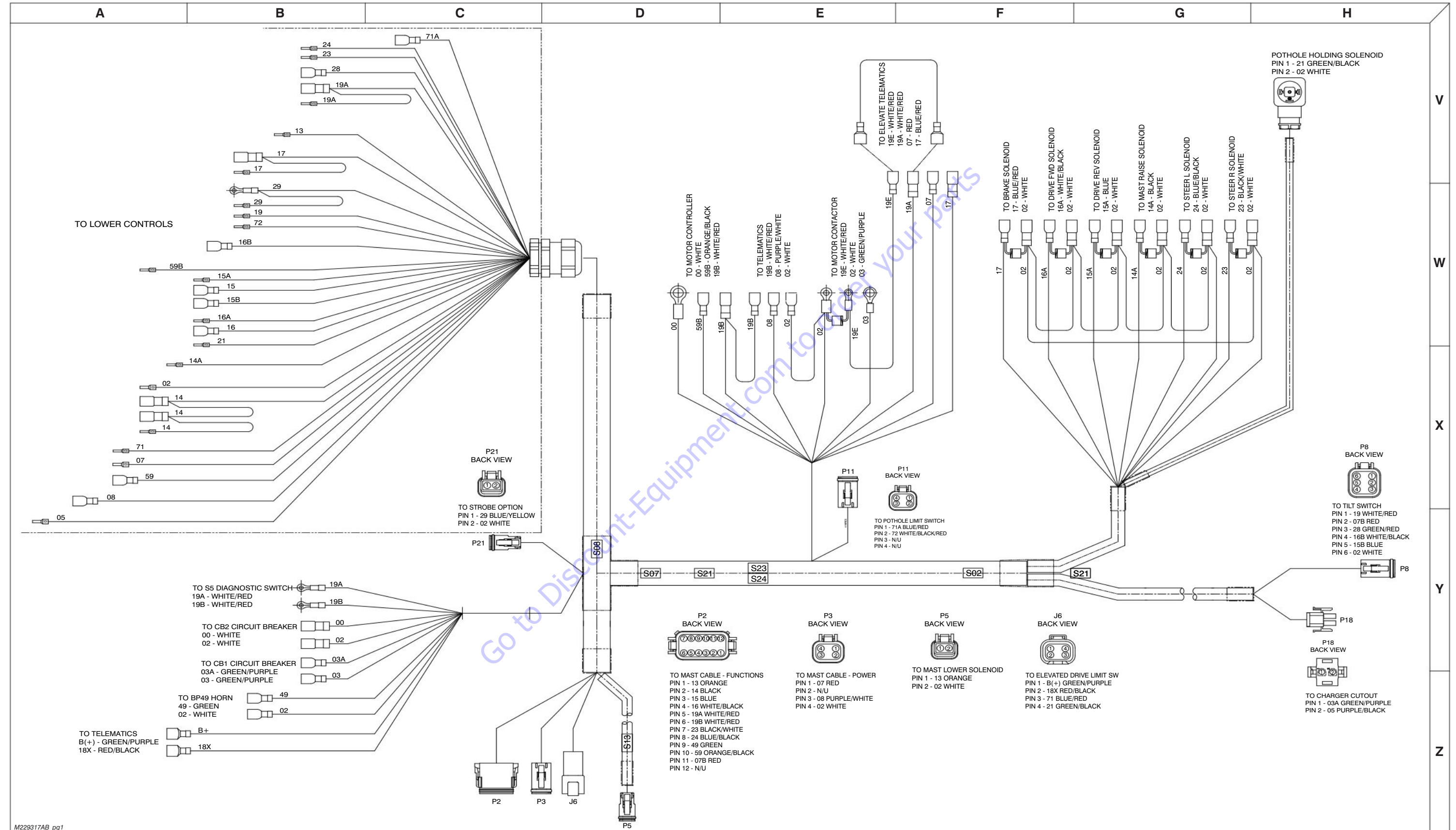
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3.18 Base Control Wiring Diagram (Page 2 of 2)



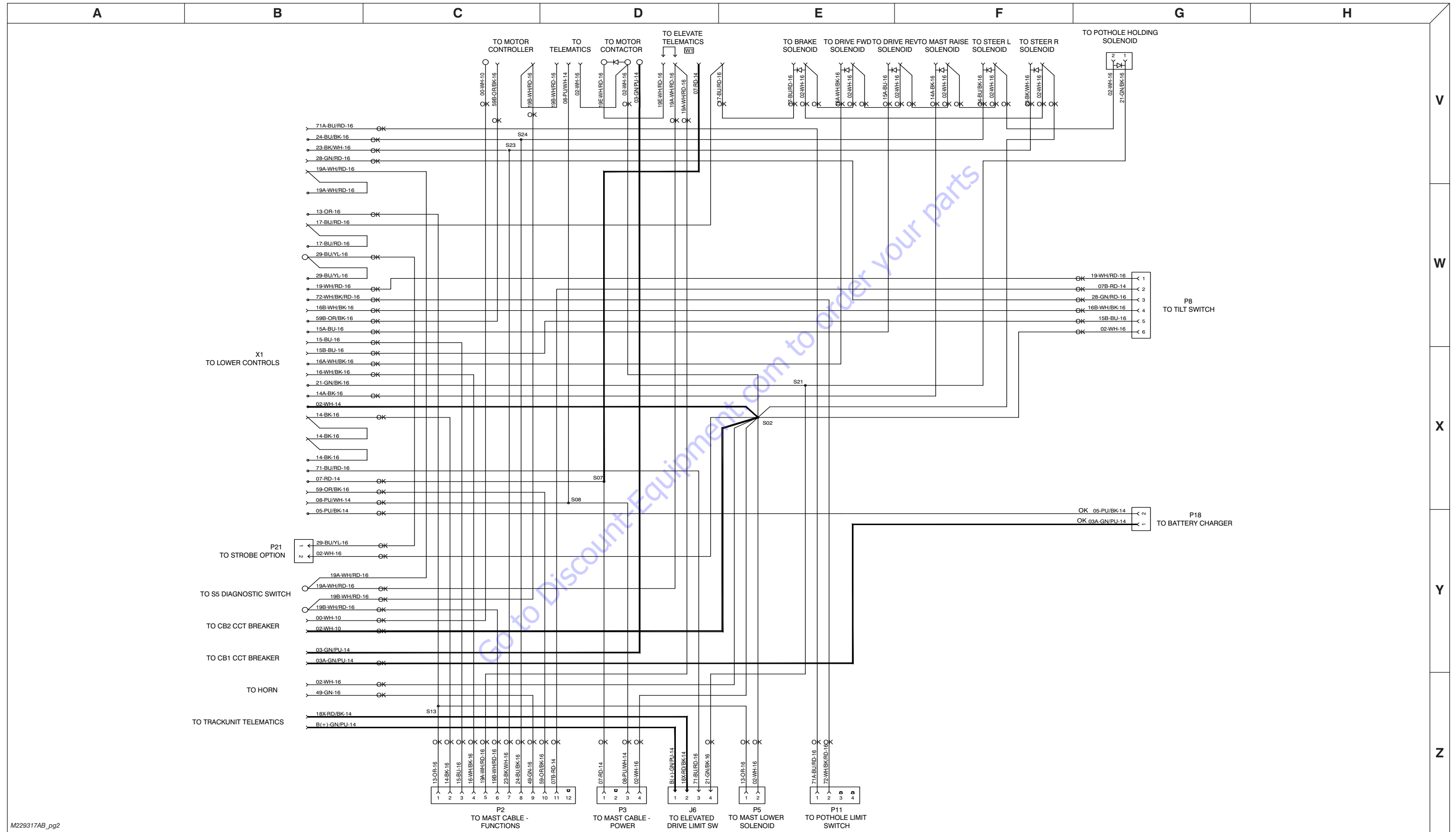
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3.19 Main Electrical Harness (Page 1 of 2)



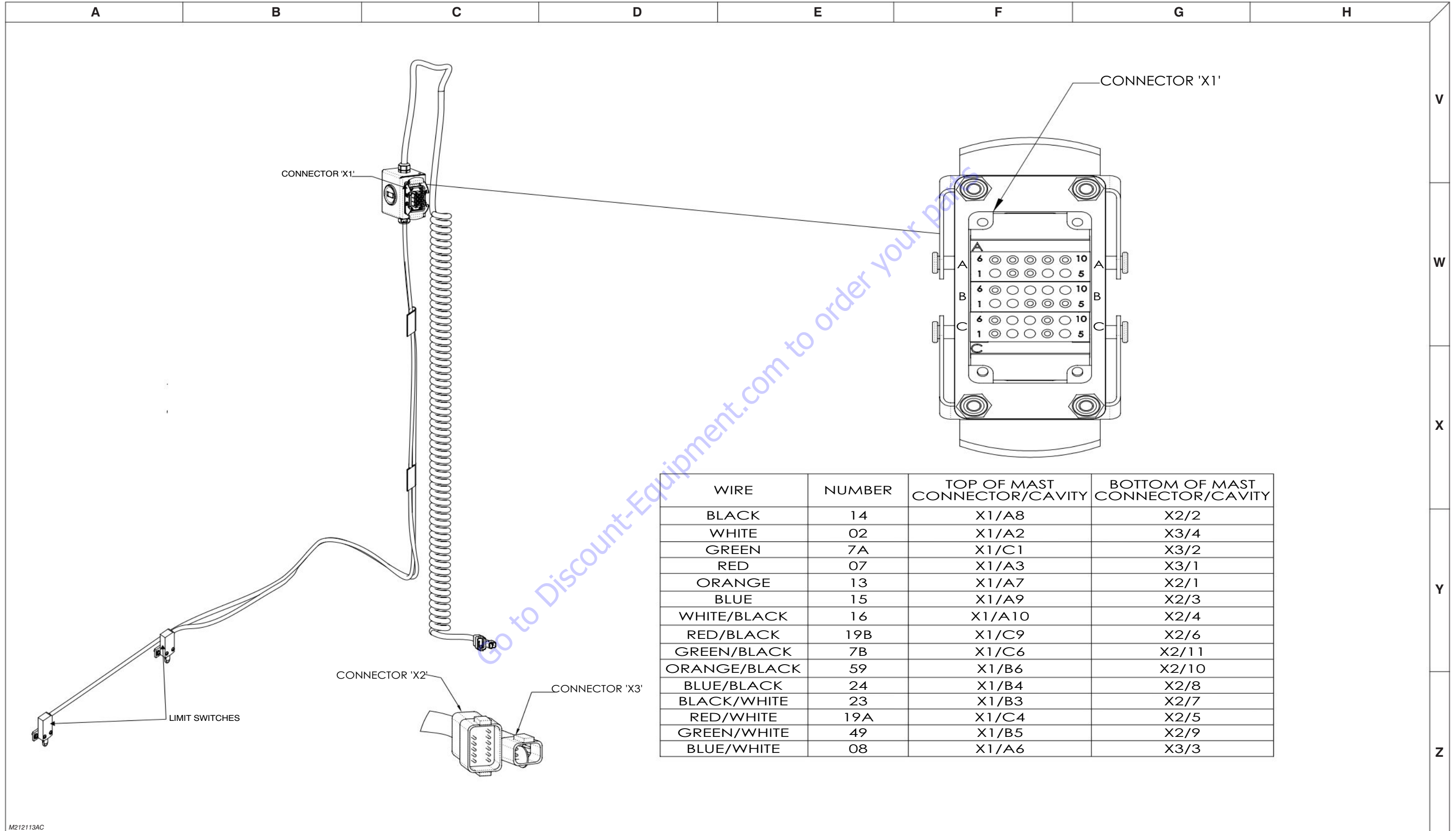
M229317AB_pg1

3.20 Main Electrical Harness (Page 2 of 2)



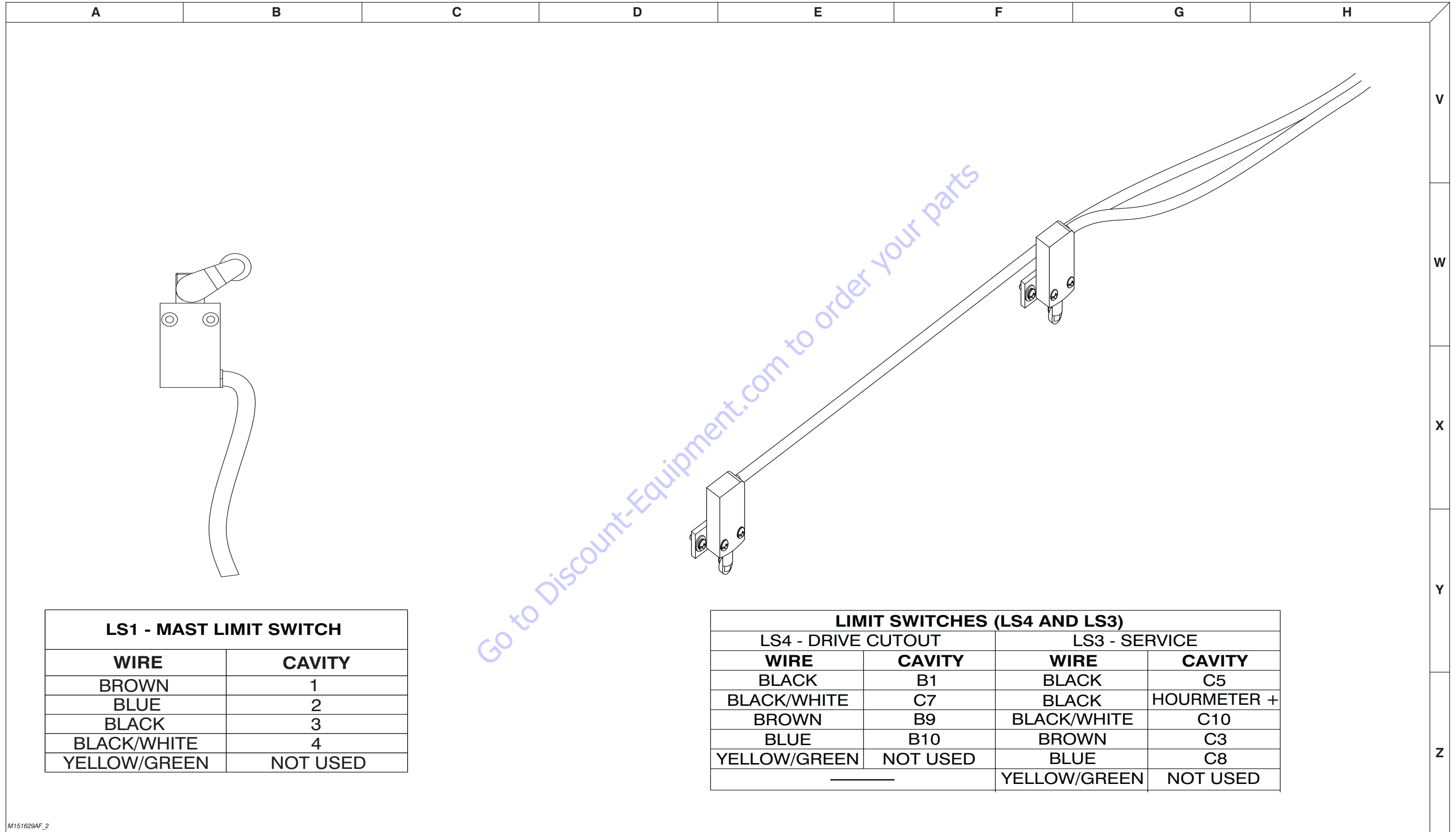
M229317AB_pg2

3.21 Mast Control Cable



M212113AC

3.22 Limit Switches

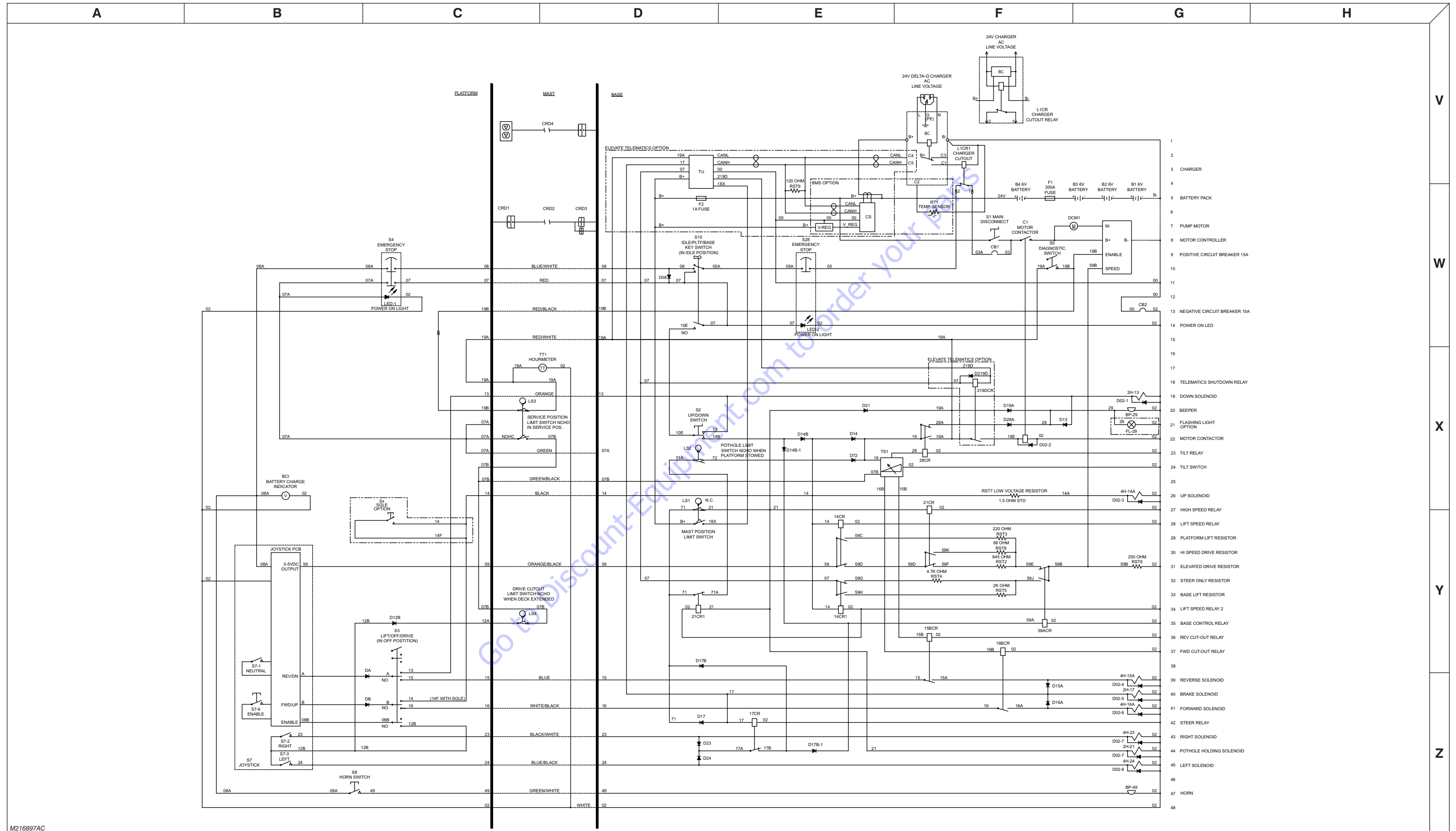


LS1 - MAST LIMIT SWITCH	
WIRE	CAVITY
BROWN	1
BLUE	2
BLACK	3
BLACK/WHITE	4
YELLOW/GREEN	NOT USED

LIMIT SWITCHES (LS4 AND LS3)			
LS4 - DRIVE CUTOUT		LS3 - SERVICE	
WIRE	CAVITY	WIRE	CAVITY
BLACK	B1	BLACK	C5
BLACK/WHITE	C7	BLACK	HOURMETER +
BROWN	B9	BLACK/WHITE	C10
BLUE	B10	BROWN	C3
YELLOW/GREEN	NOT USED	BLUE	C8
		YELLOW/GREEN	NOT USED

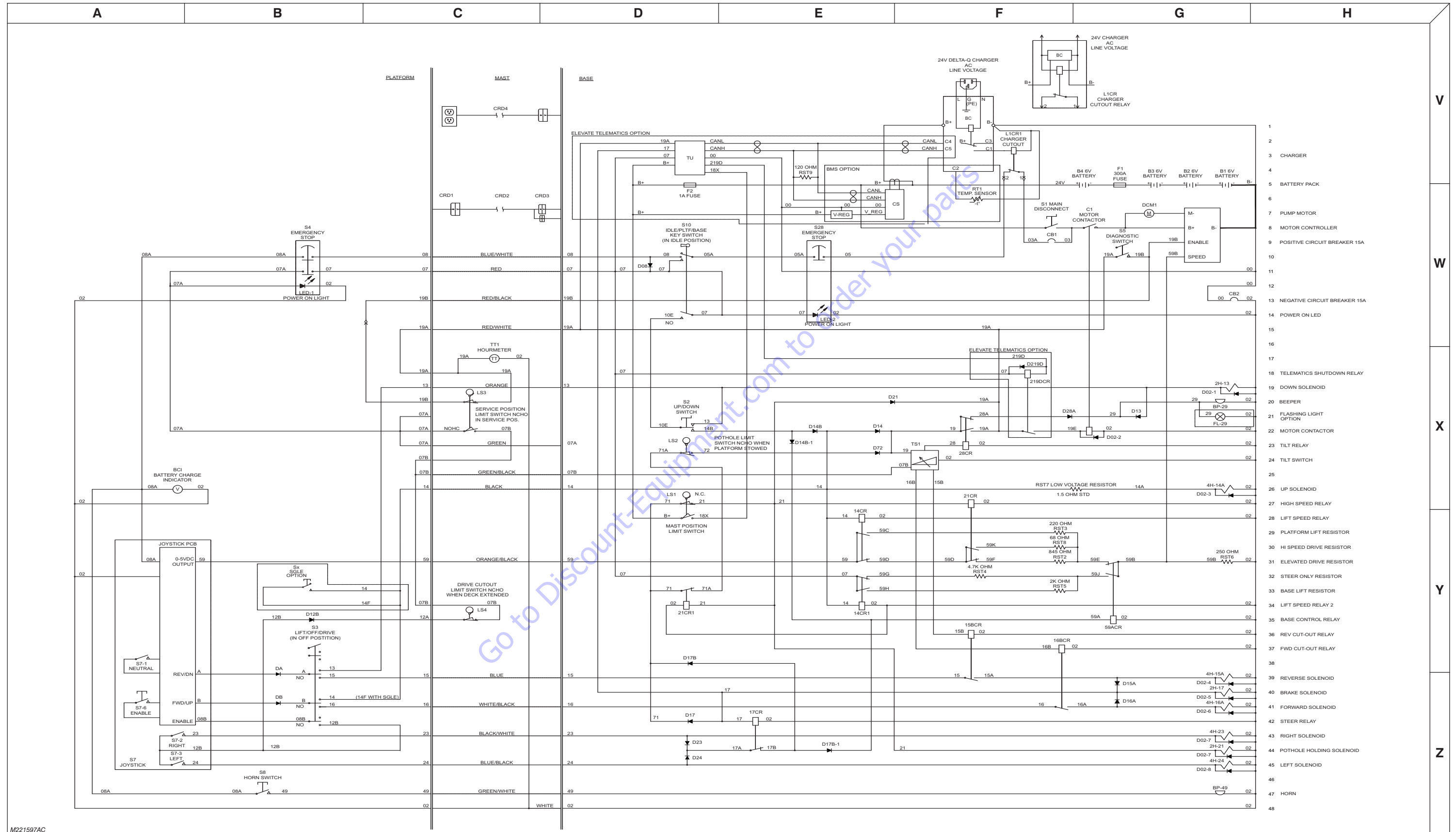
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3.23 Electrical Schematic (ANSI/CSA)



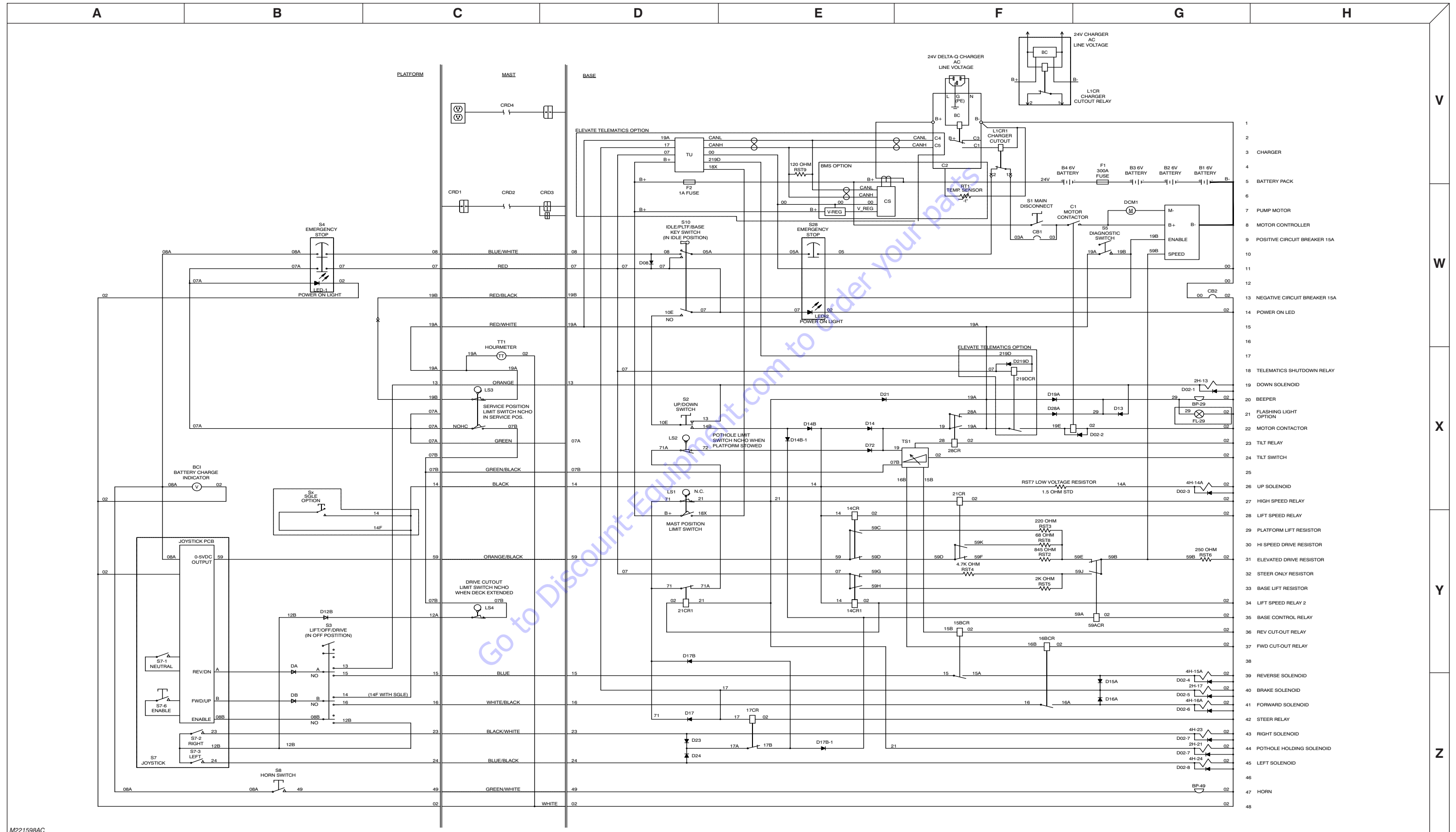
M216897AC

3.24 Electrical Schematic (CE)



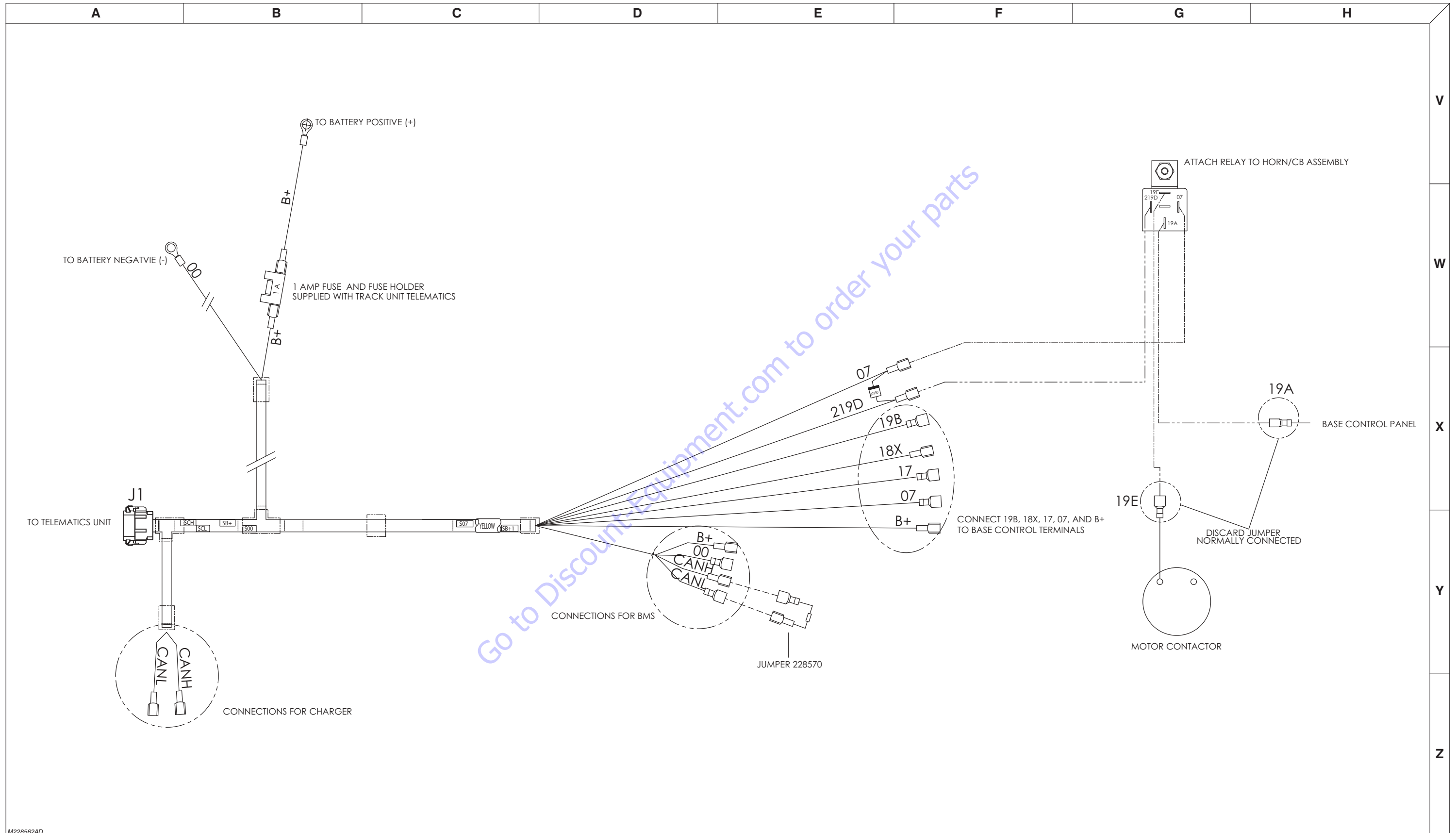
M221597AC

3.25 Electrical Schematic (AS)



M221598AC

3.26 Elevate Telematics Harness



M228562AD

Section 4 – Troubleshooting Information

4.1 Introduction

The following pages contain a table of Troubleshooting Information for locating and correcting most service trouble which can develop. Careful and accurate analysis of the systems listed in the table of Troubleshooting Information 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 preceded by a number represents the “probable cause.” The following line, noted by a dash represents the “remedy” to the “probable cause” directly above it. See example below for clarification.

1. Probable cause

Remedy

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4.2 Electrical System Troubleshooting

4.2-1 All Controls Inoperative

1. Battery charger plugged into external power source.	Disconnect charger cord. Check continuity between wire #3A and #05 to test N.C. contact in Battery Charger Cutoff Relay L1CR1. Replace charger if contact is not closed when unplugged from external power source.
2. Batteries disconnected or faulty.	Connect batteries and test each battery for proper supply voltage.
3. Dirty or loose battery terminals.	Clean and tighten connections.
4. Batteries charge low.	Check each cell with a hydrometer. Reading should be 1.275 (fully charged). Recharge if low reading. Replace if reading difference between cells is 0.050.
5. Main battery cables open or defective.	Check continuity. Replace if defective.
6. Fuse F1 defective or open.	Replace fuse.
7. Loose or broken wire #B+ from Battery to Main Battery Disconnect S1.	Check continuity. Replace if defective.
8. Main battery disconnect switch S1 open or defective.	Close switch. Check continuity between wire #B+ and wire #03 on switch. Replace switch if defective.
9. Loose or broken wire #03 from Main Battery Disconnect S1 to Motor Contactor C1.	Check continuity. Replace if defective.
10. Loose or broken wire #03 from Main Battery Disconnect S1 to circuit breaker CB1.	Check continuity. Replace if defective.
11. Defective or tripped circuit breaker CB1.	Reset circuit breaker. Replace if defective.
12. Loose or broken wire #3A from circuit breaker CB1 to Charger Cutoff Relay L1CR1.	Check continuity. Replace if defective.
13. Defective Battery Charger Cutoff Relay L1CR1.	Check relay. Replace if defective.
14. Loose or broken wire #05 from Battery Charger Cutoff Relay L1CR1 to Base Emergency Stop switch S28.	Check continuity. Replace if defective.
15. Open or defective Base Emergency Stop switch S28.	Close switch. Check continuity between wire #05 and wire #5A on switch. Replace if defective.
16. Loose or broken wire #5A from Base Emergency Stop switch S28 to Idle/PLTF/Base Key switch S10	Check continuity. Replace if defective.

17. Open or defective Idle/PLTF/Base Key switch S10.	Select function with switch. Check continuity between wire #5A and wire #08 on switch. (Platform selected). Check continuity between wire #5A and wire #07 on switch. (Base selected). Replace switch if no continuity during correct switch function.
18. Loose or broken B- cable wire #00 from batteries to B- lug on Motor Controller.	Check continuity. Replace if defective.
19. Loose or broken wire #00 from Motor Controller to Circuit Breaker CB2.	Check continuity. Replace if defective.
20. Defective or tripped circuit breaker CB2.	Reset Circuit Breaker. Replace if defective.
21. Loose or broken wire #02 from Circuit Breaker CB2 to Base terminal block.	Check continuity. Replace if defective.

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4.2-2 All Controls Except for Down Function Inoperative

1. Loose or broken wire #59B from base terminal block to motor controller.	Check continuity. Replace if defective.
2. Loose or broken wire #19A from base terminal block to diagnostic switch S5.	Check continuity. Replace if defective.
3. Loose or broken wire #19A from Diagnostic switch S5 to Mast Control cable.	Check continuity. Replace if defective.
4. Loose or broken wire #19A in mast control cable or its connectors.	Check continuity between Mast function cable connector P2 pin #5 and Platform connector X1 pin #C4/C5 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
5. Loose or broken wire #19A from Control Box connector #C4/C5 to Limit switch LS3.	Check continuity. Replace if defective.
6. Loose or broken wire #19B from limit switch LS3 to control box connector pin #C9.	Check continuity. Replace if defective.
7. Defective limit switch LS3.	Check limit switch. Replace if defective.
8. Loose or broken wire #19B in mast control cable or its connectors.	Check continuity between Mast function cable connector P2 pin #5 and Platform connector X1 pin #C4 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
9. Loose or broken wire #19B from diagnostic switch S5 to mast control cable.	Check continuity. Replace if defective.
10. Loose or broken wire #19B from diagnostic switch S5 to motor controller. (Enable signal)	Check continuity. Replace if defective.
11. Loose or broken wire B- cable from batteries to B- lug on motor controller.	Check continuity. Replace if defective.
12. Loose or broken wire B+ from main battery disconnect switch S1 to motor contactor C1.	Check continuity. Replace if defective.
13. Loose or broken wire B+ from motor contactor C1 to motor DCM1.	Check continuity. Replace if defective.
14. Loose or broken wire B+ from motor DCM1 to B+ lug on motor controller.	Check continuity. Replace if defective.
15. Loose or broken wire B- from B+ from Motor DCM1 to M- lug on Motor Controller.	Check continuity. Replace if defective.
16. Defective motor controller.	Check motor controller input and output voltage. Replace if defective.
17. Defective Motor DCM1.	Supply the Motor DCM1 with 24 volt supply and a B- across motor to check operation of Motor DCM1. Replace if defective

4.2-3 All Controls Inoperative From Base Control Console

1. Open or defective Idle/PLTF/Base Key switch S10.	Operate switch. Check continuity between wire #5A and wire #07 when Base selected. Check continuity between wire #07 and wire #10E when Base selected. Replace if either contact is defective on switch.
2. Loose or broken wire #10E from Idle/PLTF/Base Key switch S10 to Up/Down switch S2.	Check continuity. Replace if defective.
3. Open or defective Up/Down switch S2.	Operate switch. Check continuity between wire #10E and wire #14B on switch (when selected on Up). Check continuity between wire #10E and wire #13 on switch (when selected to Down). Replace switch if no continuity when operating switch.

4.2-4 No Up Function from Base Control Console

1. Open or defective Up/Down switch S2.	Operate switch. Check continuity between wire #10E and wire #14B on switch (when selected to Up). Check continuity between wire #10E and wire #13 on switch (when selected to Down). Replace switch if no continuity when operating switch.
2. Loose or broken wire #14B from up/down switch S2 to base terminal block.	Check continuity. Replace if defective.
3. Open diode D14B-1.	Check diode. Replace if defective.
4. Open diode D14B.	Check diode. Replace if defective.
5. Loose or broken wire #14 from base terminal block to lift speed relay 14CR.	Check continuity. Replace if defective.
6. Loose or broken wire #14 from lift speed relay 14CR to Lift Speed Relay2 14CR1.	Check continuity. Replace if defective.
7. Open diode D14.	Check diode. Replace if defective.
8. Defective low voltage protection resistor RST7.	Check resistor and make sure it is secure. Replace if defective.
9. Loose or broken wire #14A from base terminal block to up valve coil 4H-14A.	Check continuity. Replace if defective.
10. Loose or broken wire #02 from base terminal block to up valve coil 4H-14A.	Check continuity. Replace if defective.
11. Defective up valve coil 4H-14A.	Check continuity through coil. Replace if defective.
12. Loose or broken wire #19B from Limit switch LS3 to Control box connector pin #C9.	Check continuity. Replace if defective.
13. Defective Limit switch LS3.	Check limit switch. Replace if defective.

14. Loose or broken wire #19B in Mast control cable or its connections.	Check continuity between Mast function cable connector P2 pin #5 and Platform connector X1 pin #C4 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
15. Loose or broken wire #19B from Diagnostic switch S5 to Mast Control cable.	Check continuity. Replace if defective.
16. Loose or broken wire #19B from Diagnostic switch S5 to Motor Controller. (Enable signal)	Check continuity. Replace if defective.
17. Loose or broken wire #19 from Base terminal block to Tilt switch TS1	Check continuity. Replace if defective.
18. Defective Tilt switch TS1.	Test Tilt switch. Replace if defective.
19. Loose or broken wire #28 from Tilt switch TS1 to Tilt Relay 28CR.	Check continuity. Replace if defective.
20. Loose or broken wire #02 from Tilt switch TS1 to Base terminal block.	Check continuity. Replace if defective.
21. Defective Tilt Relay 28CR.	Check relay. Replace if defective.
22. Loose or broken wire #19A from Tilt Relay 28CR to Motor Contactor C1.	Check continuity. Replace if defective.
23. Loose or broken wire #59A from Base terminal block to Base Control Relay 59ACR.	Check continuity. Replace if defective.
24. Loose or broken wire #02 from Base terminal block to Base Control Relay 59ACR.	Check continuity. Replace if defective.
25. Defective Base Control Relay 59ACR.	Check relay. Replace if defective.
26. Loose or broken wire #07 from Base terminal block to Lift Speed Relay2 14CR1.	Check continuity. Replace if defective.
27. Loose or broken wire #59H from Lift Speed Relay2 14CR1 to Base terminal block.	Check continuity. Replace if defective.
28. Defective Base Lift Resistor RST5.	Check resistor and make sure it is secure. Replace if defective.
29. Loose or broken wire #59J from Base terminal block to Base Control Relay 59ACR.	Check continuity. Replace if defective.

4.2-5 Up Function Slow from Base Control Console

1. Loose or broken wire #14 from base terminal block to lift speed relay2 14CR1.	Check continuity. Replace if defective.
2. Loose or broken wire #02 from base terminal block to lift speed relay2 14CR1.	Check continuity. Replace if defective.
3. Defective lift speed relay2 14CR1.	Check relay. Replace if defective.

4.2-6 No Down Function from Base Control Console

1. Open or defective up/down switch S2.	Operate switch. Check continuity between wire #10E and wire #14B on switch (when UP selected). Check continuity between wire #10E and wire #13 on switch (when DOWN selected). Replace switch if no continuity when operating switch.
2. Loose or broken wire #13 from up/down switch S2 to base terminal block.	Check continuity. Replace if defective.
3. Loose or broken wire #13 from base terminal block to down valve coil 2H-13.	Check continuity. Replace if defective.
4. Loose or broken wire #02 from base terminal block to down valve coil 2H-13.	Check continuity. Replace if defective.
5. Defective down valve coil 2H-13.	Check continuity through coil. Replace if defective.

4.2-7 All Controls Inoperative From Platform Control Console

1. Open or defective Idle/PLTF/Base Key switch S10.	Operate switch. Check continuity between wire #5A and wire #08 when Platform selected. Replace if either contact is defective on switch.
2. Loose or broken wire #08 from Idle/PLTF/Base Key switch S10 to Base terminal block.	Check continuity. Replace if defective.
3. Loose or broken wire #08 in mast control cable or its connections.	Check continuity between Base connector P3 pin #3 and Platform connector X1 pin #A6 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
4. Loose or broken wire #08 from Platform connector pin #A6 to Platform Emergency Stop switch S4.	Check continuity. Replace if defective.
5. Open or defective platform emergency stop switch S4.	Close switch. Check continuity between wire #08 and wire #08A on switch. Replace if defective.
6. Loose or broken wire #08A from Platform Emergency Stop switch S4 to Joystick S7 connector pin #5.	Check continuity. Replace if defective.
7. Loose or broken wire #02 from Platform connector X1 pin #A2 to Joystick S7 connector pin #8.	Check continuity. Replace if defective.
8. Defective joystick S7.	Check joystick. Replace if defective.

4.2-8 No Up Function from Platform Controls

1. Loose or broken wire #B from Joystick S7 connector pin #4 to Diode DB on Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
2. Open diode DB.	Check diode. Replace if defective.
3. Loose or broken wire “B” from diode DB to lift/off/drive switch S3.	Check continuity. Replace if defective.
4. Open or defective Lift/Off/Drive switch S3.	Operate switch. Check continuity between wire #B and wire #14 when Lift selected. Replace if defective.
5. Loose or broken wire #14 from Lift/Off/Drive switch S3 to Platform connector X1 pin #A8.	Check continuity. Replace if defective.
6. Loose or broken wire #14 in Mast control cable or its connections.	Check continuity between Mast function cable connector P2 pin #2 and Platform connector X1 pin #A8 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
7. Loose or broken wire #14 from Base terminal block to Lift Speed Relay 14CR.	Check continuity. Replace if defective.
8. Loose or broken wire #14 from Lift Speed Relay 14CR to Lift Speed Relay2 14CR1.	Check continuity. Replace if defective
9. Open diode D14.	Check diode. Replace if defective.
10. Defective low voltage protection Resistor RST7.	Check resistor and make sure it is secure. Replace if defective.
11. Loose or broken wire #14A from Base terminal block to Up Valve coil 4H-14A.	Check continuity. Replace if defective
12. Loose or broken wire #02 from Base terminal block to Up Valve coil 4H-14A.	Check continuity. Replace if defective.
13. Defective Up Valve coil 4H-14A	Check continuity through coil. Replace if defective.
14. Loose or broken wire #19B from Service Position Limit switch LS3 to Control box connector pin #C9.	Check continuity. Replace if defective.
15. Defective Service Position Limit switch LS3.	Check limit switch. Replace if defective.
16. Loose or broken wire #19B in Mast control cable or its connections.	Check continuity between Mast function cable connector P2 pin #5 and Platform connector X1 pin #C4 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
17. Loose or broken wire #19B from Diagnostic switch S5 to Mast Control cable.	Check continuity. Replace if defective.

18. Loose or broken wire #19B from Diagnostic switch S5 to Motor Controller. (Enable signal)	Check continuity. Replace if defective.
19. Loose or broken wire #19 from Base terminal block to Tilt switch TS1.	Check continuity. Replace if defective.
20. Defective Tilt switch TS1.	Test Tilt switch. Replace if defective
21. Loose or broken wire #28 from Tilt switch TS1 to Tilt Relay 28CR.	Check continuity. Replace if defective.
22. Loose or broken wire #02 from Tilt switch TS1 to Base terminal block.	Check continuity. Replace if defective.
23. Defective Tilt Relay 28CR.	Check relay. Replace if defective.
24. Loose or broken wire #19A from Tilt Relay 28CR to Motor Contactor C1.	Check continuity. Replace if defective.
25. Loose or broken wire #07 from Base terminal block to Lift Speed Relay 14CR.	Check continuity. Replace if defective.
26. Loose or broken wire #59C from Lift Speed Relay 14CR to Base terminal block.	Check continuity. Replace if defective.
27. Defective Base Lift Resistor RST3.	Check resistor and make sure it is secure. Replace if defective.
28. Defective Base Control Relay 59ACR.	Check relay. Replace if defective.
29. Loose or broken wire #59B from Base terminal block to Motor Controller.	Check continuity. Replace if defective.

4.2-9 Up Function Slow from Platform Control Console

1. Loose or broken wire #14 from Base terminal block to Lift Speed Relay 14CR.	Check continuity. Replace if defective.
2. Loose or broken wire #02 from Base terminal block to Lift Speed Relay 14CR.	Check continuity. Replace if defective.
3. Defective Lift Speed Relay 14CR.	Check relay. Replace if defective.

4.2-10 No Down Function from Platform Controls



NOTE

Down function is not proportionally controlled

1. Loose or broken wire #A from Joystick S7 connector pin #6 to Diode DA on Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
2. Open diode DA.	Check diode. Replace if defective.
3. Loose or broken wire #A from Diode DA to Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
4. Open or defective Lift/Off/Drive switch S3.	Operate switch. Check continuity between wire #A and wire #13 when Lift selected. Replace if defective.
5. Loose or broken wire #13 from Lift/Off/Drive switch S3 to Platform connector X1 pin #A7.	Check continuity. Replace if defective.
6. Loose or broken wire #13 in Mast control cable or its connections.	Check continuity between Mast function cable connector P2 pin #1 and Platform connector X1 pin #A7 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
7. Loose or broken wire #13 from Mast function cable connector P2 pin #1 to Down Valve coil 2H-13.	Check continuity. Replace if defective.
8. Loose or broken wire #02 from Base terminal block to Down Valve coil 2H-13.	Check continuity. Replace if defective.
9. Defective Down Valve coil 2H-13.	Check continuity through coil. Replace if defective.

4.2-11 Pothole Bars Will Not Retract



NOTE

Machine must be below high speed limit switch LS1 to allow the pothole bars to retract

1. Loose or broken wire #21 from base terminal block to pothole release valve coil 2H-21.	Check continuity. Replace if defective.
2. Loose or broken wire #02 from base terminal block to pothole release valve coil 2H-21.	Check continuity. Replace if defective.
3. Defective pothole release valve coil 2H-21.	Check continuity through coil. Replace if defective.

4.2-12 Steer Only Inoperative

1. Loose or broken wire #08B from Joystick S7 connector pin #9 to Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
2. Open or defective Lift/Off/Drive switch S3.	Operate switch. Check continuity between wire #08B and wire #12B when Drive selected. Replace if defective.
3. Loose or broken wire #12B from Lift/Off/Drive switch S3 to Steer switches S7-2 and S7-3.	Check continuity. Replace if defective.
4. Open diode D23 or D24.	Check diodes. Replace if defective.
5. Loose or broken wire #17A from Base terminal block to Steer Relay 17CR.	Check continuity. Replace if defective.
6. Defective Steer Relay 17CR.	Check relay. Replace if defective.
7. Loose or broken wire #17B from Steer Relay 17CR to Base terminal block..	Check continuity. Replace if defective.
8. Open diode D17B-1 or D17B.	Check diodes. Replace if defective.
9. Defective Lift Speed Relay2 14CR1.	Check relay. Replace if defective.
10. Loose or broken wire #59G from Lift Speed Relay2 14CR1 to Base terminal block.	Check continuity. Replace if defective.
11. Defective steer only resistor RST4.	Check resistor and make sure it is secure. Replace if defective.
12. Defective Base Control Relay 59ACR.	Check relay. Replace if defective.

4.2-13 Right Steer Inoperative

1. Open or defective right steer switch S7-2.	Operate switch. Check continuity between wire #12B and wire #23 on switch. Replace switch if no continuity when operating switch.
2. Loose or broken wire #23 from Right Steer switch S7-2 to Joystick S7 connector pin #3.	Check continuity. Replace if defective.
3. Loose or broken wire #23 from Joystick S7 connector pin #3 to Mast function cable connector X1 pin #B3.	Check continuity. Replace if defective.
4. Loose or broken wire #23 in Mast function cable or its connections.	Check continuity between Mast function cable connector P2 pin #7 and Platform connector X1 pin #B3 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
5. Loose or broken wire #23 from Mast function cable to Base terminal block.	Check continuity. Replace if defective.
6. Open diode D23.	Check diode. Replace if defective.

7. Loose or broken wire #23 from Mast function cable connector P2 pin #7 to Steer Right Valve coil 4H-23. **Check continuity. Replace if defective.**

8. Loose or broken wire #02 from Base terminal block to Steer Right Valve coil 4H-23. **Check continuity. Replace if defective.**

4.2-14 Left Steer Inoperative

1. Open or defective Left Steer switch S7-1. **Operate switch. Check continuity between wire #12B and wire #24 on switch. Replace switch if no continuity when operating switch.**

2. Loose or broken wire #24 from Right Steer switch S7-1 to Joystick S7 connector pin #1. **Check continuity. Replace if defective.**

3. Loose or broken wire #24 from Joystick S7 connector pin #1 to Mast function cable connector X1 pin #B4.. **Check continuity. Replace if defective.**

4. Loose or broken wire #24 in Mast function cable or its connections. **Check continuity between Mast function cable connector P2 pin #8 and Platform connector X1 pin #B4 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.**

5. Loose or broken wire #24 from Mast function cable to Base terminal block. **Check continuity. Replace if defective.**

6. Open diode D24. **Check diode. Replace if defective.**

7. Loose or broken wire #24 from Mast function cable connector P2 pin #8 to Steer Left Valve coil 4H-24. **Check continuity. Replace if defective.**

8. Loose or broken wire #02 from Base terminal block to Steer Left Valve coil 4H-24. **Check continuity. Replace if defective.**

4.2-15 No Drive Forward or Reverse

1. Loose or broken wire #A or #B from Joystick S7 connector pin #4 or #6 to Diode DA or Diode DB on Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
2. Open diode DA or DB on Lift/Off/Drive switch S3.	Check diodes. Replace if defective.
3. Loose or broken wire #A or #B from Diode DA or DB to Lift/Off/Drive switch S3.	Check continuity. Replace if defective.
4. Open or defective Lift/Off/Drive switch S3.	Operate switch. Check continuity between wire #B and wire #15 or #16 when Drive selected. Check continuity between wire #8B and wire #12B when Drive selected. Replace if defective.
5. Loose or broken wire #07A from Platform Emergency Stop switch S4 to Mast function cable.	Check continuity. Replace if defective.
6. Loose or broken wire #07A in Mast function cable or its connections.	Check continuity between Platform connector X1 and Control box connection pin #C1/C2/C3. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
7. Open diode D12B on Lift/Off/Drive switch S3.	Check diode. Replace if defective.
8. Loose or broken wire #12A from Diode D12B to Control Box connection #B1.	Check continuity. Replace if defective.
9. Loose or broken wire #12A from Mast function cable #B1 to Drive Cutout Limit switch LS4.	Check continuity. Replace if defective.
10. Defective or out of adjustment Drive Cutout Limit switch LS4.	Check limit switch. Replace if defective.
11. Loose or broken wire #07B from Drive Cutout Limit switch LS4 to Mast function cable pin #C8/C7/C6.	Check continuity. Replace if defective.
12. Loose or broken wire #07B in Mast function cable or its connections.	Check continuity between Mast function cable pin #C8/C7/C6 and Tilt switch TS1 connector P8 pin #2. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
13. Defective Tilt switch TS1.	Test Tilt switch. Replace if defective.
14. Open diode D17.	Check diode. Replace if defective.
15. Defective Mast Position Relay 21CR1.	Check relay. Replace if defective.
16. Loose or broken wire #71A from Mast Position Relay 21CR1 to Pothole Limit switch LS2.	Check continuity. Replace if defective.
17. Defective or out of adjustment Pothole Limit switch LS2.	Check limit switch. Replace if defective.
18. Loose or broken wire #72 from Pothole Limit switch LS2 to Base terminal block.	Check continuity. Replace if defective.
19. Open diode D72.	Check diode. Replace if defective.

4.2-16 Brake will not Release

1. Open or shorted diode D16A Forward or D15A Reverse.	Check diodes. Replace if defective.
2. Loose or broken wire #17 from base terminal block to brake valve coil 2H-17.	Check continuity. Replace if defective.
3. Defective Brake valve coil 2H-17.	Check continuity. Replace if defective.
4. Loose or broken wire #02 from Base terminal block to Brake Valve coil 2H-17.	Check continuity. Replace if defective.

4.2-17 No Elevated Drive

1. Pothole protection bars not fully lowered.	Clear obstructions. Repair and/or replace as needed.
2. Open diode D17.	Check diode. Replace if defective.
3. Loose or broken wire #71 from base terminal block to high speed limit switch LS1.	Check continuity. Replace if defective.
4. Defective high speed limit switch LS1.	Test switch. Replace if defective.
5. Loose or broken wire #21 from high speed limit switch LS1 to base terminal block.	Check continuity. Replace if defective.
6. Defective mast Position Relay 21CR1.	Check relay. Replace if defective.
7. Loose or broken wire #71A from Mast Position Relay 21CR1 to Base terminal block.	Check continuity. Replace if defective.
8. Loose or broken wire #71A from Base terminal block to Pothole Limit switch LS2.	Check continuity. Replace if defective.
9. Defective or out of adjustment Pothole Limit switch LS2.	Check limit switch. Replace if defective.
10. Loose or broken wire #72 from Pothole Limit switch LS2 to Base terminal block.	Check continuity. Replace if defective.
11. Open diode D72.	Check diode. Replace if defective.
12. Defective High Speed Relay 21CR.	Check relay. Replace if defective.
13. Loose or broken wire #59F from High Speed Relay 21CR to Base terminal block.	Check continuity. Replace if defective.
14. Defective Elevated Drive Resistor RST2.	Check resistor and make sure it is secure. Replace if defective.

4.2-18 Work Platform Drives in Slow Speed Only

1. Loose or broken wire #71 from Base terminal block to high speed limit switch LS1.	Check continuity. Replace if defective.
2. Defective high speed limit switch LS1.	Test switch. Replace if defective.
3. Loose or broken wire #21 from high speed limit switch LS1 to base terminal block.	Check continuity. Replace if defective.

4. Loose or broken wire #21 from base terminal block to high speed relay 21CR.	Check continuity. Replace if defective.
5. Defective high speed relay 21CR.	Check relay, replace if defective.
6. Loose or broken wire #02 from base terminal block to high speed relay 21CR.	Check continuity. Replace if defective.
7. Loose or broken wire #59K from high Speed Relay 21CR to Base terminal block.	Check continuity. Replace if defective.
8. Defective elevated Drive Resistor RST8.	Check resistor and make sure it is secure. Replace if defective.

4.2-19 Forward Drive Function Inoperative

1. Loose or broken wire #16 from Lift/Off/Drive switch S3 to Platform connector X1 pin #A10.	Check continuity. Replace if defective.
2. Loose or broken wire #16 in Mast control cable or its connections.	Check continuity between Mast function cable connector P2 pin #4 and Platform connector X1 pin #A10 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
3. Loose or broken wire #16 from Mast function cable to Forward Cutout Relay 16BCR.	Check continuity. Replace if defective.
4. Defective Tilt switch TS1.	Test Tilt switch. Replace if defective.
5. Loose or broken wire #16B from Tilt switch TS1 to Forward Cutout Relay 16BCR.	Check continuity. Replace if defective.
6. Loose or broken wire #02 from Forward Cutout Relay 16BCR to Base terminal block.	Check continuity. Replace if defective.
7. Defective Forward Cutout Relay 16BCR.	Check relay. Replace if defective.
8. Loose or broken wire #16A from Forward Cutout Relay 16BCR to Base terminal block.	Check continuity. Replace if defective.
9. Loose or broken wire #16A from Base terminal block to Forward Valve coil 4H-16A.	Check continuity. Replace if defective.
10. Loose or broken wire #02 from Base terminal block to Forward Valve coil 4H-16A.	Check continuity. Replace if defective.
11. Defective Forward Valve coil 4H-16A.	Check continuity. Replace if defective.

4.2-20 Reverse Drive Function Inoperative

1. Loose or broken wire #15 from Lift/Off/Drive switch S3 to Platform connector X1 pin #A10.	Check continuity. Replace if defective.
2. Loose or broken wire #15 in mast control cable or its connectors.	Check continuity between Mast function cable connector P2 pin #3 and Platform connector X1 pin #A9 on cable. Check for loose or corroded connections on cable connectors. Replace if wire is defective.
3. Loose or broken wire #15 from Mast function cable to Reverse Cutout Relay 15BCR.	Check continuity. Replace if defective.
4. Defective Tilt switch TS1.	Test Tilt switch. Replace if defective.
5. Loose or broken wire #15B from Tilt switch TS1 to Reverse Cutout Relay 15BCR.	Check continuity. Replace if defective.
6. Loose or broken wire #02 from Reverse Cutout Relay 15BCR to Base terminal block.	Check continuity. Replace if defective.
7. Defective Reverse Cutout Relay 15BCR.	Check relay. Replace if defective.
8. Loose or broken wire #15A from Reverse Cutout Relay 15BCR to Base terminal block.	Check continuity. Replace if defective.
9. Loose or broken wire #15A from Base terminal block to Reverse Valve coil 4H-15A.	Check continuity. Replace if defective.
10. Loose or broken wire #02 from Base terminal block to Reverse Valve coil 4H-15A.	Check continuity. Replace if defective.
11. Defective Reverse Valve coil 4H-15A.	Check continuity. Replace if defective.

4.2-21 Two or More Functions at One Time

- | | |
|----------------------|---|
| 1. Shorted diode(s). | Check continuity of all diodes. Replace if defective. |
|----------------------|---|

4.3 Hydraulic System Troubleshooting

4.3-1 All Functions Inoperative

- | | |
|---|---|
| 1. Electric Motor DCM1 not engaged. | Refer to electrical troubleshooting. |
| 2. Pump P1 and/or pump coupler defective. | Check system pressures and Pump P1 functionality. Replace if defective. |
| 3. System Relief valve R1 stuck open. | Clean valve. Replace if defective. |

4.3-2 All System Sluggish

- | | |
|---|--|
| 1. System relief valve R1 defective or not adjusted properly. | Adjust valve. Replace if defective. |
| 2. Hydraulic pump P1 worn or strainer contaminated. . | Check system pressure and flow from Pump P1. Replace if defective. |

4.3-3 Platform Drifts Down

- | | |
|---|--|
| 1. Defective Lift cylinder seals at the gland. | Replace if damaged.
Note: There are no piston seals, just wear rings. |
| 2. Combination of stuck or defective Holding/Emergency Lowering valves 2H-13. | Check valve. Replace if defective. |

4.3-4 Platform Lifts Slowly

- | | |
|--|--|
| 1. Defective or stuck Holding/Emergency Lowering valve 2H-13 | Check valve. Replace if defective. |
| 2. Lift relief valve R3 defective or is not set correctly. | Check pressures and adjust if necessary. Replace if defective. |

4.3-5 Platform Does Not Lift

- | | |
|---|--|
| 1. Defective Lift valve 4H-14A. | Check valve. Replace if defective. |
| 2. Hydraulic oil level too low. | Fully lower the platform. Fill hydraulic tank until fluid is at or slightly above the top mark on the sight glass. |
| 3. Lift Relief valve R3 is defective or is set incorrectly. | Check pressures and adjust if necessary. Replace if defective. |
| 4. Platform weight excessive. | Reduce platform load to maximum capacity. |

4.3-6 Platform Will Not Lower

- | | |
|--|--|
| 1. Defective Holding/Emergency Lowering valve 2H-13. | Check valve. Replace if defective. |
| 2. Lowering orifice O1 plugged or contaminated. | Clear debris from Orifice. Replace if defective. |

4.3-7 Pothole Bars Will Not Retract

- | | |
|---|---|
| 1. Defective or sticking Pothole valve 2H-21. | Check valve. Replace if defective. |
| 2. Defective or binding Pothole Cylinder. | Check for mechanical binding. Rebuild cylinder seals. Replace if defective. |

4.3-8 Platform Drives Slow

- | | |
|------------------------------------|-------------------------------------|
| 1. Drive motor M1 or M2 defective. | Check motors. Replace if defective. |
|------------------------------------|-------------------------------------|

4.3-9 Platform Will Not Drive in Forward

- | | |
|---|------------------------------------|
| 1. Forward drive valve 4H-16A defective or is sticking. | Clean Valve. Replace if defective. |
| 2. Counterbalance valve CB1 defective or is plugged. | Clean Valve. Replace if defective. |

4.3-10 Platform Will Not Drive in Reverse

- | | |
|---|------------------------------------|
| 1. Reverse drive valve 4H-15A defective or is sticking. | Clean Valve. Replace if defective. |
| 2. Counterbalance valve CB1 defective or is plugged. | Clean Valve. Replace if defective. |

4.3-11 Brake(s) Will Not Release

- | | |
|--|--|
| 1. Brake valve 2H-17 defective or is sticking. | Clean valve. Replace if defective. |
| 2. Brake Override Valve V1 is defective. | Check valve. Replace if defective. |
| 3. Defective Brakes BR1 and/or BR2. | Inspect wheel motor assembly. Check if hydraulic pressure is available at brake hubs. Rebuild/repair brake hubs if required. Replace if defective. |

4.3-12 Platform Does Not Steer

- | | |
|--|---|
| 1. Priority steer valve FC1 defective or not adjusted correctly. | Adjust valve. Replace if defective. |
| 2. Right Steer valve 4H-23 and/or Left Steer valve 4H-24 is defective. | Check valves. Replace if defective. |
| 3. Steer cylinder C1 seals leaking. | Rebuild cylinder(s). Replace if damaged. |
| 4. Steer Relief valve R2 defective or not adjusted correctly. | Adjust valve. Replace if damaged. |
| 5. Mechanical binding in king pins. | Check for binding. Repair as needed. |

4.3-13 Platform Steers Very Slowly

- | | |
|--|--|
| 1. Priority steer valve FC1 defective or not adjusted correctly. | Adjust valve. Replace if defective. |
|--|--|

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Section 5 – Procedures

5.1 General

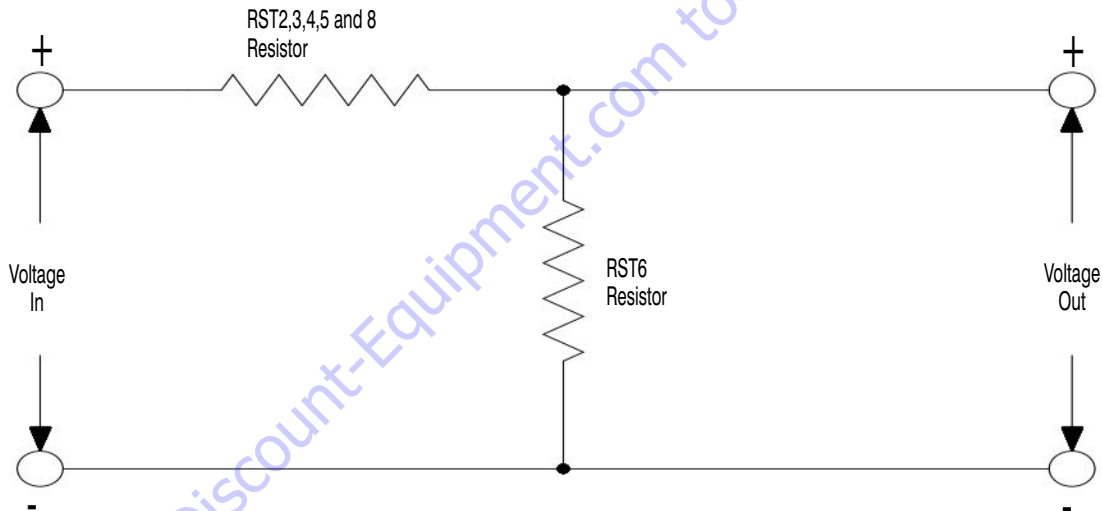
The following information is provided to assist you in the use and application of servicing and maintenance procedures contained in this chapter.

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, make sure that adequate support is provided.

5.2 Electrical System Adjustments

5.2-1 Electrical System



5.2-2 Resistor - Voltage Divider

Common Resistor	Resistor	Ohm	Function	Input voltage*	Output Voltage**
RST6 250 Ohm	RST3	220	Platform lift resistor	4.8	2.5
	RST8	68	Hi speed drive resistor	4.8	3.8
	RST2	845	Elevated drive resistor	4.8	1.1
	RST4	4.7K	Steer only resistor	24	1.2
	RST5	2K	Base lift resistor	24	2.7

* 4.8 volts refers to full stroke on the joystick. 24 volts represents a full charge on the battery pack.

** Values given are with all connections tight and free from corrosion + or - 10%.

5.2-3 Troubleshooting - Diagnostic Switch

The SJ12 and SJ16 machines are equipped with a diagnostic switch for the purpose of troubleshooting. Once the deck is in the service position (deck fully extended out), the electric signal to the motor controller enable function is disengaged. All electrical wiring and components can be checked in the service position other than the signal to the enable of the motor controller. To accomplish this you would be required to engage the diagnostic switch.

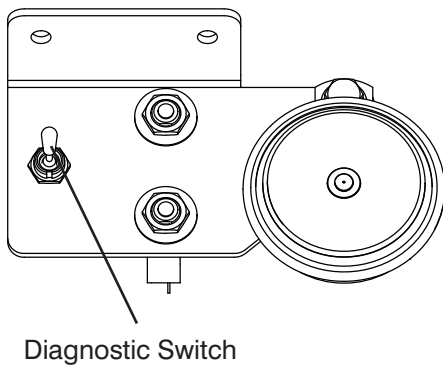


Figure 02 Diagnostic and Horn Assembly

5.2-4 Tilt Switch Orientation

The design of this equipment and the tilt switch require it to be installed in a specific direction. Below you will find a picture indicating the direction of TS1 Tilt Switch. As indicated in the picture the tilt switch is oriented so that the wiring harness as well as the reset buttons face the center of the machine.

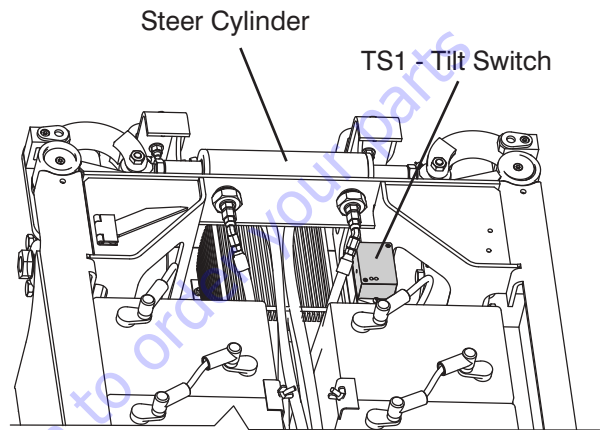


Figure 03 Tilt Switch Orientation

5.3 Hydraulic System Adjustments

All adjustments must be made with a calibrated gauge. Refer to the serial number plate located on the rear of the machine for system and lift pressure values.

5.3-1 System Relief Pressure Adjustment

1. Extend transverse deck to service position, then raise the service access door and secure in position with the prop rod provided.
2. Locate system pressure test port on power pack manifold. Refer to Section 3 Power Pack and Port Identification for location.
3. Install a calibrated 5000 PSI gauge to the system pressure test port.
4. Remove platform control box from guardrail and locate it in the proximity of the work area of the power pack.
5. At the power pack manifold, loosen locknut on system relief valve R1. Refer to Section 3 Power pack and Port Identification for location.
6. Remove wires #15A and #16A from the valve coils. Refer to Section 3 Power Pack and Port Identification for location.
7. Select drive with the Lift/Drive switch on the platform control box.
8. Engage either forward or reverse drive and hold. Engage diagnostic switch and hold.
9. Observe reading on gauge when drive is selected. Adjust system relief valve R1 value listed on the serial number plate. Turn the stem on the relief valve clockwise to increase pressure. Turn the stem counterclockwise to decrease pressure.
10. Release joystick, diagnostic switch and then tighten the locknut.
11. Reinstall wires #15A and #16A to the valve coils.
12. Remove the gauge from the system pressure test port.
13. Store prop rod back to its holder, then lower service access door and secure it. Push the transverse deck back to the working position.

5.3-2 Lift Pressure Adjustment

1. Extend transverse deck to service position, then raise the service access door and secure in position with the prop rod provided.
2. Locate the hose going to the lift cylinder on the main manifold. Remove and plug the hose. Refer to Section 3 Main Manifold Assembly for location.
3. Install a calibrated 5000 PSI gauge to the port on the manifold where the hose was disconnected.
4. At the main manifold, loosen the locknut on the lift relief valve R3.
5. Select lift with the Lift/Drive select switch on the platform control box.
6. Engage platform lift function and hold. Engage diagnostic switch and hold.
7. Observe reading on gauge. Adjust lift relief valve R3 to the value listed on the serial number plate. Turn the stem of the relief valve clockwise to increase pressure. Turn the stem counterclockwise to decrease pressure.
8. Release platform lift function, diagnostic switch and then tighten the locknut.
9. Remove the gauge from the lift port on the manifold. Reattach lift cylinder hose and tighten.
10. Store prop rod back to its holder, then lower Service access door and secure it. Push the transverse deck back to the working position.



NOTE

Pressure setting may vary as machine components wear. The lift pressure should be set for rated load only.

5.3-3 Steer Relief Pressure Adjustment

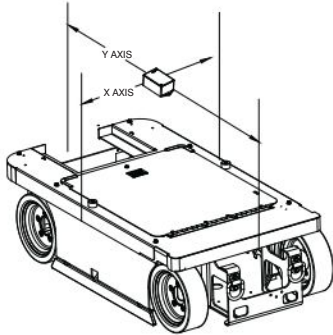
1. Extend transverse deck to service position, then raise the service access door and secure in position with the prop rod provided.
2. Locate system pressure test port on power pack manifold. Refer to [Section 3.8](#) Power pack and Port Identification for location.
3. Install a calibrated 5000 PSI gauge to the system pressure test port.
4. Remove platform control box from guardrail and locate it in the proximity of the work area of the power pack.
5. At the main manifold, loosen locknut on steer relief valve R2. Refer to [Section 3.14](#) for location.
6. Select drive with the Lift/Drive switch on the platform control box.
7. Engage steer right and hold. Engage diagnostic switch and hold.
8. Observe reading on gauge when steering is at full stroke. Adjust steer relief valve R2 value at 1500 psi. Turn the stem on the relief valve clockwise to increase pressure. Turn the stem counterclockwise to decrease pressure.
9. Release steer switch, diagnostic switch and then tighten the locknut.
10. Remove the gauge from the system pressure test port.
11. Store prop rod back to its holder, then lower service access door and secure it. Push the transverse deck back to the working position.



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5.4 Electronic Tilt Switch Setup Procedure

The following information is supplied for replacement or reprogramming of the electronic tilt switch. Also included are test and verification instructions. Follow the appropriate procedures below.

5.4-1 Tilt Switch Replacement



1. Make sure the MEWP is parked on a firm level surface.
2. Chock or block wheels to keep the MEWP from rolling forward or backward.
3. Lower platform completely. Extend the transverse deck to the service position. Open the base cover and prop it in position using the rod provided.
4. Push in  emergency stop buttons and turn main disconnect switch to  off position.
5. Remove any covers to locate and view the tilt switch.
6. Disconnect tilt switch from 6 pin connector.
7. Remove old tilt switch from mount.


 **NOTE**

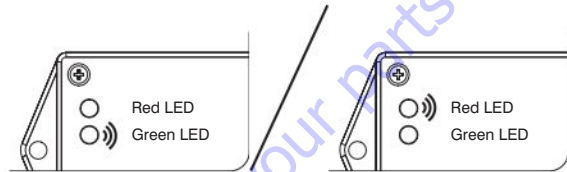
Make sure the part number of old and new tilt switch are the same.

8. Install new switch to mount (in the same orientation as the old switch) and connect switch plug to 6 pin connector.

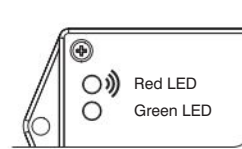
 **NOTE**

The tilt circuit is only powered when activating a function.

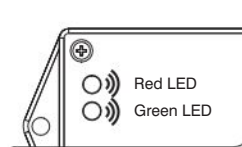
9. Disconnect all wires #02 from motor contactor.
10. Remove base control console from the base. Remove the cover plate on the base control console to access the terminal strip.
11. Install jumper wire between #7 and #19 to terminal strip.
12. Turn main disconnect switch to "I" ON position. Pull out "" emergency stop buttons.
13. Verify switch is powered. (Red or green LED will be continually blinking)



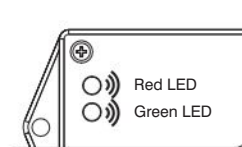
14. Program the Tilt Switch
 1. Press and release the set to zero button 3 times.
 2. Observe program delay / stabilization time. (Only the red LED will blink for 4 seconds)



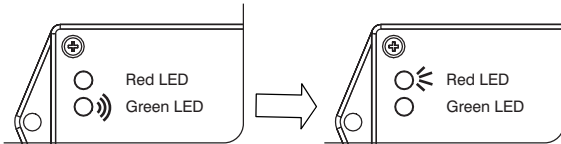
3. Both LEDs will flash for 1 second. Results: The switch is learning the new zero position.



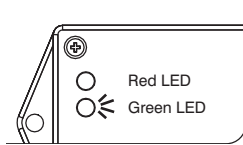
4. Both LEDs will turn on solid for 1 second. Results: The new zero position has been learned.



5. The green LED will flash and then the red LED will turn on solid for 2 seconds.
Results: The switch is verifying the new zero position.



6. The green LED will turn on solid.
Results: The switch is ready for normal operation.

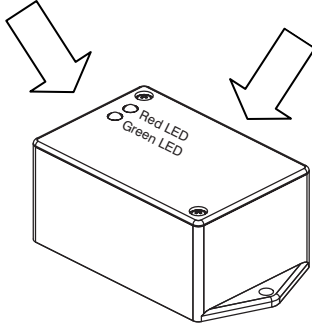




15. Turn main disconnect switch to “O” off position.
16. Remove jumper wire between #7 and #19 from terminal block.
17. Reattach all wires #02 to motor contactor.
18. Reinstall cover plate on the base control console. Reinstall the base control console into the base of the machine and secure with old hardware.
19. Reinstall any covers that were removed.
20. Close the base cover making sure it is secure. Retract the transverse deck to the stored position.
21. Remove chock or wheel blocks.
22. Proceed to Test and Verify Tilt Circuit.

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5.4-2 Reprogramming Existing Tilt Switch

Light Indicators The set to zero button is located on this face next to the harness





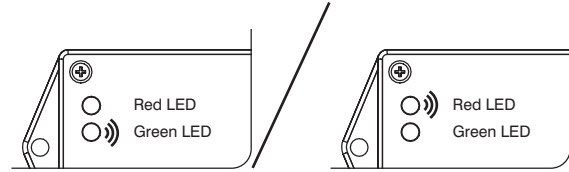
1. Make sure the MEWP is parked on a firm level surface.
2. Chock or block wheels to keep the MEWP from rolling forward or backward.
3. Lower platform completely. Extend the transverse deck to the service position. Open the base cover and prop it in position using the rod provided.
4. Push in “” emergency stop buttons and turn main disconnect switch to “” off position.



NOTE

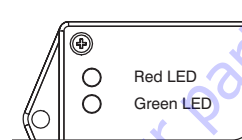
The tilt circuit is only powered when activating a function.

5. Remove any covers to locate and view the tilt switch.
6. Disconnect all wires #02 from motor contactor.
7. Remove base control console from the base. Remove the cover plate on the base control console to access the terminal strip.
8. Install jumper wire between #7 and #19 to terminal strip.
9. Turn main disconnect switch to “” ON position. Pull out “” emergency stop buttons.
10. Verify switch is powered. (Red or green LED will be continually blinking)

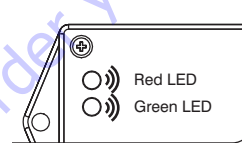


11. Reprogram the Tilt Switch

1. Press and hold the set to zero button for 5 seconds.
Results: Both LEDs will be OFF.



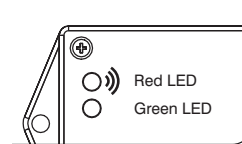
2. Both LEDs will flash.



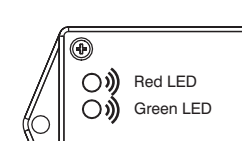
IMPORTANT

Step “c” must be completed within a 5 second period, or the switch will automatically exit program mode and return to normal operation using previously stored data.

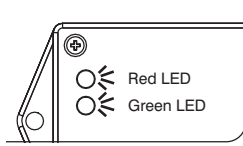
3. Press and release set to zero button 3 times.
4. If 5 second period has expired prior completion, repeat Step “a”, “b” and “c”.
5. Observe program delay / stabilization time. (Only the red LED will blink for 4 seconds)



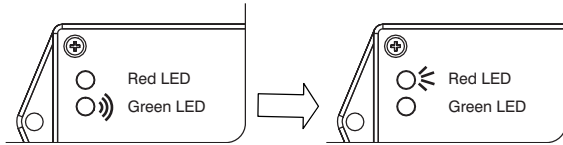
6. Both LEDs will flash for 1 second.
Results: The switch is learning the new zero position.



7. Both LEDs will turn on solid for 1 second.
Results: The new zero position has been learned.



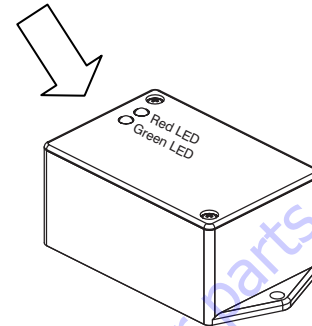
8. The green LED will flash and then the red LED will turn on solid for 2 seconds.
Results: The switch is verifying the new zero position.



9. The green LED will turn on solid.
Results: The switch is ready for normal operation.
12. Turn main disconnect switch to “○” off position.
13. Remove jumper wire between #7 and #19 from terminal block.
14. Reattach all wires #02 to motor contactor.
15. Reinstall cover plate on the base control console. Reinstall the base control console into the base of the machine and secure with old hardware.
16. Reinstall any covers that were removed.
17. Close the base cover making sure it is secure. Retract the transverse deck to the stored position.
18. Remove chock or wheel blocks.
19. Proceed to Test and Verify Tilt Circuit.

5.4-3 Test and Verify Tilt Circuit

Indicators Lights



Operations of Tilt Switch

The following describes the LED’s and what they indicate.

Green LED	Illuminated whenever both tilt axes are within the specified degrees of the zero/ home learned position. Flashes when transitioning in or out of tilt angle limits, but built in time delay has not fully occurred.
Red LED	Illuminated whenever tilt on one or more axes is more than the specified degrees out from the zero/ home position.
Green & Red LED	On together, no blinking when fault detected.

Tilt Circuit Test

1. Refer to section 2 for test tilt sensor procedure.

5.5 Wheel Reinstallation and Torquing Procedure

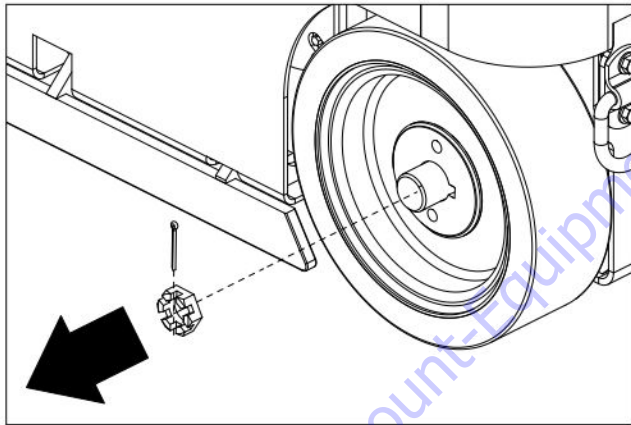
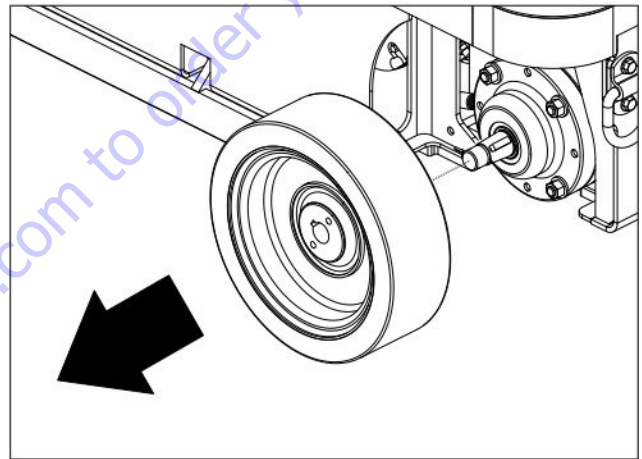
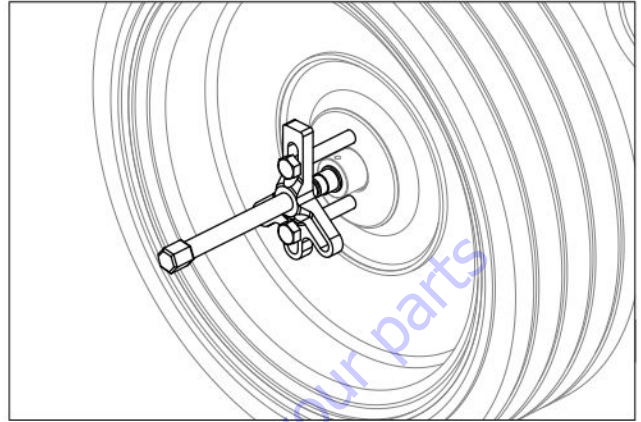
Tools Needed

- Adjustable Torque Wrench
Capacity 380 Nm (280 ft-lb)
- Hub Puller

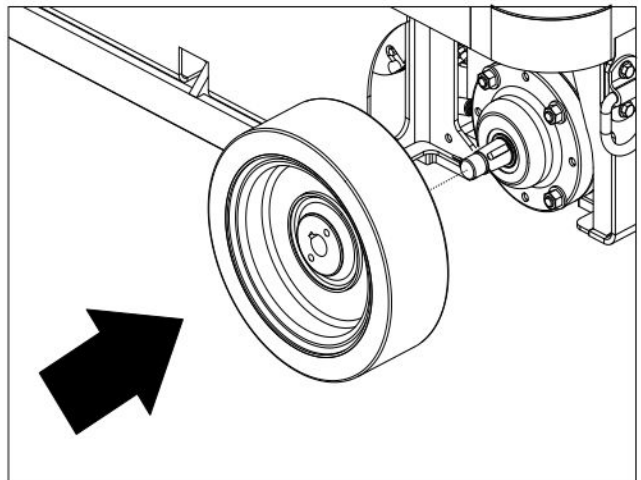
Hub/Integrated Hub Wheel Removal

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 set aside the castle nut.
3. Remove and discard the cotter pin. A new one will be required for re- installing the integrated hub wheel.

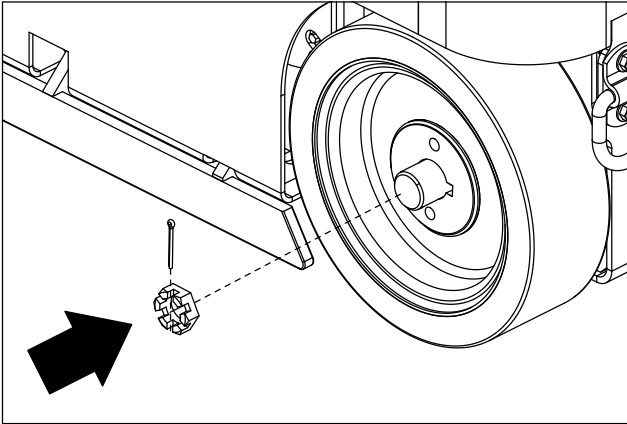
4. Use two 3/8"-24 bolts with a hub puller to remove the wheel.



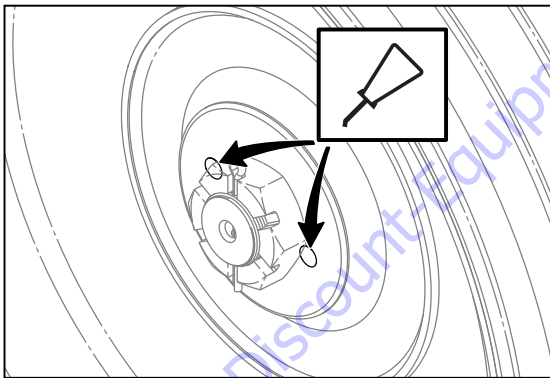
5. Install the wheel onto the brake.



6. Use a torque wrench to tighten the castle nut to 95 Nm (70 ft-lb) and insert the cotter pin.
7. If the holes do not align to install the cotter pin, continue to torque the castle nut clockwise until the next hole is visible.
8. Make sure the cotter pin is pushed in completely.
9. Bend the ends of the cotter pin to secure the castle nut.



10. 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.



5.6 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.

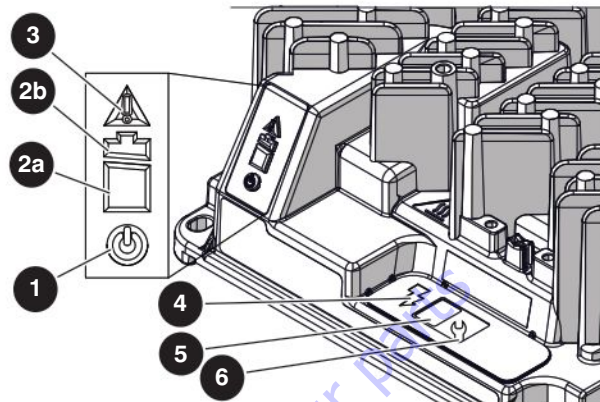
NOTE

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.

5.6-1 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.

5.6-2 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	#73 (P-0-7-3)
U.S. Battery - US 250 XC/XC2 Flooded-lead, 6V, 255 Ah		
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

5.6-3 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.	

5.6-4 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"> ▪ Check the battery voltage and cable connections. ▪ Check charger voltage model is appropriate for batteries. ▪ This error automatically clears once the condition has been corrected.
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"> ▪ Check the battery voltage and cable connections. ▪ Check the charger is the correct voltage for the batteries it is connected to. ▪ Check battery size and condition. Batteries may be overdischarged. Use another charger to bring the batteries above the minimum voltage. ▪ This error automatically clears once the condition has been corrected.
E-0-0-3	Charge time limit reached. Algorithm dependent.	<ul style="list-style-type: none"> ▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature. ▪ Charger output reduced due to low AC voltages. Check AC voltages. ▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Batteries too large for the charger. Replace batteries. ▪ Very deeply discharged battery. Retry charge. ▪ Battery connections are loose or corroded. Check connections. ▪ Extra loads. Turn off other devices running on the battery ▪ This error automatically clears once the charger is reset by cycling DC or by loss of AC for over 10 minutes.
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"> ▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Check DC connections. ▪ May be caused because of output reduced due to high temperature. ▪ Some new batteries may trigger these alarms as there voltage dips ▪ when charging starts before it goes onto rise.
E-0-0-7	Charge amp-hour Limit reached. Algorithm dependent.	<ul style="list-style-type: none"> ▪ Charger output reduced due to high temperatures. Operate at lower ambient temperature ▪ Charger output reduced due to low AC voltages. Check AC voltage. ▪ Check for shorted or damaged cells. ▪ Poor battery health. Replace the battery. ▪ Very deeply discharged battery. Retry charge. ▪ Battery connections are loose or corroded. Check connections. ▪ Extra loads. Turn off other devices running on the battery ▪ This error automatically clears once the charger is reset by cycling ▪ DC or by loss of AC for over 10 minutes.

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

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

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

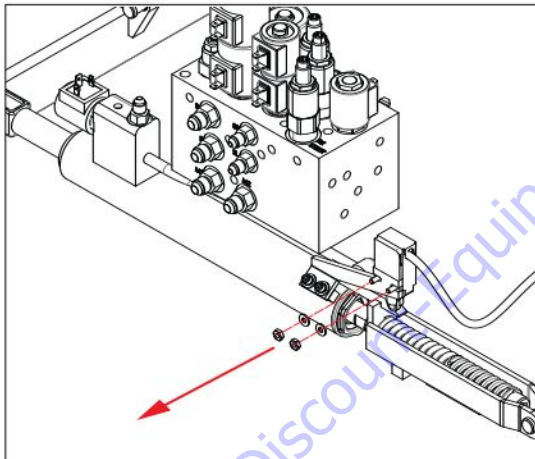
5.7 Pothole Limit Switch(LS2) Replacement and Adjustment

Machine Preparation

1. Make sure the MEWP is parked on a firm level surface.
2. Chock or block the wheels to keep the MEWP from rolling forward or backward.

Limit Switches Removal

1. Extend the platform to the service position.
2. Open the service cover door, and properly install the prop bar.
3. Remove the bolts and nuts (x2) securing the limit switch to the limit switch bracket. Set the hardware aside for later reinstallation.



4. Remove the limit switch and free the limit switch cable by cutting the tie wraps.
5. Follow the cable into the main harness, and disconnect the limit switch wire from the main harness. Discard the limit switch.

Limit Switch Replacement

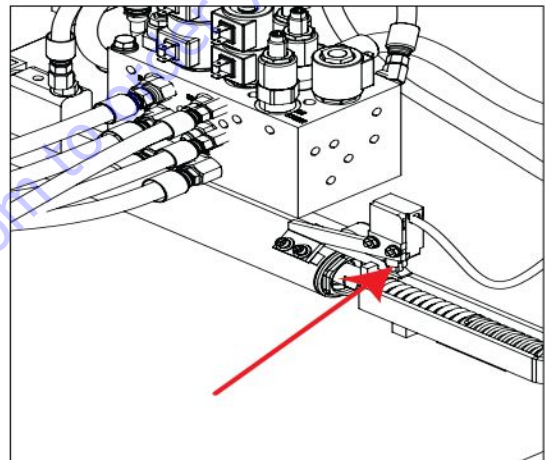
1. Mount loosely the new limit switch assembly: , using the hardware removed previously.

Limit Switch Electrical Connections

2. Route the new limit switch cable along the same path as the old one to the main harness. Use tie wraps as needed to secure them at regular intervals.
3. Plug the spade connectors into the same wire numbers. The #71A and #72 wires from the limit switches connect to the respective wires on the main harness.

Limit Switch Setup

4. Loosen the hardware securing the limit switch to the limit switch bracket. Adjust and move the limit switch towards the lever bar until it depresses the plunger roller.



5. Fully tighten the bolts securing the limit switch. Make sure the limit switch does not move while tightening the bolts.

Limit Switch Testing

1. Place a block, approximately 1.5" (3.75 cm), under the pothole bar and then raise the platform to an approximate height of 7 feet (2 meters) or until the pothole protection is activated.
2. Attempt to drive forward or reverse. The MEWP should not move forward or backward when pothole protection is on a block.

5.8 Mast Lubrication Procedure

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.

WARNING

Crushing/entrapment hazard due to moving chains/rollers and mast components. Keep all hands, other body parts and clothing away from moving parts.

5.8-1 Outside Mast Lubrication

1. Using the base controls, fully extend the mast.
2. Turn main disconnect switch to off position.

IMPORTANT

The operator must understand and follow the step-by-step instructions to test all MEWP functions.

3. Clean any existing lubricant on the sides of the vertical mast.
4. Apply DuPont Multi-Use Lubricant (158692) or any **PTFE wax based dry lubricant** covering 1-1/2" wide along the outside corners of each section of the mast except to top/outer mast.
5. Allow 10 minutes for the lubricant to dry, then retract the mast using the base controls.

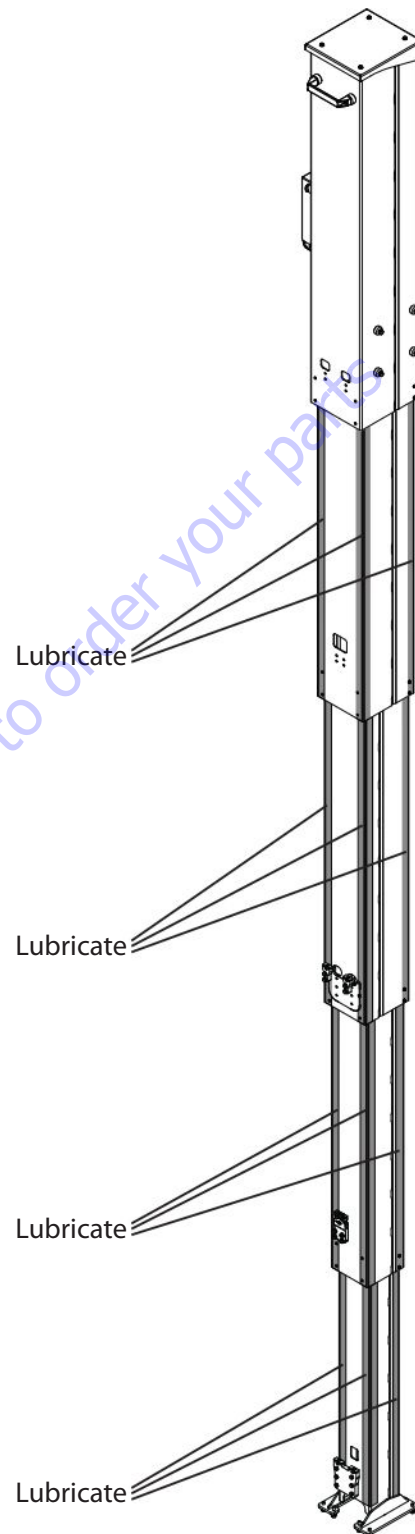



Figure 04 Mast Lubrication Zone.

5.8-2 Inner wear pads lubrication

1. Using the base controls, fully retract the mast.
2. Turn main disconnect switch to off  position.
3. Remove top mast cover.

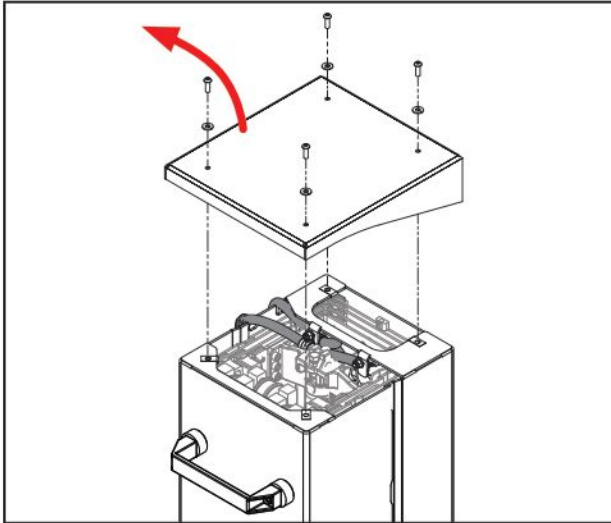


Figure 05 Top Cover Removal.

 **NOTE**

Make sure the proper type of lubrication is used in the correct locations.

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

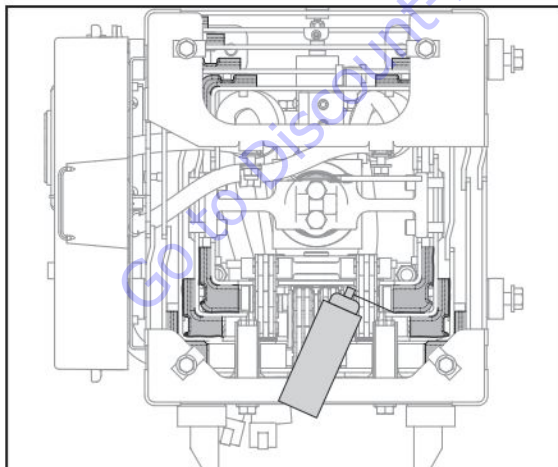


Figure 06 Inner wear pads lubrication.

5.8-3 Chains and rollers lubrication

 **NOTE**

Make sure the proper type of lubrication is used in the correct locations.

1. Locate the roller assemblies inside the mast. Lubricate the entire assemblies using standard bearing grease (NLGI level 2 grease, or equivalent) and apply a generous film on all visible areas of the roller assembly.

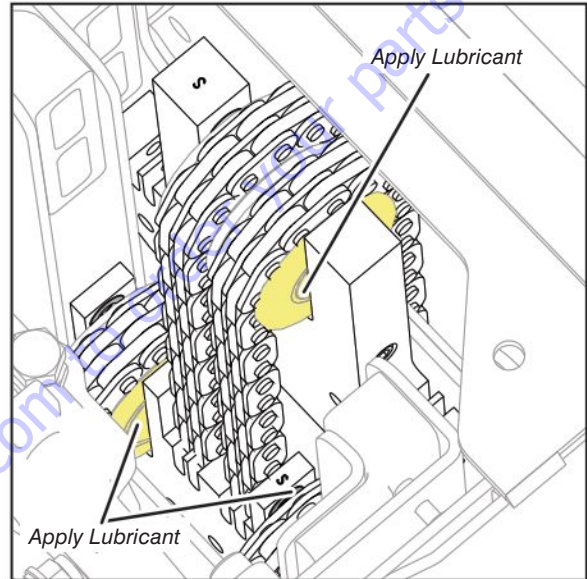


Figure 07 Rollers lubrication

2. For replacement rollers, pack the thrust washers and the sides of the replacement rollers with grease prior to installation.

3. Locate the chain assemblies inside the mast. Lubricate the entire length of chain and anchor points using spray on industrial “Moly based” chain lubricant (for example Crown Wire Rope, Chain and Cable Lube 7043).

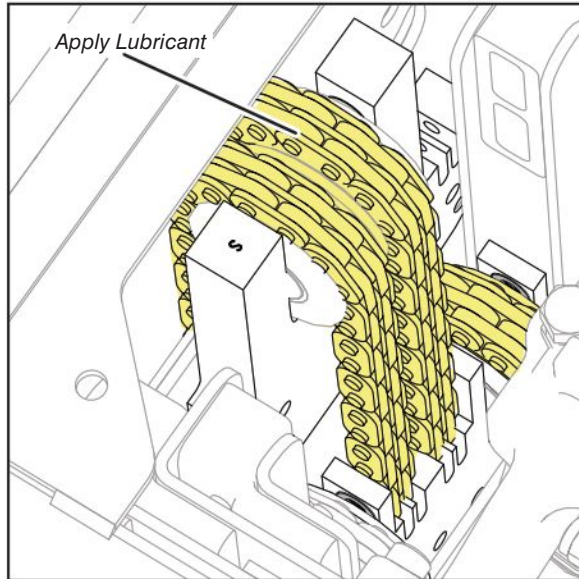


Figure 08 Chain lubrication

4. Exit the work platform.
5. From the base controls, fully raise and lower the platform three times to distribute the lubricant.
6. Install the mast cover at the top.

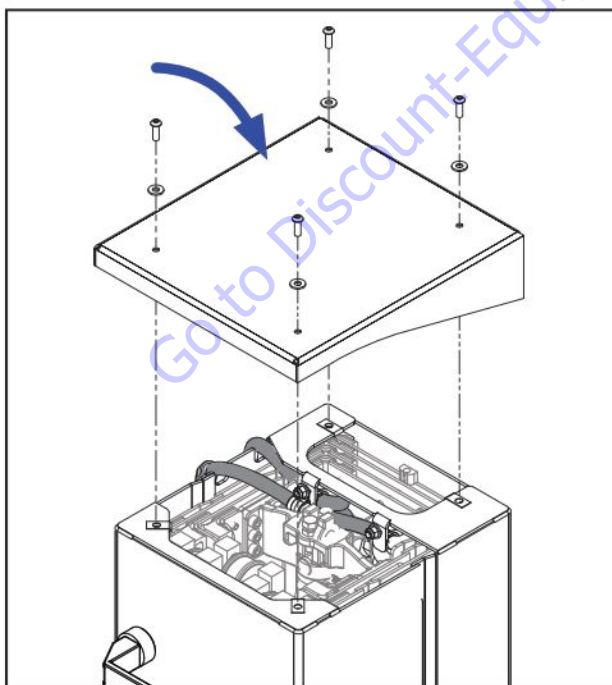


Figure 09 Mast Top Cover Installation.

5.9 Mast Roller Inspection/Maintenance

5.9-1 Roller Operation Inspection

1. Using the base controls, fully retract the mast.

⚠ WARNING

Crushing/entrapment hazard due to moving chains/rollers and mast components. Keep all hands, other body parts and clothing away from moving parts.

2. Enter the platform and remove top mast cover.

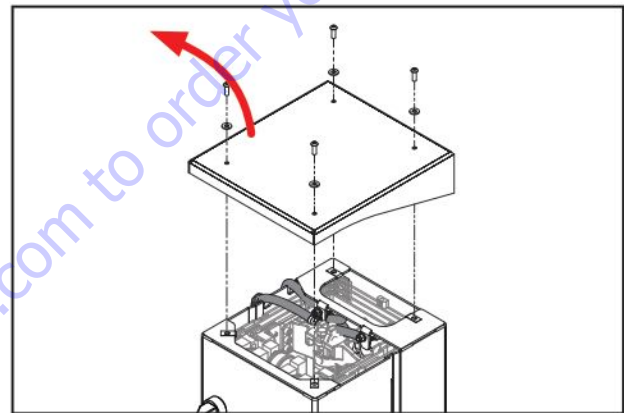
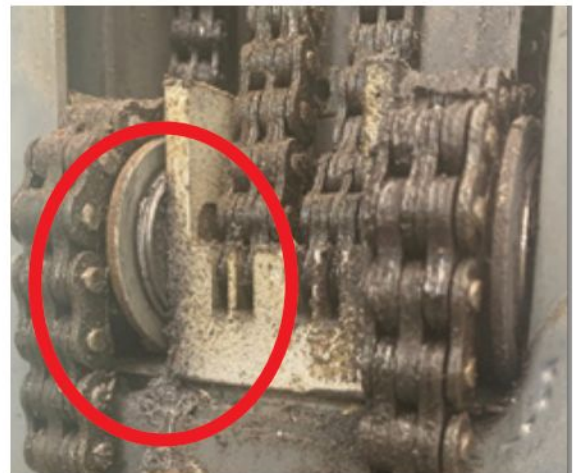
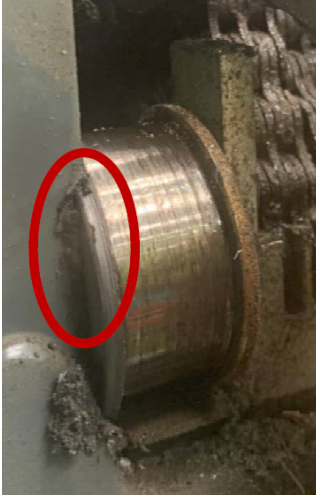


Figure 10 Top Cover Removal.

3. Inspect for metal shavings and dusty residue around the roller mounts and on the chain. This could indicate roller and/or chain erosion. Monitor for visible (magnetic) dusting and feel rollers for any grooving.



- Inspect rollers for uneven movement, rollers out of alignment, uneven gaps on either side of the rollers and excessive wear or gouging on the mast, brackets or rollers. Replace brackets and rollers if damaged.



- Mark each roller with an indelible marker. While slowly raising the mast observe and ensure the rollers rotate freely.
- Fully retract the mast.
- Install the mast cover at the top.

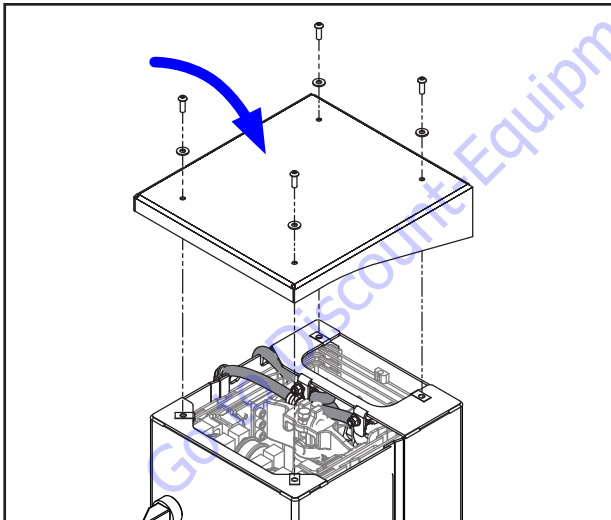


Figure 11 Mast Top Cover Installation.

- Exit the work platform.


NOTE

When rollers are replaced for any reason, perform a full inspection on the chain for damage as described in section [5.10-1 Chain Thorough examination](#)

5.10 Mast Chain Visual Inspection

NOTE

When inspecting chains, wipe off any grease or dirt as required to allow for proper visual inspection of the chain. When inspection is complete and the chain has been determined to be in good condition lubricate the chain as per [5.8-3 Chains and rollers lubrication](#)

- Using the base controls, fully retract the mast.
- Turn main disconnect switch to off  position.
- Remove top mast cover.
- Using non-specialized equipment (flashlight, mirror) inspect all surfaces of visible sections of chain, including anchor points, for broken, cracked, corroded or worn links (Refer to [5.10-2 Condition inspection table](#) for examples). Replace the chain if required.

WARNING

Crushing/entrapment hazard due to moving chains/rollers and mast components. Keep all hands, other body parts and clothing away from moving parts.

- Turn on the Main Power Disconnect and pull out both e-stops.
- Re-enter the platform
- While observing the roller movement, slowly lift the platform using the platform controls.
- If there is any uneven roller movement, or stiff roller movement, refer to roller inspection and maintenance section.
- Stop lifting when 6 to 8 inches have traveled over the top roller.
- Push the E-stop on the platform.
- Keeping hands clear of the rollers and chains, use a flashlight to inspect the newly exposed chain links for broken, cracked, corroded or worn links, with particular attention to wear on the links that have traveled over the rollers.

If during any of the inspections outlined above, a chain shows any signs of degradation, perform a thorough chain examination as per [5.10-1 Chain Thorough examination](#) as well as mast roller inspection as per [5.9-1 Roller Operation Inspection](#).

If there is any reason to suspect a chain of damage, or if the mast is apart for other repairs then a thorough chain examination or replacement is recommended.

5.10-1 Chain Thorough examination

1. Remove all chains from the masts following section [5.11 Mast Disassembly Procedure](#) of the manual.
2. Clean off all debris, grease and lubricant from the chain and anchor sections.
3. Lay the chain onto a clean bench.
4. Inspect the full length of the chain using an elongation gauge to ensure no section fails the limits set out in table 1.
5. Inspect each chain link for damage as set out in the condition inspections table.
 - For link wear, use a Digital Calliper
 - For elongation use a Chain Gauge
 - Visually inspect for the start of crack propagation and other types of damage
6. Inspect anchor points for missing parts, cracks, damage, rubbing or wear.
7. Turn the chain over and re-inspect each chain link for damage as set out in [5.10-2 Condition inspection table](#).
8. Replace chain if necessary.

5.10-2 Condition inspection table

Inspection	Description		Limit
A	Stretched links & elongated chain	<p>Stretched & elongated chain L + 3% (MAXIMUM)</p>	3% across the chain or links
B	Broken or cracked links	<p>Broken Cracked</p>	any broken link or start of crack propagation on any leaf
C	Stiff links	<p>Stiff Links</p>	Any lack of free movement under load
D	Worn link & pins	<p>Worn</p>	5% material loss on any link, leaving height of 11.5 mm
E	Corroded links		Any evidence
F	Turned or abnormally protruding pins	<p>Abnormal protruding pin Turned pin</p>	Any evidence

5.11 Mast Disassembly Procedure

⚠ CAUTION

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

⚠ CAUTION

Risk of personal injury or equipment damage. The use of an assistant is required to safely complete this procedure

⚠ WARNING

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

📌 NOTE

It is recommended that 2 lifting straps (or similar) be used for a straight, even lift.

📌 NOTE

SJ16 machines have one more mast section than the SJ12 machines. Some of the following steps (as indicated) apply only to the SJ16 machines.

5.11-1 Extending Platform Removal

1. With the platform fully-lowered, enter the platform. Traverse the platform by stepping on the foot pedal, grasping the platform repositioning handle, then pushing the platform until fully-traversed. Exit the platform.
2. From base controls, lift the platform approximately 10 in (25 cm).
3. Put a wood block (4" x 4") between the platform and the base.
4. Turn main disconnect switch to off position.

5. Disconnect the platform control cable quick connector from the mast.
6. Remove the control cable enclosure that houses the hour meter from the side of the mast.
7. Disconnect the wires for the platform limit switch harness with the contact pin extraction tool (208767).

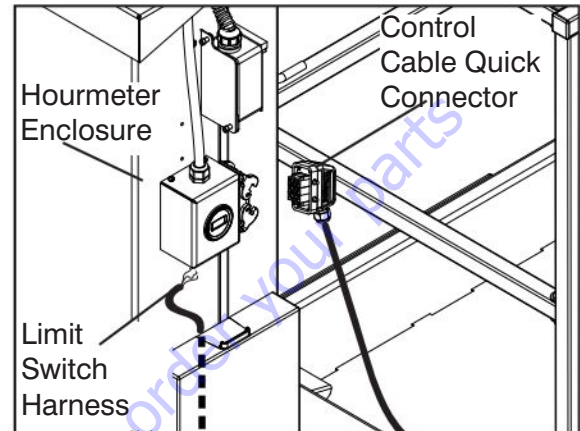


Figure 12 Harnesses Disconnection

8. Pull the limit switch harness through the strain connector and out of the box. Tie the harness and the platform control cable to the platform.

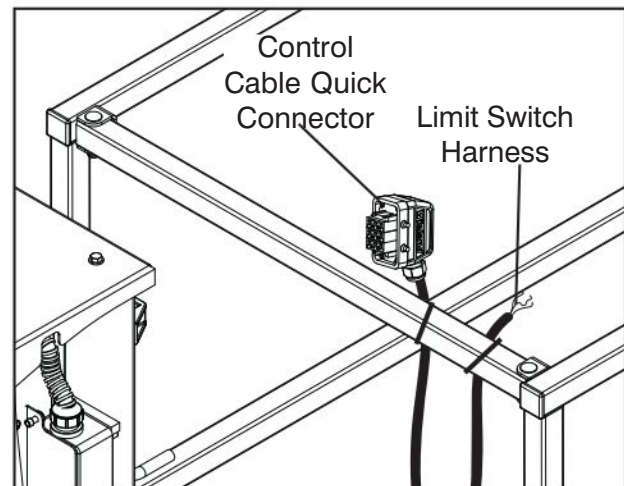


Figure 13 Harnesses Secured

- 9. From a position outside of the work platform, remove the mast cover.

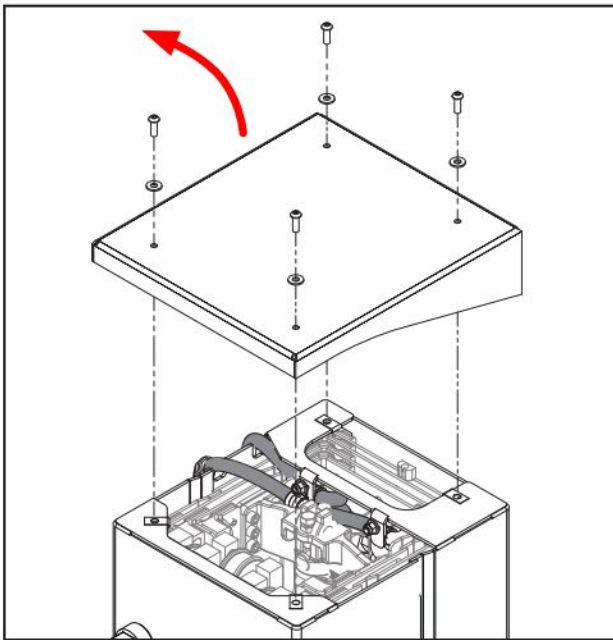


Figure 14 Top Cover Removal

- 10. Support the platform using suitable lifting straps. Remove the hardware securing the platform to the mast. Set aside.

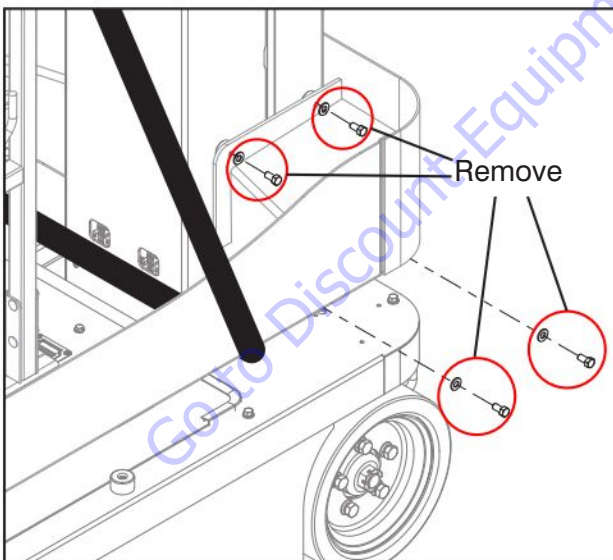


Figure 15 Platform Hardware Removal

- 11. Raise the platform slightly then carefully and slowly slide the platform towards the back of the machine to clear the mast.

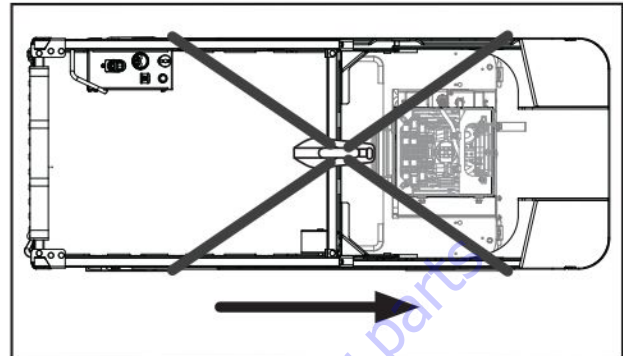


Figure 16 Platform Positioning

- 12. Raise the platform over the mast and set aside.

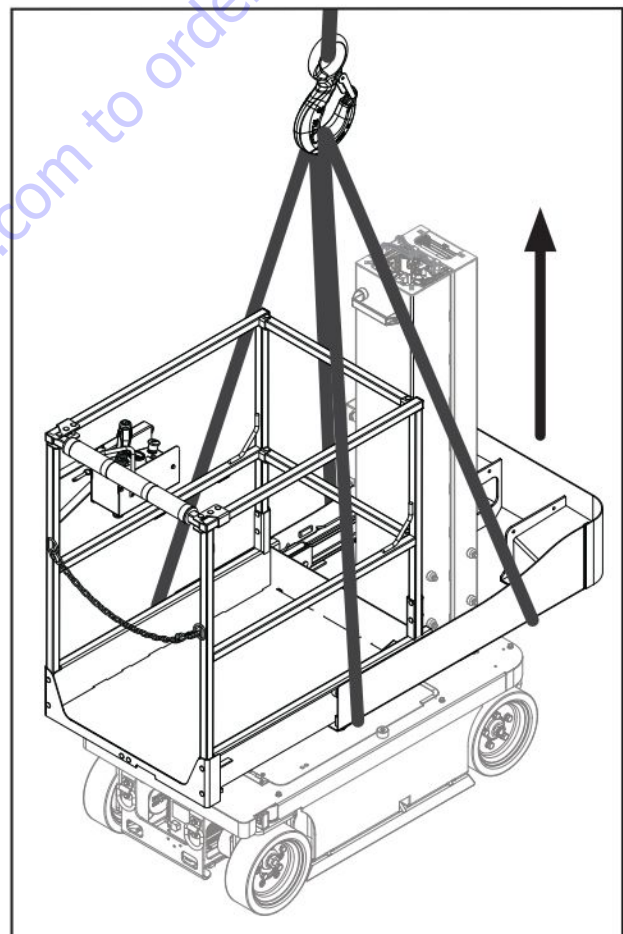


Figure 17 Platform Removal

13. On the side of the mast disconnect the AC power supply cable from the weatherproof outlet box, then loosen strain relief and remove the harness (ANSI/CSA Only).
14. Remove the 3 harness clamps at the top of the mast assembly. Secure the harnesses to the cylinder mounting bracket with cable ties.

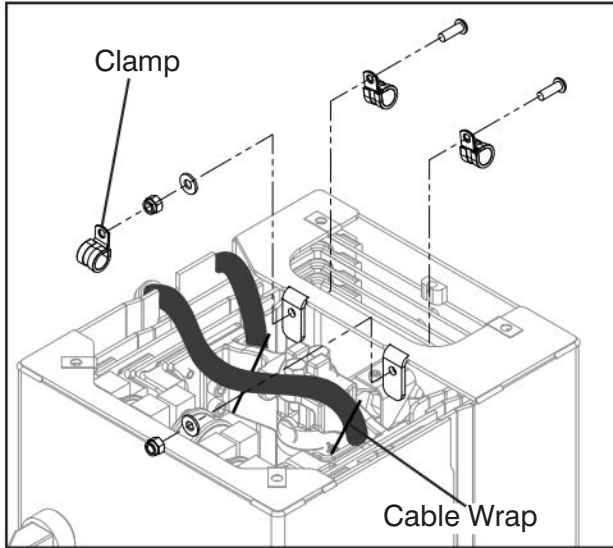


Figure 18 Harness Clamps

5.11-2 Mast Section 5 Removal (SJ16 Only)



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 5 for a straight, even lift



NOTE

Attach lifting straps away from mast grab handle and receptacle box.

1. Disconnect the chains by removing the hardware securing the chain mounts inside mast section 5 as shown.

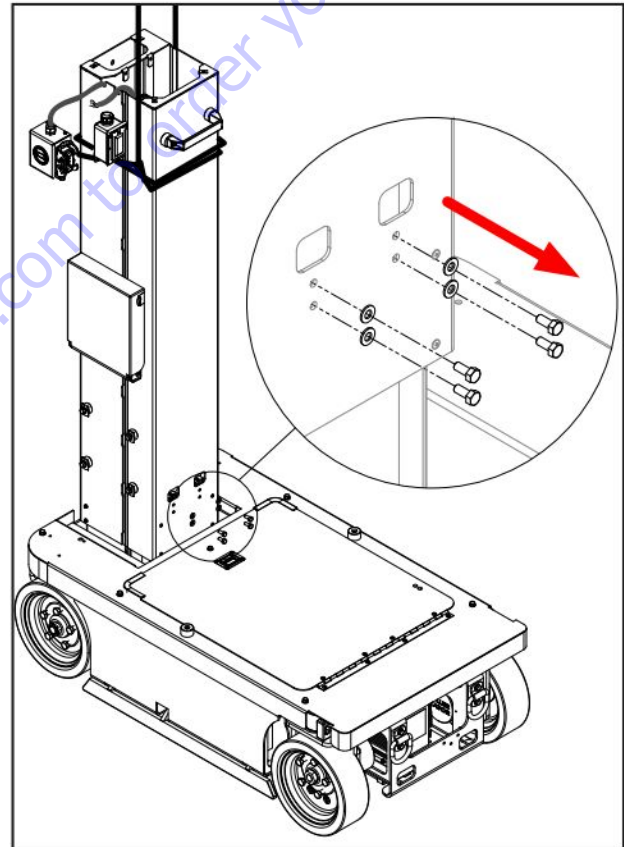


Figure 19 Chain Tensioner Disconnection (Section 5)

2. Once the chains are disconnected, raise the mast section and remove the lower wear pads. Mark the location of each wear pad.
3. Lift mast section 5 up and away from the mast column, make sure the harnesses and the control cable enclosure box are clear at the top of the mast. Set the mast section aside.

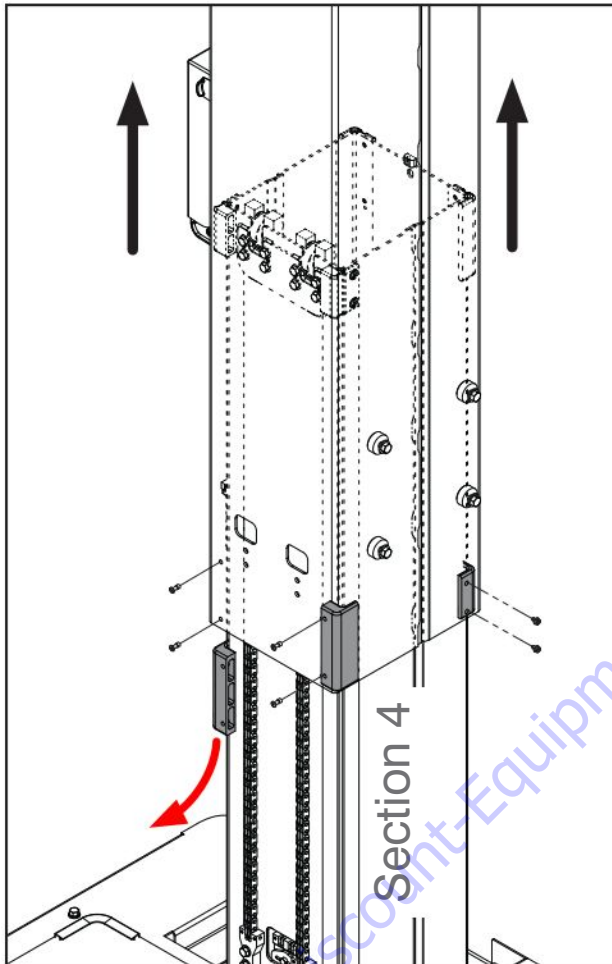


Figure 20 Wear Pads Removal (Section 5)

5.11-3 Mast Section 4 Removal

1. **(SJ16 Only)** Pull the chains laying on the outside of section 4 up and over the single rollers so they drop into the mast column. Make sure they do not tangle.

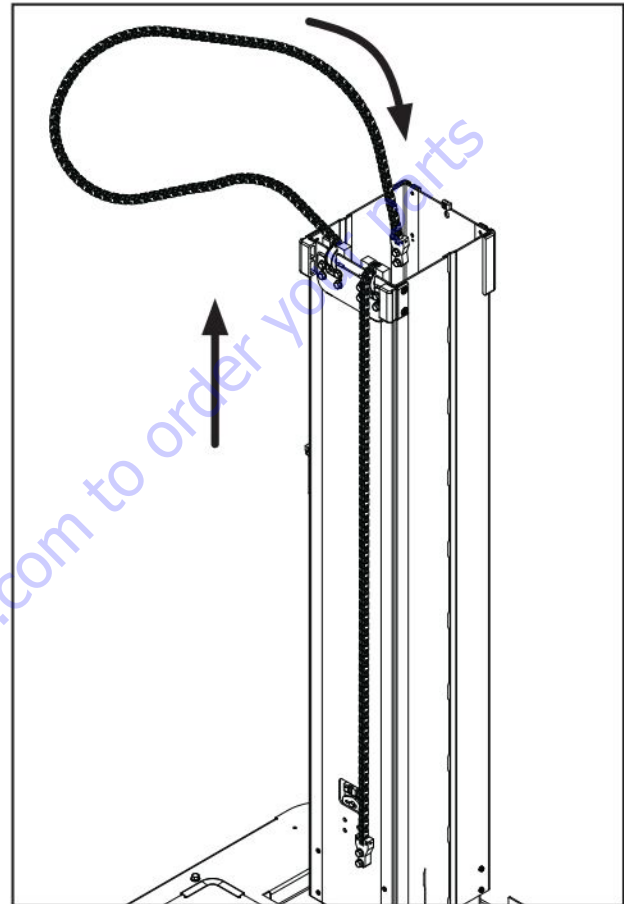


Figure 21 Section 3 to Section 5 Chains (SJ16 Only)

NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 4 for a straight, even lift.

NOTE

For SJ12 - Attach lifting straps away from mast grab handle and receptacle box.

- Carefully lift mast section 4, just enough so that the chains are not in tension. Remove the hardware securing the chain tensioner block inside mast 4.

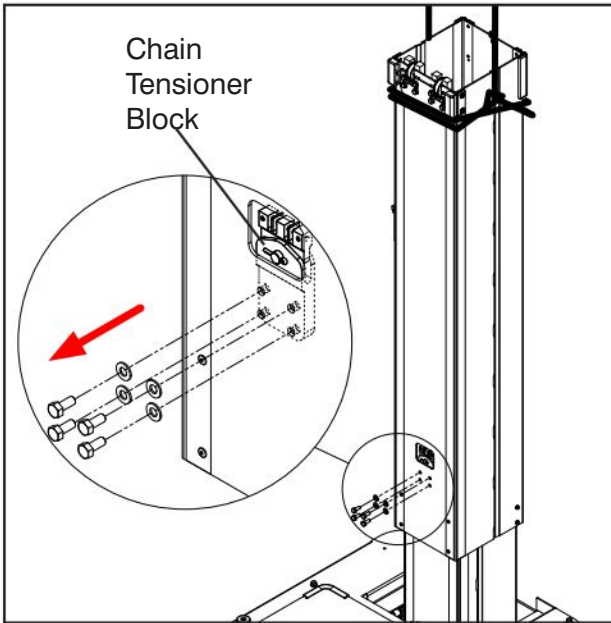


Figure 22 Chain Tensioner Disconnection (Section 4)

- Lift the mast section up to a suitable working height and remove the lower wear pads. Mark the location of each wear pad.

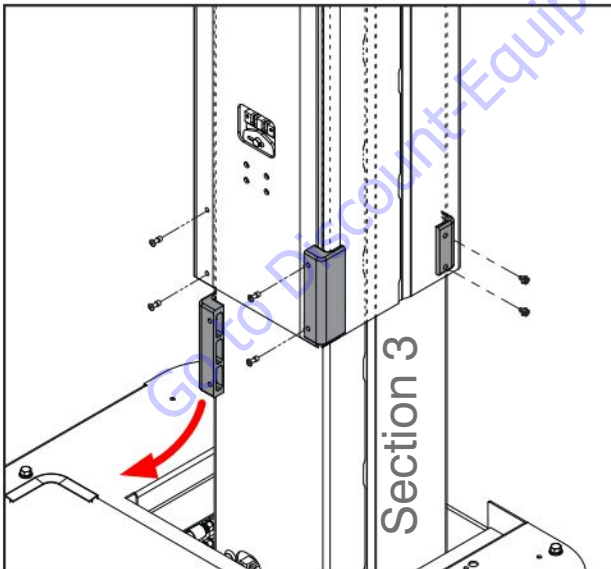


Figure 23 Wear Pads Removal (Section 4)

- Pry/push the bottom of the mast section forward to allow the chain tensioner to drop past the bottom edge of the mast section.

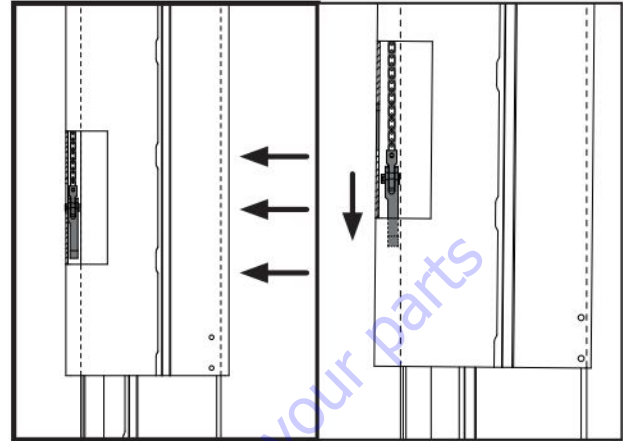


Figure 24 Chain Tensioner Release (Section 4)

- Lift mast section 4 up and away from the mast column. Make sure the harnesses and the control cable enclosure box are clear at the top of the mast. Set the mast section aside.

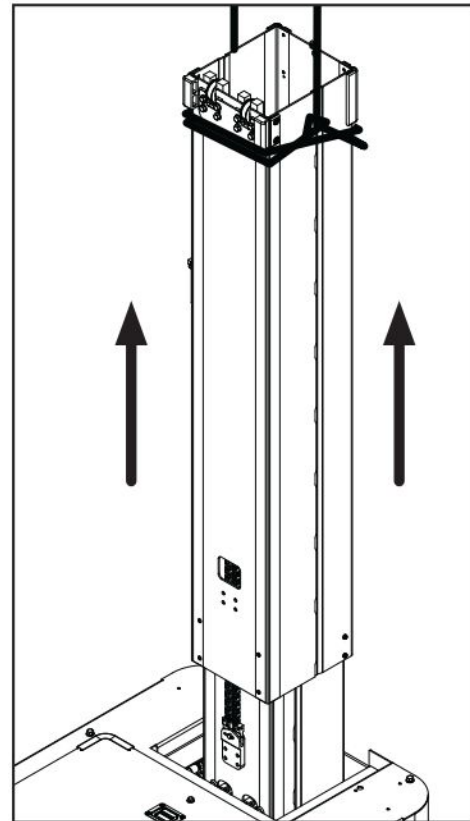


Figure 25 Mast Section 4 Removal

5.11-4 Mast Section 3 Removal

1. (SJ16 Only) Pull the chains attached to mast section 3 out of the mast column and lay them against the front of mast section 3.

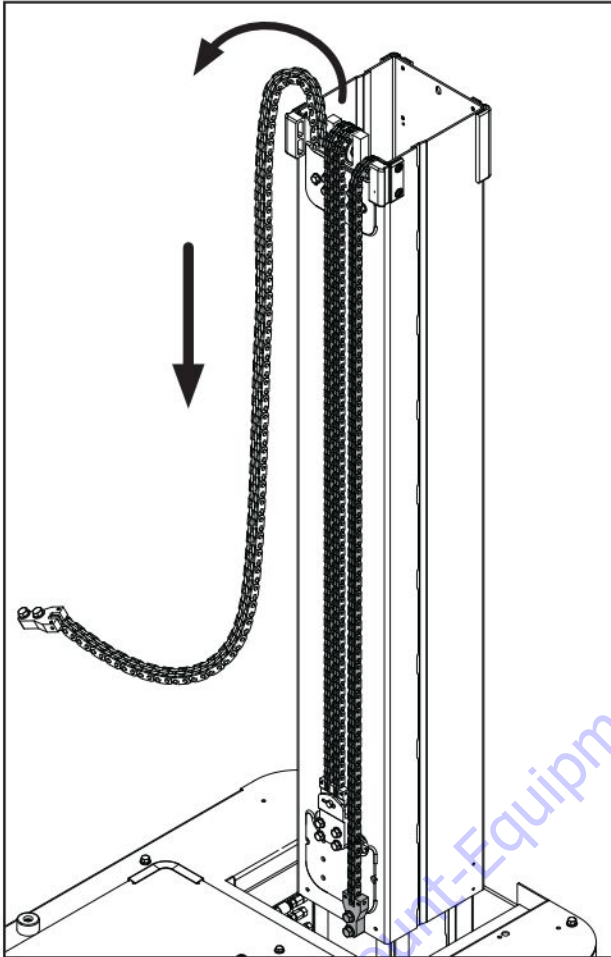


Figure 26 Section 3 Chains (SJ16 Only)

2. Pull the chains attached to mast section 2 up and over the double rollers so they can drop into the mast column. Make sure they do not tangle.

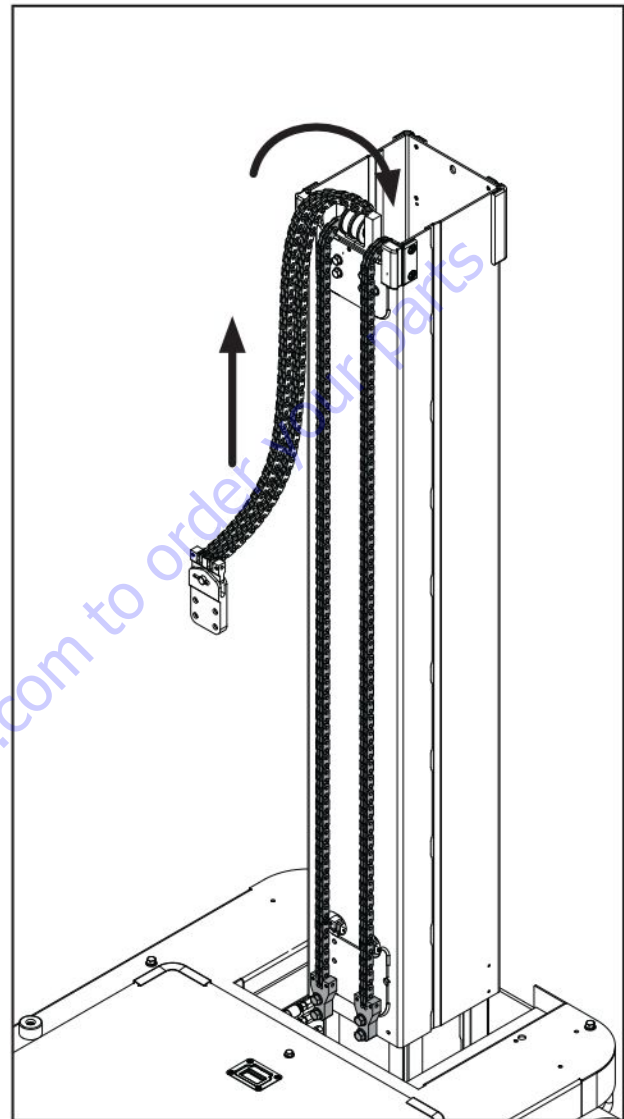


Figure 27 Section 2 to Section 4 Chains



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 3 for a straight, even lift.

- 3. Carefully lift mast section 3 evenly, just enough so that chains are not in tension. Remove the hardware securing the chain tensioner block inside mast 4.

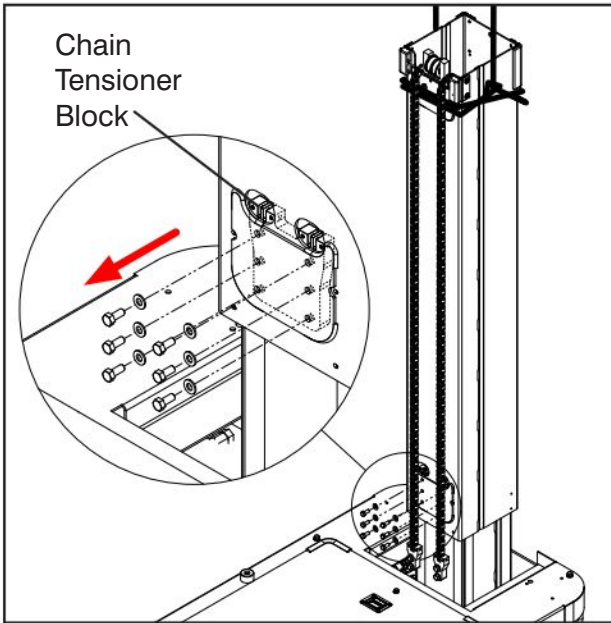


Figure 28 Chain Tensioner Disconnection (Section 3)

- 4. Lift the mast section up to a suitable working height and remove the lower wear pads. Mark location of each wear pad.

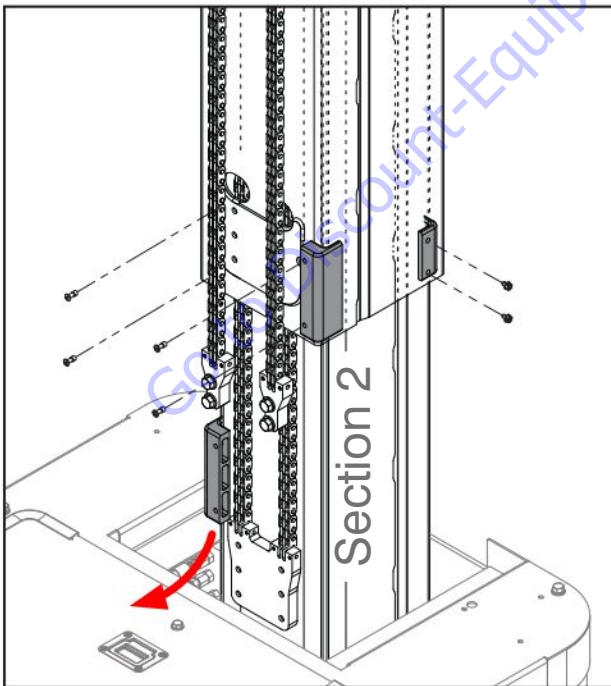


Figure 29 Wear Pads Removal (Section 3)

- 5. Lift mast section 3 up and away from the mast column. Make sure the harnesses and the control cable enclosure box are clear. Set the mast section aside.

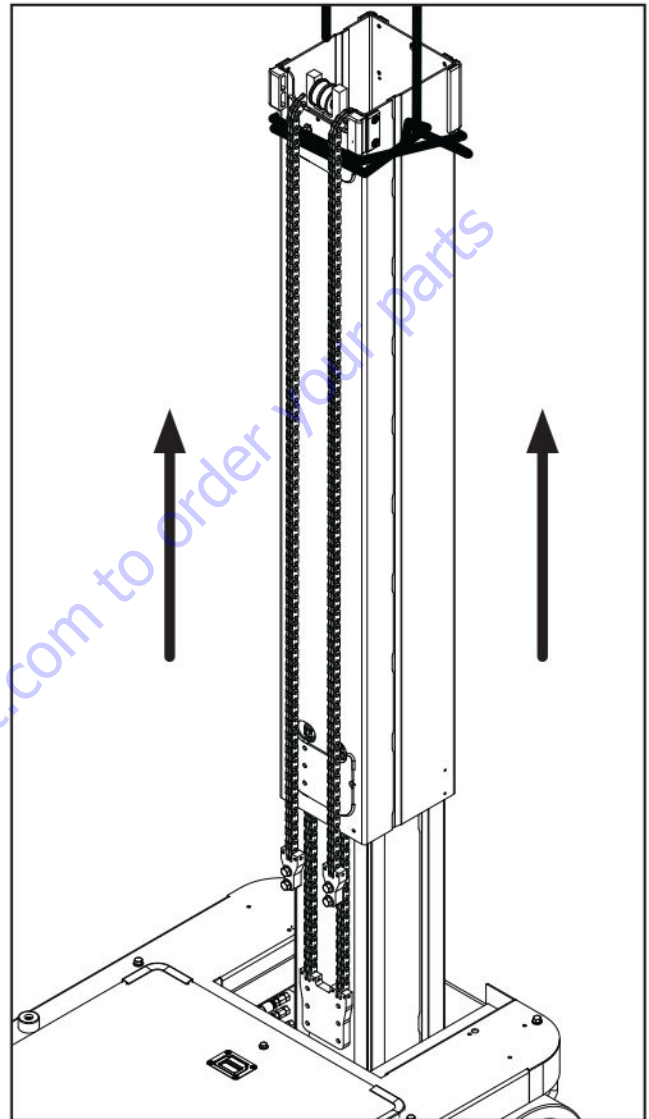


Figure 30 Mast Section 3 Removal

5.11-5 Mast Section 2 Removal

1. Remove the hydraulic cylinder rod pin securing the cylinder to the mount bracket in section 2 as shown in figure below.
2. Cut all the cable ties securing the harnesses to the cylinder mount bracket.

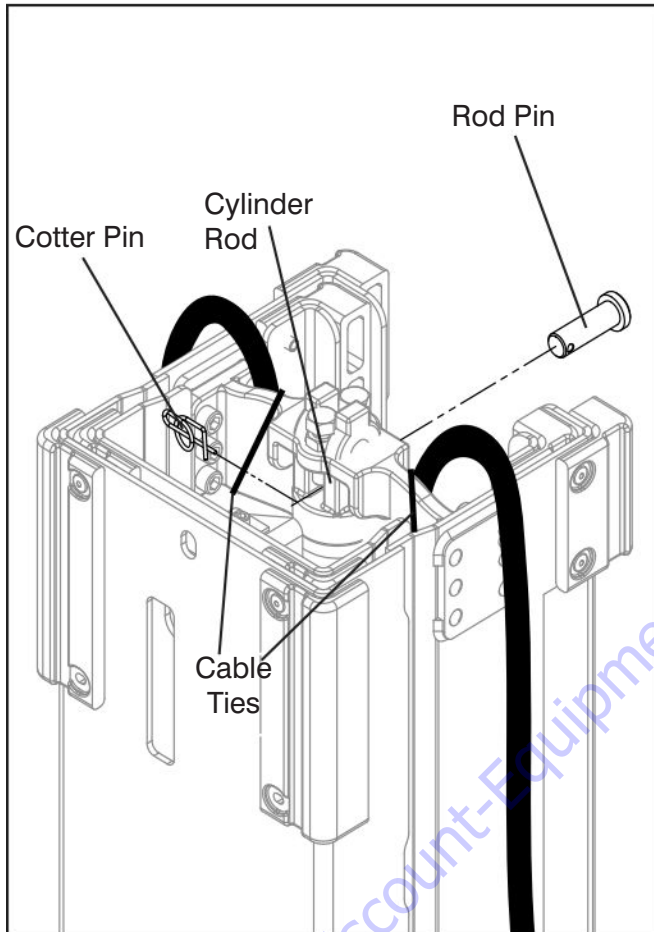


Figure 31 Rod Pin Removal

3. Pull the chains attached to mast section 2 out of the mast column and lay them against the front of mast section 2.

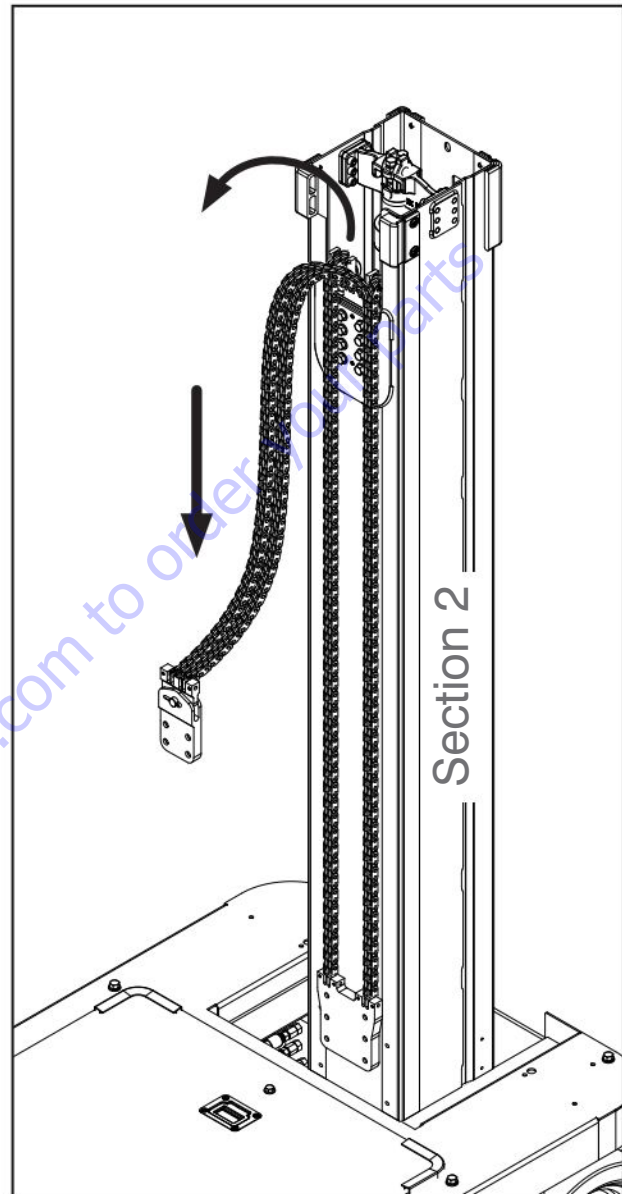


Figure 32 Section 2 Chains

4. Pull the chains attached to mast section 1 up and over the double rollers so they drop into the mast column. Make sure they do not tangle.

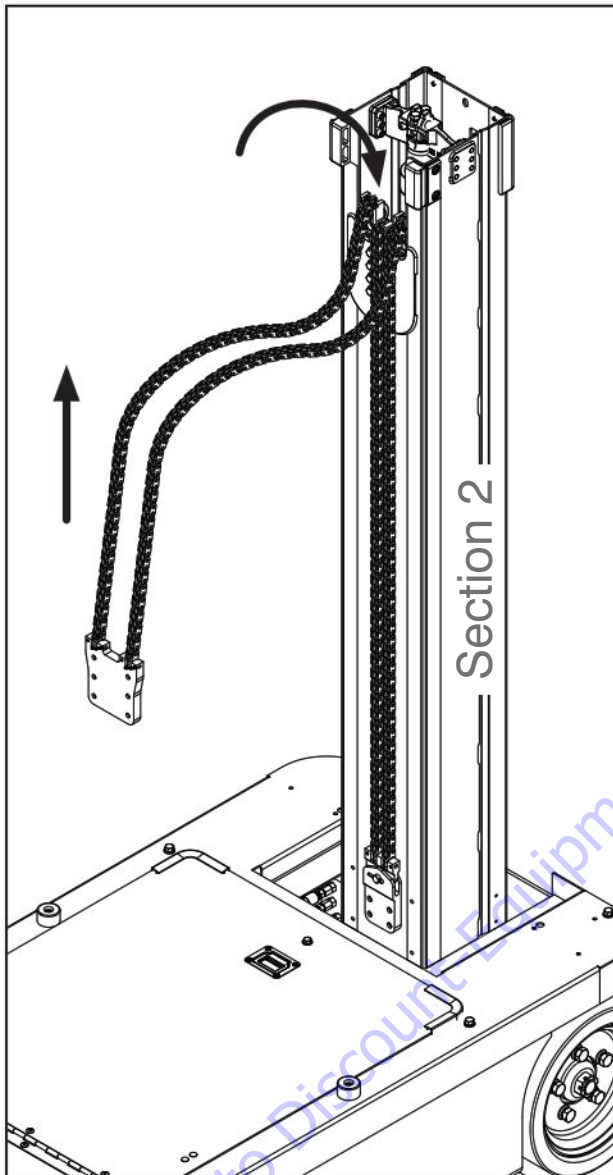


Figure 33 Section 1 to Section 3 Chains

 **NOTE**

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 2 for a straight, even lift.

5. Lift the mast section up to a comfortable working height and remove the lower wear pads. Mark the location of each wear pad.

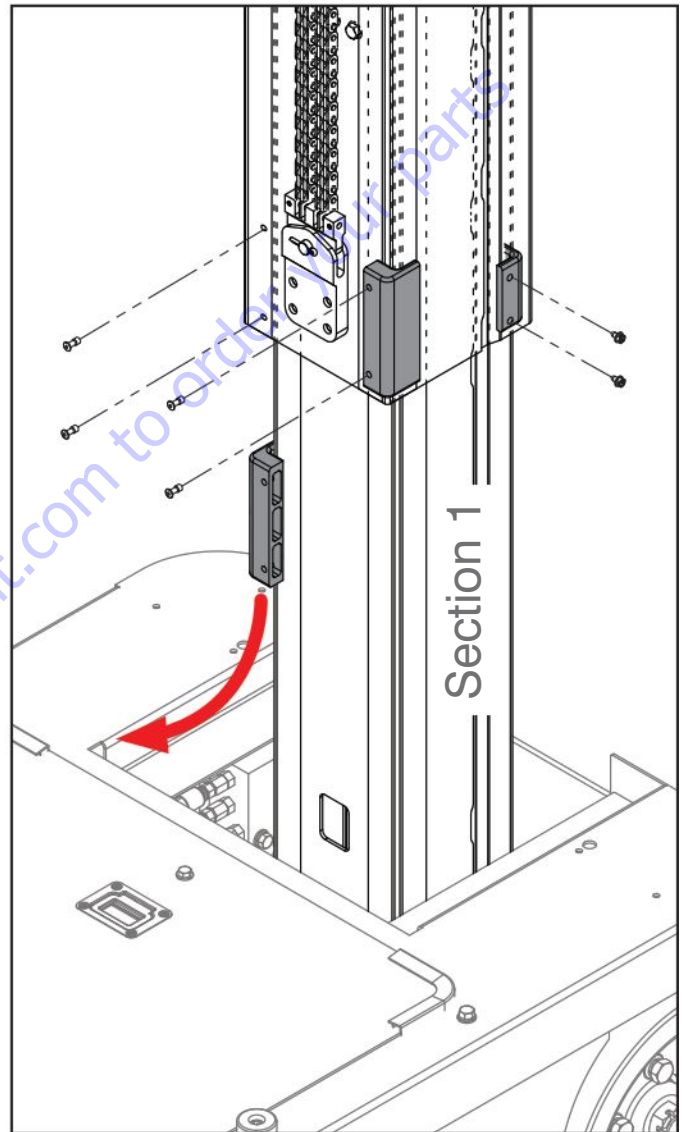


Figure 34 Wear Pads Removal (Section 2)

6. Lift mast section 2 up and away from the mast column. Make sure the harnesses and the control cable enclosure box are clear. Set the mast section aside.

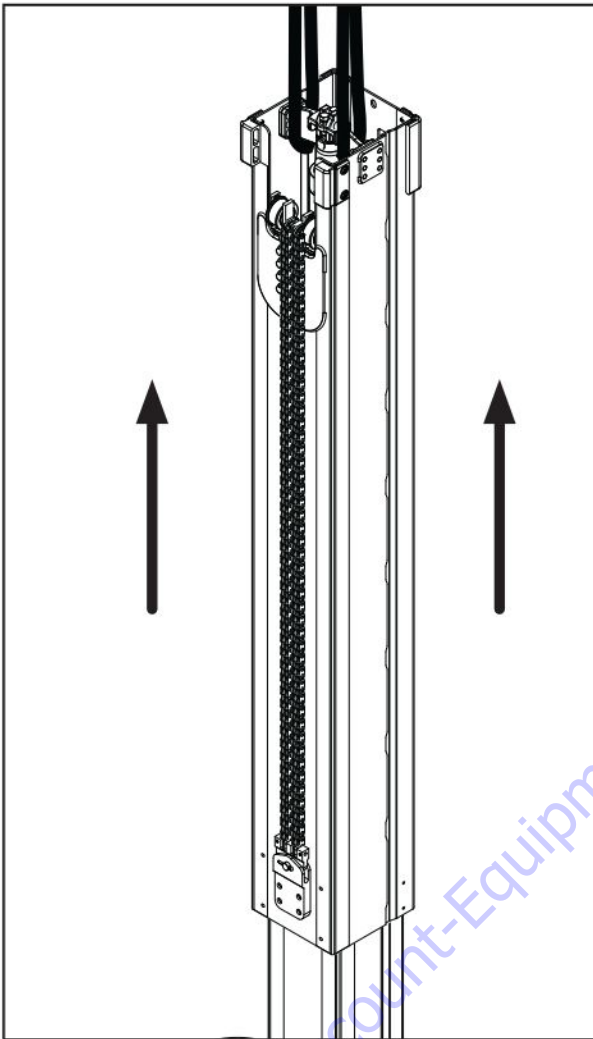


Figure 35 Section 2 Removal

5.11-6 Mast Section 1 Removal

1. Pull the chains attached to mast section 1 out of the mast column and lay them against the front of the mast.

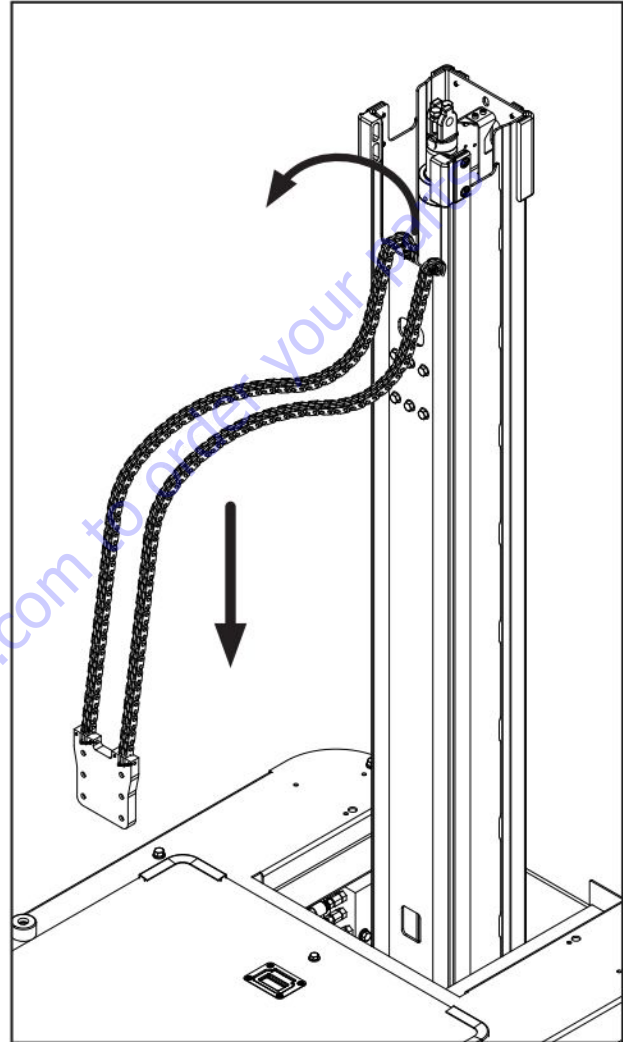


Figure 36 Section 1 Chains

NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 1 for a straight, even lift.

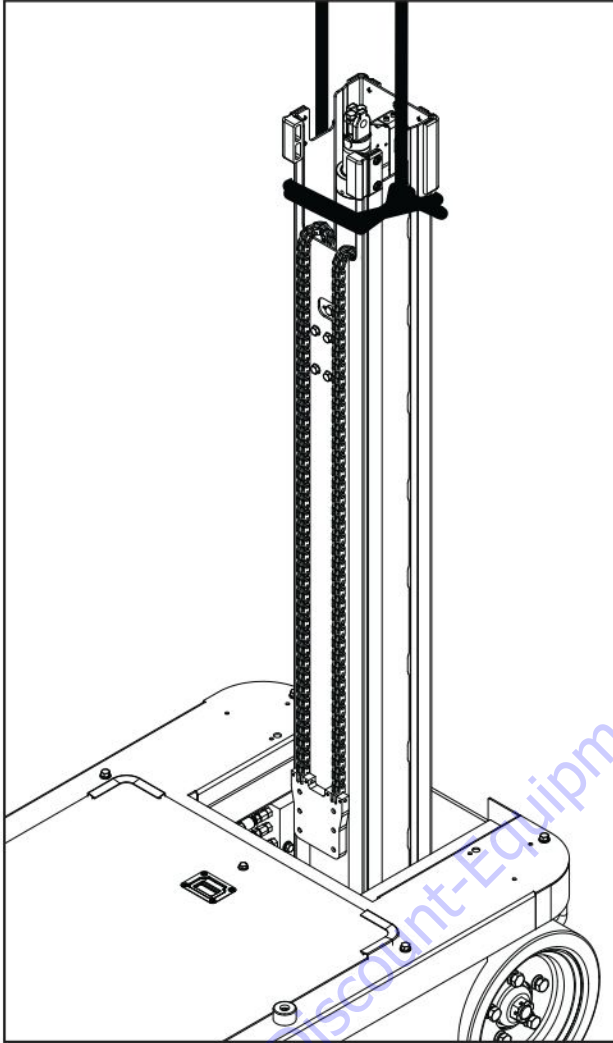


Figure 37 Mast Section 1 Secured

2. Remove the 4 clamps that secure the harnesses to the mast base, then disconnect the two harness plug connectors and the mast limit switch harness.

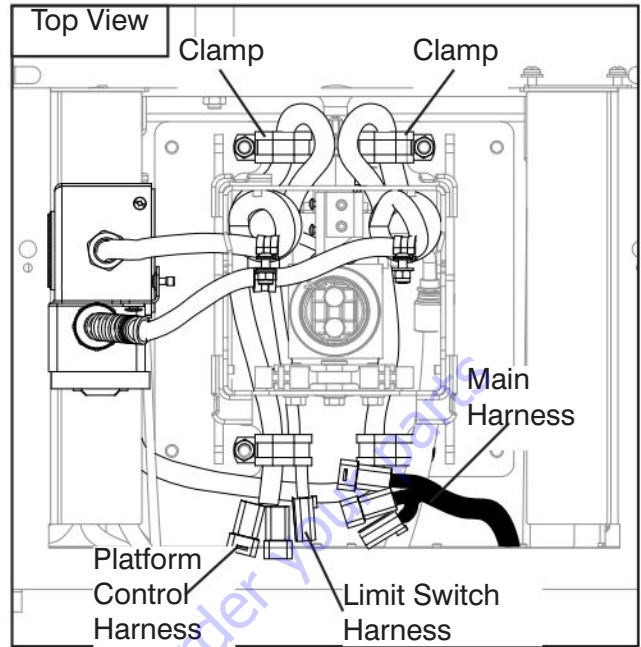


Figure 38 Harnesses Disconnection

3. Remove the rivets securing the power inlet at the base of the mast. Disconnect the wires from it and pull the harness through from the inside of the base so that it is clear. (ANSI/CSA Only)

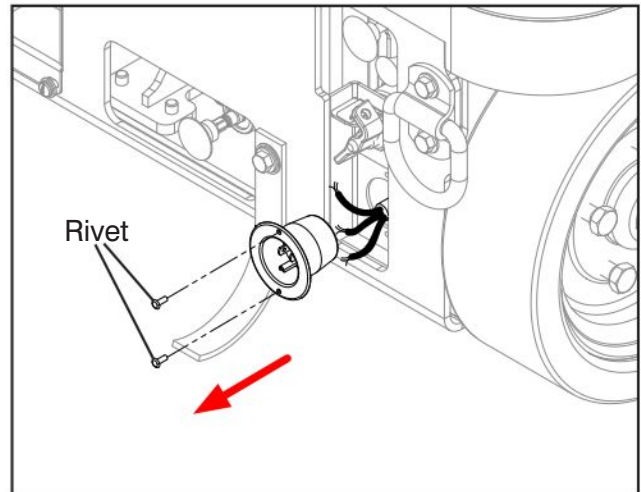


Figure 39 Power Inlet Removal

NOTE

Disconnect the harness ground wire connected to a mast mounting bolt at the base of the mast.

4. Remove all hardware securing the mast to the base.

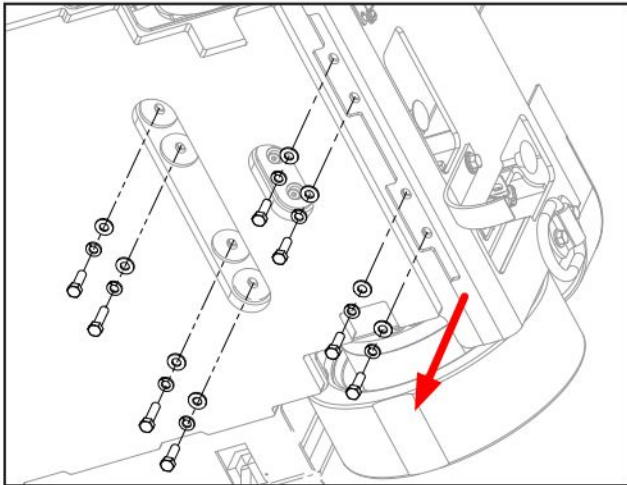


Figure 40 Mast Hardware Removal

5. Lift mast section 1 up and away from the lift cylinder. Make sure all harnesses are clear. Set the mast section aside.

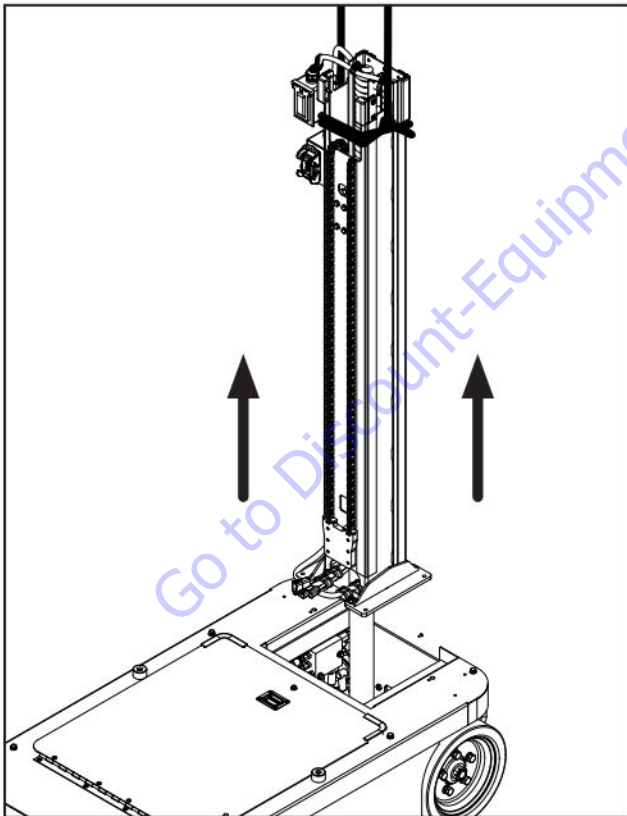


Figure 41 Mast Section 1 Removal

5.12 Mast Roller Replacement

1. Remove the hardware securing the roller assembly to the mast.
2. Tap the roll pins out of the mast and pull the roller assembly off.
3. Pull the roller assembly apart. Replace worn parts as required.

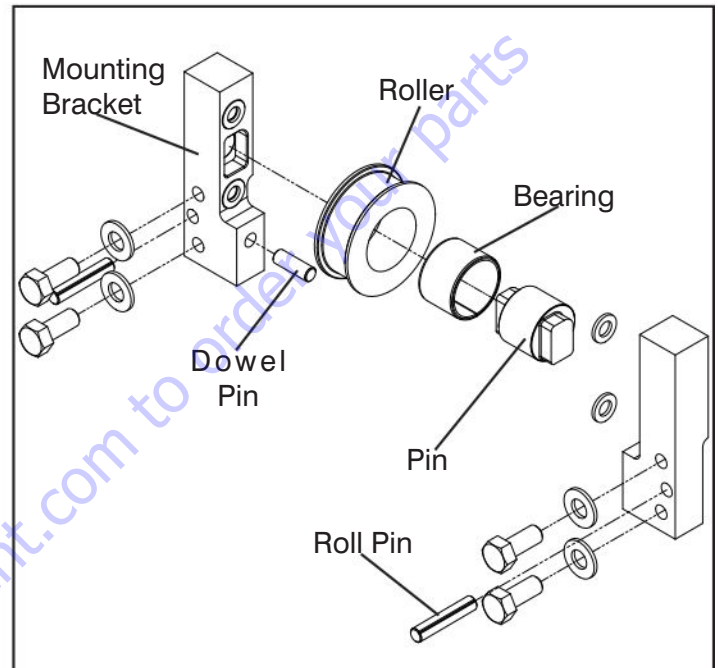


Figure 42 Roller Pin Components

4. Reassemble the roller assembly.
5. Align the holes in the roller assembly with the holes in the mast. Tap the roll pins into the holes.
6. Apply Loctite 242 (blue) to the threads and install the bolts. Torque to 18 ft-lb

IMPORTANT

Once installed, the rollers must turn freely. Check rotation before assembling the mast.

5.13 Mast Assembly Procedure

5.13-1 Mast Section 1 Installation

CAUTION

A second person to assist will be required to complete this procedure.

WARNING

Do not stand or pass under a suspended load.

1. Make sure the main power disconnect switch is in the off position.
2. Lift mast section 1 over the lift cylinder then slowly and carefully lower the section in place, ensuring the electrical harnesses are secured at the top and bottom of the mast. Apply Loctite 242 (blue) to the threads of the 8 mounting bolts and install them with flat washers and lock washers. Torque to 23 ft-lb (31 N·m)

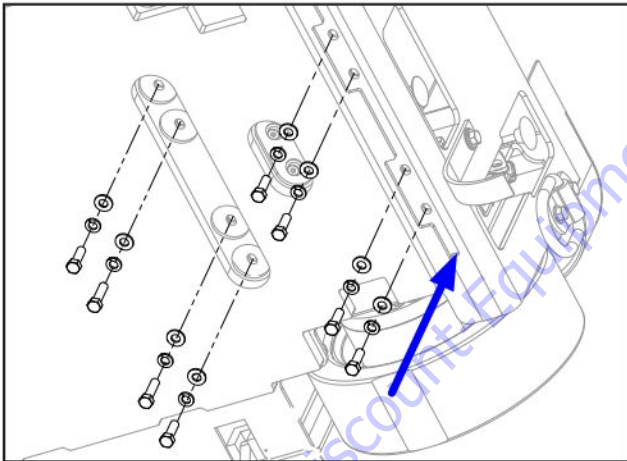


Figure 43 Mast Hardware Installation

3. Organize and route the harnesses at the back end of the base. Leave enough length to properly secure them with the clamps.

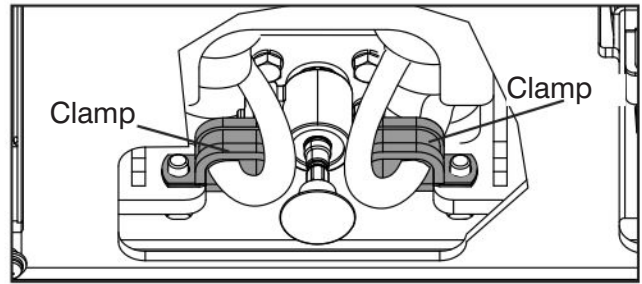


Figure 44 Harness Routing

4. Connect the mast control cable and limit switch harness plugs.

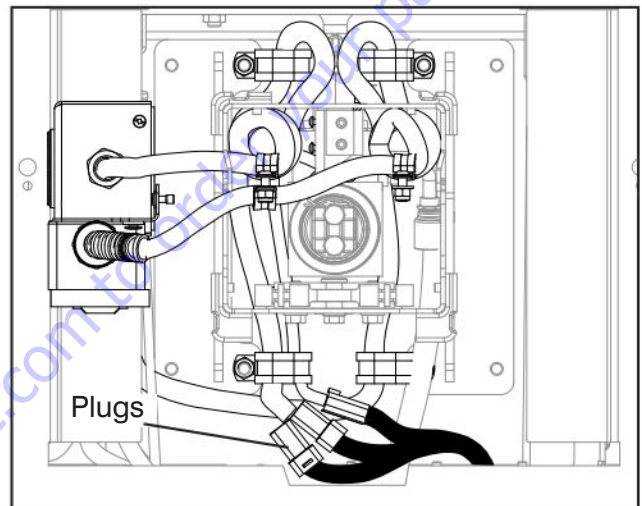


Figure 45 Harness Plugs Connection

5. Connect the AC power supply harness to the inlet at the base. Match the green wire to the green terminal, the black wire to the bronze terminal, and the white wire to the silver terminal. Install the inlet with a 1/16" rivet in each hole. (ANSI/CSA only)

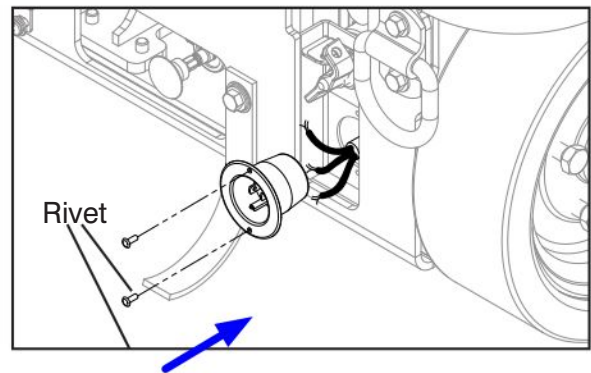


Figure 46 Power Inlet Installation

6. Locate the limit switch at the top of the mast, then press and hold the plunger away from the opening with a piece of tape to avoid any potential damage when the next section passes over it.

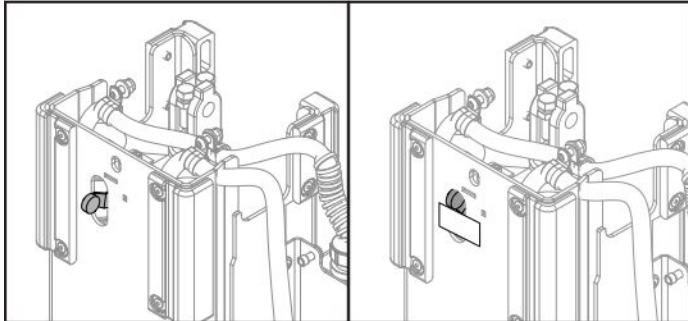


Figure 47 Mast Limit Switch

5.13-2 Mast Section 2 Installation

1. Pull the chains attached to the mast section 1 up and over so they drop into the mast column. Make sure they do not tangle.

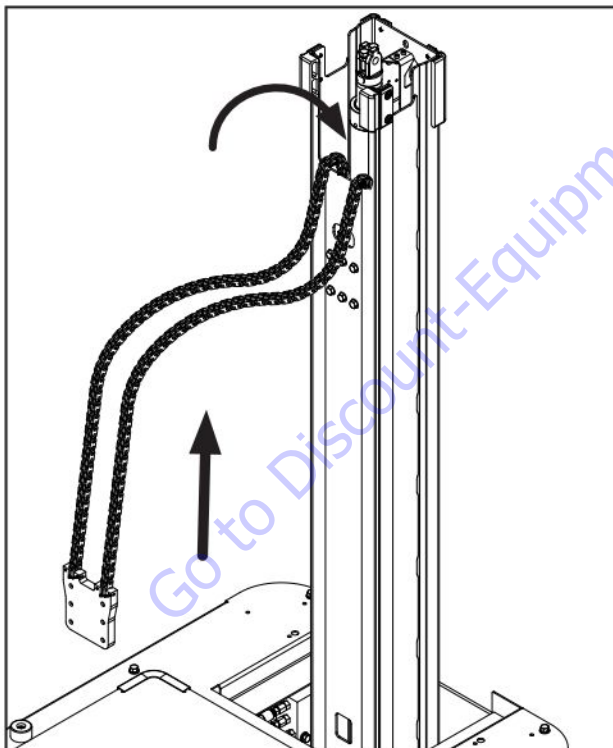


Figure 48 Mast Section 1 Chains



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 2 for a straight, even lift.

2. Lift mast section 2 over the mast column, then slowly and carefully lower the section in place. Make sure the harnesses and the control cable enclosure box are clear at the top of mast section 1.
3. Lower the section until the bottom end of the mast is at a suitable working height to install the lower wear pads.
4. Install the rear (short) wear pads with the 10-32 x 3/8" screws. Install the front (long) wear pads using 3/16" x 1/4"-3/8" rivets.

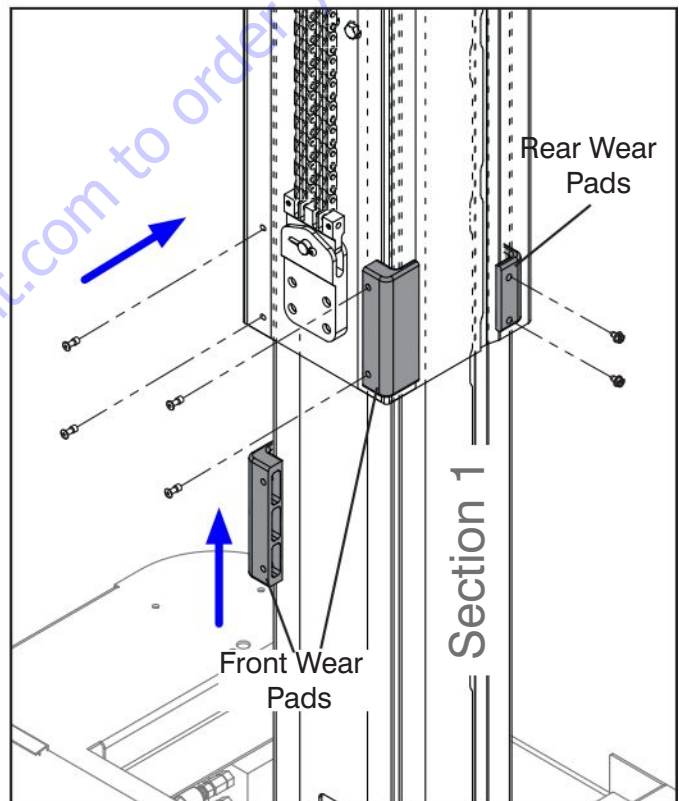


Figure 49 Wear Pads Installation (Mast Section 2)

5. Fully lower the section in place.
6. Remove tape to release the limit switch.

5.13-3 Mast Section 3 Installation

1. Pull the chains attached to mast section 1 out of the mast column and lay them against the front of mast section 2.

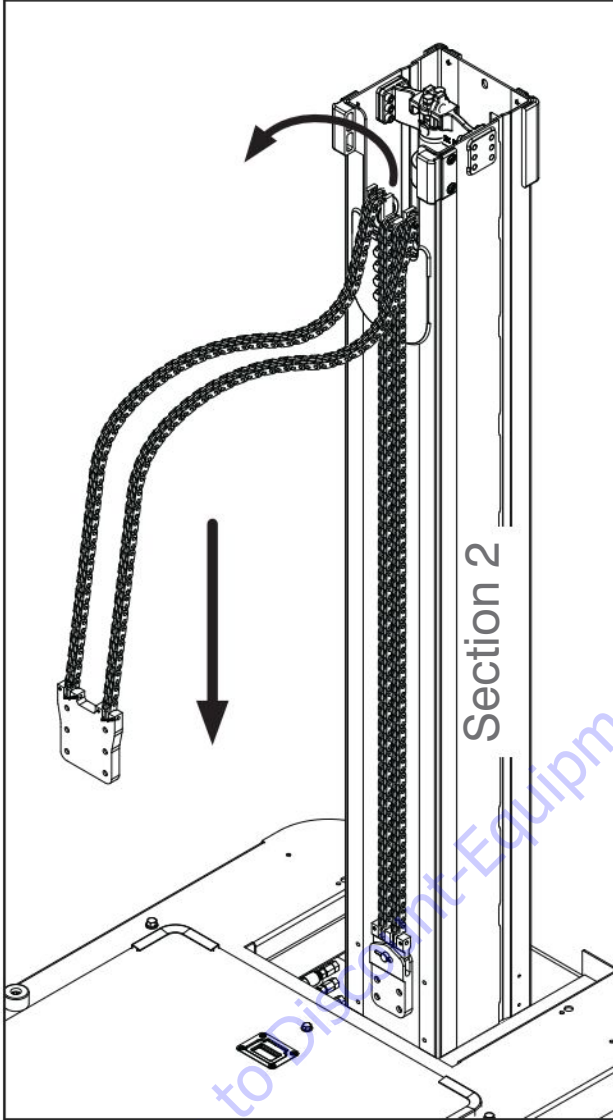


Figure 50 Section 1 to Section 3 Chains

2. Pull the chains attached to mast section 2 up and over the double rollers so they drop into the mast column. Make sure they do not tangle.

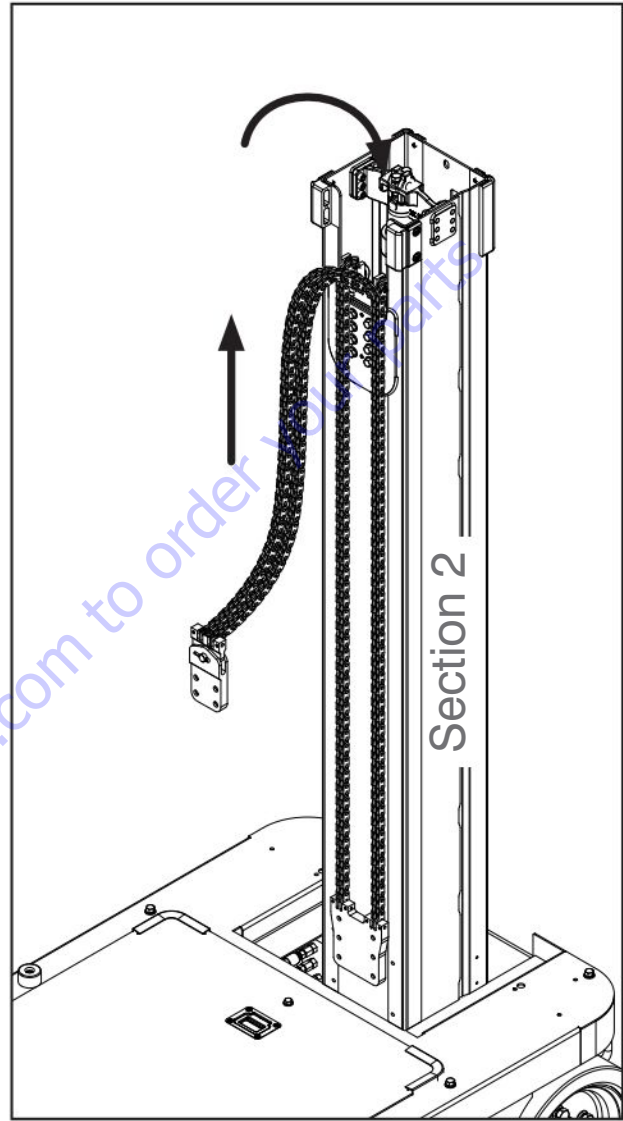


Figure 51 Section 2 Chains



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 3 for a straight, even lift.

3. Lift mast section 3 over the mast column, then slowly and carefully lower the section in place. Make sure the harnesses and the control cable enclosure box are clear at the top.
4. Once in place, lower the section until the bottom end of the mast is in a suitable working height to install the lower wear pads.
5. Install the rear (short) wear pads with the 10-32 x 3/8" screws. Install the front (long) wear pads using 3/16" rivets.

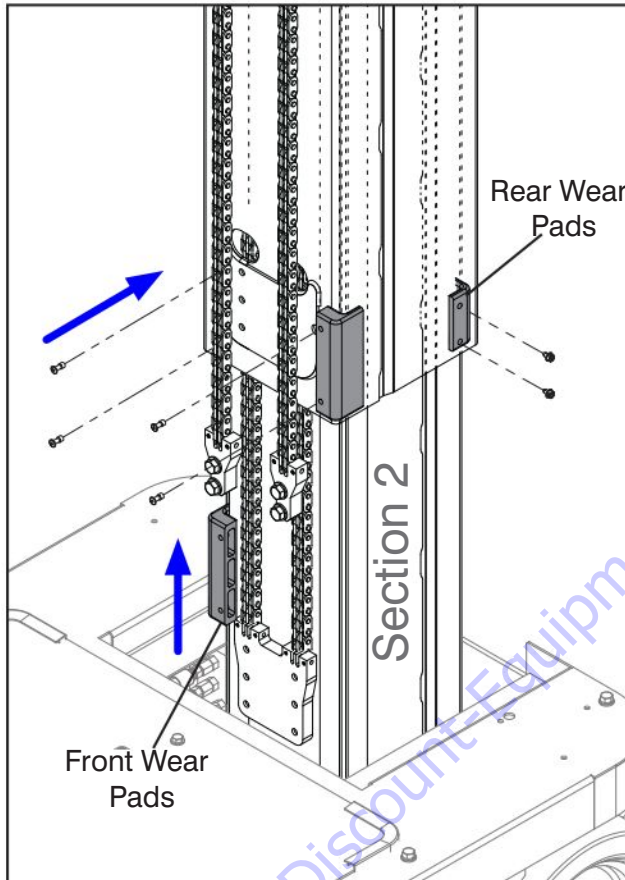


Figure 52 Wear Pads Installation (Section 3)

6. Continue lowering until the chain block tensioner inside the mast section can be attached. Apply Loctite 242 (blue) to the threads of the six bolts and install them with the flat washers.

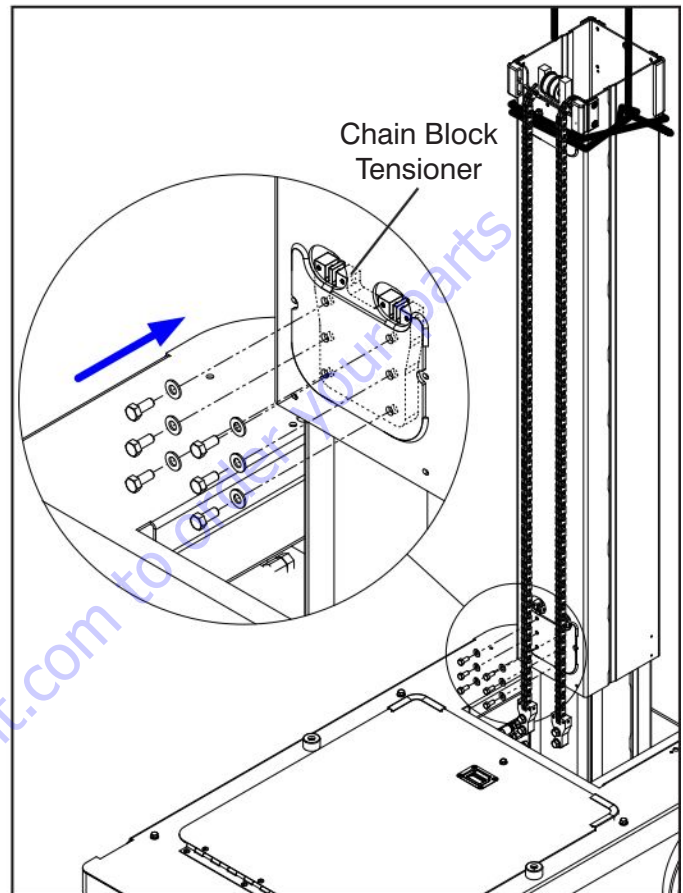


Figure 53 Chain Tensioner Installation (Section 3)

7. Fully lower mast section 3. Guide the electrical harnesses and the control cable enclosure out of the mast column.

5.13-4 Mast Section 4 Installation.

1. Pull the chains attached to mast section 2 out of the mast column and lay them against the front of mast section 3.

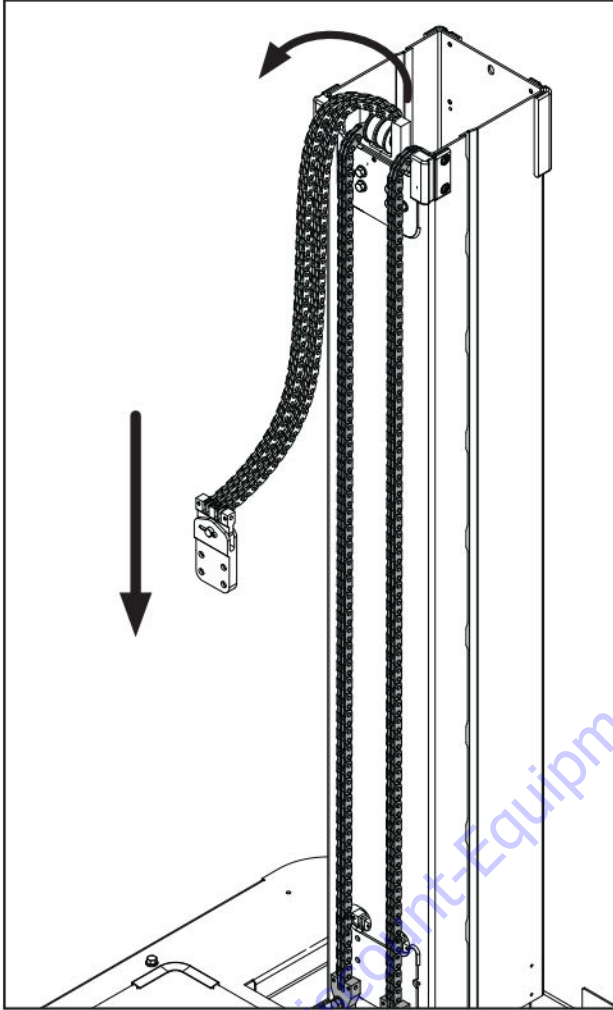


Figure 54 Section 2 to Section 4 Chains

2. (SJ16 Only) Pull the chains attached to mast section 3 up and over the double rollers so they can drop into the mast column. Make sure they do not tangle.

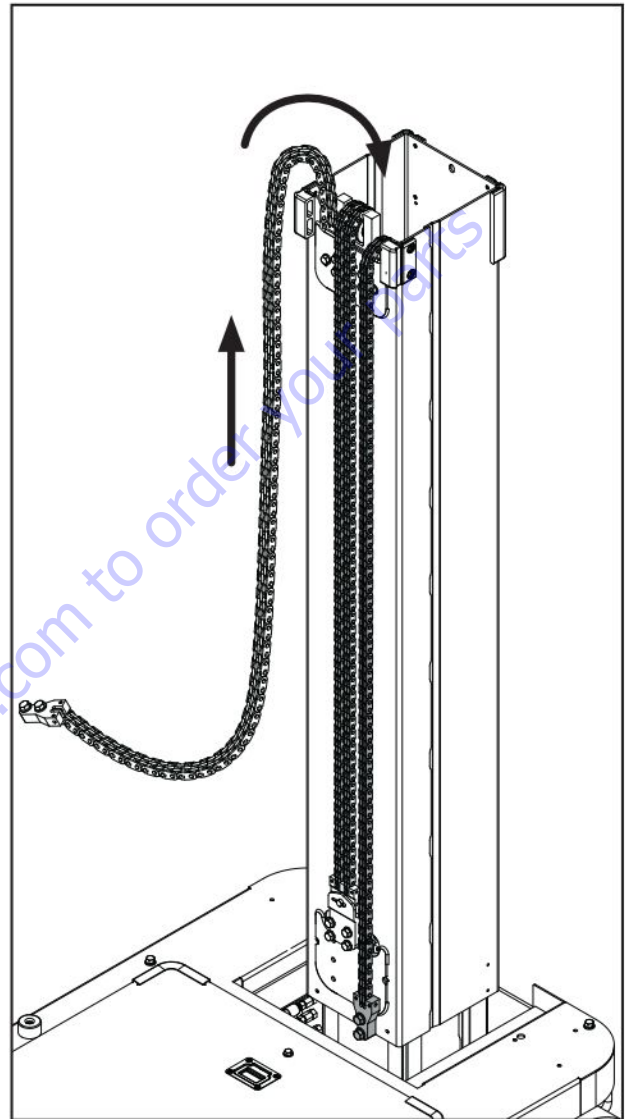


Figure 55 Section 3 Chains (SJ16 Only)



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 4 for a straight, even lift.

3. Lift mast section 4 over the mast column, then slowly and carefully lower the section in place, make sure the harnesses and the control cable enclosure box are clear at the top.
4. Lower mast section 4 enough to connect the chain block tensioner. Push the mast section slightly forward to allow the chain tensioner to pass through the mast section. Apply Loctite 242 (blue) to the threads of the four bolts and install them with flat washers.

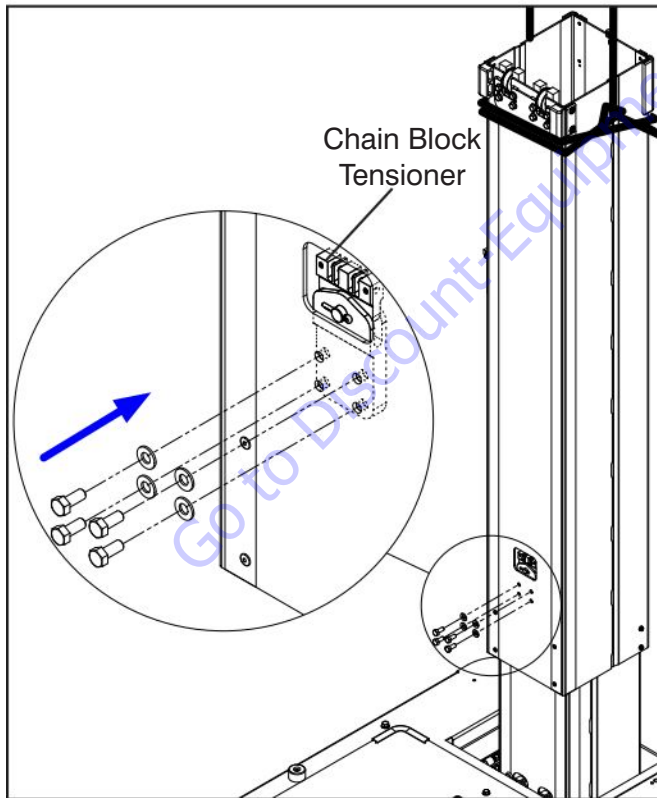
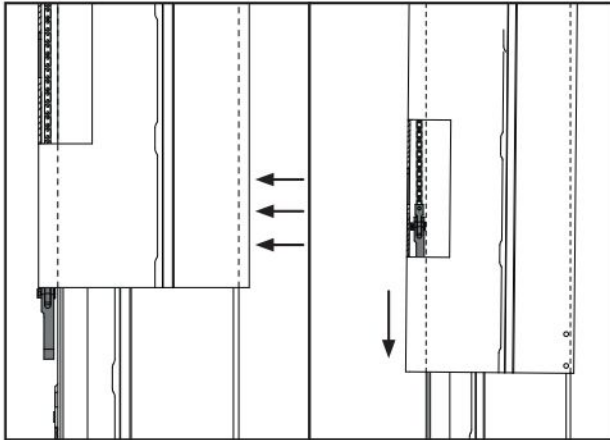


Figure 56 Chain Tensioner Installation (Section 4)

5. Lower the section until the bottom end of the mast is in a suitable working height to install the lower wear pads.
6. Install the rear (short) wear pads with the 10-32 x 3/8" screws. Install the front (long) wear pads using 3/16" x 1/4"-3/8" rivets.

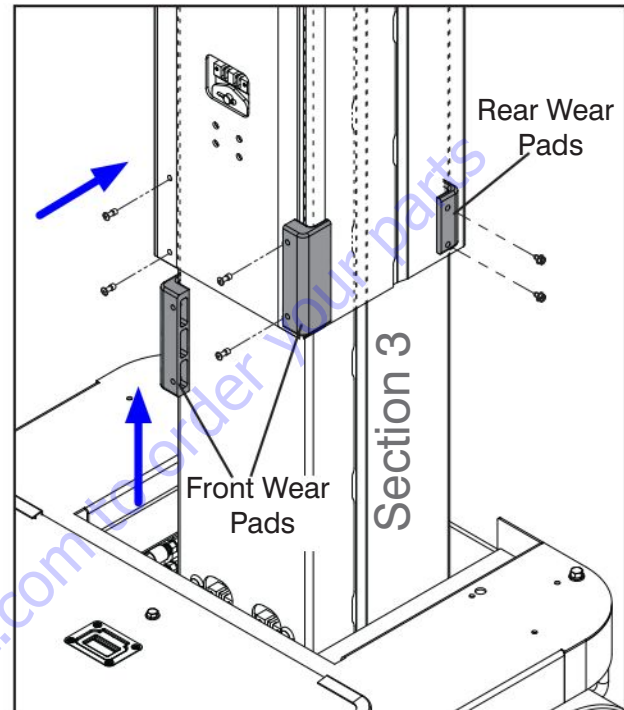


Figure 57 Wear Pads Installation (Section 4)

7. Fully lower mast section 4. Guide the electrical harnesses and the control cable enclosure out of the mast column.

5.13-5 Mast Section 5 Installation (SJ16 Only)

1. Pull the chains attached to mast section 3 out of the mast column and lay them against the front of mast section 4.

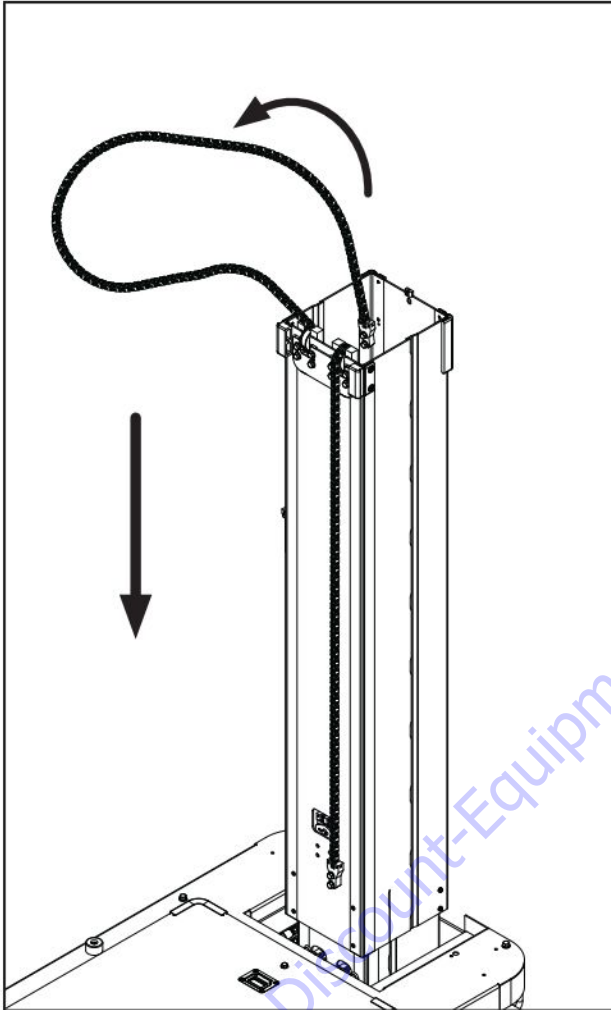


Figure 58 Section 3 to Section 5 Chains

NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to mast section 5 for a straight, even lift.

2. Lift mast section 5 over the mast column, then slowly and carefully lower the section in place. Make sure the harnesses and the control cable enclosure box are clear at the top.
3. Lower the section until the bottom end of the mast is in a comfortable working height to install the lower wear pads.
4. Install the rear (short) wear pads with the 10-32 x 3/8" screws. Install the front (long) wear pads using 3/16" rivets.

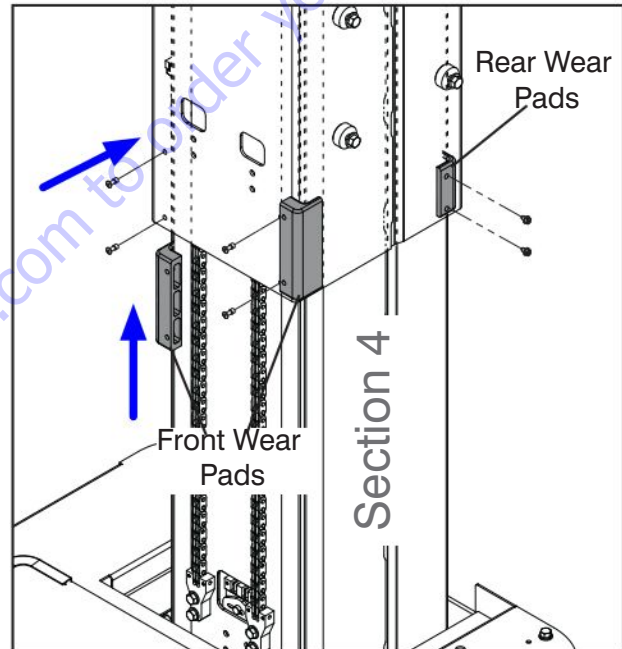


Figure 59 Wear Pads Installation (Section 5)

- Lower mast section 5 enough to connect the chain tensioner. Apply Loctite 242 (blue) to the threads of the four bolts and install them with the flat washers.

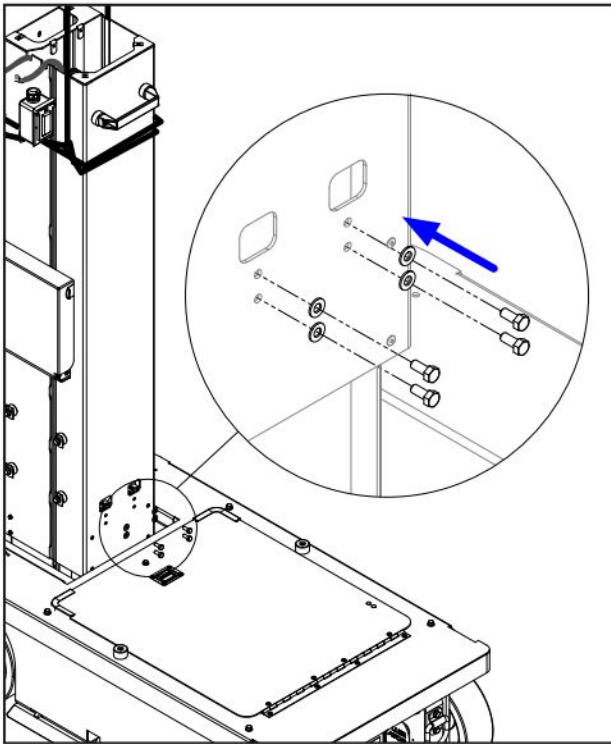


Figure 60 Chain Tensioner Installation (Section 5)

- Fully lower mast section 5. Guide the electrical harnesses and the control cable enclosure out of the mast column.

5.13-6 Extending Platform Installation

- Secure the harnesses with the clamps at the top of the mast as shown in figure below.

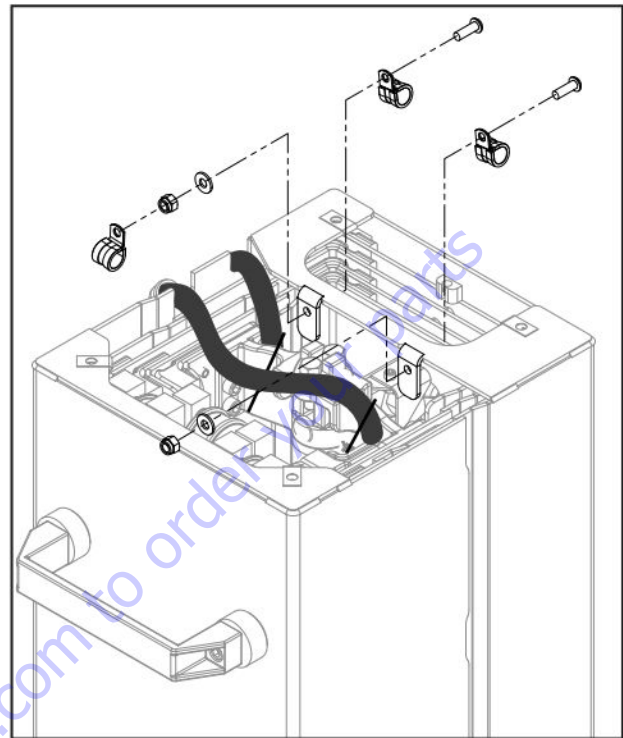


Figure 61 Harness and Clamps Installation

- Route the AC power supply harness through the strain relief to the inside of the receptacle box on the side of the mast and connect the harness to the outlet (ANSI/CSA Only).

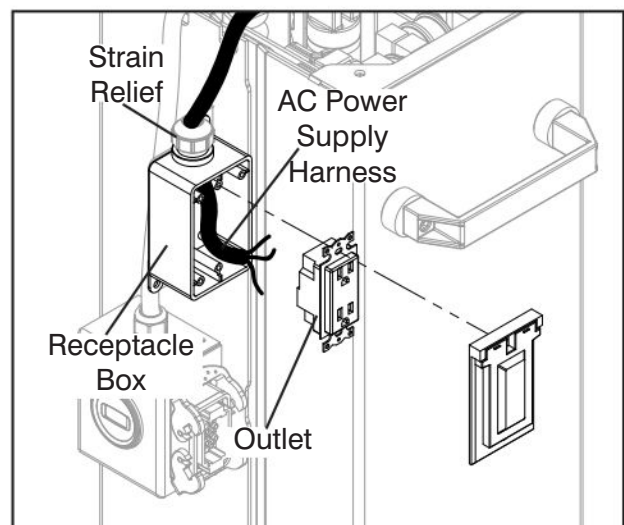


Figure 62 AC Power Supply Harness Connection

3. Lift platform in position over the mast then slowly and carefully lower it in place.

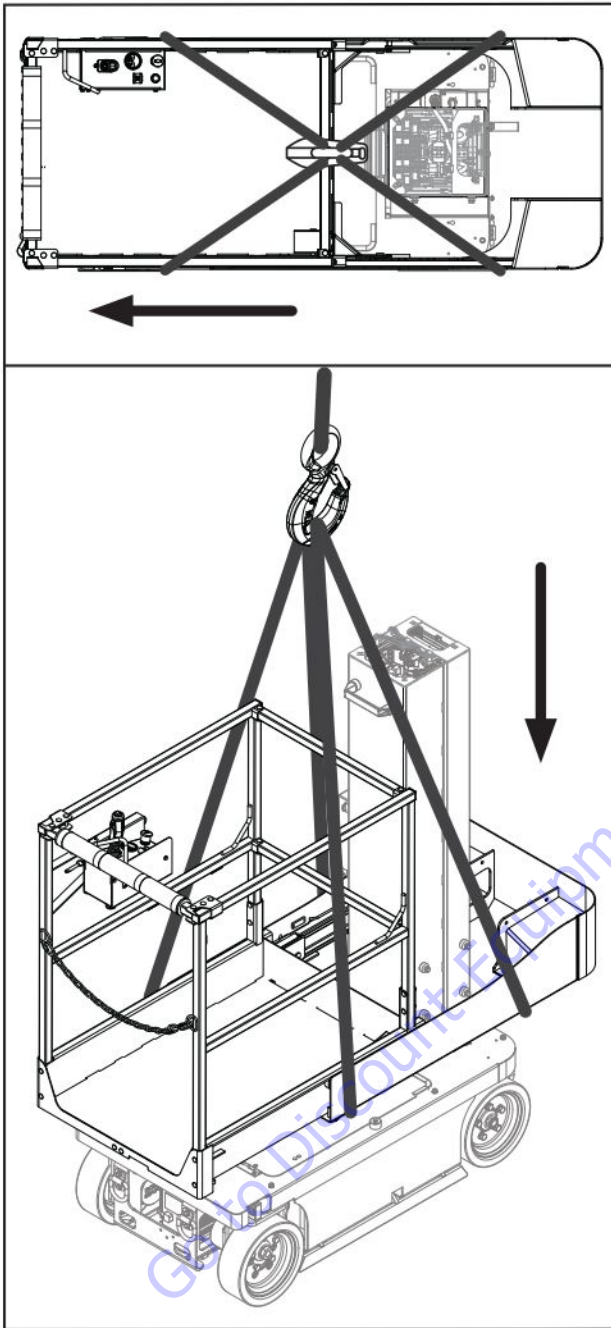


Figure 63 Platform Installation

4. Apply Loctite 242 (blue) to the threads of the upper 4 bolts then install them with the washers. Torque to 23 ft-lb (31 N·m).

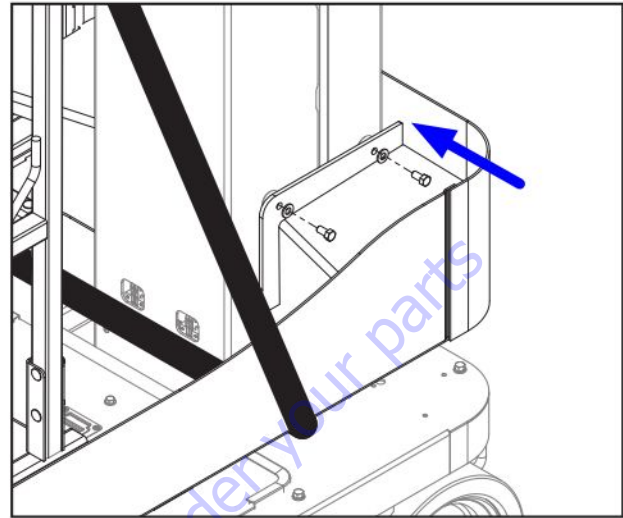


Figure 64 Platform Upper Bolts Installation

5. Route the limit switch harness through the plastic clips and behind the manual box.
6. Route the limit switch harness through the strain connector at the bottom of the enclosure box then connect the wires to the appropriate terminal block. Refer to section 3.22 Limit Switches.
7. Connect the platform control cable quick connector.

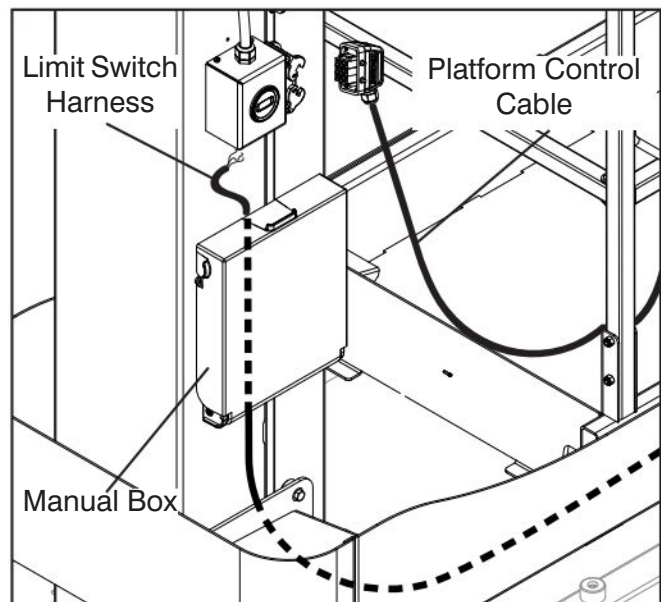


Figure 65 Platform Harnesses Installation

8. Raise the platform into position using the base controls so the lower platform bolts can be installed. Apply Loctite 242 (blue) to the threads and install the lower 4 bolts. Torque to 30 ft-lb (41 N·m).

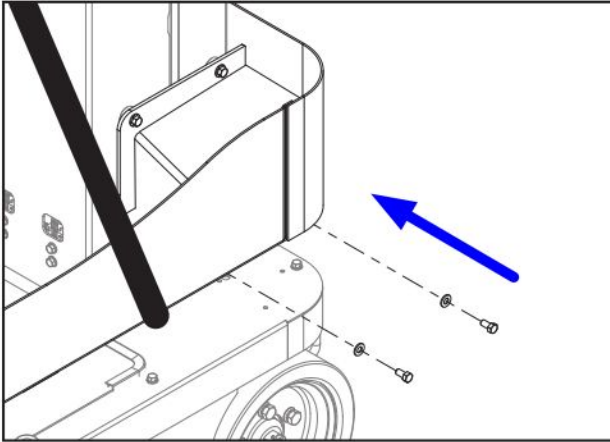


Figure 66 Platform Lower Bolts Installation

9. Fully lower the platform.
10. Install the mast cover

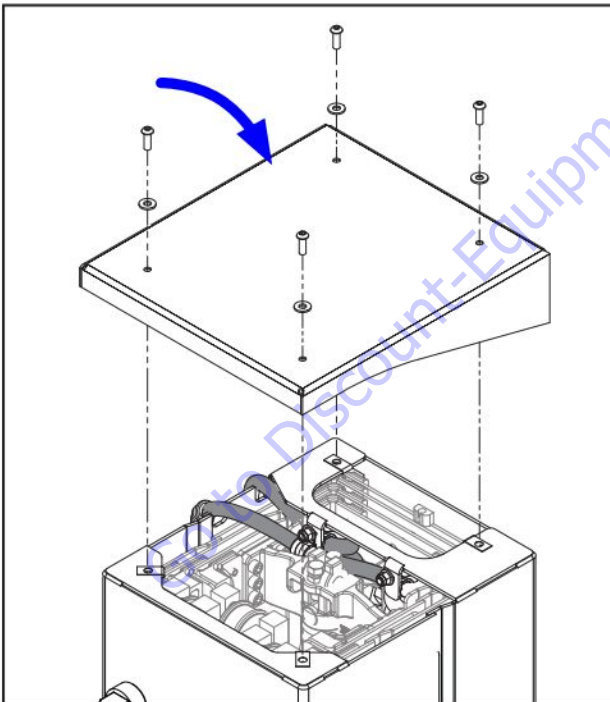


Figure 67 Mast Cover Installation

11. Perform a full function test before putting machine into service as outlined in 2.3 Specifications and Features - CE, AS of the operating manual.

5.14 Lift Cylinder Replacement

⚠ CAUTION

A second person to assist will be required to complete this procedure.

⚠ WARNING

Do not stand or pass under a suspended load.

To remove the lift cylinder from the machine, the platform and mast assembly must be removed first. Fully lower the platform and shut down the MEWP before starting this procedure.

5.14-1 Extending Platform Removal

1. See 5.8-1 Extending Platform Removal for platform removal.

5.14-2 Mast Assembly Removal

1. Remove the cover on the top of the mast.

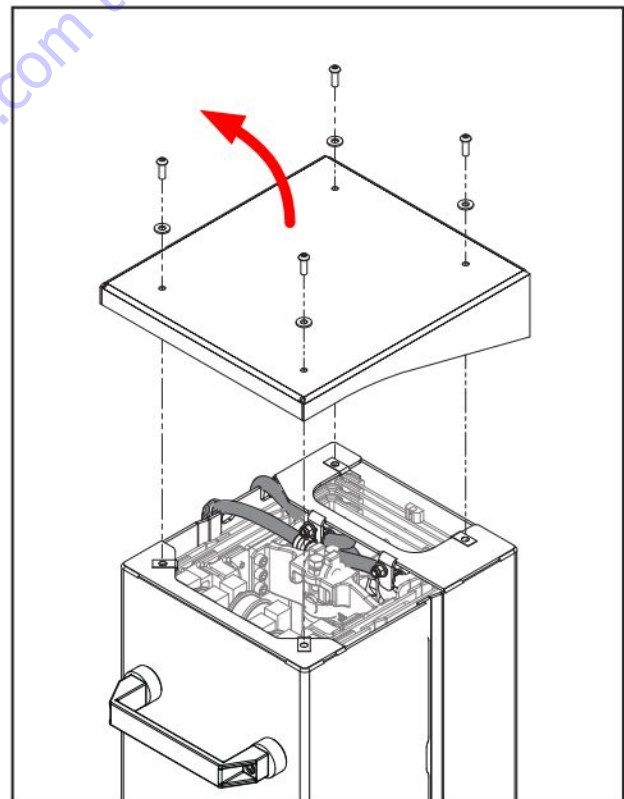


Figure 68 Mast Top Cover Removal

2. Remove the hydraulic cylinder rod pin securing the cylinder to the mount bracket.

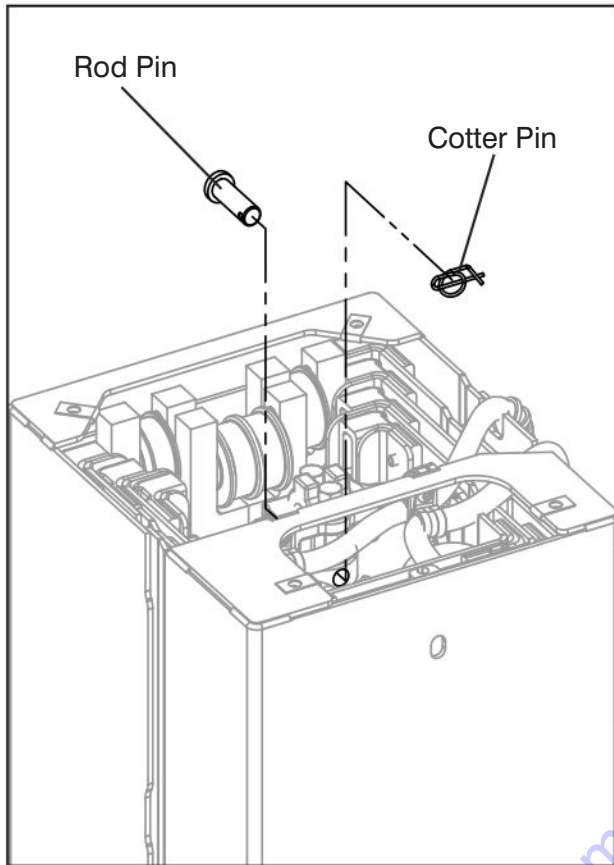


Figure 69 Rod Pin Removal



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to the cylinder mounting bracket on mast section 2 for a straight, even lift.

3. Lift the mast enough to reach the harness plug connectors at the base.

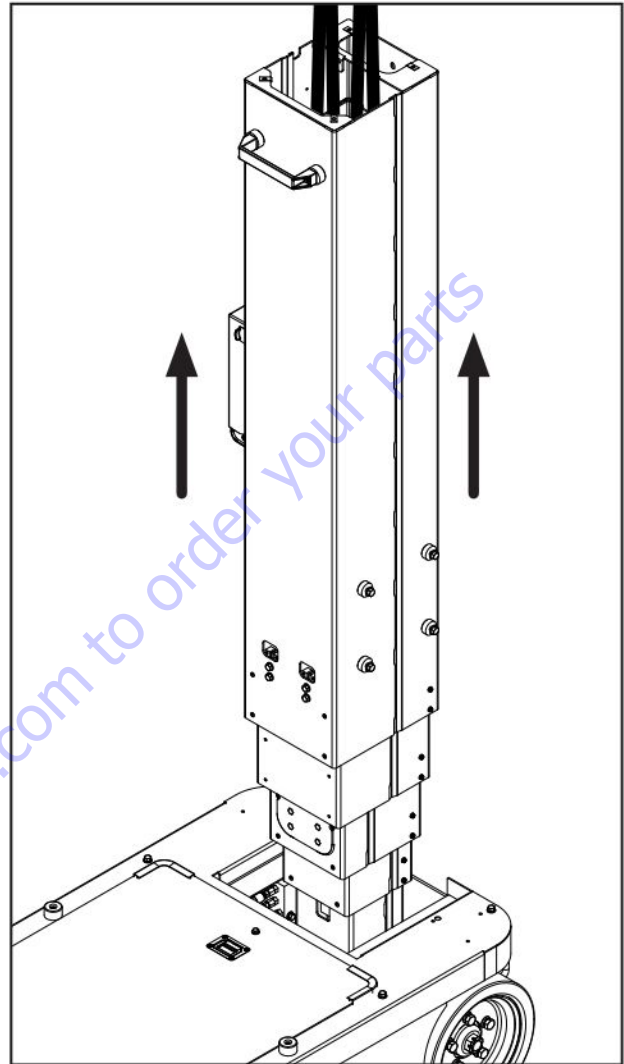


Figure 70 Mast Positioning

4. Turn the main power disconnect switch to the off position.

5. Disconnect the two harness plug connectors and the mast limit switch harness.
6. Remove all clamps securing the harnesses to the mast base.

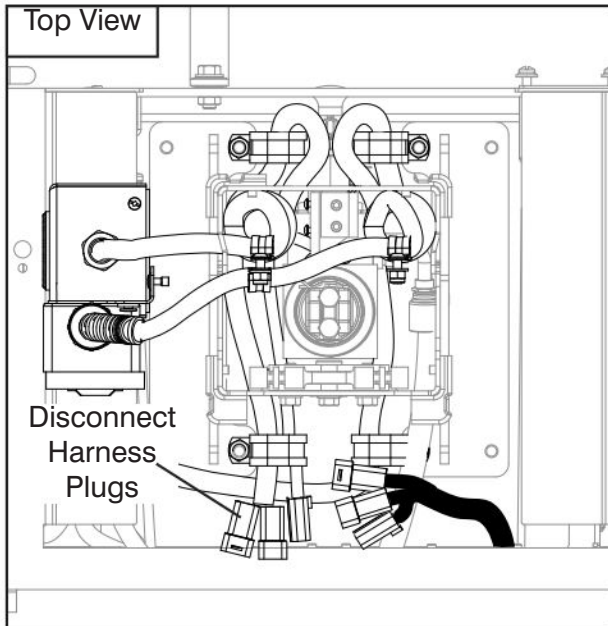


Figure 71 *Harness Disconnection*

7. Remove the rivets securing the power inlet at the base of the mast, then disconnect the wires and pull the harness through from the inside of the base so that it is clear. (ANSI/CSA Only)

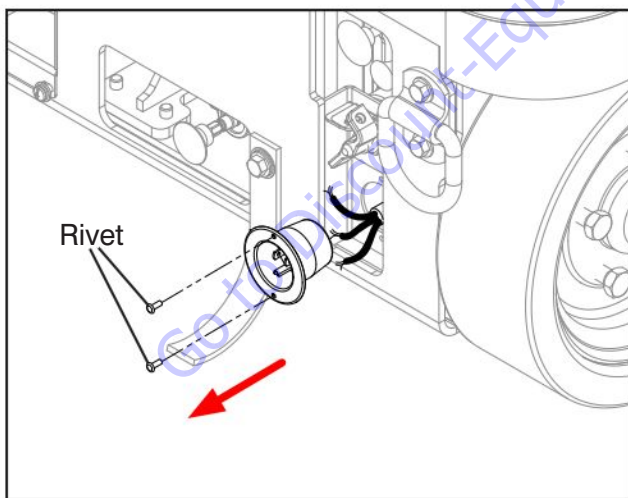


Figure 72 *Power Inlet Removal*

8. Lower the mast so that it is slightly supported by the lifting straps.

9. Remove all hardware securing the mast to the base as shown.

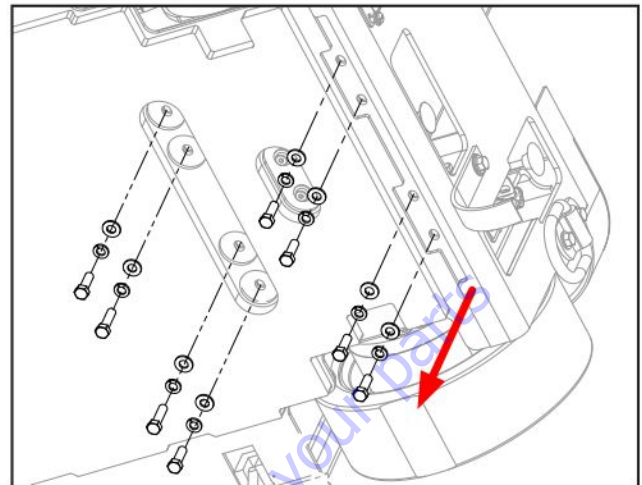


Figure 73 *Mast Hardware Removal*

10. Lift the mast assembly straight up and off the cylinder, ensuring the harnesses are clear. Set the mast aside.

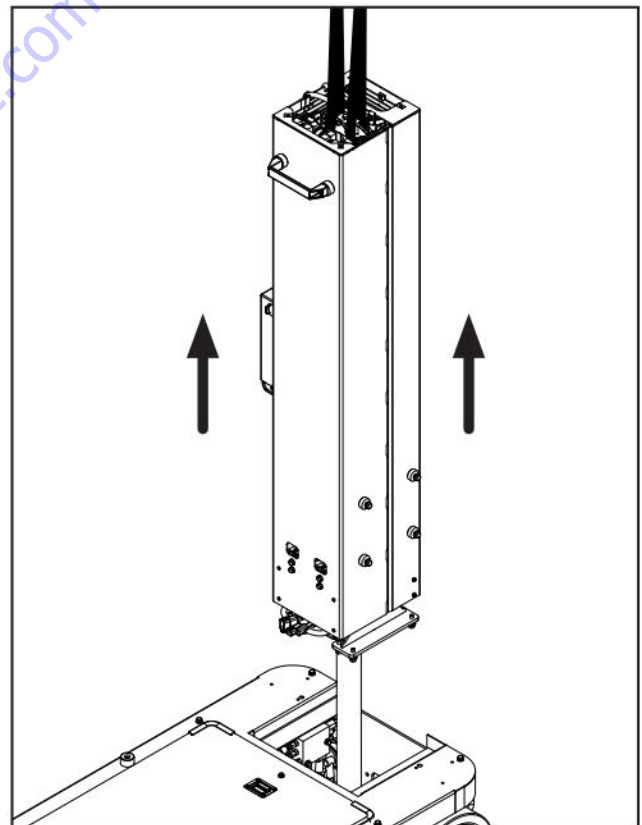


Figure 74 *Mast Removal*

5.14-3 Lift Cylinder Removal

1. Attach appropriate slings at the top of the cylinder to secure it.

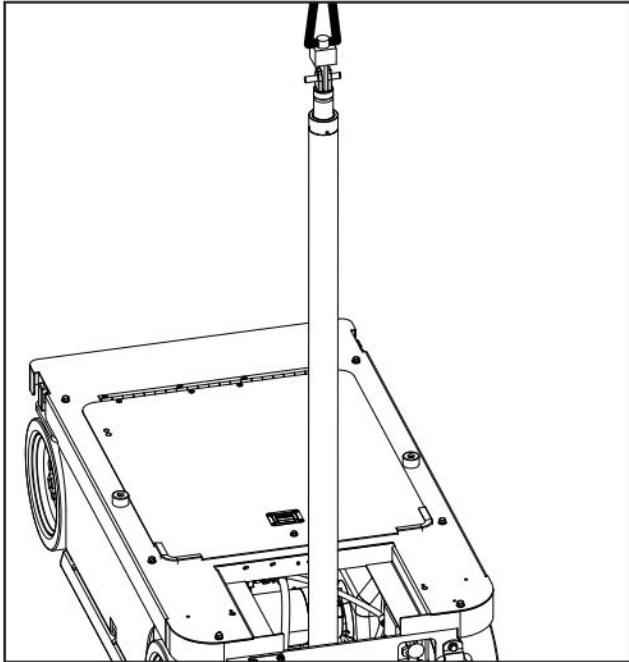


Figure 75 Cylinder Secured

2. Remove the 2 socket head screws and flat washers at the base of the cylinder.

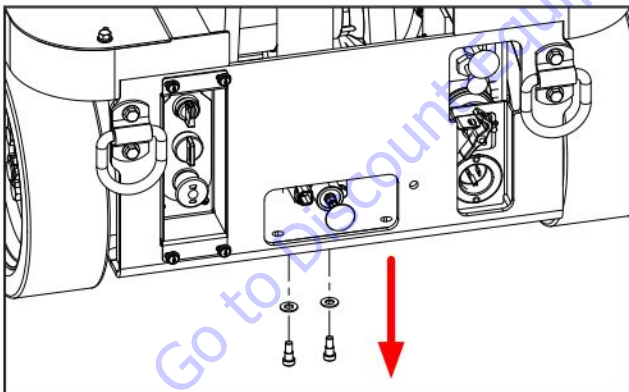


Figure 76 Cylinder Hardware

3. Carefully raise the cylinder approximately 4 in (10 cm). Make sure the valve at the base of the cylinder is clear.

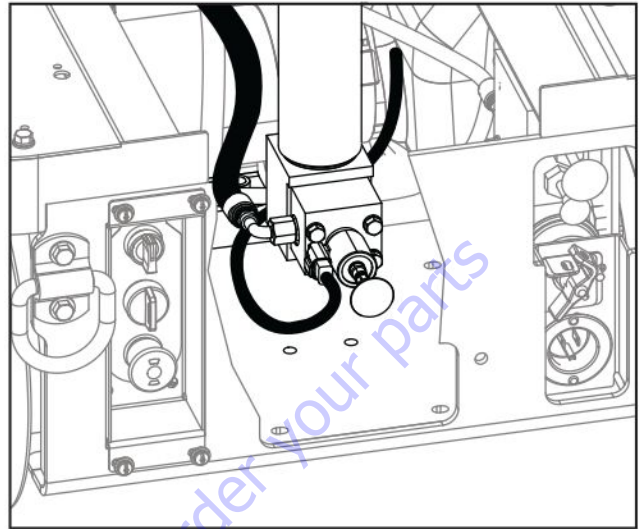


Figure 77 Cylinder Manifold

4. Place a suitable container underneath to catch any escaping oil. Disconnect the hydraulic hose at the base of the cylinder and the harness connected to the valve. Install caps on all fittings (hose and valve).

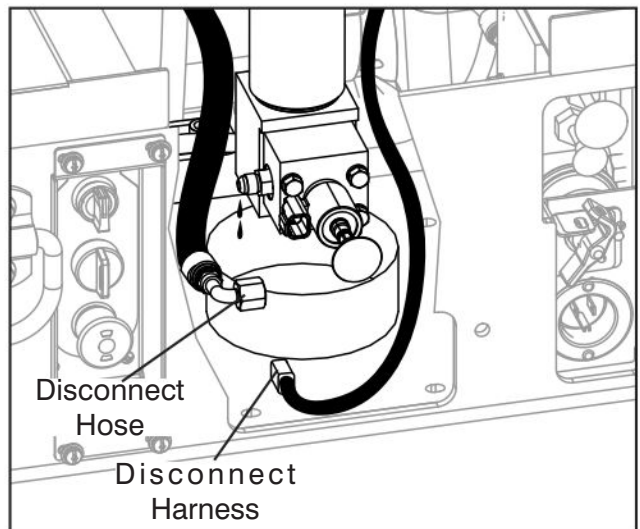


Figure 78 Manifold Hose and Harness Disconnection

5. Lift the cylinder carefully out of the base while ensuring the valve on the base of the cylinder is clear.

5.14-4 Lift Cylinder Installation

1. Attach appropriate slings at the top of the cylinder then carefully lift the cylinder over the base plate.

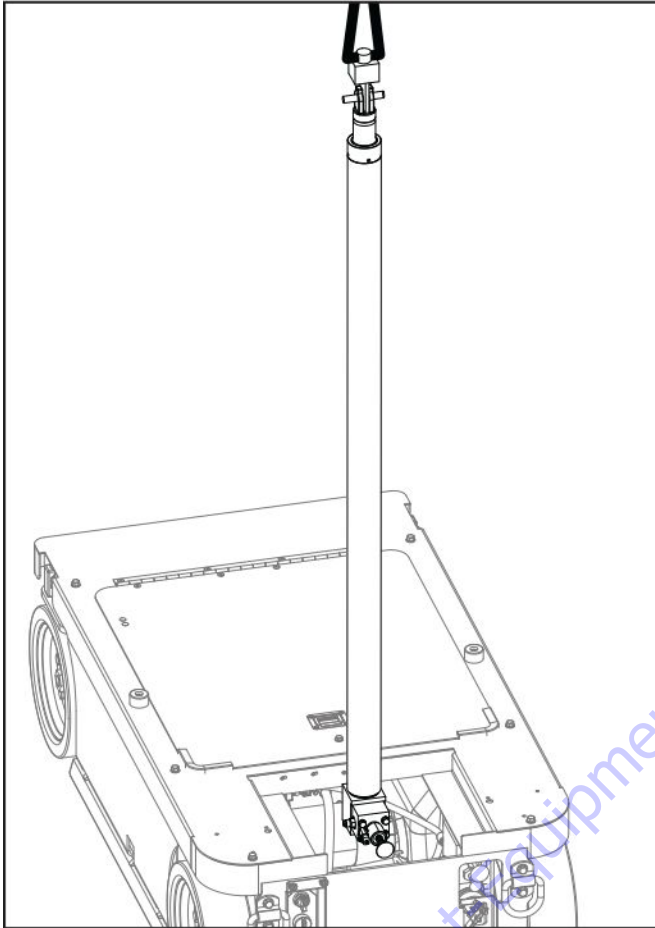


Figure 79 Cylinder Positioning

2. Lower the cylinder so there is a distance of approximately 4 in (10 cm) between the cylinder manifold and the base plate. Make sure the valve on the base of the cylinder is clear.

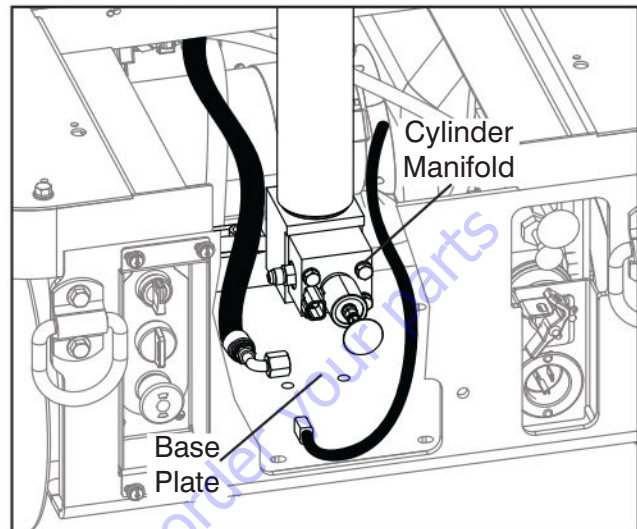


Figure 80 Cylinder Manifold

3. Connect the hydraulic hose to the cylinder manifold, then torque the hose fitting to 19 ft-lb (26 N·m).
4. Connect the harness plug to the valve coil.

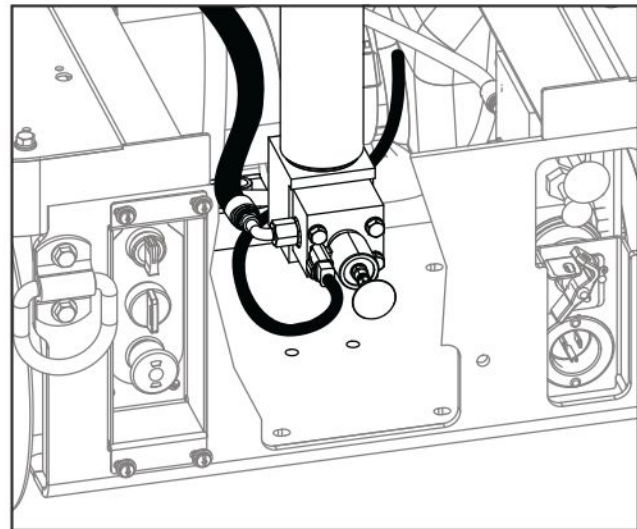


Figure 81 Manifold Hose and Harness Connection

5. Fully lower the cylinder in place. Apply loctite 242 (blue) to the threads of 2 socket head screws then install with flat washers at the base of the cylinder as shown. Torque to 18ft-lb (24.4 N·m).

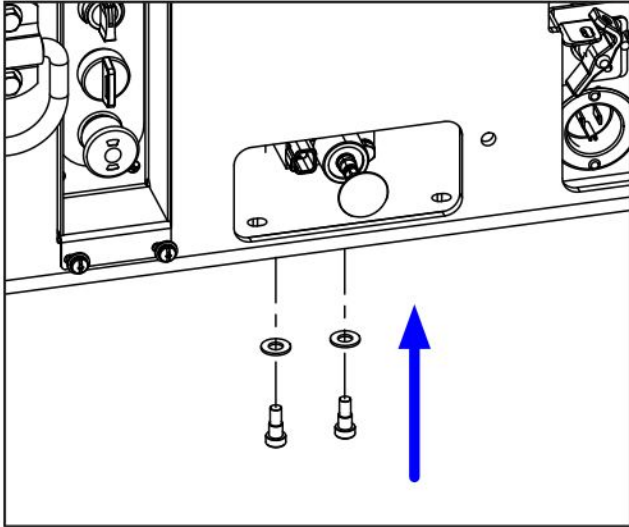


Figure 82 Cylinder Hardware Installation

5.14-5 Mast Assembly Installation



NOTE

It is recommended that 2 lifting straps (or similar) be attached evenly to the cylinder mounting bracket on mast section 2 for a straight, even lift.

1. Carefully lift the mast assembly over the lift cylinder and slowly lower the mast in place. Make sure the harnesses are clear while lowering the mast.

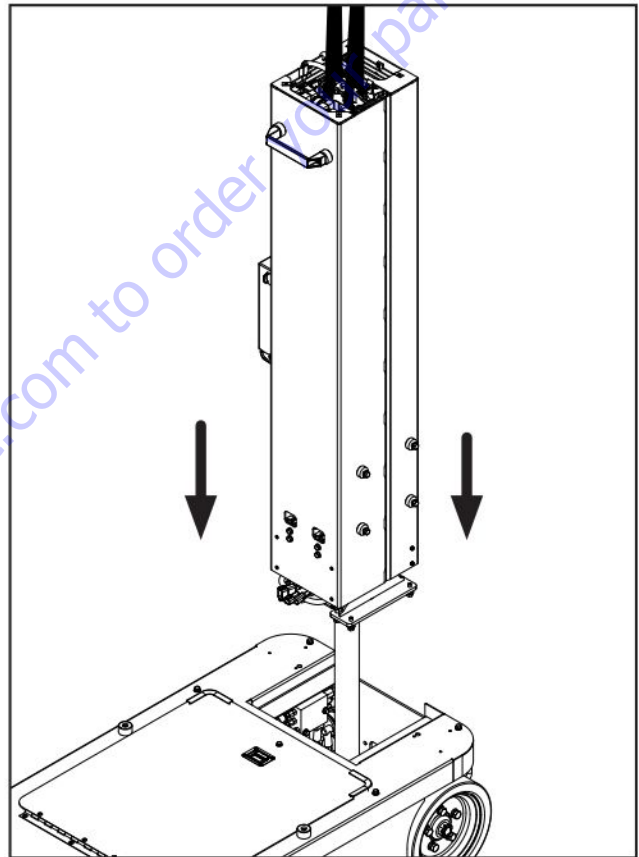


Figure 83 Mast Installation

2. Apply Loctite 242 (blue) to the threads and install the eight mounting bolts with the flat and the lock washers. Torque to 23 ft-lb (31 N·m).

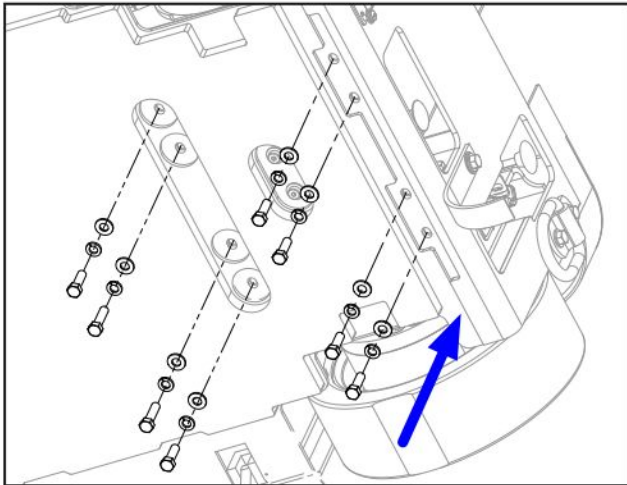


Figure 84 Mast Hardware Installation

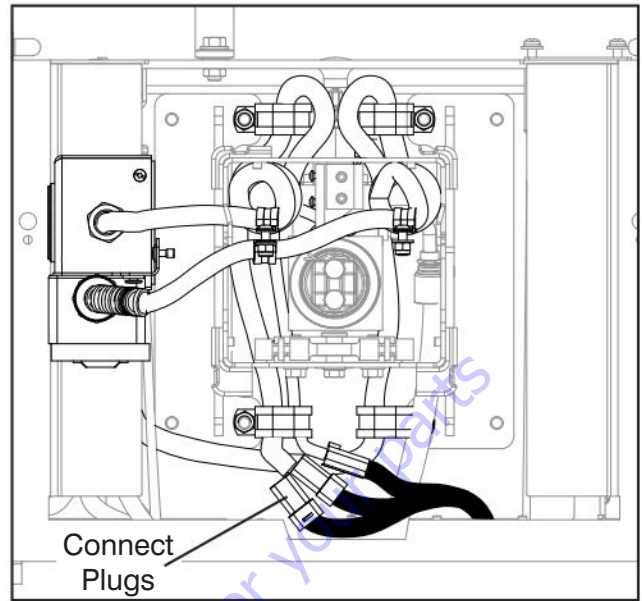


Figure 86 Mast Harness Connection

3. Lift the mast enough to connect the harness plug connectors at the base.

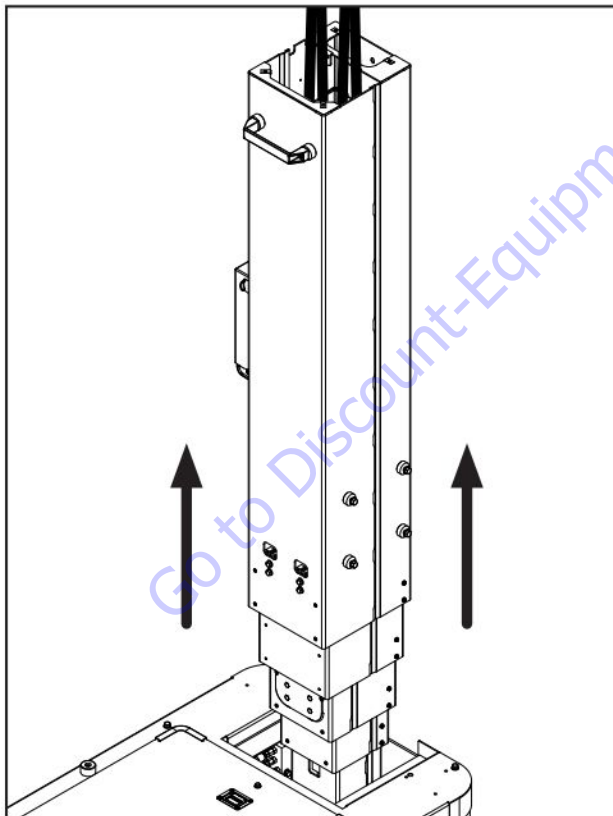


Figure 85 Mast Positioning

4. Connect the AC power supply harness to the power inlet at the base. Match the green wire to the green terminal, the black wire to the bronze terminal, and the white wire to the silver terminal. Install the socket with the ground pin down using a 1/16" rivet in each hole.

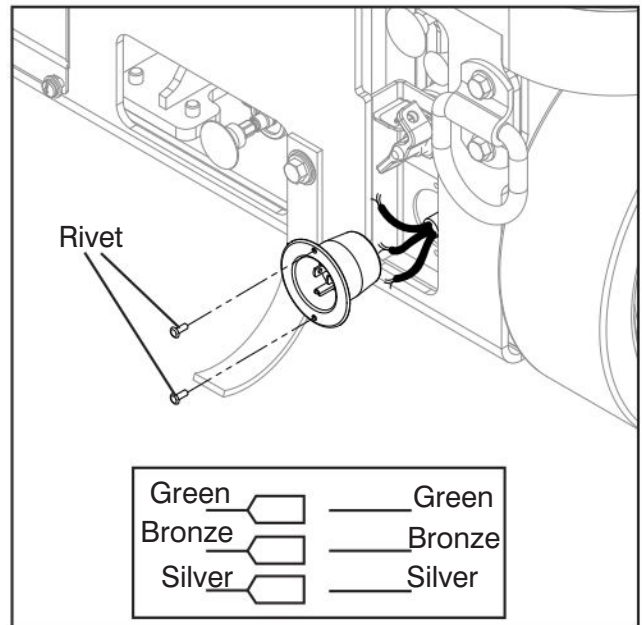


Figure 87 Power Inlet and Harness Installation

- Secure the mast control and AC power supply harnesses with the clamps and hardware at the base of the mast.

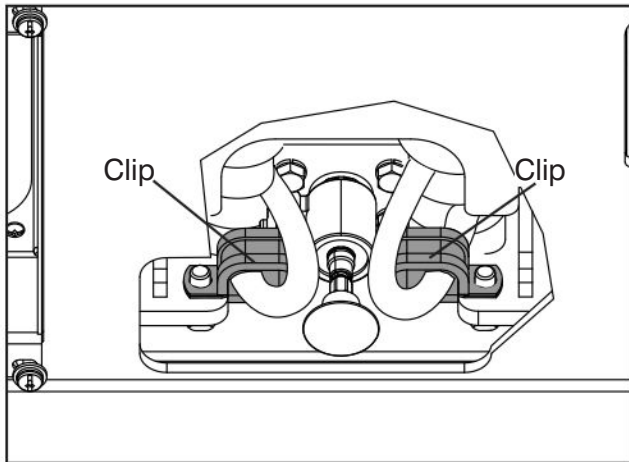


Figure 88 Mast Base Clamps Installation

- Fully lower the mast and remove the lifting straps.
- Secure the lift cylinder to the cylinder mount bracket on section 2 with the rod pin and cotter pin.

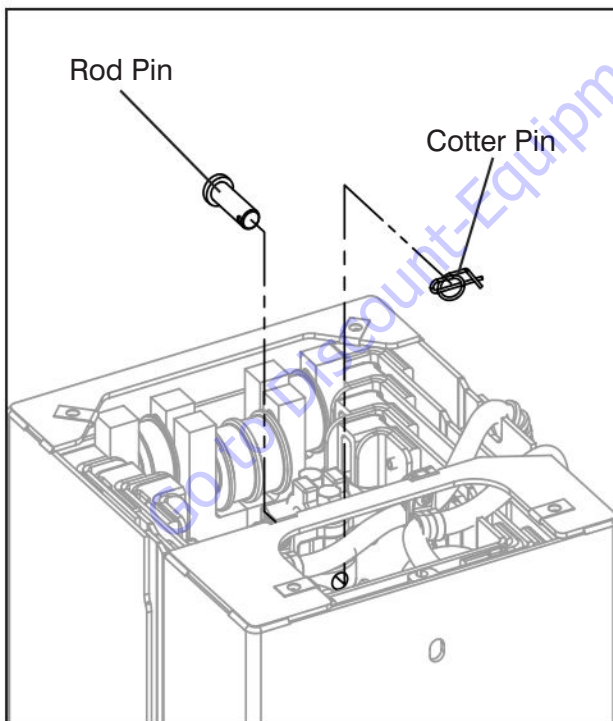


Figure 89 Rod Pin Installation

- Install the mast cover at the top.

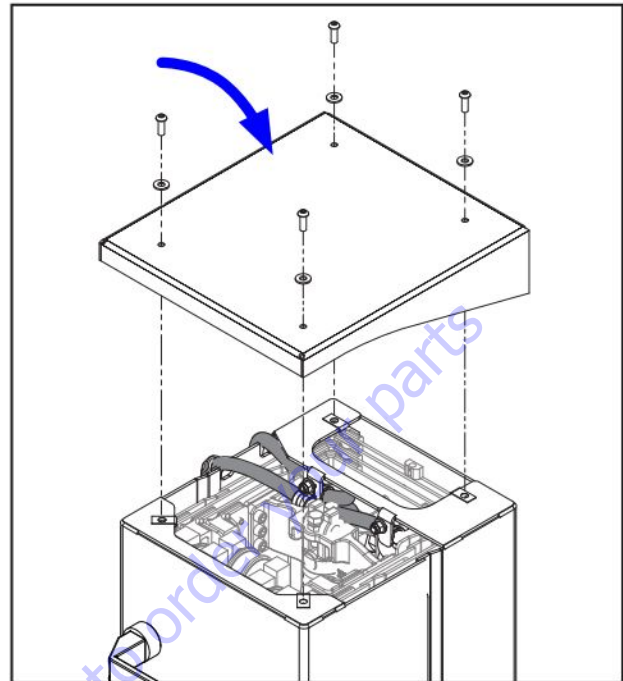


Figure 90 Mast Top Cover Installation

- Refer to [5.10-6 Extending Platform Installation](#) for platform installation.
- Perform a full function test as outlined in the operating manual.

5.15 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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