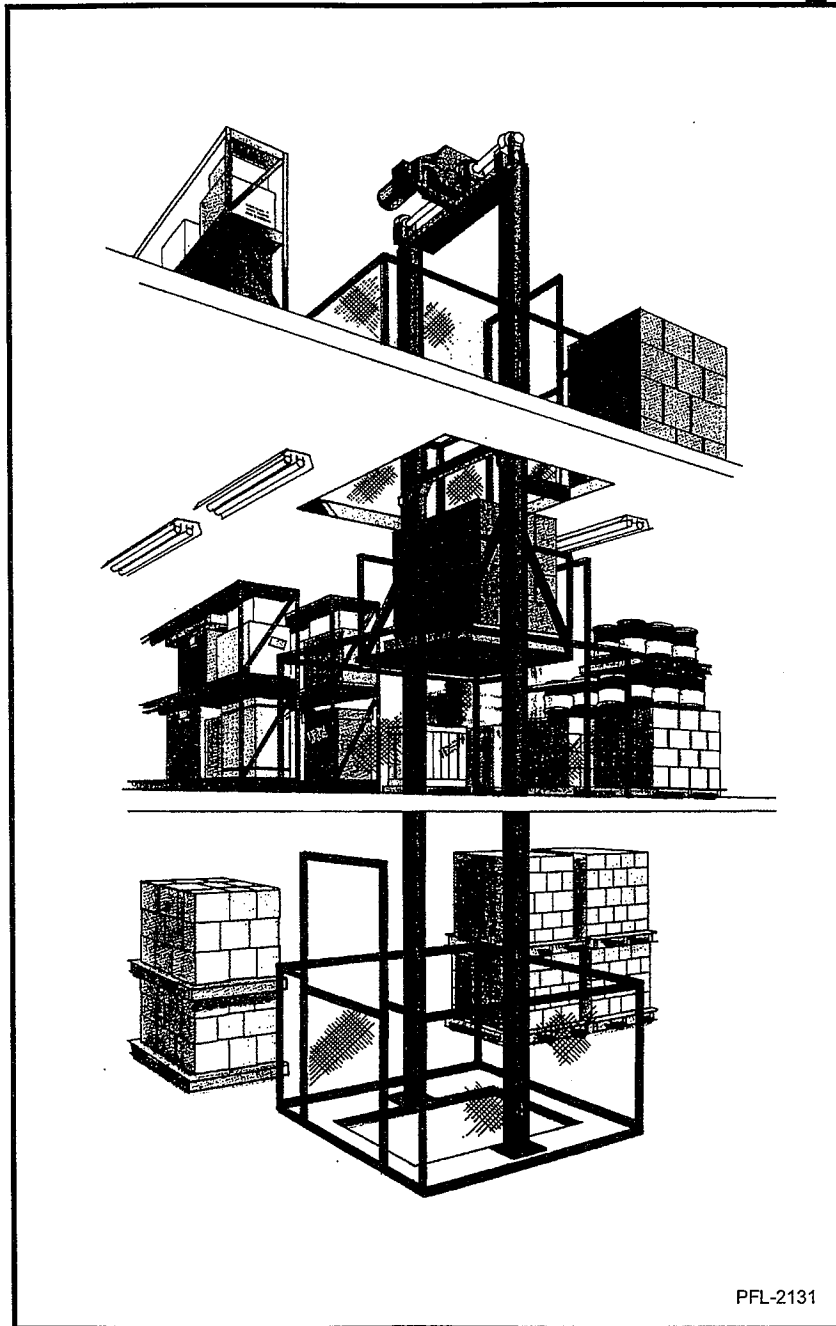


# PFLOW VERTICAL LIFTS

The Nation's Largest Manufacturer of Vertical Lifts



PFL-2131

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

## OWNER'S MANUAL

## SERIES M

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## INTRODUCTION

Thank you for purchasing a PFLOW INDUSTRIES, INC., Series M, Vertical Reciprocating Conveyor (VRC). As the nation's largest manufacturer of VRCs, 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.

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 the back of this manual. Prior authorization must be obtained from Pflow before commencing work of any kind.

**Feedback** - Let us know how we are doing. A questionnaire is included in this manual. Please fill it out and return it to us. We can't prevent a problem if we are not aware of it.

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## 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 to occur 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.**

## Electrical Safety Precautions

### DANGER

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

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

## Safety Precautions When Working on Live Circuits or Equipment:

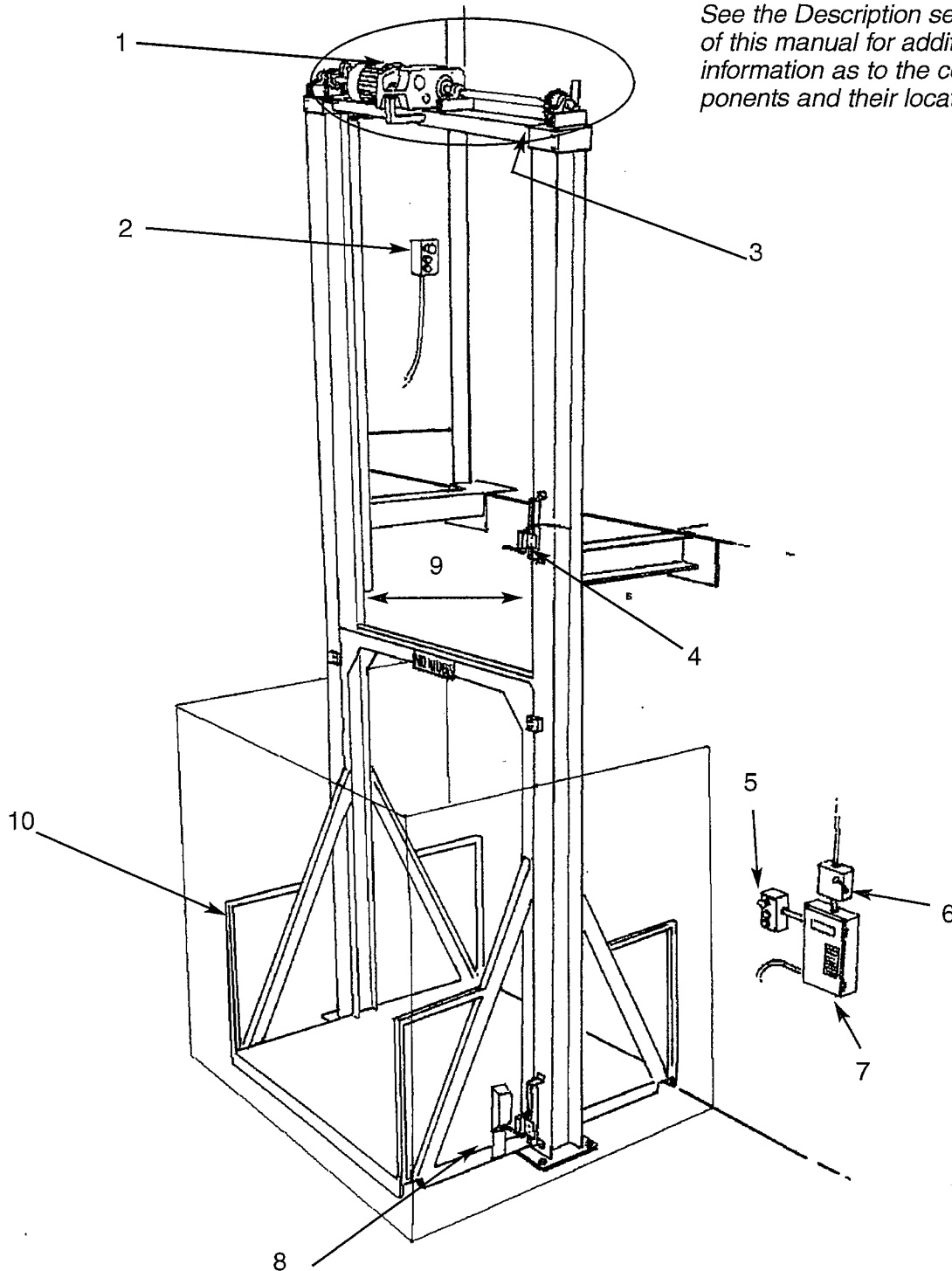
When electrical repair or maintenance work is required that prohibits de-energizing the circuits involved, extreme measures of safety must be used. The work should be accomplished only by well-supervised personnel who are fully aware of the dangers involved. Every care should be taken to protect the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

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

## COMPONENT LOCATION - STRADDLE

### NOTE

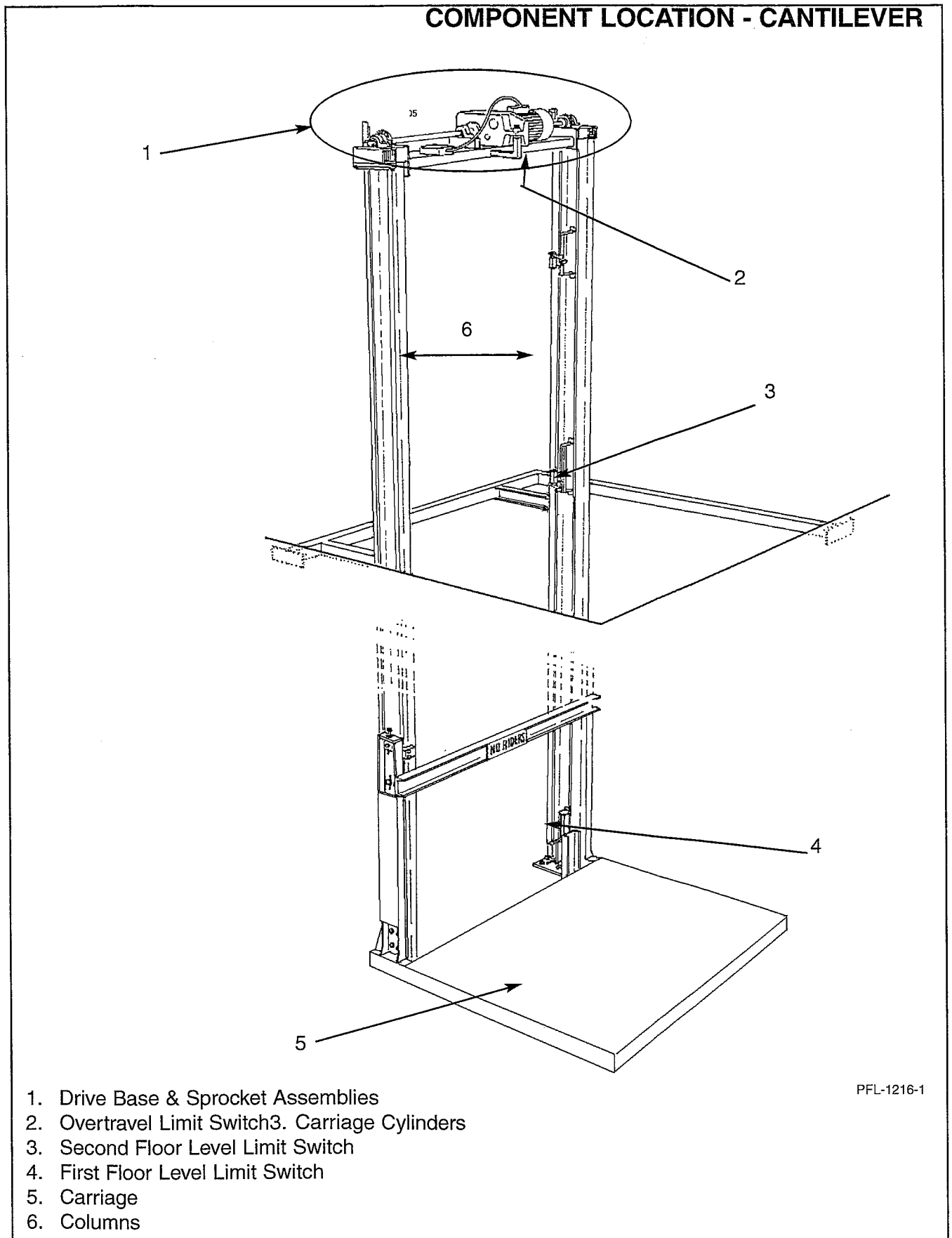
See the Description section of this manual for additional information as to the components and their location.



- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1. Drive Base & Sprocket Assemblies | 6. Fused Disconnect               |
| 2. Second Floor Push Button Station | 7. Main Control Panel             |
| 3. Overtravel Limit Switch          | 8. First Floor Level Limit Switch |
| 4. Second Floor Level Limit Switch  | 9. Columns                        |
| 5. First Floor Push Button Station  | 10. Carriage                      |

PFL-1099-3

Figure 1



**Figure 2**



## MECHANICAL OVERVIEW

Each Series M Vertical Reciprocating Conveyor (VRC) has a frame, drive base, and two lift sprocket assemblies, a moving platform (carriage), and interlocked safety gates or doors. In addition, there is a main control panel and one push button station per level. More information on the electrical components can be found in areas within this section of the manual

The **FRAME** consists of two vertical upright columns that are bolted to the floor at the first level, positioned by the drive base at the top, and braced to the building structure at the upper and intermediate levels.

Each column has an angle welded to one flange of the column to form a track and a chain guard welded to the face of the other flange. The tracks face each other allowing the carriage to ride between them. See Figures 3 and 4.

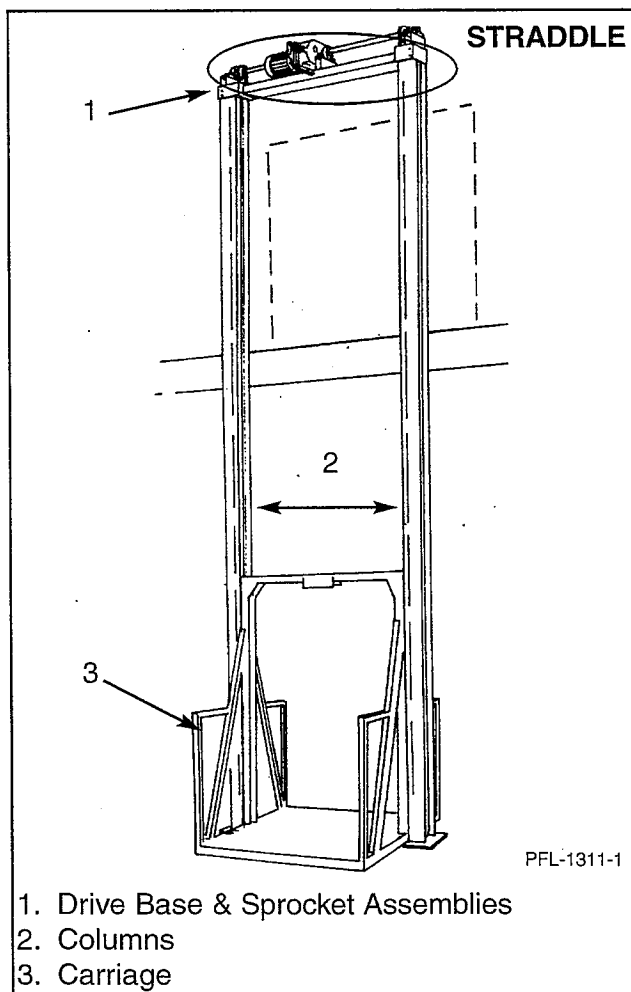


Figure 3

There are two configuration types available for this model. "Straddle" is when a column is located on each side of the carriage. This is shown in Figure 3.

"Cantilever" is when both columns are at the back. An example is shown in Figure 4. There is no difference in the operation or maintenance of the two models.

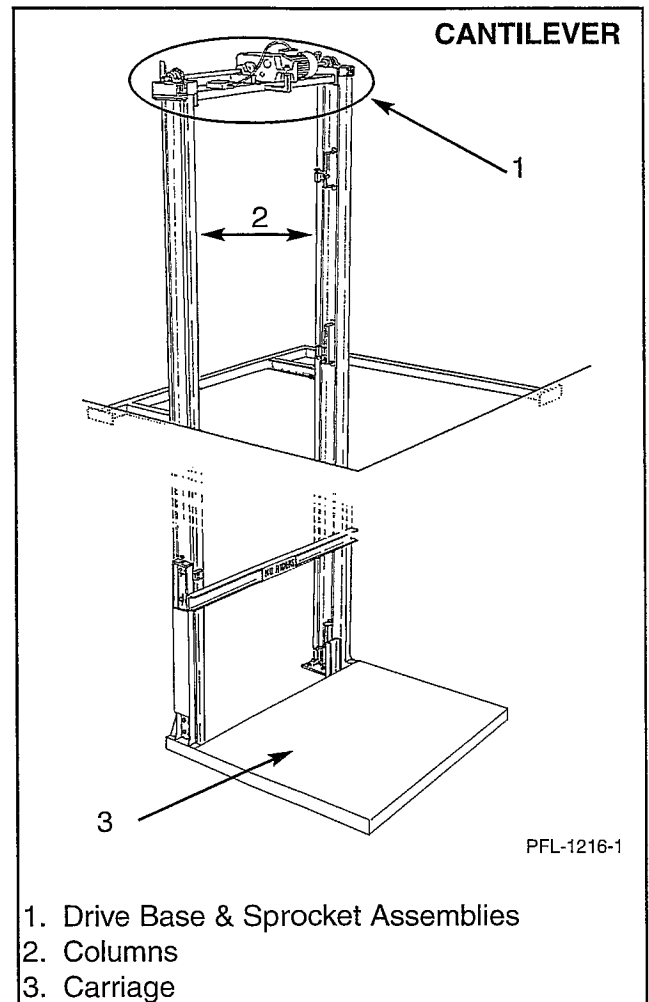
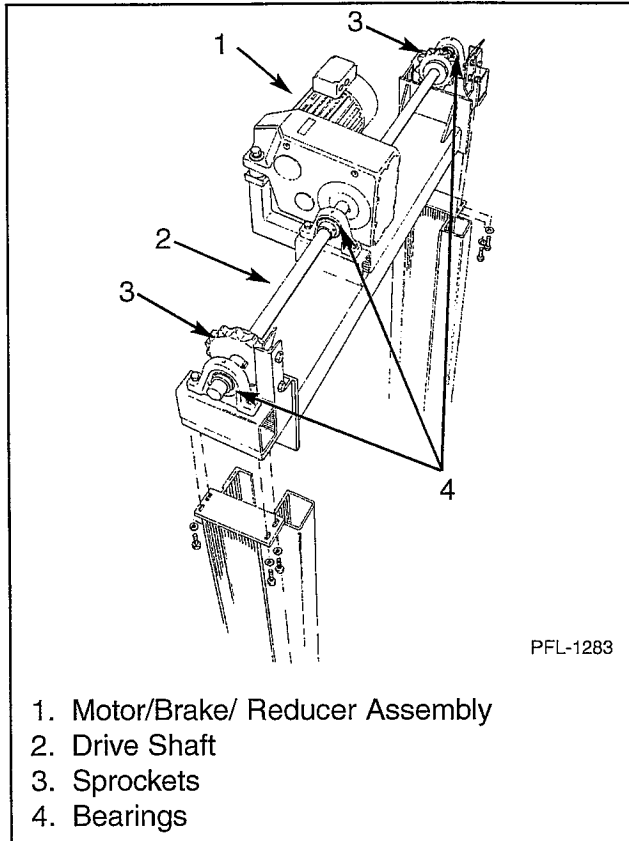


Figure 4

# M Series

The **DRIVE BASE** consists of a motor brake, gear reducer, lift sprockets, a drive shaft, bearings, and support structure. Roller lift chains connecting to tensioner chains and chain tensioners complete the components. This assembly is mounted on top of the columns. See Figure 5.



**Figure 5**

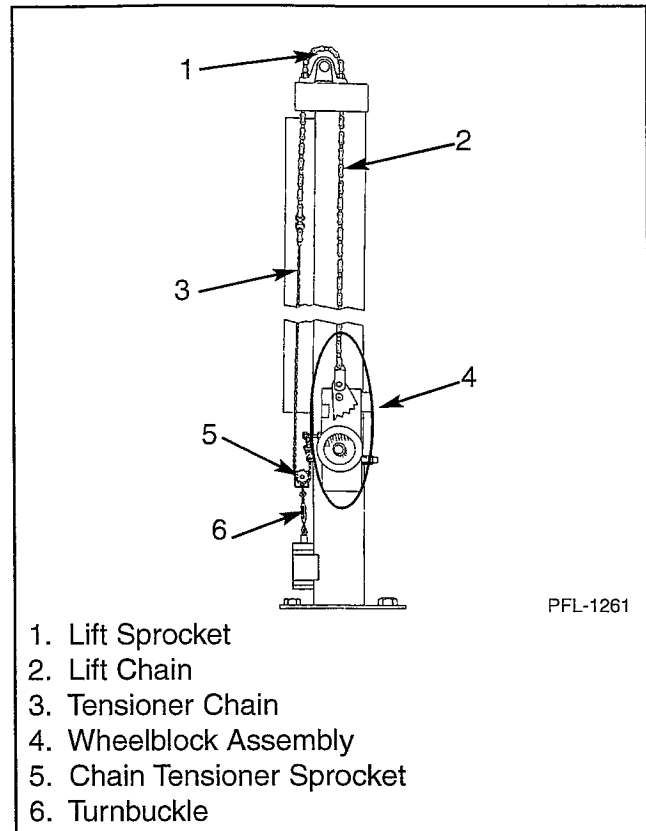
Inside each track, one end of a lift chain connects to a wheelblock assembly bolted to the carriage upright.

The lift chain goes up over the lift sprocket at the top of the column, then proceeds downward through the chain guard (chain tube), and connects to the smaller tensioner chain. See Figure 6.

The tensioner chain then goes around a small sprocket and back up fastening to a bolt on the upper wheelblock.

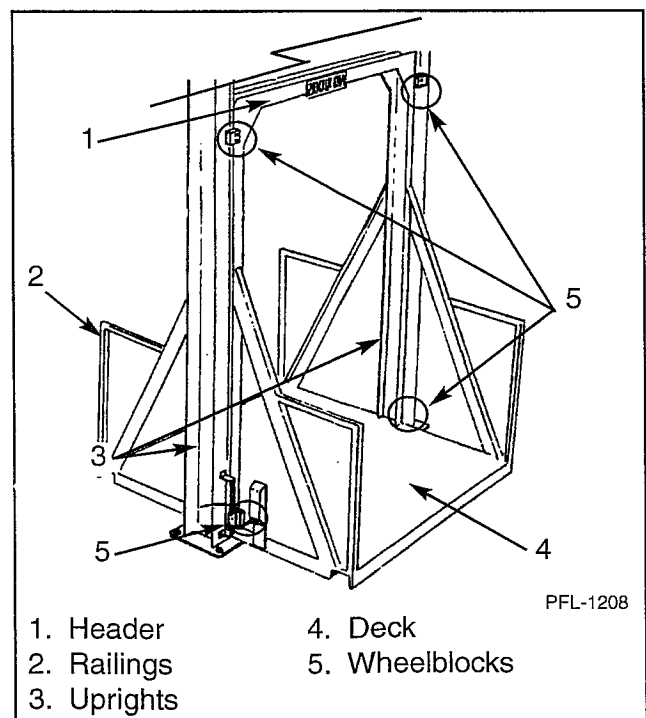
The tensioner sprocket is spring-loaded by a chain tensioner which maintains tension on the chain/tensioner combination. If the chain is pulled too tight or goes slack, the limit switch is activated to shut off the unit.

The tension is adjusted at the turnbuckle on the chain tensioner assembly.



**Figure 6**

The **CARRIAGE** consists of a deck, uprights, railings or enclosure panels (not shown in overview), and four wheelblocks. See Figure 7.



**Figure 7**

# Mechanical Overview

The wheelblocks are bolted to the uprights thus allowing the wheels to ride within the lift columns and guide the carriage during travel. See Figure 8.

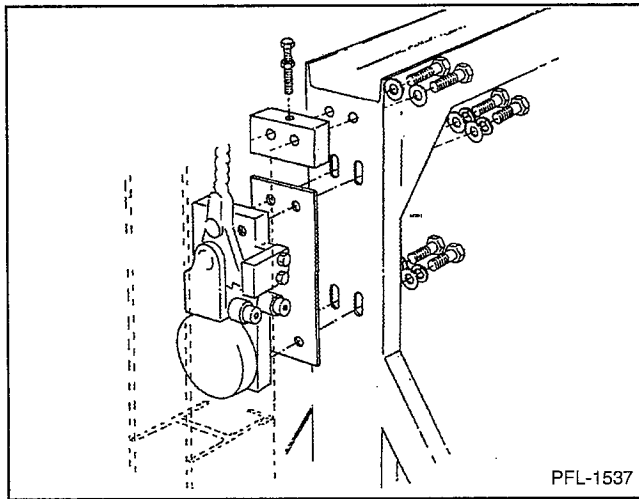


Figure 8

Each **WHEELBLOCK** has a mounting block, a wheel, and two guide rollers. The guide rollers locate the wheelblocks within the track. Each upper wheelblock also has a **SAFETY CAM** with teeth cut into it and a shoe. The shoe fits around the outside of the track while the steel safety cam is pivoted on the mounting block and is spring-loaded. See Figure 9. For an exploded view, see the Parts section of this manual.

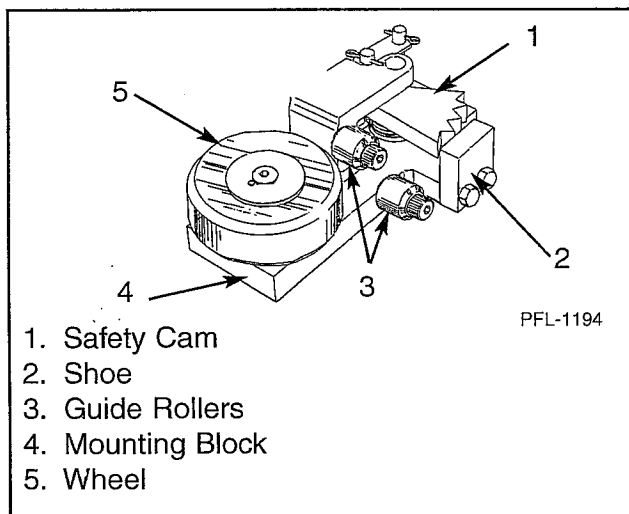


Figure 9

Because the lifting chain connects to this safety cam, all lifting action is through it.

Should the chain break or go slack, the cam will be pivoted by its spring into a jam position with the track to stop the carriage from falling. The guide shoe on the outside of the track helps to wedge the track between it and the cam teeth. See Figure 10.

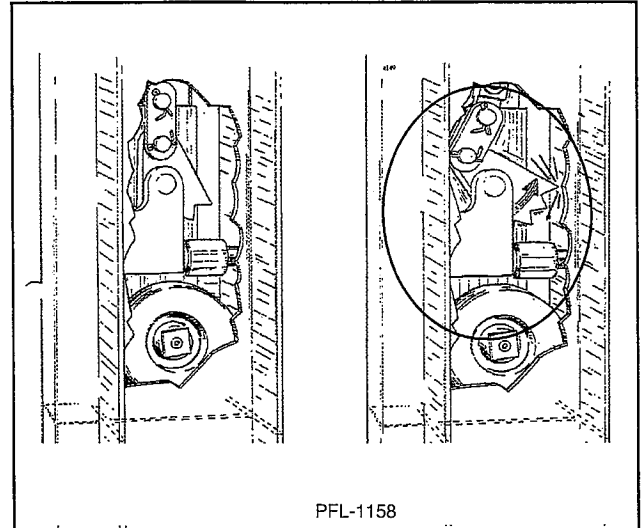


Figure 10

In accordance with ANSI/ASME B20.1, Pflow Industries supplies standard **ENCLOSURE PANELS** to be installed around the unit as required by site conditions. See Figure 11.

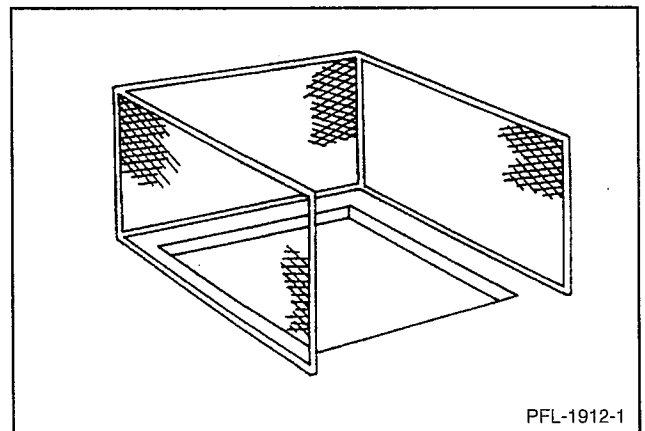
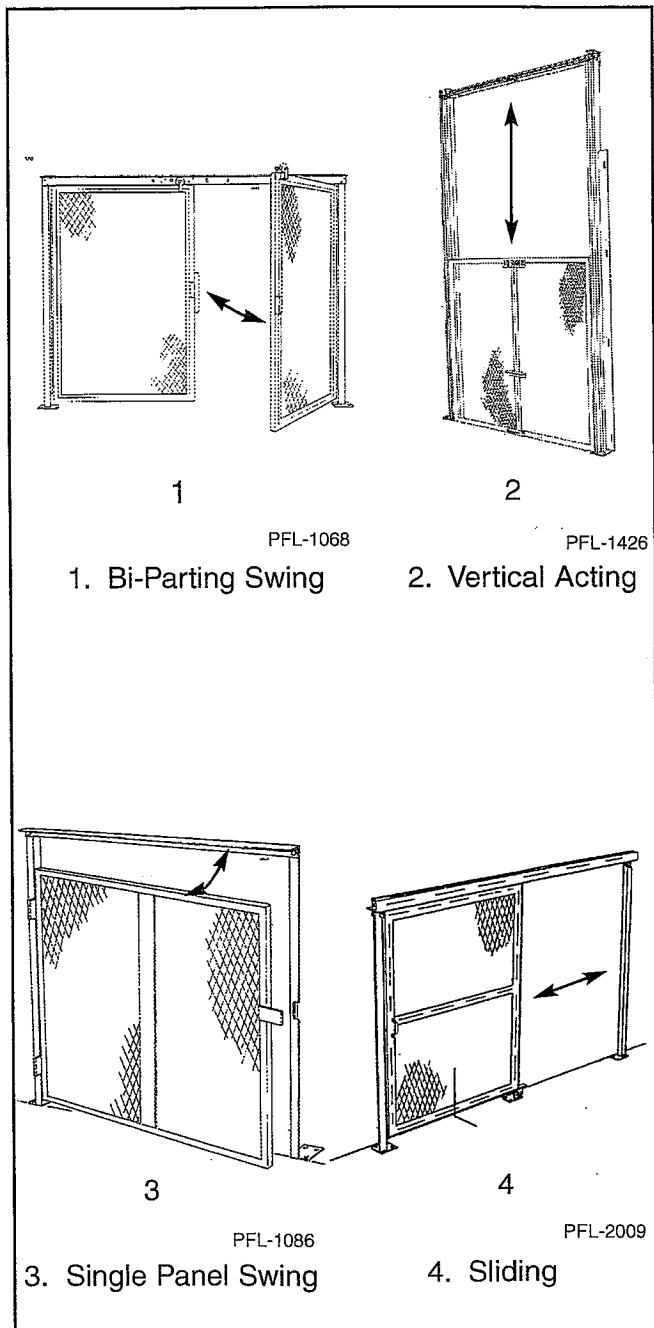


Figure 11

The panels are manufactured of 1-1/2" angle iron frames and 18-gauge flattened expanded metal which will reject a ball 1/2" in diameter. Our standard panels are 8' tall.

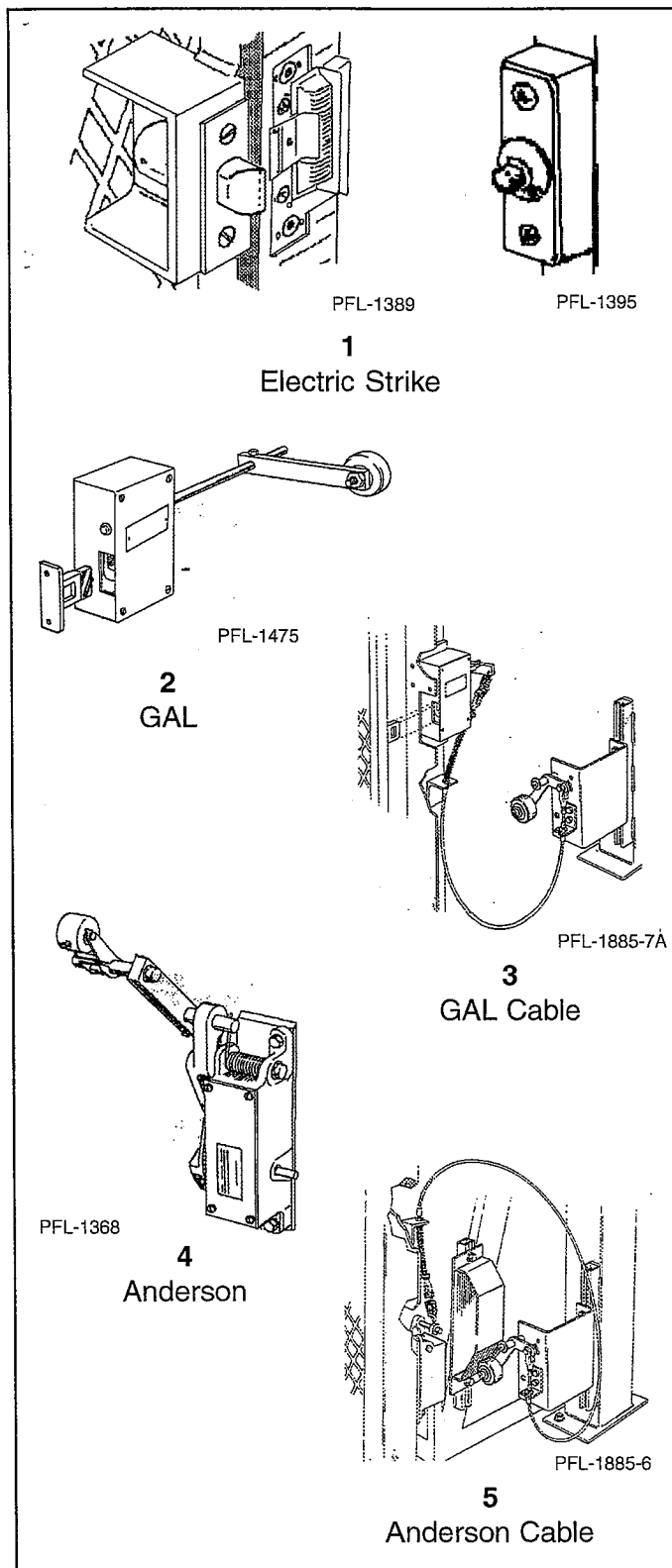
# M Series

A safety **GATE** or door must be provided at each opening in the lift area at each level. The gate must be interlocked both mechanically and electrically with the operation of the unit. This prevents movement of the platform when a gate is open and the opening of a gate when the lift is not present at that level. See Figure 12.



**Figure 12**

Pflow Industries uses various styles of interlocks depending upon the gate type and application. The Parts section of this manual contains views with part numbers. See Figure 13.



**Figure 13**

## ELECTRICAL OVERVIEW

### NOTE

*The following is a standard description of the electrical wiring of the VRC ONLY. It DOES NOT include specifics on options available or ordered. A copy of the schematic can be found in a manila envelope in the parts crate.*

All electrical devices are tied into the **MAIN CONTROL PANEL**. It contains a fused transformer, which reduces the high voltage needed for the motor down to the voltage required to operate the control circuit, motor starter and push button stations. Overload heaters are provided to protect the motor should excessive current draw cause overheating.

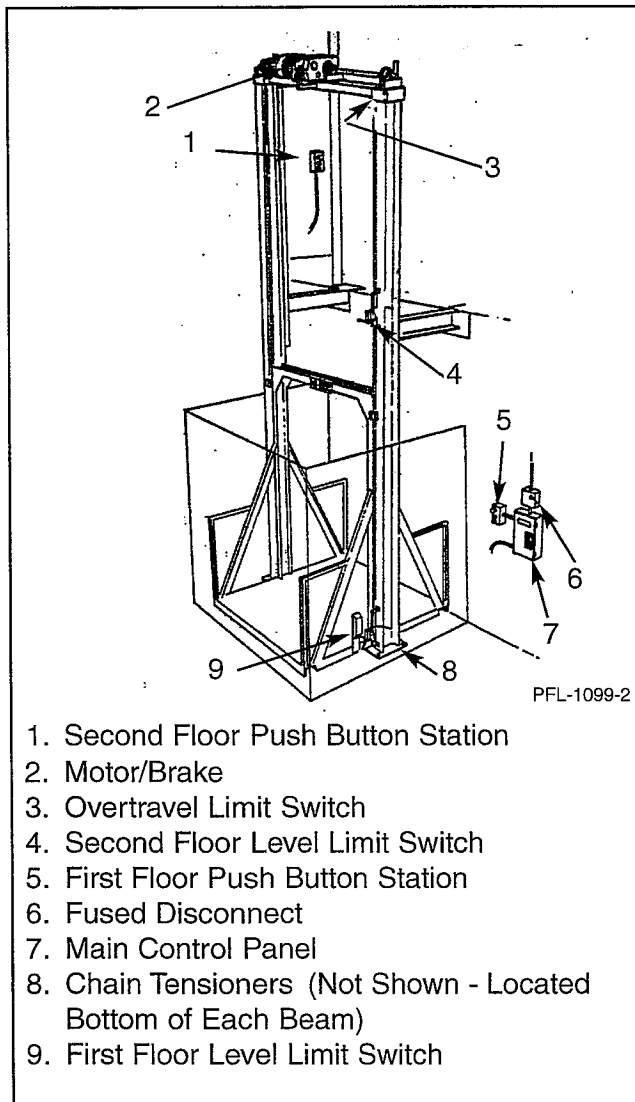


Figure 14

**PUSH BUTTON STATIONS.** One station is normally supplied for each level. ANSI/AME B20.1 code requires that they be remotely located so they cannot be activated by someone standing on the carriage. Each station has an UP, DOWN, and EMERGENCY STOP button.

The UP and DOWN switches are momentary contact. This allows the operator to depress the button and let go. The EMERGENCY STOP button is pushed to activate but will stay in and must be pulled back out for the unit to operate.

Required by NEC code, the **MAIN DISCONNECT** should be fused, lockable, and located within line of sight of the control panel. (Not supplied by Pflow.)

The **MOTOR/BRAKE** unit will have the brake prewired to the motor so that only the motor need be wired. However, non-standard assemblies may be supplied and will require separate field wiring of these components.

There are five **CONTROL SWITCHES** incorporated into a standard two-level unit: one at each level to stop the carriage, one overtravel, two chain tensioner. All switches require field mounting and wiring. Units servicing more than two levels require two additional switches for each intermediate level.

### ⚠ WARNING

**All gates or doors accessing the lift area must be electro-mechanically INTERLOCKED. This requires electrical contacts to prevent the lift from operating if a gate is open when the carriage is at that level and mechanical locks to lock the gate until the carriage is at that landing.**

Different types and styles of interlocks are supplied depending upon the type of gate and on-site conditions. Standard styles incorporate from one to four electrical components per gate.

## SEQUENCE OF OPERATION

### NOTE

For the unit to operate:

- All gates must be closed.
- Loads cannot hang over the edge or sides of the carriage.
- The load must be within the specified weight limit.

1. When the UP button at the upper push button station is pressed (Figure 15), the control circuit to the motor starter (motor contactor) is completed. The coil of the motor starter (Figure 16) magnetically closes the high voltage contacts completing the power circuit to the motor.

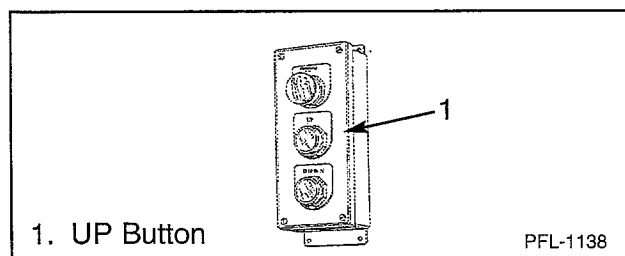


Figure 15

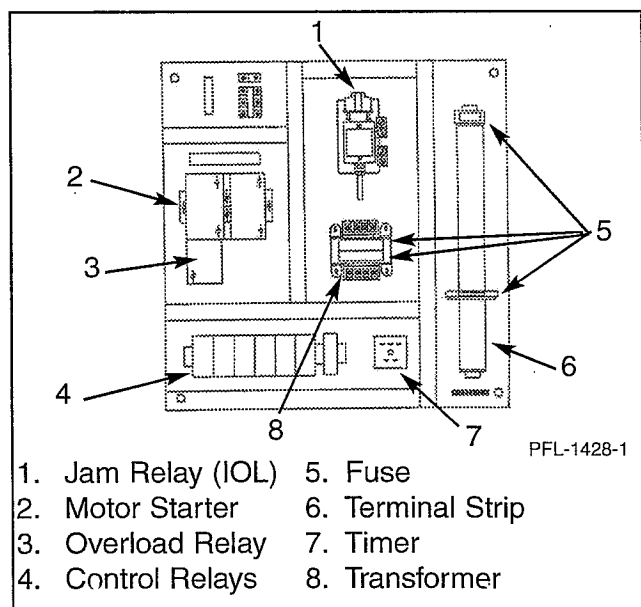


Figure 16

2. Now the up button is released. The motor turns the gears in the reducer, which in turn rotates the drive shaft. The sprockets on the shaft also turn resulting in the raising or lowering of the lift chains. (Because the motor

starter is reversible, the direction of travel can be alternated.) As the chains are fastened to the wheelblocks, which are bolted to the carriage, this action raises or lowers the carriage.

3. When it arrives at the next level, the **floor level limit switch** (one per level) is activated by movement of a cam located on the side of the carriage. When activated, this switch cuts the power to the motor circuit, the motor starter contacts drop out or open, the motor stops, and the brake is applied stopping the carriage. See Figure 17.
4. The **overtravel limit switch** is a safety device mounted directly above the upper level floor level limit switch. The only time it should activate is if there is a failure of the upper level limit switch. Again, activated by the cam mounted on the side of the carriage, it will send a signal to shut the unit down. Before activating the unit, find out why this occurred and correct the problem. See Figure 17.

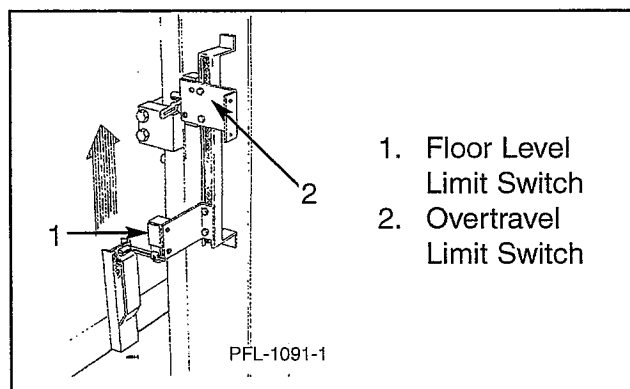


Figure 17

5. When excessive current draw causes overheating, the instantaneous overload (jam) relay will protect the lift motor by cutting off the power to the control circuit. This will happen when the unit is loaded beyond its rated capacity. For proper adjustment procedures, see Instantaneous Trip Current (Overload) Relay (IOL).
6. When the lift or tensioner chain goes slack or breaks, the chain tensioner switch will activate, as described in the Mechanical Overview, cutting off the power to the motor and applying the brake. The safety cam will be triggered only if the chain breaks.

## OPERATION

BEFORE OPERATING THE LIFT, PLEASE READ, UNDERSTAND AND FOLLOW ALL THE SAFETY PRECAUTIONS LISTED BELOW.

### **⚠ DANGER**

Malfunctioning interlocks may allow the door to be opened when the carriage is not present. **YOU MUST MAKE SURE CARRIAGE IS PRESENT BEFORE WALKING THROUGH DOORWAY.** If the carriage is not present, you could fall into the empty shaftway and be seriously injured or die!

### **⚠ DANGER**

Door must be closed and locked unless carriage is present. Door interlock must be operational. It prevents door from being opened when carriage is not present. Door restricts personnel from falling into opening or from being struck by moving parts that could result in serious injury or death!

### **⚠ DANGER**

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

### **⚠ DANGER**

DO NOT walk or work under a raised platform.

### **⚠ WARNING**

Only trained persons shall be permitted to operate or maintain this equipment. Improper operation or maintenance may cause serious injury or death!

### **⚠ WARNING**

If at any time proper operation or performance of your Pflow VRC is in question, DO NOT USE IT! Notify your supervisor or the proper maintenance people immediately.

### **CAUTION**

DO NOT allow loads to overhang the sides of the carriage. This will result in damage to the equipment and merchandise.

### **CAUTION**

DO NOT exceed the rated capacity.

### **TO OPERATE LIFT**

- Close gate.
- Depress and release the appropriate push button to move the carriage to the desired floor. The carriage will stop when it reaches the appropriate level.
- When the unit has arrived at the appropriate level and comes to a complete stop, open the gate.
- If an emergency occurs when the carriage is moving, push the **EMERGENCY STOP** button. The button will keep the lift inoperative until the button is pulled back out. See Figure 18.

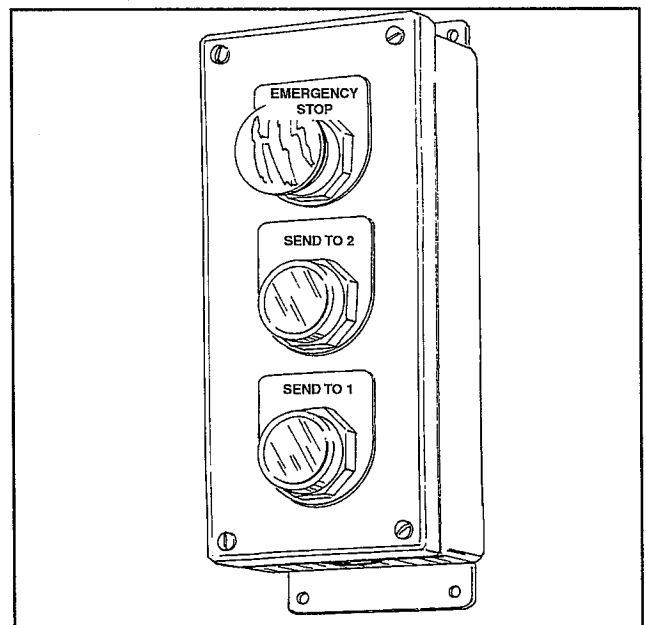


Figure 18

### **NOTE**

Service must be performed by authorized personnel only. Read the Owner's Manual before operating the equipment. For service, contact your local representative.

# M Series

## Maintenance Schedule

Your VRC requires consistent minimal and basic periodic attention. It is recommended that you keep a record during inspection and make a periodic evaluation of lubricating needs to reflect any increase in service that may be required. Problems must be addressed immediately as they may affect the safety devices.

AVG. NO. OF MONTHS	ITEM	ACTION	REFERENCE
3	Drive & Tensioner Chains	Coat with oil; inspect for wear, rust, bent or binding links.	Note #1*
6	Pillow Block Bearings	Grease through fitting; tighten set screws.	Note #2*
6	Chain Tensioners (Lower)	Inspect for tensioner chain and sprocket wear; adjust switch and tensioner, if required.	
12	Wheelblock Wheels	Inspect for wear. Wheels have sealed bearings. Remove and grease if any sign of contamination is present.	Note #2*
3	Guide Rollers	Inspect for wear and rotation interference.	
6	Safety Cams	Inspect for wear or damage.	
6	Chain Sprockets	Inspect for wear; tighten set screws. Center chain in chain tube.	
6	Brake	Check air gap.	
24	Reducer	Change oil.	
3	Interlocks	Inspect for proper operation.	
3	Gates	Inspect for wear and damage.	
6	Geared Couplings (By Application)	Check alignment; check bolt tightening torque; inspect seal ring and gaskets; lubricate with EP #0 grease.	

Follow above schedule. \*Extreme temperatures, outdoor locations, corrosive environments, and/or contaminated environments will require more frequent maintenance and possibly different lubricants. (Check with your lubrication supplier for your particular needs.) Additional options, as ordered by the customer, may require maintenance and are not included in the above information.

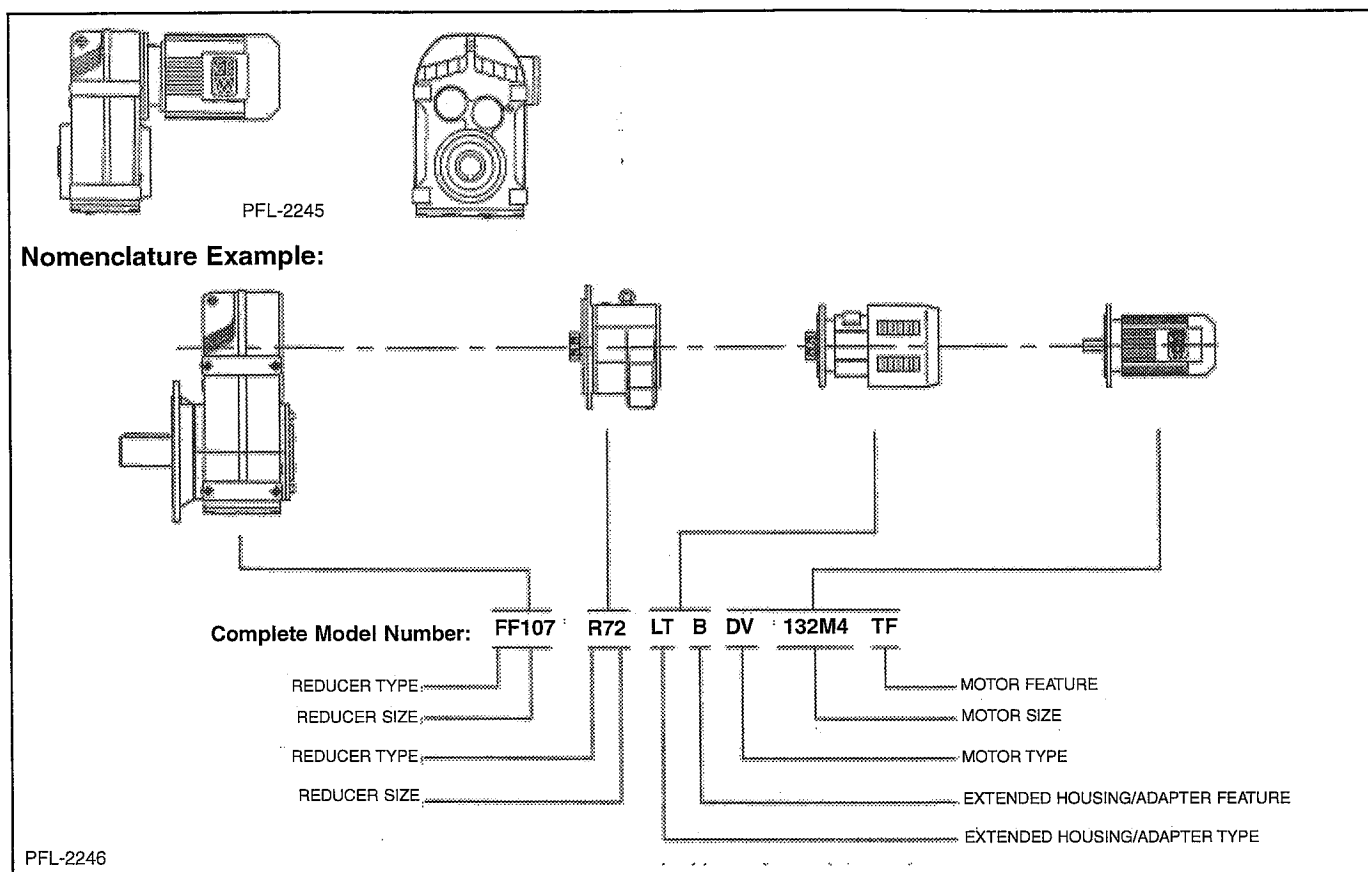
\*Note #1 - Use non-detergent, petroleum-based SAE 30 oil.

\*Note #2 - Use lithium axle grease.

If you have any questions or problems, please feel free to contact either your local service representative or our Product Support Department for assistance.



## Eurodrive Reducer Information



The SEW-Eurodrive model number consists of a series of letters to designate the type of unit or feature and numbers to designate the size of the unit. The model number always begins with the output side of the unit and ends with the input side. For use in our application, Pflow Industries, Inc. typically purchases only the following types:

**HELICAL GEAR UNIT TYPES - FA - Shaft Mount.** Typically there are no additional features or extended housing/adapter types.

### EXTENDED HOUSING ADAPTER FEATURES

B - Disc Brake  
HR - Manual Brake Release (self-reengaging)

### MOTOR TYPES

DT, DV - AC Squirrel-cage Motor

### MOTOR FEATURES

BM, BMG - Disc Brake  
HR - Manual Brake Release (self-reengaging)  
TH - Thermostat Protection (used in inverter applications)

# M Series

## Eurodrive Reducer Information

### WARNING

**Check oil level prior to operation!**

### NOTE

Make sure that the plastic stop in the vent plug is removed before operating the gear unit. This will ensure that no pressure buildup will take place inside the gear unit.

## OIL LEVEL

To check the oil level, remove the red painted screw plug. The level is correct when the surface of the oil is level with the lowest point of the tapped hole.

## LUBRICATION

Each gear unit is supplied from the factory with the correct grade and quantity of lubricant for the specified mounting position

Gear Units	Type	Manufacturer	Ambient Temperature (C)
F..37-127	Mobilgear 629(M)	Mobil Oil Co.	-15 to +25
F..37-127	Mobil SHC 630(S)	Mobil Oil Co.	-25 to +60
F..37-127	Mobil SHC 629(S)	Mobil Oil Co.	-30 to +50

(M) Mineral Oil

(S) Synthetic Oil

Gear Unit	Mounting Position (H3)
F..37	0.29/1.1
F..47	0.45/1.7
F..67	0.85/3.2
F..77	1.66/6.3
F..87	2.96/11.2
F..97	5.42/20.5
F..107	7.40/28
F..127	12.94/49

The approximate lubricant in US gallons/liters per mounting position.

## MAINTENANCE

1. All oil levels and oil quality must be checked every 5,000 hours of operation. If the oil is contaminated, burned, or waxed, change the oil immediately and flush out the box if necessary.
2. Under normal operating conditions, change oil every 10,000 hours of operation or two years.
3. When synthetic oil is used, change the oil every 40,000 hours or four years.

The above suggestions are subject to change if the units are running in high temperature, high humidity, or corrosive environments.

## STORAGE

Units must be stored in the normal position. Units in storage or operated very intermittently must be run briefly at least once a month to protect the gears and seals by circulating the lubrication. For long-term storage, units should be completely filled with oil containing a rust preventative which is soluble in lubricating oil or drained of oil and cleaned with a rust preventative applied to the shaft, gears, and bearings. When taken out of storage for use, the gear unit must be cleaned out and refilled with the proper oil.

## Eurodrive Motor Information

The SEW-Eurodrive AC motors are designed for continuous operation under difficult operating conditions. They are supplied integral to a SEW-Eurodrive gear unit or as foot mounted or flange mounted design.

## ENCLOSURES

The AC motors are provided as totally enclosed fan cooled (TEFC) in accordance with NEMA MG1-1.26.2-1993. They are also provided as an IP54 enclosure rating in accordance with DIN 40050 as standard or with IP55 or IP65 ratings as a modification.

## BEARINGS

The following chart shows the bearings for the appropriate motor frame sizes:

Frame Size	Driving End Side A		Fan End Side B
	Geared	Flanged and Footed	Geared, Flanged and Footed
DT71-80	6303 C3-2RS	6204 C3-2RS	6203 C3-2RS
DT90-100	6306 C3-2RS		6205 C3-2RS
DV112-132S	6307 C3-2RS	6208 C3-2RS	6207 C3-2RS
DV132M/ML-160M	6309 C3-2Z		6209 C3-2Z
DV160L-180	6312 C3-2Z		6213 C3-2Z
DV200-225	6314 C3-2Z		6314 C3-2Z

## INSULATION CLASSES

All single-speed and tapped-wound, two-speed AC motors have Class B insulation as standard. Class F or Class H insulation can be provided as a modification.

## SUPPLY VOLTAGES AND FREQUENCIES

SEW-Eurodrive AC motors can be supplied suitable for operation on any voltage in the range of 200-660 volts. The standard voltages are 230/460V and 575V. The standard operation frequency is 60 Hz.

## AMBIENT TEMPERATURE AND ALTITUDE

The ratings of all motors in this catalog are based on continuous operation at 40°C ambient temperature and a maximum elevation of 3,300 feet above sea level. For higher ambient temperatures or greater installation heights, it is necessary to reduce the motor power rating per Diagrams 1 and 2.

Diagram 1 - Power reduction as a function of the ambient temperature

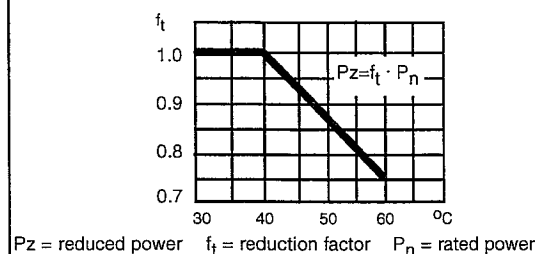
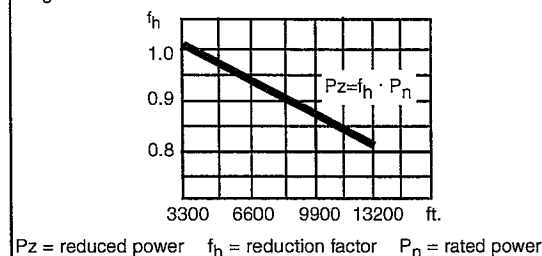


Diagram 2 - Power reduction as a function of elevation



## DUTY TYPES

S2 is a short-term operation, i.e., operation with a constant load state whose duration is sufficient to reach the thermal steady state condition.

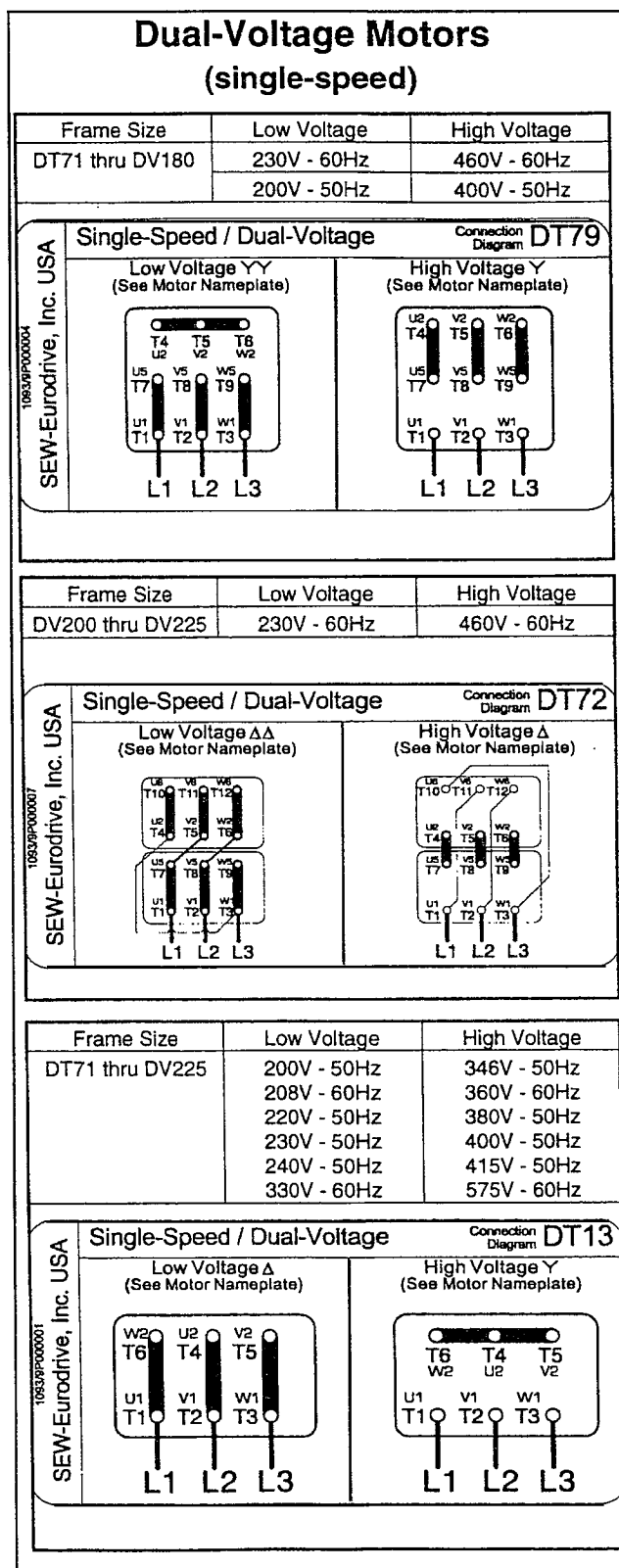
S3 is a period operation not under the influence of the start-up, consisting of a sequence of similar cycles each comprising a period with constant load and a pause. The starting current should not markedly affect the warming up. Maximum period of 10 minutes.

## Eurodrive Motor Information

### MOTOR PROTECTION

Fuses installed in electrical supply lines do not protect the motor against overloads. The fuses merely protect the motor switchgear and supply cables in the event of short circuits. Standard overload relays for motors are adequate protection under normal operating conditions which involve relatively low starting frequencies and relatively short acceleration times coupled with low starting currents. However, whenever relatively high starting frequencies are required or the motor is required to start against considerable loads, then overload relays are unsuitable because the thermal time constant of motor and relay are not matched and the relays invariably trip out when set to the correct rated current. Only motors incorporating positive temperature coefficient thermistors offer full protection against thermal overloading irrespective of the reason. Motors so equipped can be used for operating conditions with high frequency starting, starting against heavy masses, and voltage and frequency fluctuations.

### Standard Wiring Diagrams



## Eurodrive Brake Information

### OPERATION

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

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

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

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

### MAINTENANCE

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

#### WARNING

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

#### WARNING

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

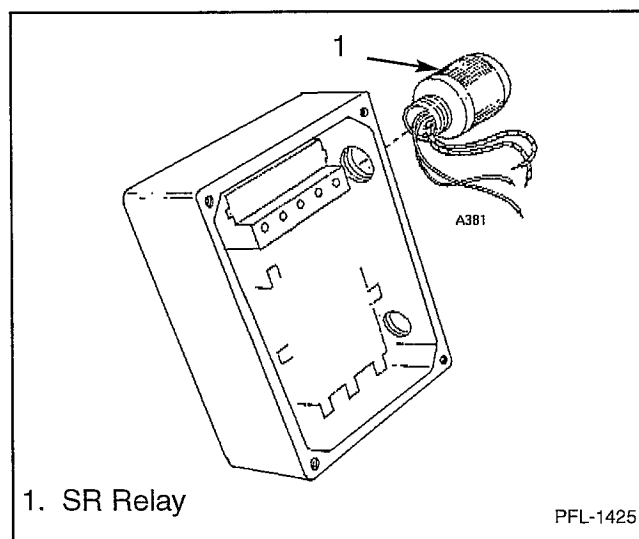
### NOTE

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

### BMG BRAKE SYSTEM OPERATION

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

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



**Figure 1**

# M Series

## Eurodrive Brake Information

### SR RELAY WIRING

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

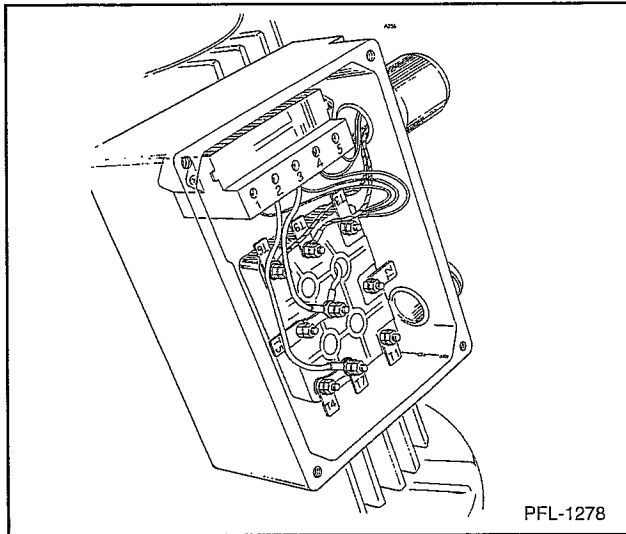


Figure 2

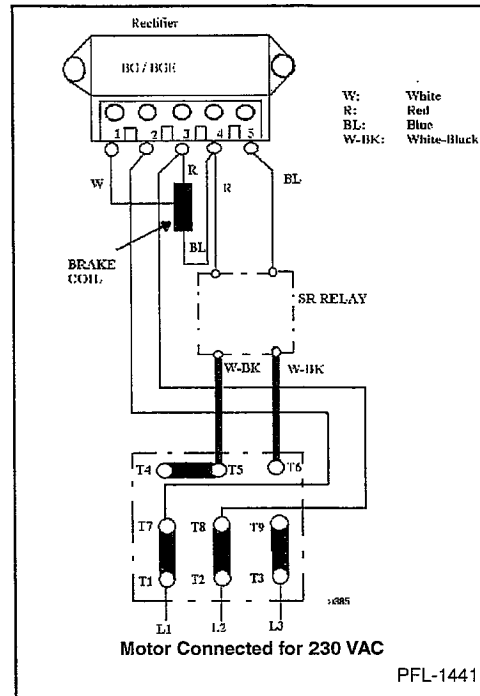


Figure 3

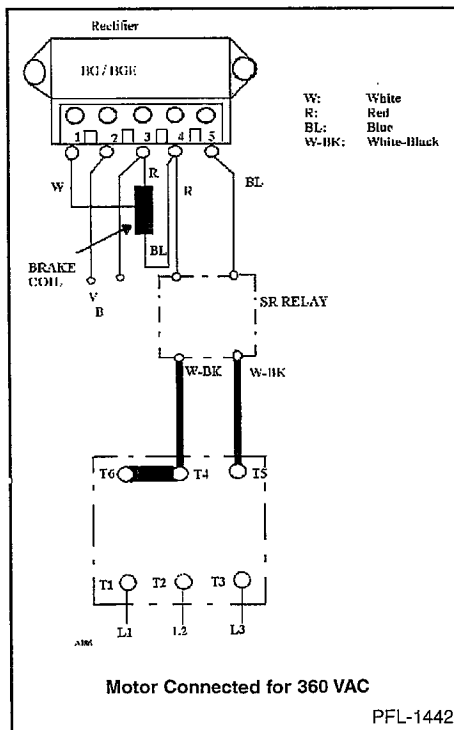


Figure 4

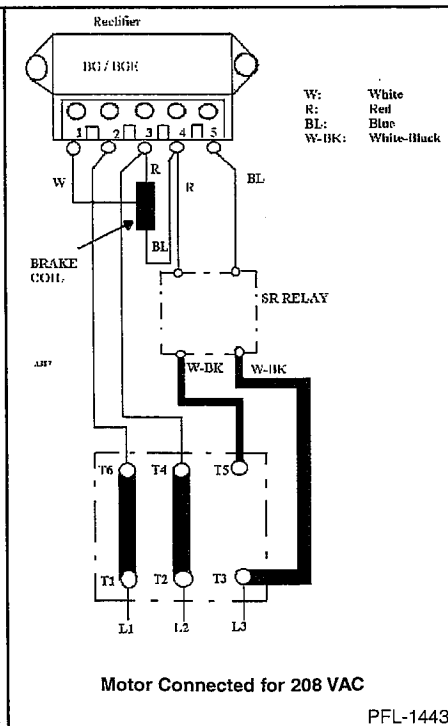


Figure 5

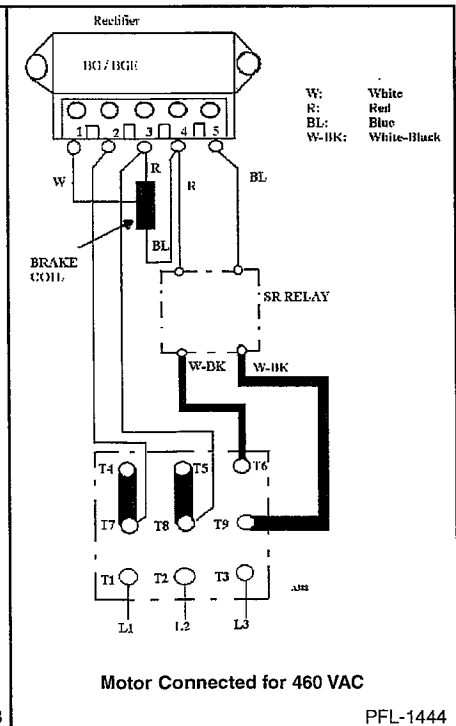


Figure 6

## Eurodrive Brake Information - TROUBLESHOOTING

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

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

### ADJUSTING BRAKE AIR GAP

#### NOTE

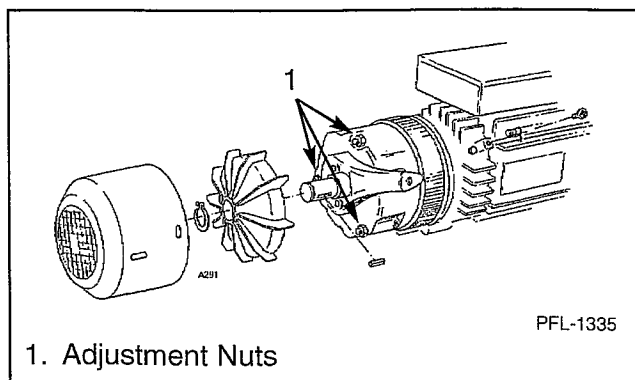
*Air gap is factory set. Adjust only after consulting factory.*

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

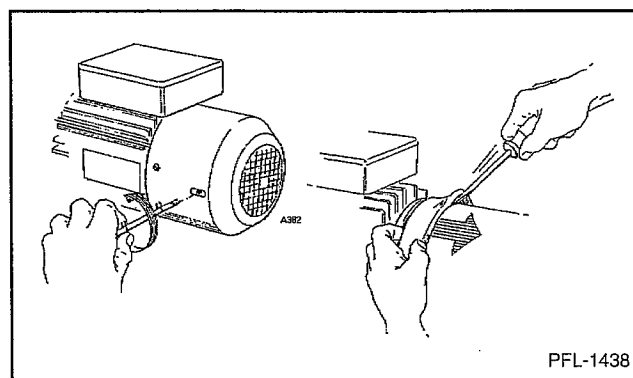
#### CAUTION

**Do not overtighten!**

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



**Figure 7**



**Figure 8**

### AIR GAP REQUIREMENTS

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

#### NOTE

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

## TO INSPECT BRAKE DISC

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

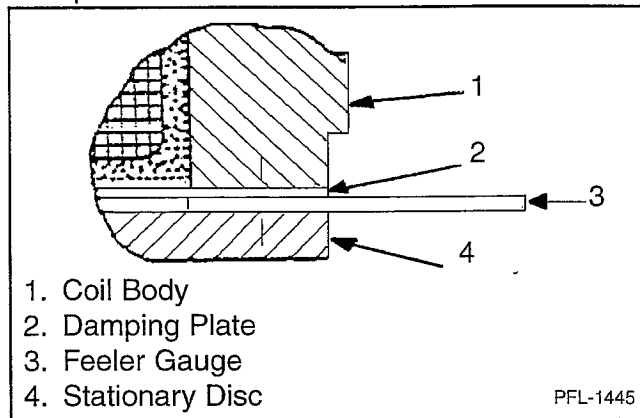


Figure 9

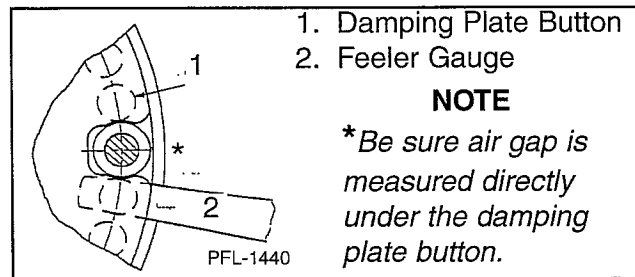


Figure 10

## THE HAND RELEASE MECHANISM

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

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

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

### NOTE

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

## TESTING BRAKE RECTIFIER

### ⚠ WARNING

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

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

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

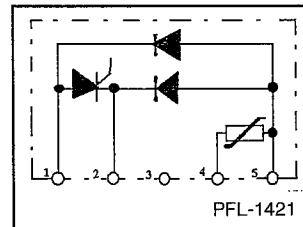


Figure 11

### CAUTION

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

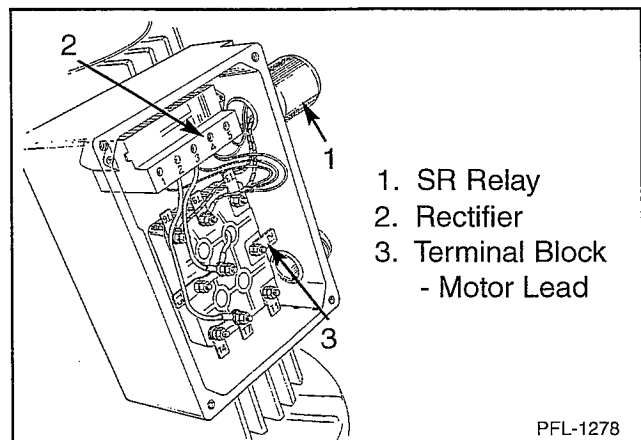


Figure 12



## Safety Cam Inspection

Routine inspection of the safety cams is **EXTREMELY** important as they are one of the major safety devices of our product.

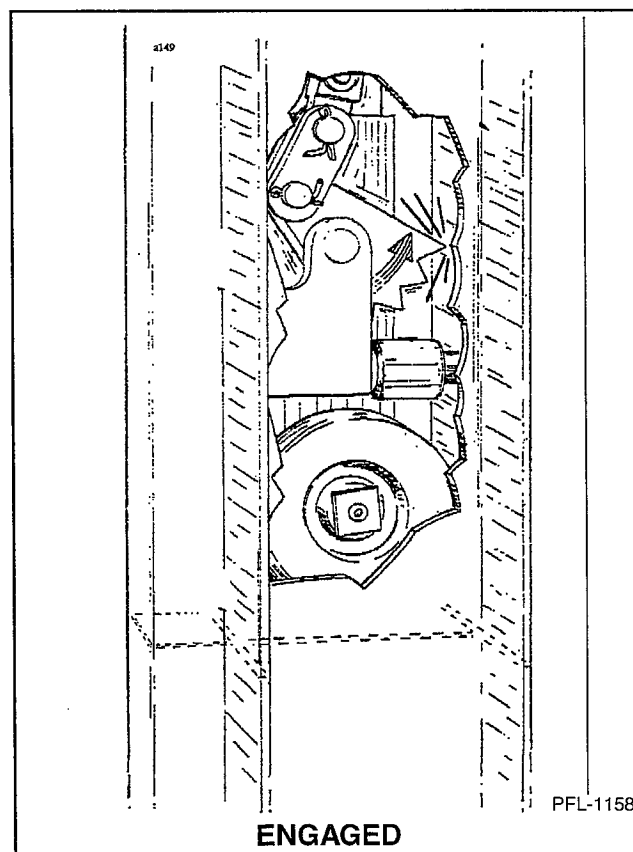
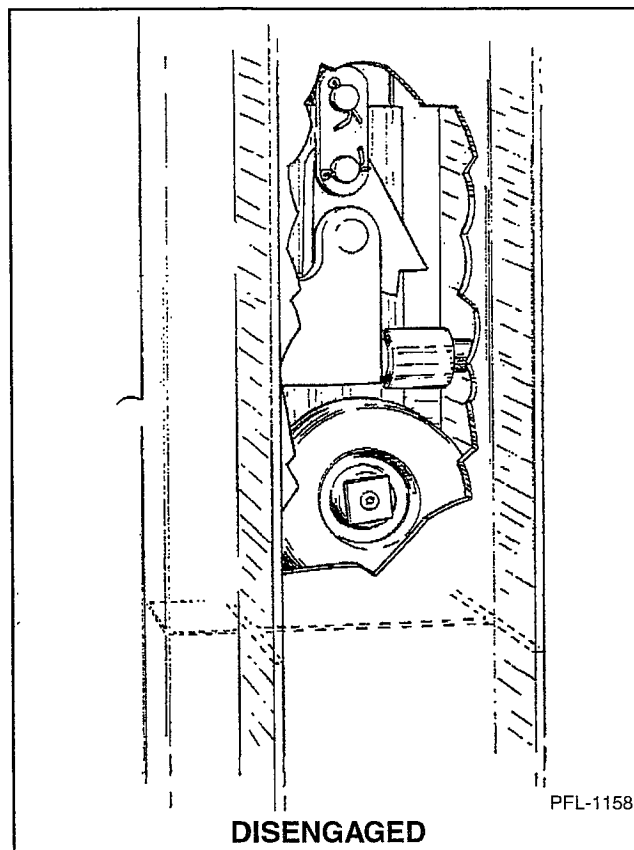
### VISUAL INSPECTION

The cam should be checked for rust and corrosion, chips in the teeth, and other visual signs of wear.

### ROTATION

Make sure safety cams rotate completely by slackening the chains.

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



# M Series

## Troubleshooting

Before troubleshooting, please observe all of the precautions in the Safety section at the front of this manual.

The following is a list of common problems and solutions:

SYMPTOM	POSSIBLE CAUSE	SUGGESTED SOLUTION	REF.
Controls (push buttons do NOT start motor	Gate or door is open or ajar.	Check all gates/doors to make sure they are closed.	
	Main disconnect is off.	Check to see if there is a reason before turning on.	
	Thermal overload has tripped	Press reset button. If it trips again, determine cause. The motor is overheating.	
	Control fuse is blown.	Replace fuse after determining cause.	
	Power circuit between disconnect and starter is dead	Using a voltmeter, check voltage. Repair as needed.	
	Slack lift/tensioner chain	Tighten chain	
	Broken lift/tensioner chain	Repair or replace as needed.	
Motor starts and carriage raises, but motor stops before second level	Safety gate has been opened.	Close gate. Check to see why this has happened.	
	Object encountered	Identify the problem. Remove or repair as needed.	
	Drive component interference.	Remove object. Repair if needed.	
	Jam relay or thermal overload has tripped.	Lower and remove excessive weight. Check brake for possible malfunction, excessive ambient temperature, or mechanical binding.	
	Slack lift/tensioner chain	Tighten chain.	
	Broken lift/tensioner chain.	Repair or replace as needed.	
Lift motor starts for three seconds and stops	IOL (jam) relay trips	Lighten load.	
Carriage fails to stop	Travel limit switch failure	Adjust, repair or replace.	
	Brake failure	Determine cause and correct.	

SYMPTOM	POSSIBLE CAUSE	SUGGESTED SOLUTION	REF.
Carriage raises, but it will not lower.	Mechanical interference	Identify the problem; remove and repair as needed.	
Carriage lowers but stops early.	Debris in the pit.	Clean pit out.	
Rough or noisy operation	Interference between chain and guards or guides.	Determine cause and correct.	
	Shaft or idler sprocket bearings.	Inspect, lubricate, and replace as needed.	
	Motor/reducer	Determine cause and correct.	
	Travel interference	Identify; remove or repair as needed.	
	Drive component interference	Identify; remove or repair as needed.	
	Wheel guide rollers worn.	Inspect, lubricate, and replace as needed. Determine why they wore out.	
	Slide shoe rubbing on main beams.	Determine cause and correct.	
	Carriage is not level.	Determine cause and correct.	
Motor hums but does not rotate; then thermal overload trips.	Load is greater than capacity.	Lighten load.	
	Object encountered.	Identify the problem. Remove or repair as needed.	
	Drive component	Remove object; repair if needed.	
	Improper operation of brake/motor or reducer.	Refer to Service section of this manual.	
	Single phasing	Using a voltmeter, check incoming main leads. Repair as needed.	

# M Series

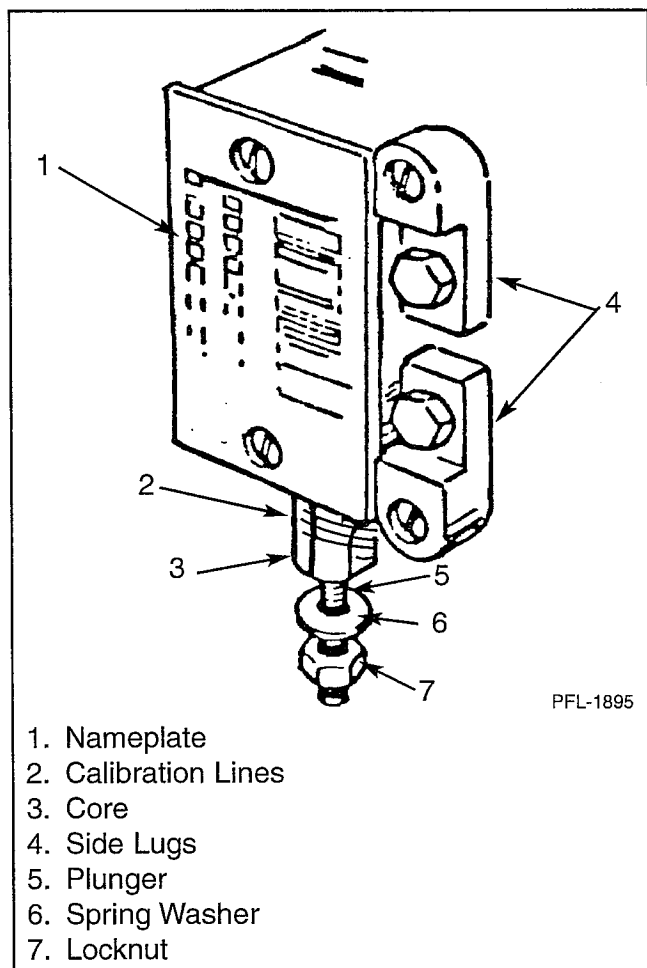
## Instantaneous Trip Current (Overload) Relay (IOL)

### INFIELD ADJUSTMENT

1. Load carriage to capacity weight.
2. While raising unit, adjust IOL until trip relay current equals motor current or until motor will continue to run after timer times out.
3. If no power is available, use calibration lines to set IOL relay at no more than 90% of the motor's full load current as shown on the serial plate.

### WARNING

Side lugs are high voltage.



### ADJUSTMENT

The tripping current of the relay can be adjusted by moving the plunger core up or down on the threaded stem. The five calibration lines appearing on the plunger core correspond to the nameplate ampere ratings.

Select the desired ampere rating by adjusting the corresponding calibration line on the plunger core within the inside edge of the cup washer.

Secure the plunger and setting with the spring washer and locknut.

## Recommended Spare Parts Listing - Series M

This recommended spare parts list is generic (not specific to your Pflow lift). Part numbers are deleted due to variables specific to each application. This list is a guide to assist you in establishing an emergency inventory for your Pflow VRC. Convenience and minimal down time are two good reasons to maintain an inventory of spare parts. This list does not imply that any part is subject to failure. However, should any of these parts fail, they could place the unit out of service.

Your Pflow representative can provide a customized recommended spare parts list.

Quantity	Part Number	Description	Price Each
2 2 2		<b><u>Lift Rollers</u></b> Roller, Main Screw, Guide Roller Roller, Trolley Guide	\$ \$ \$
2 2 2		<b><u>Chain Tensioner Components</u></b> S-Hooks Swivel Turnbuckle	\$ \$ \$
1 1 1 1 1 1		<b><u>Electrical Components</u></b> Button w/Contact, Up/Down Button w/Contact, E-Stop Timer Motor Circuit Protector Limit Switch Arm, Limit Switch	\$ \$ \$ \$ \$ \$
1 1 1 2 2		<b><u>Gate Components</u></b> Keeper, Interlock Roller, Interlock Actuator Arm Cable, Interlock Actuator (x feet) Magnet, Swing Gate Contact w/Insulator (bi-swing gate)	\$ \$ \$ \$ \$

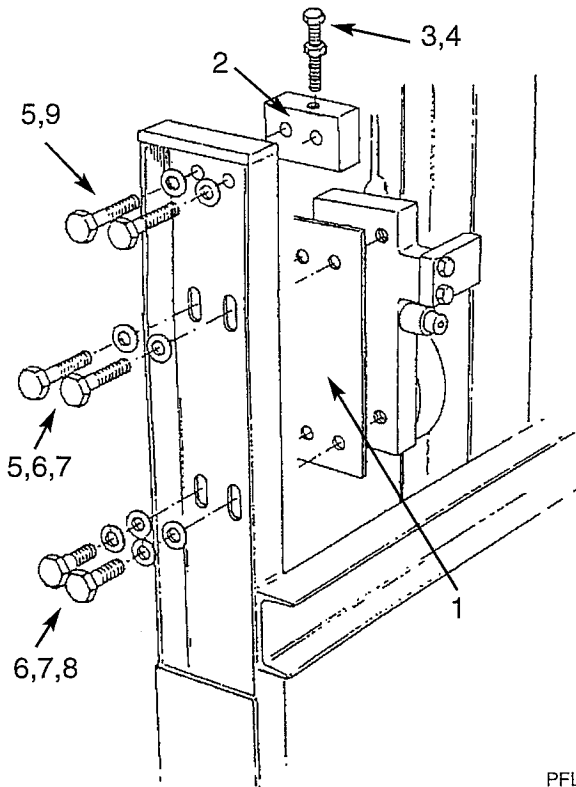
Part numbers within this manual are subject to change or correction without notice. A \$50 Rush Fee may be charged for requested same day shipments. Components replaced under warranty will be charged for in accordance with our RGA procedures. Minimum order charge \$35. FOB Milwaukee, WI. Pflow Industries Product Support Department must issue an authorization in advance of any claim for warranty and/or warranty labor. Any changes, updates, parts by others or modifications after shipment are unknown to Pflow Industries.

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

# M Series

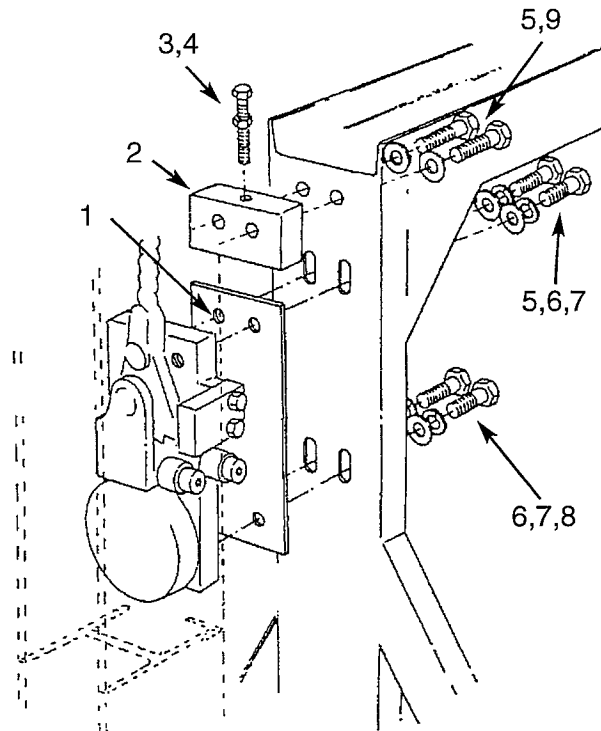
## Adjustable Wheelblock Assembly

**CANTILEVER**



PFL-2259

**STRADDLE**



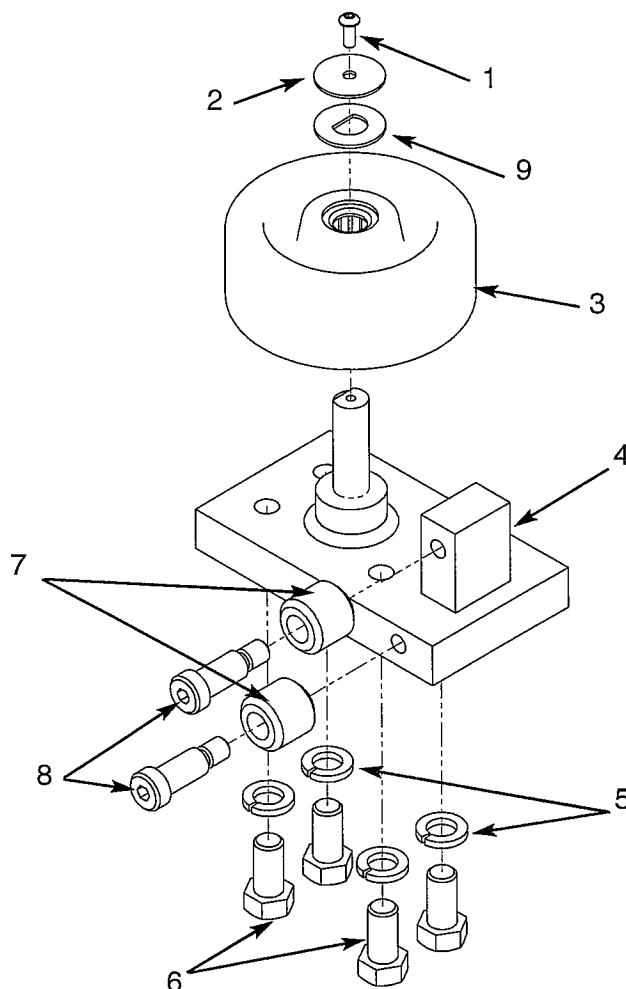
PFL-2260

Item	Qty.	Part No.	Description
1	1	2377-0001	Spacer, Wheelblock, 1/8" (Not used on 4" upright)
2	1	9677-0000	Block, Adjuster
3	1	8872-0088	Screw, HHC, 1/2-13, UNC 5-1/2
4	1	6358-0013	Nut, Hex, 1/2-13
5	2	9237-0020	Screw, HHCS, 1/2-13
6	2	5858-0015	Lockwasher, STD 5/8
7	2	6296-0015	Washer, Flat, 5/8
8	1	6758--0020	Screw, 5/8-11 UNC x 1 1/4
9	1	5858-0013	Lockwasher, STD 1/2

## Lower Wheelblock Assembly - Phenolic

Complete Assembly (5-1/4) - Part No. 2721-0000 / Part No. 2089-0000

Complete Assembly (5-3/8) - Part No. 2721-1000 / Part No. 2089-1000



2721-0000-XV-N

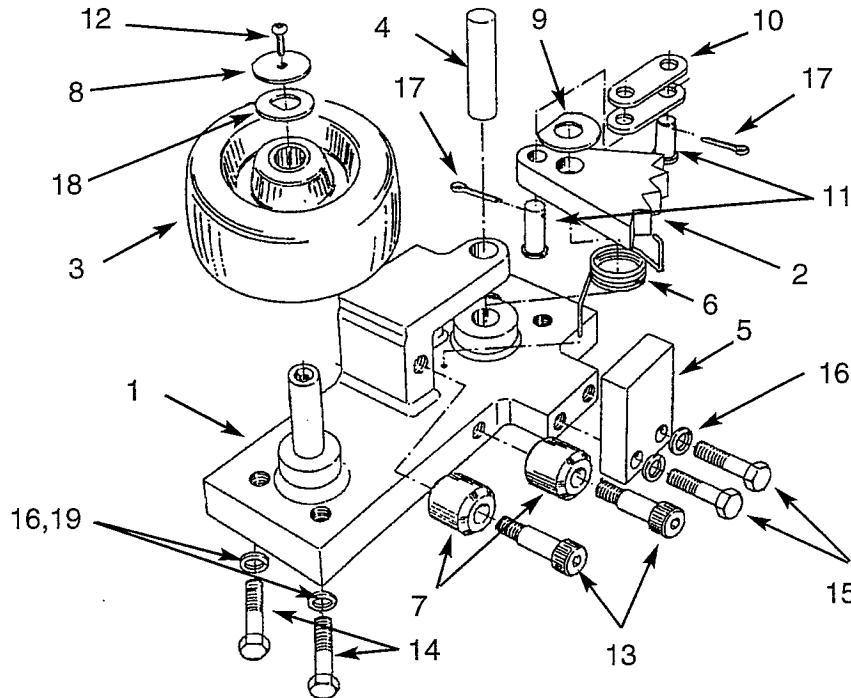
Item	Qty.	Part No.	Description
1	1	2888-0010	Screw, BH/SC, 1/4-20 x 5/8
2	1	5222-0000	Washer, Flat, 9/32 ID x 1 1/2 OD
3	1	2591-0001	Wheel, Phenolic (5-1/4)
	1	2591-1001	Wheel, Phenolic (5-3/8)
4	1	Consult Factory	Wheelblock Weldment, RH or LH
5	4	5858-0015	Lockwasher, STD 5/8
6	4	6758-0020	Screw, HHC, 5/8-11 x 1 1/4
7	2	5221-0000	Guide Roller, Assembly
8	2	5874-0020	Bolt, Shoulder, SOC HD, 5/8 x 1 1/4
9	1	8774-0000	Washer, D, 3/4 ID x 1 1/2 OD

# M Series

## Upper Wheelblock Assembly - Phenolic

Complete Assembly (5-1/4) - Part No. 6196-0000 / Part No. 6197-0000

Complete Assembly (5-3/8) - Part No. 6196-1000 / Part No. 6197-1000



PFL-1605

Item	Qty.	Part No.	Description
1	1	Consult Factory	Wheelblock Weldment, RH or LH
2	1	6186-0000	Cam, Safety
3	1	2591-0000	Wheel, Phenolic (5-1/4)
	1	2591-1001	Wheel, Phenolic (5-3/8)
4	1	5230-0000	Pin, Cam
5	1	2754-0000	Shoe
6	1	2443-0000	Spring, Cam, RH, or
	1	2127-0000	Spring, Cam, LH
7	2	5221-0000	Roller, Guide
8	1	5222-0000	Washer, Flat 9/32 ID x 1-1/2 OD
9	1	8339-0000	Bearing Thrust
10	2	6187-0000	Link, Safety Cam to Toggle
11	2	2521-0000	Pin, Clevis 3/4 x 2
12	1	2888-0010	Screw, BHC, 1/4-20 x 5/8
13	2	5874-0020	Bolt, Shoulder, 5/8 x 1-1/4
14	4	6758-0020	Screw, HHC, 5/8-1 x 1-1/4
15	2	2198-0040	Screw, HHC, 5/8-11 x 2-1/4, Grade 8
16	6	5858-0015	Lockwasher, STD 5/8
17	2	2522-0000	Pin, Cotter
18	1	8774-0000	Washer, D
19	4	7768-0015	Washer, Flat, 5/8 SAE

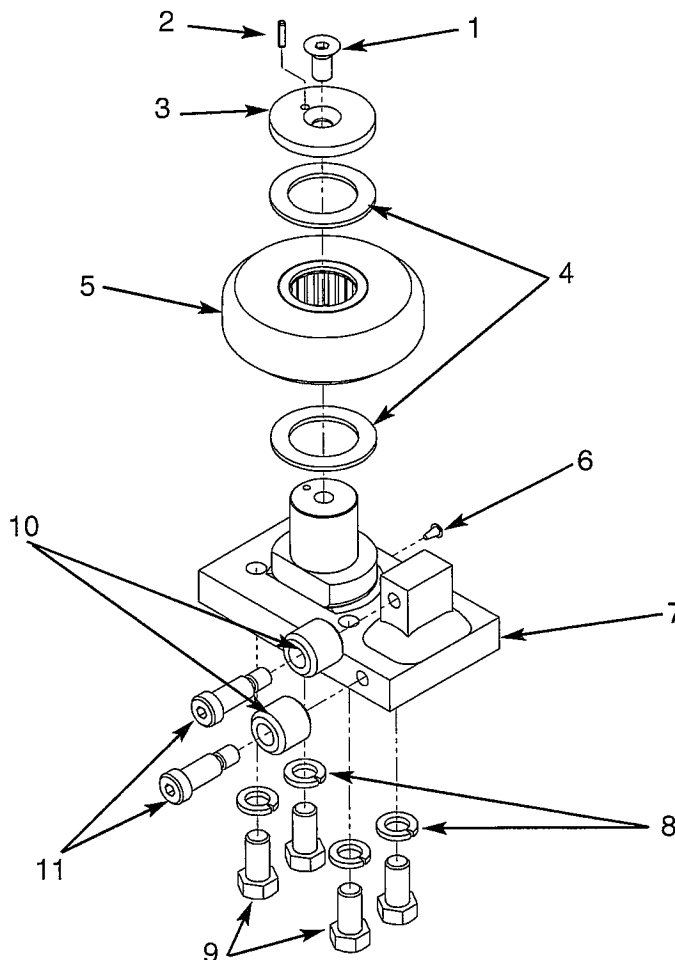


## Lower Wheelblock Assembly

### 5 1/4 Steel Wheel w/Roller Bearing

Complete Assembly, Part No. 6493-0000, Right Hand

Complete Assembly, Part No. 6494-0000, Left Hand



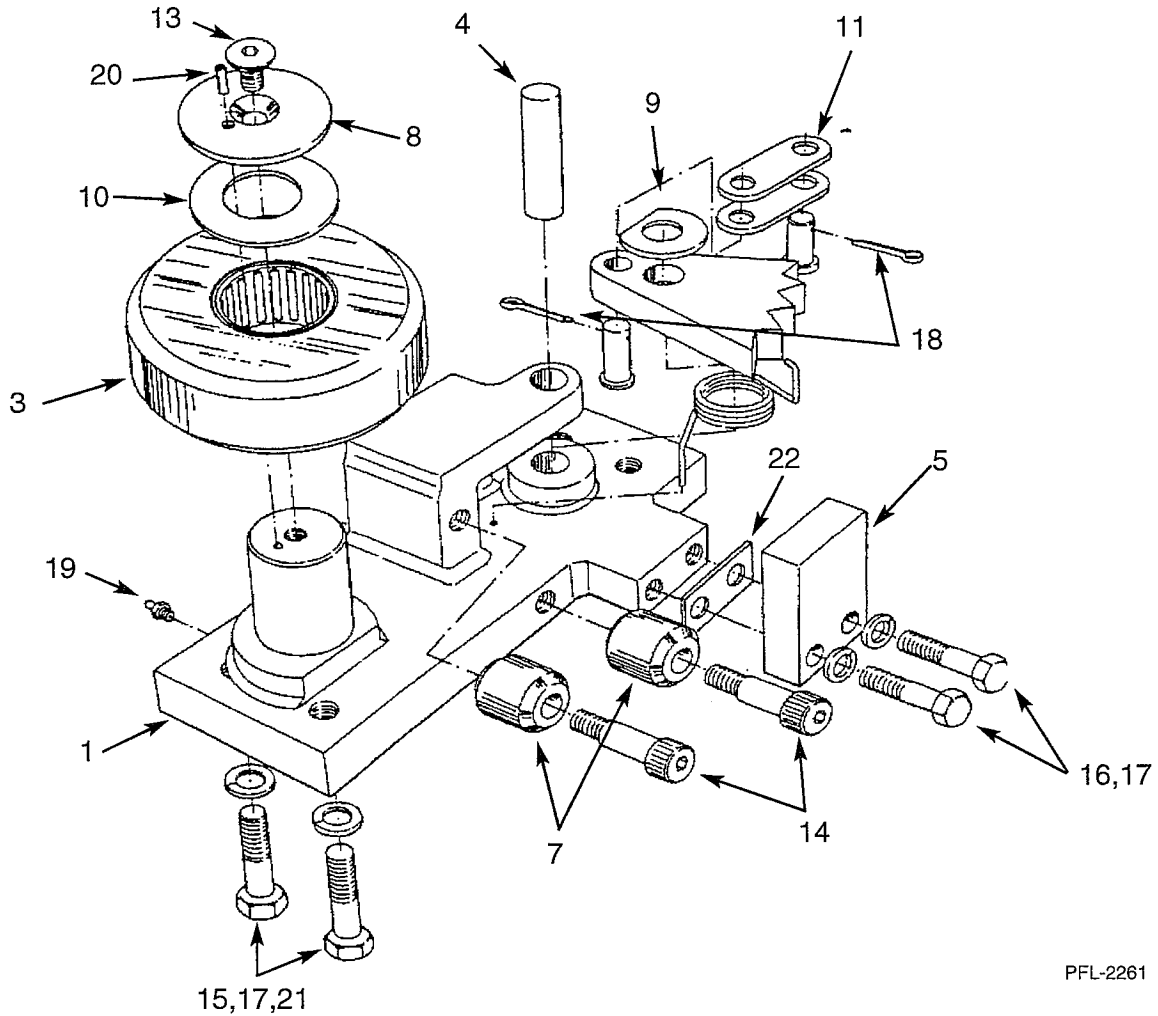
6493-0000-XV-N

Item	Qty.	Part No.	Description
1	1	4299-0016	Screw, FHSC, 1/2 x 1 LG w/Nylock
2	1	5209-0012	Pin, Roll - 3 1/16 DIA X 3/4 LG
3	1	3629-0000	Retainer, Steel Wheel
4	2	3622-0000	Washer, Thrust
5	1	6381-0000	Wheel, Steel, 5 1/4 w/Roller Bearing
6	1	9975-0006	Plug/Cap, Plastic, Tapered
7	1	2400-0000	Whlblk Wldm, Lower RH
		2453-0000	Whlblk Wldm, Lower LH
8	4	5858-0015	Lockwasher, STD 5/8
9	4	6758-0020	Screw, HHC, 5/8-11 x 1 1/4 LG
10	2	5221-0000	Roller Guide Assembly, 1 1/8 LG
11	2	5874-0020	Bolt, Shoulder, SH, 5/8 x 1 1/4

# M Series

## Upper Wheelblock Assembly 5 1/4 Steel Wheel w/Roller Bearing

Complete Assembly, Part No. 6492-0000, Left Hand  
Complete Assembly, Part No. 6491-0000, Right Hand



PFL-2261

Item	Qty.	Part No.	Description
1	1	5244-0000	Wheelblock Weldment, RH
		5245-0000	Wheelblock Weldment, LH
2	1	6186-0000	Cam, Safety
3	1	6381-0000	Wheel, 5 1/4 Steel w/RB
4	1	5230-0000	Pin, Cam
5	1	2754-0000	Shoe
6	1	2443-0000	Spring, Cam, RH
		2127-0000	Spring, Cam, LH
7	2	5221-0000	Roller, Guide
8	1	3629-0000	Retainer, Steel Wheel
9	1	8339-0000	Bearing Thrust
10	1	3622-0000	Washer, Thrust, 1 3/4 Whl Stud
11	2	6187-0000	Link, Safety Cam to Toggle

Item	Qty.	Part No.	Description
12	2	2521-0000	Pin, Clevis 3/4 x 2
13	1	4299-0016	Screw, FHSC, 1/2-13 x 1
14	2	5874-0020	Bolt, Shoulder, 5/8 x 1 1/4
15	4	6758-0020	Screw, HHC 5/8-11 x 1 1/4
16	2	2198-0040	Screw, HHC 5/8-11 x 2 1/4
17	6	5858-0015	Lockwasher, STD 5/8
18	2	2522-0000	Pin, Cotter
19	1	2590-0000	Fitting, Zerk
20	1	5209-0012	Pin, Roll
21	4	7768-0015	Washer, Flat, 5/8 SAE
22	*	2767-0000	Spacer, Wheelblock Shoe

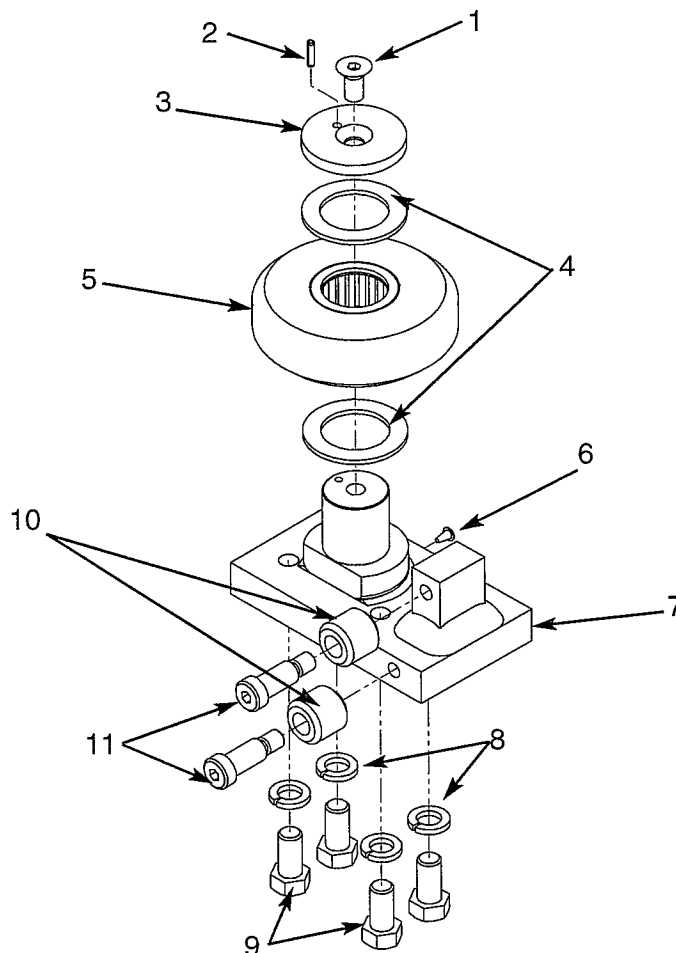
\*Number of spacers dependent upon column size.  
#15 = 0  
#20 = 1  
#25 = 2

## Lower Wheelblock Assembly

### 5 3/8 Steel Wheel w/Roller Bearing

Complete Assembly, Part No. 2403-0000, Right Hand

Complete Assembly, Part No. 2474-0000, Left Hand



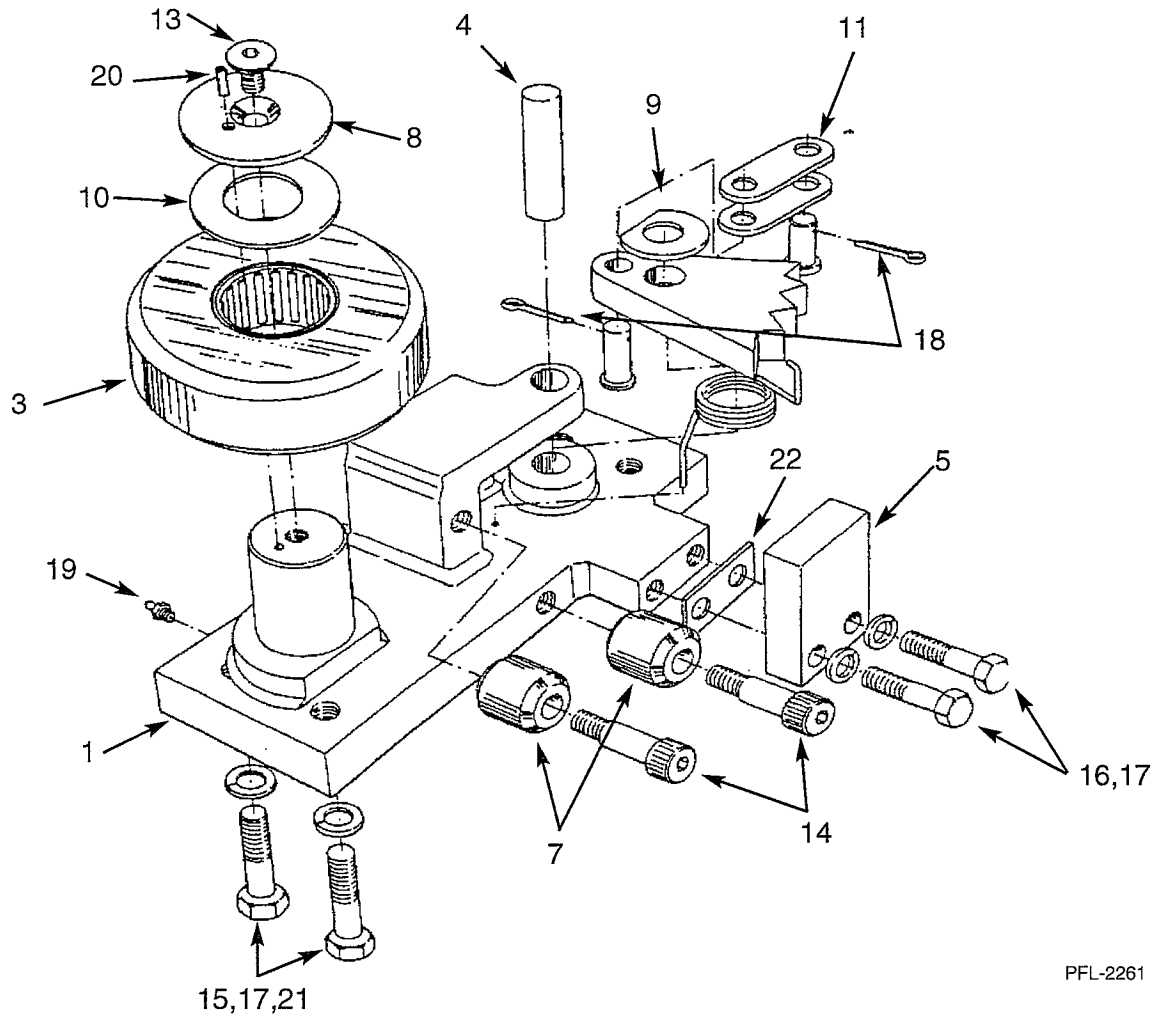
2403-0000-XV-N

Item	Qty.	Part No.	Description
1	1	4299-0016	FHSMS, 1/2-13 x 1
2	1	5209-0012	Pin, Roll 3/16 x 3/4
3	1	3629-0000	Washer, Retainer STL
4	2	3622-0000	Washer, Thrust, 2-3/4 OD
5	1	6304-0001	Wheel Assy, STL, 5 3/8
6	1	9975-0000	Plug/Cap, Plastic
7	1	2400-0000	Whlblk Wldm, Lower RH
		2453-0000	Whlblk Wldm, Lower LH
8	4	5858-0015	Lockwasher, STD 5/8
9	4	6758-0020	Screw, HCS, 5/8-11 x 1 1/4 GR 2
10	2	5221-0000	Roller, Guide, Plastic 1
11	2	5874-0020	Bolt, Shoulder, SH, 5/8 x 1 1/4 x 1/2-13

# M Series

## Upper Wheelblock Assembly 5 3/8 Steel Wheel w/Roller Bearing

Complete Assembly, Part No. 6198-0000, Left Hand  
Complete Assembly, Part No. 6199-0000, Right Hand



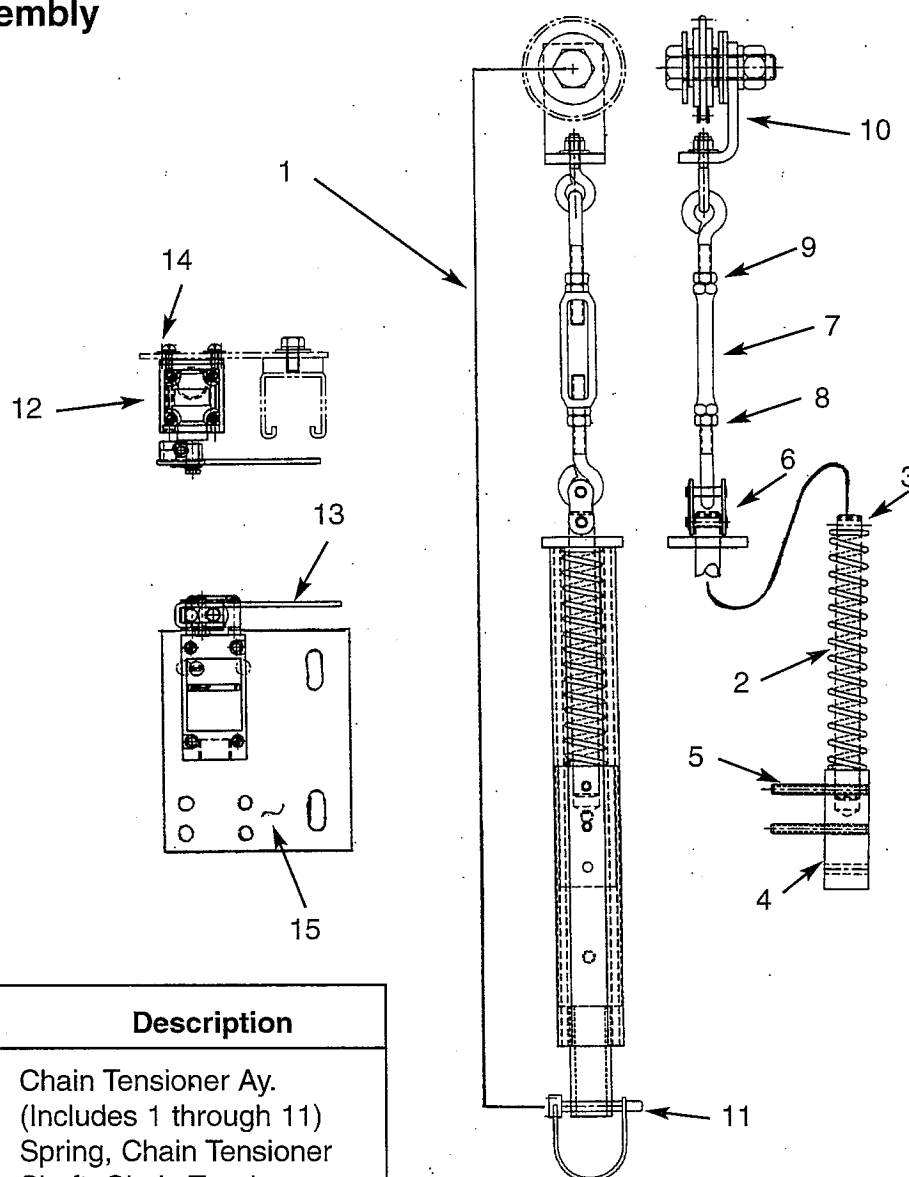
PFL-2261

Item	Qty.	Part No.	Description
1	1	5244-0000	Wheelblock Weldment, RH
		5245-0000	Wheelblock Weldment, LH
2	1	6186-0000	Cam, Safety
3	1	6381-0000	Wheel, 5 3/8 Steel w/RB
4	1	5230-0000	Pin, Cam
5	1	2754-0000	Shoe
6	1	2443-0000	Spring, Cam, RH
		2127-0000	Spring, Cam, LH
7	2	5221-0000	Roller, Guide
8	1	3629-0000	Retainer, Steel Wheel
9	1	8339-0000	Bearing Thrust
10	1	3622-0000	Washer, Thrust, 1 3/4 Whl Stud
11	2	6187-0000	Link, Safety Cam to Toggle

Item	Qty.	Part No.	Description
12	2	2521-0000	Pin, Clevis 3/4 x 2
13	1	4299-0016	Screw, FHSC, 1/2-13 x 1
14	2	5874-0020	Bolt, Shoulder, 5/8 x 1 1/4
15	4	6758-0020	Screw, HHC 5/8-11 x 1 1/4
16	2	2198-0040	Screw, HHC 5/8-11 x 2 1/4
17	6	5858-0015	Lockwasher, STD 5/8
18	2	2522-0000	Pin, Cotter
19	1	2590-0000	Fitting, Zerk
20	1	5209-0012	Pin, Roll
21	4	7768-0015	Washer, Flat, 5/8 SAE
22	*	2767-0000	Spacer, Wheelblock Shoe

\*Number of spacers dependent upon column size.  
#15 = 0  
#20 = 1  
#25 = 2

## Chain Tensioner Assembly



PFL-2114

Item	Qty.	Part No.	Description
1	1	10107-0000	Chain Tensioner Ay. (Includes 1 through 11)
2	1	10111-0000	Spring, Chain Tensioner
3	1	10103-0000	Shaft, Chain Tensioner
4	1	10102-0000	Guide Block, Tensioner
5	2	5854-0040	Roll Pin, 1/4" x 2-1/2"
6	1	5668-0000	Link, Tensioner
7	1	2520-0000	Turnbuckle, Tensioner
8	1	3732-0010	Nut, 5/16-18, LH Thread
9	1	6358-0010	Nut, 5/16-18, RH Thread
10	1	10244-0000	Sprocket & Bracket Ay.
11	1	10184-0024	Pin, Tensioner Anchor
12	1	**	Limit Switch
13	1	**	Arm, Limit Switch
14	2	**	Bolt, Limit Switch Mtg.
	2	**	Lockwasher, Switch Mtg.
	2	**	Washer, Switch Mtg.
15	1	10182-0000	Bracket, Switch Mtg.

\*\*Contact Pflow Industries for part number. Serial number required.

## Chain Loop Arrangement

The following drawings depict the path of the lift chain (#3).

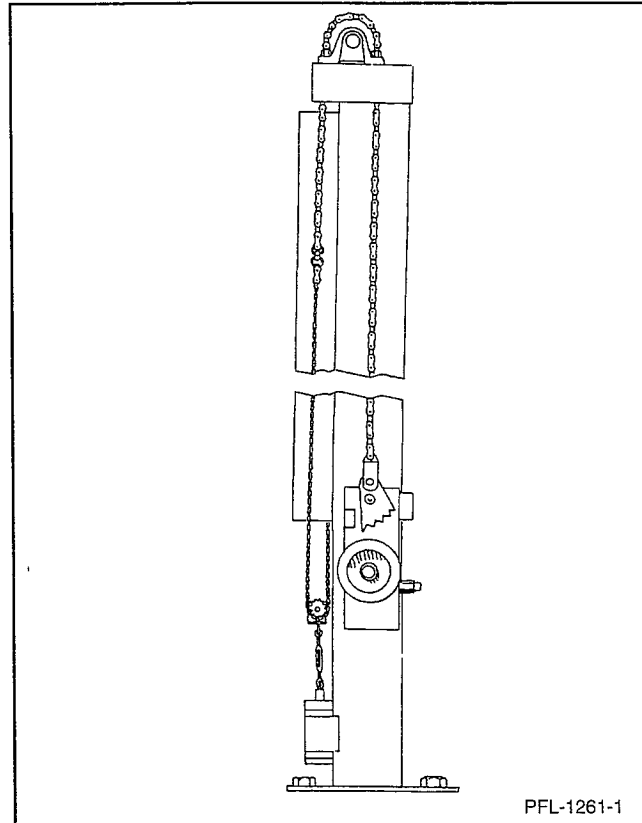
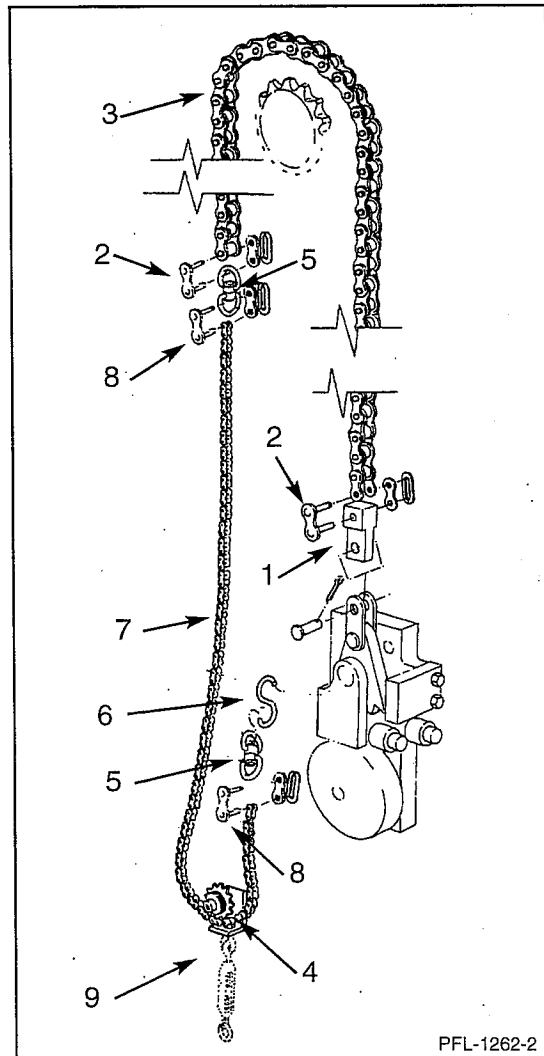
The drive chain (not shown) is applicable to the F-Series only and runs between the sprockets on the top of the unit.

The tensioner chain (#7) is the section that connects the wheelblock to the lift chain.

### NOTE

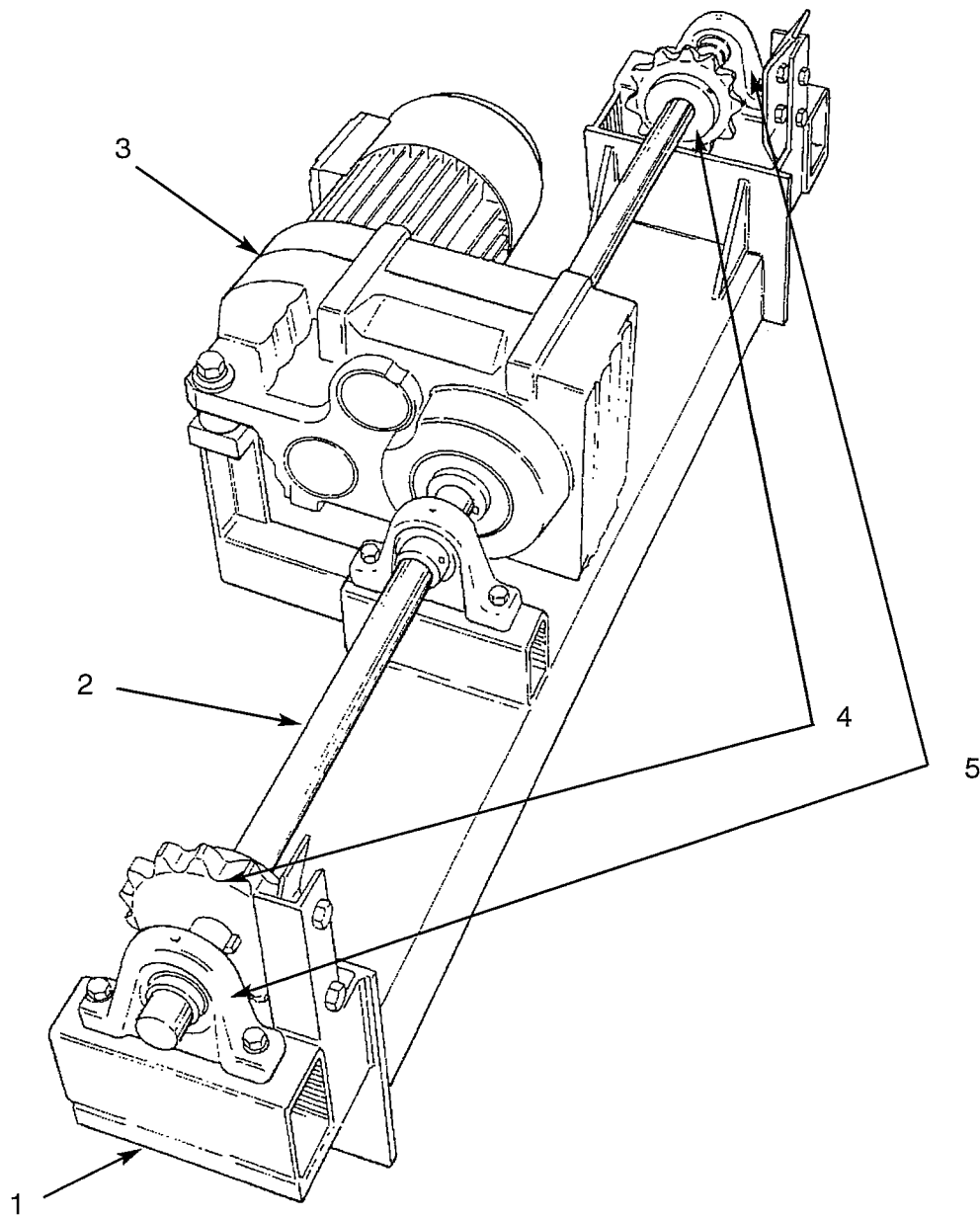
*Size of drive and lift chain vary by application. Consult factory before ordering.*

*Exploded views of the wheelblock and chain tensioner assemblies can be found on other pages within this manual. See your Table of Contents.*



Item	Qty.	Part No.	Description
1	1	6191-0000 6190-0000 6189-0000 6188-0000	Toggle, #60 Chain, or Toggle, #80 Chain, or Toggle, #100 Chain, or Toggle, #120 Chain
2	2	5668-0000 2618-0000 2523-0000 5186-0000	Master Link, #60 Chain or Master Link, #80 Chain or Master Link #100 Chain or Master Link, #120 Chain
3	1	5667-0000 2692-0000 2693-0000 4102-0000	Chain, #60 or Chain, #80 or Chain, #100 or Chain #120
4	1	7937-0000	Sprocket Assembly
5	2	7651-0000	Swivel, Round Eye Double
6	1	3715-0000	"S" Hook
7	1	7938-0000	Chain, #35 x Length
8	1	7953-0000	Master Link, #35 Chain
9			Chain Tensioner Assembly (partial view)

Drive Base Assembly



PFL-2263

These are custom-designed components and vary by job. To ensure correct replacement components are used, you must consult the factory for proper part numbers. Please have the SO number from the reducer assembly and the Pflow serial number available when requesting this information.

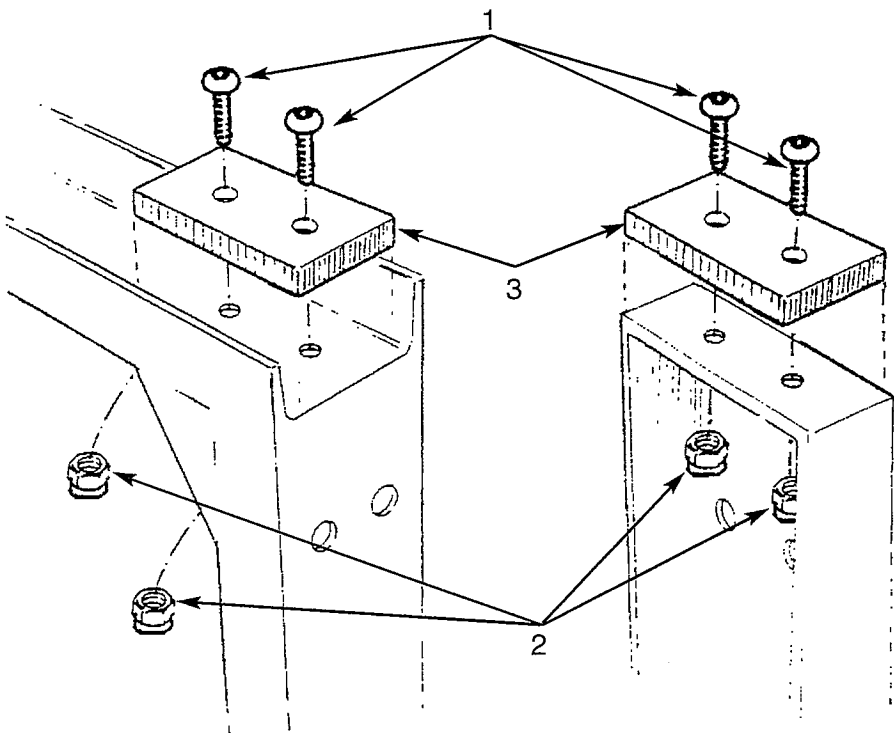
Item	Qty.	Description
1	1	Drive Base Weldment
2	1	Drive Shaft
3	1	Motor/Brake/Reducer Assembly
4	2	Drive Sprocket
5	2	Bearing, Pillow Block

# M Series

## Carriage Stop

### STRADDLE CARRIAGE

### CANTILEVER CARRIAGE

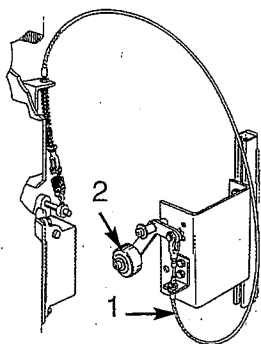


Item	Qty.	Part No.	Description
1	1	8399-0016	Screw. BHSC 3/8-16 UNC 1"
2	2	6708-0011	Nut, Lock, Nylon, 3/8
3	1	10414-0000	Pad, UHMW



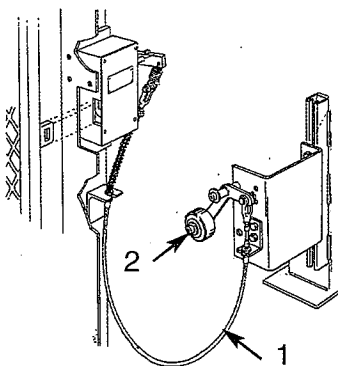
The **INTERLOCK** is a device used to mechanically prevent the gate from opening. Below are the standard types of interlocks supplied. As this is a safety device, replacement components are only available as shown below. Some configurations may vary by application.

## ANDERSON CABLE



PFL-1885-6A

## GAL CABLE

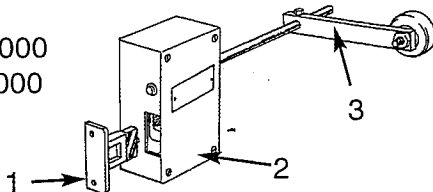


PFL-1885-7A

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

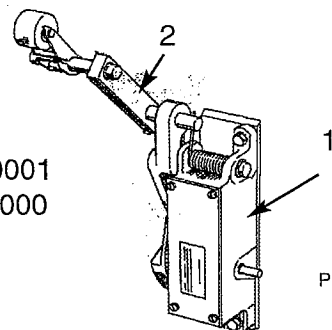


PFL-1475

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

## ANDERSON (Right Hand Shown)

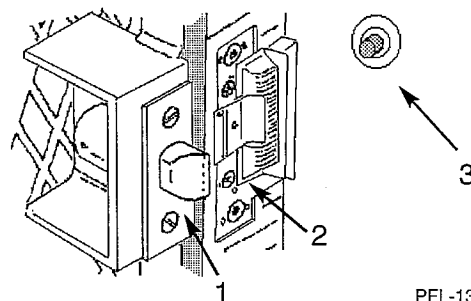
RH #2678-0001  
LH #2678-0000



PFL-1368

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

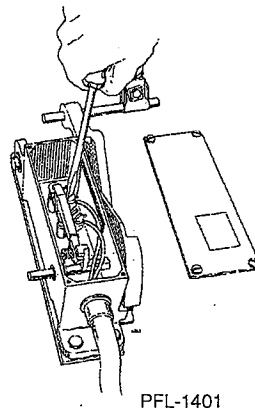
## ELECTRIC STRIKE



PFL-1389

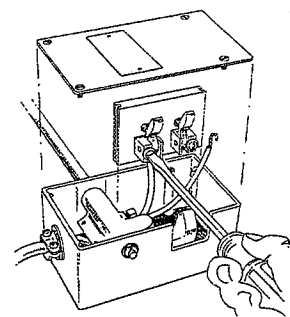
1. Spring Latch #7566-0000
2. Strike #9169-0000
3. Button #9096-0000

## ANDERSON



PFL-1401

## GAL

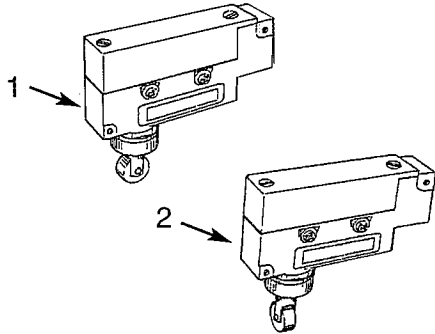


PFL-1250

See schematic for proper wiring instructions.

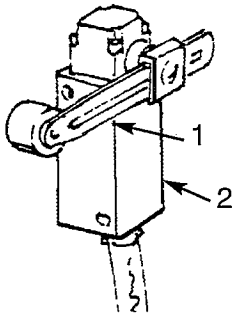
## M Series

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.



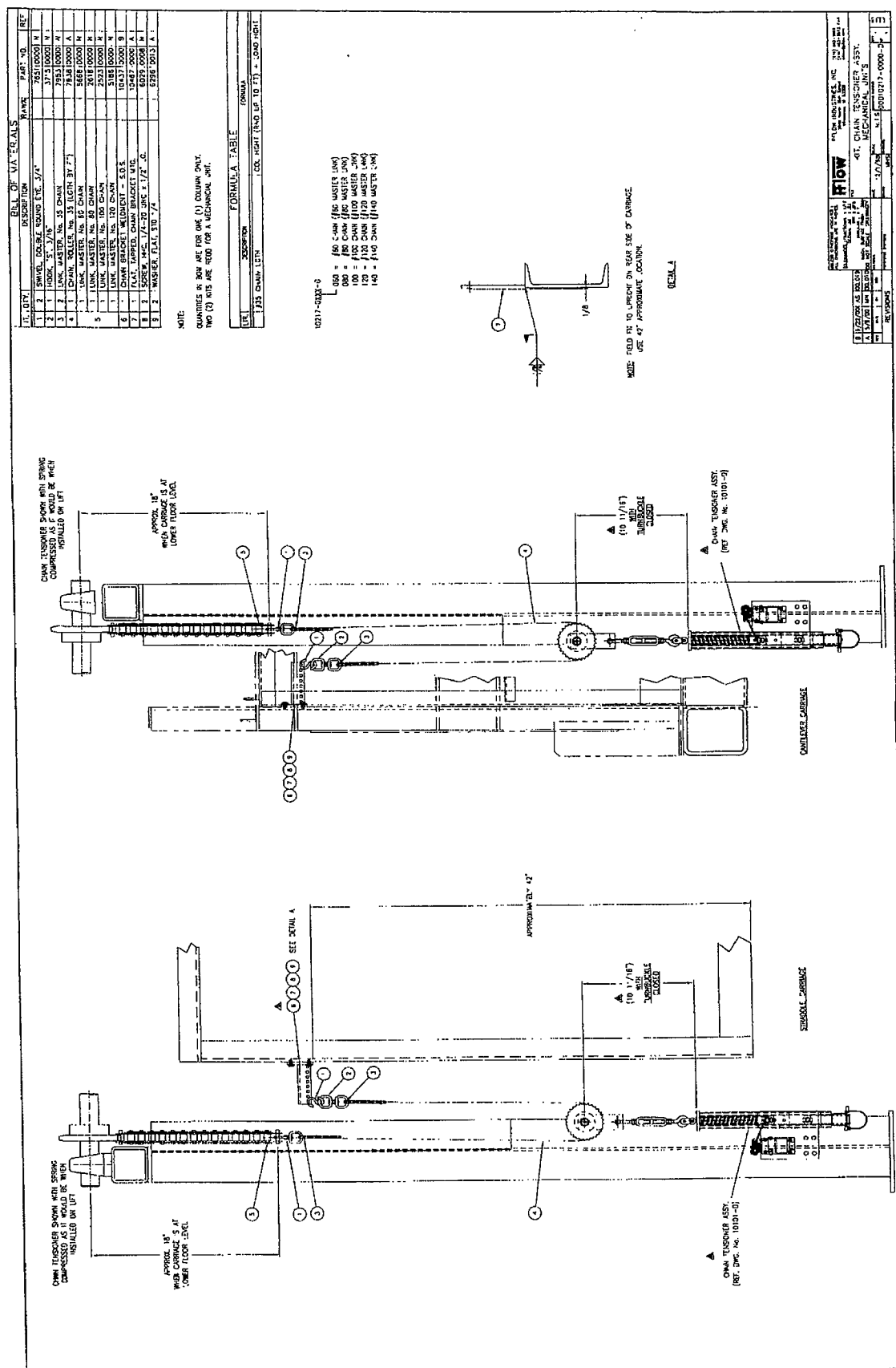
PFL-1293

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



PFL-1205

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



# Recommended Storage Requirements

## RECOMMENDED STORAGE REQUIREMENTS

### ENVIRONMENT

All components should be stored indoors. The area of storage should be kept at a constant temperature above 55 degrees and relative humidity of approximately 40%, free from heavy dust and contaminants. Outdoor storage is NOT recommended.

### STACKING

Except for placing the parts container and bracing on the empty carriage, stacking of the various gate components is strictly forbidden. Enclosure and gate panels will warp. Objects on top of the columns and drive base assembly may cause severe damage.

**LONG-TERM STORAGE**, more than two months after shipment, will require that the following maintenance procedures be performed every sixty days from date of shipment:

1. If CHAINS are stored for an extended period of time or in a corrosive environment, they may need to be dipped in a non-detergent oil to retain their original condition.
2. SPROCKETS should be coated lightly with a non-detergent oil to prevent corrosion.
3. SAFETY CAMS are a part of the WHEEL-BLOCK ASSEMBLY and should be lubricated with a non-detergent oil and rotated to ensure free operation.
4. DRIVE BASE ASSEMBLY. The drive base should be cycled. With the vent plug installed in the reducer, the drive base will need to have the motor/brake powered with temporary power of the correct voltage and the correct brake wiring configuration. This will rotate the drive shaft and cycle the brake once. The brake should also be cycled manually several times using the lever on the side of the motor. After rotating with temporary power, the vent plug should be removed and the original plug installed to prevent contamination of the reducer oil. Before initial use, the reducer oil should be changed.

5. PILLOWBLOCK BEARINGS have to be greased with lithium-type grease.
6. ELECTRICAL COMPONENTS should be plugged to prevent moisture and other contaminants from entering them. Store in a dry place to prevent corrosion.
7. PARTS CRATE must remain sealed and dry.

For units stored longer than six months, it is recommended that you contact the Product Support Department of Pflow Industries for additional information that may be available prior to starting up your unit.

Our warranty policy does not cover damage as a result of improper storage.

## ELECTRICAL TERMINOLOGY AND APPLICATIONS

### Ruling Bodies:

NEMA - National Electrical Manufacturers Association - (National testing and manufacturing standards body of electrical apparatus.)

UL - Underwriters Laboratories, Inc. - (Independent testing laboratory - some cities require UL control panels and electrical apparatus.)

JIC - Joint Industry Council - (Advisory group to provide standards for production equipment, safety and dependability.)

NFPA - National Fire Protection Association - (Ruling board of NEC - sets national fire/safety standards for equipment/plants.)

CSA - Canadian Standards Association - (Regulatory agency of Canada - CSA required stamp on electrical devices in Canada.)

ANSI - American National Standards Institute - (Adopts code; sets committees.)

ASME - American Society of Mechanical Engineers - (Writes codes - Secretariat for ANSI.)

NEC - National Electrical Code - (Advisory board to NFPA - their recommendation/codes are usually adopted throughout the USA.)

OTHERS - GM, Ford, Dupont, etc.  
Customers may have special plant specifications incorporating several ruling bodies or their own electrical code specifications.

### Pflow's Standard

NEMA type 1 classification is a general purpose, indoor only, usage. Only COMMERCIAL users generally accept this type: i.e., retail stores, mini storage, warehouses, etc.

#### NOTE

*INDUSTRY does not accept (this NEMA type 1): i.e., auto manufacturing, chemical manufacturing, and paper manufacturing.*

All other Pflow units are NEMA 12 classification in regard to the controls, push button stations, and electrical design built under the following standards:

JIC: EMP-1 Electrical standards for mass production equipment.

JIC: Electrical standards for general purpose machine tools.

NFPA 79: Electrical standard for industrial machinery

NEMA type 12 classification is an indoor only usage with gasket protection from dust, dirt, fiber flyings, dripping water, and external condensation of non-corrosive liquids.

#### NOTE

*If JIC is to be strictly adhered to, they require that all devices be minimum NEMA 12, rigid conduit, specific wire coloring, etc. (controls and field wiring).*

#### NOTE

*You should note that the NEMA rating of equipment is based on the electrical device(s) with the lowest NEMA type.*

EXAMPLES: 1) If we provide a JIC NEMA 12 standard control package with an Anderson or VA gate interlock, our NEMA rating goes to NEMA type 1; and we lose our JIC rating. 2) If we provide a GAL interlock, which has exposed electrical contacts, we rate no NEMA rating and lose our JIC rating. 3) If we provide EMT conduit or don't provide the proper JIC electrical field wiring techniques, we lose our JIC rating.

### Outdoor Application

Outdoor units or electrical devices exposed to severe weather conditions should not be rated less than NEMA type 4. This is a watertight, dust-tight indoor-outdoor classification that will provide protection against splashing water, seepage of water, falling or hose-directed water, and severe external condensation.

### Corrosive Application

The Chemical Industry on the whole usually specifies a minimum NEMA type 4X. A NEMA 4X rating is similar to a NEMA 4 with added corrosion resistance.

# Electrical Terminology and Applications

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## Hazardous Locations

Hazardous locations are an extremely specialized electrical classification. Few electrical experts exist in this field. All explosion-proof hazardous locations must be handled on an individual job site condition.

The NEC has three classes (I, II, III), - two divisions, (1 and 2) and seven group designations (A, B, C, D, E, F, and G).

### Class Definitions:

**CLASS I Locations:** Those in which flammable gasses or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

**CLASS II Locations:** Those where the presence of combustible dust presents a fire or explosion hazard.

**CLASS III Locations:** Those where easily ignitable fibers or flyings are present but not likely to be suspended in the air in quantities sufficient to produce ignitable mixtures.

### Division Definitions:

**DIVISION 1** is an extremely dangerous explosive condition that exists normally.

**DIVISION 2** is a dangerous explosive condition that could exist but usually does not.

**GROUP** designations are given by the NFPA, State Fire Marshals, insurance companies or consulting engineering firms according to the gasses/dust, etc. in the area and the spark or temperature needed to produce an explosion.

Currently, in order to provide competitive pricing in the hazardous location area, we are producing "intrinsically safe" control packages. Intrinsically safe is defined as: electrical devices provided cannot produce a spark or temperature hot enough to ignite the surrounding gasses/dust, etc.

## Optional Control Packages and Devices for Hazardous Locations

NEMA type 7, Class I, Division 1 and 2, Group A, B, C, or D enclosures shall be capable of withstanding the pressures resulting from an internal explosion of specified gas and shall contain such an explosion sufficiently so that an explosive gas mixture existing in the atmosphere will not be ignited.

NEMA type 9 is similar to NEMA type 7 but is rated for dust ignition-proof - Class II, Division 1 and 2, Groups E, F, or G.

# Warranty

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## PARTS

Structure .....Lifetime  
Manufactured Components.....One Year  
Purchased Components .....One Year

## LABOR

Structure .....Lifetime  
Manufactured Components .....One Year  
Purchased Components .....90 Days

## The Small Print

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.

We, the manufacturer, sincerely hope that you do not experience problems with the equipment. If you do, the following procedures should be followed:

## 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 from 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 problem;
  - Pflow serial number;
  - Labor hours per problem;
  - Rate per hour;
  - Travel time incurred;
  - Date work was performed;
  - Copies of receipts for materials purchased locally or labor subcontracted.

## 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 on-site repair time as determined by Pflow Industries.

# Installation Questionnaire

*We want to provide equipment that is built correctly and shipped complete. To achieve that, we need to know what errors are being made or what field problems you are experiencing. Please answer the following questions and return this form to the Product Support Department at Pflow Industries, Inc. If more space is required for comments, please use the reverse side.*

1. Was the unit received in good condition? Yes / No

If not, please describe damage:\_\_\_\_\_

2. Was the unit received complete? Yes / No

If not, what was missing?\_\_\_\_\_

3. Was the lift manufactured correctly? (Did it match the GA drawing?) Yes / No

If not, please describe the errors:\_\_\_\_\_

4. Did the unit (i.e., lift, gates, enclosures) fit? Yes / No

If not, please describe in detail the problem areas:\_\_\_\_\_

5. Did you return after the electrical was completed 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 electrical problems that you were aware of?

Was there a problem with the components? Yes / No

If yes, please describe:\_\_\_\_\_

Was there a problem with the field wiring? Yes / No

If yes, please describe:\_\_\_\_\_

6. Did you test the unit to full capacity? Yes / No

7. Did you test all gates to make sure that the unit does NOT operate if they are open? Yes / No

8. At each level, when the carriage is NOT present, can you open the gate? Yes / No

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

Pflow Job #:\_\_\_\_\_ Customer/User:\_\_\_\_\_

Questionnaire Completed By:\_\_\_\_\_ Date:\_\_\_\_\_

Company:\_\_\_\_\_ Phone:\_\_\_\_\_

PFLOW INDUSTRIES, INC., 6720 North Teutonia Avenue, Milwaukee, WI 53209  
Phone (414) 352-9000; Fax (414) 352-9002; 041406



# Acceptance Certification

*We accept this equipment as being properly installed, tested, and performing to our satisfaction. This form covers both the mechanical and electrical installation of the equipment and is 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.*

**JOB NO.:** \_\_\_\_\_ **JOB NAME:** \_\_\_\_\_

Site Mailing Address: \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

On-Site Contact for future follow-up:

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Ext. \_\_\_\_\_

**Tests Successfully Performed:** \_\_\_\_\_ Load test at \_\_\_\_\_ % of capacity \_\_\_\_\_ Operation  
\_\_\_\_\_ Gate/Interlock Operation Other: \_\_\_\_\_

## Personnel Instructed on the Operation:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Name: \_\_\_\_\_ Company: \_\_\_\_\_

## ACCEPTED BY:

Name: \_\_\_\_\_ Name: \_\_\_\_\_

Title: \_\_\_\_\_ Title: \_\_\_\_\_

Company: \_\_\_\_\_ Company: \_\_\_\_\_

Phone: \_\_\_\_\_ Phone: \_\_\_\_\_

## PFLOW PERSONNEL / REPRESENTATIVE / INSTALLER PRESENT:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

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

PFLOW INDUSTRIES, INC., 6720 North Teutonia Avenue, Milwaukee, WI 53209  
Phone (414) 352-9000; Fax (414) 352-9002; 040199



FROM: SANDY

MATERIAL SAFETY DATA SHEET - COMPLIES WITH 29 CFR 1910-1200

FORMAT A/GP

\*\*\*\*\* SECTION I \*\*\*\*\*

DATE PRINTED-03/06/01 REVISED-11-23-99

MANUFACTURERS NAME: CUSTOM-PAK PRODUCTS, INC.  
N115 W19150 EDISON DRIVE  
GERMANTOWN, WI 53022

MANUFACTURERS CODE I.D.: 13E032N-12

PRODUCT CLASS: AEROSOL PAINT

HMIS INFORMATION:  
HEALTH.....2  
FLAMMABILITY...4  
REACTIVITY.....1  
PROTECTIVE EQ..

INFORMATION TELEPHONE: (262) 251-6180

PRODUCT DESC: 00002871-0003-N

PFLOW BLUE

ENAMEL

24 HR EMERGENCY TELEPHONE: 1-800-688-4005

FOR EMERGENCY SITUATIONS REFERENCE 13E032N-12

PACKAGE FOR: 12TM/C C1113  
PFLOW INDUSTRIES, INC. 14TM/C  
MILWAUKEE, WI 53209 12TM/C

\*\*\*\*\* SECTION II - HAZARDOUS INGREDIENTS \*\*\*\*\*

INGREDIENT	CAS #	VOLATILE		VAPOR PRESSURE	OSHA	ACGIH	SARA 313	LISTED CARCINOGEN	
		%	LEL	mm Hg. @20C	PEL-PPM	TLV-PPM	LISTED	NTP	IARC OSHA
		BY WEIGHT							
ETHYL ACETATE	141-78-6	28.0	2.2	29.30	400	400	N	N	N
PROPANE	74-98-6	14.0	2.2	110.0	1000	1000	N	N	N
N-BUTANE	106-97-8	6.0	1.8	17.0	800	800	N	N	N
XYLENE	1330-20-7	5.0	1.0	5.1	100	100	Y	N	N
PM ACETATE	108-65-6	3.0	1.5	3.7	N/A	N/A	N	N	N
VM&P NAPHTHA/NAPHTHA	64742-89-8	3.0	.9	10.2	300	300	N	N	N
*TOLUENE	108-88-3	2.45	1.2	22.0	100	50	Y	N	N
ISOBUTYL ALCOHOL	78-83-1	2.0	1.7	8.0	100	50	N	N	N
ETHYLBENZENE	100-41-4	1.0	1.0	7.1	100	100	Y	N	N

\* SEE WARNING SECTION V

\*\*\*\*\* SECTION III - PHYSICAL DATA \*\*\*\*\*

BOILING RANGE: -43F to 340F % VOLATILE BY VOLUME: 90.33 VAPOR DENSITY: Heavier than Air APPEARANCE: Opaque Spray  
WEIGHT PER GALLON: 11.83 WATER SOLUABLITY: Negligible ODOR: Solvent Odor EVAPORATION RATE: Faster than Ether

\*\*\*\*\*SECTION IV - FIRE AND EXPLOSION HAZARD DATA \*\*\*\*\*

DOT PROPER SHIPPING NAME: CONSUMER COMMODITY ID NO.: UN1950 HAZARD CLASS: ORM-D-AIR  
PACKAGE GROUP: LABEL REQUIREMENT:

EXTINGUISHING MEDIA: Use (NFPA) CLASS B extinguisher, CO2 or foam. FLASH POINT: <12F LEL: See Section II

UNUSUAL FIRE AND EXPLOSION HAZARDS: Pressure build up due to heat exposure may cause containers to explode.  
Water may be used to cool ruptured containers.

SPECIAL FIRE FIGHTING PROCEDURES: Fight fire from safe distance. Wear full protective equipment,  
including self-contained breathing gear.

LEVEL 3 AEROSOL (NFPA 30B)

\*\*\*\*\* SECTION V - HEALTH HAZARD DATA \*\*\*\*\*

EFFECTS OF OVEREXPOSURE: (ACUTE) Anesthetic effect. Irritation of the respiratory tract or acute nervous system depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma. EYE.....Contact may cause redness, irritation, tearing and blurred vision. SKIN.....Contact may dry skin causing cracks and irritation. INGESTION..... May be harmful or fatal if swallowed.

(CHRONIC) Reports have associated repeated and prolonged occupational overexposure to solvents with liver, kidney, brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Asthma and other respiratory ailments. Chemical sensitization.

PRIMARY ROUTE(S) OF ENTRY: (X) DERMAL (X) INHALATION ( ) INGESTION ( ) EYES

EMERGENCY AND FIRST AID PROCEDURES: VAPORS.....Remove from exposure. Administer oxygen if necessary. Call a physician. EYES.....Immediately flush eyes with water for at least 15 minutes. Get medical attention. SKIN.....Remove contaminated clothing and shoes. Wash contact area with soap and water. Wash clothing and shoes before reuse. INGESTION.....Drink 1 or 2 glasses of water to dilute. Do not induce vomiting. Consult a physician or Poison Control Center immediately.

\* WARNING: Product contains a chemical(s) known to the State of California to cause cancer, birth defects or other reproductive harm.

\*\*\*\*\* SECTION VI - REACTIVE DATA \*\*\*\*\*

STABILITY: STABLE (X) UNSTABLE ( ). HAZARDOUS POLYMERIZATION; MAY OCCUR ( ) WILL NOT OCCUR (X)  
CONDITIONS TO AVOID: High temperatures and open flames. INCOMPATIBLE MATERIALS TO AVOID: Unknown  
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide.....Carbon Monoxide.

\*\*\*\*\* SECTION VII - SPILL OR LEAK PROCEDURE \*\*\*\*\*

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED: Eliminate all ignition sources. Provide ventilation. Collect spills with absorbent materials and non-sparking tools. See Section VIII for protective equipment.  
WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State and Local regulations. Do not incinerate containers.

\*\*\*\*\* SECTION VIII - SPECIAL PROTECTION INFORMATION/CONTROL MEASURES \*\*\*\*\*

RESPIRATORY PROTECTION: In open areas with unrestricted ventilation, an OSHA approved respirator to remove solid airborne particles of overspray may be used if prolonged and repeated exposure is likely. In areas with restricted ventilation, the use of OSHA approved chemical/mechanical filter designed to remove both particles and vapors is recommended.  
VENTILATION: Supply sufficient ventilation to keep air contaminant concentration below current OSHA (PEL) or ACGIH (TLV).  
PROTECTIVE GLOVES: Use protective gloves if contact with product is likely.  
OTHER PROTECTIVE EQUIPMENT: Safety glasses to prevent eye contact.  
HYGIENIC PRACTICES: Wash hands before eating or using washroom.

\*\*\*\*\* SECTION IX - SPECIAL PRECAUTIONS \*\*\*\*\*

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store in areas above 100F or near fire or open flame. When storing large quantities, storage conditions should comply with OSHA 1910.106.  
OTHER PRECAUTIONS: Prevent prolonged or repeated breathing of vapor or spray mist. Do not take internally. Keep out of reach of children. Use with adequate ventilation.

FROM: SANDY

MATERIAL SAFETY DATA SHEET - COMPLIES WITH 29 CFR 1910-1200

FORMAT A/GP

\*\*\*\*\* SECTION I \*\*\*\*\*

DATE PRINTED-03/06/01 REVISED-06-28-00

MANUFACTURERS NAME: CUSTOM-PAK PRODUCTS, INC.  
N115 W19150 EDISON DRIVE  
GERMANTOWN, WI 53022

MANUFACTURERS CODE I.D.: 18E025N-12  
PRODUCT CLASS: AEROSOL PAINT

HMIS INFORMATION:  
HEALTH.....2  
FLAMMABILITY...4  
REACTIVITY.....1  
PROTECTIVE EQ..

INFORMATION TELEPHONE: (262) 251-6180

PRODUCT DESC: 00002871-0004-N  
PFLOW PRIMER

24 HR EMERGENCY TELEPHONE: 1-800-688-4005

FOR EMERGENCY SITUATIONS REFERENCE 18E025N-12

PACKAGE FOR: 12TM/C C1113  
PFLOW INDUSTRIES, INC. 14TM/C  
MILWAUKEE, WI 53209 12TM/C

\*\*\*\*\* SECTION II - HAZARDOUS INGREDIENTS \*\*\*\*\*

INGREDIENT	CAS #	VOLATILE		VAPOR PRESSURE		OSHA	ACGIH	SARA 313	LISTED CARCINOGEN	
		%	LEL	mm Hg.	@20C	PEL-PPM	TLV-PPM	LISTED	NTP	IARC OSHA
		BY WEIGHT								
ACETONE	67-64-1	30.0	12.8	181.0	750	750	N	N	N	N
PROPANE	74-98-6	16.0	2.2	110.0	1000	1000	N	N	N	N
N-BUTANE	106-97-8	8.0	1.8	17.0	800	800	N	N	N	N
VM&P NAPHTHA/NAPHTHA	64742-89-8	5.0	.9	10.2	300	300	N	N	N	N
XYLENE	1330-20-7	3.0	1.0	5.1	100	100	Y	N	N	N
*TOLUENE	108-88-3	2.20	1.2	22.0	100	50	Y	N	N	N
ISOBUTYL ALCOHOL	78-83-1	1.0	1.7	8.0	100	50	N	N	N	N
GLYCOL ETHER EB	111-76-2	1.0	1.1	0.88	25	25	Y	N	N	N

\* SEE WARNING SECTION V

\*\*\*\*\* SECTION III - PHYSICAL DATA \*\*\*\*\*

BOILING RANGE: -43F to 340F % VOLATILE BY VOLUME: 99.90 VAPOR DENSITY: Heavier than Air APPEARANCE: Opaque Spray

WEIGHT PER GALLON: 11.89 WATER SOLUABILITY: Negligible ODOR: Solvent Odor EVAPORATION RATE: Faster than Ether

\*\*\*\*\*SECTION IV - FIRE AND EXPLOSION HAZARD DATA \*\*\*\*\*

DOT PROPER SHIPPING NAME: CONSUMER COMMODITY ID NO.: UN1950 HAZARD CLASS: ORM-D-AIR  
PACKAGE GROUP: LABEL REQUIREMENT:

EXTINGUISHING MEDIA: Use (NFPA) CLASS B extinguisher, CO2 or foam. FLASH POINT: <12F LEL: See Section II

UNUSUAL FIRE AND EXPLOSION HAZARDS: Pressure build up due to heat exposure may cause containers to explode.  
Water may be used to cool ruptured containers.

SPECIAL FIRE FIGHTING PROCEDURES: Fight fire from safe distance. Wear full protective equipment,  
including self-contained breathing gear.

LEVEL 3 AEROSOL (NFPA 30B)

\*\*\*\*\* SECTION V - HEALTH HAZARD DATA \*\*\*\*\*

EFFECTS OF OVEREXPOSURE: (ACUTE) Anesthetic effect. Irritation of the respiratory tract or acute nervous system depression characterized by headache, dizziness, staggering gait, confusion, unconsciousness or coma. EYE.....Contact may cause redness, irritation, tearing and blurred vision. SKIN.....Contact may dry skin causing cracks and irritation. INGESTION..... May be harmful or fatal if swallowed.

(CHRONIC) Reports have associated repeated and prolonged occupational overexposure to solvents with liver, kidney, brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: Asthma and other respiratory ailments. Chemical sensitization.

PRIMARY ROUTE(S) OF ENTRY: (X) DERMAL (X) INHALATION ( ) INGESTION ( ) EYES

EMERGENCY AND FIRST AID PROCEDURES: VAPORS.....Remove from exposure. Administer oxygen if necessary. Call a physician. EYES.....Immediately flush eyes with water for at least 15 minutes. Get medical attention. SKIN.....Remove contaminated clothing and shoes. Wash contact area with soap and water. Wash clothing and shoes before reuse. INGESTION.....Drink 1 or 2 glasses of water to dilute. Do not induce vomiting. Consult a physician or Poison Control Center immediately.

\* WARNING: Product contains a chemical(s) known to the State of California to cause cancer, birth defects or other reproductive harm.

\*\*\*\*\* SECTION VI - REACTIVE DATA \*\*\*\*\*

STABILITY: STABLE (X) UNSTABLE ( ). HAZARDOUS POLYMERIZATION; MAY OCCUR ( ) WILL NOT OCCUR (X)  
CONDITIONS TO AVOID: High temperatures and open flames. INCOMPATIBLE MATERIALS TO AVOID: Unknown  
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide.....Carbon Monoxide.

\*\*\*\*\* SECTION VII - SPILL OR LEAK PROCEDURE \*\*\*\*\*

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED: Eliminate all ignition sources. Provide ventilation. Collect spills with absorbent materials and non-sparking tools. See Section VIII for protective equipment.  
WASTE DISPOSAL METHOD: Dispose of in accordance with Federal, State and Local regulations. Do not incinerate containers.

\*\*\*\*\* SECTION VIII - SPECIAL PROTECTION INFORMATION/CONTROL MEASURES \*\*\*\*\*

RESPIRATORY PROTECTION: In open areas with unrestricted ventilation, an OSHA approved respirator to remove solid airborne particles of overspray may be used if prolonged and repeated exposure is likely. In areas with restricted ventilation, the use of OSHA approved chemical/mechanical filter designed to remove both particles and vapors is recommended.  
VENTILATION: Supply sufficient ventilation to keep air contaminant concentration below current OSHA (PEL) or ACGIH (TLV).  
PROTECTIVE GLOVES: Use protective gloves if contact with product is likely.  
OTHER PROTECTIVE EQUIPMENT: Safety glasses to prevent eye contact.  
HYGIENIC PRACTICES: Wash hands before eating or using washroom.

\*\*\*\*\* SECTION IX - SPECIAL PRECAUTIONS \*\*\*\*\*

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store in areas above 100F or near fire or open flame. When storing large quantities, storage conditions should comply with OSHA 1910.106.  
OTHER PRECAUTIONS: Prevent prolonged or repeated breathing of vapor or spray mist. Do not take internally. Keep out of reach of children. Use with adequate ventilation.



Division of Prime Leather Finishes  
1002 Hickory St. • Pewaukee, WI 53072  
(414) 691-1930 • FAX (414) 691-3892

## TECHNICAL INFORMATION

COATING NUMBER: 170GY023

DATE: September 24, 1999

DESCRIPTION: Grey H.S. Primer

WEIGHT PER GALLON, LBS: 11.99

TOTAL SOLIDS, % BY WEIGHT: 71.8

TOTAL SOLIDS, % BY VOLUME: 50.22

VISCOSITY: 21 " Zahn 3

VOC, AS SUPPLIED (LBS/GAL): 3.40

FLASHPOINT, CLOSED CUP (SETAFLASH): 70° F

APPLICATION METHOD: Spray

REDUCTION FOR APPLICATION: None

CURE SCHEDULE: Air Dry

GLOSS:

VOC AT APPLICATION, LBS/GAL: 3.40

M A T E R I A L   S A F E T Y   D A T A   S H E E T

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : GREY H S PRIMER  
 IDENTIFICATION NUMBER: 170GY023  
 PRODUCT USE/CLASS : Air dry primer

DATE PRINTED: 08/21/00

SUPPLIER:  
 Prime Coatings  
 1002 Hickory Street  
 Pewaukee WI 53072

MANUFACTURER:  
 Prime Coatings  
 1002 Hickory Street  
 Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930  
 7:30 am - 4:00 pm

EMERGENCY TELEPHONE: 414-691-1930  
 7:30 am - 4:00 pm

PREPARER: Lori Schneider, PHONE: 262-691-1930, PREPARE DATE: 08/21/00

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	CHEMICAL NAME	CAS NUMBER	WT/WT % EQUAL TO
01	VM&P Naphtha	8032-32-4	11.1 %
02	Xylene	1330-20-7	6.7 %
03	Toluene	108-88-3	5.0 %
04	Isobutanol	78-83-1	3.2 %
05	Ethyl benzene	100-41-4	1.7 %

EXPOSURE LIMITS						
ITEM	ACGIH		OSHA		COMPANY	SKIN
	TLV-TWA	TLV-STEL	PEL-TWA	PEL-CEILING		
01	300 ppm	N.E.	300 ppm	N.E.	N.E.	NO
02	100 ppm	150 ppm	100 ppm	150 ppm	N.E.	NO
03	50 ppm	N.E.	100 ppm	150 ppm	N.E.	YES
04	50 ppm	N.E.	50 ppm	N.E.	N.E.	NO
05	100 ppm	125 ppm	100 ppm		N.E.	NO

(See Section 16 for abbreviation legend)

SECTION 3 - HAZARDS IDENTIFICATION

\*\*\* EMERGENCY OVERVIEW \*\*\*: Flammable liquid! May cause eye irritation on contact. Overexposure to vapors may cause dizziness or headache. The International Agency for Research on Cancer has evaluated ethylbenzene and classified it as a possible human carcinogen (Group 2B) based on sufficient evidence of carcinogenicity in experimental animals, but inadequate evidence for cancer in exposed humans.

(Continued on Page 2)



**SECTION 3 - HAZARDS IDENTIFICATION**

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Can cause eye irritation, redness, tearing.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

EFFECTS OF OVEREXPOSURE - INHALATION: Excessive inhalation of vapors can cause nasal and respiratory irritation, and central nervous system effects such as dizziness, fatigue, nausea, headache.

EFFECTS OF OVEREXPOSURE - INGESTION: Can cause gastrointestinal irritation, nausea, vomiting, or diarrhea.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Possible reproductive hazard. Overexposure may cause kidney damage. May cause liver disorder (e.g., edema, proteinuria) and damage. May cause cardiovascular disorder and damage. May cause brain cell damage from deliberate and abusive inhalation of vapors. May affect the blood, causing anemia. Toluene and xylene have been found to be orotoxins, that is, exposure to these solvents may cause hearing loss. More severe effects can result when chemical exposure is combined with noise exposure, even if these exposures are below the recommended limits.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION

**SECTION 4 - FIRST AID MEASURES**

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

FIRST AID - SKIN CONTACT: Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Aspiration of this material into the lungs may cause chemical pneumonitis, which may be fatal.

**SECTION 5 - FIRE FIGHTING MEASURES**

FLASH POINT: 70 F  
(TAGLIABUE CLOSED CUP)

LOWER EXPLOSIVE LIMIT: 0.9 %  
UPPER EXPLOSIVE LIMIT: 7.0 %

(Continued on Page 3)

SECTION 5 - FIRE FIGHTING MEASURES
------------------------------------

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL FOAM

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors can travel along the ground to a source of ignition and flashback. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures at or above the flashpoint.

SPECIAL FIREFIGHTING PROCEDURES: Containers can build up pressure if exposed to heat (fire). As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Use water with caution. Since this material may be lighter than water and insoluble, use of water may spread the fire.

SECTION 6 - ACCIDENTAL RELEASE MEASURES
---

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid runoff into storm sewers and ditches which lead to waterways. Absorb small spills with inert material and place in chemical waste container. For a large spill: dike area of spill and pump to salvage container. Collect remainder on inert material and place in chemical waste container. Wear organic vapor respirator. Remove all sparks, flames, and other sources of ignition from the area and allow any hot surfaces to cool. Use non-sparking tools only. Ventilate area thoroughly.

SECTION 7 - HANDLING AND STORAGE
----------------------------------

HANDLING: "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, 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. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of. Wash thoroughly after handling. Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment.

STORAGE: Keep away from heat, sparks and flame. Keep container closed when not in use.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION
---

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

(Continued on Page 4)

**SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION**

**RESPIRATORY PROTECTION:** NIOSH/MSHA approved respirator should be worn to avoid inhalation. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product. Ventilation rates must be maintained to keep exposure below the TLV or PEL. Otherwise, an approved organic vapor respirator must be used. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

**SKIN PROTECTION:** Gloves should be worn to avoid prolonged skin contact. Chemically resistant gloves should be worn if contact is likely.

**EYE PROTECTION:** Wear safety glasses with side shields or goggles.

**OTHER PROTECTIVE EQUIPMENT:** Where splashing is possible, an impermeable apron and boots should be worn.

**HYGIENIC PRACTICES:** Wash hands before eating. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Avoid contact with eyes, skin, and clothing.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

BOILING RANGE	: 226 - 285 F	VAPOR DENSITY	: Is heavier than air
ODOR	: Solvent	ODOR THRESHOLD	: N.D.
APPEARANCE	: Liquid	EVAPORATION RATE:	Is faster than Butyl Acetate
SOLUBILITY IN H2O	: None	SPECIFIC GRAVITY:	1.4457
FREEZE POINT	: N.D.	pH @ 0.0 %	: N.D.
VAPOR PRESSURE	: N.D.	VISCOSITY	: N.D.
PHYSICAL STATE	: N.D.		
WEIGHT % SOLIDS	: 71.80		

(See Section 16 for abbreviation legend)

**SECTION 10 - STABILITY AND REACTIVITY**

**CONDITIONS TO AVOID:** Hazardous polymerization will not occur.

**INCOMPATIBILITY:** Avoid contact with oxidizing agents.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Burning may produce carbon dioxide and carbon monoxide. Products containing nitrocellulose produce oxides of nitrogen if burned.

**HAZARDOUS POLYMERIZATION:** Will not occur under normal conditions.

**STABILITY:** This product is stable under normal storage conditions.

(Continued on Page 5)

**SECTION 11 - TOXICOLOGICAL PROPERTIES**

No product or component toxicological information is available.

Toxic section 11B: No Information.

**SECTION 12 - ECOLOGICAL INFORMATION**

ECOLOGICAL INFORMATION: No Information.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

DISPOSAL METHOD: This material is a RCRA hazardous waste due to ignitability. Some components may be listed wastes or on the land ban form. Comply with all applicable federal, state, and local regulations when disposing of this material. This material may be fuel blended. This material may be sent to a recycler for solvent recovery.

**SECTION 14 - TRANSPORTATION INFORMATION**

DOT PROPER SHIPPING NAME: Paint

DOT TECHNICAL NAME:

DOT HAZARD CLASS: 3

HAZARD SUBCLASS:

DOT UN/NA NUMBER: UN 1263

PACKING GROUP: II

RESP. GUIDE PAGE: 127

**SECTION 15 - REGULATORY INFORMATION**

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

CERCLA - SARA HAZARD CATEGORY:

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD FIRE HAZARD

(Continued on Page 6)

SECTION 15 - REGULATORY INFORMATION
-------------------------------------

## SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

----- CHEMICAL NAME -----	CAS NUMBER	WT/WT %
Xylene	1330-20-7	6.7 %
Toluene	108-88-3	5.0 %
Ethyl benzene	100-41-4	1.7 %
Cobalt compounds		0.1 %

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

SECTION 16 - OTHER INFORMATION
--------------------------------

HMIS RATINGS - HEALTH: 1      FLAMMABILITY: 3      REACTIVITY: 0

PREVIOUS MSDS REVISION DATE: 09/21/99

VOLATILE ORGANIC COMPOUNDS (VOCS): 3.40 lbs/gal,    407 grams/ltr

LEGEND: N.A. - Not Applicable, N.E. - Not Established,  
N.D. - Not Determined

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The information contained on this MSDS has been checked and should be accurate. However, it is the responsibility of the user to comply with all Federal, State, and Local laws and regulations.

---

&lt;END OF MSDS&gt;



Division of Prime Leather Finishes  
1002 Hickory St. • Pewaukee, WI 53072  
(414) 691-1930 • FAX (414) 691-3892

## TECHNICAL INFORMATION

**COATING NUMBER:** 170BE031

**DATE:** 27 September 1999

**DESCRIPTION:** High-Solids Blue Enamel

**WEIGHT PER GALLON, LBS:** 11.86

**TOTAL SOLIDS, % BY WEIGHT:** 71.4

**TOTAL SOLIDS, % BY VOLUME:** 51.5

**VISCOSITY:** 19 Seconds Zahn 3/ 74° F

**VOC, AS SUPPLIED (LBS/GAL):** 3.4

**FLASHPOINT, CLOSED CUP (SETAFLASH):** Per MSDS

**APPLICATION METHOD:** Conventional spray

**REDUCTION FOR APPLICATION:** None Required

**CURE SCHEDULE:** Dry to touch 30- 1 hour

**GLOSS:** 12-16 (60°)

**VOC AT APPLICATION, LBS/GAL:** 3.40

# M A T E R I A L   S A F E T Y   D A T A   S H E E T

## SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : BLUE ENAMEL  
 IDENTIFICATION NUMBER: 170BE031  
 PRODUCT USE/CLASS :

DATE PRINTED: 08/21/00

SUPPLIER:  
 Prime Coatings  
 1002 Hickory Street  
 Pewaukee WI 53072

MANUFACTURER:  
 Prime Coatings  
 1002 Hickory Street  
 Pewaukee WI 53072

EMERGENCY TELEPHONE: 414-691-1930  
 7:30 am - 4:00 pm

EMERGENCY TELEPHONE: 414-691-1930  
 7:30 am - 4:00 pm

PREPARER: Lori Schneider, PHONE: 262-691-1930, PREPARE DATE: 08/21/00

## SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	CHEMICAL NAME	CAS NUMBER	WT/WT % EQUAL TO
01	Xylene	1330-20-7	9.3 %
02	VM&P Naphtha	8032-32-4	5.2 %
03	Toluene	108-88-3	4.9 %
04	Isobutanol	78-83-1	3.4 %
05	Methoxy propyl acetate	108-65-6	2.6 %
06	Ethyl benzene	100-41-4	2.3 %

ITEM	EXPOSURE LIMITS					SKIN
	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING	COMPANY TLV-TWA	
01	100 ppm	150 ppm	100 ppm	150 ppm	N.E.	NO
02	300 ppm	N.E.	300 ppm	N.E.	N.E.	NO
03	50 ppm	N.E.	100 ppm	150 ppm	N.E.	YES
04	50 ppm	N.E.	50 ppm	N.E.	N.E.	NO
05	N.E.	N.E.	N.E.	N.E.	N.E.	NO
06	100 ppm	125 ppm	100 ppm		N.E.	NO

(See Section 16 for abbreviation legend)

## SECTION 3 - HAZARDS IDENTIFICATION

\*\*\* EMERGENCY OVERVIEW \*\*\*: Flammable liquid! May cause eye irritation on contact. Overexposure to vapors may cause dizziness or headache. The International Agency for Research on Cancer has evaluated ethylbenzene and classified it as a possible human carcinogen (Group 2B) based on sufficient

(Continued on Page 2)

SECTION 3 - HAZARDS IDENTIFICATION
------------------------------------

evidence of carcinogenity in experimental animals, but inadequate evidence for cancer in exposed humans.

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Can cause eye irritation, redness, tearing.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

EFFECTS OF OVEREXPOSURE - INHALATION: Excessive inhalation of vapors can cause nasal and respiratory irritation, and central nervous system effects such as dizziness, fatigue, nausea, headache.

EFFECTS OF OVEREXPOSURE - INGESTION: Can cause gastrointestinal irritation, nausea, vomiting, or diarrhea.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Possible reproductive hazard. Overexposure may cause kidney damage. May cause liver disorder (e.g., edema, proteinuria) and damage. May cause cardiovascular disorder and damage. May cause brain cell damage from deliberate and abusive inhalation of vapors. May affect the blood, causing anemia. Toluene and xylene have been found to be orotoxins, that is, exposure to these solvents may cause hearing loss. More severe effects can result when chemical exposure is combined with noise exposure, even if these exposures are below the recommended limits.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION

SECTION 4 - FIRST AID MEASURES
--------------------------------

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

FIRST AID - SKIN CONTACT: Wash with soap and water. Get medical attention if irritation develops or persists. Wash contaminated clothing before reuse.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, do NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Aspiration of this material into the lungs may cause chemical pneumonitis, which may be fatal.

(Continued on Page 3)



**SECTION 5 - FIRE FIGHTING MEASURES**

FLASH POINT: 70 F  
(TAGLIABUE CLOSED CUP)

LOWER EXPLOSIVE LIMIT: 0.9 %  
UPPER EXPLOSIVE LIMIT: 13.1 %

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL FOAM WATER FOG

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors can travel along the ground to a source of ignition and flashback. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures at or above the flashpoint.

SPECIAL FIREFIGHTING PROCEDURES: Containers can build up pressure if exposed to heat (fire). As in any fire, wear self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Use water with caution. Since this material may be lighter than water and insoluble, use of water may spread the fire.

**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid runoff into storm sewers and ditches which lead to waterways. Absorb small spills with inert material and place in chemical waste container. For a large spill: dike area of spill and pump to salvage container. Collect remainder on inert material and place in chemical waste container. Wear organic vapor respirator. Remove all sparks, flames, and other sources of ignition from the area and allow any hot surfaces to cool. Use non-sparking tools only. Ventilate area thoroughly.

**SECTION 7 - HANDLING AND STORAGE**

HANDLING: "Empty" containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, 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. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of. Wash thoroughly after handling. Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment.

STORAGE: Keep away from heat, sparks and flame. Keep container closed when not in use.

(Continued on Page 4)

**SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION**

**ENGINEERING CONTROLS:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

**RESPIRATORY PROTECTION:** NIOSH/MSHA approved respirator should be worn to avoid inhalation. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product. Ventilation rates must be maintained to keep exposure below the TLV or PEL. Otherwise, an approved organic vapor respirator must be used. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

**SKIN PROTECTION:** Gloves should be worn to avoid prolonged skin contact. Chemically resistant gloves should be worn if contact is likely.

**EYE PROTECTION:** Wear safety glasses with side shields or goggles.

**OTHER PROTECTIVE EQUIPMENT:** Where splashing is possible, an impermeable apron and boots should be worn.

**HYGIENIC PRACTICES:** Wash hands before eating. Remove contaminated clothing and wash before reuse. Use only in a well ventilated area. Avoid contact with eyes, skin, and clothing.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

BOILING RANGE	: 226 - 285 F	VAPOR DENSITY	: Is heavier than air
ODOR	: Solvent odor	ODOR THRESHOLD	: N.D.
APPEARANCE	: Blue liquid	EVAPORATION RATE:	Is faster than Butyl Acetate
SOLUBILITY IN H2O	: None	SPECIFIC GRAVITY:	1.4248
FREEZE POINT	: N.D.	pH @ 0.0 %	: N.D.
VAPOR PRESSURE	: N.D.	VISCOSITY	: N.D.
PHYSICAL STATE	: N.D.		
WEIGHT % SOLIDS	: 71.36		

(See Section 16 for abbreviation legend)

**SECTION 10 - STABILITY AND REACTIVITY**

**CONDITIONS TO AVOID:** Hazardous polymerization will not occur.

**INCOMPATIBILITY:** Avoid contact with oxidizing agents.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Burning may produce carbon dioxide and carbon monoxide. Products containing nitrocellulose produce oxides of nitrogen if burned.

**HAZARDOUS POLYMERIZATION:** Will not occur under normal conditions.

**STABILITY:** This product is stable under normal storage conditions.

(Continued on Page 5)

**SECTION 11 - TOXICOLOGICAL PROPERTIES**

No product or component toxicological information is available.

Toxic section 11B: No Information.

**SECTION 12 - ECOLOGICAL INFORMATION**

ECOLOGICAL INFORMATION: No Information.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

DISPOSAL METHOD: This material is a RCRA hazardous waste due to ignitability. Some components may be listed wastes or on the land ban form. Comply with all applicable federal, state, and local regulations when disposing of this material. This material may be fuel blended. This material may be sent to a recycler for solvent recovery.

**SECTION 14 - TRANSPORTATION INFORMATION**

DOT PROPER SHIPPING NAME: Paint

DOT TECHNICAL NAME:

DOT HAZARD CLASS: 3

HAZARD SUBCLASS:

DOT UN/NA NUMBER: UN-1263

PACKING GROUP: II

RESP. GUIDE PAGE: 127

**SECTION 15 - REGULATORY INFORMATION**

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

CERCLA - SARA HAZARD CATEGORY:

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD FIRE HAZARD

(Continued on Page 6)

SECTION 15 - REGULATORY INFORMATION
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## SARA SECTION 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

----- CHEMICAL NAME -----	CAS NUMBER	WT/WT %
Xylene	1330-20-7	9.3 %
Toluene	108-88-3	4.9 %
Ethyl benzene	100-41-4	2.3 %
Cobalt compounds		0.1 %

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

SECTION 16 - OTHER INFORMATION
--------------------------------

HMIS RATINGS - HEALTH: 1      FLAMMABILITY: 3      REACTIVITY: 0

PREVIOUS MSDS REVISION DATE: 09/29/99

VOLATILE ORGANIC COMPOUNDS (VOCS): 3.40 lbs/gal,      407 grams/ltr

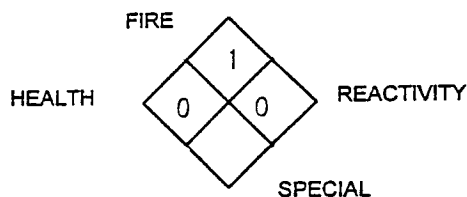
LEGEND: N.A. - Not Applicable, N.E. - Not Established,  
N.D. - Not Determined

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The information contained on this MSDS has been checked and should be accurate. However, it is the responsibility of the user to comply with all Federal, State, and Local laws and regulations.

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&lt;END OF MSDS&gt;



#### HAZARD CODE

- 0. INSIGNIFICANT
- 1. SLIGHT
- 2. MODERATE
- 3. HIGH
- 4. EXTREME

## MATERIAL SAFETY DATA SHEET

This form complies with OSHA's Hazard Communication Standard 29 CFR 1910.1200

### SECTION I - Material Identification

Identity: COMPLITH RT (all grades)

Date: 09/23/93

Benz Oil, Inc.  
2724 W. Hampton Ave.  
Milwaukee, WI 53209

Emergency Ph# (414) 442-2900  
Information Ph# (414) 442-2900

### SECTION II - Hazardous Ingredients/Identity Information

Hazardous Components	OSHA PEL	ACGIH TLV	Other	Approx %
Mineral Oil				90
Lithium Stearate				8
Zinc Diamyldithiocarbamate				2

### SECTION III - Physical/Chemical Characteristics

Initial Boiling Point min.	500°F	Specific Gravity (H <sub>2</sub> O=1)	0.9
Vapor Pressure @ 20°C max.	0.01	Melting Point °F	NA
Vapor Density min. (AIR=1)	5	Evaporation Rate (Bu Ace=1)	NIL

Water Solubility: Very slight at room temperature

Appearance & Odor: Red greasy substance

### SECTION IV - Fire & Explosion Hazard Data

Flash Point °F COC	400+	Flammability Limits	LEL %: NA	UEL %: NA
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Extinguishing Media: Carbon dioxide, water spray, foam, dry chemical

Fire fighting procedures and explosion hazards

Directly spraying extinguishing media onto hot burning product may cause frothing and spreading of fire.  
Use self-contained breathing apparatus for fighting fires in enclosed areas.

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**SECTION V - Reactivity Data**

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Stability	Stable	X	Hazardous Polymerization	Will not occur	X
	Unstable			Will occur	

Incompatibility: Avoid contact with strong oxidants such as chlorine gas

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Decomposition Products: Fumes, smoke, COx, SOx, NOx, when combusted

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**SECTION VI - Health Hazard Data**

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Routes of entry:	Inhalation	X	Skin	X	Ingestion	X
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**Health Hazards**

Product has a low order of acute, oral, and dermal toxicity.

Product contacting the eyes may cause irritation.

Repeated skin contact may cause skin irritation or dermatitis because these types of products tend to remove natural emollients from the skin.

This product is not listed as a carcinogen by NTP, IARC or OSHA

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Symptoms of Exposure: Reddening and irritation of eyes or skin.

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Conditions Aggravated by Exposure: Pre-existing dermatitis or skin diseases

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**First Aid Procedures**

Skin contact: Wash with a mild soap containing lanoline or other emollients.

Eye contact: Flush eyes with clear water for 15 minutes and contact a physician if irritation persists.

Ingestion: Do not induce vomiting. Contact a physician.

Inhalation: Remove to fresh air.

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**SECTION VII - Precautions for Safe Handling and Use**

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**Spill, Leak & Disposal Procedures**

Recover free product. Add sand, earth, or other absorbent to spill. Minimize skin contact. Keep product out of sewers and waterways. Advise authorities of large spills. Dispose of material in a licensed landfill or incineration facility in accordance with local, state and federal regulations.

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**Handling & Storage Procedures**

Store away from heat, sparks and other ignition sources. "Empty" containers retain residual oil. Do not pressurize, cut, weld, solder, drill, grind or expose drums to other ignition sources.

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**SECTION VIII - Control Measures**

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In most cases, good personal hygiene is all that is needed for safe, trouble-free use of this product. Splash goggles and oil resistant gloves may be useful in certain applications. Under normal conditions of use, local exhaust provides sufficient ventilation. Use an organic vapor mask if TLV is exceeded.

**COMPLITH RT**

Complith RT is a premium quality Red, Tacky lithium complex grease. It is formulated to meet the highest performance requirements of chassis and wheel bearing greases. Complith 1RT and 2RT meet the SAE GC/LB performance specifications. Complith is also an excellent lubricant for industrial applications. Below are its performance properties:

NLGI GRADE	0	1	2
SAE/ASTM Grade	-	GC/LB	GC/LB
Worked Penetration	370	320	280
Dropping Point, °F	475	505	518
Rust Protection	Pass	Pass	Pass
High Temperature Life, Hrs.	NA	120	120
Extreme Pressure Performance			
Load Wear Index	62	33	32
Weld Point	315	315	315
Timken OK Load, Min.	50	70	70
Antiwear Performance			
4-Ball Scar Dia. mm	.5	.5	.4
Oil Separation, % W	NA	3	2
Leakage Tendency, grams	NA	8	6
Water Washout Resistance % @ 80° C	NA	11.0	9.5
Fretting Protection, g. loss	NA	8	5
Low Temp. Torque @ -40°F, Nm	2.6	5.7	8.5
Elastomer Compatibility			
CR Vol. Change	14	12	10
CR Hardness Change	-2	-2	-2
NBR-L Vol. Change	13	10	7
NBR-L Hardness Change	-4	-3	-4
Flash Point, °F	480	480	480
Mineral Oil Viscosity			
SUS @ 100°F	2200	2200	2200
SUS @ 210°F	140	140	140
Color	Red	Red	Red
Texture	Tacky	Tacky	Tacky
Thickener	Li Complex	Li Complex	Li Complex

Form 0076

# MATERIAL SAFETY DATA SHEET

## SEW Eurodrive (Reducer Oil)

Ref #1 MOB-01

EEO Project SEW-HEF93

### HAZARD EVALUATION FORM (HEF)

**SEW EURODRIVE, INC.**

The purpose of the "HEF" is to assemble hazard information from the MSDS comply with OSHA Hazard Communication Standard (29CFR1910.1200) and with EPA SARA Title III. (The HEF does not replace the manufacturer's MSDS).

SEW CHEMICAL GROUP: OIL

PRODUCT TRADENAME: MOBIL GEAR 630

MANUFACTURER: MOBIL OIL CO.

#### OSHA HAZARD CATEGORIES

N :Combustible Liquid	N :Highly Toxic	:Liver
N :Compressed Gas	N :Toxic	:Kidney
N :Explosive	N :Corrosive	:Nervous sys.
N :Flammable	:Irritant	:Blood/Heart
N :Oxidizer	:Sensitizer	:Reproductive
N :Organic Peroxide	N :Carcinogenic	:Derm (Skin)
N :Unstable	:Eye	
N :Water Reactive	:Pulmonary	
N :Air Reactive		

Comments

NO HAZ STATEMENT FOR OSHA



610873

## MOBIL OIL CORPORATION MATERIAL SAFETY DATA BULLETIN

REVISED: 12/08/89

\*\*\*\*\* I. PRODUCT IDENTIFICATION\*\*\*\*\*  
MOBILGEAR 630

SUPPLIER:	HEALTH EMERGENCY TELEPHONE:
MOBIL OIL CORP.	(609) 737-4411
CHEMICAL NAMES AND SYNONYMS:	TRANSPORT EMERGENCY TELEPHONE:
PET. HYDROCARBONS AND ADDITIVES	(800) 424-9300 (CHEMTREC)
USE OR DESCRIPTION:	PRODUCT TECHNICAL INFORMATION:
INDUSTRIAL GEAR OIL	(800) 662-4525

## \*\*\*\*\* II. TYPICAL CHEMICAL AND PHYSICAL PROPERTIES\*\*\*\*\*

APPEARANCE: ASTM 6.0 LIQUID	ODOR: MILD	PH: NA
VISCOSITY AT 100 F, SUS: 1100.0 AT 40 C, CS: 209.0		
VISCOSITY AT 210 F, SUS: 92.0 AT 100C, CS: 18.0		
FLASH POINT F(C): > 420(216) (ASTM D-92)	POUR POINT F(C): 0(-18)	
MELTING POINT F(C): NA		
BOILING POINT F(C): > 600(316)		
RELATIVE DENSITY, 15/4 C: 0.89	SOLUBILITY IN WATER: NEGLIGIBLE	
VAPOR PRESSURE-MM HG 20C: < .1		

NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES  
FOR FURTHER INFORMATION, CONTACT YOUR LOCAL MARKETING OFFICE.

\*\*\*\*\* III. INGREDIENTS\*\*\*\*\*  

	WT PCT	EXPOSURE LIMITS	SOURCES
	(APPROX)	MG/M3	PPM (AND NOTES)

POTENTIAL HAZARDOUS INGREDIENTS:  
NONE

OTHER INGREDIENTS:

REFINED MINERAL OILS	> 95
ADDITIVES AND/OR OTHER INGREDIENTS	< 5

SEE SECTION XII FOR COMPONENT REGULATORY INFORMATION.

SOURCES: A=ACGIH-TLV, A\*=SUGGESTED-TLV, M=MOBIL, O=OSHA, S=SUPPLIER  
NOTE: LIMITS SHOWN FOR GUIDANCE ONLY. FOLLOW APPLICABLE REGULATIONS.

\*\*\*\*\* IV. HEALTH HAZARD DATA\*\*\*\*\*  
--- INCLUDES AGGRAVATED MEDICAL CONDITIONS, IF ESTABLISHED ---  
THRESHOLD LIMIT VALUE: 5.00 MG/M3 SUGGESTED FOR OIL MIST  
EFFECTS OF OVEREXPOSURE: SLIGHT SKIN IRRITATION.\*\*\*\*\* V. EMERGENCY AND FIRST AID PROCEDURES\*\*\*\*\*  
--- FOR PRIMARY ROUTES OF ENTRY ---

EYE CONTACT: FLUSH WITH WATER.  
SKIN CONTACT: WASH CONTACT AREAS WITH SOAP AND WATER.  
INHALATION: NOT EXPECTED TO BE A PROBLEM.  
INGESTION: NOT EXPECTED TO BE A PROBLEM. HOWEVER, IF GREATER THAN 1/2 LITER (PINT) INGESTED, IMMEDIATELY GIVE 1 TO 2 GLASSES OF WATER AND CALL A PHYSICIAN, HOSPITAL EMERGENCY ROOM OR POISON CONTROL CENTER FOR ASSISTANCE. DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

## \*\*\*\*\* VI. FIRE AND EXPLOSION HAZARD DATA \*\*\*\*\*

FLASH POINT F(C): > 420(216) (ASTM D-92)

FLAMMABLE LIMITS. LEL: .6 UEL: 7.0

EXTINGUISHING MEDIA: CARBON DIOXIDE, FOAM, DRY CHEMICAL AND WATER FOG.

SPECIAL FIRE FIGHTING PROCEDURES: WATER OR FOAM MAY CAUSE FROTHING.

USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURE. FOR FIRES IN ENCLOSED AREAS, FIREFIGHTERS MUST USE SELF-CONTAINED BREATHING APPARATUS. PREVENT RUNOFF FROM FIRE CONTROL OR DILUTION FROM ENTERING STREAMS OR DRINKING WATER SUPPLY.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

NFPA HAZARD ID: HEALTH: 0, FLAMMABILITY: 1, REACTIVITY: 0

## \*\*\*\*\* VII. REACTIVITY DATA \*\*\*\*\*

STABILITY (THERMAL, LIGHT, ETC.): STABLE

CONDITIONS TO AVOID: EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

## \*\*\*\*\* VIII. SPILL OR LEAK PROCEDURE \*\*\*\*\*

ENVIRONMENTAL IMPACT: REPORT SPILLS AS REQUIRED TO APPROPRIATE AUTHORITIES.

U.S. COAST GUARD REGULATIONS REQUIRE IMMEDIATE REPORTING OF SPILLS THAT COULD REACH ANY WATERWAY INCLUDING INTERMITTENT DRY CREEKS. REPORT SPILL TO COAST GUARD TOLL FREE NUMBER 800-424-8802.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED: ADSORB ON FIRE RETARDANT TREATED SAWDUST, DIATOMACEOUS EARTH, ETC. SHOVEL UP AND DISPOSE OF AT AN APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.

WASTE MANAGEMENT: PRODUCT IS SUITABLE FOR BURNING IN AN ENCLOSED, CONTROLLED BURNER FOR FUEL VALUE OR DISPOSAL BY SUPERVISED INCINERATION. SUCH BURNING MAY BE LIMITED PURSUANT TO THE RESOURCE CONSERVATION AND RECOVERY ACT. IN ADDITION, THE PRODUCT IS SUITABLE FOR PROCESSING BY AN APPROVED RECYCLING FACILITY OR CAN BE DISPOSED OF AT ANY GOVERNMENT APPROVED WASTE DISPOSAL FACILITY. USE OF THESE METHODS IS SUBJECT TO USER COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS AND CONSIDERATION OF PRODUCT CHARACTERISTICS AT TIME OF DISPOSAL.

## \*\*\*\*\* IX. SPECIAL PROTECTION INFORMATION \*\*\*\*\*

EYE PROTECTION: NO SPECIAL EQUIPMENT REQUIRED.

SKIN PROTECTION: NO SPECIAL EQUIPMENT REQUIRED. HOWEVER, GOOD PERSONAL HYGIENE PRACTICES SHOULD ALWAYS BE FOLLOWED.

RESPIRATORY PROTECTION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

VENTILATION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE VENTILATION.

## \*\*\*\*\* X. SPECIAL PRECAUTIONS \*\*\*\*\*

NO SPECIAL PRECAUTIONS REQUIRED.

\*\*\*\*\* XI. TOXICOLOGICAL DATA \*\*\*\*\*

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): LD50: > 5 G/KG SLIGHTLY TOXIC (ESTIMATED) ---

BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY (RABBITS): LD50: > 2 G/KG SLIGHTLY TOXIC (ESTIMATED) ---

BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

INHALATION TOXICITY (RATS): NOT APPLICABLE ---HARMFUL CONCENTRATIONS OF MISTS AND/OR VAPORS ARE UNLIKELY TO BE ENCOUNTERED THROUGH ANY CUSTOMARY OR REASONABLY FORESEEABLE HANDLING, USE, OR MISUSE OF THIS PRODUCT.

EYE IRRITATION (RABBITS): EXPECTED TO BE NON-IRRITATING. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SKIN IRRITATION (RABBITS): MAY CAUSE SLIGHT IRRITATION ON PROLONGED OR REPEATED CONTACT. ---BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

--- SUBCHRONIC TOXICOLOGY (SUMMARY) ---

SEVERELY SOLVENT REFINED AND SEVERELY HYDROTREATED MINERAL BASE OILS HAVE BEEN TESTED AT MOBIL ENVIRONMENTAL AND HEALTH SCIENCES LABORATORY BY DERMAL APPLICATION TO RATS 5 DAYS/WEEK FOR 90 DAYS AT DOSES SIGNIFICANTLY HIGHER THAN THOSE EXPECTED DURING NORMAL INDUSTRIAL EXPOSURE. EXTENSIVE EVALUATIONS INCLUDING MICROSCOPIC EXAMINATION OF INTERNAL ORGANS AND CLINICAL CHEMISTRY OF BODY FLUIDS SHOWED NO ADVERSE EFFECTS.

--- CHRONIC TOXICOLOGY (SUMMARY) ---

THE BASE OILS IN THIS PRODUCT ARE SEVERELY SOLVENT REFINED AND/OR SEVERELY HYDROTREATED. TWO YEAR MOUSE SKIN PAINTING STUDIES OF SIMILAR OILS SHOWED NO EVIDENCE OF CARCINOGENIC EFFECTS.

# Mobil

MOBILGEAR 630

610873

\*\*\*\*\* XII. REGULATORY INFORMATION \*\*\*\*\*

GOVERNMENTAL INVENTORY STATUS: ALL COMPONENTS REGISTERED IN ACCORDANCE WITH TSCA.

D.O.T. SHIPPING NAME: NOT APPLICABLE

D.O.T. HAZARD CLASS: NOT APPLICABLE

US OSHA HAZARD COMMUNICATION STANDARD: PRODUCT ASSESSED IN ACCORDANCE WITH OSHA 29 CFR 1910.1200 AND DETERMINED NOT TO BE HAZARDOUS.

RCRA INFORMATION: THE UNUSED PRODUCT, IN OUR OPINION, IS NOT SPECIFICALLY LISTED BY THE EPA AS A HAZARDOUS WASTE (40 CFR, PART 261D); DOES NOT EXHIBIT THE HAZARDOUS CHARACTERISTICS OF IGNITABILITY, CORROSIVITY, OR REACTIVITY, AND IS NOT FORMULATED WITH THE METALS CITED IN THE EP TOXICITY TEXT. HOWEVER, USED PRODUCT MAY BE REGULATED.

THIS PRODUCT HAS BEEN USDA APPROVED UNDER THE FOLLOWING CATEGORY: H2 - LUBRICANTS WITH NO FOOD CONTACT.

U.S. SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III: THIS PRODUCT CONTAINS NO "EXTREMELY HAZARDOUS SUBSTANCES."

SARA (302) REPORTABLE HAZARD CATEGORIES: NONE

THIS PRODUCT CONTAINS NO CHEMICALS REPORTABLE UNDER SARA (313) TOXIC RELEASE PROGRAM.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
*** NO REPORTABLE INGREDIENTS ***		

--- KEY TOL LIST CITATIONS ---

1 = OSHA Z,	2 = ACGIH,	3 = IARC,	4 = NTP,	5 = NCI,
6 = EPA CARC,	7 = NFPA 49,	8 = NFPA 325M,	9 = DOT HMT,	10 = CA RTK,
11 = IL RTK,	12 = MA RTK,	13 = MN RTK,	14 = NJ RTK,	15 = MI 293,
16 = FL RTK,	17 = PA RTK,	18 = CA P65		

--- NTP, IARC, AND OSHA INCLUDE CARCINOGENIC LISTINGS ---

NOTE: MOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

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INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

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PREPARED BY: MOBIL OIL CORPORATION

ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPARTMENT, PRINCETON, NJ

FOR FURTHER INFORMATION, CONTACT:

MOBIL OIL CORPORATION, PRODUCT FORMULATION AND QUALITY CONTROL  
3225 GALLOWS ROAD, FAIRFAX, VA 22037 (703) 849-3265