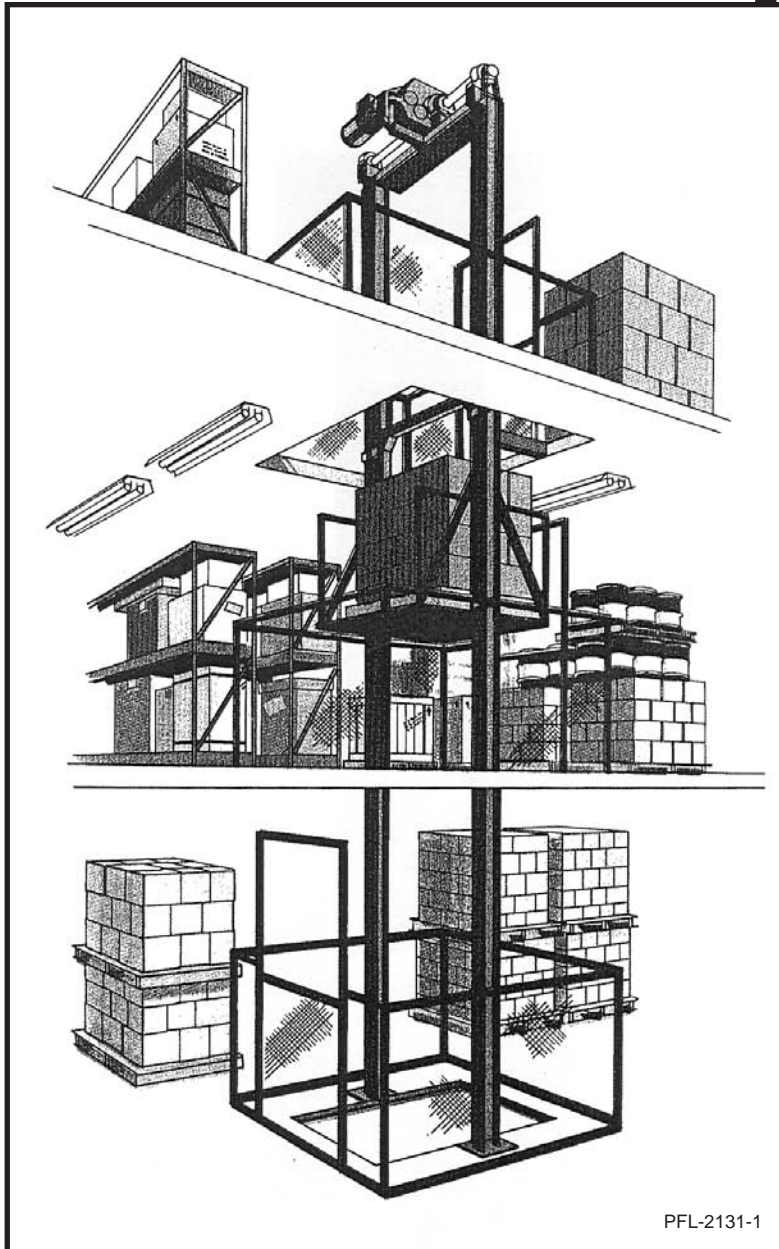


PFLOW VERTICAL LIFTS

The Nation's Largest Manufacturer of Vertical Lifts



INSTALLATION INSTRUCTIONS

SERIES M

**READ THIS MANUAL IN ITS ENTIRETY AND
VERIFY JOB SITE DIMENSIONS AGAINST
GENERAL ARRANGEMENT DRAWING
BEFORE STARTING INSTALLATION**

**THE ILLUSTRATIONS IN THIS MANUAL
ARE NOT TO SCALE OR DETAIL AND
ARE FOR REFERENCE ONLY**

051006-MSI

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INTRODUCTION

Thank you for purchasing a PFLOW INDUSTRIES, INC., Series M, Vertical Reciprocating Conveyor (VRC). We are confident that your unit will provide you with many years of reliable service.

CODE REQUIREMENTS - VRCs are NOT elevators. Your unit is designed for the movement of materials only, up to its rated capacity, from one level to the next. VRCs have their own national code (ANSI/ASME B20.1) and are specifically exempt from the National Elevator Code. All electrical designs and components are in accordance with National Electric Code (NEC) requirements. Local codes may require initial inspection of the installation and periodic inspection and testing of the unit. Call Pflow Industries for more information in the event an inspection is required for your equipment.

Some states require special components and have specific guidelines regarding how the equipment must be installed, inspected, and tested. If we know in which state the equipment will be located, and if we are kept informed of state and local requirements, Pflow will incorporate the components into the order, as approved by the customer, and also provide any pertinent information, as called out on the general arrangement drawing, related to the installation of the equipment. We will not be on site for the testing, but we strongly advise that the installer be there.

If at any time you have questions about your state's requirements, please feel free to call.

NOTE

The information and illustrations in this manual are intended only as an aid to understanding the VRC's general installation. It does not cover every possible contingency or circumstance regarding non-standard options or site conditions.

If you have a problem, call Pflow at (414) 352-9000, between 8:30 A.M. and 5:00 P.M., CST, Monday through Friday. Ask for the Product Support Department and have your serial number ready.

Parts - Pflow Industries maintains a complete stock of, or has access to, all replacement components. We keep detailed records of all equipment sold. If something is damaged in shipment, is defective or missing, contact us immediately.

Service - Our Product Support Department is available to assist your maintenance personnel with any questions or problems they may have regarding the equipment.

Warranty - Our warranty procedures can be found in this manual. Prior authorization must be obtained from Pflow before commencing work of any kind.

Feedback - Let us know how we are doing. Each installation manual contains a questionnaire. Please fill it out and return it to us. We can't prevent a problem if we are not aware of it.

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M Series

SAFETY

To ensure your safety and the safety of those around you, it is important that you read, understand, and follow ALL the safety precautions relative to a particular task. Safety precautions in this manual are labeled with the alert symbol followed by the word DANGER, WARNING, or CAUTION.

DANGER

When you see this symbol, it means that serious injury or death is likely if the instructions are not followed carefully.

WARNING

When you see this symbol, it means that the potential for personal injury is high if directions are not followed carefully.

CAUTION

When you see this, it means that the potential for damage to the equipment is high if directions are not followed carefully.

NOTE

This term is used to provide additional information to help clarify instructions.

DANGER

HIGH VOLTAGE. Failure to follow proper procedures when performing electrical installation or service may result in serious injury or death.

DANGER

DO NOT ride this equipment. Riding may result in injury or death. **VRCs ARE NOT ELEVATORS.**

DANGER

DO NOT walk or work under a raised platform.

DANGER

If you can open a gate when the unit is not at that level, or the unit will operate with a gate open, a safety device is not working and could result in serious injury or death.

WARNING

DO NOT operate the unit if either the gates or interlocks are not functioning properly.

CAUTION

Paint overspray on cylinder rod will damage seals and void warranty.

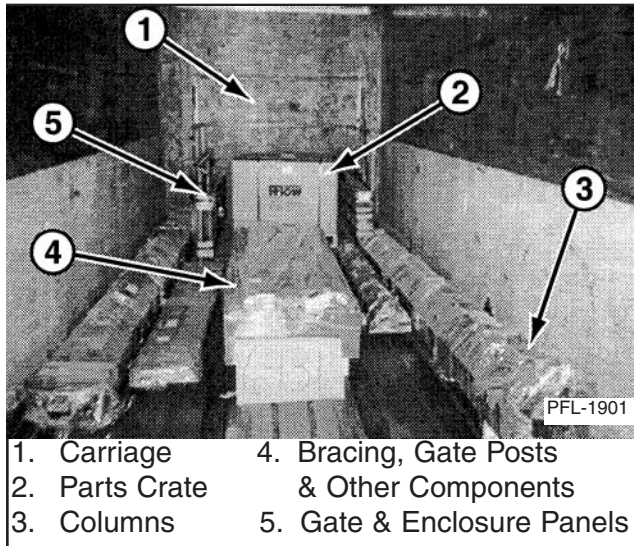
CAUTION

DO NOT exceed rated capacity.

Equipment Arrival and Unpacking

EQUIPMENT ARRIVAL AND UNPACKING

You will need a fork truck capable of lifting approximately 2,000 lbs. Larger units may require a higher lifting capacity fork truck. To ensure complete shipments, Pflow Industries takes pictures of the unit, contents of the parts crate, and individual boxes. See Figures 1-3.



- | | |
|----------------|----------------------------|
| 1. Carriage | 4. Bracing, Gate Posts |
| 2. Parts Crate | & Other Components |
| 3. Columns | 5. Gate & Enclosure Panels |

Figure 1

NOTE

The material in the boxes, cartons, etc. was loaded complete, in good condition and so delivered to the carrier agent.

Verify that the number of items on the Bill of Lading agrees with the number of items delivered to you. Check all pieces to determine if damage has occurred during transit. The carrier agent is responsible for, and should be notified immediately of, any visible loss or damage that has occurred. If damaged, the shipment must be signed for as such. Where loss or damage appears, call on the carrier agent to inspect the shipment before unloading it and make notation of condition of contents on freight bill. A claim for loss or damage should be presented to the carrier agent without delay, and a complete statement of facts should be in your possession. All hidden damage must be reported directly to the freight carrier within seven days of delivery. Pflow Industries is not responsible for shipping / receiving damage once the equipment has left the factory nor will we file any claims for damage that may occur.

If you believe anything is missing, contact our Product Support Department immediately. Failure to notify us may affect completion time of the installation. Our warranty does not cover lost time and/or additional trips for missing or damaged components.

All replacement components or labor that may be needed as a result of any damage will require a purchase order and compliance with our RGA procedures. This number should be obtained from Pflow Industries.

Figure 2 shows the typical contents of the parts crate.

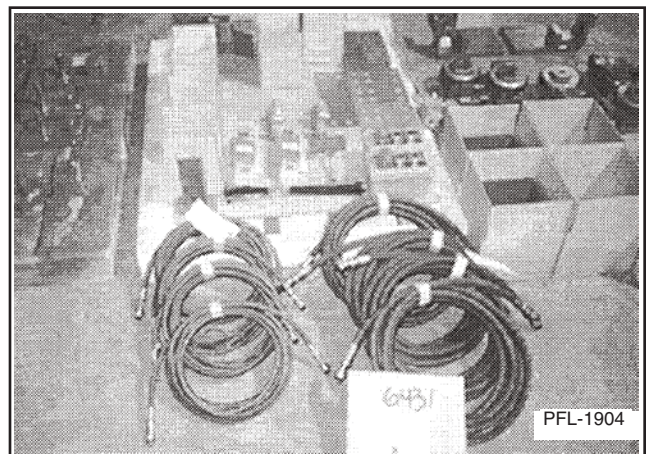


Figure 2

The shipping packet can be found inside the parts crate. This packet contains the owner's manual, these installation instructions, general arrangement drawing, a copy of the schematic, and additional information as may be applicable to the installation.

An additional copy of the schematic can be found inside the control panel. See Figure 3.

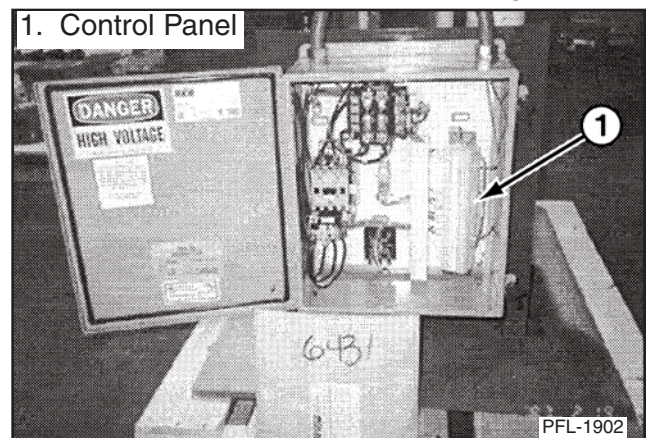


Figure 3

M Series

PRE-INSTALLATION CHECKLIST

Site conditions can mean the difference between an installation that is smooth and one that is difficult.

We have provided a general checklist to help set up your installation. We recommend that the installer, or someone with installation experience, discuss not only these items but all other concerns directly with the people on site.

A pre-installation visit is always recommended and considered to be included in the responsibilities of the mechanical installer.

WARNING

Safety should always be first and foremost in your mind on this or any job. Besides following safe working procedures, items required by OSHA may include: a hard hat, safety shoes, safety glasses and belt, fire extinguisher, and other safety equipment.

Mechanical Installer Responsibilities

- Complete mechanical erection of the equipment as sold by Pflow, called out on the general arrangement (GA) drawing and in accordance with all instructions within this installation manual.
- Return trip upon completion of the electrical installation for final checkout, adjustments and training. (See Completion Checklist.)
- On non-union sites, mounting of all electrical devices.

Customer Responsibilities

- Unloading and transportation of the equipment to the installation area.
- Storage (if applicable). If unit is stored indoors or long-term storage is required, consult Pflow Industries for storage procedures required to keep warranty in effect.
- All necessary site work to prepare for the installation such as pit, floor opening, adequate bracing locations, and shaftway openings.
- Any site/building modifications necessary to get the equipment to the installation area.

- Adequate pick point or lifting mechanism capable of lifting the heaviest load. If weight of load is in question, please call Pflow Industries.

If you have any questions or concerns, please contact our Product Support Department prior to start of work.

- ___ Can the equipment pass through all doorways, hallways, etc.?
- ___ Can you use the customer's fork truck? Is the truck's capacity sufficient?
- ___ Are safety meetings required?
- ___ Are there any work procedure/safety guidelines particular to the job site?
- ___ Is welding permitted? Is a "hot permit" required? Is a fire watch required?
- ___ Is there a pick point capable of lifting the necessary components?
- ___ What hours are you allowed to work on site?
- ___ Who is the authorized site contact?
- ___ Is this a union or non-union site?
- ___ Bracing requirements - Will additional materials be required?
- ___ Is temporary power available within 10 ft. of the unit?
- ___ Do you have a well-lit area to work in?
- ___ Is the installation area ready (pit complete, floor opening cut and/or finished, etc.)?
- ___ Are shaftway openings complete?
- ___ Are there any discrepancies between the site dimensions/application and the Pflow GA drawings? Has this information been provided to Pflow?
- ___ Will customer doors and/or shaftway openings be completed prior to your arrival?
- ___ Will other trades or in-plant production cause conflict with your proposed work schedule?
- ___ Special welding requirements if you have special coatings, i.e., epoxy paint, hot galvanized, etc.

SITE VS. GENERAL ARRANGEMENT

Comparison Check

1. Check your shipment to make sure that nothing is damaged or missing. Missing components must be reported to Pflow Industries immediately per instructions in the introduction of this manual.
2. The shipping packet found inside the parts crate contains a copy of the general arrangement drawing. See Figure 4.
3. Compare the dimensions as called out on the general arrangement drawing to actual site conditions. Report any discrepancies to Pflow immediately. The following are just a few of the dimensions that could be a problem if they do not match:

Pit Length
 Pit Width
 Pit Depth
 Is Pit Square?
 Overhead Clearance

Gate Clearance - Level 1
 Gate Clearance - Level 2

Are there any protrusions from the floor level or wall that could interfere with either the installation or operation?

Floor-to-Floor Clearance - Upper Level

Floor Opening - Length
 Floor Opening - Width
 Is Floor Opening Square?
 Is the Floor Opening Properly Aligned Above the Pit?

CAUTION

Discrepancies between the general arrangement drawing and site conditions must be addressed immediately. Contact the Product Support Department (414) 352-9000 for assistance.

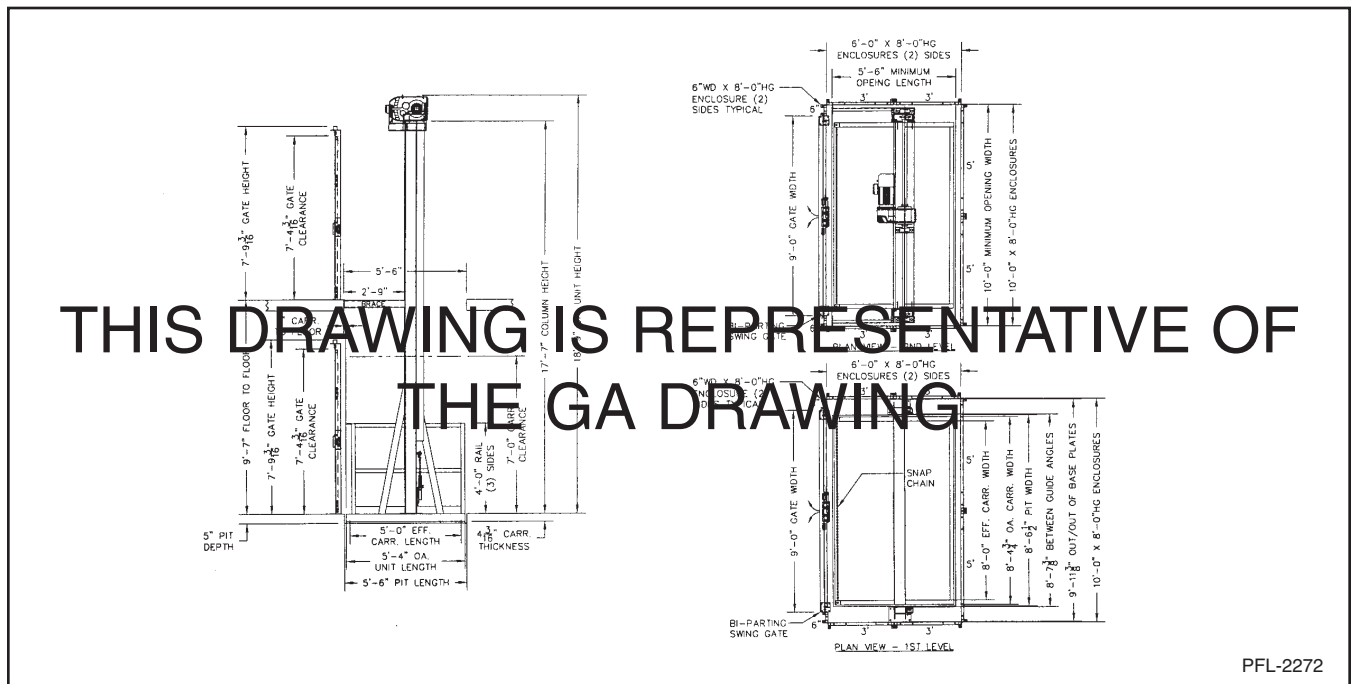


Figure 4

NOTE

The model and dimensions shown in Figure 4 are not applicable to your unit. This drawing is for illustrative purposes only.

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TOOLS REQUIRED FOR VRC INSTALLATION

The following is a list of tools we feel are necessary to install a VRC in a professional and expedient manner. This is only a guideline. Individual sites and applications may require additional items as needed. If you have any questions regarding these items, contact Pflow Industries.

Welding machine and equipment. (i.e., helmet, gloves, rods, etc.)	Socket set - 1/2" drive, sockets to 1-1/8"
Cutting torch with tanks	Hammer drill and bits for 1/4", 3/8", and 1/2" anchors, 4" min.
Fire extinguisher	Hack saw, reciprocating saw, or portable band saw
Forklift - 2,000# capacity or alternative	Drill and drill bits
Chain fall - 2,000# capacity minimum	Extension cords
Come-A-Long	Portable light
Cables or hook chains with 1,000# or greater capacity	Sledge hammer
Disk grinder	Allen wrenches to 3/8"
"C" clamps	Open or box end wrenches to 1-1/4"
Drift punch	Chalk line
5/8"-11 N.C. tap	Plumb bobs
Carpenter's square	Grease gun
4' Level	25' Measuring tape
SAE 30W non-detergent motor oil	Rags

M Series

INSTALLATION INSTRUCTIONS

Unit Placement

1. The load/unload edges of the carriage should be 1" away from the edge of the upper floor level; and if there is a pit, the same dimensions apply (unless otherwise noted on GA). See Figure 1.

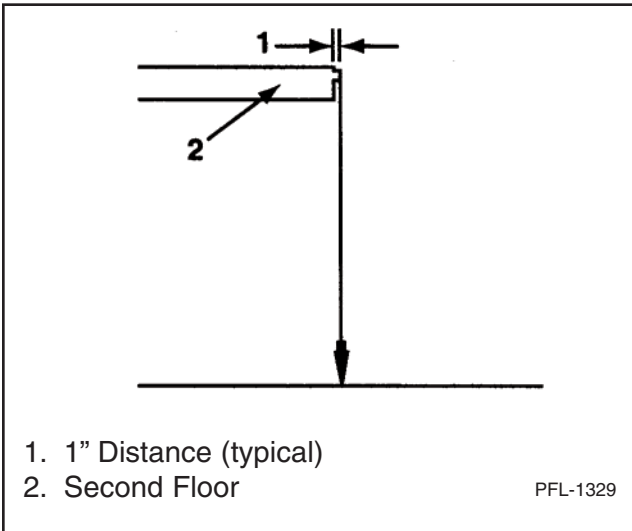


Figure 1

2. To verify this location on the lower level, drop a plumb bob 1" away from the edge and mark that point on the lower floor. Do this for each load/unload side.

CAUTION

If there are any protrusions (from floor, wall, etc.), they will have to be removed. Plumb lines have to be positioned beyond the protrusion or the carriage WILL NOT clear after installation. Floor may have to be extended to get the proper distance from floor to carriage.

3. Mark the center of the opening. See Figure 2.
4. Drop a plumb bob from point A and mark point B. See Figure 3.
5. Drop a plumb bob and mark points C and D. See Figures 4, 5, and 6.

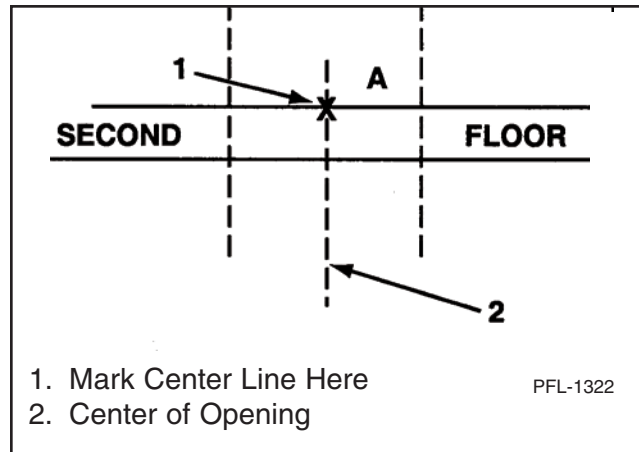


Figure 2

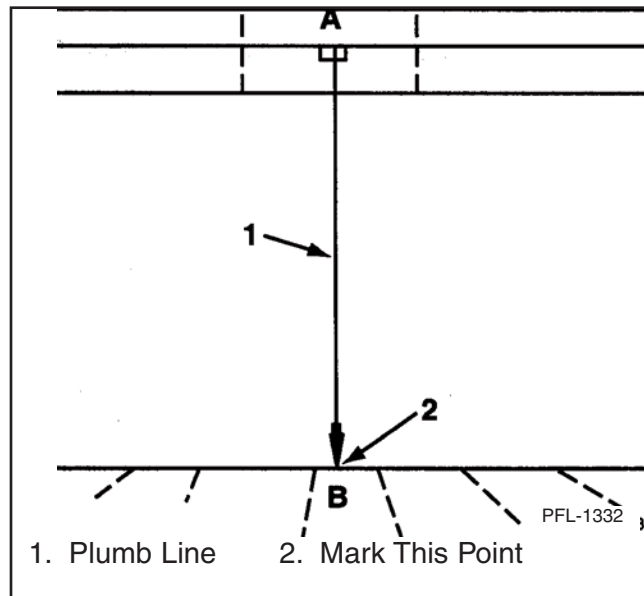


Figure 3

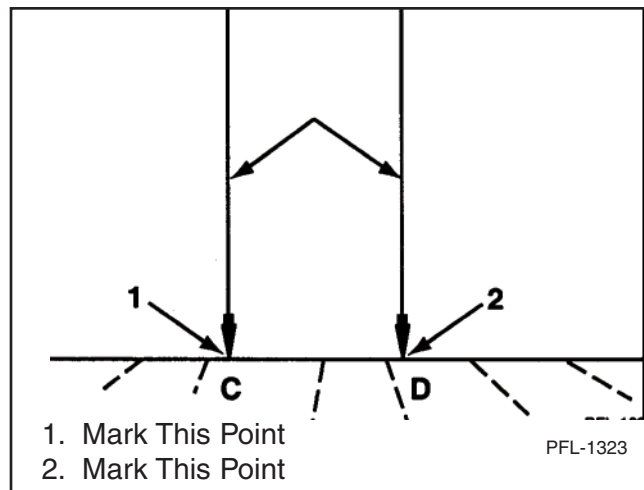


Figure 4

6. Locate three (3) marks C, B, and D. See Figure 5.

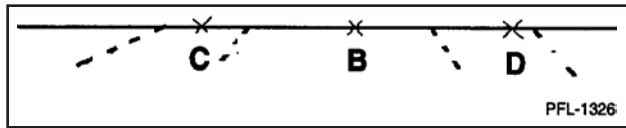


Figure 5

7. Snap a chalk line between marks C and D and through mark B.
8. Align edge of the carriage with line C, B, and D. See Figure 6. See GA drawing for orientation of carriage.

NOTE

Setting the carriage on blocks (example: 4" channel set on edge) will allow you to attach and adjust chain tensioner chains later on without waiting for power. Align carriage; level carriage, shimming if necessary; and temporarily secure carriage from moving. Weld to building structure or weld anchor tabs to carriage.

If carriage goes through a floor and clearances are tight, you might want to position the carriage AFTER the columns have been assembled and raised into place.

In some applications, taller units, e.g., spliced columns, restricted shaftways, etc., it may be necessary to raise the columns before positioning the carriage.

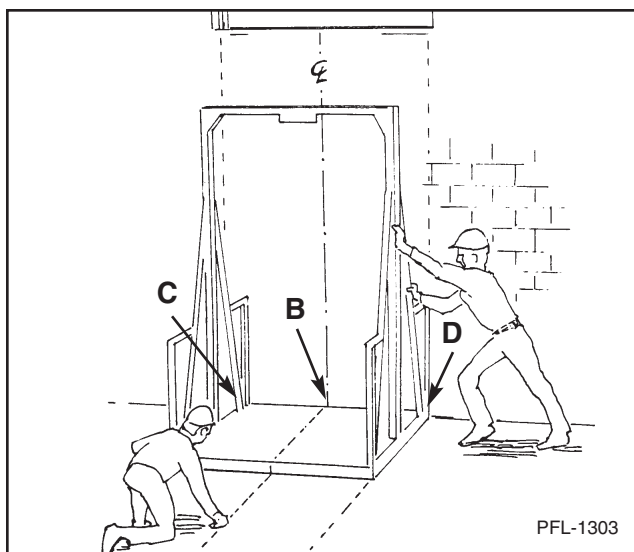


Figure 6

M Series

Wheelblocks

NOTE

If you have green tensioner wheels, install them now. See Figure 7.

After all wheelblocks are installed, tension wheels against columns to prevent carriage from rocking. Tighten mounting bolts securely. See Figure 7A.

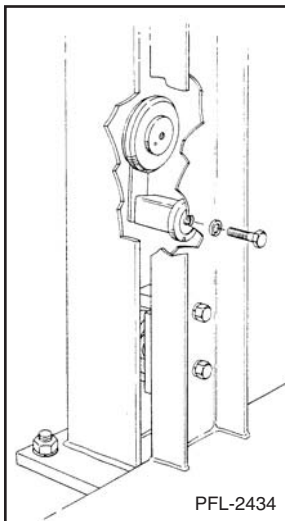


Figure 7

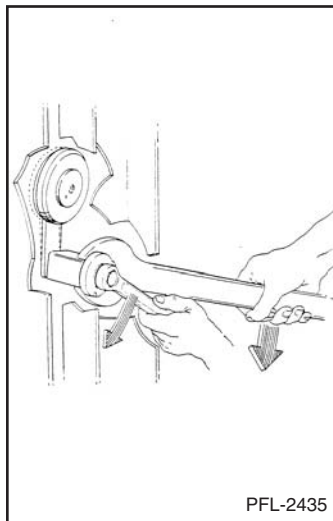


Figure 7A

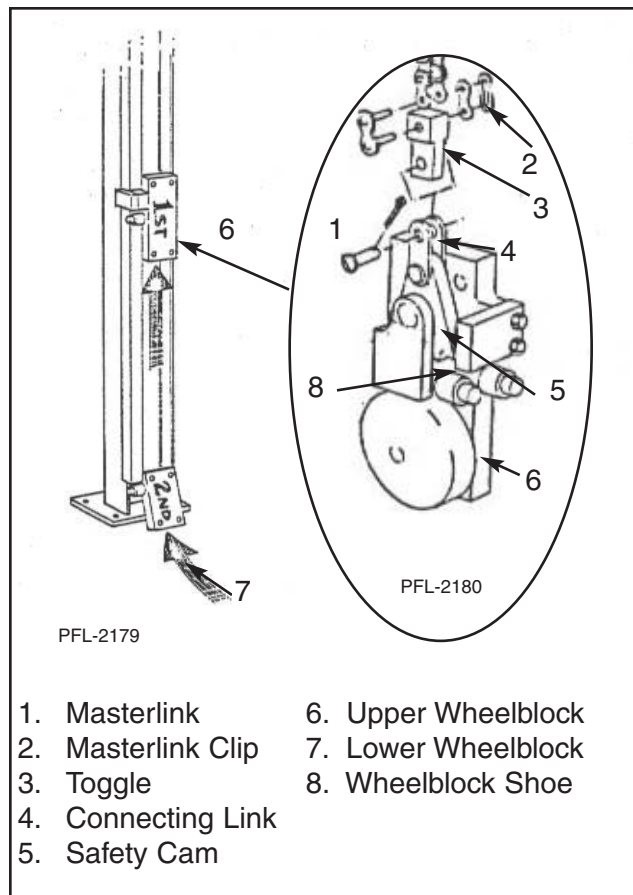


Figure 7B

NOTE

If a cantilevered VRC, see B272, Cantilever Guidelines.

1. Remove all 5/8" hex head screws from the four wheelblocks. Insert wheelblocks in the columns through the notch in the guide angle at the base of the beam. The upper wheelblocks are longer and are installed with the shoe toward the top of the column. Insert lower wheelblock after upper wheelblock has been inserted. See Figure 7B.
2. **Make sure masterlink clip in each upper wheelblock faces the carriage, not the inside of the columns. See Figure 7B.**

NOTE

Wheelblocks may have to be partially disassembled for insertion into columns (removal of outside guide roller and shoe on upper wheelblock).

Installation Instructions

- Each column must be correctly installed. There is only one right way. The front of the lift for orientation is as follows: The face of the column with the guide angle to the inside of the column should be positioned toward the front of the lift. The face of the column with the chain tube should be positioned toward the back of the lift. See Figure 8.

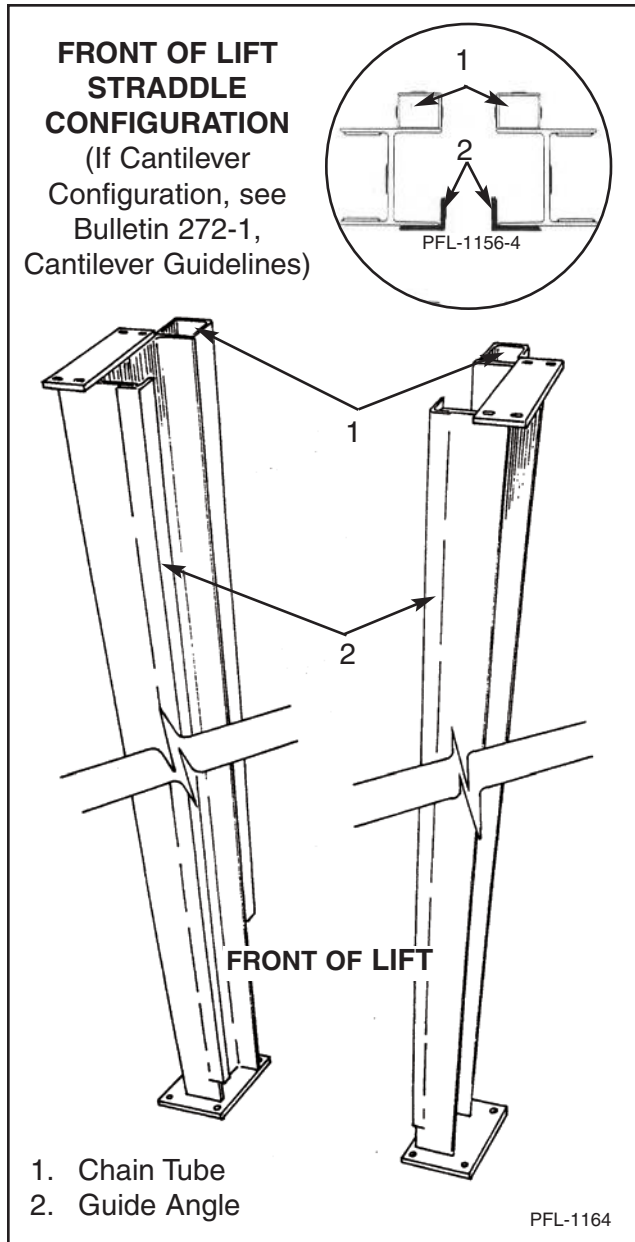


Figure 8

NOTE

If your VRC has spliced columns, refer to Page 35 through 37, Spliced Column Assembly, NOW. If columns are not spliced, continue installation of the VRC.

- Raise one column into position. See Figure 9.

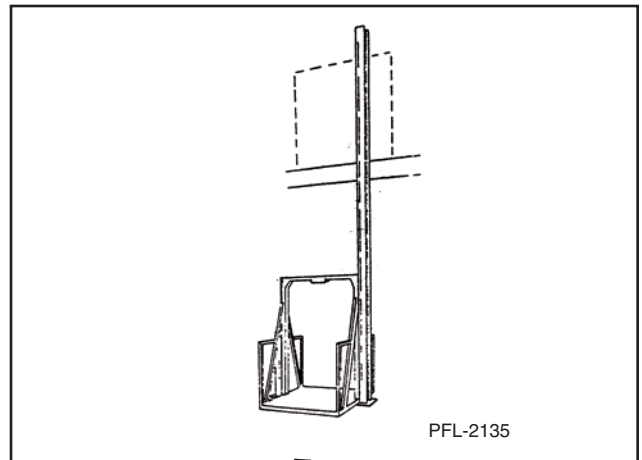


Figure 9

- Slide column alongside carriage so that the wheelblocks align with mounting holes. Bolt the carriage to the wheelblocks using the screws previously removed. Make sure column is secured. See Figure 10.

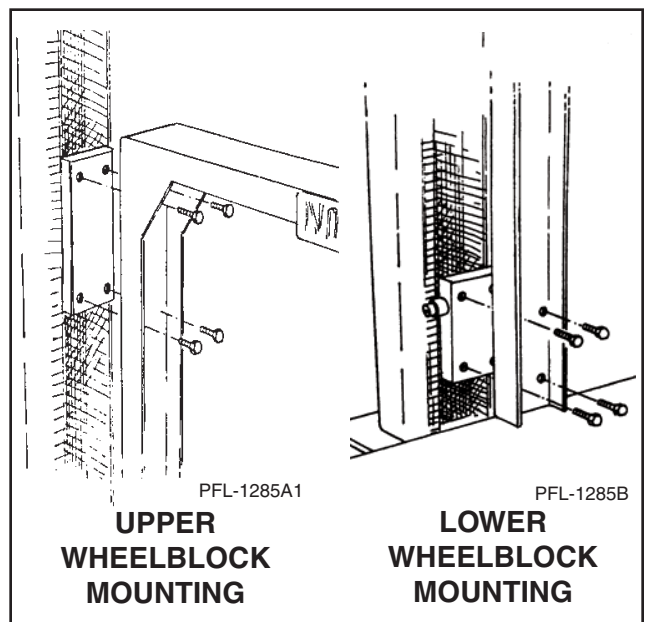


Figure 10

NOTE

Running a tap through all the threaded holes in the wheelblocks to clean them out should make bolting the carriage to the wheelblocks much easier.

CAUTION

Do not depend on carriage and wheelblocks to support columns!

M Series

It will help to leave the upper mounting bolt on the upper wheelblock(s) out (the one furthest away from the guide angle). Rotate the safety cam vertically, and stick a screwdriver through the carriage upright and the wheelblock bolt hole so the safety cam rests against the screwdriver. This will prevent the safety cam from rotating and engaging the column when you plumb the column.

NOTE

Be sure to remove the screwdriver and replace the mounting bolt before running the unit.

6. Make sure first column is secured. Raise second column. Use the same method as outlined for the first column (preceding steps). Then bolt carriage to the upper and lower wheelblocks.
7. Upper wheelblock should be installed at the middle of the slots in the upright. Install jackscrew above upper wheelblock on side of carriage that has slots in the upright. See Figure 11.

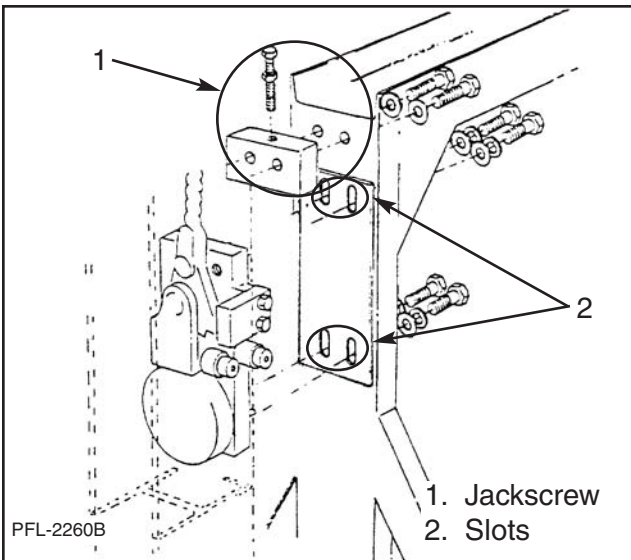


Figure 11

8. Make sure columns are well secured. Raise drive base into position and place over the top of the columns aligning it with the mounting pads at the top of the columns. See Figure 12.
9. Install bolts as illustrated. Snug bolts down. (Tighten enough to allow for adjustment.) See Figure 12.

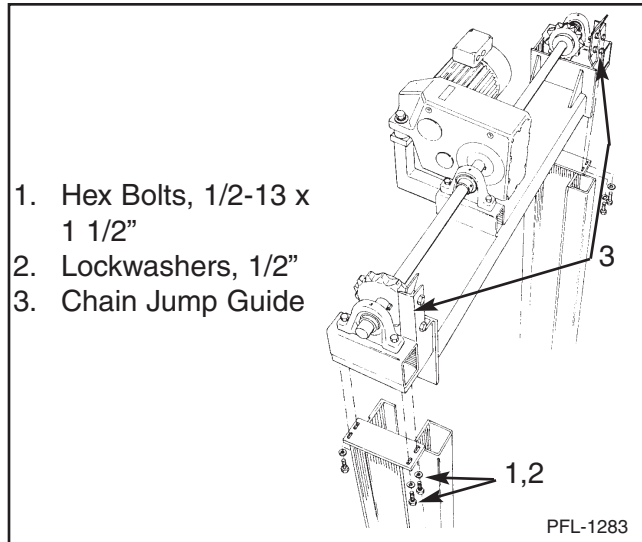


Figure 12

Alignment

1. Alignment of the main columns is important. Refer to the general arrangement drawing for guide angle to guide angle dimension. Measure between the columns at several points and make sure to hold that dimension to the top of the unit. See Figure 13.

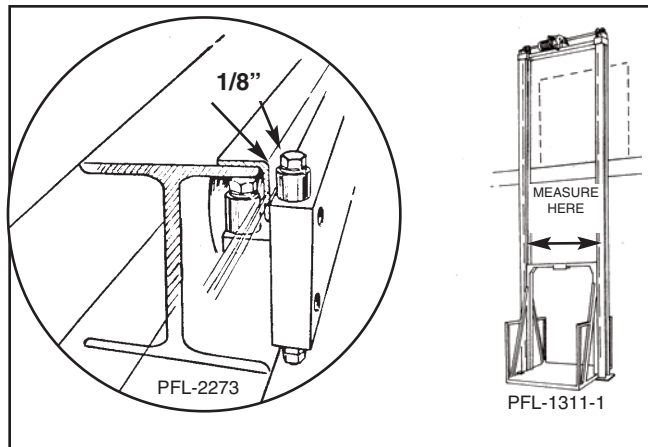


Figure 13

2. Make sure carriage is level. Double-check the guide angle to guide angle dimension to carriage width by measuring the space between the guide roller on the wheelblocks and the guide angle of the columns. There should be a gap of approximately 1/8". See Figures 13, 14.

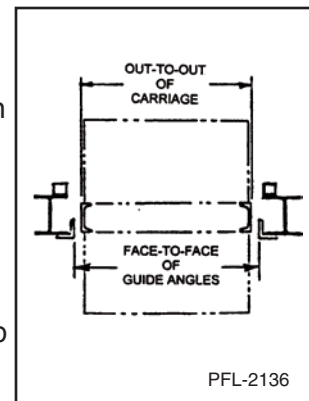


Figure 14

Installation Instructions

- Plumb both columns in both directions using plumb bobs or level. Recheck spacing and lag or tack weld floor-to-column braces. Make sure there is no column twist. See Figure 15.

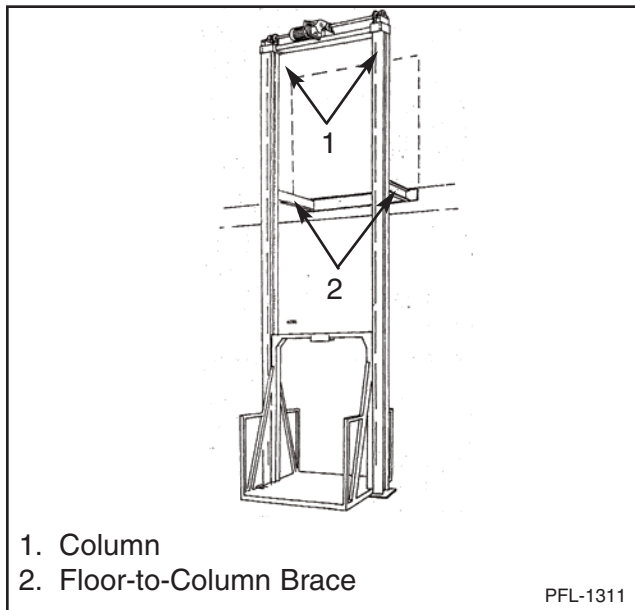


Figure 15

- Recheck and anchor to floor if columns are plumb. Recheck dimensions before fully welding column braces. See Figure 16.

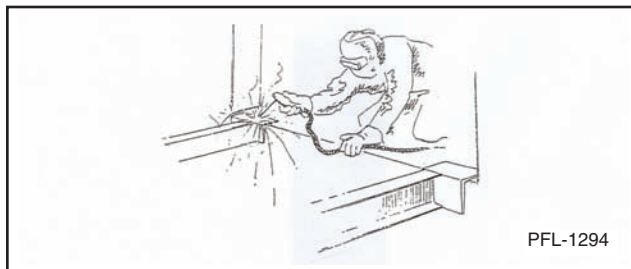


Figure 16

- Add side bracing as necessary.

NOTE

Columns should be supported in at least two directions that are perpendicular (90 degrees) to each other.

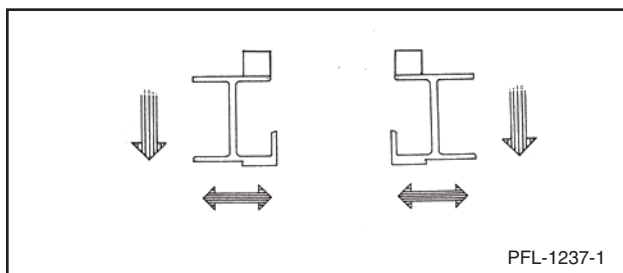


Figure 17

- Tighten hex bolts on drive base. See Figure 12.
- Remove chain jump guide. See Figure 12. Take a 10' section of the lift chain (larger chain) and install it over the sprocket on the column so that the end of the chain is just above the chain tube at the back of the column. At this time, adjust the sprocket so the chain goes down the center of the chain tube. Take the #35 chain and divide it equally into two sections (one for each column). Mount the swivel to one end of the #35 chain using the masterlink. See Figure 18.

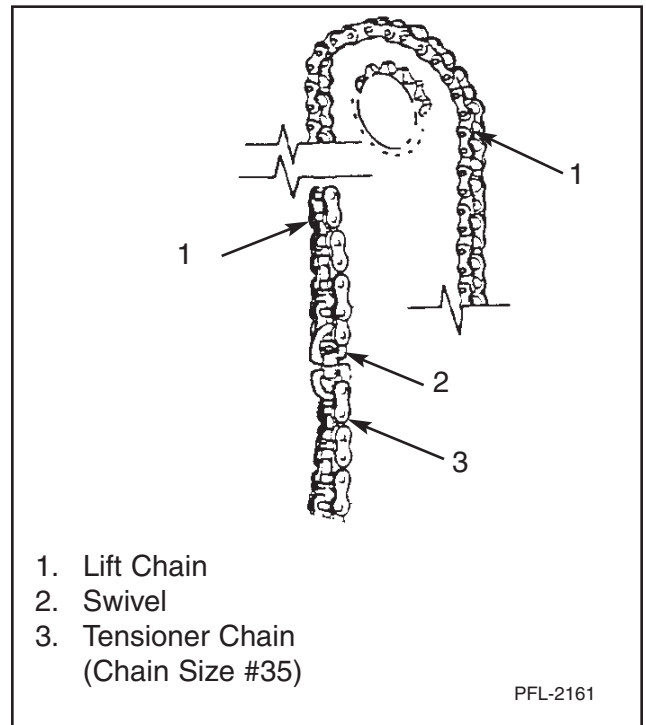


Figure 18

Carefully drop the #35 chain down the chain tube on the back of the column (drop the end without the swivel into the tube). Make sure the chain goes down without any knots or kinks. Attach the swivel to the masterlink on the lift chain.

Carefully jump the lift chain over the sprocket so that approximately 2' is down into the chain tube. Continue adding sections of the lift chain down the front of the column. (Make sure you have divided the chain into two equal lengths. It will usually be ten foot lengths with two smaller lengths, one for each column.) Attach the end of the chain to the wheel-blocks. See Figure 19.

M Series

CAUTION

If chains don't reach the wheelblock, carefully jump the chain over the sprocket to reach. Do not put hands under the chain. Pull the chain from the side. If chain gets away, the weight will crush fingers. Do not allow chain to come off sprocket.

NOTE

With carriage at the first level, there should be at least 1' of lift chain over the top of the sprockets and into the chain tube.

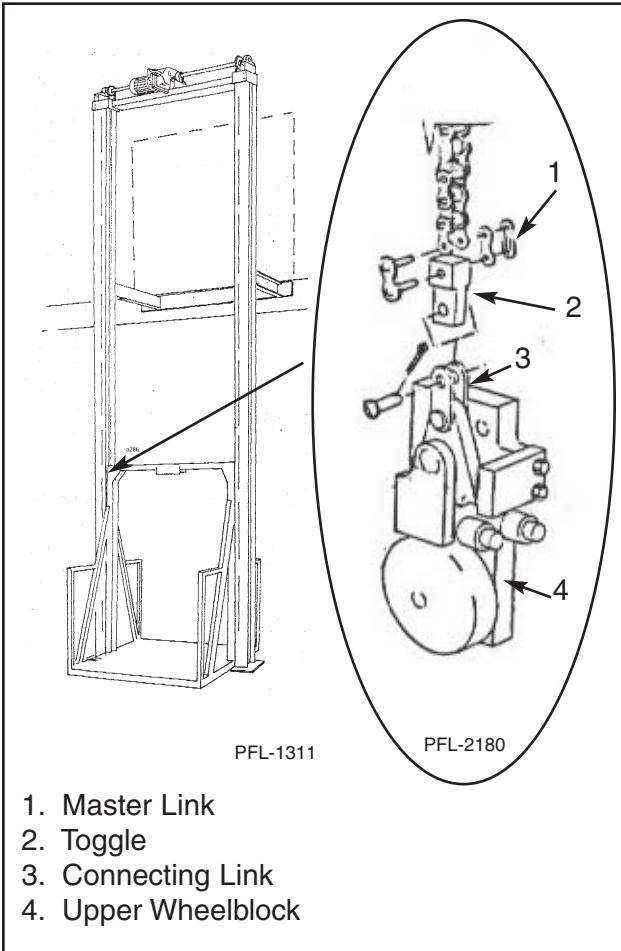


Figure 19

Continue with the other column.

After the chains are installed, try to get them approximately the same length by jumping the chain over the sprockets.

CAUTION

Again, be careful; the chain can crush your fingers between the chain and the sprockets.

Remove the blocks from under the carriage and remove the temporary anchors or welds holding the carriage secure. Carriage should now be hanging from the chains. Level the carriage (see page 18).

NOTE

If the carriage is not hanging freely from the chains, you will have to wait until you get power to raise the carriage slightly and then adjust the #35 tensioner chain and chain tensioner switch.

8. Bolt the tapped plates and chain brackets together. See Figure 20.

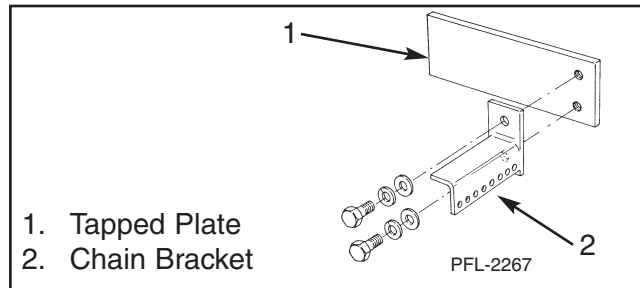


Figure 20

Weld the plate to the diagonals if the lift is a straddle lift or to the carriage upright channel if a cantilever lift. See Figures 21 and 22.

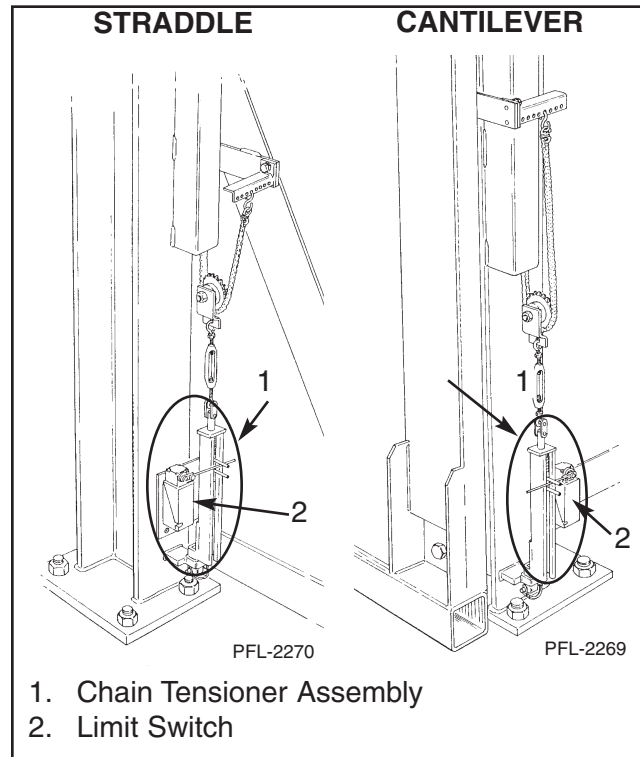


Figure 21

Installation Instructions

NOTE

Bracket should be approximately 42" up from the carriage and away from the tube so the chain and swivels don't rub on the tube. See Figure 22.

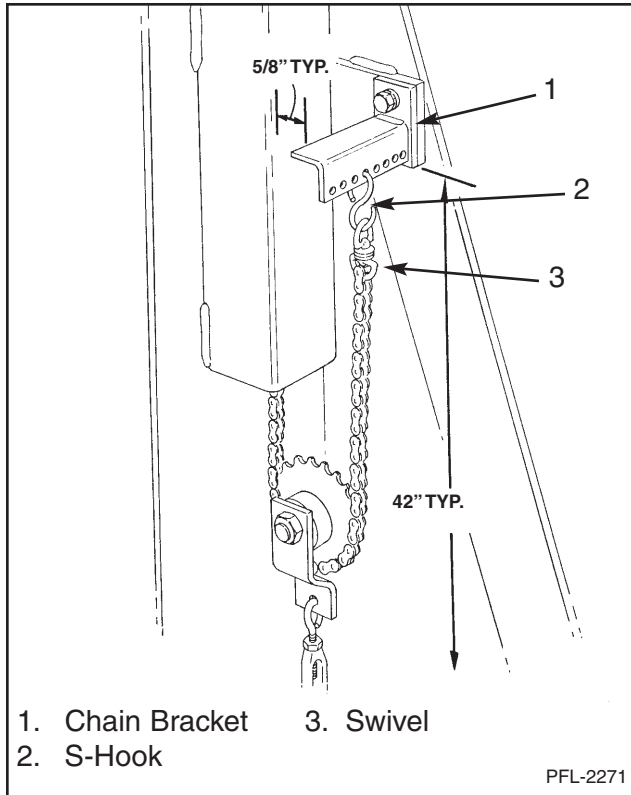


Figure 22

9. Insert chain tensioner assembly into mounting tube near bottom of the columns. Notice that the limit switches are away from the carriage. See Figure 21.
10. Open the turnbuckle to its fullest point. Take S-hook and swivel and place on chain bracket. See Figure 22. Place the #35 chain coming from the chain tube around the sprocket and cut to length to meet the swivel. Attach to swivel with the masterlink.
11. If carriage is hanging free from lift chains, adjust turnbuckle (Figure 23) until limit switch rod arm is centered between the two roll pins on chain tensioner bracket. See Figure 24. (Limit switch arm should be parallel to ground when set.)

NOTE

If carriage is not hanging from lift chains, you will have to wait until unit can be "bumped up" by electrician to do above steps.

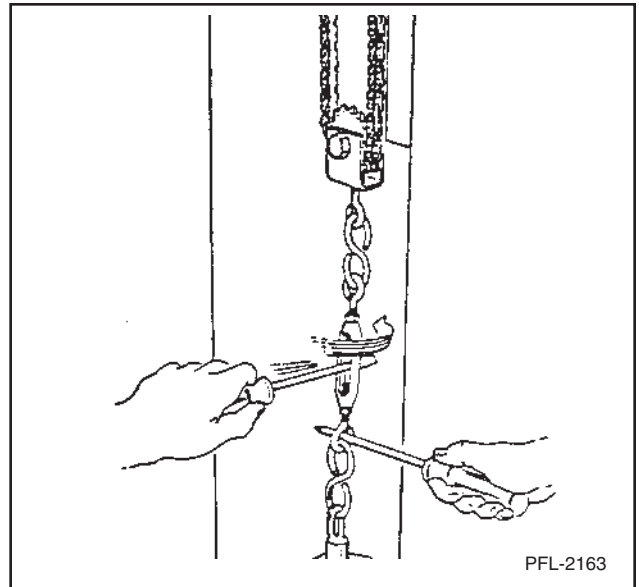


Figure 23

12. On tall units, the excess chain movement may cause the limit switch to activate prematurely. In these cases, move the lower roll pin to the lower hole in the chain tensioner block to allow for more movement in block. See Figure 24.

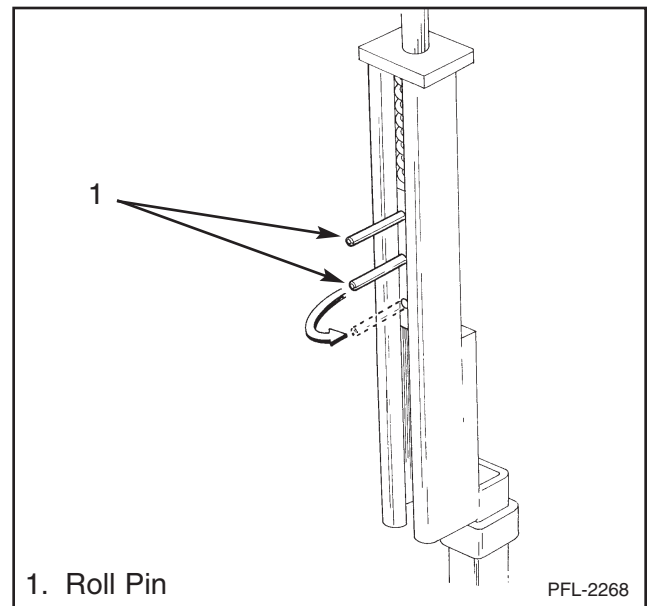


Figure 24

NOTE

Have the electrician "bump" the motor to check rotation. Preferably, this should be done before the drive chains are installed if an electrician is available.

M Series

CAUTION

Do not allow the electrician to “run” the motor until rotation is verified as damage to the chain tensioner assembly and chains may occur if the rotation is incorrect. The lift chain will also run off the sprockets.

WARNING

When running the unit before all limit switches are installed, be prepared to disconnect power. Allowing carriage overtravel in either direction may result in severe damage. The use of temporary power is not recommended for inexperienced installers.

13. Make sure carriage is free to rise 6”. Check to make sure carriage is level and chains are equally tight.

Leveling Carriage

1. Loosen wheelblock mounting bolts on side of the carriage with the jackscrew. See Figure 11.
2. Using a level, determine what direction the jackscrew has to be turned to level the carriage.
3. After leveling the carriage, tighten mounting bolts.

NOTE

Do not use jackscrew to support the carriage. Wheelblock bolts must be tightened.

4. Continue to raise the carriage in small 6” increments checking for binding or interference.

CAUTION

The power unit has high torque, and you have not fully welded the unit. Any resistance to carriage movement can pull the structure apart.

Final Steps

1. Stop carriage at upper floor. Check alignment.

2. Lower carriage in small increments. Check for any interference or binding of the chain and carriage.
3. Reinstall chain jump guides. See Figure 12. If chain rubs on the guides, adjust.

NOTE

Check clearance between wide flange columns and wheelblock shoes. See Figure 13. Sometimes wheelblock shoes may rub slightly. If so, use flat washers to shim shoes out not more than 3/16th inch.

4. Make any changes necessary to align columns to allow smooth travel.
5. Fully weld horizontal floor braces.
6. Weld drive base to columns.

NOTE

Lateral support may be called for. If necessary, weld braces to sides of the opening. See Anchoring and Bracing pages for bracing examples.

7. Mount floor-level limit switches (see Page 25 - Two-Level VRC Limit Switch Mounting Instructions) and overtravel limit switch (see Page 27- Overtravel Limit Switch Mounting Instructions). If unit is multi-level, see Page 29 - Three-Level or More Limit Switch Mounting Instructions - in addition to Pages 25 and 27.
8. Install gates and enclosures per OSHA B20.1 Standards. See Options - Gate Identification section for specific gate installation instructions.
9. Mount control stations at least six feet from access to carriage on all levels.
10. After unit is completely wired, floor-level limit switches will have to be adjusted. To accomplish this, run carriage to desired floor level. Measure distance the carriage is off from floor level. Loosen the mounting bolts that hold the switch to the unistrut only enough so that the switch can be moved by lightly tapping the switch assembly. It is extremely difficult to loosen the bolts completely and adjust the switch assembly for proper height.

11. Adjust the instantaneous current relay (IOL). See Page 34 - Setting IOL - Instantaneous Overload Relay.

Anchoring and Bracing

NOTE

The following illustration is for reference only. Site conditions may require a different alternative to the ones we suggest.

Side-to-side and front-to-back bracing of the unit is required. Seismic requirements will be different, and a separate drawing is usually provided in the shipping packet. Bracing of the unit and enclosures is the responsibility of the installer.

It is the customer's responsibility to make sure that the site conditions have a structure of adequate strength to brace to in order to withstand the forces.

For a two-level unit, Pflow will supply:

- (2) 10' lengths of 4" channel (unpainted)
- (2) 4-hole pads (unpainted)
- (1) 10' length of 1-1/2" x 1-1/2" x 3/16" angle per gate (unpainted)
- (2) Cans of spray paint

Each additional level will be supplied with the following:

- (1) 10' length of channel
- (1) 10' length of angle per gate
- (2) 4-hole pads

We do not supply bolts nor guarantee that the above material will be sufficient for the application. It is the installer's responsibility to check the information included in the shipping packet prior to commencing work. Specific bracing instructions may be provided.

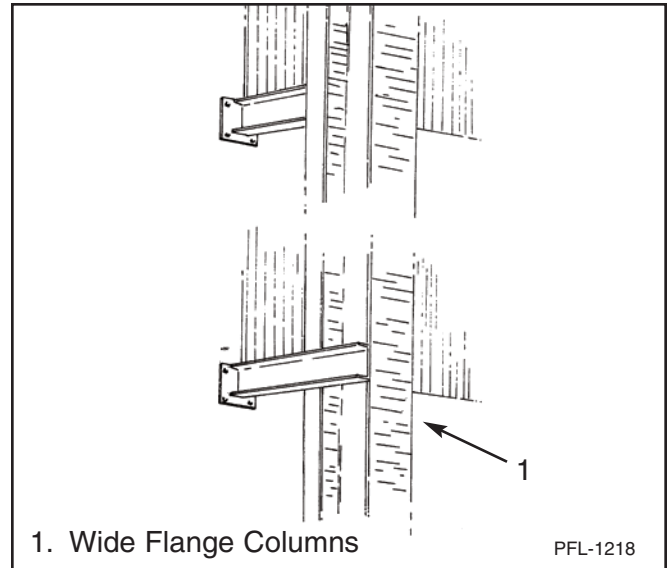


Figure 25

M Series

Guidelines for Anchoring

Welding to a Curb Angle (Figure 26)

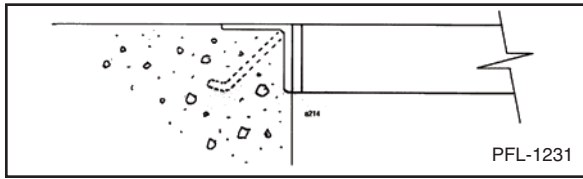


Figure 26

Using a Tie Plate (Figure 27)

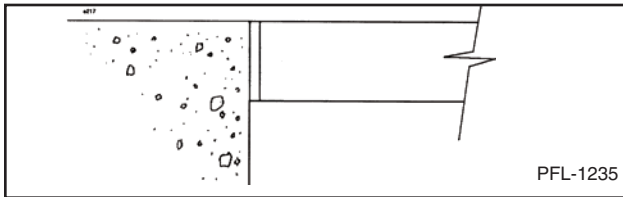


Figure 27

Anchoring to Wooden Floors (Figures 28, 29, and 30)

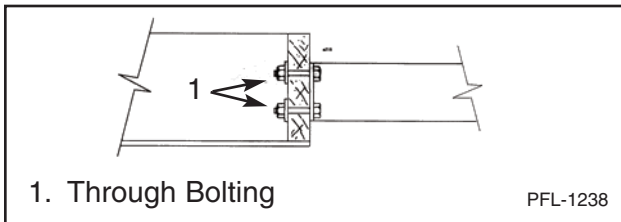


Figure 28

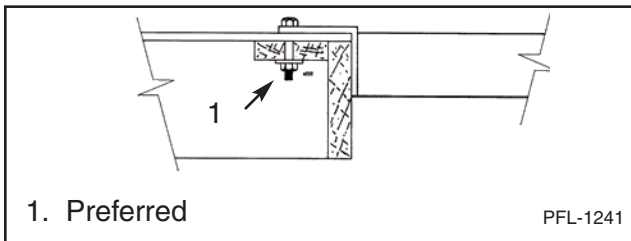


Figure 29

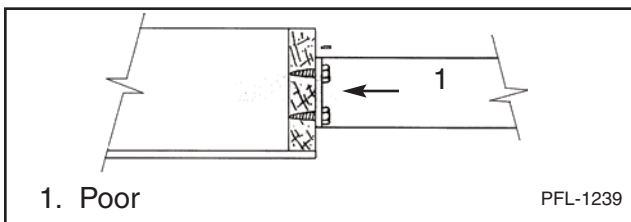


Figure 30

Anchoring to Block Walls (Figures 31 and 32)

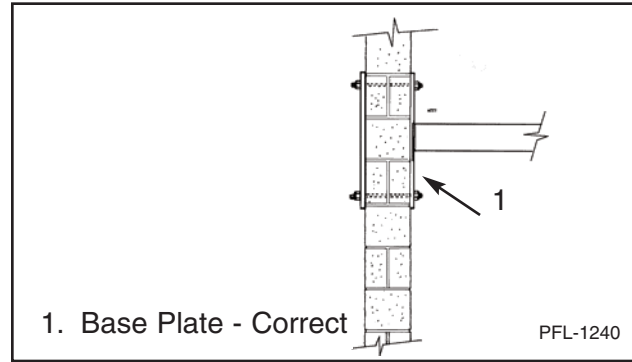


Figure 31

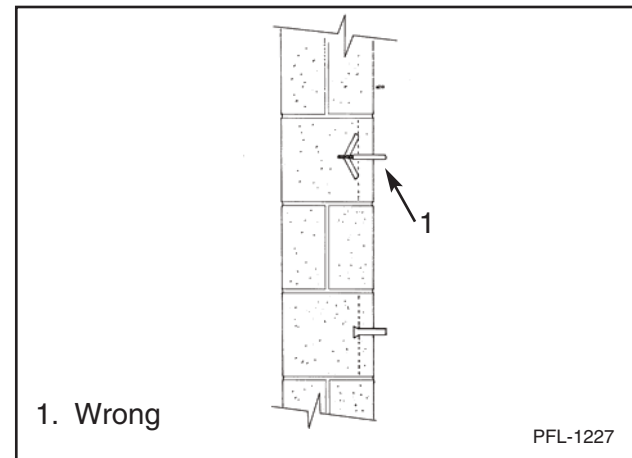


Figure 32

Anchoring Base Plate to Solid Floor (Figure 33)

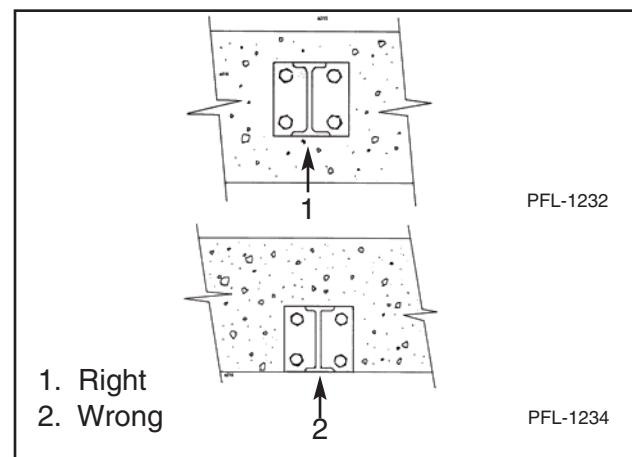


Figure 33

2. The following Guidelines for Bracing page shows how to attach bracing to the building. Proceed with the final bracing. Tack bracing into position.

Guidelines for Bracing - Straddle

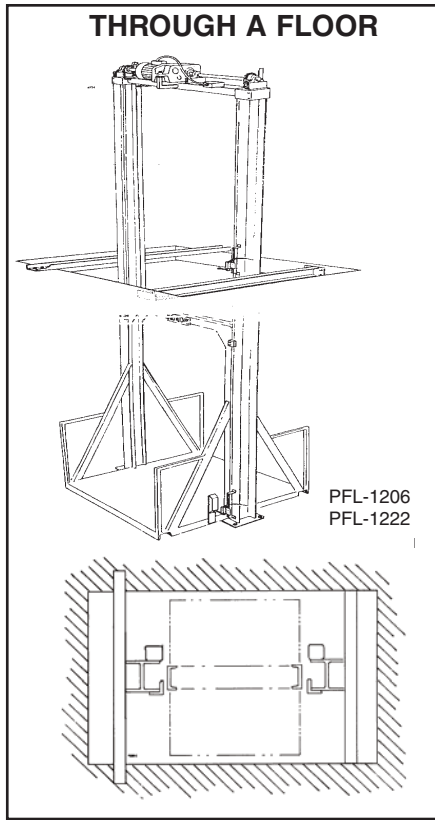


Figure 34

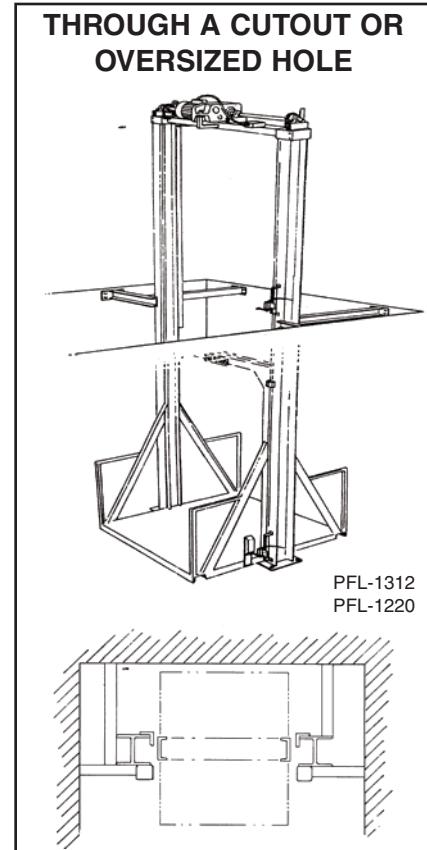


Figure 35

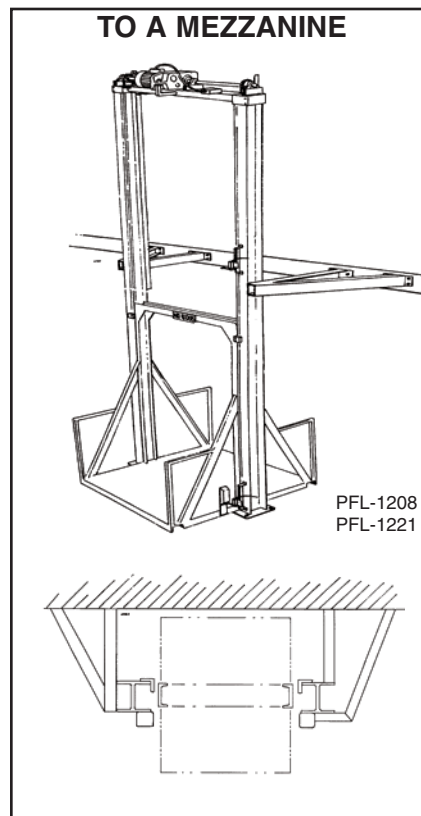


Figure 36

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Guidelines for Bracing - Cantilever

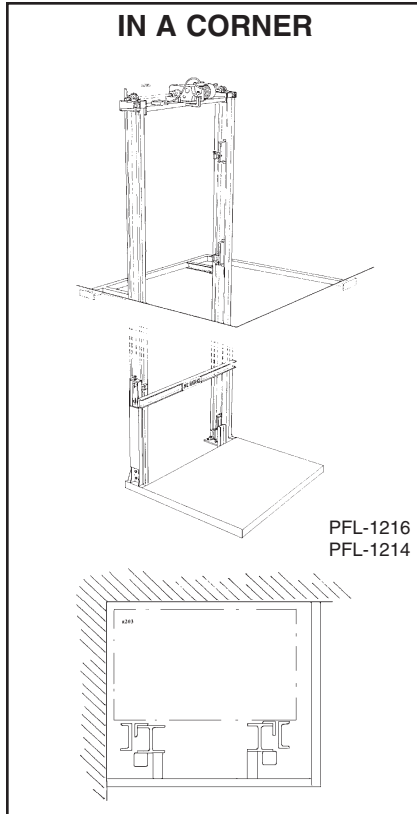


Figure 37

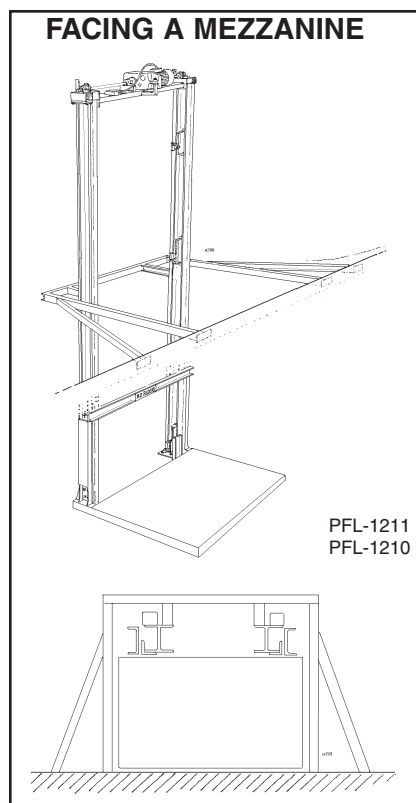


Figure 38

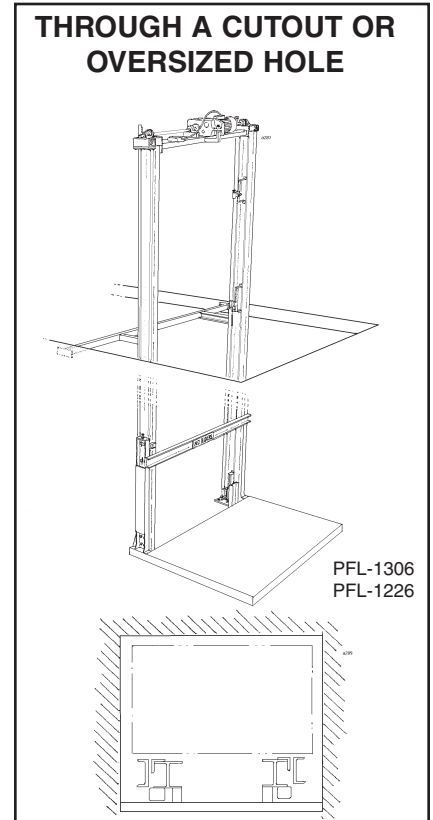


Figure 39

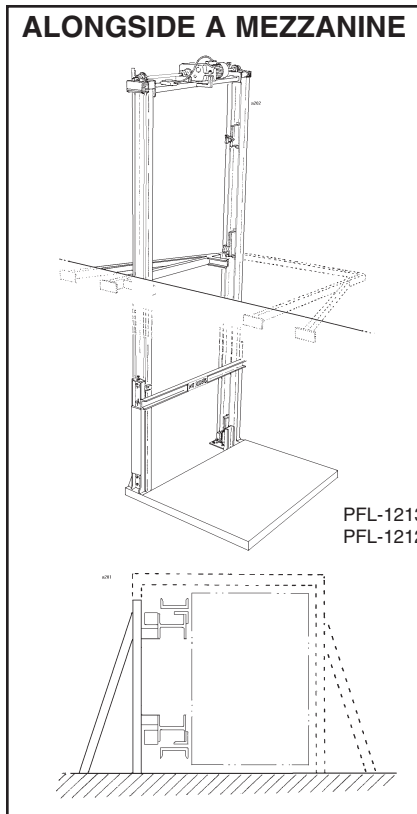


Figure 40

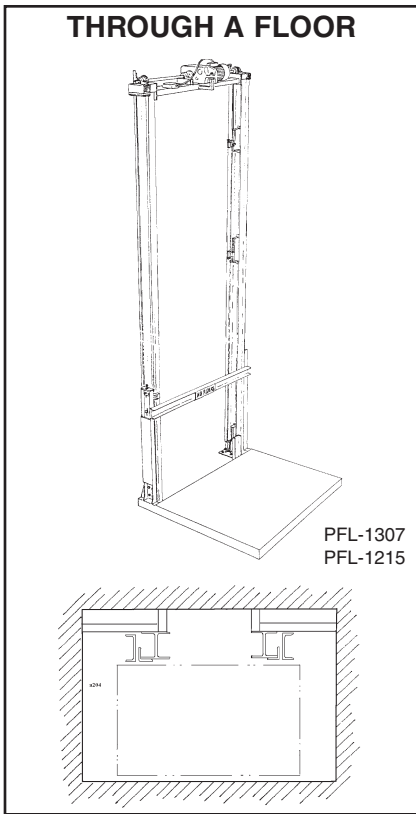


Figure 41

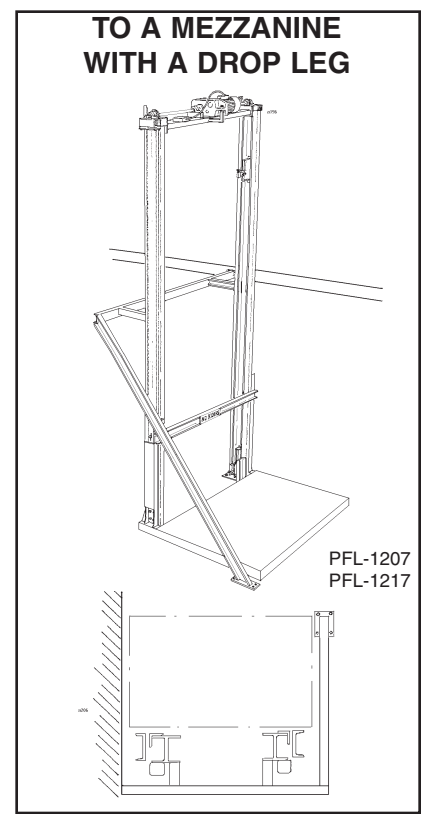


Figure 42

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Two-Level VRC Limit Switch Mounting Instructions

The standard two-level VRC incorporates one switch at each level to stop the carriage and one overtravel switch to act as a backup. The following instructions and diagrams show the most commonly used method of mounting these switches. Due to varying site conditions, the instructions and diagrams may not apply to an application due to possible site variances. If you need assistance, please contact Pflow Industries, Product Support Department, (414) 352-9000.

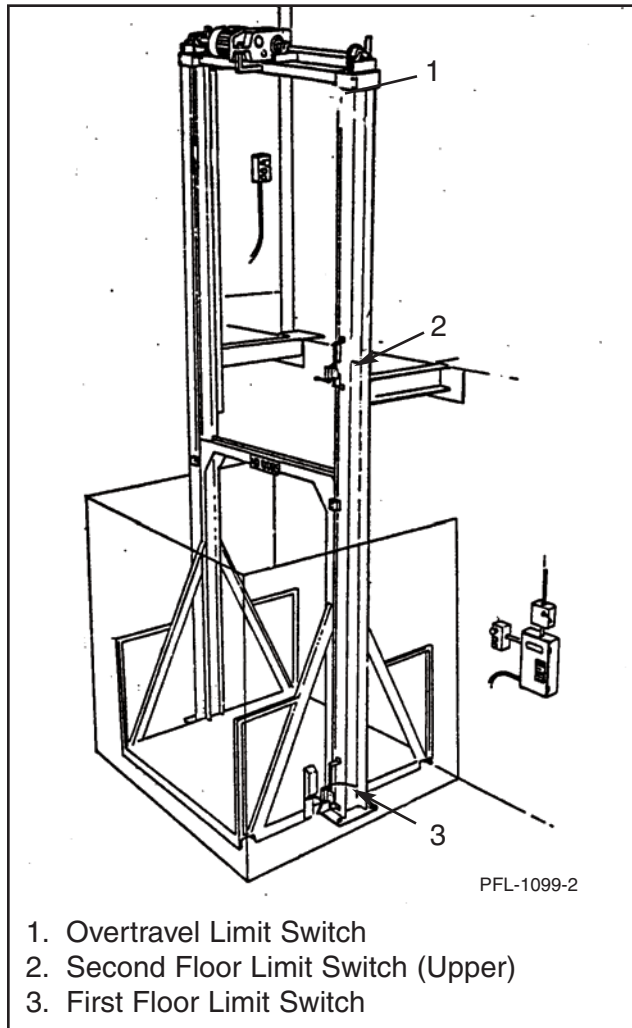


Figure 1

1. LOWER LEVEL - With the carriage resting on the lowest level, tack weld or clamp a limit switch assembly (L-bracket with limit switch mounted) to the column. The unistrut mounts should be positioned flush with the outside edge of the column. Do NOT weld to the column at this time. See Figure 2.

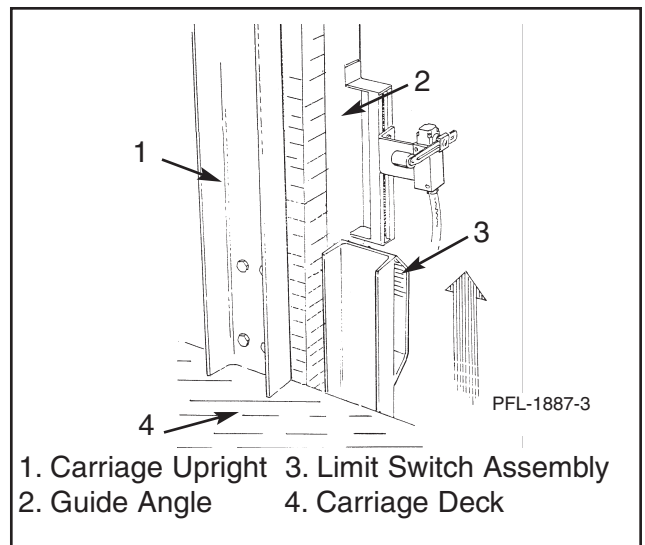


Figure 2

2. Position the limit switch actuator plate on the carriage so that the roller on the switch arm of the limit switch assembly makes contact with the center of the bottom of the actuator plate. See Figure 3.

Take a measurement from the carriage deck to the top of the limit switch actuator plate. This measurement will be needed for mounting the upper level limit switch. See Figure 3.

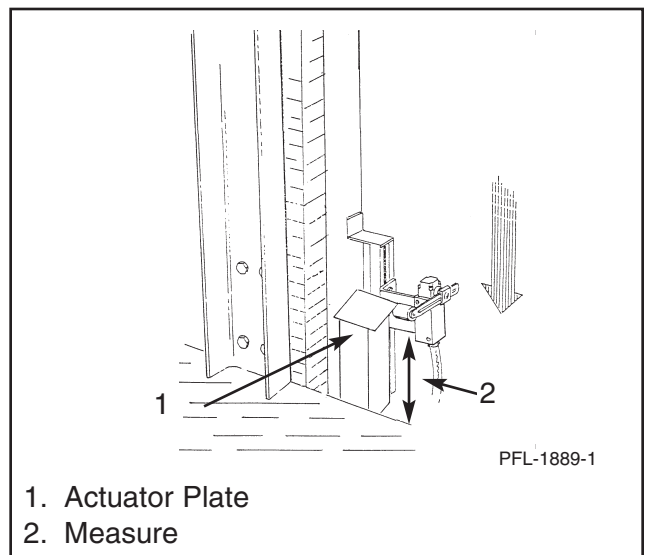


Figure 3

It is recommended that the overhang side of the plate be free to make contact with the limit switch arm. The arm is adjustable, and repositioning may be required to ensure the proper contact.

M Series

3. UPPER LEVEL

Place a straightedge on the upper level and extend it to the column. See Figure 4.

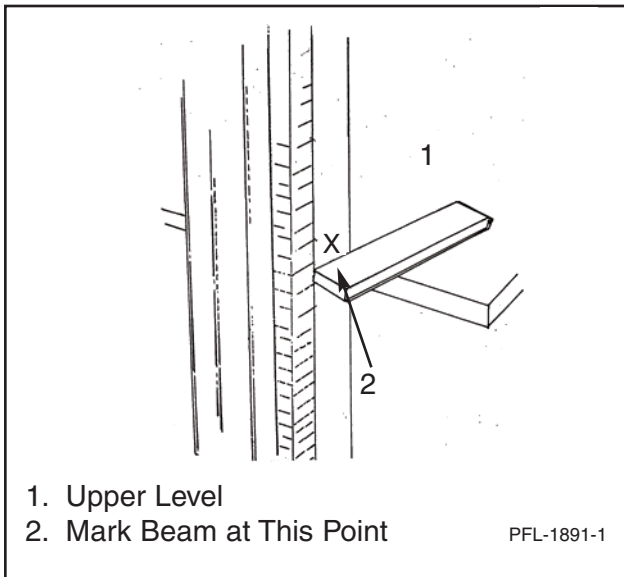


Figure 4

Placement of two to three feet of the straight edge on the floor should help to ensure a level reading. This mark shows where the carriage deck will be when the lift is stopped at that level.

4. Using the measurement taken in Step 2, measure up the same number of inches from the mark you placed on the column in Step 3. See Figure 5.

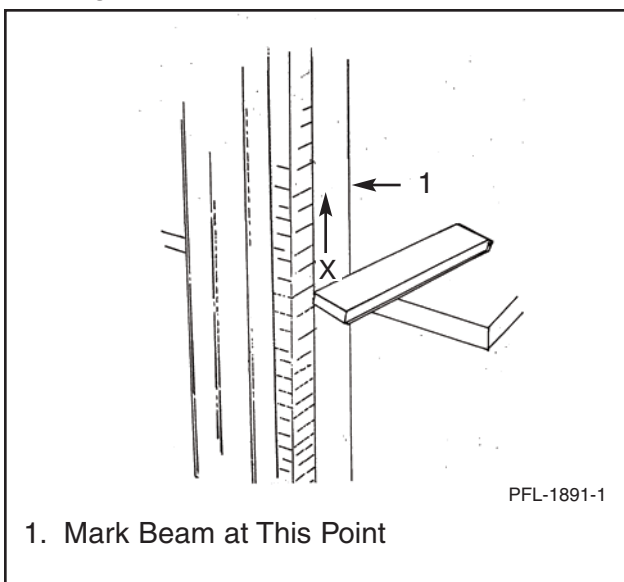


Figure 5

The upper level limit switch assembly will be centered on this point flush to the outside edge of the column and will operate in the upward direction off the top of the actuator plate. See Figure 6.

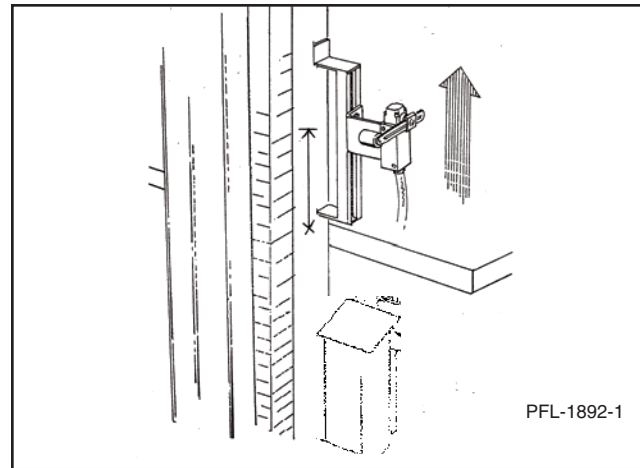


Figure 6

CAUTION
DO NOT WELD ON GUIDE ANGLE.

Weld the unistrut mounts to the face of the column. (This illustration is for alignment purposes only, and actual field application may vary.)

The overtravel limit switch can now be installed.

Overtravel Limit Switch Mounting Instructions

Measure the distance from the top of the carriage deck to the top of the wheelblock shoe. Take this distance and measure from the upper floor level mark you made on the column in Step 3, Page 26, and again mark the column.

At this point, weld the overtravel limit switch bracket so the unistrut is centered on this mark and the limit switch roller will contact the wheelblock shoe.

NOTE

For overtravel, the limit switch L-bracket has to be loosened from the unistrut and mounted in the position shown in Figure 1.

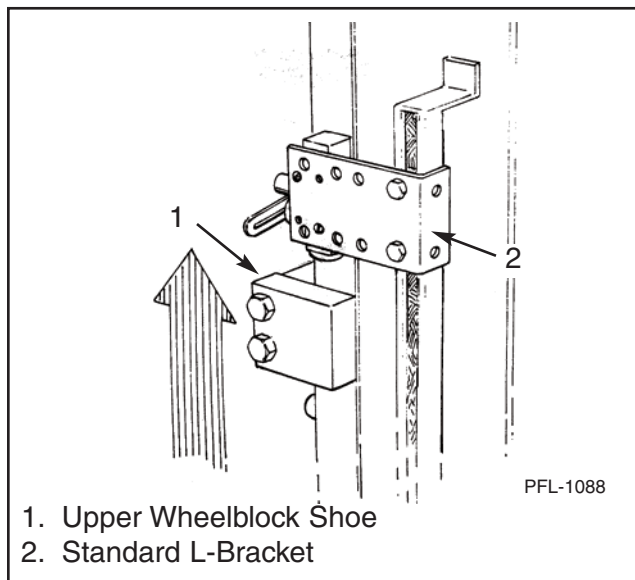


Figure 1

CANTILEVER APPLICATIONS

Figures 2, 3, and 4 represent possible mounting options of the overtravel switch.

Cantilevered applications are usually required due to lack of space available. We, therefore, recommend mounting the switch assemblies inside of the column as shown with the above overtravel arrangement.

Where enclosures are mounted on the back of the carriage, you may want to use the carriage as an alternate actuator plate.

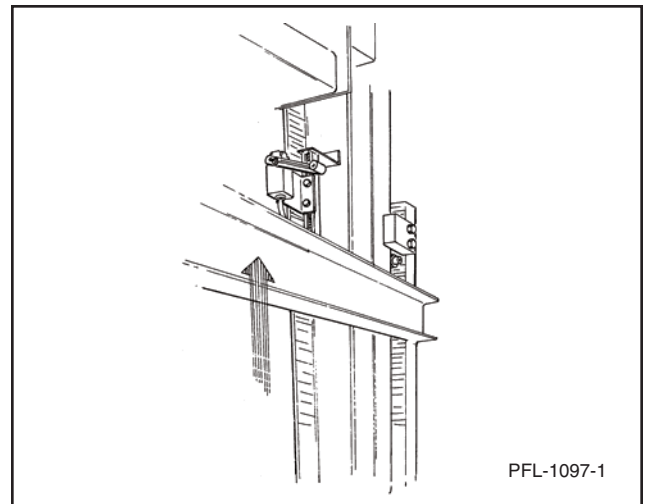


Figure 2

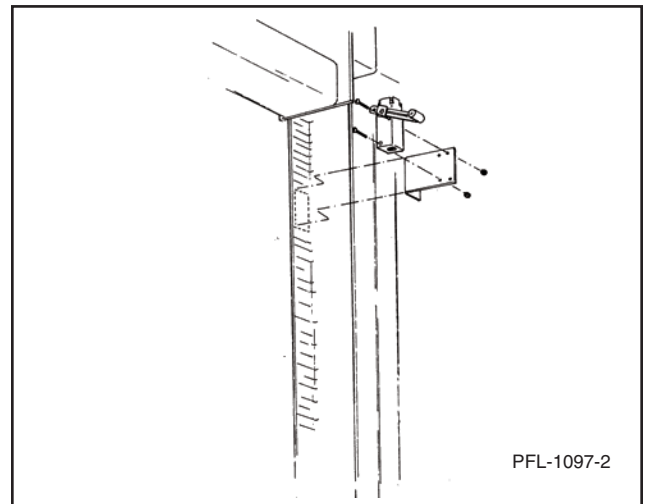


Figure 3

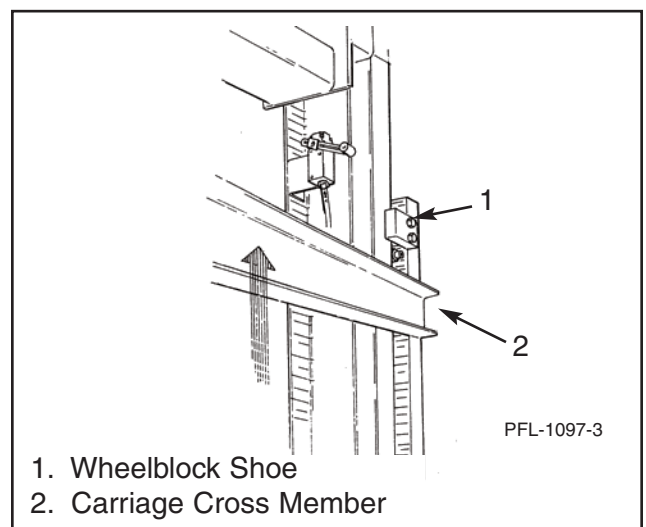


Figure 4

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Three-Level or More Limit Switch Mounting Instructions

THREE-LEVEL OR MORE OVERVIEW OF LIMIT SWITCH MOUNTING

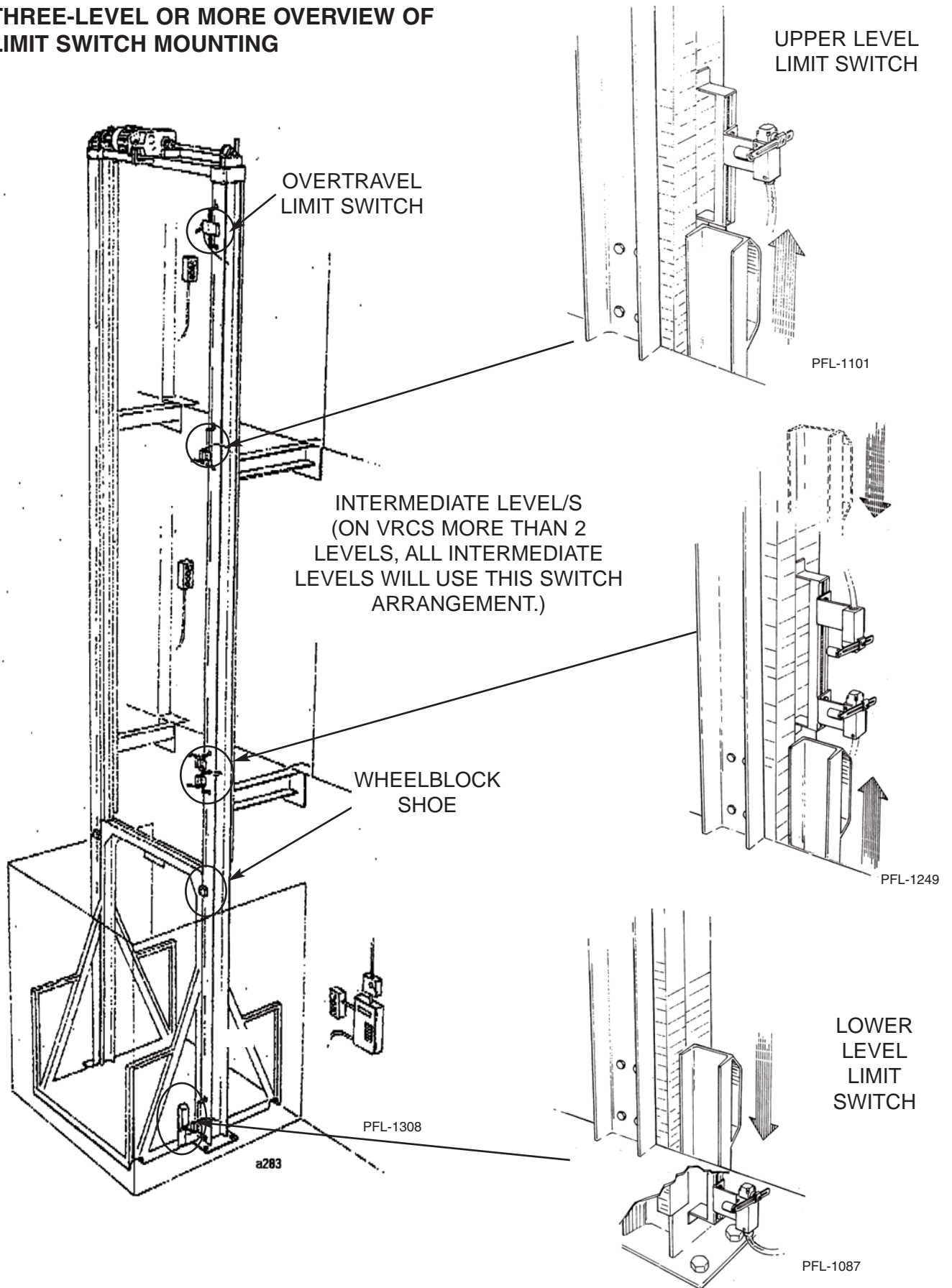


Figure 1

**UPPER & LOWER FLOOR LIMIT SWITCHES
(TOP LEVEL & LOWEST LEVEL)
(EXAMPLE ON 3-LEVEL LIFT WOULD BE 1ST & 3RD)**

1. Hold a limit switch assembly on the beam. The assembly has only one limit switch on it. (Do not weld assembly to the beam at this time.) Tack weld or clamp. Place the actuator cam on the carriage so that the roller on the limit switch is on the center of the actuator cam. Then weld actuator cam solidly onto the carriage.
2. Install first floor level limit switch assembly as illustrated. NOTE: First floor limit switch is actuated off the bottom of the carriage cam, and the top floor level limit switch is actuated off the top portion of that same cam.

3. Install upper top floor level limit switch.

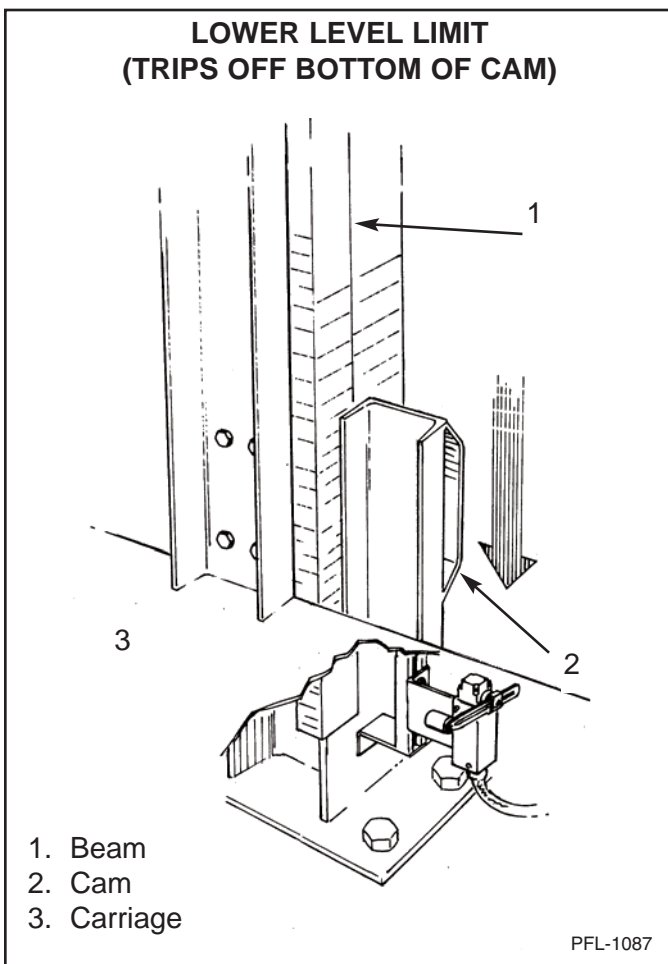


Figure 2

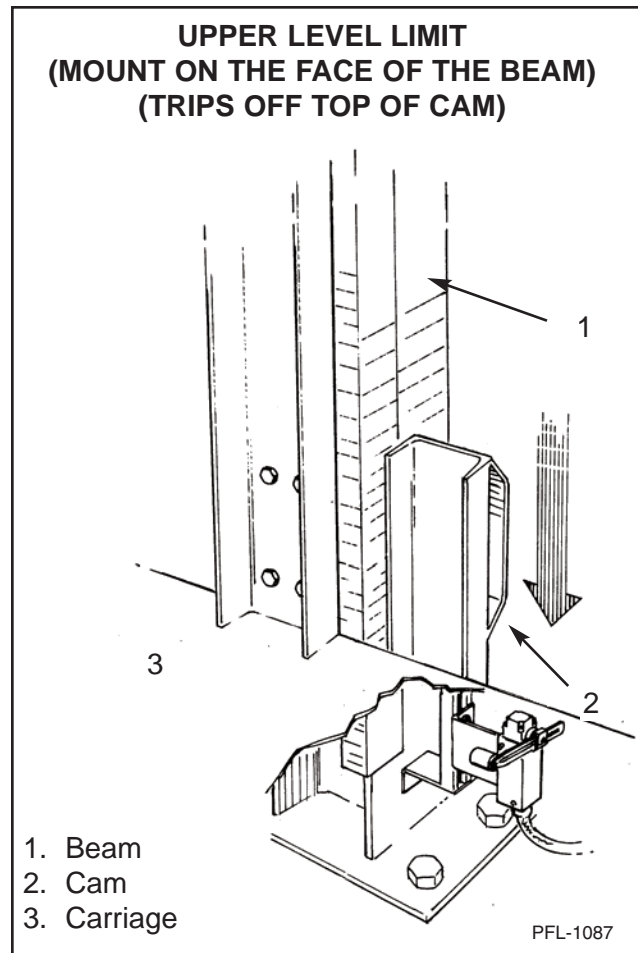


Figure 3

Intermediate Floor Level Limit Switch Mounting Instructions

Install intermediate floor level limit switch assembly as illustrated. (It has two limit switches.)

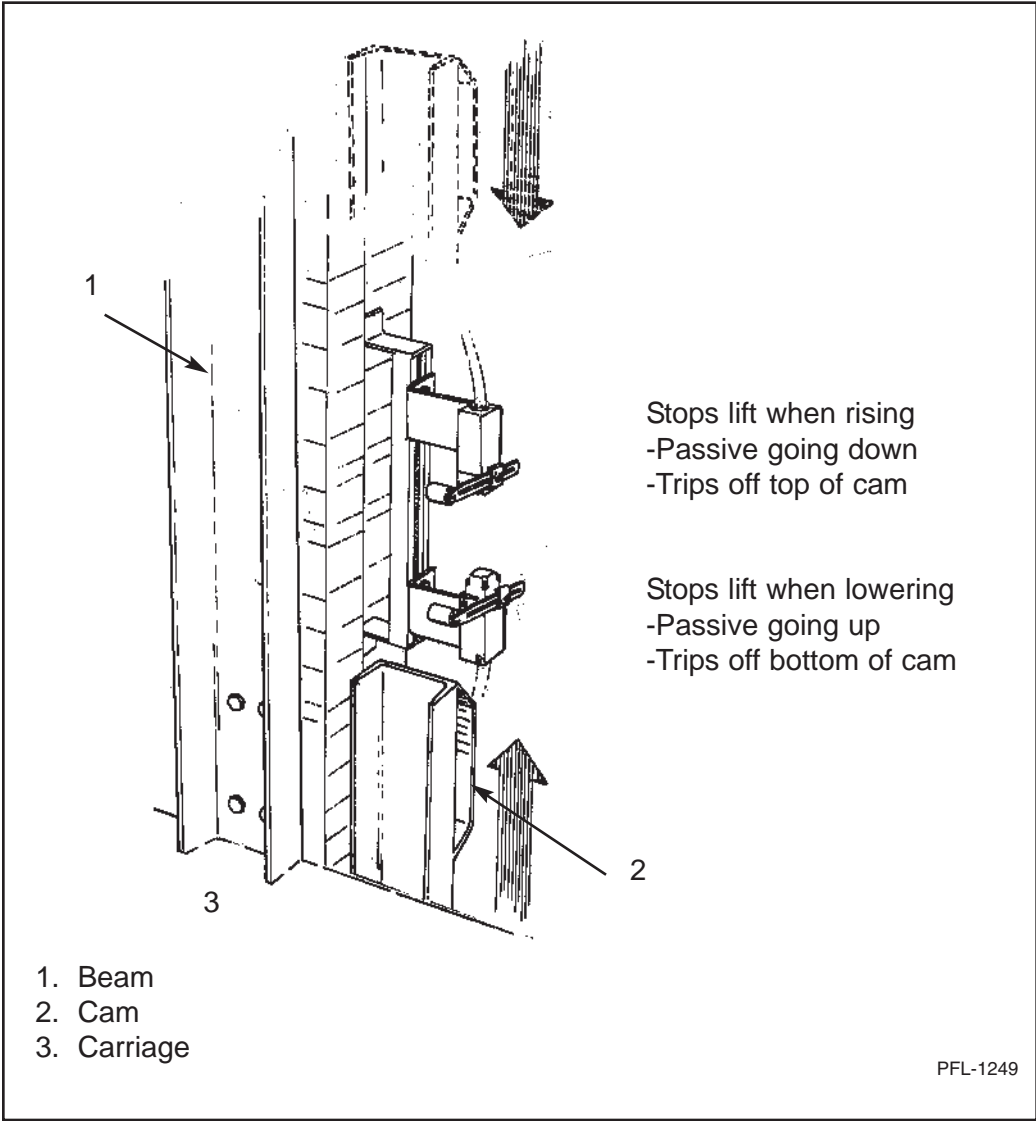


Figure 4

Note: Limit switch actuation direction may have to be changed. Switches have to be passive in one direction. See Level Limit Switch illustration (Page 32) to change actuation direction, if necessary.

LEVEL LIMIT SWITCH - CHANGING ACTUATION

On units with intermediate floors, it may be necessary to change switch actuation direction. Use Page 31 as a guide.

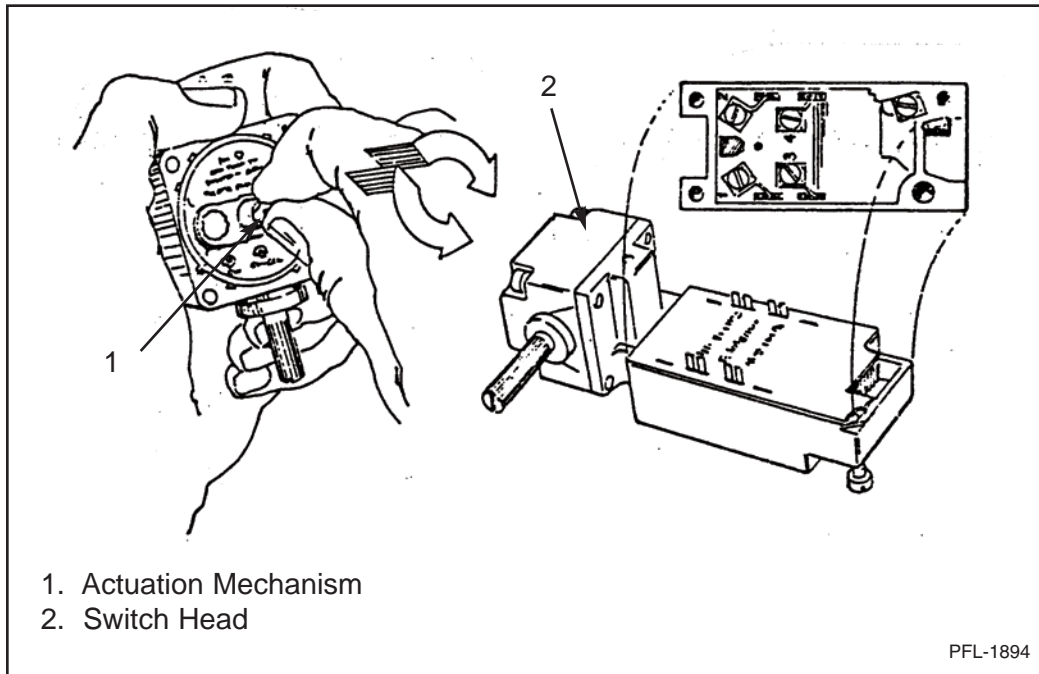


Figure 5

1. To change actuation direction, remove switch head.
2. Change actuating control mechanism to desired actuation direction. CW, clockwise, switch will activate in clockwise direction. CW - CCW switch will activate in both directions (used in this position for upper and lower switches); and CCW, counterclockwise, switch will activate when turned counterclockwise. The switch has four settings that can be changed by pulling actuation mechanism inside the switch head, rotating actuation mechanism, and allowing activator to reset.
3. You can tell switch actuation direction by turning it. There should be a "click" when switch activates.

ELECTRICAL SAFETY PRECAUTIONS

DANGER

Always assume that a circuit is not safe until you are sure that it is dead. Make sure that it cannot be energized after you start working on it. Follow OSHA procedures for locking out the control panel ANYTIME maintenance or service is being performed on the unit. Put a lock and tag on disconnects, breakers, and/or pulled fuses.

- Use a voltage tester on circuits - **DO NOT USE YOUR FINGERS**. Use fuse pullers to change a fuse; **NEVER** use fingers, pliers or screwdrivers. Covers on exposed electrical devices or wires **MUST** be installed to protect personnel from injury or shock.
- **ALL** metal connection boxes, switch boxes, starting boxes, transformer shells, and motor frames must be grounded to prevent shock to personnel.
- When using a portable electric meter, **DO NOT** connect one wire and leave other wires dangling loose. Anyone touching it will receive a shock through the meter.
- Before powering a circuit on, make sure that all is clear. This is necessary in order to protect personnel from injury and to prevent damage to the equipment.
- Avoid accidental contact with equipment or conductors which are known to be live or are **NOT** known to be dead. If it is necessary to work on equipment while it is hot, extra care must be observed. Always test and repair equipment that indicates a warning of unsafe conditions by giving a nonfatal shock. **NEVER** assume that because the warning shock is nonfatal, the next shock will also be nonfatal.
- **TAKE TIME TO BE CAREFUL!** Following safety precautions and using common sense will prevent injury, mutilation, or death.

Safety Precautions When Working on Live Circuits or Equipment:

When electrical repair or maintenance work is required that prohibits de-energizing the circuits involved, extreme measures of safety must be used. The work should be accomplished only by well-supervised personnel who are fully aware of the dangers involved. Every care should be taken to protect the person performing the work and to use all practical safety measures. The following precautions **MUST** be taken:

- The person doing the work should not wear a wristwatch, rings, watch chain, metal articles, necklaces or loose clothing which might make accidental contact with live parts or throw some part of his body into contact with live parts.
- Clothing and shoes should be as dry as possible.
- Insulate the worker from ground by covering any adjacent grounded metal, with which he might come in contact, with insulating material. Suitable insulating materials are dry wood, rubber mats, dry canvas, dry phenolic material, or even heavy, dry paper in several thickness. Be sure that it has no holes and no conducting materials embedded in it. Cover sufficient area so that adequate space is permitted for worker movement.
- Cover working metal tools with an insulating rubber tape (not friction tape) as much as is practical.
- **DO NOT** stick a bare screwdriver or other tool into a hot fuse box.

M Series

FOR YOUR ELECTRICIAN

1. Mount push button station out of reach from the carriage (approximately six feet).
2. Circuit incorporates a current sensing magnetic overload relay. This device will reset at 70 to 80% of its overload condition. A timer is used to bypass the IOL relay for a nominal three seconds during starting in-rush.
3. The limit switches on the chain tensioning assembly should be wired as follows:

If the tensioner chain goes slack causing the arm on the limit switch to move down or if a strong tension on the tensioner chain causes the arm to move up, there will be a break in the control power; therefore, they are wired to the normally closed contact on each limit switch. These limit switches are designated as 93LS and 94LS on the electrical drawing. On 4-post units, there are two additional switches. They are designated as 95LS and 96LS.

SETTING IOL - INSTANTANEOUS OVERLOAD RELAY

Infield Adjustment

1. Load carriage to capacity weight.
2. While raising lift (with load), adjust IOL until instantaneous trip current equals motor current or until motor will continue to run after timer times out.
3. If no power is available, use calibration lines to set IOL relay at no more than the motor's full load current as shown on its serial plate. See Figure 43.

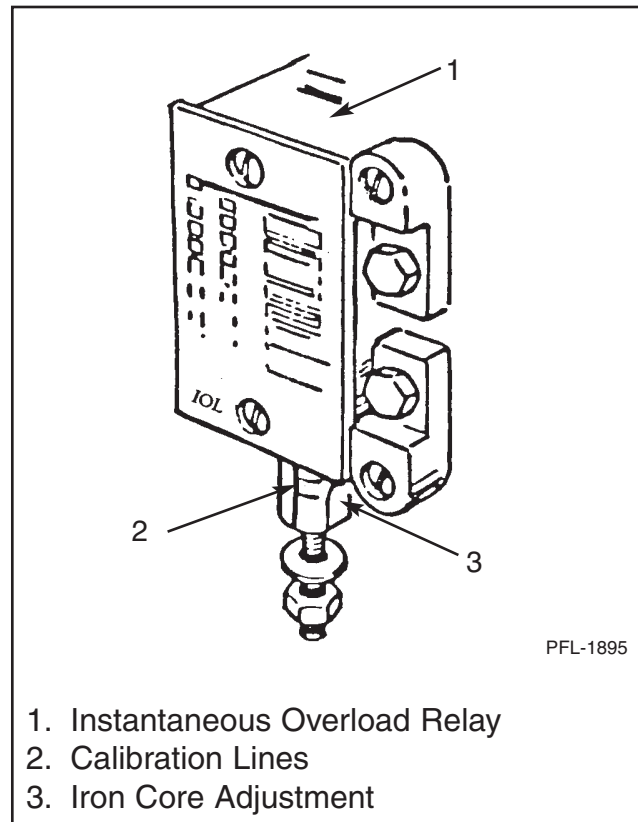


Figure 43

Spliced Column Assembly Instructions

SERIES M & SERIES 21

NOTE

COLUMNS ARE MARKED A AND B. PLACEMENT OF THE COLUMNS IS NOT DETERMINED BY THESE MARKS. THE COLUMN LETTERS ARE ONLY USED TO CORRECTLY ASSEMBLE A SPLICED COLUMN. THE SPLICED PARTS OF THE COLUMN ARE LET-TERED AS SHOWN IN FIGURE 1 AND BY THE CORRESPONDING LETTERS SHOWN IN FIGURES 2 AND 3.

Unband spliced column pieces. Locate the identification letters, which will be found on the column flanges 6" from the splice ends as shown in Figure 1. Group the spliced column pieces by letters.

CAUTION

STRADDLE APPLICATIONS - Right and left columns are determined by placing the columns with the guide angles to the front inside and the chain tube to the back.

CANTILEVER APPLICATIONS - Columns are placed in the opposite position with the guide angles facing outward and chain tubes remaining to the rear.

NOTE

Lift shown partially assembled to better depict the marking system. See Figures 1 and 2.

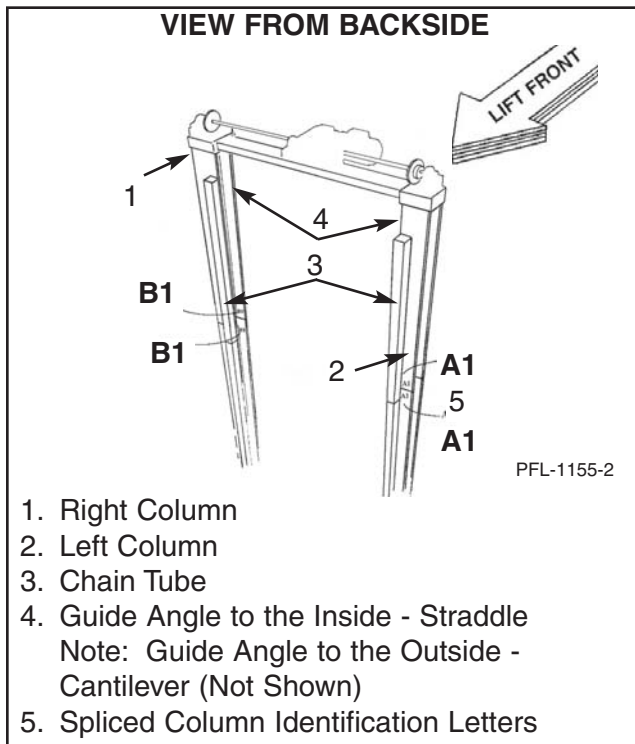


Figure 1

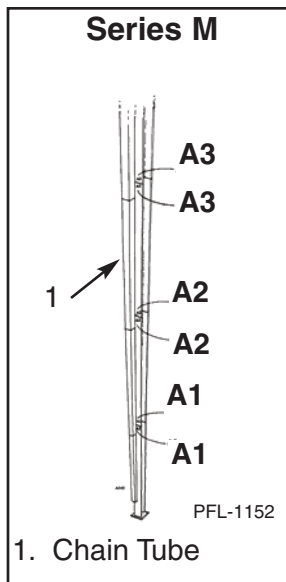


Figure 2

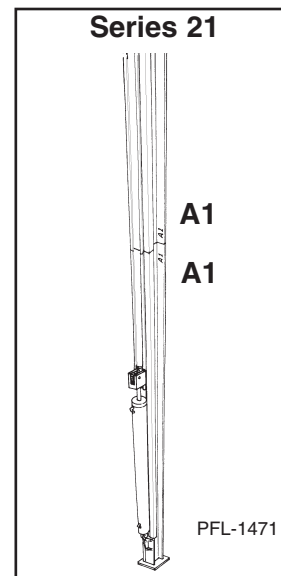


Figure 3

Assemble spliced column pieces as shown. Use 5/8" bolts and nuts (two per splice) to help hold and align each piece of the column. See Figure 4.

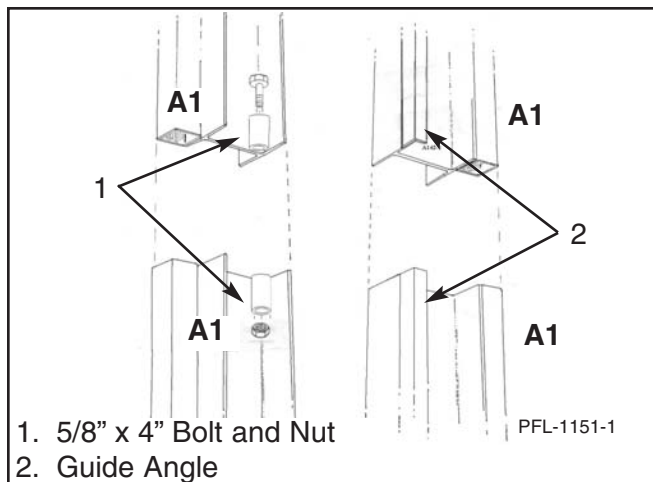


Figure 4

M Series

Tack weld spliced column pieces together. The bolts alone are not strong enough to hold the column pieces together. Temporarily brace the column. Continue to bolt together and tack weld the rest of the column pieces keeping the column temporarily braced until it has been completed.

Assemble the second column in the same manner.

Proper alignment is CRITICAL to the installation and operation of your VRC. Use a string as shown to check alignment. Column has to be aligned from two directions. (See inset Figure 5.) Keep equal distance between the string and the guide angle down both column sections. See Figure 5.

⚠ WARNING

Column is shown unsupported for illustrative purposes only. Columns must be supported.

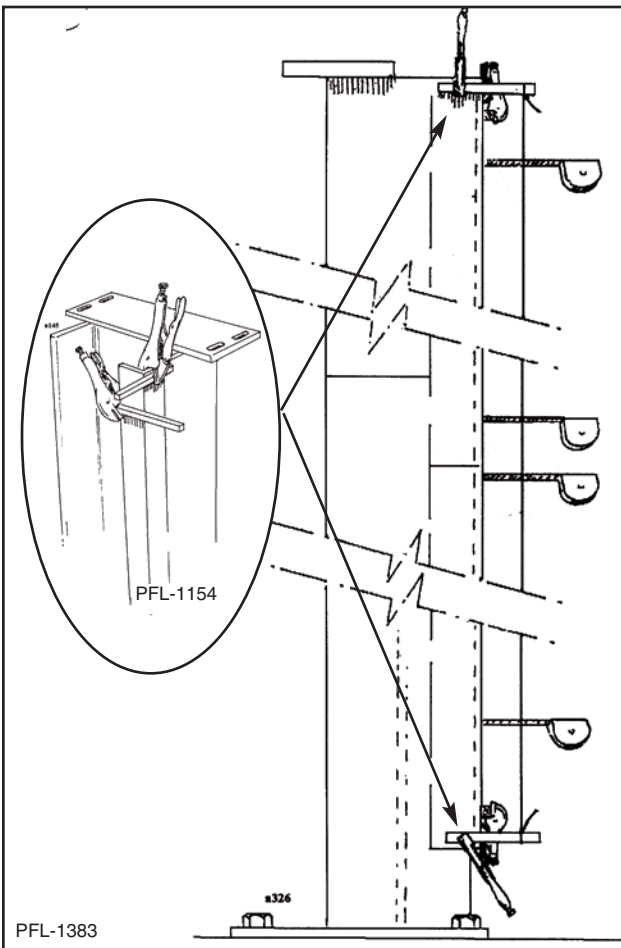


Figure 5

CAUTION

Too much heat introduced into the column will cause column twist. Weld in a manner to allow heat to dissipate.

After columns are properly aligned, do the final welding and bracing of the spliced column pieces. Bolts do not have to be removed after final welding.

NOTE

Do NOT weld on the inside of the guide angle surface. It must be clear for the wheelblock to ride over it.

Weld the guide angle at the splice on the outside of the column and then grind it flat. Be sure to do short welds on the chain tube. The tube is thin, and you must be careful not to burn through the chain tube. See Figure 6.

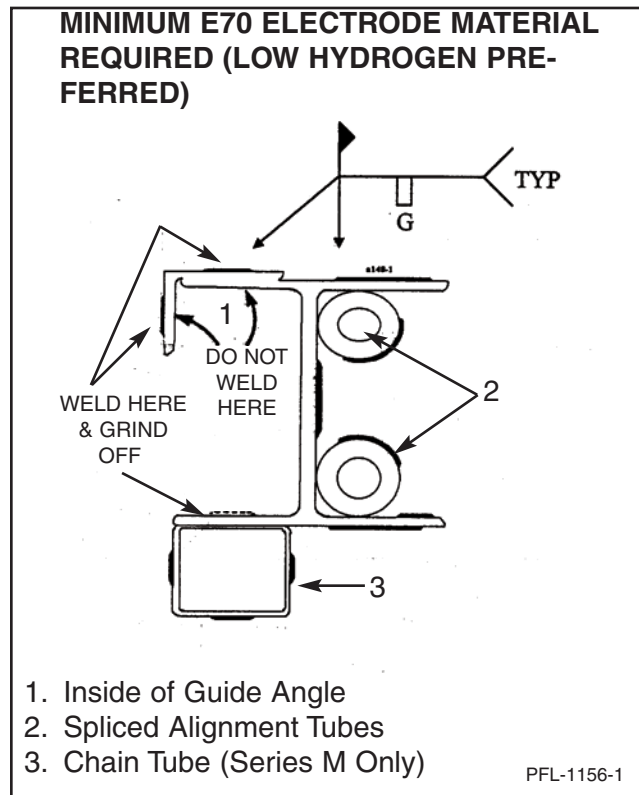


Figure 6

Spliced Column Assembly Instructions

These instructions are very general due to variations in site construction conditions, available installation equipment, installer's ability, and situations beyond Pflow Industries' control. Any variation that is safe and functionally correct for the equipment is acceptable.

If you have any questions or concerns, please contact the Product Support Department of Pflow Industries for assistance.

Return to Page 13 of the M Series Installation Manual or Page 12 of the 21 Series Installation Manual and continue installation of the VRC.

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OPERATION

EURODRIVE gear motors are designed and manufactured with totally enclosed, fan-cooled, squirrel-cage induction motors which are designed for operation under difficult conditions. The windings are protected with a special insulating material Class B equivalent or better. The brake motors incorporate a DC disc brake, and the supply is taken from a half-wave rectifier mounted inside the motor terminal box and an SR relay mounted on the terminal box which switches DC power on and off.

The voltage to the brake must be applied and removed at the same time as the power to the motor.

- Voltage to the rectifier energizes the brake coil and releases the brake.
- Removal of the voltage to the brake de-energizes the brake coil and allows the brake to be applied.
- The SR relay is to switch the DC voltage to brake coil shortening brake response time.

The AC voltage to the brake will be rectified to a DC level of 50% of the AC voltage applied.

MAINTENANCE

The only maintenance normally required is to ensure that the area between the cooling fins and the area through which the air is drawn in the fan guard is kept clean and that an audible check is made on the bearings. If the motor is being overhauled, the bearings must be cleaned and repacked. If the motor has to operate in moist or wet surroundings, then it is very important that upon reassembly of the motor the end shield tenons are coated with a sealing compound such as Loctite.

WARNING

Dangerous high voltage potential exists. Use extreme care when testing.

WARNING

Do not work on this power unit without the platform being secured or blocked in place.

NOTE

Only a qualified controls electrician is to work on the lift's electrical circuits and within the main control panel. ALL INSTRUCTIONS THAT INVOLVE ELECTRICAL WORK APPLY TO THE ELECTRICIAN!

BMG BRAKE SYSTEM OPERATION

As with previous brake systems, the BMG brake with SR relay is based on the fail-safe circuit principle. The brake is released when the power is applied to the brake coil, and a spring applies the brake when power is removed. Thus, in case of a power failure, the brake still holds.

The brake coil actually consists of two coils. One coil is called the accelerator coil, and the other is called the partial coil. When power is applied, the accelerator coil is energized releasing the brake quickly. Shortly thereafter, the partial coil is switched on electronically (done internally by rectifier module) and placed in series with the accelerator coil. Both coils in series are used for holding. The two coils together use less power for holding; thus when power is removed from the brake, reaction time is shortened. To further increase braking speed and to eliminate wiring needed from the control panel to the brake, an SR relay is being used. Units without SR relay (junction box on motor does not have it sticking out the side) must have the brake circuit wired from control panel to junction box on drive base.

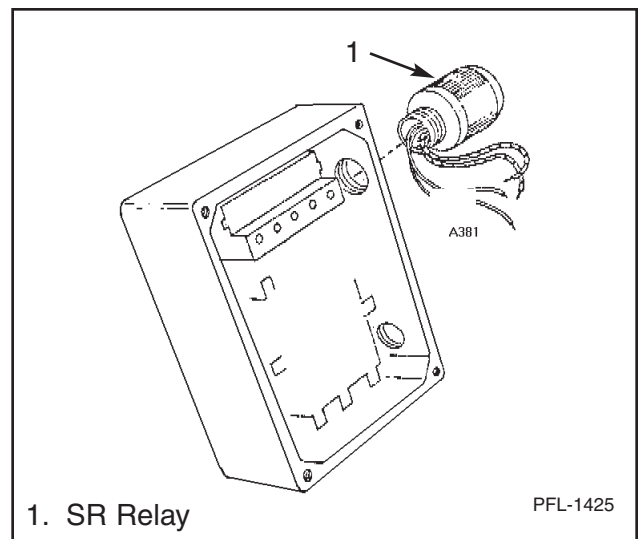


Figure 1

M Series

SR RELAY WIRING

BSR control - Combination of the BG or BGE rectifier and the SR relay. Used for fast brake action without additional customer supplied wiring or contacts. Connection diagrams for 208/360 and 230/460 VAC Dual Voltage Motors with 200 VAC BMG Brake and SR Relay.

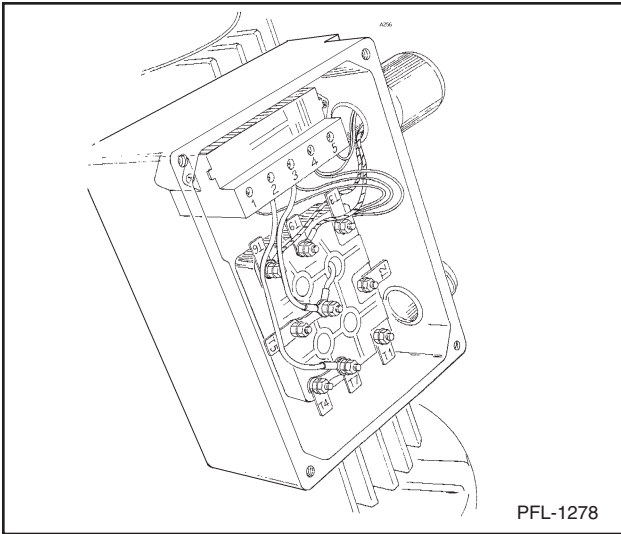


Figure 2

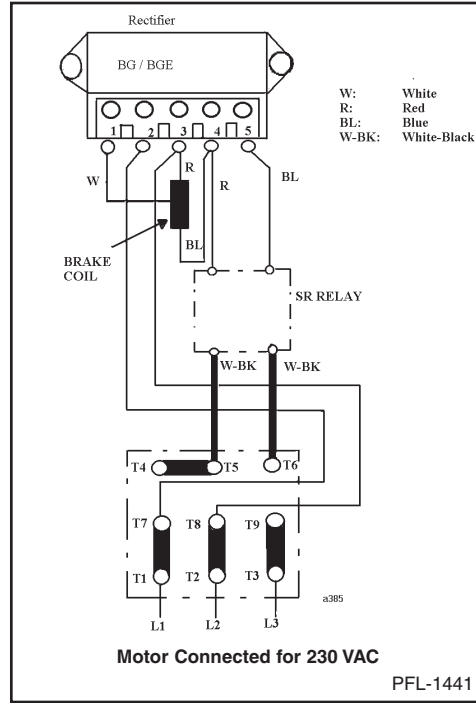


Figure 3

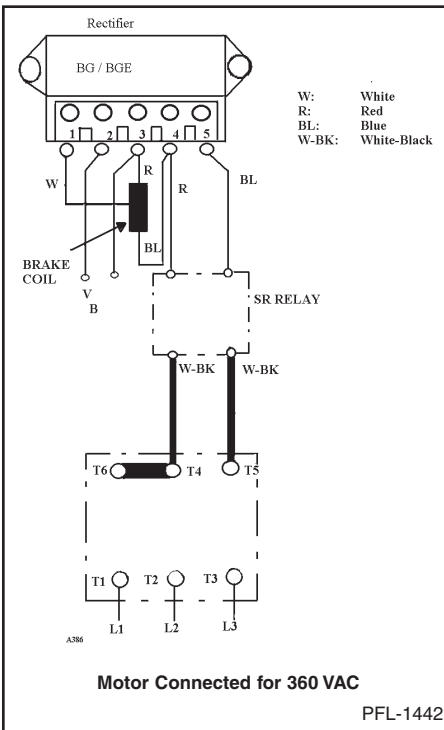


Figure 4

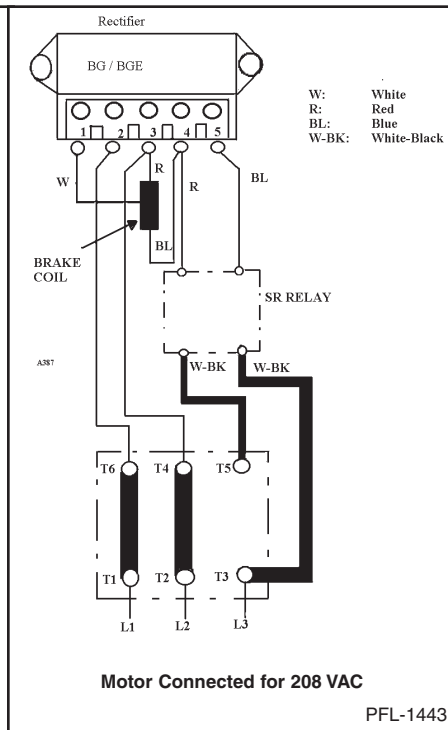


Figure 5

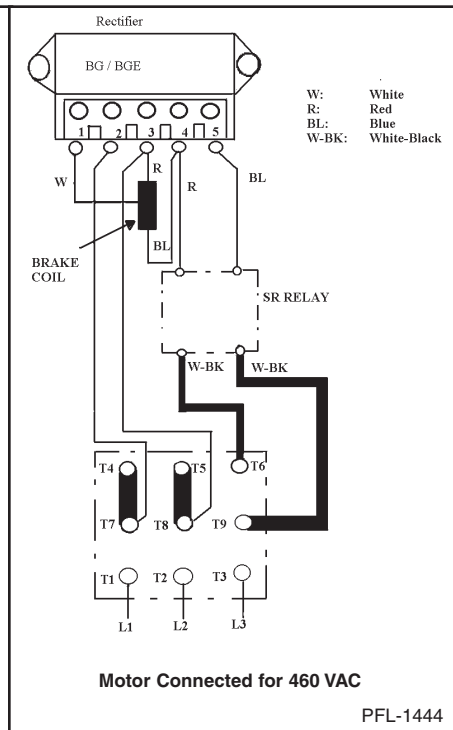


Figure 6

TROUBLESHOOTING

In case of a brake failure, check first for an open brake coil. If the brake coil is okay, follow the Troubleshooting Chart below.

FAULT	CAUSE	SOLUTION
<u>Brake Does Not Disengage</u>	Wrong voltage on the rectifier module Rectifier dead The maximum permissible air gap due to brake lining wear. Voltage drop in the line high	Apply correct voltage (check the nameplate) Replace rectifier. Readjust brake. If brake lining is completely worn out, replace the brake disc. Ensure correct line voltage.
<u>Motor Does Not Brake</u>	Brake lining is completely worn. The air gap has increased to a point where the adjusting nuts are run up tight. The hand brake is not properly adjusted	Replace brake disc. Reset brake. The adjusting nuts must be properly adjusted.
<u>Braking Action Is Too Slow</u>	The brake is actuated with the normal brake action circuit. SR relay defective During reassembly, the brass shims were omitted.	The brake is to be actuated with fast brake action circuit. Replace relay Install the brass shims.

ADJUSTING BRAKE AIR GAP

NOTE

Air gap is factory set. Adjust only after consulting factory.

1. Remove cover and fan.
2. Tighten the three brake adjustment nuts lightly.

CAUTION

Do not overtighten!

3. Slide rubber seal over so the stationary disc and brass shim are exposed.
4. Back off the three brake adjustment nuts until the correct brake air gap is obtained between shim and stationary disc. See chart for correct air gap.

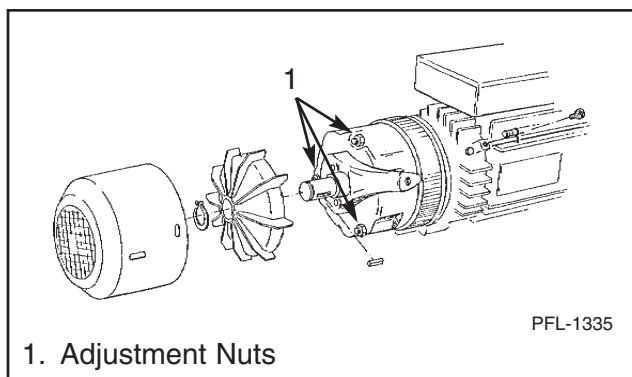


Figure 7

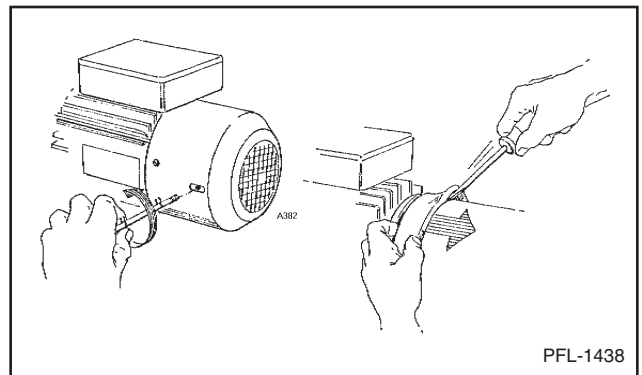


Figure 8

AIR GAP REQUIREMENTS

- 2 HP, 3 HP, 5 HP
Minimum 0.01 inch - maximum 0.024 inch
- 7.5 HP, 10 HP, 15 HP
Minimum 0.012 inch - maximum 0.047 inch
- Above 15 HP
Consult factory for air gap

NOTE

Air gap must be equal all around to ensure proper braking operation.

M Series

TO INSPECT BRAKE DISC

Remove cover and fan. Slide rubber seal back to expose brake disc.

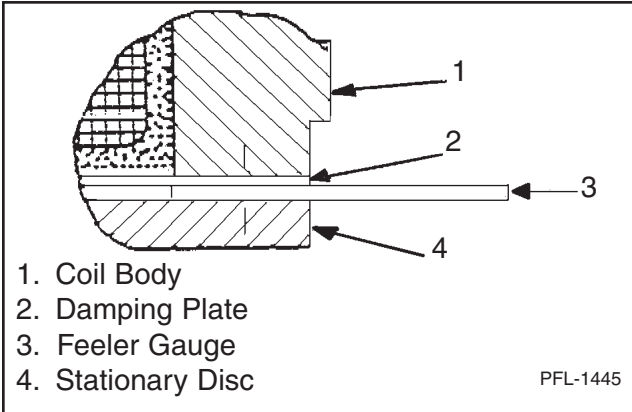


Figure 9

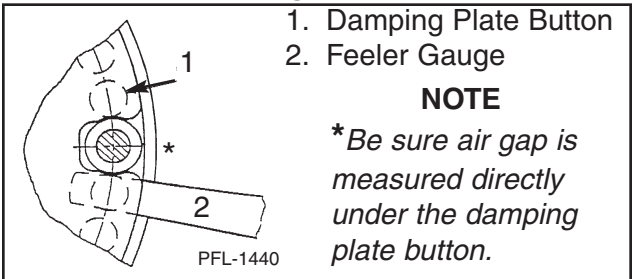


Figure 10

THE HAND RELEASE MECHANISM

Most of the brakes are supplied with a hand-operated release lever. This allows opening of the brake without applying power, allowing for adjustments on the driven machinery.

The “BMHR” 4-type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically once the lever is released. The lever, when not used, is attached to the motor’s cooling fins with clamps.

Since the stationary disc will move away from the coil body during the brake’s operation, it is vital that there is free play (floating clearance) on the release arm of 0.060”-0.080”. The springs should be placed between the arm and the nuts to eliminate noise.

NOTE

The brake release mechanism is not used to change the brake’s torque setting. There must always be clearance on the lever.

TESTING BRAKE RECTIFIER

⚠ WARNING

To prevent electrical shock, be sure to disconnect the power to the brake circuit before attempting to service or repair.

The BGE rectifier module, due to its internal construction, cannot be checked thoroughly with an ohmmeter. You can only check to see if any internal parts are damaged to an open state, which would show an infinity reading on the meter.

1. Identify as BGE style (red cover).
2. Remove all wires from the terminal strip of the rectifier.
3. Set meter range to K Ω .
4. Check for opens between all terminals. An extremely low resistance reading may indicate a defective rectifier.
5. To isolate the brake problem to the rectifier module as potentially defective, it may be necessary to replace or check voltages on the rectifier to see if it is functioning properly.

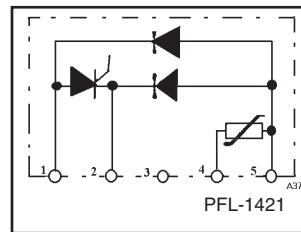


Figure 11

CAUTION

Before replacing the rectifier module, determine the cause of the failure to prevent damage to the replacement module.

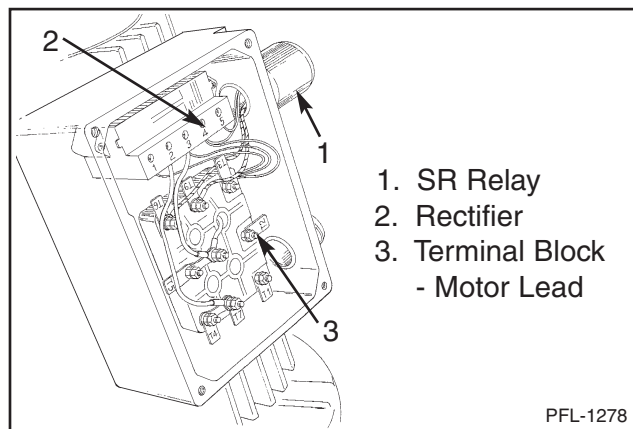


Figure 12

INSTALLATION COMPLETION CHECKLIST

Please make sure all of the following steps are complete:

- The VRC is braced from front to back and from side to side.
- The gates and enclosures are braced.
- Touch up all welds, marks, scrapes, etc. with paint.
- Route hoses to prevent interference during travel.
- Check fittings and hoses for leakage.
- Make sure that all electrical connections are properly made.
- Check that the unit stops level at each floor.
- Is there excessive noise during travel?
- Does the carriage “rock” during travel?
- Do a full load test.
- Safety Check #1 -
 - You should not be able to open a gate when the unit is not present.
 - You should not be able to operate the unit with a gate open.
 - Did you check each level for the above items?
 - Are there any unsafe conditions that exist?
If so, please contact Pflow Industries immediately and report them.
- Post all operational signs.
- Remove all debris.
- Instruct the customer on the proper operation.
- Instruct the user on proper loading.
- Instruct the customer on procedures if there is a problem.
- Complete the Installation Questionnaire and Acceptance Certification. Return both to Pflow Industries.

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