Published Manual Number/ECN: MPP60WE2AE/2006313A

- **Publishing System: TPAS**
- **Access date: 8/1/2006**
- **Document ECN's: Exact**

Service—

60044WP2 Washer-Extractors

Read the separate safety manual before installing, operating, or servicing

PELLERIN MILNOR CORPORATION POST OFFICE BOX 400, KENNER, LOUISIANA 70063-0400, U.S.A.

Please Read

About the Manual Identifying Information on the Cover

The front cover displays pertinent identifying information for this manual. Most important, are the published manual number (part number) /ECN (date code). Generally, when a replacement manual is furnished, it will have the same published manual number, but the latest available ECN. This provides the user with the latest information applicable to his machine. Similarly all documents comprising the manual will be the latest available as of the date the manual was printed, **even though older ECN dates for those documents may be listed in the table of contents**.

When communicating with the Milnor factory regarding this manual, please also provide the other identifying information shown on the cover, including the publishing system, access date, and whether the document ECN's are the latest available or exact.

References to Yellow Troubleshooting Pages

This manual may contain references to "yellow pages." Although the pages containing troubleshooting procedures are no longer printed on yellow paper, troubleshooting instructions, if any, will be contained in the easily located "Troubleshooting" chapter or section. See the table of contents.

Trademarks of Pellerin Milnor Corporation

Comments and Suggestions

Help us to improve this manual by sending your comments to:

Pellerin Milnor Corporation
Attn: Technical Publications
P. O. Box 400
Kenner, LA 70063-0400

Fax: (504) 469-1849

Table of Contents
for MPP60WE2AE/2006313A
60044WP2 Washer-Extractors

Table of Contents, cont.

ABOUT THIS MANUAL

Scope—This instruction manual is intended to provide preventive maintenance, service procedures, and mechanical parts identification for your machine. See the safety manual for safety instructions before installing, servicing, or operating this machine. See the installation guide for facility requirements, installation instructions, and assembly instructions. See the operator guide for operator instructions. See the reference manual for programming, operating, and troubleshooting instructions. See the schematic manual for electrical parts identification and electrical troubleshooting.

Manual Number/Date Code (When To Discard or Save)—The manual number/date code is located on the inside front cover, upper right corner just above the manual name. Whenever the manual is reprinted with new information, part of this number changes. **If the *date code* after the "/" changes, the new version applies to all machines covered by the old version, but is improved— thus the old version can be discarded. If the *manual number* before the "/" changes, the new manual covers only new machines.** Example: Discard MATMODELAE/8739**C**V when MATMODELAE/8739**D**V is received (minor improvements). Also, discard MATMODELAE/87**39D**V when MATMODELAE/87**46A**V is received (major improvements). But keep MATMODEL**A**E/8746FV when MATMODEL**B**E/8815AV is received, since the new manual no longer applies to machines originally shipped with the old manual.

Documents and Change Bars—The individual documents comprising this manual use the same revision criteria as the manual. Text documents also display change bars. Example: When section MSOP0599AE/9135**B**V becomes MSOP0599AE/9135**C**V, change bars with the letter "C" appear next to all changes for this revision. For a major rewrite (e.g., MSOP0599AE/92**26A**V), all change bars are deleted.

For Assistance—Please call:

Pellerin Milnor Corporation
Attn: Service Department
P. O. Box 400
Kenner, LA 70063-0400

Phone: (504) 467-9591
Fax: (504) 467-9777

Trademarks of Pellerin Milnor Corporation—The following, some of which may be used in this publication, are trademarks of Pellerin Milnor Corporation:

Ampsaver®	CBW®	Gear Guardian®	Milnet®	Staph-Guard®
Autolint®	Dye-Extractor®	Hands-Off®	Milnor®	System 4®
Auto-Purge®	Dyextractor®	Hydro-Cushion®	Miltrac	System 7®
Autovac	E-P Plus®	Mildata®	Miltron	Totaltrol®

PELLERIN MILNOR CORPORATION

LIMITED STANDARD WARRANTY

We warrant to the original purchaser that MILNOR machines including electronic hardware/software (hereafter referred to as “equipment”), will be free from defects in material and workmanship for a period of one year from the date of shipment from our factory with no operating hour limitation. This warranty is contingent upon the equipment being installed, operated and serviced as specified in the operating manual supplied with the equipment, and operated under normal conditions by competent operators.

Providing we receive written notification of a warranted defect within 30 days of its discovery, we will – at our option – repair or replace the defective part or parts, FOB our factory. We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is repaired or altered in any way without MILNOR’s written consent.

Parts which require routine replacement due to normal wear – such as gaskets, contact points, brake and clutch linings and similar parts – are not covered by this warranty, nor are parts damaged by exposure to weather or to chemicals.

We reserve the right to make changes in the design and/or construction of our equipment (including purchased components) without obligation to change any equipment previously supplied.

ANY SALE OR FURNISHING OF ANY EQUIPMENT BY MILNOR IS MADE ONLY UPON THE EXPRESS UNDERSTANDING THAT MILNOR MAKES NO EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE. MILNOR WILL NOT BE RESPONSIBLE FOR ANY COSTS OR DAMAGES ACTUALLY INCURRED OR REQUIRED AS A RESULT OF: THE FAILURE OF ANY OTHER PERSON OR ENTITY TO PERFORM ITS RESPONSIBILITIES, FIRE OR OTHER HAZARD, ACCIDENT, IMPROPER STORAGE, MISUSE, NEGLECT, POWER OR ENVIRONMENTAL CONTROL MALFUNCTIONS, DAMAGE FROM LIQUIDS, OR ANY OTHER CAUSE BEYOND THE NORMAL RANGE OF USE. REGARDLESS OF HOW CAUSED, IN NO EVENT SHALL MILNOR BE LIABLE FOR SPECIAL, INDIRECT, PUNITIVE, LIQUIDATED, OR CONSEQUENTIAL COSTS OR DAMAGES, OR ANY COSTS OR DAMAGES WHATSOEVER WHICH EXCEED THE PRICE PAID TO MILNOR FOR THE EQUIPMENT IT SELLS OR FURNISHES.

WE NEITHER ASSUME, NOR AUTHORIZE ANY EMPLOYEE OR OTHER PERSON TO ASSUME FOR US, ANY OTHER RESPONSIBILITY AND/OR LIABILITY IN CONNECTION WITH THE SALE OR FURNISHING OF OUR EQUIPMENT TO ANY BUYER.

BMP720097
92732A

How to order repair parts

Repair parts may be ordered either from the authorized dealer who sold you this machine, or directly from the MILNOR factory. In most cases, your dealer will have these parts in stock.

When ordering parts, please be sure to give us the following information:

1. Model and serial number of the machine for which the parts are required
2. Part number
3. Name of the part
4. Quantity needed
5. Method of shipment desired
6. In correspondence regarding motors or electrical controls, please include all nameplate data, including wiring diagram number and the make or manufacturer of the motor or controls.

All parts will be shipped C.O.D. transportation charges collect only.

Please read this manual

It is strongly recommended that you read the installation and operating manual before attempting to install or operate your machine. We suggest that this manual be kept in your business office so that it will not become lost.

PELLERIN MILNOR CORPORATION
P.O. BOX 400, KENNER, LA., 70063-0400, U.S.A.
FAX: Administration 504/468-9307, Engineering 504/469-1849, Service 504/469-9777

BMP720097R
72332A

Safety—Divided Cylinder and Staph-Guard™ Washer-Extractors

1. General Safety Requirements—Vital Information for Management Personnel [Document BIUUUS04]

Incorrect installation, neglected preventive maintenance, abuse, and/or improper repairs, or changes to the machine can cause unsafe operation and personal injuries, such as multiple fractures, amputations, or death. The owner or his selected representative (owner/user) is responsible for understanding and ensuring the proper operation and maintenance of the machine. The owner/user must familiarize himself with the contents of all machine instruction manuals. The owner/user should direct any questions about these instructions to a Milnor® dealer or the Milnor® Service department.

Most regulatory authorities (including OSHA in the USA and CE in Europe) hold the owner/user ultimately responsible for maintaining a safe working environment. Therefore, the owner/user must do or ensure the following:

- recognize all foreseeable safety hazards within his facility and take actions to protect his personnel, equipment, and facility;
- work equipment is suitable, properly adapted, can be used without risks to health or safety, and is adequately maintained;
- where specific hazards are likely to be involved, access to the equipment is restricted to those employees given the task of using it;
- only specifically designated workers carry out repairs, modifications, maintenance, or servicing;
- information, instruction, and training is provided;
- workers and/or their representatives are consulted.

Work equipment must comply with the requirements listed below. The owner/user must verify that installation and maintenance of equipment is performed in such a way as to support these requirements:

- control devices must be visible, identifiable, and marked; be located outside dangerous zones; and not give rise to a hazard due to unintentional operation;
- control systems must be safe and breakdown/damage must not result in danger;
- work equipment is to be stabilized;
- protection against rupture or disintegration of work equipment;
- guarding, to prevent access to danger zones or to stop movements of dangerous parts before the danger zones are reached. Guards to be robust; not give rise to any additional hazards; not be easily removed or rendered inoperative; situated at a sufficient distance from the danger zone; not restrict view of operating cycle; allow fitting, replacing, or maintenance by restricting access to relevant area and without removal of guard/protection device;
- suitable lighting for working and maintenance areas;
- maintenance to be possible when work equipment is shut down. If not possible, then protection measures to be carried out outside danger zones;
- work equipment must be appropriate for preventing the risk of fire or overheating; discharges of gas, dust, liquid, vapor, other substances; explosion of the equipment or substances in it.

1.1. **Laundry Facility**—Provide a supporting floor that is strong and rigid enough to support–with a reasonable safety factor and without undue or objectionable deflection–the weight of the fully loaded machine and the forces transmitted by it during operation. Provide sufficient clearance for machine movement. Provide any safety guards, fences, restraints, devices, and verbal and/or posted restrictions necessary to prevent personnel, machines, or other moving machinery from accessing the machine or its path. Provide adequate ventilation to carry away heat and vapors. Ensure service connections to installed machines meet local and national safety standards, especially regarding the electrical disconnect (see the National Electric Code). Prominently post safety information, including signs showing the source of electrical disconnect.

1.2. **Personnel**—Inform personnel about hazard avoidance and the importance of care and common sense. Provide personnel with the safety and operating instructions that apply to them. Verify that personnel use proper safety and operating procedures. Verify that personnel understand and abide by the warnings on the machine and precautions in the instruction manuals.

1.3. **Safety Devices**—Ensure that no one eliminates or disables any safety device on the machine or in the facility. Do not allow machine to be used with any missing guard, cover, panel or door. Service any failing or malfunctioning device before operating the machine.

1.4. **Hazard Information**—Important information on hazards is provided on the machine safety placards, in the Safety Guide, and throughout the other machine manuals. **Placards must be kept clean so that the information is not obscured. They must be replaced immediately if lost or damaged. The Safety Guide and other machine manuals must be available at all times to the appropriate personnel.** See the machine service manual for safety placard part numbers. Contact the Milnor Parts department for replacement placards or manuals.

1.5. **Maintenance**—Ensure the machine is inspected and serviced in accordance with the norms of good practice and with the preventive maintenance schedule. Replace belts, pulleys, brake shoes/disks, clutch plates/tires, rollers, seals, alignment guides, etc. before they are severely worn. Immediately investigate any evidence of impending failure and make needed repairs (e.g., cylinder, shell, or frame cracks; drive components such as motors, gear boxes, bearings, etc., whining, grinding, smoking, or becoming abnormally hot; bending or cracking of cylinder, shell, frame, etc.; leaking seals, hoses, valves, etc.) Do not permit service or maintenance by unqualified personnel.

2. Safety Alert Messages—Internal Electrical and Mechanical Hazards [Document BIUUUS11]

The following are instructions about hazards inside the machine and in electrical enclosures.

WARNING $\boxed{1}$: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not unlock or open electric box doors.
- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.

WARNING $\boxed{2}$: Entangle and Crush Hazards—Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.
- Keep yourself and others off of machine.
- Know the location of all emergency stop switches, pull cords, and/or kick plates and use them in an emergency to stop machine motion.

3. Safety Alert Messages—External Mechanical Hazards [Document BIUUUS12]

The following are instructions about hazards around the front, sides, rear or top of the machine.

WARNING $\boxed{3}$: Crush Hazards—Suspended machines only—Spaces between the shell and housing can close and crush or pinch your limbs. The shell moves within the housing during operation.

- Do not reach into the machine housing or frame.
- Keep yourself and others clear of movement areas and paths.

4. Safety Alert Messages—Cylinder and Processing Hazards [Document BIUUUS13]

The following are instructions about hazards related to the cylinder and laundering process.

WARNING $\boxed{4}$: Crush Hazards—Contact with the turning cylinder can crush your limbs. The cylinder will repel any object you try to stop it with, possibly causing the object to strike or stab you. The turning cylinder is normally isolated by the locked cylinder door.

- Do not attempt to open the door or reach into the cylinder until the cylinder is stopped.
- Do not place any object in the turning cylinder.
- Do not operate the machine with a malfunctioning door interlock.
- Divided cylinder machines only—Keep yourself and others clear of cylinder and goods during inching or Autospot operation.
- Do not operate the machine with malfunctioning two-hand manual controls.

WARNING $\boxed{5}$: Confined Space Hazards—Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not attempt unauthorized servicing, repairs, or modification.

WARNING $\boxed{6}$: Explosion and Fire Hazards—Flammable substances can explode or ignite in the cylinder, drain trough, or sewer. The machine is designed for washing with water, not any other solvent. Processing can cause solvent-containing goods to give off flammable vapors.

- Do not use flammable solvents in processing.
- Do not process goods containing flammable substances. Consult with your local fire department/public safety office and all insurance providers.

5. Safety Alert Messages—Unsafe Conditions [Document BIUUUS14]

5.1. Damage and Malfunction Hazards

5.1.1. Hazards Resulting from Inoperative Safety Devices

DANGER 7: Entangle and Sever Hazards—Cylinder door interlock—Operating the machine with a malfunctioning door interlock can permit opening the door when the cylinder is turning and/or starting the cycle with the door open, exposing the turning cylinder.

- Do not operate the machine with any evidence of damage or malfunction.

WARNING 8: Multiple Hazards—Operating the machine with an inoperative safety device can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.

WARNING 9: Electrocution and Electrical Burn Hazards—Electric box doors—Operating the machine with any electric box door unlocked can expose high voltage conductors inside the box.

- Do not unlock or open electric box doors.

WARNING 10: Entangle and Crush Hazards—Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Do not remove guards, covers, or panels.

5.1.2. Hazards Resulting from Damaged Mechanical Devices

WARNING 11: Multiple Hazards—Operating a damaged machine can kill or injure personnel, further damage or destroy the machine, damage property, and/or void the warranty.

- Do not operate a damaged or malfunctioning machine. Request authorized service.

WARNING 12: Explosion Hazards—Cylinder—A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Do not operate the machine with any evidence of damage or malfunction.

WARNING 13: Explosion Hazards—Inner door latches (divided cylinder machines)—A damaged or improperly seated latch can cause the inner door to open during operation, damaging the cylinder and shell. A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.

- Ensure that the inner door is securely latched when loading and unloading.
- Do not operate the machine with any evidence of damage or malfunction.

WARNING 14: Explosion Hazards—Clutch and speed switch (multiple motor machines)—A damaged clutch or speed switch can permit the low speed motor to engage during extract. This will over-speed the motor and pulleys and can cause them to rip apart, discharging metal fragments at high speed.

- Stop the machine immediately if any of these conditions occur: • abnormal whining sound during extract • skidding sound as extract ends • clutches remain engaged or re-engage during extract

5.2. Careless Use Hazards

5.2.1. Careless Operation Hazards—Vital Information for Operator Personnel (see also operator hazards throughout manual)

WARNING 15: Multiple Hazards—Careless operator actions can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.
- Do not operate a damaged or malfunctioning machine. Request authorized service.
- Do not attempt unauthorized servicing, repairs, or modification.
- Do not use the machine in any manner contrary to the factory instructions.
- Use the machine only for its customary and intended purpose.
- Understand the consequences of operating manually.

5.2.2. Careless Servicing Hazards—Vital Information for Service Personnel (see also service hazards throughout manuals)

WARNING 16: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.

WARNING 17: Entangle and Crush Hazards—Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.

WARNING 18: Confined Space Hazards—Confinement in the cylinder can kill or injure you. Hazards include but are not limited to panic, burns, poisoning, suffocation, heat prostration, biological contamination, electrocution, and crushing.

- Do not enter the cylinder until it has been thoroughly purged, flushed, drained, cooled, and immobilized.

— End of BIUUUS27 —

About the Forces Transmitted by Milnor® Washer-extractors

Document BIWUUI02
Specified Date 20001108
As-of Date 20001108
Access Date 20001108

Applicability...........................WUU

During washing and extracting, all washer-extractors transmit both static and dynamic (cyclic) forces to the floor, foundation, or any other supporting structure. During washing, the impact of the goods as they drop imparts forces which are quite difficult to quantify. Size for size, both rigid and flexibly-mounted machines transmit approximately the same forces during washing. During extracting, rigid machines transmit forces up to 30 times greater than equivalent flexibly-mounted models. The actual magnitude of these forces vary according to several factors:

- machine size,
- final extraction speed,
- amount, condition, and type of goods being processed,
- the liquor level and chemical conditions in the bath preceding extraction, and
- other miscellaneous factors.

Estimates of the maximum force normally encountered are available for each Milnor® model and size upon request. Floor or foundation sizes shown on any Milnor® document are only for on-grade situations based only on previous experience without implying any warranty, obligation, or responsibility on our part.

1. Rigid Machines

Size for size, rigid washer-extractors naturally require a stronger, more rigid floor, foundation, or other supporting structure than flexibly-mounted models. If the supporting soil under the slab is itself strong and rigid enough and has not subsided to leave the floor slab suspended without support, on grade installations can often be made directly to an existing floor slab if it has enough strength and rigidity to safely withstand our published forces without transmitting undue vibration. If the subsoil has subsided, or if the floor slab itself has insufficient strength and rigidity, a deeper foundation, poured as to become monolithic with the floor slab, may be required. Support pilings may even be required if the subsoil itself is “springy” (i.e., if its resonant frequency is near the operating speed of the machine). Above-grade installations of rigid machines also require a sufficiently strong and rigid floor or other supporting structure as described below.

2. Flexibly-mounted Machines

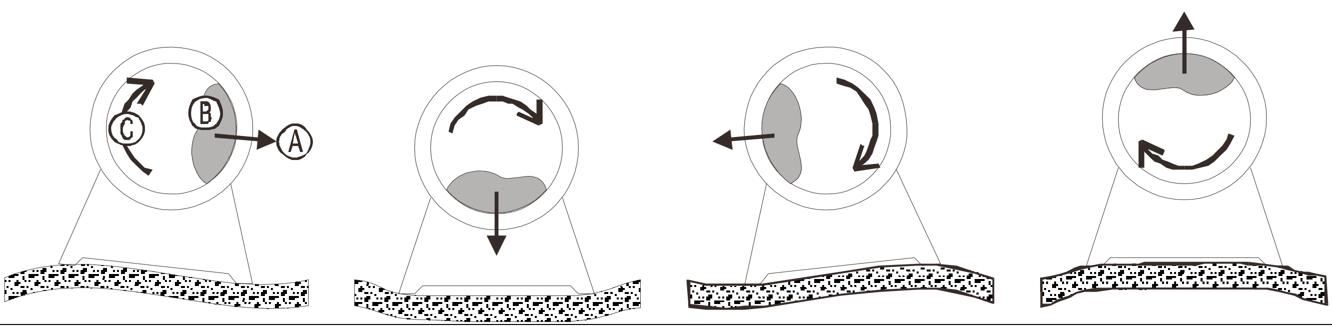
Size for size, flexibly-mounted machines generally do not require as strong a floor, foundation, or other supporting structure as do rigid machines. However, a floor or other supporting structure having sufficient strength and rigidity, as described in section 3, is nonetheless vitally important for these models as well.

3. How Strong and Rigid?

Many building codes in the U.S.A. specify that laundry floors must have a minimum live load capacity of 150 pounds per square foot (732 kilograms per square meter). However, even compliance with this or any other standard does not necessarily guarantee sufficient rigidity. In any event, it is the sole responsibility of the owner/user to assure that the floor and/or any other supporting structure exceeds not only all applicable building codes, but also that the floor and/or any other supporting structure for each washer-extractor or group of washer-extractors actually has sufficient strength and rigidity, plus a reasonable factor of safety for both, to support the weight of all the fully loaded machine(s) including the weight of the water and goods, and including the published 360º rotating sinusoidal RMS forces that are transmitted by the machine(s). Moreover, the floor, foundation, or other supporting structure must have sufficient rigidity (i.e., a natural or resonant frequency many times greater than the machine speed with a reasonable factor of safety); otherwise, the mentioned 360º rotating sinusoidal RMS forces can be multiplied and magnified many times. It is especially important to consider all potential vibration problems that might occur due to all possible combinations of forcing frequencies (rotating speeds) of the machine(s) compared to the natural frequencies of the floor and/or any other supporting structure(s). A qualified soil and/or structural engineer must be engaged for this purpose.

Figure 1: How Rotating Forces Act on the Foundation

Typical Machine



Legend

A. Direction of force
B. Load
C. Rotation (Frequency = RPM / 60)

Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available from Milnor® upon request. All data is subject to change without notice and may have changed since last printed. It is the sole responsibility of every potential owner to obtain written confirmation that any data furnished by Milnor® applies for the model(s) and serial number(s) of the specific machines.

— End of BIWUUI02 —

Glossary of Tag Illustrations—Suspended Washer-Extractors

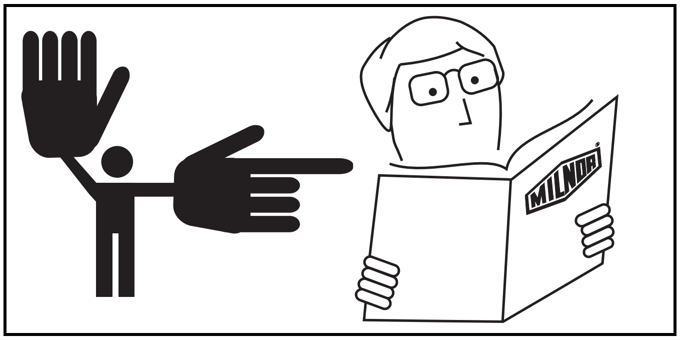
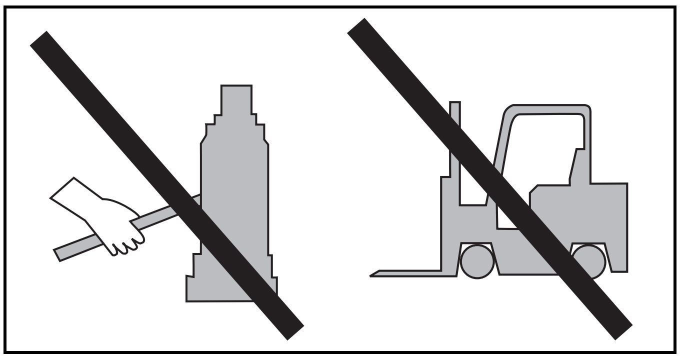
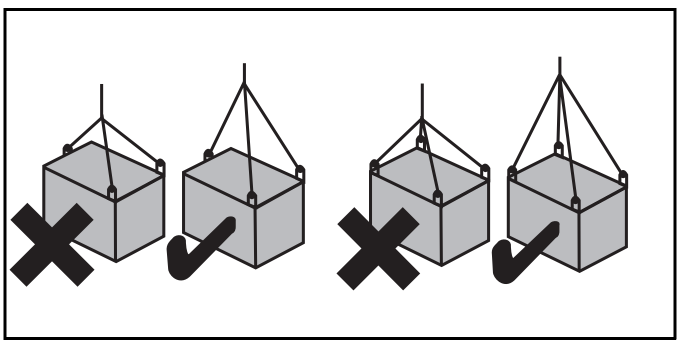
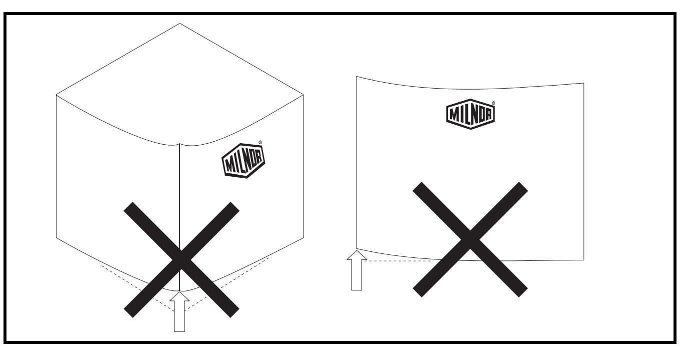
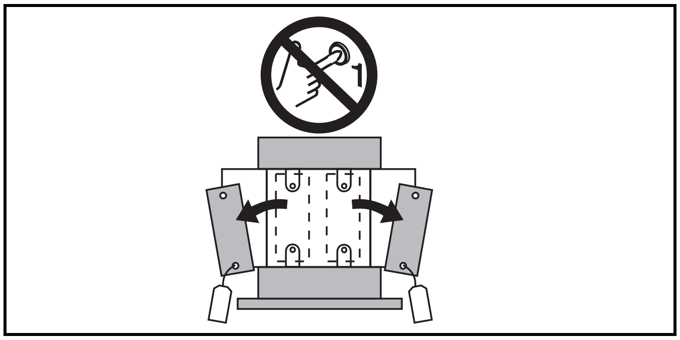
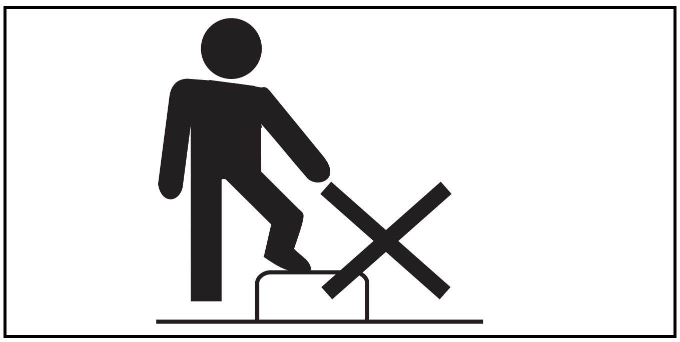
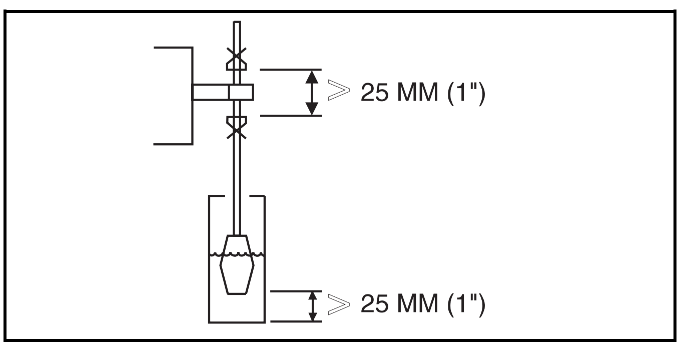
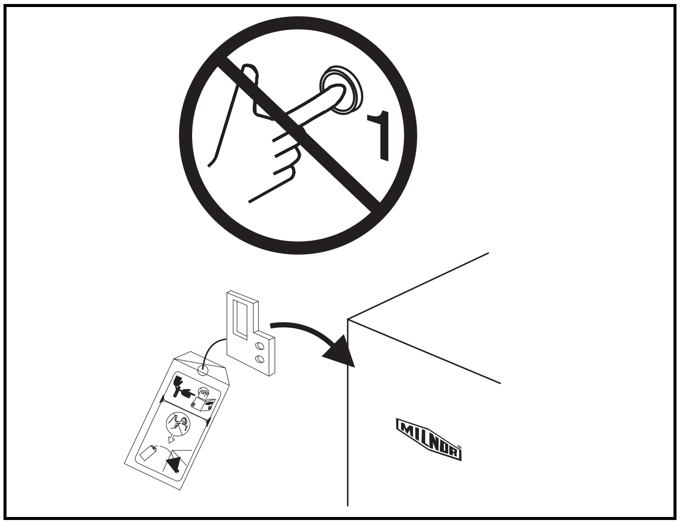
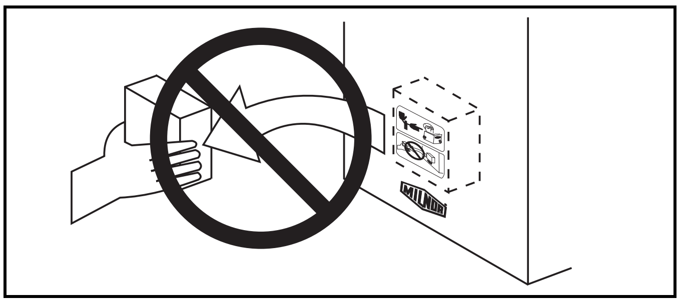
Illustration	Explanation
	Stop! Read the manual first for complete instructions before continuing.
	Do not jack the machine here. Do not lift the machine here.
	Use three point or four point lifting as determined by the lifting eyes furnished. Rig the load using lifting cables of sufficient size and length to ensure cables are not over-stressed.
	Do not lift the machine from one corner or one side edge.

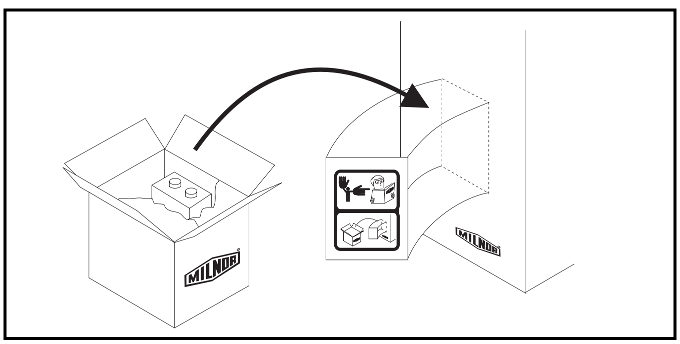
Illustration	Explanation
	Do not start this machine until the packing materials, lifting brackets, etc. with this tag attached or behind this panel are removed. These materials are painted red. Safety stands or brackets (also painted red) may be provided with this machine. Do not discard safety stands or brackets
	Do not step or stand on this machine part.
	Maintain a 25 mm. (1") minimum clearance between float clips. Set "low level" so that the bottom of the float is always at least 25mm (1") above the bottom of the float tube.
	This motor or pump should rotate in the direction of the arrow.



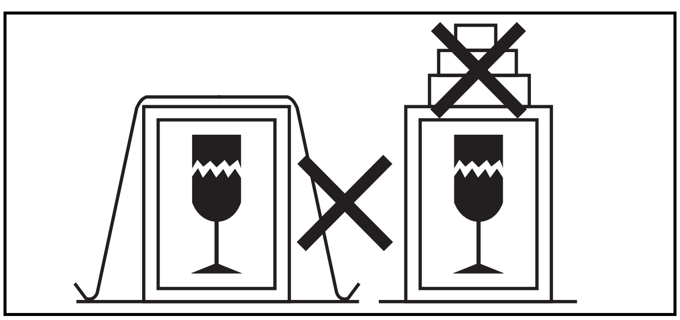
Do not start this machine until the part with this tag is installed on the machine.



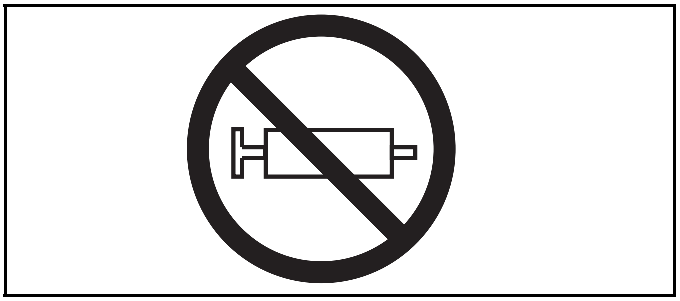
Do not remove this component from the machine.



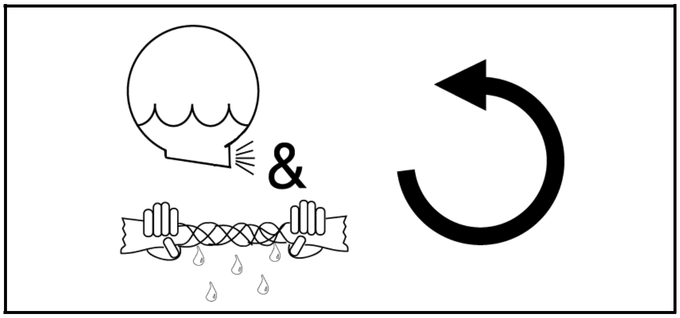
Install the appropriate part here before operating the machine.



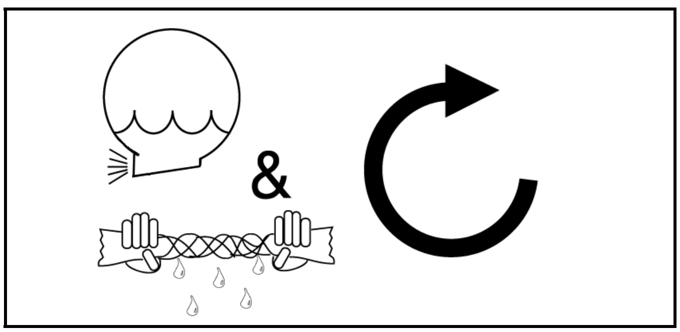
Do not strap or chain over box



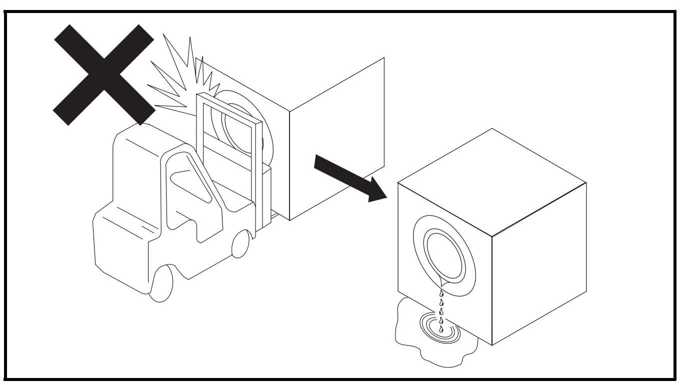
Do not pump grease here.



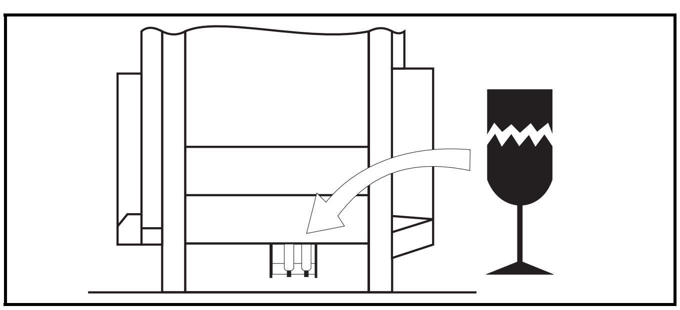
During drain and extract, the cylinder must rotate counterclockwise when viewed from here (rear of machine).



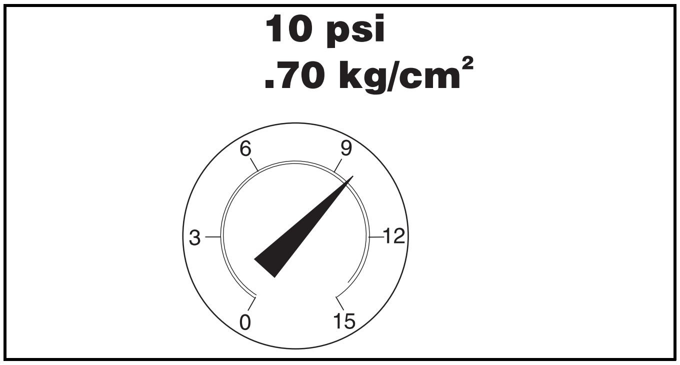
During drain and extract, the cylinder must rotate clockwise when viewed from here (front of machine).



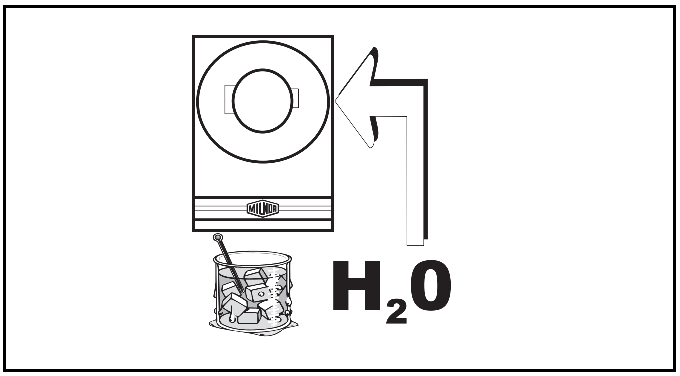
Do not strike shell front of washer-extractors during fork lifting. Striking shell front will cause door to leak.



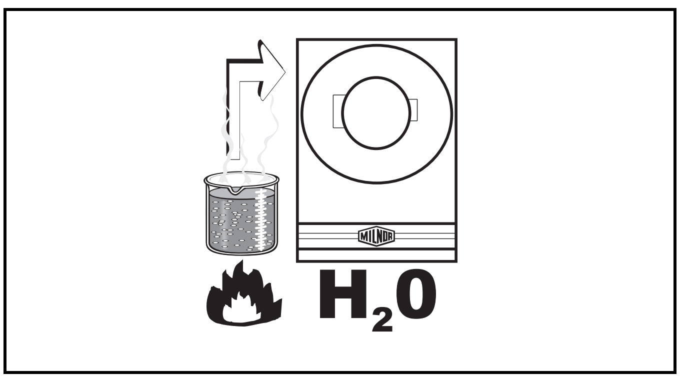
Brake assembly under machine is fragile. Forklift blades should only be placed under main structural beams



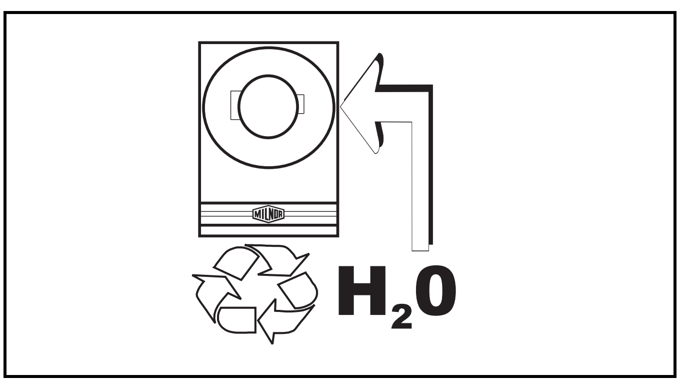
Set main bearing air pad gauge at 10 psi ($.70\ kg/cm^2$), 64" and 72" ExN and JxN models only.
Set disc brake air gauge at 10 psi ($.70\ kg/cm^2$), 64" and 72" ExN and JxN models only.



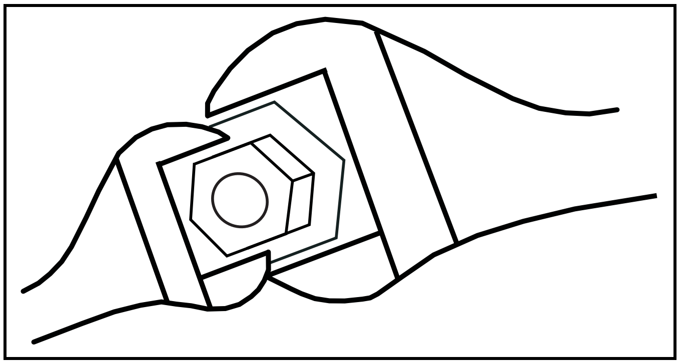
Make cold water connection here.



Make hot water connection here.



Make third (reuse) water connection here.



Hold the connection side of the valve with a wrench when connecting plumbing.

Avoiding Damage From Allied Remote Chemical Delivery Systems

Milnor® does not manufacture or supply remote chemical delivery systems and this document is meant only to illustrate some of the possible problems that can be minimized during installation of such systems by the chemical supply company. Milnor washer-extractors and CBW® batch washers (tunnels) are available with convenient inlets for such systems (see Figure 1). Most common of the types of systems currently used in commercial laundering operations are pumped chemical systems. Other types, such as constant pressure, re-circulating ring main systems have also been, and may continue to be used with Milnor equipment.

This document warns about some of the possible hazards posed by chemical systems and lists certain requirements needed to minimize those hazards. The procedures for interfacing with allied chemical systems and information pertinent to chemical use in general are provided elsewhere in the product manuals (see Note 1).

Figure 1: Pumped Chemical Inlets on CBW Batch Washer

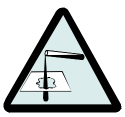
> **Note 1:** Misuse of laundering chemicals (such as injecting excessive concentrations of chlorine bleach or permitting acid sours to react with hypo chlorite) due to incorrect formulation can also be hazardous. Information pertinent to chemical use is provided elsewhere in the product manuals.

1. How a Chemical System Can Damage the Machine It Serves

Milnor has manufactured washer-extractors and tunnel washers with the same stainless steel specification since its founding. Every batch of steel used is certified and documented by the steel mill. Testing of samples damaged by corrosion have, in every case, proven the steel to be well within the AISI 304 specification.

Chemical products commonly found in the laundry industry, when used in **established** dosages and proper operating parameters, under the auspices of an experienced chemical specialist, should produce satisfactory results, with no consequential detrimental effects. The industry has published standards in Riggs and Sherrill, “Textile Laundering Technology”. However, the stainless steel can be damaged and even destroyed by **abnormal** contact with chlorine bleach, hydrofluosilicic acid and other commonly used chemicals, as will occur if chemicals are unintentionally leaked into the machine, particularly when it is no longer in use and especially when machine surfaces are dry.

Some chemical systems have been found to permit chemicals to dribble from the supply lines, or worse, to siphon from the supply tank into the machine, during operation and long after the system is shut down—as after working hours and during weekends. If this occurs, **deterioration (rusting) of the stainless steel and damage to any textiles therein will inevitably result. If this condition goes undetected, machine damage is likely to be catastrophic.** No machine is immune to such damage.



CAUTION 1: Equipment and Textile Damage Hazards—Chemicals leaked into the machine, particularly when it is idle can destroy machine components and textiles left in the machine. **Pellerin Milnor Corporation accepts absolutely no responsibility for damage to its equipment or to textiles therein from abnormal contact with chemicals.**

- Ensure that the chemical system prevents unintentional release of chemicals.
- Inspect regularly for proper operation and evidence of damage.

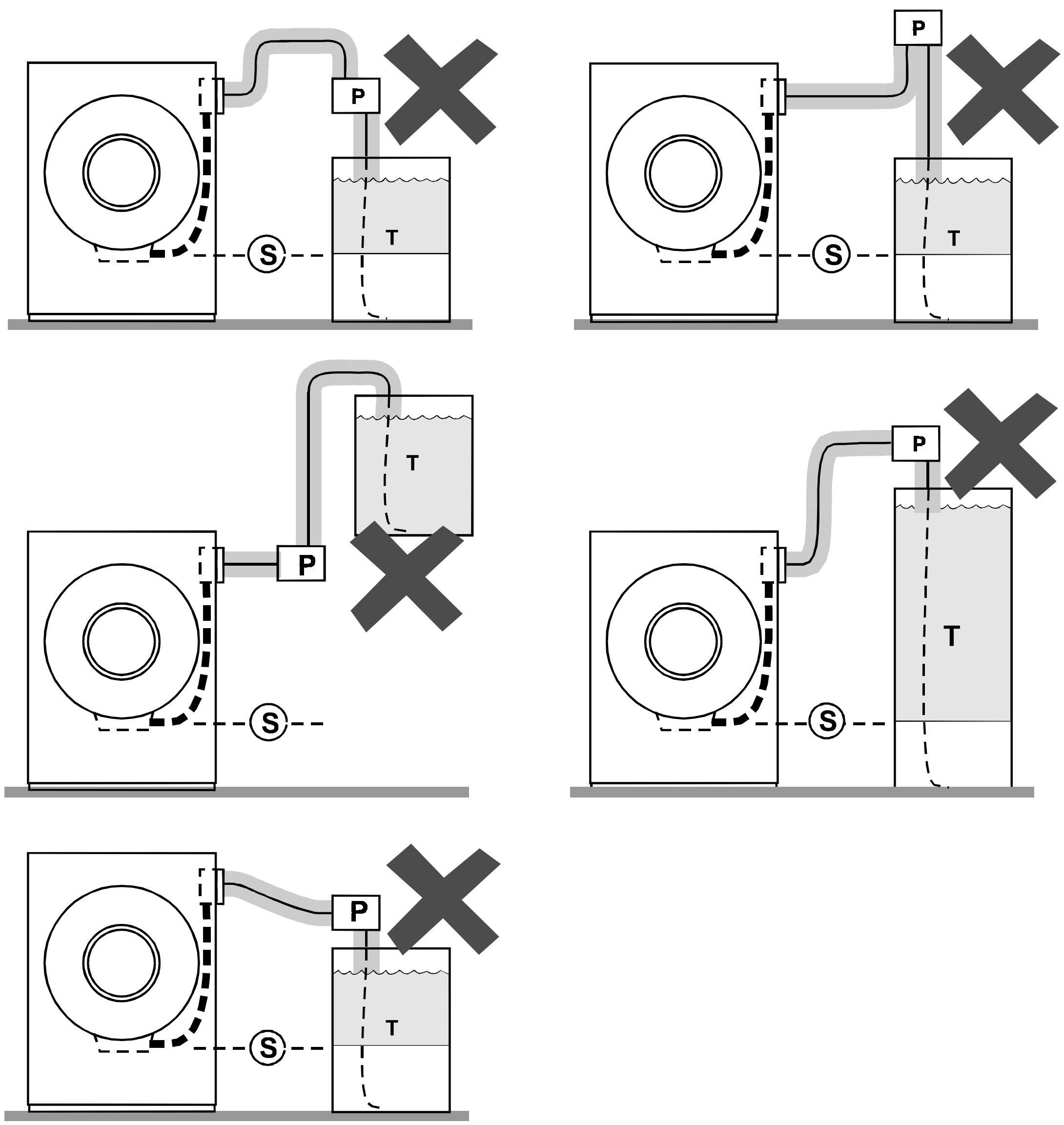
2. Requirements for Chemical Systems Used With Milnor Machines

It is the responsibility of the chemical system manufacturer and supplier to ensure that their system is safe for personnel and equipment. Some important points are described below.

2.1. Ensure the System Cannot Siphon.—The supply system must be designed to counteract any siphoning that could occur as a result of having a sealed supply line between the bottom of the chemical tank and the internal machine connection at the drain trough. As shown in the Figure 2 examples, if the pump (P) and/or the valving does not provide positive closure and there is no vacuum breaker protection, siphoning is likely to occur. In each of the Figure 2 illustrations, the volume of chemical in the tank above the siphon level (S), and indicated by shading, will flow into the machine.

Figure 2: **Siphoning From the Chemical Tank into the Machine**

Examples



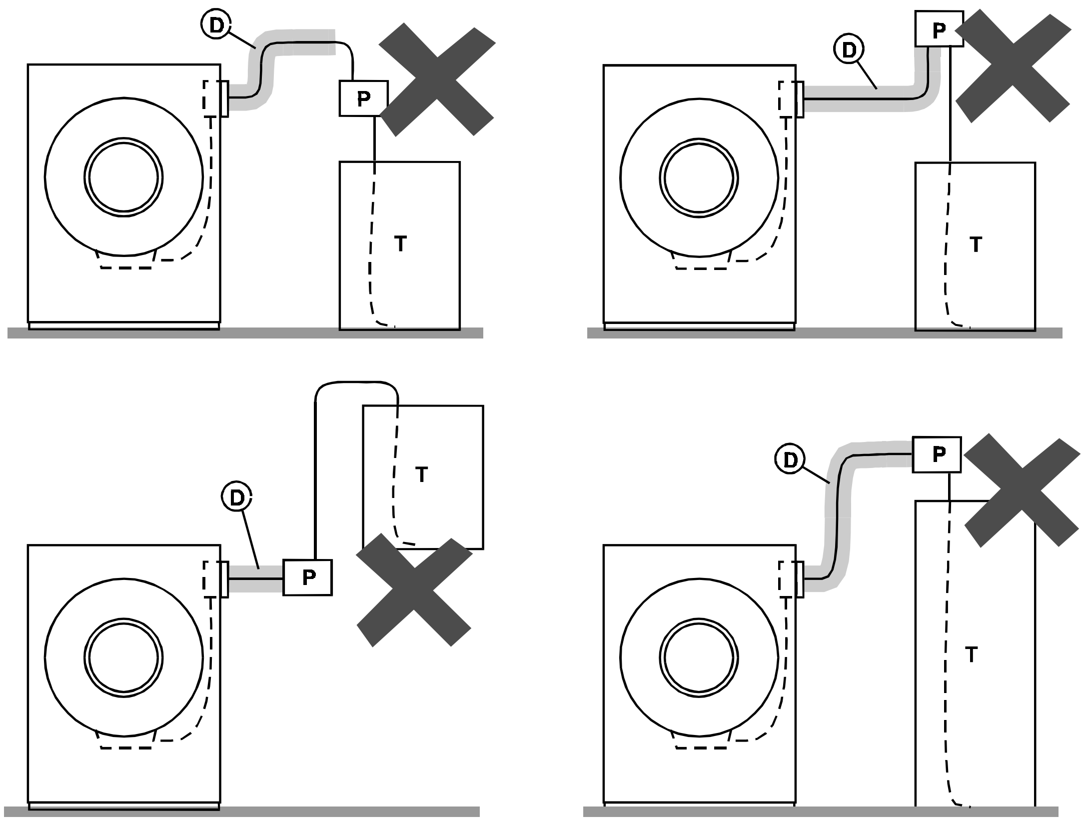
Legend

P. Pump
S. Siphon level. Shading indicates the chemical delivery line and tank content that can siphon into the machine.
T. Chemical tank

2.2. Ensure the Chemical Lines Cannot Dribble—The pumped chemical system may provide a means of positively closing the chemical line at the pump location, but not at the injection site. Hence, any concentrated chemical that remains in the injection line between the pump and the machine is free to flow into the machine. Some examples of this are shown in Figure 3.

Figure 3: Dribbling From Chemical Supply Line Into Machine (assumes positive closure at the pump)

Examples



Legend

D. Portion of supply line, the contents of which can dribble into the machine
P. Pump
T. Chemical tank

3. Design and Installation Recommendations

It is the responsibility of the chemical system manufacturer and supplier to use whatever measures are necessary to ensure that their system is safe for personnel and equipment. The following are some of the possible methods the manufacturer or supplier may wish to use, as appropriate.

3.1. Siphoning: Positively close the line.

—If the pump does not provide positive closure when the system is off, employ a shutoff valve in the line to serve this purpose.

3.2. Siphoning: Break the siphon.

—Provide an air gap or vacuum breaker in the chemical delivery line. This must be located above the “full” line of the tank.

3.3. Dribbling: Flush the entire chemical delivery line.

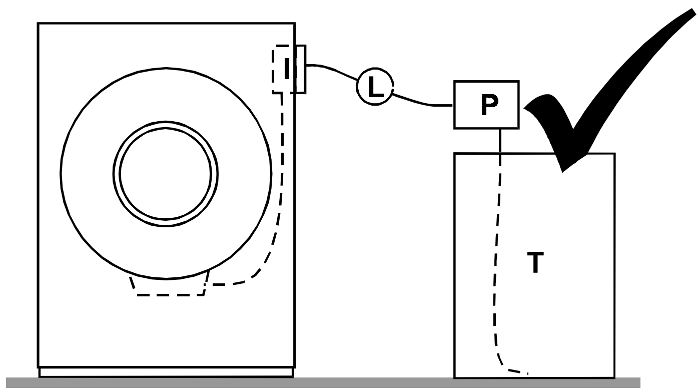
—If any concentrated chemical that remains in the injection line between the pump and the machine is free to flow into the machine, employ a system that flushes the entire line between the pump and the injection point with fresh water after each injection.

3.4. Dribbling: Locate the entire chemical line below the machine inlet.—

Assuming the chemical system does not retain any line pressure and that the pump provides positive closure when the system is off, locate the entire chemical delivery line below the level of the chemical inlet. An example of this is shown in Figure 4.

Figure 4: Locating a Pumped Chemical System With Positive Closure To Protect Against Machine Damage

Example of Correct Placement



Legend

- **I.** Chemical inlet on machine
- **L.** Chemical delivery line
- **P.** Pump with positive closure when system is off
- **T.** Chemical tank

4. Guarding Against Leaks

All personnel who may work with the chemical system (e.g., chemical system manufacturer, chemical system supplier, chemical supplier, operator, maintenance personnel) should be vigilant in observing for leaks in the system. When connecting, or reconnecting chemical lines, whether at installation, after taking samples, or when replacing components, at a minimum ensure that:

1. the proper components are used,
2. all connections are the proper fit, and
3. all components are securely connected.

CAUTION 2: Injury and Damage Hazards—Chemicals leaking from a chemical system may be corrosive or toxic. Such chemicals can injure personnel and damage equipment.

- Use care when connecting chemical lines.
- Inspect regularly for leaks.

— End of BIWUUI03 —

Section 1

Service and Maintenance

LUBRICATION AND PREVENTIVE MAINTENANCE FOR HYDRO-CUSHION® MACHINES

General Requirements

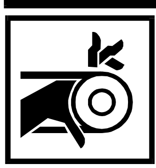
Maintenance procedures require:

- A hand operated grease gun.
- The correct lubricants (see "LUBRICANTS FOR MILNOR MACHINES," in the Table of Contents).

Lubricant Requirements

To achieve the optimum performance and service life from the Milnor® machine and as a warranty requirement, the machine must be lubricated in strict accordance with the instructions in this section.

⚠ DANGER ⚠



ENTANGLE AND CRUSH HAZARD—Belts and pulleys can entangle and crush body parts.

- ☞ **Lock OFF and tag out power at the wall disconnect before servicing, except where specifically instructed otherwise in this section.**
- ☞ **Insure belt and pulley guards are in place during service procedures.**
- ☞ **Permit only qualified maintenance personnel to perform these procedures.**

⚠ DANGER ⚠

CRUSH/SEVER HAZARD—Tilting mechanism can crush or sever parts of your body caught in them.

- ☞ **Install the safety stands before performing maintenance under a tilted machine.**
- ☞ **NEVER test or operate (manually or automatically) any machine function with any portion of a person's body under the tilted machine—even if the safety stands are installed.**

⚠ DANGER ⚠

CRUSH/SEVER HAZARD—Tilting machines with tilt wheels/cradles may lunge forward or rearward and even fall over if the tilt wheels at the non-tilted end are raised out of their cradles—killing/injuring personnel and/or damaging property.

☞ **NEVER manually tilt (lift) both ends of the machine at the same time. One end must always be seated in its cradle.**

☞ **ALWAYS visually inspect the tilt wheels to be sure they are all fully seated in their cradles before each manual tilt up.**

☞ **Hydraulic valve manual operation must be done by trained competent maintenance personnel who thoroughly understand the system and all the consequences of manual operations.**

☞ **ALWAYS understand beforehand all the consequences of manually operating hydraulic valves.**

☞ **Never permit operation with malfunctioning tilt limit switches.**

Correct Grease Gun Procedures

1. **Do not use a pneumatic grease gun.** Pump grease slowly, taking 10-15 seconds to complete each stroke. A grease gun can build up extremely high pressure which will force seals out of position and cause them to leak, even though both the seal and the bearing housing are equipped with spring loaded relief plugs.
2. **Apply quantity of grease called for in the checklist**. Over-lubrication can be as damaging as under-lubrication. Where quantities are stated in strokes, one stroke of the grease gun is assumed to provide .0624 fluid ounces (1.77 grams) (by volume) of grease. Therefore, one fluid ounce (28.3 grams) of grease would be provided by 16 strokes of the grease gun. Determine the flow rate of your grease gun by pumping one ounce into a calibrated container. If fewer than 16 strokes are required, all quantities in strokes in the chart should be reduced accordingly, and if more than 16 strokes are required, the number of strokes should be increased. Before starting lubrication, **make sure your grease gun is working and that you get a full charge of grease with every stroke.**
3. **Do not pump grease in until it oozes out of the spring loaded relief plugs.** Plugs bleed out excess grease and help prevent abnormal pressures from building up in the housing during operation (especially when the machine is first commissioned and after each lubrication). **Plugs will not protect against over-lubrication.**
4. **Do not over-lubricate motors.** Over-lubrication of a motor can seriously damage it by forcing grease into motor windings. Over-lubrication of the extract motor can force grease into the centrifugal switch causing it to malfunction.
5. **Do not allow grease to drip on the brake disk or clutch tire/drum during lubrication.** This will reduce the braking action considerably, and may permit the cylinder to creep while loading and unloading.

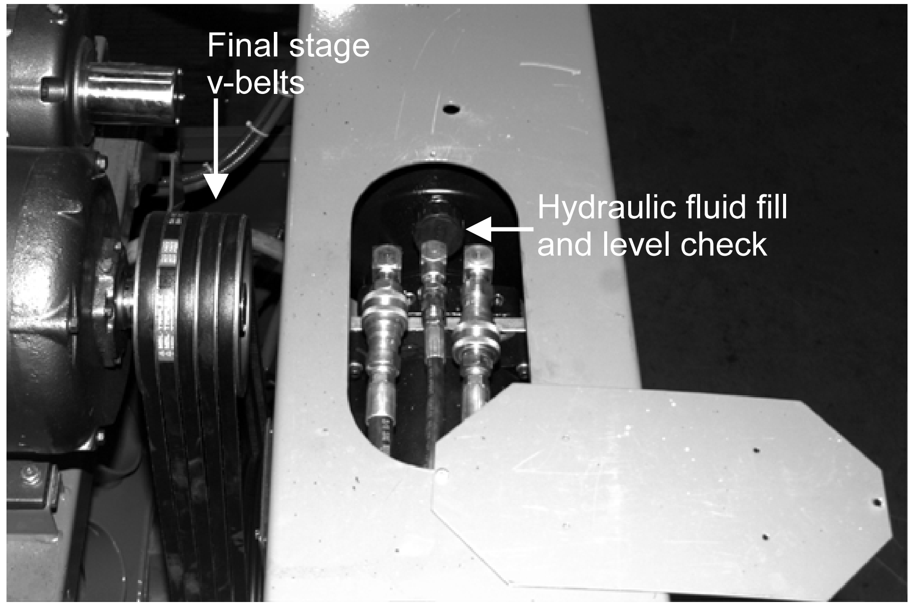


FIGURE 1 (MSSM0201CE)
Hydraulic Fluid Reservoir Fill and Level Check Point
(located at rear of 48", 52", and 72" tilt machines only)

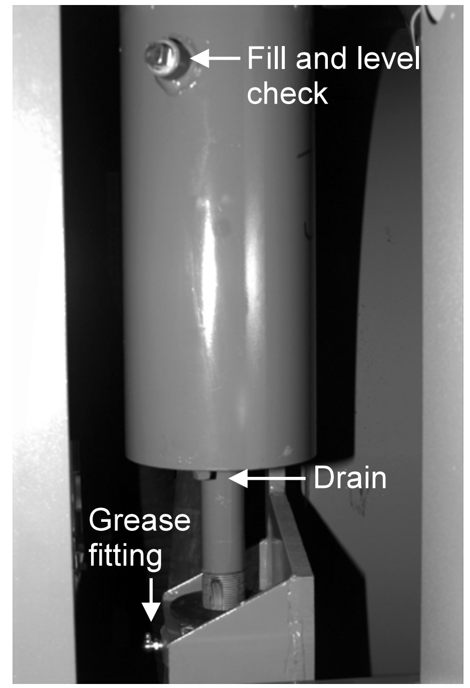


FIGURE 2 (MSSM0201CE)
Typical Hydro-Cushion®
Maintenance Points

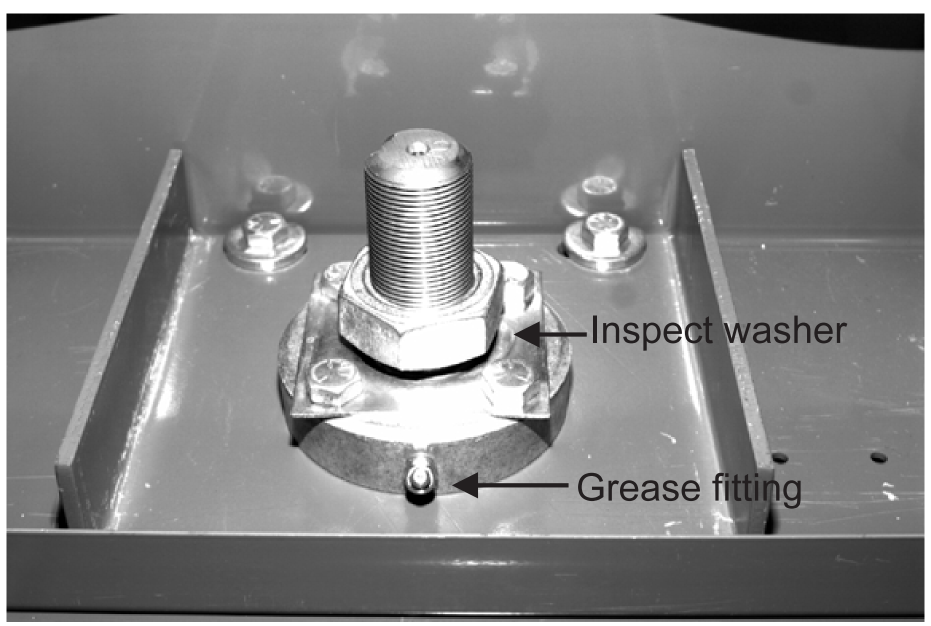


FIGURE 3 (MSSM0201CE)
Typical Upper Hydro-Cushion®
Grease Fitting

Daily and Weekly Maintenance Items

Frequency	Component	Action
Daily	**Hydraulic Tilt System** (48", 52", and 72" Tilt machines) • Reservoir FIGURE 1 and NOTE 1	Check fluid with machine not tilted
	Hydro-Cushions® (all machines) FIGURES 2 and 3	Check for leaks
Weekly	**Final stage and other v-belts** (throughout all machines) FIGURES 1 and 12 NOTES 2 and 3	Check for wear and tension

NOTE 1: Tank should be approximately three-quarters full when the machine is not tilted. Do not over-fill.

NOTE 2: V-belt instructions for the first week of operation
- After 24 hours operation (three eight hour days), tighten final stage v-belts.
- After 80 hours operation (ten eight hour days), tighten final stage v-belts again.
- After 160 hours of operation (twenty eight hour days), tighten final stage v-belts, and check all other v-belts and tighten if necessary.

NOTE 3: All v-belts are not alike. “Super” or “High Capacity” v-belts frequently have considerably higher capacities than “Standard” belts. Sometimes, one brand of v-belt is more suitable than another brand of v-belt, although both v-belts are “interchangable”. It is always best to purchase replacement belts from the original manufacturer of the equipment. Purchasing exact replacements of the original belts is the best way to assure belt life equal to the original set.
Occasionally, Milnor® will change a belt specification to improve belt life.
Belts purchased from Milnor® are as currently specified.

Monthly Maintenance Items

Frequency	Component	Action
Monthly (see NOTE 4)	**All Divided cylinder and Staph-Guard® main bearing and seals** FIGURES 4 through 10, NOTES 5 and 6	
	• Each bearing grease fitting	0.37 ounces (10.6 grams), six strokes at two locations
	• Each seal grease fitting	0.12 ounces (3.54 grams), two strokes at two locations

NOTE 4: Once a month or once every 200 operating hours, whichever occurs first.

NOTE 5: Main bearings and jackshaft bearings (if so equipped) are prepacked with lubricant at the factory. Do not add grease for thirty days. During the first month's operation, some grease will ooze out of the automatic grease fittings at the bottom of the housing(s). This is normal. These grease fittings allow excess grease to escape, thus avoiding over-heating. This escaping lubricant need not be replaced. Every time these bearings are lubricated, the surplus grease will come out of the spring loaded relief fittings after a few hours running time.

NOTE 6: Bearings can run hot enough to make it extremely uncomfortable for a person to hold his hand on the bearing housing for more than a few seconds. This is normal.

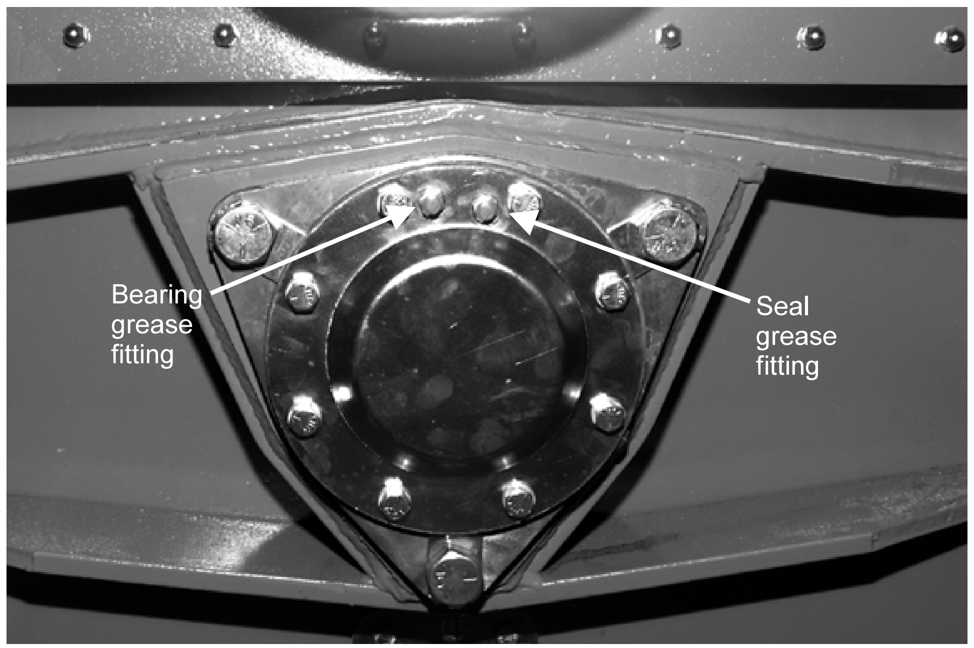


FIGURE 4 (MSSM0201CE)
42" Divided Cylinder Front Bearing and Seal Grease Fittings

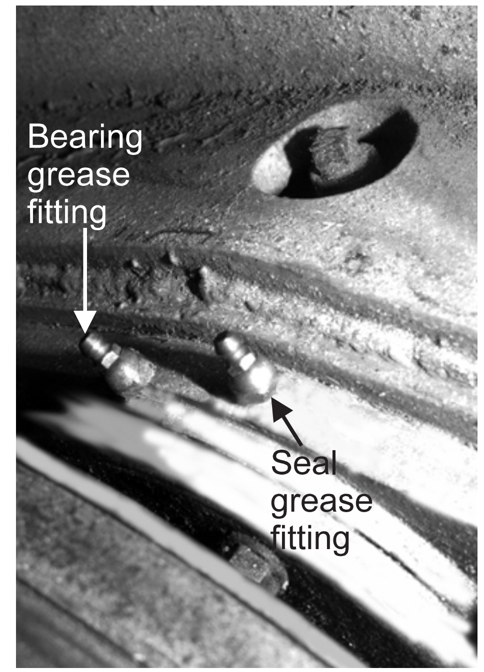


FIGURE 5 (MSSM0201CE)
42" Staph-Guard® Front and Rear Bearing and Seal Grease

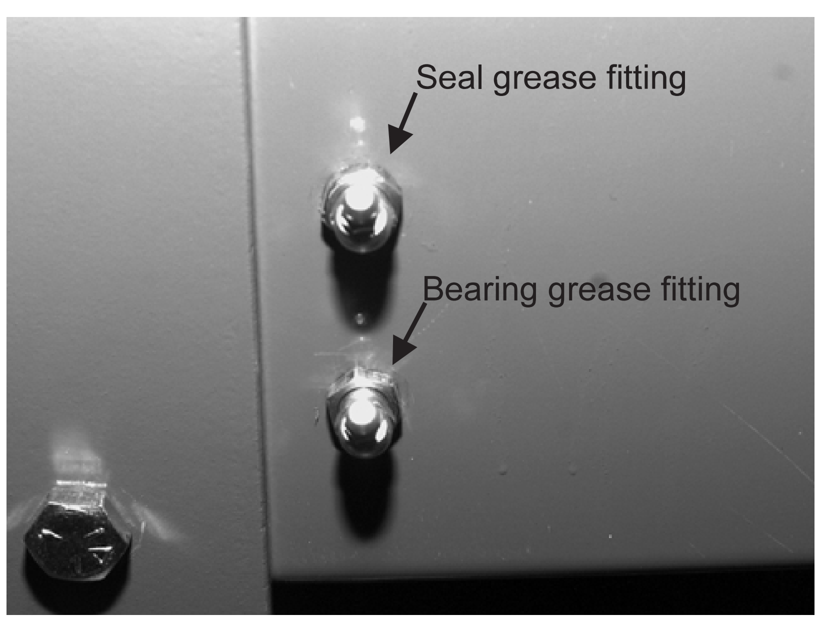


FIGURE 6 (MSSM0201CE)
42" Divided Cylinder Rear Bearing and Seal Grease Fittings

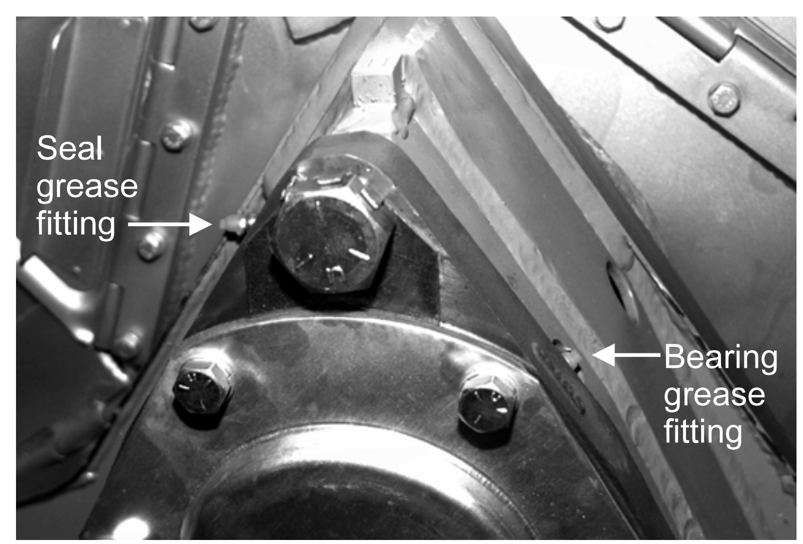


FIGURE 7 (MSSM0201CE)
60" and 72" Divided Cylinder Front Seal and Bearing Grease Fittings

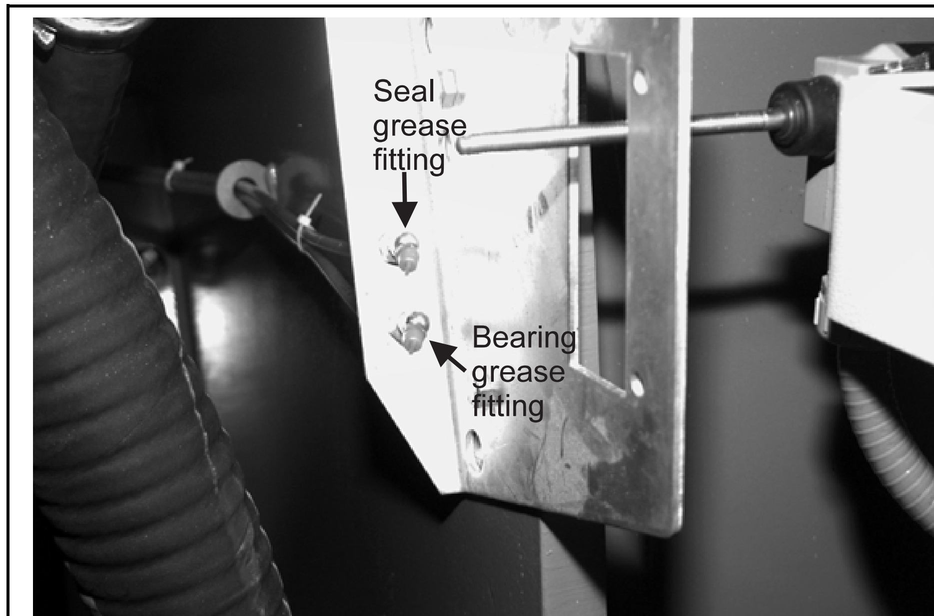


FIGURE 8 (MSSM0201CE)
60" and 72" Divided Cylinder Rear Seal and Bearing

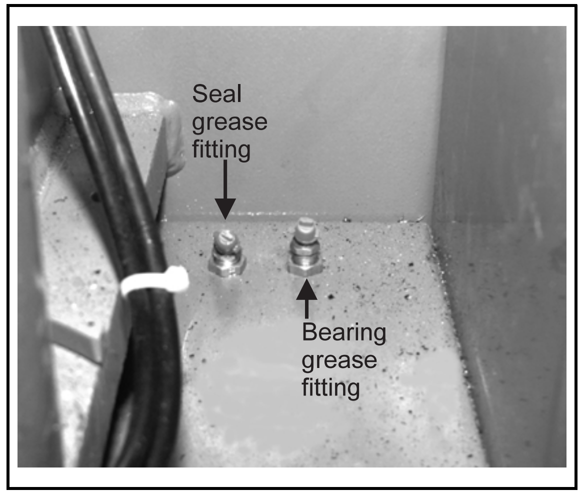


FIGURE 9 (MSSM0201CE)
60044 and 72044 Staph-Guard® Front Bearing and Seal Grease Fit-

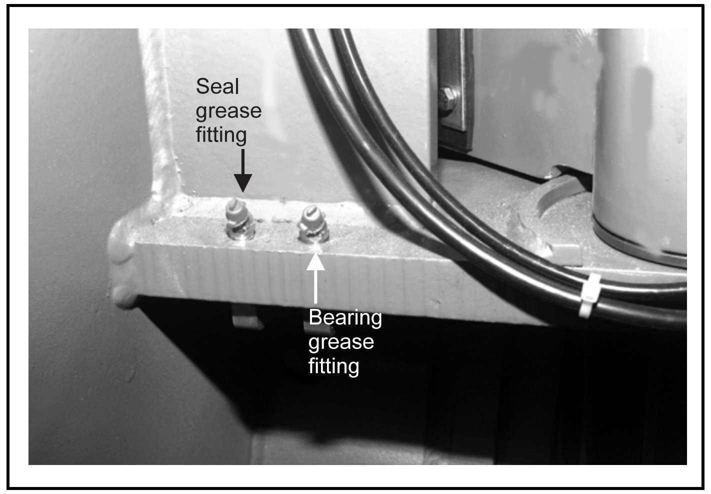


FIGURE 10 (MSSM0201CE)
60044 and 72044 Staph-Guard® Rear Bearing and Seal Grease Fittings (lo-

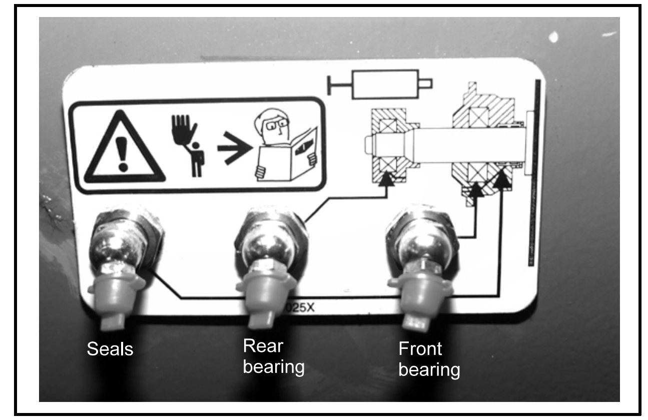


FIGURE 11 (MSSM0201CE)
All Open-Pocket Machine Seal and Bearing Grease Fitting Plate

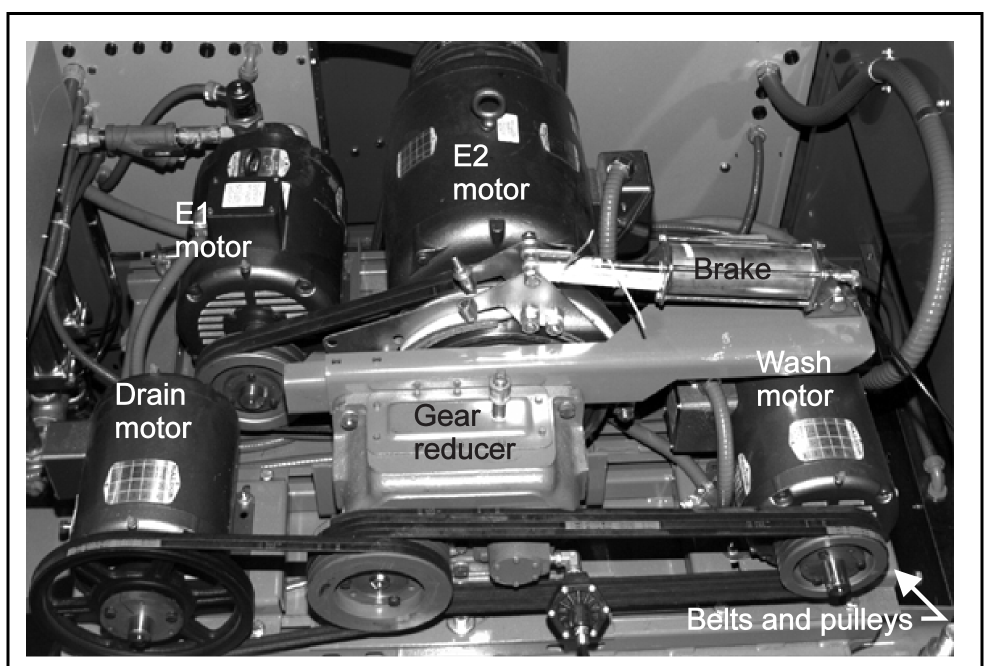


FIGURE 12 (MSSM0201CE)
Typical Drive Train Components (48" machine shown)

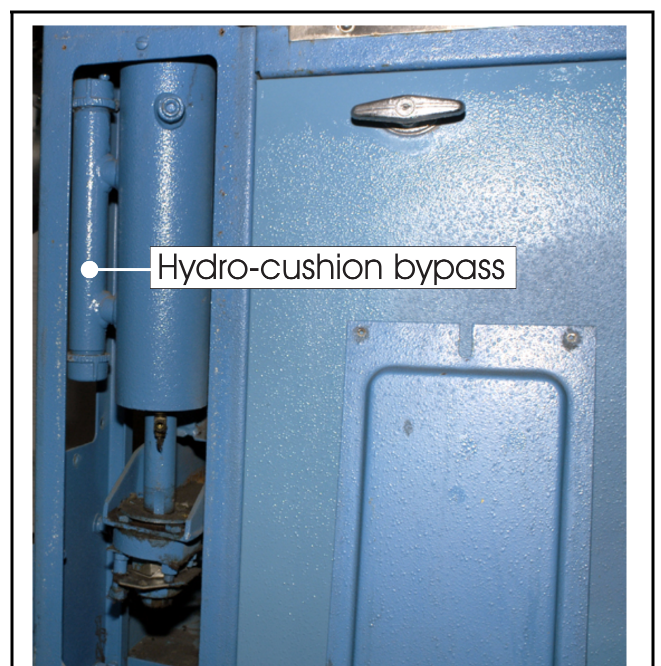


FIGURE 13 (MSSM0201CE)
Hydrocushion Bypass Valve (48" machines only")

Monthly Maintenance Items

Frequency	Component	Action
Monthly (see NOTE 4)	**42" Open pocket main bearings and seals** FIGURE 11, NOTES 5 and 6	
	• Front and rear bearing grease fitting	0.12 ounces (3.54 grams), two strokes at two locations
	• Seal grease fitting	0.06 ounces (1.77 grams), one stroke at one location
	48" Open pocket main bearings, seals and Hydro-Cushions® FIGURES 11 and 13, NOTES 4, 5, 6 and 7	
	• Front and rear bearing grease fitting	0.31 ounces (8.85 grams), five strokes at two locations
	• Seal grease fitting	See “Semi-AnnualMaintenance Items” in this section
	• Hydro-Cushion® bypass (48" open-pocket only)	Drain small quantity of oil. If milky, see note 7 below
	52" and 72" Open pocket main bearings and seals FIGURE 11, NOTES 4, 5, and 6	
	• Front bearing grease fitting	0.62 ounces (17.7 grams), ten strokes at one location
	• Rear bearing grease fitting	0.31 ounces (8.8 grams), five strokes at one location
	• Seal grease fitting	0.19 ounces (5.31 grams), three strokes at one location
	Drive train components FIGURE 12	
	• Pulleys and clutches	Check for wear
	• All components	Remove soil build-up

NOTE 7:“Milky” oil is contaminated by water. Drain cylinder and unscrew cap on bottom of bypass (See BMP890047). Remove piston rod and inspect the upper piston cups and lower piston for wear or damage. Worn piston cups allow water from the air supply to enter hydrocushion. Repair worn parts and change oil.

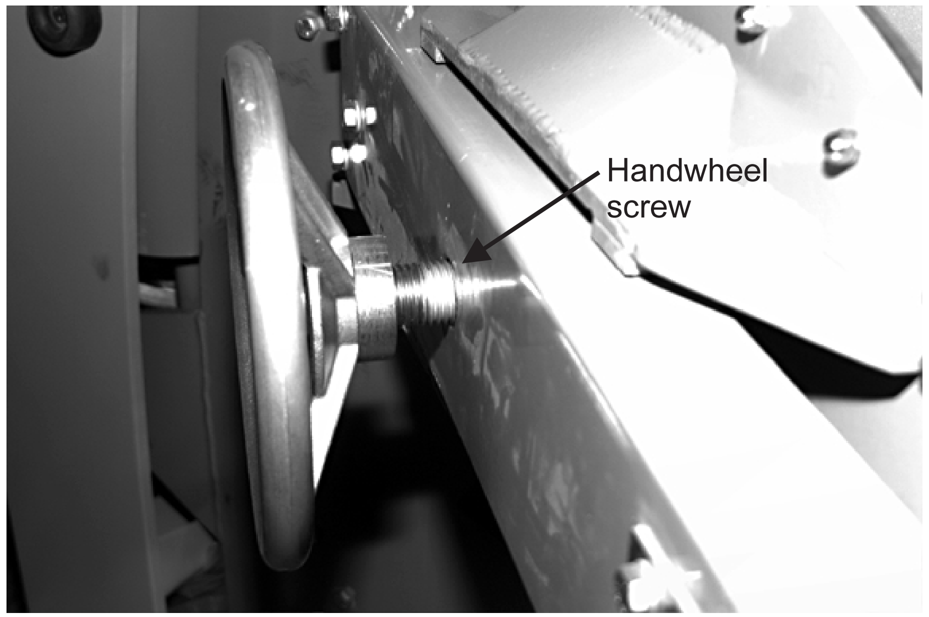


FIGURE 14 (MSSM0201CE)
Handwheel Screw
(42" Divided Cylinder and Staph-Guard® only)

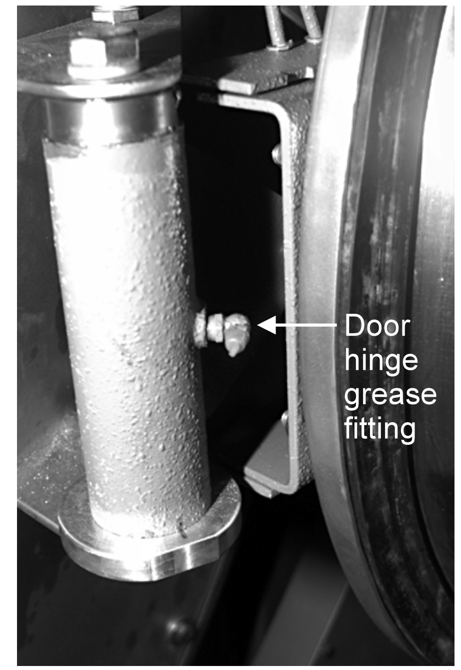


FIGURE 15 (MSSM0201CE)
Typical Door Hinge

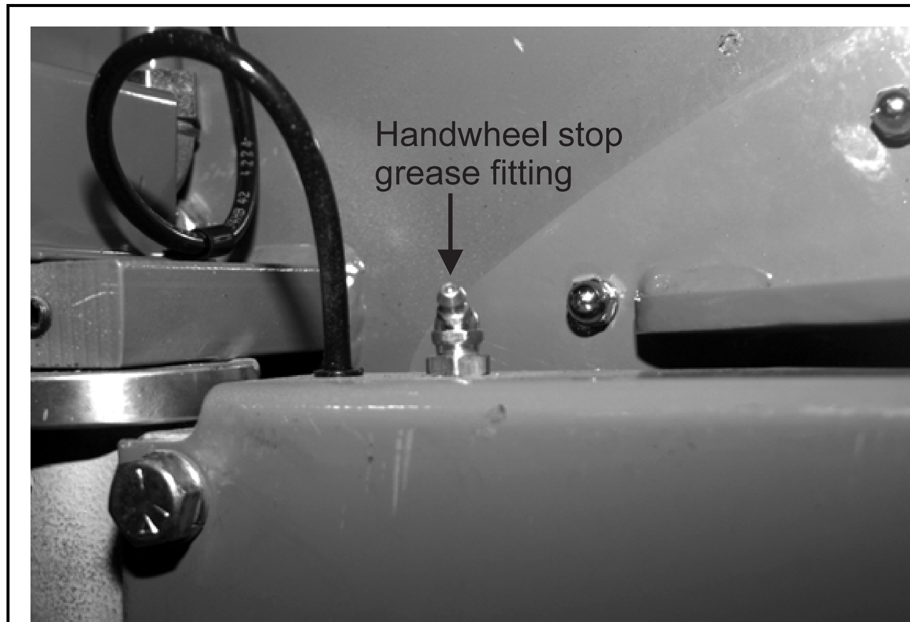


FIGURE 16 (MSSM0201CE)
Handwheel Stop
(42" Divided Cylinder and Staph-Guard® only)

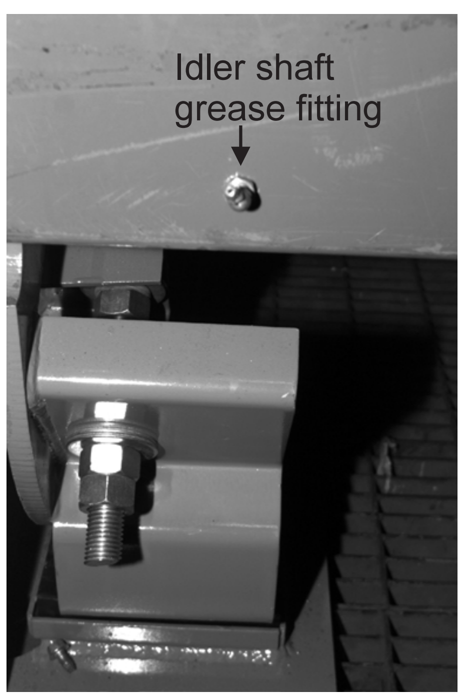


FIGURE 17 (MSSM0201CE)
42" Staph-Guard®
Idler Shaft
Grease Fitting

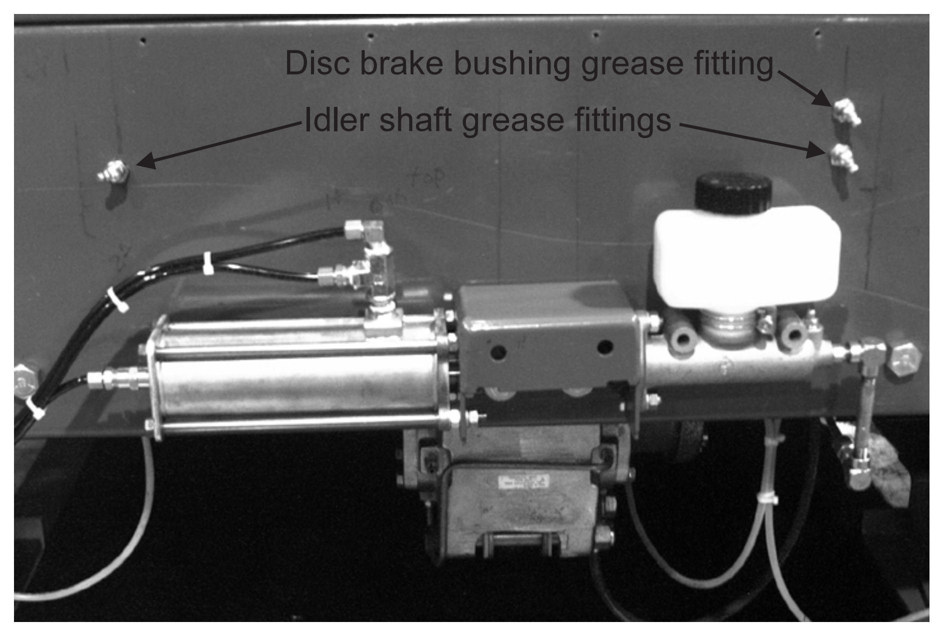


FIGURE 18 (MSSM0201CE)
60" and 72" Staph-Guard® Idler Shaft
and Disc Brake Grease Fittings
(60" shown)

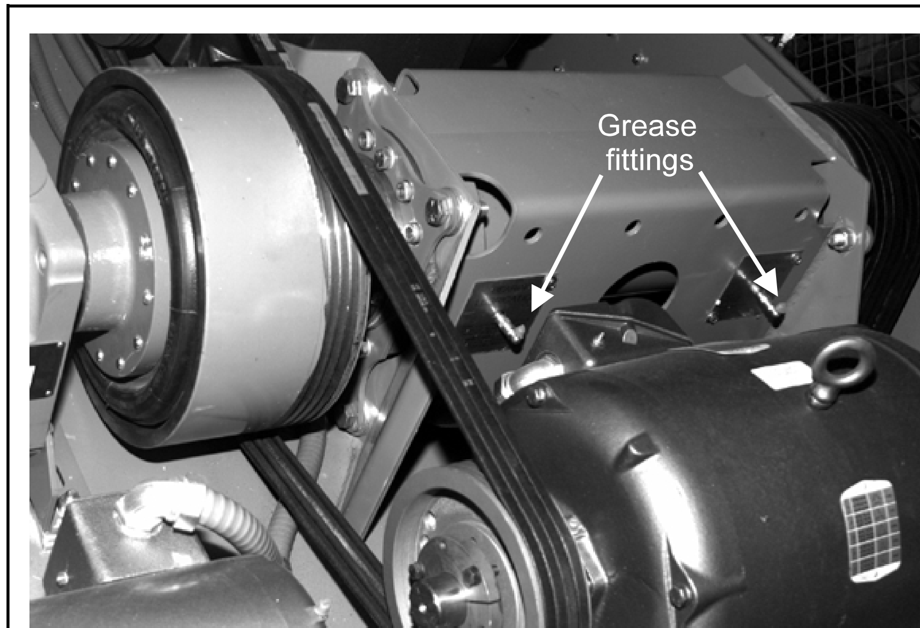


FIGURE 19 (MSSM0201CE)
Typical Jackshaft
Grease Fittings
(52" machine shown)

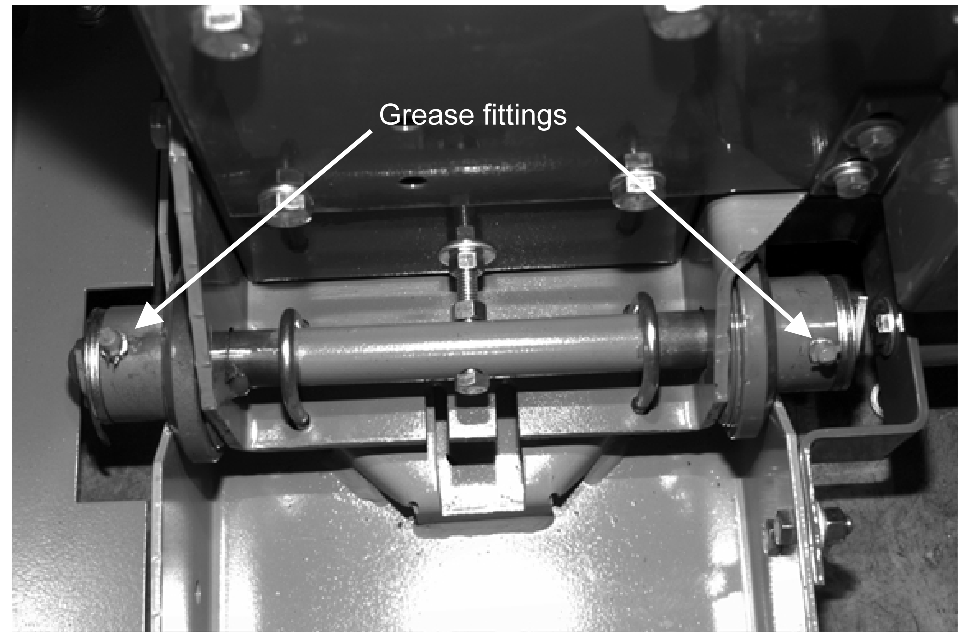


FIGURE 20 (MSSM0201CE)
Tilt Wheels
(42"and 48" tilt machines only)

Monthly Maintenance Items

Frequency	Component	Action
Monthly (see NOTE 4)	**Handwheel screw** (42" Divided Cylinder and Staph-Guard®) • Screw thread FIGURE 14	Three drops of light machine oil
	Door hinges • Grease fittings FIGURE 15	0.12 ounces (3.54 grams), two strokes at each location
	Handwheel stop (42" Divided Cylinder and Staph-Guard®) • Grease fitting FIGURE 16	0.06 ounces (1.77 grams), one stroke at one location
	Idler shaft (Staph-Guard® only) • Grease fittings FIGURES 17 and 18	0.31 ounces (8.85 grams), five strokes at two locations
	Disc brake (60" and 72" Staph-Guard® only) • Grease fittings FIGURE 18	0.12 ounces (3.54 grams), two strokes at one location
	Jackshaft (if equipped) • Grease fittings FIGURE 19 NOTES 5 and 6	0.12 ounces (3.54 grams) two strokes at two locations
	Tilt wheels (42", 48", and 72" Tilt Models) • Grease fittings FIGURE 20	0.12 ounces (3.54 grams), two strokes at each locations

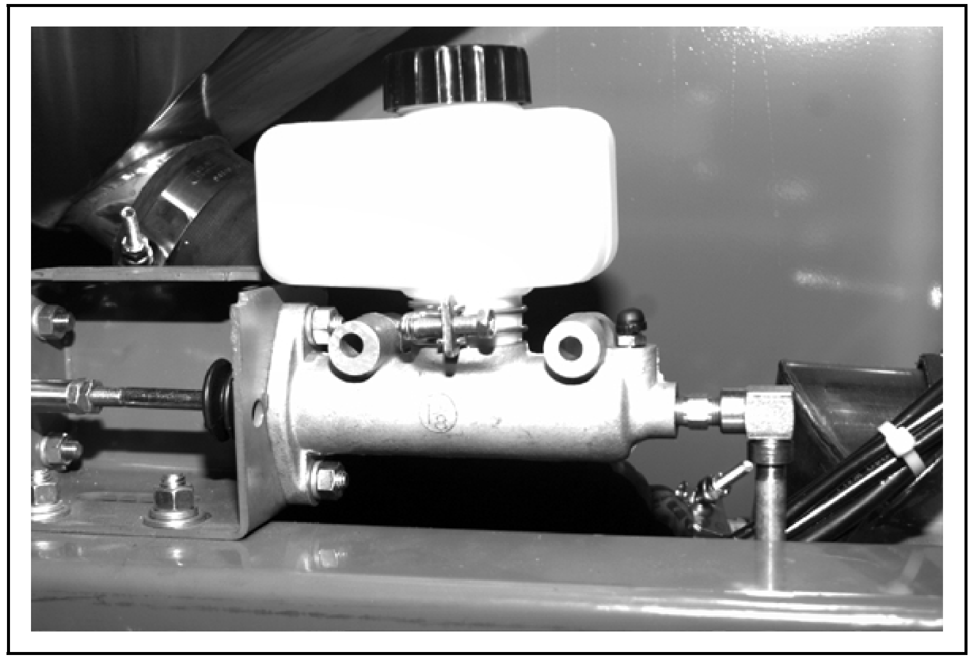


FIGURE 21 (MSSM0201CE)
Disk Brake Reservoir
(Staph-Guard® only)

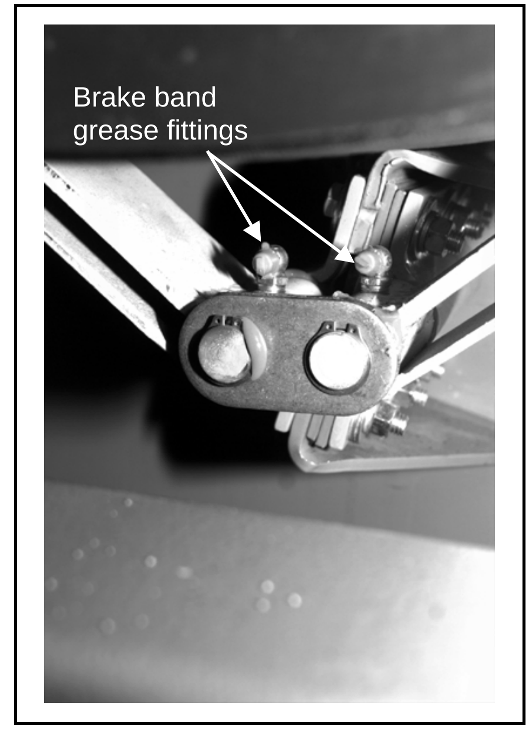


FIGURE 22 (MSSM0201CE)
Brake Band Grease Fittings
(60044 and 72044WP2/WP3)

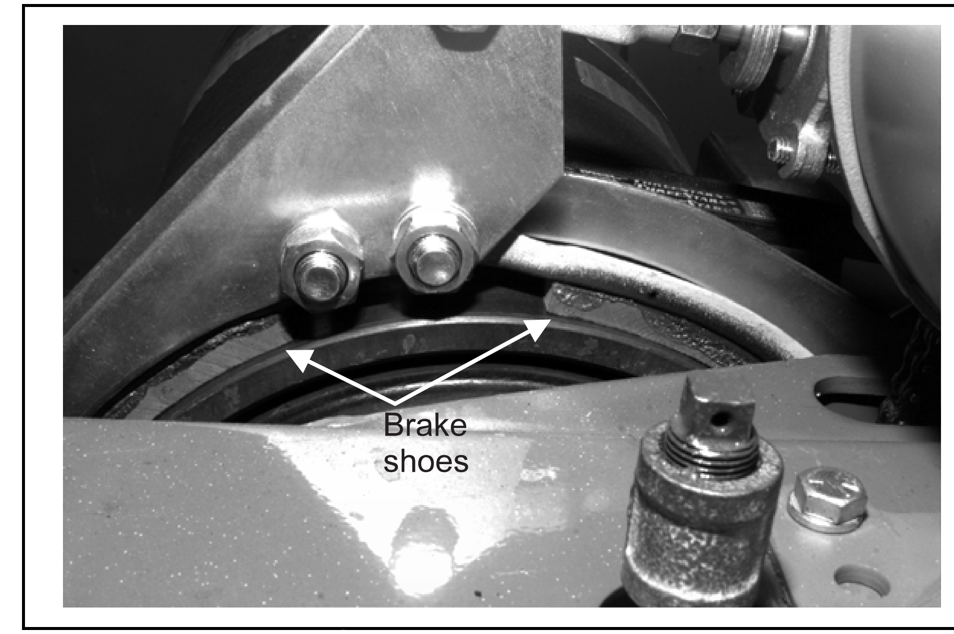


FIGURE 23 (MSSM0201CE)
Brake Shoes (all machines)

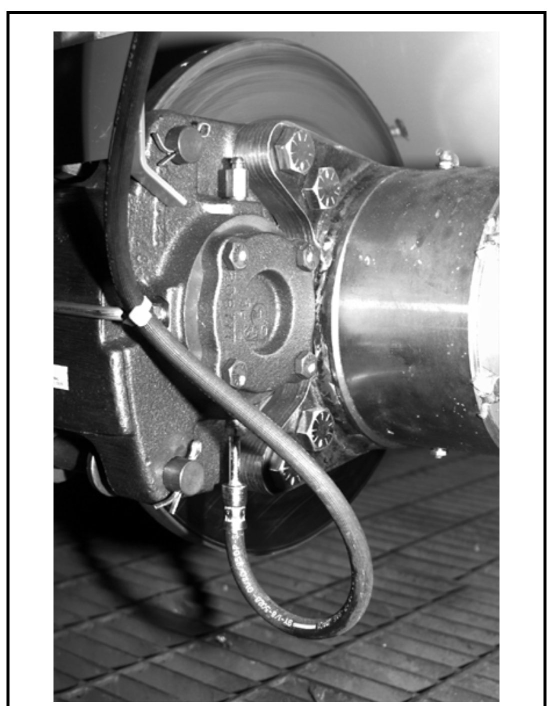


FIGURE 24 (MSSM0201CE)
Disk Brake
(Staph-Guard® only)

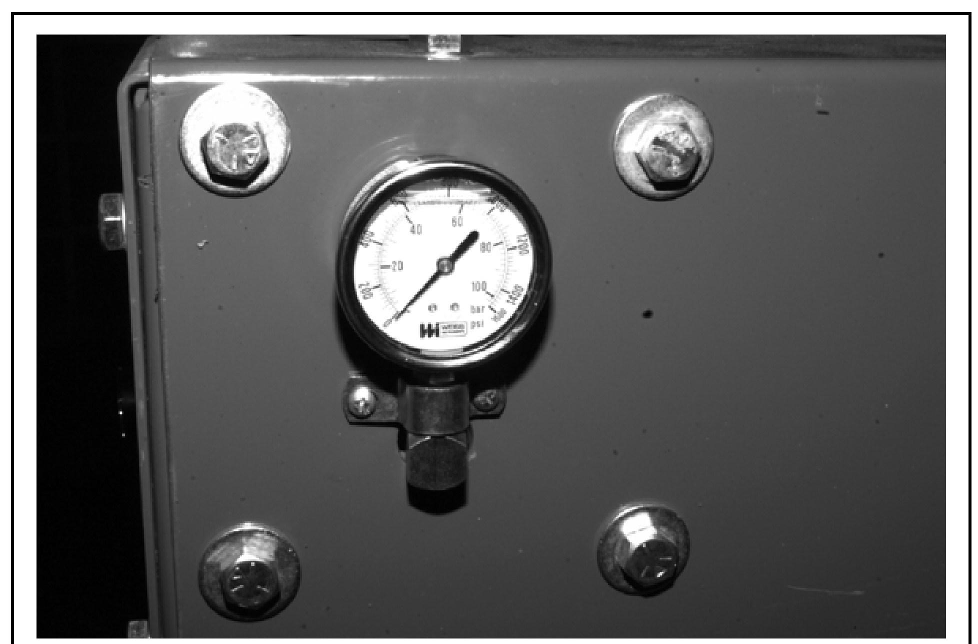


FIGURE 25 (MSSM0201CE)
Hydraulic Tilt Pressure Gauge
(On rear of 42", 48", and 72" tilt models)

FIGURE 26 (MSSM0201CE)
Door Seal Pressure Regulator

Quarterly Maintenance Items

Frequency	Component	Action
Quarterly	**Brake Components**	
	• Disk brake reservoir (60" and 72" Staph-Guard® only) FIGURE 21	Check level, refill as required (Always use fresh fluid from a sealed container)
	• Brake band grease fittings (60044 and 72044 WP2/WP3 only) FIGURE 22	0.06 ounces (1.77 grams), one stroke at two locations. Do not allow grease to drip on brake surfaces.
	• Brake shoes FIGURE 23	Check for wear, adjust or replace as required.
	• Disc brake pads (60" and 72" Staph-Guard®only) FIGURE 24	Check for wear, replace as required
	Hydro-Cushions® FIGURES 2 and 3	Check oil level, add as necessary Inspect washer, replace as necessary
	Motors FIGURE 12 NOTES 8 and 9	See “BALDOR MOTOR MAINTENANCE...,” MSSM0274AE in this manual.
	Hydraulic tilt pressure gauge FIGURE 25	Check pressure while machine is returning from a tilted position
	• 42" Open pocket	800 PSI (55 Bar)
	• 48" Open pocket	900 PSI (62 Bar)
	• 72" Open pocket	1000 PSI (69 Bar)
	Door seal pressure regulator FIGURE 26	Check settings with machine in bare manual and clockwise wash rotation. See instructions for operating individual outputs in the reference manual.
	• 42" and 48" Open pocket	48 - 50 PSI (3.37 - 3.51Kg/cm^2)
	• 60" and 72" Rapid load	25 - 28 PSI (1.76 - 1.97 Kg/cm^2)
	• 60" and 72" Staph-Guard®	18 - 20 PSI (1.27 - 1.41 Kg/cm^2)

NOTE 8: If motor manufacturer’s instructions conflict with manual section, follow nameplate instructions. motors are warrantied by their manufacturers, not by Milnor®.

NOTE 9: Pump grease slowly with relief ports open. Do not over-lubricate.

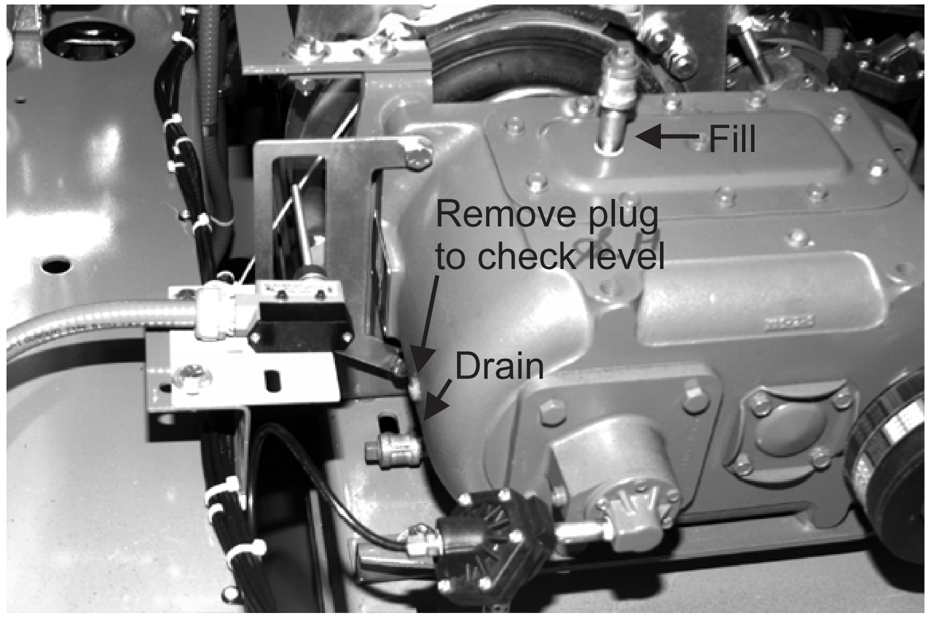


FIGURE 27 (MSSM0201CE)
Typical Gear Reducer Fill and Drain

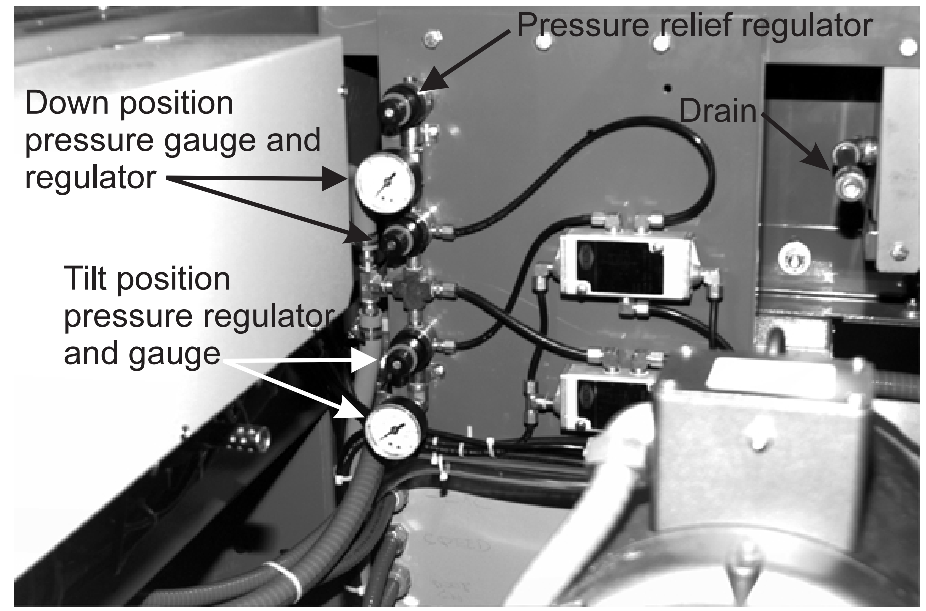


FIGURE 28 (MSSM0201CE)
Push Back and Forward Hydraulic System Gauges and Regulators (42", 48", and 72" Tilt Models)

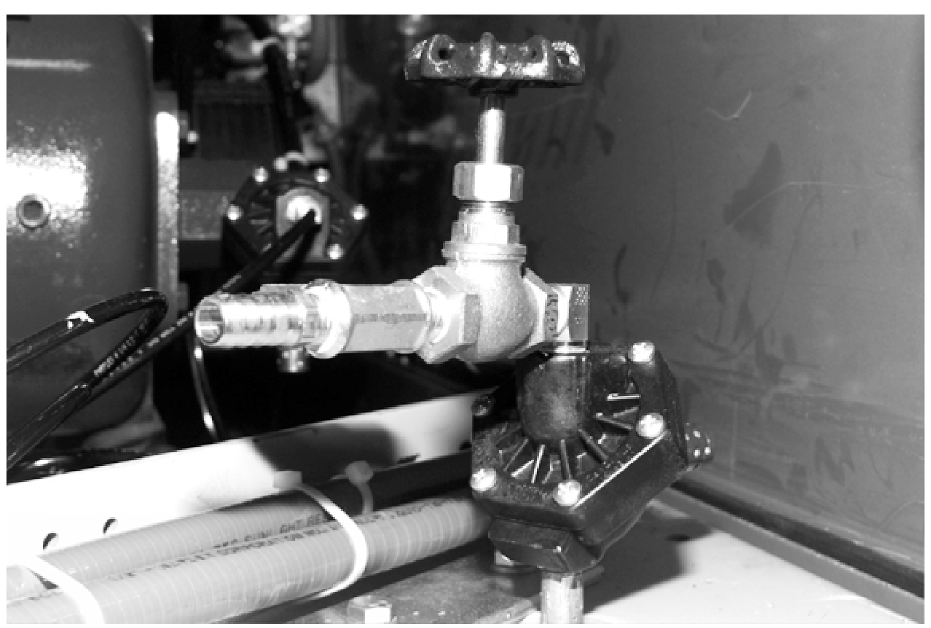


FIGURE 29 (MSSM0201CE)
Push-Down Control Valve (72" Rapid load and Staph-Guard® only)

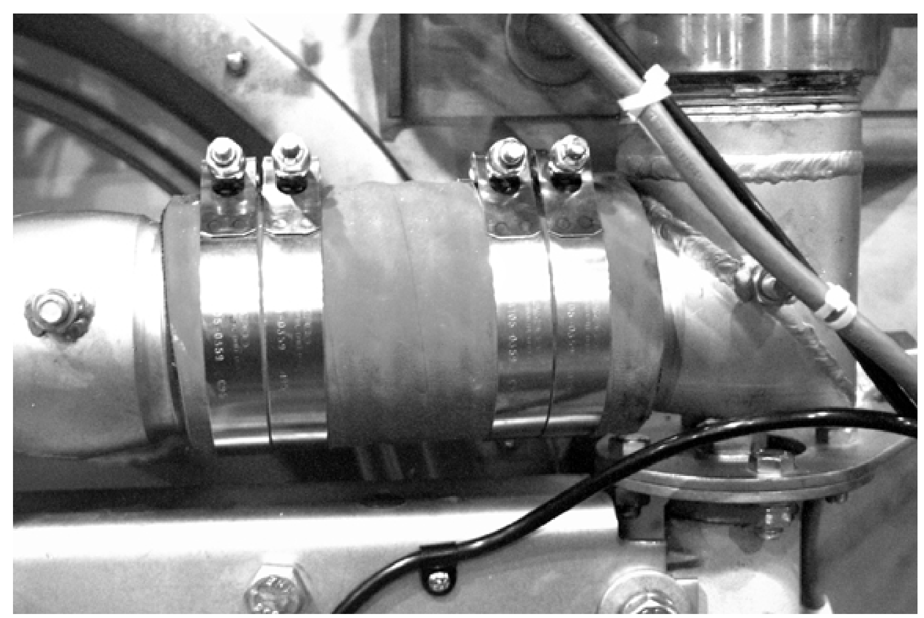


FIGURE 30 (MSSM0201CE)
Shell Door Recirculation Hose (48" dye machine only - cover removed for clarity)

Semi-Annual Maintenance Items

Frequency	Component	Action
Semi-Annual	**Main bearings and seals** • 48" Seal grease fittings FIGURE 11	0.12 ounces (3.54 grams), two strokes at one location
	Gear reducer FIGURE 27	Check oil level, refill as required
	Push Back and Forward System FIGURE 28 and NOTE 10	
	• Down position pressure gauge and regulator	Check pressure in a “wash step” 3 - 5 PSI (.21- 0.35 Kg/cm^2)
	• Tilt position pressure regulator and gauge	Check pressure in a “wash step” 30 PSI (2.11Kg/cm^2)
	Push-down control valves (72" Rapid load and Staph-Guard®) FIGURE 29 and NOTE 11	Observe operation and adjust if required
	Recirculation (48" dye models only) FIGURE 30	Replace hose

Annual or Less Frequent Maintenance Items

Frequency	Component	Action
Annual	**Gear reducer** FIGURE 27	Change oil and clean magnetic plug (if so equipped)
	Hydro-Cushions® FIGURE 2	Change oil
Every 2 years	**Hydraulic system** FIGURE 28	Change oil

NOTE 10: 52" and 72" machines are not equipped with a tilt pressure regulator or gauge.

NOTE 11: Adjust push-down control valves so that machine moves down evenly, and all push-down sockets meet simultaneously. If the back of the machine comes down first, close the valve slowly. If the front comes down first, open the valve.

LUBRICANTS FOR MILNOR® MACHINES

The following are lubricants used in Milnor® machines. Always refer to the preventive maintenance instructions for specific lubricating instructions. Consult lubricant manufacturer to verify equivalence before using a substitute. Mixing different base greases can cause bearing and seal damage.

Washer-Extractors

Open Pocket Machines	Bearing housings	Gear reducers	Isolators	Hydro-Cushions®	Motors	Commutator cam	Balancing mechanism	Disc brake (if so equipped)	Hydraulic tilt mechanism	Door latches	Other grease points
30015, 20, 22, C, S, and M	30										
3022F8J	220		220								
36021Q4x, 36026Q4x											
36021BWP						Wells	1540				
36021Q6x, 36026Q6x, 42024Q4x, 42026Q6x	EPLF 2	220			EPLF 2						
36030Fxx			1030					DOT 3			
42032Fxx											
42026QHP 48032BHP/BTL/BTN 48036QHP/QTL/QTN		220		220					1030	Door	EPLF 2
52038WP1/WTL/WTN				1030							
64046ExN 72046ExN 72058JxN			1030					DOT 3	68		
Divided Cylinder Machines											
42031 - 44 WP2/3 42031 - 44 SP2/3 60044 SP2/3 72044 SP2/3	EPLF 2	220		1030	EPLF 2			DOT 3		Door	EPLF 2

CBW®, Extractor, Press, Shuttles, Conveyors, and Dryvacs

	Bearing housings	Gear reducer	Drive motors	Hydro-Cushions®	Hydraulic mechanisms	Disc brake	Mist oiler	Guide rollers	Drive/Support rollers	Blower shaft bearings	Press pressure pump	Blower motors	Inflatable rib couplings	Shuttle chain	All other grease points
CBW®		220					T32	EPLF 2	EPLF 2						
42032M7E	EPLF 2			220	68	DOT 3							SRI		
42032M9E			EPLF 2	32											EPLF 2
Single Stage Press		1030													
Press							23				630				
Dryer									EPLF 2	EP2		R			
Shuttle & Conveyor		634												FL	
Dryvac										EP2		R			

Oils

DOT 3	= NAPA Super Heavy Duty Brake Fluid DOT 3
23	= Shell Tellus® 23
30	= High quality SAE 30, 40, or 50 weight motor oil (non-detergent, if available)
32	= Shell Tellus® 32
T32	= Shell Turbo® T32
68	= Shell Tellus® 68
220	= Shell Morlina® 220
630	= Valvoline Special Moly® EP 630
634	= Mobile SHC® 634 Oil
1030	= Shell Rotella T® 10W30
1540	= Shell Rotella T® HD 15W40

Greases

Door	=	Doorease® Stick lubricant
EPLF 2	=	Shell Alvania® EP-LF Type 2
EP2	=	Shell Darina® EP-2
FL	=	Recol Food Lubricant
R	=	Shell Dolium® R
Wells	=	Wells CL200 Cam Lubricant
SRI	=	Chevron SRI oil

BALDOR MOTOR MAINTENANCE

MSSM0274AE/9731AV

Most of the information in this document is taken from the *Baldor Electric Company Instruction, Operation, and Maintenance Manual,* and provides a means of more accurately determining motor lubrication requirements based on local conditions.

General Maintenance

Inspect, clean, and test motors at regular intervals— approximately every 500 operating hours or every three months, whichever comes first. Lubricate motors at the intervals determined herein. Keep accurate maintenance records.

⚠ DANGER: Electrocution and Electrical Burn Hazards

Contact with high voltage will electrocute or burn you. Power switches on the machine and the control box do not eliminate these hazards. High voltage is present at the machine unless the main power is off. Electrical power can cause death or severe injury.

- **Do not service machine unless qualified and authorized.**
- **Lock OFF and tag out power at the wall disconnect before servicing, or in accordance with factory service procedures.**

⚠ DANGER: Entangle and Crush Hazard

Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

- **Do not service machine unless qualified and authorized.**
- **Lock OFF and tag out power at the wall disconnect before servicing, or in accordance with factory service procedures.**

Clean—Keep the exterior of the motor free of dirt, oil, grease, water, etc. Keep ventilation openings clear. Oily vapor, paper pulp, textile lint, etc., can accumulate and block ventilation, causing overheating and early motor failure.

Test—Periodically, check the motor and winding insulation integrity using a "megger." Record the megger readings and immediately investigate any significant drop in insulation resistance. Check all electrical connectors to be sure they are tight.

Lubricate—Determine the proper lubrication interval for your motor as explained in "How to Determine Lubrication Interval" in this section, and lubricate accordingly.

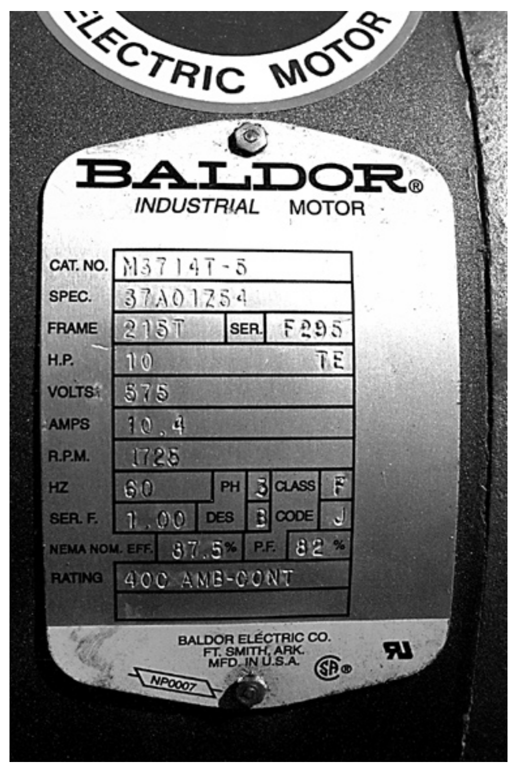


FIGURE 1 (MSSM0274AE)
Typical Motor Data Plate

How to Determine Lubrication Interval—The useful life of antifriction bearing grease can be estimated, based on service conditions, frame type, and motor rpm. An example of determining the correct lubrication interval is provided below.

Ex: A fan motor, operating at an ambient temperature of 109^{O}F (43^{O}C) in a moderately corrosive atmosphere. The motor has a NEMA 286T/(IEC 180) frame and is rated at 1750 rpm.

1. Table 1 classifies the service condition as “severe.”
2. Table 2 specifies a 0.5 service condition multiplier value for “severe” service condition.
3. Table 3 specifies 9500 hours as the recommended lubrication interval for frame sizes 254 to 286 (see nameplate), given standard service conditions.
4. Multiply .5 *(service condition multiplier value)* by 9500 hours *(recommended lubrication interval)* = 4750 hours *(calculated lubrication interval).*
5. Table 4 shows that the amount of grease to be added is 0.32 ounces (9.1 grams).

Table 1 — Determining the Service Condition

Severity of Service	Maximum Ambient Temperature	Atmospheric Contamination	Type of Bearing
Standard	104^{O}F (40^{O}C)	Clean, little corrosion	Deep groove ball bearing
Severe	122^{O}F (50^{O}C)	Moderate dirt, corrosion	Ball thrust, Roller
Extreme	>122^{O}F (>50^{O}C) or Class H Insulation (**Note 1**)	Severe dirt, abrasive dust, corrosion	All bearings
Low Temperature	-22^{O}F (-30^{O}C) (**Note 2**)		

Note 1: Special high temperature grease is recommended.

Note 2: Special low temperature grease is recommended.

Table 2 — Service Condition Multiplier Value

Operating Condition	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1

Table 3 — Recommended Lubrication Intervals at Standard Service Conditions

NEMA (IEC) Frame Size	Rated Speed - RPM			
	3600	1800	1200	900
Up to 215 (132)	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
254 to 286 (160 - 180)	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
324 to 365 (200 - 225)	2200 Hrs.(**Note 3**)	7400 Hrs.	12000 Hrs.	15000 Hrs.
404 to 5000 (280 - 315)	2200 Hrs.(Note 3)	3500 Hrs.	7400 Hrs.	10500 Hrs.

Note 3: Bearings in 404 through 5000 frame, 2 pole motors are either 6313 or 6314 bearings and the lubrication interval is shown in the table. **If roller bearings are used, the bearings must be lubricated more frequently. Divide the listed lubrication interval by two.**

Table 4 — Lubrication Amounts per Frame

NEMA (IEC) Frame Size	Bearing Description These are the “Large” bearings (Shaft End) in each frame size (Note 4)					
	Largest bearing in size category	OD D mm	Width B mm	Grease gun strokes (Note 5)	Volume of grease to be added	
					ounces	grams
Up to 215 (132)	6307	80	21	2.5	0.16	4.7
254 to 286 (160 - 180)	6311	120	29	5.0	0.32	9.1
324 to 365 (200 - 225)	6313	140	33	7.0	0.43	12.2
404 to 5000 (280 - 315)	NU322	240	50	18.0	1.11	31.5

Note 4: Smaller bearings in size category may require reduced amounts of grease.

Note 5: See “Correct Grease Gun Procedures” for information on estimating the output of hand-operated grease guns.

Lubrication Recommendations

Type of Grease—Use Shell Dolium R (factory installed) or Chevron SRI greases for standard service conditions. The extreme and low temperature conditions are not normally encountered in the laundry. However, for extreme conditions, use Darmex 707 and for low temperature conditions, use Arrowshell 7. Contact Baldor for equivalents, if necessary.

Correct Grease Gun Procedures

1. Use hand-operated grease gun, not a pneumatic grease gun. Pump grease slowly, taking 10 to 12 seconds to complete each stroke.
2. Apply quantity of grease called for. Over-lubrication can be as damaging as under-lubrication. Where quantities are stated in strokes, one stroke of the grease gun is assumed to provide .0624 fluid oz. (1.77 grams) (by volume) of grease. Therefore, one fluid ounce (28.3 grams) of grease would be provided by 16 strokes of the grease gun. Determine the flow rate of your grease gun by pumping one ounce into a calibrated container. If fewer than 16 strokes are required, all quantities in strokes in the chart should be reduced accordingly. If more than 16 strokes are required, the number of strokes should be increased. **Before starting lubrication, make sure your grease gun is working and that you get a full charge of grease with every stroke.**
3. Do not over-lubricate motors. Over-lubrication of a motor can seriously damage it by forcing grease into motor windings. Over-lubrication of the extract motor can force grease into the centrifugal switch causing it to malfunction.
4. Do not allow grease to drip on the brake disk or clutch tire/drum during lubrication. This will reduce the braking action considerably, and may permit the cylinder to creep while loading and unloading.

Lubrication Procedure

NOTICE: Motor Damage

To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

1. Clean grease fittings.
2. Remove grease outlet plug.
3. Add recommended amount of grease. Be sure grease to be added is compatible with the grease already in motor. Consult your Baldor distributor or an authorized Baldor Service Center if grease other than recommended is to be used. Stop when new grease appears at shaft hole in the endplate or grease outlet plug.
4. Replace grease outlet plug.

FASTENER TORQUE REQUIREMENTS

The specifications in this section apply to 1/4 inch and larger Unified National fine and coarse fasteners used on Milnor® machines. This information is to be used only when torque specifications are not stated in the installation or service instructions.

When tightening applicable fastener, abide by the following precautions:

1. Always use new fasteners. Replace bolts, nuts, flat washers, and lock washers in the order shown on the parts drawing.
2. Unless otherwise specified, use:
   - Loctite® 271 threadlocker or equivalent for bearing housing mounting bolts from one half to one inch in diameter.
   - Loctite® 277 threadlocker or equivalent for bearing housing mounting bolts of one inch diameter or larger.
   - Loctite® 242 threadlocker for all other fasteners requiring thread locking compound.
3. Use a torque wrench to assure proper tightness.
4. Never lubricate fasteners. The values specified herein are maximum recommended torques and are calculated from published ASTM and SAE data. Actual allowable torques are application dependent and can vary for many reasons, (joint types, gaskets, etc.). Use these values as a guide.
5. Although FIGURE 1 depicts hex head bolts, the table applies to all head types.

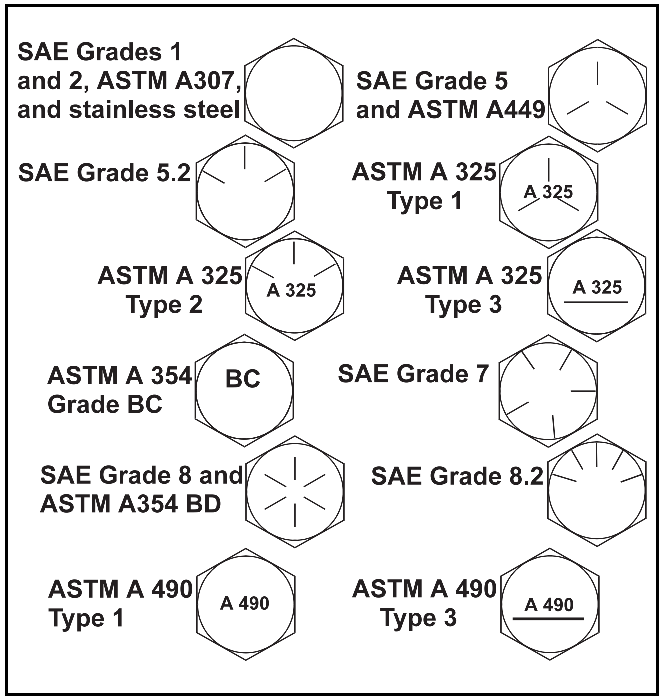


FIGURE 1 (MSSM0101CE)
Fastener Grade Markings

Fasteners and Threadlocker

How Fasteners Loosen—Standard threaded fasteners are manufactured with a clearance fit for easy assembly. With the fastener at the proper torque, 85% of the tightening torque is absorbed in the threads and under the fastener head. The remaining 15% provides the friction that prevents the thread from slipping. When this friction is overcome (by bending, thermal expansion, internal pressures, functional loads, or impact) the thread slips and loosens. Although higher torques reduce the likelihood of thread slippage, if slippage occurs, the threads unwind and the fastener loosens. Once thread slippage begins, vibration increases the rate of loosening.

Preventing Loosening—The most effective way to prevent loosening of threaded parts is by proper application of a threadlocking compound. Threadlocker provides lubrication during assembly, then hardens to seal the threads against corrosion and provide resistance to thread slippage.

Applying Threadlocker

NOTE: The following threadlocker information and illustrations are excerpts from the Loctite® User's Guide and are used with permission.

For maximum strength, threadlocker must fill the thread voids completely, as shown in FIGURE 2. Organic or petroleum solvent will remove excess uncured adhesive from joints. Consult information below for the specific fastener application.

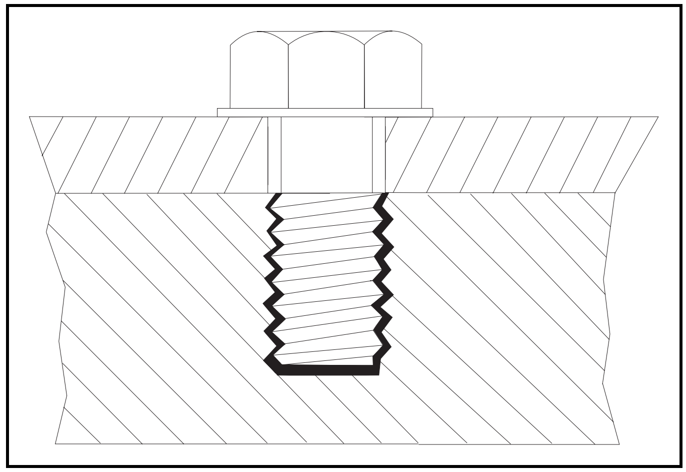


FIGURE 2 (MSSM0101CE)
Correct Threadlocker Use

Bolts and Nuts—See FIGURE 3.

1. Clean all threads (bolt and nut) with cleaning solvent.
2. Spray all threads with Loctite® Primer N. Allow to dry.
3. Insert bolt into through hole assembly.
4. Apply several drops of threadlocker onto bolt engagement area.
5. Assemble and tighten nut to correct torque for the threadlocker.

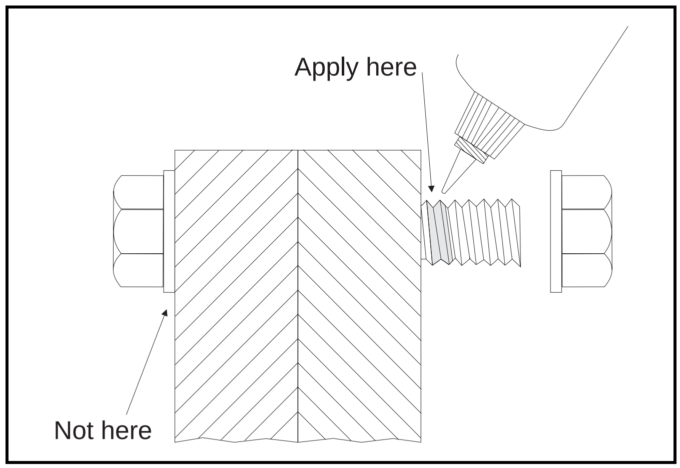


FIGURE 3 (MSSM0101CE)
Applying Threadlocker to Through Hole

Blind Holes—See FIGURE 4.

1. Clean all threads (bolt and nut) with cleaning solvent.
2. Spray all threads with Loctite® Primer N. Allow to dry.
3. Squirt several drops down female threads into bottom of hole.
4. Apply several drops to bolt.
5. Tighten to correct torque for the threadlocker.

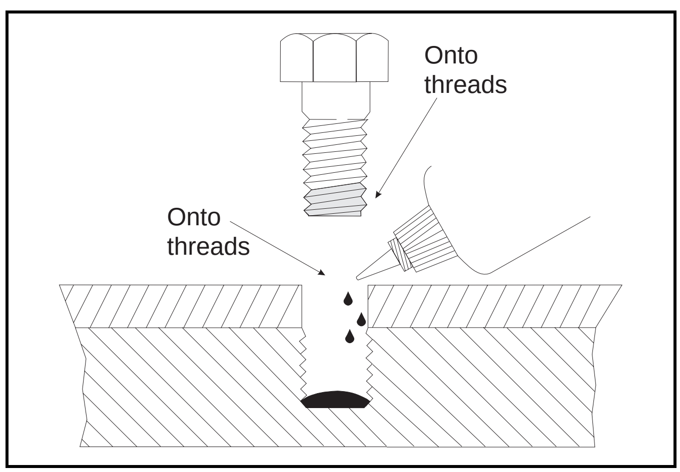


FIGURE 4 (MSSM0101CE)
Applying Threadlocker to Blind Holes

Removing Fasteners

High strength threadlockers like Loctite® 271 (or equivalent) may be weakened by heating to at least 500° F (260° C) as follows.

1. Apply localized heat to fastener as shown in FIGURE 5.

2. Disassemble while hot. Once disassembled, the cured adhesive can be removed with Loctite® Gasket Remover #790 (or equivalent).

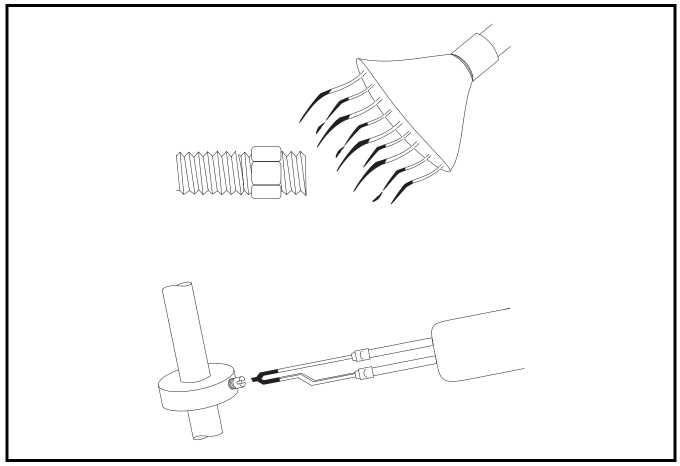


FIGURE 5 (MSSM0101CE)
Removing High Strength Threadlocker

Carbon Steel Fasteners

All values in foot pounds and (Newton meters)

Nominal bolt size	**Grade Designation and Standard**	**Zinc or Cadmium Plated**	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1/4 - 20	SAE Grade 1 ASTM A307	2.5 (3.39)	3.0 (4.06)	3.3 (4.47)	3.6 (4.88)	4.6 (6.23)	4.3 (5.83)	3.3 (4.47)
	SAE Grade 2	4.1 (5.56)	4.9 (6.64)	5.5 (7.45)	6.0 (8.13)	7.7 (10.44)	7.1 (9.63)	5.5 (7.46)
	SAE Grade 4	4.8 (6.50)	5.8 (7.86)	6.4 (8.67)	7.0 (9.49)	9.0 (12.20)	8.3 (11.25)	6.4 (8.67)
	SAE Grade 5 ASTM A449	6.3 (8.54)	7.6 (10.3)	8.4 (11.38)	9.3 (12.60)	11.8 (15.99)	11.0 (14.91)	8.4 (11.39)
	SAE Grade 7	7.9 (10.7)	9.4 (12.7)	10.5 (14.23)	11.5 (15.59)	14.7 (19.93)	13.6 (18.44)	10.5 (14.23)
	SAE Grade 8 ASTM A354 Grade BD	8.9 (12.0)	10.7 (14.5)	11.9 (16.13)	13.1 (17.76)	16.6 (22.50)	15.4 (20.88)	11.9 (16.13)
	ASTM A354 Grade BC	7.9 (10.7)	9.4 (12.7)	10.5 (14.23)	11.5 (15.59)	14.7 (19.93)	13.6 (18.44)	10.5 (14.23)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for : Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1/4 - 28	SAE Grade 1 ASTM A307	2.8 (3.80)	3.4 (4.61)	3.8 (5.15)	4.1 (5.56)	5.3 (7.18)	4.9 (6.64)	3.8 (5.15)
	SAE Grade 2	4.7 (6.37)	5.6 (7.60)	6.3 (8.54)	6.9 (9.36)	8.8 (11.93)	8.1 (10.98)	6.3 (8.54)
	SAE Grade 4	5.5 (7.46)	6.6 (8.95)	7.3 (9.90)	8.1 (10.98)	10.3 (13.96)	9.5 (12.88)	7.3 (9.90)
	SAE Grade 5 ASTM A449	7.3 (9.90)	8.7 (11.80)	9.7 (13.15)	10.7 (14.50)	13.6 (18.44)	12.6 (17.08)	9.7 (13.15)
	SAE Grade 7	8.9 (12.07)	10.7 (14.50)	11.9 (16.13)	13.1 (17.76)	16.6 (22.51)	15.4 (20.88)	11.9 (16.13)
	SAE Grade 8 ASTM A354 Grade BD	10.2 (13.83)	12.2 (16.54)	13.6 (18.44)	15.0 (20.34)	19.0 (25.76)	17.7 (23.99)	13.6 (18.44)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for : Loctite 222 or262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
5/16 - 18	SAE Grade 1 ASTM A307	5.1 (6.91)	6.2 (8.40)	6.8 (9.22)	7.5 (10.17)	9.6 (13.02)	8.9 (12.07)	6.8 (9.22)
	SAE Grade 2	8.5 (11.52)	10.2 (13.83)	11.3 (15.32)	12.5 (16.95)	15.9 (21.56)	14.7 (19.93)	11.3 (15.32)
	SAE Grade 4	10.0 (13.56)	12.0 (16.27)	13.3 (18.03)	14.6 (19.79)	18.6 (25.22)	17.3 (23.46)	13.3 (18.03)
	SAE Grade 5 ASTM A449	13.0 (17.63)	15.6 (21.15)	17.4 (23.60)	19.1 (25.90)	24.3 (32.95)	22.6 (30.64)	17.4 (23.60)
	SAE Grade 7	16.1 (21.83)	19.3 (26.17)	21.5 (29.15)	23.6 (31.99)	30.1 (40.81)	27.9 (37.83)	21.5 (29.15)
	SAE Grade 8 ASTM A354 Grade BD	18.5 (25.08)	22.1 (29.96)	24.6 (33.35)	27.1 (36.74)	34.5 (46.78)	32.0 (43.39)	24.6 (33.35)
	ASTM A354 Grade BC	16.1 (21.83)	19.3 (26.17)	21.5 (29.15)	23.6 (31.99)	30.1 (40.81)	27.9 (37.83)	21.5 (29.15)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc orCadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
5/16 - 24	SAE Grade 1 ASTM A307	5.6 (7.59)	6.7 (9.08)	7.4 (10.03)	8.2 (11.12)	10.4 (14.10)	9.6 (13.01)	7.4 (10.03)
	SAE Grade 2	9.4 (12.74)	11.3 (15.32)	12.5 (16.94)	13.8 (18.71)	17.5 (23.73)	16.3 (22.09)	12.5 (16.94)
	SAE Grade 4	11.0 (14.91)	13.2 (17.90)	14.6 (19.79)	16.1 (21.83)	20.5 (27.79)	19.0 (25.76)	14.6 (19.79)
	SAE Grade 5 ASTM A449	14.4 (19.52)	17.2 (23.32)	19.1 (25.90)	21.1 (28.60)	26.8 (36.35)	24.9 (33.76)	19.1 (25.90)
	SAE Grade 7	17.9 (24.27)	21.4 (29.01)	23.8 (32.27)	26.2 (35.52)	33.4 (45.28)	31.0 (42.03)	23.8 (32.27)
	SAE Grade 8 ASTM A354 Grade BD	20.4 (27.66)	24.4 (33.08)	27.1 (36.74)	29.9 (40.54)	38.0 (51.52)	35.3 (47.86)	27.1 (36.74)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
3/8 - 16	SAE Grade 1 ASTM A307	9.0 (12.20)	10.8 (14.64)	12.0 (16.27)	13.1 (17.76)	16.7 (22.64)	15.5 (21.01)	12.0 (16.27)
	SAE Grade 2	14.9 (20.20)	17.9 (24.27)	19.9 (26.98)	21.9 (29.69)	27.9 (37.83)	25.9 (35.11)	19.9 (26.98)
	SAE Grade 4	17.8 (24.13)	21.3 (28.88)	23.7 (32.13)	26.0 (35.25)	33.1 (44.87)	30.8 (41.76)	23.7 (32.13)
	SAE Grade 5 ASTM A449	23.2 (31.45)	27.8 (37.69)	30.9 (41.89)	34.0 (46.09)	43.3 (58.70)	40.2 (54.50)	30.9 (41.89)
	SAE Grade 7	28.7 (38.91)	34.4 (46.64)	38.2 (51.79)	42.0 (56.94)	53.5 (72.54)	49.7 (67.39)	38.2 (51.79)
	SAE Grade 8 ASTM A354 Grade BD	32.7 (44.33)	39.2 (53.15)	43.6 (59.11)	48.0 (65.08)	61.0 (82.70)	56.7 (76.87)	43.6 (59.11)
	ASTM A354 Grade BC	28.7 (38.91)	34.4 (46.64)	38.2 (51.79)	42.0 (56.94)	53.5 (72.54)	49.7 (67.39)	38.2 (51.79)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
3/8 - 24	SAE Grade 1 ASTM A307	10.2 (13.83)	12.2 (16.54)	13.6 (18.44)	15.0 (20.33)	19.0 (25.76)	17.7 (24.00)	13.6 (18.44)
	SAE Grade 2	16.9 (22.91)	20.3 (27.52)	22.5 (30.52)	24.8 (33.62)	31.5 (42.70)	29.3 (39.73)	22.5 (30.50)
	SAE Grade 4	20.0 (27.11)	24.0 (32.54)	26.7 (36.20)	29.4 (39.86)	37.4 (50.70)	34.7 (47.04)	26.7 (36.20)
	SAE Grade 5 ASTM A449	26.2 (35.52)	31.4 (42.57)	34.9 (47.32)	38.4 (52.06)	48.9 (66.30)	45.4 (61.55)	34.9 (47.32)
	SAE Grade 7	32.3 (43.79)	38.8 (52.60)	43.1 (58.44)	47.4 (64.26)	60.4 (81.89)	56.1 (76.06)	43.1 (58.43)
	SAE Grade 8 ASTM A354 Grade BD	36.9 (50.02)	44.3 (60.06)	49.2 (66.70)	54.1 (73.35)	68.9 (93.41)	64.0 (86.77)	49.2 (66.70)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium-Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
7/16 - 14	SAE Grade 1 ASTM A307	14.0 (18.98)	17.0 (23.04)	19.14 (25.95)	21.0 (28.47)	27.0 (36.60)	25.0 (33.89)	19.0 (25.76)
	SAE Grade 2	24.0 (32.54)	28.8 (39.05)	32.0 (43.39)	35.2 (47.72)	44.8 (60.74)	41.6 (56.40)	32.0 (43.39)
	SAE Grade 4	28.3 (38.37)	34.0 (46.10)	37.7 (51.11)	41.5 (56.27)	52.8 (71.59)	49.1 (66.57)	37.7 (51.11)
	SAE Grade 5 ASTM A449	37.1 (50.30)	44.5 (60.33)	49.5 (67.11)	54.4 (73.76)	69.3 (93.96)	64.3 (87.18)	49.5 (67.11)
	SAE Grade 7	45.9 (62.23)	55.1 (74.70)	61.3 (83.11)	67.4 (91.38)	85.8 (116.33)	79.6 (107.92)	61.3 (83.11)
	SAE Grade 8 ASTM A354 Grade BD	52.5 (71.18)	63.0 (85.41)	70.0 (94.90)	77.0 (104.40)	98.0 (132.87)	91.0 (123.38)	70.0 (94.90)
	ASTM A354 Grade BC	45.7 (61.96)	54.9 (74.43)	61.0 (82.70)	67.1 (90.97)	85.4 (115.79)	79.3 (107.52)	61.0 (82.70)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
7/16 - 20	SAE Grade 1 ASTM A307	16.0 (21.70)	19.2 (26.03)	21.3 (28.88)	23.5 (31.86)	29.9 (40.54)	27.7 (37.56)	21.3 (28.88)
	SAE Grade 2	26.9 (36.48)	32.2 (43.66)	35.8 (48.54)	39.4 (53.42)	50.1 (67.93)	46.6 (63.18)	35.8 (48.54)
	SAE Grade 4	31.6 (42.84)	37.9 (51.39)	42.1 (57.08)	46.3 (62.77)	59.0 (79.99)	54.7 (74.16)	42.1 (57.08)
	SAE Grade 5 ASTM A449	41.4 (56.13)	49.7 (67.38)	55.2 (74.84)	60.8 (82.43)	77.3 (104.80)	71.8 (97.35)	55.2 (74.84)
	SAE Grade 7	51.3 (69.55)	61.5 (83.38)	68.4 (92.74)	75.2 (101.96)	95.7 (129.75)	88.9 (120.53)	68.4 (92.74)
	SAE Grade 8 ASTM A354 Grade BD	58.2 (78.90)	69.9 (94.77)	77.7 (105.35)	85.4 (115.78)	108.7 (147.37)	101.0 (136.94)	77.7 (105.35)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1/2 - 13	SAE Grade 1 ASTM A307	22.0 (29.83)	26.0 (35.25)	29.38 (39.83)	32.0 (43.39)	41.0 (55.59)	38.0 (51.52)	29.0 (39.32)
	SAE Grade 2	36.6 (49.62)	43.9 (59.52)	48.8 (66.16)	53.6 (72.67)	68.3 (92.60)	63.4 (85.96)	48.8 (66.16)
	SAE Grade 4	43.1 (58.44)	51.8 (70.23)	57.5 (77.96)	63.3 (85.82)	80.5 (109.14)	74.8 (101.42)	57.5 (77.96)
	SAE Grade 5 ASTM A449	56.7 (76.87)	68.1 (92.33)	75.6 (102.5)	83.2 (112.80)	105.9 (143.58)	98.3 (133.27)	75.6 (102.50)
	SAE Grade 7	69.8 (94.64)	83.8 (113.62)	93.1 (126.23)	102.4 (138.84)	130.4 (176.80)	121.1 (164.19)	93.1 (126.23)
	SAE Grade 8 ASTM A354 Grade BD	79.7 (108.05)	95.6 (129.62)	106.3 (144.12)	116.9 (158.50)	148.8 (201.75)	138.1 (187.24)	106.3 (144.12)
	ASTM A354 Grade BC	69.8 (94.64)	83.8 (113.62)	93.1 (126.23)	102.4 (138.84)	130.4 (176.80)	121.1 (164.19)	93.1 (126.23)

All values in foot pounds and (Newton meters)

Nominal bolt size	Standard and Grade Designation	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1/2 - 20	SAE Grade 1 ASTM A307	24.8 (33.62)	29.8 (40.40)	33.1 (44.88)	36.4 (49.35)	46.4 (62.91)	43.1 (58.44)	33.1 (44.88)
	SAE Grade 2	41.3 (56.00)	49.5 (67.11)	55.0 (74.57)	60.5 (82.02)	77.0 (104.40)	71.5 (96.94)	55.0 (74.57)
	SAE Grade 4	48.8 (66.16)	58.5 (79.32)	65.0 (88.13)	71.5 (96.94)	91.0 (123.38)	84.5 (114.57)	65.0 (88.13)
	SAE Grade 5 ASTM A449	63.8 (86.50)	76.5 (103.72)	85.0 (115.24)	93.5 (126.77)	119.0 (161.34)	110.5 (149.82)	85.0 (115.24)
	SAE Grade 7	78.8 (106.84)	94.5 (128.12)	105.0 (142.36)	115.5 (156.60)	147.0 (199.30)	136.5 (185.07)	105.0 (142.36)
	SAE Grade 8 ASTM A354 Grade BD	90.0 (122.02)	108.0 (146.43)	120.0 (162.70)	132.0 (179.00)	168.0 (277.78)	156.0 (211.51)	120.0 (162.70)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
9/16 - 12	SAE Grade 1 ASTM A307	32.0 (43.39)	38.0 (51.52)	42.19 (57.20)	46.0 (62.37)	59.0 (80.00)	55.0 (74.57)	42 (56.94)
	SAE Grade 2	52.7 (71.45)	63.3 (85.82)	70.3 (95.31)	77.3 (104.80)	98.4 (133.41)	91.4 (123.92)	70.3 (95.31)
	SAE Grade 4	62.2 (84.33)	74.7 (101.28)	83.0 (112.53)	91.3 (123.79)	116.2 (157.55)	107.9 (146.30)	83.0 (112.53)
	SAE Grade 5 ASTM A449	81.7 (110.77)	98.1 (133.00)	109.0 (147.78)	119.9 (162.56)	152.6 (206.90)	141.7 (192.17)	109.0 (147.78)
	SAE Grade 7	100.7 (136.53)	120.9 (163.92)	134.3 (182.09)	147.7 (200.25)	188.0 (254.89)	174.6 (236.73)	134.3 (182.09)
	SAE Grade 8 ASTM A354 Grade BD	115.0 (155.92)	138.0 (187.10)	153.3 (207.85)	168.6 (228.59)	214.6 (290.96)	199.3 (270.21)	153.3 (207.85)
	ASTM A354 Grade BC	100.7 (136.53)	120.9 (163.92)	134.3 (182.09)	147.7 (200.25)	188.0 (254.89)	174.6 (236.73)	134.3 (182.09)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
9/16 - 18	SAE Grade 1 ASTM A307	35.3 (47.86)	42.4 (57.49)	47.1 (63.86)	51.8 (70.23)	66.0 (89.48)	61.2 (82.98)	47.1 (63.86)
	SAE Grade 2	59.1 (80.13)	70.9 (96.13)	78.8 (106.84)	86.6 (117.41)	110.3 (149.55)	102.4 (138.84)	78.8 (106.84)
	SAE Grade 4	69.6 (94.36)	83.5 (113.21)	92.8 (125.82)	102.1 (138.43)	129.9 (176.12)	120.7 (163.65)	92.8 (125.85)
	SAE Grade 5 ASTM A449	91.2 (123.65)	109.5 (148.46)	121.6 (164.87)	133.8 (181.40)	170.3 (230.90)	158.1 (214.36)	121.6 (164.87)
	SAE Grade 7	112.3 (152.26)	134.8 (182.76)	149.8 (203.10)	164.7 (223.30)	209.7 (284.32)	194.7 (263.98)	149.8 (203.10)
	SAE Grade 8 ASTM A354 Grade BD	128.7 (174.61)	154.4 (209.34)	171.6 (232.66)	188.7 (255.84)	240.2 (325.67)	223.0 (302.35)	171.6 (232.66)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
5/8 - 11	SAE Grade 1 ASTM A307	44 (59.66)	52 (70.50)	58.2 (78.90)	64 (86.77)	81 (109.82)	76 (103.04)	58 (78.64)
	SAE Grade 2	72.7 (98.57)	87.2 (118.23)	96.9 (131.38)	106.6 (144.53)	135.6 (183.85)	125.9 (170.70)	96.9 (131.38)
	SAE Grade 4	86.1 (116.74)	103.4 (140.19)	114.8 (155.65)	126.3 (171.24)	160.8 (218.02)	149.3 (202.42)	114.8 (155.65)
	SAE Grade 5 ASTM A449	112.5 (152.53)	135.0 (183.04)	150.0 (203.37)	165.0 (223.71)	210.0 (284.72)	195.0 (264.38)	150.0 (203.37)
	SAE Grade 7	138.9 (188.32)	166.6 (225.88)	185.2 (251.10)	203.7 (276.18)	259.2 (351.43)	240.7 (326.35)	185.2 (251.10)
	SAE Grade 8 ASTM A354 Grade BD	158.8 (215.30)	190.5 (258.28)	211.7 (287.03)	232.9 (315.77)	296.4 (401.86)	275.2 (373.12)	211.7 (287.03)
	ASTM A354 Grade BC	139.2 (188.73)	167.0 (226.42)	185.5 (251.50)	204.1 (276.72)	259.8 (352.24)	241.2 (327.02)	185.5 (251.50)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
5/8 - 18	SAE Grade 1 ASTM A307	49.5 (67.11)	59.4 (80.54)	66.0 (89.48)	72.6 (98.43)	92.4 (125.27)	85.8 (116.33)	66.0 (89.48)
	SAE Grade 2	82.6 (112.00)	99.1 (134.36)	110.2 (149.41)	121.2 (164.33)	154.2 (209.07)	143.2 (194.15)	110.2 (149.41)
	SAE Grade 4	97.3 (131.92)	116.7 (158.22)	129.7 (175.85)	142.7 (193.48)	181.6 (246.22)	168.6 (228.59)	129.7 (175.85)
	SAE Grade 5 ASTM A449	127.7 (173.14)	153.3 (207.85)	170.3 (230.90)	187.3 (253.95)	238.4 (323.23)	221.4 (300.18)	170.3 (230.90)
	SAE Grade 7	157.6 (213.68)	189.1 (256.39)	210.2 (285.00)	231.2 (313.47)	294.2 (398.88)	273.2 (370.41)	210.2 (285.00)
	SAE Grade 8 ASTM A354 Grade BD	179.9 (243.91)	215.9 (292.72)	239.8 (325.13)	263.8 (357.66)	335.8 (455.28)	311.8 (422.74)	239.8 (325.13)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
3/4 - 10	SAE Grade 1 ASTM A307	77 (104.40)	93 (126.09)	103.1 (139.78)	113 (153.20)	144 (195.24)	134 (181.68)	103 (139.65)
	SAE Grade 2	129.4 (175.44)	155.3 (210.55)	172.5 (233.88)	189.8 (257.33)	241.5 (327.43)	224.3 (304.11)	172.5 (233.88)
	SAE Grade 4	152.6 (206.90)	183.1 (248.25)	203.4 (275.77)	223.8 (303.43)	284.8 (386.14)	264.5 (358.61)	203.4 (275.77)
	SAE Grade 5 ASTM A449	199.7 (270.76)	239.6 (324.85)	266.3 (361.05)	292.9 (397.12)	372.8 (505.45)	346.1 (469.25)	266.3 (361.05)
	SAE Grade 7	246.8 (334.62)	296.2 (401.60)	329.1 (446.20)	362.0 (355.22)	460.7 (624.63)	427.8 (580.02)	329.1 (446.20)
	SAE Grade 8 ASTM A354 Grade BD	282.0 (382.34)	338.3 (458.67)	375.9 (509.65)	413.5 (560.63)	526.3 (713.57)	488.7 (662.59)	375.9 (509.65)
	ASTM A354 Grade BC	246.4 (334.07)	295.7 (400.92)	328.6 (445.53)	361.5 (490.13)	460.0 (623.67)	427.2 (579.20)	328.6 (445.53)

All values in foot pounds and (Newton meters)

Nominal bolt size	**Grade Designation and Standard**	**Zinc or Cadmium Plated**	If instructions call for:					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
3/4 - 16	SAE Grade 1 ASTM A307	86.5 (117.28)	103.8 (140.73)	115.3 (156.33)	126.8 (171.92)	161.4 (218.83)	149.9 (203.24)	115.3 (156.33)
	SAE Grade 2	144.1 (195.37)	173.0 (234.56)	192.2 (260.59)	211.4 (286.62)	269.1 (364.85)	249.8 (338.68)	192.2 (260.59)
	SAE Grade 4	170.2 (230.76)	204.2 (276.86)	226.9 (307.64)	249.6 (338.41)	317.6 (430.61)	294.9 (399.15)	226.9 (307.64)
	SAE Grade 5 ASTM A449	222.9 (302.21)	267.5 (362.68)	297.2 (402.95)	326.9 (443.22)	416.1 (564.16)	386.3 (523.75)	297.2 (402.95)
	SAE Grade 7	275.6 (373.66)	330.8 (448.50)	367.5 (498.26)	404.3 (548.16)	514.5 (697.57)	477.8 (647.81)	367.5 (498.26)
	SAE Grade 8 ASTM A354 Grade BD	315.0 (427.08)	378.0 (512.50)	420.0 (569.44)	462.0 (626.39)	588.0 (797.22)	546.0 (740.28)	420.0 (569.44)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	**Grade Designation and Standard**	**Zinc or Cadmium Plated**	If instructions call for:					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
7/8 - 9	SAE Grade 1 ASTM A307	124.7 (169.07)	149.6 (202.83)	166.3 (225.47)	182.9 (247.98)	232.8 (315.63)	216.1 (293.0)	166.3 (225.47)
	SAE Grade 2	124.7 (169.07)	149.6 (202.83)	166.3 (225.47)	182.9 (247.98)	232.8 (315.63)	216.1 (293.00)	166.3 (255.47)
	SAE Grade 4	246.1 (333.67)	295.3 (400.37)	328.1 (444.84)	360.9 (489.32)	459.4 (622.86)	426.6 (578.40)	328.1 (444.84)
	SAE Grade 5 ASTM A449	322.4 (437.11)	386.9 (524.57)	429.8 (582.73)	472.8 (641.03)	601.8 (815.93)	558.8 (757.63)	429.8 (582.73)
	SAE Grade 7	397.9 (539.48)	477.4 (647.27)	530.5 (719.26)	583.5 (791.12)	742.7 (1007.00)	689.6 (935.00)	530.5 (719.26)
	SAE Grade 8 ASTM A354 Grade BD	454.5 (616.22)	545.3 (739.33)	605.9 (821.49)	666.5 (903.65)	848.3 (1150.14)	787.7 (1067.98)	605.9 (821.49)
	ASTM A354 Grade BC	397.9 (539.48)	477.4 (647.27)	530.5 (719.26)	583.5 (791.12)	742.7 (1007.00)	689.6 (935.00)	530.5 (719.26)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
7/8 - 14	SAE Grade 1 ASTM A307	137.8 (186.83)	165.4 (224.25)	183.8 (249.20)	202.1 (274.01)	257.3 (348.85)	238.9 (323.90)	183.8 (249.20)
	SAE Grade 2	137.8 (186.83)	165.4 (224.25)	183.8 (249.20)	202.1 (274.01)	257.3 (348.85)	238.9 (323.90)	183.8 (249.20)
	SAE Grade 4	271.5 (368.11)	325.8 (441.73)	362.0 (490.80)	398.2 (539.89)	506.8 (687.13)	470.6 (638.05)	362.0 (490.80)
	SAE Grade 5 ASTM A449	355.2 (481.59)	426.2 (577.85)	473.6 (642.12)	521.0 (706.38)	663.0 (898.91)	615.7 (834.78)	473.6 (642.12)
	SAE Grade 7	438.0 (593.85)	525.7 (712.75)	584.1 (791.93)	642.5 (871.11)	817.7 (1108.65)	759.3 (1029.47)	584.1 (791.93)
	SAE Grade 8 ASTM A354 Grade BD	501.2 (679.54)	601.5 (815.53)	668.3 (906.09)	735.1 (996.66)	935.6 (1268.50)	868.8 (1177.94)	668.3 (906.09)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for:					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1 - 8	SAE Grade 1 ASTM A307	187.5 (254.22)	225.0 (305.06)	250.0 (338.95)	275.0 (372.85)	350.0 (474.54)	325.0 (440.64)	250.0 (338.95)
	SAE Grade 2	187.5 (254.22)	225.0 (305.06)	250.0 (338.95)	275.0 (372.85)	350.0 (474.54)	325.0 (440.64)	250.0 (338.95)
	SAE Grade 4	369.4 (500.84)	443.3 (601.03)	492.5 (667.74)	541.8 (734.58)	689.5 (934.84)	640.3 (868.13)	492.5 (667.74)
	SAE Grade 5 ASTM A449	482.8 (654.59)	579.4 (785.56)	643.8 (872.88)	708.1 (960.05)	901.3 (1222.00)	836.9 (1134.69)	643.8 (872.88)
	SAE Grade 7	596.3 (808.47)	715.5 (970.09)	795.0 (1077.88)	874.5 (1185.66)	1113.0 (1509.03)	1033.5 (1401.24)	795.0 (1077.88)
	SAE Grade 8 ASTM A354 Grade BD	681.6 (924.13)	817.9 (1108.92)	908.8 (1232.17)	999.6 (1355.28)	1272.3 (1725.00)	1181.4 (1601.77)	908.8 (1232.17)
	ASTM A354 Grade BC	596.7 (809.01)	716.1 (970.90)	795.6 (1078.69)	875.2 (1186.61)	1113.9 (1510.25)	1034.3 (1402.32)	795.6 (1078.69)

All values in foot pounds and (Newton meters)

Nominal bolt size	**Grade Designation and Standard**	**Zinc or Cadmium Plated**	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1 - 12	SAE Grade 1 ASTM A307	205.3 278.35	246.4 (334.07)	273.8 (371.22)	301.1 (408.24)	383.3 (519.69)	355.9 (482.54)	273.8 (371.22)
	SAE Grade 2	205.3 (278.35)	246.4 (334.07)	273.8 (371.22)	301.1 (408.24)	383.3 (519.69)	355.9 (482.54)	273.8 (371.22)
	SAE Grade 4	404.1 (547.88)	484.9 (657.44)	538.8 (730.52)	592.6 (803.46)	754.3 (1022.70)	700.4 (949.62)	538.8 (730.52)
	SAE Grade 5 ASTM A449	528.8 (716.96)	634.5 (860.27)	705.0 (955.85)	775.5 (1051.44)	987.0 (1338.19)	916.5 (1242.61)	705.0 (955.85)
	SAE Grade 7	652.5 (884.67)	783.0 (1061.60)	870.0 (1179.56)	957.0 (1297.52)	1218.0 (1651.39)	1131.0 (1533.42)	870.0 (1179.56)
	SAE Grade 8 ASTM A354 Grade BD	746.3 (1011.85)	895.5 (1214.14)	995.0 (1349.04)	1094.5 (1483.49)	1393.0 (1888.66)	1293.5 (1753.73)	995.0 (1349.04)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	**Grade Designation and Standard**	**Zinc or Cadmium Plated**	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1 - 14	SAE Grade 1 ASTM A307	210.0 (284.72)	252.0 (341.66)	280.0 (379.63)	308.0 (417.60)	392.0 (531.48)	364.0 (493.52)	280.0 (379.63)
	SAE Grade 2	210.0 (284.72)	252.0 (341.66)	280.0 (379.63)	308.0 (417.60)	392.0 (531.48)	364.0 (493.52)	280.0 (379.63)
	SAE Grade 4	413.4 (560.50)	496.1 (672.62)	551.3 (747.46)	606.4 (822.17)	771.8 (1046.42)	716.6 (971.58)	551.3 (747.46)
	SAE Grade 5 ASTM A449	540.9 (733.36)	649.1 (880.06)	721.3 (977.95)	793.4 (1075.70)	1009.8 (1369.10)	937.6 (1271.22)	721.3 (977.95)
	SAE Grade 7	668.4 (906.23)	802.1 (1087.50)	891.3 (1208.44)	980.4 (1329.25)	1247.8 (1691.79)	1158.6 (1570.85)	891.3 (1208.44)
	SAE Grade 8 ASTM A354 Grade BD	764.1 (1035.98)	916.9 (1243.15)	1018.8 (1381.31)	1120.6 (1519.33)	1426.3 (1933.80)	1324.4 (1795.65)	1018.8 (1381.30)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1-1/8 • 7	SAE Grade 1 ASTM A307	265.8 (360.37)	318.9 (432.37)	354.4 (480.50)	389.8 (528.50)	496.1 (672.62)	460.7 (624.63)	354.4 (480.50)
	SAE Grade 2	265.8 (360.37)	318.9 (432.37)	354.4 (480.50)	389.8 (528.50)	496.1 (672.62)	460.7 (624.63)	354.4 (480.50)
	SAE Grade 4	523.1 (709.23)	627.8 (851.18)	697.5 (945.68)	767.3 (1040.32)	976.5 (1323.96)	906.8 (1229.46)	697.5 (945.68)
	SAE Grade 5 ASTM A449	595.9 (807.93)	715.1 (969.55)	794.5 (1077.20)	874.0 (1184.99)	1112.3 (1508.07)	1032.9 (1400.43)	794.5 (1077.20)
	SAE Grade 7	844.8 (1145.40)	1013.8 (1374.53)	1126.4 (1527.20)	1239.0 (1679.86)	1577.0 (2138.13)	1464.3 (1985.33)	1126.4 (1527.20)
	SAE Grade 8 ASTM A354 Grade BD	966.1 (1309.86)	1159.3 (1571.80)	1288.1 (1746.43)	1416.9 (1921.06)	1803.4 (2445.08)	1674.6 (2270.46)	1288.1 (1746.43)
	ASTM A354 Grade BC	844.8 (1145.40)	1013.8 (1374.53)	1126.4 (1527.20)	1239.0 (1679.86)	1577.0 (2138.13)	1464.3 (1985.33)	1126.4 (1527.20)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1-1/8 • 12	SAE Grade 1 ASTM A307	297.4 (403.22)	356.9 (483.89)	396.6 (537.72)	436.2 (591.40)	555.2 (752.75)	515.5 (698.93)	396.6 (537.72)
	SAE Grade 2	297.4 (403.22)	356.9 (483.89)	396.6 (537.72)	436.2 (591.40)	555.2 (752.75)	515.5 (698.93)	396.6 (537.72)
	SAE Grade 4	586.4 (795.05)	703.7 (954.09)	781.9 (1060.12)	860.1 (1166.14)	1094.6 (1484.08)	1016.4 (1378.06)	781.9 (1060.12)
	SAE Grade 5 ASTM A449	667.6 (905.14)	801.1 (1086.15)	890.2 (1206.95)	979.2 (1327.62)	1246.2 (1689.62)	1157.2 (1568.95)	890.2 (1206.95)
	SAE Grade 7	948.2 (1285.58)	1137.8 (1542.65)	1264.2 (1714.02)	1390.6 (1855.40)	1769.9 (2399.66)	1643.5 (2228.30)	1264.2 (1714.02)
	SAE Grade 8 ASTM A354 Grade BD	1083.2 (1468.62)	1299.8 (1762.30)	1444.2 (1958.07)	1588.6 (2153.85)	2021.9 (2741.33)	1877.5 (2545.55)	1444.2 (1958.07)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1-1/4 • 7	SAE Grade 1 ASTM A307	375.0 (508.43)	450.0 (610.11)	500.0 (677.91)	550.0 (745.70)	700.0 (949.07)	650.0 (881.28)	500.0 (677.91)
	SAE Grade 2	375.0 (508.43)	450.0 (610.11)	500.0 (677.91)	550.0 (745.70)	700.0 (949.07)	650.0 (881.28)	500.0 (677.91)
	SAE Grade 4	738.3 (1001.00)	885.9 (1201.12)	984.4 (1334.67)	1082.8 (1468.08)	1378.1 (1868.45)	1279.7 (1735.04)	984.4 (1334.67)
	SAE Grade 5 ASTM A449	840.2 (1139.16)	1008.3 (1367.07)	1120.3 (1518.93)	1232.3 (1670.78)	1568.4 (2126.47)	1456.4 (1974.62)	1120.3 (1518.93)
	SAE Grade 7	1191.8 (1615.87)	1430.2 (1939.09)	1589.1 (2154.53)	1748.0 (2369.97)	2224.7 (3016.30)	2065.8 (2800.85)	1589.1 (2154.53)
	SAE Grade 8 ASTM A354 Grade BD	1362.9 (1847.85)	1635.5 (2217.44)	1817.2 (2463.80)	1998.9 (2710.15)	2544.1 (3449.34)	2362.3 (3202.85)	1817.2 (2463.80)
	ASTM A354 Grade BC	1192.4 (1616.68)	1430.9 (1940.04)	1589.8 (2155.48)	1748.8 (2371.05)	2225.8 (3017.78)	2066.8 (2802.20)	1589.8 (2155.48)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1-1/4 • 12	SAE Grade 1 ASTM A307	414.8 (562.40)	497.8 (674.93)	553.1 (749.90)	608.4 (824.88)	774.4 (1049.95)	719.1 (974.97)	553.1 (749.90)
	SAE Grade 2	414.8 (562.40)	497.8 (674.93)	553.1 (749.90)	608.4 (824.88)	774.4 (1049.95)	719.1 (974.97)	553.1 (749.90)
	SAE Grade 4	816.8 (1107.43)	980.2 (1328.97)	1089.1 (1476.62)	1198.0 (1624.27)	1524.7 (2067.22)	1415.8 (1919.57)	1089.1 (1476.62)
	SAE Grade 5 ASTM A449	930.5 (1261.60)	1116.6 (1513.90)	1240.6 (1682.03)	1364.7 (1850.29)	1736.9 (2354.92)	1612.8 (2186.66)	1240.6 (1682.03)
	SAE Grade 7	1320.7 (1790.63)	1584.8 (2148.70)	1760.9 (2387.46)	1937.0 (2626.22)	2465.3 (3342.50)	2289.2 (3103.74)	1760.9 (2387.46)
	SAE Grade 8 ASTM A354 Grade BD	1509.4 (2046.47)	1811.3 (2455.80)	2012.5 (2728.59)	2213.8 (3001.51)	2817.5 (3820.02)	2616.3 (3547.23)	2012.5 (2728.58)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1-3/8 • 6	SAE Grade 1 ASTM A307	491.1 (665.84)	589.4 (799.12)	654.8 (887.79)	720.3 (976.60)	916.8 (1243.00)	851.3 (1154.21)	654.8 (887.80)
	SAE Grade 2	491.1 (665.84)	589.4 (799.12)	654.8 (887.79)	720.3 (976.60)	916.8 (1243.00)	851.3 (1154.21)	654.8 (887.80)
	SAE Grade 4	968.1 (1312.57)	1161.7 (1575.06)	1290.8 (1750.10)	1419.9 (1925.13)	1807.1 (2450.10)	1678.0 (2275.07)	1290.8 (1750.09)
	SAE Grade 5 ASTM A449	1102.1 (1494.25)	1322.6 (1793.20)	1469.5 (1992.38)	1616.5 (2191.68)	2057.3 (2789.33)	1910.4 (2590.16)	1469.5 (1992.38)
	SAE Grade 7	1563.6 (2119.96)	1876.4 (2544.06)	2084.8 (2826.61)	2293.3 (3109.30)	2918.8 (3957.37)	2710.3 (3674.68)	2084.8 (2826.61)
	SAE Grade 8 ASTM A354 Grade BD	1786.6 (2422.30)	2144.0 (2906.88)	2382.2 (3229.83)	2620.4 (3552.79)	3335.1 (4521.80)	3096.8 (4198.70)	2382.2 (3229.83)
	ASTM A354 Grade BC	1563.6 (2119.96)	1876.4 (2544.06)	2084.8 (2826.61)	2293.3 (3109.30)	2918.8 (3957.37)	2710.3 (3674.68)	2084.8 (2826.61)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	**Loctite 242**	**Loctite 271**	**Loctite 272**	**Loctite 277**	**Bare**
1-3/8 • 12	SAE Grade 1 ASTM A307	559.5 (758.58)	671.3 (910.16)	745.9 (1011.30)	820.5 (1112.45)	1044.3 (1415.88)	969.7 (1314.74)	745.9 (1011.30)
	SAE Grade 2	559.5 (758.58)	671.3 (910.16)	745.9 (1011.30)	820.5 (1112.45)	1044.3 (1415.88)	969.7 (1314.74)	745.9 (1011.30)
	SAE Grade 4	1102.1 (1494.25)	1322.6 (1793.21)	1469.5 (1992.38)	1616.5 (2191.68)	2057.3 (2789.33)	1910.4 (2590.16)	1469.5 (1992.38)
	SAE Grade 5 ASTM A449	1254.3 (1700.60)	1505.1 (2040.64)	1672.3 (2267.34)	1839.6 (2494.16)	2341.3 (3174.38)	2174.0 (2947.55)	1672.3 (2267.34)
	SAE Grade 7	1780.2 (2413.63)	2136.2 (2896.30)	2373.6 (3218.17)	2611.0 (3540.04)	3323.0 (4505.39)	3085.7 (4183.65)	2373.6 (3218.17)
	SAE Grade 8 ASTM A354 Grade BD	2034.1 (2757.87)	2441.0 (3309.56)	2712.2 (3677.25)	2983.4 (4044.95)	3797.1 (5148.18)	3525.8 (4780.35)	2712.2 (3677.25)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1-1/2 • 6	SAE Grade 1 ASTM A307	652.5 (884.67)	783.0 (1061.60)	870.0 (1179.56)	957.0 (1297.52)	1218.0 (1651.39)	1131.0 (1533.43)	870.0 (1179.56)
	SAE Grade 2	652.5 (884.67)	783.0 (1061.60)	870.0 (1179.56)	957.0 (1297.52)	1218.0 (1651.39)	1131.0 (1533.43)	870.0 (1179.56)
	SAE Grade 4	1283.9 (1740.74)	1540.7 (2088.91)	1711.9 (2321.03)	1883.1 (2553.14)	2396.6 (3249.36)	2225.4 (3017.24)	1711.9 (2321.03)
	SAE Grade 5 ASTM A449	1462.5 (1982.88)	1755.0 (2379.46)	1950.0 (2643.85)	2145.0 (2908.23)	2730.0 (3701.39)	2535.0 (3437.00)	1950.0 (2643.85)
	SAE Grade 7	2074.2 (2812.24)	2489.1 (3374.77)	2765.6 (3749.66)	3042.2 (4124.67)	3871.9 (5249.60)	3595.3 (4874.58)	2765.6 (3749.66)
	SAE Grade 8 ASTM A354 Grade BD	2370.9 (3214.51)	2845.1 (3857.44)	3161.3 (4286.15)	3477.4 (4714.73)	4425.8 (6000.58)	4109.6 (5571.88)	3161.3 (4286.15)
	ASTM A354 Grade BC	2074.9 (2813.20)	2489.9 (3375.85)	2766.6 (3751.01)	3043.2 (4126.03)	3873.2 (5251.36)	3596.5 (4876.20)	2766.6 (3751.01)

All values in foot pounds and (Newton meters)

Nominal bolt size	Grade Designation and Standard	Zinc or Cadmium Plated	If instructions call for :					
			Loctite 222 or 262	Loctite 242	Loctite 271	Loctite 272	Loctite 277	Bare
1-1/2 • 12	SAE Grade 1 ASTM A307	734.1 (995.30)	880.9 (1194.34)	978.8 (1327.07)	1076.6 (1459.67)	1370.3 (1857.88)	1272.4 (1725.14)	978.8 (1327.07)
	SAE Grade 2	734.1 (995.30)	880.9 (1194.34)	978.8 (1327.07)	1076.6 (1459.67)	1370.3 (1857.88)	1272.4 (1725.14)	978.8 (1327.07)
	SAE Grade 4	1445.6 (1959.97)	1734.8 (2352.07)	1927.5 (2613.34)	2120.3 (2874.33)	2698.5 (3658.68)	2505.8 (3397.41)	1927.5 (2613.34)
	SAE Grade 5 ASTM A449	1645.3 (2230.73)	1974.4 (2676.93)	2193.8 (2974.40)	2413.1 (3271.73)	3071.3 (4164.13)	2851.9 (3866.66)	2193.8 (2974.40)
	SAE Grade 7	2334.4 (3165.02)	2801.3 (3798.06)	3112.5 (4219.99)	3423.8 (4642.05)	4357.5 (5907.98)	4046.3 (5486.05)	3112.5 (4219.99)
	SAE Grade 8 ASTM A354 Grade BD	2667.7 (3616.92)	3201.2 (4340.25)	3556.9 (4822.51)	3912.6 (5304.78)	4979.6 (6751.44)	4623.9 (6269.17)	3556.9 (4822.51)
	ASTM A354 Grade BC	—	—	—	—	—	—	—

Other Fastener Torque Specifications

All values in foot-pounds and (Newton-meters)

Nominal bolt size	18 - 8 Stainless Steel	316 Stainless Steel	Brass	Aluminum 2024 - T4
1/4 - 20	6.3 (8.54)	6.6 (8.95)	5.1 (6.91)	3.8 (5.15)
1/4 - 28	7.8 (10.57)	8.3 (11.25)	6.4 (8.67)	4.8 (6.50)
5/16 - 18	11.0 (14.90)	11.5 (15.60)	8.9 (12.06)	6.7 (9.08)
5/16 - 24	11.8 (16.00)	12.3 (16.67)	9.7 (13.15)	7.2 (9.76)
3/8 - 16	19.7 (26.71)	20.6 (27.93)	16.0 (21.70)	11.9 (16.13)
3/8 - 24	21.6 (29.28)	22.6 (30.64)	17.7 (24.00)	13.1 (17.76)
7/16 - 14	31.3 (42.44)	32.8 (44.47)	26.4 (35.80)	19.0 (25.76)
7/16 - 20	33.3 (45.15)	34.8 (47.18)	27.3 (37.00)	20.2 (27.38)
1/2 - 13	43.1 (58.43)	45.2 (61.28)	35.2 (47.72)	26.1 (35.38)
1/2 - 20	45.1 (61.14)	47.1 (63.86)	36.9 (50.00)	27.3 (37.00)
9/16 - 12	56.8 (77.00)	59.4 (80.53)	46.5 (63.04)	34.4 (46.64)
9/16 - 18	62.7 (85.00)	65.6 (88.94)	51.3 (69.55)	38.0 (51.52)
5/8 - 11	92.5 (125.41)	96.7 (131.10)	75.6 (102.50)	59.6 (80.80)
5/8 - 18	103.7 (140.60)	108.4 (146.97)	84.7 (114.84)	66.5 (90.16)
3/4 - 10	127.5 (172.86)	131.8 (178.70)	104.1 (141.14)	81.7 (110.77)
3/4 - 16	124.2 (168.39)	129.8 (175.98)	101.7 (137.88)	79.8 (108.19)

Other Fastener Torque Specifications

All values in foot-pounds and (Newton-meters)

Nominal bolt size	18 - 8 Stainless Steel	316 Stainless Steel	Brass	Aluminum 2024 - T4
7/8 - 9	194.0 (263.03)	202.5 (274.55)	158.8 (215.30)	124.6 (168.93)
7/8 - 14	193.2 (261.94)	201.7 (273.47)	157.9 (214.08)	124.2 (168.40)
1 - 8	286.7 (388.71)	299.6 (406.20)	234.6 (318.07)	183.8 (249.20)
1 - 14	259.2 (351.43)	270.8 (367.16)	212.1 (287.57)	166.3 (225.47)
1-1/8 • 7	413.0 (559.95)	432.0 (585.71)	337.0 (456.91)	265.0 (359.29)
1-1/8 • 12	390.0 (528.77)	408.0 (553.17)	318.0 (431.15)	251.0 (340.31)
1-1/4 • 7	523.0 (709.09)	546.0 (740.28)	428.0 (580.30)	336.0 (455.55)
1-1/4 • 12	480.0 (650.80)	504.0 (683.33)	394.0 (534.19)	308.0 (417.60)
1-1/2 • 6	888.0 (1203.97)	930.0 (1260.91)	727.0 (985.68)	570.0 (772.82)
1-1/2 • 12	703.0 (953.14)	732.0 (992.46)	575.0 (779.60)	450.0 (610.12)

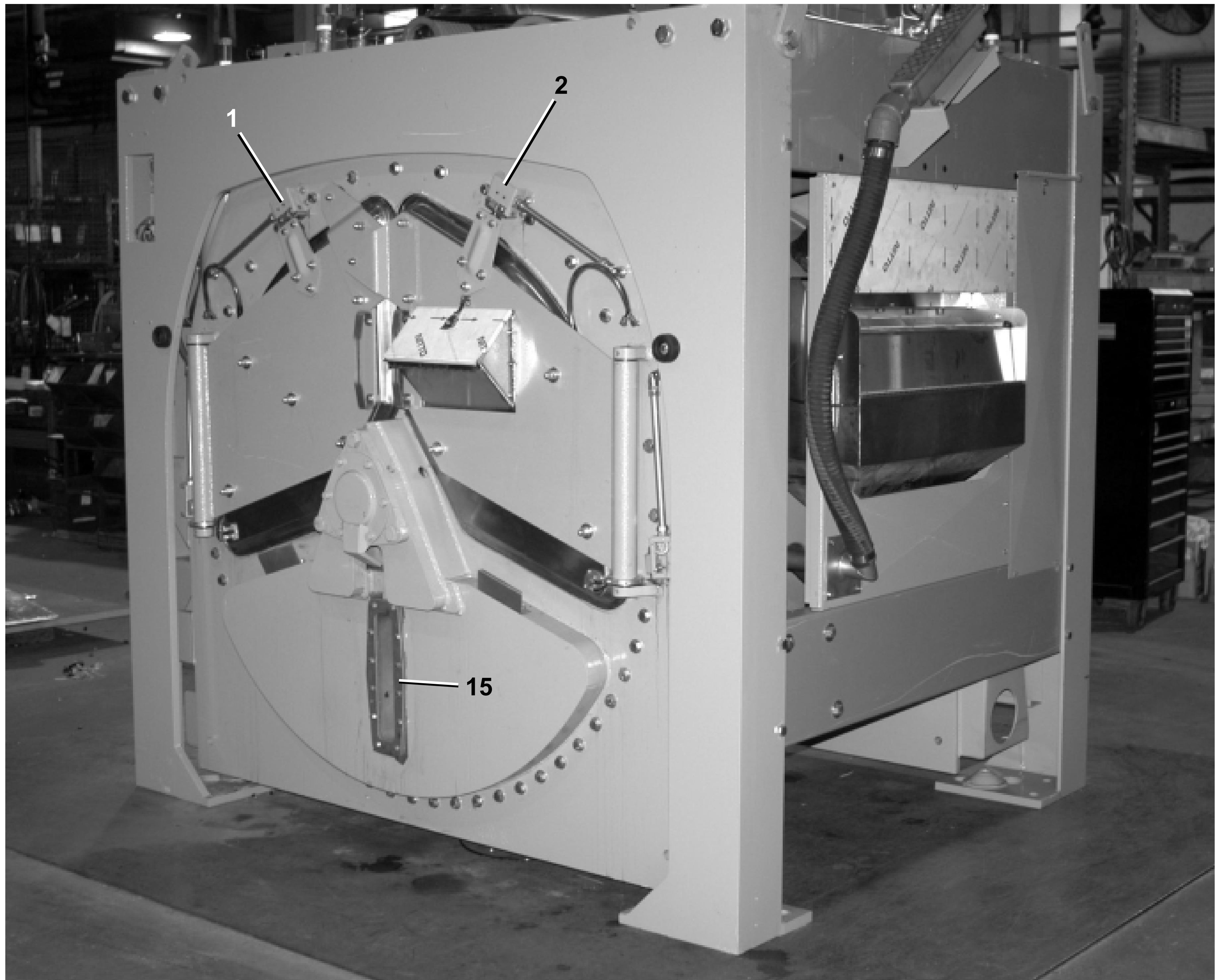
General Assembly

6044WP2/3, 6044WP2 SM(Single Motor), 7244WP2/WP3

BMP060019/2006185B
(Sheet 1 of 5)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



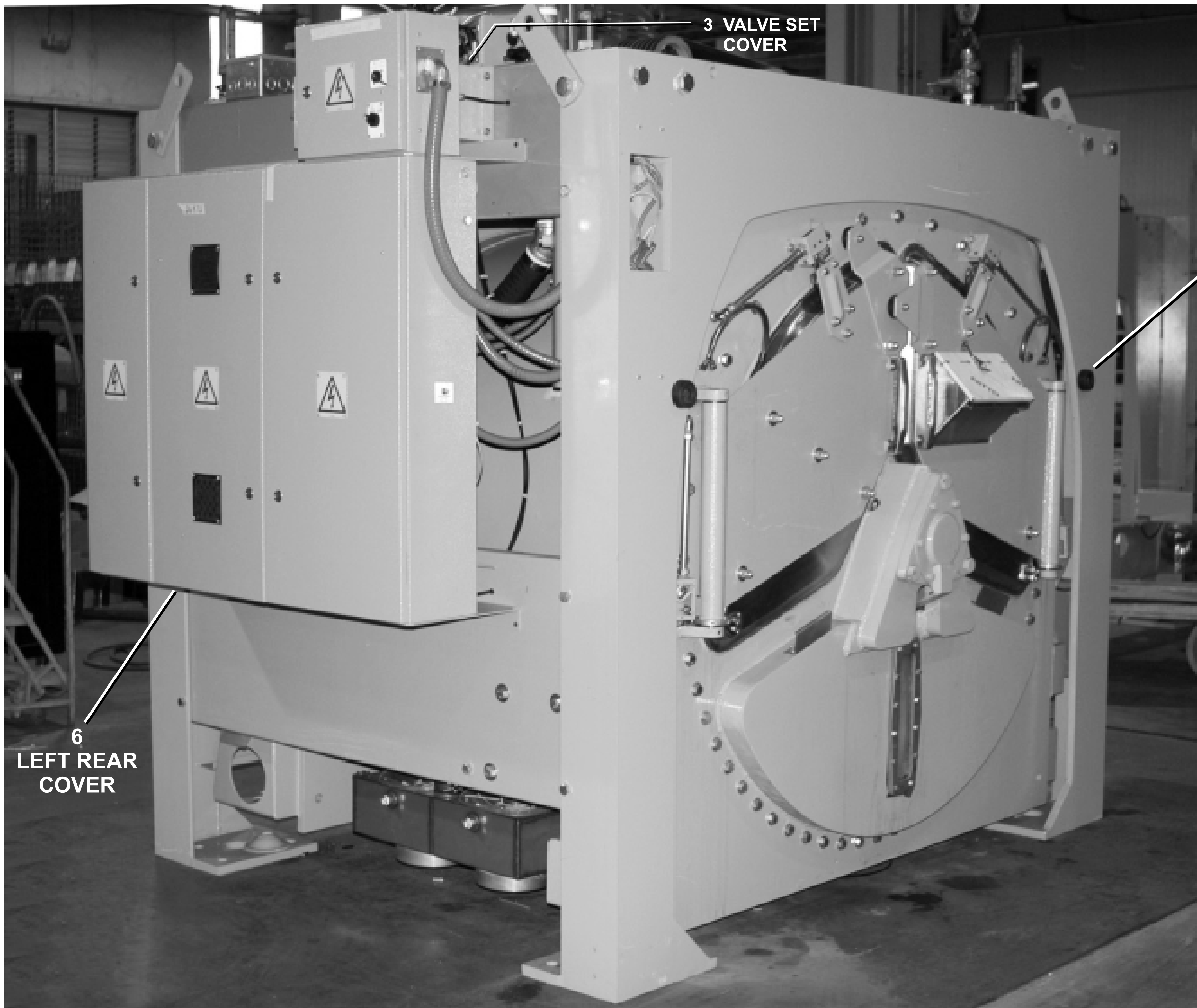
General Assembly

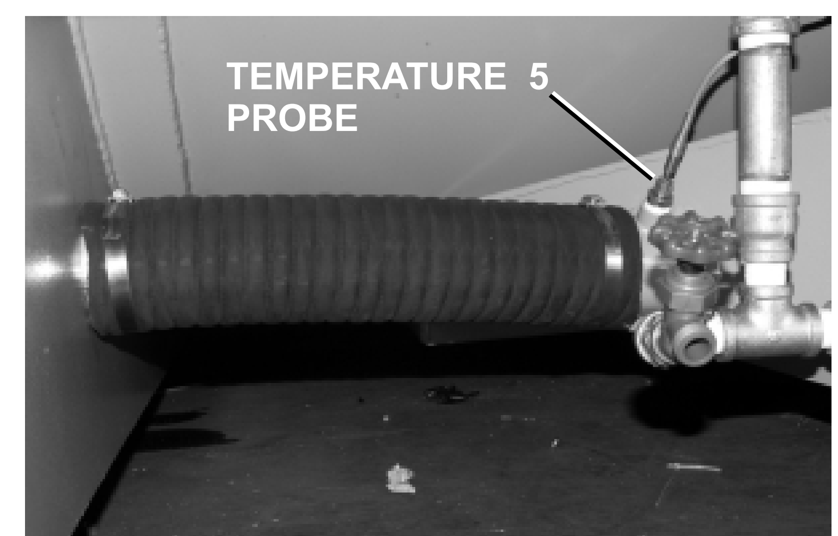
6044WP2/3, 6044WP2 SM(Single Motor), 7244WP2/WP3

BMP060019/2006185B
(Sheet 2 of 5)

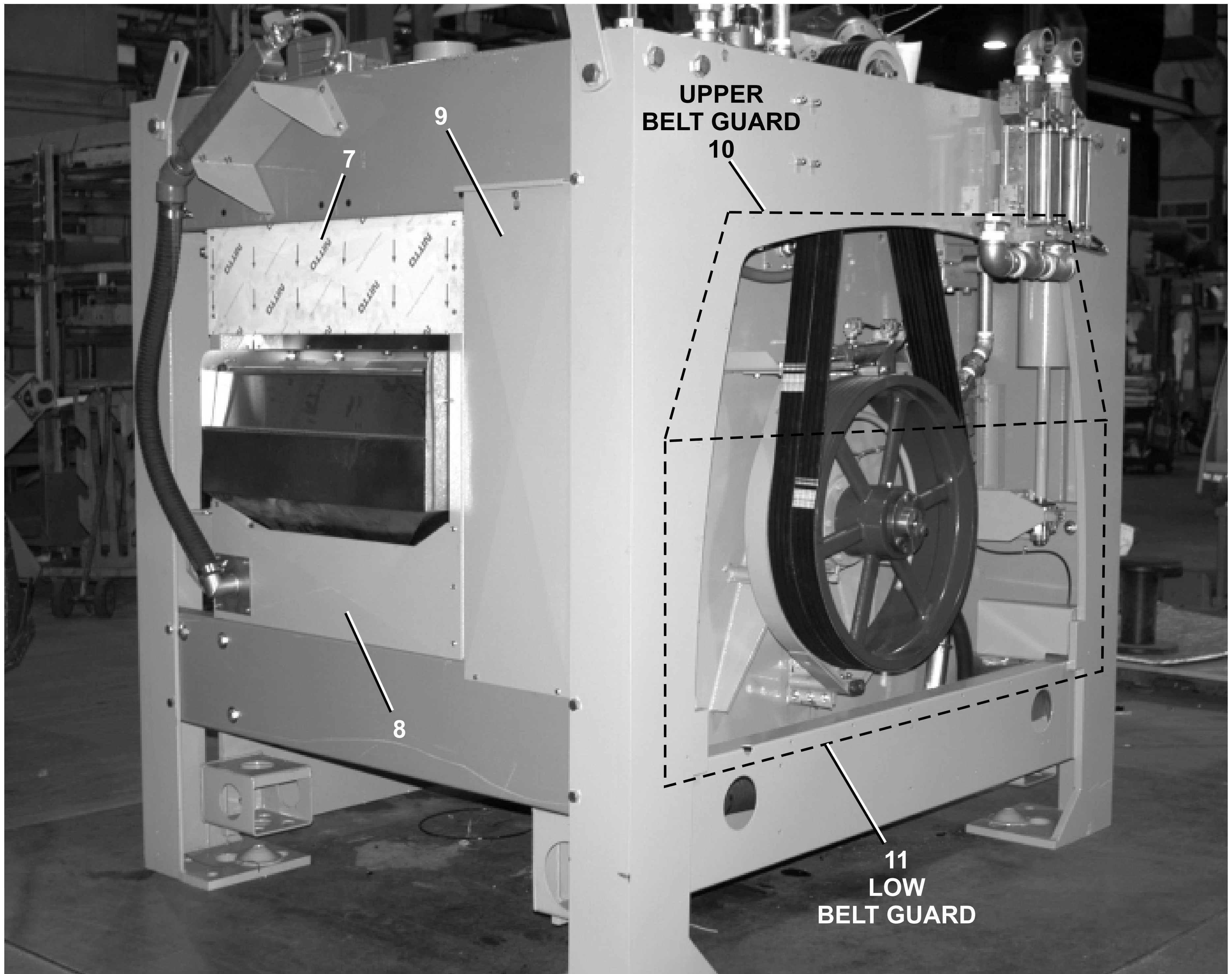
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



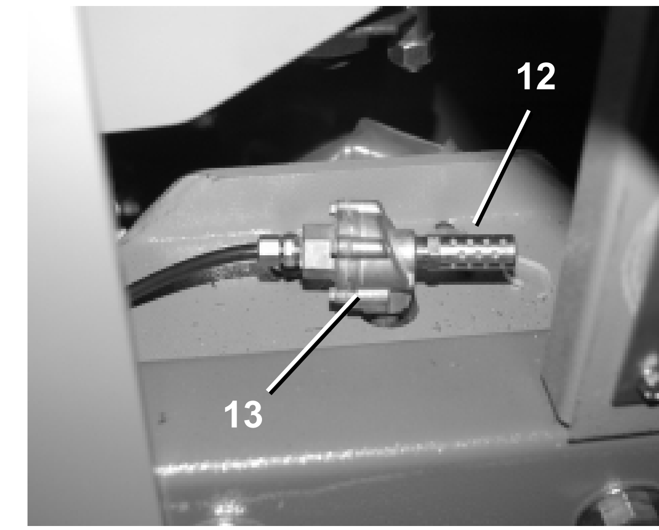


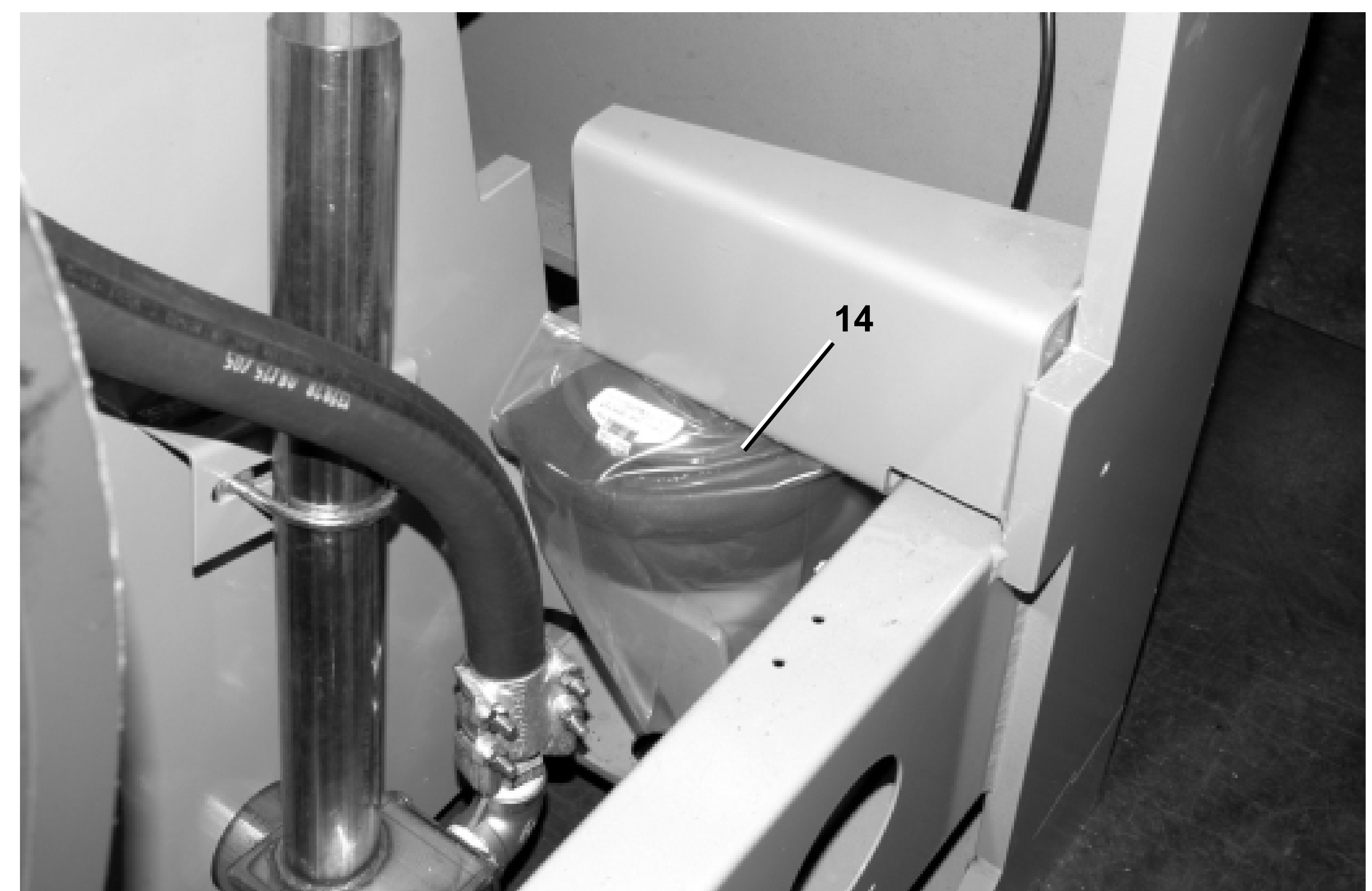
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

SUSPENSION
CYLINDERS
SEE
BMP701408





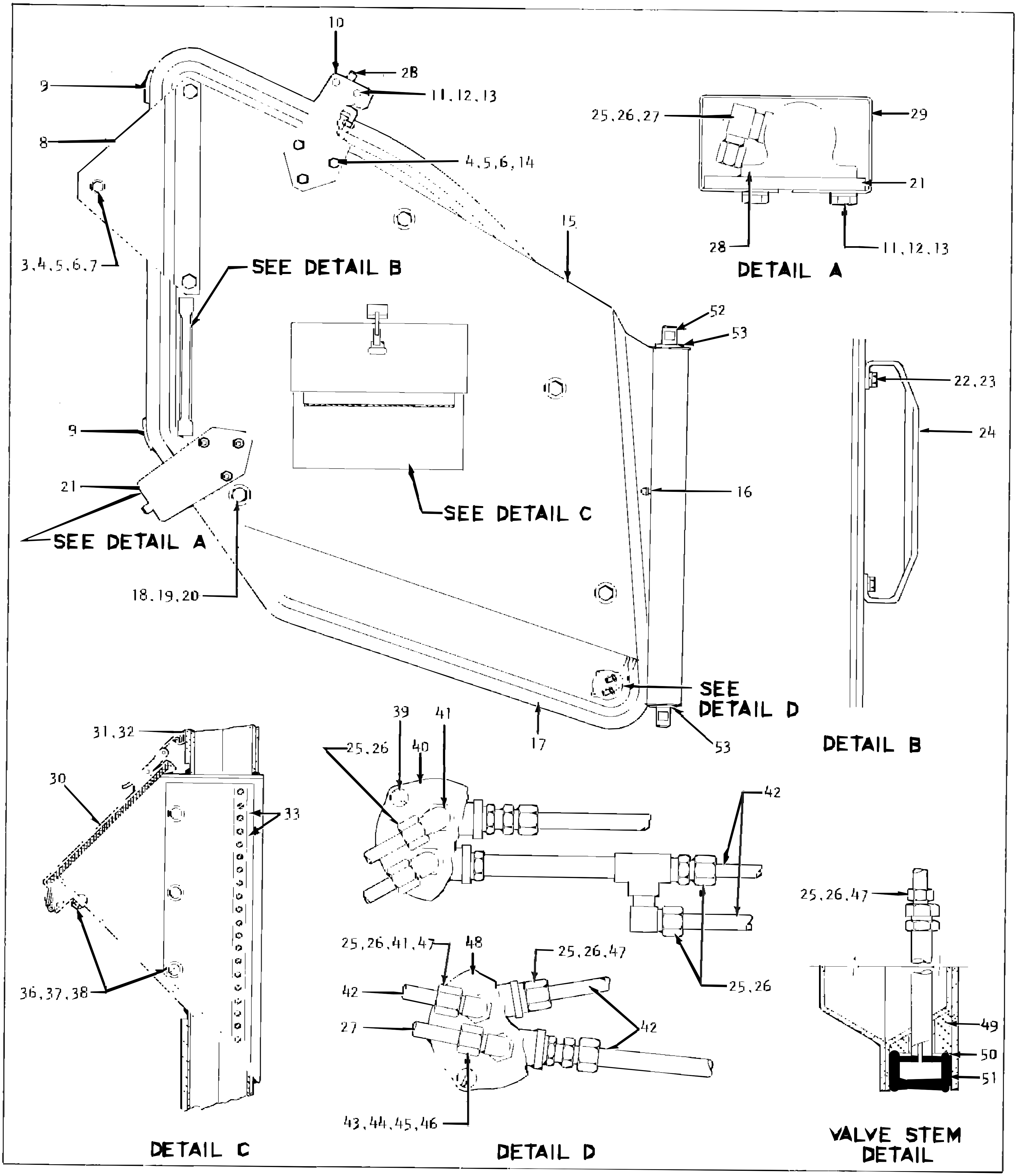
Parts List—General Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			---ASSEMBLIES---	
	A		6044WP2/WP3	
	B		7244WP2/WP3	
			---COMPONENTS---	
all	1	AD 29 024L	*DOORINTERLOCK SW ASSY LEFT	
all	2	AD 29 024R	*DOORINTERLOCK SW ASSY RIGHT	
all	3	03 CL721K	COVER:W/E DYE MICRO VAL SET	
all	4	60C075	TRUCK BUMPER 2+1/2ODW3/8HO.613	
all	5	30R0043PB	TEMPERATURE PROBE ASSY=BRASS	
B	6	05 20296D	+LEFT REAR COSMETIC COVER	
B	7	02 18824C	COVER=UPPER SUP INJ 6044SG	
B	8	02 18824D	COVER=SUP INJ LO SUP 6044SG	
B	9	05 20296C	+RIGHT REAR COSMETIC COVER	
A	10	02 175174	BELTGUARD UPREAR 60WE	
B	10	03 06380	GUARD=UPPER BELT-72WE	
A	11	02 175175	BELTGUARD,LO-REAR 60WE	
B	11	03 06385	GUARD=LOWER BELT-72WE	
all	12	27A005	MUFFLER 3/8" BANTAM B38	
all	13	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	14	60B120	AIRMT S-20 2CONV F#W013586910	
A	15	AD 28 111	SIGHT GLASS ASSY=WED + WEH	
B	15	AD 36 004	SIGHT GLASS ASSY=72WED	

Section 2

Shell and Door Assemblies



60" & 72" WEH—SHELL DOOR ASSEMBLY

PELLERIN MILNOR CORPORATION

Shell Door Assembly
60 & 70 WEH

BMP780109R/81433A
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Shell Door Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
			none	
			COMPONENTS	
all	1	SA 36 010	930721*SHELL DOOR ASY 72WE2 RIGHT	
all	2	SA 28 122	930721*SHELL DOOR ASY 60WE2 RIGHT	
all	3	60C075	TRUCK BUMPER 2+1/2"OD+3/8"HOLE #613	
all	4	15G200	01Z HXCPNUT 3/8-16 UNC2A 5/8X1/2	
all	5	15U240	FLATWASHER(USS STD) 3/8" ZNC PLT	
all	6	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	7	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC/CAD	
all	8	03 06068	70358C PLATE=DOOR OPENING 1/72WED	(USED ON SA-36-010)
all	8	02 18961	91071C PLATE=DOOR OPENING 60WED	(USED ON SA-28-122)
all	9	02 175134	71143A PATCH=SHELL DOOR GASKET	
all	10	02 175131	82231B PLATE-LATCH MOUNT RT 60+72WE	
all	11	15K039	HXCAPSCR 1/4-20UNC2AX3/4 GR5 ZNC/CD	
all	12	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	13	15U185	FLATWASHER(USS STD) 1/4" ZNC PLT	
all	14	15K097	PLOWSCR-#3 3/8-16NCX1 BLK GR5	
all	15	W3 06063	93072#* HINGE PLATE WELDMENT-RIGHT	(USED ON SA-36-010)
all	15	W2 18874	93072D* HINGEPLATE WELDMNT-RITE=WED	(USED ON SA-28-122)
all	16	54M015	65408A GREASEFIT 60X36/60X44 1610BL	
all	17	W3 06061	89412#* SHELLDOOR WELDMENT-RITE=WED	(USED ON SA-36-010)
all	17	W2 18960	93362#* SHELL DOOR-60"WED-RIGHT	(USED ON SA-28-122)
all	18	15U490	FLAWASH 1+1/2X17/32X1/4ZINC	
all	19	15G228	01Z HXCPNUT 1/2-13 UNC GR-2	
all	20	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	21	03 06310	89393B PLATE=LATCH MOUNTING LOWER	(USED ON SA-36-010 ONLY)
all	22	15K084S	HXCAPSCR 3/8-16NCX5/8 SS18-8	
all	23	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	

Parts List, cont.—SHELL DOOR ASSEMBLY

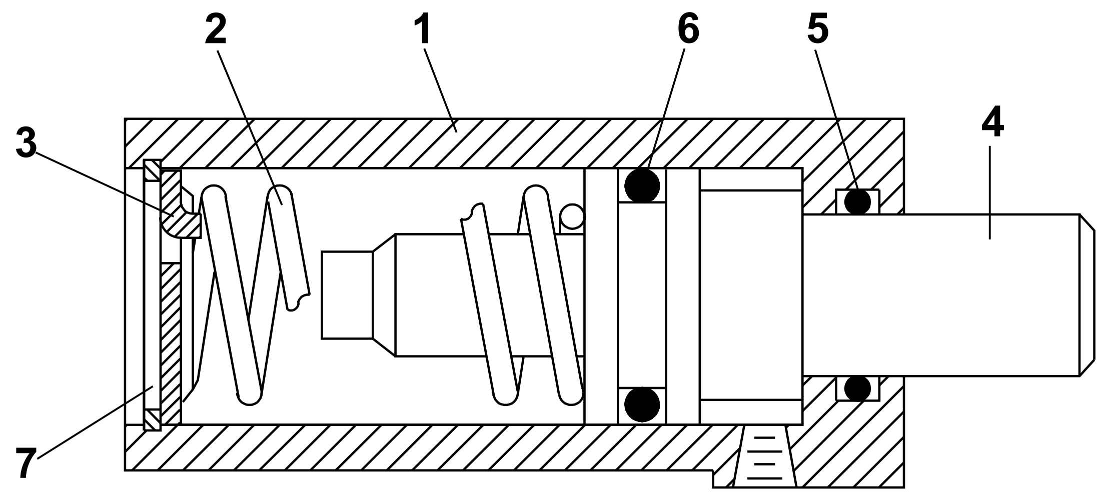
Used In	Item	Part Number	Description	Comments
all	24	02 175037	92452C HANDLE=SHELDOR=WED-SS	
all	25	53A500	1/4" SLEEVE-DELRIN	
all	26	53A059A	NUT 1/4"COMP.HOLYOKE ANDERSON#61A-4	
all	27	53A005F	BODY=FEMCONN 1/4X1/8 COMP W#B66X4	
all	28	SA 10 020	90516B* DOORLATCH ASSY-SMALL	
all	29	03 06301	87233T COVER=LOWER DOOR LATCH CYL	(USED ON SA-36-010 ONLY)
all	30	SA 28 125	93402C*LID ASSY=SOAP CHUTE-GASKETED	
all	31	02 18640	65531Z HOOK=SOAPCHUTE LATCH	
all	32	15P100	07Z THDCUT-F PANHD 8-32 X 3/8 SS410	
all	33	02 19308	81247C GUARD=60+72WE SOAP CHUTE	
all	36	15N117	RDMACSCR 10-24UNC2X3/8SS18-8	
all	37	24G018N	ROLLED WASHER .194"ID NYLTITE #10W	
all	38	15G121	HXCAPNUT 10-24UNC2 #3266BR NKLPLTG2	
all	39	15P010	12Z PHILPAN TRDCUTSCRTYP10-24X1/2SS	
all	40	AAM36001R	82246J PIPING=SEAL+LATCH RITE 72WED	
all	41	53A031B	BODY-MAL90ELL1/4X1/8COMPPH#269C-42B	
all	42	60E004TE	04Z 1/4"OD X.170"ID NYLON TUBING *	
all	43	53A039B	BODY=BRMAL90 5/16X1/8COMP #B69A-5A	
all	44	53A060A	NUT BRASS 5/16 COMP W#61X5	
all	45	53A508	5/16" SLEEVE-DELRIN	
all	46	53A509	TUBEINSERT .187"OD	
all	47	53A501	TUBEINSERT .170"OD	
all	48	AAM28001R	77512J PIPING=SEAL+LATCH RITE 60WED	
all	49	02 18888	92601A DOORFILLER RUBBER 75FT/COIL*	
all	50	02 175267	76119B RUBBER STRIP=CORNERS+DR STEM	
all	51	03 06050B	81441D 72"DORSEAL,G-28-6X124+1/2"	(USED ON SA-36-010)
all	51	02 18889B	83426D 60"DORSEAL,G-28-6X100"	(USED ON SA-28-122)
all	53	54A716	FLANGEBEAR 1"ID SEAL SCHATZ#TW-25	
all	54	02 18878	73056B PIN-HINGE=SHELL DOOR 60WED	

AIR OPERATED VACUUM PUMP FOR DOOR SEALS

MILNOR Rapid load door seals are now deflated with an air operated vacuum pump. The air operated vacuum pump quickly deflates the door seals when the stop button is pressed. Once the stop button is pressed a timer in the door circuit prevents the doors from being opened for 7-1/2 seconds. This allows the seals time to deflate before the doors are open. The air operated vacuum pump is mounted on the side of the main valve set. The two valves, the relay and the time delay for the vacuum pump is shown on the wiring diagram that was shipped with the machine. The two valves that operate the vacuum pump are labeled deflator enable and deflator supply valve, the relay is aux 3-wire and the time delay is door latch delay.

Door Latch Assembly
36030F8S 42032F7S 52038WTL 60044WP2 72044DA1,WP2

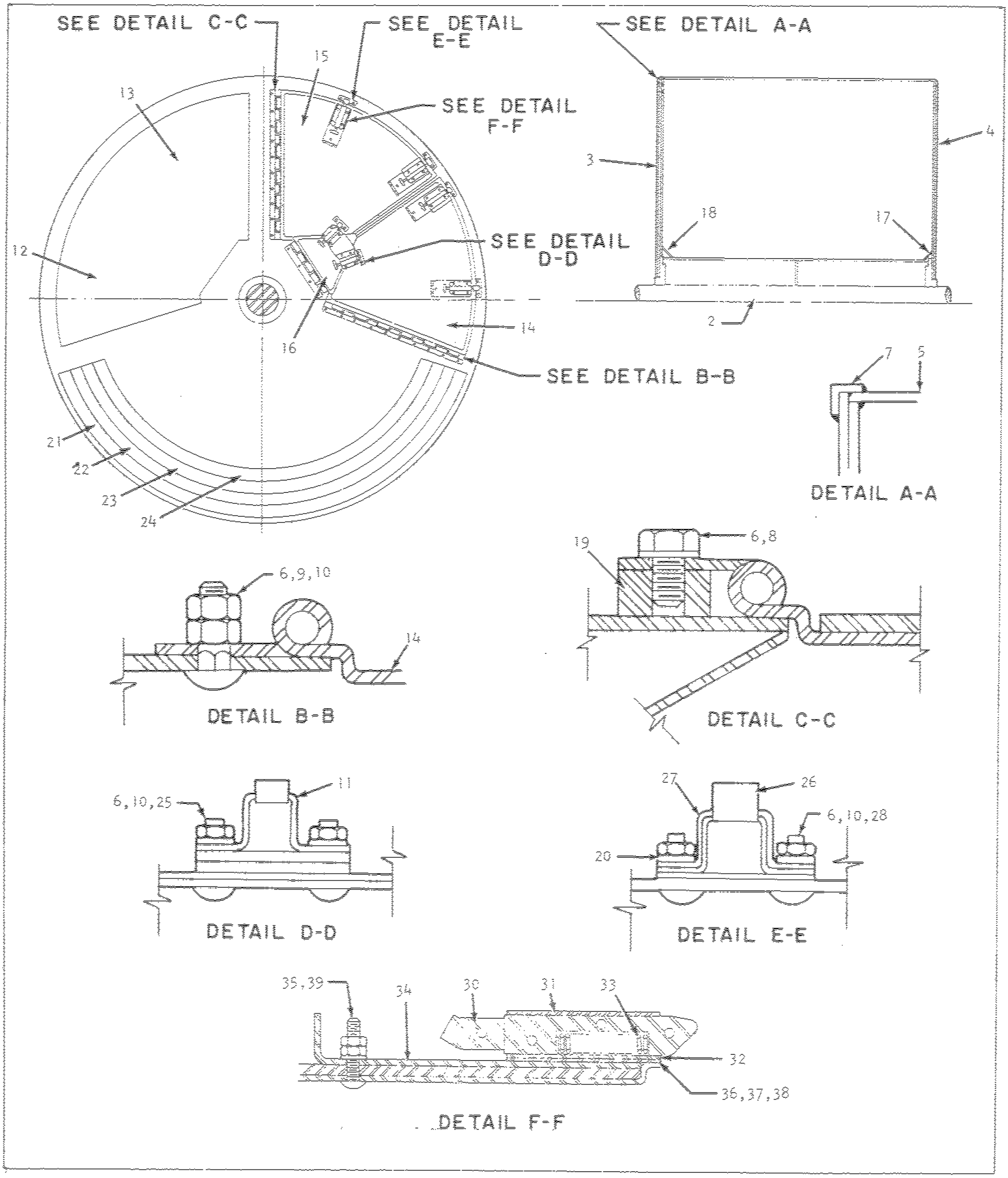
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
BMP701316/98183V (1 of 1)
Litho in U.S.A.



Parts List—Door Latch Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	SA 10 020	90516B* DOORLATCH ASSY-SMALL	
			COMPONENTS	
all	1A	02 10188	CYLINDER-DOORLATCH	
all	1B	02 10188L	97087# CYL=DR LATCH W/TAP LEFT SIDE	
all	2	02 10222	82391B SPRING=DOOR LATCH=BALCOM	
all	3	02 10221	RETAINER-DOORLATCH SPRING	
all	4	Y2 10314	70256B* PLUNGER=DOOR INTERLOCK	
all	5	60C112	ORING 5/8 ID 3/32CS BN 70 DURO #114	
all	6	60C115	ORING 3/4 ID 1/8CS BN70 DURO #210	
all	7	17B014	INTRETRING IND#3000-X100-ST-ZD ZINC	



CYLINDER ASSEMBLY
6036, 6044, & 7244 WE2
PELLERIN MILNOR CORPORATION

LITHO IN U.S.A.

BMP780043
792218

P/L CYLINDER ASSEMBLY

60 & 70 WE2

BMP780043R/86387A
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—P/L CYLINDER ASSEMBLY

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
			none	
			COMPONENTS	
all	1	ACA18WE2A	91091Y* CYL ASSY=6036WE2 WELD/SHAFT	(USED ON 6036 WE2)
all	1	ACA19WE2A	91091@* CYL ASSY=6044WE2 WELD/SHAFT	(USED ON 6044 WE2)
all	1	ACA36WE2A	91091D* CYL ASSY=7244WE2 WELD/SHAFT	(USED ON 7244 WE2)
all	2	Y2 175001	93421D MAINSHAFT 6036	(6036 WE2)
all	2	Y2 19216	93421# MAINSHAFT 6044	(6044 WE2)
all	2	Y3 06368	94247D MAINSHAFT 7244WE2+3	(7244 WE2)
all	3	X2 18825	92413D CYLFRONT 60WE2 ONLY	(6036&6044 WE2)
all	3	X3 06013	92413D+CIRCLE-CYLFRONT=1/72WED	(7244 WE2)
all	4	X2 18678	92413C CYLBAK W/SPRAYHOLES WE2	(6036&6044 WE2)
all	4	X3 06014	92413C CIRCLE-CYLBACK=1/72WED	(7244 WE2)
all	5	X2 18813	70256C CYLSIDE=2/6036WEDU	(6036 WE2)
all	5	X2 19161	70256C CYLSIDE=2/6044WED+6044SGD	(6044 WE2)
all	5	X3 06011	70256C SHEET-CYLSIDE=2/72WEDU	(7244 WE2)
all	6	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	7	02 18096	70123C RING=REAR CYL REINFORCING	(6036&6044 WE2)
all	7	03 06018	89321C RING=CYL REINFORCING	(7244 WE2)
all	8	15K084S	HXCAPSCR 3/8-16NCX5/8 SS18-8	
all	9	15A010	67346A CARRSCR 3/8-16UNC2X1 SPECIAL	
all	10	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
all	11	X2 15201	89207A KEEPER=CYLDOOR LATCH	
all	12	SA 28 110	83206D* CYLDOR LOLT 60WE2+ MIN-REIF	(6036&6044 WE2)
all	12	SA 36 003	93461@* CYLDOR LOLT 72WE2+ MAX-REIF	(7244 WE2)
all	13	SA 28 111	83206D* CYLDOR UPLT 60WE2+ MIN-REIF	(6036&6044 WE2)
all	13	SA 36 004	93397@* CYLDOR UPLT 72WE2+ MAX-REIF	(7244 WE2)
all	14	SA 28 112	93386D* CYLDOR LORT 60WE2+ MIN-REIF	(6036&6044 WE2)

Parts List, cont.—P/L CYLINDER ASSEMBLY

Used In	Item	Part Number	Description	Comments
all	14	SA 36 001	93397Y* CYLDOR LORT 72WE2+ MAX-REIF	(7244 WE2)
all	15	SA 28 113	93386D* CYLDOR UPRT 60WE2+ MIN-REIF	(6036&6044 WE2)
all	15	SA 36 002	93461Y* CYLDOR UPRT 72WE2+ MAX-REIF	(7244 WE2)
all	16	SA 28 114	96172D* CYLDOR ASY,SMALL =60+72WE2	
all	17	02 18899C	78202B FAIRING=REAR SIDES	
all	18	02 18901A	81442# FAIRING TOP	
all	19	02 18857	91091B TAPSTRIP-CYL DOOR 2/60WEDU	(6036&6044 WE2)
all	19	02 18859	86216A TAPSTRIP=SMALL CYL DOOR	(7244 WE2)
all	20	03 06174	77426A KEEPER=DOORLATCH REINFORCE	
all	21	02 19207	90372D COUNTERWEIGHT=CYL 60WE2	(6036&6044 WE2)
all	21	03 06177	81333# COUNTERWEIGHT=CYL 72WE2	(7244 WE2)
all	25	15K106E	BUTSOKCAPSCR 3/8-16NCX1+1/2 SS18-8	(6036&6044 WE2)
all	25	15A015	67381A CARRSCR 3/8-16X1+1/4 SPECIAL	(7244 WE2)
all	26	X3 06166	89207A KEEPER=CYL DOOR LATCH	
all	27	03 06167	88161L COVER-LARGE CYLDOOR KEEPER	
all	28	15A015	67381A CARRSCR 3/8-16X1+1/4 SPECIAL	
all	30	X3 06150	72195B PLUNGER=LARGE CYLDOOR(CAST)	
all	31	03 06151	94222A LATCHBODY-LARGE=CYLDOOR	
all	32	X3 06152	87346A PLATE = LARGE DOORLATCH	
all	33	03 06156	70025A SPRING=LARGE CYLDOOR LATCH	
all	34	02 18869	78041B SPACER-LATCH PULL BND@PRNT	
all	35	15K042K	BUTSOKCAPSCR 1/4-20UNCX1+1/4 SS18-8	
all	36	03 06172	77422A SHIM=DOOR LATCH-18GA	
all	38	03 06173A	77422A SHIM=DOOR LATCH-11GA	
all	39	15G170	HEXNUT 1/4-20UNC2 SS18-8	

Section 3

Drive Assemblies

DRIVE BASE COMPONENTS ON HYDRO-CUSHION® MACHINES

General Description of Drive Mechanism

Major drive train components of the drive base include the following:

1. Drive motors: Wash, Drain, E-1 (low extract), E-2 (high extract) and Autospot. (The E1 motor is optional on 42" machines and standard on larger models except for 64" machines, which use one 2-speed extract motor. Autospot is optional on divided cylinder machines and not applicable to open pocket machines.)
2. Belts and pulleys
3. Jackshaft (The jackshaft assembly is used on 52", 60", 64" and 72" machines only. On 42" and 48" machines, the E2 (high extract) motor also serves as the jackshaft.)
4. Clutch and drum assembly
5. Gear reducer
6. Brake assembly (The brake is located on the drive base on 42" and 48" machines only. On larger models, it is located elsewhere.)
7. Centrifugal switch

Concept of Drive Train Operation—See FIGURE 1. During washing and inching, the cylinder is driven by the wash motor through the gear reducer and the clutch, while the drain motor and the extract motors merely coast. As soon as the drain valve opens, the wash motor is shut off and coasts with the extract motors, while the drain motor drives the cylinder through the reducer and clutch. During extraction, both the wash and drain motors are shut off, the clutch disengages, and the extract motor drives the cylinder through the jackshaft pulley and main “V” belt drive. At the expiration of extract, the extract motor shuts off, the brake is applied, and either the drain or wash motor (depending upon whether the drain valve is open or closed) starts and runs idle while the brake decelerates the machine. When the machine has slowed down sufficiently to actuate the centrifugal switch, the brake is automatically released, and the clutch engages, returning the machine to wash or drain speed.

Advance Preparations for Drive Assembly Maintenance

The drive train on your Milnor® machine has been designed to give long, trouble-free service under continuous use. Strict adherence to the lubrication schedule, proper belt tensioning, and the normal good practice of inspecting your machine regularly for possible problems is the best way of prolonging service life.

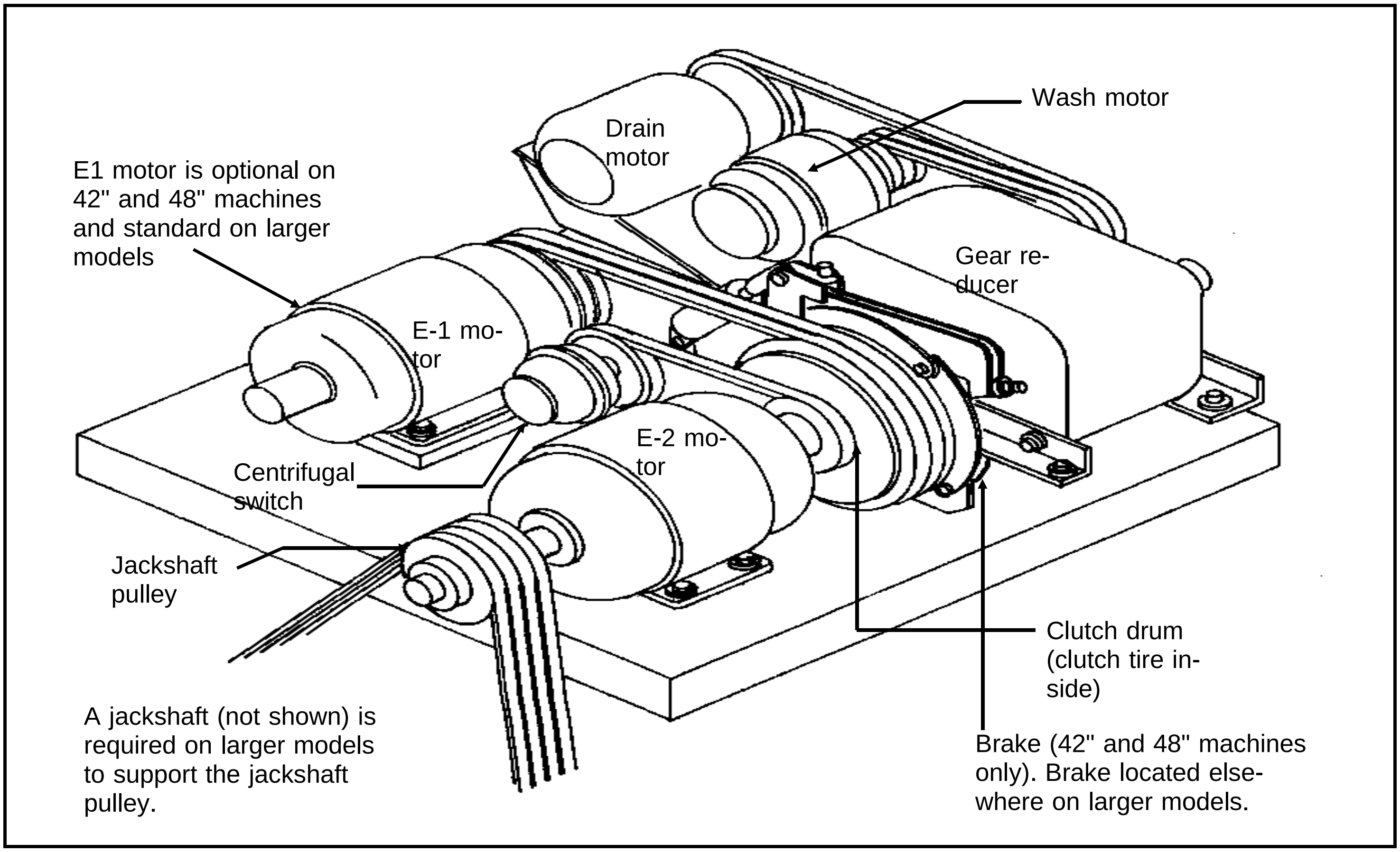


FIGURE 1 (MSSMA407BE)
Drive Base: 42" and 48" Machines
(Shows Concept of Operation For All Hydro-cushion® Washers and Dye-extractors®)

Eventually, however, drive train components may require replacement. If this becomes necessary, the following preparations and precautions will help to minimize down time:

1. Inspect belts regularly and purchase a replacement set for future use, before those on your machine become severely worn. This is especially important for the main drive belts. Purchase a belt tension tester (see “V-BELT TENSION ADJUSTMENTS”) and familiarize yourself with its use. It is also recommended to stock an extra clutch tire.
2. Although any motor can fail with no prior warning, two signs of potential failure are 1) motor running slower than normal and 2) motor emitting a loud or unusual noise. If either condition is detected, immediately check for voltage fluctuations in your electrical supply. Fluctuations greater than 10% below or 10% above those specified may cause the above symptoms and are extremely detrimental to the motor. If voltage fluctuations are not detected, yet the symptom persists, then the motor will probably soon fail. A slow running motor may indicate a bad rotor; whereas a loud or unusual noise likely indicates worn bearings. If possible, make immediate repairs to avert complete failure. If this is not possible, make sure replacement parts will be on hand when needed. Note however, that if a motor is allowed to fail, this is almost sure to require a new or completely rebuilt motor.
3. Familiarize yourself with the various components of the drive base and with the procedures herein.

Motor, Belt, and Pulley Replacement

Part numbers for belts, pulleys, and related components may be found on the Drive Chart and/or Drive Assembly drawings for your machine. When ordering motors and motor parts from the Milnor® factory, provide the machine model and serial number and the motor function (i.e., wash, drain, E1 (low extract), E2 (high extract) or Autospot). Replacement rotors and bearings are available from Milnor® for some motors.

Whenever a motor, belt, or pulley is replaced, the corresponding pulleys must be precisely aligned when reinstalled, the taper lock bushing properly tightened and the belt(s), properly tensioned. (See "V-BELT TENSION ADJUSTMENTS" for tensioning procedure using a tension testing device available from the Milnor® factory.)

All pulleys (used for power transmission) on Milnor® Hydro-cushion® machines use taper lock bushings. This feature greatly facilitates the removal and/or adjustment of these pulleys. Components of the taperlock bushing are identified below.

To Remove a Pulley

1. See FIGURE 2.
2. Remove the belts. Release belt tension by adjusting the position of the component to which the pulley is attached with the jack screws, until the belts easily slip off of the sheave. **Do not force belts off by using a pry bar or rolling the sheave.**
3. Loosen all three bushing cap screws.
4. Put two cap screws into the push-off holes in the bushing flange and tighten alternately until the sheave has loosened from the bushing (see FIGURE 2).
5. Remove sheave and bushing from the shaft.

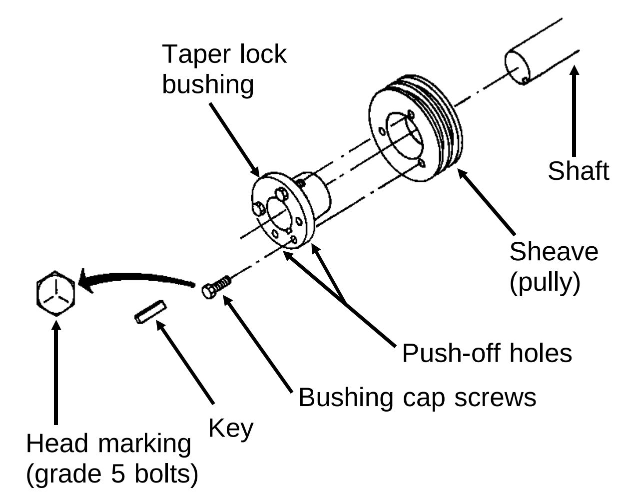


FIGURE 2 (MSSMA407BE)
Typical Taperlock Bushing Construction

To Maximize Belt Life

1. Never mix new and used belts on a drive.
2. Never mix belts from more than one manufacturer.
3. Always replace with the right type of belt and observe V-belt matching limits.
4. Inspect belt grooves in sheaves and replace sheave for any of the following reasons:
   - **a.** Worn groove side walls. Walls should be straight (not curved inward) when viewed in cross section.
   - **b.** Chipped or broken side walls.
   - **c.** Shiny groove bottoms (indicating that belt is bottoming out).

To Replace Pulleys and Belt(s)

1. Clean the tapered bore of the sheave, mating surface of the bushing, bore of the bushing, and the shaft until free of any foreign substance (including paint).

   NOTE: Do not use lubricants, "Locktite," or other adhesives on these mating surfaces.

2. Assemble the key in the shaft keyway checking to ensure the key is a snug fit, neither too tight nor too loose.
3. Loosely assemble the sheave and bushing on the shaft in the approximate location for proper belt alignment, allowing for take-up movement of the sheave. Make certain Grade 5 bolts, identified by the head marking shown in FIGURE 3, were supplied.
4. Carefully tighten the cap screws alternately and progressively until the taper is seated (approximately the "Initial Torque" as shown in the "Taperlock Bushing Bolt Torque Specs" elsewhere herein). Rotate the sheave to detect any wobble or runout (see FIGURE 2 next page).
5. Install the belts onto the sheaves (driving and driven) and with the slack of each belt on the same side, adjust

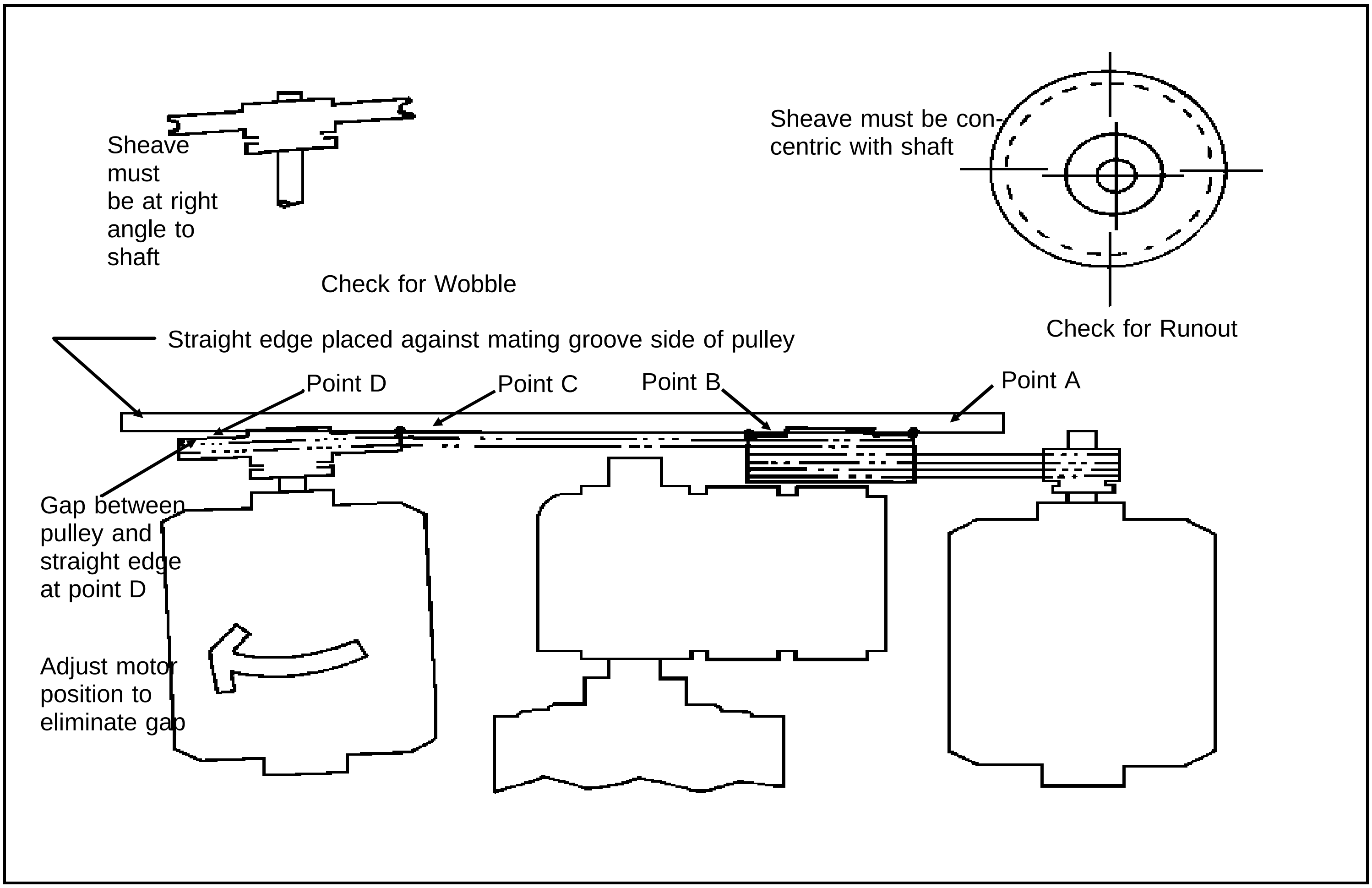


FIGURE 3 (MSSMA407BE)
Test for Pulley Alignment
(Straight edge must touch points A, B, C, and D)

the motor position with the motor mount (or other component) jack screws until all slack is taken up. **Do not force belts onto the sheaves by using a pry bar or rolling the sheaves.**

6. Check for sheave alignment as shown in FIGURES 3. The sheaves must be aligned within 1/64" per foot between shaft centerlines and in no case greater than 1/8". Readjust the sheave position as required to correct alignment.

7. Continue to alternately and progressively tighten cap screws to the “Final Torque” shown in the table. Use a torque wrench for the final torque check. When properly mounted, the gap between the bushing flange should not be less than .078" nor more than .130".

8. Check for proper belt tension and adjust if required. See “V-BELT TENSION ADJUSTMENTS” (see Table of Contents).

Taperlock Bushing Bolt Torque Specifications

Size Code (Stamped on bushing)	**Bolt Size** (All National Coarse Thread)	**Initial torque** (in lb.)	**Final torque** (in lb.)
G	1/4 x 5/8	48	115
H	1/4 x 3/4	48	115
P_1	5/16 x 1	96	240
P_2	5/16 x 1	96	240
Q_1	3/8 x 1 1/4	174	430
Q_2	3/8 x 1 1/4	174	430
R_1	3/8 x 1 3/4	174	430
R_2	3/8 x 1 3/4	174	430
S_1	1/2 x 2 1/4	420	1080
S_2	1/2 x 2 1/4	420	1080
SH	1/4 x 1 3/8	54	115
SDS	1/4 x 1 3/8	54	115
SD	1/4 x 1 7/8	54	115
SK	5/16 x 2	90	240
SF	3/8 x 2	180	430
M	3/4 x 6 3/4	1350	3700

Gear Reducer and Clutch

For gear reducer part numbers, see Gear Reducer Assembly and Reducer Air Seal drawings for your machine. For clutch components, see Drive Assembly drawing for your machine.

Concept of Clutch Operation—The clutch (see cross section view, next page) consists of a tubeless tire mounted to the gear reducer output shaft and a drum similar to an automobile brake drum, mounted to the jackshaft (or E2 motor shaft), within which the tire nests. When the tire is automatically inflated on command from the machine controls, it grips the inside of the drum, thus engaging the gear reducer and the jackshaft. When air pressure is released, the tire deflates, thus disengaging the gear reducer and jackshaft and allowing the machine to run in extract without overspeeding the reducer, wash motor or drain motor.

Air controlled by a solenoid valve is admitted to the clutch through a hole in the center of the gear reducer shaft. The air is prevented from entering the reducer housing itself by a mechanical end face seal located inside the air inlet on the gear reducer. The reducer is also fitted with a vented fill plug to prevent build up of air pressure in the housing, should the mechanical seal fail. A quick release valve permits instant clutch release by providing a large area “short circuit” exhaust connection near the clutch. The quick release valve is necessary for the clutch used on Milnor® washer-extractors, and is furnished as original equipment. The air supplied to the clutch must be free of oil and moisture.

⚠ CAUTION ⚠

If the machine makes a loud screeching sound like skidding automobile tires during deceleration from extract speed to wash speed, turn the *Master switch* to *off* immediately and refer to the troubleshooting procedures.

Alignment Requirements—The gear reducer must be positioned on the drive base such that its output shaft is on the same axis as the jackshaft (or E2 motor shaft), as shown in FIGURE 4. Otherwise, the clutch tire will not properly engage the drum. Slight misalignment reduces the service life of the clutch tire and perhaps other components. Severe misalignment may result in serious damage to the jackshaft, clutch, or gear reducer (i.e., broken shaft).

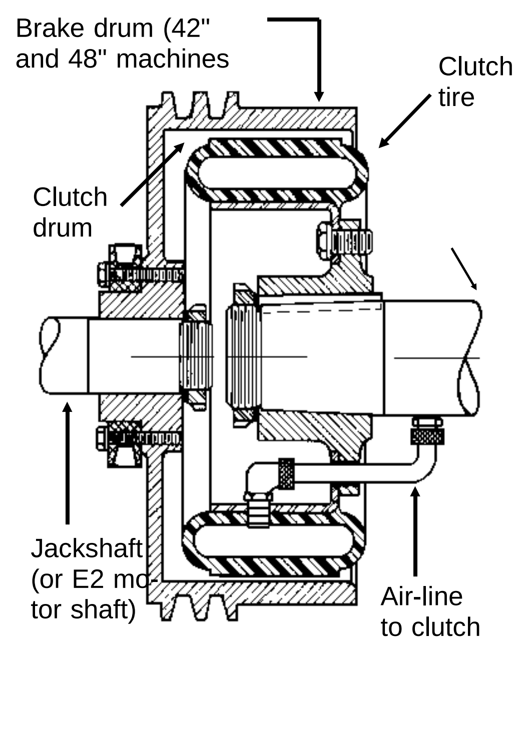


FIGURE 4 (MSSMA407BE)
Cross Section View of Clutch

To Remove the Gear Reducer and Clutch

1. Remove all belts from the gear reducer and clutch drum pulleys as previously explained.
2. Remove the air line to the quick release valve located on the reducer air seal.
3. Remove any other components which may be mounted to the gear reducer mounting bracket, such as Autospot motor, brake assembly, etc.
4. *On all machines except 64" models,* shims are used under the gear reducer mounting bracket, to align the gear reducer.

It is essential when removing the gear reducer, to record the positions of these shims so that they may be replaced in the exact same position later. Bearing this in mind, carefully remove the gear reducer mounting bracket (with the reducer attached) from the drive base. Note that the clutch tire, attached to the reducer output shaft, must be allowed to slip out of the clutch drum as the reducer is removed.

4a. On 64" machine models only (i.e., 64042BTN), check and adjust the jacking bolts on the gear reducer support bracket under the input shaft side of the reducer to be sure they are just touching the drive base. Leave the angle bracket between the reducer mounting bracket and the drive base side members firmly attached to the drive base. Remove only the two bolts and one dowel pin on each side of the reducer mounting bracket that attaches it to the angle brackets.

5. The gear reducer should not be unbolted from the mounting bracket unless absolutely necessary (i.e., replacing an old gear reducer with a new one); since this will complicate clutch alignment. The clutch tire may be removed from the gear reducer by removing the retaining locknut, as well as the connection where the short length of copper tubing meets the reducer shaft, then gently working the assembly off of the tapered shaft with a rubber mallet or pulling fixture. The clutch drum may also be removed from the jackshaft, if required, by removing the retaining locknut and pulling the drum off with a pulling fixture. **Do not attempt to drive the drum off with a hammer or mallet.**

6. In addition to any other required maintenance, inspect the various belts and the clutch tire. These components should be replaced at this time if they show appreciable wear. It is highly recommended to replace the belts that drive the clutch drum pulley, unless these are brand new.

To Replace the Gear Reducer and Clutch—Reassemble all components in reverse order of their removal. **Remember that all components such as motors, brake, etc. must be properly adjusted, using the alignment procedures described herein.**

When the gear reducer and mounting brackets are replaced on the drive base, *with the shims replaced in their original positions,* this should achieve rough alignment of the reducer. If, however, the gear reducer was removed from its mounting brackets, or the jackshaft was removed from its housing, the reducer may be out of rough alignment.

To align the gear reducer and clutch:

1. Observe the position of the clutch tire within the drum and check for clearance between the tire and drum all around, with a feeler gauge. **Determine that the tire is roughly centered within the drum. If it is, skip to step 3.** If not, proceed to step 2a or 2b.

2a. For all machines except 64" models, add or remove shims from between the gear reducer mounting brackets and drive base as required to roughly position the clutch tire within the drum in accordance with the "CLUTCH ALIGNMENT REQUIREMENTS" drawing.

2b. On 64" machine models only (i.e., 64042BTN), remove the two bolts and one dowel pin from each side of the gear reducer mounting bracket and using C-clamps to secure the mounting bracket to the angle brackets, adjust the position of the gear reducer to achieve rough alignment in accordance with the "CLUTCH ALIGNMENT REQUIREMENTS" drawing. If the existing bolt holes are now misaligned, either enlarge the existing holes or drill new holes as required and reinstall the four bolts. Mark any new bolt holes as being the correct ones. Do not reinstall the dowel pins.

3. Temporarily disconnect the internal air line to the gear reducer and connect an external, valve-controlled air line to the reducer, but do not inflate the tire yet.

4. Loosen but do not remove the bolts that attach the gear reducer mounting brackets to the drive base. (On 64" machine models, check to be sure the jacking bolts under the input shaft side of the reducer are resting on the drive base then loosen the bolts and remove the dowel pins if they were reinstalled.)

5. Inflate the clutch tire to cause the gear reducer to position itself with the clutch precisely centered. (It should move very little, if at all.)

6a. On all machines except 64" models, add or remove shims as required to firmly seat the reducer mounting brackets on the drive base and tighten down the mounting bolts.

6b. On 64" machine models only (i.e., 64042BTN), tighten down the mounting bolts. If the dowel pin holes are aligned, reinstall the pins. If the holes are not aligned, drill new holes, install the dowel pins, and mark the new holes as being the correct ones.

7. Replace the internal air line to the gear reducer.

8. Energize power to the machine and run in wash, while observing for any evidence of gear reducer misalignment such as 1) wobbling of the gear reducer or related components, or 2) any apparent difficulty of the clutch tire to engage the drum (i.e., an extended squealing sound).

9. If any of the above symptoms are observed, repeat the alignment procedures.

Jackshaft Replacement: 52", 60", 64", and 72" Machines

Jackshaft components may be found in the JACKSHAFT BEARING ASSEMBLY drawing for your machine. Replacement jackshafts are supplied, preassembled and are installed as a one-piece unit. To replace the jackshaft, proceed as follows:

1. Remove belts, gear reducer, and clutch drum exactly as previously explained.

2. Lower the drive base using the drive base jacking bolts. Remove the main drive belts and the jackshaft pulley.

3. Remove the grease fittings (or grease lines as appropriate).

4. To remove the jackshaft bearing assembly from its housing, it is convenient to remove the mounting plates from both ends of the housing. Shims may have been installed between the mounting plates and the housing to align the jackshaft within the housing. **It is essential to record the positions of these shims, so that they may be replaced in the exact same position later.**

On some models, the front mounting plate differs from the rear plate. Therefore, it is also necessary to identify the mounting plates as front or rear, so that they will be returned to the same positions. Remove each mounting plate by first unbolting the jackshaft from the plate then unbolting the plate from the housing.

5. Remove the jackshaft bearing assembly from the housing.

6. In addition to any other required maintenance, inspect all belts that were removed and replace with new belts, if they show appreciable wear.

To replace the jackshaft, reassemble all components in reverse order of their removal. Make certain that the jackshaft is properly oriented with the clutch end of the shaft to the front of the machine and that all shims are returned to their original positions. Install all jackshaft mounting bolts hand tight. Lift each end of the jackshaft with a pry bar (one end at a time) then tighten the bolts on that end, so that the jackshaft will sit as high as possible in the housing. This will provide for greater clearance between the clutch pulley and the drive base for the belts and easier alignment of the jackshaft. When tightening the bolts, tighten first the bolts that secure the jackshaft to the mounting plate, then those that secure the mounting plate to the housing. **Remember that all components such as motors, gear reducers, brakes, etc., must be properly adjusted, using the alignment procedures explained herein.**

Brake Assembly

Concept of Operation—On 42" and 48" Hydro-cushion® machines, the brake is located on the drive base. (The clutch drum is also the brake drum.) On 60" and 72" Staph-guard® machines, the brake is located on the idlershaft. On all other 52", 60", 64", and 72" machines, it is located on the cylinder shaft (thus, the main drive pulley and brake drum are combined). Machines covered by these instructions use spring loaded air cylinders to hold the brake band against the drum. Open-pocket machines use only one level of braking (“first brake”) and divided cylinder machines (WE’s and SG’s) use two levels (“first” and “second” brake). The “first” brake is normally *on,* and braking pressure is supplied by the action of the springs inside the brake air cylinder. The “first” brake is released by applying air to the top of the air cylinder to counteract the springs. This occurs whenever the cylinder rotates under power. On divided cylinder machines, the “second” brake which is *on* whenever the cylinder is at rest *with the door open,* supplements the “first” brake with air pressure applied to the back of the air cylinder.

Brake Assembly Maintenance—For identification of brake components and specific adjustment procedures refer to the Brake Assembly, Drive Assembly and/or Brake Air Cylinder drawings for your machine. Specific adjustment procedures are also found on the Brake Assembly drawing for your machine.

The brake may be readily adjusted to compensate for wear by adjusting the nuts on the air cylinder stem. If brake components must be removed or repaired, it is essential to adjust the brake upon replacement in accordance with the Brake Assembly drawing.

> **NOTE:** For any adjustment procedure requiring air pressure to the brake, do not attempt to perform this procedure by energizing the washer as it is not possible to release the “first” brake without the cylinder rotating under power.

To release the “first” brake without energizing the washer:

1. Disconnect the internal air line to the air cylinder. (This is the only air line to the air cylinder on open-pocket machines and the air line closest to the air cylinder stem on divided cylinder machines.)
2. Temporarily connect a direct air line to the air cylinder where the internal line was removed and apply air to release the brake.
3. On divided cylinder machines, make sure the doors are closed (to release the “second” brake).

Centrifugal Switch

Concept of Operation—After an extraction, the centrifugal switch will signal the Miltrol as soon as the washer cylinder has slowed sufficiently to permit the wash speed clutch to re-engage. Also, until this low speed has been attained, the Miltrol circuits prevent the opening of the shell door, thus providing safety interlocking.

This centrifugal switch assembly consists of three mercury tube switches wired in parallel, and connected to two copper rings. The shaft of the centrifugal switch is driven by the extract motor shaft and rotates at the same speed as the extract motor. At a predetermined speed, centrifugal force will cause the mercury switches to open the circuit. At lower speeds, there is always at least one switch closed, thus maintaining the circuit continuity. Two spring loaded carbon brushes, riding on the copper contact rings, transmit this electrical signal to the Miltrol.

This electrical signal is used to energize the speed relay at the expiration of extraction, when the predetermined reclutching speed has been reached. The combined operation of the extract relay and the speed relay in the Miltrol perform all the functions of operating the brake, clutch, and extract motors incidental to the automatic entrance into extraction, and subsequent return to wash speed.

Centrifugal Switch Maintenance—See Centrifugal Switch Assembly for your machine for identification of switch components.

The centrifugal switch is very simple, yet of *vital* importance. Failure of one of the mercury switches to make contact, an irregular contact between the brushes and the contact rings, a loose connection in the wiring, or any other condition that would cause an open circuit will prevent the clutch from engaging, in which case the machine will not operate after having braked down from extract speed.

The carbon brushes should be inspected occasionally, and replaced when worn. The copper contact rings may be cleaned with *fine* emery when needed. (Do not scratch the surface of the contact rings.)

⚠ WARNING ⚠

A short circuit or ground in the centrifugal switch or its associated wiring will cause the wash speed clutch to engage in high speed rotation. This condition would be identified by an extremely loud screeching sound as soon as the machine stops extracting. The sound would be similar to skidding auto tires. Such a malfunction is very dangerous and must be corrected at once before further operation.

⚠ CAUTION ⚠

Turn *off* power at main wall switch before entering centrifugal switch. This assembly carries high voltage, and remains energized when Miltrol master switch is *off.*

⚠ CAUTION ⚠

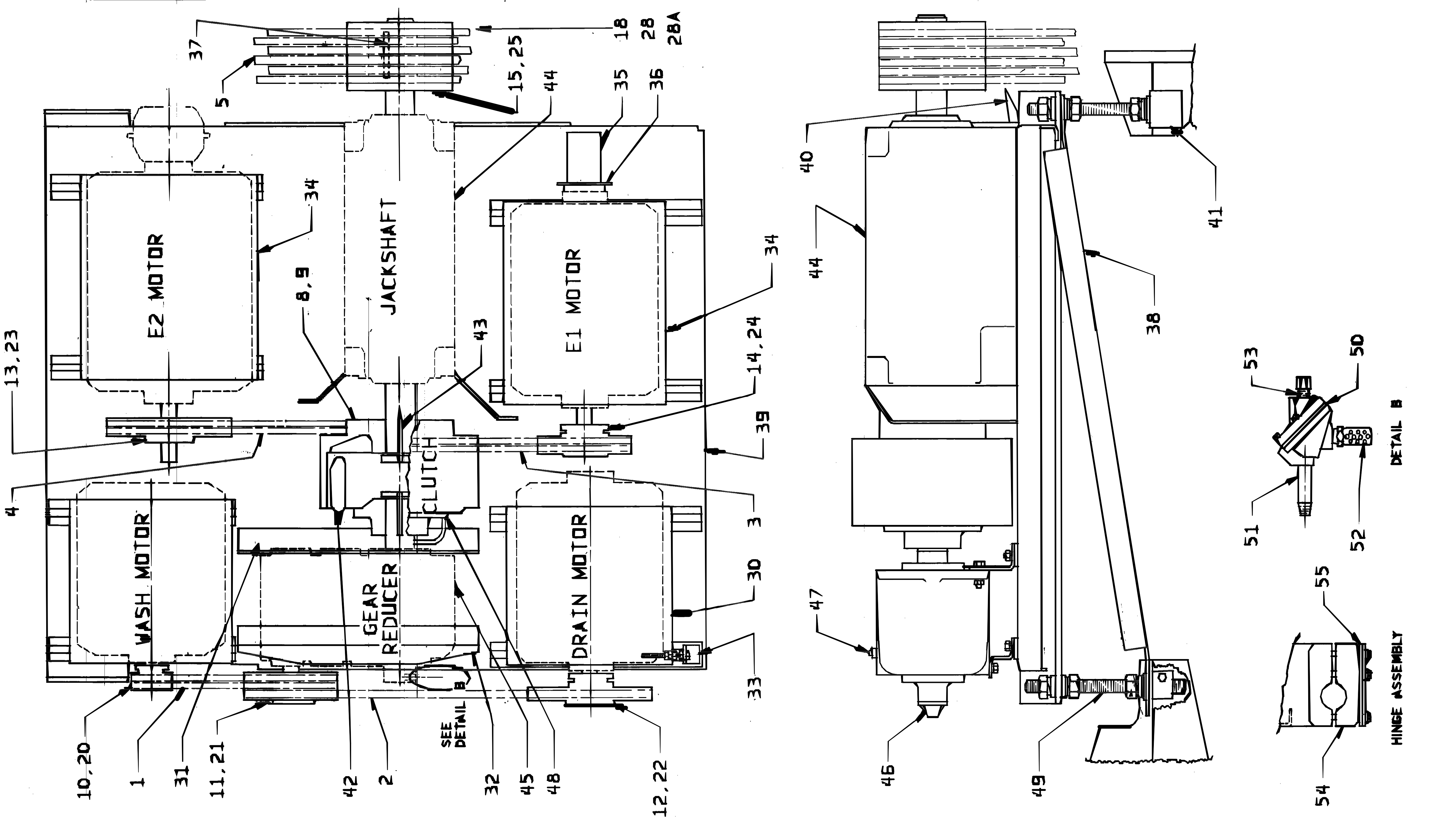
Over-lubrication of extract motor bearings will force grease into centrifugal switch housing and will cause the centrifugal switch to malfunction.

MILNOR

DRIVE ASSEMBLY

6036WE2, 6036WE3, 6044WE2, 6044WE3 50 + 60 CYCLE MACHINES

BMP840021
91107D



Drive Assembly

60036WE2/WE3,60044WE2/WE3 (50+60 CYCLE MACHINES)

BMP840021R/2006146B
(Sheet 1 of 1)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Drive Assembly

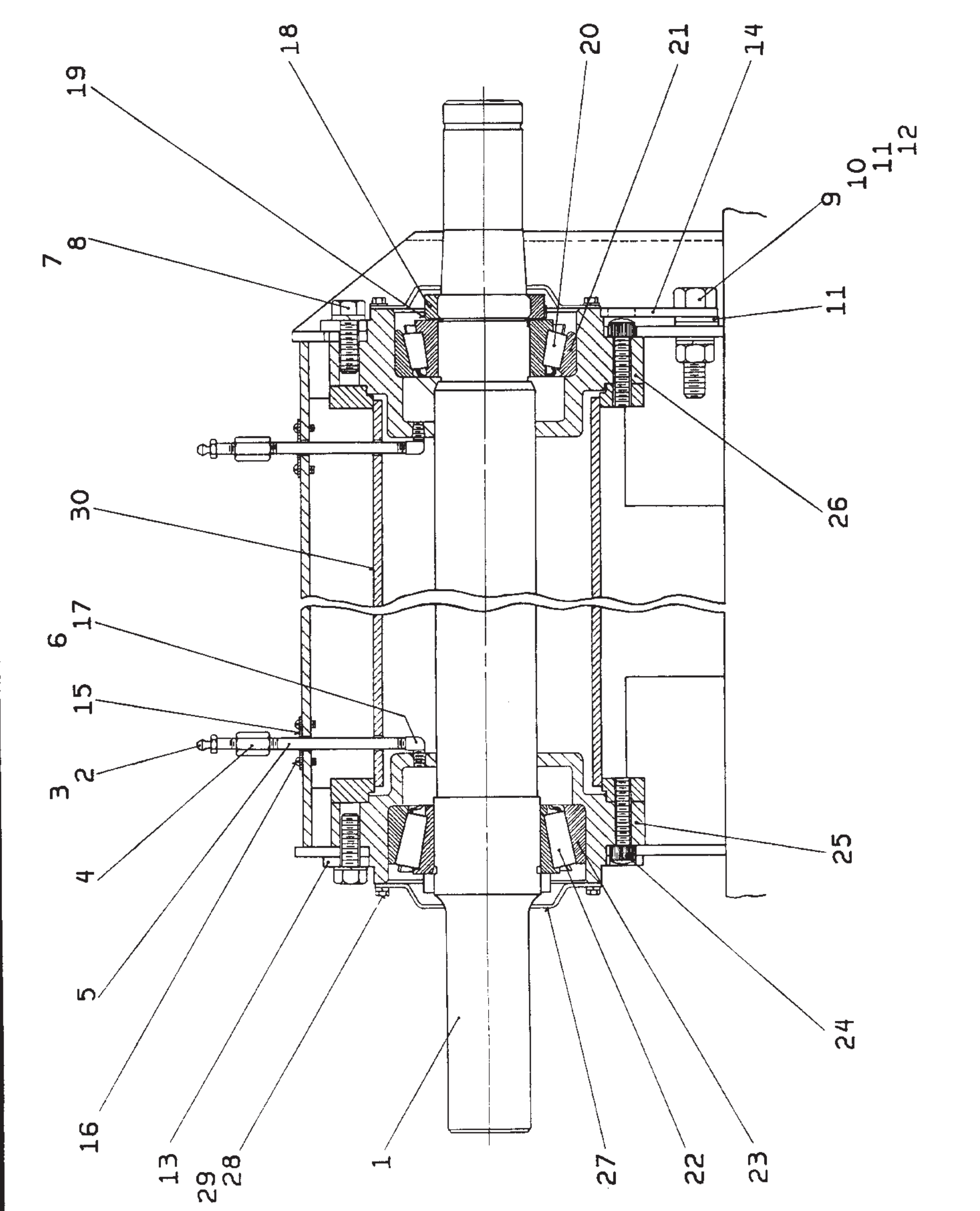
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	D28 00160	76501R* DRIVECHART=6036WE2 60CYC	
	B	D28 00250	76501B* DRIVECHART=6036WE2 50CYC	
	C	D28 00760	76501Q* DRIVECHART=6036WE3 60CYC	
	D	D28 00850	76501R* DRIVECHART=6036WE3 50CYC	
	E	D29 00150	76501M* DRIVECHART=6044WE2 50CYC	
	F	D29 00260	76501B* DRIVECHART=6044WE2 60CYC	
	G	D29 00750	76501B* DRIVECHART=6044WE3 50CYC	
	H	D29 00860	76501Q* DRIVECHART=6044WE3 60CYC	
	J	SA 28 103	89106Y*DRIVE BASE ASSY=60WE 60CYCLE	
	K	SA 28 104	89106@*DRIVE BASE ASSY=60WE 50CYCLE	
			COMPONENTS	
all	1	56VR0425M4	VBELT 3V425 MATCHSET=4 "EA"=1 BELT	
B only	1	56VR0450M4	VBELT 3V450 MATCHSET=4 "EA"=1 BELT	
all	2	56VR0750M2	VBELT 3V750 MATCHSET=2 "EA"=1 BELT	
all	3	56VR067S	VBELT 3V670	
all	4	56VR071S	VBELT 3V710	
A,D,F,H	5	56VS1505X4	SET OF TWO 4R5VX1505 VBANDS	
B,C,E,G	5	56VS1530M8	SET OF TWO 4R5VX1530 VBANDS	
all	9	X2 15106	94251B FLANGE=CLUTCH DRIVE 2.5	
A,B,E,F	10	560407R4SH	VPUL 4G3V4.07 (SH) TYPE QD	IF BUSHNG KEYED TO PULLEY, ORDER ALSO"SH" STYLE BUSH
C,D,G,H	10	560330R4SH	VPUL 4G3V3.3 (SH) TYPE QD	IF BUSHNG KEYED TO PULLEY, ORDER ALSO"SH" STYLE BUSH
all	11	02 19201C	92102C V-PUL 6G3V7.95 QD TYPE "SK"	IF BUSHNG KEYED TO PULLEY, ORDER SO"SH" STYLE BUSH
all	12	560685R2SE	VPUL 2G3V6.85 (SDS) TYPE QD	IF BUSHNG KEYED TO PULLEY , ORDER ALSO"SDS"STYLE BUSH
all	13	561055R3SK	VPUL 3G3V10.55 (SK) TYPE QD	IF BUSHNG KEYED TO PULLEY ORDER ALSO "SH" STYLE BUSH
All	14	560795R4SK	VPUL 4G3V7.95 (SK) TYPE QD	

Parts List, cont.—Drive Assembly

Used In	Item	Part Number	Description	Comments
A,D,F,H	15	02 18531	87327B VPU2 865V8.7 (R2) SPECIAL	
B,C,E,G	15	561080S8F	VPUL 8G5V10.8 (F) TYPE QD	
all	18	02 18561	94277C VPUL+BRAKDRUM 8G5V30.OPD 60W	
A,B,E,F	20	56Q1CSH	1+1/8" BUSH VPUL QD TYPE SH	
C,D,G,H	20	56Q1CH	1+1/8" BUSH VPUL TYP H,D,OR QT	
All	21	56Q1ESK	1+1/4" BUSH VPUL QD TYPE SK	
all	22	56Q1CSDS	1+1/8" BUSH VPUL QD TYPE SDS	
all	23	56Q1MSK	1+5/8" BUSH VPUL QD TYPE SK	
all	24	56Q1MSK	1+5/8" BUSH VPUL QD TYPE SK	
all	25	56Q2HR2S	01Z2+7/16" SPLIT BUSH B#R2	
all	25	56Q2HF	2+7/16" BUSH VPUL QD TYPE F	
all	28	Y3 01265	90432B BUSHING=AUTOSPOT=DIVCYL	
all	28	Y3 01265	90432B BUSHING=AUTOSPOT=DIVCYL	OPTIONAL AUTOSP IF BUSHNG KEYED TO PULLEY REPLACE PULLEY + BUSHING
All	30	02 19285	76688C MTRPLATE 184/215T BEND@PRINT	
all	31	02 19130	86226C BRACKET=REAR REDUCER MOUNT	
all	32	02 19131	88473C BRACKET=FRONT REDUCER MOUNT	
all	33	02 19288	87483B BRACKET=ADJUSTING-1.5X1.75	
all	34	02 19286	92571C MTRPLATE 254/256T BEND@PRINT	
all	34	02 19287	76688C MTRPLATE FR256T BEND@PRINT	
all	35	03 01234	68106A COVER=CENT-SW SHAFT PLATED	
all	37	02 175121	71058A KEY=5/8SQ	
all	38	02 18701A	83266# SWAY BRACE=WE DRIVE BASE(REV	
all	39	W2 19162A	92137D*DRVBSE=60WEV (60C ONLY)TMKN	
all	40	02 175257	75561C GREASE RELIEF=DRIP SHIELD	
all	41	02 18702	81533B FORK=ADJ SCREW-MOTOR MT-FRT	
all	42	54H150	REPLACED BY KIT K15 0002	
all	43	15E230	STRMACHKEY 3/8SQX2+1/2 TOL.+0 -.022	
all	44	GBJ28001	87332D JKSHFT ASSY TIMKEN 60W+72W+T	
all	45	54S023B	03Z REDUCER 3210-375EC2=AUTOSPOT	
all	46	AD 28 008	93456B DRAIN=DIVCYL GEAR REDUCER	
all	47	5SP0GFFSSV	NPT PLUG 3/8 SQSOLIDVENTBLKSTL	
all	48	A28 18000	71183C CLUTCH DRUM-AIR ASSY=60+72WE	
all	49	17R125A15K	83287# STUD=DRIVEBASEADS 1+1/4X15.5	
all	50	96M051	USE KZK5B00100	
all	51	5N0E02AG42	NPT NIPPLE 1/4X2 TBE GALSTL SK40	
all	52	27A005	MUFFLER 3/8" BANTAM B38	
all	53	53A008B	BODYMALECON.25X.25COMP#B68A-4B	
all	54	X2 18634	90183# CLAMP=MACHINED DR HINGPIN	
All	55	02 18706	70120G REINFORCEMENT=HINGE PINCLAMP	

MILNOR	JACKSHAFT BEARING ASSEMBLY 5238,6036,6044,6442,7244	BMP820109 89253C



Litho in U.S.A. PELLERIN MILNOR CORPORATION

Jackshaft Bearing Assembly
52, 60, 64, 72

BMP820109R/89253A
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List—Jackshaft Bearing Assembly

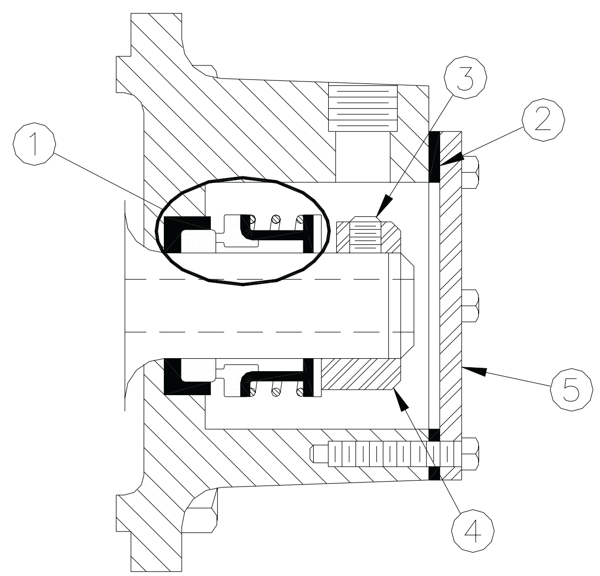
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
ASSEMBLIES				
	X	GBJ25001	87332# JKSHFT ASSY TIMKEN 52U+72S	52 W/E,60+72 STAPHGUARD
	Y	GBJ28001	87332D JKSHFT ASSY TIMKEN 60W+72W+T	60,64+72 W/E
	Z	ABJ25001	92327C*JKSHFT-BRGHOUS ASSY-TIMKENS	ONLY
COMPONENTS				
all	1	X2 18711B	93417D JACKSHAFT=TIMBRG W/TRUSTWASH	
all	2	54M025	HYDRAULICFIT 1/8"-90 ALEMITE#1613-B	
all	3	20H012	SHELL ALVANIA EP-2 # 71125 E=35LBPL	
all	4	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	5	5N0C04AG42	NPT NIPPLE 1/8X4 TBE GALSTL SK40	
all	6	5SL0CBEC	NPT ELBOW 90DEG STRT 1/8"BRASS 125#	
all	7	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5 PLATE	
all	8	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	9	15K221	HEXCAPSCR 5/8-11 UNC2X2GR5 ZINC	
all	10	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	11	15U314	FLATWASHER(USS STD) 5/8" ZNC PLT	
all	12	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
(Y onlY	13	02 19382	89016D BEARHOUSE MT PLATE REAR	)
(X,Y)	14	02 19383	89016D BEARHOUSE MT PLATE FRONT	
all	15	01 10237	82446B NAMEPLATE LUBG BRG JACKSHAF	
all	16	15P185	TRDCUT-F HXHD 1/4-20UNC2AX3/4 ZNC	
all	17	51A001	ADAPTER 1/8 PT BRASS	
all	18	56AHN14	N14 BEARING LOCKNUT	
all	19	56AHW14	W14 BEARING LOCKWASHER	
all	20	54AT060	01Z CONE TIMKEN 644 1/BOX+ PT NO	
all	21	54AU060	01Z CUP TIMKEN 632 1/BOX+PT NO	
all	22	54AT050	01Z CONE TIMKEN 6461 1/BOX+ PT NO	
all	23	54AU050	01Z CUP TIMKEN 6420 1/BOX+ PT NO	
all	24	15K193	06Z SKCPSC-1/2-13X2.75GR8 HK	

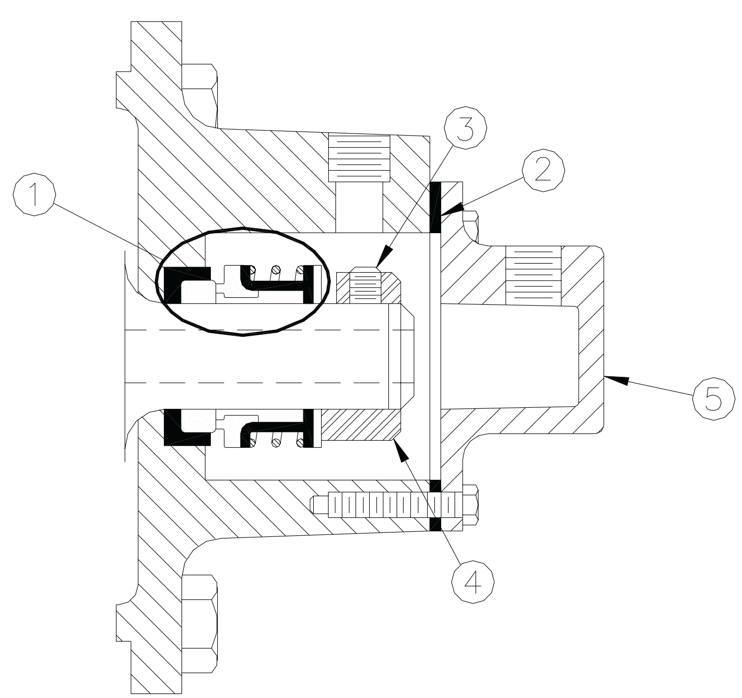
Parts List, cont.—Jackshaft Bearing Assembly

Used In	Item	Part Number	Description	Comments
all	25	X2 19381	94182D BEARHOUSE=LG BRG REAR TIMKEN	
all	26	X2 19381B	94182D BRGHSE=SM BRG FRONT W/WASHER	
all	27	02 19384	82296C COVER=BRG HOUSE FT+REAR	
all	28	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	29	15K030	HEXCAPSCR 1/4-20UNC2X1/2 GR5 ZINC	
all	30	X2 19378	88506C BRGHSG SUP=TIMKENS MACHINED	

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400



00A—00C



00D—00F

Parts List—Reducer Air Seal

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

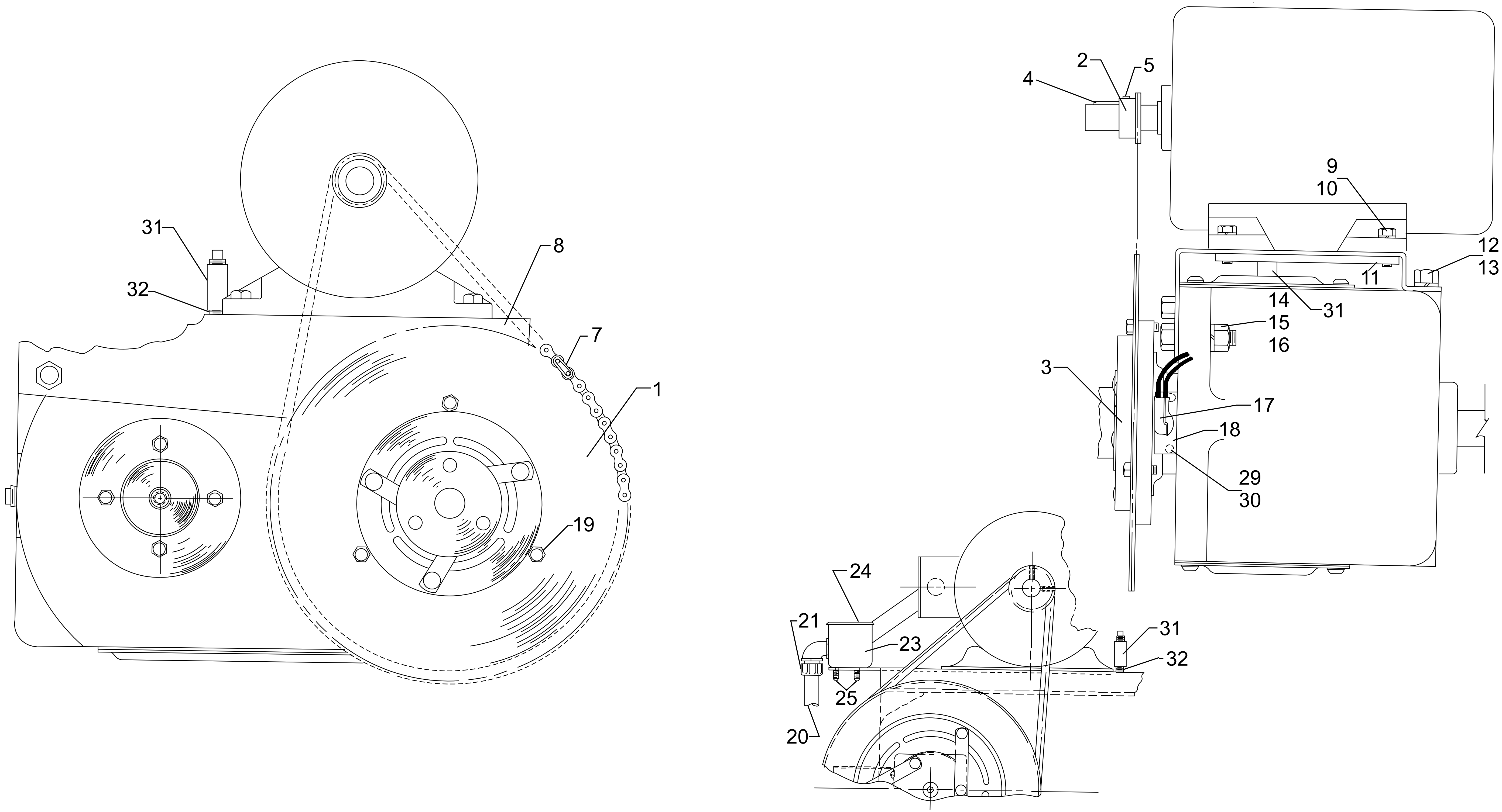
Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	54S014HC	REDUCER 15.4 DORRIS#1115-60HC	3621,3626,4226,4832, 4836
	B	54S012HC	REDUCER 15.4 DORRIS #1115-25HC	SHUTL36/40/48R+L
	C	54S015	REDUCER 19.6 SKK/DOR 3220-60C	4226DYE
	D	54S022A	REDUCR 19.59:1 3220-300EC1	4231,4244,5238
	E	54S023B	REDUCR 10.16:1 3210-375EC2	6044
	F	54S025A	REDUCR 10.16:1 3210-600EC2	6442,6446,7244 6440/50
			COMPONENTS	
B-F	1	K10 0002	KIT=ROTARY AIR SEAL	
B-F	2	02 15111	GASKET AIRSEALHOUSING COVER	
B-F	3	15Q077	SOKSETSCR 1/4-20X1/4 ZINC ALLE	
all	4	02 10380	Z SHAFT COLLAR FOR AIR SEAL	
A-C	5	02 15108	COVER=ROTARY AIRSEAL HOUSING	
D-F	5	02 15108A	AIRINLET=CLUTCH DIECAST+TAP	

Autospot Drive Assembly

BMP701411/2000133V
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List—Autospot Drive Assembly

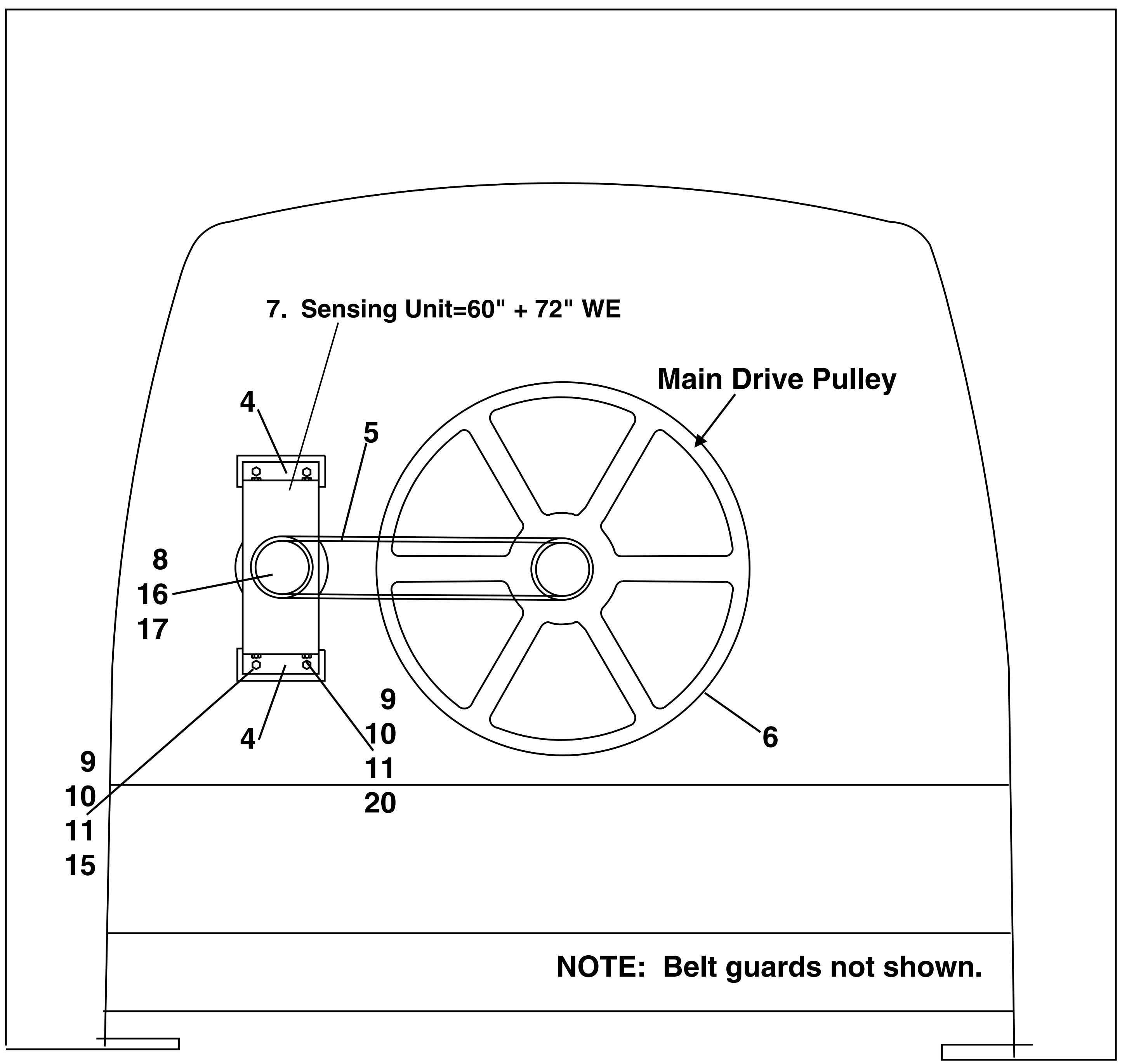
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			--ASSEMBLY--	
-	A	G15 13400	814811 MOTOR DRIVE ASSY=AUTOSPOT	4231,4244WP2/2 CP2/3 WP2/3 SP2/3 6044SP2 , 72044 SP2/SP3
	B	G28 15600	81481C MOTOR DRIVE ASSY=AUTOSPOT	6044WP2/3 SP2/3 72044WP2/3
			--COMPONENTS--	
	1	54N015	02Z SPROCKET BROWN#35A96-6"BORE	
	2	54N008	SPRKT BROWN#35-13X7/8" BORE	
	3	54H164A	08Z CLUTCH 12VDC MAPM02	
	4	15E006	KEY #6 WOODRUFF 5/32X5/8 SAE10	
	5	15Q068	SOKSETSCR CUP10-24X1/4ZINCALLE	
	7	54G010B43P	71245N ROLLCHAIN+CONNLINK 3/8"=AUTO	
A	8	02 15865	96101D BASE=AUTOSPOT MOTOR BND@PRT	
B	8	02 175036	96101C BASE=AUTOSPTMTR60+72WE BND@PT	
	9	15K105	HXCAPSCR 3/8-16UNC2A1.25 Gr5 P	
	10	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
	11	02 175027	96101BTAPSTRIP=AUTOSPOT MOTORMOUNT	
	12	15K211	HEXCAPSCR 5/8-11UNC2AX1 Gr5 ZIN	
	13	15U315	LOCKWASHER MEDIUM 5/8 ZINCPL	
	14	15K180	HXCAPSCR 1/2-13UNCAX2 Gr5 ZINC	
	15	15U300	LOCKWSHER REGULAR ½ ZINC PLT	
	16	15G230	HXNUT 1/2-13UNC2B ZINC Gr5	
	17	03 01275	69268C COVER=AUTO CLUTCHWIRES	
	18	12M036L	1/2' 90-DEG SHORT ELLS	
	18A	12M035	3/8' SCREW-IN CONNECTOR	
	19	15K041	HXCAPSCR 1/4-20OUNC2AX1 GR 5 ZI	
A	20	12C0375FN	3/8" FLX NON-METAL CONDUIT	
A	21	12M040	3/8" X 90-DEG SEALTITE CONN.	
A	23	12H050	HANDYBOX 4X2+1/8X21/8	
A	24	12H095	HANDY BOX COVER 4+2+1/8	
A	25	15P185	TRDCUT-F HXHD 1/4-20OUNC2AX3/4	
A	29	15U150	LOCKWASHER MEDIUM #10 ZINCPL	
A	30	15K018	05Z SKCPSCR 10-24 UNC 3X3/8	
	31	5SCC0GNF	NPT COUP 3/8 GALMAL 150#	
	32	5N0G02AG42	NPT NIP 3/8X2 TBE GALSTL Sk40	

Air Operated Autospot Assembly
60044WP2/WP3 and 72044WP2/WP3

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

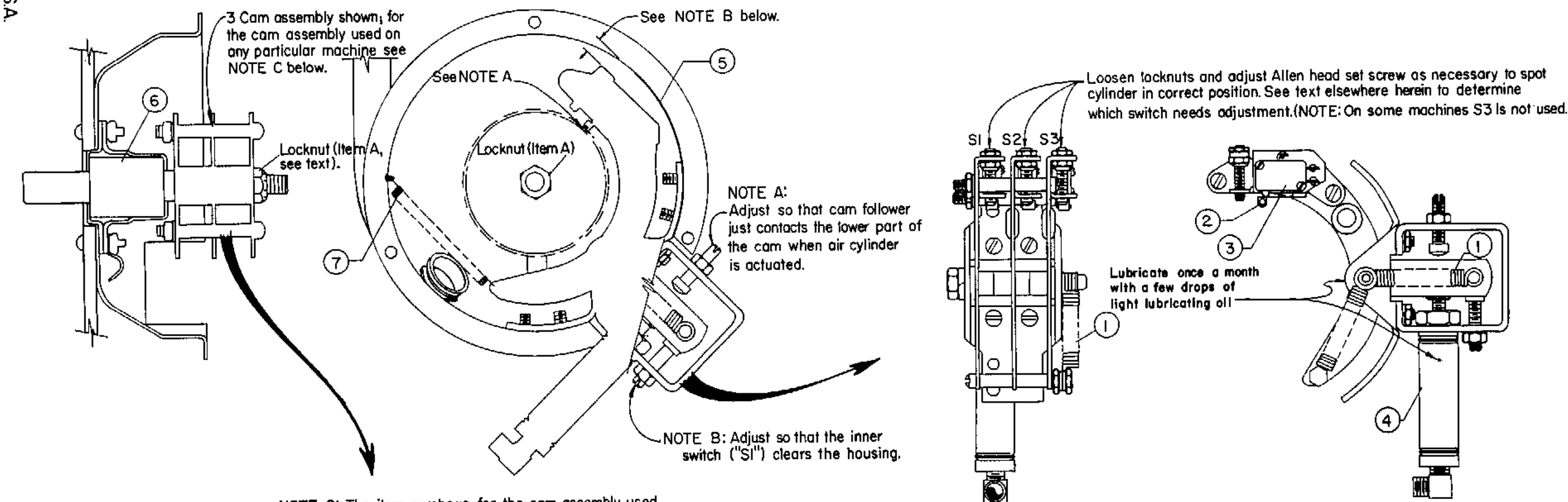
Litho in U.S.A.



Parts List—60044WP2/WP3 and 72044WP2/WP3

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	G28 16200	71241Y AIROP AUTOSPOT=60"WE2	60044WP2
	B	G28 16300	71241# AIROP AUTOSPOT=60"WE3	60044WP3
	C	G36 05500	71318D AIROP AUTOSPOT ASSY=7244WE2	72044WP2/WP3
			COMPONENTS	
all	4	02 175144	75690B BKT MTG=AIROP AUTOSPOT	
A, B	5	54C135	GEARBELT SYNCRO-COG DAYCO #600L050	
C	5	54C160	GEARBELT UNIROYAL MOLD 9386X1/2B4N1	
A, B	6	AD 28 119	81512U DRIVE PULLEY ASSY=AUTOSPOT	
C	6	G36 05900	76179T DRIVE PULLEY=AIROP AUTOSPOT	
A, C	7	E28 00800	71263T* SENSE UNIT AUTOSPOT60+72WE2	
B	7	E28 01100	71263T* SENSE UNIT AUTOSPOT60+72WE3	
all	8	54X020	PULLEY-TIMEBELT (LH) ELECT #40L050D	
all	9	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC/CAD	
all	10	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	11	15U240	FLATWASHER(USS STD) 3/8" ZNC PLT	
all	15	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	16	56Q0MHS	05Z .627" BUSHING,VPUL TYPE H,DORQT	
all	17	15E007	KEY #7 WOODRUFF 3/4X1/8 SAE1035	
all	19	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 PLATED	
all	20	15U238	LOKWAS INTOOTH 3/8" (US STD) 410SS	



NOTE C: The item number(s) for the cam assembly used on any particular machine is indicated in the table below.

MACHINE MODEL	ITEM NO.
4231WE2, 4244WE2	11
4231SG2 , 4244SG2	11
4231WE3, 4244WE3	9
4231SG3 , 4244SG3	9A
6036WE2 ,6044WE2	10
6036SG2 ,6044SG2	11
6036WE3,6044WE3	9A
6036SG3 ,6044SG3	9A
7244WE2	10
7244SG2	11
7244WE3	9A
7244SG3	9, 9A

SENSING UNIT=AIROP AUTOSPOT
PELLERIN MILNOR CORPORATION

ITEM	HOW PART IS USED IN ASSY (ONLY IF PERTINENT)	P/N	DESCRIPTION
001	SEE DESCRIPTION ------->	03 01355	71157A SPRING=EXT=AIROP AUTOSPOT
002	SEE DESCRIPTION ------->	09R015	ACTUATOR.MICROSW #JV-9 (CLASS 004)
003	SEE DESCRIPTION ------->	09R014	017 MICSW SPDT LEVELSW V3-1-B (13)
004	SEE DESCRIPTION ------->	27C205	027 AIR CYL 3/4 BORE 1" STKE
005	SEE DESCRIPTION ------->	03 IF2X3	85046B INSUL.AUTOSPOT/CENTRIFUGL.SW
006	SEE DESCRIPTION ------->	03 01329	84493A SHAFT=AIROPAUTOSPOT OUR MATL
007	SEE DESCRIPTION ------->	02 02463	82362B SPRING-CHART HOLDING
009	SEE DESCRIPTION ------->	E15 02700	71333B$CAM A/S 42WE3,42DY3,SS72SG3
009A	SEE DESCRIPTION ------->	E15 02700A	74558B$CAM AS60+72WE3,42+60+CS72SG3
010	SEE DESCRIPTION ------->	E28 00700	71157B$CAM ASSY A/S 60+72WE2
011	SEE DESCRIPTION ------->	E15 03100	79036B$CAM AS42WE2+SG2+DY2+60-72SG2

PARTS LIST FOR: BMP710042R/85353A SHEET 1 (END)

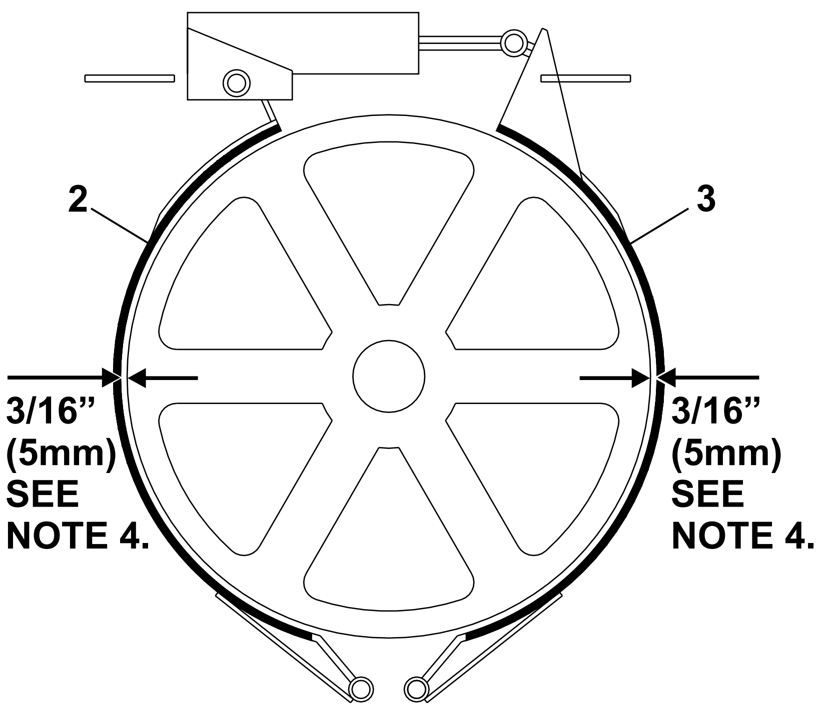
Brake Assembly

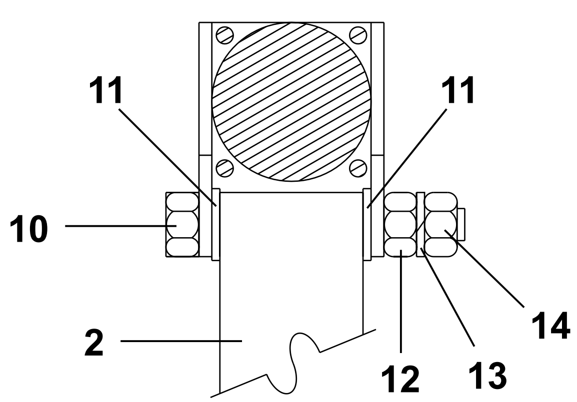
6044WP2/WP3, 6044WP2 SM(Single Motor), 7244WP2/WP3

BMP710022/2006155B
(Sheet 1 of 3)

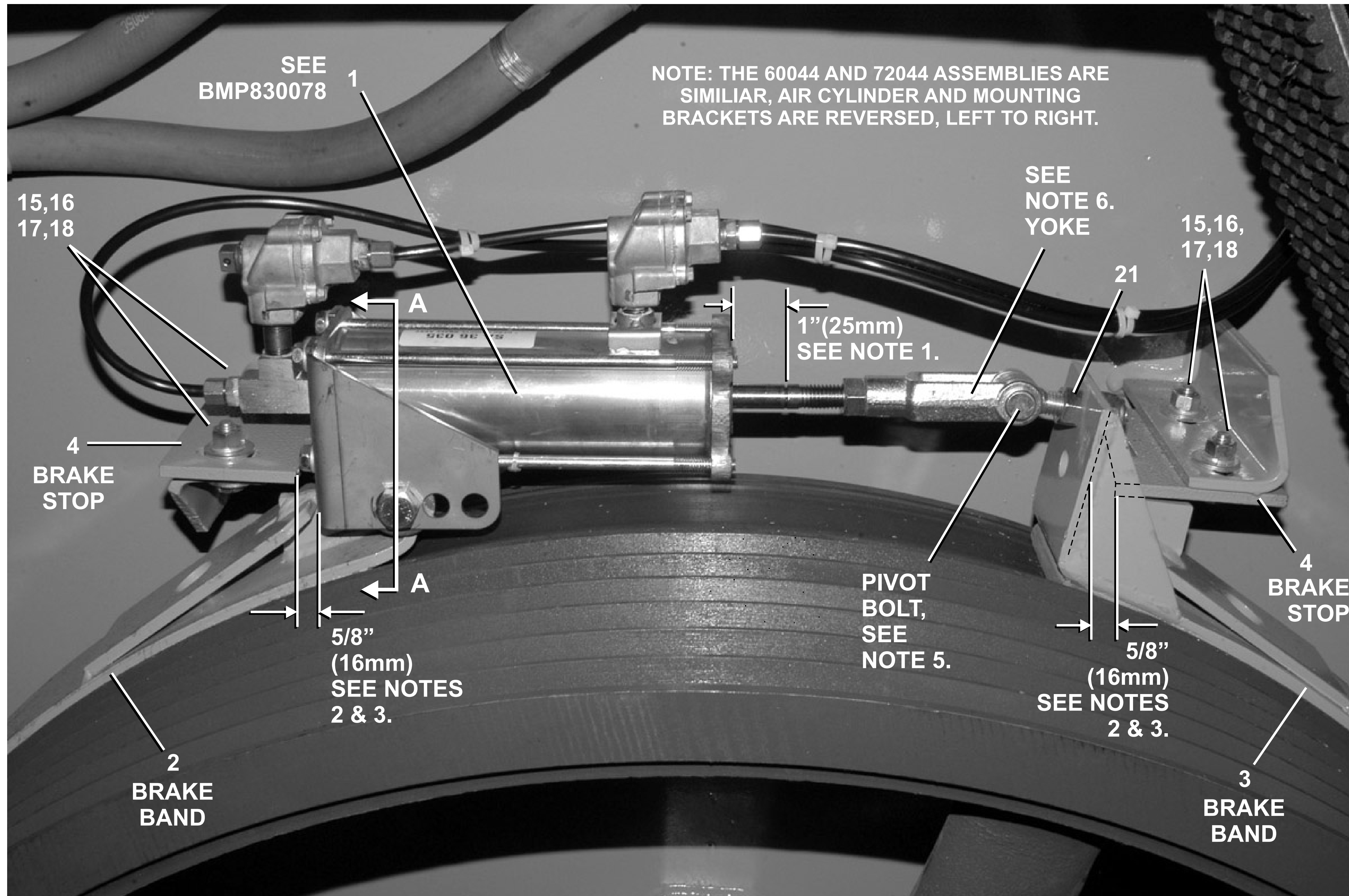
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



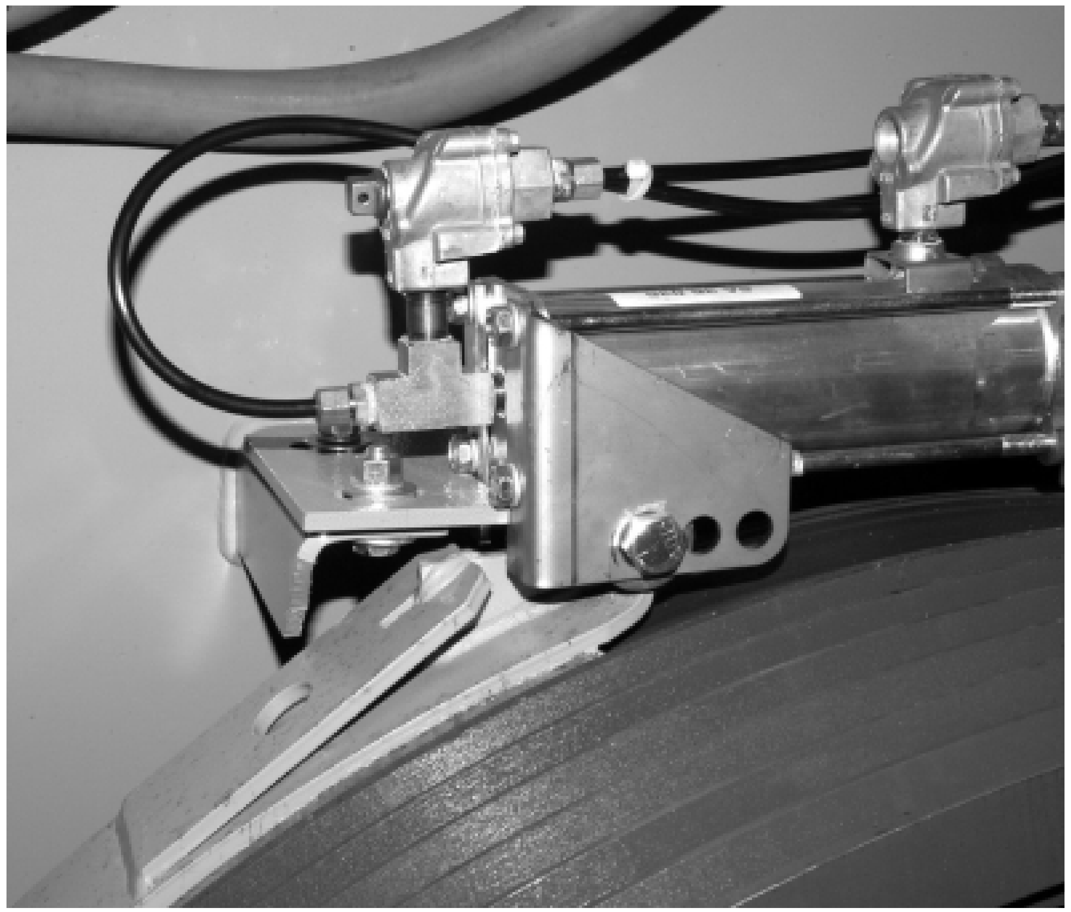


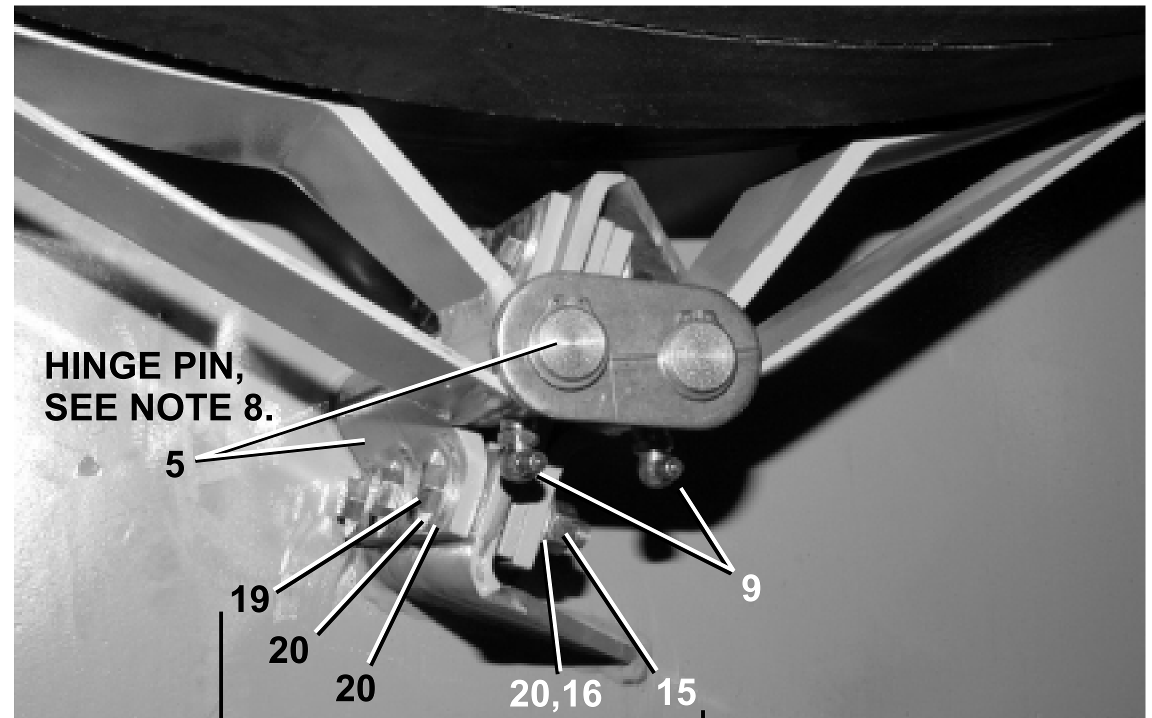
VIEW A-A



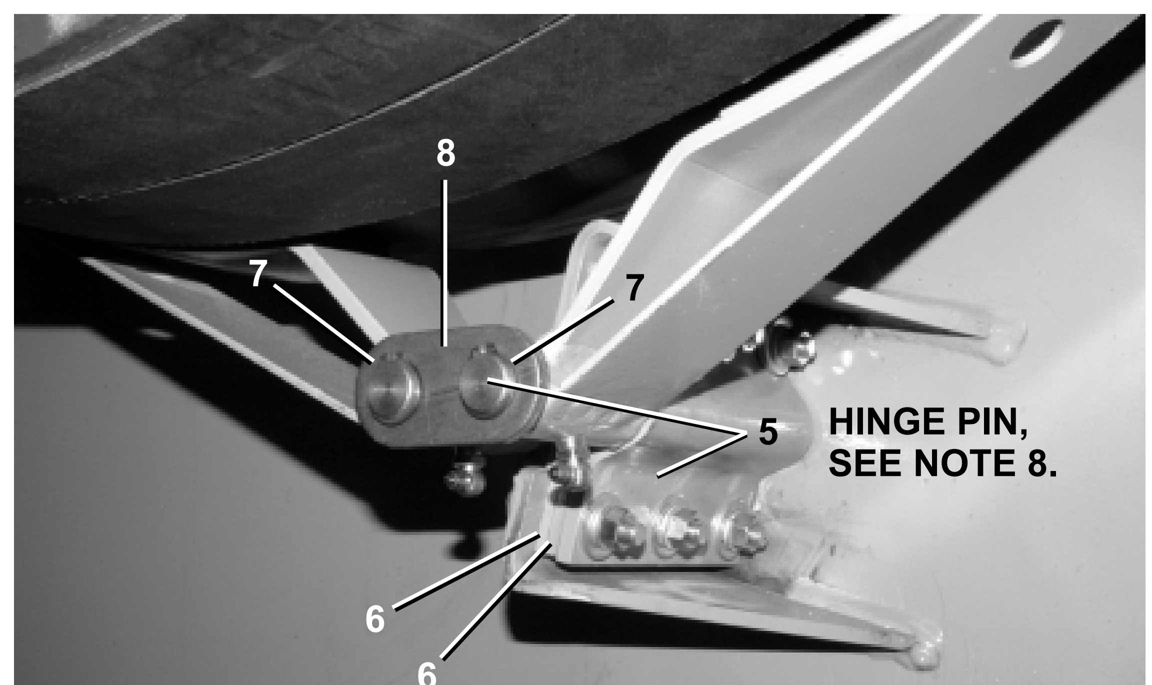
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.





TYPICAL 6 PLACES



ASSEMBLY INSTRUCTIONS (NOTES):

1. With brake applied, groove on air cylinder stem should be 1”[25mm] from air cylinder head. Adjust rod end & yoke to set this dimension.

2. With brake applied, brakes stop must be 5/8”+/- 1/16” [16mm+/- 1.5mm] from brake bands.

3. When brake is released, brake band & air cylinder assembly should rest firmly and squarely against stops.

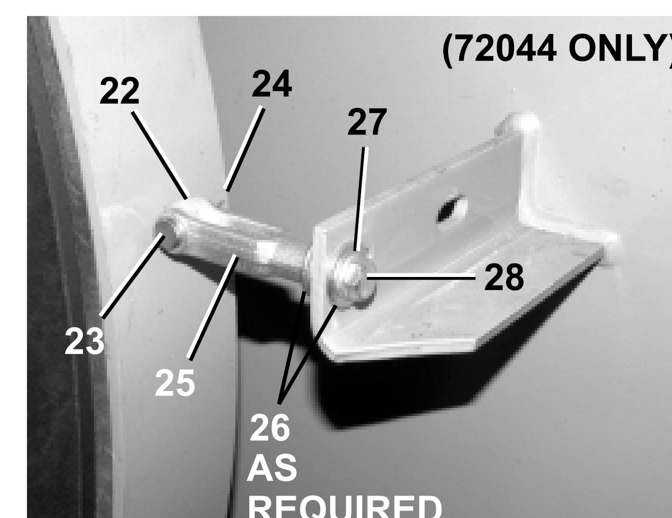
4. When brake is released, it should clear the drum by approximately 3/16”[5mm].

5. Do not over tighten pivot bolt. Air cylinder must move easily about the bolt.

6. Keep both yoke arms in a horizontal plane. Do not skew or cock yokes.

7. Be sure brake bands pivot easily on pins.

8. Do not get grease or oil on brake drum.



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Parts List—Brake Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			---ASSEMBLIES---	
	A	AD 28 151	BRAKE INSTALLATION=WED + WEH	6044WP2/WP3
	B	AD 36 043	BRAKE INSTALLATION=7244WED	72044WP2/WP3
			---COMPONENTS---	
A	1	SA 28 152	* BRAKE AIRCYL 2-WAY 60WE2+3	
B	1	SA 36 035	* AIRCYL=BRAKE ASSY	
A	2	SA 28 153N	*BRAKEBAND RT(NON-ASB)52+60WE	
B	2	SA 36 008N	*BRAKEBAND RT(NON-ASB)72W+T+D	
A	3	SA 28 154N	*BRAKEBAND LT(NON-ASB)52+60WE	
B	3	SA 36 007N	*BRAKEBAND LT(NON-ASB)72W+T+D	
all	4	02 175080	PLATE-BRAKE STOP	
all	5	W2 18661	* WELDMENT=BRAKE HINGE PIN	
all	6	02 18786	SHIM=BRAKE BAND 60+72WE	
all	7	17B062	EXTRETRING S/S INDUST#3100-75-	
all	8	02 18516B	WASHER=BRAKE BAND PIN +$10SU	
all	9	54M025	HYDFIT 1/8"-90 ALEMITE 1613-B	
all	10	15D119	HXTAPSCR 1/2-13X4 GR5 ZNC FTL	
all	11	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	12	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	13	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	14	15G231	HXFINJAMNUT 1/2-13UNC2B ZINC G	
all	15	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	16	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	17	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	18	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	
all	19	15K117	HEXCAPSCR 3/8-16X1+3/4 GR 5 PL	
all	20	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	21	15G234N	HXLOCKNUT NYL 1/2-13UNC2 STL/Z	
B	22	02 18689	ROLLER-BRAKE ADJUST (NYLON)	
B	23	17A030	CLEVIS PIN 3/8"X1+3/32"DRIL SS	
B	24	15H030	STDCOTTERPIN 3/32X3/4 ZINCPL	
B	25	17A010	ADJ YOKE 3/8-16 EMPIGARD COAT	

Parts List, cont.—Brake Assembly

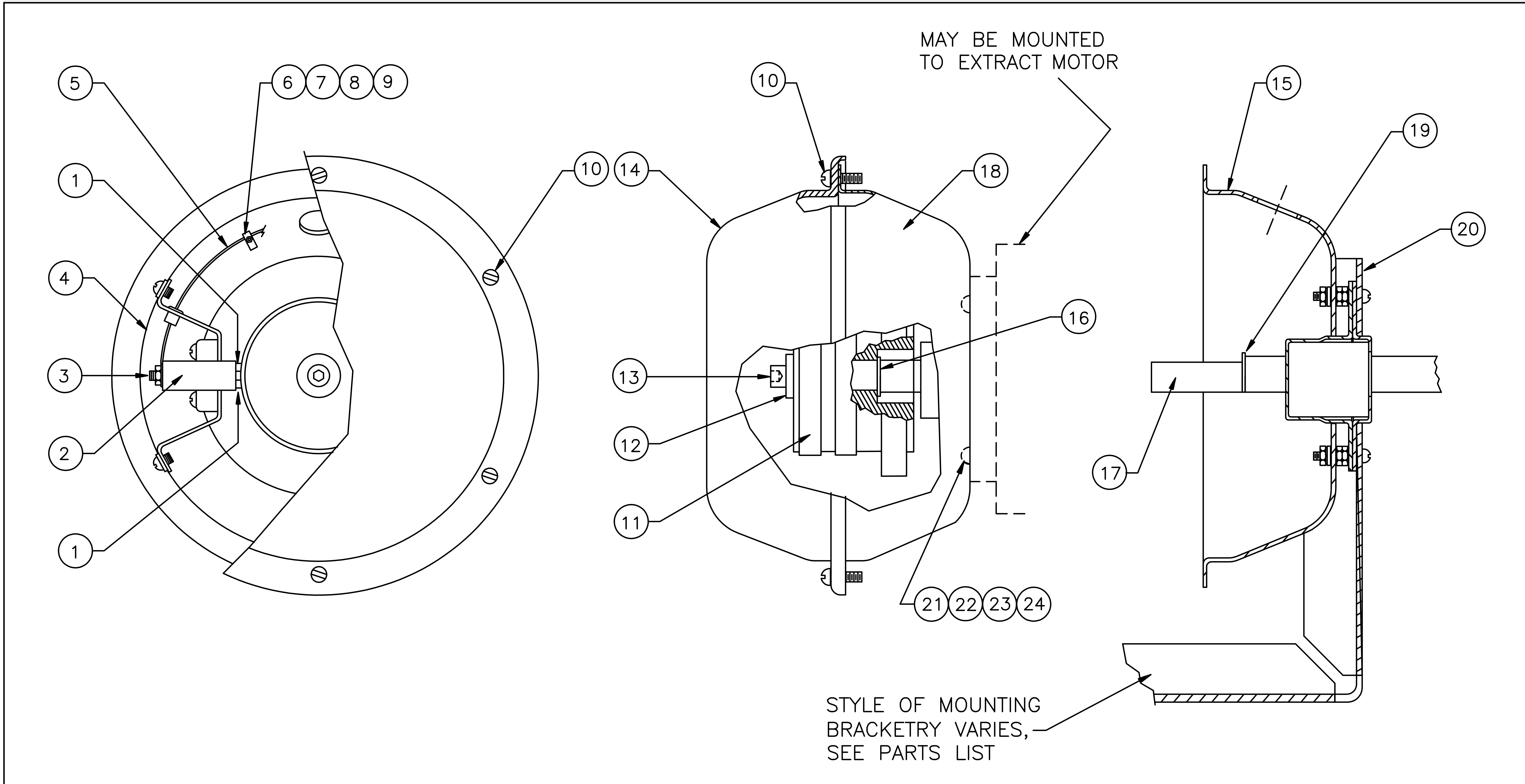
Used In	Item	Part Number	Description	Comments
B	26	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
B	27	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
B	28	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	

Centrifugal Switch Assembly

BMP701195/2000242V
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Centrifugal Switch Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	N	EDC14003	92000Z*CENTSW + MTG BRKT 3621/26F	3621Q'S MANUFACTURED AFTER JAN. 6,1993
	P	EDC14002	90000Z CENTSW+MTG BRKT 36/42QG/J/P	3621/26+4226Q4'S, Q6'S
	Q	G10 05000B	84412# CENTSW ASSY=FRAME NO-PLATE	3621CPE,BWP,NSP 4226DA1, 64040/64050E6N 64046E6N/J6N/D6N
	R	G03 04500A	84412C CENTSWITCH=MOTOR MT NO-PLATE	6044,6442,6446,7244
	T	SAE03 088	792571 ASSY=CENSW + MOUNTBKT 42	42031,42044,48032,48036
	U	SAE03 088A	83417J ASSY=CENSW + MOUNTBKT 42DYA	5238 DYE
	V	ADC11001	84122D ASSY=CENSW + MOUNTBKT4226QH	4226
	W	ADC14001	90351C CENT SWITCH ASSY 3621F8P	3621F8P
	X	EDC14801	86252C ASSY=CENSW+MTGBRKT RWP	3621/26,4226RWP/SYS 7
	Y	SAE13 001	83246I ASSY=CENSW + MOUNTBKT SWE	3626SWE
	Z	SAE13 001A	83417J CENTRIFUGAL SW ASSY 42QHE	4226,4832,4836
			COMPONENTS	
all	1	09X100	CARBON BRUSH 3/16"SQ=CENSW	
all	2	ESC0001	82281B* CENT SWITCH BRUSHOLDER ASSY	
all	3	15G071	MACHSCRLOKNUT 6-32 NM SER ZINC	
all	4	03 IF2X3	85046B INSUL.AUTOSPOT/CENTRIFUGL.SW	
all	5	60E005E	TUBING VINYL 3/8IDX.025"W #HT105C *	
all	6	12P015C	CABLECLAMP 5/16-1/2	
all	7	15G070	HXMACHSCRNUT 6-32UNC2B ZINC GR2	
all	8	15N045	RDMACHSCR 6-32UNC2AX3/8 ZINC GR2	
all	9	15U100	LOKWASHER MEDIUM #6 ZINCPL	
all	10	15P010	12Z PHILPAN TRDCUTSCRTYP10-24X1/2SS	
all	11	SAE03 012B	83407#*SLIPRING+CENT SW.ASSY(LORES)	
all	12	15U342	FLTWASH .255/.260IDX.750DX.125T SS	
all	13	15K036	05Z SKSELL0KCP SCR 1/4-20X5/8	

Parts List, cont.—Centrifugal Switch Assembly

Used In	Item	Part Number	Description	Comments
all	14	02 15582	COVER=CENTSW-CADSTL	
N-R	15	03 01147	HOUSING FOR CENTRIFUGAL SWITCH	
all	15	A33 11000	75675B$ HOUSE+BKT+SHAF=CENSW CWM	00S
T	15	A03 01300	75491C*HOUSE+BKT+SHAFT=CENSW 42+52U	
U	15	A03 01300A	75491#* HOUSE+BKT+SHAF=CENSW 42DYA	
V	15	A03 11000	82506T*CENTSWITCH=HOUSING+BRKT 42Q	
W	15	ADC14001A	93381C*C-SWITCH=MNT BRKT+HOUSING	
X	15	ADC14801	86246C*CENT SW HOUSING & BRKT ASSY	
Y	15	A13 02700	83246C$ HOUSE+BKT+SHAF=CENSW SWE	
Z	15	A13 02700A	83246# CENSW HSG+BRKT ASSY 2SPD WAS	
T-Z onlY	16	17B059W	RETAIN RING-ROTOR CLIP# SH-62-ST	
T-Z onlY	17	A03 01400	71103B SHAFT ASSY=CENTSWITCH	
T-Z onlY	18	03 01147	HOUSING FOR CENTRIFUGAL SWITCH	
T-Z onlY	19	17B059W	RETAIN RING-ROTOR CLIP# SH-62-ST	
T	20	02 15359	CENTSW MOUNTBRACKET	
U	20	03 25417	76154C BRKT=CENT SWITCH MT	
V	20	02 11452	94222D CENTRIFUGAL SWITCH BRKT-42Q	
W	20	02 14609	93381D+BRKT=CENTRIF SWITCH 3621F8P	
X	20	02 14836	89391C CENT=SW MTG BRKT	
Y	20	02 13111	77481C BRKT=CENT-SWITCH MT BND@PRNT	
Z	20	03 48170	83246C BRACKET=CENT.SW.MT.2SP WASH	
all	21	15N117	RDMACSCR 10-24UNC2X3/8SS18-8	
all	22	15U130	FLAWAS#10 .031X7/16ODX.203ID ZINCPL	
all	23	15U150	LOCKWASHER MEDIUM #10 ZINCPL	
all	24	15G201	01Z HXLOKNUT 3/8-16 NYL/SS TYPE NE	

CENTRIFUGAL SWITCH OPERATION

After an extraction, the centrifugal switch will signal the MILTROL as soon as the washer-cylinder has slowed sufficiently to permit the wash speed clutch to reengage. Also, until this low speed has been attained, the MILTROL circuits prevent the opening of the shell door - thus providing safety interlocking.

This centrifugal switch assembly consists of three mercury tube switches wired in parallel, and connected to two copper rings. This entire assembly is mounted on a rear extension of the extractor motor shaft, and rotates at the same speed as the extract motor. At a predetermined speed, centrifugal force will cause the mercury switches to open the circuit. At lower speeds, there is always at least one switch closed, thus maintaining the circuit continuity. Two spring loaded carbon brushes, riding on the copper contact rings, transmit this electrical signal to the MILTROL.

This electrical signal is used to energize the speed relay at the expiration of extraction - when the predetermined reclutching speed has been reached. The combined operation of the extract relay and the speed relay in the MILTROL perform all the functions of operating the brake, clutch and extractor motors incidental to the automatic entrance into extraction, and subsequent return to wash speed.

The centrifugal switch is very simple - yet of <u>VITAL</u> importance. Failure of one of the mercury switches to make contact, or an irregular contact between the brushes and the contact rings, or a loose connection in the wiring, or any other condition that would cause an open circuit will prevent the clutch from engaging - in which case the machine will not operate after having braked down from extraction speed.

WARNING: A SHORT CIRCUIT OR GROUND IN THE CENTRIFUGAL SWITCH OR ITS ASSOCIATED WIRING WILL CAUSE THE WASH SPEED CLUTCH TO ENGAGE IN HIGH SPEED ROTATION. THIS CONDITION WOULD BE IDENTIFIED BY AN EXTREMELY LOUD SCREECHING SOUND AS SOON AS THE MACHINE STOPS EXTRACTING. THE SOUND WOULD BE SIMILAR TO SKIDDING AUTO TIRES. SUCH A MALFUNCTION IS VERY DANGEROUS AND MUST BE CORRECTED AT ONCE - BEFORE FURTHER OPERATION.

CAUTION: Over-lubrication of extractor motor bearings will force grease into centrifugal switch housing and will cause centrifugal switch to malfunction.

The carbon brushes should be inspected occasionally, and replaced when worn. The copper contact rings may be cleaned with <u>fine</u> emery when needed. (Do not scratch the surface of the contact rings.)

WARNING: TURN "OFF" POWER AT MAIN WALL SWITCH BEFORE ENTERING CENTRIFUGAL SWITCH. THIS ASSEMBLY CARRIES HIGH VOLTAGE, AND REMAINS ENERGIZED WHEN MILTROL MASTER SWITCH IS "OFF".

V-BELT TENSION ADJUSTMENTS FOR 48", 52", 60" AND 72" WASHER-EXTRACTORS

This instruction is to be used for adjusting the belt tension on the following machine models:

48032BHE	48032BTG	48032BTH	48036QHE	48036QTG	48036QTH		
52038WE1	52038WTF	52038WTB	52038WTG	52038WTH			
60036WE2	60036WE3	60036SG2	60036SG3	60044WE2	60044WE3	60044SG2	60044SG3
72044SG2	72044SG3	72044WE2	72044WE3	72044WTB	72044WTG	72044WTH	

A belt tension testing device (Milnor® part number 30T001) and a straight edge are required when tensioning unbanded belts.

Tension Settings—Unbanded Belts

Set the o-rings on the tension testing device (see FIGURE 1) as follows:

1. Move the upper o-ring to the topmost position, resting against the bottom edge of the cap.
2. Find the proper belt deflection setting (by machine model and belt function) in the appropriate table below.
3. Move the lower o-ring on the tension tester to this deflection setting on the inches scale.

NOTE 1: The tension testing device is marked on one side in inches and pounds and on the other side in centimeters and kilograms. All values in the tables are in inches (in.) and pounds (lbs.).

NOTE 2: The instruction sheet provided with the tension testing device should not be used. Use only the instructions provided herein.

NOTE 3: The reference (ref.) code shown in the tables are for factory use only.

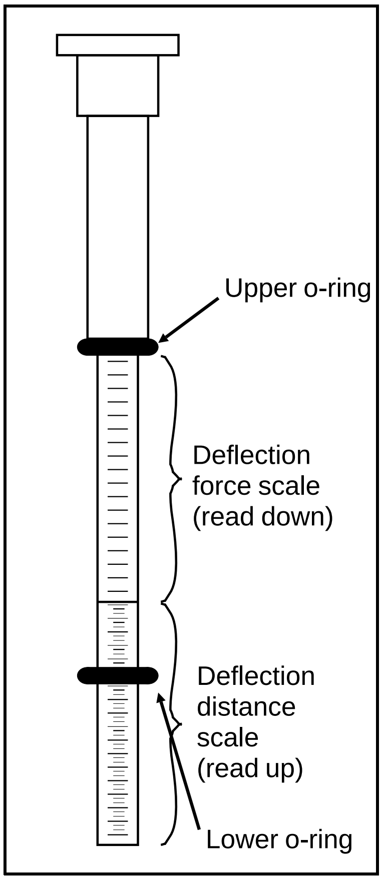


FIGURE 1 (MSSMA405AE)
Tension Settings

Belt Tension Measurements

Unbanded Belts

1. Place a straight edge along the top edge of the belt to be tested so that it spans both pulleys. Place the tension tester in the center of the belt and press down on the cap until the lower o-ring is in line with the straight edge, as shown.

2. Read the setting of the upper o-ring on the lbs scale of the tension tester.

3. Compare this value with the acceptable range in the appropriate table. If the belt is brand new (has never been run), use the range in the Initial Tension column. If the belt is not brand new, locate the acceptable range in the Final Tension column.

4. If the reading on the tension tester is *less* than the range shown in the table, the belt is *too loose* and must be tightened. If the reading is *greater* than the range shown in the table, the belt is *too tight* and must be loosened. Adjust the belt until the reading falls within the acceptable range in the table.

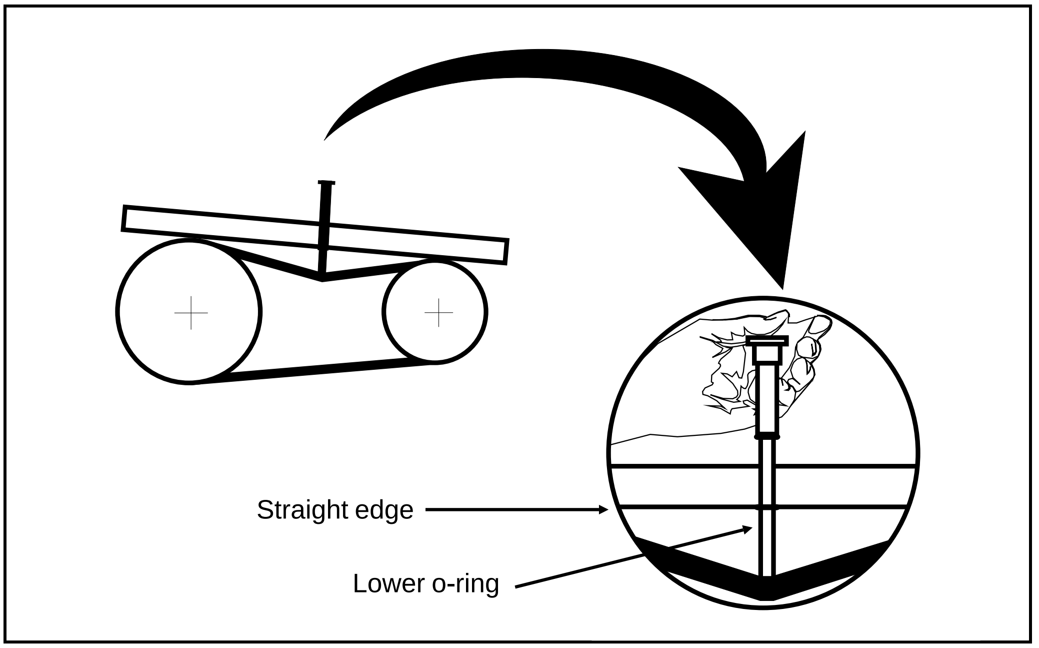


FIGURE 2 (MSSMA405AE)
Measuring Belt Tension

Tensioning Banded Belts

48032BHE, BTG, BTH — **48036QHE, QTG, QT**

	48032BHE, BTG, BTH					48036QHE, QTG, QT				
	Belt Deflect. (inches)	**Initial Tension (lbs.)**	**(ref.)**	**Initial Tension (lbs.)**	**(ref.)**	**Belt Deflect (in.)**	**Initial Tension (lbs.)**	**(ref.)**	**Initial Tension (lbs.)**	**(ref.)**
WASH/ 2 SPEED WASH	9/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/16	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	5/32	5.7 - 7.6	JP3	4.4 - 5.9	JN	5/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
MAIN 50C	35/64	10.5 - 14.3	NP3	8.1 - 11.0	NN	17/32	10.5 - 14.3	NP3	8.1 - 11.0	NN
MAIN 60C	17/32					17/32				
LOW SPEED EXTRACT	13/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	3/16	9.62 - 13.0	MP3	7.4 - 10.0	MN

52038WE1, WTF, WTB, WTG, WTH — **60036 + 60044WE2 + WE3**

	52038WE1, WTF, WTB, WTG, WTH					60036 + 60044WE2 + WE3				
	Belt Deflect. (inches)	**Initial Tension (lbs.)**	**(ref.)**	**Initial Tension (lbs.)**	**(ref.)**	**Belt Deflect (in.)**	**Initial Tension (lbs.)**	**(ref.)**	**Initial Tension (lbs.)**	**(ref.)**
WASH/ 2 SPEED WASH	25/64	10.5 - 14.3	NP3	8.1 - 11.0	NN	3/16	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	5/32	10.5 - 14.3	NP3	8.1 - 11.0	NN	13/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
E1	1/4	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E2	1/2	6.6 - 9.2	KP3	5.1 - 7.1	KN	11/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
MAIN 50C	11/16	18.2 - 26.0	SP3	14.0 - 20.0	SN	43/64	16.9 - 20.8	RP3	13.0 - 16.0	RN
MAIN 60C	23/32	16.9 - 20.8	RP3	13.0 -16.0	RN	45/64				

48032BHE, BTG, BTH — 48036QHE, QTG, QT

	Belt Deflect. (inches)	Initial Tension (lbs.)	(ref.)	Initial Tension (lbs.)	(ref.)	Belt Deflect (in.)	Initial Tension (lbs.)	(ref.)	Initial Tension (lbs.)	(ref.)
WASH/ 2 SPEED WASH	1/4	5.7 - 7.6	JP3	4.4 - 5.9	JN	17/64	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	3/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	33/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E-1	9/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E-2	39/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/8	6.6 - 9.2	KP3	5.1 - 7.1	KN
UPPER JACK TO LOWER JACK LOWER JACK TO UPPER JACK	BANDED BELTS NEED SPECIAL INSTRUCTIONS					BANDED BELTS NEED SPECIAL INSTRUCTIONS				

52038WE1, WTF, WTB, WTG, WTH — 60036 + 60044WE2 + WE3

		Belt Deflect. (inches)	Initial Tension (lbs.)	(ref.)	Initial Tension (lbs.)	(ref.)	Belt Deflect (in.)	Initial Tension (lbs.)	(ref.)	Initial Tension (lbs.)	(ref.)
WASH/ 2 SPEED WASH		15/64	5.7 - 7.6	JP3	4.4 - 5.9	JN	15/64	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN		13/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	25/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E1		17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E2		5/16	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/16	6.6 - 9.2	KP3	5.1 - 7.1	KN
MAIN	50C	45/64	16.9 - 20.8	RP3	13.0 -16.0	RN	3/4	16.9 - 20.8	RP3	13.0 - 16.0	RN
	60C	11/16	16.9 - 20.8	RP3	13.0 -16.0	RN	23/32	16.9 - 20.8	RP3	13.0 - 16.0	RN

Section 4

Bearing Assemblies

MAIN BEARING AND SEAL REPLACEMENT FOR DIVIDED CYLINDER MACHINES

This section applies to the front and rear cylinder shaft bearings of all divided cylinder machines (Rapid Load, Staph-guard®, dye machines, etc.). It does not apply to jackshaft bearings, idler shaft bearings or bearings on open pocket machines.

The bearings covered by this section are double row, spherical roller, self aligning bearings; Koya, SKF, FMC, Torrington or equal. Referring to FIGURE 1, the rear (clean side on Staph-guard® models) bearing is firmly held in the bearing housing (bearing and seal carrier) by the shaft seal holder, preventing axial movement. The front (soil side on Staph-guard® models) bearing is free to move axially in the bearing housing to accommodate thermal expansion of the shaft during operation and is thus the "floating" bearing. Both bearings are held in place on the tapered portion of the shaft by a bearing lockwasher and locknut.

The front and rear bearings are each protected from contamination from wash water by three spring loaded, lip type seals and a shaft seal leak-off cavity (that carries off any water that leaks past the main water seals) as shown in FIGURE 1.

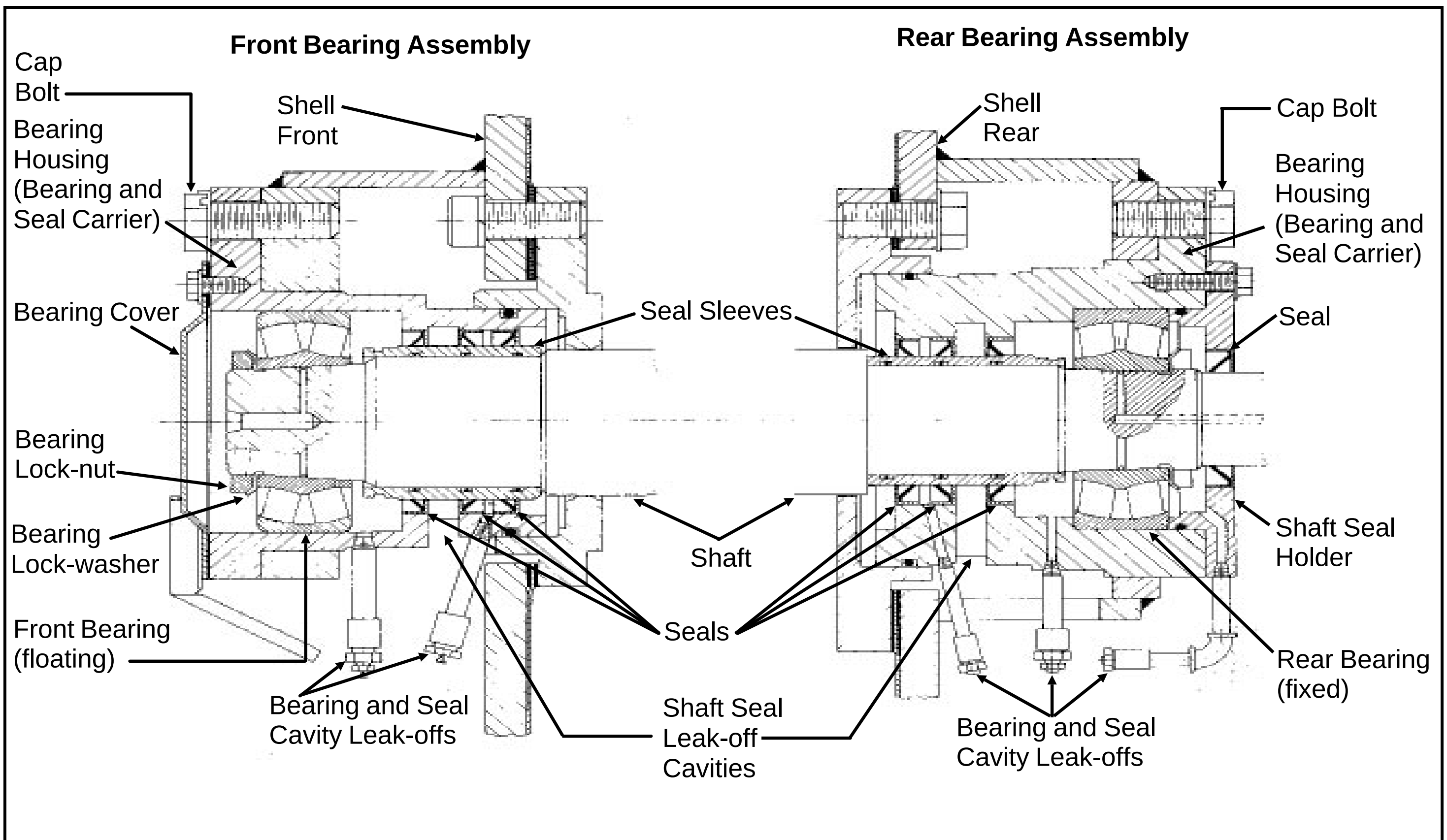


Figure 1 (MSSM0303AE)
Cross Section View of Front and Rear Bearing Assemblies
(Bearing Assembly for 60" and 72" WED Shown. Others similar.)

Access to the bearings and seals for lubrication is provided by the various grease passages. Excess lubricant is excreted through the bearing and seal cavity leak-offs as shown on FIGURE 1. The bearings and seals must be lubricated regularly and the leak-off cavities flushed out periodically through the plugged cleanout connections, in strict accordance with the preventive maintenance procedures elsewhere.

If bearing replacement becomes necessary due to wear, it is essential that the bearings *and seals* are replaced. Seal replacement requires removal of the bearing housing and seal sleeve. (In rare instances where the seals are known to be in good condition, it is not necessary to remove the bearing housing, seals or seal sleeve when a bearing is replaced.) **A pulling fixture is required to remove the bearing housing. A set of guide rods, a seal sleeve setting fixture and a bearing setting fixture are required for reinstallation of the housing.** These tools are available for rental or purchase from the Milnor® factory and are pictured elsewhere in this section. Contact the factory two weeks in advance of repairs, when ordering these tools.

This maintenance is performed in the following order:

1. Remove old bearing(s). When removing both bearings, remove the front (soil side) bearing first.

2. Remove bearing housings, seal sleeves, and seals.

3. If both bearings were removed, install the bearing housing, seal sleeve, seals, and new bearing on the rear (clean side).

4. Install the bearing housing, seal sleeve, seals, and new bearing on the front (soil side).

5. Tighten bearing(s).

See the Main Bearing Assembly drawing for your machine for bearing component part numbers.

Removing the Bearing (Front or Rear)

1. Loosen, then remove the main drive belts and cylinder shaft pulley (if applicable) by lowering the drive base with the jacking bolts. Do not attempt to pry belts off with a pry bar or by rolling the sheave. Remove the bearing cover (or shaft seal holder) to expose the bearing.

2. Bend back the locking tang on the bearing lockwasher then remove the locknut and lockwasher.

3. The center tapped hole in the shaft end is an oil passage through which oil may be forced between the tapered shaft and the bearing inner race. Install a pipe fitting into this tapped hole as shown in figure to the right. Using a “Porto-Power” or similar hand operated hydraulic pump, force fluid into the passage. Pump hard to build up fluid pressure. This pressure will cause the inner race to expand slightly; just enough to free the tapered surfaces and allow the bearing to slip off easily. If the bearing is not readily removed, remove the front water level

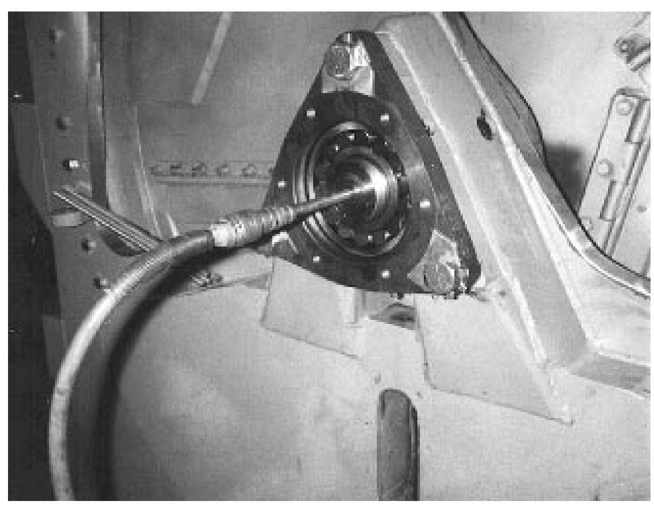


FIGURE 2 (MSSM0303AE)
Connection From Hydraulic Pump to Assist in Bearing Removal

inspection plate and use a timber to pry up the cylinder to remove cylinder weight from the bearings. Once the bearing is removed, the cylinder drops only approximately 1/32" before the shaft comes to rest on the shaft support.

4. Slide the bearing off of the shaft and if it is to be reused, place it on a clean surface and cover with a clean, lint free cloth.

Removing the Bearing Housing (Bearing and Seal Carrier), Seal Sleeve, and Seals (Front or Rear)

These procedures require the use of a pulling fixture and guide rods available from the Milnor® factory. With the bearing cover (or shaft seal holder) and the bearing removed, proceed as follows:

1. Remove the three bearing housing cap bolts and the grease lines from the bearing housing front plate. Install guide rods in two of the bolt holes, as shown in FIGURE 3.
2. Install the pulling fixture as shown in FIGURE 4, by placing each of the four threaded rods through a hole in the steel plate with hexnuts to the outside of the plate then screwing each rod into the appropriate tapped hole in the bearing housing (same holes as used to mount the bearing cover or shaft seal holder).

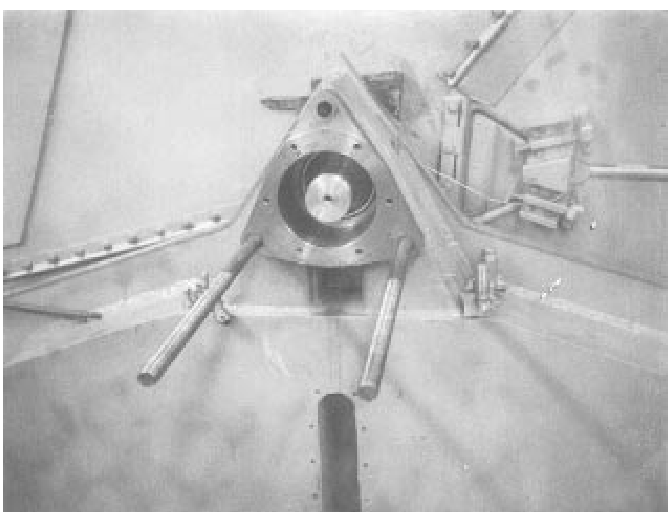


FIGURE 3 (MSSM0303AE)
Two Bearing Housing Guide Rods in Position

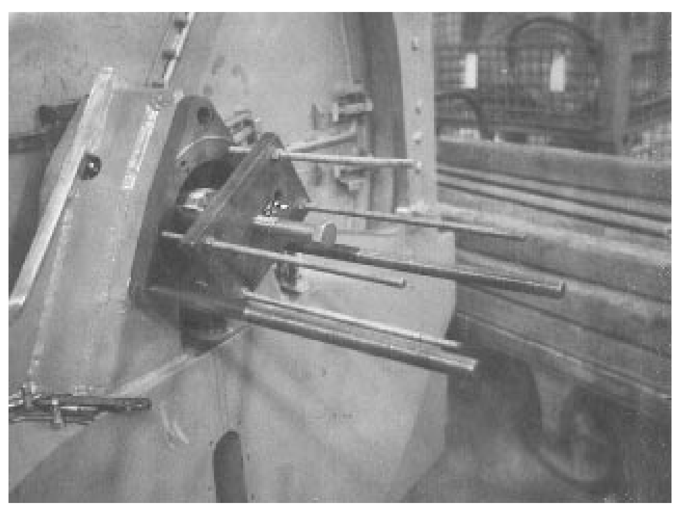


FIGURE 4 (MSSM0303AE)
Bearing Housing Pulling Fixture in Position

NOTE: Step 2a or 2b below will cause the bearing housing to slide away from the shell. Shims were placed under one or more of the three bearing housing pads during factory assembly to align the housing and insure its being exactly parallel with the shaft. **When removing the bearing housing, be sure to keep these shims separate and identified so that they may be returned to their proper location, otherwise the bearing and seal will be out of line and may be damaged after a short operating period.** As a precaution in case the shims are lost during disassembly, you will find stamped next to the bearing housing the proper thickness of shims required (if any) under each adjacent bearing housing pad. The stamped number indicates the shim thickness in thousandths of an inch. For example, the number “38” indicates that 38/1000 (.038") shims would be required under this pad.

2a. Tighten all four hexnuts on the threaded rods such that the pulling fixture plate is pressed against the shaft end. With an impact wrench, tighten down on the center bolt until the housing slides out, or

2b. If no impact wrench is available, simply continue to tighten down on each of the four hexnuts behind the pulling fixture plate, alternately and progressively, until the housing slides out. It may be necessary to place a spacer (approx. two inches long) between the plate and the shaft to provide enough clearance between the plate and the bearing housing.

3. Once the bearing housing is free of the shell, carefully slide it off of the guide rods and place on a clean work surface.

4. The seal sleeve will almost always remain on the shaft when the housing is removed. Remove the seal sleeve *taking care not to damage or scar it* and place it on a clean work surface.

Precautions for Bearing Replacement

The most important ingredient in successful bearing and seal installation is *cleanliness.* The bearing housing must be free of all foreign matter. The grease and leak-off passages must be blown clear and all *foreign* matter removed. You must have a clean work area. Keep your hands and tools free from grit and grime. Wash your hands before starting and as required during these procedures. Foreign matter is, without doubt, the most frequent cause of bearing failure, and one over which the manufacturer has no control.

Where cleaning is required, bearings, bearing housings and seal sleeves may be cleaned with the following solvents or cleaning agents (in strict accordance with the manufacturer’s recommendations as such substances are generally toxic and/or explosive under certain conditions):

Benzene	Gasoline	Naptha
Chlorethane	Kerosene	Tricholorethylene
Freons	Mineral Spirts	

Do not, however, expose any components to the above substances for more than 24 hours and only use at room temperature. Never use the following solvents or cleaning agents: alcohols, cresols, phenols, flouro propanols, or other similar chemicals or mixtures.

NOTE: Hammer blows, overheating, or improper use of force can damage precision parts.

Replacing the Bearing Housing, Seal Sleeve, and Seals (Front or Rear)

1. With the seal sleeve removed, press all old seals out of the bearing housing. Remove the large o-ring from the outside of the housing. Thoroughly clean the bearing housing and flush out all grease passages to make certain they are unblocked. Remove the o-rings from the inside of the seal sleeve and clean the seal sleeve.

2. While the bearing housing is dissassembled, charge all grease passages with grease. This will assure that there are no blockages.

3. Replace the o-rings in the seal sleeve and the large o-ring on the outside of the bearing housing. Replace with new o-rings if the old ones are worn.

4. Press new seals into the bearing housing. You may gently work the seals in with a mallet and metal drift as shown in FIGURE 5.

⚠ CAUTION ⚠

Each seal must be of the proper material and face the proper direction. The type of material and direction the seal faces may differ from one seal to another within the same bearing housing and also from one type of machine to another. It is essential to consult the Main Bearing Assembly drawing for your machine for the proper part number and direction to face each seal.

5. Slip the seal sleeve into the bearing housing as shown in FIGURE 6 below right, using care not to damage or fold under any of the seal lips. Be sure to insert the sleeve in the proper direction (see Bearing Assembly drawing).

FIGURE 5 (MSSM0303AE)
Installing Seals in Bearing Housing

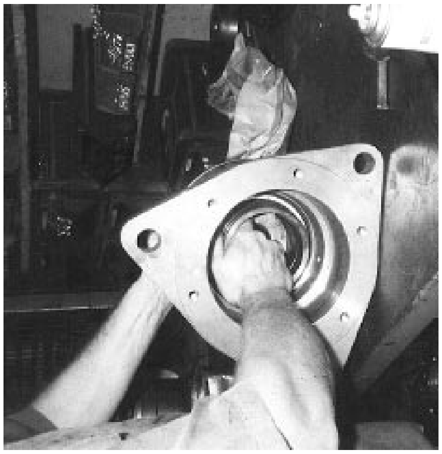


FIGURE 6 (MSSM0303AE)
Installing Seal Sleeve in Bearing Housing

NOTE: If both housings are being installed, install the rear housing first.

6. With two of the three temporary guide rods in position on the shell, place the bearing housing onto the guide rods and install the seal sleeve setting fixture on to the bearing housing as shown in FIGURE 7. The seal sleeve setting fixture prevents the seal sleeve from being pushed out of the housing as the housing is inserted into the shell. Note that the seal sleeve setting fixture and the bearing setting fixture are very similar, but the seal sleeve setting fixture has a longer hub.

7. With a clean, lint free cloth, apply a coating of light machine oil to the outside of the housing, to assist in installation. Push the housing into the shell as shown in FIGURE 8. Once the housing is far enough into the shell to support itself, place any shims back into position between the housing and the shell. Remove, then replace guide rods if required to place shims under bearing housing pads.

FIGURE 7 (MSSM0303AE)
Installing the Bearing Housing Setting Fixture onto Housing (42" machine shown)

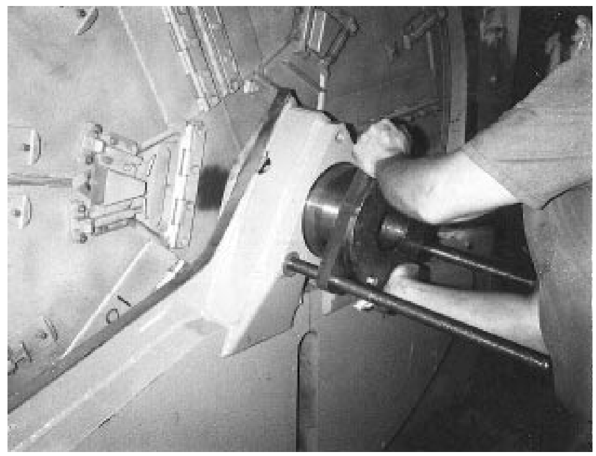


FIGURE 8 (MSSM0303AE)
Pushing the Bearing Housing into the Shell (60" Rapid-load machine shown)

8. Install the third guide rod, spacers if required, and hex-nuts, using these to seat the housing fully, as shown in FIGURE 9. Remove the seal sleeve setting fixture.

9. Remove the guide rods and install the bearing housing cap bolts. See “BOLT TORQUE REQUIREMENTS” elsewhere, for proper torques.

10. With the grease gun, pump grease into the inner portion of the bearing cavity, such that when the bearing is installed, the space between the bearing and the seals will be approximately 1/3 full of grease.

11 Proceed to “Measuring Unmounted Clearance . . .” below, even if both the front and rear bearings are being replaced. Once the rear bearing is installed, the bearing housing replacement procedures may then be repeated for the front (soil side) bearing housing.

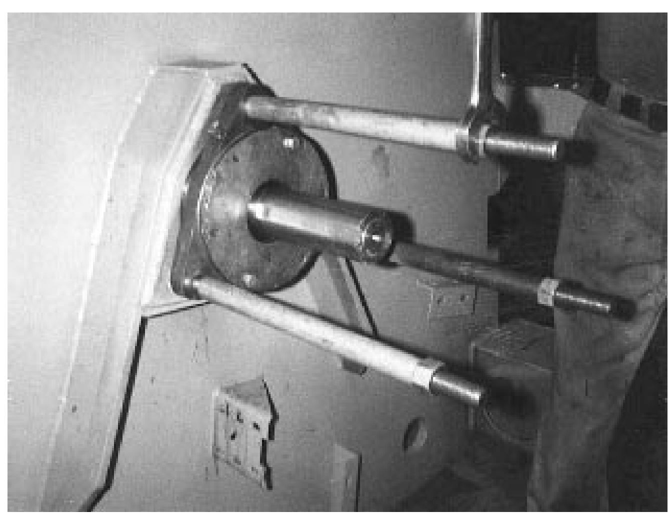


FIGURE 9 (MSSM0303AE)
Tightening the Bearing Housing into the Shell (42" machine shown)

Measuring Unmounted Clearance and Setting Bearing (Front or Rear)

The bearings used on Milnor® washer and dye extractors are the very best anti-friction devices available for these applications. However, the anti-frictional characteristics of the bearings will be reduced if they are not properly installed. It is of critical importance when installing these tapered roller bearings, to accomplish the following (A step by step procedure follows this synopsis):

1. Accurately measure the unmounted internal clearance of the bearing (gap between the rollers and outer race before the bearing is installed). This is an essential quality control measure.

2. Calculate the final internal clearance by subtracting the specified clearance reduction (amount that the internal clearance must be reduced when the bearing is tightened onto the tapered shaft) from the unmounted clearance.

3. Tighten the bearing onto the shaft until the final internal clearance as calculated is achieved and verified by measurement.

These measurements are taken in thousandths of an inch. Although this requires precise work, attention to detail and a good set of feeler gauges, it is the only way to insure that the bearing will be tightened onto the shaft to precisely the right tension. If you have any questions on performing the measurements or adjustments described below, your local bearing supplier or the Milnor® factory can assist you. Although these procedures require precision over and above that normally required for laundry room maintenance, they are standard in bearing installation and absolutely essential:

NOTE: Step 1 which follows, requires a good set of feeler gauges including .001" through .010" in thousandths of an inch increments. Contact your local bearing supplier.

1. When you are ready to proceed (and not before) remove the new bearing from it's box or protective wrapping. Do not attempt to clean the bearing or wash out the preservative coating. On a clean work surface, stand the bearing on edge and insert a .003 feeler gauge into the bearing as shown in FIGURE 10, at right. The gauge should be inserted just inside the outer race between two rollers and worked through to the opposite row of rollers. Rotate the inner race of the opposite row so that the end of the feeler gauge is caught between a roller and the outer race.

FIGURE 10 (MSSM0303AE)
Measuring Bearing Unmounted Clearance (bridge for 42" machine shown)

2. Try to pull the gauge straight out. If it comes out, increase the size of the gauge by .001". If it does not come out, decrease the gauge by .001". The thickest feeler gauge that will come out is the unmounted internal clearance of the bearing.

3. Compare the measured clearance with the "Unmounted Clearance" in the table below. If the measured clearance is not within the range shown, do not use the bearing. Contact your bearing supplier for an exchange.

NOTE 1: The clearances listed in the chart are industry standards and therefore apply to all brands of bearings supplied by Milnor®. If other sources of bearings are used, refer to the manufacturer's instructions for proper clearances.
NOTE 2: To locate your bearing on the chart, match the first five characters of the manufacturer's part number *(not the Milnor® part number)* with those in the chart. For example, for a manufacturer's part number 22217LBK, find under "Manufacturer Part Number" the line "22217 . . ."

Table of Bearing Clearances

Manufacturer Part Number	**Unmounted Clearance**		**Clearance Reduction**	
	Minimum	**Maximum**	**Minimum**	**Maximum**
22330 . . .	.0071	.0091	.002	.003
22213 . . .	.0030	.0039	.001	.002
22216 . . .	.0028	.0037	.001	.002
22217 . . .	.0044	.0057	.0015	.0025
22312 . . .	.0030	.0039	.001	.002
22316 . . .	.0037	.0049	.001	.002
22320 . . .	.0044	.0057	.0015	.0025
22328 . . .	.0063	.0081	.002	.003
23220 . . .	.0044	.0057	.0015	.0025

4. Calculate and record the final internal clearance by deducting the "Clearance Reduction" for your bearing (see above chart) from the measured clearance. For example, if you measured .004 and the clearance reduction is .001 to .002, then the final internal clearance should be between .002 and .003.

5. Hand pack the bearing with grease by rotating the inner race and rollers, forcing grease between all rollers.

   NOTE: The bearing will be set into position in Step 6. If both front and rear bearings are being installed, the rear (clean side on Staph-guard® models) bearing should be set in position first because it is the fixed bearing.

6. Set the bearing into the housing (with the taper facing the proper direction) and seat the bearing using the bearing setting fixture. This fixture is installed in similar fashion to the seal sleeve setting fixture. If you have just set the rear bearing and the front bearing housing is yet to be installed, leave the bearing setting fixture in place for now.

7. If you have just set the rear bearing and the front bearing housing is yet to be installed, repeat all steps in bearing housing installation, measuring unmounted clearance and setting bearing, for the front bearing and housing. The bearing setting fixture should not be removed from the rear housing until it is needed to seat the front bearing. This will prevent rear bearing components from being pushed out of position by the shaft as the front housing components are seated. Remove the bearing setting fixture from the front housing once the bearing is seated.

Tightening Bearing(s) (Front and/or Rear)

1. Once both bearings are seated, or if only one bearing was replaced, install the bearing lockwasher(s) and locknut(s). Use a hammer and a metal drift as shown in FIGURE 11, to tighten the locknut. **It is imperative to only tap lightly and to assure that metal chips from the drift or locknut do not fall off and contaminate the bearing.** If both bearings are being tightened, work between the front and rear bearings and turn the basket by hand periodically, while tightening the locknut(s).
2. After tightening the bearing(s) onto the tapered shaft, check the internal clearance as pictured in FIGURE 12, by working a feeler gauge between the outer race and a roller of the outer row then between the outer race and a roller of the inner row.

   NOTE: Sometimes, when setting the bearings, all the load is taken by only one row of rollers (although the load would quickly equalize on both rows after the machine has run for only a few minutes). If all the load is taken by one row, you will get an erroneous clearance reading. It is therefore, necessary to use the feeler gauge to measure the *clearance of both rows of rollers.* With the bearing in place on the machine it is admittedly rather difficult to get a feeler gauge back past the first row of rollers to measure the second *but it must be done.*

3. If one row of rollers is tight but the other has measurable clearance, tap lightly on the end of the shaft nearest the tight row of rollers to cause the shaft to shift axially and equalize the roller loading. Adjust the bearing tightness to achieve the internal clearance previously calculated.
4. When the proper internal clearance has been attained, lock the nut by bending over the matching tang on the lockwasher, making sure that all unused tangs are bent as near the nut as possible so that they will not rub against the bearing roller cage.

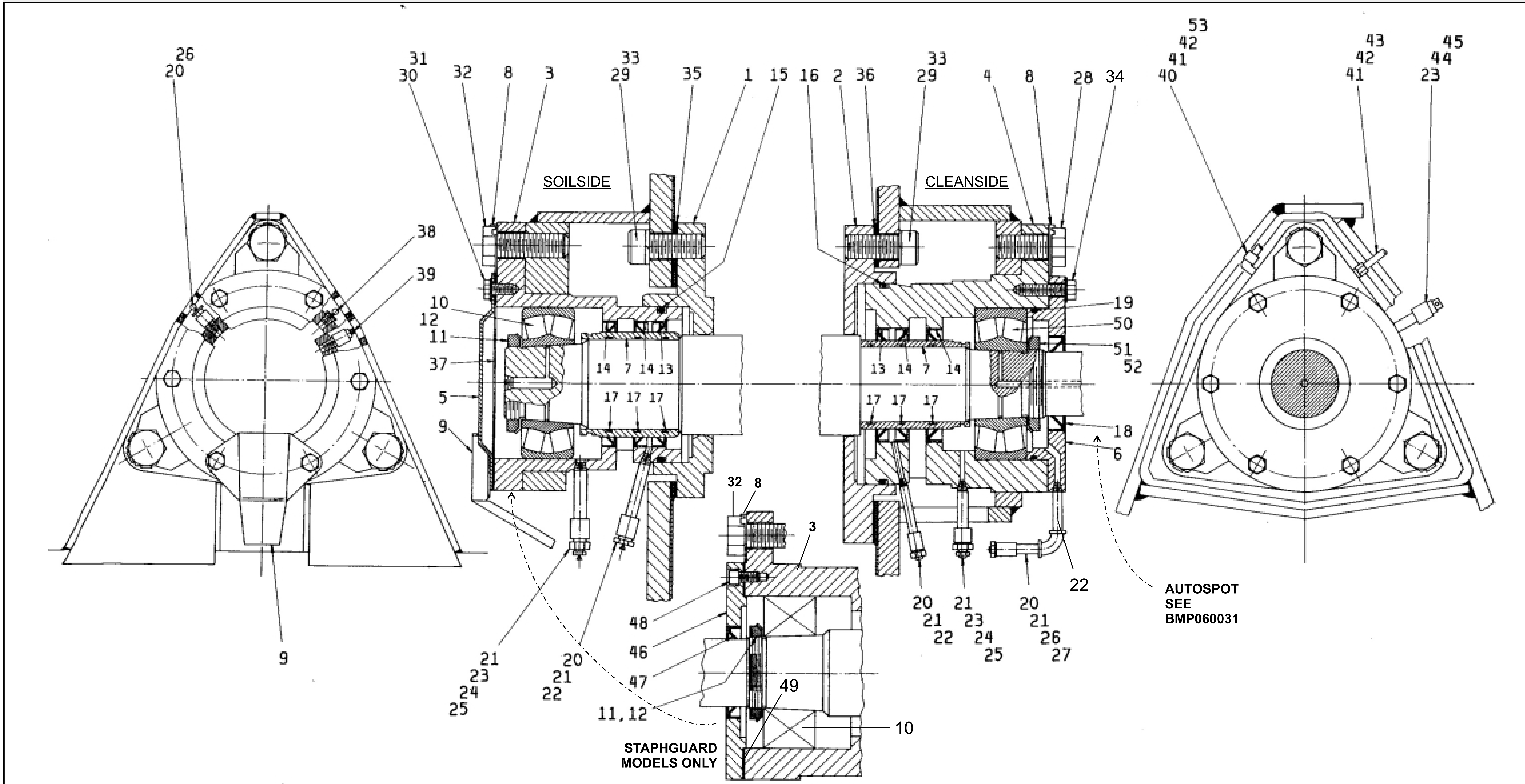
Check each unused tab individually to insure this.

FIGURE 11 (MSSM0303AE)
Tightening the Bearing Locknut (42" machine shown)

FIGURE 12 (MSSM0303AE)
Measuring the Mounted Internal Clearance of the Bearing (42" machine shown)

5. With the grease gun, fill the space between the bearing and the front of the housing 1/3 full of grease.

6. Install the bearing cover plate or shaft seal holder, as appropriate. When installing the shaft seal holder, take care not to damage the seal as it is gently pushed over the shaft. Cover the keyway on the end of the shaft with tape to prevent the sharp corners of the keyway from cutting the seal lip. Also, make sure that the seal lip does not turn over as it passes over rough areas.



SOILSIDE
CLEANSIDE
STAPHGUARD MODELS ONLY
AUTOSPOT SEE BMP060031

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Parts List—Main Shaft Bearing Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			COMPONENTS	
all	1	X2 175008	SUPPORT=FRNTSHFT=60": C2-18843	60036, 60044WP2
All	1	X2 175009	SHAFT SUPPORT= 60"WE: C2-18592	60036,60044WP3,DA3 SP2/SP3
all	1	X3 06047	SUPPORT=FRNTSHFT=72": C2-18843	72044WP2/WP3
all	1	X3 06047S	SHAFTSURPORT-FRONT 4.81"D SS	72044DA3
all	1	X3 06003	SHAFT SUPPORT= 72"WE: C2-18592	72044SP2/SP3
all	2	X2 175009	SHAFT SUPPORT= 60"WE: C2-18592	60036,44WP2/WP3,DA3, SP2/SP3
all	2	X3 06003	SHAFT SUPPORT= 72"WE: C2-18592	72044WP2/WP3,SP2/SP3
all	2	X3 06003S	SHAFT SUPPORT-REAR 4.81"D S/S	72044DA3
all	3	X3 06005	HOUSING=FRNT BRG+SIL:C2-18842	60036,60044WP2 72044WP2,WP3
all	3	X2 175005	BRGHOUSE=FRNT=SG: C2-18590	60036,60044WP3,SP2/SP3, DA3; 72044SP2/SP3
all	3	X3 06005S	FRNT BRG HSG W/ S/S CAP 60WEU	72044DA3
all	4	X2 175007	BRGHOUSE=REAR=WEH:C2-18590	60036,44WP2/WP3,DA3 SP2,SP3: 72044SP2,SP3
all	4	X3 06369	HOUSING=REAR=BRG :C2-18590	72044WP2/WP3
all	4	X3 06369S	HOUSING REAR BRG S/S CAP	72044DA3
all	5	02 18618A	COVER=BEARING 60 WED	WP2 ONLY
all	6	X2 18190	HOLDER=SHAFT SEAL	60036,60044WP2/WP3,DA3
all	6	X2 175052	HOLDER=SEAL=60SG CS W/AUTOSP	60036,60044SP2/SP3
all	6	X3 06370	HOLDER=REAR SEAL	72044WP2/WP3,DA3
all	6	X2 175053	HOLDER=SEAL=60SG SS W/AUTOSP	72044SP2/SP3
all	6	X2 175054	SEAL HOLDER=AUTOSPOT SGL MTR	6044SP2 SM W/AUTOSPOT
all	7	X3 06006	SLEEVE=SEAL 2/60WEHU	60036,44WP2/WP3,DA3 SP2/SP3
all	7	X3 06165	SLEEVE=SHAFT SEAL=2/72WEDU	72044WP2,WP3,DA3,SP2/3
all	8	02 18219	LOCKWASH=MAIN BEARHOUSE ZINC	
all	9	02 18928	DRIPSHIELD=60" WE + ZINC	ALL EXCEPT SP2/SP3
all	10	56S22316T	SPHEROLBRG KOYO#22316RKW33C3FY	
all	11	56AHN16	AN16 BEARING LOCKNUT	
all	12	56AHW16	W16 BEARING LOCKWASHER	
all	13	24S114	SEAL 4.5X5.5X.50 JM# 9170 LUP	
all	14	24S114	SEAL 4.5X5.5X.50 JM# 9170 LUP	

Parts List, cont.—Main Shaft Bearing Assembly

Used In	Item	Part Number	Description	Comments
all	15	60C161	ORING 6"IDX1/4CS BUNA-70 #437	60036,60044WE2, 7244WP2WP3,DA3
all	15	60C172	ORING 8"IDX1/4CS BUNA70 #445	60036,44WE3,DA3 SP2/SP3
all	15	60C172	ORING 8"IDX1/4CS BUNA70 #445	72044SP2/SP3
all	16	60C172	ORING 8"IDX1/4CS BUNA70 #445	
all	17	60C154	ORING 3+7/8ID3/16CS BUNA70#344	60036,44WP2,WP3,DA3 SP2,SP3
all	18	24S111	SEAL 3X4.00X.437#21158-2175	60036,44WP2/WP3,DA3, SP2/SP3
all	18	24S111	SEAL 3X4.00X.437#21158-2175	72044SP2/SP3
all	18	24S112	SEAL 3.75X4.75X.500 CS/BUNA	72044WP2,WP3,DA3
all	19	60C160J	ORING 6+1/4ID1/8CS BUNA70 #259	
all	20	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	21	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	22	5N0C03AG42	NPT NIP 1/8X3 TBE GALSTL SK40	
all	23	5SCC0EBE	NPT COUP 1/4 BRASS 125# W/HEX	
all	24	5N0E02KG42	NPT NIP 1/4X2.5 TBEGALSTL SK40	
all	25	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	26	5N0CCLSB42	NPT NIP 1/8XCLS TBE BRASS STD	
all	27	5SL0CBEA	NPTELB 90DEG 1/8 BRASS 125#	ALL EXCEPT SP2/SP3
all	27	5SL0ENFK	NPTELB 45DEG 1/4 GALMAL 150#	SP2/SP3 ONLY
all	28	15B243	HEXCAPSCR 1-8X2+1/2 GR5 ZINC	
all	29	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	30	15K145	HXCAPSCR 1/2-13UNC2AX3/4 GR5 P	WP2/3 ONLY
all	31	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	WP2/3 ONLY
all	32	15B236	HEXCAPSCR 1-8UNC2AX3 SAEGR5 ZN	60036,44WP2, 7244WP2/WP3,DA3
all	32	15B243	HEXCAPSCR 1-8X2+1/2 GR5 ZINC	60036,44WE3,DA3, SP2/SP3
all	32	15B243	HEXCAPSCR 1-8X2+1/2 GR5 ZINC	72044SP2,SP3
all	33	15K236	SOKCAPSCR 1-8X2.75 BLK	
all	34	15K162	HXCAPSCR 1/2-13UNC2AX1.5 GR5 P	60036,44WP2/WP3,DA3 72044WP2/WP3,SP2/SP3 DA3

Parts List, cont.—Main Shaft Bearing Assembly

Used In	Item	Part Number	Description	Comments
All	34	15K147C	SKCPSC 1/2-13X1 BLK	60036,44SP2/SP3
all	35	02 18768D	GASKET=SHAFT SUPT DA3	
all	35	02 18870	GASKET=SHAFTSUPPORT 2/60WEDU	60036,44WP2 ONLY
all	36	02 18768D	GASKET=SHAFT SUPT DA3	
all	37	02 18105	BEARING CAP GASKET	ALL EXCEPT SP2/S3
all	38	54M015	GREASEFIT 60X36/60X44 1610BL	
all	39	5SP0CFESSV	NPTPLUG1/8SQSLDBLKSTL LVENT125	
all	40	53A039B	BODY=EL90MALE5/16X1/8 #B69A-5A	
all	41	53A508	SLEEVE DELRIN 5/16"OD#60PT-5	
all	42	53A509	TUBE INSERT 5/16"OD X .53"LG.	
all	43	53A019B	BODYMALECON5/16X1/8COM#B68A-5A	
all	44	5N0E01KBE2	NPT NIP 1/4X1.5TBE BRASS STD.	
all	45	51P008B	PLUG SQSLD 1/4"BLK LVENT STEEL	
all	46	X2 175053	HOLDER=SEAL=60SG SS W/AUTOSP	60036,44SP2/SP3 ONLY
all	46	X2 175052	HOLDER=SEAL=60SG CS W/AUTOSP	72044SP2/SP3 ONLY
all	47	24S111	SEAL 3X4.00X.437#21158-2175	SP2/SP3 MACHINES ONLY
all	48	15K147C	SKCPSC 1/2-13X1 BLK	60036,44SP2/SP3 ONLY
all	48	15K162	HXCAPSCR 1/2-13UNC2AX1.5 GR5 P	72044SP2/SP3 ONLY
all	49	02 18105	BEARING CAP GASKET	SP2/SP3 MACHINES ONLY
all	50	56S22316T	SPHEROLBRG KOYO#22316RKW33C3FY	ALL EXCEPT 72044WP2/WP3
all	50	56S23220T	SPHEROLBRG NTN#23220BL1KD1C3	72044WP2/WP3 ONLY
all	51	56AHN16	AN16 BEARING LOCKNUT	ALL EXCEPT 72044WP2/WP3
all	51	56AHN20	AN20 BEARING LOCKNUT	72044WP2/WP3 ONLY
all	52	56AHW16	W16 BEARING LOCKWASHER	ALL EXCEPT 72044WP2/WP3
all	52	56AHW20	W20 BEARING LOCKWASHER	72044WP2/WP3 ONLY
all	53	53A060A	NUT BRASS 5/16 COMP#61A-5	

Section 5

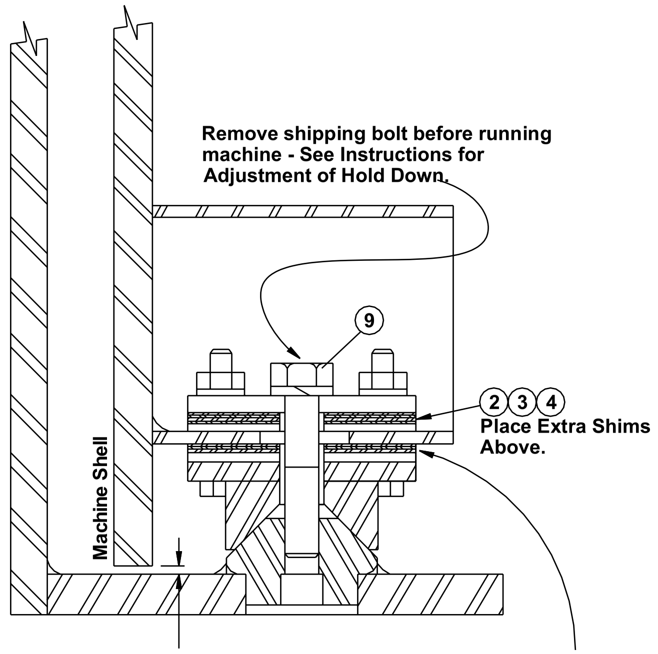
Frame, Pivots and Suspension

Hold Down Adjustments

6036WP2/3, 6044WP2/3 , 7244WP2/3, 6036SP2/3, 6044SP2/3 , 7244SP2/3, 6044SP2/3 SM

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



NOTE: Be sure shell does not bottom on base pad - there must be clearance at this point. Check each corner.

NOTE: Place shims here to adjust ring weldment so that all four corners seat simultaneously.

FIGURE 1:
Cross Section - Machine Locked Down for Shipment

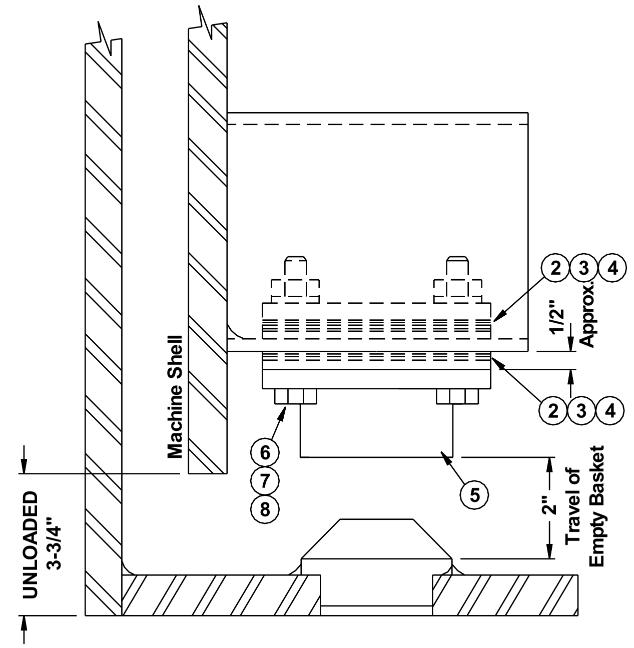
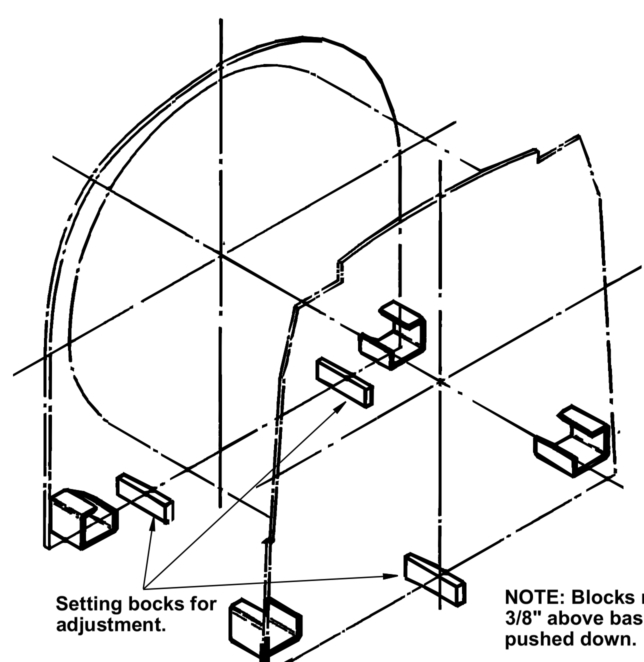


FIGURE 2:
Adjustment Complete, Machine Up

For Instruction:
<u>Push-Down Travel Dimensions and Adjustment Procedures</u>,
See MSSM0302AE.



NOTE: Blocks must hold shell approximately 3/8" above base pads when machine is pushed down.

Parts List—Hold Down Adjustments

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
	2	03 06216A	SHIM=HOLDOWN 1/4"THICK	
	3	03 06216B	SHIM=HOLDOWN 10GA THICK	
	4	03 06216C	SHIM=HOLDOWN 16GA THICK	
	5	W3 06406	*RING=HOLD DOWN CENT-STAMPED	
	6	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
	7	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
	8	15D125	HXTAPSCR 5/8-11X4-FLTHRD GR5	
	9	15K300	HXCAPSCR 1-8UNC2A X4.5 SAE GR5	

SUSPENSION ADJUSTMENTS FOR DIVIDED CYLINDER MACHINES

The suspension system on Milnor® Hydro-cushion® machines is adjusted and thoroughly tested at the factory. It should not require subsequent adjustment unless the machine is distorted during shipment or installation or unless some component of the system, such as a Hydro-cushion® cylinder is replaced.

There are two primary objectives when adjusting the suspension system on any Hydro-cushion® machine model:

1. To position the shell in the proper location within the frame (hanging dimensions) to maximize freedom of movement of the shell and to insure proper draining, and

2. To adjust the length of up and down travel at each of the push-down locations (push down travel) so that the shell will not be distorted (racked) when pushed down.

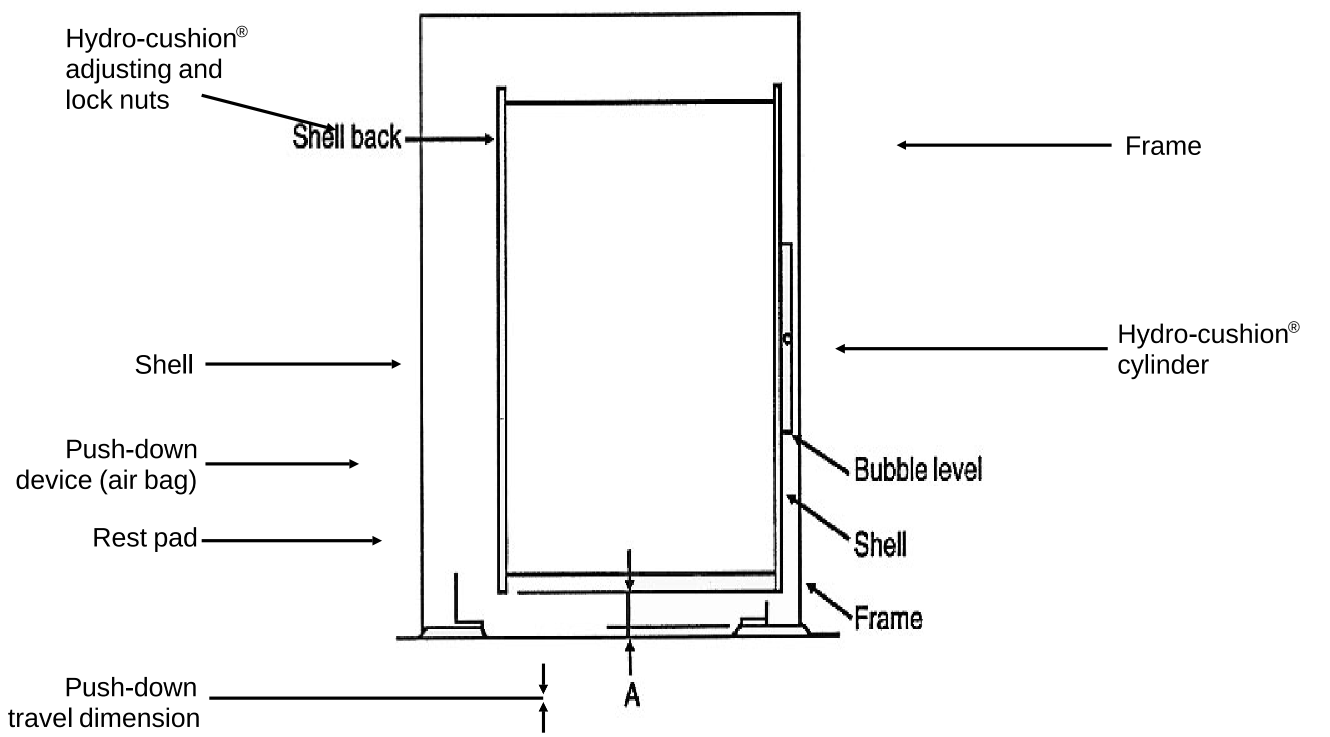


FIGURE 1 (MSSM0302AE)

Hydro-cushion® Suspension System Components (does not depict a specific machine)

All Milnor® Hydro-cushion® machines contain the following suspension system components (as shown on the typical system on the previous page):

1. Hydro-cushion® cylinder—which suspend the shell and cylinder within the frame and provide vibration damping during extraction.
2. Pneumatic push down devices (air bags)—which when inflated, force the shell downward where it is held against rigid pads during loading, unloading, washing, and draining.
3. Metal or rubber pads—some rigidly fixed to the shell and some rigidly fixed to the frame, which come in contact when the shell is pushed down.

The actual configuration of these components varies from model to model.

How Shell Adjustments are Made

Regardless of machine model, repositioning of the shell is always accomplished by adjusting the nuts at the top of the upper Hydro-cushion® shafts. To move the shell up or down at the location of any Hydro-cushion®, see FIGURE 2 and proceed as follows:

⚠ CAUTION ⚠

These procedures should be accomplished with power to the machine locked *off*.

1. Straighten the tongues on the keyed lock washer using pliers, screw driver, etc.
2. Loosen the lock nut (upper hex nut) and move it all the way up to the top of the shaft, but do not remove it.
3. Use the adjusting nut (lower hex nut) to “crank” the shaft up or down as required.
4. Once final adjustment is made, while holding the adjusting nut to prevent it from turning, retighten the lock nut against the adjusting nut (with the lock washer between).
5. Rebend the tongues on the lockwasher as before, to prevent movement of the nuts.

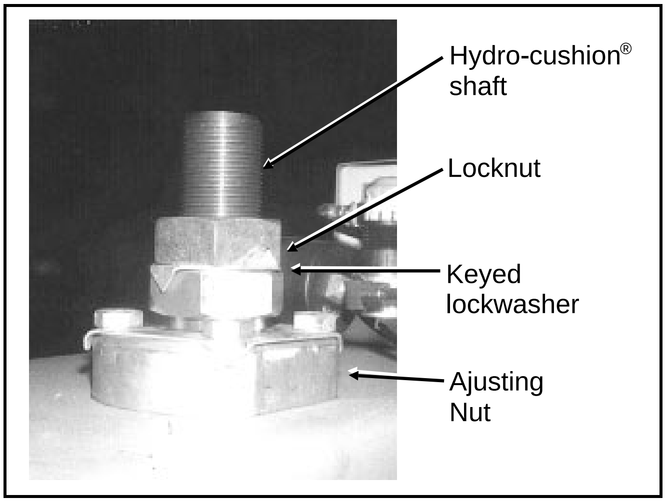


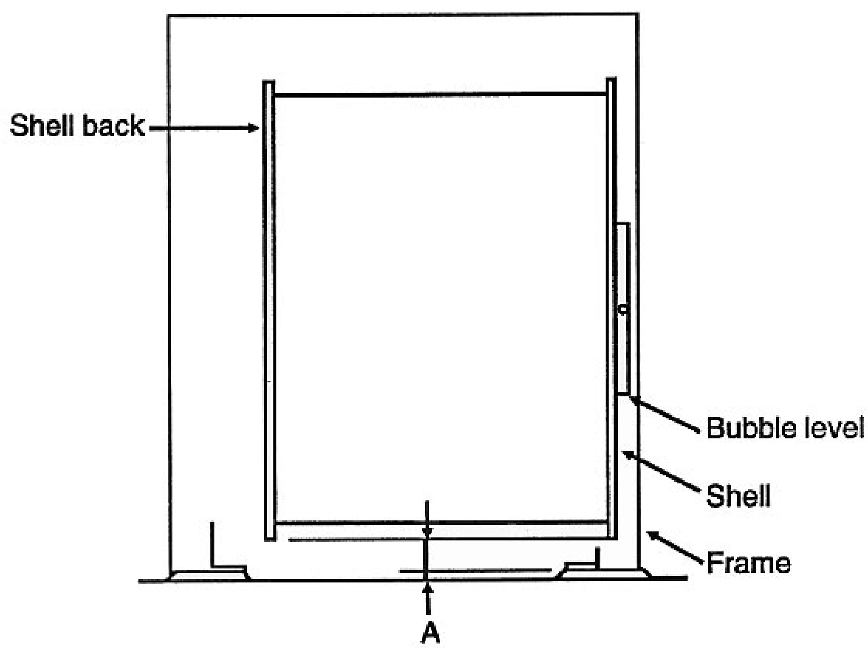
FIGURE 2 (MSSM0302AE)
Hydro-cushion® Upper Shaft and Adjusting Nuts

Shell Hanging Dimensions and Adjustment Procedures

To adjust the shell of a divided cylinder machine, proceed as follows:

1. Locate the shell hanging dimension for your machine in the table below and adjust your machine accordingly. Take measurements on the left and right sides of the shell, to assure that the shell is horizontal, left to right.
2. The shell and cylinder should be level front to back. Check this with a bubble level, as shown in FIGURE 3.
3. If further adjustment is required in order to level the cylinder, make small adjustments at all four corners. For example, if the cylinder slopes down to the front, try raising the two front corners by 1/16" (2mm) and lowering the two rear corners by 1/16" (2mm). Always split the difference.

   NOTE: Only slight deviations from the dimensions shown should be used to level the shell. If large deviations are required, this may indicate that the frame is out of level. If so, this condition must be corrected before attempting to level the shell.



MACHINE MODEL	DIMENSION A
42031WE	4 1/8" (105)
42031SG	4 1/8" (105)
44044WE	4 1/8" (105)
42044SG	4 1/8" (105)
60031WE	3 5/8" (92)
60031SG	3 5/8" (92)
60044WE	3 5/8" (92)
60044SG	3 5/8" (92)
72044SG	3 3/4" (95)
72044WE	3 3/4" (95)

FIGURE 3 (MSSM0302AE)
Shell Hanging Dimensions for Divided Cylinder Machines
(Left side view of 60044WE shown)

Push-Down Travel Dimensions and Adjustment Procedures

⚠ CAUTION ⚠

Some of the following procedures require power to the machine. Take the necessary precautions to assure that no one operates the machine controls while personnel are adjusting the push-down components.

42" Divided Cylinder Machines

The push-down stops on these machines consist of brackets attached to the shell and rubber rest pads, mounted atop the base pads (see figures below) which make contact when the shell pushes down. The rubber rest pads sit in metal pans and are raised or lowered by adding metal shims to or removing the shims from inside the pans. Extra shims and adhesive for securing the shims were supplied with your machine.

There is no specific push-down travel dimension for these machines; however, length of travel must be adjusted as follows:

1. With the *Master switch* set to *off,* and the shell hanging free, measure the gap between each bracket and base pad.

2. Add or remove shims from the appropriate pads as required to make all four gaps equal and to insure that no rest pad protrudes completely from its metal pan.

Test for equal length of travel at all four locations as follows:

3. With four sheet metal shims of *equal* thickness, set one shim *on top of* each rubber rest pad, such that at least a one inch length of the shim overhangs the outside edge of the pad.

4. Set the *Master switch* to *manual,* causing the shell to push-down.

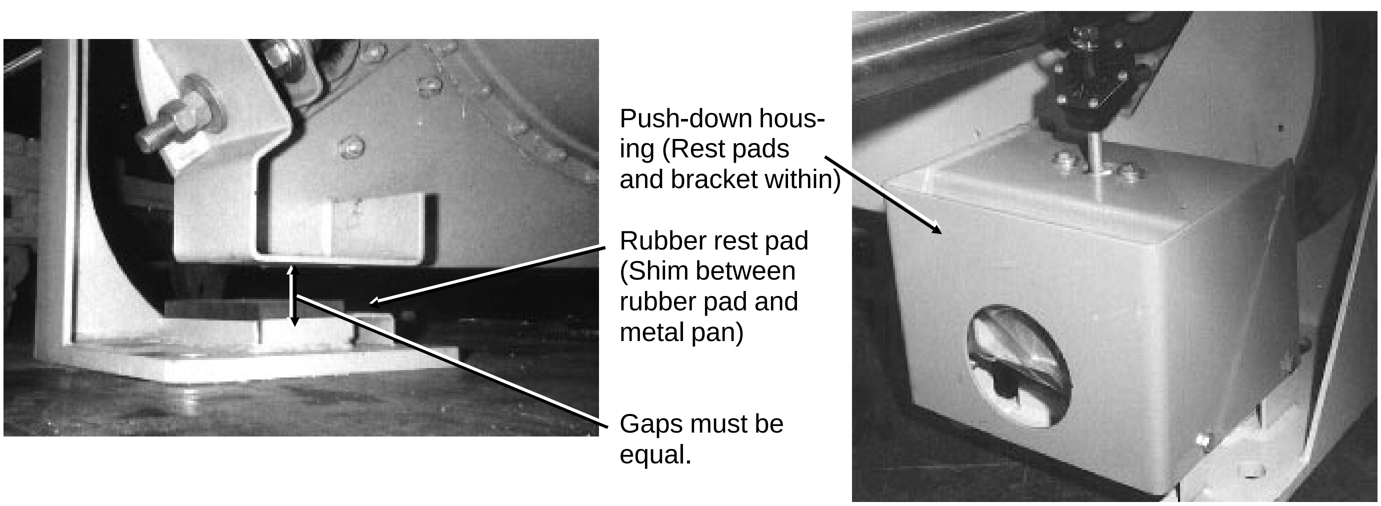


FIGURE 4 (MSSM0302AE)
Push-down Travel Adjustment: 42" Div-cyls (42" Staph-guard® shown)

5. With the shell pushed down, attempt to pull each test shim out from between the bracket and rubber pad. The test shims should all be tight. If any shim(s) are not pinched tightly between the bracket and pad, take note of which one(s) are not.

Make final adjustments as follows:

6. Set the *Master switch* to *off*, remove the test shims and make the necessary changes to the shims below the rubber pads as indicated by the above test.

7. Repeat Steps 3 through 6 as required, until this test is successful.

8. Once the adjustments are completed, secure all shims and rubber rest pads with the adhesive provided.

60" Divided Cylinder Machines

These machines have push-down stops on the four corners of the frame which appear as shown in FIGURES 5 and 6. When pushed down, the ring weldments (which move with the shell) must seat firmly onto the plugs which are mounted atop the base pads. The push-down travel dimension must assure that 1) the ring weldments and plugs are far enough apart when the shell is not pushed down, so as not to interfere with the free movement of the shell, and 2) that all four stops are in solid contact when the shell is pushed down. To accomplish this, proceed as follows:

1. With the *Master switch* set to *off* and the shell hanging free, remove the bolts securing the ring weldments to the mounting brackets. Set each ring weldment on top of its respective plug, removing any shims which may have been used and placing them next to the ring weldment.

2. Measure the gap between the top of the ring weldment and the bottom of the mounting bracket, at each location.

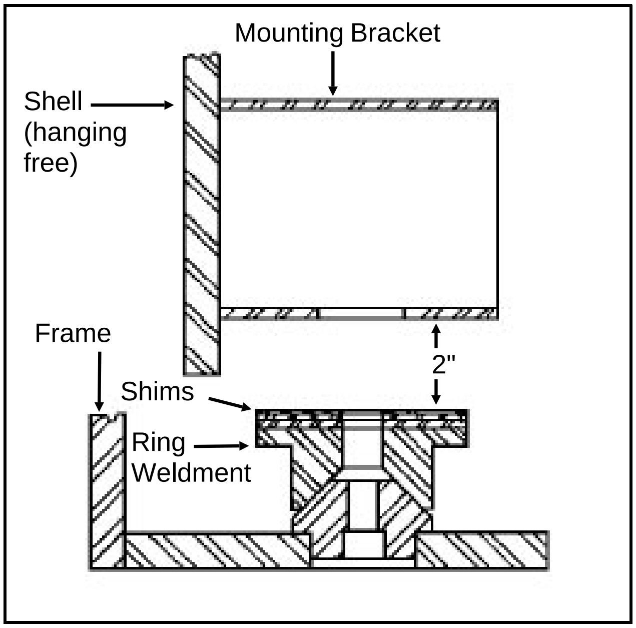


FIGURE 5 (MSSM0302AE)
Shimming Ring Weldments

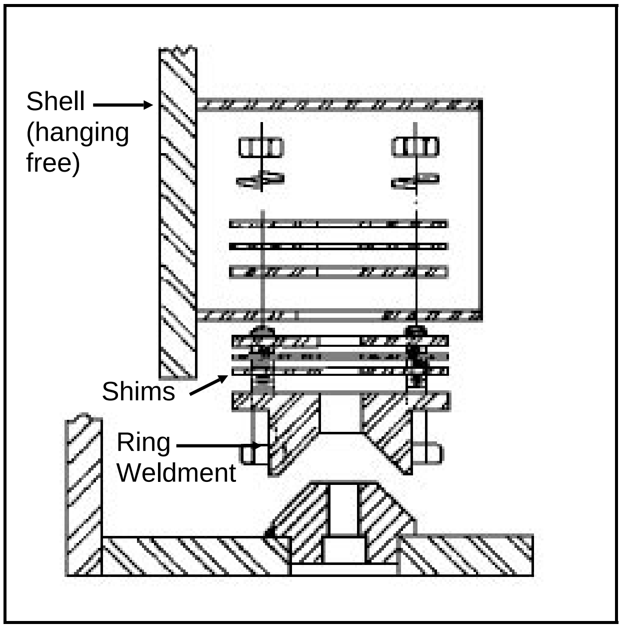


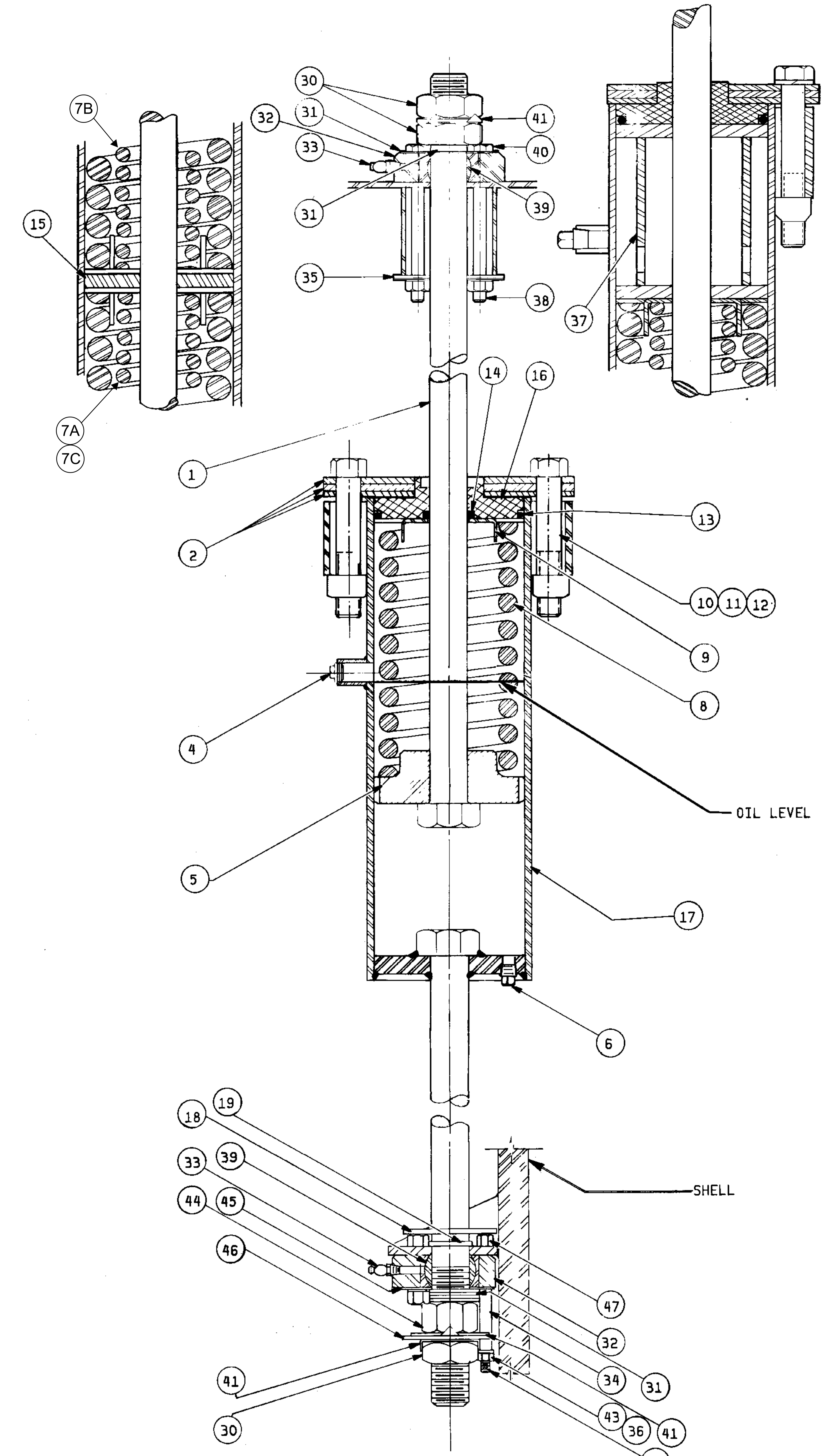
FIGURE 6 (MSSM0302AE)
Reconnecting Ring Weldments

3. Stack shims on top of the ring weldment as required to make each gap *exactly 2 inches* as shown in FIGURE 5. If the gap at any location is less than 2 inches without shims, the shell must then be raised in the frame, using the procedures previously described.

4. Once the proper arrangement of shims is made, remount the ring weldment and shims to the mounting bracket (see FIGURE 6). Any extra shims may be stacked on the top side of the mounting bracket plate to which the ring weldment is attached.

Suspension Cylinder Assemblies
42031,42044,52038,60044,72044

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Parts List—Suspension Cylinder Assemblies

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	B	SA 16 039	*HYDROCUSHION CYL ASSY-"B"	CYLINDER ASSY B
	C	SA 16 038	*HYDROCUSHION CYL ASSY-"C"	CYLINDER ASSY C
	D	SA 28 091	*HYDROCUSHION CYL ASSY-"D"	CYLINDER ASSY D
	F	SA 36 021	*HYDROCUSHION CYL ASSY-"F"	CYLINDER ASSY F
	G	SA 36 023	*HYDROCUSHION CYL ASSY-"G"	CYLINDER ASSY G
	H	SA 36 047	*HYDROCUSHION CYL ASSY-"H"	CYLINDER ASSY H
	K	SA 29 031K	*HYDROCUSHION CYL ASSY-"K" (Note: To identify which cylinder is supplied with your machine, see BMP701235 which should be located in the manual next to this document. Once you know which cylinder assembly you have, "B-K" listed above, Identify your parts by referencing the "Used In" coding.)	CYLINDER ASSY K
			COMPONENTS	
ABCDK	1	02 18244	BOLT=HYDCYL 27+7/8LG+KEYWAY	
K	1	02 18244A	BOLY=HYDCYL 28+7/8LG+KEYWAY	
FGH	1	03 06201	BOLT=HYDCYL 41+7/8LG+KEYWAY	
all	2	02 18840A	UPCAP=HYDROCYL 42+52+60	
all	4	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
BC	5	X2 15356	PISTON=HYDROCYL 6"- 6 NOTCH	
DFGHK	5	X2 18228	PISTON=HYDROCYL 6"- 3 NOTCH	
all	6	5SP0GHFHKM	NPT PLUG 3/8"-HEXCSMAGNETIC ZN	
FG	7A	03 06139	SPRING=INNER HYDRO CYL 331LB/IN	FULL SPRING (PURPLE)
G	7B	03 06139A	SPRING=INNER HYDRO CYL	PLUS ½ SPRING "G" ONLY (PURPLE)
H	7C	03 06338	SPRING INNER-GOLD 14"LONG	GOLD
B	8	02 16068	MAIN SPRING 212LB/IN RED	RED
C	8	02 16125	MAIN SPRING 300LB/IN BLACK	BLACK
D	8	02 19039	MAIN SPRING 480LB/IN GREEN	GREEN
FG	8	03 06138	SPRING=OUT HYDROCYL 667LB/IN	ORANGE
G	8	03 06138A	SPRING=OUT HYDRO CYL	ORANGE
H	8	03 06337	SPRING-OUTER-GOLD 14.5"LONG	GOLD
K	8	03 09016	MAIN SPRING 1035LB/IN BLUE	BLUE
ABCDFGK	9	02 18619	BUSHING RETAINER + CAD	
H	9	03 06358	BUSHING RETAINER.CAD	
all	10	15B237	HXCAPSCR 1-8UNC2AX5.5 SAEGR5 Z	

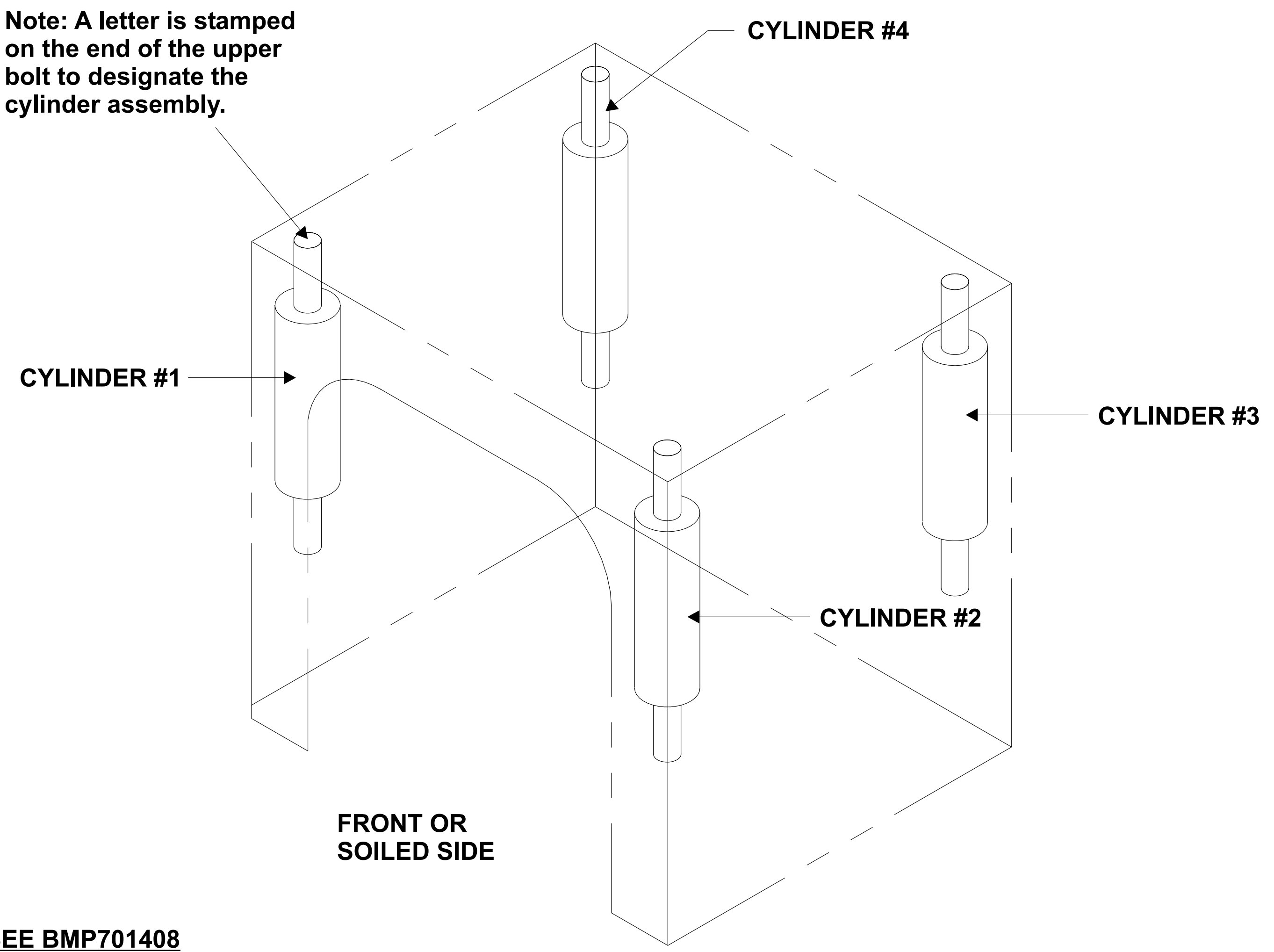
Used In	Item	Part Number	Description	Comments
all	11	15G255A	SQNUT 1-8UNC2B SAE ZINC GR2	
all	12	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	13	60C159A	0RING 5.475ID 1/4CS BN70 #433	
all	14	24S040	SEAL URETHNE 1-7/16 2.25 13/32	
GH	15	M2 18690	LOWER CAP=HYDROCYL	
all	16	02 18839A	MACHBUSH HYDRCYL CAP #433-OR	
BC	17	SA 15 084	*HYDCUSH CYL WLDMT (18"X/12")	
DI	17	SA 28 090	*HYDCUSH CYL WLDMT (18"/23")	
FGH	17	W3 06203	*HYDCUSH CYL WLDMT (35"/12")	
K	17	W2 18233	*HYDCUSH CYL WLDMT (20"X22")	
all	18	02 175034	SHIELD-BALLBUSH-4/HYDRO MACH	
BDFGH	19	02 02230	6 WATER BARRIER (NEOPRENE)	
all	30	15G268	HXFINJAMNUT 1+1/2-12UNF2B ZINC	
all	31	02 18571A	PISTON ROD WASHER-.25"TK	
all	32	X3 06252	RETAINER-BALBUSH=4/72WEDU	
all	33	54M025	HYDFIT 1/8"-90 ALEMITE 1613-B	
all	34	27B240	SPCRROLL.5ID.813L.062T STLZNC	
all	35	02 18534	HOLDPLATE= BALLBUSH ZNC/CAD	
all	36	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
F	37	Y3 06200	SPACER=HYDRO-CUSH CYL-MACH	
all	38	15K203	HXCAPSCR TFL 1/2-13X5 GR5 ZINC	
all	39	54A705	BALBUSH 1.5 SKF#GEZ108ESAVE467	
all	40	15N037	HXCAPSCR 1/2-13UNC2AX6.5 GR5 Z	
all	41	02 18256	LOKWASH-TONGUE 8/WEH ZINC	
all	42	15K202	HXCAPSCR 1/2-13UNC2AX5 GR5 ZIN	
all	43	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	44	15G231	HXFINJAMNUT 1/2-13UNC2B ZINC G	
all	45	02 18534	HOLDPLATE= BALLBUSH ZNC/CAD	
all	46A	02 18795A	WASH-TIMING=HYDRO CYL 45DEG	USE ONE
all	46B	02 18795B	WASH-TIMING=HYDRO CYL 75DEG	USE ONE
all	47	15K191	HXCAPSCR 1/2-13UNC2AX2.5 GR5 Z	
FGH	48	AVH52001	ASSY=OILFIL SPOUT 72HYD CYL	

Suspension Cylinder Locations
Use with BMP701408

BMP701235/2006304A
(Sheet 1 of 1)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



SEE BMP701408
FOR REPAIR PARTS:
HYDROCUSHION CYLINDER ASSEMBLY "*B*"
THROUGH HYDROCUSHION CYLINDER ASSEMBLY "*K*"

	MACHINE MODELS:								
POSITION:	42031 CP2,NP2 WP2,WP3	42031 SP2,SP3	42044 CP2,NP2 WP2,WP3 D7P	42044 SP2,SP3; SP2 SM	42044 WP2 SM, WP3 SM	52038 WTL,WTN WP1	60044 WP2,WP3, WP2 SM, WP3 SM, SP2,SP3, SP2 SM	72044 WP2,WP3 DA1	72044 SP2,SP3
CYLINDER #1	B	B	C	C	C	D	K	H	G
CYLINDER #2	B	C	B	C	C	D	K	H	G
CYLINDER #3	B	C	B	C	C	D	K	F	G
CYLINDER #4	B	C	C	C	C	D	K	F	G

Section 6

Control and Sensing Assemblies

VIBRATION SAFETY SWITCH ADJUSTMENTS

B What the Vibration Safety Switch Does

The *vibration safety switch* pictured below is an important safety feature. If properly adjusted, the switch will momentarily actuate as a result of repeated machine movement caused by an out-of-balance condition. Table A B below illustrates the effect of the *vibration safety switch* actuation.

Table A—Effect of Tripping Vibration Safety Switch

Machine Model	Function of Vibration Safety Switch
30015, 30020, and 30022	Disables high speed extract
All microprocessor-controlled washer-extractors not listed above, and all dye machines	De-energizes three-wire relay, effectively terminating machine operation

Adjustments

When the machine leaves Milnor®, the actuator arm is B tie-wrapped to prevent damage (except on 30015, 30020, and 30022 models). **This tie wrap must be removed after the machine is set into position but before the machine is operated.**

Adjustment of this switch from the factory setting is not recommended; however, it should be checked for proper functioning and adjusted if its proper setting is lost.

As shown at right in FIGURE 1, the unit consists of a *sensitive micro-switch* with an extended actuating arm supporting an eccentric weight. The weight may be adjusted by moving it up and down on the arm and by rotating it on the arm. In addition, the *micro-switch* itself may be tilted from side to side.

The sensitivity of the switch increases as the eccentricweight is raised on the actuating arm and decreases as the weight is lowered.

The unit should be adjusted so that the actuating arm will always reset by itself, this being accomplished by rotating either the switch or the weight to give just enough bias to cause the switch to reset. Check the adjustment by moving the arm to the left then slowly releasing it. Make sure the microswitch clicks when the arm is **slowly** released, thus indicating

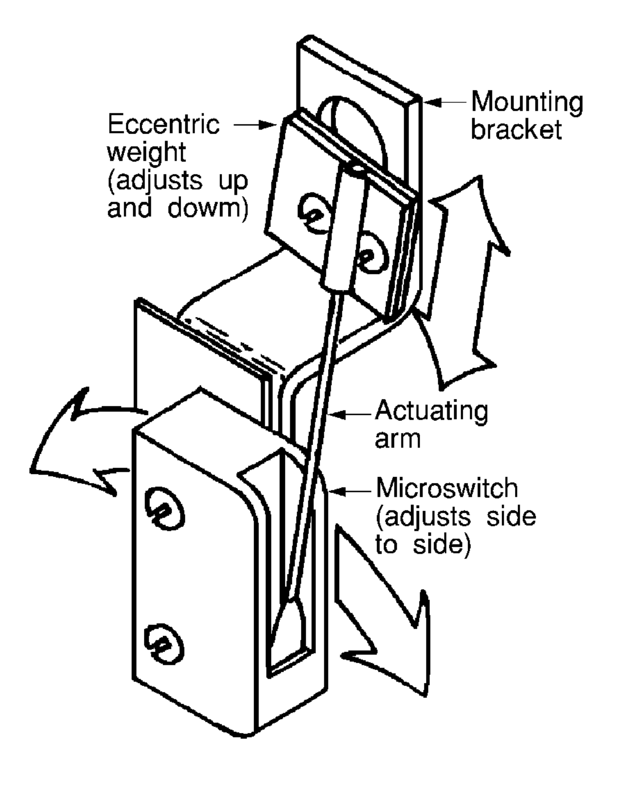


FIGURE 1 (MSSMA408BE)
Vibration Switch

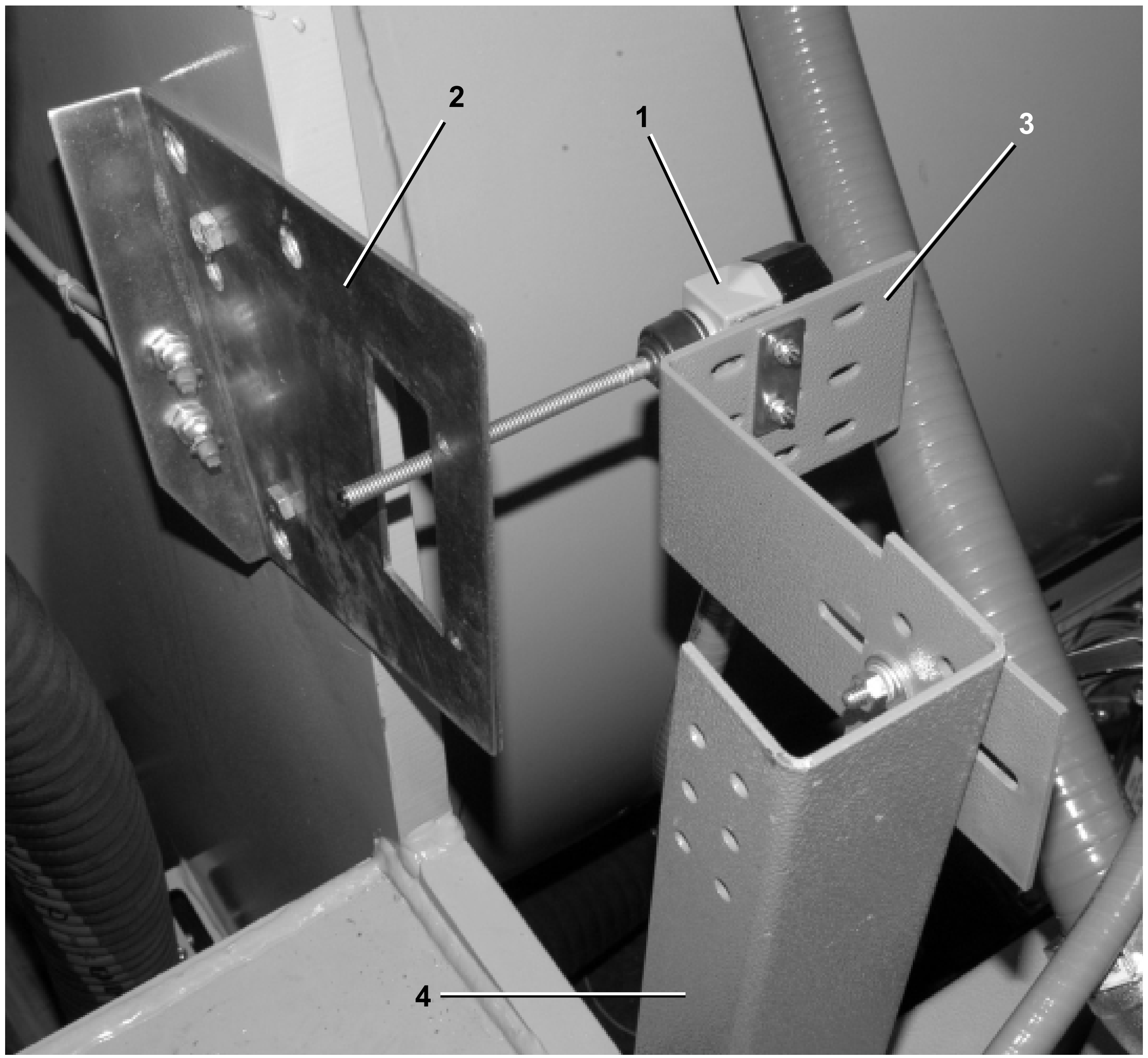
that it has reset. In the released position the arm should rest **lightly** but definitely against the stop on the *micro-switch* case that prevents any further arm movement to the left.

For machines with rigid mounted shells, where the machine is bolted to a very substantial foundation, very little machine movement will occur for a given degree of out-of-balance. Under such conditions it may be better to adjust the switch to be very sensitive. With less substantial foundations (e.g., ones where the sub-soil is mushy or springy or otherwise not as desirable), considerably greater machine movement will occur for a given degree of out-of-balance, in which case a less sensitive *vibration switch* setting may be indicated.

Excursion Switch
6044WP2 SM (Single Motor)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Parts List—Excursion Switch

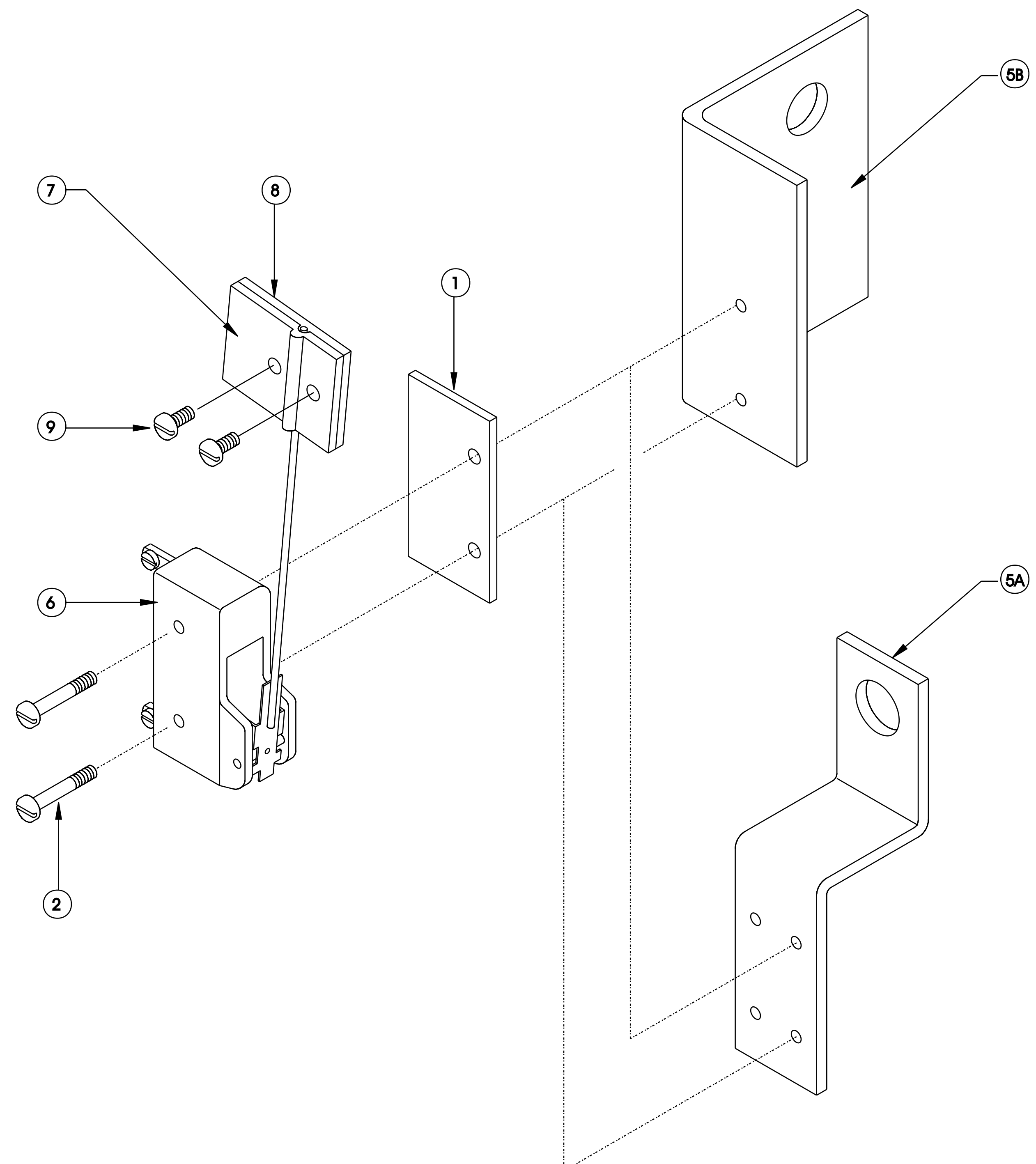
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
			none	
			COMPONENTS	
all	1	09R008ASTD	* 09R008A+MOUNTING HDWRE+INST	
all	2	02 18542A	ACTUATOR=EXCURSION SW SHELMT	
all	3	02 18784E	EXCURSION SW MOUNT BKT	
all	4	02 18784D	BRACKET=EXCURSION SW	

Vibration Safety Switch

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Parts List—Vibration Safety Switch

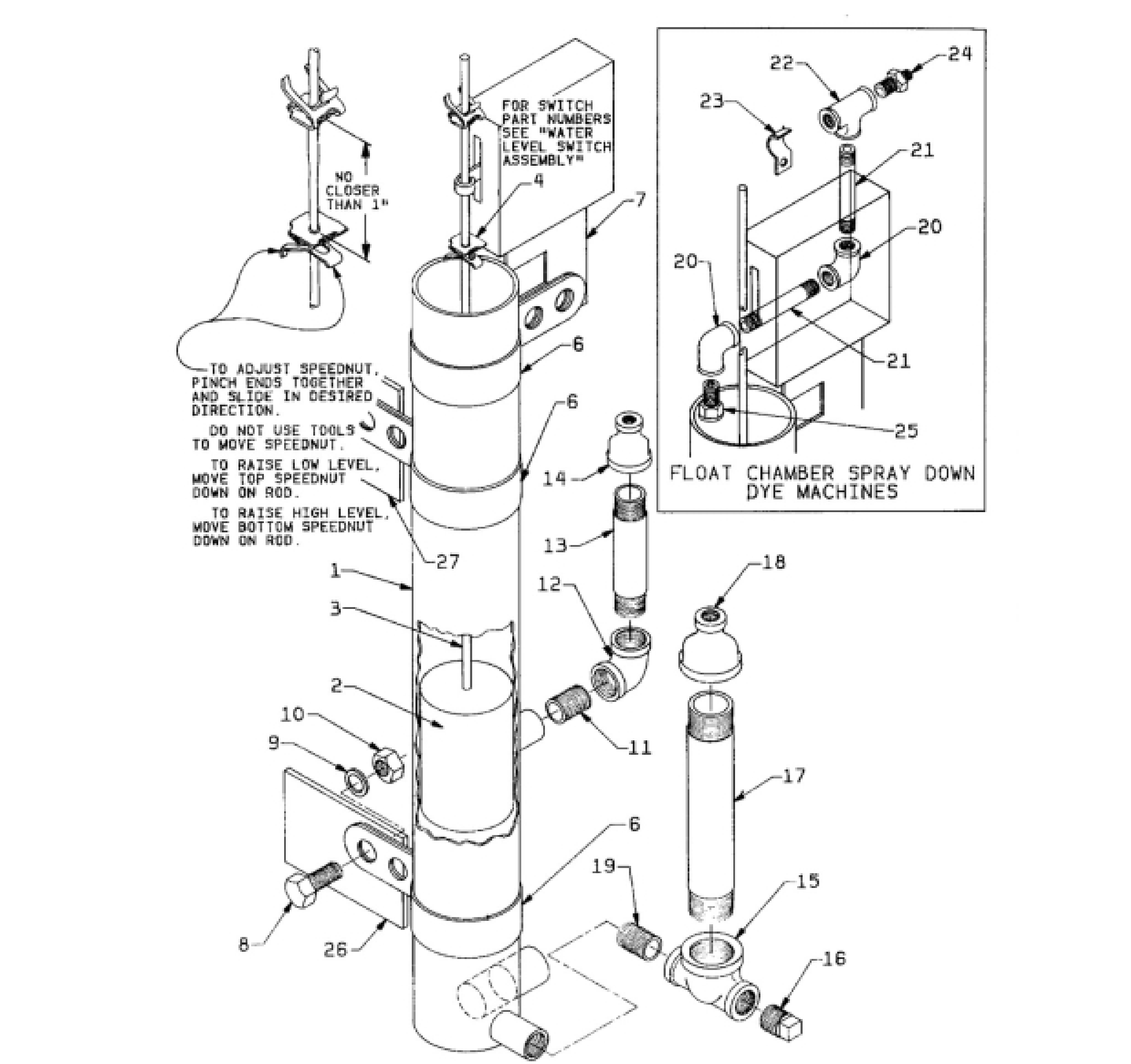
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	SAE03 151	* ASSY-VIBRATION SWT=LG CONTR	(ALL MODELS EXCEPT BWP,CPE) 3015/22 V/T/G/F 3022F,362F, 4232F 3022X,3626X,4226X,4232X 4244, 6044,7244WP/SP CONTAINS 001,002, 005A-009
	B	SAE03 151A	*ASSY-VIBRATION SWT=BALCOM	(MODELS 3621BWP,CPE ONLY) CONTAINS 001,002, 005B-009
			COMPONENTS	
all	1	02 02038	PLATE INSULATING SMALL9NOV51	
all	2	15P008	TRDCUT PANHD 6-32X1 NIKSTL +WA	
A	5	02 15119	BRACKET=VIBSW CAD	
B	5	02 10264	BRACKET=SAFESW CAD	
all	6	09R020	SWITCH NC VIBR#WZ-2RW84429-P52	
all	7	03 01059	VIBSWITCH CLAMP CADSTL	
all	8	03 01058	VIBSWITCH WEIGHT-CADSTL	
all	9	15P101	TRDCUT-F PANHD 8-32X3/8 NIKSTL	

Water Level Float Chamber

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Parts List—Water Level Float Chamber

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	A03 03100	FLOAT CHMBR ASSY=8.25"CLDCON	
	B	ALL11001	*FLOAT CHAMBER INSTAL=4226QHE	
	C	A14 07200C	$ ASSY=FLOAT SPRAY 42DAZ	DYE TANKS
	D	ALL48001	*FLOAT CHAMBER ASSY 4832-36	4832,4836
	E	AD 14 046	*FLOAT CHMBR INSTAL=35#+60#W	3621CPE,BWP
	F	AD 15 047	FLOAT CHMBR 25.25ASY=42+72WE	4231,4244
	G	ALL11000	*FLOAT CHMBR 33.25ASSY=4226Q	4226Q
	H	G28 18700A	FLOAT CHAMBER 25.25 INST=60"	6044
	I	G36 07500A	FLOAT CHAMBER 25.25 INST=72"	7244
	J	G25 02600A	FLOAT CHAMBER INSTAL=5238	5238
	K	GLL64002	FLOAT CHAMB=FRAME INSTL 64NP	6446
	L	ALL64002	FLT CHAMBR ASSY64NP W/90D 1N	6446
			COMPONENTS	
alL	1	W2 14432	* FLOAT-TUBE L=25.25"	
alL	1	X2 14432K	FLOAT CHAMBER 96"LG REUSE	FOR USE WITH REUSE SUMP
alL	1	W2 14432M	*FLOAT CHAMBER-33.25"W/90DIN	
AlL	2	X2 02239	FLOAT=PLAST LVL CONT(SANDED)	TO ORDER SEE ITEMS 30+31
alL	3	02 02146	LEVEL CONTROL FLOAT ROD=25"L	TO ORDER SEE ITEM 30
alL	3	02 02146E	LEVEL CONTROL FLOAT ROD=66"L	TO ORDER SEE ITEM 31
alL	3	02 02146B	COUPLING=FLOAT ROD	FOR USE WITH REUSE SUMP
alL	4	17N050	10-24 SPEDNUT #C10733-1024-373	TO ORDER SEE ITEMS 30+31
alL	6	02 15642A	CLAMP-3"FLOAT CHAMBERED	
alL	7	02 15097C	BRACKET LEVCONT PER PRINT	
alL	8	15K039	HXCAPSCR 1/4-20UNC2AX3/4 GR5 Z	
alL	9	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
alL	10	15G165	HXNUT 1/4-20UNC2BSAE ZC GR2	
alL	11	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
alL	12	5SL0KNFA	NPTELB 90DEG 1/2 GALMAL 150#	COOLDOWN OPT.
alL	13	5N0K04AG42	NPT NIP 1/2X4 TBE GALSTL SK40	COOLDOWN OPT
alL	14	5SR0K0CNF	NPT RED 1/2X1/8 GALMAL 150#	COOLDOWN OPT.
alL	15	5S0KNFA1A	NPT TEE 1/2X1/2X1" GALMAL 150#	4226,4832,4836,6442
alL	16	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	4226,4832,4836,6442

Parts List, cont.—Water Level Float Chamber

Used In	Item	Part Number	Description	Comments
alL	17	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	4226,4832,4836,6442
alL	18	5SR1A0ENF	NPT RED 1X1/4 GALMAL 150#	4226,4832,4836,6442
alL	19	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	4226,4832,4836,6442
alL	20	5SL0EBEA	NPTELB 90DEG 1/4 BRASS 125#	SPRAY-DOWN /DYE MACHINES
alL	21	5N0E03KBE2	NPT NIP 1/4X3.5 TBE BRASS STD	SPRAY-DOWN /DYE MACHINES
alL	22	51V015	TEE 1/4 FGDBRASS 101T7-444	SPRAY-DOWN /DYE MACHINES
alL	23	12P014KK	CABLE CLMP NONMTL 1/2IDX1/2WID	SPRAY-DOWN /DYE MACHINES
alL	24	53A008B	BODYMALECON.25X.25COMP#B68A-4B	SPRAY-DOWN /DYE MACHINES
alL	25	27A003	NOZZLE 1/4" BRASS SQUARE PATTE	SPRAY-DOWN /DYE MACHINES
alL	26	02 10506	BRACKET-BOTTOM FLOAT=CHAMBER	3016,3621
alL	26	02 15663	BRKT=FLOAT CHAMBER MTG	4231,4241,7244
alL	26	02 15649	BRKT=FLOAT CHAMBER MTG	6036,6044
alL	26	03 25298A	FLOAT CHAMBER BRACK	4832,4836,6442
AlL	27	02 10505	BRACKET=TOP FLOATCHMBR+$8 SU	3016,3621
alL	27	02 15649	BRKT=FLOAT CHAMBER MTG	4231,4241,6036, 6044,7244
alL	27	08 01065	BRACKET=LEVEL CNTRL MT 90DEG	4226DYA
alL	27	03 25298A	FLOAT CHAMBER BRACK	4832,4836,6442
alL	30	SA 02 011	*FLOAT ASSY L=25"-STD LEVEL	ITEMS 002,003A,004
alL	31	SA 02 011B	*FLOAT ASSY L=66" 42DA+52DYA	ITEMS 002,003B,004

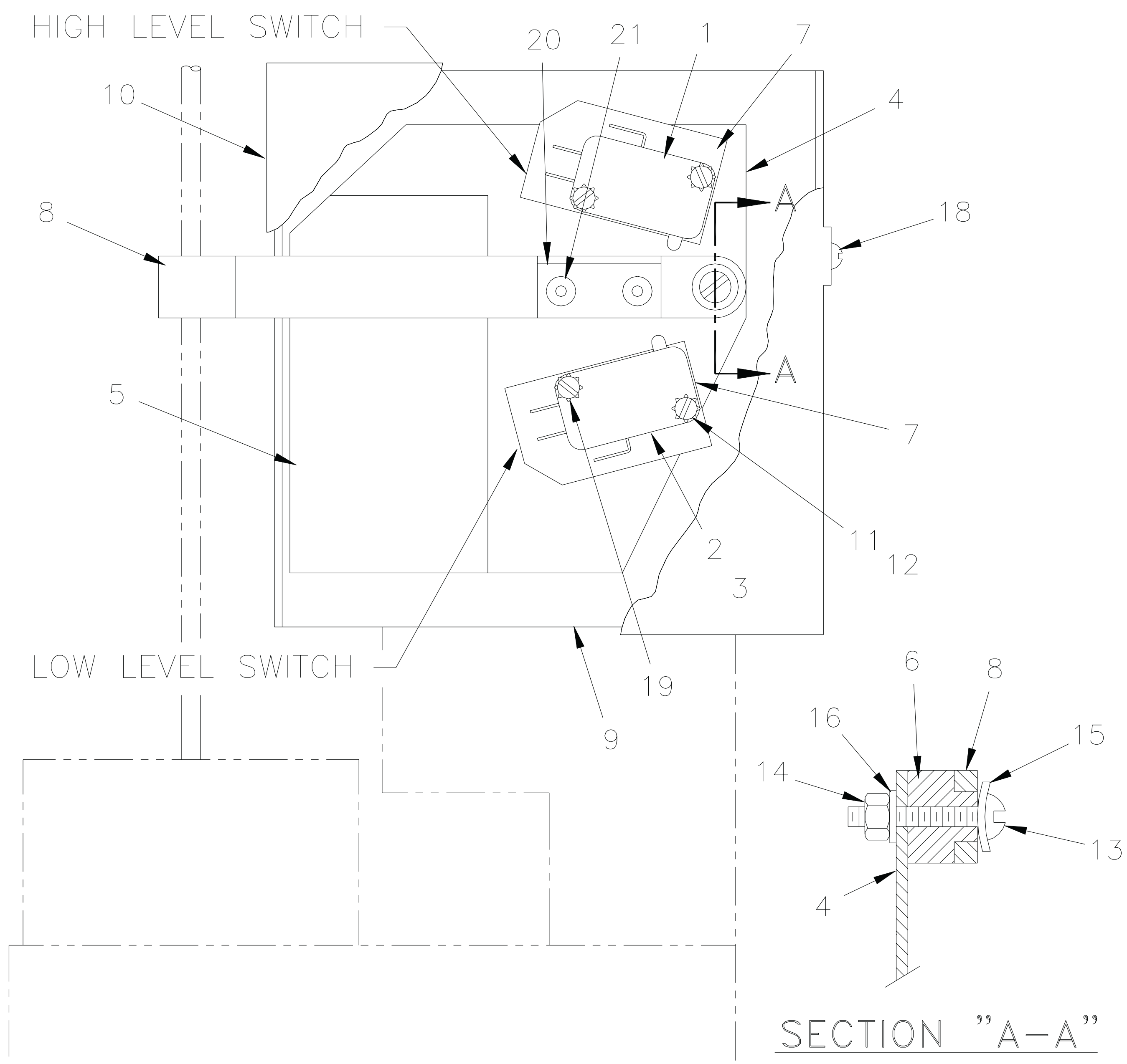
Used In	Item	Part Number	Description	Comments

Water Level Switch Assembly

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Notes:
1. Disconnect power at main switch before operating this enclosure.
2. Wiring must not interfere with movement of item 8.
3. To order complete water level switch assembly, see items A-G.
4. When item 20 is used in assembly G, flange will be on top (shown). When item 20 is used in assembly F, flange will be on bottom.



Parts List—Water Level Switch Assembly

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	ELL000MK1	*LIQUOR LEVEL SW ASSY CBW	1 UP + 0 LO
	B	ELL000MK2	*WATER LEV SW ASSY: 1 UP+ 1LO	1 UP + 1 LO
	C	ELL000MK2A	*CONVEYOR E-STOP ASSY 1UP-1DN	1 UP + 1 LO
	D	ELL000MK2S	*MK2 WATER LEVE SWITCH ASSYSS	1 UP + 1 LO SS
	E	ELL000MK3	WATER LEV SW ASSY:0 UP +1 LO	0 UP + 1 LO
	F	ELL000MK4	*WATER LEV SW ASSY:1 UP +2 LO	1 UP +2 LO
	G	ELL000MK5	$WATER LEV SW:2UP +1LO	2 UP + 1 LO
			COMPONENTS	
A-D,F-G	1	09R014A	MINI-SW SPDT STAKON #V15G1C26K	
B-G	2	09R014A	MINI-SW SPDT STAKON #V15G1C26K	
F-G	3	09R014WS	MICROSW SPDT STAKON V3-2101-D8	
004-C,E-G	4	02 02150M	SW MOUNTPLATE=LEVCONT ZINCPL	
D only	4	02 02150S	PLATE=SWITCH MNT LEVEL S/S	
all	5	01 10227	LABEL=WATER LEVEL SWITCH ASMB	
all	6	02 02152	BUSHING=FLOAT LEVER	
all	7	02 02164	INSULATION=V3-1 MICROSWITCH	
all	8	02 02190	FLOATLEVER=LEVEL SW	
A-C-E-G	9	02 02553	BASE=LEVEL CONTROL	
D only	9	02 02553S	BASE=LEVEL CONTROL ENCL S/S	
A-B-E-G	10	02 02554	COVER=LEVEL CONTROL-PLTD	
C only	10	02 02554A	COVER=CONVEYOR E-STOP-PLATED	
D only	10	02 02554S	WATER LEVEL CONTROL ENCL S/S	
all	11	15N019	RDMACSCR 4-40UNC2AX5/8 ZINC GR	
all	12	15U021	LOKWASH EXTOOTH #4 (US STD) ZI	
A-C,E-G	13	15N055	RDMACHSCR 6-32UNC2AX5/8 ZINC G	
A-C,E-G	14	15G070	HXMACHSCRNUT 6-32UNC2B ZINC GR	
D	14	15G075	HEX MACH SCREW NUT 6-32UNC2 S	
all	15	15U060	FLAT WASHER#6 ANSI TYPEB BRASS	
A-C,E-G	16	15U100	LOKWASHER MEDIUM #6 ZINCPL	
D only	16	15U102	LOCKWASHER MEDIUM #6 SS18-8	
A-C,E-G	17	15P105	TRDCUT-F PANHD 8-32X5/8 NIKSTL	
D only	17	15P103	TRDCUT-F RDHDSLOT 8-32UNCX1/2	
all	18	15P100	#8 X 3/8 PHILPANHD TYPE B SMS	
F-G only	19	15N021	RDMACSCR 4-40 UNC2X1 ZINC PLT	
F-G only	20	03 01462C	ANGLE=H20 LEVEL ACTUATOR	
F-G only	21	15J051	POPRIVET 1/8DIAX.265 LONG S/S	

Section 7

Chemical Supply Devices

RULES FOR THE FIELD INSTALLATION OF PUMPED-TYPE LIQUID SUPPLY SYSTEMS

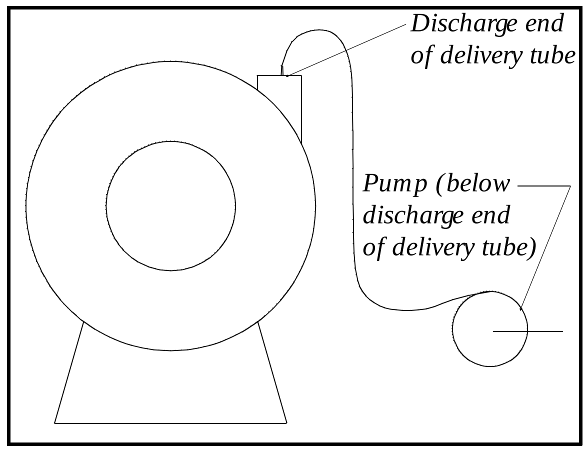
APPLICABILITY: All Washer-Extractor Models

GENERAL

Pellerin Milnor Corporation does not guarantee machines against damage from corrosion caused by improper installation and/or operation of pumped-type liquid supply systems. The following precautions must be observed when pumps are used:

1. Always install the pumping unit lower than the discharge end of the chemical delivery tube as shown at right. This will prevent any excess chemical concentrate from dribbling out of the tube and onto unprotected machine surfaces when the machine is idle.

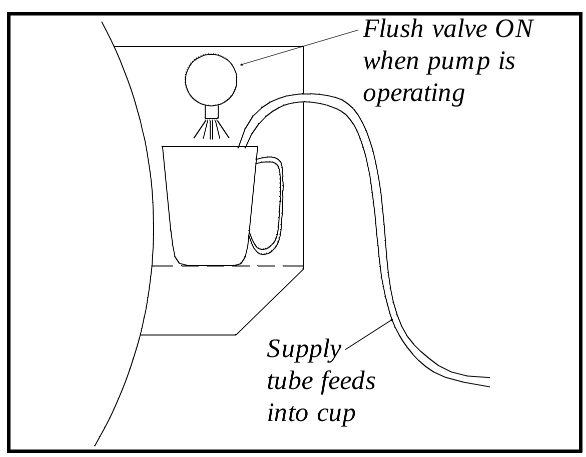
   Merely putting a "drip loop" in the delivery tube won't help much. (It might reduce the dribble a little, but not enough to prevent damage.) **The real solution is to install the pumps below the discharge end of the delivery tubes so excess chemical won't dribble out of the tube long after the pumps stop.**



2. If the machine is also equipped with a flushing supply injector:

   a. Always wire the new system so the appropriate flushing valve also operates whenever chemical is being injected. This will dilute the concentrated chemical with obvious advantages. If possible, the water flushing valve should remain on for a minimum of 30 seconds after the longest injection time for that chemical.

   b. Always inject the chemical into a plastic cup (and direct the flushing water into the same cup). This way, any chemical that dribbles out

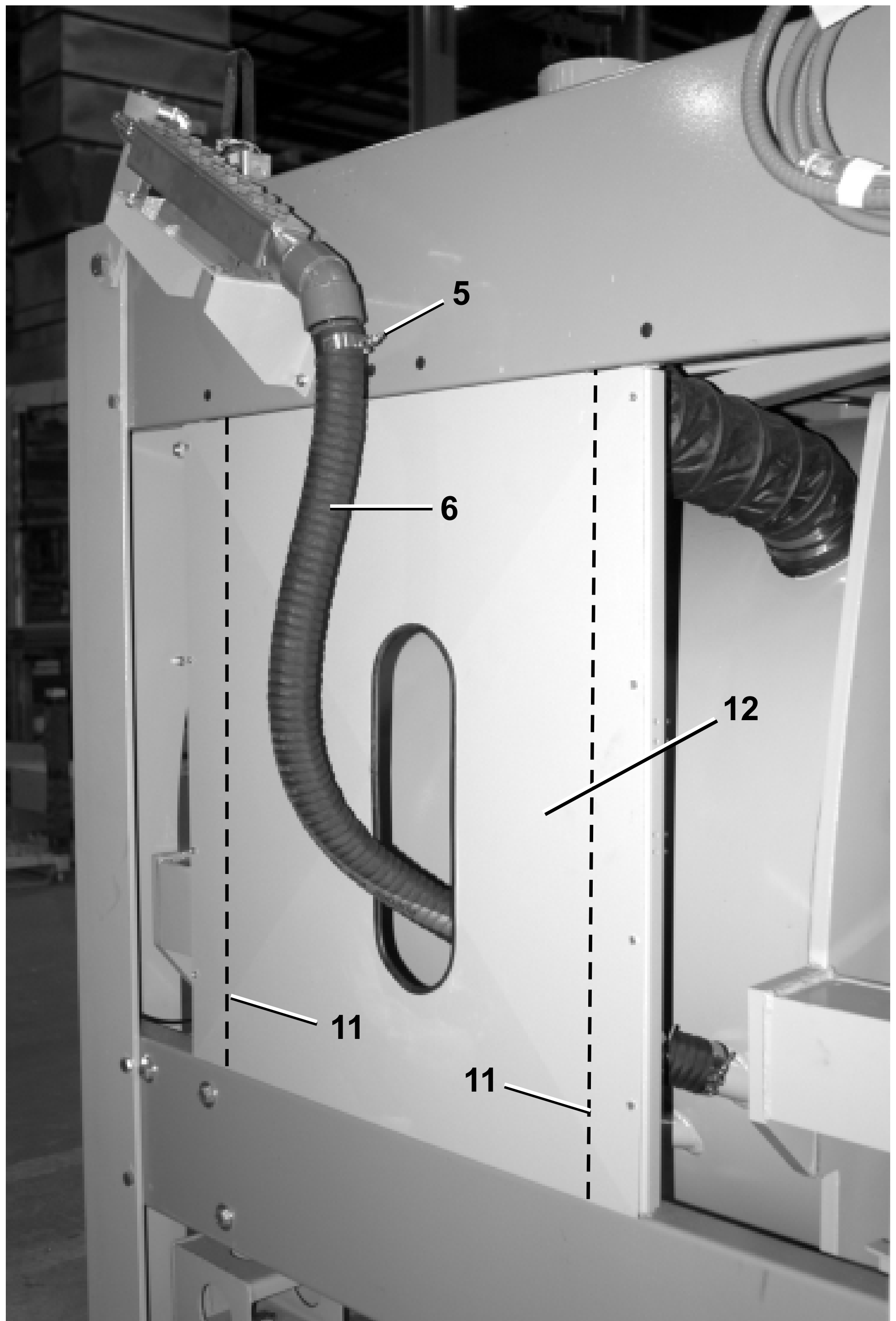


of the tube after the pump stops will be diluted by the water remaining in the cup.

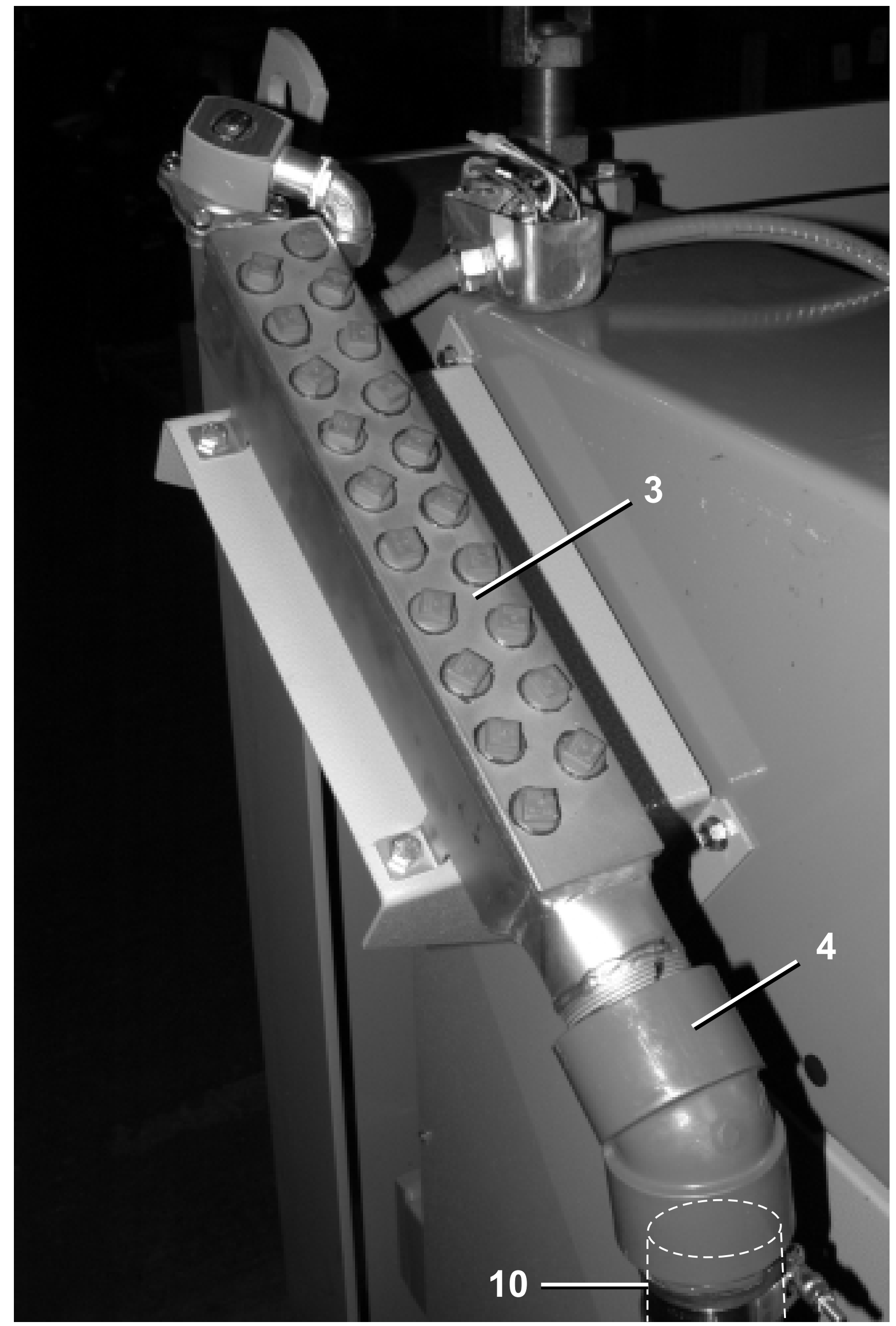
3. Never inject any concentrated chemical directly onto any metal, rubber, or plastic surface of the machine other than the plastic cups provided.

It is not enough to merely inject the chemical onto a surface that will be subsequently flushed or wetted sometime during the wash process. This is because the "culprit" is the chemical which dribbles out later. The damage occurs when the residue of a chemical (even a diluted chemical) dries on a surface—as when a chemical dribbles out of the delivery tube after the last wash cycle is finished. As the chemical dries, the water content evaporates—leaving a deposit of a very concentrated chemical which is then free to attack the host surface throughout the night (or over the weekend) or until the machine is returned to service.

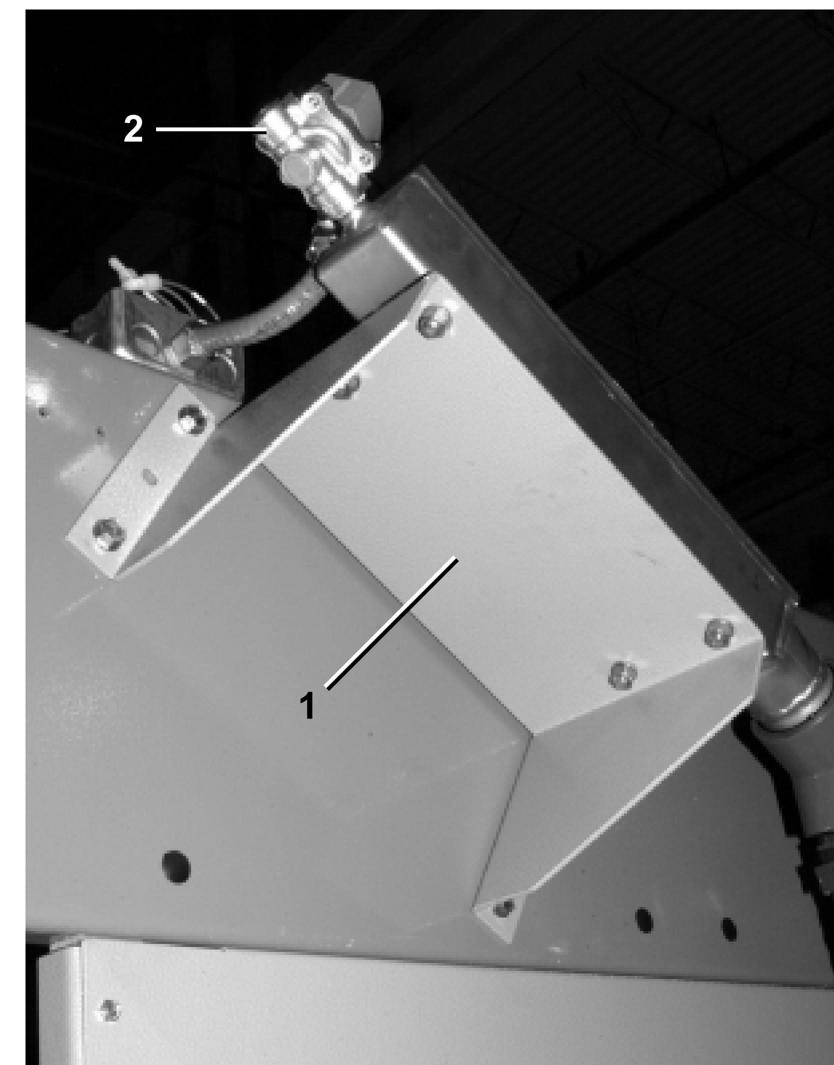
The only realistic solution is to make sure that the discharge end of each chemical delivery tube is above the pump so excess chemical left in the tube after the pump stops cannot dribble out later.



5
6
12
11
11



3
4
10

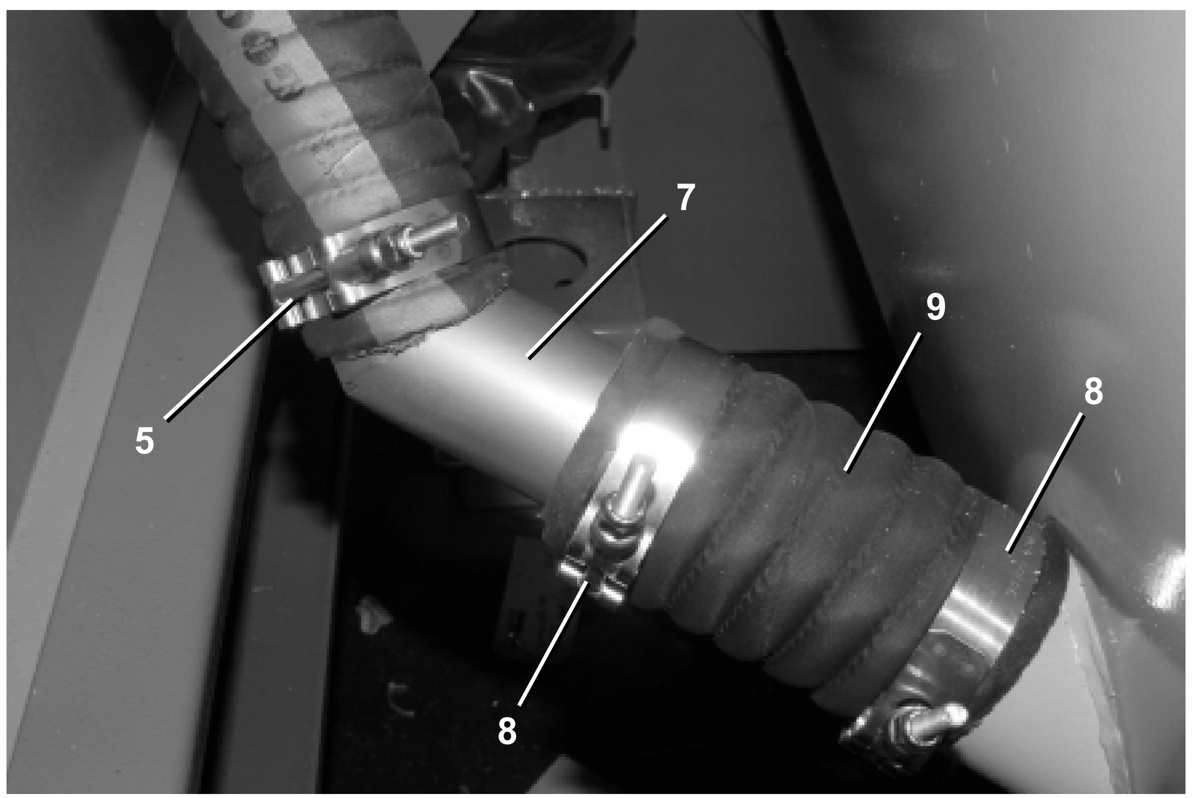


2
1

Peristaltic Connection
6044WP2 SM (Single Motor)

BMP060012/2005155B
(Sheet 2 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400



Parts List—Peristaltic Connection

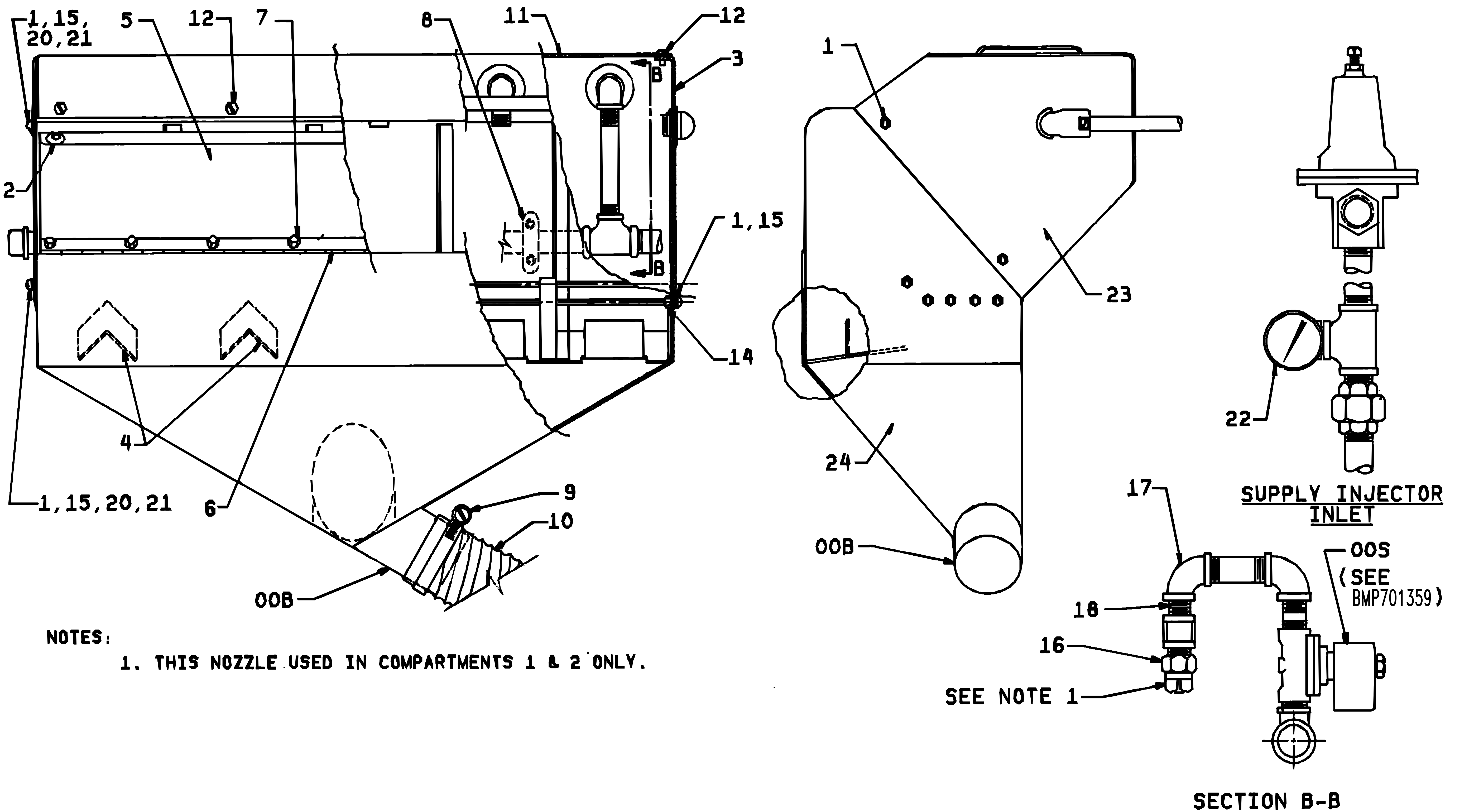
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	GWL28005	INST=PARASTALTIC CONNECT 60	
			COMPONENTS	
all	1	03 25267E	PERISTALTIC MOUNTING BRACKET	
all	2	96TDC2AA37	1/2" N/C 2WAY 120V50/60C VALVE	
all	3	W8 01254	*ASSY=PERIST CONNECT 20 HOLES	
all	4	5SL2AP8K	NPT EL45DEG 2"PVC SH80 FPTXFPT	
all	5	27A072	T-BOLT HOSECLAMP2.16-2.47CADSC	
all	6	60E255A70A	HOSE=2"ID X 70"LG(NO DWG)	
all	7	W2 15265A	*WLMT=PERISTAL CONN TRAN	
all	8	27A075	T-BOLT HOSECLAMP 2.78-3.09"	
all	9	60E301A04A	HOSE= *2.5"ID PE X4"	
all	10	51AB2AN2AA	HOSE INSERT X MPT 2"PVC40	
all	11	02 18538	SUPPORT=SUPPLY INJ LH/RH	
all	12	02 19327B	COVER=6044 W/PERISTAL RTSIDE	

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

BMP9700940/97287V (1 of 2)

Litho in U.S.A.



NOTES:

1. THIS NOZZLE USED IN COMPARTMENTS 1 & 2 ONLY.

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Supply Injector

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	A28 18300	85031D* ASSY,5FLUSH SUPINJ=6036WE	6036
	B	SA 28 085	SUPPLYINJECTOR 5FLUSH=60" DIVCYLS	6044
	D	A28 18600	90346D$PIPING+VALVE=SUP INJ ASSY	
	E	SA 28 086	70256C* COVER ASSY=SUPPINJ	00A & 00B
			COMPONENTS	
all	1	15G121	HXCAPNUT 10-24UNC2 #3266BR NKLPLTG2	
all	2	60C001	RUBBER BUMPER BLK W/WASHER ONLY#698	
all	3	02 18024	66023Z FRONT VALVCLOZ	
all	4	02 18179	76164B DIVIDER-SUP INJ	
all	5	02 18543	93352C LID=SUPPLY INJECTOR	
all	6	02 02649	89356A HINGE=VALVE ENCLOSURE-16.25"	
all	7	15J004	01Z TUBULAR RIVET TRS#40988 3/16"	
all	8	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 PLATED	
all	9	27A074	HOSECLAMP 2+1/16-3"CADSCR+1/25 BAND	
all	10	60E301A24A	HOSE= *2.5"ID PE X 24"	
all	11	02 18564	85013C ENCLOSURE=SUPPLY INJ VALVE	
All	12	15P010	12Z PHILPAN TRDCUTSCRTYP10-24X1/2SS	
all	13	27A126	MEASURECUP 48OZ STOWAY1025P	
all	14	15G130	HEXMACHSCRNUT 10-24UNC2 SS18-8	
all	15	24G018N	ROLLED WASHER .194"ID NYLTITE #10W	
all	16	27A001	NOZZLE BRASS 1/2" SPRAYSYS #HH29SQ	
all	17	5SL0PNFA	NPT ELBOW 90DEG 3/4" GALMAL 150#	
all	18	5N0PCLSB42	NPT NIPPLE 3/4XCLS TBE BRASS STD	
all	20	15N117	RDMACSCR 10-24UNC2X3/8SS18-8	
all	21	15U160	LOCKWASHER MEDIUM #10 SS18-8	
All	22	30N100	07Z PRESSGUAGE 1/8"BACKCONN 0-30PSI	
all	23	02 18025	66022Z REAR VALVCLOZ	
all	24	W2 18559	92612#* SUP-CHUTE 5-FLUSH=6044W+S+	

Section 8

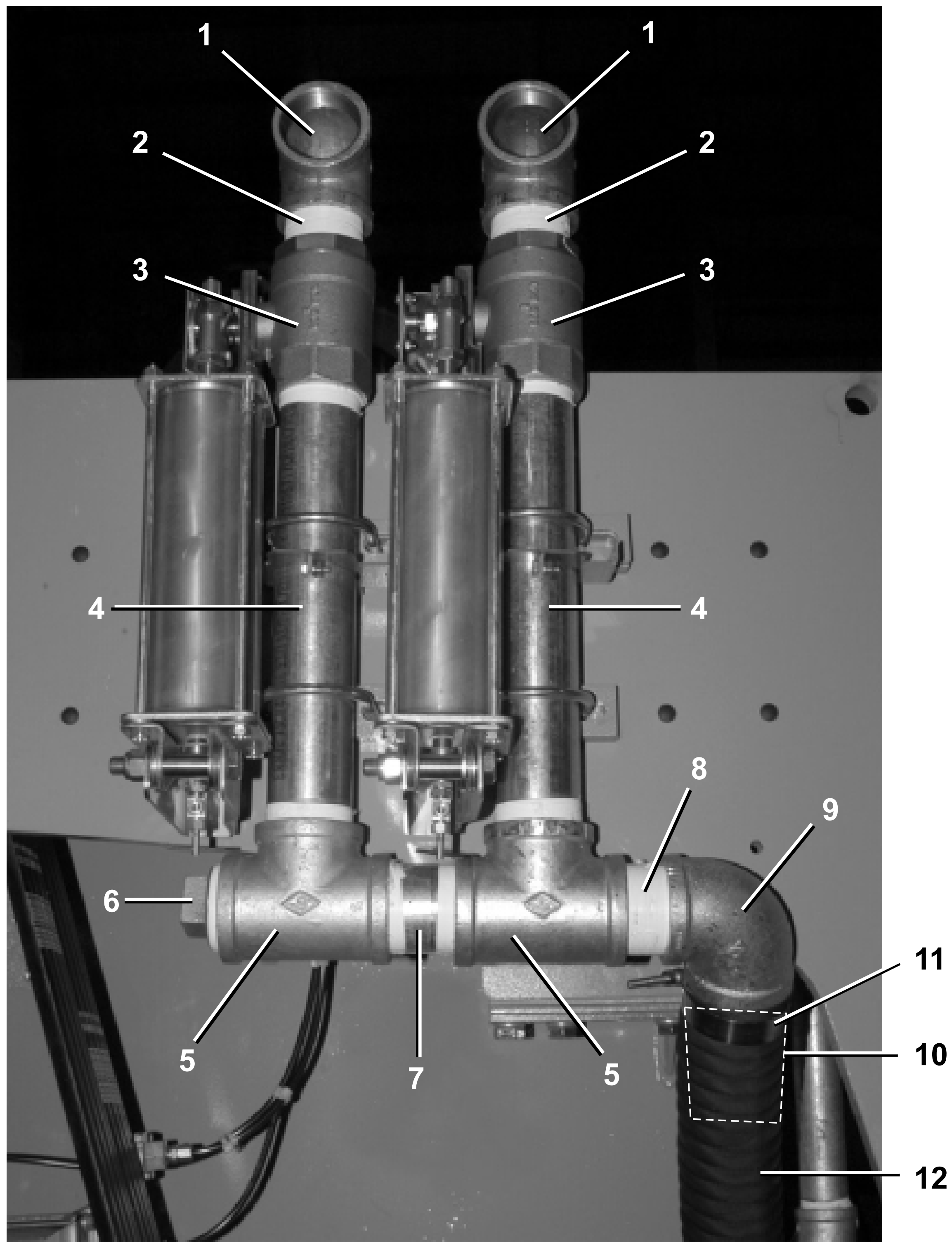
Water and Steam Piping Assemblies

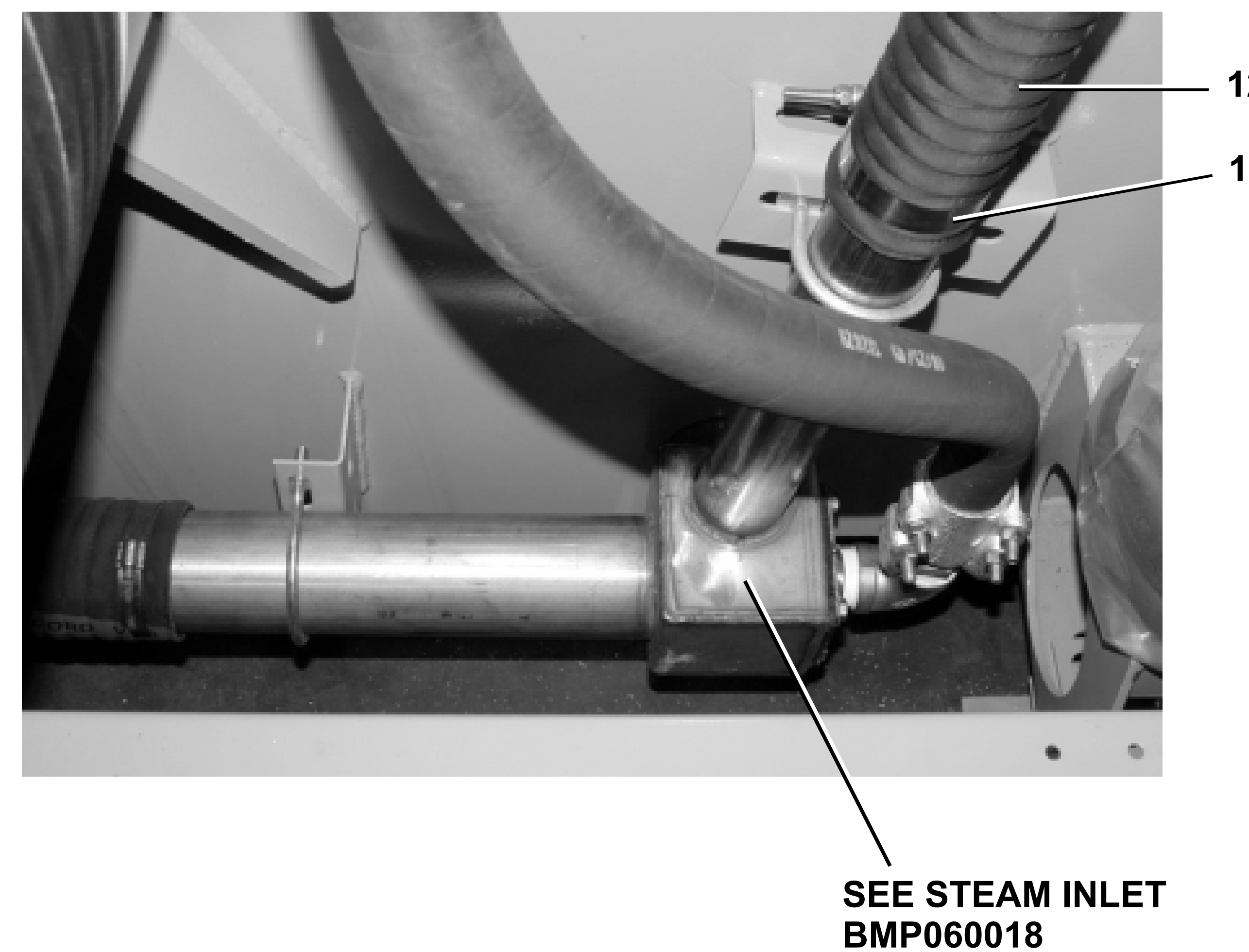
Water Inlet

6044WP2 & 6044WP2 SM(Single Motor)

BMP060013/2006175B
(Sheet 1 of 2)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400





Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

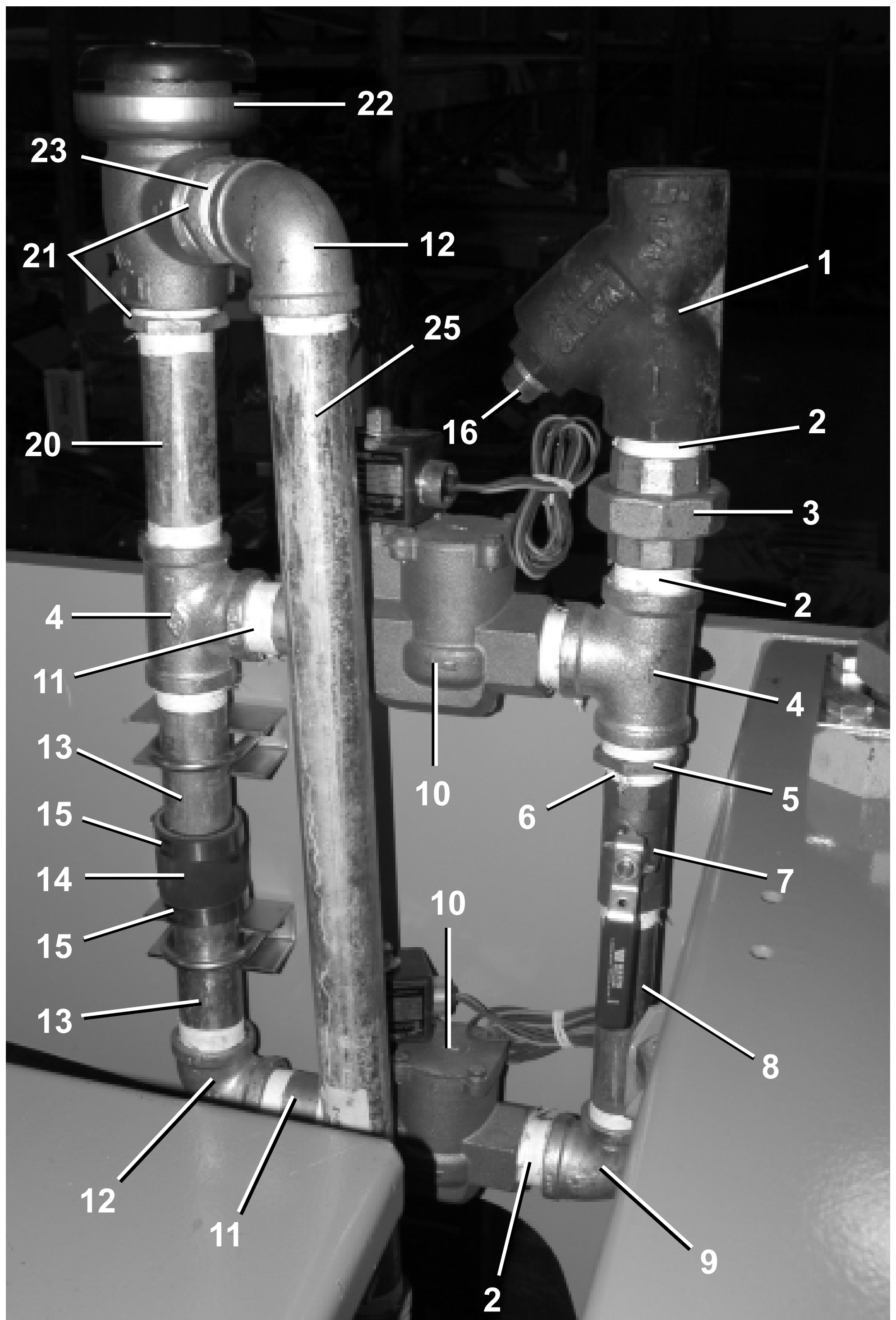
Parts List—Water Inlet

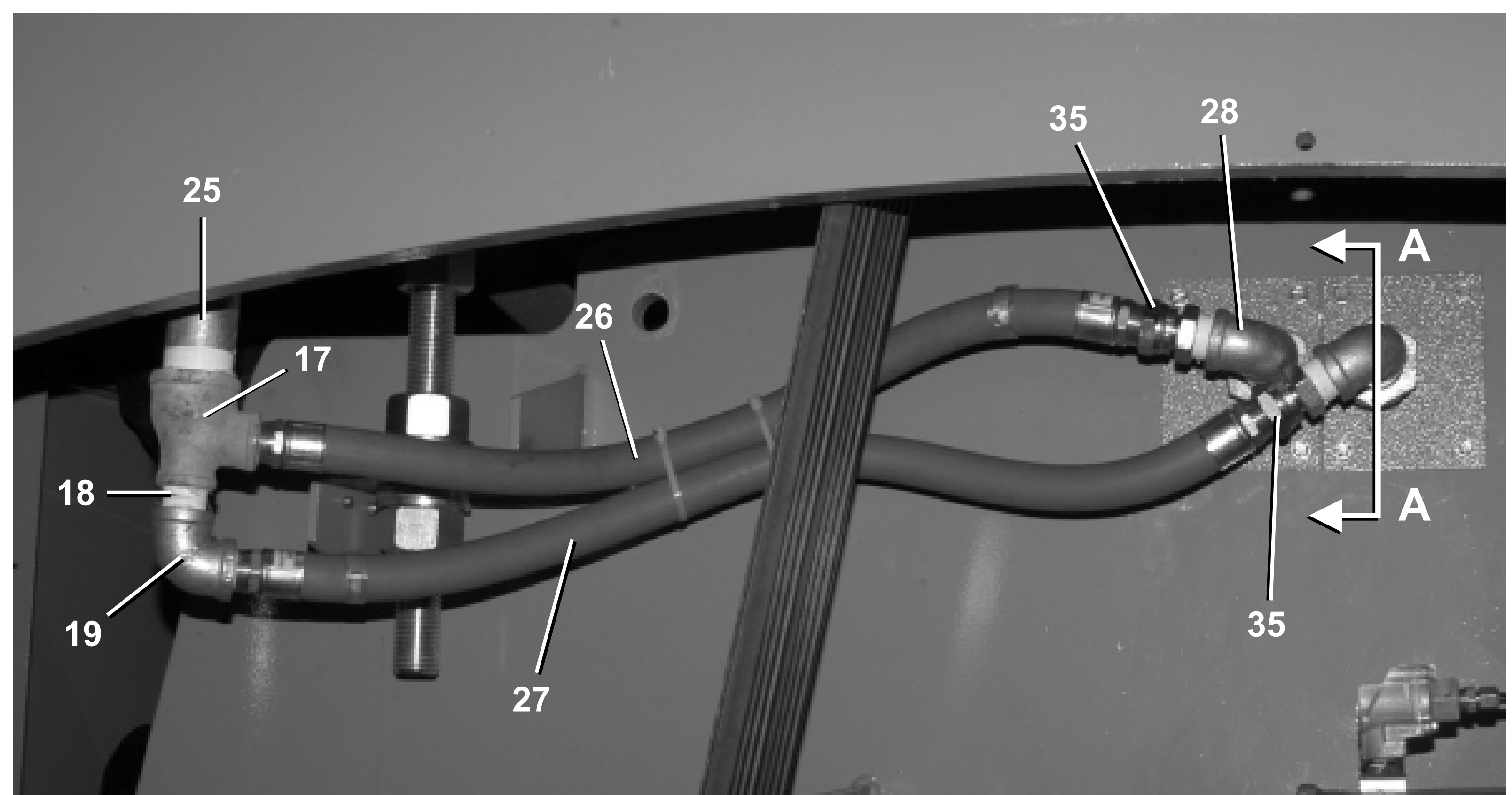
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

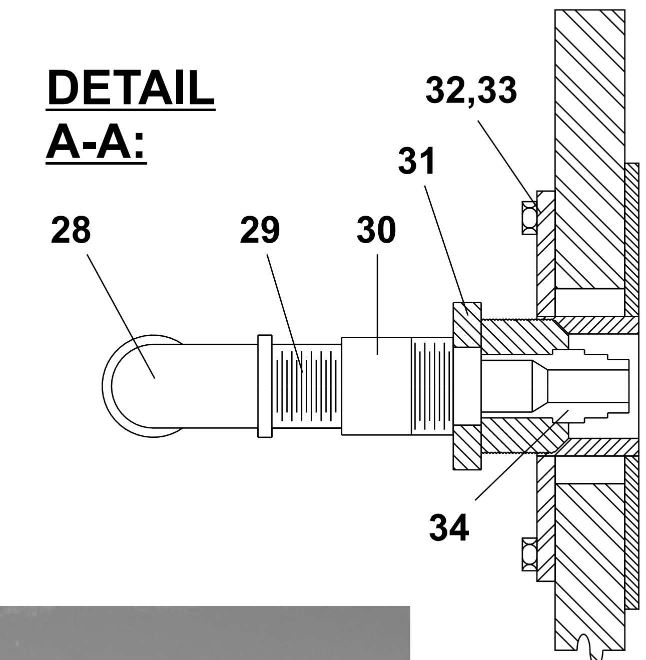
Used In	Item	Part Number	Description	Comments
---ASSEMBLIES---				
	A	AVW28023	*HOT,COLD,& FRESH H2O VAL60WE	
	B	AVW28024	*H2O INLT=+1 FRESH VALUE 60WE	
	C	AVW28022	*H2O INLET= INLT PIPING.60WE	
---COMPONENTS---				
all	1	5SL2ANFA	NPT ELBOW 90DEG 2" GALMAL 150#	
all	2	5N2ACLSG42	NPT NIP 2XCLS TBE GALSTL SK40	
All	3	96D088BCSR	2.00WAT BVAL+ACT/BR/NC/ST/RH	
all	4	5N2A13PG42	NPT NIP 2X13.75 TBE GALSTL SK4	
all	5	5S2ANFA	NPT TEE 2" GALMAL 150#	
all	6	51P060	PLUG PIPE SQ 2"GALCORED CI 125	
all	7	5N2A03AG42	NPT NIPPLE 2X3 TBE GALSTL SK40	
all	8	5N2ACLSG42	NPT NIP 2XCLS TBE GALSTL SK40	
all	9	5SL2ANFA	NPT ELBOW 90DEG 2" GALMAL 150#	
all	10	51E098B	KINGREDNIP2.5"IDX2"NPT#STC3025	
all	11	27A075	T-BOLT HOSECLAMP 2.78-3.09"	
all	12	60E301A33A	HOSE= *2.5"ID PE X33"	

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.







Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Cooldown Inlet

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	AVW28030A	*INTL.PIP=SPRY+COOLDOWN 60WP2	
	B	GVW28023	SPRY OR CLDN:MTG.HDW NO SB	
	C	GVW28025	SPRY+CLDN:MTG.HDWE NO SB60WE	
			COMPONENTS	
all	1	51T060	Y-STRAINER 1+1/4" CAST IRON	
all	2	5N1ECLSG42	NPT NIP 1.25XCLS TBE GALSTLS40	
all	3	5SU1ENF	NPT UNION 1.25" GALMAL 150#	
all	4	5S1ENFA	NPT TEE 1.25" GALMAL 150#	
all	5	5SB1E1ADEO	NPTHEXBUSH 1.25X1" GALCI 125#	
all	6	5N1ACLSG42	NPT NIP 1XCLS TBE GALSTL SK40	
all	7	96D084	BALL VALVE 1" WATTS#B6100 BRZ	
all	8	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	
all	9	5SL1ENFA1A	NPTELB 90DEG 1.25X1 GALM 150#	
all	10	96P151A37	1.25VAL 110V HAYS#9-2110IS-120	
all	11	5N1E03AG42	NPT NIP 1.25X3 TBE GALSTL SK40	
all	12	5SL1ENFA	NPT ELB 90DEG 1.25 GALMAL 150#	
all	13	5N1E05AG41	NPT NIP 1.25X5 TOE GALSTL SK40	
all	14	60E015A06A	HOSE= *1.62IDX2.12ODX6"LG PE	
all	15	27A060	HOSECLAMP1+5/16-2.25CADSC#HS28	
all	16	5SP0PHFSS	NPT PLUG 3/4 SQ SOLID STL/ZINC	
all	17	5S1ENFA0P	NPTTEE 1.25X3/4X3/4 GALMAL150#	
all	18	5N0PCLSG42	NPT NIP 3/4XCLS TBE GALSTL S40	
all	19	5SL0PNFA	NPTELB 90DEG 3/4 GALMAL 150#	
all	20	5N1E08AG42	NPT NIP 1.25X8 TBE GALSTL SK40	
all	21	5SB1K1EDEO	NPTHXBUSH 1.5X1.25GALMAL 150	
all	22	SA 03 009	1.5"SIPHONBRKR+SCUPPER ASSY	
all	23	5N1ECLSG42	NPT NIP 1.25XCLS TBE GALSTLS40	
all	24	5SL1ENFA	NPT ELB 90DEG 1.25 GALMAL 150#	
all	25	5N1E26AG42	NPT NIP 1.25X26 TBE GALSTL SK4	
all	26	60E086C18K	*WATERHOSE 3/4"=18.5"LG+ENDS	

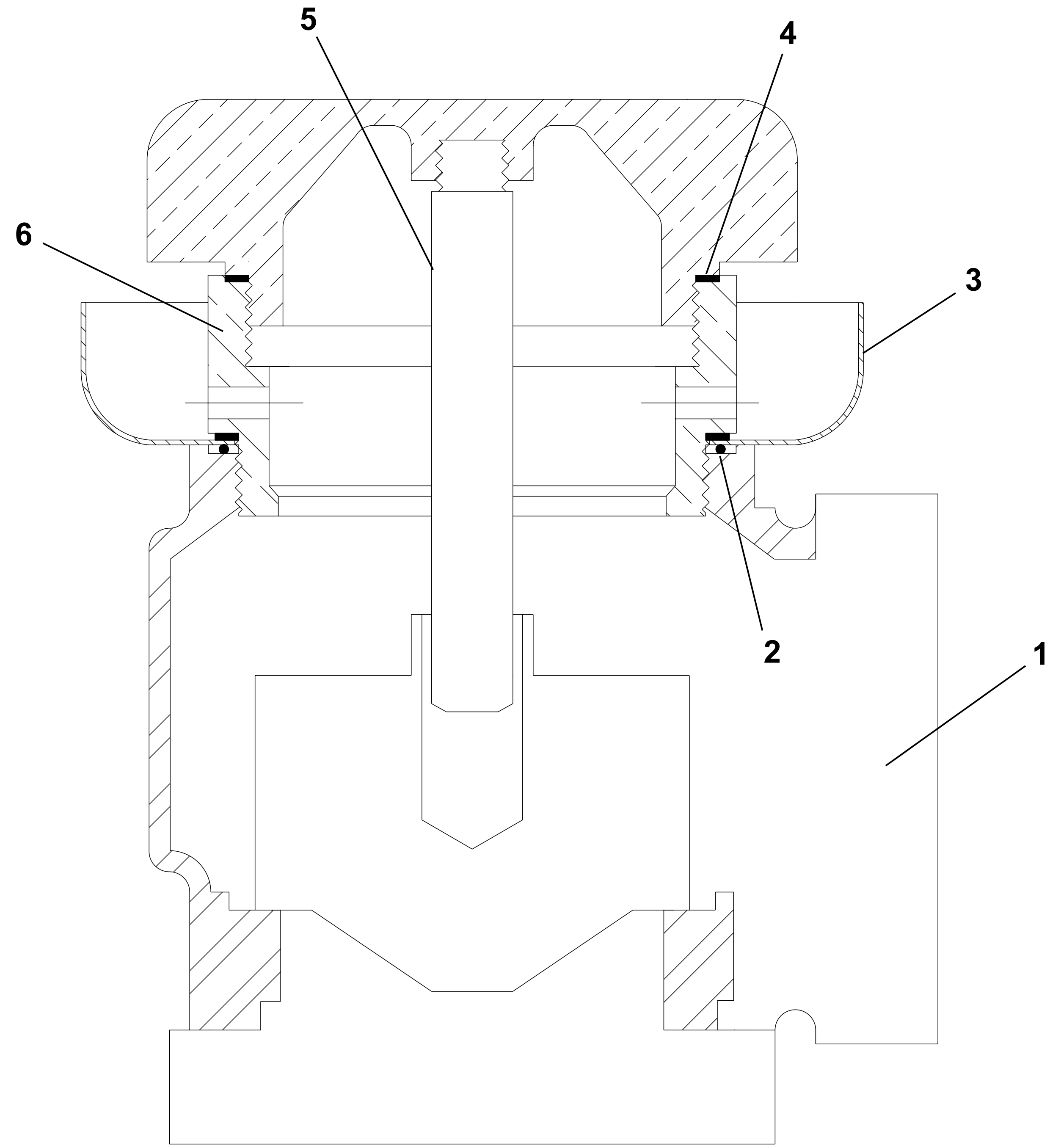
Parts List, cont.—Cooldown Inlet

Used In	Item	Part Number	Description	Comments
all	27	60E086C22K	*WATERHOSE 3/4"=22.5"LG+ENDS	
all	28	5SL0PNFA	NPTELB 90DEG 3/4 GALMAL 150#	
all	29	5N0PCLSG42	NPT NIP 3/4XCLS TBE GALSTL S40	
all	30	51E037	COUP 3/4"F W/1"M NPTONOD 304S	
all	31	5SB1K1ADEO	NPTHEXBUSH 1.5X1 GALCI 125#	
all	32	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
all	33	02 18965	PLATE=SPRAYDOWN LOCATING	
all	34	27A004	NOZZLE SPRACO#H3/4U00350G	
all	35	51X019	UNIONSTRADT 3/4"#0107-12-12	

1.5” Siphon Breaker & Scupper

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Parts List—Siphon Breaker & Scupper

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

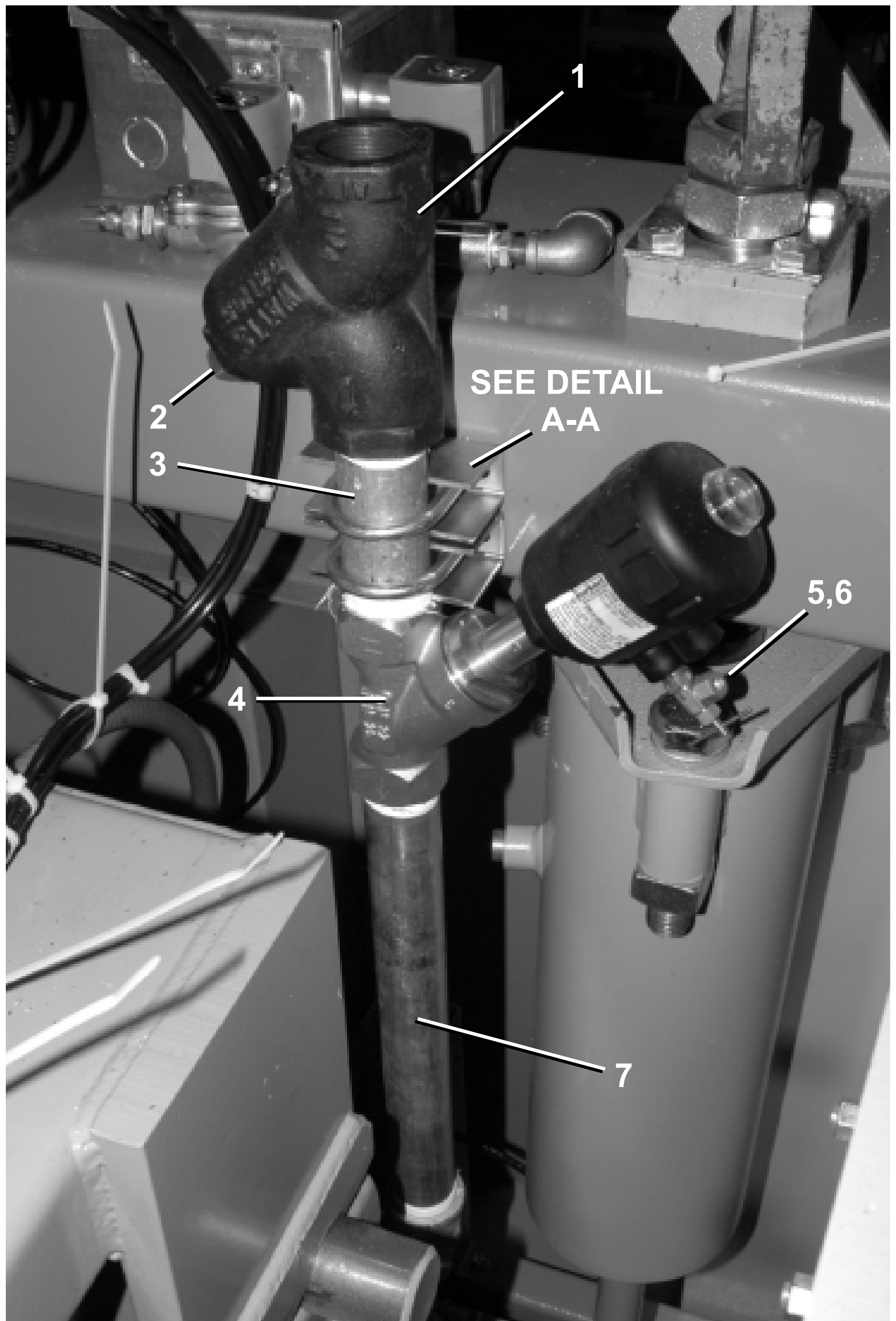
Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	SA 03 009	1.5"SIPHONBRKR+SCUPPER ASSY	
			COMPONENTS	
all	1	96M031	1.5"VAC BREAKER WATTS288A M2	
all	2	60C130	ORING 1+3/4ID1/8CS BUNA70 #224	
all	3	03 01319	SCUPPER=1+1/2 SIPHON BREAKER	
all	4	03 01318	GASKET-RING=1+1/2"SIPHONBRKR	
all	5	03 01316A	GUIDE STM,1.5"SIPHBKR 1/4-40	
all	6	03 01317	SPCR=BON=1+1/2SIPBRK OURMATL	

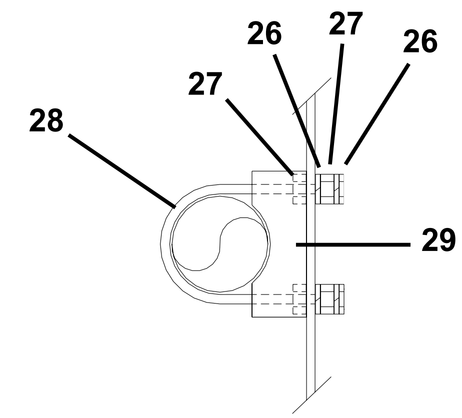
Steam Inlet
6044WP2/WP3 & 6044WP2 SM (Single Motor)

BMP060018/2006175B
(Sheet 1 of 3)

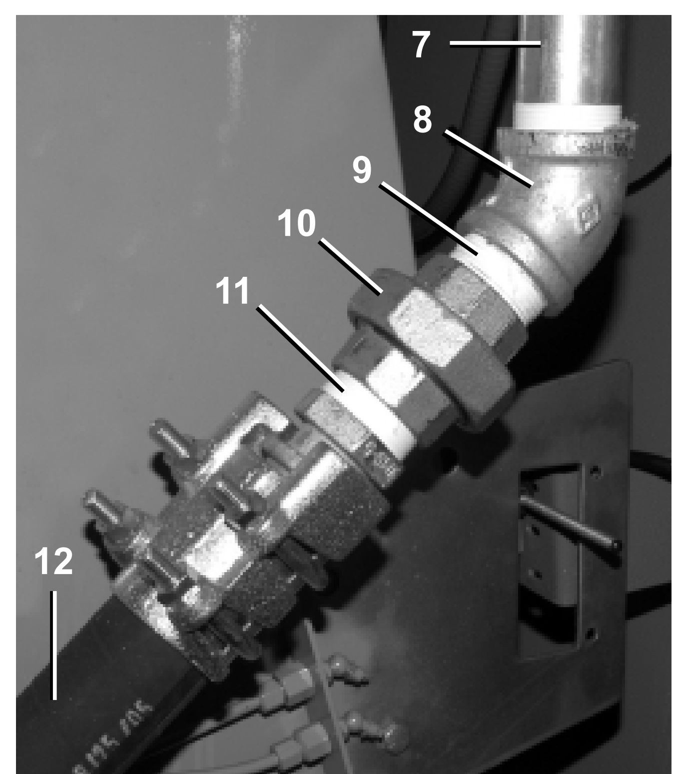
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

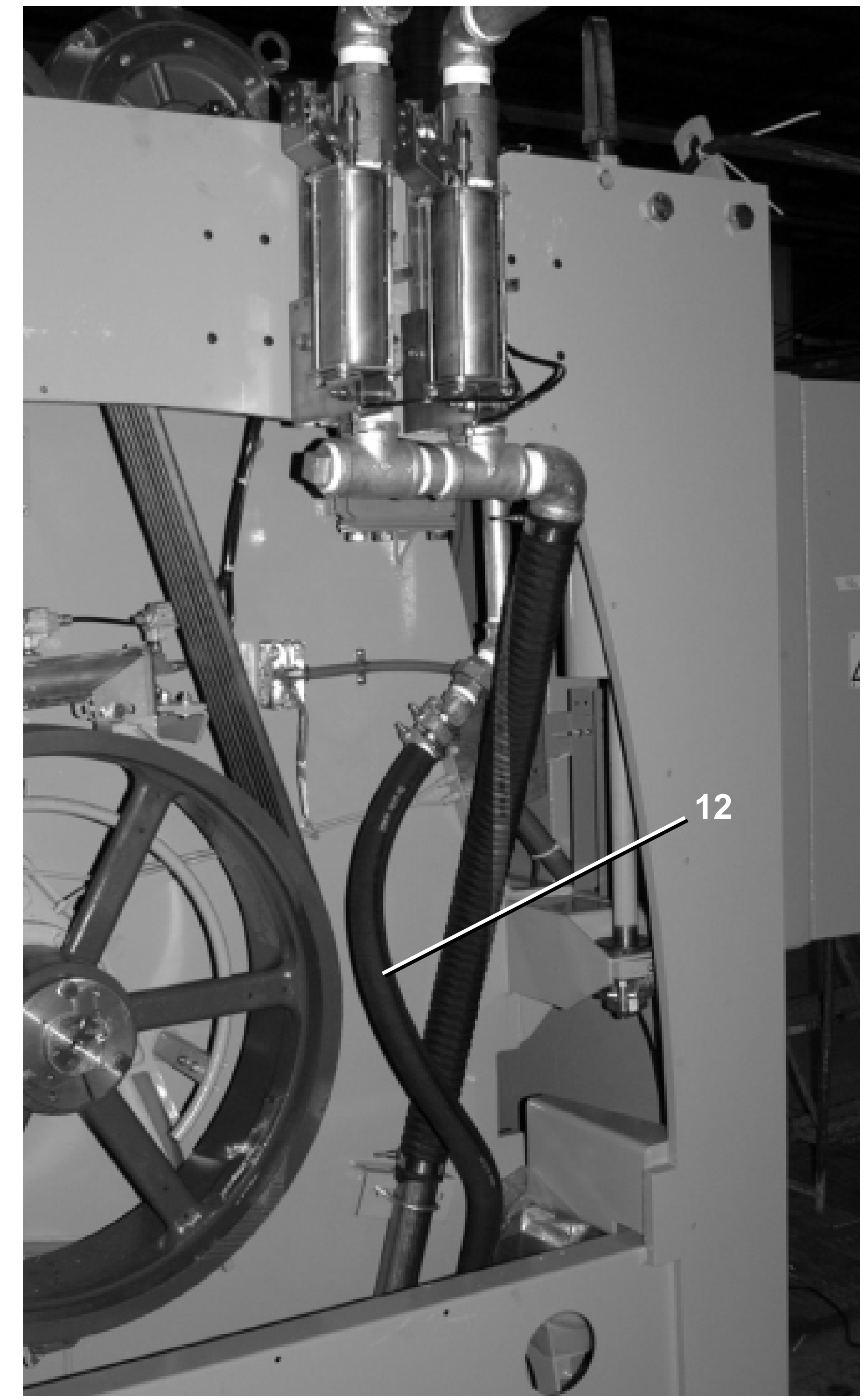
Litho in U.S.A.





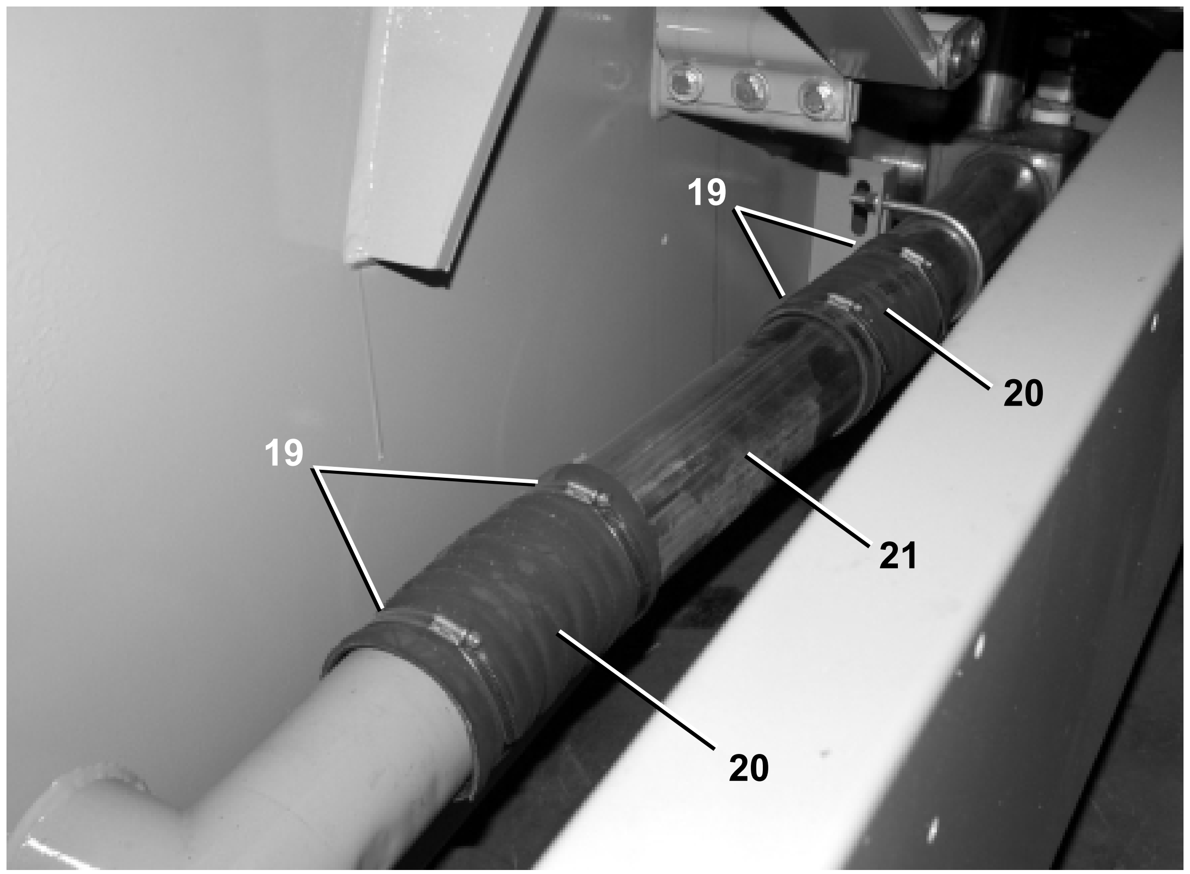
DETAIL A-A

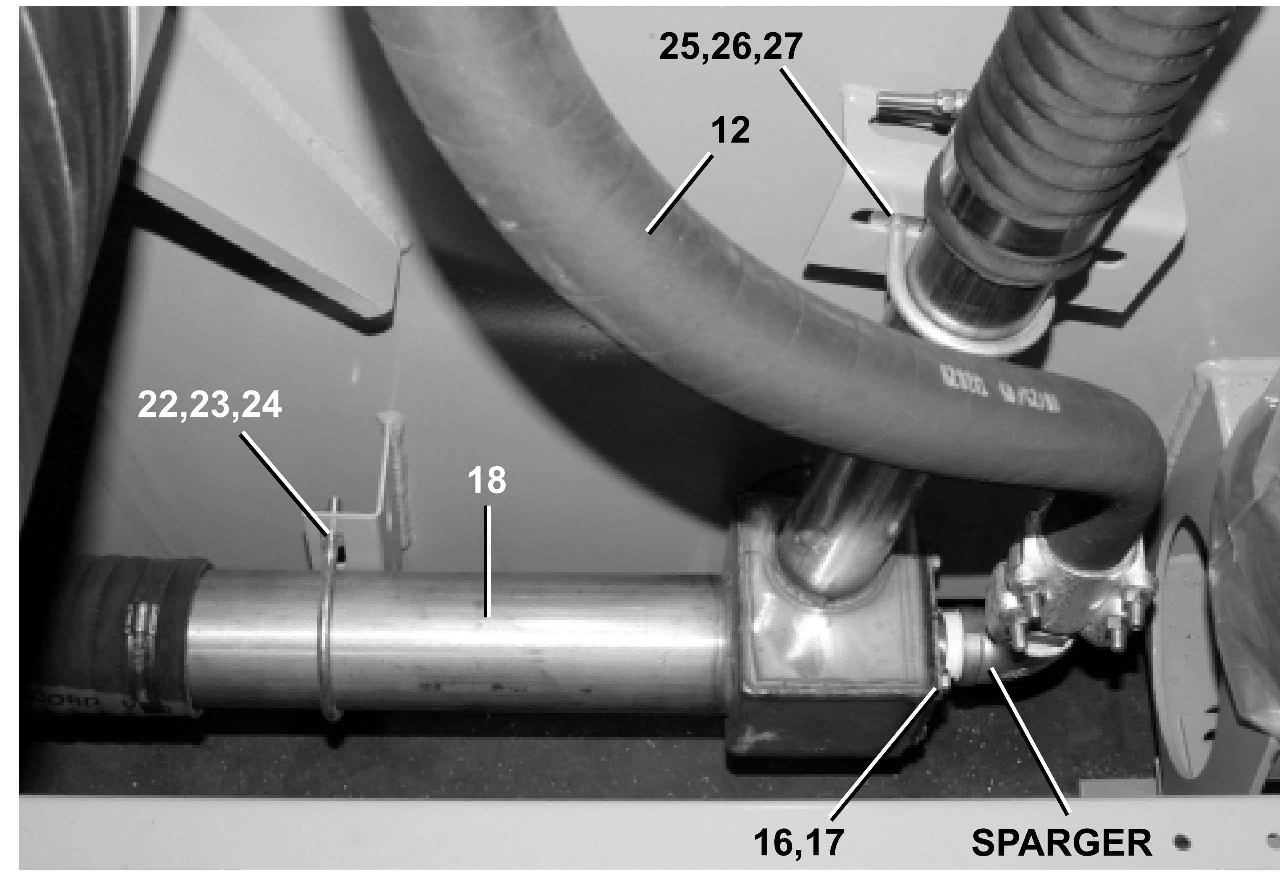


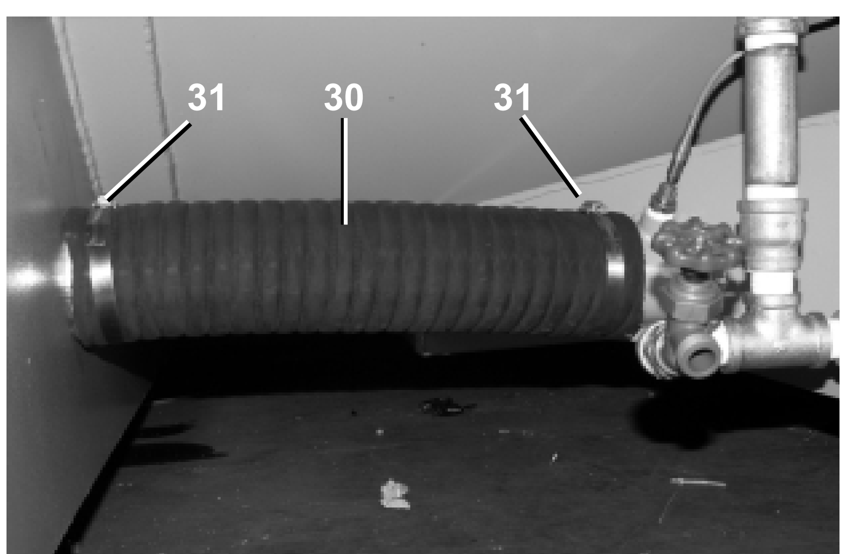


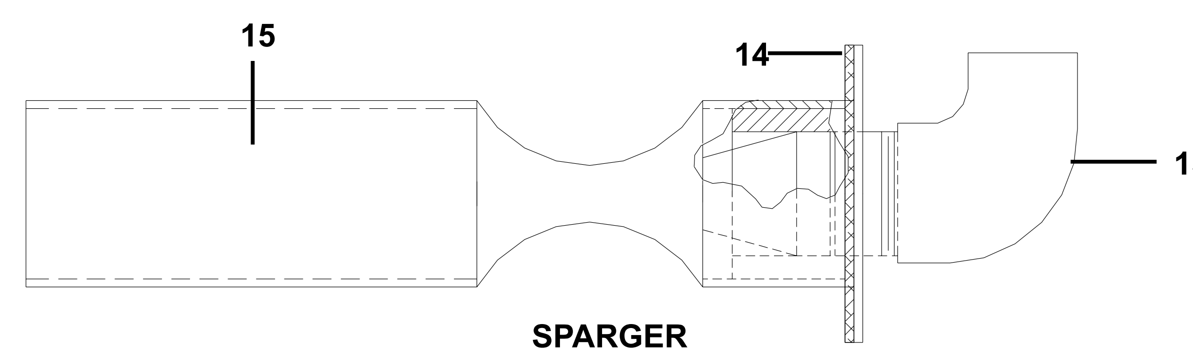
Steam Inlet
6044WP2/WP3 & 6044WP2 SM (Single Motor)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.









Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

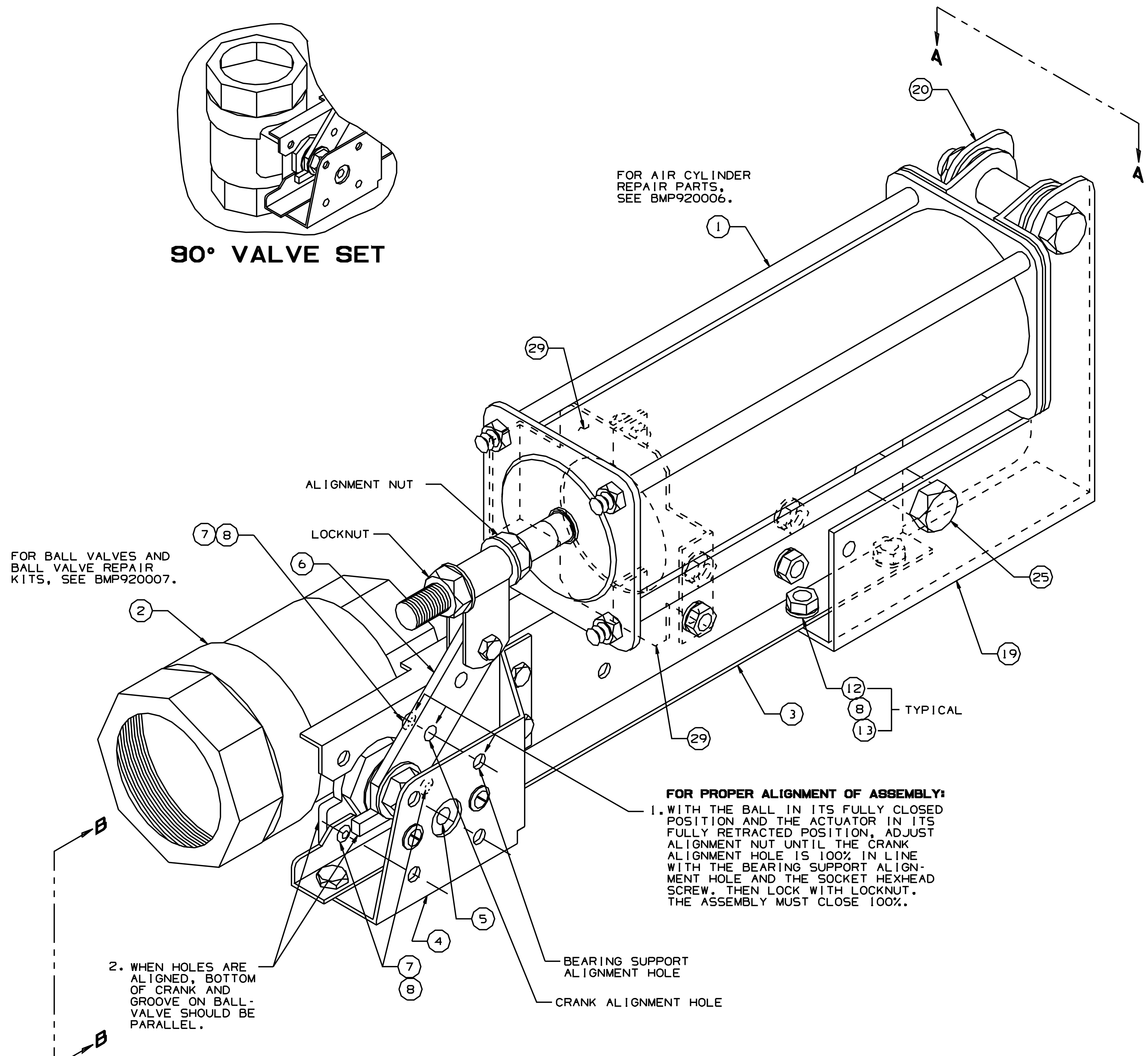
Litho in U.S.A.

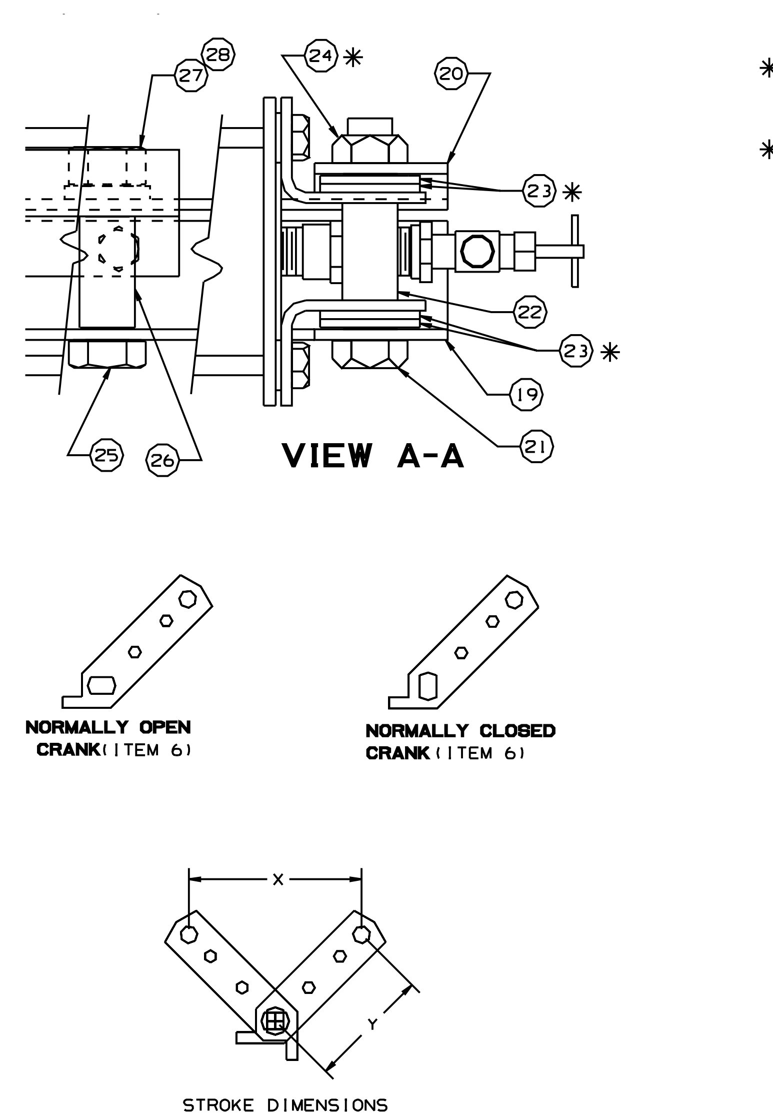
Parts List—Steam Inlet

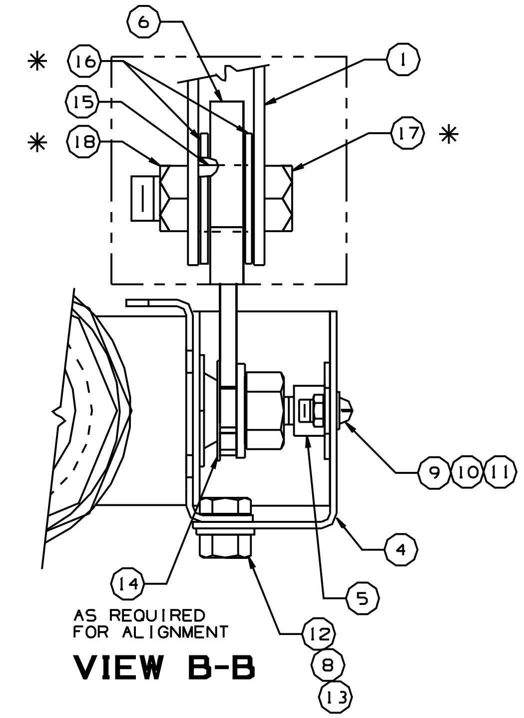
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	GVS28001	INSTALL=STEAM INLET 60"	
	B	AVS28001	$1.25 BURKERT STEAM=60WE2+3	
	C	ASS25001	*52&60 STEAM SPARGER3/4ORFICE	
	D	AVS03001	*1+1/4BURKERT +STRAINER	
			COMPONENTS	
all	1	51T060	Y-STRAINER 1+1/4" CAST IRON	
all	2	5SP0PHFSS	NPT PLUG 3/4 SQ SOLID STL/ZINC	
all	3	5N1E05AG42	NPT NIP 1.25X5 TBE GALSTL SK40	
all	4	96D0011E	1.25"NPTBRZ N/C STEAMVALANGBD	
all	5	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MP	
all	6	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	7	5N1E17AG42	NPT NIP 1.25X17 TBE GALSTL SK4	
all	8	5SL1ENFK	NPT ELB 45DEG 1.25 GALMAL 150#	
all	9	5N1ECLSG42	NPT NIP 1.25XCLS TBE GALSTLS40	
all	10	5SU1ENF	NPT UNION 1.25" GALMAL 150#	
all	11	51E096C	MALESTEM 1.25"CADPL CAMP#IMS5	
all	12	60E096C42A	STEAMH*OSE=1.25"X42"+2ENDS=(NO	
all	13	5SL1ESFA	NPT ELB 90DEG 1.25 304SS 150#	
all	14	02 14647E	GASKET=DRNTRGH TO RECIRC BOX	
all	15	W3 64566B	*WLM=STM SPARGER .75 ORF-12"L	
all	16	15K096	HEXCAPSCR 3/8-16UNC2X1SS18-8	
all	17	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	18	W2 19250C	* STEAM+WATER INLET=60WE ONLY	
all	19	27A084	HOSECLAMP 3+9/16-4.5CADSC#HS64	
all	20	60E306A04K	HOSE=*3.5"1D PE X 4.5"	
all	21	87Z070018A	TUBE=3.5"OD X 18"LG SQ ENDS	
all	22	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	23	27A035	UBOLT 3/8-16 3.625"BETWEN LEGS	
all	24	15G235	HEXNUT 1/2-20UNF2B SAE ZINC GR	
all	25	27A032M	UBOLT 2"PIPE 3/8-16 ZNC3.5" LG	
all	26	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	27	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	28	27A031	UBOLT 1"PIPE 5/16-18X2+3/16LG	
all	29	02 16306A	BRKT=1+1/4"PIPE SUPPORT	
all	30	60E306A18A	HOSE= *3.5"ID PE X18"	
all	31	27A084	HOSECLAMP 3+9/16-4.5CADSC#HS64	

Universal Actuators & Mounting Hardware for Watts Ball Valves - New Pivot







SIZE	X	Y
2" VALVES	3.89	2.75

NOTES:

1)RIGHT HAND ASSEMBLY IS SHOWN, LEFT HAND ASSEMBLY IS OPPOSITE.

2) FOR 90 DEGREE VALVE SET, VALVE IS ROTATED 90 DEGREES.

3) ASSEMBLE SO THAT THE LINKAGE IS FREE TO MOVE IN THE SPACER, THIS MEANS THAT THERE SHOULD BE DAYLIGHT BETWEEN THE CRANK AND EACH ADJACENT WASHER WITHOUT EXCESSIVE CLEARANCE.

Parts List—Actuators & Mounting Hardware for Watts Ball Valves

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	AA	96D085BCSL	92000Z 1.00WAT BVAL+ACT/BR/NC/ST/LH	
	AB	96D085BCSR	93513S 1.00WAT BVAL+ACT/BR/NC/ST/RH	
	AC	96D085BOSL	93513S 1.00WAT BVAL+ACT/BR/NO/ST/LH	
	AD	96D085BOSR	93513S 1.00WAT BVAL+ACT/BR/NO/ST/RH	
	AE	96D085SOSR	92000Z 1.00WAT BVAL+ACT/SS/NO/ST/RH	
	AF	96D085SCSR	92000Z 1.00WAT BVAL+ACT/SS/NC/ST/RH	
	BA	96D086BCSL	93513S 1.25WAT BVAL+ACT/BR/NC/ST/LH	
	BB	96D086BCSR	93513S 1.25WAT BVAL+ACT/BR/NC/ST/RH	
	BC	96D086BOSL	93513S 1.25WAT BVAL+ACT/BR/NO/ST/LH	
	BD	96D086BOSR	93513S 1.25WAT BVAL+ACT/BR/NO/ST/RH	
	BE	96D086SCNR	92000Z 1.25WAT BVAL+ACT/SS/NC/90/RH	
	BF	96D086SCSL	92000Z 1.25WAT BVAL+ACT/SS/NC/ST/LH	
	BG	96D086SCSR	92000Z 1.25WAT BVAL+ACT/SS/NC/ST/RH	
	BH	96D086SOSL	92000Z 1.25WAT BVAL+ACT/SS/NO/ST/LH	
	BJ	96D086SOSR	92000Z 1.25WAT BVAL+ACT/SS/NO/ST/RH	
	CA	96D087BCSL	93513S 1.50WAT BVAL+ACT/BR/NC/ST/LH	
	CB	96D087BCSR	93513S 1.50WAT BVAL+ACT/BR/NC/ST/RH	
	CC	96D087BOSR	93513S 1.50WAT BVAL+ACT/BR/NO/ST/RH	
	CD	96D087SCNR	92000Z 1.50WAT BVAL+ACT/SS/NC/90/RH	
	CE	96D087SCSR	92000Z 1.50WAT BVAL+ACT/SS/NC/ST/RH	
	CF	96D087SOSR	92000Z 1.50WAT BVAL+ACT/SS/NO/ST/RH	
	DA	96D088BCSR	92177S 2.00WAT BVAL+ACT/BR/NC/ST/RH	
	DB	96D088BCNR	92177S 2.00WAT BVAL+ACT/BR/NC/90/RH	
	DC	96D088BCSL	92177S 2.00WAT BVAL+ACT/BR/NC/ST/LH	
	DD	96D088BOSR	92177S 2.00WAT BVAL+ACT/BR/NO/ST/RH	
	DE	96D088SCNR	92177S 2.00WAT BVAL+ACT/SS/NC/90/RH	
	DF	96D088SCSR	92177S 2.00WAT BVAL+ACT/SS/NC/ST/RH	
	DG	96D088SOSR	92177S 2.00WAT BVAL+ACT/SS/NO/ST/RH	
	DH	96D088BCNL	92177S 2.00WAT BVAL+ACT/BR/NC/90/LH	
	DJ	96D088BOSL	92177S 2.00WAT BVAL+ACT/BR/NO/ST/LH	
	DK	96D088SCSL	92177S 2.00WAT BVAL+ACT/SS/NC/ST/LH	
	DL	96D088SOSL	92177S 2.00WAT BVAL+ACT/SS/NO/ST/LH	
			COMPONENTS	
AA-AD, BA-BD, CA-CC	1	SA 10 056F	92000Z AIRCYL=2.38ODX2.70STX20.5#CD	
AE-AF, BE-BJ, CD-CF	1	SA 10 056G	92000Z*AIRCYL=2.38ODX2.70STX20.5#SS	
DA-DD, DH-DJ	1	SA 10 057C	95222D AIRCYL=3.0ODX3.89ST171/176CD	
DE-DG, DK-DL	1	SA 10 057D	95222# AIRCYL=3.0ODX3.89ST171/176SS	
AA-AE	2	96D085WEXS	07Z BALVAL 1" BRZ WATTS#B6400SSZ107	
AF	2	96D085WSS	07Z BALVAL 1" SS WATTS S8000-Z107	
BA-BD	2	96D086WEXS	08Z BAVAL 1+1/4BRZ WATS#B6400SSZ107	
BE-BJ	2	96D086WSS	08Z BAVAL 1+1/4"SS WATTS S8000-Z107	
CA-CC	2	96D087WEXS	09Z BAVAL 1+1/2BRZ WATS#B6400SSZ107	

Parts List, cont.—Actuators & Mounting Hardware for Watts Ball Valves

Used In	Item	Part Number	Description	Comments
CD-CF	2	96D087WSS	08Z BAVAL 1+1/2"SS WATTS S8000-Z107	
DA-DD, DH-DJ	2	96D088WEXS	09Z BALVAL 2" BRZ WATTS#B6400SSZ107	
DE-DG, DK-DL	2	96D088WSS	09Z BALVAL 2" SS WATTS S8000-Z107	
AA,AC	3	03 01634A	94053# ACTUATOR CHANNL SUPPORT-LEFT	
AB,AD,AE, AF	3	03 01634	94053C ACTUATOR CHANNL SUPPORT 1.0"	
BA,BC,BF, BH,CA	3	07 20700L	88512# ACTUATOR ZEE SUPPORT-LEFT	
BB,BD,BE, BG,BJ,CB, CC,CE, CF	3	07 20700	88512D ACTUATOR ZEE SUPPORT	
CD	3	03 01633	92651C ACTUATOR SUPPORT BRKT 1.0"	
DA,DB, DD-DG	3	03 01628	92126D ACTUATOR ZEE SUP 3"AIRCYL	
DC,DH-DL	3	03 01628L	92126# ACT ZEE SUP 3" AIRCYL-LEFT	
AA,AC	4	03 01632A	90507# ACTUATOR BEARING SUPPRT-LEFT	
AB,AD-AF, CD	4	03 01632	90507C ACTUATOR BEARING SUPPORT-1"	
BA,BC,BF, BH,CA	4	07 20702L	88512# ACTUATOR BEARING SUPPORT-LFT	
BB,BD,BE, BG,BJ,CB, CC,CE, CF	4	07 20702A	88512C ACTUATOR BEARING SUPPORT	
DA,DB, DD-DG	4	03 01629	92023C ACTUATOR BEARING SUPPORT 3	
DC,DH-DL	4	03 01629L	92023# ACT BEARING SUPPORT 3"-LEFT	
AA-AF,CD	5	54E001PABA	89281B ASSY=1/4"PRESSBEARING	
BA-BJ, CA-CC,CF, DA-DL	5	54E002PABA	89281B ASSY=5/16"PRESSBEARING	
AA,AB,AF, CD	6	03 01631	91507B+VALVE CRANK N.C.WATTS 1.0"	
AC-AE	6	03 01631A	88381B VALVE CRANK N.O.WATTS-1.0"	
BA,BB,BE, BF,BG,CA, CB,CE	6	07 20703A	91507B VALVE CRANK N.C.WATTS 1.5"	
BC,BD,BH, BJ	6	07 20703B	88153B VALVE CRANK N.O.WATTS 1.5"	
DA,DC,DF, DK	6	03 01624B	92061B CRANK=NC 2"BALVAL .626 STEM	
DB,DD,DE, DG,DH,DJ, DL	6	03 01624C	92061B CRANK=NO 2"BALVAL .626 STEM	
all except CC,CD	7	15K031	BUTSOKCAPSCR 1/4-20X1/2 SS18-8	
CC,CD	7	15N117	RDMACSCR 10-24UNC2X3/8SS18-8	
all	8	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	9	15N130	RDMACHSCR 10-24UNC2A X 1/2 SS18-8	
all	10	15U135	FLATWASH#10 .4370DX.203IDX.04TSS188	

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List, cont.—Universal Actuators & Mounting Hardware for Watts Ball Valves

Used In	Item	Part Number	Description	Comments
all	11	15G126	01Z HXLOCKNUT NYLON 10-24 UNC SS NM	
all	12	15N159	HEXCAPSCR 1/4-2OUNC2AX7/16 18-8SS	
all	13	15G170	HEXNUT 1/4-20UNC2 SS18-8	
AA-AF,BE, CD,DA-DL	14	07 20703D	89354B WASHER=2.00"WATTS CRANK	
BA-BD, BF-BJ, CA-CC,CE, CF	14	07 20703C	89354B WASHER=1.25-1.50 WATTS CRANK	
all	15	02 15893	92683B SPACER=BALL VALVE CRANK STEM	
all	16	15U188	01Z FLTWASH 1/4 STD COMM SS18-8	
all	17	15N186	HXCAPSCR 1/4-20UNC2X3/4SS18-8	
all	18	15G164	01Z HX THIN LOCKNUT NYL1/4-20 SS	
BA,BB,BE, BJ,CE	19	03 01661A	92271B BRKT=RHT AIR CYL SUPT-S/S	
DA,DB, DD-DG	19	03 01625A	92271B 3" AIR-CYL SPT BRK R-SIDE RT	
DC,DH-DL	19	03 01625B	92271# 3" AIR-CYL SPT BRK R-SIDE LT	
BE,BG,BJ, CE-CF	20	03 01662A	92271B BRKT=LFT AIR CYL SUPT-S/S	
DA,DB, DD-DG	20	03 01625C	92271B 3" AIR-CYL SPT BRK L-SIDE RT	
DC,DH, DJ-DL	20	03 01625D	92271# RIGHT=3"AIR CYL SUPT BRKT	
all	21	15K190S	HXCAPSCR 1/2-13UNC2AX2.5 FLTHRD SS	
all	22	27B24S0K1P	SPACER ROLL.5ID1.75L.062T 304 SS	
all	23	15U318S	FLATWASH 1.12ODX.656IDX.09T 304 SS	
AB,DA-DL	24	15G234NS	HXLOCKNUT NYL 1/2-13UNC2 SS18-8	
all	25	15K180S	HXCAPSCR 1/2-13UNCAX2 18-8SS	
all	26	27B24SSK1F	SPACER ROLL.5ID1.25L.062T S/S	
all	27	15U310	LOKWASHER REGULAR 1/2 SS18-8	
all	28	15G231S	HXFINJAMNUT 1/2-13UNC2B SS18-8	
AA-AF	29	03 01633	92651C ACTUATOR SUPPORT BRKT 1.0"	
BA-BJ	29	07 20771	88407C ACTUATOR SUPPORT BRKT 1.25"	
CA-CF	29	07 20770	88243B ACTUATOR SUPPORT BKT 1+1/2	
DA-DL	29	03 01626	89473B ACTUATOR SUPPORT BRKT 2"VAL	

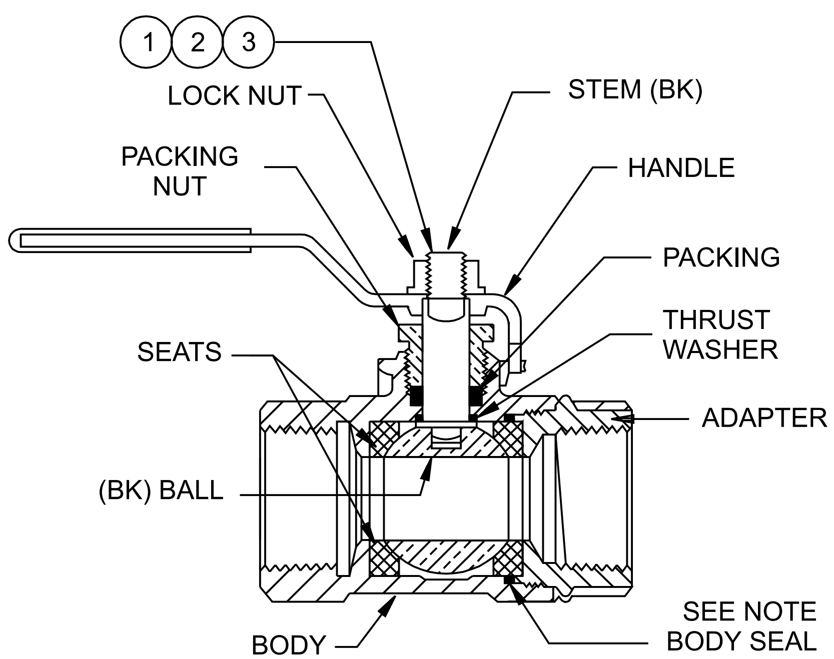
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

BMP920007/96067V (1 of 2)

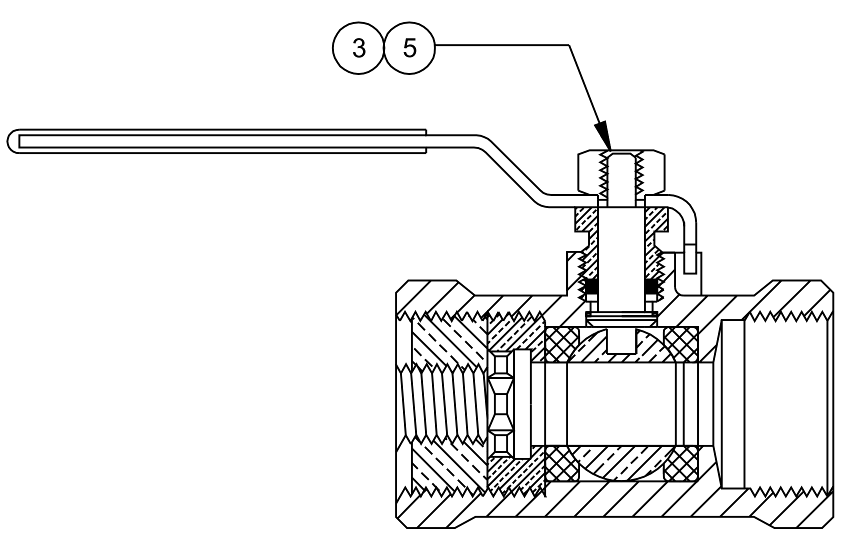
Litho in U.S.A.

Watts Ball Valves and Repair Kits

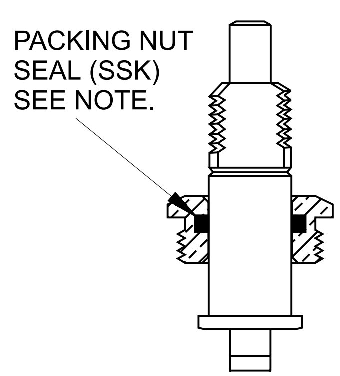
BALL VALVES WITHOUT ACTUATOR PADS FOR MANUAL OPERATION



1/2" BRONZE OR 1/2", 3/4" STAINLESS
NO REPAIR KITS

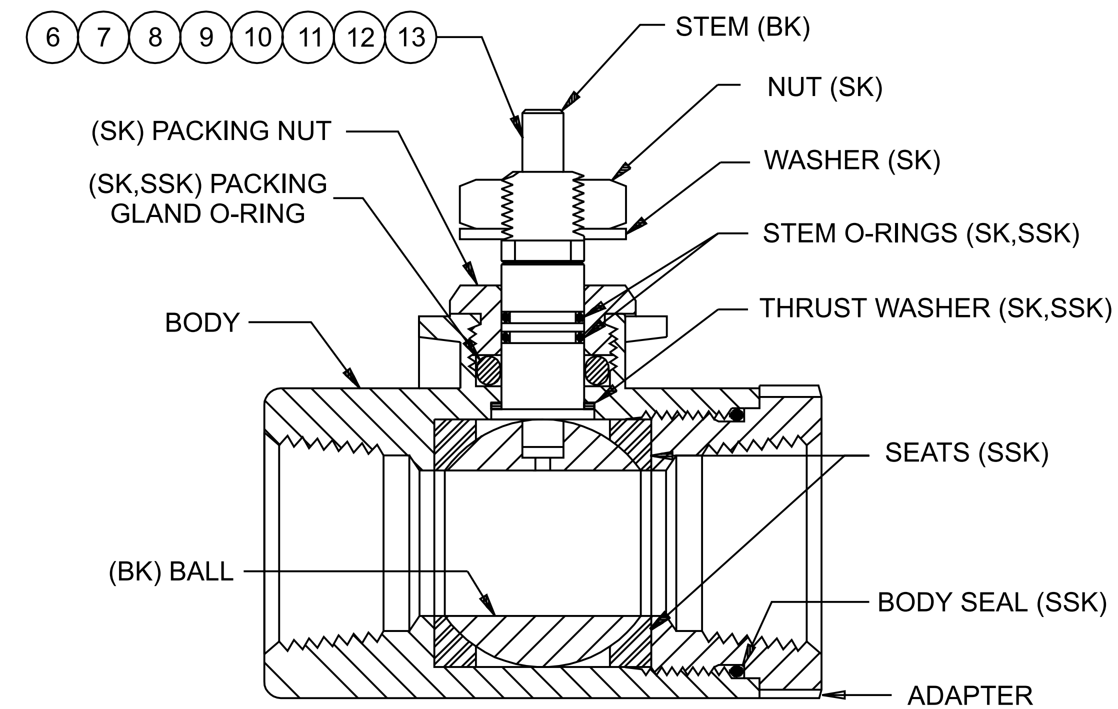


3/4",1"
BRONZE
NO REPAIR KITS



DETAIL
OLD STYLE STEM

AIR OPERATED BALL VALVES



1",1-1/4",1-1/2",2"
BRONZE & STAINLESS
(For Bracketry and Mounting Hardware, See BMP920005. For Air Cylinders that Operate Watts Ball Valves, See BMP920006.)

HOW TO USE THIS DRAWING:

The ball valves are separated by size, material, and type of operation. Find the cross section which shows your ball valve (example 1-1/2" bronze air operated). See the parts list for the item number which represents your ball valve (1-1/2" bronze air operated would be item 10 on the parts list). For valves that offer repair kits the internal parts are labled and marked as to which kit they are found in:

- (BK) part of Ball Kit
- (SK) part of Stem Kit
- (SSK) part of Seat/Seal Kit

For the part number of the Seat/Seal Kit for item 10 (1-1/2" bronze air operated valve) see the parts list and look for item 10SSK, likewise the Stem Kit will be 10SK.

NOTE:
AIR OPERATED VALVES: (SSK) kits for air operated ball valves include all parts required to repair either our old style or new style stems. A packing nut seal is provided to repair our old style stems which had a seal in the packing nut (see Detail). Our new style stem uses a double o-ring design.

Parts List—Watts Ball Valves and Repair Kits

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			—ASSEMBLIES—	
			none	
			—COMPONENTS—	
all	1	96D034	04Z BALLVALVE 1/2" WATTS #6400-SS	1/2"BRONZE-MANUAL, NO KITS
all	2	96D040WSS	01Z 1/2" BALLVALVE S/S WATTS#S-8000	1/2"STAINLESS-MANUAL
all	002BK	96V040BK	BALL KIT WATTS #BV4SSA6	
all	002SSK	96V040SSK	01Z REPKIT 1/2"VAL WATTS#3SSK-02-RK	
all	3	96D050A	01Z 3/4"BALLVALVE BRZ WATTS#B6100	3/4"BRONZE-MANUAL, NO KITS
all	4	96D055WSS	01Z 3/4"BALLVALVE S/S WATTS#S-8000	3/4"STAINLESS-MANUAL
all	004BK	96V055BK	BALL & STEM KIT WATTS #4BSK-SSRK	
all	004SSK	96V055SSK	01Z REPKIT 3/4"VAL WATTS#4SSK-02-RK	
all	5	96D084	01Z BALL VALVE 1" WATTS#B6100 BRZ	1" BRONZE-MANUAL , NO KITS
all	6	96D085WEXS	07Z BALVAL 1" BRZ WATTS#B6400SSZ107	1" BRONZE-AIR OPERATED
all	006BK	96V085BK	BALL KIT WATTS #1-BALL-RK-Z107	
all	006SK	96V085SK	02Z STEM KIT 1" WATTS#1-ST-RK-Z107	
all	006SSK	96V085SSK	02Z REPKIT 1"BALVAL#1SSK-02-KK-Z107	
all	7	96D085WSS	07Z BALVAL 1" SS WATTS S8000-Z107	1" STAINLESS-AIR OPERATED
all	007BK	96V085BK	BALL KIT WATTS #1-BALL-RK-Z107	
all	007SK	96V085SK	02Z STEM KIT 1" WATTS#1-ST-RK-Z107	
all	007SSK	96V085SSK	02Z REPKIT 1"BALVAL#1SSK-02-KK-Z107	
all	8	96D086WEXS	08Z BAVAL 1+1/4BRZ WATS#B6400SSZ107	1-1/4"BRONZE-AIR OPERATED
all	008BK	96V086BK	BALL KIT WATTS #1.25-BALL-RK-Z107	
all	008SK	96V086A7SK	02Z STEMKIT 1.25-1.5-ST-RK-Z107	

Parts List, cont.—Watts Ball Valves and Repair Kits

Used In	Item	Part Number	Description	Comments
all	008SSK	96V086SSK	02Z REPKIT 1.25BALVALSSK-02-RK-Z107	
all	9	96D086WSS	08Z BAVAL 1+1/4"SS WATTS S8000-Z107	1-1/4"STAINLESS-AIR OPER.
all	009BK	96V086BK	BALL KIT WATTS #1.25-BALL-RK-Z107	
all	009SK	96V086A7SK	02Z STEMKIT 1.25-1.5-ST-RK-Z107	
all	009SSK	96V086SSK	02Z REPKIT 1.25BALVALSSK-02-RK-Z107	
all	10	96D087WEXS	09Z BAVAL 1+1/2BRZ WATS#B6400SSZ107	1-1/2"BRONZE-AIR OPERATED
all	010BK	96V087BK	BALL KIT WATTS #1.5-BALL-RK-Z107	
all	010SK	96V086A7SK	02Z STEMKIT 1.25-1.5-ST-RK-Z107	
all	010SSK	96V087SSK	02Z REPAIR KIT 1.5" BALL VALVE	
all	11	96D087WSS	08Z BAVAL 1+1/2"SS WATTS S8000-Z107	1-1/2"STAINLESS-AIR/ OPER.
all	011BK	96V087BK	BALL KIT WATTS #1.5-BALL-RK-Z107	
all	011SK	96V086A7SK	02Z STEMKIT 1.25-1.5-ST-RK-Z107	
all	011SSK	96V087SSK	02Z REPAIR KIT 1.5" BALL VALVE	
all	12	96D088WEXS	09Z BALVAL 2" BRZ WATTS#B6400SSZ107	2"BRONZE-AIR OPERATED
all	012BK	96V088BK	BALL KIT WATTS #2-BALL-RK-Z28	
all	012SK	96V088SK	03Z STEM KIT 2" WATTS#2-ST-RK-Z107	
all	012SSK	96V088SSK	02Z REPKIT 2"VAL WAT2SSK-02-RK-Z107	
all	13	96D088WSS	09Z BALVAL 2" SS WATTS S8000-Z107	2"STAINLESS-AIR OPERATED
all	013BK	96V088BK	BALL KIT WATTS #2-BALL-RK-Z28	
all	013SK	96V088SK	03Z STEM KIT 2" WATTS#2-ST-RK-Z107	
all	013SSK	96V088SSK	02Z REPKIT 2"VAL WAT2SSK-02-RK-Z107	

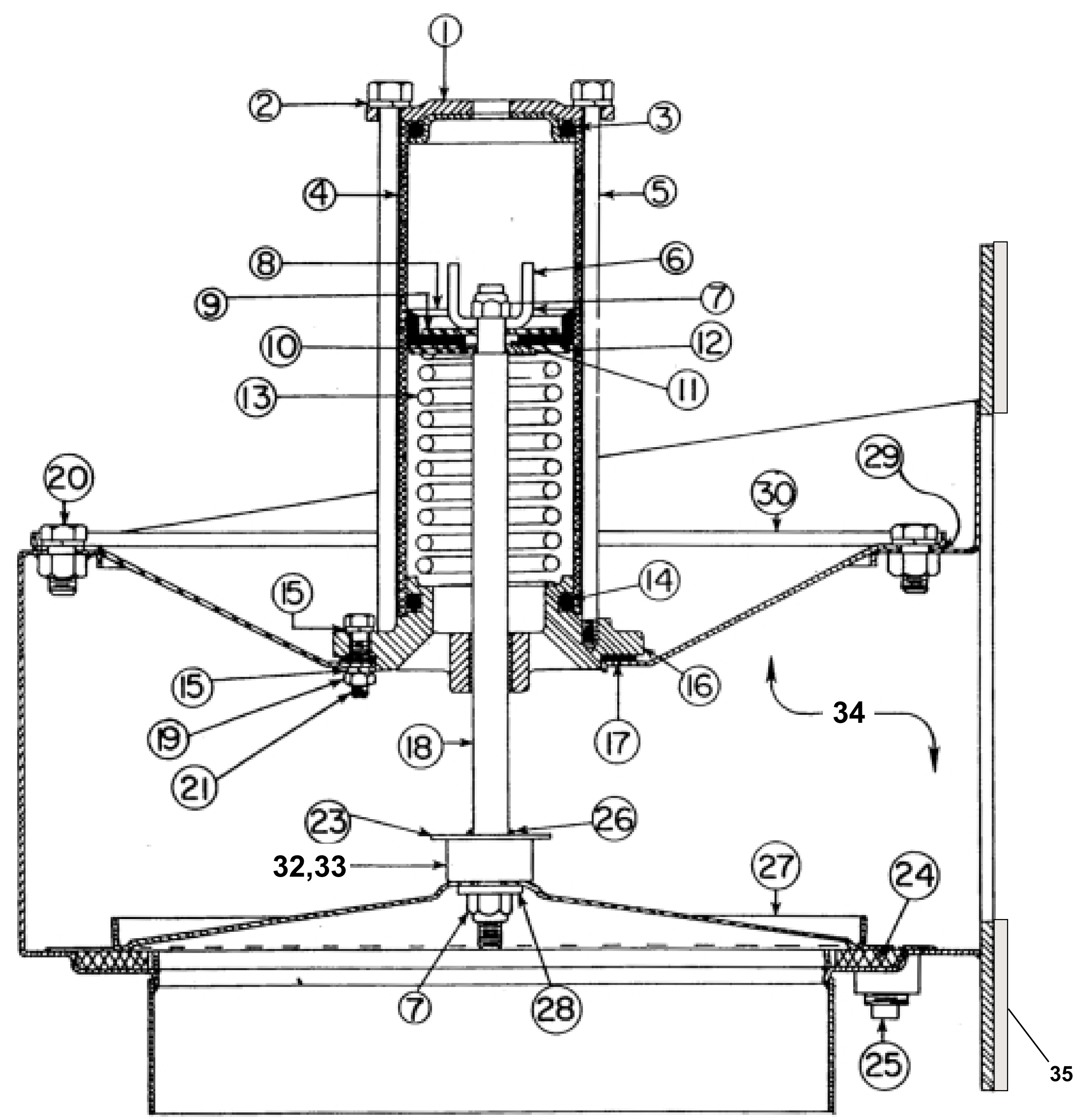
8” & 10” Stainless Dump Valve

42044WP2/CP2/SP2/SP3/NP2 52038WP1 60044WP2/WP3/SP2/SP3
72044WP1/D5N 72058SP2

BMP780095/2006185B
(Sheet 1 of 1)

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



Parts List—8” & 10” Stainless Dump Valve

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
	A	SA 28 124	*8"SGL.DUMPVALVE 4244+52+60	42044WP2/CP2/SP2/SP3/NP2 52038WP1 60044WP2/WP3/SP2/SP3
	B	SA 36 015	10"SGL.DUMP VALVE 72WE+SG+WT	72044WP1/SP2, 72058D5N
	C	SA 28 158	* BONNET+AIRCYL=8"SS DUMPVALV	8" DUMP VALVE
	D	SA 36 044	* BONNET+AIRCYL=10"SS DUMPVAL	10" DUMP VALVE
			-COMPONENTS-	
all	1	02 02101	CYLHEAD W/TAPPED HOLE	
all	2	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	3	60C132	ORING 2"IDX3/16CS BUNA70 #329	
all	4	02 02068	AIRCYL-STAINLESS=DUMPVALVE	
all	5	02 10585D	TIE BOLT=5/16-18X7.875 PLTD	
all	6	03 01313	STOP=AIR CYL W/2+11/16STROKE	
all	7	15G220	LTHX THIN LOKNUT 3/8-24 SSNTE	
all	8	02 02194	PISTONCUP=DUMPVALVE 2+3/8"	
all	9	02 02085	UP WASHER=2"OD=PISTON CUP	
all	10	60C106	ORING 5/16ID 1/16CS BUNA70#011	
all	11	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	12	02 02105	PISTON CUP WASHER STNLS STL	
all	13	03 06429	SPRING=2.11ODX6.5FL 64#/"	
all	14	60C132	ORING 2"IDX3/16CS BUNA70 #329	
all	15	24G020N	ROLLED WASH.252ID NYLTITE 25W	
all	16	X2 02743	BONNET=2"DUMP VALVE	
all	17	02 18931F	GASKET=DUMPVALVE-1/60+72WEHU	
all	18	02 16021I	DUMPVAL STEM-4"+8"316SS	
all	19	15G168	SQNUT 1/4-20UNC2 SS18-8	
all	20	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	21	15K041S	HEXCAPSCR 1/4-20UNC2AX1 SS18-8	
all	23	02 16021E	WASHER 3/8IDX1.250D DUMPVAL	
A	24	02 18068	9 SEAT-RESILIENT=8"DUMPVALVE	
BI	24	03 06084	SEAT-RESILIENT=10"DUMPVALVE	
all	25	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
all	26	60C106	ORING 5/16ID 1/16CS BUNA70#011	
A	27	02 18796	DISC-8" DUMP VALVE S/S	
B	27	03 06083	DISC-10"DUMP VALVE S/S	
all	28	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	29	03 06086G	GASKET=10" DUMP VALVE BONNET	
A	30	02 18931E	BONNET-8"DUMP VALVE	8" DUMP VALVE
B	30	03 06086F	BONNET=10"DUMP VALVE	10" DUMP VALVE
All	32	02 16021C	BUMPER=DUMP VALVE BONNET	
all	33	02 16021D	DUMP VALVE BUMPER RETAINER	
A	34	W2 18931	* BODY=8"DUMPVALV=4244,60,52	8" DUMP VALVE
B	34	W3 06086	*BODY=10"DUMP VALVE 72WE,SG,T	10" DUMP VALVE
A	35	02-18107	GASKET=8"FLANGED DUMP VALVE	8" DUMP VALVE
B	35	03 06085D	GASKET=10"FLANGEDUMP72D 8050	10"DUMP VALVE

Section 9

Pneumatic Piping and Assemblies

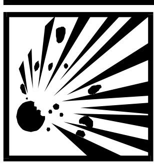
SERVICING AIR CYLINDERS

This is the general procedure for rebuilding an air cylinder using a Milnor® furnished repair kit, once the air cylinder has been removed from the machine. See the specific air cylinder and major assembly parts drawing(s) for component identification and removal/replacement information.

Maintenance procedures require:

- Two threaded rods and nuts, twice the length of the tie bolts.
- The appropriate repair kit.

⚠ CAUTION ⚠



EXPLOSION HAZARD—Spring tension can cause air cylinder to burst apart with great force during dissassembly. You can be struck by air cylinder parts.

☞ **Follow maintenance instructions carefully.**

☞ **Wear eye protection.**

NOTE: Use a new locknut when re-assembling air cylinder (see the appropriate parts drawing).

1. Replace two diagonally opposite tie bolts with threaded rods and nuts as shown in FIGURE 1.
2. Tighten nuts on the threaded rods until they contact the air cylinder.
3. Remove the other two tie bolts and the nuts, washers, clips, and actuators from the external end of piston stem.

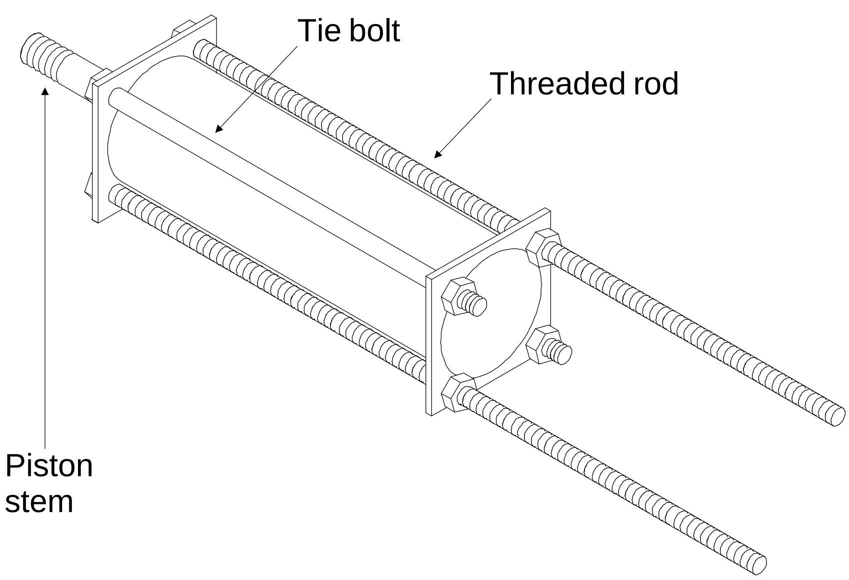


FIGURE 1 (MSSM0130AE)
Using Threaded Rods

4. Loosen nuts on threaded rods evenly, permitting cylinder heads to separate. Use only a few turns on one nut before moving to the other one. Continue until springs have no tension.

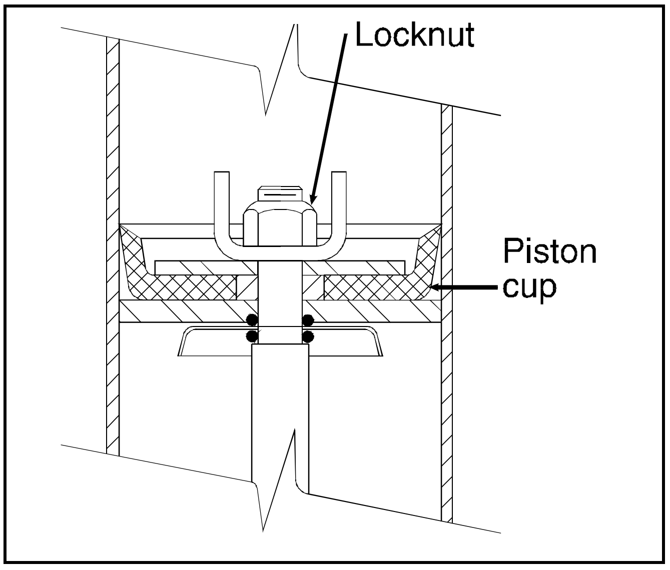


FIGURE 2 (MSSM0130AE)
Correct Piston Cup Shape

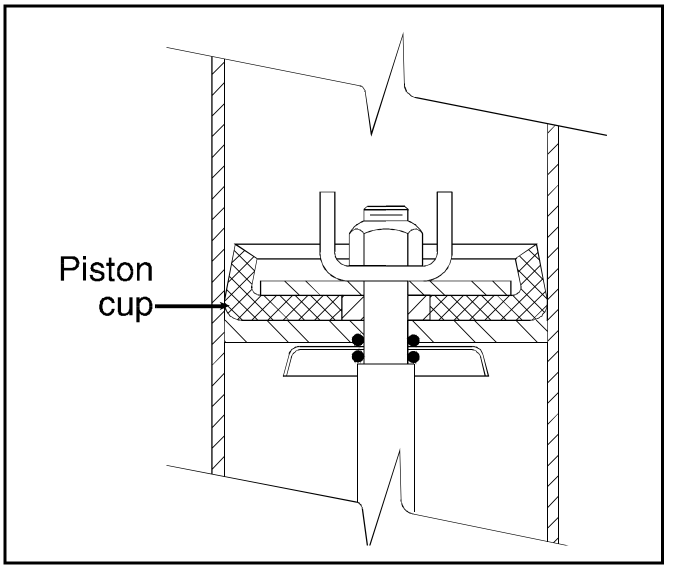
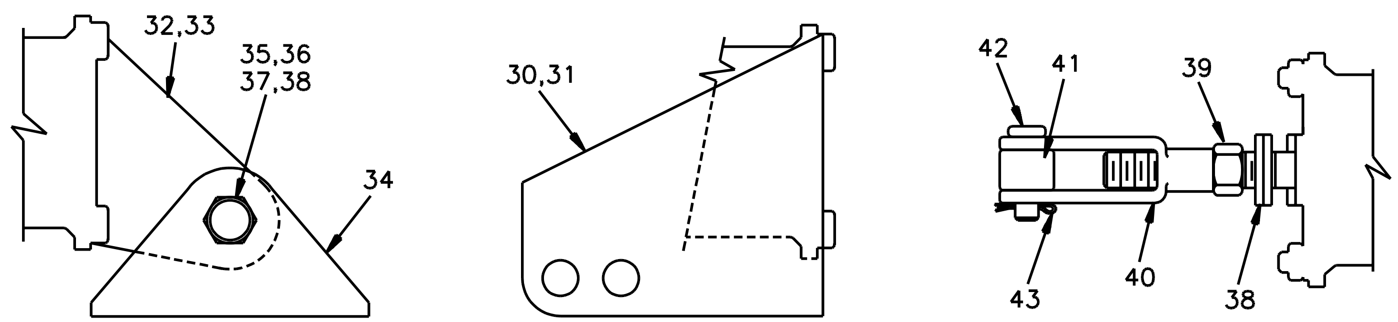


FIGURE 3 (MSSM0130AE)
Distorted Piston Cup Shape

5. Note position and orientation of piston cup(s), washers, and springs. Replace worn parts, then reassemble in reverse order. Tighten locknut until it is just barely possible to turn the piston cup and washer assembly on the stem. Correct piston cup shape is shown in FIGURE 2. **DO NOT** overtighten, as this causes the piston cup to deform to the shape shown in FIGURE 3 and may cause piston to bind in cylinder.

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

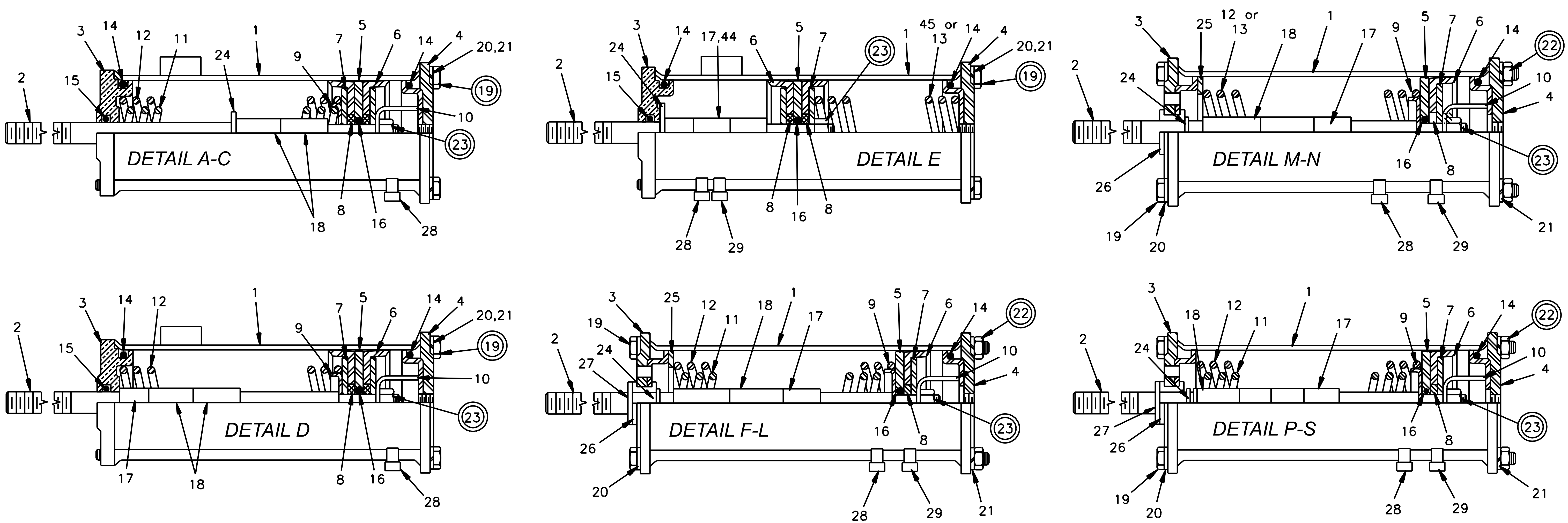
Litho in U.S.A.



AIR CYLINDER MOUNTING HARDWARE

⚠ WARNING ⚠

EXPLOSION HAZARD - Air cylinder can burst apart with great force.
Circled items are under high spring tension.
Follow maintenance instructions MSSM0130AE carefully.



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

Parts List—Air Cylinder Assemblies

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			—ASSEMBLIES—	
	A	SA 36 035	89483V* AIRCYL=BRAKE ASSY	72WP2,WP3,WE3
	B	SA 28 128	89483T* BRAKE AIRCYL 2-WAY 60+72SGU	60+72SP2,SP3
	C	SA 28 152	89483V* BRAKE AIRCYL 2-WAY 60WE2+3	60WP2,WP3,D3A,DA3
	D	SA 10 019A	89483U* BRAKE AIRCYL,2-WAY=42WE+DAU	4231/4244 WP2/WP3 CP2/CP3 NP2/NP3 SP2/SP3
	F	A52 00200	89463U* BRAKE AIRCYL=7244 TILT ONLY	72DA1/L/N,DBN, WTL/N,WP1
	G	SA 10 019Q	89483T*BRAKE CYL ASSY=4226QWE+DYA	4226DP1,DA1,DYP,D5P
	H	AAC14001A	90000Z AIRCYL-LONG= 42S6PSG	3621+26Q6X 4226Q4X,Q6X
	I	A76AC001A	89463T AIR CYL.2-3/8 BORE 2"STROKE	5840TG2,TS1,TT1
	J	A76AC001B	89463@ AIR CYL.2-3/8 BORE 3"STROKE	5840TG2,TS1,TT1
	K	A75 01200	89463T*AIR CYL. DAMPER = 3"STROKE	5858+80TG1/2,TS1,TT1
	L	A75 01300	89463U*AIR CYL. DAMPER = 2"STROKE	5858+80TG1/2,TS1,TT1
	M	SA 10 019	89497U* BRAKE AIRCYL=BALCOM+DIVCYL	
	N	AAC14001	90041U*AIRCYL=RATE 50-91 STRK 2.09	3621F8P
	P	A25 00600	89457V* BRAKE AIRCYL=52WE1 +52TILT	52LWN/H,WTL/N,WP/E1,DYA
	Q	AAC64001	894613*AIRCYL=BRAKE ASSY 6442	64BTL,BTN,BHP, DA1,DAL,DAN
	R	AAC65001	93481B AIRCYL=BRAKE ASSY 6446E6N	6446,7246,7258,M7E 4244SP2 SM
	S	AAC58001	95000Z AIRCYL=BRAKE ASSY 7258J2N	7258J2N
			—COMPONENTS—	
A-D	1	W2 18646	93344L*CYLINDER-AIR=DOUBLEACT BRAKE	
F-S	1	02 02068	94266A AIRCYL-STAINLESS=DUMPVALVE	
A-D,F-G,S, I-K,M-Q	2	02 18650	96431B STEM=2 WAY AIRCYLINDER BRAKE	
H	2	03 06313A	96431# STEM=AIR CYL 304SS	
L	2	02 18650A	96417B STEM-AIRCYL.UPLOCK PRESS	
R	2	02 18650B	97362B STEM=2WAY AIRCYL BRAKE 7.88L	
A-D	3	02 18660	CYLHEAD-BRASS=2WAY AIRCYL	
F-Q	3	02 02546	CYLHEAD=SLIDESTEM	
R	3	06 20702E	91227B FLOW NOT ACTUATOR CYL HEAD	
S	4	02 02101	71334A CYLHEAD W/TAPPED HOLE	
ALL	5	02 02105	91522A PISTON CUP WASHER STNLS STL	
S	5	02 02105B	92253B 2.38"ACYL BRASS PISCUP WASHR	
ALL	6	02 02194	93217B PISTONCUP=DUMPVALVE 2+3/8"	
ALL	7	02 02085	75161A UP WASHER=2"OD=PISTONCUP	

Parts List, cont.—Air Cylinder Assemblies

Used In	Item	Part Number	Description	Comments
ALL	8	02 02185	79237A WASHER=PISTON CUP COMP LIMIT	
A-D,F-Q,S	9	02 18651	73171A WASHER=2WAY BRAKECYL	
A-D,F-Q,S	10	03 01313	70219A STOP=AIR CYL W/2+11/16STROKE	
A-C,F-L,P-Q S	11	02 15880	96471B SPRING=BRAKE1.5OD10.3FL17#/"	
A,D,F-M,Q,S	12	02 15881	96471# SPRING=BRAKE2.1OD11FL15.5#/"	
N	13	02 17023	83392B SPRING-SS=DUMP 1.5OD8FL21#/"	
ALL	14	60C132	ORING 2"IDX3/16CS BUNA70 #329	
A-D	15	60C110	ORING 1/2IDX3/32CS BUNA70 #112	
ALL	16	60C106	ORING 5/16ID 1/16CS BUNA70#011	
D,G-J,L-N Q,S	17	27B240	SPCRROLL.5ID.813L.062T STLZNC	
A,C-D,F-Q,L S	18	27B250	SPCRROLL.5ID1.5L.062T STLZNC	
S	19	02 10585E	91142# TIE BOLT=5/16-18X8.25LG PLTD	
ALL	19	02 10585E	91142# TIE BOLT=5/16-18X8.25LG PLTD	
R ONLY	19	W6 20702F	90293B*FLOW NOT VLV=AIR-CYL ROD WLD	
ALL	20	15U200	FLATWASHER(USS STD) 5/16"ZNC PLT	
ALL	21	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
F-Q	22	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR2	
ALL	23	15G220	02Z LTHX THIN LOKNUT 3/8-24 SSNTE	
A,C,F-G,I-J L,Q,S	24	15U243	FLAWASHER 7/8ODX33/64IDX16GA ZINCPL	
F-N	25	15U520	FLAT WASHER 2+3/8X1+41/64X12GA ZINC	
F-Q,S	26	54E220	NYLNR 8L2FF BUSH 1/2X9/16X.140	
F,K,I-J,Q,S	27	17B012	EXTRETRING IND#1000-50-ST-ZD ZINC	
A	28	20L601R	ID TAG NAT'L #1614 ALUM EMB LET "R"	
B	28	20L601U	ID TAG NAT'L #1614 ALUM EMB LET "U"	
C	28	20L601P	ID TAG NAT'L #1614 ALUM EMB LET "P"	
D	28	20L601X	ID TAG NAT'L #1614 ALUM EMB LET "X"	
S	28	20L601J	ID TAG NAT'L #1614 ALUM EMB LET "J"	
F,H,Q,S	28	20L601A	ID TAG NAT'L #1614 ALUM EMB LET "A"	
G	28	20L601Q	ID TAG NAT'L #1614 ALUM EMB LET "Q"	
M	28	20L601F	ID TAG NAT'L #1614 ALUM EMB LET "F"	
N	28	20L601D	ID TAG NAT'L #1614 ALUM EMB LET "D"	
P	28	20L601V	ID TAG NAT'L #1614 ALUM EMB LET "V"	
K	28	20L601V	ID TAG NAT'L #1614 ALUM EMB LET "V"	
I-J,L	28	20L601E	ID TAG NAT'L #1614 ALUM EMB LET "E"	
F,I-L	29	20L601A	ID TAG NAT'L #1614 ALUM EMB LET "A"	
G-H	29	20L601F	ID TAG NAT'L #1614 ALUM EMB LET "F"	

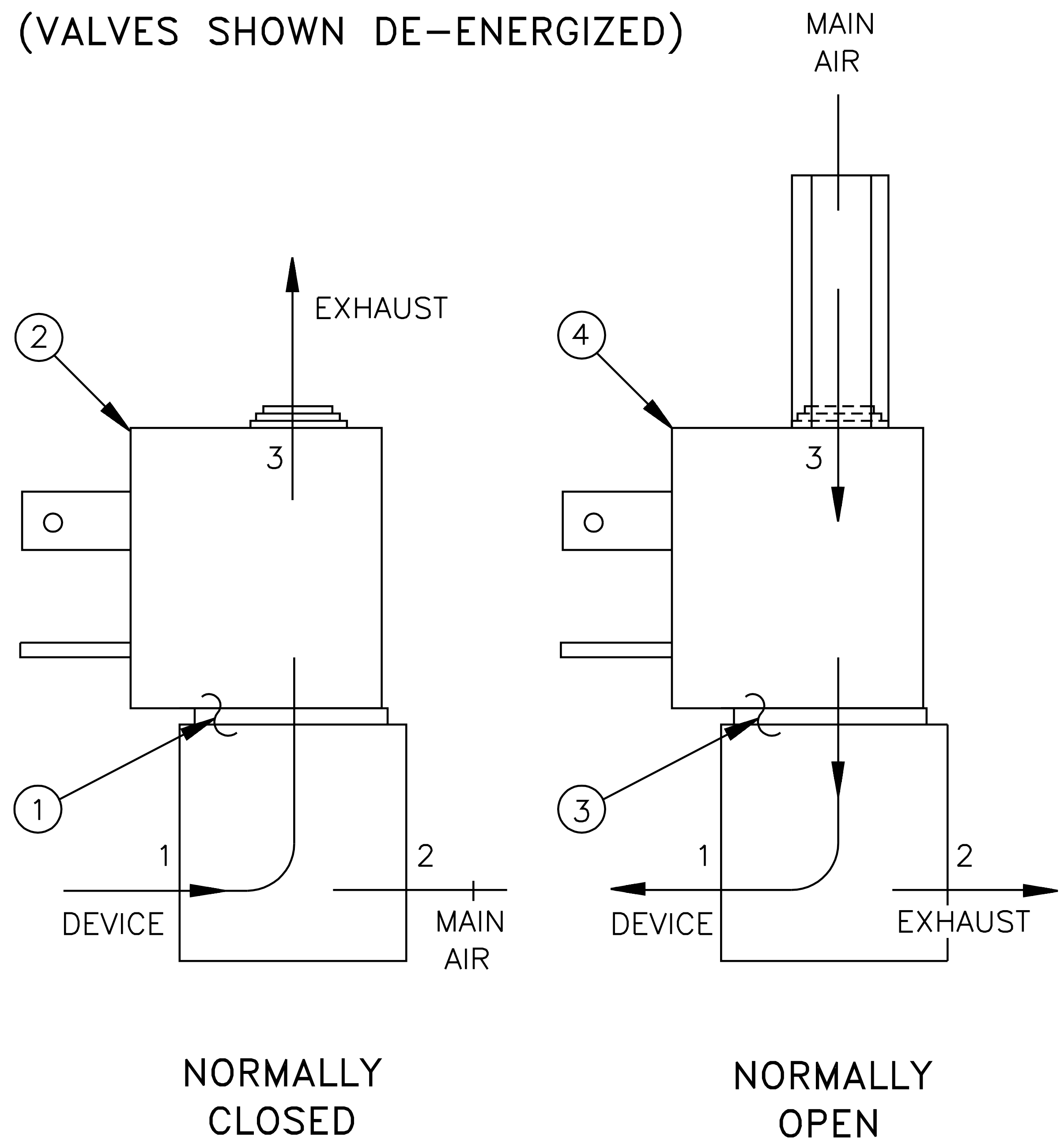
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List, cont.—Air Cylinder Assemblies

Used In	Item	Part Number	Description	Comments
N	29	20L601C	ID TAG NAT'L #1614 ALUM EMB LET "C"	
Q	29	20L601D	ID TAG NAT'L #1614 ALUM EMB LET "D"	
ALL	30	03 06309	70310C RIGHTMOUNT=BRAKE CYL ZNC	RIGHT
ALL	31	03 06308	70310C LEFTMOUNT=BRAKE CYL ZINC	LEFT
ALL	32	02 02550	97437ABRKT=AIRCYL-RIGHT ZINC/CAD	RIGHT
ALL	33	02 02547	LT BRACKET=AIRCYL CAD	LEFT
ALL	34	02 02556	SUPPORT=AIRCYL CADSTL	
ALL	35	27B2750L0T	01Z SPC RROLL.562ID.937L.048T ZNK	
ALL	36	15K206	HEXCAPSCR M5-.8X40MM 18-8SS	
ALL	37	15G235F	HXFNJAMNUT 9/16-12UNC2B ZINC GR2	
ALL	38	15U280	01Z FL+WASHER(USS STD)1/2 ZNC PL+D	
ALL	39	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
ALL	40	17A020	ADJ CLEVIS MACHINED 1/2-13 ZINC PLT	
ALL	41	17A065	01Z EYEEND 1/2-13 X2.25 ZINC	
ALL	42	17A040	CLEVISPIN 1/2"X1+3/8" DRILLED	
ALL	43	15H030	STDCOTTERPIN 3/32X3/4 ZINCPL	
ALL	44	27B34010SZ	SPCRROLL.512ID.625L.062T STLZC	
ALL	45	02 17024	94302B SPRING-SS=DUMP 1.5OD4FL40#/"	

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
BMP900032/91182V (1 of 1)
Litho in U.S.A.

3-Way Pilot Valves



FOR REPAIR OR REPLACEMENT PARTS FOR PILOT VALVES USED ON WASHER EXTRACTORS GENERALLY PRIOR TO JUNE 1, 1985, SEE BMP701359.

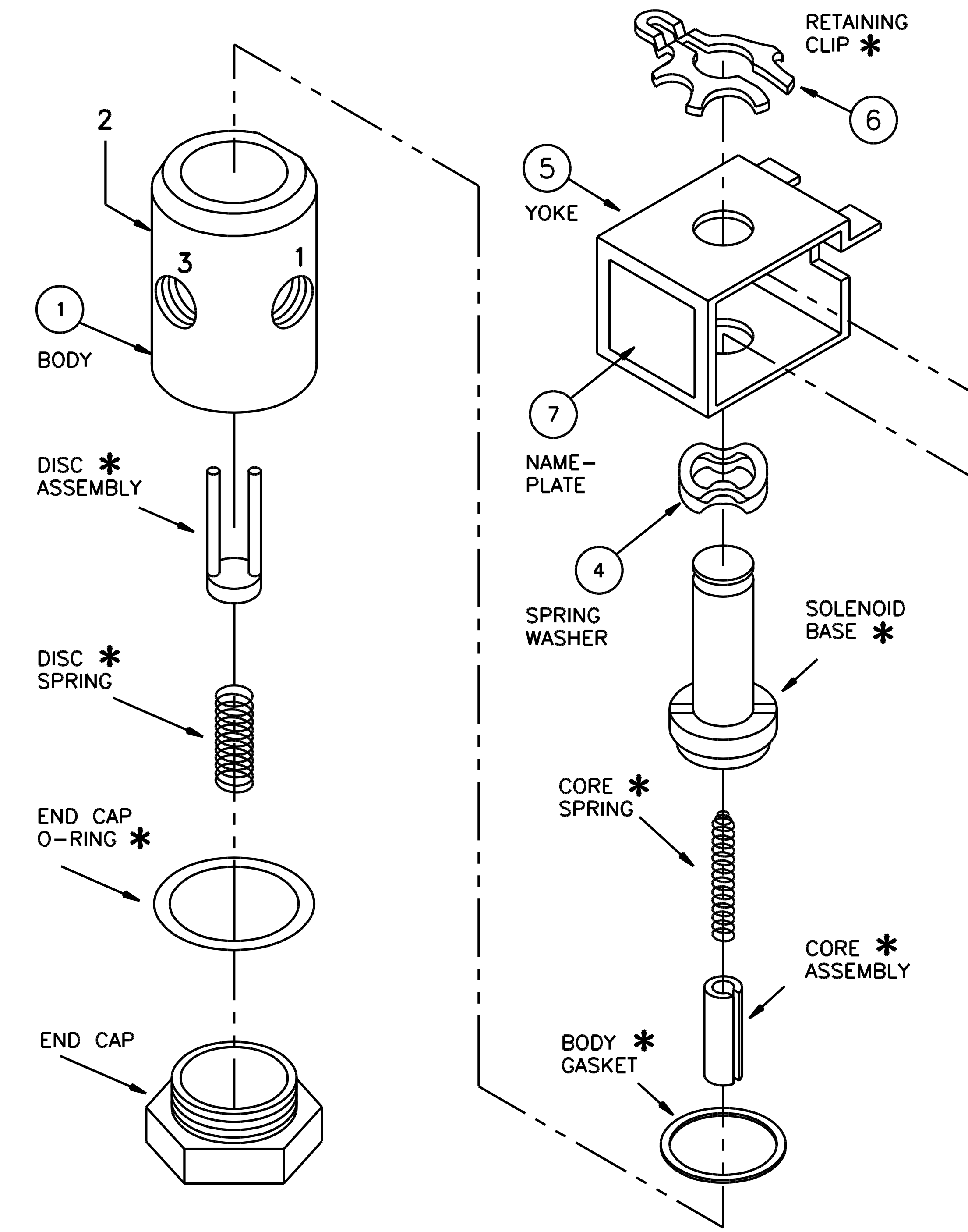
Parts List—3-Way Pilot Valves

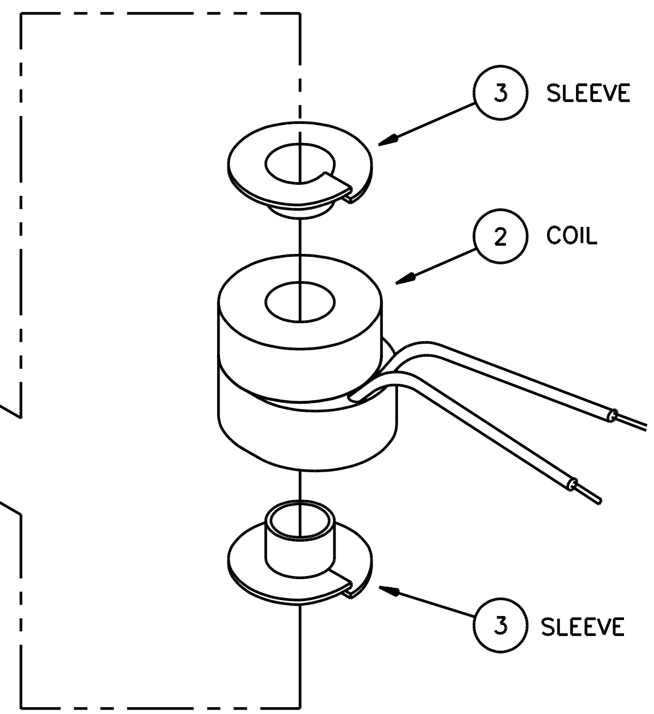
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
			none	
			COMPONENTS	
all	1	96R301A37	05Z 1/8" AIRPILOT 3W NC 120V50/60	
all	1	96R301A24	06Z 1/8" AIRPILOT 3W NC 24V50/60	
all	3	96R302A37	06Z 1/8" AIRPILOT 3W NO 120V50/60	
all	3	96R302A24	07Z 1/8" AIRPILOT 3W NO 24V50/60	

Asco 3-way Solenoid Valves
Applicable Models

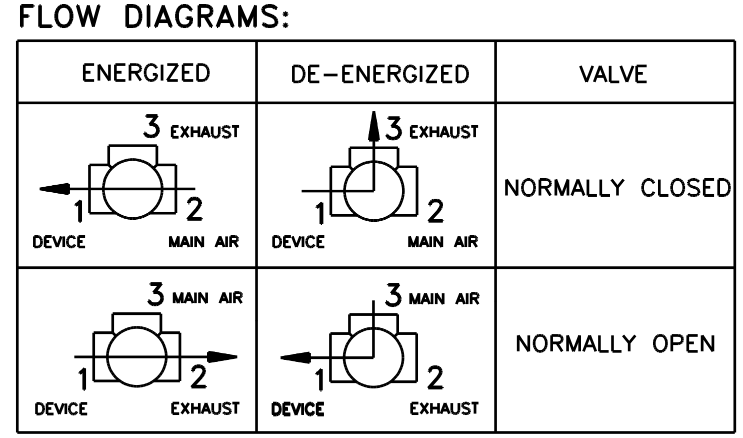
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400





COMPONENTS LABELED (✱) ARE CONTAINED IN KIT "00Q", SEE PARTS LIST FOR OTHER AVAILABLE KITS.

FLOW DIAGRAMS:



OPERATION

NORMALLY CLOSED VALVE – OPEN WHEN ENERGIZED
CLOSED WHEN DE-ENERGIZED

NORMALLY OPEN VALVE – CLOSED WHEN ENERGIZED
OPEN WHEN DE-ENERGIZED

Identification and Description

Check nameplate for correct catalog number, pressure, voltage, and service.

Safety Instructions

⚠ DANGER ⚠

SHOCK HAZARD - will cause death or severe injury.

☞ **Lock OFF - and tag out power at wall disconnect before servicing. Power switches on machine and control box disable only control circuit power in electrical boxes.**

⚠ WARNING ⚠

EXPLOSION HAZARD- may cause serious injury.

☞ **Release pressure to valve before disassembly.**

⚠ CAUTION ⚠

BURN HAZARD - Solenoid enclosures become too hot to touch when energized for a long period. This will not damage the solenoid, but may cause a painful burn.

☞ **Allow solenoids to cool before servicing the valves.**

Cleaning - Clean all solenoid valves periodically. If the voltage to coil is correct, sluggish valve operation usually indicates that cleaning is required.

Maintainence

READ ALL SAFETY STATEMENTS ABOVE BEFORE PROCEEDING ANY FURTHER!

Coil Replacement

1. Remove retaining clip. NOTE: When metal retaining clip disengages, it springs upwards.
2. Slip yoke containing coil and sleeves off solenoid base sub-assembly.
3. Replace coil.
4. Reassemble in reverse order.

Valve Disassembly and Reassembly

1. Remove retaining clip.
2. Slip entire solenoid enclosure off the solenoid base sub-assembly.
3. Remove solenoid base sub-assembly, core assembly and core spring.
4. Remove diaphragm spring, diaphragm assembly and gasket.
5. Replace all worn or damaged parts
6.

Troubleshooting

Control Circuit: Listen for a metallic click when energizing the solenoid. Absence of the click indicates loss of power to the solenoid. Check for loose connections, blown fuses, open or grounded coil circuit, and broken lead wires.

Faulty Coil: Check for open circuit in coil. Replace coil if necessary.

Low Voltage: Voltage across coil leads must be at least 85% of nameplate rating for proper operation.

Incorrect pressure: Pressure to valve must be within range specified on nameplate.

Excessive leakage: Disassemble valve and clean all parts. Replace all worn parts for best results.

Parts List—Asco 3-way Solenoid Valves

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	96TAC3AA24	04Z 1/8" N/C 3WAY 24V50/60C VALVE	COMPLETE VALVE ASSEMBLY
	B	96TAC3AA37	04Z 1/8" N/C 3WAY 120V50/60C VALVE	COMPLETE VALVE ASSEMBLY
	C	96TAC3AA71	04Z 1/8" N/C 3WAY 240V50/60C VALVE	COMPLETE VALVE ASSEMBLY
	G	96TBC3BA24	04Z 1/4" N/C 3WAY 24V50/60C VALVE	COMPLETE VALVE ASSEMBLY
	J	96R300AAM	78183L*NC VALVEBODY+HARDWARE	VALVE BODY+HARDWARE 00A,00B,00C
	Q	96V304A	PARTKIT 8320 1/8" ASCO#K260767	VALVE REPAIR KIT ALL SEE PARTS WITH (*) FRONT
	R	96V236B	PARTKIT 8320 1/4 ASCO#K302142P	00G
			COMPONENTS	
J	1	96V300	1/8" VALVEBODY ASCO #UX8320B13	
all	1	96R300AB	73111F 1/8"BODY-3WAY.06D NORM OPEN	00K
A,	2	96T1002A24	SOLENOID 24V ASCO#260283-005	00D
B,	2	96T1003A37	COIL 120V50/60C ASCO#162-919-1	00E
C,	2	96T1003A71	COIL 120V50/60C ASCO#162-919-2	00F
all	2	96T1003A24	COIL 24V50/60C ASCO *162-919-3	
all valves	3	96V300GB	SLEEVE ASCO#101400-1	00P
+ kits J-				
all	4	15U275	SPRINGWASHER 7/16" GAR#3W-325 ZINC	
all valves except G	4	96V1002WSH	STARWASHER MXX ASCO#238589-1	
all valves except G	5	96V300GA	YOKE ASCO#78-345-1	
all valves except G	6	96V300F	METAL CLIP ASCO #92-059-1	
G	6	96V1002CLP	METAL CLIP MXX ASCO#176-993-1	
G	7	96V1002PLT	NAMEPLTE,BLK MXX ASCO#258775-1	
all	8	96V300L	SPRING-DISC N/O ASCO#90-083	00K

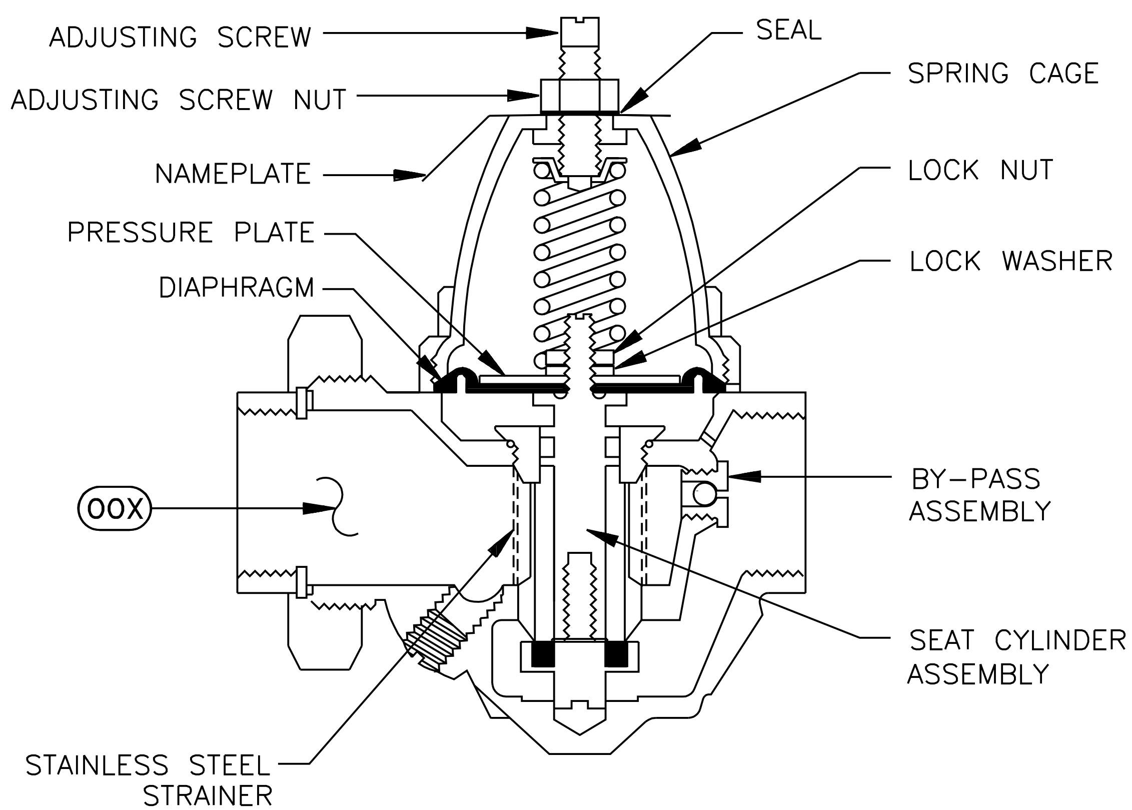
Parts List, cont.—Asco 3-way Solenoid Valves

Used In	Item	Part Number	Description	Comments

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

BMP900031/96081V (1 of 2)

Litho in U.S.A.



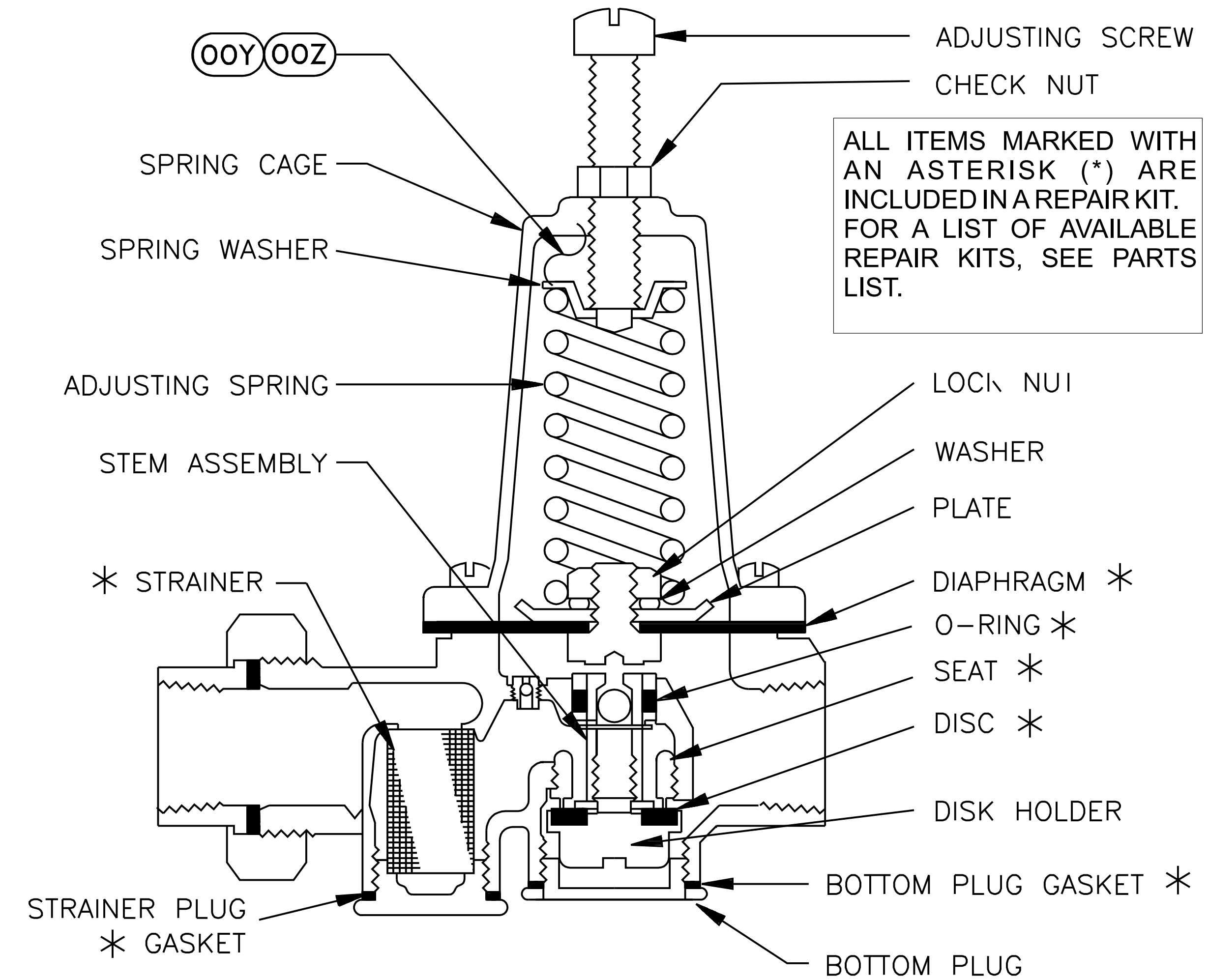
TO CLEAN OR REPLACE PARTS:

1.Remove spring cage and all parts above diaphragm.

2. Loosen and remove diaphragm lock nut, lock washer, pressure plate, and diaphragm from valve stem.

3. Unscrew seat cylinder from body and remove entire assembly.

4. While disassembled open gate valve to flush out collected sediment.



TO CLEAN OR REPLACE PARTS:

1. Remove bottom plug and gasket.

2. Loosen disc holder with screwdriver or socket wrench.

3. Inspect disc and clean or replace.

4. Seat can be removed, if necessary, with an allen wrench or socket wrench.

5. Unscrew and remove adjusting screw, check nut, and spring cage screws. Lift off spring cage, spring washer and adjusting spring.

6. Loosen and remove lock nut, washer, plate, and diaphragm.

7. Lift stem assembly upwards to remove from body.

8. To reassemble valve follow above instructions in reverse. Tighten or loosen adjusting screw for the required pressure of 28 P.S.I.

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List—Pressure Regulators

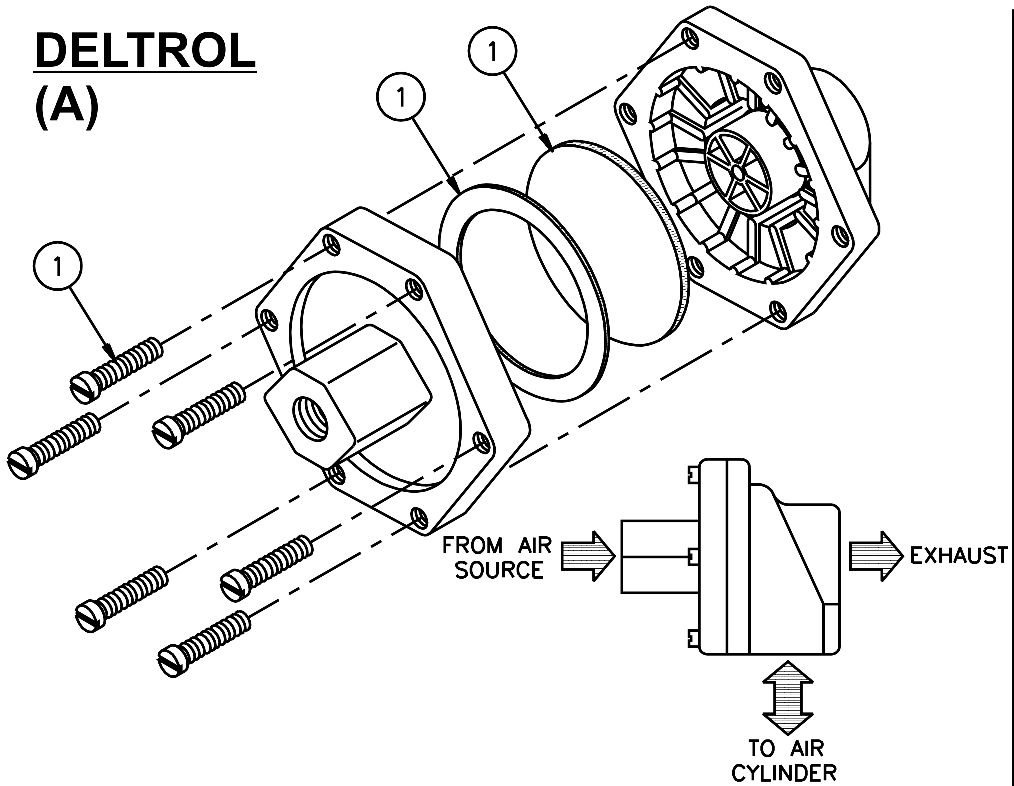
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	X	96J030FF	01Z 1/2"PRESS REG SET 28# FEM X FEM	(NO REPAIR KIT)
	Y	96J030D	01Z 1/2" PRESREGULTR SET 28# FEM-UN	(FOR KIT, SEE BELOW)
	Z	96J031D	01Z 3/4" PRESREGULTR SET 28# FEM-UN	(FOR KIT, SEE BELOW)
			COMPONENTS	
all	1	96V158B	REPAIRKIT #14510=1/2 PRESSREG EB86	(KIT/DISCONT.VLV1/2 EB72)
all	2	96V158C	REPAIRKIT #10341 FOR E24U (96J030C)	(KIT/DISCONT.VLV1/2 E24U)
Y	3	96V158D	REP.KIT #14649FOR 1/2"E72U& E86U	
all	4	96V159B	REPAIRKIT C/A#14511=3/4PRESREG EB72	(KIT/DISCONT.VLV3/4 EB72)
Z	5	96V159D	REP KIT #14648 FOR 3/4"E72U +E86U	

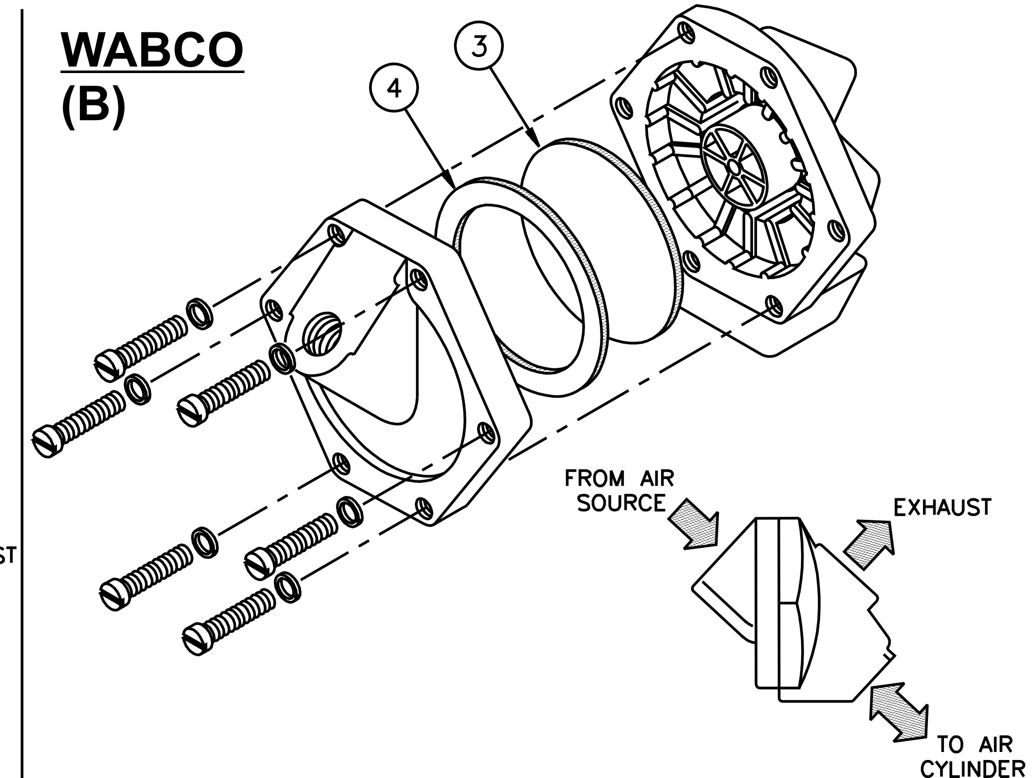
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

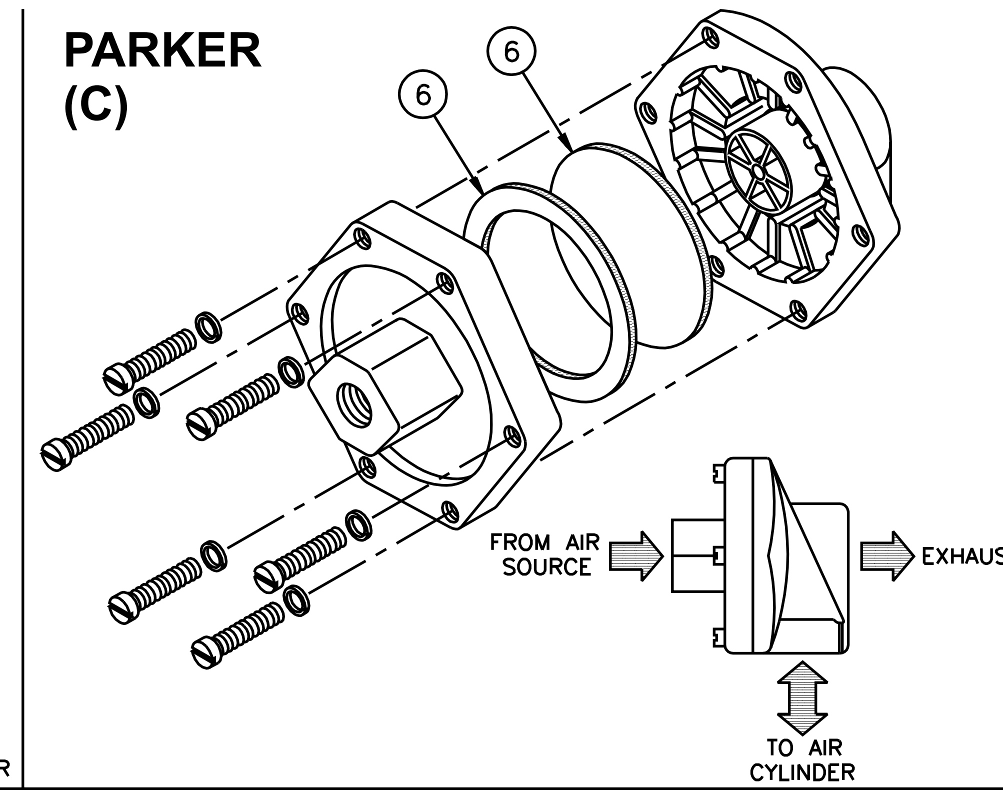
DELTROL
(A)



WABCO
(B)

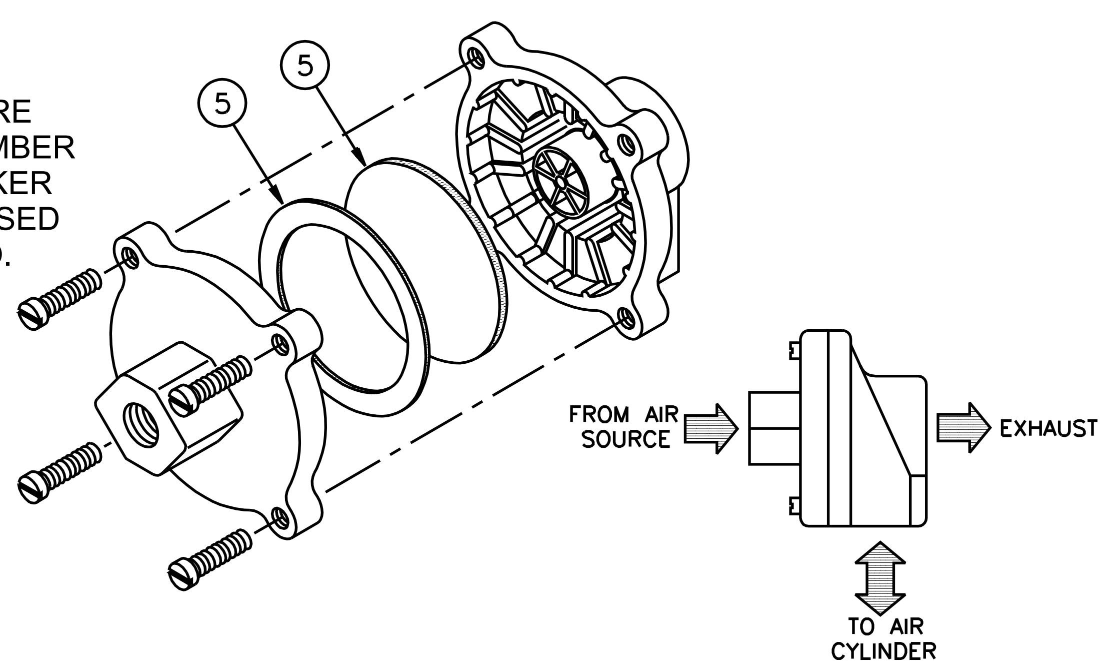


PARKER
(C)



ASCO
(D)

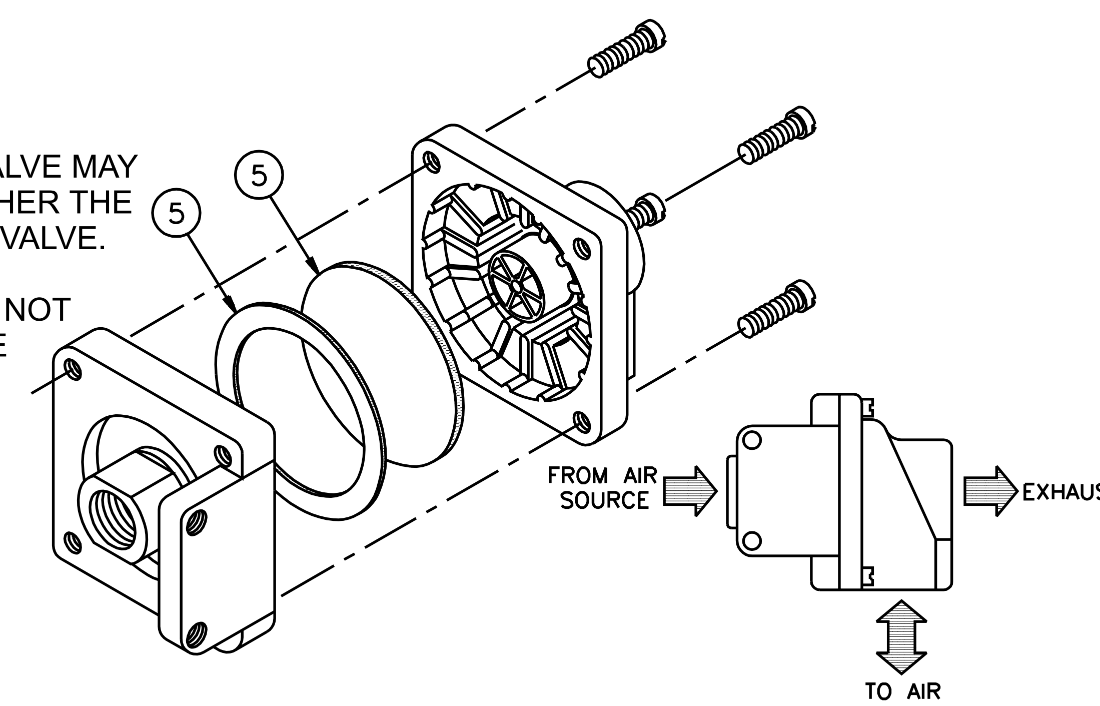
NOTE: ASCO VALVES ARE USED PRIOR TO NOVEMBER 1987. SINCE THEN PARKER VALVES HAVVE BEEN USED IN PLACE OF THE ASCO.



GOYEN
(E)

NOTE: THE GOYEN VALVE MAY BE REPLACES BY EITHER THE WABCO OR DELTROL VALVE.

THE GOYEN VALVE IS NOT TO BE USED IN PLACE OF THE WABCO OR DELTROL VALVE.



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List—Quick Exhaust Valves

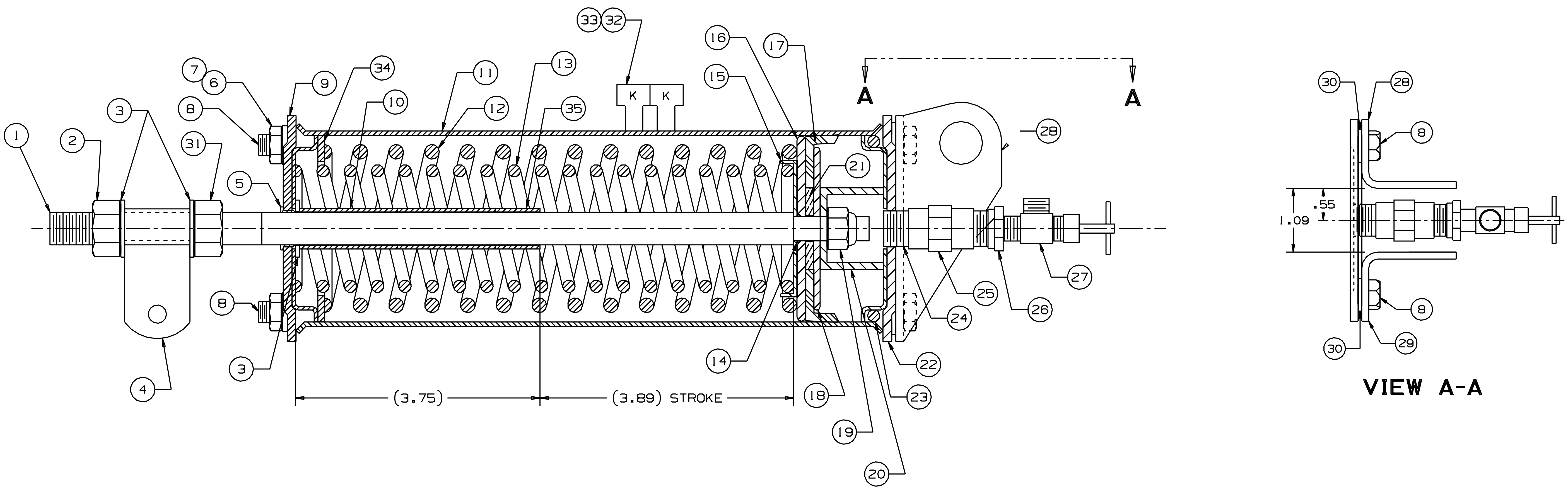
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
----------ASSEMBLIES----------				
	A	MESSAGE B2	REPAIR KITS ONLY <>	DELTROL
	B	96M051	USE KZK5B00100	WABCO
	C	96M054	QWIKEXHAUSTVLV 3/4"URETHANE	PARKER
	D	MESSAGE B1	PARTS NO LONGER SOLD	ASCO
	E	MESSAGE B2	REPAIR KITS ONLY <>	GOYEN
	F	96M055	QUICK EXHAUST VALVE 1/4”	DELTROL
----------COMPONENTS----------				
all	1	96M053A	KIT,QWIKRELVLV EV20A#10091-18	DELTROL VALVE ONLY
all	3	96M051B	DIAPHRAM,QWIKREL WAB#PS112-12	WABCO VALVE ONLY
all	4	96M051A	GASKET,WABCO QUICK EXHAUST VLV	WABCO VALVE ONLY
all	5A	96M052A	REPKIT,QES#M1319 (FOR 96M052)	GOYEN VALVE ONLY
all	5B	96M055A	REPAIR KIT FOR 96M055# 10128-99	DELTROL VALVE ONLY
all	6	96M054K	REPKIT 3/4"QWIKEXHAUSTVLV	PARKER VALVE ONLY

Air Cylinders for 2" Watts Ball Valves

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



NOTES:

1. LUBRICATE SPRINGS WITH A LAYER OF GREASE BUT NOT SO MUCH AS TO CAUSE EXCESS TO LEAK OUT.
2. DO NOT GREASE THE CUP, ITEM 17! DOING SO WOULD BLOCK THE AIR LINES.

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Parts List—Air Cylinders for 2" Watts Ball Valves

Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			ASSEMBLIES	
	A	SA 10 057C	95222D AIRCYL=3.0ODX3.89ST171/176CD	
	B	SA 10 057D	95222# AIRCYL=3.0ODX3.89ST171/176SS	STAINLESS
	C	SA 10 056F	92000Z AIRCYL=2.38ODX2.70STX20.5#CD	
	D	SA 10 056G	92000Z AIRCYL=2.38ODX2.70STX20.5#SS	STAINLESS
			COMPONENTS	
A,B	1	03 01615	94191B PISTON STEM 3"AIRCYL	
C,D	1	02 18650	96461B STEM=2 WAY AIRCYLINDER BRAKE	
all	2	15G234NS	HXLOCKNUT NYL 1/2-13UNC2 SS18-8	
all	3	15U243S	FLAWASHER 7/8ODX33/64IDX16GA 18-8SS	
all	4	03 01209A	92536B STEMCLIP H=1.313 BALVAL S/S	
all	5	54E220	NYLINER 8L2FF BUSHING 1/2X9/16X.140	
A	6	15G191	HXFINJAMNUT 5/16-24UNC2 ZINC GR2	
B,C,D	6	15G190	HEXFINJAMNUT 5/16-18NC2 SS18-8	
A	7	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
B,C	7	15U205	LOCKWASHER MEDIUM 5/16" 18-8SS	
D	7	15U200S	FLATWASHER US STD 5/16 SS18-8	
A	8	02 10585H	91142# TIE BOLT=5/16-18X10LNG PLTD	
B	8	02 10585G	91142# TIE BOLT=5/16-18X10LG (SS)	
C	8	02 10585E	91142# TIE BOLT=5/16-18X8.25LG PLTD	
D	8	02 10585A	91142# TIE ROD-5/16-18X8+1/4 (SS)	
A	9	03 01623	90351C CYLINDER HEAD 3"AIRCYLINDER	
BI	9	03 01623A	90351# CYLHEAD 3"AIRCYLINDER-S/S	
C	9	02 02546	87341C CYLHEAD=SLIDESTEM	
D	9	02 02546S	87341# CYLINDER HEAD=SLIDE STEM SS	
all	10	27B32024SS	SPACER ROLL .51IDX.6250DX1.5L STN S	
A,B	11	03 01621	94266BTUBE 2+7/8 AIR CYLINDER 9"	
C,D	11	02 02068	94266A AIRCYL-STAINLESS=DUMPVALVE	
A,B	12	03 01617C	92133B SPRING=FL11.5SR23.5#MD2.368	
C	12	02 15881	96471# SPRING=BRAKE2.1OD11FL15.5#/"	
D	12	02 15881A	85504Z SPRING,02 -15881+HEAVY PAINT	
A,B	13	03 01616C	92133B SPRING=FL11.35SR20.5MD1.811	
C	13	02 15880	96471B SPRING=BRAKE1.5OD10.3FL17#/"	
D	13	02 15880A	85504Z SPRING,02-15880 +HEAVY PAINT	
all	14	60C106	ORING 5/16ID 1/16CS BN 70 DURO #011	
A,B	15	03 01620A	92133B 3"AIR CYL=SPRING RETAINER	
C,D	15	02 18651	73171A WASHER=2 WAY BRAKE CYL	

Parts List, cont.—Air Cylinders for 2" Watts Ball Valves

Used In	Item	Part Number	Description	Comments
A,B	16	X3 01619A	92066# MACH=3"ACYL BRASS PISCUP WSH	
C,D	16	02 02105B	92253B 2.38"ACYL BRASS PISCUP WASHR	
A,B	17	02 19302	93356B PISTON CUP 2+7/81D CYLINDER	
C,D	17	02 02194	93217B PISTONCUP=DUMPVALVE 2+3/8"	
A,B	18	03 01618	91522B PISTON CUP WASHER 3"AIRCYL	
C,D	18	02 02085	94092B UP WASHER=2"OD=PISTON CUP	
all	19	15G220	02Z LTHX THIN LOKNUT 3/8-24 SSNTE	
A,B,D	20	03 01313S	85506B+STOP=AIRCYL W/2+11/16STR.SS	
C	20	03 01313	70219A STOP=AIR CYL W/2+11/16STROKE	
A,B	21	03 01630	87506B 3"AIRCYL PSTN CUP COMPLMTWSH	
C,D	21	02 02185	79237A WASHER=PISTON CUP COMP LIMIT	
A	22	03 01622	88531# CYL HEAD TAPHOLE 3"AIRCYL SS	
B	22	03 01622A	88531# CYLHEAD TAPHOLE-3"ARCYL S/S	
C	22	02 02101	71334A CYLHEAD W/TAPPED HOLE	
D	22	02 02101S	88531B CYLINDER HEAD TAP HOLE (SS)	
A,BI	23	60C134	ORING 2.5 ID 3/16CS BN 70 DURO #333	
C,D	23	60C132	ORING 2"IDX3/16CS BUNA70 #32	
all	24	5N0ECLSBE2	NPT NIPPLE 1/4XCLS TBE BRASS 125#	
all	25	5SCC0EBE	NPT COUP 1/4 BRASS 125# #103	
all	26	5SB0E0CBEO	HEXPIPBUSH 1/4 X 1/8 BRASS 125#	
all	27	96H018	NEEDLE VALVE	
A,B	28	03 01627B	92023# LEFT=3"AIR CYL MNTG BRKT	
C	28	03 01660C	93231B BRKT=AIR CYL MONUT LEFT	
D	28	03 01660A	92271B BRKT=AIR CYL MNT LFT-S/S	
A,B	29	03 01627A	92023B RIGHT=3"AIR CYL MNTG BRKT	
C	29	03 01660D	BRKT=AIR CYL MOUNT RIGHT	
D	29	03 01660B	92271# BRKT=AIR CYL MNT RHT-S/S	
all	30	15U200	FLATWASHER(USS STD) 5/16"ZNC PLT	
all	31	15G231S	HXFINJAMNUT 1/2-13UNC2B SS18-8	
all	32	20L601K	ID TAG NAT'L #1614 ALUM EMB LET "K"	
all	33	27B2400K0N	SPACER ROLL.5ID .687L .062T STL/ZNC	
all	34	03 01620E	92136B.WASHER=2.86ODX2.06IDX.105THK	