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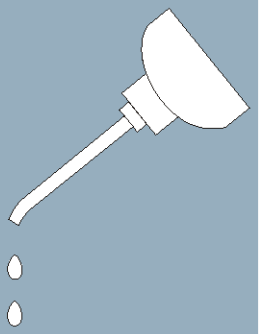
Service

64040/64050E6N Single Motor 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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ABOUT THIS MANUAL

Scope—This instruction manual is intended to provide preventive maintenance procedures, service procedures and mechanical parts identification for all Milnor® 64046, 72046 and 72058 suspended washer-extractors. Measurements are in common US and metric units unless otherwise noted. Always use new fasteners when replacing or repairing parts.

See the appropriate installation manual for facility requirements and machine installation procedures. See the appropriate programming, operating, and troubleshooting manual for information on the control system. See the schematic manual for electrical parts identification and electrical troubleshooting.

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

Documents and Change Bars—The individual documents comprising this manual use the same revision criteria as the manual. Text documents also display change bars. Example: When sectionMSOP0599AE/9135**B**V becomes MSOP0599AE/9135**C**V, change bars with the letter "C" appear next to all changes for this revision. For a major rewrite (e.g., MSOP0599AE/92**26A**V), all change bars are deleted.

For Assistance—Please call:

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

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

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, FOB our factory. We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is 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.

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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 —

Service and Maintenance

1

BIUUUS27 (Published) Book specs- Dates: 20051111 / 20051111 / 20060323 Lang: ENG01 Applic: EOT

Safety—Tilting 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.

WARNING 3: Crush Hazards—Tilting machines only—The machine housing will crush your body or limbs if it descends or falls while you are under it. Housing can descend with power off or on. Manual operation of tilting valves overrides safety interlocks. Improper operation of manual tilting valves may cause the housing to descend.

- Do not remove guards, covers, or panels.
- Do not reach into the machine housing or frame.

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 4: Strike and Crush Hazards—Machines with power operated door—The moving door can strike you or crush or pinch your limbs if caught between the door and machine. Some doors move automatically.

- Keep yourself and others clear of movement areas and paths.
- Keep both hands on the controls while operating.
- Do not operate the machine with malfunctioning two-hand manual controls.

WARNING 5: Crush Hazards—Tilting machines only—The machine can crush your body or limbs if you are caught between the tilting housing and a stationary object. Some machines tilt automatically.

- Keep yourself and others clear of movement areas and paths.
- Keep both hands on the controls while operating.
- Do not operate the machine with malfunctioning two-hand manual controls.

WARNING 6: 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.

DANGER 7: Entangle and Sever Hazards—Contact with goods being processed can cause the goods to wrap around your body or limbs and dismember you. The goods are 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 touch goods inside or hanging partially outside the turning cylinder.
- Do not operate the machine with a malfunctioning door interlock.
- Open pocket machines only—Do not jog the cylinder and pull the goods at the same time.
- Open pocket machines only—Keep yourself and others clear of cylinder and goods during jogging operation.
- Do not operate the machine with malfunctioning two-hand manual controls.
- Know the location of all emergency stop switches, pull cords, and/or kick plates and use them in an emergency to stop machine motion.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.

WARNING 8: 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.
- Open pocket machines only—Keep yourself and others clear of cylinder and goods during jogging operation.
- Do not operate the machine with malfunctioning two-hand manual controls.

WARNING 9: 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 10: 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 11: 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 12: 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 13: 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 14: 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.

WARNING 15: Crush Hazards—Down limit switches (machines with front and rear tilt cylinders)—Failure of both front or both rear limit switches allows the seated tilt wheels on a tilted machine to lift from their cradles. The housing will fall and lunge forward or rearward.

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

5.1.2. Hazards Resulting from Damaged Mechanical Devices

WARNING 16: 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 17: 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 18: 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 19: 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 20: 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 21: 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 22: Crush Hazards—Tilting machines only—The machine housing will crush your body or limbs if it descends or falls while you are under it. Housing can descend with power off or on. Manual operation of tilting valves overrides safety interlocks. Improper operation of manual tilting valves may cause the housing to descend.

- Secure both red safety supports in accordance with the instructions furnished, then lock out and tag out power at the main machine disconnect before working under the tilted machine.
- Do not operate the manual tilt valves with anyone under the machine.
- Do not operate the tilt controls with anyone under the machine.

WARNING 23: Crush Hazards—Tilting machines with front and rear tilt cylinders—The housing will fall and lunge forward or rearward if the tilt wheels on the non-tilted end lift out of their cradles, even with safety supports in place.

- Understand the consequences of operating manually.

WARNING 24: 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 —

How To Use the Safety Stands on E-Style, Hydraulic-tilting Washer-extractors

These machines are provided with four safety stands—two short (which also serve as shipping brackets) and two long— (painted red) for maintenance. After the shell is tilted to the needed position, the appropriate stands are placed under the tilt frame front cross brace. Use the safety stands to perform maintenance on the machine while the shell is raised. Use the long or the short stands as appropriate for the maintenance to be performed.

WARNING 1: Crush Hazard—The safety stands provide protection against the un-powered drifting down of the shell during maintenance in the event of a leak in the hydraulic system.

- Never work **under** the raised shell unless both safety stands are installed and power is locked out/tagged out. Do not work **near** the raised shell with power on unless both safety stands are installed.
- Install these safety components using the procedure prescribed in this document.
- Maintain these safety components in good condition.
- Designate a convenient, secure area to stow these safety components when not in use.

Figure 1: Safety Stands for E-Style, Hydraulic-tilting Washer-extractors (not J2N models)

Install the safety stands as follows:

1. At the controls, tilt the machine as in normal operation. Tilt up only as far as needed to insert the stands securely.
2. Referring to the figure, place the safety stands (long or short, as appropriate) onto their mounting studs on the tilt base. Refer to the safety stands parts drawing for a more detailed depiction of the installed stands. Always use both stands.
3. Bolt each safety stand to the tilt base (four 1/2" bolts per stand).
4. See caution statement **2** below. At the controls, carefully lower the shell just until it is resting on the stands.

CAUTION 2: Machine Damage Hazard—Damage can occur if hydraulic power is applied to the safety stands for an extended time.

- Release the controls as soon as the shell is resting on the stands.

5. Lock out/tag out power to the machine.

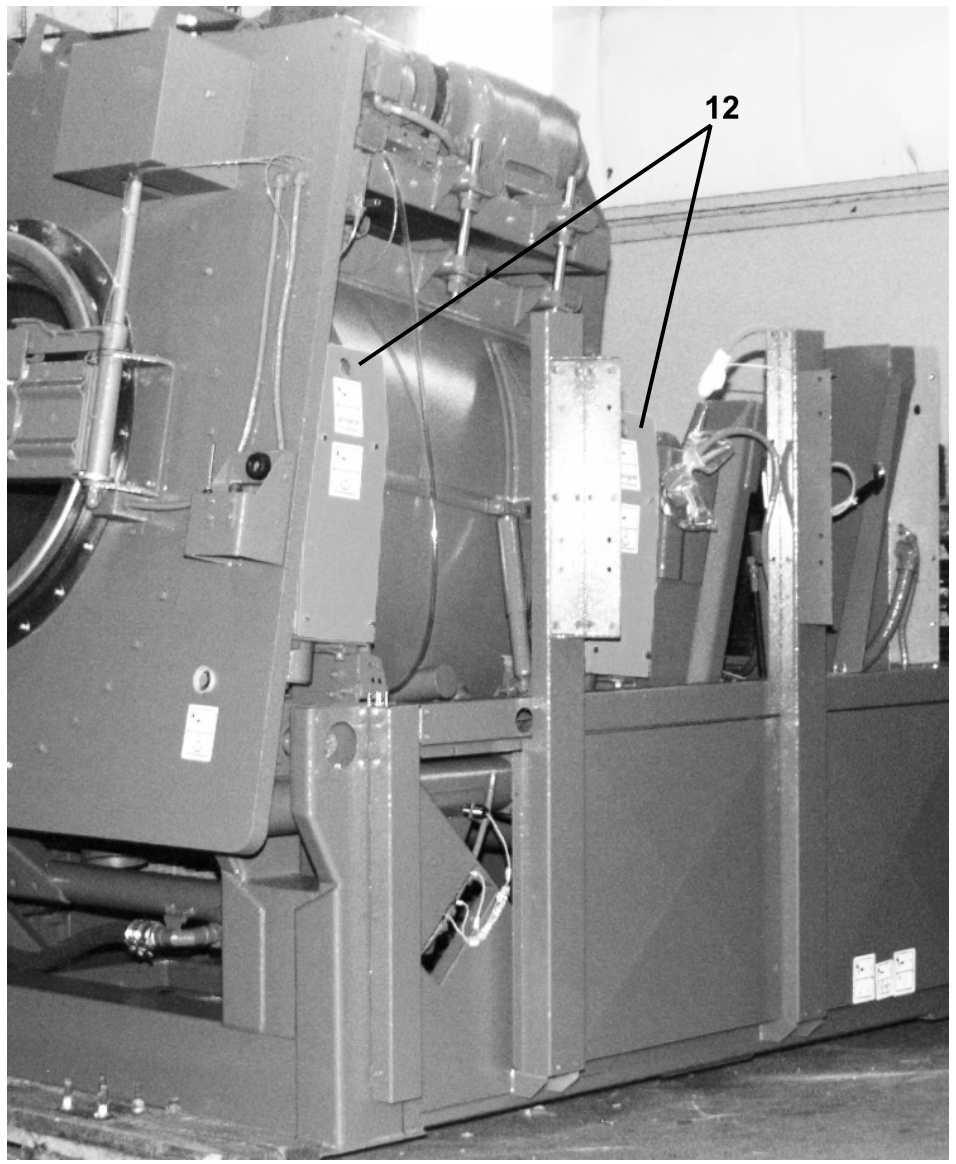
— End of BIUUUS06 —

Shipping Brackets & Safety Stands

64040/64050E6N

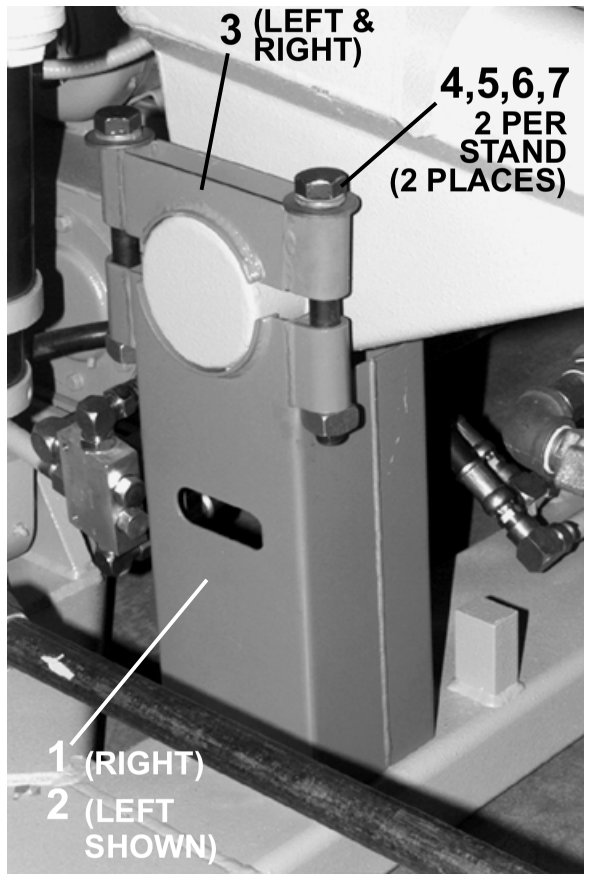
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

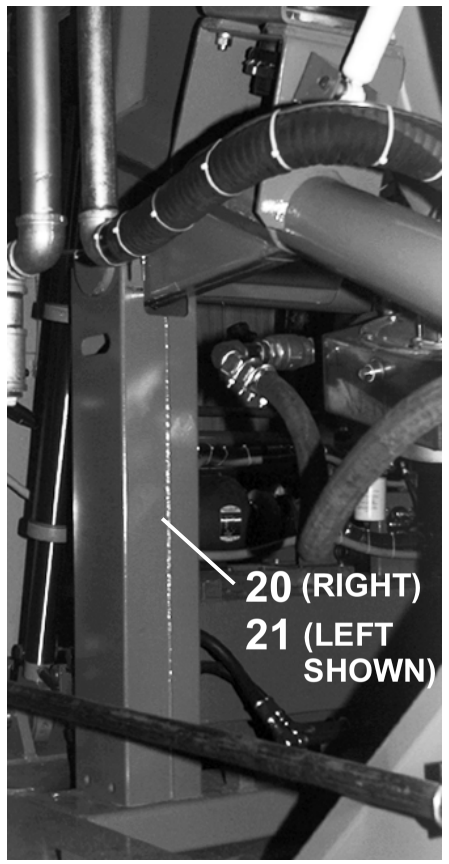


Note:
Tighten all bolts with an impact wrench before shipping.

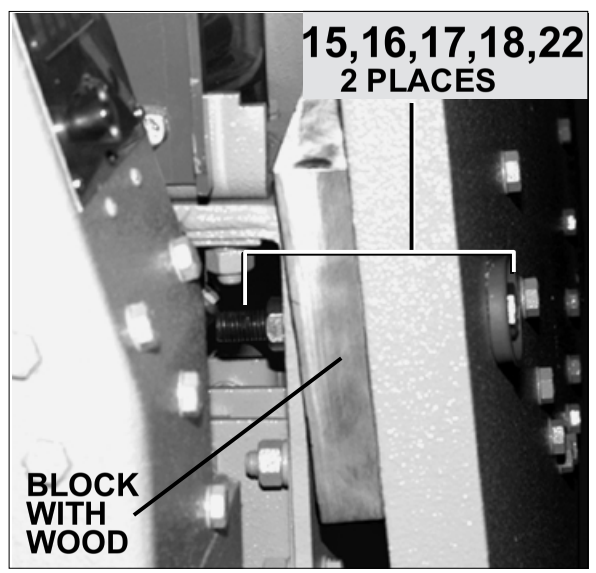
Isolator Shipping Brackets



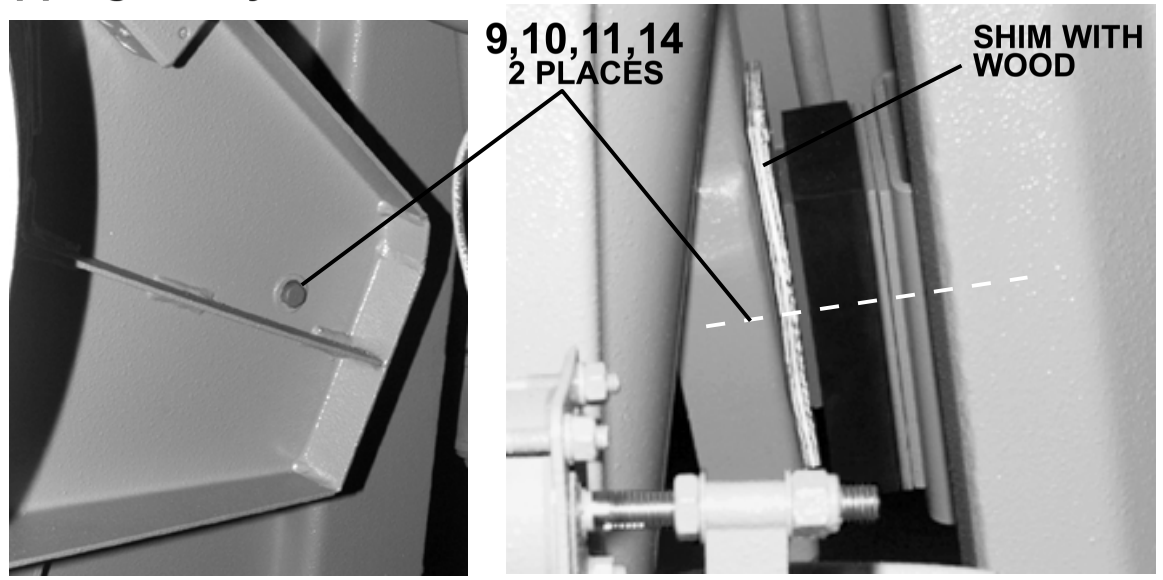
Shipping Safety Stands



Tilt Safety Stands



Shellfront locking bolts



Shellback locking bolts through tilt stops

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

Parts List—Shipping Brackets & Safety Stands

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	GSB65001	93473B INST=SAFTY STANDS + SHIPBRKT	6440/6450E6N
			----------COMPONENTS----------	
all	1	W3 65226D	94243C*WELD=RT SAFTY STND RUN MD2	
all	2	W3 65226E	94243#*WELD=LT SAFTY STND RUN MD2	
all	3	W3 65229	92803C*WLMT=UPPER SAFTY STND RUN	
all	4	15K301	HXCAPSCR 1-8 X 9 GRADE 5	
all	5	15U390P	FLATWASHER(USS STD) 1" ZNC PLT	
all	6	15U400	LOCKWASHER MEDIUM 1" ZINCPL	
all	7	15G255A	SQNUT 1-8UNC2B SAE ZINC GR2	
all	8	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	9	15U280	01Z FL+WASHER(USS STD)1/2 ZNC PL+D	
all	10	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	11	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
A	12	05 58230B	94468C ISO SHIP BRKT W/PICKUP	
all	14	15D119	HXTAPSCR 1/2-13X4 GR5 ZNC FULLTHRD	
all	15	15K235GA	HEXCAPSCREW 3/4-10X6.5" BLACK	
all	16	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	17	15U320	FLATWASHER(USS STD) 3/4" UNPLT	
all	18	15G240	HXNUT 3/4-10UNC2B SAE ZINC GR2	
all	20	W3 65226F	94243D*WELD=RT SAFTY STND UNLD MD2	
all	21	W3 65226G	94243#*WELD=LT SAFTY STND UNLD MD2	
all	22	51P060E	PLUGCAPTAPERD NOTHDPLAS.#68	

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

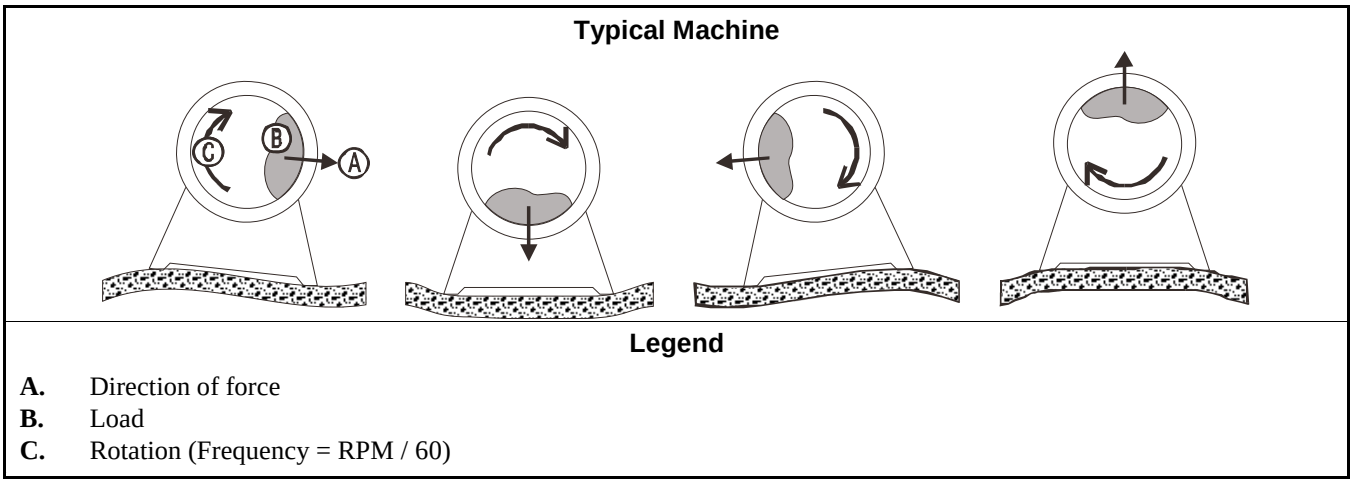


Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available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

Glossary of Tag Illustrations— Suspended Washer-Extractors

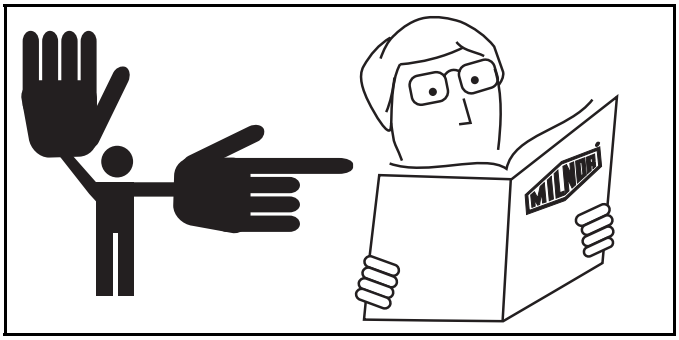
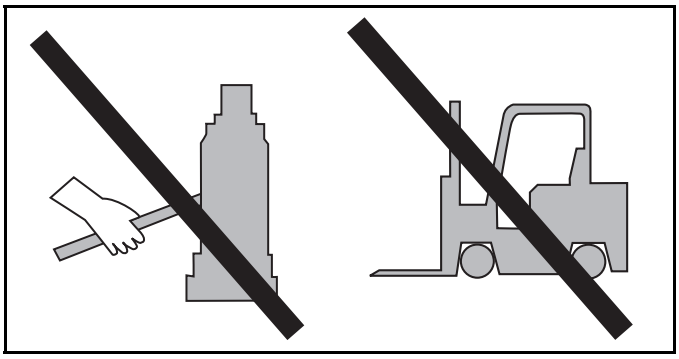
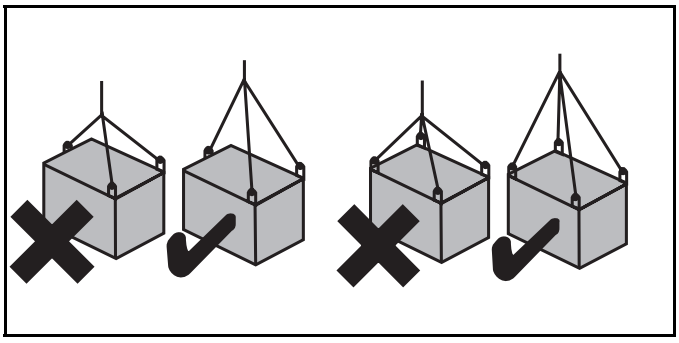
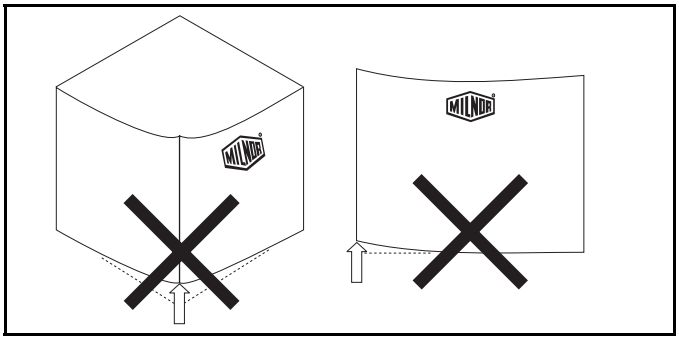
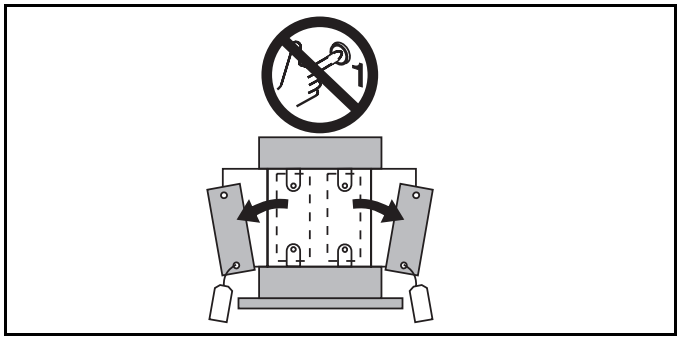
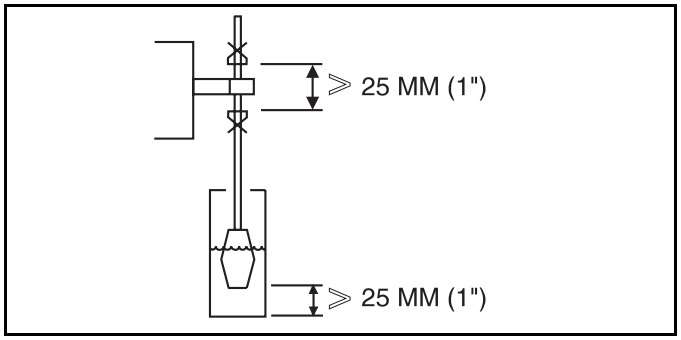
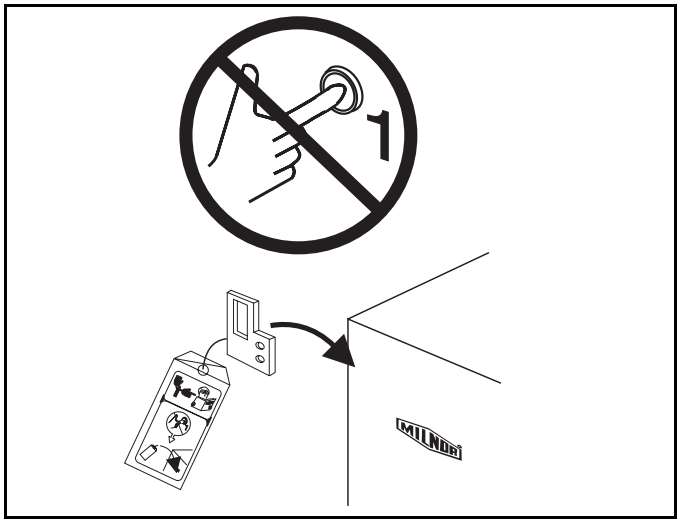
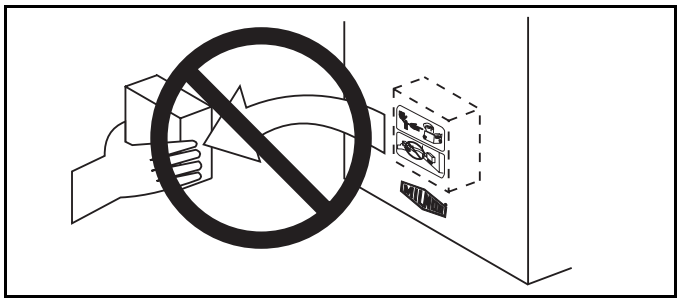
Illustration	Explanation
	Stop! Read the manual first for complete instructions before continuing.
	Do not jack the machine here. Do not lift the machine here.
	Use three point or four point lifting as determined by the lifting eyes furnished. Rig the load using lifting cables of sufficient size and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

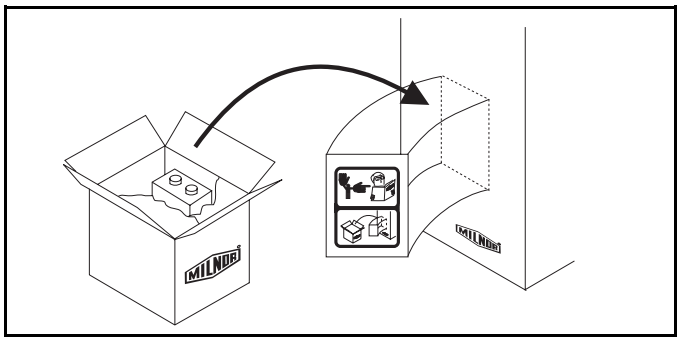
Illustration	Explanation
	Do not start this machine until the packing materials, lifting brackets, etc. with this tag attached or behind this panel are removed. These materials are painted red. Safety stands or brackets (also painted red) may be provided with this machine. Do not discard safety stands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



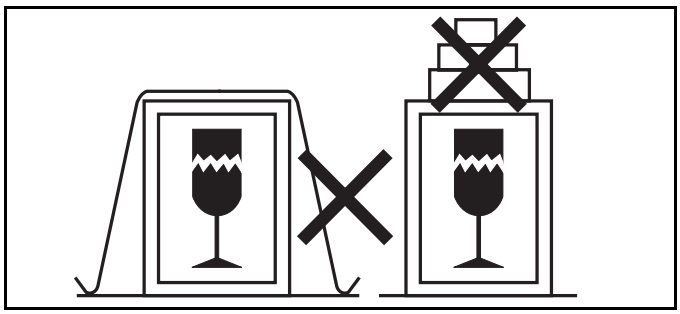
Do not start this machine until the part with this tag is installed on the machine.



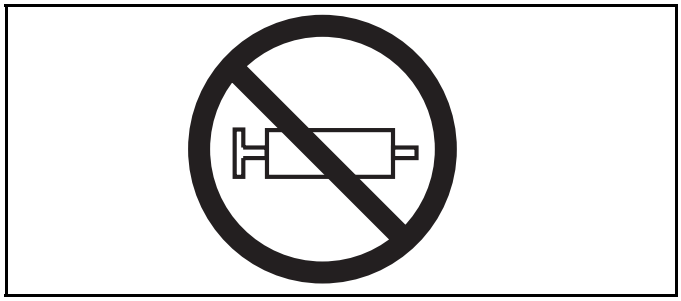
Do not remove this component from the machine.



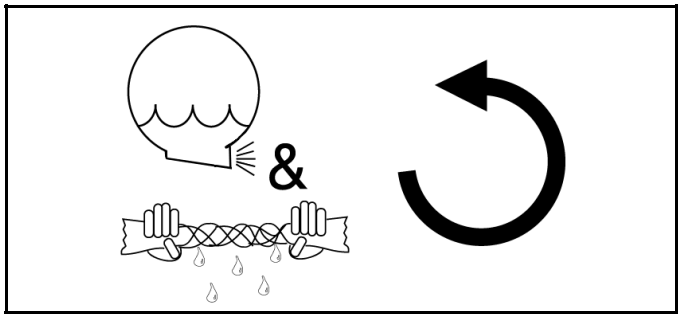
Install the appropriate part here before operating the machine.



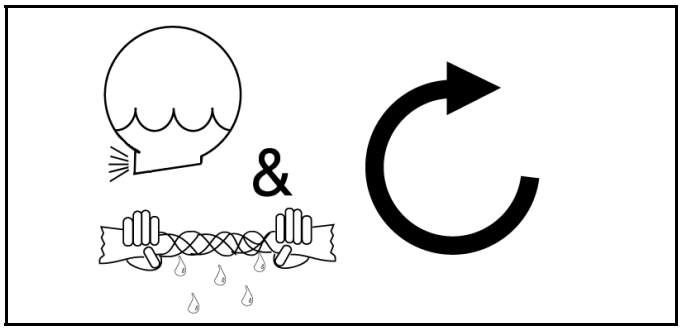
Do not strap or chain over box



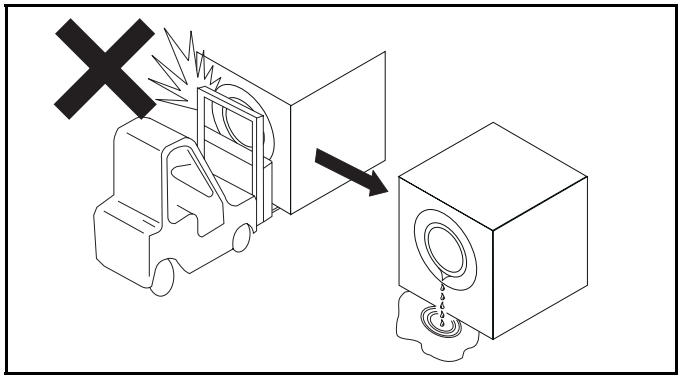
Do not pump grease here.



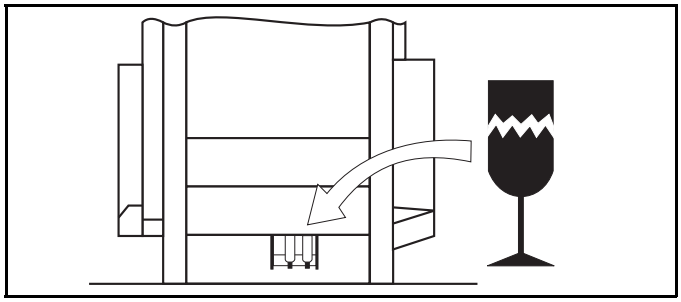
During drain and extract, the cylinder must rotate counterclockwise when viewed from here (rear of machine).



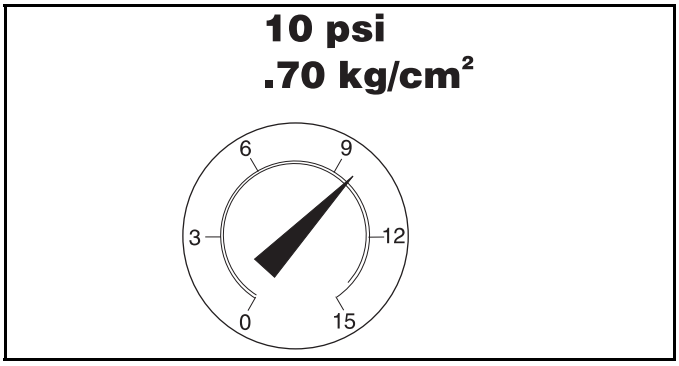
During drain and extract, the cylinder must rotate clockwise when viewed from here (front of machine).



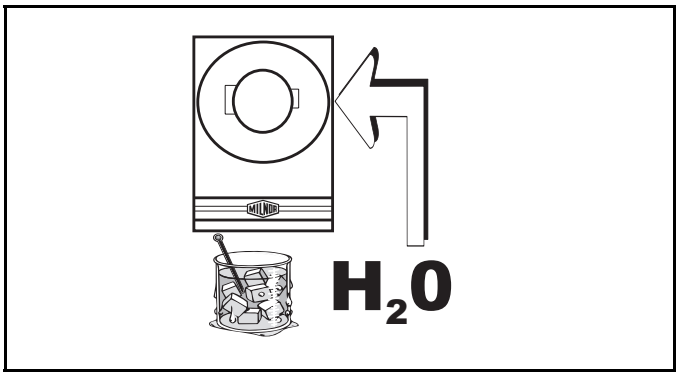
Do not strike shell front of washer-extractors during fork lifting. Striking shell front will cause door to leak.



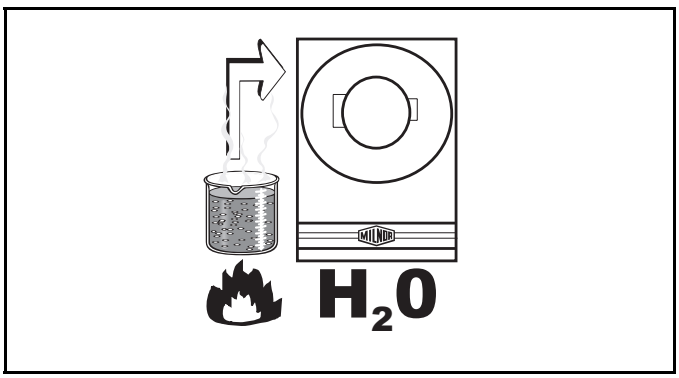
Brake assembly under machine is fragile. Forklift blades should only be placed under main structural beams



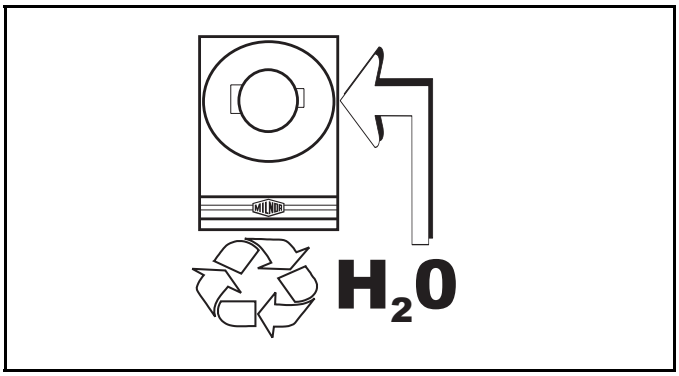
Set main bearing air pad gauge at 10 psi (.70 kg/cm^2), 64" and 72" ExN and JxN models only.
Set disc brake air gauge at 10 psi (.70 kg/cm^2), 64" and 72" ExN and JxN models only.



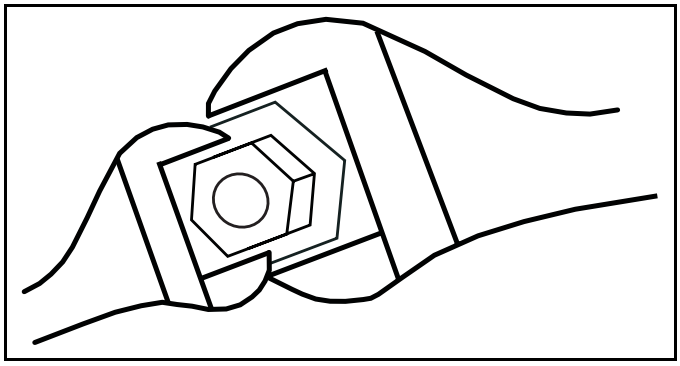
Make cold water connection here.



Make hot water connection here.



Make third (reuse) water connection here.



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

Safety Placard Use and Placement

64040 & 64050E6N

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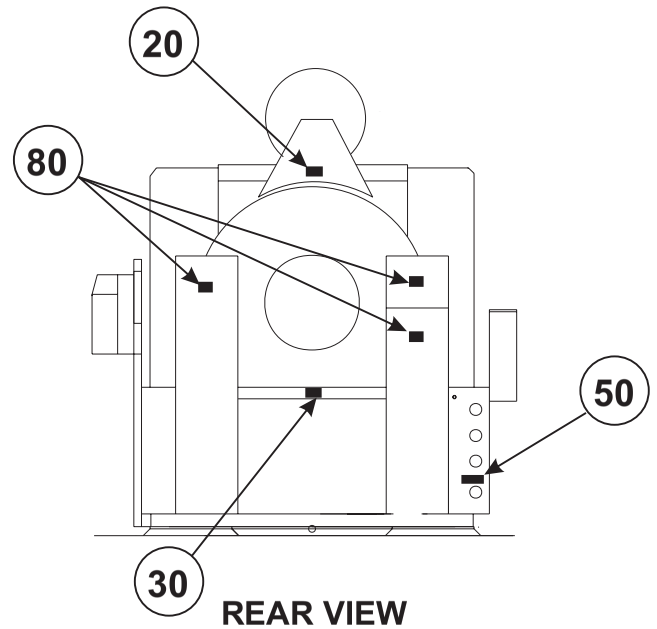
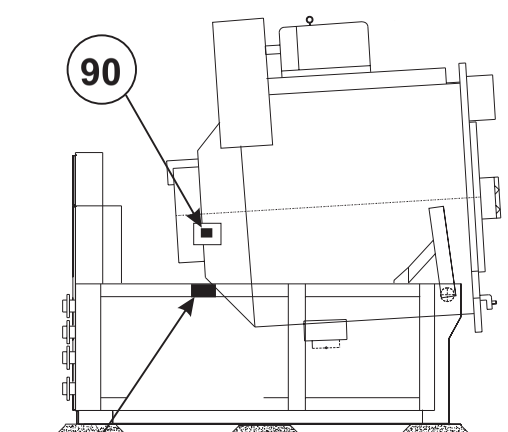
Notes:

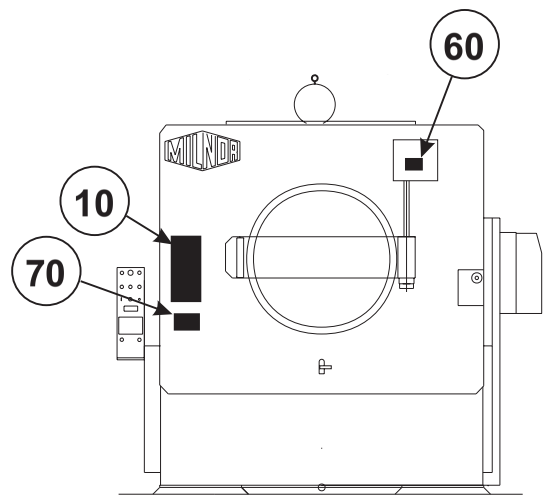
1. **Replace placard immediately, if removed or unreadable.**
2. **Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.**



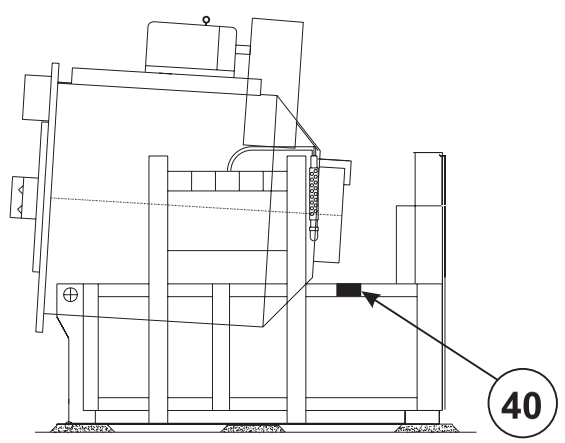
REAR VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

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Parts List—Safety Placard Use and 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 10583A	NPLT:64/72 W/E WARN FRT-TCATA	
all	20	01 10689A	NPLT:BELT HAZARD SM TCATA	
all	30	01 10630A	NPLT:TILT CRUSH HAZARD-TCATA	
all	40	01 10599A	684T:64/72W/E WARNG SIDE TCATA	
all	50	01 10685A	NPLT:BURN HAZARD-TCATA	
all	60	01 10648A	NPLT:GEAR HAZARD -TCATA	
all	70	01 10699A	NPLT:SERV HZRD-PLYEST-TCATA	
all	80	01 10377A	NPLT:ELEC HAZARD LG-TCATA	
all	90	01 10375B	NPLT:ELEC HAZARD SMALL-TCATA	

Safety Placard Use and Placement ISO

64040 & 64050E6N

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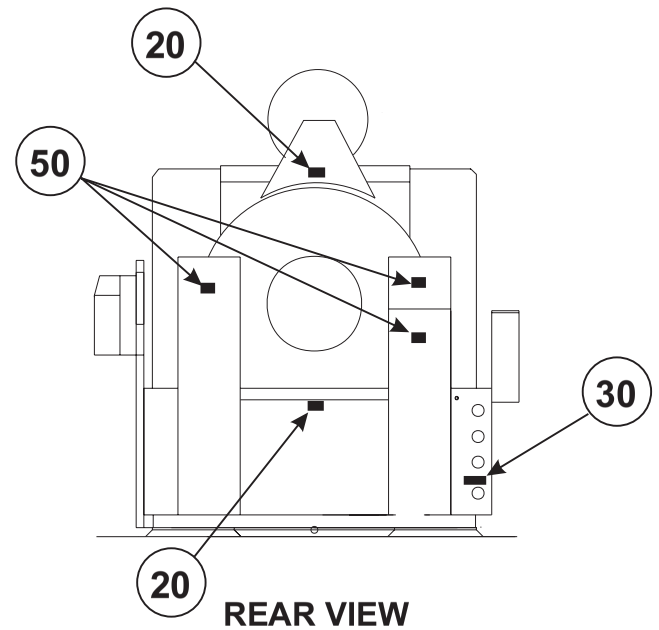
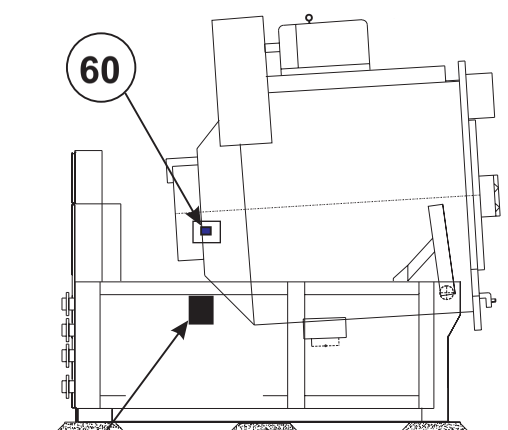
ISO Placards shown on this page

Notes:

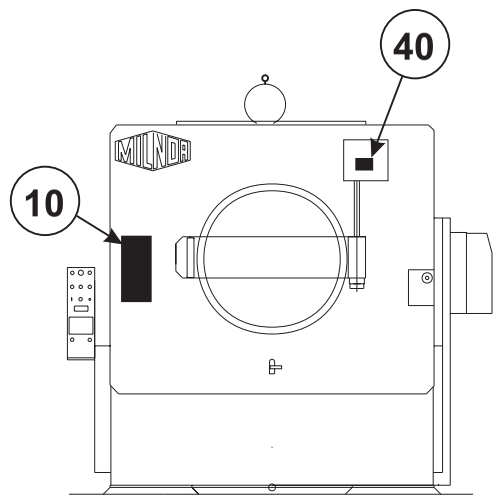
1. **Replace placard immediately, if removed or unreadable.**
2. **Approximate locations of placards are shown. Mounting holes are provided on machine. Use #8 self-tapping screws.**



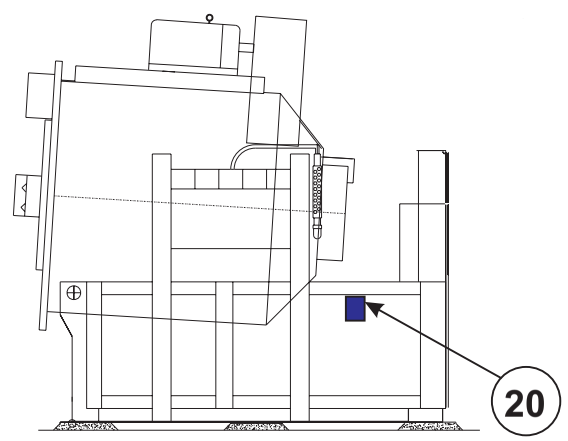
REAR VIEW



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 10583X	NPLT:E-SERIES W/E WARN FR-ISO	
all	20	01 10599X	NPLT:E-SERIES W/E WARN SD-ISO	
all	30	01 10649X	NPLT:HOT BEHIND CVR WARN-ISO	
all	40	01 10648X	NPLT:ACTUATED VALVE WARN-ISO	
all	50	01 10377	NPLTE:"WARNING" 4X4	
all	60	01 10375	NPLTE:"WARNING" 2X2	

Avoiding Damage From Allied Remote Chemical Delivery Systems

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

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

Figure 1: Pumped Chemical Inlets on CBW Batch Washer

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

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

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

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

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

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

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

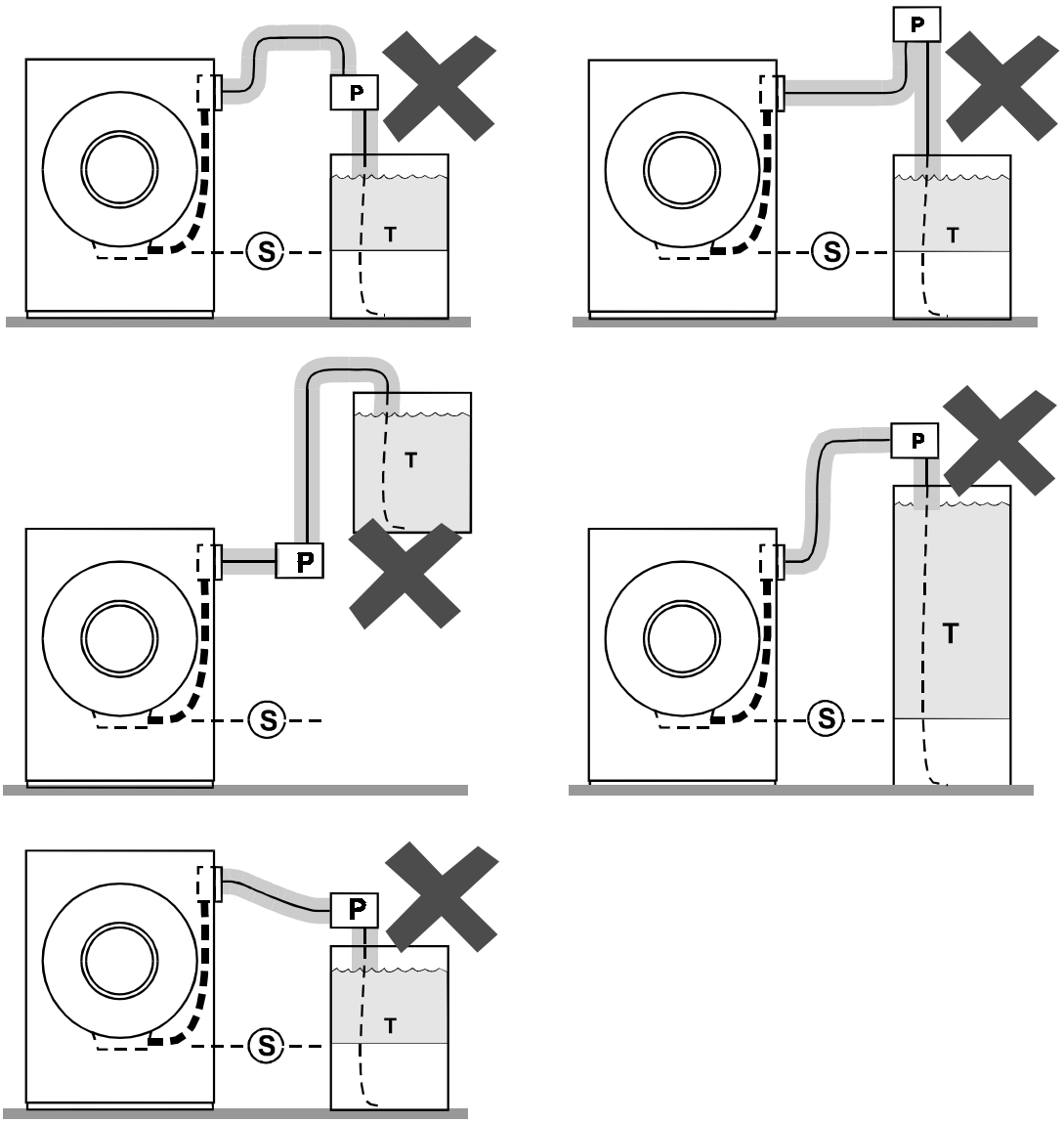
2. Requirements for Chemical Systems Used With Milnor Machines

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

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

Figure 2: Siphoning From the Chemical Tank into the Machine

Examples

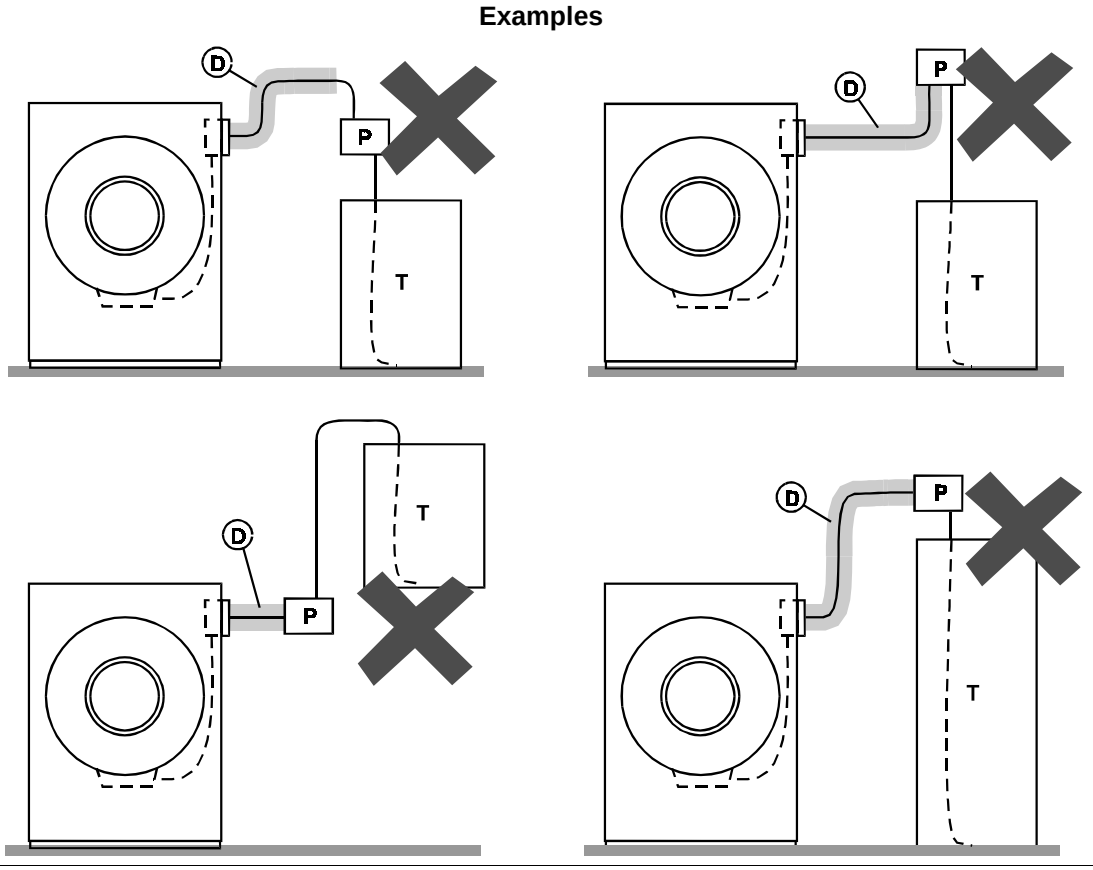


Legend

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

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

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



Legend

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

3. Design and Installation Recommendations

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

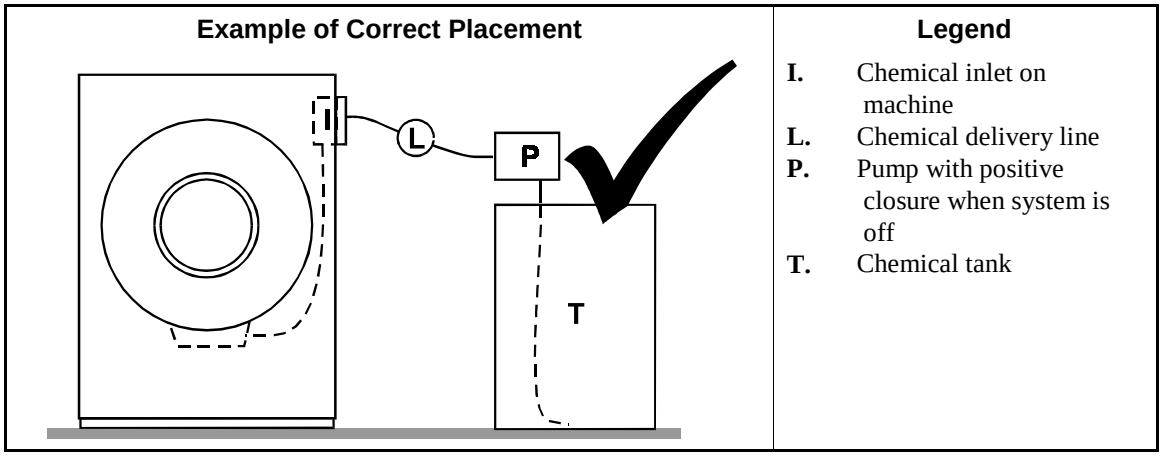
3.1. Siphoning: Positively close the line.—If the pump does not provide positive closure when the system is off, employ a shutoff valve in the line to serve this purpose.

3.2. Siphoning: Break the siphon.—Provide an air gap or vacuum breaker in the chemical delivery line. This must be located above the "full" line of the tank.

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

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

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



4. Guarding Against Leaks

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

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

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

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

— End of BIWUUI03 —

Cosmetic Covers
64040E6N, 64050E6N

BMP990063/2000242V
(Sheet 1 of 2)

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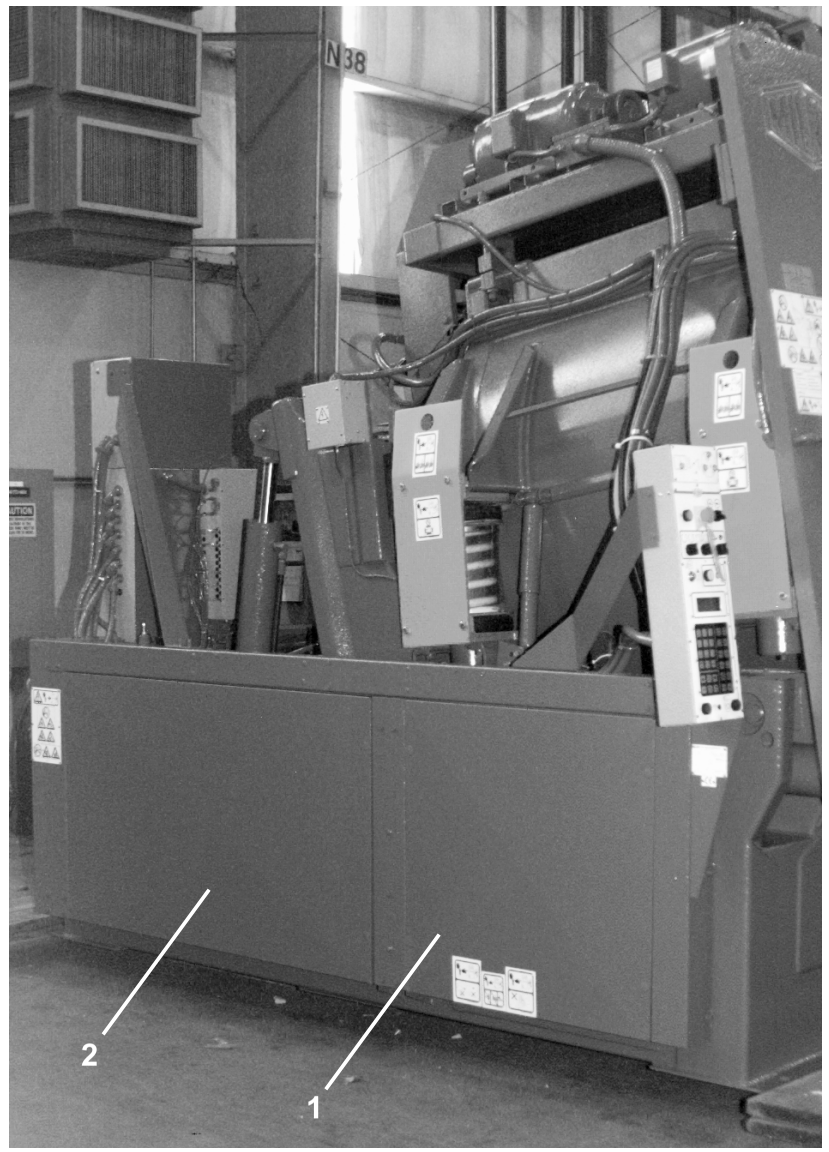
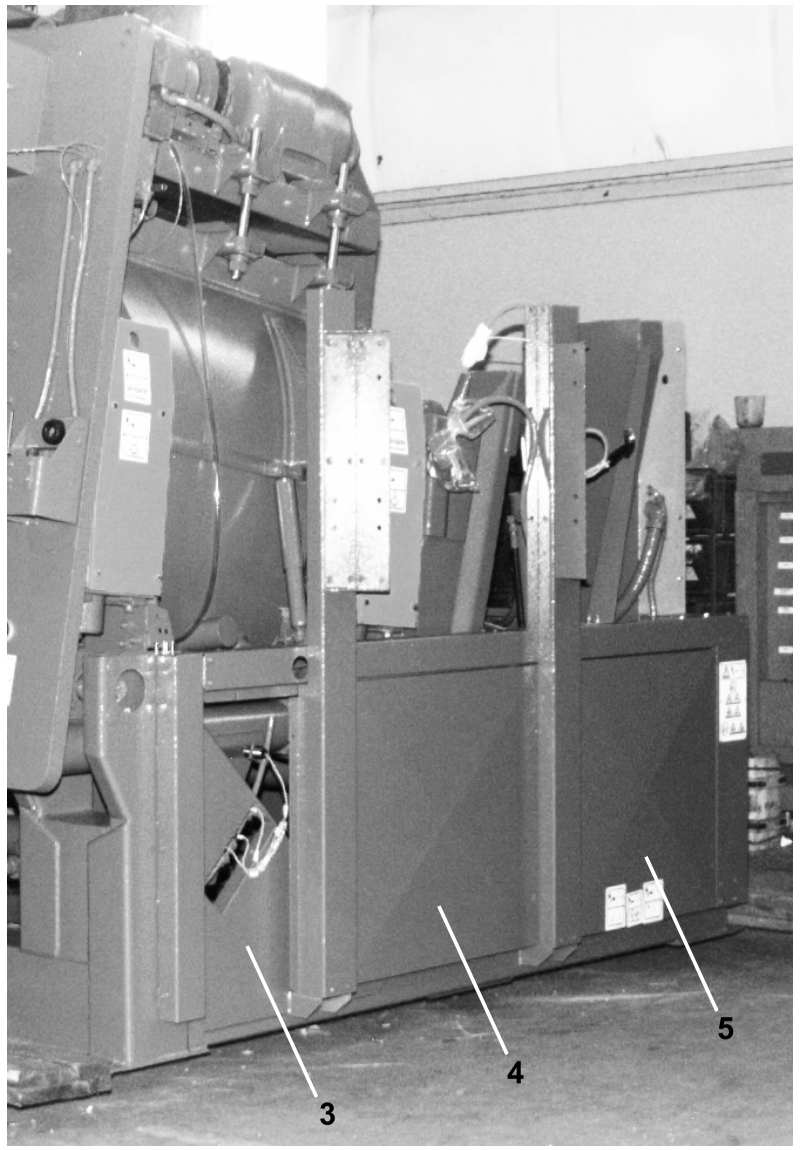
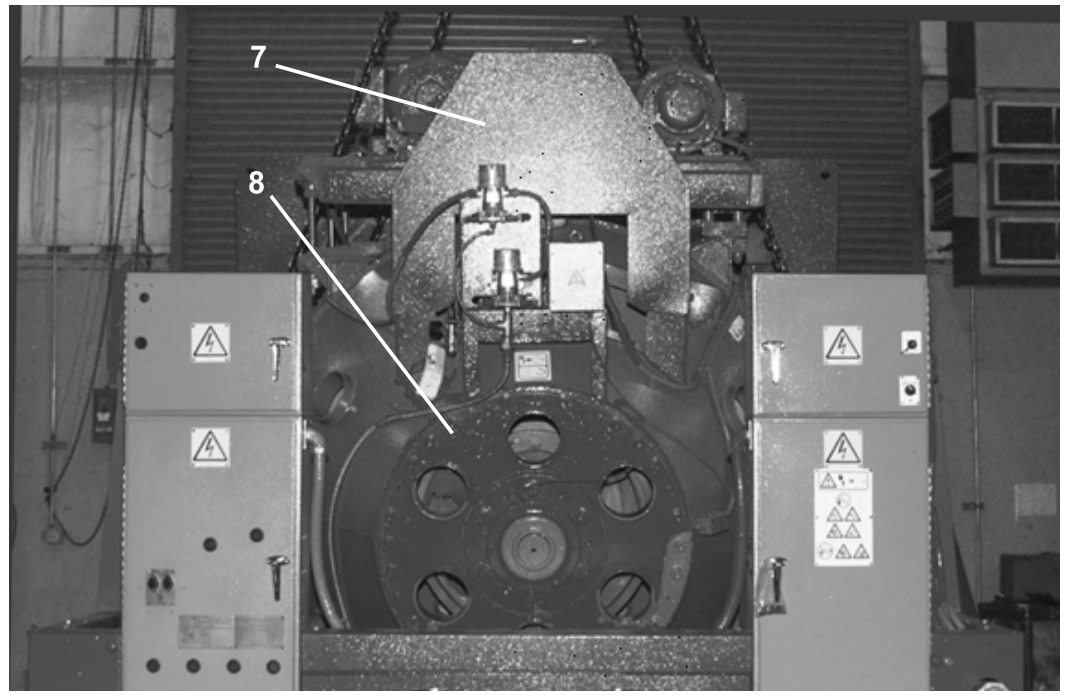
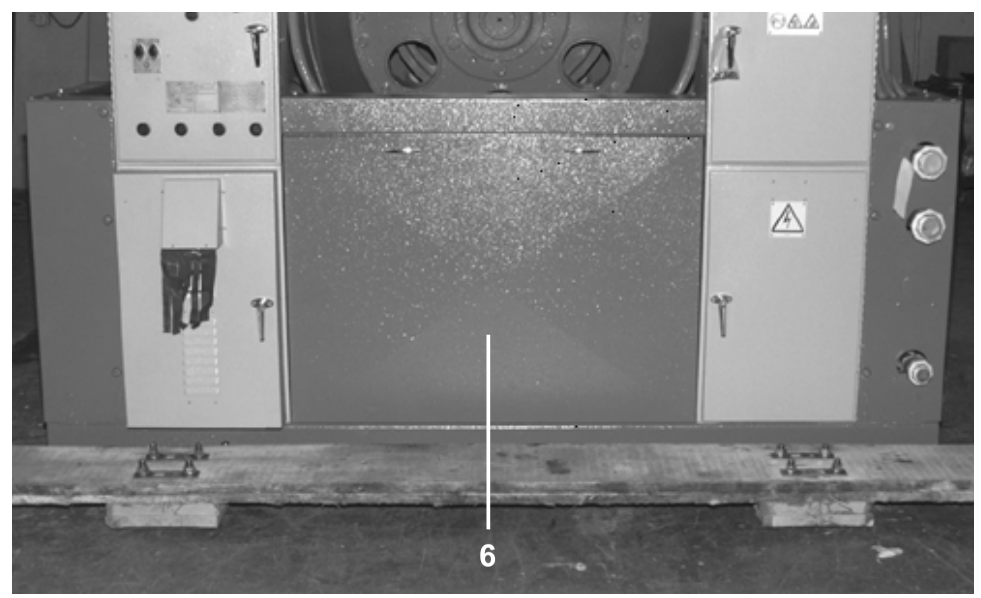








Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
Litho in U.S.A.

Parts List, cont.—Cosmetic Covers

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	GGS60001	INST=COS COVERS 6440	
	B	AGS60009	ASSY=CVRS LEFT SIDE 6440	
	C	AGS60010	ASSY=CVRS SUPPLY SIDE 6440	
	D	AGS60003	ASSY=CVR REAR LOW COS 6440	
			----------COMPONENTS----------	
all	1	03 60334	COVER=6440 LEFT FRONT	
all	2	03 60335	COVER=6440LEFT REAR	
all	3	03 60330	COVRS=6440 SUPPLY SIDE FRNT	
all	4	03 60331	COVRS=6440 SUPPLY SIDE MID	
all	5	03 60332	COVRS=6440 SUPPLY SIDE REAR	
all	6	03 60327	COVER=REAR LOW COS 6440	
all	7	W5 58210E	WLMT=BELT GUARD CVR 72J2 NB	
all	8	W3 65209	*WLMT=DISC BRAKE COVER MOD2	

Lubrication and Preventive Maintenance For 64" and 72"ExN and JxN Models

Follow these schedules, instructions and precautions to achieve optimum performance and service life from your Milnor ™washer-extractors and comply with warranty requirements.

1. Required Equipment

Maintenance procedures require a hand operated grease gun and the specified lubricants.

2. Lubrication Precautions [Document BIUUUM01]

CAUTION 1: Machine Damage Hazard—Improper lubrication can damage machine components and cause the machine to malfunction.

- Do not mix petroleum and synthetic based lubricants.
- Do not use an unspecified lubricant without consulting the lubricant manufacturer.
- Do not apply grease with a pneumatic grease gun. Use only a hand-operated grease gun.
- Do not over-lubricate.
- Always clean grease fittings before adding grease. Clean off excess grease.
- Ensure that lubricants do not drip onto belts, brake shoes or drums.

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.

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

2.1. Pumping Grease—Pump grease slowly, taking 10-12 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.

2.2. Grease Quantity—Apply the 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 oz. (1.77 grams) (by volume) of grease. Therefore, one fluid ounce (28.3 grams) of grease would be provided by 16 stokes of the grease gun. Determine the flow rate of your grease gun by pumping one ounce into a calibrated container. If fewer than 16 stokes 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.

2.3. Lubricant Specifications—Lubricant specifications are provided in the preventive maintenance checklist. Lubricants should be purchased locally. If a specified lubricant is not available locally, it is permissible to substitute a product that has been specified as equivalent by the lubricant manufacturer. If you cannot obtain either the specified lubricant or a valid equivalent locally, contact the Milnor Service Department for assistance.

3. Specified Lubricants

Table 1: Lubricants Table

Assembly	Components	Specifications
Bearing housing	Seals and bearings	Shell Alvania EP or equivalent
Hydraulics	Shell pivot grease fittings, hydraulic cylinder grease fittings, pump	Shell Alvania EP or equivalent
	Hydraulic fluid reservoir	Shell Tellus 68 or equivalent
Motors	Motor bearings	Use Shell Alvania EP or equivalent.
Gear reducer	Gear reducer	Shell Morlina 220
Braking	Brake reservoir	DOT 3 brake fluid or equivalent
Isolators (Figure 4)	Isolator bodies	10W30 (ISO 30-100) motor oil or equivalent
Load door	Locking latches	Door-ease stick lubricant or equivalent
	Gears and hinges	Shell Alvania EP or equivalent

4. Greasing Bearings and Seals

DANGER 3: Entangle and Crush Hazards—Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Power is ON and cylinder is turning during the following procedure. Permit only qualified maintenance personnel to perform this procedure.

Grease seals and main bearing as follows:

1. Locate the seal and bearing grease fittings (Figure 1, item 9).
2. Place the machine in a wash step.
3. With the cylinder turning, grease the seals and bearings as called for on the “Preventive Maintenance Checklist” and “Lubrication Precautions.”

5. Maintenance Checklist

Table 2: Preventive Maintenance Checklist

Components		Action	Frequency (hours of operation)	Figure Number
Pulleys and Belts	Pulley condition and alignment (See Note 1)	Check sheaves for wear and alignment	Monthly (167 hours)	Figure 1
	Belts	Check for wear, replace if required		
Gear Reducer, Motors and Drive Components	Drive gear reducer (if so equipped)	Check level at plug, add oil as required	Semiannually (1000 hours)	
		Change oil (drain valve below)	Annually (2000 hours)	
	Centrifugal switch (if so equipped)	Check brushes for wear, replace as required	Monthly (167 hours)	
	Jack shaft (if so equipped) See Note 2	0.19 ounces (5.31 grams) (three strokes) at two locations	Monthly (167 hours)	
	Motor(s)	See "BALDOR MOTOR MAINTENANCE...MSSM0274AE" in this manual.		
	Air clutch quick release valve (if so equipped)	Change internal diaphragm	Annually (2000 hours)	
Bearing Housing	Front bearing grease fitting (Note 2)	Slowly grease: 0.62 ounces (17.7 grams), ten strokes at one location	Monthly (167 hours)	
	Rear bearing grease fitting (Note 2)	Slowly grease: 0.31 ounces (8.8 grams), five strokes at one location		
	Seal grease fitting (except J2N)	Slowly grease: 0.19 ounces (5.31 grams), three strokes at one location		
	J2N seal grease fitting	Slowly grease: 0.19 ounces (5.31 grams), three strokes at one location	Weekly (40 hours)	
	Main bearing air pad gauge	Verify pressure: 10 psi (0.70 kg/sq.cm)	Monthly (167 hours)	
	Water seals and leak-offs	See "Flushing water seals and leak-offs...MSSM0271AE" in this manual	Semiannually (1000 hours)	
Brake Components	Reservoir (if so equipped)	Check levels, add fluids if required	Monthly (167 hours)	Figure 2
	Pad/Shoes	Check for wear, replace if required		
Hydraulic Components	Hydraulic cylinders	Slowly grease: 0.12 ounces (3.54 grams) (two strokes) at two locations	Monthly (167 hours)	Figure 1

Components		Action	Frequency (hours of operation)	Figure Number
	Shell pivot	Slowly grease: 0.12 ounces (3.54 grams) (two strokes) at two locations	Monthly (167 hours)	
	Shell stop(s)	Check for wear, replace if required	Semiannually (1000 hours)	
	Line pressure (E6N and J5N machines)	Check pressure while machine is tilting to the load position 900-1000 PSI (62-69 bar) E6N and J5N machines	Daily (8 hours)	Figure 3
	Filter	Replace	Semiannually (1000 hours)	
	Filter pressure	Check pressure while machine is tilting to the load position 30-60 PSI (2-4 bar)	Daily	
	Pump motor	Slowly grease: 0.12 ounces (3.54 grams) (two strokes) at two locations	Semiannually (1000 hours)	
	All hoses/couplings	Check for leaks, cracks and bulges	Monthly (167 hours)	
	Reservoir level	Check level with machine tilted to the load position. Add if below black mark on gauge	Daily (8 hours)	
		Have oil tested by a reputable testing facility. Tests should include viscosity, the presence of insolubles, acid number and spectrographic wear analysis. Retain or replace oil as advised by the testing facility.	Annually (2000 hours of operation)	
Shocks and Isolators	Isolators	Check oil level	Quarterly (500 hours)	Figure 4
		Replace oil	Annually (2000 hours)	
	Shocks	Check for leaks, replace as required (four locations)	Semiannually (1000 hours)	
	Isolator cushions	Check cushions for cracks and deterioration (eight locations)	Monthly (167 hours)	
Doors	Gears	Lubricate	Monthly (167 hours)	Figure 5
	Hinges	0.12 ounces (3.54 grams) (two strokes) at three locations		
	Locking latches	Lubricate (two locations)		
Water	Cooldown water adjustment	Adjust as required	Monthly (167 hours)	Figure 6
Water	Water pressure regulator	Check water pressure (28 PSI) when there is no flow of flushing or balancing water	Monthly (167 hours)	Figure 7

Components		Action	Frequency (hours of operation)	Figure Number
Inverter	Enclosure, screen and fan	Vacuum out enclosure, clean screen and verify fan operation	Weekly (40 hours)	Figure 8
	Inverter vents	Vacuum out vents		Figure 9
Recirculation (if so equipped)	All recirculation hoses and couplings	Check for leaks, cracks and bulges	Monthly (167 hours)	Figure 10
	Door hose	Replace door hose every 6 months or 840 hours, whichever occurs first.	Semiannually	

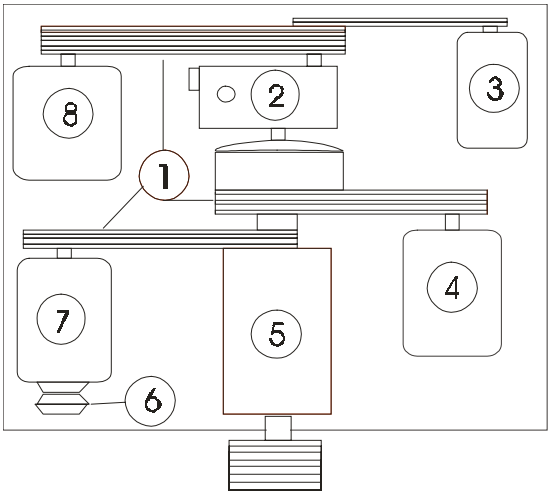
Note 1: See "Tensioning and Aligning Main Drive Belts...BIIEUM01" in this manual.

Note 2: Main bearings and jack shaft bearings (if equipped) are pre-packed with lubricant at the factory. Do not grease for 30 days. Some grease will ooze out of the grease relief fittings during the first month of operation and every time the bearings are re-lubricated. These fittings avoid overheating by permitting excessive grease to escape. The escaping lubricant does not have to been replaced. Bearings run hot enough to be uncomfortably warm to the touch. This is normal.

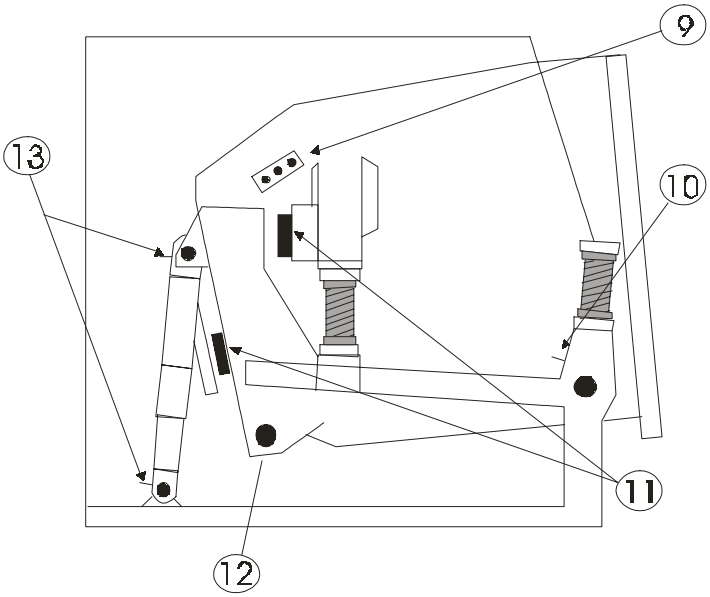
6. Maintenance Points

Figure 1: Motor Platform, Hydraulic Cylinder, Shell and Suspension Maintenance Points

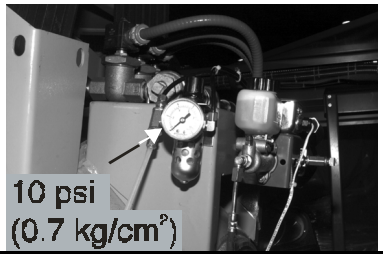
Motor Platform (four motor platform shown)



Hydraulic Cylinder and Shell Maintenance Points



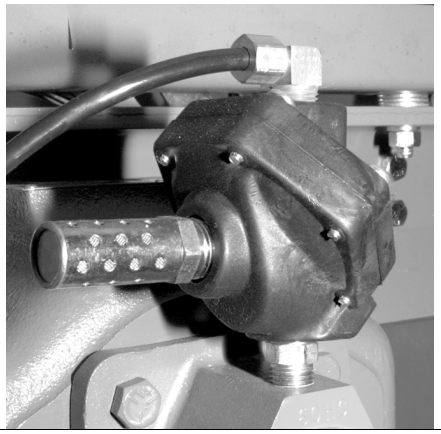
Main Bearing Air Pad



Legend

1. Check pulley sheaves and belts for wear and alignment
2. Gear reducer level plug (drain below)
3. Drain motor grease points
4. Low extract motor grease points
5. Jack shaft grease fittings (Note 2)
6. Centrifugal switch (if so equipped)
7. High extract motor grease fittings
8. Wash motor grease fittings
9. Seal and bearing grease fittings
10. Shell pivot grease fittings (two locations)
11. ExN and J5N shell stops (four locations)
12. J2N shell stop (if equipped)
13. Hydraulic cylinder grease fittings

Air Clutch Quick Release Air Valve (if equipped)



J2N Shell Stop

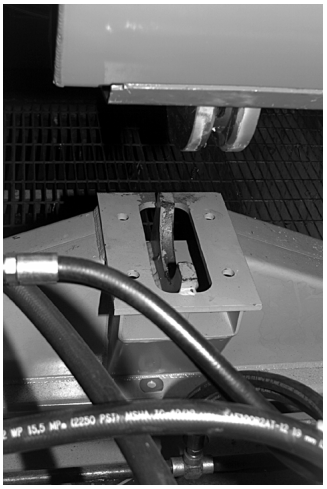
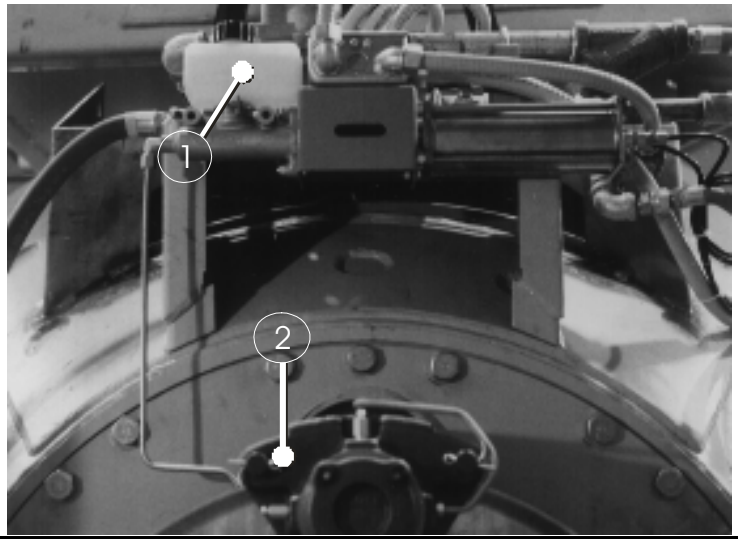


Figure 2: Brake Components

Brake Reservoir and Pads (E6N and J5N machines only)

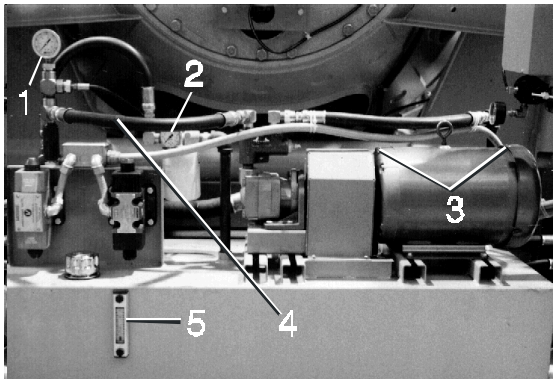


Legend

1. Brake reservoir
2. Brake pads

Figure 3: Hydraulic System Maintenance Points

E6N and J5N Hydraulic System



J2N Hydraulic System

Legend

1. Line pressure gauge (E6N and J5N)
2. Filter and filter pressure gauge
3. Pump grease fittings (two locations)
4. Hoses and couplings (throughout machine)
5. Reservoir level

Figure 4: Isolators and Shocks

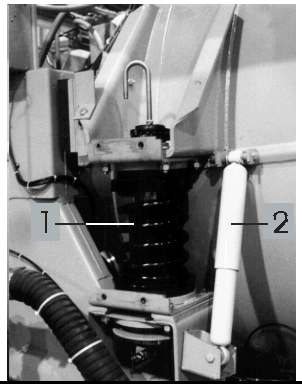
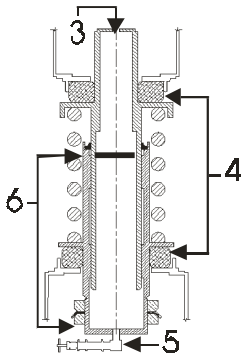
E6N and J5N Isolators and Shocks	Isolator Details	Legend
		**1.** Isolators (four locations) **2.** Shocks (four locations) **3.** Remove vent and check or add oil here **4.** Cushions (8 locations) **5.** Drain **6.** Oil Level 11-12" (279-305) above bottom of isolator

Figure 5: Door Maintenance Points

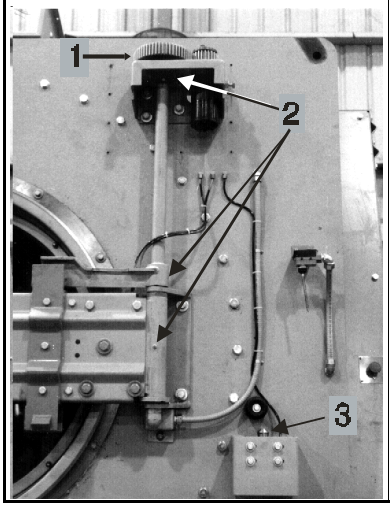
Gears, hinge and locking latches	Legend
	**1.** Gears **2.** Hinge grease fittings (three locations) **3.** Locking latches (two locations)

Figure 6: Cooldown Vernier Valve

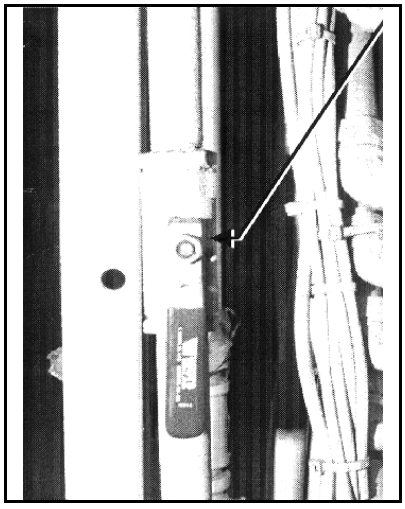


Figure 7: Water Pressure Adjustment

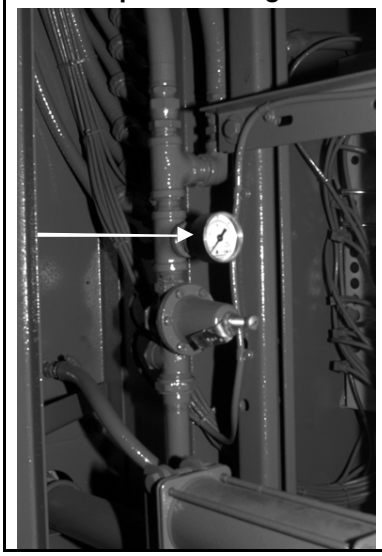
Water pressure regulator	Legend
	**Use hot water if it is available.** Set pressure regulator for 28 psi when there is no flow of flushing or balancing water.

Figure 8: Inverter Enclosure, Screen and Fan

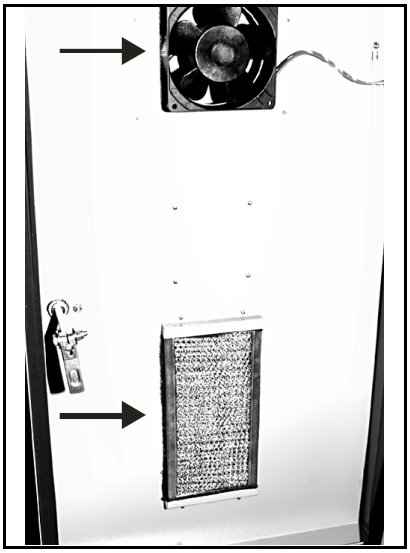


Figure 9: Inverter Vents

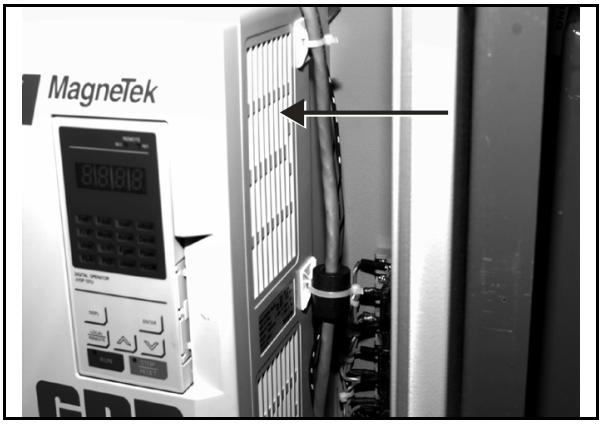
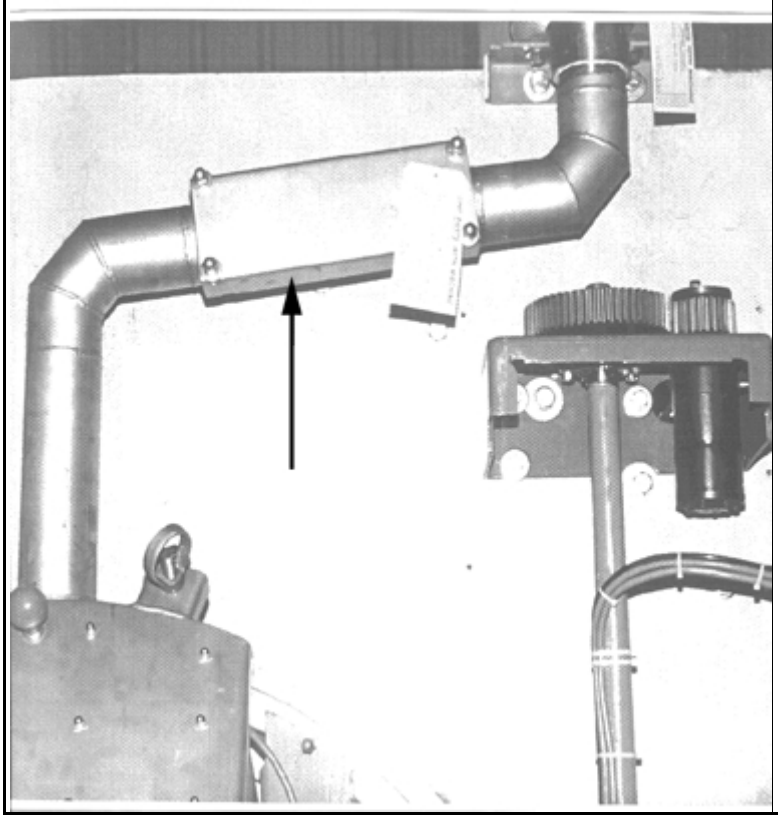


Figure 10: Recirculation Equipped Machines

Recirculation hoses	Legend
	The hose behind this plate must be replaced every 6 months or 840 hours of operation. A weak hose can burst, causing hot bath liquor to spray onto personnel, scalding them.

— End of BIIEAM01 —

Tensioning and Aligning Main Drive Belts on 64" and 72" ExN and JxN Washer-Extractors

Check belt tension and main drive pulley alignment whenever the main drive belts are replaced or tensioned. Also check belt tension and alignment whenever the drive base is moved or when called for in the preventive maintenance checklist. Determine the type of belts fitted to the machine then refer to either “Setting Belt Tension...with Individual Main Drive Belts” or “Setting Belt Tension...with Banded Main Drive Belts.” After setting the belt tension, see “Aligning The Main Drive Pulleys (Both Belt Types)” for alignment information.

Check tension for new belts according to the following schedule:

- After 24 hours of operation (three eight-hour shifts)
- After 80 hours of operation (ten eight-hour shifts)
- After 160 hours of operation (twenty eight-hour shifts)

Note 1: Do not refer to instruction sheet provided with the tension testing tool. Use this instruction instead.

Note 2: All belts are not alike. Certain belts are better suited to certain applications. Consequently, it is always best to purchase replacement belts from the original manufacturer of the equipment. Alternatively, purchase the exact style and type of belts with which the machine was originally equipped. If you were not satisfied with the life of the original set, you should ask the factory if a better belt has been developed for the specific application.

1. Setting Belt Tension on Machines Equipped with Individual Main Drive Belts

These machines use the “belt tension gauge method” for tensioning the main drive belts. This method requires a belt tension testing tool and straight edge.

Use the tension gauge to set belt tension as follows:

1. Move upper O-ring on tension testing tool to uppermost position (resting against bottom edge of sliding cap).
2. Determine belt deflection for the tested belt (see Table A for the setting).
3. Move lower O-ring to the correct setting (inches or centimeters) on scale. Read the bottom edge of the O-ring.
4. Place a straight edge along the top edge (pulley to pulley) of the belt to be tested. Depress the tension testing tool by sliding the cap against the middle of the belt span until the bottom edge of the lower O-ring aligns with the straight edge as shown in (Figure 1).
5. Read the top of the upper O-ring position and determine if it is within specified range.
   - See specifications in the “Individual belt initial tension” column for belts that have never been used.
   - See specifications in the “Individual belt final tension” column for belts that have been in use for more than 24 hours (three eight-hour shifts).
6. If reading is below specified range, belt must be tightened. If reading is above specified range, belt must be loosened. Adjust belt and repeat Steps 1 through 5 until tension is within specified range

Figure 1: Testing Belt Tension (Individual Belts)

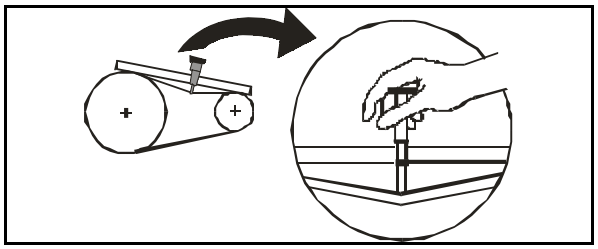


Table 1: Table A - ExN and JxN Main Drive Belt Tension

Belts	Belt deflection inches (mm)	Hertz	Individual belt initial tension pounds (kilograms)	Individual belt final tension pounds (kilograms)
Final stage	3/4" (19)	All	17 - 20 (7.7 - 9.1)	13 - 16 (5.9 - 7.2)

2. Setting Belt Tension on Machines Equipped with Banded Main Drive Belt

These machines use the “belt elongation method” for tensioning the main drive belts. This method requires a tape measure and either “Table B - 64" ExN and JxN Main Drive Belt Tension (Banded Belts)” or “Table C - 72" ExN and JxN Main Drive Belt Tension (Banded Belts),” depending on the machine type.

1. Accurately measure the outer diameter of the belt. Call this measurement L1. Look up L1 in Table B for 64" machines or Table C for 72" machines. Find the corresponding “Banded Belt Tension Length.” Tie a string to this length.
2. Install belt.
3. Fit string to the outer diameter of both pulleys.
4. Slowly raise motor platform until string is tight.

Table 2: Table B - 64" ExN and JxN Main Drive Tension (Banded Belts)

L1 inches (mm)	Multiplier	Tensioned Length inches (mm)
149 (3784.6)	1.007	150.04 (3811.0)
149.3 (3792.2)		150.29 (3817.4)
149.5 (3797.3)		150.55 (3824.0))
149.8 (3804.9)		150.80 (3830.3)
150 (3810.0)		151.05 (3836.7)
150.3 (3817.6)		151.30 (3843.0)
150.5 (3822.7)		151.55 (3849.4)
150.8 (3830.3)		151.81 (3856.0)
151 (3835.4)		152.06 (3862.3)
151.3 (3843.0)		152.31 (3868.7)
151.5 (3848.1)		152.56 (3875.0)
151.8 (3855.7)		152.81 (3881.4)
152 (3860.8)		153.06 (3887.7)
152.3 (3868.4)		153.32 (3894.3)
152.5 (3873.5)		153.57 (3900.7)
152.8 (3881.1)		153.82 (3907.0)
153 (3886.2)		154.07 (3913.4)
153.3 (3893.8)		154.32 (3919.7)
153.5 (3898.9)		154.57 (3926.1)
153.8 (3906.5)		154.83 (3932.7)
154 (3911.6)		155.08 (3939.0)
154.3 (3919.2)		155.33 (3945.4)
154.5 (3924.3)		155.58 (3951.7)

Table 3: Table C - 72" ExN and JxN Main Drive Belt Tension (Banded Belts)

Banded Belt Tension		
L1 inches (mm)	Multiplier	Tensioned Length inches (mm)
163.5 (4152.9)	1.007	164.64 (4181.9)
163.75 (4159.2)		164.90 (4188.5)
164 (4165.6)		165.15 (4194.8)
164.25 (4172.0)		165.40 (4201.2)
164.5 (4178.3)		165.65 (4207.5)
164.75 (4184.7)		165.90 (4213.9)
165 (4191)		166.16 (4220.5)
165.25 (4197.4)		166.41 (4228.8)
165.5 (4203.7)		166.66 (4233.2)
165.75 (4210.1)		166.91 (4239.5)
166 (4216.4)		167.16 (4245.9)
166.25 (4222.8)		167.41 (4252.5)
166.50 (4229.1)		167.67 (4258.8)
166.75 (4235.4)		167.92 (4265.2)
167.00 (4241.8)		168.17 (4271.5)
167.25 (4284.2)		168.42 (4277.9)
167.50 (4254.5)		168.67 (4284.2)
167.75 (4260.9)		168.92 (4290.6)
168.00 (4267.2)		169.18 (4297.2)
168.25 (4273.6)		169.43 (4303.5)
168.50 (4279.9)		169.68 (4309.9)
168.75 (4286.3)		169.93 (4316.2)
169.00 (4292.6)		170.18 (4322.6)
169.25 (4298.9)		170.43 (4328.9)
169.50 (4305.3)		170.69 (4335.5)
169.75 (4311.6)		170.94 (4341.9)
170.00 (4318.0)		171.19 (4348.2)
170.25 (4325.4)		171.44 (4354.6)
170.50 (4330.7)		171.69 (4361.0)
170.75 (4337.0)		171.95 (4367.5)
171.00 (4343.4)		172.20 (4373.9)
171.25 (4349.8)		172.45 (4380.2)

3. Aligning The Main Drive Pulleys (Both Belt Types)

Correct pulley alignment is critical to maximize the main drive belt life. Pulley alignment must be checked whenever any of the main drive components (motors, pulleys, or belts) are adjusted or

replaced. Also check pulley alignment whenever excessive amounts of belt wear and dust are noticed (a small amount of belt dust is normal).

Required tools: laser level (available at many local hardwear stores), ruler and tape measure.

We recommend the use of laser levels since these have proven to yield much greater accuracy in pulley alignment than older methods of alignment which utilize string. Use a laser level to align pulleys as follows:

1. Determine the distance between the levels edge and the laser emitter lens. Place the level on a flat surface. Hold a ruler upright to the beam and note where the beam hits the ruler (Figure 5).
2. If the machine is a tilting model, tilt the machine so that the main bearing shaft face is perpendicular to the floor (Figure 2). Hold the level vertically on the main bearing shaft face to check for plumb. If the bearing shaft face is plumb, then the main bearing shaft pulley is plumb.
3. Check the plumb on the motor pulley. If the motor pulley is not plumb, then shim motor platform between the hinge and the motor base (Figure 3).
4. Once both pulleys are plumb, check the pulley to pulley alignment as follows:
    - Place the laser on the face of the small motor pulley (Figure 5).
    - Check at the 2, 4, 8 and 10 o'clock points on the outer edge of the large pulley (Figure 5). This measurement must equal the laser emitter lens to levels edge distance (measured in step 1), plus or minus 1/16th of an inch. The closer the alignment is to ideal, the longer the belt life.
    - The small motor pulley can be aligned with the big pulley by either of two methods. Either move the small motor pulley on the shaft or loosen the hinge side bolts and adjust the drive base threaded rod closest to the front of the machine (Figure 4).
    - If the hinge bolts are loosened, be sure to coat the bolt threads with Loctite 242 before tightening.

Figure 2: Identifing the Main Bearing Shaft Face

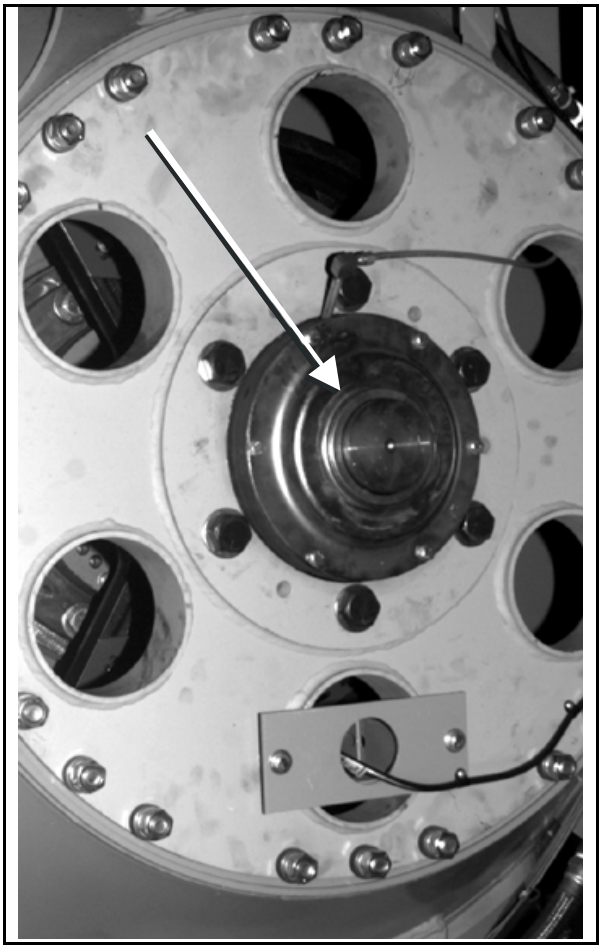


Figure 3: Shim Motor Platform to Plumb Motor Pulley

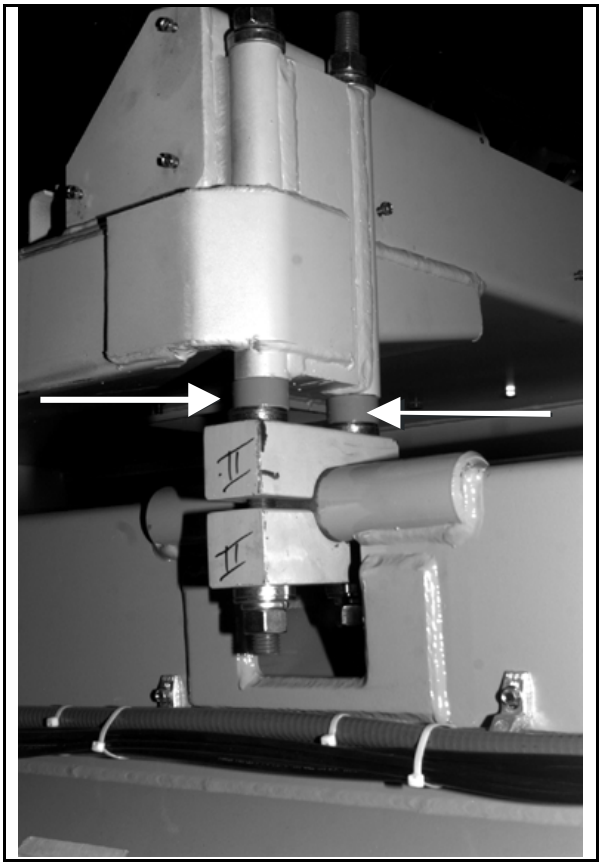


Figure 4: Second Method of Adjusting Pully Alignment

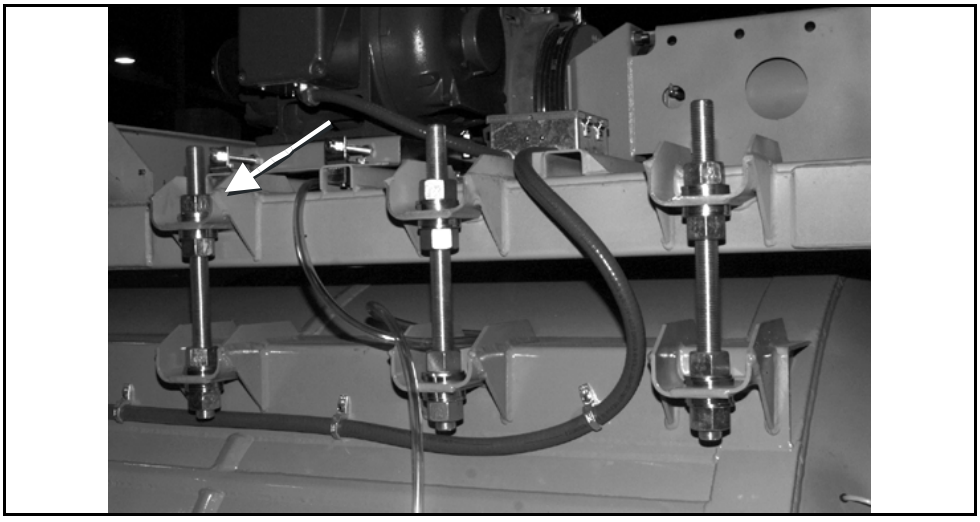
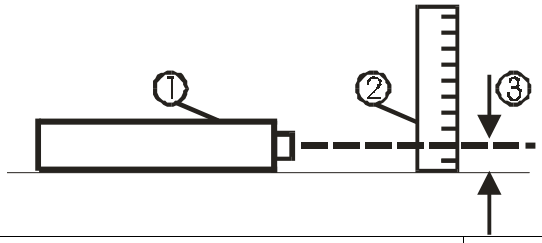


Figure 5: Pulley Alignment

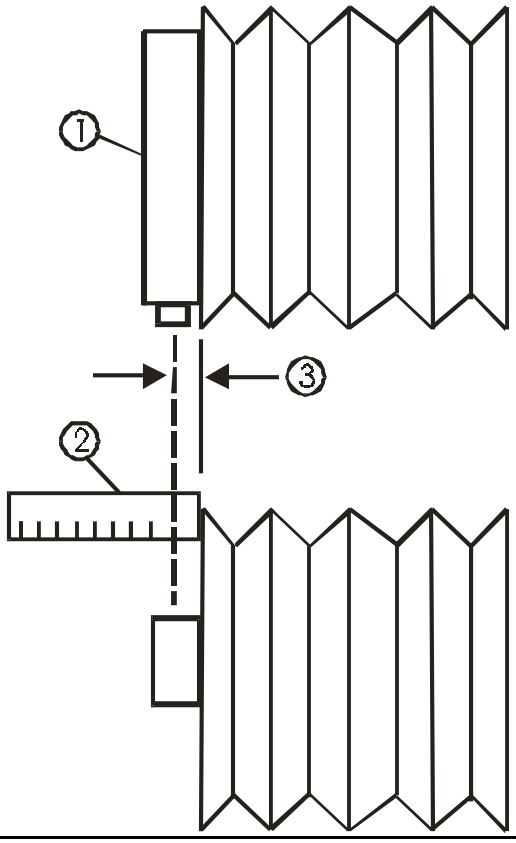
Deterring the distance between the emitter lens and the level base



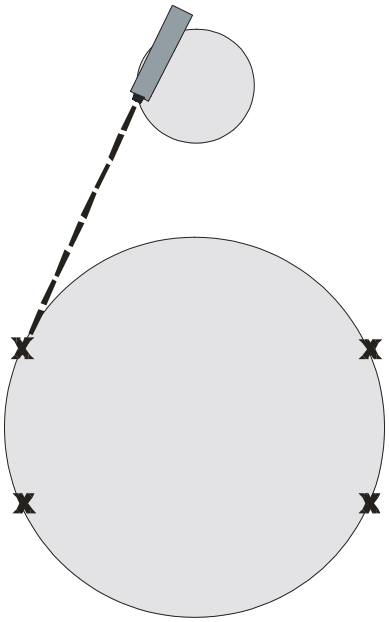
Legend

1. Laser level
2. Ruler
3. Laser emitter to level distance

How to align pulleys



Measuring pulley to pulley alignment in four places



— End of BIIEUM01 —

FLUSHING WATER SEALS AND LEAK - OFFS IN 52" AND LARGER WASHER-EXTRACTORS

DANGER: ENTANGLE AND CRUSH HAZARD

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

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

Required Kits—This procedure requires bulb pump kit (p/n KZ5CP00100), one gallon (3.8 liters) of mineral spirits, a hand operated grease pump, and the specified lubricants.

Background Information—The grease filled bearing housings for 52 inch and larger machines are supplied with two water seals and a grease seal as shown in FIGURES 1 and 2. Bath liquor is prevented from entering the bearings by two water seals separated by grease filled cavity (FIGURE 2). Any water leaking past the water seals is drained by the leak-off cavity. The grease seal retains the grease in the housing. The seal grease cavity and the leak-off cavity can become clogged with lint and debris, resulting in seal and bearing failure. Every six months, flush out these cavities with mineral spirits, as described within. Normally, flushing is done less often than greasing. However, whenever flushing is due, it should be done just prior to greasing, during the same maintenance session.

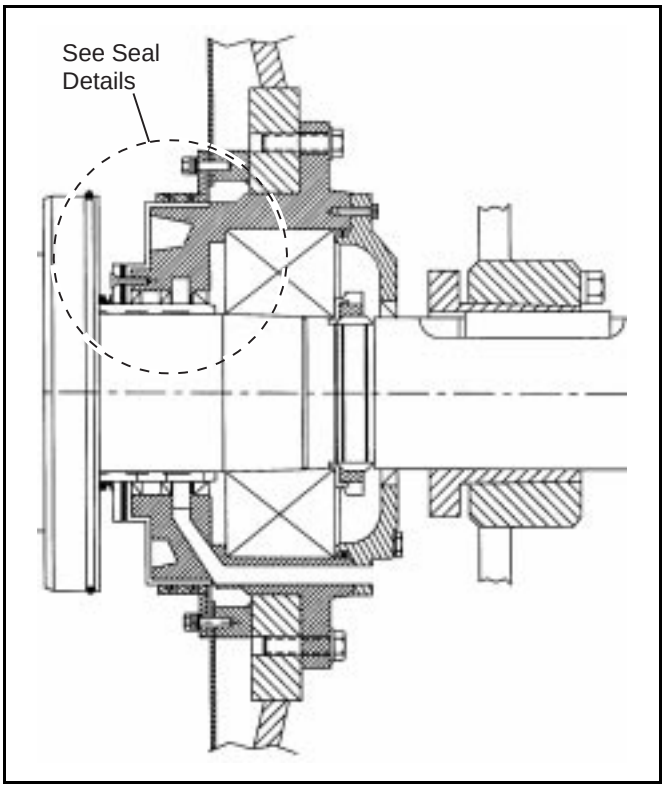


FIGURE 1 (MSSM0271AE) — Typical Bearing Housing for 52 through 72 Washer-Extractors

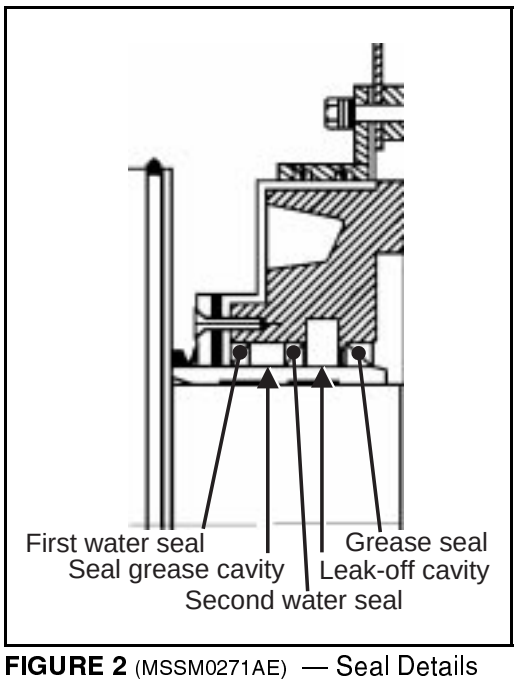


FIGURE 2 (MSSM0271AE) — Seal Details

NOTICE: BEARING DAMAGE HAZARD

BEARING DAMAGE HAZARD—Bearings will quickly burn up if grease is contaminated by mineral spirits.

- ☞ **DO NOT attempt to force mineral spirits into the bearing housing. If mineral spirits do not flow easily through the seal cavity grease relief and leak-off, ream out grease relief and leak-off drain.**
- ☞ **DO NOT attempt to flush the main or rear bearing.**

Flushing the Seal Grease Cavity—Before beginning, study the main bearing assembly drawing in the service manual to identify inlets, connections, reliefs, and leak-offs.

1. Locate the tubing running from the seal cavity grease point to the bearing housing (FIGURE 3). Disconnect this tubing at the bearing housing.
2. Install the bulb pump.
3. Remove the seal cavity grease relief fitting (if so equipped) to prevent the mineral spirits and contaminated grease from being pushed back into the shell under the first water seal. FIGURE 4 shows the internal passage from the seal cavity grease inlet to the seal grease cavity (FIGURE 2) and the internal seal cavity relief passage from the seal grease cavity to the grease relief fitting (if so equipped) on the housing.
4. Flush until the mineral spirits dripping from the seal cavity grease relief are clear (approximately two quarts - 1.9 liters).
5. Re-install seal cavity grease tubing and grease relief fitting (if so equipped).

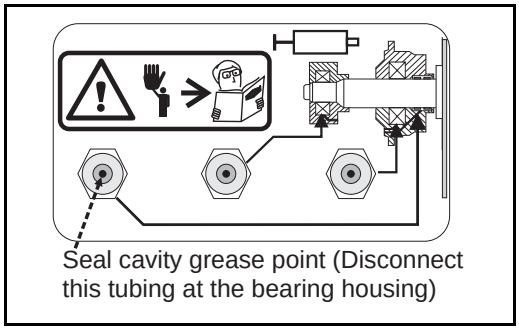


FIGURE 3 (MSSM0271AE) — Identifing the Seal Cavity Grease Point

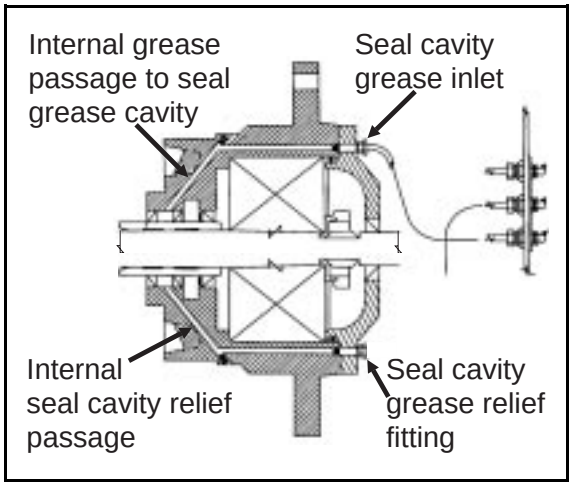


FIGURE 4 (MSSM0271AE) — Internal Seal Grease Cavity Passage and Relief

Flushing the Leak-off Cavity

1. Remove the vented plug at the flushing connection and install the bulb pump.
2. Pump approximately two quarts (1.9 liters) of mineral spirits into the flushing connection until the spirits flow easily out of the leak-off drains. FIGURE 5 shows the internal passage from the flushing connection, through the leak-off cavity, and the internal drain to the exterior of the housing.
3. After flushing, replace the vented plug, then see "Greasing Seals and Bearings" in the Preventive Maintenance section.

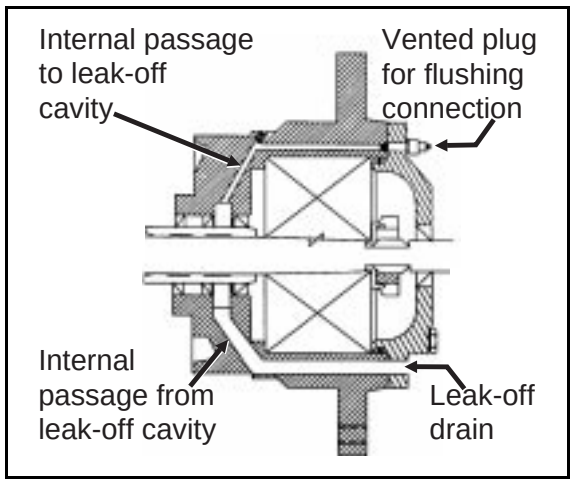


FIGURE 5 (MSSM0271AE) — Internal Flushing Passage and Leak-off

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.

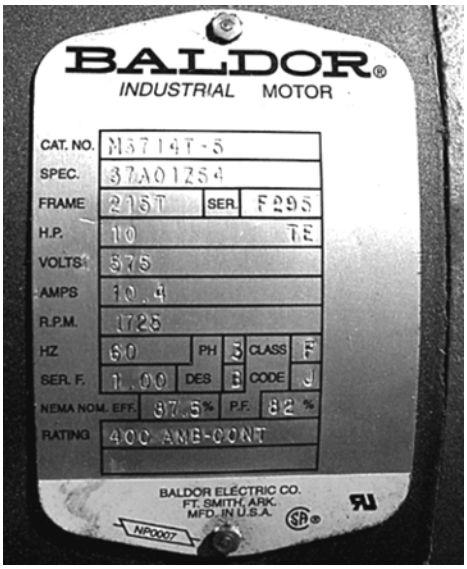
operation conditions—the conditions that can decrease the life of the motor and make it necessary to lubricate more frequently.

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.

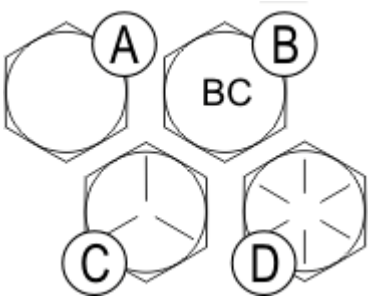
— End of BIUUUM03 —

BIUUUM04 (Published) Book specs- Dates: 20080506 / 20080506 / 20080506 Lang: ENG01 Applic: UUU

Fastener Torque Requirements

Torque requirements for other fasteners are specified in the specific document which describes the assembly. **If fastener torque specifications or threadlocking compound requirements in an assembly document vary from the specifications in this document, use the assembly document.**

Figure 1: Common Bolts Used in Milnor Equipment

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

1. Torque Values

The tables below list the standard size, grade, threadlocking compound, and torque requirements for fasteners commonly used on Milnor® equipment.

Note 1: Data derived from Pellerin Milnor® Corporation "Bolt Torque Specification" (bolt_torque_milnor.xls/2002096).

1.1. Carbon Steel Fasteners

1.1.1. Without Threadlocking Compound

Table 1: Torque Values for Dry Fasteners 5/16-inch and Smaller

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 Dry Fasteners Larger Than 5/16-inch

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 5/16-inch and Smaller

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 Threadlocking Compound

Table 5: Threadlocking Compound Selection by Bolt Size

	Bolt Size			
LocTite Product	1/4"	1/4" – 5/8"	5/8" – 7/8"	1" +
LocTite 222	OK			
LocTite 242		OK		
LocTite 262			OK	
LocTite 272			High temperature	
LocTite 277				OK

Table 6: Torque Values for Applications of LocTite 222

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 for Applications of LocTite 242

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 for Applications of LocTite 262

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 for Applications of LocTite 272 (High Temperature)

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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 for Applications of LocTite 277

	Bolt Grade							
	Grade 2		Grade 5		Grade 8		Grade BC	
Bolt Size	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	
Nominal Bolt Size	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

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

2. Preparation

WARNING 1: Fire Hazard—Some solvents and primer products are flammable.

- Use in a well ventilated area.
- Do not use flammable products near ignition sources.

1. Clean all threads with a wire brush, a tap, or a die.
2. Degrease the fasteners and the mating threads with a cleaning solvent. Wipe the parts dry.

   Note 2: LocTite 7649 Primer N™ will remove grease from parts, but it costs more than a standard organic or petroleum solvent.

3. Prime the fasteners and the mating threads with LocTite 7649 Primer N™ or equal. Allow the primer to dry for at least one minute.

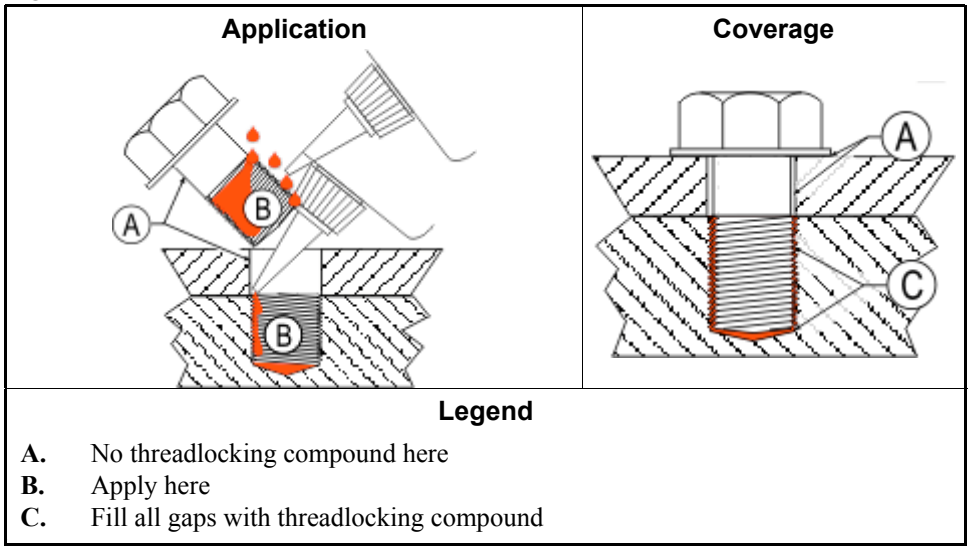
3. Application of Threadlocking Compound

CAUTION 2: Malfunction Hazard—Improper application of threadlocking compounds may result in fasteners becoming loose from impact, heat, or vibration. Loose fasteners can cause the equipment to malfunction.

- Read and follow the threadlocking compound manufacturer's instructions and warnings.

Apply threadlocking compound to the thread engagement areas of fasteners and mating threads only.

Figure 2: Blind Hole



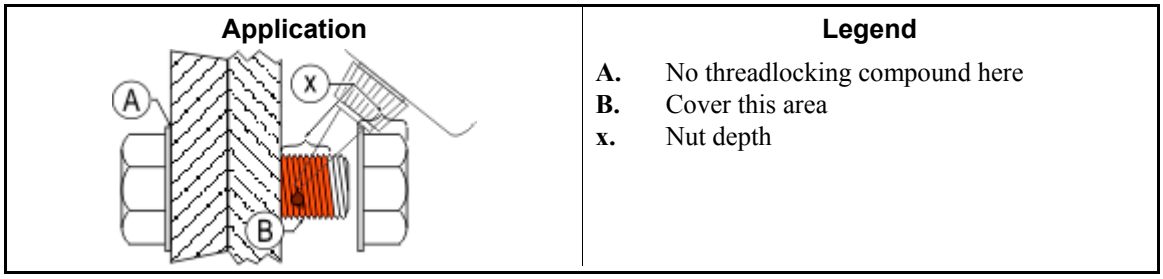
3.1. Blind Holes

1. Apply several drops of threadlocking compound down the female threads to the bottom of the hole.
2. Apply several drops of threadlocking compound to the bolt.
3. Tighten bolt to value shown in the appropriate table (Table 5 through Table 11).

3.2. Through Holes

1. Insert bolt through assembly.
2. Apply several drops of threadlocking compound to the bolt thread area that will engage the nut.
3. Tighten bolt to value shown in the appropriate table (Table 5 through Table 11).

Figure 3: Through Hole

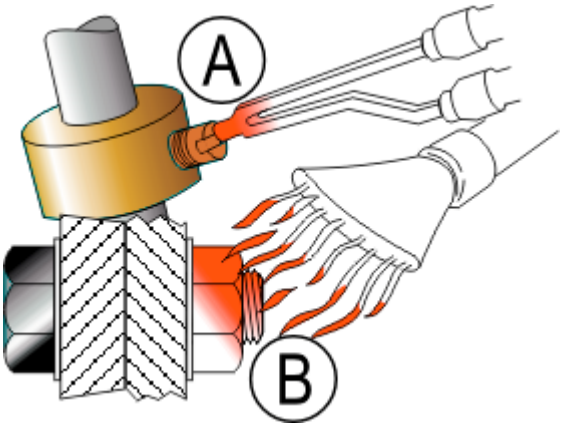


3.3. Disassembly—For low-strength and medium-strength products, disassemble with hand tools.

For high-strength products, apply localized heat for five minutes. Disassemble with hand tools while the parts are still hot.

Figure 4: Disassembly

Use Localized Heat



Legend

A. Soldering gun heating small fastener
B. Torch heating large fastener

— End of BIUUUM04 —

Drive and Brake Assemblies

2

Drive Chart

6450E6N Single Motor

BMP080006/2008293B
(Sheet 1 of 2)

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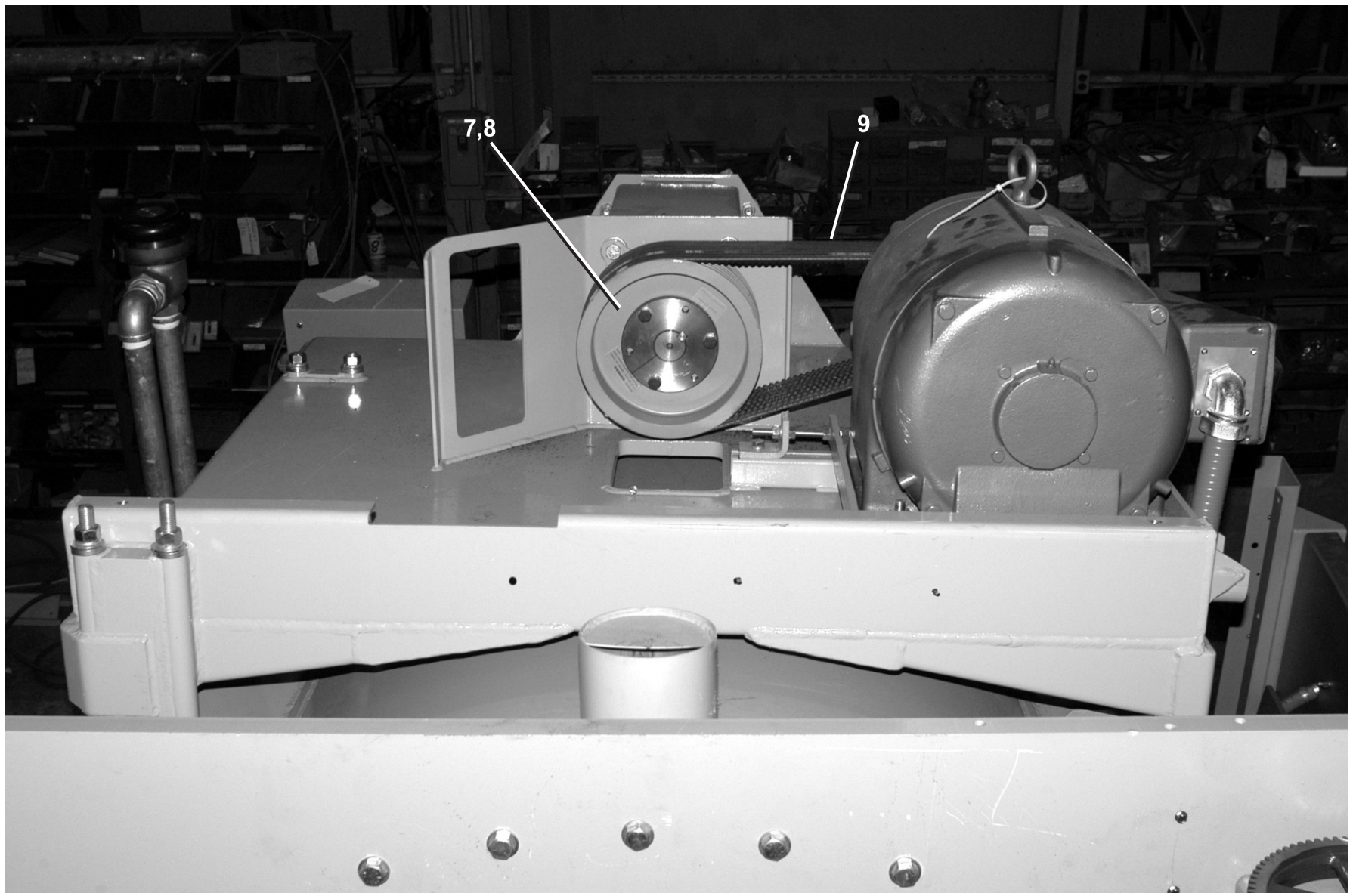

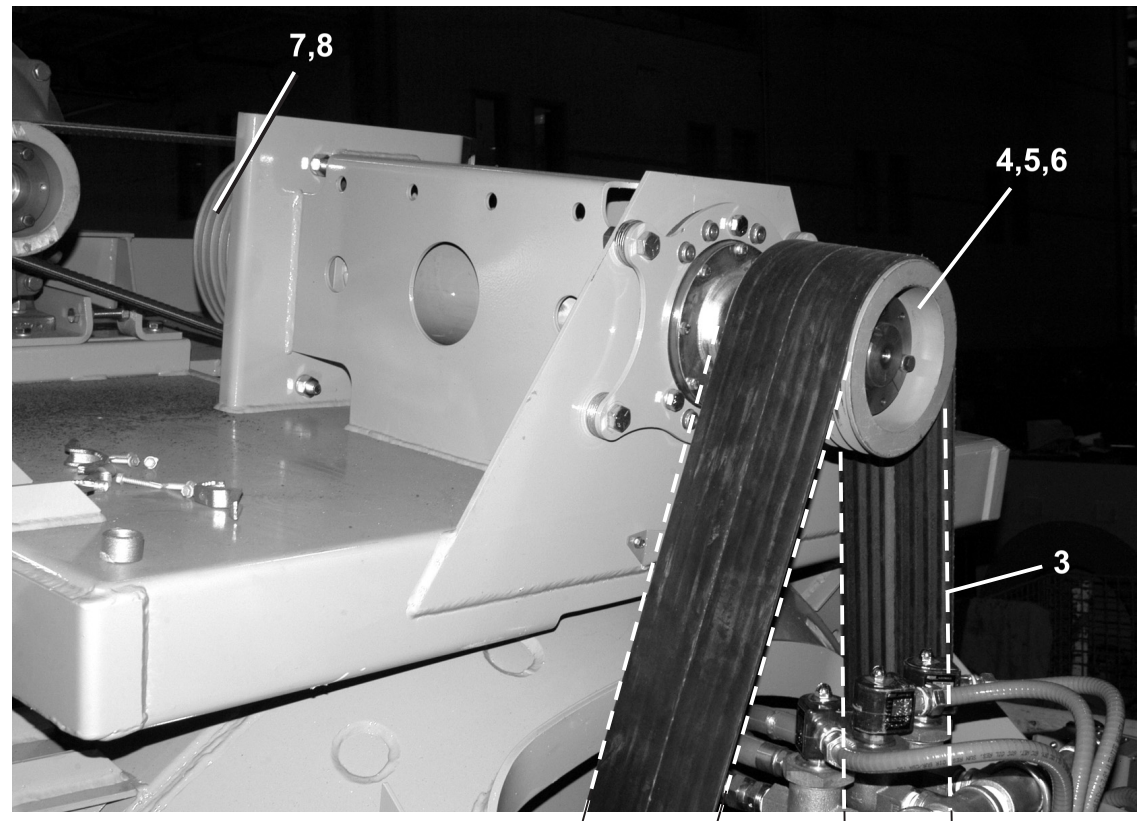

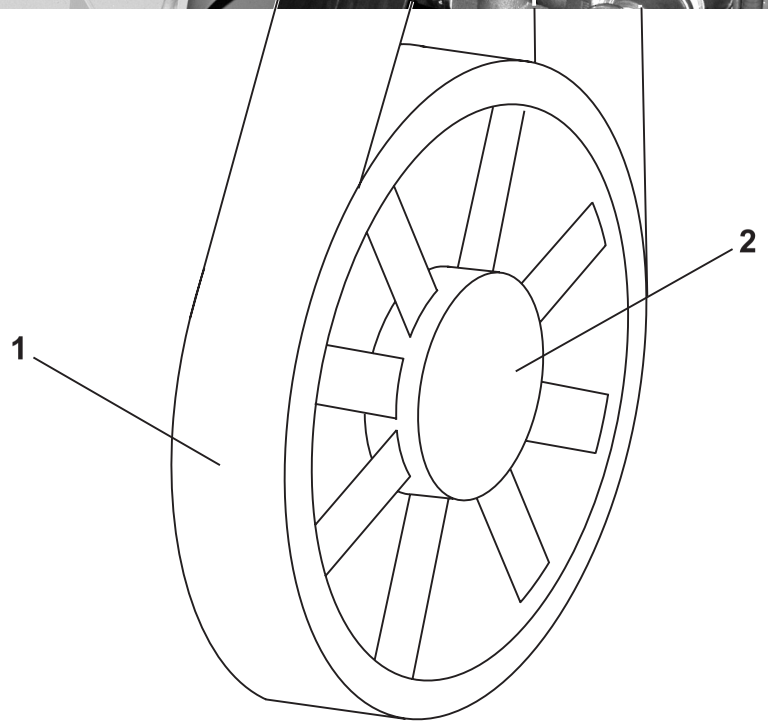

Drive Chart

6450E6N Single Motor

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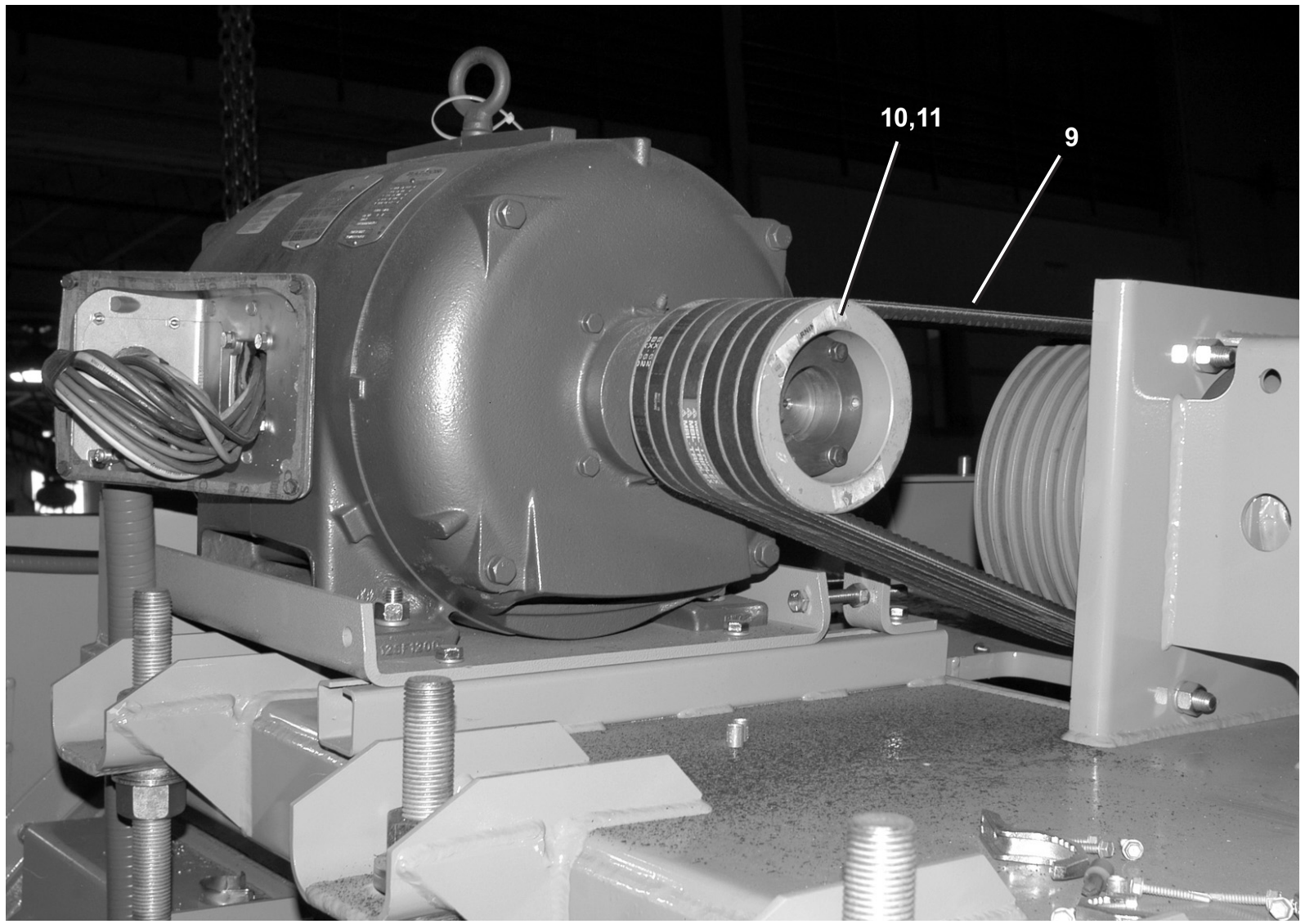

Parts List—Drive Chart

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	D65 00250	DRIVE CHART 6450 1 MOTOR	
			----------COMPONENTS----------	
all	1	X5 58160	VPUL 10G5V31.4PD/31.5OD MACH	
all	2	56Q5EM	5+1/4" BUSH VPUL QD TYPE M	
all	3	56VX1530W4	V-BAND SET OF 2 WRAP 4R5V1530	
all	4	54V2716	BUSHING VPUL 2+7/16 TYPE SF	
all	5	02 175121	KEY=5/8SQ	
all	6	5608575F	VPUL 8G5V7.5	
all	7	5607B110	PULLEY 7B11.0 TYPE E	
all	8	56Q2AE	2.0" BUSHING VPUL QD TYPE "E"	
all	9	56VB062X	VBELT BX62 RAWEDGE COG	
all	10	5607B54	PULLEY 7B5.4 TYPE SK	
all	11	56Q2CSK	2+1/8" BUSHING VPUL QD TYPE SK	

Drive Base Installation

64040, 64050, 64046E6N/J6N/D6N 72046E5N/J5N 72058J2N/J5N 6440/6450E6N SM

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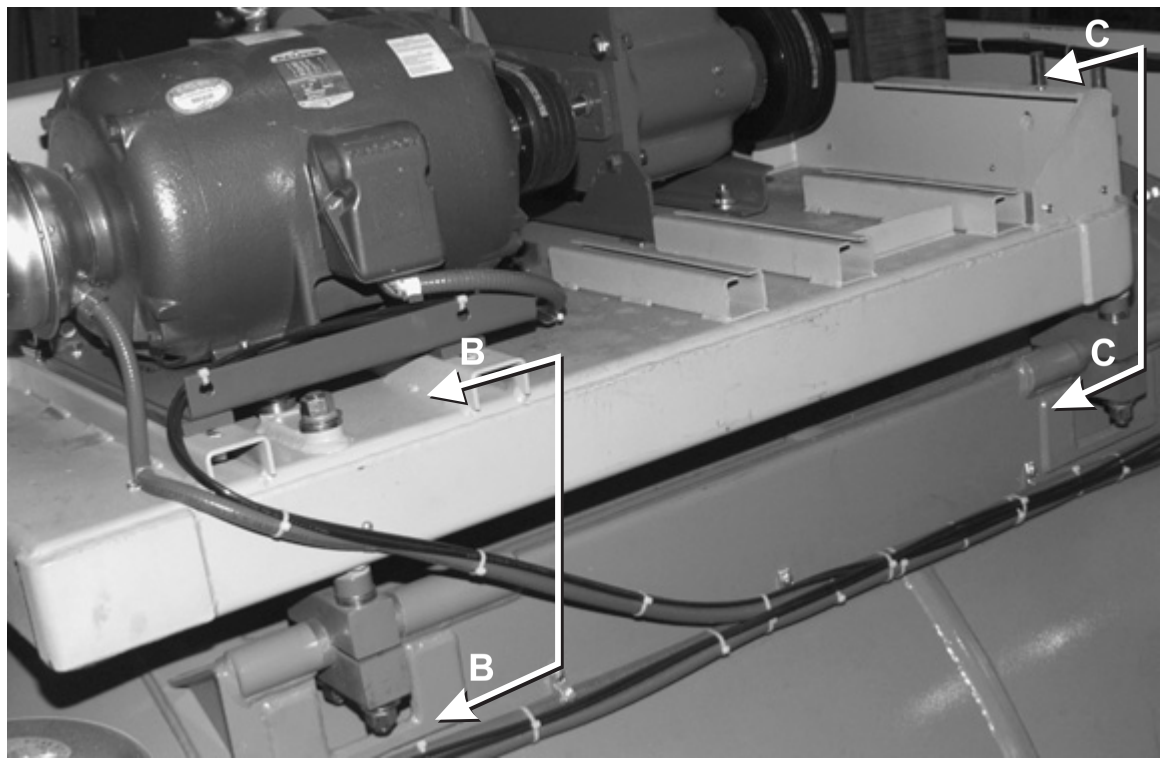
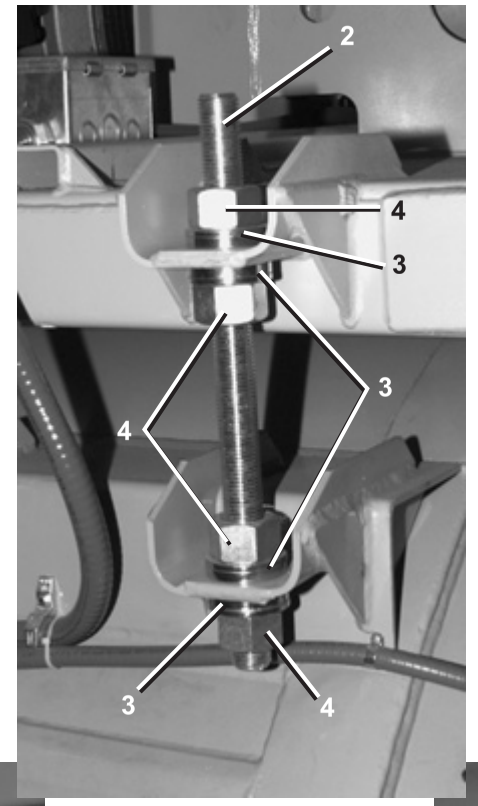
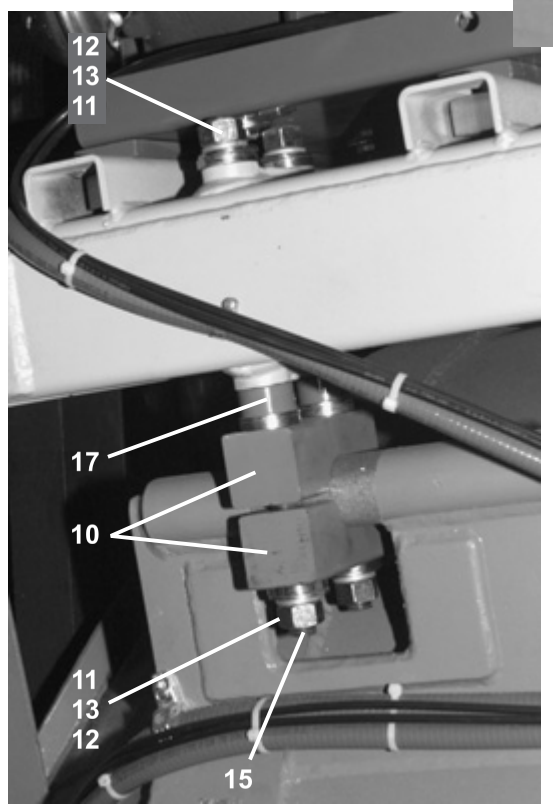


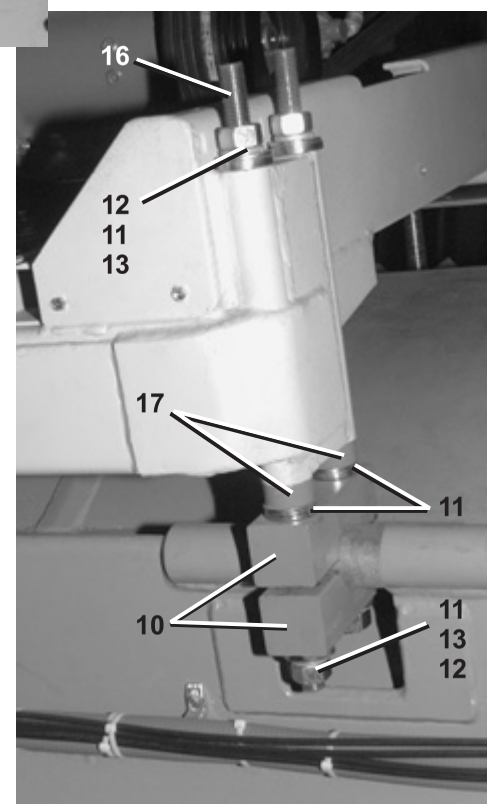


VIEW A-A

VIEW B-B



VIEW C-C



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Parts List—Drive Base Installation

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

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	GDB65001	93442L INST=DRIVE BASE 6446E6N	65050, 64046D6N,J6N,E6N
	B	GDB46001	94000Z INST=DRIVE BASE 7246E5N	7246J5N,E5N
	C	GDB58001	93000Z INST=DRIVE BASE 7258	7258D5N,J5N
	D	GDB58501	94000Z INST=DRIVE BASE 7258J2N	7258J2N,7258J2N SLIM
	E	GDB65002	99000Z INST=DRIVE BASE 6440	64040E6N, 64050
	F	GDB65003	INST=DRIVE BASE 6440 1MTR	6440/6450E6N SINGLE MOTOR
			----------COMPONENTS----------	
A	1	ADB65001	93452B ASSY=DRIVE BASE 6446E6N	
B	1	ADB46001	94000Z ASSY=DRIVE BASE 7246E6N	
C	1	ADB58001	94000Z ASSY=DRIVE BASE 7258E5N	
D	1	ADB58501	94000Z ASSY=DRIVE BASE 7258J2N	
E	1	ADB650002	99000Z ASSY=DRIVE BASE 6440	
F	1	ADB65003	ASSY DRIVE BASE 6450 1MOTOR	
all	2	17R125A17K	83287# STUD=DRIVEBASEADJ 1+1/4X17.5	
all	3	17W125	81422B 1+1/4"SPHERICAL WASHER SET	
all	4	15G261	HVHXNUT 1+1/4-8UNC2B ZINC GR2H	
all	10	03 64176	89112B BAR=MTR MNT HINGE PIN CLAMP	
all	11	17W050	04Z SPHERICALWASHER SET 7/8 M/F	
all	12	15G240	HXNUT 3/4-10UNC2B SAE ZINC GR2	
all	13	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	15	17R026A14A	93297B MCS BEARING CARRIER STUD	
all	16	17R026A19A	93297# 3/4-1OUNC2 THREADED ROD 19LG	
all	17	03 64281	89112B SPACER 6442 MTR.MT.	

Drive Base Assembly

6450E6N SM

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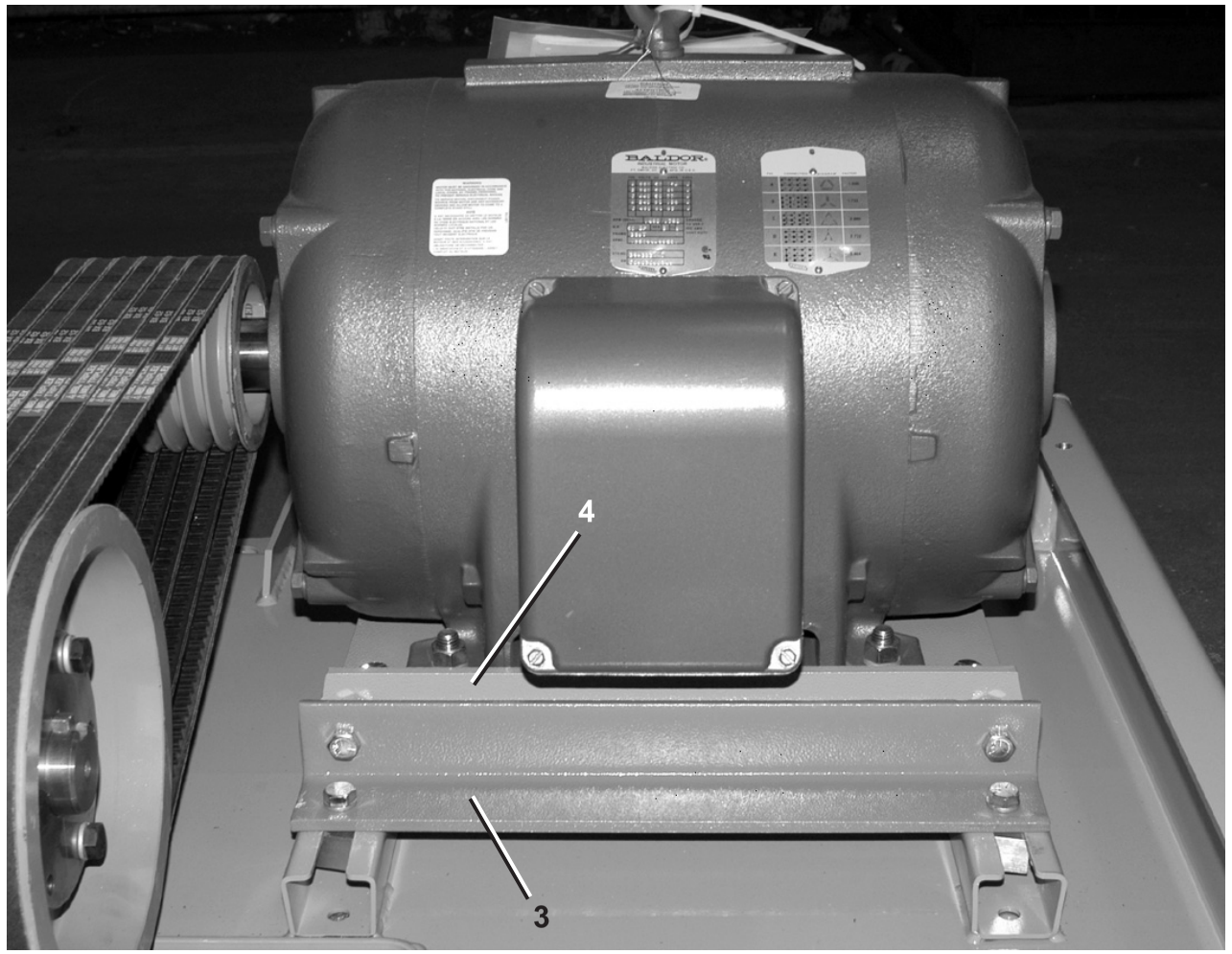
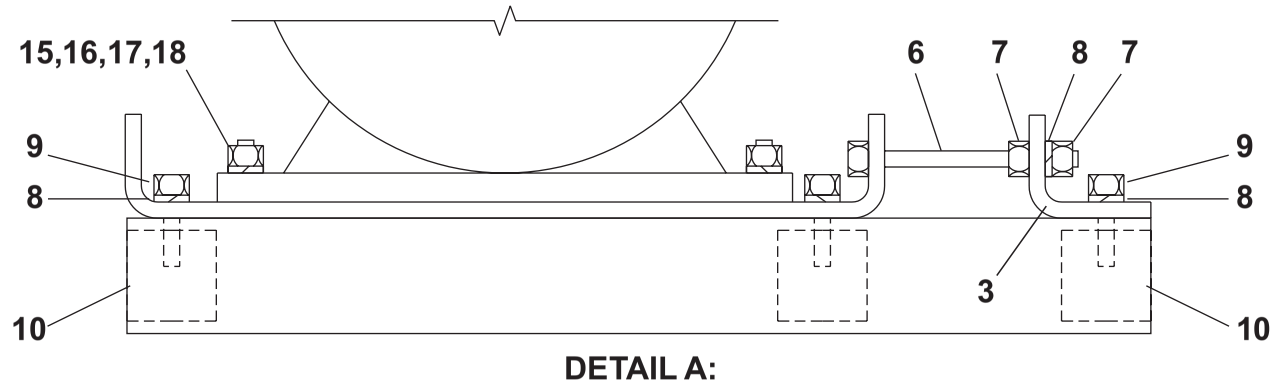


Motor Mount



DETAIL A:

Drive Base Assembly

6450E6N SM

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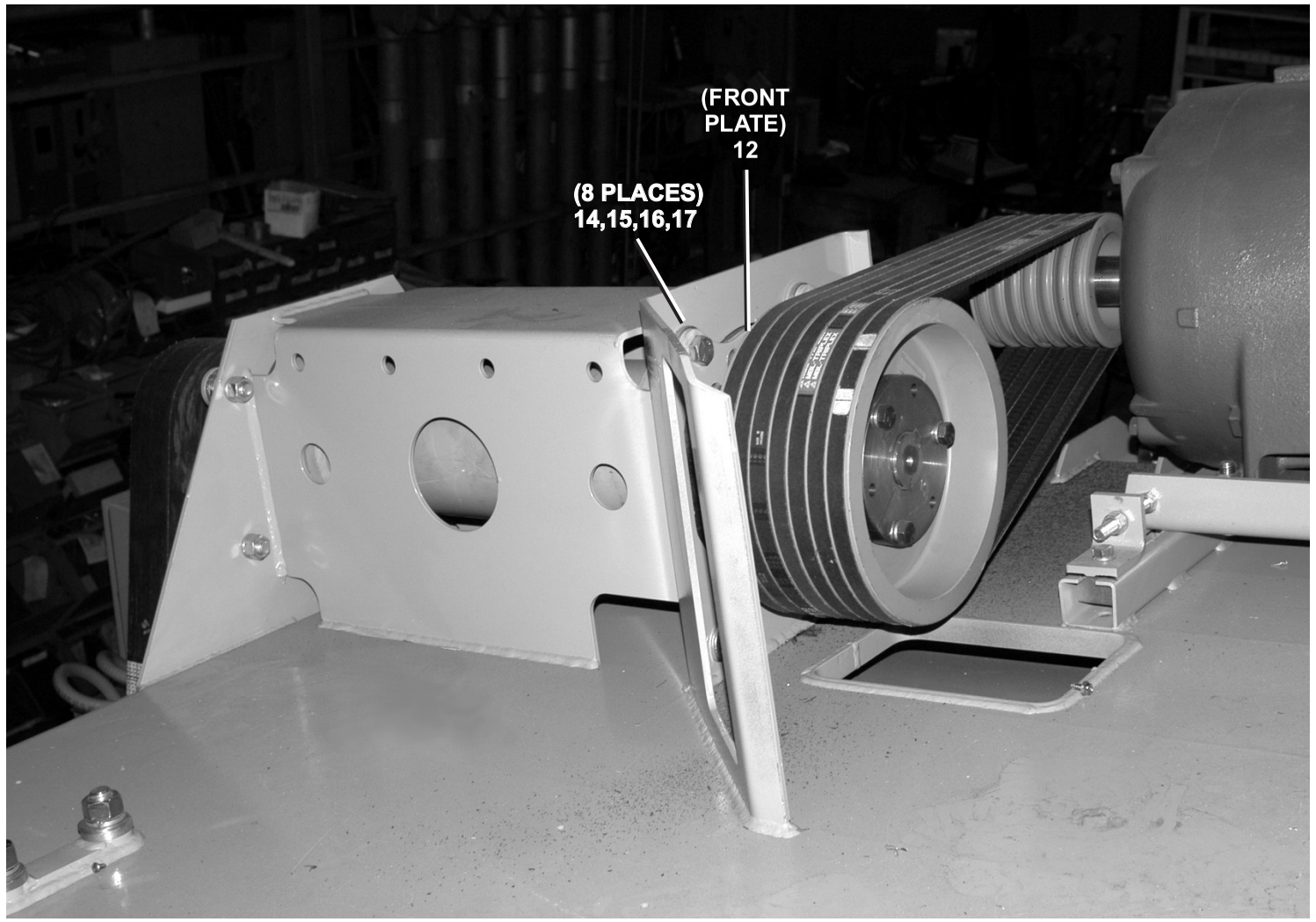
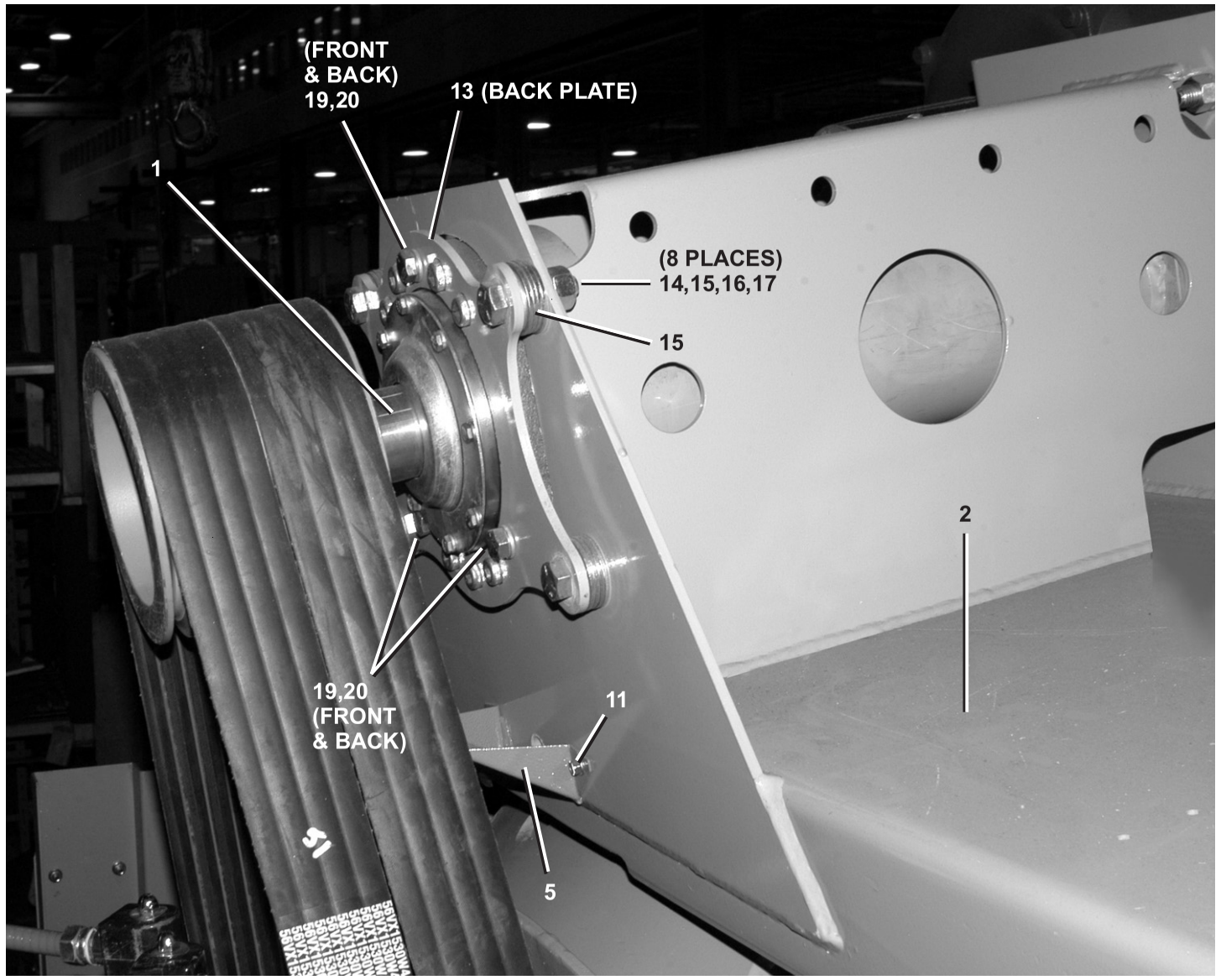


Jackshaft Installation



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Parts List—Drive Base 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	GDB65003	INST=DRIVE BASE 6440 1MTR	
	B	ADB65003	ASSY DRIVE BASE 6450 1MOTOR	
	C	GBJ28002	JACKSHAFT ASSY 1-MOTOR	
			----------COMPONENTS----------	
all	1	ABJ25005	JKSHAFT-BRGHOUS-SPHRCL BNG	
all	2	W3 65255A	WLMT=DRIVE BASE 1-MOTOR	
all	3	05 20131F	BRKT=SINGLE MOTOR ADJUST	
all	4	05 20131D	PLATE=MOTOR MTG SGL MOTOR	
all	5	02 175257	GREASE RELIEF=DRIP SHIELD	
all	6	15D119	HXTAPSCR 1/2-13X4 GR5 ZNC FTL	
all	7	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	8	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	9	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5	
all	10	02 19283	NUT=1/2-13UNCX1+1/2SQ SPEC	
all	11	15P185	TRDCUT-F HXHD 1/4-20UNC2AX3/4	
all	12	02 19382	BEARHOUSE MT PLATE REAR	
all	13	02 19383	BEARHOUSE MT PLATE FRONT	
all	14	15K221	HEXCAPSCR 5/8-11 UNC2X2GR5 ZIN	
all	15	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	16	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	17	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	18	15K225	HEXCAPSCR 5/8-11X2+1/2	
all	19	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5	
all	20	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	

Jackshaft

6450E6N Single Motor

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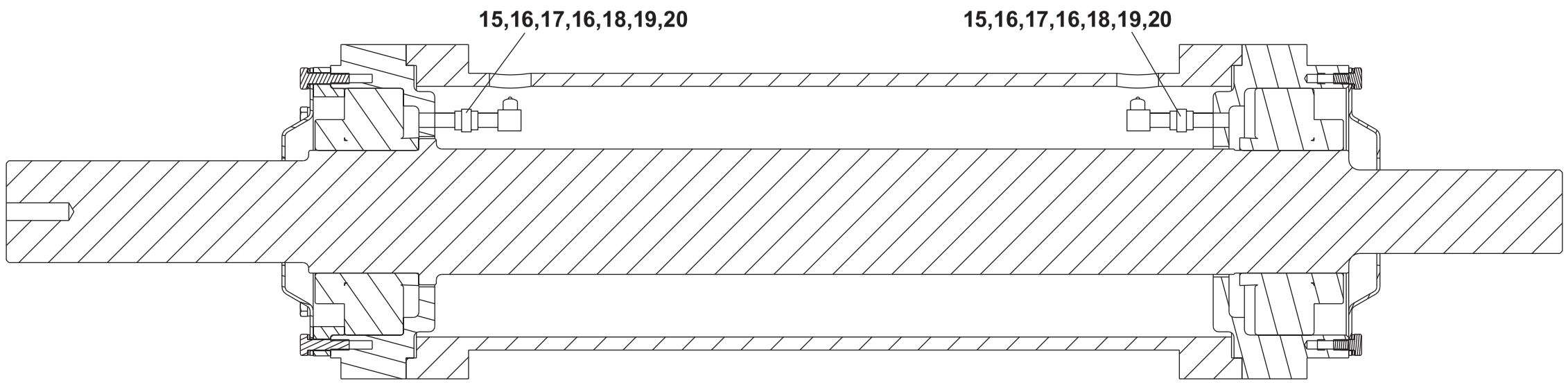
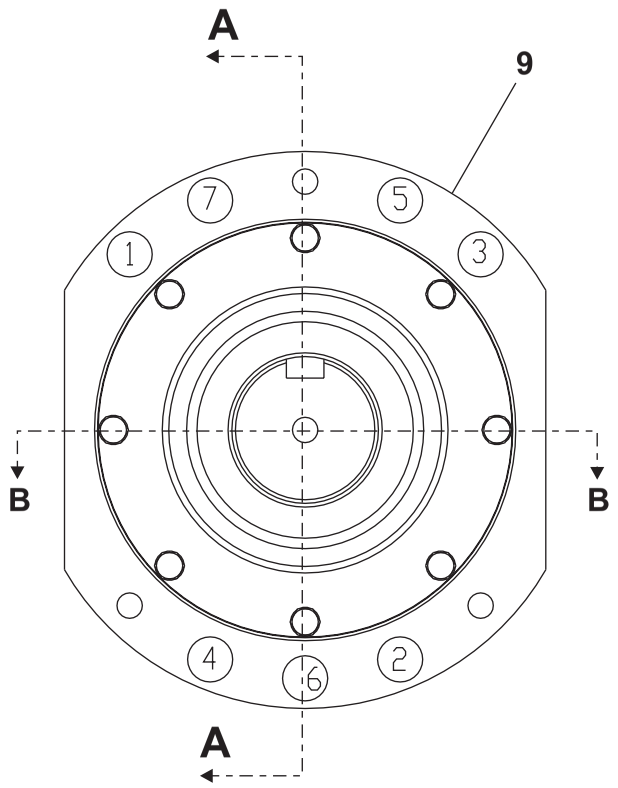
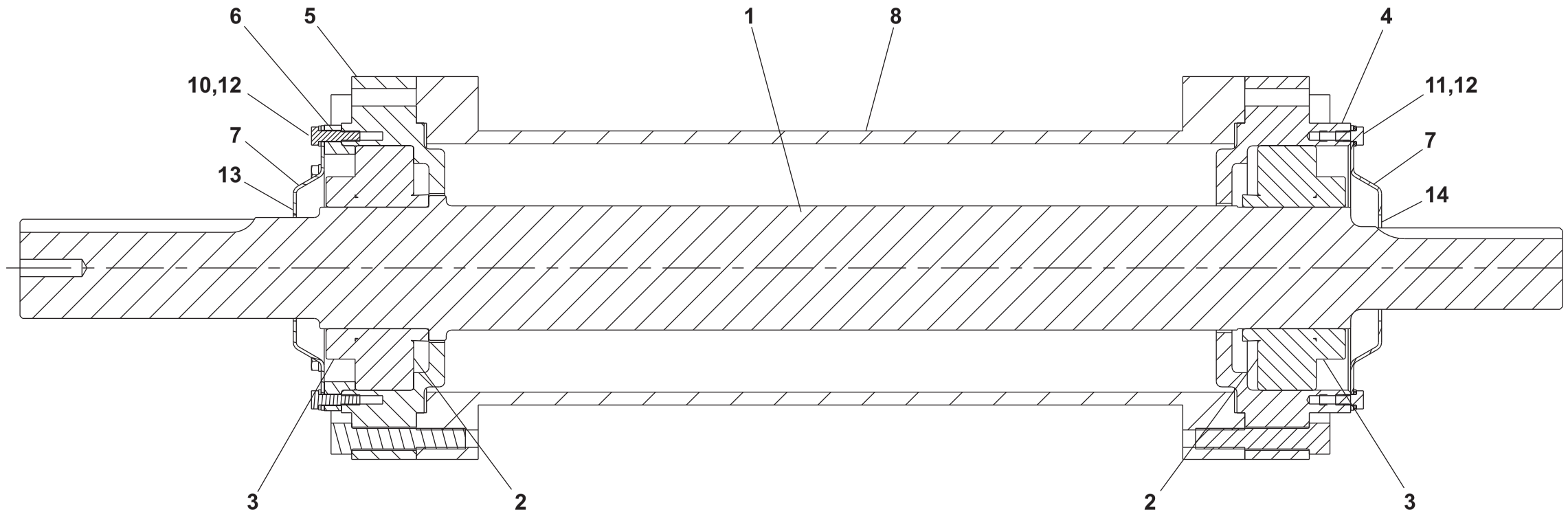


INSERT ALL ½"FASTENERS HAND TIGHT. THEN TORQUE IN THE SEQUENCE ABOVE, FRONT & BACK.





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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	ABJ25005	JKSHAFT-BRGHOUS-SPHRCL BNG	
			----------COMPONENTS----------	
all	1	X2 18711G	JKSHFT-NO CLUTCH-SPERICAL	
all	2	54A988	SKF BRNG #22217EK/C3	
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	5N0CCLSB42	NPT NIP 1/8XCLS TBE BRASS STD	
all	17	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	18	5SL0CBEC	NPTELB 90DEG STRT 1/8 BRASS125	
all	19	54M015SS	GRSFIT 1/8 PTF ALEMITE 1961-S	
all	20	20C009	THRDLKSEAL LCT#27731 50CC	

BIEUUM01 (Published) Book specs- Dates: 20120629 / 20120629 / 20120629 Lang: ENG01 Applic: HDU IFL IFG IFS IHU IEU PVU MXC MXD

Disk Brake Maintenance

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

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

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

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

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

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

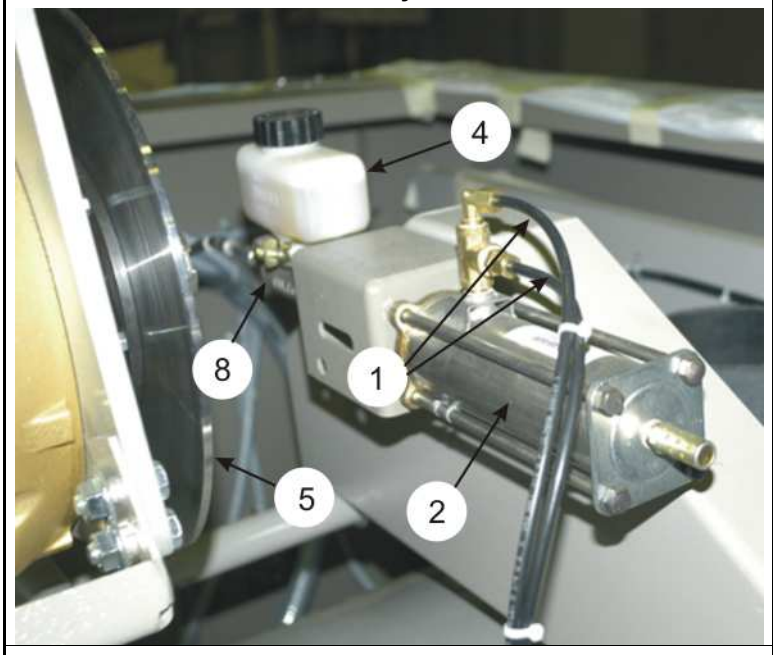
WARNING 2: Risk of injury or death —A machine in operation without safety guards is dangerous.

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

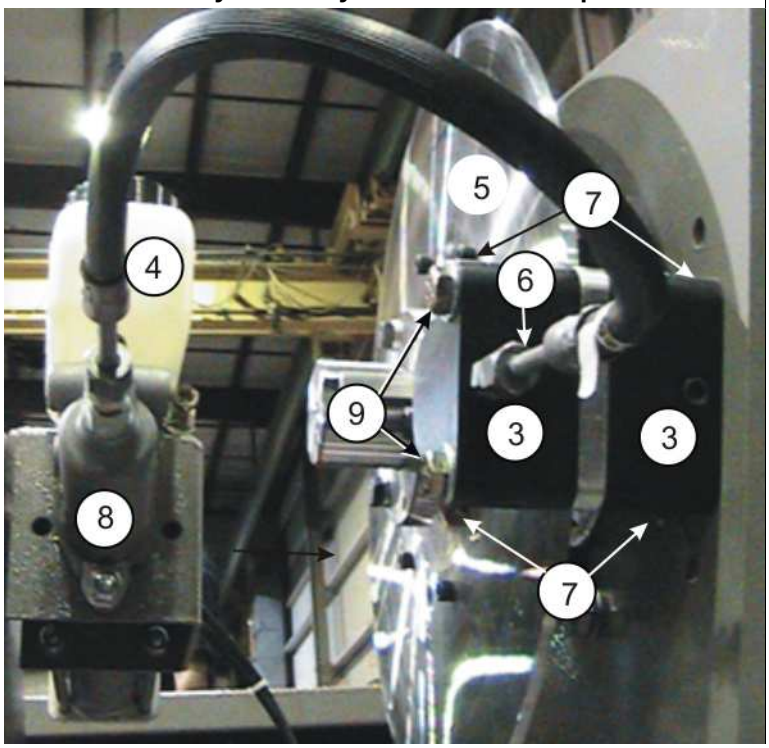
Tip: During parts of this procedure when you open up the calipers or hydraulic lines, put a cloth under the calipers to catch hydraulic fluid and parts that will fall. For safety, fully remove spilled hydraulic fluid after brake maintenance. This will help you easily identify leaks.

Figure 1: A typical hydraulic brake system

The air cylinder



The hydraulic cylinder and the caliper



Legend

1. Tubing for air
2. Air cylinder
3. Caliper body halves (Figure 2, item 2)
4. Hydraulic reservoir
5. Rotor disk
6. Hydraulic inlet
7. Valves to drain fluid and bleed the brake
8. Hydraulic cylinder
9. Bolts to attach the caliper (Figure 2, item 1)

1. The Inspection of the Brake

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

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

1.1. Examine the fluid in the reservoir. —Change the hydraulic fluid if it smells, has contamination, or has an unusual color. See Section 4.

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

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

1.2. Examine the rotor disk surface (Figure 1, item 5). —Replace the disk if it is worn or if it is not flat.

1.3. Examine the brake pads (Figure 2, item 4). —To do this, you will remove/replace the calipers and bleed the hydraulic system. See Section 3 and Section 4.

1. **Remove power from the machine (see Notice P1).**
2. Remove the bolts (Figure 1, item 9) that attach the caliper halves (Figure 1, item 7).
3. Remove the caliper halves.
4. Replace the pads as told in Section 2 if
   - the pads make an unusual noise when you apply the brake
   - if the rotor is worn or damaged
   - if the pad thickness is less than 1/16 inches (2 mm) (Figure 2, item 14) above the mounting screw (Figure 2, item 3). Always replace the two brake pads at the same time.
5. Put the caliper halves in their positions on the brake assembly. Tighten the mounting bolts to 30 foot-pounds (41 Newton-meters).
6. Bleed the hydraulic systems as told in Section 4.4.
7. Supply electrical power to the machine.

1.4. Examine the condition of all of the brake system.

1. Make sure that brake mounting components are tightly installed.
2. Make sure that fittings are tight. Make sure that there are no leaks.

2. How to Do a Friction Pad Replacement

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

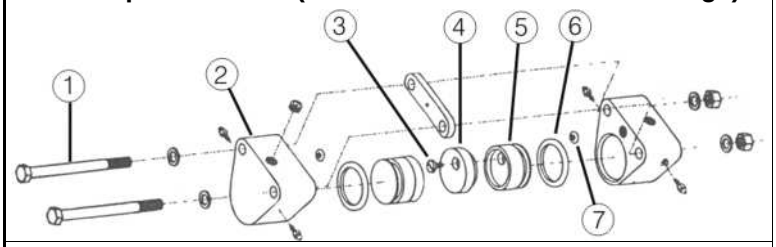
1. **Remove power from the machine (see Notice P1).**
2. Remove the used fluid. See Section 4.3.
3. Remove the two bolts that attach the caliper (Figure 1, item 9) and the two caliper halves (Figure 1, item 3) to get access to the friction pads. Do not disconnect the hydraulic line (Figure 1, item 6).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

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

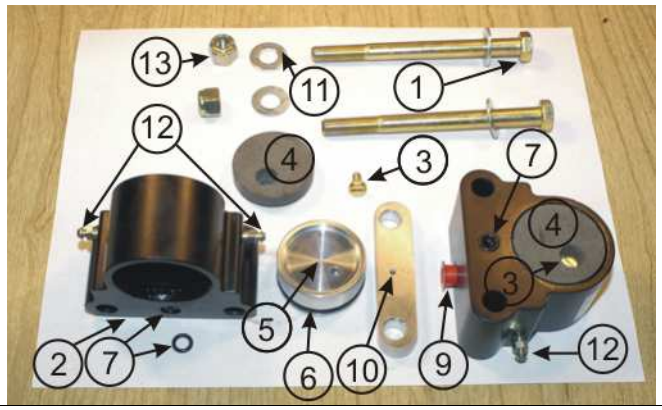
3. How to Do a Caliper Overhaul

Figure 2: The Caliper Components

The Expanded View (Shows the Piston and the O-rings)



The Caliper and the Pad



Legend

1. The bolts to attach the caliper (Figure 1, item 9)
2. Caliper body halves (Figure 1, item 3)
3. Brass screw
4. Friction pad
5. Piston
6. The Piston O-ring
7. The connection O-ring and its position
8. Plug for the hydraulic inlet
9. A hydraulic inlet (connected on one caliper, a plug (item 8) on the other)
10. The hole in the spacer
11. Washer
12. One of the four valves to bleed the fluid
13. Nut
14. The pad thickness must be more than than 1/16 inches (2 mm) above item 3

Fittings for the Hydraulic Inlet

Look at the pad thickness above the top of the screw

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

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

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

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

4.1. Risks and Precautions

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

- Stay away from operating mechanisms.

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

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

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

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

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

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

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

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

Figure 3: Pumps Used to Remove Hydraulic Fluid Quickly

Alternative Pumps for Suction of Hydraulic Fluid

Legend

1. A manual suction pump
2. The Vacula suction pump uses compressed air and holds used hydraulic fluid.

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

These tools use gravity and pressure in the hydraulic cylinder	Legend
	**1.** a clean 12 ounce container **2.** a flexible hose to attach from the bleed valves to a container **3.** a wrench for the bleed valves (Figure 2, item 12) **4.** a suction device to remove brake fluid from the reservoir

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

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

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

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

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

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

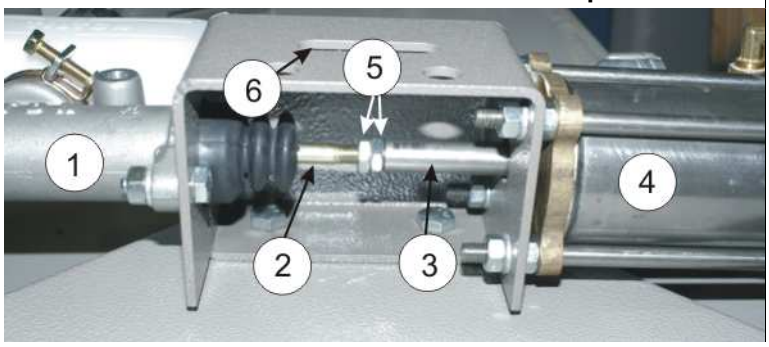
4. Put a small quantity of new brake fluid (approximately inches (50 mm)) in the 12 ounce container (Figure 4, item 1).
5. Do these steps for each bleed valve (Figure 1, item 1) . Two technicians are necessary. This will move the fluid in one direction and push air out of the line:
   a. Attach a clean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

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

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

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

A view of the brake rod and related components

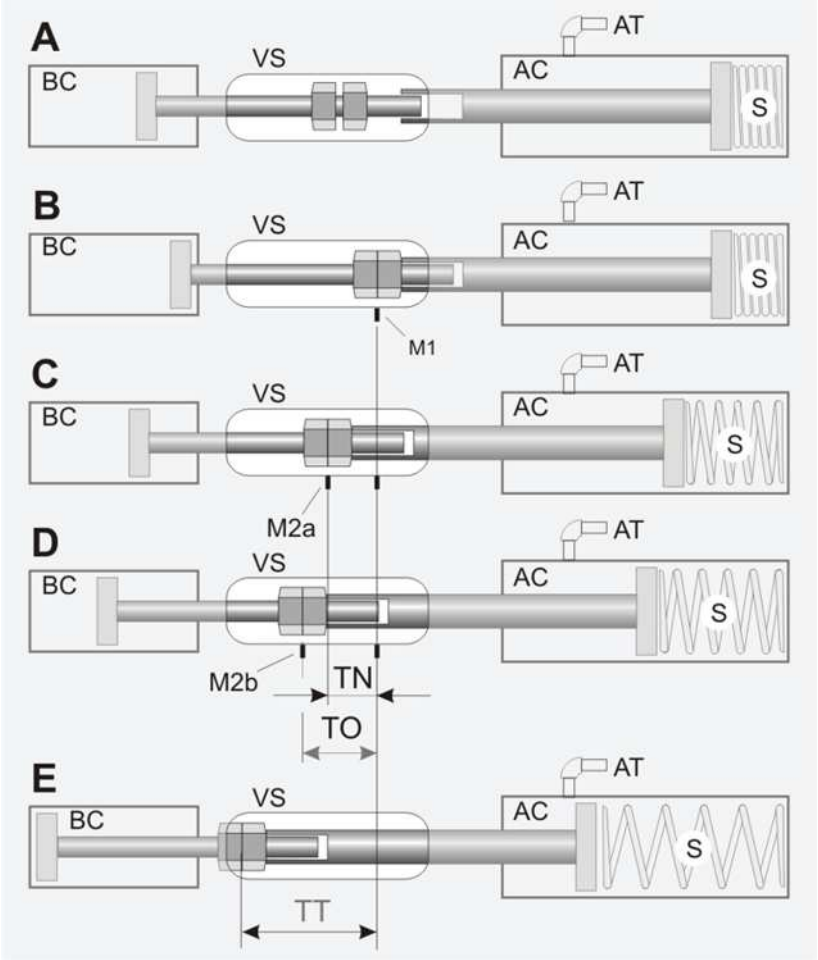


Legend

1. The brake cylinder
2. The rod for the brake cylinder
3. The rod for the air cylinder
4. The air cylinder
5. Two nuts to lock the rods together
6. The slot to see the nuts

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

Schematic Views of Different Conditions



Legend

AC. Air cylinder (Figure 5, item 4)
BC. Brake cylinder (Figure 5, item 1)
VS. Slot to see the nuts (Figure 5, item 6)
A. Before travel adjustment -- Rods not locked by nuts (Figure 5, item 5)
B. After travel adjustment -- the brake released (See Section 6.2)
C. Brake applied--NEW pads (See Section 6.1)
D. Brake applied--OLD pads
E. This will occur if you apply the brake with the hydraulic line removed
TN. Rod travel, new pads
TO. Rod travel, very worn pads
TT. Full travel with the hydraulic line removed
M1 First mark at the view slot -- the brake released
M2a. Second mark--one possible position -- the brake applied
M2b. Second mark-- a different position -- the brake applied
AT. Air tubing (See Figure 1,1). Air releases the brake.
S. Spring applies the brake

5.1. Adjust for maximum rod travel.

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

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

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

6. Operation of Brake Systems

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

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

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

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

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

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

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

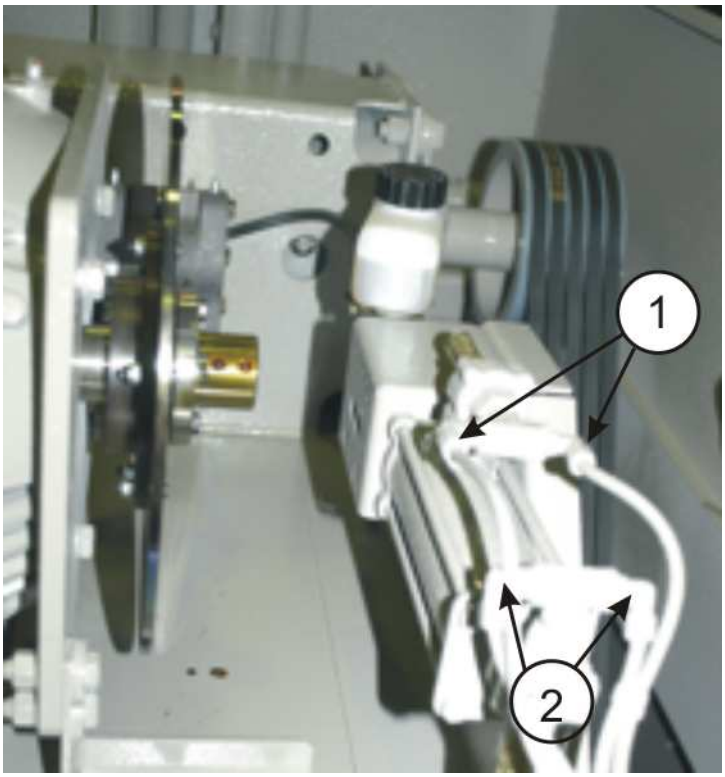
1. Disconnect the air tubing (Figure 1, item 1).

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

6.4. How the Brake Operates on Divided Cylinder Machines

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

Two pairs of air tubing connect to different ends of the air cylinder.



Legend

1. Tubing for air that releases the first brake (85 -100 PSI) (5.95 - 07.0 kg/cm-cm)

2. Tubing for air that applies the second brake (10 – 12 PSI) (0.7-0.84 kg/cm-cm)

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

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

— End of BIEUUM01 —

Brake Installation

64040/64050E6N, 64046E6N/J6N, 72046E5N/J5N, 72058J5N

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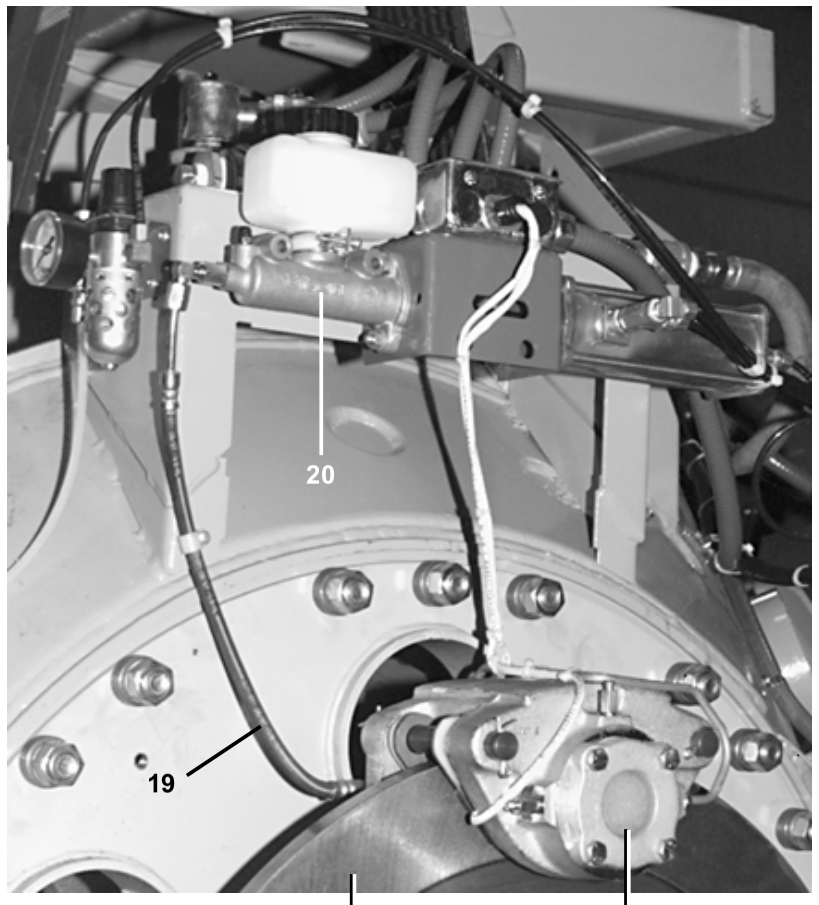

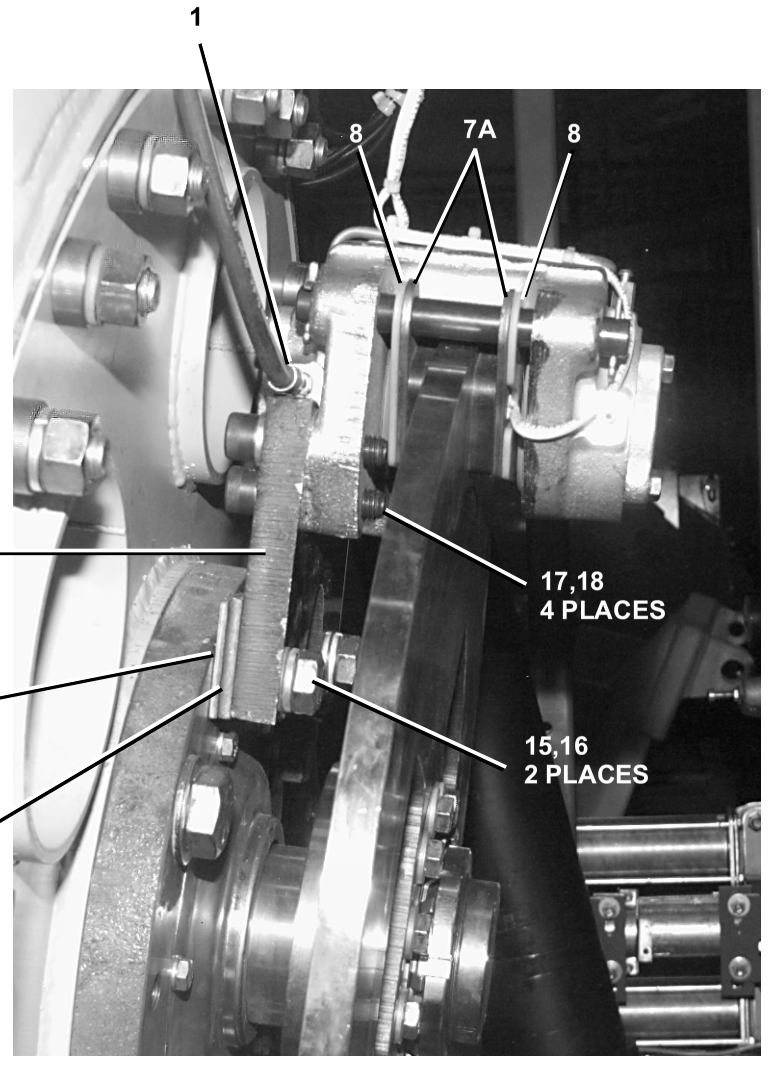

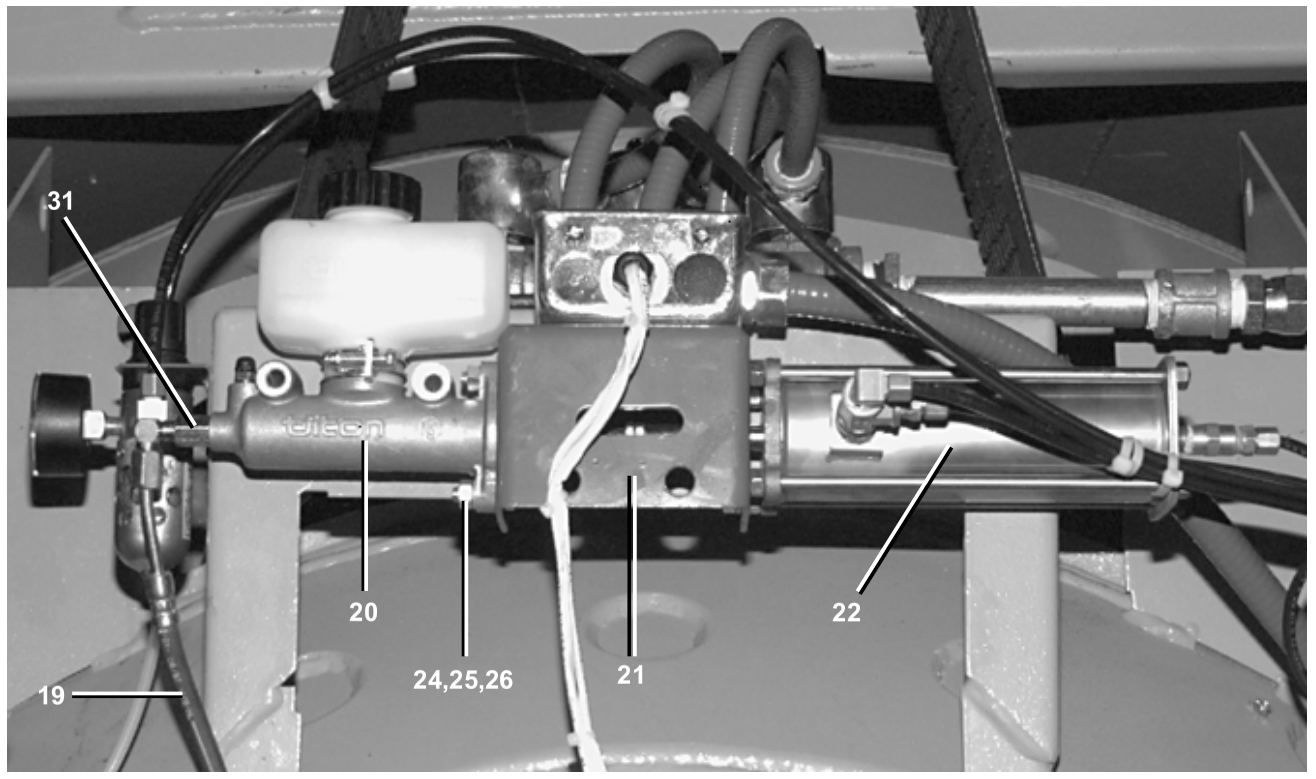

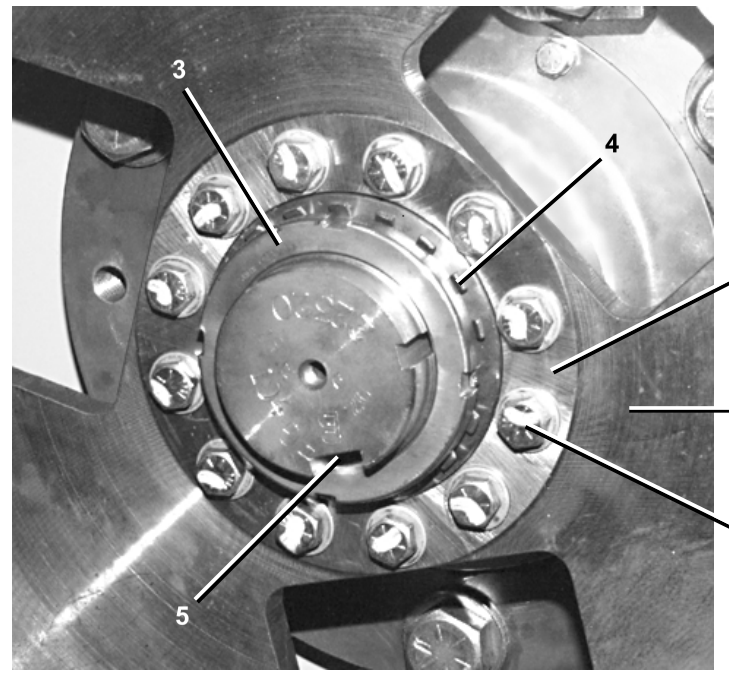

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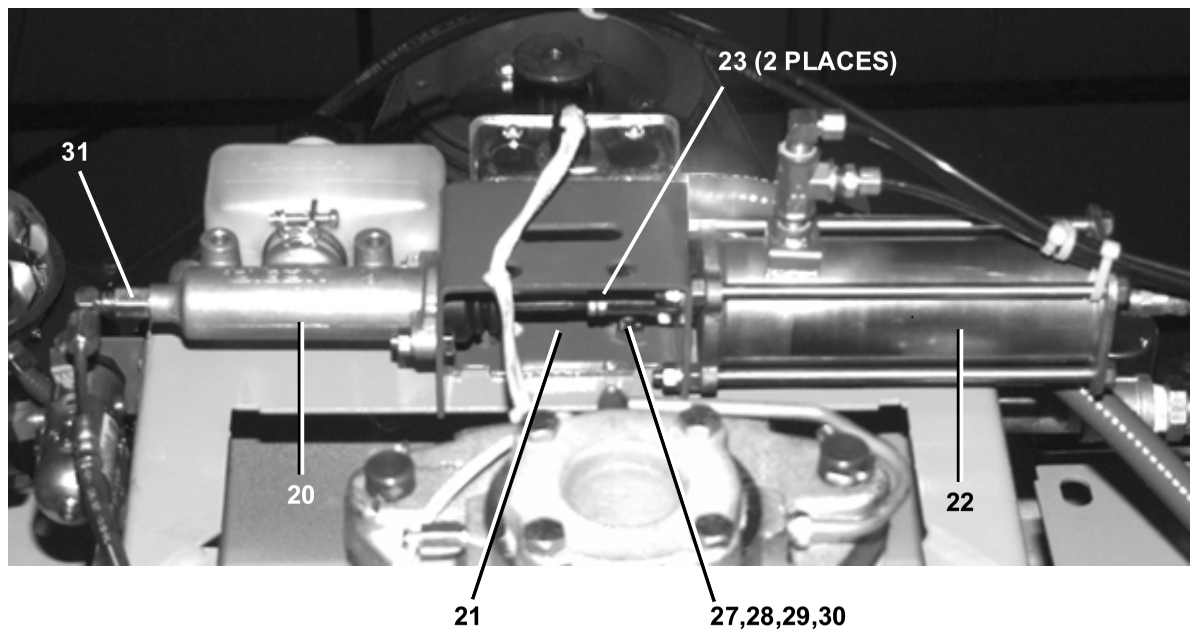

Parts List—Brake Installation

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	GBR65001A	93442Q INSTL=DISC BRAKE MOD2	ALL
	B	ABR65001A	97106C DISC BRAKE MOD2=ASSY+BALANCE	ALL
	C	GBR60002	98456N BRAKE INSTALLATION 6440	64040, 64050 ONLY
			----------COMPONENTS----------	
all	1	54KC7961B0	O-RING 08-11070 BRAKE 2-660	
all	2	ABR65001A	97106C DISC BRAKE MOD2=ASSY+BALANCE	
all	3	56AHN18	AN18 BEARING LOCKNUT	
all	4	56AHW18	W18 BEARING LOCKWASHER	
all	5	15E245	92803B SQMACHKEY 7/8X7/8 C1018	
all	6	X3 65202	93173# MACH=CALIPER MNT PLT MOD2	
all	7	54KC7961	01Z CALIPER HYD FIXMT 12/20 ROTOR	CALIPER BRAKE ASSEMBLY
	7A	54KC7961RS	00Z BRAKE PAD W/SENSOR #B99-13727	REPAIR PART FOR 7
	7B	54KC7961BG	BRAKE HOSE=1/8"X18"OAL #50612	REPAIR PART FOR 7
	7C	54KC7961BH	02Z BRAKE HOSE #W2261 1/8X18"OAL	REPAIR PART FOR 7
	7D	54KC7961BP	01Z BRAKEFLUID/PISTON KIT #98-1198	REPAIR PART FOR 7
	7E	54KC7961BS	BLEEDERSCREW#10-07721 #2-660	REPAIR PART FOR 7
`	7F	54KC7961B0	O-RING 08-11070 BRAKE 2-660	REPAIR PART FOR 7
	7G	54KC7961CT	CROSSOVERTUBEKIT HAY#B98-11700	REPAIR PART FOR 7
	7H	54KC7961H2	01Z BRAKEHOSE #W2511 1/8X32" OAL	REPAIR PART FOR 7
all	8	03 65203	95071B DISC BRAKE PAD DAMPENER 1/8T	
All	10	03 65204B	94467# 3/16 SPCR=CALIP MNT PLT MOD2	
all	11	03 65204	94467B 3/8 SPCR=CALIP MNT PLT MOD2	
all	12	03 65204A	94467# 1/4 SPCR=CALIP MNT PLT MOD2	
all	13	03 65204C	94467# 10GA SPCR=CALIP MNT PLT MOD2	
all	14	03 65204D	94467# 14GA SPCR=CALIP MNT PLT MOD2	
all	15	15K235A	03Z HXCPSC 3/4-10X2.5 GR 8	
all	16	15U340	LOCKWASH MEDIUM 3/4 ZINCPL	
all	17	15K226C	06Z SKCPSC-5/8-11X3GR8BLK HK	
all	18	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	19	54KC7961BH	02Z BRAKE HOSE #W2261 1/8X18"OAL	
all	20	54KMC1125U	01Z MASTER CYL TILTON 74-1125U	

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Parts List—Brake 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
All	21	W3 65238	95051#*WLMT=MASTER BRAKE CYL BRKT	
all	22	AAC65001	93481B AIRCYL=BRAKE ASSY 6446E6N	
all	23	15G191	HXFINJAMNUT 5/16-24UNC2 ZINC GR2	
all	24	15K065	HEXCAPSCR 5/16-18UNC2AX1 GR5 ZINC	
all	25	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
all	26	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR2	
all	27	15K088	HEXCAPSCR 3/8-16NCX7/8 GR 5 ZINC	
all	28	15U240	FLATWASHER(USS STD) 3/8" ZNC PLT	
all	29	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	30	15U205	LOCKWASHER MEDIUM 5/16" 18-8SS	
all	31	52XY0ER004	STRADTUN3/16MJX1/8FP#2405-3-2	
all	32	X3 65200	94187# MACH=DISC BRAKE DISC MOD2	
all	33	X3 65201	94147# MACH=DISC BRAKE HUB MOD2	
all	34	15K181B	02Z HEXCASCR 1/2-13X2 GR8 ZNC	
all	35	15U317B	FLTWSHR 1.0625ODX.531IDX13GA GR8 ZC	
.				

Bearing Assemblies 3

REPLACING BEARING HOUSING ON ExN AND JxN MODELS

Special Items Required

We recommend having the following items on hand before replacing a bearing housing; a replacement bearing housing, the rear bearing and seal kit (in case the rear bearing is worn or is damaged during removal), bearing fixture kit K65 0001 (containing a cylinder and trolley fixture), hydraulic pulling kit PK10 0010A or an equivalent hydraulic pump and NPT pipe fittings, Loctite 242 or equivalent, Loctite primer or equivalent. This procedure only covers bearing replacement. Due to the exacting internal tolerances bearing housings require, we do not recommend that you re-build the bearing housing, but suggest that it be returned to Milnor for re-building or exchange.

Approximate Component Weights

Component	Pounds	Kilograms
Cylinder	1200	550
Bearing housing	1000	450
Pulley	330	150

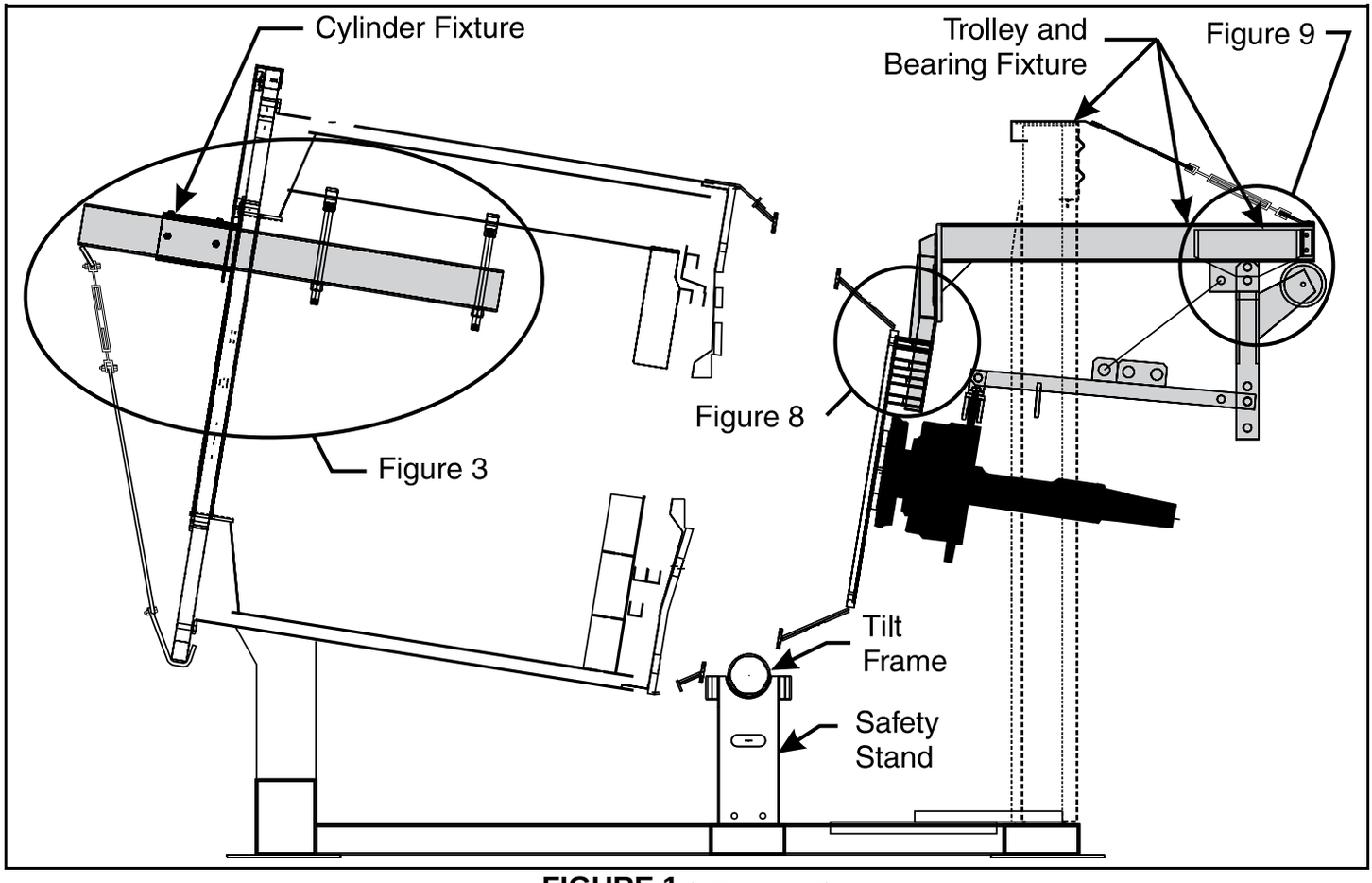


FIGURE 1 (MSSMA430AE)
Overview of Bearing Housing Removal Kit in Use

Removing the Rear Bearing and Front Bearing Housing

⚠ DANGER ⚠

ENTANGLE AND CRUSH HAZARD—Machine components can entangle and crush body parts.

- ☞ **Permit only qualified maintenance personnel to perform these procedures.**
- ☞ **Install safety stands.**
- ☞ **Lock OFF and tag out power at the wall disconnect before proceeding.**

Preparation—Referring to FIGURE 2, lower the motor platform to loosen the final drive belts. Do not move the top nut as it is a reference when retightening belts. Disconnect hydraulic hoses and remove tank. Also remove brake cover, caliper, and disk. Secure the caliper out of the way.

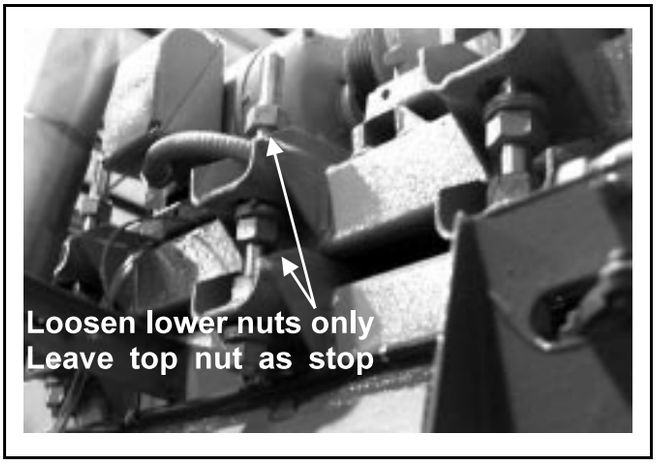


FIGURE 2 (MSSMA430AE)
Motor Platform

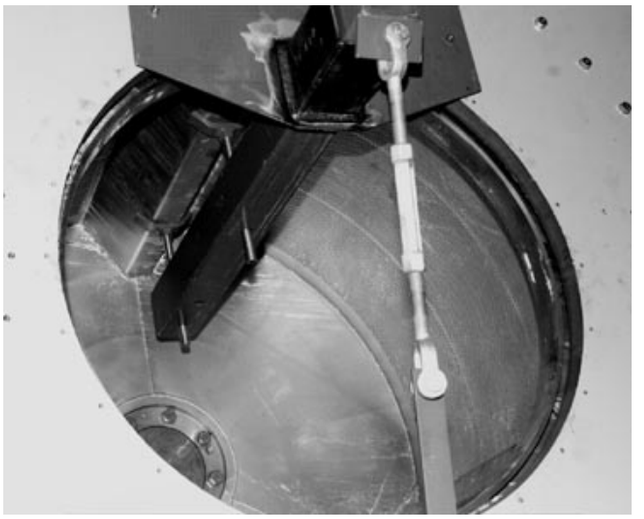


FIGURE 3 (MSSMA430AE)
Cylinder Fixture showing Y-Bolts and Turnbuckle

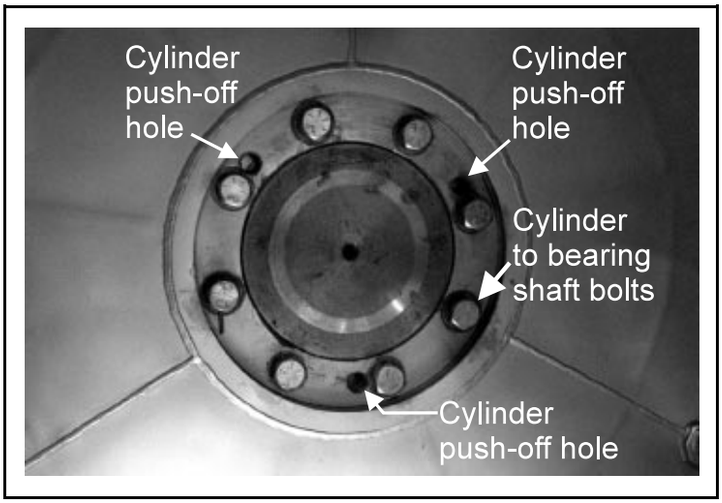


FIGURE 4 (MSSMA430AE)
Cylinder to Bearing Shaft Bolts and Cylinder Push-off Holes

Installing the Cylinder Fixture and Removing the Cylinder Bolts—For ease of re-assembly, the kit includes a cylinder fixture (FIGURES 1 and 3) to align and support the cylinder within the shell after the cylinder-to-bearing bolts are removed.

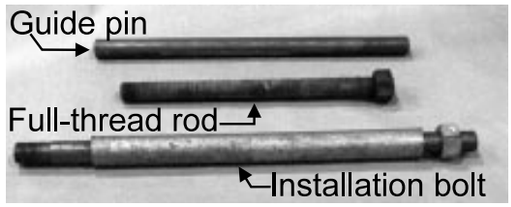


FIGURE 5 (MSSMA430AE)
Identifing Pins, Rods, and Bolts

1. Rotate cylinder by hand so that rib one (stamped on front of rib) is top dead center.
2. Install the cylinder fixture and tighten the lower turnbuckle. Position the Y bolts under rib one and tighten until bolts contact rib (FIGURE 3). Drive wedges between the cylinder and the shell front at eight places then clamp the cylinder to the shell front as shown in FIGURE 11.
3. Remove protective cover in center of the cylinder (5/16 allen wrench). Remove the plastic plugs covering the three cylinder push-off holes (FIGURE 4). Install full-thread rods (FIGURE 5) in the cylinder push-off holes. Only hand-tighten the rods at this time. Remove the cylinder-to-bearing shaft bolts (FIGURE 4).

Removing the Rear Bearing Components and Installing the Trolley

NOTICE

Machine components that are part of the balancing system, (main pully, balancing nozzles, target, and proximity switch) are precisely positioned. Scribe each of these items before removal so that they can be re-installed in the exact position.

NOTE: This procedure requires Kit PK10 0010 containing a hydraulic pump, pump adapter, and NPT fittings or the equivalent.

1. Remove the rear bearing cover, locknut, lockwasher (FIGURE 6), and the proximity switch bracket (FIGURE 7). Pump hydraulic fluid into rear of the shaft to force the inner rear bearing race off the tapered shaft (FIGURE 7). Remove rear grease lines, then unbolt the entire rear plate. Remove rear plate with outer bearing race still attached.

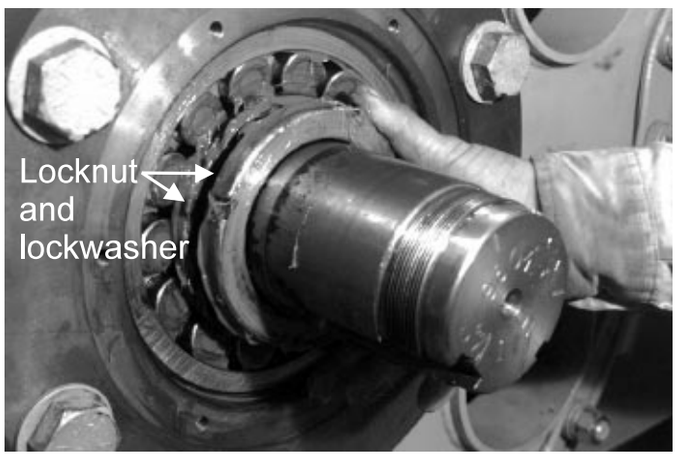


FIGURE 6 (MSSMA430AE)
Rear Bearing Details

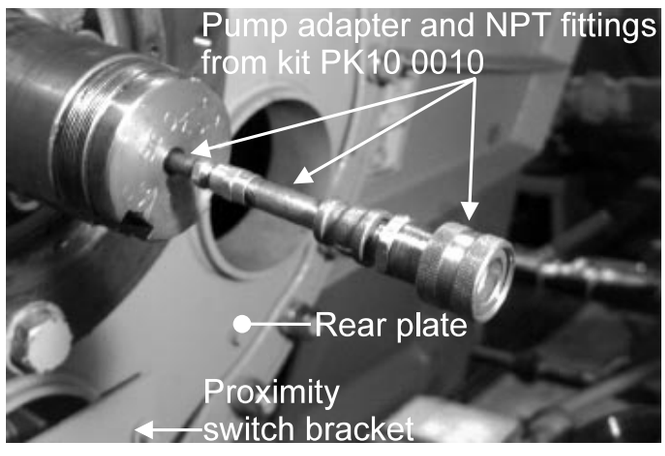


FIGURE 7 (MSSMA430AE)
Removing the Inner Race

FIGURE 8 (MSSMA430AE)
Trolley to Shell

FIGURE 9 (MSSMA430AE)
Trolley and Hoist

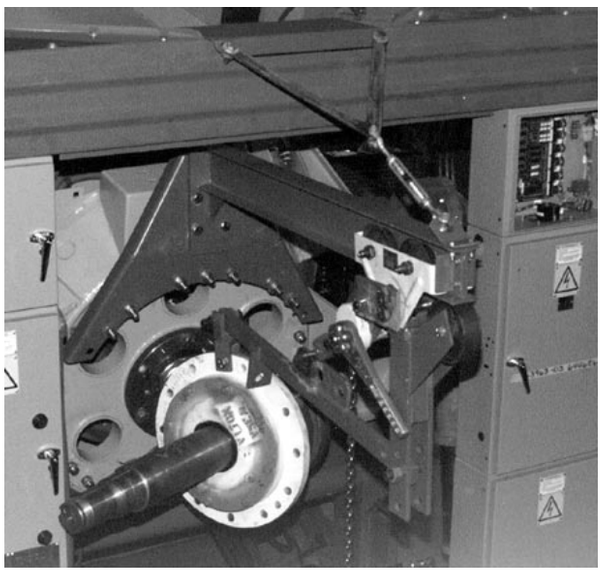


FIGURE 10 (MSSMA430AE)
Trolley and Bearing Fixture in Use

FIGURE 11 (MSSMA430AE)
Cylinder Clamp

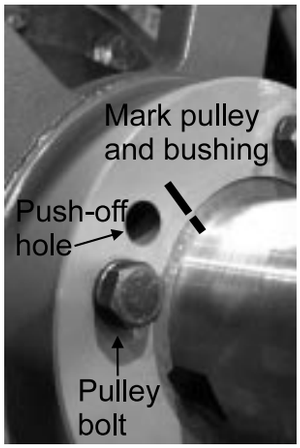


FIGURE 12 (MSSMA430AE)
Pulley Bolts and Push-Offs

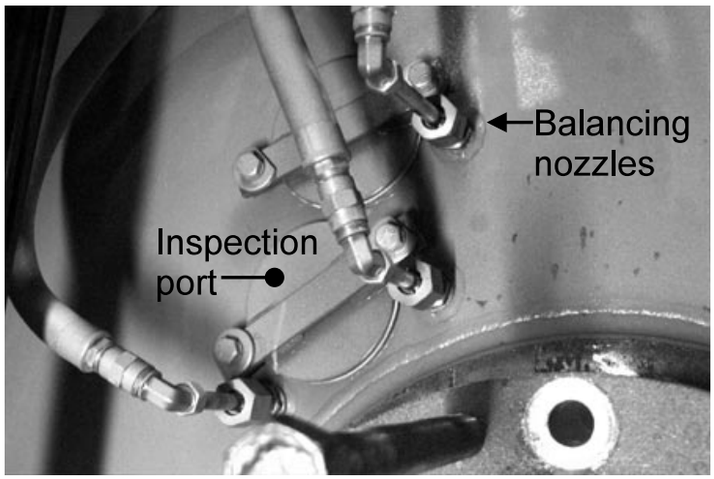


FIGURE 13 (MSSMA430AE)
Balancing Nozzle Inspection Ports

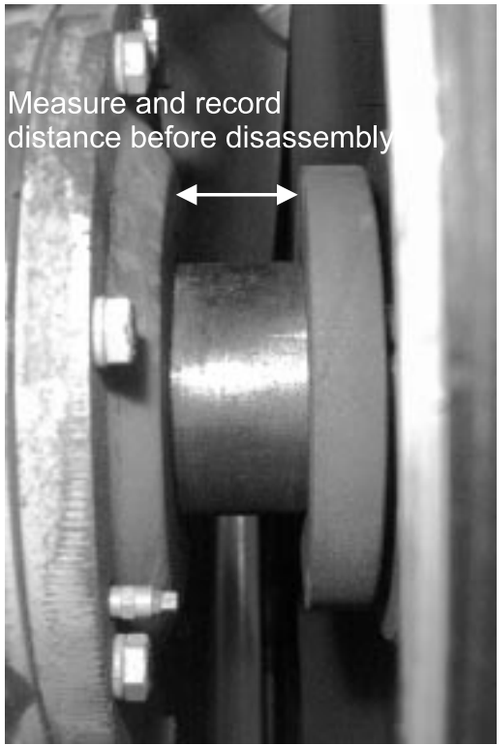


FIGURE 14 (MSSMA430AE)
Measuring from Back of Pulley Bushing to the Bearing Housing

2. Install trolley and bearing fixture (FIGURES 1, 8, 9, and 10).
3. Measure and record the distance from the back of the pulley bushing to the bearing housing (FIGURE 14), then mark or scribe the pulley and bushing joint before removing (FIGURE 12). After re-assembly, the pulley must line up exactly as removed, or the balancing system will not work.
4. Unbolt pulley then remove by threading pulley bolts into push-off holes. Remove bushing and disconnect grease lines from front housing.
5. Loosen each balancing nozzle, then reach through the inspection port (FIGURE 13), and rotate each nozzle down, out of its channel.

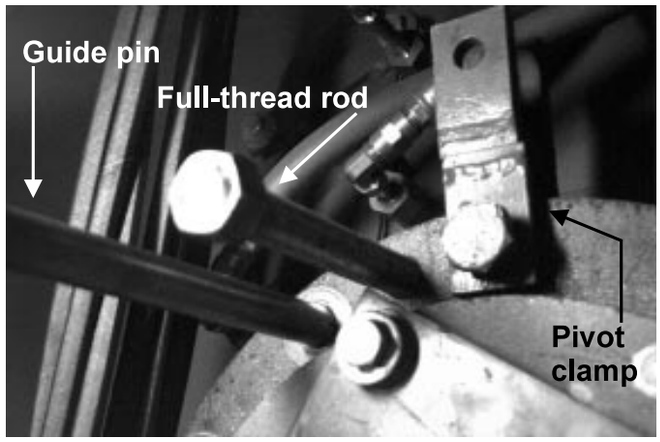


FIGURE 15 (MSSMA430AE)
Removing Housing Using Guide Pins and Full-thread Rods

⚠ DANGER ⚠

ENTANGLE AND CRUSH HAZARD—Bearing housings weigh approximately 1,000 pounds (455 kg.), and if allowed to fall, will crush anyone under it.

- ☞ **Follow procedure carefully.**
- ☞ **Bearing housing removal requires two people.**

6. Remove bearing housing bolts. Replace three of the bearing housing bolts with guide pins (FIGURES 5 and 15). These guide pins support the loosened bearing housing until the pivot clamp (FIGURES 1 and 15) and trolley can be attached. Thread three full-thread rods into the bearing housing push-off holes (FIGURE 15). From inside the cylinder, one person uses the full-thread rods (installed previously), to push the bearing housing out of the shell, while a second person at the rear of the machine uses the bearing housing full-thread rods to pull the bearing housing about one inch out of its mounting ring. **Attach pivot clamp and trolley lifting fixture as soon as possible to ensure that the housing does not drop out of the shell.** Remove the bearing housing and shaft.

FIGURE 16 (MSSMA230AE)
Bearing Setting Fixture

Re-installing the Front Bearing Housing and Rear Bearing

NOTICE

Cleanliness is very important—Foreign material is the most frequent cause of bearing failure.

- ☞ **Remove foreign material from bearing housing before installation.**
- ☞ **Clean hands, tools, and work area before installing bearing housing.**

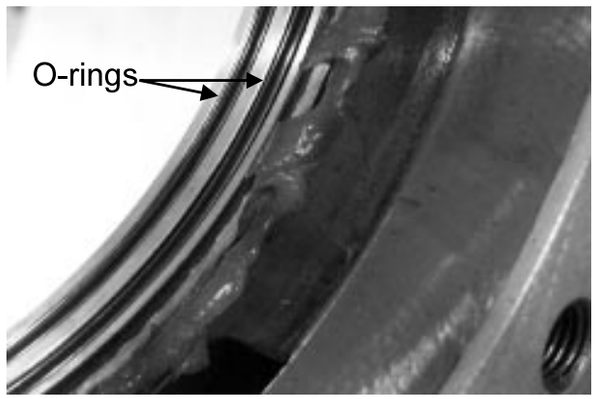


FIGURE 17 (MSSMA430AE)
Shell Back Liner Seal

1. Use trichloroethene and light sanding to remove old Loctite from the cylinder hub and shell back surfaces.
2. Clean mounting surfaces of bearing housing, shaft hub, and rear bearing taper.
3. Replace shell back liner O-rings (FIGURE 17) and coat with grease. Install a new shaft hub O-ring.

NOTICE

Loctite cures in one-half hour after mating parts. Make sure you have ample time to install housing before applying.

4. Apply Loctite primer to machine, housing, and shaft hub surfaces. Do not wipe clean. Apply Loctite 242 to primered surfaces.
5. Position housing and shaft in machine. Make sure the bottom of the housing (identified by the cast drain slot) is on the bottom. Leave bearing setting fixture (FIGURE 16) attached until bearing is securely mounted in shell back mounting ring.

⚠ CAUTION ⚠

CYLINDER AND BEARING DAMAGE—the cylinder and main bearing could be ruined if the cylinder contacts shell front while tightening bolts.

- ☞ **Proceed with caution.**

6. Install three guide pins through the bearing housing and into the mounting ring. From inside the cylinder, install three all-thread rods through the cylinder and into the shaft hub to align the cylinder and the shaft. Using the installation bolts (FIGURE 5), draw the housing one eighth-inch (3 mm) into the mounting ring. Tighten the all-thread rods and draw the cylinder one inch (25mm) onto the shaft. Repeat this procedure, tightening the housing one-half inch (13mm) and the cylinder one-half inch (13mm) until both seat firmly. Torque housing and cylinder bolts to 500 foot-pounds (69 Kg/m). Remove bearing setting fixture.

7. Re-assemble the main pulley and grease inlet lines. Locate belts on pulley. Re-install the rear plate. **Install the rear bearing using light taps of a soft mallet to gently drive the bearing into position.**

8. Hand pack the rear bearing with grease by rotating the inner race and rollers out of the outer race and forcing grease into all the rollers, making certain all rollers are covered with grease. Tighten the locknut to the proper internal clearances, using the procedure explained in "How to Adjust Rear Bearing". Remove the cylinder fixture. Re-install the brake assembly and tighten belts.

NOTE: The setting procedure for spherical self-aligning bearings requires greater skill and attention to detail than needed with non-spherical bearings. Visit your local bearing supplier, bring this section with you, and have him demonstrate in detail how to adjust this type of bearing and how to use the feeler gauge to get the proper "reading".

How to Adjust Rear Bearing—Tightening the bearing locknut adjusts the radial internal clearance. Follow these instructions carefully, as this is a precise operation. Setting the internal radial clearance is necessary to:

- Make the best of the bearing anti-frictional values (preventing rapid failure).
- Ensure that the bearing seats tightly on the tapered shaft (this is mandatory).

Before installing the bearing in the housing, stand the new bearing on the outer race on a clean flat surface and align the two rows of rollers with each other (as shown in FIGURE 18). Accurately measure the existing clearance with a feeler gauge between the top rollers and the outer race (shown in FIGURE 19). Make four such measurements and average them. This is the "unmounted radial clearance". Compare the measurements with the unmounted clearance shown below. Do not use bearings that are not within specifications.

Rear Bearing Specifications

Milnor part number	NTN part number	Radial internal clearance inches (millimeters)	
		Unmounted	Mounted
56S22320T	22320BLIKD1C3	.0053 - .0066 (.1350 - .1700)	.0029 - .0043 (.0750 - .1100)
56S22322T	22322BLIKD1C3		.0033 - .0039 (.0850 - .1000)

NOTICE

Keep bearings clean and free from all foreign matter during installation and setting.

These clearances are measured in thousands of an inch - or approximately one tenth as thick as normal automobile breaker point clearances. You must have a good set of thickness gauges to set these bearings properly.

After installing the bearing in the housing, slowly tighten the bearing locknut until the internal clearances fall within the mounted clearance range shown above. Measure clearance near the bottom of the bearing (FIGURE 20), between the outer race and the rollers of both rows. Turn the cylinder after each adjustment to keep all the load from being taken by only one row (although the load would quickly equalize on both rows after the machine has run for

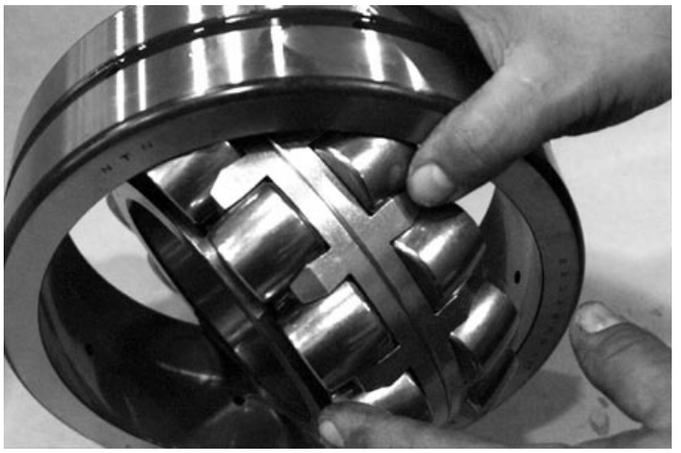


FIGURE 18 (MSSMA430AE)
Aligning the Two Rows of Rollers

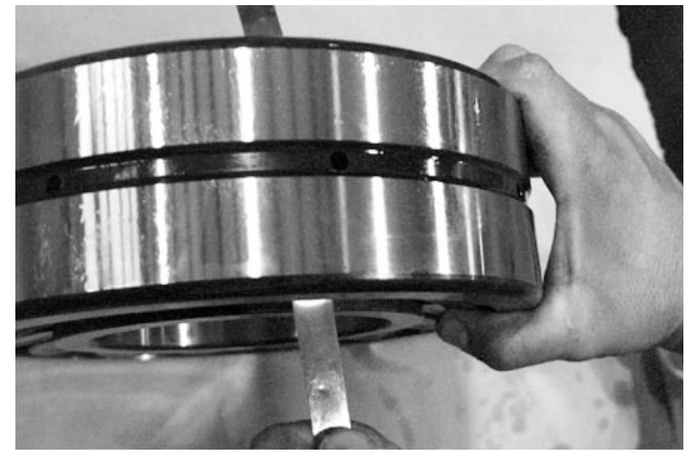


FIGURE 19 (MSSMA430AE)
Determining Unmounted Radial Clearance

only a few moments). 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 on both sets of rollers (shown in FIGURE 21). With the bearing in place on the machine, it is difficult to get a feeler gauge back past the first row of rollers to measure the second, but it must be done.

After the correct internal clearance is set, lock the nut by bending over the matching tabs on the lockwasher. Make sure that all unused tabs on the lockwasher 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 ensure this.

FIGURE 20 (MSSMA430AE)
Where to Measure Internal Radial Clearance

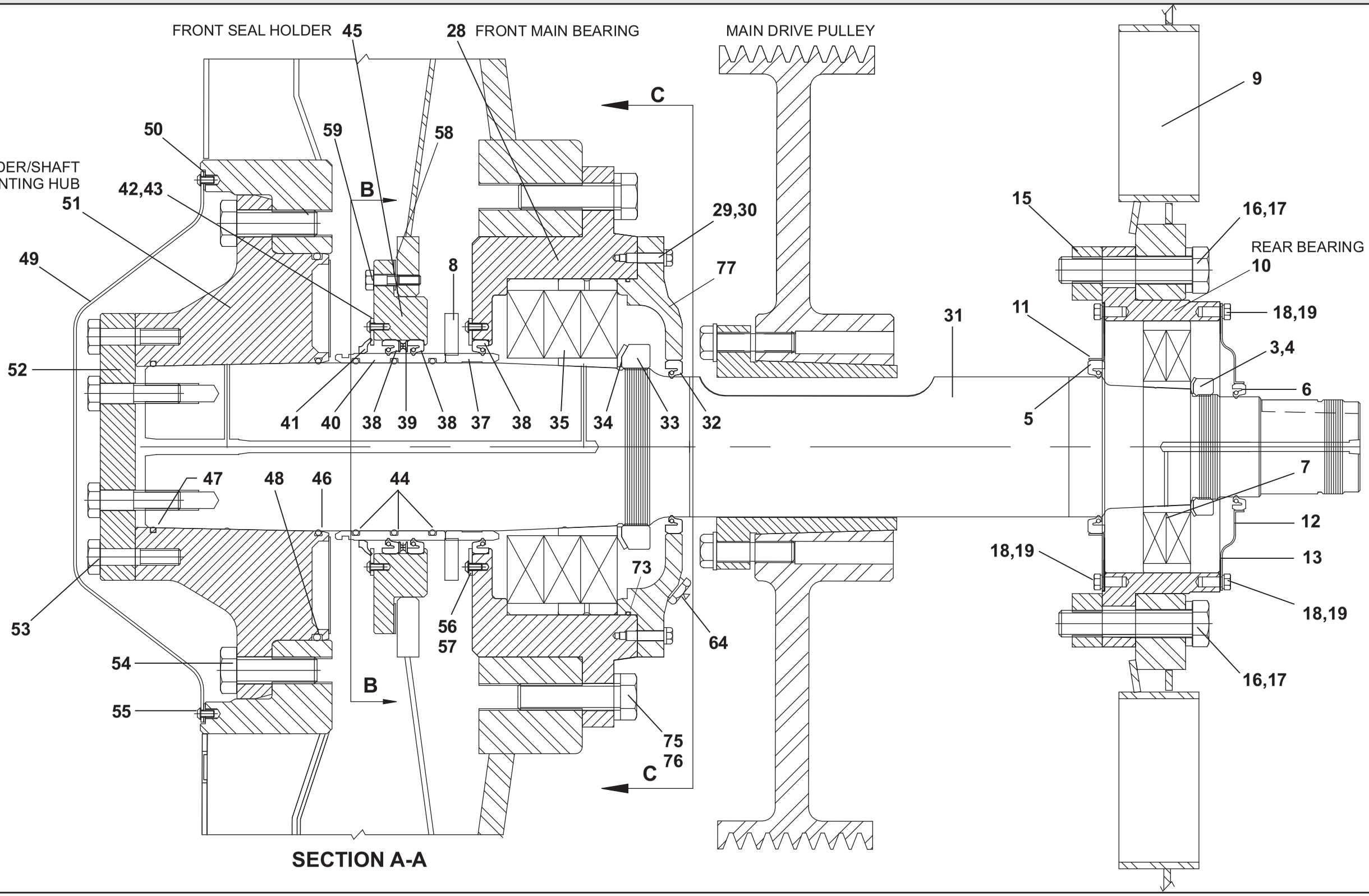
FIGURE 21 (MSSMA430AE)
Determining Internal Radial Clearance

Bearing Installation

64040E6N, 64050E6N

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

Litho in U.S.A.



Bearing Installation

64040E6N, 64050E6N

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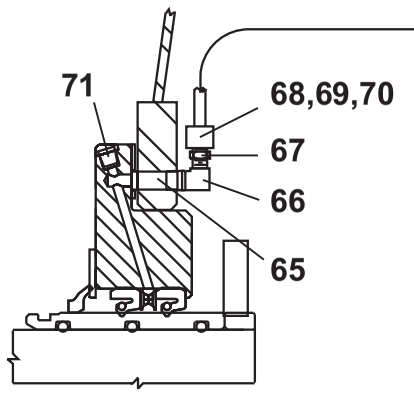
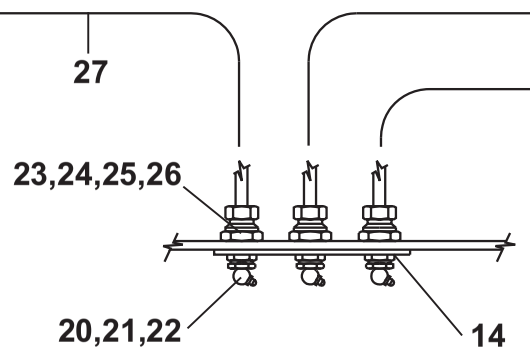
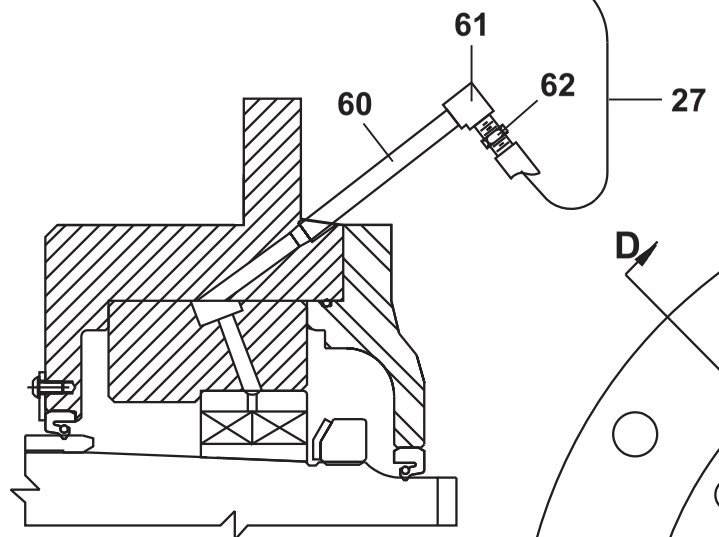
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

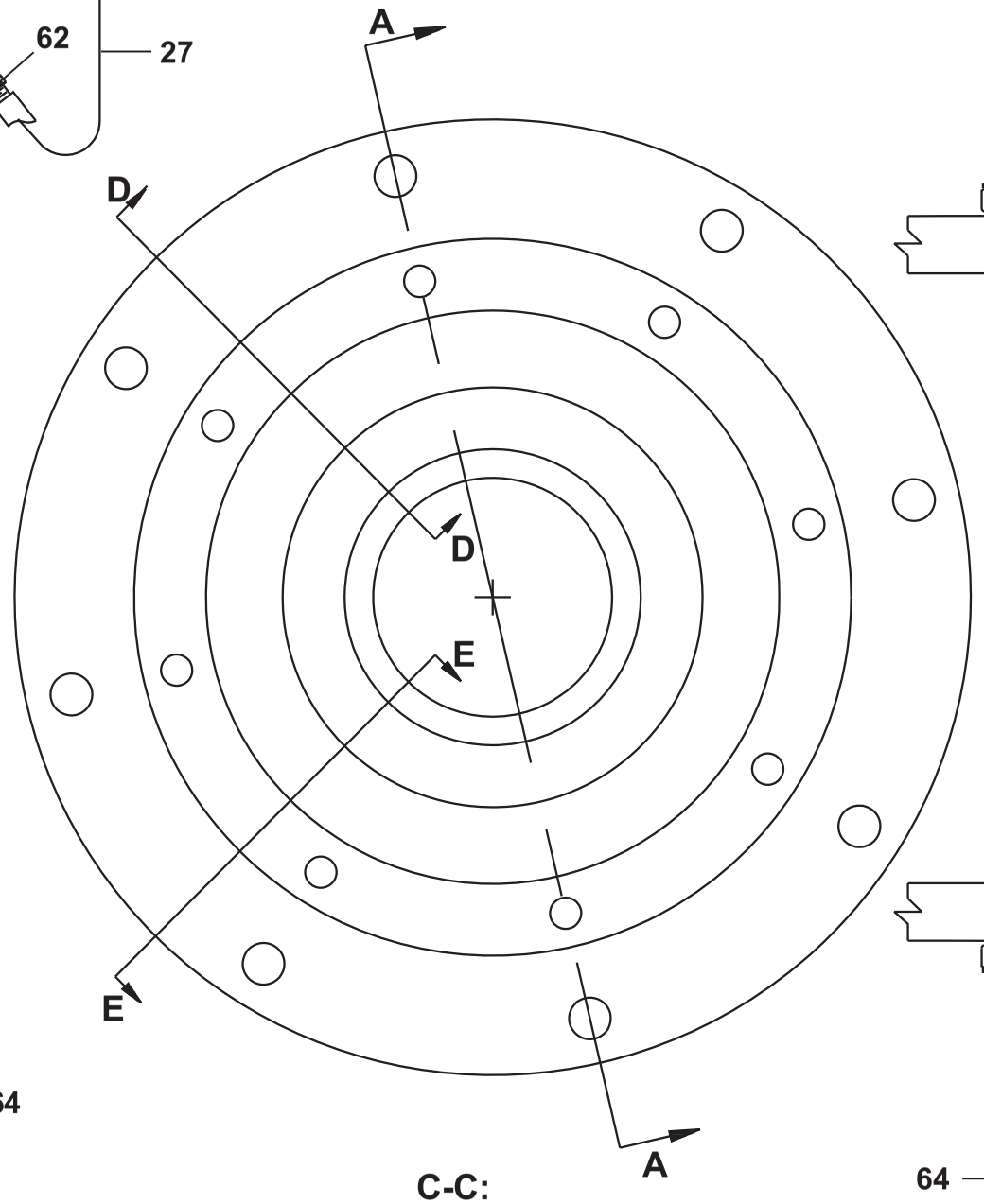


F-F:
GREASE INLET
TO SEALS

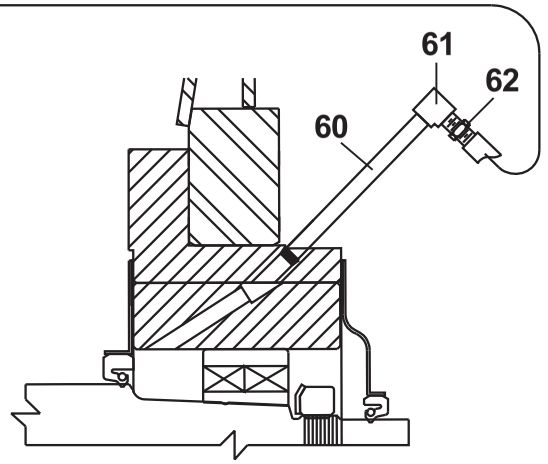




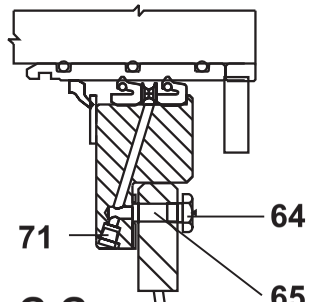
D-D:MAIN BEARING
GREASE INLET



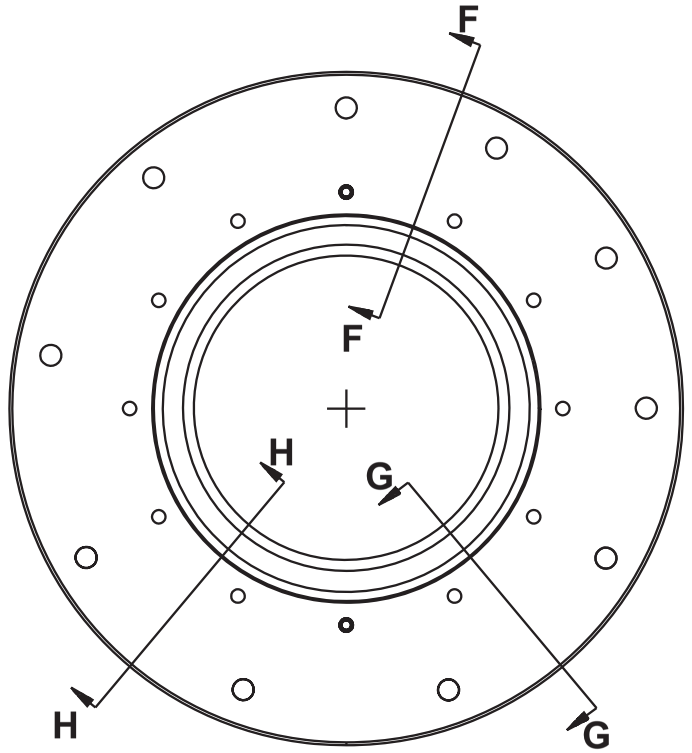
C-C:
MAIN BEARING



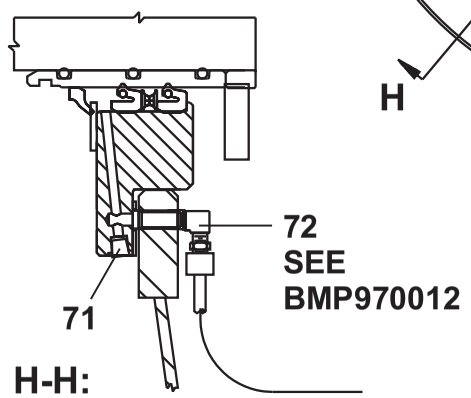
REAR BEARING
GREASE INLET



G-G:
GREASE REFIEF
FOR SEALS

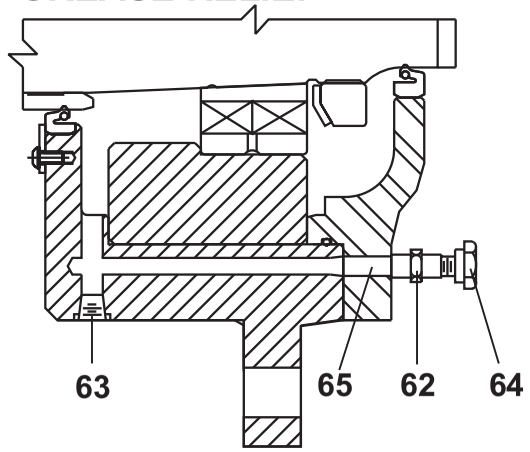


B-B
FRONT SEAL

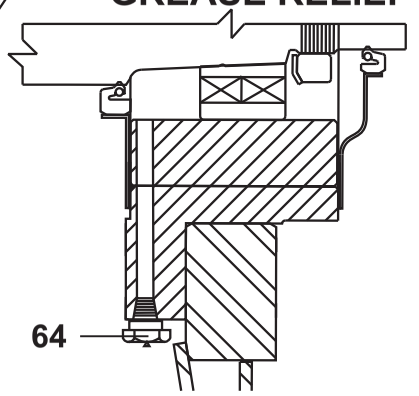


H-H:
FRONT SEAL
AIR INJECT

E-E:MAIN BEARING
GREASE RELIEF



REAR BEARING
GREASE RELIEF



Bearing Installation

64040E6N, 64050E6N

Pellerin Milnor Corporation
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Parts List—Bearing 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	GBM60001	97000Z INST=MAIN FRONT+REAR BEARINGS	
	B	GBM60010FE	97000Z INST=STD FRONT SEAL+CYL MT HUB	STANDARD
	C	GBM60010FV	97000Z INST=VTN FRONT SEAL+CYL MT HUB	VITON
	D	ABN60001	99000Z ASSY=FRNTBG HSE+SHAFT 6440/50	
	E	ABM60001	97000Z ASSY=FRONT MAIN BEARING 6440/50	
	F	ABM60005	97000Z PRTS=REAR MAIN B.HOUSE	
	G	ABM60005A	97000Z PRTS=REAR B.HOUSE MNT PLATE	
	H	AIR58003	97000Z AIR INJECT ASSY=BNG HOUSE	
	J	ABM60010HS	97000Z PRTS=STNRD CYL/SHAFT MNT HUB	
	K	ABM60010SS	97000Z PRTS=STANDARD FRONT SEALS	
	L	ABM60010HV	97000Z PRTS=VITON CYL/SHAFT MNT HUB	
	M	ABM60010SV	97000Z PRTS=VITON FRONT SEALS	
			COMPONENTS	
F	3	56AHN20	AN20 BEARING LOCKNUT	
F	4	56AHW20	W20 BEARING LOCKWASHER	
F	5	24S127	06ZSEAL5.25X6.50X.625 JM#7112LUP	
F	6	24S112	03Z SEAL 3.75X4.75X.500 CS/BUNA	
F	7	56S22320T	05Z SPHEROLBRG KOYO#22320RKW33C3F	
K,M	8	03 60106	97156C SLINGER=BRG FRNT SEALS	
G	9	W3 60100	97282D*WLMT=MAIN MNT RING RR BRG HS	
F	10	X3 60095	97036D MACH=REAR FLT BRG HOUSE 6440	
F	11	03 25131	73037A SEALHOLDER=REAR BRNG 17.5SU	
F	12	03 25134	73067C SEALHOLDER REAR BRG XTENSION	
F	13	03 25137	92627A GASKET=REAR BRG SEAL HOLDER	
all	14	01 10025X	97263B NPLT:BEARING+SEAL LUB - ISO	
F	15	X3 60096	97076B DRILL=BOLT RING REAR BRG HS	
F	16	15K300	HXCAPSCR 1-8UNC2A X4.5 SAE GR5	
F	17	15U393	03Z FLATWASHER 1"GR 9 ZN DICHR	
F	18	15K083	HXCAPSCR 3/8-16 UNC2AX1/2 GR5 ZNC	
F	19	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	20	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	21	54M020	GREASEFIT 30DEG 1611-B ALEMITE	
all	22	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	23	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	24	53A500	1/4" SLEEVE-DELRIN	
all	25	53A501	TUBEINSERT .170"OD	
all	26	53A007B	BODYFEMCON.25X.25COMP#B66A-4B	
all	27	60E004TC	02ZTUBING NYL(NAT)1/4"ODX.17ID *	
D	028	X3 60090	97512D MACH=FRNT BEARING HOUSE	
all	29	15K225	05Z HXCPSCR 5/8-11X2+1/2	
all	30	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
D	31	X3 60081	97351E MACH=MAIN SHAFT 6440	
E	32	24S127	06ZSEAL5.25X6.50X.625 JM#7112LUP	
E	33	56AHN30	AN30 BEARING LOCKNUT	
E	34	56AHW30	W30 BEARING LOCKWASHER	
E	35	56S22330T	SPHEROLBRG 22330LBK-C3-W33-C40	
E	37	X3 60084	97032C SLEEVE=GRS SEAL PRESFIT	
M	38	24S130V	05ZSEAL7.0X8.0X.625 JM#19636LUPV	
K	38	24S130	04Z SEAL 7X8X.625 JM#6862 NITRILE	
K,M	39	24S130LR	96523C LANTERN RING=7X8X.313	
K,M	40	X3 60084A	97302C SLEEVE=H2O SEAL ORING	
M	41	24S146V	00Z SEAL 7.0X8.0X.437 TYPE SSW VIT	
K	41	24S146	00Z SEAL 7.0X8.0X.437 TYPE SSW NTRL	
K,M	42	X3 60088	97057B MACH=EXCLUDER WEAR PLT	
K,M	43	15K106E	BUTSOKCAPSCR 3/8-16NCX1+1/2 SS	
M	44	60C160DV	O-RING 6.25NDX3/16CSY1TON 70DUR#362	

Parts List, cont.—Bearing Installation

Used In	Item	Part Number	Description	Comments
K	44	60C160DB	O-RING 6.25NDX3/16CSBUNA-N70DUR#362	
K,M	45	X3 60087	97297D MACH=FRNT SEAL HOLDER	
L	46	60C160DV	O-RING 6.25NDX3/16CSY1TON 70DUR#362	
J	46	60C160DB	O-RING 6.25NDX3/16CSBUNA-N70DUR#362	
J	47	60C159W	ORING5.97ID3/16CS BUNA70 #361	
L	47	60C159X	ORING5.97IDX3/16 VITON 70 #361	
J	48	60C190	ORING 13.9"IDX1/4CS BUNA-N 70 #457	
L	48	60C190D	ORING 13.9IDX1/4CS VITON #457	
J,L	49	X3 60085	97096C DRILL=COVER CYL/SHFT MNT HUB	
J,L	50	03 60085A	97031B GASKT=CVR CYL/SHT HUB	
J,L	51	Y3 60082	97167D MACH=CYL/SHFT MNT HUB	
J,L	52	X3 60089	97123C MACH=WASHER CYL/SHFT MNT HUB	
J,L	53	15K240D	HEXCAPSCR 3/4-16X3 GR8 ZNC	
J,L	54	15K235K	02Z HXCAPSCR 1-14X3 GR 8 ZINC	
J,L	55	15K086E	BUTSOKCAPSCR 3/8-16X3/4SS NYPT	
all	56	X3 60088	97057B MACH=EXCLUDER WEAR PLT	
K,M	57	15K031A	BUTSOKLOKCAPSCR 1/4-20X1/2 188	
K,M	58	03 60087A	97031B GSKT=FRNT SEAL HOLDER	
all	59	15K100	HEXCAPSCR 3/8-16X1+1/4 SS18-8	
all	60	5N0C03AG42	NPT NIP 1/8X3 TBE GALSTL SK40	
all	61	5SL0CBEA	NPTELB 90DEG 1/8 BRASS 125#	
all	62	53A005B	BODYMALCON1/4X1/8COMP #B68A-4A	
all	63	51P013	PLUG HXCNTRSUNK 1/4"BRASS	
all	64	54M029	RELIEFFIT 1/8STR ALEMITE 47200	
all	65	5N0C01KG42	NPT NIP 1/8X1.5 TBE GALSTL S40	
all	66	5SL0CBEA	NPTELB 90DEG 1/8 BRASS 125#	
all	67	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	68	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	69	53A500	1/4" SLEEVE-DELRIN	
all	70	53A501	TUBEINSERT .170"OD	
all	71	5SP0CBEHS	NPT PLUG 1/8 HXCTRSNK BRASS	
all	72	AIR58003	97000Z AIR INJECT ASSY=BNG HOUSE	
E	73	60C186	ORING 12.0IDX1/8CS BUNA-N 70 #278	
E	75	15K236C	09Z HXCPSCR-1-8X2.75 GR8/ZC	
E	76	15U393	FLTWASH 1"ZNC DICR	
E	77	X3 25107S	98436C MACH=FRBRGCAP=RR LEAKOFF/AIR	

Air Inject Assembly

52038WP1/WTL/WTN 64046E6N,J6N 72046E5N/J5N, 72058J5N

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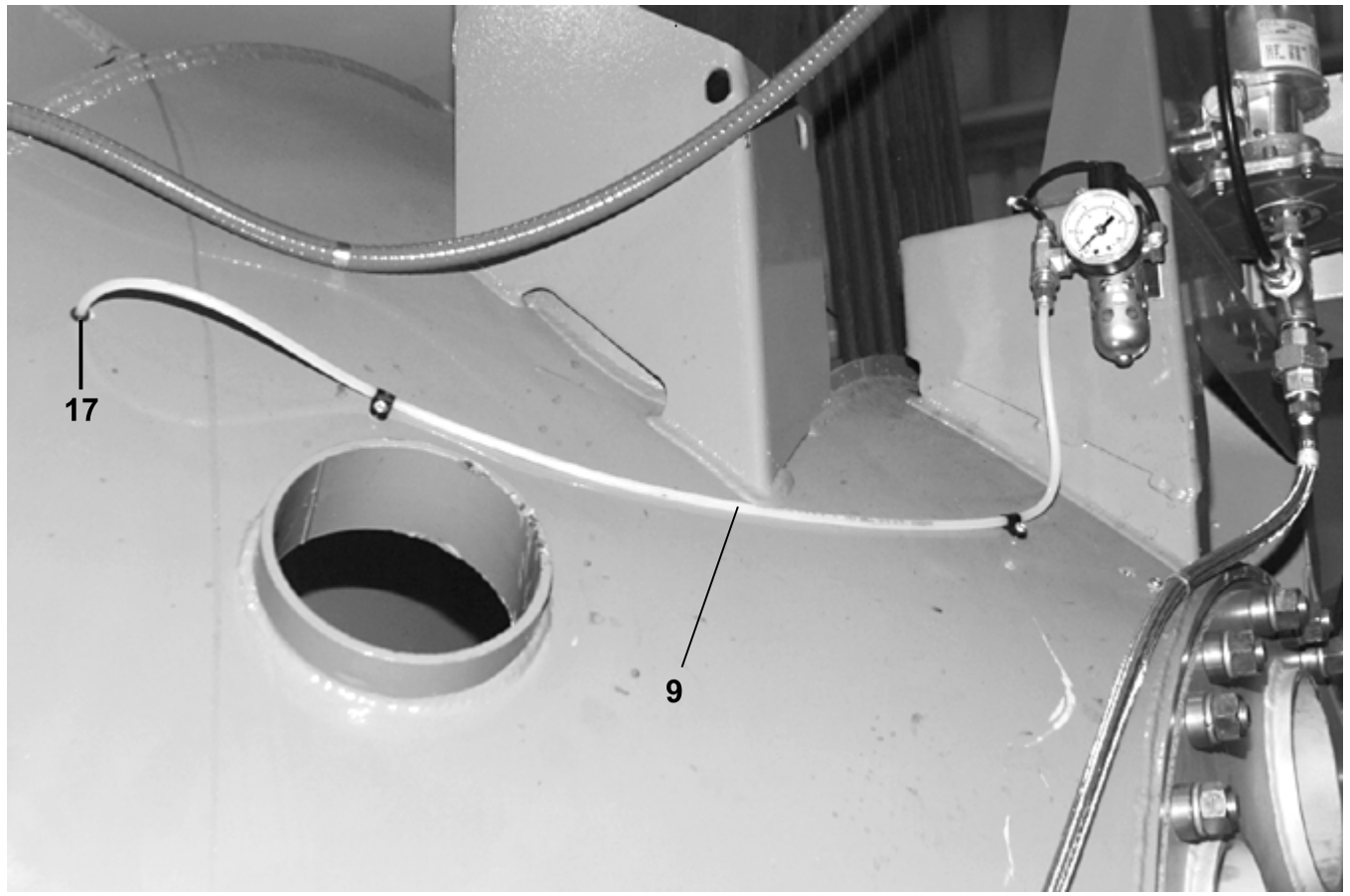

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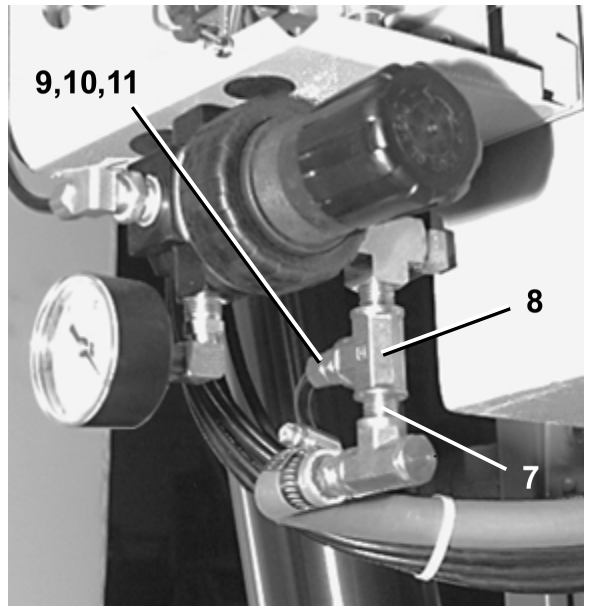
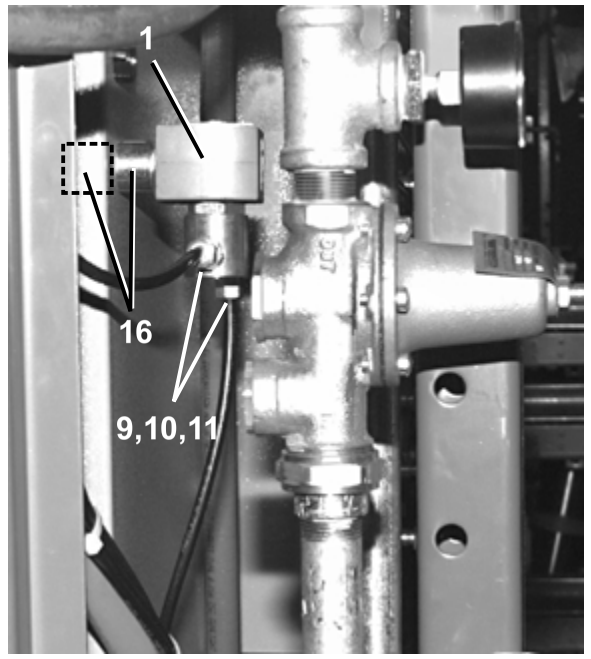
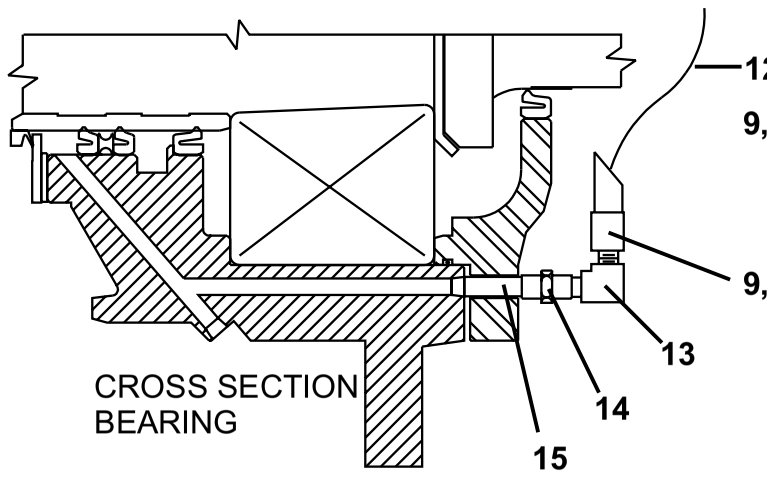
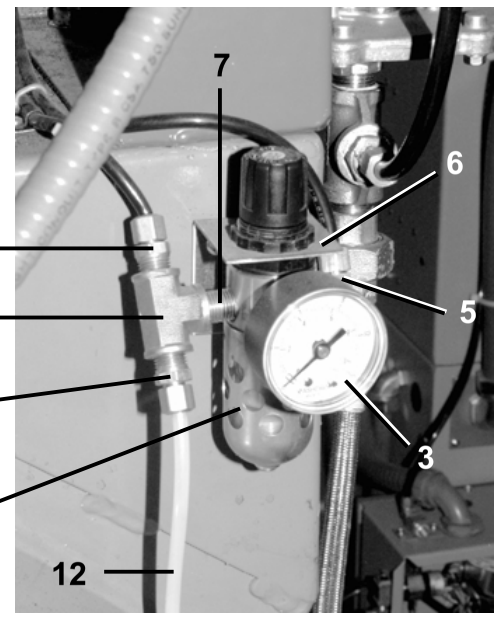


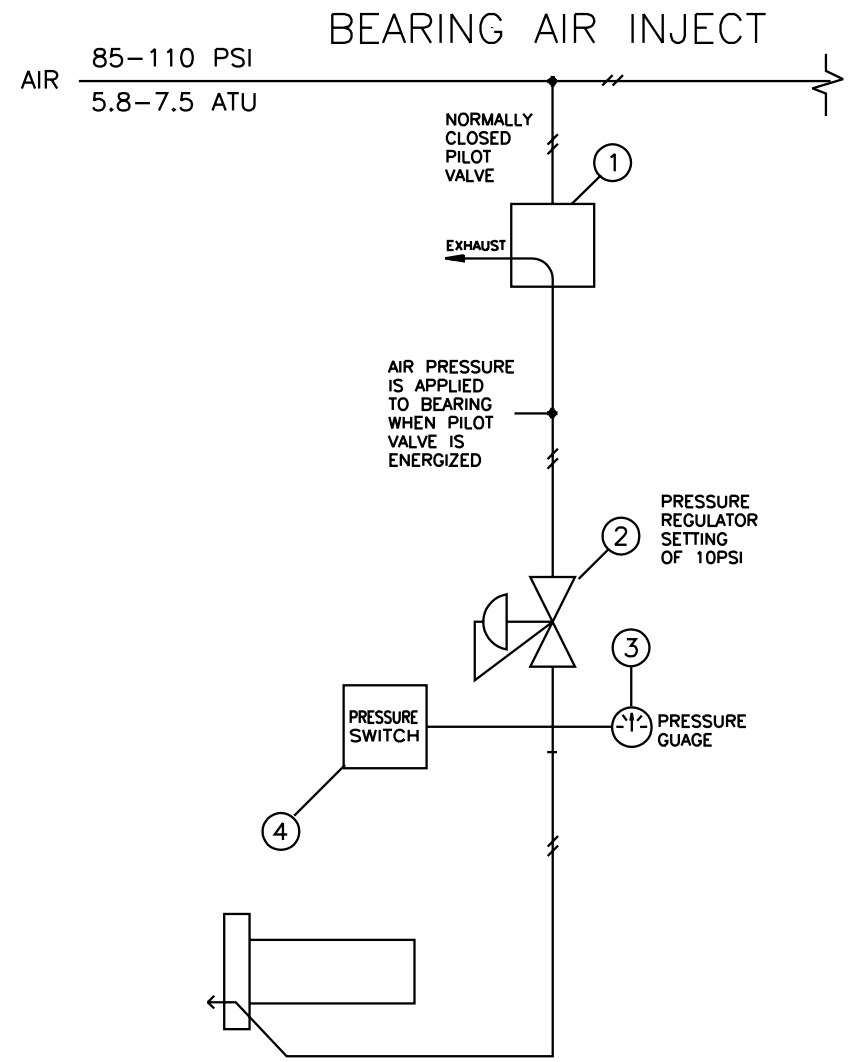
Main Air



Pilot Valve







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Parts List—Air Inject 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	AIR58003	97000Z AIR INJECT ASSY=BNG HOUSE	
			----------COMPONENTS----------	
all	1	96TBC2BA37	04Z 1/4" N/C 2WAY 120V50/60C VALVE	
all	2	96J019G	1/4"FILTERREG 0-60PSI	
all	3	30N095	03ZPRESSGAUGE 1/8"BACKCN.0-15PSI	
all	4	09N082B05	00Z PRESSW NASON CLOSE @ 5 LB	
all	5	53A031XB	BODY-EL90MALE.25X25 #269C-4-4B	
all	6	03 01666	97141B FILTER REG SUPPORT BKT	
all	7	5N0ECLSBE2	NPT NIP 1/4XCLS TBE BRASS 125#	
all	8	51V015	03Z TEE PIPE 1/4"FGDBRASS101-T7-444	
all	9	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	10	53A500	1/4" SLEEVE-DELRIN	
all	11	53A501	TUBEINSERT .170"OD	
all	12	60E004TC	02ZTUBING NYL(NAT)1/4"ODX.17ID *	
all	13	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
all	14	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	15	5N0C01KG42	NPT NIP 1/8X1.5 TBE GALSTL S40	
all	16	15K005	04Z SKCPSCR 6-32X3/8 SELFOK	
all	17	12P1AGSB	SNAPBUSH 3/8"MH X 1/4" T=1/8	

REPLACING JxN & FxN WATER SEALS

MSSM0275AE/2009443A

Background—JxN models manufactured after June 11, 1997 (97241), & all 68036F5N models are fitted with a new type of bearing housing featuring an easily removable water seal holder and a replaceable shaft sleeve. Two technicians (working with ordinary hand tools from the inside of the machine) can change the water seals and the shaft sleeve. Previously, the entire bearing housing had to be removed.

Buna-N water seals are standard on textile machines due to their superior abrasion resistance qualities. Viton water seals are optional. Viton seals have a somewhat greater resistance to industrial chemicals and are recommended for applications where either the wash liquors or the chemicals contain a small percentage of solvents due to the nature of the goods being processed (e.g., industrial garments).

Preparations—Have the following items on hand before replacing water seals: seal removal kit KFBBSL72J2, and either Buna-N seal kit KFBBSH72J2 or Viton seal kit KFBBSV72J2. This procedure only covers replacing water seals; see MSSMA430AE for bearing removal information. Before beginning, study FIGURE 1 and read through this procedure in order to become familiar with the main bearing components and the seal replacement process.

DANGER: Entangle and Sever 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 machine unless qualified and authorized.**
- ☞ **Lock off and tag out power at the main machine disconnect before servicing, or in accordance with factory service procedures.**

DANGER: 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 throughly purged, flushed, drained, cooled, and immobilized.**

DANGER: 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

- ☞ **Viton seals do not render the machine explosion proof or make it suitable for any type of solvent cleaning process.**
- ☞ **Do not use flammable solvents in processing.**
- ☞ **Laundry-type machines must not be used to process goods containing any significant quantity of flammable solvent that might burn or explode.**
- ☞ **Thoroughly flush all flammable-soiled goods with multiple cold baths before any hot bath. Consult with your local fire department/public safety office and all insurance providers.**

Approximate Component Weights

Component	Pounds	Kilograms
Hub	225	103
Shaft cap fixture	33	15
Seal holder	33	15

Supporting the Cylinder

1. Rotate cylinder by hand so that *rib 1* (rib number stamped on front of rib) is top dead center. Drive wedges between the cylinder and shell front at eight places then clamp the cylinder to the shell front (shown in FIGURE 2).
2. Remove the short bolts that plug the cylinder support weldments and replace with the long bolts included in the kit (FIGURE 3). Tighten each bolt until it contacts the cylinder then tighten an additional quarter turn.
3. Remove cover plate in the center of the cylinder (FIGURE 1).

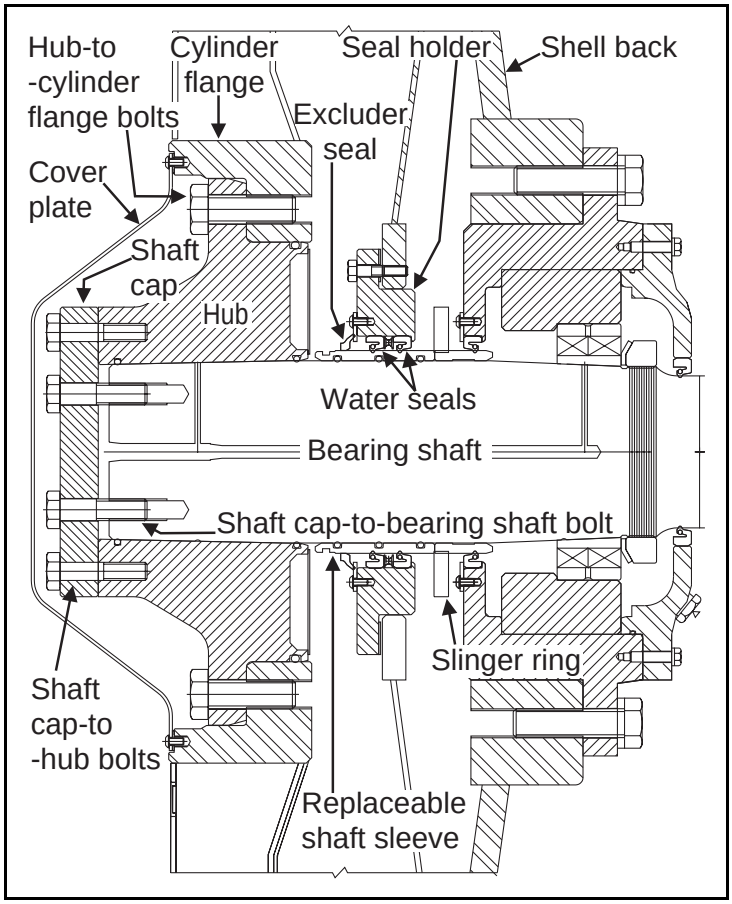

FIGURE 1 (MSSM0275AE)
Overview of Main Bearing Showing Water Seal Components

FIGURE 2 (MSSM0275AE)
Clamping the Cylinder to the Shell Front

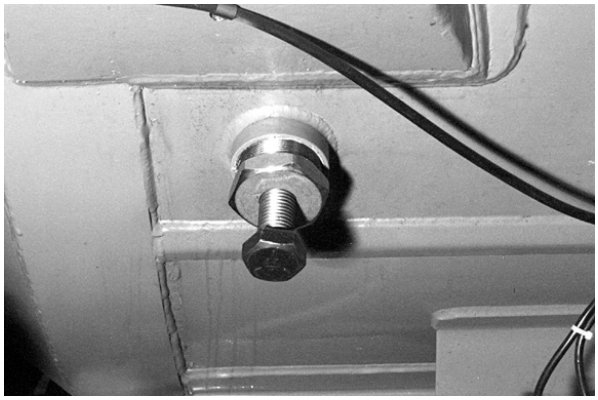

FIGURE 3 (MSSM0275AE)
Cylinder Support Weldment and Long Bolt

WARNING:Crush Hazard

ENTANGLE AND CRUSH HAZARD—Hub weighs approximately 225 pounds (103 kg.), and if allowed to fall, will crush body parts under it.

- ☞ **Follow procedure carefully.**
- ☞ **Hub removal requires two people.**

Removing the Hub

1. Remove three of the *hub-to-cylinder flange bolts (*FIGURE 4) and replace them with *guide pins* (supplied in kit) as shown in FIGURE 6. These *guide pins* support the hub during the seal holder and shaft sleeve replacement procedure. Remove the rest of the *hub-to-cylinder flange* bolts after the *guide pins* are in place.

2. Install two *hub push-off* bolts (FIGURES 4 and 6).

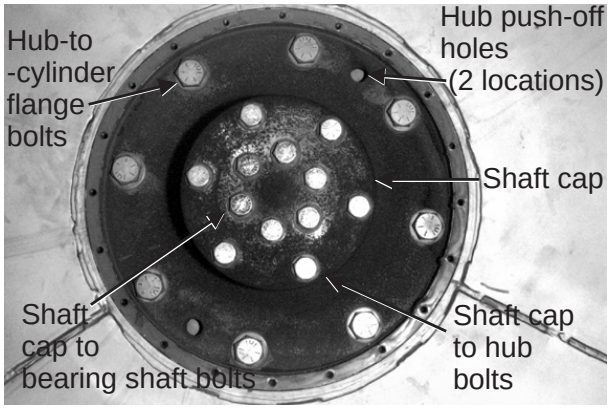

FIGURE 4 (MSSM0275AE)
Identifying Bolts and Shaft Cap

FIGURE 5 (MSSM0275AE)
Shaft Cap Fixture Showing Raised Surface

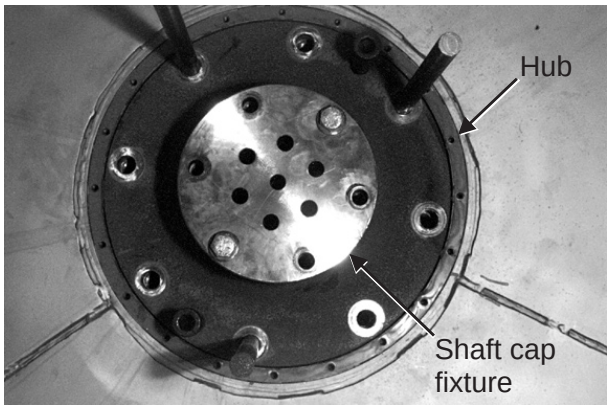

FIGURE 6 (MSSM0275AE)
Guide Pins and Push-off Bolts in Place on Hub

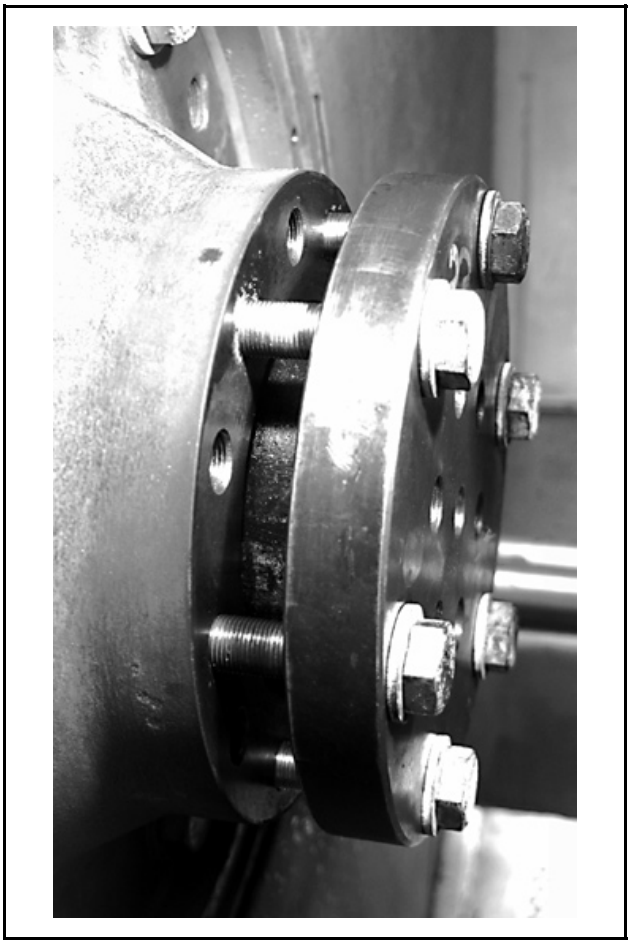

FIGURE 7 (MSSM0275AE)
Shaft Cap Fixture With Push-off Bolts on Hub

3. Remove the *shaft cap* (FIGURE 4) and replace with the *shaft cap fixture* (FIGURE 5) with the raised surface turned inward.
4. Install six *shaft cap fixture* push-off bolts (supplied in the kit), as shown in FIGURE 7. Alternately tighten the *hub push-off bolts* (FIGURE 6) and the *shaft cap fixture push-off bolts* to simultaneously force the hub off both the bearing shaft and the cylinder flange.
5. Carefully and slowly slide hub about 5 inches (127 cm.) out from the *bearing shaft* and *cylinder flange*.

Removing the Seal Holder and Shaft Sleeve

1. With the hub supported in place by the *guide pins*, remove and discard the *excluder seal* (FIGURES 9 and 10).
2. Unbolt and remove *seal holder* (FIGURE 11).

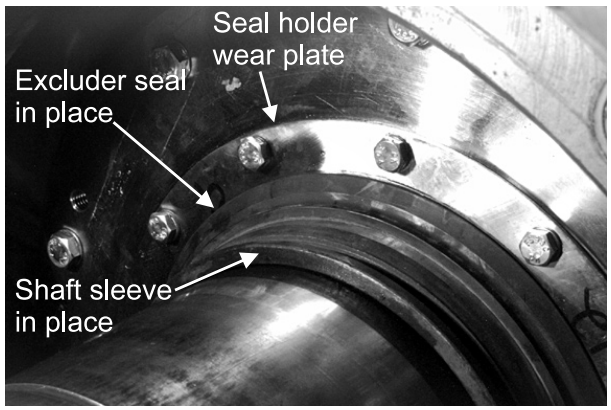

FIGURE 9 (MSSM0275AE)
Excluder Seal in Place

FIGURE 10 (MSSM0275AE)
Excluder Seal

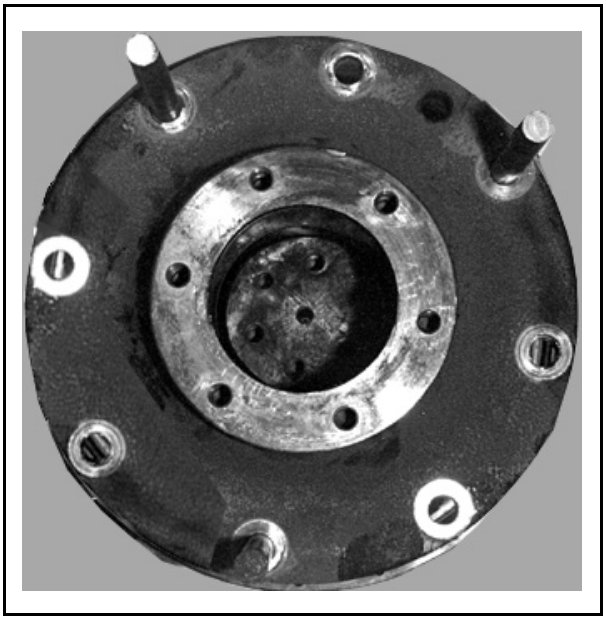

FIGURE 8 (MSSM0275AE)
Shaft Cap Fixture Showing Raised Surface

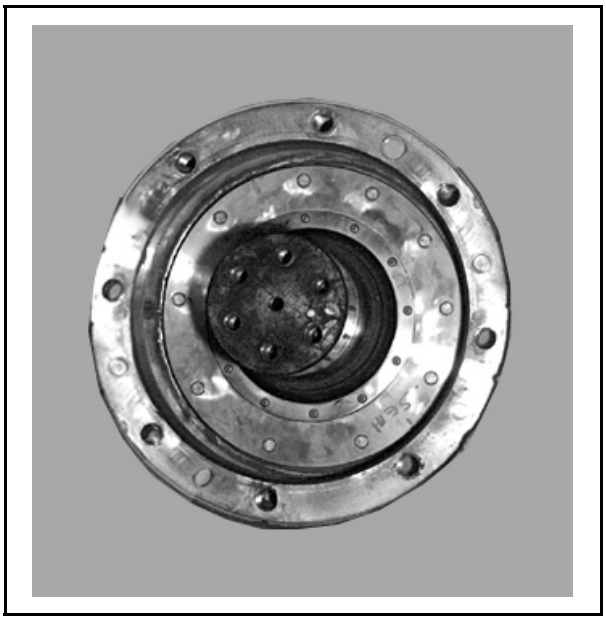

FIGURE 11 (MSSM0275AE)
Identifing the Seal holder

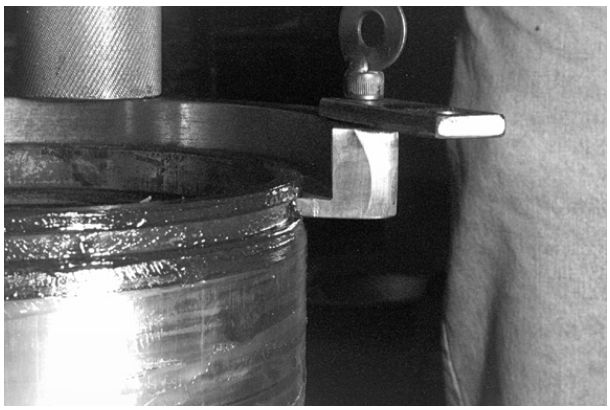

FIGURE 12 (MSSM0275AE)
Shaft Sleeve Tool Details

3. Hook the *shaft sleeve tool* (FIGURES 12 and 13) to the milled groove in the *shaft sleeve*. Using the tool's slide hammers, free the *shaft sleeve* from the shaft and discard.

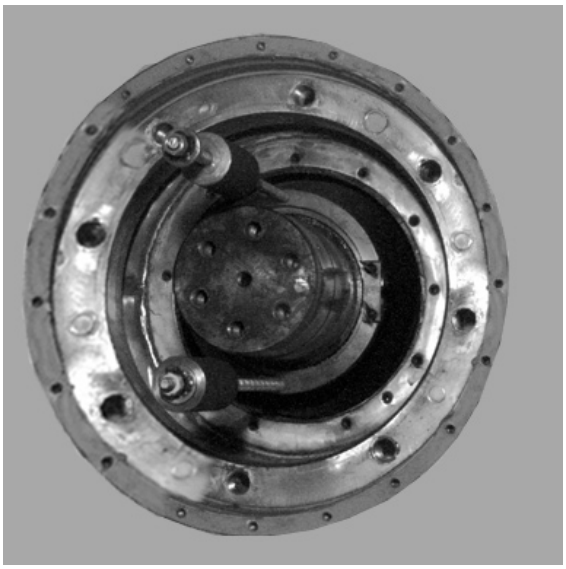

FIGURE 13 (MSSM0275AE)
Shaft Sleeve Tool in Place

Installing the Shaft Sleeve and Seal Holder

1. Clean the bearing shaft. Install the *o-rings* (FIGURE 14) in the new *shaft sleeve*, and the new *water seals* in the *seal holder* (FIGURE 1). If installing a new seal holder wear plate (FIGURE 9), completely coat the underside of the new wear plate liberally with silicon or a similar type gasket material, to ensure that air from the injection system does not leak from the back of the wear plate. Coat the *o-rings* and *water seals* with grease.
2. Add spacers to each *shaft sleeve tool* slide hammer as shown in FIGURE 15. Use slide hammers to gently tap *shaft sleeve* into place.
3. Tape *shim stock* over the groove of the *shaft sleeve* (FIGURE 16) to ensure that the new *water seals* in the *seal holder* stay in position as the *seal holder* is slipped into place.
4. Apply a new gasket to the *seal holder*. Carefully slip the *seal holder* over the *shim stock* and into position. The *seal holder* is drilled in a special pattern and can only be installed one way.

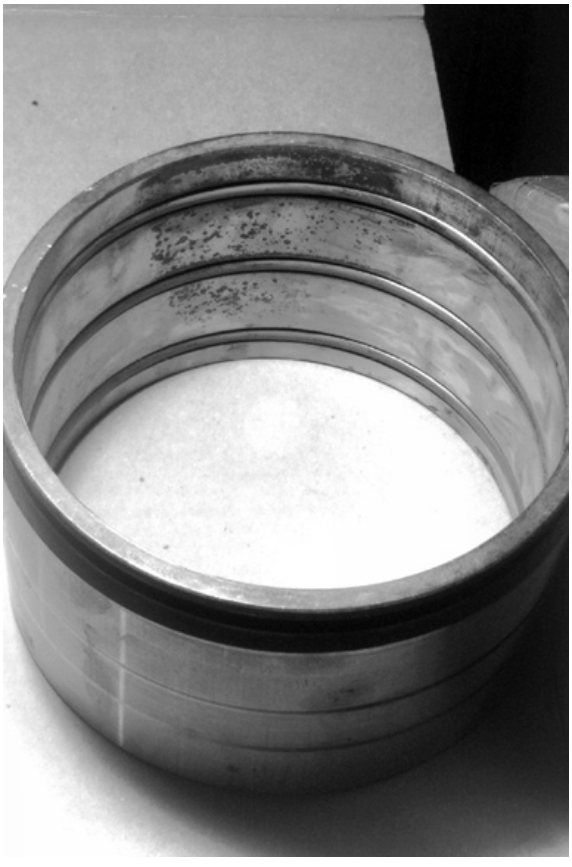

FIGURE 14 (MSSM0275AE)
Shaft Sleeve O-Rings

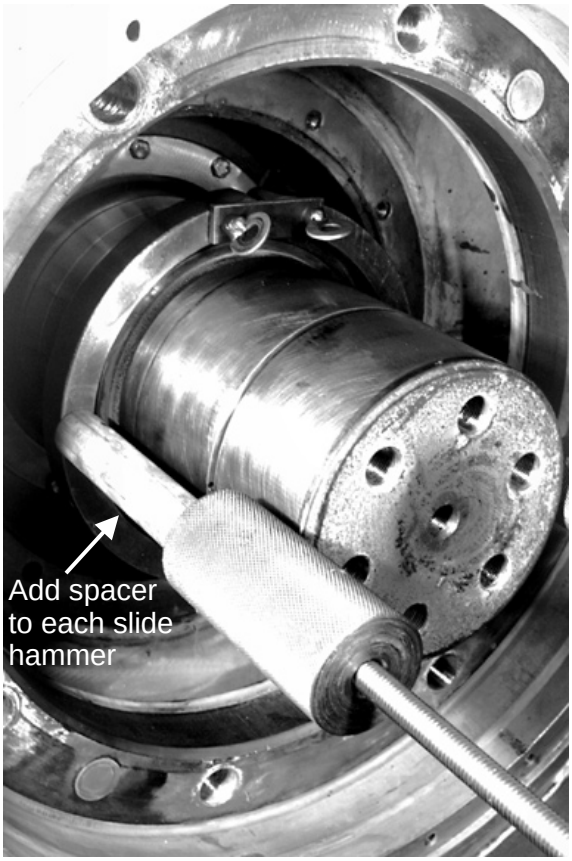

FIGURE 15 (MSSM0275AE)
Using Shaft Sleeve Tool to Install Sleeve

FIGURE 16 (MSSM0275AE)
Shim Stock Covering Edge of Shaft Sleeve
(Slinger ring removed for clarity)

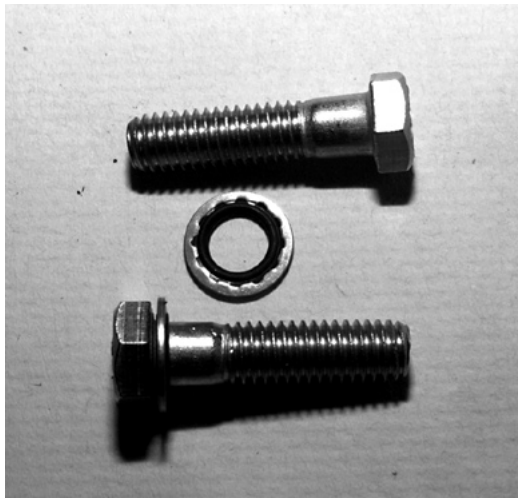

FIGURE 17 (MSSM0275AE)
Seal Holder Bolts and O-ring Washer

5. Place an *o-ring equipped washer* under each bolt (FIGURE 17), apply Loctite 242 to each *seal holder* bolt, then install and torque to specifications. See "MSSM0101CE...FASTENER TORQUE REQUIREMENTS."

Installing the Excluder Seal and Hub

1. Remove clamps and wedges clamping cylinder to shell front. **Do not remove the long bolts supporting the cylinder (FIGURE 3) at this time.**

NOTICE: MACHINE DAMAGE

Cylinder can be bent if components are reinstalled with the clamps and wedges in place.

2. Install the new *excluder seal* flush against the *seal holder* as shown in FIGURE 9. Using Loctite® 404 (or a similar cyanoacrylate based adhesive), tack the base of the *excluder seal* to the *shaft sleeve* in four places.
3. Slowly push the hub into contact with the *bearing shaft* and *cylinder flange*.
4. Install the *shaft cap*. Use several equally spaced bolts to draw the hub onto the *cylinder flange* and *bearing shaft* as shown in FIGURE 18. Remove bolts after the hub is drawn up onto the *bearing shaft*.
5. Apply Loctite 242 to each bolt, then install and torque bolts to specifications in the following order:

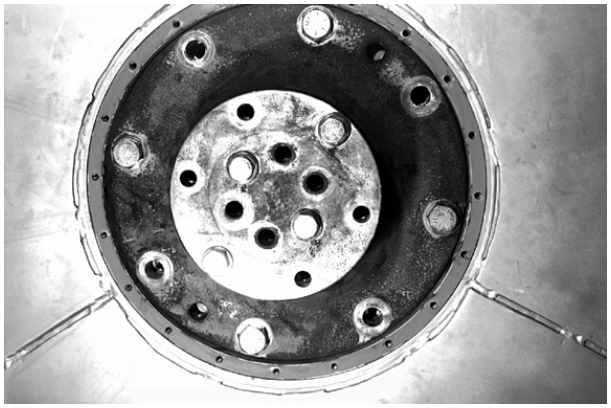

FIGURE 18 (MSSM0275AE)
Drawing Hub into Place

   a. The eight *hub-to-cylinder flange bolts*.
   b. The six *shaft cap-to-hub bolts*.
   c. The six *shaft cap-to-bearing shaft bolts*.

6. Replace the cover plate.

7. Remove the long bolts supporting the cylinder and replace with short bolts.

Shell and Door Assemblies

4

Installation Shellfront

64040,64050E6N 72058,72075J2N

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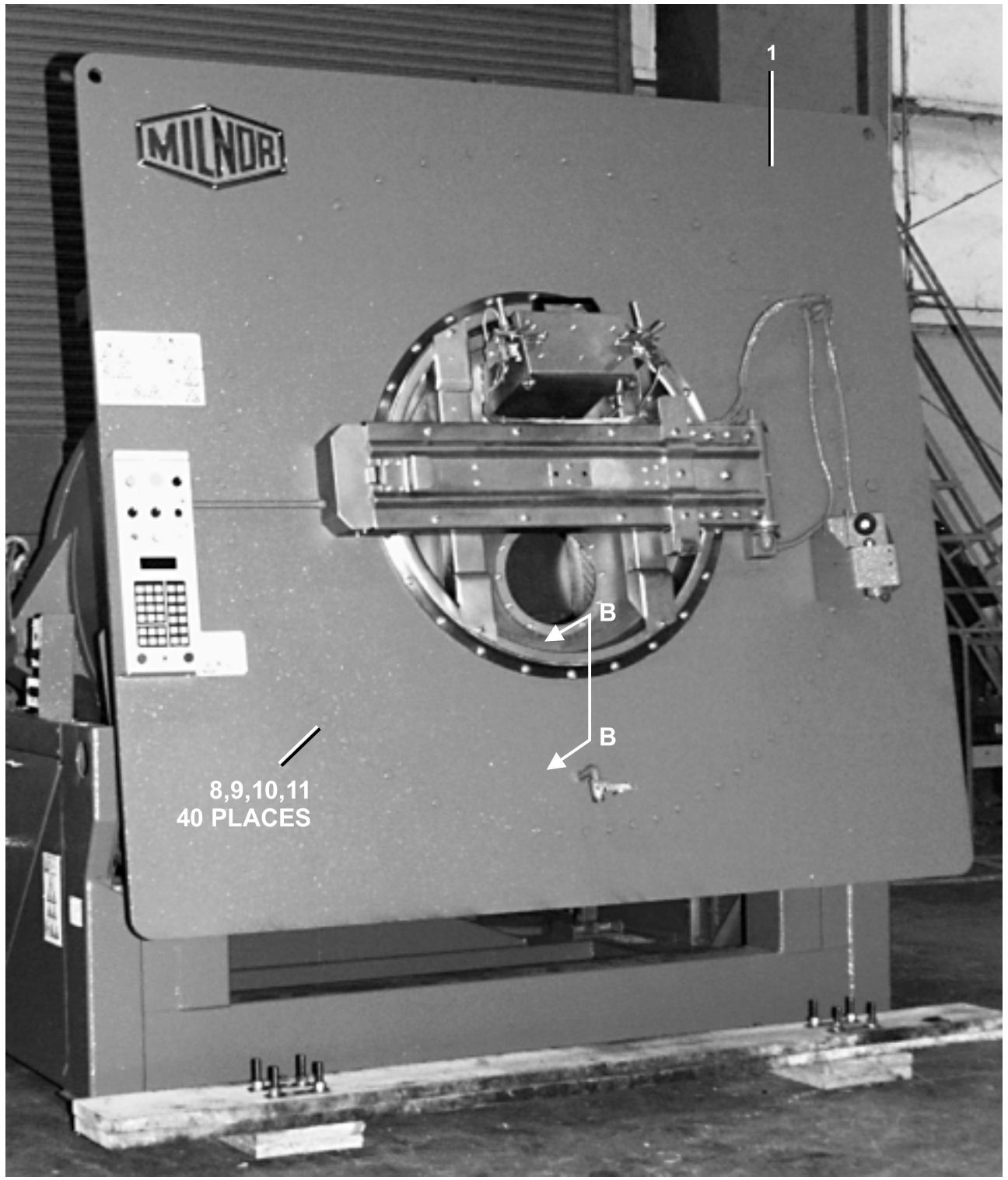
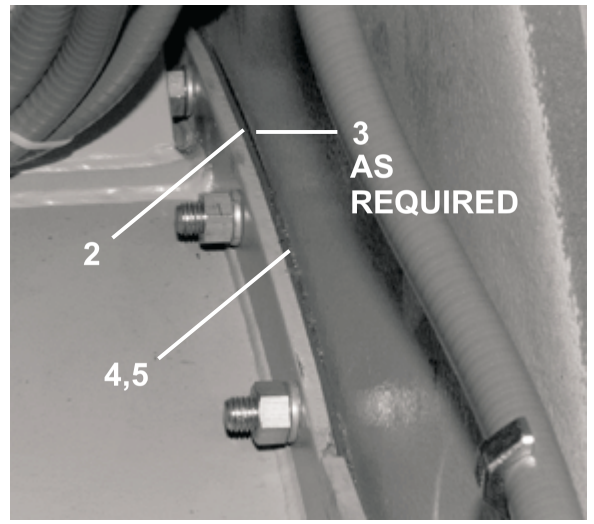
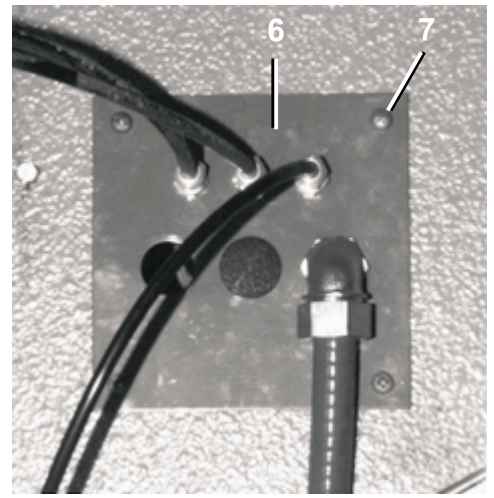
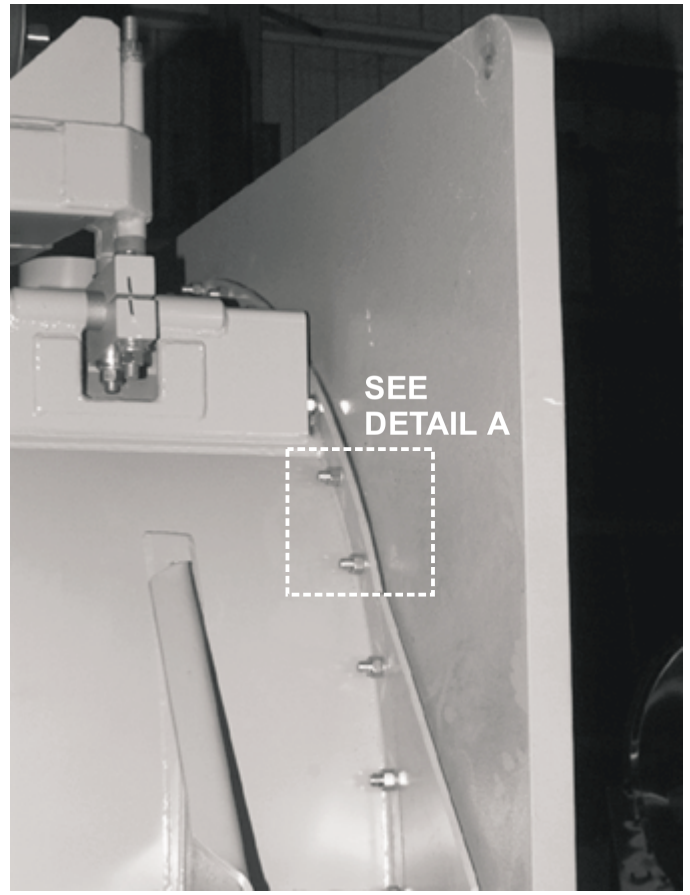
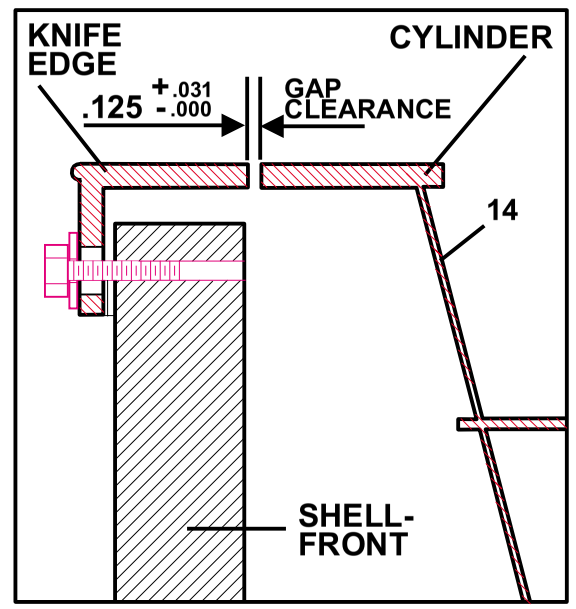




DETAIL A: SHELLFRONT GASKET







SECTION B-B

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Parts List—Installation Shellfront

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	GSF58002	94000Z INST=SHELL FRONT 7258J2N	7258J2N
	B	GSF58003	98531N INST=SHL FRNT 7275J2N W/48”DR	7275J2N
	C	GSF60001	98000Z INST=6440 SHL FRNT W/40DRLG	6440E6N 40”DOOR
	D	GSF60002	99000Z INST=6450 SHL FRNT-48”DOOR	6450E6N 48”DOOR
	E	GSF60011	INST=6440 SHL FRNT W/48DRLG	6440E6N 48”DOOR
			----------COMPONENTS----------	
A	1	W5 58540	94000Z*WLMT=SHELL FRONT 7258 STONE	
B	1	W5 75540	98477N WLDMT=SHELL FRONT 7275J2N	
C	1	W3 60040	98077C WLMT=SHELL FRONT 6440 40”DRLG	
D	1	W3 60200	99122C WLMT=SHELL FRONT 6450 48”DR	
E	1	W3 60140	98000Z WLMT=SHELL FRONT 6440 48”DRLG	
A,B	2	05 58044	94347C 3"W GASKET 38.88BR 1/8T DY	
C,D,E	2	03 65044D	93123C GASKET=70.0BC 1/8”THK 6446D6	
A,Bl	3	05 58044A	94347# 3"W GASKET 38.88BR 1/16 DY	
C,D,E	3	03 65044E	93123# GASKET=70.0BC 1/16THK 6446D6	
all	4	20C044	041290ADHESIVE-EC1300-PINT	
all	5	20C036	PERMATEX NO 1C IN 11 OZ TUBES	
all	6	03 CF551	98322BSF COVER PLATE W/HOLES HRS	
all	7	15P059	01Z SCRHXSELFDR:10-16X1/2 #2 ZINC	
all	8	15K227	HXCAPSCR 5/8-11UNC2AX4 GR5 ZINC/CAD	
all	9	15U318	FLATWASH 1+1/8 ODX21/32 IDX3/32 PL	
all	10	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	11	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	12	03 65050	93236B PLATE=GEAR BOX COVER 6446E6N	
all	13	15P100	07Z THDCUT-F PANHD 8-32 X 3/8 Ss410	
C	14	ACA6440E6N	2001386D ASSY=STANDARD 6440CYL 304	
E	14	ACA6440LDR	2001386D ASSY=6440CYL W/LARGE DOOR 304L	
D	14	ACA6450LDR	2002022D ASSY=6450 CYL W/48" DOOR 304	
A	14	ACA7258J2	2002085D CYL 72J2 12GA W/O LINER 304	
B	14	ACA7275JNL	2002103N CYL=7275 7GA CYLBCK W/O LINERS	

Standard Door

64040, 64050E6N

BMP020063/2002496V
(Sheet 1 of 3)

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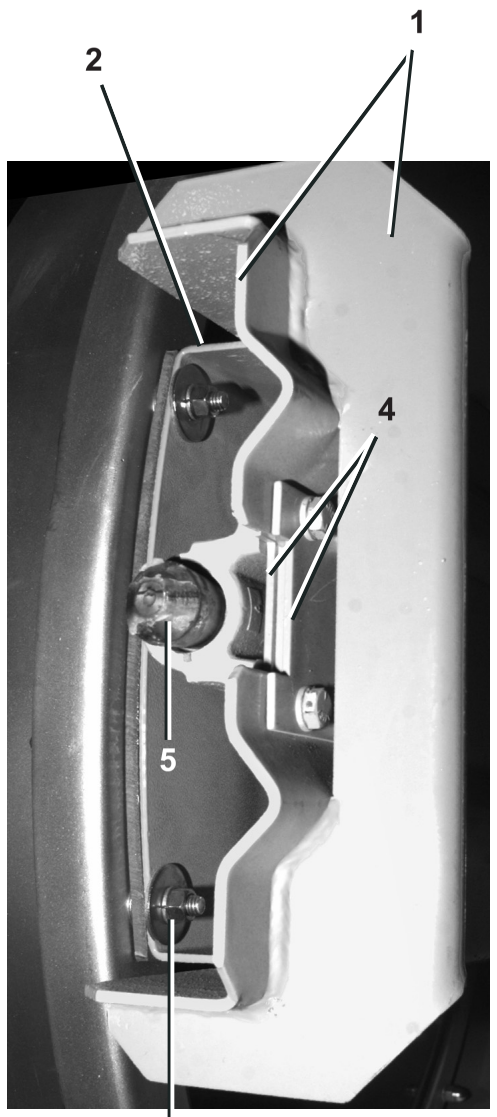

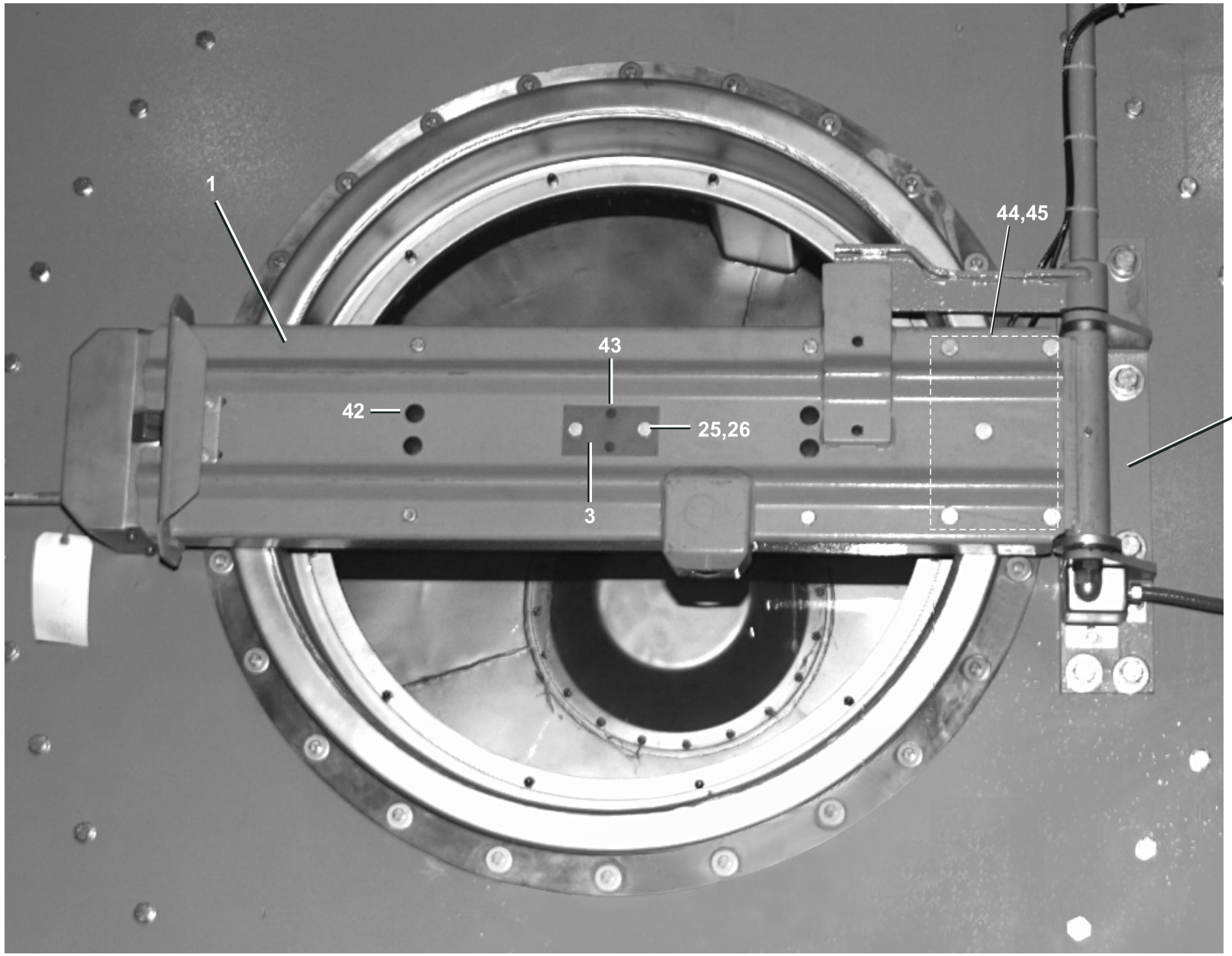

Standard Door

64040, 64050E6N

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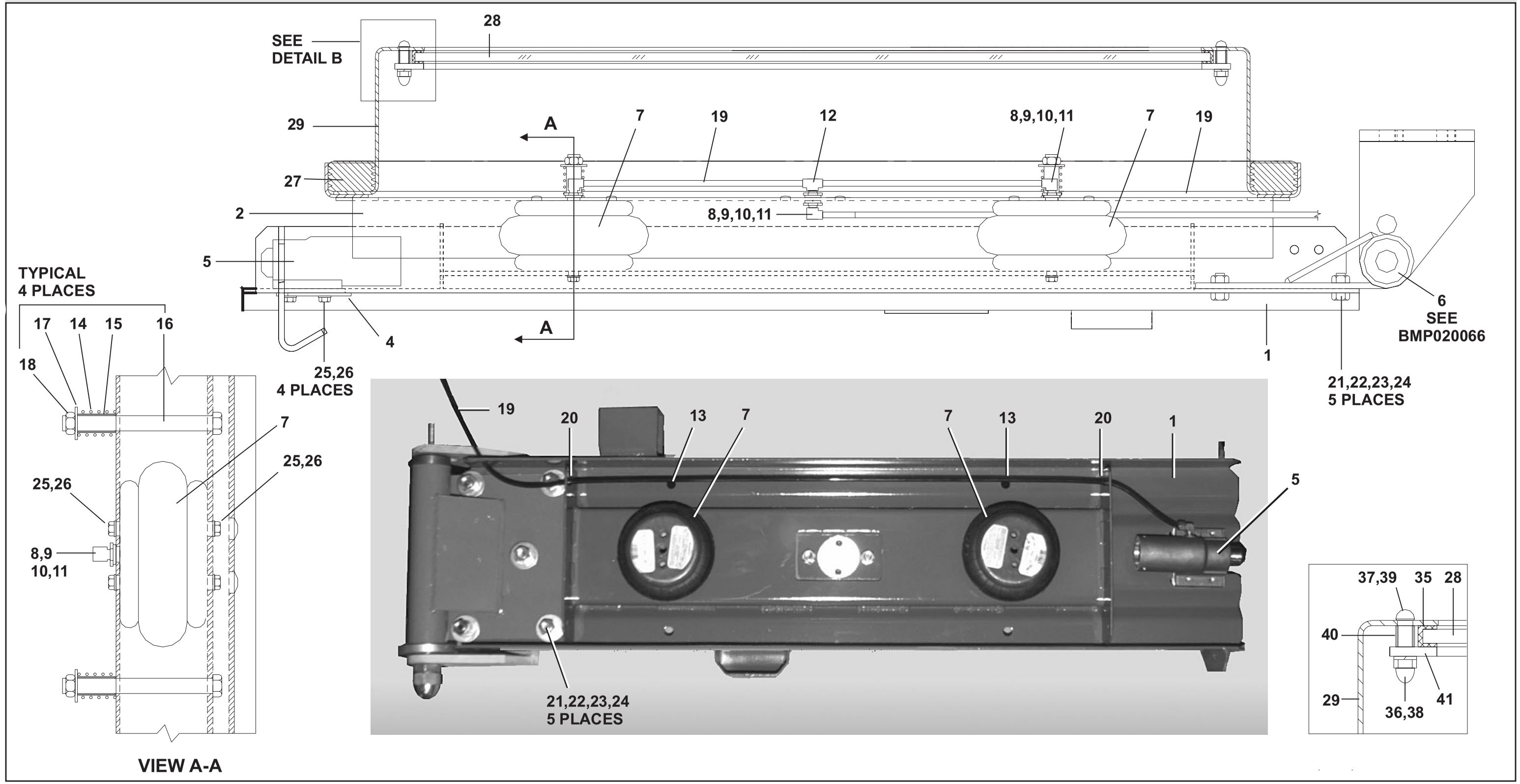

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Parts List—Standard Door

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

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	ADC60001	ASSY=40DRLG CHNL W/2AIR BSK CB	
	B	ASD60001	ASSY=40X4DR LG 304 W/GLASS	
			----------COMPONENTS----------	
all	1	W3 60765	WLMT=OUTER 40" DOOR CHANNEL	
all	2	03 60766	INNER CHNL 40"DR LG	
all	3	03 64039C	COVER PLATE W/O HANDWHEEL	
all	4	02 15633	ADJPLATE=DOORLATCH CAD	
all	5	SA 15 028	* DOOR LATCH ASSY-DIVCYLS	
all	6	ADH60001	PRTS=40"DR LG HINGE CRB	
all	7	60B090	AIRMT S-131 1CONV.F#W013587731	
all	8	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
all	9	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	10	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
all	11	53A501	TUBE INSERT .163"OD #63PT-4-40	
all	12	53A044A	BODY=TEE 1/4TX1/8FP #177C-4-2B	
all	13	12P016	CABLE CLMP-BLACK UL APPROVED	
all	14	02 18187S	SPRING=DOOR STAINLESS STEEL	
all	15	27B2750L0T	SPC RROLL.562ID.937L.048T ZNK	
all	16	15K203D	HXCAPSCR 1/2-13X5.5 GR5 ZINC	
all	17	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	18	15G234	LOKNUT 1/2-13NC CAD FLXLOC#21F	
all	19	60E004TE	1/4"OD X.170"ID NYL(BLK)TUBING	
all	20	12P1AGSB	SNAPBUSH 3/8"MH X 1/4" T=1/8	
all	21	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	
all	22	15U314	FLATWASHER(USS STD) 5/8" ZNC P	
all	23	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	24	15G238	HXNUT 5/8-11UNC2B SAE ZINC GR2	
all	25	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
all	26	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	27	03 60751	GASKET=40"DOOR EPDM	

Parts List, cont.—Standard Door

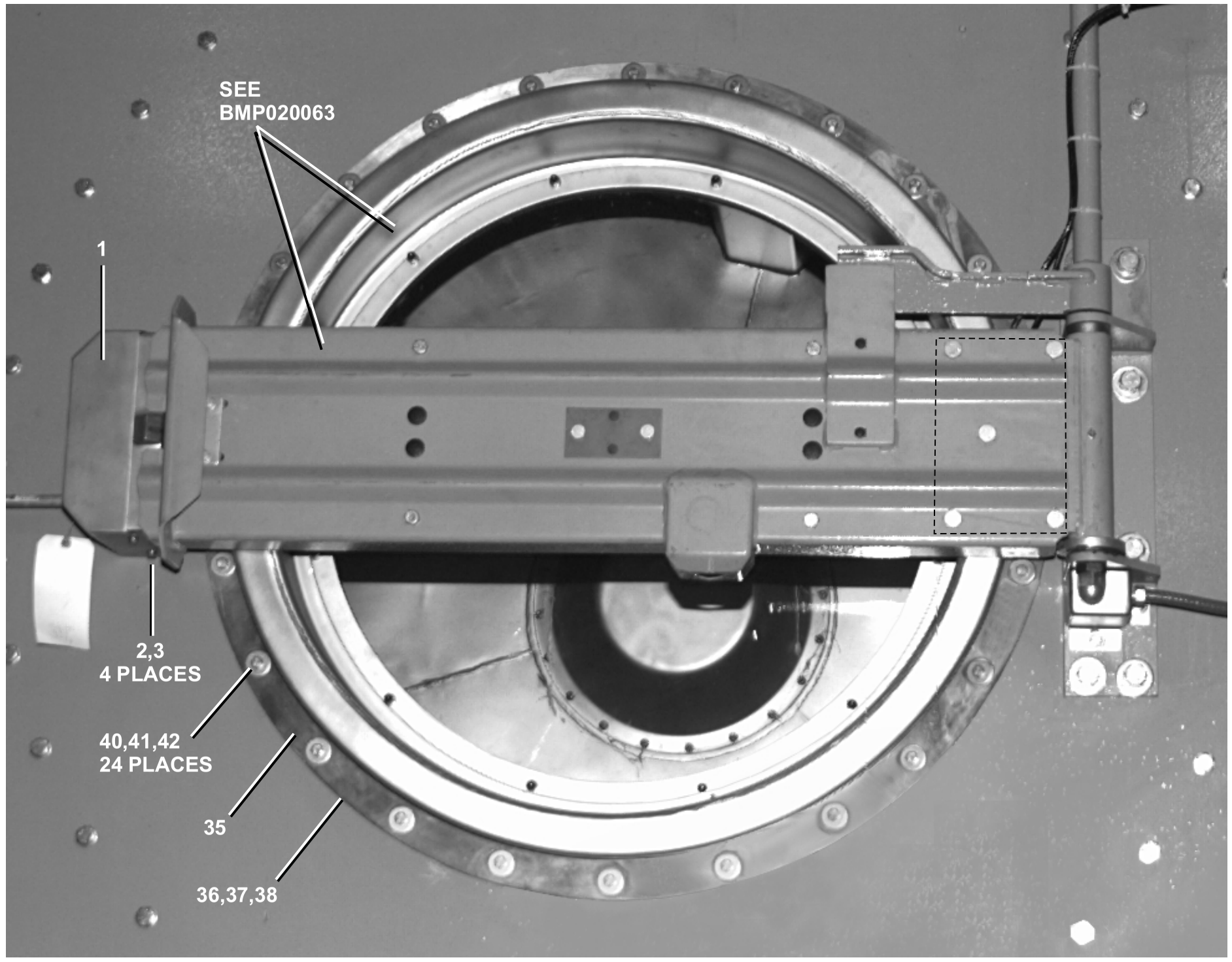
Used In	Item	Part Number	Description	Comments
all	28	03 60755	GLASS=40"DOOR 3/8T X 34.5OOD	
all	29	X3 60750	DRILL=40"DOOR W/LARGE GSKT	
all	30	15G206	HEXNUT 3/8-16 UNC2 SS 18-8	
all	31	15N223A	FLATMACHSCR 3/8-16X1+1/2 SS SL	
all	32	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	33	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	35	03 60756	GASKET=GLASS 40"DOOR 34.5DIA	
all	36	15G200	HXCPNUT 3/8-16 UNC2A 5/8X1/2	
all	37	15K106B	BUTSOKCAPSCR 3/8-16NCX1+3/8 SS	
all	38	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
all	39	24G030N	ROLLED WASH.379ID NYLTITE 37W	
all	40	27B2400K0L	SPACER ROLL.43ID.562L.03T SS	
all	41	X3 60757	MACH=40"DR GLSS MNT RING LG	
all	42	12P1AKHP	HOLEPLUG 1/2" BLK HEYCO#2643	
all	43	12P1AGHP	HOLEPLUG 3/8"BLK HEYCO #2617	

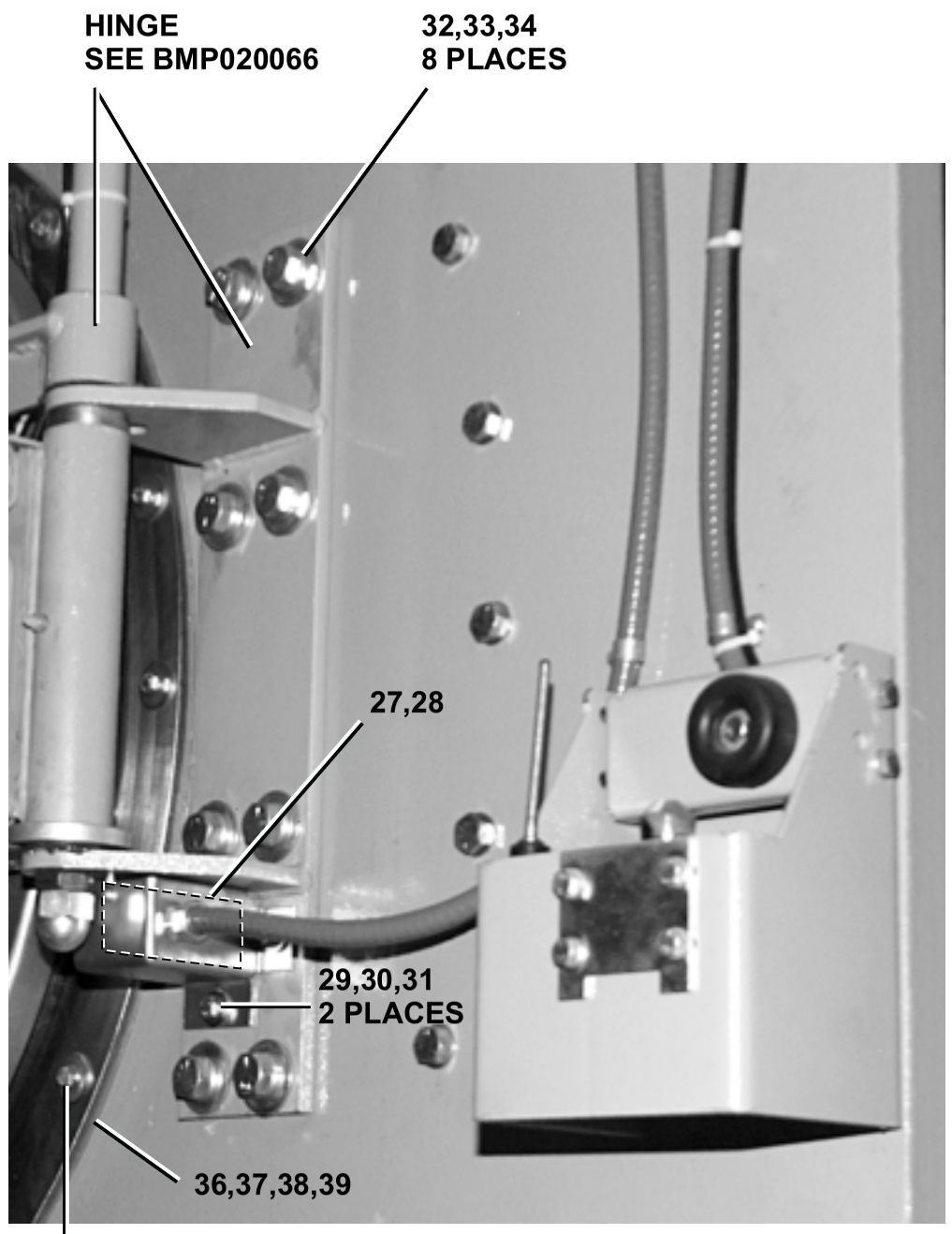
Installation Standard Door

64040 & 64050E6N

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

Litho in U.S.A.

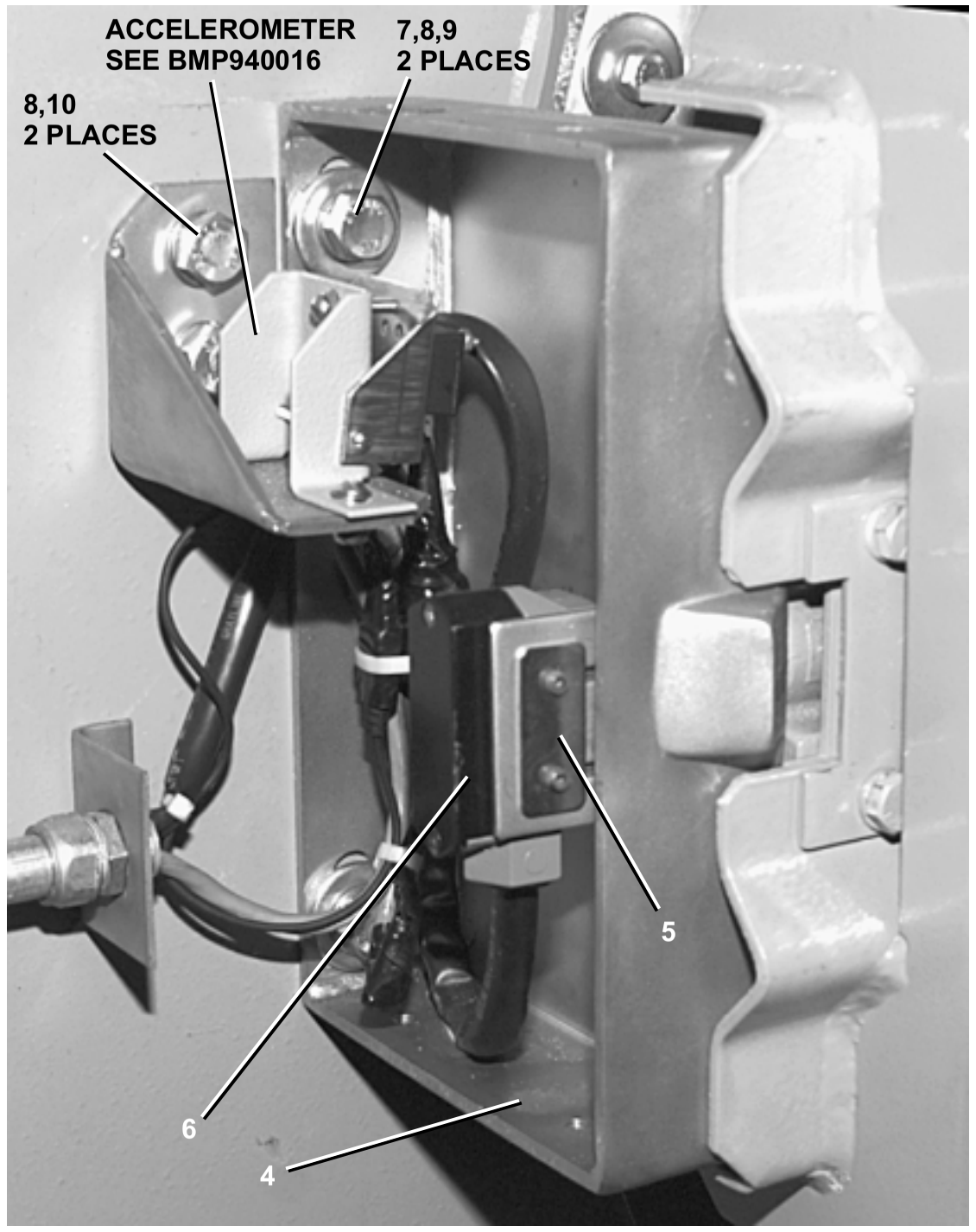


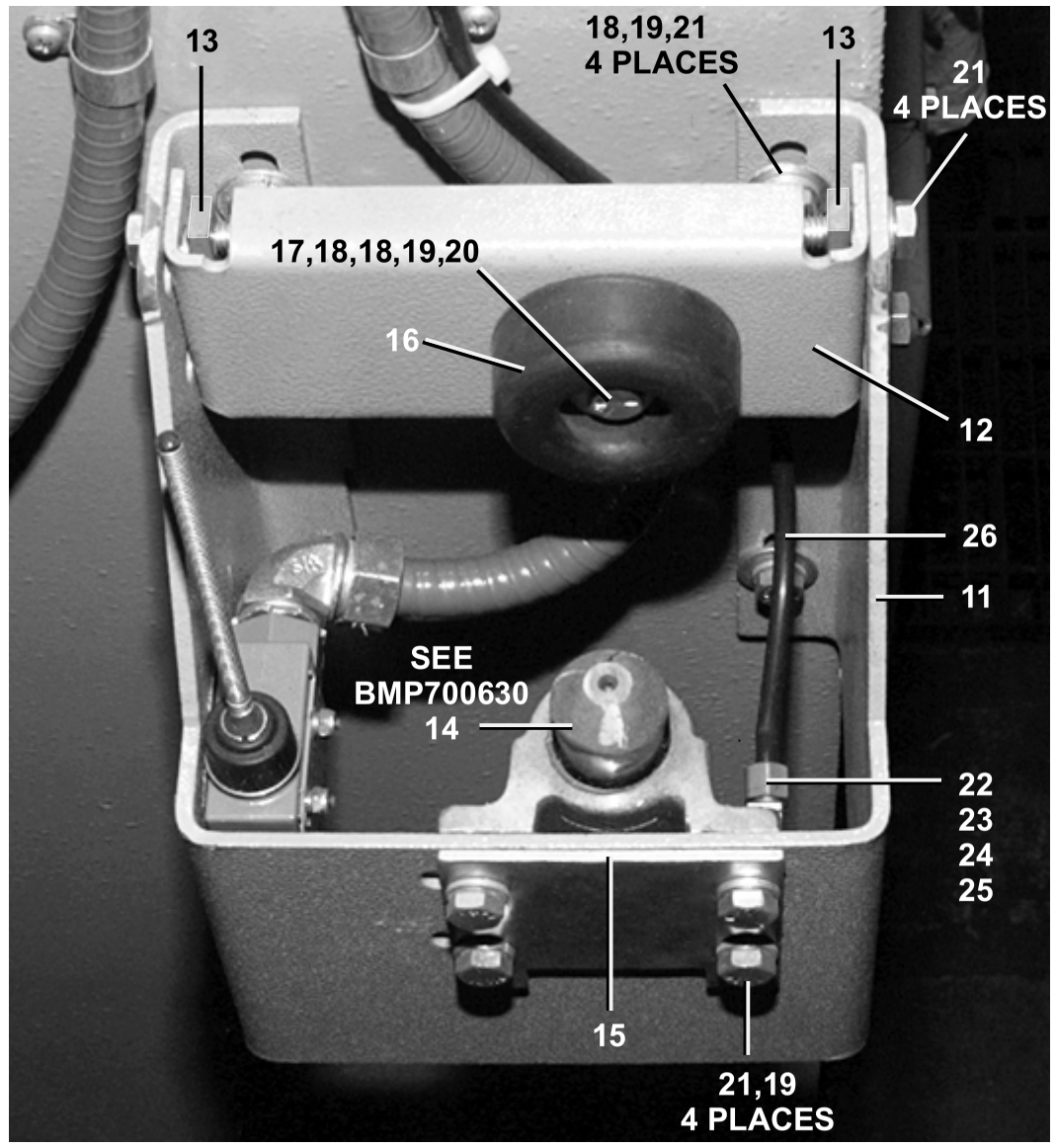


Installation Standard Door
64040 & 64050E6N

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

Litho in U.S.A.





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Parts List—Installation Standard Door

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

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	ADH60001	98000Z PRTS=40"DR LG HINGE CRB	
	B	ADC60001	98000Z ASSY=40DRLG CHNL W/2AIR BSK CB	
	C	ADL60001	98000Z ASSY=40DRLG CLOSED STRKR 304	
	D	ADL60010	98000Z ASSY=40DRLG FULL OPN LCH+SW CB	
	E	ADS60001	2000303Z PRTS=40DRLG SECONDARY DR SWTCH	
	F	GKE60001	98000Z INST=40"DR LG KNIFE EDGE 304	
			----------COMPONENTS----------	
All	1	W3 60778	99203C WLMT=STRIKER COVER 40" DOOR	
All	2	15K031	BUTSOKCAPSCR 1/4-20X1/2 SS18-8	
All	3	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
All	4	W3 60775	99203C WLMT=LATCH STRIK 40"DR LG	
All	5	02 10391	63113B COVER STRIP=MICRO SW #6-8	
All	6	E25 00100A	94102B DOOR INTLK SWITCH ASSY E6N	
All	7	15K153	HXCAPSCR 1/2 -13 X 1 +1/4 SS	
All	8	15U310	LOKWASHER REGULAR 1/2 SS18-8	
All	9	15U285A	87451B FLATWASH 1/8THK 1/2ID SS18-8	
All	10	15K146	HEX CAP SCR 1/2-13 UNC2 X 1 SS	
All	11	03 60785	2001322C FULL OPEN LATCH MNT 40"DR LG	
All	12	03 60785A	2001322B FULL OPEN BUMPER MNT 40"DR	
All	13	03 60785B	2001066B TAP STRIP=BUMPER MNT 40" DR	
All	14	SA 15 028	70239D * DOOR LATCH ASSY-DIVCYLS	
All	15	02 15633	93216B ADJPLATE=DOORLATCH CAD	
All	16	60C075	TRUCK BUMPER 2+1/2ODW3/8HO.613	
All	17	15K105	HXCAPSCR 3/8-16UNC2A1.25 GR5 P	
All	18	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
All	19	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
All	20	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
All	21	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
All	22	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
All	23	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
All	24	53A501	TUBE INSERT .163"OD #63PT-4-40	
All	25	53A031B	BODY-EL90MALE.25X1/8 #269C-42B	
All	26	60E004TE	1/4"OD X.170"ID NYL(BLK)TUBING	
All	27	03 60782A	2001322B SECOND DR SWTCH BKT-HVY HNGE	
All	28	09RM02212S	CAPSW 12' 180DEG ROLLER SILVER	
All	29	15K084S	HXCAPSCR 3/8-16NCX5/8 SS18-8	
All	30	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
All	31	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
All	32	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5	
All	33	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
All	34	15U490	FLAWASH 1+1/2X17/32X1/4ZINC	

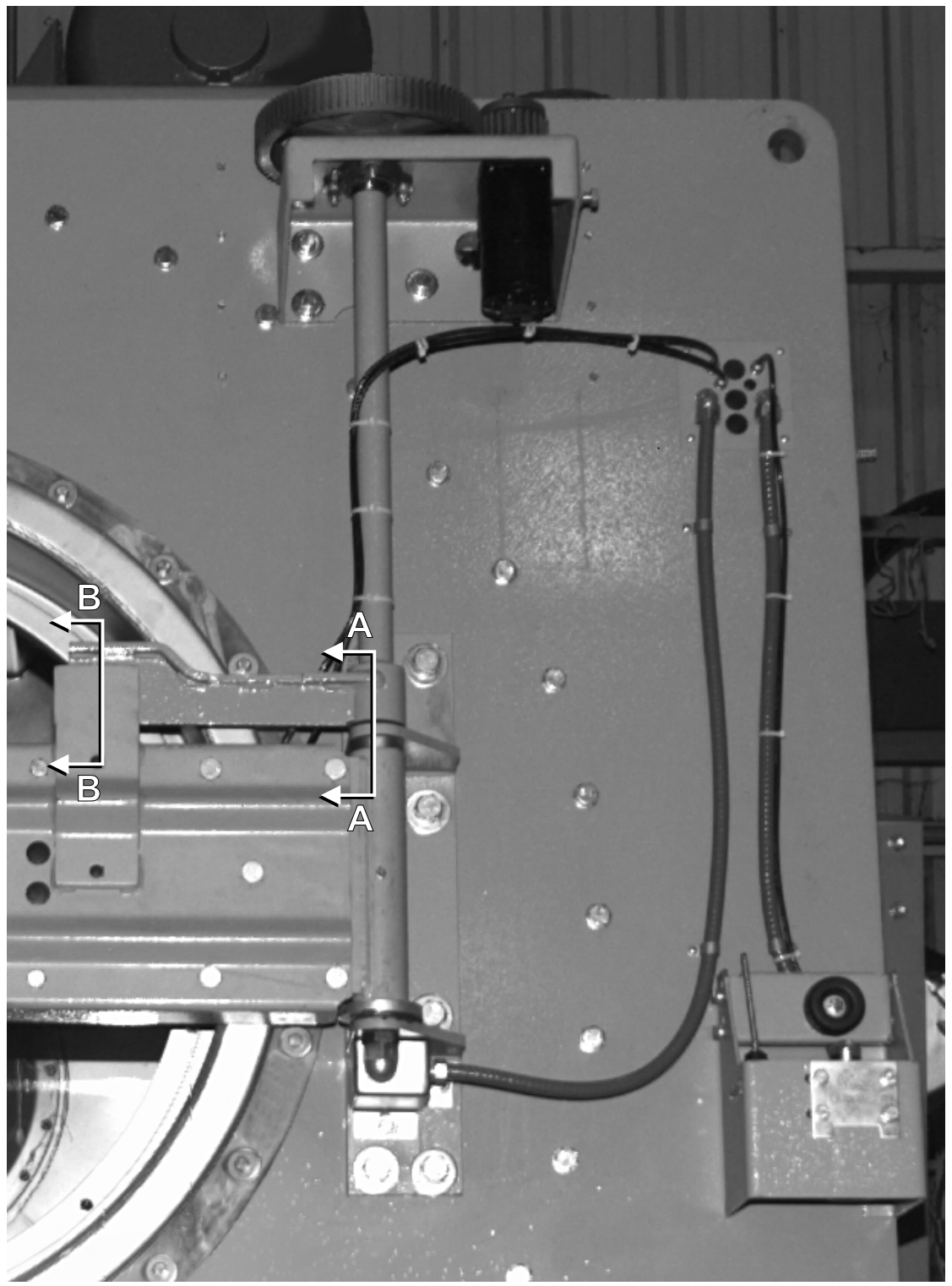
Parts List, cont.—Installation Standard Door

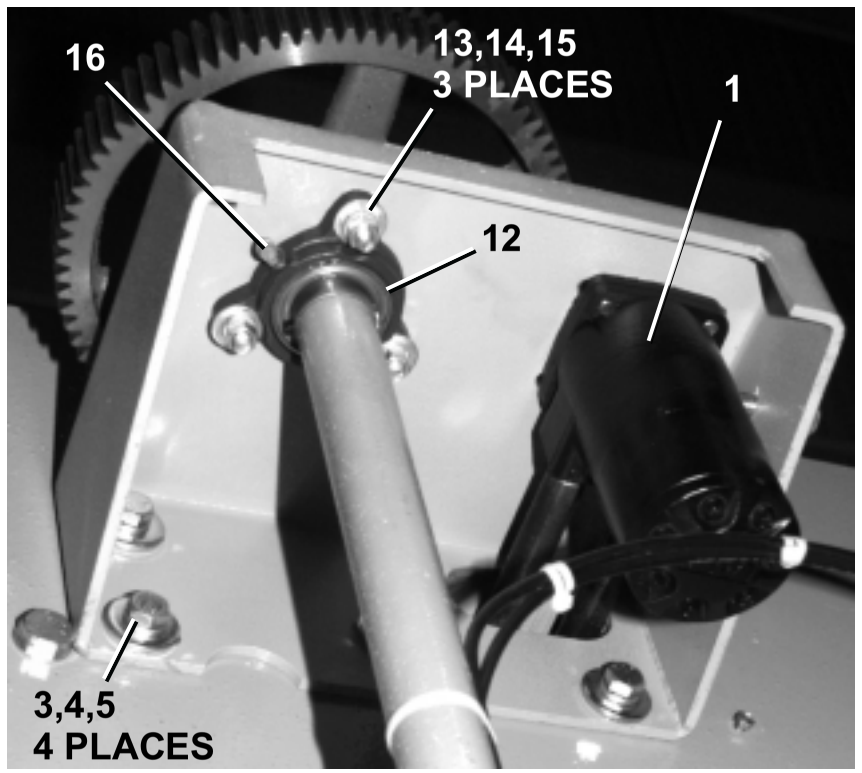
Used In	Item	Part Number	Description	Comments
All	35	X3 60760	2001213C MACH=KNIFE EDGE 40"DR LG	
All	36	03 60762	98077B 1/8"GASKET=40"DR KNIFE EDGE	
All	37	03 60762A	98077# 1/16"GASKET=40"DR KNIFE EDGE	
All	38	03 60762B	98077# 1/32"GASKET=40"DR KNIFE EDGE	
All	39	20C040B	SILSEAL RTV CLR10.2 OZ #59575	
All	40	15K112	HXCAPSCR 3/8-16X1+1/2 SS18-8	
All	41	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	
All	42	15U491	FLTWASH 1.439OD.394ID.120TH188	

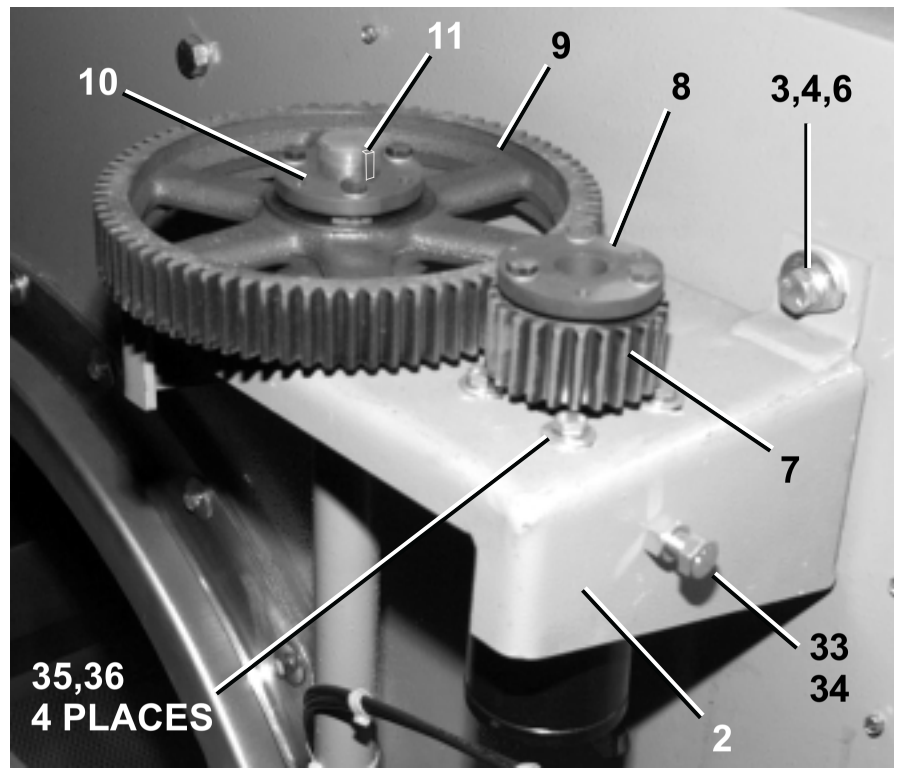
Hydraulic Door Assemblies
64040 & 64050E6N

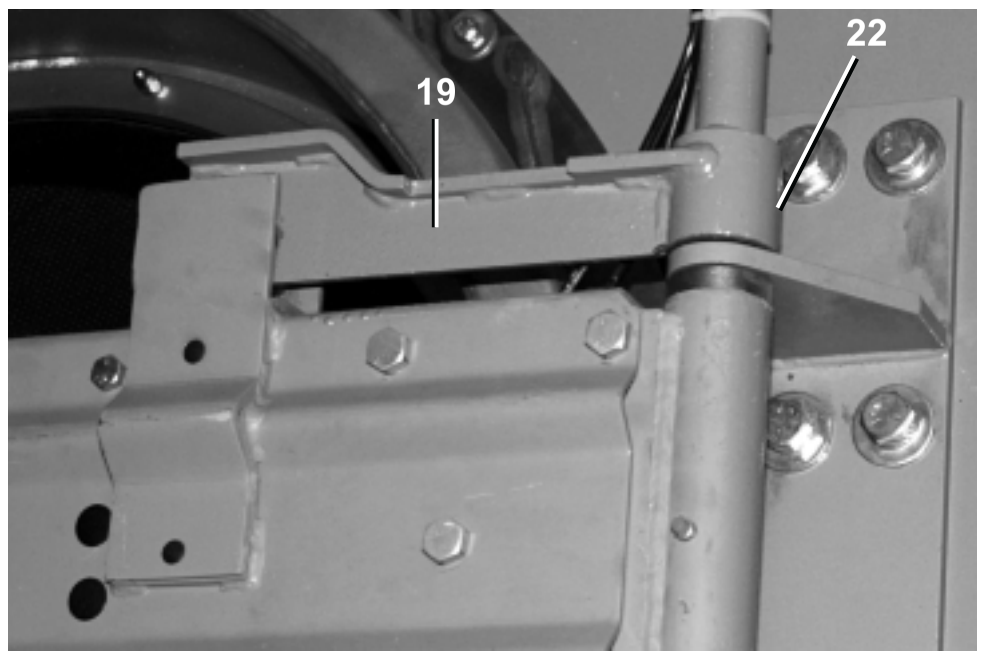
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

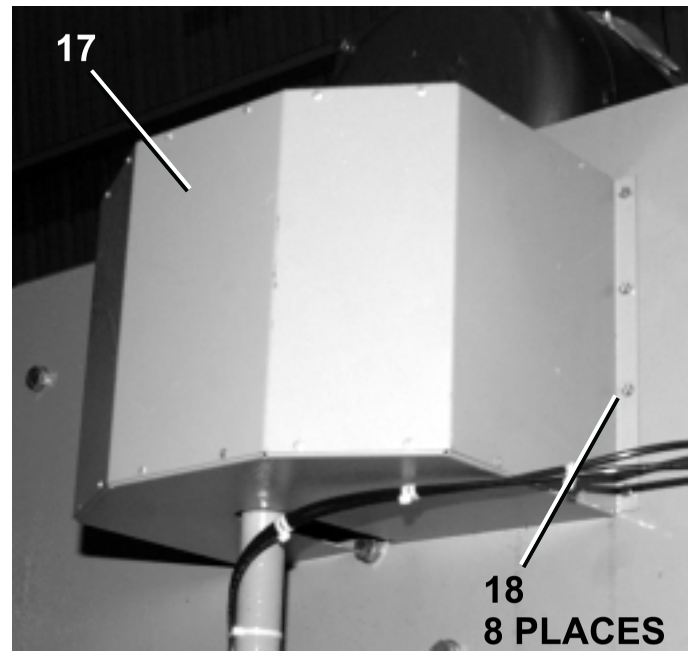
Litho in U.S.A.











Hydraulic Door Assemblies
64040 & 64050E6N

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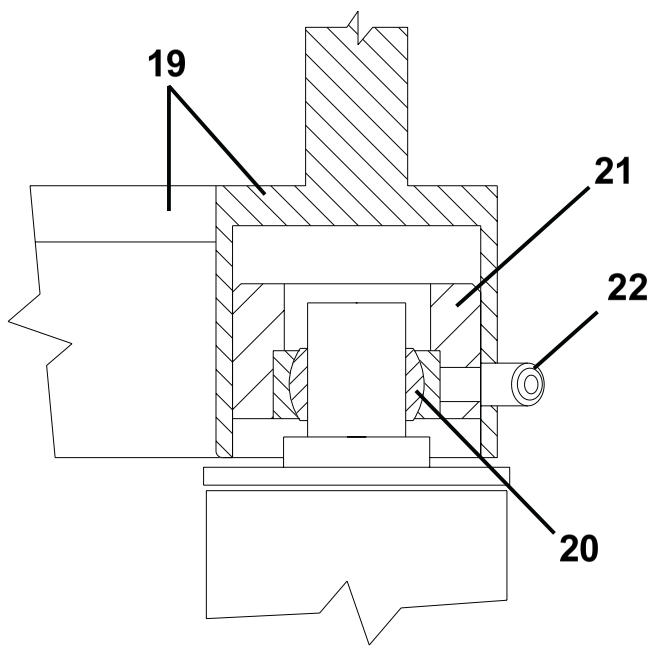
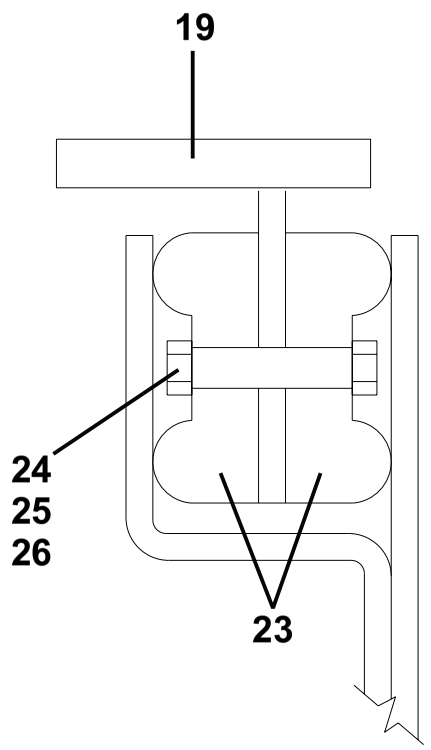
Litho in U.S.A.



VIEW A-A



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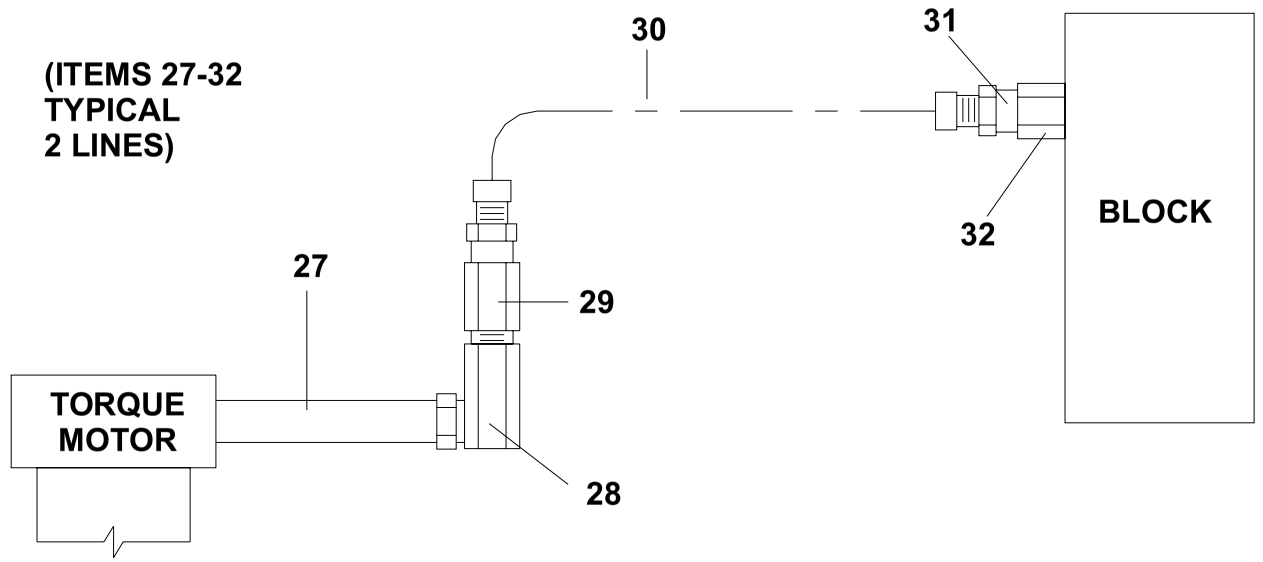
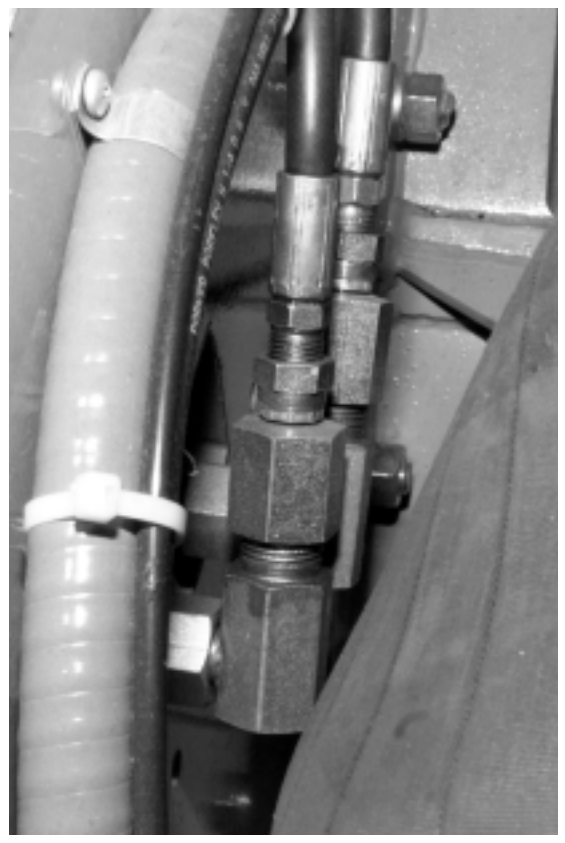
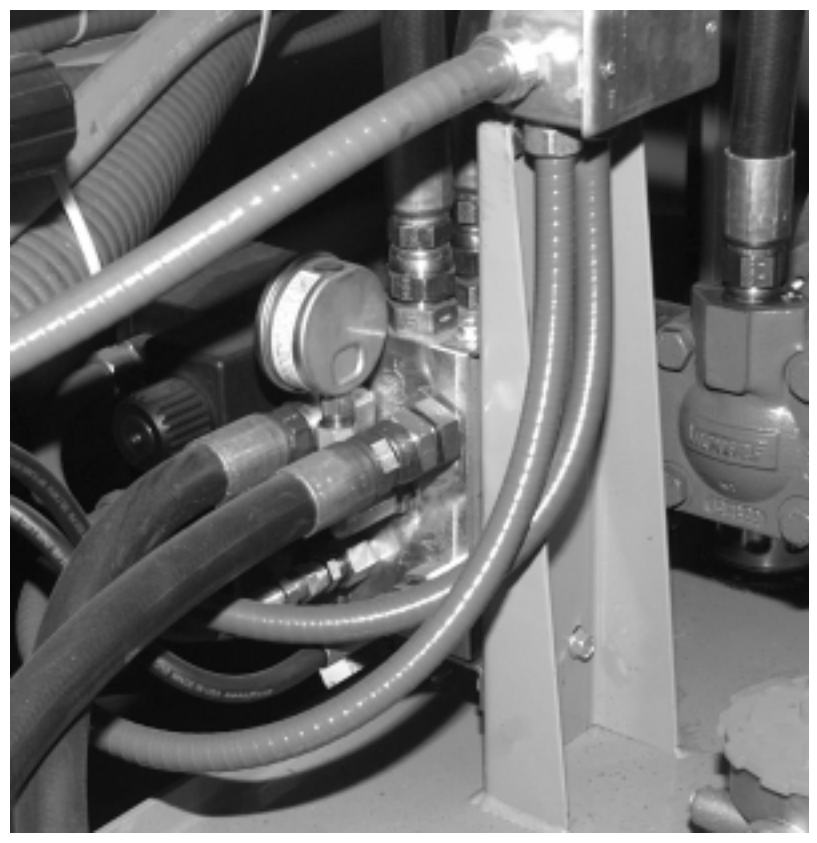


BACK OF SHELLFRONT / HYDRAULIC FITTINGS / INTO BLOCK





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Parts List—Hydraulic Door Assemblies

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

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	GSH60001	INST=40"DR HYDMTR+BRKTS 6440	
			----------COMPONENTS----------	
All	1	27E320025	99157A TDRQMOTOR- HYRAULIC	
All	2	W5 20144C	2001322# WLMT=HYD MNT BRKT 48" DOOR	
All	3	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5	
All	4	15U490	FLAWASH 1+1/2X17/32X1/4ZINC	
All	5	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
All	6	02 11603C	90273B WASHER DBLR=1.5W/CUTOFF SIDE	
All	7	54N090	SPURGEAR B#YSS8-24 P1 PE-5064	
All	8	56Q1AP1	1.0" BUSH VPUL BROWNING P1	
All	9	54N095	SPURGR 8P80T20PA 1.5F YCS8P80	
All	10	56Q1EP1	1+1/4" BUSH VPUL BROWNING P1	
All	11	15E210	SQMACHKEY 1/4X2 NOTAPER-NOHEAD	
All	12	54A718	FLGBRG 1+1/4" HC#FB150X1+1/4S	
All	13	15K088	HEXCAPSCR 3/8-16NCX7/8 GR 5 ZI	
All	14	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
All	15	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
All	16	54M021	GRSFIT 1/8PIPE X 1/4STR 1607-B	
All	17	AGS75001	2001322D COVER=48"DOOR GEAR TRAIN	
All	18	15P185	TRDCUT-F HXHD 1/4-20UNC2AX3/4	
All	19	W5 20139C	2001322D *WELD=TORQUE ARM-PWR DR 6446	
All	20	54AA00PBB	BUSH BALL 3/4 RBC-B12L	
All	21	03 25604	82472B ADAPTER FOR B12-L BUSHING	
All	22	54M021	GRSFIT 1/8PIPE X 1/4STR 1607-B	
All	23	60C075	TRUCK BUMPER 2+1/2ODW3/8HO.613	
All	24	15K120	HXCAPSCR 3/8-16UNC2AX2 GR5 ZIN	
All	25	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
All	26	15G218	HXLOKNUT NYL 3/8-16 STL/ZNC	
All	27	5N0K07AF82	NIPPLE 1/2X7 TBE BLK SCH80	
All	28	52JY0KR013	ELB90 1/2"MPXFPSWIVEL#1501-8-8	

Parts List, cont.—Hydraulic Door Assemblies

Used In	Item	Part Number	Description	Comments
All	29	52XY0KR011	STRADAPUN 1/2X1/4=FP#1405-8-4	
All	30	60EH15C265	93077N HYD HOSE 3/16"TENDS=265"	
All	31	52XY0ER008	STRADAPT 1/4" #1404-4-4	
All	32	52XY0KR031	STRADPT 1/20RX1/4F#6405-8-4-0	
All	33	15K110	HEXCAPSCR 3/8-16UNC2AX1.5 GR5-	
All	34	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
All	35	15K095	HXCPSCR 3/8-16UNC2AX1 GR5 ZINC	
All	36	15U238	LOKWAS INTOOTH 3/8" (US STD) 4	

Hinge Assembly

64040 & 64050E6N

Pellerin Milnor Corporation
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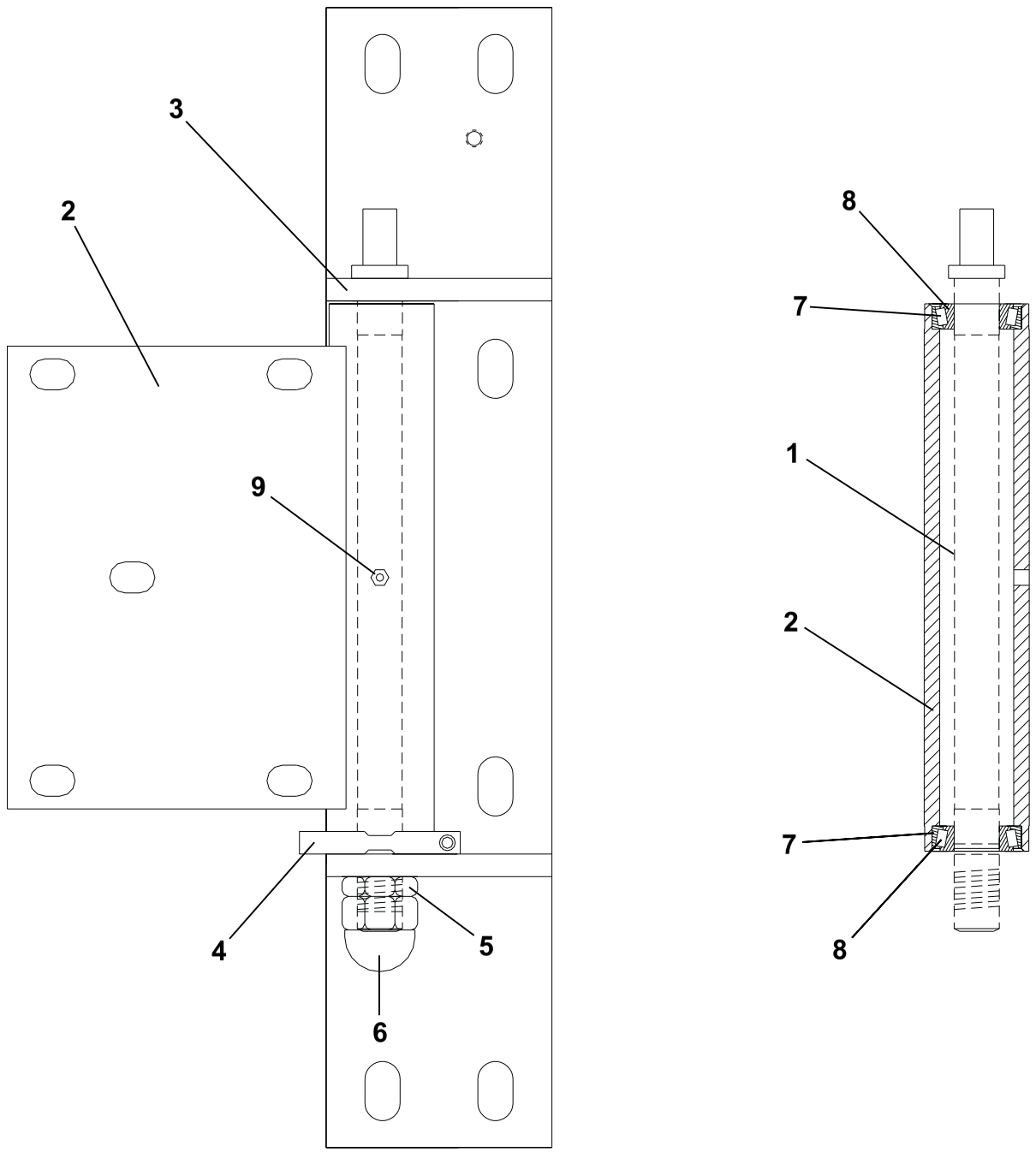
Litho in U.S.A.



127

Parts List—Hinge 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	ADB60001	ASSY=40:DRLG BEAR+HINGE CRB	
----------COMPONENTS----------				
all	1	05 20140A	PIN-DOOR HINGE 15.625LG 72T	
all	2	W5 20017	* WELDMENT=40" DOOR HINGE	
all	3	W3 60780A	WLMT=48" DOOR HINGE BRKT	
all	4	54JH13562B	HINGE COL SPLIT 3.56 FL TOP	
all	5	15G248	HXJAMNUT 1-14UNF2B ZINC GR2	
all	6	15G249	HXCAPNUT L-CROWN 1-14UNF2B ZIN	
all	7	54A976	CUP TIMKN #L44610 2"OD 1BX+PT#	
all	8	54A977	CONE TIMKN #L44643 1"ID 1BX+P#	
all	9	54M015	GREASEFIT 60X36/60X44 1610BL	

Door Latch

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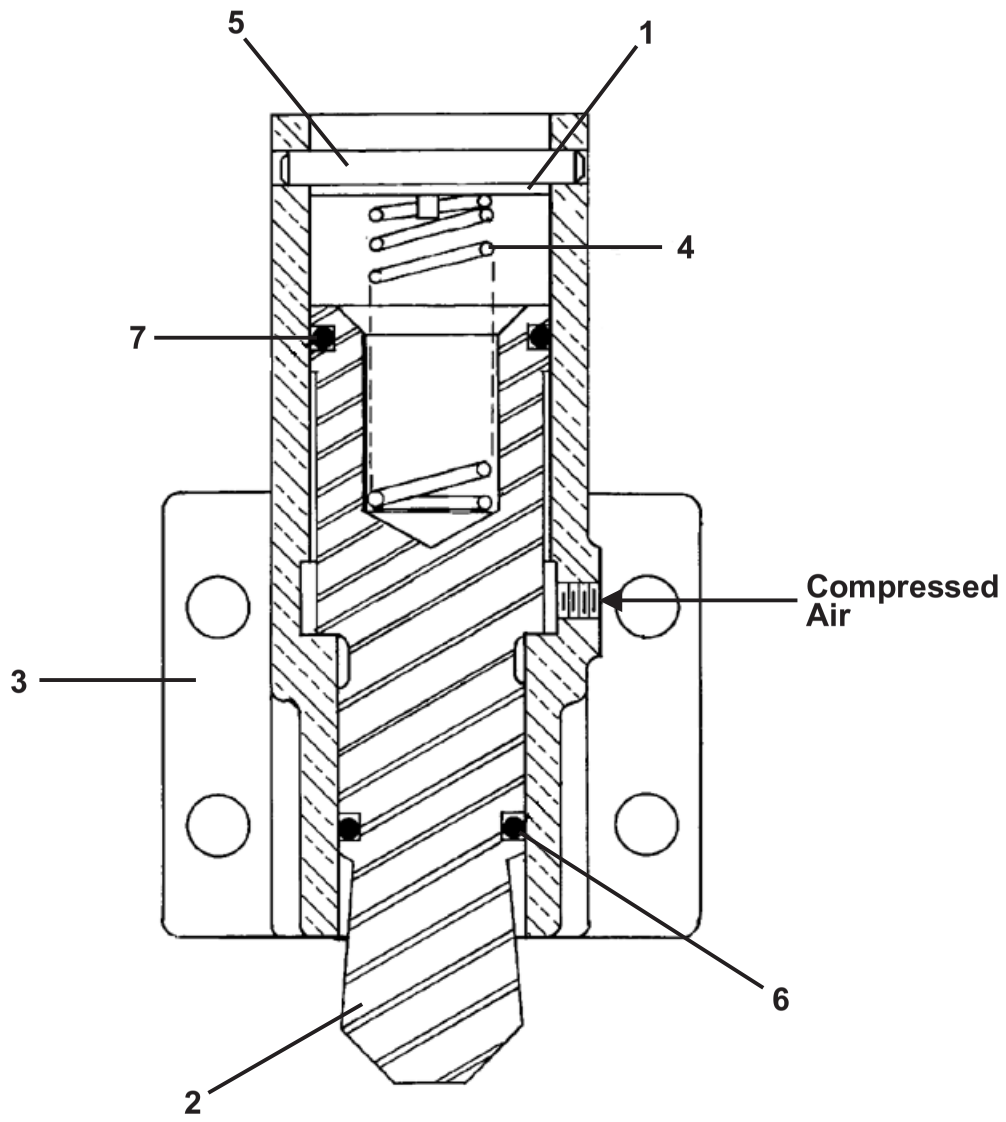
Litho in U.S.A.



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	

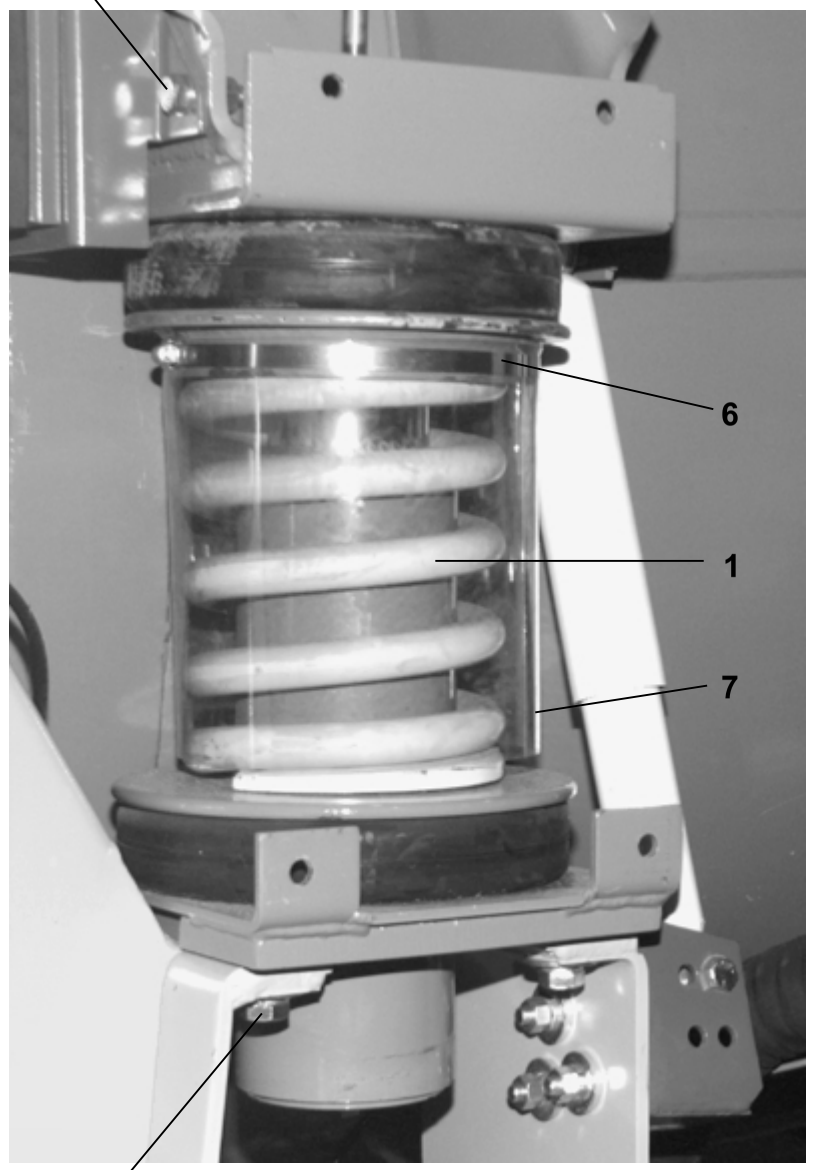
Suspension 5

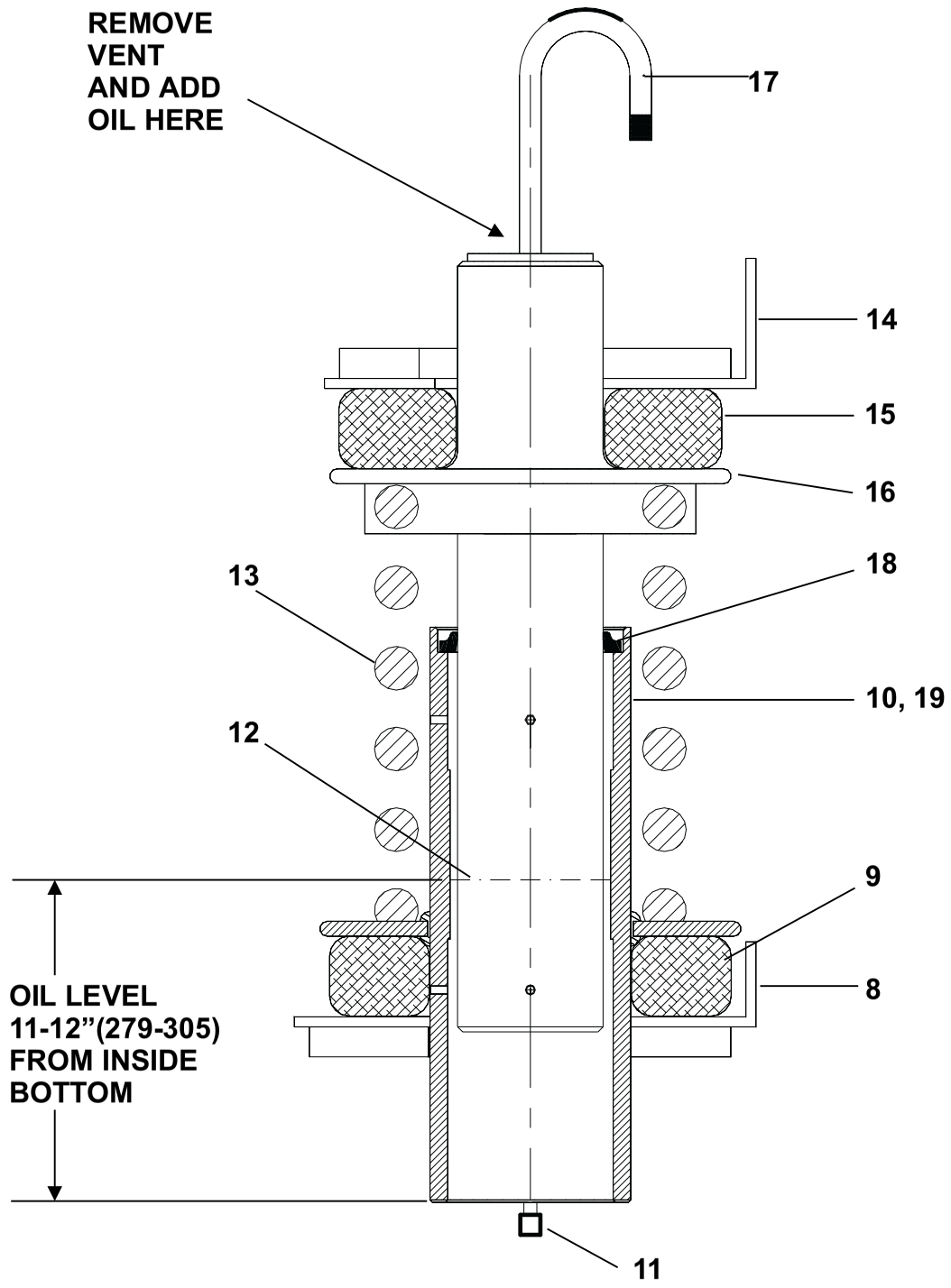
Isolator Assembly & Installation

64040/64050E6N

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

Litho in U.S.A.





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Litho in U.S.A.

Parts List—Isolator 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	GIC65003	INST=ISO ASSY'S 64E&J Md2	
	B	AIC65003	ASSY=FNT OR RR ISO 64E&J MD2	
			----------COMPONENTS----------	
all	1	AIC65003	ASSY=FNT OR RR ISO 64E&J MD2	
all	2	15K218	HXCPSCR 5/8-11X1+5/8" GR.5 ZIN	
all	3	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	5	20C008C	THDLOCK-RMUBL-250CC LT#242-41	
all	7	03 65036P	PLASTIC SHIELD 12.75X 27.75	
all	6	27A092	HOSECLAMP S.S.SCR 7+1/8-10"	
all	8	W3 65030G	*WLMT=BTM ISO MNT PLTE MD2	
all	9	60D10A05AA	ISO MNT=10/5.03/2 M6AA814	
all	10	AIC65000	SUBASSY=64ISO BODY+SEALS	
all	11	5SP0GGFSS	NPT PLUG 3/8 SQ SOLID GALSTL	
all	12	20H008A	ROTELLA 10W30 MTR OIL DR.EA=1G	
all	13	03 65032	SPRING=7.25 OD X 1170#/IN	
all	14	W3 65030E	*WLMT=TOP ISO MNT PLATE MD2	
all	15	60D09K03NA	ISO MNT=9.5/3.69/2 M6AA814	
all	16	X3 65025E	MACH=3.5 ISO ROD MD2	
all	17	03 65036	ISOLATOR = VENT PIPE BRASS	
all	18	Y3 65033F	MACH=ISO BODY W/BUSH 64 MD2	
all	19	24S004	SEALH1L7 WIPER3.625X4.625X.500	
all	20	20C004	LOCTITE GRADE B .2CC SIZE	

Shock Absorber Installation

64040/64050E6N 64046E6N/J6N 72046E5N/J5N 72058J5N

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

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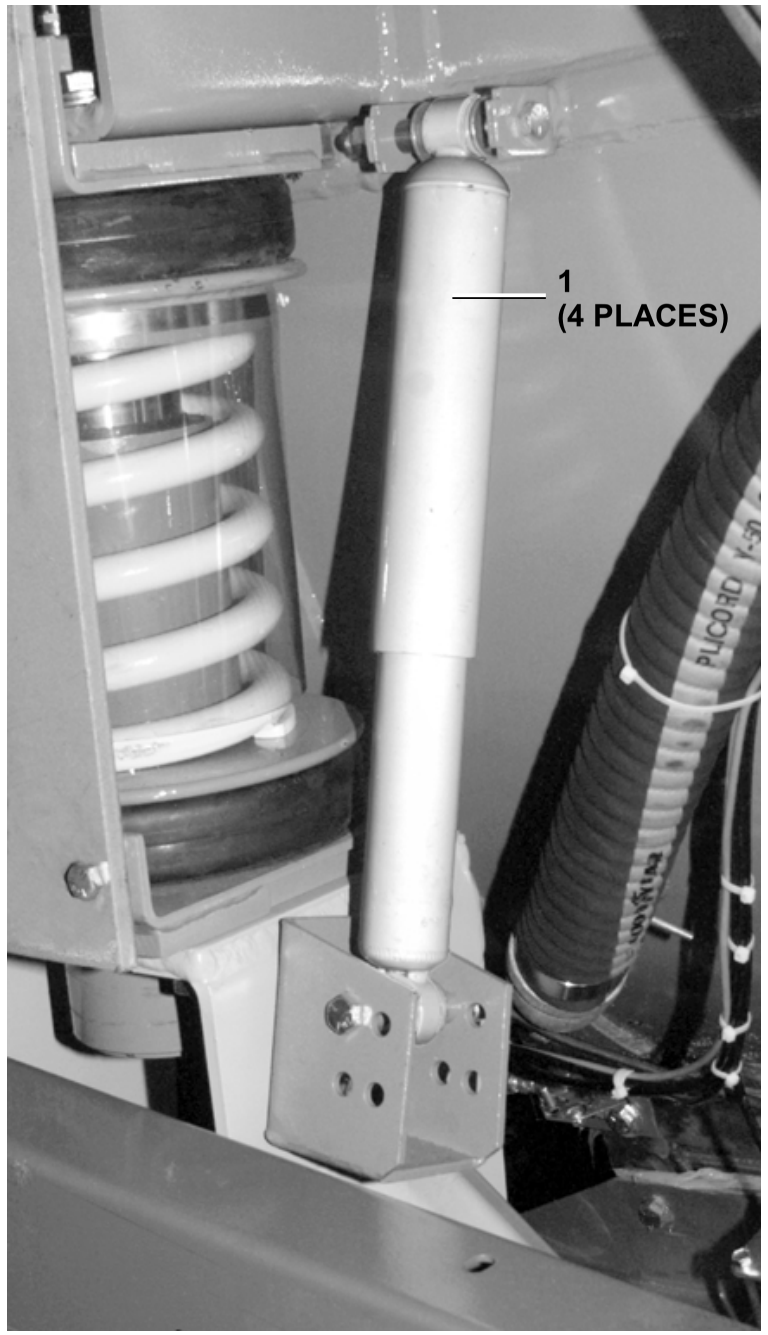

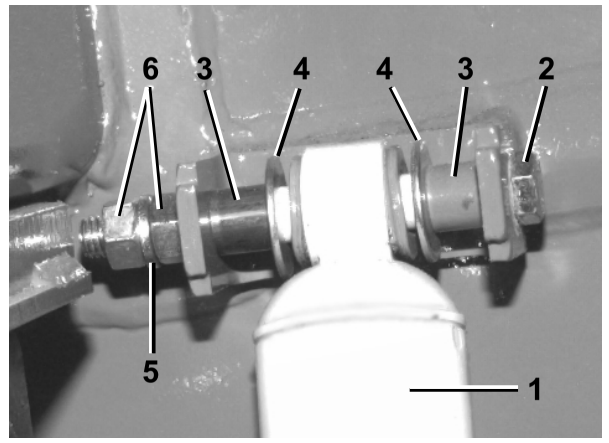

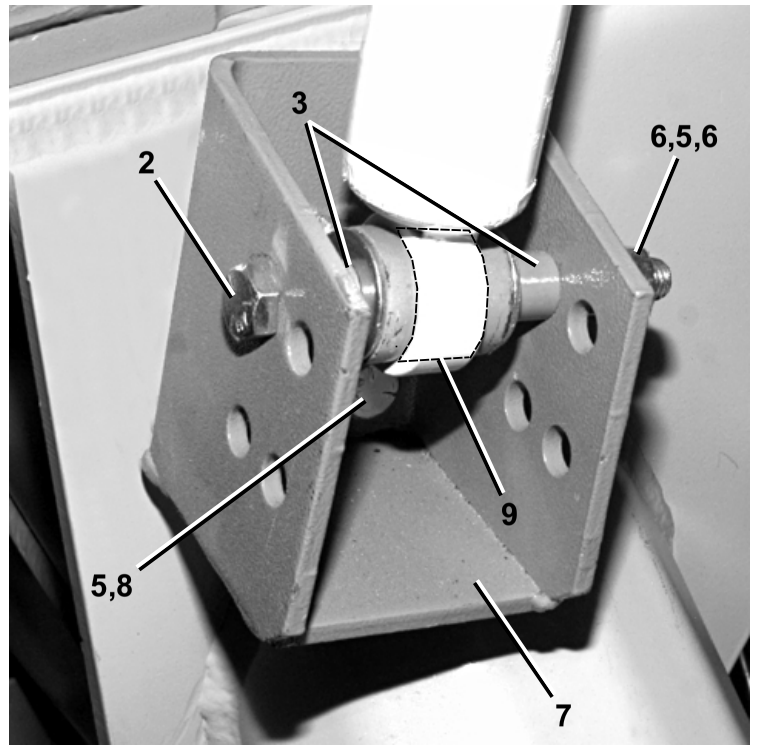

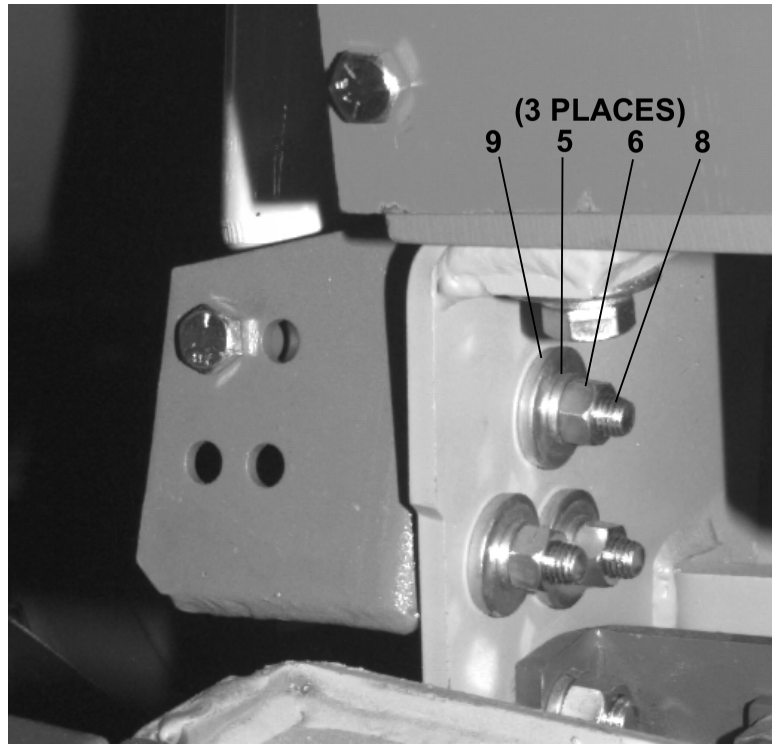

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Parts List—Shock Absorber Installation

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	GIC65002	INST=SHOCK ABSORBER 6446E6N	64040/64050E6N 64046E6N/J6N
	B	GIC58002	INST=SHOCK ABSORBER 7258E5N	72046E5N/J5N 72058D5N/J5N
			----------COMPONENTS----------	
all	1	60BS6832	SHOCK ABSORBR GABRIEL65488440X	
all	2	15K202	HXCAPSCR 1/2-13UNC2AX5 GR5 ZIN	
all	3	05 20190	MTG-SPACER=SHOCK ABSORBER72T	
all	4	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	5	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	6	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	7	W3 65110B	96261C *WELD=SHOCK MNT PLATE ISO	
all	8	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	9	05 20187A	MTG.STUD=SHOCK ABS 6446E6N	

Tilt Frame and Pivots 6

Frame Pivots and Tilt Limits

64040/64050E6N

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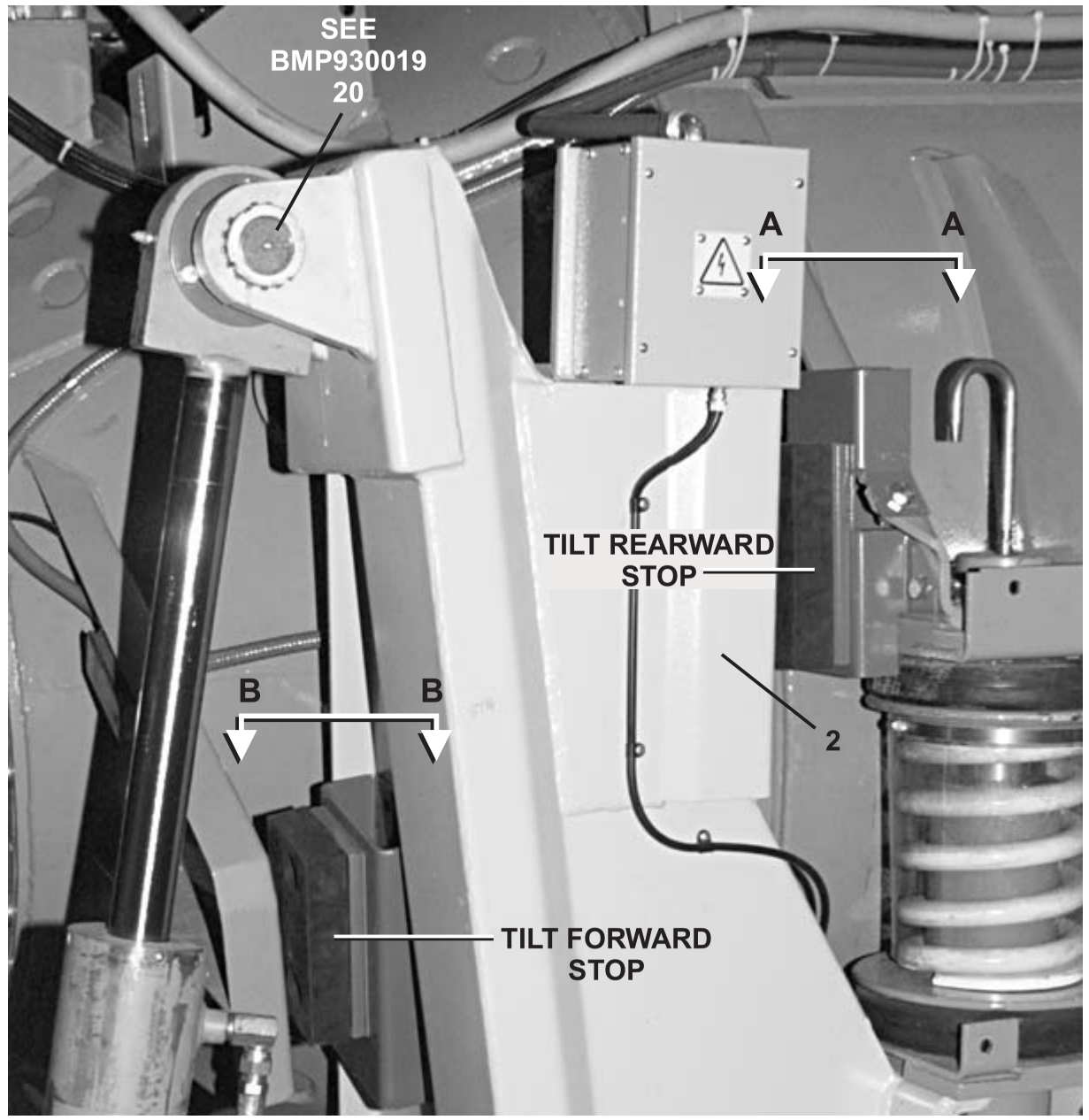
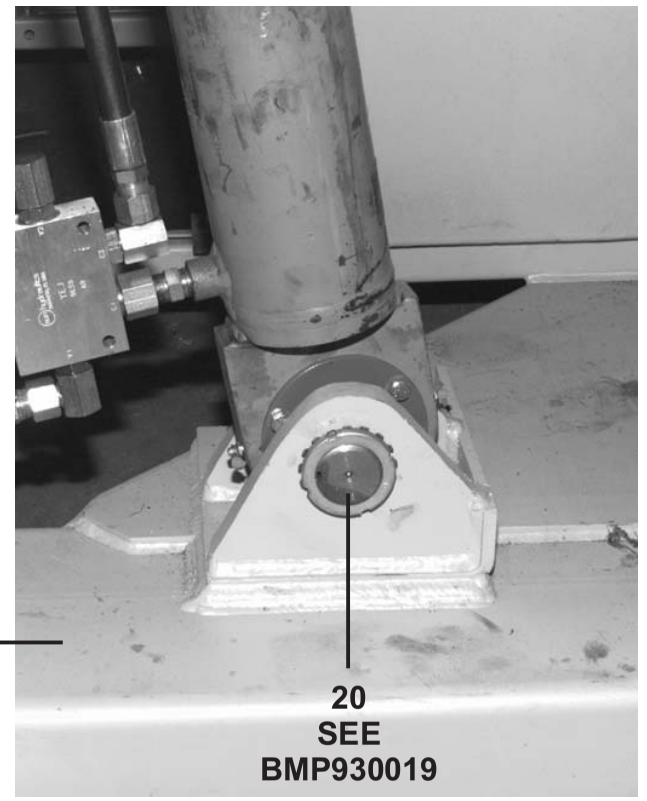
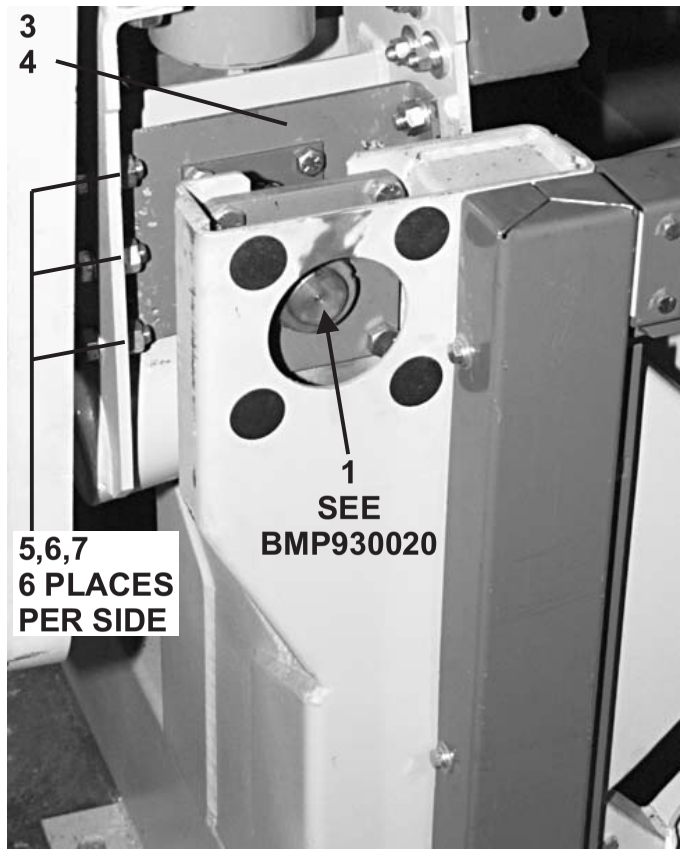
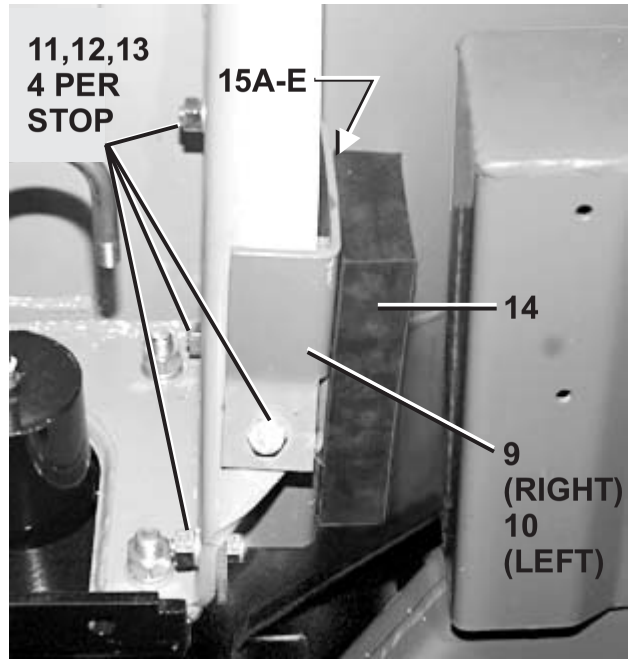
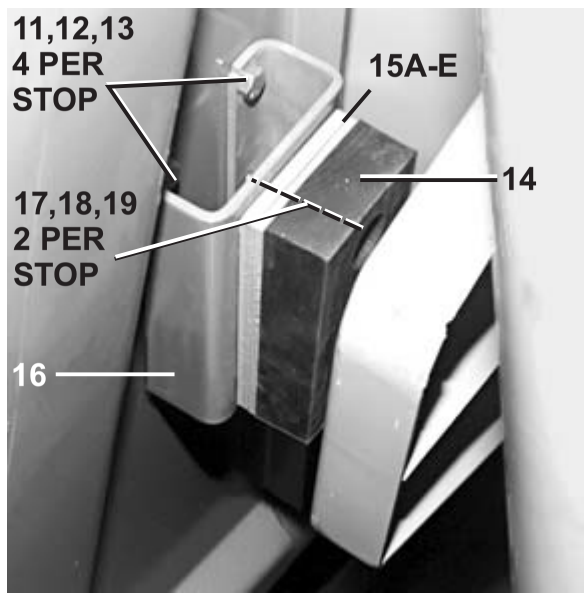








VIEW A-A



VIEW B-B

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Parts List—Frame Pivots and Tilt Limits

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	GHF60001P	INST=FRAMES+PIVOTS=6440&6450	
	B	GBM16003	INSTL=BAL BUSH PIVOT M7E/E6N	
	C	GBM60200	INST=3"BALL BUSH 6450	
	D	AHT65001	ASSY=HYDRAULIC MNT 2"BALBUSH	
			----------COMPONENTS----------	
all	1	GBM16003	INSTL=BAL BUSH PIVOT M7E/E6N	SEE BMP930020
all	2	W3 60121P	WLMT=TILT FRAME 6440&6450	
C	3	03 60157	RT MNT BRKT=BOLT=3"BAL BUSH	
Cl	4	03 60157A	LT MNT BRKT=BOLT=3"BAL BUSH	
C	5	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 Z	
C	6	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
C	7	15U238	LOKWAS INTOOTH 3/8" (US STD) 4	
all	8	W3 60171N	WLMT=BASE FRAME 6440&50	
all	9	03 65134B	TILT RRWRD TILT FRM RT MP2	
all	10	03 65134C	TILT RRWRD TILT FRM LT MP2	
all	11	15K147	HXCAPSCR 1/2-13UNC2X1 GR5 ZINC	
all	12	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	13	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	14	03 64681	RESTPAD=SHELL STOP FRONT64TN	
all	15	03 64681E	REST PAD :1/2"SPACER	AS REQUIRED
all	15	03 64681A	REST PAD:10GA SPACER	AS REQUIRED
all	15	03 64681B	REST PAD :7GA SPACER	AS REQUIRED
all	15	03 64681C	REST PAD :1/4"SPACER	AS REQUIRED
all	15	03 64681D	REST PAD :3/8"SPACER	AS REQUIRED
all	16	03 65133A	TILT FRWRD TILT FRM STP MD2	
all	17	15K191	HXCAPSCR 1/2-13UNC2AX2.5 GR5 Z	
all	18	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	19	15G234	LOKNUT 1/2-13NC CAD FLXLOC#21F	
all	20	AHT65001	ASSY=HYDRAULIC MNT 2"BALBUSH	SEE BMP930019

Installation of Pivot Ball Bushing

42032M7/M9 64040,64050E6N 64046E6N/J6N 72046E5N/J5N 72058J2N/J5N 72075J2N

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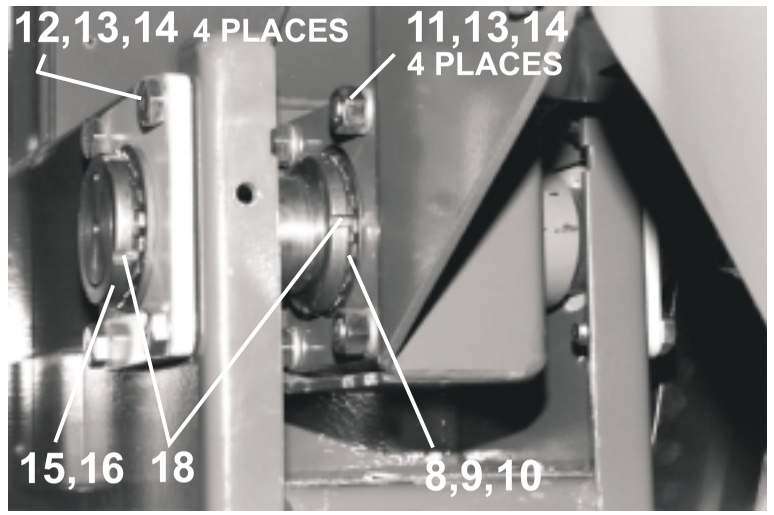
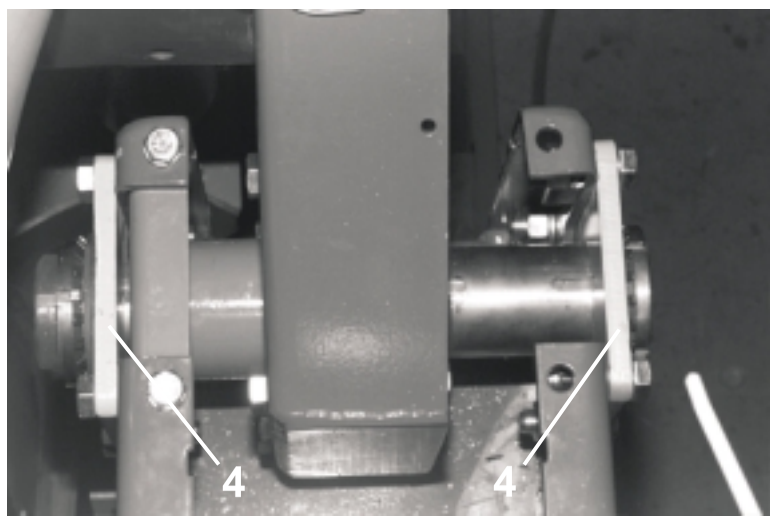
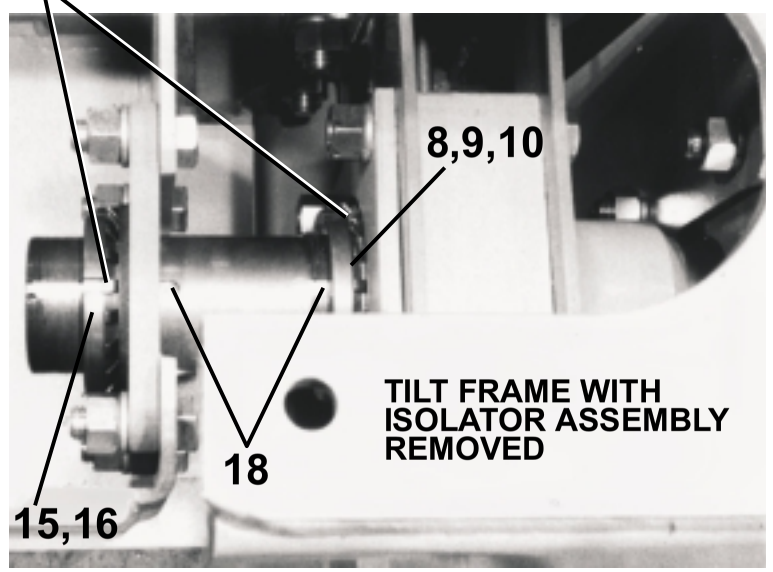


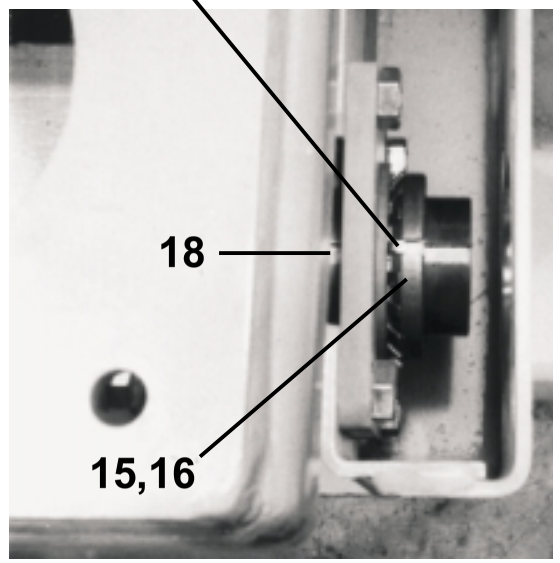
Note: These two views are of the 42032M7E Pivot Installation-Right Side



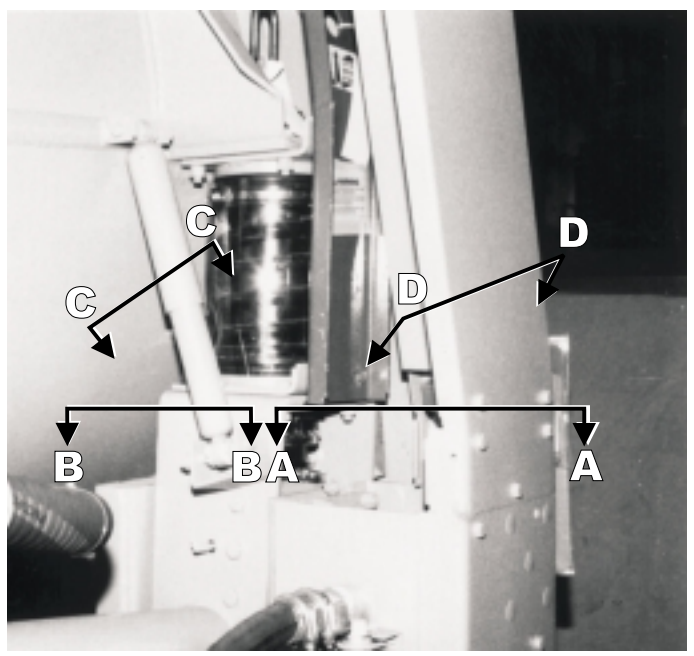
Top View of Right Pivot



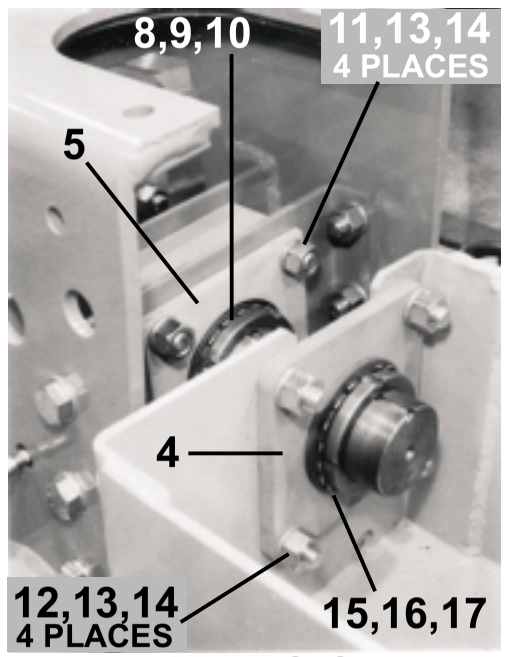
View A-A



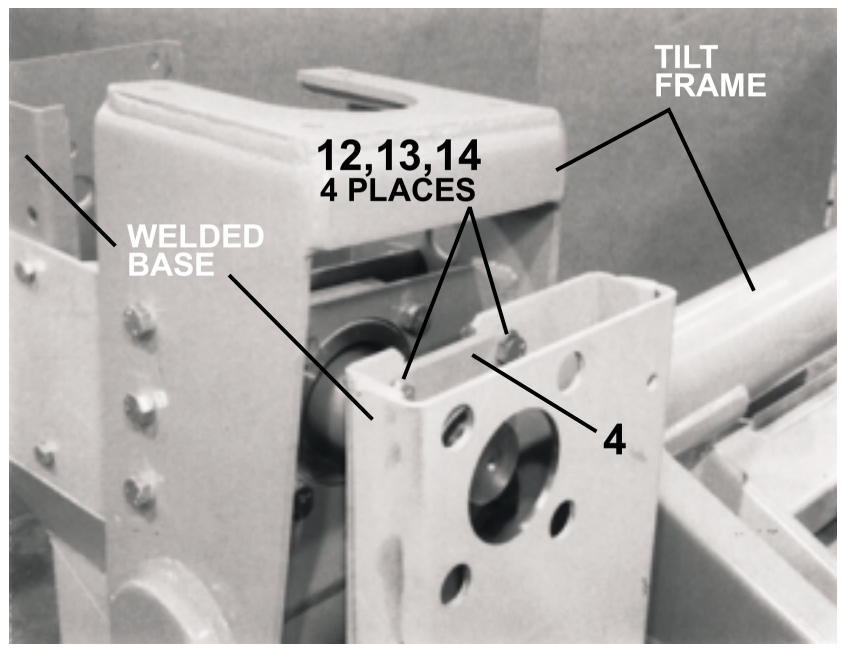
View B-B



Overview Pivot Installation 64046E6N-Left Side

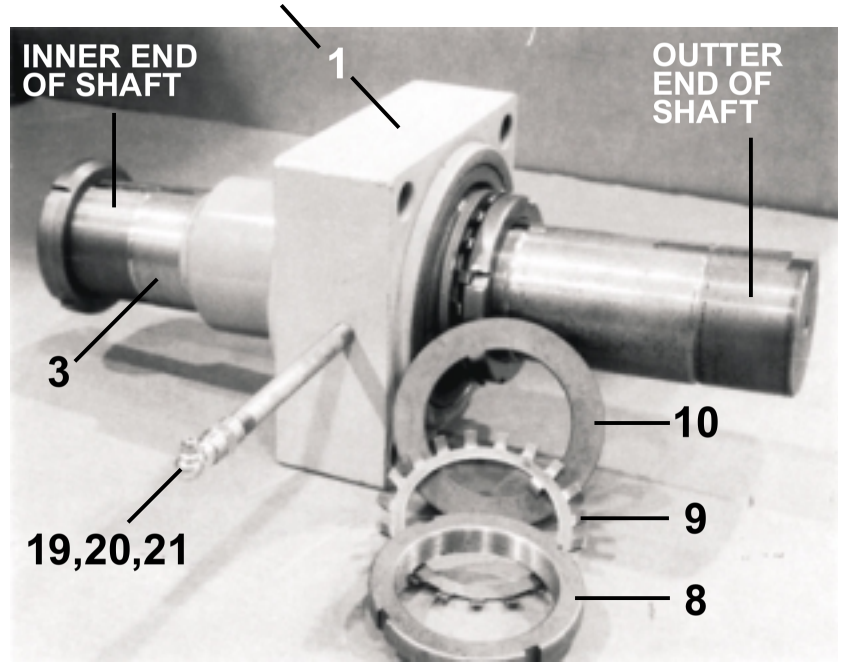


View C-C



View D-D

SEE BMP930026



Ball Bushing and Shaft

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Parts List—Pivot Ball Bushing

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	GBM16003	93491B INSTL=BAL BUSH PIVOT M7E/E6N	
			----------COMPONENTS----------	
all	1	ABM16003	93442B ASSY=BAL BUSH PIV 42M7E64E6N	
all	3	X3 65150	94277C SHAFT=3" BALL BUSH PIVOT	
all	4	X3 65153	93023B MNT PLT=3" BALL BUSH PIVOT	
all	5	03 65152	93491B LOCK PLT=3" BALL BUSH PIVOT	
all	8	56AHN14	N14 BEARING LOCKNUT	
all	9	56AHW14	W14 BEARING LOCKWASHER	
all	10	56ATW14	TONGUE WASH TIM K91514 FOR N14	
all	11	15K227A	HXCAPSCR 5/8-11X4.5 Gr8 ZINC	
all	12	15K214E	HXCAPSCR 5/8-11UNC2AX1.5 GR5 ZNC/CD	
all	13	15U315	LOKWASHER MEDIUM 5/8 ZINCPL	
all	14	15G238B	HEXFINNUT 5/8-11UNC2 Gr8 ZINC	
all	15	56AHN13	N13 BEARING LOCKNUT	
all	16	56AHW13	W13 BEARING LOCKWASHER	
all	18	15E212	STDSQMACHKEY 5/16X2+1/2 C1018	
all	19	5N0C04AG42	NPT NIP 1/8X4 TBE GALSTL SK40	
all	20	5SCC0CBE	NPT COUP 1/8 BRASS 125# 103A-A	
all	21	54M023	GRSFIT 45DEG ALEMITE 1688-B	

Ball Bushing

64046E6N/J6N, 72046E5N/J5N, 72058J2N/J5N, 42032M7E, M7V4840C, M7V4836C

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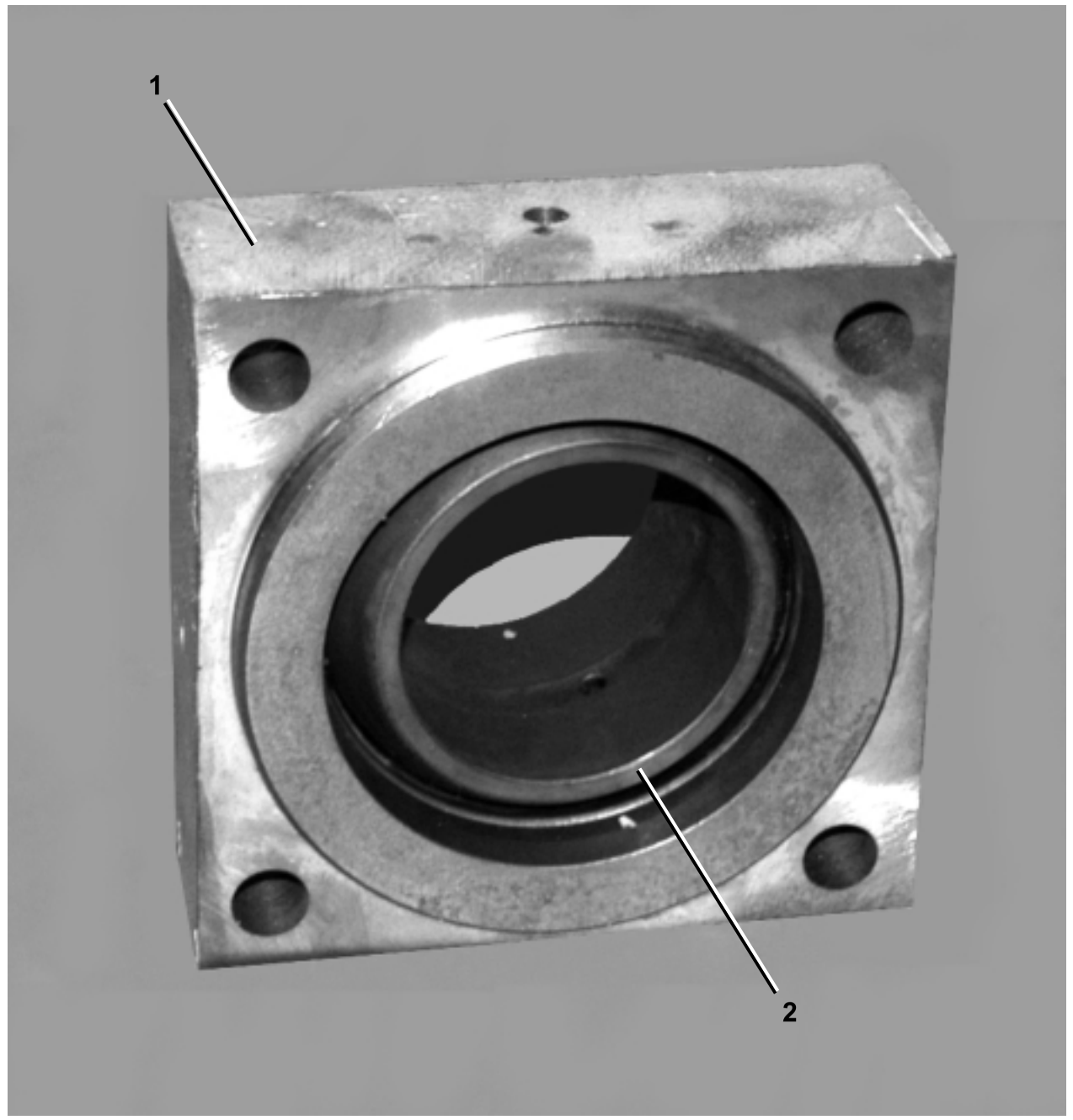

Parts List—Assembly Ball Bushing

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	ABM16003	ASSY=BAL BUSH PIV 42M7E64E6N	
			----------COMPONENTS----------	
all	1	X3 65151	MNT BLOCK=3" BALL BUSH PIVOT	
all	2	54A707	BALL BUSHING 3" RBC# B48-L	

Hydraulic Cylinder Mounting 2” Ball Bushing

64040/64050E6N 64046E6N/J6N 72046E5N/J5N 72058J5N 72058/72075J2N

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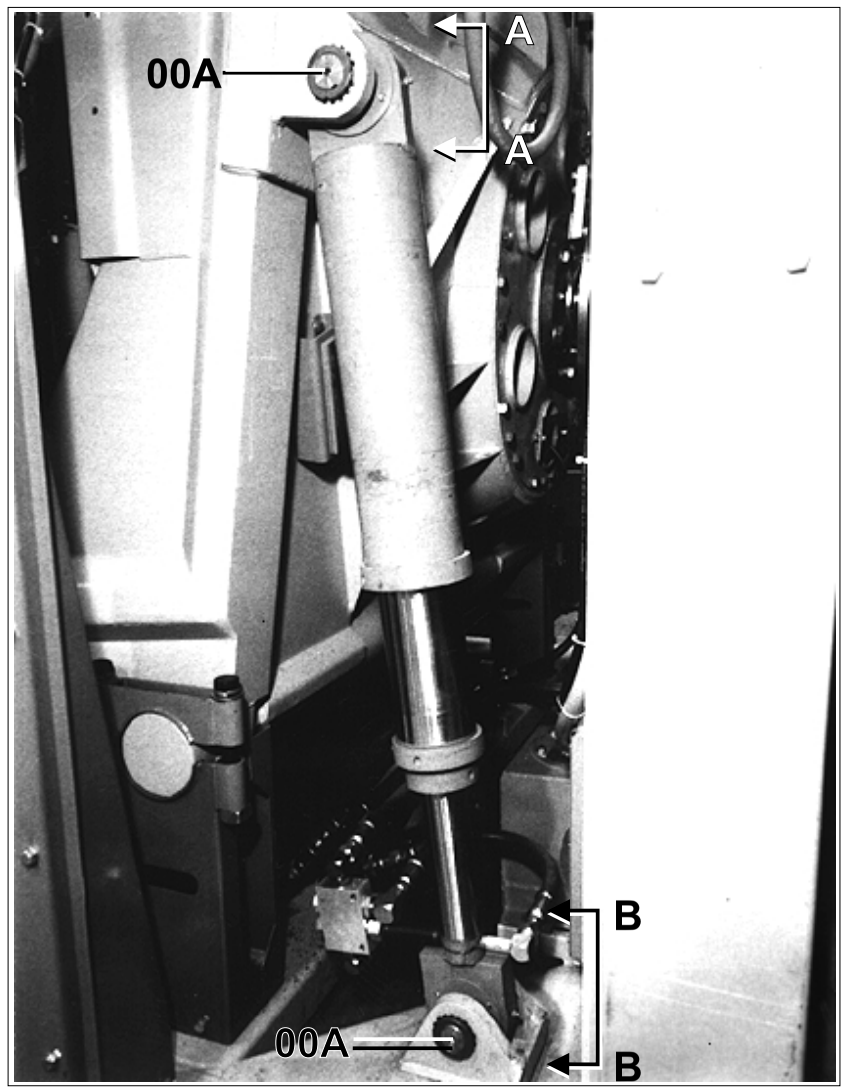

Figure 1:

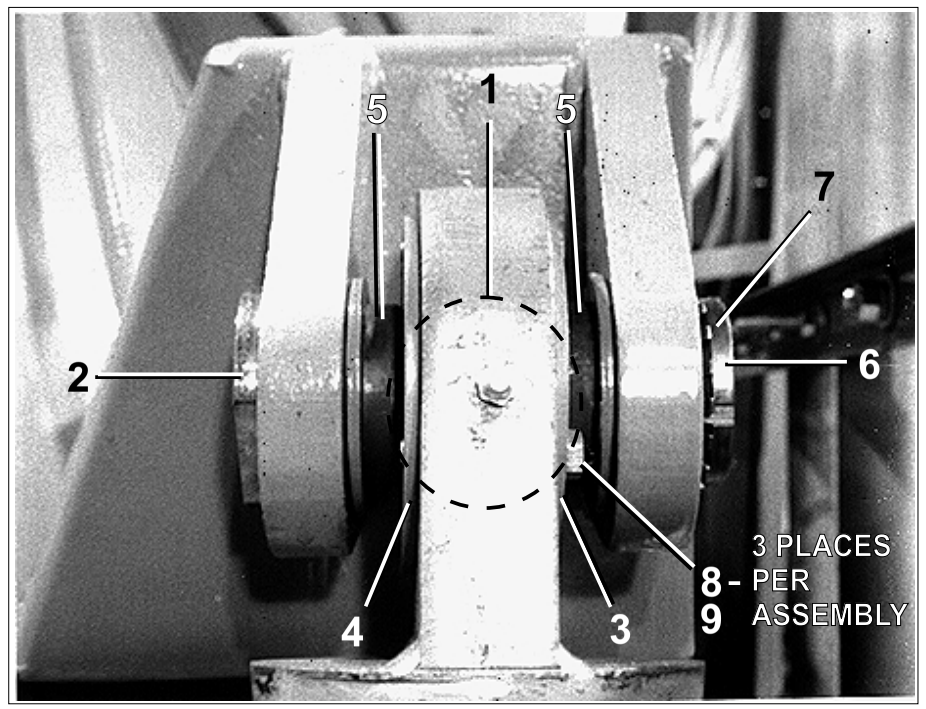

Figure 2: View A-A

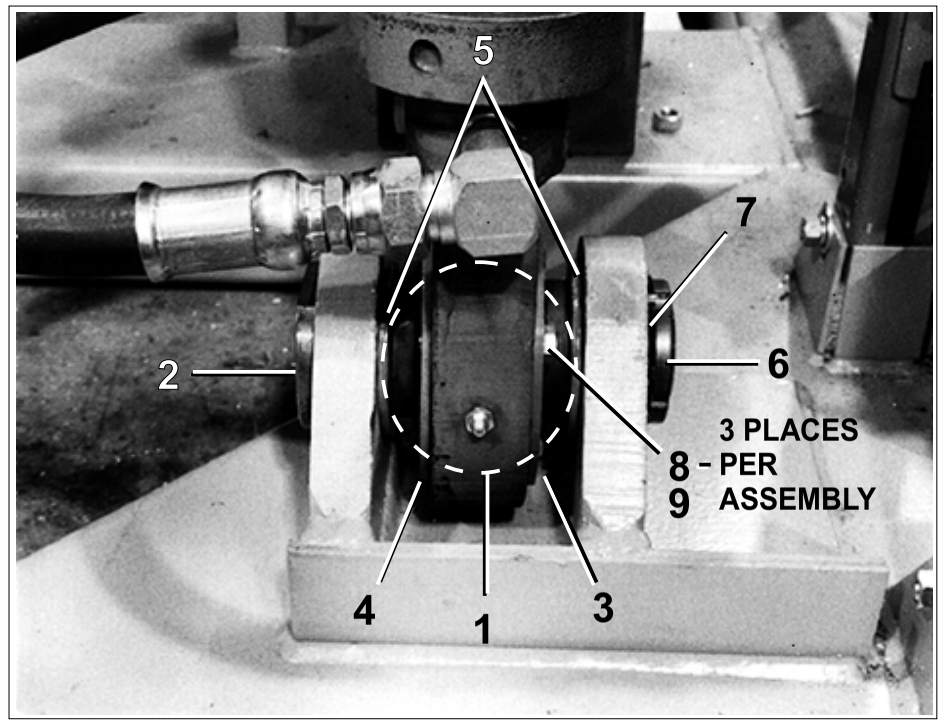

Figure 3: View B-B

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Parts List—Hydraulic Cylinder Mounting 2” Ball Bushing

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	AHT65001	94407B ASSY=HYDRAULIC MNT 2"BALBUSH	
----------COMPONENTS----------				
all	1	54A705A	00Z BALL-BUSH 2" SKF #GEZ200ES	
all	2	X3 65141	93387B BOLT=2.00 SFTDIA X 5.25L HYD	
all	3	03 65142	92483B WASH=HYD4.75ODX2.62IDW/HOLES	
all	4	X3 65142A	92483B WASH=HYD4.75ODX2.62IDW/TAP	
all	5	X3 65145	94283B SPCR=HYDCYL MNT2"BALBUSH SM	
all	6	56AHN09	N09 BEARING LOCKNUT	
all	7	56AHW09	W09 BEARING LOCKWASHER	
all	8	15K120	HXCAPSCR 3/8-16UNC2AX2 GR5 ZINC/CAD	
all	9	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	

Proximity Switch Installation

64040, 64050E6N 72058,72075J2N

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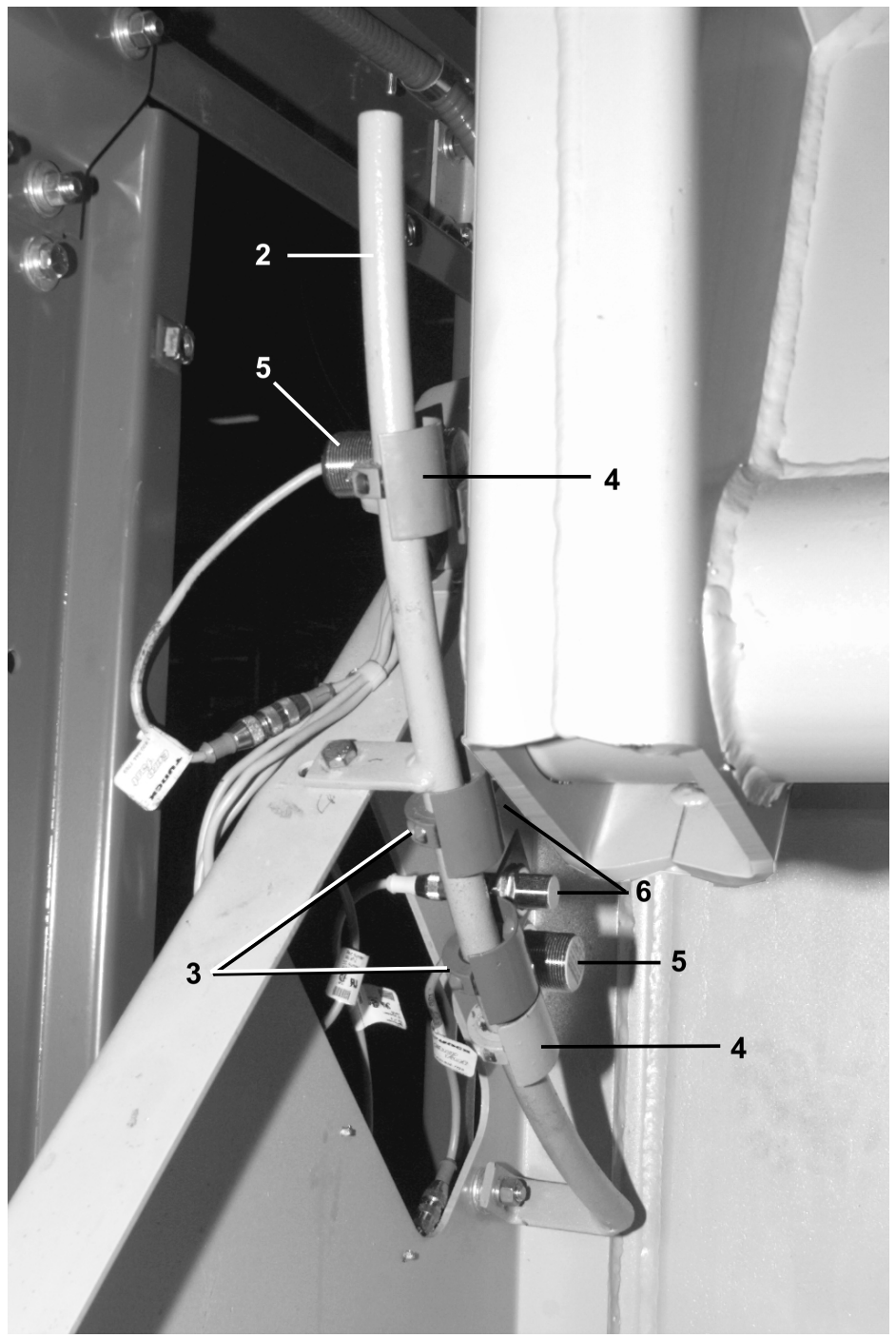

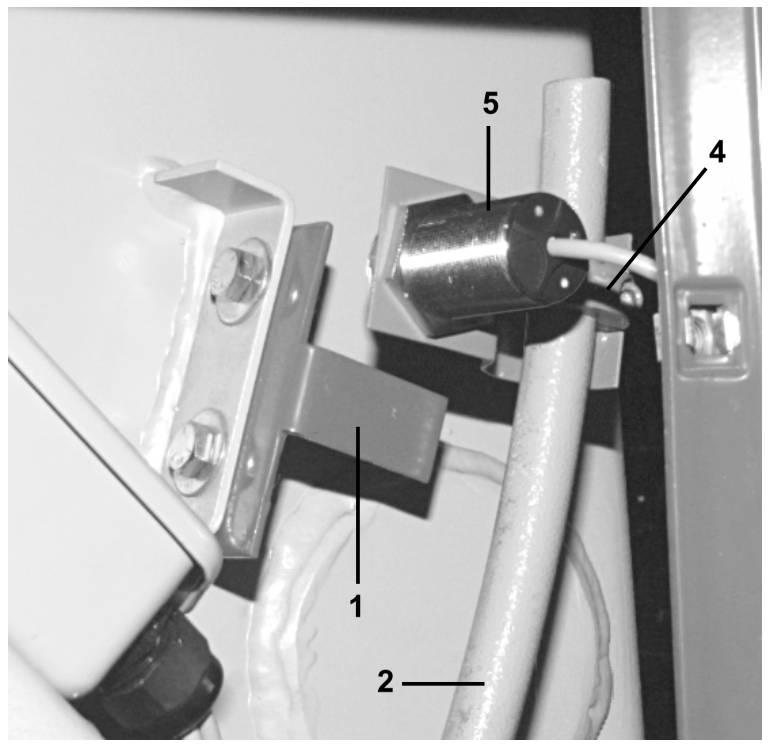

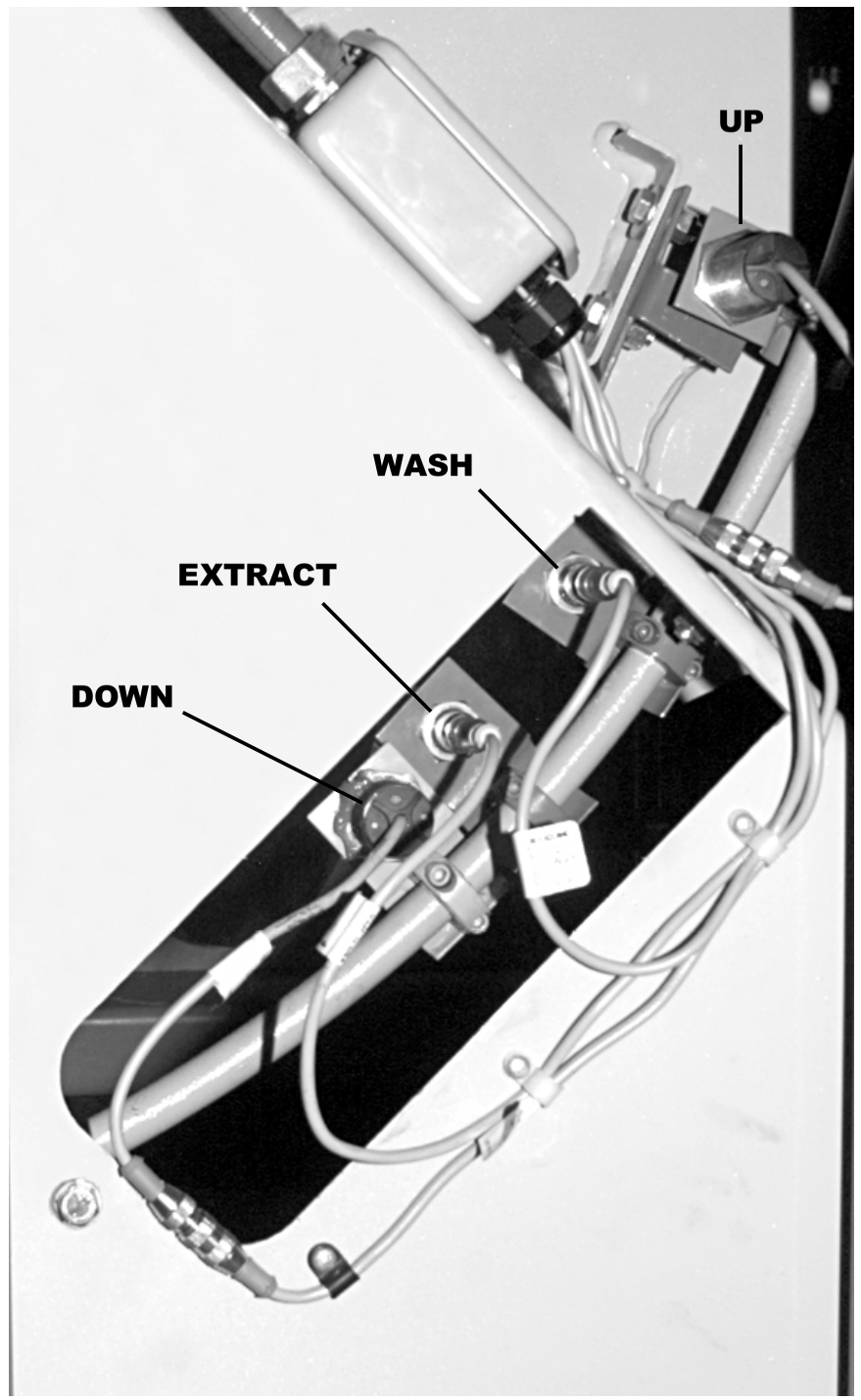

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Parts List—Proximity Switch Installation

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	GPS60001	INST=PROX SWTCHS 6440	
			----------COMPONENTS----------	
all	1	03 65221	TARGET BRKT 6446E6N	
all	2	W3 60219	WLMT=MNT BAR=PROX SWTCH 6440	
all	3	W3 60220A	PROX SW MTG WLMT 18MM, 6440	
all	4	W3 60220B	PROX SW MTG WLMT 30MM, 6440	
all	5	09RPS30BAS	PRXSW QK CONN 30M NC-AC SHLD	
all	6	09RPS18ADS	PRXSW QK CONN 18M NO-DC SHLD	

7 Hydraulic Piping and Assemblies

Hydraulic Schematic

64040/64050E6N 72058/72075J2N

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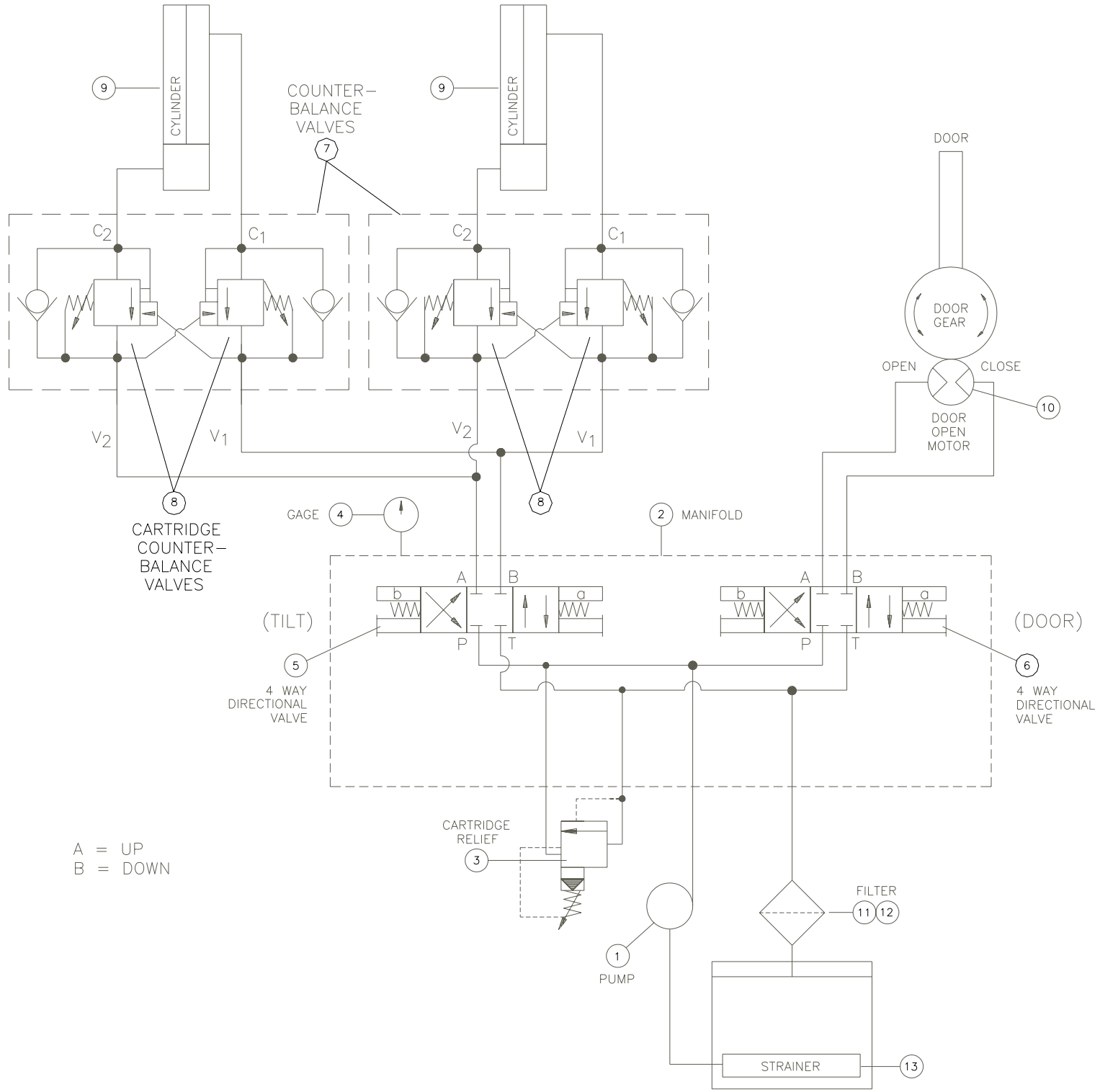

Parts List—Hydraulic Schematic

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	GSD58001	INST=40"DR HYDMTR TRBKT 72J2	40”DOOR 72J2
	B	GSH60001	INST=40"DR HYDMTR+BRKTS 6440	40”DOOR 6440 & 48”DOOR 6450
	C	GSH60001A	INST=48"DR HYDMTR+BRKTS 72J2	48”DOOR 72J2N
	D	AHT60120	ASSY=6440 TANK TOP ASSY	TANK ASSEMBLY “ALL”
	E	AHT60102	ASSY=34/48GAL-2ND VALV 6440	OPTIONAL 2ND VALVE “ALL”
	F	AHT60020	ASSY=1STG.HYD.CYL.39.2ST+PIPNG	1 STAGE 14 DEG 6440/50
	G	AHT60030	ASSY=3STG.HYD.CYL.59.6ST+PIPNG	3 STAGE 21DEG 6440/50
	H	AHT58020	ASSY=1STG HYD CYL J2N 7275	1 STAGE 7275 J2
	J	AHT58021	ASSY=1STG HYD CYL J2N 7258	1 STAGE 7258 J2
			----------COMPONENTS----------	
all	1	27E5500	PUMPHVDVANE;VICK#V20-1P13PD11	
all	2	96DH455	MANIFOLD, 2-VALVE D05 PARALLEL	
all	3	96DH455A	CARTRIDGE,RELIEFVICK#RV510S020	
all	4	27E731500	LIQFILL GAGE 0-1500PSI/BAR BRZ	
all	5	96RH711E37	DIRECTIONAL CONT. VLV.D05-NG10	TILT
all	6	96RH705E37	VALVE-HYD.4-WAY DIRECTIONAL	AUTO DOOR
all	7	96DH471	COUNTERBALANCE VALVE-SUN BODY	F,H,J
all	7	96DH472	C0UNTERBALANCE VALVE-SUN BODY	G
all	8	96DH471A	CARTRIDGE-COUNTERBAL.SUN	F,H,J
all	8	96DH472A	CARTRIDGE, COUNTERBALANCE VLV.	G
all	9	27E164039A	HYD.CYL.D/A 4"X2"X39.18"STK.	F (1 STAGE)
all	9	27E1657A59	HYD.CYL.3-STAGE 59.57"STROKE	G (3 STAGE)
all	9	27E16330MT	3X30 PRINCE HYDCYL W/MTG HDW	H (PRINCE 3X30)
all	9	27E16329MT	3X29 PRINCE HYDCYL W/MTG HDW	J (PRINCE 3X29)
all	10	27E320025	TDRQMOTOR- HYRAULIC	
all	11	27E7112	INTANK RETURN FILTER 1+1/4"	
all	12	27E7201	FILLER-BREATH-FILT.LHA#ABB-40N	
all	13	27E7113	STRAINER,TANKMT LHA#TM-25-100	6440/6450 ONLY
all	13	27E7107	SUCTION STRAINER 1+1/4"PORT	7258/7275 ONLY

Hydraulic Tank and Installation

64040/64050E6N 72058/72075J2N

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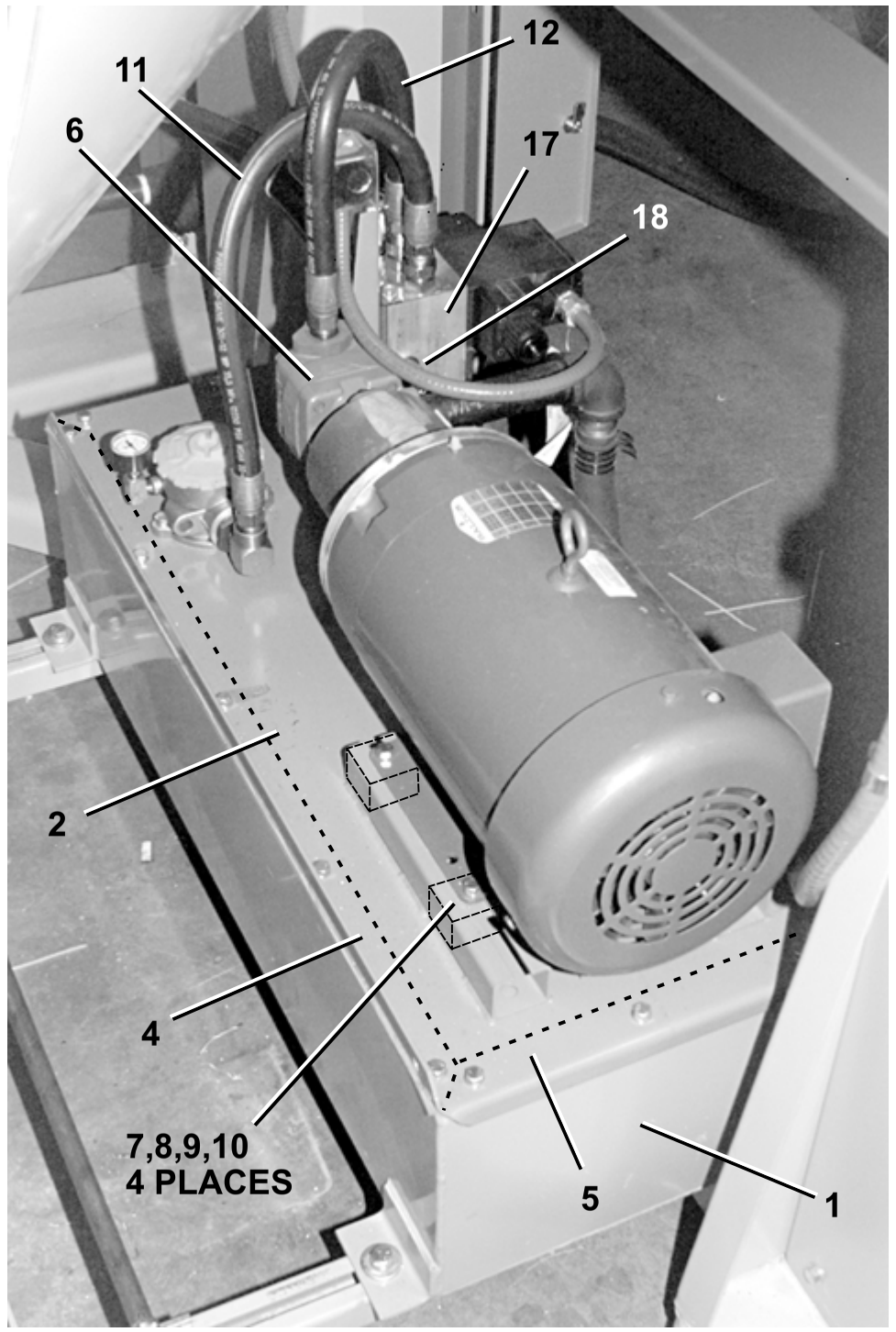
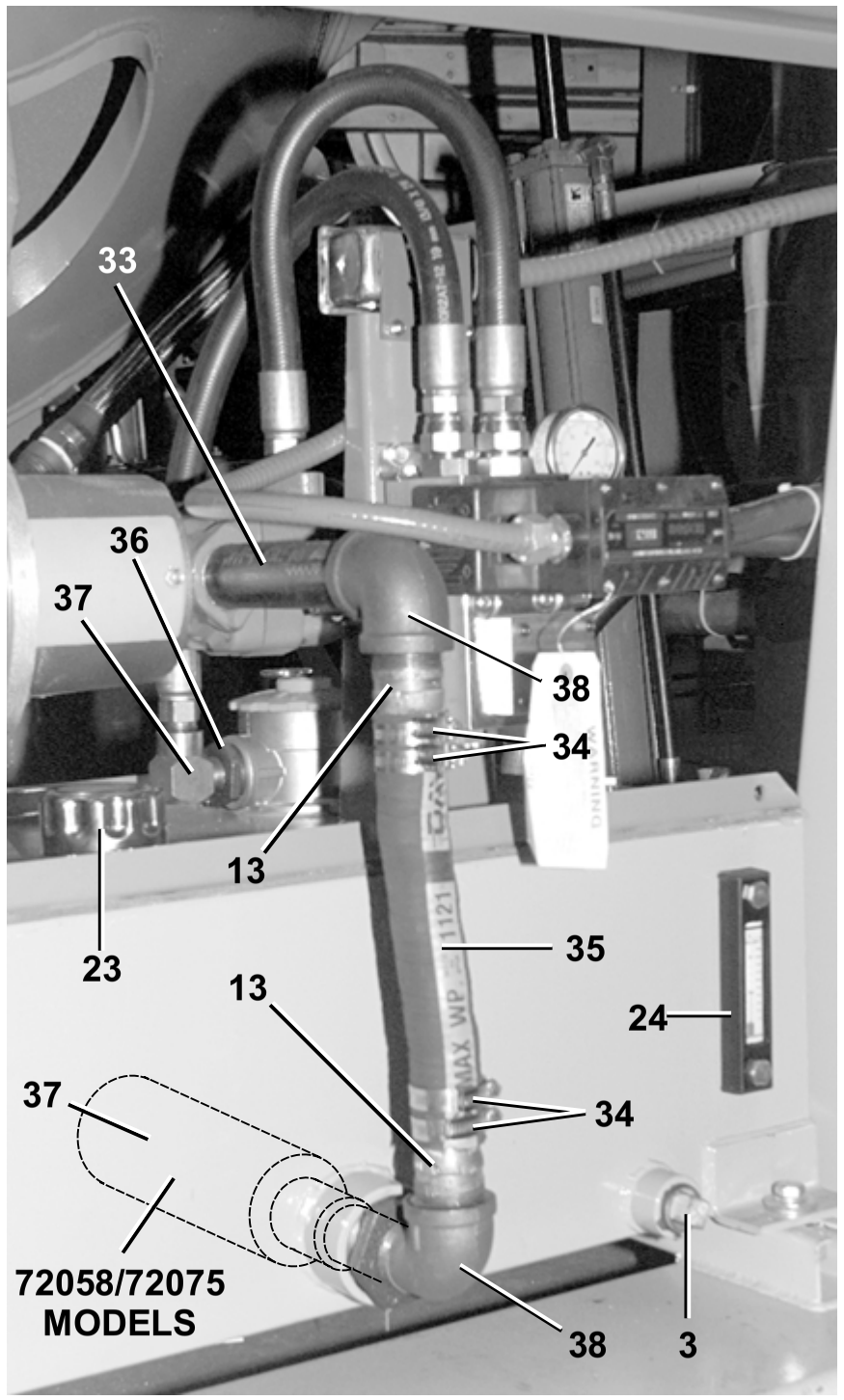
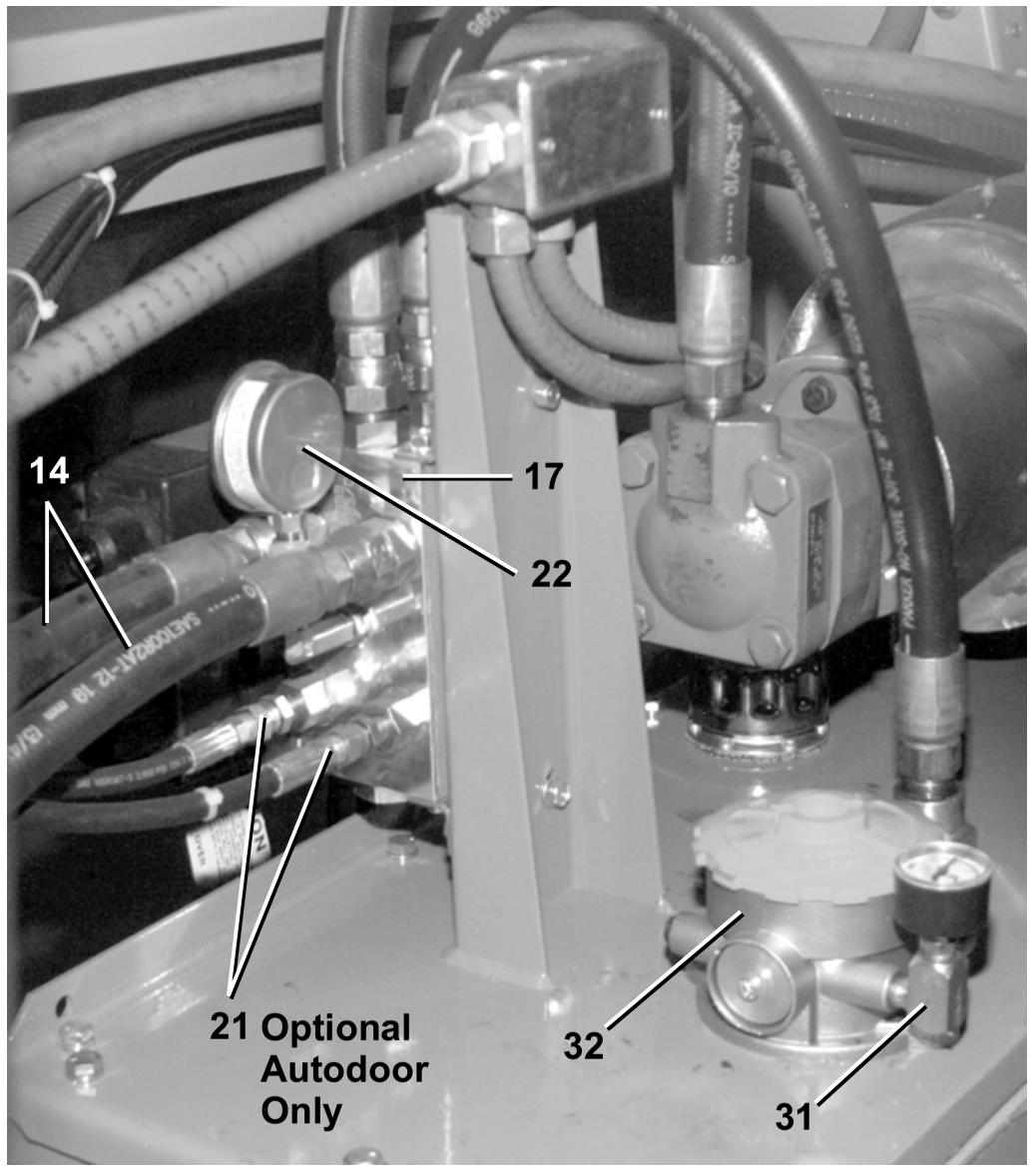
Litho in U.S.A.





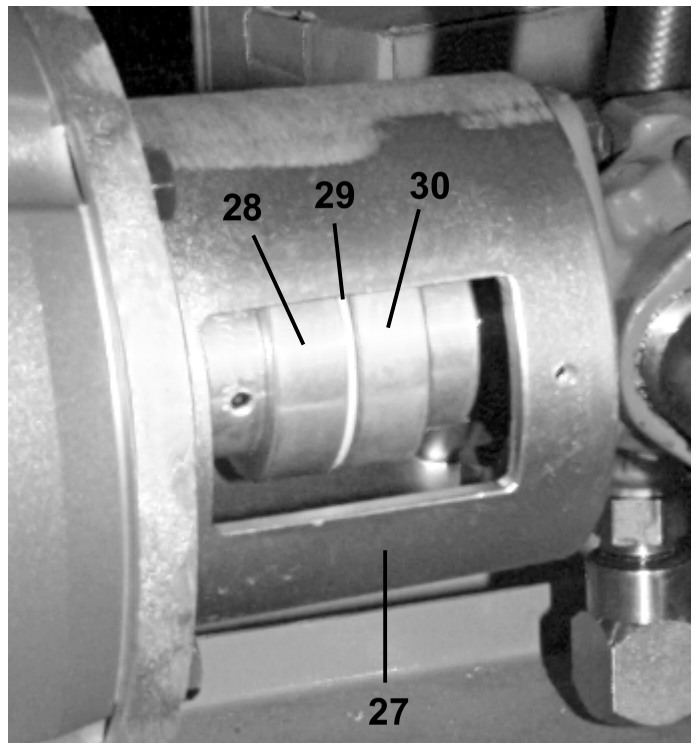


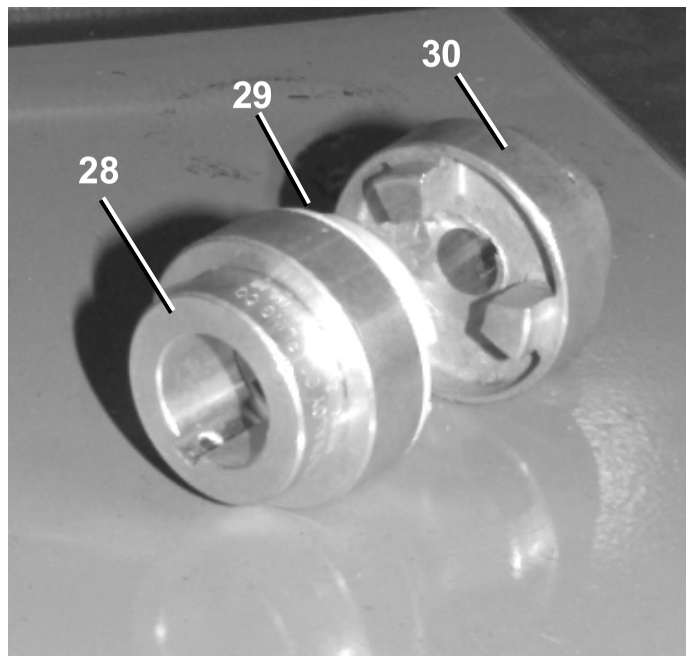
Hydraulic Tank and Installation

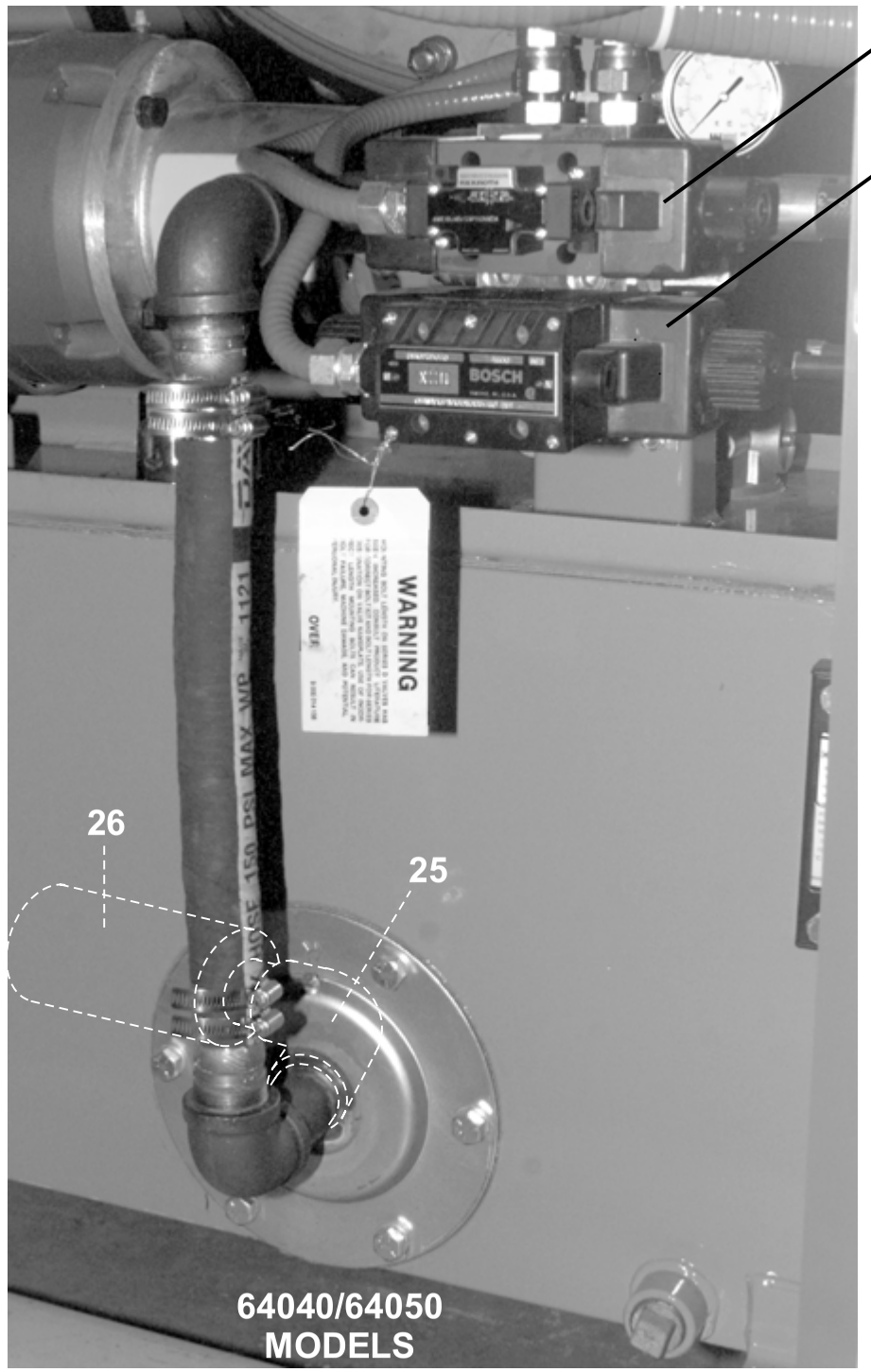
64040/64050E6N 72058/72075J2N

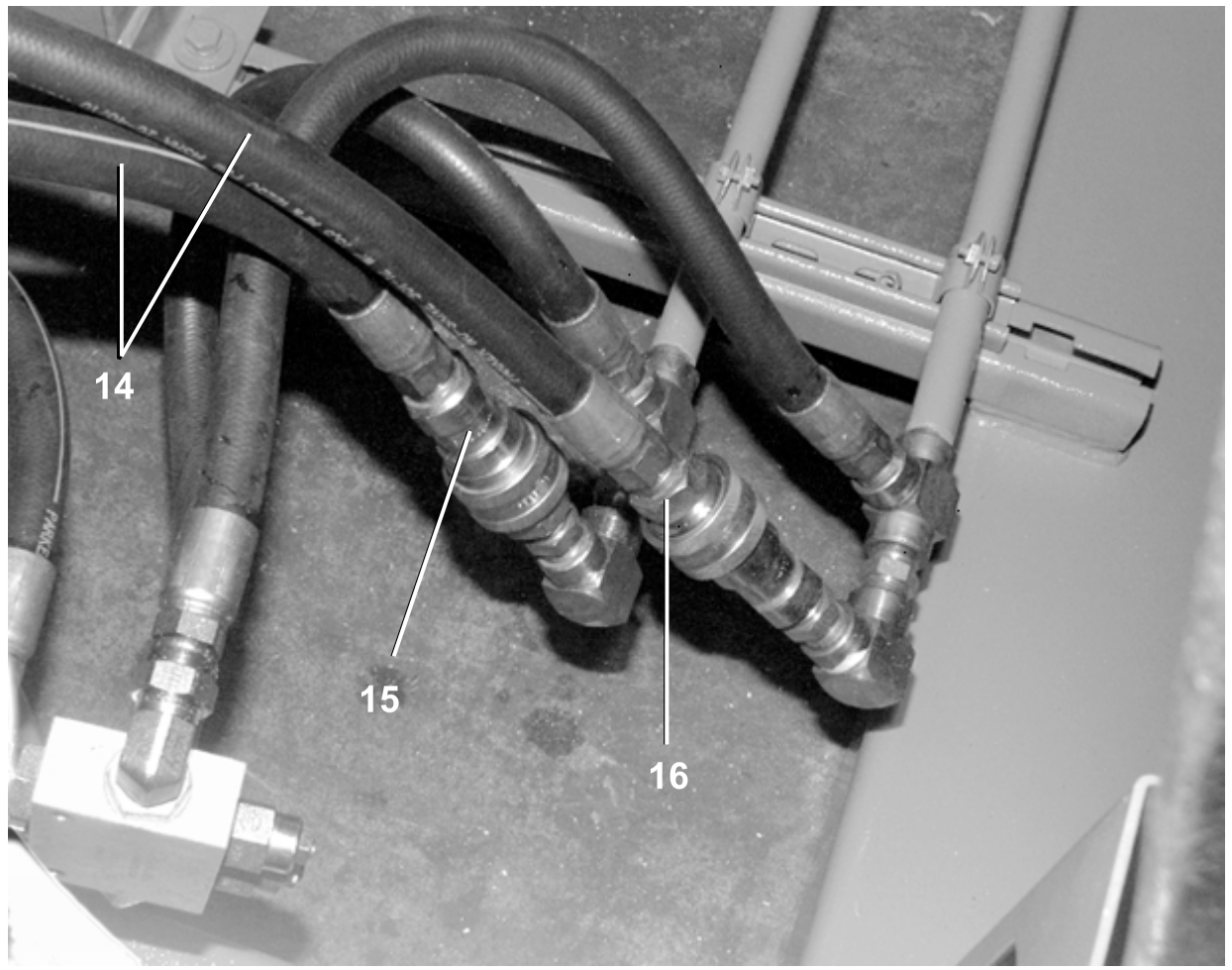
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.









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Litho in U.S.A.

Parts List—Hydraulic Tank 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----------	
	00A	GHT60100	98000Z INST=34/48GL HYD TNK 1VLV 6440	6440/6450 E6N
	00B	GHT58006	20000Z INST=HYD CYL+TANK 27GAL TANK	7258J2/7275J2
A	00C	AHT60110	98000Z ASSY=34/48GAL HYD TNK WELD 6440	6440/6450
B	00D	AHT58110	20000Z ASSY=27GAL HYD TANK WELD J2N	7258/7275
	00E	AHT60120	98000Z ASSY=6440 TANK TOP ASSY	ALL
			----------COMPONENTS----------	
C	1	W3 60360	20001D WLMT=TNK 34/48GAL HYD TNK 6440	
D	1	W3 60360A	20001D WLMT=J2N HYDRAULIC TANK	
	2	W3 60362	98472C WLMT=TNK 34/48GL TOP 6440	
	3	5SP1ACESC	NPT PLUG 1” SQ CORED BLK CI	
	4	03 60363	99016B 34/48GAL HYD TANK GASKET-LNG	
	5	03 60363A	99016B 34/48GAL HYD TANK GASKET-SHT	
	6	27E5500	PUMPHVANE;VICK#V20-1P13PD11	
	7	15K105	HXCAPSCR 3/8-16UNC2A1.25 Gr5 P	
	8	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
	9	17N070AP	01Z RETAIN NUT#S10222-27	
	10	02 11942	90387B H2O BRKT JAM PLATE 36/42QU	
	11	60EH50C28B	98503N ASSY=HYD HOSE 3/4”X28”L 6440	28” HOSE
	12	60EH50C24A	01Z HYD.HOSE 3/4”+MPTXFJIC=24”LG.	24” HOSE
	13	51E099ST	DIXON 1.25KINGNIP NPTEND #St15	
	14	60EH50C48A	01Z HYD.HOSE 3/4”+MPTXFJIC=48”LG	48” HOSE
	15	52XY0BP00X	3/4”QUICK DISCONN.FEM #H6-62	
	16	52XY0BP00Y	3/4”QUICK DISCONN.MALE#H6-63	
	17	96DH455	MANIFOLD, 2-VALVE D05 PARALLEL	
	18	96DH455A	CARTRIDGE,RELIEFVICK#RV510S020	
	19	96RH711E37	DIRECTIONAL CONT.VLV.D05-NG10	
	20	96RH705E37	04Z VALVE-HYD 4 WAY- DIRECTIONAL	
	21	60EH15C265	93077N HYD HOSE 3/16”TENDS=265”	265” HOSE
	22	27E731500	01Z LIQFILL GAGE 0-1500PSI/BAR BRZ	
	23	27E7201	FILLER-BREATH-FILT.LHA#ABB-40N	
	24	27E7301	03Z SIGHTGAUGE-FLUID:STAUFF#SNA-2T	
	25	5SL1EMFC	NPTELBOW 90D STRT 1.25” BLKMAL	
	26	27E7113	STRAINER,TANKMT LHA#TM-25-100	
	27	27E5507	PUMP-TO-MOTOR MOUNT 5.81”LG.	
	28	27E5505A	1+3/8”BORE W/5/16KW=CPLG.ASSY	
	29	27E5505B	HYTREL INSERT-MAGNA#M270H9	
	30	27E5508	COUP ASSY=3/4”BOREX3/16”KW	
	31	52JY0ER007	El90 1/4”MPX1/8”FP #5502-4-2	
	32	27E7112	INTANK RETURN FILTER 1+1/4”	
	33	5N1E08AF42	NPT NIP 1.25X8 TBE BLKSTL Sk40	
	34	27A060	HOSECLAMP1+5/16-2.25CADSC#HS28	
	35	60E097	05Z HOSE 1.25”WIRE INSERT 4684C	
	36	5SR1E0PMF	NPT RED 1.25X3/4 BLKMAL 150#	
	37	27E7107	SUCTION STRAINER 1+1/4”PORT	

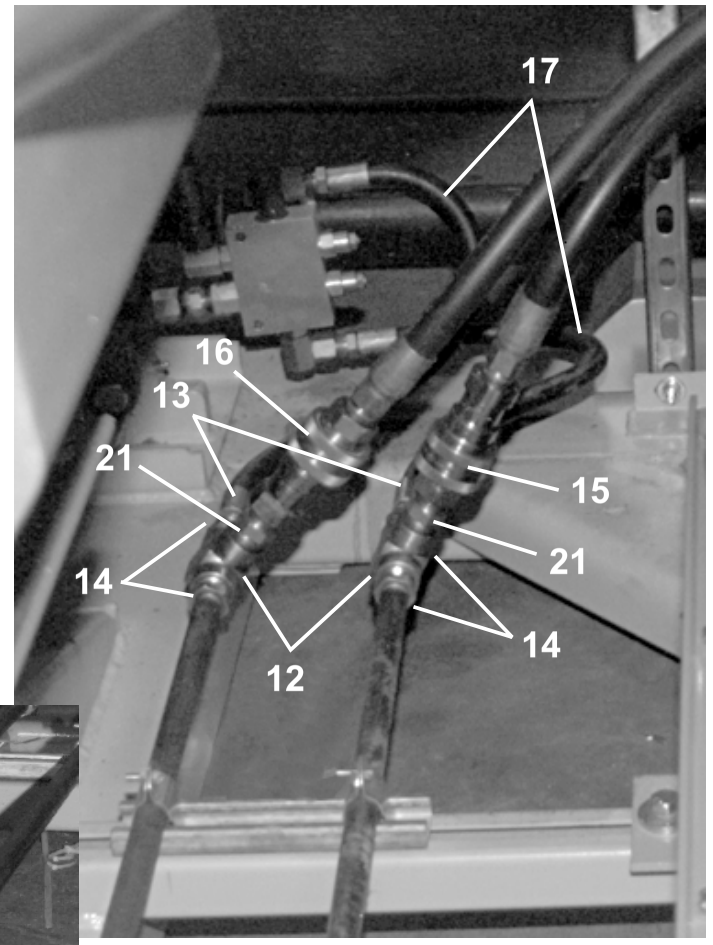
Hydraulic Cylinder Piping

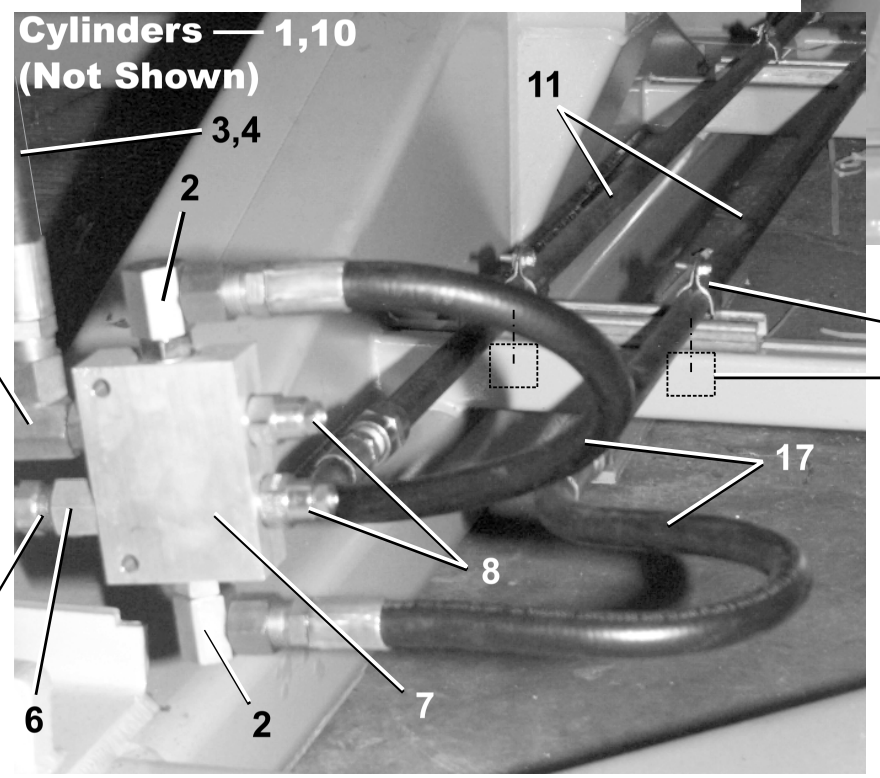
64040/64050E6N 14 Degree Tilt

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

Litho in U.S.A.

Piping for
14 Degree Tilt
1 Stage Cylinders
(Cylinders Not Shown)





Parts List—Hydraulic Cylinder Piping

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----------	
	00A	GHT60020	97000Z INST=1STG.HYD.CYL.39.2ST+PIPNG	
	00B	AHT60020	98000Z ASSY=1STG.HYD.CYL.39.2ST+PIPNG	
			----------COMPONENTS----------	
	1.	27E164039A	00Z HYD.CYL..D/A 4”X2”X39.18”STK.	
	2	52JY0KR012	EI90 1/2MORINGX FEM.SWIVEL	
	3	60EH40C39A	92631N HYD HOSE 1/2”+ENDS=39”	
	4	52JY0KR013	ELB90 1/2”MPXFPSWIVEL#1501-8-8	
	5	52LY0KR001	HEXPIPNIP 1/2XCLOSE #5404-8-8	
	6	52XY0KR029	STRADAPT 1/2”0RXFP #6405-8-8-0	
	7	96DH471	03Z COUNTERBALANCE VALVE-SUN BODY	
	8	96DH471A	01Z CARTRIDGE-COUNTERBAL.SUN.	
	10	AHT60020	98000Z ASSY=1STG.HYD.CYL 39.2ST+PIPNG	
	11	03 60365	98472B HYD LINE PIPE 1/2SCH80 60LNG	
	12	52VY0PR003	TEE 3/4”FP #5605-12-12-12	
	13	52EY0KR002	COUP.STR 1/2”FR #5000-8-8	
	14	52AY0PR004	HEXPIPEBUSH 3/4X1/2 STEEL BAR	
	15	52XY0BP00X	3/4”QUICK DISCONN.FEM #H6-62	
	16	52XY0BP00Y	3/4” QUICK DISCONN.MALE3#H6-63	
	17	60EH40C20A	80332N HYD HOSE 1/2” +ENDS=20”	
	18	27A0050	CLP-RGDSTL COND #P1100-1/2	
	19	17N070AP	01Z RETAIN NUT#S10222-27	
	20	02 11942	90387B H2O BRKT JAM PLATE 36/42QU	
	21	52LY0PR002	HEXPIPNIP 3/4X3/4 #5404-12-12	

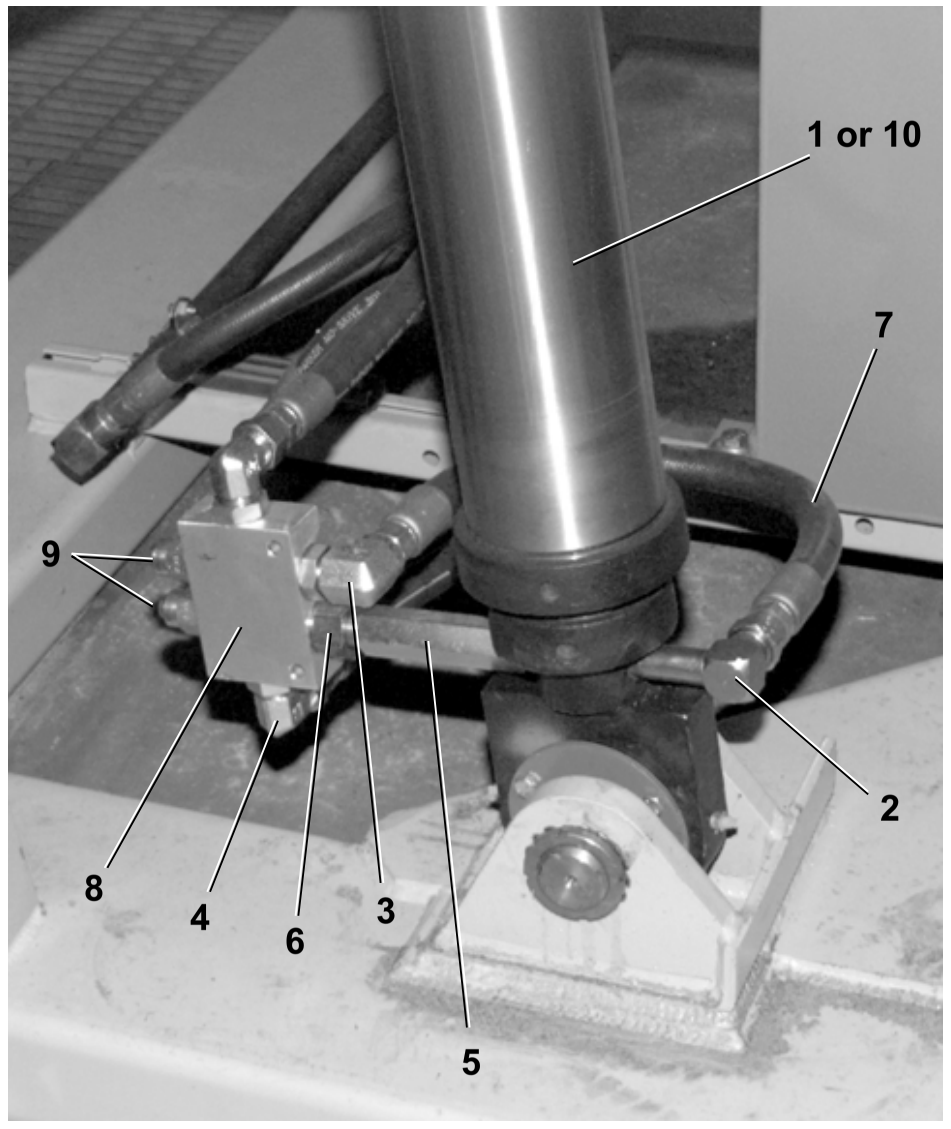
Hydraulic Cylinder Piping

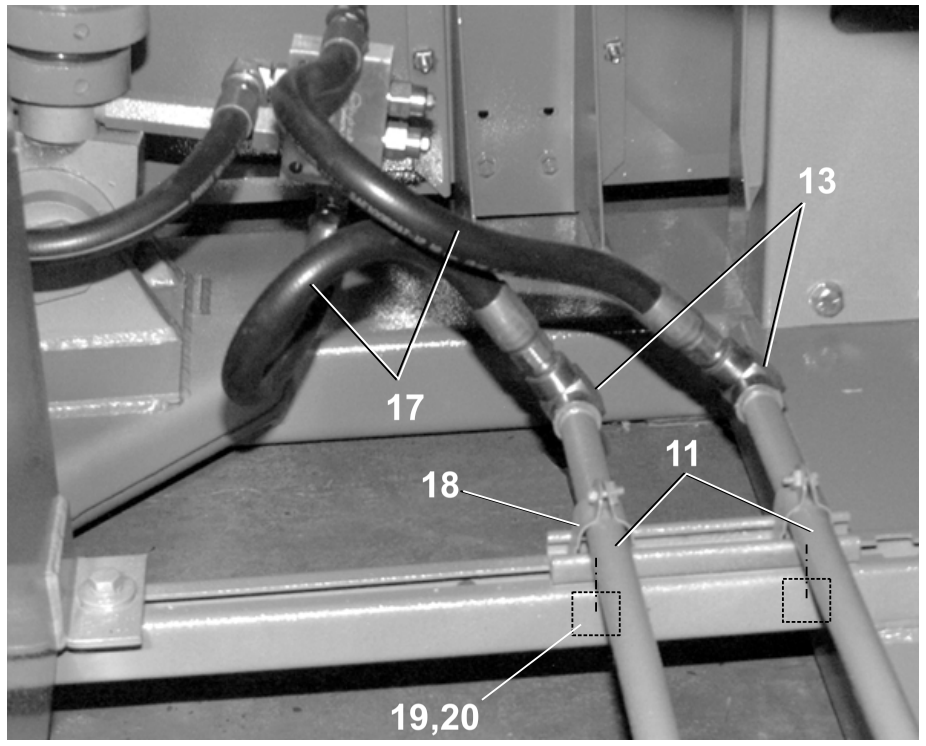
64040/64050E6N 21 Degree Tilt

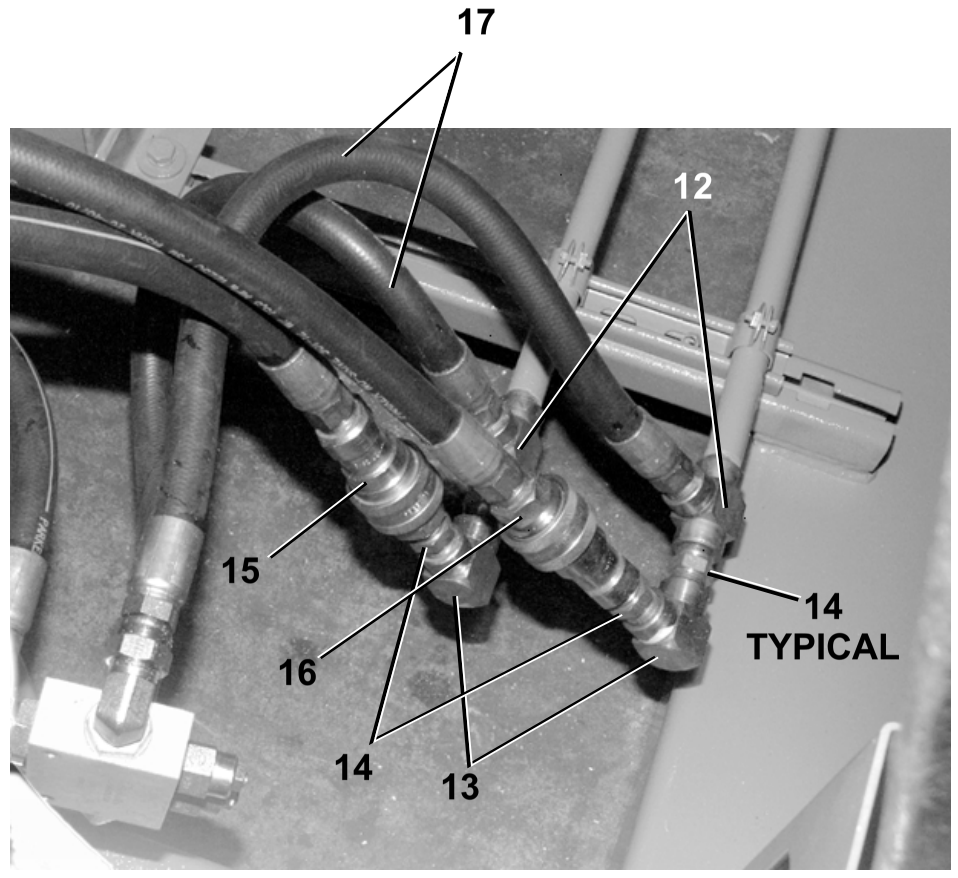
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

21 Degree Tilt
3 Stage Cylinder (Shown)







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

Parts List—Hydraulic Cylinder Piping

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----------	
	00A	GHT60030	97000Z INST=3STG.HYD.CYL.59.6ST+PIPNG	
	00B	AHT60030	98000Z ASSY=3STG.HYD.CYL59.6ST+PIPNG	
			----------COMPONENTS----------	
	1	27E1657A59	98431A HYD.CYL.3-STAGE 59.57”STROKE	
	2	52JY0PR006	ELB 3/4MJICX1/2MP#2501LL-12-08	
	3	52JY0PR008	ELB.3/4MORXF #6805-12-12NWO	
	4	52JY0PRA08	ELB90 3/4MORXMJIC#6801-12-12NW	
	5	52LY0PR006	01Z HEXPIPNIP 3/4X6”HEXBODY	
	6	52XY0KR045	STRDPT 3/4MORXF #6405-12-12-0	
	7	60EH50C24A	01Z HYD.HOSE 3/4”+MPTXFJIC=24”LG.	
	8	96DH472	03Z COUNTERBALANCE VALVE-SUN BODY	
	9	96DH472A	01Z CARTRIDGE ,COUNTERBALANCE VLV.	
	10	AHT60030	98000Z ASSY=3STG.HYD.CYL.59.6ST+PIPNG	
	11	5N0P48AF82	NPT NIP 3/4X48 TBE BLKSTL Sk80	
	12	52VY0PR003	TEE 3/4”FP #5605-12-12-12	
	13	52JY0PRC06	ELB90 3/4FPR #5504-12-12	
	14	52LY0PR002	HEXPIPNIP 3/4X/3/4 #5404-12-12	
	15	52XY0BP00X	3/4” QUICK DISCONN.FEM #FEM #H6-62	
	16	52XY0BP00Y	3/4”QUICK DISCONN.MALE#H6-63	
	17	60EH50C28B	98503N ASSY=HYD HOSE 3/4”X28”L 6440	
	18	27A0075	CLP-RGDSTL COND #P1100-3/4	
	19	17N070AP	01Z RETAIN NUT#S10222-27	
	20	02 11942	90387B H2O BRKT JAM PLATE 36/42QU	
	21	52LY0PR002	HEXPIPNIP 3/4X3/4 #5404-12-12	

Assuring Proper Counterbalance Valve Operation-Hydraulic Tilting Washer-Extractors and Centrifugal Extractors

Various conditions, such as a non-functioning or misadjusted limit switch, a seized pivot ball bushing or, a counterbalance valve failure, can cause erratic or uneven up/down movement of the hydraulic tilt cylinders. This document addresses normal counterbalance valve operation and adjustment.

In most cases, it is not possible to perform counterbalance valve adjustments without entering the housing and/or reaching under the raised cylinder.

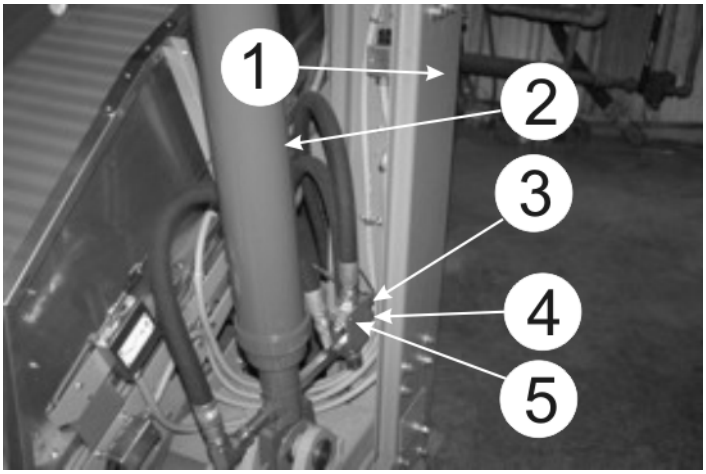
WARNING 1: Entangle and Crush Hazard—The machine shell will crush your body or limbs if it descends or falls while you are under it. The housing can descend with power off or on. Manual operation of tilting valves overrides safety interlocks. Improper operation of manual tilting valves may cause the shell to descend.

- Never operate the manual tilting with anyone under the machine.
- Use the safety stands as appropriate. If used, follow instructions in the manual.
- Read the SAFETY ALERT on use of the *access panel interlock safety bypass* switch in the service manual before setting the maintenance key switch to "Maintenance Only "
- After adjustments, return the key switch to "Safe Operation" and remove the key to a secure area before resuming normal operation.

1. Observing Tilt Cylinder Operation

Figure 1: Right Cylinder and associated Counterbalance Valves

Components of Hydraulic Manifold



Legend

1. Right rear corner of machine
2. Tilt cylinder
3. Upper counterbalance screw-in cartridge valve (controls the ascending speed of a tilt cylinder)
4. Lower counterbalance screw-in valve cartridge (controls the descending speed of a tilt cylinder)
5. Counterbalance valve manifold body

1.1. Setup

1. Remove the left and right door side panels and identify the components shown in Figure 1.
2. Set the *access panel interlock safety bypass key* switch to the "Maintenance Only" position.

1.2. Observations

Use the key pad controls, as explained in the manuals, to manually raise and lower the shell several times as described below, and verify the following proper operation.

1. Carefully move the shell from full down to full up. Verify that the cylinders move in unison and reach the top at approximately the same time.
2. Raise the shell fully and release the controls. Observe the machine for at least 3 minutes to assure that the shell does not drift down.
3. Manually lower the shell completely. Verify that the tilt cylinders move in unison and reach the bottom at approximately the same time.
4. If the cylinders exhibit any erratic movement that can be attributed to the counterbalance valves, perform the service explained below.

2. Tilt Cylinder Hydraulic Components and Functions

The hydraulic schematic provided in the service manual titled "Hydraulic Schematic " shows the counterbalance circuitry.

2.1. Components—Figure 1, item 5 shows one of the two counterbalance manifolds. Each manifold has two screw-in counterbalance valve cartridges (items, 3 and 4). Referring to Figure 2, each counterbalance valve cartridge has the following:

- A base nut (item 5) used to screw the valve into the manifold.
- A lock nut which must be turned slightly using an open-end wrench (item 1).
- An adjustment screw, (item 3) which must be turned with a hex key wrench.

2.2. Functions of Components

Manifold (Milnor P/N 96DH472)—Provides feedback between the two counterbalance valves

Counterbalance valve (Milnor P/N 96DH472A)—Provides the following:

- Permits unrestricted flow into a cylinder, while controlling exhaust flow from the cylinder.
- Protects against cylinder drifting down
- Reduces flow when lowering to limit speed
- Provides speed adjustment so cylinders can be made to travel in unison
- Pilot action locks machine shell from coming down if pressure is lost due to leaks

Tip: For an in-depth explanation of these components, see www.sunhydraulics.com or download Sun´s virtual counterbalance valve simulation (www.e4training.com/hyd03/sitemap.htm).

3. Counterbalance Valve Adjustments

Use this procedure on all four counterbalance valves if you observes any erratic movements listed above.

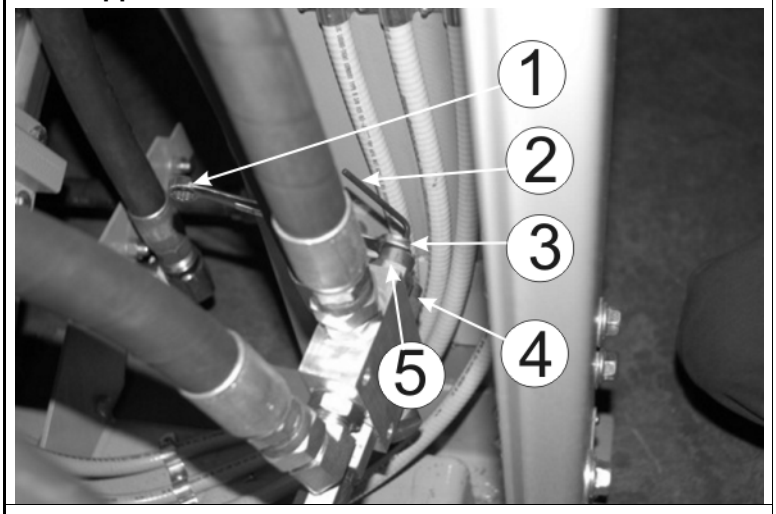
3.1. Coarse Adjustments—Referring to Figure 2,

1. Loosen the lock nut with a 9/16" open end wrench (item 1) .
2. Using a 5/32" hex key wrench (Allen wrench, Unbrako key), screw the adjustment nut (Figure 2, item 2) in fully.

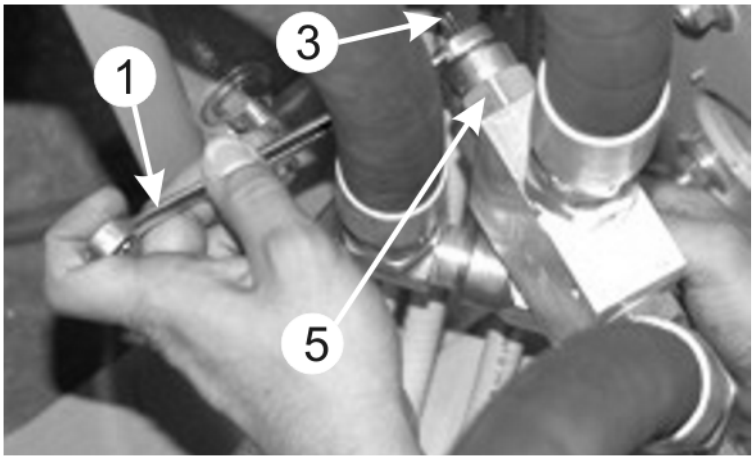
3. Back off the adjustment screws
   a. upper valve -- one full turn (360 degrees)
   b. lower valve -- 3/4 turn (270 degrees)
4. While holding the adjustment nut stationary, tighten the lock nut.

Figure 2: Right Side Hydraulic Manifold

Upper and lower counterbalance valve locations



Adjusting the Upper Counterbalance Valve



Legend

1. 9/16" open end wrench connected to lock nut on upper counterbalance valve
2. 5/32" hex key wrench (Allen wrench, Unbrako key) in adjustment screw
3. Adjustment screw (recessed socket for hex key wrench)
4. Lower counterbalance valve
5. Base nut screwed into hydraulic manifold

3.2. Fine Adjustments—By making small adjustments of about a 1/4 of a turn to either counterbalance valve, you should be able to get the two cylinders to move up and down in unison so that both sides reach end of travel at approximately the same time. Be careful to hold the adjustment screw (Figure 2, item 3) stationary, while tightening the lock nut (Figure 2, item 1). Screw out the adjustment (Figure 2, item 3) to slow downward movement. Screw in the adjustment (Figure 2, item 3) to increase speed.

4. Return Machine to Normal Operation

Remove the tilt safety stands if they were used.

1. Manually tilt the shell down.

2. Replace the door side panels. Return the key switch to "safe operations" and move the key to a secure area.

— End of BIPEUM01 —

Balancing System 8

DESCRIPTION AND MAINTENANCE OF THE ELECTRONIC BALANCING SYSTEM FOR WASHER-EXTRACTORS AND TEXTILE MACHINES

Components of the Balancing System

The water balancing system consists of electrical and mechanical components which sense the location and magnitude of an imbalance in the cylinder, and by injecting water into the rib (or ribs) opposite that imbalance, re-balance the cylinder. The basic components (FIGURE 1) include:

- *The accelerometer and balance filter board.*
- *The proximity switch and target.*
- *The analog to digital balance board.*
- *Balancing water valves, rings, and ribs.*

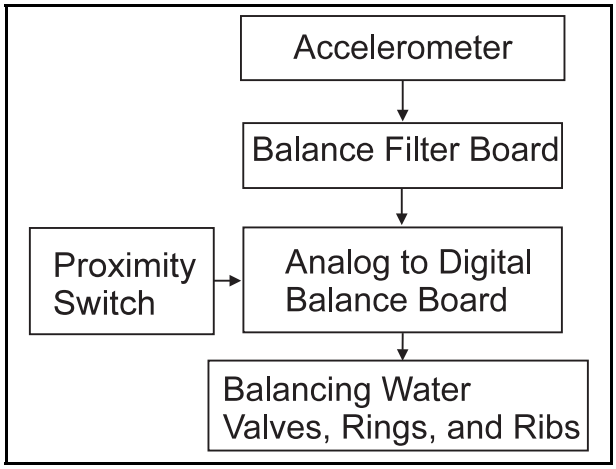


FIGURE 1 (MSSMA401BE)
System Components

Accelerometer and Balance Filter Board— In a flexibly supported washer-extractor (after an initial excursion at the onset of extraction), the unbalanced cylinder rotates about the center of mass resulting in the "light side out" and the "heavy side in" as shown in FIGURE 2. This causes the shell front to oscillate. The door-latch mounted accelerometer (FIGURE 12), and the filter board produce a voltage which fluctuates with this occillation. The fluctuating voltage can be represented as a sine wave (FIGURES 6 and 7).

Proximity Switch and Target—The target passes the proximity switch once per revolution (see FIGURE 4), thus producing a timing signal.

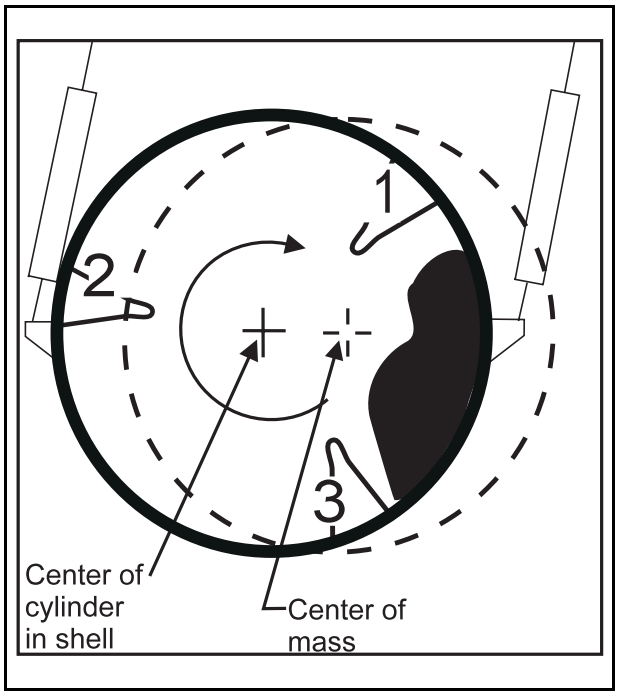


FIGURE 2 (MSSMA401BE)
Flexibly Supported Machine (Hydro-cushion® shown)

Analog to Digital Balance Board—This board uses the accelerometer sine wave and the timing signal to determine the magnitude and location of the imbalance, and in turn control the balancing valve and safety relays mounted on the board (see FIGURE 3), the three balancing water valve relays add water to the individual ribs opposite the imbalance. The machine excursion relay (not used on ExN, JxN, TxN machines) and balance excursion relay make a microprocessor input, causing a

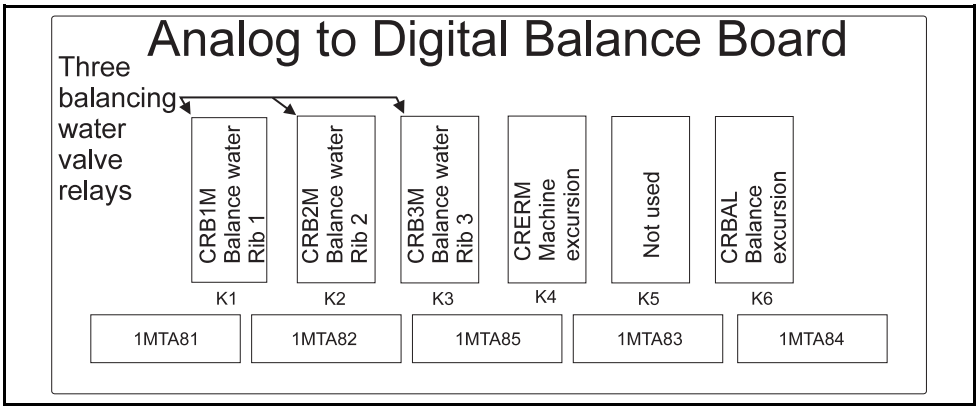


FIGURE 3 (MSSMA401BE)
Balance Board Details

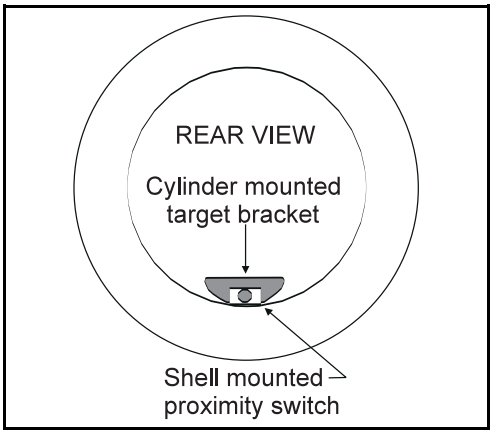


FIGURE 4 (MSSMA401BE)
Proximity Switch and Target (64046 E6N shown)

recycle, if shell excursions or an out-of-balance condition exceed acceptable limits. The machine excursion input causes a recycle at any time in extract, whereas the balance excursion input is checked just before the onset of high speed extraction, and then again from a few seconds after the onset of high speed extract throughout the remainder of extraction.

Balancing Water Valves, Rings, and Ribs—The water from balancing water valves enters the ribs via individual injection nozzles aimed into respective pick-up rings on the back of the cylinder. Corresponding valves, nozzles, and rings must be connected as shown in FIGURE 5.

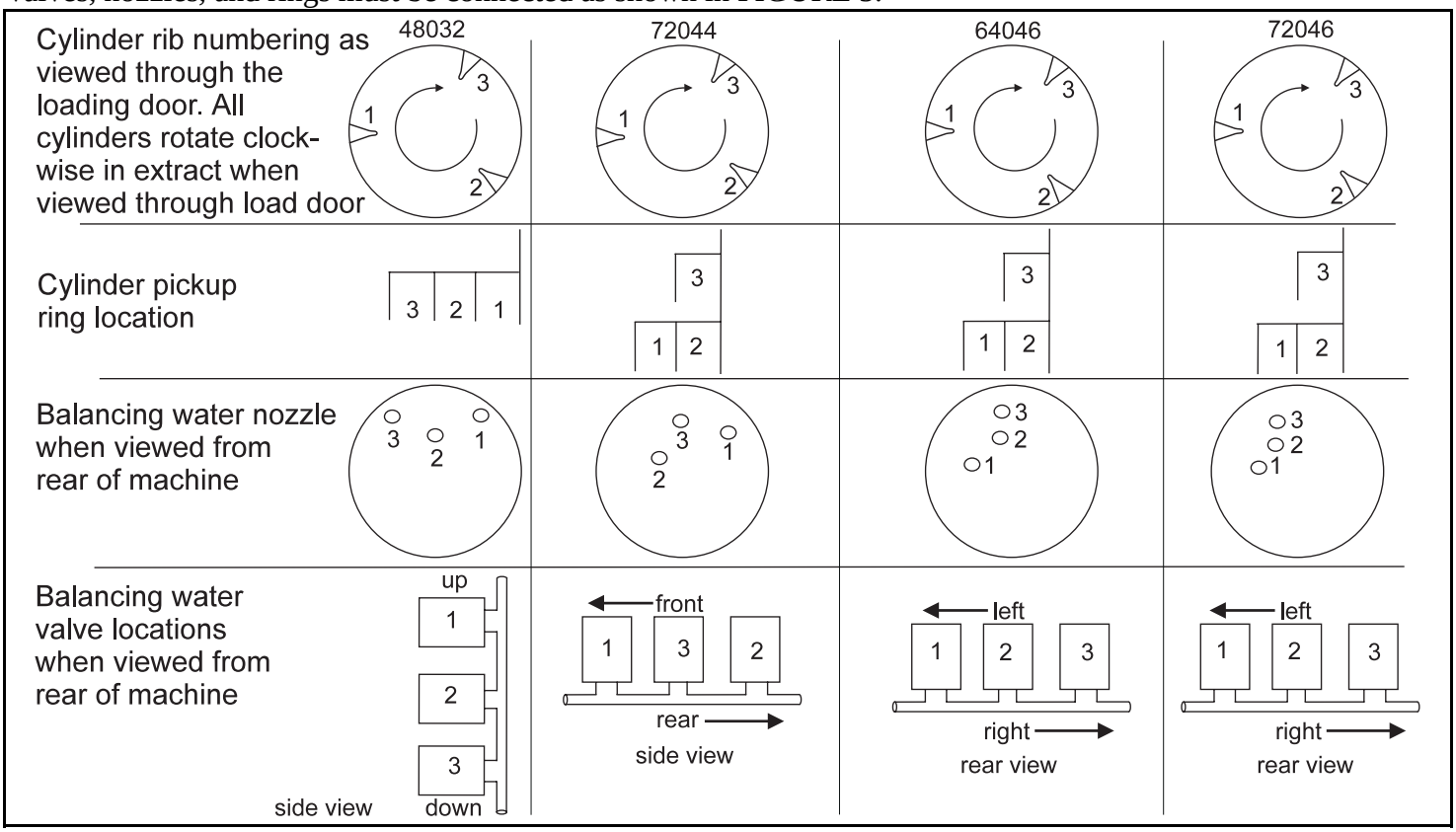


FIGURE 5 (MSSMA401BE)
Hydro-cushion and Suspended Machines

How the Balancing System Works

Determining where the imbalance is and correcting the imbalance takes place in two steps over several revolutions. FIGURE 6, *Step One—Finding the Imbalance*, describes in detail how the machine determines the location of the imbalance.

FIGURE 7, *Step Two—Cancelling the Imbalance*, explains how the machine cancels the imbalance in two stages. During the *first stage*, the machine adds water at the same rate to both ribs opposite the imbalance. The added water in the rib nearest the imbalance, together with the original imbalance, causes the center of mass to shift exactly opposite a rib. During the *second stage*, additional water is added to the counterbalancing rib until the cylinder again rotates about its geometric center. This causes accelerometer sine waves to again fall within the normal (balanced) range and shut off the balancing water valves. The ribs retain their water during the remainder of the extraction cycle, (except for some slight leakage from the ribs which is automatically replenished).

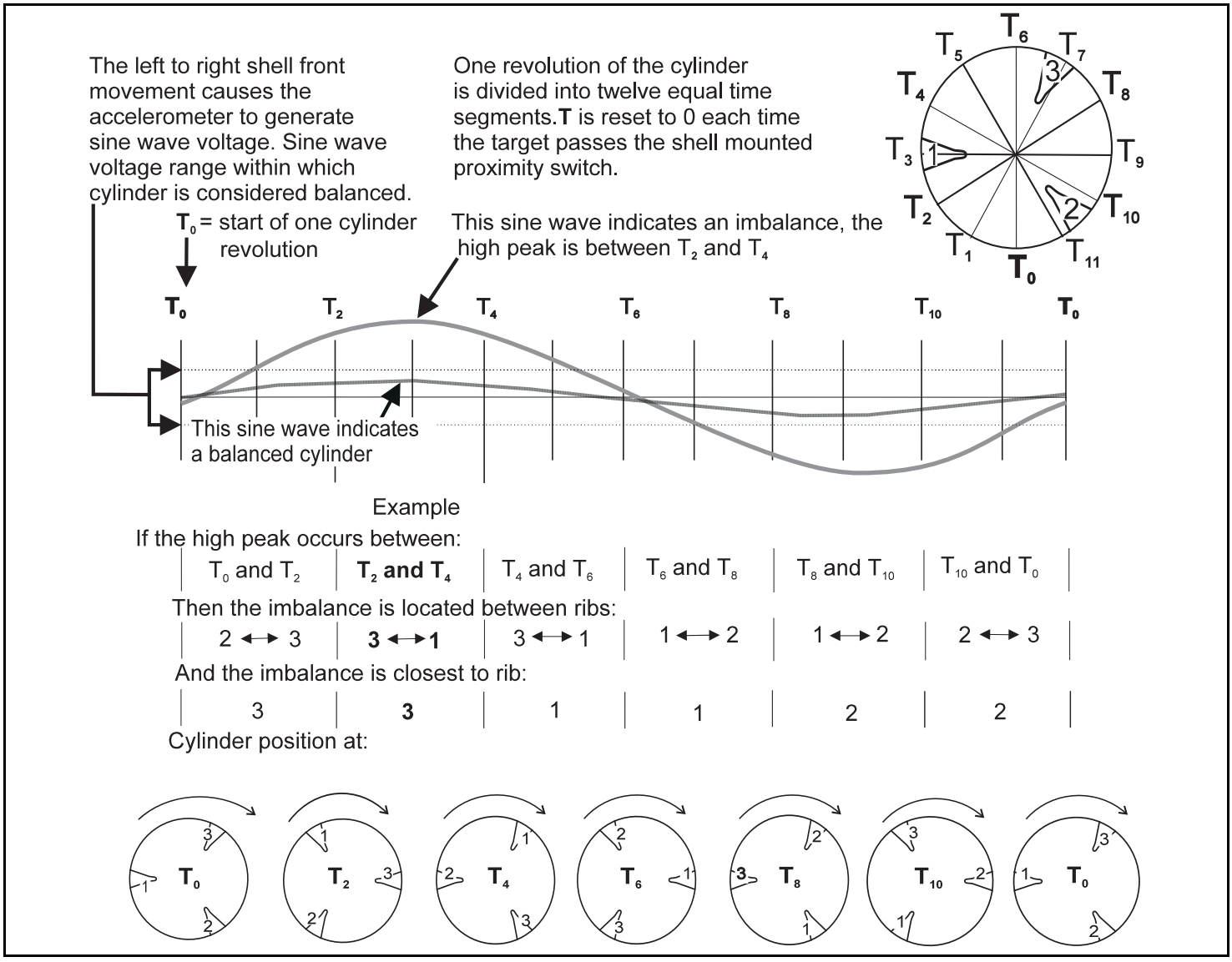
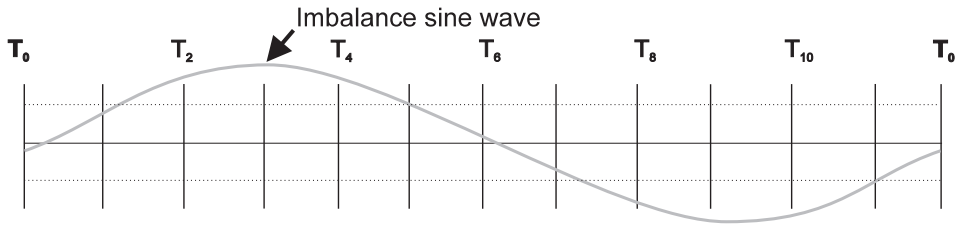
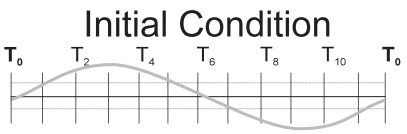
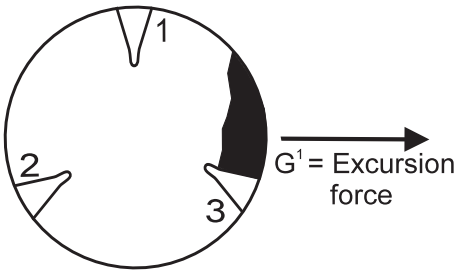


FIGURE 6 (MSSMA401BE)
Step 1—Finding the Imbalance

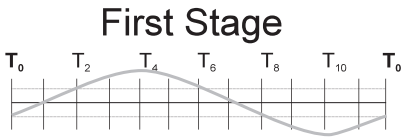
In this example, the high peak of the sine wave occurs at T_3, telling the balancing system that an imbalance is located between ribs 1 and 3, and the imbalance is closest to rib 3. Self balancing takes place in two stages over several revolutions.

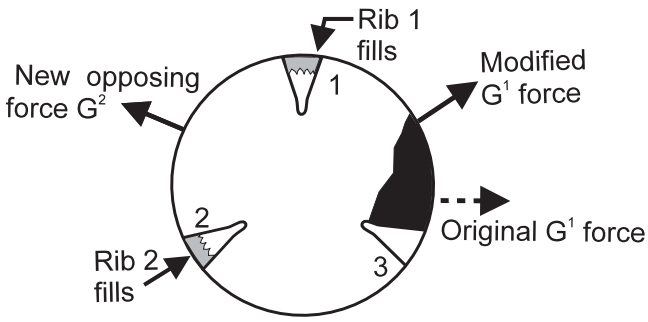




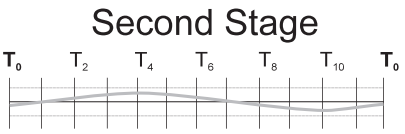


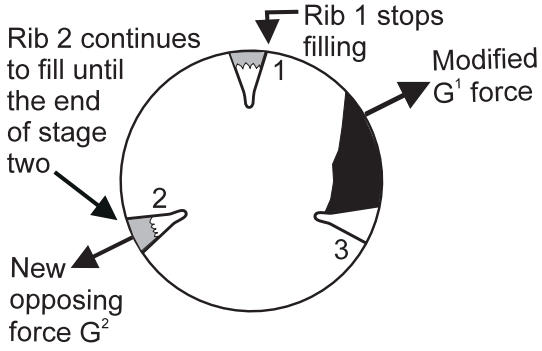
The maximum excursion force G^1, occurs next to rib 3, exactly at the area of maximum imbalance. Since no counterbalancing rib is exactly opposite the imbalance, (a requirement for balancing) the maximum excursion force must be moved to a point opposite a rib.





Simultaneously filling ribs 1 and 2 creates a new opposing excursion force G^2. This new G^2 force modifies the vector of the original force G^1 as shown above, resulting in moving the G^1 force to a point opposite rib 2. The second stage of balancing can now begin.





At the onset of the second stage of balancing, Rib 1 stops filling while Rib 2 continues to fill. This results in moving the opposing G^2 force to a point opposite the original G^1 force. Ultimately the, two forces equalize, reducing the shell front excursion, and the amplitude of the resulting accelerometer sine waves. All water valves shut off when sine waves fall within normal (balanced operation) range and the balancing system resumes monitoring operation.

FIGURE 7 (MSSMA401BE)
Step 2—Cancelling the Imbalance

Monitoring the Balancing System

Status panel lamps monitor balancing system functions. This status panel (FIGURE 8), includes:

Balance Excursion Lamp—This lamp illuminates whenever the three wire circuit is energized. If this lamp extinguishes during E1 (low extract), the machine will not enter E2 (high extract), but recycles instead (see “Recycle Circuit” in this section).

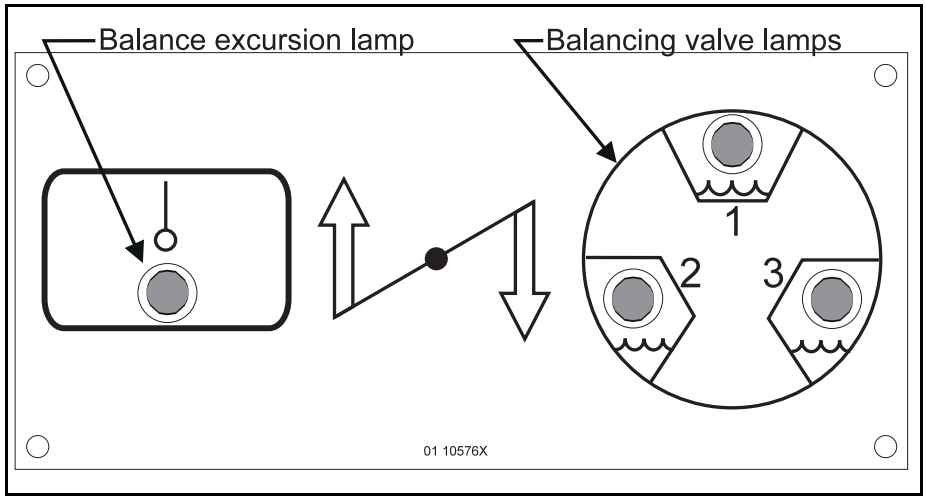


FIGURE 8 (MSSMA401BE)
Balancing System Status Panel

Balancing Valve Lamps—These three lamps go ON and OFF with their respective balancing valves. Lamps should be OFF once balancing is completed, except for intermittent valve operation as the balancing system compensates for changing imbalances (caused by varying load thickness, different absorption rates, etc.). All three lamps should never illuminate except at the onset of low speed extraction and again at the onset of high extraction. At all other times, only one or two of the three lamps should illuminate until balance is achieved, never all three. Continuous recyling over several loads may indicate a need for service.

Balancing System Maintenance

Aiming Injection Nozzles—When properly aimed and adjusted, the injection nozzles correctly deliver balancing water from each balancing water valve to the pickup ring for the appropriate rib. If not aimed or adjusted correctly, water may splash (or fall) into the wrong pick-up ring and enter the wrong rib, rendering the system unworkable. Aim the nozzles so that the water streams gently into the intended ring. Make sure that they are exactly centered in the pickup ring as shown in FIGURE 9. Any splashing causes water to enter the wrong ring, rendering the system inoperative. Periodically check nozzle alignment and for cracks, clogs, and debris in the rings.

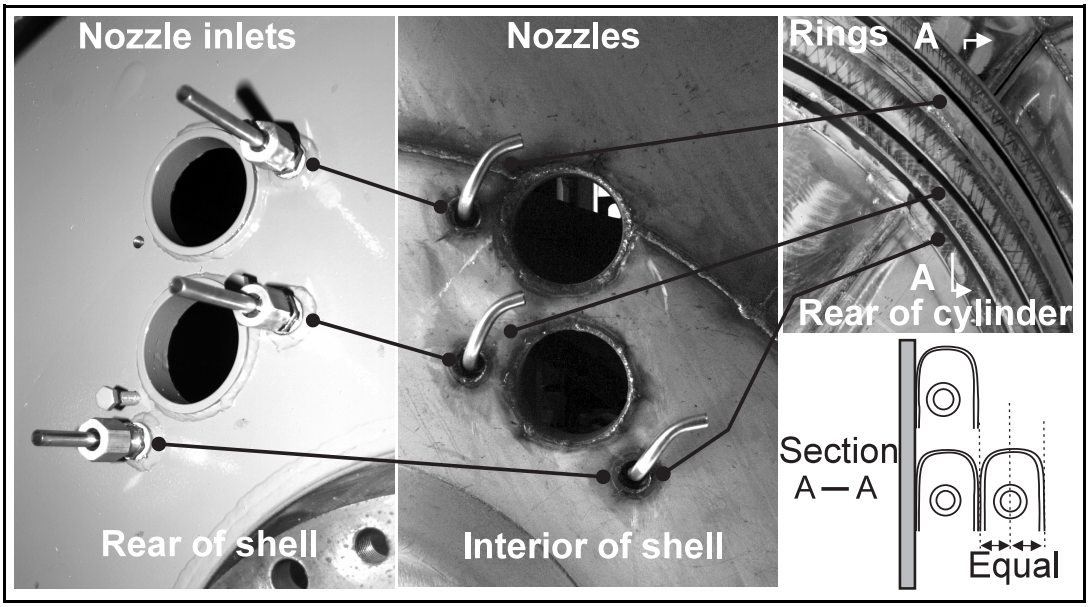


FIGURE 9 (MSSMA401BE)
Aiming the Balancing Nozzles

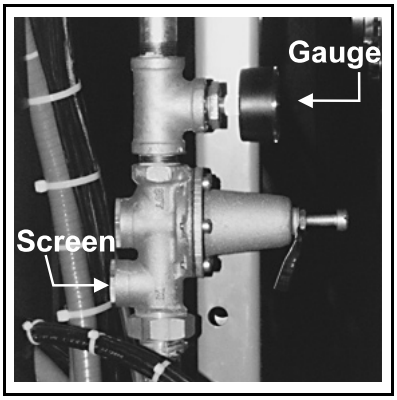


FIGURE 10 (MSSMA401BE)
Water Pressure Gauge

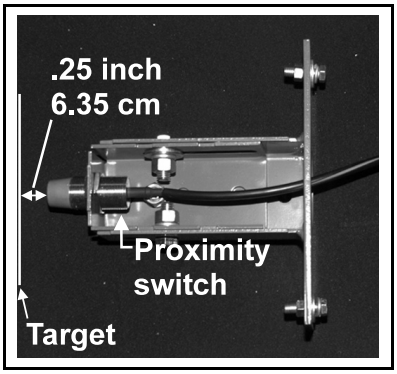


FIGURE 11 (MSSMA401BE)
Proximity Switch

Checking Water Pressure—Check pressure regulator for 28 PSI (1.96 Kg/sq cm) water pressure when there is no water flow and approximately 10 - 15 PSI (0.70 - 1.05 Kg/sq cm) when water valves are operating. Clean screen and/or adjust regulator as required (FIGURE 10).

Positioning the Proximity Switch—Adjust a replacement proximity switch, (FIGURE 11), .187 - .25 inch (4.75 - 6.35) from the target plate.

Preparing to Set Accelerometer—Accelerometer voltage must be adjusted with the shellfront in the drain/extract position. In order to do this, put the machine in a valid formula and stop in an wash step. The machine will drain with the shellfront at the 10 degree tilt necessary for setting the accelerometer. The following displays are typical. They may appear differently according to machine model and/or options.

RUN FORMULA 00 OR OK POWER OFF	Machine is ready for load and the *Run Formula menu* is displayed, as shown at left, ENTER NEXT **Accesses *formula 00* .**
FILLING MACHINE	Machine filling with water
RUN FORMULA 00 FORMULA 00	① **Silences the operator signal and starts the process.**
10:38 F0005S03 2:37 dF=A055/D140 * HC3	Alternates With 10:38 STEP01 2:37 WAIT FOR LEVEL HC3

DRAINING TO SEWER

CANCEL ESCAPE Cancels step. The water, chemical, and steam valves close, the drain opens (machines with normally open drain valves), and the shellfront tilts to the angle necessary for the correct adjustment of the accelerometer. Machines with normally closed drain valves must be drained before continuing (See VIEWING INPUTS/OUTPUTS AND ACTUATING OUTPUTS ON THE MARK III MICROPROCESSOR CONTROL...).

3 WIRE DISABLED FAULT: SEE MANUAL

0 Disables the three wire circuit, preventing machine from entering intermediate extract, and displaying an error message. CANCEL ESCAPE cancels the formula, silences the operator signal.

Cancel button,

Adjusting the Accelerometer—Measure accelerometer voltage at balance filter board connector from 1MTA 86-4 to 1MTA 86-5 with the machine in a formula and the cylinder tilted to the drain/extract position as described in “Preparing to Set Accelerometer” in this section. The accelerometer is adjusted by the screw (FIGURE 12). Set accelerometer voltage between 2.3 - 2.5 VDC, the higher the voltage, the more sensitive the circuit. Output voltages beyond 5 VDC indicate a defective unit.

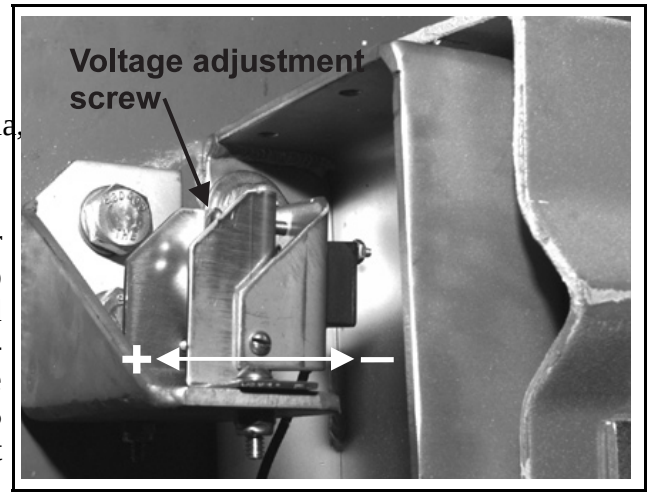


FIGURE 12 MSSMA401BE
Accelerometer

Additional Protection for Excessive Imbalance

Two devices, the recycle and the vibration circuits, independent of the balancing system, protect the machine from excessive imbalances.

Recycle Circuit—The recycle circuit automatically redistributes an out of balance load. It becomes operational when extract commences and is actuated by the machine excursion switch (FIGURE 13). Although the excursion switch initiates a recycle anytime it is actuated during extraction, the primary purpose of this switch is to sense an excessive imbalance during the onset of extraction. When a recycle is initiated, the cylinder comes to a full stop, rotates 16 seconds CCW in wash speed, 7.5 seconds in CW wash speed, and 7.5 seconds in drain speed, then re-enters extract. During a recycle, the program timing stops, and starts again 7.5 seconds after high extract has again been achieved. The machine recycles up to five times, before repeating the final bath (without chemicals) and re-entering extraction.

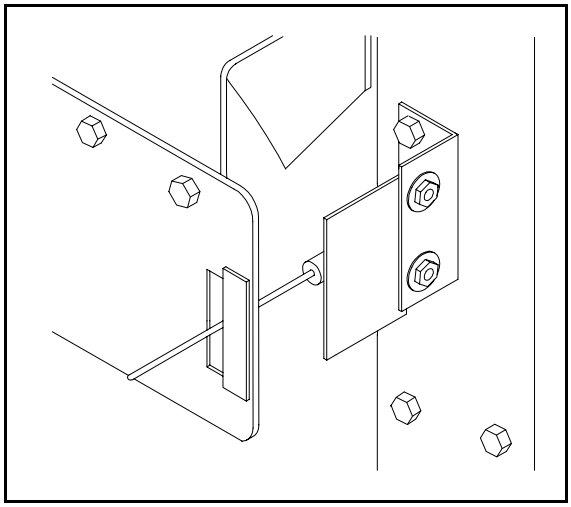


FIGURE 13 (MSSMA401BE)
Excursion Switch

NOTICE

The excursion switch actuator must be exactly in the center of the slotted hole - both when the machine is pushed down and when it is hanging free. If not, the switch will actuate prematurely (during the initial excursion at the onset of extraction), causing unnecessary recycles.

Vibration Circuit—The vibration safety switch (FIGURE 14) reacts to excessive vibration which is not contained by the balancing system, actuating a switch which de-energizes the three wire relay. When this occurs, the cause of the vibration should be determined and corrected. See "VIBRATION SAFETY SWITCH ADJUSTMENTS" elsewhere in this manual.

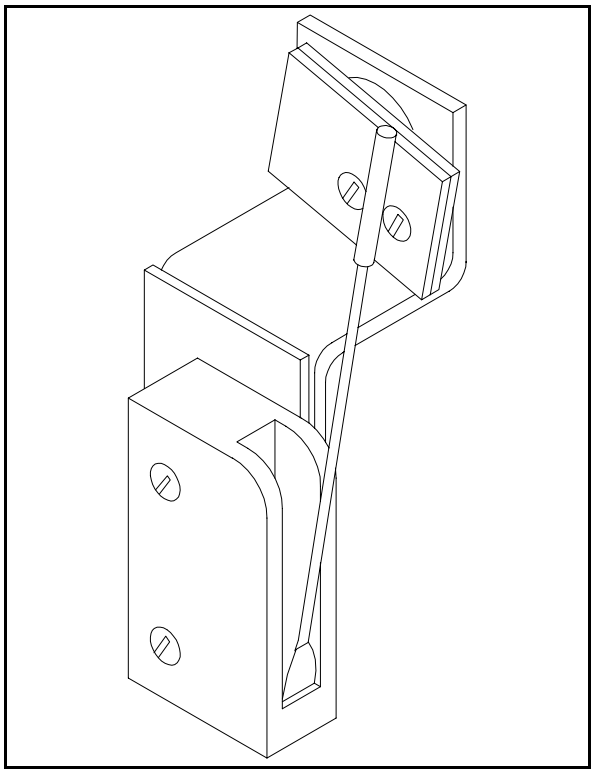


FIGURE 14 (MSSMA401BE)
Vibration Safety Switch

Balancing Bracket Installation

64040/64050E6N 64046E6N/J6N/D6N 72046E5N/J5N 72058J5N

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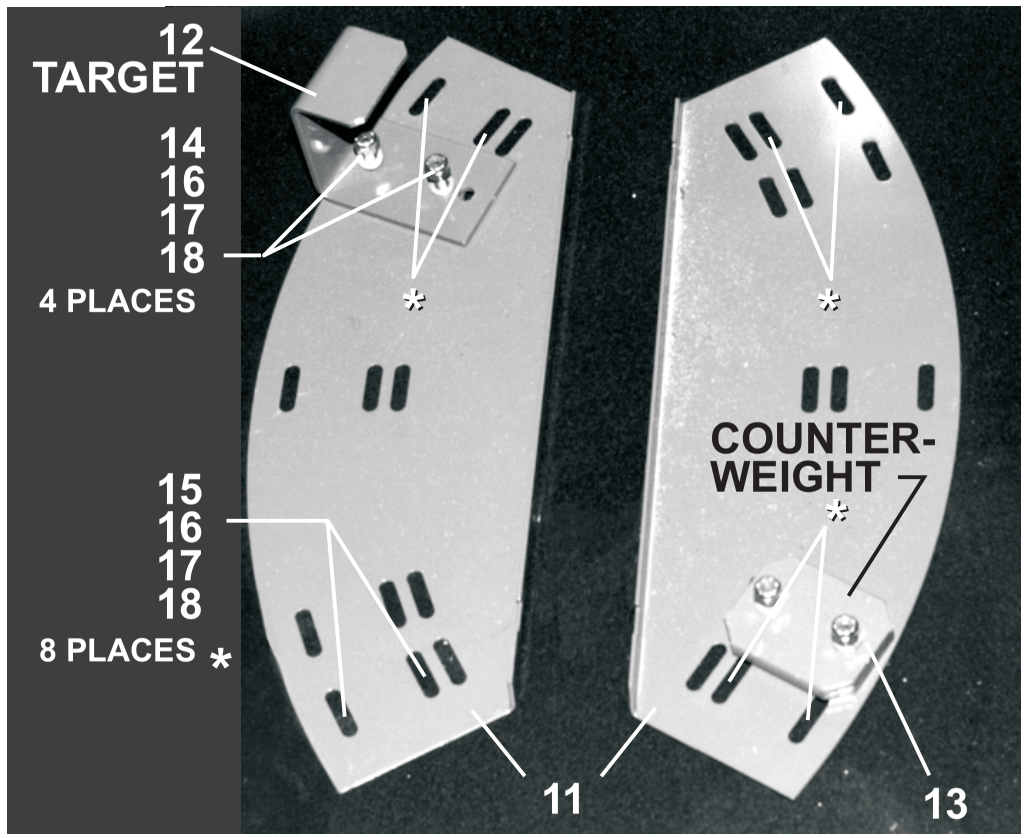
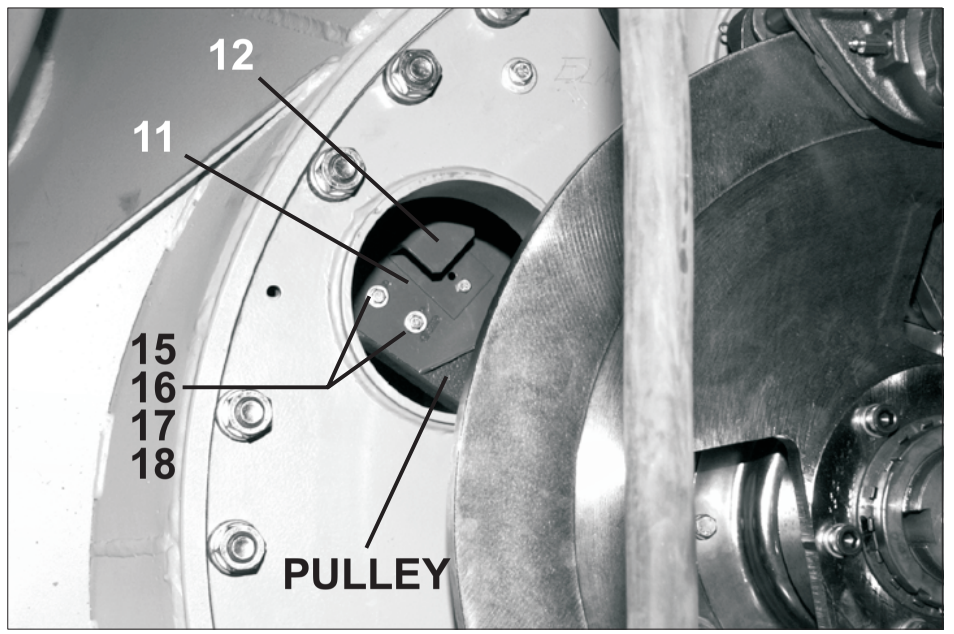
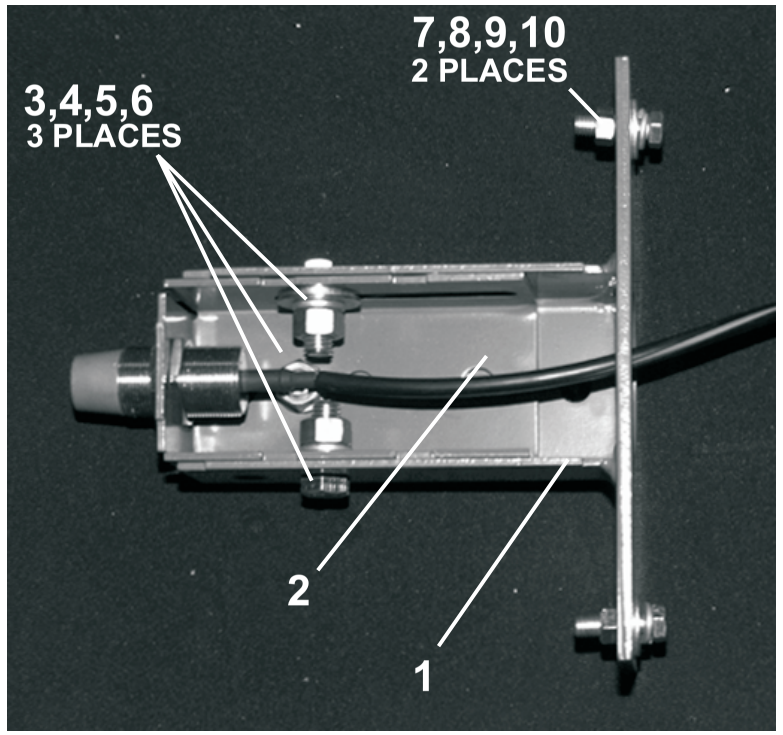


Balancing brackets with target and counter weight



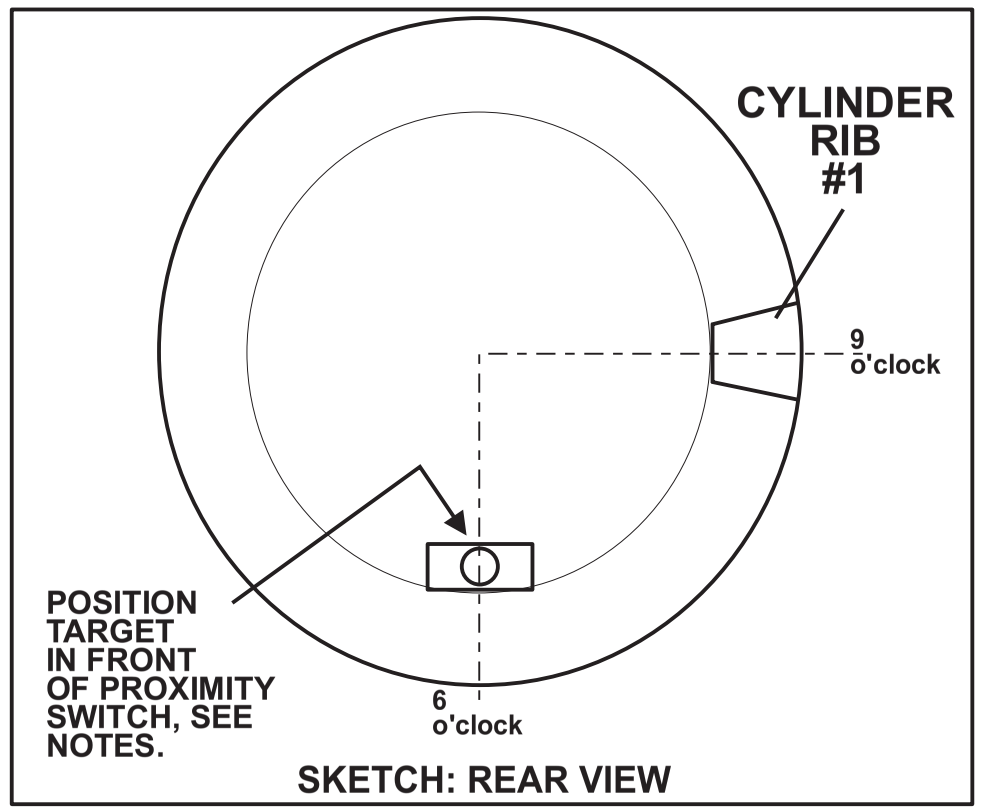
Balancing brackets mount to pulley through access holes.



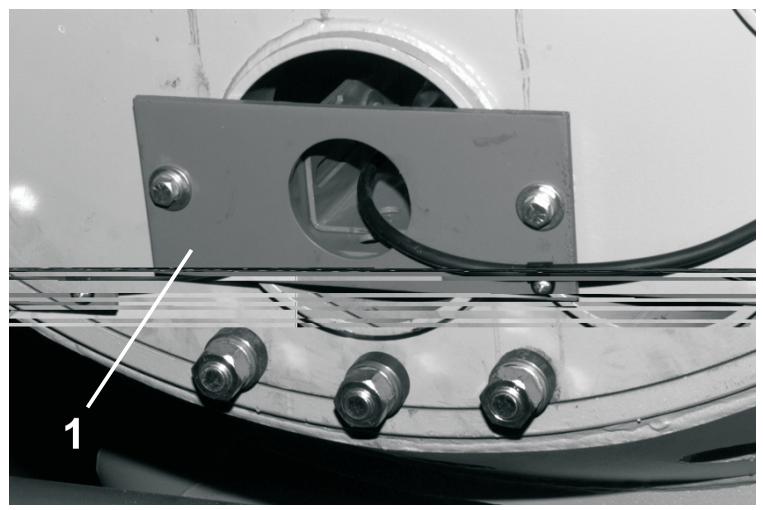
NOTES:

1) POSITION BALANCING BRACKETS AND TARGET ON PULLEY SO CYLINDER RIB #1 IS IN THE 9 O'CLOCK POSITION WHEN THE TARGET BRACKET ACTUATES THE PROXIMITY SWITCH.

2) THE COUNTER WEIGHT SHOULD BE POSITIONED ON BALANCING BRACKETS 180 DEGREES FROM THE TARGET BRACKET.



SKETCH: REAR VIEW



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Parts List—Balancing Bracket 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----------	
all	A	GEB65001	INST=ELE BALANCING BRKTS	
			----------COMPONENTS----------	
all	1	W3 65223	*WELD=PLATE-E BAL MNT	
All	2	03 65223B	CHNL=E BAL MNT BRKT PROC SWT	
all	3	15K050	HXCAPSCR 5/16-18UNC2AX1/2 GR5	
all	4	15U241	FLATWASHER 13/32IDX1+3/4ODX14G	
all	5	15U278	LOCKWASHER MEDIUM 7/16 ZINCPL	
all	6	15G185	HXNUT 5/16-18UNC2B SAE ZINC GR	
all	7	15K083	HXCAPSCR 3/8-16 UNC2AX1/2 GR5	
all	8	15U240	FLATWASHER(USS STD) 3/8" ZNC P	
all	9	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
all	10	15G205	HXNUT 3/8-16UNC2B ZINC GR2	
all	11	03 65224	12.375 TARGET MNT BRKT	
all	12	03 BZ2X2F	2"TARGET BALANCE PROX SW	
all	13	03 65222	PULLEY COUNTERWEIGHT- 8 OZ	
all	14	15K041	HXCAPSCR 1/4-2OUNC2AX1 GR 5 ZI	
all	15	15K046	HXCAPSCR 1/4-20 UNC2A X 2"GR5	
all	16	15U185	FLATWASHER(USS STD) 1/4" ZNC P	
all	17	15U180	LOCKWASHER MEDIUM 1/4 ZINCPL	
all	18	15G164NE	HEXLOKNUT NYL 1/4-20 UNC2A SS.	

Balancing Nozzels

64040/64050E6N 64046E6N/J6N/D6N 72046E5N/J5N 72058J5N

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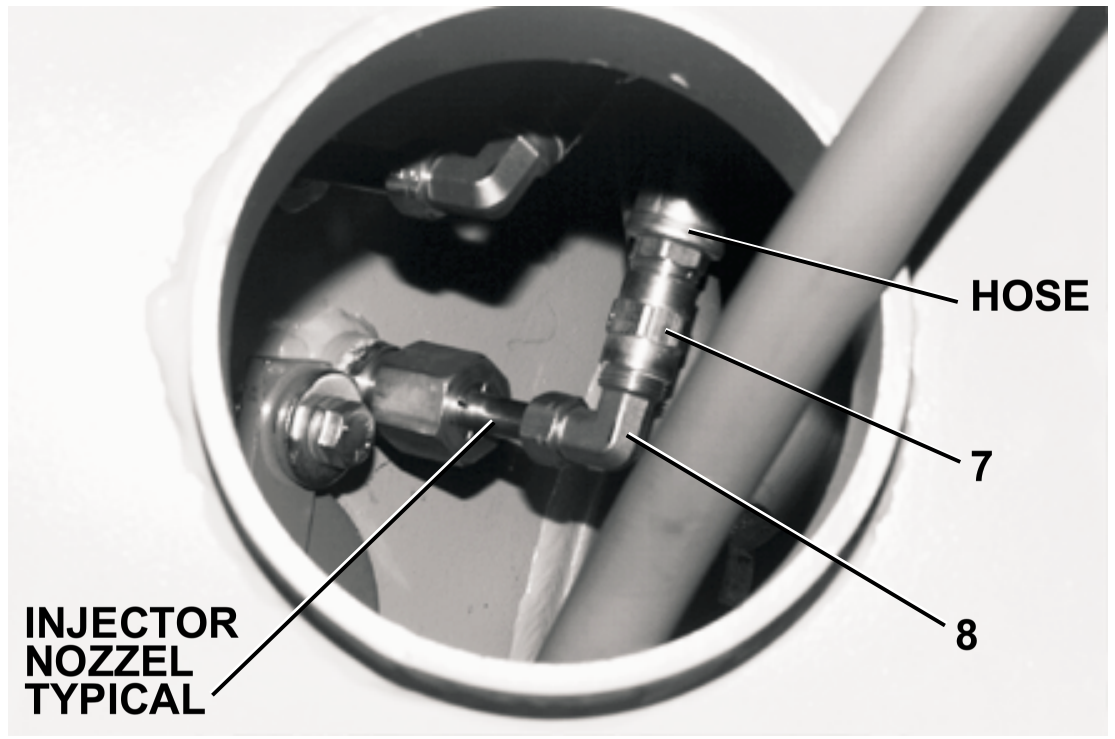
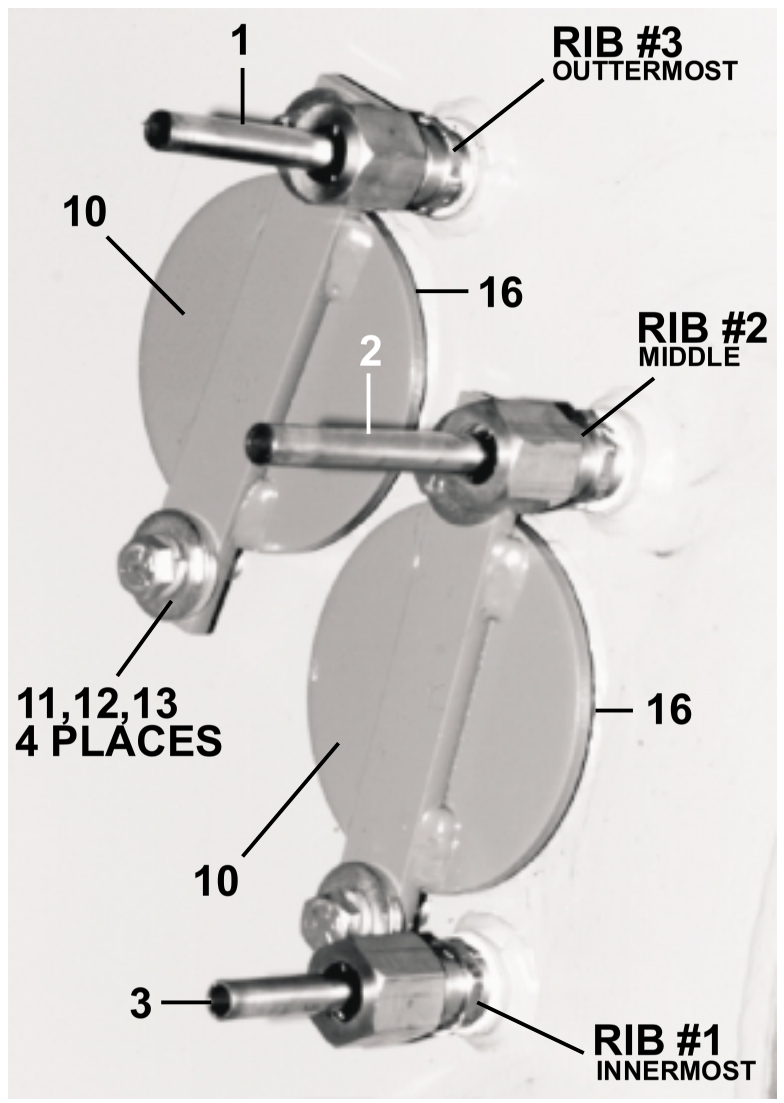
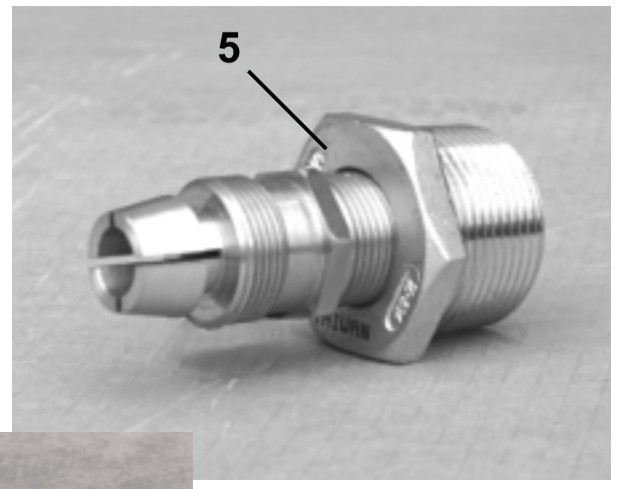
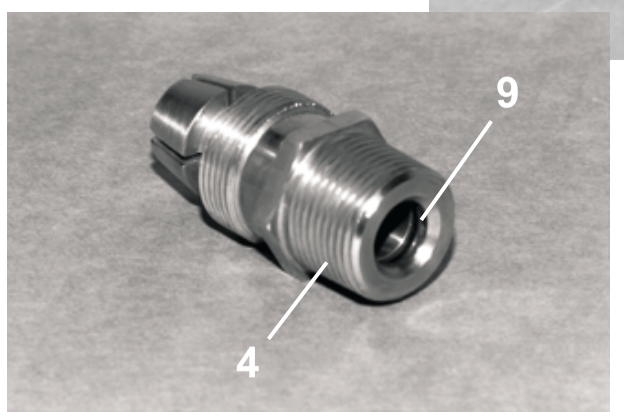
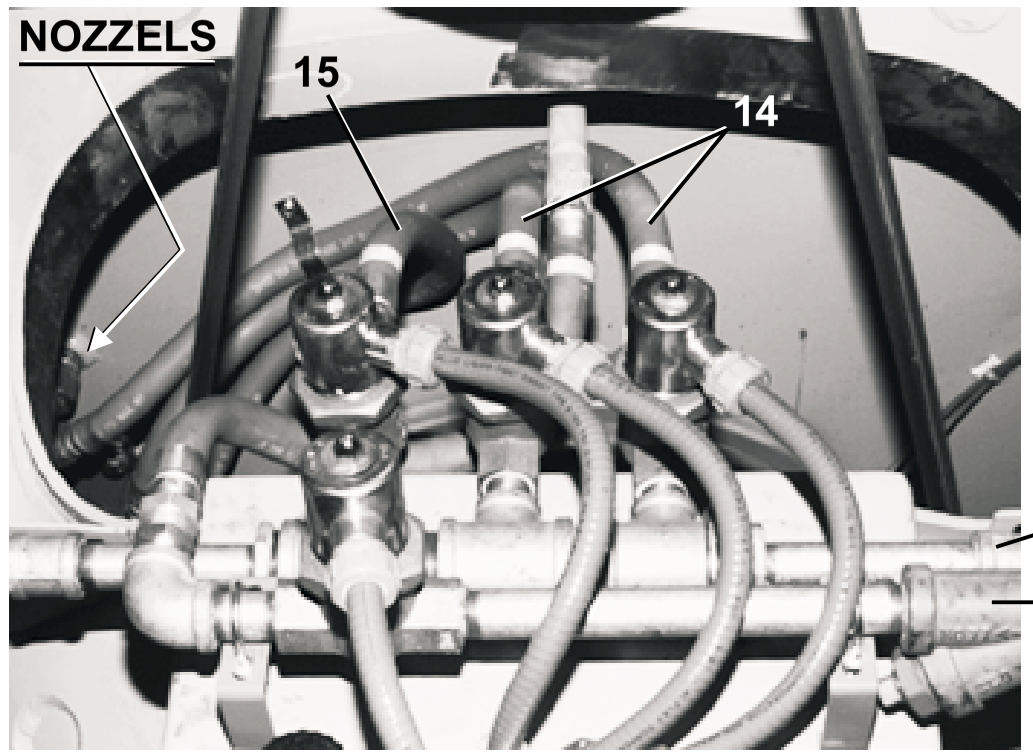






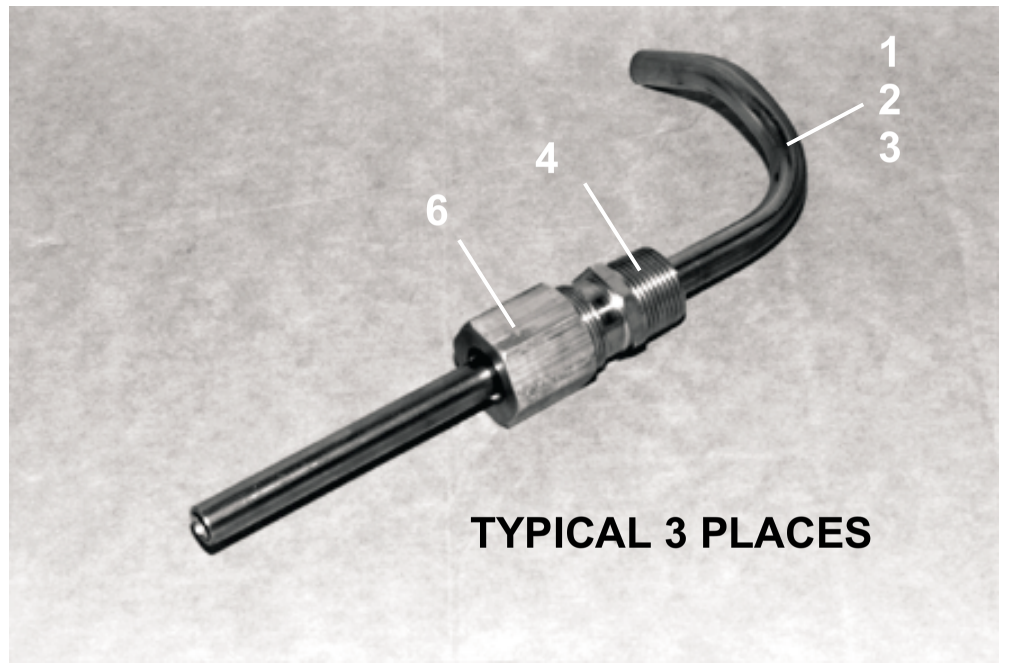


64040, 64050
ONLY



BALANCING VALVES

COOLDOWN (OPTIONAL)



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Parts List—Balancing Nozzels

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	AVW65005B	ASSY=BALANCING NOZZELS	64046, 72058
	B	AVW60005	PRTS=BALANCING NOZZLES	64040,64050
			----------COMPONENTS----------	
A	1	05 10004	INJECTOR SHORT NOZLE SHORT BDY	
B	1	05 10004C	99447B INJECTOR LONG NOZLE LONG BD	
Al	2	05 10004A	INJECTOR SHORT NOZLE MED BDY	
B	2	05 10004B	99447B INJECTOR SHORT NOZLE LONG BD	
B	3	05 10004A	99447B INJECTOR SHORT NOZLE MED BD	
all	4	03 48062A	COLLET RETAINER=BAL NOZZLE	
B	5	5SB1E0PSFO	NPTHEXBUSH 1.25X3/4 30SS 150	
all	6	03 48063A	NUT=BAL NOZZLE COLLET RTNR	
all	7	5SCC0KBE	NPT COUP 1/2 BRASS 125#	
all	8	53A046B	EL90 1/2TXMP PH#8-DBU	
all	9	60C110	ORING 1/2IDX3/32CS BUNA70 #112	
all	10	Y5 20100	*HAND HOLE COVER	
all	11	15K173A	HXCAPSCR 1/2-13UNC2AX1.75 GR5	
all	12	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	13	15U280	FL+WASHER(USS STD)1/2 ZNC PL+D	
all	14	60E086E30A	WATERHOSE 30"LG+3/4&1/2 ENDS	
all	15	60E086E33A	WATERHOSE 33"LG+3/4&1/2 ENDS	
all	16	20C047	ADHES.3M #1099 INDUST QUARTS	

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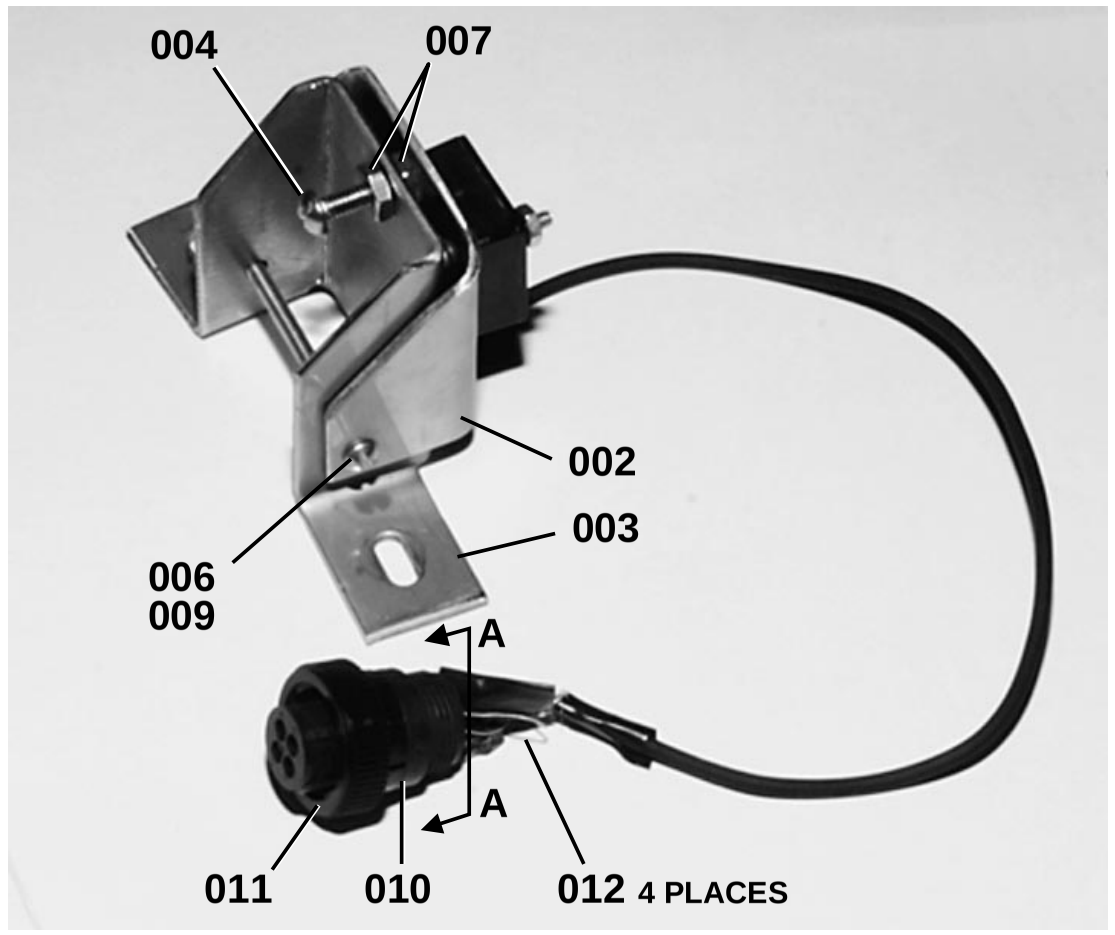
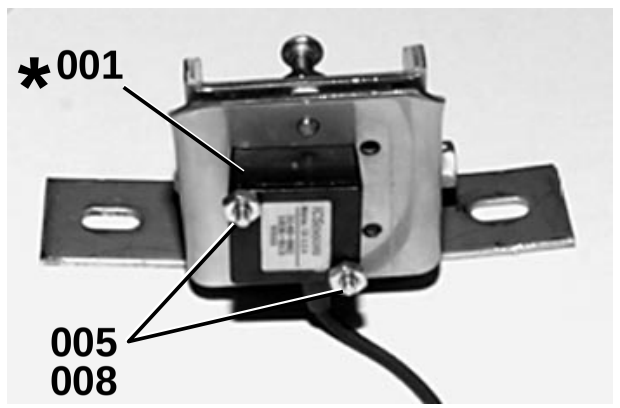
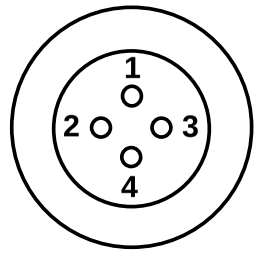
700 JACKSON STREET/POST OFFICE BOX 400
KENNER, LOUISIANA 70063-0400 USA

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

ACCELEROMETER ASSEMBLY
64046E6N/J6N/D6N 72046E5N/J5N 72058J5N







VIEW A-A

PIN CONNECTIONS

1 = RED (+12 VDC)
2 = WHITE OR BLUE (OUTPUT)
3 = BLACK OR GREEN (GROUND)
4 = SHIELD

* Fragile! Do not strike, drop, or bump this part.

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PARTS LIST
(See other page for drawing.)

ACCELEROMETER ASSEMBLY
64046E6N/J6N/D6N 72046E5N/J5N 72058J5N

ITEM	PART NUMBER	DESCRIPTION	HOW PART IS USED IN ASSEMBLY (Only if pertinent)
00A	EACCLRM1	94102L ASSMBLY:ACCELROMETER O-5VOC	REFERENCE ASSEMBLY
001	30K205B	ACCELROMETER 0-2G IC.SENSOR #3145-2	
002	03 BU1X23	94247B BRKT:ACCELERAMETER ADJUSTMNT	
003	03 BU2X43	94286B BRKT:ACCELERAMETER MTG BASE	
004	15N095	RDMACSCR 8-32UNC2X3/4 SS18-8	
005	15N020	RDMACSCR 4-40 UNC2AX3/4 ZINC GR5	
006	15N071B	RDMASCR 6-32UNC2A2+1/4 SS 18-8	
007	15G105	HEXMACSCRNUT 8-32UNC2 SS18-8	
008	15G020	HXMACHSCRNUT 4-4OUNC2BZINC GR2	
009	15G072	HXCTRLOKNUT 6-32IFI100 ZINC GR2	
010	09BC04BRLQ	CIRCULAR 4PIN CONN PLUG(FEMALE PIN)	
011	09BC04CRLQ	CIRCULAR 4PIN CONN RECPT(MALE PINS)	
012	09BT23MCLN	FEM TERM .062 TIN(LOOSE) #66601-1	
		******** 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

9 Water

Water & Steam Schematic

64040E6N, 64050E6N

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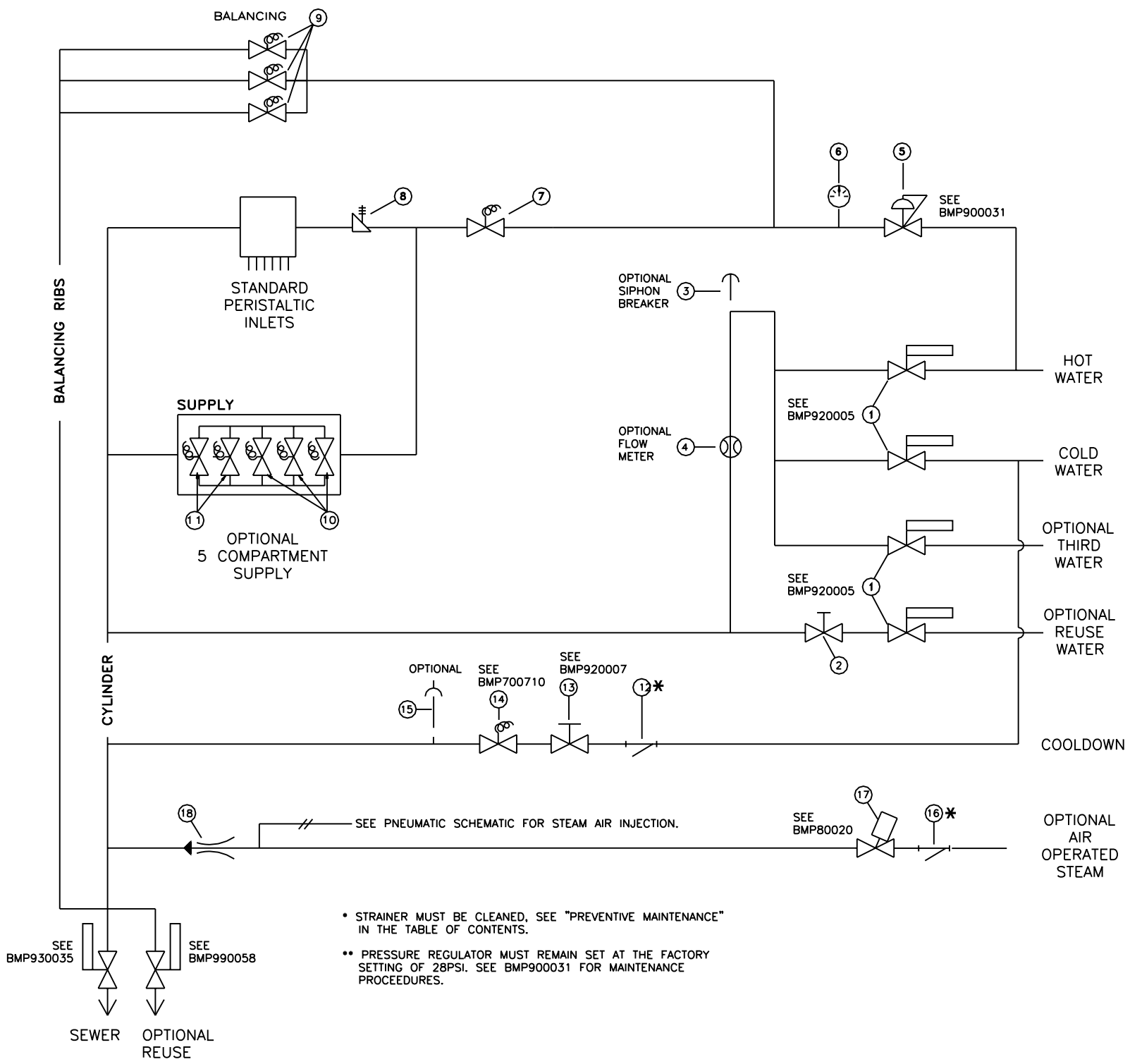

* STRAINER MUST BE CLEANED, SEE "PREVENTIVE MAINTENANCE" IN THE TABLE OF CONTENTS.

** PRESSURE REGULATOR MUST REMAIN SET AT THE FACTORY SETTING OF 28PSI. SEE BMP900031 FOR MAINTENANCE PROCEEDURES.

Parts List—Water & Steam Schematic

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	GVW60001	INST=1FRESH H20 VALVE 6440E	
	B	AVW58001	ASSY=H20 VALVE W/ "T" 72J2S	
	C	AVW58001A	ASSY=H20 VALVE W/O "T" 72J2S	
	D	AVW58002	ASSY=H20 VALVE W/MAN VAL 72J2S	
	E	AVW58003	ASSY=PRESS REG+ FLUSH VAL72J2S	
	F	GVW60008	INST=COOL DOWN W/O VAC BK 6440	
	G	GVW60008N	INST=COOL DOWN W/VAC BRK 6440	
	H	GVS60010	INST=STM FLEXHOSE 1"ORF 6440E	
	J	A64SV006	ASSY=STM AIR INJECT 64'S&72'S	
	K	GVW60011	INST=FLOW METER 6440E	
	L	AVW58011	ASSY=FLOW METER 72J2S	
			----------COMPONENTS----------	
alL	1	96D088BCSL	2.00WAT BVAL+ACT/BR/NC/ST/LH	
alL	2	96D088WEXS	BALVAL 2"BRZ B6400SSZ1070SP	
alL	3	96M033	2.5"VAC BREAKER WATTS288A M2	
alL	4	30F515	FLOW SENSOR SIGNET P51530-P0	
alL	5	96J031D	3/4"PRESSREG SET 28# FEMXUN	
alL	6	30N101	PRESSGAUGE 1/8"BACKCN.0-60PSI	
alL	7	96P053A37	3/4"VAL 110V HAYS#6-2110IS-120	
alL	8	96M001	1/2X3/8" RELIEF VALVE SET31#	
alL	9	96P053A37	3/4"VAL 110V HAYS#6-2110IS-120	
alL	10	96TCC2AA37	3/8" N/C 2WAY 120V50/60C VALVE	
alL	11	96TDC2AA37	1/2" N/C 2WAY 120V50/60C VALVE	
alL	12	51T030B	Y-STRAINER-BRONZE 3/4" W/PLUG	
alL	13	96D050A	3/4"BALLVALVE BRZ WATTS#B6100	
alL	14	96P053A37	3/4"VAL 110V HAYS#6-2110IS-120	
alL	15	96M022	3/4" VAC BREAKER #288A	
alL	16	51T060	Y-STRAINER 1+1/4" CAST IRON	
alL	17	96D0011E	1.25"NPTBRZ N/C STEAMVALANGBD	
alL	18	W3 64566J	WLM=STM SPARGER .75 ORF-12" L	

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

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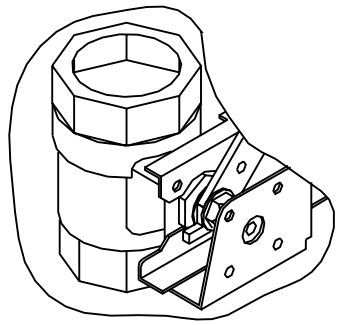
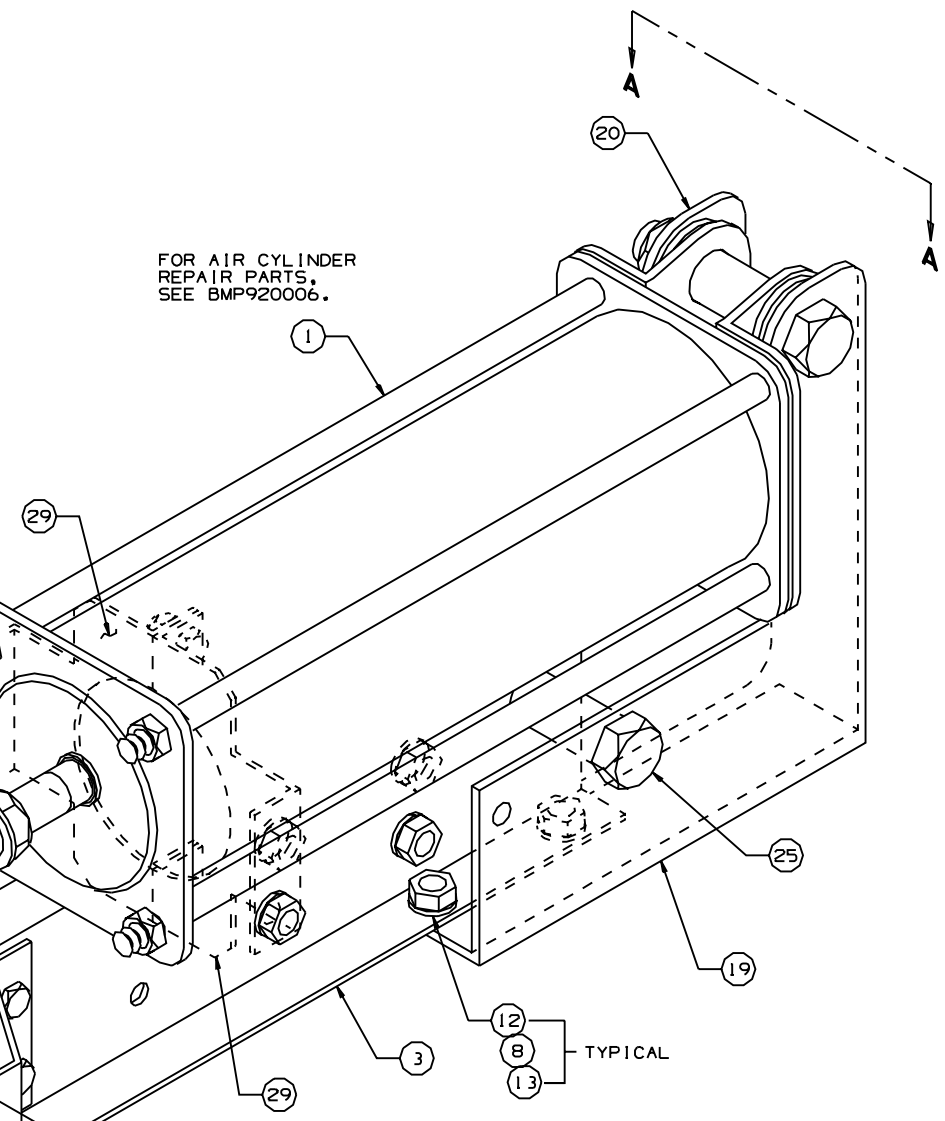
Litho in U.S.A.

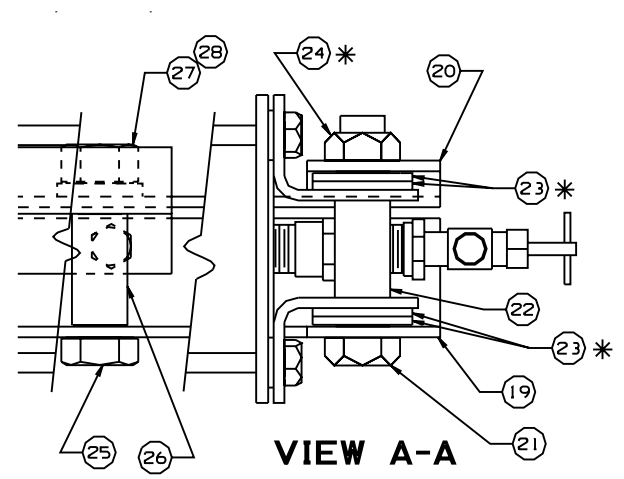


90° VALVE SET

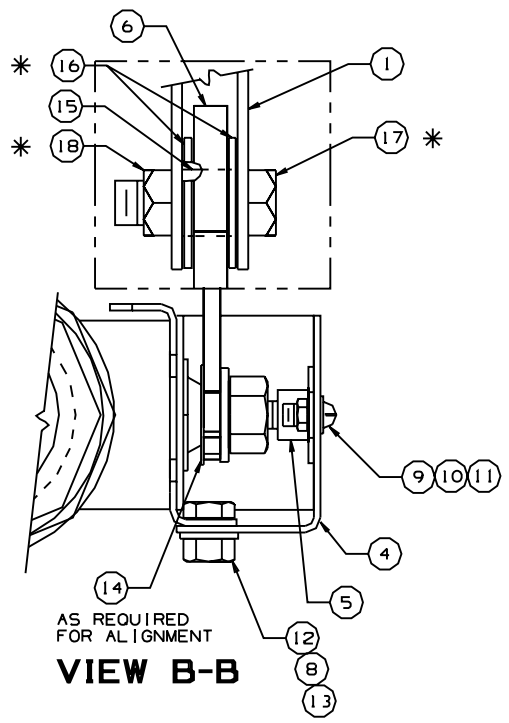


FOR PROPER ALIGNMENT OF ASSEMBLY:

1. WITH THE BALL IN ITS FULLY CLOSED POSITION AND THE ACTUATOR IN ITS FULLY RETRACTED POSITION, ADJUST ALIGNMENT NUT UNTIL THE CRANK ALIGNMENT HOLE IS 100% IN LINE WITH THE BEARING SUPPORT ALIGNMENT HOLE AND THE SOCKET HEXHEAD SCREW. THEN LOCK WITH LOCKNUT. THE ASSEMBLY MUST CLOSE 100%.

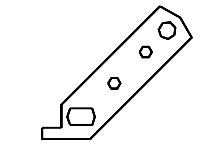


VIEW A-A

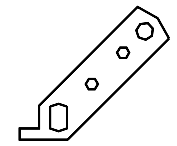


AS REQUIRED FOR ALIGNMENT

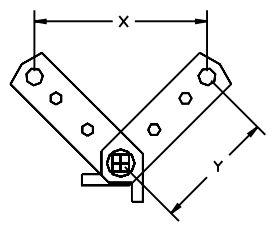
VIEW B-B



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	

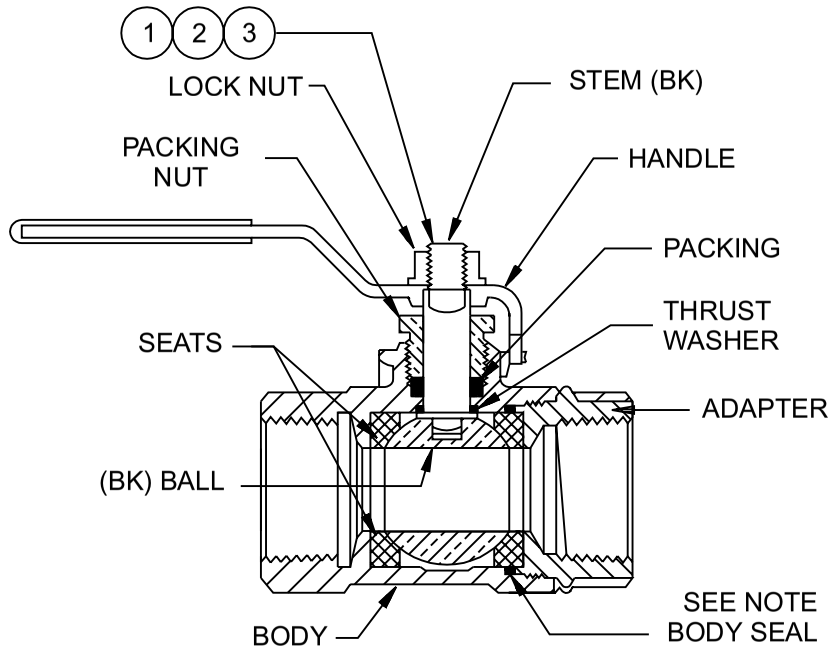
Watts Ball Valves and Repair Kits

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

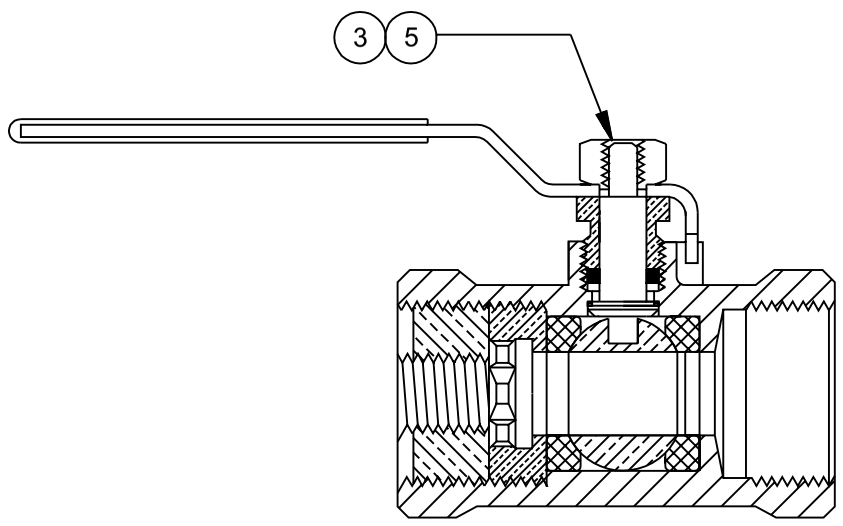
Litho in U.S.A.

178

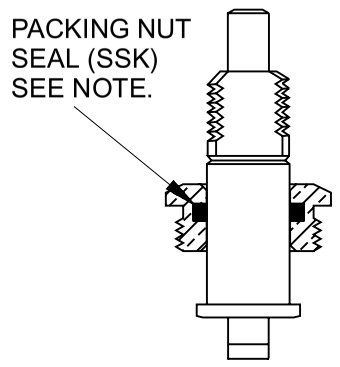
BALL VALVES WITHOUT ACTUATOR PADS FOR MANUAL OPERATION



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

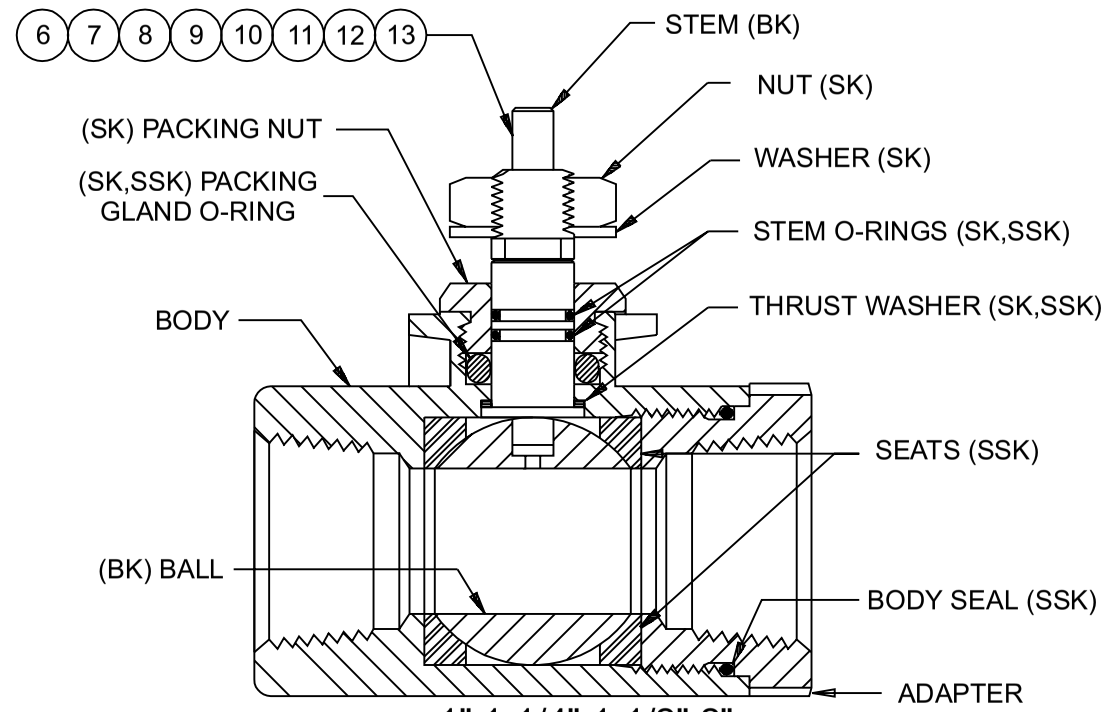


3/4",1"
BRONZE
NO REPAIR KITS



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.

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

Litho in U.S.A.

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	

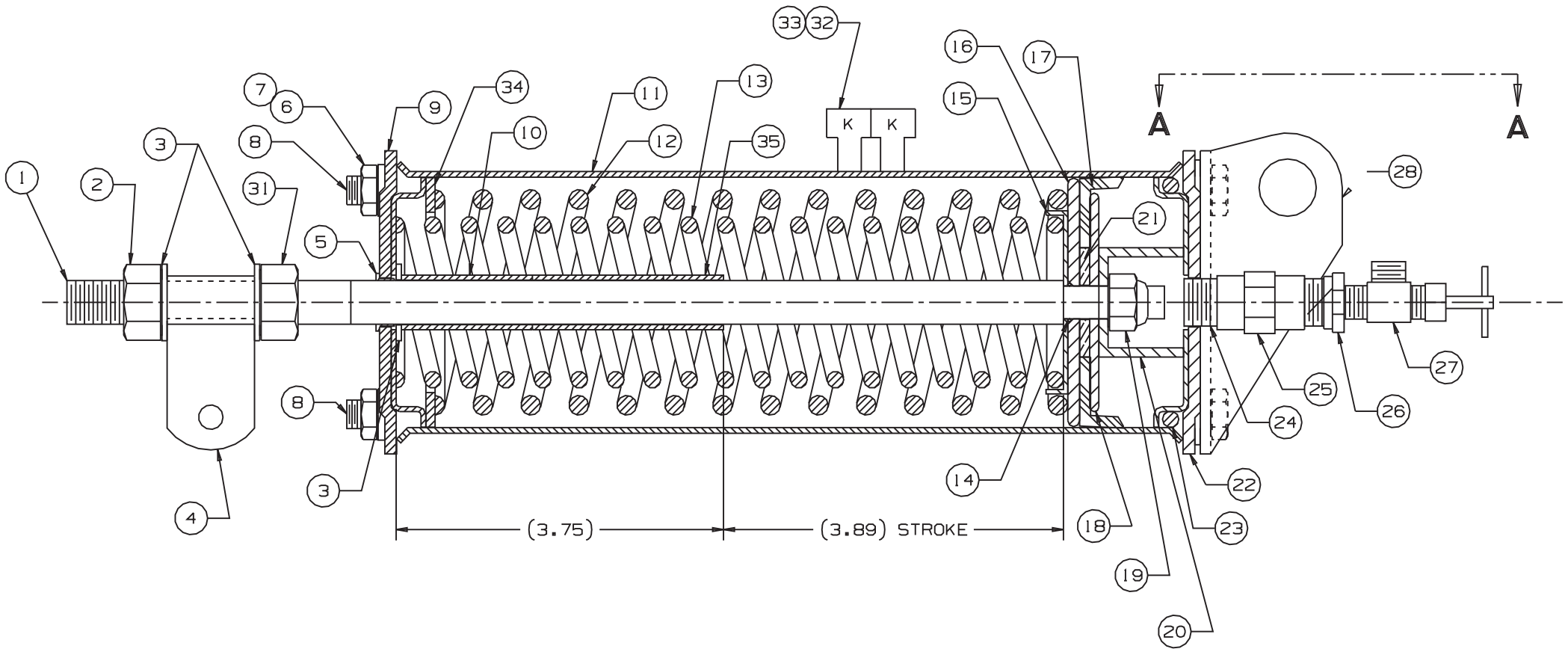
Parts List, cont.—Watts Ball Valves and Repair Kits

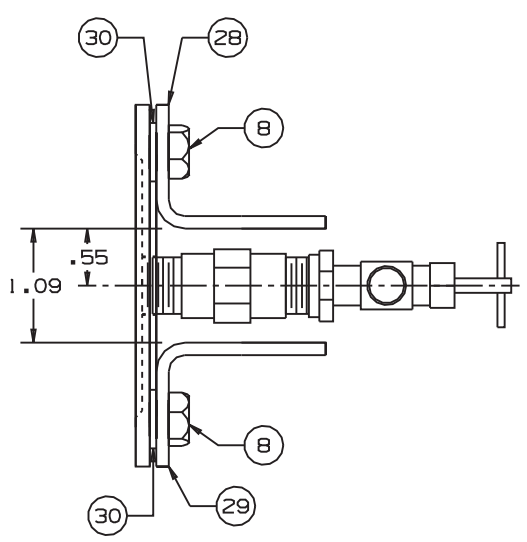
Used In	Item	Part Number	Description	Comments
all	008SSK	96V086SSK	02Z REPKIT 1.25BALVALSSK-02-RK-Z107	
all	9	96D086WSS	08Z BAVAL 1+1/4"SS WATTS S8000-Z107	1-1/4"STAINLESS-AIR OPER.
all	009BK	96V086BK	BALL KIT WATTS #1.25-BALL-RK-Z107	
all	009SK	96V086A7SK	02Z STEMKIT 1.25-1.5-ST-RK-Z107	
all	009SSK	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

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

Litho in U.S.A.





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.

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

Litho in U.S.A.

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	92000Z AIRCYL=2.38ODX2.70STX20.5#CD	FOR 1,1.25,1.5 BALLVALVES
	D	SA 10 056G	92000Z 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 BRAKE	
all	2	15G234NS	HXLOCKNUT NYL 1/2-13UNC2 SS18-8	
all	3	15U243S	FLAWASHER 7/8ODX33/64IDX16GA 18-8SS	
all	4	03 01209A	92536B STEMCLIP H=1.313 BALVAL S/S	
all	5	54E220	NYLINER 8L2FF BUSHING 1/2X9/16X.140	
A	6	15G191	HXFINJAMNUT 5/16-24UNC2 ZINC GR2	
B,C,D	6	15G190	HEXFINJAMNUT 5/16-18NC2 SS18-8	
A	7	15U210	LOKWASHER MEDIUM 5/16 ZINCPL	
B,C	7	15U205	LOCKWASHER MEDIUM 5/16" 18-8SS	
D	7	15U200S	FLATWASHER US STD 5/16 SS18-8	
A	8	02 10585H	91142# TIE BOLT=5/16-18X10LNG PLTD	
B	8	02 10585G	91142# TIE BOLT=5/16-18X10LG (SS)	
C	8	02 10585E	91142# TIE BOLT=5/16-18X8.25LG PLTD	
D	8	02 10585A	91142# TIE ROD-5/16-18X8+1/4 (SS)	
A	9	03 01623	90351C CYLINDER HEAD 3"AIRCYLINDER	
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	
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	
all	32	20L601K	ID TAG NAT'L #1614 ALUM EMB LET "K"	
all	33	27B2400K0N	SPACER ROLL.5ID .687L .062T STL/ZNC	
all	34	03 01620E	92136B.WASHER=2.86ODX2.06IDX.105THK	

Hays Electric Inlet Valves

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

Litho in U.S.A.

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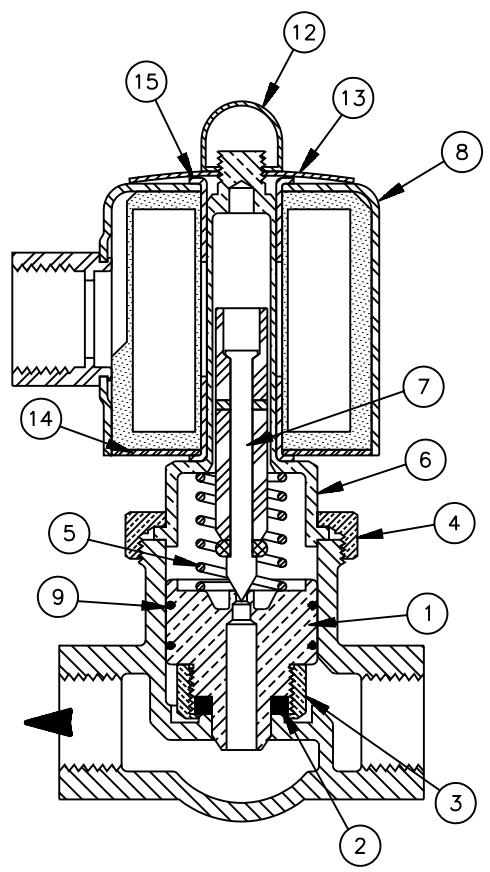
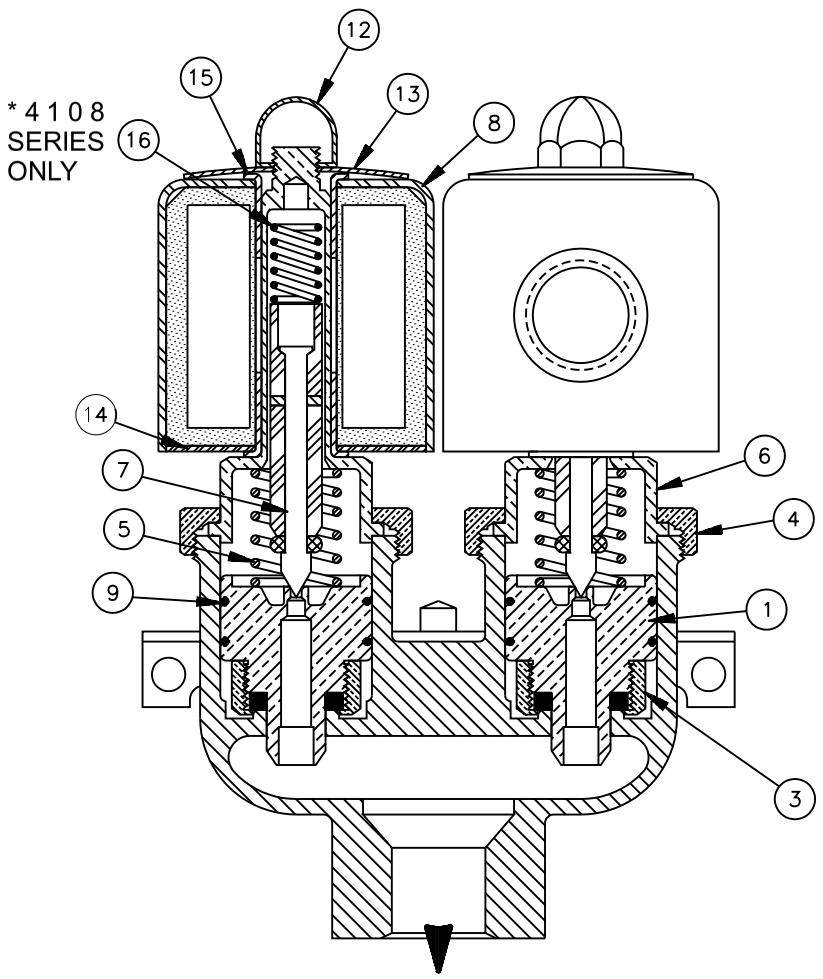
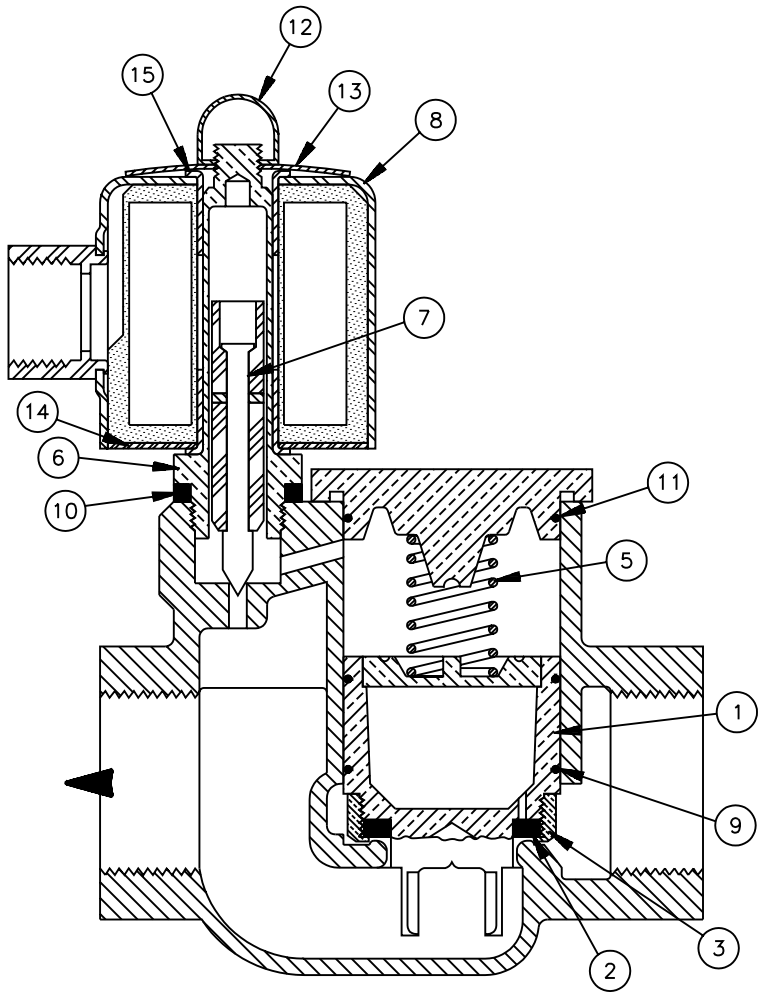


00S,00W,00X,00XX
3/8" BALANCING & 3/4" VALVES

NOTE:
HAYS 4108 SERIES DUOVALVE IS REPLACED BY THE 3108 SERIES(SHOWN). IF REPLACEMENT PARTS ARE NEEDED FOR THE OBSOLETE 4108 SERIES SEE PARTS LIST ON REVERSE SIDE.



00T,00U,00V
1/2" DUO VALVES



00Y,00Z,00ZZ
1-1/4" VALVES

GENERAL MAINTENANCE:

1) THOSE VALVES WITH COUPLING NUTS MUSTY NOT BE EXCESSIVELY TIGHTENED. USE A STEADY PULL WITH A 14" OR SMALLER WRENCH. DO NOT HAMMER ON NUT OR WRENCH. LIMIT MAXIMUM TORQUE ON COUPLING NUT TO 600LB/INCH. EXCESSIVE THIGHTENING OF COUPLING NUT WILL DISTORT VALVE BODY CAUSING THE PISTON BODY TO JAM AND THE VALVE WILL NOT SHUT OFF.

2) IF THE VALVE LEAKS BETWEEN THE BODY AND BONNET, LOOSEN THE COUPLING NUT AND TURN THE BODY SLIGHTLY, THEN TIGHTEN THE COUPLING NUT. IF THE VALVE STILL LEAKS, REPEAT THE OPERATION. IN NO CASE MUST THE NUT BE TIGHTENED EXCESSIVELY.

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

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Parts List—Hays Electric Inlet 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----------	
	S	96P014	02Z 3/8" VALVE 120V HAYS 2195-0055	
	T	96P016	10Z 1/2" DUOVAL 120V HAYS3108-6021	
	U	96P016A24	08Z 1/2" DUOVAL 24V HAYS3108-6421	
	V	96P016A71	05Z 1/2" DUOVAL 240V HAYS3108-6121	
	W	96P053	05Z 3/4"VAL 24V HAYS 2110-6421IS	
	X	96P053A37	06Z 3/4"VAL 110V HAYS #2110-6021IS	
	XX	96P053A71	3/4" HAYS VALVE 240V60/50C FACTMADE	
	Y	96P151	09Z 1+1/4" VAL 24V HAYS 2110-6421IS	
	Z	96P151A37	05Z 1+1/4" VAL 110V HAYS2110-6021IS	
	ZZ	96P151A71	1.25" HAYSVALVE 240V60/50C FACTMADE	
			----------COMPONENTS----------	
S	1	96V245	PISTON ASSY HAYS #7735505	
T-V	1	96V216	PISTON-TEFLON FOR HAYS STYLE 3108	
W-XX	1	96V222	PISTON ASSY HAYS 7730004 FOR 96P053	
Y-ZZ	1	96V224B	PISTON ASSY HAYS #7643101=96P151	
all	1	96V216A	PISTON-TEFLON FOR HAYS STYLE 4108	OBSOLETE 4108 DUOVALVE
S-V,	2	96V247	SEATWASHER HAYS #8222301 96P014+16	OBSOLETE 4108 DUOVALVE ALSO
W-XX	2	96V225	SEAT WASHER HAYS #8249801	
Y-ZZ	2	96V225A	SEAT WASHER HAYS #84048 FOR 96P151	
S-V,	3	96V248	SEATWASHER NUT HAYS#82222 96P014+16	OBSOLETE 4108 DUOVALVE ALSO
W-Z	3	96V226	SEAT WASHER NUT HAYS #86030 =96P053	
S-V	4	96V246	COUPLING NUT HAYS #76303 96P014+16	
W-Z	4	96V254	COUPLING NUT HAYS #76028 = 96P053	
S-V,Y-ZZ	5	96V244	PISTON SPRING FOR HAYS STYLE 3108	
W-XX	5	96V222A	PISTON SPRING HAYS 82488	
all	5	96V244A	PISTON SPRING HAYS 4108 HAYS #88108	OBSOLETE 4108 DUOVALVE
S-V	6	96V242	BONNET FOR HAYS 3108 HAYS#83021	
W-XX	6	96V258	BONNET HAYS #73026 FOR 96P053	
Y-Z	6	96V260	BONNET HAYS #83192 FOR 96P151	
S onlY	7	96V243	PLUNGER ASSY TEFLON TIP HAYS #74327	
T-ZZ	7	96V223	PLUNGER HAYS #7319503	
all	7	96V223A	PLUNGER ASSY FOR HAYS STYLE 4108	OBSOLETE 4108 DUOVALVE

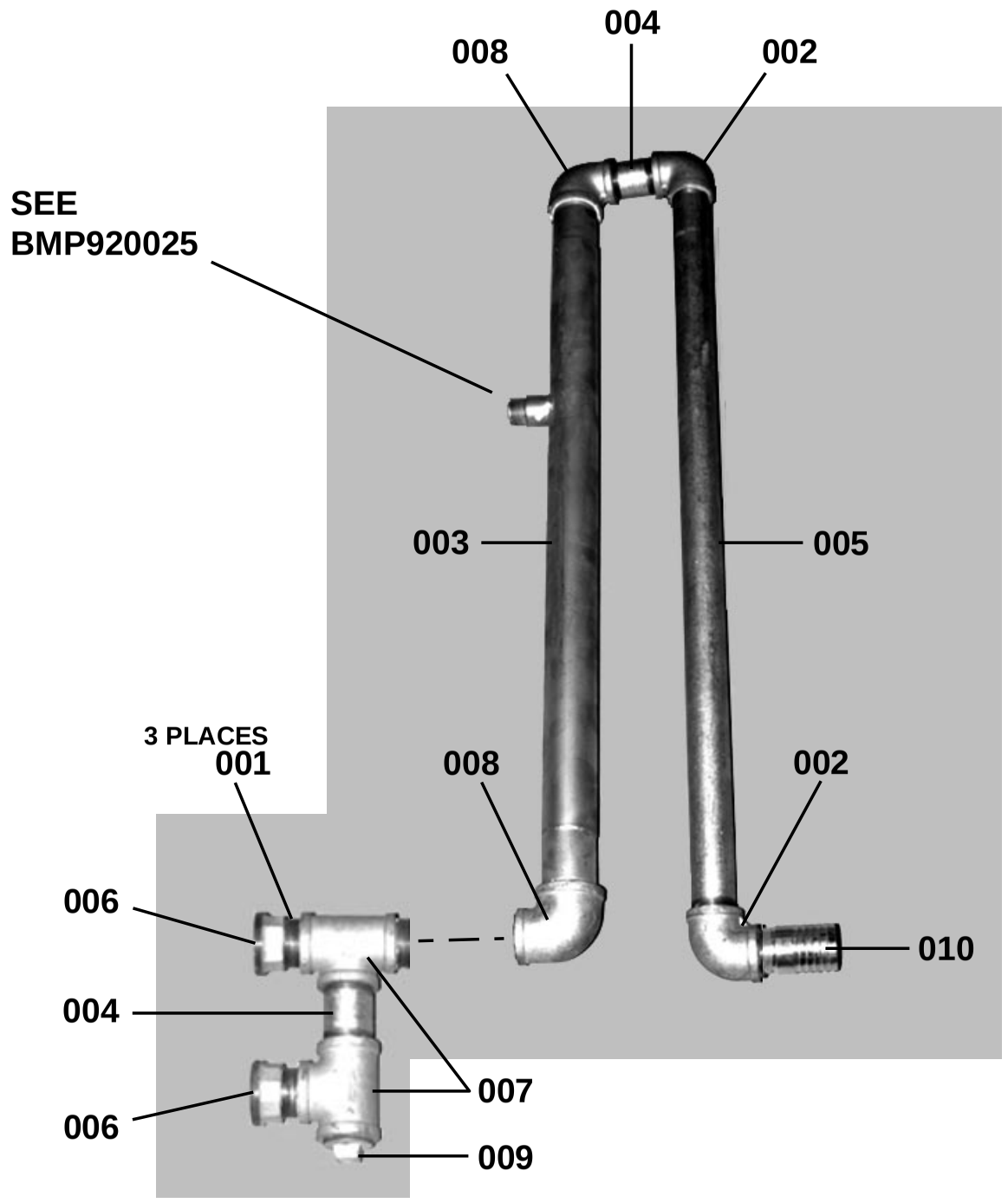
Parts List, cont.—Hays Electric Inlet Valves

Used In	Item	Part Number	Description	Comments
S-T,X,Z	8	96V211	COIL 120V50/60C FOR HAYS STYLE 3108	
U,W,Y,ZZ	8	96V210	COIL 24V50/60C FOR HAYS STYLE 3108	
V,XX	8	96V212	COIL 240V50/60C FOR HAYS STYLE 3108	
S-V,	9	96V217	TEFLON SPLIT RING 1/2" HAYS#8502901	OBSOLETE 4108 DUOVALVE ALSO
W-XX	9	96V222T	TEFLON SPLIT RING HAYS #8503002	
Y-ZZ	9	96V224T	TEFLON SPLITRING 1 1/4"HAYS#8503102	
Y-ZZ onlY	10	96V229	BONNET GASKET HAYS #82224= 96P151	
Y-Z onlY	11	96V261	O-RING (SEAL CAP) HAYS#87407=96P151	
all	12	96V250	PALNUT HAYS #3069-PC	
all	13	96V251	SPRING WASHER HAYS #83600	
all	14	96V264	BOTTOM PLATE (COIL) HAYS#8223601	
all	15	96V262	FERRULE (COIL SLEEVE) HAYS #82239	
all	16	96V244PS	PLUNGER SPRING FOR HAYS STYLE 4108	OBSOLETE 4108 DUOVALVE ONLY
all	17	96V250A	COIL RETAINER HAYS4108 HAYS #82958	(NOT SHOWN) OBSOLETE 4108 DUOVALVE

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

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

FLOW METER PIPING
64046E6N/J6N 72046E5N/J5N 72058J5N



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.)

FLOW METER PIPING
64046E6N/J6N 72046E5N/J5N 72058J5N

ITEM	PART NUMBER	DESCRIPTION	HOW PART IS USED IN ASSEMBLY (Only if pertinent)
00A	AVW65006	94052B ASSY=FLOWMETER PIP 6446E/T6N	REFERENCE ASSEMBLY
001	5N2ACLSG42	NPT NIPPLE 2XCLS TBE GALSTL SK40	
002	5SL2ANFA	NPT ELBOW 90DEG 2" GALMAL 150#	
003	W3 64077	92631C*FLOWMETER MANIFOLD	
004	5N2A04AG42	NPT NIPPLE 2X4 TBE GALSTL SK40	
005	5N2A48AG42	NPT NIPPLE 2X48 TBE GALSTL SK40	
006	5SU2ANF	NPT UNION 2" GALMAL 150#	
007	5S2ANFA	NPT TEE 2" GALMAL 150#	
008	5SL2KNFA2A	NPT ELBOW 90DEG 2.5X2" GALMAL 150#	
009	51P060	PLUG PIPE SQ 2"GALCORED CI 125#	
010	02 15847C	85426B ADAPTER,CARBSTL2-1/2HOSX2NPT	
		******** 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

Paddlewheel Flow Sensor

Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400
BMP920025/92662V (1 of 2)
Litho in U.S.A.

Identification and Description

The flow sensor is installed in a pipe line to measure flow rate. The flow passing by the flow sensor paddlewheel rotates the paddlewheel, moving the magnets past a coil in the transducer body. An AC voltage is induced in the coil by the rotating magnets of the paddlewheel.

Both frequency and amplitude of the output of the coil are directly proportional to the velocity of the fluid flow in the pipe. A complete cycle occurs every time two of the paddlewheel blades go by the coil; therefore, two entire cycles are generated for each paddlewheel rotation.

Safety Instructions

⚠ DANGER ⚠

SHOCK HAZARD will cause death or severe injury.

Lock OFF and tag out power to machine at wall disconnect. Power switches on machine and control box disable only control circuit power in electrical boxes.

⚠ CAUTION ⚠

Turn off fluids before removing flow sensor from pipe line.

Maintenance

The flow sensor requires minimal care. Check your flow sensor every three months until actual maintenance intervals can be determined. After removing flow sensor:

1. Paddlewheel must turn freely, if not, see troubleshooting below.
2. Inspect flow sensor electrical connections and cable.
3. Check O-rings and lubricate with G.E. Silcone Compound G660 or similar. Keep paddlewheel and pin free of lubrication (replacement paddlewheels and other parts are available from manufactuer).

Troubleshooting

The paddlewheel is designed to rotate on the shaft; the shaft should not rotate with respect to the housing. The paddlewheel must turn freely. If it does not, clean the paddlewheel assembly as follows:

1. Remove the flow sensor from the pipe and insert the plug into the pipe fitting. Clean any external debris from the paddlewheel.
2. Using a small flat-bladed screwdriver, gently pry one of the paddlewheel mounting ears away from the pin (see FIGURE 2).
3. When one end of the pin is free, gently work the paddlewheel and pin out of the remaining mounting ear.
4. Throughly clean the pin, paddle, and pin holes with a wire brush and/or toothpick along with alcohol and/or soap and water.
5. To reinstall the paddlewheel and pin, reverse steps 1, 2, and 3.
6. After cleaning, the paddlewheel should spin freely without binding or sticking.

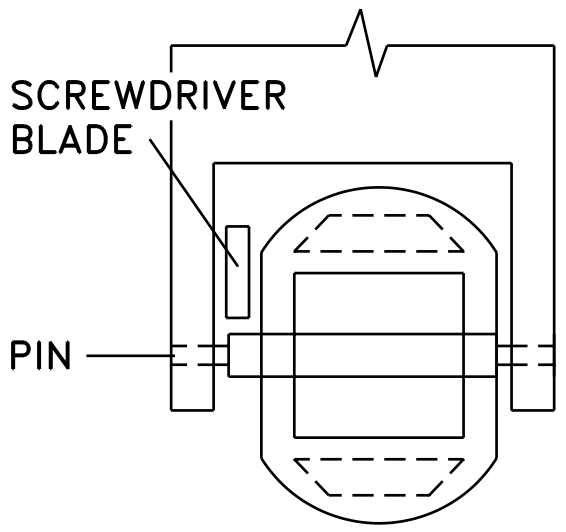


FIGURE 2: REMOVAL OF PADDLEWHEEL PIN

FIGURE 1: FLOW SENSOR

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

Litho in U.S.A.

Parts List—Paddlewheel Flow Sensor

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
	00A	30F515	FLOW SENSOR SIGNET #MK515-PO	COMPLETE FLOW SENSOR
	001	30F515R01	VITON O-RING FOR FLOW SENSOR SIGNET	REPAIR KIT O-RINGS (2PER)

Parts List, cont.—Paddlewheel Flow Sensor

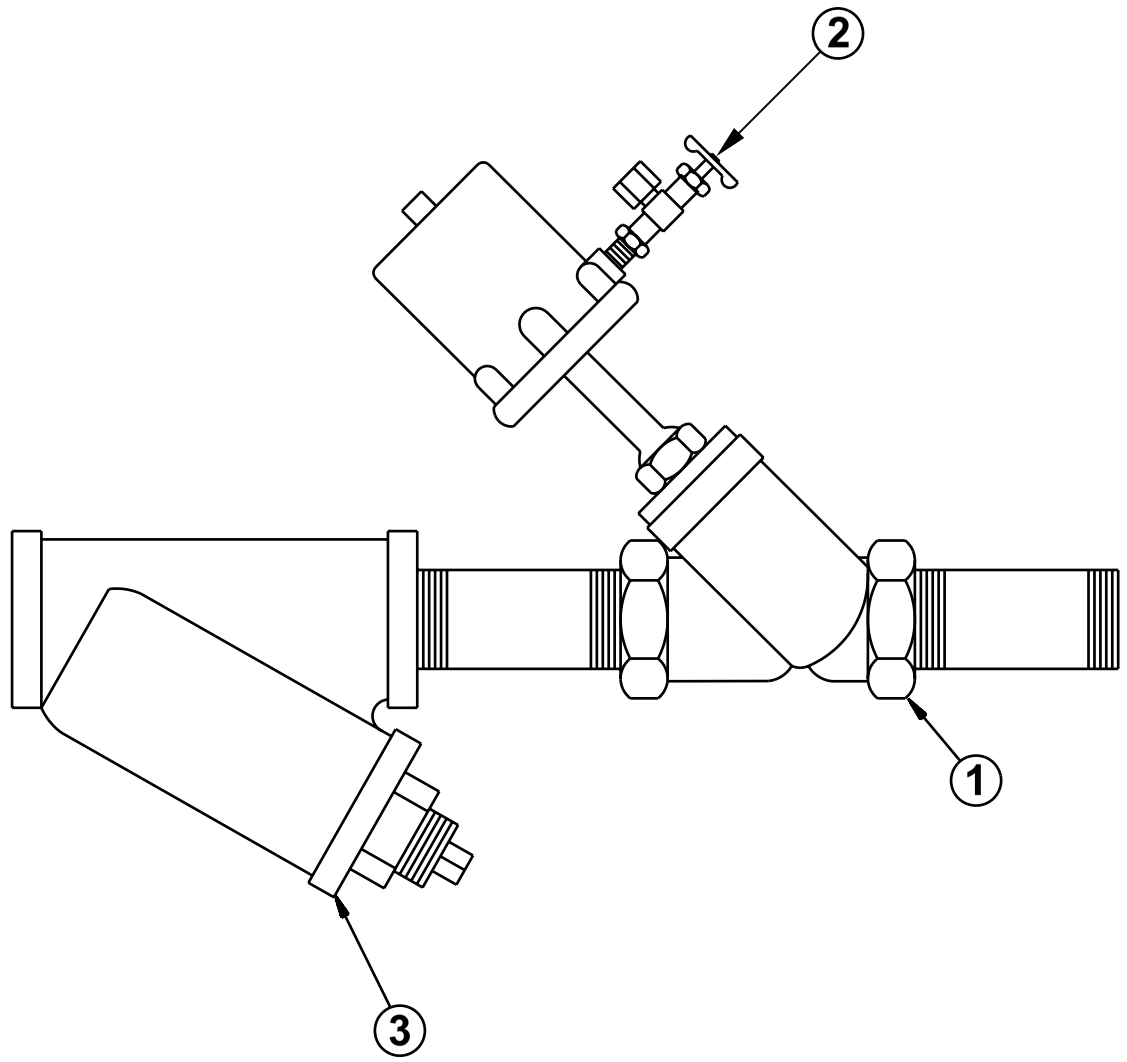
Used In	Item	Part Number	Description	Comments

Steam 10

Burket Steam Valve

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

Litho in U.S.A.



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Parts List—Burket Steam Valve

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

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

Steam Sparger & Hose Installation

64040/64050E6N

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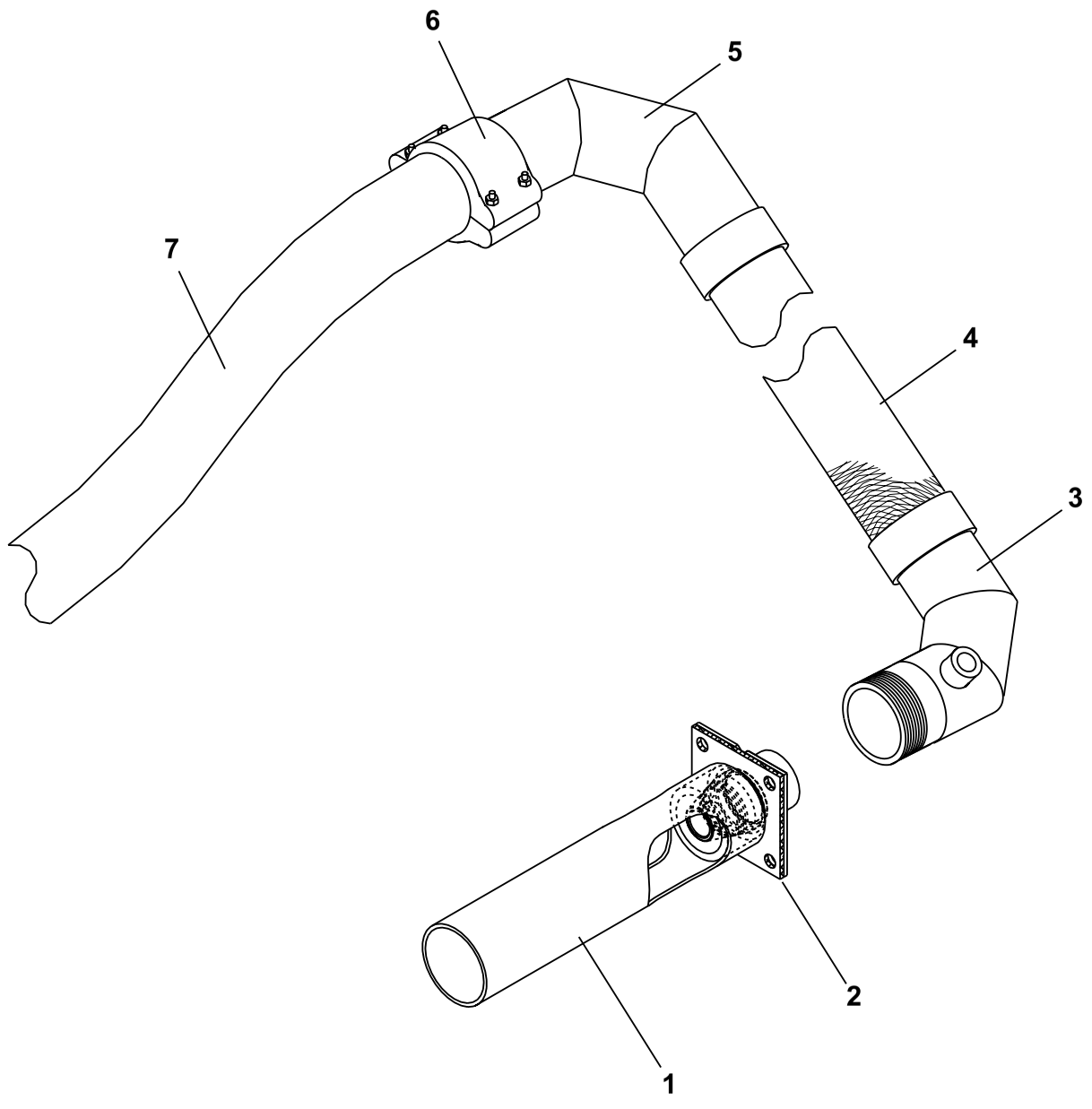
Litho in U.S.A.



Parts List—Steam Sparger & Hose 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
			----------ASSEMBLY----------	
	A	ASS65003	98000Z ASSY=NEW SATM SPARGER .75”ORF	
			----------COMPONENTS----------	
	1	W3 64566J	97472C WLM=STM SPARGER .75 ORF-12” L	
	2	02 14647G	97492B GASKET=REDESIGN STEAM SPARGER	
	3	W3 65242	99427C WLMT=SWEEPING EL/NEW DESIGN	
	4	60E524C17K	98157N STEAM HOSE SSFLX 1.5X2SSENDS17	
	5	W3 60130B	98516# WLMT=STEAM PIPE ELBO 6440/50	
	6	51E097MB	UBOLT CLAMP 1.5CADPL CAMP#IC6	
	7	60E100	STMHOSE 1.5ID BOSTON-250STM	

11 Drain

8” Dump Valve Assembly & Installation

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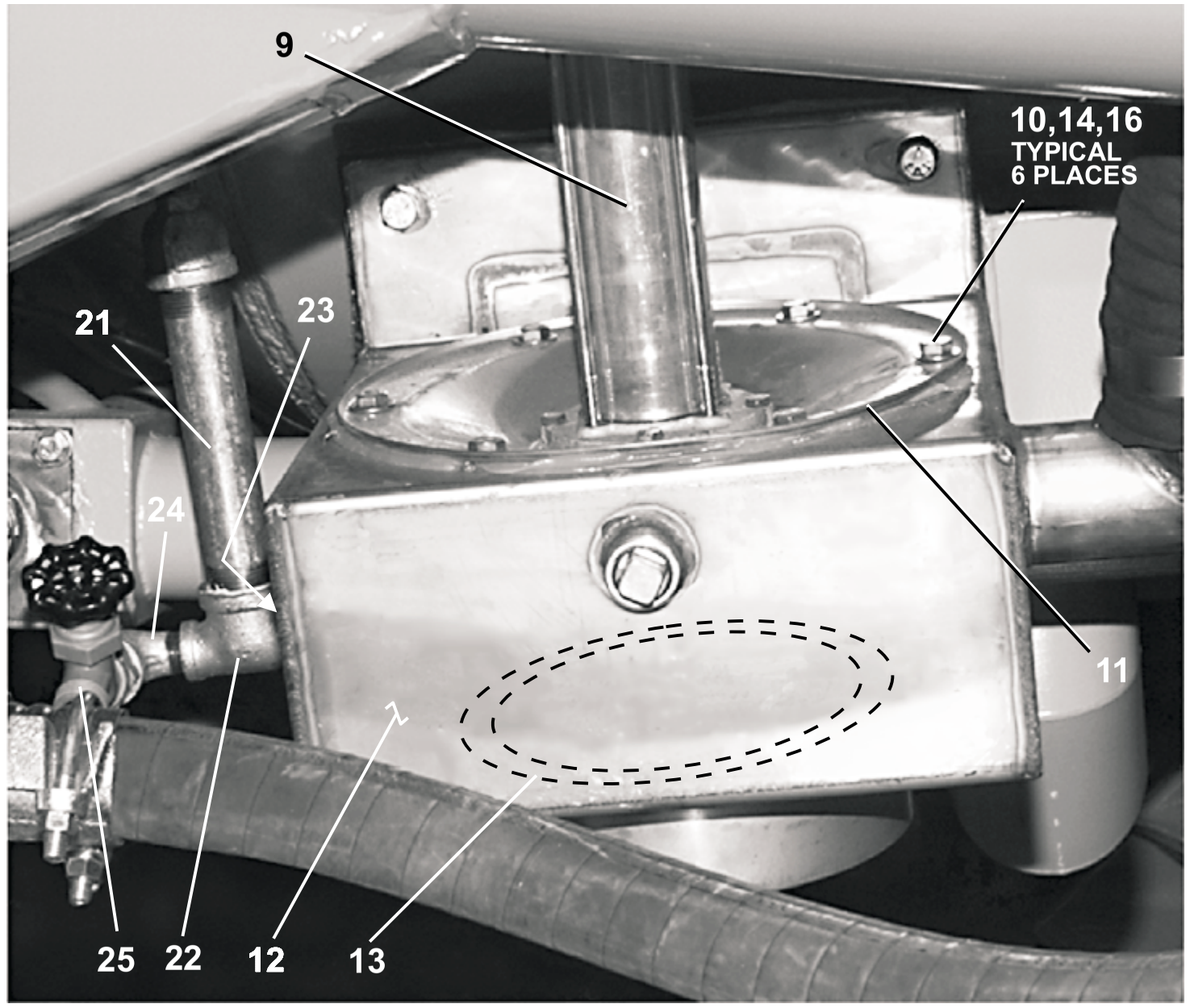
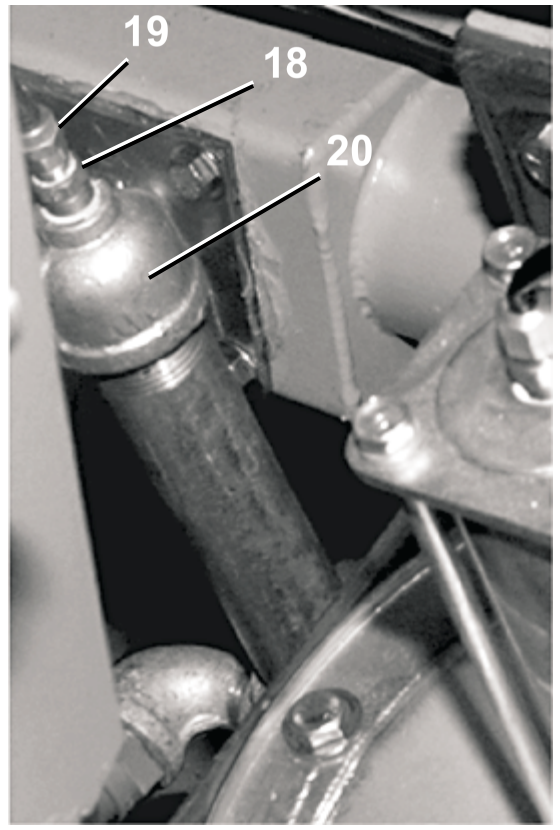
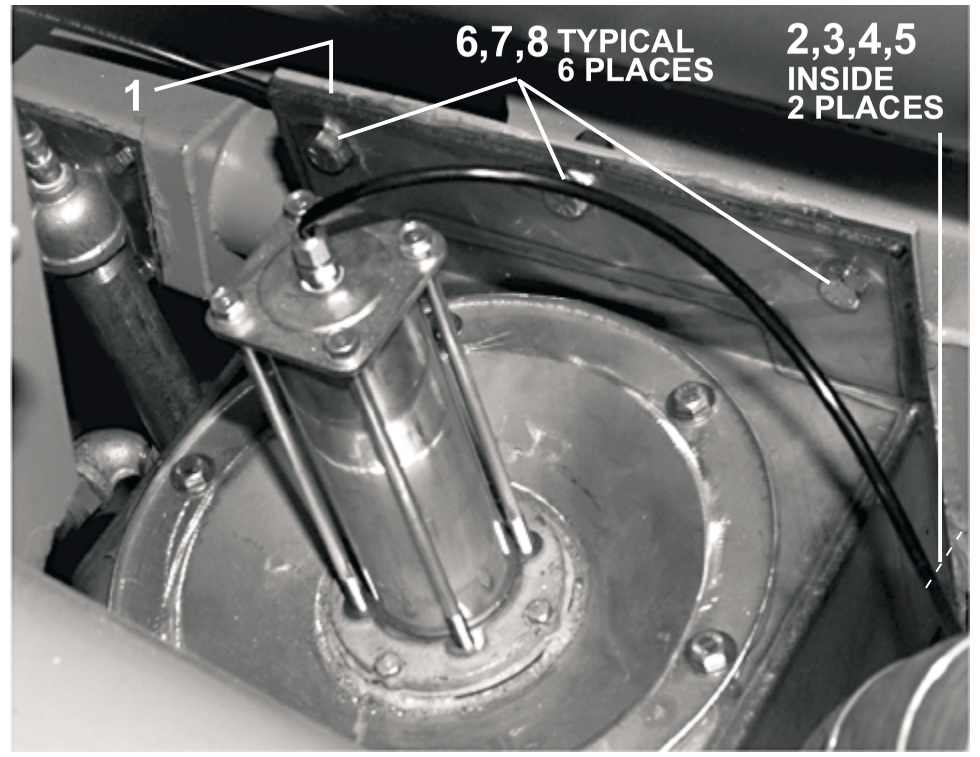
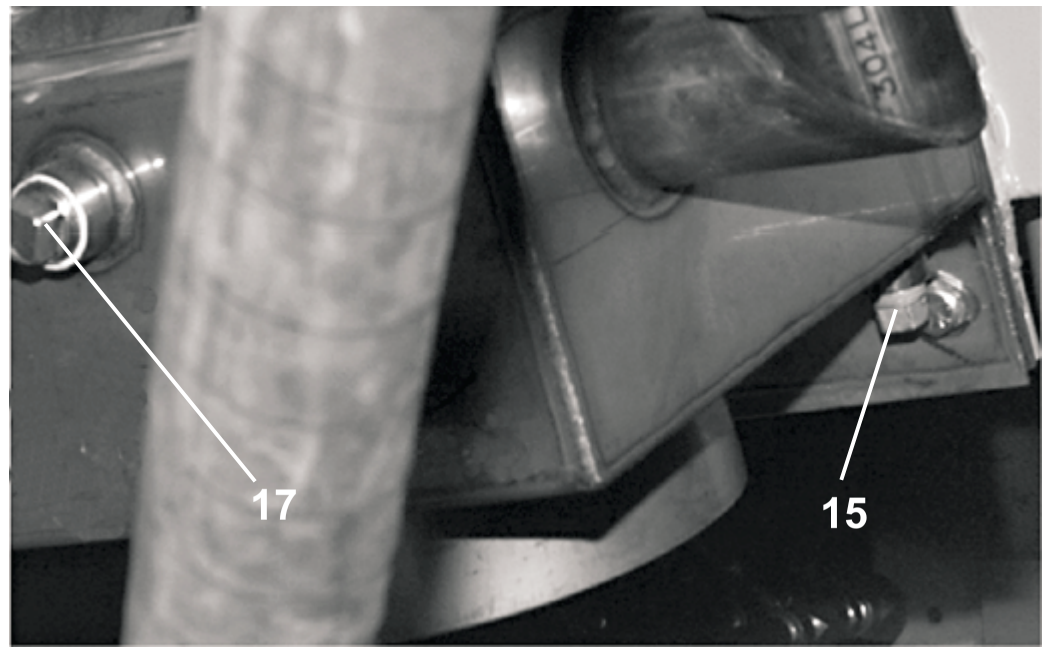
Litho in U.S.A.









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Parts List—8” 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----------	
	A	GVD65001J	INST=8"DUMPVAL DBLACTB 6446J	64046J6N,7258J2N
	B	GVD60001	INSTALL=8”DUMPVAL 6440E6N	64040,64050
	C	GVD65001	INSTALL= 8"DUMPVAL 6446E6N	64046,72046,72058
	D	AVD65001	ASSY= 8" DUMPVAL 6446E6N	64040,64050 64046,72046,72058
	E	AVD65001J	ASSY=8"DUMPVAL DBLACTB 6446J	64046J6N,7258J2N
	F	AD 15 090A	AIRCHAMBER PRESWITCH INSTALL	ALL MODELS
	G	SA 28 124	8”SGL DMPVALVE 4244+52+60	4244,5238,6044
			----------COMPONENTS----------	
A,B,C,G	1	02 18107	GASKET=8"FLANGED DUMP VALVE	
A,B,C	2	15K153	HXPSCR 1/2 WCX1.25S.S.	
A,B,C	3	24G032N	ROLLED WASH.50ID NYLTITE 50W	
A,B,C	4	15U310	LOKWASHER REGULAR 1/2 SS18-8	
A,B,C	5	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
A,B,C	6	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5	
A,B,C	7	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
A,B,C	8	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
D,E,G	9	SA 28 158	* BONNET+AIRCYL=8"SS DUMPVALV	
E	9	SA 28 158J	ASSY=DBL ACT 8"SS BON+AIRCYL	
D,E,G	10	24G030N	ROLLED WASH.379ID NYLTITE 37W	
D,E,G	11	02 18104	GASKET=8"DUMP VALVE BONNET	
D,E,G	12	W2 18931C	*BODY=8" DUMPVALVE 6446E6N	
D,E,G	13	02 18068	9 SEAT-RESILIENT=8"DUMPVALVE	
D,E,G	14	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
D,E,G	15	5SP0KGFSS	NPT PLUG 1/2 SOSOLID GALSTL	
D,E,G	16	15U200	FLATWASHER(USS STD) 5/16"ZNC P	
D,E,G	17	5SP0PBESC	PLUG PIPE SQ 3/4" BRASS CORED	
F	18	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
F	19	53A047H	MALCON 5/16X1/8POLY PH#68P-5-2	
F	20	5SR1A0ENF	NPT RED 1X1/4 GALMAL 150#	
F	21	5N1A07AG42	NPT NIP 1X7 TBE GALSTL SK40	
F	22	5S0KNFA1A	NPT TEE 1/2X1/2X1" GALMAL 150#	
F	23	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
F	24	5SL0PNFC0K	NPT 90D STREET 3/4X1/2 GAL150#	
F	25	96DB0PNA	HOSEBIBB 3/4" MALEINLT CELCON	

Dual Dump Valve Assembly

64040E6N, 64050 E6N

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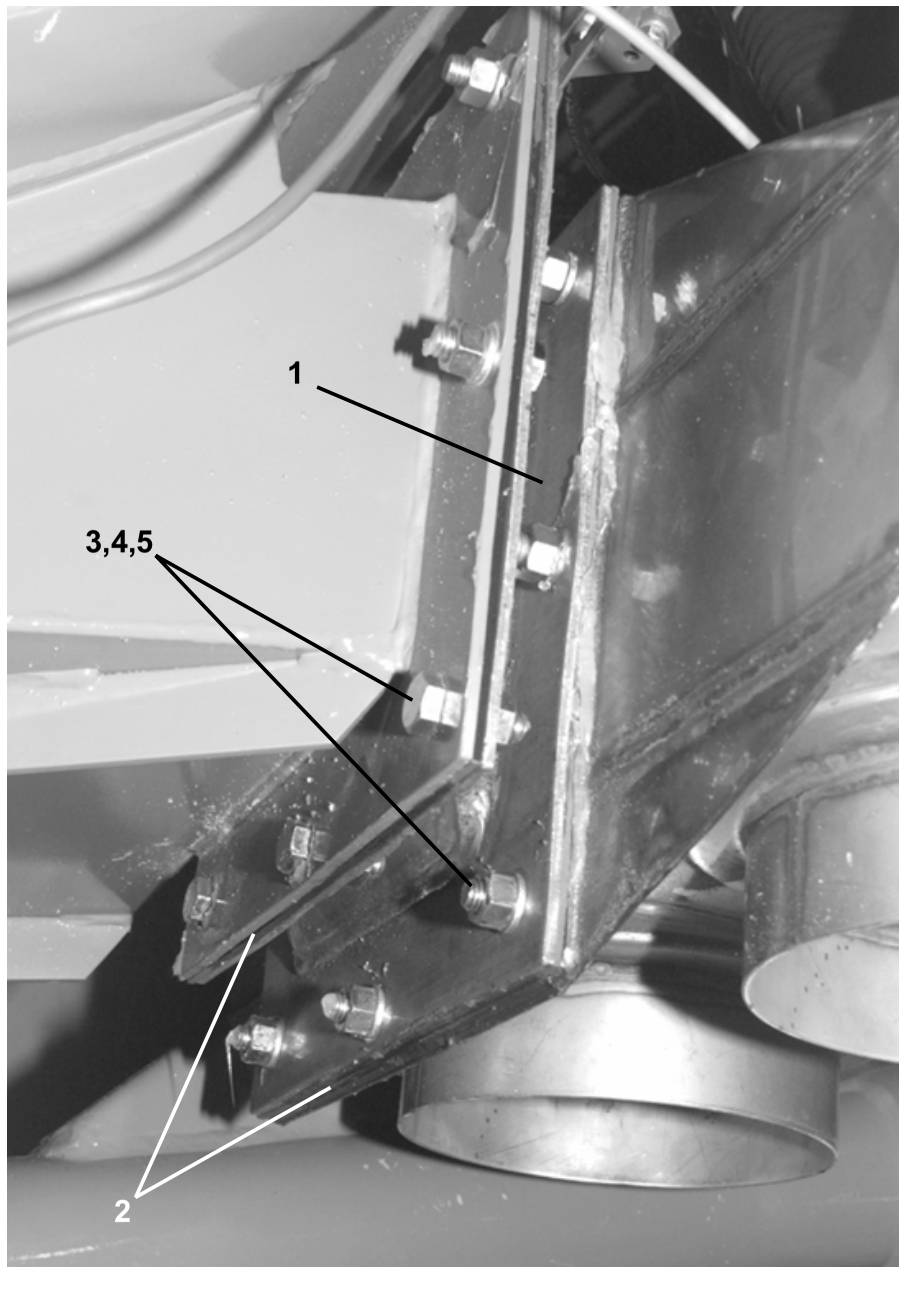

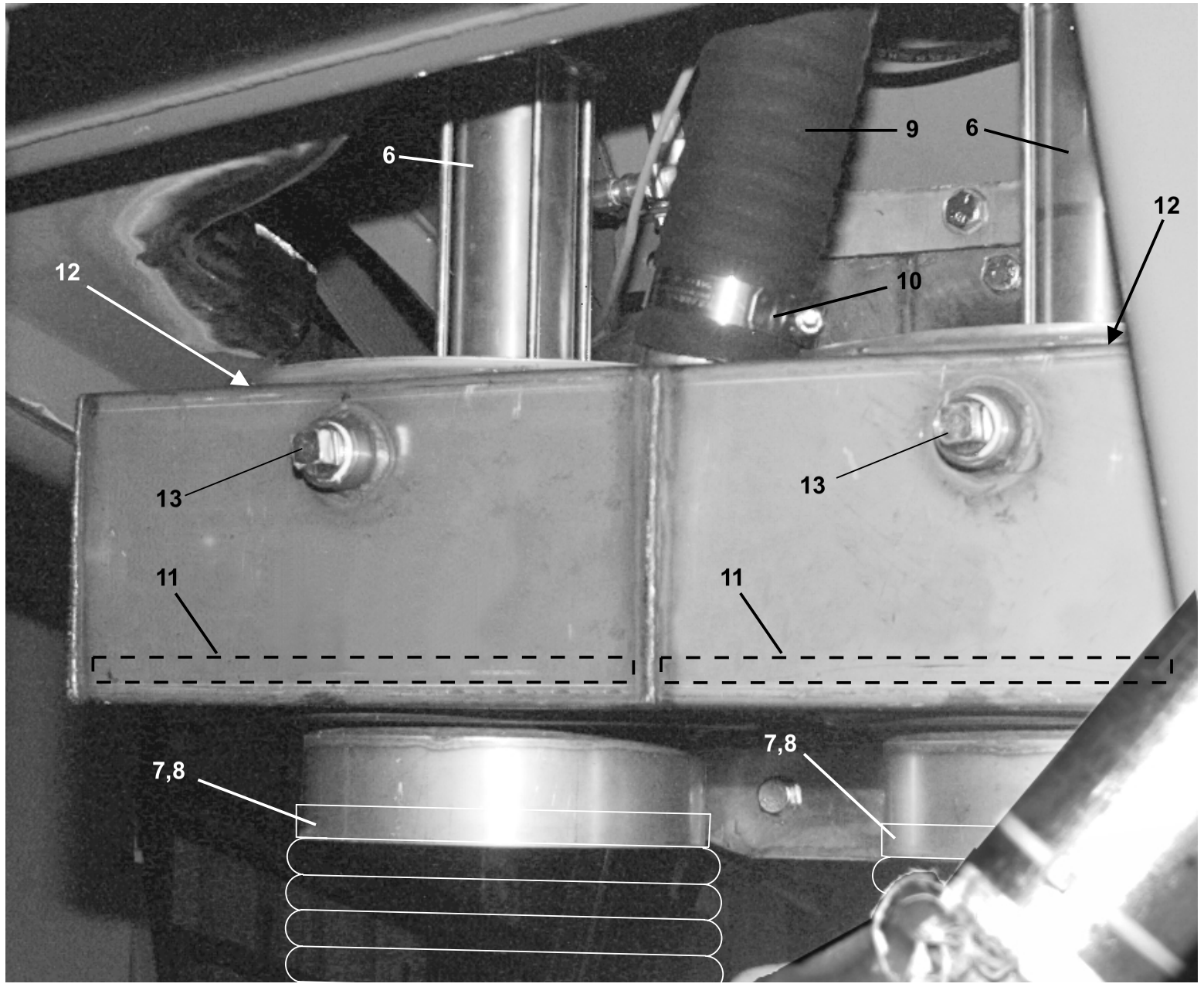

Dual Dump Valve Assembly

64040E6N, 64050 E6N

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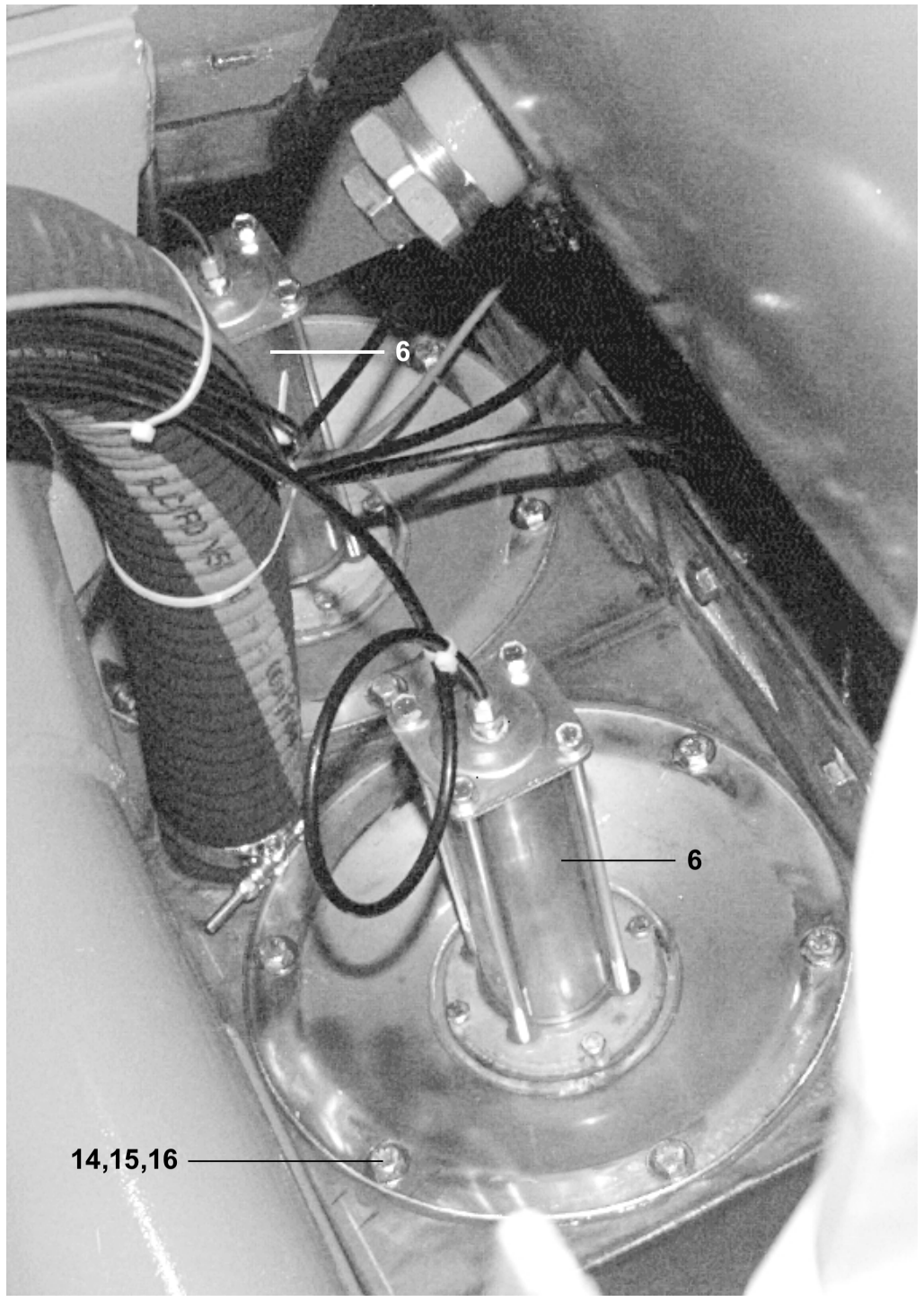

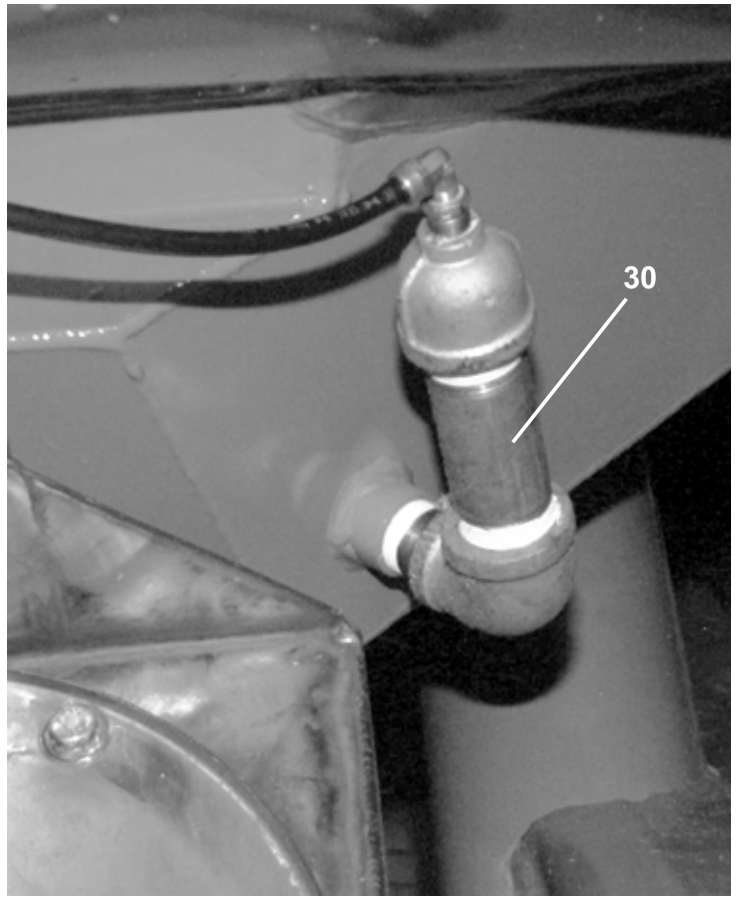

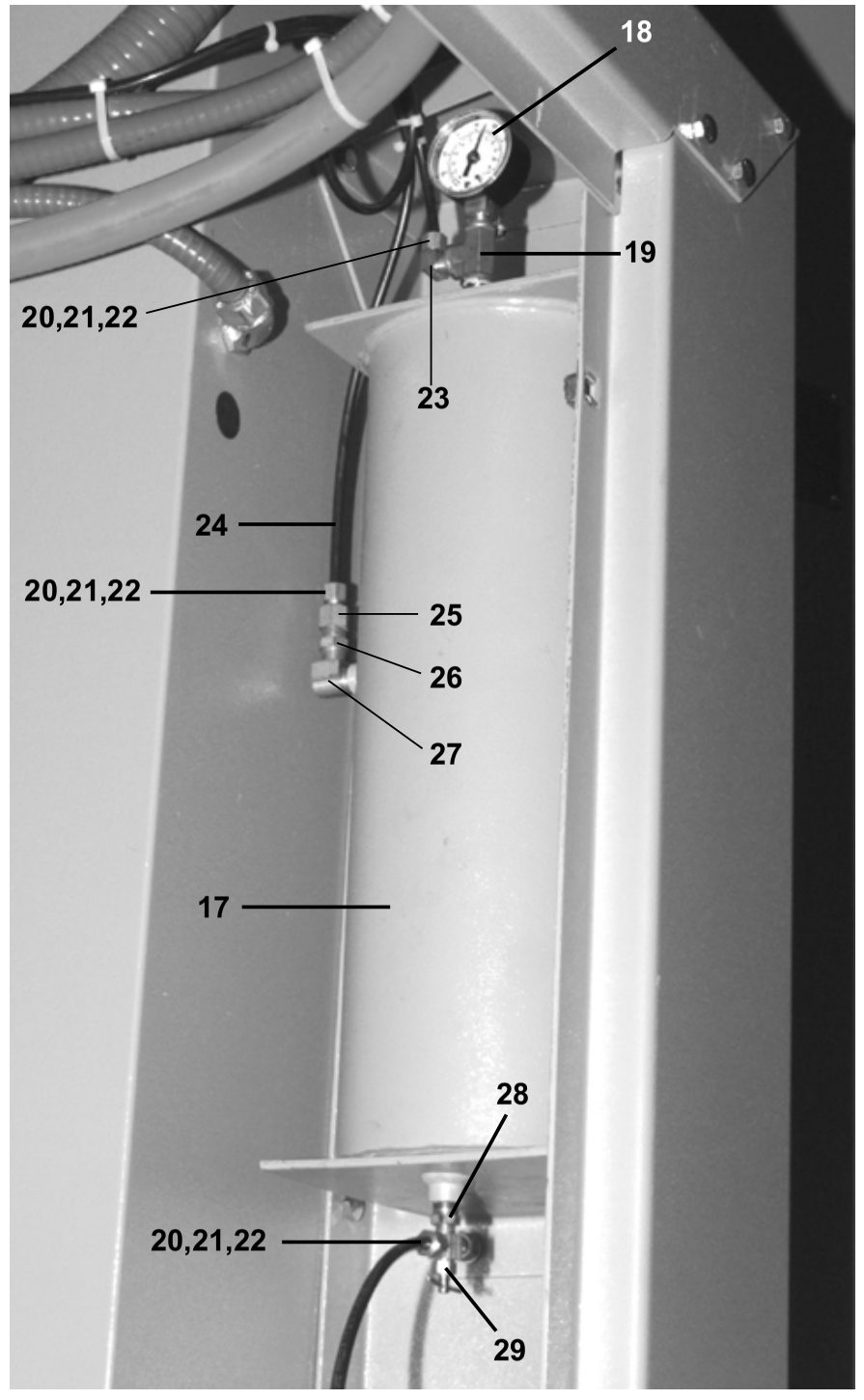

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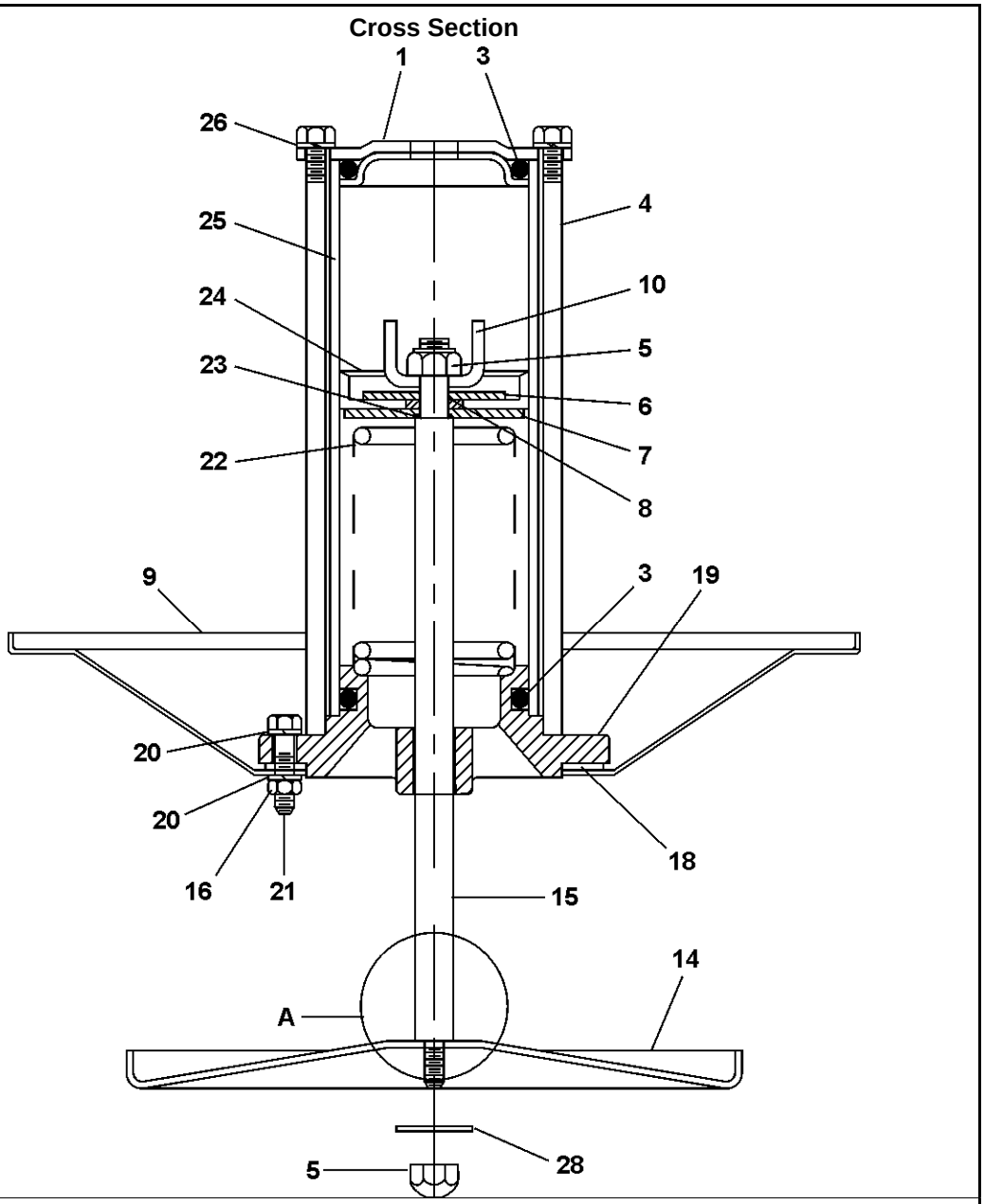
Parts List, cont.—Dual Dump Valve Assembly

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
	A	GVD60002	INST= DUAL-DUMPVAL 6440E6N	
	B	AVD65003	ASSY=DUAL-DUMPVALVE 6440/50	
			----------COMPONENTS----------	
all	1	W2 18932F	6440/50 DUAL DUMP TRANSITION	
all	2	02 18107	GASKET=8"FLANGED DUMP VALVE	
all	3	15K151	HXCAPSCR 1/2-13UNC24X1.25 GR5	
all	4	15U300	LOKWASHER REGULAR 1/2 ZINC PLT	
all	5	15G230	HXNUT 1/2-13UNC2B SAE ZINC GR2	
all	6	SA 28 158	* BONNET+AIRCYL=8"SS DUMPVALV	
all	7	27A092	HOSECLAMP S.S.SCR 7+1/8-10"	
all	8	60E328A18A	HOSE-8"1DX18"LONG GATES 4175EC	
all	9	60E301A48A	HOSE= *2.5"2D PE X48"	
all	10	27A075	T-BOLT HOSECLAMP 2.75"-3.06"	
all	11	02 18068	9 SEAT-RESILIENT=8"DUMPVALVE	
all	12	02 18104	GASKET=8"DUMP VALVE BONNET	
all	13	5SP0PBESC	PLUG PIPE SQ 3/4" BRASS CORED	
all	14	15K086	HXCAPSCR 3/8-16NCX3/4 SS18-8	
all	15	24G030N	ROLLED WASH.379ID NYLTITE 37W	
all	16	15U200	FLATWASHER(USS STD) 5/16"ZNC P	
all	17	W3 25307D	*TANK=AIR PRESSURE RESERVE	
all	18	30N102	PRESSGAUGE 1/4BOTCON.0-150PSI	
all	19	51V015	TEE 1/4 FGDBRASS 101T7-444	
all	20	53A501	TUBE INSERT .163"OD #63PT-4-40	
all	21	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
all	22	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	23	53A007B	BODYFEMCON.25X.25COMP#B66A-4B	
all	24	60E004TE	1/4"OD X.170"ID NYL TUBING	
all	25	53A008B	BODYMALECON.25X.25COMP#B68A-4B	
all	26	96D047AAK	CHECK VALVE 1/4"DELT#CMMQ20B	
all	27	5SL0EBEC	NPTELB 90DEG STRT 1/4 BRASS125	
all	28	5SB0E0CBEO	NPTHEXBUSH 1/4X1/8 BRASS 125#	
all	29	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MP	
all	30	AD 15 090A	AIRCHAMBER PRESWITCH INSTALL 1	

BIIFGM28 (Published) Book specs- Dates: 20100722 / 20100722 / 20100806 Lang: ENG01 Applic: IFG

Bonnet Assembly

Figure 1: Bonnet and air cylinder



Legend

A. Detailed views: Bumper, O-ring, Washer

Figure 2: Detailed views: Bumper, O-ring, Washer

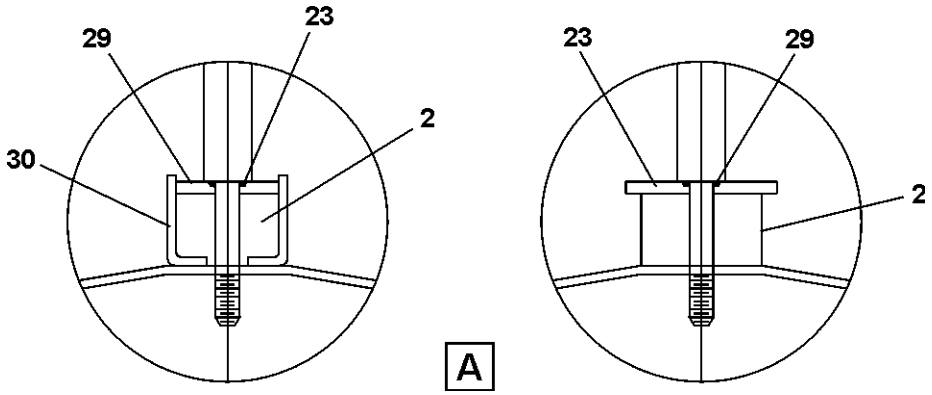


Table 1: Parts List—Bonnet Assembly

Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.				
Used In	**Item**	**Part Number**	**Description/Nomenclature**	**Comments**
Assemblies				
	A	SA 28 158	Assembly, Bonnet and air cylinder	
Components				
all	1	02 02101	Cylinder head	
all	2	02 16021C	Bumper	
all	3	60C132	O-ring, 2X3/16	
all	4	02 10585D	Bolt, 5/16-18X7.875	
all	5	15G220	Nut, 3/8-24	
all	6	02 02085	Washer, Upper, .381X2"	
all	7	02 02105B	Washer, Piston cup, .378X2.38"	
all	8	02 02185	Washer, Compression limit, .39X3/4"	
all	9	02 18931E	Casting, Bonnet	
all	10	03 01313	Stop	
all	14	02 18796	Disk	
all	15	02 16021I	Stem	
all	16	15G168	Nut, 1/4-20	
all	18	02 18931F	Gasket	
all	19	X2 02743	Bonnet	
all	20	24G020N	Washer, Nylon, 1/4	
all	21	15K041S	Bolt, 1/4-20X1	
all	22	03 06429	Spring	
all	23	60C106	O-ring, 5/16X1/16	
all	24	02 02194	Piston cup, 2+3/8"	
all	25	02 02068	Air cylinder	
all	26	15U210	Washer, Lock, 5/16	
all	28	15U245	Washer, Flat, 3/8"	
all	29	02 16021E	Washer, 3/8X1.25	
all	30	02 16021D	Retainer	

— End of BIIFGM28 —

Pneumatics 12

Pneumatic Schematic

64040E6N, 64050E6N

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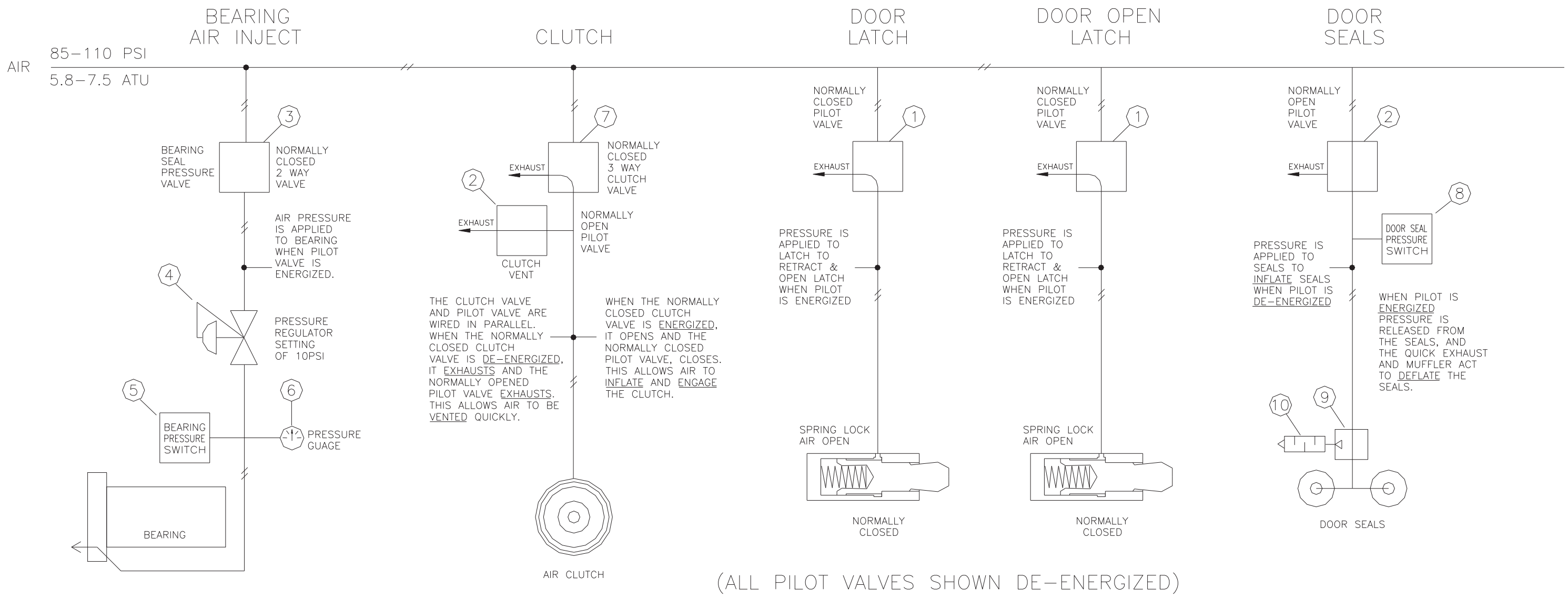

(ALL PILOT VALVES SHOWN DE–ENERGIZED)

Pneumatic Schematic

64040E6N, 64050E6N

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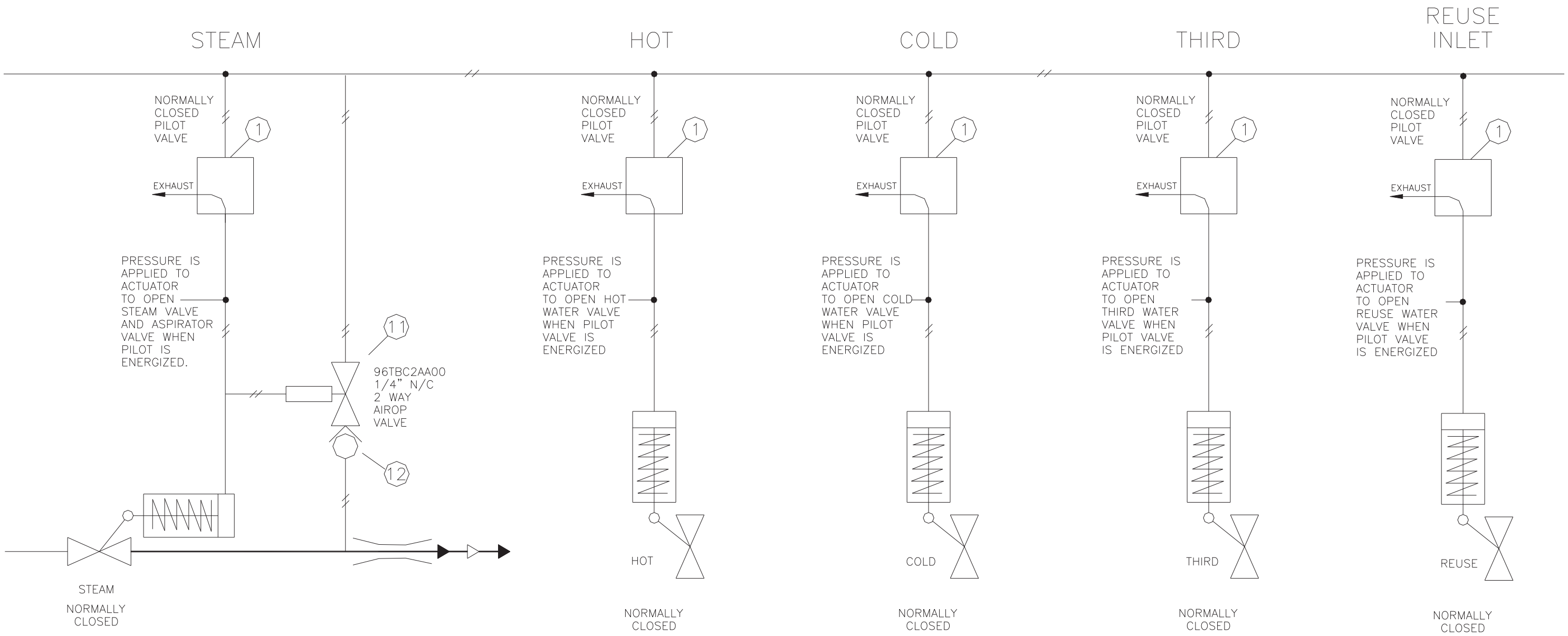

Pneumatic Schematic

64040E6N, 64050E6N

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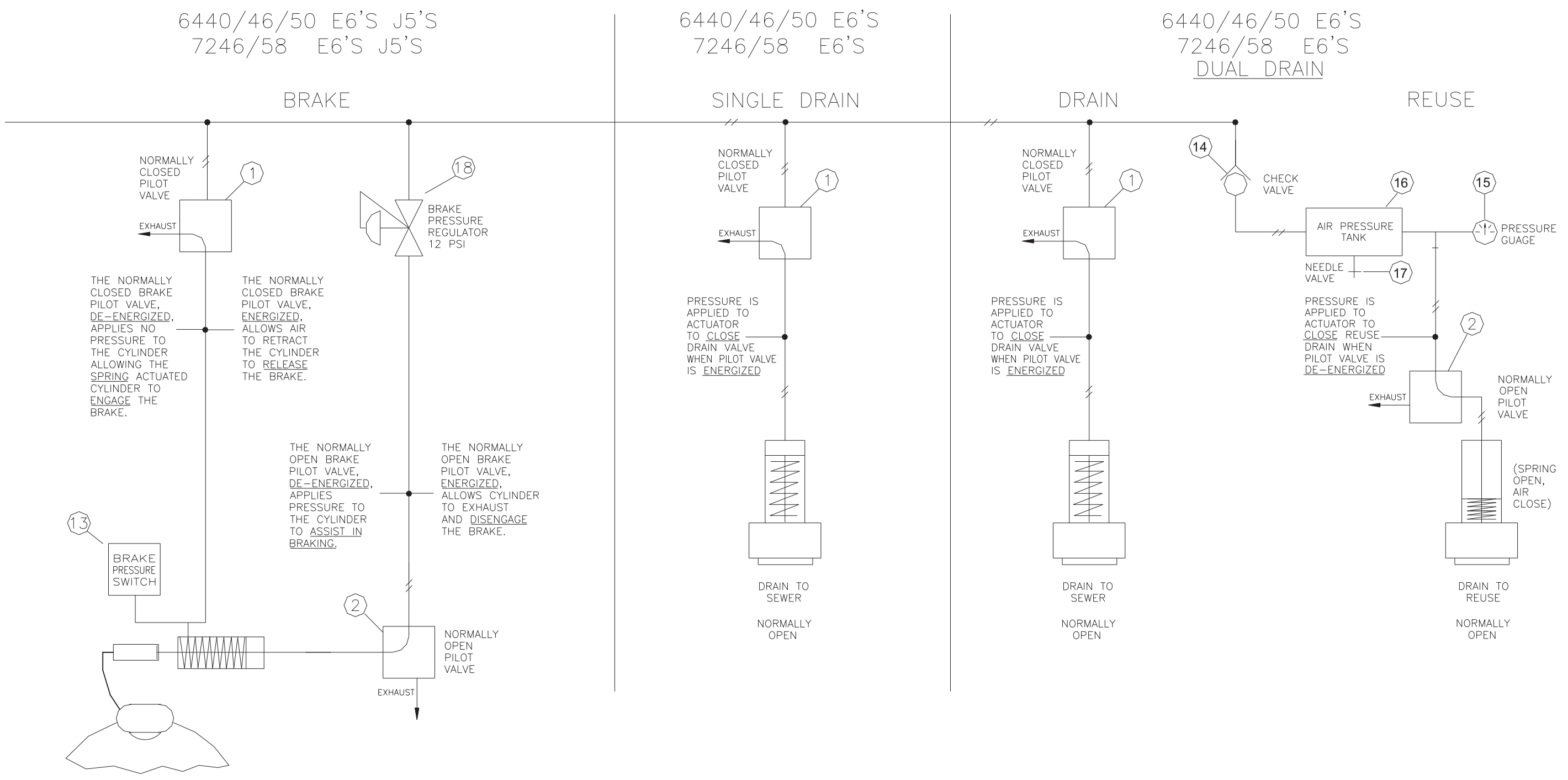

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Parts List, cont.—Pneumatic Schematics

Used In	Item	Part Number	Description	Comments
			----------ASSEMBLIES----------	
			none	
			----------COMPONENTS----------	
all	1	96R301A37	1/8" AIRPILOT 3W NC 120V50/60	
all	2	96R302A37	1/8" AIRPILOT 3W NO 120V50/60	
all	3	96TBC2BA37	1/4" N/C 2WAY 120V50/60C VALVE	
all	4	96J019G	1/4"FILTERREG 0-60PSI	
all	5	09N082B05	PRESSW NASON CLOSE @ 5 LB	
all	6	30N095	PRESSGAUGE 1/8"BACKCN.0-15PSI	
all	7	96TBC3BA37	1/4" N/C 3WAY 120V50/60C VALVE	
all	8	09N082B10	PRESSW NASON CLOSE @ 10 LB	
all	9	96M055	QUICK EXHAUST VALVE 1/4"	
all	10	27A005	MUFFLER 3/8" BANTAM B38	
all	11	96TBC2AA00	1/4" N/C 2WAY AIR-OP VALVE	
all	12	96DG030	CHECKVLV,1/4"WATTS-SERIES 600	
all	13	09N082A	PRESSW NASON CLOSE @ 62 LB.	
all	14	96D047AAK	CHECK VALVE 1/4"DELT#CMMQ20B	
all	15	30N102	PRESSGAUGE 1/4BOTCON.0-150PSI	
all	16	W3 25307D	*TANK=AIR PRESSURE RESERVE	
all	17	96H018	ANGLE NEEDLE VLV 1/4"T X 1/8MP	
all	18	96J019E	1/4"PRESSREG2-50P R07-200-RNEA	

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.

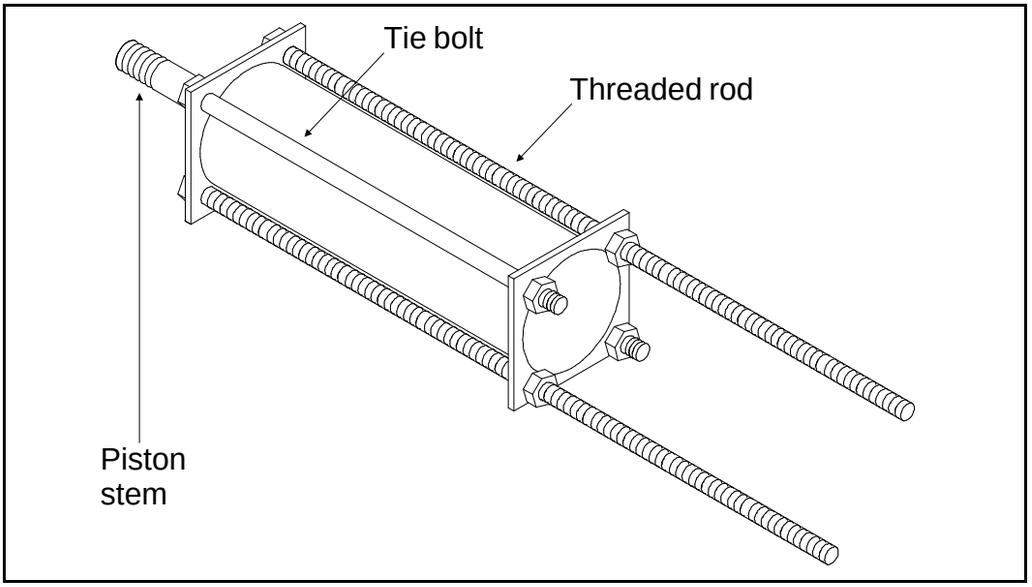

FIGURE 1 (MSSM0130AE)
Using Threaded Rods

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.

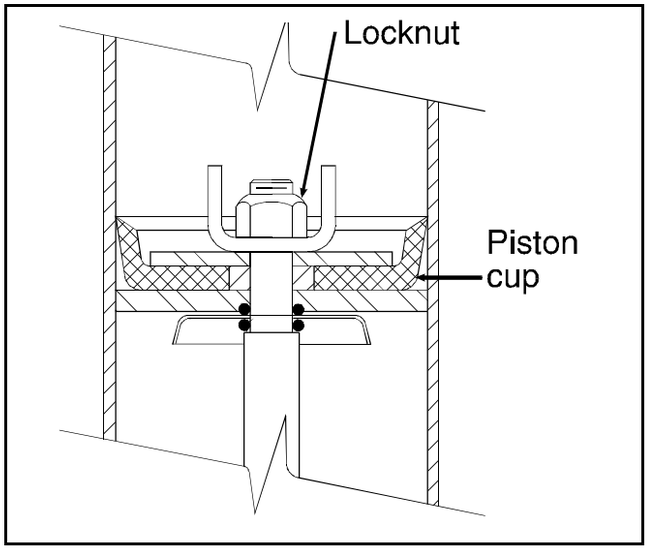

FIGURE 2 (MSSM0130AE)
Correct Piston Cup Shape

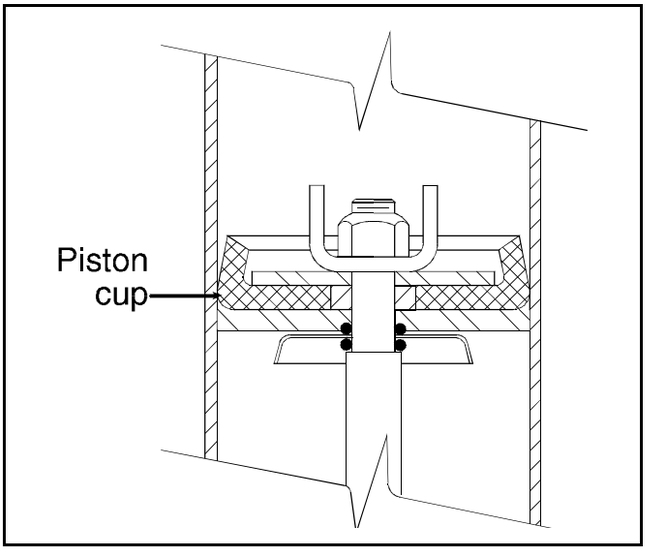

FIGURE 3 (MSSM0130AE)
Distorted Piston Cup Shape

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.

Air Cylinder Assemblies

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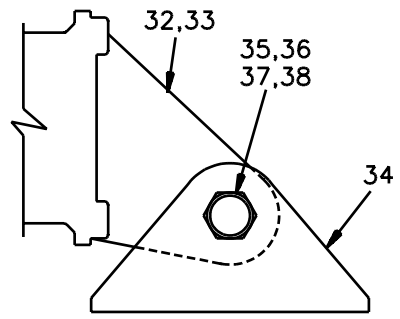
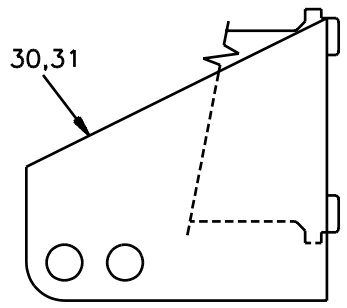
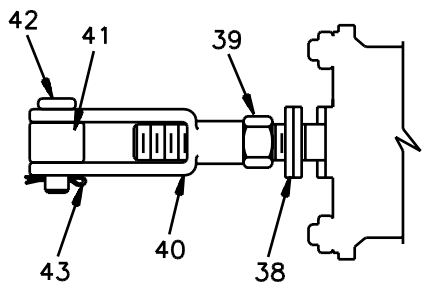
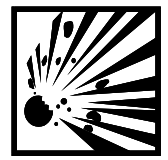




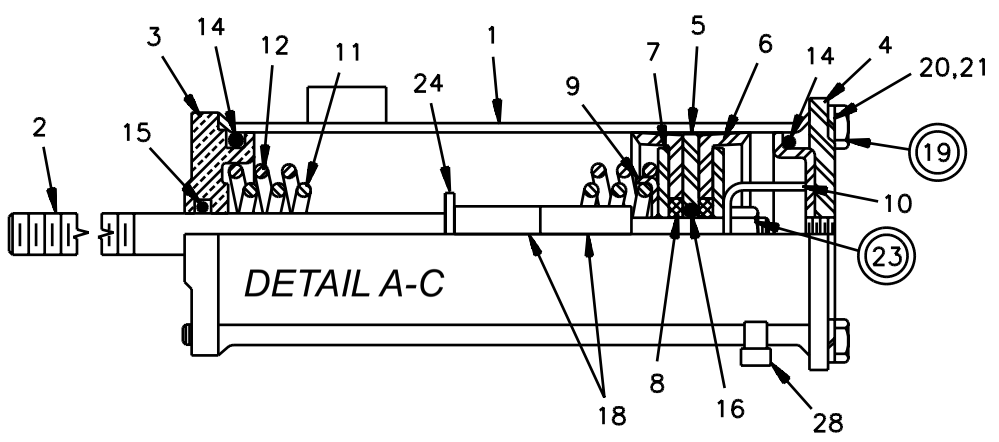


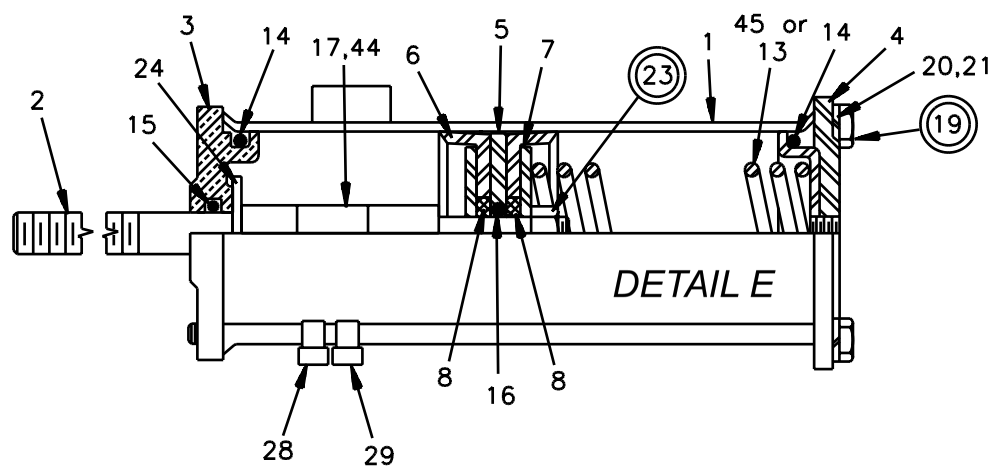
AIR CYLINDER MOUNTING HARDWARE

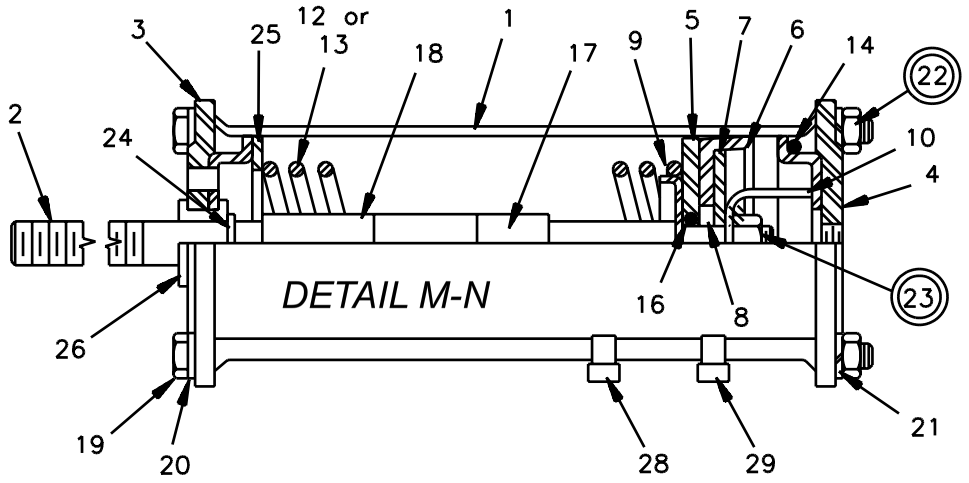
⚠ WARNING ⚠

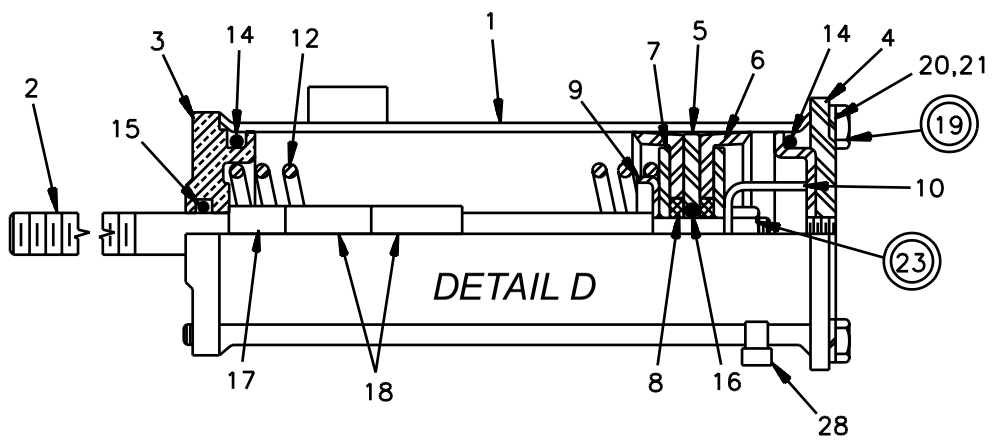


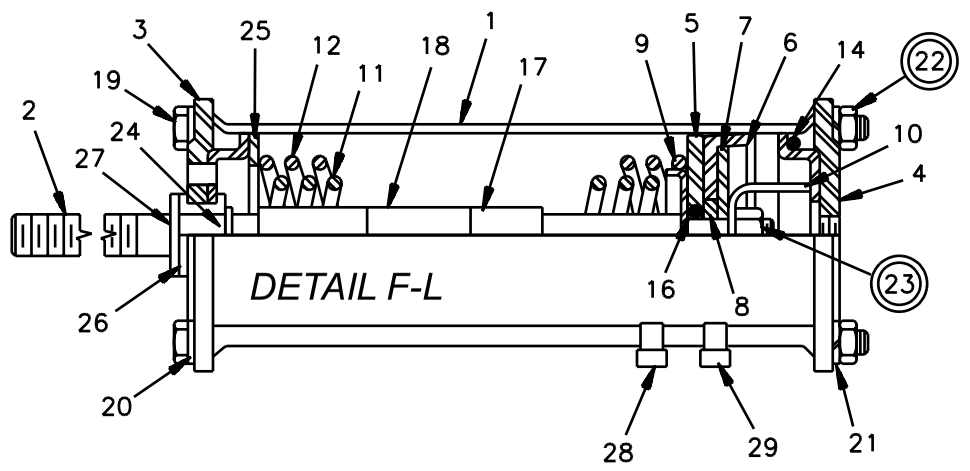
EXPLOSION HAZARD - Air cylinder can burst apart with great force.
Circled items are under high spring tension.
Follow maintenance instructions MSSM0130AE carefully.

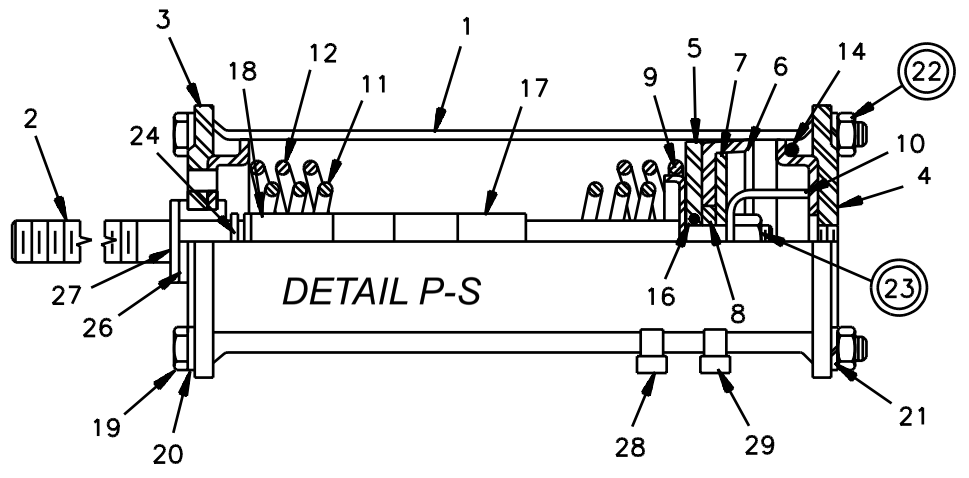












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Parts List—Air Cylinder Assemblies

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

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

Parts List, cont.—Air Cylinder Assemblies

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

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Parts List, cont.—Air Cylinder Assemblies

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

3-Way Pilot Valves

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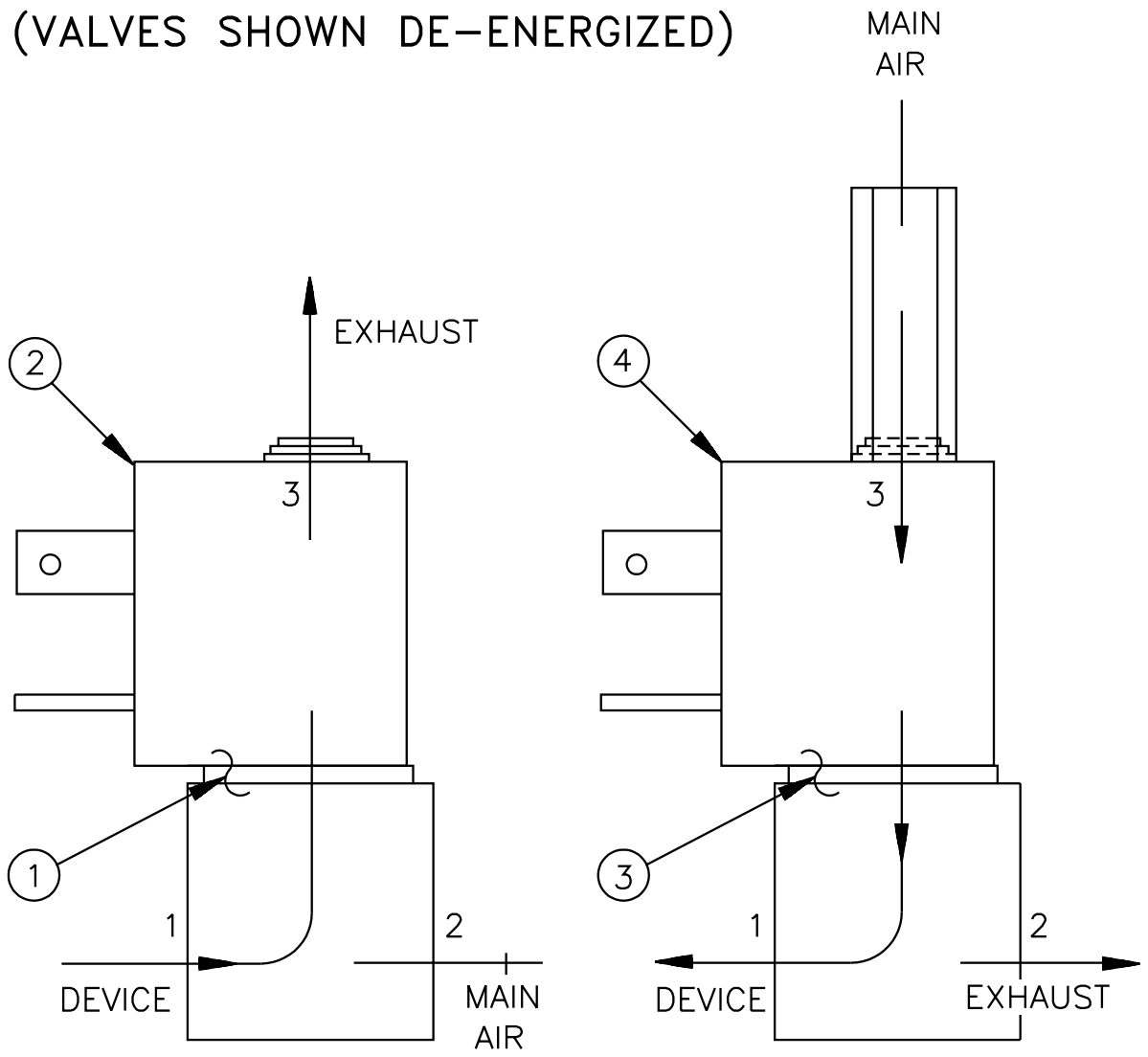

FOR REPAIR OR REPLACEMENT PARTS FOR PILOT VALVES USED ON WASHER EXTRACTORS GENERALLY PRIOR TO JUNE 1, 1985, SEE BMP701359.

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	

Chemical Supply Assemblies

13

5 Compartment Supply
64040E6N, 64050E6N

BMP990060/2000242V
(Sheet 1 of 2)

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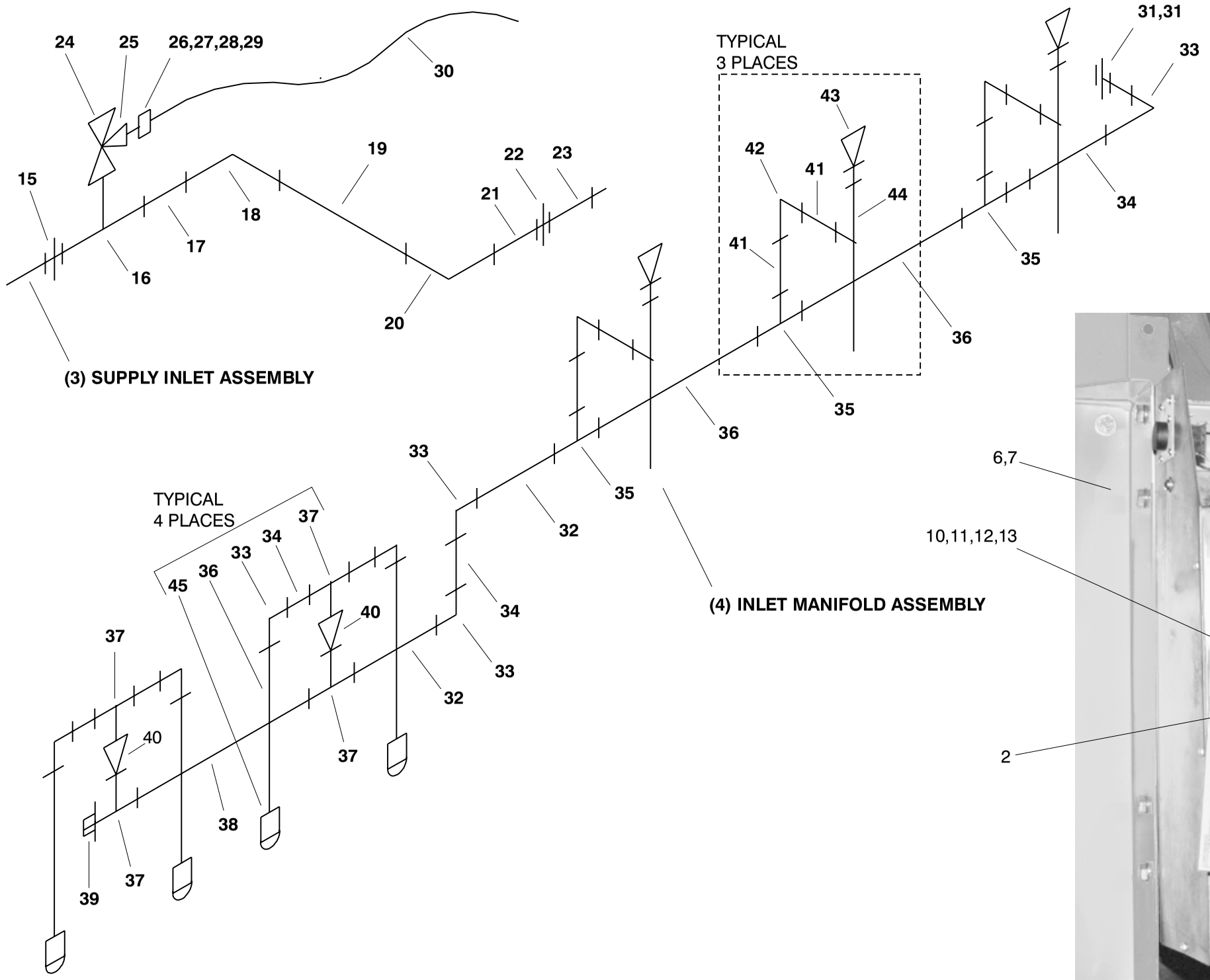

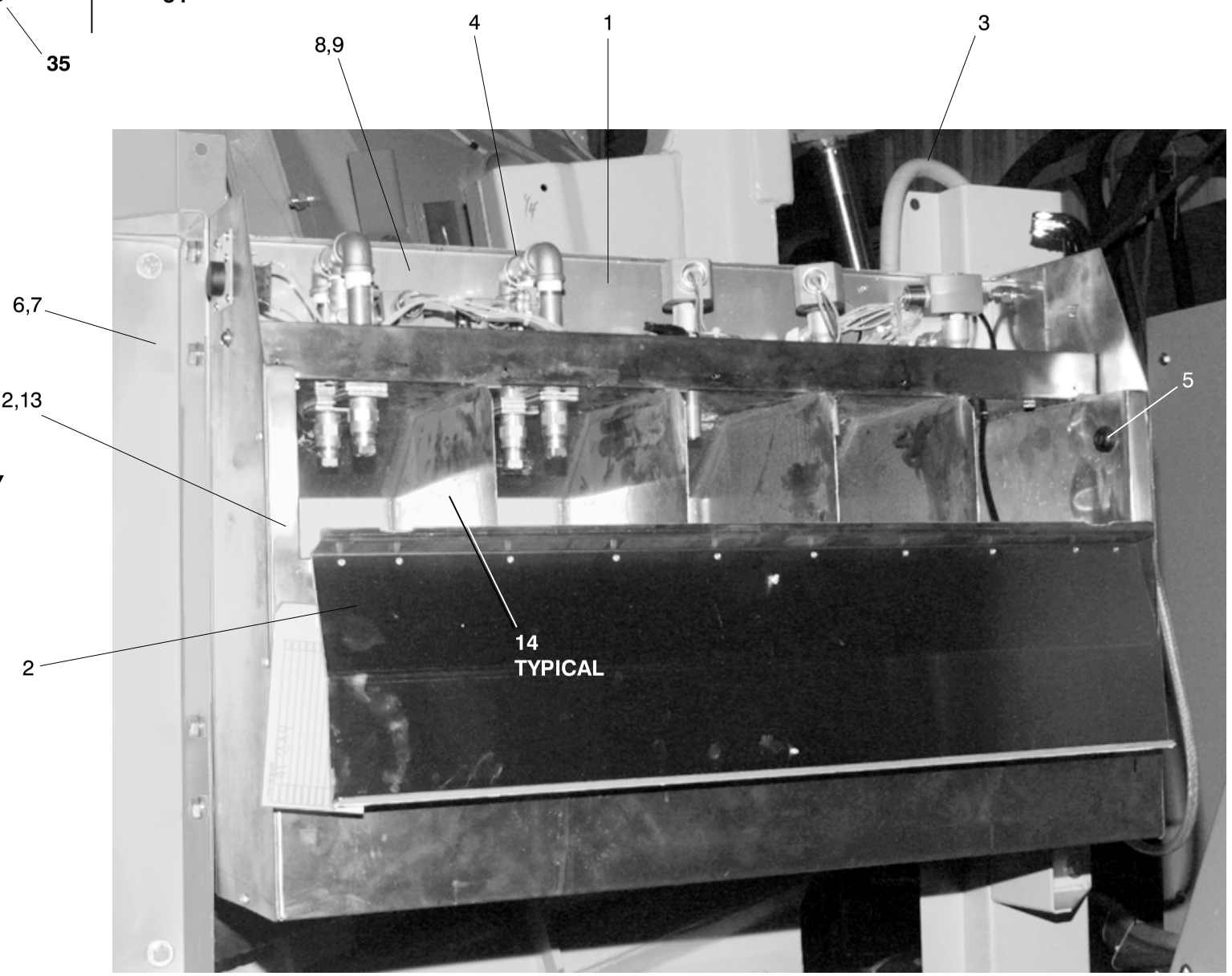

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Parts List—5 Compartment Supply

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	GWS60003	INST=5COMP. CHEM. SUP. 6440	
	B	AWS60001	ASSY=5COMP DRY SUPPLY-6440	
	C	AWS64003	SUPINJ DOOR ASSY 6442	
	D	AWP64001D	*SUPPLY INLT H20 CONN 64DAN	
----------COMPONENTS----------				
all	1	AWS60001	ASSY=5COMP DRY SUPPLY-6440	
all	2	AWS64003	SUPINJ DOOR ASSY 6442	
all	3	AWP64001D	*SUPPLY INLT H20 CONN 64DAN	
all	4	AWP64005	ELEV SUPPLY INLET MANIFOLD	
all	5	60C001	RUBBER BUMPER-BLKW/WASHER #698	
all	6	03 65390	REAR MNT PLATE DRY SUPPLY-RT	
all	7	03 64754A	BRACE=ELEV SUPINJ UPPER	
all	8	03 64751A	COVER=SUPPLY INJECTOR VALVE	
all	9	03 64750C	LOWER 7"ELEVATED SUPPLY COV	
all	10	03 64300B	SPACER=SUPINJ 6442 1/2"VALVE	
all	11	03 64300A	6442 SUPINJ SOAP DIVERTER #1	
all	12	03 64300	DIVIDER = SUPINJ 6442	
all	13	W3 64294	*WLMT = SUP INJ 6442	
all	14	03 01471E	PLATE=ADAPT WE2 MILTROL CABL	
all	15	5SU0KNF	NPT UNION 1/2" GALMAL 150#	
all	16	5S0KBEA	NPT TEE 1/2" BRASS 125#	
all	17	5N0KCLSBE2	NPT NIP 1/2XCLS TBE BRASS STD	
all	18	5SL0KBEA	NPTELB 90DEG 1/2 BRASS 125#	
all	19	5N0K03KB42	NPT NIP 1/2X3.5 TBE BRASS STD	
all	20	5SL0KBEA	NPTELB 90DEG 1/2 BRASS 125#	
all	21	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
all	22	51X017	UNIONSTRADT 1/2"PH#0107-8-8	
all	23	5N0KCLSG42	NPT NIP 1/2XCLS TBE GALSTLSK40	
all	24	96M001	1/2X3/8" RELIEF VALVE SET31#	
all	25	5SB0G0CHEO	NPTHEXBUSH 3/8X1/8 STLZC 150#	

Parts List, cont.—Document Name

Used In	Item	Part Number	Description	Comments
all	26	53A500	SLEEVE DELRIN 1/4"OD#60PT-4	
all	27	53A501	TUBE INSERT .163"OD #63PT-4-40	
all	28	53A059A	NUT 1/4"BR.HOLYOKE AND #61A-4	
all	29	53A005B	BODYMALCON1/4X1/8COMP #B68A-4A	
all	31	5SU0KNF	NPT UNION 1/2" GALMAL 150#	
all	32	5N0K02ABE2	NPT NIP 1/2X2 TBE BRASS STD	
all	33	5SL0KBEA	NPTELB 90DEG 1/2 BRASS 125#	
all	34	5N0KCLSBE2	NPT NIP 1/2XCLS TBE BRASS STD	
all	35	5S0KBEA0G	NPT TEE 1/2X1/2X3/8 BRASS 125#	
all	36	5N0K05ABE2	NPT NIP 1/2X5 TBE BRASS STD	
all	37	51V027	TEE 1/2FX1/2FX1/2M FORG T9-888	
all	38	5N0K06ABE2	NPT NIP 1/2X6 TBE BRASS STD	
all	39	5SP0GBEHK	NPT PLUG 3/8 HXCTRSNKBRASS	
all	40	96TDC2AA37	1/2" N/C 2WAY 120V50/60C VALVE	
all	41	5N0GCLSBE2	NPT NIP 3/8XCLS TBE BRASS STD	
all	42	5SL0GBEA	NPTELB 90DEG 3/8 BRASS 125#	
all	43	96TCC2AA37	3/8" N/C 2WAY 120V50/60C VALVE	
all	44	5N0G03KBE2	NPT NIP 3/8X3.5 TOE BRASS 125#	
all	45	27A001	NOZZLE BRASS 1/2" SPRAYSYSTEMS	

Peristaltic Soap Chute

64040E6N, 64050E6N

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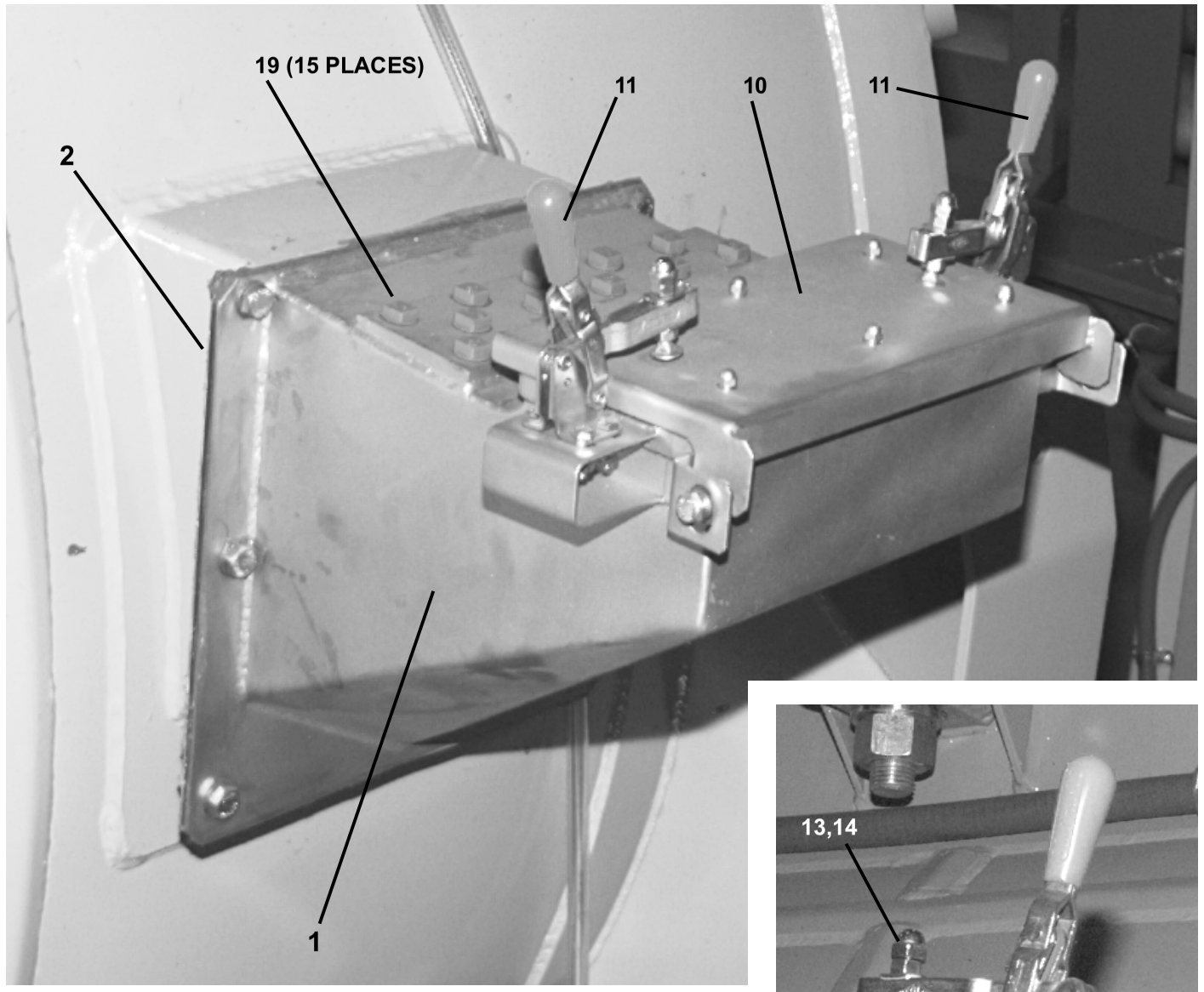

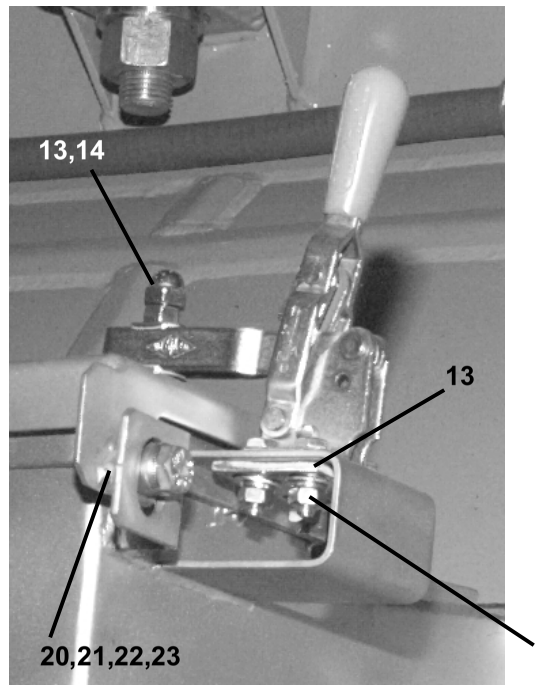

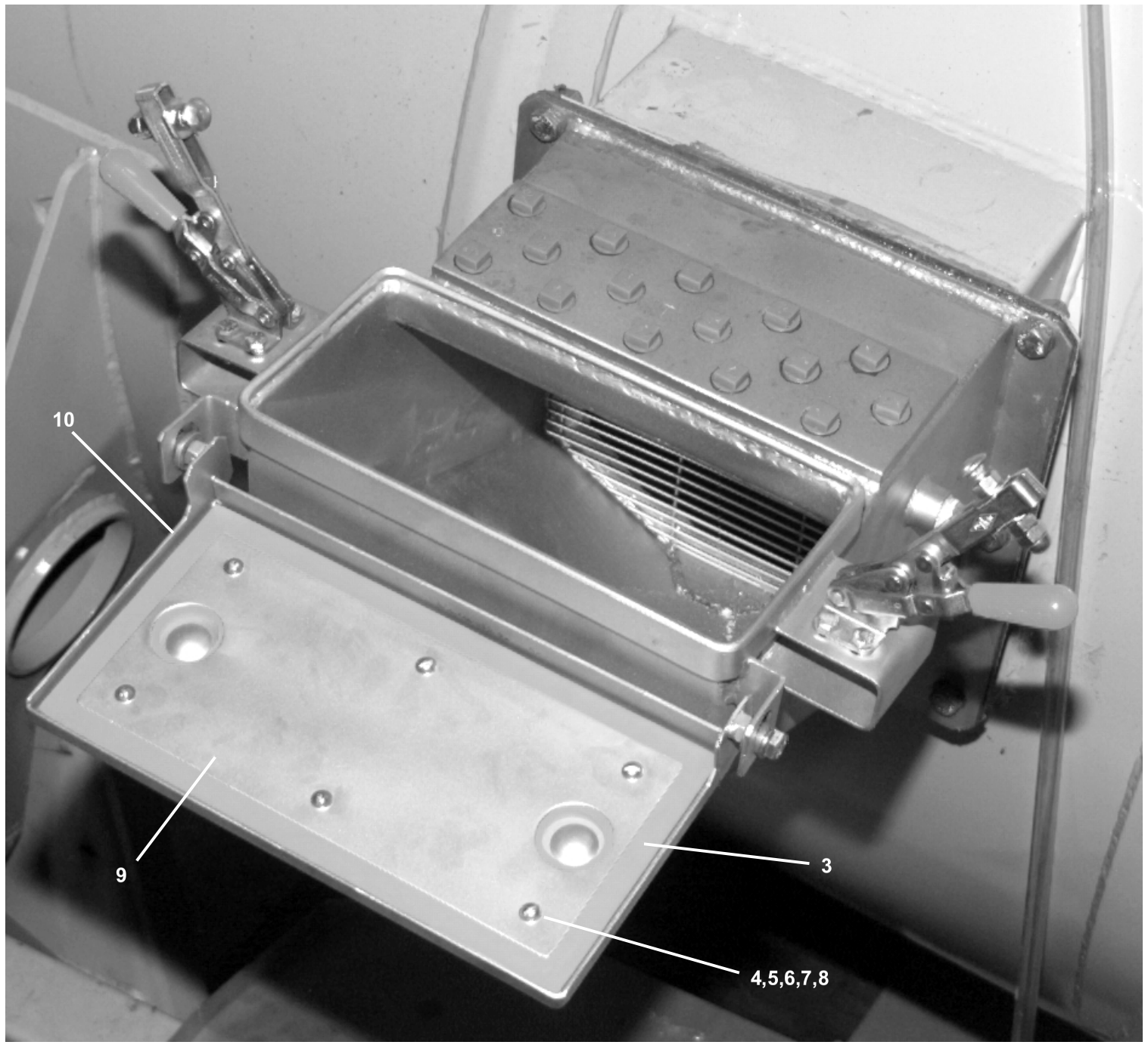

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Parts List—Peristaltic Soap Chute

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	AWS65014	ASSY=LIQ.CHEM.CON.MAN.SHL MNT	
	B	AWS65011	INST=SOAP CHUTE LID 6446	
	C	AWS65012	PRTS=SOAP CHT LID LATCH	
			----------COMPONENTS----------	
all	1	W3 65403C	WLMT=SHL MT SP CHT W/LIQ CN	
all	2	03 65414	72J2SHLMT SCH=SP CH GASKET	
all	3	03 65411	GASKT=SOAP CHUTE LID	
all	4	15G130	HEXMACHSCRNUT 10-24UNC2 SS18-8	
all	5	15N141	RDMACSCR 10-24NCX3/4 SLOTTED S	
all	6	15U135	FLATWASH#10 .4370DX.203IDX.04T	
all	7	15U160	LOCKWASHER MEDIUM #10 SS18-8	
all	8	24G018N	ROLLED WASH.194ID NYLTITE 10W	
all	9	03 65412	PLAT=GASKET COVER SOAP CHUTE	
all	10	W3 65410	*WLMT=LID SOAP CHUTE 64E6N	
all	11	27A700	TOGGLECLAMP GOODHAND E=1	
all	12	03 65413	CLAMP MNT PLATE DESTACO	
all	13	15A005A	CARSCR 5/16-18X3+1/2 FUL THD S	
all	14	15G190	HEXFINJAMNUT 5/16-18NC2 SS18-8	
all	15	15G168	SQNUT 1/4-20UNC2 SS18-8	
all	16	15K041S	HEXCAPSCR 1/4-20UNC2AX1 SS18-8	
all	17	15U181	LOCKWASHER MEDIUM 1/4 SS18-8	
all	18	15U188	FLTWASH 1/4 STD COMM SS18-8	
all	19	51P031	PLUG PIPE SQ 1/2-14 NPT HD PLA	
all	20	54E016M	FLGBRG 3/8X5/8X3/8BRZ#FB610-3	
all	21	15K084S	HXCAPSCR 3/8-16NCX5/8 SS18-8	
all	22	15U245	FLTWASH 3/8 STD COMM 18-8 SS	
all	23	15U260	LOCKWASHER MEDIUM 3/8 SS18-8	

14 Control and Sensing Assemblies

Excursion Switch Installation

64040, 64050, 64046E6N/J6N 72058J2N/D5N

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BMP930033/2000077V (1 of 1)

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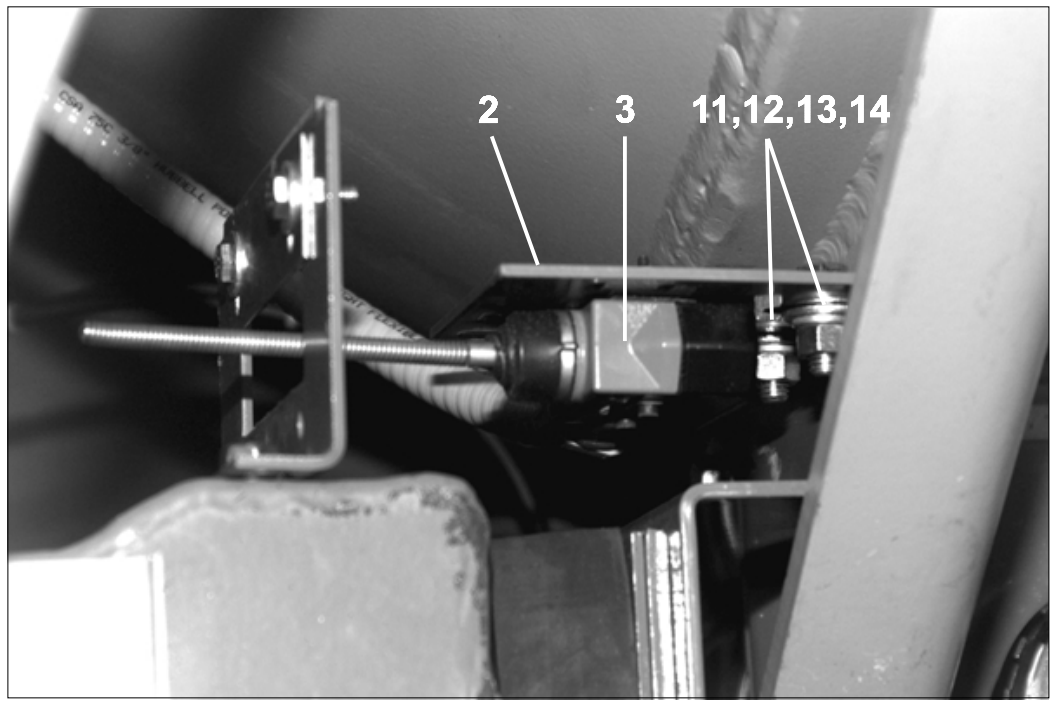
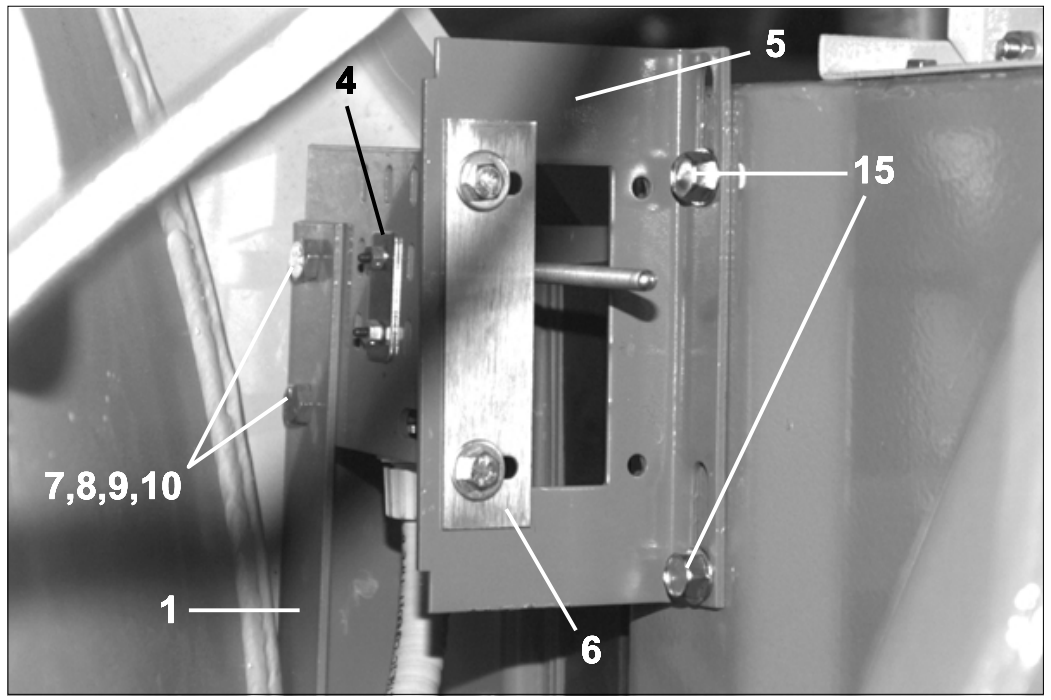


Top View



Rear View

Parts List—Document Name

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	GES65001	93442L INST=EXCURSION SWITCH NP	
			----------COMPONENTS----------	
All	1	03 65233	99197B E-SWITCH MNT ANGL SHELL	
All	2	02 15783A	83173A PLATE=EXCURSION SW MTG	
All	3	09R008ASTD	82026B 09R008A+MOUNTING HDWRE+INST	
All	4	02 10391	63113B COVER STRIP=MICRO SW #6-8	
All	5	03 65234	99466B E-SWITCH WINDOW ANGL T.F.	
All	6	03 65234B	99466B EXCURSION WINDOW PLATES	
All	7	15K039	HXCAPSCR 1/4-20OUNC2AX3/4 Gr5 Z	
All	8	15G165	HXNUT 1/4-2OUNC2BSAE ZC Gr2	
All	9	15U185	FLATWASHER(USS STD) 1/4” ZNC P	
All	10	15U180	LOCKWASHER MEDIUM ¼ ZINCPL	
All	11	15K085	HEXCAPSCR 3/8-16INC2AX3/4 Gr5	
All	12	15G205	HXNUT 3/8-16UNC2B ZINC Gr2	
All	13	15U240	FLATWASHER(USS STD) 3/8” ZNC P	
All	14	15U255	LOCKWASHER MEDIUM 3/8 ZINCPL	
All	15	15P185	TRDCUT-F HXHD 1/4-20UNC2AX3/4	