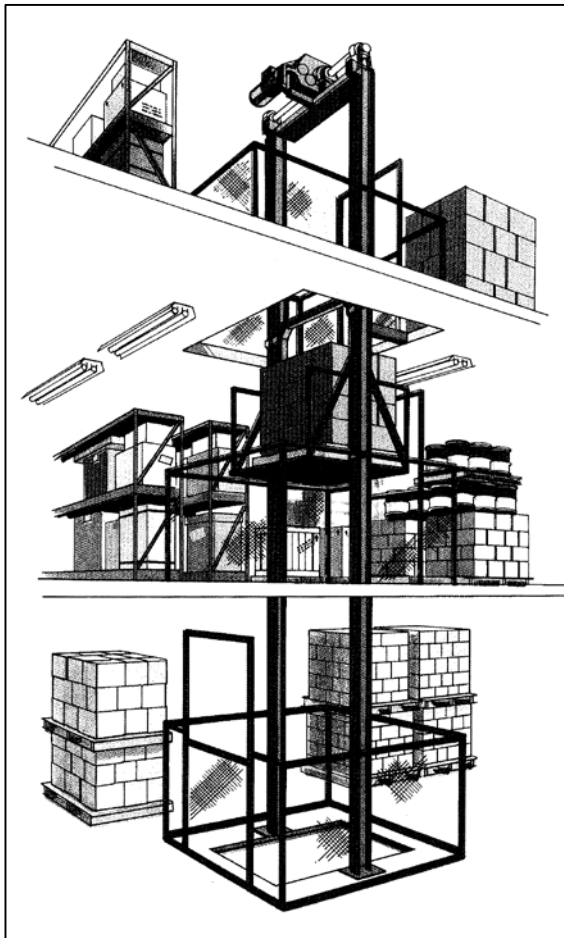


READ THIS MANUAL IN ITS ENTIRETY AND VERIFY JOB SITE DIMENSIONS AGAINST THE PFlow GENERAL ARRANGEMENT DRAWING BEFORE STARTING THE INSTALLATION,

The illustrations depicted in this manual are not to scale or to detail and are for reference only.



15870-0001



SERIES M

Installation Manual

If you need assistance, please call PFlow Industries, Inc. Product Support Department.



15870-0001

PFlow Industries, Inc. • 6720 N. Teutonia Avenue • Milwaukee, WI. 53209
Phone - Main Switchboard: (414) 352-9000 • Product Support Dept: Fax - (414) 247-9834; email: psd@pflow.com

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2015-02-20

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Warranty Specialist	Lynn Ross	101	-
Product Support Manager	Pat Herrmann	126	414-745-5813
Electrical Engineering	Jonathan Kumbera	111	-
Mechanical Engineering	Mike Reilly	184	-
Director of Sales Engineering	Brent Bayer	173	-

DOCUMENTATION

PFlow Industries reserves the right to make changes or improvements to the standard VRC model line at any time.

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SYSTEM MODIFICATIONS/DISCLAIMER

Mechanical or electrical modifications performed on the VRC not approved by PFlow Industries, Inc. may also void any warranty and/or service agreements. Please contact the PFlow Sales or Service Department at one of the numbers listed above for assistance with service modifications.

Notes

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OPTIONS

GATE IDENTIFICATION (15710-0024)	GI-1
---	------

Bulletin # / Drawing #	Description	Rev.
B129	Bi-Parting Swing Gate	-
B130	Swing Gate	-
B201	Single & Bi-Panel VA Gate	-
B139	Sliding Gate	-

GATE INTERLOCK INFORMATION

Bulletin # / Drawing #	Description	Rev.
B284	Gate Cable Interlock Installation Instructions	-
B263	Anderson Interlock	-
B264	Anderson Cable Interlock	-
B265	GAL Cable Interlock	-
B266	Interlocks & Gate Status Switches	-

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ENCLOSURE PANELS.....B116

APPENDIX APPENDIX-1

MATERIAL SAFETY DATA SHEETS

Sherwin-Williams, Fast Dry Acrylic Enamel, FDA PFlow Blue VOC

Sherwin-Williams, Universal Primer, White

Sherwin-Williams, Blue Aerosol

Shell Oil Corporation, Omala S2 G 220 Gear Lubricant

Exxon Mobil, Mobilgrease XHP 222 Special Grease

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.

PFLOW INDUSTRIES, INC.,
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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.

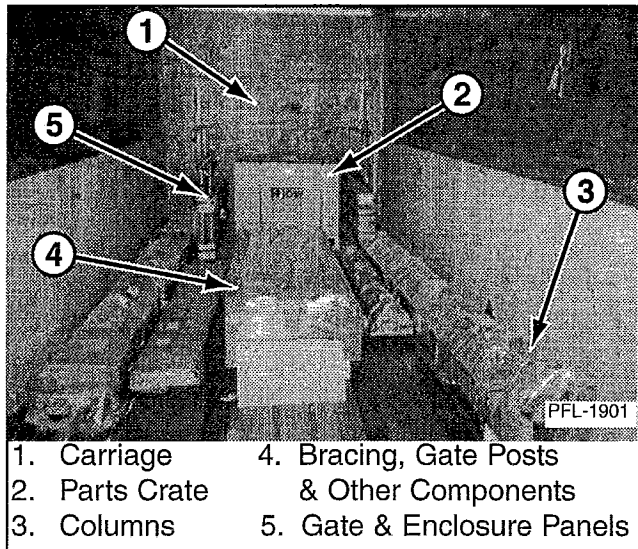


Figure 1

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.

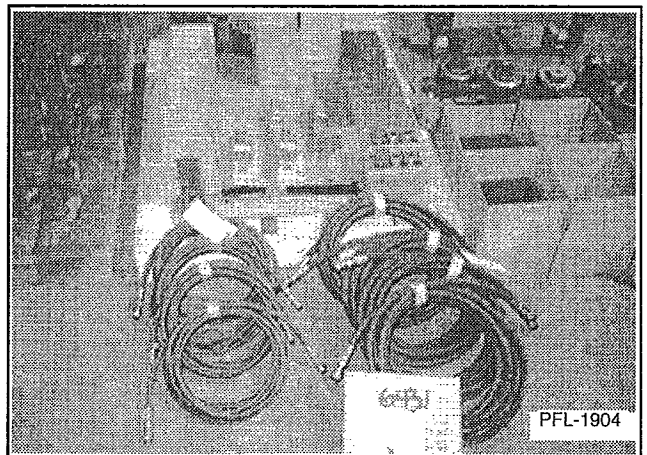


Figure 2

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.

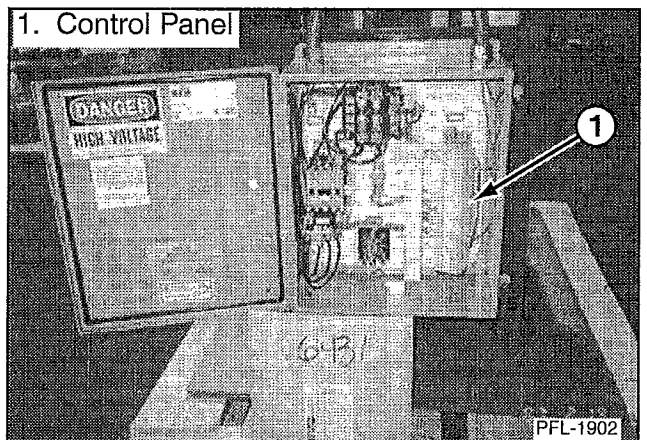


Figure 3

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

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.

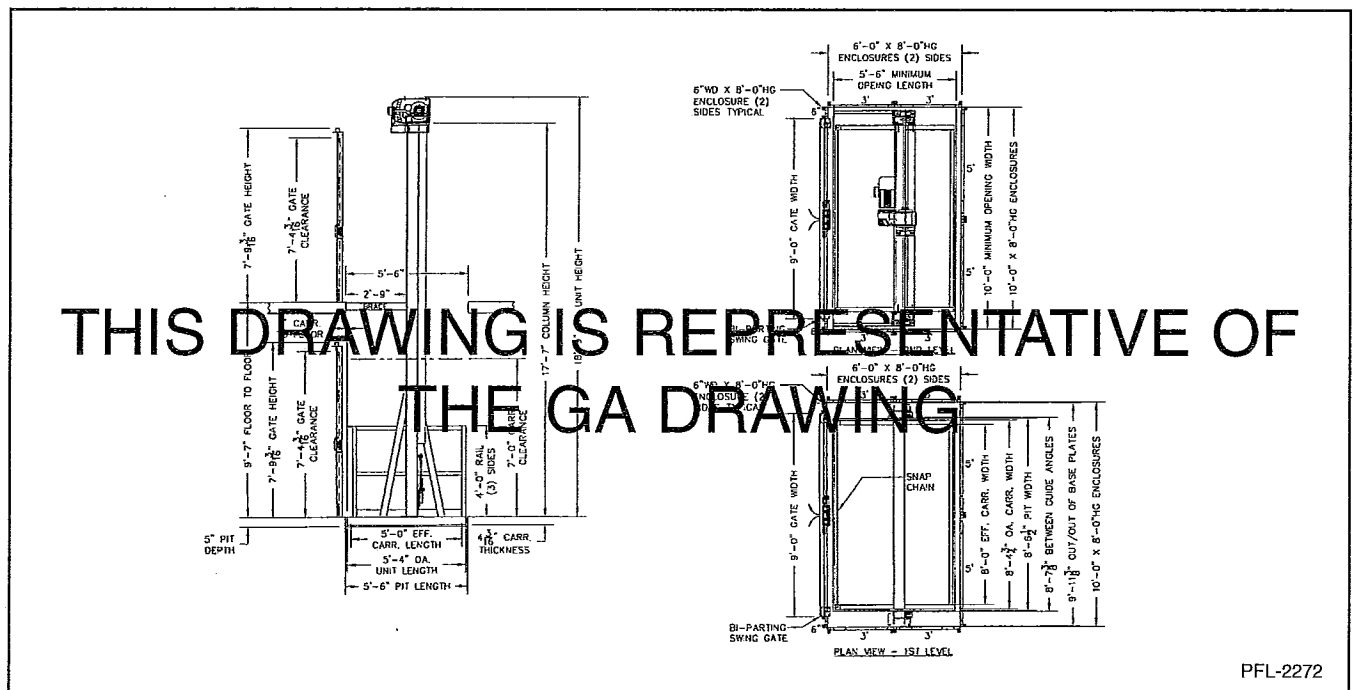


Figure 4

NOTE

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

M Series

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.)

Cutting torch with tanks

Fire extinguisher

Forklift - 2,000# capacity or alternative

Chain fall - 2,000# capacity minimum

Come-A-Long

Cables or hook chains with 1,000# or
greater capacity

Disk grinder

"C" clamps

Drift punch

5/8"-11 N.C. tap

Carpenter's square

4' Level

SAE 30W non-detergent motor oil

Socket set - 1/2" drive, sockets to 1-1/8"

Hammer drill and bits for 1/4", 3/8", and
1/2" anchors, 4" min.

Hack saw, reciprocating saw, or portable
band saw

Drill and drill bits

Extension cords

Portable light

Sledge hammer

Allen wrenches to 3/8"

Open or box end wrenches to 1-1/4"

Chalk line

Plumb bobs

Grease gun

25' Measuring tape

Rags

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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.

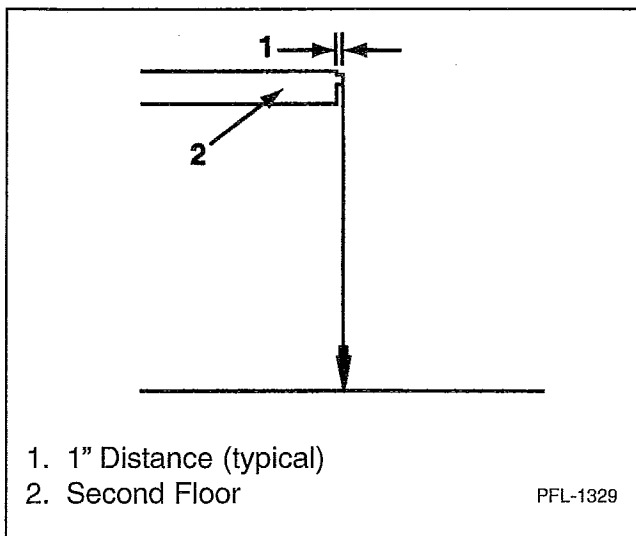


Figure 1

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.

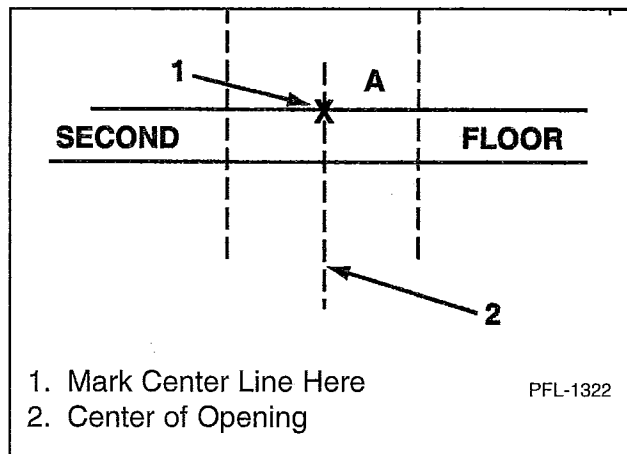


Figure 2

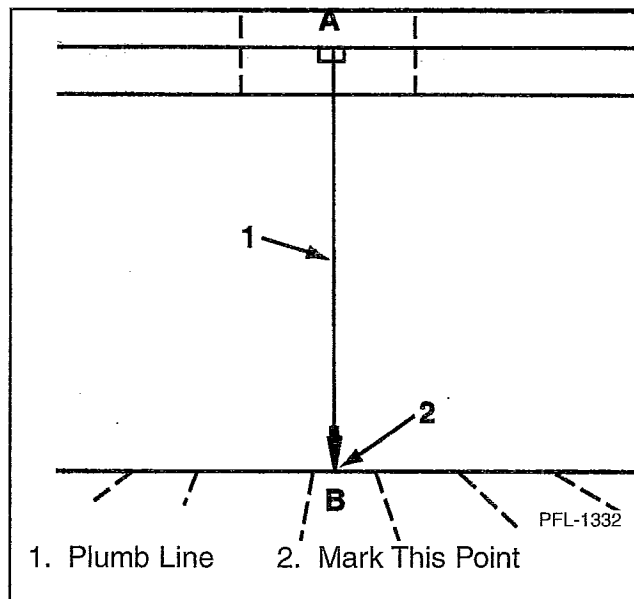


Figure 3

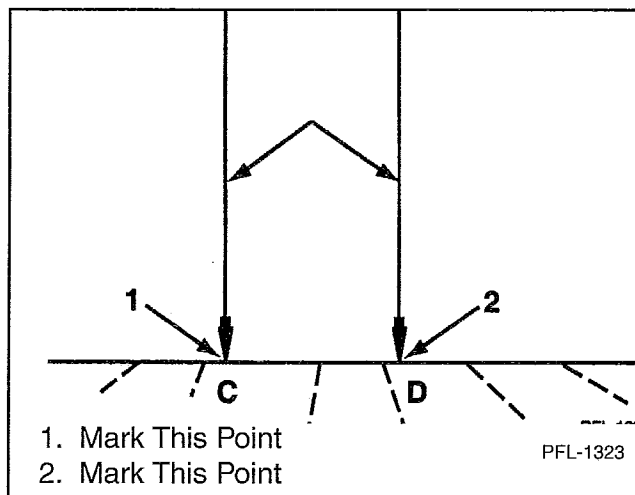


Figure 4

Installation Instructions

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

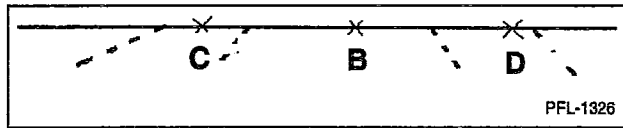


Figure 5

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.

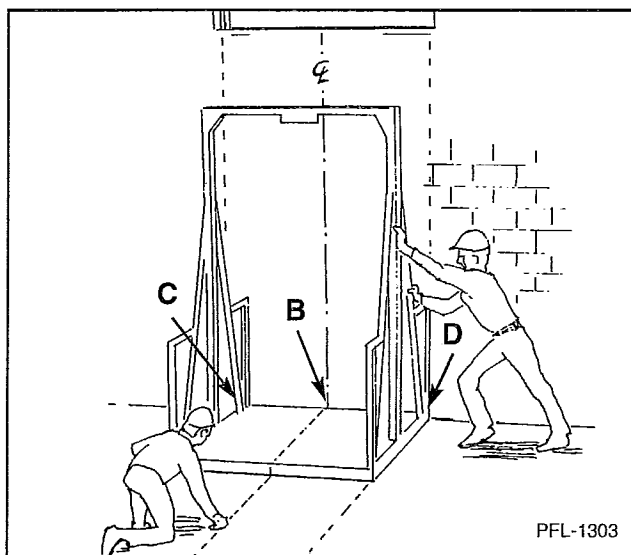


Figure 6

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.

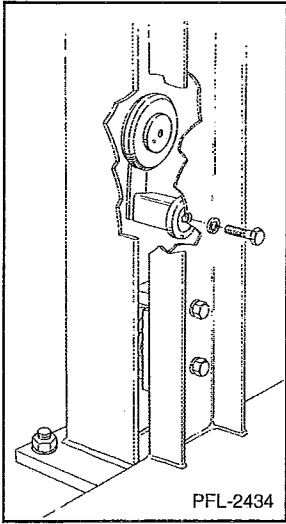


Figure 7

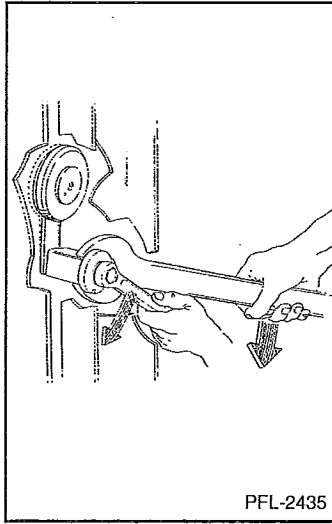


Figure 7A

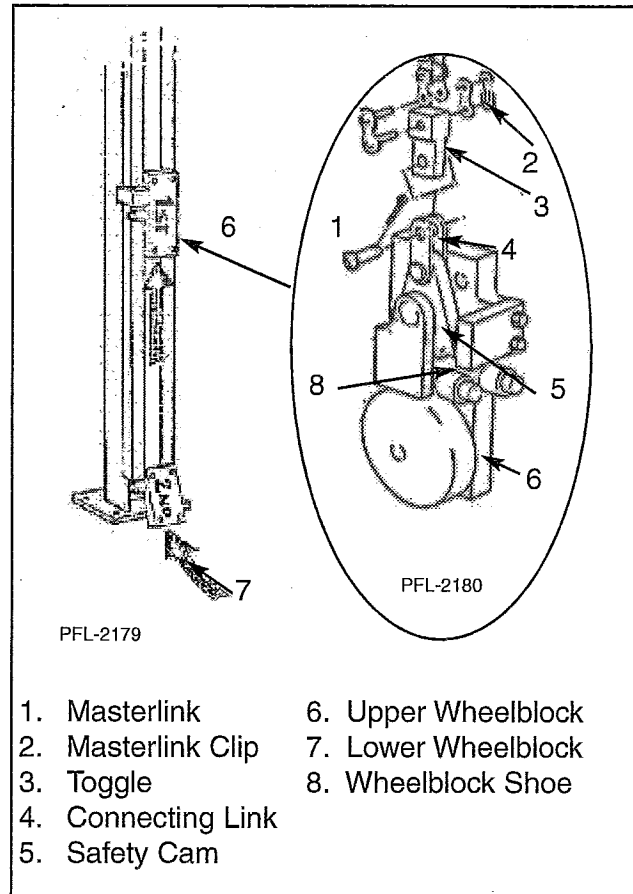


Figure 7B

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.

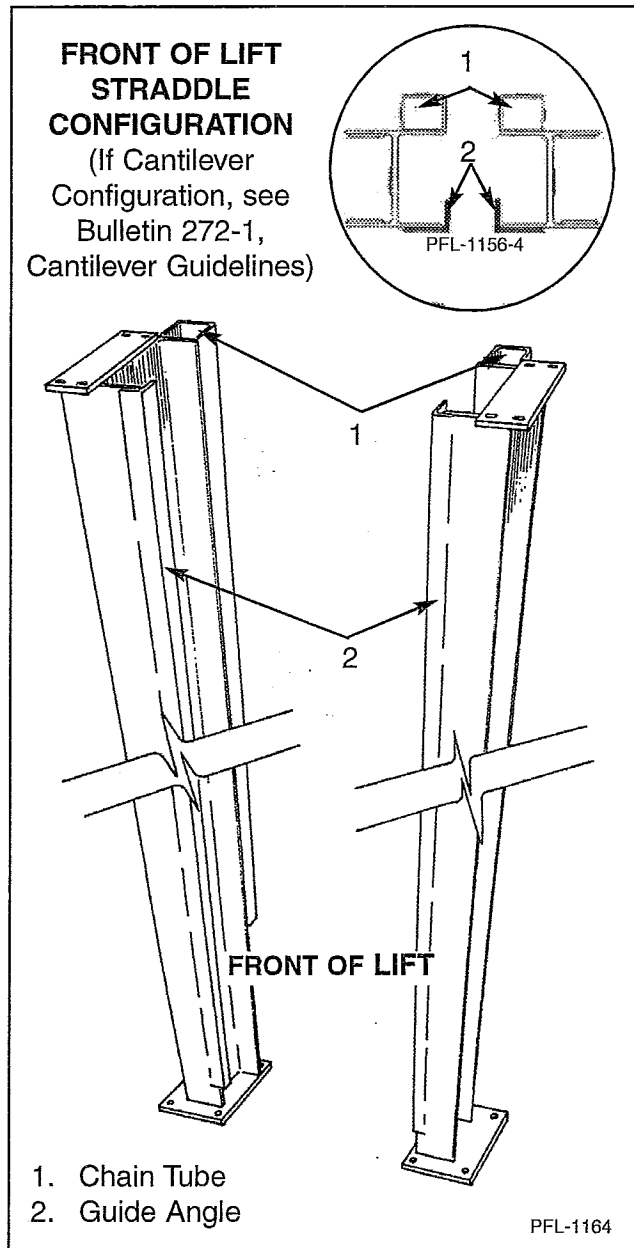


Figure 8

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.

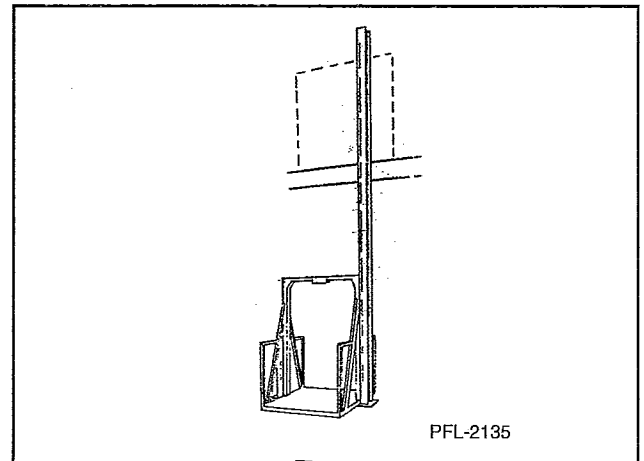


Figure 9

- 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.

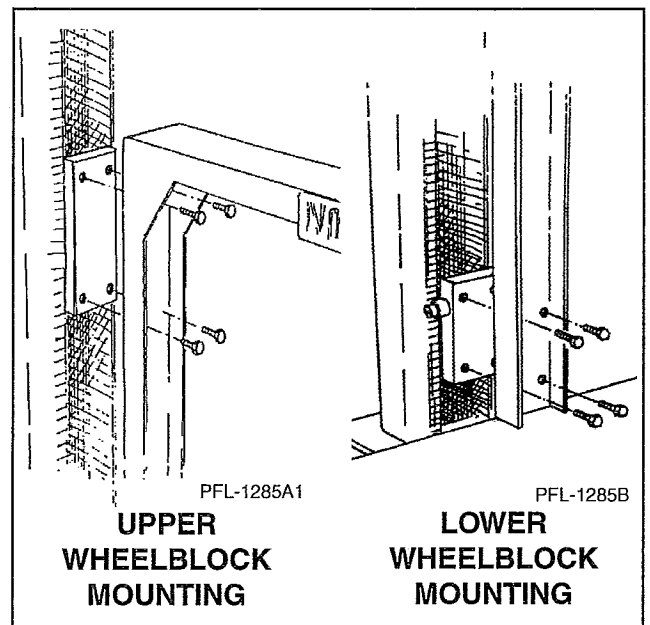


Figure 10

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.

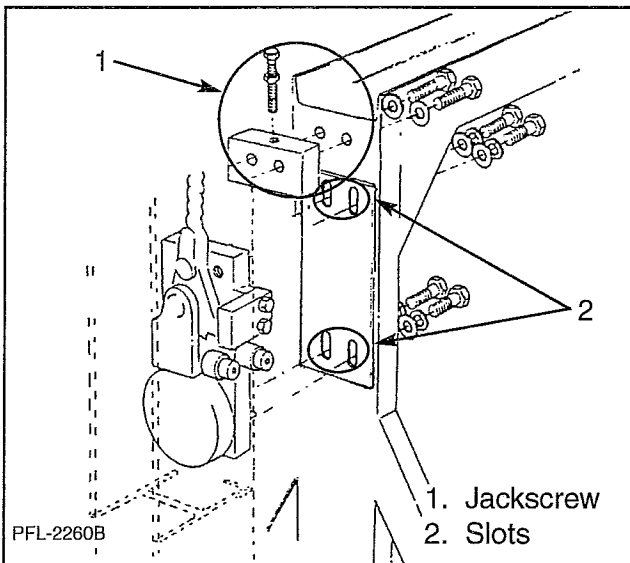


Figure 11

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.

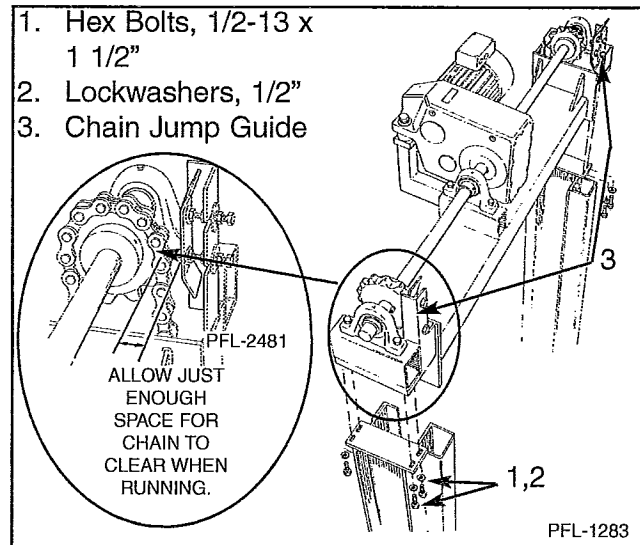


Figure 12

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.

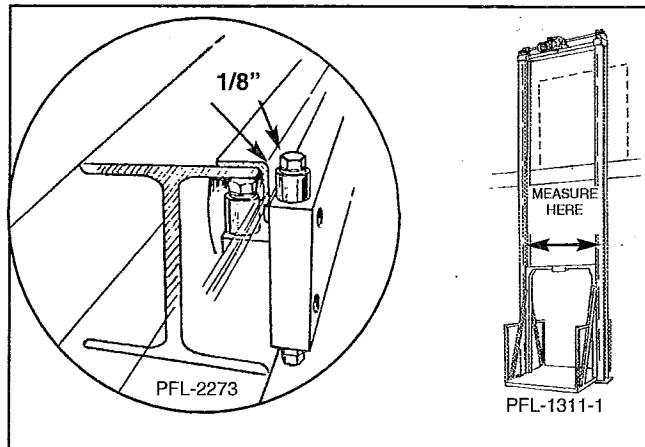


Figure 13

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.

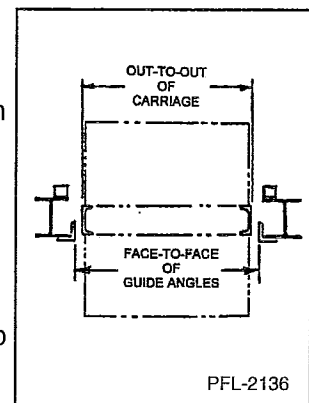


Figure 14

Installation Instructions

3. 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.

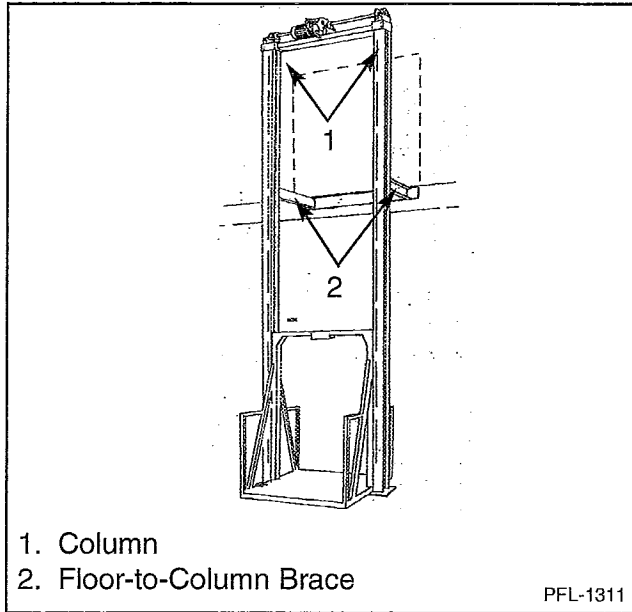


Figure 15

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

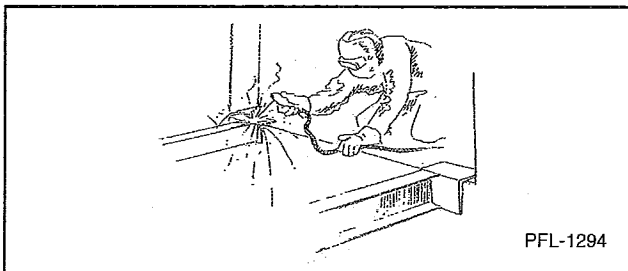


Figure 16

5. Add side bracing as necessary.

NOTE

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

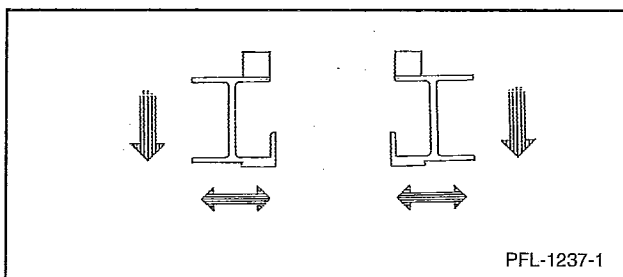


Figure 17

6. Tighten hex bolts on drive base. See Figure 12.
7. 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.

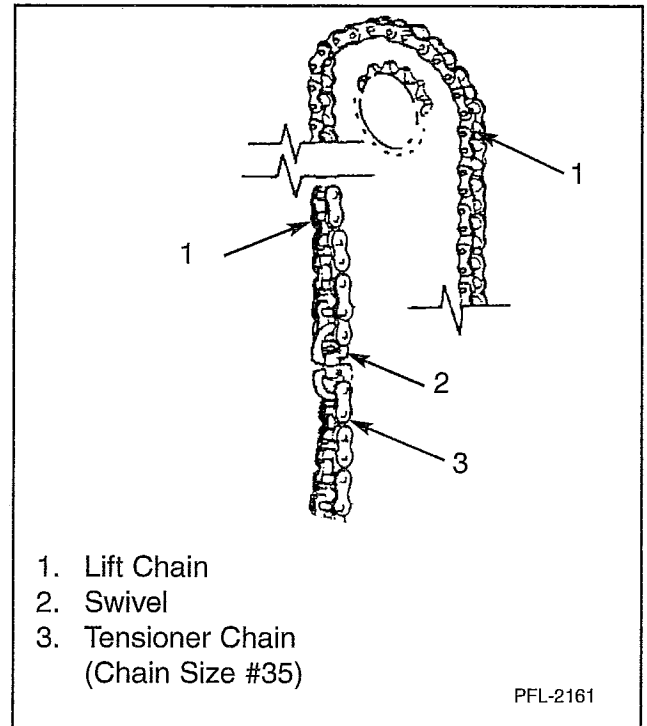


Figure 18

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.

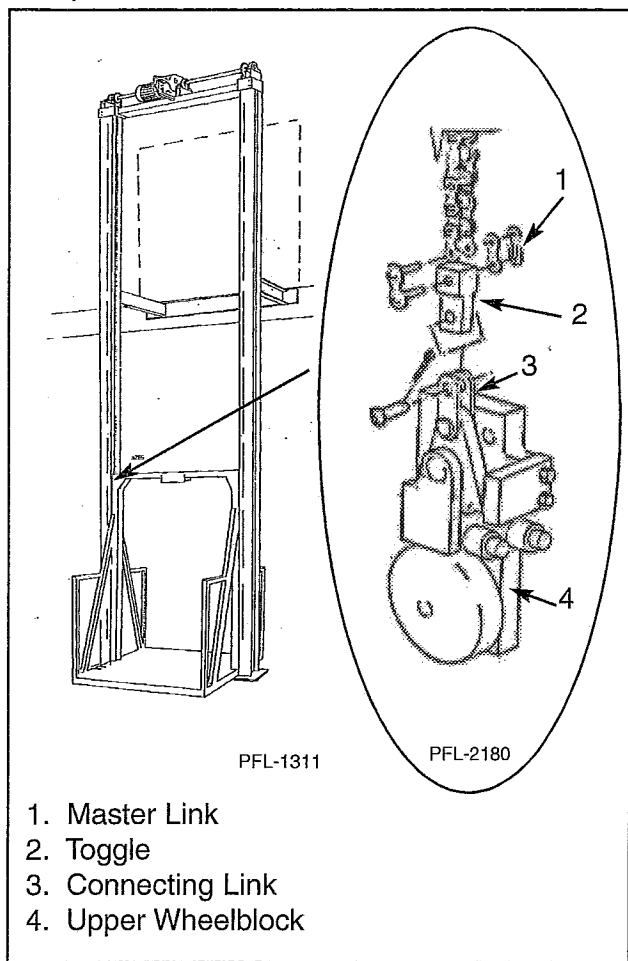


Figure 19

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.

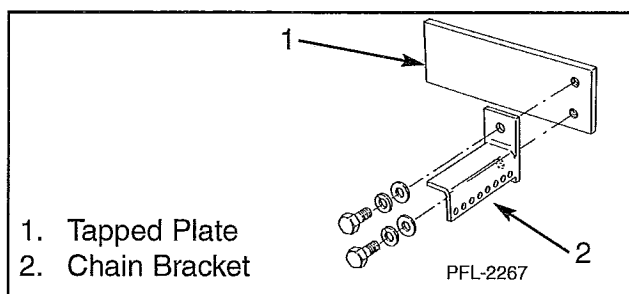


Figure 20

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.

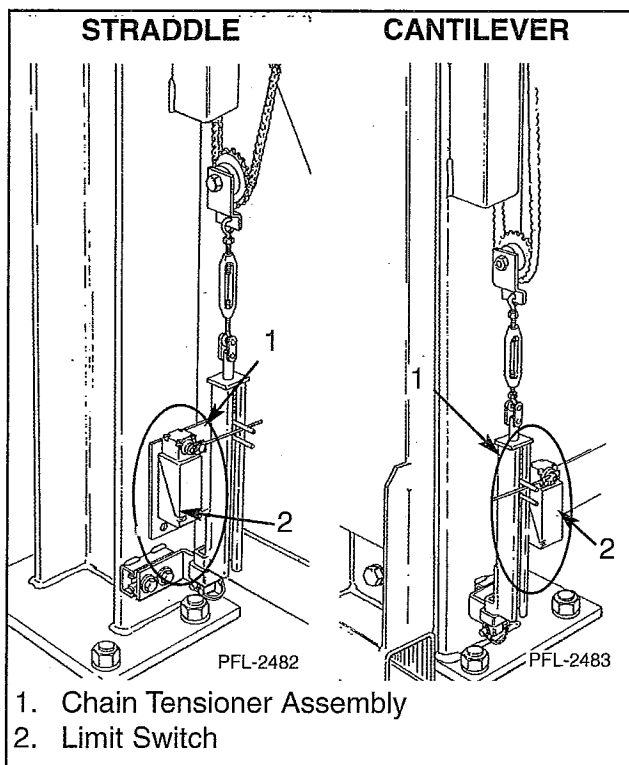


Figure 21

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.

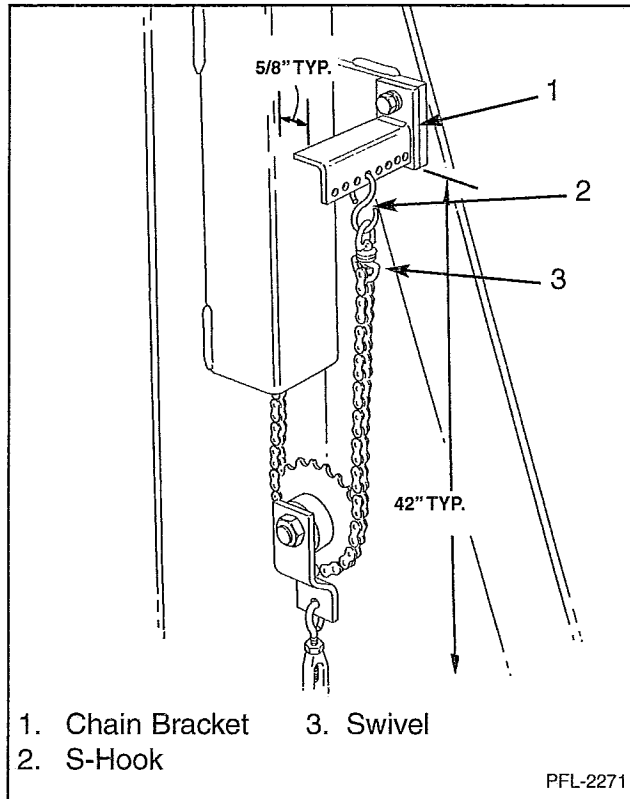


Figure 22

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.

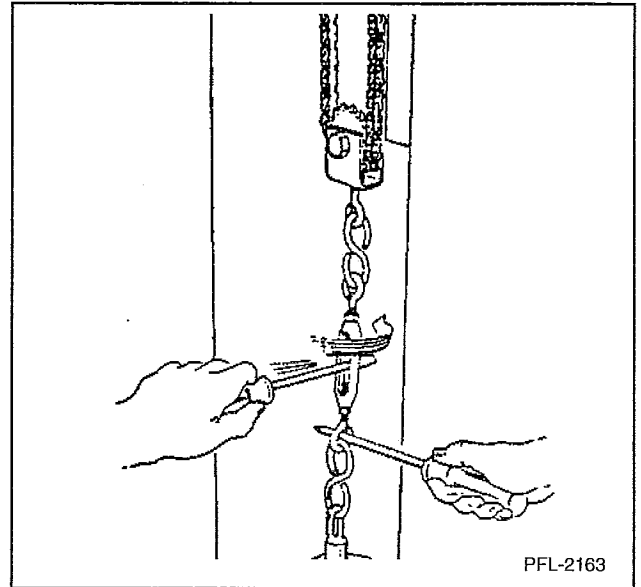


Figure 23

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.

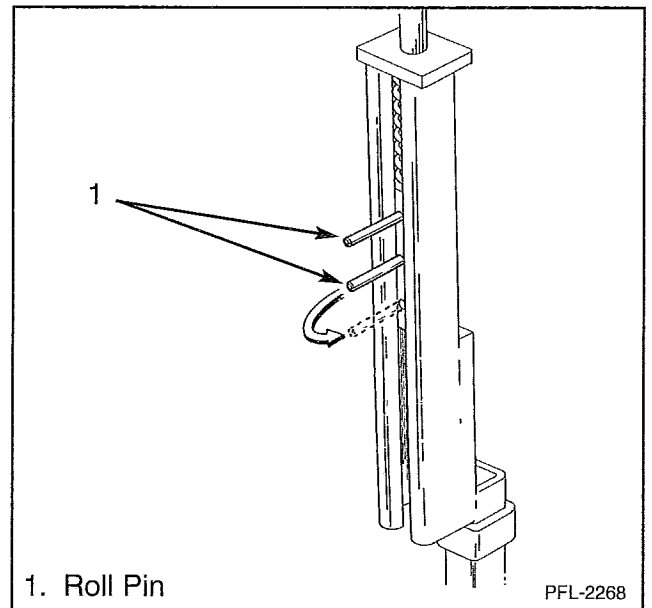


Figure 24

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.

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.

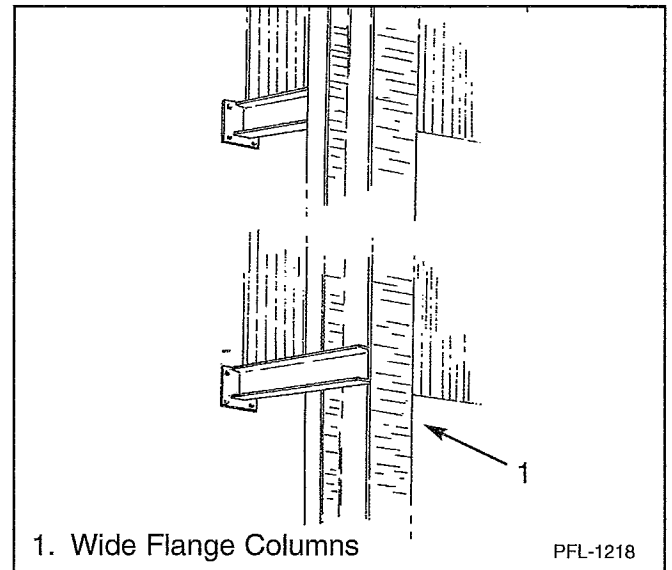


Figure 25

M Series

Guidelines for Anchoring

Welding to a Curb Angle (Figure 26)

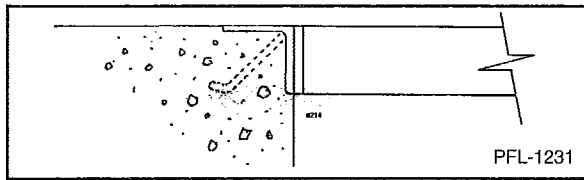


Figure 26

Using a Tie Plate (Figure 27)

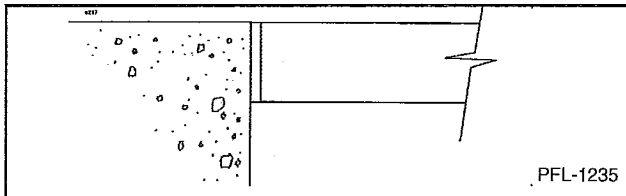


Figure 27

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

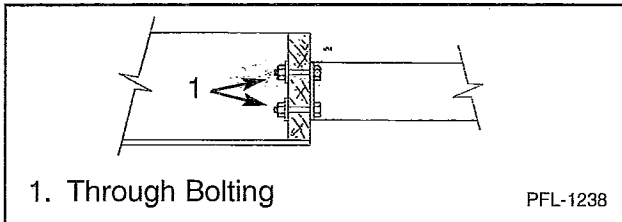


Figure 28

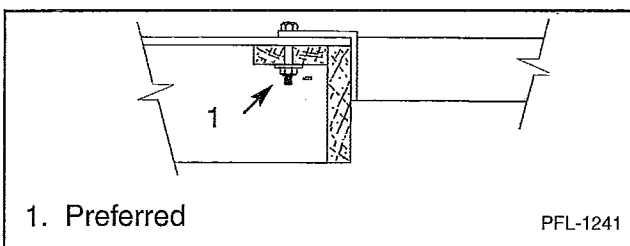


Figure 29

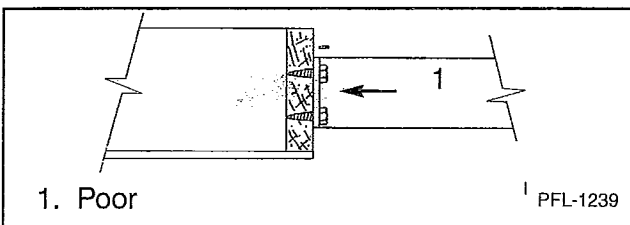


Figure 30

Anchoring to Block Walls (Figures 31 and 32)

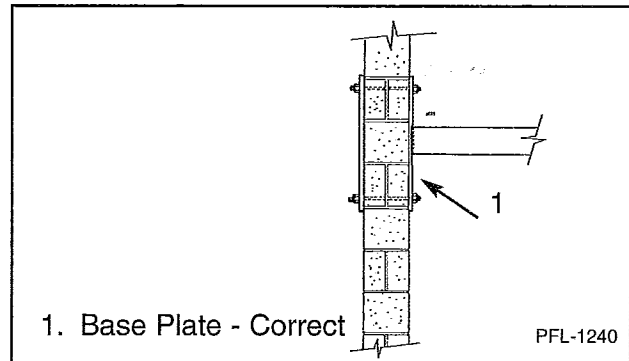


Figure 31

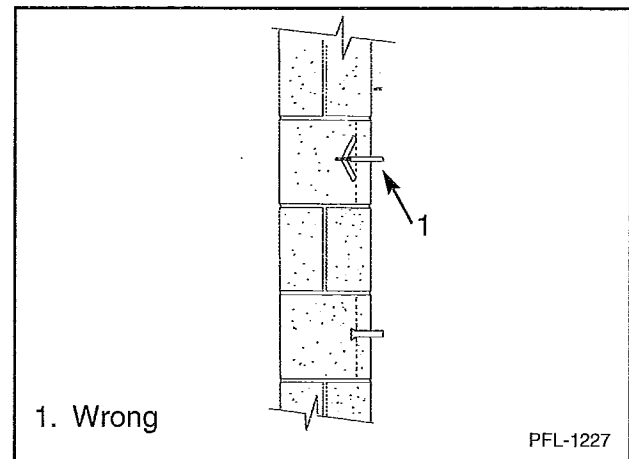


Figure 32

Anchoring Base Plate to Solid Floor (Figure 33)

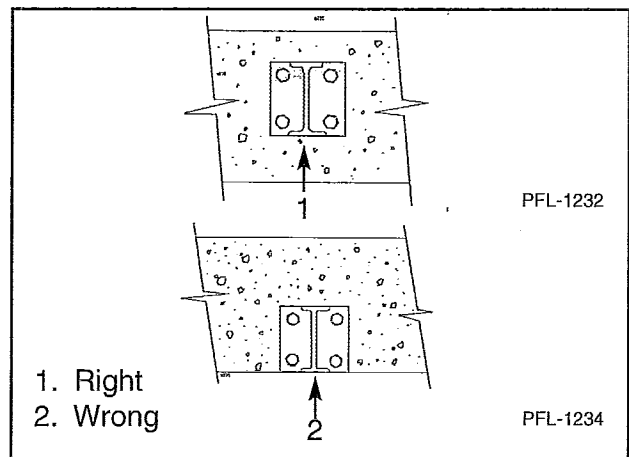


Figure 33

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

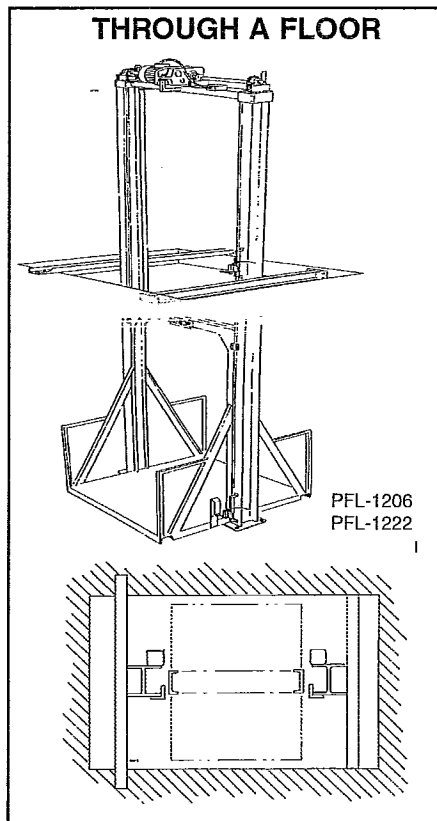


Figure 34

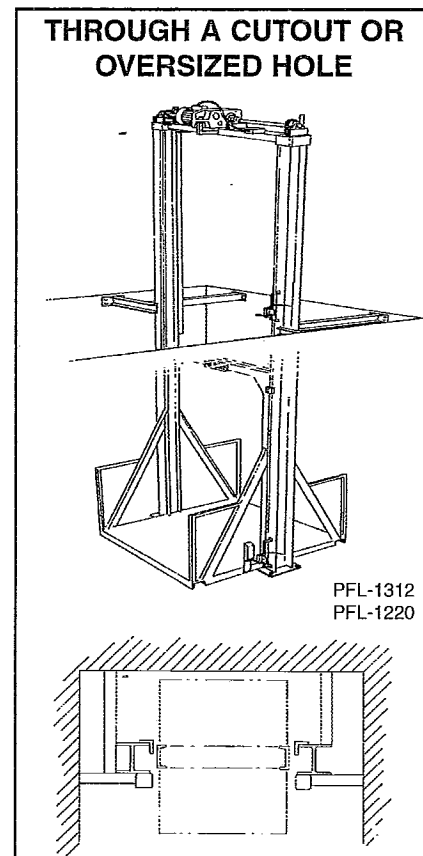


Figure 35

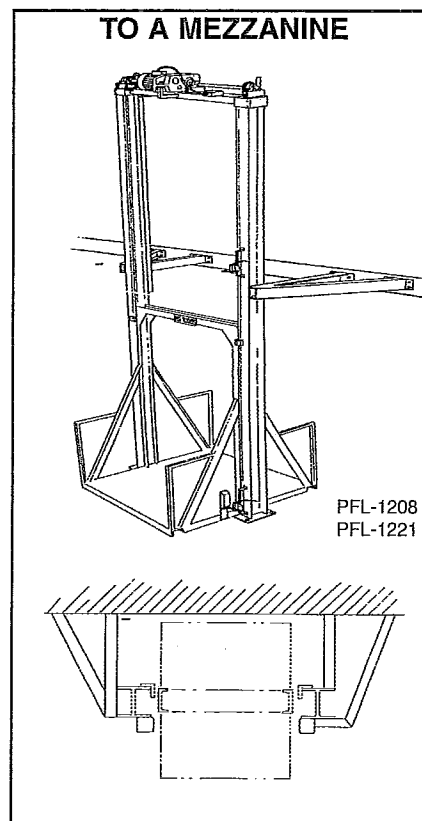


Figure 36

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Installation Instructions

Guidelines for Bracing - Cantilever

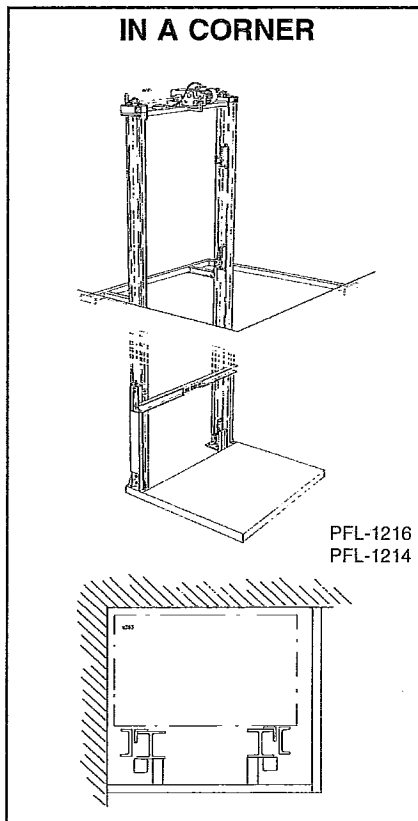


Figure 37

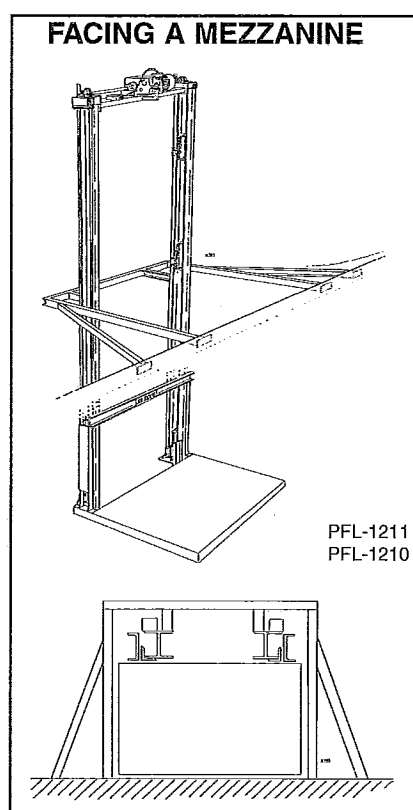


Figure 38

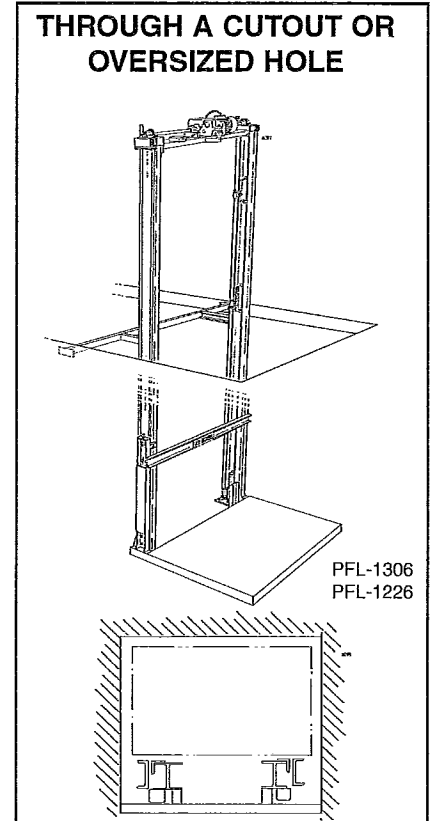


Figure 39

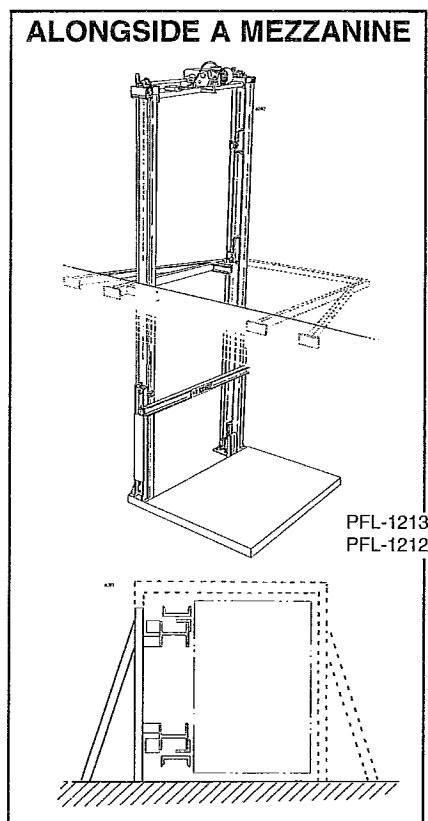


Figure 40

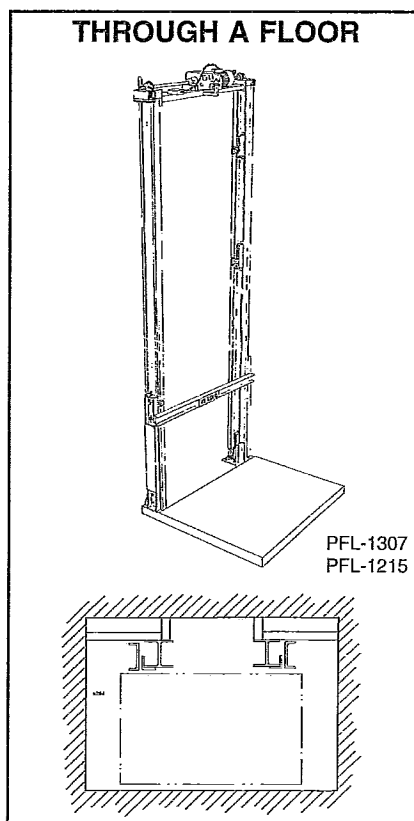


Figure 41

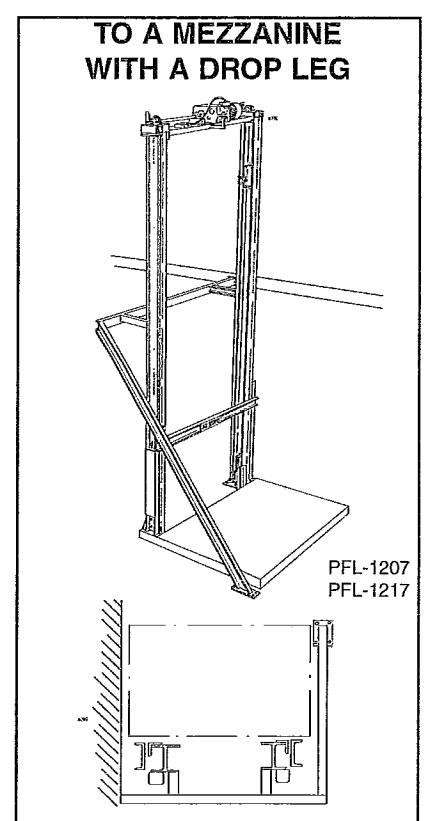


Figure 42

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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.

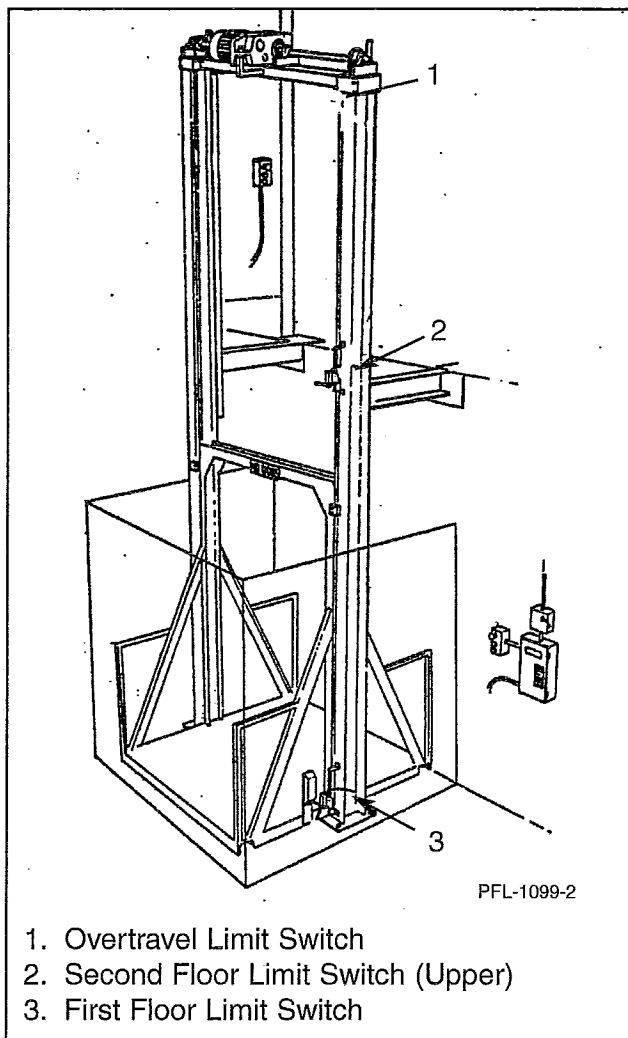


Figure 1

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.

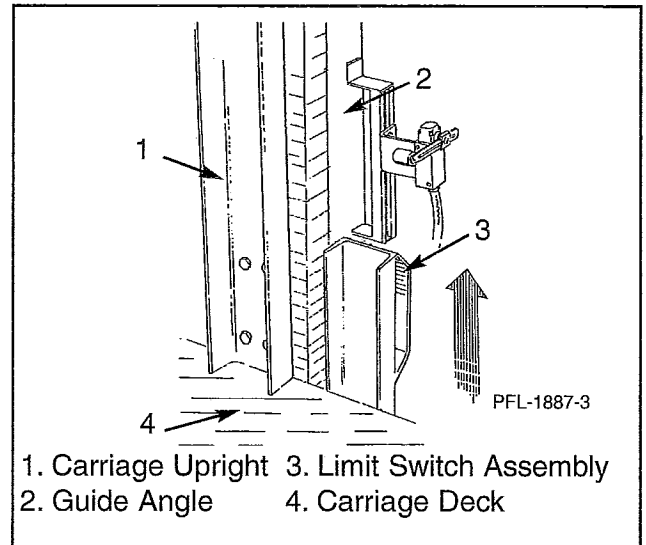


Figure 2

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.

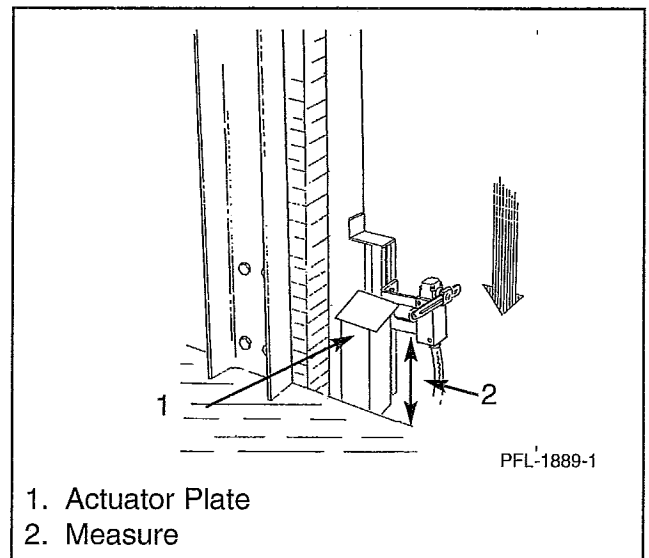


Figure 3

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.

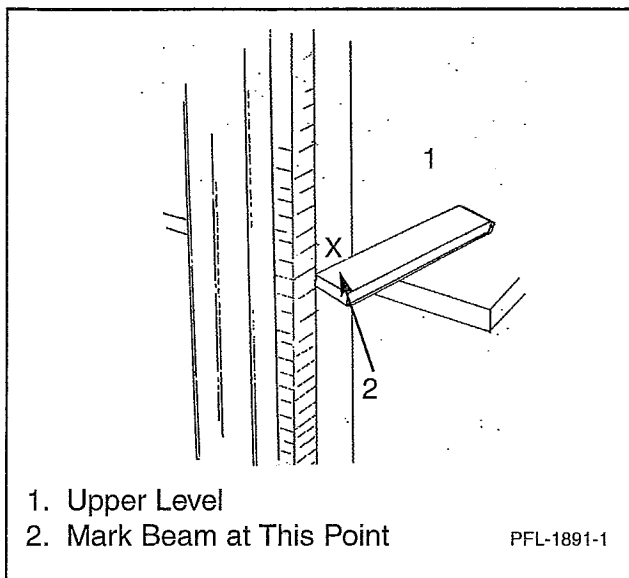


Figure 4

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.

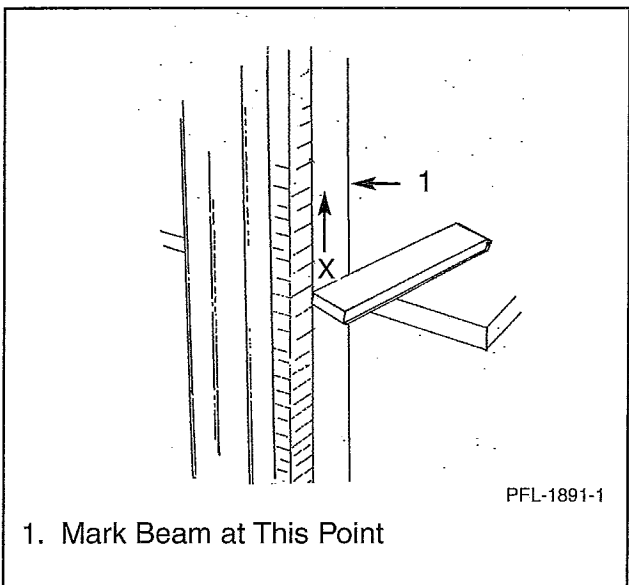


Figure 5

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.

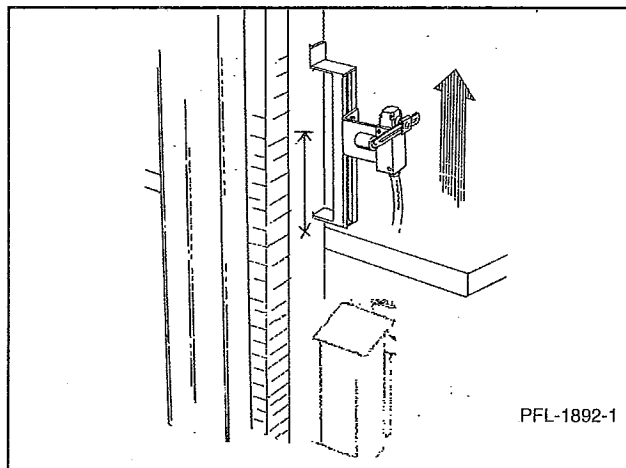


Figure 6

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.

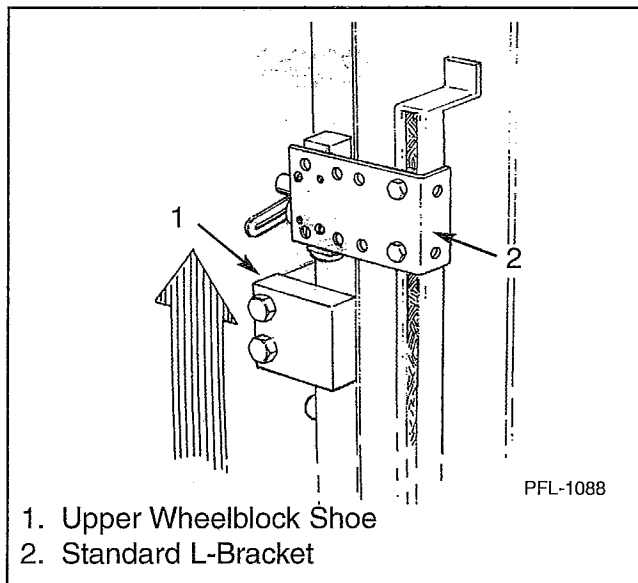


Figure 1

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.

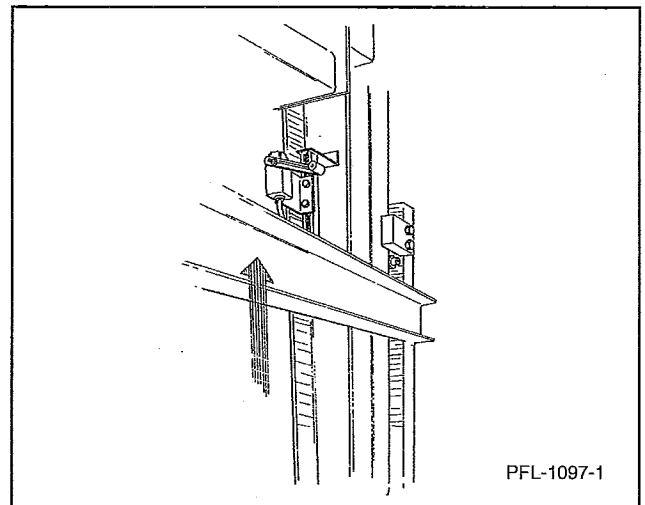


Figure 2

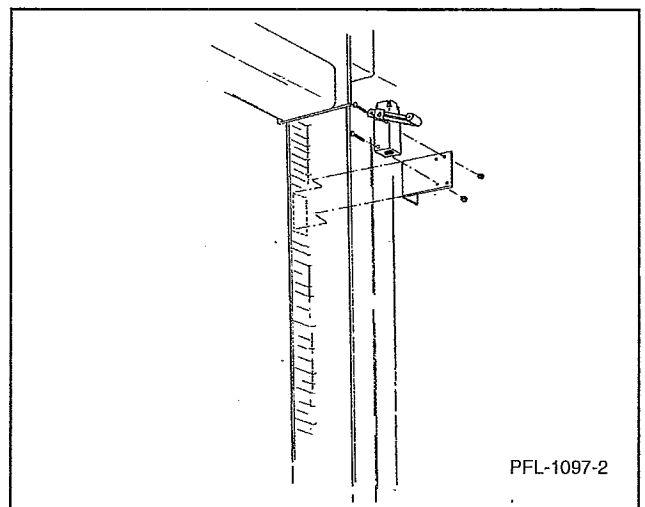


Figure 3

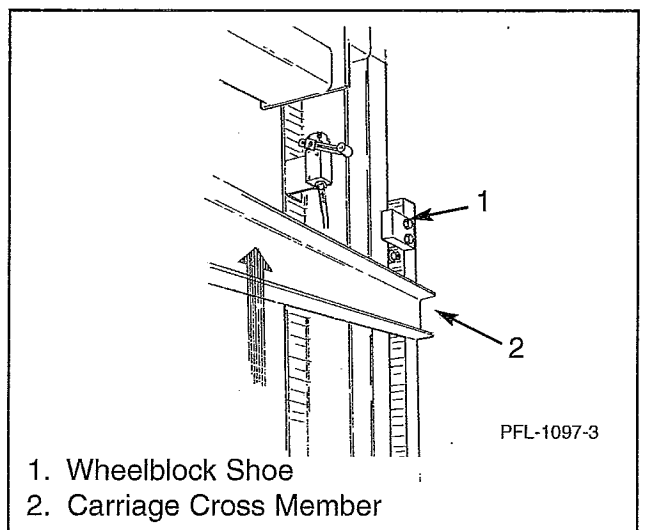


Figure 4

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Three-Level or More Limit Switch Mounting Instructions

THREE-LEVEL OR MORE OVERVIEW OF LIMIT SWITCH MOUNTING

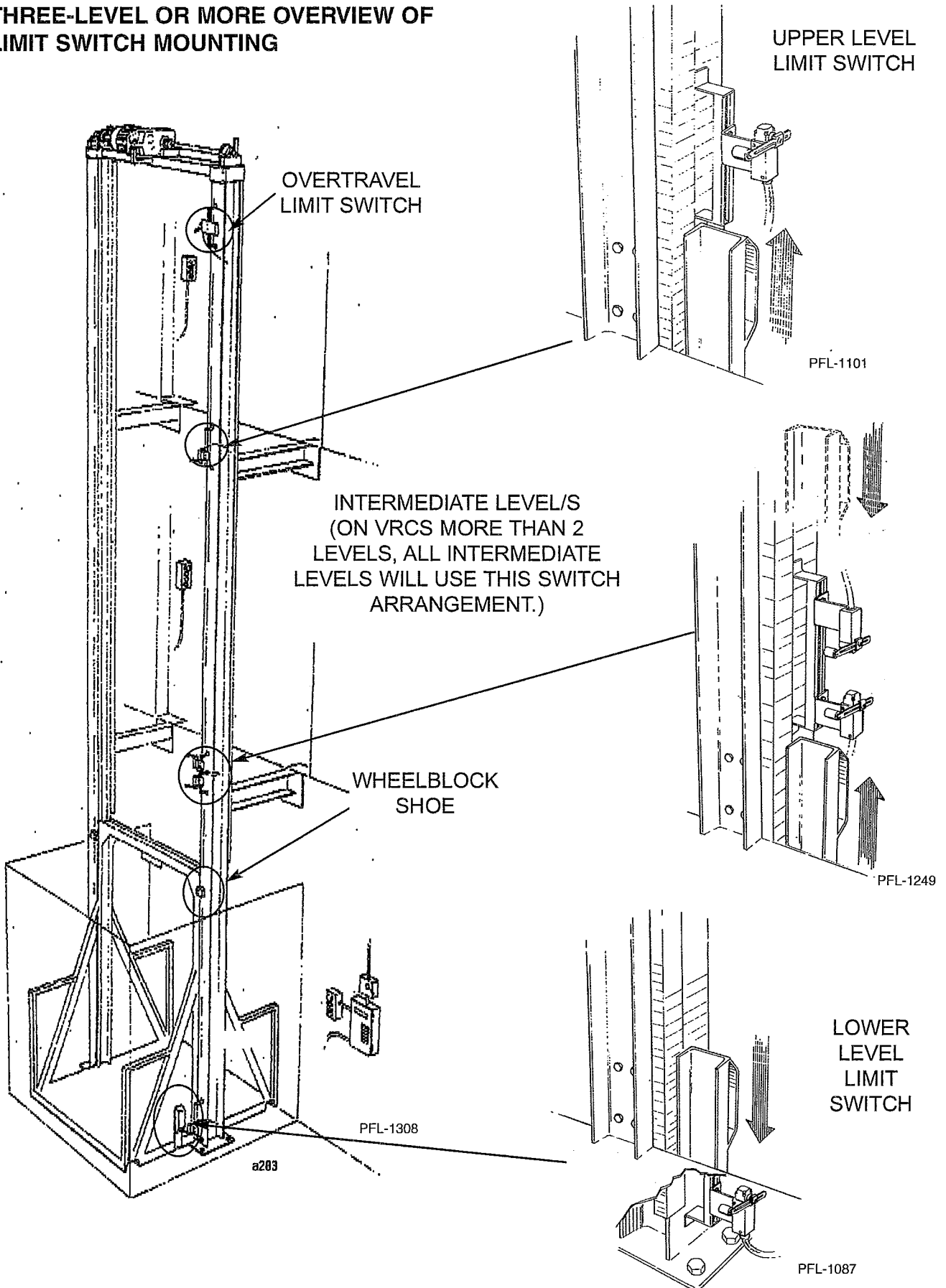


Figure 1

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.

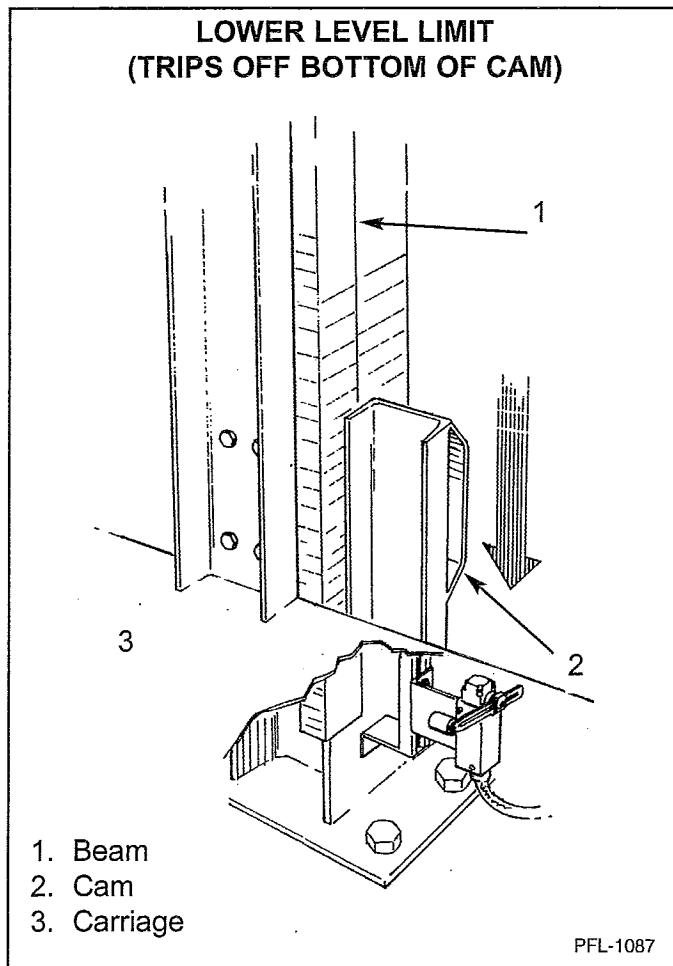


Figure 2

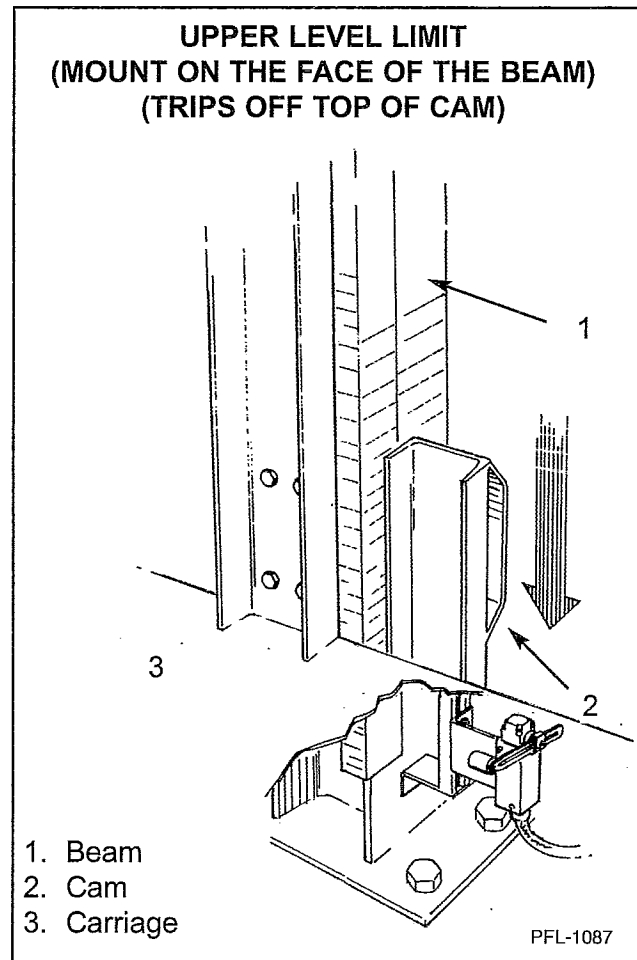


Figure 3

Intermediate Floor Level Limit Switch Mounting Instructions

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

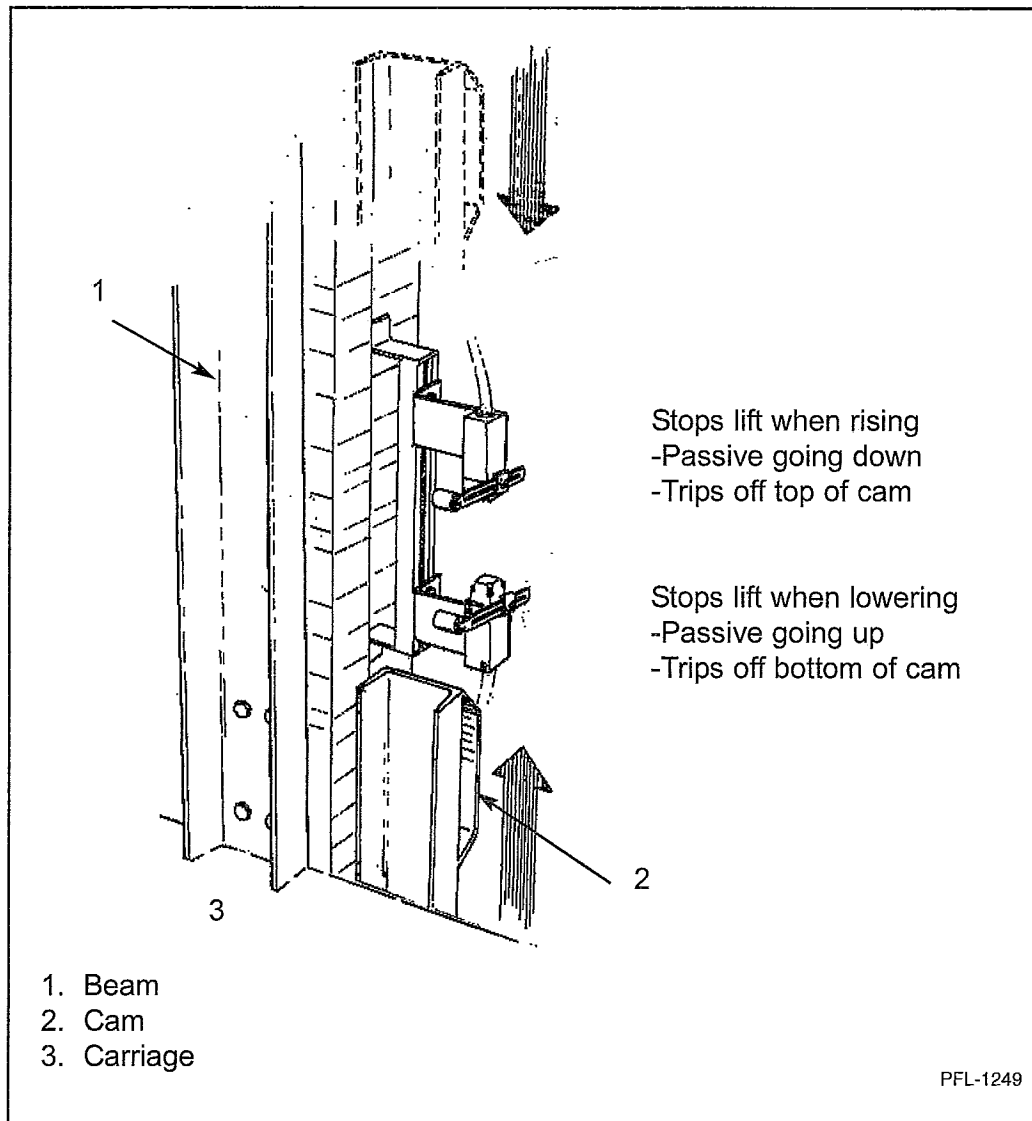


Figure 4

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.

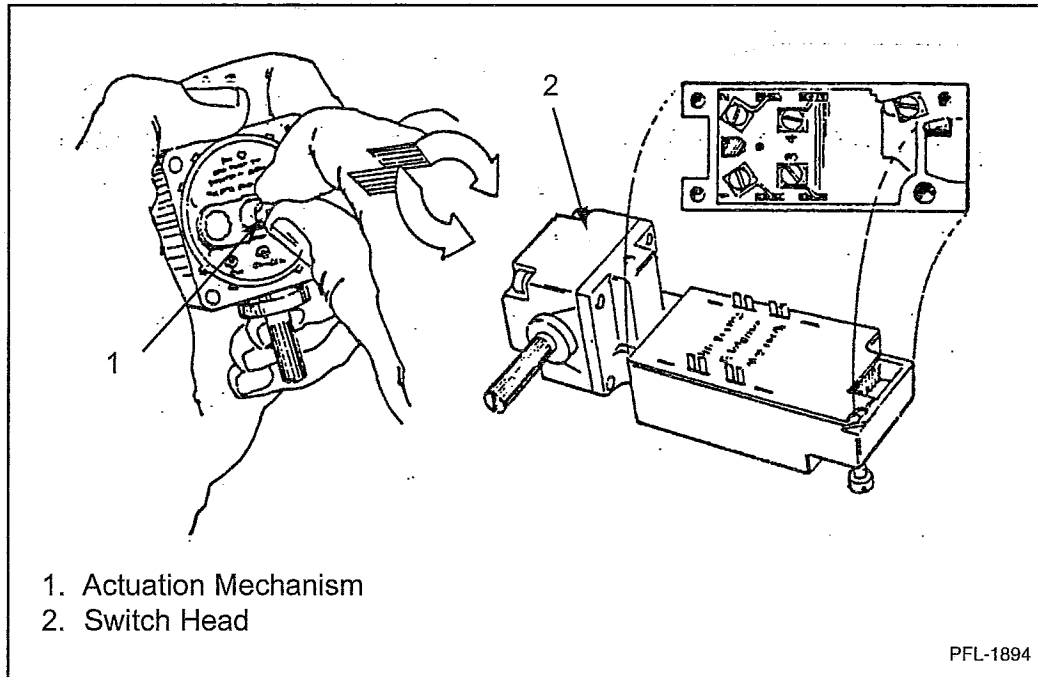


Figure 5

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 reseal.
3. You can tell switch actuation direction by turning it. There should be a "click" when switch activates.

ELECTRICAL SAFETY PRECAUTIONS



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

1. Use a voltage meter on circuits. DO NOT USE YOU FINGERS.
2. Use a fuse pullers to change a fuse; NEVER use your bare hands, pliers, or screwdrivers.
3. Covers on exposed electrical devices or wires MUST be installed to protect personnel from serious injury.
4. ALL metal connection boxes, switch boxes, starting boxes, transformers, and motors must be grounded to prevent shock to personnel.
5. When using a portable electric meter, DO NOT attach one lead to the equipment and leave other lead dangling. Anyone touching it will receive a shock through the meter.
6. 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.
7. Avoid accidental contact with equipment or conductors which are known to be energized or are NOT known to be de-energized-energized. If it is necessary to work on equipment while it is energized, extra care must be used. Always test and repair equipment that indicates a warning of unsafe condition by giving a nonfatal shock. NEVER assume that because the warning shock is non-fatal, the next shock may be fatal.
8. **TAKE TIME TO BE CAREFUL!** Following safety precautions and using common sense will prevent injury, or death.

SAFETY PRECAUTIONS WHEN WORKING ON ENERGIZED CIRCUITS OR EQUIPMENT

When electrical repair or maintenance work is required that prohibits de-energizing the circuits involved, an extreme measure of caution must be used. The work should be accomplished only by well trained and 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:

1. **The person performing the work should not be wearing:** wristwatch, watch chain, rings, necklaces, metal appendages to clothing, oversized metallic belt-buckles, or loose clothing which has the potential to make accidental contact with energized surfaces. In addition, long hair should be secured with a hairnet or covered with a plastic helmet.
2. Hair barrettes or bobbie-pins are electrically conductive and accidental contact can cause serious bodily injury.
3. Clothing and shoes should be as dry as possible. No moisture should be present on the soles of shoes.
4. Insulate the worker from the ground by covering any adjacent grounded metal surfaces with an insulating material. Suitable insulating materials are dry wood, rubber mats, dry canvas, dry phenolic material, or even heavy, multi-ply paper (cardboard). Be sure that the insulating material has no holes present and there are no conductive materials (staples) embedded in it. Cover sufficient area so that adequate space is permitted for worker movement.
5. Any tool used when working on energized circuits must be insulated and rated to withstand to voltage of the energized circuits.
6. **DO NOT** useuse a bare screwdriver shaft or other tools with an energized fuse box.

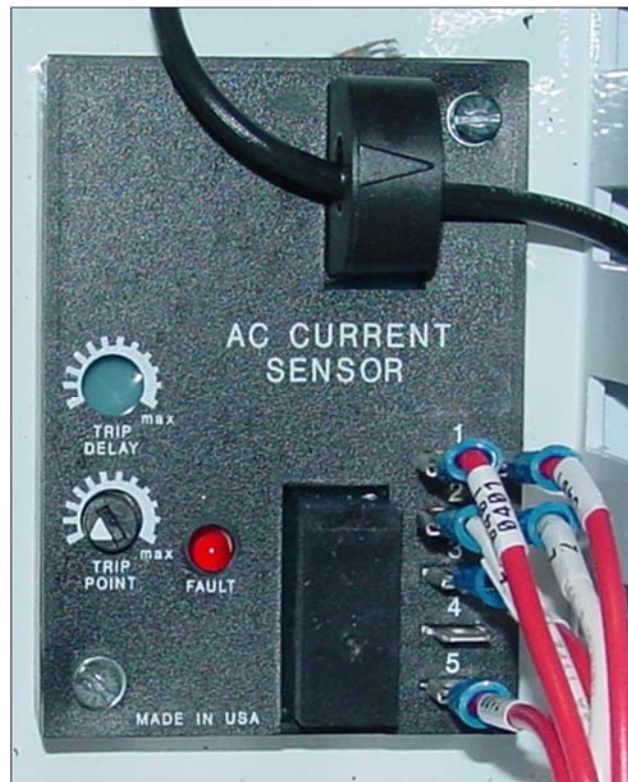
FOR THE INSTALLATION ELECTRICIAN

1. Locate and review the electrical schematics furnished with the equipment.
2. Verify the proper fit-up, wiring and operation of all required electrical components.
3. Mount the push-button station out of reach from the carriage (approximately six feet).
4. Verify the proper fit-up, wiring and operation of all required electrical components.
5. Circuitry incorporates a current sensing magnetic overload relay. This device will reset at 70-80% of its overload condition. A timer is used to bypass the IOL relay for a nominal three seconds during starting in-rush.
6. With a standard lift the limit switches on the chain tensioning assembly should be wired (see your job specific electrical schematic as required) as follows:
7. If the tensioner chain goes slack causing the arm on the limit switch to move down or if a strong tension is exerted on the tensioner chain causing the arm to move up, there will be a break in the control power; therefore, with a standard lift 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 four-post units, there are two additional switches. They are designated as 95LS and 96LS.

SETTING THE OCS (OVERCURRENT SENSOR)

INFIELD ADJUST-STEPS

1. If the current adjustment dial is calibrated, adjust it to the full load amperage of the motor. If it is not calibrated, turn the current adjustment dial to its lowest position.
2. Place the maximum load on the carriage.
3. Run the carriage UP.
4. If the OCS trips, turn the current adjustment dial clockwise a small amount and repeat step 3.
5. If the OCS does not trip, run the carriage DOWN.
6. If the OCS trips, turn the current adjustment dial clockwise a small amount and repeat step 5.
7. If the OCS does not trip, run the carriage UP and DOWN several times.
8. If the OCS trips, repeat step 3.
9. If the OCS does not trip, the solid state IOL is properly adjusted.



Note: This photo is for reference only.
Your actual OCS may be different.

Notes

SPLICED COLUMN ASSEMBLY INSTRUCTIONS

NOTICE

Columns are match marked (i.e. A1, B1). The location of the columns is not determined by these marks. The column letter is only used to correctly assemble a spliced column. The spliced parts of a the column are lettered as shown in Figure 1, and by the corresponding letters shown in Figures 2 and 3.

 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.

NOTICE

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

NOTICE

If there are more than two column pieces per column,
see Figure 2 or 3 to determine placement of spliced pieces.

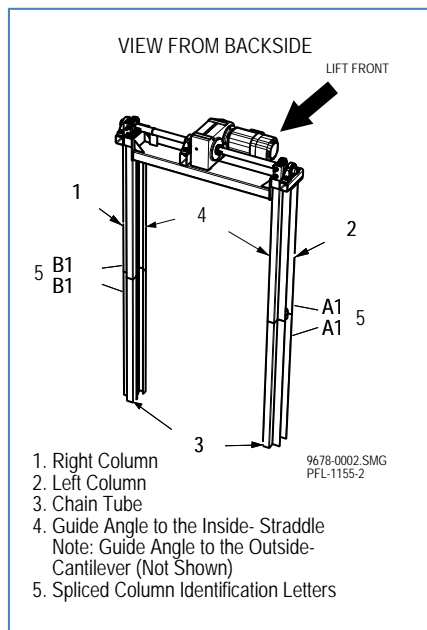


Figure 1

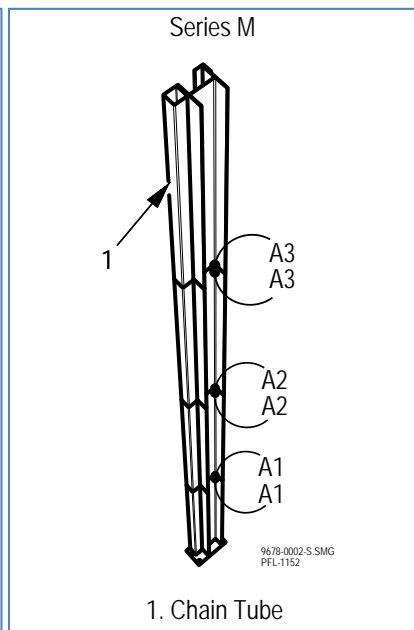


Figure 2

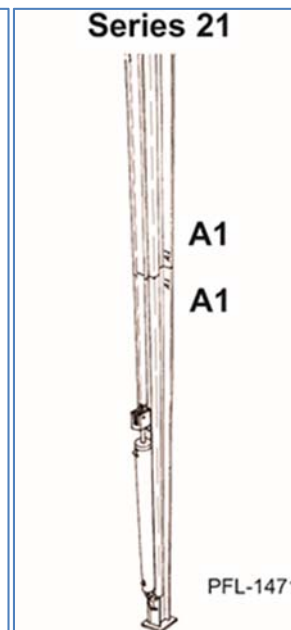


Figure 3

1. If possible align and weld each column on the ground. Then position and align vertically.
2. Assemble spliced column pieces, **see Figure 4**. Use 5/8" bolts and nuts (two per splice) to help hold and align each piece of the column.
3. Tack weld spliced column pieces together. The bolts alone are not strong enough to hold the column pieces together.
4. Temporarily brace the column. Verify that permanent bracing clears the carriage structure and carriage attachments (i.e. limit switch cams, junction box) during the carriage vertical travel.
5. If job specific bracing (i.e. seismic bracing) is to be provided, verify that the bracing meets the job specific bracing drawing layout. Any bracing variation may require local inspector approval.
6. Continue to bolt together and tack weld the rest of the column pieces, keeping the column temporarily braced until the column is completed assembled.
7. Assembly the second column in the same manner as steps 1 and 2.
8. Proper alignment is CRITICAL to the installation and operation of the VRC. Use a string to check alignment, **see Figure 5**. The column is to be aligned from two directions, **see Figure 5** inset. Keep equal distance between the string and the guide angle down both column sections.



The column is shown unsupported for illustrative purposes only. Columns are to be supported as required by VRC loading and site condition.

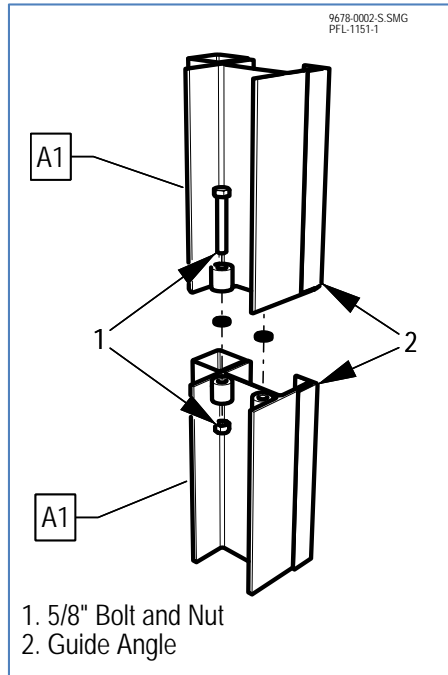


Figure 4

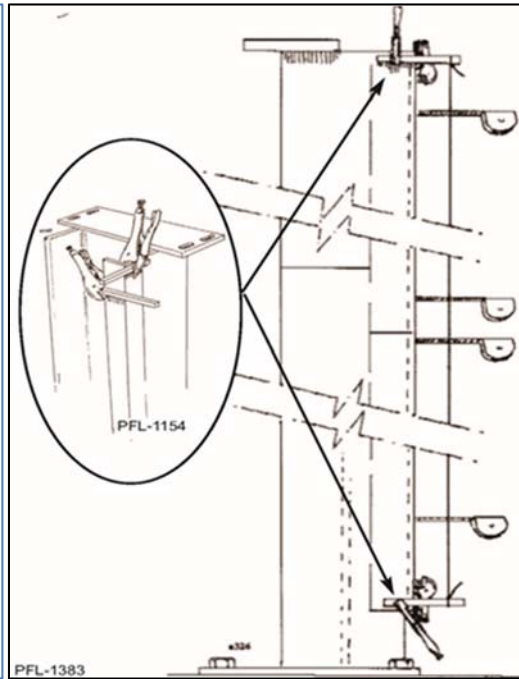


Figure 5



CAUTION

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

9. 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.

NOTICE

DO NOT weld on the inside of the guide angle surface.

It must be clean and clear weld splatter to allow the wheelblock to ride freely on the column flange.

10. Weld the guide angle at the splice on the outside of the column and then grind it flat (this is to allow wheelblock shoe clearance for vertical carriage travel). Be sure to do short welds on the chain tube. The chain tube is not a structural member. It is provided as a chain guard. The chain tube is thin walled. You must be careful not to burn through the chain tube. **See Figure 6.**
11. Welding to be to latest edition of AWS D1.1.
12. Weld filler material to be minimum E70xx.
13. Clean and paint all welded areas.

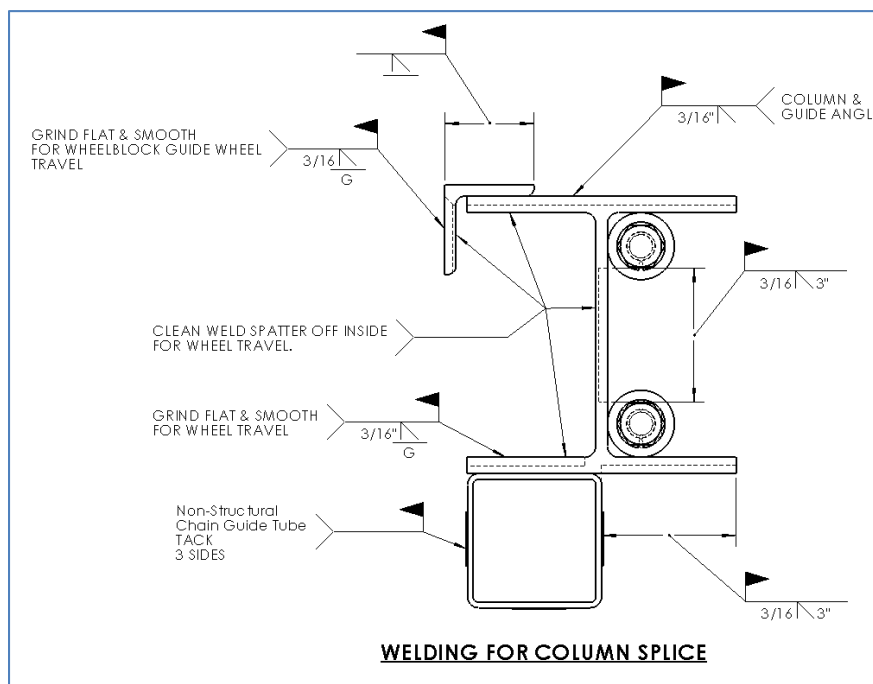


Figure 6

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

If you need assistance, please call PFlow Industries, Inc. Product Support Department.



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EURODRIVE BRAKE OPERATION



This document is not a replacement for the SEW Eurodrive "Operating Instructions". Always refer to the SEW "Operating Instructions" for safety and installation information. Additional resource and information for the DR motor "BE" brakes can be found at the www.seweurodrive.com under *Technical Notes* tab.

15870-0003 SEW EURODRIVE gearmotors 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 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 (when provided) mounted on the motor 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.

1. Voltage to the rectifier energizes the brake coil and releases the brake.
2. Removal of the voltage to the rectifier de-energizes the brake coil and allows the brake to be applied.
3. The SR relay (when provided) switches the DC voltage to the brake coil, shortening the brake response time.
4. The AC voltage to the brake will be rectified to a DC level of 50% of the AC voltage supplied.

MAINTENANCE

The only maintenance normally required is to ensure the area between the cooling fins and the area through which the air is drawn in the fan guard is kept clean, the brake disc air gap is checked 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 secured or blocked in place.

NOTICE

Only a qualified controls electrician should 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

The BMG brake with a SR relay (when provided) is based on the fail-safe circuit principle. **See Figure 2.** The brake is released when the power is applied to the brake coil, and a spring applies the brake when power is removed. In case of a power failure, the brake still holds.

The brake coil 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; 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, a SR relay is used. Units without a SR relay (motor junction box on the motor does not have the SR relay extending out the of the motor junction box side) must have the brake circuit wired from the control panel to the motor junction box.

DR MOTOR BRAKE SR RELAY CONNECTION DIAGRAMS

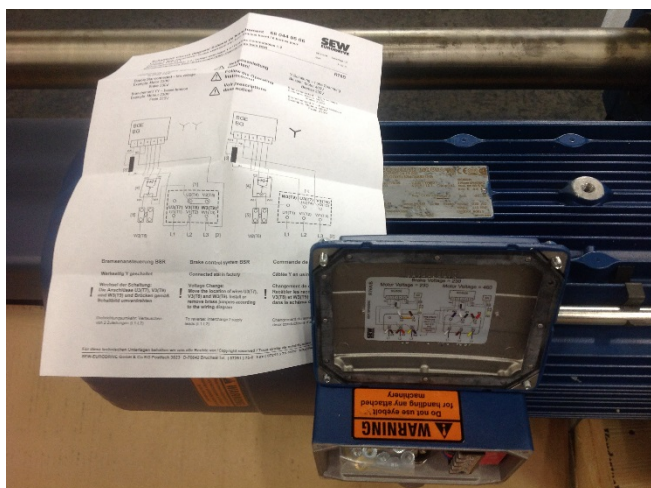


Figure 1

Verify your specific SEW Eurodrive connection diagram by locating the "Circuit Diagram" sheet located in the motor junction box. A specific motor connection diagram label is fixed on the inside of the motor junction box cover. **See Figure 1.**

With the SEW Eurodrive SO# (on motor nameplate) the SEW website will indicate the connection diagram number (i.e. connection R72B)



15870-0005

The QR code (15870-0005) links to the SEW Eurodrive SO# lookup page.

http://www.seweurodrive.com/s_ptpilot/so_information.php5

Now available as an iPhone/iPad App!!! [CLICK HERE](#) for iTunes preview. HIDE

SO# (Serial Number) Information - USA (For info on units not from USA click [here](#))

SEW EURODRIVE, INC. USA

SO# 850018425-02-02-001

→ 850

Enter Print

SO#	
Model/Type	
Gear Ratio	Motor HP
Output Speed	Motor Voltage
Mtg Position	Frequency
Shaft Diameter	Connection
Flange Diameter	Motor Amps
Conduit Box Loc	KVA Code
Cable Entry	Insulation Class
Out Torque (lb-in)	Brake Rectifier
Gear S.F.	Brake Voltage
Other	

If you need assistance, please call PFlow Industries, Inc. Product Support Department.



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SR RELAY WIRING (WHEN USED)

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.

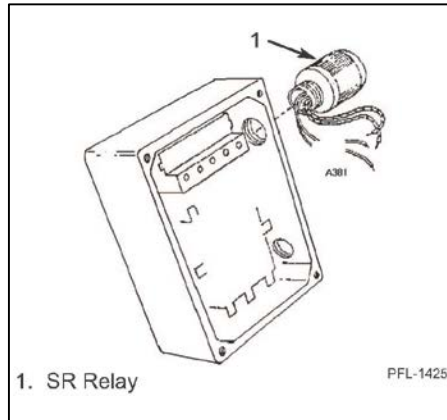


Figure 2

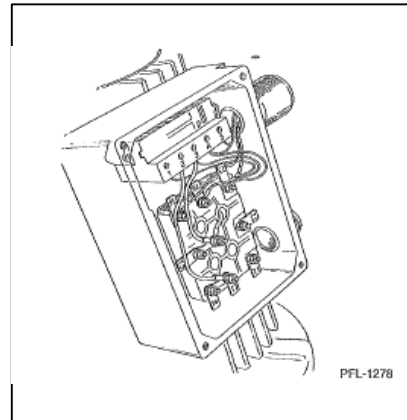
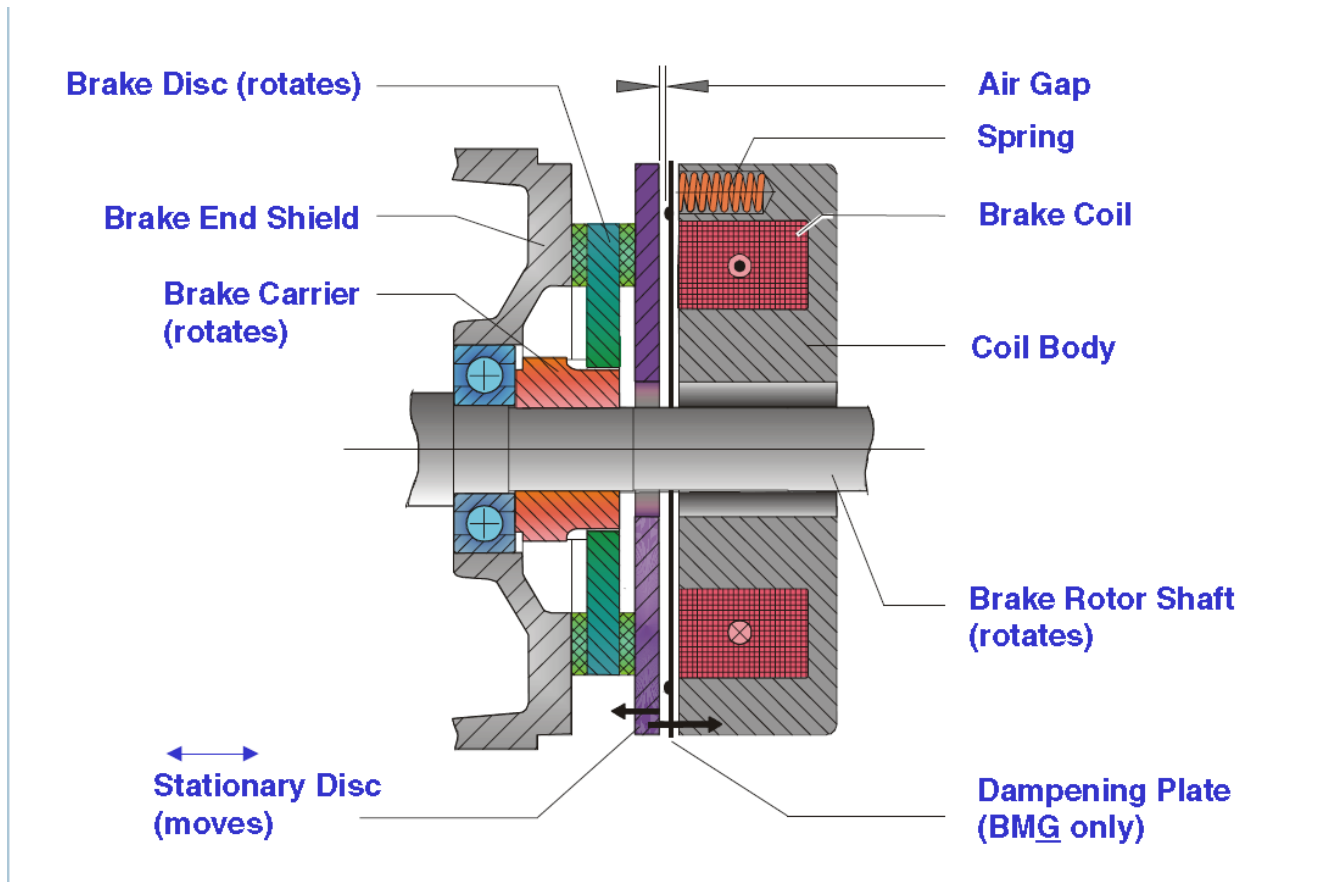


Figure 3

TROUBLESHOOTING

Fault	Cause	Solution
1. Brake does not disengage.	<ol style="list-style-type: none"> Wrong voltage on the rectifier module. Rectifier has failed. The maximum permissible air gap due to brake line wear. Voltage drop in the high voltage connection. 	<ol style="list-style-type: none"> Apply correct voltage (check the motor/brake nameplate). Replace rectifier. Readjust brake. If brake lining is completely worn out, replace the disc brake. Ensure correct line voltage.
2. Motor does not brake.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> Replace brake disc. Reset brake. The adjusting nuts must be properly adjusted.
3. Braking action is too slow.	<ol style="list-style-type: none"> The brake is actuated with the normal brake action circuit. SR relay defective. During reassembly, the brass shims were omitted. 	<ol style="list-style-type: none"> The brake is to be actuated with fast brake action circuit. Replace the SR relay. Install the brass shims.

BRAKE COMPONENTS



15870-0006

http://www.seweurodrive.com/s_admin/inc.training/files/Brake_Service_and_Maintenance.pdf

ADJUSTING BRAKE AIR GAP

NOTICE

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

1. Remove cover and fan.
2. Tighten the three brake adjustment nuts lightly. **See Figure 4.**

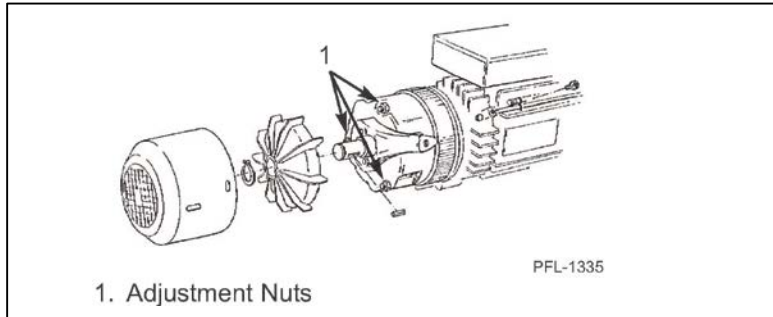


Figure 4

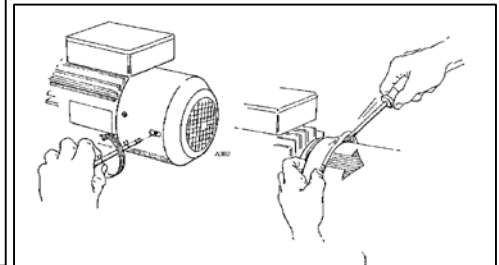


Figure 5



CAUTION

Do not over tighten nuts!

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 working air gap is obtained between shim and stationary disc. **See Table 1** for correct air gap. **See Figure 6 & 7.**
5. Any adjustment to the air gap will also affect the play in the manual release.
6. 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" (1.5-2.0 mm). The springs should be placed between the arm and the nuts to eliminate noise.

Motor Size	Brake Size	Air Gap
DT71 - DT100	BM(G)05 - BM(G)4	0.010"-0.024" (0.25-0.6 mm)
DV112 - DV225	BM(G)8 - BM31	0.012"-0.047" (0.3-1.2 mm)
DV180 - DV225	BM32-BM62 Double Disc	0.016"-0.047" (0.4-1.2 mm)
DV250 - DV280	BMG61	0.012"-0.047" (0.3mm - 1.2mm)
	BMG122 Double Disk	0.016"-0.047" (0.4mm-1.2mm)

Table 1



NOTICE

Adjustments to the air-gap must be made evenly.
Adjust each nut and recheck adjustment once the final gap has been set.

NOTICE

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



BRAKE DISC INSPECTION

1. Remove cover and fan.
2. Slide rubber seal back to expose brake disc. **See Figure 6 & 7.**

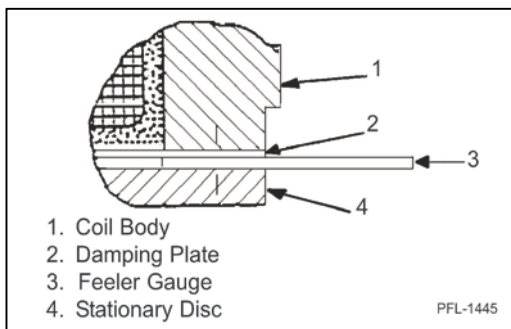


Figure 6

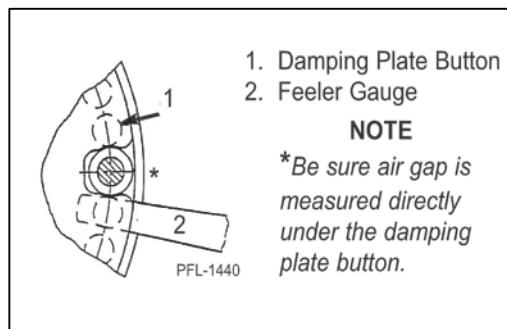


Figure 7

HAND RELEASE MECHANISM

Most of the brakes are supplied with a hand operated release lever allowing the operator to open the brake without applying power to make 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. Brake will re-engage automatically when 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.

NOTICE

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.

CAUTION

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

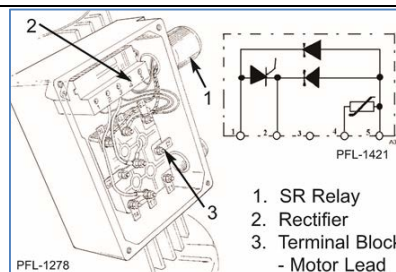


Figure 11

Notes

INSTALLATION COMPLETION CHECKLIST

Please make sure all of the following steps are completed.

✓		Verify Completion Check
	1	The VRC is braced from front to back and from side to side.
	2	The gates and enclosures are braced.
	3	Touch up all welds marks, scrapes, etc. with paint.
	4	Route hoses to prevent interference during travel (If applicable).
	5	Check fittings and hoses for leakage (If applicable)
	6	Make sure all electrical connections are properly made.
	7	Check that the carriage stops level at each floor.
	8	Is there excessive noise during travel?
	9	Does carriage "rock" during travel?
	10	Full load test completed

✓		Verify Completion Check
	11	The <u>gate should open</u> when the <u>unit is present</u> at each level.
	12	The unit should <u>not operate with any gate open</u> .
	13	Check each level for items 1 and 2 above.
	14	Are there any unsafe conditions? If so, please contact PFlow Industries, Inc. Product Support Dept. immediately and report them.
	15	Post all required operational signs.
	16	Clean the installation site & remove all debris.
	17	Instruct the customer on proper lift operation.
	18	Instruct customer on procedures if there is a problem.
	19	Complete the Installation Questionnaire and Acceptance Certificate. Return both to PFlow Industries, Inc.



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Installation Completion Checklist – Section 12

Notes

Thank you for giving us the opportunity to serve you. We appreciate your business and want to make sure we meet your expectations. Please help us by taking a few minutes to tell us about the equipment and service that you have received so far. Please answer the questions and return this form to PFlow Industries, Inc. Product Support Department. If more space is needed, please use the reverse side of this page.

1	Did you receive the equipment in good condition?	Yes	No	
	If No, please describe any damage.			
2	Did you receive the equipment shipment complete as expected?	Yes	No	
	If No, what was missing?			
3	Was the equipment manufactured correctly?	Yes	No	
	If No, describe concerns in the workmanship.			
4	Did it match the General Arrangement (GA) drawing?	Yes	No	
5	Was the unit (i.e., lift, gates, and enclosures) dimensionally correct (did it fit)?	Yes	No	
	If No, describe in detail any problem areas			
6	After the completion of the electrical installation was it necessary to return for final adjustments, testing, and training?	Yes	No	
	If No, were you able to hook up temporary power to test the unit and make all final adjustments?	Yes	No	
	If Yes, were there any electrical problems that you were made aware?			
7	Were the electrical components a concern?	Yes	No	
	If Yes, describe			
8	Was the electrical field wiring completed as required?	Yes	No	
	If No, describe			
9	Where you able to test the unit at full capacity?	Yes	No	
10	Did you test all the gates to ensure proper operation and interlock operation?	Yes	No	
11	Comments:			
PFlow Job Number		Date		
Customer/User				
Questionnaire completed by		email		
Company		Phone		

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Questionnaire

Notes

Acceptance Certification - VRC

We accept the above equipment as being properly installed, tested, and performing to our satisfaction. This form covers both the mechanical and electrical installation of the equipment for the purpose of quality assurance by PFlow Industries, and in no way releases either PFlow Industries, Inc. or the installing contractor(s) of their warranty obligations. If there are any exceptions or unresolved items, please note.

PFlow Unit Number:	Job Name:	Date:
Site Mailing Address:		
Site City:	Site State:	Site Zip Code:
Customer Contact Name:	Contact Title:	
Customer Contact Phone: () - Ext.	Customer contact e-mail:	

Tests Successfully Performed: Yes <input type="checkbox"/> No <input type="checkbox"/>		Customer Initials	Equipment start-up date:
Load test: _____ at _____ % of lift capacity		Operation Test Yes <input type="checkbox"/> No <input type="checkbox"/>	
Gate/Interlock Operation: Yes <input type="checkbox"/> No <input type="checkbox"/>		Other:	
Comments:			

Personnel Instructed on the Operation	
Name:	Company:
Name:	Company:

Accepted By		Acceptance Date:
Name:	Name:	
Title:	Title:	
Company:	Company:	
Phone:	Phone:	
PFLOW PERSONNEL / REPRESENTATIVE / INSTALLER PRESENT: Name: _____ Company: _____		

Please return a copy of this form to the PFlow Product Support Department.

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Notes

PARTS AND LABOR

Parts:

Structure Lifetime
Manufactured Components 1 Year
Purchased Components 1 Year

Labor:

Structure Lifetime
Manufactured Components 1 Year
Purchased Components 90 Days

WARRANTY

The warranty period begins 30 days after shipment. All warranty work must be pre-authorized by PFlow Industries' Product Support Department prior to starting work. All billing must be in accordance with our Warranty Procedures. Replacement of defective parts will be handled in accordance with PFlow's Return Goods Authorization policy. If PFlow Industries determines that equipment failures were caused by abuse, improper installation, or lack of maintenance, they will not be covered. PFlow Industries will not accept consequential losses (missed production, etc.), premium time labor, or air freight charges. Manufactured items are defined as those components manufactured and/or assembled by PFlow. Structure is defined as columns and carriage (excluding carriage side guards). Purchased items are those components that are used as supplied by vendors. Gates and enclosures are excluded and covered for 90 days parts and labor. This warranty applies to all models and may not be modified or extended except by written authorization from PFlow Industries, Inc.

- Manufactured items are defined as those components manufactured and or assembled by PFlow.
- Structure is defined as a columns and carriage.
- Purchased items are those components that are used as supplied by vendors.

PRE-AUTHORIZATION

PFlow Industries must be notified of the problem before we can authorize the repair. We need to determine the cause of the problem, who should be doing the work and what is involved. If it is our decision to have your organization or your subcontractor do the work, you will be given an authorization number which must be referenced on all subsequent paperwork. During our non-working hours, we ask that you notify us by phone or FAX during the next business day. Issuance of an authorization number does not guarantee approval and or payment.

INVOICES

1. You have 30 days past the date the work was completed to submit an invoice for approval. If approved, payment is made 30 days from the date of approval.
2. A deduction from outstanding payments to PFlow for warranty is NEVER authorized and will result in a 10% processing fee.
3. Invoices received without sufficient information will be returned. They will be reconsidered for approval when complete documentation is received. All invoices must include, in detail, the following:
 - Description of the problem.
 - PFlow serial number.
 - Labor hours expended resolving the problem.
 - Rater per hour.
 - Travel time incurred.
 - Date the work was performed.
 - Copies of receipts for materials purchased locally or labor sub-contracted.

Comments

- PFlow Industries is not responsible for payment made on claims prior to our approval.
- Local purchase of components must be pre-authorized.
- Where distance and or experience may be more cost-effective, PFlow Industries reserves the right to use alternate organizations.
- Labor is defined as a maximum of two hours travel per call, plus reasonable onsite repair time as determined by PFlow Industries

Notes

GATE IDENTIFICATION

Prior to shipment, all gate panels, posts, interlock components, etc., are color coded for each level. When two (2) gates are on one level, they will be coded with the same color. Please use the information available on the general arrangement (GA) drawing and in your installation manual to separate the components.

The colors per level will always remain the same. They are:

Level	Color
1 st (Bottom)	Green
2 nd	Yellow
3 rd	Red
4 th	Blue
5 th	Orange
6 th and higher	White

Each tag will be marked with the following:

- A. PFlow Serial Number
- B. Customer Project Number
- C. PFlow Part Number and Description
- D. Initials of Inspector
- E. Levels higher than 6 will include the number of the appropriate level

If you have any questions, please feel free to contact the Product Support Department for assistance.



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Notes

Bi-Parting Swing Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

GREEN - LOWER LEVEL

YELLOW - SECOND LEVEL

RED - THIRD LEVEL

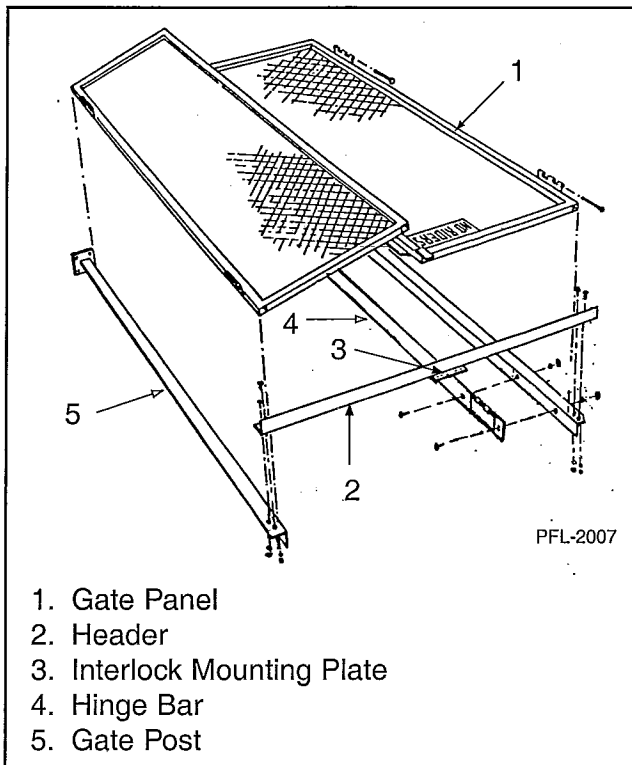


Figure 1

The preferred method of installing a bi-parting swing-type gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing the gates.

1. Lay the gate posts on the floor parallel to each other. See Figure 1.
2. Place the angle iron "header" at the top of the gate posts and bolt in position with hardware provided.
3. Place the gate panels in position between the gate posts and hinge bars.

4. Locate and mark the center of the gate panel (where panels meet in the center.)
5. Locate and mark center of the carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to assure the center of the gate is on the center line of the carriage. See Figure 2.

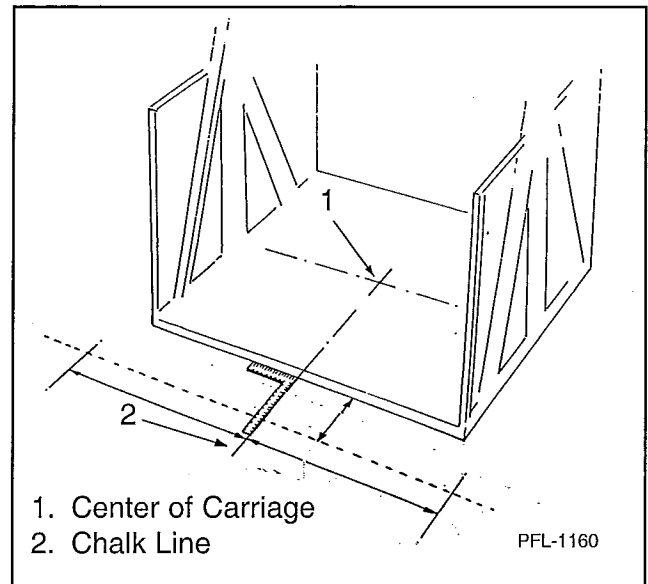


Figure 2

6. The ideal position of the gate is 6" from inside of gate panels to carriage. However, the gate can be located anywhere within a range of 4" minimum from inside of gate panel to carriage and a maximum of 6" from inside of gate panels to carriage. See Figure 3.

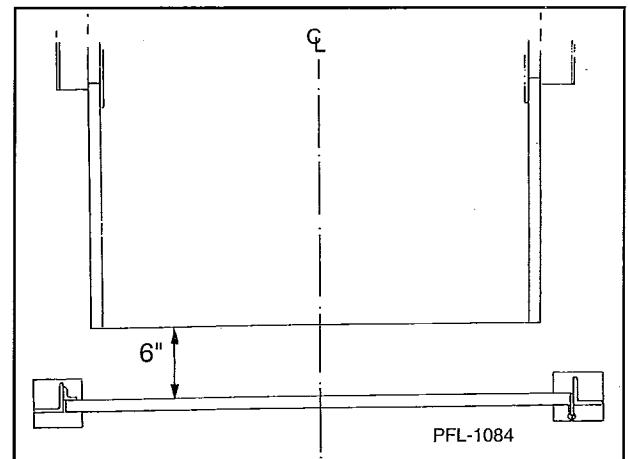


Figure 3

Bi-Parting Swing Gate Installation Instructions

When the gate panel to carriage measurement has been determined, snap a chalk line to identify gate position parallel to the carriage.

NOTE

Length of enclosure panels may be the determining factor in gate location.

7. Raise the gate assembly. Position the gate assembly so the center of the gate is located on the center of the carriage line and the inside of gate panel is on the chalk line parallel to the carriage.

8. Using 3/8" anchors 3 1/2" long, drill and anchor gate post base plates to the floor.

NOTE

Depth of holes should always be deeper than the length of the anchor bolt.

9. Plumb the gate using a plumb bob or a four foot or longer level. See Figure 4.

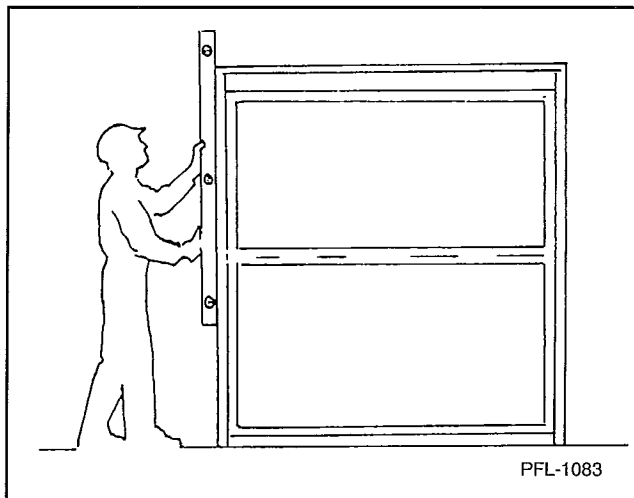


Figure 4

10. With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" x 1/4" angle iron or similar).

11. Tighten all bolts.

12. Weld angle iron header to gate posts. See Figure 5.

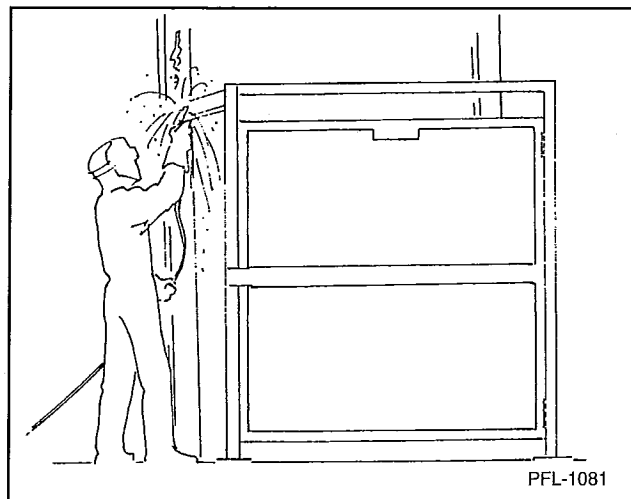


Figure 5

13. Check gate operation.

14. Install magnet. (A magnet belongs on each gate.) Put bolt through magnet. Turn inside nut (closest to magnet) until 1/16" clearance is obtained between nut and magnet. Take magnet with bolt and nut and put the protruding end of bolt through mounting hole. Take the other nut and lockwasher and mount the magnet. Hold the bolt and tighten mounting nut (outside nut). The 1/16" clearance is necessary to allow for variations of magnets striking the area. If given clearance is not included, magnet will not hold gate closed and may result in a broken magnet. See Figure 6.

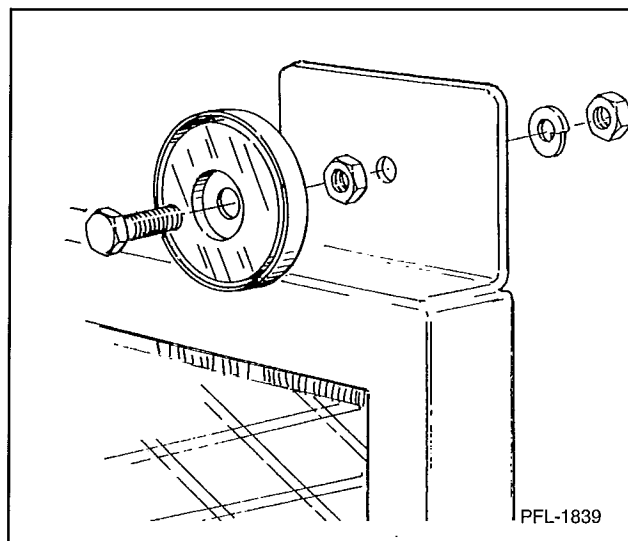


Figure 6

15. Install gate interlock.

Swing Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

GREEN - LOWER LEVEL
YELLOW - SECOND LEVEL
RED - THIRD LEVEL

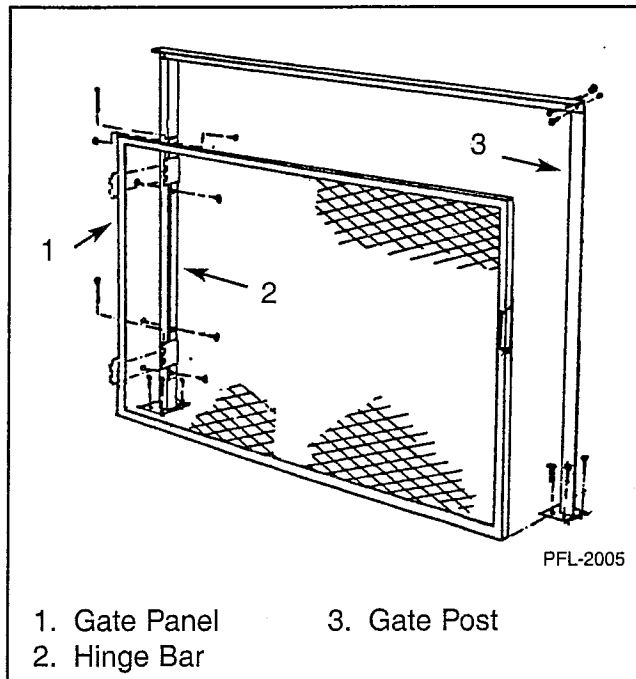


Figure 1

The preferred method of installing a swing gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing the gates.

1. Lay the gate posts on the floor parallel to each other. See Figure 1.
2. Place the angle iron "header" at the top of the gate posts and bolt in position with hardware provided. See Figure 2.
3. Place the gate panels in position between the gate posts and hinge bars. See Figure 2.

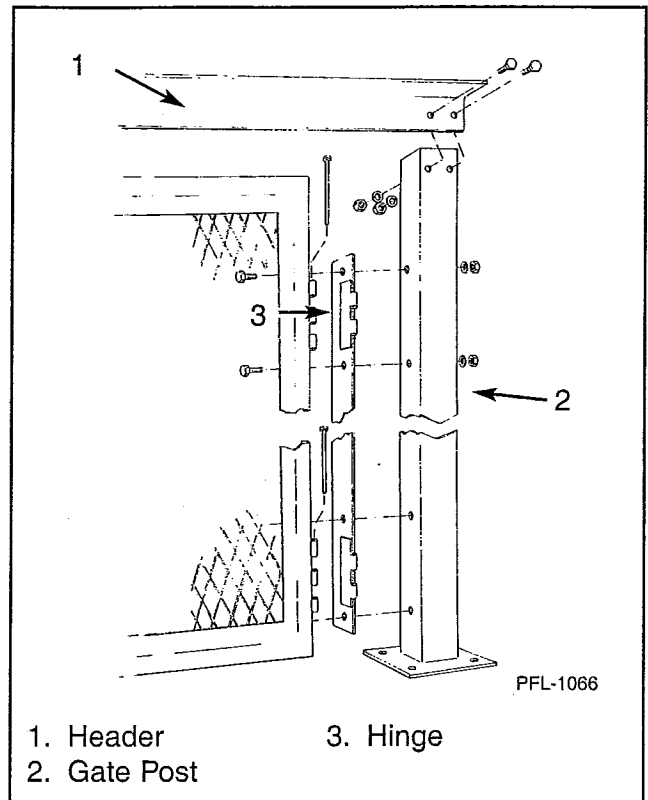


Figure 2

4. Locate and mark the center of the gate panel (where panels meet in the center.)
5. Locate and mark center of the carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to assure the center of the gate is on the center line of the carriage. See Figure 3.

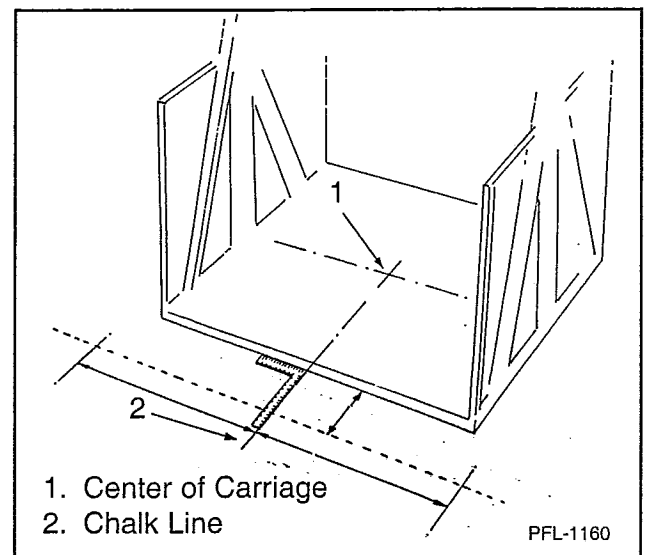


Figure 3

Swing Gate Installation Instructions

- The ideal position of the gate is 6" from inside of gate panels to carriage. However, the gate can be located anywhere within a range of 4" minimum from inside of gate panel to carriage and a maximum of 6" from inside of gate panels to carriage. See Figure 4.

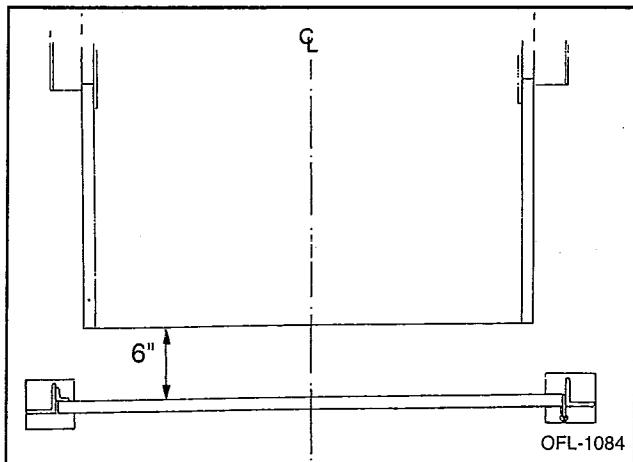


Figure 4

When the gate panel to carriage measurement has been determined, snap a chalk line to identify gate position parallel to the carriage.

NOTE

Length of enclosure panels may be the determining factor in gate location.

- Raise the gate assembly. Position the gate assembly so the center of the gate is located on the center of the carriage line and the inside of gate panel is on the chalk line parallel to the carriage.
- Using 3/8" anchors 3 1/2" long, drill and anchor gate post base plates to the floor.

NOTE

Depth of holes should always be deeper than the length of the anchor bolt.

- Plumb the gate using a plumb bob or a four foot or longer level. See Figure 5.

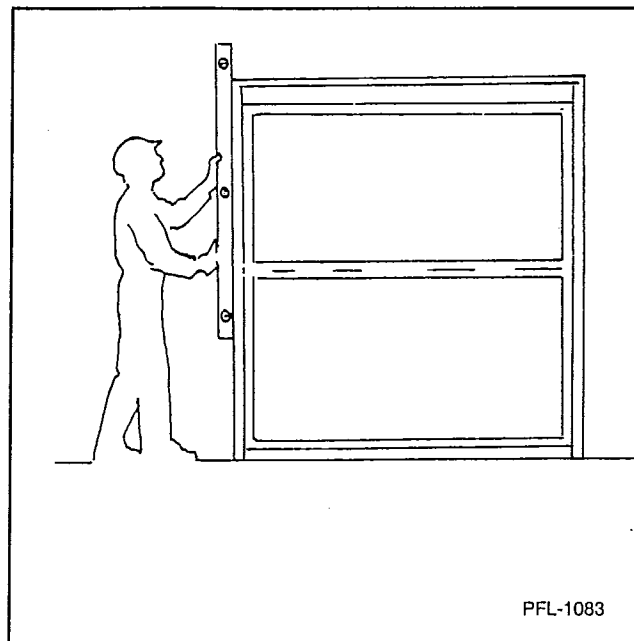


Figure 5

- With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" x 1/4" angle iron or similar).
- Tighten all bolts.

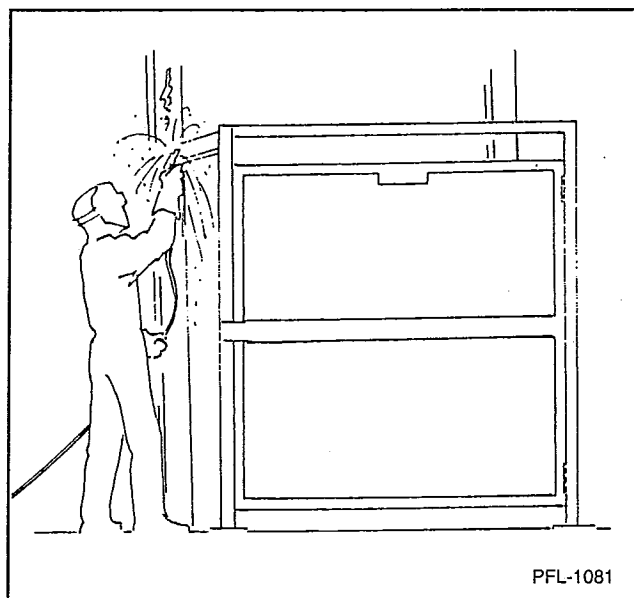


Figure 6

- Weld angle iron header to gate posts. See Figure 6.
- Check gate operation.

Swing Gate Installation Instructions

14. Install magnet. Put bolt through magnet. Turn inside nut (closest to magnet) until 1/16" clearance is obtained between nut and magnet. Take magnet with bolt and nut and put the protruding end of bolt through mounting hole. Take the other nut and lock-washer and mount the magnet. Hold the bolt and tighten mounting nut (outside nut). The 1/16" clearance is necessary to allow for variations of magnets striking the area. If given clearance is not included, magnet will not hold gate closed and may result in a broken magnet. See Figure 7.

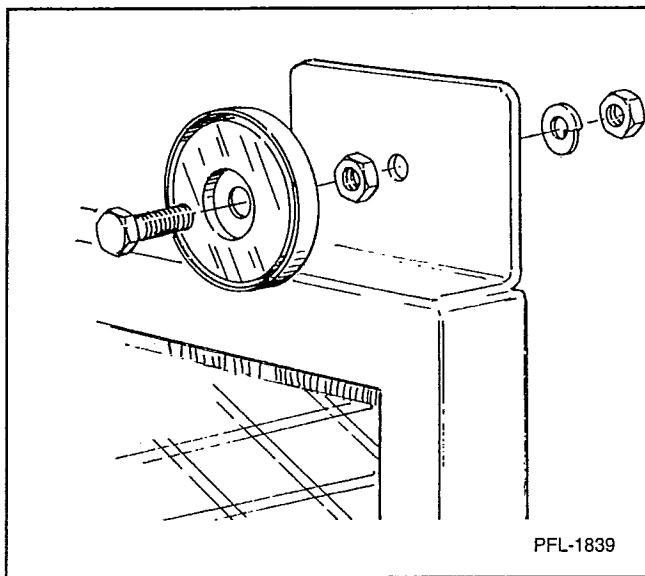


Figure 7

15. Install gate interlock.

Single & Bi-Panel VA Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components (posts, panels, header assembly, interlocks) will be color coded with tags for the appropriate level. **GREEN** = LOWER LEVEL; **YELLOW** = SECOND LEVEL; **RED** = THIRD LEVEL. Each gate will be tagged with a different color. Hardware will be in boxes marked for each level gate.

Before beginning installation of the gate, match up all gate components with their floor placement as determined by the general arrangement (GA) drawing. Assembly is easiest if there is room to lay the components out. As this is not always possible, please see Helpful Hints for Upright Assembly.

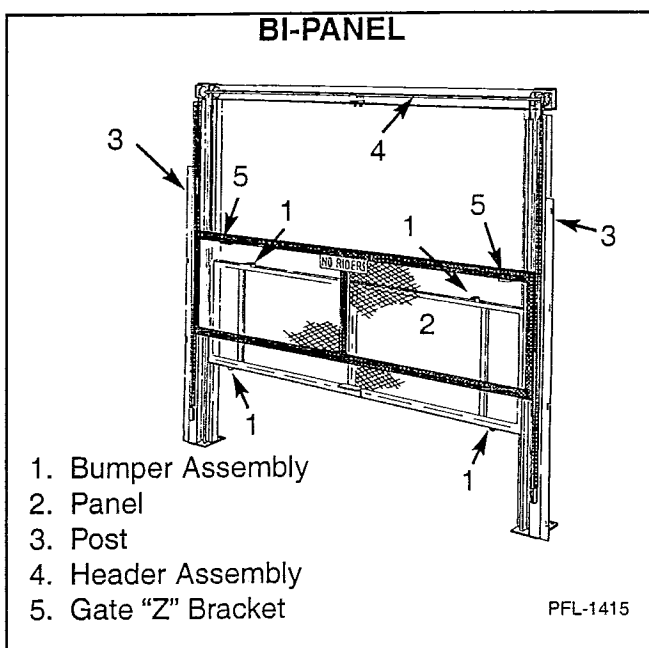


Figure 1

NOTE

Smaller panel is the lower panel and will be closer to the carriage.

HELPFUL HINTS FOR UPRIGHT ASSEMBLY

- Set up one post at a time. (Tie a long length of string to the last few links of chain. This will help retrieve the chain if it accidentally falls down the tube during installation.)
- Take out the counterweight shipping bolt. Slide weight above bolt and reinstall bolt.
- Make sure each post is plumb.

- With header on and chain weaved through the sprockets, you should have one to two feet of chain hanging over the sprockets. Lift panel up to meet this chain. Heavier panels may require the use of a forklift or come-along around the header.

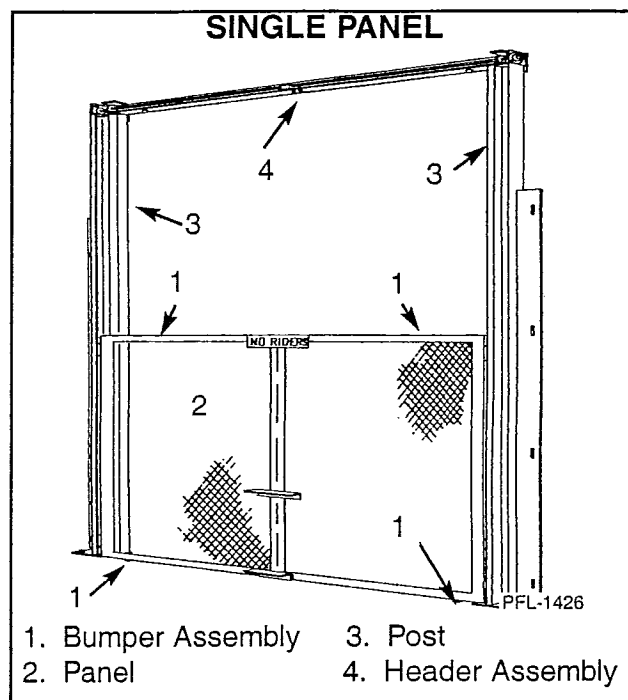


Figure 2

NOTE

On some applications, the panel may be in two pieces and require assembly in the field.

1. Attach gate components to the panels as shown. See Figures 3, 4, and 5.

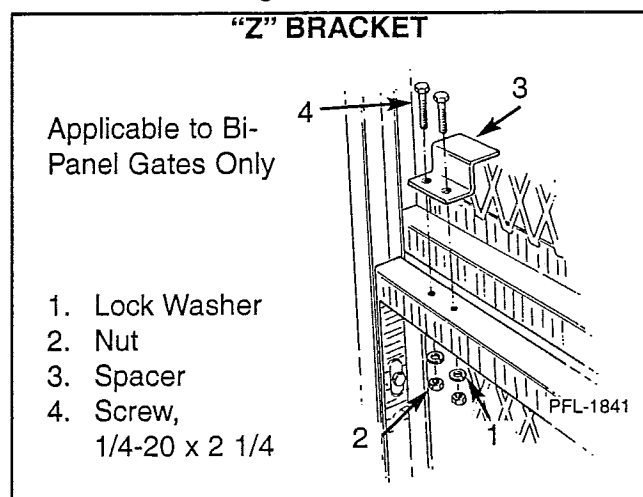


Figure 3

Single & Bi-Panel VA Gate Installation Instructions

BUMPER ASSEMBLY

THIS ASSEMBLY COMES AS ONE PIECE and is applicable to both style gates.

1. Bumper
2. Bumper Mounting Bracket

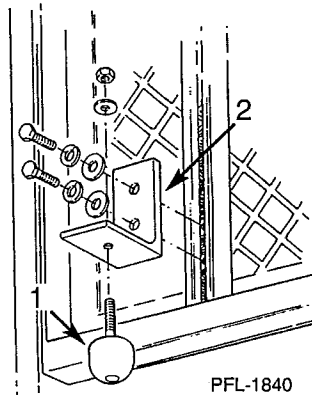
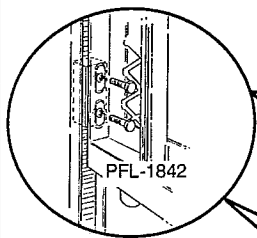


Figure 4

UHMW BLOCKS



2 UHMW Blocks per side for each gate panel - applicable to both style gates.

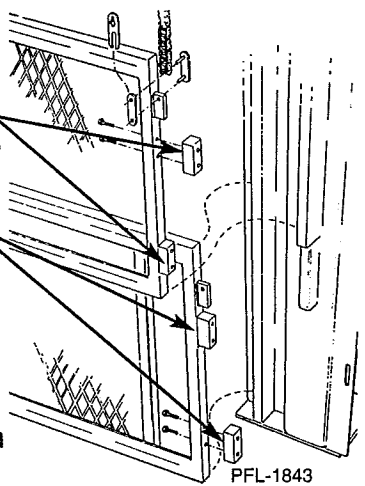


Figure 5

NOTE

Plastic UHMW blocks slide over bolt threads.

2. Lay out the framework in the proper arrangement. See Figure 6.

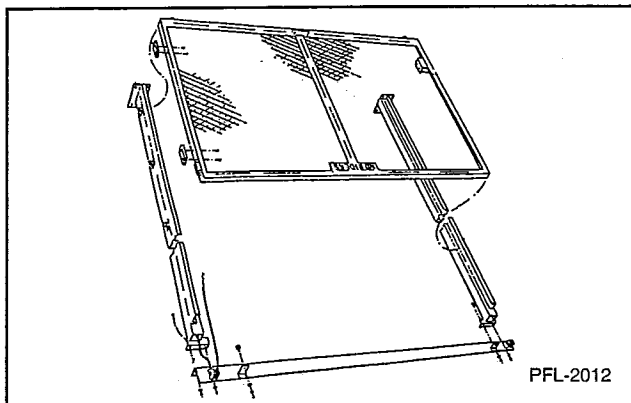


Figure 6

3. Position the header with the sprockets facing up. Bolt into place using four (4) 3/8-16 x 1 1/4" long bolts with lock washers and nuts. See Figures 7, 8, and 9.

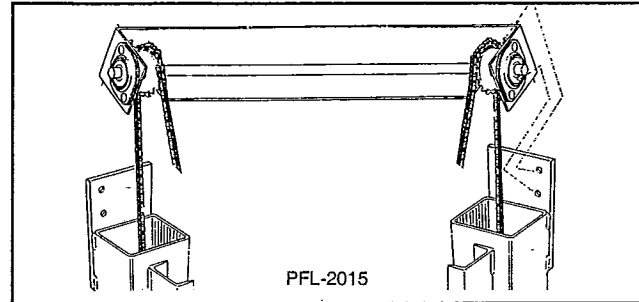
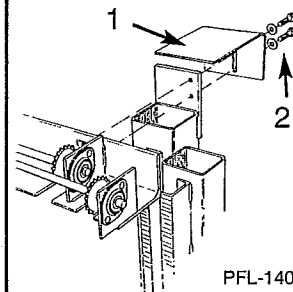


Figure 7

BI-PANEL

SINGLE PANEL



1. Chain Anti-Jump Guide
2. 3/8 x 1/4 Screw w/Flat & Lock Washers

Figure 8

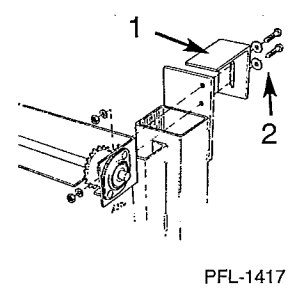


Figure 9

4. Remove the #50 master links from the #35 chain sticking out of each gate post and thread the chain over the sprockets on the header. See Figure 10.

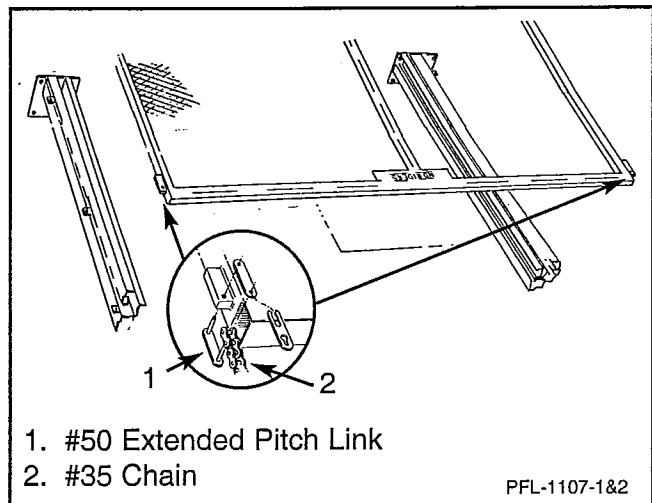


Figure 10

Single & Bi-Panel VA Gate Installation Instructions

NOTE

Remove the counterweight shipping bolt, slide the counterweight above the bolt, position, and re-install the bolt. Tie a length of string to the end of the #35 chain to assist in pulling the chain out of the tube if it should fall down into the tube.

5. Place the panel(s), with all components installed, into the track of the gate posts.
6. Slide the panel up to the header and re-connect the master links removed in Step #4 (Figure 10). Make sure that the length of chain on each side is equal. See Figure 11.

NOTE

When raising the panels, have one to two feet of chain hang over the sprockets.

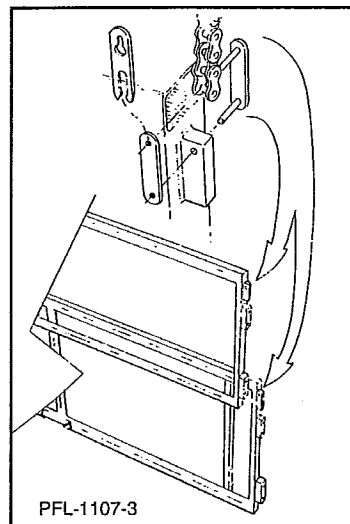


Figure 11

7. Stand gate assembly upright and place in position. Place the back face of the gate post on the chalk line 6" from the face of the carriage. See Figures 12 and 13. Some states require the gate closer to the carriage. Where necessary, adjust accordingly.

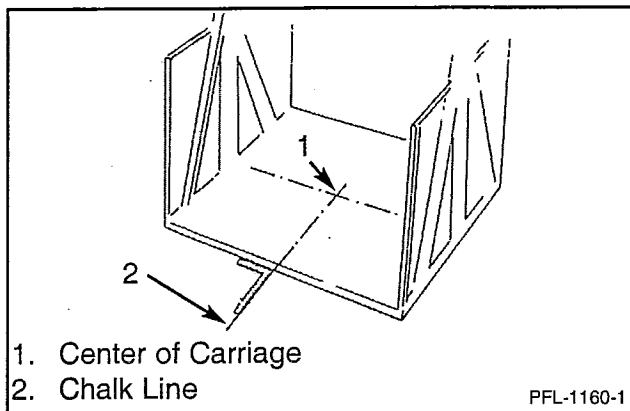


Figure 12

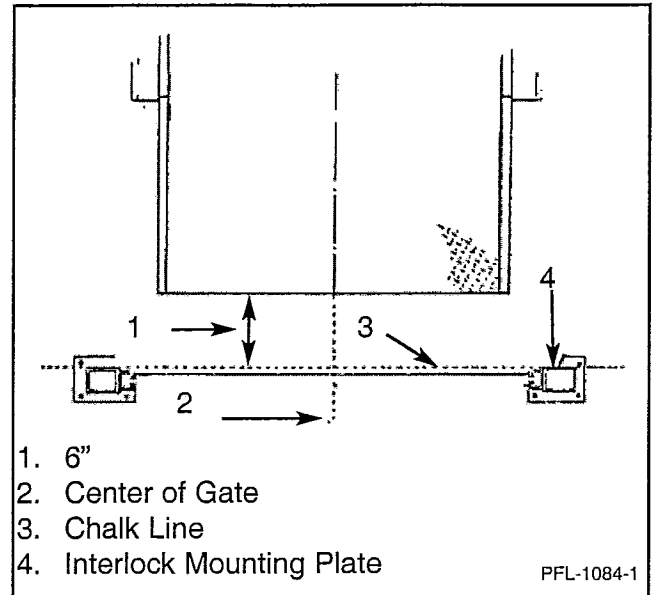


Figure 13

NOTE

The use of a forklift or come-along may be required to place heavier gate assemblies into position.

8. Make sure the posts are plumb in both directions. See Figure 14.

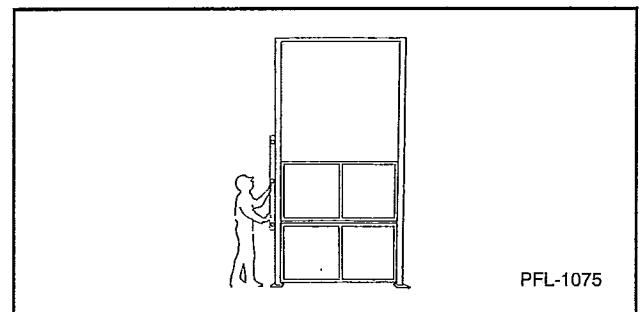


Figure 14

9. Temporarily brace the posts to the enclosure panels, building, or lift, as required.
10. Move the gate panels up and down and check that the panels move freely during travel from top to bottom of the posts. Lift the gate panel approximately two feet to check the counterbalancing. The gate should remain in that position.

Single & Bi-Panel VA Gate Installation Instructions

- A. If the gate continues to raise, add steel bar stock to the bottom center of the panel inside the frame. Recheck and repeat as needed
- B. If the gate drops, contact Pflow Industries for instructions.

NOTE

Carriage gates must also be tested during operation. Routine vibration during travel may affect the weight required and necessitate adjustments.

- 11. If everything runs smoothly, brace the posts and anchor the base plates securely to the floor. See Figure 15.

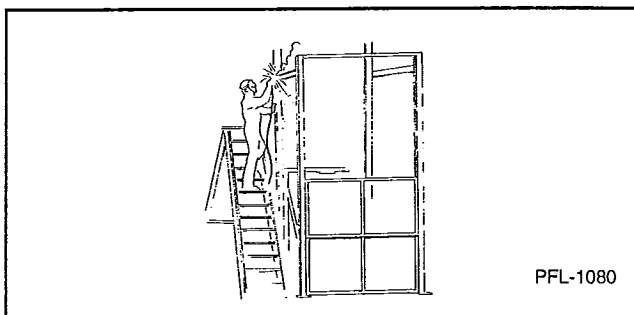


Figure 15

- 12. Make sure that the chain anti-jump guard is installed as close to the chain as possible without rubbing. See Figures 8 and 9.

Installation of INTERLOCKS and GATE STATUS SWITCHES, where applicable, are covered in other bulletins. Refer to the Table of Contents in your installation manual.

Sliding Gate Installation Instructions

IDENTIFY COMPONENTS

Gate components, posts, panels, header assembly, interlocks, will be color coded with tags. Each gate will be a different color.

GREEN - LOWER LEVEL

YELLOW - SECOND LEVEL

RED - THIRD LEVEL

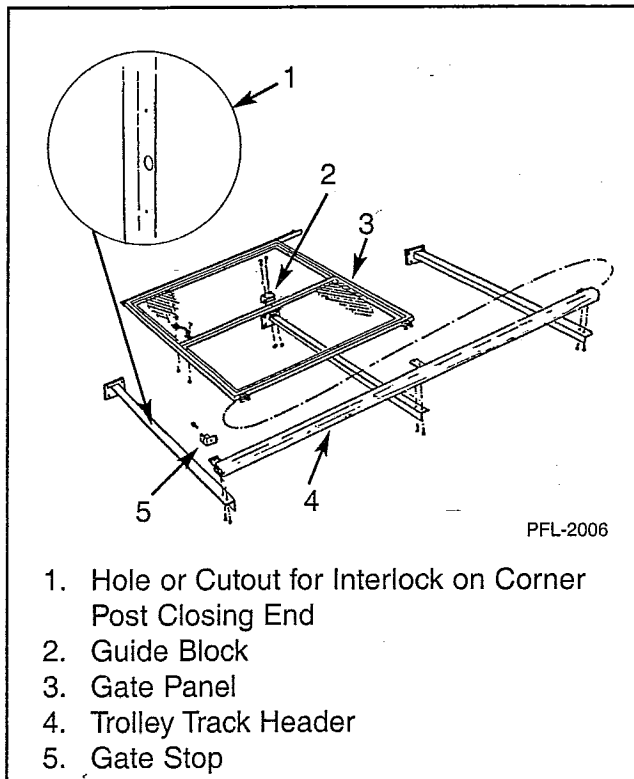


Figure 1

The preferred method of installing a sliding gate is to pre-assemble the gate on the floor and then stand it up. The following instructions are for pre-assembly of the gates. If for some reason pre-assembly is not possible, use these instructions as a general guide for the assembly, positioning, and securing of the gates.

1. Lay the gate posts on the floor parallel to each other with the gate post that has the hole or cutout for the interlock on the closing end. The middle post should have two holes near the base plate for mounting the guide block. See Figure 1.

2. Bolt the trolley track header to the gate posts, and slide the gate panel into the trolley track header.
3. Bolt guide block to middle post. See Figure 2.

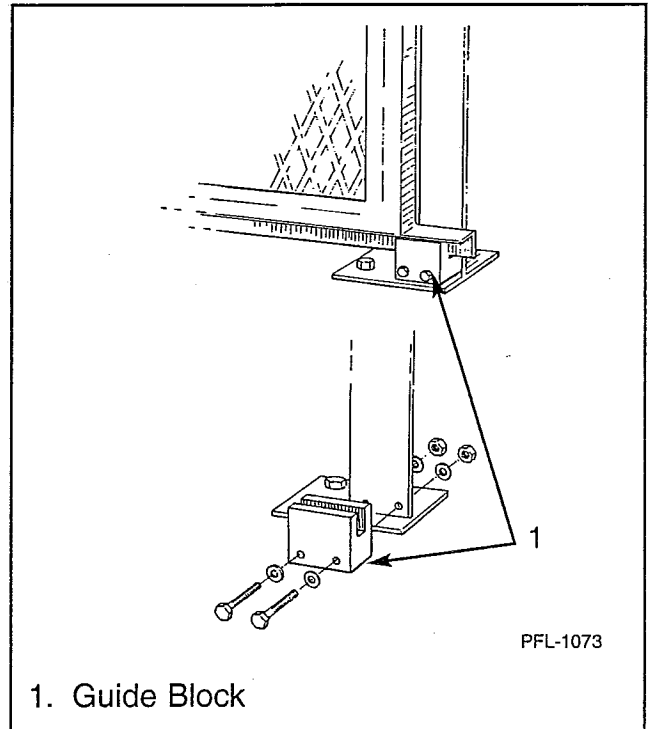


Figure 2

4. Slide gate to its closed position. Locate and mark center of the gate. See Figure 3.

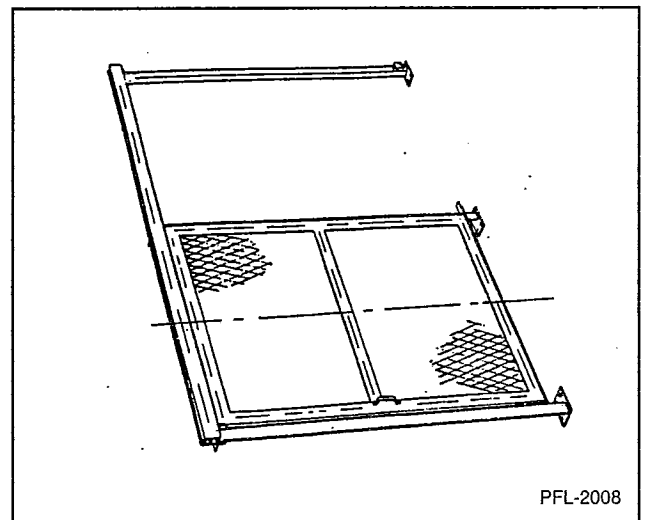


Figure 3

Sliding Gate Installation Instructions

5. Locate and mark center of carriage. Using a carpenter square held on the front edge of the carriage, mark a chalk line on the floor to ensure center of the gate is on the center line of the carriage. See Figure 4.

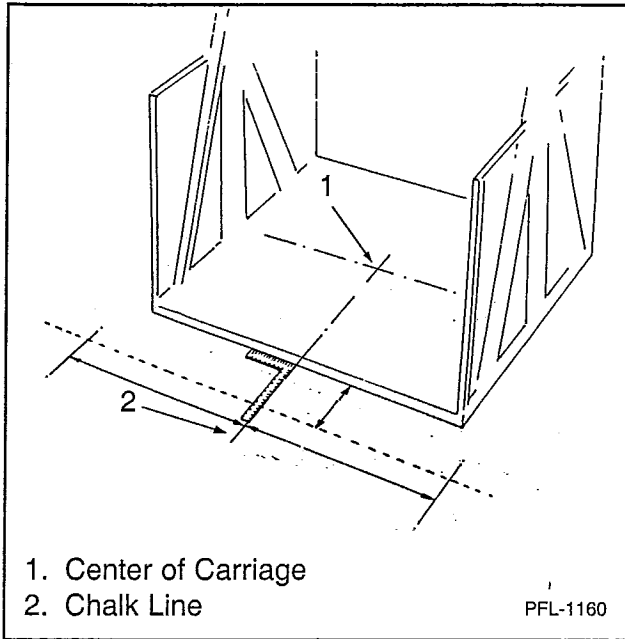


Figure 4

6. The ideal position of the gate is 6" from inside of gate to carriage. However, the gate can be located anywhere within a range of 4" minimum from the inside of the gate post to carriage and a maximum of 6" from inside of gate post to carriage.

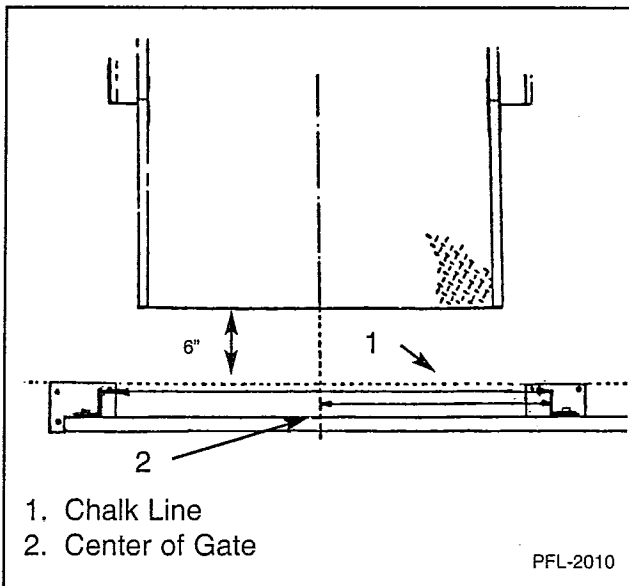


Figure 5

When the gate post to carriage measurement has been determined, snap a chalk line to identify the gate position parallel to the carriage. See Figure 5.

NOTE

Length of enclosure panels may be a determining factor in gate location. Check GA drawing for enclosure placement.

7. Raise the gate assembly. The track and gate are to be on the outside. Position the gate assembly so the center of the closed gate is located on the center of the carriage parallel to the carriage and the inside of the gate posts' base plates are on the chalk line. See Figure 6.

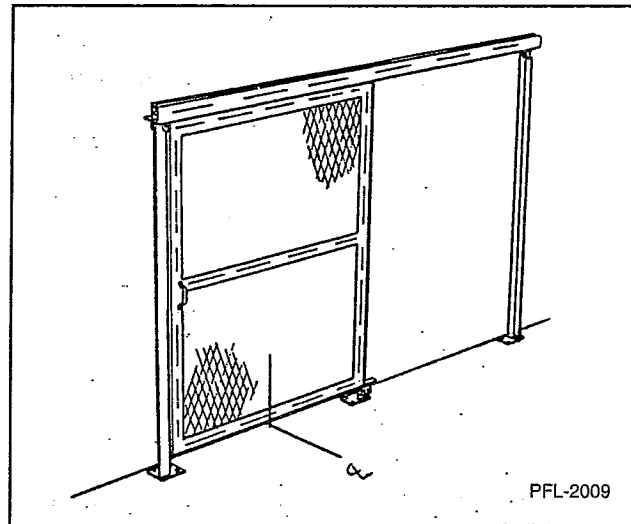


Figure 6

8. Using 3/8" anchors 3 1/2" long, drill and anchor gate post gate plates to the floor.

NOTE

Depth of holes should always be deeper than the length of the anchor bolt.

9. Plumb the gate using a plumb bob or a four foot or longer level. See Figure 7.

Sliding Gate Installation Instructions

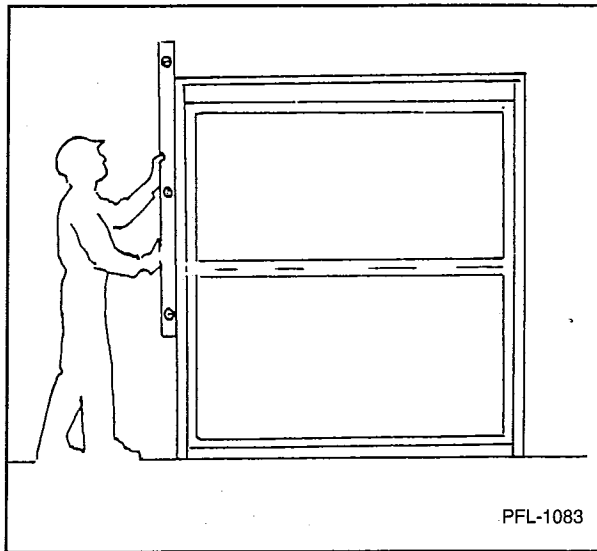


Figure 7

10. With the gate posts plumb, measure from gate post to VRC column. Cut two support braces and install as illustrated (1 1/2" x 1 1/2" angle iron or similar).
11. Tighten all bolts.
12. Weld angle iron header to gate posts. See Figure 8.

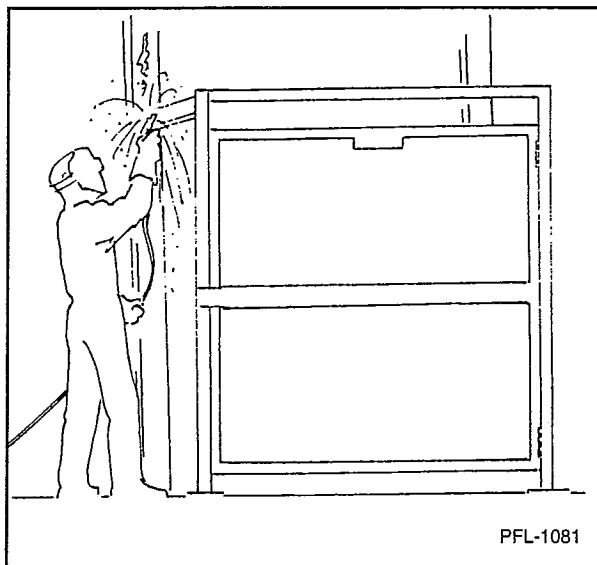


Figure 8

13. Check gate operation. Additional bracing may be necessary.
14. Install gate interlock.

Gate Cable Interlock Installation Instructions

**READ THIS BULLETIN IN ITS ENTIRETY
BEFORE STARTING INSTALLATION.**

GENERAL DESCRIPTION

The cable interlock consists of four main items:

1. CARRIAGE MOUNTED CAM

The cam is mounted on the carriage to activate the roller assembly. It must be positioned to allow the roller to move freely on the inclined cam face and to allow the pull cable to activate the interlock. See Figure 1.

2. COLUMN MOUNTED ROLLER ASSEMBLY

The roller assembly is mounted on the lift column. It must be positioned to limit the pull cable travel. See Figure 1.

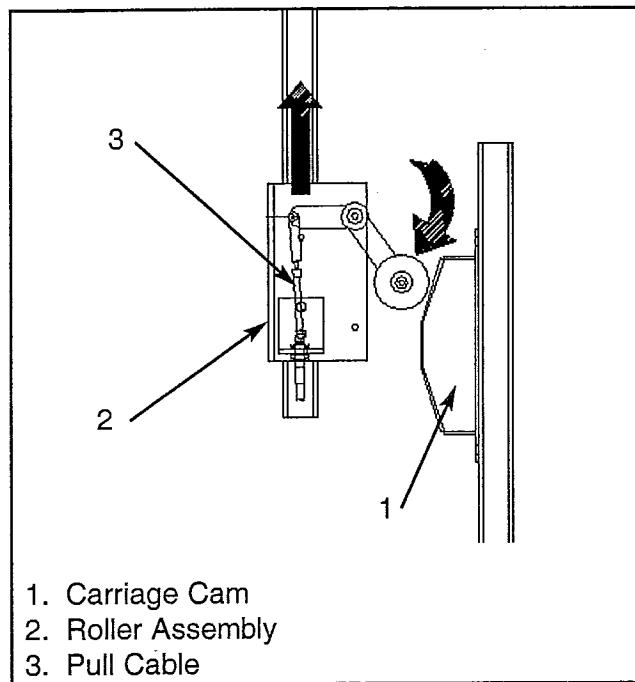


Figure 1

NOTE

Do not allow the clevis to bottom out or overextend. The required travel is approximately 3/4" - 1". The maximum cable travel is 2".

3. PULL CABLE

The pull cable is a utility cable with threaded stainless steel end rods. The cable has a maximum 2" stroke. See Figures 1 and 2.

⚠ WARNING

If travel is extended beyond 2", cable damage will occur.

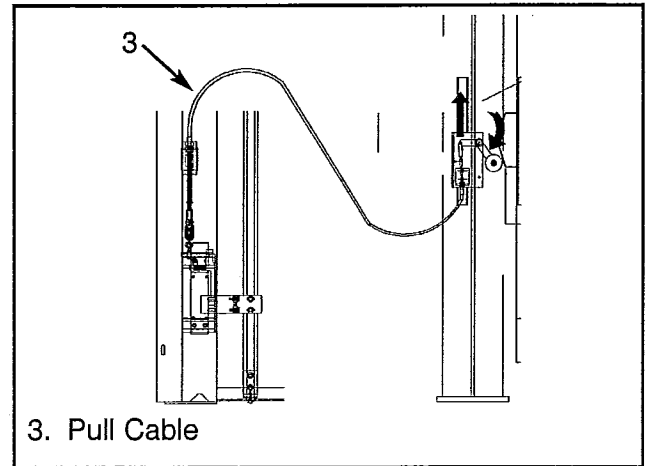


Figure 2

4. GATE CABLE INTERLOCK ASSEMBLY

The gate cable interlock assembly is attached to the gate post. The stroke of the cable is adjusted to permit the interlock to release the gate latch. See Figure 3.

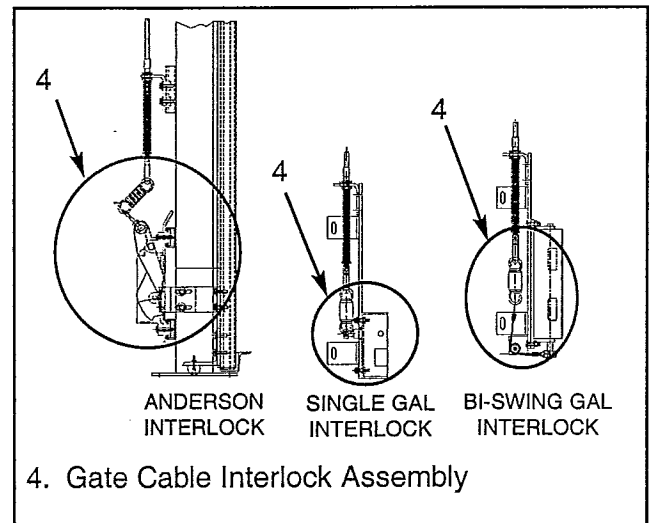


Figure 3

⚠ WARNING

Cables are lubricated for the life of the cable. Do not remove the seals or lubricate the cable. Cables are designed to be non-repairable. Do not attempt to repair the cable. Protect the cable from physical damage by paint, kinking, vibration, etc., which may damage the cable.

Gate Cable Interlock Installation Instructions

INTERLOCK ASSEMBLY ADJUSTMENT

1. The tension on the compression spring should be adjusted by positioning the cable on the angle bracket. The activation of the interlock is also adjusted by the position of the set collar. See Figure 4.

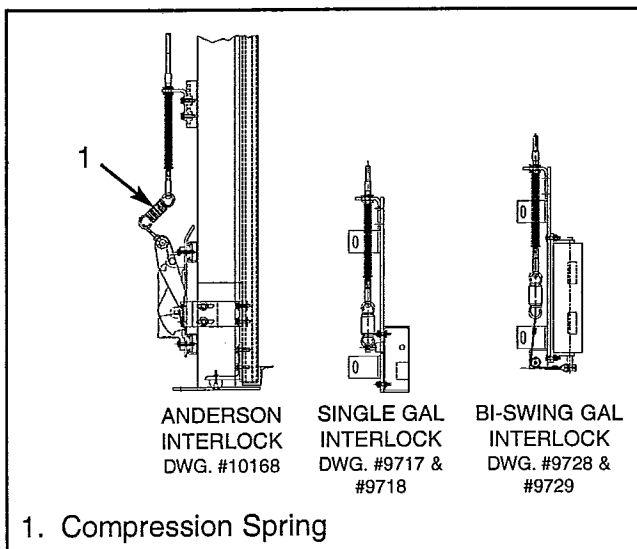


Figure 4

CABLE ADJUSTMENT WITH ROLLER ARM

1. Mount the carriage cam to allow 3/4"-1" cable travel (2" maximum cable travel). Make sure the roller wheel clears the edge of the cam. Center the cable travel at the center of the full cable stroke by positioning the cable in the bracket angle. See Figure 5.

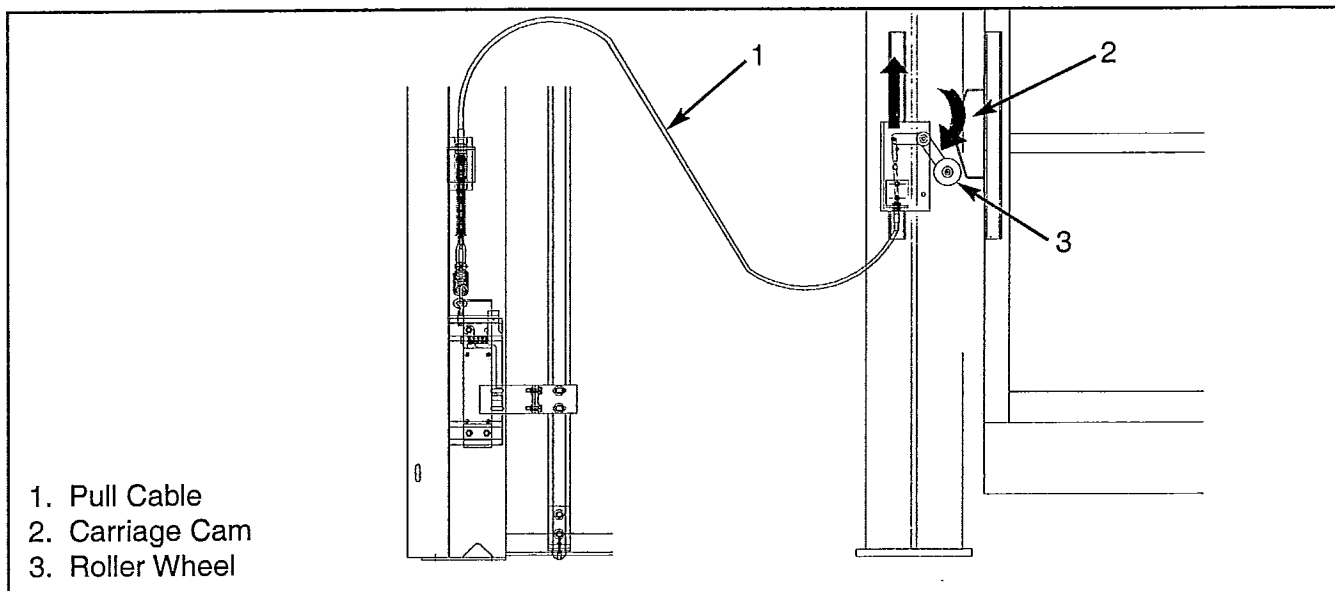


Figure 5

⚠ WARNING

Proper engagement of the roller and cam is critical. The roller arm should pull the cable out of the sleeve. Improper alignment could cause the roller arm to push the cable into the sleeve causing it to bend and break.

2. Edge of cam must not be past center of wheel toward bracket. See Figure 6.

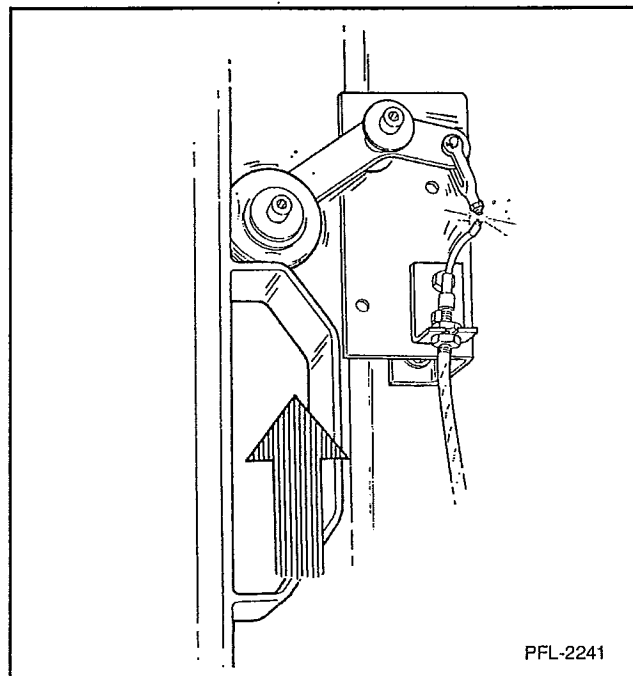


Figure 6

Gate Cable Interlock Installation Instructions

POSITION OF THE ROLLER ARM ON THE LIFT COLUMN

1. The position of the roller on the cam is very important. The roller must roll freely on the cam incline. See Figure 7.

CAUTION

Do not allow the roller to hang up on the top/bottom horizontal surface of the cam.

⚠ WARNING

Proper engagement of the roller and cam is critical. The roller arm should pull the cable out of the sleeve. Improper alignment will cause the roller arm to push the cable into the sleeve causing it to bend and break.

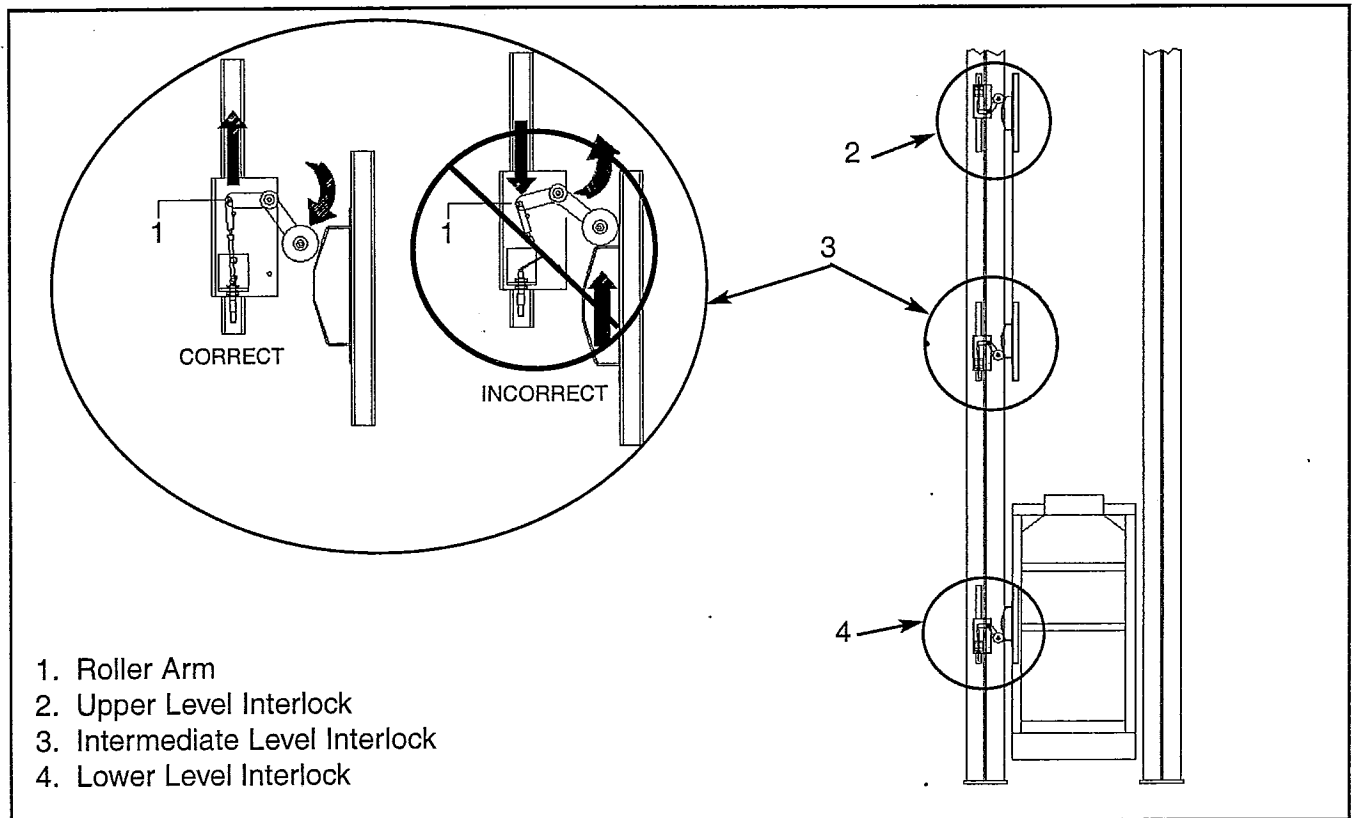


Figure 7

2. At the top and bottom levels, the roller arm assembly should be oriented so the cam hits the roller wheel arm in the pivot direction. See Figure 8.

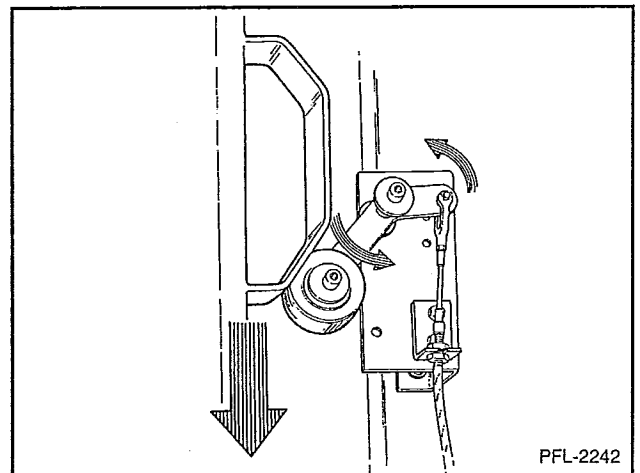


Figure 8

Gate Cable Interlock Installation Instructions

3. If you need to change roller arm assembly to opposite configuration, unbolt angle and pivot arm and reassemble in new location. See Figure 9.

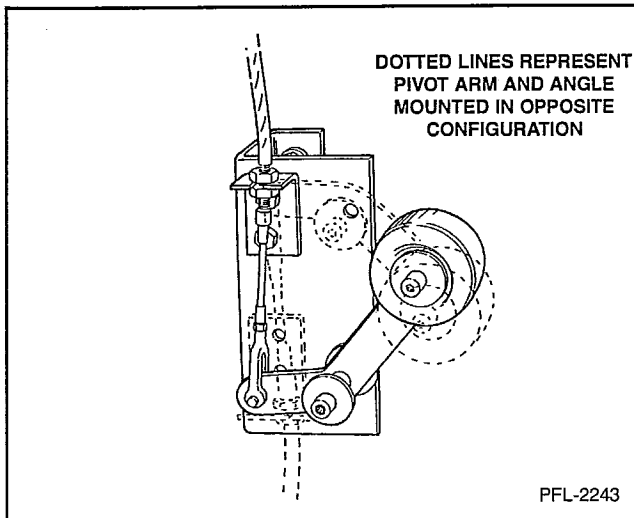


Figure 9

NOTE

Only on the intermediate levels, the cam will hit the roller arm going in both directions, so alignment is important. See Figure 7.

The edge of the cam must be past center of wheel (away from bracket) to allow pivot arm to rotate. See Figure 10.

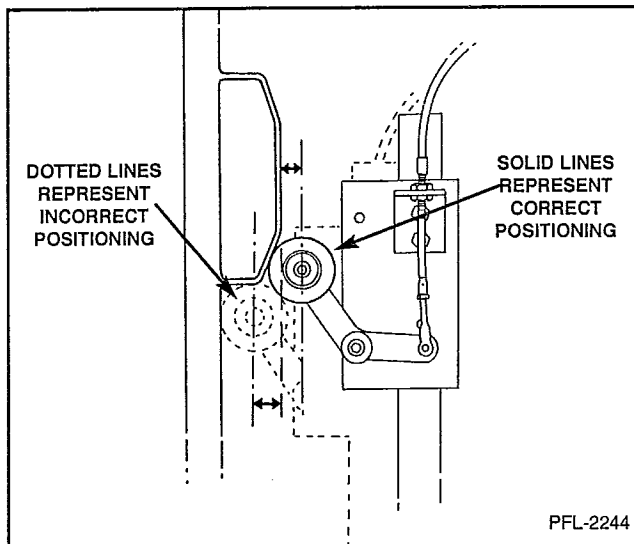
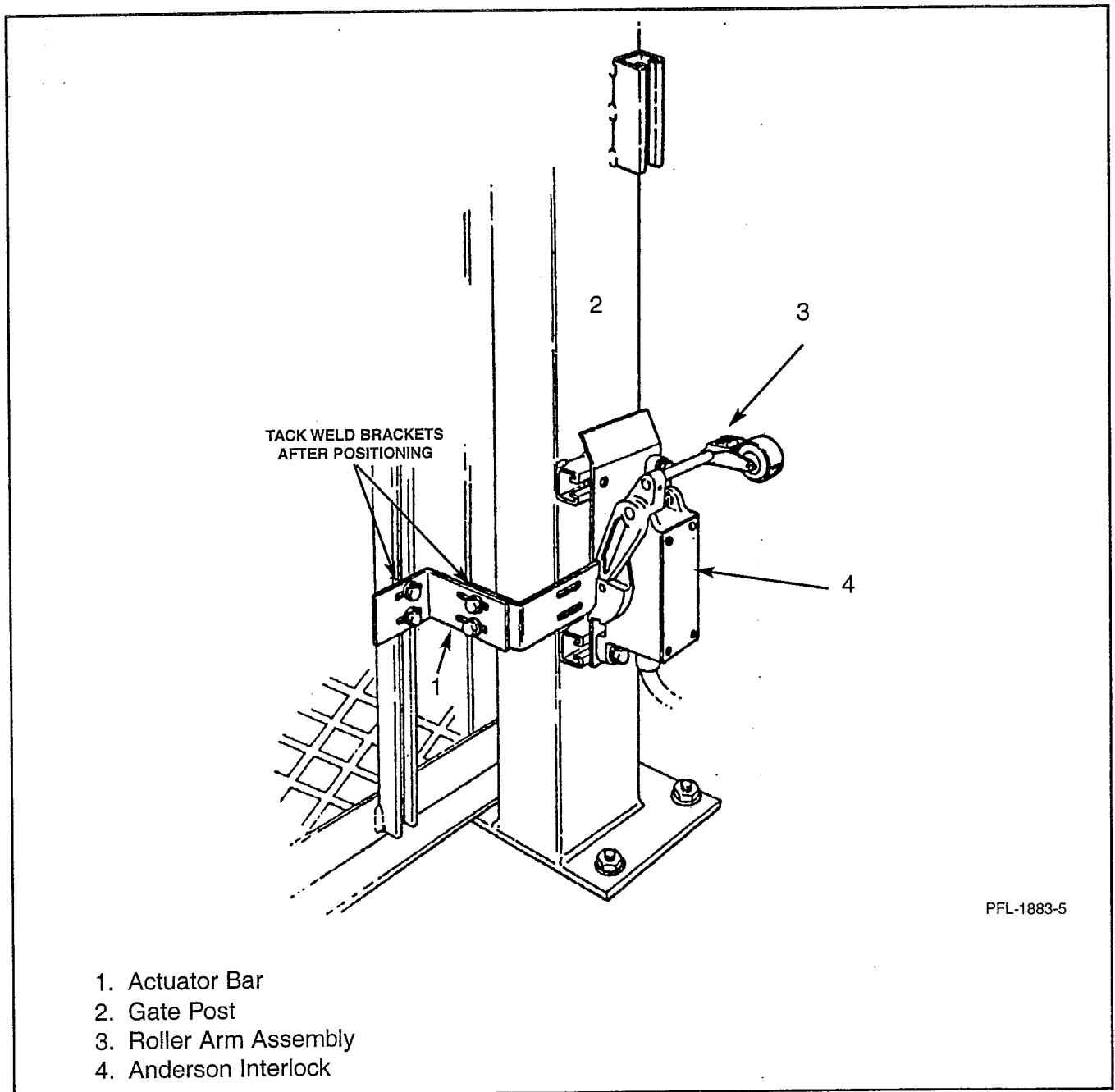


Figure 10

If cam hits under the wheel not allowing the arm to pivot, the cable will break. See Figure 6.

Anderson Interlock for Vertical Acting Gate



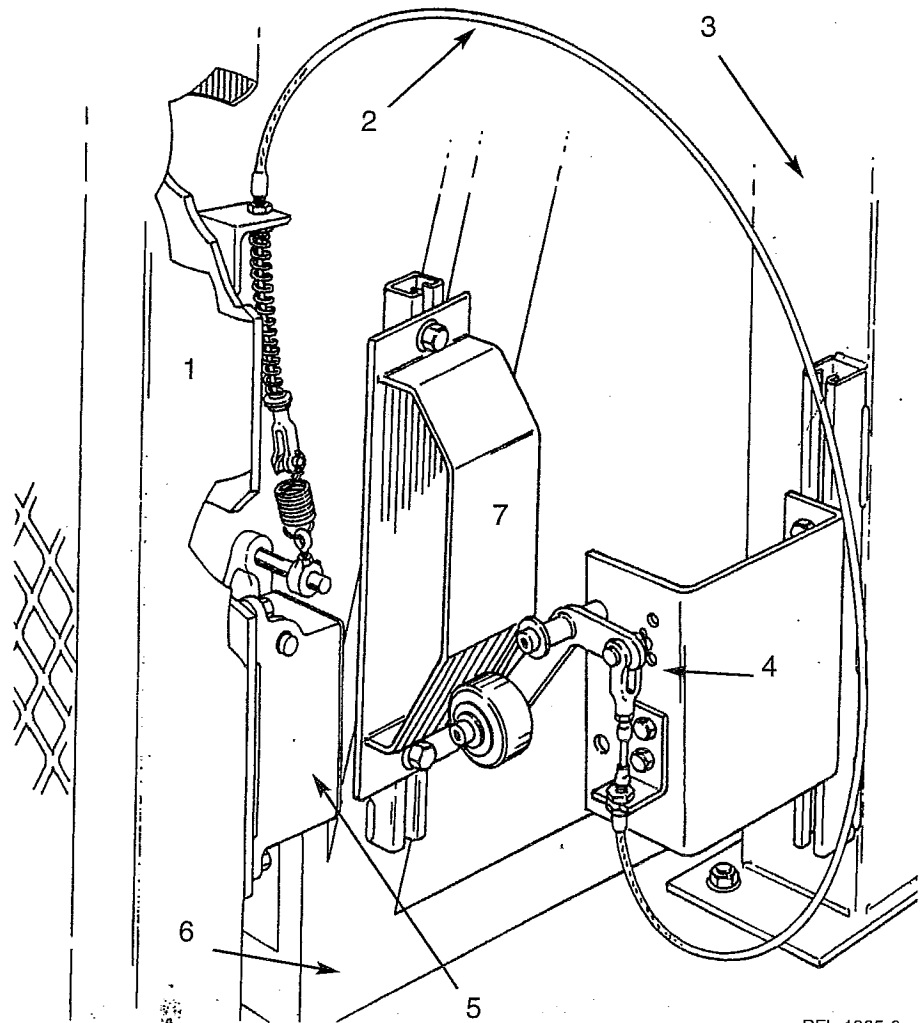
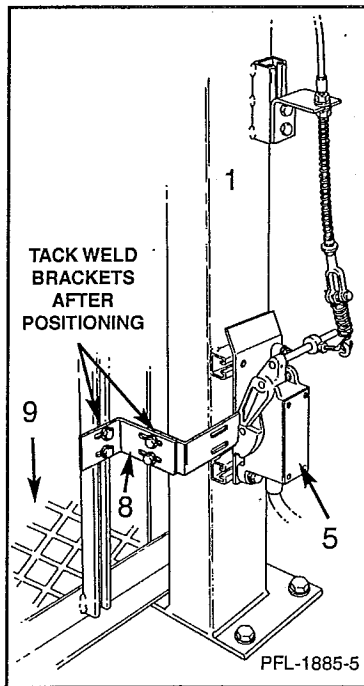
If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 N. Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

Anderson Cable Interlock

Anderson Cable Interlock

For use on Vertical Acting & Bi-Panel Vertical Acting Gates



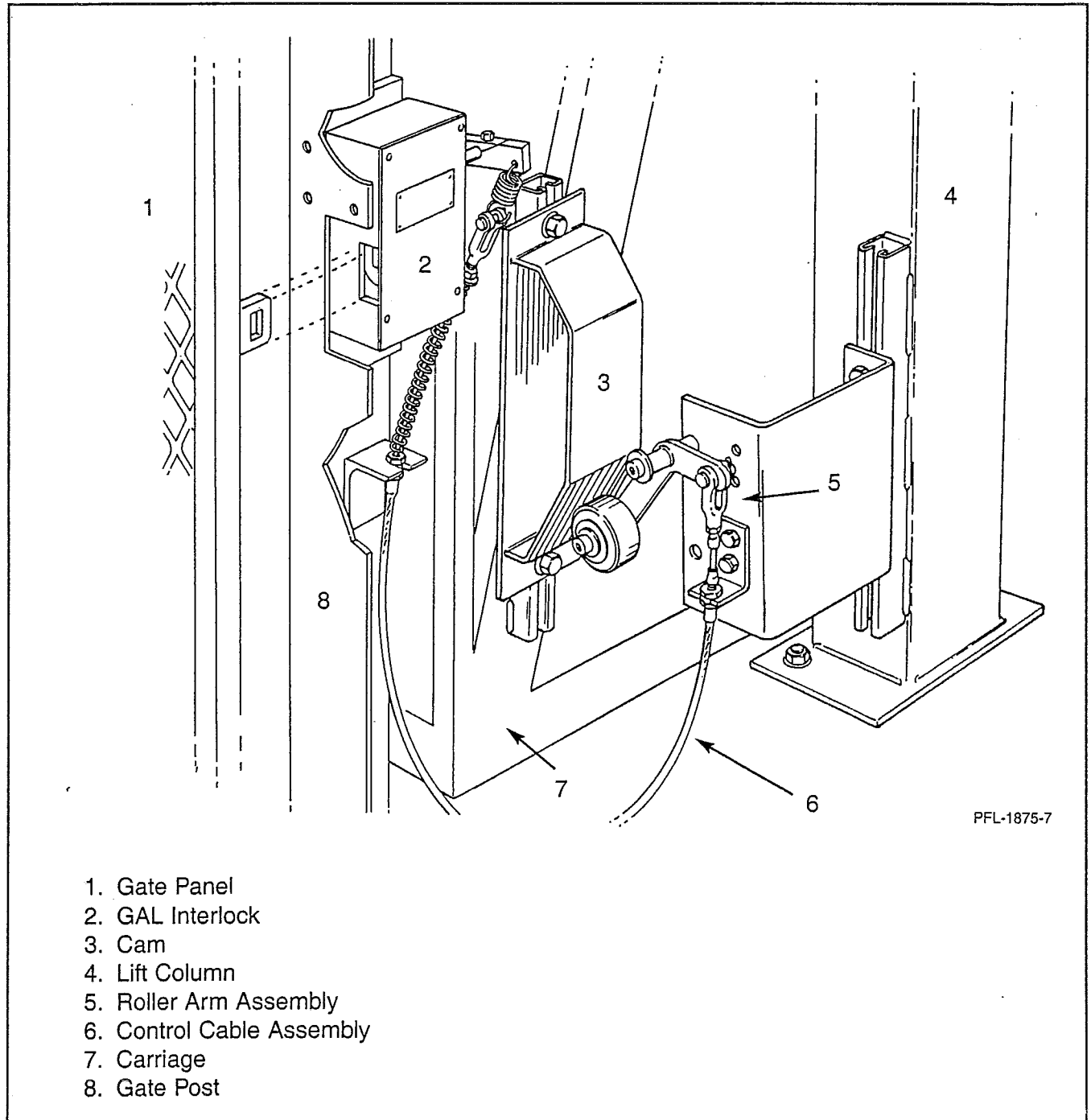
- 1. Gate Post
- 2. Control Cable Assembly
- 3. Lift Column
- 4. Roller Arm Assembly
- 5. Anderson Interlock
- 6. Carriage
- 7. Cam
- 8. Actuator Bar (On Gate Panel)
- 9. Gate Panel

If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

GAL Cable Interlock

GAL Cable Interlock For use on Sliding & Single Panel Swing Gates



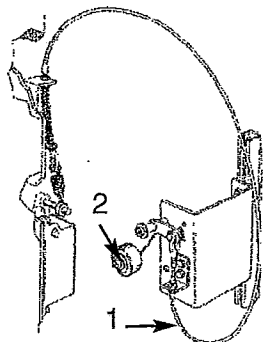
If you have any questions, or require assistance, please contact the Product Support Department.

Pflow Industries, Inc., 6720 North Teutonia Avenue, Milwaukee, WI 53209
Phone (414) 352-9000; Fax (414) 352-9002

Interlocks & Gate Status Switches

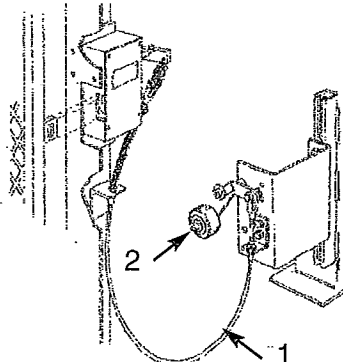
The **INTERLOCK** is a device used to mechanically prevent the gate from opening. Below are the standard types of interlocks supplied. As this is a safety device, replacement components are only available as shown below. Some configurations may vary by application.

ANDERSON CABLE



PFL-1885-6A

GAL CABLE

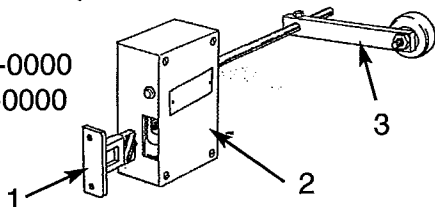


PFL-1885-7A

1. Control Cable Assembly
10' - #9292-0120
15' - #9292-0180
25' - #9292-0300
30' - #9292-0360
2. Roller Arm Assembly #9280-0000
Wheel Only #9284-0040

GAL (Left Hand Shown)

RH #2690-0000
LH #2691-0000

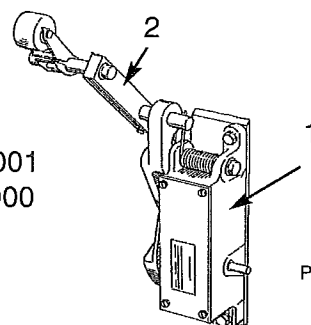


PFL-1475

1. Keeper #3838-0000
2. Contact Block (inside) #3832-0000
3. Arm w/Roller #4342-0000

ANDERSON (Right Hand Shown)

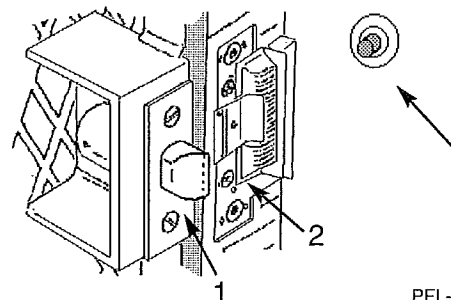
RH #2678-0001
LH #2678-0000



PFL-1368

1. Contact Block (inside)
2. Arm #6950-0000

ELECTRIC STRIKE

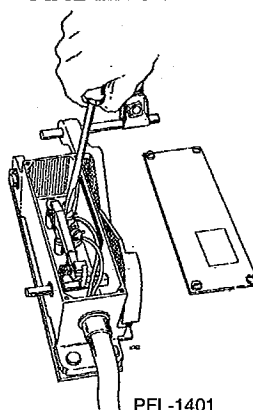


PFL-1389

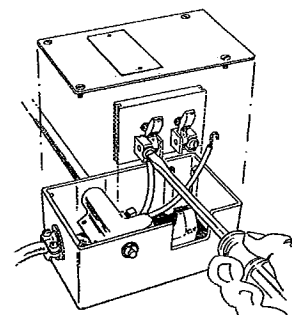
1. Spring Latch #7566-0000
2. Strike #9169-0000
3. Button #9096-0000

ANDERSON

GAL



PFL-1401

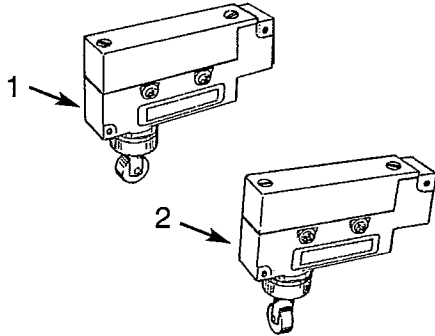


PFL-1250

See schematic for proper wiring instructions.

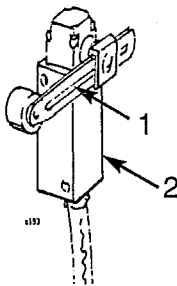
Interlocks & Gate Status Switches

A **GATE STATUS SWITCH** is supplied when the contacts are not being used. If required, it will be mounted to the gate post or header. Normally the GAL and Anderson interlocks do not use this switch. Specific order requirements may dictate otherwise.



PFL-1293

1. Roller Plunger (parallel) #6220-0000
2. Roller Plunger (perpendicular) #6216-0000



PFL-1205

1. Arm #2891-0005
2. Switch #2893-0005

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ENCLOSURE PANELS

1. In accordance with ANSI B20.1, PFlow Industries supplies standard enclosure panels to be installed around the unit (VRC) as required by site conditions. Our enclosure panels are manufactured of a 1½" steel angle frame and 15 gauge flattened expanded metal which will reject a ball 2" in diameter.
2. The PFlow VRC general arrangement (GA) drawing provides a "Plan View" for each level. This shows the proper placement and appropriate size for layout and installation purposes.

NOTICE

At enclosure installation verify site & state code compliance.

FULL HEIGHT ENCLOSURES

1. Applications requiring full height enclosures (FHE) have an additional enclosure drawing in the shipping packet.
2. When stacking panels, as in full height applications or a transom above a gate, panels without legs are used on top of our regular panels. Brace adequately to support and stabilize the enclosure panels.

INSTALLATION

1. Modifications for site obstructions are best done in the field by the installer. **See Figure 1.**
2. Standard panels are 8' high in compliance with OSHA requirements. Total height includes 1½" legs. These panels are located and lagged to the floor. **See Figure 2.**

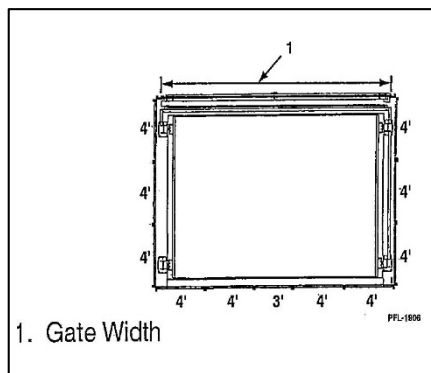


Figure 1

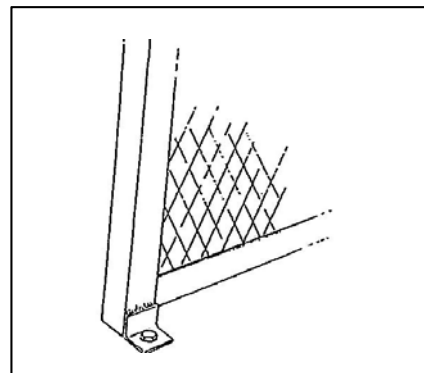


Figure 2

3. Enclosures must be braced to the VRC or building structure by the mechanical installer. Use of structural angle is suggested.

4. Stiffeners are provided whenever two panels in excess of 6" meet. **See Figure 3.**
5. Filler panels are used to fill a gap of less than 6". **See Figure 4.**

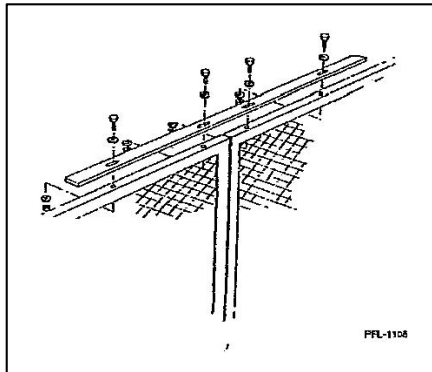


Figure 3

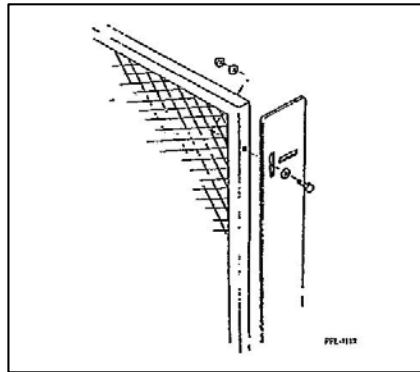


Figure 4

6. Corner angles are required for 90° attachment of panels. **See Figure 5.**
7. Wall attachment kits are provided when a gate or panel meets an existing wall. **See Figure 6.**

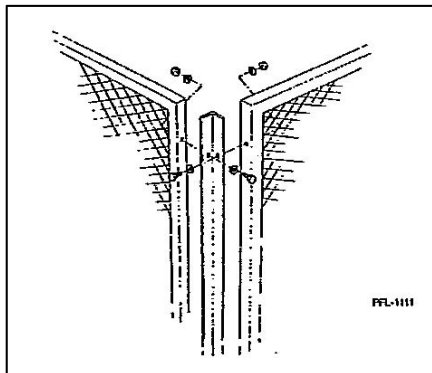


Figure 5

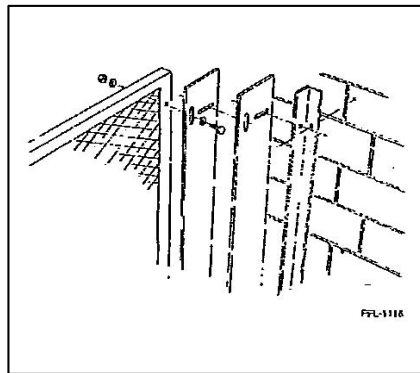


Figure 6

If you need assistance, please call PFlow Industries, Inc. Product Support Department..



PFlow Industries, Inc. • 6720 N. Teutonia Avenue • Milwaukee, WI. 53209
Phone - Main Switchboard: (414) 352-9000 • Product Support Dept: Fax - (414) 247-9834; email: psd@pflow.com

Notes

MATERIAL SAFETY DATA SHEET

F78XXL13851-4357
00 01

DATE OF PREPARATION
Dec 21, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

F78XXL13851-4357

PRODUCT NAME

Fast Dry Acrylic Enamel, FDA PFlow Blue VOC

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
<i>*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)</i>	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
4	64742-89-8	V. M. & P. Naphtha ACGIH TLV OSHA PEL OSHA PEL	300 PPM 300 PPM 400 PPM STEL	12 mm
9	108-88-3	Toluene ACGIH TLV OSHA PEL OSHA PEL	20 PPM 100 ppm (Skin) 150 ppm (Skin) STEL	22 mm
4	100-41-4	Ethylbenzene ACGIH TLV OSHA PEL OSHA PEL	20 PPM 100 PPM 125 PPM STEL	7.1 mm
22	1330-20-7	Xylene ACGIH TLV ACGIH TLV OSHA PEL OSHA PEL	100 PPM 150 PPM STEL 100 PPM 150 PPM STEL	5.9 mm
24	67-64-1	Acetone ACGIH TLV ACGIH TLV OSHA PEL	500 PPM 750 PPM STEL 1000 PPM	180 mm
4	110-19-0	Isobutyl Acetate ACGIH TLV OSHA PEL	150 PPM 150 PPM	12.5 mm
1	108-65-6	1-Methoxy-2-Propanol Acetate ACGIH TLV OSHA PEL	Not Available Not Available	1.8 mm
3	112926-00-8	Amorphous Precipitated Silica ACGIH TLV OSHA PEL	10 mg/m3 as Dust 6 mg/m3 as Dust	
2	14807-96-6	Talc ACGIH TLV OSHA PEL	2 mg/m3 as Resp. Dust 2 mg/m3 as Resp. Dust	
4	13463-67-7	Titanium Dioxide ACGIH TLV OSHA PEL OSHA PEL	10 mg/m3 as Dust 10 mg/m3 Total Dust 5 mg/m3 Respirable Fraction	
0.3	1333-86-4	Carbon Black ACGIH TLV OSHA PEL	3.5 MG/M3 3.5 MG/M3	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the hematopoietic (blood-forming) system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and laundry before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT 1 °F TCC	LEL 0.9	UEL 13.1	FLAMMABILITY CLASSIFICATION RED LABEL -- Extremely Flammable, Flash below 21 °F (-6 °C)
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EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are EXTREMELY FLAMMABLE. Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	7.84 lb/gal	939 g/l
SPECIFIC GRAVITY	0.94	
BOILING POINT	132 - 325 °F	55 - 162 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	77%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
4.90 lb/gal	588 g/l	Less Water and Federally Exempt Solvents
3.52 lb/gal	422 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
64742-89-8	V. M. & P. Naphtha	LC50 RAT LD50 RAT	4HR	Not Available Not Available
108-88-3	Toluene	LC50 RAT LD50 RAT	4HR	4000 ppm 5000 mg/kg
100-41-4	Ethylbenzene	LC50 RAT LD50 RAT	4HR	Not Available 3500 mg/kg
1330-20-7	Xylene	LC50 RAT LD50 RAT	4HR	5000 ppm 4300 mg/kg
67-64-1	Acetone	LC50 RAT LD50 RAT	4HR	Not Available 5800 mg/kg
110-19-0	Isobutyl Acetate	LC50 RAT LD50 RAT	4HR	Not Available 13400 mg/kg
108-65-6	1-Methoxy-2-Propanol Acetate	LC50 RAT LD50 RAT	4HR	Not Available 8500 mg/kg
112926-00-8	Amorphous Precipitated Silica	LC50 RAT LD50 RAT	4HR	Not Available 4500 mg/kg
14807-96-6	Talc	LC50 RAT LD50 RAT	4HR	Not Available Not Available
13463-67-7	Titanium Dioxide	LC50 RAT LD50 RAT	4HR	Not Available Not Available
1333-86-4	Carbon Black	LC50 RAT LD50 RAT	4HR	Not Available Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

5 Liters (1.3 Gallons) and Less may be Classed as LTD. QTY. OR ORM-D

Larger Containers are Regulated as:

UN1263, PAINT, 3, PG II, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

Acetone 5000 lb RQ

Ethylbenzene 1000 lb RQ

Toluene 1000 lb RQ

Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

RQ, UN1263, PAINT, 3, PG II, (XYLENES (ISOMERS AND MIXTURE)),

(ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO

5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.

UN1263, PAINT, CLASS 3, PG II, (-17 C c.c.), EmS F-E, S-E**IATA/ICAO**

UN1263, PAINT, 3, PG II

SECTION 15 — REGULATORY INFORMATION**SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION**

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	9	
100-41-4	Ethylbenzene	4	
1330-20-7	Xylene	22	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET

B50XXW10463-4357
00 01

DATE OF PREPARATION
Dec 21, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B50XXW10463-4357

PRODUCT NAME

UNIVERSAL PRIMER, White B50-WZ1

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

Telephone Numbers and Websites

Regulatory Information	(216) 566-2902
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
2	108-88-3	Toluene		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	
		OSHA PEL	150 ppm (Skin) STEL	
1	100-41-4	Ethylbenzene		7.1 mm
		ACGIH TLV	20 PPM	
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
7	1330-20-7	Xylene		5.9 mm
		ACGIH TLV	100 PPM	
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
2	64742-95-6	Light Aromatic Hydrocarbons		3.8 mm
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
2	95-63-6	1,2,4-Trimethylbenzene		2.03 mm
		ACGIH TLV	25 PPM	
		OSHA PEL	25 PPM	
35	67-64-1	Acetone		180 mm
		ACGIH TLV	500 PPM	
		ACGIH TLV	750 PPM STEL	
		OSHA PEL	1000 PPM	
3	14807-96-6	Talc		
		ACGIH TLV	2 mg/m3 as Resp. Dust	
		OSHA PEL	2 mg/m3 as Resp. Dust	
25	471-34-1	Calcium Carbonate		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	15 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	
7	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.

Remove contaminated clothing and laundry before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES**FLASH POINT**

-2 °F TCC

LEL

0.7

UEL

12.8

FLAMMABILITY CLASSIFICATION

RED LABEL -- Extremely Flammable, Flash below 21 °F (-6 °C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE**STORAGE CATEGORY**

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are EXTREMELY FLAMMABLE. Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally.

Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.62 lb/gal	1153 g/l
SPECIFIC GRAVITY	1.16	
BOILING POINT	132 - 360 °F	55 - 182 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	73%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
	3.28 lb/gal 394 g/l	Less Water and Federally Exempt Solvents
	1.58 lb/gal 190 g/l	Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
108-88-3	Toluene	LC50 RAT LD50 RAT	4HR	4000 ppm 5000 mg/kg
100-41-4	Ethylbenzene	LC50 RAT LD50 RAT	4HR	Not Available 3500 mg/kg
1330-20-7	Xylene	LC50 RAT LD50 RAT	4HR	5000 ppm 4300 mg/kg
64742-95-6	Light Aromatic Hydrocarbons	LC50 RAT LD50 RAT	4HR	Not Available Not Available
95-63-6	1,2,4-Trimethylbenzene	LC50 RAT LD50 RAT	4HR	Not Available Not Available
67-64-1	Acetone	LC50 RAT LD50 RAT	4HR	Not Available 5800 mg/kg
14807-96-6	Talc	LC50 RAT LD50 RAT	4HR	Not Available Not Available
471-34-1	Calcium Carbonate	LC50 RAT LD50 RAT	4HR	Not Available Not Available
13463-67-7	Titanium Dioxide	LC50 RAT LD50 RAT	4HR	Not Available Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

5 Liters (1.3 Gallons) and Less may be Classed as LTD. QTY. OR ORM-D

Larger Containers are Regulated as:

UN1263, PAINT, 3, PG II, (ERG#128)

DOT (Dept of Transportation) Hazardous Substances & Reportable Quantities

Acetone 5000 lb RQ

Xylenes (isomers and mixture) 100 lb RQ

Bulk Containers may be Shipped as (check reportable quantities):

RQ, UN1263, PAINT, 3, PG II, (XYLENES (ISOMERS AND MIXTURE)), (ERG#128)

Canada (TDG)

UN1263, PAINT, CLASS 3, PG II, (ERG#128)

IMO

5 Liters (1.3 Gallons) and Less may be Shipped as Limited Quantity.

UN1263, PAINT, CLASS 3, PG II, (-19 C c.c.), EmS F-E, S-E**IATA/ICAO**

UN1263, PAINT, 3, PG II

SECTION 15 — REGULATORY INFORMATION**SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION**

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	2	
100-41-4	Ethylbenzene	1	
1330-20-7	Xylene	7	
95-63-6	1,2,4-Trimethylbenzene	2	
	Zinc Compound	1	0.7

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Material Safety Data Sheet

IDENTIFICATION Effective Date: January 1, 2013

Manufactured By: Sherwin Williams
 6125 W. Douglas Avenue
 Milwaukee, WI 53218 1596 USA

24-Hour Emergency Telephone
 Domestic US: 1-800-373-7542 International: 1-484-951-2432 Haz Mat Services

Trade Name:	F78XXL13851-4357 2871-0003 PFLOW BLUE PAINT
Mfg. Part Number:	20016 00341 F78XXL13851-4357 2871-0003 PFLOW BLUE PAINT

II. HAZARDOUS INGREDIENTS

CAS #67-64-1 Acetone		Weight %: 20 – 50 Footnote (1)
ACGIH TLV: 500 ppm TWA OSHA PEL: 1000 ppm TWA VAPOR PRESSURE: 185 MM Hg60F	ACGIH STEL: 1000 ppm OSHA CEILING: LEL: 2.6%	OSHA PEAK:
CAS #75-28-5 Isobutane		Weight %: 5 - 20
ACGIH TLV: NE OSHA PEL: NE VAPOR PRESSURE: 3.1 atm	ACGIH STEL: OSHA CEILING: LEL: 1.6%	OSHA PEAK:
CAS # 74-98-6 Propane		Weight %: 5 -20
ACGIH TLV: 2500 ppm TWA OSHA PEL: 1000 ppm TWA VAPOR PRESSURE: 7150mmHg@20c	ACGIH STEL: OSHA CEILING: LEL:	OSHA PEAK:
CAS # 1330-20-7 Xylene		Weight %: 5 – 20 Footnote (1)
ACGIH TLV: 100 ppm TWA OSHA PEL: 100 ppm TWA VAPOR PRESSURE: 6.6mmHg@20c	ACGIH STEL: 150 ppm OSHA CEILING: LEL: 1%	OSHA PEAK:
CAS # 100-41-4 Ethyl Benzene		Weight %: 1 - 5
ACGIH TLV: 100 ppm TWA OSHA PEL: 100 ppm TWA VAPOR PRESSURE:	ACGIH STEL: 125 ppm OSHA CEILING: LEL:	OSHA PEAK:
CAS # 123-42-2 Diacetone Alcohol		Weight %: 1 - 5 Footnote (1)
ACGIH TLV: 50 ppm TWA OSHA PEL: 50 ppm TWA VAPOR PRESSURE: 1 mm	ACGIH STEL: 75 ppm OSHA CEILING: LEL: 1.8%	OSHA PEAK:
CAS #64742-95-6 Aromatic 100		Weight %: 1 - 5 Footnote (1)
ACGIH TLV: OSHA PEL: VAPOR PRESSURE: 2.7 mmHg@20c	ACGIH STEL: OSHA CEILING: LEL: 0.9%	OSHA PEAK:

Warning Messages:

- (1) Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Chronic exposure may cause damage to the central nervous system, respiratory system, lung, eye, skin, liver, gastro intestinal tract, spleen, kidneys and blood.
- (2) See Section IX for reportable Hazardous Air Pollutants.

III. PHYSICAL DATA

BOILING RANGE: -43-356 degree Farenheight

EVAPORATION RATE: Propellant: Faster then ether SOLVENT: Slower than ether

PERCENT VOLITILE BY VOLUME: 87.34% WEIGHT PER GALLON: 6.64 LBS.

VAPOR DENSITY: Propellant is lighter than air Solvent is heavier than air

ACTUAL VOC (lb/gal): 3.59

EPA VOC (lb/gal): 4.59

EPA VOC: (g/L): 550.07

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: -156 Degree Farenheight
 - 105 Degree Celsius

LEL: Refer to Section II

FLAMMABILITY CLASSIFICATION: CLASS 1A

HAZARD CLASSIFICATION: FLAMMABLE

CONSUMER COMMIDTY: ORM-D

EXTINGUISHING MEDIA: *carbon dioxide, dry chemical, or fire foam”

UNUSUAL FIRE AND EXPLOSION HAZARDS: With excessive heat, can will rupture from internal pressure and discharge flammable contents. Vapors may ignite explosively. Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Prevent build up of vapors by opening all windows and doors to achieve cross-ventilation.

SPECIAL FIRE FIGHTING PROCEDURES: Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible auto ignition or explosion when exposed to extreme heat.

V. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II.

EFFECTS OF OVEREXPOSURE:

Inhalation – Anesthetic

Irritation of the respiratory tract or acute nervous system. Depression caused by headache, dizziness, staggering gait, confusion, unconsciousness, dizziness

Acute – High vapor concentrations are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death. Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

Chronic- Xylene contains ethyl benzene which has been classified as a possible carcinogen to humans, group 2B, by the International Agency for the Research on Cancer (IARC), based on sufficient evidence in laboratory animals but inadequate evidence for cancer in humans. Prolonged or repeated overexposure to ethyl benzene may cause the following: kidney effects, liver effects, lung effects, thyroid effects, testicular effects, pituitary effects.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: consult physician

PRIMARY ROUTE (S) OF ENTRY: Eyes, Ingestion, Skin and Inhalation

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air.

EYES: Flush immediately with large amounts of water for at least 15 minutes. Talk to a physician for medical treatment.

SKIN: Wipe off with towel. Wash with soap and water. Remove contaminated clothing.

INGESTION: If swallowed, call a physician immediately. Remove stomach contents by gastric suction or induce vomiting only as directed by medical personnel. Never give anything by mouth to an unconscious person.

HMIS Rating

Health 3, Flammability 4, Physical Hazard 0, Personal Protection G

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks.

VI. Reactivity Data

STABILITY: STABLE

Hazardous Polymerization: *will not occur*

INCOMPATIBILITY: oxidizing agents, halogens, strong reducing agents and strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS: When heated to decomposition, toxic fumes are formed.

CONDITIONS TO AVOID: Fire, burning, and welding

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Remove all sources of ignition (flames, hot surfaces and electrical, static or frictional sparks). Avoid breathing vapors. Ventilate area. Use non-sparking tools. Remove with inert absorbent.

WASTE DISPOSAL METHOD: Dispose of in accordance with local, state, and federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: For casual use none required. To avoid breathing vapors or spray mist, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches or dizziness, increase fresh air or wear respiratory protection (NIOSH/MSHA approved) or leave the area. Avoid contact with eyes, skin and clothing.

VENTILATION: Provide general dilution or local exhaust ventilation in volume and pattern to keep TLV and LEL of most hazardous ingredients in Section II, below acceptable limits.

PROTECTIVE GLOVES: Permeation resistant gloves (butyl rubber, nitrile rubber) should be used. Cover as much of the exposed skin area as possible with appropriate clothing.

EYE PROTECTION: Splash proof eye and goggles. In emergency situations, use eye goggles with a full-face shield.

OTHER PROTECTIVE EQUIPMENT: Protective clothing such as coveralls or lab coats must be worn

HYGENIC PRACTICES: See section V

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Do not store above 120 degrees F. Store large quantities in buildings designed and protected for storage of NFPA Class 1A flammable liquids.

OTHER PRECAUTIONS: Do not spray in eyes. Do not puncture or incite cans. Do not stick a pin or any sharp objects into opening of can. Finger must not protrude over spray button.

LIST OF HAZARDOUS AIR POLLUTANTS SUBJECT TO THE PROVISIONS OF THE CLEAN AIR ACT, TITLE I SECTION 112 'National Emission Standards for Hazardous Air Pollutants':

Ingredient	CAS#	Wt% of HAPS In product	Pounds HAPS/ Gal product
Xylene	1330-20-7	15.0 %	1.0
Ethyl Benzene	100-41-4	3.4 %	0.2

X. STABILITY & REACTIVITY

Not available at this time

XI. TOXICOLOGICAL INFORMATION

No information available at this time

XII. ECOLOGICAL INFORMATION

No information available at this time.

XIII. DISPOSAL INFORMATION

Disposal should be made in accordance with local, state and federal regulations.

XIV. TRANSPORTATION INFORMATION

US Department of Transportation

Proper shipping name: Aerosols Flammable

UN ID Number: UN1950

International Air Transport Association

Proper Shipping name: Aerosols, Flammable

Hazardous Class: 2.1

UN ID Number: UN1950

International Maritime Organization

Proper Shipping name: Aerosols, Flammable

Hazardous Class: 2

UN ID Number: UN1950

Please consult 49CFR to ensure that shipments comply with regulations. Exceptions may be applied and can be found in 49CFR subchapter C.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : Shell Omala S2 G 220
Uses : Gear lubricant.

Manufacturer/Supplier : SOPUS Products
PO BOX 4427
Houston, TX 77210-4427
USA

SDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.

The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview	
Appearance and Odour	: Brown. Liquid at room temperature. Slight hydrocarbon.
Health Hazards	: Not classified as dangerous for supply or conveyance.
Safety Hazards	: Not classified as flammable but will burn.
Environmental Hazards	: Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.

Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Eye Contact : May cause slight irritation to eyes.

Ingestion : Low toxicity if swallowed.

Other Information : Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhea.

Aggravated Medical Conditions : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.

Environmental Hazards : Not classified as dangerous for the environment.

Material Safety Data Sheet

Additional Information : Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information : Not expected to be a health hazard when used under normal conditions.

Inhalation : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.

Skin Contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

Eye Contact : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

Ingestion : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

Advice to Physician : Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point : Typical 240 °C / 464 °F (COC)

Upper / lower : Typical 1 - 10 %(V)(based on mineral oil)

Flammability or Explosion limits

Auto ignition temperature : > 320 °C / 608 °F

Specific Hazards : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Suitable Extinguishing Media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media : Do not use water in a jet.

Protective Equipment for Firefighters : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Clean Up Methods : Slippery when spilt. Avoid accidents, clean up immediately.

Material Safety Data Sheet

Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.

Product Transfer : This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Occupational Exposure Limits**

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	
Oil mist, mineral	OSHA Z1	PEL(Mist.)		5 mg/m3	

Biological Exposure Index (BEI)

No biological limit allocated.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls

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based on a risk assessment of local circumstances.

Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.
- Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur.
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples

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analyzed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances
<http://www.hse.gov.uk/>
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany.
<http://www.dguv.de/inhalt/index.jsp>
L'Institut National de Recherche et de Sécurité, (INRS), France
<http://www.inrs.fr/accueil>

Environmental Exposure Controls : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Brown. Liquid at room temperature.
Odour	: Slight hydrocarbon.
pH	: Not applicable.
Initial Boiling Point and Boiling Range	: > 280 °C / 536 °F estimated value(s)
Pour point	: Typical -18 °C / 0 °F
Flash point	: Typical 240 °C / 464 °F (COC)
Upper / lower Flammability or Explosion limits	: Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	: > 320 °C / 608 °F
Vapour pressure	: < 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	: Typical 0.899 at 15 °C / 59 °F
Density	: Typical 899 kg/m ³ at 15 °C / 59 °F
Water solubility	: Negligible.
n-octanol/water partition coefficient (log Pow)	: > 6 (based on information on similar products)
Kinematic viscosity	: Typical 220 mm ² /s at 40 °C / 104 °F
Vapour density (air=1)	: > 1 (estimated value(s))
Electrical conductivity	: This material is not expected to be a static accumulator.
Evaporation rate (nBuAc=1)	: Data not available

10. STABILITY AND REACTIVITY

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidizing agents.
Hazardous Decomposition	: Hazardous decomposition products are not expected to form

Material Safety Data Sheet**Products**

during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Not expected to be carcinogenic. Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Material	:	Carcinogenicity Classification
Highly refined mineral oil (IP346 <3%)	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Highly refined mineral oil (IP346 <3%)	:	IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%)	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity	:	Not expected to be a hazard.
Additional Information	:	Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity	:	Poorly soluble mixture. May cause physical fouling of aquatic
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Material Safety Data Sheet

organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract. Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

- Mobility** : Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.
- Persistence/degradability** : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
- Bioaccumulation** : Contains components with the potential to bioaccumulate.
- Other Adverse Effects** : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION**US Department of Transportation Classification (49CFR)**

This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Material Safety Data Sheet**Federal Regulatory Status****Notification Status**

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

SARA Hazard Categories (311/312)

No SARA 311/312 Hazards.

State Regulatory Status**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	: 0, 1, 0
SDS Version Number	: 1.2
SDS Effective Date	: 02/06/2013
SDS Revisions	: A vertical bar () in the left margin indicates an amendment from the previous version.
SDS Regulation	: The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
SDS Distribution	: The information in this document should be made available to all who may handle the product.
Disclaimer	: The information contained herein is based on our current knowledge of the underlying data and is intended to describe

Shell Omala S2 G 220

MSDS# 17948

Version 1.2

Effective Date 02/06/2013

According to OSHA Hazard Communication Standard, 29 CFR
1910.1200

Material Safety Data Sheet

the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Product Name: MOBILGREASE XHP 222 SPECIAL
Revision Date: 15Apr2009
Page 1 of 9

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: MOBILGREASE XHP 222 SPECIAL
Product Description: Base Oil and Additives
Product Code: 2015A0202531, 530550-00, 97G870
Intended Use: Grease

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION
3225 GALLOWES RD.
FAIRFAX, VA. 22037 USA
24 Hour Health Emergency 609-737-4411
Transportation Emergency Phone 800-424-9300
ExxonMobil Transportation No. 281-834-3296
Product Technical Information 800-662-4525, 800-947-9147
MSDS Internet Address <http://www.exxon.com>, <http://www.mobil.com>

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	< 2.5%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0
HMIS Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

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INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5	FIRE FIGHTING MEASURES
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EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >204C (400F) [EST. FOR OIL, ASTM D-92 (COC)]

Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

Autoignition Temperature: N/D

SECTION 6	ACCIDENTAL RELEASE MEASURES
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NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

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SPILL MANAGEMENT

Land Spill: Scrape up spilled material with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7	HANDLING AND STORAGE
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HANDLING

Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabeled containers.

SECTION 8	EXPOSURE CONTROLS / PERSONAL PROTECTION
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EXPOSURE LIMIT VALUES

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

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For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Solid

Form: Semi-fluid

Color: Dark Gray

Odor: Characteristic

Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.914

Flash Point [Method]: >204C (400F) [EST. FOR OIL, ASTM D-92 (COC)]

Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

Auto-ignition Temperature: N/D

Boiling Point / Range: > 316C (600F)

Vapor Density (Air = 1): N/D

Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 C

Evaporation Rate (n-butyl acetate = 1): N/D

pH: N/A

Log Pow (n-Octanol/Water Partition Coefficient): > 3.5

Solubility in Water: Negligible

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Viscosity: 220 cSt (220 mm²/sec) at 40 C | >16 cSt (16 mm²/sec) at 100C

Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D

Melting Point: >260°C (500°F)

DMSO Extract (mineral oil only), IP-346: < 3 %wt

NOTE: Most physical properties above are for the oil component in the material.

SECTION 10

STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11

TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity: No end point data.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

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Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

SECTION 12

ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.
Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13

DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken.

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for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
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LAND (DOT) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15	REGULATORY INFORMATION
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OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, EINECS, ENCS, PICCS, TSCA

Special Cases:

Inventory	Status
KECI	Restrictions Apply
NDSL	Restrictions Apply

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	< 2.5%
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	< 2.5%

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
NAPHTHENIC ACIDS, ZINC	12001-85-3	15

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SALTS		
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2:1) (ZDDP)	68649-42-3	13, 15, 17
ZINC NEODECANOATE	27253-29-8	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

Section 06: Notification Procedures - Header was modified.

Section 01: Product Code was modified.

Section 13: Empty Container Warning was modified.

Section 08: Hand Protection was modified.

Section 11: Dermal Lethality Test Data was modified.

Section 11: Oral Lethality Test Data was modified.

Section 11: Inhalation Lethality Test Data was modified.

Section 05: Hazardous Combustion Products was modified.

Section 15: List Citations Table was modified.

Section 15: List Citation Table - Header was modified.

Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table was modified.

Section 15: National Chemical Inventory Listing was modified.

Section 16: Code to MHCs was modified. Section

15: Special Cases Table was modified. Section

06: Notification Procedures was modified.

Section 01: Company Contact Methods Sorted by Priority was modified.

Section 15: TSCA Class 2 Statement was deleted.

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Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2006163XUS (550276)

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