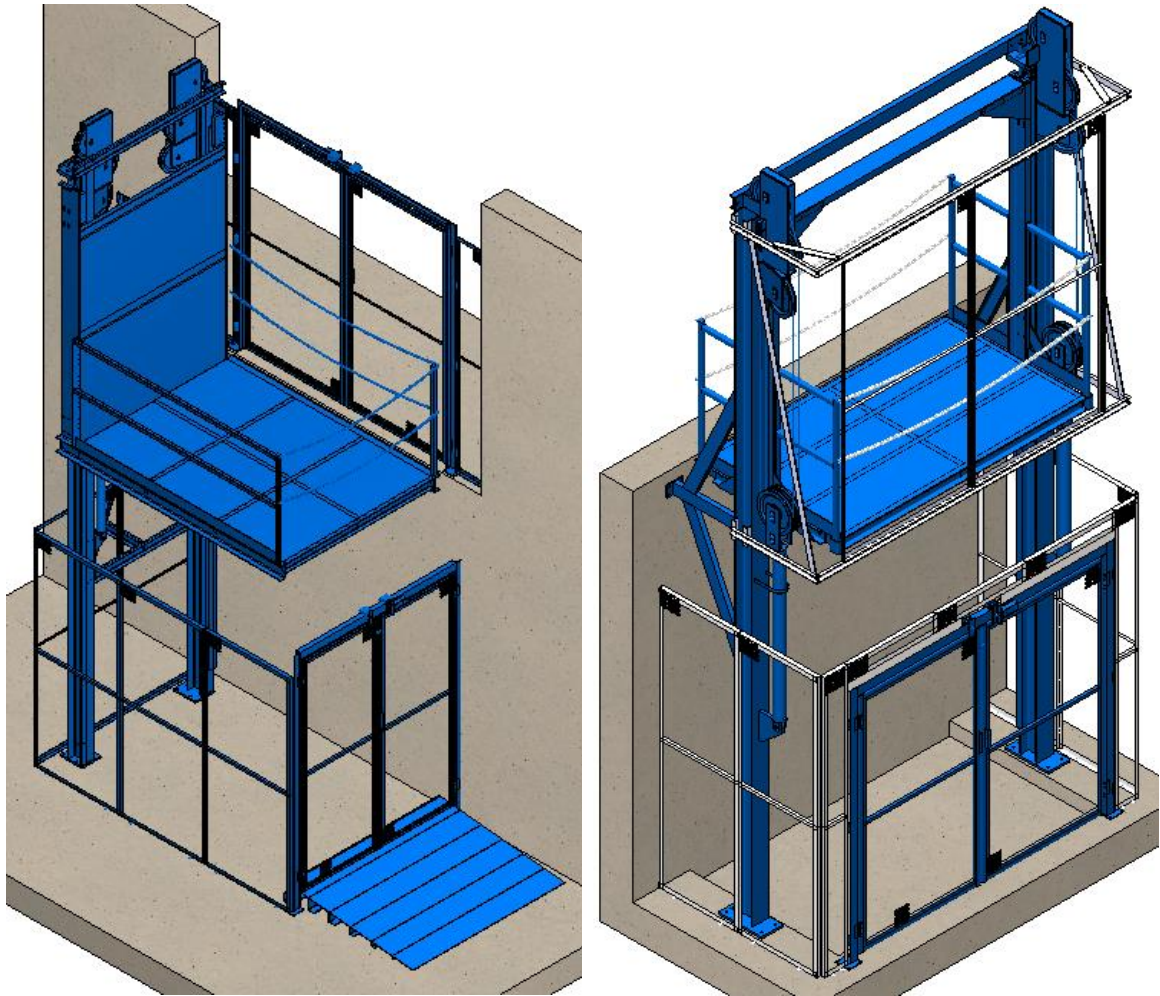


# VRC INSTALLATION, OPERATION AND SERVICE MANUAL

## Models – FHC & FHS



# Autoquip

Innovative Lift Solutions

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Item# 830FHC\_S

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# I. INTRODUCTION

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## **i** WARNING



Please read and understand this manual prior to installation or operation of this lift. Failure to do so could lead to property damage and/or serious personal injury.

## NOTICE

The control panel instructions are in the controller manual sent with the order. These are required for installation.

## I.1 Contact Information

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If you have any questions, contact a local representative, or use the Autoquip contact information below.



Autoquip Corporation  
1058 West Industrial Road  
Guthrie, OK 73044-1058



[aqservices@autoquip.com](mailto:aqservices@autoquip.com)  
[sales@autoquip.com](mailto:sales@autoquip.com)



888.811.9876  
405.282.5200



[\(FHC documentation\)](#)  
[\(FHS documentation\)](#)



## I.2 Code Requirements/Compliance

---

Vertical Reciprocating Conveyors (VRCs) are **NOT** elevators. This conveyor (lift) is designed for the transfer of material only from one level to another. Absolutely NO RIDERS! VRCs have their own national safety code (ANSI/ASME B20.1) and are specifically exempt from the National Elevator Code.

Some states require special components and have specific guidelines regarding how the equipment must be installed, inspected, and tested. The owner is ultimately responsible for understanding these requirements for the specific job location, and Autoquip will incorporate any special requirements into the order as requested and approved by the customer.

Note: Contact Autoquip ([see 1.1 Contact Information](#)) with any questions you may have concerning VRC code requirements.

## I.3 Important

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Autoquip Corporation has designed and manufactured the VRC to move materials safely and efficiently between multiple floors or levels. It has been built to provide many years of dependable service.

**OPERATORS** - Please read and understand this manual prior to operation of this VRC. Failure to do so could lead to property damage and/or serious personal injury.

Situations may arise which are not covered in this manual. If you have questions, please contact Autoquip Customer Service ([see 1.1 Contact Information](#)).

**NOTE: Unless otherwise stated, mechanical installation does not include unloading, permits, seismic calculations, or extensive acceptance testing. The requirements of each contract should be carefully reviewed for possible conflicts of interpretation.**

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## I.4 Identification

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When ordering parts or requesting information or service on this lift, PLEASE REFER TO THE SERIAL NUMBER. This information is on a nameplate attached to the control panel. Replacement parts are available from a local representative or Autoquip ([see 1.1 Contact Information](#)).

Please record the following information and refer to it when contacting your representative or Autoquip.

Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Installation Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## I.5 Inspection

---

### **NOTICE**

**The “Bill of Lading” will state the number of pieces shipped. TWO ITEMS MAY BE BANDED TOGETHER AND COUNT AS ONE PIECE.**

Upon receipt of the shipment, check for exposed damage or shortages and make note of it on the trucking company Bill of Lading or the Shipping Papers. Reports of concealed damage to items contained in crates must be reported within 48 hours. DO NOT destroy the crating while opening it to inspect the contents. If damage is suspected or found, report it directly to the carrier. DO NOT contact Autoquip Corporation!! **All shipments are FOB from the Autoquip plant. Any claims for damage must be filed with the carrier. Any parts shipped from Autoquip that are intended to replace damaged or lost items will be invoiced to the ordering party.**

Assuming no damage has occurred to the crate(s), check the components against the packing list. This will provide assurance that every item shipped has been received, report any shortages to Autoquip Corporation within 10 days. (Autoquip is not responsible for parts lost, stolen or damaged during transportation, storage, installation, or during any other circumstances that are beyond corporate control.)

## I.6 Modifications

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### **i WARNING**

**Do not modify lift. Autoquip cannot foresee and is not responsible for injury or damage which results from unauthorized modifications or misuse of lift.**

## 2. RESPONSIBILITY OF OWNERS/USERS

---

### 2.1 Inspection & Maintenance

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The lift shall be inspected and maintained in accordance with this manual and with other applicable safe operating practices.

### 2.2 Removal from Service

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Any lift not in safe operating condition such as, but not limited to, excessive leakage, missing parts or fasteners, any bent or cracked structural members, cut or frayed electric, hydraulic, or pneumatic lines, damaged or malfunctioning controls or safety devices, etc. shall be removed from service until it is repaired to the original manufacturer's standards.

### 2.3 Repairs

---

All repairs must be made by a qualified technician in conformance with Autoquip's instructions. ASME B20.1 defines a qualified person:

**Qualified person** - *a person who, by possession of a recognized degree or certificate of professional standing or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work.*

### 2.4 Operators

---

Only authorized personnel shall be permitted to operate lift.

**Authorized personnel** - *a trained or qualified person approved or assigned to perform a specific duty or duties.*

**Trained personnel** - *personnel who have been trained by a qualified person and have demonstrated the ability to perform a particular function on or around a VRC.*

### 2.5 Before Operation

---

Before using lift, operator shall:

- Read and/or had explained, and understood, manufacturer's operating instructions and safety rules.
- Inspect lift for proper operation and condition. Any suspect item must be carefully examined and a determination made by a qualified person as to whether it constitutes a hazard. All items not in conformance with Autoquip's specification must be corrected before operating lift.

### 2.6 During Operation

---

Use lift in accordance with this manual.

- Do not overload lift.
- Do not allow any portion of the load to overhang the perimeter of the platform.
- Verify all safety devices are operational and in place.

### 2.7 Modifications or Alterations

---

Modifications or alterations to this equipment may be made only with written permission of Autoquip. Unauthorized modification or alteration will void warranty.

# 3. SAFETY

## 3.1 Safety Signal Words

Before installing, operating or servicing lift, you must read, understand and follow the instructions and safety warnings in this manual. Your lift may not be equipped with some optional equipment shown in this manual.

The safety information in this manual is denoted by the safety alert symbol: **i**  
The level of risk is indicated by the following signal words.

### **i DANGER**

**DANGER** – Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

### **i WARNING**

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

### **i CAUTION**

**CAUTION** – Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

### **NOTICE**

**NOTICE** – Indicates a situation that could result in damage to the lift or other property.

The following alerts will be identified in this manual.

### **i DANGER**



- All maintenance procedures described in this section should only be performed by qualified service personnel.



- Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).
- Failure to properly adhere to lift blocking procedures is to risk the sudden and uncontrolled descent of the lift during maintenance or inspection. A falling lift can cause severe injury or death.
- Do not stand beneath the platform while setting the maintenance device into position.



- Check the stability of the supports. If there is any chance of the support tipping or otherwise not providing a safe and stable condition, do not go under the platform!
- Turn off the power and lock out the power at the primary power disconnect switch before service or maintenance per OSHA Lock-Out, Tag-Out procedures.



- Never operate unit when parts are broken or damaged! Do not operate this equipment when non-factory approved or damaged parts are in use! Contact local representative to rectify all such situations or contact Autoquip ([see 1.1 Contact Information](#)).



- DO NOT walk out onto the platform or attempt to physically free the jam until load is removed and mechanism is securely blocked with maintenance devices ([see 5 Blocking Instructions](#)).



## ! WARNING



- Please read and understand this manual prior to installation or operation of this lift. Failure to do so could lead to property damage and/or serious personal injury.
- Do not modify lift. Autoquip cannot foresee and is not responsible for injury or damage which results from unauthorized modifications or misuse of lift.
- Slack ropes require factory help! Do not attempt to repair slack wire rope conditions alone! Always contact the local representative or Autoquip ([see 1.1 Contact Information](#)).
- Never run the unit with the gates or doors open! Do not operate unit with doors open or with the interlocks “defeated” (bypassed)!
- Shaft way door barrier bars are not intended to be used as a primary means of personnel protection. It is the responsibility of the operator to ensure that all gate/door interlocks have been installed and are functioning properly. Serious injury or death could result if upper level gates/doors can be opened when the lift is not present at that level.
- To protect against death or serious injury, all labels must be on lift and must be legible.
- If any of these labels are missing or cannot be read, contact Autoquip for replacement labels ([see 1.1 Contact Information](#)).
- Improperly or inadequately supported beams could fall and cause serious injury to adjacent personnel or permanent damage to the equipment.
- Do not depend on the platform uprights and wheel blocks to support the beam! Use other means to support and secure the beams in the raised position during installation and prior to final bracing.
- Do not weld on the guide flanges of the masts! Interfering with the free travel of the wheel guides could cause permanent damage to the lift and prevent safety devices from operating as intended.
- Spilled hydraulic fluid is slippery and may also present a fire hazard. Clean up spilled hydraulic fluid.
- Use properly rated hoses only! Never use fittings or hoses that are not properly rated for the intended use.
- Do not over travel! Mechanical stops must be in place to prevent the platform from over traveling. Over-traveling can cause permanent damage to the platform or failure of the lifting cylinders.
- Never operate the lift by “manual-ing” the electrical controls (using the contactors located inside the control panel). All safety devices are by-passed in this mode of operation and lift damage or severe personal injury could occur.
- Ensure one “WARNING – Do Not Tamper” label is adjacent to (within 6-12 inches) each sensing device (limit switches, door status switches, door interlocks, etc.) in a location that is visible to the operator.
- GUARDS, INTERLOCKS, SAFETY DEVICES and ELECTRICAL CIRCUIT must be restored to correct operation when installing parts or making adjustments or repairs.
- Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids during maintenance and/or repair of the lift which may result in severe injury or death. Assume that all hydraulic hoses and components are pressurized.
- Wear personal protective equipment, such as gloves and safety glasses, whenever installing, servicing, or checking a hydraulic system.
- Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.
- Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin even through gloves. Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.
- Ingesting hydraulic fluid is toxic and hazardous to people and wildlife. Symptoms may be skin irritation, weakness in the hands, intestinal bleeding, pneumonia, or death. Seek first aid immediately. Dispose of spilled fluids appropriately.
- No riders! The VRC is provided for the sole purpose of transporting goods between floor elevations. At no time should it be used to transport personnel.
- Before operating VRC, all personnel interacting with lift must read, understand and follow instructions and safety warnings in this manual.
- Close all gates when not in use. Never leave the VRC unattended with gates left open.





- Do not use a swivel fitting between velocity fuse and cylinder. If installed improperly, it will not lock up in the event of a hydraulic line failure.
- Velocity fuse is not repairable. Replace velocity fuse if defective.

## i CAUTION

- Never use concrete anchor bolts on a cinderblock or brick wall! The wall will not withstand the pull force developed by the lift. Use only recommended anchoring and bracing methods illustrated in this manual. Equipment damage or personal injury could result.
- Purge air in the system! The presence of air in the system can lead to a lock-up of the velocity fuses. (Air reacts like a spring when it is compressed.)
- Do not operate the VRC until the platform is leveled and the guide beams are plumbed and secure.
- The pressure switch is not functional with temporary power! The power unit will continue to run as long as the contact button is pressed. Permanent damage to the lift may result if power to the electric motor is not shut off once the platform makes contact with the stop bolts.
- Take extreme caution when running the unit before mechanical stops are installed and adjusted properly! Lift over-travel can cause severe damage
- Do not operate motor at relief pressure! The motor should not be operated for more than a few seconds when the unit is operating at relief pressure. Longer running times could result in damage to the pump.
- Do not operate motor without cover reinstalled on relief valve.
- Do not operate the VRC until all sensing switches have been confirmed to be installed and adjusted correctly.
- Do not use Teflon tape. Tape fragments can cause malfunctioning of the hydraulic system. Loctite PST #567 pipe thread sealant or equivalent is recommended.

## NOTICE

- The control panel instructions are in the controller manual sent with the order. These are required for installation.
- The “Bill of Lading” will state the number of pieces shipped. **TWO ITEMS MAY BE BANDED TOGETHER AND COUNT AS ONE PIECE.**
- In order for the lift to operate:
  - All gates/doors guarding the lift must be closed.
  - Loads cannot hang over the edge or sides of the platform.
  - The load must be within the specified load capacity of the lift.
  - All electrical safeties, sensors, and switches must be in their “normal” condition.
- Per ASME B20.1, operator pushbutton stations must be located such that they cannot be activated while standing on the platform.
- Always find out why the E-Stop button may have been pressed, and be sure to correct the problem (malfunction, interference, etc.) before making the lift operational again.
- Autoquip recommends replacing any NPT fittings that have been disassembled due to their inherent design for sealing.
- Use approved fluids only. Use of unauthorized fluids may cause damage to seals and hosing.
- Make sure the top cylinder rod bolt is re-installed.

## 3.2 Safety Features

---

There are several active safety features and devices to help protect personnel, property, and the equipment.

### **Mechanical Locking Safety Cams**

Each wire rope is terminated at the platform in a clevis, which is attached to a tension spring loaded steel safety cam. This safety cam pivots on a high strength steel pin which is chrome plated. The safety cam has serrated teeth cut into one of its faces that are adjacent to the guideway flange.

Should the wire rope become slack for any reason, the spring tension would cause the serrated teeth of the safety cam to engage the guideway. The teeth bite into the guideway and a wedging effect takes place between the safety cam and the guideway. The result is a positive halt to downward movement.

The only way to release the safety cam is to correct the malfunction that caused the slack rope and exert upward tension on the rope through the hydraulic cylinder and cable sheaves. Either of the two cams will support the loaded platform at any point in the vertical travel.

### **i WARNING**

**Slack ropes require factory help! Do not attempt to repair slack wire rope conditions alone! Always contact the local representative or Autoquip ([see 1.1 Contact Information](#)).**

### **Zero-Drift Feature**

A zero-drift feature has been incorporated into the VRC. The zero drift uses a limit switch mounted at the upper level and the pressure switch circuit. The limit switch is tripped closed when the platform is at the upper level. The electrical circuit energizes if the pressure switch closes due to a pressure drop or leak. The motor will start and build pressure until the pressure switch shuts the motor off. This keeps the platform from drifting downward from the upper level. When the operator closes all gates and energizes the down pushbutton, the zero-drift circuit is disabled and the platform will lower.

### **Hydraulic Velocity Fuses**

Each hydraulic cylinder has a hydraulic velocity fuse (HVF) installed in the cylinder port. These HVFs are installed at a predetermined flow velocity as the oil returns to the reservoir. They do not affect incoming oil. Should a catastrophic rupture or breach occur in the hydraulic system, and oil flows through the breach that exceeds the HVF rating, the HVF will trigger and lock up. This lock up will occur within 1-2in of downward movement of the platform.

**NOTE: Air in the system will also cause a lock up. Air acts like a spring when compressed. To remove air from the system, ([see 7.3.4 Bleeding Air from System](#)).**

**NOTE: Small fitting leaks will not trigger the HVFs. In an air-free system, the breach must be large enough to cause an uncontrolled or destructive lowering speed. Should a triggering and lockup occur, it can only be released by applying upward hydraulic flow in a functional system.**

### **Safety Release Bypass Valve (SRBV)**

The SRBV is a part of the hydraulic system. Should the system pressure exceed the predetermined pressure setting, the SRBV will bypass the pump output back to the oil reservoir. The SRBV is factory set to the proper pressure, which will prevent damage to the mechanical, hydraulic, and electrical systems due to overloading, obstruction, or other circumstances. This setting should be tested once installation is complete (see Installation section).

### **Power Supply Secondary Circuit Breaker**

This circuit breaker is down stream of the power supply and protects the 24 volt DC control circuit from damage should a fault occur which would result in excessive electric current flow. Should the circuit breaker trip it will prevent operation and the interlock circuit will not operate. These circuit breakers are in the control enclosure.

### **Motor Overload Relays (MOR)**

These are current sensing devices that are in line with the three legs of the electric motor primary power circuit (208, 230, or 460 volt). They protect the motor from excessive current draw and overheating if it becomes overloaded or has a short circuit. Should an over-current situation be detected on any leg the MOR will trip and open the path to ground for the contactor coil via an auxiliary contact.

### **Safety Interlocks/Latches-Gates or Doors (where applicable)**

These are electro/mechanical devices that prevent operation of the VRC when the gates or doors are left open on any level. They also prevent the gates or doors from being opened at any level unless the platform is in place at that floor level.

#### **i WARNING**

**Never run the unit with the gates or doors open! Do not operate unit with doors open or with the interlocks “defeated” (bypassed)!**

### **Shaft Way Door Barrier Bars (where applicable)**

Shaft way door barrier bars are designed to provide a secondary means of personnel protection at the upper level landing of a VRC shaft way installation. When the platform is not present at the upper level, the two barrier bars rest in permanent brackets attached to both sides of the door frame on the outside (shaft side) of the upper level door. The barrier bars form rigid barriers at approximately 24 inches and 48 inches above floor level. In the unlikely event that the upper level door is able to be opened when the platform is not at the upper landing, the bars provide an additional means of personnel protection against stepping or backing into the shaft way where the platform could be assumed to be present.

When properly installed, the barrier bars are lifted along their tracks by the platform as it approaches the upper landing until it is completely above the load height as the lift stops. As the lift moves to the lower level, it carries the bars back to their stationary brackets attached to the outside of the door.

#### **i WARNING**

**Shaft way door barrier bars are not intended to be used as a primary means of personnel protection. It is the responsibility of the operator to ensure that all gate/door interlocks have been installed and are functioning properly. Serious injury or death could result if upper level gates/doors can be opened when the lift is not present at that level.**

### **Personnel Guards**

Depending on the application, one or more of the following personnel protection features is included in the design of this equipment (**different states may vary on the exact design and orientation of these features – It is important to become familiar with the specific code requirements of your state**):

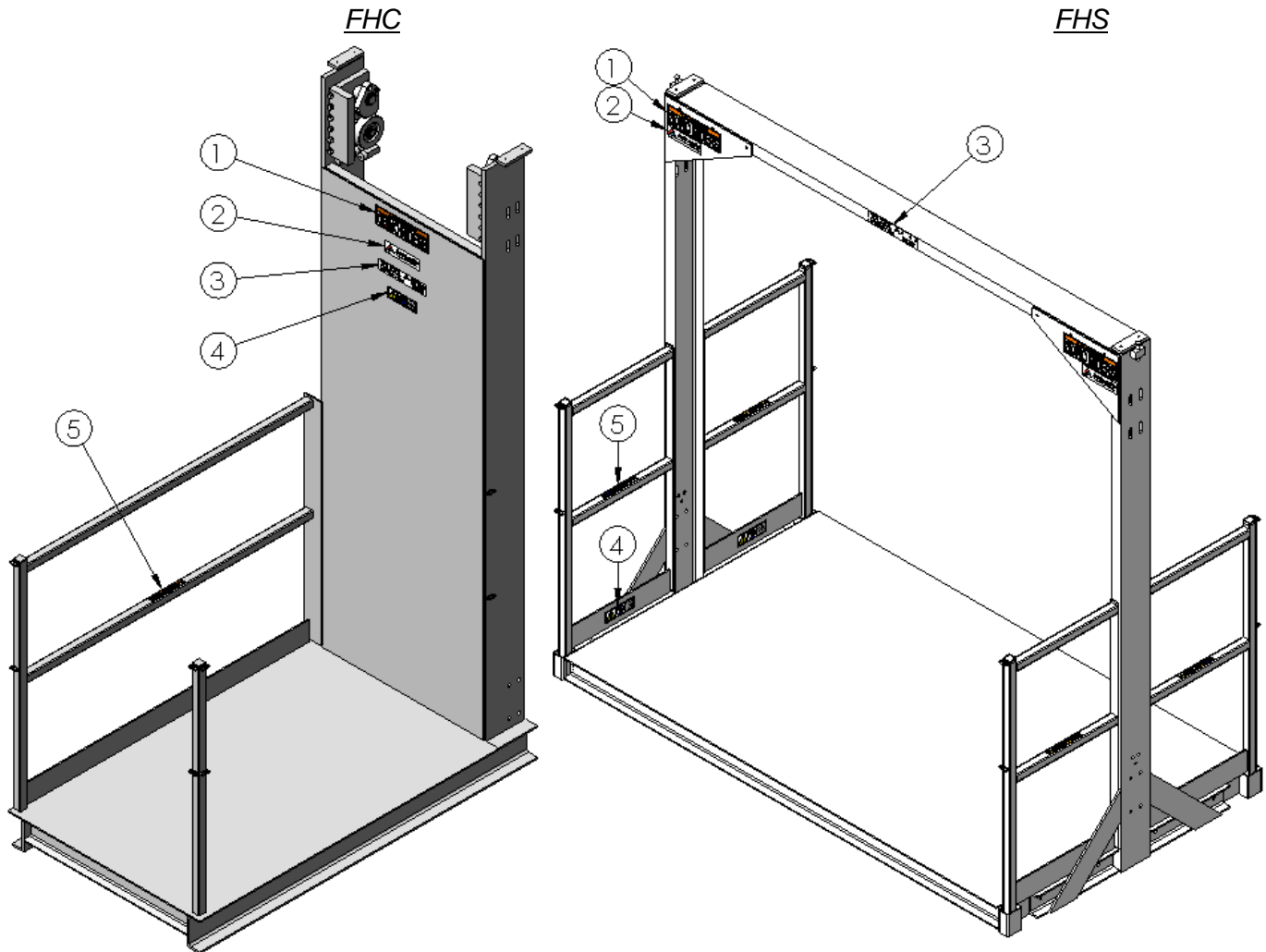
- **GATES & ENCLOSURES:** Required per ASME B20.1 to protect personnel from inadvertent physical contact with a moving lift & moving load at all lift landings.
- **PLATFORM RAILINGS & SNAP CHAINS:** Required per ASME B20.1 to protect personnel whenever personnel walk onto the lift platform when in the raised position. Railings or side guards protect non-operating sides, snap chains protect operating sides.
- **PLATFORM BACK-STOP PANELS:** Additional safety feature required at all upper levels to provide additional fixed guarding 2 inch (max.) away from & across all unused, operating sides of the lift (typical with non-shaft way, 'Z', & 90-degree load patterns).

### 3.3 Safety Labels

#### **i** WARNING

To protect against death or serious injury, all labels must be on lift and must be legible.

If any of these labels are missing or cannot be read, contact Autoquip for replacement labels ([see 1.1 Contact Information](#)).



**FHC/S labels (platform)**

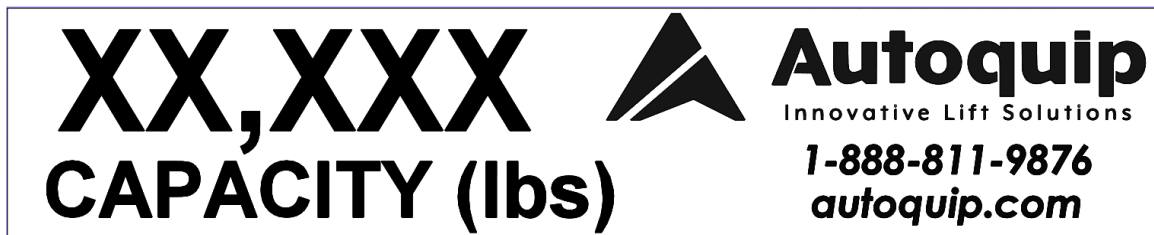
Item #	Qty.	Description	Part No.
1	1 / 4	Warning – No Riders	36404093
2	1 / 4	Autoquip Logo Label	36403220
3	1 / 4	Capacity	DECAL_CAPACITY
4	1 / 2	Caution – Familiarize Yourself . . .	36401487
5	1/rail	Warning: Platform Personnel Guarding	36403720



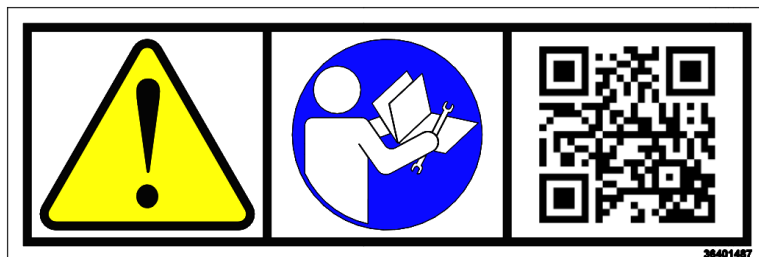
1 – 36404093



2 – 36403220



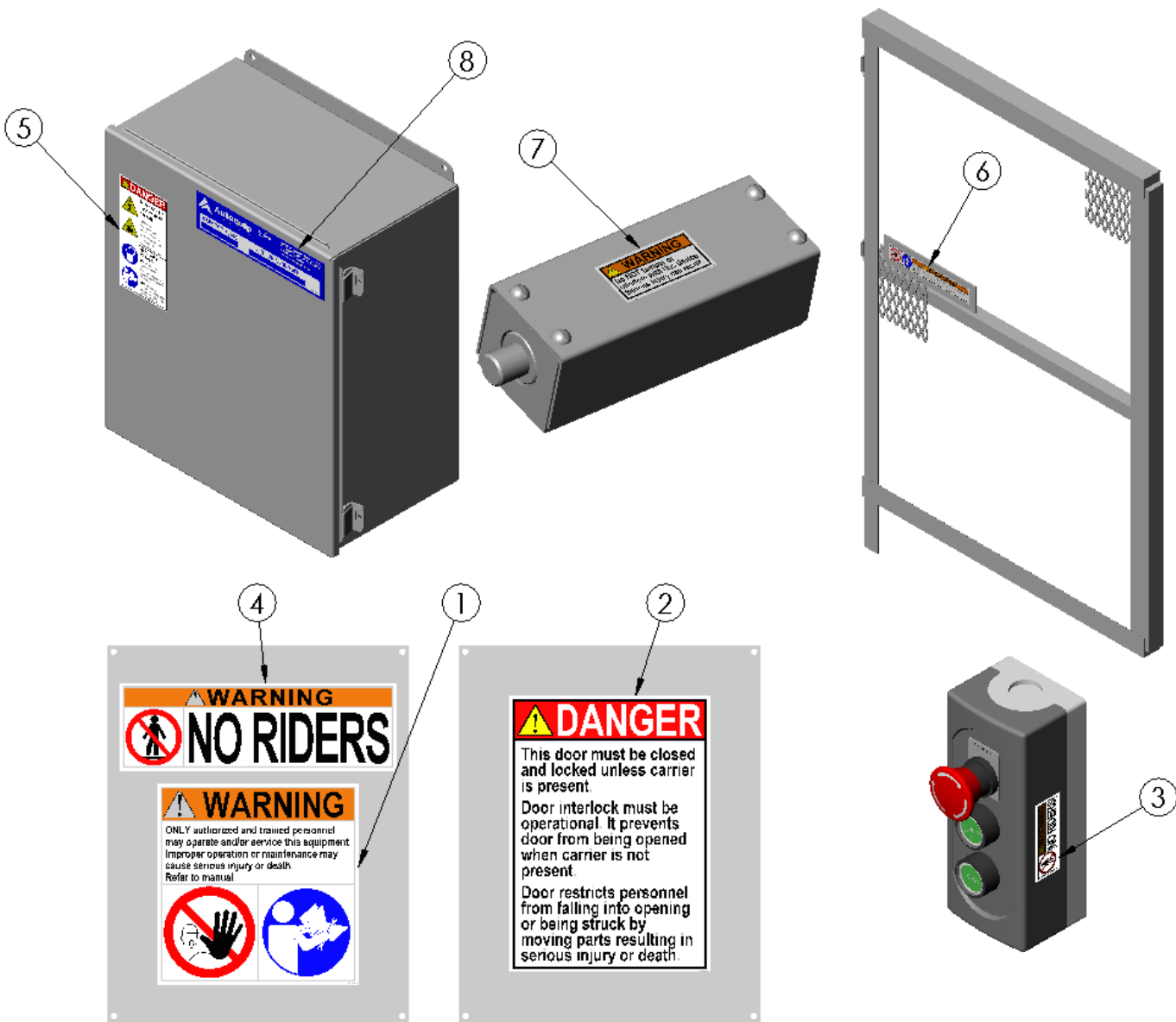
3 – DECAL\_CAPACITY



4 – 36401487



5 – 36403720



### FHC/S labels (other locations)

Item #	Qty	Description	Part #
1	1	WARNING, ONLY AUTHORIZED AND TRAINED....	36405670
2	1	DANGER, THIS DOOR MUST BE CLOSED....	36405680
3	1	WARNING, NO RIDERS	36405705
4	1	WARNING, NO RIDERS	36404093
5	1	DANGER, ARC FLASH, SHOCK	36430303
6	1	WARNING, DO NOT OPERATE W/O PLATFORM....	36403720
7	1	WARNING, DO NOT TAMPER w/ THIS SAFETY DEVICE	36405695
8	1	AUTOQUIP SERIAL NUMBER NAME PLATE	36401570

**WARNING**

ONLY authorized and trained personnel may operate and/or service this equipment. Improper operation or maintenance may cause serious injury or death. Refer to manual.




1 - 36405670

**DANGER**

This door must be closed and locked unless carrier is present.

Door interlock must be operational. It prevents door from being opened when carrier is not present.

Door restricts personnel from falling into opening or being struck by moving parts resulting in serious injury or death.

2 - 36405680



**WARNING**

**NO RIDERS**



3 - 36405705


**DANGER**


Shock and arc flash explosion hazards.

Follow ALL requirements in NFPA 70E for safe work practices and for Personal Protective Equipment.

**Hazardous Voltage.**



Will cause severe injury or death.



Turn off and lock out system power before servicing.

DO NOT operate machine with electrical panel doors opened or covers removed.

5 - 36430303

**WARNING**

**NO RIDERS**



4 - 36404093

**WARNING**




Do NOT operate without personnel guarding. Serious injury or death could occur.

6 - 36403720

**WARNING**

Do NOT tamper or interfere with this device. Serious injury can result.

7 - 36405695

**Autoquip** innovative Lift Solutions

A SUBSIDIARY OF **MINER**

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GUTHRIE, OK 73044-1058  
1-888-811-9876  
www.autoquip.com

**CAPACITY (LBS)** **LIFT SERIAL NUMBER**

36401870

8 - 36401570



## 4. INSTALLATION

---

### NOTICE

**The control panel instructions are in the controller manual sent with the order. These are required for installation.**

Proper installation of Vertical Reciprocating Conveyors (VRCs) is vital to the safety of the operators, the efficiency of the unit, and the ultimate satisfaction of the end user. These guidelines have been prepared by member companies of the Material Handling Industry's VRC Subcommittee to assist the VRC installers in understanding their role and responsibility in providing customers with a safe and reliable VRC.

### 4.1 Pre-installation Activity

---

1. Whenever possible, make a pre-installation visit or contact someone at the site. Installers must be familiar with everything relative to proper installation of this equipment. It is the installer's responsibility to check the site for problems and work out solutions with the appropriate people – preferably before installation begins.
2. Check floor-to-floor dimensions on the general arrangement drawings to make sure that they match on-site conditions. VRC's are designed and built to individual applications and specific customer requirements. It is difficult and expensive to modify the lift after it arrives for installation.
3. Installation may or may not include unloading, permits, seismic calculations, or extensive acceptance testing. The requirements of each contract should be carefully reviewed for possible conflicts of interpretation.
4. Each state, county, or municipality may have unique codes governing the installation and acceptance of VRC's. Acquaint yourself with the permitting and/or licensing requirements (and expenses) of the local regulatory agencies.

Note: some agencies may require inspection or testing before and/or after lift start-up. Contact Autoquip ([see 1.1 Contact Information](#)) with any questions you may have concerning VRC code requirements.

5. Make sure there is adequate ingress/egress to the installation site. Verify that the equipment can get through the existing doorways, halls, and shaft openings. Think through how the lift will be unloaded, carted/moved, raised into position, and accessed for installation, operation & maintenance.
6. Verify the construction and integrity of building columns, joists, walls, or mezzanines that will be used to help support the VRC mast guide beams.

### 4.2 Shipment and Initial Inspection

---

1. Upon receipt of the shipment, check for exposed damage or shortages and make note of it on receiving paperwork from the trucking company, any claims for damage must be filed with the carrier. Unless otherwise stated, the VRC Manufacturer is not responsible for parts lost, stolen or damaged during transportation, storage, or installation.
2. Assuming no damage has occurred to the crate, check the components against the packing list. This will help ensure that every item shipped has been received.

3. Make sure you have a copy of the latest version of the general arrangement and electrical drawings before beginning installation, changes could have been made since original purchase order submittal and order entry.
4. Read and understand this manual thoroughly prior to starting the installation.

### **4.3 Equipment Layout**

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1. Make sure pit and/or lift are properly squared and vertically aligned with upper landings to ensure that the platform will clear the upper landings by the required distance.
2. Be sure to take into consideration any other obstructions (pipes, ductwork, ceiling joists/beams, etc.) that may be located around the lift.
3. Inspect the installation for any overhanging floor landing or other obstruction (pipes, ductwork, ceiling joists/beams, etc.) which could potentially jam a load that is slightly overhanging the platform deck as it raises to the next floor level. Any potential jam point should have some type of slanted or beveled guarding placed beneath the obstruction to push the overhanging load back onto the platform.

### **4.4 Structural Installation**

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1. Follow the bracing recommendations shown on the general arrangement drawings and in the installation & Service manual. Site conditions may also require customization to standard anchoring and bracing. The installers are ultimately responsible for the proper and safe anchoring and bracing of the equipment and should consult the manufacturer if there is any doubt as to the structural integrity of the installation.
2. When anchoring guide beams to walls, you must be sure that the walls can support the reaction loads imparted on them.
3. If spliced masts are provided, be sure to assemble and field install them exactly to the Manufacturer's recommendations. Failure to do so will reduce the safety and performance of the VRC. See Installation Section for acceptable limits.
4. Make sure guide beam pairs are plumb, parallel, and straight after you are finished with all welding. See Installation Section for acceptable limits.
5. Do not modify any component of the lift without expressed written consent from the Manufacturer.

### **4.5 Personnel & Equipment Safeties**

---

1. ASME B20.1 requires that all VRC installations be completely guarded to prevent injury from inadvertent contact with the lift or its load. ASME also requires that doors or gates at all unloading stations be interlocked so that these doors can only be opened when the lift platform is stopped at that level & that the platform is incapable of being operated or moved so long as these doors or gates remain open. It is the responsibility of the installer to ensure that the installation meet these requirements, regardless of who (manufacturer, customer, architect, general contractor, etc.) provides the doors/gates and means of enclosure. Consult Autoquip whenever there is a question as to whether the gate & enclosure installation meets ASME B20.1.
2. Where the application requires personnel to walk onto the platform in the raised position, the installer must ensure that the platform is adequately provided with railings, guards, and snap chains that are a minimum of 42 inch high.
3. Travel limit switches must be installed and working properly.

## 4.6 Testing

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1. Test up and down speeds.
2. Test all electrical switches and sensors, gate interlocks, gate status switches, and any other safety features or devices as described in the Installation section of this manual. Also consult any manuals which may have been shipped separately for the gate installation & operation.
3. Some states or municipalities may require testing of the platform free-fall arrest system (locking cams) – consult the local regulatory agency or the manufacturer.

## 4.7 Clean-up & Hand-off

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1. Conduct a final inspection of the lift installation using the Installation Checklist in the Appendix of this manual. Correct any deficiencies before clean-up & hand-off.
2. Apply proper signage to all locations of the installation per the guidelines in the Label Identification section and per any instructions shipped separately with the gate interlock kits. Contact Autoquip ([see 1.1 Contact Information](#)) if labels appear to be missing or damaged.
3. Clean up any spilled oil from the area.
4. Train key personnel on the operation of the system and all safety features and procedures by referencing the corresponding sections in this manual.

## 4.8 Tools Required

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Listed below are some of the tools needed to install the VRC in a professional and prompt manner. Individual site situations and a basic variation in the types of units may dictate the need for additional items.

Welding Machine and Equipment	Disk Grinder
Cutting Torch with full Tanks	Drill and Drill Bits
Fire Extinguisher	Extension Cords
Forklift	Sledgehammer
Chain Fall	Open or box end wrench
Come-A-Long	Drift Punch
Cables or Hook Chains with 1,000# Cap.	Carpenter's Square
Hack Saw, Reciprocating Saw, or portable band saw	Chalk Line
'C' Clamps (12 inch opening)	Plumb Bobs
Socket Set (½ inch drive, sockets to 1⅞ inch)	4 foot Level
Pinch Bar	25 foot Measuring Tape
Hammer Drill & Bits for ¼, ⅜, and ½ inch anchors	Broom

The following supplies will also be needed:

- Concrete anchors (16 minimum) sized for the required minimum pullout of the base floor channels and upper level bracing. Refer to the approval drawing since the size of the anchors can vary for each installation.
- Concrete anchors for accessories, such as enclosures, approach ramps, etc. (Usually ⅜ inch diameter anchors and at least 12 anchors, minimum.)

- Shim stock for the floor channel, platform corners, and/or approach ramp (if a part of this installation)
- Hydraulic oil - see oil recommendations [7.3.1 Oil Recommendations](#).
- Paint (standard colors available in spray can, 1, or 5 gallons)
- Steel angle iron or channel for additional bracing

**ALSO - BEFORE YOU BEGIN:**

- Beams are too heavy to lift manually and require lifting equipment. Check for availability of overhead attachment of chain fall or of fork truck before you start.
- Before you will be able to complete the installation, the unit must be operated. Power to the motor (even if temporary) is required. Arrange for power before starting installation.

**NOTE: All illustrations contained in this manual are for reference purposes only. Specific applications and site conditions may require different anchoring and bracing procedures. The ultimate responsibility for the anchoring and bracing rests with the installation crew.**

See [9.1 General Assembly](#) for part identification and nomenclature.

## **4.9 Laying Out Platform Position & Marking Floors for Alignment**

The following illustrates how to lay out and mark the reference lines so that the lift will clear the upper landing and any obstructions that may be located around the lift. The General Arrangement (GA) Record Drawings should indicate the necessary clearance needed for the specific application.

1. Layout the position of the lift at the second level landing/opening, marking the edges of the platform.

**NOTE: Depending on your load pattern, the platform may not be centered on the opening.**

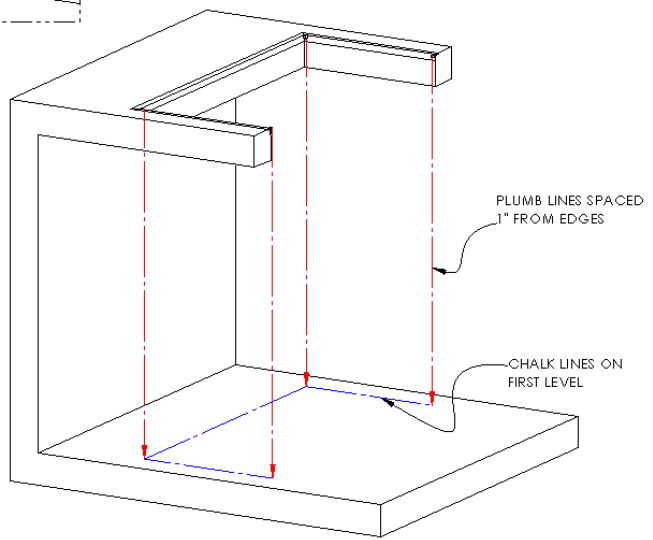
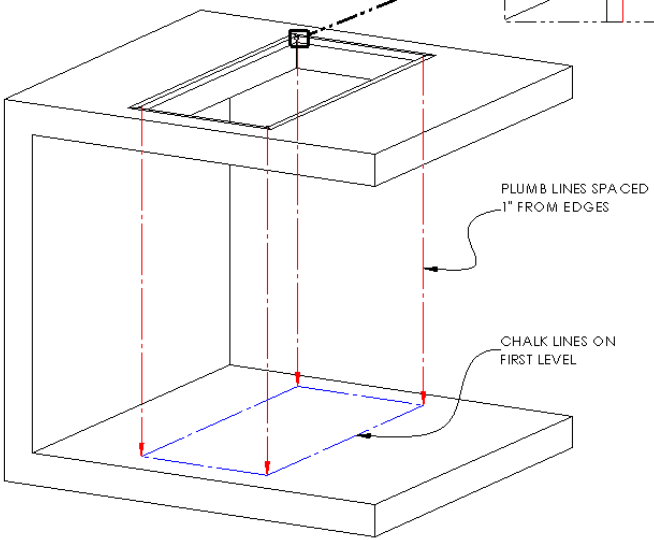
2. Drop a plumb line from each corner of every edge at the second floor **holding the plumb line 1 inch out from the edge of the landing** (this is a standard distance for clearance - deviations may occur).
3. Using a chalk line, snap a line between the plumb lines at the lower level.
4. Check the clearance from the first level all the way up ensuring there is 1 inch of clearance for the entire travel.

**NOTE: To ensure platform clearance between floors, remove any protrusions from the floor, wall, etc., or move the plumb lines out beyond the protrusions.**

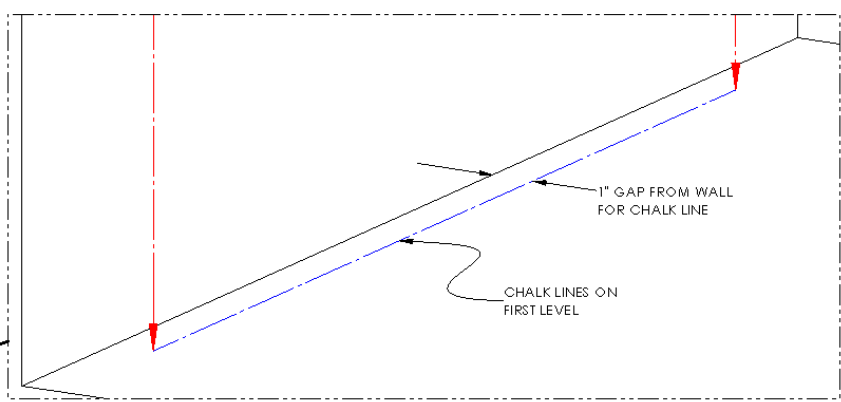
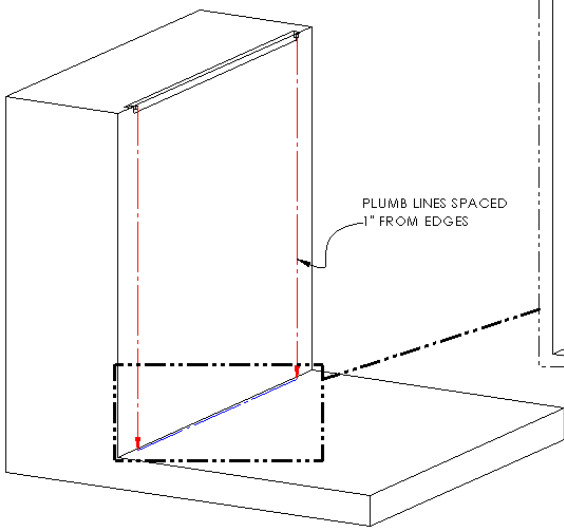
BLOCK / SPACER  
1" FROM EDGES

### THRU-FLOOR

### 3-SIDED



### EDGE OF MEZZANINE



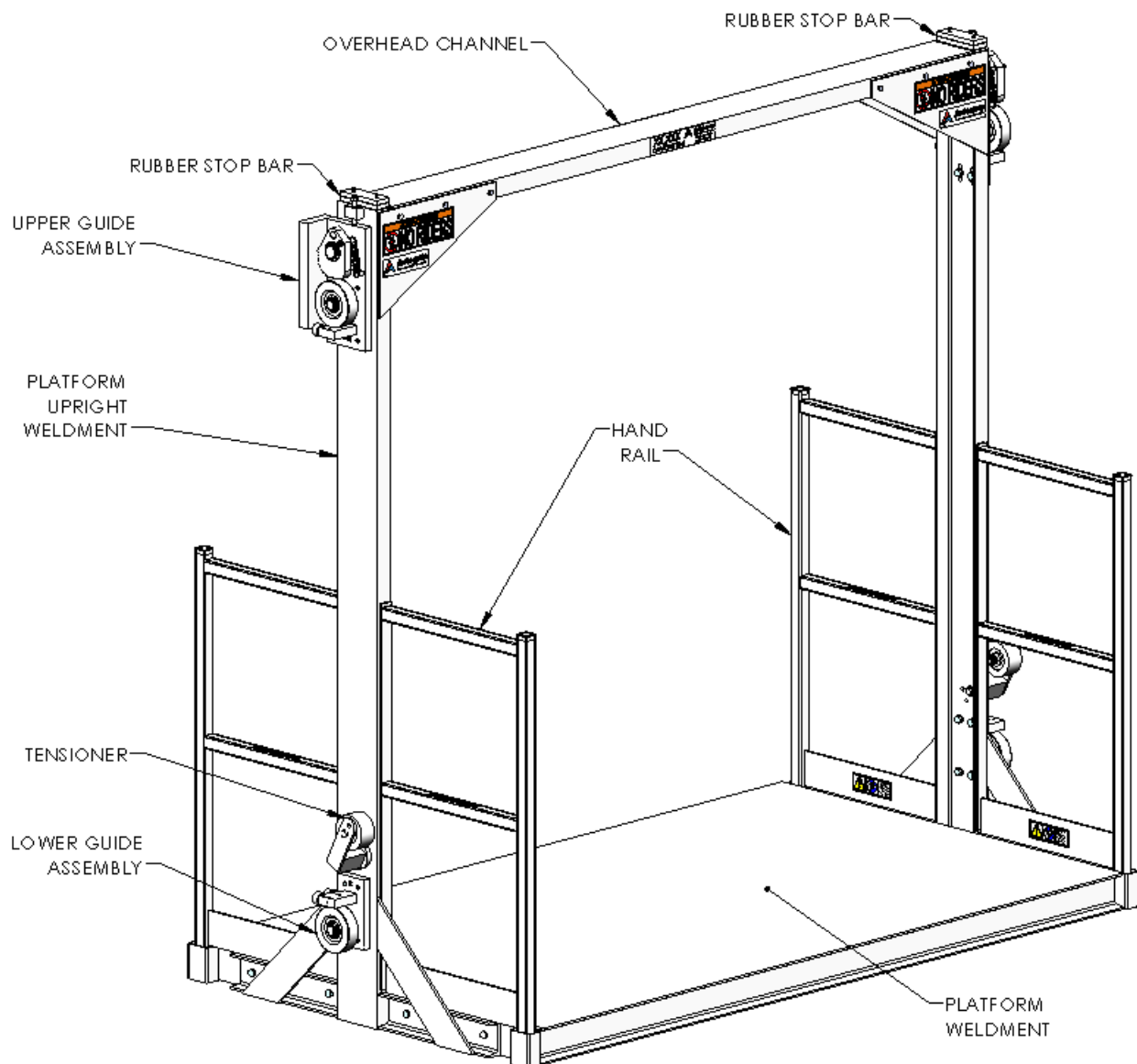
## 4.10 Mechanical Installation Details

1. Most work can be done with the lift platform fully lowered. Never work under the lift platform unless it is blocked in place ([see 5 Blocking Instructions](#)).
2. Never allow a person to ride on the platform of the lift.
3. Use only the hardware supplied by the Manufacturer to assemble the lift. This hardware is often high grade, some hardware is metric.
4. Use only the platform lifting cables, cylinders, and attachment hardware supplied by the Manufacturer.

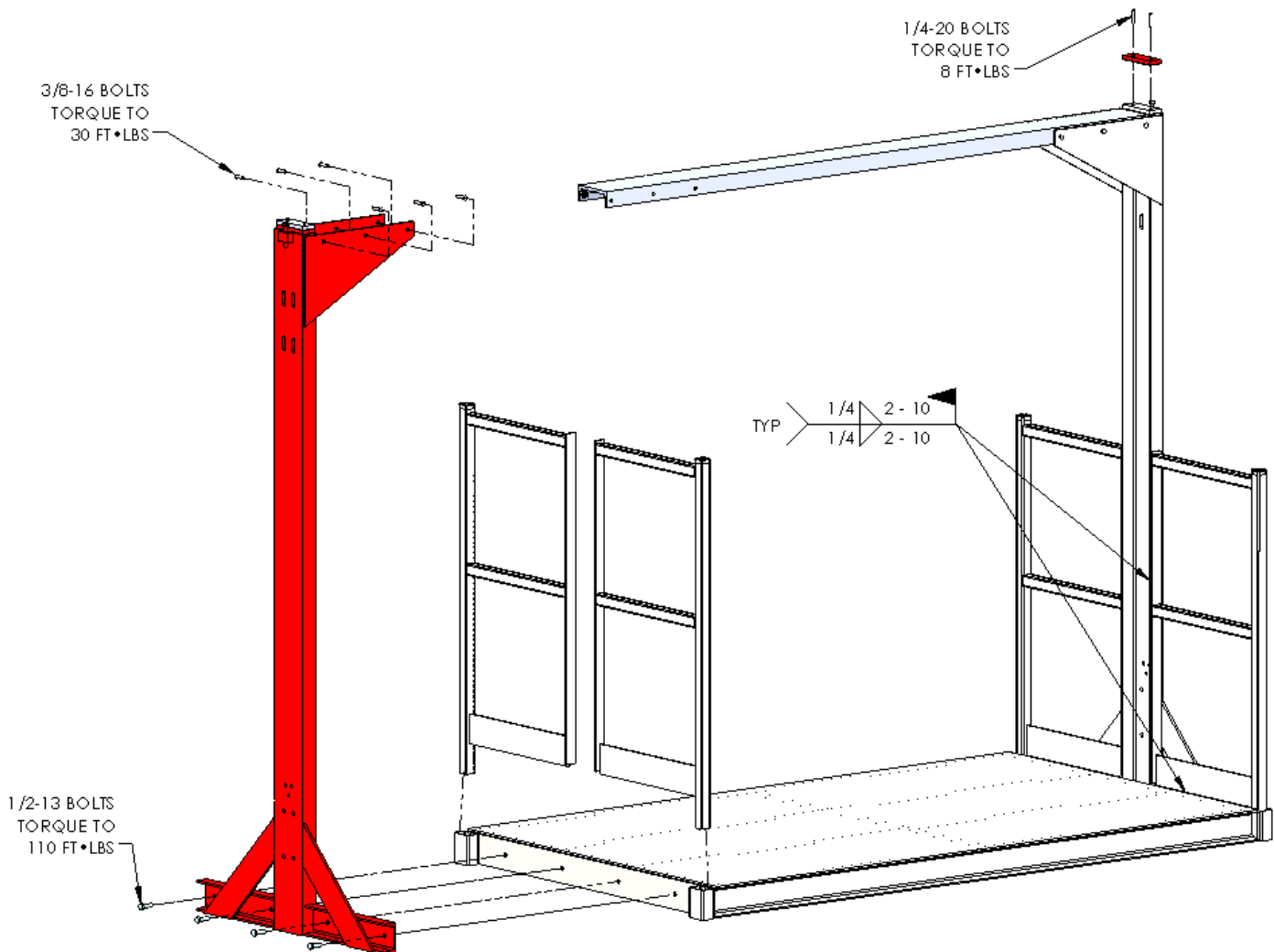
### 4.10.1 Platform Assembly

#### 4.10.1.1 Straddle Assembly

1. Block platform weldment at a convenient work height to permit access to the underside of the platform.



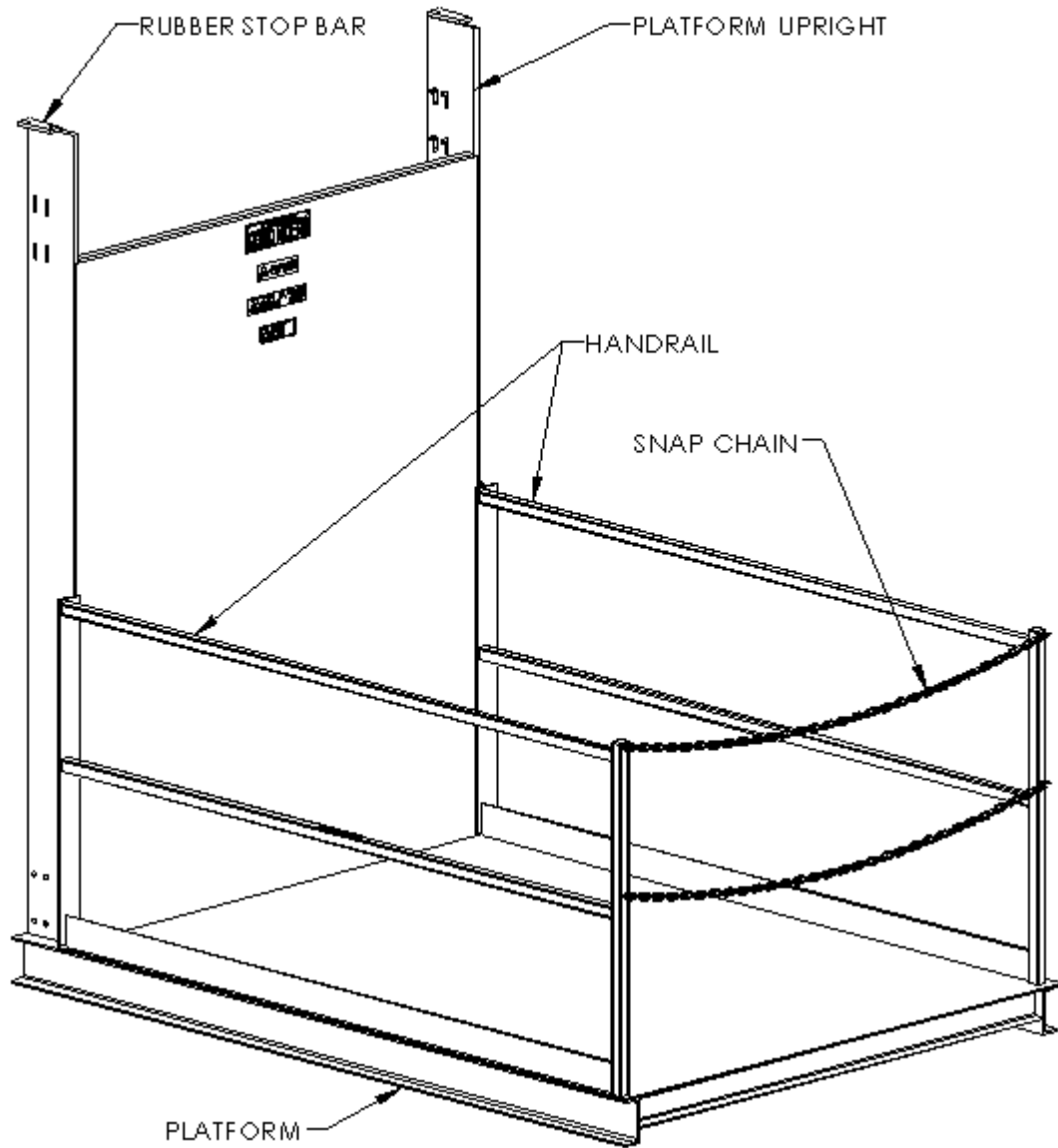
2. Attach the Platform Upright weldments to the platform deck with the  $\frac{1}{2}$ -13 grade 8 bolts, nuts and washers provided. Upright weldments are identical – there is no right and left. Torque bolts to 110 ft•lbs.
3. Attach Overhead Channel to the top, platform upright gusset plates with the  $\frac{3}{8}$ -16 grade 5 bolts, nuts, bevel washers, flat and lock washers provided. Torque to 30 ft•lbs.
4. Attach the rubber stop pads to the top of the overhead channel as shown using the  $\frac{1}{4}$ -20 grade 5 bolts, nuts, flat and lock washers provided. Torque to 8 ft•lbs.
5. Attach handrails or side guard panels by positioning as shown below and/or the General Arrangement drawing, and welding into place with a minimum  $\frac{1}{4}$  inch fillet, 2 inch long on 10 inch centers. Grind welds and touch up the paint where necessary.
6. Follow the instructions included when attaching snap chain(s).



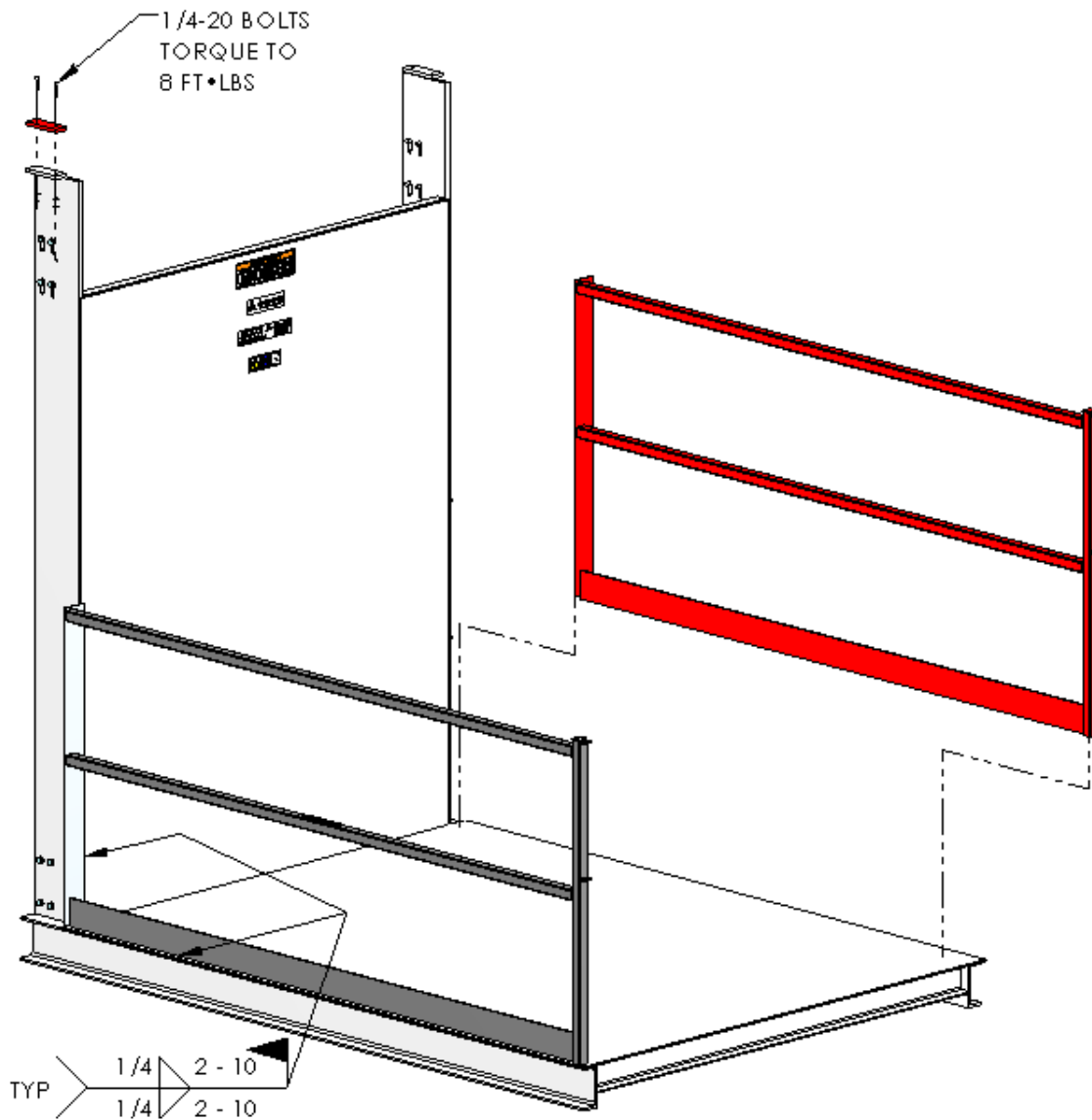


#### 4.10.1.2. Cantilever Assembly

1. Block platform weldment at a convenient work height to permit access to the underside of the platform.



2. Attach the rubber stop pads to the top of the uprights as shown using the 1/4-20 grade 5 bolts, nuts, flat and lock washers provided. Torque to 8 ft•lbs.
3. Attach handrails or side guard panels by positioning as shown below and/or the General Arrangement drawing, and welding into place with a minimum 1/4 inch fillet, 2 inch long on 10 inch centers. Grind welds and touch up the paint where necessary.
4. Follow the instructions included when attaching snap chain(s).

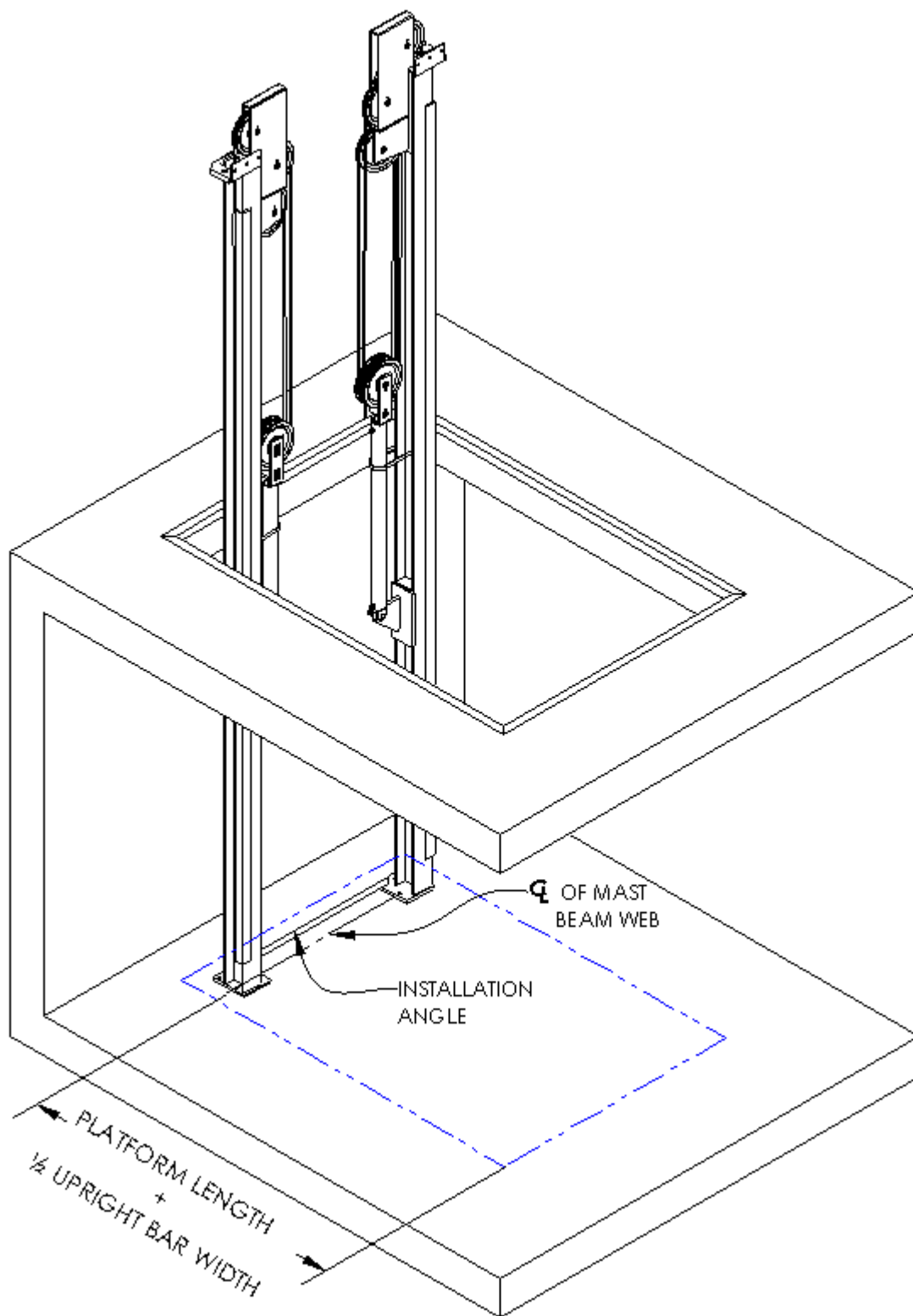


5. ***For Pit Mounted Lifts*** - the pit should be poured 1/2 inch deeper than the total thickness of the platform for shim and grout as required.

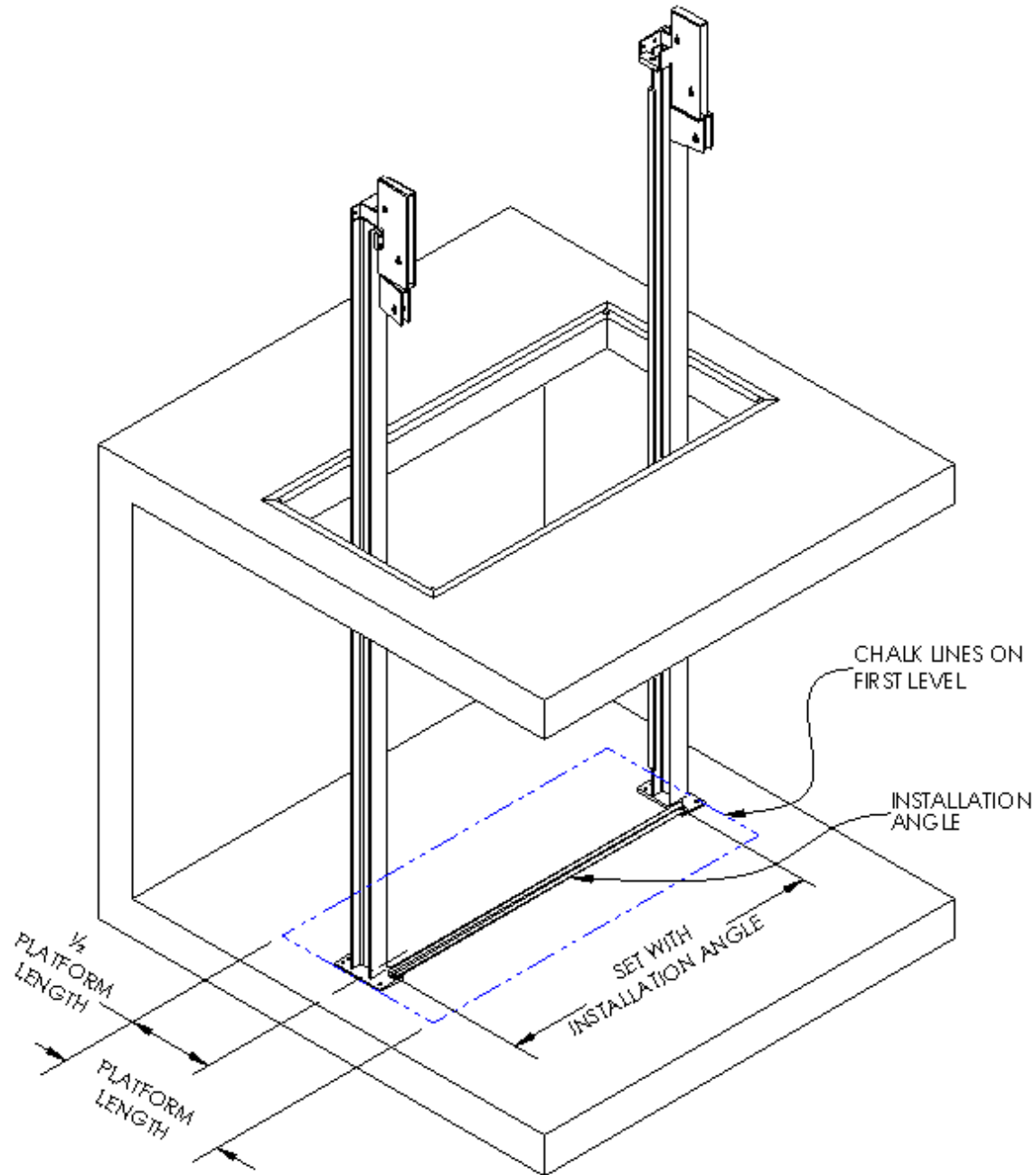
**NOTE: Masts may or may not be in the pit. Verify your pit dimensions before continuing.**

6. ***For Through-Floor or Shaft Installations*** – when clearances are tight, you may choose to position the platform after the beams have been assembled and raised into place.

### CANTILEVER



## STRADDLE



7. The installation angle shipped with your unit can be used to properly space the two beams apart temporarily, prior to setting the platform or securing beams to floor.
8. Set the platform onto the floor at the lower level position aligning with the chalk lines created earlier. Make sure platform is level, shim as necessary.
9. Once platform alignment has been completed and all clearances confirmed with pit walls, floor openings, and/or other site-specific constraints, etc.), make sure the platform is level and the masts are plumbed and straight.

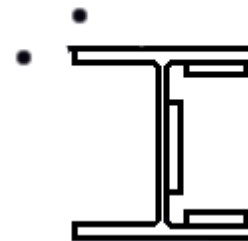
## 4.10.2 Spliced Beams (when used)

Items needed for field splice:

- AC\DC Arc Welder
- String line (at least 100 feet long)
- Cutting Torch with Full Tanks
- 'C' Clamps - 12 inch (4 minimum)
- Crain, Hoist or Fork Truck to move and position beam
- Straight Edge

1. There are two ways to assemble the splices, depending on your location and job site conditions. The beams can be spliced before you stand the beams vertically, or as you stand them up. In either case the procedure will be the same.
2. The beams will be marked "L" or "R" on the footplate of each beam. NOTE - the beams will only match one way. Check the guide angle and counterweight tube for orientation.
3. Fit the upper mast to its respective lower mast (plates & beams are marked) in the orientation as shown, taking necessary precautions not to bend or damage transition plates then clamp.
4. Place the string line on the entire beam length to have a straight-line reference. The string should be spaced off the beam about 1 inch as this will allow you to detect the deflection of the beams as they are welded together. The beam should be straightened to  $\frac{1}{8}$  inch over any 10 feet, not to exceed  $\frac{3}{8}$  inch overall. You will need to put the string on both sides of the beam, to check the straightness. This should also be checked as the beams are welded. The beams should be tack welded at all joints after you are satisfied with the straightness of the beam. (Remember that you cannot straighten the beam very easy after it is welded). The entire operation of the VRC also depends on the straightness of the beam after it is spliced.
5. Weld one side of the splice at a time taking care not to put too much heat to the beam, as this will cause the beam to bow or deflect severely. As the beam is welded check the straight line and make sure the beam is not deflecting too far beyond the tolerance.

STRING LINE HERE



**NOTE: If you find the beam bowing beyond the tolerance stop welding that side and move to another side. You may need to let the beam cool as you weld, to help control the deflection of the beam.**

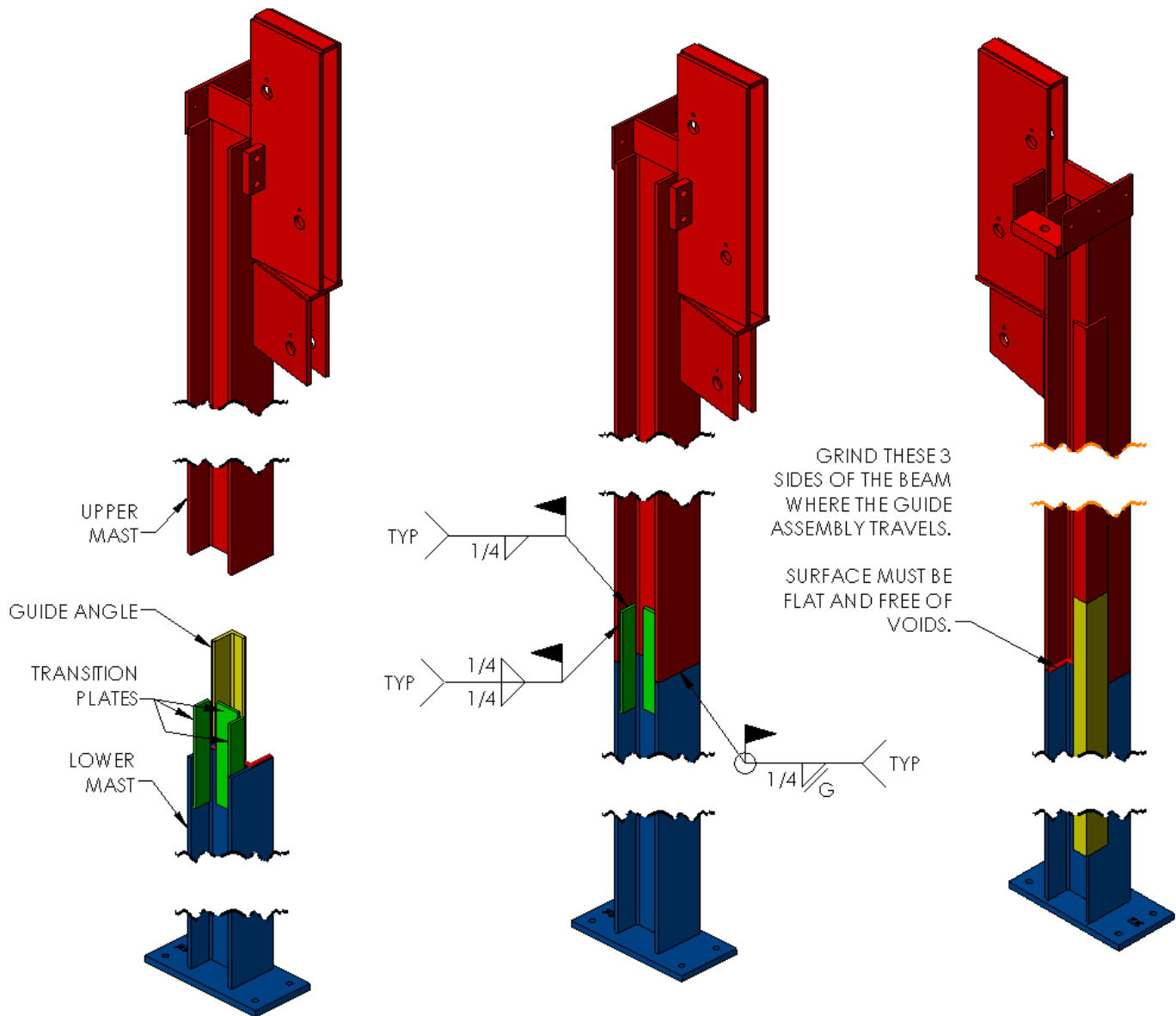
6. After the beams have cooled, verify that both beams are true, straight, and plumb within  $\frac{1}{8}$  inch over any 10 foot span and not to exceed  $\frac{3}{8}$  inch over the entire length of the beam.

**NOTE: This tolerance must not be exceeded or immediate & permanent damage to the hardened wheel guide wheels will occur. (Shim material by installer).**

7. Permanently weld the upper & lower mast assemblies together as shown. Weld distortion to the beams must be minimized to hold the required tolerance to beam straightness.

**NOTE: Care should be exercised not to distort the masts from welding, and alignment is critical. Grind the guide beam to provide a smooth surface for the guide wheels and rollers.**

**NOTE: Beams must be plumb and parallel within  $\frac{3}{8}$  inch overall before proceeding with permanent bracing. The beams MUST be within this tolerance or the guide wheel assemblies will fail prematurely.**



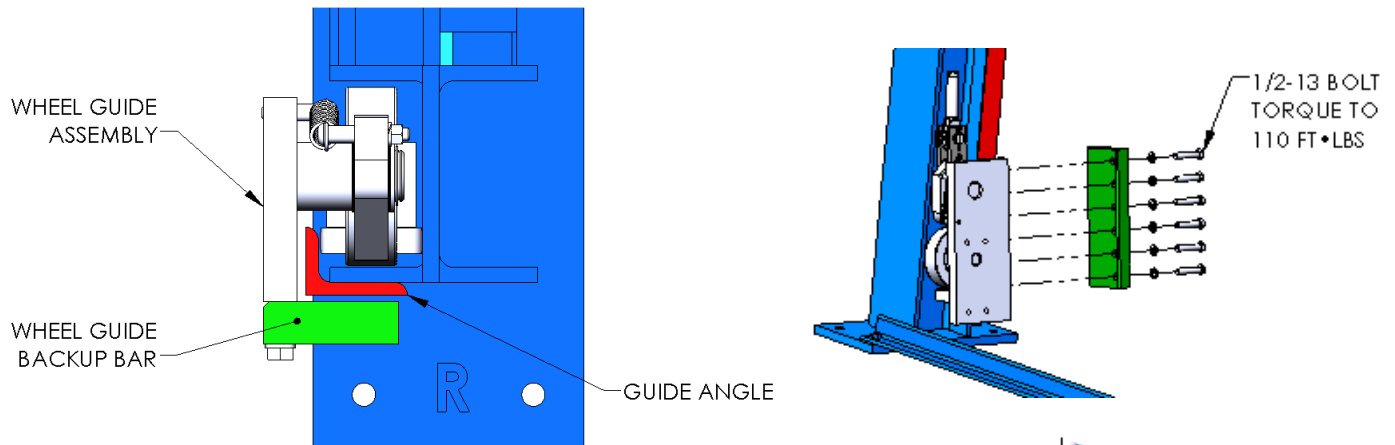
### 4.10.3 Positioning Wheel Guide Assemblies

Items Needed:

Qty	Description
2	Mast Beams – Left & Right
2	Upper Wheel Guides – left & right (“L” & “R” on the assembly)
2	Cable Adaptors
4	Cotter Pins
2	Cable Adaptor Pins (with cotter pin holes)

1. Remove the wheel guide back up bar from the assembly. This is recommended for ease of installation.
2. Place the upper wheel guide assemblies in the beam as shown by sliding them into the beam running space from below the guide angle near the bottom of the mast beam.

**NOTE: This step must be done first due to the limited access space once the wheel guides are inside the guide beams & behind guide angles.**

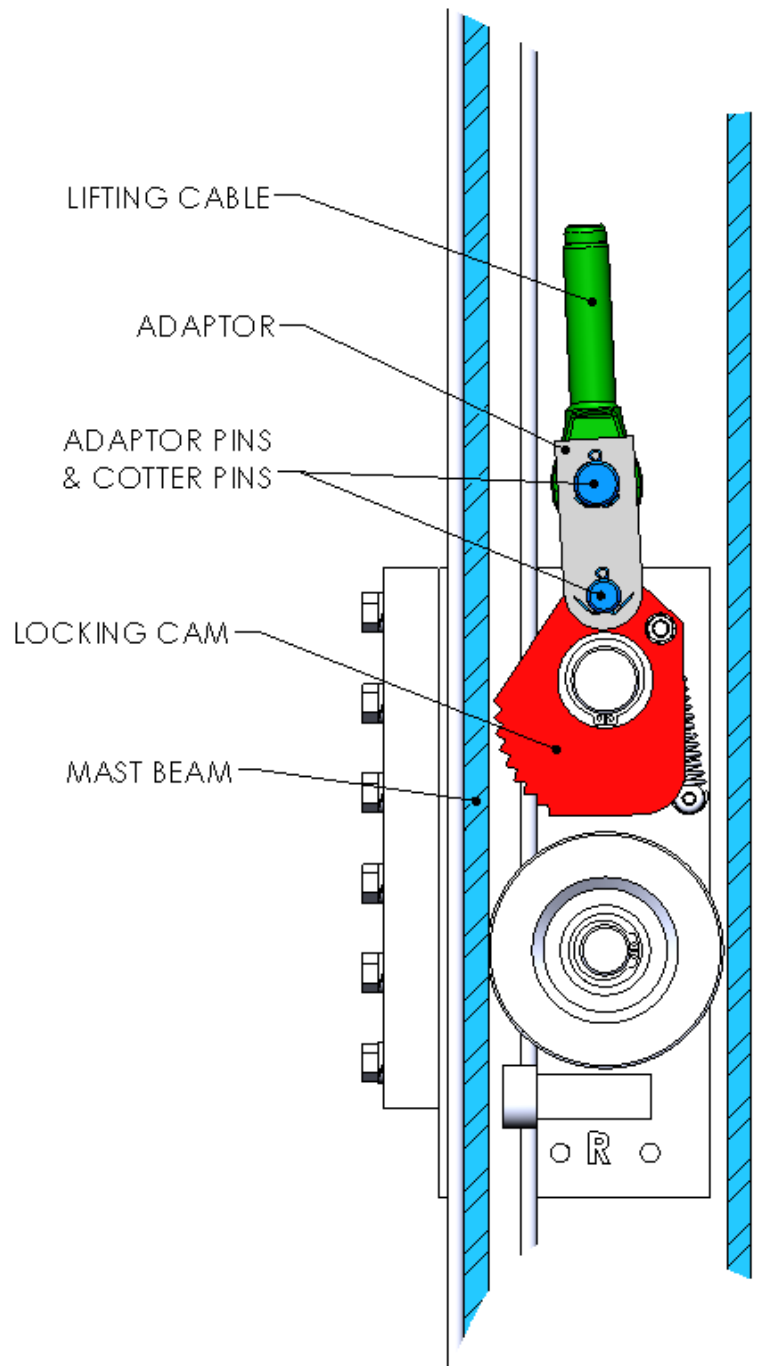


3. Attach the lifting cables to the cable adaptors and the cable adaptors to the upper wheel guide locking cams using the high strength adaptor pins and cotter pins provided.
4. Pull on the cable where it attaches to the wheel guide assembly. Slide the wheel guide assembly until it is approximately 7 feet from the bottom of the beam. The upper wheel guide blocks should then be positioned so that they will align with the uppermost sets of holes in the platform uprights once the beam is raised into position.

**NOTE: The safety cams will attempt to engage as you move them down the beam. Rotate and hold them in a disengaged position while you slide them into position.**

**NOTE: Oil may be released when cylinders are extended.**

5. Re-install the backup bar and torque the bolts.

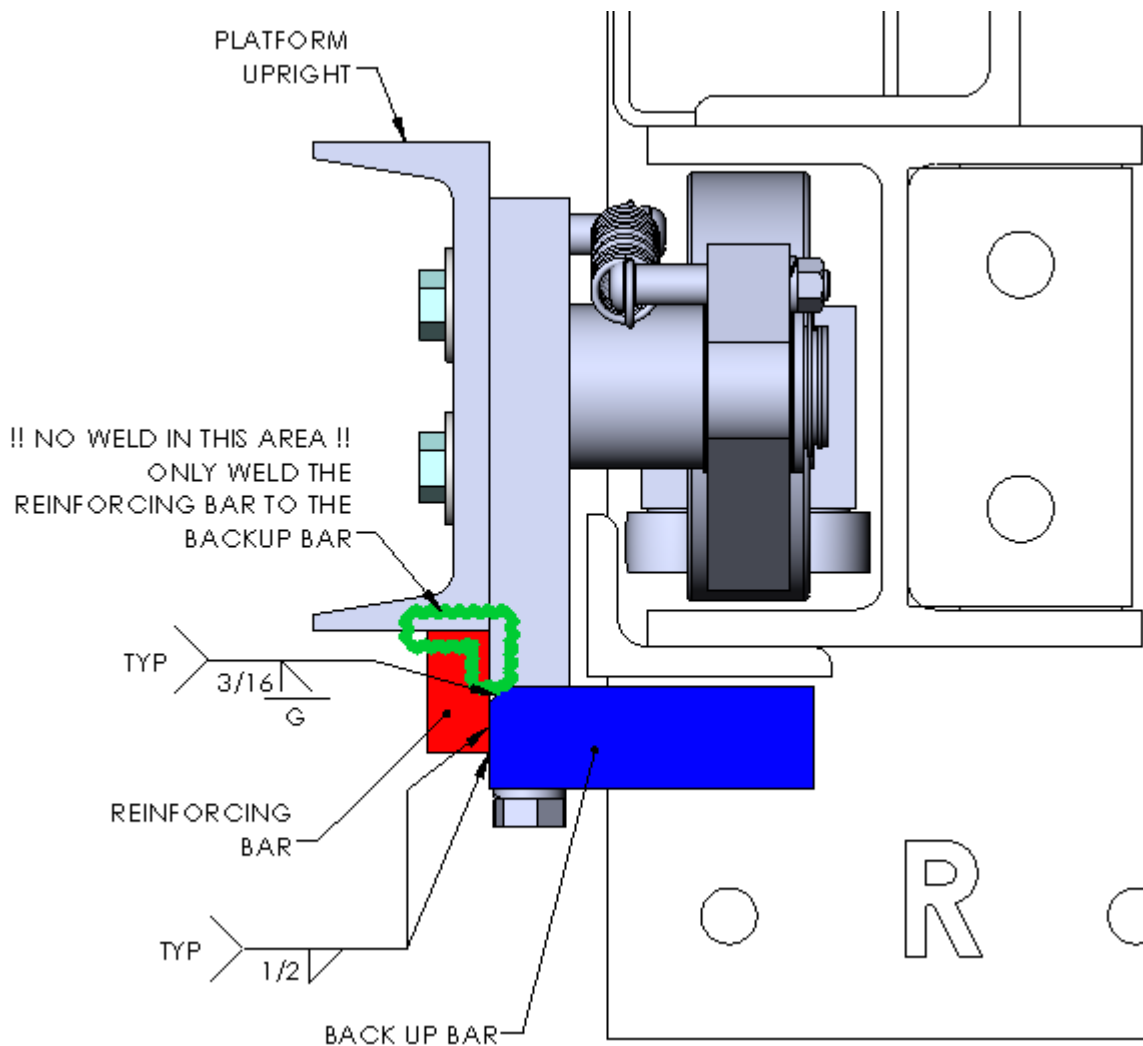




#### 4.10.4 Installing Reinforcing Bar (Straddle ONLY)

1. Locate the ship-loose 3/4" x 1-1/2" x 11-1/4" flat bar and position between the carriage upright and wheel guide as shown below
2. Tack weld this bar to the wheel guide as shown.
3. Unbolt the wheel guide back-up bar from the wheel guide to complete the welding on the inside of these parts.
4. Grind this weld as needed to re-bolt weldment to the wheel guide.

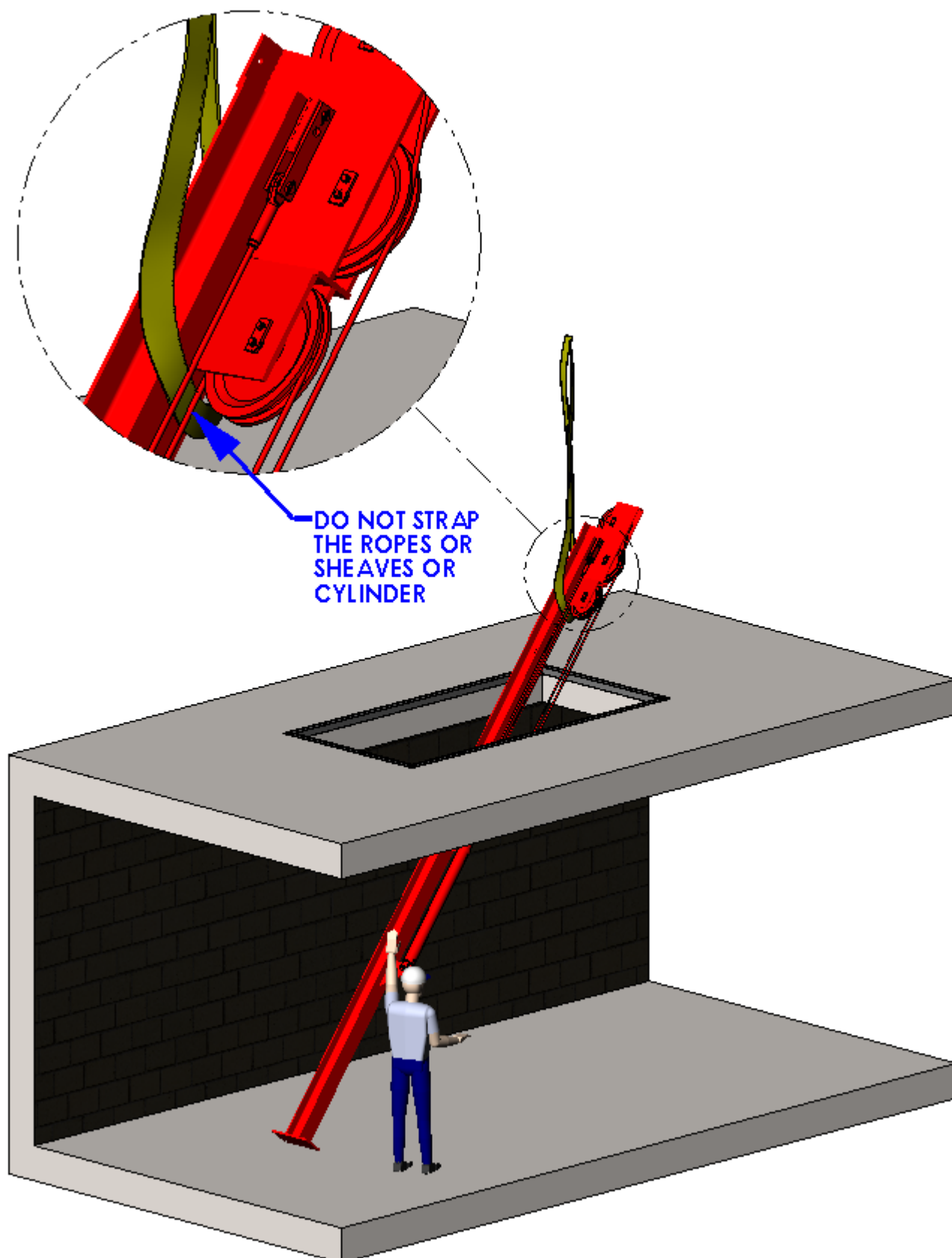
**NOTE: Do not weld the reinforcing bar to anything but the backup bar.**



1. Re-install the backup bar and torque the bolts.

## 4.1.1 Raising the Beams and Wheel Guides

1. Raise the beams into position. If using straps, ensure they only wrap the beam itself.



2. The mast beam assemblies are designated either left or right hand (there is an “L” or “R” marked on the mast beam base plate). The left hand is to your left and the right hand to your right as you stand at the upper level (or with your back against the bracing wall) facing the beams:

**CANTILEVER** - guide angles are away from you.

**STRADDLE** - guide angles are towards you.

3. **STRADDLE ONLY** - Install one wheel tensioner assembly per side using the dedicated metric bolts, torque to 63 ft•lbs as shown. Roller is oriented away from the mast guide angle when rotated into position for bolting. Rotate until notch lines up with  $\frac{3}{8}$  inch hole in upright. Use the supplied  $\frac{5}{16}$ -18 grade 5 bolts and hardware to secure tensioner to upright through notch and  $\frac{3}{8}$  inch hole. Torque these bolts to 17 ft•lbs.
4. Position the lower wheel blocks into their respective beams by tipping the blocks and allowing the rollers to fit inside the guide angles. Then, insert the guide wheel into the opening at the bottom of the beams.
5. Slide the right hand beam into position along the platform. Both upper and lower wheel guide assemblies should align with their respective mounting holes on the platform uprights. Bolt the wheel guide assemblies to the uprights using the  $\frac{1}{2}$ -13 grade 8 bolts and washers that have been provided. Torque these bolts to 110 ft•lbs.

**NOTE: Make sure the beam is secure with chain or temporary bracing.**

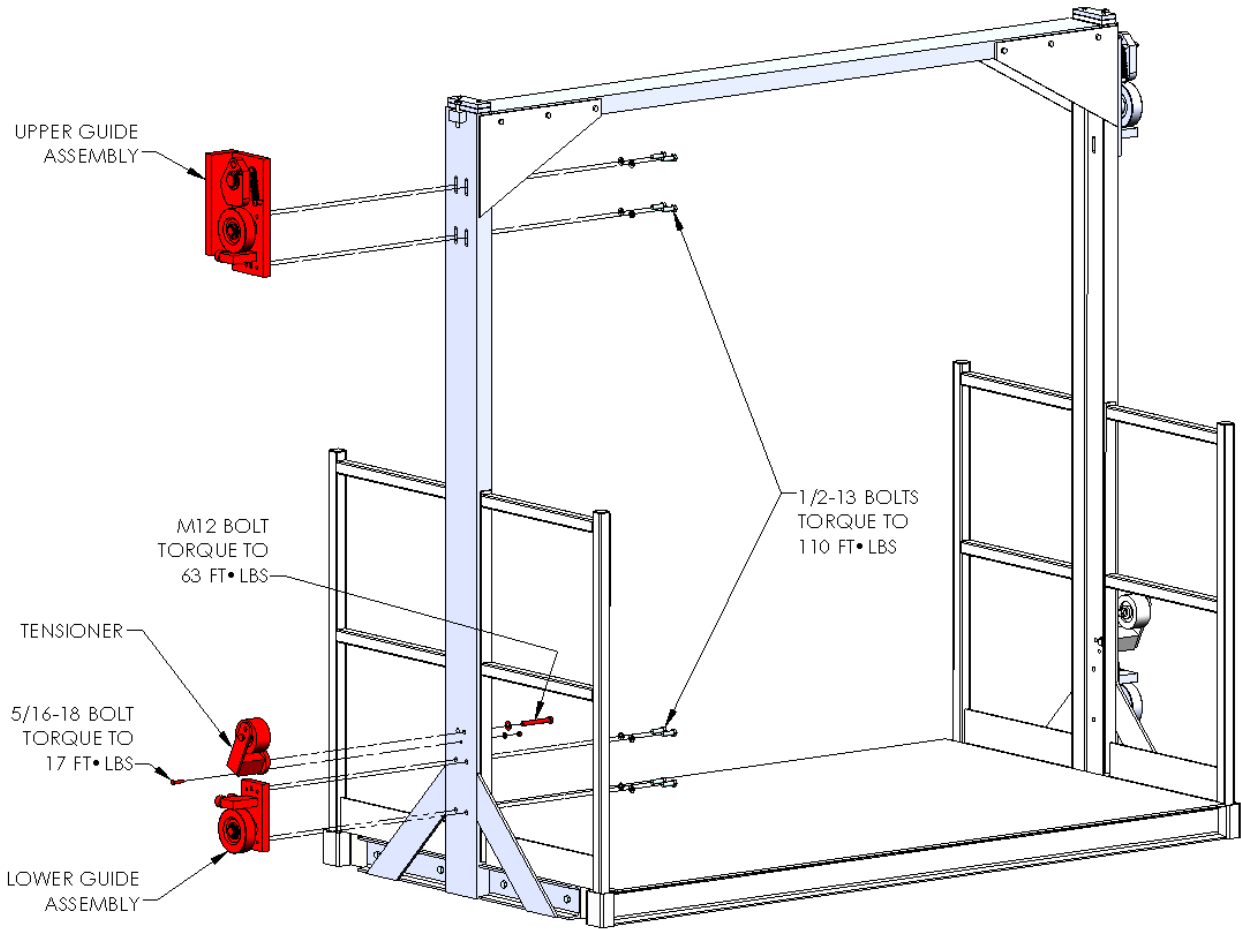
### **i WARNING**

**Improperly or inadequately supported beams could fall and cause serious injury to adjacent personnel or permanent damage to the equipment.**

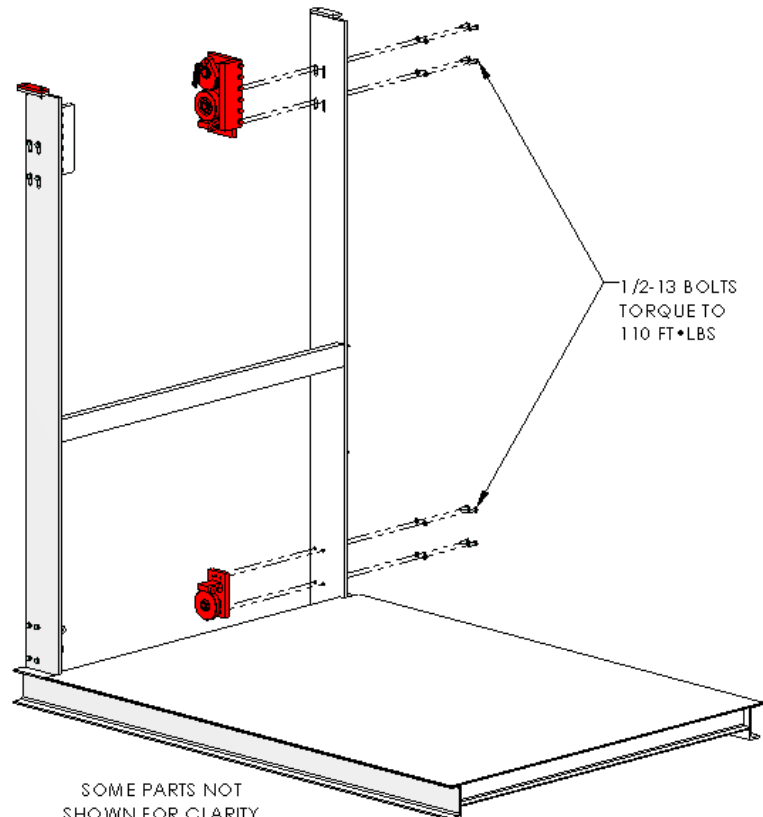
**Do not depend on the platform uprights and wheel blocks to support the beam! Use other means to support and secure the beams in the raised position during installation and prior to final bracing.**

6. Repeat the previous step to position and secure the left hand beam.
7. The installation angle shipped with your unit can be used to properly space the two beams apart temporarily, prior to setting the platform or securing beams to floor.

## STRADDLE



## CANTILEVER



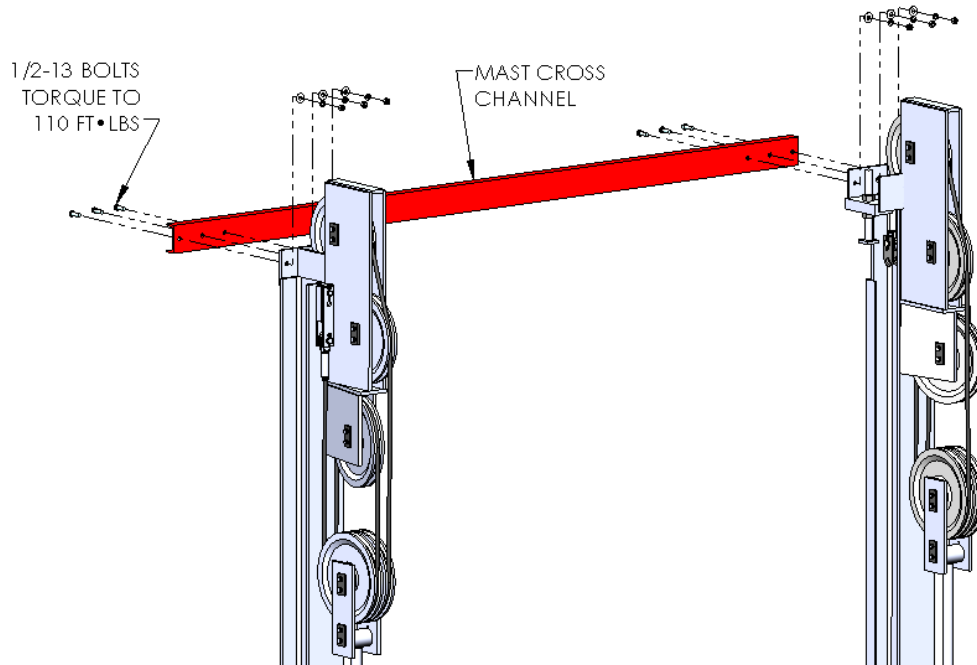
## 4.12 Securing the Masts

Items needed:

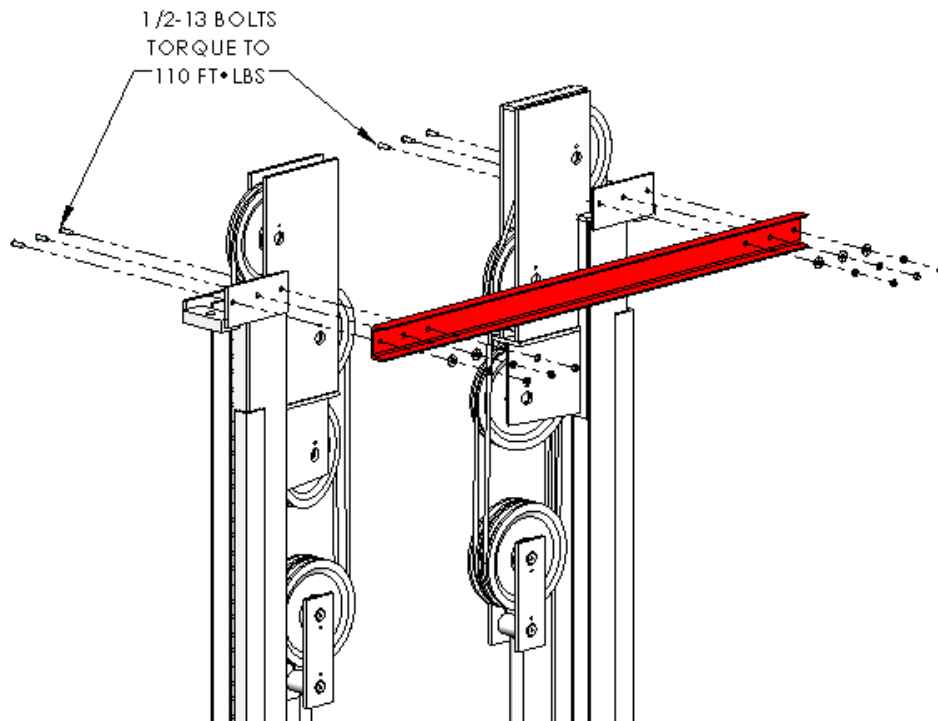
- Mast cross channel (pre-drilled).
- 1/2-13 grade 8 bolts, nuts, and washers that have been provided.

1. Raise the channel into position above the mast beams in the orientation shown, and bolt into place using the hardware provided.

### STRADDLE



### CANTILEVER



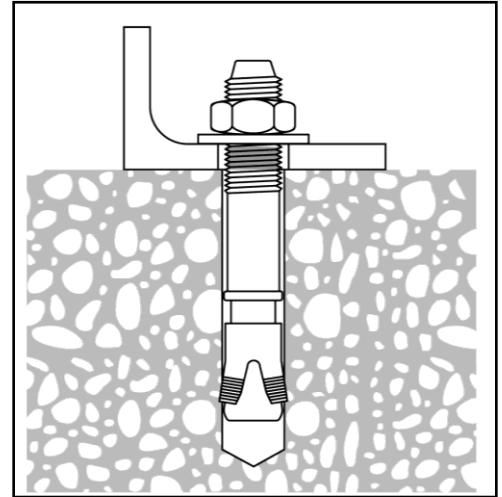
**NOTE: Alignment of the main beams is very important! Check the guide angle dimension (from bottom to top) against the GA drawing.**

2. Recheck the position of the beams and ensure the beams are not twisted or turned, and that they are also plumb, parallel, square, and level (beam pairs mounted in pit floors must be checked closely for level, pit floors may not be poured level). To maintain proper positioning of the beams – shim under each mast foot plate as required to fill any gaps between the foot plate and the floor which may have been created during the plumb-square-level process. Torque to 110 ft•lbs.

**NOTE: Beams must be plumb and parallel within 3/8 inch over the entire length of beam before proceeding with permanent bracing. The beams MUST be within this tolerance or the guide wheel assemblies will fail prematurely.**

3. Remove the installation angle (if used).
4. Lag the beams to the floor using four, 1/2-13 bolts for each mast beam plate – sized to withstand the pull-out force specified on the GA drawing. Torque to manufacturer's requirements.

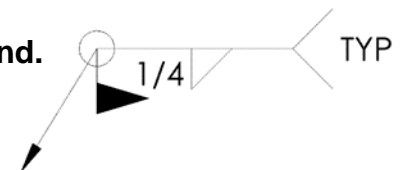
**NOTE: Recommended concrete anchor bolts are: HILTI “Kwik-Bolt”, Molly Parabol or similar.**



## 4.13 Bracing the Beams

All illustrations on the GA drawing for bracing preferences are for reference only. Site conditions may require different anchoring and bracing. The installers are ultimately responsible for the proper and safe anchoring and bracing of the equipment. Autoquip Corporation supplies material for bracing on standard applications, but special bracing may be required by the installer on non-standard models. The special materials for anchoring and bracing of the lift and gates are not the responsibility of Autoquip.

**NOTE: For all field welding of braces, use 1/4 inch fillet – all around.**



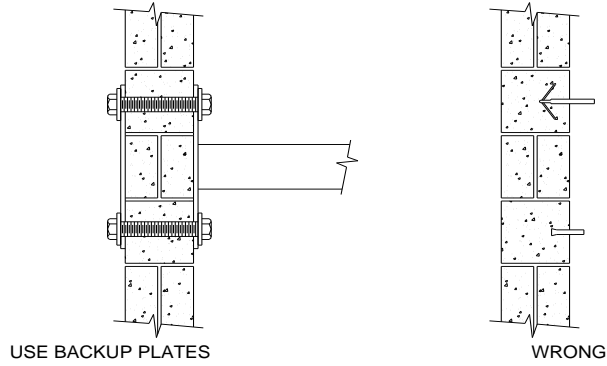
Items needed:

- Horizontal Brace Channels (qty. varies)
  - Diagonal Brace Channels (when applicable)
  - Side Brace Channels (when applicable)
  - Brace Plates (qty. varies)
1. Attach the horizontal channel brace to the upper floor landings with either lags or by welding (it has been assumed that you will have a solid floor face to attach to for your installation). When attaching the floor to beam brace, use bolts which have been properly sized to withstand the horizontal pull-out force shown on the GA drawing.

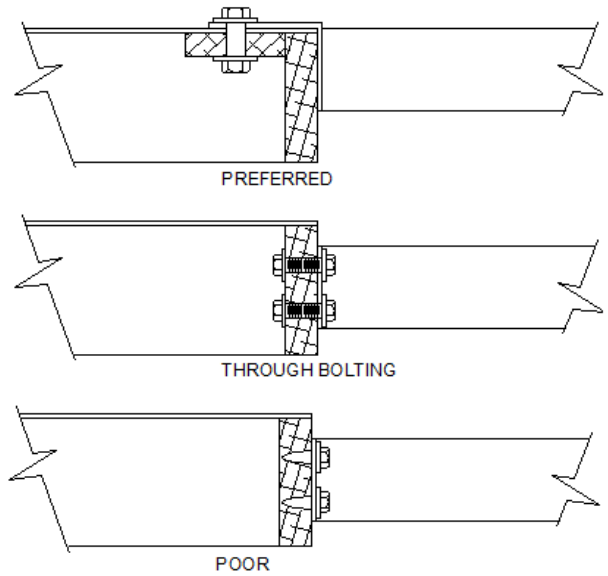
### **i CAUTION**

**Never use concrete anchor bolts on a cinderblock or brick wall! The wall will not withstand the pull force developed by the lift. Use only recommended anchoring and bracing methods illustrated in this manual. Equipment damage or personal injury could result.**

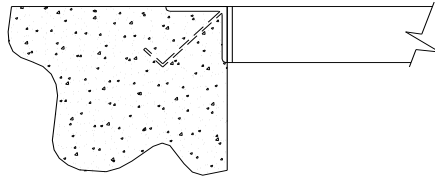
ANCHORING TO BLOCK WALLS



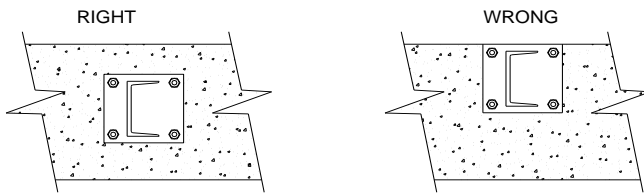
WOODEN FLOORS



WELD TO CURB ANGLE



ANCHORING TO FACE OF FLOOR

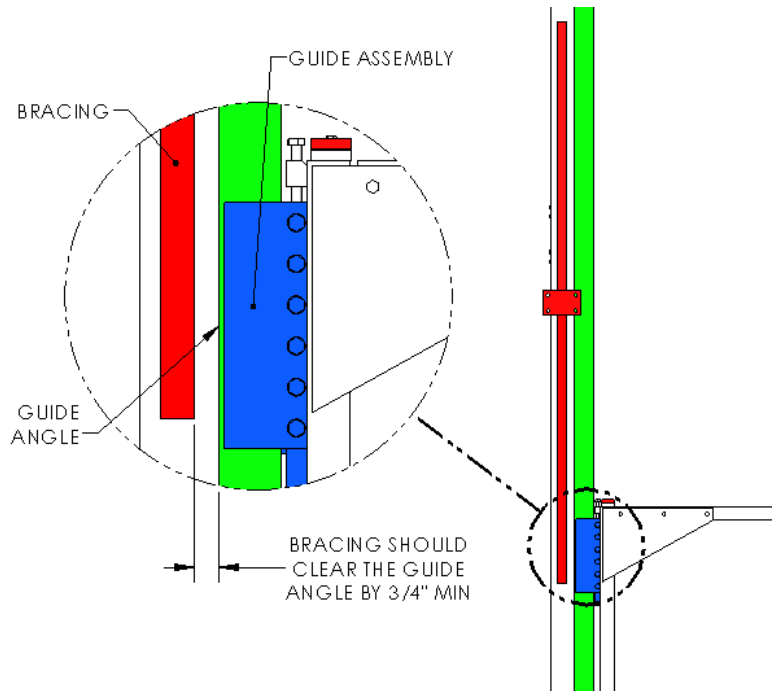


2. Ensure  $\frac{3}{4}$  inch clearance between the guide angle and any bracing.

**i WARNING**

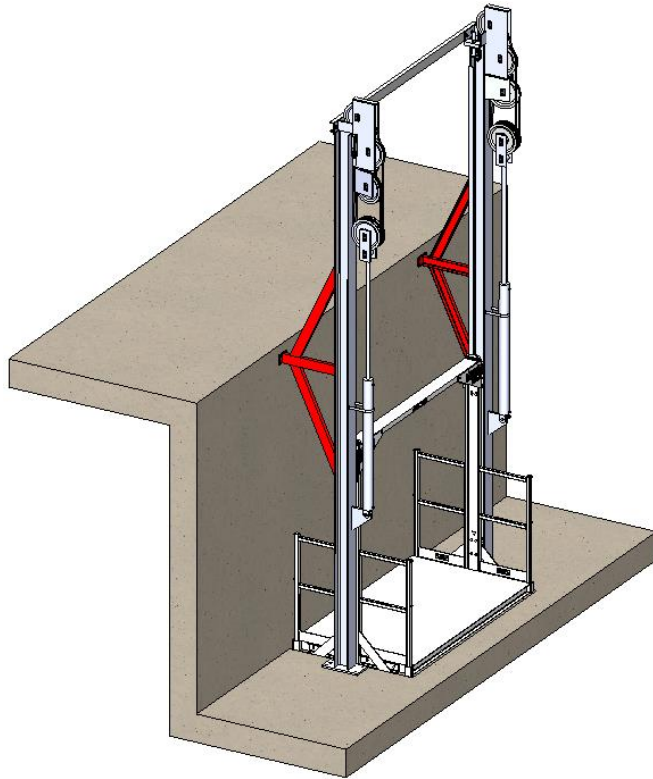
**Do not weld on the guide flanges of the masts! Interfering with the free travel of the wheel guides can cause damage to the lift and prevent safety devices from operating as intended.**

3. Add side bracing as necessary for your specific installation in order to prevent the beams from flexing or swaying sideways during operation.
4. Weld additional mast cross bracing to keep mast beams from spreading, quantity depends on travel (refer to GA drawing). Take necessary precautions to minimize beam movement resulting from the heating & cooling of welds.
5. Install upper and lower diagonal bracing per the GA drawing for your installation in order to prevent bowing of the beams during operation.

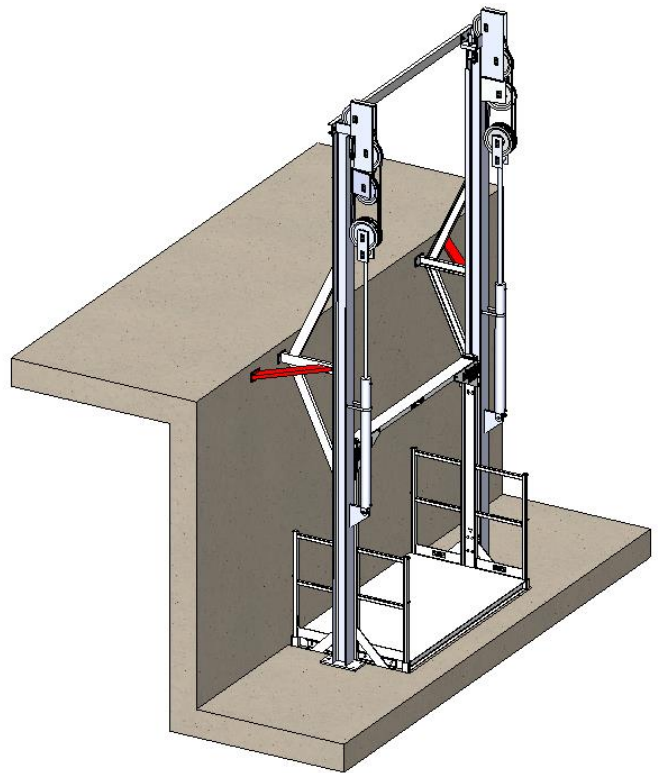




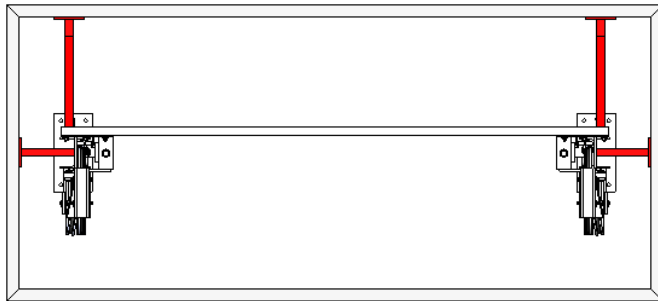
**STRADDLE DESIGN**



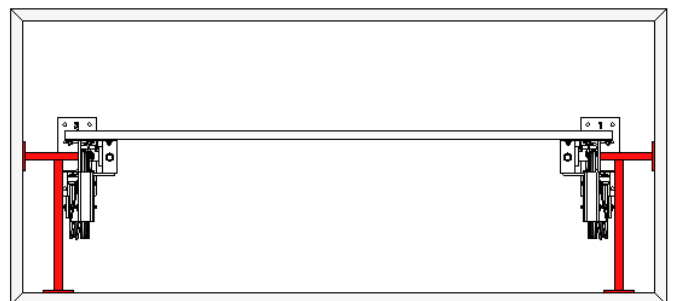
**PREFERRED MEZZANINE BRACING**



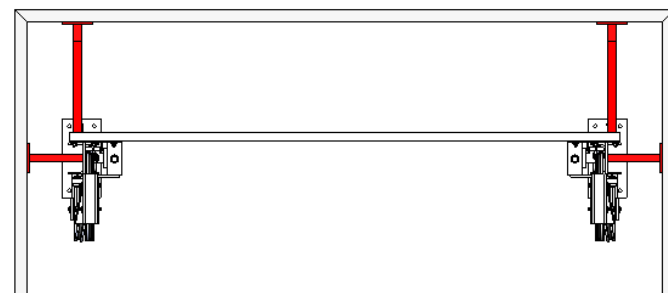
**OPTIONAL - ADDITIONAL MEZZANINE BRACING**



**PREFERRED BRACING THROUGH A FLOOR**

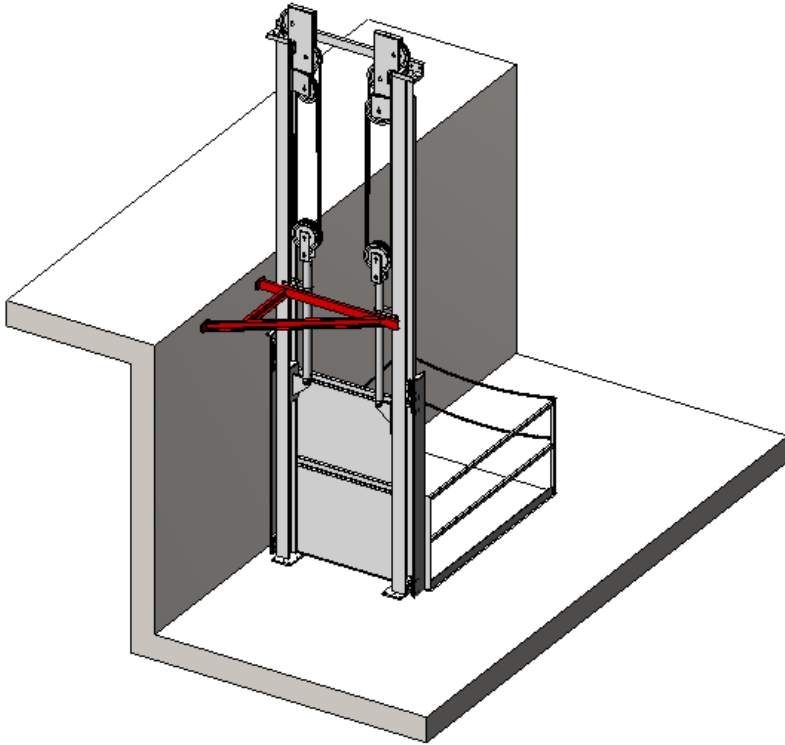


**OPTIONAL BRACING THROUGH A FLOOR**

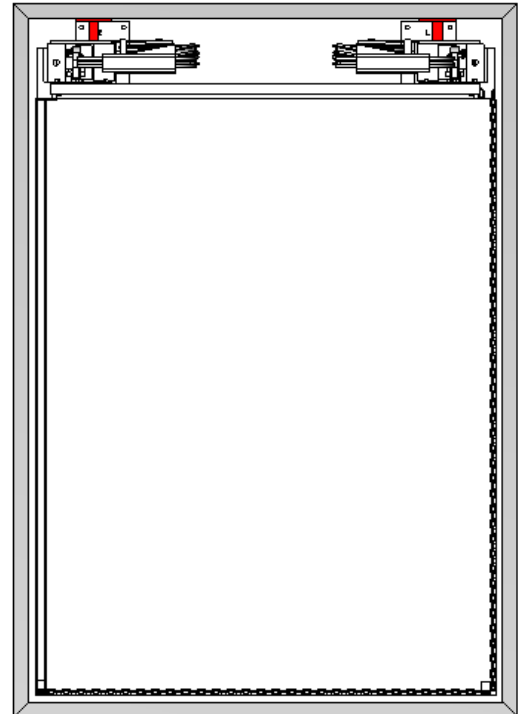


**BRACING FOR 3-SIDED OPENING**

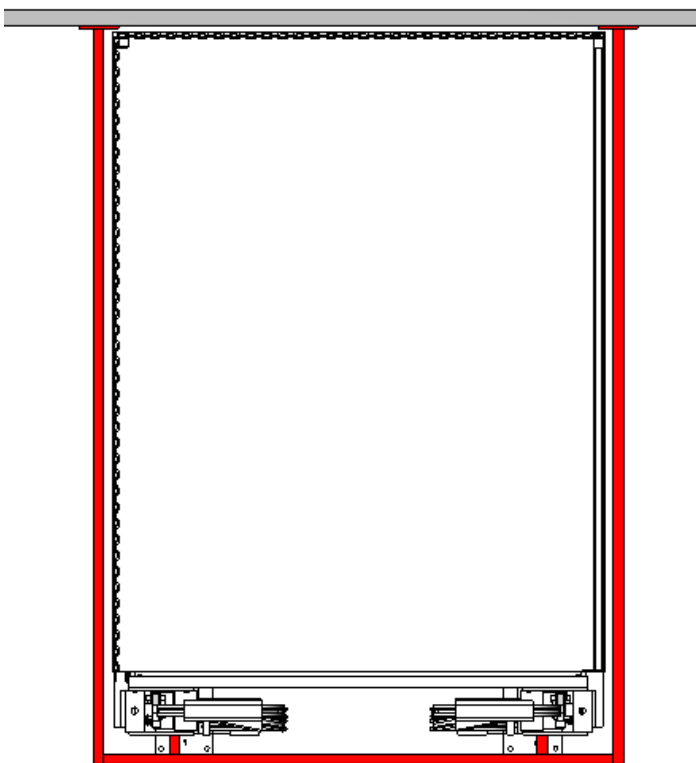
**CANTILEVER DESIGN**



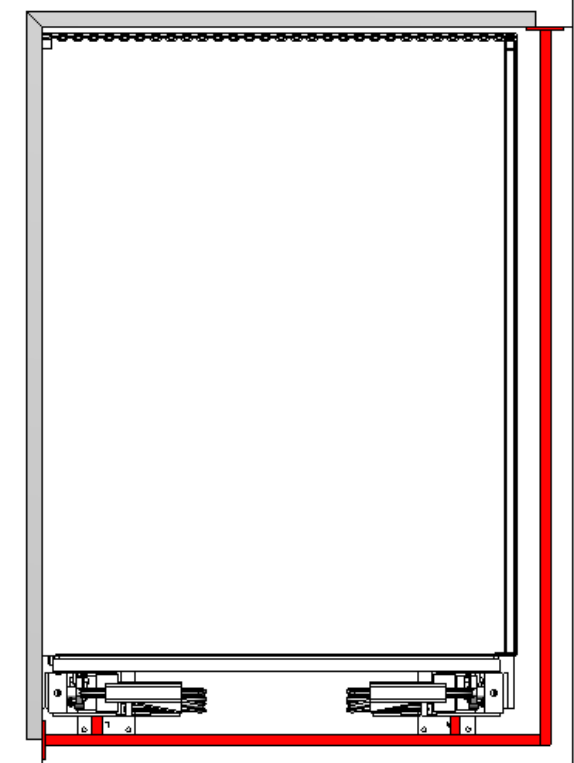
**ALONG MEZZANINE BRACING**



**THROUGH FLOOR BRACING**



**FACING MEZZANINE BRACING**



**IN A CORNER BRACING**

## 4.14 Hydraulic Installation Details

---

### **i** WARNING



Spilled hydraulic fluid is slippery and may also present a fire hazard.



Clean up spilled hydraulic fluid.

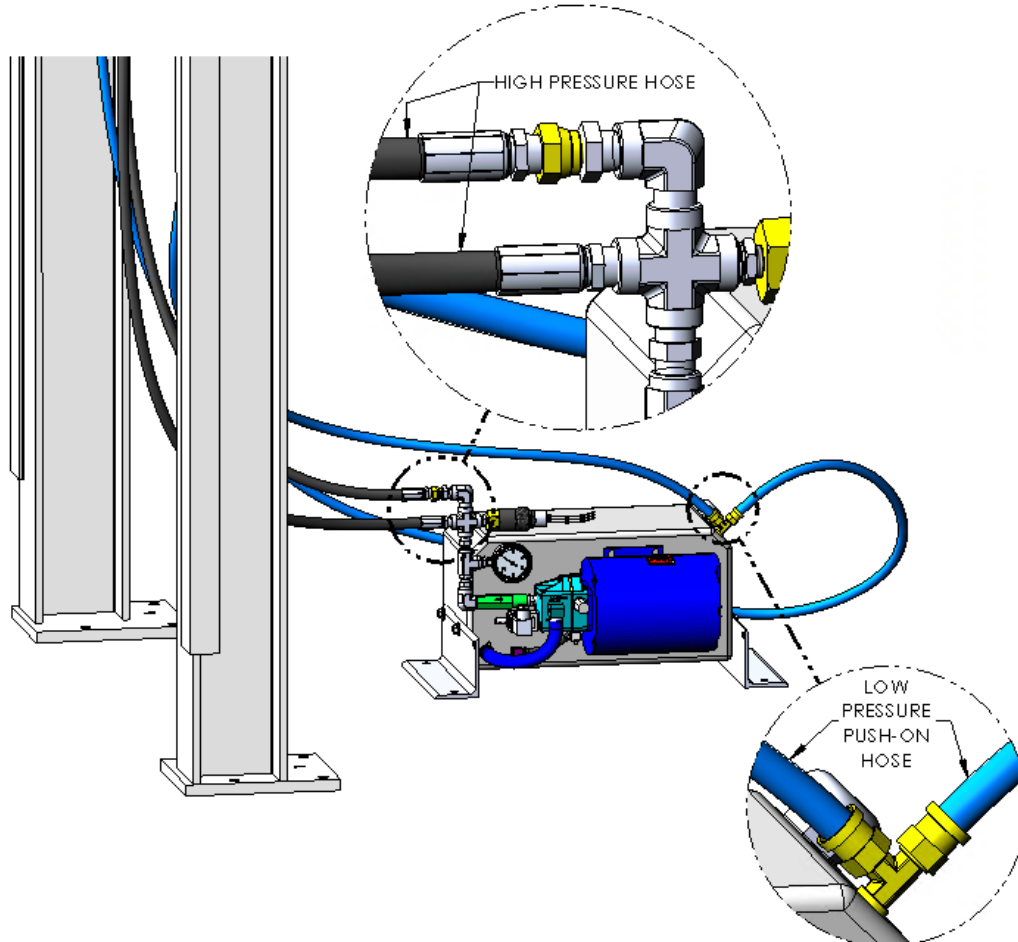
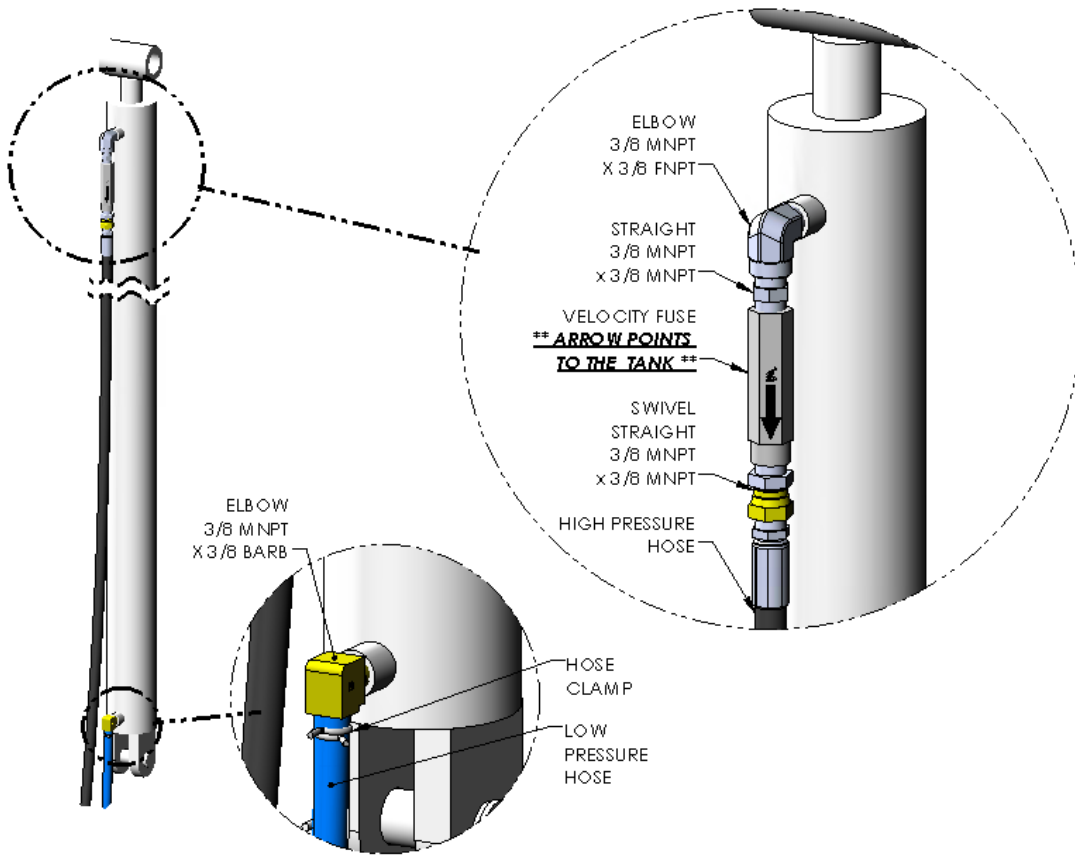
1. Most work can be done with the lift platform fully lowered. Never work under the lift platform unless it is blocked in place per the Installation and Service manual ([see 5 Blocking Instructions](#)).
2. Never use Teflon tape on threaded connections. Teflon tape does not dissolve and, if introduced into hydraulic system, may contaminate the oil and cause valving to malfunction.
3. Refer to ([4.18.1 Relief Valve Adjustments](#)) section for instructions as to how to properly adjust a relief valve setting. These are factory set to meet design and code requirements but may need final adjustment once installation is complete.
4. Carefully bleed all air out of the hydraulic system before running lift to full travel ([see 7.3.4 Bleeding Air from System](#)).
5. Make sure that the oil level in the reservoir is sufficient for running lift to full travel. Do not over fill! The oil level should be approximately 2 inches from the top of the tank ([see 7.3.1 Oil Recommendations](#)).
6. Use only fluid recommended by the manufacturer ([see 7.3.1 Oil Recommendations](#)).
7. Make sure all pressure in the system is relieved before cracking open or disassembling any pressurized fitting or hose.

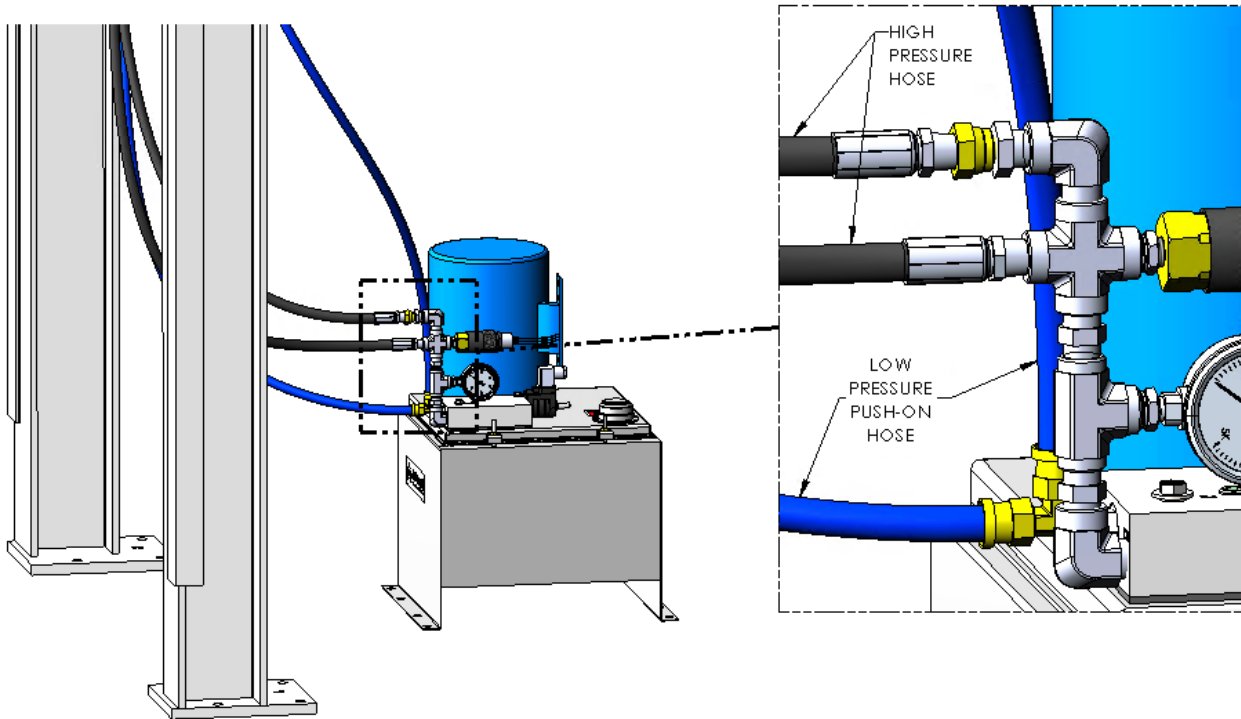
### **i** WARNING

**Use properly rated hoses only! Never use fittings or hoses that are not properly rated for the intended use.**

**Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids during maintenance and/or repair of the lift which may result in severe injury or death. Assume that all hydraulic hoses and components are pressurized.**

8. Locate the power unit, preferably within 20 feet of the lift cylinders (the lift is supplied with an extra 20 foot connecting hose). The power unit can be mounted on the floor or on the wall, contact the Autoquip Customer Assurance department if special mounting brackets are required.
9. Plumb each lifting cylinder as shown, taking care to note correct orientation of the velocity fuses (arrows are stamped on the side of the fuse to show the direction of the flow you are trying to control). There are 2 styles of power unit available.
10. Attach the braided hoses from the high pressure port of the power unit to the cylinders.
11. Cut the required lengths of  $\frac{3}{8}$  inch low pressure, rubber bleeder tubes and connect from the reservoir of the power unit to the cylinders as shown.



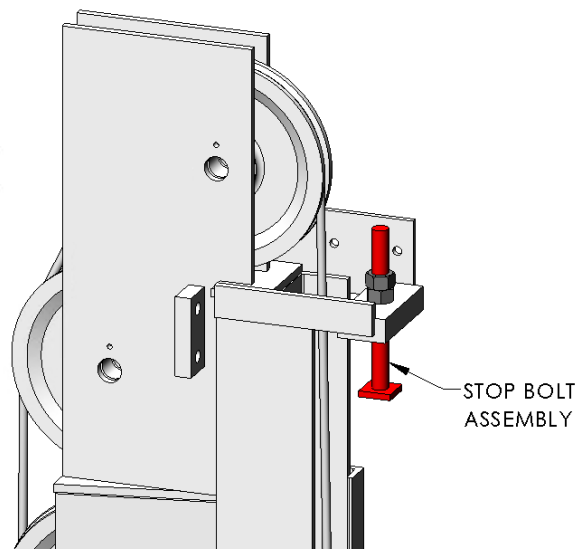


12. Connect electrical power to the power unit.

**i CAUTION**

**Purge air in the system! The presence of air in the system can lead to a lock-up of the velocity fuses. (Air reacts like a spring when it is compressed.)**

13. Adjust the top stop bolts that are provided at the top of each mast to stop the platform at the upper level (see illustration below).



**i WARNING**

**Do not over travel! Mechanical stops must be in place to prevent the platform from over traveling. Over-traveling can cause permanent damage to the platform or failure of the lifting cylinders.**

## 4.15 Electrical Installation Details

---

### **i DANGER**



All maintenance procedures described in this section should only be performed by qualified service personnel.

### **i WARNING**

Never operate the lift by “manual-ing” the electrical controls (using the contactors located inside the control panel). All safety devices are by-passed in this mode of operation and lift damage or severe personal injury could occur.

### **i CAUTION**

Do not operate the VRC until the platform is leveled and the guide beams are plumbed and secure.

### **NOTICE**

The control panel instructions are in the controller manual sent with the order. These are required for installation.

1. Ensure that the supplied voltage matches the motor supplied.
2. Make sure that the customer-supplied electrical disconnect is a fused-type disconnect and is installed within direct line of sight of the associated lift.
3. All electrical work must meet the requirements of ASME B20.1 as well as all state and local codes.
4. Make sure that only qualified electricians perform all wiring and that they are familiar with the electrical drawings shipped with the equipment.
5. Operator pushbutton stations must not be operable from the platform with the gate(s) or door(s) closed, typically located at least 6ft away from the platform.
6. Per OSHA requirements, the motor control panel must be mounted in a location that is visible from the lift.
7. Always follow OSHA lock-out, tag-out procedures when the lift being maintained, serviced, or inspected.
8. Bump/jog the motor to check the rotation. See the HMI manual for how to bump/jog the motor without all electrical components installed. If motor is turning wrong direction, reverse any two motor electrical leads.

A job-specific schematic has been shipped separately in a packet of information which includes this installation manual for reference by the electrical contractor or service provider. Refer to this schematic and follow all applicable NEC requirements throughout the electrical installation process.

Autoquip typically provides all the electrical control and signal devices. All required wire, conduit, and main disconnect for field wiring is supplied by others. Unless specifically included in the contract, the mounting and wiring of control and signal devices is the user's responsibility.

**MAIN DISCONNECT:** This should be a fused type disconnect which is to be located within 10ft of the lift. THIS ITEM IS NOT SUPPLIED BY AUTOQUIP AND IS REQUIRED BY THE NEC (National Electrical Code.)

**MAIN CONTROL PANEL:** This panel is supplied and shipped loose by Autoquip, then mounted & wired by others. All electrical components will be tied into this panel.

**HYDRAULIC POWER UNIT:** Autoquip supplies the power unit shipped loose and recommends it be located adjacent to the unit. The power unit includes these electrical components to be field wired to the Control Panel: a motor, a pressure switch, and an electrical solenoid for the oil dump valve.

**PUSH BUTTON STATIONS:** Autoquip supplies (1) P/B station for each level (under normal conditions). Stations are to be mounted by an electrician. The Safety Code (ANSI/ASME B20.1) dictates the position of these units to be, “remotely located so they cannot be activated while standing on the lift platform.”

**LIFT STATUS LIMIT SWITCHES:** Limit switches have been shipped loose to be field mounted, wired, and adjusted to sense the status/position of the lift platform (lower level – for interlocks, upper level – for hydraulic re-pressurization circuit, and/or mid-level for 3-level applications).

**OPTIONS AND ACCESSORIES:** Items such as lift present lights, platform lights, power gates, horns, etc, will all require electrical installation and will increase the installation time and the costs.

## 4.16 Installing Level/Lift Status Limit Switches

### **i DANGER**



Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).

### **i WARNING**

Ensure one “WARNING – Do Not Tamper” label is adjacent to (within 6-12 inches) each sensing device (limit switches, door status switches, door interlocks, etc.) in a location that is visible to the operator.



Items needed:

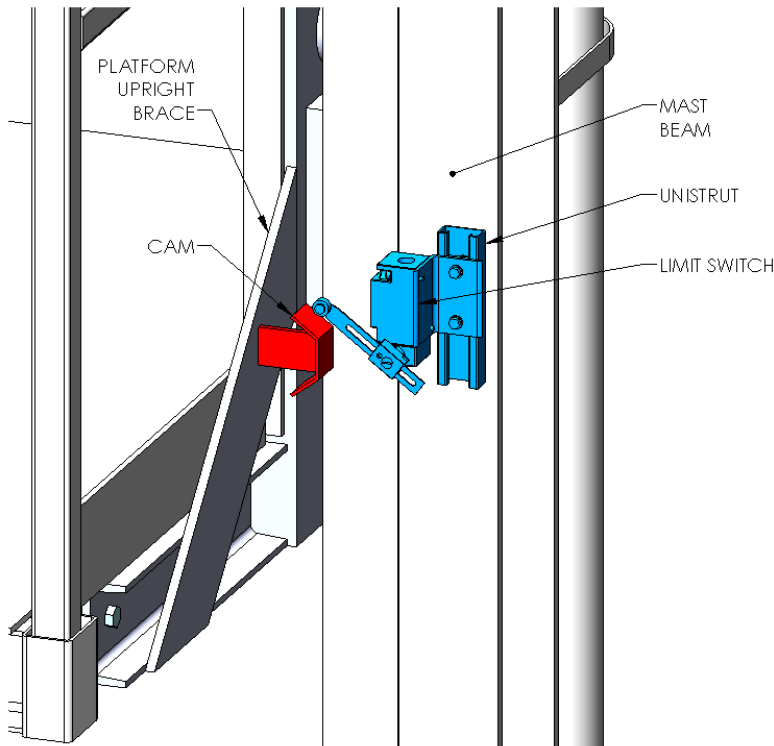
- 1 N.O. – 1 N.C. Limit Switch Kits (Qty. varies)

Level limit switch Kits – typically 1 limit switch per level has been shipped loose to be field mounted, wired, and adjusted to sense the status/position of the lift platform.

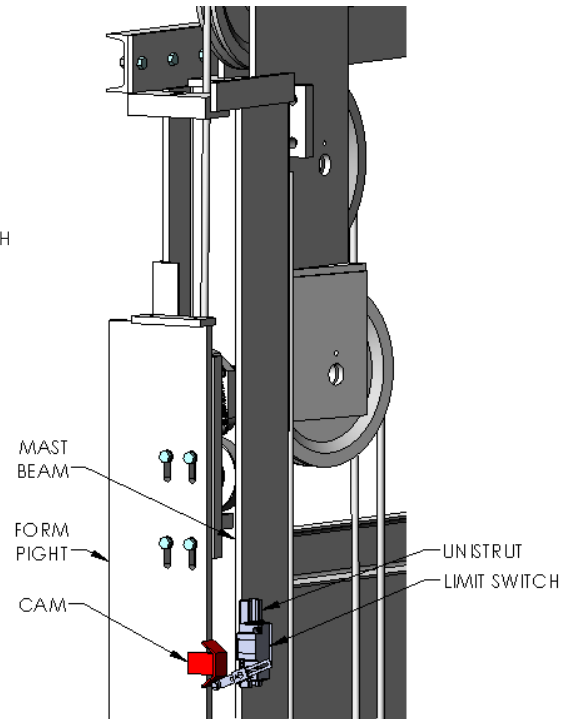
1. **STRADDLE** - Locate and weld the limit switch cam assembly to the platform bracing as shown.  
**CANTILEVER** - Locate and weld the limit switch cam assembly to the platform upright as shown.
2. Locate and assemble the adjustable level limit switch kits as shown, including the Unistrut mounting channel.



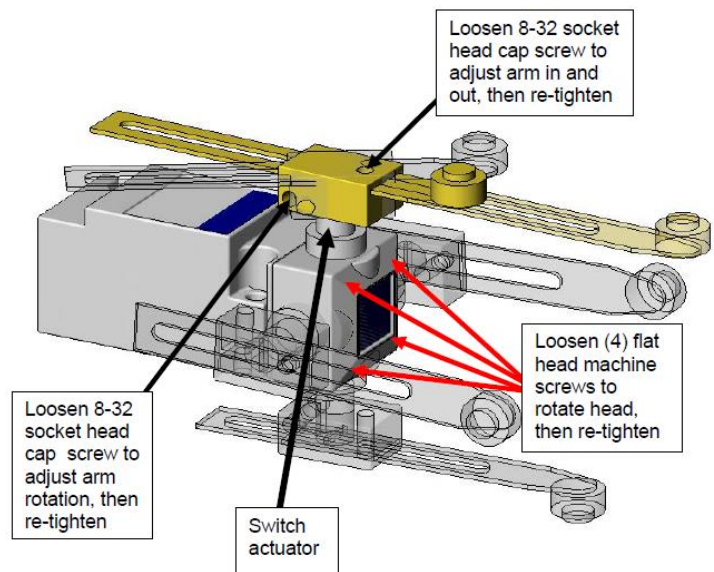
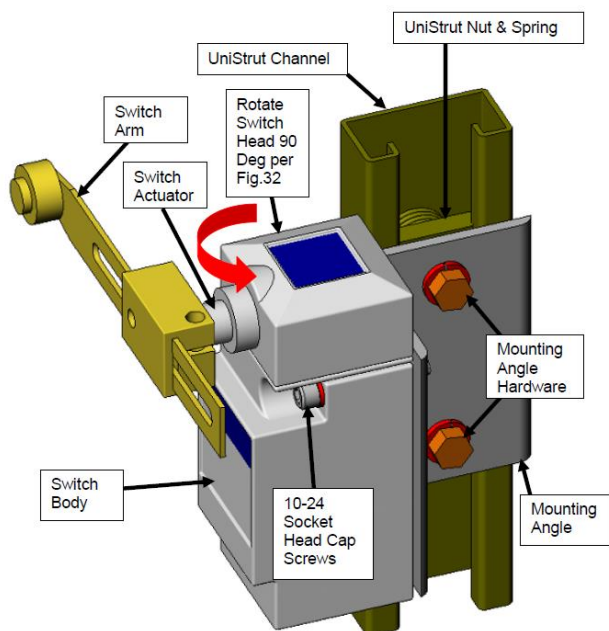
- Once assembled, orient and weld the Unistrut to the mast to allow the limit switch arm to make contact with the cam when the platform is at that corresponding level – leaving room for adjustment.
- For best results in adjusting position of the switch, loosen the mounting bolts that hold the switch to the Unistrut channel just enough so that the switch can be lightly tapped into position. It is extremely difficult to loosen the bolts completely and adjust the switch.



**STRADDLE DESIGN**



**CANTILEVER DESIGN**





## 4.17 Test Run (Empty)

---

### **i DANGER**



Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).

### **i CAUTION**

The pressure switch is not functional with temporary power! The power unit will continue to run as long as the contact button is pressed. Permanent damage to the lift may result if power to the electric motor is not shut off once the platform makes contact with the stop bolts.

Take extreme caution when running the unit before mechanical stops are installed and adjusted properly! Lift over-travel can cause severe damage.

1. Check that all cables are properly seated in the sheaving system.
2. Turn on power and press the UP button to raise the platform 6-12 inches. (you must press E-Stop button to stop the lift) and check for:
  - a. Correct rotation/direction of the motor
  - b. Running clearance of the platform in the guides
  - c. Any unexpected noise, vibration, rubbing, interferences, etc.
  - d. Level platform deck surface
3. Re-set the E-Stop and activate the down push button and lower the lift. Is the platform stopping square at the bottom level?
4. Raise the platform 3-6 feet above the floor. Is everything okay? Any unusual noises? Are masts stable or do they need additional bracing?
5. If you are satisfied with the alignment and structural integrity of the unit, run the platform higher, continuing to check the clearance and smoothness of operation.
6. Run the platform to the top floor and check the alignment of the platform. Re-adjust the stops as necessary to achieve alignment with the upper floor. Be sure that at least 1 inch clearance is present between the platform and all building structures, and other site constraints.
7. Adjust the top-level limit switch to make contact with the platform limit switch cam.
8. Lower the platform a few feet and raise it back to its full travel. Run it hard against the mechanical stops and check platform alignment once more.

## 4.18 Final Adjustments

---

### **i DANGER**



All maintenance procedures described in this section should only be performed by qualified service personnel.

1. Run the system through its paces if you have a complete electrical system.
2. To change the actuation direction of the limit switch, remove the switch head. Change the actuating control knob/mechanism to the desired actuation direction.

### 4.18.1 Relief Valve Adjustments

Though set at the factory, it is recommended that the pressure relief setting be checked prior to placing the unit in service.

1. Make sure top stop bolts and nuts are installed and tightened per instructions above.
2. See the HMI manual for how to override the pressure switch.

### **NOTICE**

The control panel instructions are in the controller manual sent with the order. These are required for installation.

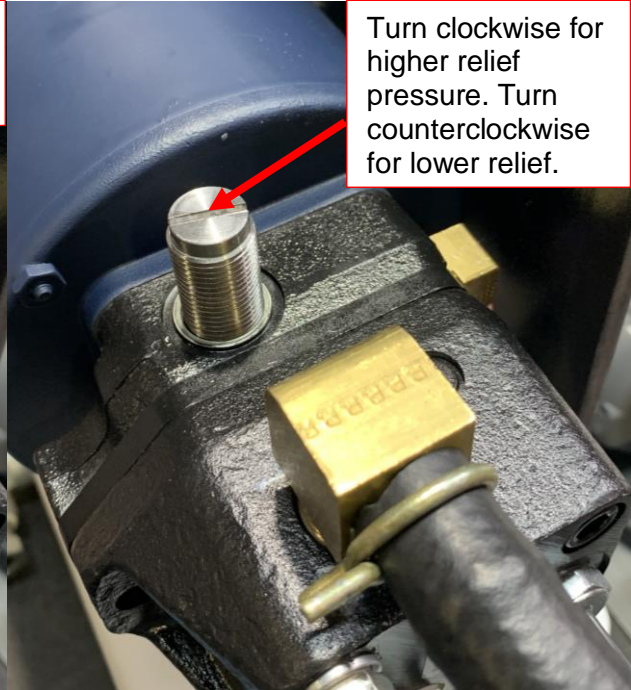
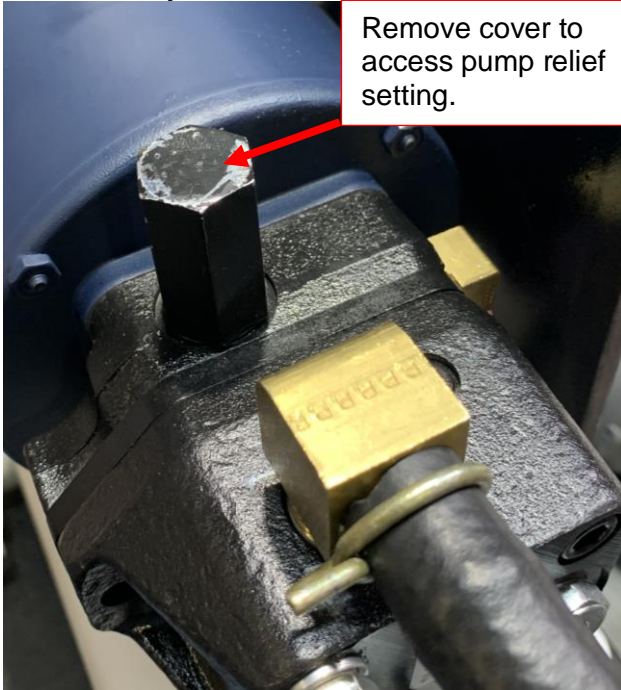
3. Once overridden, raise the lift platform to full travel against the top stops. Pressure gauge should read 3200 psi (all air must have already been bled from the hydraulic circuit before this is done).

### **i CAUTION**

**Do not operate motor at relief pressure! The motor should not be operated for more than a few seconds when the unit is operating at relief pressure. Longer running times could result in damage to the pump.**

4. If pressure does not read 3200 psi, adjust the relief valve setting per the steps shown below.

### Contractor power unit -

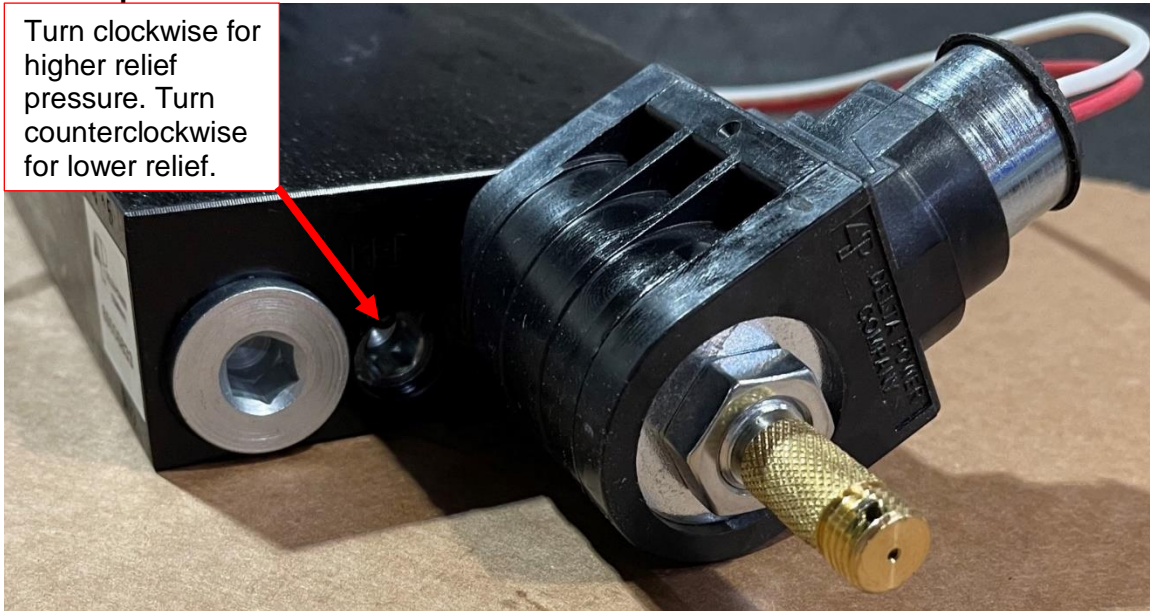


### **i CAUTION**

Do not operate motor without cover reinstalled on relief valve.

### Vertical power unit –

Turn clockwise for higher relief pressure. Turn counterclockwise for lower relief.



5. After adjustment, check the setting one more time before removing the override in the controller.

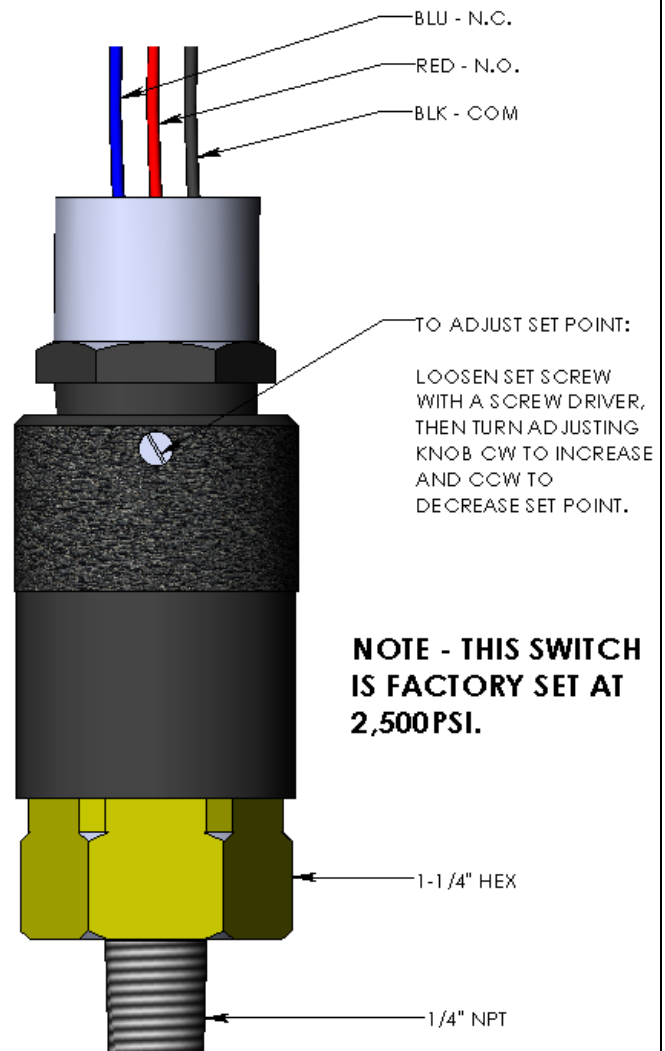
### **i WARNING**

**GUARDS, INTERLOCKS, SAFETY DEVICES and ELECTRICAL CIRCUIT must be restored to correct operation when installing parts or making adjustments or repairs.**

## 4.18.2 Pressure Switch Setting

Though set at the factory, it is recommended that the pressure switch setting be checked prior to placing the unit in service to ensure that the power unit motor is turning off when the platform reaches the fully raised position.

1. Make sure top stop bolts and nuts are installed and tightened per instructions above.
2. Raise the lift platform to full travel against the top stops. Pressure gauge reading should be 2,500 psi (all air must have already been bled from the hydraulic circuit before this is done).
3. If pressure does not read 2,500 psi and the motor shuts off, cut off electrical power to the motor at the main disconnect. Adjust the pressure switch setting per the instructions to the right.
4. If pressure reads 2,500 psi or less and the motor does not shut off, [see 4.18.1 Relief Valve Adjustments](#).
5. After adjustment, reconnect power to the motor and raise the lift to the top stops again. If the pressure is at 2,500 psi and the motor turns off, make sure pressure switch set screw is locked in place.
6. Run the lift up to full travel a few more times to ensure that the setting is correct.



## 4.19 Gate & Enclosure (Guarding) Installation

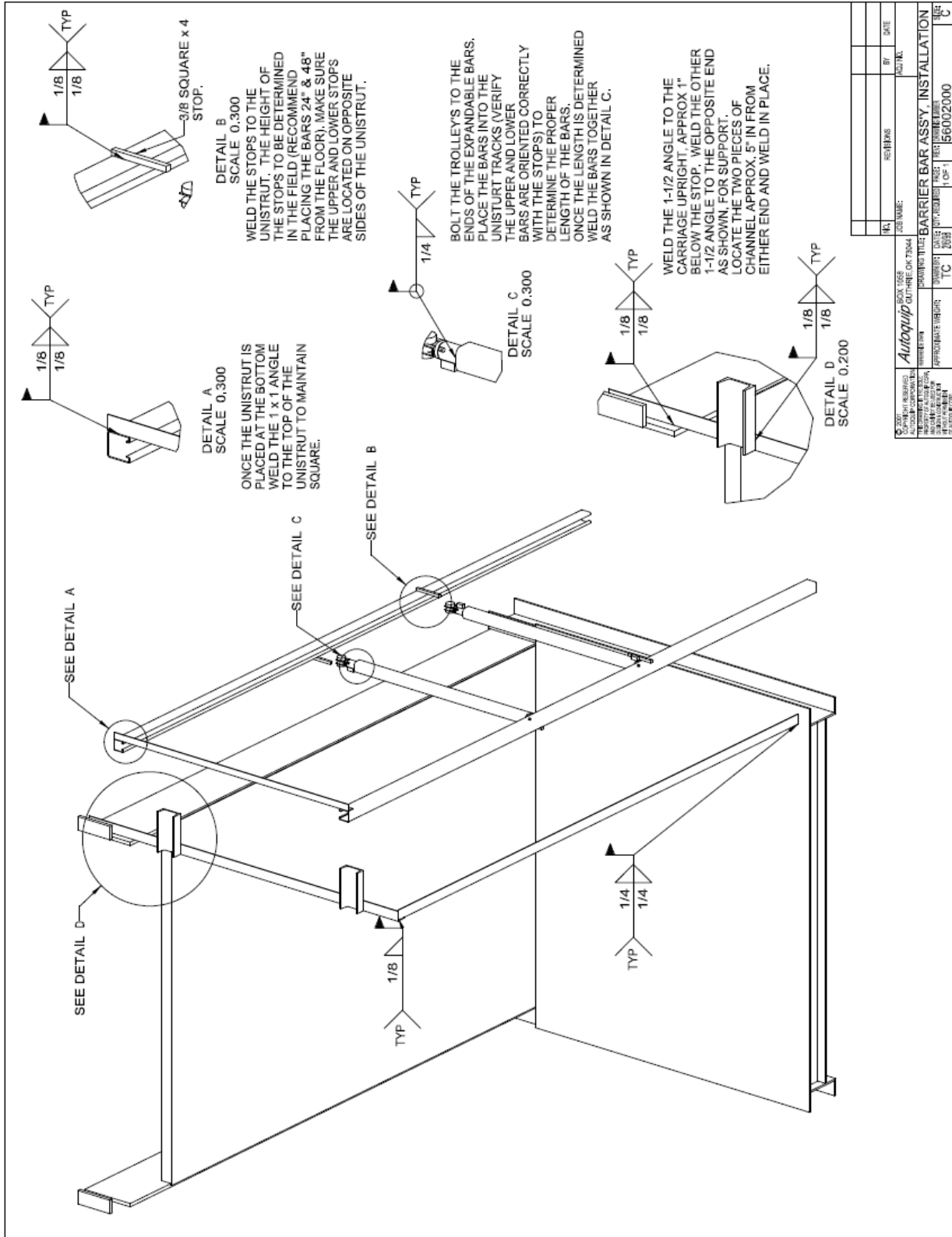
1. Install the gate and enclosures following the layout on the GA drawing provided with the enclosure package and referring to the Gate & Enclosure Installation Manual that has been sent separately for this particular application.
2. All gates or doors accessing the lift must have electrical contacts and mechanical locks to prevent the lift from operating if a gate is left open. The gate should lock until the platform is at the landing. There are many variables that can affect your installation: the type of gate; the type of door; conditions unique to a specific site. One (1) to Two (2) electrical sensing or signaling devices are supplied with each gate that incorporates the standard interlock design.

**NOTE: If the guarding is not purchased from Autoquip it is the responsibility of the Owner to make sure it is in compliance with the requirements set forth in ASME B20.1.**

# 4.20 Shaft Way Barrier Bar Kit (for shaft way applications)

The figure below illustrates the contents and installation details for the shaft way barrier bar system supplied for units in shaft way applications. The barrier bar system is designed to leave (1) mid and (1) top rail across the door opening at the upper level when the platform is called to the lower level.

## CANTILEVER DESIGN

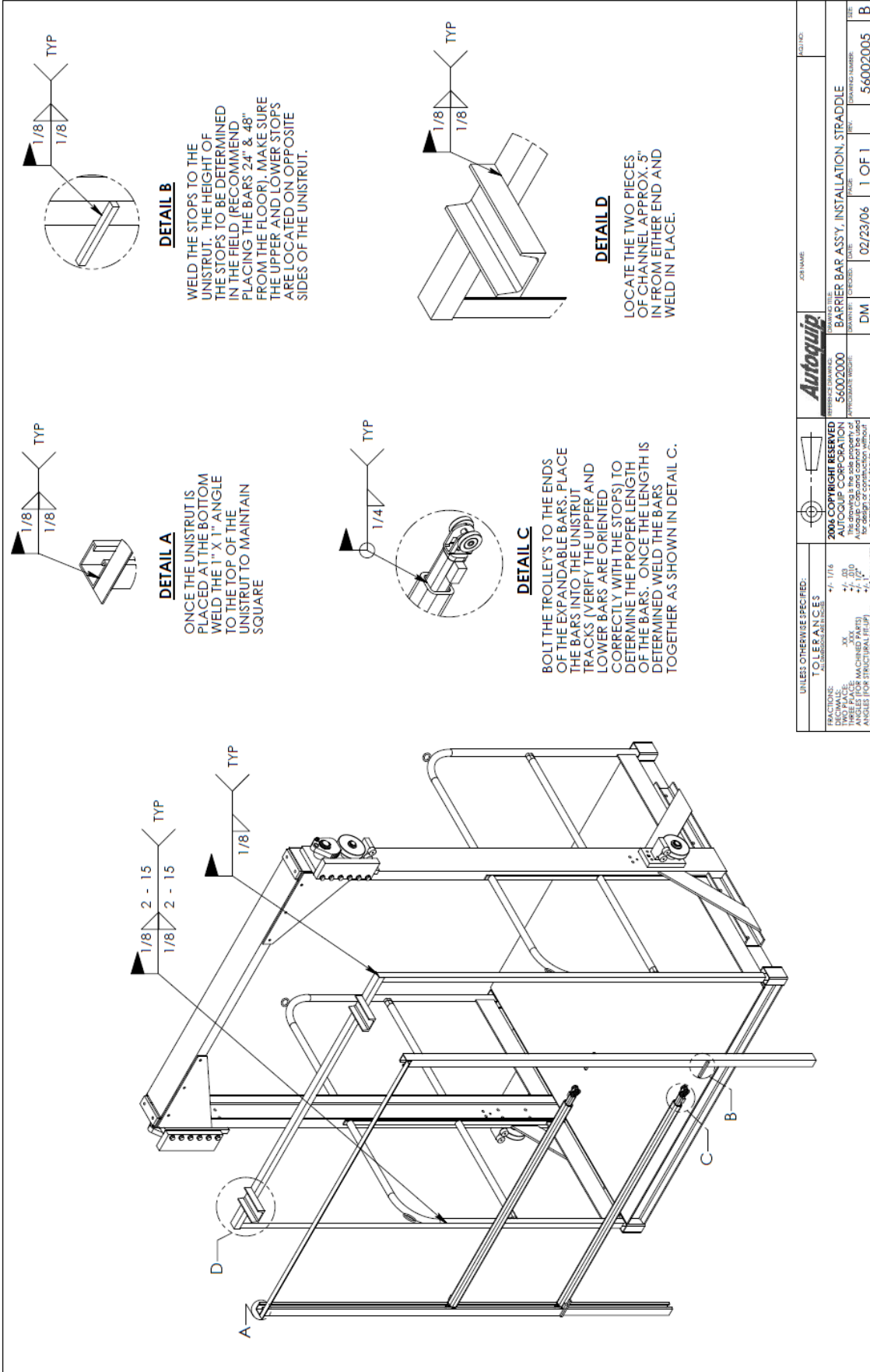


IC	RES/ISS	BY	DATE
Autoquip	56002000		
REVISION TITLE: BARRIER BAR ASSY. INSTALLATION			
DATE	BY	CHK'D	REV
1/1/2022	TC	1/2022	1
APPROVED: [Signature]			REV: C
DESIGNED: [Signature]			PART NO. 56002000



# STRADDLE DESIGN

56002005 1 OF 1



**DETAIL B**

WELD THE STOPS TO THE UNISTRUT. THE HEIGHT OF THE STOPS TO BE DETERMINED IN THE FIELD (RECOMMEND PLACING THE BARS 24" & 48" FROM THE FLOOR). MAKE SURE THE UPPER AND LOWER STOPS ARE LOCATED ON OPPOSITE SIDES OF THE UNISTRUT.

**DETAIL D**

LOCATE THE TWO PIECES OF CHANNEL APPROX. 5" IN FROM EITHER END AND WELD IN PLACE.

**DETAIL A**

ONCE THE UNISTRUT IS PLACED AT THE BOTTOM WELD THE 1" X 1" ANGLE TO THE TOP OF THE UNISTRUT TO MAINTAIN SQUARE

**DETAIL C**

BOLT THE TROLLEYS TO THE ENDS OF THE EXPANDABLE BARS. PLACE THE BARS INTO THE UNISTRUT TRACKS (VERIFY THE UPPER AND LOWER BARS ARE ORIENTED CORRECTLY WITH THE STOPS) TO DETERMINE THE PROPER LENGTH OF THE BARS. ONCE THE LENGTH IS DETERMINED, WELD THE BARS TOGETHER AS SHOWN IN DETAIL C.

UNLESS OTHERWISE SPECIFIED:		JOB NAME	
TOLERANCES		PART NUMBER	
FRACTIONS: AS SHOWN, DECIMALS		DRAWING NUMBER	
DECIMALS:	+/ - 1/16	56002005	
THREE PLACES:	XX	REV. DATE	
FOUR PLACES:	XXX	02/23/06 1 OF 1	
ANGLES (FOR STRUCTURAL FITUP):	+/ - 1'	ISSUED NUMBER	
BREAK ALL SHARP EDGES: 2017 MAX	30° MINIMUM	56002005	
 2004 COPYRIGHT RESERVED AUTOQUIP CORPORATION 56002000 PARTICIPANT WEIGHT 02/23/06 DATE DM SIZE B		BARRIER BAR ASSY, INSTALLATION, STRADDLE 56002000 02/23/06 1 OF 1 56002005	



# STRADDLE DESIGN

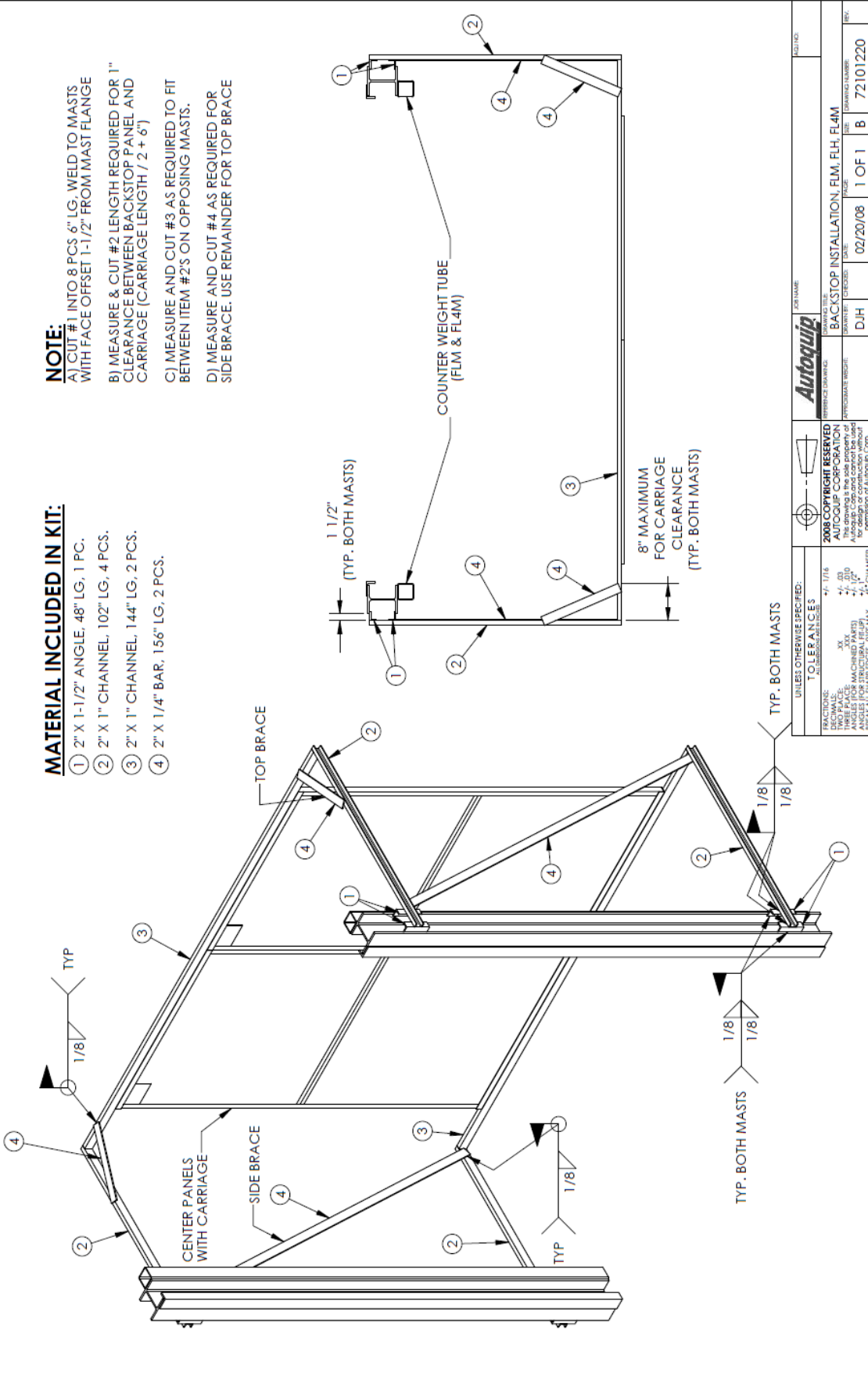
72101220 1 OF 1

**MATERIAL INCLUDED IN KIT:**

- ① 2" X 1-1/2" ANGLE, 48" LG, 1 PC.
- ② 2" X 1" CHANNEL, 102" LG, 4 PCS.
- ③ 2" X 1" CHANNEL, 144" LG, 2 PCS.
- ④ 2" X 1/4" BAR, 156" LG, 2 PCS.

**NOTE:**

- A) CUT #1 INTO 8 PCS 6" LG, WELD TO MASTS WITH FACE OFFSET 1-1/2" FROM MAST FLANGE
- B) MEASURE & CUT #2 LENGTH REQUIRED FOR 1" CLEARANCE BETWEEN BACKSTOP PANEL AND CARRIAGE [CARRIAGE LENGTH / 2 + 6"]
- C) MEASURE AND CUT #3 AS REQUIRED TO FIT BETWEEN ITEM #2'S ON OPPOSING MASTS.
- D) MEASURE AND CUT #4 AS REQUIRED FOR SIDE BRACE. USE REMAINDER FOR TOP BRACE



		FOR NAME: _____ DRAWING NO.: _____ BACKSTOP INSTALLATION, FLM, FL4M
2008 COPYRIGHT RESERVED AUTOQUIP CORPORATION This drawing is the sole property of Autoquip Corporation. It is to be used for design or construction without permission of Autoquip Corp.	DATE: 02/20/08 DRAWN BY: DJH CHECKED BY: _____ PARTICULATE WEIGHT: _____	REV: 72101220 SIZE: B 1 OF 1
UNLESS OTHERWISE SPECIFIED: TOLERANCES: FRACTIONS: AS SHOWN DECIMALS: .0005 ANGLES: AS SHOWN HOLE POSITION: ±.010 HOLE SIZE: ±.005 BREAK ALL SHARP EDGES: .015" MAX FINISH: 32" CHUMASTER		



## 4.22 Installation Wrap-Up

---

1. After the unit is completely wired, make all necessary adjustments to the interlocks, gate status switches, upper & lower lift status limit switches, and to the top stop bolts to ensure proper operation of the lift and its safeties as required by the schematic.
2. Ensure that all WARNING SIGNS AND DECALS provided with the unit which may have been shipped loose for field installation (gate panel, etc.) are in place ([see 3.3 Safety Labels](#)).
3. Clean the area, paint and touch up as needed.

## 5. BLOCKING INSTRUCTIONS

---

### **i DANGER**



Failure to properly adhere to lift blocking procedures is to risk the sudden and uncontrolled descent of the lift during maintenance or inspection. A falling lift can cause severe injury or death.



Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).

This procedure describes the only factory-approved method of working under a lift. Follow these instructions EVERY time you plan to reach or crawl beneath the lift to perform service or maintenance – no matter how momentary that might be.

### 5.1 Lower the Platform

---

The safest way to inspect or maintain a VRC unit is with the load removed and the lift platform in the fully lowered position. When the platform is fully lowered it has no potential to suddenly or unexpectedly shift or drop.

If the platform cannot be lowered by gravity, [see 7.3.2 If a Platform Hangs Up or Jams](#).

### 5.2 When the Platform Must be Raised or Secured

---

1. Remove any load from the unit.
2. Raise the platform to the desired elevation.

**If Operational:** Enter “Maintenance” mode on the HMI and use the “jog” function until the desired height is reached

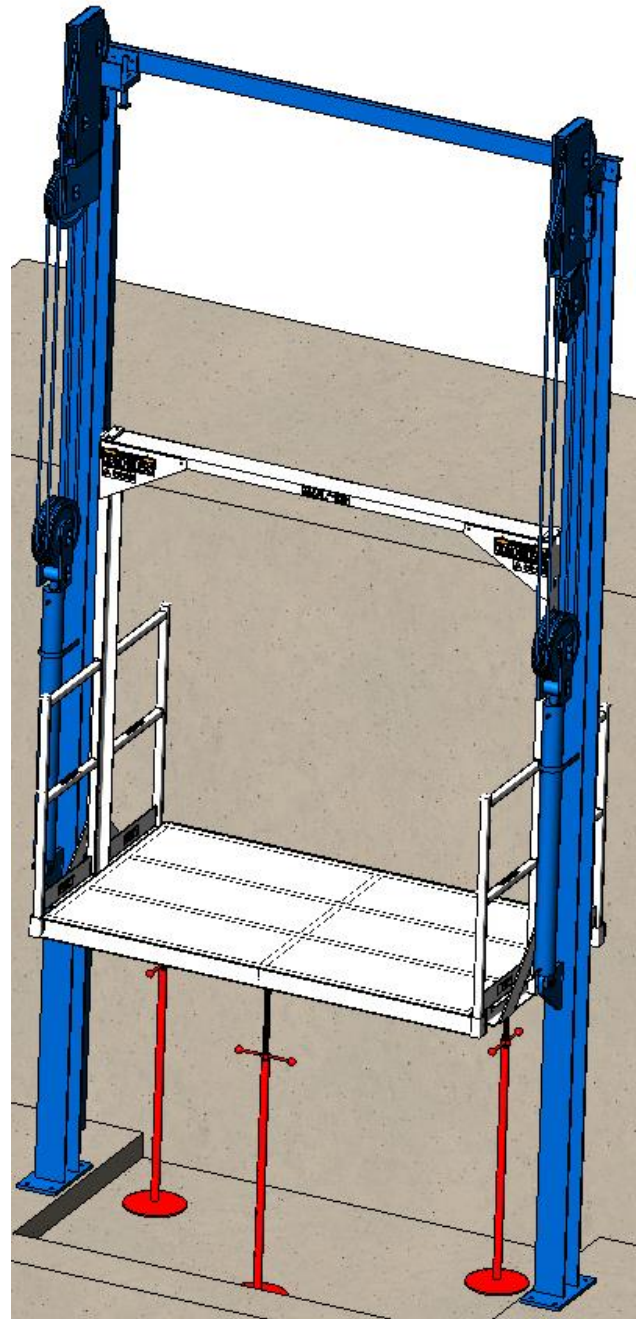
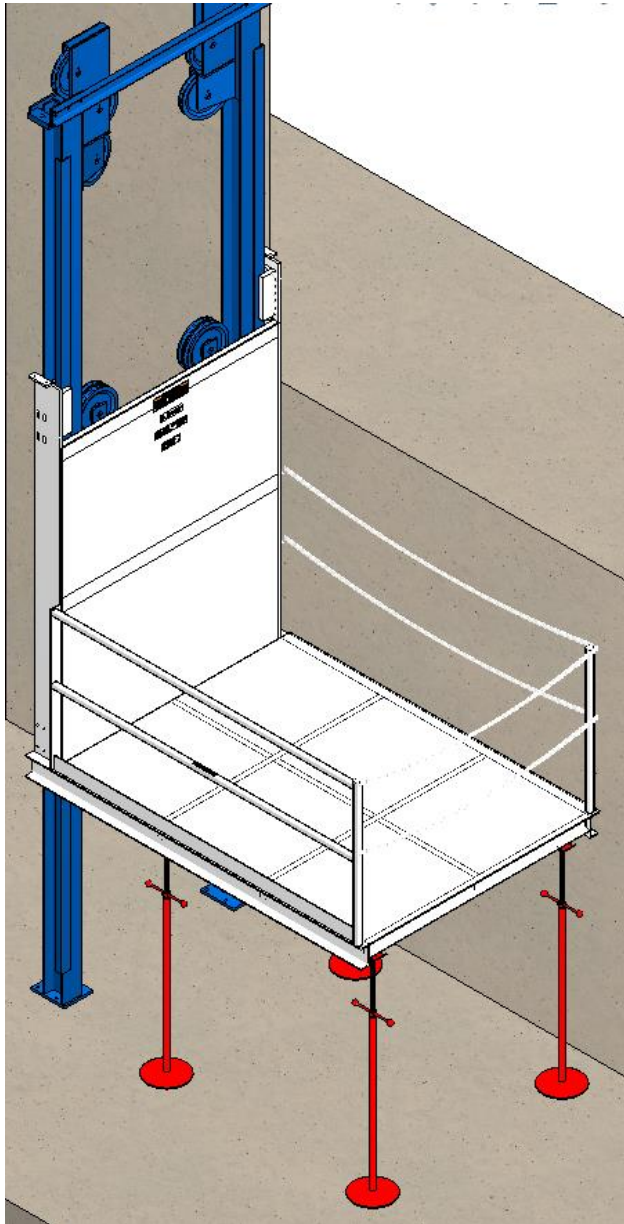
**If Not Operational:** Use a fork truck or other lifting device to raise the VRC platform, taking care not to damage the platform or lift actuator/drive.

3. Use a series of adequately sized adjustable jack stands (or equivalent) around the underside perimeter of the lift platform to provide a level, stable support.

**i DANGER**

**Do not stand beneath the platform while setting the supports into position.**

**Check the stability of the supports. If there is any chance of the support tipping or otherwise not providing a safe and stable condition, do not go under the platform!**



4. Lower the platform onto the supports.

**If operational** – Enter “Maintenance” mode on the HMI and use the “jog” function until the platform lands onto, and is fully supported by, the maintenance devices.

**If NOT operational** - Use a fork truck or other lifting device to lower the VRC platform onto the maintenance devices, taking care not to damage the platform or lift actuator/drive. Make sure the platform is level when supported.

5. Re-check to ensure that the supports are fully and properly engaged with the underside of the platform. If not fully engaged the lift could fall unexpectedly, resulting in permanent damage to the device or the lift.

6. After the platform is fully lowered, continue to hold the DOWN button/lowering valve for an additional 5-10 seconds to relieve the hydraulic system of pressure.

## **i WARNING**

**Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids during maintenance and/or repair of the lift which may result in severe injury or death. Assume that all hydraulic hoses and components are pressurized.**



**Wear personal protective equipment, such as gloves and safety glasses, whenever installing, servicing, or checking a hydraulic system.**



**Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.**



**Small hydraulic hose leaks are extremely dangerous and can inject hydraulic oil under the skin even through gloves. Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.**



**Ingesting hydraulic fluid is toxic and hazardous to people and wildlife. Symptoms may be skin irritation, weakness in the hands, intestinal bleeding, pneumonia, or death. Seek first aid immediately. Dispose of spilled fluids appropriately.**

7. Follow OSHA electrical lock-out/tag-out procedures. Disconnect and tag all electrical and/or other power sources to prevent an unplanned or unexpected actuation of the lift.

## **i DANGER**



**Turn off the power and lock out the power at the primary power disconnect switch before service or maintenance per OSHA Lock-Out, Tag-Out procedures.**



8. Once inspection or work is complete, reverse the performance of the steps above to raise the platform off the maintenance devices and return the devices to their designated storage positions.

## 6. OPERATION

### **i DANGER**

Never operate unit when parts are broken or damaged! Do not operate this equipment when non-factory approved or damaged parts are in use! Contact local representative to rectify all such situations or contact Autoquip ([see 1.1 Contact Information](#))

### **i WARNING**



No riders! The VRC is provided for the sole purpose of transporting goods between floor elevations. At no time should it be used to transport personnel.

Before operating VRC, all personnel interacting with lift must read, understand and follow instructions and safety warnings in this manual.

Close all gates when not in use. Never leave the VRC unattended with gates left open.

Never run the unit with the gates or doors open. Do not operate unit with doors open or with the interlocks “defeated” (bypassed).

### **i CAUTION**

Do not operate the VRC until all sensing switches have been confirmed to be installed and adjusted correctly.

### **NOTICE**

In order for the lift to operate:

- All gates/doors guarding the lift must be closed.
- Loads cannot hang over the edge or sides of the platform.
- The load must be within the specified load capacity of the lift.
- All electrical safeties, sensors, and switches must be in their “normal” condition.

Per ASME B20.1, operator pushbutton stations must be located such that they cannot be activated while standing on the platform.



### 6.1 Moving Up



1. Verify all personnel are clear of VRC.
2. Press and release the “UP” button to raise lift.
3. When the platform makes contact with the upper stop bolts (or any other obstruction in the path), the pressure switch senses an increase in pressure, which engages the holding circuit and shuts off the motor.


## 6.2 Moving Down



1. Press and release the "DOWN" button to lower lift.

## 6.3 Emergency Stop



1. Press the red emergency stop button to stop all travel of the VRC at any time.
2. The emergency stop button will interrupt all electrical control functions when it is activated. Movement of the platform will cease, regardless of its direction.
3. The emergency stop button is typically reset by one of two methods:
  - a. Turning clockwise until it pops back out. This is usually indicated by the  symbol.
  - b. Another style just pulls straight back out.
4. After the emergency stop button has been reset, any level button may be pressed to continue travel.

### NOTICE

**Always find out why the E-Stop button may have been pressed, and be sure to correct the problem (malfunction, interference, etc.) before making the lift operational again.**

## 6.4 Storage

When not in use, it is always best to store the unit with the platform in the fully lowered position. This removes pressure from the hydraulic system during non-use and will extend the overall life of the components.

# 7. MAINTENANCE

---

## **i DANGER**



All maintenance procedures described in this section should only be performed by qualified service personnel.



Turn off the power and lock out the power at the primary power disconnect switch before service or maintenance per OSHA Lock-Out, Tag-Out procedures.

## 7.1 Planned Maintenance Program

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A local Autoquip representative provides a Planned Maintenance Program (PMP) for this equipment using qualified and experienced personnel. Contact a local representative or Autoquip ([see 1.1 Contact Information](#)).

## 7.2 Routine Maintenance

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Recommended maintenance interval –  
**Every week or 8 hours of operation.**

- Inspect all gates/doors for wear or damage.
- Check that all the hydraulic fittings are secure and dry.
- While running, listen for unusual noises. Isolate and check for the cause. Repair if required.



**Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).**

- Using a long-handled broom or other implement, remove any debris from under the platform or in the enclosed area.

Recommended maintenance interval –  
**Every 6 months or 175 hours of operation, whichever comes first.**

- Verify the platform is hitting the upper limit stop bolts.
- Make sure the platform is lined up with the upper floor. Adjust the stop bolts, if required.
- Check the re-pressurization circuit limit switch and adjust it, if needed.
- Look for any unusual rub marks on the guides, wall, platform, masts, etc., which might indicate misalignment of the components due to overloading, misuse, or something out of tolerance.
- Inspect guide rollers for wear, binding, or other indication of non-rotation.
- Inspect all gate/door interlocks and status switches for proper operation.
- Inspect all gates/doors for wear or damage.
- Check that all bolts and nuts are secure.



- Check the oil level in the power unit reservoir. The oil should be 1-½ to 2 inches below the top of the tank when the VRC is fully lowered.
- Check that the cylinder is clean and un-nicked. There may be a small amount of oil accumulating near the rod clevis block and around the rod seal due to the normal wiping action of the rod wiper. Wipe the area clean.

NOTE: Do not mistake normal lubricating weeping for a leak. If oil is running down the outside of the cylinder barrel and is dripping on the floor after everything has been wiped clean during the last maintenance, there may be a bleed screw leak.

## 7.3 General Maintenance

### 7.3.1 Oil Recommendations

Autoquip recommends 5W-30 for most environments. If the temperature is below 32°F, please consult Autoquip for recommendations ([see 1.1 Contact Information](#)). Also available are biodegradable and food grade oils.

### 7.3.2 If a Platform Hangs Up or Jams

**i DANGER**



All maintenance procedures described in this section should only be performed by qualified service personnel.

Never operate unit when parts are broken or damaged! Do not operate this equipment when non-factory approved or damaged parts are in use! Contact local representative to rectify all such situations or contact Autoquip ([see 1.1 Contact Information](#))



Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).



DO NOT walk out onto the platform or attempt to physically free the jam until load is removed and mechanism is securely blocked with maintenance devices ([see 5 Blocking Instructions](#)).

One possible issue would be a velocity fuse may be locked. **Do not attempt to remove the velocity fuse.** The following steps should be followed:

1. Remove load from lift. Inspect all fittings, hoses, and other hydraulic components for leaks or damage.
2. If no leak or damage is noticed, attempt to pressurize lifting cylinder by pressing “UP” button on controller for a few seconds. Once the lift reaches the next level, press “DOWN” button.
3. Once lift is lowered, you should check for air in the system ([see 7.3.4 Bleeding Air from System](#)).

If above steps do not correct problem, contact Autoquip ([see 1.1 Contact Information](#)) to provide assistance in discovering the source & acceptable remedy for the platform jam.

Contact an authorized Autoquip dealer or representative to conduct a comprehensive inspection of the lift for structural and component damage before placing it back in service.



### 7.3.3 Hydraulic Velocity Fuse (HVF) Replacement

#### **i WARNING**

Velocity fuse is not repairable. Replace velocity fuse if defective.

Do not use a swivel fitting between velocity fuse and cylinder. If installed improperly, it will not lock up in the event of a hydraulic line failure.

#### **i CAUTION**

Do not use Teflon tape. Tape fragments can cause malfunctioning of the hydraulic system. Loctite PST #567 pipe thread sealant or equivalent is recommended.

#### **NOTICE**

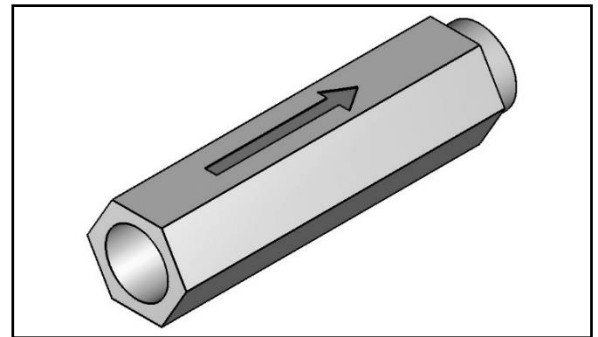
Autoquip recommends replacing any NPT fittings that have been disassembled due to their inherent design for sealing.

Use approved fluids only. Use of unauthorized fluids may cause damage to seals and hosing.

#### **Do Not Use:**


- Automatic Transmission Fluid (ATF)
- Hydraulic Jack Oil
- Brake Fluids

Arrow on hydraulic velocity fuse indicates direction of oil flow restriction. Hydraulic velocity fuse must be installed with arrow pointing away from cylinder.



1. Apply Loctite PST #567 pipe thread sealant or equivalent to threads and install fuse to cylinder with arrow pointing away from cylinder. Tighten fuse.
2. Fill reservoir to full mark if necessary with proper oil.
3. Check all fitting connections for hydraulic leaks and tighten as necessary.
4. Bleed air from system ([see 7.3.4 Bleeding Air from System](#)).

### 7.3.4 Bleeding Air from System

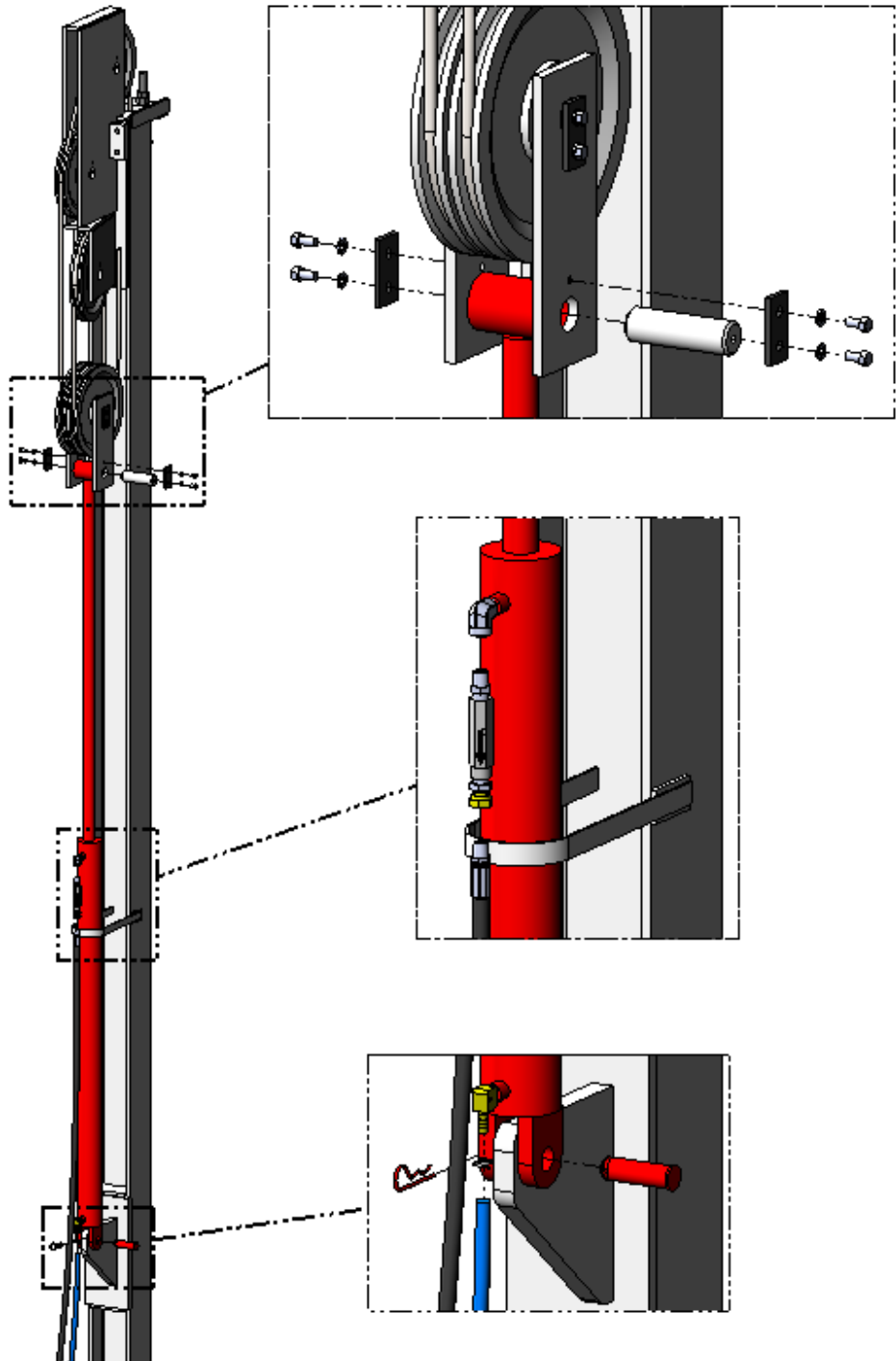
1. Press the “UP” button and allow the platform to raise 36-48 inches and stop it with the E-stop. 
2. Release the E-stop and press the “DOWN” button and allow the platform to fully lower.
3. Repeat procedure 8-10 times. If this does not bleed all air from system, contact Autoquip.
4. Clean up any spilled oil. Dispose of spilled oil in an environmentally safe manner.

NOTE: A small amount of air may remain in the cylinder, but it will be flushed back to the reservoir after a few operations of the system.

## 7.4 Cylinder and/or Seal Replacement

### 7.4.1 Cylinder Removal

1. Press the "DOWN" button and lower the platform to the fully down position. Continue to hold the button for five to ten seconds to relieve all hydraulic pressure and cable tension. The cylinders will be fully extended.
2. Cut off the electricity to the power unit (lock out-tag out).
3. Disconnect all hosing from the cylinder and place in a clean container to prevent spillage. Temporarily plug the two cylinder ports to prevent oil leakage.
4. Hold the cylinder securely and remove the clevis pin from the rod end that fits into the sheave mounting bracket. Secure the sheave bracket and cables so that they do not turn or twist.
5. Securely hold the cylinder and remove the lower cylinder clevis pin at the base to remove the cylinder from the mast. Once you have the cylinder down you will need to remove the temporary plugs and push the rod into the case, this will cause the oil inside the cylinder to be pushed out so take caution to prevent oil spillage.
6. Once free from the sheaves, push the piston rod into the cylinder to eject as much oil as possible into the power unit or another container.



## 7.4.2 Seal Replacement

See instructions provided with seal kit, or contact Autoquip ([see 1.1 Contact Information](#)).

## 7.4.3 Re-Installing the Cylinder

1. Reinstall the cylinder by reversing the steps above.
2. Check the oil level ([see 7.3.1 Oil Recommendations](#)).
3. Proceed to bleed air out of the system ([see 7.3.4 Bleeding Air from System](#)).
4. Clean the oil fill breather cap.
5. Clean up any debris and/or spilled oil from the area.

### **i CAUTION**

**Do not use Teflon tape. Tape fragments can cause malfunctioning of the hydraulic system. Loctite PST #567 pipe thread sealant or equivalent is recommended.**

### **NOTICE**

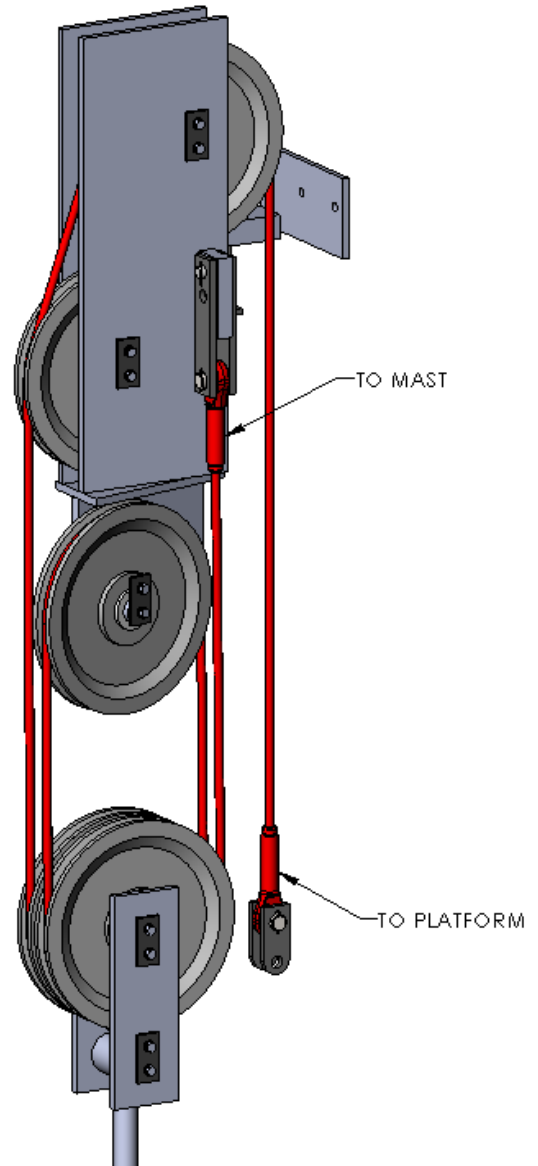
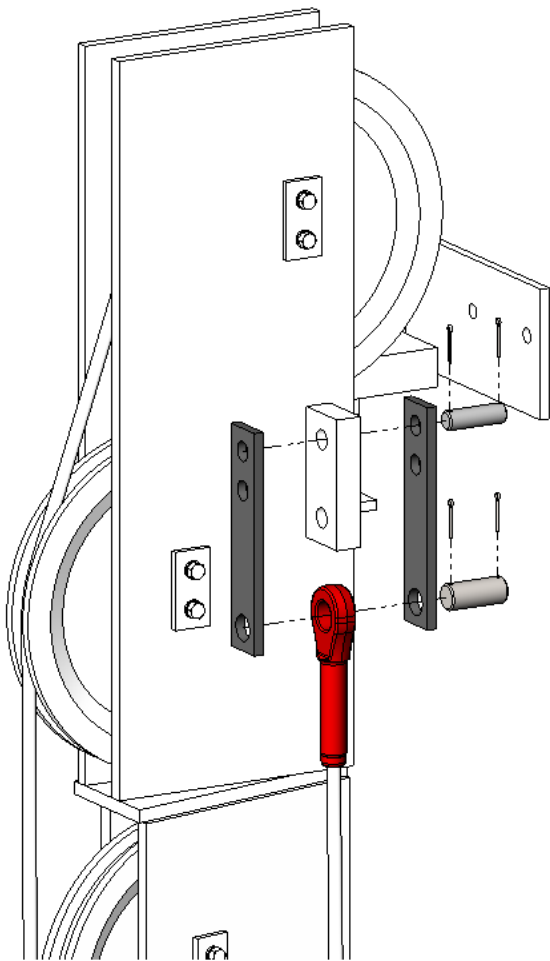
**Make sure the top cylinder rod bolt is re-installed.**

## 7.5 Cable (Wire Rope) Adjustment Procedure

The cable will stretch over time, possibly requiring the need to adjust the height of the platform.

4½ inches of adjustment are available in 1½ inch increments for the lifting cables.

Adjustment is made by changing the clevis pin between four sets of holes in the dead head clevis and mounting bracket. The mounting bracket is located on the outside of the masts, at the top, near the masthead. The carriage should be at the lowest floor level when this adjustment is performed.

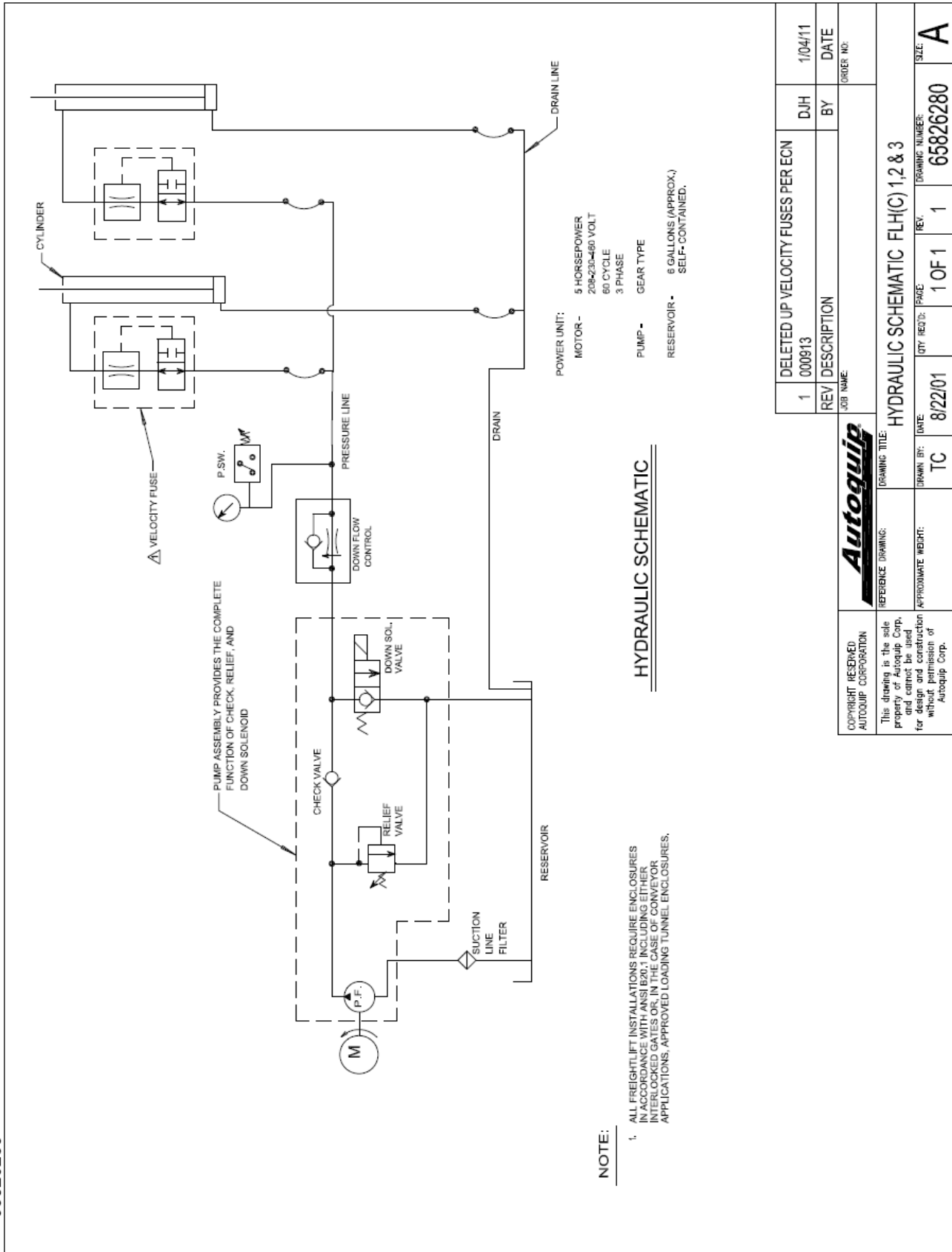


**CABLE ROUTING**

# 7.6 Schematics and Field Wiring Details

PLEASE REFER TO THE JOB SPECIFIC ELECTRICAL SCHEMATIC SUPPLIED WITH ORDER.

65826280



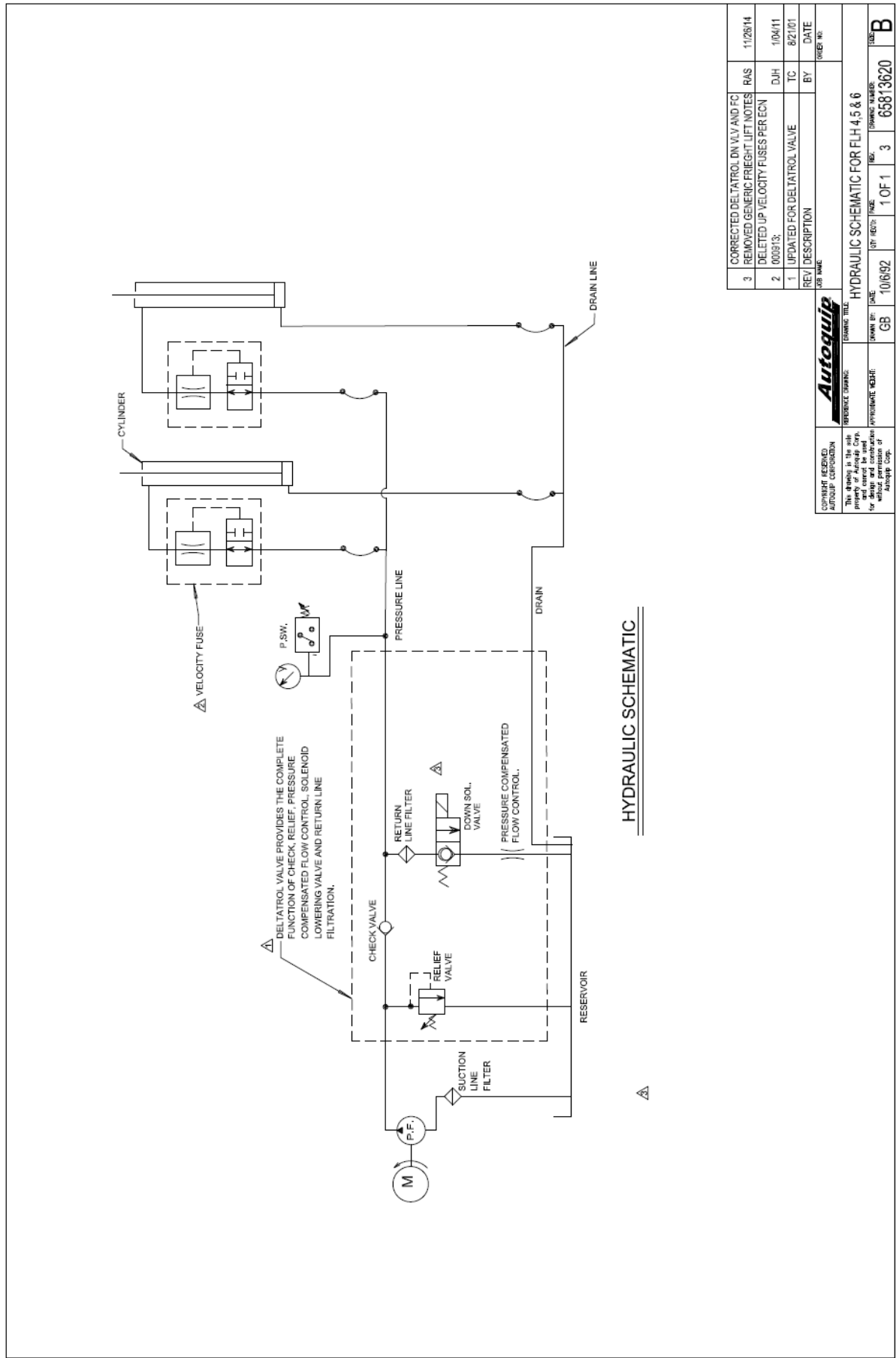
NOTE:

1. ALL FREIGHTLIFT INSTALLATIONS REQUIRE ENCLOSURES IN ACCORDANCE WITH ANSI B20.1 INCLUDING EITHER INTERLOCKED GATES OR, IN THE CASE OF CONVEYOR APPLICATIONS, APPROVED LOADING TUNNEL ENCLOSURES.

## HYDRAULIC SCHEMATIC

1	DELETED UP VELOCITY FUSES PER ECN	D/JH	1/04/11
REV	DESCRIPTION	BY	DATE
JOB NAME: ORDER NO:			
TC	8/22/01	1 OF 1	1
REV	DRAWING NUMBER:	REV	SIZE:
1	65826280	1	A

**Autoquip**  
 COPYRIGHT RESERVED  
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 This drawing is the sole property of Autoquip Corp. and cannot be used for design and construction without permission of Autoquip Corp.  
 REFERENCE DRAWING:  
 DRAWING TITLE: HYDRAULIC SCHEMATIC FLH(C) 1,2 & 3  
 DRAWN BY: DWY  
 APPROXIMATE WEIGHT: TC  
 DRAWING NUMBER: 65826280  
 REV: 1  
 SIZE: A



3	CORRECTED DELTA TROL DV W/V AND FC	RAS	11/28/14
2	DELETED UP VELOCITY FUSES PER ECN 100913	DJH	10/04/11
1	UPDATED FOR DELTA TROL VALVE	TC	8/21/01
REV DESCRIPTION		BY	DATE
JOB NAME		DRES NO.	
		FORMIC TITLE	
CONSULT DESIGN/ APPROVAL AUTHORITY This drawing is the sole property of Autoquip and shall not be used for any other purpose without the written consent of Autoquip Corp.		FORMIC NUMBER	
HYDRAULIC SCHEMATIC FOR FLH 4, 5 & 6		DOWN BY	
DATE	QTY REQ'D	PRICE	ISSUE
GB	1 OF 1	3	B
10/6/92		65813620	

## 8. TROUBLESHOOTING

### i DANGER



Never go under lift platform until load is removed and mechanism is securely blocked in raised position with maintenance devices ([see 5 Blocking Instructions](#)).



All maintenance procedures described in this section should only be performed by qualified service personnel.



Turn off the power and lock out the power at the primary power disconnect switch before service or maintenance per OSHA Lock-Out, Tag-Out procedures.



### i WARNING



Wear personal protective equipment, such as gloves and safety glasses, whenever installing, servicing, or checking a hydraulic system.



Failure to relieve operating system pressure could result in the sudden and unexpected release of high-pressure fluids during maintenance and/or repair of the lift which may result in severe injury or death. Assume that all hydraulic hoses and components are pressurized.



Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.



Spilled hydraulic fluid is slippery and may also present a fire hazard.



Clean up spilled hydraulic fluid.

The HMI control panel can help diagnose some issues. See the HMI manual for how to show the alarms.

Alarms

Add Alarm Delete Alarms

Trigger	Alarm Type	Message
ALARM_CS1	Bit	Carriage gate 1 open(ed).
ALARM_CS2	Bit	Carriage gate 2 open(ed).
ALARM_CS3	Bit	Carriage gate 3 open(ed).
ALARM_ENABLE	Bit	The enable switch must be ON and stay ON for the lift to run.
ALARM_ESTOP	Bit	Emergency stop activate(d).
ALARM_GS_L1	Bit	Level 1 gate open(ed).
ALARM_GS_L2	Bit	Level 2 gate open(ed).
ALARM_LMTSW	Bit	Both level limit switches activated, check for stuck level switches or wiring.
ALARM_LS_L1	Bit	Lift already at level 1.
ALARM_LS_L2	Bit	Lift already at level 2.
ALARM_MOVING_TO_1	Bit	Lift already moving to level 1.
ALARM_MOVING_TO_2	Bit	Lift already moving to level 2.
ALARM_OVLD_TRIP	Bit	Motor overload tripped.
ALARM_PSW	Bit	Pressure switch tripped without level 2 limit switch.
ALARM_REPRESSURIZATION_MAX	Bit	Max repressurization attempts reached.
ALARM_REPRESSURIZATION_TIMEOUT	Bit	Repressurization attempt timed out.
ALARM_TIMEOUT_DOWN	Bit	Lift did not reach the lower level within the max allowed time, /*N:3 DOWN_TIME_MAX_DINT NOFILL DP:0*/ sec.
ALARM_TIMEOUT_UP	Bit	Lift did not reach the upper level within the max allowed time, /*N:3 UP_TIME_MAX_DINT NOFILL DP:0*/ sec.
ALARM_TOO_SOON	Bit	Request to move too soon after lift stopped.
MAINT_CAR_SILK_1	Bit	The carriage gate solenoid interlock is nearing end of life, schedule downtime to replace.
MAINT_CAR_SILK_2	Bit	The 2nd carriage gate solenoid interlock is nearing end of life, schedule downtime to replace.
MAINT_CAR_SILK_3	Bit	The 3rd carriage gate solenoid interlock is nearing end of life, schedule downtime to replace.
MAINT_SILK_L1	Bit	The lower level solenoid interlock is nearing end of life, schedule downtime to replace.
MAINT_SILK_L2	Bit	The upper level solenoid interlock is nearing end of life, schedule downtime to replace.

Issue	Possible Cause	Solution
Unit won't lower - Hydraulic Circuit	Check for mechanical obstructions or a binding condition.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	Check for tripped velocity fuses.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	Heavy oil and/or cold temperatures can cause a lockup	<a href="#">See 7.3.1 Oil Recommendations</a>
Unit lowers too slowly with a load.	Restricted hydraulics.	Check for a p"ed hose or tubing.
	The down valve malfunctioning.	Check and replace control valve.
	The down valve solenoid mounting is loose preventing the valve from opening completely.	Check and repair.
	Heavy oil and/or cold temperatures cause a slowness.	<a href="#">See 7.3.1 Oil Recommendations</a>
	The down valve solenoid may be weak and not pulling in completely (it will usually chatter).	Check and repair or replace. Also, check the control voltage.
	Partially blocked or malfunctioning flow control valve.	Check and repair.
Unit raises, then lowers back slowly.	The "DOWN" solenoid valve may be energized in the "open" position.	Remove the solenoid coil and recheck. If the lift does not hold with the solenoid coil removed, replace the down valve cartridge.
	The oil line, hose, or fitting may be leaking.	Check and repair.
	The hydraulic cylinder rod seal may be leaking.	Check to see if hydraulic oil is running down the outside of the cylinder barrels at the rod end. Repair as necessary.
	<b>NOTE:</b> A small amount of oil at the rod seal is normal and desirable for proper lubrication of the cylinder. A leak would cause oil to flow from the rod seal when the lift is in the raised position.	
Unit does not raise completely to the upper level (had to press "emergency stop" button to stop motor.)	There is some sort of interference with the platform.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	The load exceeds the capacity of the unit.	Reduce the excess load.
	The oil level in the reservoir may be too low.	Check and replace. Determine cause and repair.



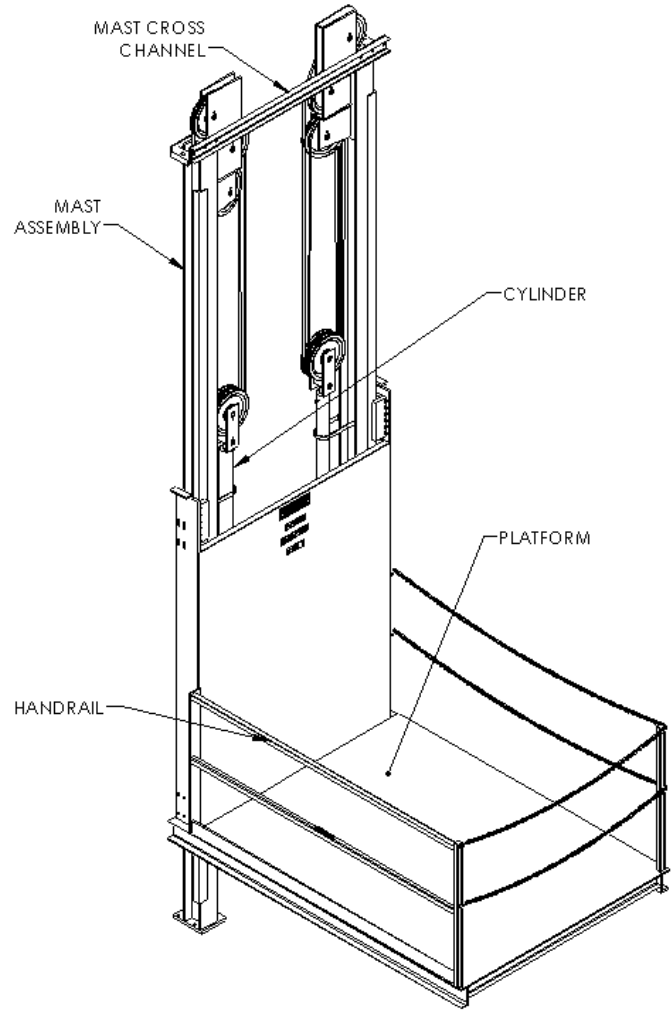
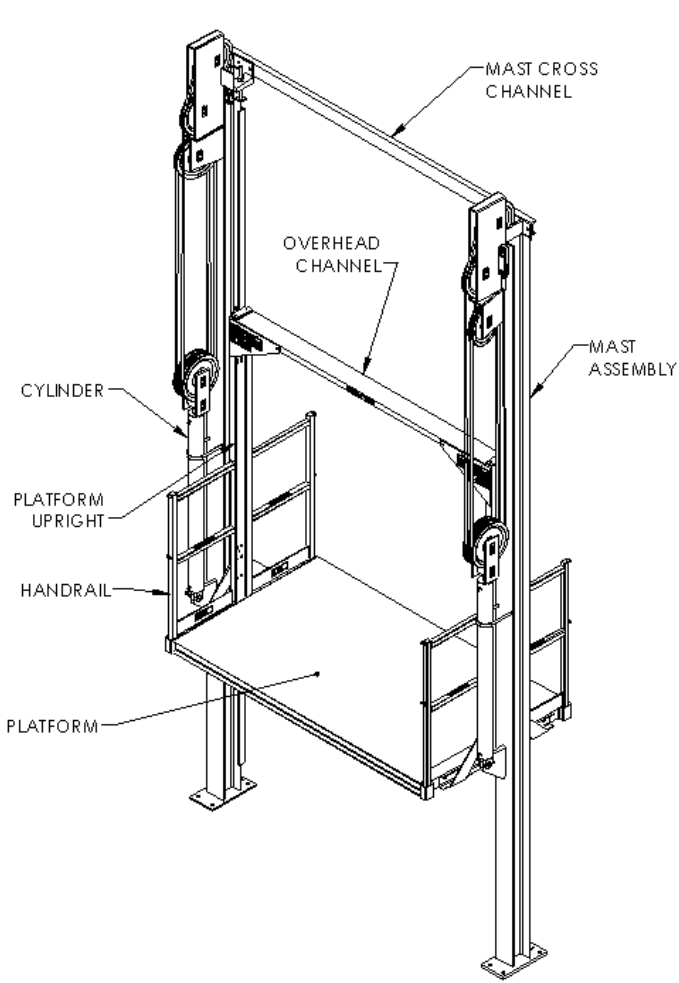
Issue	Possible Cause	Solution
Unit will not raise (motor <b>not</b> running or “humming”).	The emergency stop button may be depressed or jammed.	Check all push-button stations. Repair as necessary.
	The gate or door is not closed.	Check and close.
	The main line disconnect switch is open (off).	Check and close (on).
	The gate status switch or door interlock is malfunctioning or is out of tolerance.	Check and repair or adjust as required.
	The main line fuse disconnect fuse is blown.	Check and replace.
	The “UP” push button or circuit is malfunctioning.	Check at the other push button station for “UP” function. Check components and circuit. Repair or replace.
	The motor overload relay (MOR) has tripped.	Check and reset. If it trips again, check for cause in the motor circuit.
	A circuit breaker on the secondary voltage has tripped.	Check and reset CB1 or CB2.
	The motor contactor coil has burned out.	Check and replace.
Unit will not raise (motor <b>is</b> running or “humming”).	The load may exceed the rating.	Reduce the excess load.
	Low oil.	Check for hydraulic oil leak. Add oil as required.
	Rotation on the 3-phase motor may be reversed.	Reverse any two motor electrical leads.
	3-Phase motor may be single-phasing (humming).	Check wiring, fuses, etc.
	Breather cap on the reservoir may be clogged.	Remove and clean.
	Suction screen may be clogged. The screen is attached to the suction line in the tank.	Remove and clean. Drain and replace oil.
	Pump may be cavitating due air in the system	Check for loose fittings. Bleed air from the system ( <a href="#">see 7.3.4 Bleeding Air from System</a> ).
	The down valve may be energized by faulty wiring or it may be stuck in the open position.	Remove the solenoid and check.
	The voltage at the motor terminals may be too low to run the pump with the existing load.	Check before measuring the voltage at the motor terminals (or as near as possible) while the pump is running under load. Reading the source voltage or pump idling voltage is meaningless. Inadequate or incorrect wiring can starve the motor when the source voltage is ample. Correct as necessary.
The pump may be seized if the motor is humming or blowing fuses or overloads.	Remove the pump with the platform in the lowered position. The shaft should be able to be turned by hand. Check for cracks in the housing.	

	Possible Cause	Solution
Motor labors or heats excessively.	The voltage at the motor terminals may be too low to run the pump with the existing load.	Check before measuring the voltage at the motor terminals (or as near as possible) while the pump is running under load. Reading the source voltage or pump idling voltage is meaningless. Inadequate or incorrect wiring can starve the motor when the source voltage is ample. Correct as necessary.
	The wiring may be incorrect.	Be sure one leg of the motor line is not connected to the ground prong. This can happen particularly on 3-phase units using twist-lock plugs.
	The pump may be binding from oil starvation. This can cause high internal heat. The pump may have to be replaced.	Suction screen may be clogged. The screen is attached to the suction line in the tank. Check both and clean as required. Drain and replace oil.
Unit operates in a “spongy” or jerky fashion.	The load may exceed the stated capacity of the unit. Overloading caused the pressure switch valve to activate and deactivate if the “UP” button is depressed. The motor may start and stop if this condition exists.	Reduce excess load.
	Check for oil starvation, the system may have air in it.	Check clogged suction screen or loose fittings. Bleed air from the system ( <a href="#">see 7.3.4 Bleeding Air from System</a> ).
	The rollers may be binding.	Check and repair.
	The platform may be binding in the guide ways.	Check and repair.
	The cylinder may be binding internally or externally.	Check and repair.
	The pressure switch may be turning the motor on and off.	Check and repair.
Motor will not turn off when lift reaches fully raised position	Relief valve setting is too low and oil is flowing over relief.	Need to adjust setting upward per instructions in Installation section.
	Pressure switch setting is too high and oil is flowing over relief.	Need to adjust downward ( <a href="#">see 4.18.2 Pressure Switch Setting</a> ).
Unit won't lower - Electrical Circuit	The emergency stop button may be pressed or jammed.	Check and repair.
	The gates or doors may be open.	Close and try again.
	Control transformer fuse may be blown.	Check and replace.
	Down coil is not energizing.	Bleed off the hydraulic pressure with the down valve manual override. If the lift lowers, check the electrical circuit and the down solenoid. The solenoid may be incorrectly wired, burned out, not rated for the voltage, or the line voltage may be excessively low.

Issue	Possible Cause	Solution
Unit won't lower - Hydraulic Circuit	Check for mechanical obstructions or a binding condition.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	Check for tripped velocity fuses.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	Heavy oil and/or cold temperatures can cause a lockup	<a href="#">See 7.3.1 Oil Recommendations</a>
Unit lowers too slowly with a load.	Restricted hydraulics.	Check for a p"ed hose or tubing.
	The down valve malfunctioning.	Check and replace control valve.
	The down valve solenoid mounting is loose preventing the valve from opening completely.	Check and repair.
	Heavy oil and/or cold temperatures cause a slowness.	<a href="#">See 7.3.1 Oil Recommendations</a>
	The down valve solenoid may be weak and not pulling in completely (it will usually chatter).	Check and repair or replace. Also, check the control voltage.
	Partially blocked or malfunctioning flow control valve.	Check and repair.
Unit raises, then lowers back slowly.	The "DOWN" solenoid valve may be energized in the "open" position.	Remove the solenoid coil and recheck. If the lift does not hold with the solenoid coil removed, replace the down valve cartridge.
	The oil line, hose, or fitting may be leaking.	Check and repair.
	The hydraulic cylinder rod seal may be leaking.	Check to see if hydraulic oil is running down the outside of the cylinder barrels at the rod end. Repair as necessary.
	<b>NOTE:</b> A small amount of oil at the rod seal is normal and desirable for proper lubrication of the cylinder. A leak would cause oil to flow from the rod seal when the lift is in the raised position.	
Unit does not raise completely to the upper level (had to press "emergency stop" button to stop motor.)	There is some sort of interference with the platform.	<a href="#">See 7.3.2 If a Platform Hangs Up or Jams</a>
	The load exceeds the capacity of the unit.	Reduce the excess load.
	The oil level in the reservoir may be too low.	Check and replace. Determine cause and repair.

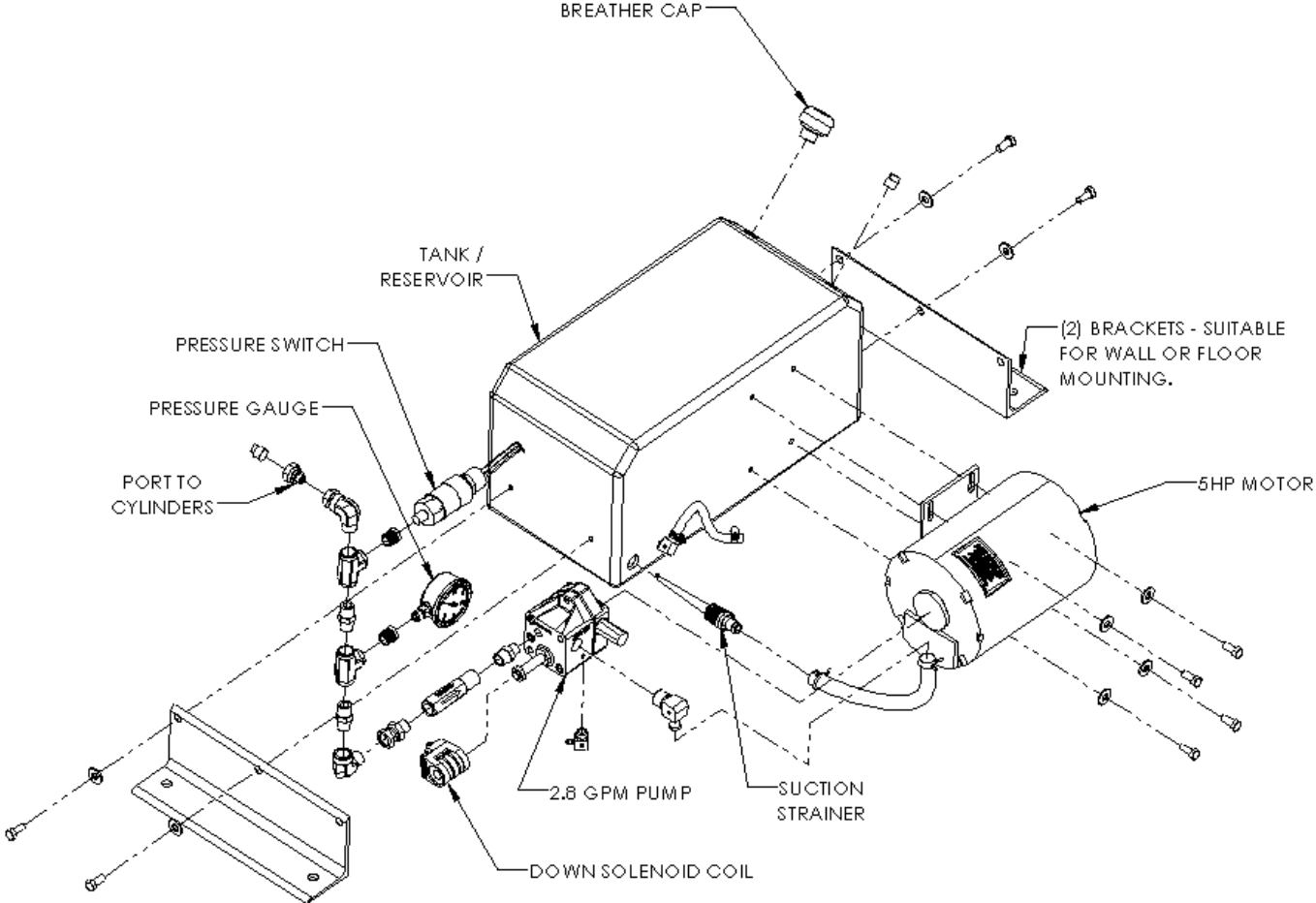
# 9. PARTS LISTS

## 9.1 General Assembly



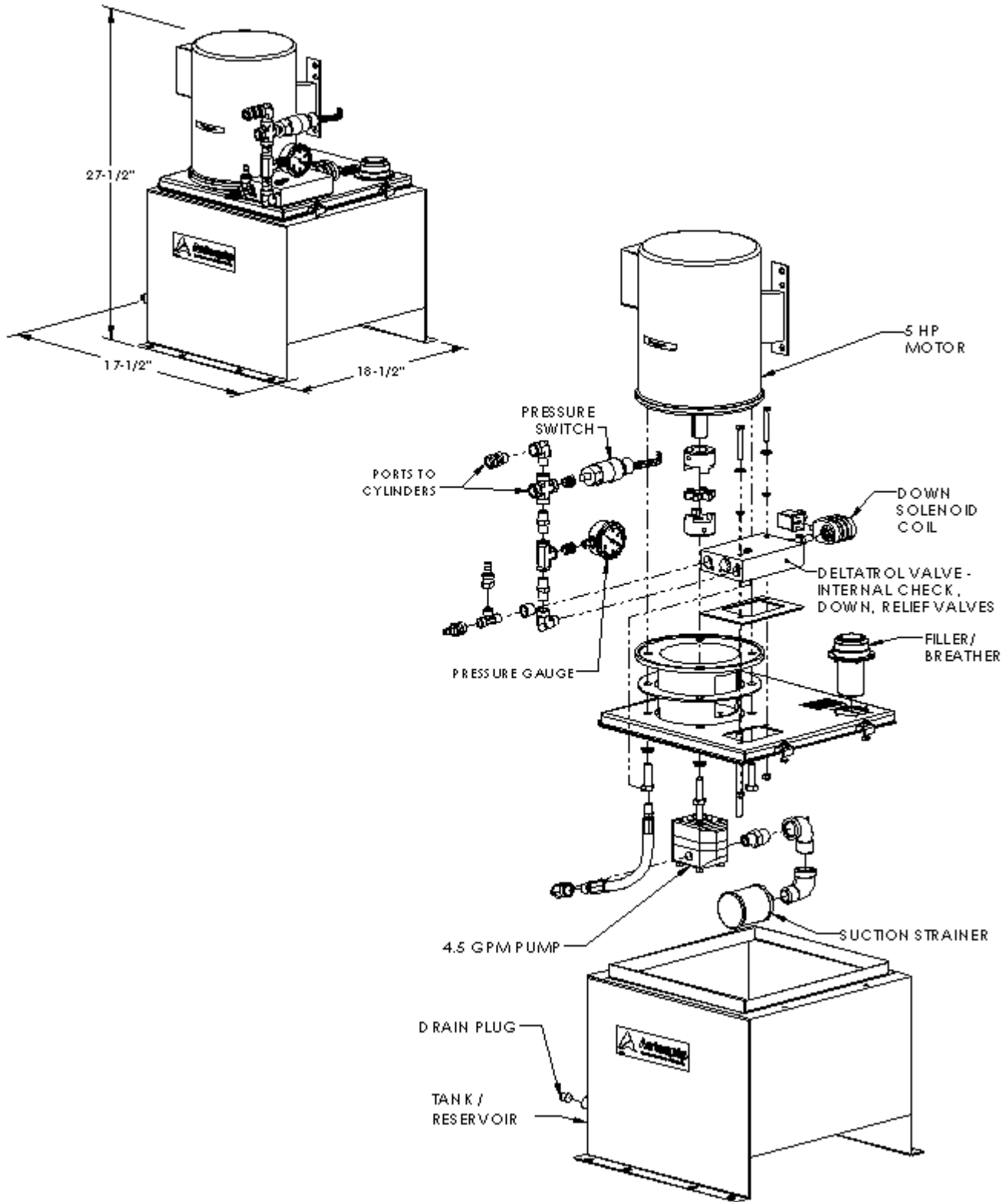
# 9.2 Typical Power Unit

## 9.2.1 Contractor 5hp



## 9.2.2 Vertical 5hp

NOTE: DIMENSIONS ARE APPROXIMATE



## 10. WARRANTY

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The user is solely responsible for using this equipment in a safe manner and observing all of the safety guidelines provided in the Owner's Manual and on the warning labels provided with the lift. If you are unable to locate either the manual or the warning labels, please contact Autoquip ([see 1.1 Contact Information](#)) for replacement downloads or information.

Autoquip expressly warrants that this product will be free from defects in material and workmanship under normal, intended use for a period of One (1) Year for all electrical, mechanical, and hydraulic components, parts or devices. Ninety (90) days labor warranty extended to One (1) year with a Planned Maintenance Contract in place. Autoquip also warrants the structure of the lift against breakage or failure for a period of Five (5) years. The warranty period begins from the date of shipment. When making a claim, immediately send your dealer or Autoquip notice of your claim. All claims must be received by Autoquip within the warranty time period. The maximum liability of Autoquip, under this Limited Warranty, is limited to the replacement of the equipment.

This warranty shall not apply to any Autoquip lift or parts of Autoquip lift that have been damaged or broken in transit/shipping, or due directly or indirectly to misuse, abuse, vehicle impact, negligence, faulty installation, fire, floods, acts of God, accidents, or that have been used in a manner contrary to the manufacturer's limitations or recommendations as stated in the manual, or that have been repaired, altered or modified in any manner outside of Autoquip's manufacturing facility or which have not been expressly authorized by Autoquip.

Autoquip makes no warranty or representation with respect to the compliance of any equipment with state or local safety or product standard codes, and any failure to comply with such codes shall not be considered a defect of material or workmanship under this warranty. Autoquip shall not be liable for any direct or consequential damages resulting from such noncompliance.

Autoquip's obligation under this warranty is limited to the replacement or repair of defective components at its factory or another location at Autoquip's discretion at no cost to the owner. This is owner's sole remedy. Autoquip will not be liable for any loss, injury, or damage to persons or property, nor for direct, indirect, or consequential damage of any kind, resulting from failure or defective operation of said equipment. All parts used to replace defective material must be genuine Autoquip parts in order to be covered by this Limited Warranty.



**Autoquip**  
Innovative Lift Solutions