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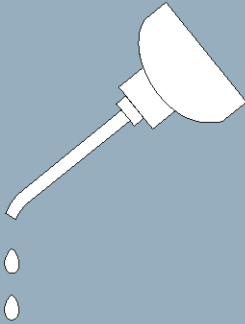


# Service

**6044SP2, SP3 SM**

**6044SR2, SR3**

**Washer-Extractors**



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



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# 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 (unless the time period is specifically extended for certain parts pursuant to a specific MILNOR published extended warranty) 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, EX Factory (labor and freight specifically NOT included). 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 tampered with, modified, or abused, used for purposes not intended in the design and construction of the machine, or is repaired or altered in any way without MILNOR's written consent.

Parts damaged by exposure to weather, to aggressive water, or to chemical attack are not covered by this warranty. For parts which require routine replacement due to normal wear—such as gaskets, contact points, brake and clutch linings, belts, hoses, and similar parts—the warranty time period is 90 days.

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 OR ANY OTHER WARRANTY IMPLIED BY LAW INCLUDING BUT NOT LIMITED TO REDHIBITION. 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, MIS-USE, NEGLIGENCE, 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.

THE PROVISIONS ON THIS PAGE REPRESENT THE ONLY WARRANTY FROM MILNOR AND NO OTHER WARRANTY OR CONDITIONS, STATUTORY OR OTHERWISE, SHALL BE IMPLIED.

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.

BMP720097/19036

## How to Get the Necessary Repair Components



This document uses Simplified Technical English.  
Learn more at <http://www.asd-ste100.org>.

You can get components to repair your machine from the approved supplier where you got this machine. Your supplier will usually have the necessary components in stock. You can also get components from the Milnor® factory.

Tell the supplier the machine model and serial number and this data for each necessary component:

- The component number from this manual
- The component name if known
- The necessary quantity
- The necessary transportation requirements
- If the component is an electrical component, give the schematic number if known.
- If the component is a motor or an electrical control, give the nameplate data from the used component.

To write to the Milnor factory:

Pellerin Milnor Corporation  
Post Office Box 400  
Kenner, LA 70063-0400  
UNITED STATES

Telephone: 504-467-2787  
Fax: 504-469-9777  
Email: [parts@milnor.com](mailto:parts@milnor.com)

— End of BIUUUD19 —

# Trademarks

BNUUUU02.R01 0000158093 A.2 7/13/17 1:11 PM Released

These words are trademarks of Pellerin Milnor Corporation and other entities:

**Table 1 Trademarks**

AutoSpot™	GreenTurn™	Milnor®	PulseFlow®
CBW®	GreenFlex™	MilMetrix®	PurePulse®
Drynet™	Hydro-cushion™	MilTouch™	Ram Command™
E-P Express®	Linear Costa Master™	MilTouch-EX™	RecircONE®
E-P OneTouch®	Linear Costo™	Miltrac™	RinSave®
E-P Plus®	Mentor®	MultiTrac™	SmoothCoil™
Gear Guardian®	Mildata®	PBW™	Staph Guard®

End of document: BNUUUU02

## 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 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 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 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 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 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 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: Electrocutation 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

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 360° 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 360° 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**

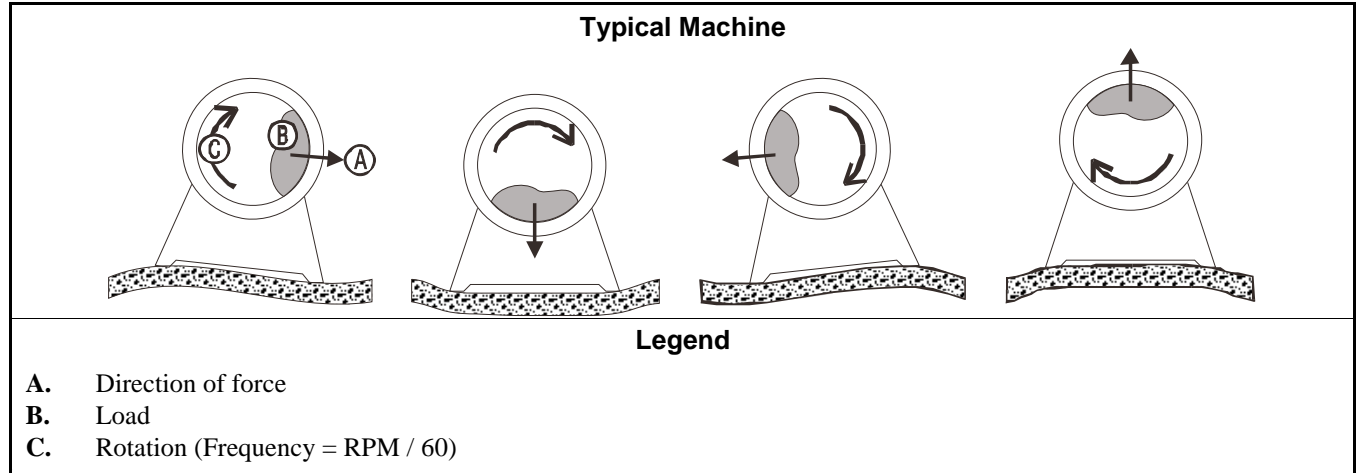


Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available 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 BIWUI02 —

BIUUUI02HD (Published) Book specs- Dates: 20160713 / 20160713 / 20160713 Lang: ENG01 Applic: HDU

## Tag Guidelines for the Models Listed Below

42044CP2 42044NP2 42044SP2 42044SP3 42044WP2 42044WP3 60044SP2  
 60044SP3 60044WP2 60044WP3 72044SP2 72044SP3 72044WP2 72044WP3

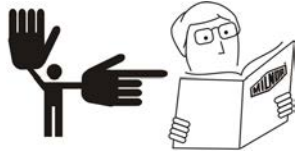
**Notice 1:** This information may apply to models in addition to those listed above. It applies to paper tags. It does not apply to the vinyl or metal safety placards, which must remain permanently affixed to the machine and replaced if no longer readable.

Paper tags on the machine provide installation guidelines and precautions. The tags can be tie-on or adhesive. You can remove tie-on tags and white, adhesive tags after installation. Yellow adhesive tags must remain on the machine.

Tag Guidelines for the Models Listed Below

The following entries explain the installation tags. Each entry includes: 1) the tag illustration, 2) the tag part number displayed at the bottom of the tag, and 3) the meaning of the tag.

**Display or Action**



**Explanation**

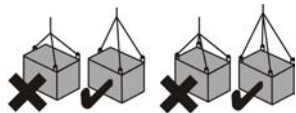
Read the manuals before proceeding. This symbol appears on most tags. The machine ships with safety, operator, and routine maintenance guides for customer use. Milnor dealer manuals for installing, servicing, and commissioning this machine are also available from the Milnor Parts department.



B2TAG88005: This carefully built product was tested and inspected to meet Milnor® performance and quality standards by (identification mark of tester).



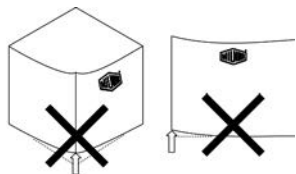
B2TAG94078: Do not forklift here; do not jack here; do not step here—whichever applies.



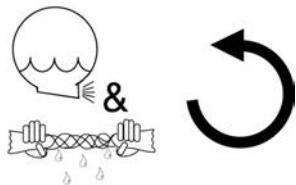
B2TAG94079: Rig for crane lifting (either 3-point or 4-point, depending on the number of lifting eyes provided) using a steep angle on the chains (closer to vertical than horizontal).



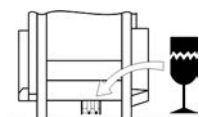
B2TAG94081: Motor must rotate in this direction. On single motor washer-extractors and centrifugal extractors, the drive motor must turn in this direction during draining and extraction. This tag is usually wrapped around a motor housing. If the motor turns in the opposite direction when the machine is first tested, the electrical hookup is incorrect and must be reversed as explained in the schematic manual.



B2TAG94084: Do not lift from one corner of the machine, as this can cause the frame to rack, damaging it.



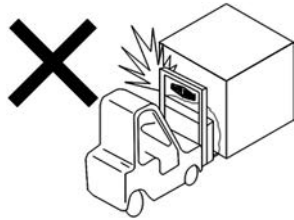
B2TAG94097: The cylinder must rotate **counterclockwise** during draining and extraction (spin) when viewed from here (rear of machine). Otherwise, reverse the electric power connections, as explained in the schematic manual.



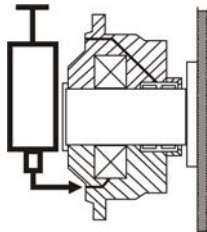
B2TAG94117: The brake assembly under the machine is fragile. Fork lift only under main structural supports.

**Display or Action**

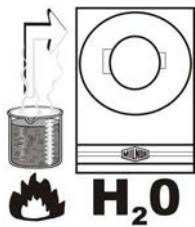
**Explanation**



B2TAG94118: Do not strike shipping container during forklifting. Fragile components inside.



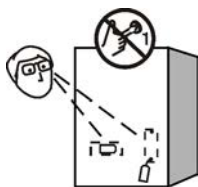
B2TAG96007: Add grease here. Refer to the preventive maintenance schedule in the service manual.



B2T2001013: Hot water connection.



B2T2001014: Cold water connection.



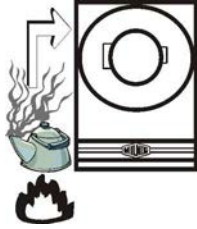
B2T2001028: Look for tags inside the machine. These tags may identify shipping restraints to be removed or components to be installed. Do not start the machine until these actions are completed.



B2T2002013: Do not start the machine until shipping restraints are removed. This tag will appear on the outside of the machine to alert you to the presence of internal shipping restraints. A tag will also appear on the restraint to help identify it. Most, but not all shipping restraints display the color red. Some shipping restraints are also safety stands. Do not discard these.

Tag Guidelines for the Models Listed Below

**Display or Action**



**Explanation**

B2T2004027: Steam connection (optional)


— End of BIUUUI02 —



# Installation Tag Guidelines

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42044SR2	42044SR3	42044WR2	42044WR3
60044SR2	60044SR3	60044WR2	60044WR3
72044SR2	72044SR3	72044WR2	72044WR3

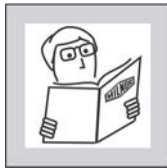
 **NOTICE:** This information may apply to models in addition to those listed above. It applies to paper tags. It does not apply to the vinyl or metal safety placards, which must remain permanently affixed to the machine and replaced if no longer readable.

Paper tags on the machine provide installation guidelines and precautions. The tags can be tie-on or adhesive. You can remove tie-on tags and white, adhesive tags after installation. Yellow adhesive tags must remain on the machine.

The following entries explain the installation tags. Each entry includes: 1) the tag illustration, 2) the tag part number at the bottom of the tag, and 3) the meaning of the tag.

**Display or Action**

**Explanation**



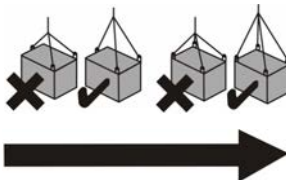
Read the manuals before proceeding. This symbol appears on most tags. The machine ships with safety, operator, and routine maintenance guides for customer use. Milnor dealer manuals for installing, commissioning, and servicing the machine are also available from the Milnor Parts department.



B2TAG88005: This carefully built product was tested and inspected to meet Milnor performance and quality standards by (identification mark of tester).

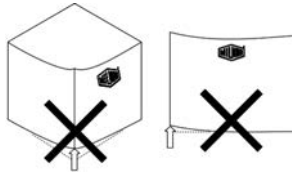


B2TAG94078: Do not forklift here; do not jack here; do not step here—whichever applies.



B2TAG94079: Rig for crane lifting (either 3-point or 4-point, depending on the number of lifting eyes provided) using a steep angle on the chains (closer to vertical than horizontal).

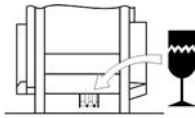
B2TAG94081: Motor must rotate in this direction. On single motor washer-extractors and centrifugal extractors, the drive motor must turn in this direction during draining and extraction. This tag is usually wrapped around a motor housing. If the motor turns in the opposite direction when the machine is first tested, the electrical hookup is incorrect and must be reversed as explained in the schematic manual.



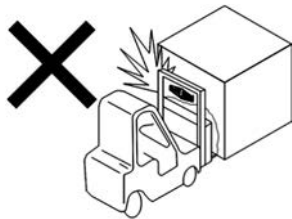
B2TAG94084: Do not lift from one corner of the machine, as this can cause the frame to rack, damaging it.



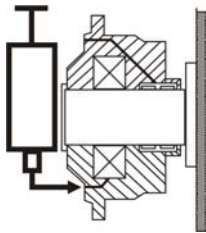
B2TAG94097: The cylinder must rotate **counterclockwise** during draining and extraction (spin) when viewed from here (rear of machine). Otherwise, reverse the electric power connections, as explained in the schematic manual.



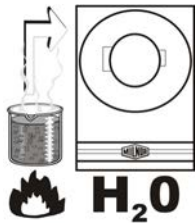
B2TAG94117: The brake assembly under the machine is fragile. Fork lift only under main structural supports.



B2TAG94118: Do not strike shipping container during fork-lifting. Fragile components inside.



B2TAG96007: Add grease here. Refer to the preventive maintenance schedule in the service manual.



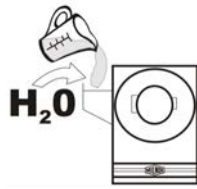
B2T2001013: Hot water connection.



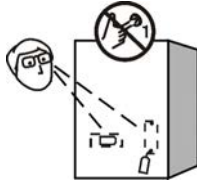
B2T2001014: Cold water connection.



B2T2001015: Reuse (third) water connection. (Optional)



B2T2001016: Flushing water connection. This is the water that goes into the supply compartment or pumped chemical manifold to flush chemicals into the machine.



B2T2001028: Look for tags inside the machine. These tags may identify shipping restraints to be removed or components to be installed. Do not start the machine until these actions are completed.



B2T2002013: Do not start the machine until shipping restraints are removed. This tag will appear on the outside of the machine to alert you to the presence of internal shipping restraints. A tag will also appear on the restraint to help identify it. Most, but not all shipping restraints display the color red. Some shipping restraints are also safety stands. Do not discard these.



B2T2004027: Steam connection.

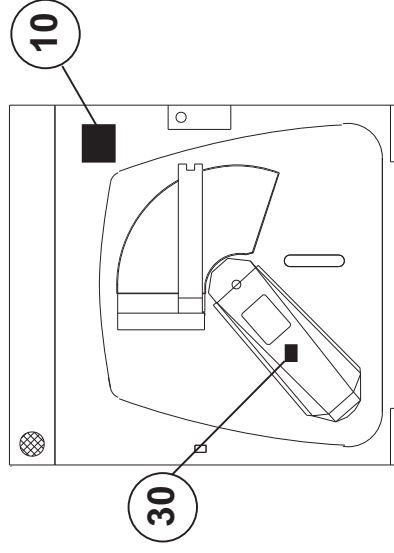
End of document: BNWG4I01



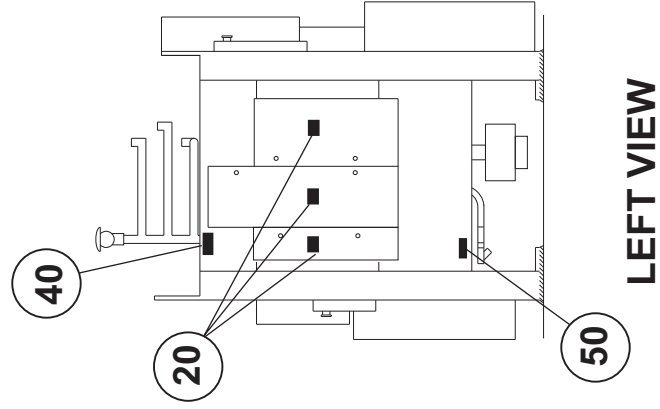
**Pellerin Milnor Corporation**  
 P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

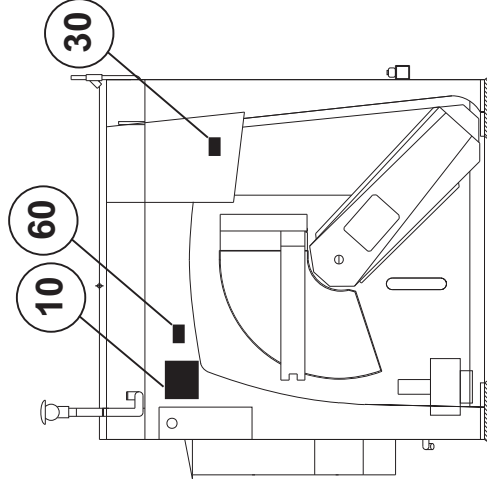
- Notes:**
1. Replace placard immediately, if removed or unreadable.
  2. Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.



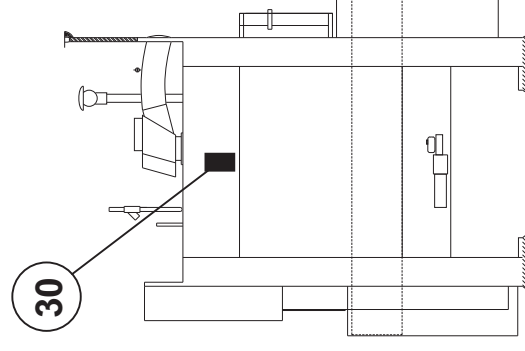
**REAR VIEW**



**LEFT VIEW**



**FRONT VIEW**



**RIGHT VIEW**



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

Litho in U.S.A.

**Parts List—Safety Placard Placement**

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	10	01 10627A	NPLT:DIV-CYL/STAPH WARN-TCATA	
all	20	01 10377A	NPLT:ELEC HAZARD LG-TCATA	
all	30	01 10689A	NPLT:BELT HAZARD SM TCATA	
all	40	01 10648A	NPLT:GEAR HAZARD -TCATA	
all	50	01 10685A	NPLT:BURN HAZARD-TCATA	
all	60	01 10699B	NPLT:SERV HZRD-ALUM-TCATA	



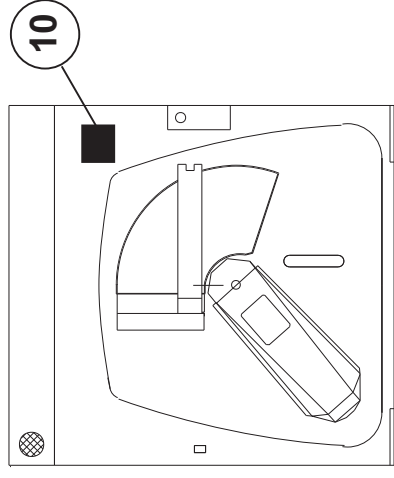
Pellerin Milnor Corporation  
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

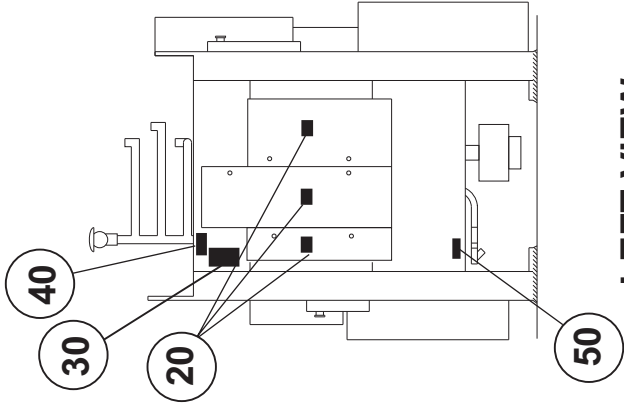
## ISO Placards shown on this page

**Notes:**

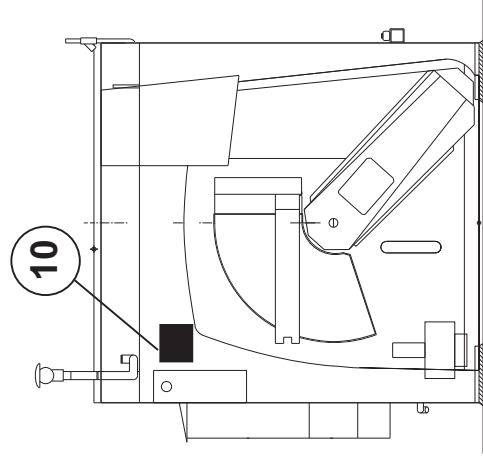
1. Replace placard immediately, if removed or unreadable.
2. Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.



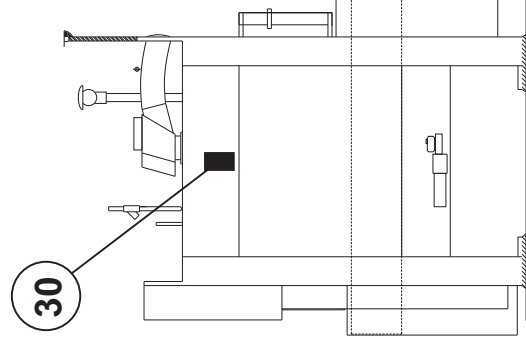
REAR VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW



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

Litho in U.S.A.

**Parts List—Safety Placard Placement**

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	10	01 10627X	NPLT:DIVCYL SG WARNG FRT ISO	
all	20	01 10377	NPLTE:"WARNING" 4X4	
all	30	01 10628X	NPLT:NONTILT W/E WARNING SIDE	
all	40	01 10648X	NPLT:ACTUATED VALVE WARN-ISO	
all	50	01 10649X	NPLT:HOT BEHIND CVR WARN-ISO	

# Prevent Damage from Chemical Supplies and Chemical Systems

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All Milnor® washer-extractors and CBW® tunnel washers use stainless steel with the AISI 304 specification. This material gives good performance when chemical supplies are correctly applied. If chemical supplies are incorrectly applied, this material can be damaged. The damage can be very bad and it can occur quickly.

Chemical supply companies usually:

- supply chemical pump systems that put the supplies in the machine,
- connect the chemical pump system to the machine,
- write wash formulas that control the chemical concentrations.

The company that does these procedures must make sure that these procedures do not cause damage. **Pellerin Milnor Corporation accepts no responsibility for chemical damage to the machines it makes or to the goods in a machine.**

## 1. How Chemical Supplies Can Cause Damage

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### Dangerous Chemical Supplies and Wash Formulas

Some examples that can cause damage are:

- a very high concentration of chlorine bleach,
- a mixture of acid sour and hypo chlorite,
- chemical supplies (examples: chlorine bleach, hydrofluosilicic acid) that stay on the stainless steel because they are not quickly flushed with water.

The book “Textile Laundering Technology” by Charles L. Riggs gives data about correct chemical supplies and formulas.

### Incorrect Configuration or Connection of Equipment

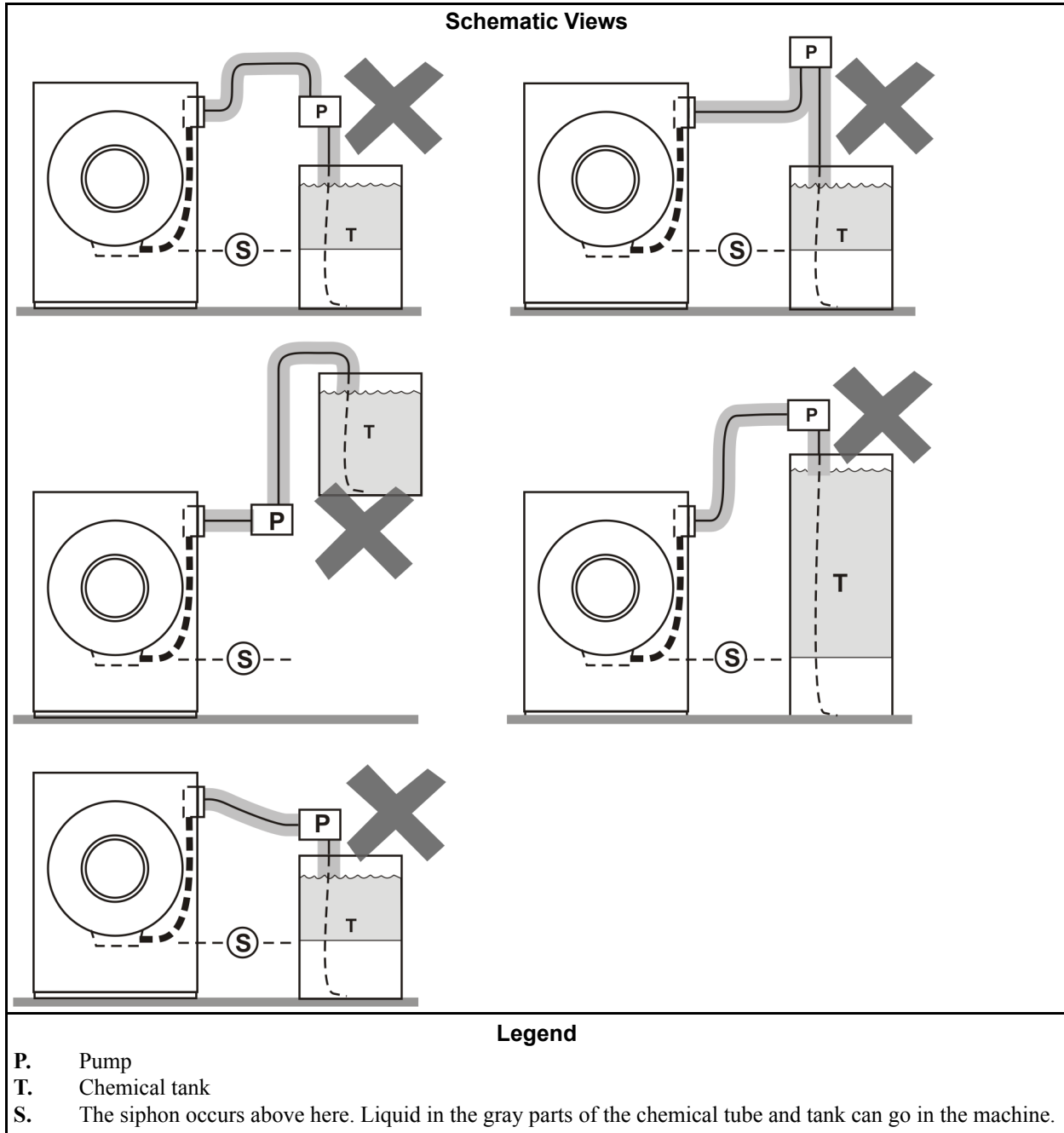
Many chemical systems:

- do not prevent a vacuum in the chemical tube (for example, with a vacuum breaker) when the pump is off,
- do not prevent flow (for example, with a valve) where the chemical tube goes in the machine.

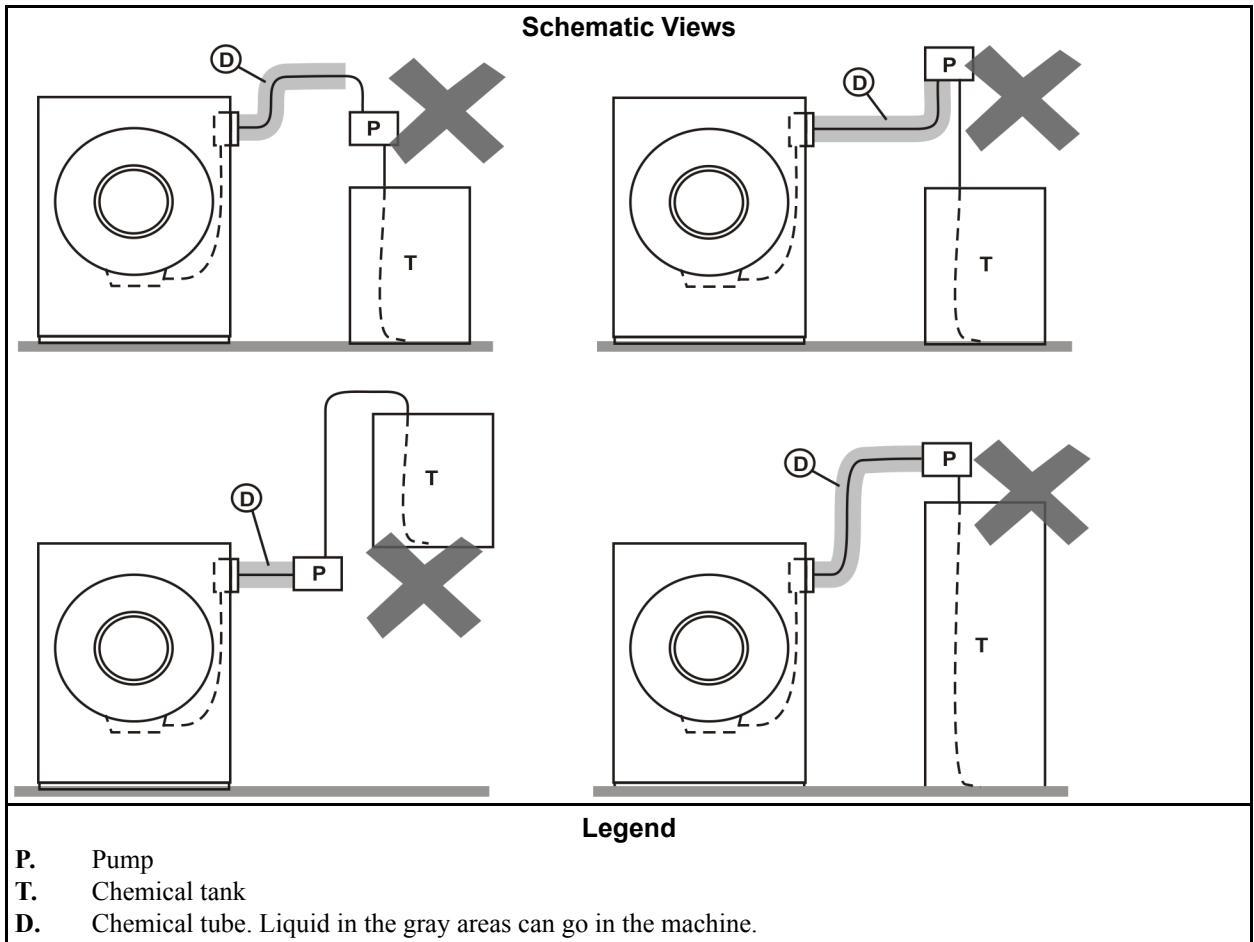
Damage will occur if a chemical supply can go in the machine when the chemical system is off. Some configurations of components can let the chemical supplies go in the machine by a siphon ([Figure 1. Incorrect Configurations That Let the Chemical Supply Go In the Machine by a Siphon](#)). Some can let chemical supplies go in the machine by gravity ([Figure 2. Incorrect Configurations That Let the Chemical Supply Go In the Machine by Gravity](#)).



Figure 1. Incorrect Configurations That Let the Chemical Supply Go In the Machine by a Siphon



**Figure 2. Incorrect Configurations That Let the Chemical Supply Go In the Machine by Gravity**



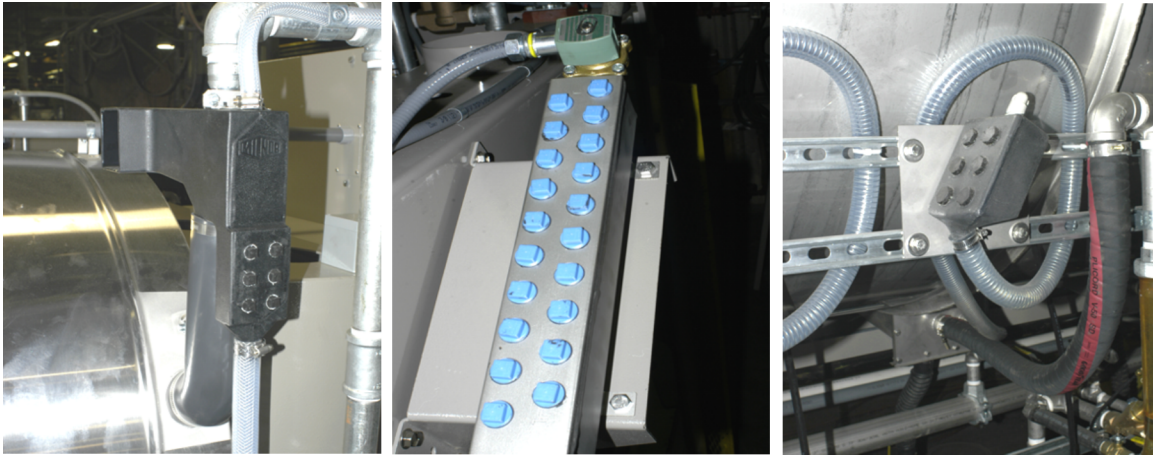
## 2. Equipment and Procedures That Can Prevent Damage

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### Use the chemical manifold supplied.

There is a manifold on the machine to attach chemical tubes from a chemical pump system. The manifold has a source of water to flush the chemical supplies with water.

**Figure 3. Examples of Manifolds for Chemical Tubes. Your equipment can look different.**



**Close the line.**

If the pump does not always close the line when it is off, use a shutoff valve to do this.

**Do not let a vacuum occur.**

Supply a vacuum breaker in the chemical line that is higher than the full level of the tank.

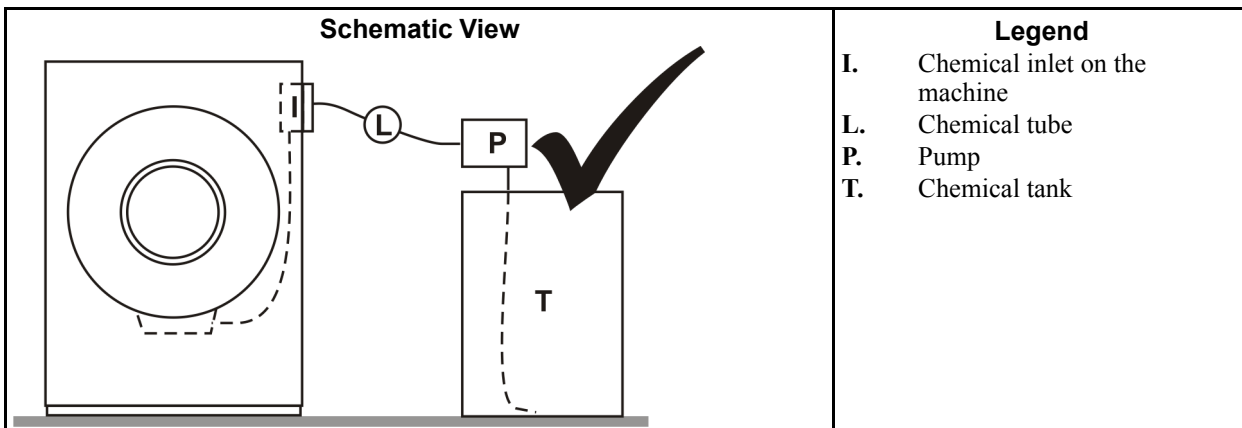
**Flush the chemical tube with water.**

If the liquid that stays in the tube between the pump and the machine can flow in the machine, flush the tube with water after the pump stops.

**Put the chemical tube fully below the inlet.**

It is also necessary that there is no pressure in the chemical tube or tank when the system is off.

**Figure 4. A Configuration that Prevents Flow in the Machine When the Pump is Off (if the chemical tube and tank have no pressure)**



## **Prevent leaks.**

When you do maintenance on the chemical pump system:

- Use the correct components.
- Make sure that all connections are the correct fit.
- Make sure that all connections are tight.

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# Service and Maintenance

1

# LUBRICATION AND PREVENTIVE MAINTENANCE FOR HYDRO-CUSHION<sup>®</sup> 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<sup>®</sup> 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 ⚠

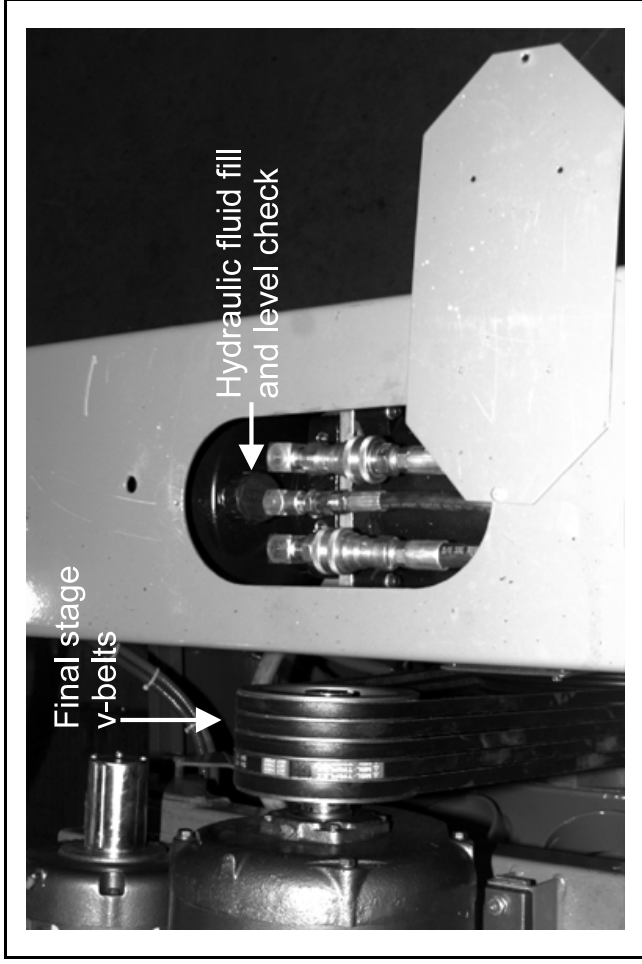


**CRUSH/SEVER HAZARD**—Tilting machines with tilt wheels/cradles may lunge forward or rearward and even fall over if the tilt wheels at the non-tilted end are raised out of their cradles—killing/injuring personnel and/or damaging property.

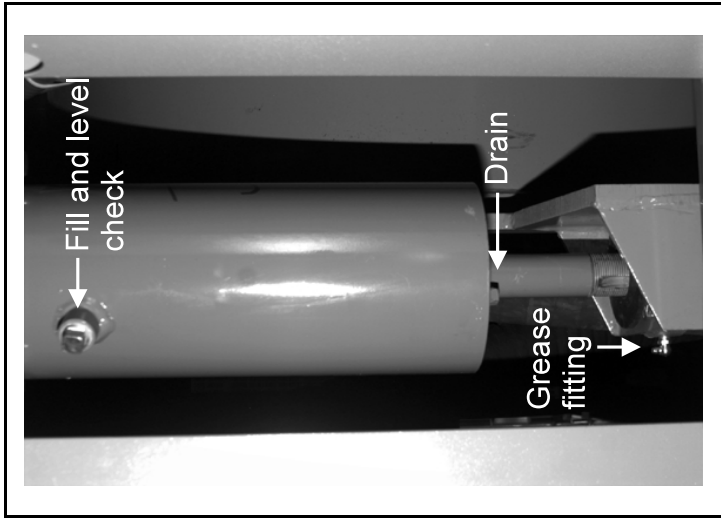
- ☞ **NEVER** manually tilt (lift) both ends of the machine at the same time. One end must always be seated in its cradle.
- ☞ **ALWAYS** visually inspect the tilt wheels to be sure they are all fully seated in their cradles before each manual tilt up.
- ☞ Hydraulic valve manual operation must be done 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	<b>Hydraulic Tilt System</b> (48", 52", and 72" Tilt machines) • Reservoir FIGURE 1 and NOTE 1	Check fluid with machine not tilted
	<b>Hydro-Cushions®</b> (all machines) FIGURES 2 and 3	Check for leaks
Weekly	<b>Final stage and other v-belts</b> (throughout all machines) FIGURES 1 and 12 NOTES 2 and 3	Check for wear and tension

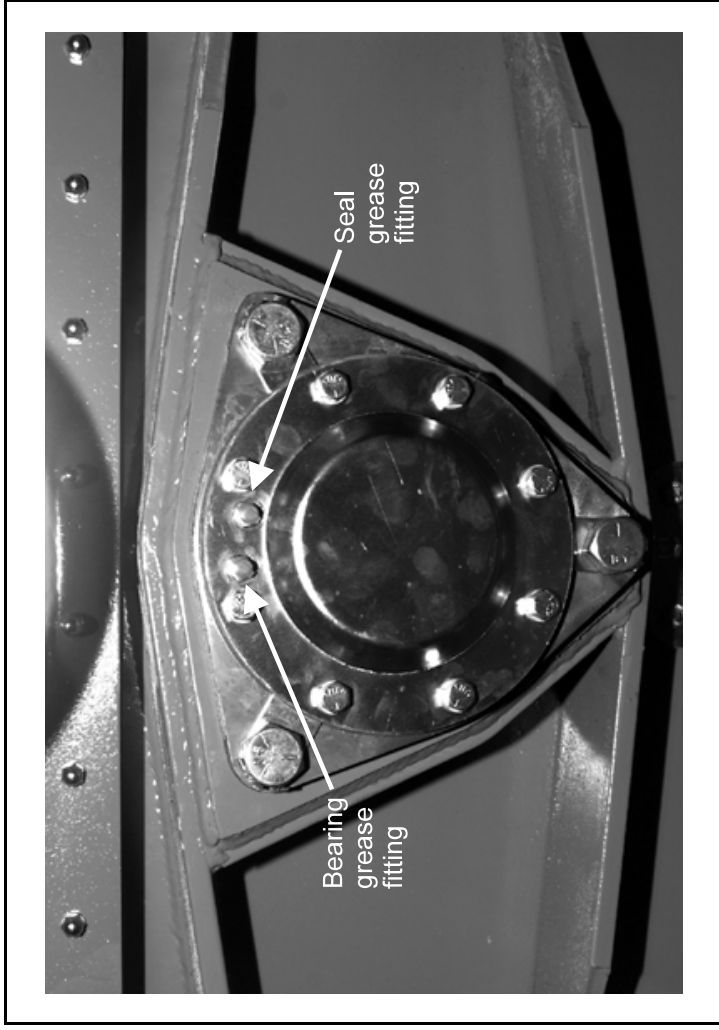
**NOTE 1:** Tank should be approximately three-quarters full when the machine is not tilted. Do not over-fill.

**NOTE 2:** V-belt instructions for the first week of operation

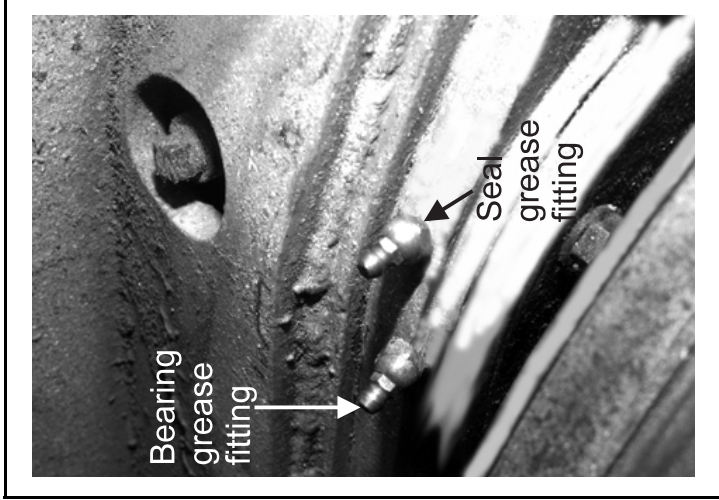
- After 24 hours operation (three eight hour days), tighten final stage v-belts.
- After 80 hours operation (ten eight hour days), tighten final stage v-belts again.
- After 160 hours of operation (twenty eight hour days), tighten final stage v-belts, and check all other v-belts and tighten if necessary.

**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 "interchangeable". 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.

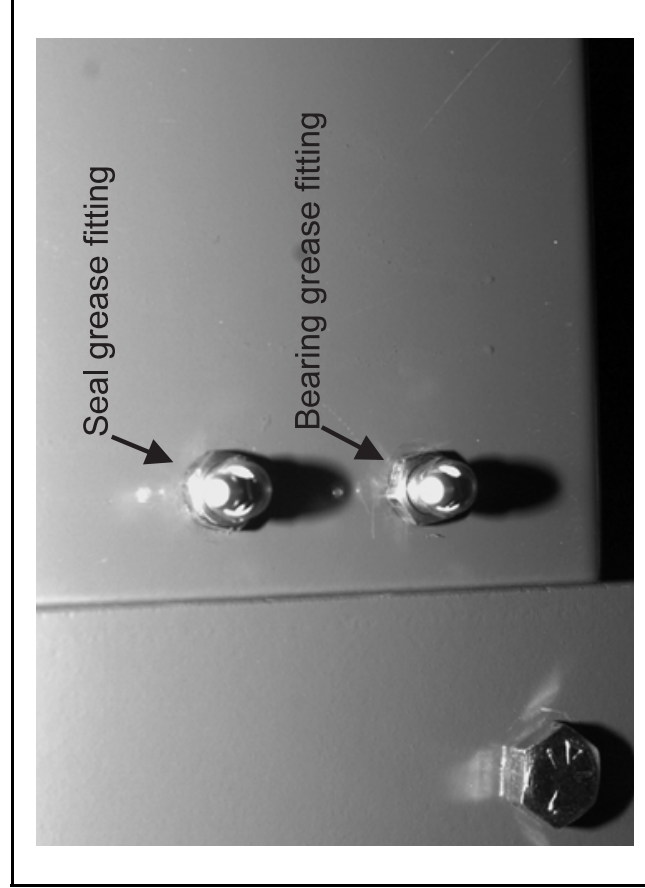




**FIGURE 4** (MSSM0201CE)  
**42" Divided Cylinder Front Bearing and Seal Grease Fittings**



**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**

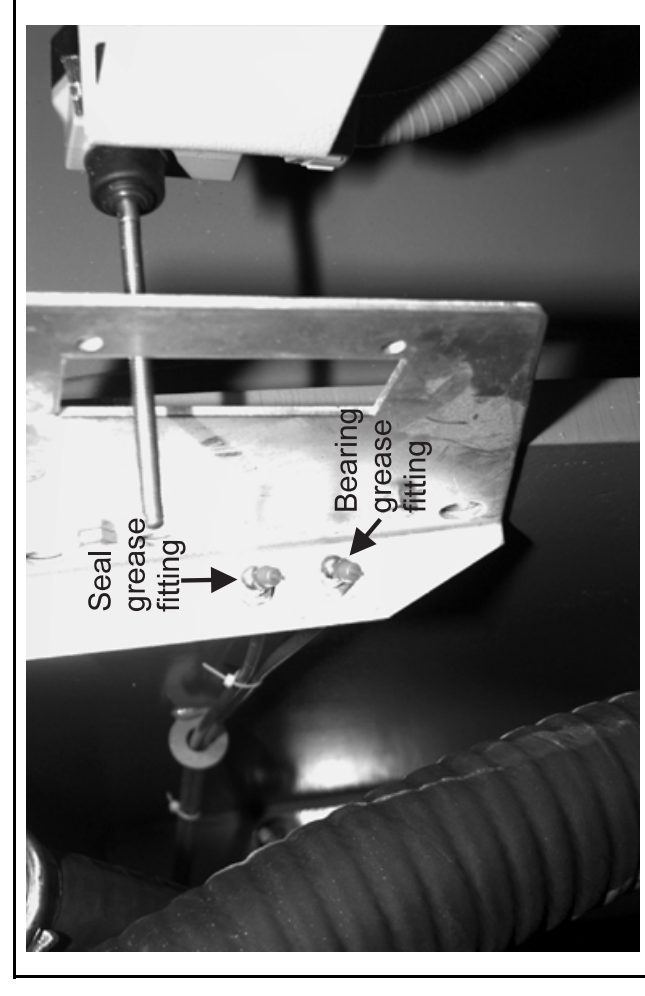
**Monthly Maintenance Items**

Frequency	Component	Action
Monthly (see NOTE 4)	<b>All Divided cylinder and Staph-Guard® main bearing and seals</b> FIGURES 4 through 10, NOTES 5 and 6	
	<ul style="list-style-type: none"> <li>Each bearing grease fitting</li> </ul>	0.37 ounces (10.6 grams), six strokes at two locations
	<ul style="list-style-type: none"> <li>Each seal grease fitting</li> </ul>	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.

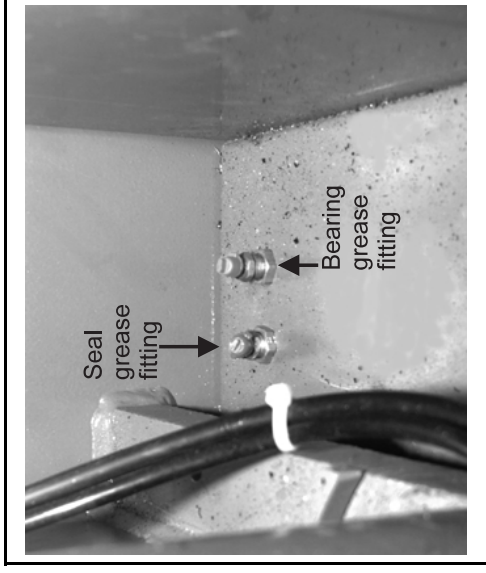
**NOTE 5:** Main bearings and jackshaft bearings (if so equipped) are prepacked with lubricant at the factory. Do not add grease for thirty days. During the first month's operation, some grease will ooze out of the automatic grease fittings at the bottom of the housing(s). This is normal. These grease 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.

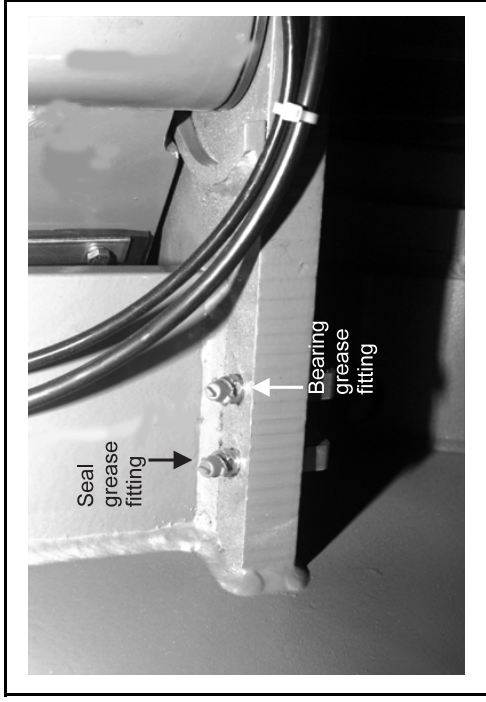


**FIGURE 8** (MSSM0201CE)  
**60" and 72" Divided Cylinder Rear Seal and Bearing**

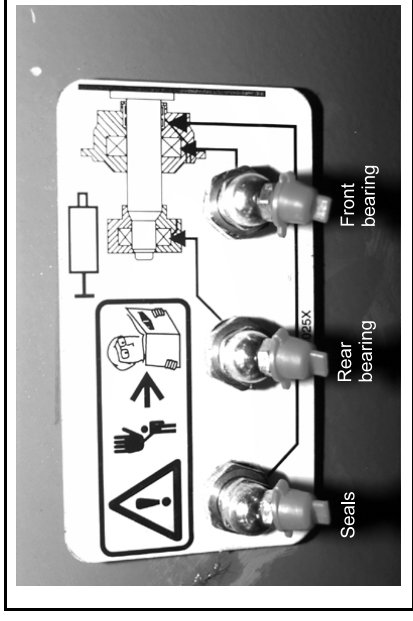




**FIGURE 9** (MSSM0201CE)  
**60044 and 72044 Staph-Guard®**  
**Front Bearing and Seal Grease Fit-**



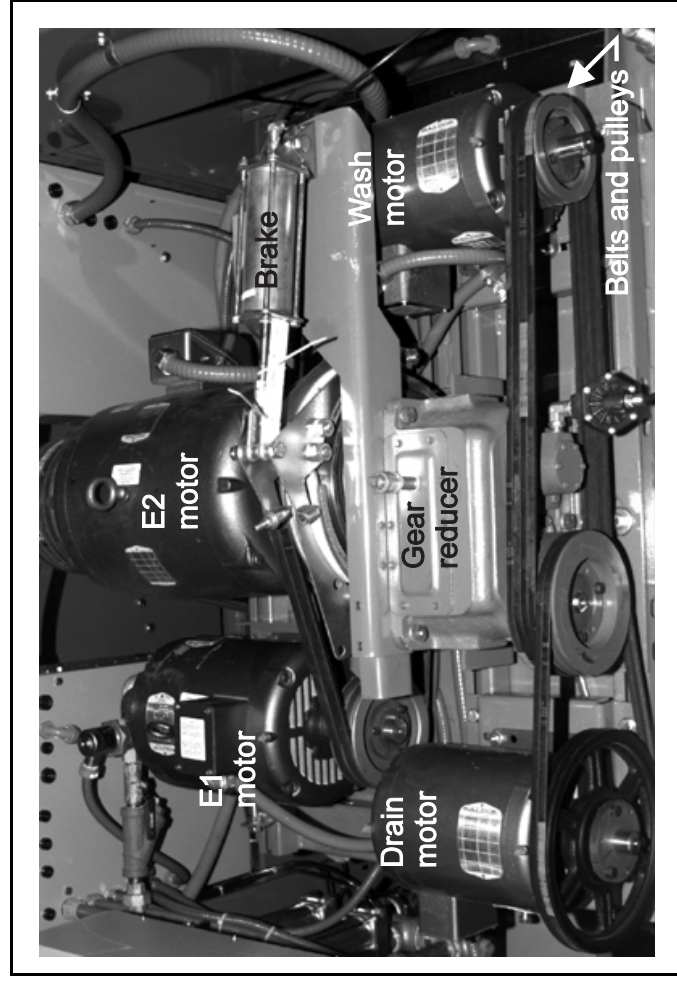
**FIGURE 10** (MSSM0201CE)  
**60044 and 72044 Staph-Guard®**  
**Rear Bearing and Seal Grease Fittings (lo-**



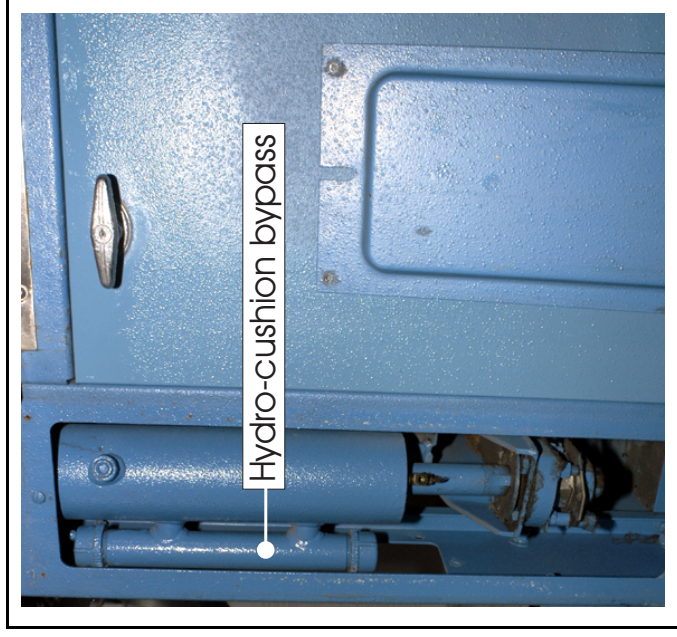
**FIGURE 11** (MSSM0201CE)  
**All Open-Pocket Machine Seal and Bearing Grease Fitting Plate**

Frequency	Component	Action
Monthly (see NOTE 4)	<b>42" Open pocket main bearings and seals</b> 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
	<b>48" Open pocket main bearings, seals and Hydro-Cushions®</b> 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-Annual Maintenance Items" in this section
	• Hydro-Cushion® bypass (48" open-pocket only)	Drain small quantity of oil. If milky, see note 7 below
	<b>52" and 72" Open pocket main bearings and seals</b> 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	
<b>Drive train components</b> 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 12** (MSSM0201CE)  
**Typical Drive Train Components (48" machine shown)**

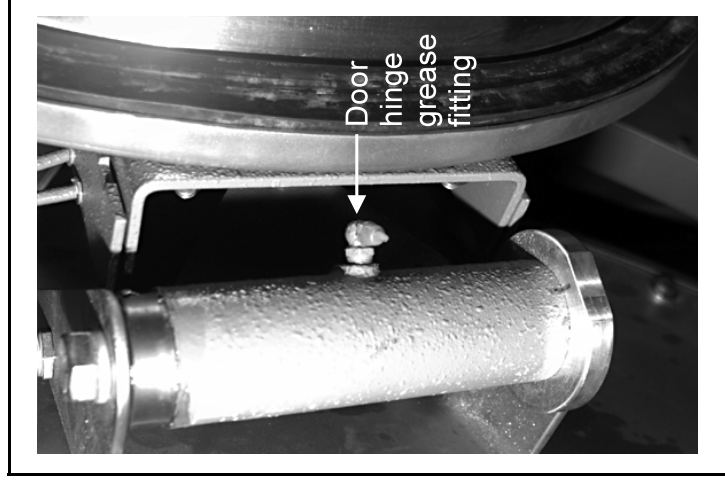


**FIGURE 13** (MSSM0201CE)  
**Hydrocushion Bypass Valve (48" machines only")**

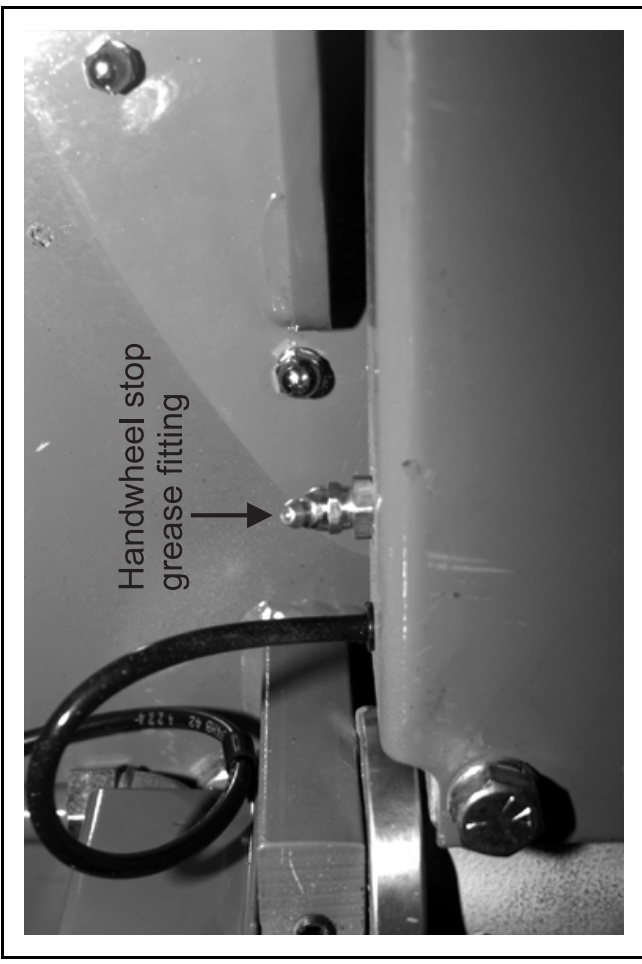




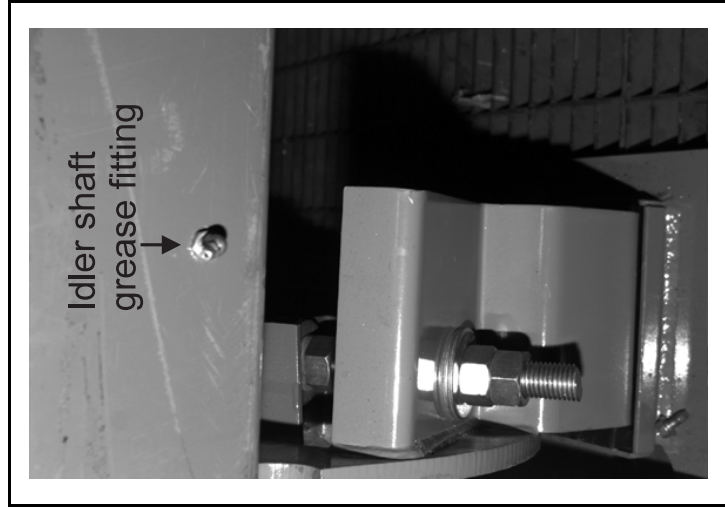
**FIGURE 14** (MSSM0201CE)  
**Handwheel Screw**  
 (42" Divided Cylinder and Staph-Guard® only)



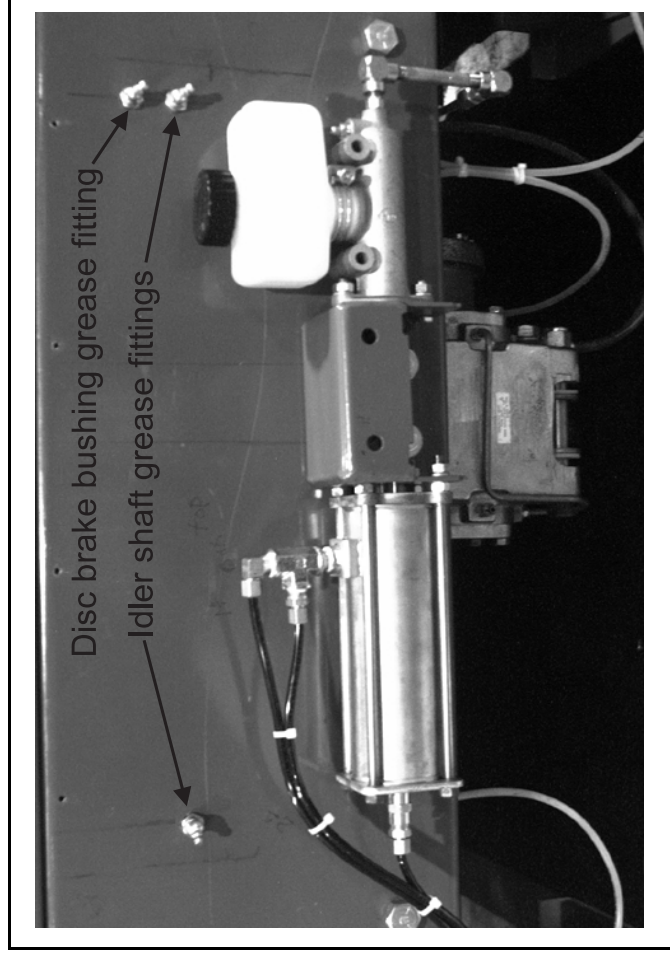
**FIGURE 15** (MSSM0201CE)  
**Typical Door Hinge**



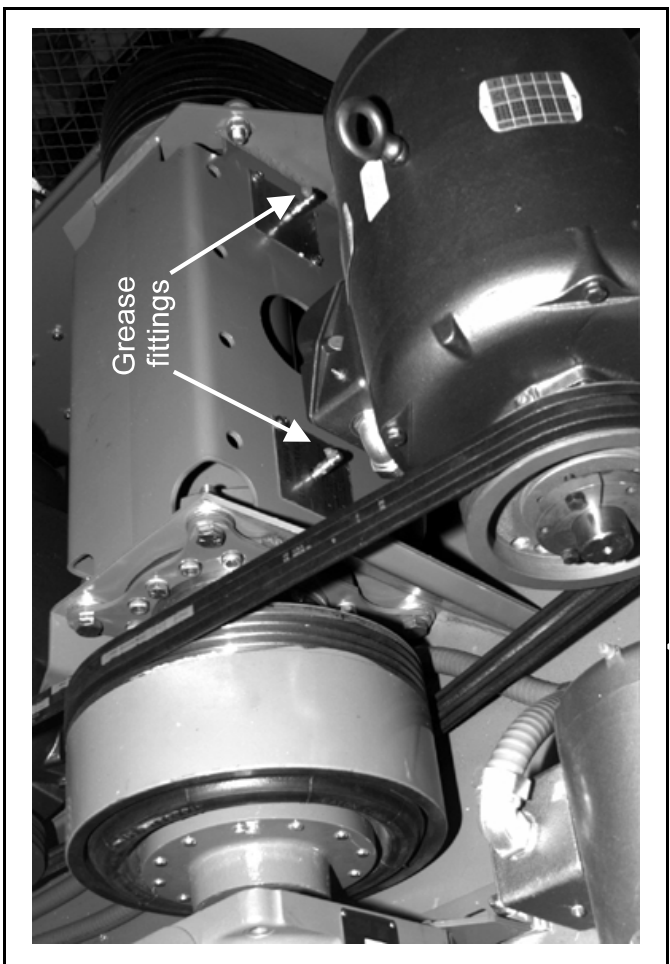
**FIGURE 16** (MSSM0201CE)  
**Handwheel Stop**  
 (42" Divided Cylinder and Staph-Guard® only)



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



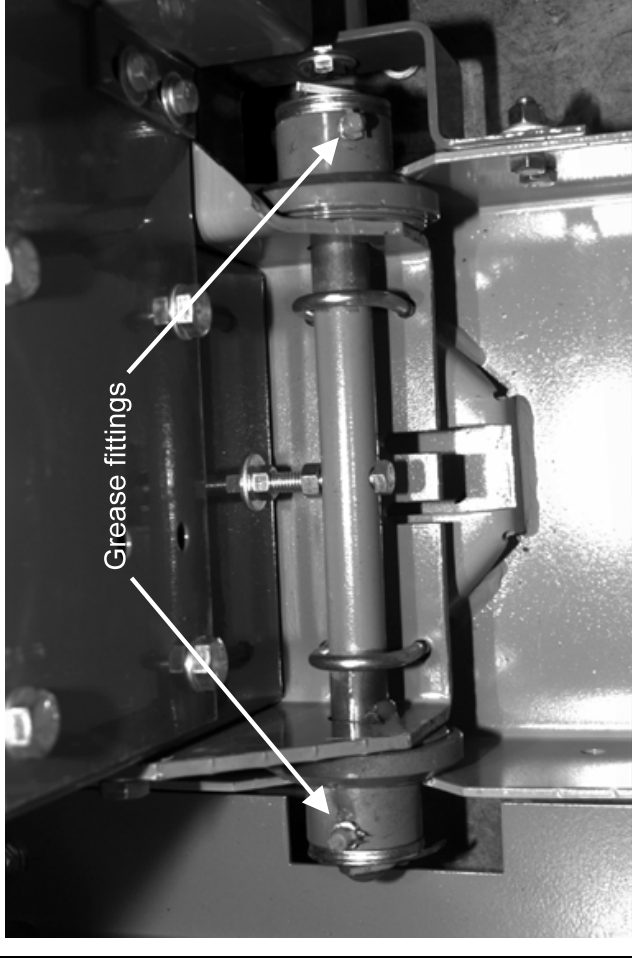
**FIGURE 18** (MSSM0201CE)  
**60" and 72" Staph-Guard® Idler Shaft**  
**and Disc Brake Grease Fittings**  
 (60" shown)



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

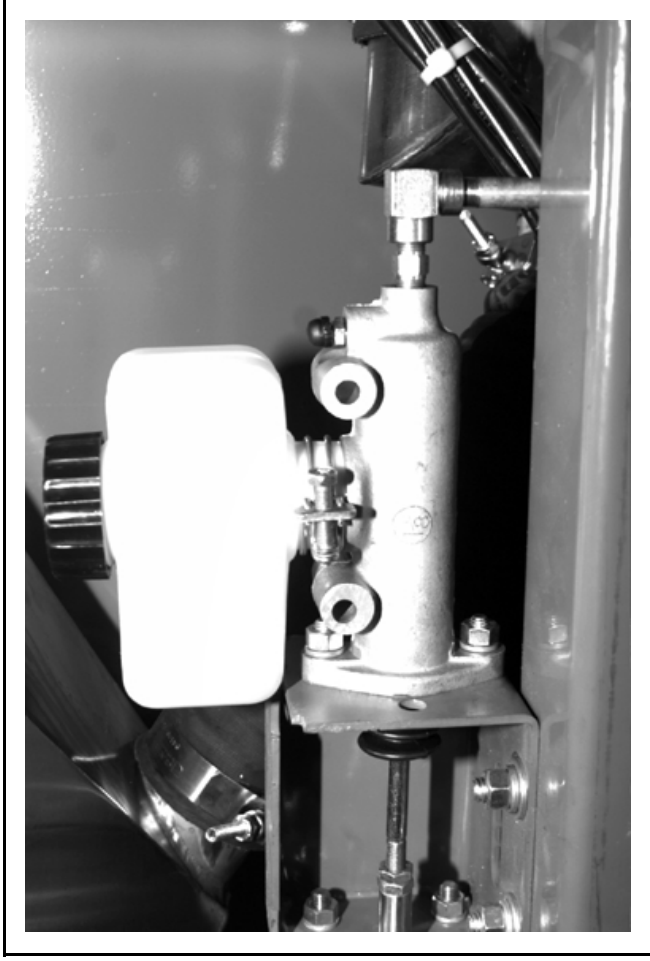
## Monthly Maintenance Items

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



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

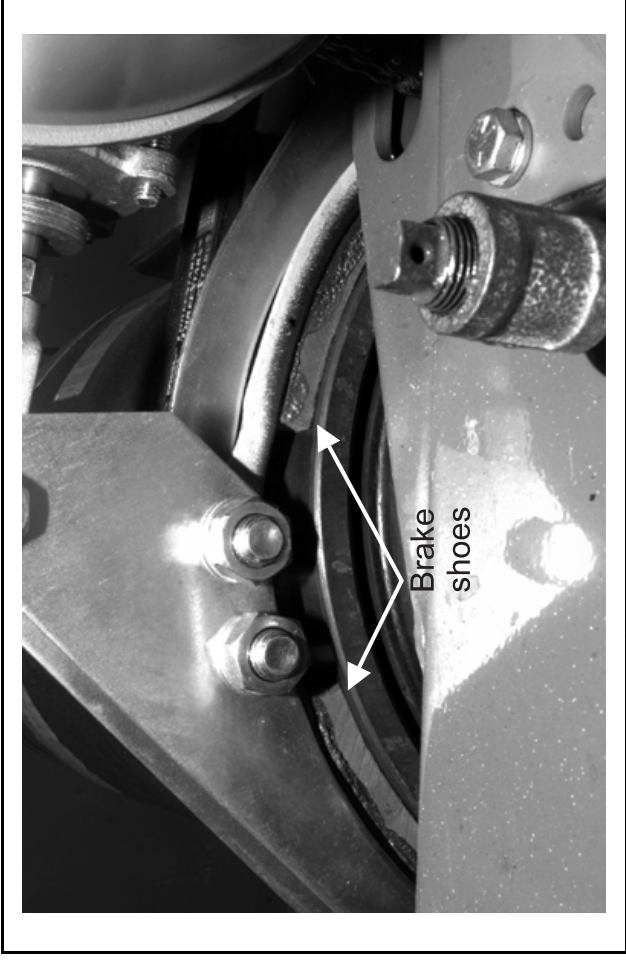




**FIGURE 21** (MSSM0201CE)  
**Disk Brake Reservoir**  
 (Staph-Guard® only)



**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**

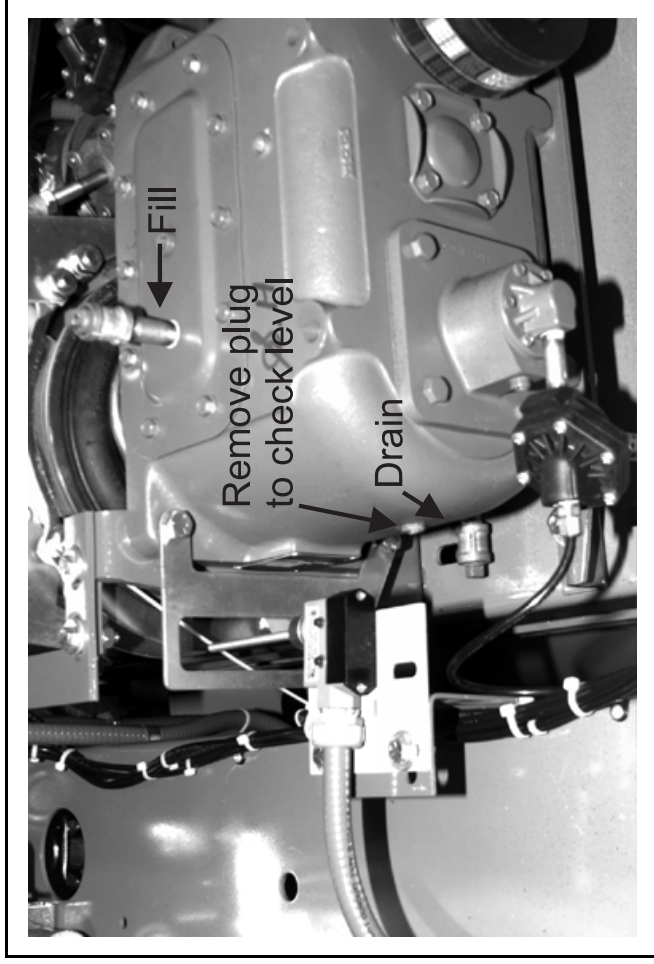
## Quarterly Maintenance Items

Frequency	Component	Action
<b>Quarterly</b>	<b>Brake Components</b>	
	• Disk brake reservoir (60" and 72" Staph-Guard <sup>®</sup> 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 <sup>®</sup> only) FIGURE 24	Check for wear, replace as required
	<b>Hydro-Cushions<sup>®</sup></b> FIGURES 2 and 3	Check oil level, add as necessary Inspect washer, replace as necessary
	<b>Motors</b> FIGURE 12 NOTES 8 and 9	See "BALDOR MOTOR MAINTENANCE..." MSSM0274AE in this manual.
	<b>Hydraulic tilt pressure gauge</b> 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)
	<b>Door seal pressure regulator</b> 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 - 3.51 Kg/cm <sup>2</sup> )
	• 60" and 72" Rapid load	25 - 28 PSI (1.76 - 1.97 Kg/cm <sup>2</sup> )
	• 60" and 72" Staph-Guard <sup>®</sup>	18 - 20 PSI (1.27 - 1.41 Kg/cm <sup>2</sup> )

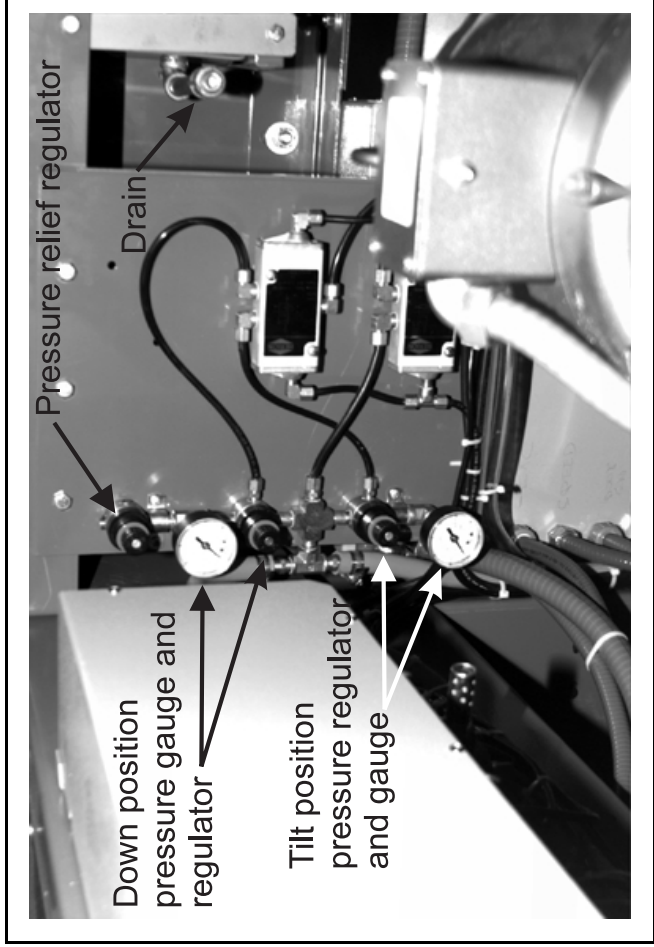
**NOTE 8:** If motor manufacturer's instructions conflict with manual section, follow nameplate instructions. motors are warranted by their manufacturers, not by Milnor<sup>®</sup>.

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





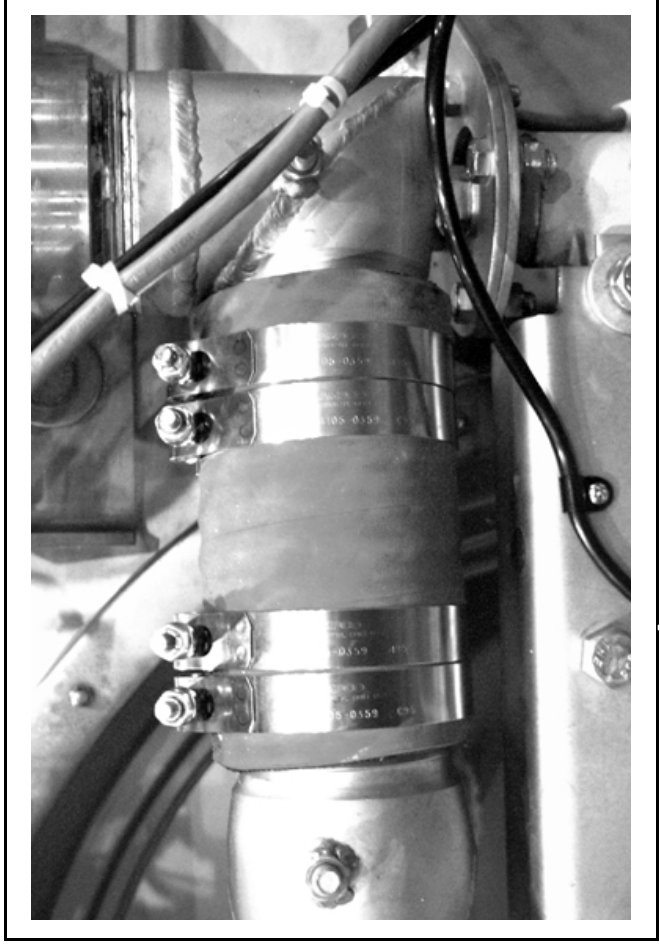
**FIGURE 27** (MSSM0201CE)  
**Typical Gear Reducer Fill and Drain**



**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	<b>Main bearings and seals</b> • 48" Seal grease fittings FIGURE 11	0.12 ounces (3.54 grams), two strokes at one location
	<b>Gear reducer</b> FIGURE 27	Check oil level, refill as required
	<b>Push Back and Forward System</b> 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 <sup>2</sup> )
	• Tilt position pressure regulator and gauge	Check pressure in a "wash step" 30 PSI (2.11Kg/cm <sup>2</sup> )
	<b>Push-down control valves</b> (72" Rapid load and Staph-Guard®) FIGURE 29 and NOTE 11	Observe operation and adjust if required
	<b>Recirculation</b> (48" dye models only) FIGURE 30	Replace hose

### Annual or Less Frequent Maintenance Items

Frequency	Component	Action
Annual	<b>Gear reducer</b> FIGURE 27	Change oil and clean magnetic plug (if so equipped)
	<b>Hydro-Cushions®</b> FIGURE 2	Change oil
Every 2 years	<b>Hydraulic system</b> 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											
	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
<b>Open Pocket Machines</b>											
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			DOT 3	1030	Door	EPLF 2
36030Fxx			1030								
42032Fxx											
42026QHP 48032BHP/BTL/BTN 48036QHP/QTL/QTN		220		220							
52038WP1/WTL/WTN											
64046ExN 72046ExN 72058JxN			1030	1030				DOT 3	68		
<b>Divided Cylinder Machines</b>											
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
<b>CBW®</b>		220					T32	EPLF 2	EPLF 2						EPLF 2
42032M7E	EPLF 2			220	68	DOT 3					630		SRI		
42032M9E			EPLF 2	32											
Single Stage Press		1030													
Press							23								
Dryer									EPLF 2	EP2		R			
Shuttle & Conveyor		634												FL	
Dryvac															

### 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



## Motor Maintenance



This document uses Simplified Technical English.  
Learn more at <http://www.asd-ste100.org>.

This document is for motors used on Milnor® machines that have grease fittings. If the motor manufacturer supplies maintenance instructions, use them. If not, use this document.

**NOTICE P1:** "Remove power from the machine" means use the necessary safety procedure for your location. In the USA, this is the OSHA lockout/tagout (LOTO) procedure. More local requirements can also apply.



**WARNING 2: Risk of Severe Injury**—A machine in operation without safety guards can pull in and mutilate your body.

- You must be an approved maintenance technician.
- Replace guards and covers that you remove for maintenance.



**WARNING 3: Risk of Severe Injury**—The machine has electrical power when the Master switch (M) on the control panel is off or on.

- Remove power from the machine (see Notice P1).

### 1. Necessary Maintenance

- 1.1. **Keep the motors clean.**—Examine and clean motors each 500 hours of operation or a minimum of each three months. Keep the motors free of dirt, oil, grease, and water. Contamination that prevents good airflow will cause too much heat and cause motor damage.
- 1.2. **Examine a motor that shows unusual symptoms.** —Examine a motor that becomes too hot, makes noise, makes smoke, smells unusual, or opens the circuit breaker frequently. Examine a motor if the inverter gives errors. Make sure that all electrical connections are tight. Make sure that the wire insulation is good. Use a low resistance ohmmeter. Disassemble the motor to clean it fully If necessary.
- 1.3. **Lubricate the motors.**—This document gives the lubricant frequency, quantity, type, and procedure. These are all important. See the related section in document BIIFUM02 which gives the calibration procedures for grease guns.

### 2. How to Find the Interval and Quantity of Grease to Add

**frame code**—codes for the standard motor dimensions used by motor manufacturers.

**standard interval**—the number of hours that a motor can operate in typical conditions before you must add grease.

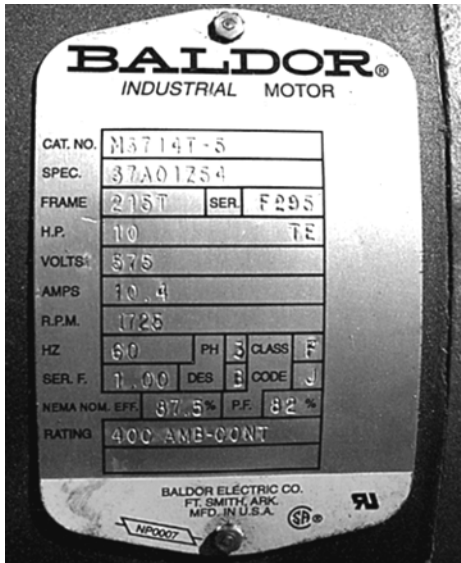
**operation conditions**—the conditions that can decrease the life of the motor and make it necessary to lubricate more frequently.

**rating**—One of three levels of operation conditions: typical, bad, very bad.

**multiplication number**—a decimal number given to the rating. Typical = 1.0, bad = 0.5, and very bad = 0.2.

This section gives the steps you use to find the interval and quantity of grease to add. The examples use the motor data plate shown in [Figure 1](#).

Figure 1: Typical Data Plate on a Motor



1. Find the frame code and RPM on the motor data plate. Example:

$$\text{Frame code} = 215T, \quad \text{RPM} = 1725$$

2. Find the standard interval in [Table 1](#). Example:

$$\text{Standard interval} = 12,000 \text{ hours}$$

3. Find the rating and multiplication number in [Table 2](#) for your worst operation condition. Example: ambient temperature = 102°F (39°C). Moderate contamination.

$$\text{Rating} = \text{bad}, \quad \text{Multiplication number} = 0.5$$

4. Calculate the correct interval (the number of hours of operation before it is necessary to add grease). Example:

$$12,000 \times 0.5 = 6,000 \text{ hours}$$

Where:

12,000 is the standard interval

0.5 is the multiplication number for a rating = bad.

5. Find the quantity of grease for the frame code for your motor in [Table 3](#). You can use the bearing data in the table to do maintenance. Do not use this data to adjust the quantity of grease. Example:

$$\text{grease volume} = 0.16 \text{ ounces (4.7 grams)}$$

$$\text{grease gun cycles} = 2.5$$

**Table 1: Standard Interval**

NEMA (IEC)** Range of Frame Codes	Interval in Hours for the Given RPM			
	3600 RPM*	1800 RPM*	1200 RPM*	900 RPM*
Up to 215 (132)	5500	12000	18000	22000
254 to 286 (160 - 180)	3600	9500	15000	18000
324 to 365 (200 - 225)	2200	7400	12000	15000
404 to 5000 (280 - 315) 6313 or 6314 bearings	2200	3500	7400	10500
	Roller bearings	1100	1750	3700

\* Use this column if this is near or the same RPM as your motor.  
 \*\* Frame codes given by the IEC are shown in parentheses.

**Table 2: Operation Condition and Multiplication Number**

Operation Conditions*			Rating	Multiplication Number
Maximum Ambient Temperature	Or Atmospheric Contamination	Or Bearing Type		
104°F (40°C)	Clean, not much corrosion	Ball bearing with a groove of large depth	Typical	1.0
122°F (50°C)	Moderate dirt, corrosion	Ball thrust, roller	Bad	0.5
>122°F (>50°C)	Much dirt, abrasive dust, corrosion	n.a.	Very bad	0.1

\* The worst condition sets the rating.

**Table 3: Grease Quantity (total quantity for all bearings in the motor)**

NEMA (IEC) Range of Frame Codes	Largest Bearing Dimension in Range			Quantity of Grease *		Cycles of the Grease Gun
	Category of Bearing	Outer Diameter (mm)	Width (mm)	(Ounces)	(Grams)	
0 thru 215 (132)	6307	80	21	0.16	4.7	2.5
254 to 286 (160 - 180)	6311	120	29	0.32	9.1	5
324 to 365 (200 - 225)	6313	140	33	0.43	12.2	7
404 to 5000 (280 - 315)	NU322	240	50	1.11	31.5	18

\* This is the quantity for the two bearings.

### 3. Grease Types and Procedures

Table 4: Type of Grease

Rating from Table 2	Type of Grease
Typical	Shell Dolium R, Chevron SRI, or equivalent
Bad	
Very Bad	Darmex 707 or equivalent



**CAUTION [4]: Damage and Malfunction Risks**—Too much grease gun pressure can put grease in the motor and cause electrical components to burn out. If grease touches a brake or a clutch surface, this can cause a malfunction.

- Apply grease carefully.

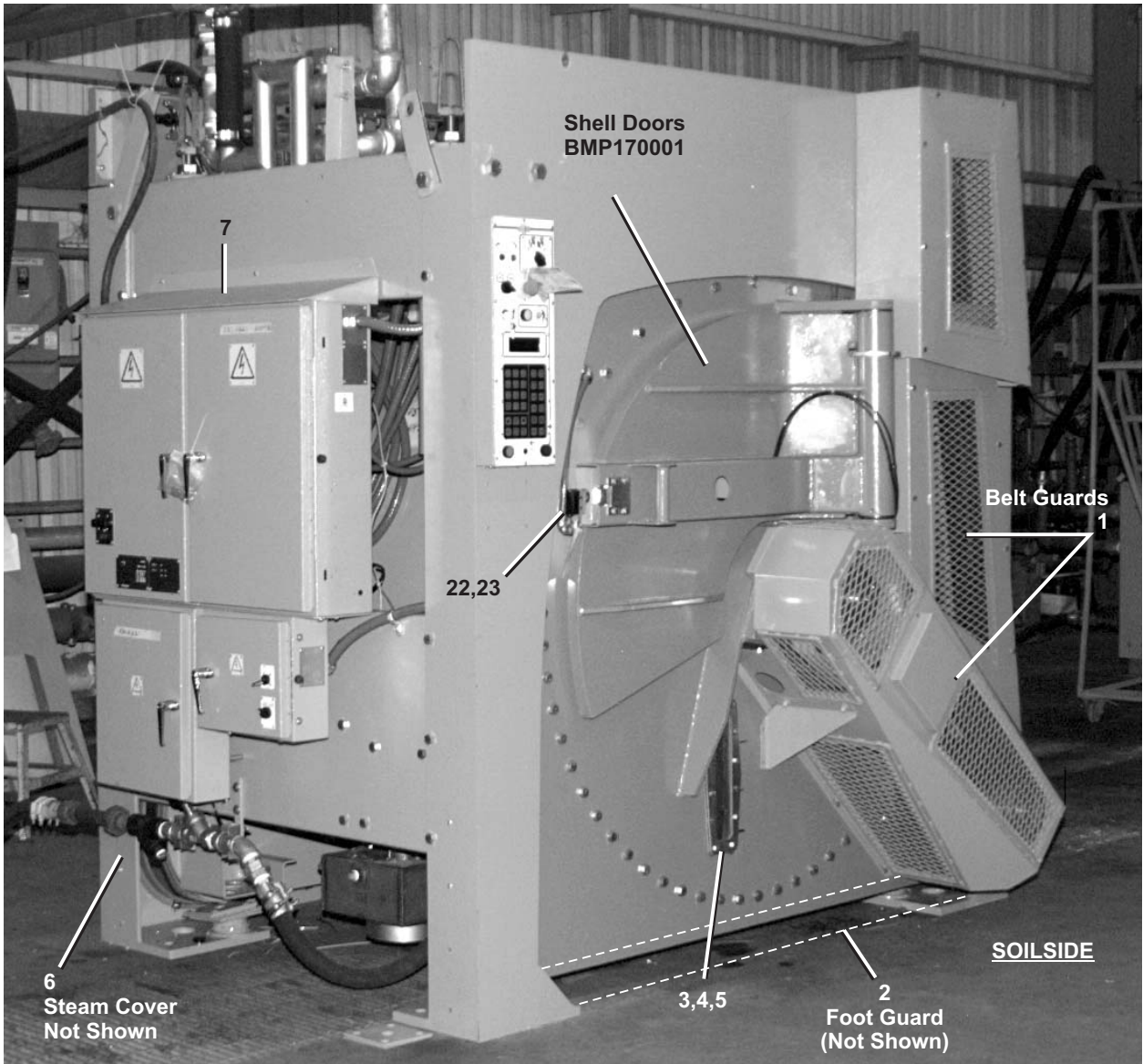
Apply grease as follows:

1. **Remove power from the machine (see Notice P1).**
2. Clean grease fittings.
3. If the motor has a grease outlet plug, remove it.
4. Add the recommended quantity of grease (See [Item 5](#)). Stop immediately if you see new grease around the motor shaft, wires or the grease outlet plug.
5. If the motor has a grease outlet plug, replace it.

— End of BIUUUM03 —

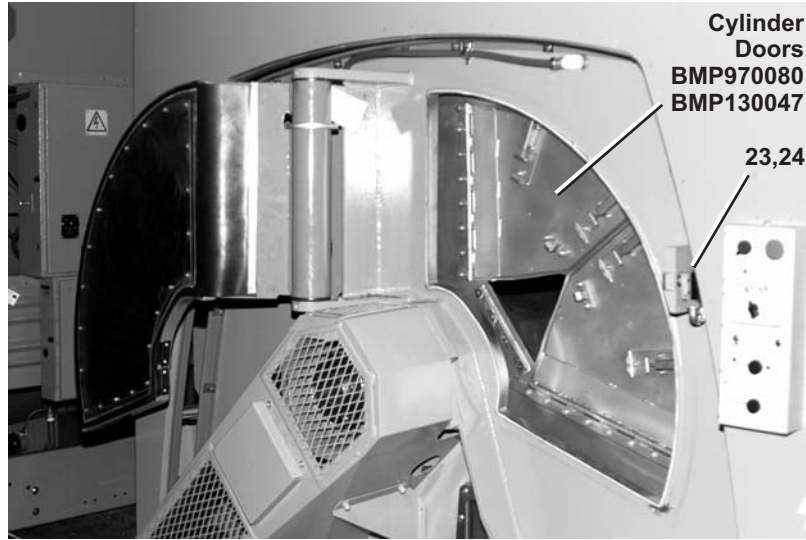
# General Assembly

6044SP2, 6044SP3, 6044SR2, 6044SR3



# General Assembly

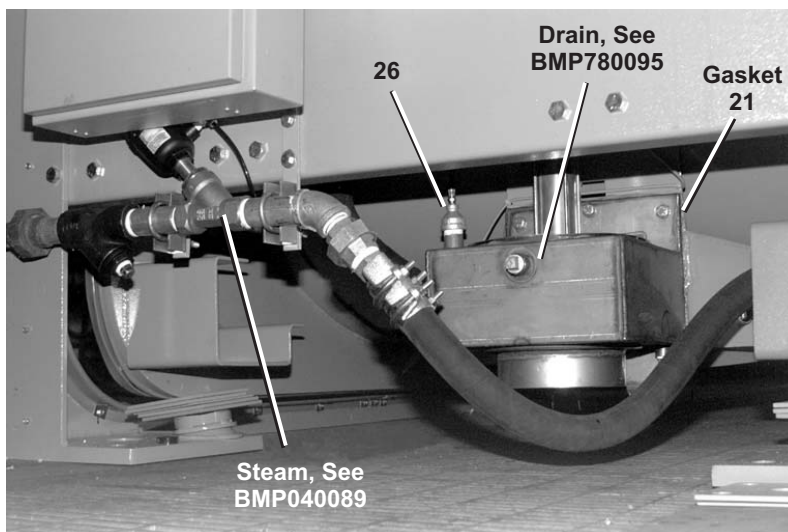
6044SP2, 6044SP3, 6044SR2, 6044SR3





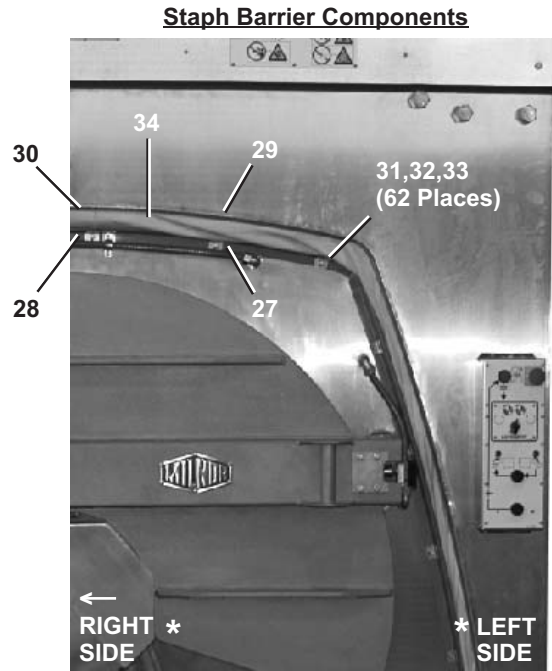
# General Assembly

6044SP2, 6044SP3, 6044SR2, 6044SR3



# General Assembly

6044SP2, 6044SP3, 6044SR2, 6044SR3



(Rear View- CLEANSIDE)

\* Note: The loading side (SOILSIDE) is the "Front" of the machine. Using this rule, the left and right staph barrier rubber extrusions are identified.





# General Assembly

6044SP2, 6044SP3, 6044SR2, 6044SR3

<b>Parts List—General Assembly</b>				
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	AD 28 079	BLTGUARD ASSY-SOILSIDE=60"SG	
all	2	03 06533A	FOOTGUARD=60SGU LOWER Y)	
all	3	AD 28 111	SIGHT GLASS ASSY=WED + WEH	
all	4	02 18980	MARKER LEVEL INDICATOR INCH	
all	5	02 175071	MARKER LEVEL INDICATOR CM	
all	6	02 18835	COVER=STEAM ASSY 6044 SP2	
all	7	03 01448A	COV=CONT BOX NAVY	
all	8	02 18824B	COVER=BRAKE ASSY LF SIDE6049	
all	9	02 18742	EXTENSION=FRAME 6036/6044SGH	
all	10	02 03344	TRIM=REAR CONSOLE TOP 7FT/PC	
all	11	02 18743	BRACKET=FRAME EXT 6036/44SGH	
all	12	02 18744	RT BRACKET FRM EXT 6036/44SG	
all	13	AD 28 078	BLTGUARD ASSY-CLNSIDE=60" SG	
all	17	02 18824C	COVER=UPPER SUP INJ 6044SG	
all	18	02 18824D	COVER=SUP INJ LO SUP 6044SG	
all	19	05 20296E	COVER=RGHT REAR 6044 SG	
all	20	03 06532	SPLASH COVER=MASTERCYL 72SG	
all	21	02 18107	GASKET=8"FLANGED DUMP VALVE	
all	22	E28 01200S	* DOOR INTERLK SW=60SGU-SOILE	
all	23	09R030STDG	09R030 + SCREWS+ SCREW SEAL	
all	24	E28 01200C	* DOOR INTERLK SWT=60SGU-CLEA	
all	25	09RM01212S	CAPSW 12' 180DEG ROLLER SILVER	
all	26	AD 15 090A	AIRCHAMBER PRESWITCH INSTALL	
all	27	02 18781E	EXTRUSION SHELL CS LF 60SG	
all	28	02 18781F	EXTRUSION SHELL CS RT 60SG	
all	29	02 18781G	EXTRUSION FRAME CS LF 60SG	
all	30	02 18781H	EXTRUSION FRAME CS RT 60SG	
all	31	15U320	FLATWASHER(USS STD) 3/4" UNPLT	
all	32	02 175032	CLAMP BOOT 60142 +60SG	
all	33	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
all	34	02 18767	BOOT ASSEMBLY 60SGH	

## Torque Requirements for Fasteners



This document uses Simplified Technical English. Learn more at <http://www.asd-ste100.org>.

The document about the assembly gives the torque requirements for other fasteners. **If fastener torque specifications or threadlocker requirements in an assembly document are different from this document, use the assembly document.**

Figure 1: The Bolts in Milnor® Equipment

The Marks on Bolt Heads	Legend
	<p>A. SAE Grades 1 and 2, ASTM A307, and stainless steel</p> <p>B. Grade BC, ASTM A354</p> <p>C. SAE Grade 5, ASTM A449</p> <p>D. SAE Grade 8 and ASTM A354 BD</p>

### 1. Torque Values

These tables give the standard dimension, grade, threadlocker, and torque requirements for fasteners frequently used on Milnor® equipment.

**Note 1:** Data from the Pellerin Milnor® Corporation “Bolt Torque Specification” (bolt\_torque\_milnor.xls/2002096).

#### 1.1. Fasteners Made of Carbon Steel

##### 1.1.1. Without a Threadlocker

Table 1: Torque Values for Standard Fasteners with Maximum 5/16-inch Diameters and No Lubricant

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	66	7	101	11	143	16	126	14
1/4 x 28	76	9	116	13	163	18	--	--
5/16 x 18	136	15	209	24	295	33	258	29
5/16 x 24	150	17	232	26	325	37	--	--

Torque Requirements for Fasteners

**Table 2: Torque Values for Standard Fasteners Larger Than 5/16-inch Diameters and No Lubricant**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
3/8 x 16	20	27	31	42	44	59	38	52
3/8 x 24	23	31	35	47	50	68	--	--
7/16 x 14	32	43	49	66	70	95	61	83
7/16 x 20	36	49	55	75	78	105	--	--
1/2 x 13	49	66	75	102	107	145	93	126
1/2 x 20	55	75	85	115	120	163	--	--
9/16 x 12	70	95	109	148	154	209	134	182
9/16 x 18	78	106	121	164	171	232	--	--
5/8 x 11	97	131	150	203	212	287	186	252
5/8 x 18	110	149	170	231	240	325	--	--
3/4 x 10	172	233	266	361	376	510	329	446
3/4 x 16	192	261	297	403	420	569	--	--
7/8 x 9	167	226	429	582	606	821	531	719
7/8 x 14	184	249	473	641	668	906	--	--
1 x 8	250	339	644	873	909	1232	796	1079
1 x 12	274	371	704	954	994	1348	--	--
1 x 14	281	381	723	980	1020	1383	--	--
1 1/8 x 7	354	480	794	1077	1287	1745	1126	1527
1 1/8 x 12	397	538	891	1208	1444	1958	--	--
1 1/4 x 7	500	678	1120	1519	1817	2464	1590	2155
1 1/4 x 12	553	750	1241	1682	2012	2728	--	--
1 3/8 x 6	655	888	1469	1992	2382	3230	2085	2827
1 3/8 x 12	746	1011	1672	2267	2712	3677	--	--
1 1/2 x 6	869	1178	1949	2642	3161	4286	2767	3751
1 1/2 x 12	979	1327	2194	2974	3557	4822	--	--

**Table 3: Torque Values for Plated Fasteners with Maximum 5/16-inch Diameters and No Lubricant**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
1/4 x 20	49	6	76	9	107	12	95	11
1/4 x 28	56	6	88	10	122	14	--	--
5/16 x 18	102	12	156	18	222	25	193	22
5/16 x 24	113	13	174	20	245	28	--	--

**Table 4: Torque Values for Plated Fasteners Larger Than 5/16-inch Diameters and No Lubricant**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
3/8 x 16	15	20	23	31	33	44	29	38
3/8 x 24	17	23	26	35	37	49	--	--
7/16 x 14	24	32	37	50	52	71	46	61
7/16 x 20	27	36	41	55	58	78	--	--
1/2 x 13	37	49	56	76	80	106	70	93
1/2 x 20	41	55	64	85	90	120	--	--
9/16 x 12	53	70	81	110	115	153	101	134
9/16 x 18	59	79	91	122	128	174	--	--
5/8 x 11	73	97	113	150	159	212	139	186
5/8 x 18	83	110	127	172	180	240	--	--
3/4 x 10	129	173	200	266	282	376	246	329
3/4 x 16	144	192	223	297	315	420	--	--
7/8 x 9	125	166	322	430	455	606	398	531
7/8 x 14	138	184	355	474	501	668	--	--
1 x 8	188	250	483	644	682	909	597	796
1 x 12	205	274	528	716	746	995	--	--
1 x 14	210	280	542	735	765	1037	--	--
1 1/8 x 7	266	354	595	807	966	1288	845	1126
1 1/8 x 12	298	404	668	890	1083	1444	--	--
1 1/4 x 7	375	500	840	1120	1363	1817	1192	1590
1 1/4 x 12	415	553	930	1261	1509	2013	--	--
1 3/8 x 6	491	655	1102	1470	1787	2382	1564	2085
1 3/8 x 12	559	758	1254	1672	2034	2712	--	--
1 1/2 x 6	652	870	1462	1982	2371	3161	2075	2767
1 1/2 x 12	733	994	1645	2194	2668	3557	--	--

## 1.1.2. With a Threadlocker

**Table 5: Threadlocker by the Diameter of the Bolt (see Note 2)**

LocTite Product	Dimension			
	1/4-inch	1/4- to 5/8-inch	5/8- to 7/8-inch	1-inch +
LocTite 222	OK			
LocTite 242		OK		
LocTite 262			OK	
LocTite 272			High temperature	
LocTite 277				OK

**Note 2:** The acceptable bolt size ranges for various LocTite® threadlocking products is the LocTite manufacturer's **general** recommendation. Specific applications sometime require that a LocTite product is applied to a bolt size outside the ranges shown here. For example, Milnor specifies LocTite 242 for use on certain 1" bolt applications and has confirmed this usage with the LocTite manufacturer. You may see variances such as this in the documentation for specific machine assemblies.

Torque Requirements for Fasteners

**Table 6: Torque Values if You Apply LocTite 222**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-inches	N-m	Pound-inches	N-m	Pound-inches	N-m	Pound-inches	N-m
1/4 x 20	60	7	96	11	132	15	108	12
1/4 x 28	72	8	108	12	144	16	--	--

**Table 7: Torque Values if You Apply LocTite 242**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
5/16 x 18	11	15	17	23	25	34	22	30
5/16 x 24	13	18	19	26	27	37	27	37
3/8 x 16	20	27	31	42	44	60	38	52
3/8 x 24	23	31	35	47	50	68	--	--
7/16 x 14	32	43	49	66	70	95	61	83
7/16 x 20	36	49	55	75	78	106	--	--
1/2 x 13	49	66	75	102	107	145	93	126
1/2 x 20	55	75	85	115	120	163	--	--
9/16 x 12	70	95	109	148	154	209	134	182
9/16 x 18	78	106	121	164	171	232	--	--
5/8 x 11	97	132	150	203	212	287	186	252
5/8 x 18	110	149	170	230	240	325	--	--

**Table 8: Torque Values if You Apply LocTite 262**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
3/4 x 10	155	210	240	325	338	458	296	401
3/4 x 16	173	235	267	362	378	512	--	--
7/8 x 9	150	203	386	523	546	740	477	647
7/8 x 14	165	224	426	578	601	815	--	--

**Table 9: Torque Values if You Apply LocTite 272 (High-Temperature)**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
<b>1 x 8</b>	350	475	901	1222	1272	1725	1114	1510
<b>1 x 12</b>	383	519	986	1337	1392	1887	--	--
<b>1 x 14</b>	393	533	1012	1372	1428	1936	--	--
<b>1-1/8 x 7</b>	496	672	1111	1506	1802	2443	1577	2138
<b>1-1/8 x 12</b>	556	754	1247	1691	2022	2741	--	--
<b>1-1/4 x 7</b>	700	949	1568	2126	2544	3449	2226	3018
<b>1-1/4 x 12</b>	774	1049	1737	2355	2816	3818	--	--
<b>1-3/8 x 6</b>	917	1243	2056	2788	3335	4522	2919	3958
<b>1-3/8 x 12</b>	1044	1415	2341	3174	3797	5148	--	--
<b>1-1/2 x 6</b>	1217	1650	2729	3700	4426	6001	3873	5251
<b>1-1/2 x 12</b>	1369	1856	3071	4164	4980	6752	--	--

**Table 10: Torque Values if You Apply LocTite 277**

Dimension	The Grade of the Bolt							
	Grade 2		Grade 5		Grade 8		Grade BC	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
<b>1 x 8</b>	325	441	837	1135	1181	1601	1034	1402
<b>1 x 12</b>	356	483	916	1242	1293	1753	--	--
<b>1 x 14</b>	365	495	939	1273	1326	1798	--	--
<b>1-1/8 x 7</b>	461	625	1032	1399	1674	2270	1464	1985
<b>1-1/8 x 12</b>	516	700	1158	1570	1877	2545	--	--
<b>1-1/4 x 7</b>	650	881	1456	1974	2362	3202	2067	2802
<b>1-1/4 x 12</b>	719	975	1613	2187	2615	3545	--	--
<b>1-3/8 x 6</b>	851	1154	1909	2588	3097	4199	2710	3674
<b>1-3/8 x 12</b>	970	1315	2174	2948	3526	4781	--	--
<b>1-1/2 x 6</b>	1130	1532	2534	3436	4110	5572	3597	4877
<b>1-1/2 x 12</b>	1271	1723	2852	3867	4624	6269	--	--

## 1.2. Stainless Steel Fasteners

**Table 11: Torque Values for Stainless Steel Fasteners 5/16-inch and Smaller**

Dimension	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
	Pound-Inches	N-m	Pound-Inches	N-m	Pound-Inches	N-m
<b>1/4 x 20</b>	79	9	76	9	45	5
<b>1/4 x 28</b>	100	11	94	11	56	6
<b>5/16 x 18</b>	138	16	132	15	79	9
<b>5/16 x 24</b>	148	17	142	16	85	10

**Table 12: Torque Values for Stainless Steel Fasteners Larger Than 5/16-inch**

Dimension	316 Stainless		18-8 Stainless		18-8 Stainless with Loctite 767	
	Pound-feet	N-m	Pound-feet	N-m	Pound-feet	N-m
3/8 x 16	21	28	20	27	12	16
3/8 x 24	23	31	22	29	13	18
7/16 x 14	33	44	31	42	19	25
7/16 x 20	35	47	33	45	20	27
1/2 x 13	45	61	43	58	26	35
1/2 x 20	47	64	45	61	27	37
9/16 x 12	59	81	57	77	34	46
9/16 x 18	66	89	63	85	38	51
5/8 x 11	97	131	93	125	56	75
5/8 x 18	108	150	104	141	62	84
3/4 x 10	132	179	128	173	77	104
3/4 x 16	130	176	124	168	75	101
7/8 x 9	203	275	194	263	116	158
7/8 x 14	202	273	193	262	116	157
1 x 8	300	406	287	389	172	233
1 x 14	271	367	259	351	156	211
1-1/8 x 7	432	586	413	560	248	336
1-1/8 x 12	408	553	390	529	234	317
1-1/4 x 7	546	740	523	709	314	425
1-1/4 x 12	504	683	480	651	288	390
1-1/2 x 6	930	1261	888	1204	533	722
1-1/2 x 12	732	992	703	953	422	572

## 2. Preparation



**WARNING 2: Fire Hazard**—Some solvents and primers are flammable.

- Use threadlocker and primers with sufficient airflow.
  - Do not use flammable material near ignition sources.
1. Clean all threads with a wire brush or a different tool.
  2. Remove the grease from the fasteners and the mating threads with solvent. Make the parts dry.

**Note 3:** Loctite 7649 Primer™ or standard solvents will remove grease from parts.

3. Apply a spray of Loctite 7649 Primer™ or equal on the fasteners and the mating threads. Let the primer dry for one minute minimum.

## 3. How to Apply a Threadlocker

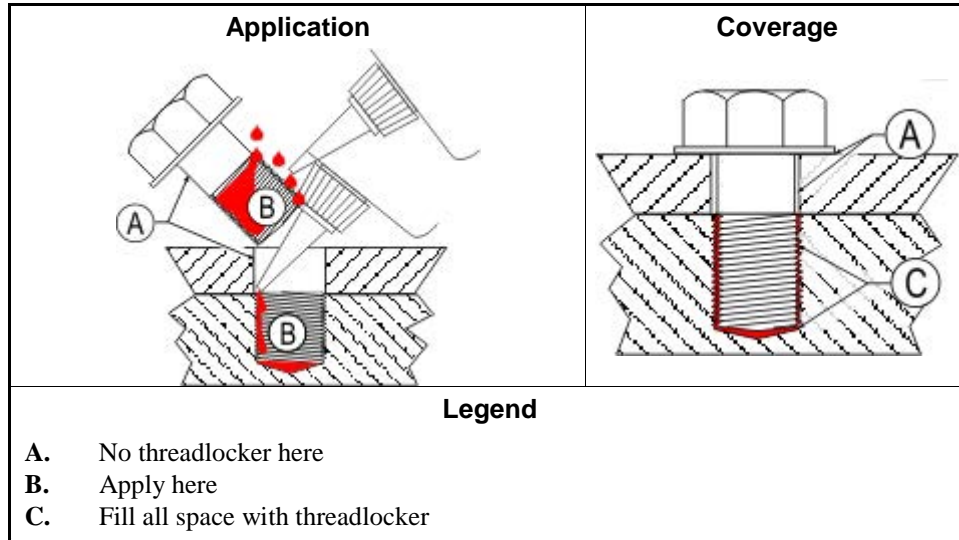


**CAUTION 3: Malfunction Hazard**—Heat, vibration, or mechanical shocks can let the fasteners loosen if you do not apply the threadlocker correctly. Loose fasteners can cause malfunctions of the equipment.

- Read the threadlocker manufacturer's instructions and warnings. Obey these instructions.

Apply the threadlocker only to the areas where the fastener threads and the mating threads engage.

**Figure 2: Blind Hole**



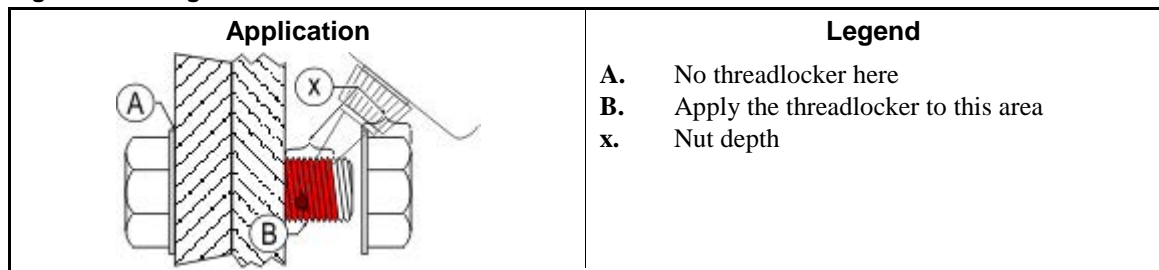
### 3.1. Blind Holes

1. Apply the threadlocker down the threads to the bottom of the hole.
2. Apply the threadlocker to the bolt.
3. Tighten the bolt to the value shown in the correct table ([Table 5](#) to [Table 11](#)).

### 3.2. Through Holes

1. Put the bolt through the assembly.
2. Apply the threadlocker only to the bolt thread area that will engage the nut.
3. Tighten the bolt to the value shown in the correct table ([Table 5](#) to [Table 11](#)).

**Figure 3: Through Hole**

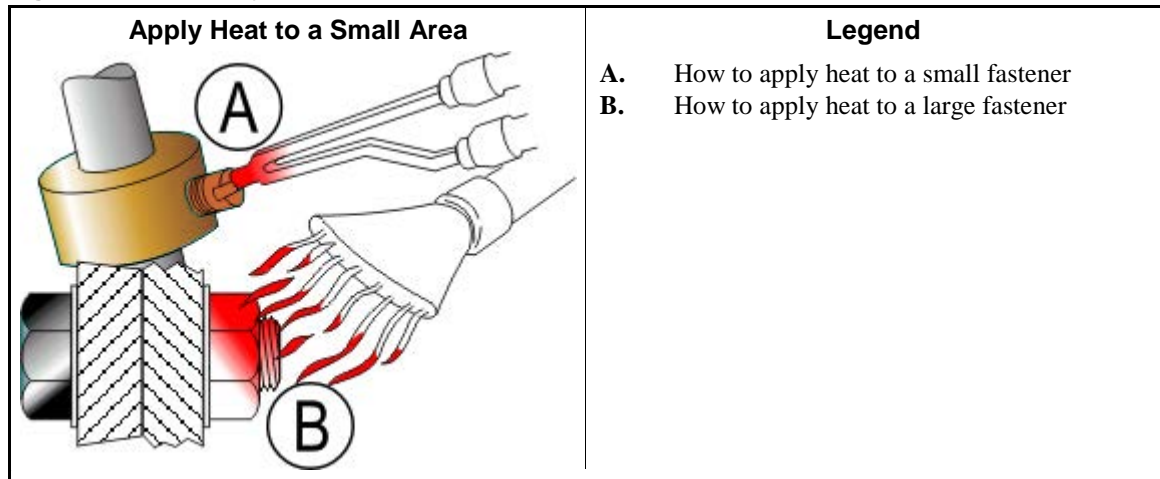


- 3.3. Disassembly**—For high-strength threadlocker, apply heat for five minutes. Disassemble with hand tools while the parts are hot.

For low-strength and moderate-strength threadlocker, disassemble with hand tools.



Figure 4: Disassembly



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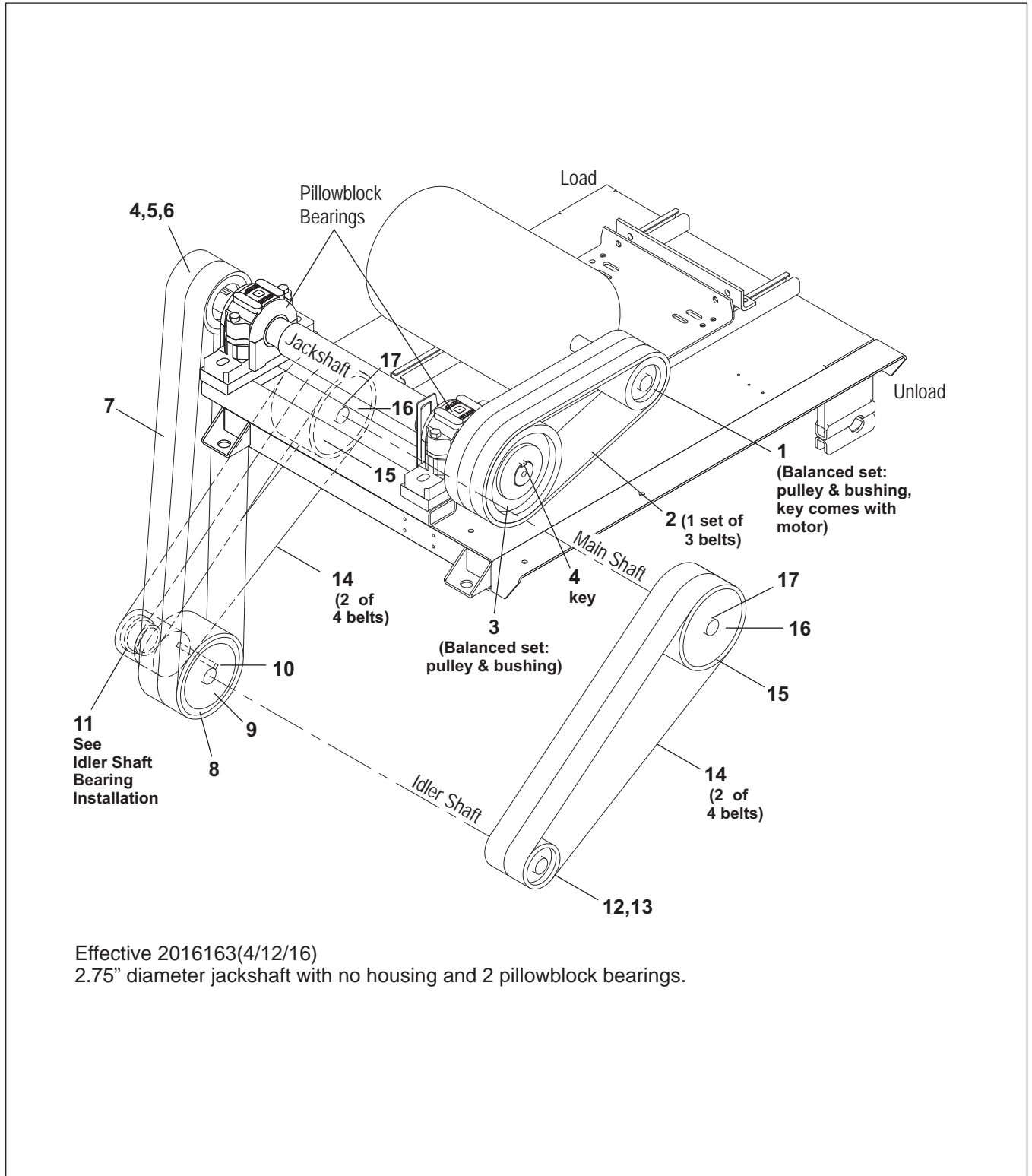


# Drive Assemblies

2

# Single Motor Drive

60044SR2



Effective 2016163(4/12/16)  
2.75" diameter jackshaft with no housing and 2 pillowblock bearings.

# Single Motor Drive

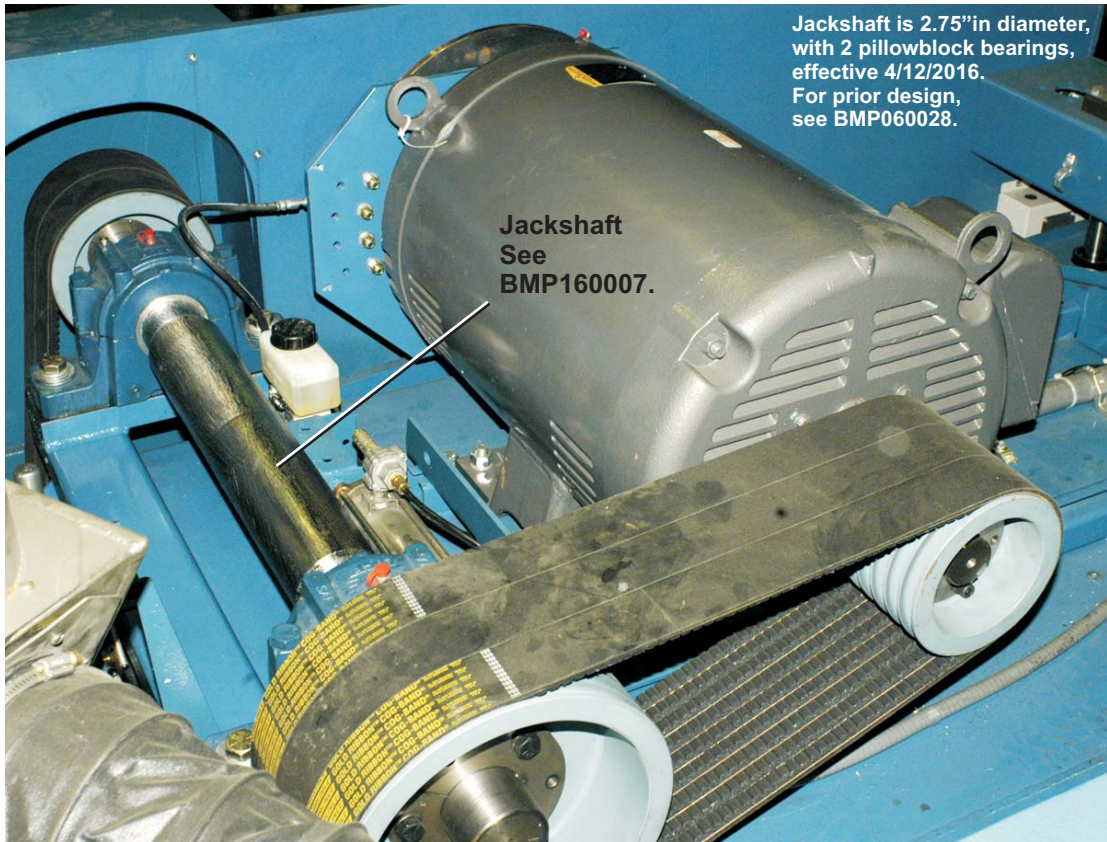
60044SR2

Parts List—Single Motor Drive				
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	D29 00960S	*DVECHRT=6044SP2 50/60 SGL MTR	REFERENCE
	B	SA 28 106S	*DRIVE BASE ASSY 60SPU SGL MTR	EFFECTIVE 4/12/2016
			-----COMPONENTS-----	
all	1	56060B9SF	BALANCED SET - VPUL 9B6.0 (SF) TYPE QD/(56Q1RSF) 1+7/8" BUSH VPUL QD TYPE SF	
all	2	56VB062XB3	VBAND 3RBX62 EACH=1	
all	3	56110B9E	BALANCED SET - VPUL 9B11.0 (E) TYPE QD/(56Q2PE) 2-3/4" BUSHING VPUL QD TYPE E	
all	4	02 175121	KEY=5/8SQ	
all	5	56080C6E	VPUL 6C8.0 (E) TYPE QD	
all	6	56Q2HE	2+7/16" BUSH VPUL QD TYPE E	
all	7	56VC173XBA	SET OF TWO 3RCX173 VBANDS (WT =24 LBS)	
all	8	X3 06330D	VPUL=6GR 7PDX14.5PD=60SG	
all	9	54V400	BUSHING=3-15/16=SPECIAL	
all	10	15E250	STRSQMACHKEY 1X6 C1018	
all	11	03 06445	WEDGE=SHEAVE+SHAFT=60+72SGU	
all	12	56070C6R2	VPUL 6C7.0 (R2) SPECIAL	
all	13	56Q3DR2S	3+3/16" SPLIT BUSH BROWNING #R2	
all	14	56VC107XBA	SET OF FOUR 3RCX107 VBANDS=30LB	(1 SET OF 4 BELTS)
all	15	56130C6F	VPUL 6C13.0 (F) TYPE QD	
all	16	56Q2TF	2+15/16" BUSH VPUL QD TYPE F	
all	17	02 175021A	KEY-3/4"SQX3+1/4"LONG	

# Drive Base Installation

60044SR2

Figure 1: Motor mount, drive shaft, and pillowblock bearings

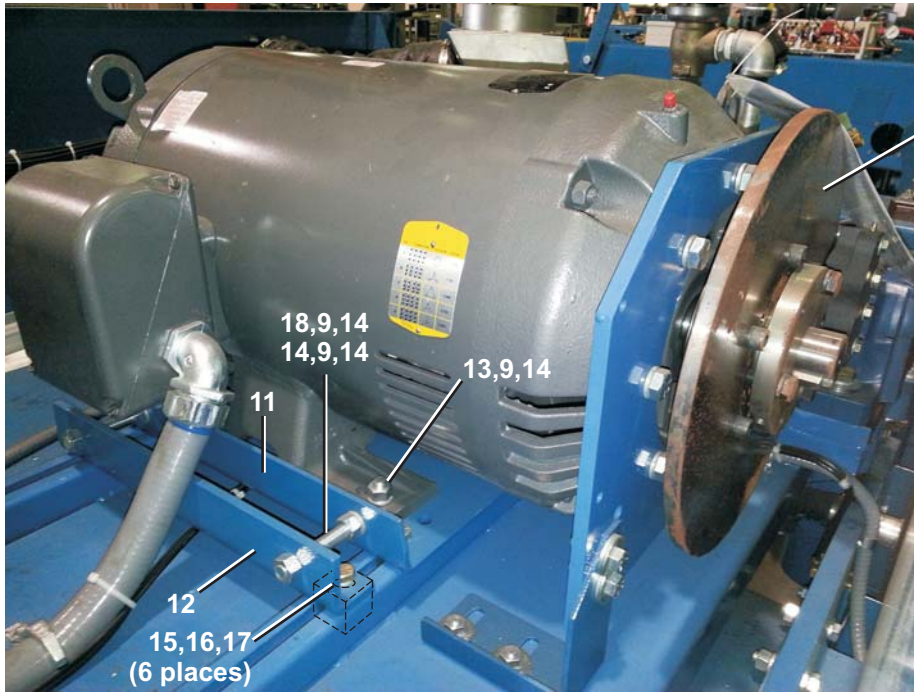




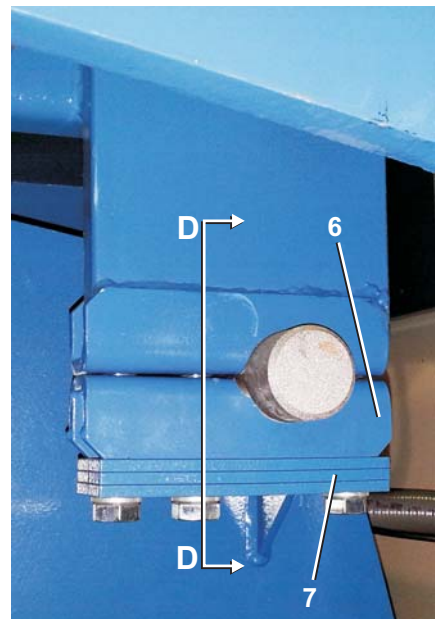
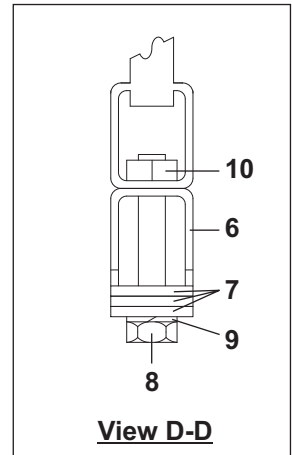
# Drive Base Installation

60044SR2

Figure 2: Motor mount, drive shaft, and pillowblock bearings



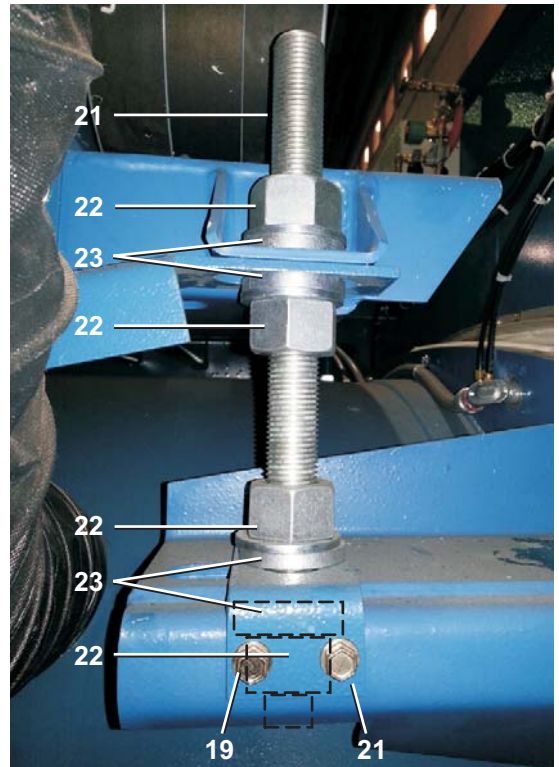
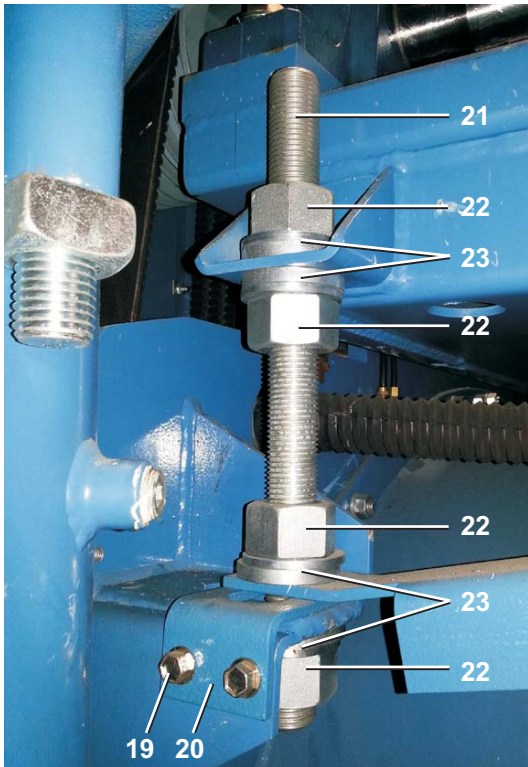
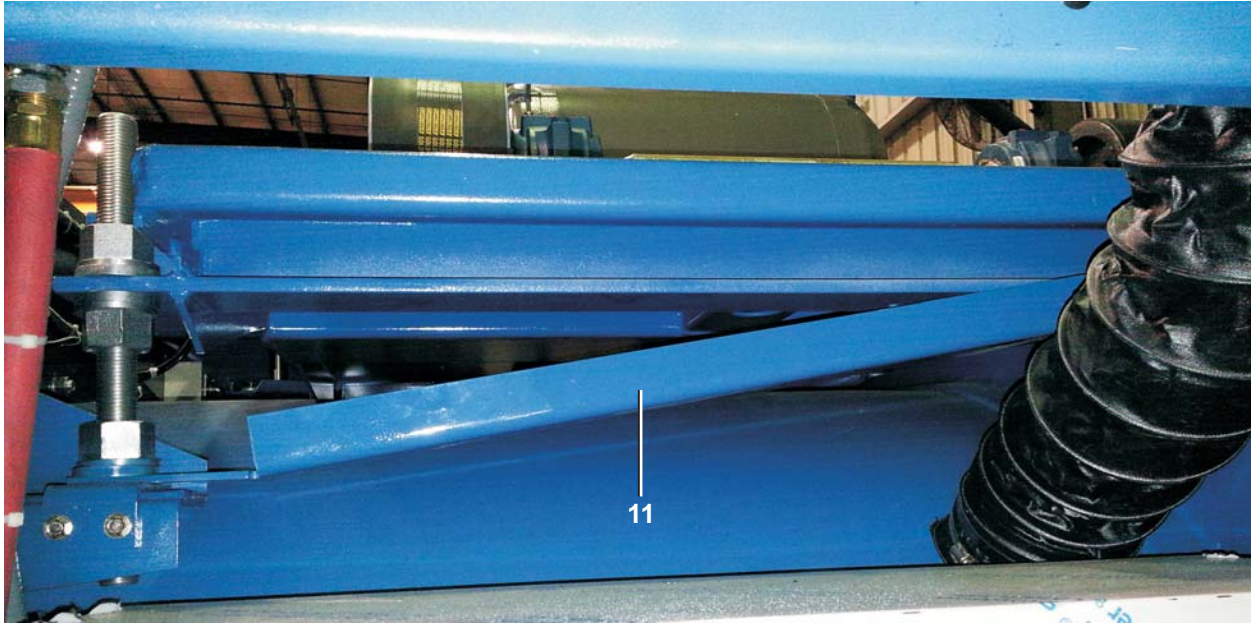
Upper Disc Brake  
See BMP060029.



# Drive Base Installation

60044SR2

Figure 4: Adjustable bolts





# Drive Base Installation

60044SR2

Parts List—Drive Base Installation				
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 28 106A	6044SP DRIVE BASE & JACKSHAFT ASSY	EFFECTIVE 04/12/2016
			-----COMPONENTS-----	
all	1	W2 18717E	6044SP DR BASE WLMT-PILLOW BLK BRG	
all	2	ABJ25006B	6044WP JACKSHAFT-PILLOW BLK BRG	
all	3	15K235AB	HXCAPSCR 3/4-10UNC2AX3"GR8 ZIN	
all	4	15U320	FLATWASHER(USS STD) 3/4" UNPLT	
all	5	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	6	X2 18634	CLAMP=MACHINED DR HINGPIN	
all	7	02 18706	REINFORCEMENT=HINGE PINCLAMP	
all	8	15K227	HXCAPSCR 5/8-11UNC2AX4 GR5 ZIN	
all	9	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	10	15G236	SQ Nut 5/8-11UNC2B SAE ZINC GR2	
all	11	05 20131E	MTRPLATE 6044SG 1 MOTOR	
all	12	02 19577	ADJ ANGLE MOTOR	
all	13	15K211	HXCAPSCR 5/8-11UNC2AX1 GR5 ZIN	
all	14	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	15	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5	
all	16	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	17	02 19283	NUT=1/2-13UNCX1+1/2SQ SPEC	
all	18	15B186	HEXTAPBLT FLT 5/8-11UNCX7	
all	19	15P200	TRDCUT-F HXWASHD 3/8-16X3/4NIK	
all	20	03 25626	FORK=MTR MNT ADJ SCREW 52	
all	21	17R125A15K	STUD=DRIVEBASEADS 1+1/4X15.5 8UN	
all	22	15G261	HVHXNUT 1+1/4-8UNC2B ZINC GR2H	
all	23	17W125	1+1/4"SPHERICAL WASHER SET	



# Jackshaft

60044WR2, 60044SR2

### Parts List—Jackshaft

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	ABJ25006B	6044WP JACKSHAFT-PILLOW BLK BRG	6044WR2, 2.75" SHAFT EFFECTIVE 2015193 (5/5/2015) &  6044SR2 2.75" SHAFT EFFECTIVE 2016163 (4/12/2016)
-----COMPONENTS-----				
all	1	X2 18711M	6044WP JACKSHAFT: PILLOW BLOCK/SPHRCL 2.75 BORE	
all	2	56S22217A	SPHEROLBRG 22217EK/C3 SAF517 PILLOW BLK 3.346"ID	

Drive Chart

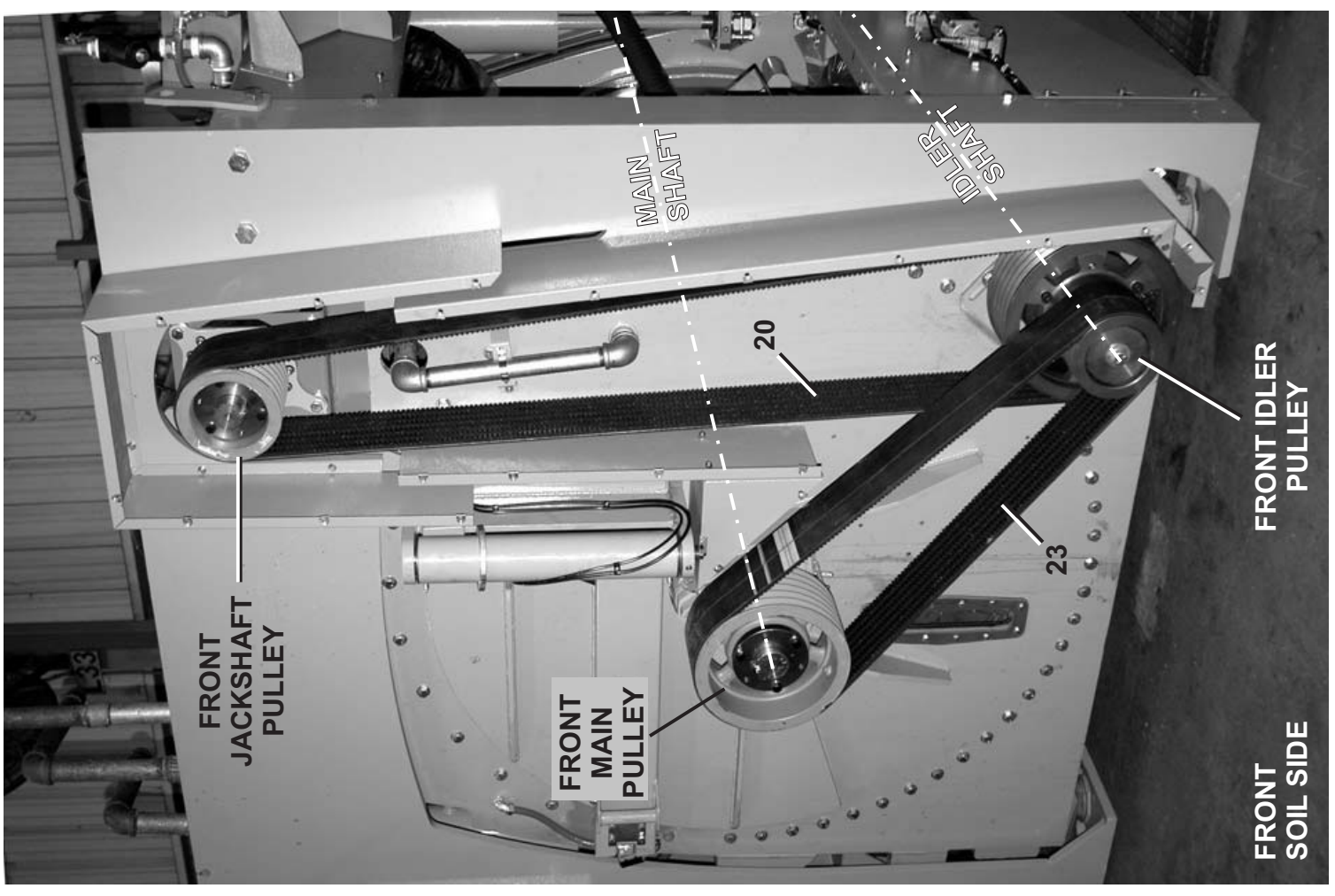
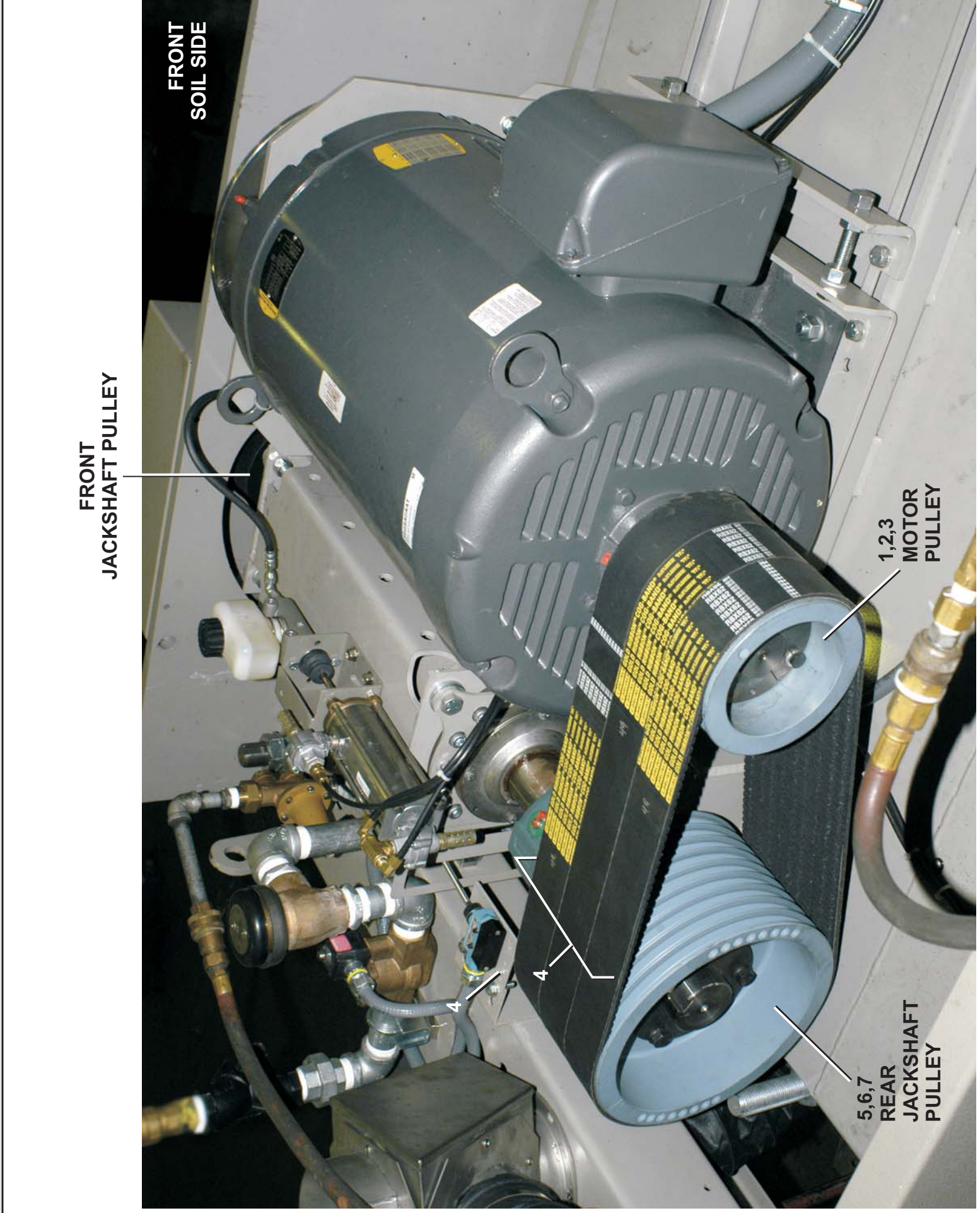
6044SP2, 6044SP3 (Single Motor)

BMP060027/2017155B  
(Sheet 1 of 3)



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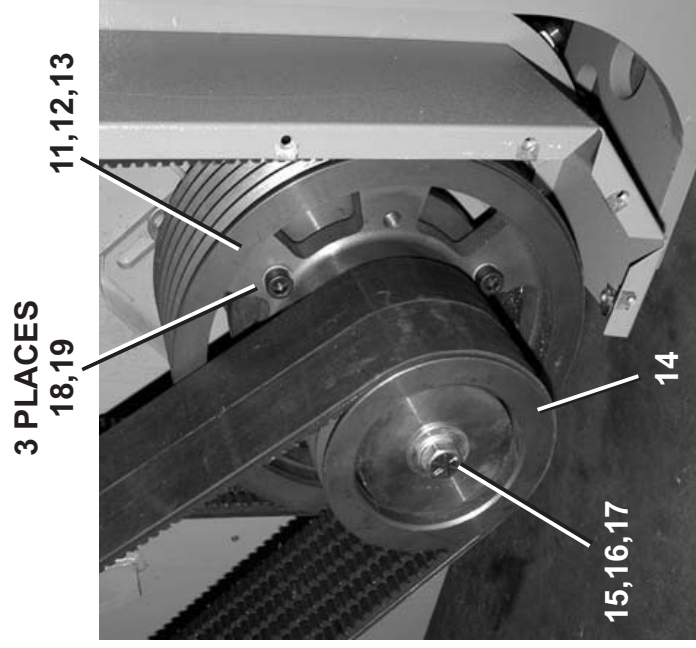
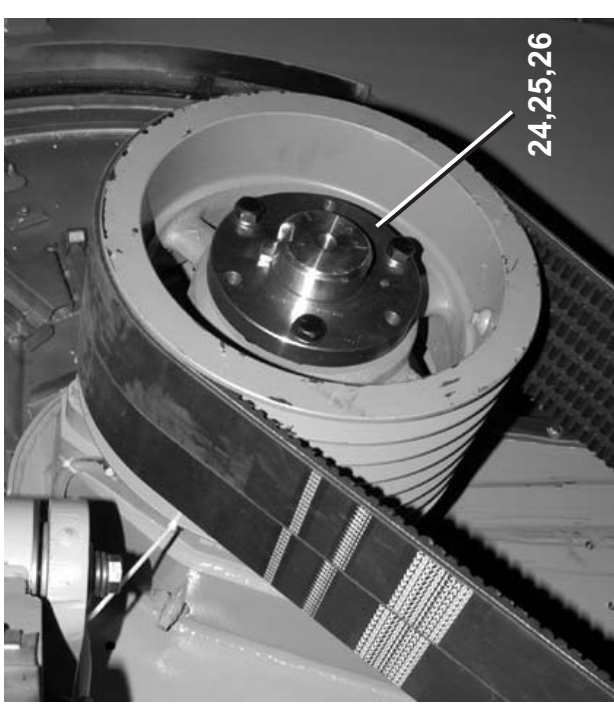
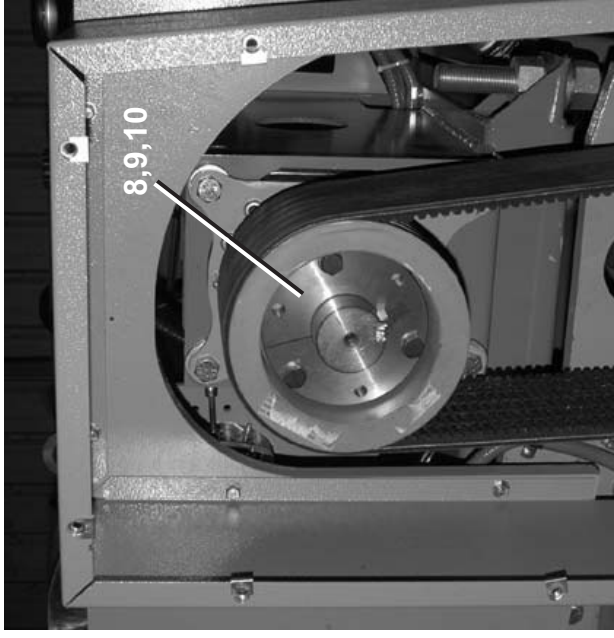
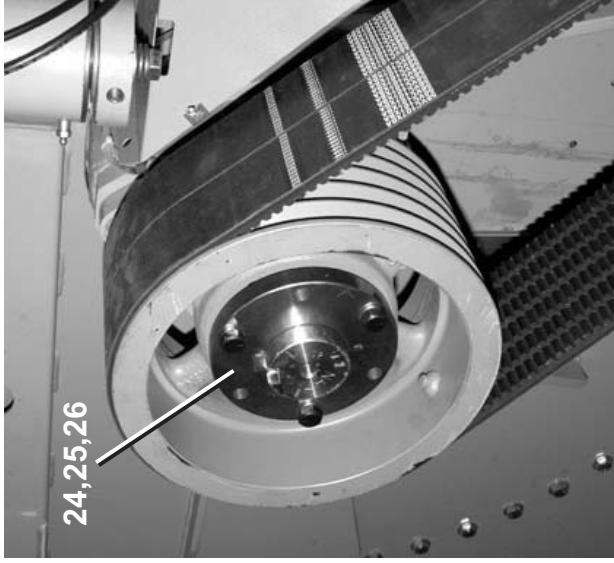
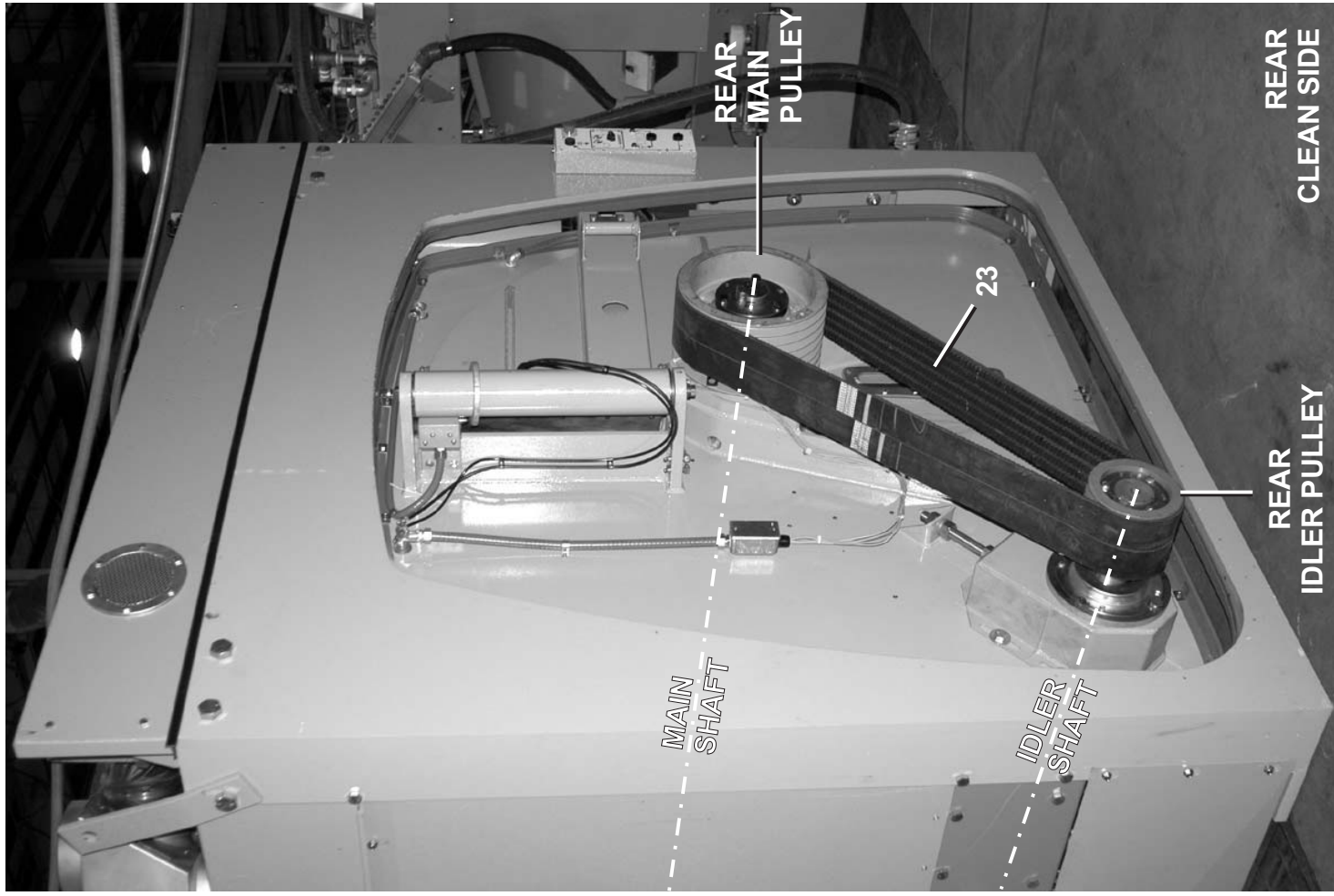






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# Drive Chart

## 6044SP2, 6044SP3 (Single Motor)

BMP060027/2017155B  
(Sheet 3 of 3)



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Used In		Item	Part Number	Description	Comments
<p><b>Parts List—Drive Chart</b> 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.</p>					
-----ASSEMBLIES-----					
A		D29 00960S		*DVECHRT=6044SP2 50/60 SGL MTR	6044SP2, 6044SP3 Single Motor Prior to 4/12/16
-----COMPONENTS-----					
all	1	56060B8SF		VPUL 8B6.0 (SF) TYPE QD	
all	2	56Q1RSF		1+7/8" BUSH VPUL QD TYPE SF	
all	3	02 15794		KEY-1/2X2+1/2 4231-4244SGH	
all	4	56VB062XB3		VBAND 3RBX62 EACH=1	USES 3
all	5	5608B110		PULLEY 8B11.0 TYPE E	
all	6	56Q2PE		2-3/4" BUSHING VPUL QD TYPE E	
all	7	15E241		SQMACHKEY 5/8X2+1/2	
all	8	56080C6E		VPUL 6C8.0 (E) TYPE QD	
all	9	56Q2HE		2+7/16" BUSH VPUL QD TYPE E	
all	10	02 175121		KEY=5/8SQ	
all	11	X3 06330D		VPUL=6GR 7PDX14.5PD=60SG	
all	12	54V400		BUSHING=3-15/16=SPECIAL	
all	13	15E250		STRSQMACHKEY 1X6 C1018	
all	14	03 06445		WEDGE=SHEAVE+SHAFT=60+72SGU	
all	15	15K235A		HEXCAPSCR 3/4-10X2.5 GR 8	
all	16	15U340		LOCKWASH MEDIUM 3/4 ZINCPL	
all	17	15U320		FLATWASHER(USS STD) 3/4" UNPLT	
all	18	15K226C		SOKCAPSCR 5/8-11X3 BLK	
all	19	15U315		LOKWASHER MEDIUM 5/8 ZINCPL	
all	20	56VC173XBA		SET OF TWO 3RCX173 VBANDS	
all	21	56070C6R2		VPUL 6C7.0 (R2) SPECIAL	
all	22	56Q3DR2S		3+3/16" SPLIT BUSH B#R2	
all	23	56VC107XBA		SET OF FOUR 3RCX107 VBANDS	
all	24	56130C6F		VPUL 6C13.0 (F) TYPE QD	
all	25	56Q2TF		2+15/16" BUSH VPUL QD TYPE F	
all	26	02 175021		KEY-3/4"SQX6+1/2"LONG-60WE	



# Drive Base

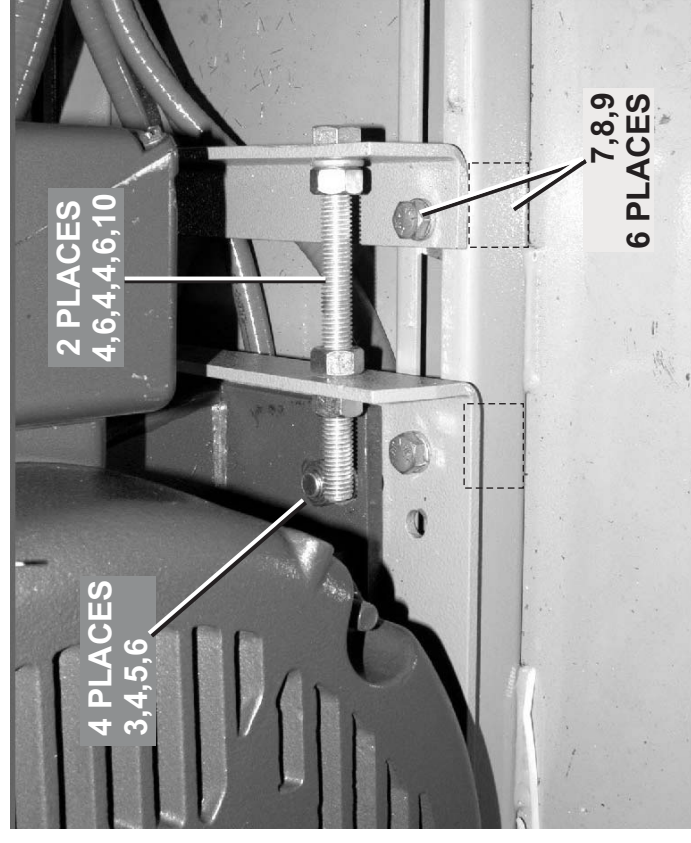
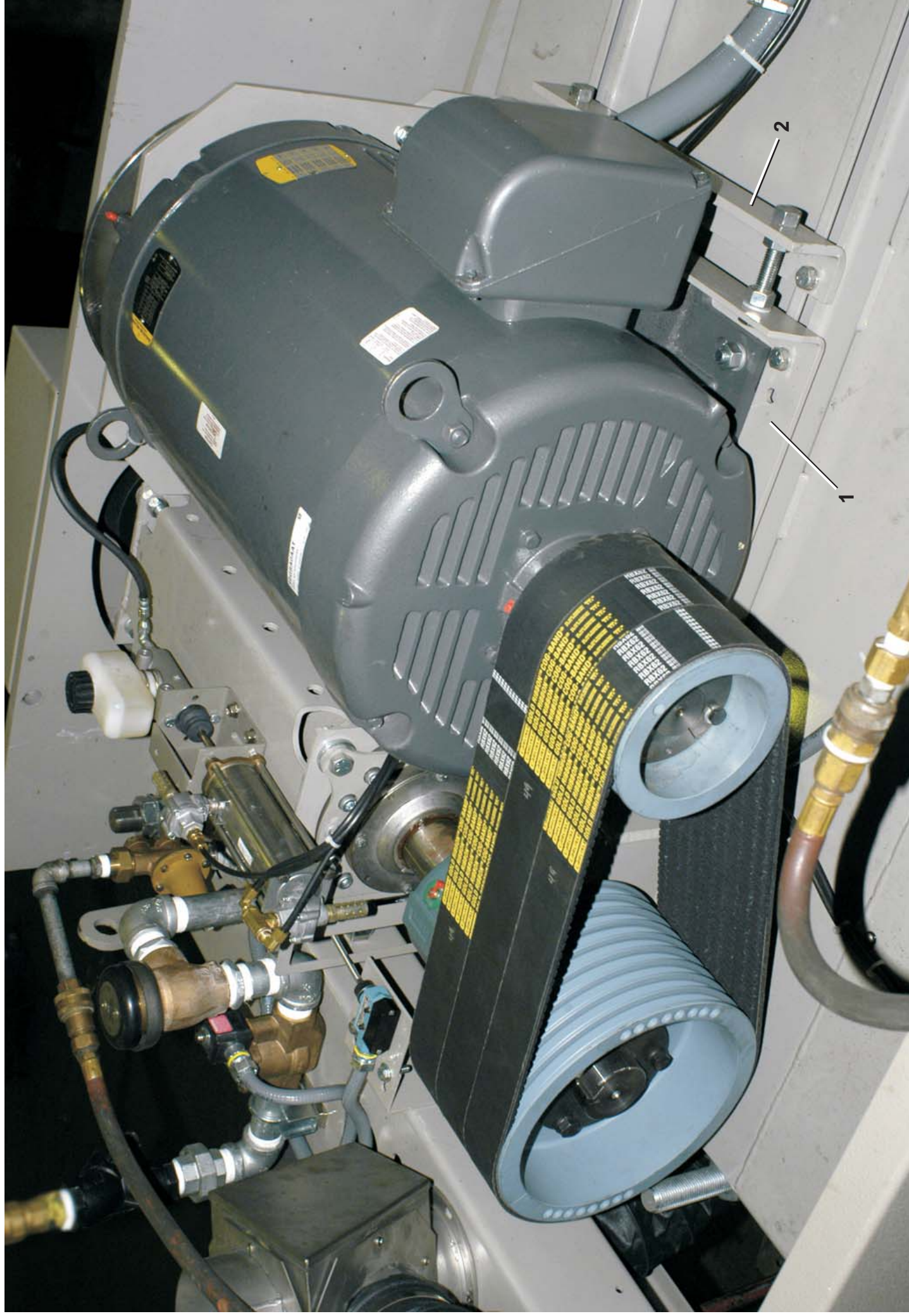
6044SP2, 6044SP3 (Single Motor)



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(Sheet 1 of 4)

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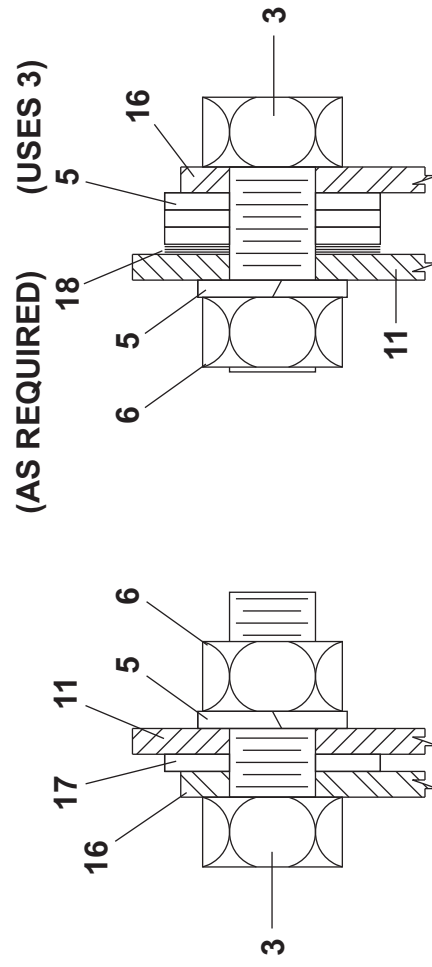
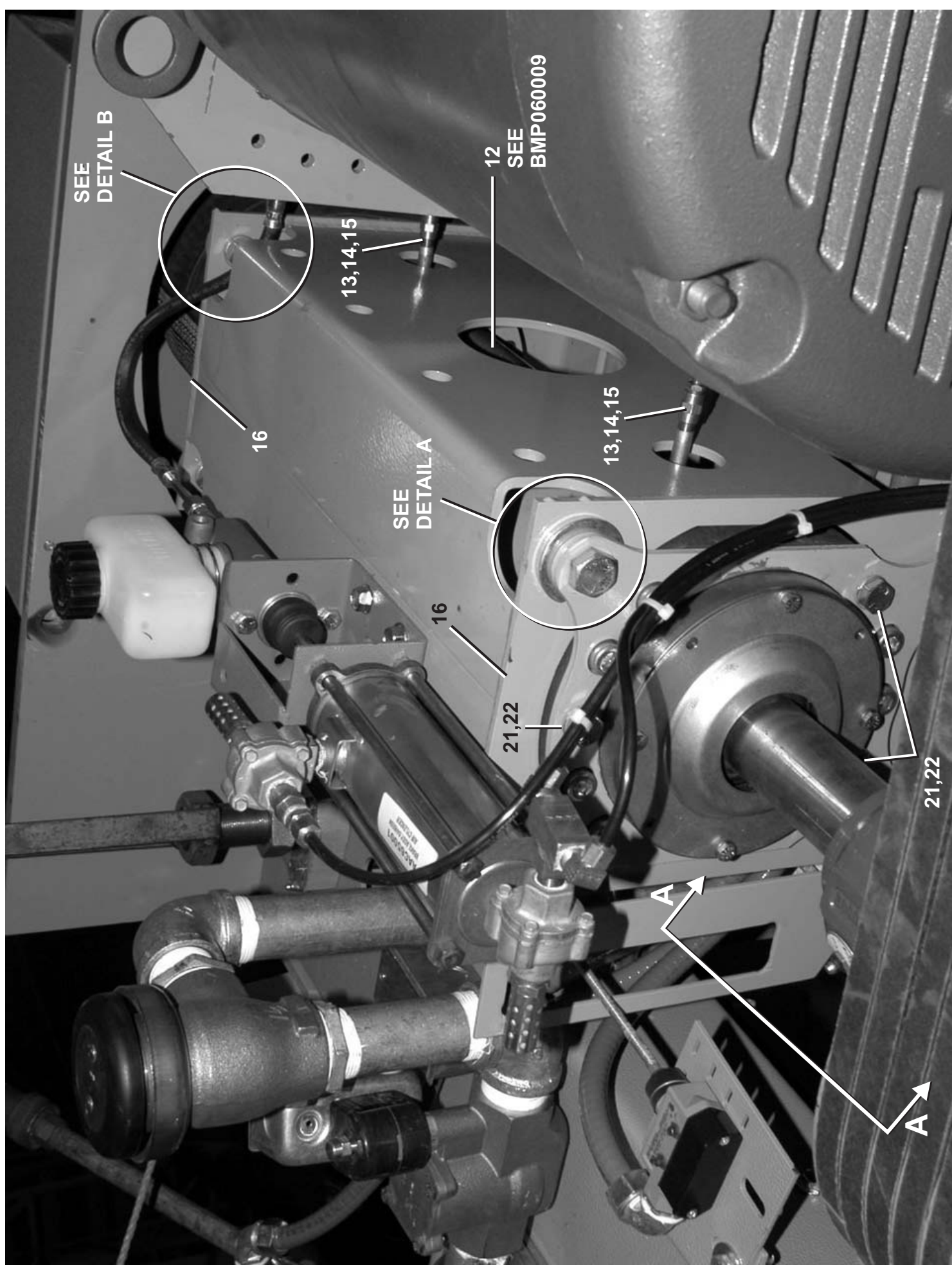
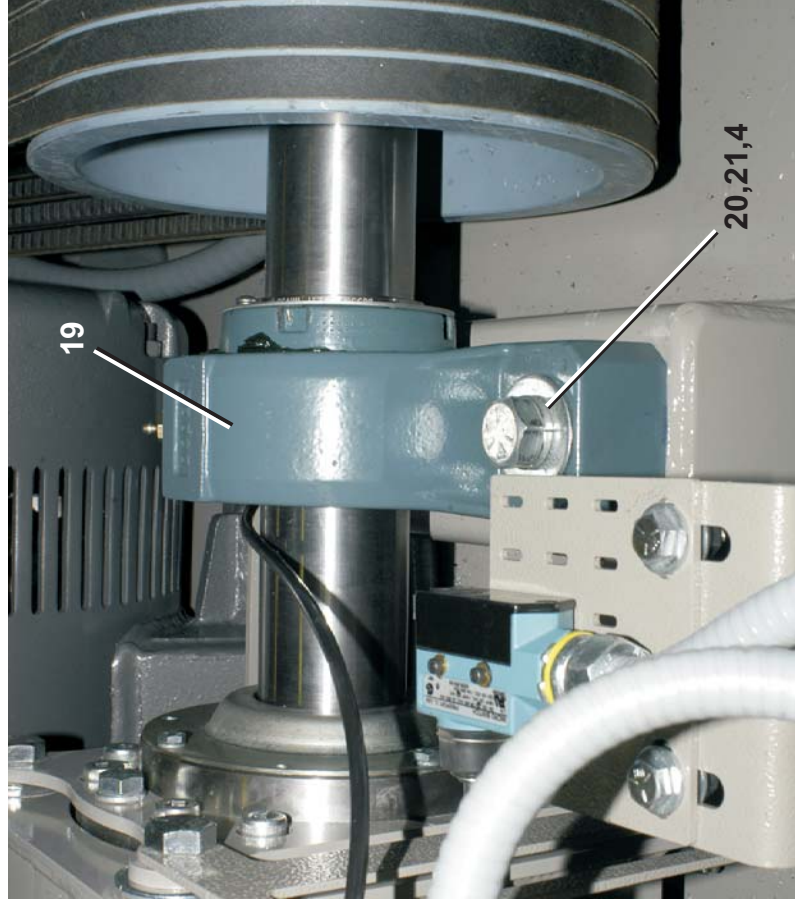


Drive Base  
6044SP2, 6044SP3 (Single Motor)

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(Sheet 2 of 4)

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# Drive Base

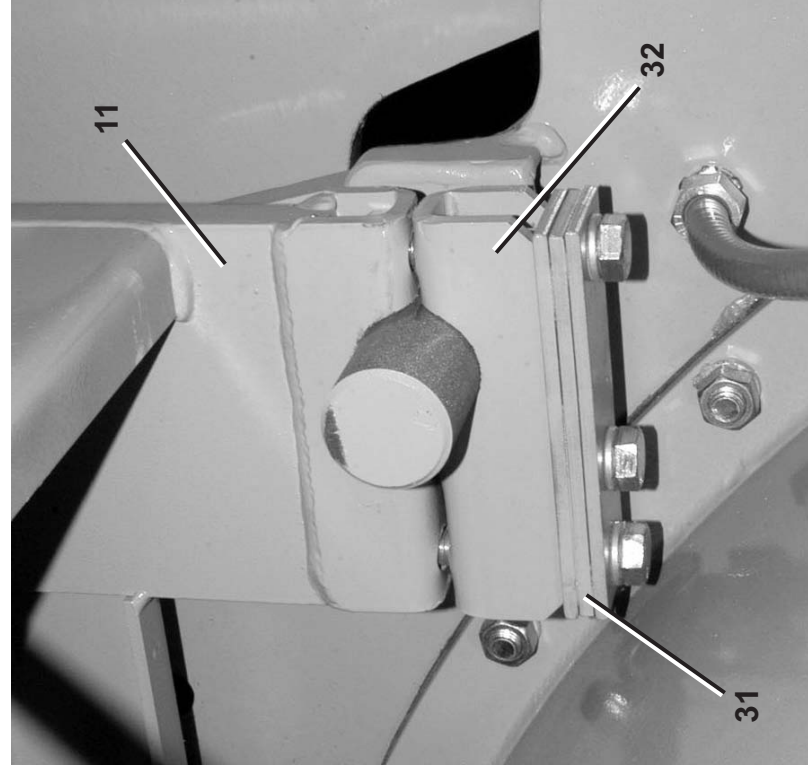
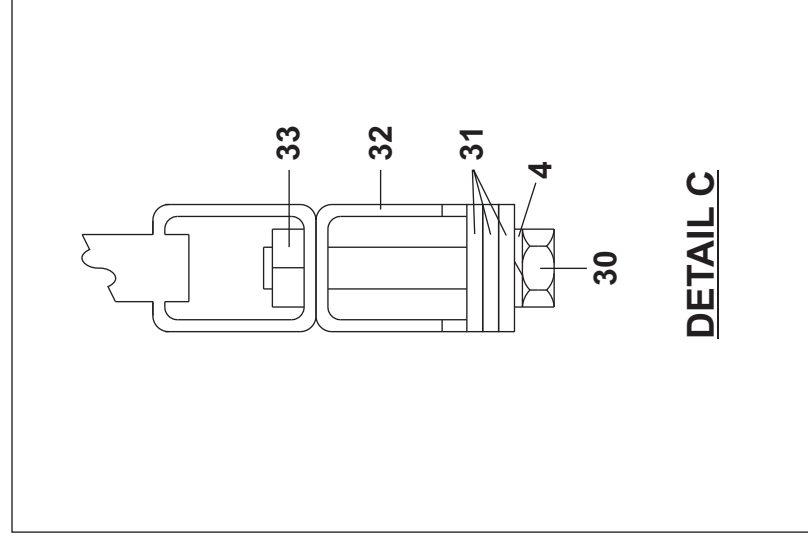
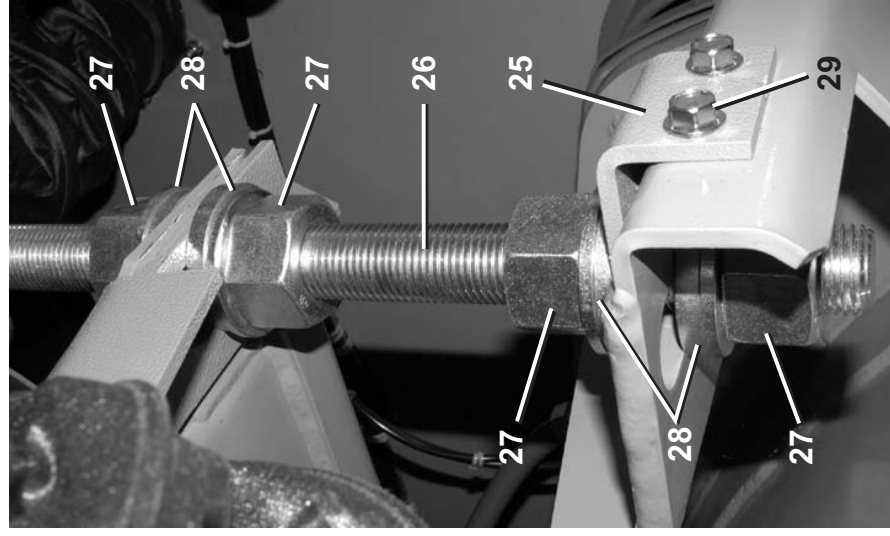
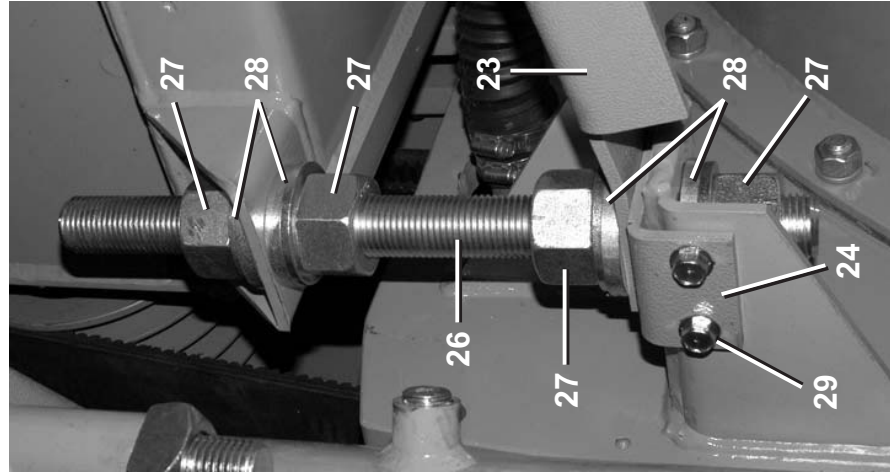
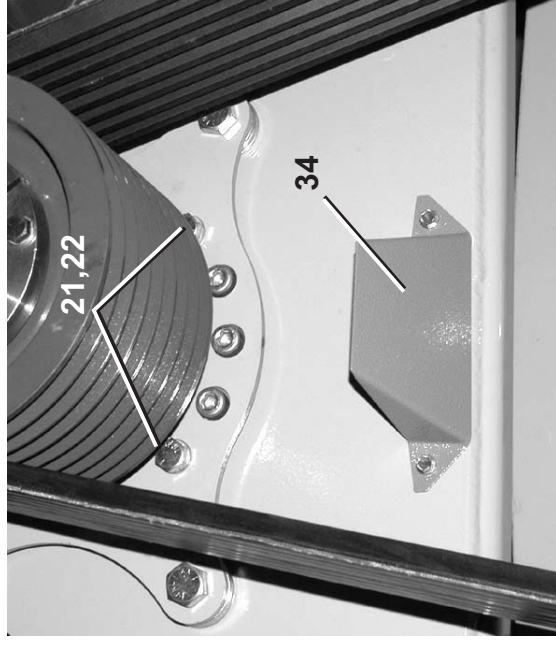
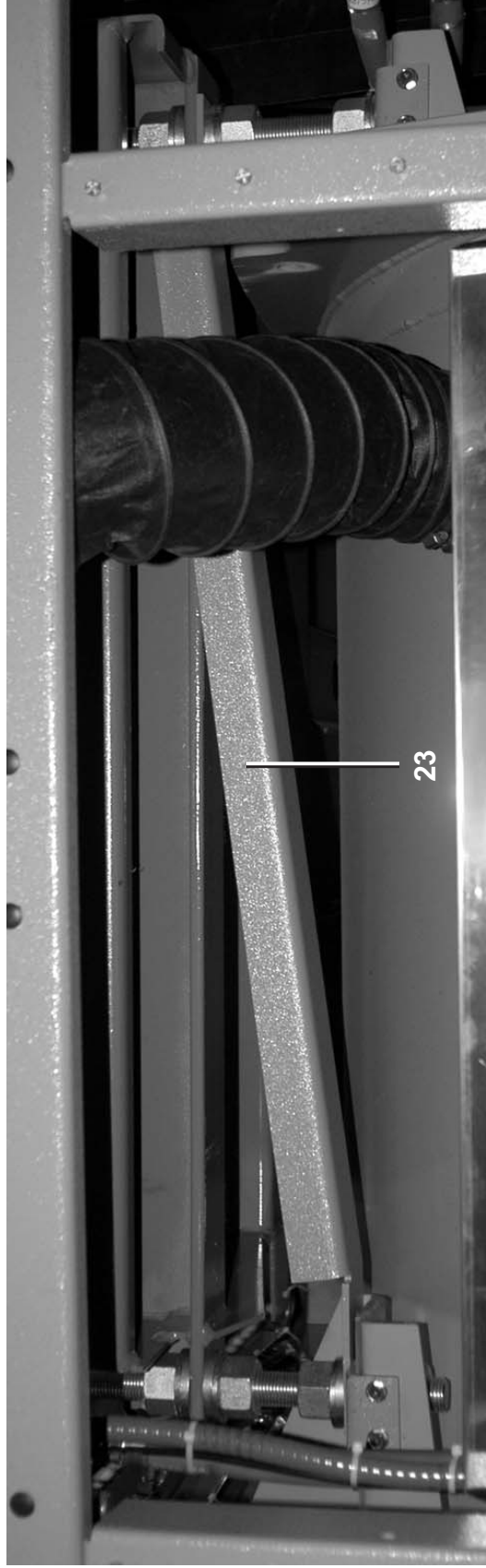
6044SP2, 6044SP3 (Single Motor)



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# Drive Base

6044SP2, 6044SP3 (Single Motor)



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(Sheet 4 of 4)

Used In	Item	Part Number	Description	Comments
	A	SA 28 106S	*DRIVE BASE ASSY 60SPU SGL MTR	6044SP2, 6044SP3 PRIOR TO 4/12/16
	B	GBJ28001S	JKSHFT ASSY 60W3 1 MOTOR	
			----- ASSEMBLIES -----	
			----- COMPONENTS -----	
all	1	05 20131E	MTRPLATE 6044SG 1 MOTOR	
all	2	02 19577	ADJ ANGLE MOTOR	
all	3	15K221	HEXCAPSCR 5/8-11 UNC2X2GR5 ZIN	
all	4	15U320P	FLATWASHER(USS STD) 3/4" ZNC	
all	5	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	6	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	7	02 19283	NUT=1/2-13UNCX1+1/2SQ SPEC	
all	8	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5	
all	9	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	10	15B186	HEXTAPBLT FLT 5/8-11UNCX7	
all	11	W2 18717D	DRIVE BASE 6044SG 1 MOTOR	
all	12	ABJ25007	JKSHFT 60SGWE 1 MOTOR SPHRCL	
all	13	54M025	HYDFIT 1/8"-90 ALEMITE 1613-B	
all	14	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	15	5N0C03AG42	NPT NIP 1/8X3 TBE GALSTL SK40	
all	16	02 19383	BEARHOUSE MT PLATE FRONT	
all	17	02 11603A	WASHER DBLR=2" W/CUTOFF SIDE	
all	18	15U355A	28GA ADJWASH=BRGHOUS ZINC PL	
all	19	54AF22215	PILLOW BLOCK BRG 2-3/4"=DODGE P2B-1P	
all	20	15K235A	HEXCAPSCR 3/4-10X2.5 GR 8	
all	21	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	22	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	23	02 18733	BRACE=SWAY 60"SGH	
all	24	03 25626	FORK=MTR MNT ADJ SCREW 52	
all	25	02 18702	FORK=ADJ SCREW-MOTOR MT-FRT	
all	26	17R125A15K	STUD=DRIVEBASEADS 1+1/4X15.5	

Used In	Item	Part Number	Description	Comments
all	27	15G261	HVHXNUT 1+1/4-8UNC2B ZINC GR2H	
all	28	17W125	1+1/4"SPHERICAL WASHER SET	
all	29	15P200	TRDCUT-F HXWASHD 3/8-16X3/4NIK	
all	30	15K227	HXCAPSCR 5/8-11UNC2AX4 GR5 ZIN	
all	31	02 18706	REINFORCEMENT=HINGE PINCLAMP	
all	32	X2 18634	CLAMP=MACHINED DR HINGPIN	
all	33	15G236	SQNUIT 5/8-11UNC2B SAE ZINC GR2	
all	34	02 175257	GREASE RELIEF=DRIP SHIELD	

# Jackshaft

6044WP2, 6044SP2, 6044SP3 (Single Motor)

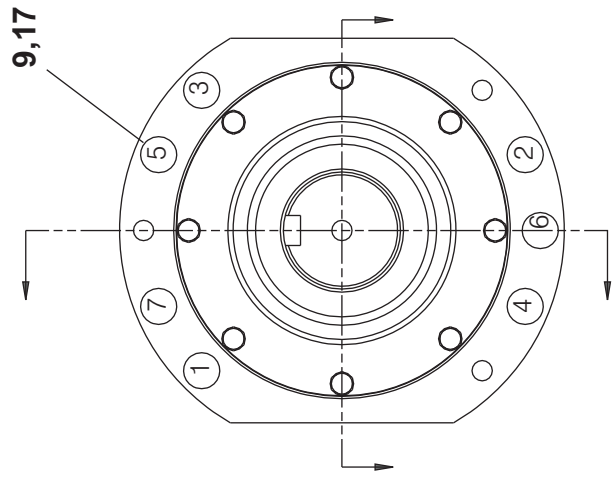
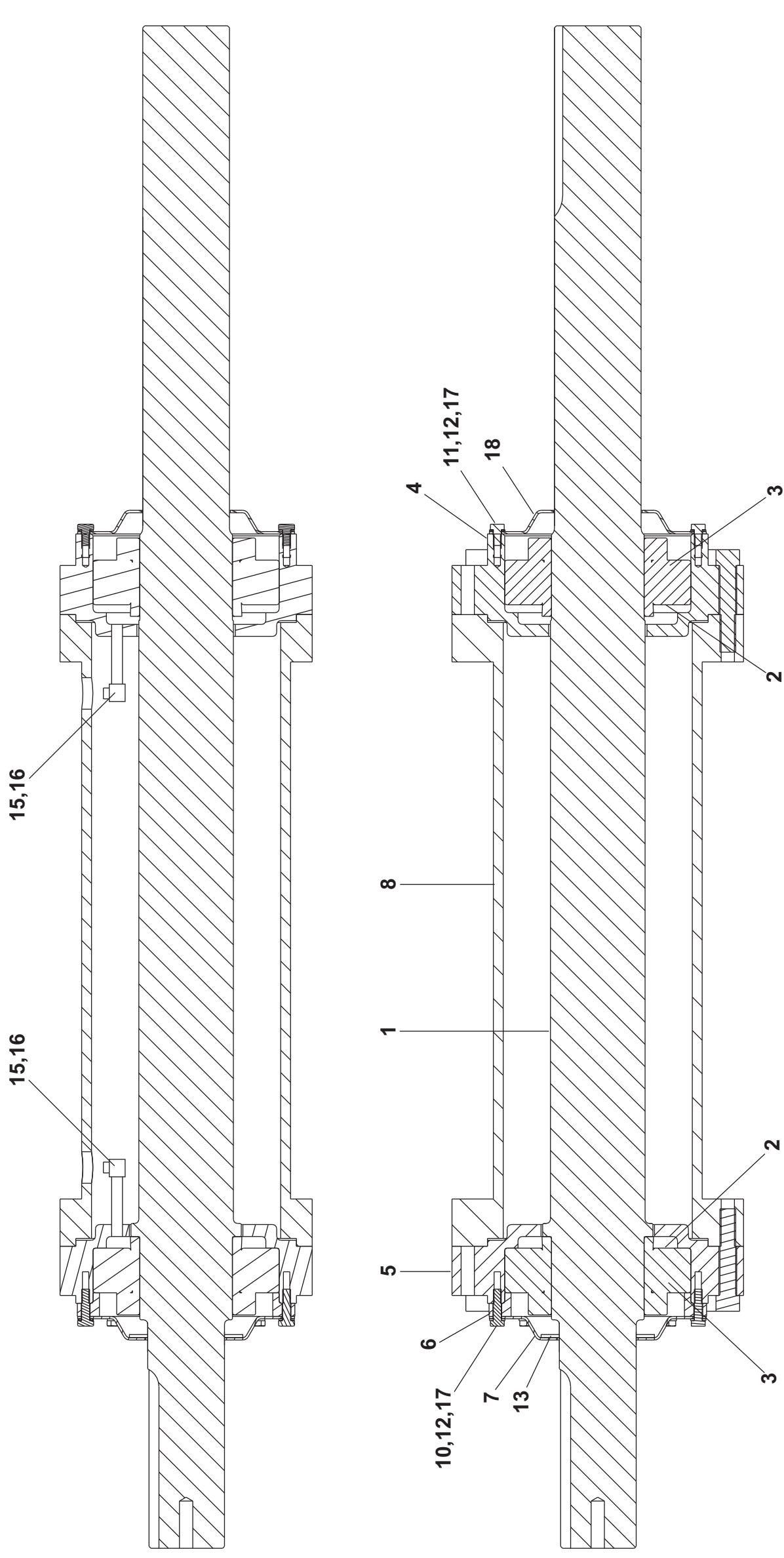
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(Sheet 1 of 2)



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This assembly used prior to 04/12/2016.  
For jackshaft after 04/12/2016, see BMP160007.



**INSERT ALL 1/2" FASTENERS  
HAND TIGHT. THEN TORQUE  
IN THE SEQUENCE ABOVE,  
FRONT & BACK.**

# Jackshaft

6044WP2, 6044SP2, 6044SP3 (Single Motor)

**BMP100021/2017155B**  
(Sheet 2 of 2)



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## Parts List—Jackshaft 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.

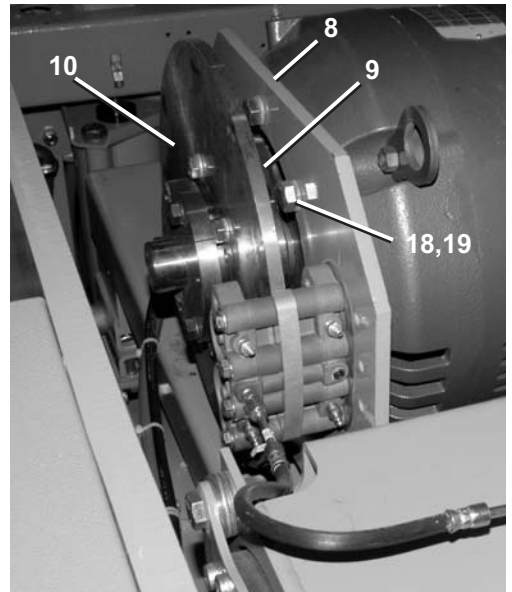
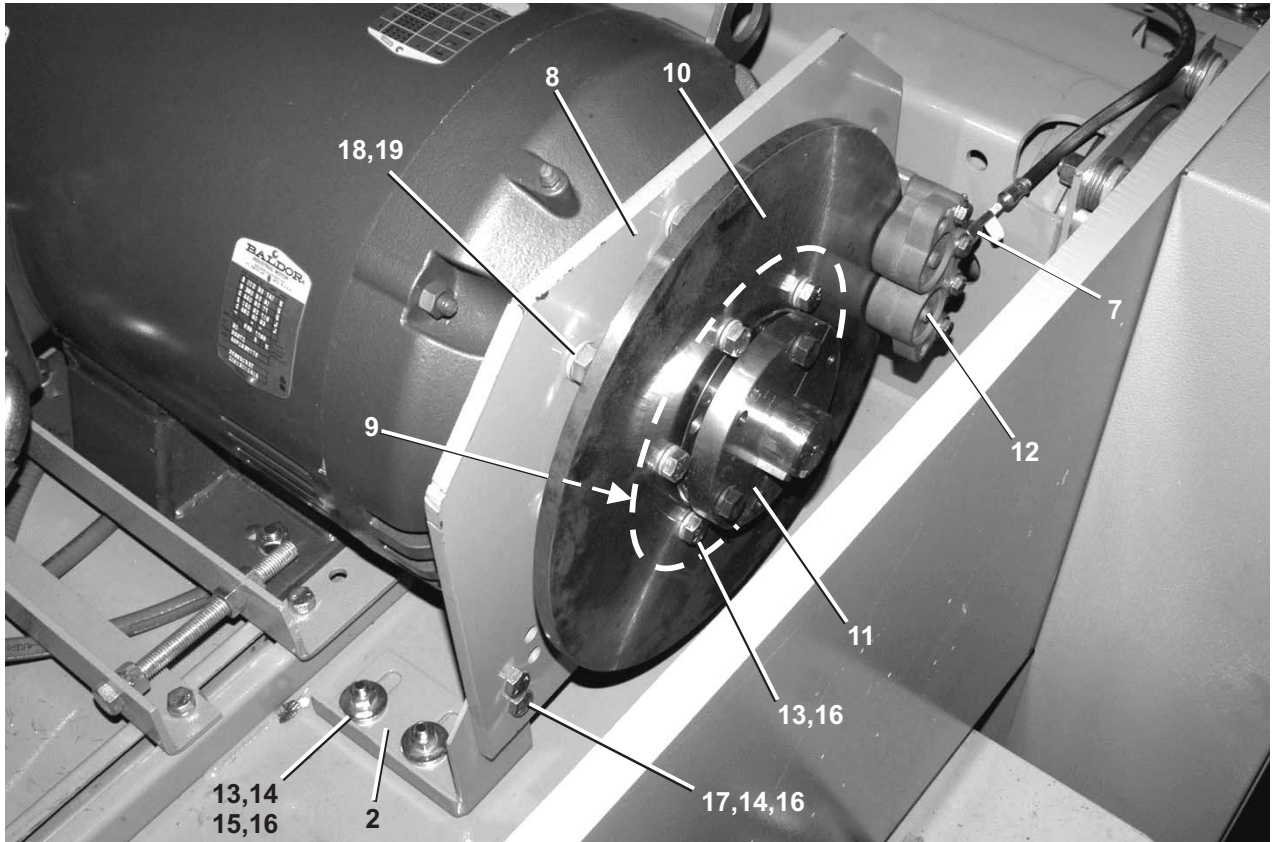
Used In	Item	Part Number	Description	Comments
-----ASSEMBLIES-----				
	A	ABJ25007	JKSHFT 60SG/WE 1 MOTOR SPHRCL	USED PRIOR TO 4/12/16.
-----COMPONENTS-----				
all	1	X2 18711K	JACKSHAFT= 64 SG SPRICAL 2.75 BRG	2.75" SHAFT
all	2	54A988	SKF BRNG #22217CCK/C3/W33	
all	3	54A989	SNW 17 X 2-15/16" ADAPTER	
all	4	X2 19381D	BRNG HOLDER=SPHRCL BRNG-REAR	
all	5	X2 19381C	BRNG HOLDER=SPHRCL BRNG-FRT	
all	6	X2 15702A	RETAINER-SPHRCL BRNG	
all	7	02 19384	COVER=BRG HOUSE FT+REAR	
all	8	X2 19378	BRGHSG SUP=TIMKENS MACHINED	
all	9	15K193	SOKCAPSCR 1/2-13X2.75GR8 HK	
all	10	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	11	15K030	HEXCAPSCR 1/4-20UNC2X1/2 GR5 Z	
all	12	15K041	HXCAPSCR 1/4-20UNC2AX1 GR 5 ZI	
all	13	02 19195	RING=GREASE SLNGR JKSHFT WHT	
all	15	51A001	ADAPTER 1/8 PT BRASS	
all	16	5SLOCBEC	NPTELB 90DEG STRT 1/8 BRASS125	
all	17	20C007G	THDLOCKSEAL LCT24231 RMUBL50CC	
All	18	02 19384B	COVER BRG HOUSE REAR	2.75" DIAMETER



# Upper Disc Brake

6044SP2, 6044SP3, 6044SR2, 6044SR3

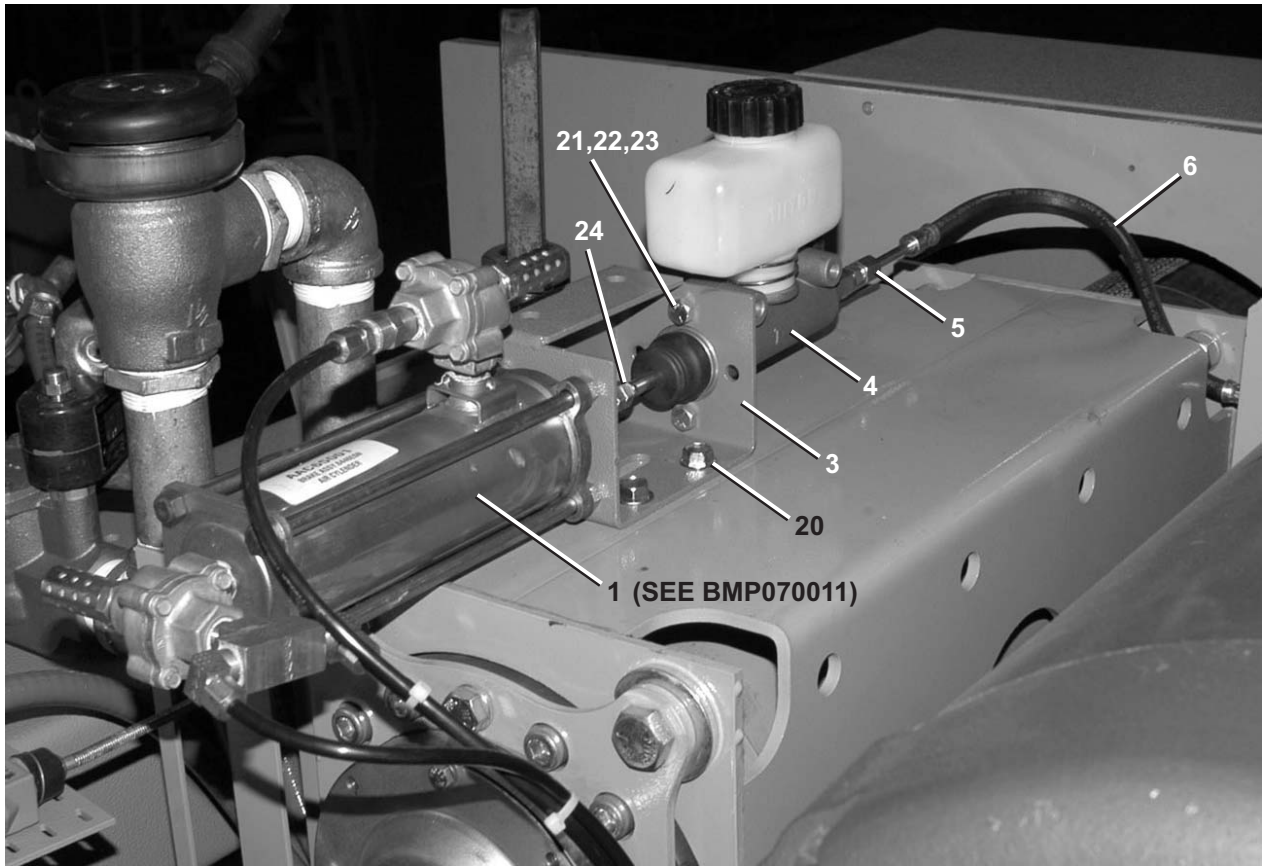
Figure 1: Disc



## Upper Disc Brake

6044SP2, 6044SP3, 6044SR2, 6044SR3

Figure 2: Air Cylinder and Master Cylinder



# Upper Disc Brake

6044SP2, 6044SP3, 6044SR2, 6044SR3

<b>Parts List—Upper Disc Brake</b>				
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	GBR28002	INST=DISC BRAKE 60SG2/3 1-MOTO	
-----COMPONENTS-----				
all	1	AAC65002	2006292 AIRCYL BRAKE SINGLE MOTOR	
all	2	02 21859B	BRAKE TORQUE ARM 60SG 1 MOTO	
all	3	W3 65238	*WLMT=MASTER BRAKE CYL BRKT	
all	4	54KMC1125U	MASTER CYL TILTON 74-1125U	
all	5	52XY0ER004	STRADTUN3/16MJX1/8FP#2405-3-2	
all	6	54KC7961BG	BRAKE HOSE=1/8"X18"OAL #50612	
all	7	52AY0ER003	STR.1/4"MJICX1/8"MP#2404-4-2	
all	8	X2 04454	MACH=BRK CALPR MNT PLT,6836	
all	9	X2 04458	BRAKE ROTOR HUB-6836E	
all	10	X2 04459	BRAKE ROTOR-6836E	
all	11	56Q1RE	1+7/8" BUSH VPUL QD TYPE E	
all	12	54KC7975	CALIPER HYD D/A 1/2" H200DERG 4004-0111	
all	13	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5	
all	14	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	15	15U490	FLTWASH 1+1/2X17/32X1/4 ZINC	
all	16	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	17	02 11603C	WASHER DBLR=1.5W/CUTOFF SIDE	
all	18	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	
all	19	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	20	15P200	TRDCUT-F HXWASHD 3/8-16X3/4NIK	
all	21	15K065	HEXCAPSCR 5/16-18UNC2AX1 GR5 Z	
all	22	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	23	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	24	15G195	HXNUT 5/16-24UNF2B SAE ZINC GR	

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## Disk Brake Maintenance



This document uses Simplified Technical English.

Learn more at <http://www.asd-ste100.org>.

**NOTICE P1:** "Remove power from the machine" means use the necessary safety procedure for your location. In the USA, this is the OSHA lockout/tagout (LOTO) procedure. More local requirements can also apply.

You can do these types of maintenance on the disk brake:

- do an inspection of the brake as specified in the maintenance schedule,
- replace the friction pads,
- do an overhaul on the calipers,
- replace the hydraulic fluid,
- adjust the connection between the brake cylinder and the air cylinder.

For the first four types of maintenance, you must remove air from (bleed) the hydraulic circuit.

Section 6 tells how to operate the disk brakes. You can use it in some of the types of maintenance in this procedure.

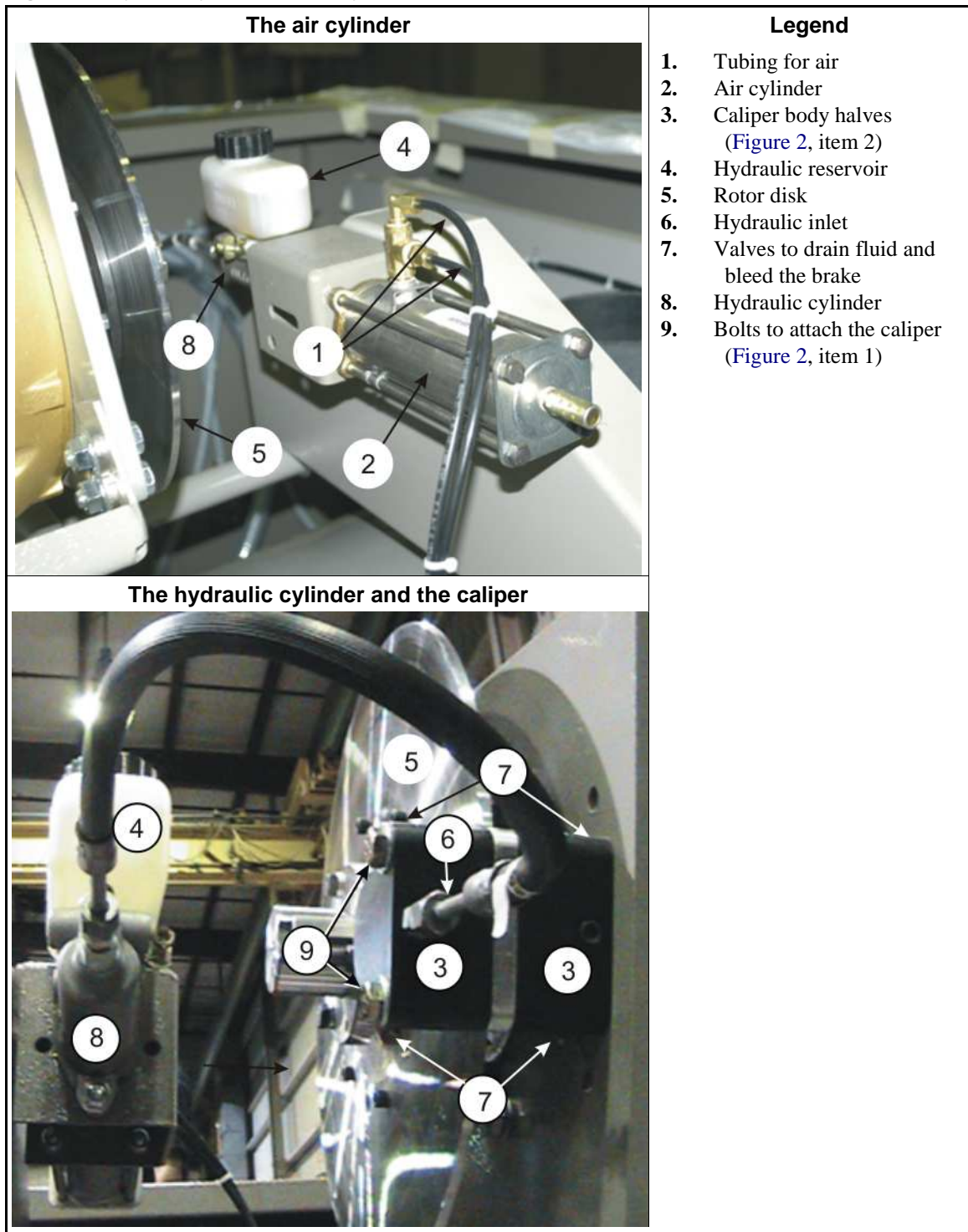


**WARNING 2: Risk of injury or death** —A machine in operation without safety guards is dangerous.

- You must be an approved maintenance technician.
- Use special caution when this instruction tells you to do work with electrical power on. Remove power from the machine for all other maintenance. Obey safety codes.
- Replace all guards and covers.

**Tip:** During parts of this procedure when you open up the calipers or hydraulic lines, put a cloth under the calipers to catch hydraulic fluid and parts that will fall. For safety, fully remove spilled hydraulic fluid after brake maintenance. This will help you easily identify leaks.

Figure 1: A typical hydraulic brake system



## 1. The Inspection of the Brake

**Note 1:** The brakes shown in this document can look different from your equipment.

**Note 2:** Do this inspection when the maintenance schedule tells it is necessary. Do this inspection after you replace friction pads or do a caliper overhaul.



- 1.1. Examine the fluid in the reservoir.** —Change the hydraulic fluid if it smells, has contamination, or has an unusual color. See [Section 4](#).

**Note 3:** Brake fluid can become defective from heat in the brake system. Brake fluid absorbs water from air. Water in the brake system causes corrosion.

If necessary, add new DOT 3 fluid to 0.25 inch (6.35 millimeters) from the top of the reservoir. Follow the precautions on the container.

- 1.2. Examine the rotor disk surface (Figure 1, item 5).** —Replace the disk if it is worn or if it is not flat.
- 1.3. Examine the brake pads (Figure 2, item 4).** —To do this, you will remove/replace the calipers and bleed the hydraulic system. See [Section 3](#) and [Section 4](#).
1. **Remove power from the machine (see Notice P1).**
  2. Remove the bolts ([Figure 1](#), item 9) that attach the caliper halves ([Figure 1](#), item 7).
  3. Remove the caliper halves.
  4. Replace the pads as told in [Section 2](#) if
    - the pads make an unusual noise when you apply the brake
    - if the rotor is worn or damaged
    - if the pad thickness is less than 1/16 inches (2 mm) ([Figure 2](#), item 14) above the mounting screw ([Figure 2](#), item 3). Always replace the two brake pads at the same time.
  5. Put the caliper halves in their positions on the brake assembly. Tighten the mounting bolts to 30 foot-pounds (41 Newton-meters).
  6. Bleed the hydraulic systems as told in [Section 4.4](#).
  7. Supply electrical power to the machine.
- 1.4. Examine the condition of all of the brake system.**
1. Make sure that brake mounting components are tightly installed.
  2. Make sure that fittings are tight. Make sure that there are no leaks.

## 2. How to Do a Friction Pad Replacement

You must have the necessary replacement friction pads for your machine. Refer to the brake parts document in your machine manual. You will find part numbers for components or overhaul/repair kits. The overhaul/repair kit contains O-rings, pads, and other components.

1. **Remove power from the machine (see Notice P1).**
2. Remove the used fluid. See [Section 4.3](#).
3. Remove the two bolts that attach the caliper ([Figure 1](#), item 9) and the two caliper halves ([Figure 1](#), item 3) to get access to the friction pads. Do not disconnect the hydraulic line ([Figure 1](#), item 6).
4. If there are leaks, see [Section 3](#) “How to Do a Caliper Overhaul ” before you continue.
5. Replace each friction pad:
  - a. Remove the brass screw ([Figure 2](#), item 3) that attaches the pad to the piston.
  - b. Attach the new pad to the piston. Tighten the screw.
  - c. Make sure that the screw head is fully in the recess in the pad.
6. Make sure that the connection o-rings are clean and in their positions ([Figure 2](#), item 7).

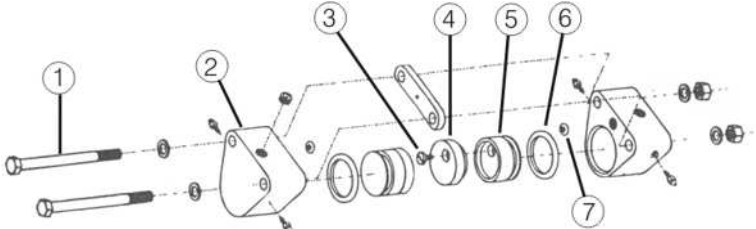
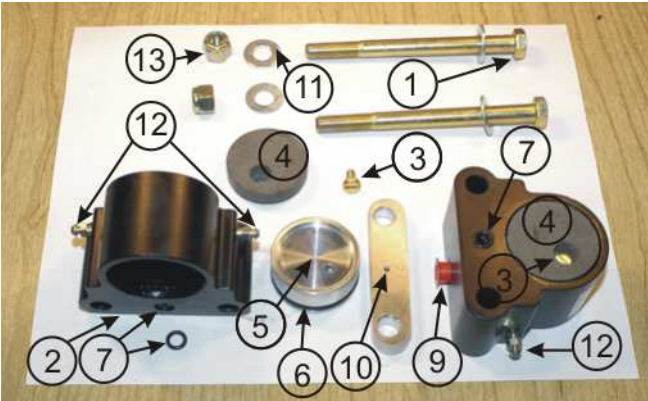




## Disk Brake Maintenance

7. Put the caliper halves in their positions on the brake assembly. Tighten the mounting bolts to 30 foot-pounds (41 Newton-meters).
8. Bleed the brake. See [Section 4 “How to Change Hydraulic Fluid and Remove \(Bleed\) Air from the Brake Circuit”](#).
9. Supply electrical power to the machine.

### 3. How to Do a Caliper Overhaul

Figure 2: The Caliper Components

<p><b>The Expanded View (Shows the Piston and the O-rings)</b></p> 	<p><b>Legend</b></p> <ol style="list-style-type: none"> <li>1. The bolts to attach the caliper (Figure 1, item 9)</li> <li>2. Caliper body halves (Figure 1, item 3)</li> <li>3. Brass screw</li> <li>4. Friction pad</li> <li>5. Piston</li> <li>6. The Piston O-ring</li> <li>7. The connection O-ring and its position</li> <li>8. Plug for the hydraulic inlet</li> <li>9. A hydraulic inlet (connected on one caliper, a plug (item 8) on the other)</li> <li>10. The hole in the spacer</li> <li>11. Washer</li> <li>12. One of the four valves to bleed the fluid</li> <li>13. Nut</li> </ol> <p>14. The pad thickness must be more than than 1/16 inches (2 mm) above item 3</p>
<p><b>The Caliper and the Pad</b></p> 	
<p><b>Fittings for the Hydraulic Inlet</b></p> 	<p><b>Look at the pad thickness above the top of the screw</b></p> 

**Tip:** Hydraulic fluid flows from one caliper to the other caliper. Fluid flows through the connection O-rings (Figure 2, item 7) and the hole in the spacer (Figure 2, item 10). When you disconnect the calipers, hydraulic fluid can flow from the hole at the connection O-rings. Air can get in the line. After you connect the calipers, you must bleed the system.

You must have the necessary kit for the overhaul of your machine. Refer to the brake parts document in your machine's manual.

1. **Remove power from the machine (see Notice P1).**
2. Get access to the caliper halves (see [Section 2](#)).
3. Do an overhaul on each caliper:
  - a. Remove and discard the connection O-rings ([Figure 2](#), item 7) on the caliper bodies.
  - b. Apply compressed air to the fitting for the hydraulic inlets (see [Figure 2](#), item 8) to push the pistons out.
  - c. Replace the piston O-rings ([Figure 2](#), item 6).
  - d. Put the pistons in the caliper body. Carefully tap the pistons with a wood or rubber hammer to install it.
  - e. Replace the connection O-rings. ([Figure 2](#), item 7)
  - f. Replace the friction pads (see [Section 2](#)).
4. Replace the caliper halves as specified in [Section 2](#).
5. Bleed the brake circuit (see [Section 4](#)).
6. Supply electrical power to the machine.

## 4. How to Change Hydraulic Fluid and Remove (Bleed) Air from the Brake Circuit

### 4.1. Risks and Precautions



**WARNING [3]: Risk of injury** —Machine power must be on for these procedures.

- Stay away from operating mechanisms.



**CAUTION [4]: Risk of injury and damage** —This procedure releases pressurized brake fluid.

- Keep brake fluid out of your eyes and mouth. Wear eye protection.
- Follow procedures carefully to prevent damage to the face of the disk or the pistons.



**CAUTION [5]: Risk of malfunction** . —Air in hydraulic fluid will compress. Compressed air in the brake line will cause brake malfunctions.

- Remove (bleed) air from the brake circuit before you operate the machine.

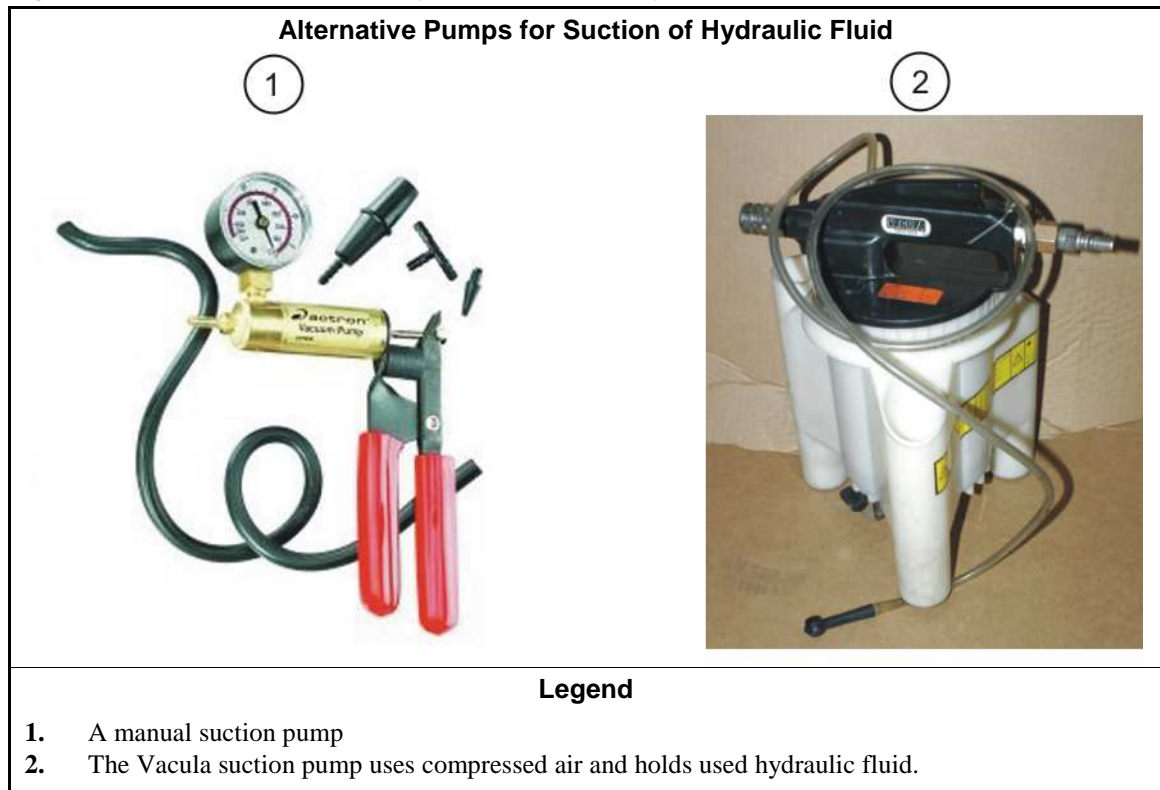
### 4.2. Requirements —These personnel and items are necessary for this procedure:

- two technicians
- an 8-ounce container of new brake fluid
- Alternative procedures to remove air and used brake fluid:
  - » a suction pump (faster procedure) (see [Figure 3](#))
  - » with pressure in the hydraulic cylinder and gravity (see [Figure 4](#))

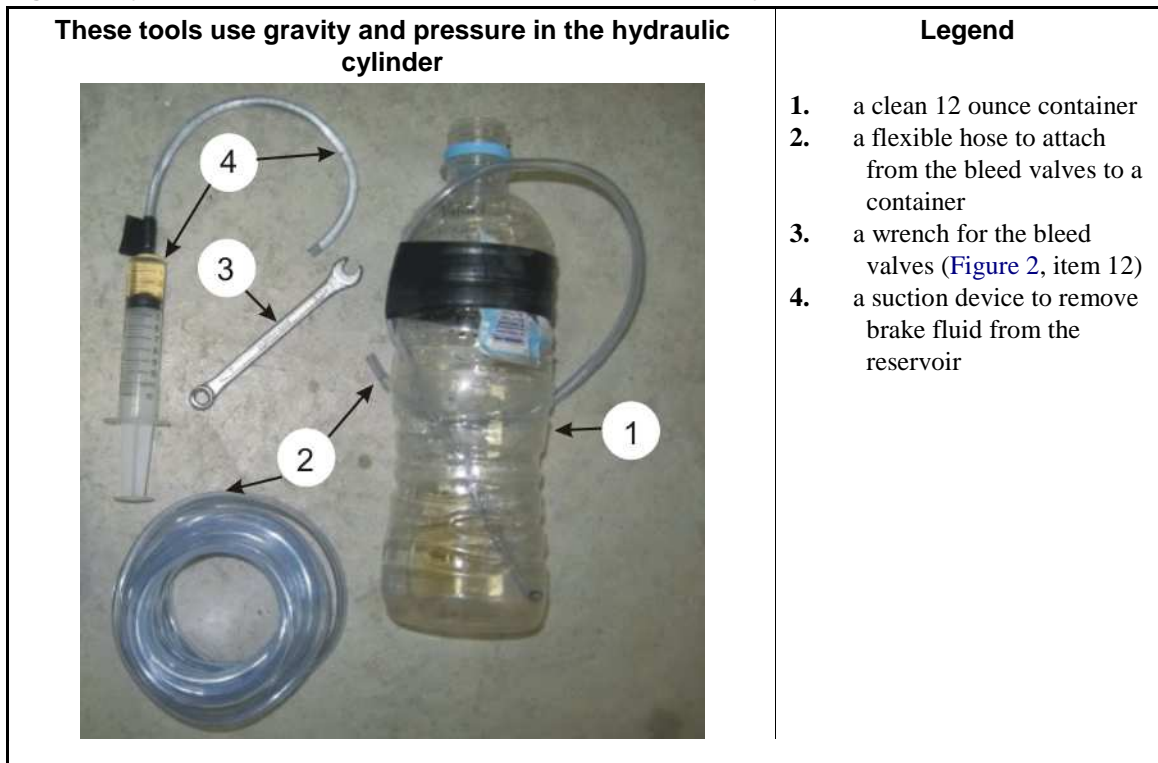
**Tip:** The Vacula suction pump can do the work more quickly than by gravity and pressure in the hydraulic cylinder. It is also cleaner because all of the hydraulic fluid goes into the container supplied. It helps you not spill the hydraulic fluid.

- If you use a suction pump as shown in [Figure 3](#), follow the manufacturer's instructions.
- If you use the tools as shown in [Figure 4](#), follow the instructions in [Section 4.3](#) and [Section 4.4](#).

**Figure 3: Pumps Used to Remove Hydraulic Fluid Quickly**



**Figure 4: Typical Tools to Remove Air (Bleed) Brakes and Used Hydraulic Fluid**



**4.3. Use the tools in Figure 4 to remove the used hydraulic fluid and clean the line.** —Do these steps:

1. Use a suction tool (Figure 4, item 4) to remove the used fluid from the reservoir. Clean the contamination.
2. Connect the tubing (Figure 4, item 2) and container (Figure 4, item 1) to the valve on the caliper (Figure 1, item 7).
3. Open the valve.
4. Add new fluid to flush out the lines.
5. Apply/release the brake (See Section 6) approximately 5 to 15 times. This will flush the used fluid out of the lines.
6. Close the valve.

**Note 4:** These steps will cause air to go into the line.

**4.4. Add new hydraulic fluid and remove (bleed) air from the brake circuit.**

**Note 5:** This procedure uses pressure in the hydraulic cylinder and the tools in Figure 4.

1. Fill the reservoir with new DOT 3 brake fluid. When you do the remaining steps, continue to add new fluid to the reservoir. Do not let the reservoir become more than half empty. You must make sure that the reservoir has fluid to prevent air flow into the system from the reservoir.
2. Apply electrical power to the machine. Release the brake.
3. See the part of the machine reference manual that tells how to operate the outputs manually.

4. Put a small quantity of new brake fluid (approximately inches (50 mm)) in the 12 ounce container (Figure 4, item 1).
5. Do these steps for each bleed valve (Figure 1, item 1) . Two technicians are necessary. This will move the fluid in one direction and push air out of the line:
  - a. Attach a clean tube to the valve. Put the other end in the container (Figure 4, item 1) below the fluid.
  - b. Make sure that the reservoir is full of fluid.
  - c. Apply the brake (See section 6).
  - d. Open the bleed valve. (Figure 2, item 12)
  - e. Look for air bubbles in the container when you push the air and fluid out through the tube.
  - f. Close the valve.
  - g. Release the brake.
  - h. Continue the steps b through g until no more air comes out of the line.
6. Add fluid to the top of the reservoir. Replace the cap.
7. Operate the brake many times. Make sure that it operates correctly.

## 5. How to Adjust the Connection between the Brake Cylinder and the Air Cylinder

If you removed the brake cylinder or the air cylinder, you must adjust this connection.

Figure 5: The Connection between the Brake Cylinder and the Air Cylinder

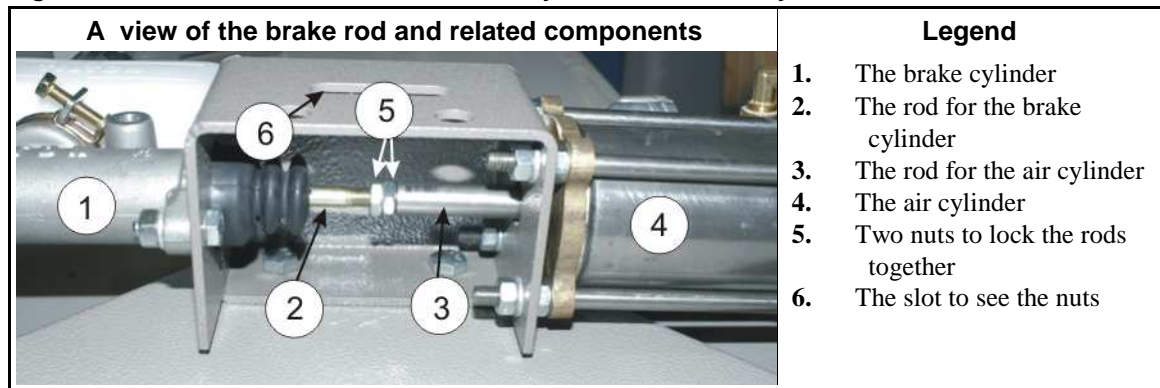
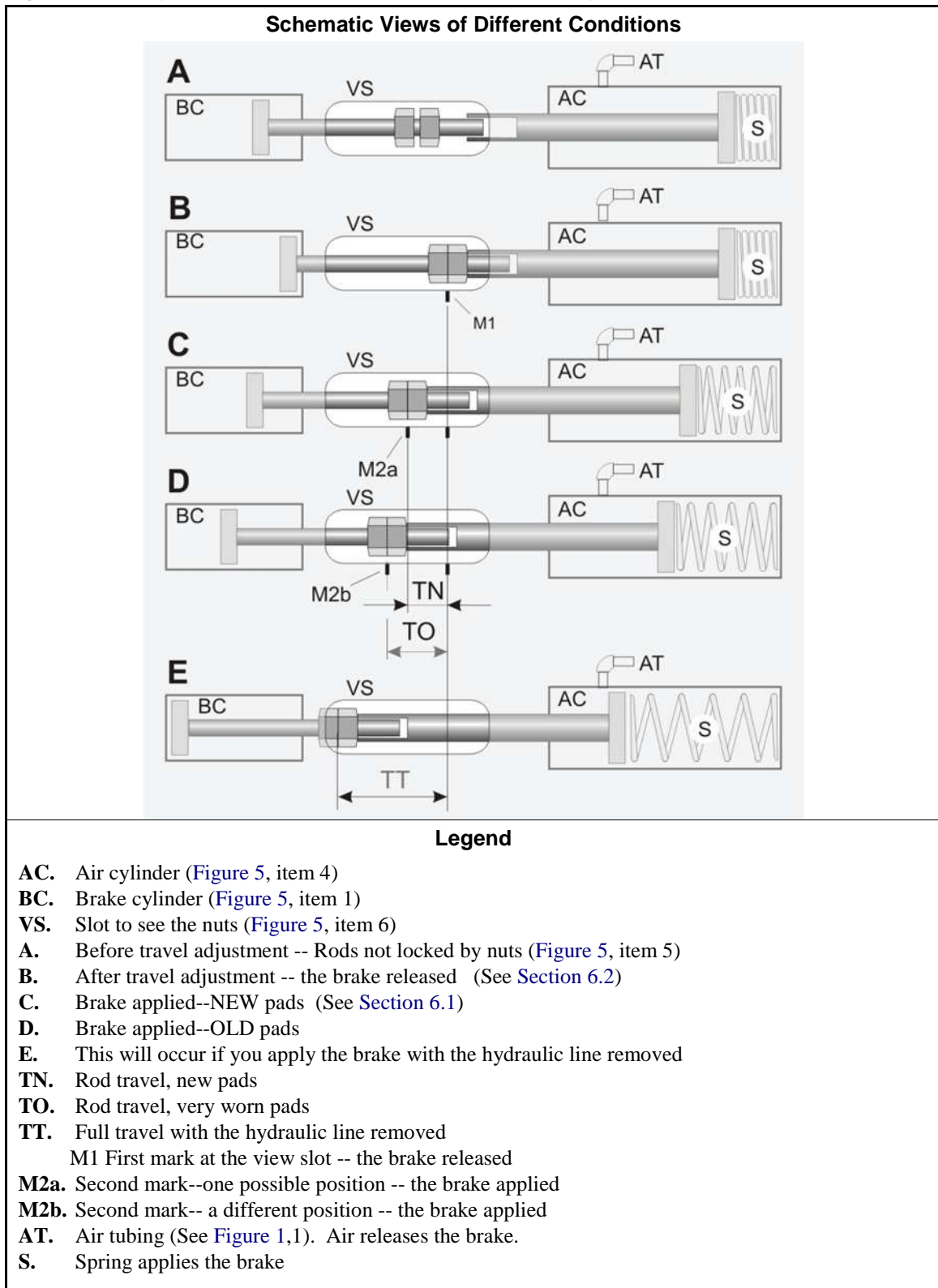




Figure 6: The Adjustment between the Brake Rod and the Air Cylinder



### 5.1. Adjust for maximum rod travel.

1. Operate the master switch to energize control power.
2. Make sure that the air pressure that releases the brake (Figure 7, item 1) is 85 -100 PSI ( 5.95 - 07.0 kg/cm-cm).
3. Make sure that the nuts that lock the rods together (Figure 5, item 5) are loose.
4. Release the brake (see Section 6). Let the air cylinder rod fully retract into the air cylinder as shown in Figure 6, A.
5. Turn the brake rod into the air cylinder rod until the brake rod comes out of the brake cylinder fully. See Figure 6, B.
6. Lock the brake rod (Figure 5, item 2) to the air cylinder rod (Figure 5, item 3) with two nuts (Figure 5, item 5).

### 5.2. Make sure that the brake will continue to operate while the pads wear.

1. Release the brake. On the view slot, put a mark at the position of the lock nuts. (Figure 6, item M1).
2. Apply the brake. See Section 6.
3. Put a mark at the position of the lock nuts when the brake is applied. This can be at position M2a, M2b, or between M2a and M2b. When the pads wear this position will move.
4. Make sure that the distance the rod moves when you apply the brake is 0.75 to 1.0 inches (19-25 mm). If the travel is more than this, the brake piston can hit the mechanical stop before the brake engages fully. This condition is shown in Figure 6 , E (dimension TT).

## 6. Operation of Brake Systems

Look at the electrical schematics of your machine to find how your brake is controlled. Some machines release the brake when you close the door. Some machines have a control relay to release or apply the brake.

### 6.1. How to Apply the Brake for Machines with a "Break Release" Output

1. Turn the "brake release" control output off to de-energize the air valve to remove air pressure to the air cylinder (Figure 1, item 1).
2. With no air pressure, a spring in the air cylinder will apply force to the hydraulic cylinder (Figure 1, item 8). This will apply pressure to the brake pads (Figure 2, item 4) against the rotor disk (Figure 1, item 5). (Figure 6, item C,D)

**Note 6:** If electrical power or compressed air is missing, hydraulic pressure will apply the brake.

### 6.2. How to Release the Brake for Machines with a "Brake Release" Output

1. Turn the control output called "brake release" on to energize the air cylinder valve.
2. Air pressure compresses the spring and releases the brake. (Figure 6, item B)

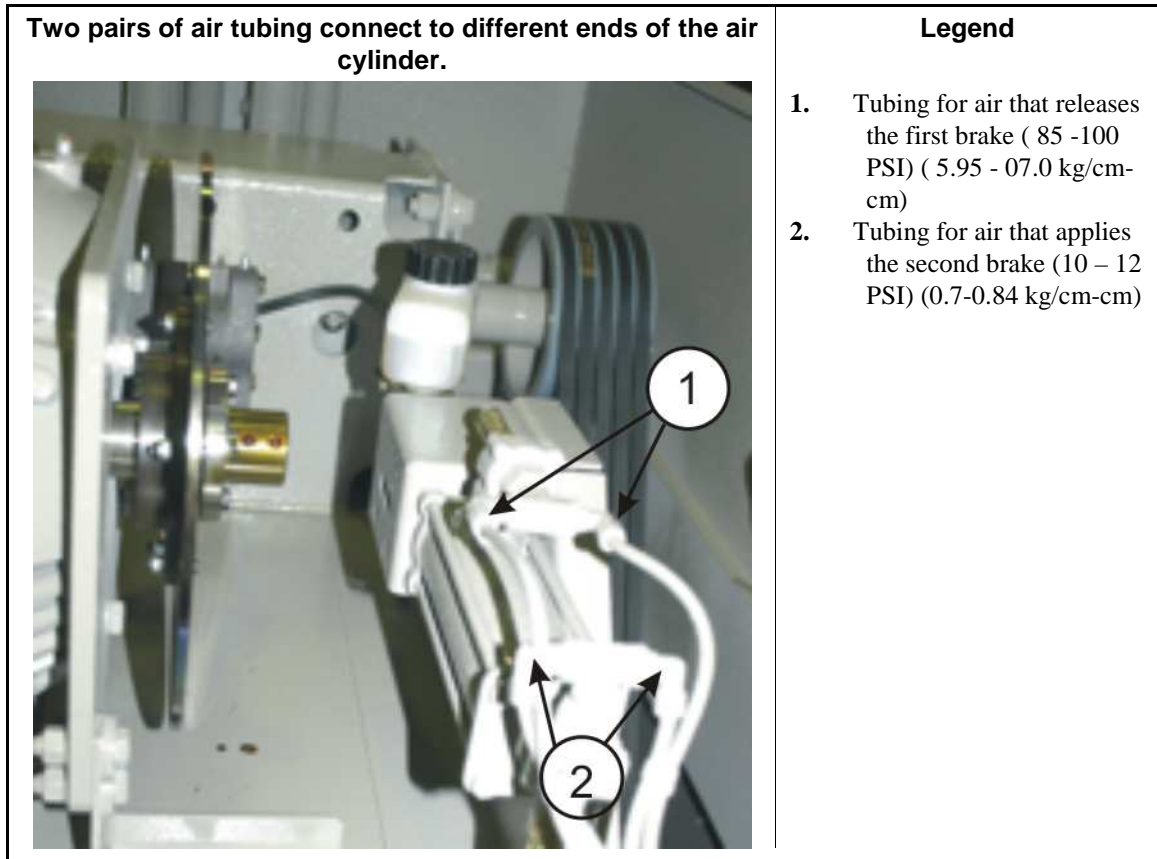
**6.3. How to Apply and then Release the Brake Quickly** —There are two air tubes at (Figure 1, item 1). One supplies compressed air from an air valve. The other sends this compressed air to a pressure switch. If you remove one of the two tubes when compressed air is there, you will apply the brake.

1. Disconnect the air tubing (Figure 1, item 1).

2. Turn the "brake release" output on. The air valve will supply compressed air to one of the tubes. (Figure 1, item 1).
3. Quickly move one of the compressed air tubes (Figure 1, item 1) on and off the air cylinder.
4. After you complete this procedure, connect the air tubing.

#### 6.4. How the Brake Operates on Divided Cylinder Machines

Figure 7: A Typical First and Second Brake on a Divided Cylinder Machine



- On divided cylinder machines, two pair of air tubes connect to different ends of the air cylinder.
- When the cylinder turns, air pressure at Figure 7, item 1 compresses the spring and releases the brake.
- When you operate the stop control, air pressure at 1 is removed. Then the spring in the air cylinder applies the brake.
- If you open the door, the 2nd brake is applied. Then the air pressure at Figure 7, item 2 and the spring apply the brake.

**6.5. The Second Brake** —If your machine has a second brake which uses air pressure and spring pressure, it will have a pressure regulator. Make sure that you adjust the air pressure of the second brake (Figure 7, item 2) to 10 – 12 PSI (0.7-0.84 kg/cm-cm).

— End of BIEUUM01 —

## 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<sup>®</sup> part number 30T001) and a straight edge are required when tensioning unbanded belts.

### Tension Settings—Unbanded Belts

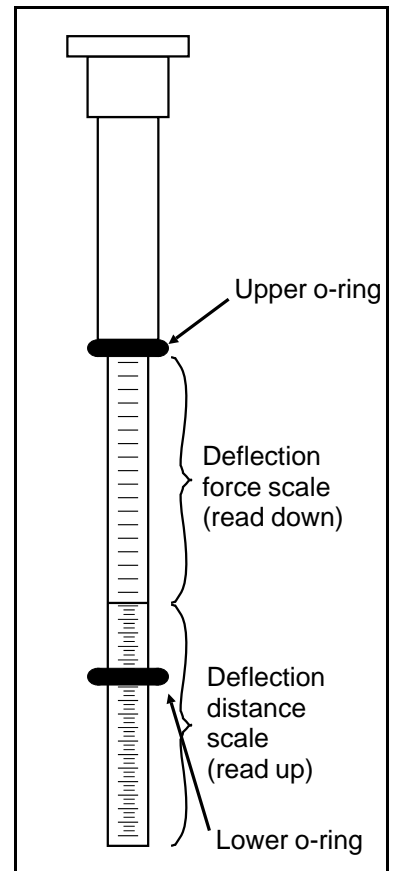
Set the o-rings on the tension testing device (see FIGURE 1) as follows:

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.

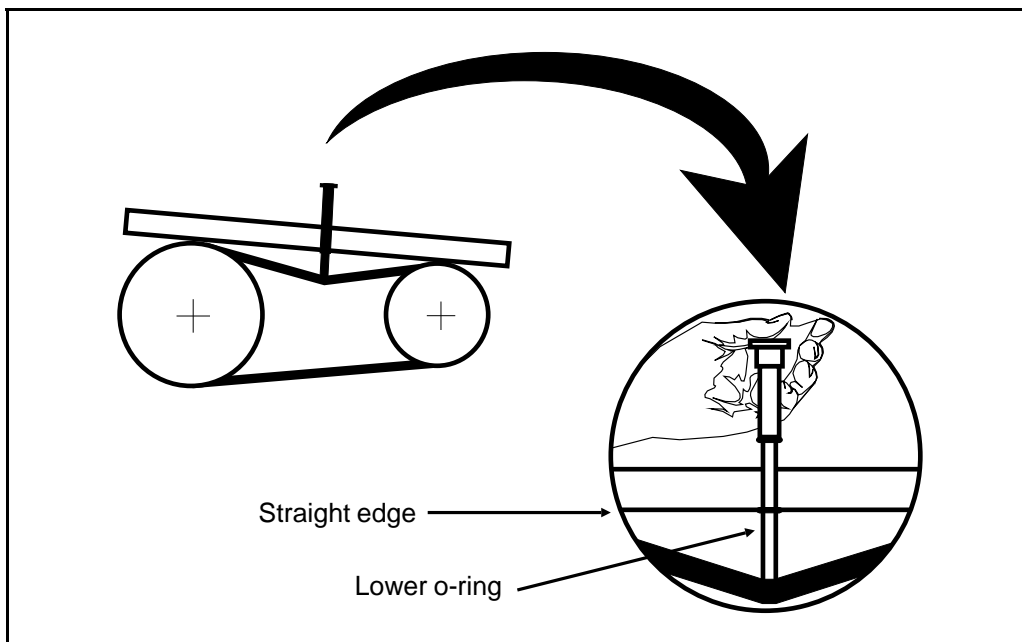


**FIGURE 1** (MSSMA405AE)  
**Tension Settings**

# 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

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(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
	60C 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

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(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
	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		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(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		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(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	3/4	16.9 - 20.8	RP3	13.0 - 16.0	RN
	60C	11/16	16.9 - 20.8	RP3	13.0 - 16.0	23/32	16.9 - 20.8	RP3	13.0 - 16.0	RN



# Bearing Assemblies

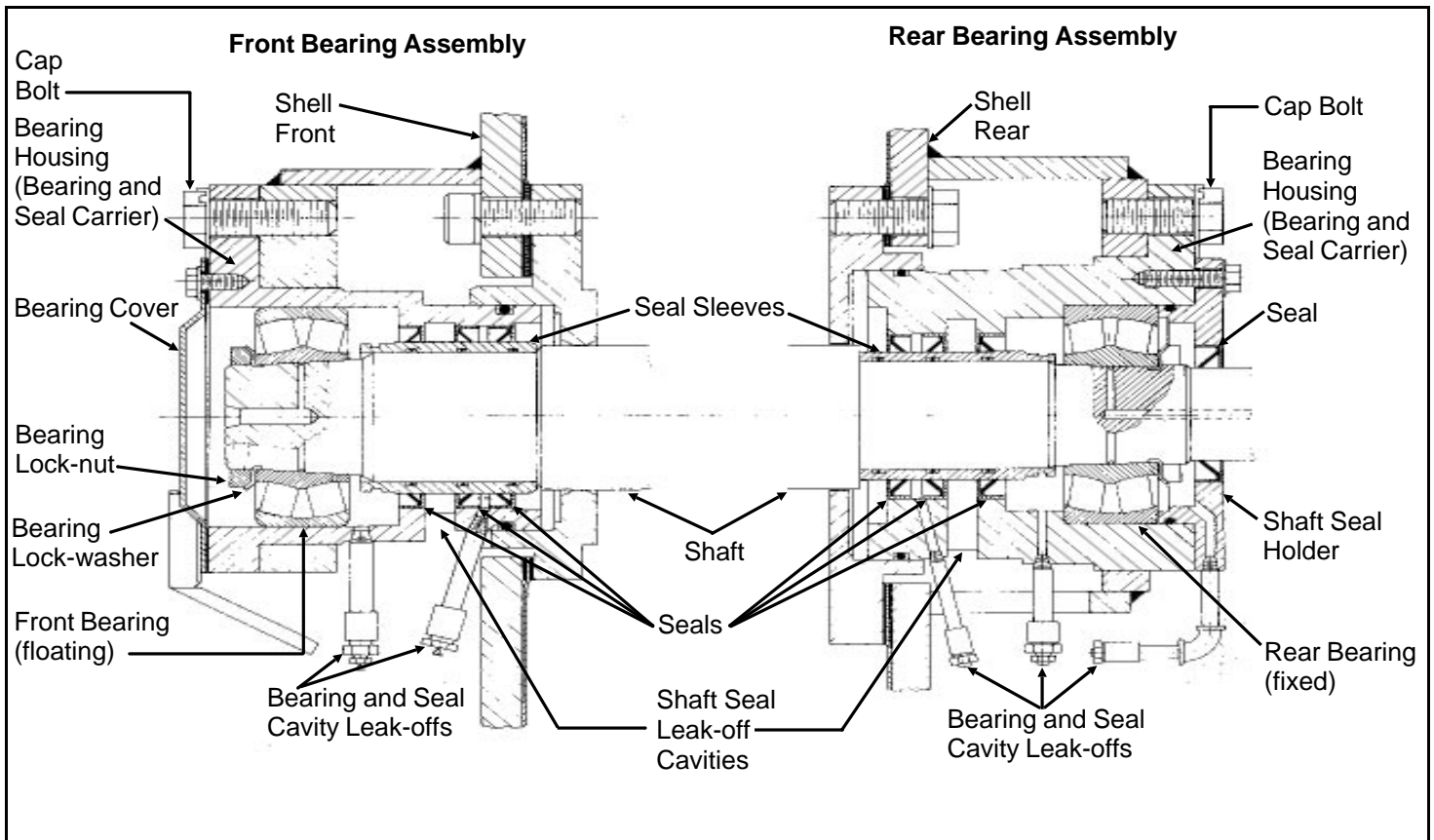
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## MAIN BEARING AND SEAL REPLACEMENT FOR DIVIDED CYLINDER MACHINES

This section applies to the front and rear cylinder shaft bearings of all divided cylinder machines (Rapid Load, Staph-guard<sup>®</sup>, 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<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> factory and are pictured elsewhere in this section. Contact the factory two weeks in advance of repairs, when ordering these tools.

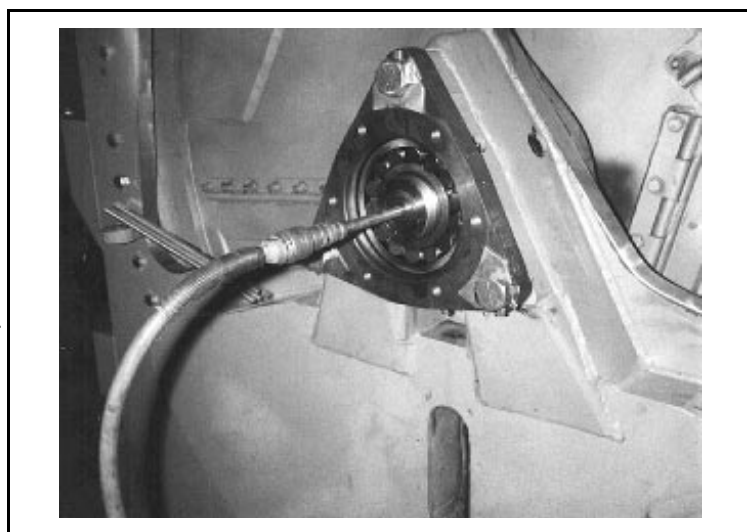
This maintenance is performed in the following order:

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 lock-washer 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**

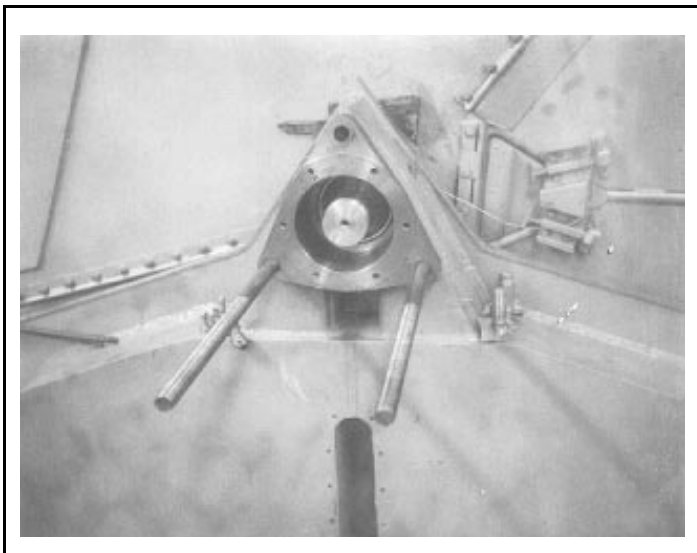
inspection plate and use a timber to pry up the cylinder to remove cylinder weight from the bearings. Once the bearing is removed, the cylinder drops only approximately 1/32" before the shaft comes to rest on the shaft support.

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.

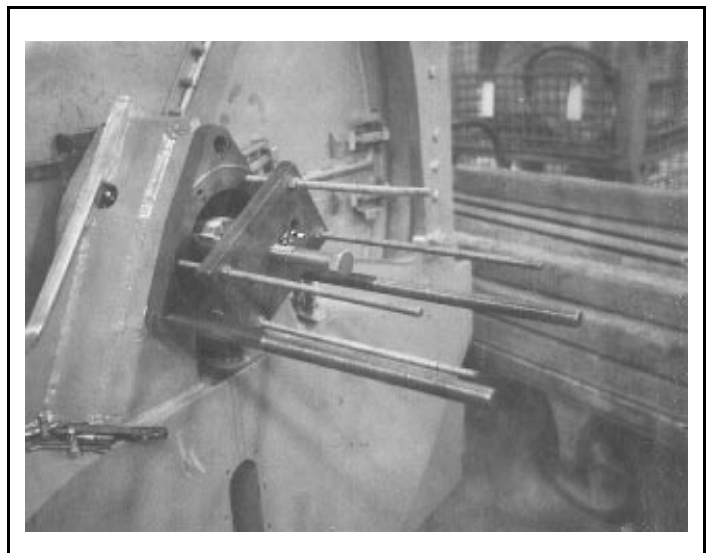
## Removing the Bearing Housing (Bearing and Seal Carrier), Seal Sleeve, and Seals (Front or Rear)

These procedures require the use of a pulling fixture and guide rods available from the Milnor<sup>®</sup> 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**

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**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	Trichlorethylene
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 disassembled, 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**



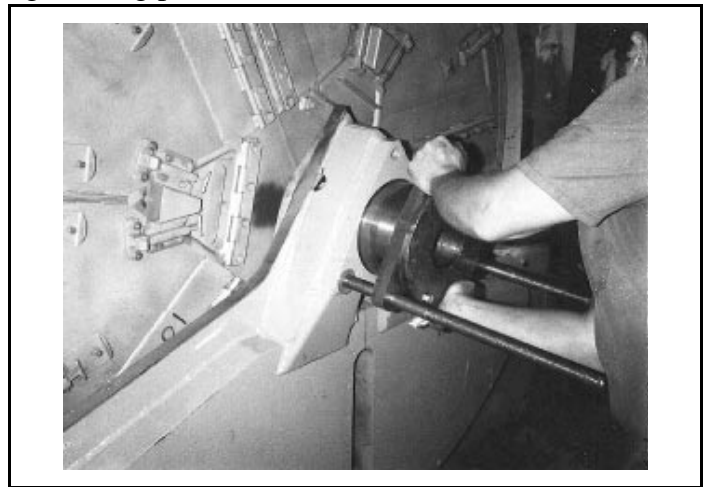
**FIGURE 6** (MSSM0303AE)  
**Installing Seal Sleeve in  
Bearing Housing**

**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.

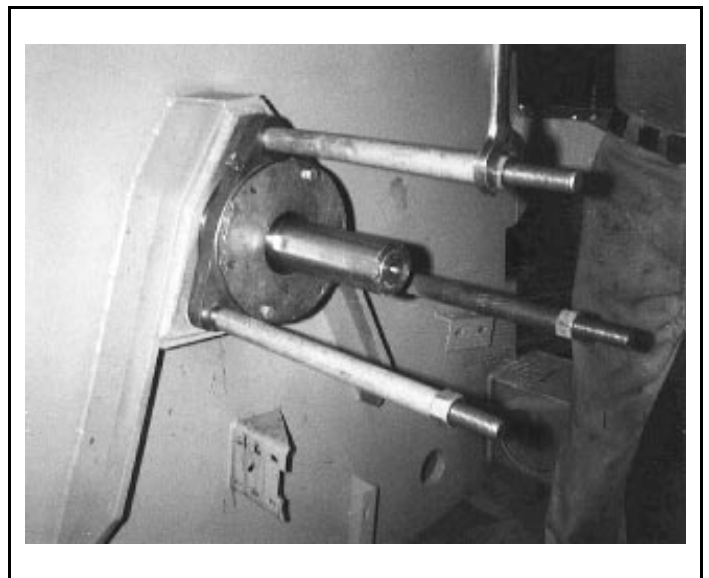


**FIGURE 7** (MSSM0303AE)  
**Installing the Bearing Housing Setting Fixture onto Housing (42" machine shown)**



**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<sup>®</sup> 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<sup>®</sup> 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 its 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.
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.



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



**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.

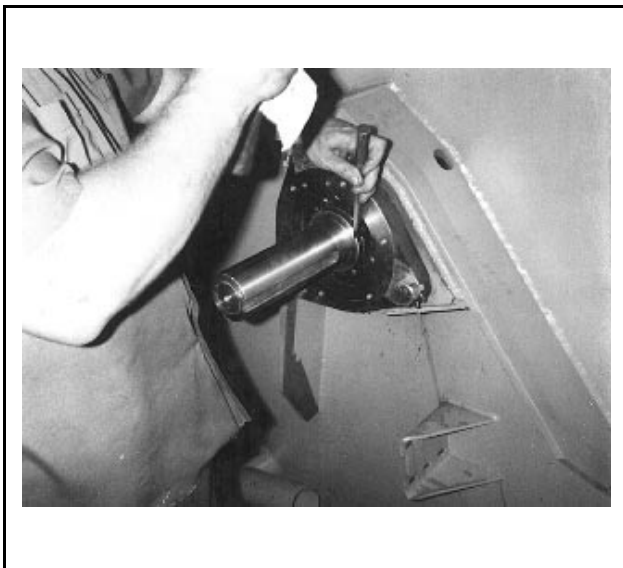
## Tightening Bearing(s) (Front and/or Rear)

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.

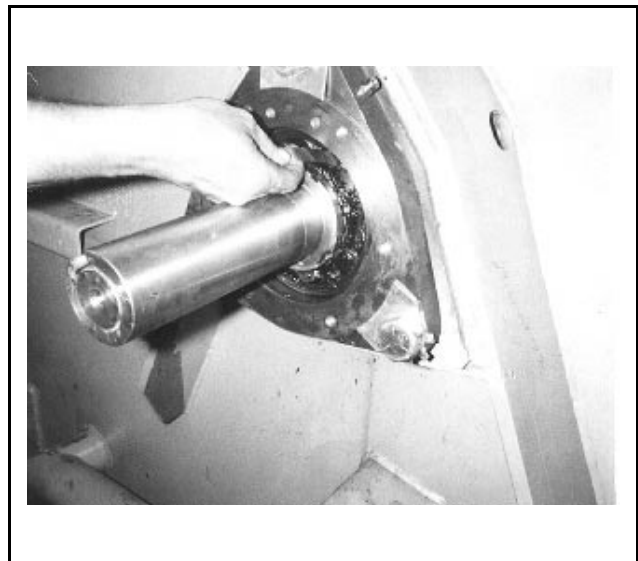
**NOTE:** Sometimes, when setting the bearings, all the load is taken by only one row of rollers (although the load would quickly equalize on both rows after the machine has run for only a few minutes). If all the load is taken by one row, you will get an erroneous clearance reading. It is therefore, 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.

# Shaft and Bearing Components

Figure 1: Shaft and Bearing Components

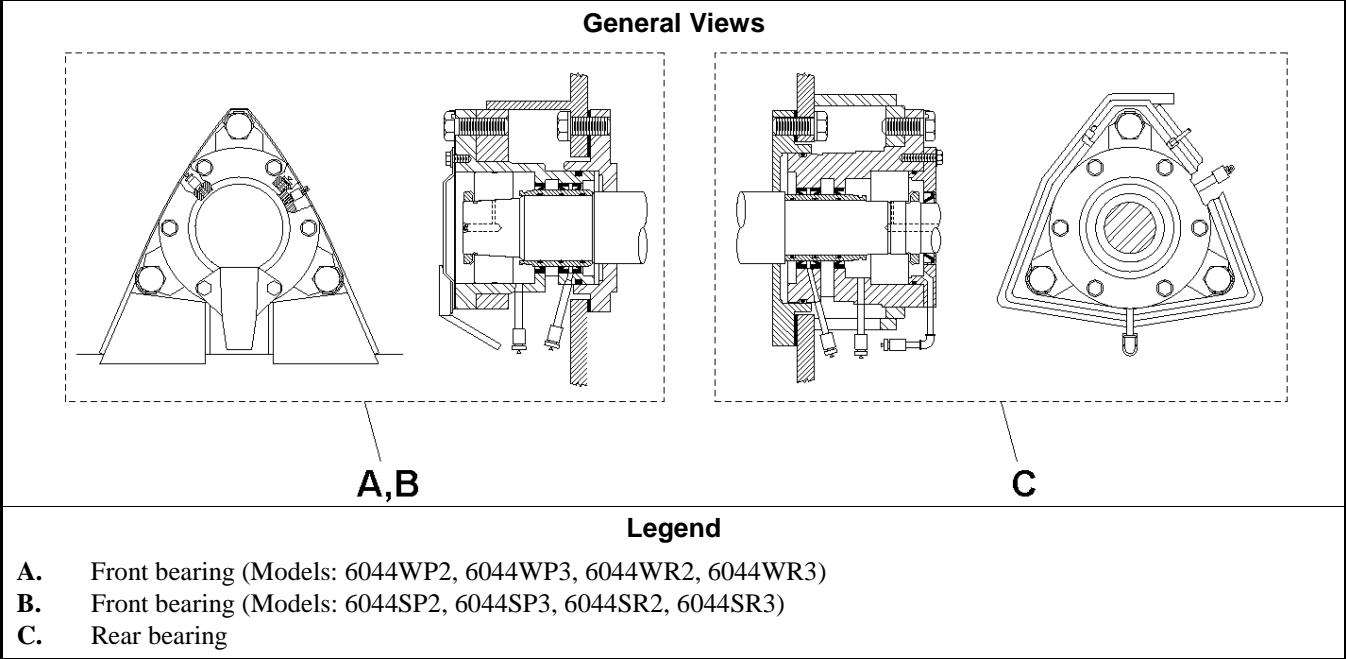


Figure 2: Front bearing (Models: 6044WP2, 6044WP3, 6044WR2, 6044WR3)

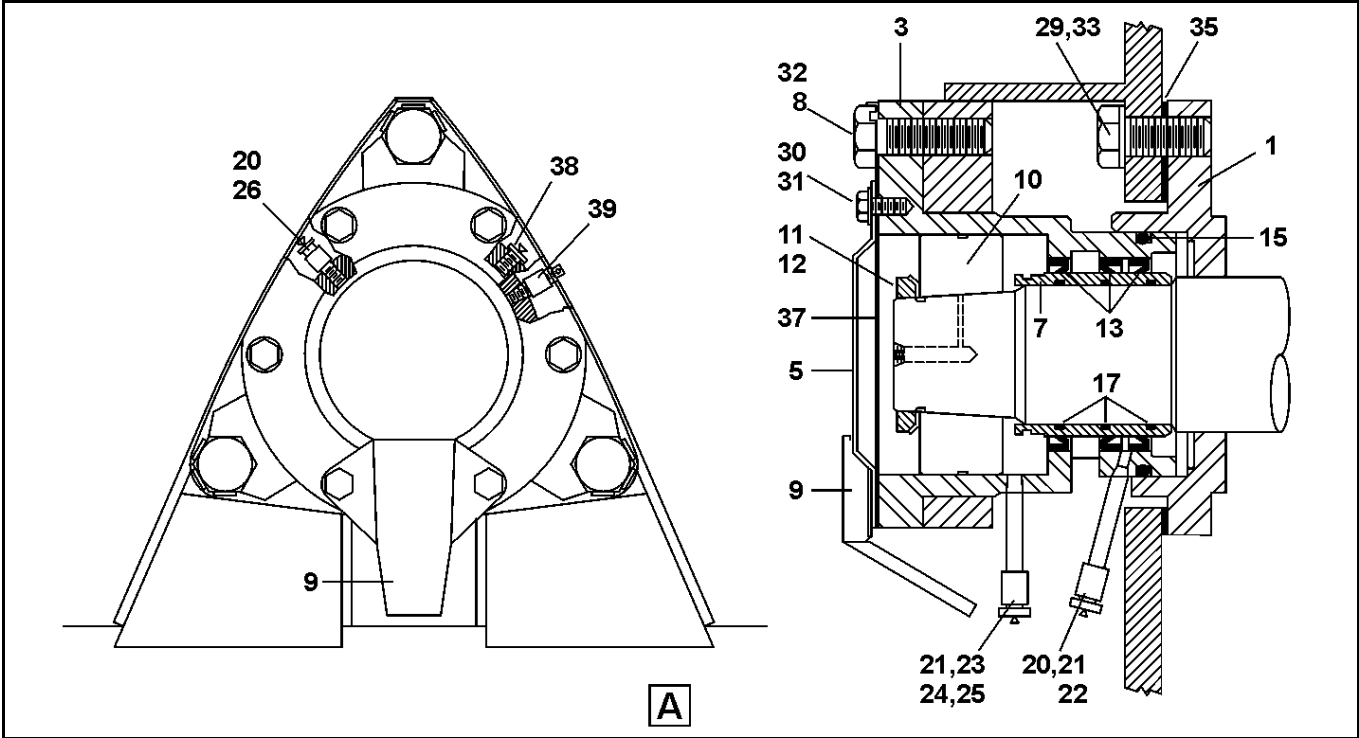


Figure 3: Front bearing (Models: 6044SP2, 6044SP3, 6044SR2, 6044SR3)

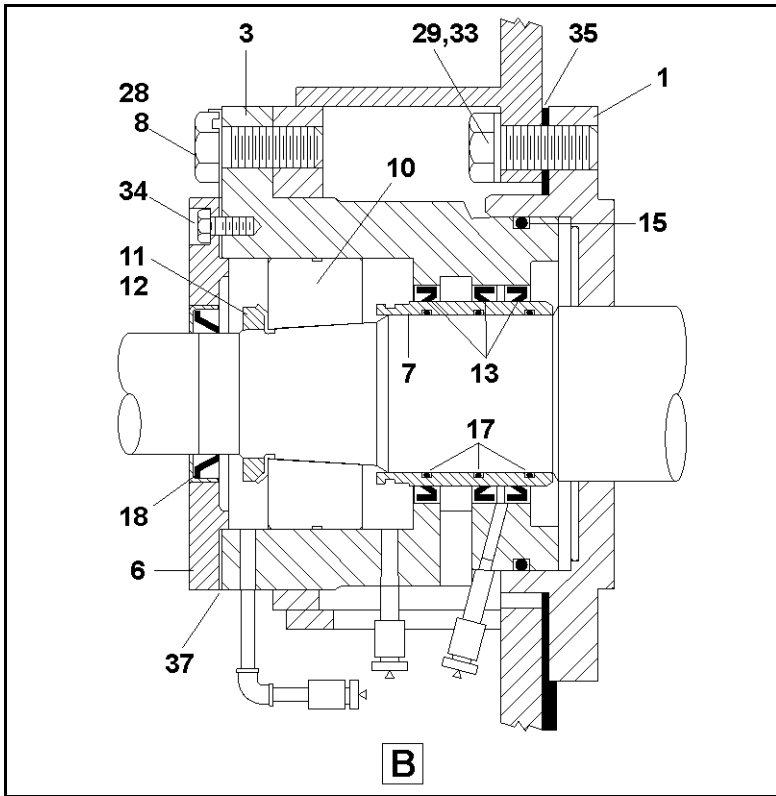
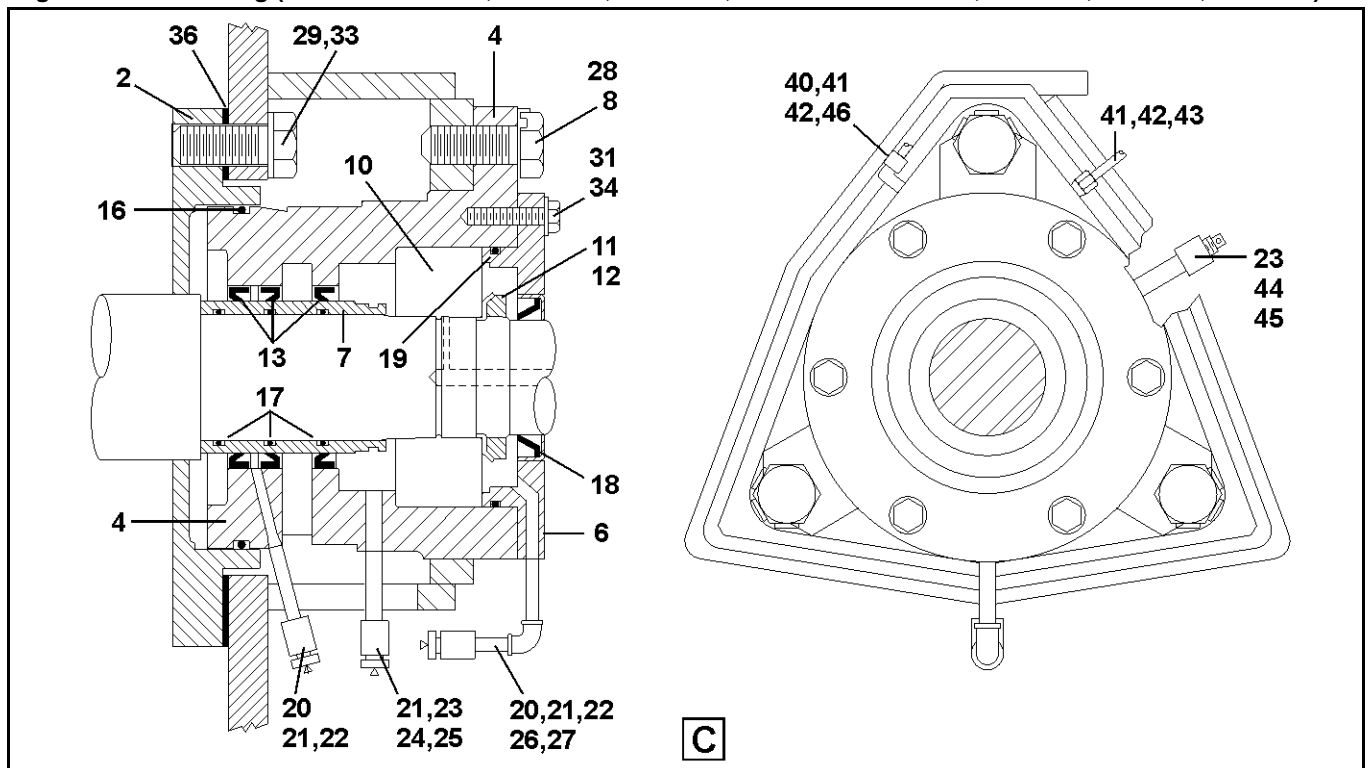


Figure 4: Rear bearing (Models: 6044WP2, 6044WP3, 6044WR2, 6044WR3 & 6044SP2, 6044SP3, 6044SR2, 6044SR3)



**Table 1: Parts List—Shaft and Bearing Components**

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	Item	Part Number	Description/Nomenclature	Comments
Assemblies				
	A	AD 29 032	Installation Group, Bearing housing	6044WP2/WP3, 6044WR2/WR3
	B	AD 29 032V	Installation Group, Bearing housing, Viton	6044WP2/WP3(Viton), 6044WR2/WR3(Viton)
	C	G28 15700	Installation Group, Bearing housing	6044SP2/SP3, 6044SR2/SR3
Components				
all	1	X2 175008	Shaft support, Front	
all	2	X2 175009	Shaft support, Rear	
AB	3	X3 06005	Bearing housing, Front	
C	3	X2 175005	Bearing housing, Front	
all	4	X2 175007	Bearing housing, Rear	
all	5	02 18618A	Cover	
AB	6	X2 18190	Seal holder	
C	6	X2 175053	Seal holder	
all	7	X3 06006	Seal sleeve	
all	8	02 18219	Washer, Lock	
all	9	02 18928	Grease shield	
all	10	56S22316T	Bearing	
all	11	56AHN16	Bearing Locknut	
all	12	56AHW16	Washer	
AC	13	24S114	Seal, 4.5X5.5X.50	
B	13	24S114V	Seal, 4.5X5.5X.50, Viton	
A	15	60C161	O-Ring, 6"X1/4	
B	15	60C161V	O-Ring, 6"X1/4, Viton	
C	16	60C172	O-Ring, 8"X1/4	
B	16	60C172V	O-Ring, 8"X1/4, Viton	
AC	17	60C154	O-Ring, 3+7/8X3/16	
B	17	60C154V	O-Ring, 3+7/8X3/16	
all	18	24S111	Seal, 3X4.00X.437	
all	19	60C160J	O-Ring, 6+1/4X1/8	
all	20	5SCC0CBE	Coupling, 1/8	
all	21	54M029	Pipe Fitting, 1/8	
all	22	5N0C03AG42	Pipe nipple, 1/8X3	
all	23	5SCC0EBE	Coupling, 1/4	
all	24	5N0E02KG42	Pipe nipple, 1/4X2.5	
all	25	5SB0E0CBEO	Hexbush, 1/4X1/8	
all	26	5N0CCLSB42	Pipe nipple, 1/8XCLS	
all	27	5SL0CBEA	Elbow, 1/8	
all	28	15B243	Bolt, 1-8X2+1/2	
all	29	15U400	Washer, Lock, 1"	
all	30	15K145	Bolt, 1/2-13X3/4	



Shaft and Bearing Components

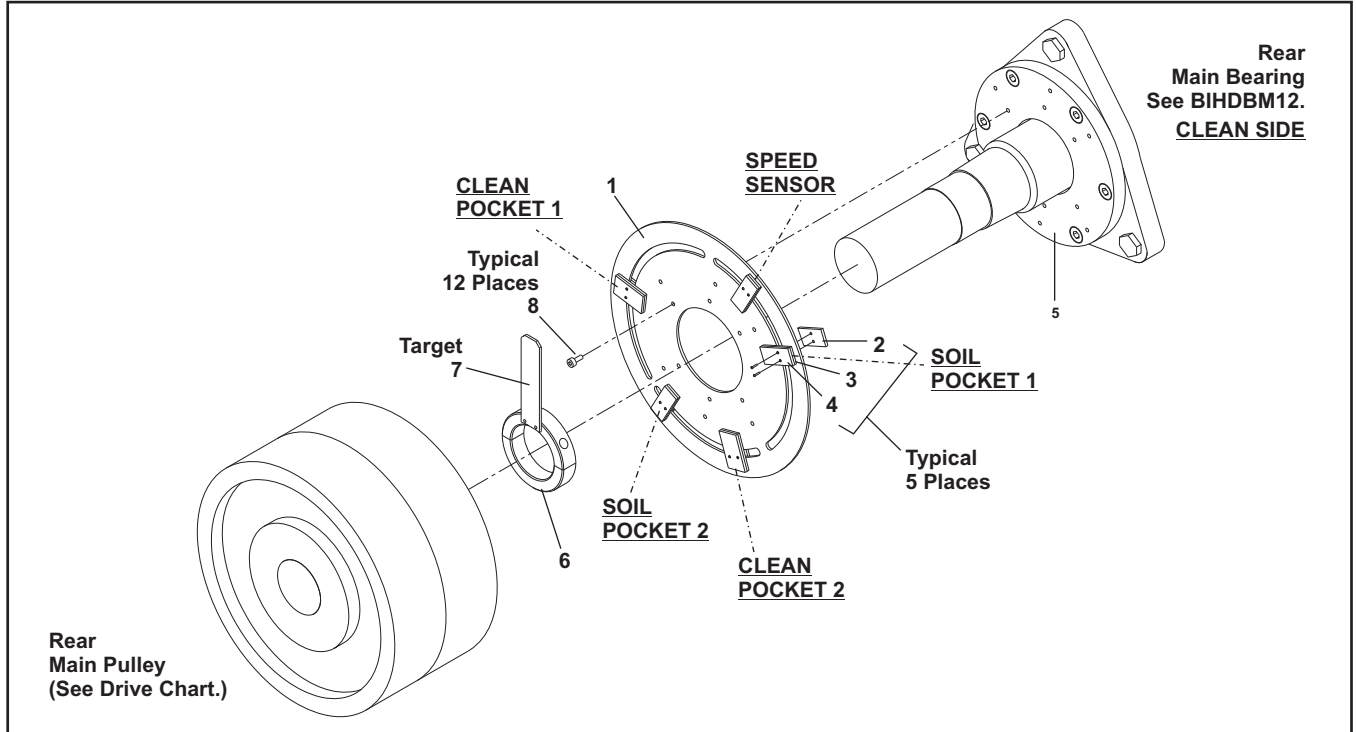
**Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.**

Used In	Item	Part Number	Description/Nomenclature	Comments
all	31	15U300	Washer, Lock, 1/2	
all	32	15B236	Bolt, 1-8X3	
all	33	15K236	Bolt, 1-8X2.75	
all	34	15K162	Bolt, 1/2-13X1.5	
all	34	15K147C	Bolt, 1/2-13X1	
all	35	02 18870	Gasket	
all	36	02 18768D	Gasket	
all	37	02 18105	Gasket	
all	38	54M015	Pipe fitting, Lubricant	
all	39	5SP0CFESSV	Plug, 1/8	
all	40	53A039B	Elbow, 5/16X1/8	
all	41	53A508	Flexible tubing, Adapter, 5/16"	
all	42	53A509	Flexible tubing, Adapter, 5/16"X .53"	
all	43	53A019B	Pipe Fitting, 5/16X1/8	
all	44	5N0E01KBE2	Pipe nipple, 1/4X1.5	
all	45	51P008B	Plug, 1/4"	
all	46	53A060A	Nut, 5/16	

— End of BIHDBM12 —

# AutoSpot™

6044SP2, 6044SP3, 6044SR2, 6044SR3



### Parts List—AutoSpot™

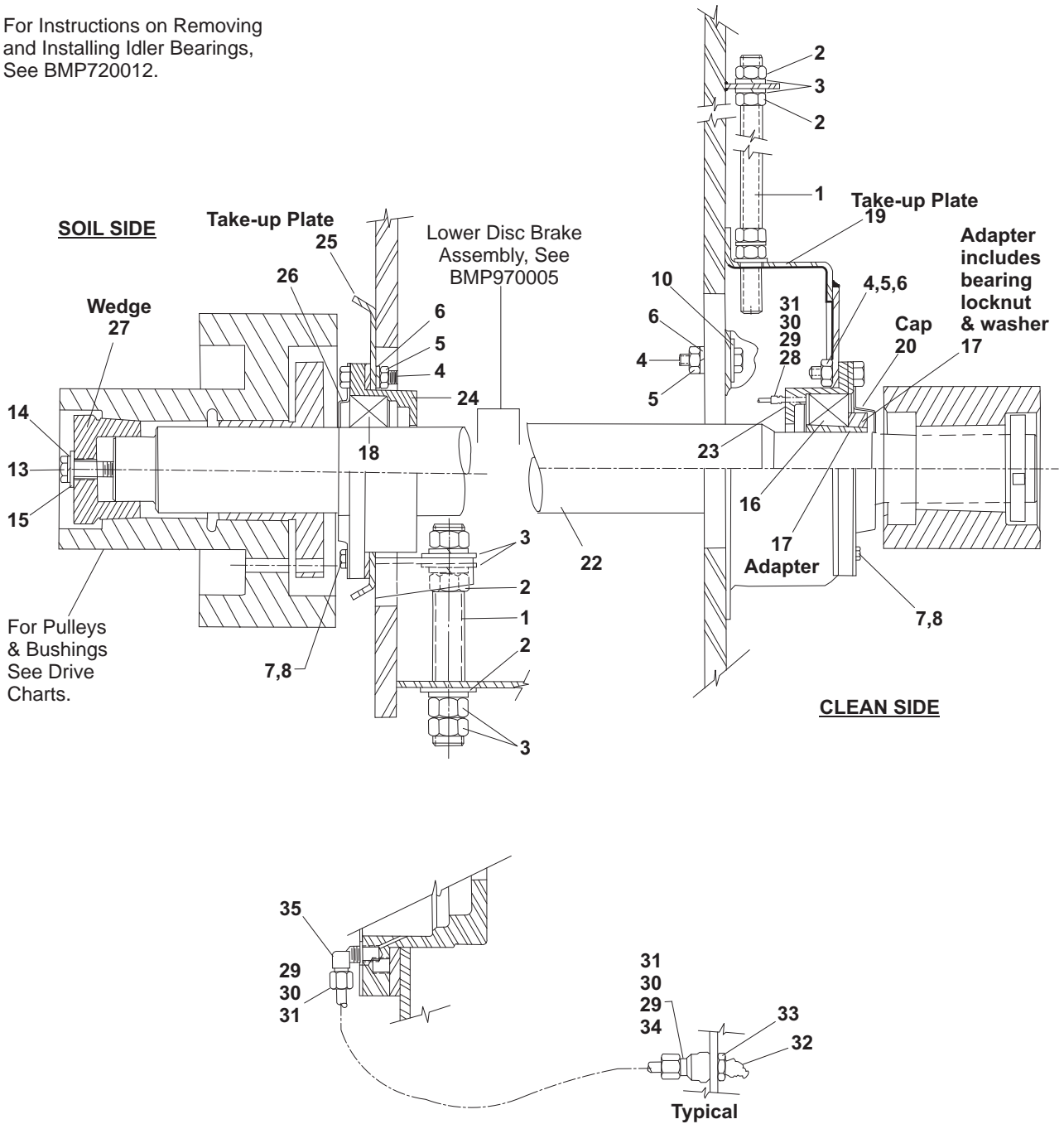
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
-----ASSEMBLIES-----				
	A	G28 15700	BEARASY MAIN(L+C)W/AUTO 60SG	
-----COMPONENTS-----				
all	1	02 19197	60" S/G AUTOSPOT TIMING PLT	
all	2	02 19179	SWITCH MNT PLATE INNER	
all	3	02 19179A	SWITCH MNT PLATE OUTER	
all	4	09RPS07RDS	7MM SENSING RECTANGULAR SHLD	
all	5	X2 175054	SEAL HOLDER=AUTOSPOT SGL MTR	
all	6	X2 19190	COLLAR=60" S/G AUTOSPOT	
all	7	02 19186C	TARGET=60" S/G AUTOSPOT	
all	8	15K018	SKCPSCR 10-24 UNC 3X3/8 BLK	

# 4" Idler Shaft Bearing Installation

6044SR2, 6044SR3

For Instructions on Removing and Installing Idler Bearings, See BMP720012.



# 4” Idler Shaft Bearing Installation

6044SR2, 6044SR3

<p align="center"><b>Parts List—4” Idler Shaft Bearing Installation</b></p> <p>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.</p>				
Used In	Item	Part Number	Description	Comments
			-----ASSEMBLIES-----	
	A	ABI28002	95041# BEARASSY=IDLERSHAFT NOBRAKE	
			-----COMPONENTS-----	
all	1	02 19023	94353A DRIVE BASE ADJ. SCREW 13.5LG	
all	2	15G250	HXNUT 1-8UNC2B SAE ZNC GR2	
all	3	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	4	15K225	05Z HXCPSCR 5/8-11X2+1/2	
all	5	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	6	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	7	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	8	15K030	HEXCAPSCR 1/4-20UNC2X1/2 GR5 ZINC	
all	9	15P010	12Z PHILPAN TRDCUTSCRTP10-24X1/2SS	
all	10	15U314	FLATWASHER(USS STD) 5/8" ZNC PLT	
all	11	15U450	FLATWASH.1345X3.25X1+11/16 ZINCPLTD	
all	12	15G268	HXFINJAMNUT 1+1/2-12UNF2B ZINC GR2	
all	13	15K235A	03Z HXCPSC 3/4-10X2.5 GR 8	
all	14	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	15	15U320	FLATWASHER(USS STD) 3/4" UNPLT	
all	16	56S22220T	04Z SPHEROLBRG NTN#22220BL1D1C3	
all	17	56AHS20	SNW20 BRG ADAPTER 3.5" CYL BORE	
all	18	56S22220S	04Z SPHEROLBRG NTN#22220BL1D1C3	
all	19	W2 18747E	92257C*TAKE-UP WLMT=4"IDLER SHAFTCS	
all	20	03 06444A	79337C CAP=BEARING IDLERSHAFT C.S.	
all	21	X2 18763A	92236D IDLER SHAFT 4"DIA 6036SGU	
all	22	X3 06154A	92236# IDLER SHAFT 4"DIA 60+72SGU	
all	23	X2 18697A	79277C BEARHOUSE IDLER SHAFT FLOAT	
all	24	X2 18696A	94283C BEARHOUSE IDLER SHAFT LOCKED	
all	25	X2 18744C	92137# MACH=TAKEUP=4"IDLER 60SG SS	
all	26	03 06444	79507C CAP=BEARING 4"IDLERSHAFT	
all	27	03 06445	94251B WEDGE=SHEAVE+SHAFT=60+72SGU	
all	28	53A005B	BODYMALCON1/4X1/8COMP #B68A-4A	
all	29	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	30	53A501	TUBEINSERT .170"OD	
all	31	53A500	1/4" SLEEVE-DELTRIN	
all	32	54M020	GREASEFIT 30DEG 1611-B ALEMITE	
all	34	53A007B	BODYFEMCON.25X.25COMP#B66A-4B	
all	35	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	

**9B.1 GENERAL DESCRIPTION**

The bearings used on the idlershaft are double-row spherical roller self-aligning bearings, SKF, Link-Belt, Torrington, or equal. Bearings are attached to the shaft with locknuts and tapered adapters. The idlershaft is designed with one bearing “fixed” and the other bearing “floating”. Lubrication is provided by grease passages that are tubed to two grease fittings located on the lower right cross brace. Grease is retained in the bearing housings by close-fitting covers.

**9B.2 TO REMOVE BEARINGS**

9B.2.A. Remove the idlershaft pulleys on both ends of the shaft; remove the bearing caps. Loosen the set screws which lock the bearings for the Brake Assembly to the idlershaft (total of four (4) setscrews).

9B.2.B. To remove the soiledside bearing, screw a 1/4"-18NPT pipe fitting into the hole in the soiledside end of the idlershaft. Loosen the bearing locknut. Using a “Porto-Power” or similar hand operated pump, force fluid into the hydraulic removal passage. Pump hard to build up fluid pressure. This pressure will be transferred to the bearing inner race causing the race to expand slightly, just enough to free the tapered surface and allow the bearing to slip off easily.

9B.2.C. To remove the cleanside bearing loosen the bearing locknut on the bearing adapter, backing the nut about 1/8" from the bearing. DO NOT take the locknut off of the adapter. Slip a piece of pipe (approx. 15" long) over the shaft. Place one end of the pipe against the locknut and adapter. Strike the other end of the pipe with a 5 lb. hammer, gently at first, then harder until the adapter snaps loose. Hitting a block placed over the end of the pipe helps to inflict an even impact on the bearing adapter; this should prove helpful in bearing removal. After the bearing has been snapped loose remove the pipe, bearing locknut, and washer; now the bearing will come out of the housing with a little assistance. Be sure not to remove the bearing locknut from the adapter when trying to snap the bearing loose; otherwise, the bearing and bearing adapter may come apart violently; besides, there is a chance of damaging the adapter which may be used again if it is not damaged during disassembly.

9B.2.D. When it is know that only the soiledside bearing is bad, it may be changed by the above mentioned hydraulic method without damaging the cleanside bearing.

If only the cleanside bearing must be changed, however, the soiled-side bearing should be removed first (hydraulically) before the cleanside bearing is mechanically removed. If it is not removed first, minute indentations, invisible in most cases, will be formed on the inner and outer races of the soiledside bearing rendering it unserviceable.

When both bearings must be changed the order of bearing removal is not critical.

9B.3 **HOW TO INSTALL NEW BEARINGS**

9B.3.A. NOTICE: 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 leakoff 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 actually inserting the bearing in the housing.) Foreign matter is, without doubt, the most frequent cause of bearing failure, and one over which the manufacturer has no control.

BEFORE INSTALLING BEARINGS, YOU MUST USE A FEELER GAUGE TO MEASURE THE INTERNAL CLEARANCE IN THE BEARING. READ THE SECTION “HOW TO ADJUST THE BEARING” BEFORE INSTALLING THE BEARINGS IN THE HOUSING. DESCRIBED IN “REMOVAL, INSTALLATION, AND SETTING MAIN BEARINGS AND SEALS”.

9B.3.B. The “fixed” bearing is always installed first. Install the bearing housings in the take-up units with three mounting bolts. Don’t put the bearing covers on the housings; however, make sure the mounting bolts are tight. Pass the idlershaft through the housings. Slip the bearing adapters on the shaft with the threaded end of the adapter near the end of the shaft; next, pass the bearing over the shaft and onto the tapered adapters. Hand tighten the locknut on the adapter, and adjust the location of the end of the idlershaft assembly drawing.

9B.3.C. With both bearings on the shaft and in the housing, measure the distance from the center of the main shaft to the center of the idlershaft on both ends of the machine. If the center distances are different, loosen the take-up units and adjust the position of the shaft. It is important that the idlershaft be parallel to the main shaft before setting the bearings, so that the plane of rotation of the rollers is approximately in the same plane with the bearing races; further, if the shaft is cocked, the floating bearing will not be located accurately from the face of the bearing housing as shown on the assembly drawing.

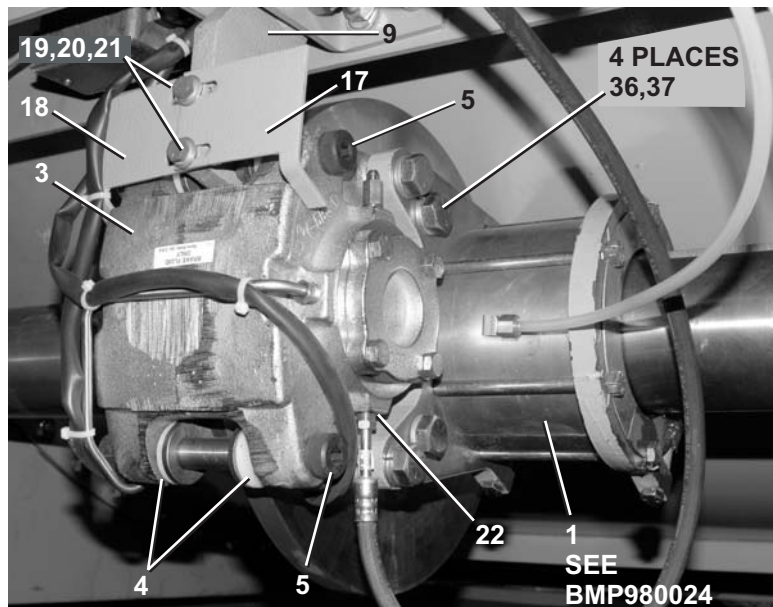
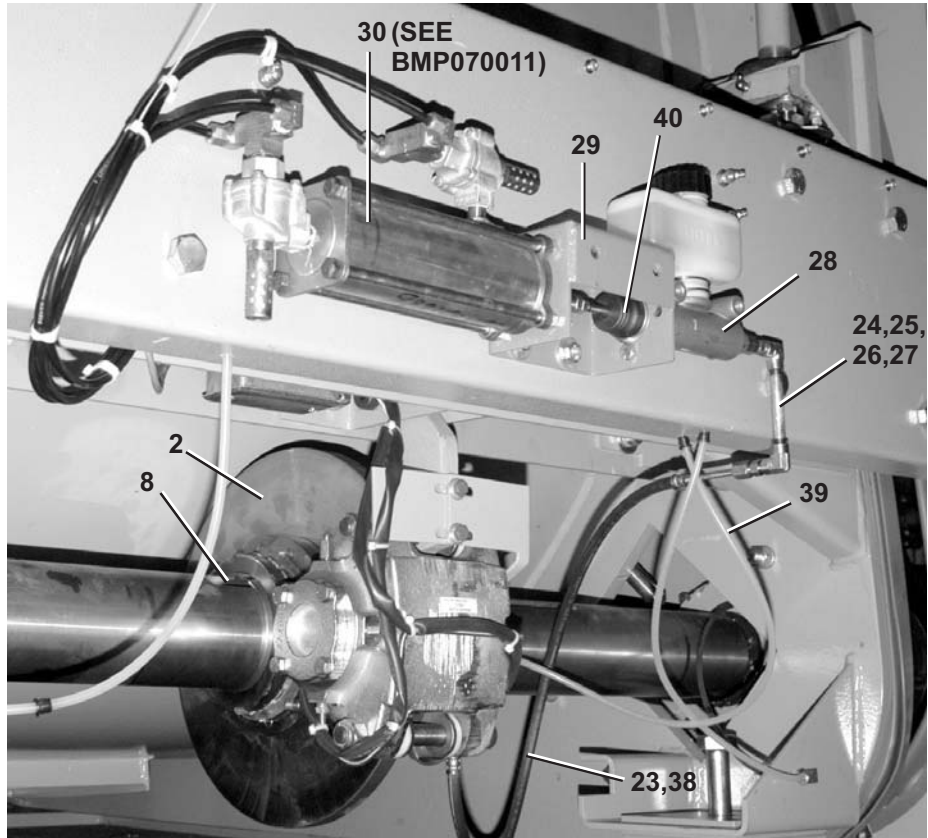
9B.3.D. Tighten the bearing locknuts to the proper internal clearance using the procedure explained in section entitled “HOW TO ADJUST THE BEARING”. (This section describes adjustment of the main bearings which also applies to the idlershaft bearing.)

9B.3.E. Loosen the three bearing housing mounting bolts, and put the covers on the bearings as shown on the idlershaft assembly. Check to make sure bearing housing mounting bolts are tight and don’t forget to lubricate the bearing before operation. Follow the instructions for bearing lubrication as outlined in Section 7 of this manual.



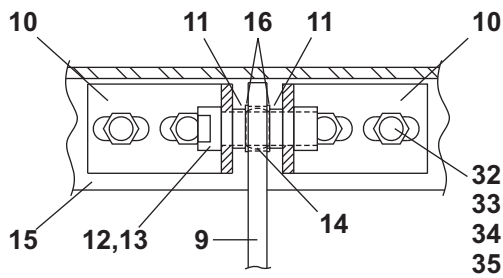
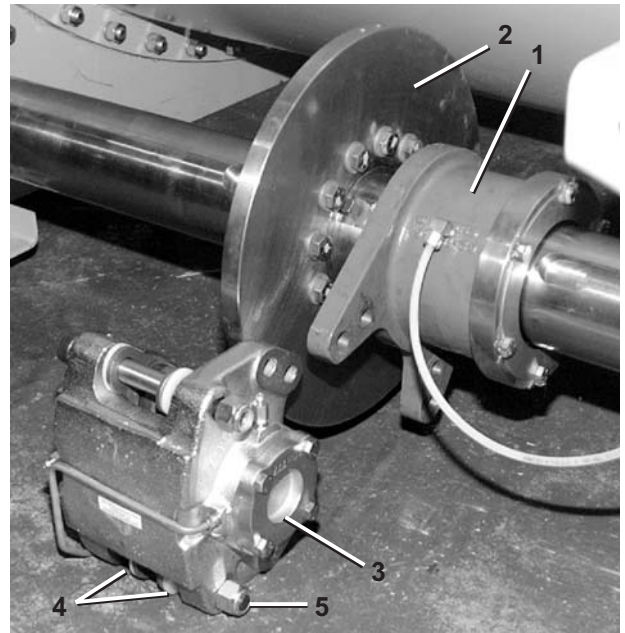
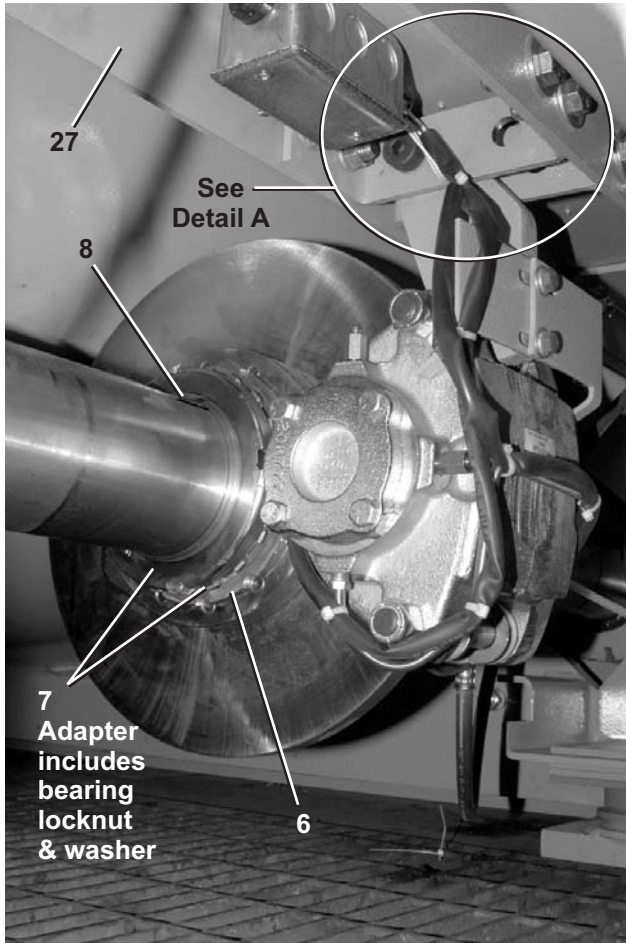
# Lower Disc Brake Installation

6044SR2, 6044SR3, 7244SR2



# Lower Disc Brake Installation

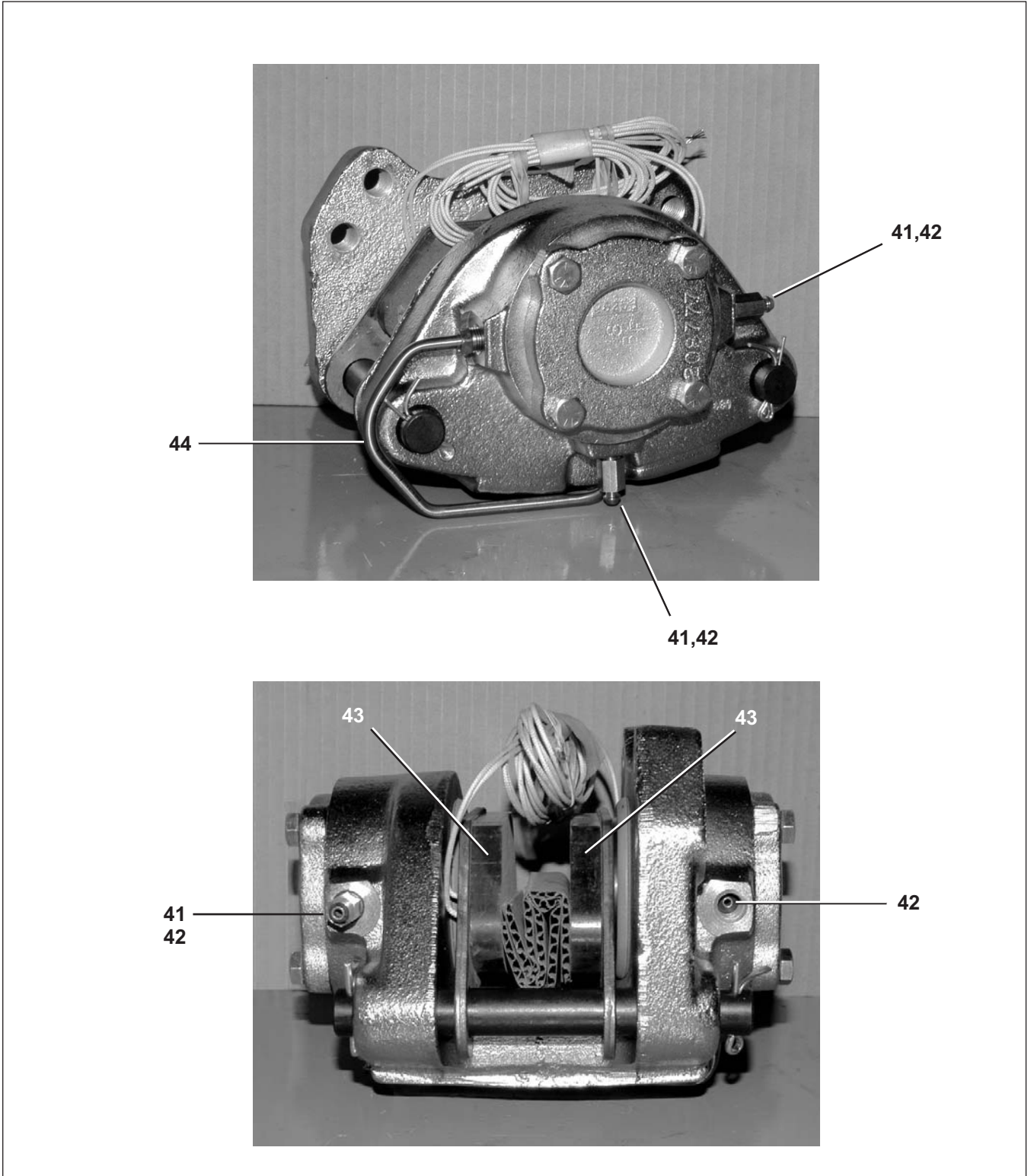
6044SR2, 6044SR3, 7244SR2



Detail A: Torque Arm Mounting

# Lower Disc Brake Installation

6044SR2, 6044SR3, 7244SR2



# Lower Disc Brake Installation

6044SR2, 6044SR3, 7244SR2

<b>Parts List—Lower Disc Brake Installation</b> 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	GBR28001	INST=DISC BRAKE=60SG	6044SR2/SR3
	B	GBR36001	INST=DISC BRAKE=72SG	7244SR2
-----COMPONENTS-----				
all	1	ABR28002A	ASSY=DISK BRAKE SPLIT BRNG	
all	2	ABR28003	DISC ASSY +BALANCE=60+725G	
all	3	54KC7961	CALIPER HYD FIXMT 12/20 ROTOR	
all	4	03 65203	DISC BRAKE PAD DAMPENER 1/8T	
all	5	15C098	HXSOKSTRPBLT 3/4X5+1/2X5/8-11	
all	6	01 09294	RETAIN RING-FLANGE(STEEL)+\$4S	
all	7	56AHS22	SNW22 BRG ADAPTER 4" CYL BORE	
all	8	15E260	KEY-DISC BRAKE	
all	9	W2 19569	*WELD TORQUE ARM 60+72SG	
A	10	02 19570	BRKT=TORQUE ARM MOUNT	
B	10	03 06531	BRACKET=TORQUE ARM MT 72SG	
all	11	X4 22046C	7/8" DIA. SPACER=COBUCK	
all	12	15C095	HXSOKSTRPBLT 3/4X1+3/4X5/8-11	
all	13	15G238N	HXLOCKNUT NYL 5/8-11UNC STL/	
all	14	54AA00PBB	BUSH BALL 3/4 RBC-B12L	
A	15	02 19573	CHANNEL=TORQUE ARM MT	
B	15	03 06530	CHANNEL=TORQUE ARM MT 72SG	
all	16	17B132	INDUSTRIAL RETAIN.RING 4000-12	
all	17	02 19572A	RT BRKT=DISCBRAKE HOLDER FRNT	
all	18	02 19572	LT BRKT=DISCBRAKE HOLDER FRNT	
all	19	15K054	HXCAPSCR 5/16-18X3/4 GR5 XYLAN	
all	20	15U185	FLATWASHER(USS STD) 1/4" ZNC P	
all	21	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	22	54KC7961B0	O-RING 08-11070 BRAKE 2-660	
all	23	54KC7961H2	BRAKEHOSE #W2511 1/8X32" OAL	
all	24	52LY0CR001	HEXPINIP 1/8"XCLOSE#5404-2-2	
all	25	52JY0CR001	ELBOW 1/8"FEM.#5504-02-02	
All	26	5N0C03AS82	NPT NIP 1/8X3 TBE 304SS SK80	



# Lower Disc Brake Installation

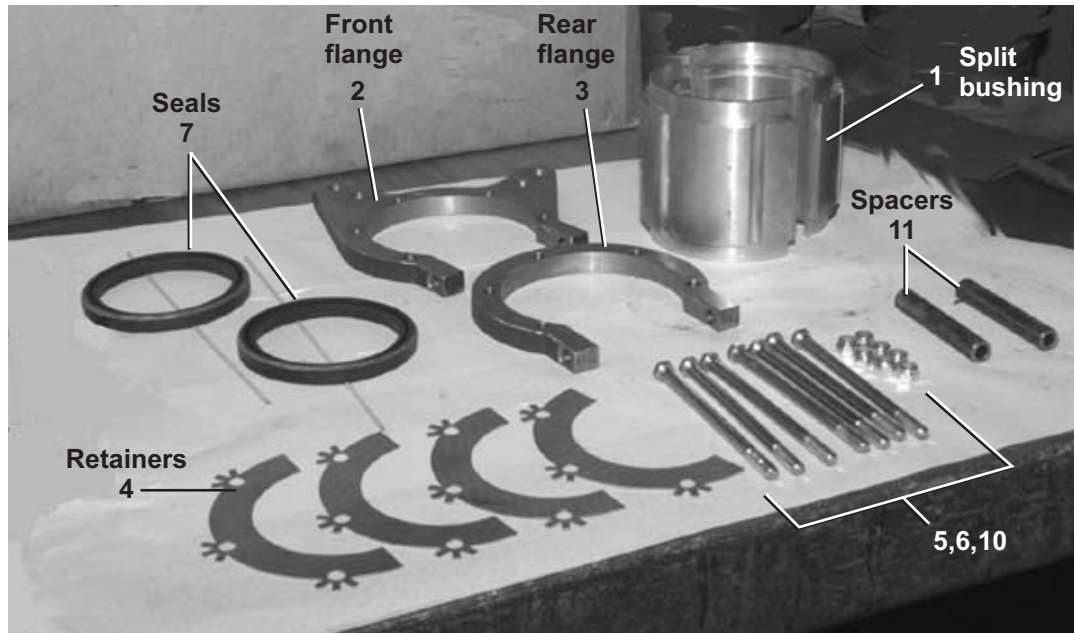
6044SR2, 6044SR3, 7244SR2

<b>Parts List—Lower Disc Brake Installation</b> 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
all	27	52AY0ER003	STR.1/4"MJICX1/8"MP#2404-4-2	
all	28	54KMC1125U	MASTER CYL TILTON 74-1125U	
all	29	W3 65238	*WLMT=MASTER BRAKE CYL BRKT	
all	30	AAC65002	2006292 AIRCYL BRAKE SINGLE MOTOR	
all	31	02 19576	SPLASH SHEILD=DISC BRAKE	
all	32	15K154A	HEXCAPSCR 1/2-13X1.5 G8 ZN	
all	33	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	34	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	35	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	36	15K223	HEXCAPSCR 5/8-11X2 GR9 2NC	
all	37	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	38	54KC7961BG	BRAKE HOSE=1/8"X18"OAL #50612	
all	39	54KC7961BH	BRAKE HOSE #W2261 1/8X18"OAL	
all	40	54KC7961BP	BRAKEFLUID/PISTON KIT #98-1198	Caliper repair part
all	41	54KC7961B0	O-RING 08-11070 BRAKE 2-660	Caliper repair part
all	42	54KC7961BS	BLEEDERSCREW#10-07721 #2-660	Caliper repair part
all	43	54KC7961RK	BRAKE PADS W/SENSOR #98-13982	Caliper repair part
all	44	54KC7961CT	CROSSOVERTUBEKIT HAY#B98-11700	Caliper repair part

## Lower Disc Brake Split Bearing

6044SR2, 72044SR2/SR3

Figure 1: Bearing Components



### Assembly Procedures:

1. Slide front and rear flanges (Items 2 & 3) onto the shaft. Bore chamfers should face inward. Assemble spacers (Item 11) and ensure bolts are loose. (See Figure 1). (New installation and complete replacement only.)
2. Apply a thin bead of high temperature RTV silicone to the bronze bushing seams (Item 1). (See Figure 2).
3. Put two halves of bronze bushing around the shaft. Ensure alignment by matching alignment marks. (See Figure 3).
4. Push front and rear flanges (Item 2 & 3) onto bronze bushing (Item 1). Use hard rubber mallet only. Ensure spacers are loose. Rotate bushing so seams are approximately 90 degrees to the flanges openings. (See Figure 7).
5. Insert seals (Item 7), both sides. Use hard rubber or plastic mallet only. (See Figure 5).
6. Install seal retainers (Item 4) so they overlap seams. Ensure bolts (Items 5 & 6) are loose. (See Figure 6).
7. Tighten spacers (Item 11) until they no longer rotate. Constantly check assembly rotation around the shaft. Use hand wrenches only.
8. Ensure retainers (Item 4) edges meet but do not overlap. Tighten bolts in an alternate pattern. Constantly check assembly rotation. Use hand wrenches only. If binding occurs, loosen bolts and repeat. (See Figure 7).
9. With all bolts tightened rotate assembly. Bend star tabs on retainer. Assembly should rotate freely.
10. Assemble fittings and tubing for grease supply line. (See Figures 7 & 8).

NOTE: Use "Antiseize" lubricant on all threads.



# Lower Disc Brake Split Bearing

6044SR2, 72044SR2/SR3

Figure 1: Bearing Components

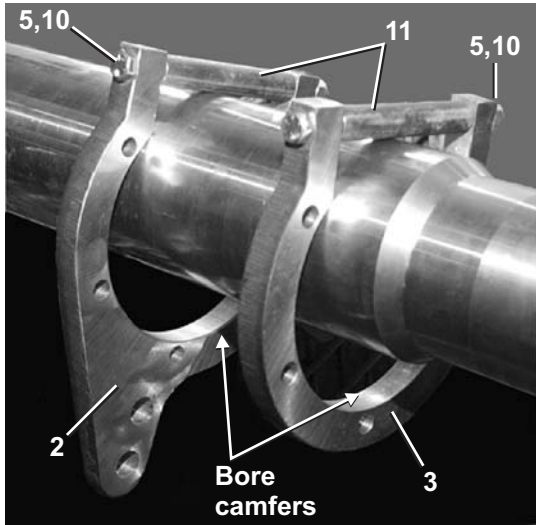


Figure 1

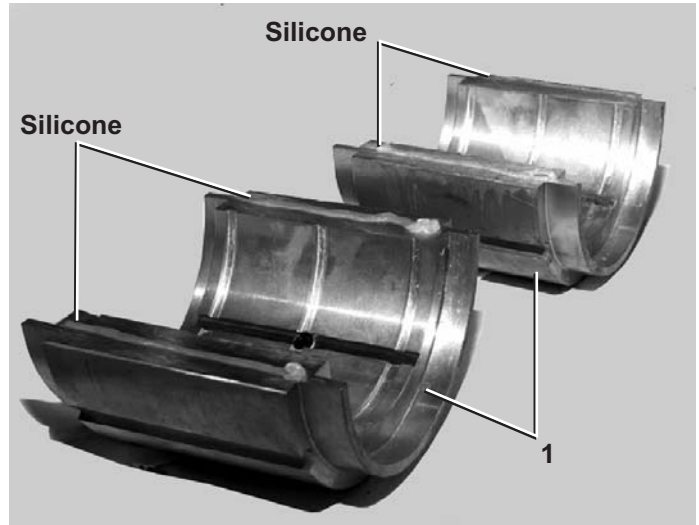


Figure 2

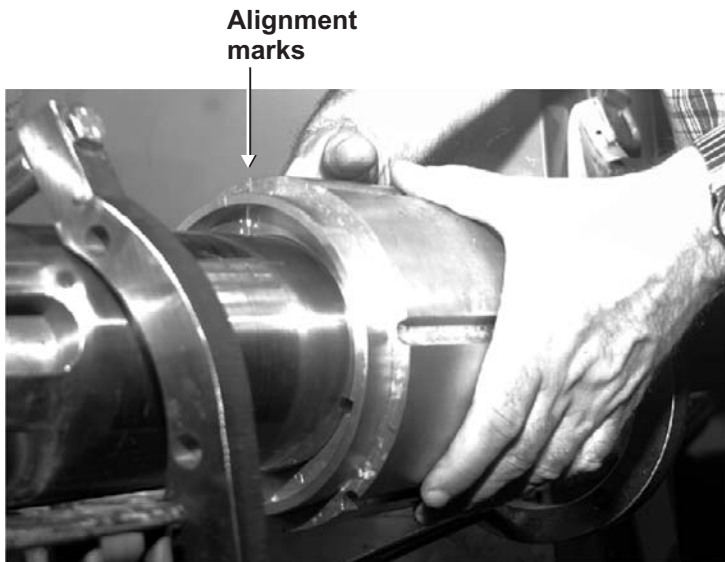


Figure 3

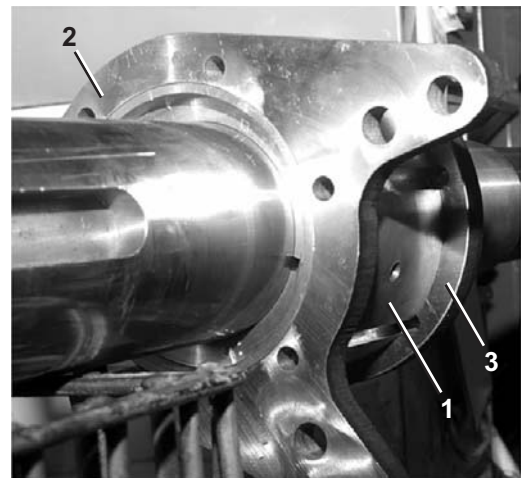


Figure 4

# Lower Disc Brake Split Bearing

6044SR2, 72044SR2/SR3

Figure 1: Bearing Components

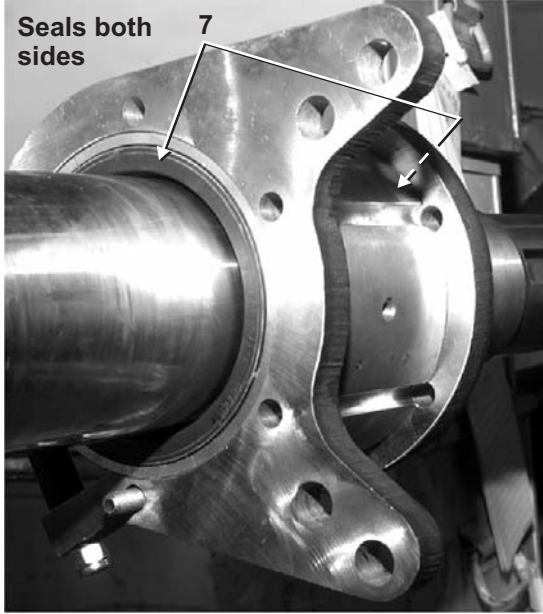


Figure 5

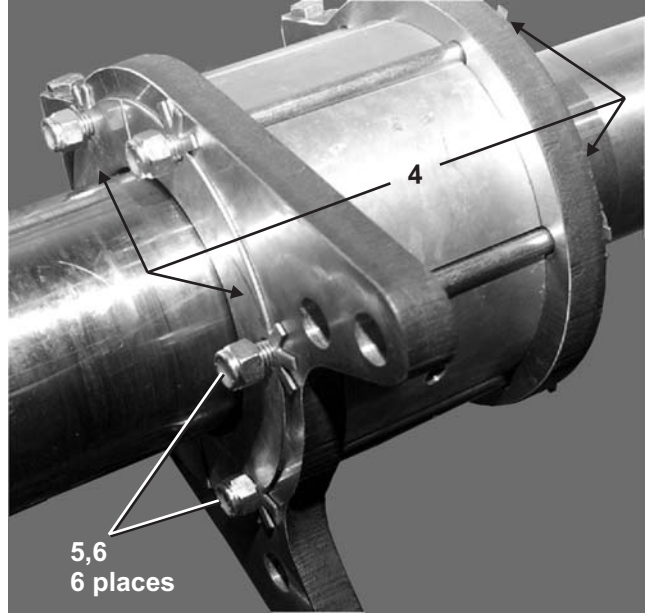


Figure 6

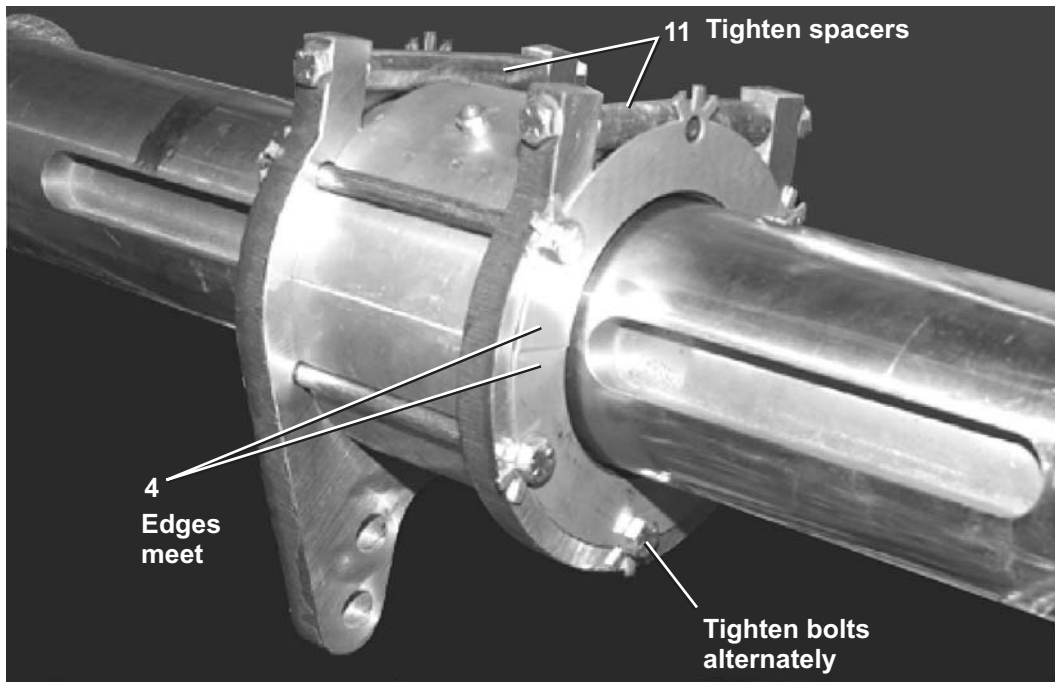
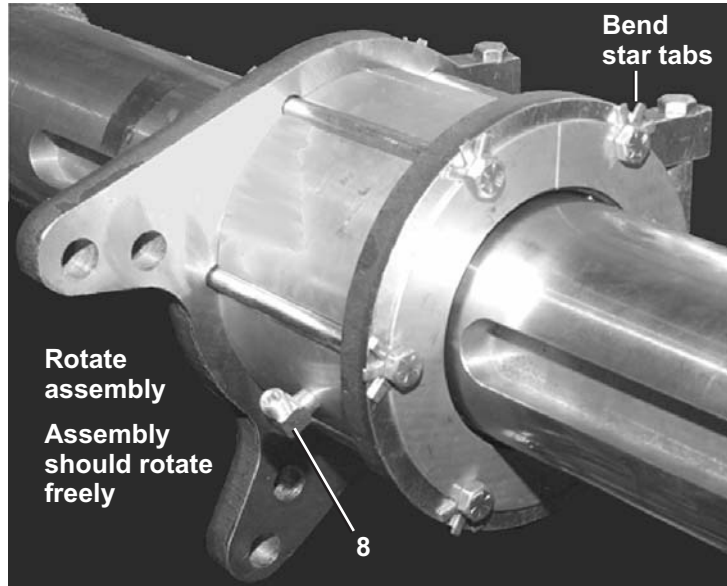


Figure 7

# Lower Disc Brake Split Bearing

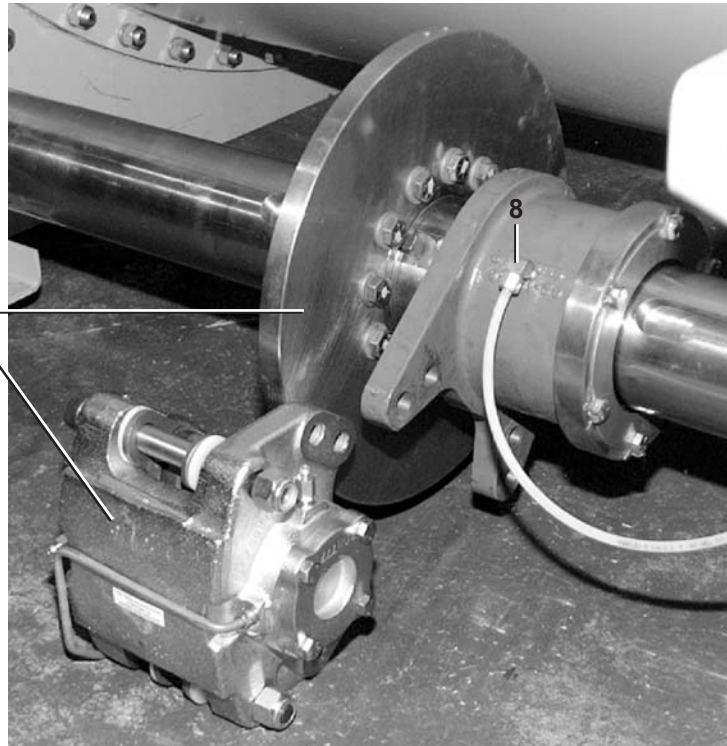
6044SR2, 72044SR2/SR3

Figure 1: Bearing Components



**Figure 8**

See  
Lower Disc  
Brake  
Installation  
BMP970005



# Lower Disc Brake Split Bearing

6044SR2, 72044SR2/SR3

<p align="center"><b>Parts List—Lower Disc Brake Split Bearing</b></p> <p>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.</p>				
Used In	Item	Part Number	Description	Comments
			-----ASSEMBLIES-----	
	A	ABR28002A	ASSY=DISK BRAKE SPLIT BRNG	
			-----COMPONENTS-----	
all	1	X2 19577	SPLIT BUSHNG=DISK BRAKE BRNG	
all	2	X2 19578	FRONT FLANGE=DISK BRAKE BRNG	
all	3	X2 19579	REAR FLANGE=DISK BRAKE BRNG	
all	4	02 10426B	WASH=SEAL RETAIN+LOCK+SPLIT	
all	5	15K142	HXCAPSCR 3/8-16X6 GR8ZC	
all	6	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	7	24S126	SEAL 4X5X.5 JM#R-0400-10175RUP	
all	8	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	9	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
all	10	15G218	HXLOKNUT NYL 3/8-16 STL/ZNC	
all	11	X2 19580	SPACER=DISC BRAKE BRNG	

# Frame, Pivots, & Suspension

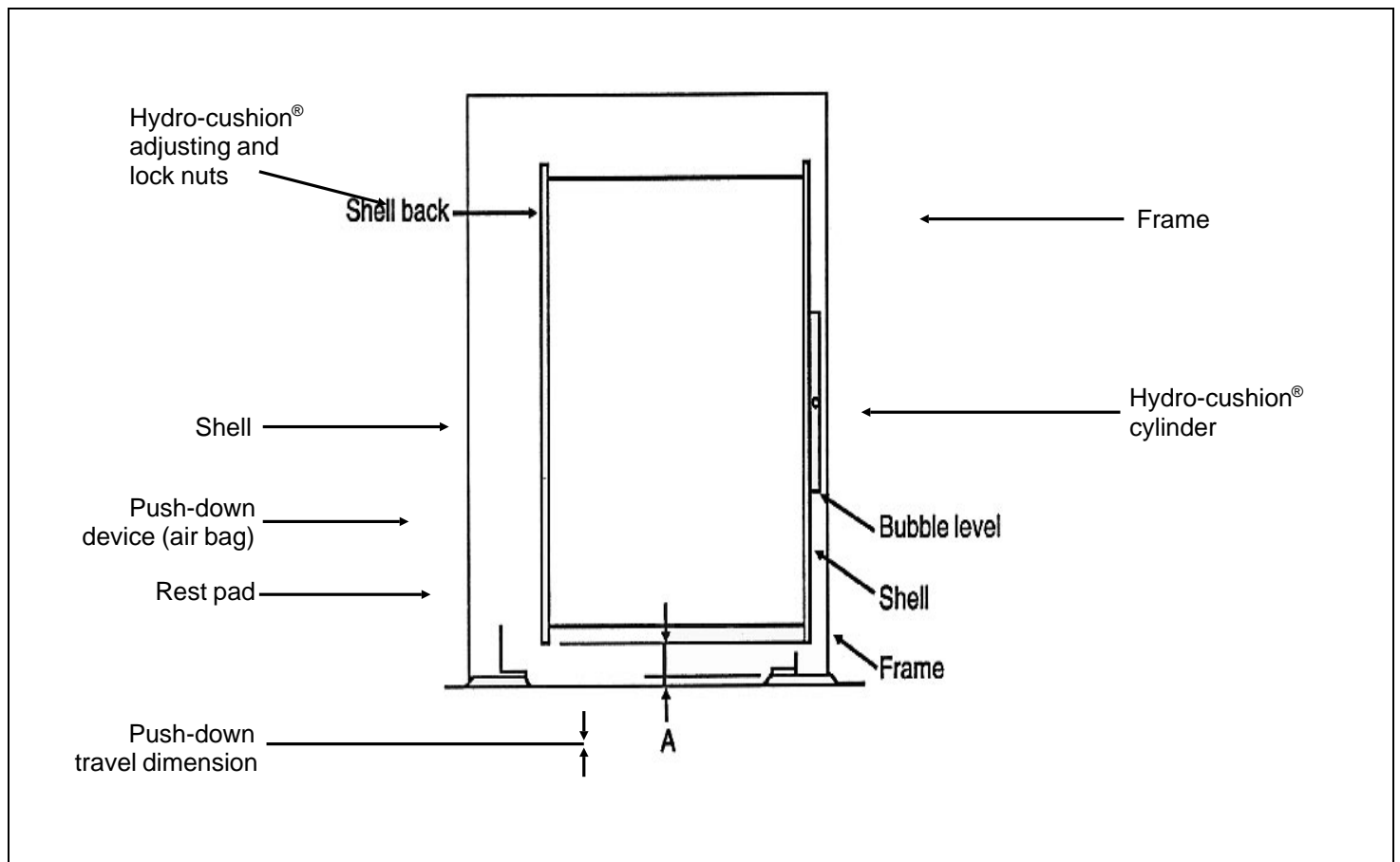
4

## SUSPENSION ADJUSTMENTS FOR DIVIDED CYLINDER MACHINES

The suspension system on Milnor<sup>®</sup> Hydro-cushion<sup>®</sup> 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<sup>®</sup> cylinder is replaced.

There are two primary objectives when adjusting the suspension system on any Hydro-cushion<sup>®</sup> 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<sup>®</sup> Suspension System Components  
(does not depict a specific machine)**



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

1. Hydro-cushion<sup>®</sup> 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.

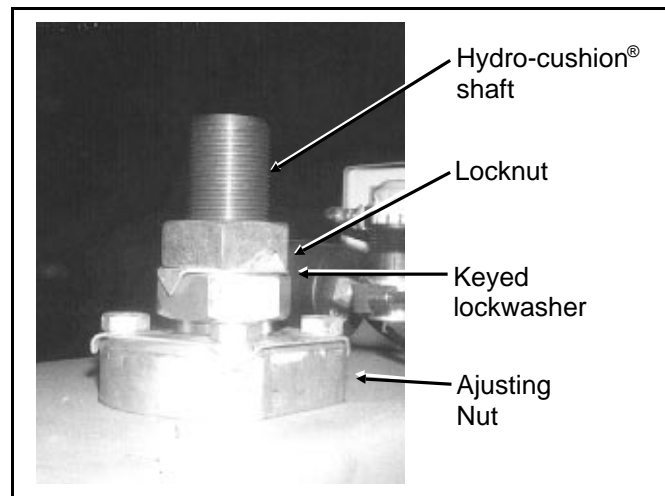
## How Shell Adjustments are Made

Regardless of machine model, repositioning of the shell is always accomplished by adjusting the nuts at the top of the upper Hydro-cushion<sup>®</sup> shafts. To move the shell up or down at the location of any Hydro-cushion<sup>®</sup>, 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.



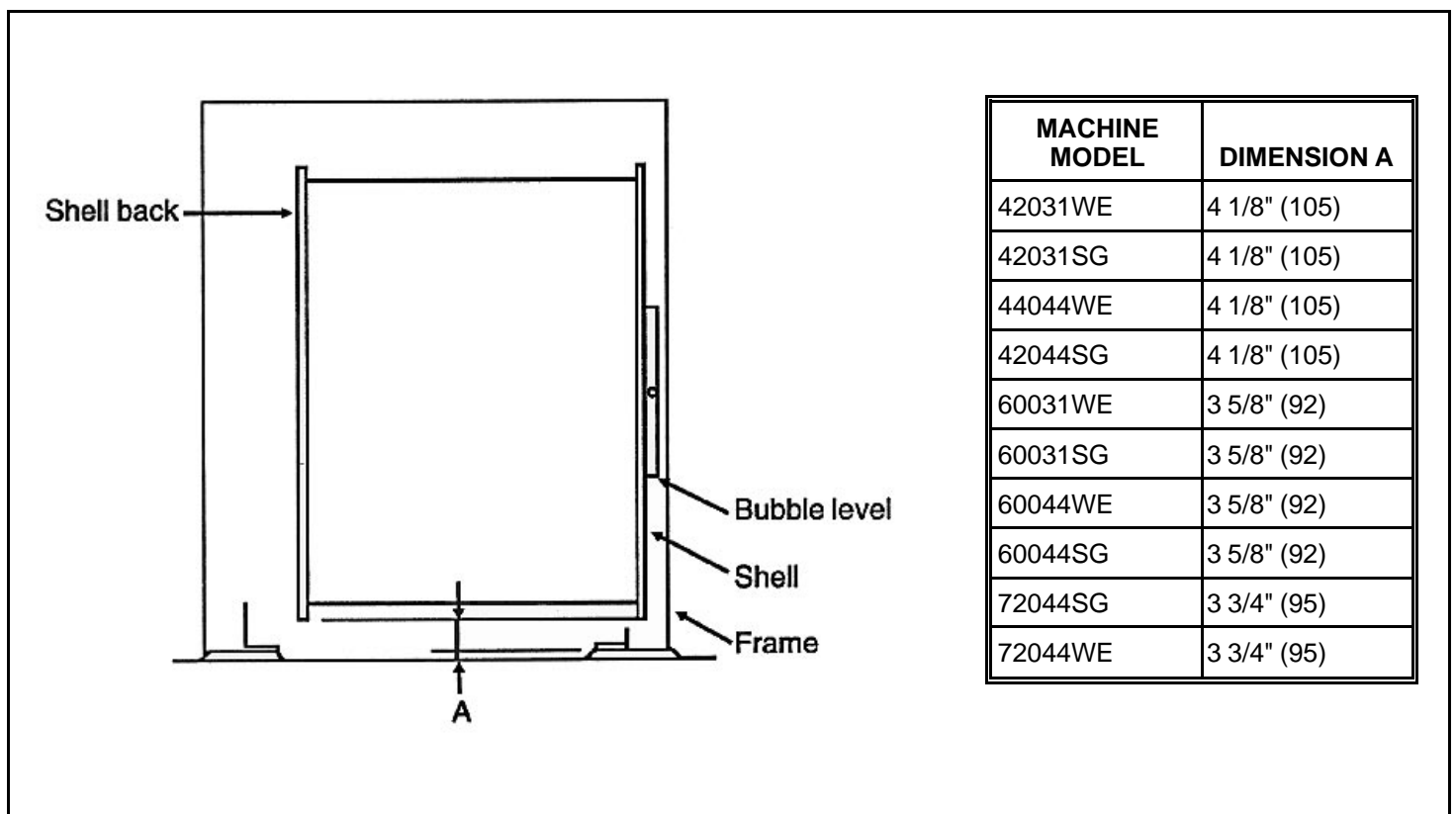
**FIGURE 2** (MSSM0302AE)  
**Hydro-cushion<sup>®</sup> Upper  
Shaft and Adjusting Nuts**

## 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.



**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

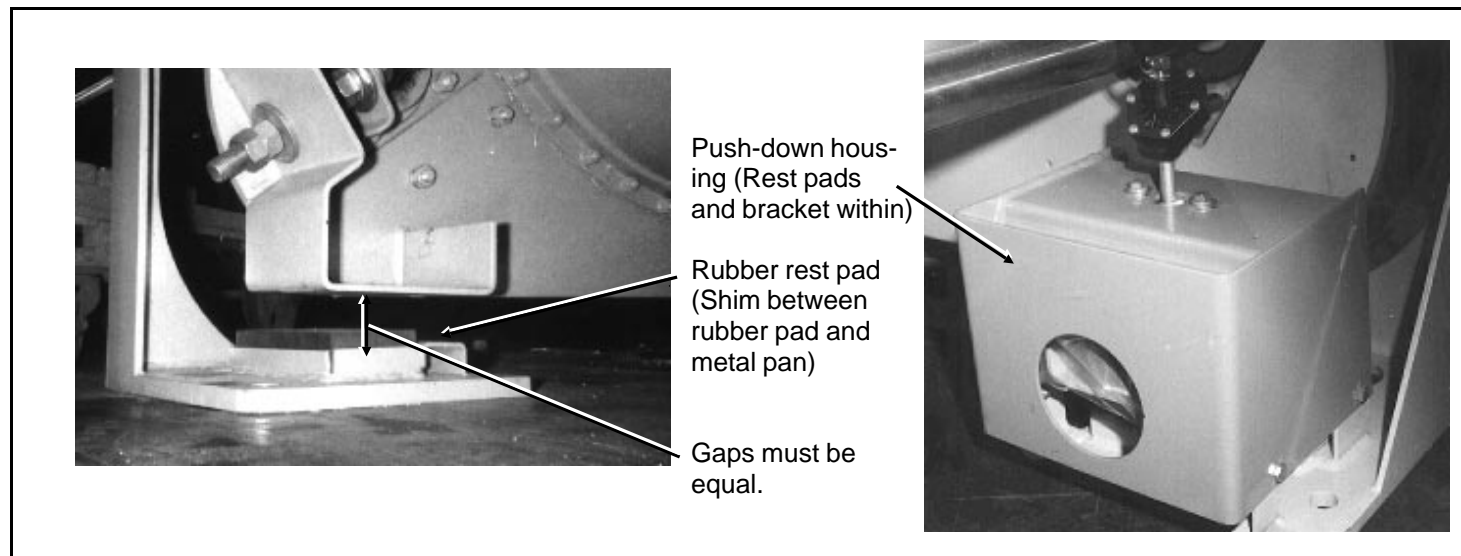
The push-down stops on these machines consist of brackets attached to the shell and rubber rest pads, mounted atop the base pads (see figures below) which make contact when the shell pushes down. The rubber rest pads sit in metal pans and are raised or lowered by adding metal shims to or removing the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

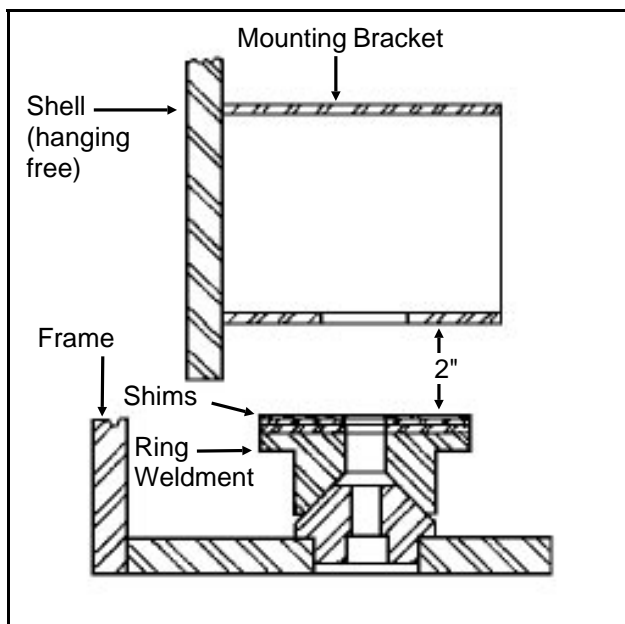
Make final adjustments as follows:

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.

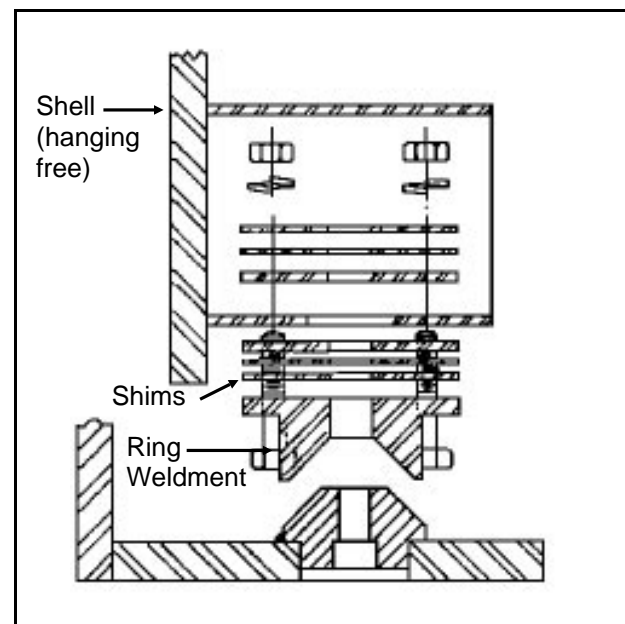
## 60" Divided Cylinder Machines

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.

## Hold Down Components

Figure 1: Hold Down Components

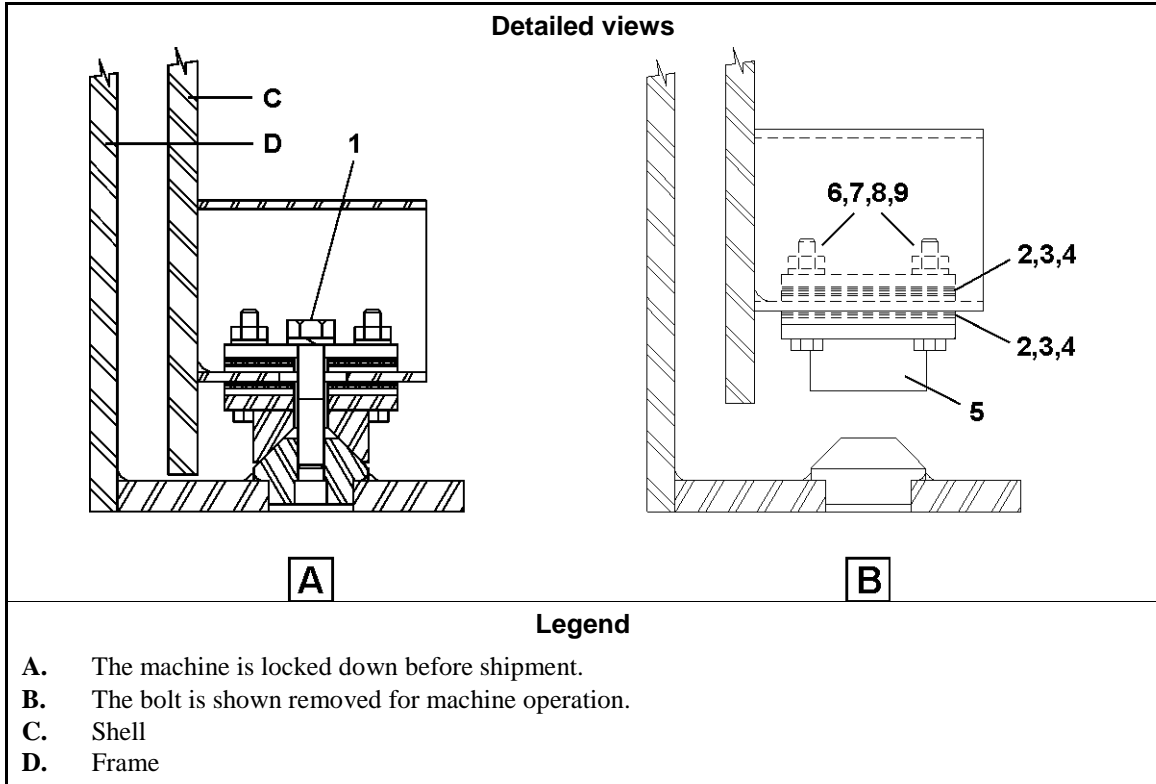


Table 1: Parts List— Hold Down Components

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	Item	Part Number	Description/Nomenclature	Comments
Assemblies				
	A	G28 17900	Installation Group, Hold down	
Components				
all	1	15K300	Bolt, 1-8X4.5	
all	2	03 06216A	Shim, 1/4"	
all	3	03 06216B	Shim, 10GA	
all	4	03 06216C	Shim, 16GA	
all	5	W3 06406	Holddown ring	
all	6	15K226K	Bolt, 5/8-11X3.5	
all	7	15U314	Washer, Flat, 5/8"	
all	8	15U315	Washer, Lock, 5/8"	
all	9	15G238	Nut, 5/8-11	

— End of BIHDBM15 —



# Suspension Cylinder Locations

Use with BMP701408

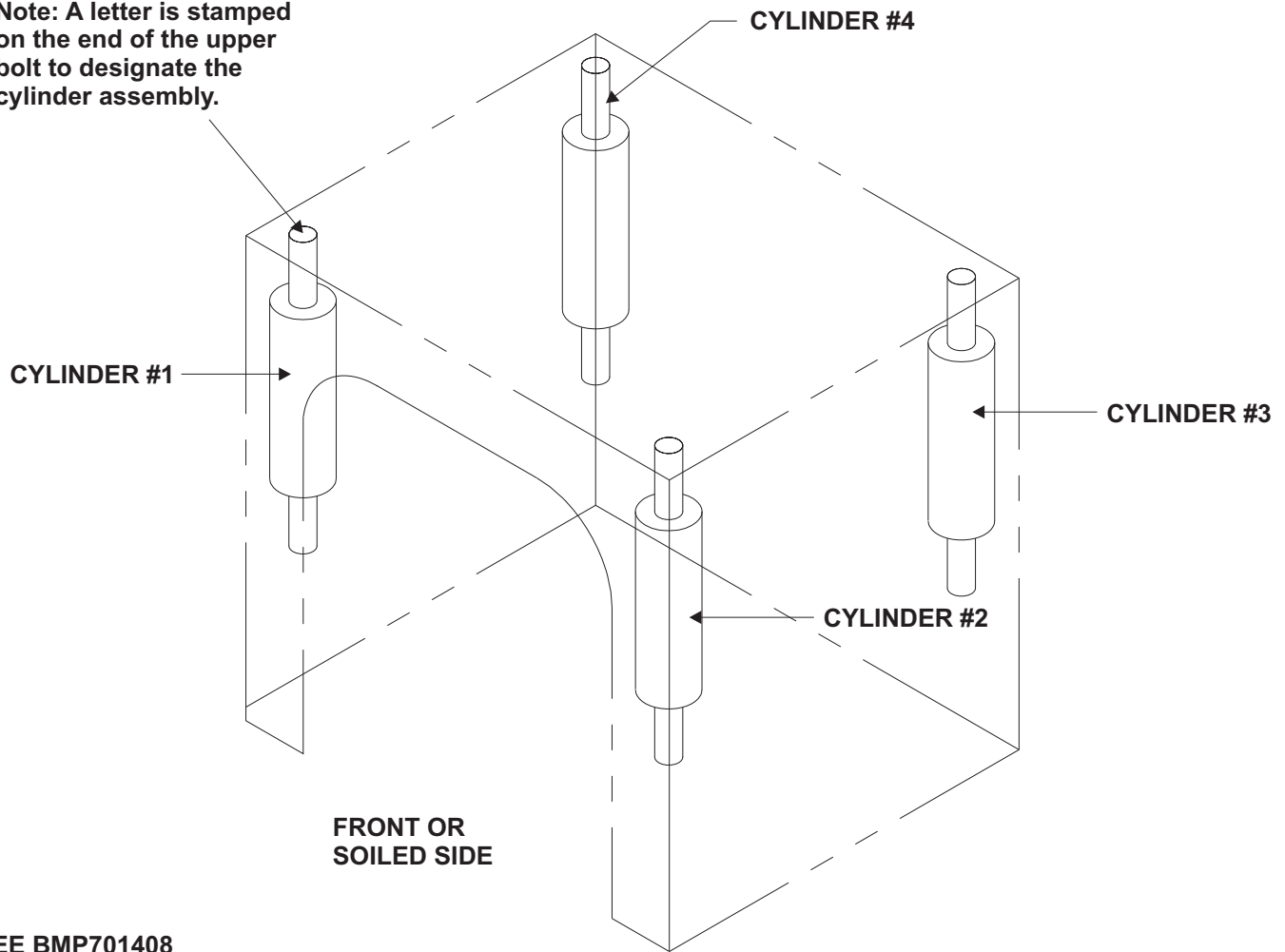
BMP701235/2017155A  
(Sheet 1 of 1)



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

Litho in U.S.A.

Note: A letter is stamped on the end of the upper bolt to designate the cylinder assembly.



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

	MACHINE MODELS:								
	42031 CP2.NP2 WP2,WP3	42031 SP2,SP3	42044 CP2.NP2 WP2,WP3 D7P	42044 SP2/3; SR2/3	42044 WP2 SM, WP3 SM WR2,WR3	52038 WTL,WTN WP1	60044 WP2/3 SM SP2/3 SM WR2/3 SR2/3	72044 WP2,WP3 DA1	72044 SP2,SP3 SR2/SR3
POSITION:									
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

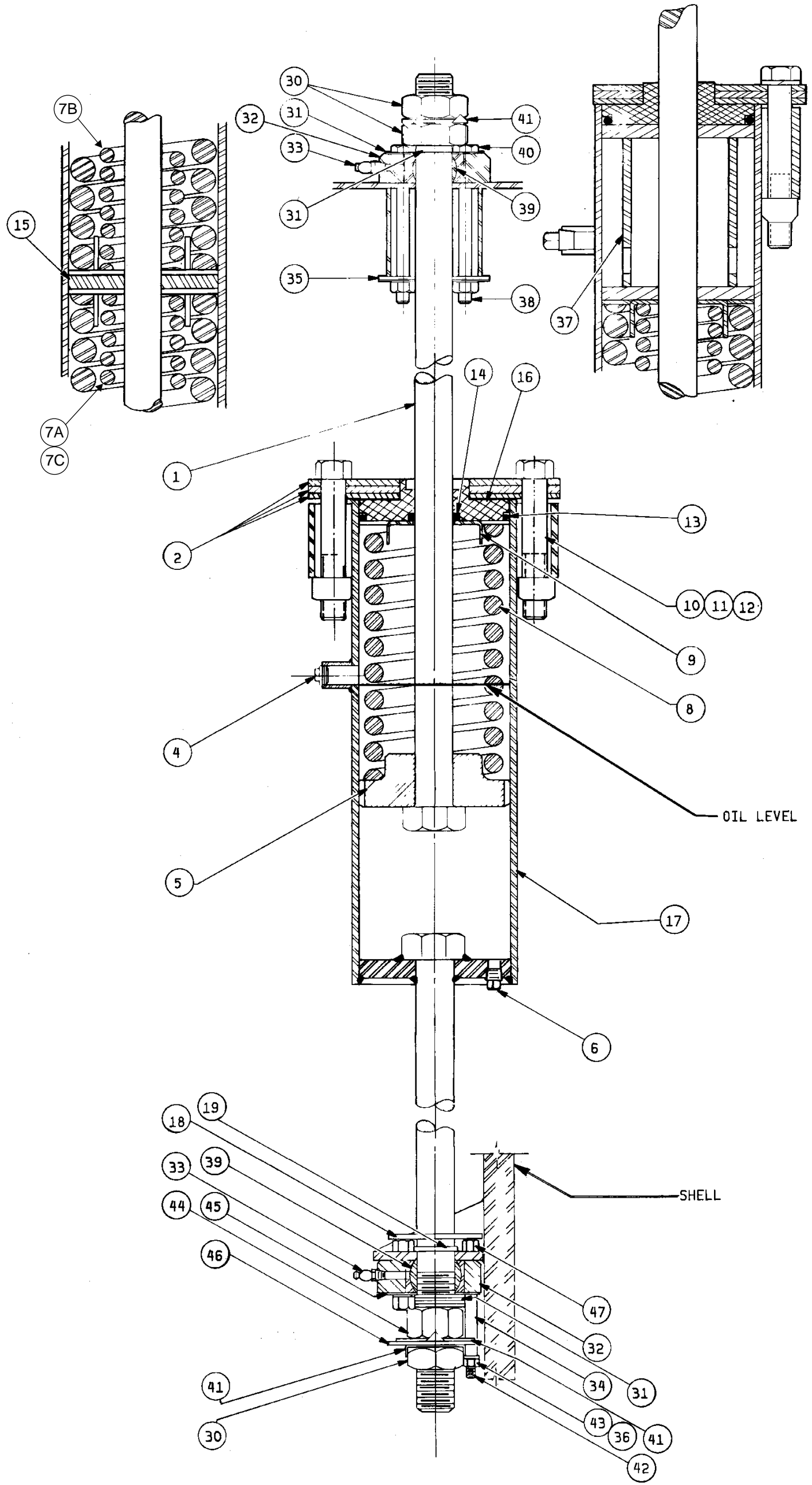
**Suspension Cylinder Assemblies**  
**42031,42044,52038,60044,72044**

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



BMP701408/2006275B  
 (Sheet 1 of 2)

Litho in U.S.A.



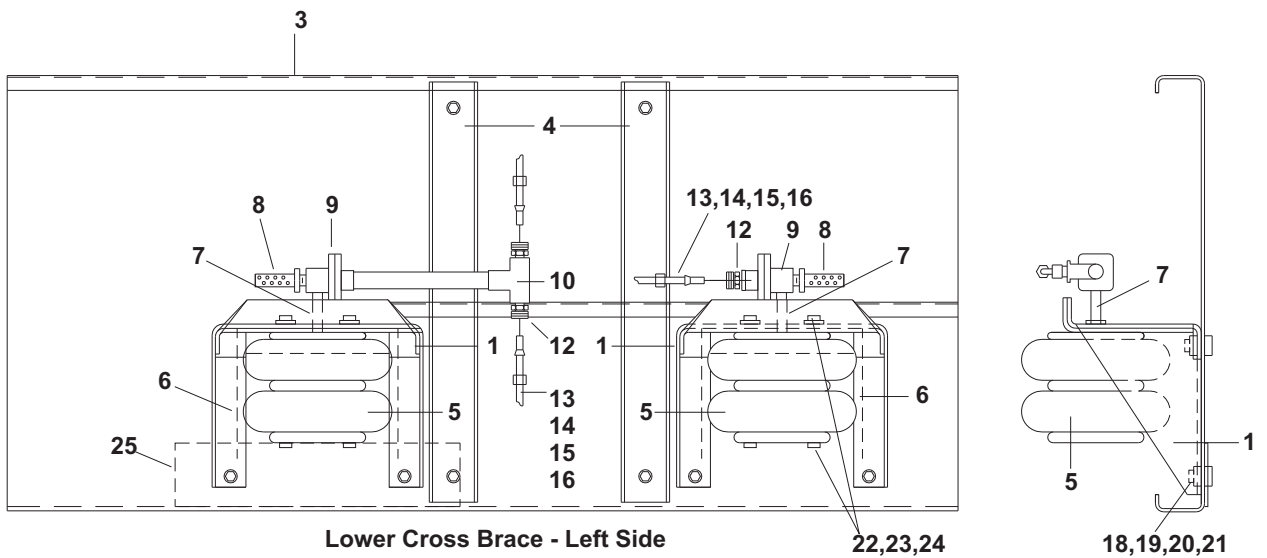
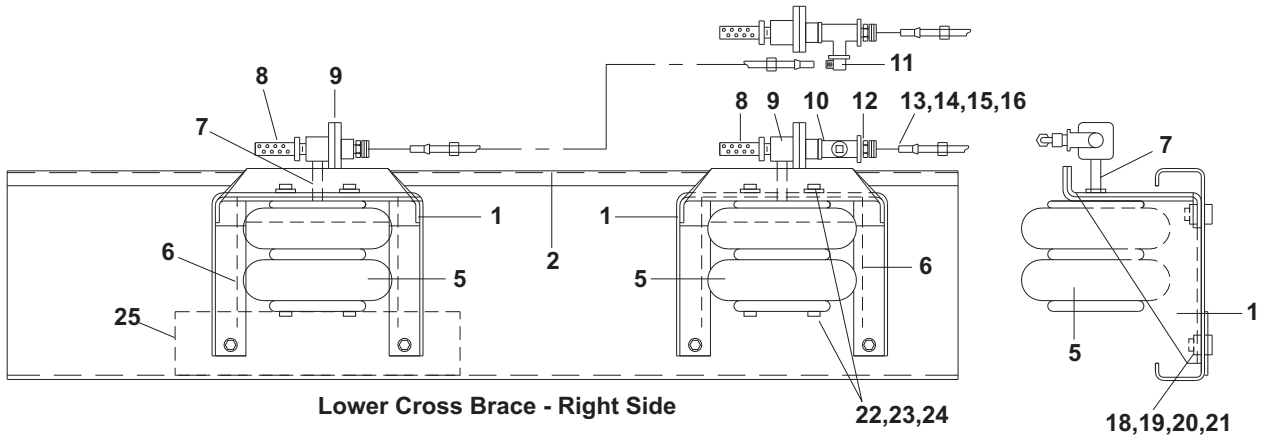
Used In		Item	Part Number	Description	Comments
<p><b>Parts List—Suspension Cylinder Assemblies</b> Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.</p>					
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"	CYLINDER ASSY K
<p>(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.)</p>					
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 1/2 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
ABCDK	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	ORING 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-BALBUSH-4/HYDRO MACH	
BDFGH	19	02 02230	6 WATER BARRIER (NEOPRENE)	
all	30	15G268	HXFJNMINUT 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	SPCROLL.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 8WEH ZINC	
all	42	15K202	HXCAPSCR 1/2-13UNC2AX5 GR5 ZIN	
all	43	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	44	15G231	HXFJNMINUT 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	

# Push Down

6044SP2, 6044SP3, 6044SR2, 6044SR3



# Push Down

6044SP2, 6044SP3, 6044SR2, 6044SR3

<b>Parts List—Push Down</b>				
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	G29 05200	XBRACE ASSY-LOWER RT 6044 SG	
	B	G29 05100M	XBRACE ASSY-LOW LF 6044SP213	
-----COMPONENTS-----				
all	1	W2 175087	*WLDMNT BRACKET-PUSH DOWN=TOP	
all	2	02 19149	XBRACE,LO-RT 6044W BEND@PRNT	
all	3	02 19148M	BRACE=LOW LF CROSS 6044SP2/3	
all	4	02 19246B	XBRACE-STIFFENER 6044WP2/WP3	
all	5	60B120	AIRMT S-20 2CONV F#W013586910	
all	6	69C050A	POLYETHYLENE BAG 9X6X13X.005	
all	7	5N0E02KG42	NPT NIP 1/4X2.5 TBEGALSTL SK40	
all	8	27A005	MUFFLER 3/8" BANTAM B38	
all	9	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	10	51V015	TEE 1/4 FGDBRASS 101T7-444	
all	11	53A040B	BODY=EL90MALE5/16X.25#B69A-5B	
all	12	53A020B	BODYMALECON5/16X.25COM#B68A-5B	
all	13	53A509	TUBE INSERT 5/16"OD X .53"LG.	
all	14	53A508	SLEEVE DELRIN 5/16"OD#60PT-5	
all	15	53A060A	NUT BRASS 5/16 COMP#61A-5	
all	16	60E005	TUBING BLK.POLY.5/160DX3/16ID	
all	18	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	19	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	20	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	
all	21	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	22	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	23	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	24	15K095	HXCPCSCR 3/8-16UNC2AX1 GR5 ZINC	
all	25	02 19149A	PLT REINFPSHDWN=60SP2+3	





# Shell, Cylinder, & Doors

5

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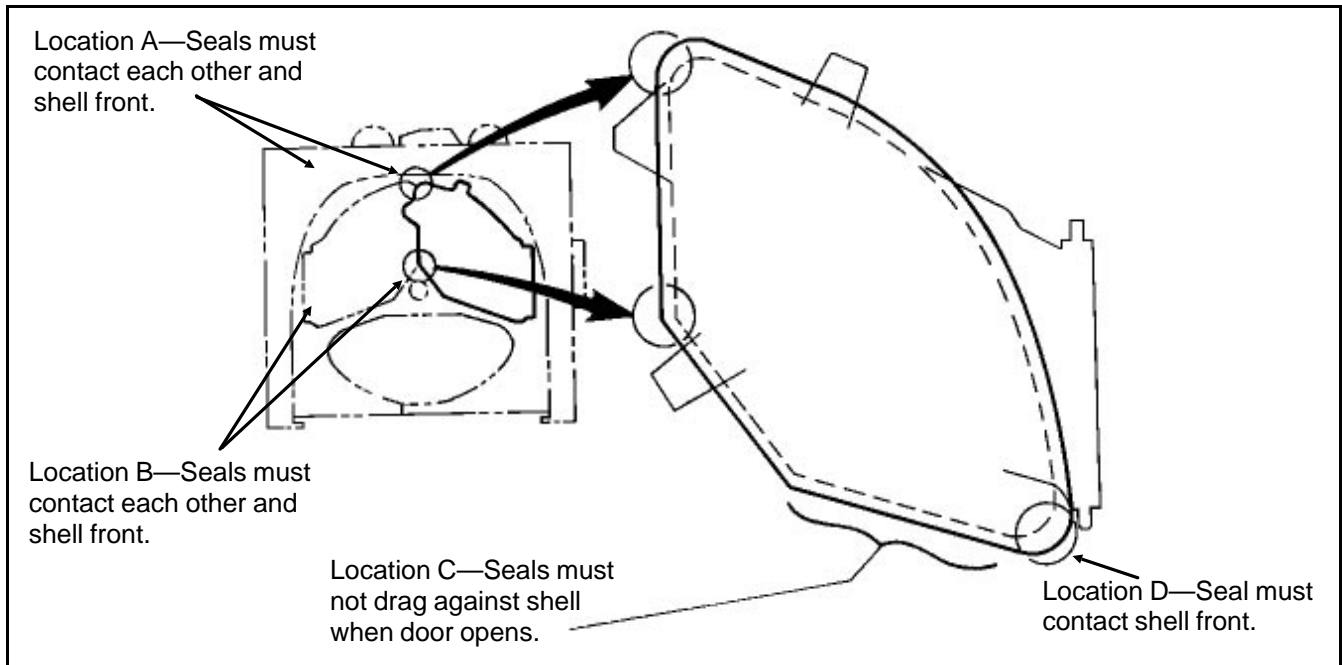
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## DOOR SEAL REPLACEMENT ON RAPID LOAD MODELS

### Door Seal Replacement

The seal components referred to herein are contained in kits K28 0005R (for 60" machines) or K36 0003R (for 72" machines).

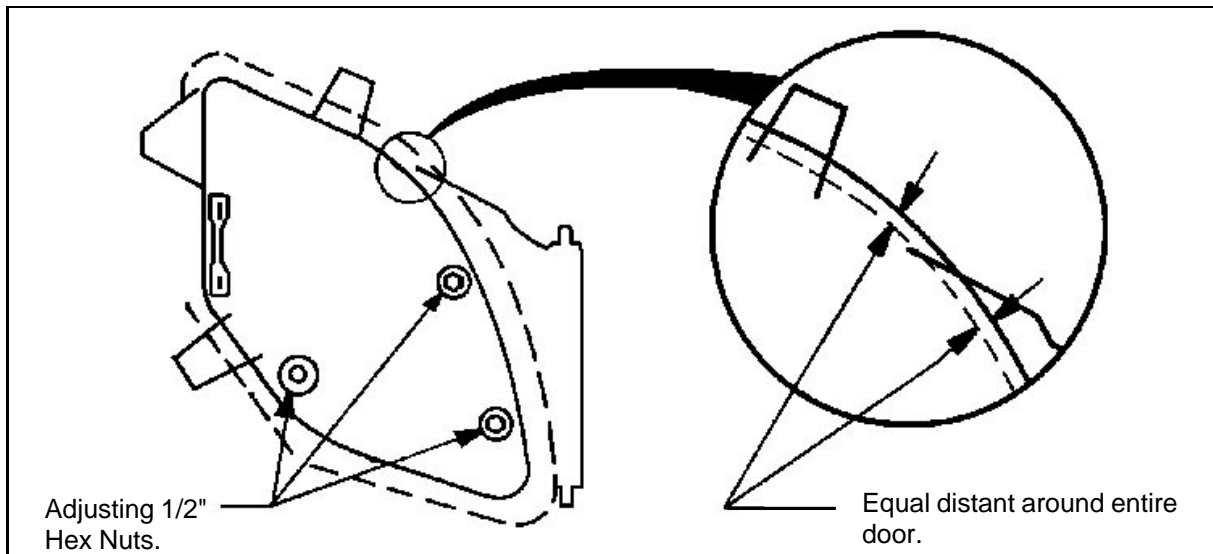
1. Remove old seal from the door cavity and carefully pull air tubing out of inner door so as not to cut tubing.
2. Remove as much as possible of the old adhesive from the rubber filler strip inside door cavity.
3. Carefully remove old seal from the air tubing fittings and attach new seal.
4. Carefully stretch new seal around door and into cavity. Because the new seal is fabric reinforced it is slightly narrower than the old style rubber seal; the wall is thinner and it does not stretch as easily. It will therefore feel much tighter than the all rubber seal when stretching it over the edge of the door.
5. After new seal is fitted and aligned into the door cavity, close both doors and inflate. Check to see that seals contact each other along the seam between the doors and that the seal contacts the shell front all around. To check this, attempt to slide a piece of paper between these surfaces.
6. If the seal does not contact the shell at locations A or D (see FIGURE 1), open the doors and stretch the seal toward these points.
7. If seals do not contact each other or the shell front in other areas, install rubber shims (part number 02 175267) between seal and filler strip as required to bring the seal further out from the door. Use adhesive (part number 20C015A) to attach shims to filler strip.
8. If seals do not contact each other at locations A and B, (see FIGURE 1), then at these points, glue tapered patches (part number 02 175134), as required, to the outside of seal (using adhesive 20C080C) to add thickness.
9. After seal has been completely fitted, roll seal up on one side, and with a small brush, paint adhesive (part number 20C015A) on filler strip to hold seal in place.



**FIGURE 1** (MSSMA413AE)  
**Door Seal Checks**

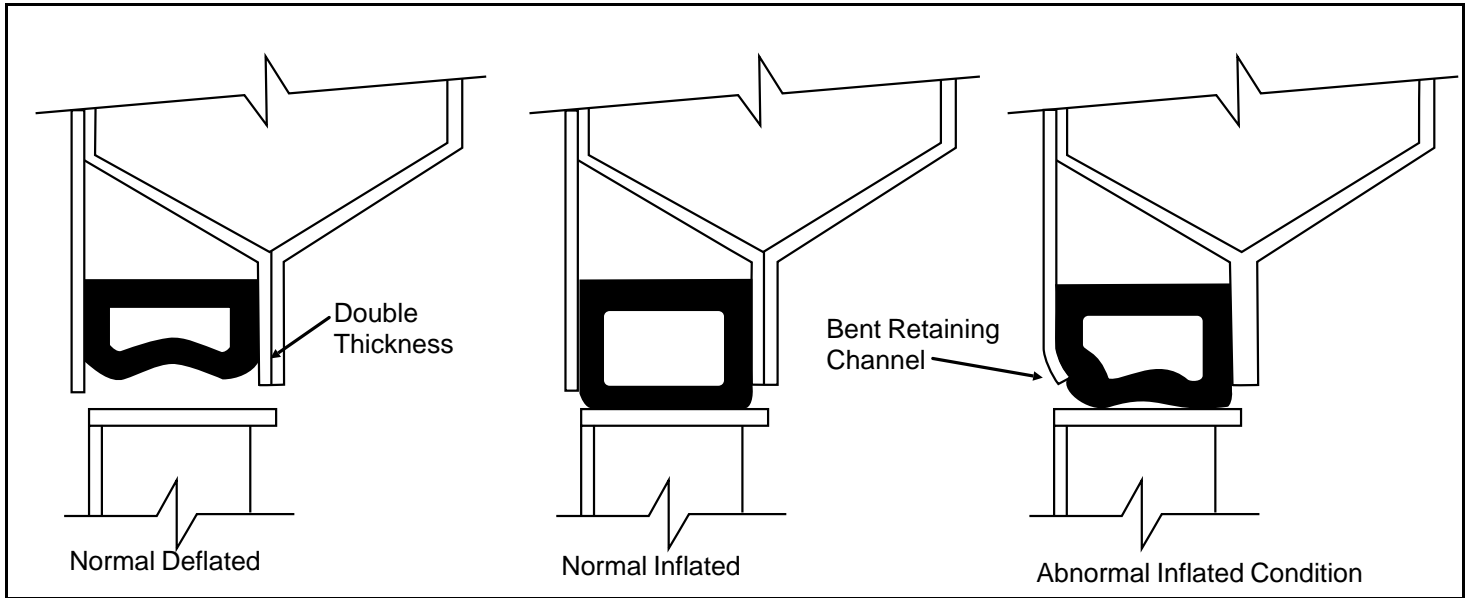
## Door Seal—Preventive Maintenance

**Check Door Alignment About the Shell Opening**—Each door must be centered in its respective shell front opening. If the doors are not centered, the inflatable door seals will drag on the sealing edge of the shell front as the doors are opened and closed. The doors can be moved in any direction for centering by loosening the 1/2" hex cap nuts which hold the door assembly to the hinge cross brace as shown below.



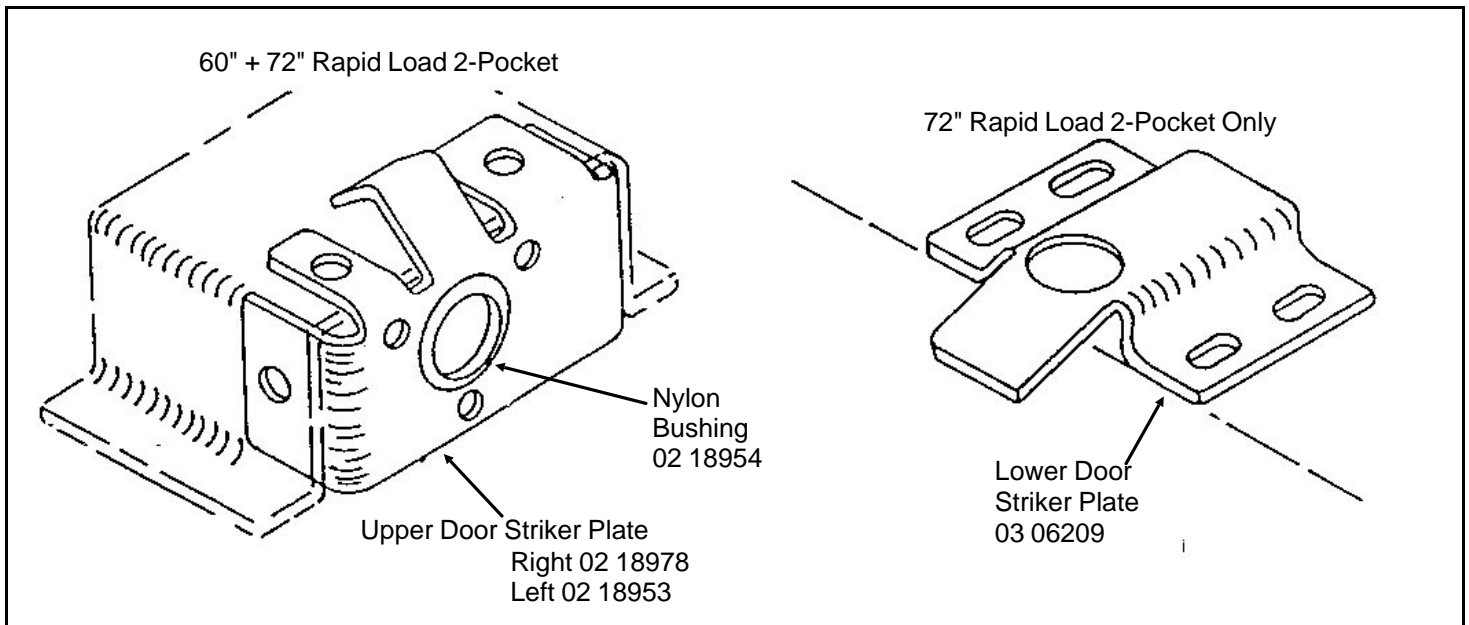
**FIGURE 2** (MSSMA413AE)  
**Door Alignments**

**Check Condition of Door Seal Channel**—Be certain the sides of the channel in which the door seal fits are straight and that mainly the inner edge is not bent. See FIGURE 3 below. Because outer edge is double thickness it is not likely to be bent out of shape. But it is possible for the inner edge to become bent as shown.



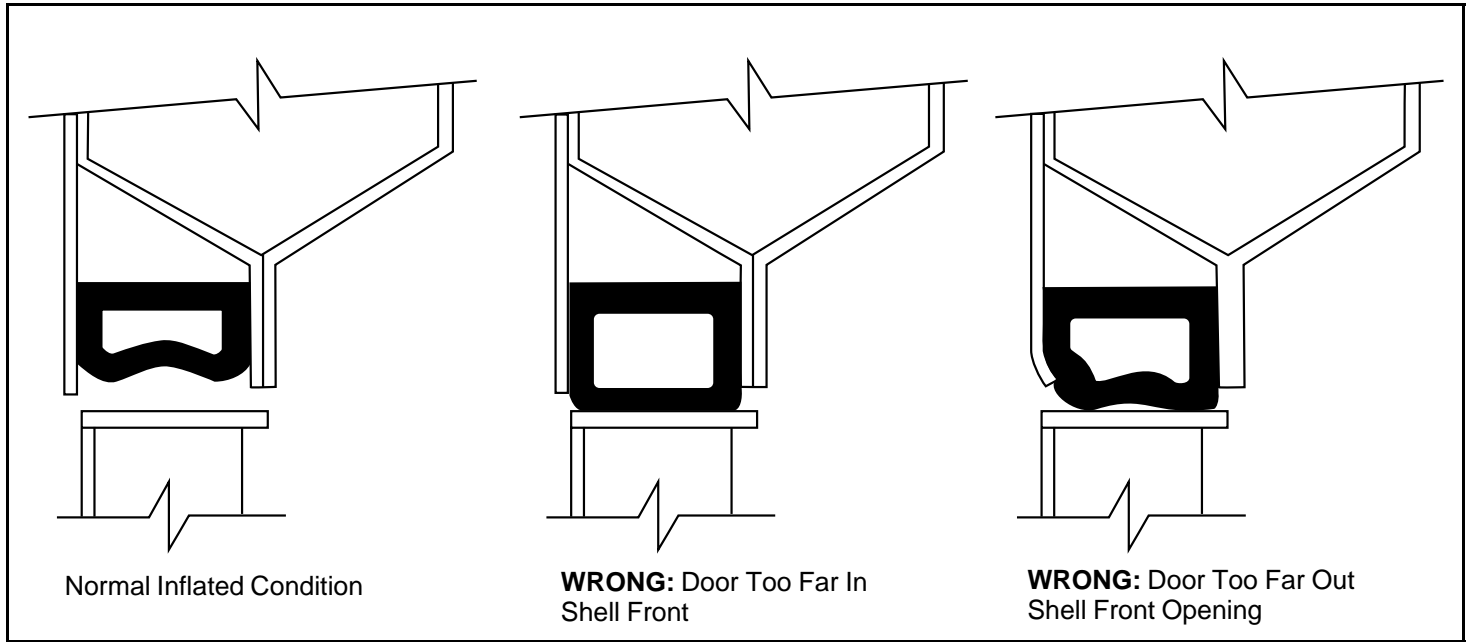
**FIGURE 3** (MSSMA413AE)  
**Door Alignment**

**Replace Worn Striker Plates**—Each of the outer doors are securely held in the closed position by air latches. These air latches snap into striker plates bolted to the shell front. If the hole in these striker plates becomes worn, the shell doors will be allowed to move while the machine is in operation. It will look as though the doors are “breathing.” This will cause rapid wear and premature seal failure. Striker plate components are shown below.



**FIGURE 4** (MSSMA413AE)  
**Worn Striker Plate**

**Check Door Alignment In and Out**—Misalignment of the doors in and out of the shell front opening can be most often attributed to worn striker plates as described above. The doors should be adjusted so that, with one door open and one door closed, the closed door's inflatable seal channel will be centered on the shell front sealing surface when viewed edgewise (see FIGURE 5). If the door latch mechanism is loose, worn, or mismatched the door can travel too far into the machine, with the result that the inflatable seal can protrude past the door channel and the shell front sealing surface and be scissored when the door is reopened.



**FIGURE 5** (MSSMA413AE)  
**Door Seals**

**Check Seal Air Pressure**—Air pressure on these inflatable door seals should be set and maintained at 25 to 28 PSI. Too high air pressure will cause blowouts and too low air pressure will cause not enough contact between seal and shell front, thus movement and rapid wear. Kit K28 0011, which contains a fixed at 25 to 28 PSI regulator, plus a pressure gauge is available from the Milnor<sup>®</sup> factory. If yours is inoperative, it should be replaced.

**Check Door Bumper**—Be sure large rubber bumper (part number 60C075) on right hand door is in place and not worn.

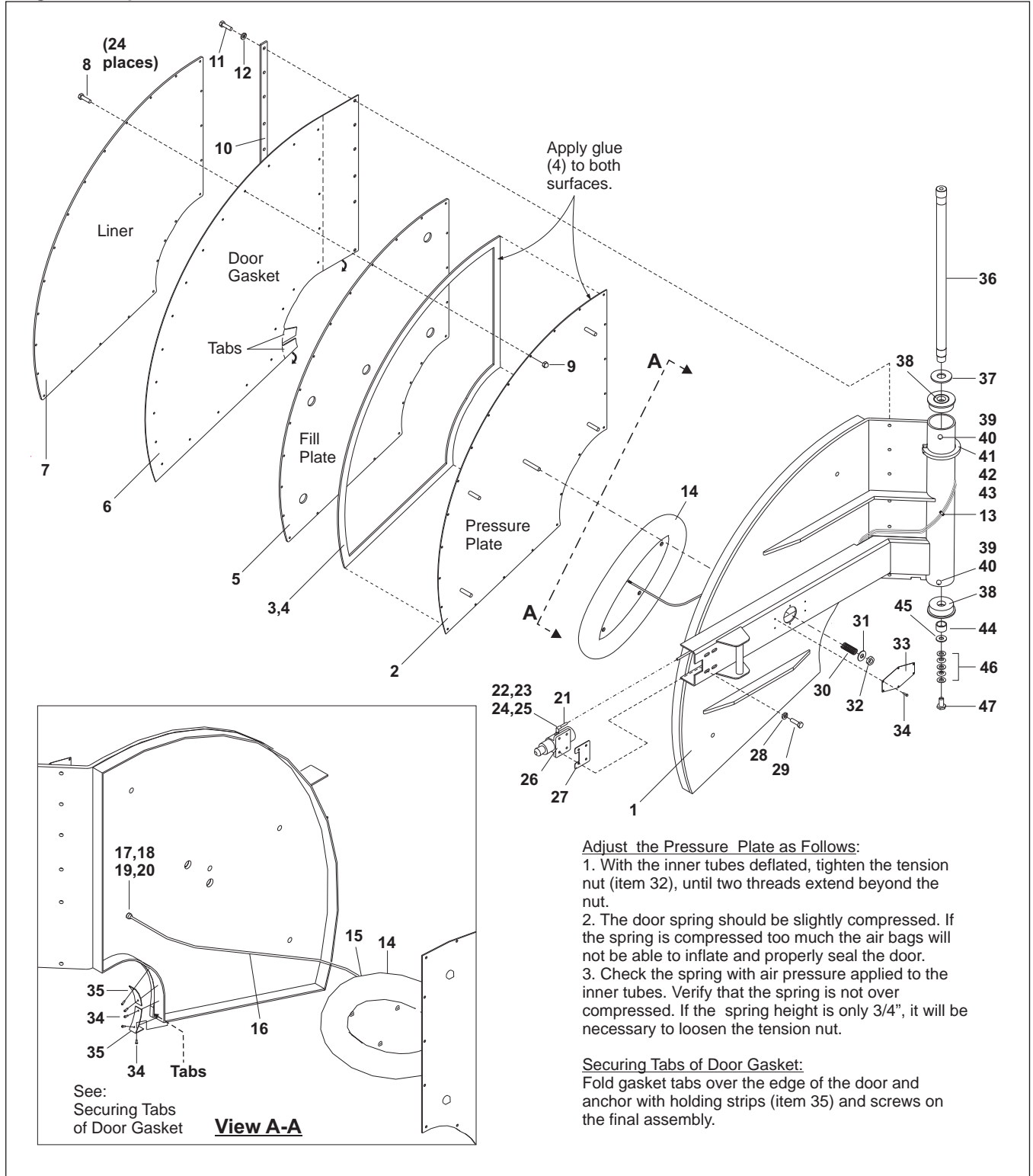
## Seal Vacuum Pump Feature

Since approximately June of 1980, all production machines have a vacuum pump which delays the opening of the door by 7.5 seconds and during that time literally sucks the air from the inflatable door seal. This is the single greatest extender of the life of the inflatable door seal. This feature is retrofitable to all 60" and 72" WE2 machines manufactured prior to June 1980. Order retrofit kit, part number K28 0013.

# Shell Doors

60044SR2, 60044SR3, 6044WR3

Figure 1: Exploded Views





# Shell Doors

60044SR2, 60044SR3, 6044WR3

<b>Parts List—Shell Door</b>				
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
-----REFERENCE ASSEMBLIES-----				
	A	SA 28 118	*SHELL DOOR ASY 60SG2 SOIL	6044SR2 SOIL SIDE
	B	SA 28 117	*SHELL DOOR ASY 60SG2 CLEAN	6044SR2 CLEAN SIDE
	C	SA 28 043	SHELLDOOR ASSY 60"SG3SOIL	6044SR3 SOIL SIDE
	D	SA 28 044	SHELL DOOR ASY 60SG3 CLEAN	6044SR3 CLEAN SIDE
	E	SA 28 017	SHELLDOOR ASSY 60"WE3	6044WR3
	F	SA 28 172	LINER ASSY SHELLDOOR 60SGD SS	A
	G	SA 28 171	LINER ASSY SHELLDOOR 60SGD CS	B
	H	SA 28 159	LINER ASSY=SHELLDOOR=WEH+SGH	CE
	J	SA 28 160	LINER ASSY=SHELLDOOR=SGH-CS	D
-----COMPONENTS-----				
A	1	W2 18846	* SHELDR WELD 60SG2 SOILSIDE	SR2
B	1	W2 18847	* SHELDR WELD 60SG2 CLEANSID	SR2
C	1	W2 18316	SHELDR WELD 60SG3 SOILSIDE	SR3
D	1	W2 18319	SHELDR WELD 60SG3 CLEANSID	SR3
E	1	W2 18143	SHELLDOOR WELDMT 60WE3 ONLY	WR3
F	2	W2 18861C	PRESSPLT WELD SHELDR 60SGD SS	
G	2	W2 18861E	PRESSPLT WELD SHELDR 60SGD CS	
H	2	W2 18152A	PRESPLT WELD=SHLDR60SG3SS+WE	
J	2	W2 18152B	PRESSPLT WELD=SHLDR60SG3 CS	
all	3	60A006P	PORON STRIP .25X1 1/4# W E=FT	
all	4	20C044	RUB/GASKET ADH 3M#EC1300 PINTS	
FG	5	02 18860A	FILLER=PLATE SHELLDOOR SGD	
HJ	5	X2 18367	PLATE=DOOR FILLER	
FG	6	02 175180	GASKET=SHELLDOOR 2/60SGD	
HJ	6	02 175169	GASKET=SHELLDOOR 1/WE3	
F	7	02 18862A	LINER=SHELL DOOR RT 60SGD	
G	7	02 18862B	LINER=SHELL DOOR LT 60SGD	
HJ	7	02 18150	LINER=DOOR BACK	
all	8	15K039A	BUTSOKCPSCR 1/4-20X7/8 SS 18-8	
all	9	15G164	HX THIN LOCKNUT NYL1/4-20 SS	
all	10	02 175149	STRIP=RUBBER DOOR GASKET-SG	
all	11	15N174	HXCAPSCR 1/4-20UNC X5/8SS18-8	
all	12	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
All	13	12P016	CABLE CLMP-BLACK UL APPROVED	
ACE	14	02 18982G	DOORTUBE-60WEHU-PRES.TUB	SOIL SIDE AND WP3
BD	14	02 18981G	DOOR TUBE-60SGH-PRES.TUBE E	CLEAN SIDE
all	15	02 18181	FITTING-BRASS FOR INNER TUBE	
all	16	60E005	TUBING BLK.POLY.5/160DX3/16ID	
All	17	53A040B	BODY=EL90MALE5/16X.25#B69A-5B	
all	18	53A060A	NUT BRASS 5/16 COMP#61A-5	
all	19	53A060	SLEEVE 5/16 COMP IMP#60-F	

# Shell Doors

60044SR2, 60044SR3, 6044WR3

### Parts List—Shell Door

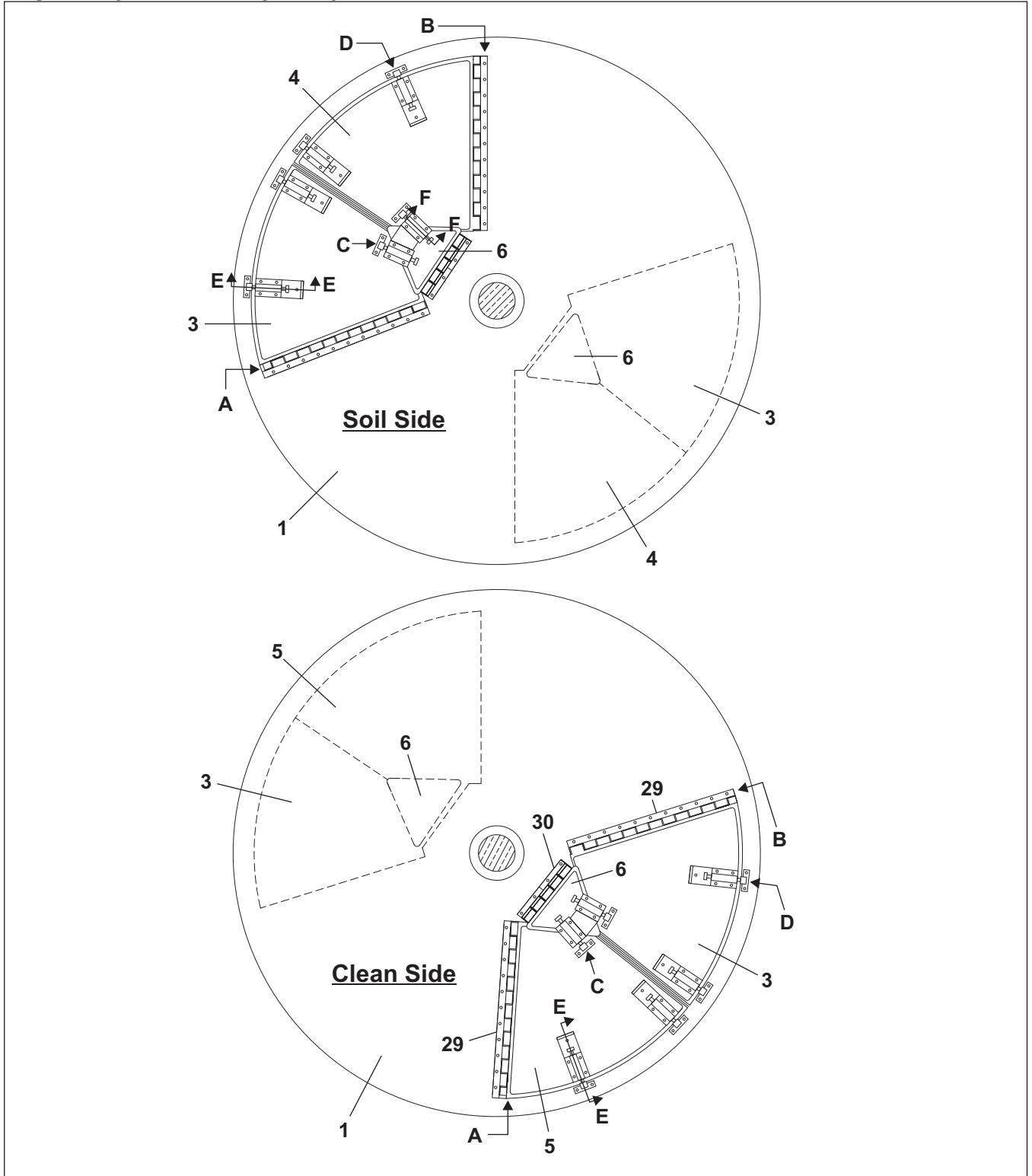
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
all	20	53A509	TUBE INSERT 5/16"OD X .53"LG.	
all	21	60E004TE	1/4"OD X.170"ID NYL(BLK)TUBING	
all	22	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	23	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
All	24	53A501	TUBE INSERT .163"OD #63PT-4-40	
All	25	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
all	26	SA 15 028	* DOOR LATCH ASSY-DIVCYLS	
all	27	02 15633S	ADJPLATE=DOORLATCH SS	
all	28	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	29	15K085	HEXCAPSCR 3/8-16UNC2AX3/4 GR5	
all	30	02 18187	SPRING=OUTER DOOR 60 WEHU	
all	31	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	32	15G234	LOKNUT 1/2-13NC CAD FLXLOC#21F	
all	33	01 10020	NPLT SMALL "MILNOR" LOGO	
all	34	15P010	TRDCUT PHILPANHDSCR 10-24X1/2S	
all	35	02 175231	PLATE=SHELL DOOR GASKET	
all	36	03 06145	HINGE PIN 60 SG2,SG3,WE2&WE3	
all	37	03 06136	WASHER,BRG BACKUP 72SG	
all	38	54A974975	TIM #L68111/L68149-1.3775"BORE	
all	39	X3 06146	BEARING ADAPTER 60&72 SG DR.	
all	40	54M021	GRSFIT 1/8PIPE X 1/4STR 1607-B	
E	40	54M015	GREASEFIT 60X36/60X44 1610BL	
all	41	54JH15500A	HINGE COL SPLIT 5.50 FL TOP	
all	42	15K045E	SKCPSCR 1/4-20X2 BLK	
all	43	15Q091	SOKSETSCR CUP1/4-20X5/8BLK	
AB	44	03 06132	BUSHING,HINGE PIN 60&72 SG	2 POCKET SR2
CDE	44	03 06148	BUSHING,HINGE PIN 60 SG3PWE3	3 POCKET WR3,SR3
all	45	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	46	15U521	SPRINGWSHR.630ID 1.250D.051T	
all	47	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	
E	47	51P034	SCREWSOCSET 5/8-11X5/8 PLASTIC	

# Cylinder Assembly and Cylinder Door Installation

6044SR2, 7244SR2

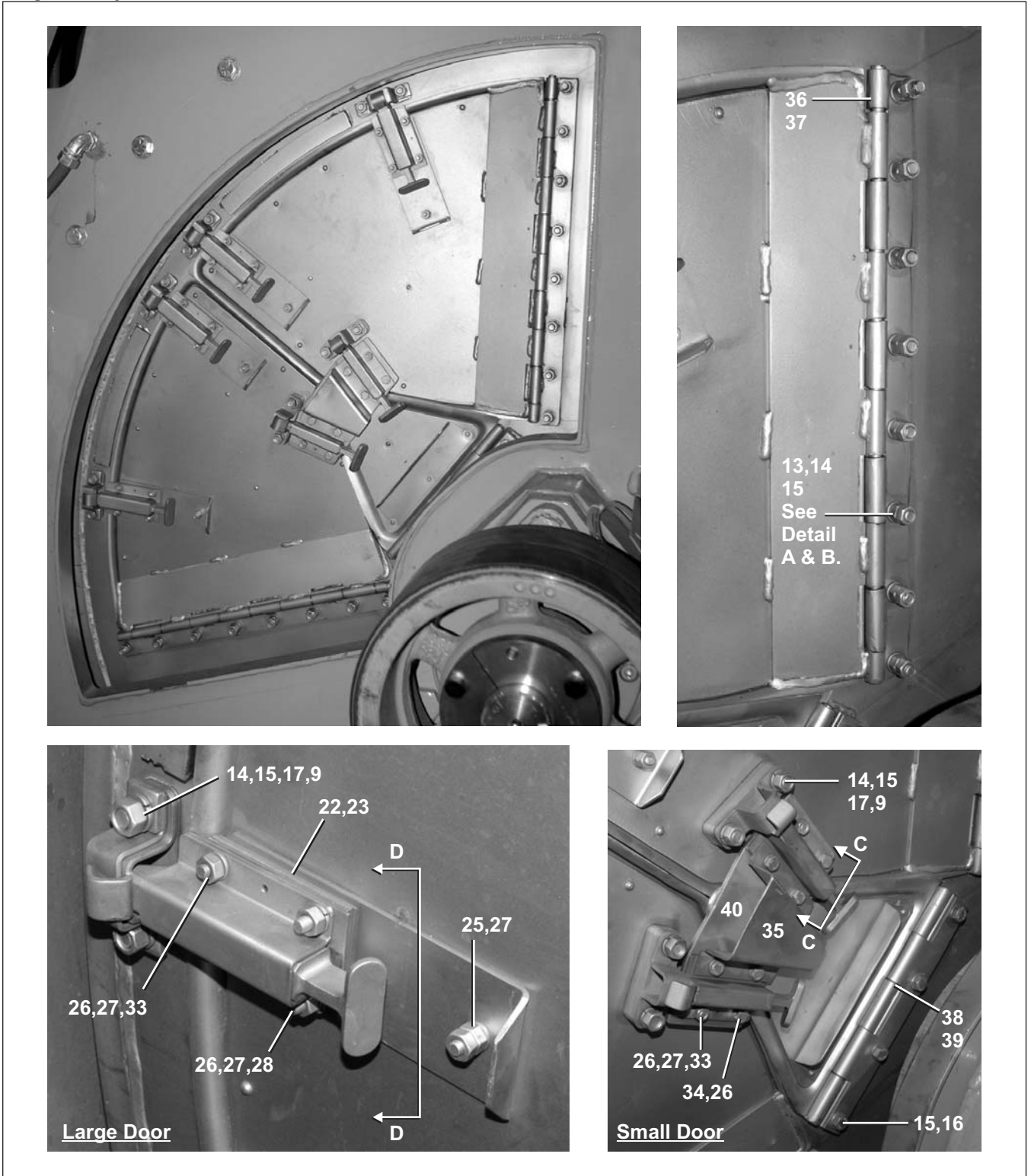
Figure 1: Cylinder Assembly and Cylinder Door Installation



# Cylinder Assembly and Cylinder Door Installation

6044SR2, 7244SR2

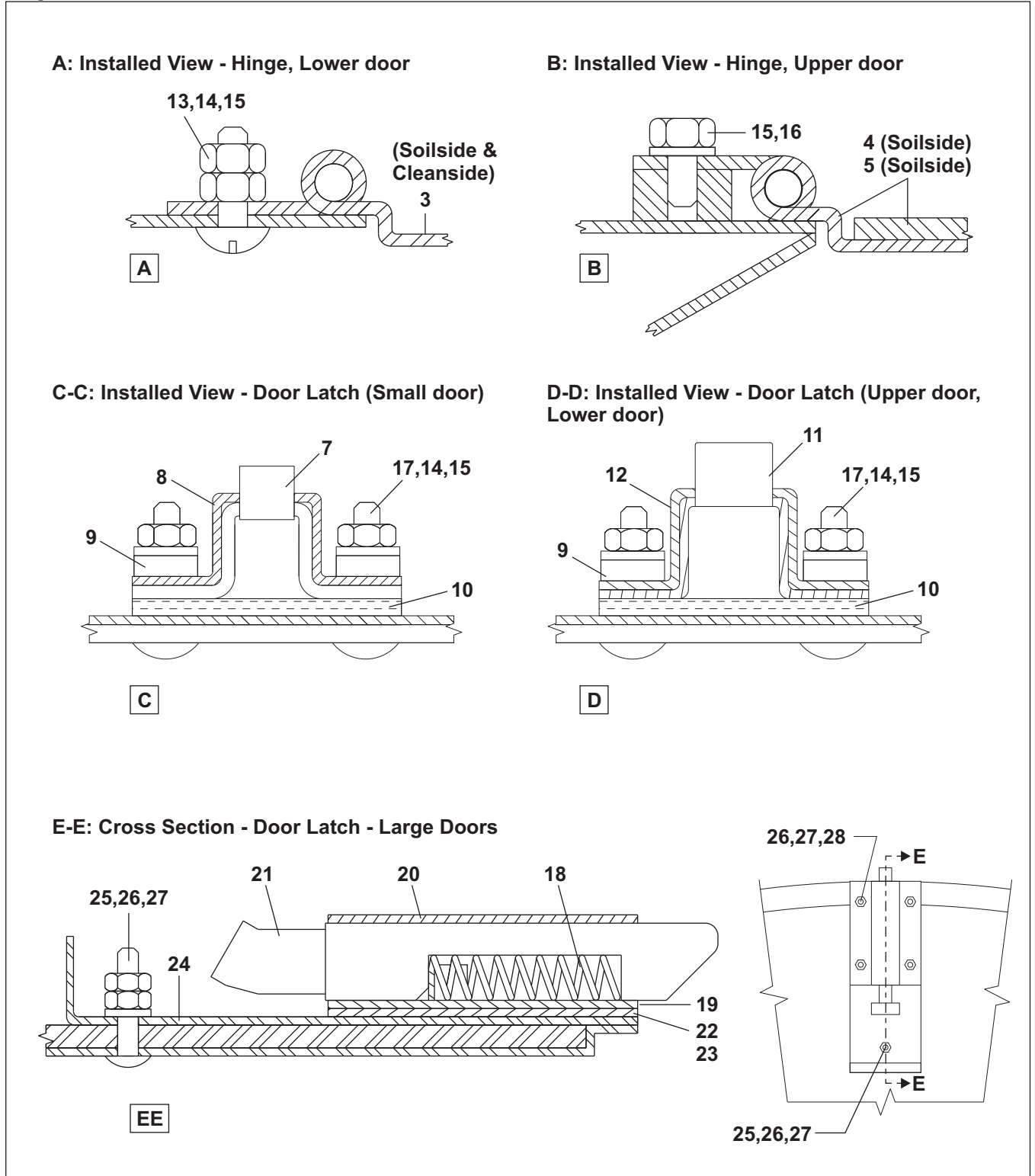
Figure 2: Cylinder Doors Installed



# Cylinder Assembly and Cylinder Door Installation

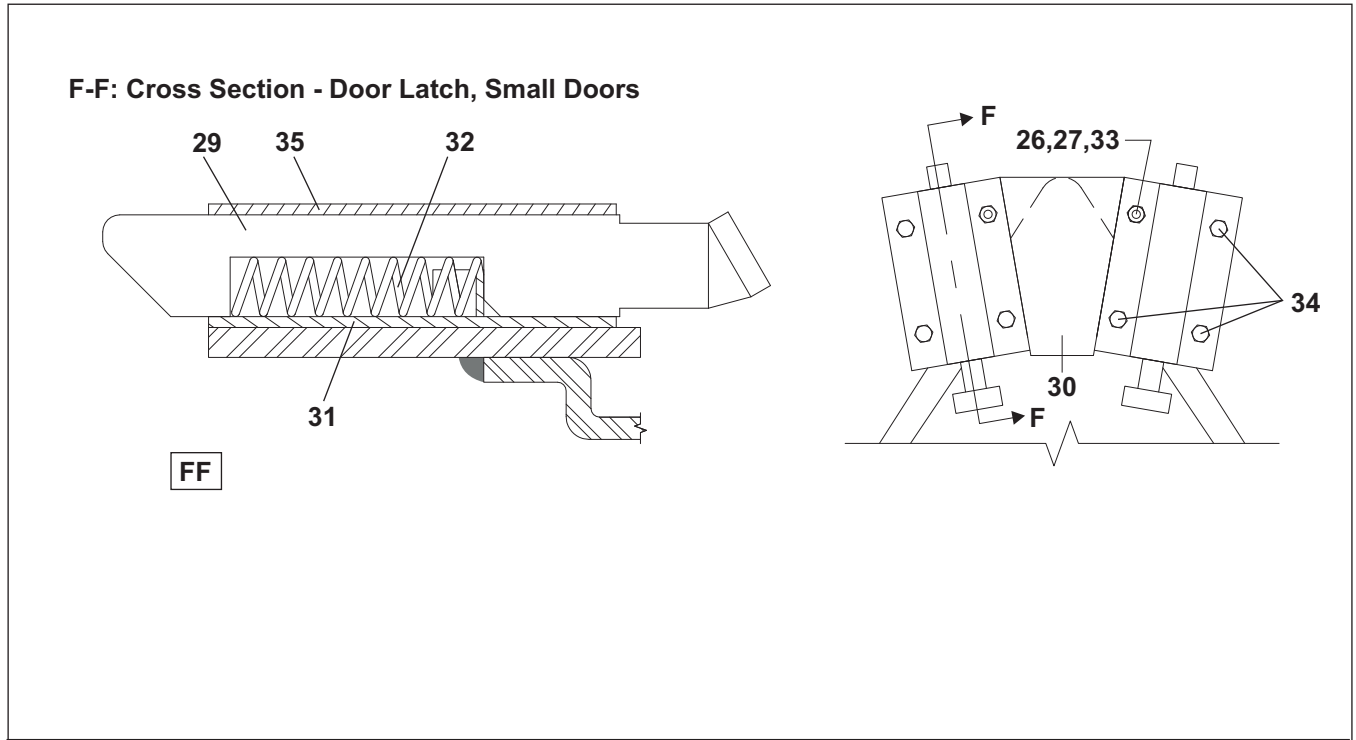
6044SR2, 7244SR2

Figure 3: Detail Views



# Cylinder Assembly and Cylinder Door Installation

6044SR2, 7244SR2



### Parts List—Cylinder Assembly and Cylinder Door

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 B	REFERENCE REFERENCE		6044SR2 7244SR2
-----COMPONENTS-----				
A	1	ACA19SG2A	CYL ASSY=6044SG2 WELD/SHAFT	
B	1	ACA36SG2A	CYL ASSY=7244SG2 WELD/SHAFT	
A	3	SA 28 110	CYLDOOR LOLT 60WE2+ MIN-REIF	
B	3	SA 36 003	CYLDOOR LOLT 72WE2+ MAX-REIF	
A	4	SA 28 111	CYLDOOR UPLT 60WE2+ MIN-REIF	
B	4	SA 36 004	CYLDOOR UPLT 72WE2+ MAX-REIF	
A	5	SA 28 112	CYLDOOR LORT 60WE2+ MIN-REIF	
B	5	SA 36 001	CYLDOOR LORT 72WE2+ MAX-REIF	
all	6	SA 28 116	CYLDOR ASY,SMALL =60+72SG2	
A	7	X3 06166	KEEPER=CYL DOOR LATCH(MONEL)	
B	7	X2 15201	KEEPER=CYLDOOR LATCH(MONEL)	
all	8	02 19183	COVER-DOORLATCH KEEP-OURMATL	
all	9	03 06174	KEEPER=DOORLATCH REINFORCE	
all	10	02 18977A	SHIM=CYL DRLATCH KEEPER-11GA	
all	10	02 18977B	SHIM=CYL DRLATCH KEEPER-14GA	
all	10	02 18977C	SHIM=CYL DRLATCH KEEPER-18GA	
all	11	X3 06166	KEEPER=CYL DOOR LATCH(MONEL)	

# Cylinder Assembly and Cylinder Door Installation

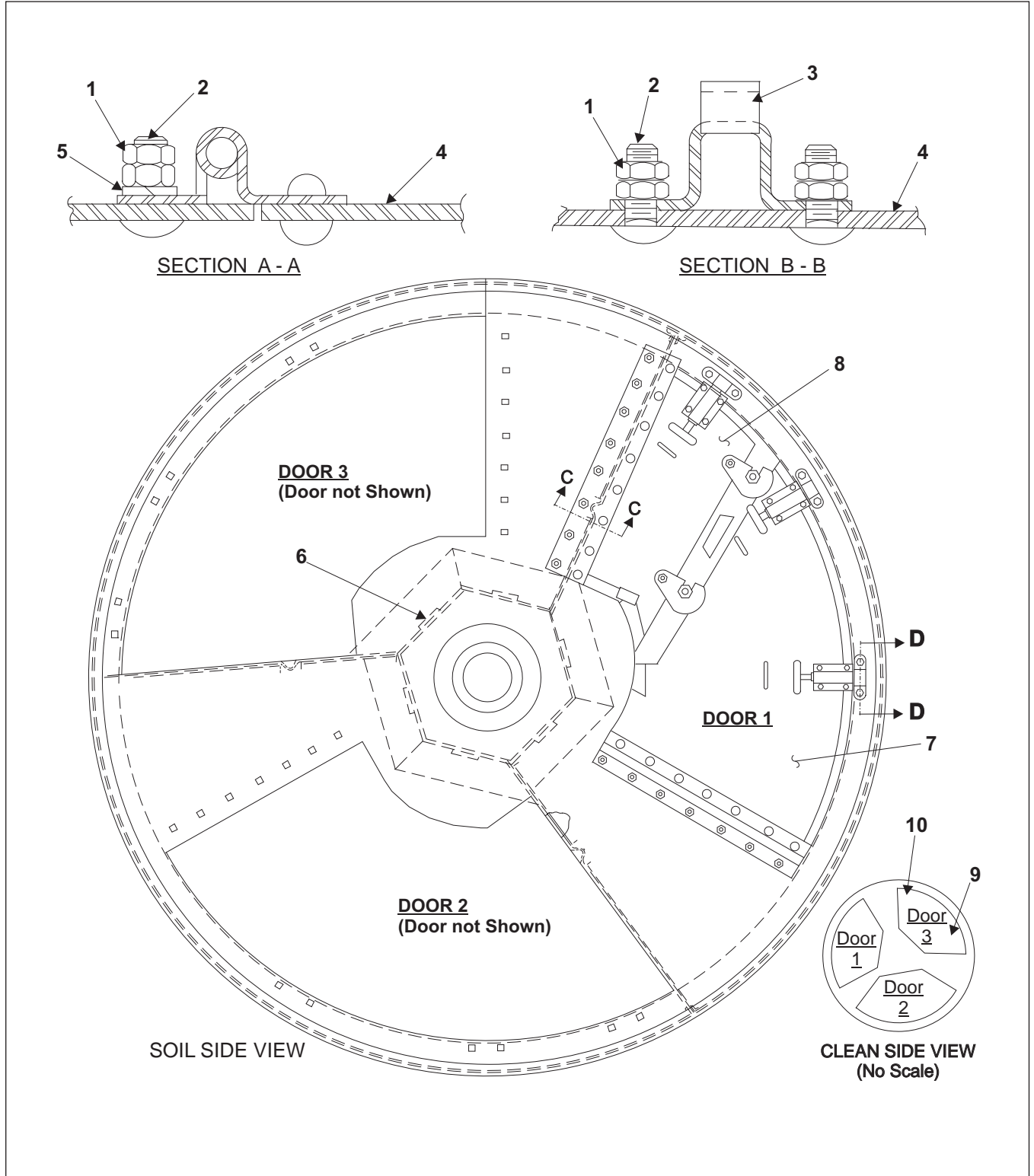
6044SR2, 7244SR2

<b>Parts List—Cylinder Assembly &amp; Cylinder Doors</b>				
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
all	12	03 06167	COVER-LARGE CYLDOOR KEEPER	
all	13	15A015	CARRSCR 3/8-16X1+1/4 18-8 SS	
all	14	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
all	15	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	16	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	17	15K106E	BUTSOKCAPSCR 3/8-16NCX1+1/2 SS	
all	18	03 06156	SPRING=LARGE CYLDOOR LATCH	
all	19	X3 06152	PLATE = LARGE DOORLATCH	
all	20	03 06151	LATCHBODY-LARGE=CYLDOOR	
all	21	X3 06150	PLUNGER=LARGE CYLDOOR(CAST)	
all	22	03 06172	SHIM=DOOR LATCH-18GA	
all	23	03 06173A	SHIM=DOOR LATCH-11GA	
all	24	02 18869	SPACER-LATCH PULL BND@PRNT	
all	25	15K042	BUTSOKCAPSCR 1/4-20NCX1 SS18-8	
all	26	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	27	15G170	HEXNUT 1/4-20UNC2 SS18-8	
all	28	15K042K	BUTSOKCAPSCR 1/4-20UNCX1+1/4 S	
all	29	02 15040	PLUNGER=CYLDOOR LATCH(CAST)	
all	30	02 15041	BODY=CYLDOOR LATCH	
all	31	02 15077	PLATE = SMALL DOORLATCH	
all	32	02 15093	SPRING=DOOR LATCH 9.4#/INCH	
all	33	15N173	FLATMACSCR 1/4-20NCX5/8SS18-8	
all	34	15N158	HEXCAPSCR 1/4-20NCX1/2SS18-8	
all	35	02 18990	PLATE=STOP + COVER 2/60+72WD	
all	36	02 18864	PIN=LG CYL DOOR HINGE	LARGE PIN
all	37	W2 18855	WLMT=HINGE LRG CYL DR MULT	USED WITH ITEMS 3 & 5
all	37	W2 18866	WLMT=HINGE LRG CYL DR 2/60WE	USED WITH ITEM 4
all	38	02 18865	PIN=SM CYL DOOR HINGE	SMALL PIN
all	39	02 18858	HALFHINGE=60"WED CYLDOR SMAL	
all	40	02 18989	PLATE-LATCH MTG2/WED+2/SGD	



# Cylinder Door Installation

6044WP3/SP3, 6044WR3, 6044SR3



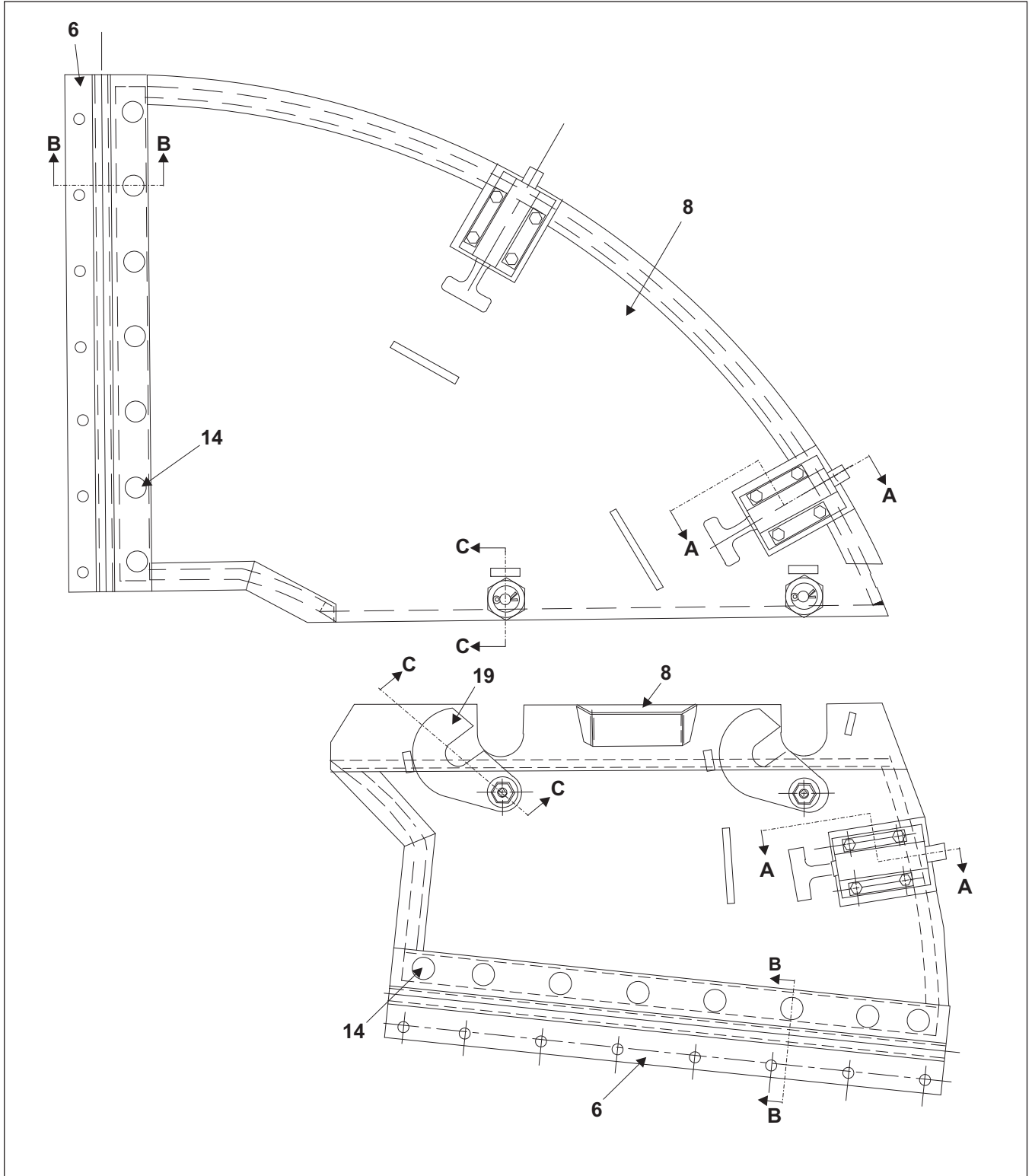
# Cylinder Door Installation

6044WP3/SP3, 6044WR3, 6044SR3

<b>Parts List—Cylinder Door Installation</b> 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
			-----REFERENCE-----	
	A	ACA19SG3A	80496D* CYL ASSY=6044SG3 WELD/SHAFT	6044SP3/SR3
	B	ACA19WE3A	* CYL ASSY=6044WE3 WELD/SHAFT	6044WP3/WR3
			-----COMPONENTS-----	
	1	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
	2	15A010	67346A CARRSCR 3/8-16 UNC2X1 SPECIAL	
	3	X2-15201	89207A KEEPER=CYLDOOR LATCH	
	4	X2-18677	92413C CYLEND 1/60WE3;60SG3	
	5	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
	6	02-19290	81201B FILLER=CYLINDER DIVIDER=60"	
	7	SA 28 073	77422C* CYLDOOR ASSY, UP-LOAD 60WE3+	
	8	SA 28 074	82157C* CYLDOOR ASSY, LO-LOAD 60WE3+	
	9	SA 28 075	77422C* CYLDOOR ASSY, UP-CLEAN 60SG3	
	10	SA 28 076	82157C* CYLDOOR ASSY, LO-CLEAN 60SG3	

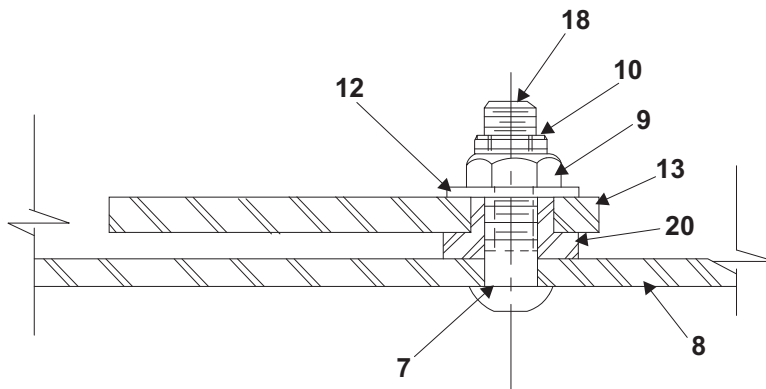
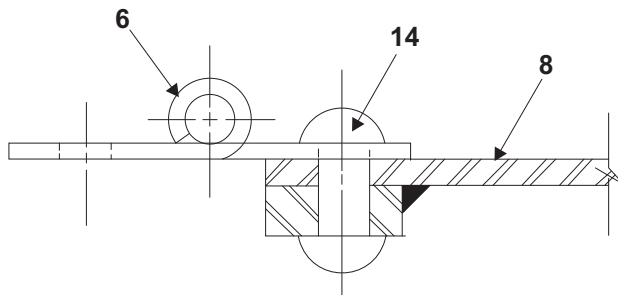
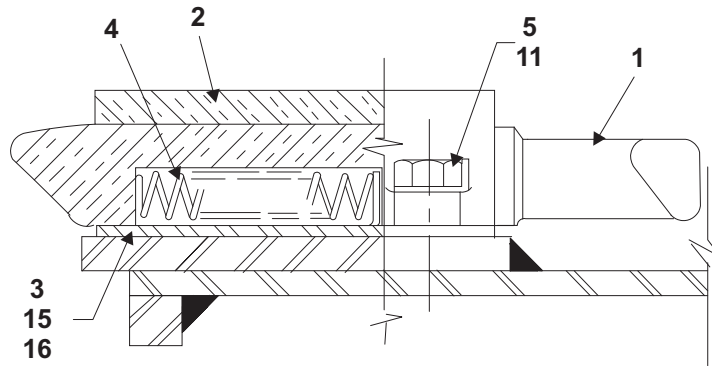
# Cylinder Door Assembly

6044WP3/SP3, 6044WR3, 6044SR3



# Cylinder Door Assembly

6044WP3/SP3, 6044WR3, 6044SR3



# Cylinder Door Assembly

6044WP3/SP3, 6044WR3, 6044SR3

<b>Parts List—Cylinder Door Assembly</b>				
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 28 073	CYLDOOR ASSY,UP-LOAD 60WE3+	UP LOAD 60WP3
	B	SA 28 074	CYLDOOR ASSY,LO-LOAD 60WE3+	LOW LOAD 60WP3
	C	SA 28 075	* CYLDOOR ASSY,UP-CLEAN 60SG3	UP CLEAN 60SG3
	D	SA 28 076	* CYLDOOR ASSY,LO-CLEAN 60SG3	LOW CLEAN 60SG3
-----COMPONENTS-----				
all	1	02 15040	PLUNGER=CYLDOOR LATCH(CAST)	
all	2	02 15041	BODY=CYLDOOR LATCH	
all	3	02 15077	PLATE = SMALL DOORLATCH	
all	4	02 15093	SPRING=DOOR LATCH 9.4#/INCH	
all	5	02 15255	LOCKWASHER CYLDOOR LATCH	
A,C	6	X2 18209	* HINGE=UP CYLDOR L=17+21/32"	
B,D	6	X2 18208	* HINGE=6OW CYLDOOR L=18+3/8"	
A,C	7	02 18405	DOORLOCK BOLT 6/60WEH+12/SG	
A	8	W2 18604	* CYLDOOR WLMT UP-LOAD 60WE3+	
B	8	W2 18605	CYLDOOR WLMTLOLOAD 60WE3,6HLAT	
C	8	W2 18606	* CYLDOOR WLMT UP-CLEAN 60SG3	
D	8	W2 18607	*CYLDRWLMT LO-CLN60SG3,6H-LAT	
A,C	9	02 18560	NUT=DOORLOCK SILBRO 6/60WEHU	
B,D	9	15G201	HXLOKNUT 3/8-16 NYL/SS TYPE NE	
A,C	10	15H031	STDCOTTERPIN 3/32X3/4 SS18-8	
all	11	15N186	HXCAPSCR 1/4-20X3/4 SS18-8	
all	12	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
A,C	13	17B062	EXTRETRING S/S INDUST#3100-75-	
all	14	15J016	BUTTON HD RIVET 3/8 X 1+1/4" S	
all	15	03 06172	SHIM=DOOR LATCH-18GA	
all	16	03 06173A	SHIM=DOOR LATCH-11GA	
B,D	18	15K106B	BUTSOKCAPSCR 3/8-16NCX1+3/8 SS	
B	19	02 18407	DOORLATCH LOADSIDE	
D	19	02 18440	DOORLATCH CLEANSIDE	
B,D	20	02 18408	SPACER=CYLDOR SWINGLATCH	

## Door Latch

Figure 1: Door Latch

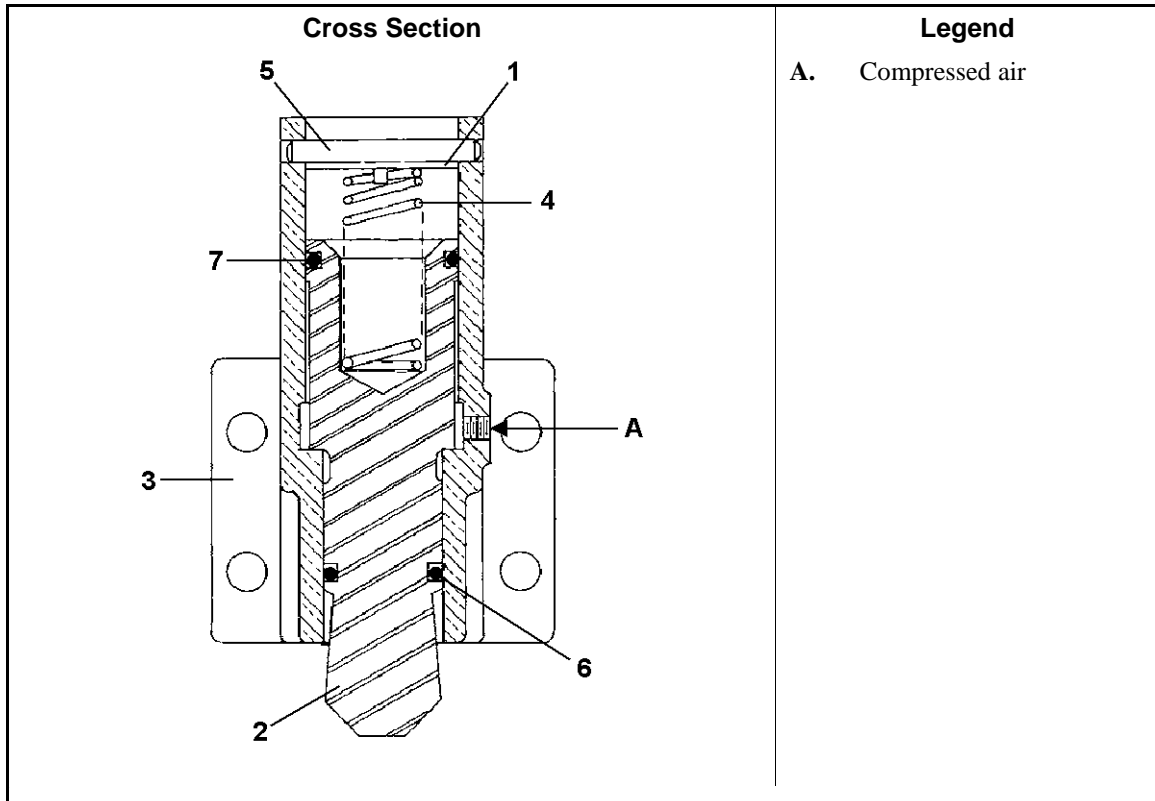


Table 1: Parts List—Door Latch

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

Used In	Item	Part Number	Description/Nomenclature	Comments
Assemblies				
	A	SA 15 028	Assembly, Door latch	
Components				
all	1	02 15105	Retainer ring	
all	2	02 15297	Striker	
all	3	02 15298	Cylinder	
all	4	02 15836	Spring	
all	5	15H090	Pin	
all	6	60C122	O-ring, 1"X1/8	
all	7	60C128	O-ring, 1+3/8X1/8	

— End of BIIFGM19 —



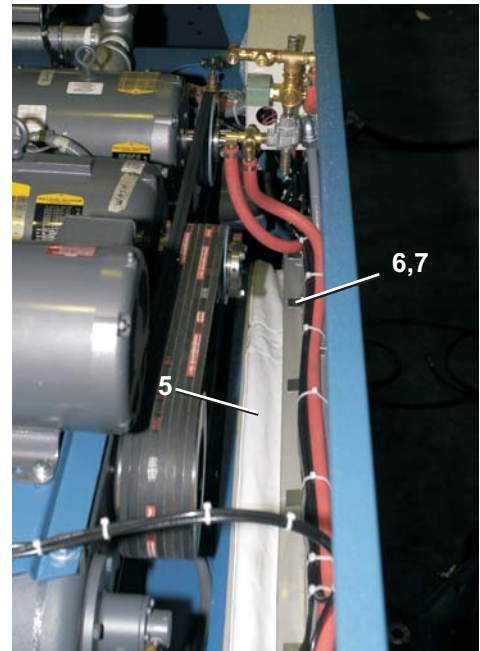


Staph Guard®

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# Staph Barrier Cleanside

6044SR2, 72044SR2



# Staph Barrier Cleanside

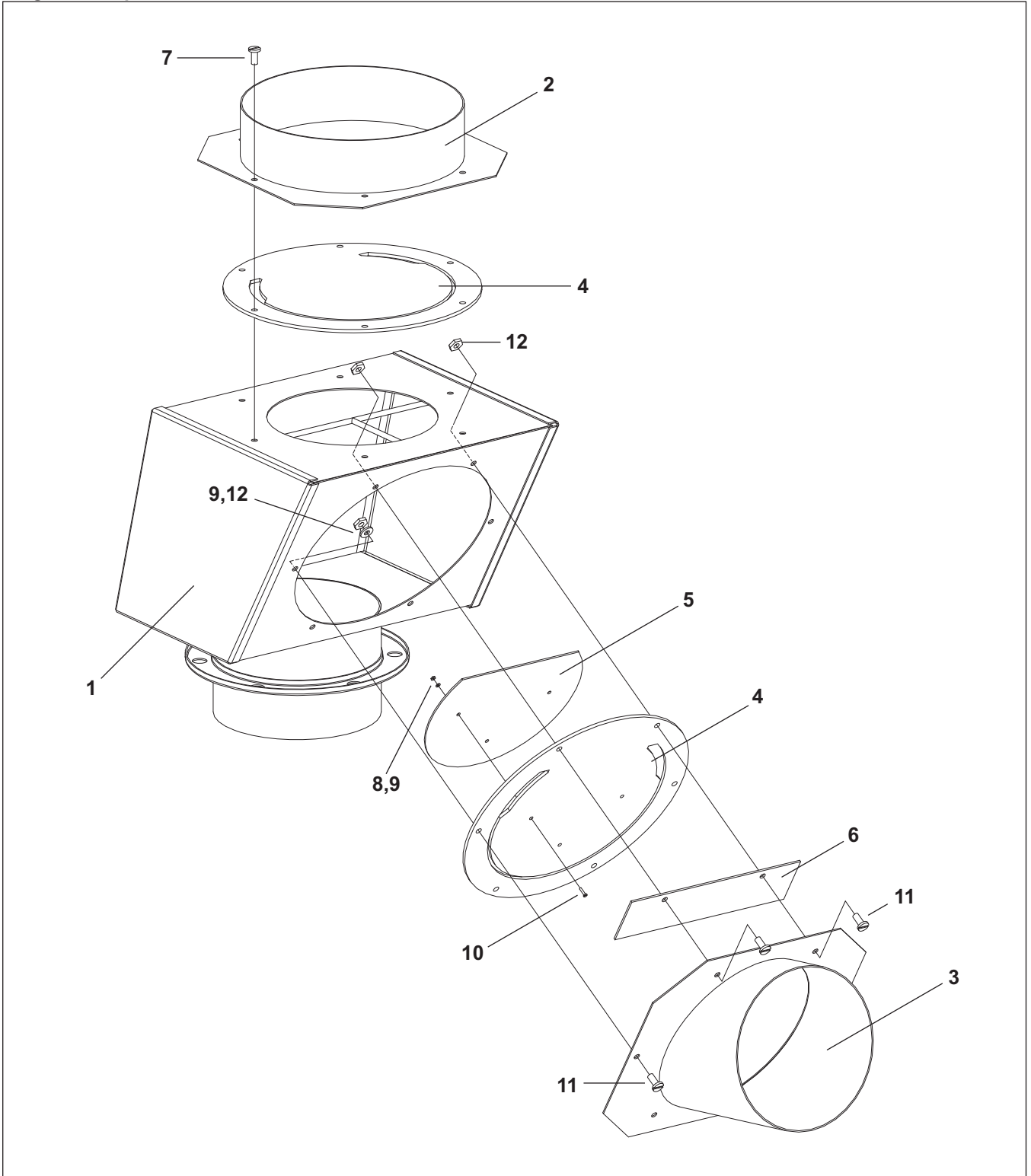
6044SR2, 72044SR2

<b>Parts List—Staph Barrier Cleanside</b>				
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	GBF60001	STAPH BARRIER CS 60SG	6044SR2
	B	GBF72001	STAPH BARRIER CS 72SG	6044SR2
-----COMPONENTS-----				
all	1	02 18781T	EXTRUSION SHELL CS LF 72SG	
all	2	02 18781V	EXTRUSION SHELL CS RT 72SG	
all	3	02 18781W	EXTRUSION FRAME CS LF 72SG	
all	4	02 18781X	EXTRUSION FRAME CS RT 72SG	
all	5	03 06105	BOOT ASSEMBLY=72SGH OUR MATL	
all	6	02 175032	CLAMP BOOT 60142 +60SG	
all	7	15P175	TRDCUT-F HXHD 1/4-20UNC2AX1/2	
B	8	02 21677	CLAMP=BOOT SHLFRY SEAM 3630S	

# Staphairtrol

60044SR2, 72044SR2

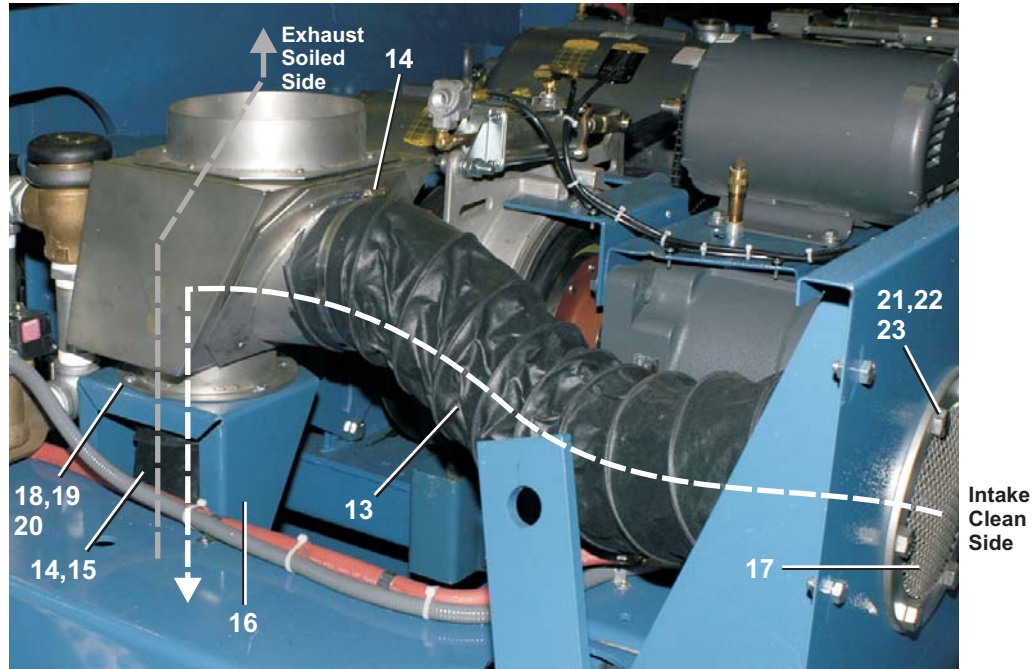
Figure 1: Exploded view



# Staphairtrol

60044SR2, 72044SR2

Figure 2: Installed view



### Parts List—Staphairtrol

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 28 126	* STAPHAIRTROL 6" #60+72SGU	
-----COMPONENTS-----				
all	1	W2 18975	* WLMT,AIRTROL BODY =60+72SGU	
all	2	W2 18973	* WLMT,AIRTROL EXHAUST =60+72	
all	3	W2 18974	* WLMT,AIRTROL INTAKE=60+72SG	
all	4	02 15714	AIR TROL FLAPPER	
all	5	02 18930	PLATE-AIRTROL FLAPPER	
all	6	02 175025	PLATE-BACKUP=AIRTROL FLAPPER	
all	7	15P010	TRDCUT PHILPANHDSCR 10-24X1/2S	
all	8	15G071	MACHSCRLOKNUT 6-32 NM SER ZINC	
all	9	15U131L	FLATWASH #10L (US STD) BRASS	
all	10	15N050	RDMACSCR 6-32UNC2X1/2 SS18-8	
all	11	15N141	RDMACSCR 10-24NCX3/4 SLOTTED S	
all	12	15G130	HEXMACHSCRNUT 10-24UNC2 SS18-8	
all	13	60E320A18A	HOSE *6"ID FLEXAUST PE X 18"	

**Staphairtrol**

60044SR2, 72044SR2

**Parts List—Staphairtrol**

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
all	14	27A083	HOSECLAMP 5+1/8-7"CADSCR#HS104	
all	15	60E320A30A	HOSE *6"ID FLEXAUST PE X 30"	
all	16	03 06199A	BRT=AIRTROL+VENT MT. BD@PRT.	
all	17	W2 18496	* WLMT,AIRTROL INSCREEN=60+72	
all	18	15K039	HXCAPSCR 1/4-20UNC2AX3/4 GR5 Z	
all	19	15U185	FLATWASHER(USS STD) 1/4" ZNC P	
all	20	15G165	HXNUT 1/4-20UNC2BSAE ZC GR2	
all	21	15K153	HXCAPSCR 1/2 -13 X 1 +1/4 SS	
all	22	15U310	LOKWASHER REGULAR 1/2 SS18-8	
all	23	15G225	HEXNUT 1/2-13UNC2 SS18-8	

# Control & Sensing Assemblies

7



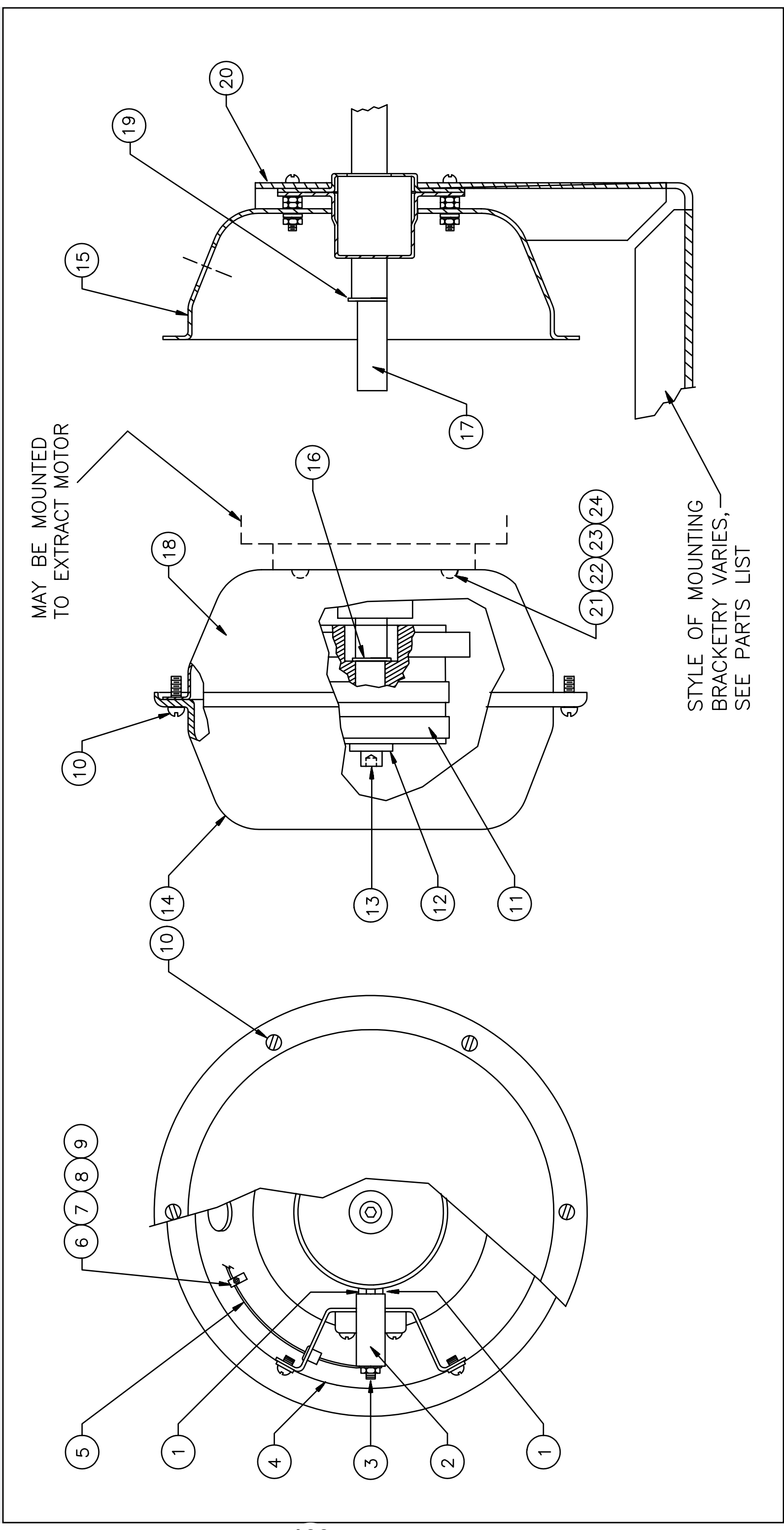
# Centrifugal Switch Assembly

BMP701195/2000242V  
(Sheet 1 of 2)



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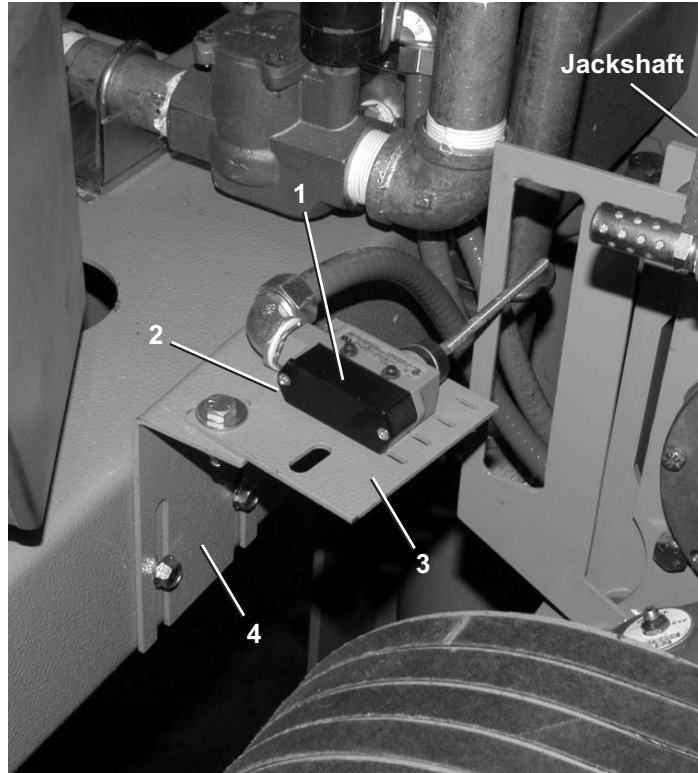
Litho in U.S.A.

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	MACHSCRLOKNUIT 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	HXMACHSCRNUIT 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 TRDCUTSCRTP10-24X1/2SS	
all	11	SAE03 012B	83407#*SLIPRING+CENT SW.ASSY(LORES)	
all	12	15U342	FLTWASH .255/.260IDX.750DX.125T SS	
all	13	15K036	05Z SKSELLOKCP SCR 1/4-20X5/8	

Parts List, cont.—Centrifugal Switch Assembly				
Used In	Item	Part Number	Description	Comments
all	14	02 15582	COVER=CENSW-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	CENSW 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	LOKWASHER MEDIUM #10 ZINCPL	
all	24	15G201	01Z HXLOKNUIT 3/8-16 NYL/SS TYPE NE	

# Excursion Switch

6044SR2, 6044SR3, 7244SR2



60044WR2 shown

### 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-----				
	A	E03 33100B	EXCURSION SWITCH ASSY 60SGH	6044SR2, SR3
	B	E15 04000	EXCURSION SWITCH ASSY=SGU	7244SR2
-----COMPONENTS-----				
A	1	09R008A	MICSW SPDT BZE6-2RN183	
B	1	09R008ASTD	09R008A+MOUNTING HDWRE+INST	
all	2	02 10391	COVER STRIP=MICRO SW #6-8	
all	3	02 15783A	*PLATE=EXCURSION SW MTG	
all	4	02 15980B	BRACKET=EXCURSION SW MT 72T	

## 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 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

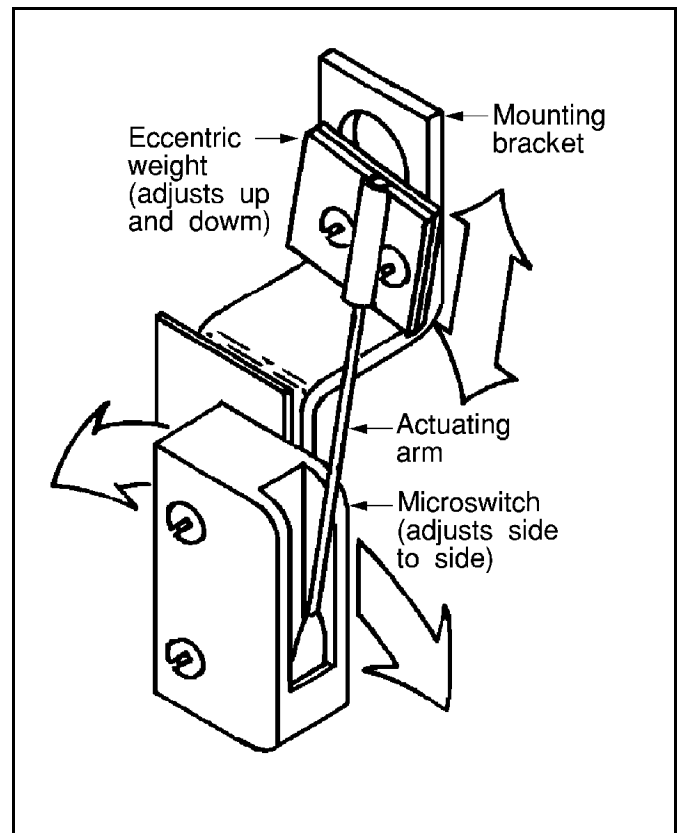
When the machine leaves Milnor<sup>®</sup>, the actuator arm is tie-wrapped to prevent damage (except on 30015, 30020, and 30022 models). **This tie wrap must be removed after the machine is set into position but before the machine is operated.**

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 micro-switch 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.

# Vibration Safety Switch

BMP910038/2012383B  
(Sheet 1 of 1)

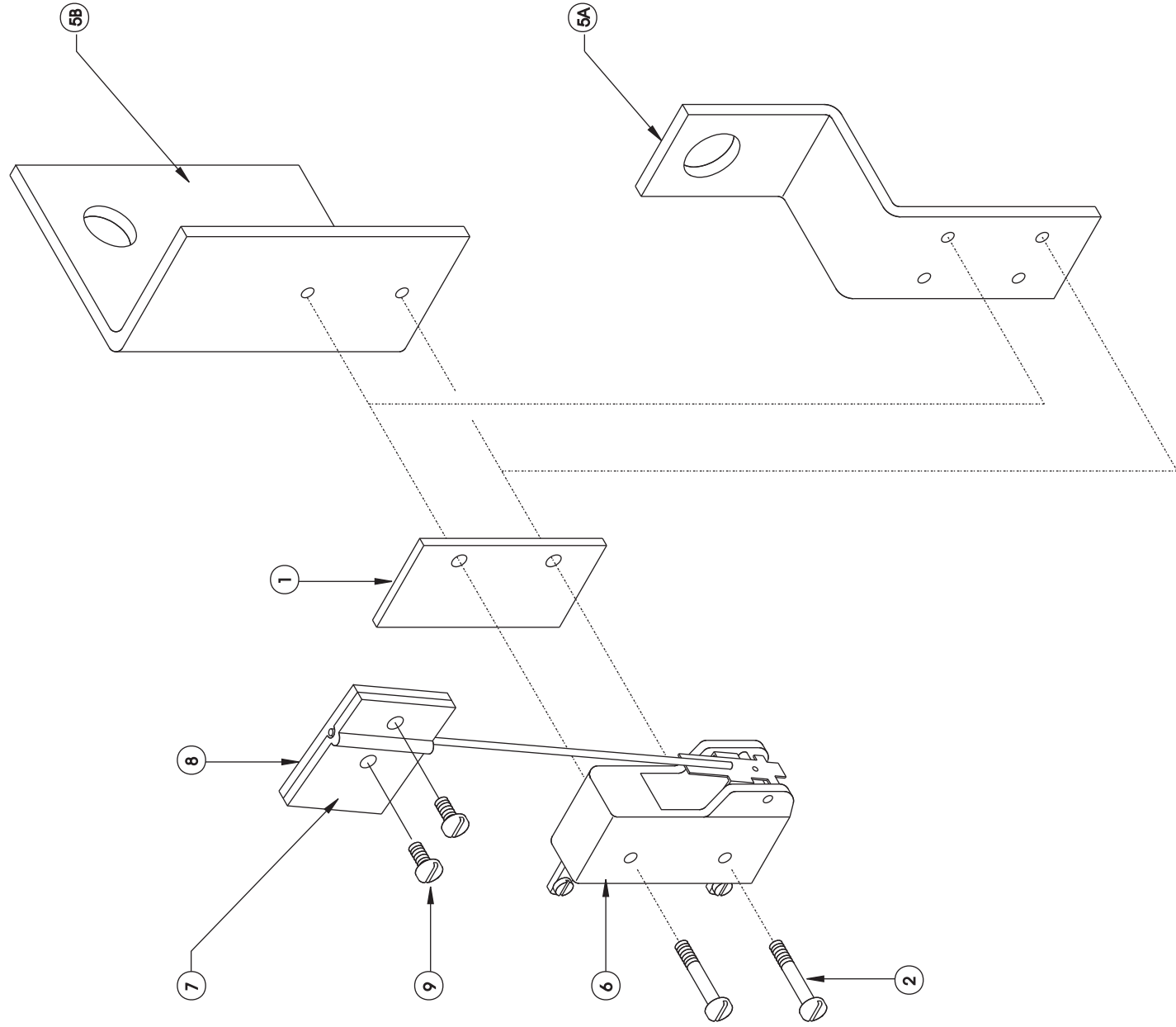


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**Parts List—Vibration Safety Switch**  
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly.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

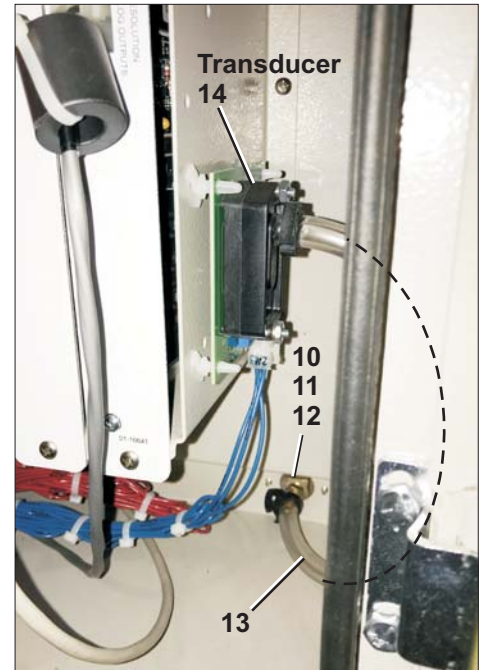
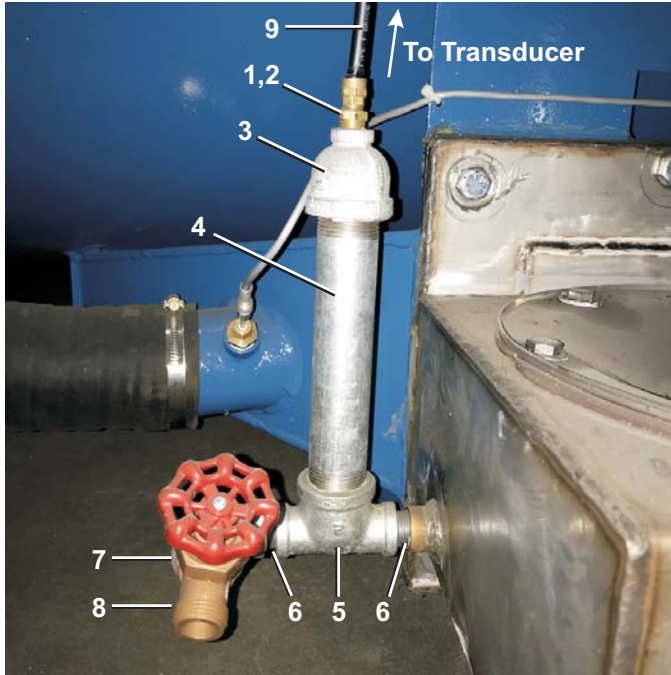
Used In	Item	Part Number	Description	Comments
			-----ASSEMBLIES-----	
A		SAE03 151	* ASSY-VIBRATION SWT=LG CONTR	(ALL MODELS EXCEPT BWP,CPE) 3015/22 V/T/G/F 3022F,362F, 4232F 3621,3626,4226,4230V 3022X,3626X,4226X,4232X 4244, 6044,7244WP/SP CONTAINS 001,002, 005A-009  (MODELS 3621BWP,CPE ONLY) CONTAINS 001,002, 005B-009
B		SAE03 151A	*ASSY-VIBRATION SWT=BALCOM	
			-----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	





# Air Chamber Level Switch

42044WR2,WR3,SR2,SR3 6044WR2,WR3,SR2



### Parts List

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 15 090A	AIRCHAMBER PRESWITCH INSTALL	
-----COMPONENTS-----				
all	1	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	2	53A047H	MALCON 5/16X1/8POLY PH#68P-5-2	
all	3	5SR1A0ENF	NPT RED 1X1/4 GALMAL 150#	
all	4	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	
all	5	5S0KNFA1A	NPT TEE 1/2X1/2X1" GALMAL 150#	
all	6	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
all	7	5SL0PNFC0K	NPT 90D STREET 3/4X1/2 GAL150#	
all	8	96DB0PNA	HOSEBIBB 3/4" MALEINLT 45DEG. ACETAL	
all	9	6.00E+06	TUBING BLK.POLY.5/160DX3/16ID	
all	10	51V010A	TEE 1/8"BRSEXTR BLOCTYP#2203P2	
all	11	51E502A	HOSESTEM BRASS 1/8MPT X3/16	
all	12	5SP0CBEHS	NPT PLUG 1/8 HXCTRSNK BRASS	
all	13	60E004NA	TUBING CLEAR PVC 3/16"IDX5/16"OD	
all	14	08BNLTT	LEVEL TRANSDUCER BD->TEST	



# Temperature Probe

6044WR2,WR3,SR2 72044WR2,WR3,SR3



### Parts List

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	30R0043PB	TEMPERATURE PROBE ASSY=BRASS	



# Chemical Supply Devices

8

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

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**APPLICABILITY:** All Washer-Extractor Models

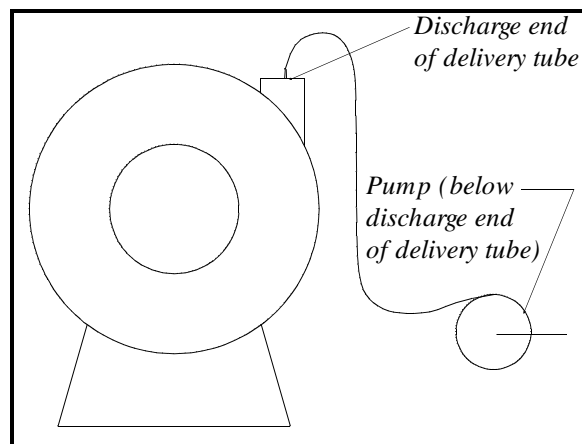
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### GENERAL

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:

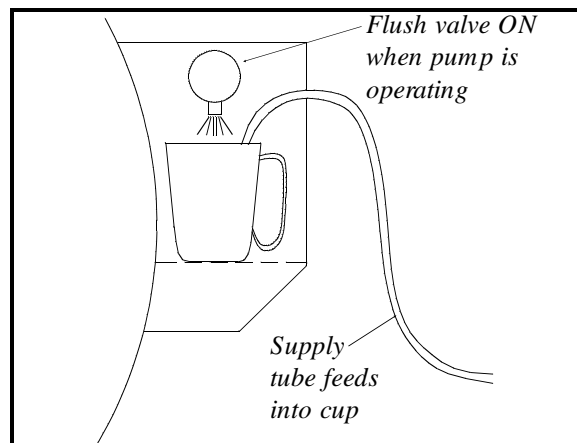
1. Always install the pumping unit lower than the discharge end of the chemical delivery tube as shown at right. This will prevent any excess chemical concentrate from dribbling out of the tube and onto unprotected machine surfaces when the machine is idle.

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.

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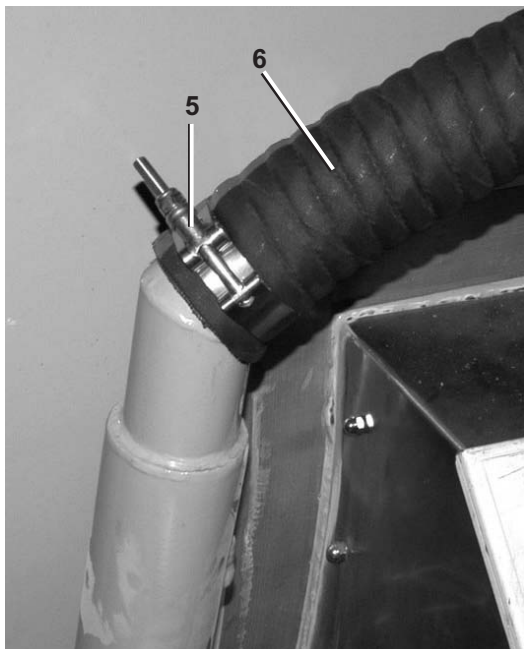
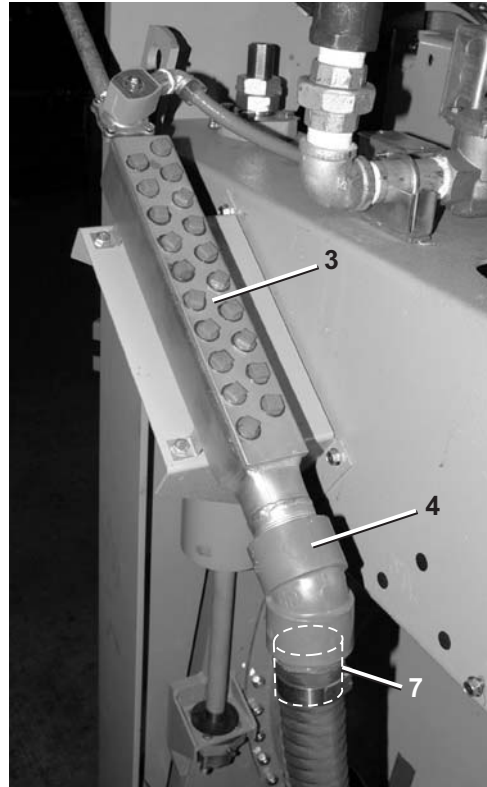
**It is not enough to merely inject the chemical onto a surface that will be subsequently flushed or wetted sometime during the wash process.** This is because the "culprit" is the chemical which dribbles out later. The damage occurs when the residue of a chemical (even a diluted chemical) dries on a 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.**

# Peristaltic Supply Inlet

6044SP2, 6044SP3, 6044SR2, 6044SR3



# Peristaltic Supply Inlet

6044SP2, 6044SP3, 6044SR2, 6044SR3

<b>Parts List—Peristaltic Supply Inlet</b>				
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	27A070	T-BOLT HOSECLAMP 1.94"-2.25"	
all	6	60E255A70A	HOSE=2"ID X 70"LG(NO DWG)	
all	7	51AB2AN2AA	HOSE INSERT X MPT 2"PVC40	
all	8	02 18538	SUPPORT=SUPPLY INJ LH/RH	
all	9	02 19327B	COVER=6044 W/PERISTAL RTSIDE	



## Five Compartments for Dry Chemical Supplies

Figure 1: Five Compartments for Dry Chemical Supplies

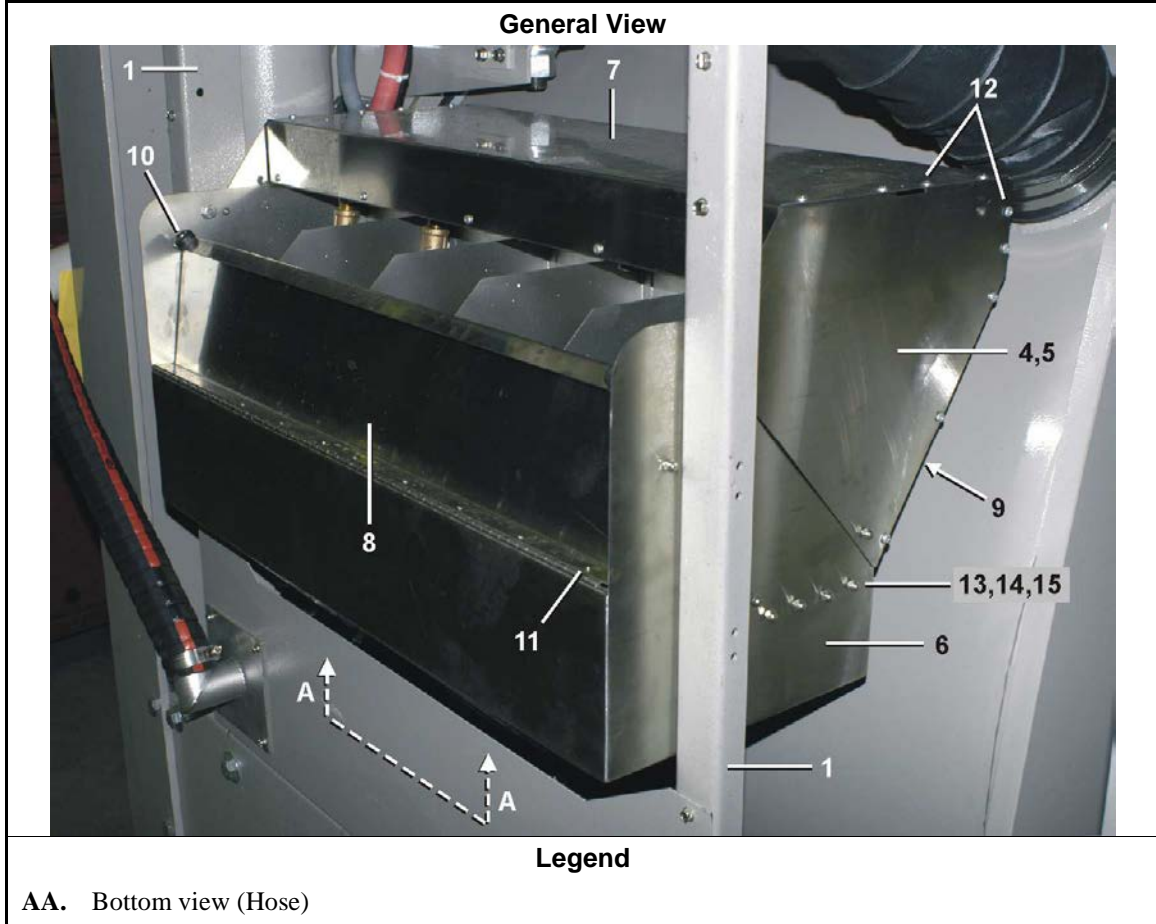


Figure 2: Right side view (Covers), Bottom view (Hose)

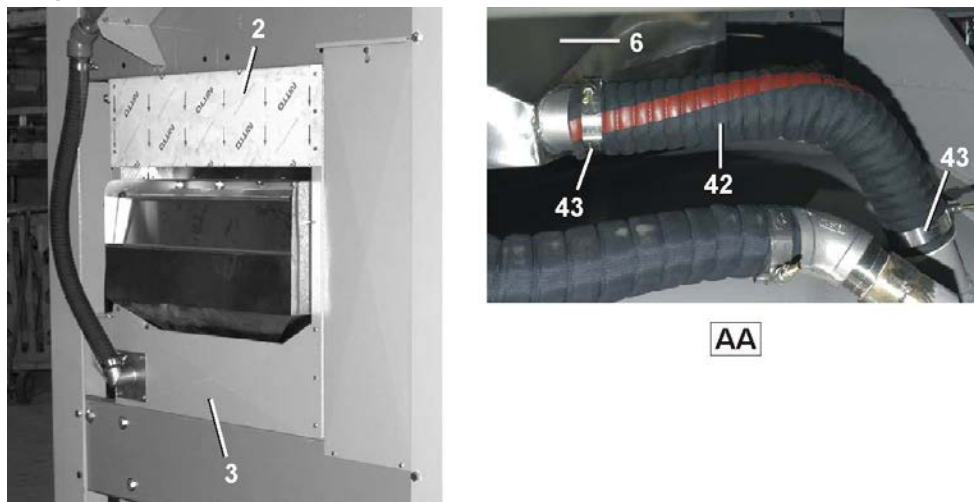


Figure 3: Valve manifold

Five Compartments for Dry Chemical Supplies

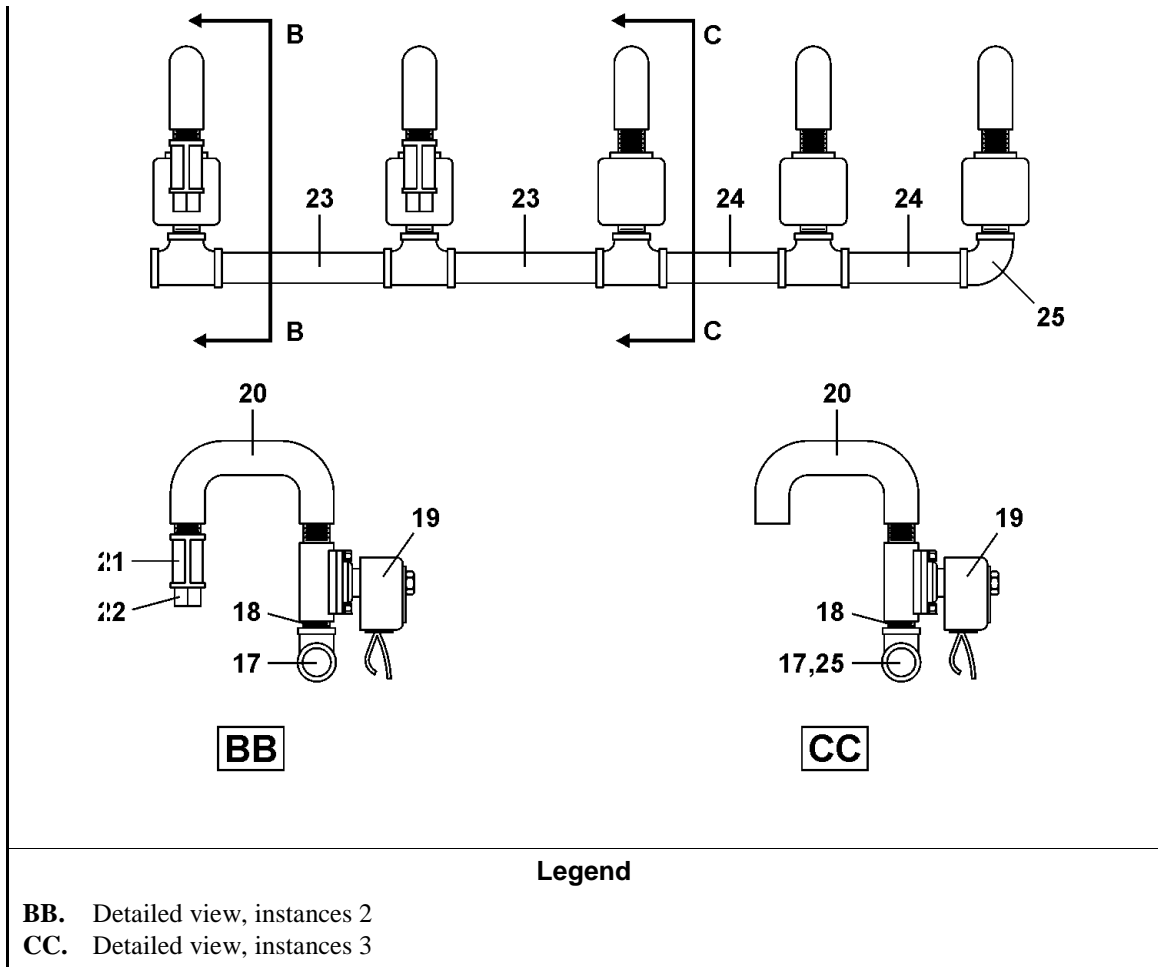
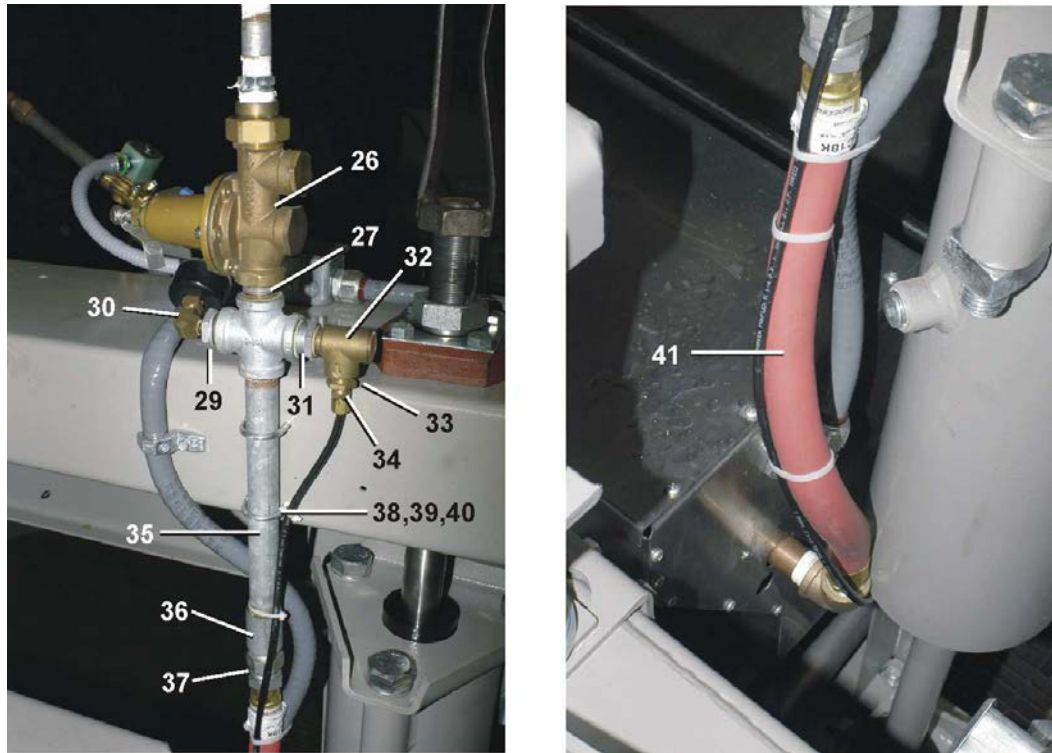


Figure 4: Hot water inlet - Pressure regulator assembly



Five Compartments for Dry Chemical Supplies

**Table 1: Parts List— Five Compartments for Dry Chemical Supplies**

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	Item	Part Number	Description/Nomenclature	Comments
Assemblies				
	A	SA 28 085B	Assembly, Five Compartments for Dry Chemical Supplies	
	B	A28 18600B	Assembly, Valve manifold	
	C	SA 28 084	Assembly, Pressure regulator assembly	
	D	AD 28 059	Installation Group, Pressure regulator assembly	
Components				
all	1	02 18538	Piece part	
all	2	02 18824C	Cover	
all	3	02 18824D	Cover	
all	4	02 18024	Panel, Front	
all	5	02 18025	Panel, Rear	
all	6	W2 18559	Weldment	
all	7	02 18564	Panel, Top	
all	8	SA 28 086	Assembly, Cover	
all	9	02 18777A	Panel, Inside	
all	10	60C001	Bumper	
all	11	15P100	Bolt, #8 X 3/8	
all	12	15P010	Bolt, 10-24X1/2	
all	13	15N117	Bolt, 10-24X3/8	
all	14	24G018N	Washer, Nylon	
all	15	15G121	Nut, Cap, 10-24	
B	17	5S0PBEA0K	Tee, 3/4X3/4X1/2	
B	18	5N0KCLSBE2	Pipe nipple, 1/2XCLS	
B	19	96TDC2AA37	Water valve, 1/2"	
B	20	02 19307	Pipe Fitting	
B	21	5SCC0KBE	Coupling, 1/2	
B	22	27A001	Nozzle, 1/2"	
B	23	5N0P06ABE2	Pipe nipple, 3/4X6	
B	24	5N0P05AB42	Pipe nipple, 3/4X5	
B	25	5SL0PBEA0K	Elbow, 3/4X1/2	
C	26	96J031D	Pressure regulator, 3/4", 28#	
C	27	5N0PCLSG42	Pipe nipple, 3/4XCLS	
C	28	5S0PNFB	Tee, 3/4"	
C	29	5SB0P0CNFA	Hexbush, 3/4X1/8	
C	30	30N100	Pressure gauge, 1/8", .0-30PSI	
C	31	5SB0P0KNFO	Hexbush, 3/4X1/2	
C	32	96M001	Pressure relief valve, 1/2X3/8", 31#	
C	33	5SB0G0EDEO	Hexbush, 3/8X1/4	
C	34	53A008B	Pipe Fitting, .25X.25	
C	35	5N0P10AG42	Pipe nipple, 3/4X10	

**Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.**

Used In	Item	Part Number	Description/Nomenclature	Comments
C	36	5SCC0PNF	Coupling, 3/4	
C	37	51X019	Union, 3/4"	
D	38	27A030B	U-bolt, 3/4", 1/4-20	
D	39	15U180	Washer, Lock, 1/4	
D	40	15G165	Nut, 1/4-20	
D	41	60E086C18K	Hose, 3/4"X18.5"	
all	42	60E301A12A	Hose, 2.5"X12"	
all	43	27A075	Hoseclamp, T-bolt, 2.78-3.09"	

— End of BIHDBM22 —

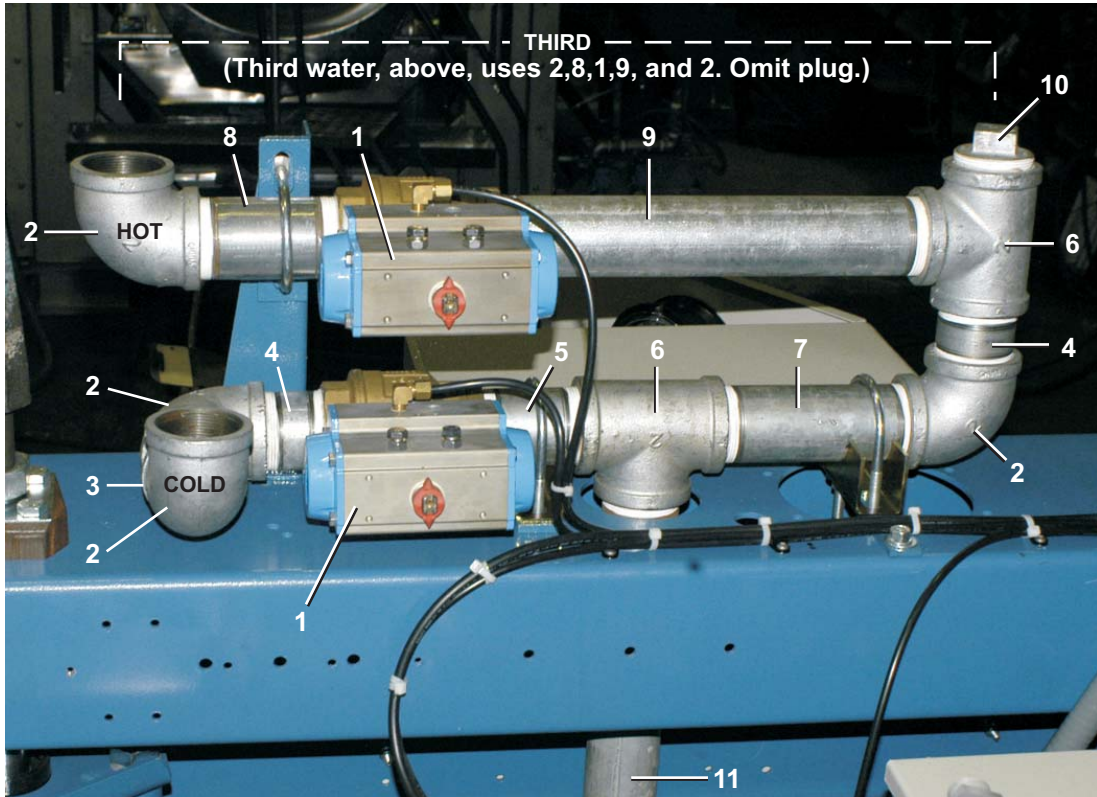
# Water and Steam Piping and Assemblies

9

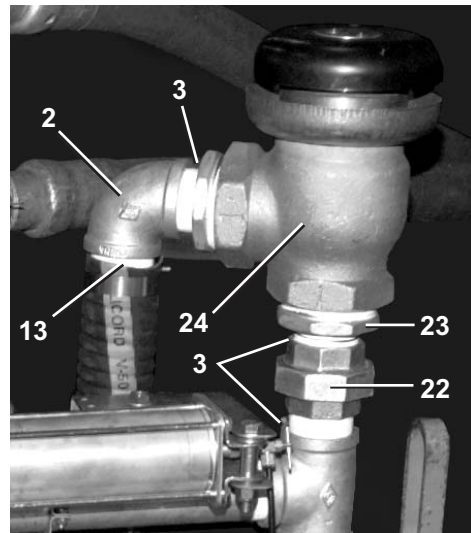
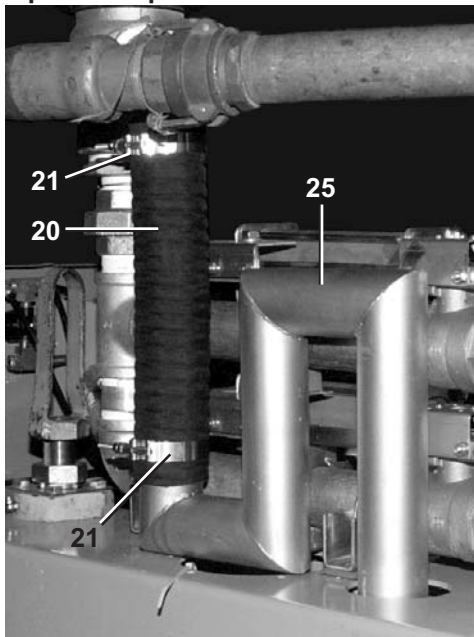
# Water Inlets & Optional Siphon Breaker

60044SR2, 60044SR3

Figure 1: Water Inlets and Optional Siphon Breaker



## Optional Siphon Breaker



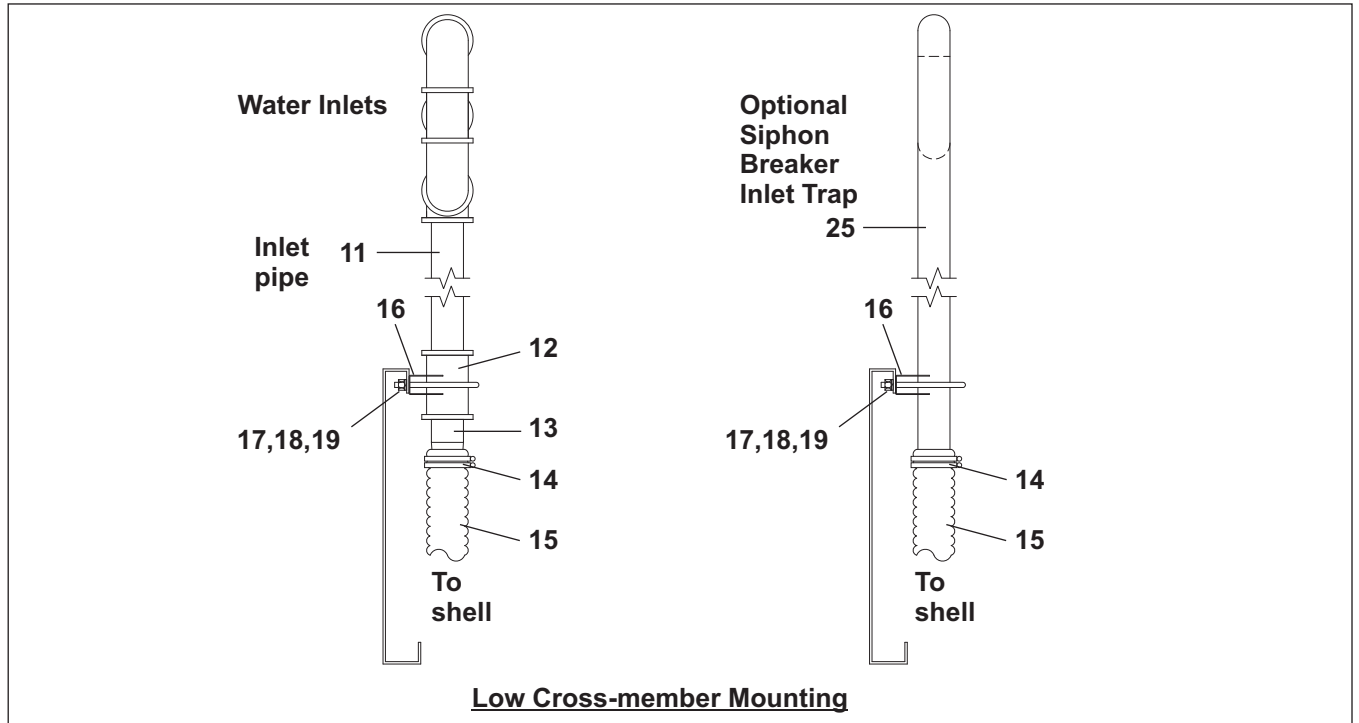
Siphon Breaker: See also BMP040078.



# Water Inlets & Optional Siphon Breaker

60044SR2, 60044SR3

Figure 2: Inlet Pipe



### Parts List—Water Inlets and Optional Siphon Breaker

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	AVW28003A	H2O INLT=BONOMI COLD ONLY, 60SG	COLD
	B	AVW28010A	H2O INLT=BONOMI +1 VALVE 60SG	HOT
	C	AVW28005A	H2O INLT=BONOMI FRESH VALVE 60SG	+1 FRESH
	D	GVW28002	H2O INLTS-MTG HDWE 60SG	ADD VACUUM BREAKER
-----COMPONENTS-----				
All	1	96D088FBA	2" BALVAL\$ BRS N/C BONOMI	
all	2	5SL2ANFA	NPT ELBOW 90DEG 2" GALMAL 150#	
all	3	5N2ACLSG42	NPT NIP 2XCLS TBE GALSTL SK40	
all	4	5N2A03AG42	NPT NIPPLE 2X3 TBE GALSTL SK40	
all	5	5N2A04AG42	NPT NIP 2X4 TBE GALSTL SK40	
all	6	5S2ANFA	NPT TEE 2" GALMAL 150#	
all	7	5N2A07AG42	NPT NIP2X7TBE GALSTL SK40	
all	8	5N2A04KG42	NPT NIP 2X4.5 TBE GALSTL SK40	
all	9	5N2A13PG42	NPT NIP 2X13.75 TBE GALSTL SK40	
all	10	51P060	PLUG PIPE SQ 2"GALCORED CI 125	
all	11	5N2A48AG42	NPT NIP 2X48 TBE GALSTL SK40	

# Water Inlets & Siphon Breaker

60044SR2, 60044SR3

### Parts List—Water Inlets and Optional Siphon Breaker

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
all	12	5SCC2ANF	NPT COUP 2" GALMAL 150#	
all	13	51E098B	KINGREDNIP2.5"IDX2"NPT#STC3025	
all	14	27A075	T-BOLT HOSECLAMP 2.78-3.09"	
all	15	60E301A48A	HOSE= *2.5"2D PE X48"	
all	16	02 18995	CLAMP=2" PIPE	
all	17	27A032N	UBOLT 2"PIPE 3/8-16 ZNC4.87"LG	
all	18	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	19	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	20	60E301A12A	HOSE= *2.5"ID PE X12"	
all	21	27A084	HOSECLAMP 3y÷4.5CADSC#HS64	
all	22	5SU2ANF	NPT UNION 2" GALMAL 150#	
all	23	5SB3A2ADEO	NPTHEXBUSH 3X2 GALCI 125#	
all	24	SA 03 007	3"SIPHONBREAKER+SCUPPER ASSY	
All	25	W2 19278	* INLET TRAP 2.5"D=SG+VACBKR	

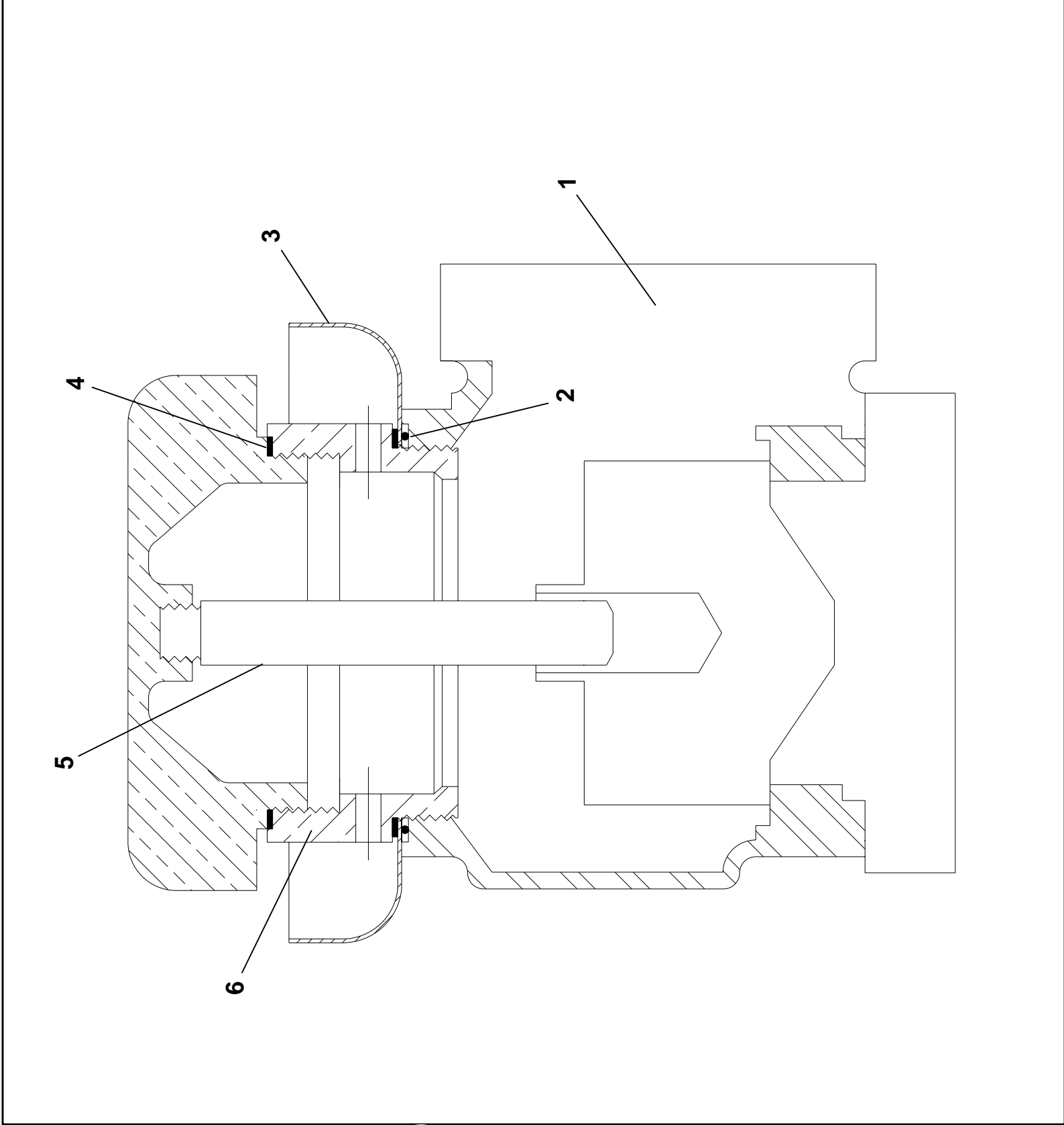
# Siphon Breaker & Scupper

BMP040078/2006182B  
(Sheet 1 of 1)



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
	A	SA 03 007	3"SIPHONBREAKER+SCUPPER ASSY	
			-----ASSEMBLIES-----	
			-----COMPONENTS-----	
all	1	96M034	3"VAC BREAKER WATTS#288A M2	
all	2	60C151	ORING 3+7/8ID1/8CS BUNA70#241	
all	3	03 01303	SCUPPER 3"SIPHON BREAKER	
all	4	03 01304	GASKET=RING 3"SIPHON BREAKER	
all	5	03 01305	STEM=GUIDE 3" SIPHON BREAKER	
all	6	03 01306	SPACER=BONNET 3"SIPHON BREAK	

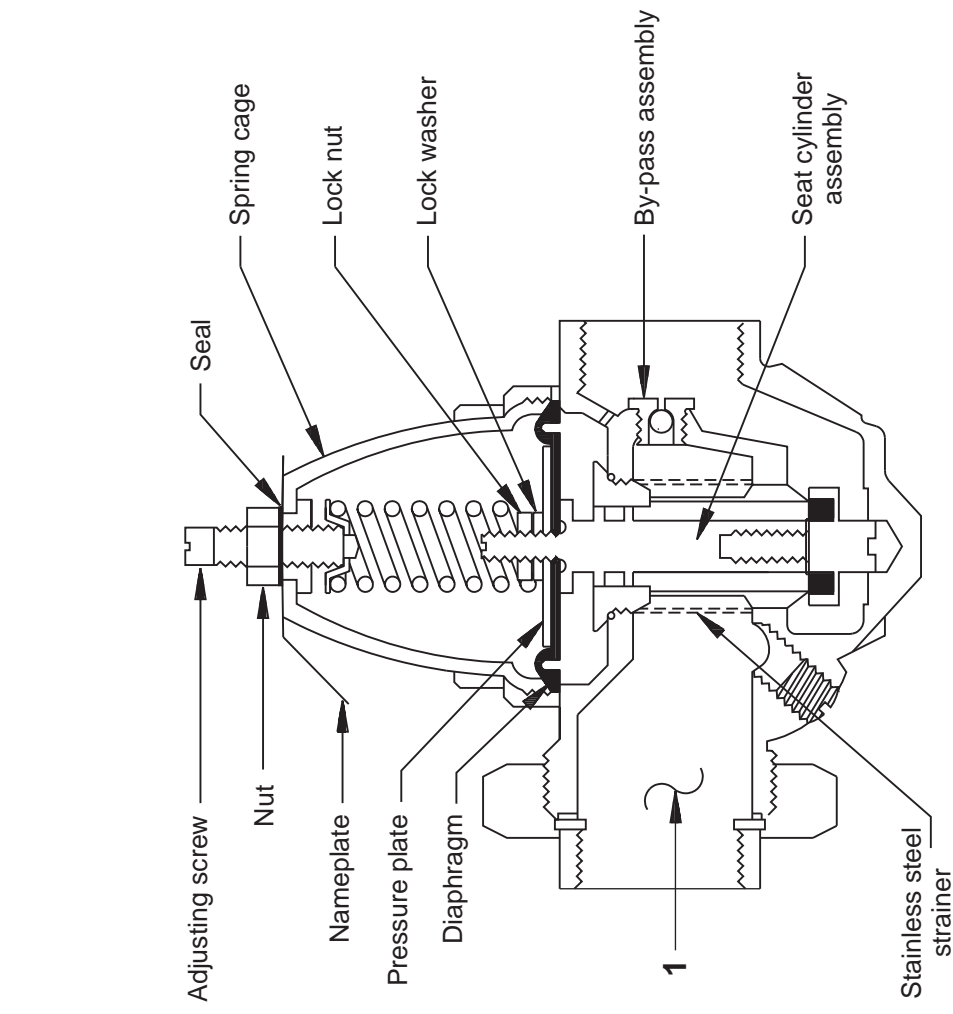
# Pressure Regulators

BMP900031/2011276B  
(1 / 2)



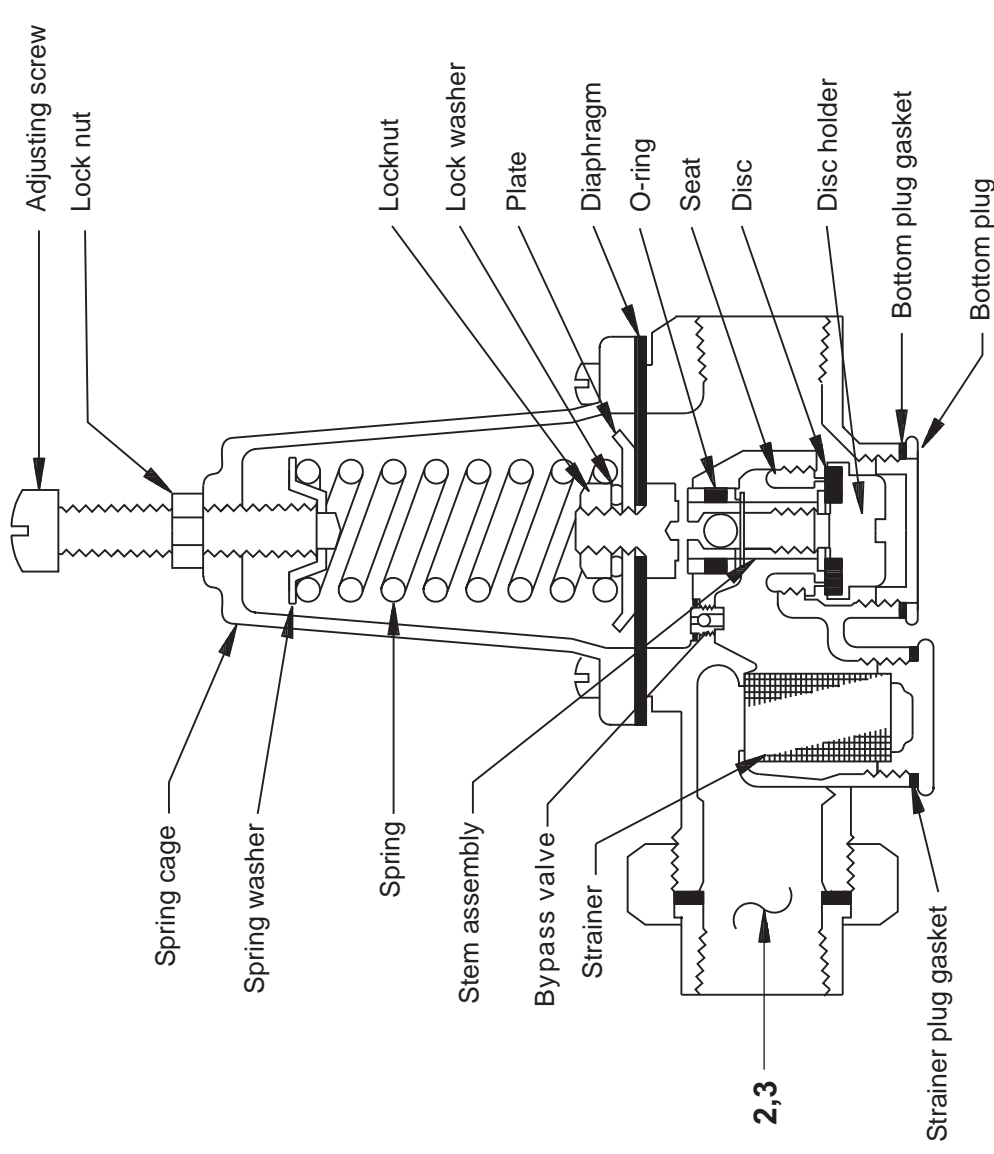
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**To clean:**

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. Open gate valve to flush out collected sediment.



**To clean :**

1. Remove bottom plug and gasket.
2. Loosen disc holder with screwdriver or socket wrench.
3. Inspect disc and clean.
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, lock 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
-----COMPONENTS-----				
	1	96J030FF	01Z 1/2"PRESS REG SET 28# FEM X FEM	1/2" REGULATOR 3621V ONLY
	2	96J030D	01Z 1/2" PRESREGULTR SET 28# FEM-UN	1/2" REGULATORS ALL OTHER MODELS
	3	96J031D	01Z 3/4" PRESREGULTR SET 28# FEM-UN	3/4" REGULATORS

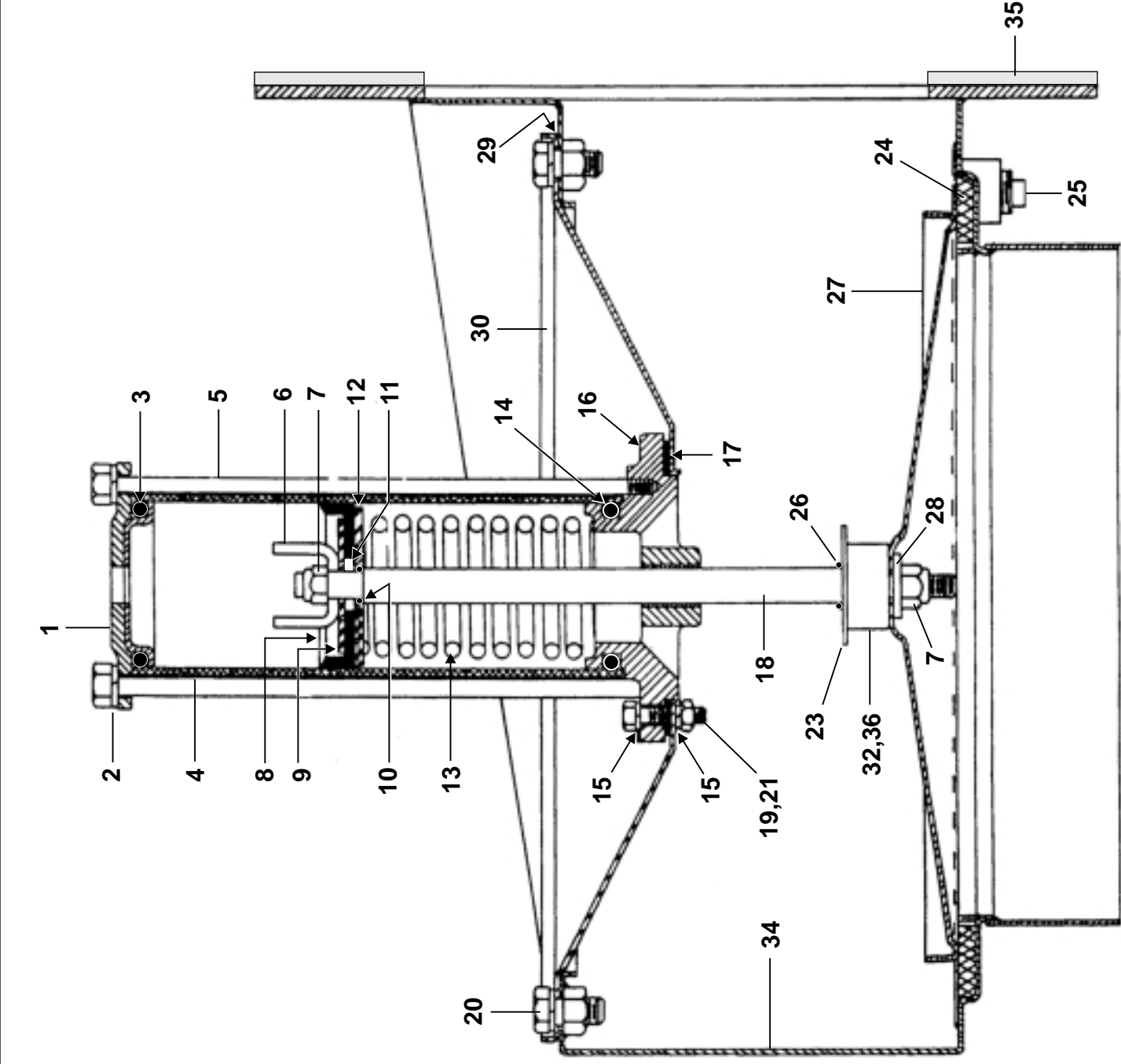
**8" & 10" Stainless Dump Valve**  
**42044WP2/CP2/SP2/SP3/NP2 52038WP1 60044WP2/WP3/SP2/SP3**  
**72044WP1/D5N 72058SP2**

BMP780095/2006363B  
 (Sheet 1 of 1)



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

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**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.

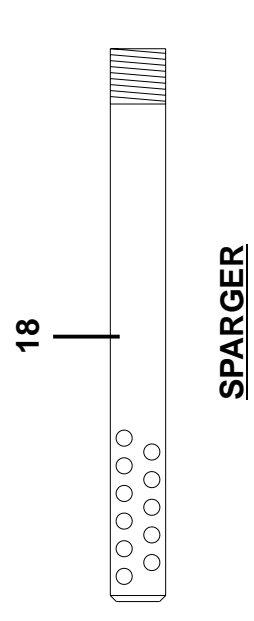
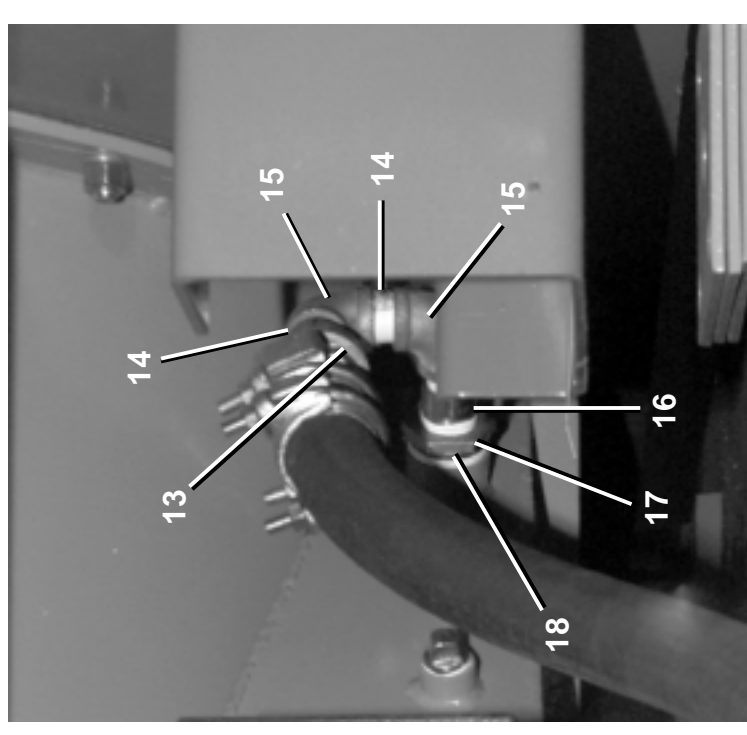
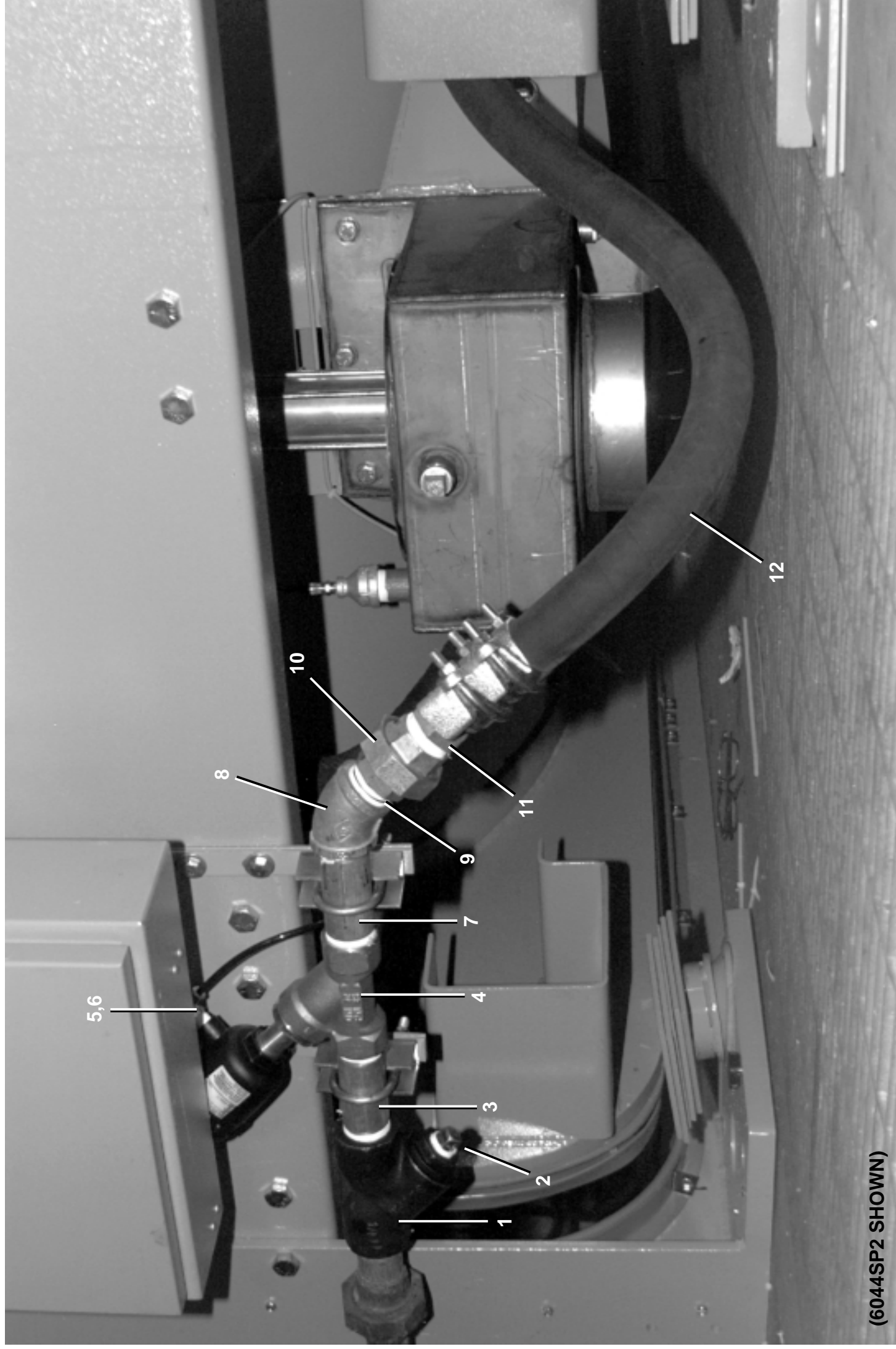
Used In	Item	Part Number	Description	Comments
A		SA 28 124	*8" SGL DUMP VALVE 4244+52+60	42044WP2/CP2/SP2/SP3/NP2 52038WP1
B		SA 36 015	10" SGL DUMP VALVE 72WE+SG+WT	60044WP2/WP3/SP2/SP3
C		SA 28 158	* BONNET+AIRCYL=8" SS DUMP VALV	72044WP1/SP2, 72058D5N
D		SA 36 044	* BONNET+AIRCYL=10" SS DUMP VALV	8" DUMP VALVE 10" DUMP VALVE
-----COMPONENTS-----				
CD	1	02 02101	CYL HEAD W/TAPPED HOLE	
CD	2	15U210	LOK WASHER MEDIUM 5/16 ZINC PL	
CD	3	60C132	ORING 2" ID X 3/16 CS BUNA70 #329	
CD	4	02 02068	AIRCYL-STAINLESS=DUMP VALVE	
CD	5	02 10585D	TIE BOLT=5/16-18X7.875 PLTD	
CD	6	03 01313	STOP=AIR CYL W/2+11/16 STROKE	
CD	7	15G220	LTHX THIN LOK NUT 3/8-24 SS NTE	
CD	8	02 02194	PISTON CUP=DUMP VALVE 2+3/8"	
CD	9	02 02085	UP WASHER=2" OD=PISTON CUP	
CD	10	60C106	ORING 5/16 ID 1/16 CS BUNA70#011	
CD	11	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	12	02 02105B	XXXXX	
CD	13	03 06429	SPRING=2.11 ODX 6.5 FL 64#"	
CD	14	60C132	ORING 2" ID X 3/16 CS BUNA70 #329	
CD	15	24G020N	ROLLED WASH.252ID NYLTITE 25W	
CD	16	X2 02743	BONNET=2" DUMP VALVE	
CD	17	02 18931F	GASKET=DUMP VALVE-1/60+72WEHU	
CD	18	02 16021I	DUMP VALV STEM-4"+8"316SS	
CD	19	15G168	SQ NUT 1/4-20 UNC 2 SS 18-8	
all	20	15K086	HX CAPSCR 3/8-16 NCX 3/4 SS 18-8	
CD	21	15K041S	HEX CAPSCR 1/4-20 UNC 2 AX 1 SS 18-8	
CD	23	02 16021E	WASHER 3/8 ID X 1.250 D DUMP VALV	
A	24	02 18068	9 SEAT-RESILIENT=8" DUMP VALVE	
B	24	03 06084	SEAT-RESILIENT=10" DUMP VALVE	
A	25	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
CD	26	60C106	ORING 5/16 ID 1/16 CS BUNA70#011	
AC	27	02 18796	DISC-8" DUMP VALVE S/S	
BD	27	03 06083	DISC-10" DUMP VALVE S/S	
all	28	15U245	FLT WASH 3/8 STD COMM 18-8 SS	
A	29	02 18104	GASKET=8" DUMP VALVE BONNET	
B	29	03 06086G	GASKET=10" DUMP VALVE BONNET	
A	30	02 18931E	BONNET=8" DUMP VALVE	
B	30	03 06086F	BONNET=10" DUMP VALVE	
CD	32	02 16021C	BUMPER=DUMP VALVE BONNET	
CD	33	02 16021D	DUMP VALVE BUMPER RETAINER	
A	34	W2 18931	*BODY=8" DUMP VALV=4244.60.52	
B	34	W3 06086	*BODY=10" DUMP VALVE 72WE,SG,T	
A	35	02-18107	GASKET=8" FLANGED DUMP VALVE	
B	35	03 06085D	GASKET=10" FLANGED DUMP 72D 8050	

**Steam Inlet & Sparger**  
**4244SP2, 4244SP2 SM, 6044SP2/SP3, 6044SP2 SM**

BMP040089/2006363B  
 (Sheet 1 of 2)

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

Litho in U.S.A.



**SPARGER**

(6044SP2 SHOWN)





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

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**Parts List—Steam Inlet & Sparger**

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	AVS03001	*1+1/4BURKERT +STRAINER	4244SP2,6044SP2/SP3
	B	AVS28002	\$1.25 BURKERT STEAM=60SG2+3	6044SP2/SP3
	C	GVS28002	INSTALL=1.25STEAM 6044SG2+3	6044SP2/SP3
	D	AVS04001	\$1.25 BURKERT STEAM=42+72SG23	4244SP2
	E	GVS15001	INSTALLATION=1+1/4STEAM 42SG	4244SP2
-----COMPONENTS-----				
A	1	51T060	Y-STRAINER 1+1/4" CAST IRON	
A	2	5SP0PHFSS	NPT PLUG 3/4 SQ SOLID STL/ZINC	
A	3	5N1E05AG42	NPT NIP 1.25X5 TBE GALSTL SK40	
A	4	96D0011E	1.25"NPTBRZ N/C STEAMVALANGBD	
A	5	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MP	
A	6	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
B,D	7	5N1E05AG42	NPT NIP 1.25X5 TBE GALSTL SK40	
B	8	5SL1ENFK	NPT ELB 45DEG 1.25 GALMAL 150#	
D	8	5SL1EMFK	NPT ELB 45DEG 1.25 BLKMAL 150#	
B,D	9	5N1ECLSF42	NPT NIP 1.25XCLS TBE BLKSTLS40	
B,D	10	5SU1EMH	NPT UNION 1.25" BLKMAL 150#	
B,D	11	51E096C	MALESTEM 1.25"CADPL CAMP#IMS5	
C	12	60E096C35A	STEAMH*OSE=1.25"X35"+2ENDS=(NO	
E	12	60E096C22A	STEAMH*OSE=1.25"X22"+2ENDS=(NO	
C,E	13	5SR1E0PNF	NPT RED 1.25X3/4 GALMAL 150#	
C,E	14	5N0PCLSG42	NPT NIP 3/4XCLS TBE GALSTL S40	
C,E	15	5SL0PNFA	NPT ELB 90DEG 3/4 GALMAL 150#	
C,E	16	5N0PCLSG42	NPT NIP 3/4XCLS TBE GALSTL S40	
C,E	17	5SB1K1ADEO	NPTHEXBUSH 1.5X1 GALCI 125#	
C,E	18	W2 18801	*LMT=STEAM NOZZLE	

# Burket Steam Valve

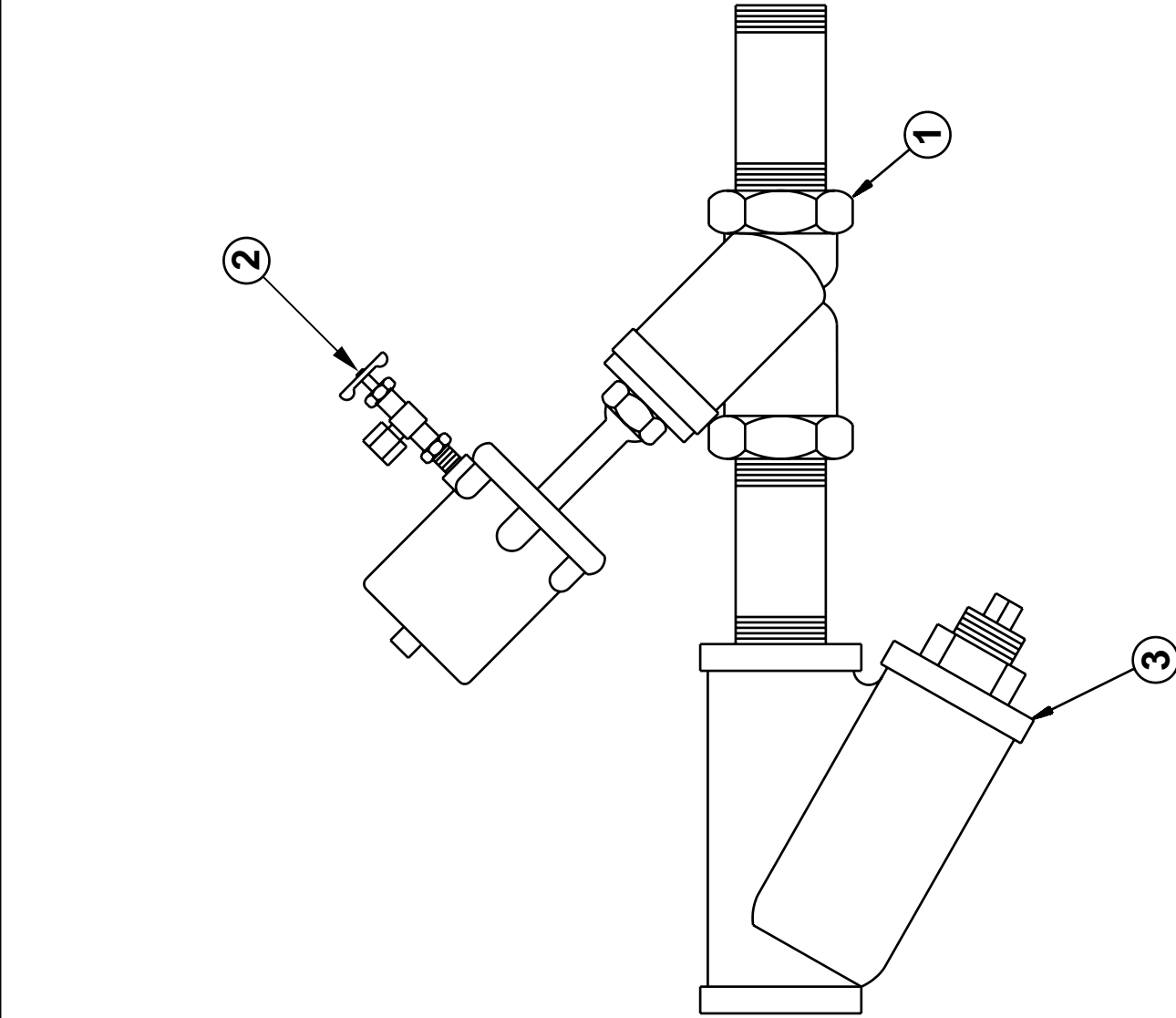
BMP800020/96066V  
(Sheet 1 of 1)



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BMP800020/96066V (1 of 1)

Litho in U.S.A.



**Parts List—Burket Steam 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
			-----ASSEMBLIES-----	
	W	96D0009ER1	02Z REPAIRKIT 3/4" STEAM VALVE	KIT FOR 001A
	X	96D0011ER1	02Z REPAIR KIT 1.25" STEAM VALVE	KIT FOR 001B
	Y	96D0011ER2	ACTUATOR HOUSING FOR BURKET #251	KIT FOR 001B
	Z	96D0011ER3	REPAIR KIT MULLER 1.25 VALVE #554	KIT FOR 001B
			-----COMPONENTS-----	
all	1	96D0009E	03Z 3/4"NPT N/C STEAMVAL ANGLE BODY	3/4"
all	1	96D0011E	08Z 1/25"NPT N/C STEAMVAL ANGLEBODY	1-1/4"
all	2	96H018	NEEDLE VALVE	
all	3	51T030	01Z Y-STRAINER 3/4" CAST IRON	USED WITH 001A
all	3	51T060	01Z Y-STRAINER 1+1/4" CAST IRON	USED WITH 001B



# Pneumatic Piping and Assemblies

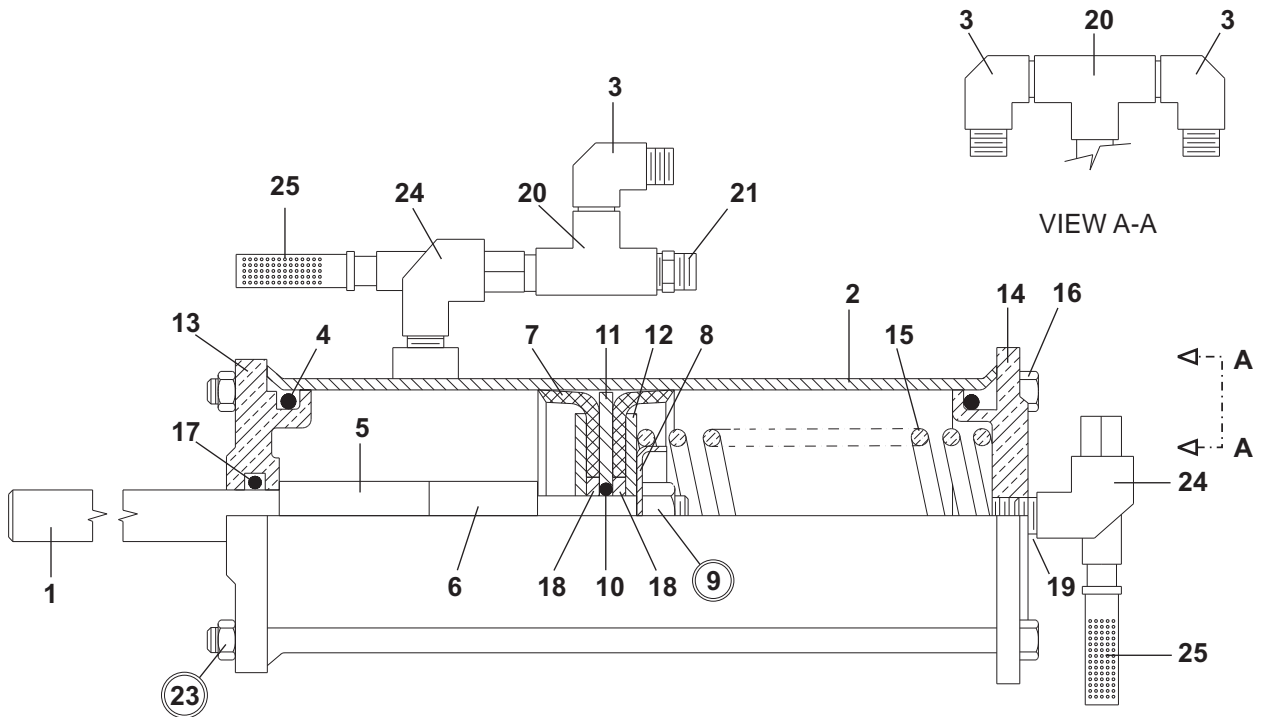
10

# Brake Air Cylinder

## ⚠ WARNING ⚠



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



# Brake Air Cylinder

Parts List—Brake Air Cylinder				
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	AAC65002	AIRCYL BRAKE SINGLE MOTOR	
-----COMPONENTS-----				
all	1	02 18650B	STEM=2WAY AIRCYL BRAKE 7.88L	
all	2	W2 18646	*CYLINDER-AIR=DOUBLEACT BRAKE	
all	3	53A031XB	BODY-EL90MALE.25X25 #269C-4-4B	
all	4	60C132	ORING 2"IDX3/16CS BUNA70 #329	
all	5	27B250	SPCRROLL.5ID1.5L.062T STLZNC	
all	6	27B34010SS	SPACERROLL .51ID.625L.062T SS	
all	7	02 02194	PISTON CUP=DUMPVALVE 2+3/8"	
all	8	02 18651	WASHER=2 WAY BRAKE CYL	
all	9	15G220	NUTLOK THINHX 3/8-24 SS/NYL	
all	10	60C106	ORING 5/16ID 1/16CSBUNA70#011	
all	11	02 02105B	2.38"ACYL BRASS PISTONCUP WSHR	
all	12	02 02085	UP WASHER=2"OD=PISTON CUP	
all	13	06 20702E	FLOW NOT ACTUATOR CYL HEAD	
all	14	02 02101	CYLHEAD W/TAPPED HOLE	
all	15	02 17024	SPRING-SS=DUMP 1.5OD4FL40#/"	
all	16	W6 20702F	*FLOW NOT VLV=AIR-CYL ROD WLD	
all	17	60C110	ORING 1/2IDX3/32CS BUNA70 #112	
all	18	02 02185	WASHER=PISTON CUP COMP LIMIT	
all	19	5N0ECLSBE2	NPT NIP 1/4XCLS TBE BRASS 125#	
all	20	51V015	TEE 1/4 FGDBRASS 101T7-444	
all	21	53A008B	BODYMALECON.25X.25COMP#B68A-4B	
all	22	5SCC0EBE	NPT COUP 1/4 BRASS 125# W/HEX	
all	23	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	24	96M055	DELTROL QUICK EXHAUST VLV.1/4"	
all	25	27A005	MUFFLER 3/8" BANTAM B38	

# 3-Way Pilot Valves

BMP900032/91182V  
(Sheet 1 of 1)



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BMP900032/91182V (1 of 1)

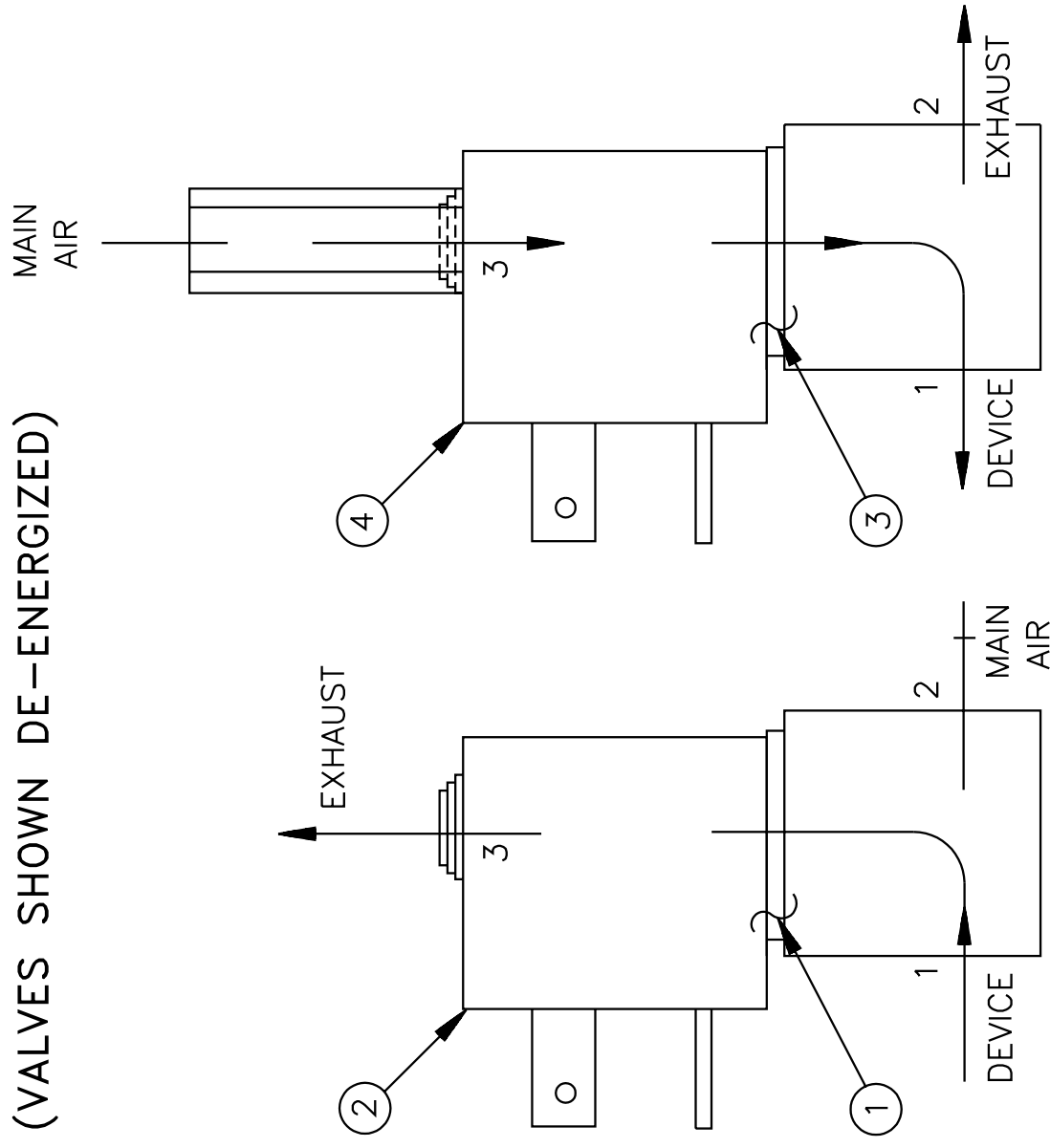
Litho in U.S.A.

## (VALVES SHOWN DE-ENERGIZED)

### 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	



NORMALLY  
CLOSED

NORMALLY  
OPEN

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



# Asco 3-way Solenoid Valves

## Applicable Models

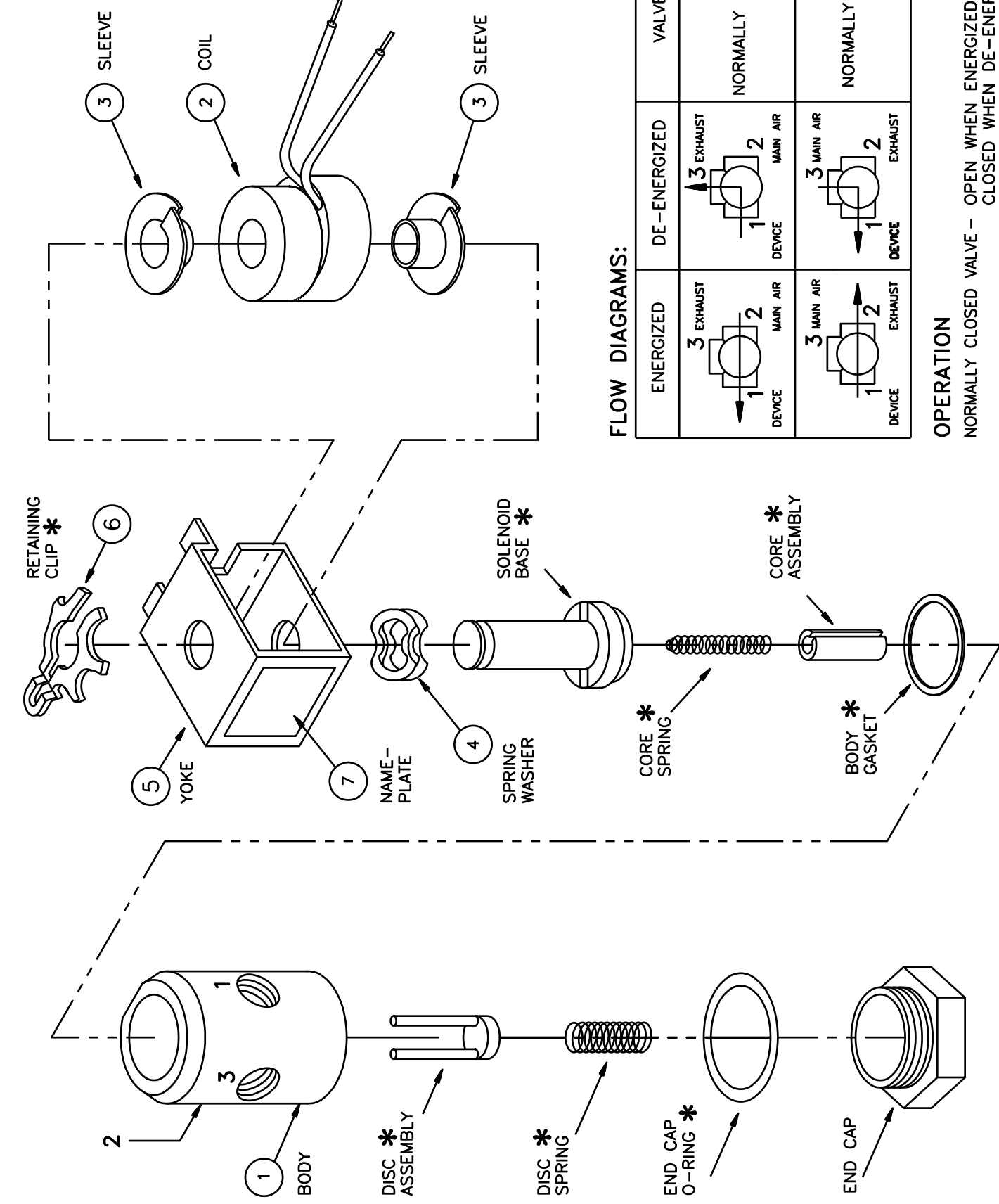


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BMP701359/97086V (1 of 2)

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BMP701359/97086V  
(Sheet 1 of 2)



### FLOW DIAGRAMS:

ENERGIZED	DE-ENERGIZED	VALVE
		NORMALLY CLOSED
		NORMALLY OPEN

### OPERATION

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

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

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

## 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.

## Maintenance

**READ ALL SAFETY STATEMENTS ABOVE BEFORE PROCEEDING ANY FURTHER!**

### Coil Replacement

1. Remove retaining clip. NOTE: When metal retaining clip disengages, it springs upward.
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.



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BMP701359/97086V (2 of 2)

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Used In		Item	Part Number	Description	Comments
<p><b>Parts List—Asco 3-way Solenoid Valves</b> 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.</p>					
-----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		00K
all	1	96R300AB	73111F 1/8"BODY-3WAY.06D NORM OPEN		00D
A,	2	96T1002A24	SOLENOID 24V ASCO#260283-005		00E
B,	2	96T1003A37	COIL 120V50/60C ASCO#162-919-1		00F
C,	2	96T1003A71	COIL 120V50/60C ASCO#162-919-2		00P
all	2	96T1003A24	COIL 24V50/60C ASCO *162-919-3		
all valves	3	96V300GB	SLEEVE ASCO#101400-1		
+ kits J-					
all	4	15UJ275	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

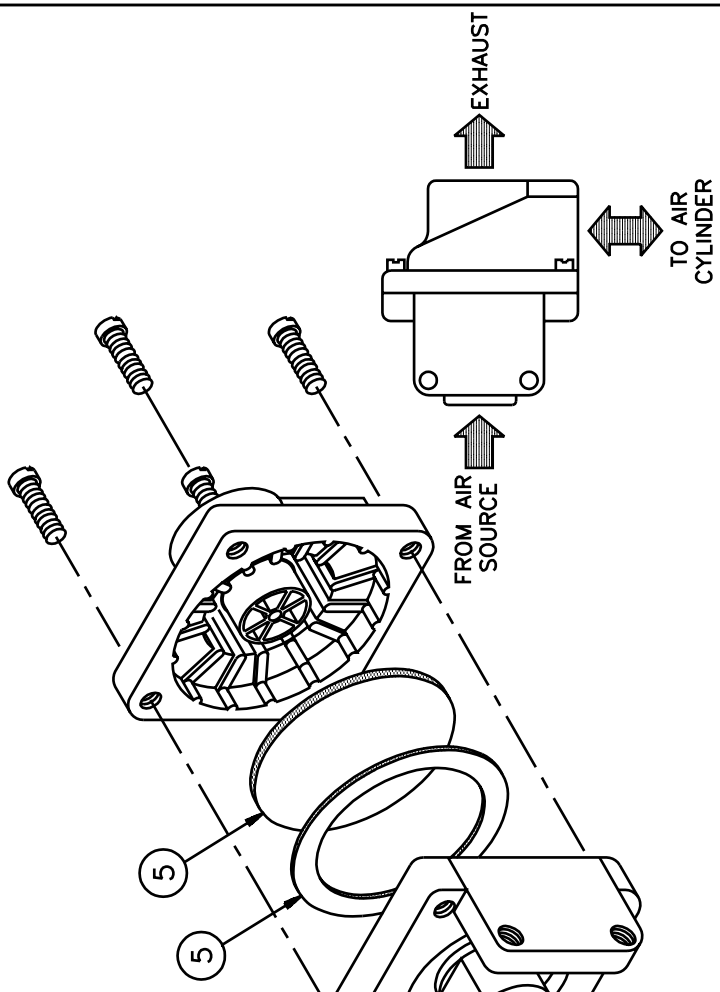
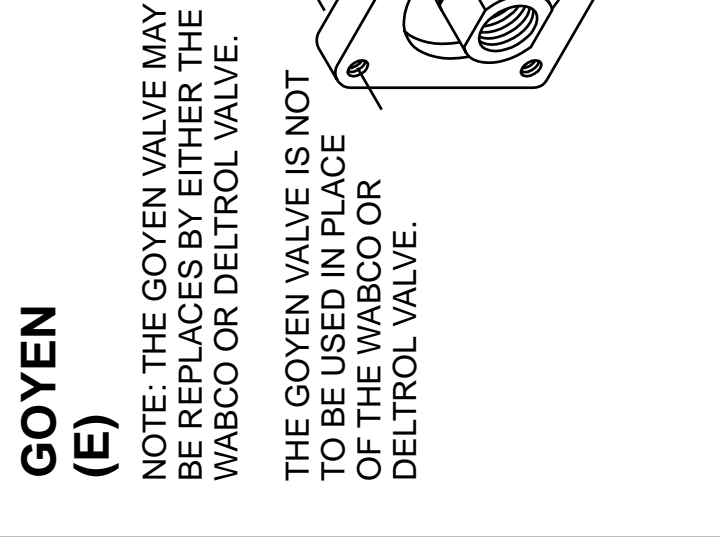
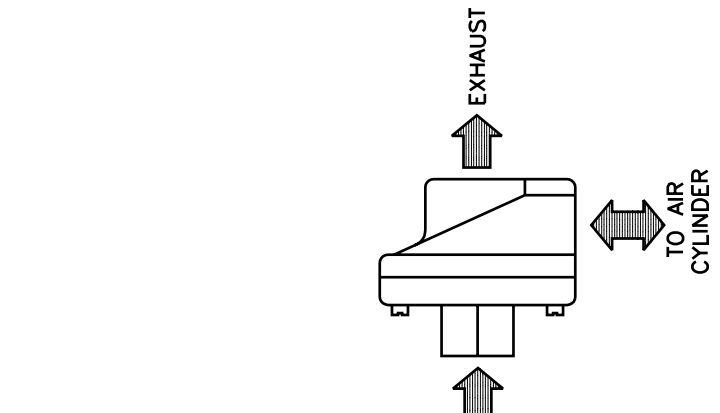
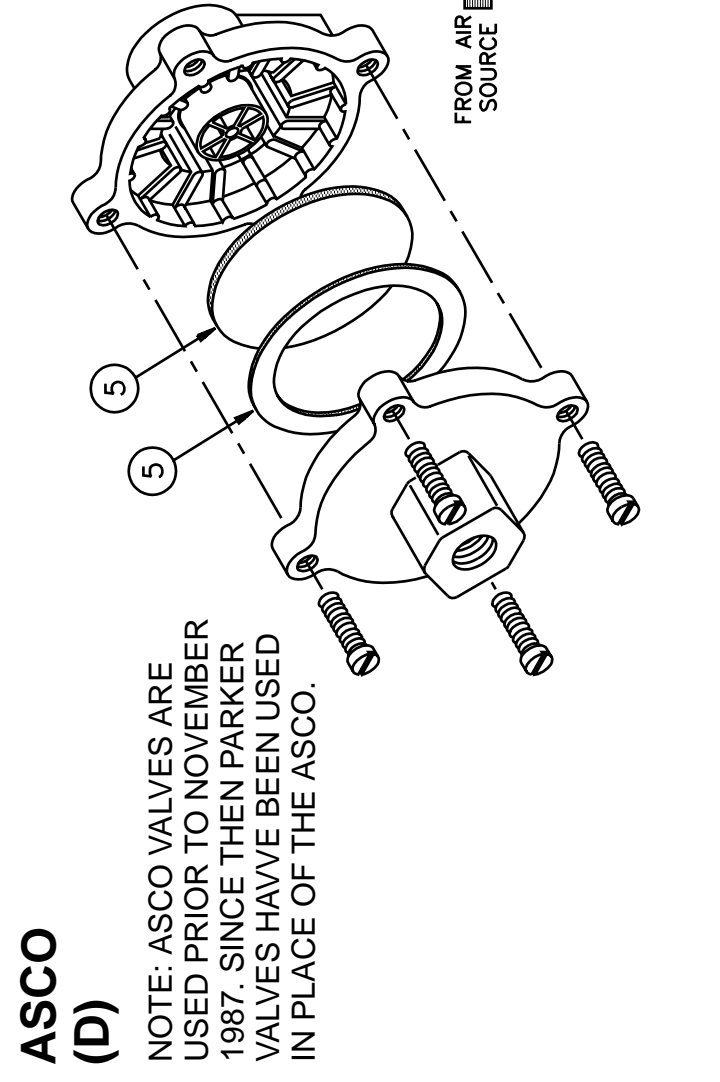
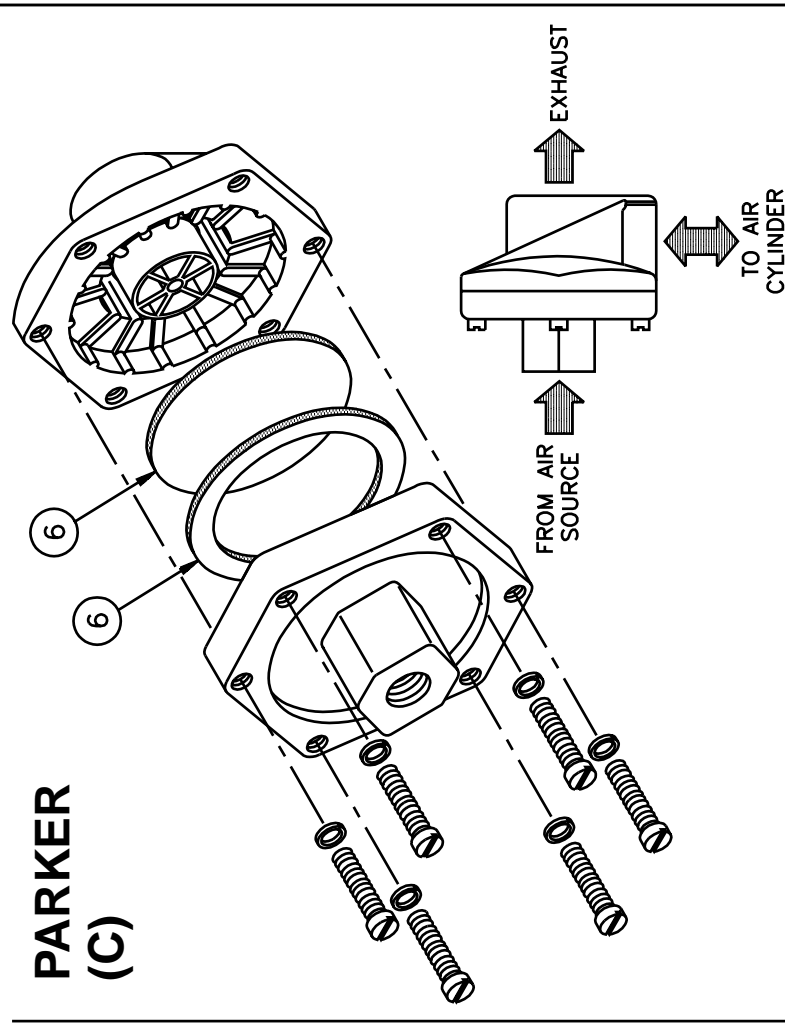
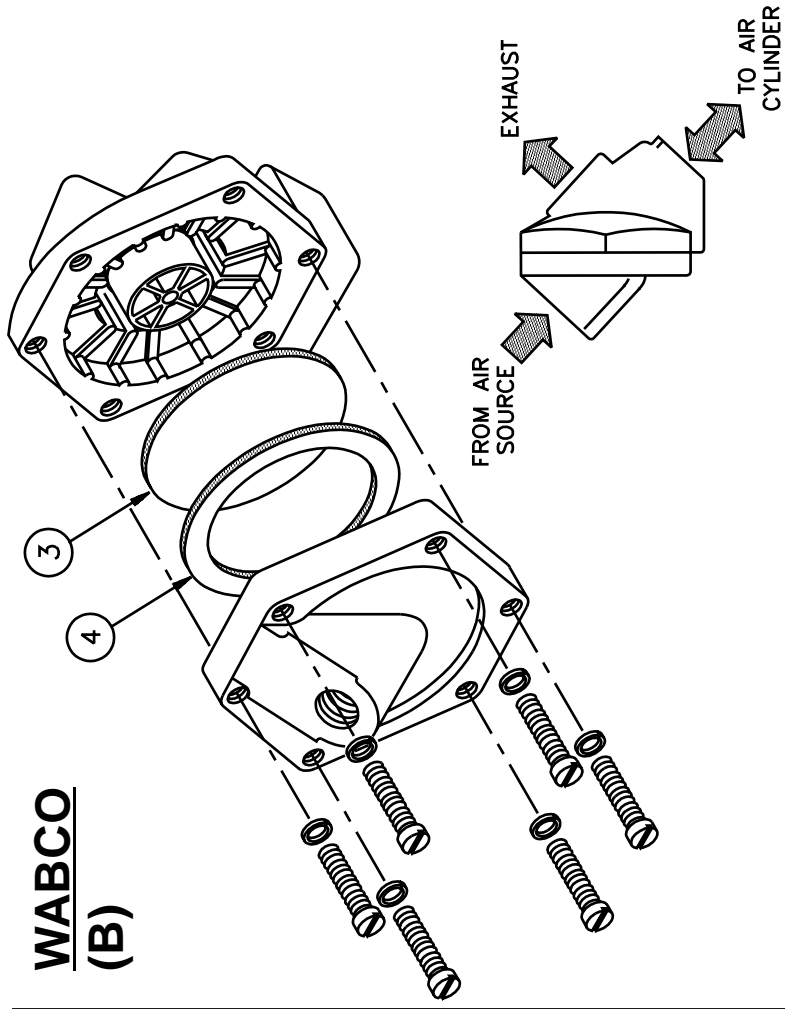
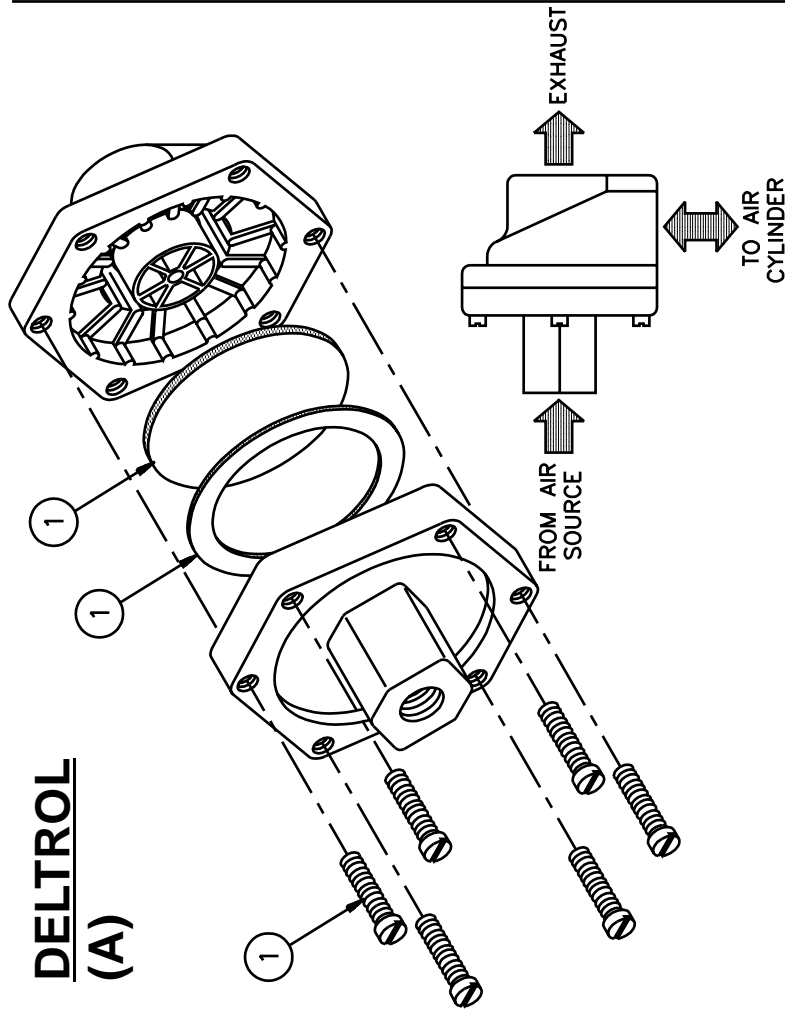
# Quick Exhaust Valves

BMP701406/2002382V  
(Sheet 1 of 2)



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

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.



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**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