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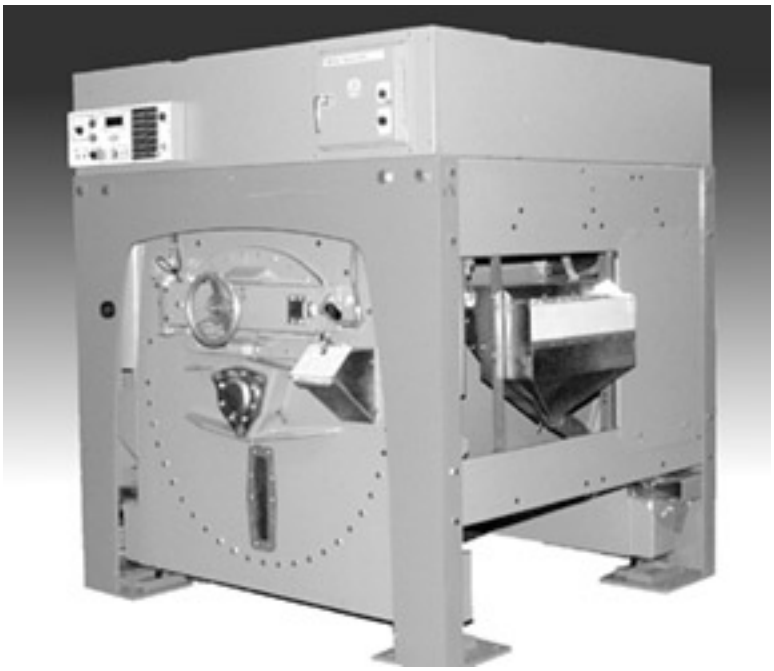
- **Document ECNs: Latest**

# Service

## 42044CP2, CP3, NP2, NP3, WP2, WP3 SM
## 42044WR2, WR3
## Washer-Extractors



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

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

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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, NEGLECT, POWER OR ENVIRONMENTAL CONTROL MALFUNCTIONS, DAMAGE FROM LIQUIDS, OR ANY OTHER CAUSE BEYOND THE NORMAL RANGE OF USE. REGARDLESS OF HOW CAUSED, IN NO EVENT SHALL MILNOR BE LIABLE FOR SPECIAL, INDIRECT, PUNITIVE, LIQUIDATED, OR CONSEQUENTIAL COSTS OR DAMAGES, OR ANY COSTS OR DAMAGES WHATSOEVER WHICH EXCEED THE PRICE PAID TO MILNOR FOR THE EQUIPMENT IT SELLS OR FURNISHES.

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

BIUUUD19 (Published) Book specs- Dates: 20081231 / 20081231 / 20081231 Lang: ENG01 Applic: UUU

# 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

— End of BIUUUD19 —

# Trademarks

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

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

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

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

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

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

— End of BIUUUS27 —

# About the Forces Transmitted by Milnor® Washer-extractors

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

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

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

## 1. Rigid Machines

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

## 2. Flexibly-mounted Machines

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

## 3. How Strong and Rigid?

Many building codes in the U.S.A. specify that laundry floors must have a minimum live load capacity of 150 pounds per square foot (732 kilograms per square meter). However, even compliance with this or any other standard does not necessarily guarantee sufficient rigidity. In any event, it is the sole responsibility of the owner/user to assure that the floor and/or any other supporting structure exceeds not only all applicable building codes, but also that the floor and/or any other supporting structure for each washer-extractor or group of washer-extractors actually has sufficient strength and rigidity, plus a reasonable factor of safety for both, to support the weight of all the fully loaded machine(s) including the weight of the water and goods, and including the published 360º rotating sinusoidal RMS forces that are transmitted by the machine(s). Moreover, the floor, foundation, or other supporting structure must have sufficient

rigidity (i.e., a natural or resonant frequency many times greater than the machine speed with a reasonable factor of safety); otherwise, the mentioned 360º rotating sinusoidal RMS forces can be multiplied and magnified many times. It is especially important to consider all potential vibration problems that might occur due to all possible combinations of forcing frequencies (rotating speeds) of the machine(s) compared to the natural frequencies of the floor and/or any other supporting structure(s). A qualified soil and/or structural engineer must be engaged for this purpose.

**Figure 1: How Rotating Forces Act on the Foundation**

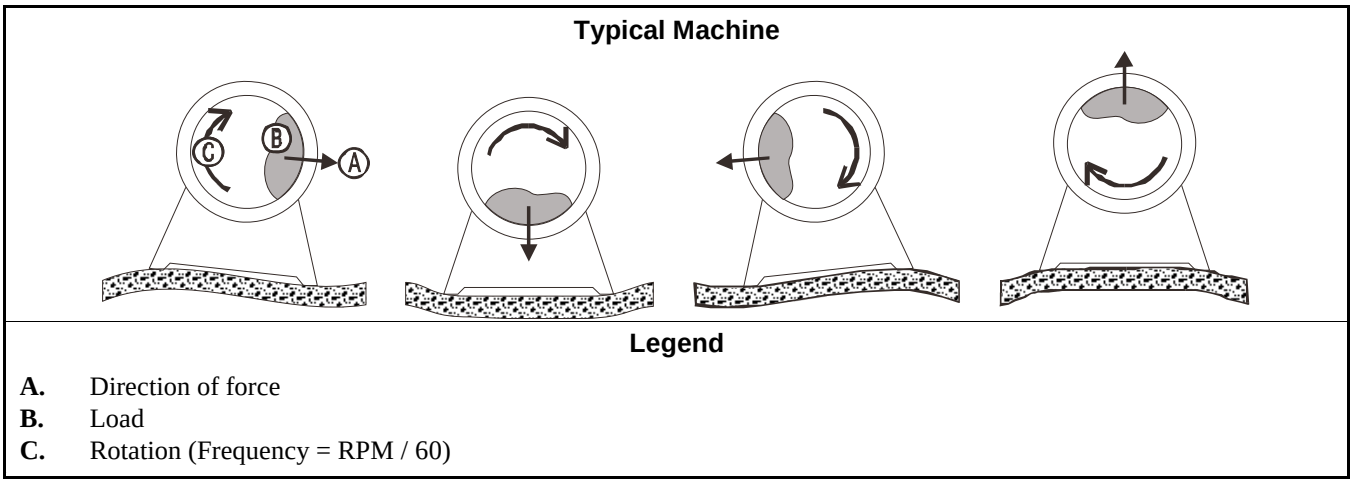



Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available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

— End of BIWUUI02 —

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

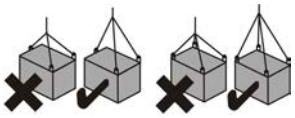
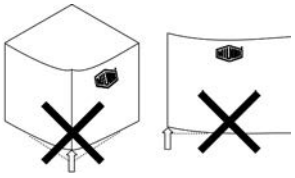
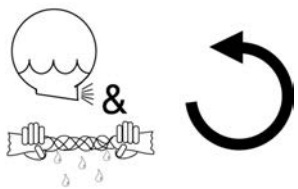
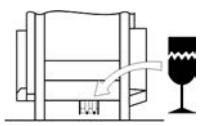
# Tag Guidelines for the Models Listed Below

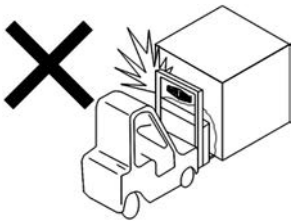
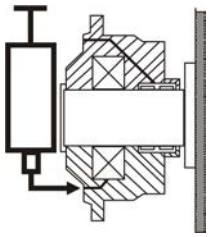
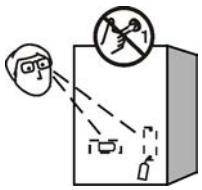
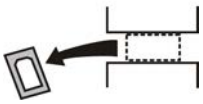
**42044CP2 42044NP2 42044SP2 42044SP3 42044WP2 42044WP3 60044SP2 60044SP3 60044WP2 60044WP3 72044SP2 72044SP3 72044WP2 72044WP3**

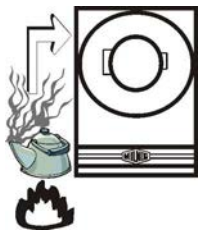
**Notice 1:** This information may apply to models in addition to those listed above. It applies to paper tags. It does not apply to the vinyl or metal safety placards, which must remain permanently affixed to the machine and replaced if no longer readable.

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.

The following entries explain the installation tags. Each entry includes: 1) the tag illustration, 2) the tag part number displayed st 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 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. |
|  | 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. |

| Display or Action | Explanation |
| --- | --- |
|  | B2T2004027: Steam connection (optional) |

— End of BIUUUI02 —

# Installation Tag Guidelines

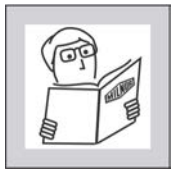
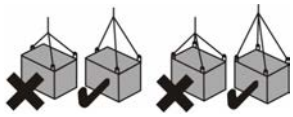


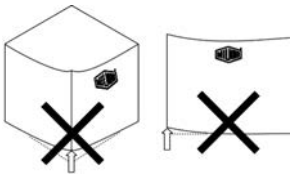
| | | | |
|---|---|---|---|
| 42044SR2 | 42044SR3 | 42044WR2 | 42044WR3 |
| 60044SR2 | 60044SR3 | 60044WR2 | 60044WR3 |
| 72044SR2 | 72044SR3 | 72044WR2 | 72044WR3 |

**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.

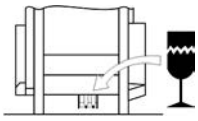
The following entries explain the installation tags. Each entry includes: 1) the tag illustration, 2) the tag part number at the bottom of the tag, and 3) the meaning of the tag.

| 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. |

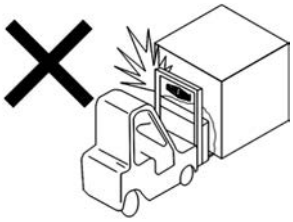


B2TAG94084: Do not lift from one corner of the machine, as this can cause the frame to rack, damaging it.

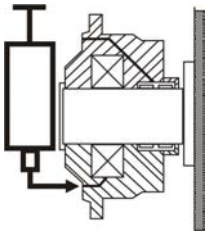
B2TAG94097: The cylinder must rotate **counterclockwise** during draining and extraction (spin) when viewed from here (rear of machine). Otherwise, reverse the electric power connections, as explained in the schematic manual.



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

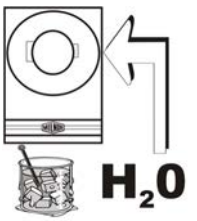


B2TAG94118: Do not strike shipping container during fork-lifting. Fragile components inside.



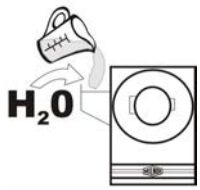
B2TAG96007: Add grease here. Refer to the preventive maintenance schedule in the service manual.


B2T2001013: Hot water connection.

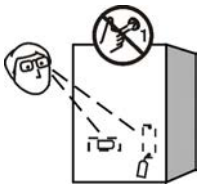



B2T2001014: Cold water connection.


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

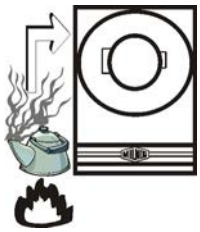



B2T2001016: Flushing water connection. This is the water that goes into the supply compartment or pumped chemical manifold to flush chemicals into the machine.



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

# Safety Placard Use and Placement

## 42044WP2 & NP2 SINGLE MOTOR DRIVE



Pellerin Milnor Corporation
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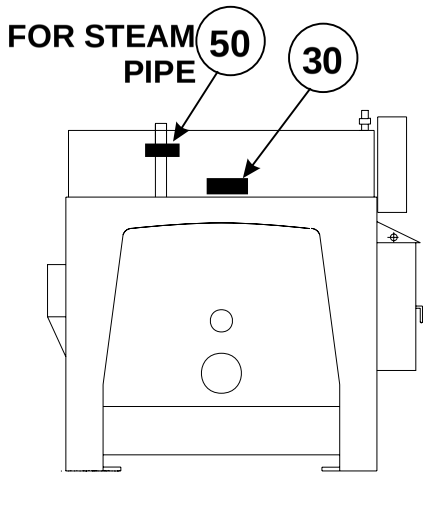
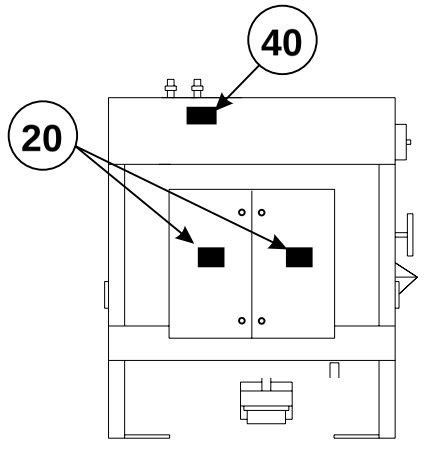
Litho in U.S.A.

**Notes:**

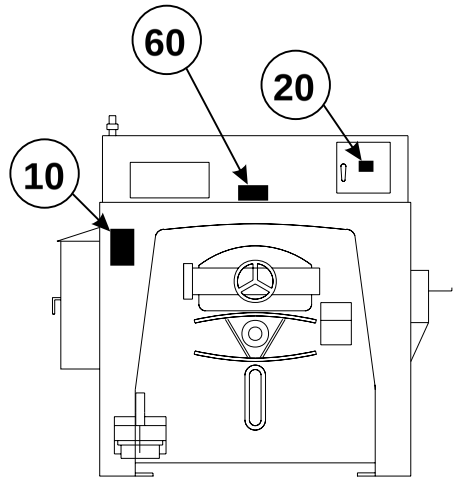
1. **Replace placard immediately, if removed or unreadable.**
2. **Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.**



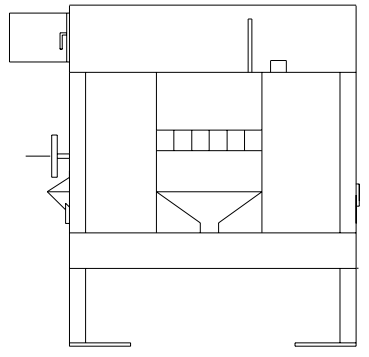

**REAR VIEW**




**LEFT VIEW**




**FRONT VIEW**



**RIGHT VIEW**

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## 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 | |

# Safety Placard Use and Placement ISO

## 42044WP2 & NP2 SINGLE MOTOR DRIVE



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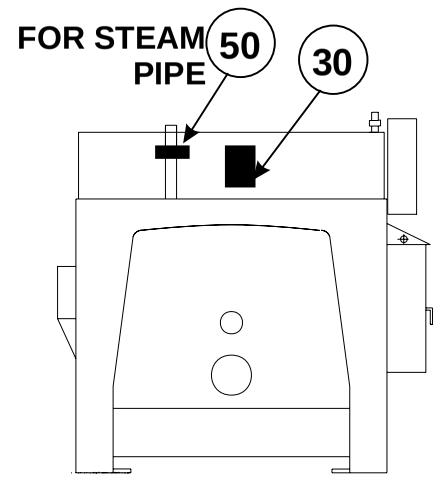
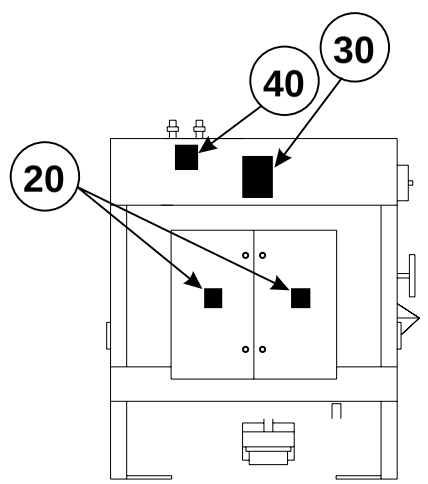
### ISO Placards shown on this page

**Notes:**

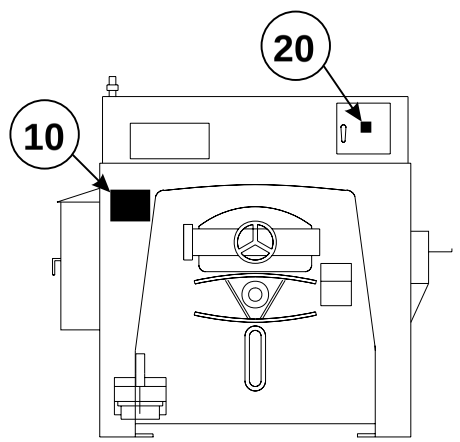
1. **Replace placard immediately, if removed or unreadable.**
2. **Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.**



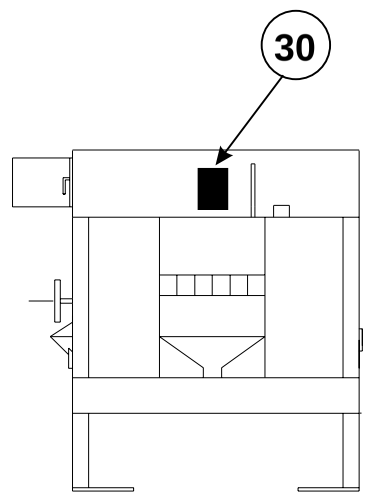

REAR VIEW




LEFT VIEW




FRONT VIEW




RIGHT VIEW

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## 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

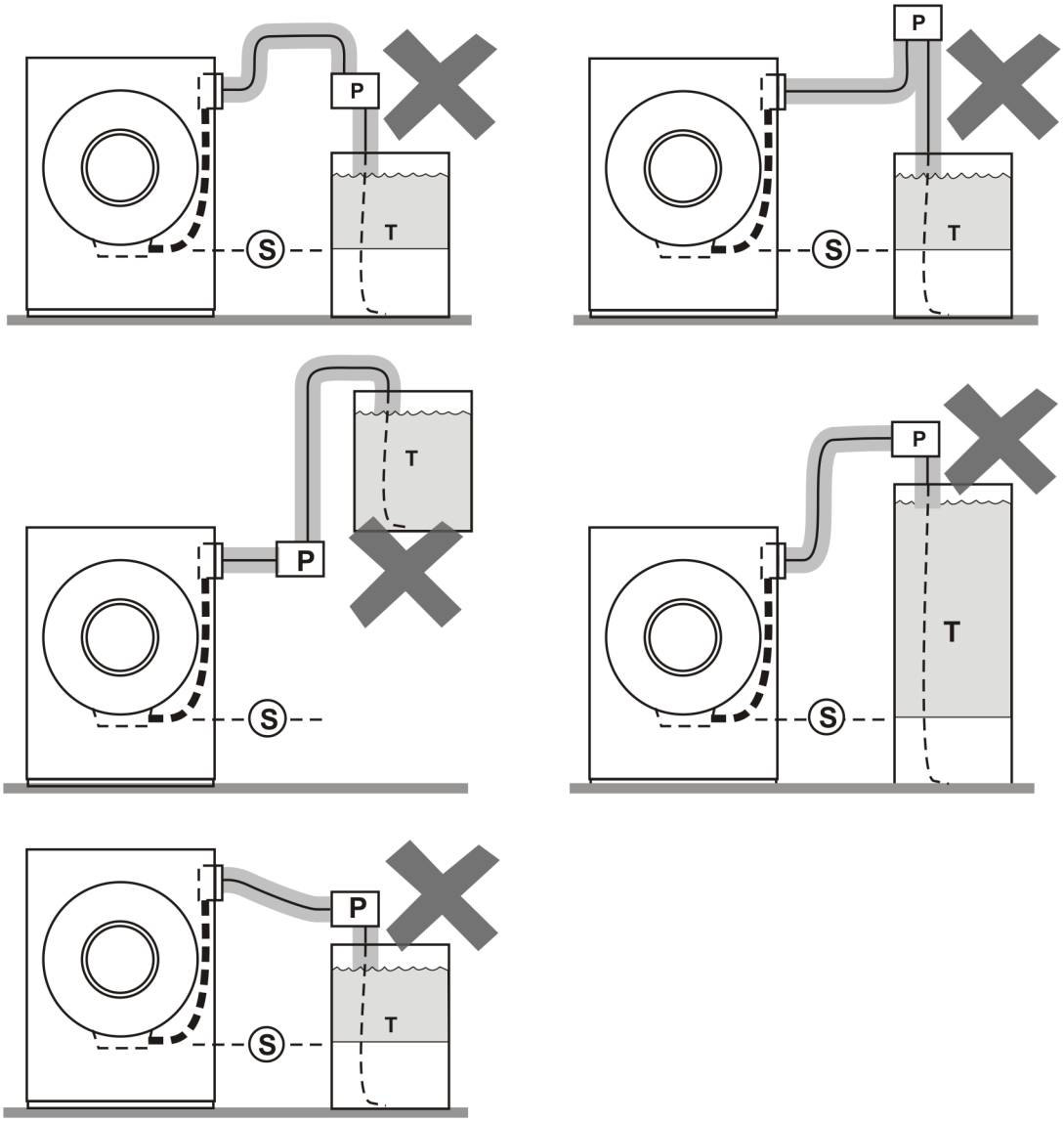
Many chemical systems:

- 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**

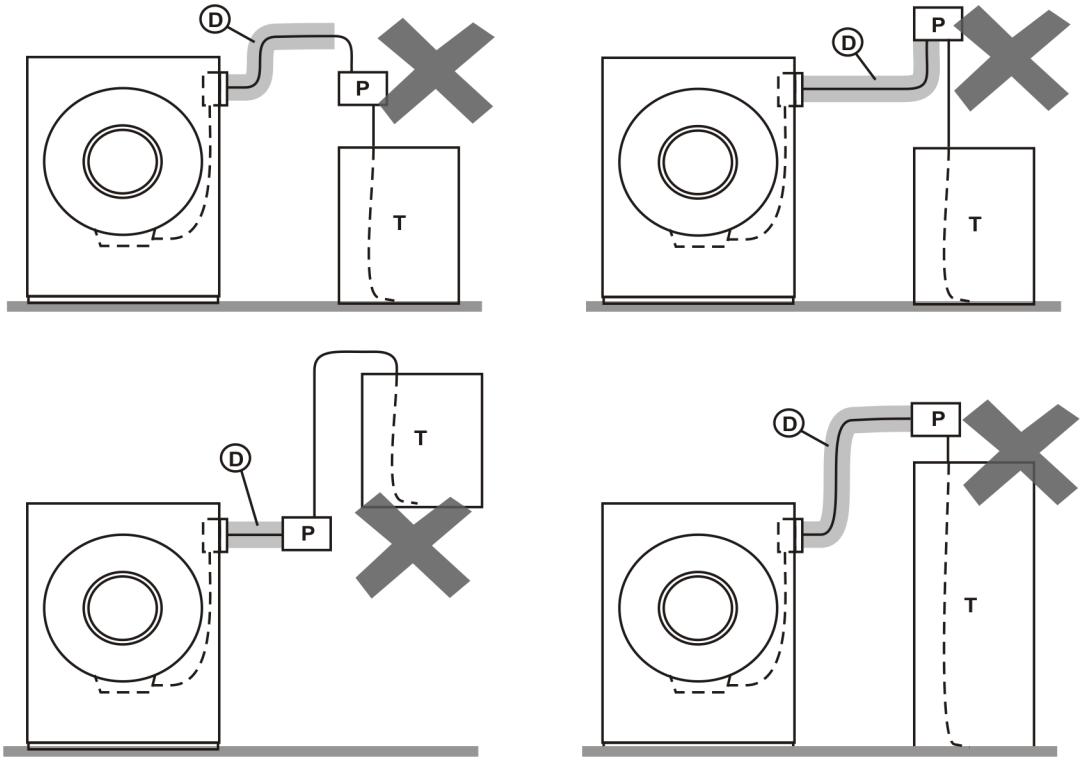
**Schematic Views**




**Legend**

**P.** Pump
**T.** Chemical tank
**S.** The siphon occurs above here. Liquid in the gray parts of the chemical tube and tank can go in the machine.

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




**Legend**

**P.** Pump
**T.** Chemical tank
**D.** Chemical tube. Liquid in the gray areas can go in the machine.

# 2. Equipment and Procedures That Can Prevent Damage

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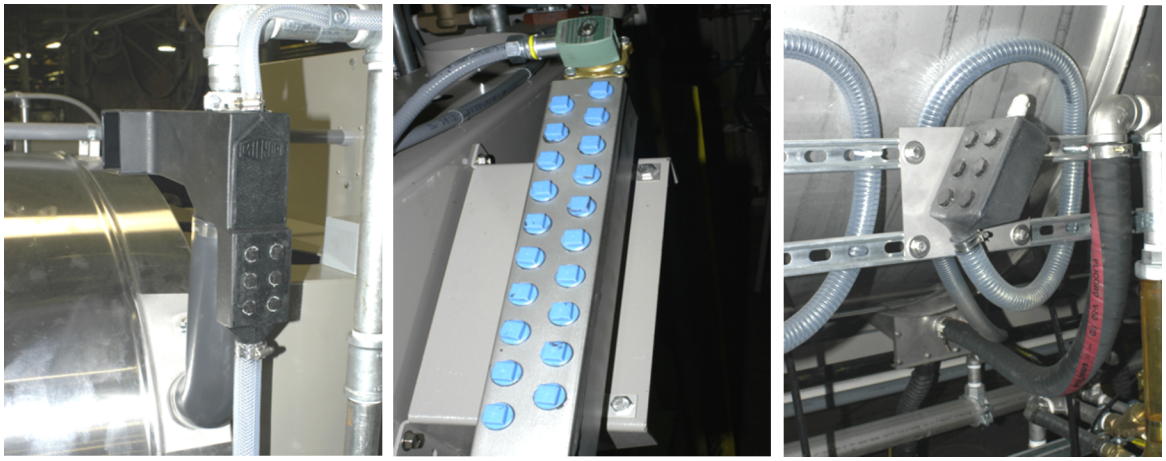
## Use the chemical manifold supplied.

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.

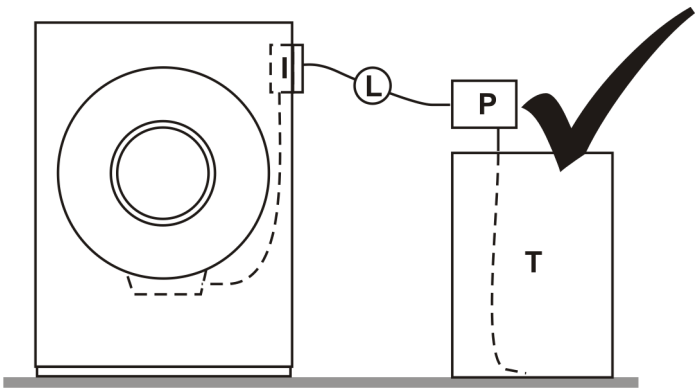
## Flush the chemical tube with water.

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)**




**Legend**

| | |
|---|---|
| **I.** | Chemical inlet on the machine |
| **L.** | Chemical tube |
| **P.** | Pump |
| **T.** | Chemical tank |

## 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.

End of document: BNUUUR02

# Service and Maintenance

1

# General Assembly
## 4231 & 4244WP2/WP3



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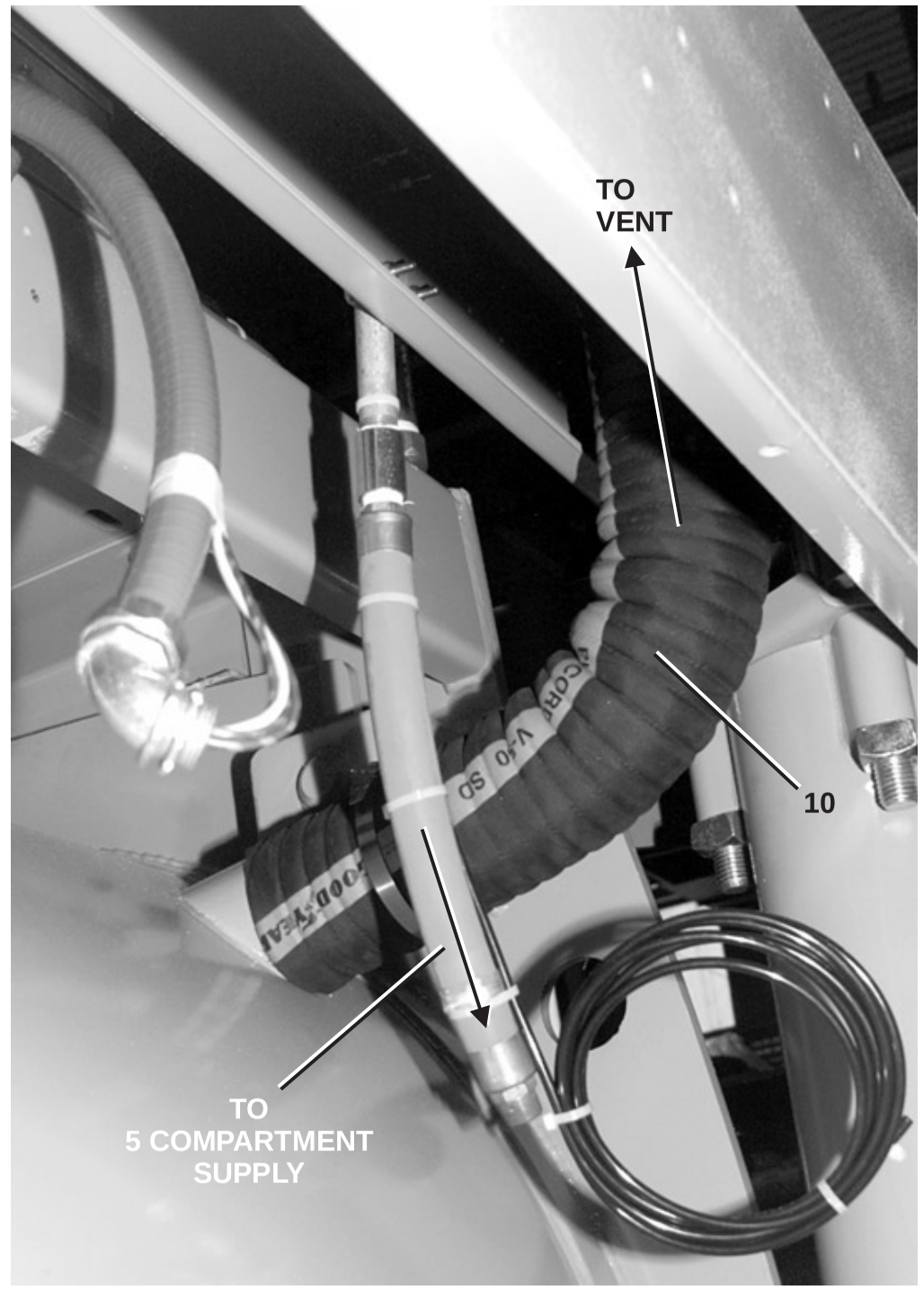

# General Assembly
## 4231 & 4244WP2/WP3



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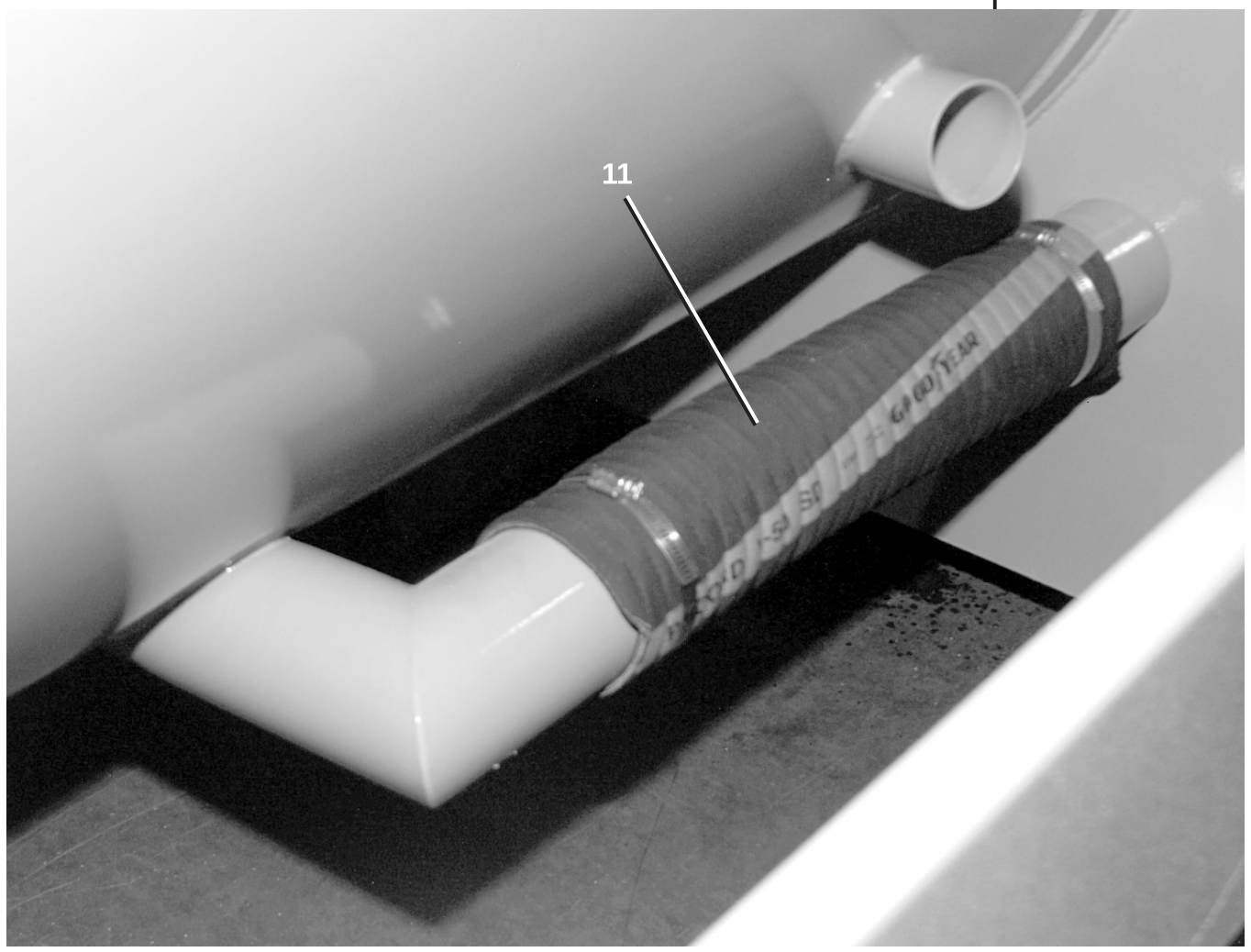
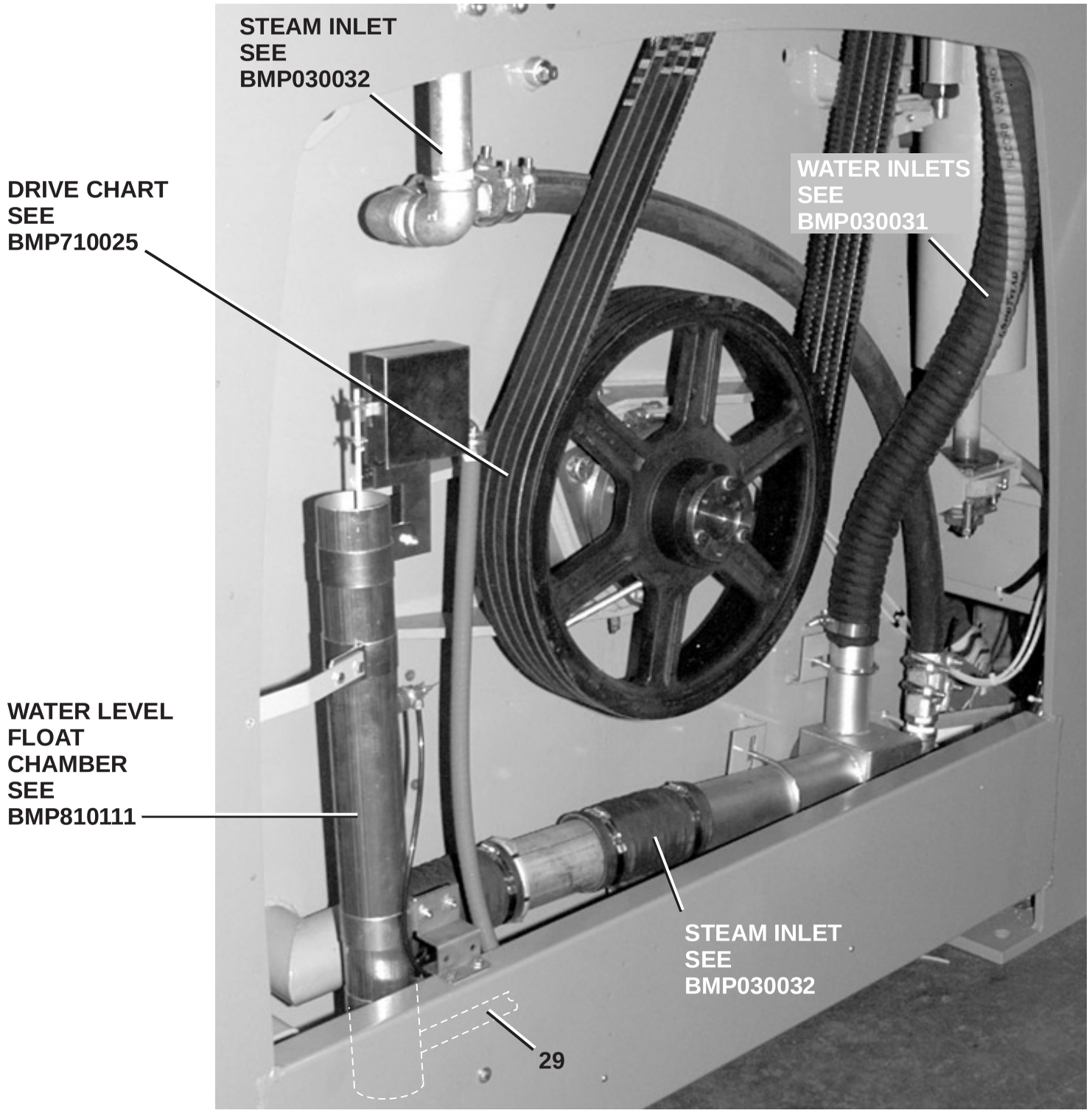
29



# General Assembly

## 4231 & 4244WP2/WP3



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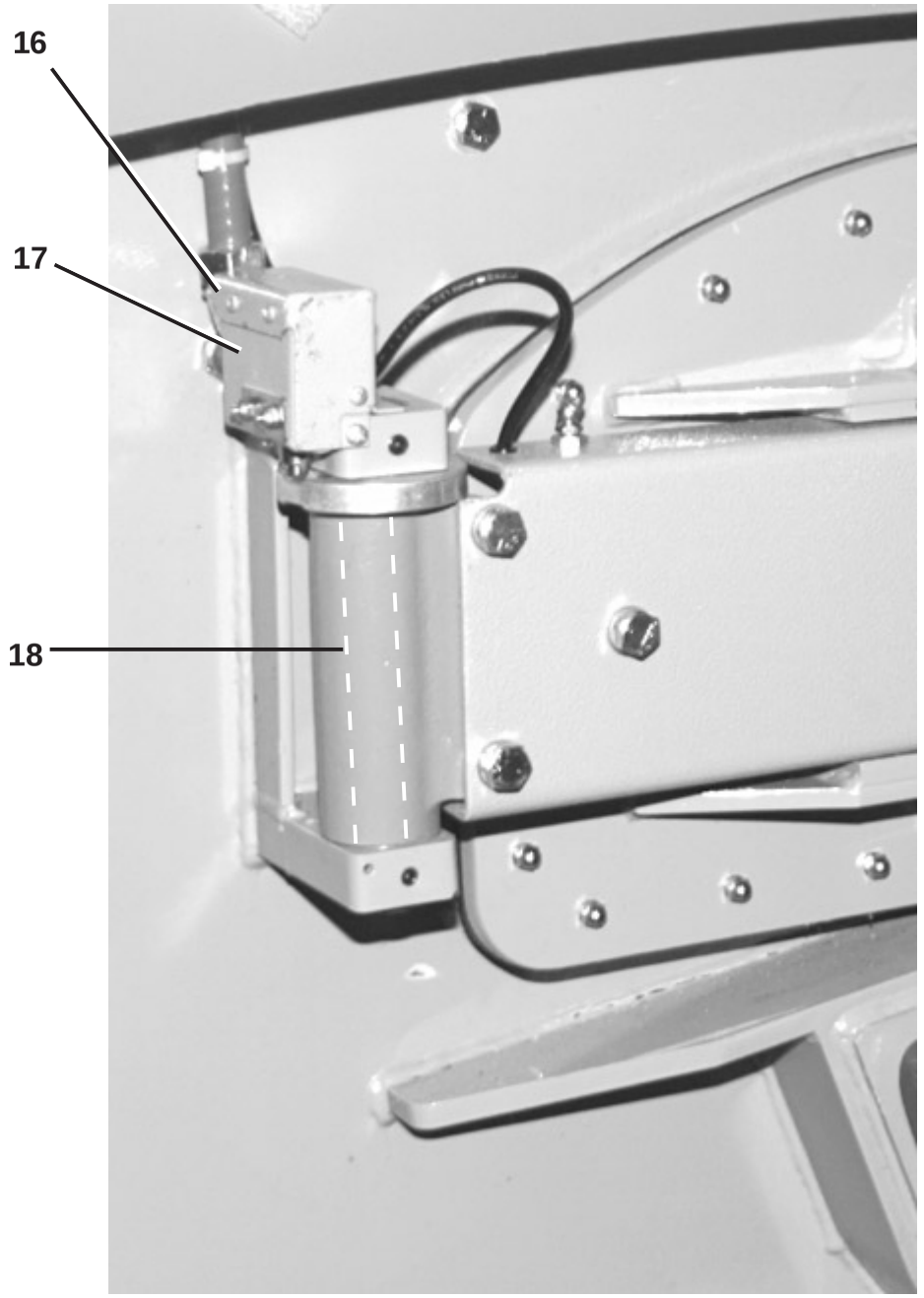
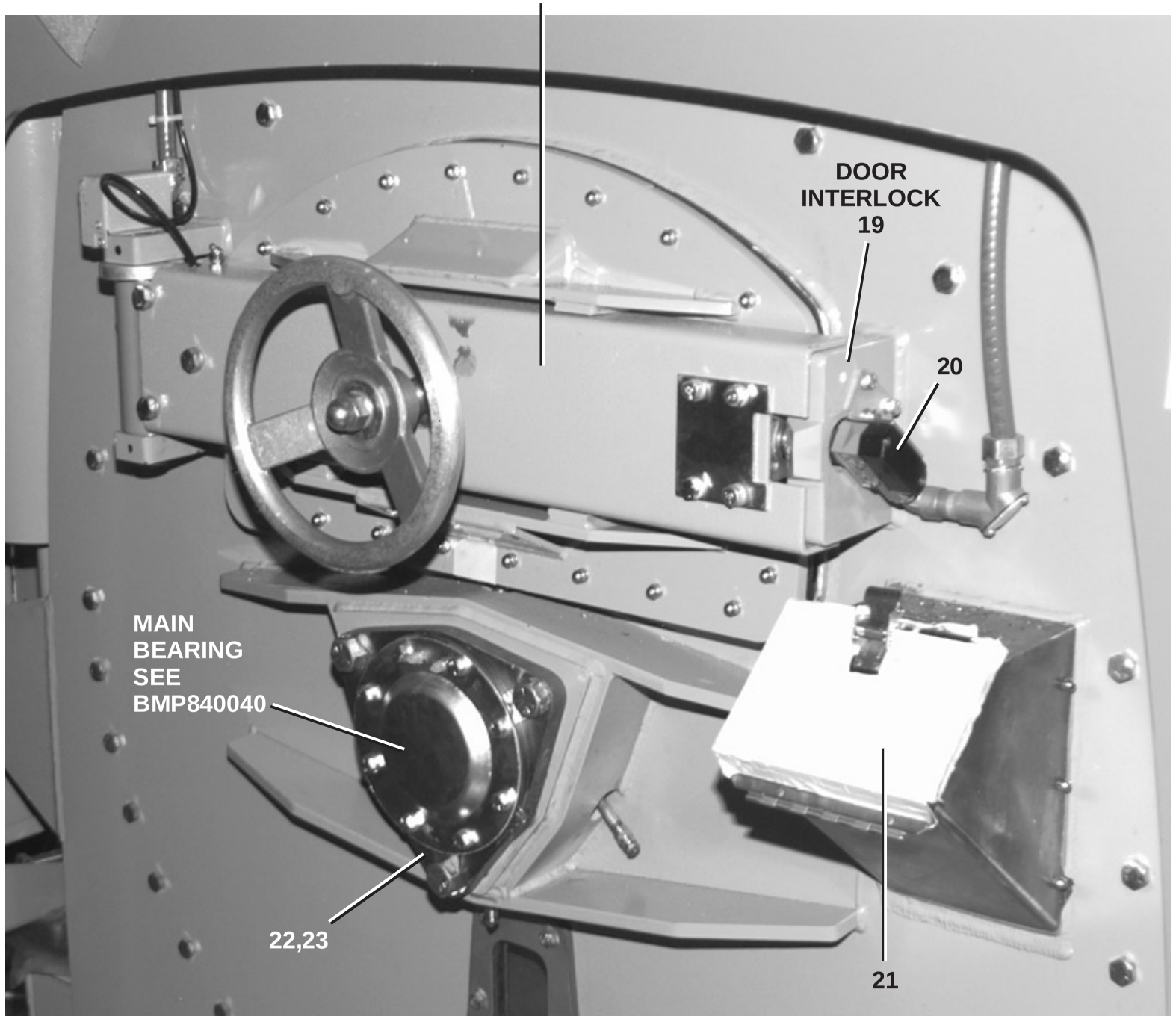
SECONDARY
DOOR SWITCH




DOOR ASSEMBLY
SEE BMP990047



# General Assembly
## 4231 & 4244WP2/WP3



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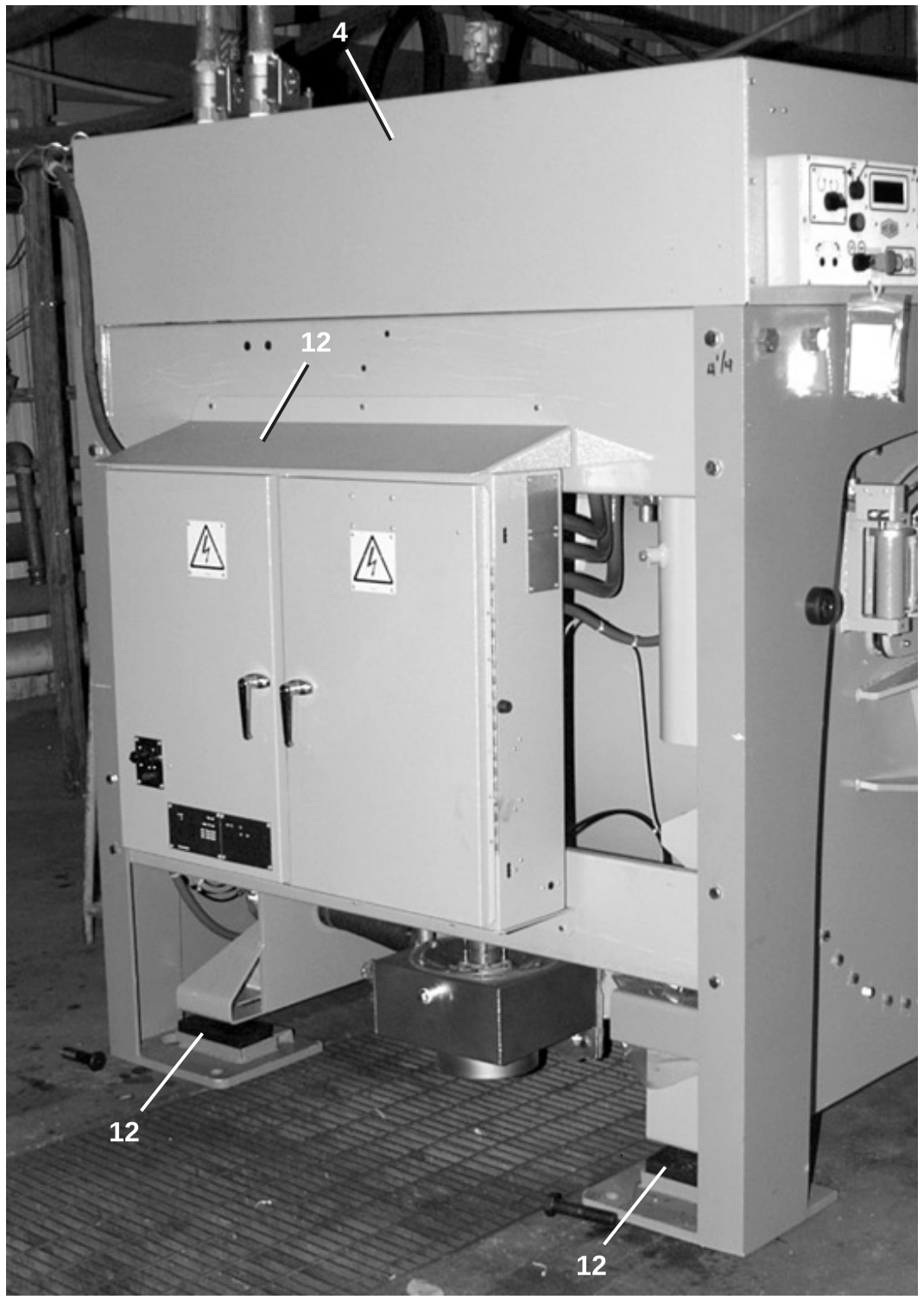


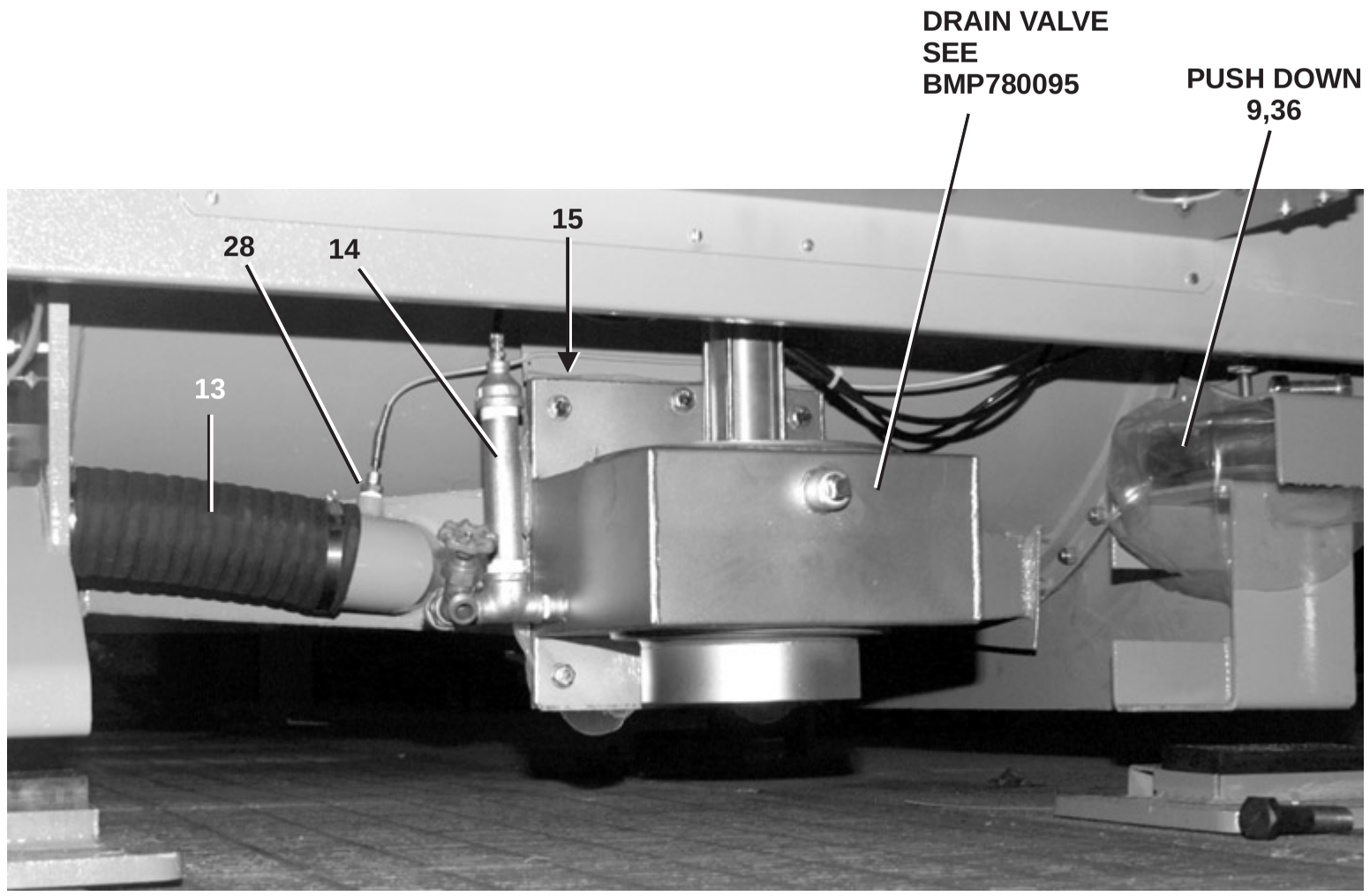

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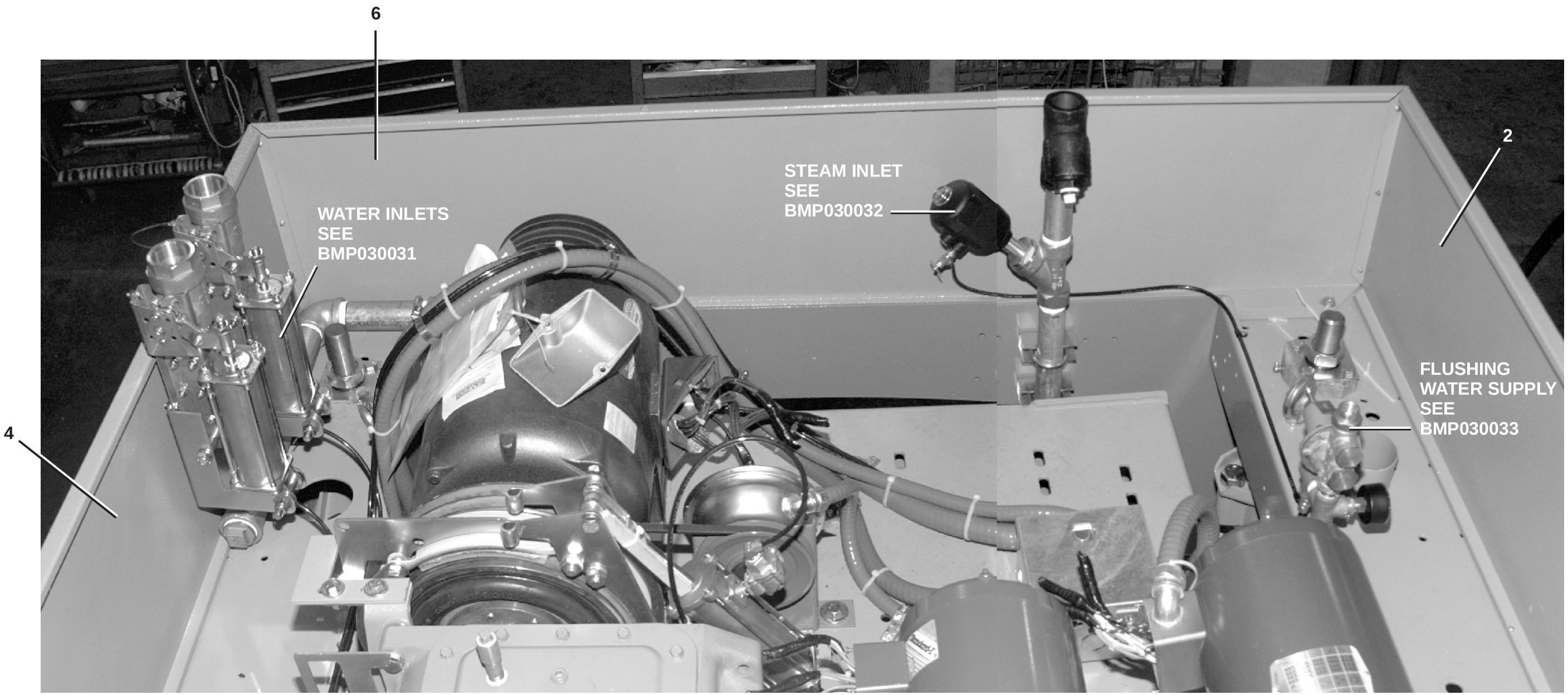

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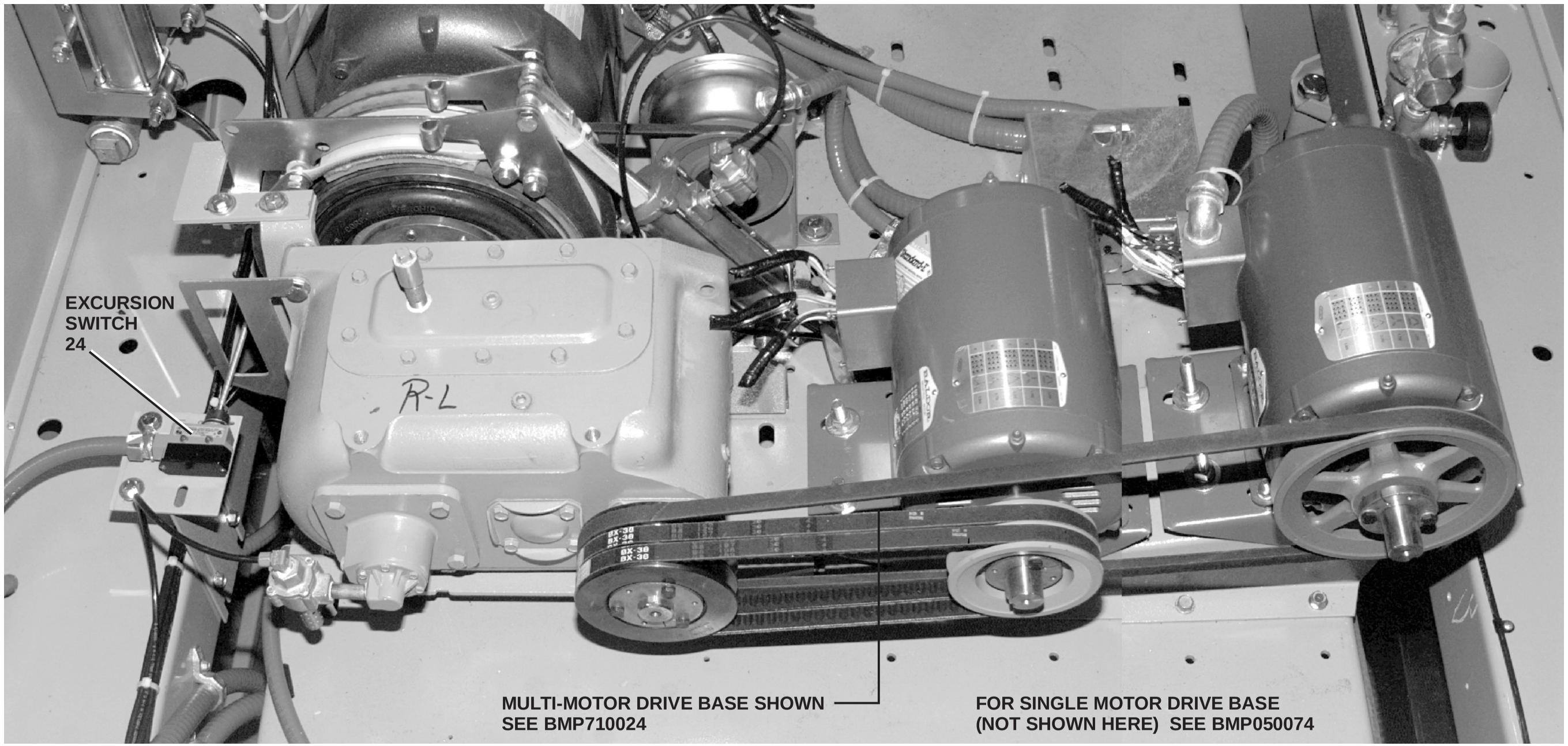

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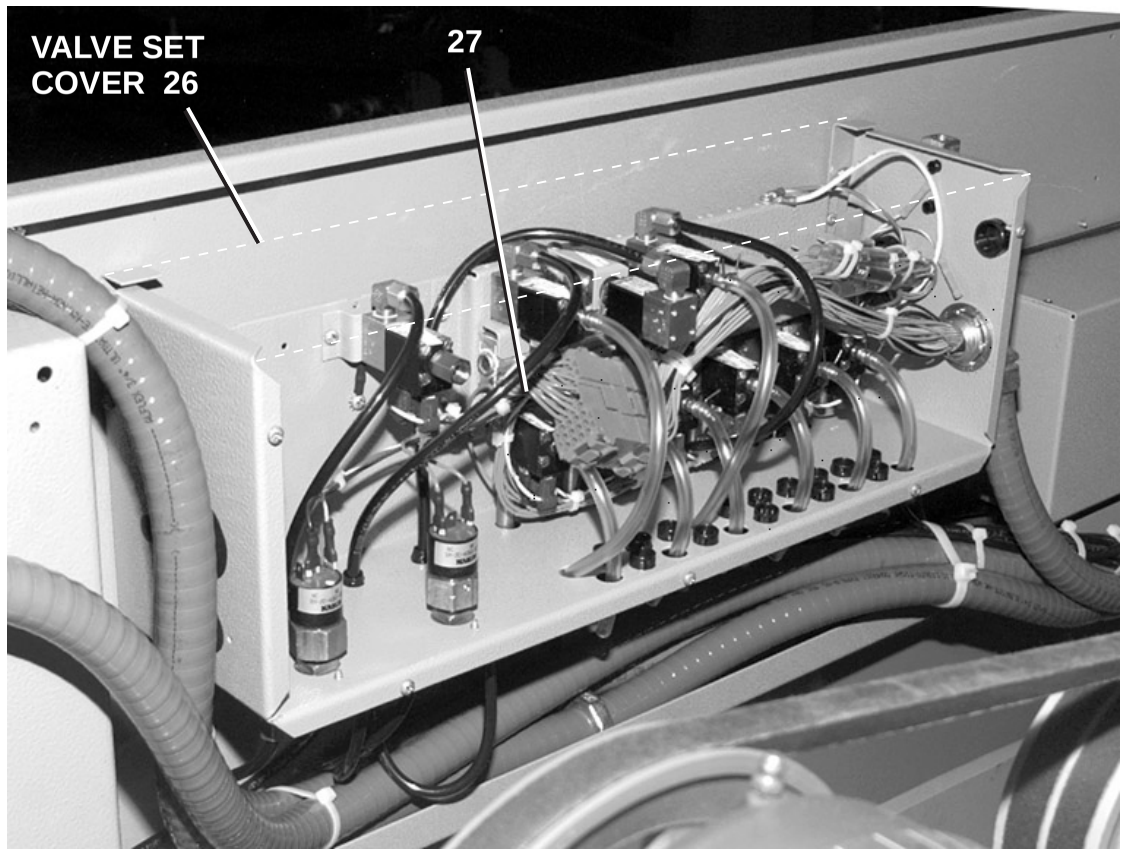


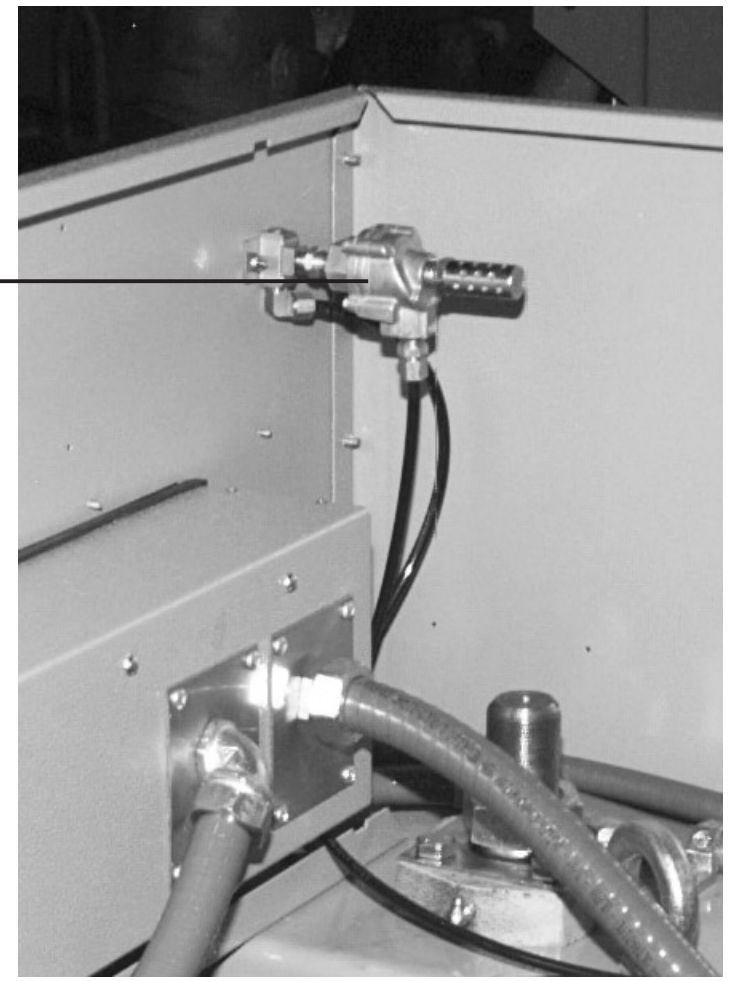

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## Parts List—General Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | | |
| | | | ----------ASSEMBLIES---------- | |
| | | | none | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 02 15627W | DRIVEBASE ENCL FRT 4244WEMIC | |
| all | 2 | X2 16137 | ENCL DR. BSE-SD 64.38"LG | |
| all | 3 | X2 15628 | ENCL DR. BSE-RR 69"LG | |
| all | 4 | X2 16137 | ENCL DR. BSE-SD 64.38"LG | |
| all | 5 | AD 15 101 | SIGHT GLASS ASSY-SS=WEHU | |
| all | 6 | 02 15014D | GASKET SHELL RING DYA | |
| all | 7 | 02 15936B | COVER=4244WP2 W/NO SUPPLY RT | |
| all | 8 | 02 15936A | +COVER=4244WP2&3 SUPPLY SIDE | |
| all | 9 | 60B100 | AIRMT S116B 1CONV F3582017564 | |
| all | 10 | 60E306A24A | HOSE *3.5"ID GATES PE X24" | |
| all | 11 | 03 01448A | COV=CONT BOX NAVY | |
| all | 12 | 02 15450 | RESTPAD(RUBBER) 4/42WEHU | |
| all | 13 | 60E306A12A | HOSE *3.5"ID GATES PE X12" | |
| all | 14 | AD 15 090A | AIRCHAMBER PRESWITCH INSTALL | |
| all | 15 | 02 18107 | GASKET=8"FLANGED DUMP VALVE | |
| all | 16 | W2 15585E | *WLMT=COV 2ND DR SW 4244/31 | |
| all | 17 | 02 15585D | BRKT=2ND DRSW 4244/4231WP/SG | |
| all | 18 | 02 15139 | PIN-DOOR HINGE | |
| all | 19 | AD 15 042A | DOOR INTERLOCK SWITCH INSTAL | |
| all | 20 | AD 15 042 | *DOOR INTERLOCK SWITCH ASSY | |
| all | 21 | AD 15 091 | SOAP CHUTE LID INSTALLATION | |
| all | 22 | X2 15683 | SUPPORT-SHAFT=2/42WEHU | |
| all | 23 | 02 15695 | GASKET=SHAFT SUP 2/42WEHU | |
| all | 24 | E03 33100 | * EXCURSION SWITCH ASSY | |
| all | 25 | X2 16137 | ENCL DR. BSE-SD 64.38"LG | |
| all | 26 | 03 CL721K | COVER:W/E DYE MICRO VAL SET | |
| all | 27 | AVA6243W37 | *MIC6 AIRVALASSY 4231-4244WPU | |
| all | 28 | 30R0043PB | TEMPERATURE PROBE ASSY=BRASS | |
| all | 29 | 60E011 | TUBING 1"ID X 1+3/16"OD POLYUR | |
| all | 30 | 02 15937A | +COV=4244WP2&3 ELEC BOX SIDE | |
| all | 31 | 09R008ASTD | * 09R008A+MOUNTING HDWRE+INST | |
| all | 32 | 02 20016 | COVER=SIDE SUPPLY 4244SGH | |
| all | 33 | 02 15619 | BRKT=42 SUPINJ BEND @PRINT | |
| all | 34 | 09RM02212S | CAPSW 12' 180DEG ROLLER SILVER | |
| all | 35 | 60E301A18A | HOSE= *2.5"ID PE X18" | |
| all | 36 | 02 20016 | COVER=SIDE SUPPLY 4244SGH | |

# LUBRICATION AND PREVENTIVE MAINTENANCE FOR HYDRO-CUSHION® MACHINES

## General Requirements

Maintenance procedures require:

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

## Lubricant Requirements

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

**⚠ DANGER ⚠**

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

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

**⚠ DANGER ⚠**

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

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

## ⚠ DANGER ⚠

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

- ☞ **NEVER manually tilt (lift) both ends of the machine at the same time. One end must always be seated in its cradle.**
- ☞ **ALWAYS visually inspect the tilt wheels to be sure they are all fully seated in their cradles before each manual tilt up.**
- ☞ **Hydraulic valve manual operation must be done by trained competent maintenance personnel who thoroughly understand the system and all the consequences of manual operations.**
- ☞ **ALWAYS understand beforehand all the consequences of manually operating hydraulic valves.**
- ☞ **Never permit operation with malfunctioning tilt limit switches.**

# Correct Grease Gun Procedures

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

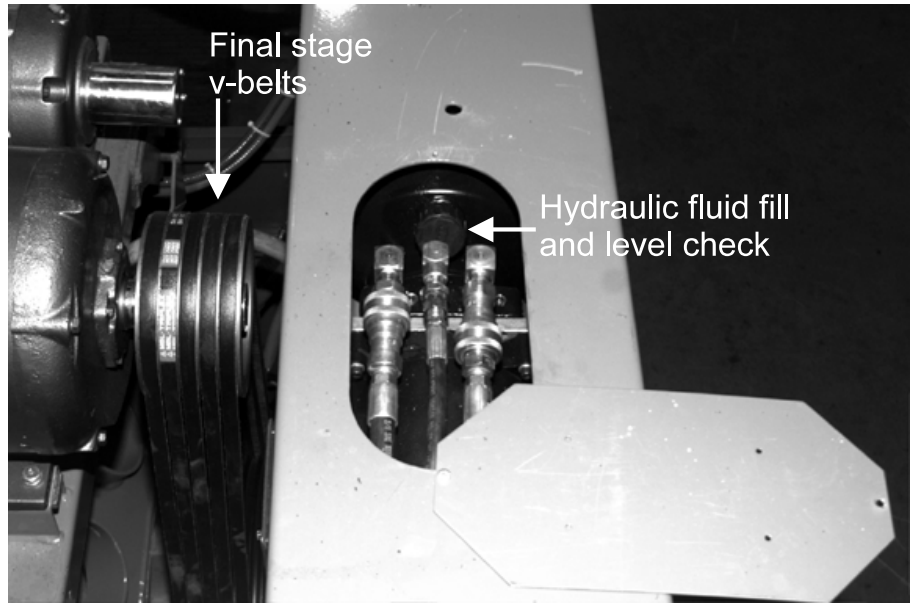



**FIGURE 1** (MSSM0201CE)
**Hydraulic Fluid Reservoir Fill and Level Check Point (located at rear of 48", 52", and 72" tilt machines only)**

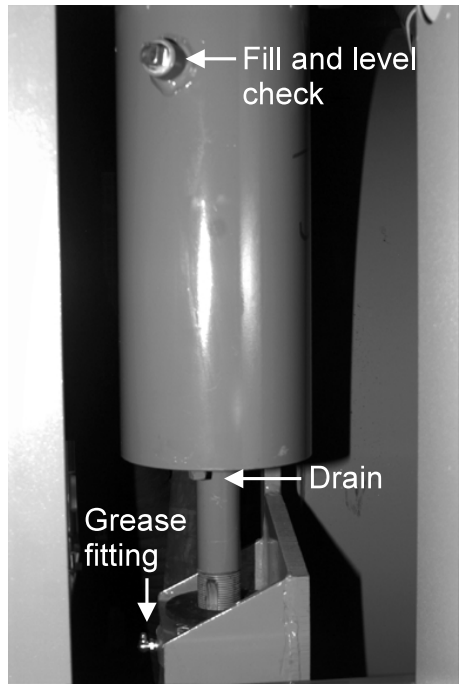



**FIGURE 2** (MSSM0201CE)
**Typical Hydro-Cushion® Maintenance Points**

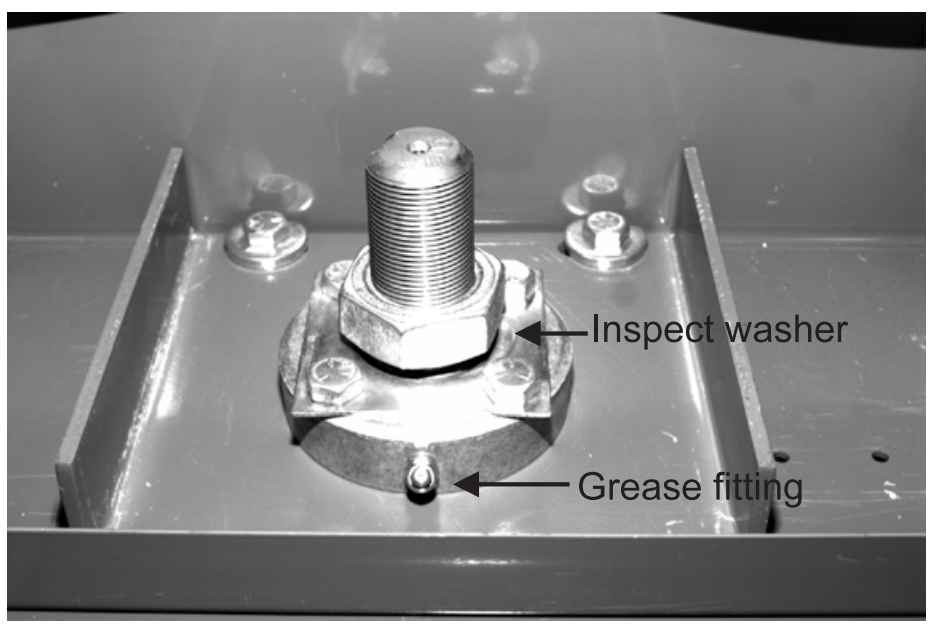



**FIGURE 3** (MSSM0201CE)
**Typical Upper Hydro-Cushion® Grease Fitting**

## Daily and Weekly Maintenance Items

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

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

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

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

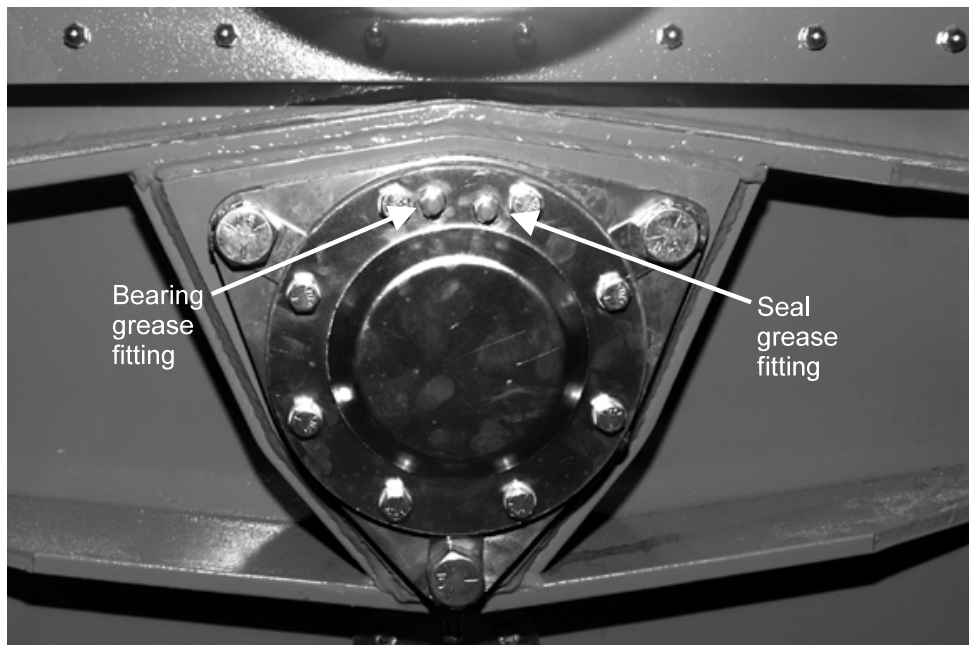



**FIGURE 4** (MSSM0201CE)
**42" Divided Cylinder Front Bearing and Seal Grease Fittings**

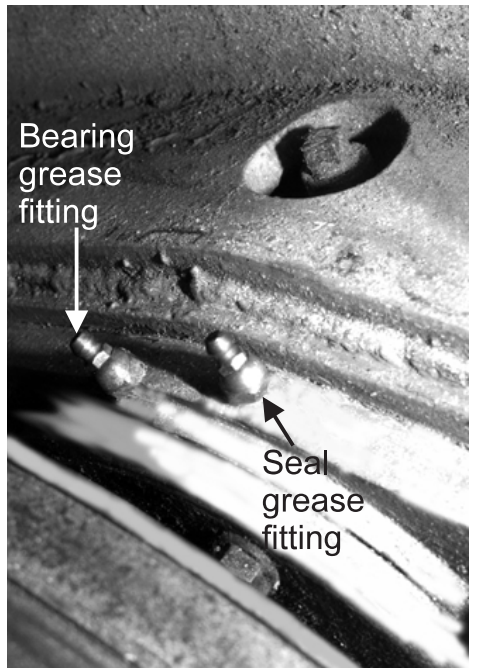



**FIGURE 5** (MSSM0201CE)
**42" Staph-Guard® Front and Rear Bearing and Seal Grease**

## Monthly Maintenance Items

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

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

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

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

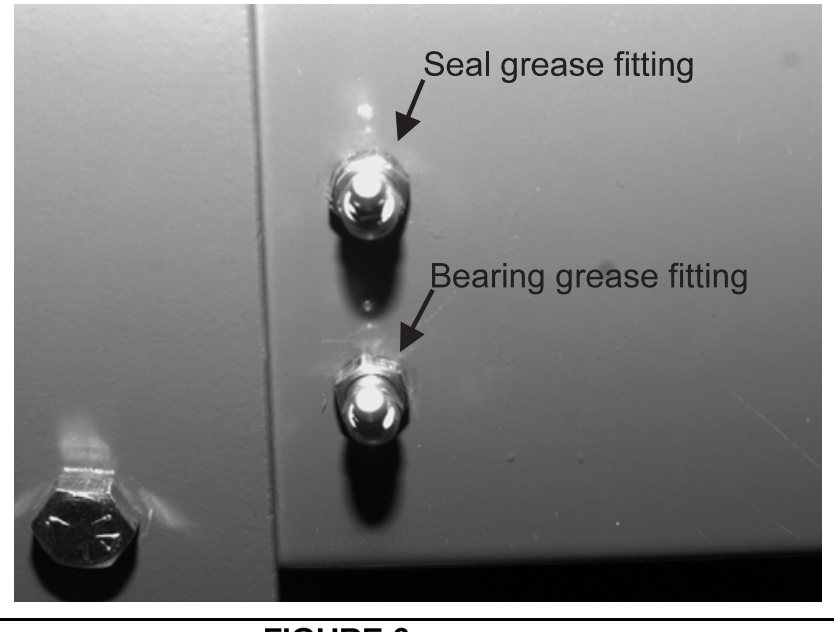



**FIGURE 6** (MSSM0201CE)
**42" Divided Cylinder Rear Bearing and Seal Grease Fittings**

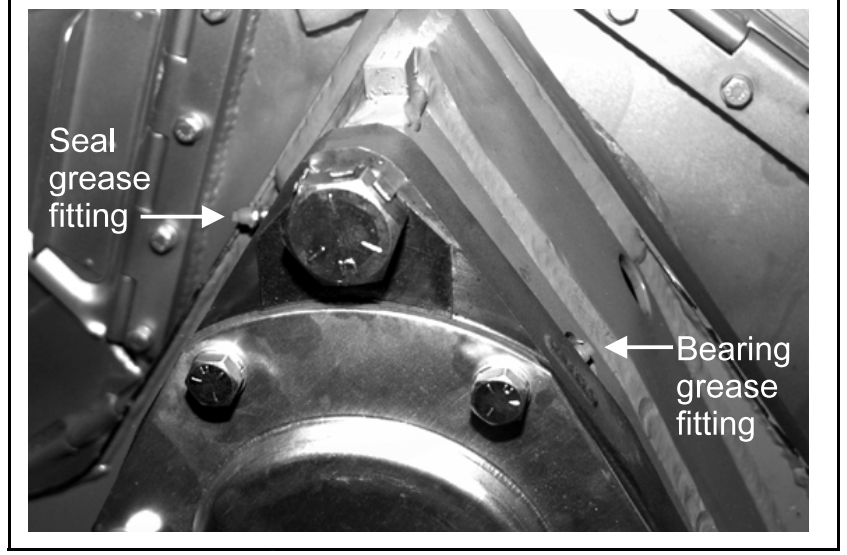



**FIGURE 7** (MSSM0201CE)
**60" and 72" Divided Cylinder Front Seal and Bearing Grease Fittings**

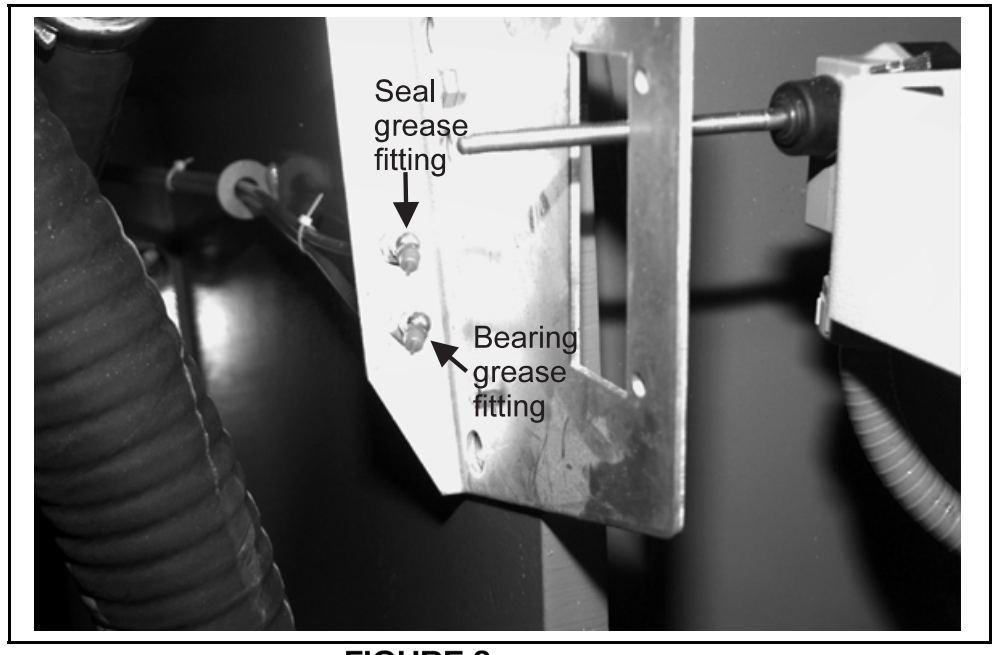



**FIGURE 8** (MSSM0201CE)
**60" and 72" Divided Cylinder Rear Seal and Bearing**

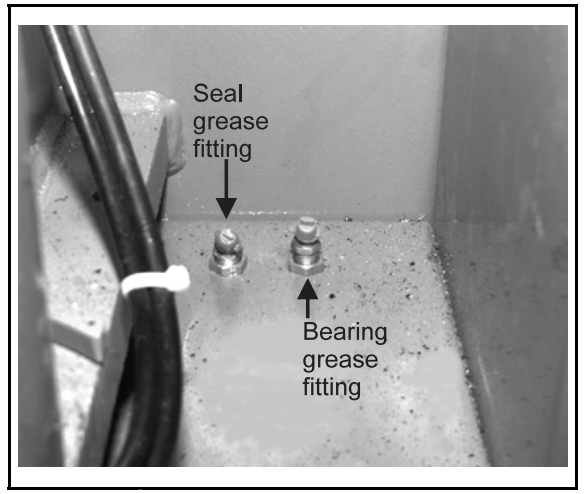



**FIGURE 9** (MSSM0201CE)
**60044 and 72044 Staph-Guard® Front Bearing and Seal Grease Fit-**

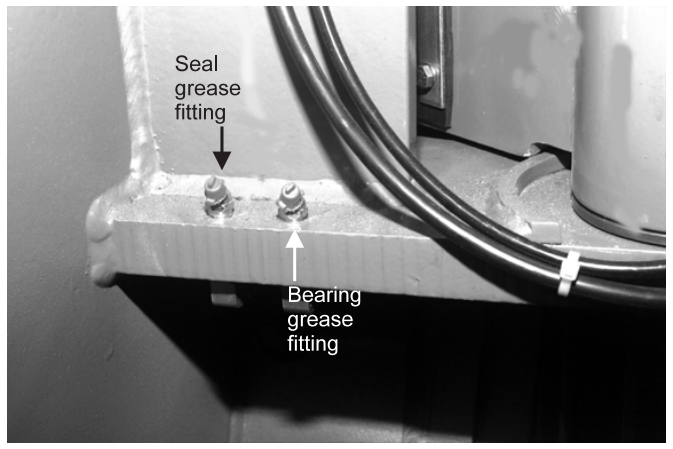



**FIGURE 10** (MSSM0201CE)
**60044 and 72044 Staph-Guard® Rear Bearing and Seal Grease Fittings (lo-**

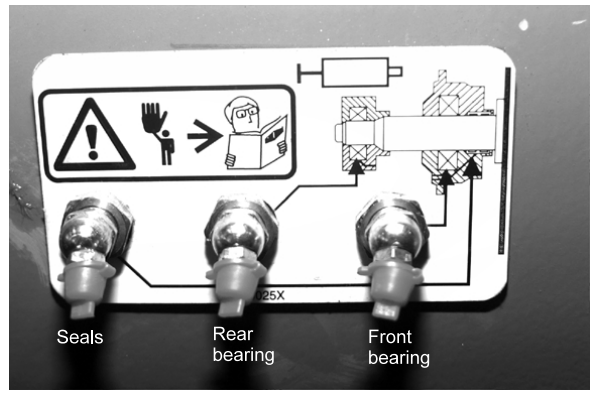



**FIGURE 11** (MSSM0201CE)
**All Open-Pocket Machine Seal and Bearing Grease Fitting Plate**

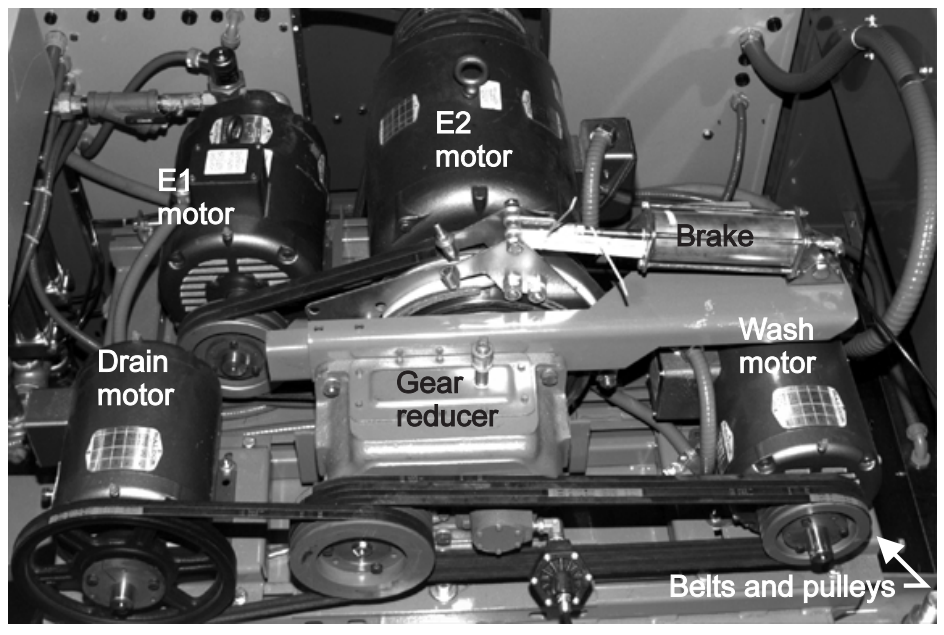



**FIGURE 12** (MSSM0201CE)
**Typical Drive Train Components (48" machine shown)**

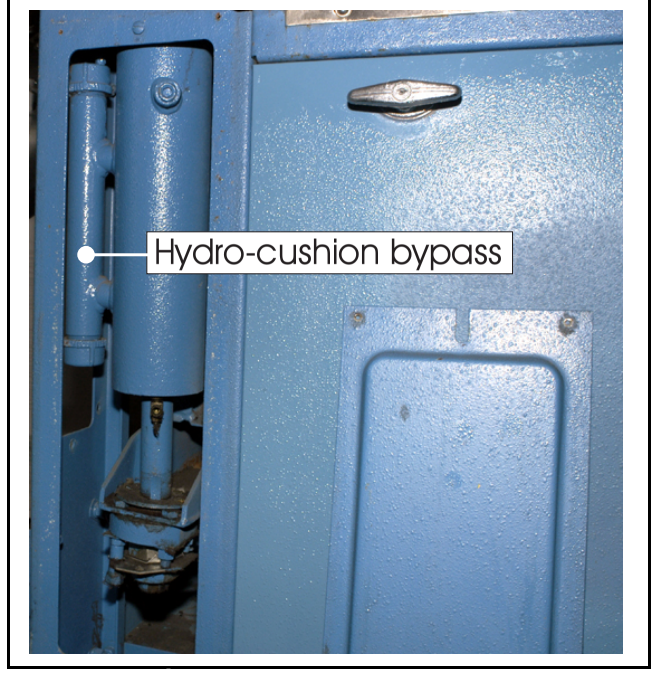



**FIGURE 13** (MSSM0201CE)
**Hydrocushion Bypass Valve (48" machines only")**

## Monthly Maintenance Items

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

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

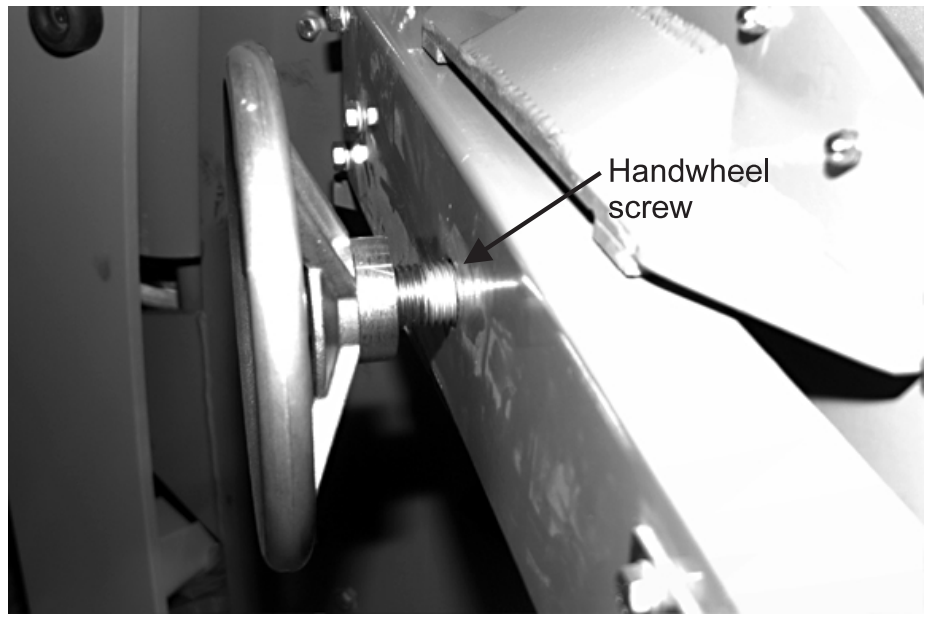



**FIGURE 14** (MSSM0201CE)
**Handwheel Screw**
**(42" Divided Cylinder and Staph-Guard® only)**

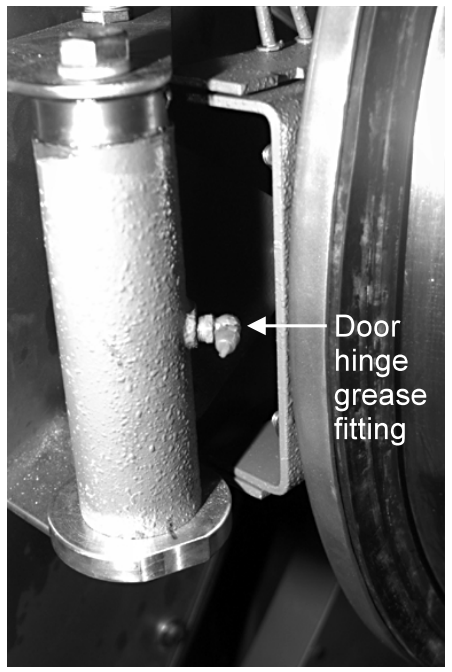



**FIGURE 15** (MSSM0201CE)
**Typical Door Hinge**

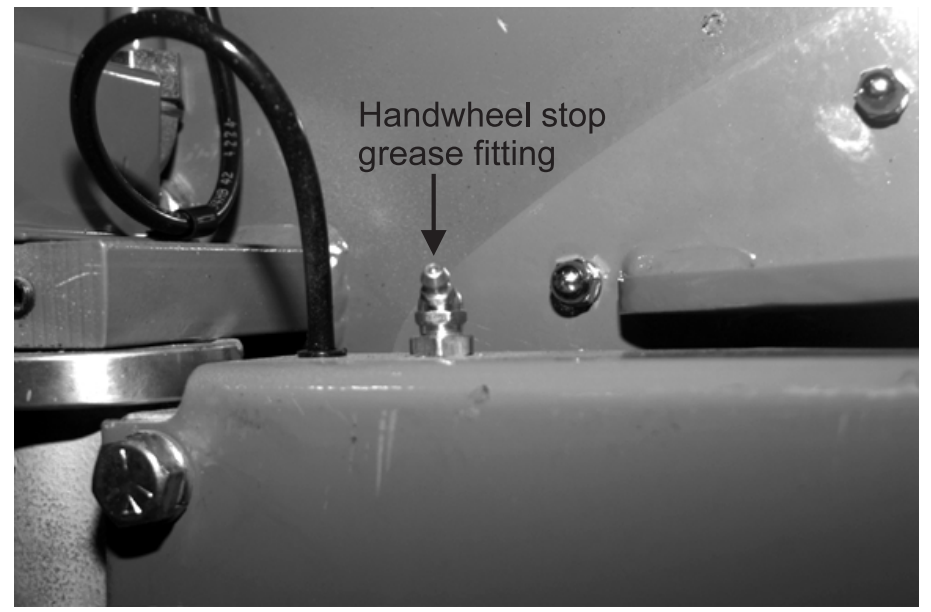



**FIGURE 16** (MSSM0201CE)
**Handwheel Stop**
**(42" Divided Cylinder and Staph-Guard® only)**

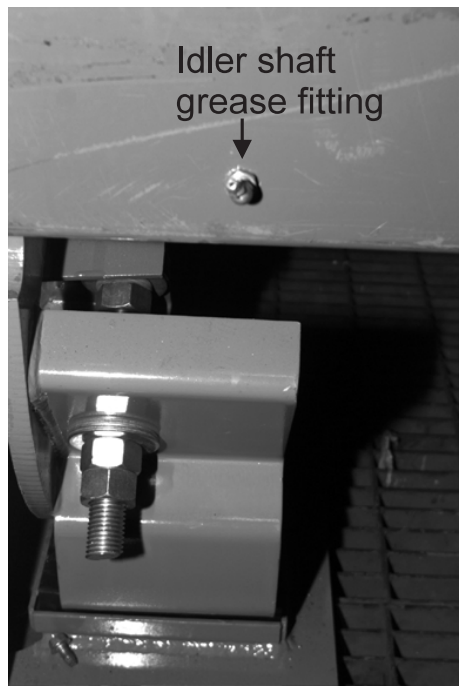



**FIGURE 17** (MSSM0201CE)
**42" Staph-Guard®**
**Idler Shaft**
**Grease Fitting**

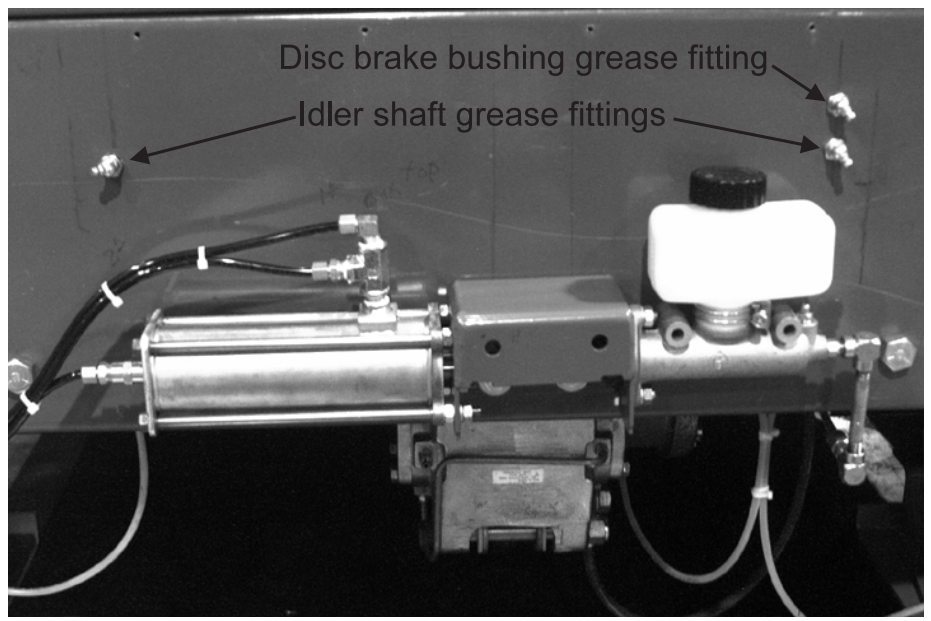



**FIGURE 18** (MSSM0201CE)
**60" and 72" Staph-Guard® Idler Shaft**
**and Disc Brake Grease Fittings**
**(60" shown)**

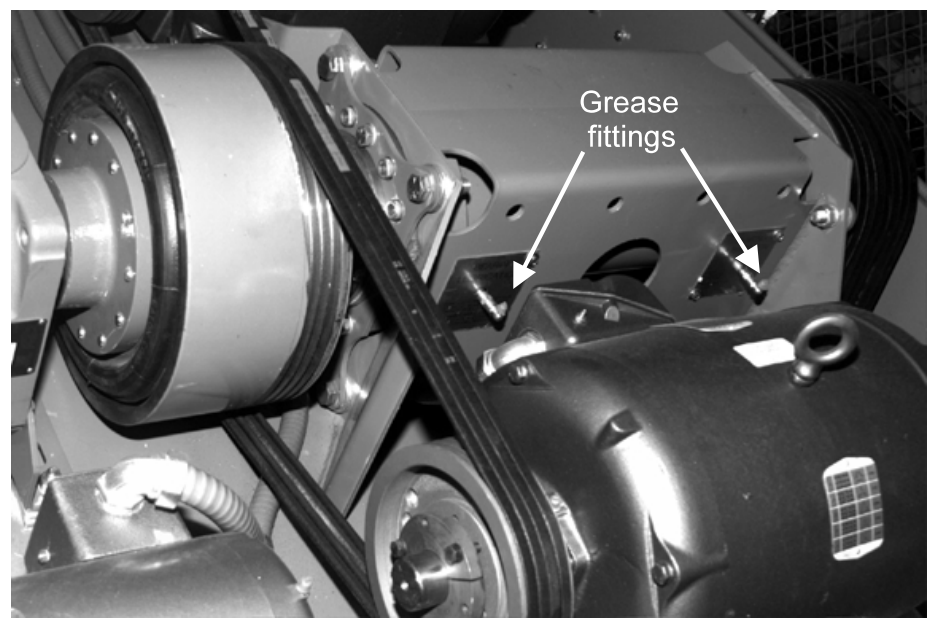



**FIGURE 19** (MSSM0201CE)
**Typical Jackshaft**
**Grease Fittings**
**( 52" machine shown)**

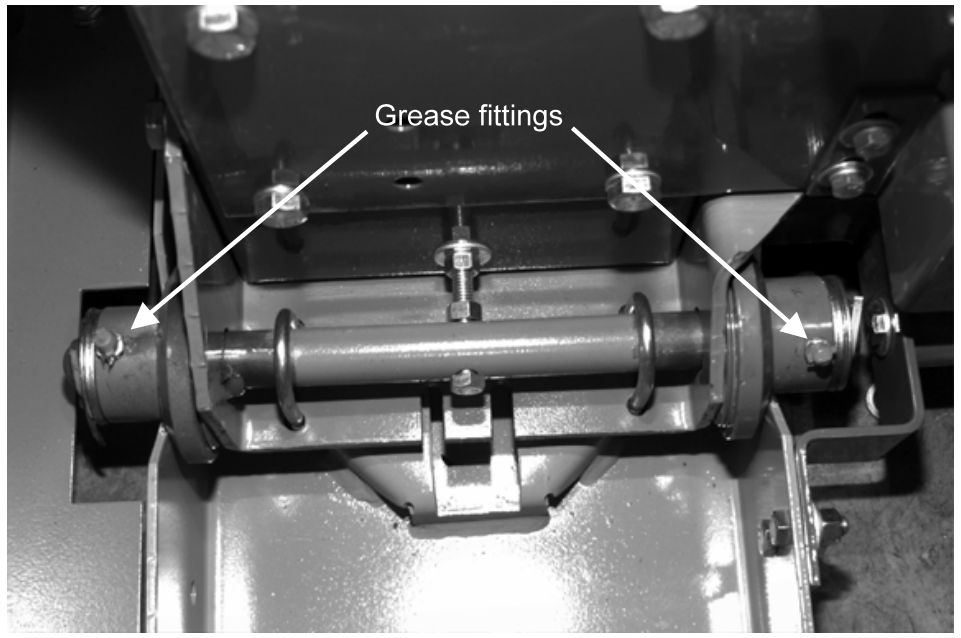



**FIGURE 20** (MSSM0201CE)
**Tilt Wheels**
**(42"and 48" tilt machines only)**

## Monthly Maintenance Items

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

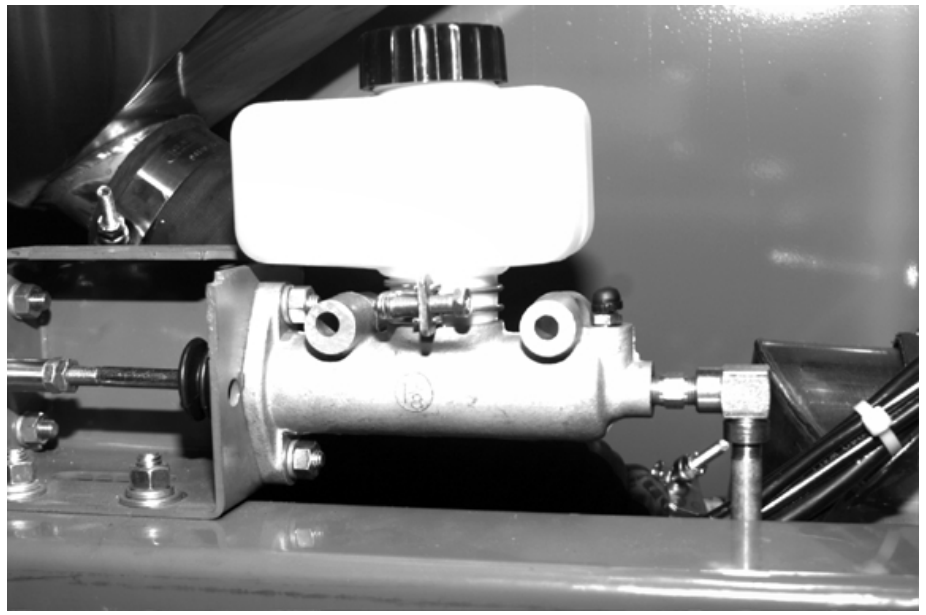


**FIGURE 21** (MSSM0201CE)
**Disk Brake Reservoir (Staph-Guard® only)**

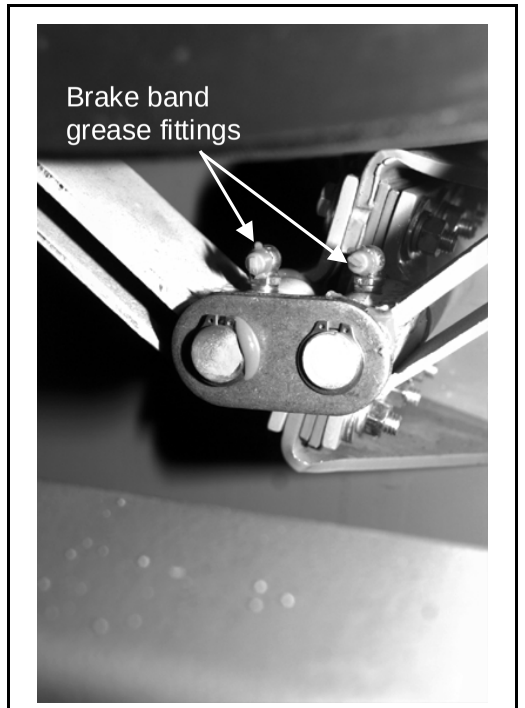



**FIGURE 22** (MSSM0201CE)
**Brake Band Grease Fittings (60044 and 72044WP2/WP3)**

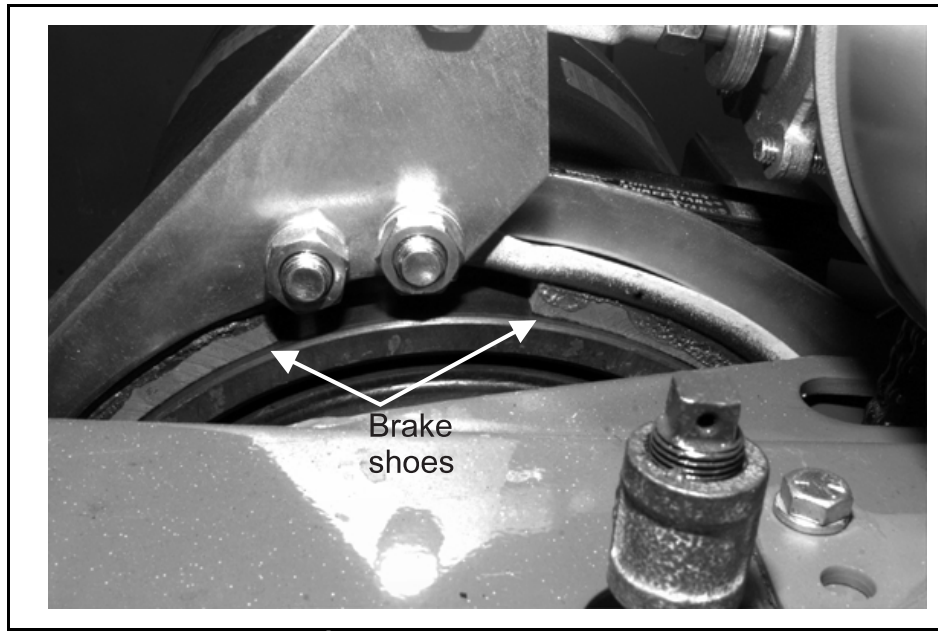



**FIGURE 23** (MSSM0201CE)
**Brake Shoes (all machines)**

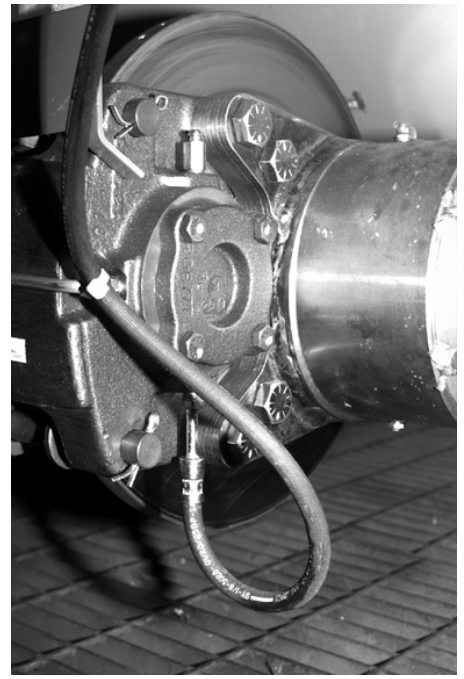


**FIGURE 24** (MSSM0201CE)
**Disk Brake (Staph-Guard® only)**

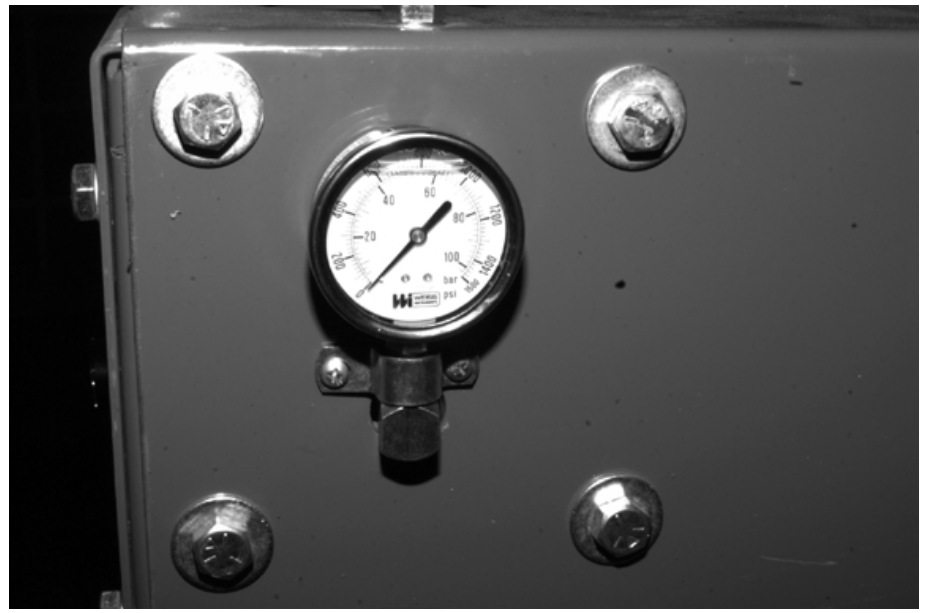


**FIGURE 25** (MSSM0201CE)
**Hydraulic Tilt Pressure Gauge (On rear of 42", 48", and 72" tilt models)**

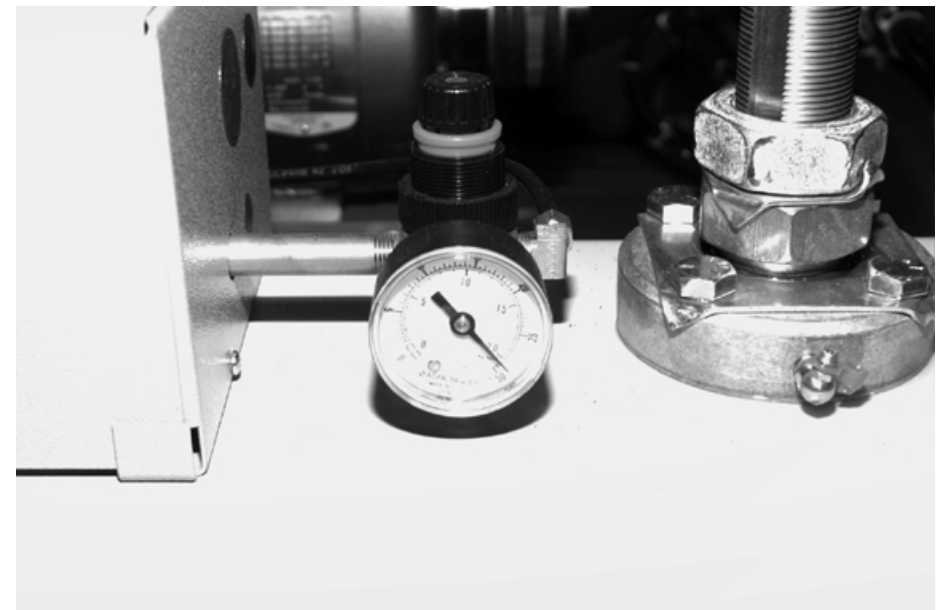


**FIGURE 26** (MSSM0201CE)
**Door Seal Pressure Regulator**

## Quarterly Maintenance Items

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

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

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

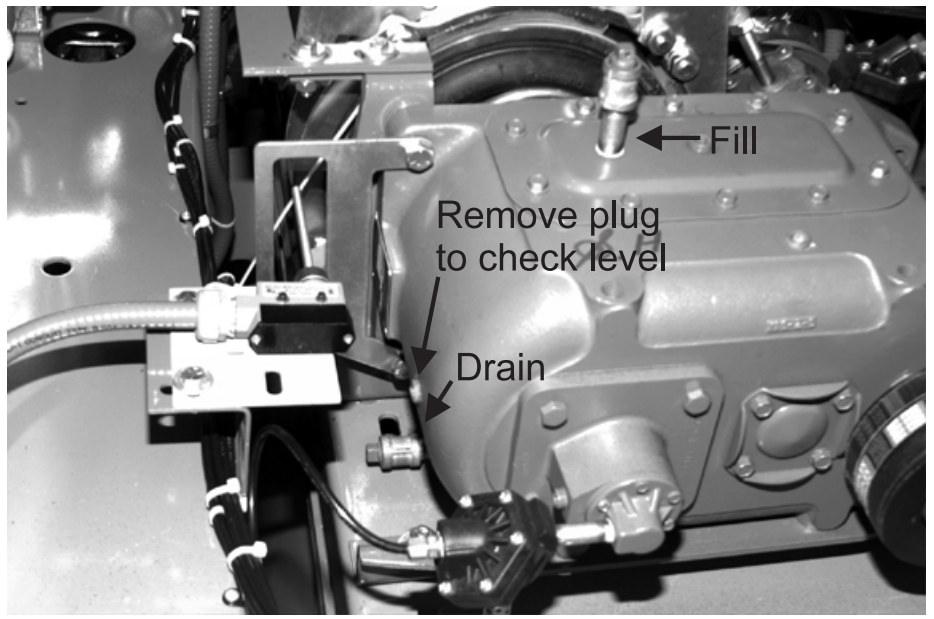



**FIGURE 27** (MSSM0201CE)
**Typical Gear Reducer Fill and Drain**

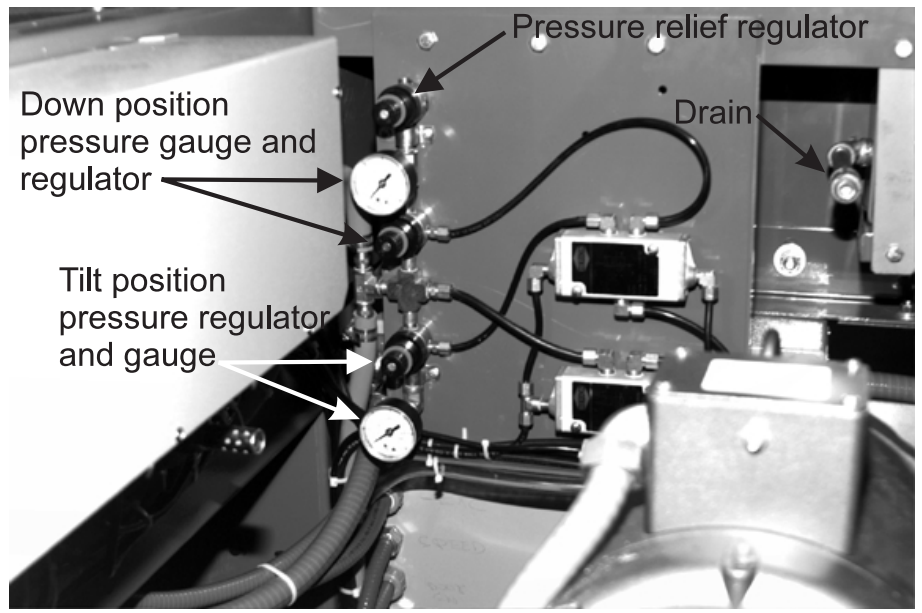



**FIGURE 28** (MSSM0201CE)
**Push Back and Forward Hydraulic System Gauges and Regulators (42", 48", and 72" Tilt Models)**

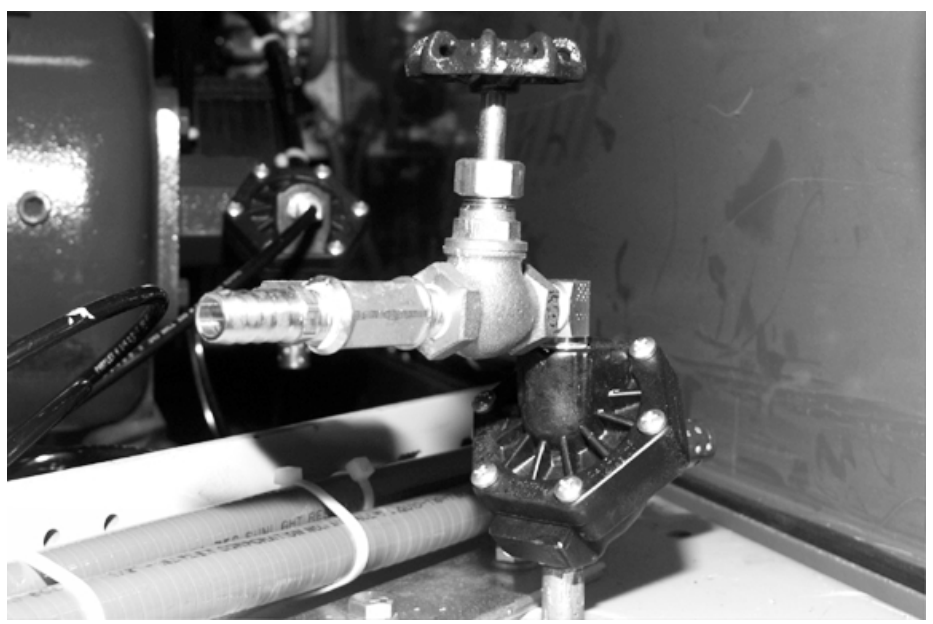


**FIGURE 29** (MSSM0201CE)
**Push-Down Control Valve (72" Rapid load and Staph-Guard® only)**

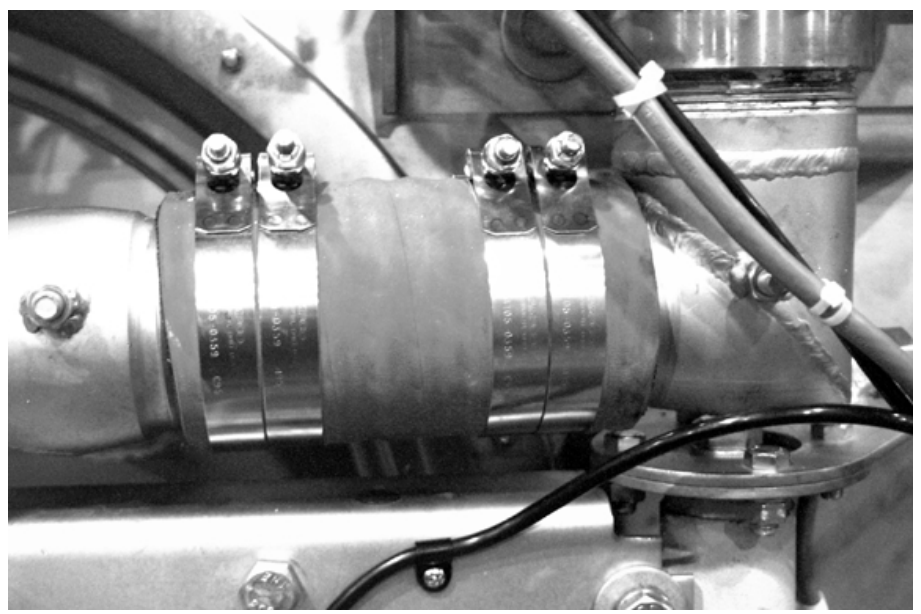


**FIGURE 30** (MSSM0201CE)
**Shell Door Recirculation Hose (48" dye machine only - cover removed for clarity)**

## Semi-Annual Maintenance Items

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

## Annual or Less Frequent Maintenance Items

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

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

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

# LUBRICANTS FOR MILNOR® MACHINES

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

## Washer-Extractors

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

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

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

### Oils

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

### Greases

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

BIUUUM03 (Published) Book specs- Dates: 20111018 / 20111018 / 20120629 Lang: ENG01 Applic: UUU

# 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.

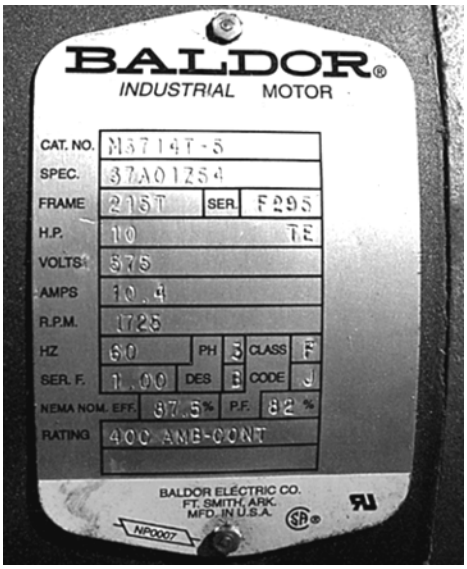
**operation conditions**—the conditions that can decrease the life of the motor and make it necessary to lubricate more frequently.

**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:

   *Frame code = 215T,  RPM = 1725*

2. Find the standard interval in Table 1. Example:

   *Standard interval = 12,000 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.

   *Rating = bad,  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 x 0.5 =* ***6,000 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:

   *grease volume =* ***0.16 ounces (4.7 grams)***
   *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 | 5250 |

*** 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 —

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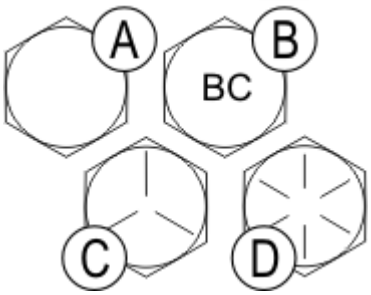
# Torque Requirements for Fasteners

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**

**A.** SAE Grades 1 and 2, ASTM A307, and stainless steel
**B.** Grade BC, ASTM A354
**C.** SAE Grade 5, ASTM A449
**D.** SAE Grade 8 and ASTM A354 BD

## 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**

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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 | -- | -- |

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

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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 |
| **3/14 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**

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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**

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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 |
| **3/14 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)**

| | Dimension | | | |
|---|---|---|---|---|
| LocTite Product | 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.

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

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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**

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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**

| | The Grade of the Bolt | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 2 | | Grade 5 | | Grade 8 | | Grade BC | |
| Dimension | 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)**

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

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

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

## 1.2. Stainless Steel Fasteners

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

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

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

| | 316 Stainless | | 18-8 Stainless | | 18-8 Stainless with Loctite 767 | |
|---|---|---|---|---|---|---|
| **Dimension** | **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.

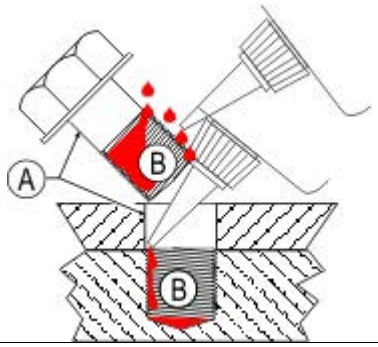
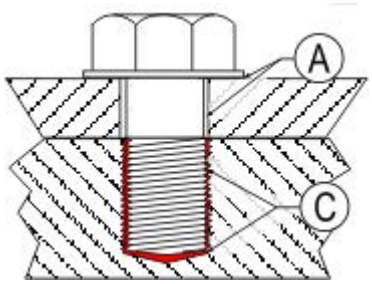
## 3. How to Apply a Threadlocker

**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**

| Application | Coverage |
|---|---|
|  |  |



**Legend**

**A.** No threadlocker here
**B.** Apply here
**C.** Fill all space with threadlocker

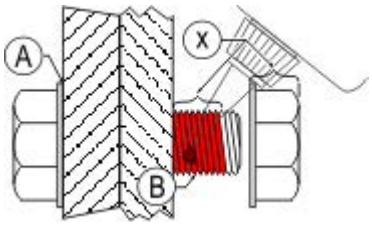
## 3.1. Blind Holes

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**

| Application | Legend |
|---|---|
|  | **A.** No threadlocker here<br>**B.** Apply the threadlocker to this area<br>**x.** Nut depth |

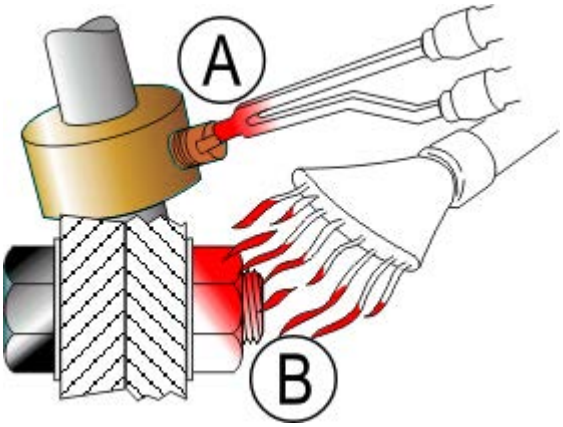


**3.3. Disassembly**—For high-strength threadlocker, apply heat for five minutes. Disassemble with hand tools while the parts are hot.

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

**Figure 4: Disassembly**

**Apply Heat to a Small Area**




**Legend**

**A.** How to apply heat to a small fastener
**B.** How to apply heat to a large fastener

— End of BIUUUM04 —

# Drive Assemblies 2

# Drive Chart

4244WP2 SM

BMP050075/2013353B
(Sheet 1 of 2)

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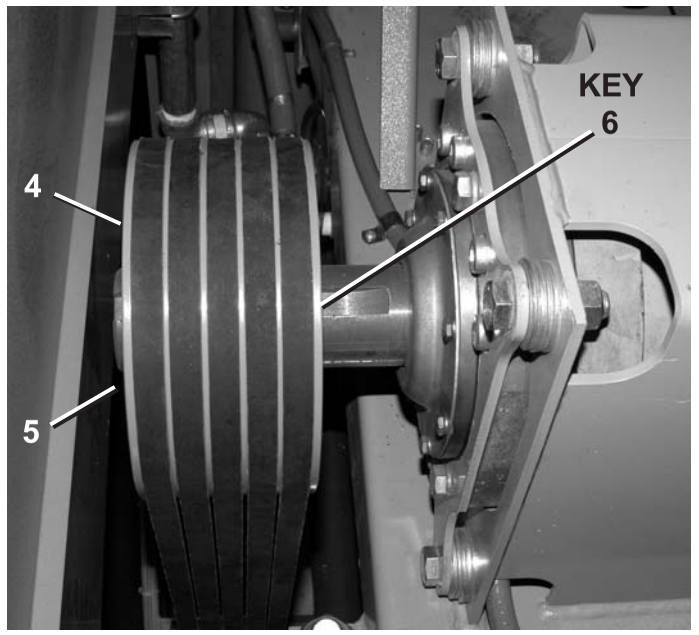


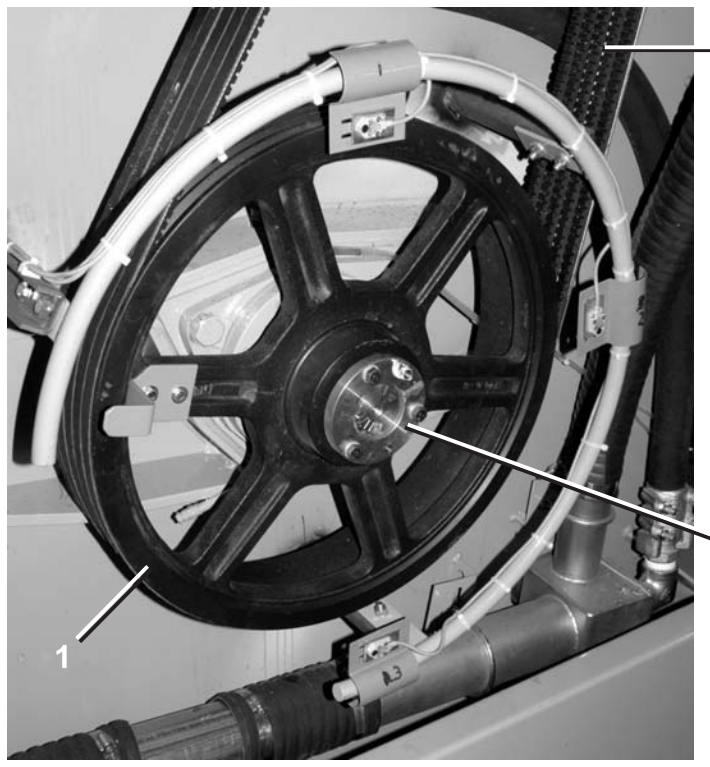


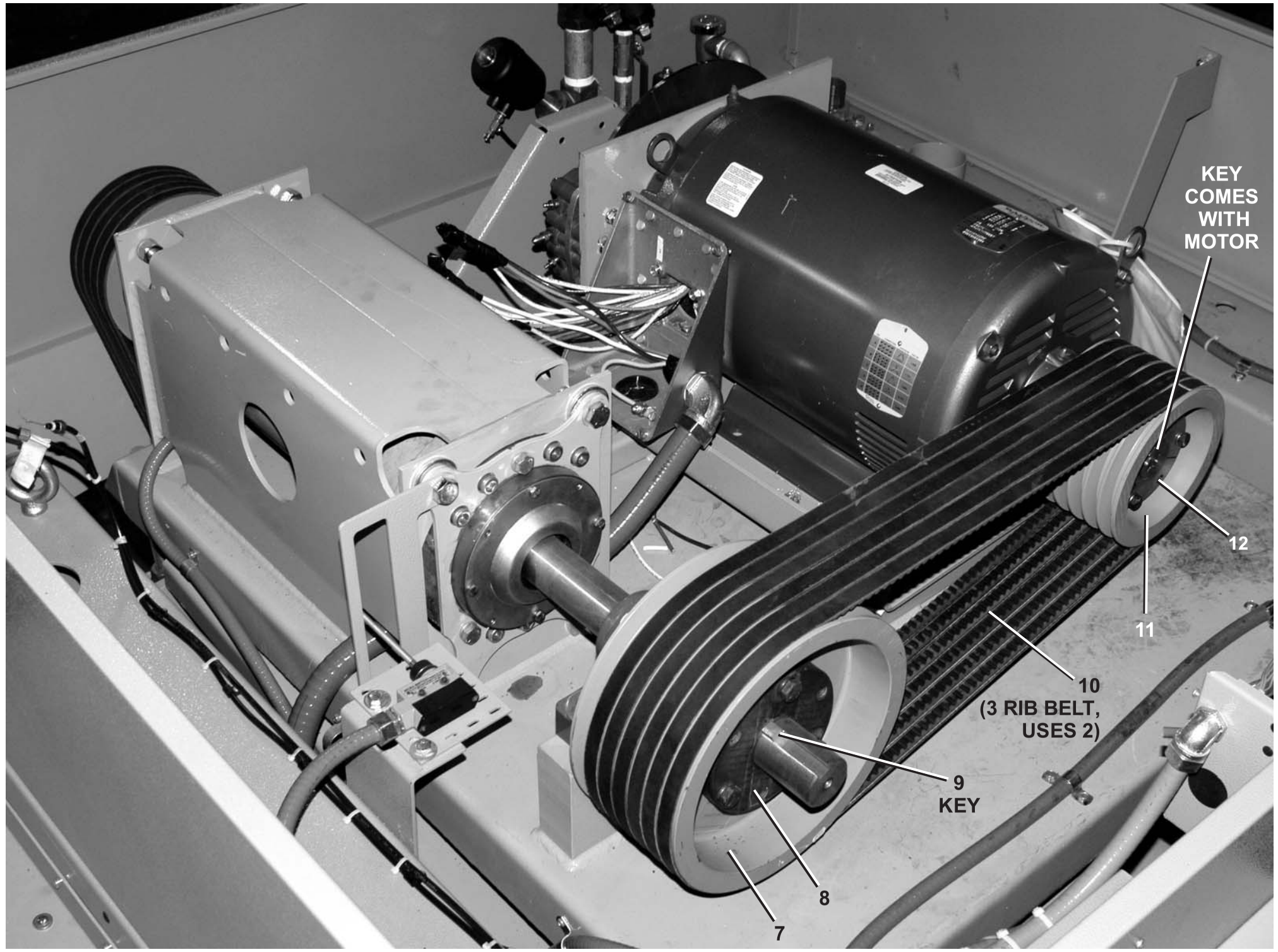


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## Parts List—Drive Chart

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 | D16 00561 | DRIVE CHART=4244WE SINGLE MOTO | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 02 16124 | VPUL 5B20 (Q2) BRN PE-5008 | |
| all | 2 | 56Q2DQ2S | 2+3/16" SPLIT BUSHING BROWN Q2 | |
| all | 3 | 56VB120X | VBELT BX120 RAWEDGE COG | |
| all | 4 | 56080B5SF | VPUL 5B8.0/A7.6 (SF) TYPE QD | |
| all | 5 | 56Q2HSF | 2+7/16" BUSH VPUL QD TYPE SF | |
| all | 6 | 02 175121 | KEY=5/8SQ | |
| all | 7 | 5607B110 | PULLEY 7B11.0 TYPE E | |
| all | 8 | 56Q2AE | 2.0" BUSHING VPUL QD TYPE "E" | |
| all | 9 | 02 15794 | KEY-1/2X2+1/2 4231-4244SGH | |
| all | 10 | 56VB070XB3 | VBAND 3RBX70 EACH=1 | |
| all | 11 | 56070B6SF | VPUL 6B7.0/A6.6 (SF) TYPE QD | |
| all | 12 | 56Q1RSF | 1+7/8" BUSH VPUL QD TYPE SF | |

# Drive Base Installation

## 4244WP2 SM (Single Motor)



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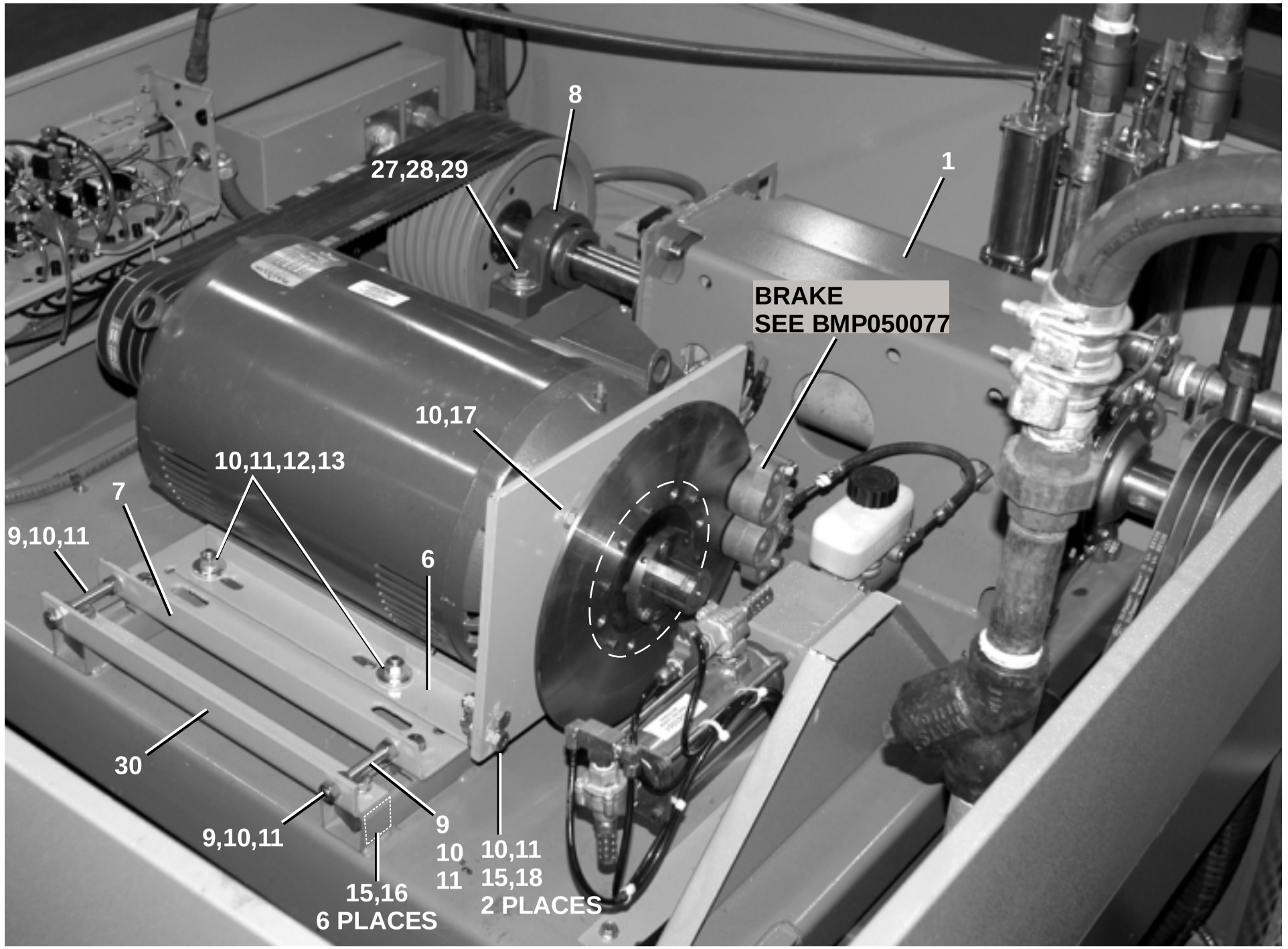


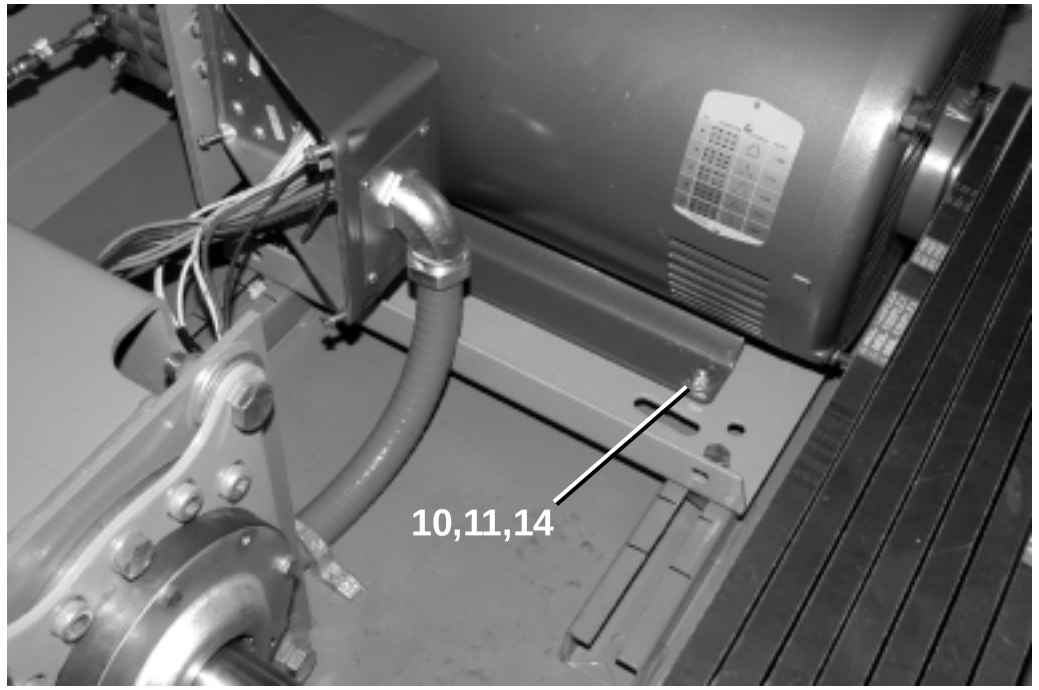


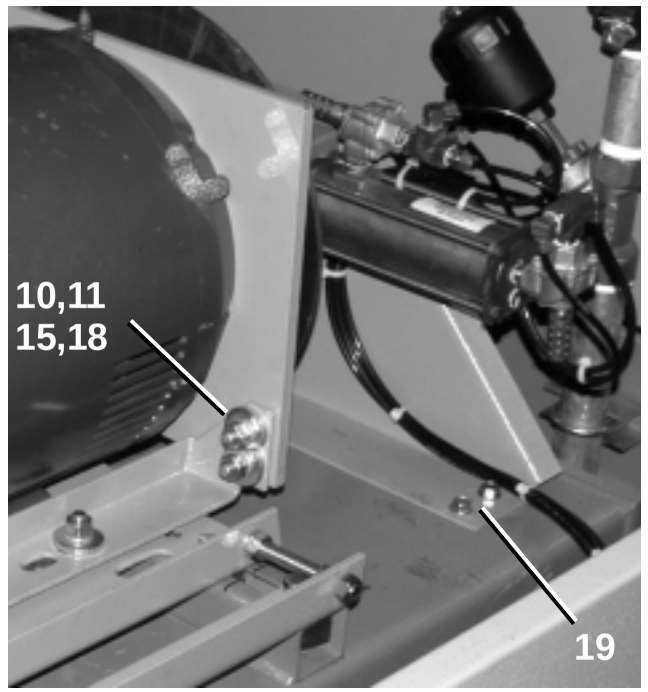

# Drive Base Installation

## 4244WP2 SM (Single Motor)



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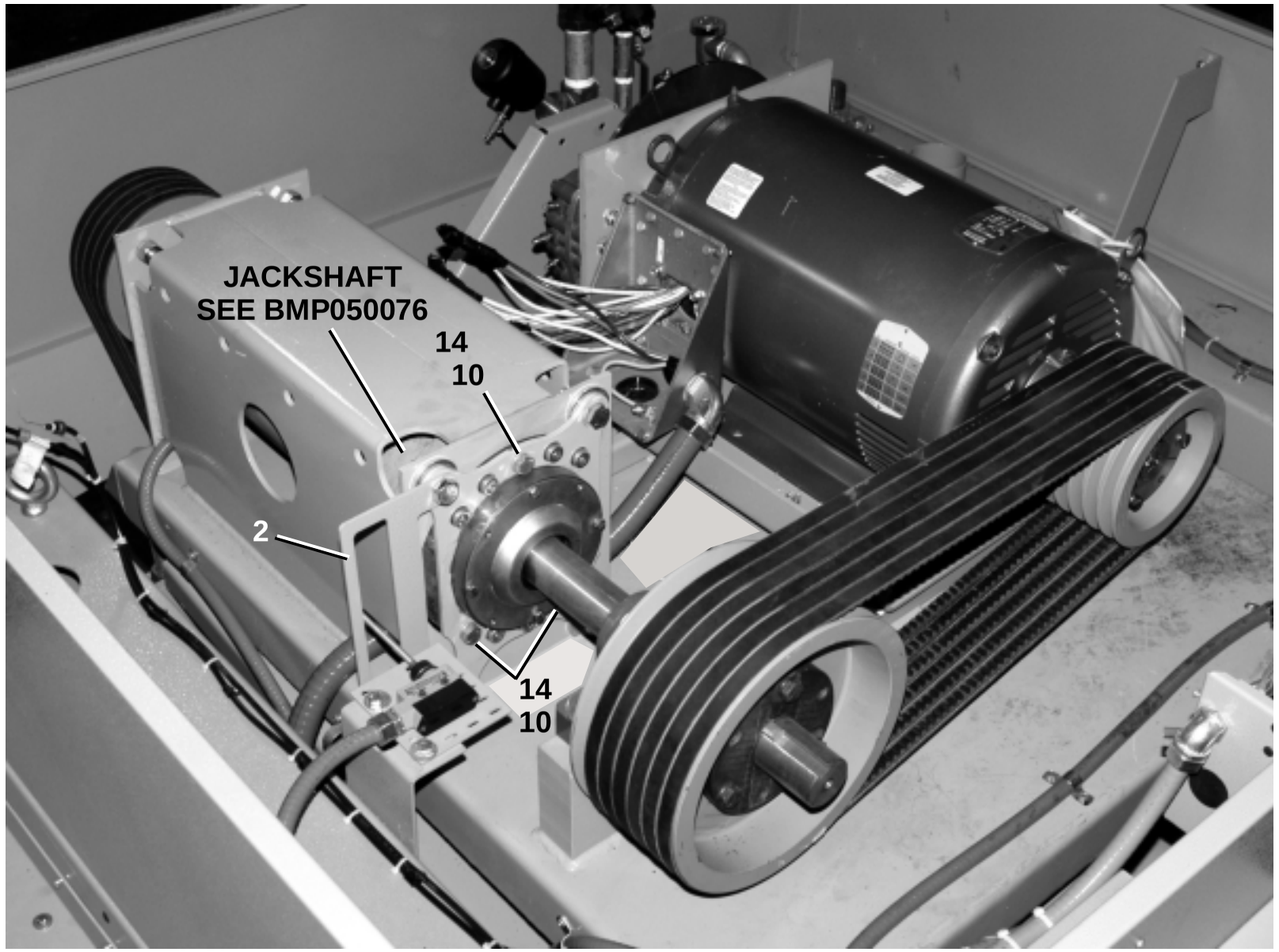


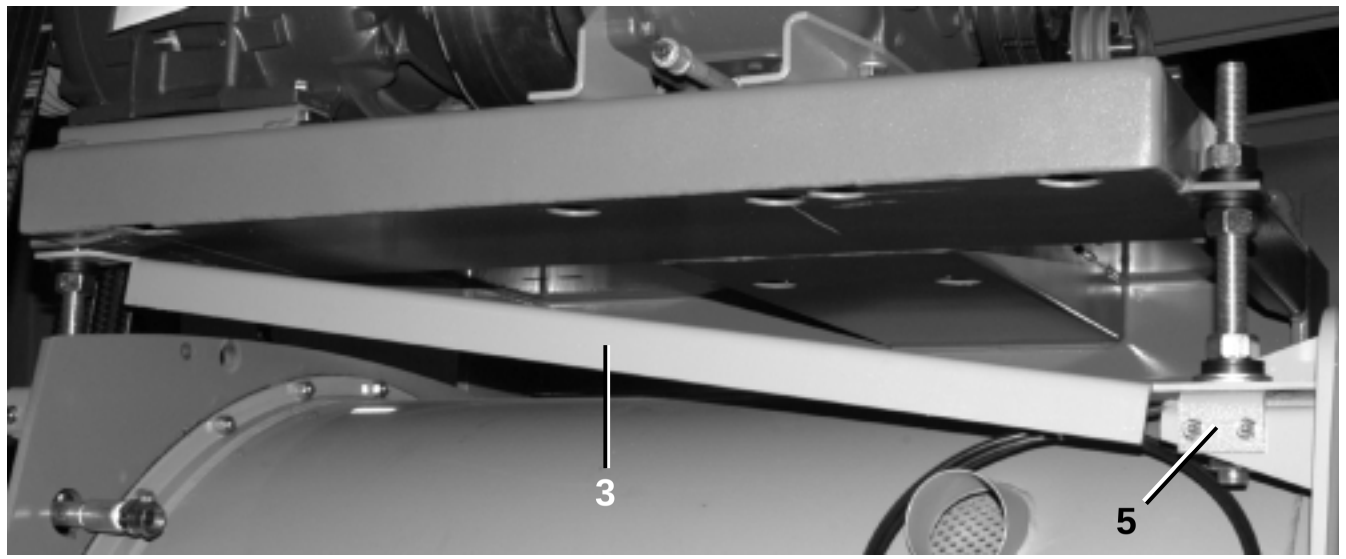


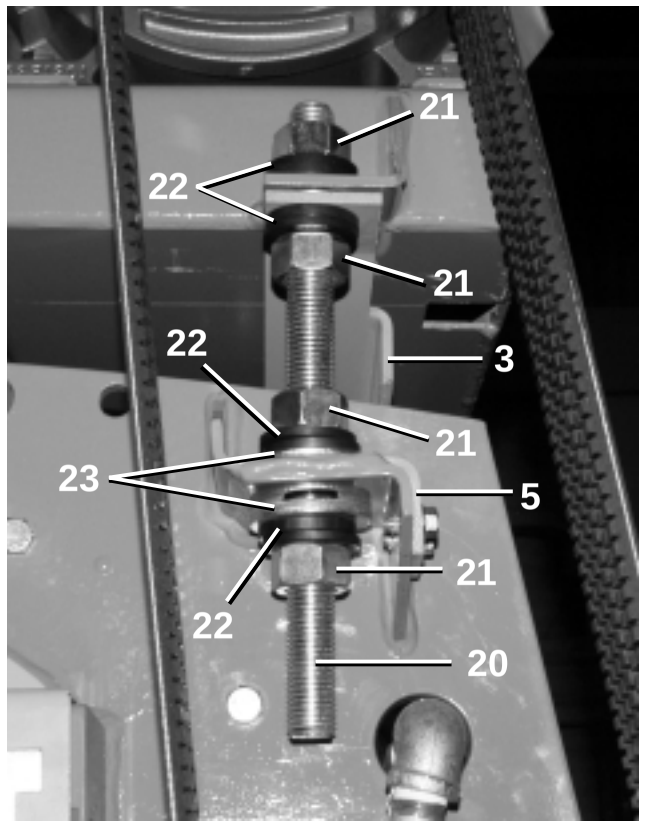


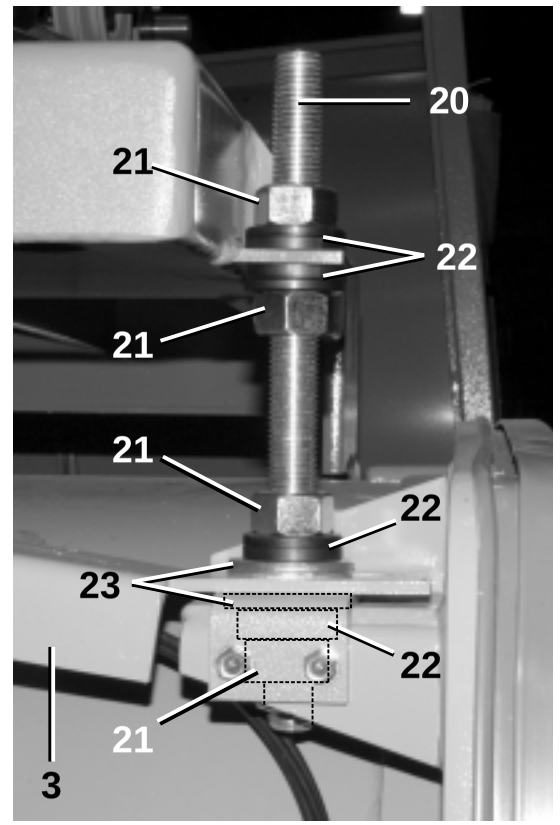

# Drive Base Installation

## 4244WP2 SM (Single Motor)



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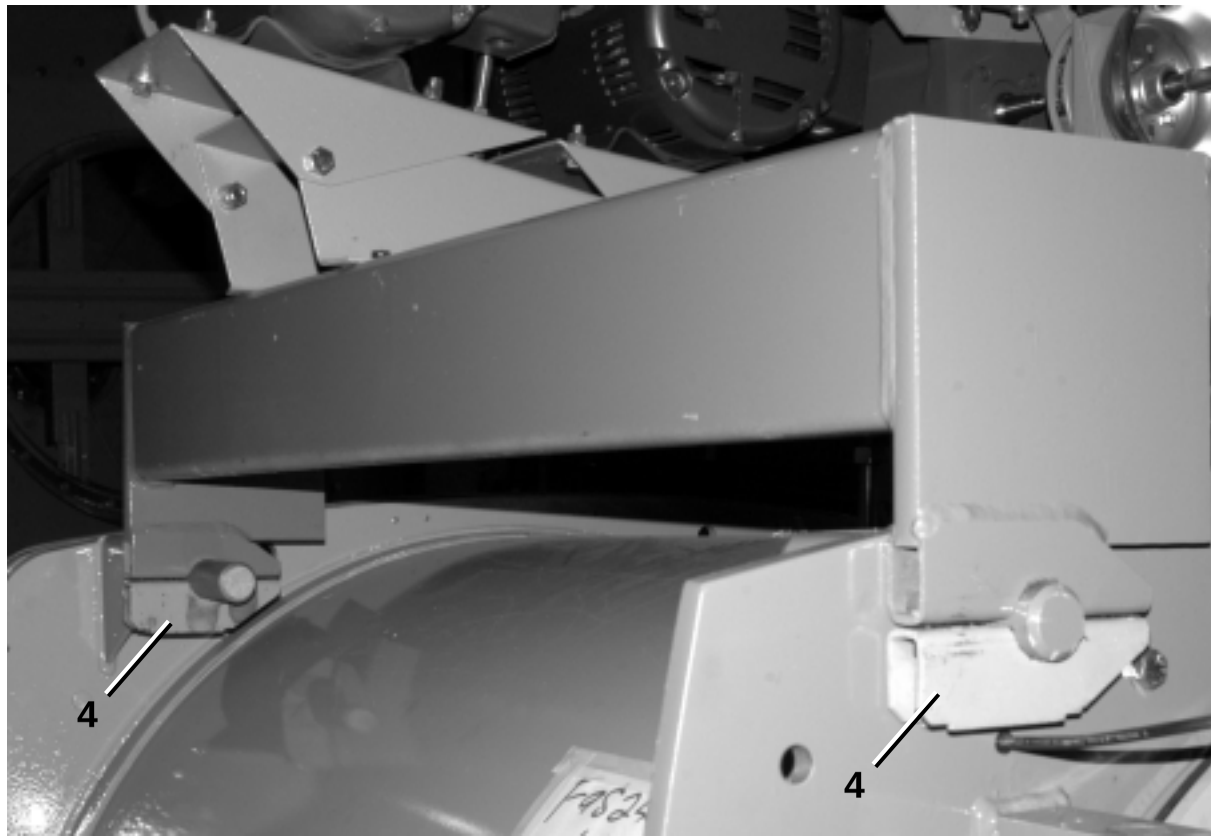
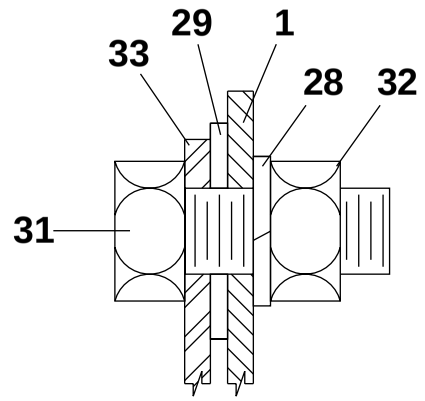
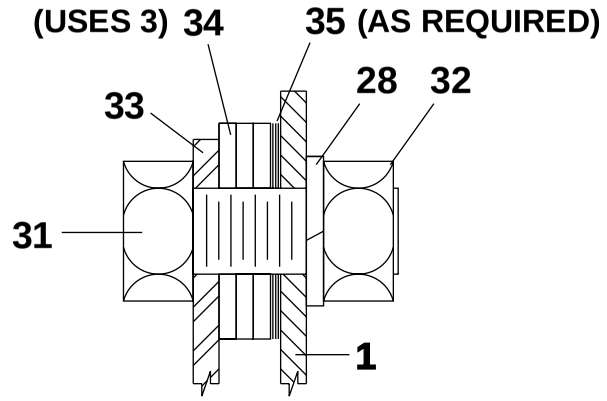
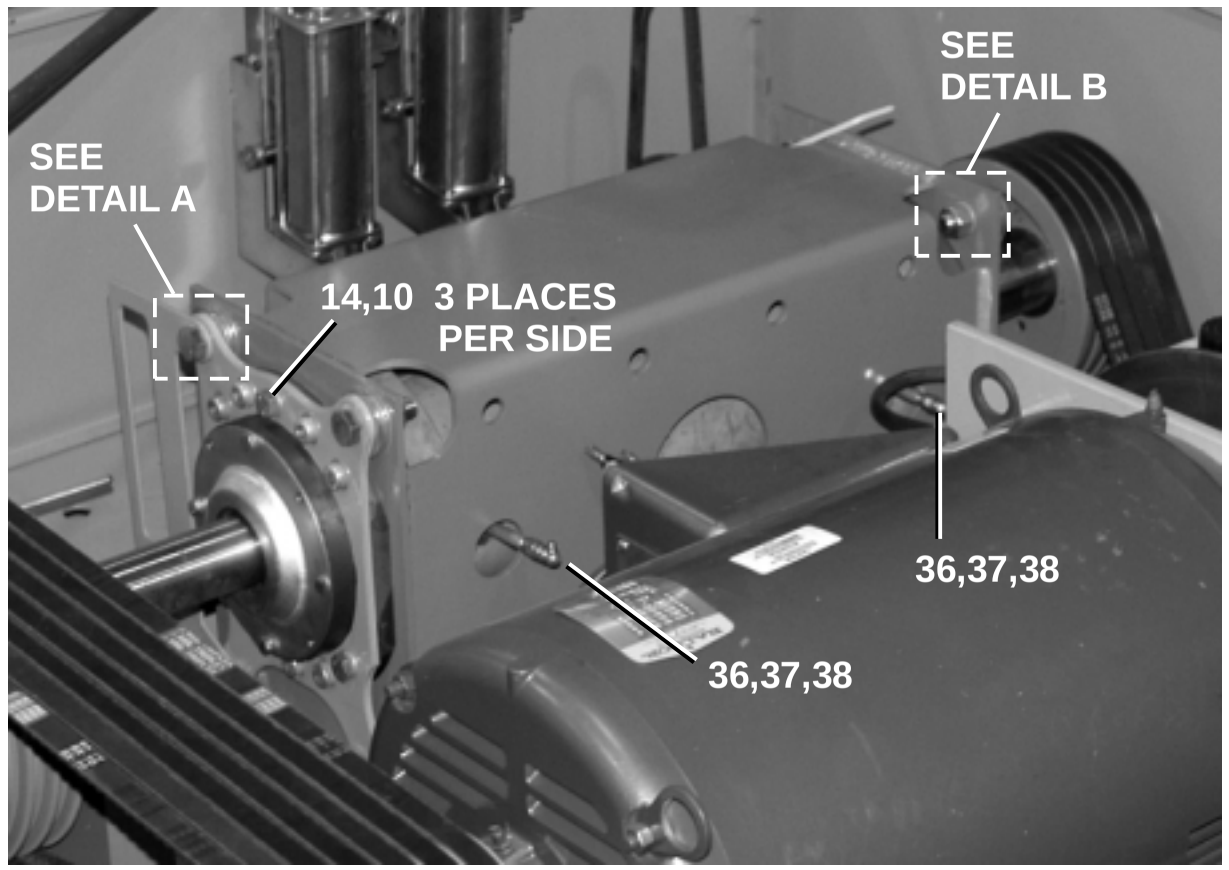


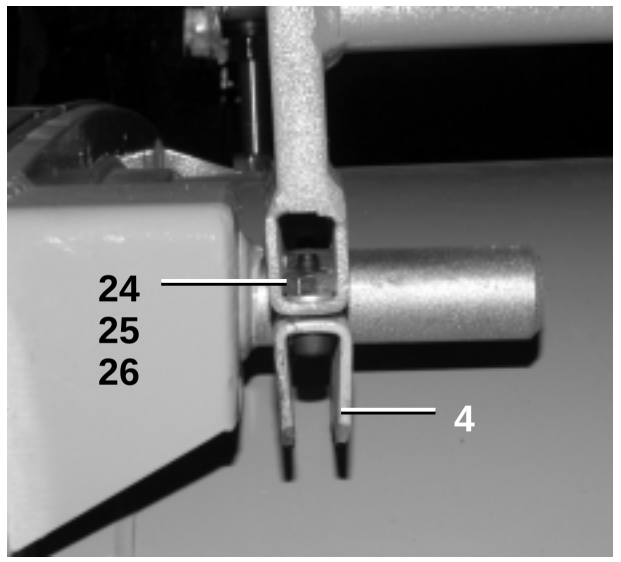



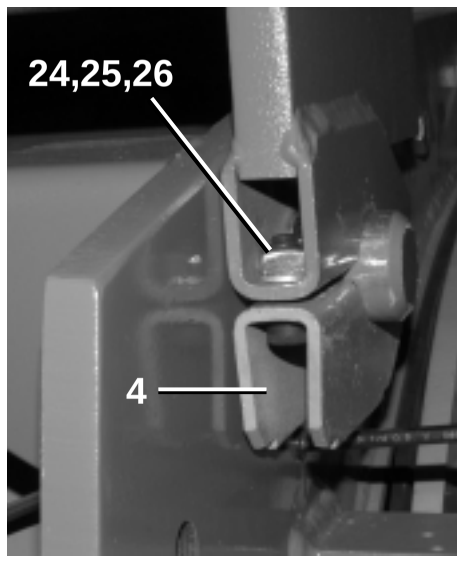

DETAIL A




DETAIL B



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## Parts List—Drive Base Installtion

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 16 021S | DRIVE BASE 4244WE SGL MOTOR | 4244WP2 SM |
| | B | GBJ25003 | JACKXHAFT INSTALL 60SG 1 MOTOR | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | W2 16141A | DRIVEBASE 4244WE 50/60 SGLMOTO | |
| all | 2 | 02 15605E | ACTUATOR=EXCURSION SW 42SG-SIG | |
| all | 3 | 02 16088 | SWAY BRACE=MOTOR MOUNT 4244 | |
| all | 4 | X2 15604 | CLAMP=MACH MTR MTG HINGEPIN | |
| all | 5 | 02 15652 | FORK=MOTOR MOUNT ADJ SCREW | |
| all | 6 | 02 21859A | BRAKE TORQUE ARM 42 1 MOTOR | |
| all | 7 | 05 20131E | MTRPLATE 6044SG 1 MOTOR | |
| all | 8 | 54AF22210 | PILLBLK BRG P2B-S2-200RE 2" | |
| all | 9 | 15D119 | HXTAPSCR 1/2-13X4 GR5 ZNC FTL | |
| all | 10 | 15U300 | LOKWASHER REGULAR 1/2 ZINC PLT | |
| all | 11 | 15G230 | HXNUT 1/2-13UNC2B SAE ZINC GR2 | |
| all | 12 | 15U490 | FLTWASH 1+1/2X17/32X1/4 ZINC | |
| all | 13 | 15K180 | HXCAPSCR 1/2-13UNCAX2 GR5 ZINC | |
| all | 14 | 15K151 | HXCAPSCR 1/2-13UNC24X1.25 GR5 | |
| all | 15 | 15K173A | HXCAPSCR 1/2-13UNC2AX1.75 GR5 | |
| all | 16 | 02 19283 | NUT=1/2-13UNCX1+1/2SQ SPEC | |
| all | 17 | 15K162 | HXCAPSCR 1/2-13UNC2AX1.5 GR5 P | |
| all | 18 | 02 11603C | WASHER DBLR=1.5W/CUTOFF SIDE | |
| all | 19 | 15P200 | TRDCUT-F HXWASHD 3/8-16X3/4NIK | |
| All | 20 | 02 19023 | DRIVE BASE ADJ. SCREW 13.5LG | |
| all | 21 | 15G250 | HXNUT 1-8UNC2B SAE ZNC GR2 | |
| all | 22 | 17W060 | SPHERICALWASHER SET 1" M/F | |
| all | 23 | 15U393 | FLTWASH 1"  HARD ASTM F436 | |
| all | 24 | 15K108 | SKCPSC 3/8-16 UNC 3X1 BLK | |
| all | 25 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | |
| all | 26 | 15G216 | SQNUT 3/8-16UNC2B SAE ZINC GR2 | |
| all | 27 | 15K225 | HEXCAPSCR 5/8-11X2+1/2 | |

## Parts List, cont.—Drive Base Installation

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| all | 28 | 15U315 | LOKWASHER MEDIUM 5/8 ZINCPL | |
| all | 29 | 02 11603A | WASHER DBLR=2" W/CUTOFF SIDE | |
| all | 30 | 02 19577 | ADJ ANGLE MOTOR | |
| all | 31 | 02 11603A | WASHER DBLR=2" W/CUTOFF SIDE | |
| all | 32 | 15G238 | HXNUT 5/8-11UNC2B SAE ZINC GR2 | |
| all | 33 | 02 19383 | BEARHOUSE MT PLATE FRONT | |
| all | 34 | 15U314 | FLATWASHER(USS STD) 5/8" ZNC P | |
| all | 35 | 15U355A | 28GA ADJWASH=BRGHOUS ZINC PL | |
| all | 36 | 54M025 | HYDFIT 1/8"-90 ALEMITE 1613-B | |
| all | 37 | 5SCC0CBE | NPT COUP 1/8 BRASS 125# 103A-A | |
| all | 38 | 5N0C03AG42 | NPT NIP 1/8X3 TBE GALSTL SK40 | |

# Jackshaft
## 4244WP2 SM



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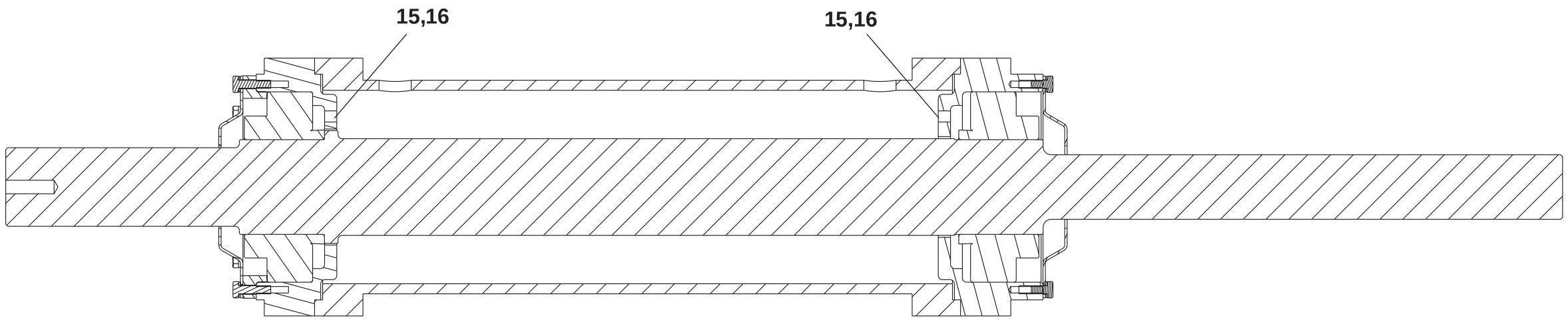
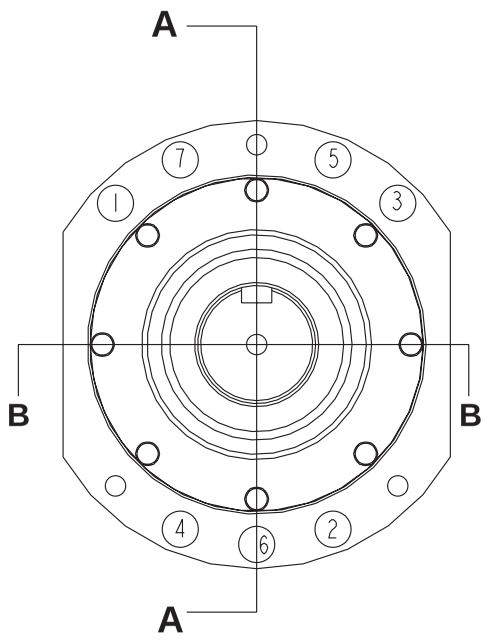
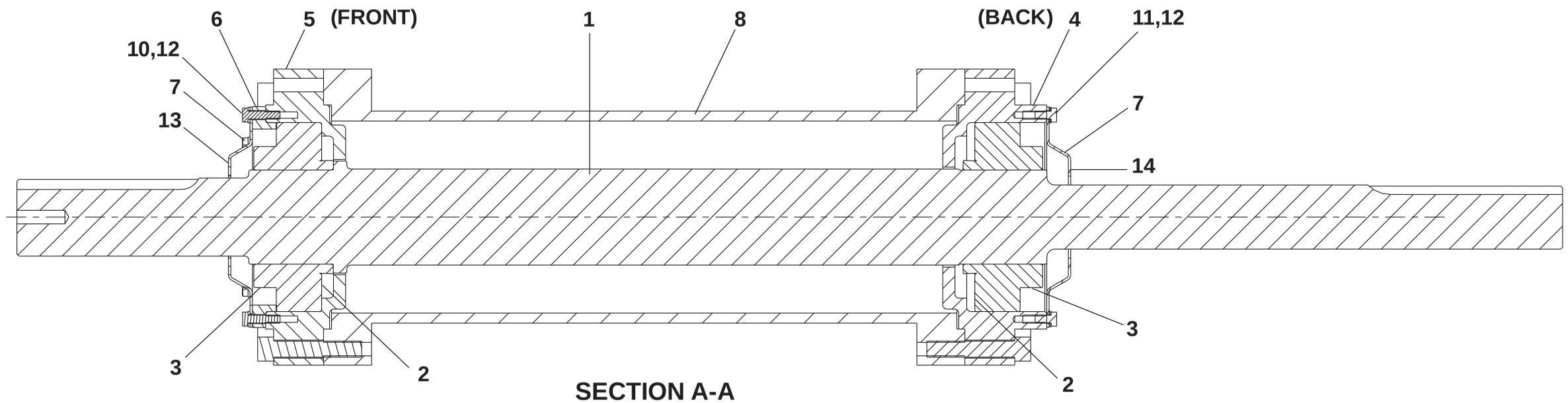



SECTION B-B

INSERT ALL ½"FASTENERS HAND TIGHT. THEN TORQUE IN THE FOLLOWING SEQUENCE, SHOWN BELOW, TO BOTH FRONT AND BACK




SECTION A-A

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Litho in U.S.A.

## 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.

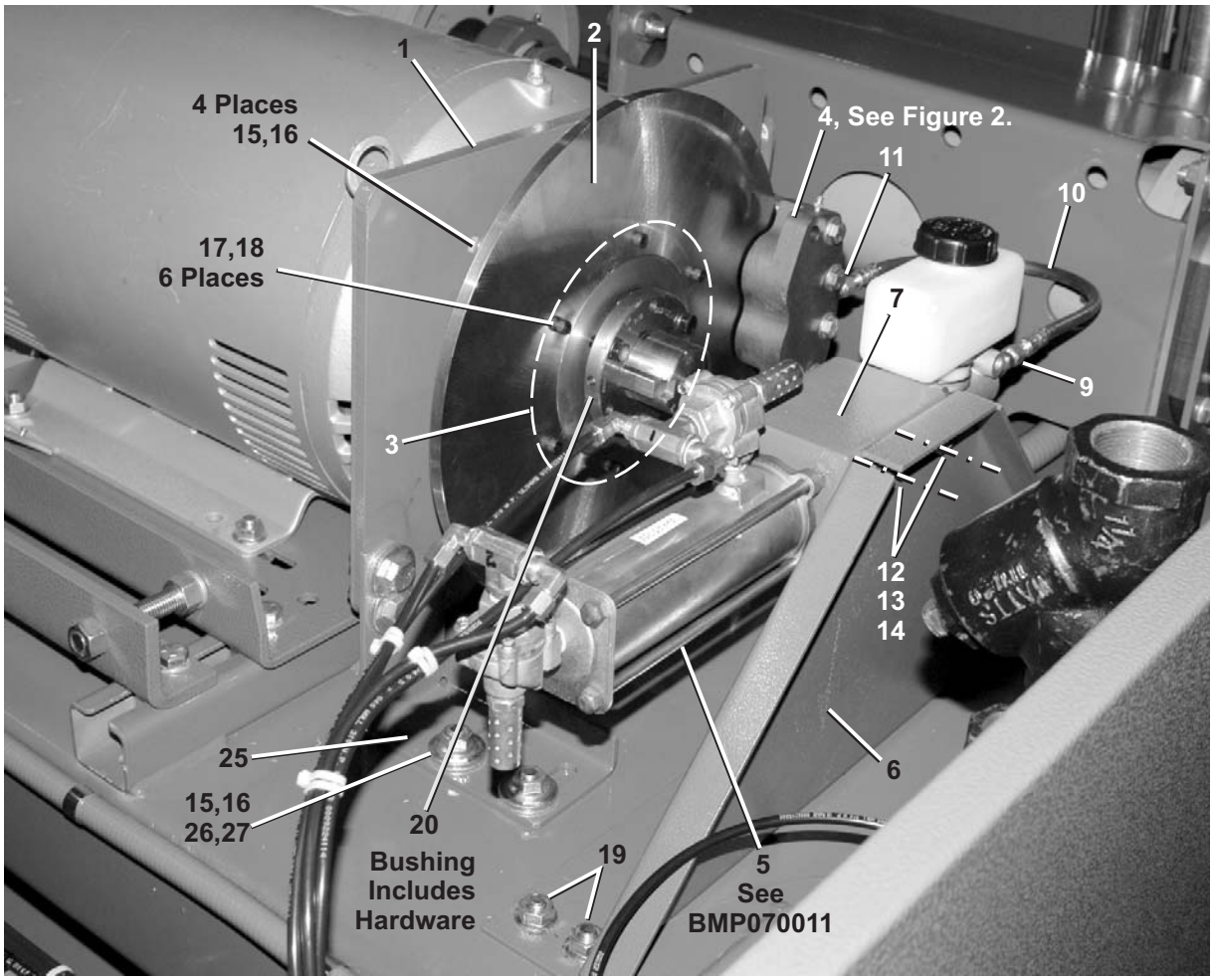
| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------ASSEMBLIES---------- | |
| | A | ABJ25006 | JKSHFT 6044SG 1 MOTOR SPHRCL | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | X2 18711H | JACKSHAFT=6440SG SPHERICAL | |
| all | 2 | 54A988 | SKF BRNG #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 1/4-2OUNC2AX1 GR 5 ZI | |
| all | 13 | 02 19195 | RING=GREASE SLNGR JKSHFT WHT | |
| all | 14 | 02 19196 | RING=GREASE SLNGR JKSHFT BLK | |
| all | 15 | 51A001 | ADAPTER 1/8 PT BRASS | |
| all | 16 | 5SL0CBEC | NPTELB 90DEG STRT 1/8 BRASS125 | |

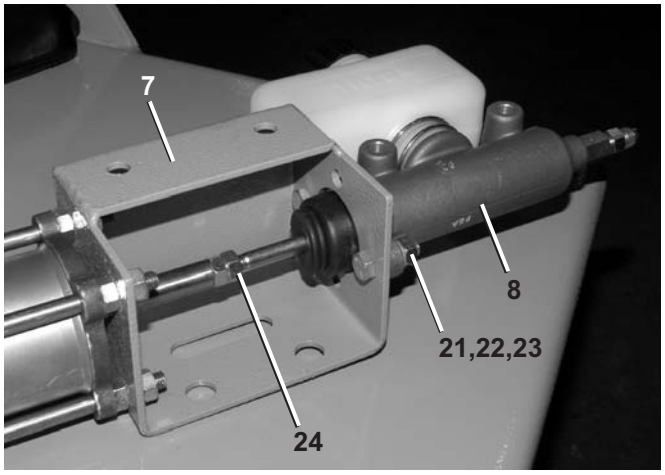
| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|

# Brake Assembly

**4244WP2/WR2, 4244SP2/SR2**

**Figure 1: Brake Assembly**

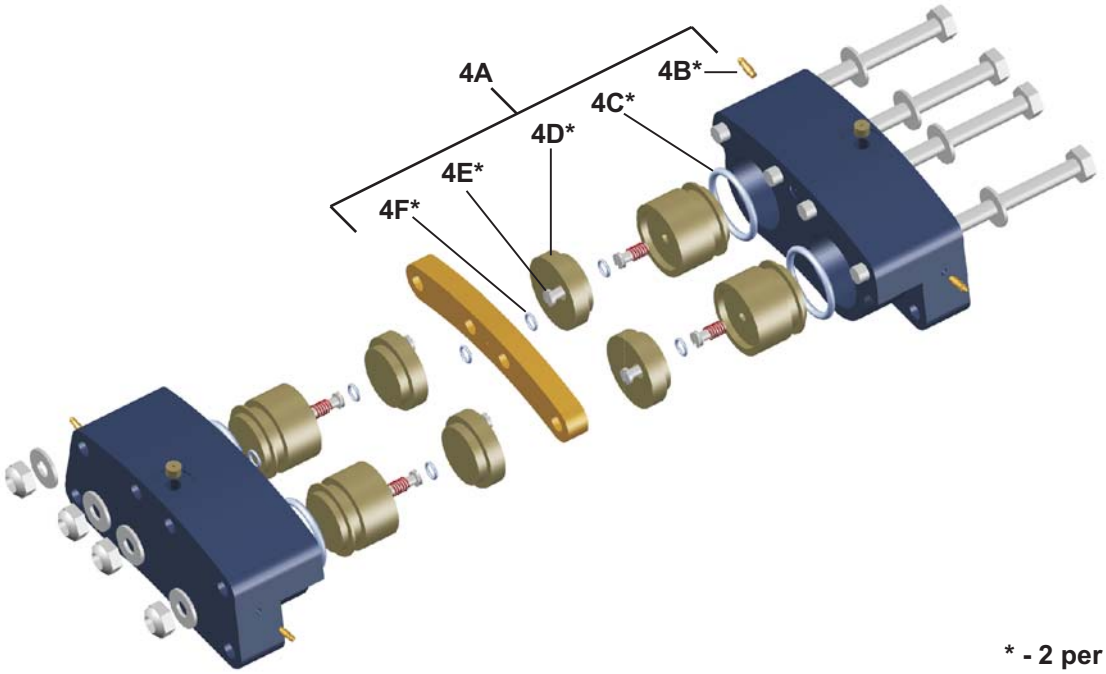


# Brake Assembly

**4244WP2/WR2, 4244SP2/SR2**

**Figure 2: Exploded view of the caliper and repair kit components**




*** - 2 per kit**

## Parts List—Brake Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | A | GBR42002 | DISC BRAKE 4244SP2 SM | 4244WP2/WR2, 4244SP2 /Sr2 INSTALLATION PARTS-REFERENCE NUMBER |
| | B | ABR42002 | DISC BRAKE ASSY 4244SP2 SM | ASSEMBLY |
| ---------- | ---------- | ---------- | ----------COMPONENTS---------- | ---------- |
| A | 1 | X2 21858 | MACH=BRK CALPR MNT PLT,4840 | |
| A | 2 | X2 21866 | MACH=CALIPER DISK, 4840F | |
| A | 3 | X2 21867 | MACH=CALIPER DISK HUB,4840F | |
| A | 4 | 54KC7976 | CALIPER HYD D/A 3/8IN RETRACT.H200DLRG | CALIPER |
| | 4A | 54KC7964RK | 54KC7964 REPAIR KIT | REPAIR KIT |
| | 4B | 54KC7964R2 | BLEEDER SCREW-W. C. BRANHAM #4000-1049 | PART OF KIT - 4A |
| | 4C | 54KC7964R1 | ORING EPR #220 W. C. BRANHAM #4000-1059 | PART OF KIT - 4A |
| | 4D | 54KC7963R1 | PUCK/FRICTION PAD=W. C. BRANHAM #4000-1052 | PART OF KIT - 4A |
| | 4E | 54KC7963R2 | PANHD SCREW - W. C. BRANHAM #4000-1118 | PART OF KIT - 4A |
| | 4F | 54KC7964R4 | ORING EPR #010 W. C. BRANHAM #4000-1002 | PART OF KIT - 4A |
| B | 5 | AAC65002 | AIRCYL BRAKE SINGLE MOTOR | PART OF B, SEE BMP070011 |

# Brake Assembly

**4244WP2/WR2, 4244SP2/SR2**

## Parts List—Brake Assembly

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

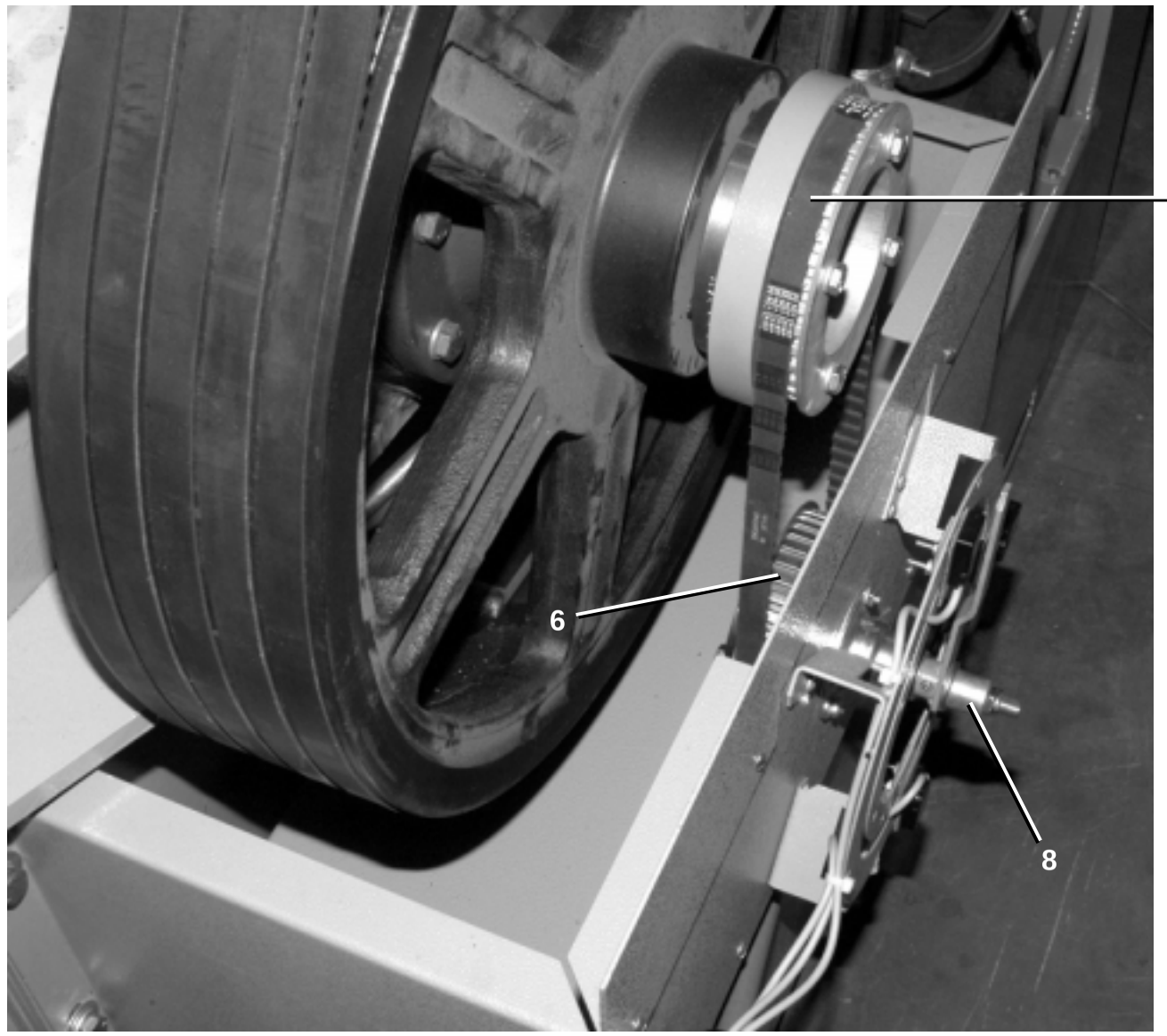
| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | A | GBR42002 | DISC BRAKE 4244SP2 SM | 4244WP2/WR2, 4244SP2 /Sr2 INSTALLATION PARTS-REFERENCE NUMBER |
| | B | ABR42002 | DISC BRAKE ASSY 4244SP2 SM | ASSEMBLY |
| | | | ----------COMPONENTS---------- | |
| A | 1 | X2 21858 | MACH=BRK CALPR MNT PLT,4840 | |
| A | 2 | X2 21866 | MACH=CALIPER DISK, 4840F | |
| A | 3 | X2 21867 | MACH=CALIPER DISK HUB,4840F | |
| A | 4 | 54KC7976 | CALIPER HYD D/A 3/8IN RETRACT.H200DLRG | CALIPER |
| | 4A | 54KC7964RK | 54KC7964 REPAIR KIT | REPAIR KIT |
| | 4B | 54KC7964R2 | BLEEDER SCREW-W. C. BRANHAM #4000-1049 | PART OF KIT - 4A |
| | 4C | 54KC7964R1 | 54KC7964R1 | PART OF KIT - 4A |
| | 4D | 54KC7963R1 | PUCK/FRICTION PAD=W. C. BRANHAM #4000-1052 | PART OF KIT - 4A |
| | 4E | 54KC7963R2 | PANHD SCREW - W. C. BRANHAM #4000-1118 | PART OF KIT - 4A |
| | 4F | 54KC7964R4 | ORING EPR #010 W. C. BRANHAM #4000-1002 | PART OF KIT - 4A |
| B | 5 | AAC65002 | AIRCYL BRAKE SINGLE MOTOR | PART OF B, SEE BMP070011 |
| B | 6 | 02 21650 | MASTER CYL SUPP BRKT | PART OF B |
| B | 7 | W3 65238 | *WLMT=MASTER BRAKE CYL BRKT | PART OF B |
| B | 8 | 54KMC1125U | MASTER CYL = WILWOOD # 260-3380 | PART OF B |
| B | 9 | 52XY0ER004 | STRADTUN3/16MJX1/8FP#2405-3-2 | PART OF B |
| B | 10 | 54KC7961BG | BRAKE HOSE=1/8"X18"OAL #50612 | PART OF B |
| B | 10B | 54KC7961BSEAL | SEAL WASHER CONICAL,BRAKE HOSE | PART OF B |
| B | 11 | 52AY0ER003 | STR.1/4"MJICX1/8"MP#2404-4-2 | PART OF B |
| B | 12 | 15K095 | HXCPSCR 3/8-16UNC2AX1 GR5 ZINC | PART OF B |
| B | 13 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | PART OF B |
| B | 14 | 15G205 | HXNUT 3/8-16UNC2B ZINC Gr2 | PART OF B |
| all | 15 | 15K162 | HXCAPSCR 1/2-13UNC2AX1.5 GR5 P | |
| all | 16 | 15U300 | LOKWASHER REGULAR 1/2 ZINC PLT | |
| all | 17 | 15K041E | SKCPSCR 1/4-20X1+1/4"BLK | |
| all | 18 | 15G166A | HXLOKNUT NYL1/4-20 UNC2A STL/Z | |
| all | 19 | 15P200 | TRDCUT-F HXWASHD 3/8-16X3/4NIK | |
| all | 20 | 56Q1RSK | 1+7/8" BUSH VPUL QD TYPE SK | |
| 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 | |

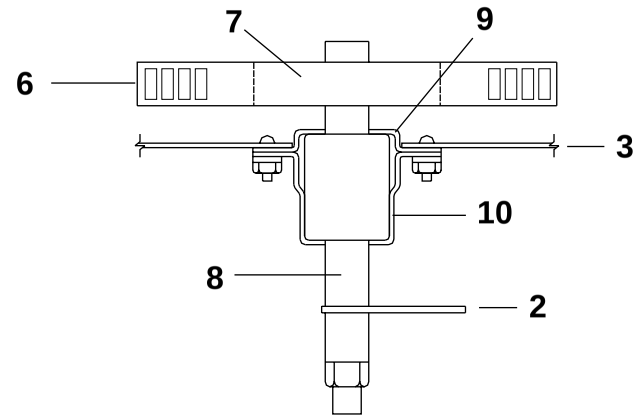
# Autospot Installation
## 4244WP2 SM

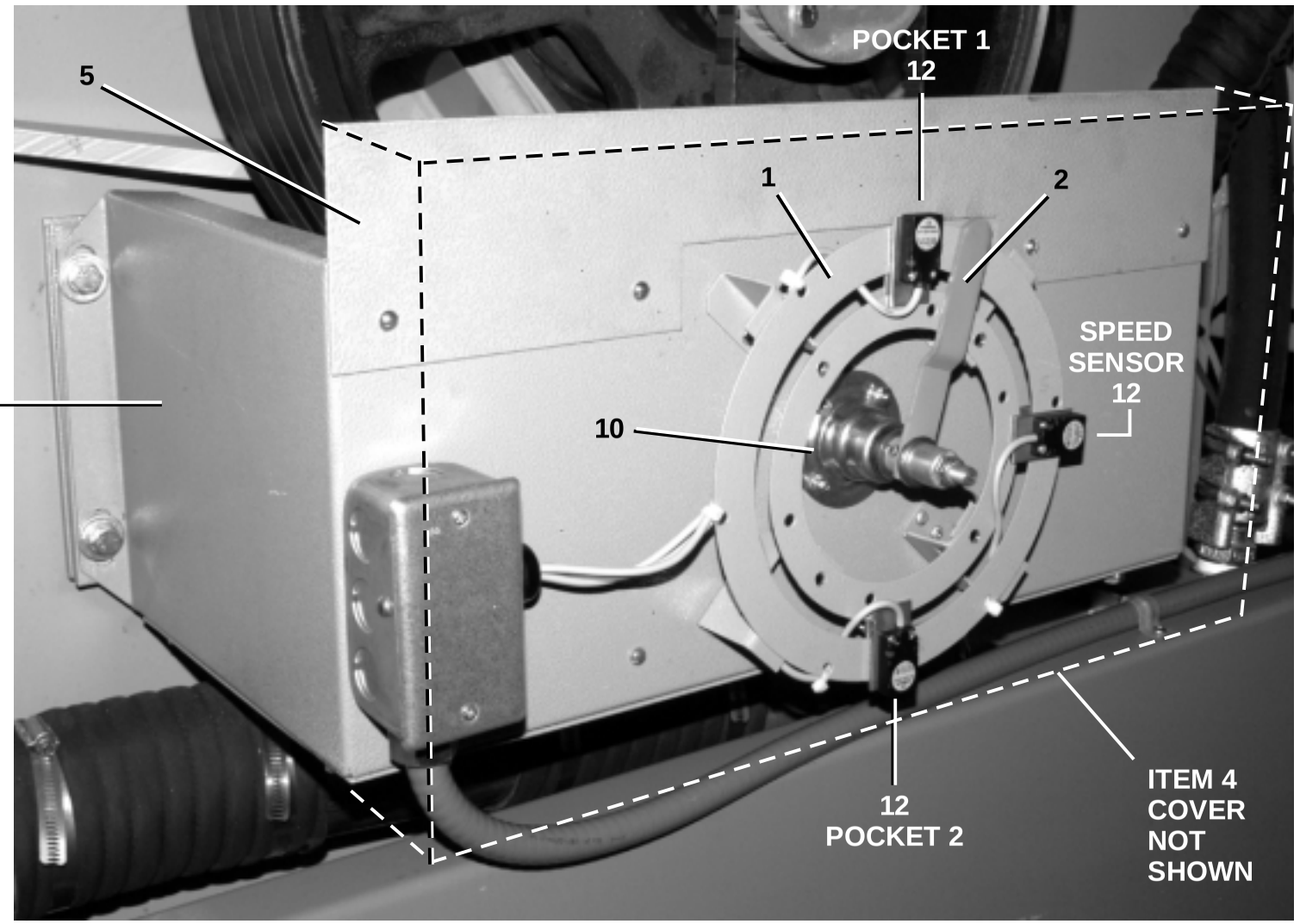


Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.




**THIS ASSEMBLY USED ON MODELS PRODUCED FROM 3/15/05 TO 2/14/06 (FOR LATER DESIGN, SEE BMP050079.)**

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## Parts List—Autospot 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 | G28 15700C | INST=42" HYDRO AUTOSPT SM | |
| ---------- | ---------- | ---------- | ----------COMPONENTS---------- | ---------- |
| all | 1 | W2 19178 | WLMT=AUTOSPOT SW/MNT 42"SG | |
| all | 2 | W2 15958 | WLMT=TARGET 42" HYDRO SGL MTR | |
| all | 3 | 02 15958A | BRKT=SW MNT 42 HYDRO SGL MTR | |
| all | 4 | 02 15958B | COVER=42 HYDRO AUTOSPOT | |
| all | 5 | 02 15961 | BELTGUARD=AIROP AUTOSPOT | |
| all | 6 | 54X020 | PULTIMBLT E#40L050D-S26050 | |
| all | 7 | 56Q0MHS | .627" BUSH VPUL TYPE H,D,OR QT | |
| all | 8 | 03 01329 | SHAFT=AIROPAUTOSPOT OUR MATL | |
| all | 9 | 02 10507 | BEARING HOUSING- CUP- PLATED | |
| all | 10 | 02 10508 | BEARING HOUSING- PLATED- ZINC | |
| all | 11 | 54C025 | GEARBLT SYNC-COG DAYCO#345L050 | |
| All | 12 | 09RPS07RDS | 7MM SENSING RECTANGULAR SHLD | |

# Autospot Installation

## 4244WP2 SM



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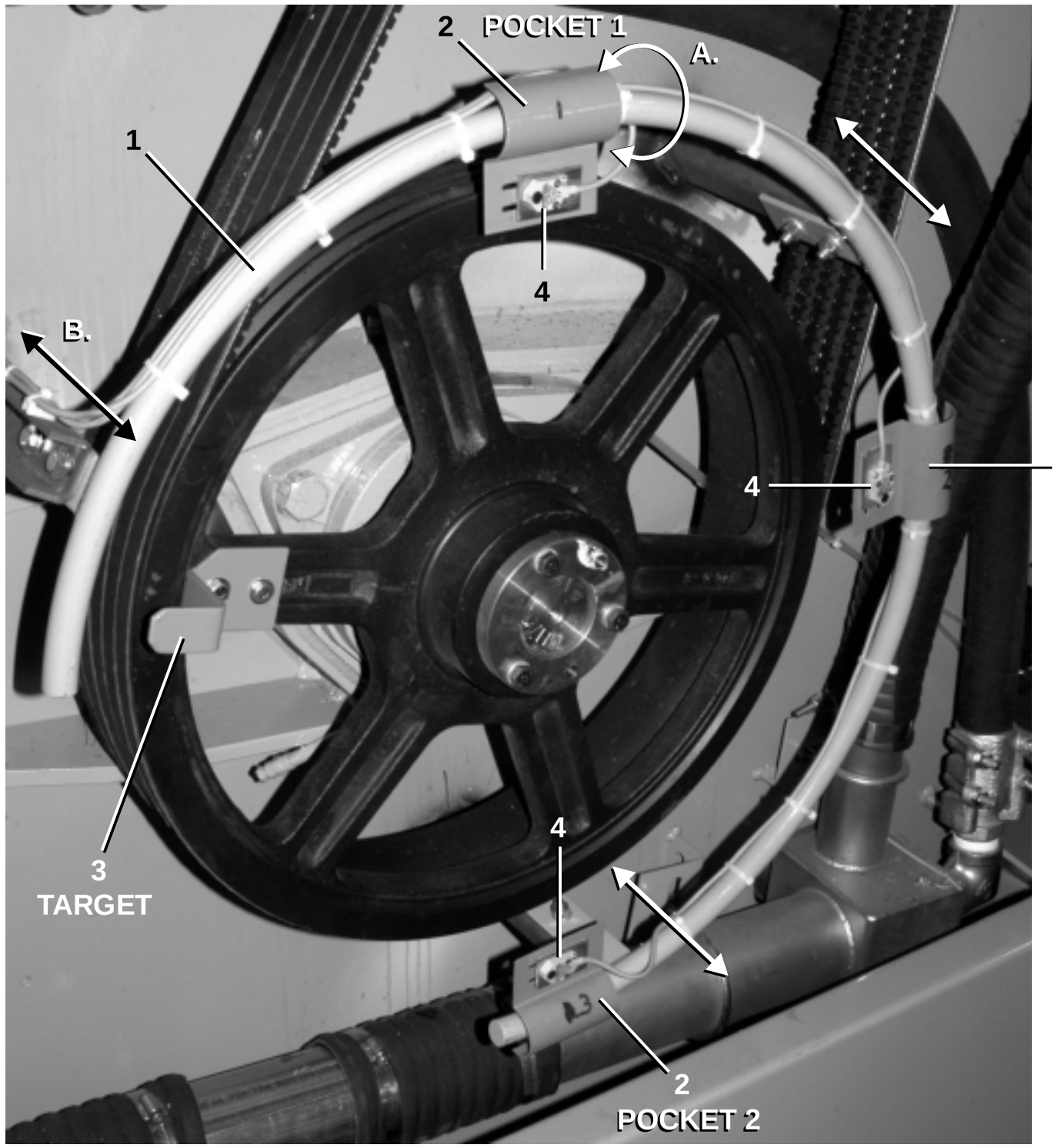
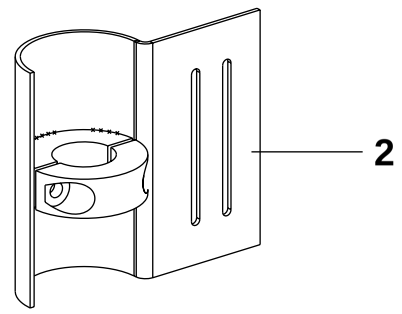



**THIS ASSEMBLY USED ON MODELS PRODUCED FROM 2/14/06 (FOR EARLIER DESIGN, SEE BMP050078.)**

**ADJUSTMENTS:**

**A. Insure the switch face is parallel to target by rotating the mounting plate on the bar and tightening the split collar.**

**B. Gap between target and switch sensor should be 3/16”[9mm]. Adjust the gap by sliding the mounting ring on slotted holes on mounting brackets.**



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## Parts List—Autospot 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 | G28 16202 | INST=42WE S/M AUTOSPOT | |
| ---------- | ---------- | ---------- | ----------COMPONENTS---------- | ---------- |
| all | 1 | W2 16181 | WLMT=PROX GUIDE MNT 42WE | |
| all | 2 | W3 60220C | WLMT=PROX MNT 60" AUTOSPOT | |
| all | 3 | 02 16142 | 4244WE PROX TARGET | |
| all | 4 | 09RPS07RDS | 7MM SENSING RECTANGULAR SHLD | |

# V-BELT TENSION ADJUSTMENTS

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

| | | | |
|---|---|---|---|
| 42031WE2 | 42031SG2 | 42031WE3 | 42031SG3 |
| 42044WE2 | 42044SG2 | 42044WE3 | 42044SG3 |

A belt tension testing device (Milnor® part number 30T001) and a straight edge are required when using these instructions.

## Tension Settings

Set the o-rings on the tension testing device (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 in this section.
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) codes shown in the tables are for factory use only.

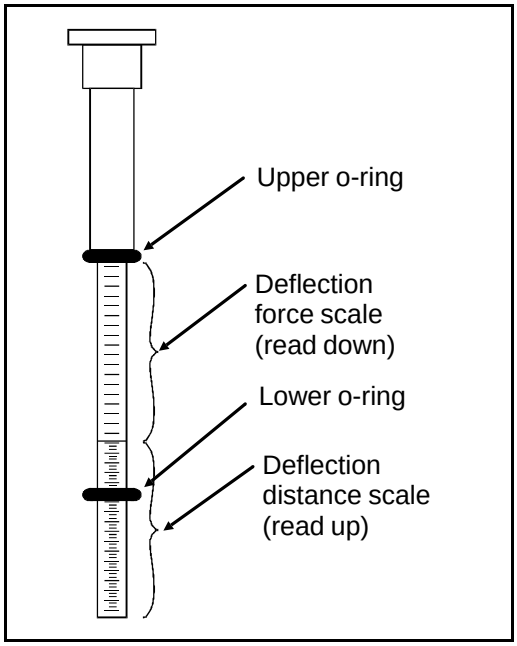


**FIGURE 1** (MSSM0301AE)
**Tension Tester Scales**

# Belt Tension Measurements

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.

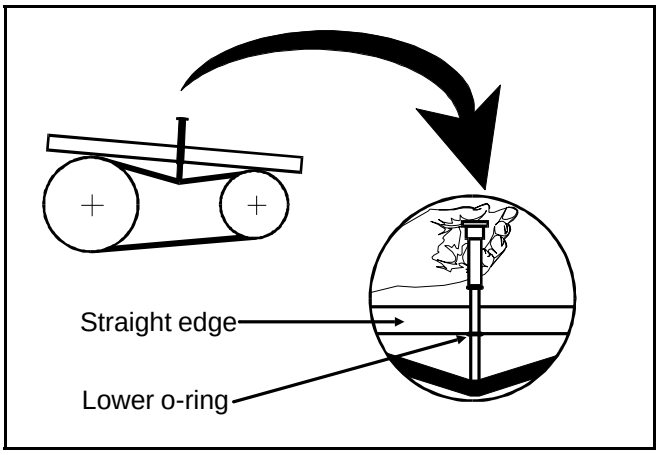


**FIGURE 2** (MSSM0301AE)
**Taking Measurements with the Tension Tester**

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.

**42031WE2/WE3 and 42044WE2/WE3 Belt Tension Measurements**

| | | Belt Deflection (inches) | Initial Tension | | Final Tension | |
|---|---|---|---|---|---|---|
| | | | (LBS) | (REF) | (LBS) | (REF) |
| Wash/2-Speed Wash | | 11/64 | 9.6-13.0 | MP3 | 7.4-10.0 | MN |
| Drain | | 3/8 | 8.0-11.0 | LP3 | 6.2-8.5 | LN |
| Main | 50Hz | 9/16 | 10.5-14.3 | NP3 | 8.1-11.0 | NN |
| | 60Hz | 37/64 | | | | |

**42031SG2/SG3 and 42044SG2/SG3 Belt Tension Measurements**

| | | Belt Deflection (inches) | Initial Tension | | Final Tension | |
|---|---|---|---|---|---|---|
| | | | (LBS) | (REF) | (LBS) | (REF) |
| Wash/2-Speed Wash | | 11/64 | 9.6-13.0 | MP3 | 7.4-10.0 | MN |
| Drain | | 3/8 | 8.0-11.0 | LP3 | 6.2-8.5 | LN |
| E1 (optional) | | 11/32 | 9.6-13.0 | MP3 | 7.4-10.0 | MN |
| Upper Jackshaft to Lower Jackshaft | 50Hz | 13/16 | 10.5-14.3 | NP3 | 8.1-11.0 | NN |
| | 60Hz | 13/16 | | | | |

# Bearing Assemblies 3

# MAIN BEARING AND SEAL REPLACEMENT FOR DIVIDED CYLINDER MACHINES

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

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

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

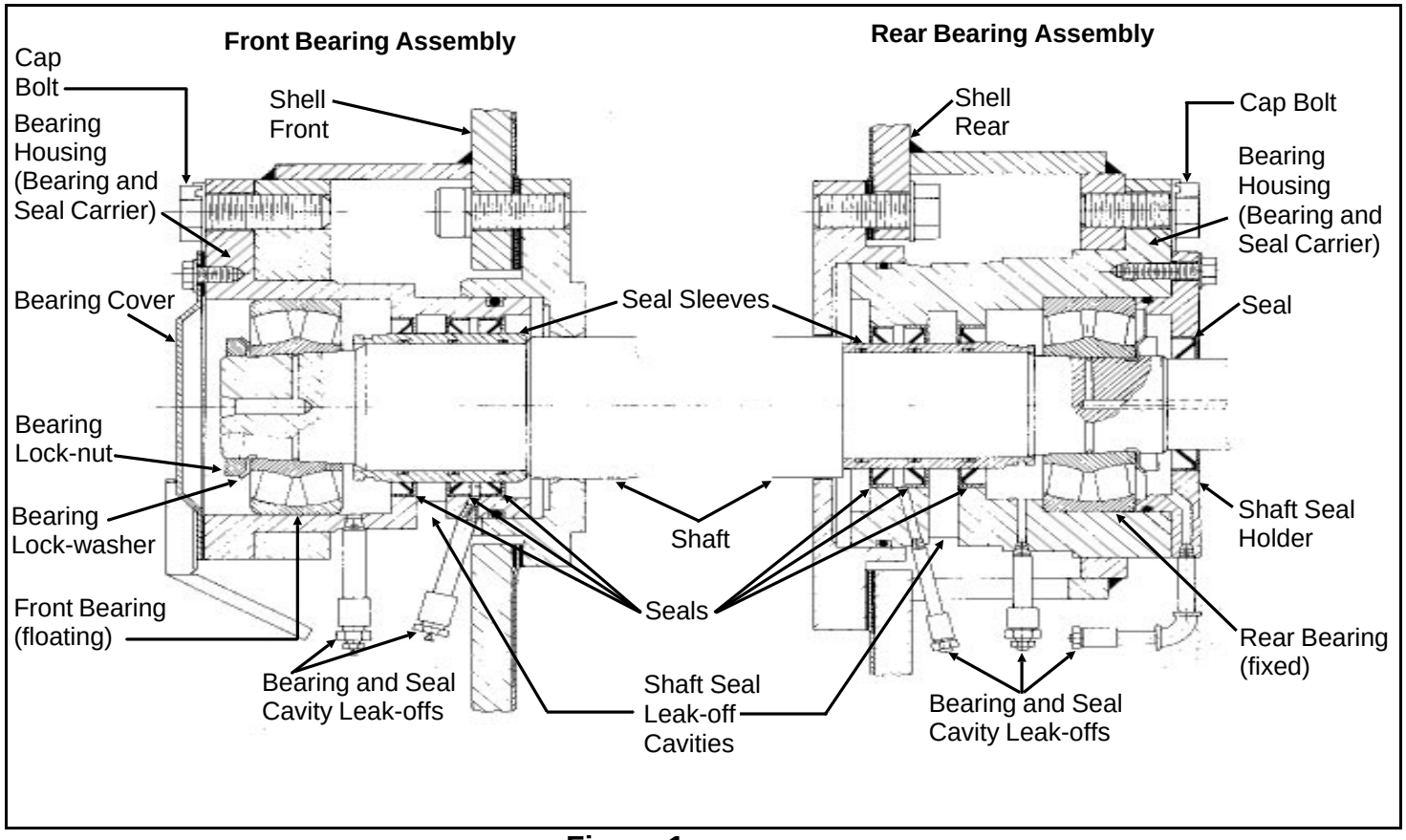


**Figure 1** (MSSM0303AE)
**Cross Section View of Front and Rear Bearing Assemblies**
**(Bearing Assembly for 60" and 72" WED Shown. Others similar.)**

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

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

This maintenance is performed in the following order:

1. Remove old bearing(s). When removing both bearings, remove the front (soil side) bearing first.
2. Remove bearing housings, seal sleeves, and seals.
3. If both bearings were removed, install the bearing housing, seal sleeve, seals, and new bearing on the rear (clean side).
4. Install the bearing housing, seal sleeve, seals, and new bearing on the front (soil side).
5. Tighten bearing(s).

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

## Removing the Bearing (Front or Rear)

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

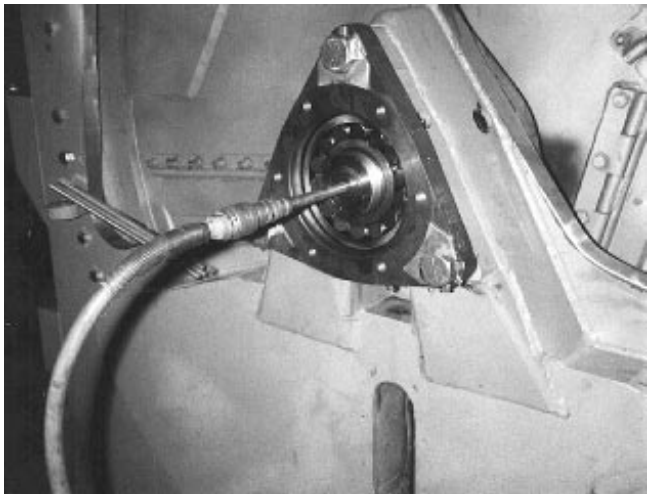

**FIGURE 2** (MSSM0303AE)
**Connection From Hydraulic Pump to Assist in Bearing Removal**

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® factory. With the bearing cover (or shaft seal holder) and the bearing removed, proceed as follows:

**1.** Remove the three bearing housing cap bolts and the grease lines from the bearing housing front plate. Install guide rods in two of the bolt holes, as shown in FIGURE 3.

**2.** Install the pulling fixture as shown in FIGURE 4, by placing each of the four threaded rods through a hole in the steel plate with hexnuts to the outside of the plate then screwing each rod into the appropriate tapped hole in the bearing housing (same holes as used to mount the bearing cover or shaft seal holder).

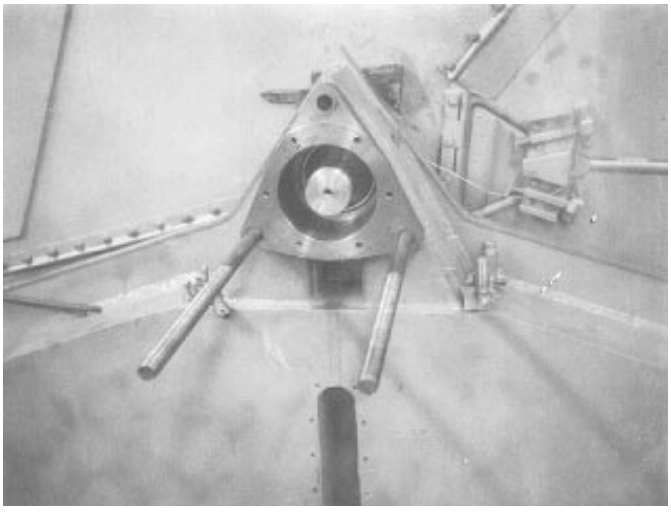

**FIGURE 3** (MSSM0303AE)
**Two Bearing Housing Guide Rods in Position**

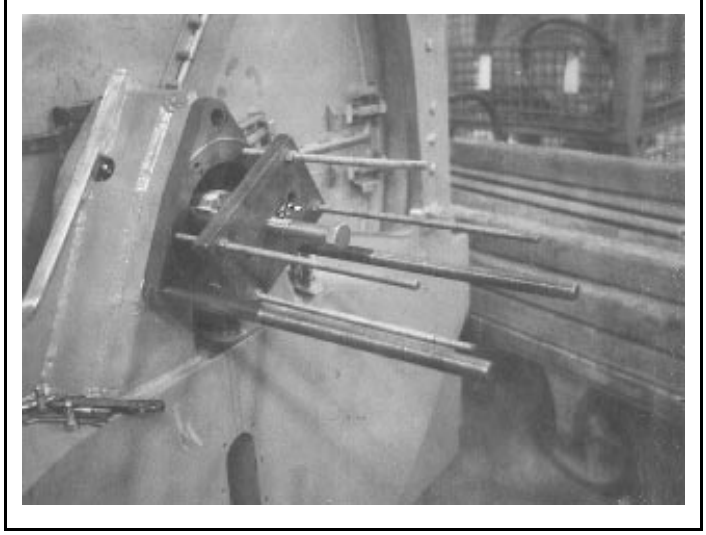

**FIGURE 4** (MSSM0303AE)
**Bearing Housing Pulling Fixture in Position**

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

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

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

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

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

## Precautions for Bearing Replacement

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

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

| | | |
|---|---|---|
| Benzene | Gasoline | Naptha |
| Chlorethane | Kerosene | Tricholorethylene |
| Freons | Mineral Spirts | |

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

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

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

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

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

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

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

**⚠ CAUTION ⚠**

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

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

**FIGURE 5** (MSSM0303AE)
**Installing Seals in Bearing Housing**

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

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

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

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

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

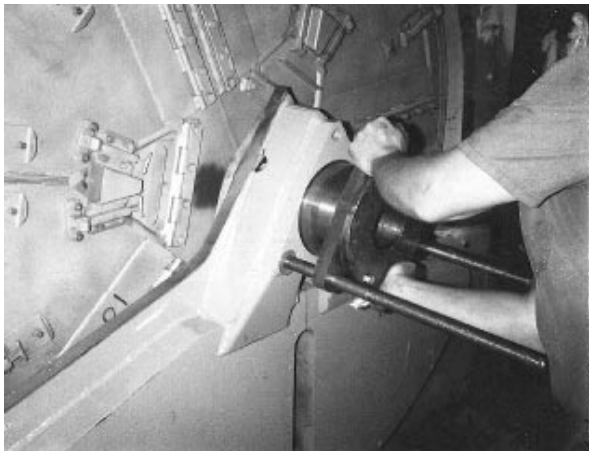

**FIGURE 8** (MSSM0303AE)
**Pushing the Bearing Housing into the Shell (60" Rapid-load machine shown)**

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

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

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

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

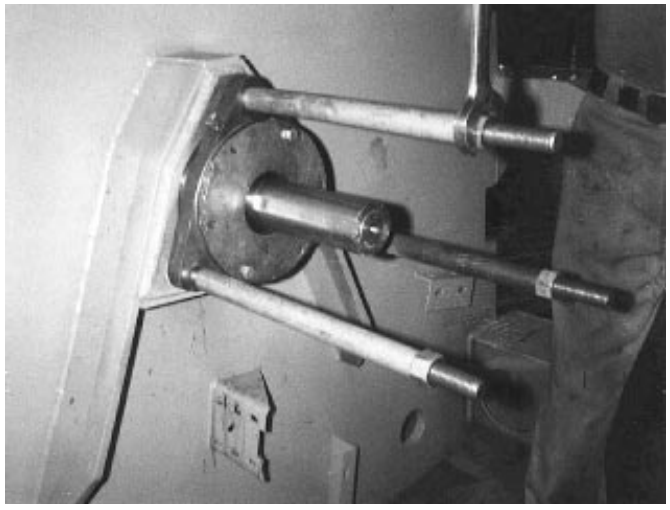

**FIGURE 9** (MSSM0303AE)
**Tightening the Bearing Housing into the Shell (42" machine shown)**

# Measuring Unmounted Clearance and Setting Bearing (Front or Rear)

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

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

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

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

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

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

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

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

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

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

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

## Table of Bearing Clearances

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

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

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

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

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

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

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

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

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

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

**Check each unused tab individually to insure this.**

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

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

5. With the grease gun, fill the space between the bearing and the front of the housing 1/3 full of grease.
6. Install the bearing cover plate or shaft seal holder, as appropriate. When installing the shaft seal holder, take care not to damage the seal as it is gently pushed over the shaft. Cover the keyway on the end of the shaft with tape to prevent the sharp corners of the keyway from cutting the seal lip. Also, make sure that the seal lip does not turn over as it passes over rough areas.

# *Main Bearing Assembly*

*42031, 42044 CP2/CP3, NP2/NP3, WP2/WP3, SP2/SP3, DA2/DA3, DP2/DP3*

**BMP840040/2006344B**
**(Sheet 1 of 2)**

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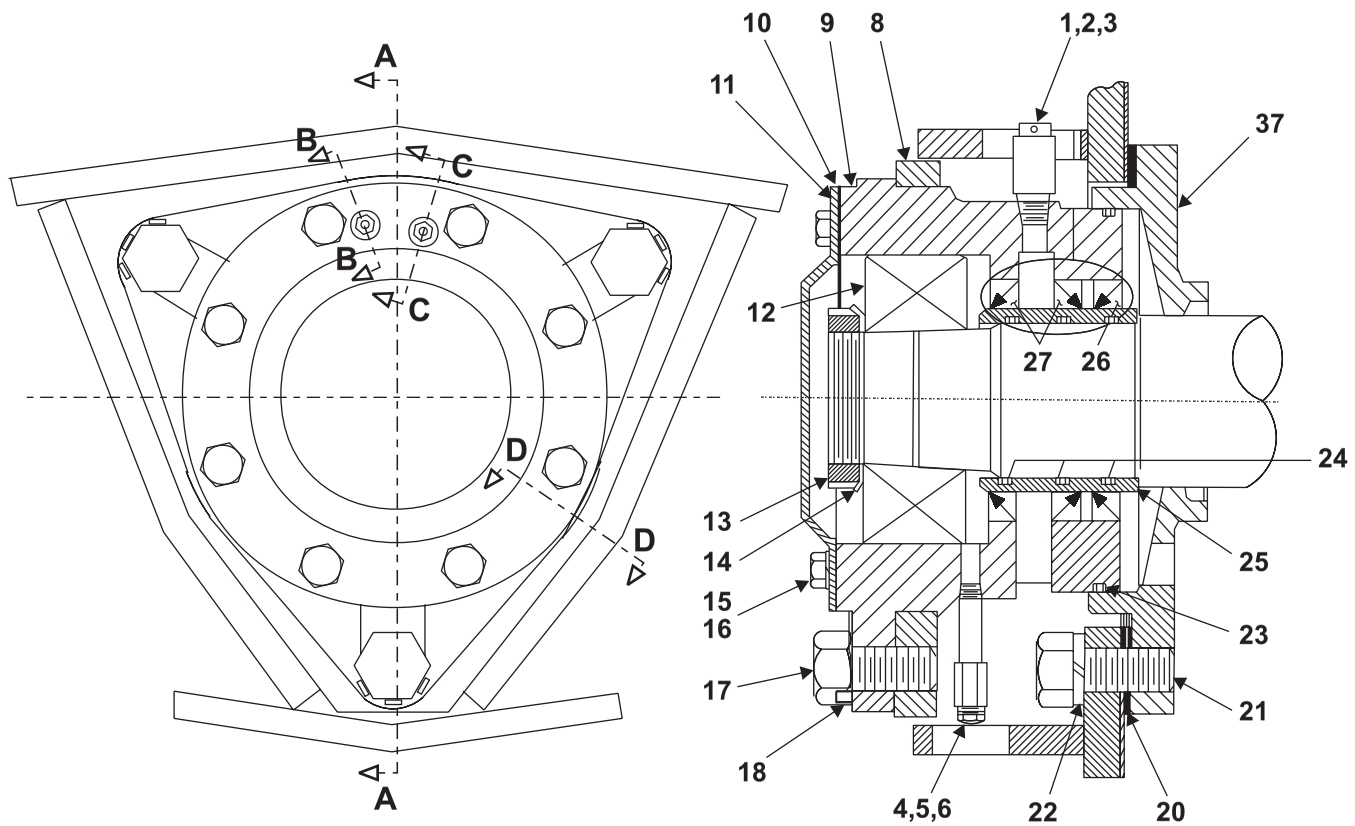
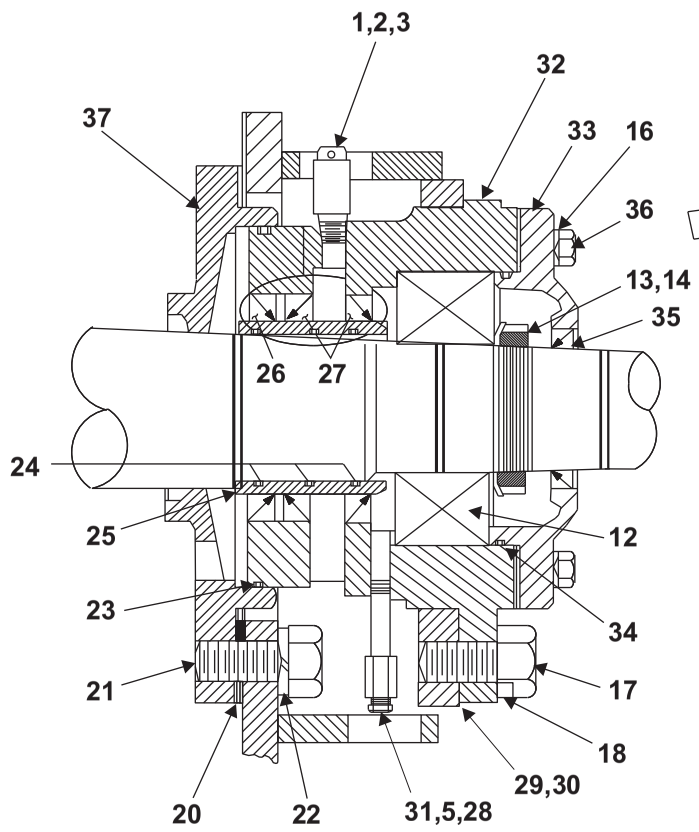


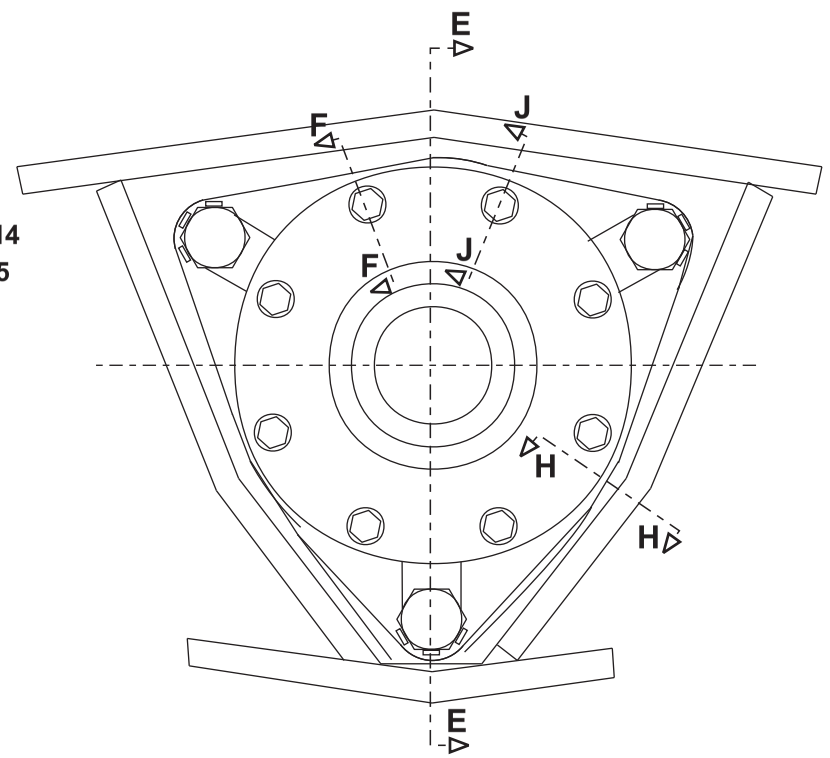


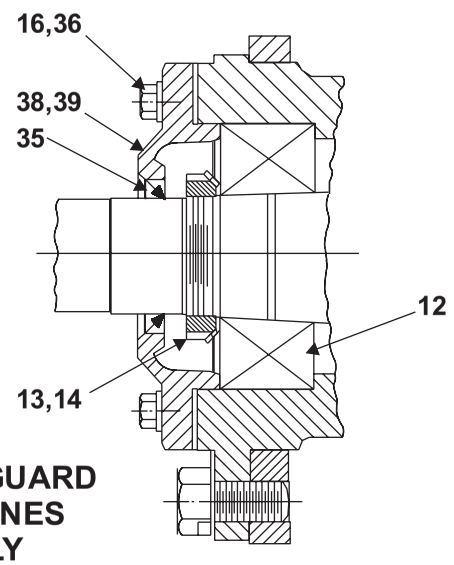


SECTION A-A

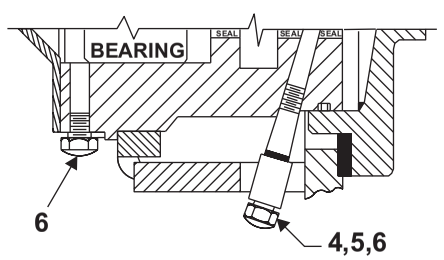



SECTION E-E




STAPH-GUARD MACHINES ONLY

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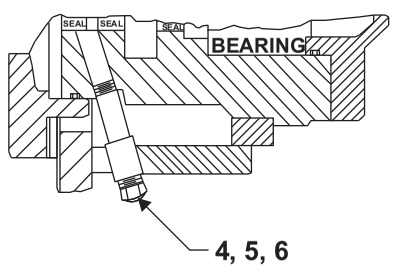


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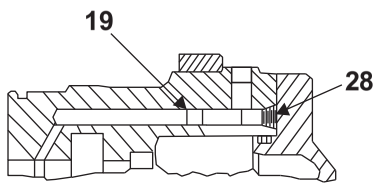
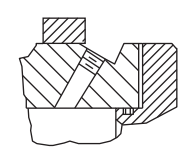
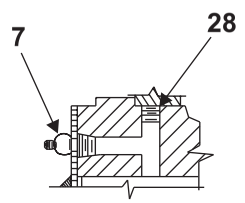


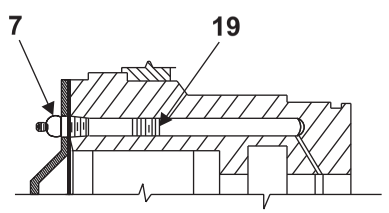

SECTION J-J



SECTION F-F




SECTION B-B




SECTION C-C

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## Parts List—Main Bearing

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 | GBM15001 | *FRONT-REAR MAIN BRG ASSY 42W | 4244WP2,CP2,CP3 |
| | B | GBM15001V | *42WE+CM+NS BEARASY=VITONSEAL | 4244WP2,WP3 VITON SEALS<br>4244CP2,CP3 VITON SEALS |
| | C | AD 16 018 | *BEARASY.MAIN(LOD+CLN)4244SGU | 4244SP2,SP3;4231SP2 |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 5N0ECLSBE2 | NPT NIP 1/4XCLS TBE BRASS 125# | |
| all | 2 | 51P008B | PLUG SQSLD 1/4"BLK LVENT STEEL | |
| all | 3 | 5SCC0EBE | NPT COUP 1/4 BRASS 125# W/HEX | |
| all | 4 | 5N0C01KG42 | NPT NIP 1/8X1.5 TBE GALSTL S40 | |
| all | 5 | 5SCC0CBE | NPT COUP 1/8 BRASS 125# 103A-A | |
| all | 6 | 54M029 | RELIEFFIT 1/8STR ALEMITE 47200 | |
| all | 7 | 54M015 | GREASEFIT 60X36/60X44 1610BL | |
| all | 9 | X2 15538 | CARRIER=FRONT BRG+SEAL | |
| All | 10 | 02 15706 | GASKET = BEARCAP | |
| all | 11 | 02 15578 | BEARCAP-CADSTL (1/42C) | |
| all | 12 | 56S22312T | SPHEROLBRG FAG#22312EASK.M.C3 | |
| all | 13 | 56AHN12 | N12 BEARING LOCKNUT | |
| all | 14 | 56AHW12 | W12  BEARING LOCKWASHER | |
| AB | 15 | 15K083 | HXCAPSCR 3/8-16 UNC2AX1/2 GR5 | |
| all | 16 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | |
| all | 17 | 15K228B | HEXCAPSCR 3/4-10 X 1+1/2 GR 5/ | |
| all | 18 | 02 15292 | LOCK WASH=BEARHSN 6/42C CAD | |
| all | 19 | 02 15528 | GREASE RESTRICTOR=42"SEALS | |
| all | 20 | 02 15695 | GASKET=SHAFT SUP 2/42WEHU | |
| all | 21 | 15B245 | HXCAPSCR 3/4-10UNC2AX1.75 GR5 | |
| all | 22 | 15U340 | LOCKWASH MEDIUM 3/4 ZINCPL | |
| all | 23 | 60C164 | ORING 6+1/21DX1/8 -260 | |
| all | 24 | 60C137A | ORING 2+3/4ID1/8CS BUNA70 #232 | |
| all | 25 | X2 15263D | SEALSLEEVE=2.75SHAFT(17-4PH) | |
| all | 26 | 24S120 | SEAL 3.25X4.25X.5 JM#9547 LUP | |

## Parts List, cont.—Main Bearing

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| AC | 27 | 24S120 | SEAL 3.25X4.25X.5 JM#9547 LUP | |
| B | 27 | 24S120V | SEAL 3.25X4.25X.50 JM#9547LUP | |
| all | 28 | 5SP0CBEHS | NPT PLUG 1/8 HXCTRSNK BRASS | |
| all | 29 | 15U355F | 24GA ADJWASH=BRGHOUS ZINC PL | |
| all | 30 | 15U355F | 24GA ADJWASH=BRGHOUS ZINC PL | |
| all | 31 | 5N0C03AG42 | NPT NIP 1/8X3 TBE GALSTL SK40 | |
| all | 32 | X2 15539 | CARRIER=REAR BRG+SEAL | |
| all | 33 | X2 15702 | RETAINER=REAR BRG+SEAL | |
| all | 34 | 60C152C | ORING 4+7/8IDX1/8CS BUNA70#249 | |
| all | 35 | 24S005 | SEAL 2.25 X 3.0 X .375 SS BUNA | |
| all | 36 | 15K095 | HXCPSCR 3/8-16UNC2AX1 GR5 ZINC | |
| all | 37 | X2 15683 | SUPPORT-SHAFT=2/42WEHU | |
| C | 38 | 51P013 | PLUG HXCNTRSUNK 1/4"BRASS | |
| C | 39 | X2 15746 | RETAINER=BRG=SOILSD:C2-15702 | |

# Frame, Pivots, and Suspension

4

# SUSPENSION ADJUSTMENTS FOR DIVIDED CYLINDER MACHINES

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

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

1. To position the shell in the proper location within the frame (hanging dimensions) to maximize freedom of movement of the shell and to insure proper draining, and
2. To adjust the length of up and down travel at each of the push-down locations (push down travel) so that the shell will not be distorted (racked) when pushed down.

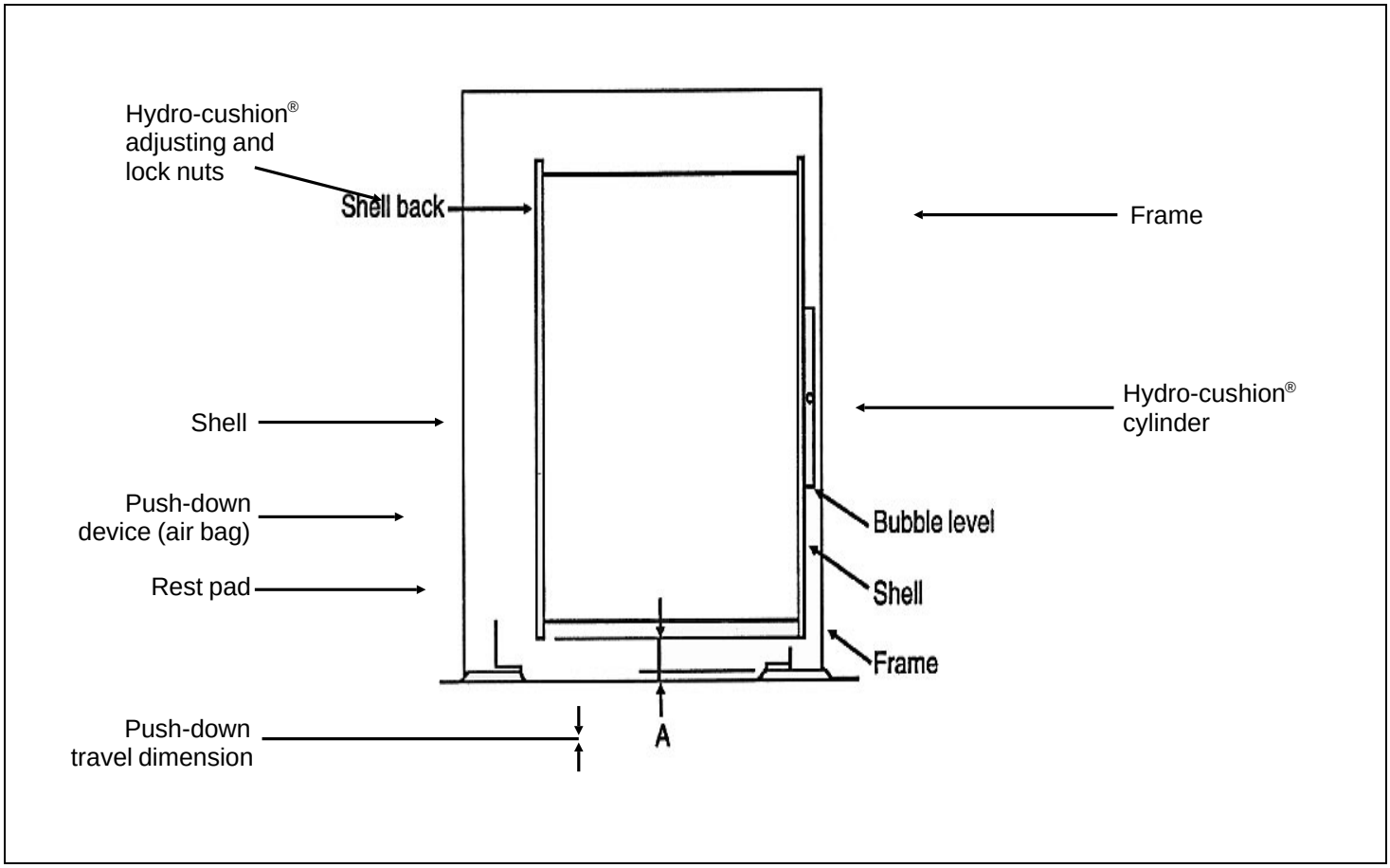



**FIGURE 1** (MSSM0302AE)

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

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

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

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

## How Shell Adjustments are Made

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

**⚠ CAUTION ⚠**

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

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

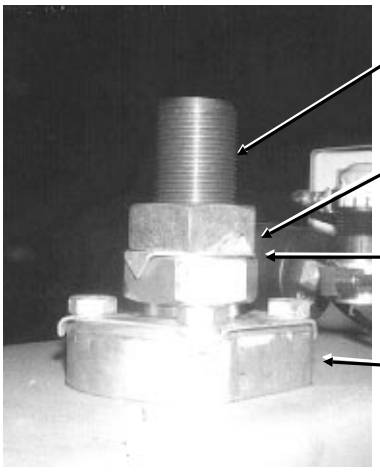


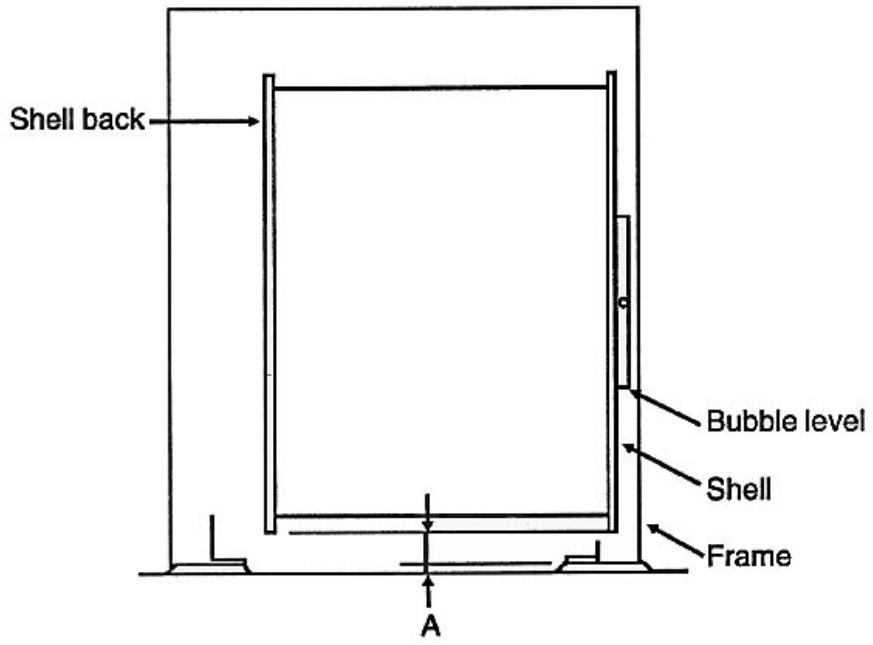

**FIGURE 2** (MSSM0302AE)
**Hydro-cushion® Upper Shaft and Adjusting Nuts**

# Shell Hanging Dimensions and Adjustment Procedures

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

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

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




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

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

# Push-Down Travel Dimensions and Adjustment Procedures

**⚠ CAUTION ⚠**

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

## 42" Divided Cylinder Machines

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

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

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

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

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

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

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

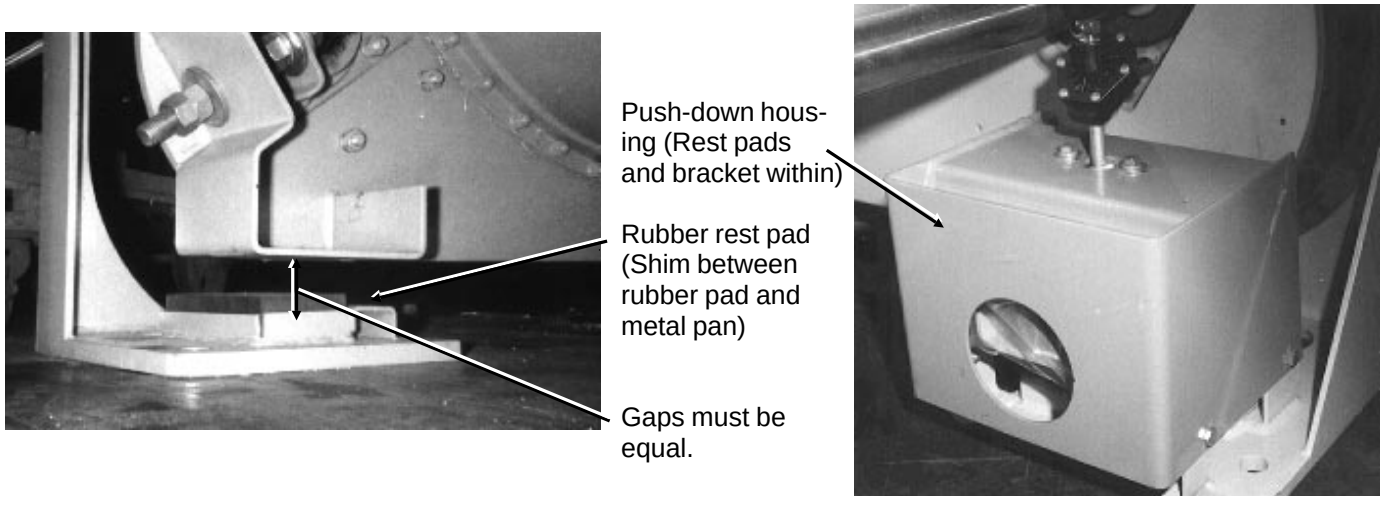



**FIGURE 4** (MSSM0302AE)
**Push-down Travel Adjustment: 42" Div-cyls (42" Staph-guard® shown)**

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

Make final adjustments as follows:

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

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

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

## 60" Divided Cylinder Machines

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

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

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

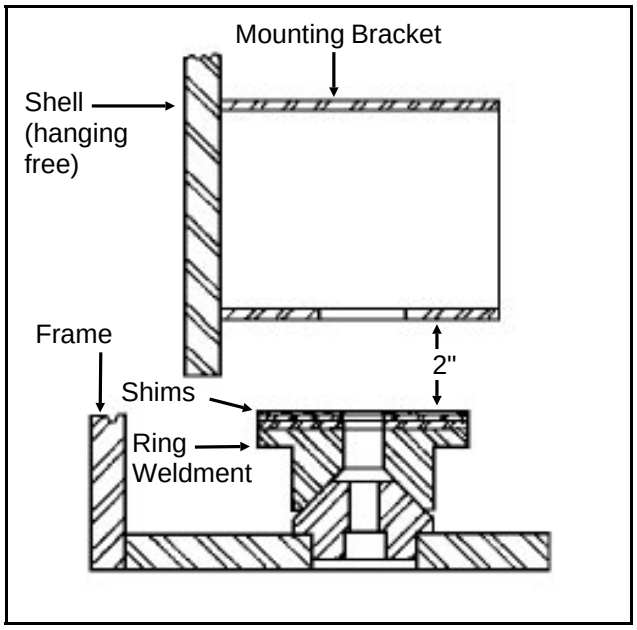



**FIGURE 5** (MSSM0302AE)
**Shimming Ring Weldments**

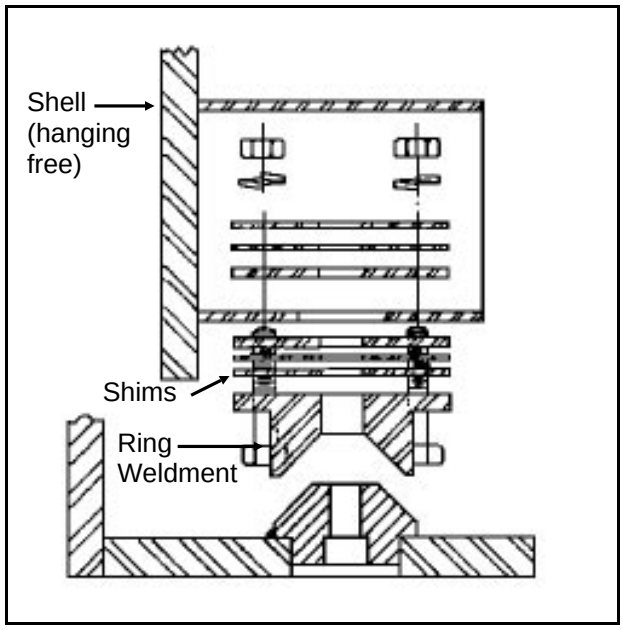



**FIGURE 6** (MSSM0302AE)
**Reconnecting Ring Weldments**

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

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

# Suspension Cylinder Locations

**Use with BMP701408**



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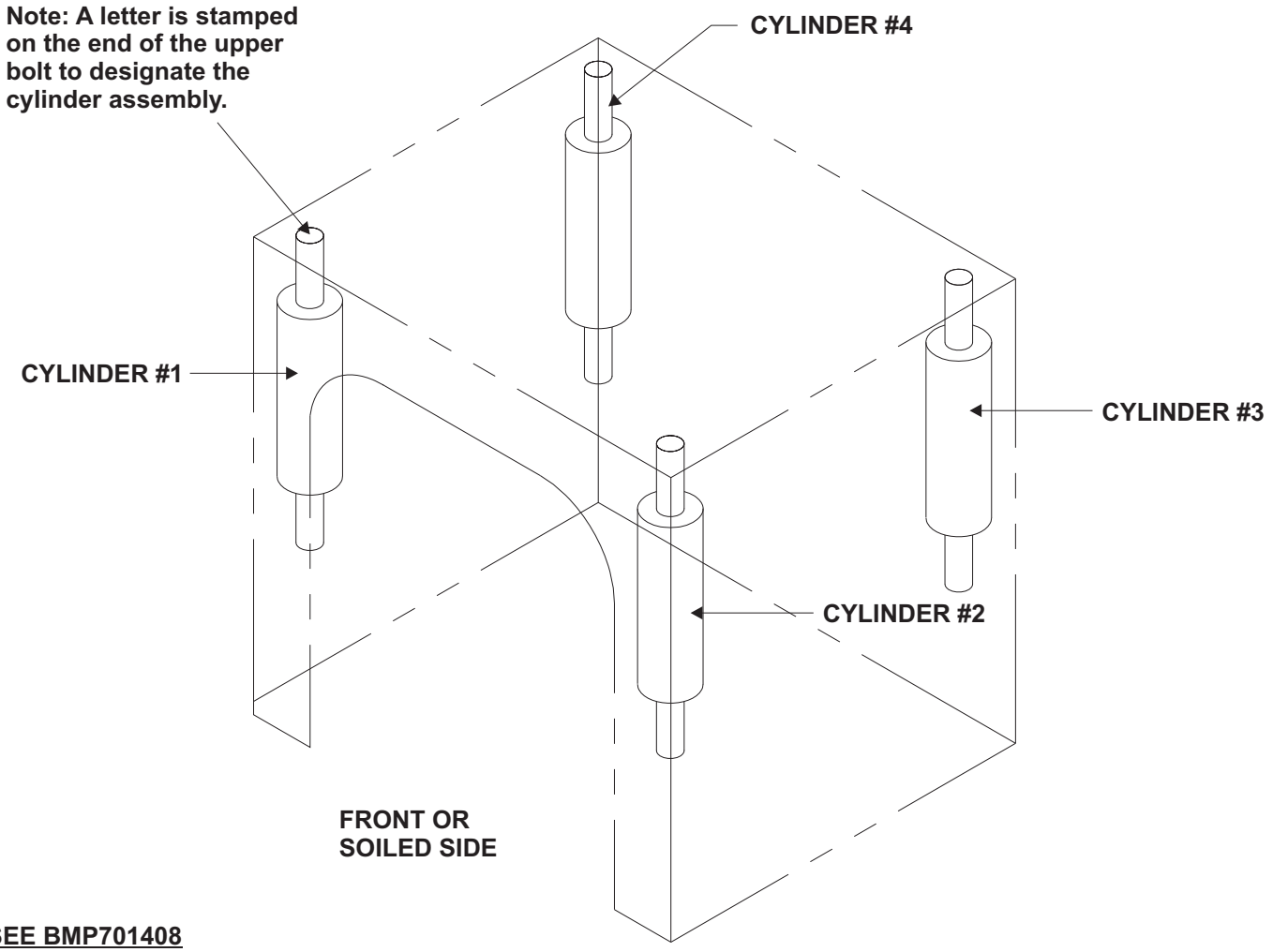


**SEE BMP701408**
**FOR REPAIR PARTS:**
**HYDROCUSHION CYLINDER ASSEMBLY "*B*"**
**THROUGH HYDROCUSHION CYLINDER ASSEMBLY "*K*"**

| | MACHINE MODELS: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| POSITION: | 42031 CP2,NP2 WP2,WP3 | 42031 SP2,SP3 | 42044 CP2,NP2 WP2,WP3 D7P | 42044 SP2/3; 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 |
| 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

BMP701408/2006275B
(Sheet 1 of 2)

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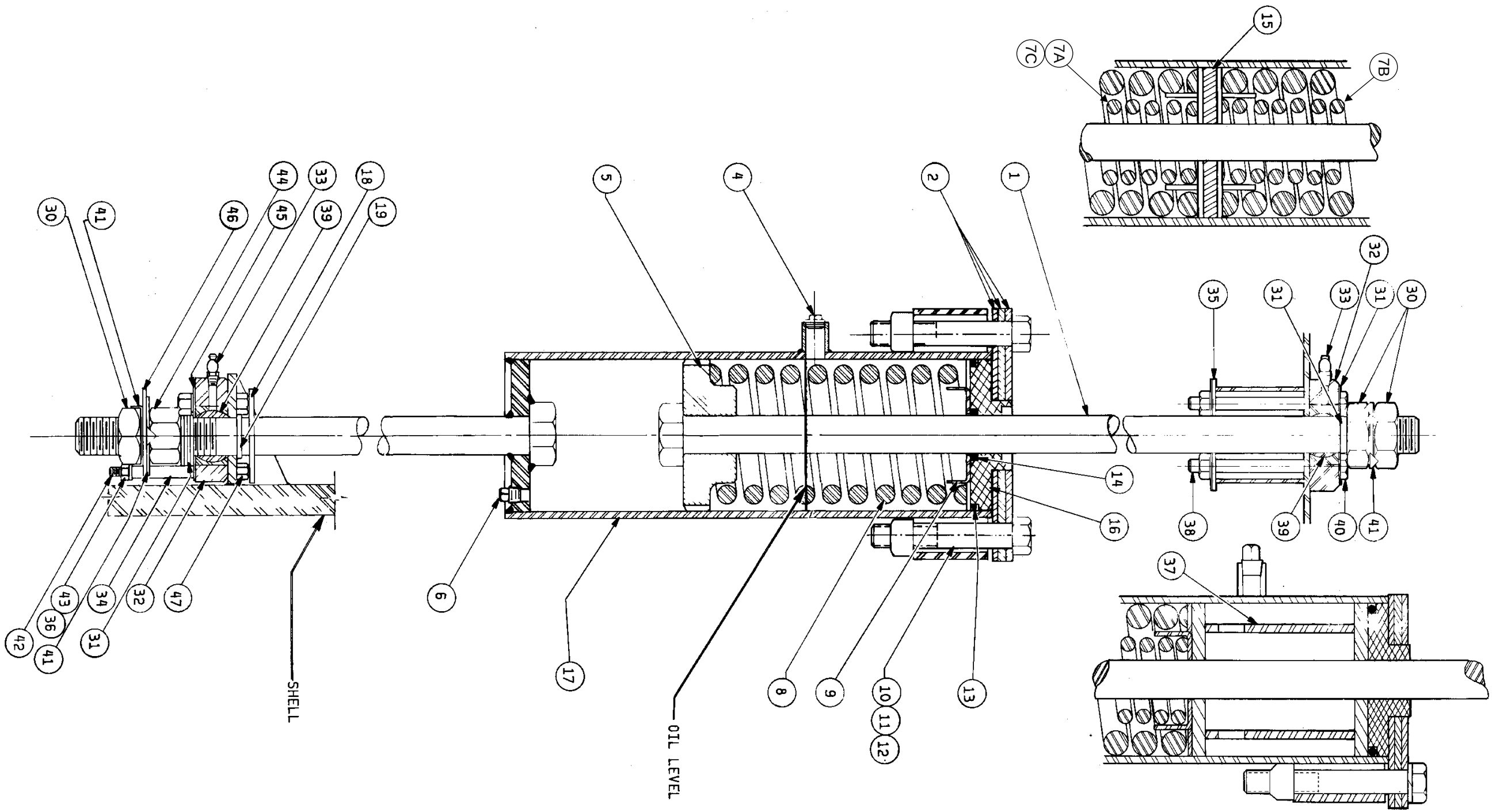

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## Parts List—Suspension Cylinder Assemblies

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------ASSEMBLIES---------- | |
| | B | SA 16 039 | *HYDROCUSHION CYL ASSY-"B" | CYLINDER ASSY B |
| | C | SA 16 038 | *HYDROCUSHION CYL ASSY-"C" | CYLINDER ASSY C |
| | D | SA 28 091 | *HYDROCUSHION CYL ASSY-"D" | CYLINDER ASSY D |
| | F | SA 36 021 | *HYDROCUSHION CYL ASSY-"F" | CYLINDER ASSY F |
| | G | SA 36 023 | *HYDROCUSHION CYL ASSY-"G" | CYLINDER ASSY G |
| | H | SA 36 047 | *HYDROCUSHION CYL ASSY-"H" | CYLINDER ASSY H |
| | K | SA 29 031K | *HYDROCUSHION CYL ASSY-"K" | CYLINDER ASSY K |
| | | | (Note: To identify which cylinder is supplied with your machine, see BMP701235 which should be located in the manual next to this document. Once you know which cylinder assembly you have, "B-K" listed above, Identify your parts by referencing the "Used In" coding.) | |
| | | | ----------COMPONENTS---------- | |
| ABCDK | 1 | 02 18244 | BOLT=HYDCYL 27+7/8LG+KEYWAY | |
| K | 1 | 02 18244A | BOLY=HYDCYL 28+7/8LG+KEYWAY | |
| FGH | 1 | 03 06201 | BOLT=HYDCYL 41+7/8LG+KEYWAY | |
| all | 2 | 02 18840A | UPCAP=HYDROCYL 42+52+60 | |
| all | 4 | 5SP0KGFSS | NPT PLUG 1/2 SOSOLID GALSTL | |
| BC | 5 | X2 15356 | PISTON=HYDROCYL 6"- 6 NOTCH | |
| DFGHK | 5 | X2 18228 | PISTON=HYDROCYL 6"- 3 NOTCH | |
| all | 6 | 5SP0GHFHKM | NPT PLUG 3/8"-HEXCSMAGNETIC ZN | |
| FG | 7A | 03 06139 | SPRING=INNER HYDRO CYL 331LB/IN | FULL SPRING (PURPLE) |
| G | 7B | 03 06139A | SPRING=INNER HYDRO CYL | PLUS ½ SPRING "G" ONLY (PURPLE) |
| H | 7C | 03 06338 | SPRING INNER-GOLD 14"LONG | GOLD |
| B | 8 | 02 16068 | MAIN SPRING 212LB/IN RED | RED |
| C | 8 | 02 16125 | MAIN SPRING 300LB/IN BLACK | BLACK |
| D | 8 | 02 19039 | MAIN SPRING 480LB/IN GREEN | GREEN |
| FG | 8 | 03 06138 | SPRING=OUT HYDROCYL 667LB/IN | ORANGE |
| G | 8 | 03 06138A | SPRING=OUT HYDRO CYL | ORANGE |
| H | 8 | 03 06337 | SPRING-OUTER-GOLD 14.5"LONG | GOLD |
| K | 8 | 03 09016 | MAIN SPRING 1035LB/IN BLUE | BLUE |
| ABCDFGK | 9 | 02 18619 | BUSHING RETAINER + CAD | |
| H | 9 | 03 06358 | BUSHING RETAINER.CAD | |
| all | 10 | 15B237 | HXCAPSCR 1-8UNC2AX5.5 SAEGR5 Z | |
| all | 11 | 15G255A | SQNUT 1-8UNC2B SAE ZINC GR2 | |
| all | 12 | 15U400 | LOCKWASHER MEDIUM 1" ZINCPL | |
| all | 13 | 60C159A | 0RING 5.475ID 1/4CS BN70 #433 | |
| all | 14 | 24S040 | SEAL URETHNE 1-7/16 2.25 13/32 | |
| GH | 15 | M2 18690 | LOWER CAP=HYDROCYL | |
| all | 16 | 02 18839A | MACHBUSH HYDRCYL CAP #433-OR | |
| BC | 17 | SA 15 084 | *HYDCUSH CYL WLDMT (18"X/12") | |
| DI | 17 | SA 28 090 | *HYDCUSH CYL WLDMT (18"/23") | |
| FGH | 17 | W3 06203 | *HYDCUSH CYL WLDMT (35"/12") | |
| K | 17 | W2 18233 | *HYDCUSH CYL WLDMT (20"X22") | |
| all | 18 | 02 175034 | SHIELD-BALLBUSH-4/HYDRO MACH | |
| BDFGH | 19 | 02 02230 | 6 WATER BARRIER (NEOPRENE) | |
| all | 30 | 15G268 | HXFINJAMNUT 1+1/2-12UNF2B ZINC | |
| all | 31 | 02 18571A | PISTON ROD WASHER-.25"TK | |
| all | 32 | X3 06252 | RETAINER-BALBUSH=4/72WEDU | |
| all | 33 | 54M025 | HYDFIT 1/8"-90 ALEMITE 1613-B | |
| all | 34 | 27B240 | SPCRROLL.5ID.813L.062T STLZNC | |
| all | 35 | 02 18534 | HOLDPLATE= BALLBUSH ZNC/CAD | |
| all | 36 | 15G230 | HXNUT 1/2-13UNC2B SAE ZINC GR2 | |
| F | 37 | Y3 06200 | SPACER=HYDRO-CUSH CYL-MACH | |
| all | 38 | 15K203 | HXCAPSCR TFL 1/2-13X5 GR5 ZINC | |
| all | 39 | 54A705 | BALBUSH 1.5 SKF#GEZ108ESAVE467 | |
| all | 40 | 15N037 | HXCAPSCR 1/2-13UNC2AX6.5 GR5 Z | |
| all | 41 | 02 18256 | LOKWASH-TONGUE 8/WEH ZINC | |
| all | 42 | 15K202 | HXCAPSCR 1/2-13UNC2AX5 GR5 ZIN | |
| all | 43 | 15U300 | LOKWASHER REGULAR 1/2 ZINC PLT | |
| all | 44 | 15G231 | HXFINJAMNUT 1/2-13UNC2B ZINC G | |
| all | 45 | 02 18534 | HOLDPLATE= BALLBUSH ZNC/CAD | |
| all | 46A | 02 18795A | WASH-TIMING=HYDRO CYL 45DEG | USE ONE |
| all | 46B | 02 18795B | WASH-TIMING=HYDRO CYL 75DEG | USE ONE |
| all | 47 | 15K191 | HXCAPSCR 1/2-13UNC2AX2.5 GR5 Z | |
| FGH | 48 | AVH52001 | ASSY=OILFIL SPOUT 72HYD CYL | |

# Shell and Door Assemblies 5

# 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.

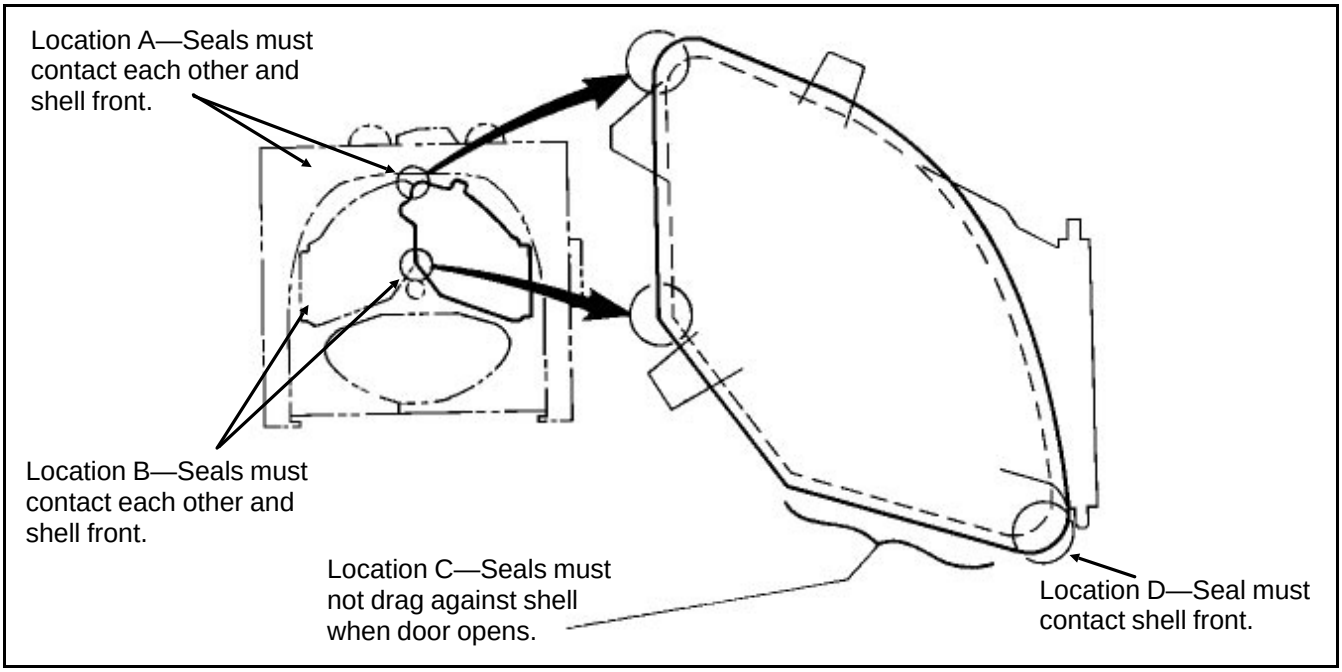


**FIGURE 1** (MSSMA413AE)
**Door Seal Checks**

# 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.

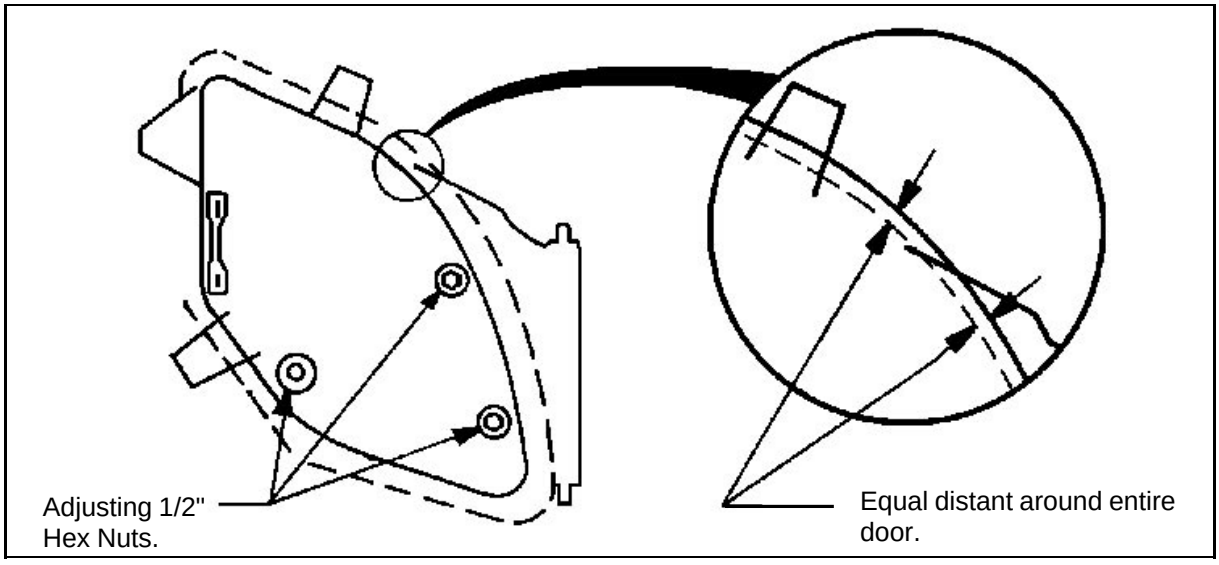


**FIGURE 2** (MSSMA413AE)
**Door Alignments**

**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.

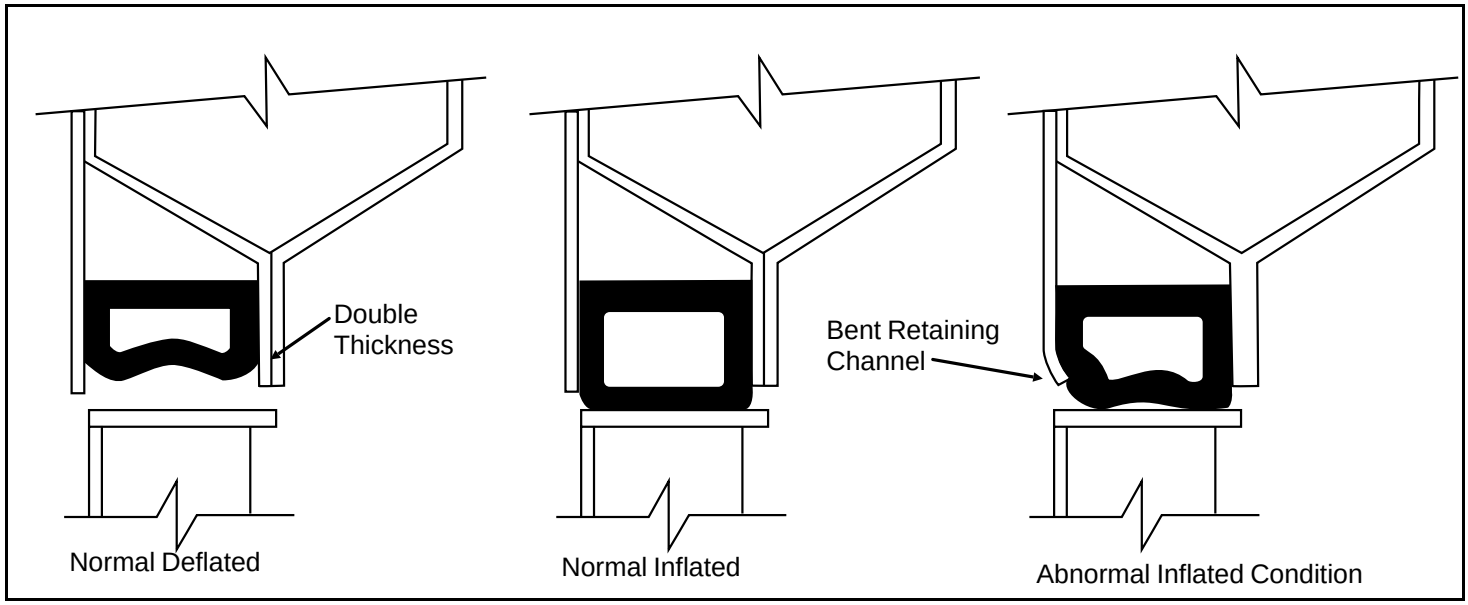


**FIGURE 3** (MSSMA413AE)
**Door Alignment**

**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.

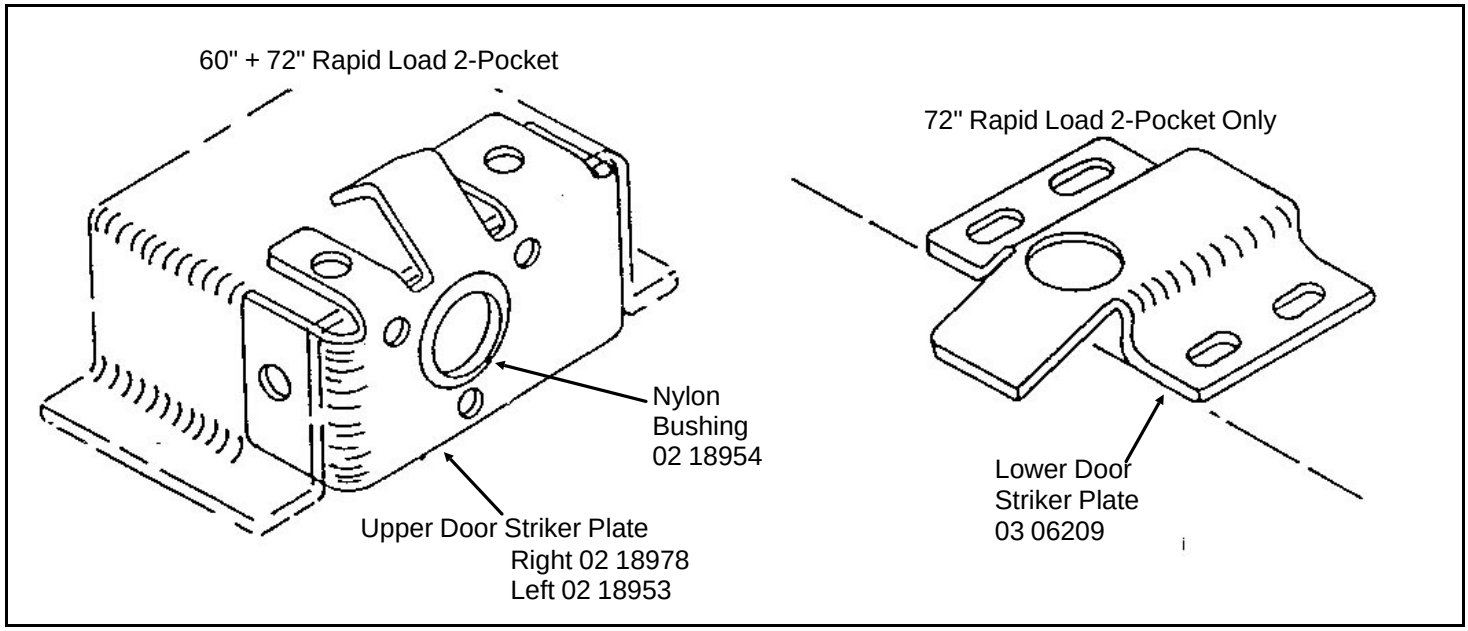


**FIGURE 4** (MSSMA413AE)
**Worn Striker Plate**

**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 mismounted 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.

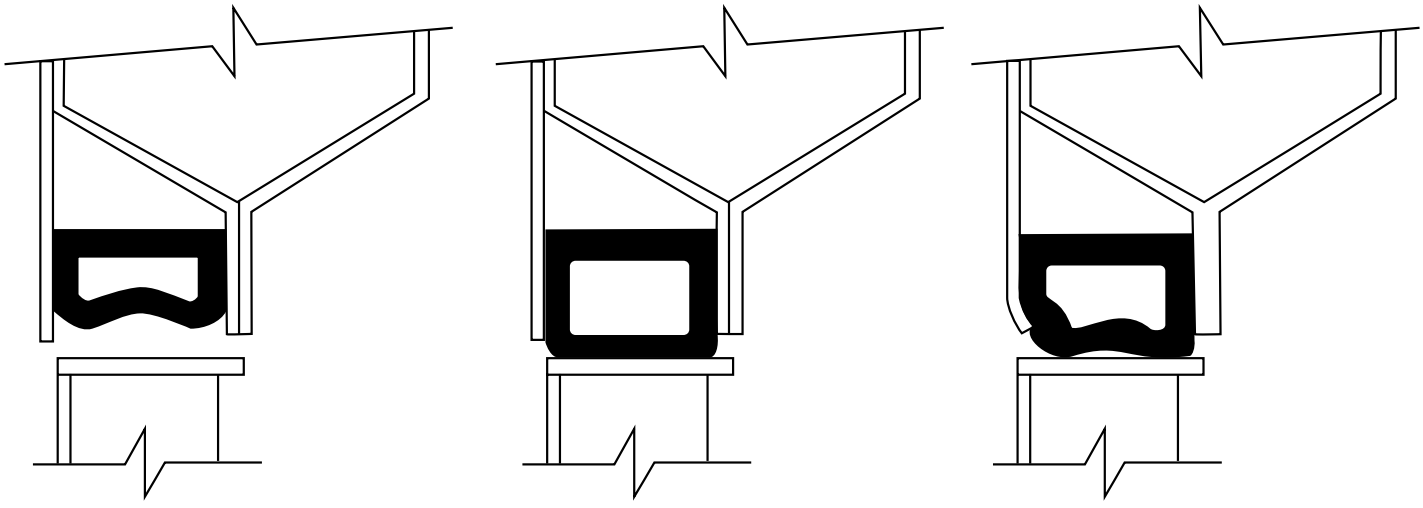


**FIGURE 5** (MSSMA413AE)
**Door Seals**

**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® 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.

# Cylinder Assembly
## 42044WP2, NP2, CP2, SP2



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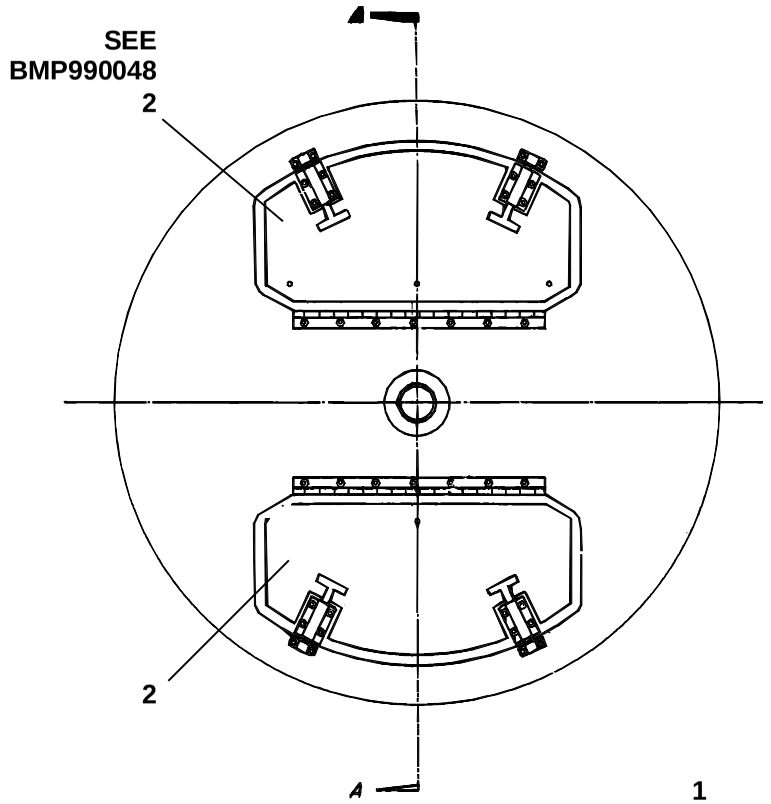


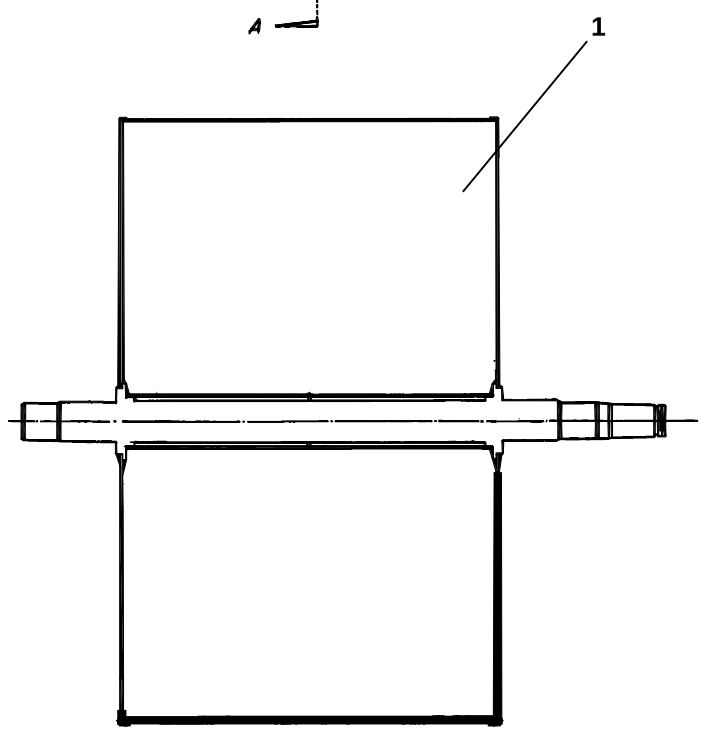


SECTION A-A

### Parts List—Cylinder Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------ASSEMBLIES---------- | |
| | | | ----------COMPONENTS---------- | |
| | 1 | ACA16WE2B | CYL ASSY=4244WE2 304L TUNNL | 42044WP2,CP2,NP2 |
| | 1 | ACA16SG2B | CYL ASSY=4244SG2 304L TUNNL | 42044SP2 |
| | 2 | SA 15 103 | CYLDOOR ASSY, STAMPED =42U | |

# Cylinder Assembly

## 42044WP3, 42044WP3 SM, 42044SP3



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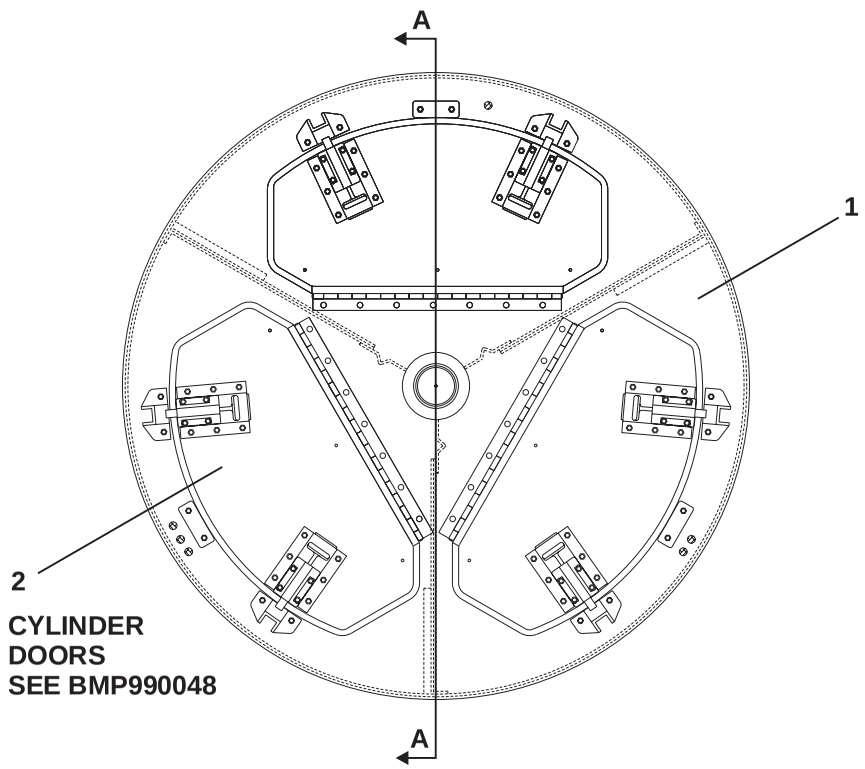


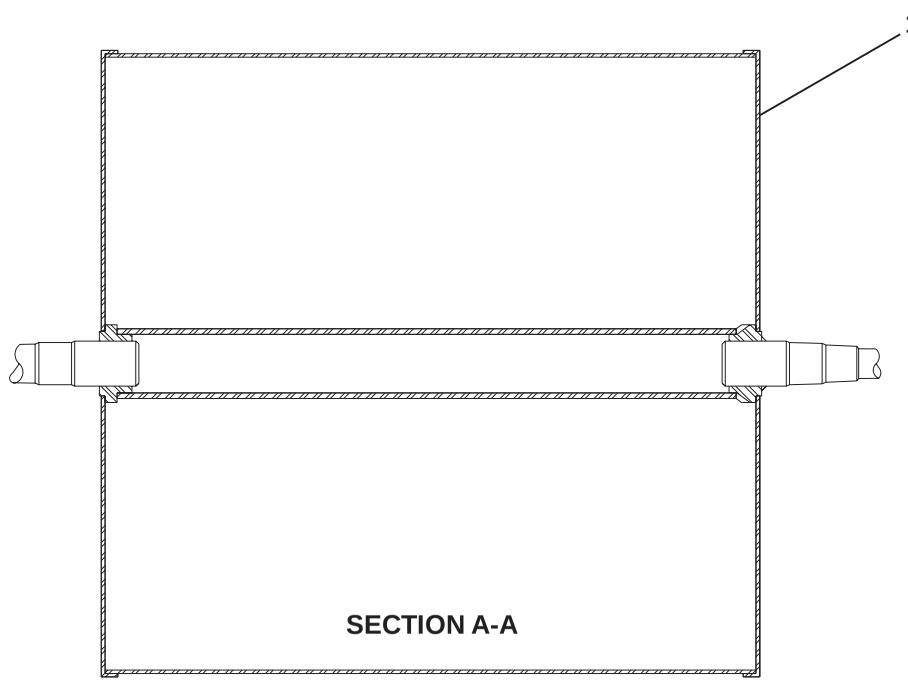


### Parts List—Cylinder Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------COMPONENTS---------- | |
| A | 1 | ACA16WE3B | * CYL ASSY=4244WE3 304L TUNNL | 4244WP3 |
| B | 1 | ACA16SG3B | * CYL ASSY=4244SG3 304L TUNNL | 4244SP3 |
| all | 2 | SA 15 103 | * CYLDOOR ASSY,STAMPED =42U | |

# Shell Doors

## 42031/42044CP2,NP2,WP2,WP3,SP2,SP3, 4244SP2 SM



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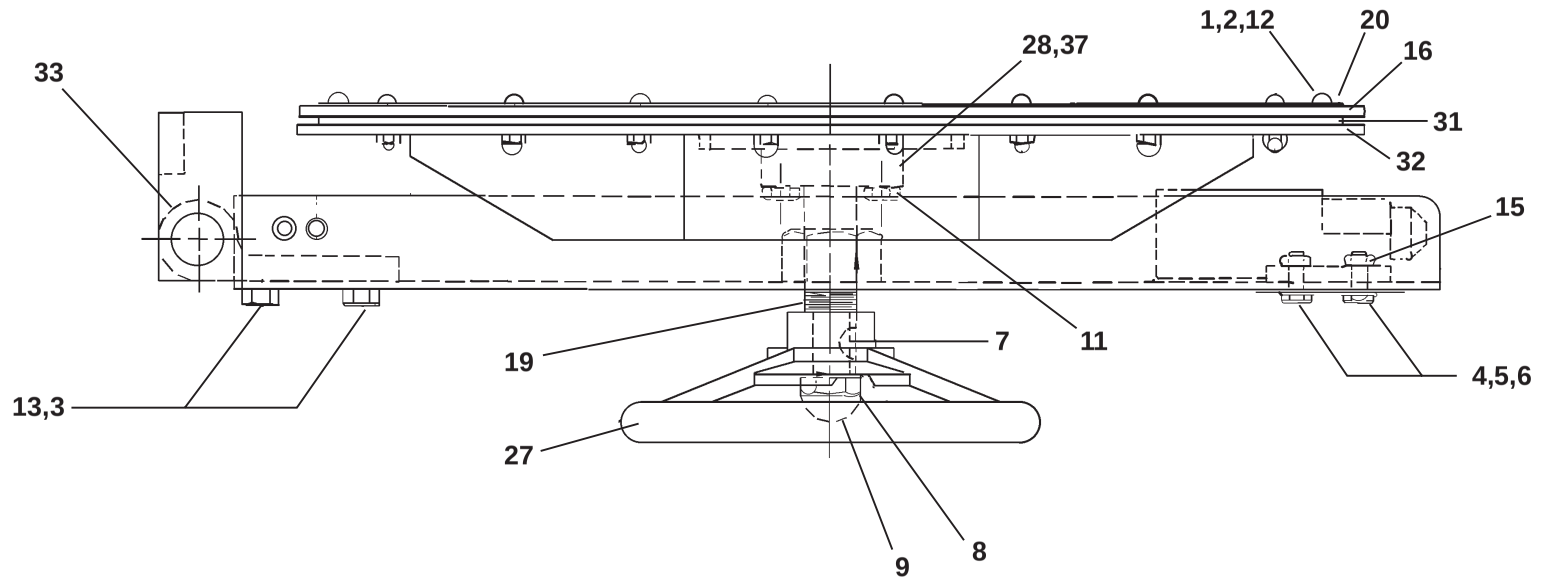


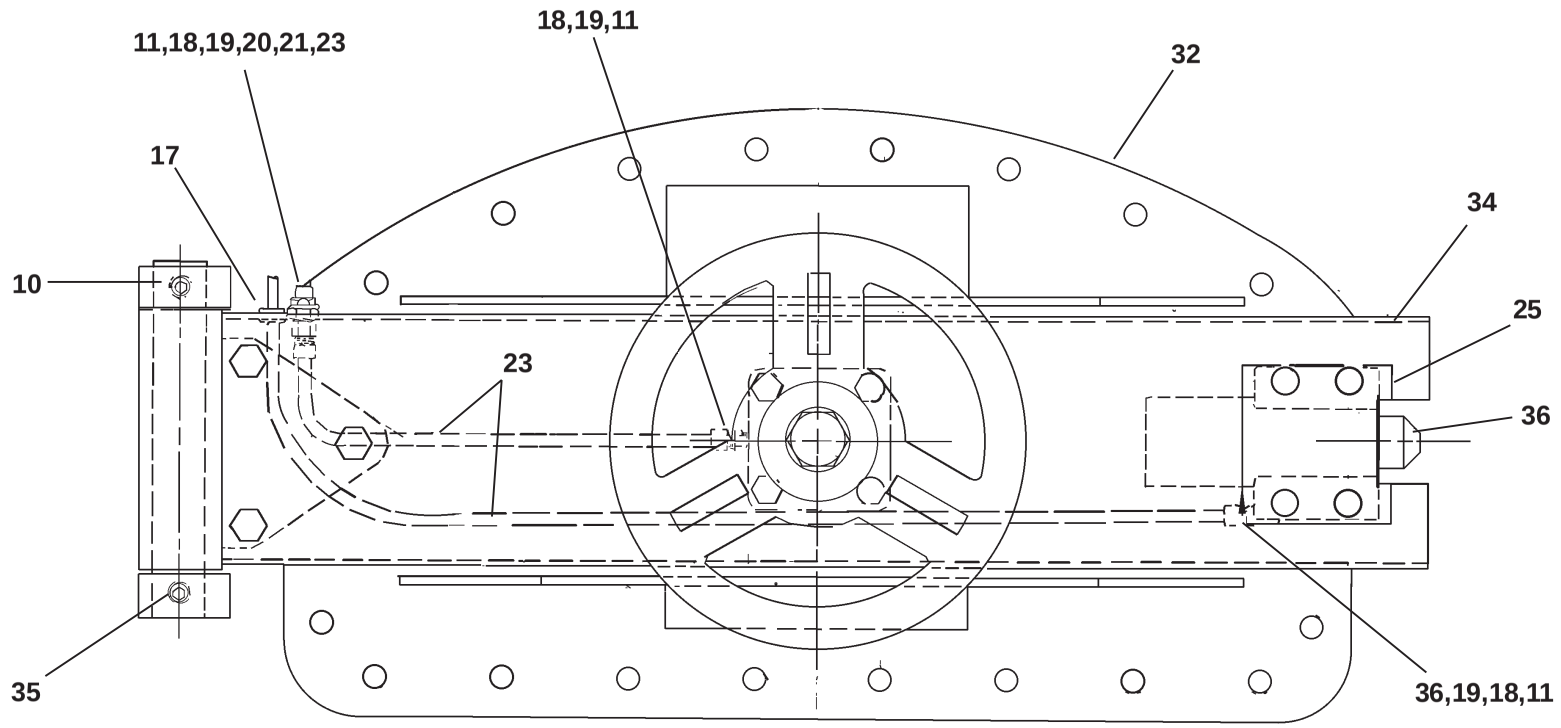

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## Parts List—Shell Doors

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 15 076A | SHELL DOOR ASY 42WE&SG CLEAN | |
| | B | SA 15 097A | *SHELL DOOR ASY 42SG SOIL | |
| | C | ASD42001 | DOOR&LINER ASSY 42WE&SG | |
| | | | ----------COMPONENTS---------- | |
| C | 1 | 15N196 | PHILRDMACSCR 1/4-20UNC2X1+1/4S | |
| C | 2 | 15G140 | HXCAPNT 1/4-20 #C250=20 NKLPLT | |
| AB | 3 | 15K151 | HXCAPSCR 1/2-13UNC24X1.25 GR5 | |
| AB | 4 | 12K095 | 1" X 3/4" WASHER REDUCER | |
| AB | 5 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | |
| A | 6 | 15K110 | HEXCAPSCR 3/8-16UNC2AX1.5 GR5- | |
| AB | 7 | 15E007 | KEY #7 WOODRUFF 3/4X1/8 SAE103 | |
| AB | 8 | 15U340 | LOCKWASH MEDIUM 3/4 ZINCPL | |
| AB | 9 | 15G244 | HEXCAPNUT 3/4-10 #3292 BRASS-N | |
| AB | 10 | 15Q140 | SOKSETSCR CUP 3/8-16X1/2 BLK | |
| AB | 11 | 53A059A | NUT 1/4"BR.HOLYOKE AND #61A-4 | |
| C | 12 | 15U181 | LOCKWASHER MEDIUM 1/4 SS18-8 | |
| AB | 13 | 15U300 | LOKWASHER REGULAR 1/2 ZINC PLT | |
| C | 14 | 15K105 | HXCAPSCR 3/8-16UNC2A1.25 GR5 P | |
| AB | 15 | 15K041E | SKCPSCR 1/4-20X1+1/4"BLK | |
| C | 16 | 02 15058 | GASKET SHELDOR#APG726=BUNA N | |
| AB | 17 | 12P1AGSB | SNAPBUSH 3/8"MH X 1/4" T=1/8 | |
| C | 18 | 53A501 | TUBE INSERT .163"OD #63PT-4-40 | |
| C | 19 | 53A500 | SLEEVE DELRIN 1/4"OD#60PT-4 | |
| AB | 20 | 54M020 | GREASEFIT 30DEG 1611-B ALEMITE | |
| AB | 21 | 5SB0E0CBEO | NPTHEXBUSH 1/4X1/8 BRASS 125# | |
| C | 22 | 53A007B | BODYFEMCON.25X.25COMP#B66A-4B | |
| AB | 23 | 60E004TE | 1/4"OD X.170"ID NYL(BLK)TUBING | |
| AB | 25 | 15U349 | FLTWASH 101NYLON 1.93ODX1.25ID | |
| AB | 26 | 53A031B | BODY-EL90MALE.25X1/8 #269C-42B | |
| AB | 27 | 02 15053 | HANDWHEEL-10" DDS+KW+POLISH | |
| B | 28 | X2 15035 | RETAINER=DOOR HANDLE SCREW | |
| C | 29 | 02 15036 | DOOR HANDLE SCREW 100-175WE | |
| C | 30 | 02 15059 | LINER=SHELLDOOR,GASKET | |
| C | 31 | 02 15059A | SPACER=HR, SHELLDOOR 42WE | |
| C | 32 | Y2 15078 | SHELL DOOR 42 | |
| AB | 33 | X2 15016 | DOOR HINGE MACHINED 6.218 LG | |
| A | 34 | W2 15034 | *BAR DOOR LOCKING WELD | |
| B | 34 | W2 15763 | *BAR DOOR INTLK WLMT-SG ONLY | |
| AB | 35 | 02 15633S | ADJPLATE=DOORLATCH SS | |
| AB | 36 | SA 15 028 | * DOOR LATCH ASSY-DIVCYLS | |
| C | 37 | 03 64039D | COVER PLATE HANDWHEEL SCREW | |
| AB | 38 | 54JH13125B | HINGE COL SPLIT 3.12 FL TOP | |
| AB | 39 | 02 10391A | COVER STRIP=MICRO SW #10 | |

# Cylinder Doors

## 42031/42044 CP2,CP3,NP2,NP3,WP2,WP3,SP2,SP3,DA3; 4244WP2 SM,WP3 SM,SP2 SM



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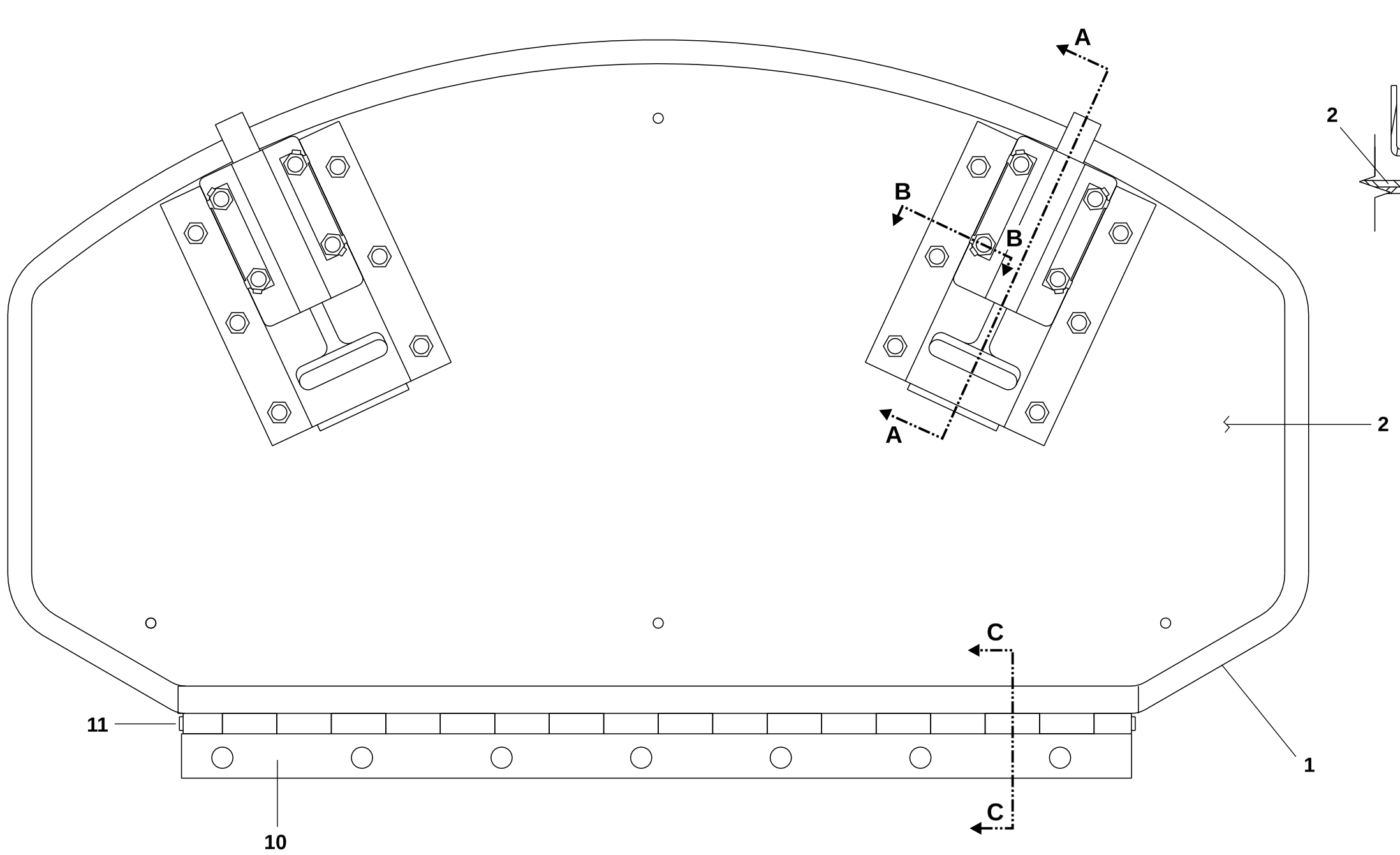
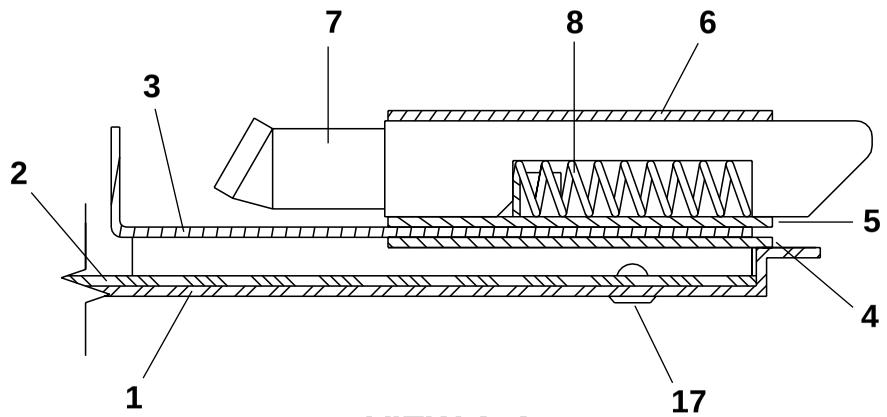
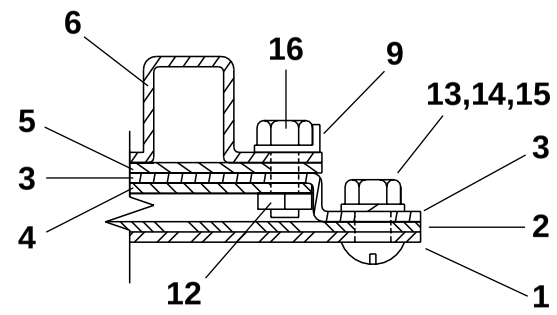
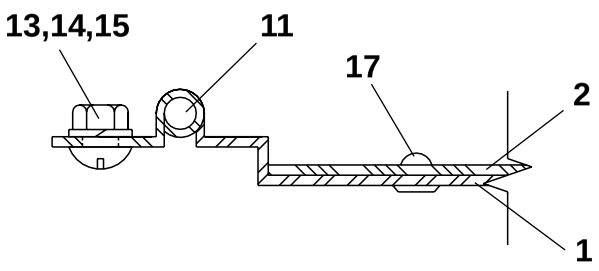



VIEW A-A




VIEW B-B




VIEW C-C

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## Parts List—Cylinder Doors

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 15 103 | * CYLDOOR ASSY,STAMPED =42U | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 02 15826 | DOOR-CYLINDER-SS-DRAWN | |
| all | 2 | 02 15830 | PLATE-CYLDOOR REINFORCING | |
| all | 3 | 02 15825 | ADAPTER PLATE=DOOR LATCH | |
| all | 4 | 02 15832 | SHIM=CYL DOOR LATCH | |
| all | 5 | 02 15077 | PLATE = SMALL DOORLATCH | |
| all | 6 | 02 15041 | BODY=CYLDOOR LATCH | |
| all | 7 | 02 15040 | PLUNGER=CYLDOOR LATCH(CAST) | |
| all | 8 | 02 15093 | SPRING=DOOR LATCH 9.4#/INCH | |
| all | 9 | 02 15255 | LOCKWASHER CYLDOOR LATCH | |
| all | 10 | 02 15823 | HALFHINGE-2/42"WEHU-302 SS | |
| all | 11 | 02 15829 | PIN=HINGE 1/4" | |
| all | 12 | 15G168 | SQNUT 1/4-20UNC2 SS18-8 | |
| all | 13 | 15U181 | LOCKWASHER MEDIUM 1/4 SS18-8 | |
| all | 14 | 15K031 | BUTSOKCAPSCR 1/4-20X1/2 SS18-8 | |
| all | 15 | 15G170 | HEXNUT 1/4-20UNC2 SS18-8 | |
| all | 16 | 15N174 | HXCAPSCR 1/4-20UNC2X5/8SS18-8 | |
| all | 17 | 15J008H | BUTTON HD RIVET 3/16 X 1/2" SS | |

# Door Latch



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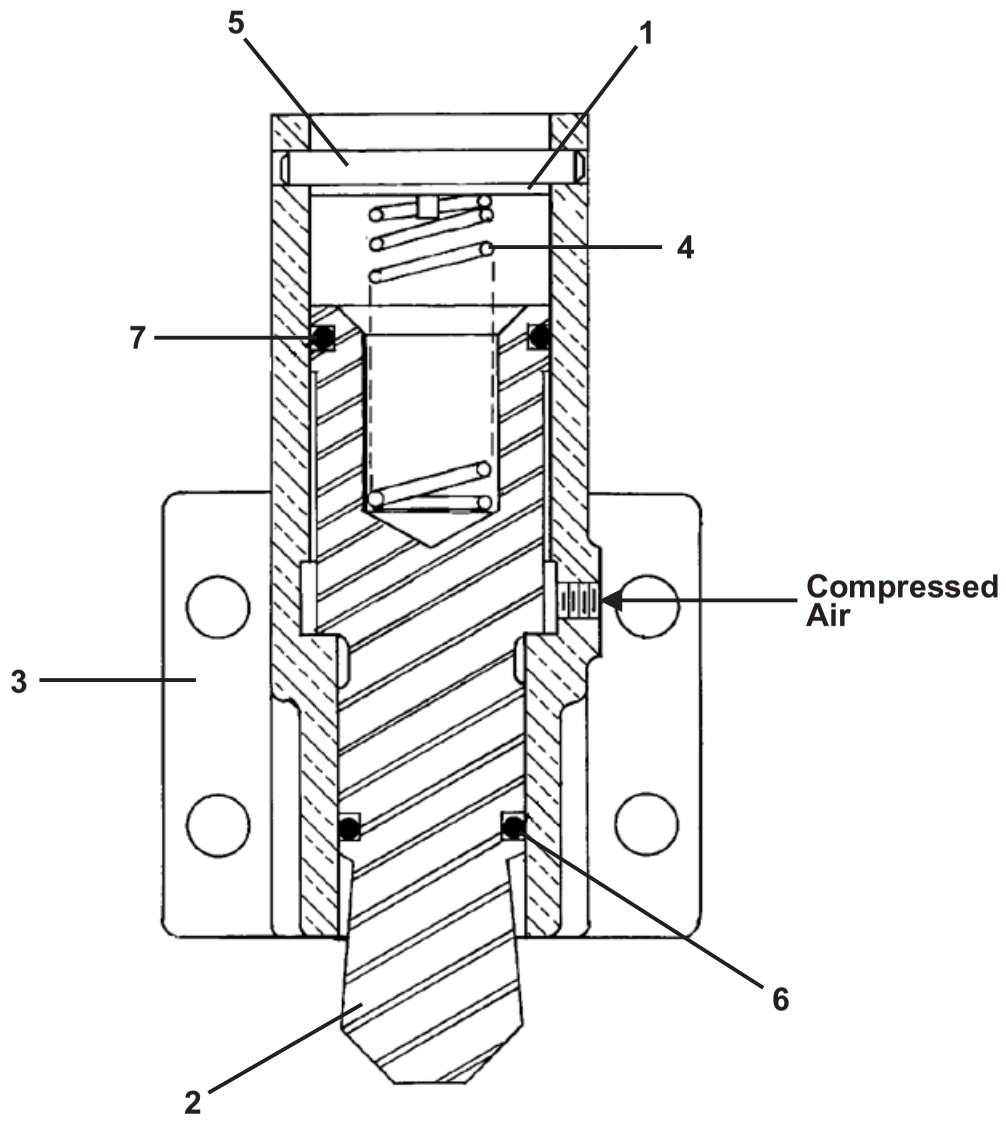


## Parts List—Door Latch

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 15 028 | 70239D* DOOR LATCH ASSY-DIVCYLS | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 02 15105 | RETAINER LATCHSPRING | |
| all | 2 | 02 15297 | 91103B PLUNGER=DOORLOCK(DIVCYL) | |
| all | 3 | 02 15298 | CYLINDER-DOORLATCH INTERLOCK | |
| all | 4 | 02 15836 | 68201A DOOR LATCH SPRING (302SS) | |
| all | 5 | 15H090 | 01Z SPRNG PIN 1/4X1+7/8 LONG PLAIN | |
| all | 6 | 60C122 | ORING 1" ID 1/8CS BN 70 DURO #214 | |
| all | 7 | 60C128 | ORING 1+3/8 ID 1/8CS BN 70DURO #220 | |

# 6 Control and Sensing Assemblies

# Excursion Switch

## 4244SP2 SM



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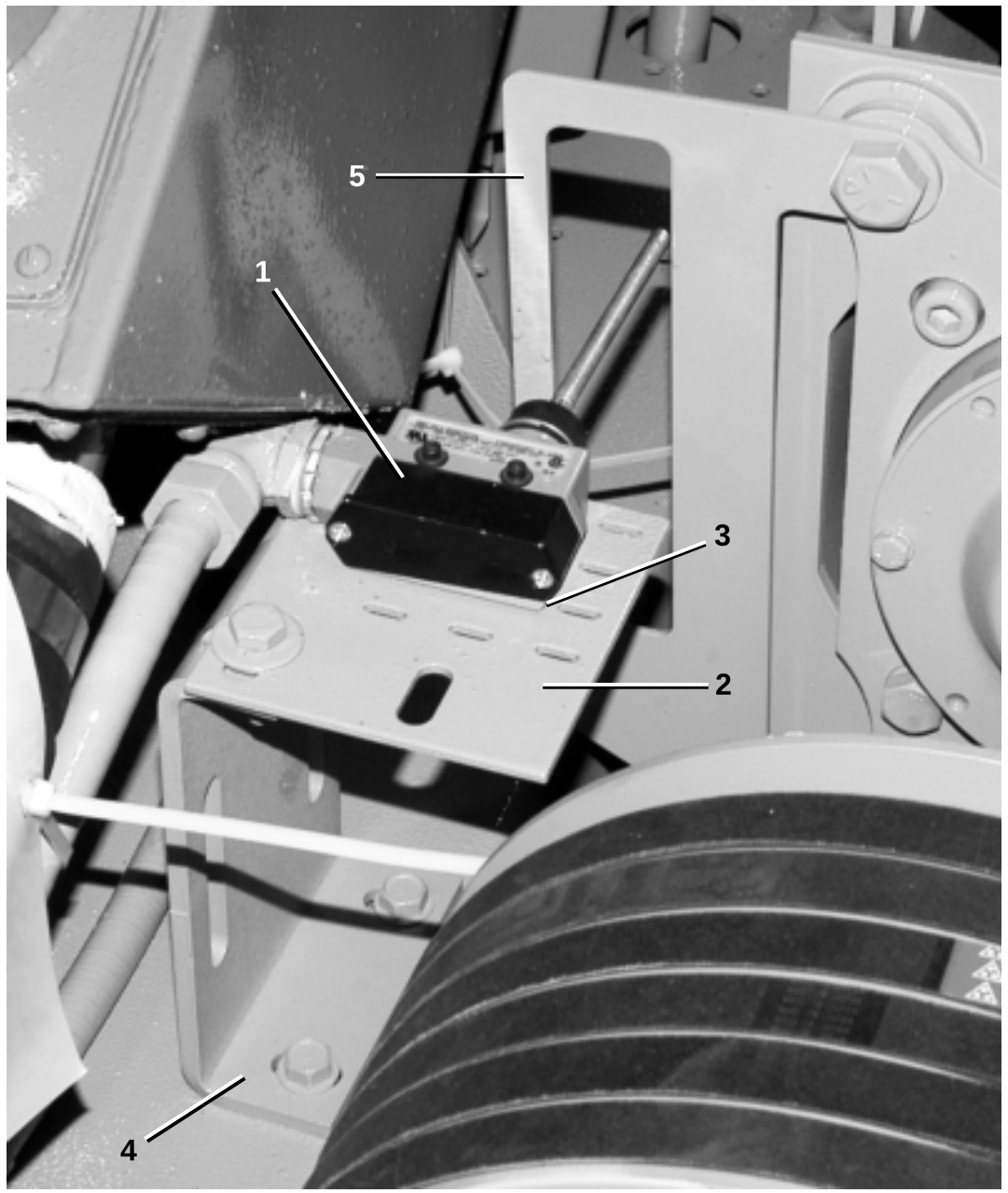



### Parts List—Excursion Switch

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 33100A | EXCURSION SWITCH ASSY 42SGH | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 09R008ASTD | * 09R008A+MOUNTING HDWRE+INST | |
| all | 2 | 02 15783A | *PLATE=EXCURSION SW MTG | |
| all | 3 | 02 10391 | COVER STRIP=MICRO SW #6-8 | |
| all | 4 | 02 15789A | BKT=EXCURSION SWITCH=SGU | |
| all | 5 | 02 15605E | ACTUATOR=EXCURSION SW 42SG-SIG | |

# VIBRATION SAFETY SWITCH ADJUSTMENTS

## 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®, 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 microswitch clicks when the arm is **slowly** released, thus indicating

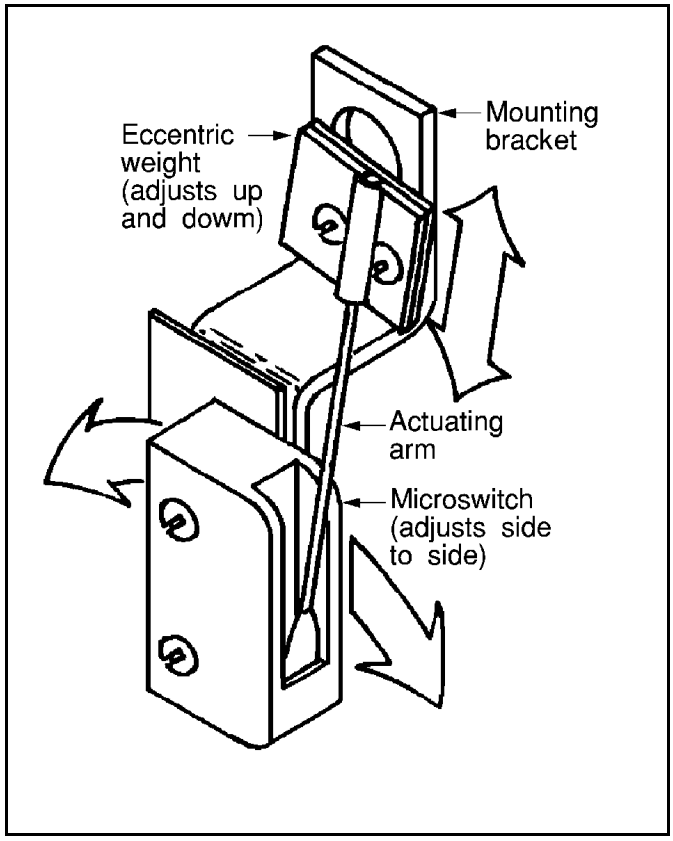
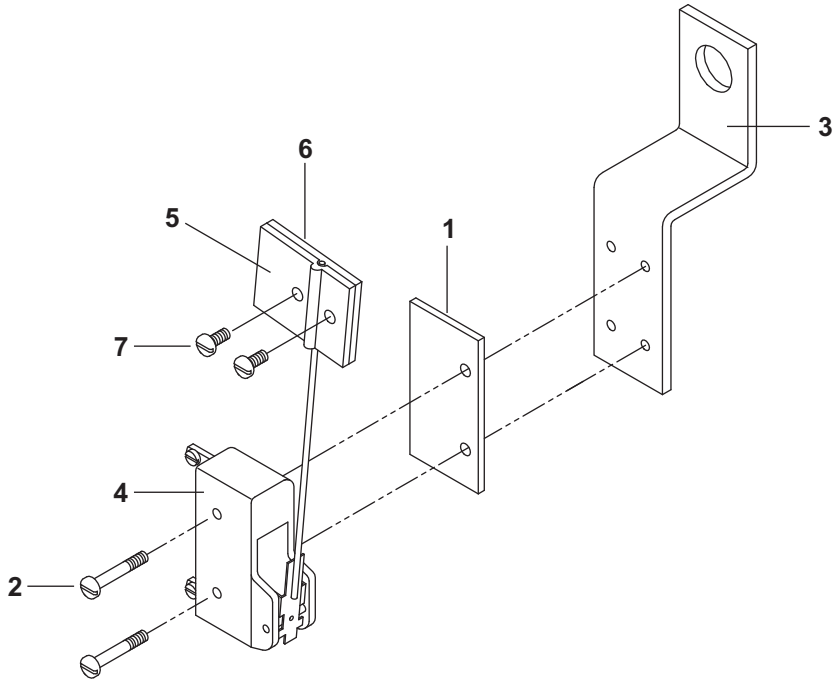



**FIGURE 1** (MSSMA408BE)
**Vibration Switch**

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

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

# Vibration Safety Switch



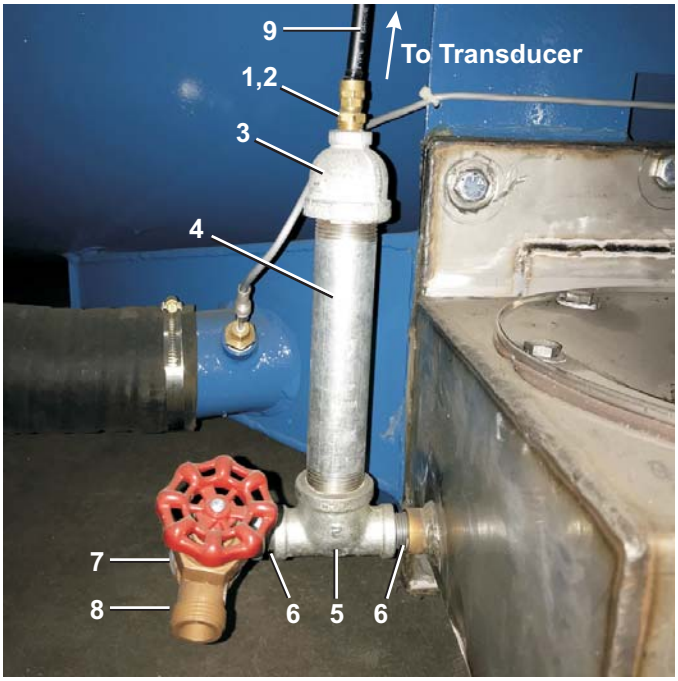

## Parts List—Vibration Safety Switch

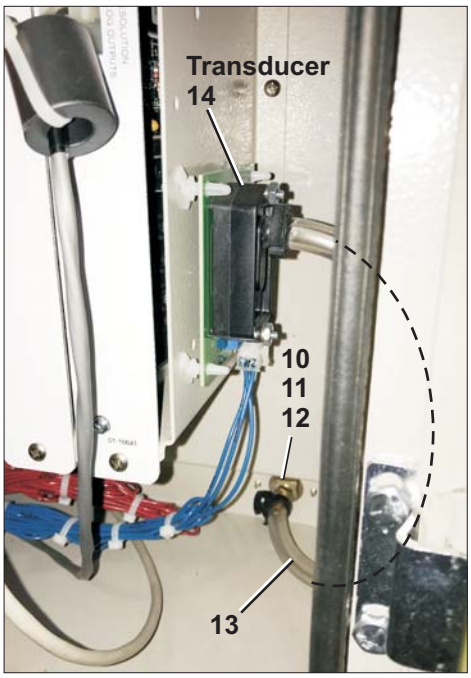
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| . | | | | |
| | | | ----------ASSEMBLIES---------- | |
| | A | SAE03 151 | * ASSY-VIBRATION SWT=LG CONTR | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 02 02038 | PLATE INSULATING SMALL9NOV51 | |
| all | 2 | 15P008 | TRDCUT PANHD 6-32X1 NIKSTL +WA | |
| All | 3 | 02 15119 | BRACKET=VIBSW CAD | |
| all | 4 | 09R020 | SWITCH NC VIBR#WZ-2RW84429-P52 | |
| all | 5 | 03 01059 | VIBSWITCH CLAMP CADSTL | |
| all | 6 | 03 01058 | VIBSWITCH WEIGHT-CADSTL | |
| all | 7 | 15P101 | TRDCUT-F PANHD 8-32X3/8 NIKSTL | |

# Air Chamber Level Switch

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




## Parts List

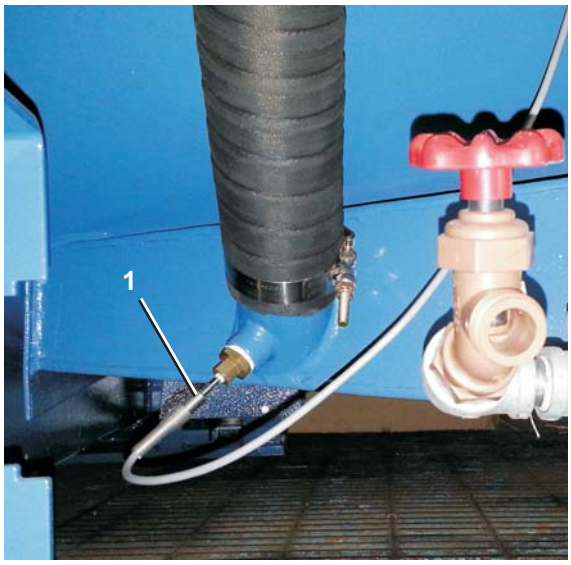
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

| 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 | |

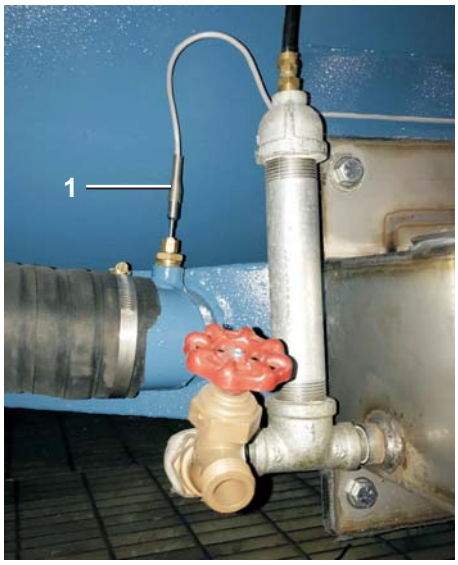
# Temperature Probe

**42044SR2, 42044WR2**

**42044SR2**




**42044WR2**




## 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 | 30R0043P | TEMP PROBE:THERMISTOR 30K OHMS | |

# Chemical Supply Devices

7

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

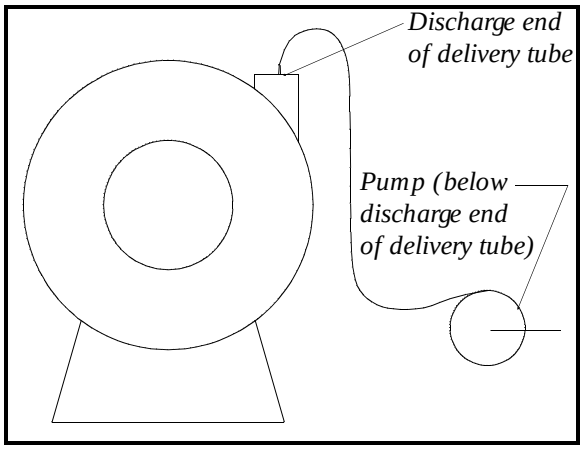
**APPLICABILITY: All Washer-Extractor Models**

## GENERAL

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

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

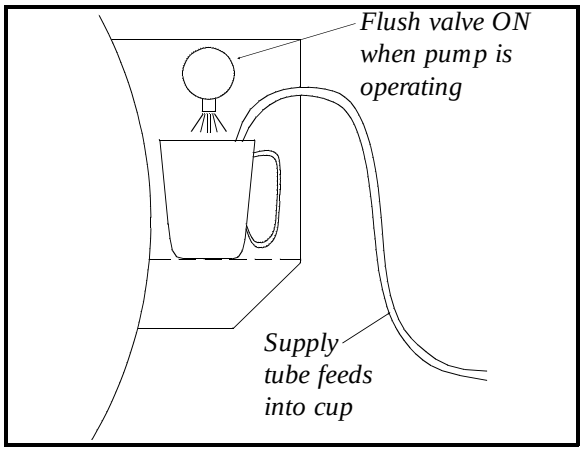
   Merely putting a "drip loop" in the delivery tube won't help much. (It might reduce the dribble a little, but not enough to prevent damage.) **The real solution is to install the pumps below the discharge end of the delivery tubes so excess chemical won't dribble out of the tube long after the pumps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




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

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

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



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

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

---

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

---

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

# Supply Injector Assembly

## 4244WP2/WP3, 4244WP2 SM, 4244SP2/SP3, 4244SP2 SM



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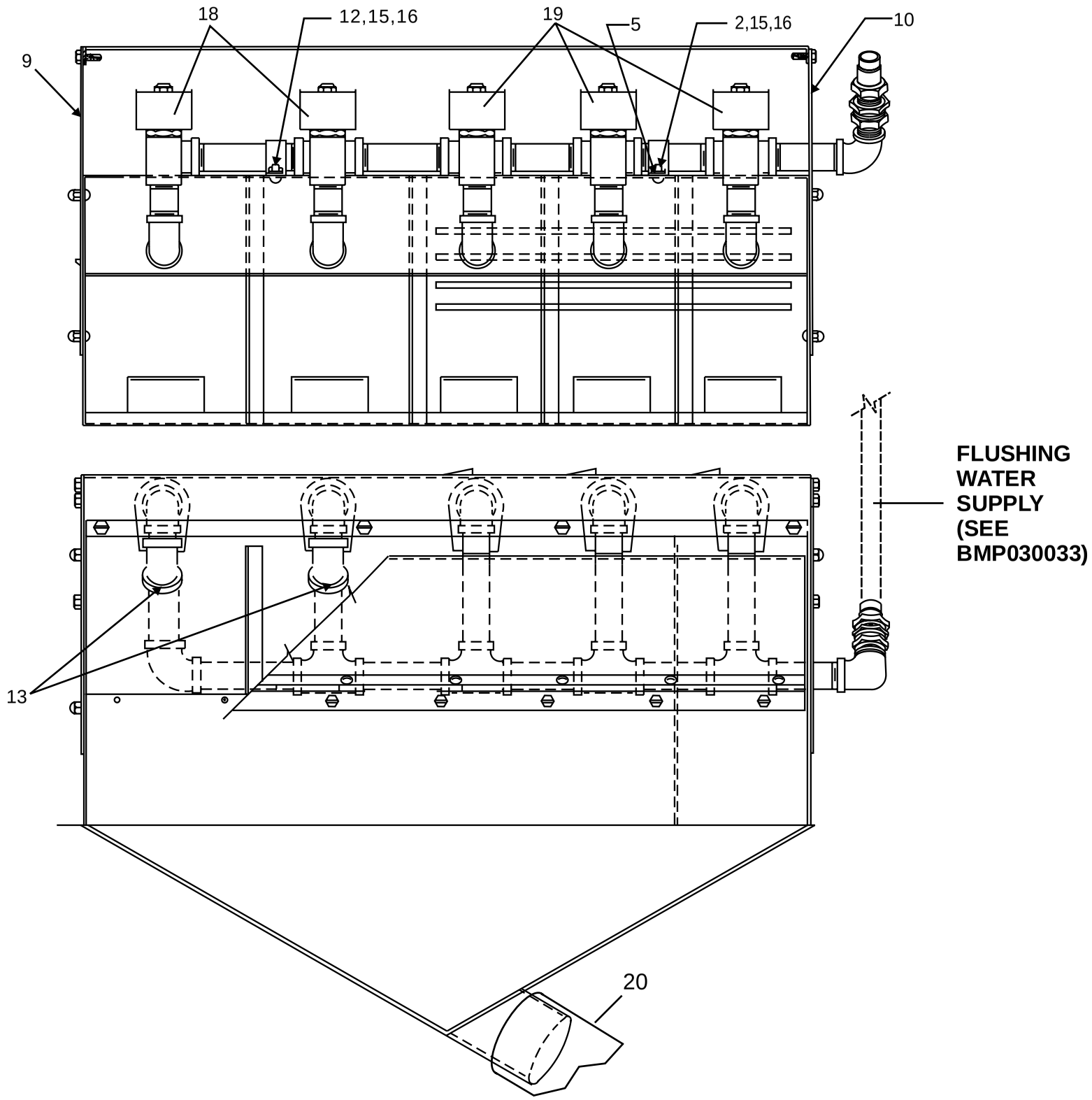


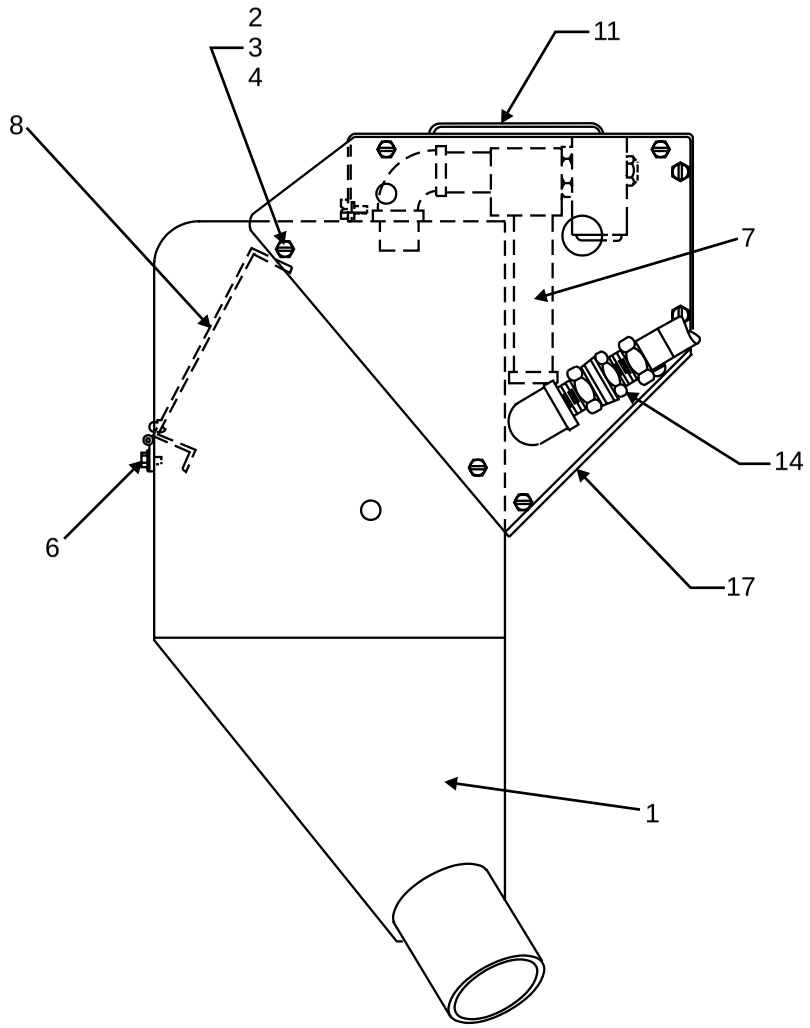

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## Parts List—Supply Injector Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| : | | | | |
| ----------ASSEMBLIES---------- | | | | |
| | A | SA-16-035A | ASSY, 5 FLUSH SUPINJ=4244WP + SP | 4244WP2/WP3,4244SP2/SP3 |
| | B | SA 16 034A | VALVASSY 5FLUSH=4244 WP+SP | |
| ----------COMPONENTS---------- | | | | |
| all | 1 | W2-15805 | 92612C* SUP-CHUTE 5-FLUSH=4231SGU | |
| All | 2 | 24G018N | ROLLED WASH. 194ID NYLTITE 10W | |
| all | 3 | 15G121 | HXCAPNUT 10-24UNC2 #3266BR NKLPLTG2 | |
| all | 4 | 15N117 | RDMACSCR 10-24UNC2X3/8 SS18-8 | |
| All | 5 | 15G130 | HEXMACHSCRNUT 10-24UNC2 SS18-8 | |
| all | 6 | 15P100 | 07Z THDCUT-F PANHD 8-32 X 3/8 SS410 | |
| all | 7 | SA-16-034A | 86081# VALVASSY 5FLUSH=4244 WP+SP | |
| all | 8 | SA-09-047 | 70297B COVER=SUPPLY INJECTOR | |
| all | 9 | 02-09100 | 92303B FRT VALVE ENCLOSURE | |
| all | 10 | 02-09112 | 92303B REAR VALVE ENCLOSURE | |
| all | 11 | 02-09103 | 93363C ENCLOSURE-VAL, TP+SIDES. | |
| all | 12 | 27A017 | PIPESTRP 1/2” 1-HOLE R. COND. | |
| all | 13 | 5SL0KBEA | NPTELB 90DEG ½ BRASS 125# | |
| all | 14 | 51X017 | UNIONSTRADT 1/2" PH#0107-8-8 | |
| all | 15 | 15N140 | RDMACSCR 10-24UNC2AX3/4 ZINC GR2 | |
| all | 16 | 15G125 | HXMACHSCRNUT 10-24 UNC2B ZINC GR2 | |
| all | 17 | 02-09102 | 91116B+ENCLOSURE=VALVE LOW SIDEWRAP | |
| all | 18 | 96TDC2AA37 | 1/2" N/C 2WAY 120V50/60C VALVE | |
| All | 19 | 96TCC2AA37 | 3/8" N/C 2WAY 120V50/60C VALVE | |
| All | 20 | 60E301A18A | HOSE= *2.5"ID PE X18" | |

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|

# 8 Water and Steam Piping and Assemblies

# Water & Steam Schematics

## 42044WP2/CP2/NP2



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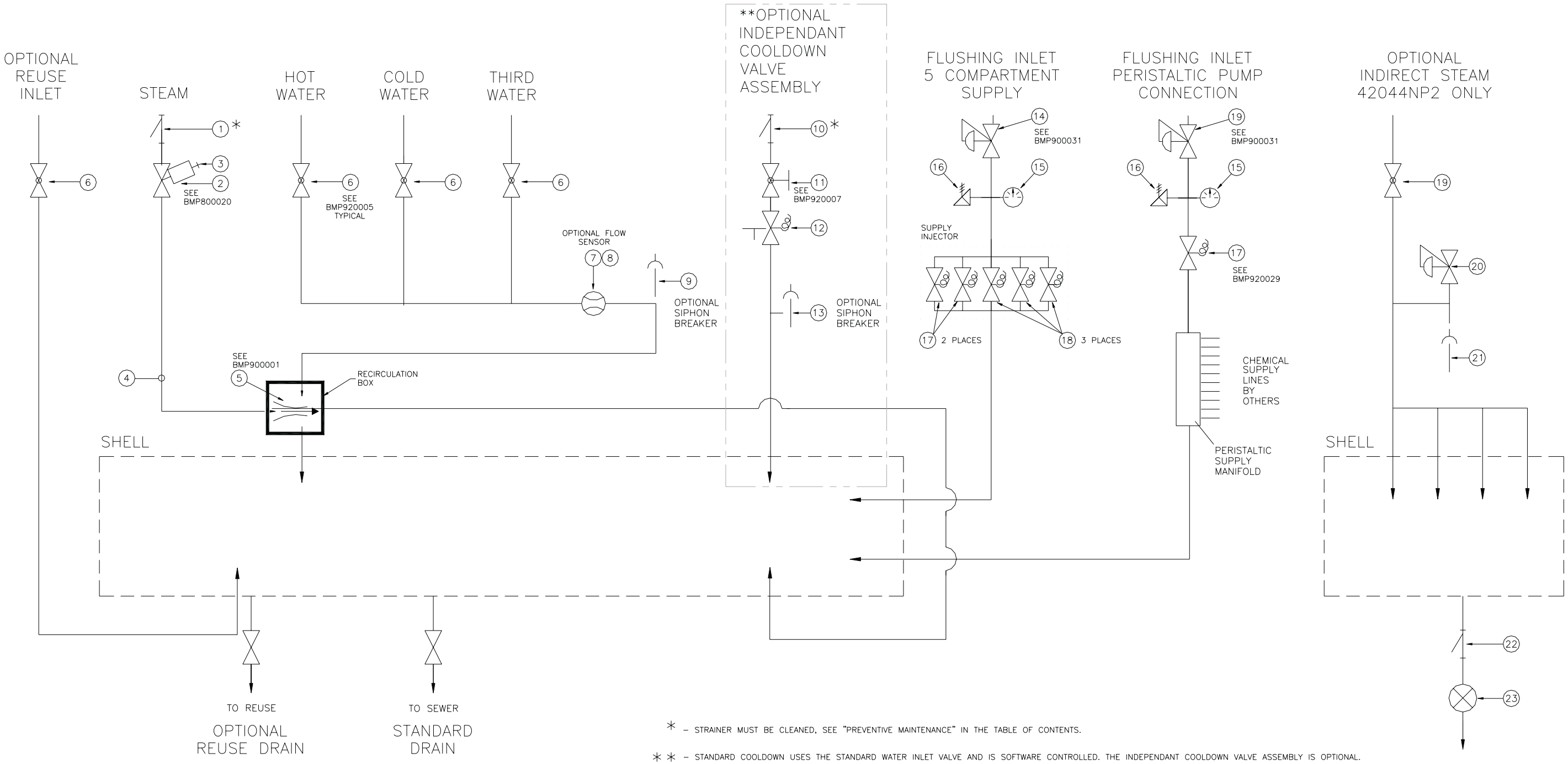


* – STRAINER MUST BE CLEANED, SEE "PREVENTIVE MAINTENANCE" IN THE TABLE OF CONTENTS.

** – STANDARD COOLDOWN USES THE STANDARD WATER INLET VALVE AND IS SOFTWARE CONTROLLED. THE INDEPENDANT COOLDOWN VALVE ASSEMBLY IS OPTIONAL.

Pellerin Milnor Corporation
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## Parts List—Water & Steam Schematics

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 | 51T060 | Y-STRAINER 1+1/4" CAST IRON | |
| all | 2 | 96D0011E | 1.25"NPTBRZ N/C STEAMVALANGBD | |
| all | 3 | 96H018 | ANGLE NEEDLE VLV 1/4"T X 1/8MP | |
| all | 4 | 60E096C54A | STEAMH*OSE=1.25"X54"+2ENDS=(NO | |
| all | 5 | ASS25001 | *52&60 STEAM SPARGER3/4ORFICE | |
| all | 6 | 96D087BCSR | 1.50WAT BVAL+ACT/BR/NC/ST/RH | |
| all | 7 | 30F515 | FLOW SENSOR SIGNET P51530-P0 | |
| all | 8 | 30F518 | SIGNET S/S PIPE TEE 1.5" | |
| all | 9 | 96M033 | 2.5"VAC BREAKER WATTS288A M2 | |
| all | 10 | 51T030 | Y-STRAINER 3/4" CAST IRON | |
| all | 11 | 96D050A | 3/4"BALLVALVE BRZ WATTS#B6100 | |
| all | 12 | 96P053A37 | 3/4"VAL 110V HAYS#6-2110IS-120 | |
| all | 13 | 96M022 | 3/4" VAC BREAKER #288A | |
| all | 14 | 96J030D | 1/2"PRESSREG SET28# FEMXUN | |
| all | 15 | 30N100 | PRESSGAUGE 1/8"BACKCN.0-30PSI | |
| all | 16 | 96M001 | 1/2X3/8" RELIEF VALVE SET31# | |
| all | 17 | 96TDC2AA37 | 1/2" N/C 2WAY 120V50/60C VALVE | |
| all | 18 | 96TCC2AA37 | 3/8" N/C 2WAY 120V50/60C VALVE | |
| all | 19 | 96D087BCSR | 1.50WAT BVAL+ACT/BR/NC/ST/RH | |
| all | 20 | 96D095 | VAL SAFETY 1"X1.25 SET 125# | |
| all | 21 | 96M021SA | 1/2" VACUUM BREAKER (STEAM) | |
| all | 22 | 51T030 | Y-STRAINER 3/4" CAST IRON | |
| all | 23 | 51T60A00QA | 3/4"STMTRP SARCO#212/10BTM.IN | |

# Water Inlets

## 4244WP2/WP3, 4244WP2 SM, 4244SP2/SP3, 4244SP2 SM



Pellerin Milnor Corporation
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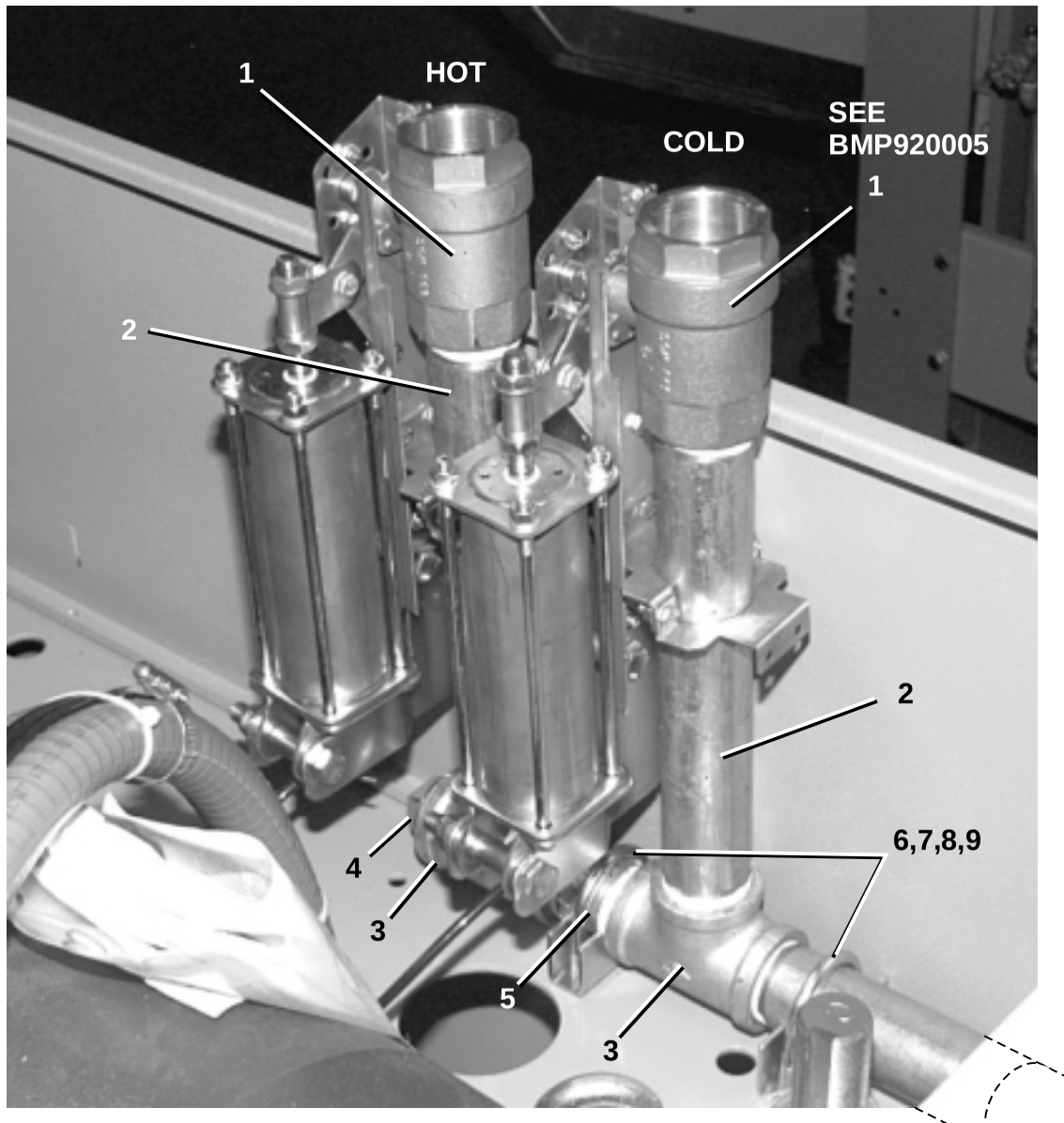


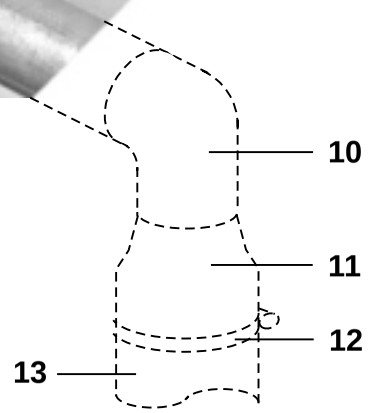


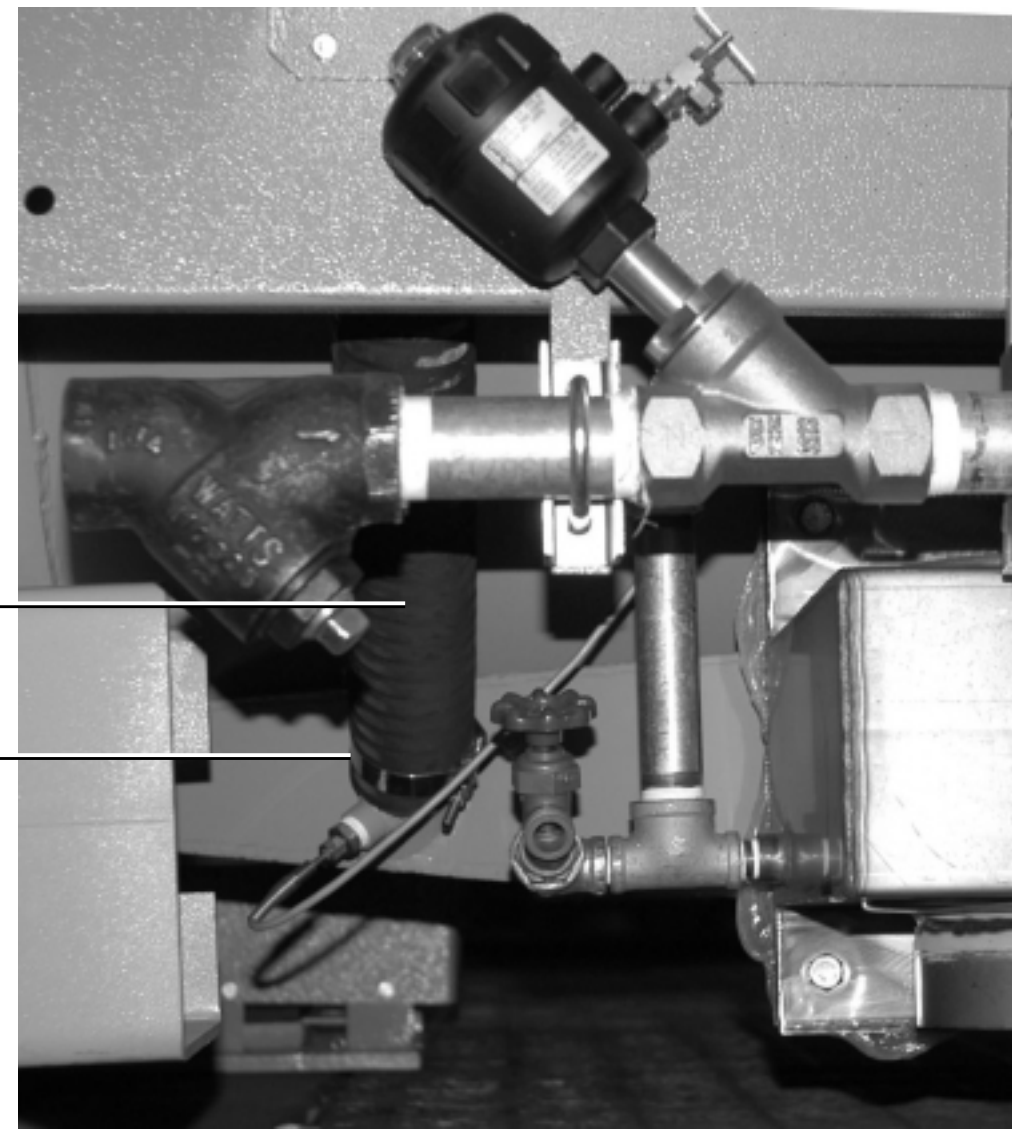


(4244SP2/SP3 MODELS SHOWN)

# Water Inlets

## 4244WP2/WP3, 4244WP2 SM, 4244SP2/SP3, 4244SP2 SM



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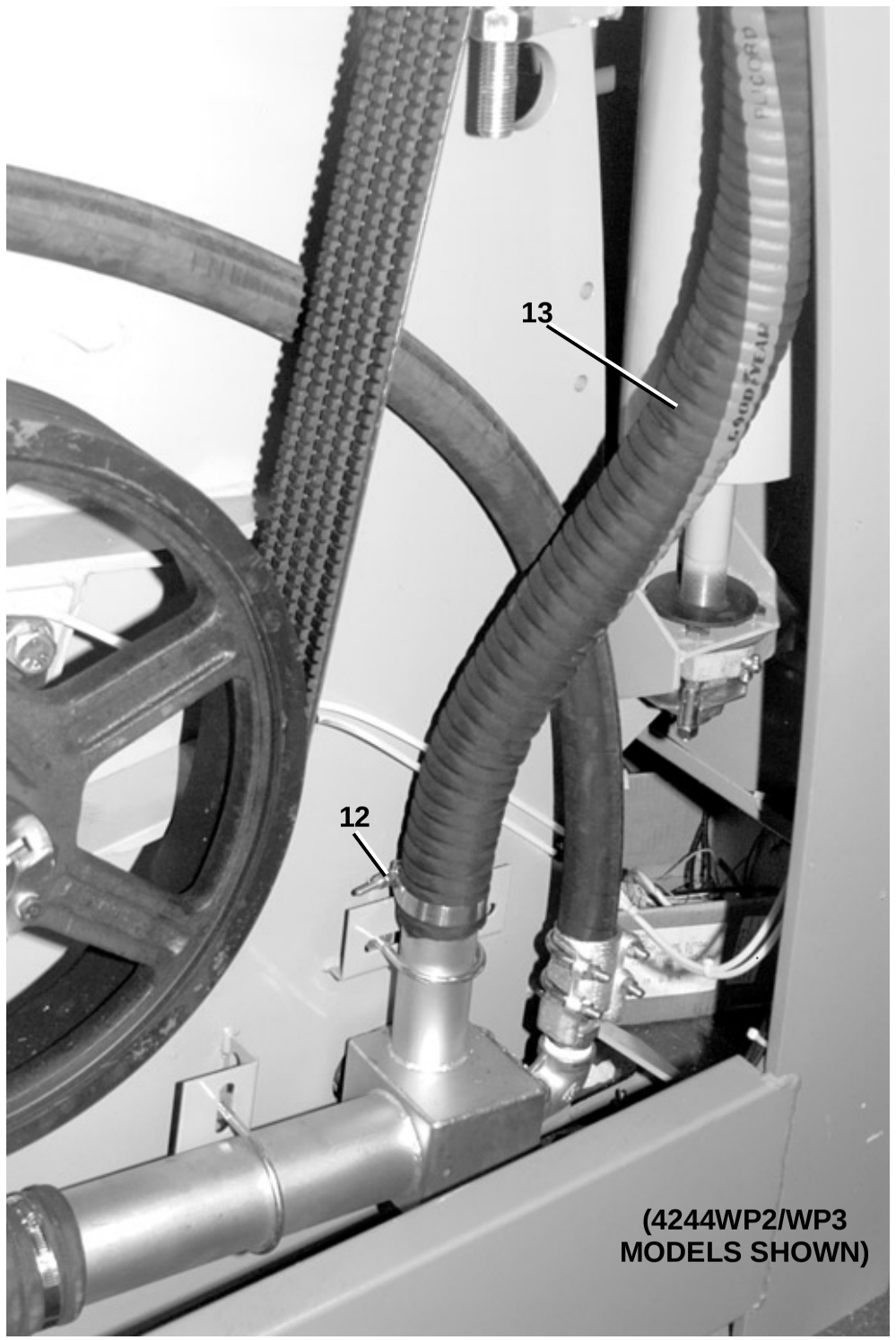


### Parts List—Water Inlets

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 | G15 15900B | WATER INSTALLED H+C | |
| | B | AVW15003W | *VALVEASSY=1.5 AIROP COLD WTS | |
| | C | AVW15004W | *VALVEASSY=1.5 AIROP H+3RD WT | |
| | D | AVW15005 | * INLET PIPING SUBASSY 42 WEH | |
| | E | AVW15007 | * INLET PIPING SUBASSY 42SGH | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 96D087BCSR | 1.50WAT BVAL+ACT/BR/NC/ST/RH | |
| all | 2 | 5N1K13AG42 | NPT NIP 1.5X13 TBE GALSTL SK40 | |
| all | 3 | 5S1KNFA | NPT TEE 1.5" GALMAL 150# | |
| all | 4 | 51P055 | NPTPLUG 1.5 SQCORED GALCI 125# | |
| all | 5 | 5N1K03AG42 | NPT NIP 1.5X3 TBE GALSTL SK40 | |
| all | 6 | 02 16306 | CLAMP=1+1/2" PIPE | |
| all | 7 | 27A032 | UBOLT 1.5"PIPE 3/8-16X3-3/4LEG | |
| all | 8 | 15G205 | HXNUT 3/8-16UNC2B ZINC GR2 | |
| all | 9 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | |
| all | 10 | 5SL1KNFA | NPT ELBOW 90DEG 1.5" GALMAL 15 | |
| all | 11 | W2 15847A | *RED1.5NPT-MALEX2.5S/S TUBE | |
| all | 12 | 27A075 | T-BOLT HOSECLAMP 2.78-3.09" | |
| all | 13 | 60E301A43A | *HOSE=2.5"ID PE X 43" | |

# Steam Inlet

## 4244WP2/WP3



Pellerin Milnor Corporation
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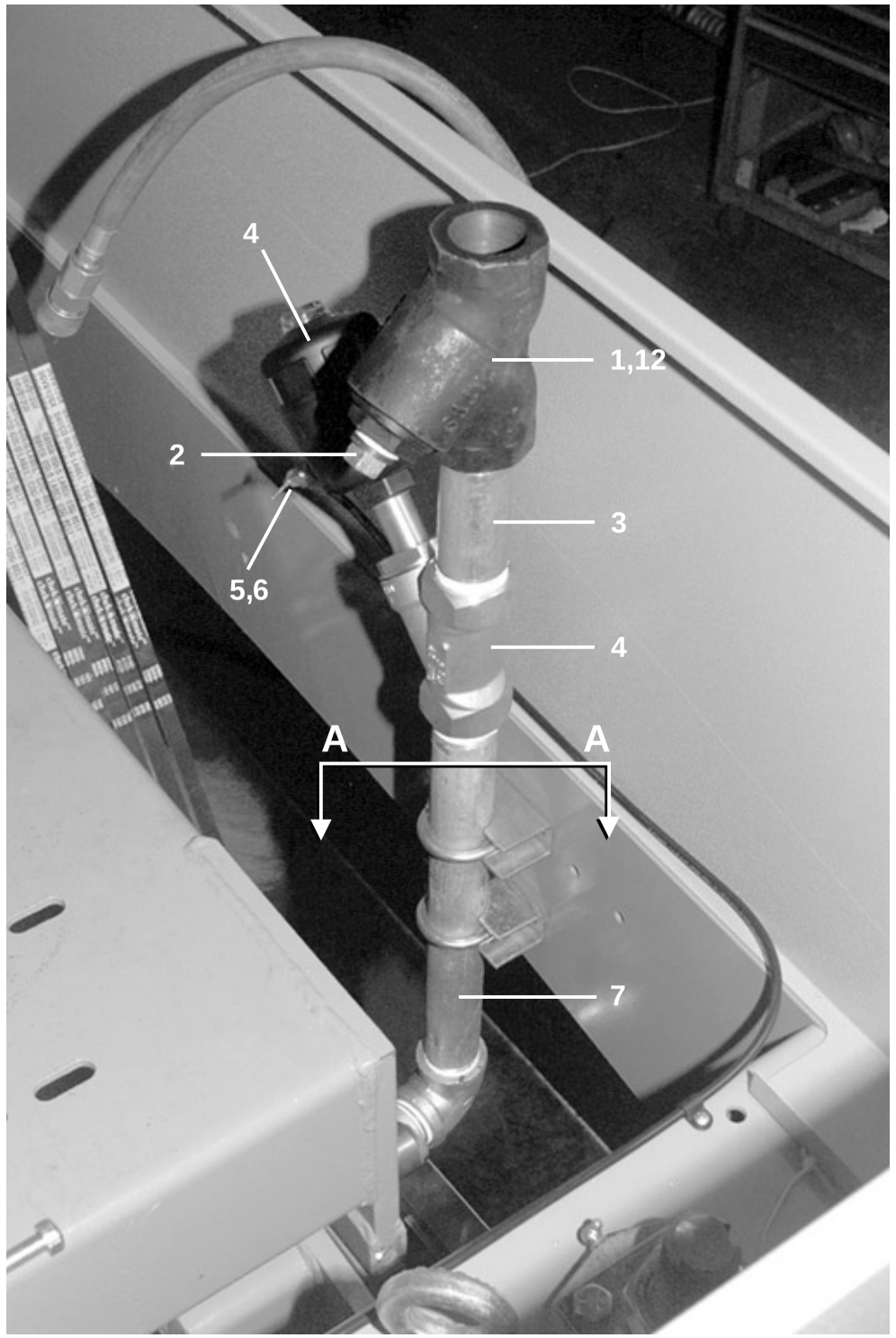
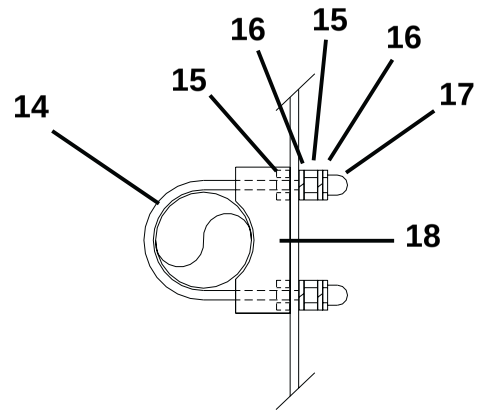
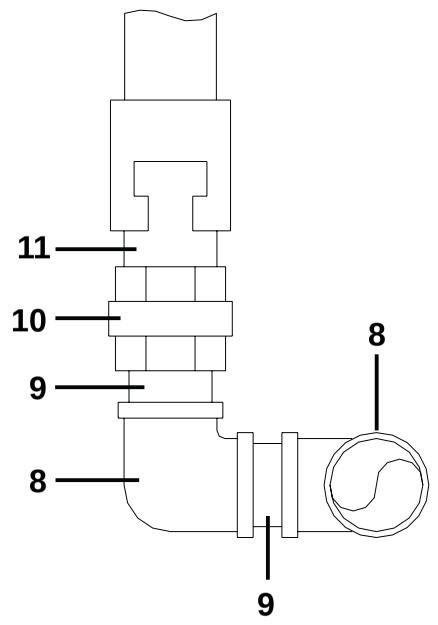
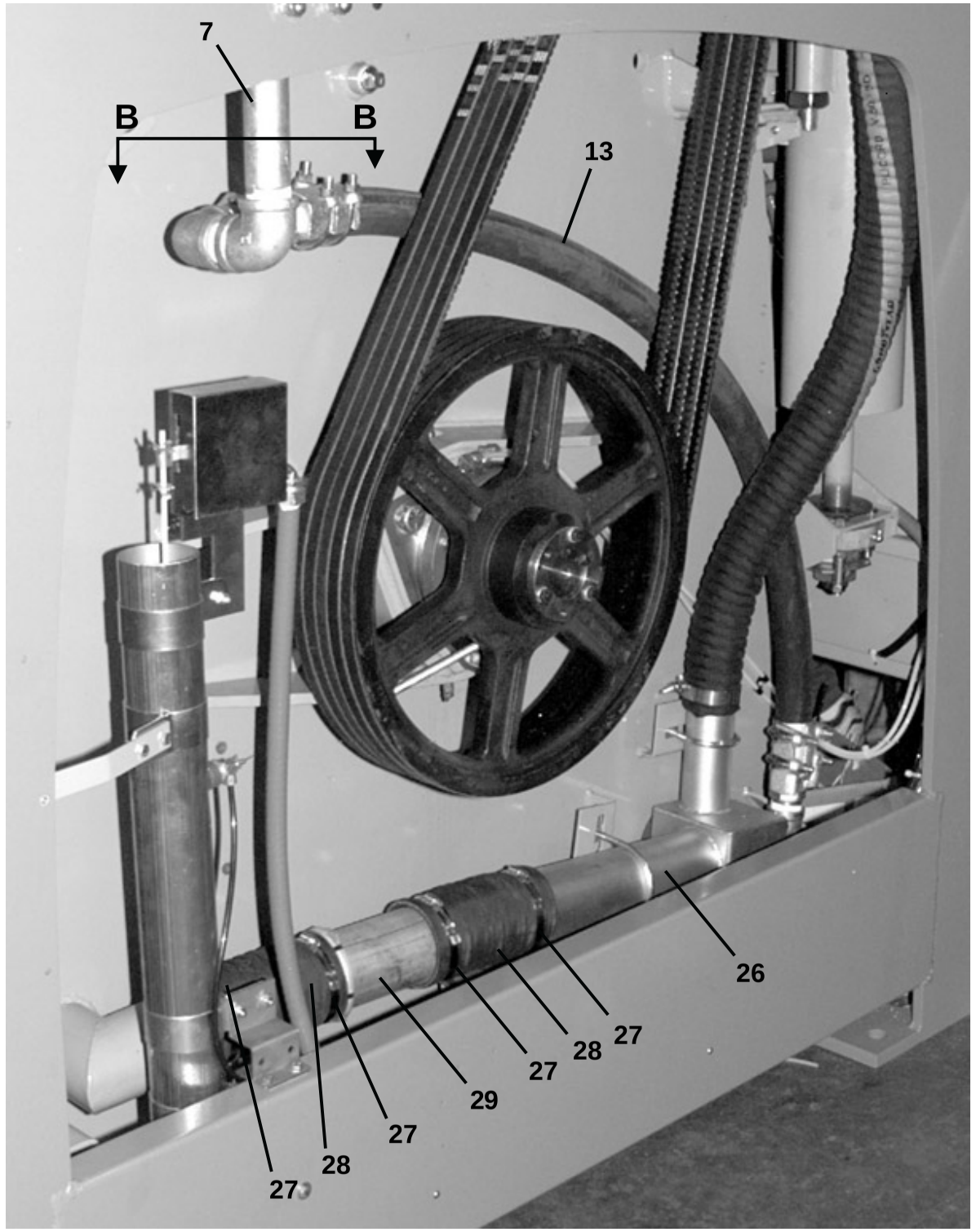



VIEW A-A




VIEW B-B



# Steam Inlet

## 4244WP2/WP3



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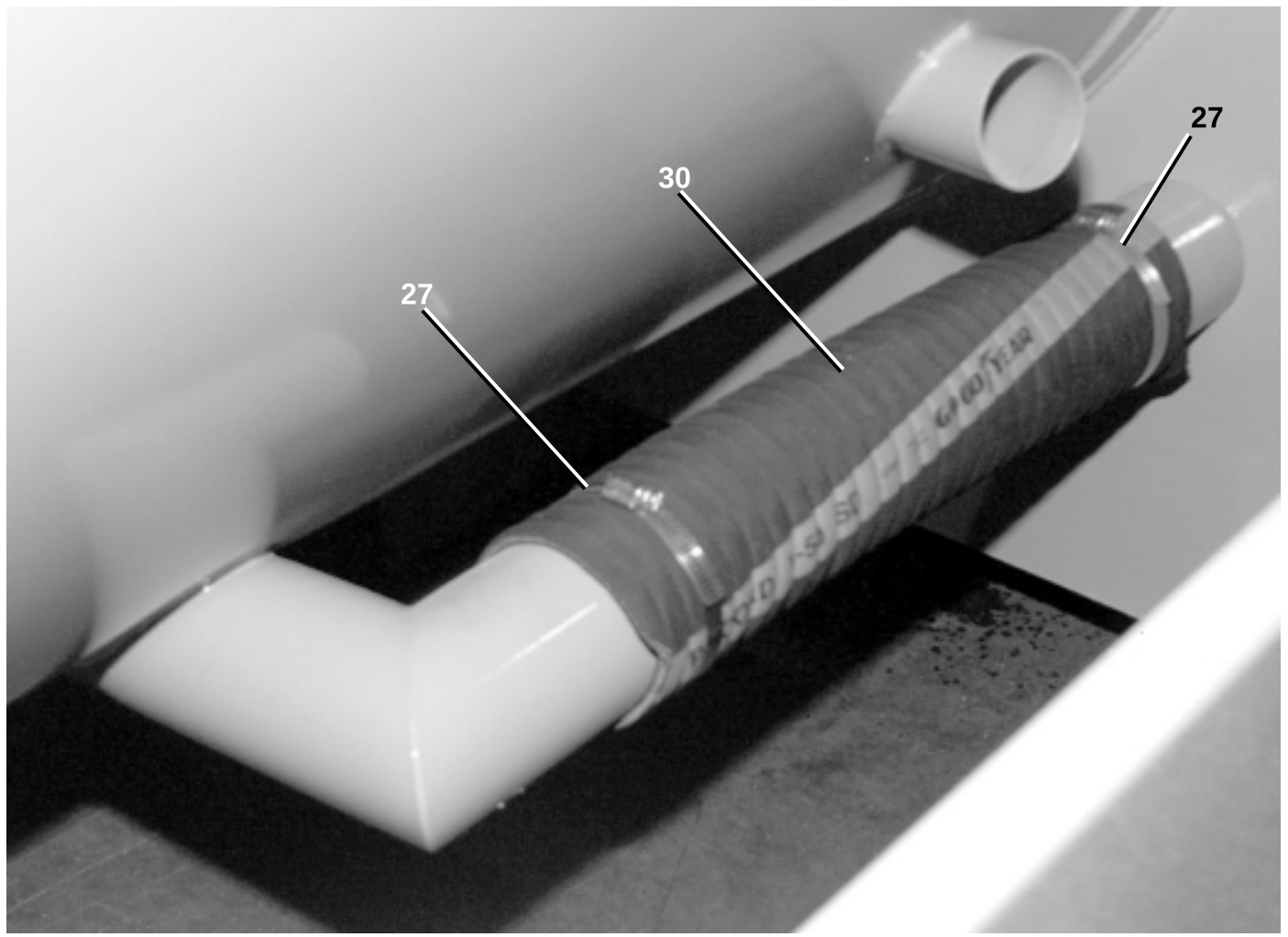


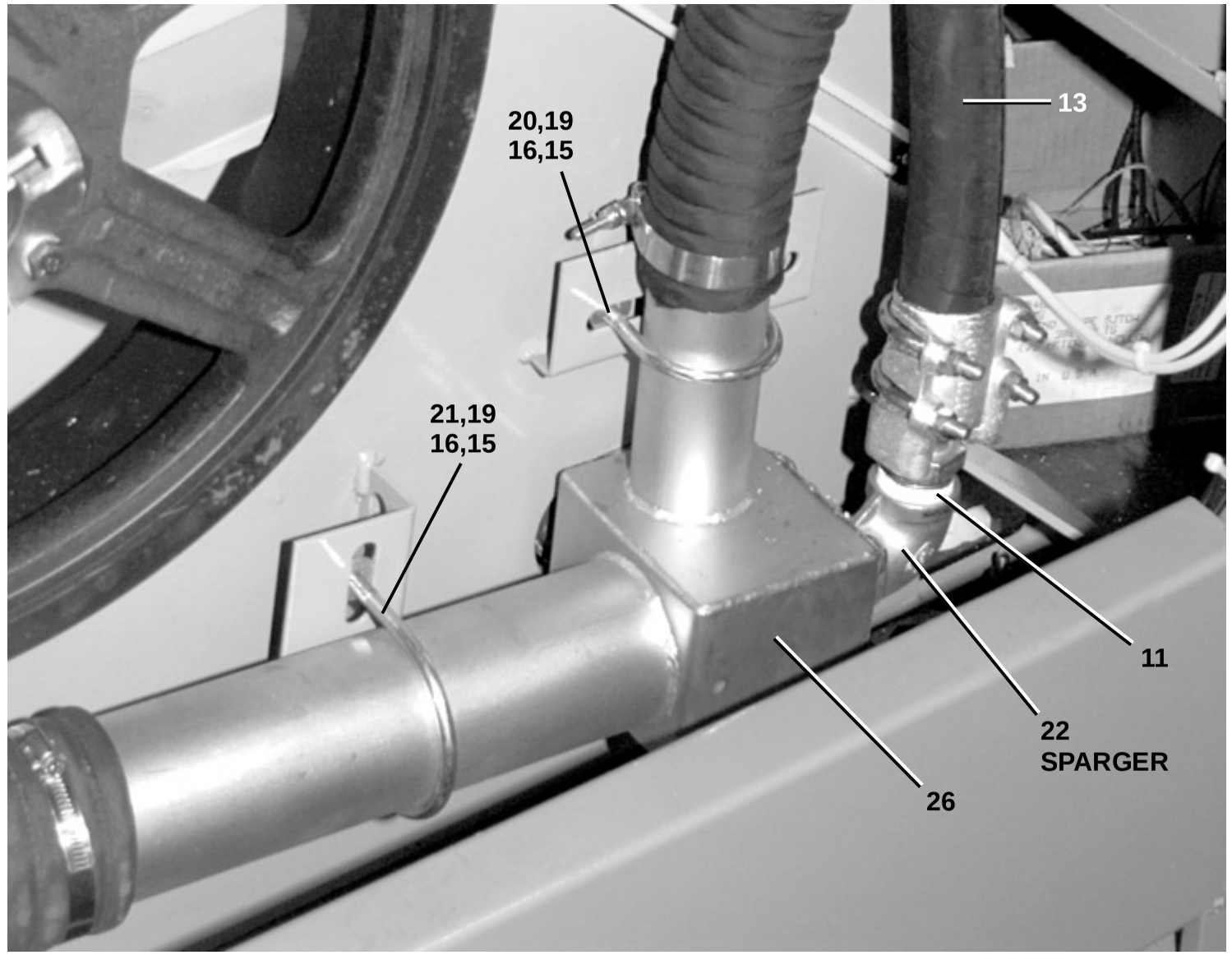


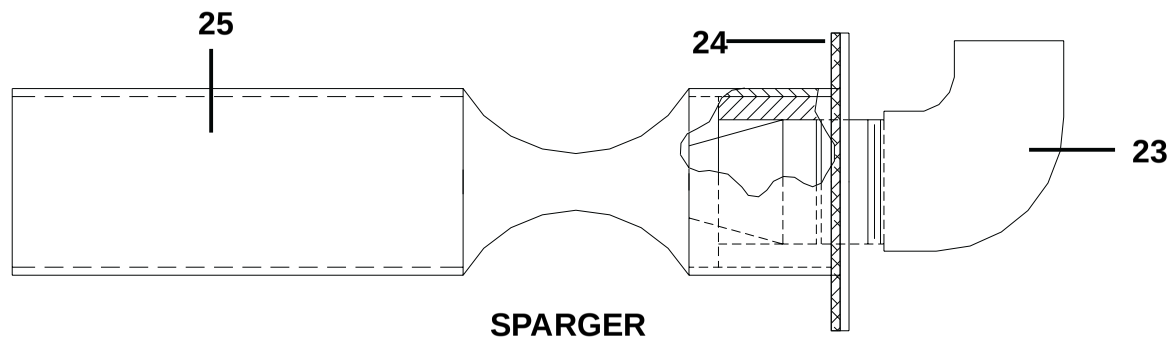

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## Parts List—Steam Inlet

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------ASSEMBLIES---------- | |
| | A | GVS15002 | INSTALL=1.25STEAM 42WE2+3 | |
| | B | AVS15001 | $1.25 BURKERT STEAM=42WE2+3 | |
| | C | AVS03001 | *1+1/4BURKERT +STRAINER | |
| | D | ASS25001 | *52&60 STEAM SPARGER3/4ORFICE | |
| | | | ----------COMPONENTS---------- | |
| all | 1 | 51T060 | Y-STRAINER 1+1/4" CAST IRON | |
| all | 2 | 5SP0PHFSS | NPT PLUG 3/4 SQ SOLID STL/ZINC | |
| all | 3 | 5N1E05AG42 | NPT NIP 1.25X5 TBE GALSTL SK40 | |
| all | 4 | 96D0011E | 1.25"NPTBRZ N/C STEAMVALANGBD | |
| all | 5 | 96H018 | ANGLE NEEDLE VLV 1/4"T X 1/8MP | |
| all | 6 | 5SB0E0CBEO | NPTHEXBUSH 1/4X1/8 BRASS 125# | |
| all | 7 | 5N1E16AG42 | NPT NIP 1.25X16 TBE GALSTL SK4 | |
| all | 8 | 5SL1ENFA | NPT ELB 90DEG 1.25 GALMAL 150# | |
| all | 9 | 5N1ECLSG42 | NPT NIP 1.25XCLS TBE GALSTLS40 | |
| all | 10 | 5SU1ENF | NPT UNION 1.25" GALMAL 150# | |
| all | 11 | 51E096C | MALESTEM 1.25"CADPL CAMP#IMS5 | |
| all | 12 | AVS03001 | *1+1/4BURKERT +STRAINER | |
| all | 13 | 60E096C54A | STEAMH*OSE=1.25"X54"+2ENDS=(NO | |
| all | 14 | 27A032 | UBOLT 1.5"PIPE 3/8-16X3-3/4LEG | |
| all | 15 | 15G205 | HXNUT 3/8-16UNC2B ZINC GR2 | |
| all | 16 | 15U255 | LOCKWASHER MEDIUM 3/8 ZINCPL | |
| all | 17 | 15G200 | HXCPNUT 3/8-16 UNC2A 5/8X1/2 | |
| all | 18 | 02 16306A | BRKT=1+1/4"PIPE SUPPORT | |
| all | 19 | 15U240 | FLATWASHER(USS STD) 3/8" ZNC P | |
| all | 20 | 27A032M | UBOLT 2"PIPE 3/8-16 ZNC3.5" LG | |
| all | 21 | 27A035 | UBOLT3/8-16 3.625BETWN LEGS | |
| all | 22 | ASS25001 | *52&60 STEAM SPARGER3/4ORFICE | |
| all | 23 | 5SL1ESFA | NPT ELB 90DEG 1.25 304SS 150# | |
| all | 24 | W3 64566B | *WLM=STM SPARGER .75 ORF-12"L | |
| all | 25 | 02 14647E | GASKET=DRNTRGH TO RECIRC BOX | |
| all | 26 | W2 15897E | *STEAM+WATER INLET WLDMT 42WE | |
| all | 27 | 27A084 | HOSECLAMP 3+9/16-4.5CADSC#HS64 | |
| all | 28 | 60E306A07A | HOSE= *3.5ID PE X 7" | |
| all | 29 | 87Z070010A | TUBE=3.5"ODX10"LG-SQ ENDS | |
| all | 30 | 60E306A18A | HOSE= *3.5"ID PE X18" | |

# Flushing Water Supply

## 4244WP2/WP3, 4244WP2 SM, 4244SP2/SP3, 4244SP2 SM



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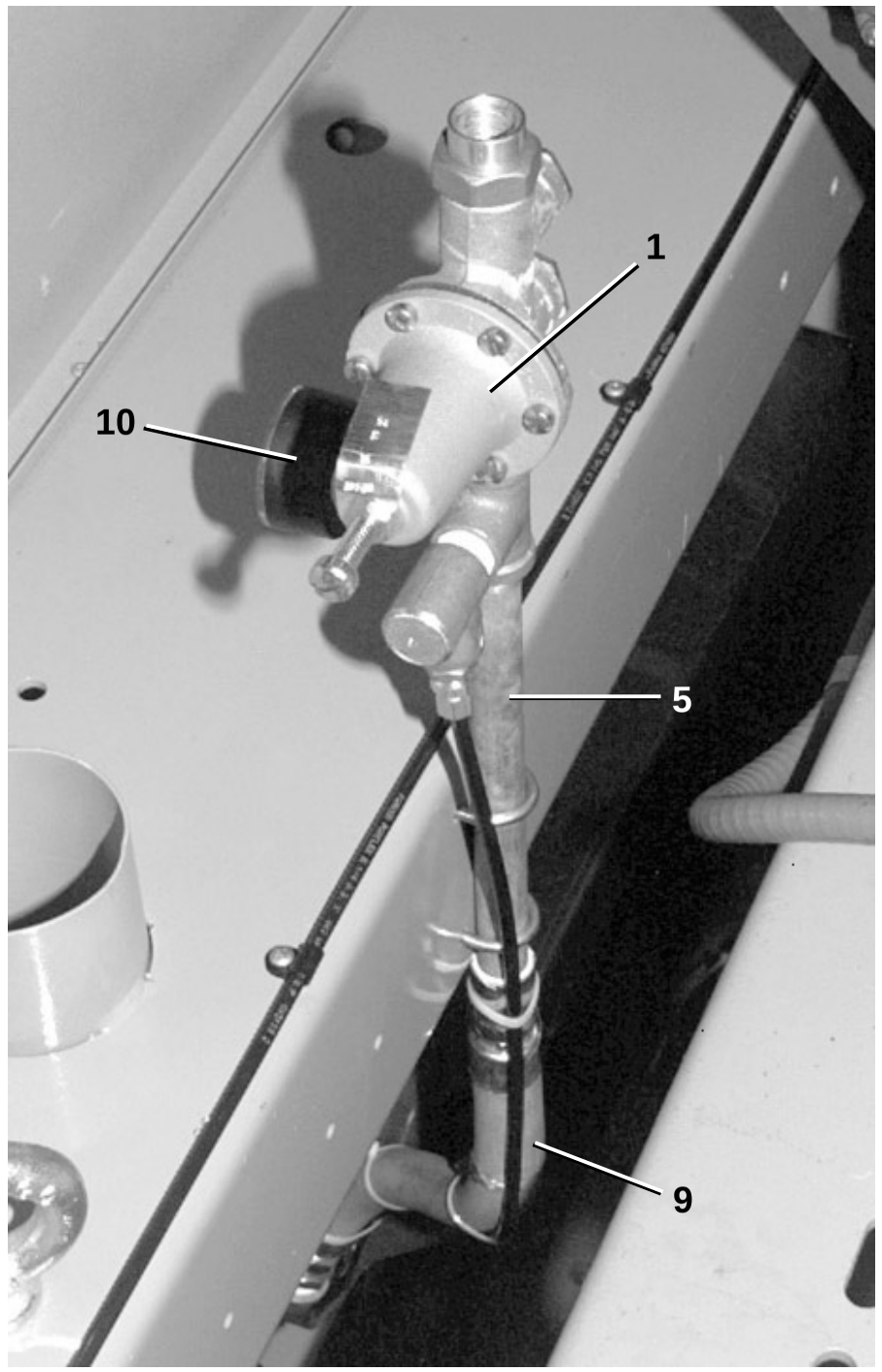


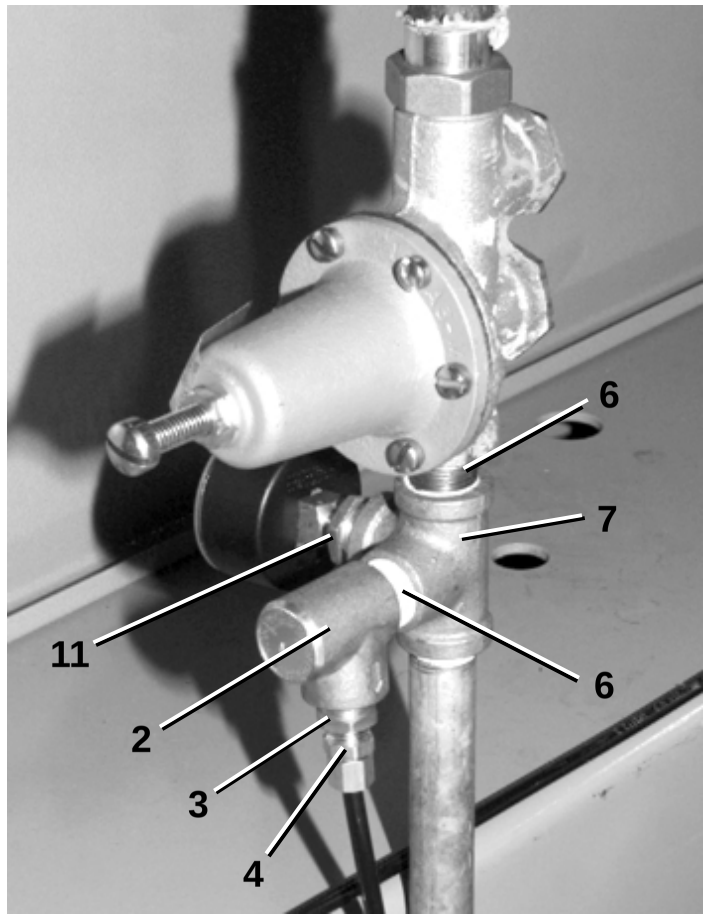


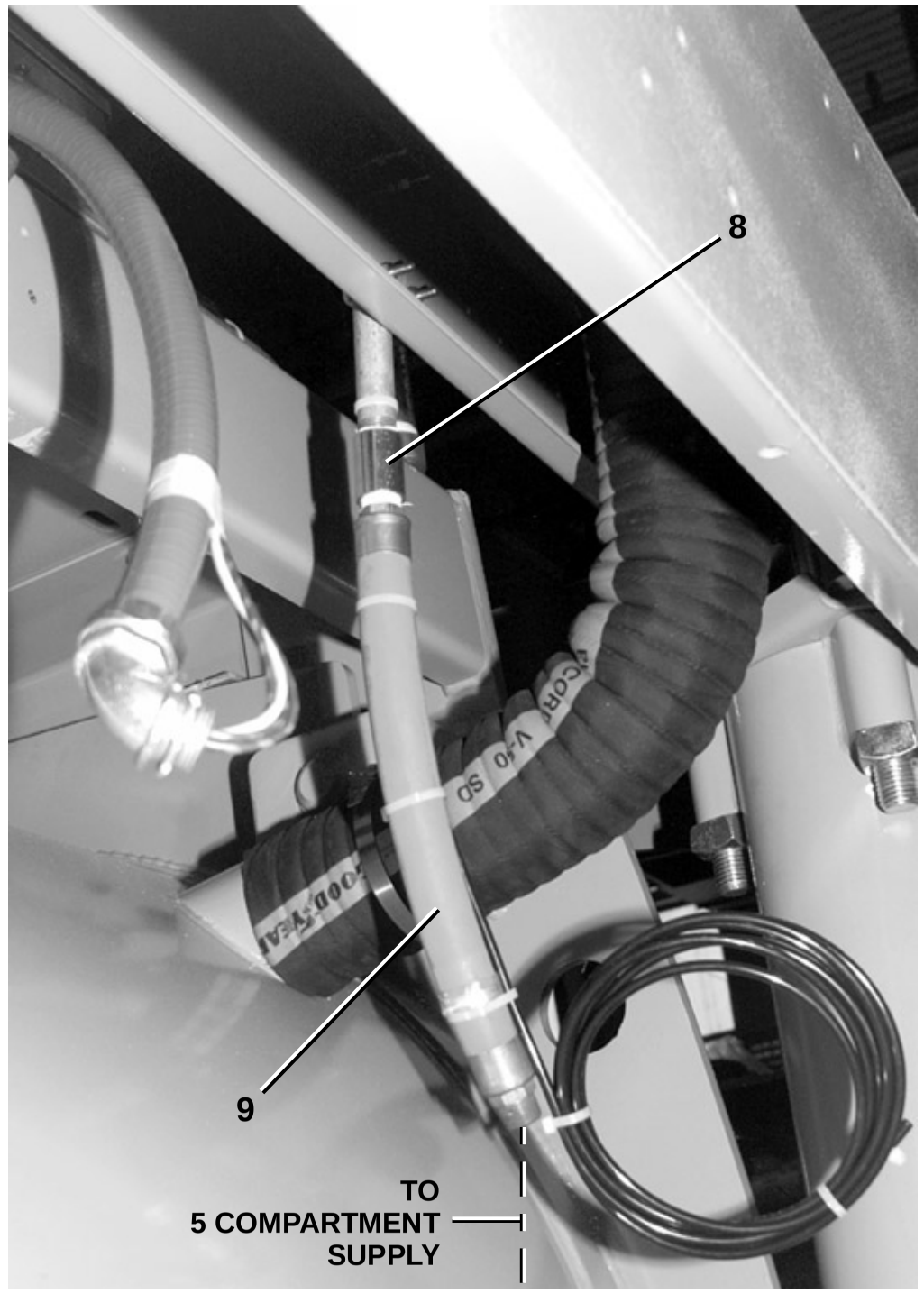


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## Parts List—Flushing Water Supply

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 15 080H | $INLET=FLUSHSUP 42HYDRO | 4244WP2/WP3 |
| | B | SA 15 080I | $INLET=FLUSHSUP 42SG | 4244SP2/SP3 |
| ---------- | ---------- | ---------- | ----------COMPONENTS---------- | ---------- |
| all | 1 | 96J030D | 1/2"PRESSREG SET28# FEMXUN | |
| all | 2 | 96M001 | 1/2X3/8" RELIEF VALVE SET31# | |
| all | 3 | 5SB0G0EDEO | NPTHEXBUSH 3/8X1/4 GALCI 125# | |
| all | 4 | 53A008B | BODYMALECON.25X.25COMP#B68A-4B | |
| all | 5 | 5N0K10AG42 | NPT NIP 1/2X10 TBE GALSTL SK40 | |
| all | 6 | 5N0KCLSG42 | NPT NIP 1/2XCLS TBE GALSTLSK40 | |
| all | 7 | 5S0KNFB | NPT SIDEOUT TEE 1/2" GALMAL | |
| all | 8 | 5SCC0KNF | NPT COUP 1/2 GALMAL 150# | |
| A | 9 | 60E086K14A | 3/4X14 WATER HOSE W/1/2ENDS | |
| B | 9 | 60E086K28A | 3/4X28 WATER HOSE W/1/2ENDS | |
| all | 10 | 30N100 | PRESSGAUGE 1/8"BACKCN.0-30PSI | |
| all | 11 | 5SB0K0CDEO | NPTHEXBUSH 1/2X1/8 GALCI 125# | |

# SERVICING AIR CYLINDERS

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

Maintenance procedures require:

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

**⚠ CAUTION ⚠**

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

☞ **Follow maintenance instructions carefully.**

☞ **Wear eye protection.**

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

**1.** Replace two diagonally opposite tie bolts with threaded rods and nuts as shown in FIGURE 1.

**2.** Tighten nuts on the threaded rods until they contact the air cylinder.

**3.** Remove the other two tie bolts and the nuts, washers, clips, and actuators from the external end of piston stem.

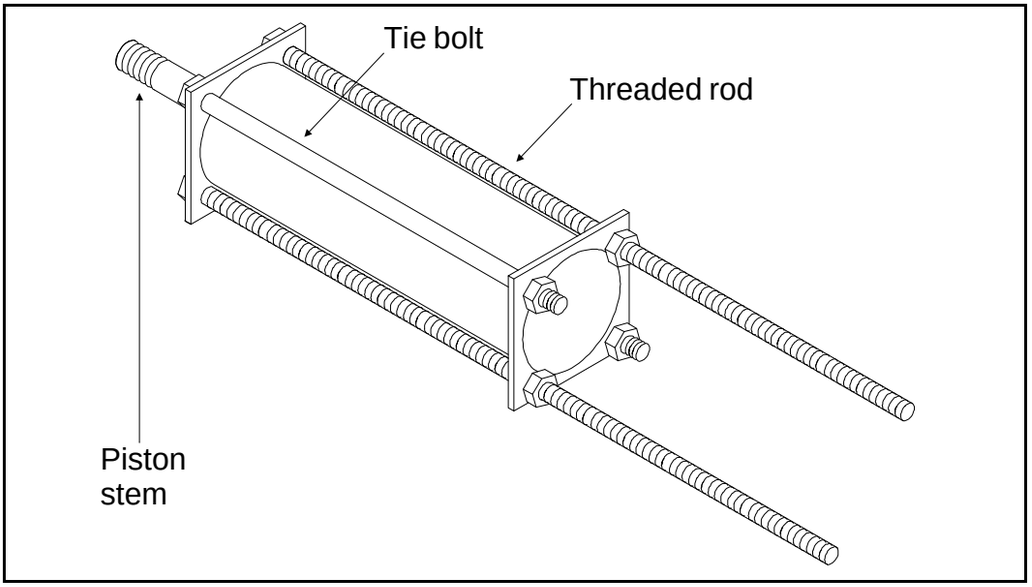


**FIGURE 1** (MSSM0130AE)
**Using Threaded Rods**

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

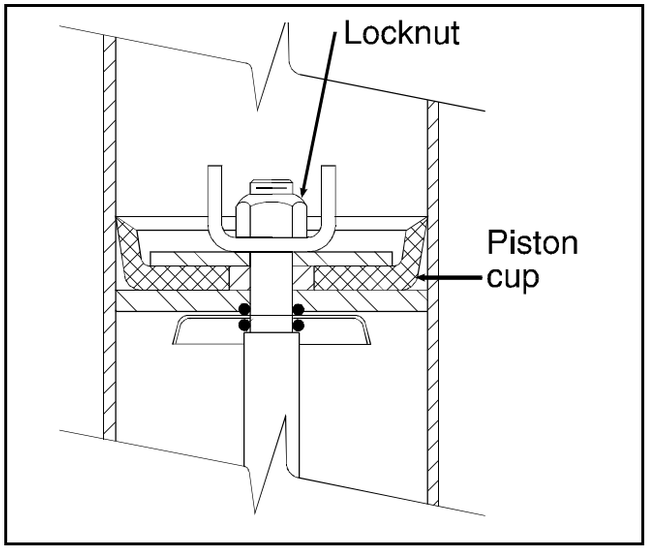


**FIGURE 2** (MSSM0130AE)
**Correct Piston Cup Shape**

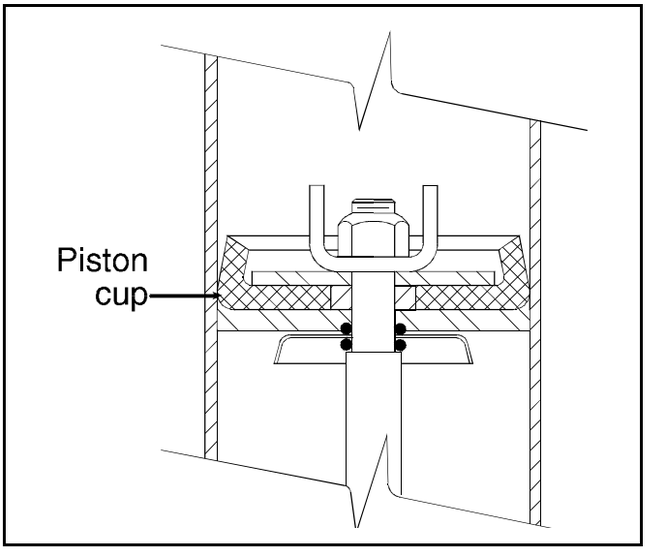


**FIGURE 3** (MSSM0130AE)
**Distorted Piston Cup Shape**

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

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



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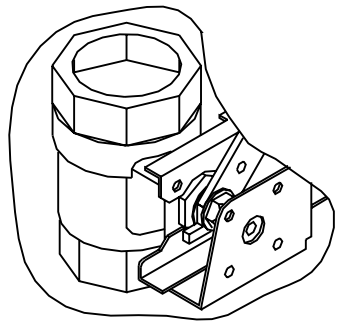
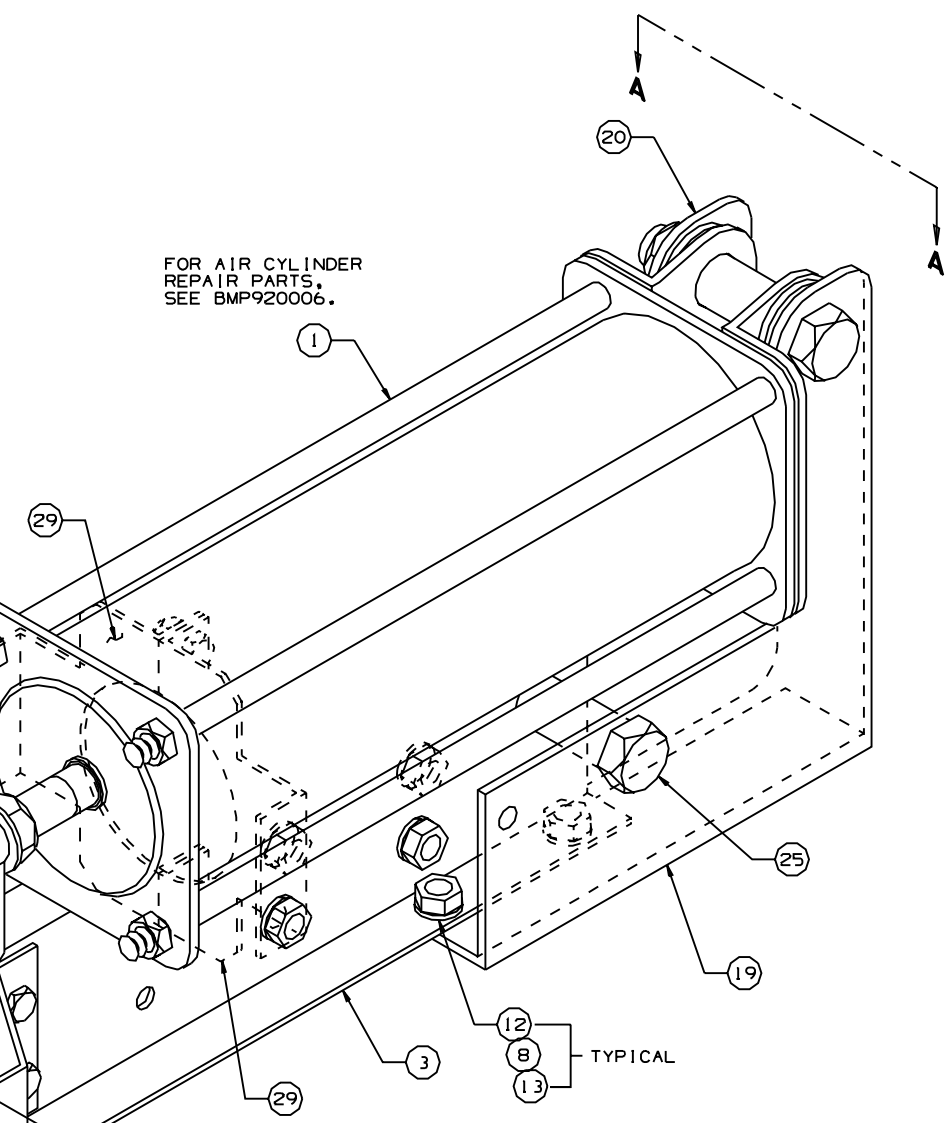
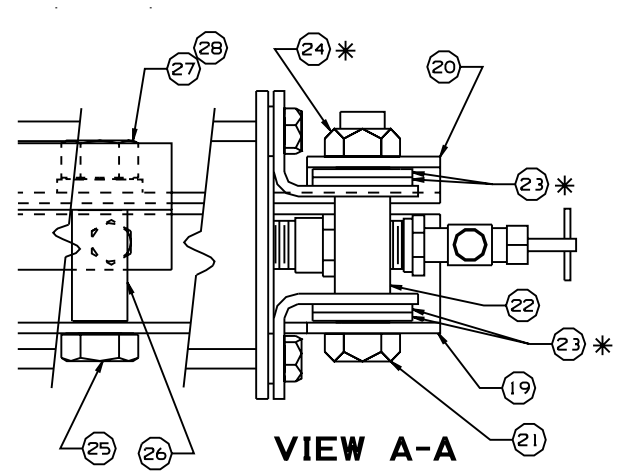
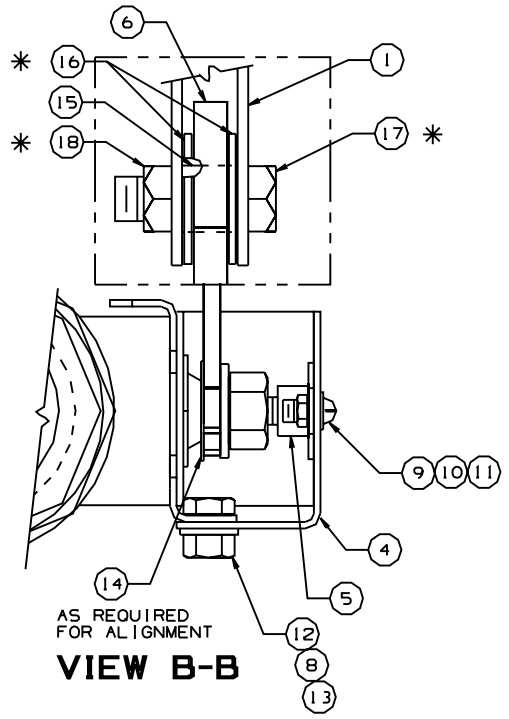


90° VALVE SET



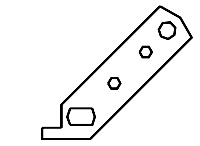




VIEW A-A

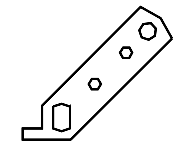



AS REQUIRED FOR ALIGNMENT

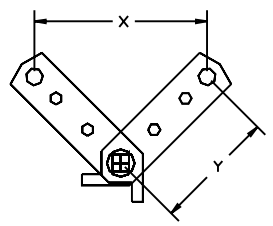
VIEW B-B



NORMALLY OPEN CRANK (ITEM 6)



NORMALLY CLOSED CRANK (ITEM 6)




STROKE DIMENSIONS

| SIZE | X | Y |
|---|---|---|
| 2" VALVES | 3.89 | 2.75 |

NOTES:

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

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

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

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## Parts List—Actuators & Mounting Hardware for Watts Ball Valves

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

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

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

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

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

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

# Watts Ball Valves and Repair Kits



Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
BMP920007/96067V (1 of 2)
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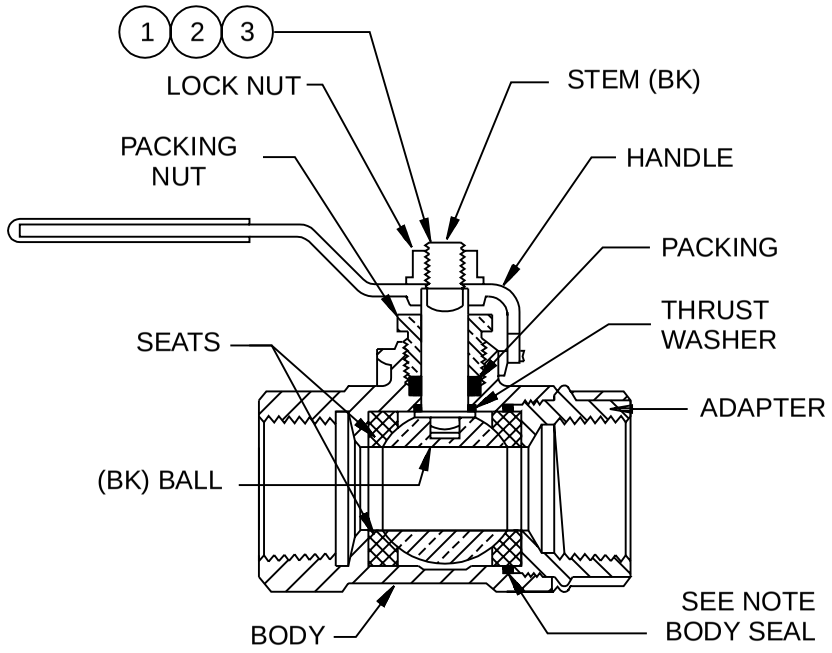
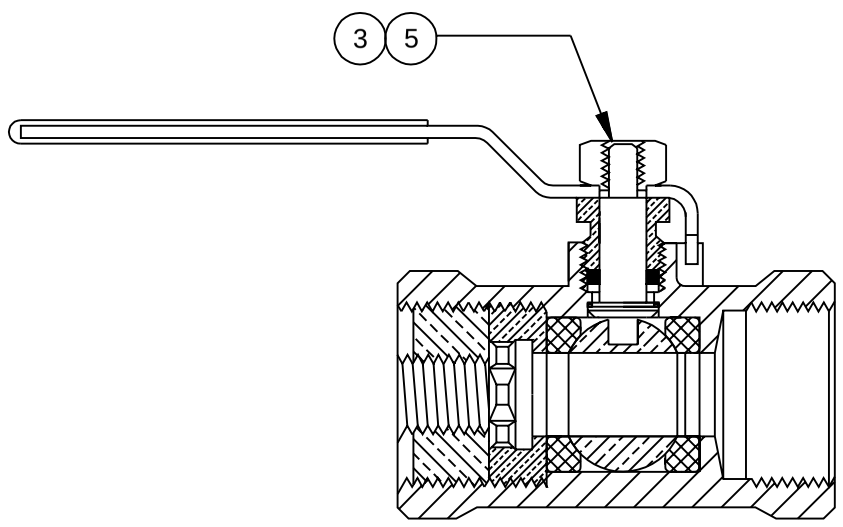
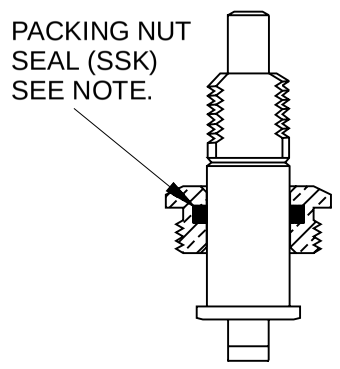
## BALL VALVES WITHOUT ACTUATOR PADS FOR MANUAL OPERATION




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

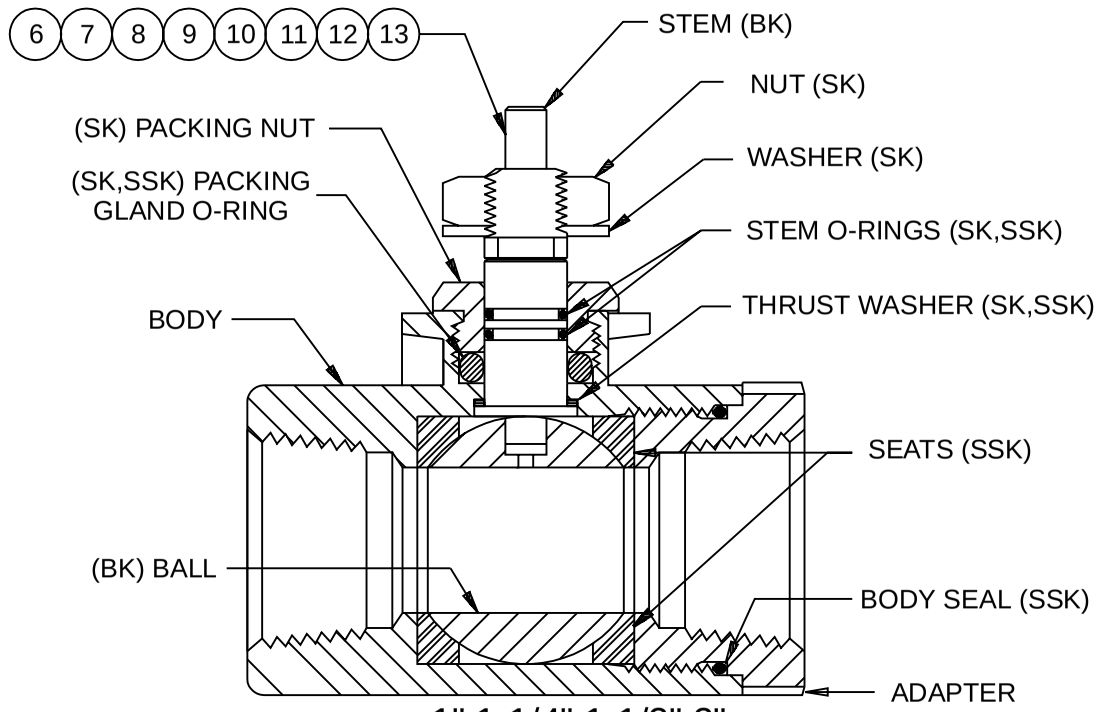



3/4",1"
BRONZE
NO REPAIR KITS




DETAIL
OLD STYLE STEM

## AIR OPERATED BALL VALVES




1",1-1/4",1-1/2",2"
BRONZE & STAINLESS

(For Bracketry and Mounting Hardware, See BMP920005. For Air Cylinders that Operate Watts Ball Valves, See BMP920006.)

HOW TO USE THIS DRAWING:

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

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

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

NOTE:

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

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## Parts List—Watts Ball Valves and Repair Kits

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

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

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

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

# Air Cylinders for **1", 1.25", 1.5" & 2"** Watts Ball Valves



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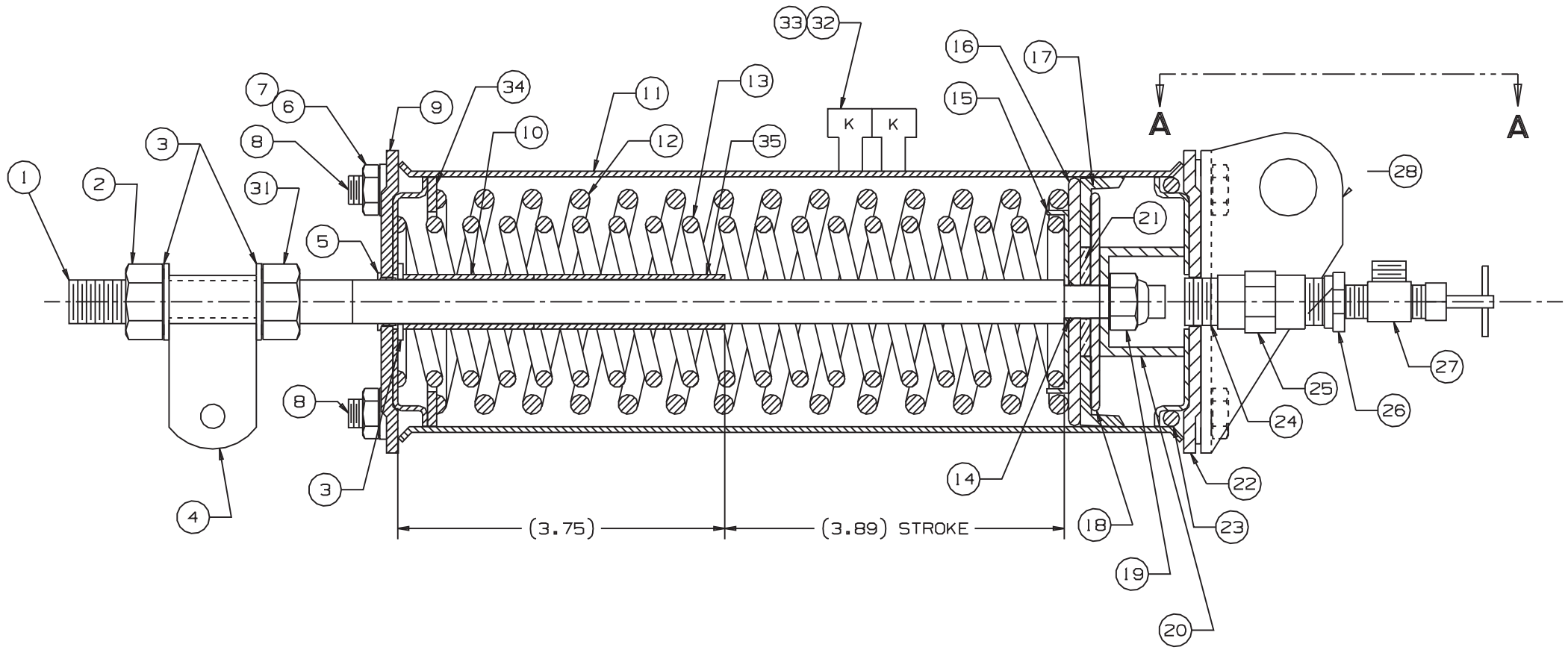


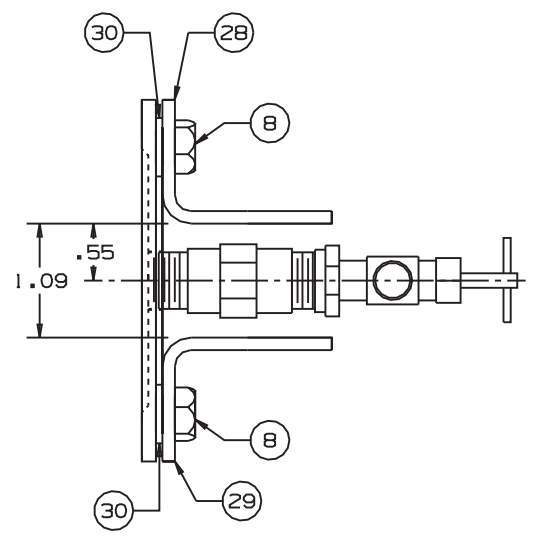


**VIEW A-A**

## NOTES:

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

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## Parts List—Air Cylinders for 2" Watts Ball Valves

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ----------ASSEMBLIES---------- | |
| | A | SA 10 057C | 95222D AIRCYL=3.0ODX3.89ST171/176CD | FOR 2” BALLVALVES |
| | B | SA 10 057D | 95222# AIRCYL=3.0ODX3.89ST171/176SS | FOR 2” STAINLESS BALLVALVES |
| | C | SA 10 056F | BRAKEAIRCYL=2.38ODX2.70STX20.5#CD | FOR 1,1.25,1.5 BALLVALVES |
| | D | SA 10 056G | *AIRCYL=2.38ODX2.70STX20.5#SS | FOR 1,1.25,1.5 STAINLESS BALLVALVES |
| | | | ----------COMPONENTS---------- | |
| A,B | 1 | 03 01615 | 94191B PISTON STEM 3"AIRCYL | |
| C,D | 1 | 02 18650 | 96461B STEM=2 WAY AIRCYLINDER | |
| all | 2 | 15G234NS | HXLOCKNUT NYL 1/2-13UNC2 SS18-8 | |
| all | 3 | 15U243S | FLAWASHER 7/8ODX33/64IDX16GA 18-8SS | |
| all | 4 | 03 01209A | 92536B STEMCLIP H=1.313 BALVAL S/S | |
| all | 5 | 54E220 | NYLINER 8L2FF BUSHING 1/2X9/16X.140 | |
| A | 6 | 15G191 | HXFINJAMNUT 5/16-24UNC2 ZINC GR2 | |
| B,C,D | 6 | 15G190 | HEXFINJAMNUT 5/16-18NC2 SS18-8 | |
| A | 7 | 15U210 | LOKWASHER MEDIUM 5/16 ZINCPL | |
| B,C | 7 | 15U205 | LOCKWASHER MEDIUM 5/16" 18-8SS | |
| D | 7 | 15U200S | FLATWASHER US STD 5/16 SS18-8 | |
| A | 8 | 02 10585H | 91142# TIE BOLT=5/16-18X10LNG PLTD | |
| B | 8 | 02 10585G | 91142# TIE BOLT=5/16-18X10LG (SS) | |
| C | 8 | 02 10585E | 91142# TIE BOLT=5/16-18X8.25LG PLTD | |
| D | 8 | 02 10585A | 91142# TIE ROD-5/16-18X8+1/4 (SS) | |
| A | 9 | 03 01623 | 90351C CYLINDER HEAD 3"AIRCYLINDER | |
| Bl | 9 | 03 01623A | 90351# CYLHEAD 3"AIRCYLINDER-S/S | |
| C | 9 | 02 02546 | 87341C CYLHEAD=SLIDESTEM | |
| D | 9 | 02 02546S | 87341# CYLINDER HEAD=SLIDE STEM SS | |
| all | 10 | 27B32024SS | SPACER ROLL .51IDX.6250DX1.5L STN S | USES 2 |
| A,B | 11 | 03 01621 | 94266BTUBE 2+7/8 AIR CYLINDER 9" | |
| C,D | 11 | 02 02068 | 94266A AIRCYL-STAINLESS=DUMPVALVE | |
| A,B | 12 | 03 01617C | 92133B SPRING=FL11.5SR23.5#MD2.368 | |
| C | 12 | 02 15881 | 96471# SPRING=BRAKE2.1OD11FL15.5#/” | |
| D | 12 | 02 15881A | 85504Z SPRING,02 -15881+HEAVY PAINT | |
| A,B | 13 | 03 01616C | 92133B SPRING=FL11.35SR20.5MD1.811 | |
| C | 13 | 02 15880 | 96471B SPRING=BRAKE1.5OD10.3FL17#/” | |
| D | 13 | 02 15880A | 85504Z SPRING,02-15880 +HEAVY PAINT | |
| all | 14 | 60C106 | ORING 5/16ID 1/16CS BN 70 DURO #011 | |
| A,B | 15 | 03 01620A | 92133B 3"AIR CYL=SPRING RETAINER | |

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| C,D | 15 | 02 18651 | 73171A WASHER=2 WAY BRAKE CYL | |
| A,B | 16 | X3 01619A | 92066# MACH=3"ACYL BRASS PISCUP WSH | |
| C,D | 16 | 02 02105B | 92253B 2.38”ACYL BRASS PISCUP WASHR | |
| A,B | 17 | 02 19302 | 93356B PISTON CUP 2+7/81D CYLINDER | |
| C,D | 17 | 02 02194 | 93217B PISTONCUP=DUMPVALVE 2+3/8” | |
| A,B | 18 | 03 01618 | 91522B PISTON CUP WASHER 3"AIRCYL | |
| C,D | 18 | 02 02085 | 94092B UP WASHER=2”OD=PISTON CUP | |
| all | 19 | 15G220 | 02Z LTHX THIN LOKNUT 3/8-24 SSNTE | |
| A,B,D | 20 | 03 01313S | 85506B+STOP=AIRCYL W/2+11/16STR.SS | |
| C | 20 | 03 01313 | 70219A STOP=AIR CYL W/2+11/16STROKE | |
| A,B | 21 | 03 01630 | 87506B 3"AIRCYL PSTN CUP COMPLMTWSH | |
| C,D | 21 | 02 02185 | 79237A WASHER=PISTON CUP COMP LIMIT | |
| A | 22 | 03 01622 | 88531# CYL HEAD TAPHOLE 3"AIRCYL SS | |
| B | 22 | 03 01622A | 88531# CYLHEAD TAPHOLE-3"ARCYL S/S | |
| C | 22 | 02 02101 | 71334A CYLHEAD W/TAPPED HOLE | |
| D | 22 | 02 02101S | 88531B CYLINDER HEAD TAP HOLE (SS) | |
| A,Bl | 23 | 60C134 | ORING 2.5 ID 3/16CS BN 70 DURO #333 | |
| C,D | 23 | 60C132 | ORING 2”IDX3/16CS BUNA70 #32 | |
| all | 24 | 5N0ECLSBE2 | NPT NIPPLE 1/4XCLS TBE BRASS 125# | |
| all | 25 | 5SCC0EBE | NPT COUP 1/4 BRASS 125# #103 | |
| all | 26 | 5SB0E0CBEO | HEXPIPBUSH 1/4 X 1/8 BRASS 125# | |
| all | 27 | 96H018 | NEEDLE VALVE | |
| A,B | 28 | 03 01627B | 92023# LEFT=3"AIR CYL MNTG BRKT | |
| C | 28 | 03 01660C93231B | BRKT=AIR CYL MONUT LEFT | |
| D | 28 | 03 01660A | 92271B BRKT=AIR CYL MNT LFT-S/S | |
| A,B | 29 | 03 01627A | 92023B RIGHT=3"AIR CYL MNTG BRKT | |
| C | 29 | 03 01660D | BRKT=AIR CYL MOUNT RIGHT | |
| D | 29 | 03 01660B | 92271# BRKT=AIR CYL MNT RHT-S/S | |
| all | 30 | 15U200 | FLATWASHER(USS STD) 5/16"ZNC PLT | |
| all | 31 | 15G231S | HXFINJAMNUT 1/2-13UNC2B SS18-8 | |
| A | 32 | 20L601K | ID TAG NAT'L#1614 ALUM EMB "K" | USES 2 |
| B | 32 | 20L601E | ID TAG NAT'L#1614 ALUM EMB "E" | USES 2 |
| CD | 32 | 20L601G | ID TAG NAT'L#1614 ALUM EMB "G" | USES 2 |
| C | 33 | 20L601F | ID TAG NAT'L#1614 ALUM EMB "F" | USES 1 |
| D | 33 | 20L601V | ID TAG NAT'L#1614 ALUM EMB "V" | USES 1 |
| all | 34 | 03 01620E | 92136B.WASHER=2.86ODX2.06IDX.105THK | |
| A,B | 35 | 27B2400K0N | SPCRROLL.5ID.687L.062T SS | USES 1 |

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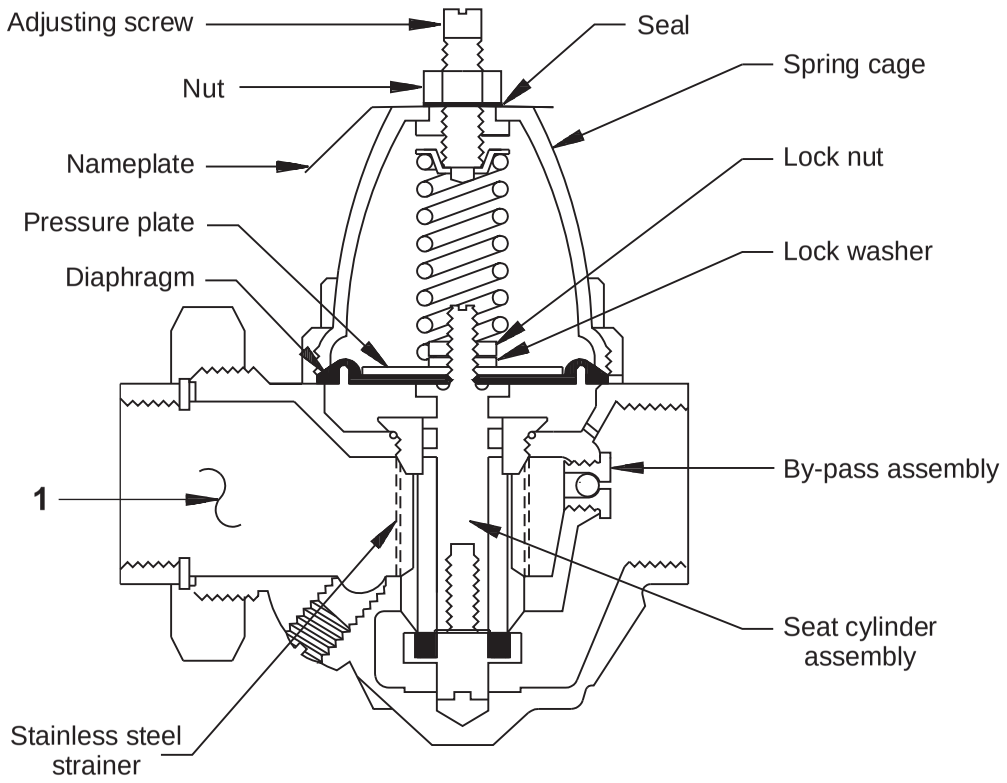


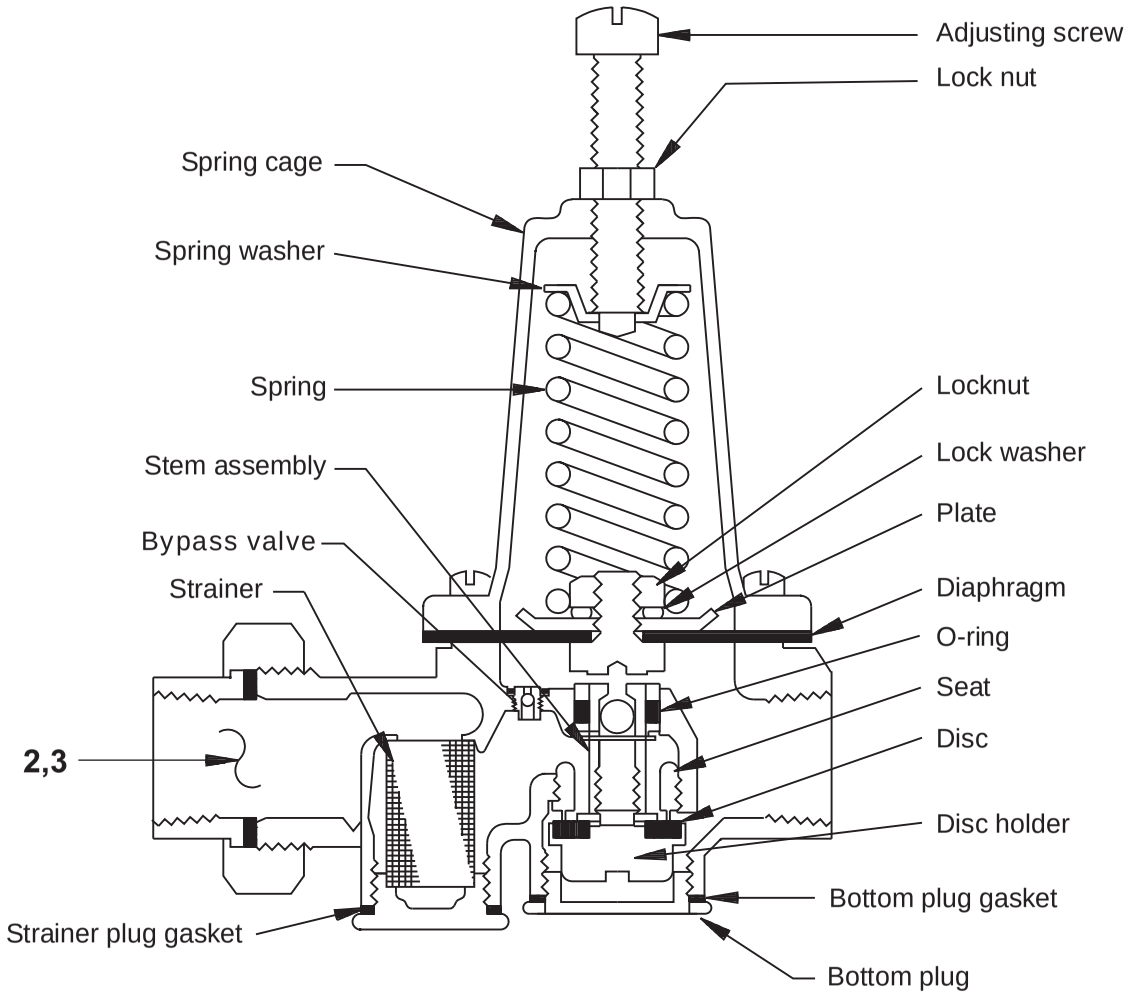

## To clean:

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.

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## 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 | ½" REGULATOR 3621V ONLY |
| | 2 | 96J030D | 01Z 1/2" PRESREGULTR SET 28# FEM-UN | ½" 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**



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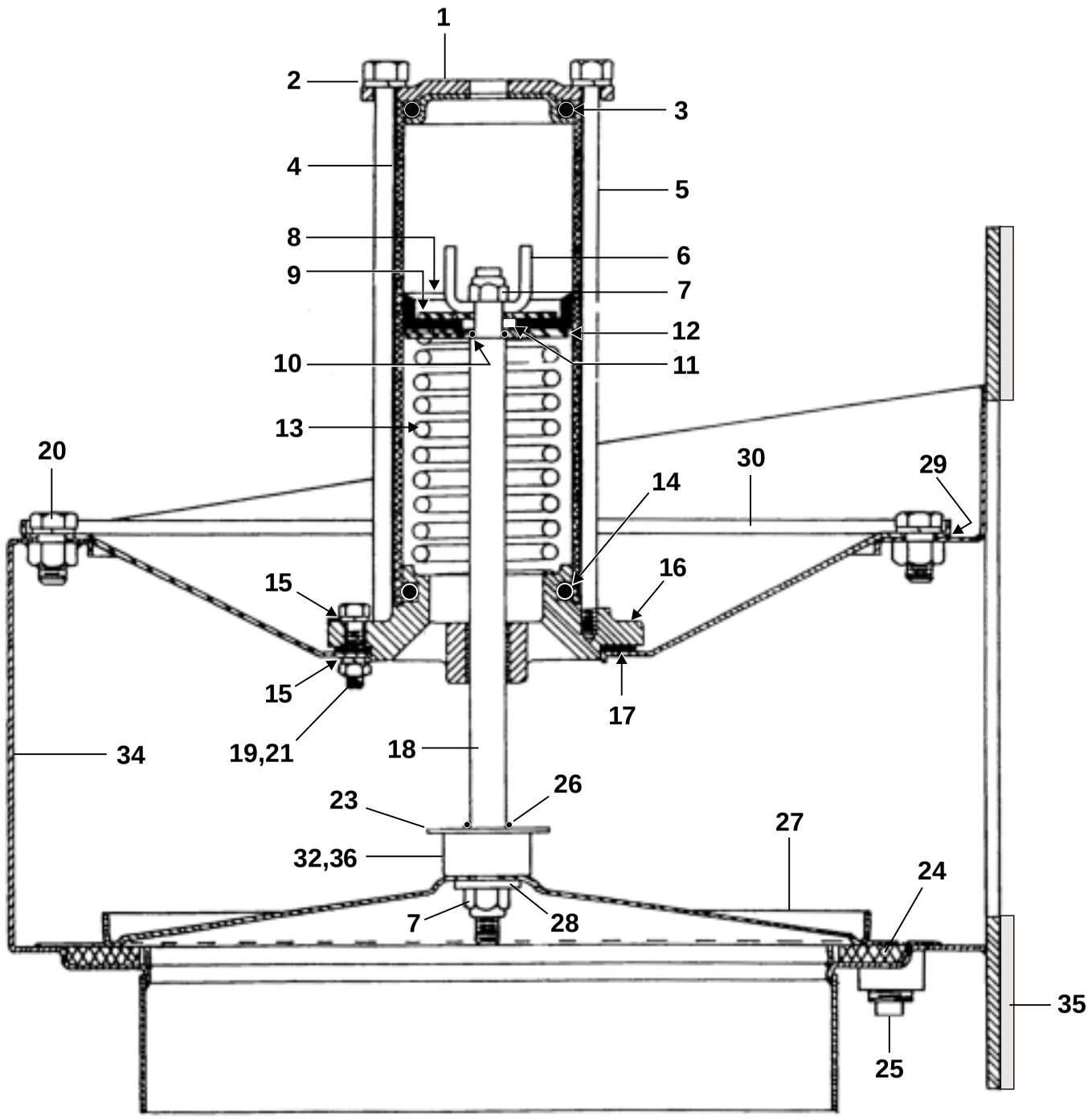



## Parts List—8” & 10” Stainless Dump Valve

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

# 3 & 4 Inch Dump Valve Assembly



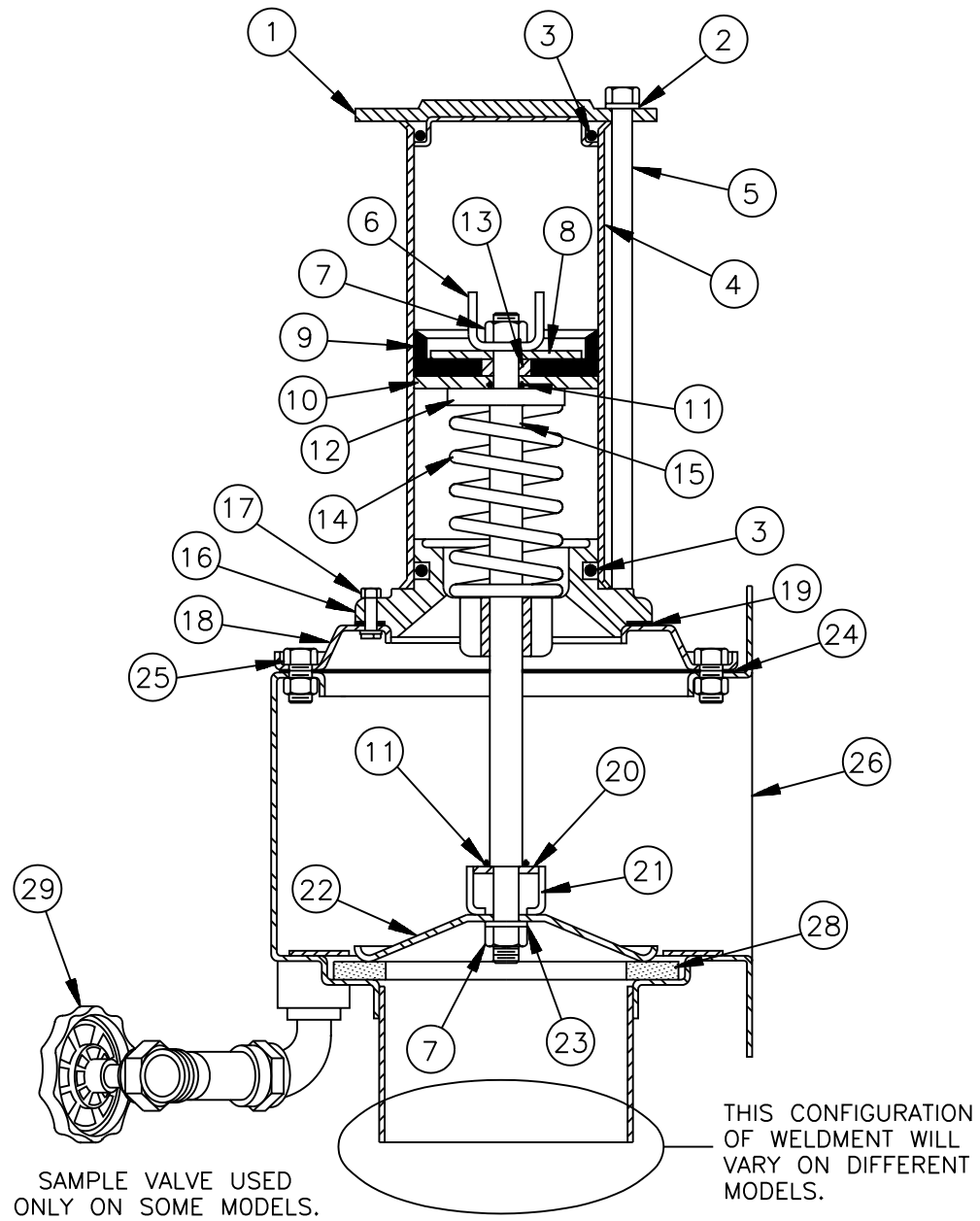
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.



**⚠WARNING⚠**

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




## Parts List—3 & 4 Inch Dump Valve Assembly

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ASSEMBLIES | |
| | N | W2 15997 | BODY=4" DUMPVALVE=4231WE+SG | CBW REUSE TANK |
| | P | AVD14003 | 91000Z ASSY DMPVALVE 36QU | 3621/26Q4G/J/P, Q6G/J/P |
| | Q | AVD14001A | 89000Z ASSY=DUMP VALVE 42S6P | 4226Q4G/JP,Q6G/J/P |
| | R | AVD14001 | 89000Z ASSY=DUMP VALVE 3621F8P | 3621F8P |
| | S | A14 06500B | 82341T*DUMP VALVE ASSY=4S/S 4226QHE | 4840F7J,F7W,F7N,F7B 48/42QTL/N/HP, 48BTL/N/HP |
| | T | A15 15100 | 84242C 4"SGL.DUMPVALVE 4231WE+SG | 4231WP2,WP3/WW CBW®,4232F7J,P,W 3630F8J,W,P |
| | U | A14 06500 | 84242@*DUMP VALVE ASSY=4"NPT SS | 3621NSP |
| | V | A14 06500A | 84242J* 4"SS DUMPVALVE=3621+4226DYA | 4226DA1 |
| | W | A14 06500F | 84266@ DUMPVALVE=10GA 4" S/S | 4226DP1,DYP |
| | X | SA 09 013A | 84242C*DUMP VALVE ASSY-3"NPT SS | 3016NSE |
| | Y | A14 06400 | 89457U* BONNET+CYL=4"SS DIVCYL DUMP | 00N-00T(CONTAINS 1-23) |
| | Z | A14 06400A | 89457%* BONNET+AIRCYL=4"DYA DUMPVAL | 00U-00X(CONTAINS 1-23) |
| | | | COMPONENTS | |
| all | 1 | 02 02101 | 71334A CYLHEAD W/TAPPED HOLE | |
| Y | 2 | 15U210 | LOKWASHER MEDIUM 5/16 ZINCPL | |
| Z | 2 | 15U205 | LOCKWASHER MEDIUM 5/16" 18-8SS | |
| Y | 3 | 60C132 | ORING 2"ID 3/16CS BUNA 70 DURO #329 | |
| Z | 3 | 60C132V | ORING 2 ID 3/16CS VITON 75 # 329 | |
| all | 4 | 02 02068 | 94266A AIRCYL-STAINLESS=DUMPVALVE | |
| Y | 5 | 02 10585D | 91142# TIE BOLT=5/16-18X7.875 PLTD | |
| Z | 5 | 02 10585 | 91142B TIE BOLT=5/16-18X7.875LG SS | |
| all | 6 | 03 01313 | 70219A STOP=AIR CYL W/2+11/16STROKE | |
| all | 7 | 15G220 | 02Z LTHX THIN LOKNUT 3/8-24 SSNTE | |
| all | 8 | 02 02085 | 75161A UP WASHER=2"OD=PISTONCUP | |
| all | 9 | 02 02194 | 93217B PISTONCUP=DUMPVALVE 2+3/8" | |
| all | 10 | 02 02105B | 92253B 2.38"ACYL BRASS PISCUP WASHR | |
| Y | 11 | 60C106 | ORING 5/16ID 1/16CS BN 70 DURO #011 | |
| Z | 11 | 60C106V | O-RING 5/16"IDX1/16"CS VITON 11-011 | |
| all | 12 | 02 18651 | 73171A WASHER=2WAY BRAKECYL | |
| all | 13 | 02 02185 | 79237A WASHER=PISTON CUP COMP LIMIT | |
| all | 14 | 02 17023 | 83392B SPRING-SS=DUMP 1.5OD8FL21#/" | |

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Litho in U.S.A.

## Parts List, cont.—3 & 4 Inch Dump Valve Assembly

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| All | 15 | 02 16021I | 94191# DUMPVAL STEM-4"+8" DYE 316L | |
| Y | 16 | X2 02743 | 87382B BONNET=2"DUMP VALVE | |
| Z | 16 | X2 02743S | 73141B BONNET=2"DUMP VALVE-SS | |
| all | 17A | 15G168 | SQNUT 1/4-20UNC2 SS18-8 | |
| all | 17B | 24G020N | ROLLED WASHER .252"ID NYLTITE #25W | |
| all | 17C | 15K041S | HEXCAPSCR 1/4-20UNC2AX1 SS18-8 | |
| all | 17D | 15U181 | LOCKWASHER MEDIUM 1/4 SS18-8 | |
| all | 18 | 02 14447 | 92037B BONNET=4"S/S DUMP VALVE | |
| Y | 19 | 02 18931F | 93362B GASKET=DUMPVALVE-1/60+72WEHU | |
| Z | 19 | 02 18932B | 93362# GASKET=DUMPVAL 1/8"RED SILIC | |
| Y | 20 | 02 16021E | 94323B WASHER 3/8IDX1.250D DUMPVAL | |
| Z | 20 | 02 18651A | 83526B WASHER=DUMP VALVE DISC | |
| Y | 21 | 02 16021C | 92051B BUMPER=DUMP VALVE BONNET | |
| Y | 21 | 02 16021D | 92632B DUMP VALVE BUMPER RETAINER | |
| Z | 21 | 02 16021S | 84206B BUMPER=DUMP VAL BONT S/S | |
| all | 22 | 02 14446 | 87503B DISC-4"S/S DUMP VALVE | |
| all | 23 | 15U245 | 01Z FLTWASH 3/8 STD COMM 18-8 SS | |
| (P-V,X) | 24 | 02 14443 | 93362B GASKET-4"S/S DUMP VAL BONNET | |
| W | 24 | 02 14443E | 91067B GASKET=DUMP/VENT VAL N-8090 | |
| all | 25A | 15K086 | HXCAPSCR 3/8-16NCX3/4 SS18-8 | |
| all | 25B | 24G030N | ROLLED WASHER .379"ID NYLTITE #37W | |
| P-T | 25C | 15U200 | FLATWASHER(USS STD) 5/16"ZNC PLT | |
| R | 26 | W2 14740 | 94261D*WLMT=DUMP VALVE 3621F8P | |
| S | 26 | W2 11304 | 89417T*DUMP VALVE BODY WELDMT 4226 | |
| N,T | 26 | W2 15997 | 91383@* BODY=4"DUMPVALVE=4231WE+SG | |
| U | 26 | W2 14445S | 80433@*DUMPVALVE WLMT=SCREWED 4"NPT | |
| V | 26 | W2 14445 | 91383Y* BODY=4"DUMPVALVE=36BWE+QTS | |
| W | 26 | W2 14445F | 91383@*DUMP VALVE WLDMT 4226DYP | |
| X | 26 | W2 14445J | 80433T*DUMPVALVE WLMT=SCREWED 3"NPT | |
| Q | 26 | W2 14740A | 91446Y*WLDMT=DUMP VALVE 42S6P | |
| P | 26 | W2 11943 | 93071D*WLMT=DUMPVAL DRN TO REAR 36Q | |
| (Q-T) | 27 | 5SP0KGFSS | NPT PLUG 1/2 SOSOLID GALSTL | |
| (U-X) | 27 | 5SP0KSFHC | NPT PLUG 1/2 HEX 304SS 150# | |
| all | 28 | 02 14166 | 77131A SEAT 4" DUMP VALVE BUNA-N | |
| all | 29 | 96DB0PNA | 01Z HOSE BIBB 3/4" MALE INLT CELCON | ONLY ON SOME MODELS |

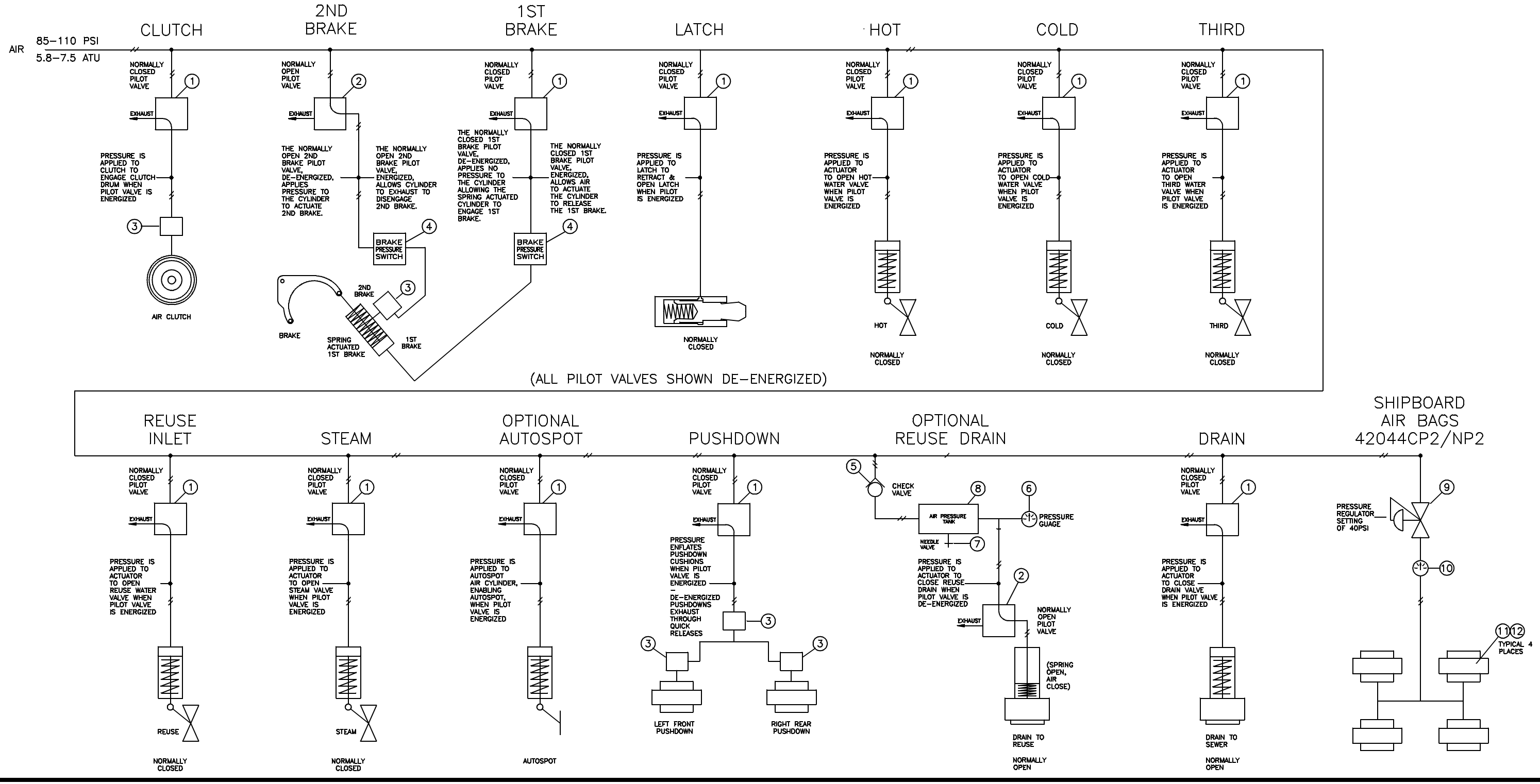
# 9 Pneumatic Piping and Assemblies

**PELLERIN MILNOR CORPORATION**
700 JACKSON STREET/POST OFFICE BOX 400
KENNER, LOUISIANA 70063-0400 USA

DRAWING
(See other page for parts list, if applicable.)

# PNEUMATIC SCHEMATICS 42044WP2/CP2/NP2

**BMP940113/94497V (Page 1)**






LITHO IN USA

PELLERIN MILNOR CORPORATION
700 JACKSON STREET/POST OFFICE BOX 400
KENNER, LOUISIANA 70063-0400 USA

PARTS LIST
(See other page for drawing.)

# PNEUMATIC SCHEMATICS 42044WP2/CP2/NP2



| ITEM | PART NUMBER | DESCRIPTION | HOW PART IS USED IN ASSEMBLY (Only if pertinent) |
|---|---|---|---|
| 001 | 96R301A37 | 04Z 1/8" PILOT 3W-NC 110/50 120/60 | |
| 002 | 96R302A37 | 05Z 1/8"AIR PILOT 3WANO 120V50/60C | |
| 003 | 96M051 | USE KZK5B00100 | |
| 004 | 09N082A | 12Z PRESSW NASON CLOSE @ 62 LB. | |
| 005 | 96D047AAK | 05Z CHECK VALVE 1/4"DELT#CMMQ20B | |
| 006 | 30N102 | 06Z PRESSGUAGE 1/4"BOTCONN 0-160PSI | |
| 007 | 96H018 | NEEDLE VALVE | |
| 008 | W3 25307D | 88186C*TANK=AIR PRESSURE RESERVE | |
| 009 | 96J019E | 1/4"PRESREG2-50PSI NOR#R06-221-RNEA | CP2/NP2 ONLY |
| 010 | 30N101 | 08Z PRESSGAUGE 1/8"BACKCONN 0-60PSI | CP2/NP2 ONLY |
| 011 | 60B100 | 67314A ARMT S116B 1CONV F3582017564 | CP2/NP2 ONLY |
| 012 | 69C050A | POLYETHYLENE BAG 9X6X13X.005 | CP2/NP2 ONLY |
| | | ******** END OF PARTS LIST ******** | |

## How to Read Parts List

**Reference Item Numbers**—Items 00A, 00B, 00C, etc., or 00X, 00Y, 00Z, etc., appearing at the top of **some** parts lists, are for reference and provide:

1. The part number for the entire assembly depicted in the drawing or a major sub-assembly thereof, and/or
2. The range of machine models this drawing applies to.

If more than one reference item appears, this usually means this drawing applies to more than one assembly (and thus to more than one range of machines).

**Component Item Numbers**—For any item on the drawing (e.g., item ①), there may be several corresponding items on the parts list (e.g., 001A, 001B, 001C, etc.) which are similar components on different assemblies. "How Part Is Used In Assembly" identifies which components apply to your machine, by listing either the machine model, or the reference item number from the top of the parts list (e.g., 00A, 00B, 00C, etc.), or a particular characteristic (e.g., bronze or stainless steel), or special ordering information, such as a repair kit number.



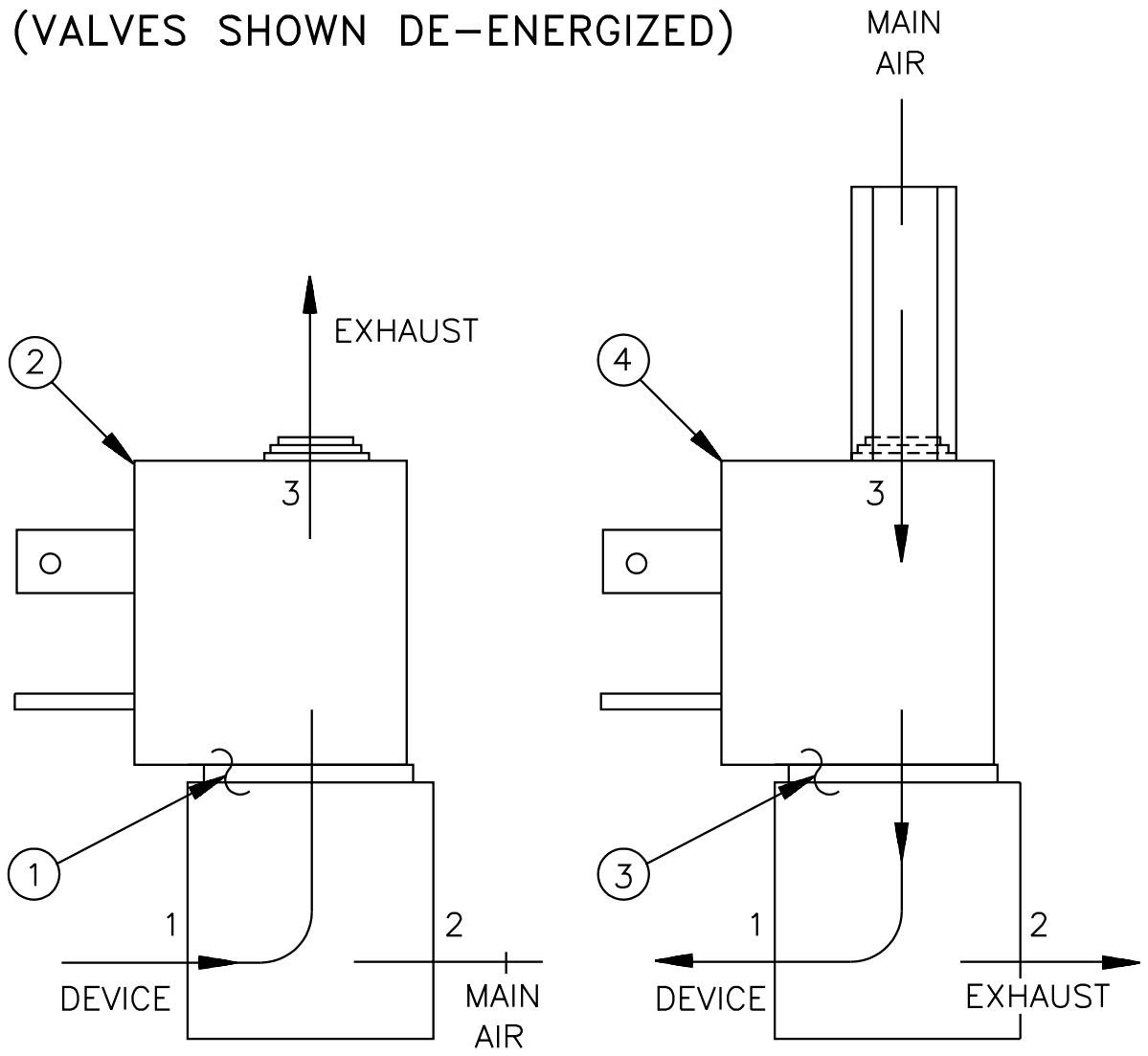
LITHO IN USA

# 3-Way Pilot Valves



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






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

## Parts List—3-Way Pilot Valves

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

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

# Asco 3-way Solenoid Valves

## Applicable Models

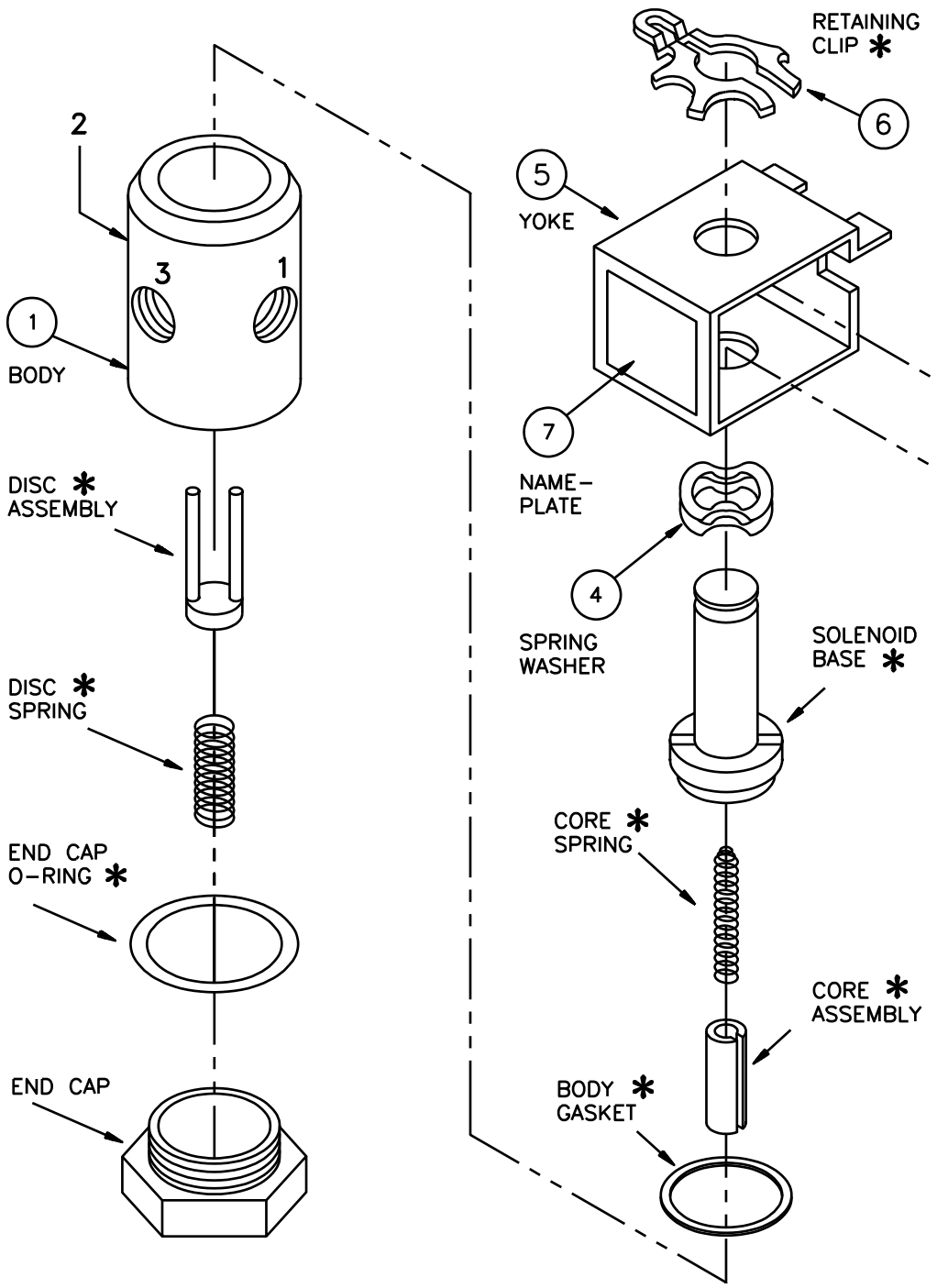


Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

BMP701359/97086V (1 of 2)

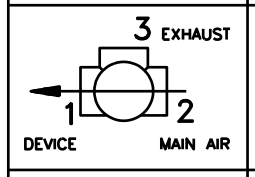
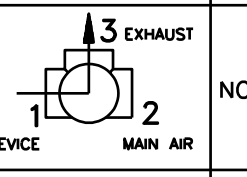
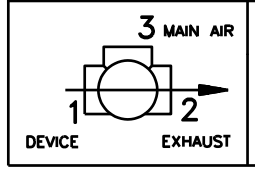
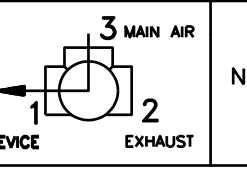
Litho in U.S.A.






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

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

## Identification and Description

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

## Safety Instructions

**⚠ DANGER ⚠**

**SHOCK HAZARD - will cause death or severe injury.**

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

**⚠ WARNING ⚠**

**EXPLOSION HAZARD- may cause serious injury.**

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

**⚠ CAUTION ⚠**

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

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

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

## Maintainence

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

### Coil Replacement

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

### Valve Disassembly and Reassembly

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

## Troubleshooting

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

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

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

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

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

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



Litho in U.S.A.



## Parts List—Asco 3-way Solenoid Valves

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

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

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|

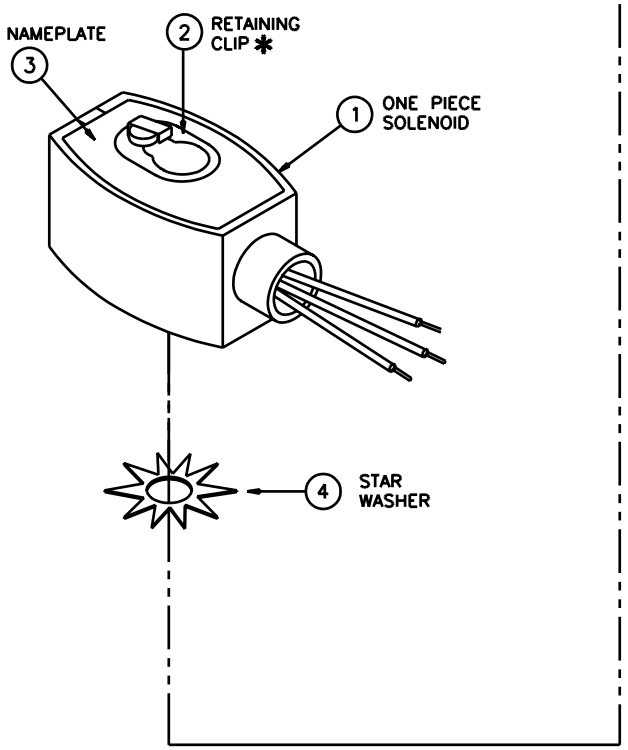
# 2-Way Electric Water Valve



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

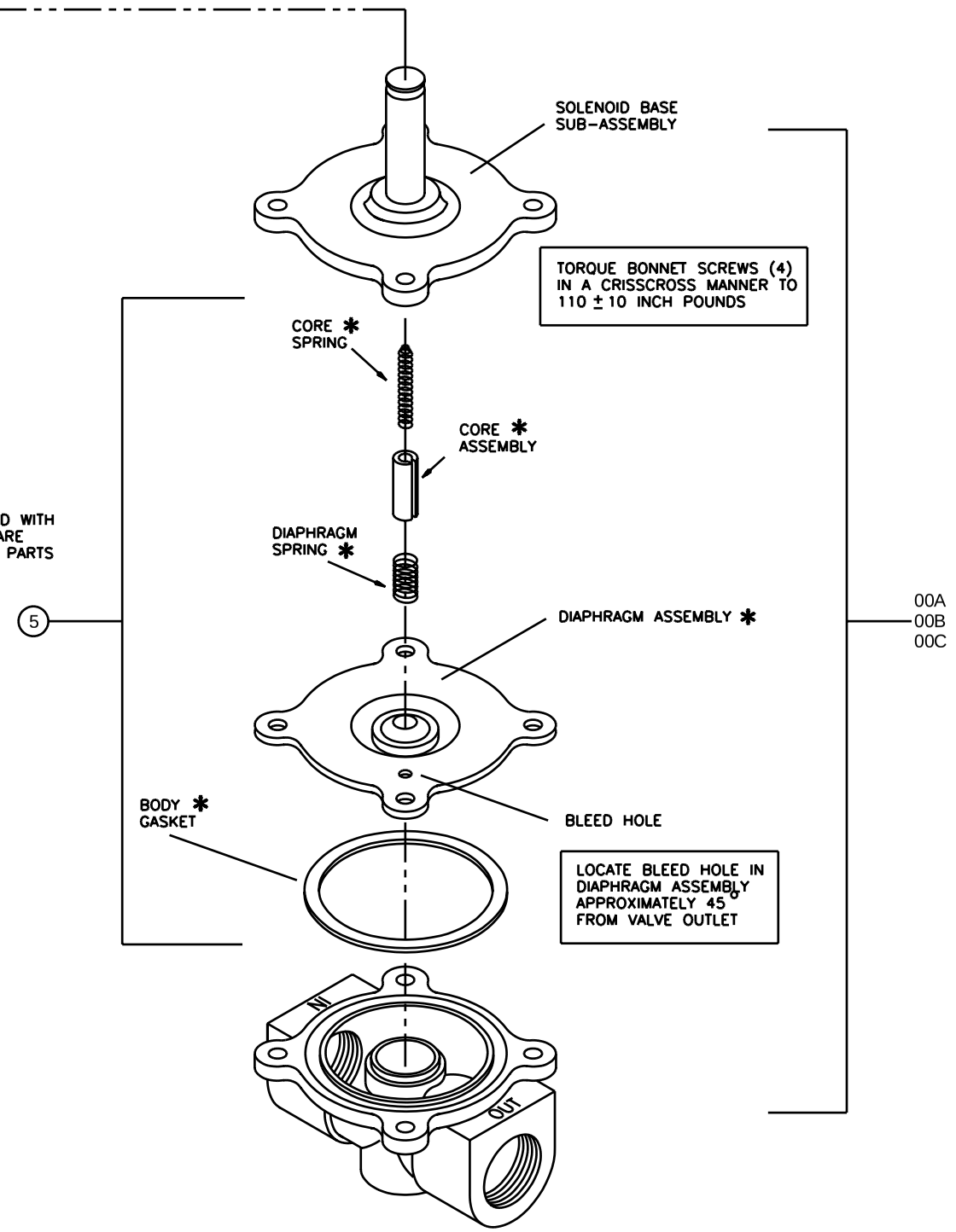
Litho in U.S.A.

157




SOLENOID ASSEMBLY

NOTE:
ONLY PARTS MARKED WITH AN ASTERICKS (•) ARE INCLUDED IN VALVE PARTS KIT, ITEM 4.




VALVE ASSEMBLY

## 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.**

## Maintenance

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

### Coil Replacement

1. Remove retaining clip. NOTE: Whe metal retaining clip disengages, it springs upwards.
2. Slip yoke containg 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. Reassemble in reverse order.

## 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.
**Excess leakage**: Disassemble valve and clean all parts. Replace all worn parts for best results.

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

## Parts List—2-Way Electric Water Valve

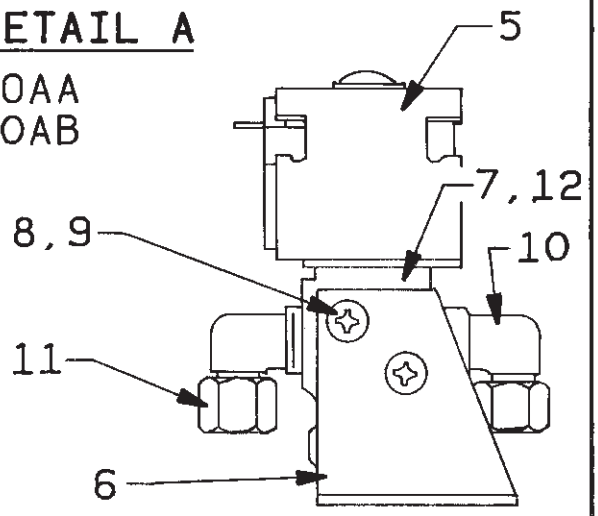
| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| . | | | | |
| | 00A | 96TDC2AA24 | 03Z 1/2” N/C 2WAY 24V50/60C VALVE | VALVE ASSEMBLY |
| | 00B | 96TDC2AA37 | 03Z 1/2” N/C 2WAY 120V50/60C VALVE | VALVE ASSEMBLY |
| | 00C | 96TDC2AA71 | 03Z 1/2” N/C 2WAY 240V50/60C VALVE | VALVE ASSEMBLY |
| | 001A | 96T1001A24 | SOLENOID 24V50/60C ASCO#260283-001 | USED WITH 00A |
| | 001B | 96T1001A37 | SOLENOID 120V50/60C ASCO#260283-002 | USED WITH 00B |
| | 001C | 96T1001A71 | SOLENOID 240V50/60C ASCO#260283-003 | USED WITH 00C |
| | 002 | 96V1001CLP | METAL CLIP M6 | USED IN 00A, 00B, 00C |
| | 003 | 96V1001PLT | NAMPLATE, BLANK REDHAT II COIL M6 | USED IN 00A, 00B, 00C |
| | 004 | 96V1001WSH | STAR WASHER REDHAT II COIL M6 | USED IN 00A, 00B, 00C |
| | 005 | 96V235B | PARTKIT ASCO #K258-120 FOR 8210D2 | REPAIRS 00A, 00B, 00C |

# AIR VALVES & MOUNTING HARDWARE

BMP780087
83457B

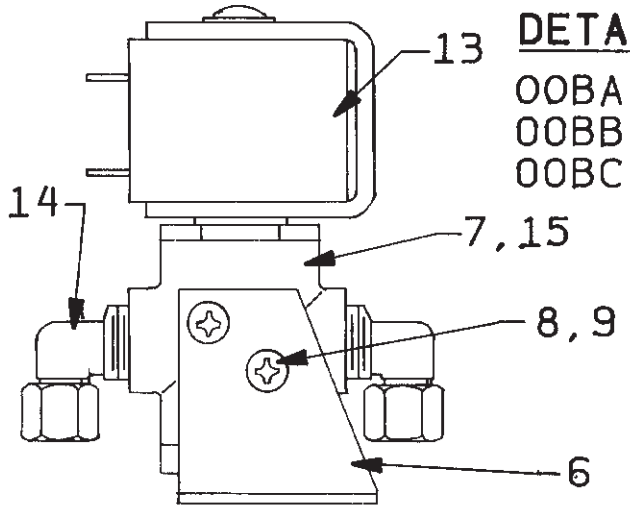
## DETAIL A

00AA
00AB



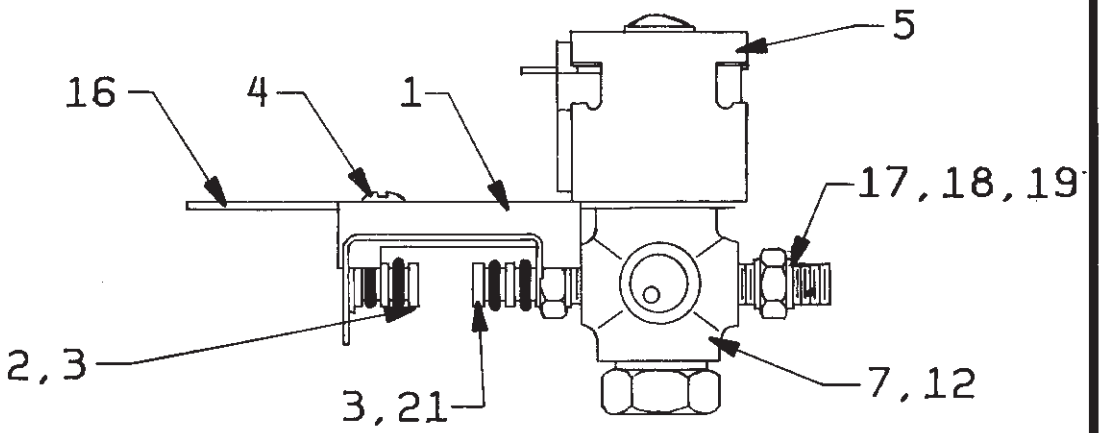

## DETAIL B

00BA
00BB
00BC



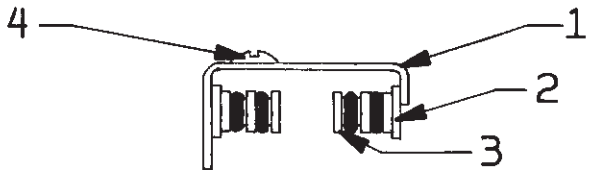

## DETAIL C

00CA
00CB
00CC



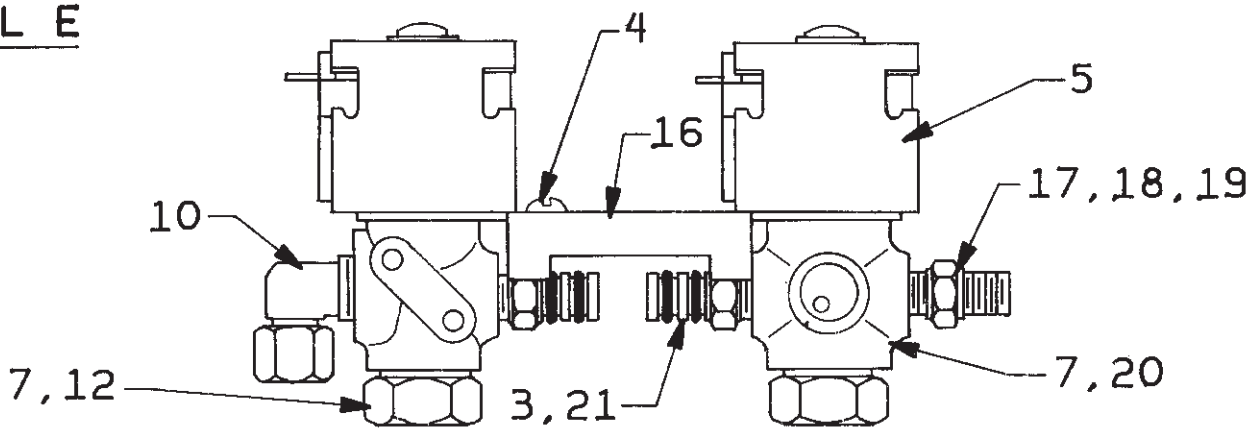

## DETAIL D

00DA




## DETAIL E

00EA
00EB
00EC
00ED
00EE
00EF



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## Parts List—Air Valves & Mounting Hardware

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

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| | | | ASSEMBLIES | |
| | AA | AVA030537 | 78173S ONE 1/8 AIRVALVE REG.AIR120V | |
| | AB | AVA030571 | 84386S ONE 1/8 AIRVALVE REG.AIR240V | |
| | BA | AVA030324 | 79066S1/4"NC24V ASCO AIRVAL+MTG HWD | |
| | BB | AVA030337 | 79066S1/4"NC120VASCO AIRVAL+MTG HWD | |
| | BC | AVA030371 | 79066S1/4"NC240VASCO AIRVAL+MTG HWD | |
| | CA | AVA030224 | 78173S1/8"NC24V ASCO AIRVAL+MTG HWD | |
| | CB | AVA030237 | 84386S1/8"NC120VASCO AIRVAL+MTG HWD | |
| | CC | AVA030271 | 84386S1/8"NC240VASCO AIRVAL+MTG HWD | |
| | DA | AVA0304 | 78136# TWO PLUGS+MTG HWD | |
| | EA | AVA030124 | 78173S TWO 1/8"AIRVALVE+MTG HWD 24V | |
| | EB | AVA030124A | 78182S TWO 1/8AIRVAL+MTG HWD 1-NO | |
| | EC | AVA030137 | 82183S TWO 1/8 AIRVALVE+MTG HWD120V | |
| | ED | AVA030137A | 78182S TWO 1/8AIRVAL+MTG HWD 1-NO | |
| | EE | AVA030171 | 78173S TWO 1/8"AIRVALVE+MTG HWD240V | |
| | EF | AVA030171A | 78182S TWO 1/8AIRVAL+MTG HWD 1-NO | |
| | | | COMPONENTS | |
| all | 1 | 03 01524 | 79177B CHANNEL=PLUG HOLDER | |
| all | 2 | 03 01509 | 77362A PLUG=MANIFOLD PORTS | |
| all | 3 | 60C105 | ORING 1/4 ID 1/16CS BN 70 DURO #010 05Z | |
| all | 4 | 15P105 | TRDCUT-F PANHD 8-32X5/8 NIKSTL | |
| AA,CB,EC, ED | 5 | 96T1001A37 | SOLENOID 120V50/60C ASCO#260283-002 | |
| AB,CC,EE, EF | 5 | 96R300B02 | COIL 220/50SFT-240/60SFT#162-919-26 | |
| EA,EB,CA | 5 | 96T1001A24 | SOLENOID 24V50/60C ASCO#260283-001 | |
| all | 6 | 03 01182B | 78036B ANGLE=SUPPORT AIR VALVE | |
| all | 7 | 03 01538 | 86053B CHANNEL=OIL SHIELD-1/8AIRVAL | |
| all | 8 | 15P101B | TRDCUT-F PANHD 8-32X3/8 | |
| all | 9 | 15U120 | LOCKWASHER MEDIUM #8 ZINCPL | |
| all | 10 | 53A031B | BODY-MAL90ELL1/4X1/8COMPPH#269C-42B | |
| AB only | 11 | 53A032 | MAL90ELL 5/16X1/8POLYFLO #169P-5-2 | |
| all | 12 | 96R300AAM | 78183L*NC VALVEBODY+HARDWARE | |
| BA only | 13 | 96T1002A24 | SOLENOID 24V50/60C ASCO#260283-005 | |
| BB only | 13 | 96T1002A37 | SOLENOID 120V50/60C ASCO#260283-006 | |
| BC only | 13 | 96T1002A71 | SOLENOID 240V50/60C ASCO#260283-007 | |
| all | 14 | 53A031XB | BODY=MAL90EL 1/4X1/4COMP #269C-4-4B | |

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## Parts List, cont.—Air Valves & Mounting Hardware

| Used In | Item | Part Number | Description | Comments |
|---|---|---|---|---|
| all | 15 | 96V350 | 1/4" VALVEBODY ASCO #UFTX8320A89 | |
| all | 16 | 03 01523 | 85096C BRKT=LOCK AIR VALVE | |
| all | 17 | 53A005B | BODY=MALECONN 1/4X1/8COMP #B68A-4A | |
| all | 18 | 53A059 | SLEEVE 1/4" COMP IMP #60F BRASS | |
| all | 19 | 53A059A | NUT 1/4"COMP.HOLYOKE ANDERSON#61A-4 | |
| EB,EC,EF | 20 | 96R300ABM | 78183@*NO VALVEBODY+HARDWARE | |
| all | 21 | 03 01508 | 77362A FITTING-SCREW 7/16 HEX | |

# Quick Exhaust Valves



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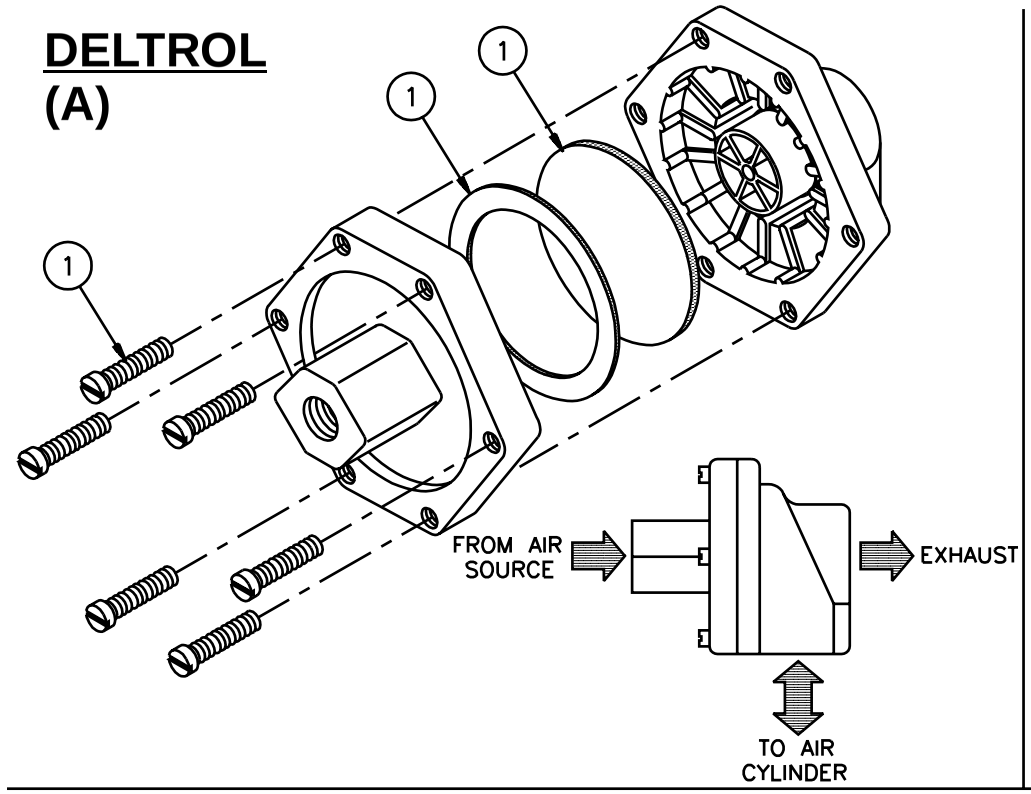
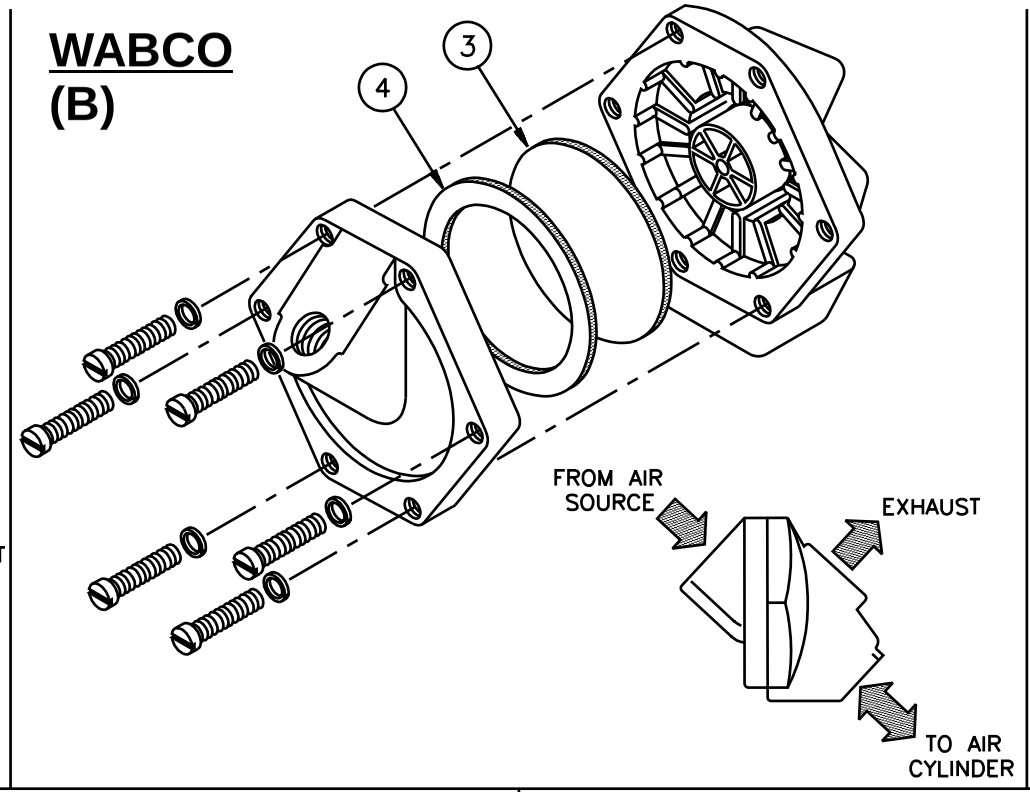
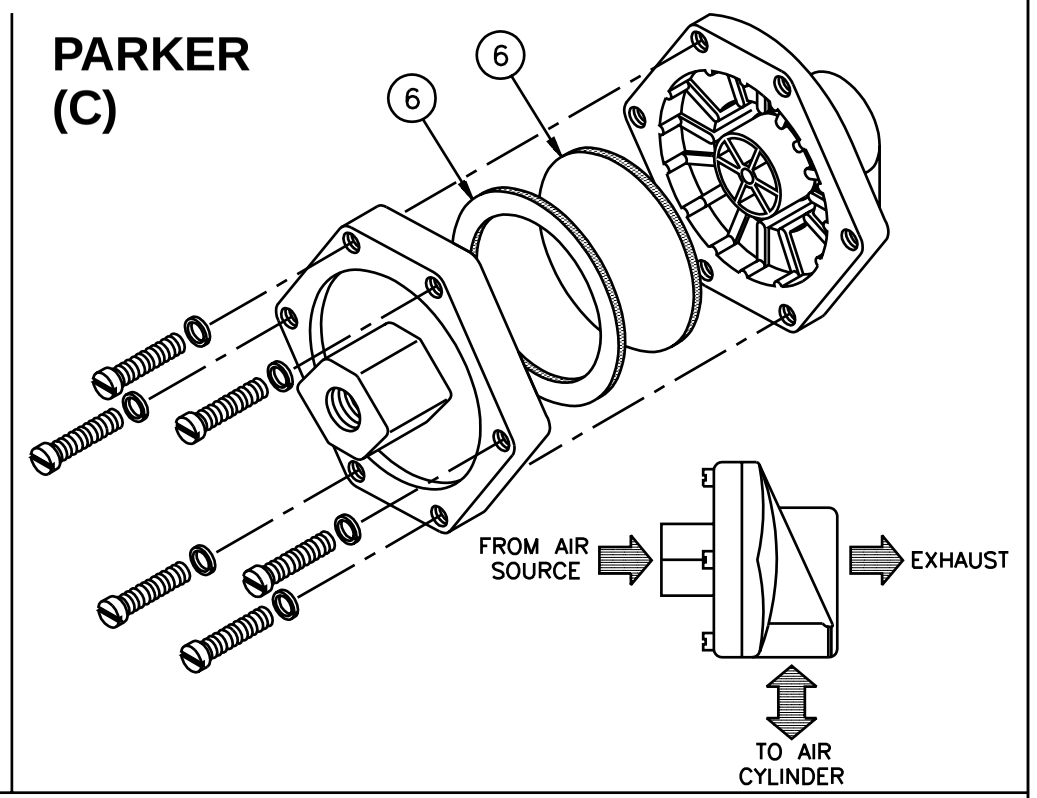
## DELTROL
## (A)




## WABCO
## (B)

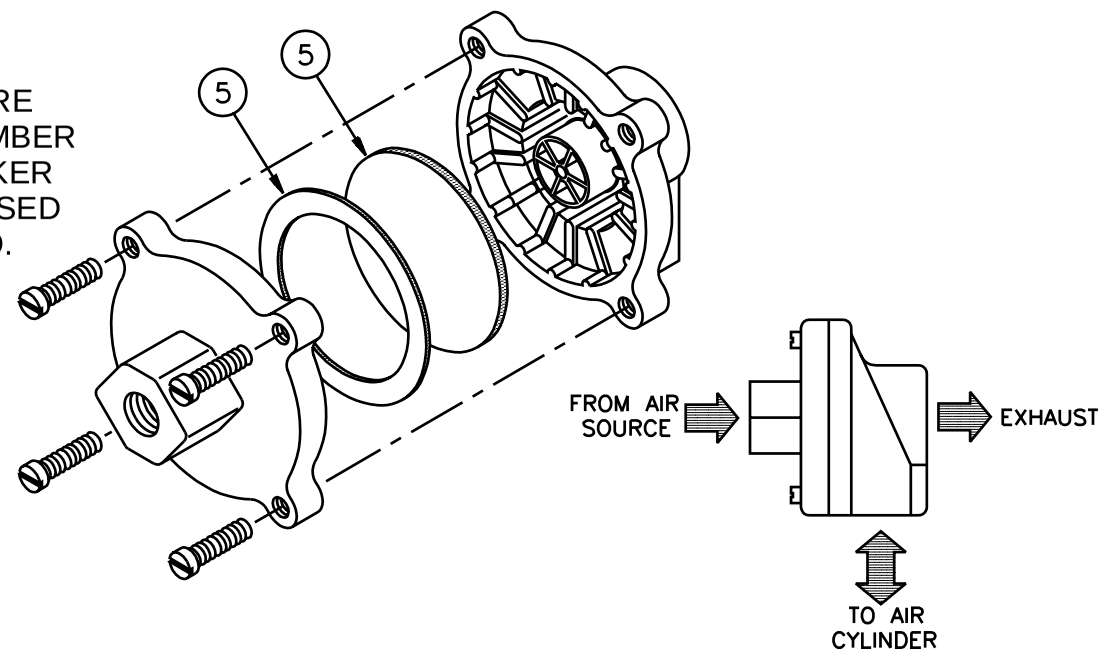



## PARKER
## (C)




## ASCO
## (D)

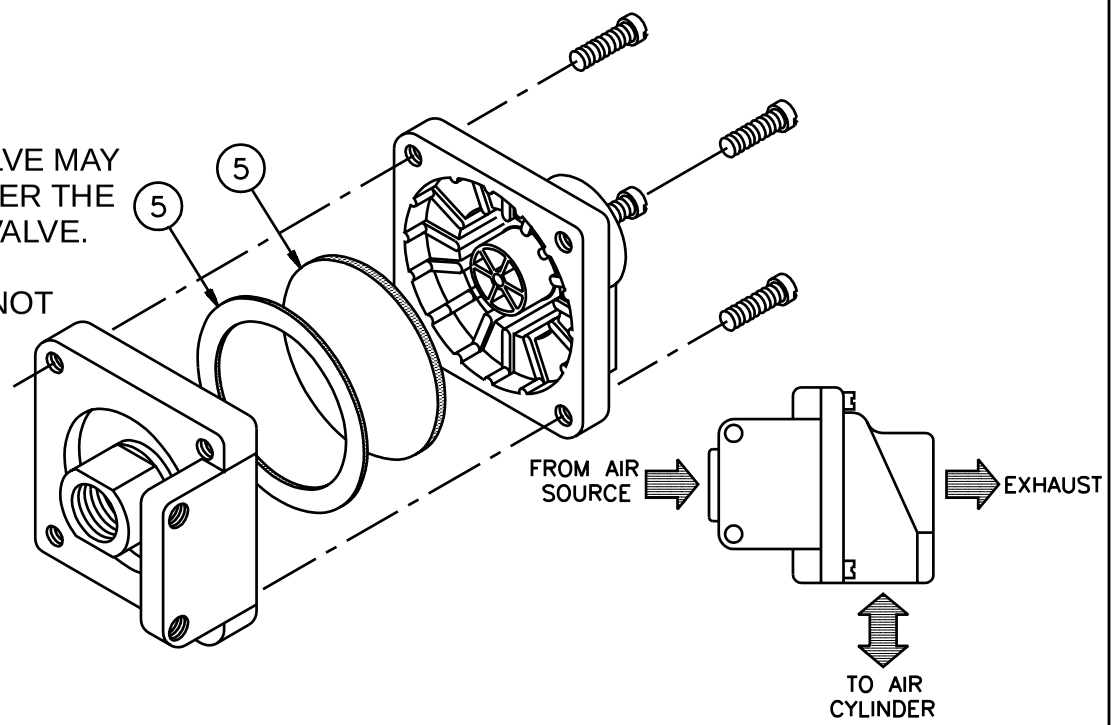
NOTE: ASCO VALVES ARE USED PRIOR TO NOVEMBER 1987. SINCE THEN PARKER VALVES HAVVE BEEN USED IN PLACE OF THE ASCO.




## GOYEN
## (E)

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

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



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## Parts List—Quick Exhaust Valves

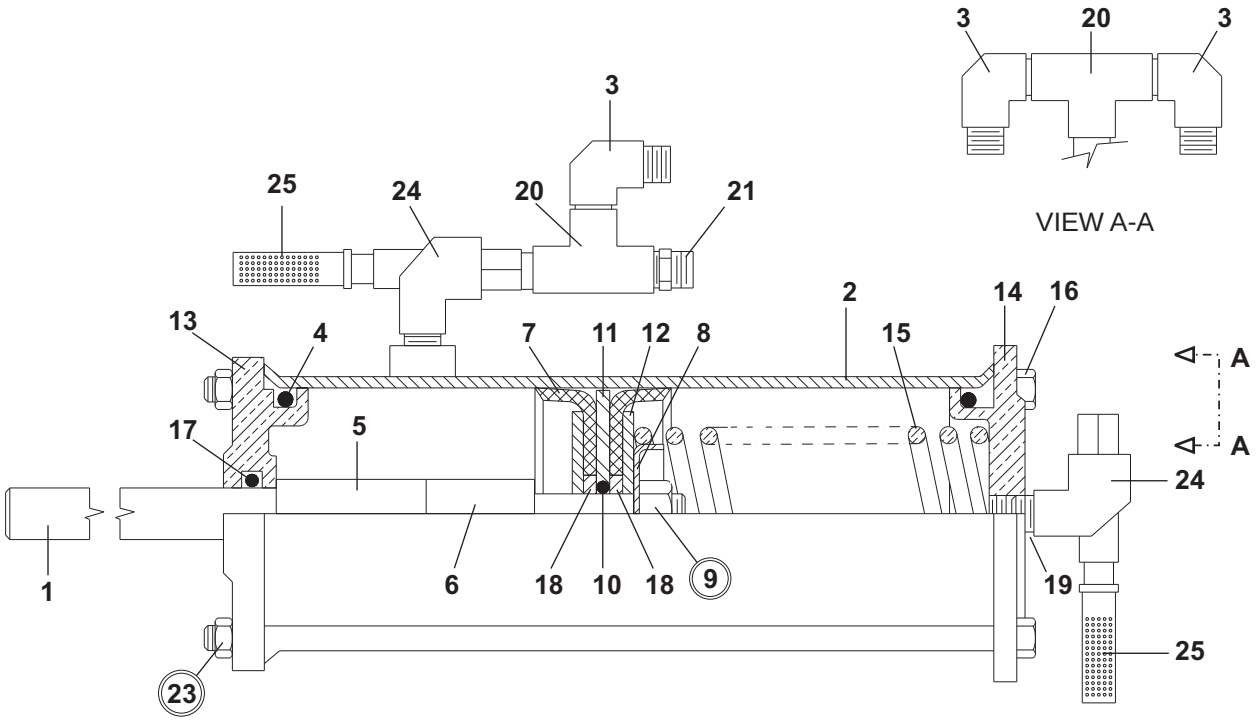
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

| 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 |

# 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 | |