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Installation and Service

MWF27J8, MWF27Z8

Washer Extractors

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

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

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PELLERIN MILNOR CORPORATION
LIMITED STANDARD WARRANTY

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

Providing we receive written notification of a warranted defect within 30 days of its discovery, we will—at our option—repair or replace the defective part or parts, EX Factory (labor and freight specifically NOT included). We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is tampered with, modified, or abused, used for purposes not intended in the design and construction of the machine, or is repaired or altered in any way without MILNOR's written consent.

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

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

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

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

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

BMP720097/19036

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

How to Get the Necessary Repair Components

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

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

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

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

To write to the Milnor factory:

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

Telephone: 504-467-2787
Fax: 504-469-9777
Email: parts@milnor.com

— End of BIUUUD19 —

Trademarks

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

Table 1. Trademarks

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

End of document: BNUUUU02

Safety—Suspended, Open Pocket, Non-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.

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

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

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

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

4. Safety Alert Messages—Cylinder and Processing Hazards

[Document BIUUUS13]

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

DANGER 4: 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 5: 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 6: 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 7: 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 8: 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 9: 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 10: 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 11: Entangle and Crush Hazards—Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Do not remove guards, covers, or panels.

5.1.2. Hazards Resulting from Damaged Mechanical Devices

WARNING 12: 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 13: 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 14: Explosion Hazards—Clutch and speed switch (multiple motor machines)—A damaged clutch or speed switch can permit the low speed motor to engage during extract. This will over-speed the motor and pulleys and can cause them to rip apart, discharging metal fragments at high speed.

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

5.2. Careless Use Hazards

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

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

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

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

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

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

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

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

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

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

— End of BIUUUS27 —

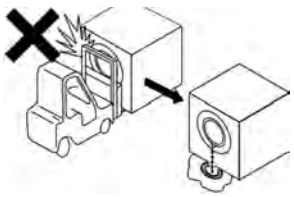
Installation Tag Guidelines

MWF27J8	MWF27Z8	MWF45J8	MWF45Z8
MWF63C7	MWF63J7	MWF63Y7	MWF63Z7
MWF77C7	MWF77J7	MWF77Y7	MWF77Z7
MWF100C7	MWF100J7	MWF100Y7	MWF100Z7

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

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

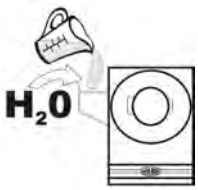
The following entries explain the installation tags. Each entry includes: 1) the tag illustration, 2) the tag part number at the bottom of the tag, and 3) the meaning of the tag.

Display or Action	Explanation
	Read the manuals before proceeding. This symbol appears on most tags. The machine ships with safety, operator, and routine maintenance guides for customer use. Milnor dealer manuals for installing, commissioning, and servicing the machine are also available from the Milnor Parts department.
	B2TAG88005: This carefully built product was tested and inspected to meet Milnor performance and quality standards by (identification mark of tester).
	B2TAG94081: Motor must rotate in this direction. On single motor washer-extractors and centrifugal extractors, the drive motor must turn in this direction during draining and extraction. This tag is usually wrapped around a motor housing. If the motor turns in the opposite direction when the machine is first tested, the electrical hookup is incorrect and must be reversed as explained in the schematic manual.
	B2TAG94097: The cylinder must rotate **counterclockwise** during draining and extraction (spin) when viewed from here (rear of machine). Otherwise, reverse the electric power connections, as explained in the schematic manual.
	B2TAG94099: Do not strike the shell door when fork-lifting. This can cause the door to leak.

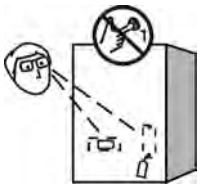
B2T2001013: Hot water connection.

B2T2001014: Cold water connection.

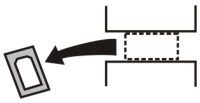
B2T2001015: Reuse (third) water connection. (Optional)



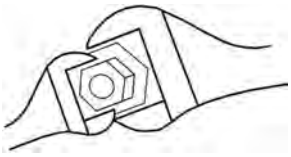
B2T2001016: Flushing water connection. This is the water that goes into the supply compartment or pumped chemical manifold to flush chemicals into the machine.



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



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



B2T2003001: Hold the side of the connection stationary with a wrench as you tighten the connection with another wrench. Otherwise, you may twist components, such as valves, damaging them.

B2T2004027: Steam connection. (Optional)

B2T2008007: Do not exceed 160° Fahrenheit (71° Celsius) water temperature. Excessive temperature can damage the water valves in this machine. Eliminate water hammer on the water lines to this machine. Water hammer can rupture the water inlet valves on this machine. Follow applicable codes when installing water hammer arresters. Maintain incoming water pressure between 10 and 75 psi (between 0.7 and 5.1 bar). Pressures outside this range can damage the water valves in this machine.

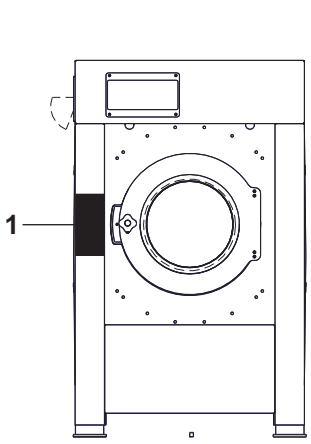
End of document: BNWMAI01

Safety Placards and Locations-

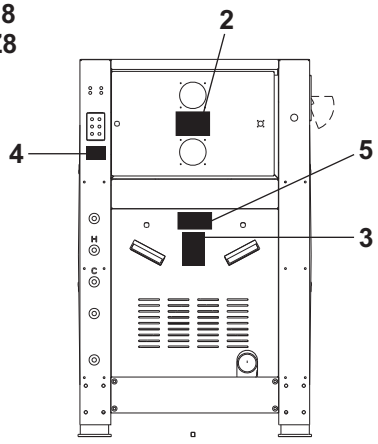
MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

- If the placard is removed or you cannot read it, replace the placard immediately.
- If the placard is aluminum, the mounting holes are on the machine. Use self-tapping screws. If the placard is vinyl, put the placard in the approximate location shown.

MWF27J8
MWF27Z8

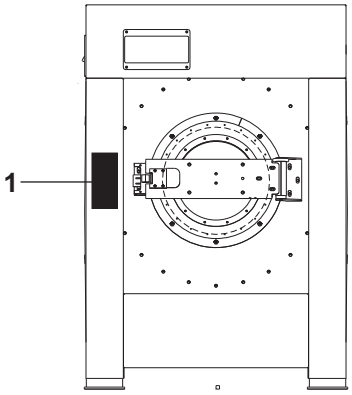


Front View

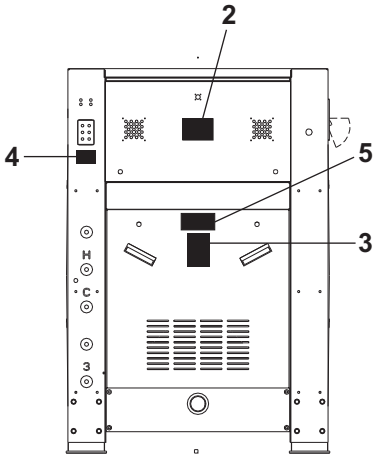


Rear View

MWF45J8
MWF45Z8



Front View

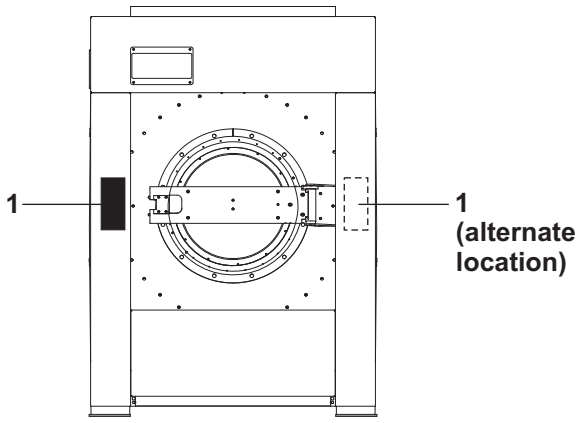


Rear View

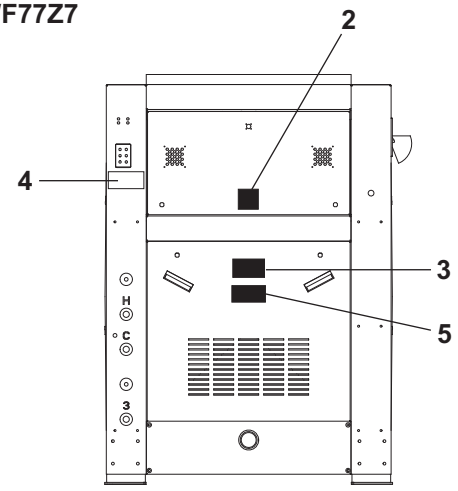
Safety Placards and Locations-

MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

MWF63J7, MWF63Z7
MWF77J7, MWF77Z7



Front View



Rear View

Safety Placards and Locations-

MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

Parts List

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

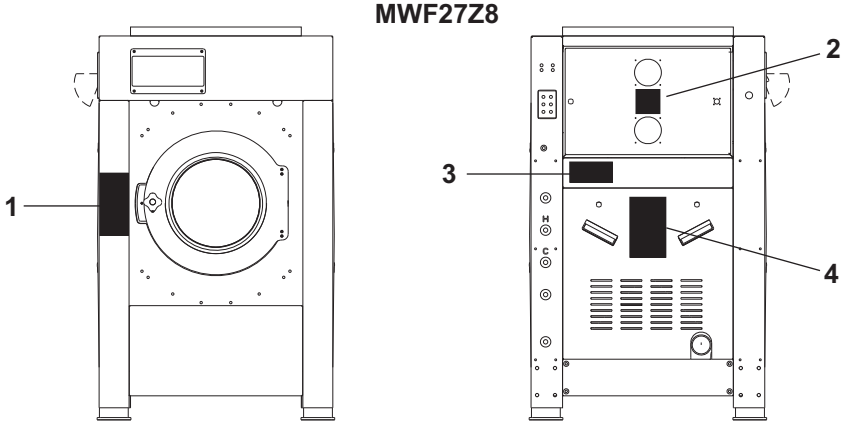
Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	01 10631B	NMPLT:SHELLFNT WARN MWF->TACATA	
all	2	01 10377A	NPLT:ELEC HAZARD LG-TCATA	
all	3	01 10699A	NPLT:SERV HZRD-PLYEST-TCATA	
all	4	01 10710A	NPLT:CAUTION CHEMICAL SYSTEM	
all	5	01 10689A	NPLT:BELT HAZARD SM TCATA	

Safety Placards and Locations- ISO

MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

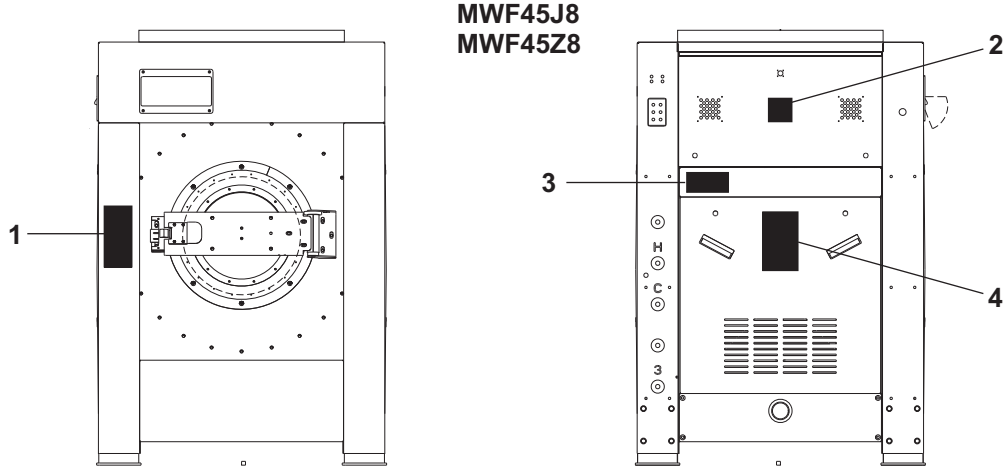
- This document is for placards that agree with: ISO.
- If the placard is removed or you cannot read it, replace the placard immediately.
- If the placard is aluminum, the mounting holes are on the machine. Use #8 self-tapping screws. If the placard is vinyl, put the placard in the approximate location shown.

MWF27J8
MWF27Z8



Front View **Rear View**

MWF45J8
MWF45Z8

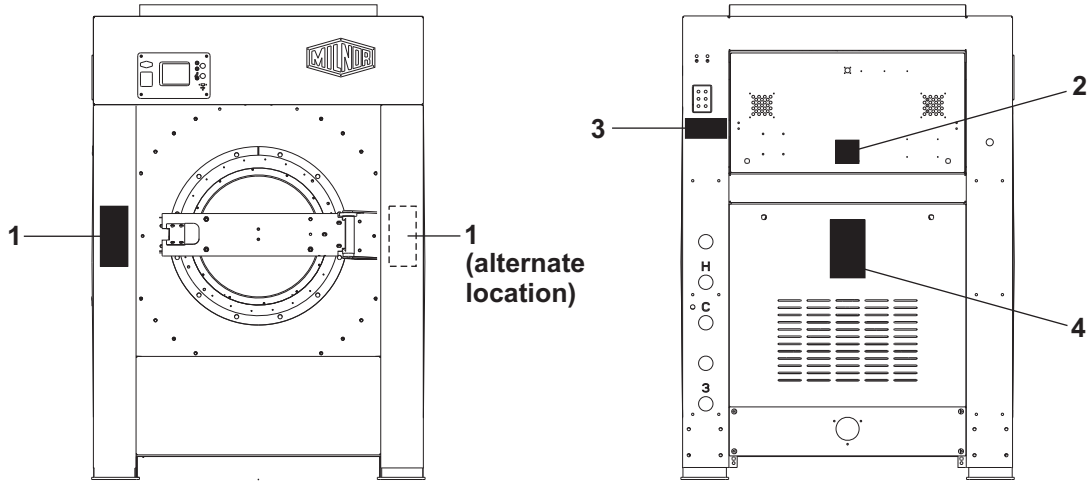


Front View **Rear View**

Safety Placards and Locations- ISO

MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

MWF63J7, MWF63Z7
MWF77J7, MWF77Z7



Front View **Rear View**

Safety Placards and Locations- ISO

MWF27J8, MWF27Z8; MWF45J8, MWF45Z8; MWF63J7, MWF63Z7; MWF77J7, MWF77Z7

Parts List

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

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	10	01 10631Y	NPLT:SHELL FRT WARN NOTILT-ISO	
all	20	01 10377	NPLTE:"WARNING" 4X4	
all	30	01 10710A	NPLT:CAUTION CHEMICAL SYSTEM	
all	40	01 10628X	NPLT:NONTILT W/E WARNING SIDE	

Installation 1

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

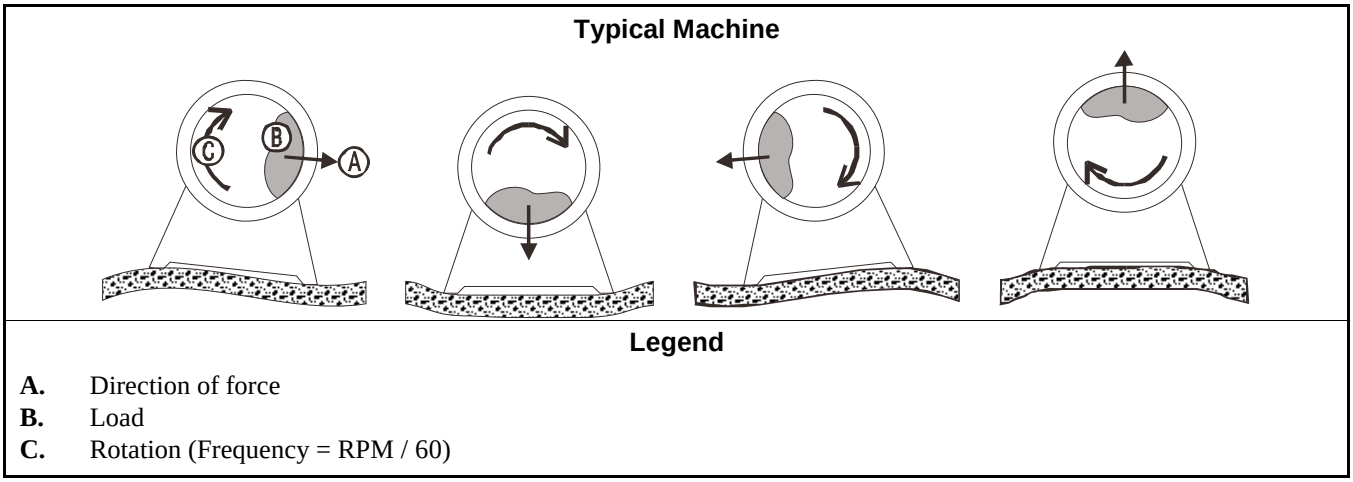


Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available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

Prevent Damage from Chemical Supplies and Chemical Systems

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

Chemical supply companies usually:

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

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

1. How Chemical Supplies Can Cause Damage

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Dangerous Chemical Supplies and Wash Formulas — Some examples that can cause damage are:

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

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

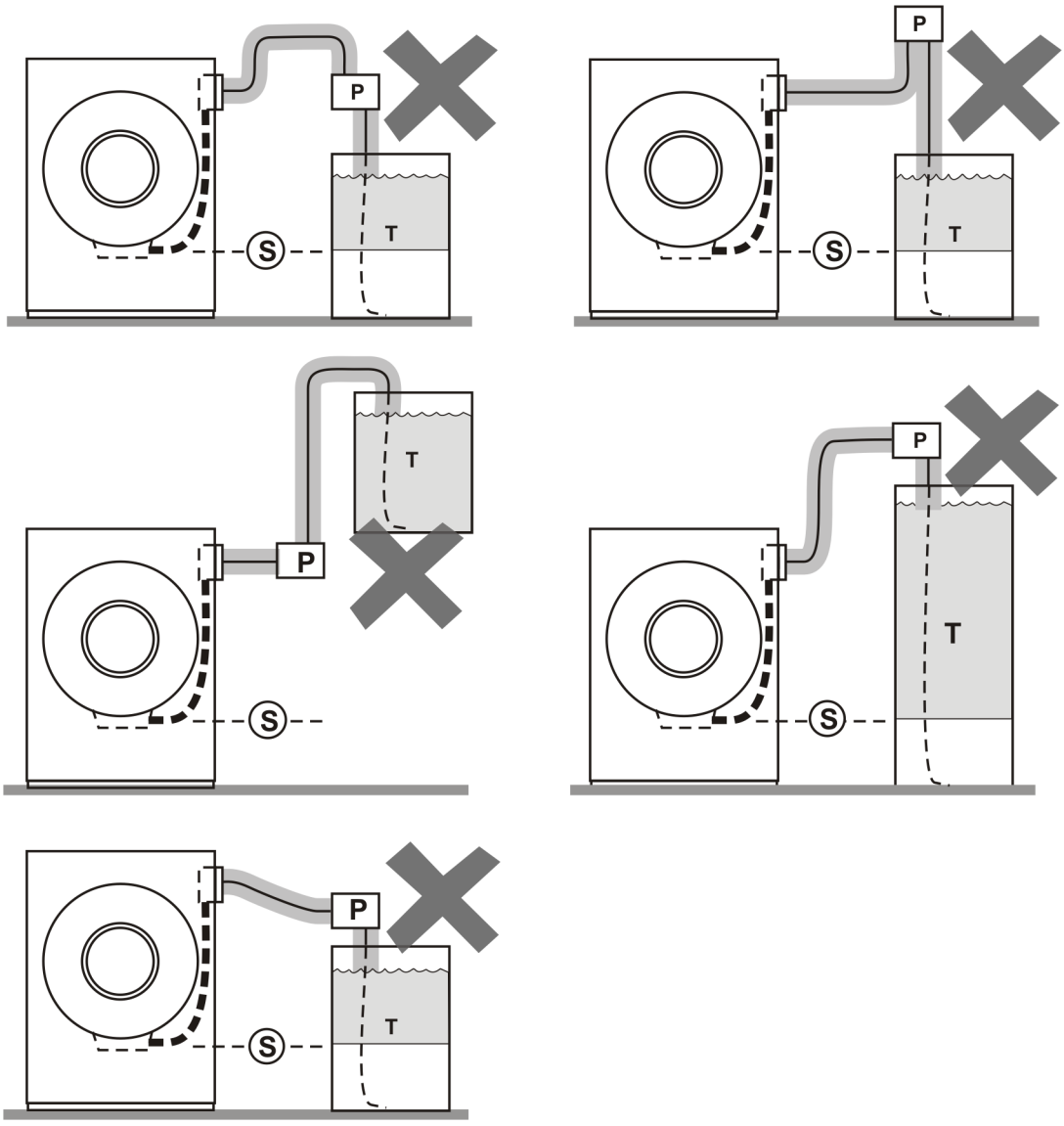
Incorrect Configuration or Connection of Equipment — Many chemical systems:

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

Damage will occur if a chemical supply can go in the machine when the chemical system is off. Some configurations of components can let the chemical supplies go in the machine by a siphon (Figure 1: Incorrect Configurations That Let the Chemical Supply Go In the Machine by a Siphon, page 2). Some can let chemical supplies go in the machine by gravity (Figure 2: Incorrect Configurations That Let the Chemical Supply Go In the Machine by Gravity, page 3).

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

Schematic Views

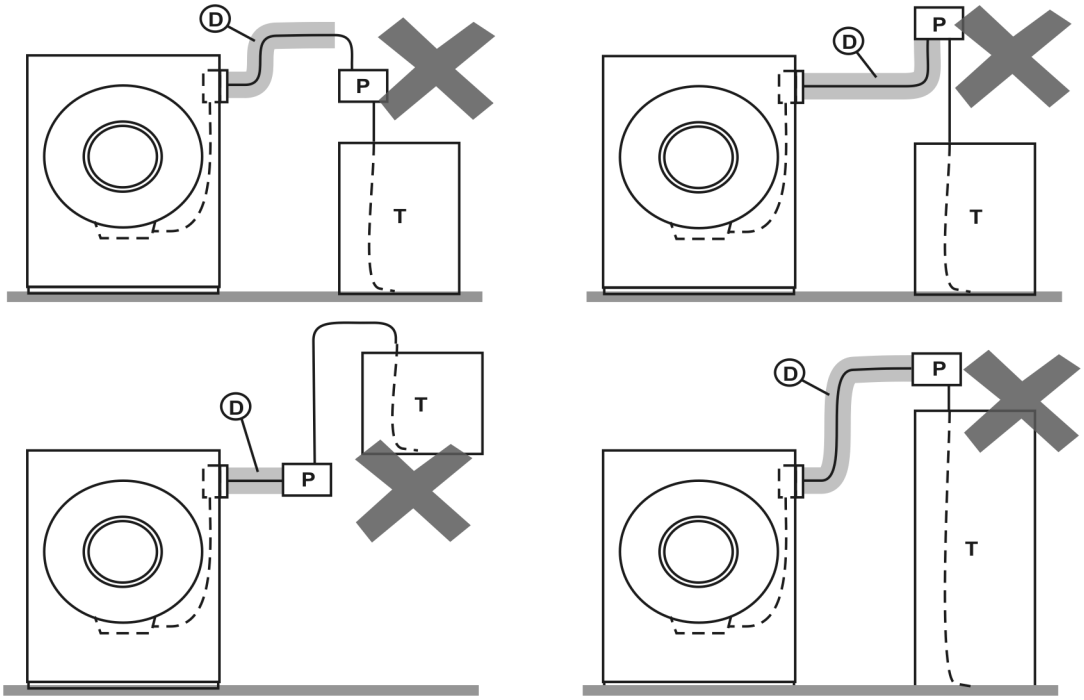


Legend

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

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

Schematic Views



Legend

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

2. Equipment and Procedures That Can Prevent Damage

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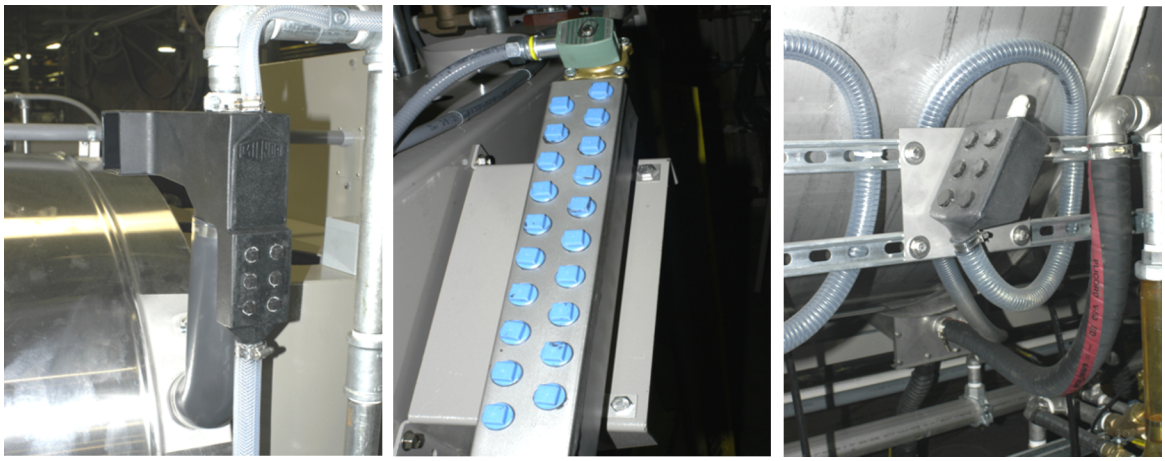
Use the chemical manifold supplied. — There is a manifold on the machine to attach chemical tubes from a chemical pump system. The manifold has a source of water to flush the chemical supplies with water.

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



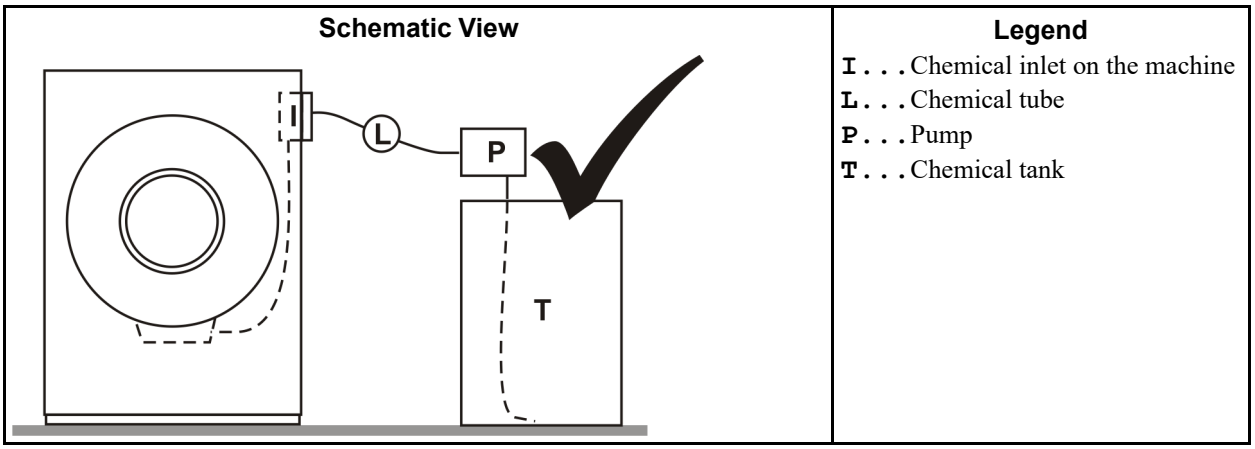
Close the line. — If the pump does not always close the line when it is off, use a shutoff valve to do this.

Do not let a vacuum occur. — Supply a vacuum breaker in the chemical line that is higher than the full level of the tank.

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

Put the chemical tube fully below the inlet. — It is also necessary that there is no pressure in the chemical tube or tank when the system is off.

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



Prevent leaks. — When you do maintenance on the chemical pump system:

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

End of document: BNUUUR02

BIMUUI01 (Published) Book specs- Dates: 20030213 / 20030213 / 20030213 Lang: ENG01 Applic: MUU

Washer-Extractor Installation

1. Handling

Once the machine is given to the carrier for delivery, it is solely the responsibility of the carrier to ensure that no damage occurs during transit. In addition to readily apparent damage, carriers are liable for concealed damage. Do not hesitate to file a claim with the carrier if the machine is damaged in any way during shipment. Milnor will be glad to assist you in filing your claim, but is not responsible for any shipping damage to the machine once it has been delivered to the carrier in good condition.

Remove the protective coverings (leaving the machine on shipping skids) and examine carefully for possible shipping damage. If the machine is damaged, notify the transportation company immediately.

2. Moving the Machine into Place

1. Use skids for fork lifting. If possible, leave the machine on shipping skids until it is near its final position. Once skids are removed, carefully place forks under base. Do not allow the forks to come in contact with valves, piping, motors, etc., located under the machine. Do not push or hit the shell front when uncrating or installing the machine as it may cause the door to leak.
2. Never push, pull, lift, jack, or exert pressure on any components that protrude from the machine frame (shell front, door, electric boxes, controls, guards, conduits, conveyors, piping, valves, drains, vents, tilt frames, etc.).
3. Do not pull on door conduit to help move the machine as the door switch may require readjustment.

3. Site Requirements

3.1. Space Requirement

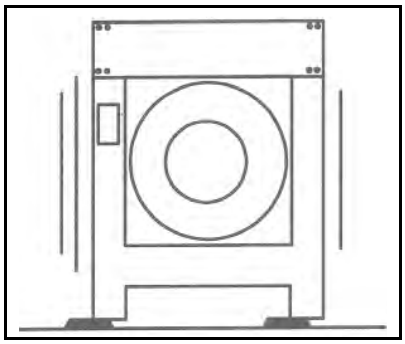
1. All openings and corridors through which equipment must pass during installation must be large enough to accommodate the width and the height of the machine as shown on the dimensional drawings. It is occasionally possible to reduce the overall dimensions by removing piping or other special modifications. Consult Milnor for additional information.
2. Sufficient clearance must be provided for normal operation and maintenance procedures.

3.2. Operational Requirements

1. Allow sufficient ventilation for the heat and vapors of normal operation to dissipate.
2. Provide easy access to controls. Operators must be able to view all status lights and reach all controls associated with the machine (e.g., electrical power connections, water and steam shutoffs, etc.)

3.3. Foundation Requirement—The floor and/or all other support components must have sufficient strength and rigidity with due consideration for the natural or resonant frequency thereof to withstand the fully loaded weight of the machine, including the wet goods and any repeated sinusoidal (rotating) forces generated during its operation. Determining the suitability of floors, foundations, and other supporting structures normally requires analysis by a qualified structural engineer.

Figure 1: Vibration warning



CAUTION 1: Machine Damage Hazards—Improperly installed suspension type machines can "walk" out of position during extract, endangering personnel and damaging equipment.

- Roughen floor. Install anchor bolts and grout under all base pads to prevent "teeter-totter" and sideways movement.
- Remove shipping restraints after machine is in place. Failure to remove all restraints (usually painted red) will cause malfunctions and damage. Restraints may be located behind access covers. These include, but are not limited to:
- Cylinder hold-down bolts, brackets, straps and/or blocking. Replace all fasteners which are part of the machine structure.
- Vibration safety switch restraint

4. Setting Procedures

To protect against lateral creeping of the machine during operation (due to vibration), roughen the area of the floor where the grout will be applied. Anchor bolts are required.

1. With the machine near the final location, unbolt the shipping skids. Observing all precautions, lift the machine off its skids and lower the machine onto blocking. Shim the blocking until the machine is level and approximately l" (25) clearance exists under each base pad. Install anchor bolts as shown on the dimensional drawing, but do not tighten bolts until grout is completely dry.
2. Apply grout between the existing foundation floor and the base pads, observing the following considerations:
   - Use only industrial strength non-shrinking grout. Pack or trowel by hand.
   - If the grout after mixing is too thin (causing it to flow from under the base pads) install temporary cardboard framing around pads to retain the grout until it cures.

CAUTION 2: Vibration and Malfunction Hazard—Voids under the base pads can magnify vibration and cause unsatisfactory operation.

- Grout must displace total clearance between base pads and existing foundation floor.
- Voids must not exist.

3. Tighten anchor bolts evenly using only one-quarter turn on each bolt before moving to the next one. While tightening, frequently skip from front to back and right to left to insure uniform tension. After tightening all bolts, check each bolt at least twice during the first week of operation.

5. Before Running Machine

CAUTION 3: Machine Damage Hazards—Machine can be damaged if shipping restraints are improperly utilized. These include various bolts, brackets, weldments and safety stands (painted red), and the vibration safety switch (tie wrapped).

- DO NOT remove shipping restraints until installation is complete
- DO remove all shipping restraints before operating machine.

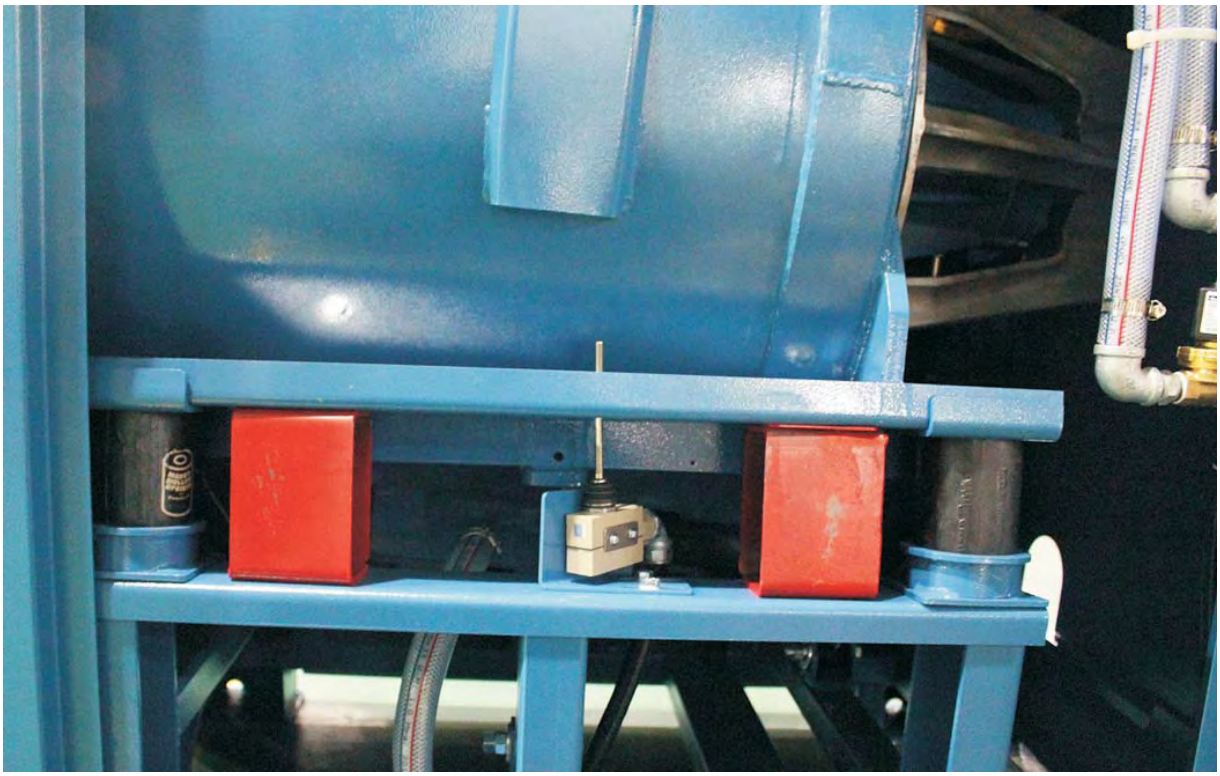
Prior to operation,

- Remove the red locking bolts from the front and back of the shell.
- Remove the red shipping bracket stands.
- Remove the tie wrap that secures the vibration safety switch.
- Check the perforated cylinder for smoothness before placing machine in service. Milnor cannot accept cylinder finish damage claims after machine is in service.

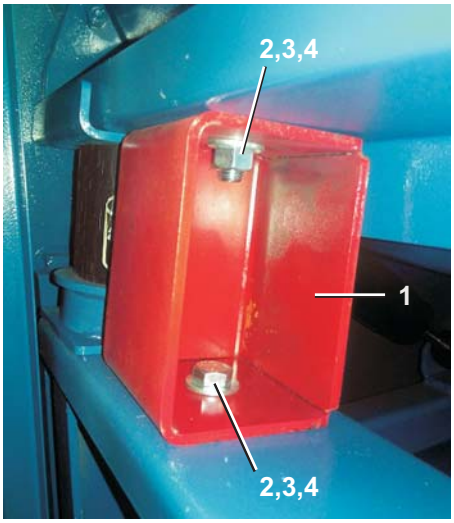
— End of BIMUUI01 —

Shipping Brackets

MWF27J8, MWF27Z8



Before operating, remove the shipping brackets (painted red). The shipping brackets may be retained in the event the machine must be moved. See BIMUUI01.



(Typical 4 Places)

Shipping Brackets

MWF27J8, MWF27Z8

Parts List—Shipping Brackets

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

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	98MW02936W	SHIPPING BRACKET MWF27	
all	2	98CX770147	HEXCAPSCRM12X30, ZINC8.8	
all	3	98CX773113	HEXNUTM12, ZINC	
all	4	98CX773513	FLATWASHER, D12 ZINC	

Covers

MWF27J8, MWF27Z8

Covers

MWF27J8, MWF27Z8

Covers

MWF27J8, MWF27Z8

Parts List—Covers

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

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	98MW02915	COVER, SIDE MWF27	
all	2	98MW02933	COVER, TOP MWF27	
all	3	98MW02916	COVER, REAR MWF27	
all	4	98CX902470	KEY LOCK	

Service and Maintenence 2

Service Connections

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1. General

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Required service connections, (depending on machine model and optional features) are as follows:

1. Piped inlets and outlets (cold water, hot water, flush water, direct steam, liquid supply and drain to sewer). The sizes and locations of piped inlets and outlets are shown on the dimensional drawing for your machine.
2. Electrical power connections.

2. Requirements for Piped Connections

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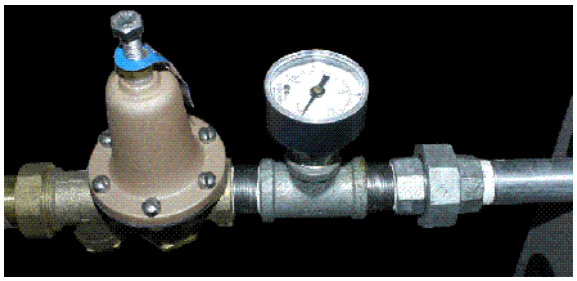
CAUTION: **Machine Damage Hazards —** Valve bodies will be ruined if twisted and distorted.

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

1. Inlet pressures must be within the minimum/maximum range specified. Pressure outside of the specified range may cause the machine to operate inefficiently or malfunction and may damage machine components.
2. A separate flush water valve pressure regulator set for approximately 28 psi (193 kPa) is shipped with the machine (Figure 1: Flush water valve pressure regulator, page 1). Install this regulator on the flush water inlet when installing piping.
3. Thoroughly flush all water lines before making connections.
4. We recommend installing 40 mesh strainers or filters in front of the cold, hot and third water valves.
5. When connecting water and steam inlets, always install unions and shut off valves at the point of connection to permit removal of the machine components for servicing, when necessary.

Figure 1. Flush water valve pressure regulator



CAUTION: **Machine Damage Hazards —** Pumped chemical systems, if not properly installed, can cause corrosion damage.

▶ See the reference manual for precautions and additional information before making any chemical connections.

2.1. Piped Inlet Specifications

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Table 1. Piped Inlets

Connection Description	Source Requirements	Piping Requirements, Comments
Cold water inlet	3/4" garden hose male thread @ 10 - 75 psi	Pipe material per plumbing code
Hot water inlet		
Flush water inlet		
Steam inlet	1/2” NPT @ 30 - 115 psi	
Liquid supply inlet	3/8" or 1/2"	Flexible tubing as supplied by the chemical supplier

2.2. Piped Outlet Specifications

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Table 2. Outlets

Connection Description	Destination Requirements or Description	Piping Specifications
Drain	3" pipe socket joint, unrestricted gravity feed to sewer (external back pressure may extend wash times - Do not reduce)	Rubber hose, PVC or other approved material per plumbing code
Vent	3"	

3. Power Connections and Precautions

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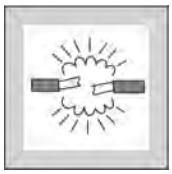
WARNING: **Electrocution and Electrical Burn Hazards —** Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

▶ Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.

CAUTION: **Machine Damage Hazards —** Voltage fluctuations of more than 10% above or below the specified voltage for your machine can damage electrical components, especially motors.



▶ Any such conditions should be corrected prior to commissioning your machine.

The customer must furnish a remotely mounted disconnect switch with lag type fuses or circuit breakers, and wiring between the electrical service box and the junction box on the machine. The sizes of these fuses and wires, along with the motor fuses supplied with the machine, depend on the machine voltage. See the fuse and wire sizing information in the schematic manual and on the machine nameplate. See dimensional drawings in this manual for electrical connection locations.

1. Electrical connections must be made by a competent electrician.
2. See fuse and wire sizing information in the schematic manual and on the machine nameplate. If the wire runs more than 50 feet, increase by one wire size for each additional 50 feet.
3. Only use Bussman Fusatron FRN (up to 250V), FRS (up to 600V) or similar lag fuses, the nameplate fuse sizes must not be applied to standard fuses.
4. Stinger leg, if any, must be connected to terminal L3, never to terminals L1 or L2.
5. Make power and liquid supply electrical connections within junction boxes on the rear of the machine.
6. Verify motor rotation (Figure 2: **Correct Rotation During Drain and Extract (when viewing front of machine)**, page 3). See the operating and trouble shooting manual for more information. If the cylinder turns in the wrong direction, interchange the wires connected to L1 and L2. Never move L3 under any circumstances. All motors are phased for proper rotation. Never attempt to reconnect motors or the motor control devices.
7. 240/208 volt machines are shipped set for 240 volt operation from the factory (Figure 3: Line Voltage Switch Set for 240 Volt Operation, page 4). Place the line voltage switch in the 208 volt position if the supply voltage is 208 volts.

Figure 2. Correct Rotation During Drain and Extract (when viewing front of machine)

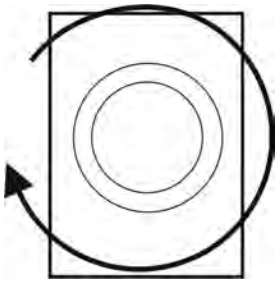
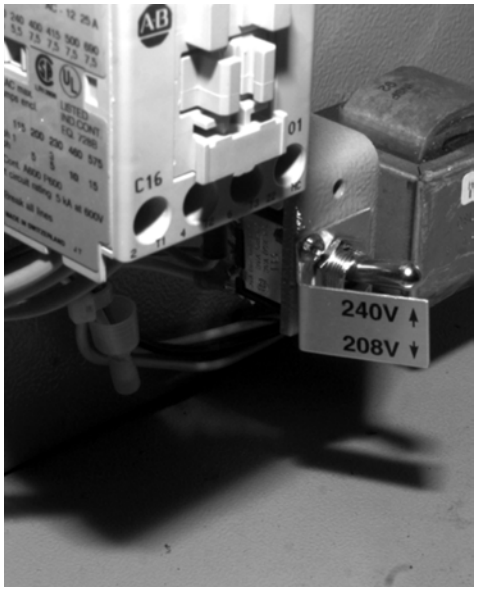


Figure 3. Line Voltage Switch Set for 240 Volt Operation



4. Remove Shipping Restraints

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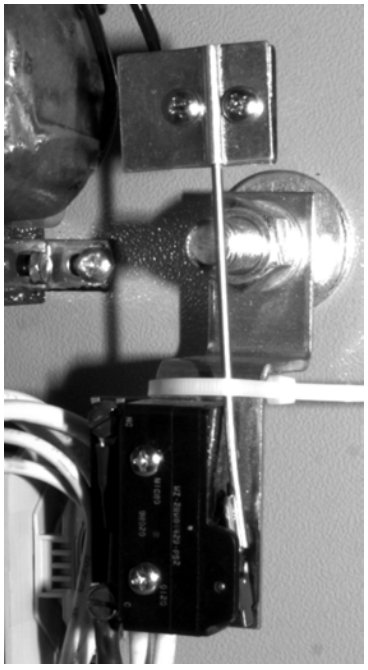
Remove all shipping restraints (usually marked in red). Restraints may be located behind access panels. Restraints may include the vibration switch restraint (Figure 4: Typical Vibration Switch Showing Restraint in Place, page 4).

Figure 4. Typical Vibration Switch Showing Restraint in Place



5. Check Cylinder Surface

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Check the perforated cylinder for smoothness. Milnor® will not accept responsibility for the cylinder finish after the machine is placed in service.

End of document: BNWBUI02

Servicing the Door to Open it with Power Off or with a Malfunctioning Door Lock

Note 1: This document supersedes document MSSM0288AE and applies to all washer-extractors with four-spoke door handles, including 30022Hxx, MCRxxxxx models. The photographs in this document show the older style bare metal door handles but the instructions apply, as well, to newer machines with black, coated handles.

The door is designed to lock as soon as the machine starts a wash cycle. If electrical power to the machine is interrupted during the washing cycle, or if the door interlock mechanism fails to unlock, the door can be opened by **qualified, service personnel** by removing the door handle and a few related components. These components must be properly reinstalled for safe operation.

WARNING 1: Entangle and crush hazards—Contact with moving components normally isolated by doors, guards, covers and panels can entangle and crush body parts. These components move automatically.

- Service the machine only if qualified and authorized.
- Lockout/tagout power at the wall disconnect before proceeding.

WARNING 2: Amputation hazard—If the door interlock mechanism does not function properly, an operator may be able to open the door and reach into the machine during operation. Goods in the rotating cylinder can wrap around a person's arm and twist it off.

- Verify proper door lock function during machine operation, before returning the machine to normal service.

1. Disassembly

1.1. Removing the Handle and Opening the Door—The handle is held in place on the shaft with a thrust washer and retaining clip in front of the handle and a flange bearing and retaining clip behind the handle. The amount of turning force the handle can exert on the shaft is adjustable with the four set screws, springs and steel balls—one within each spoke of the handle. The steel balls seat into depressions in the shaft. When properly adjusted, the set screws will apply sufficient spring tension so that the handle will reliably operate the latch, but the handle will ratchet if turned counterclockwise or if too much turning force is applied.

Remove the handle from the shaft as follows:

1. Gently pry the black plastic cap from the center of the handle with a small screwdriver.
2. Attempt to ratchet the handle by turning it counterclockwise by hand. If this is not possible, the springs have too much tension applied. Back off on the four set screws just enough for the handle to ratchet. Typically this happens when the set screws are flush with the surface of the handle spoke as is the case in Figure 1.
3. Repeat the following sub-steps four times to remove all set screws, springs, and steel balls:
   a. Remove the set screw from the topmost handle spoke.
   b. Hold a finger over the hole, then, while keeping your finger on the hole, ratchet the handle counterclockwise until the hole is pointing down.
   c. Hold one hand or a cup under the handle to catch the contents, then remove your finger, allowing the spring and ball to fall out, as in Figure 2. Shake the handle if necessary, to work the components free.

Figure 1: Door Handle Spoke Set Screw

Figure 2: Handle Spoke Spring and Ball

4. Remove the front retaining clip and thrust washer (see Figure 3), then pull the handle off of the shaft.
5. Normally, the flange bearing will come off with the handle, but if not, remove it as shown in Figure 4. Remove the rear retaining clip. Push against the door to release the retaining clip.

Figure 3: Front Retaining Clip and Thrust Washer

Figure 4: Rear Flange Bearing (being removed) and Retaining Clip (arrow)

Notice 3: Risk of component damage—The return spring is located around the shaft, between the door and the shaft cam. The end of the spring is inserted into a small hole in the shaft cam. The spring can stretch and be damaged if it does not separate from the shaft cam.

- Be prepared to work the end of the spring out of the hole in the shaft cam as the door is opened.

6. Slowly open the door. Allow the door latch shaft, which is still captive within the door lock mechanism, to slide out of the door. Watch to be sure the return spring separates from the shaft cam and remains with the door, as shown in Figure 5.

Figure 5: Return Spring After Separation from Shaft Cam

1.2. Removing the Door Latch Shaft from the Door Lock Mechanism

Tip: It is easier and more reliable to remove the shaft from the door lock mechanism then to attempt to reinsert the shaft into the door and replace the handle while the shaft is still captive in the door lock.

1. Remove the cover (not shown) from the door lock mechanism (Figure 6).
2. Using a screwdriver, push down the door lock slider pin (Figure 6) and rotate the shaft (Figure 7) counterclockwise to remove it from the lock mechanism.

Figure 6: Door Lock Slider Pin in the Door Lock Mechanism

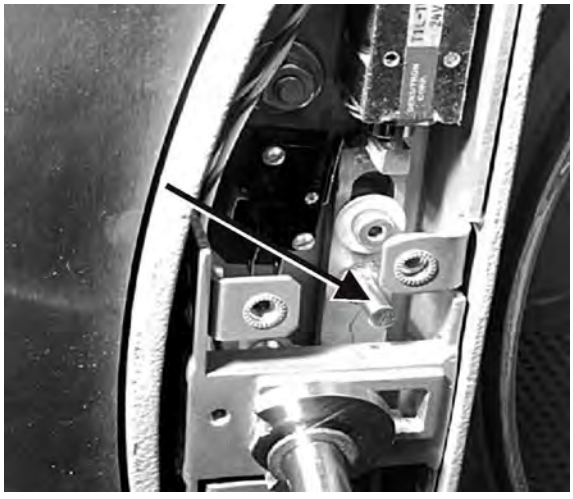
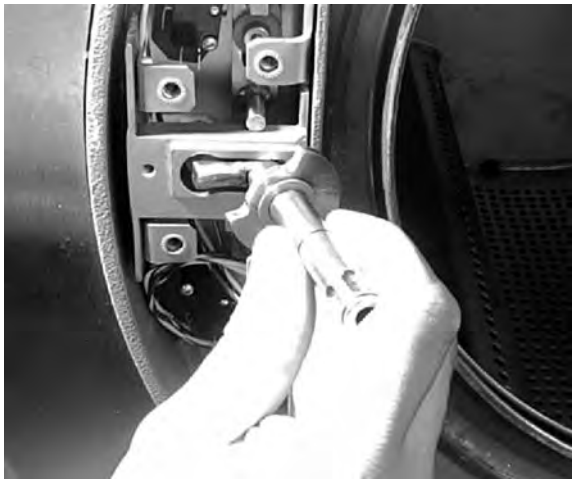


Figure 7: Removing the Shaft from the Lock Mechanism



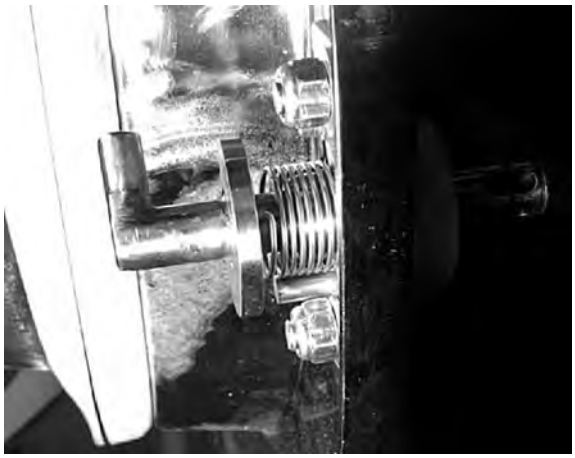
2. Reinstalling the Shaft and Door Handle

Once the goods have been removed from the machine and any malfunction of the door lock mechanism, such as a burned out coil or mechanical interference, has been identified and repaired, reinstall the components as follows:

1. Install the cover on the door lock mechanism.
2. Insert the shaft into the open door and seat the end of the return spring into retaining hole in door shaft cam (Figure 8 and Figure 9).

Figure 8: Shaft in the 9 o'clock Position Showing Spring Retaining Hole

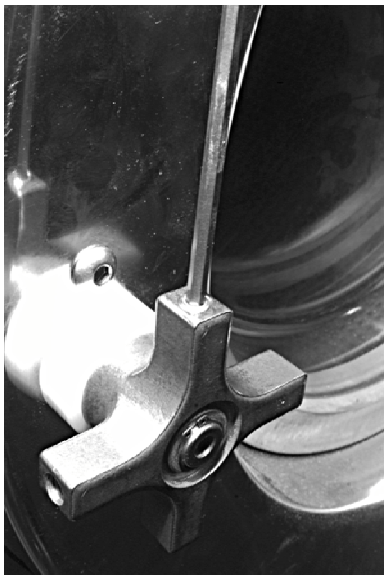
Figure 9: Shaft with Return Spring Installed



3. Looking at the rear of the door, rotate the shaft counterclockwise about 90 degrees, until the shaft fully seats into the door. When properly seated, the shaft finger (the latch) will align with the key way on the door lock mechanism.
4. Install the rear retaining clip on the shaft.
5. Slide the door handle and flange bearing onto the shaft.
6. Install the front thrust bearing and retaining clip on the shaft.
7. Repeat the following sub-steps four times—once for each ball, spring, and set screw: (Figure 10 and Figure 11):
   a. Drop the ball into the hole of door handle top spoke, followed by the spring, as shown in Figure 10.
   b. Install the set screw. As previously stated, the handle should ratchet if more turning force than necessary is applied or if turned counterclockwise. Tighten the set screw until the set screw is flush with the handle. This will provide roughly the correct spring tension.
   c. Rotate door handle counterclockwise 90 degrees to ratchet it to the next position (with the next spoke on top).

Figure 10: Inserting Ball and Spring in Handle Spoke

Figure 11: Adjusting Set Screw



8. When all four set screws are in place, check to be sure the handle will ratchet if turned counterclockwise, or if latched with more force than necessary. Make 1/4 turn adjustments to all four set screws if necessary to achieve the proper tension.
9. Install the black plastic cap over the center of the handle.

— End of BIRH3M02 —

BIRH3M01 (Published) Book specs- Dates: 20030214 / 20030214 / 20030214 Lang: ENG01 Applic: RH3

Setting Door Interlock Switches

1. How The Door Interlock Switches Work

DANGER 1: Amputation Hazard—Turning cylinder can twist off arms.

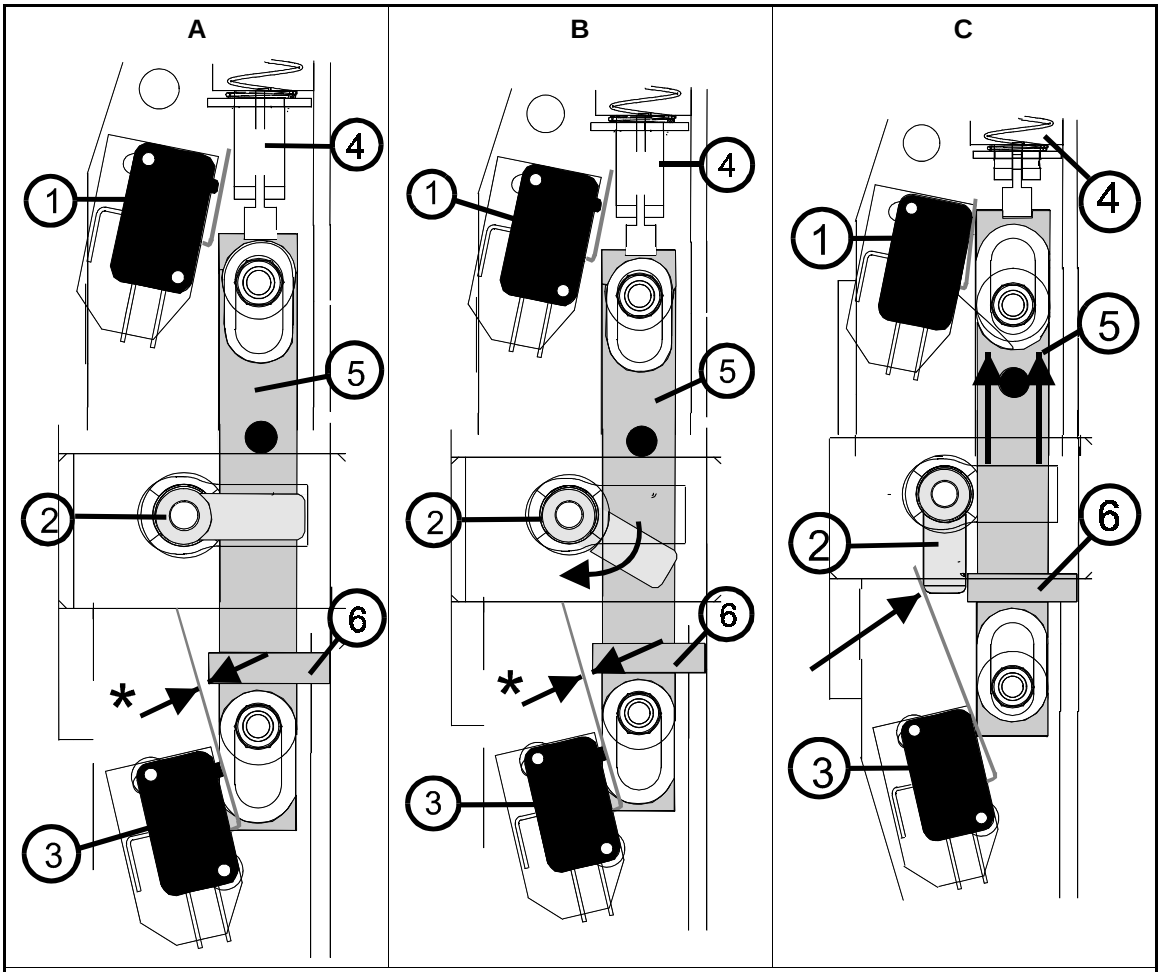
- Do not permit this machine to be operated unless door interlock switch SMD (Figure 1 item 3) is set according to these instructions.
- Do not operate this machine if a visual inspection of the unlocked door shows door lock switch SMD touching the door lock slider, or if the machine operates with the door open.
- Verify that all components of this system are in good working order.

Note 1: Study the illustrations in Figures 1 while reading the following explanation.

After the door is shut, the turning door catch (item 2) physically contacts door interlock switch SMD (item 3). Actuating this switch tells the microprocessor that the door is closed. Note that the door handle is not locked in place and the door can be opened if needed. The machine can be programmed but cannot start the wash program or allow manual actuation of outputs.

Immediately after the start switch 1 is pushed, the microprocessor energizes solenoid EMDL (item 4), pulling up the door lock slider. The raised door lock slider mechanically locks the door handle in place and actuates door interlock switch SME (item 1). Actuating this interlock switch confirms that the door is closed and locked, allowing the machine to start the wash program.

Figure 1: Door locking sequence



Legend

A. Door pushed shut, door handle (item 2) in unlocked position, door lock slider down (item 5), interlock switch SMD (item 3) and SME (item 1) not actuated.
Note the minimum sixteenth of an inch (1.6 mm) gap between the lever on interlock switch SMD and the door lock slider.

B. Door shut, door handle (item 2) being turned to the locked position. The door lock slider (item 5) is down, interlock switch SMD (item 3) and SME (item 1) not actuated.

C. Door shut, door handle (item 2) in the locked position. The door lock slider (item 5) is up, locking in door handle in place, interlock switch SMD (item 3) and SME (item 1) are both actuated.

1. Door interlock switch SME
2. Door catch
3. Door interlock switch SMD
4. Solenoid EMDL
5. Door lock slider
6. Raised section of door lock slider

2. Adjusting the Door Interlock Switches

Periodically inspect the door locking assembly for wear and proper functioning as follows:

1. Remove the cover plate. Manually push the door slider assembly (item 5) down until it stops. Check for a minimum of one sixteenth of an inch clearence (1.6 mm), between the raised portion of the door slider (item 6), and the lever of interlock switch SMD (item 3).
2. Manually push the door slider assembly up until it stops. Check that the rising slider depresses interlock switch SME (item 1), “making” the switch.

— End of BIRH3M01 —

BIUUUM04 (Published) Book specs- Dates: 20180109 / 20180109 / 20180109 Lang: ENG01 Applic: UUU

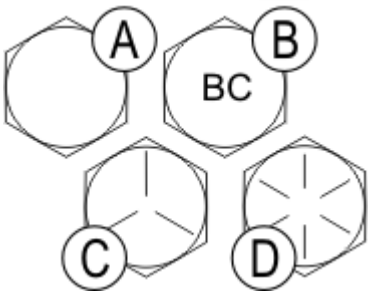
Torque Requirements for Fasteners

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

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

Figure 1: The Bolts in Milnor® Equipment

The Marks on Bolt Heads



Legend

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

1. Torque Values

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

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

1.1. Fasteners Made of Carbon Steel

1.1.1. Without a Threadlocker

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

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

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

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

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

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

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

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

1.1.2. With a Threadlocker

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

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

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

Table 6: Torque Values if You Apply LocTite 222

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

Table 7: Torque Values if You Apply LocTite 242

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

Table 8: Torque Values if You Apply LocTite 262

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

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

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

Table 10: Torque Values if You Apply LocTite 277

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

1.2. Stainless Steel Fasteners

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

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

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

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

2. Preparation

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

- Use threadlocker and primers with sufficient airflow.
- Do not use flammable material near ignition sources.

1. Clean all threads with a wire brush or a different tool.
2. Remove the grease from the fasteners and the mating threads with solvent. Make the parts dry.

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

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

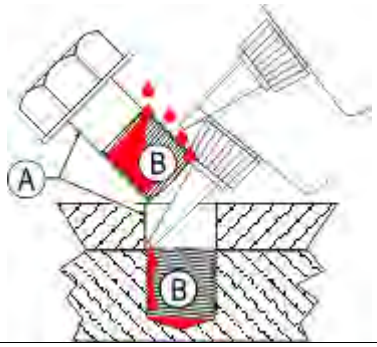
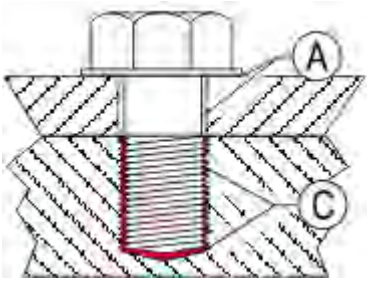
3. How to Apply a Threadlocker

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

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

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

Figure 2: Blind Hole

Application	Coverage
	

Legend

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

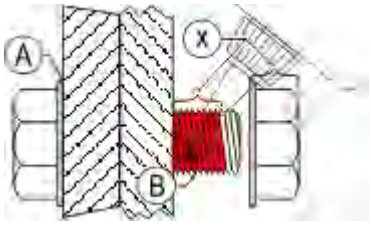
3.1. Blind Holes

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

3.2. Through Holes

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

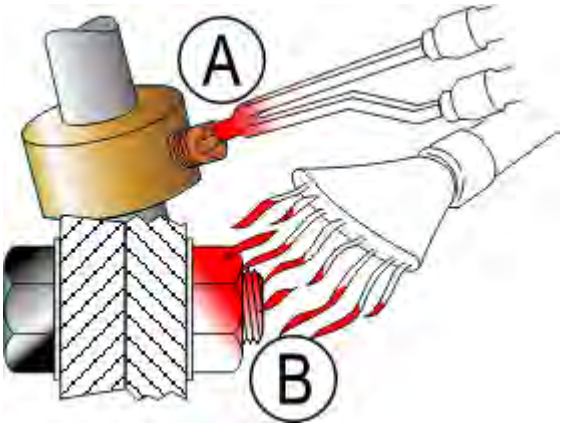
Figure 3: Through Hole

Application	Legend
	**A.** No threadlocker here **B.** Apply the threadlocker to this area **x.** Nut depth

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

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

Figure 4: Disassembly

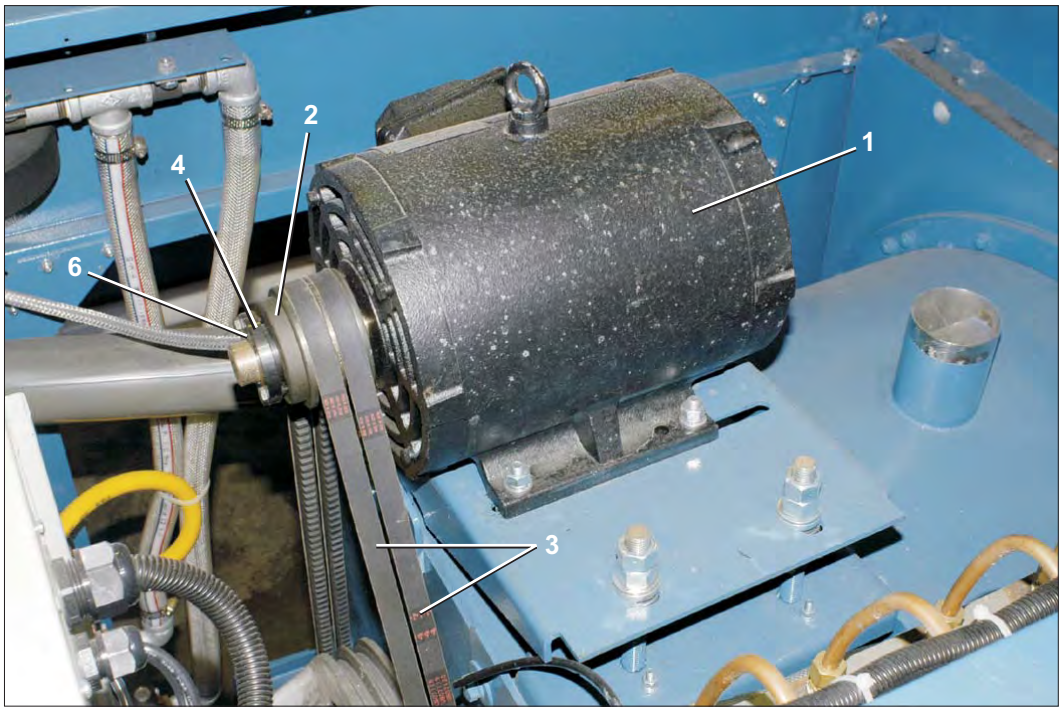
Apply Heat to a Small Area	Legend
	**A.** How to apply heat to a small fastener **B.** How to apply heat to a large fastener

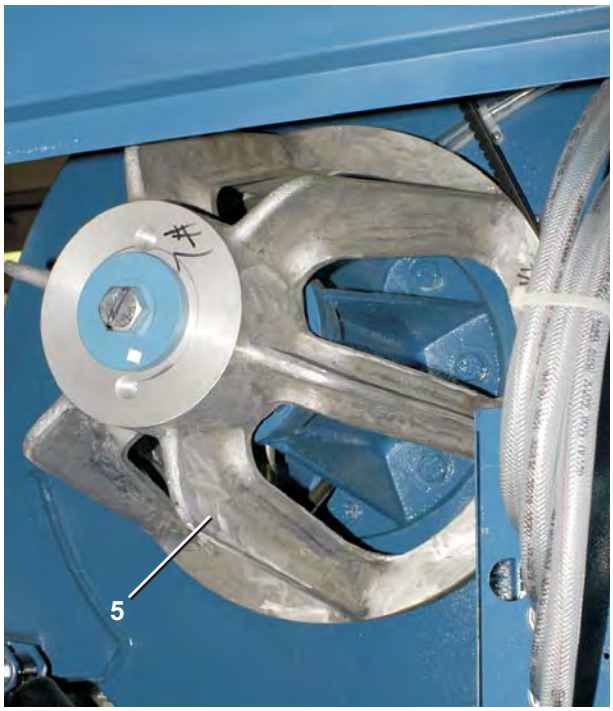
— End of BIUUUM04 —

Drive Assemblies 3

Drive

MWF27J8, MWF27Z8





Drive

MWF27J8, MWF27Z8

Parts List—Drive

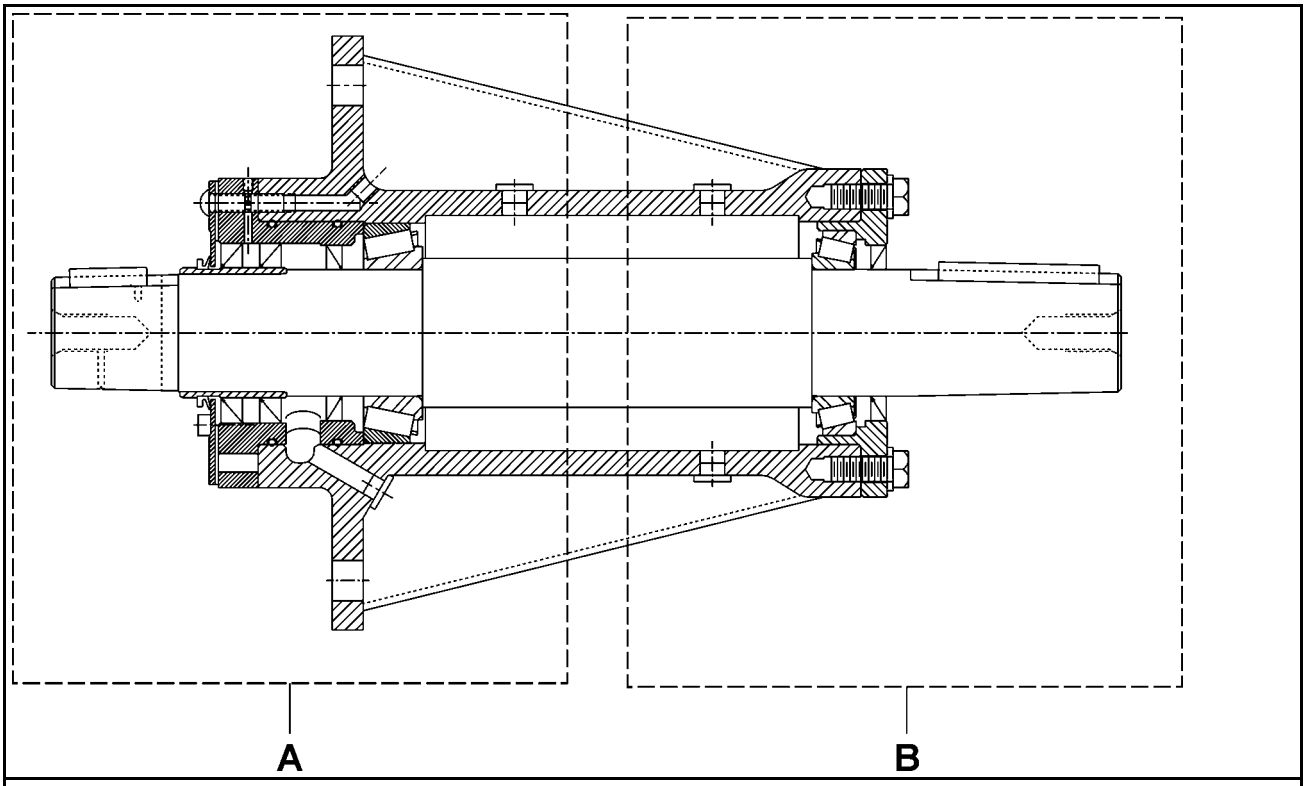
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	98CMCR0404	5HP 220/380/440V 50/60HZ 3022X CASTIC	
all	2	98CX030B2H	SMALL PULLEY	
all	3	56VB082XM2	VBELT BX82 EA=1BELT	
all	4	98CXQ1CH	TAPER BUSHING	
all	5	98CX03830	BIG PULLEY	
all	6	15E230	STRMACHKEY 3/8SQX2+1/2 TOL.+0	

Bearing Housing Components MWF27

BPWMAB03.R01 0000166674 B.2 12/11/17 3:34 PM Released

Figure 1. Bearing Assembly Cross Section

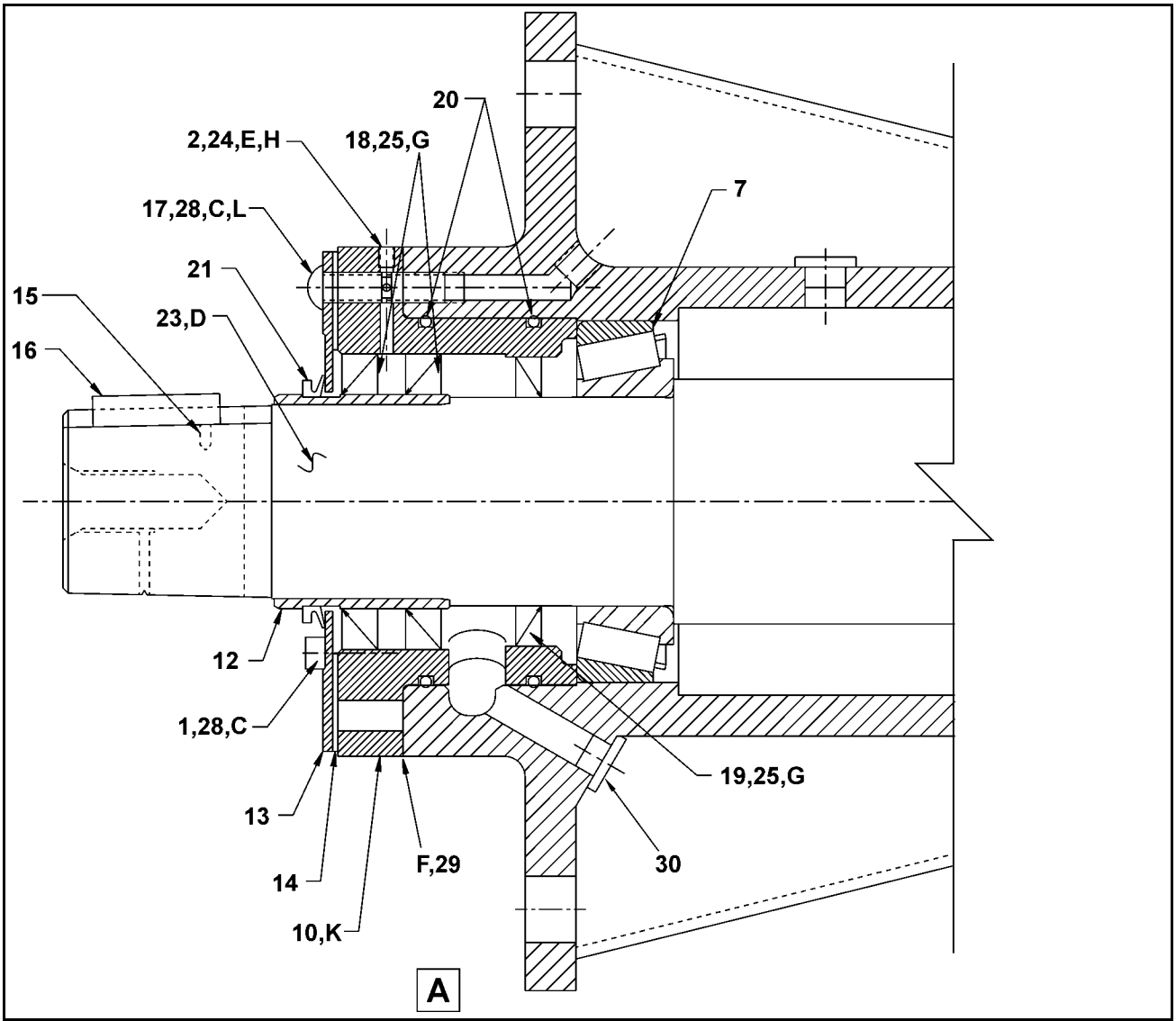


Legend

A. Detail view of the bearing housing front
B. Detail view of the bearing housing rear

Bearing Housing Components MWF27

Figure 2. Bearing Housing Front

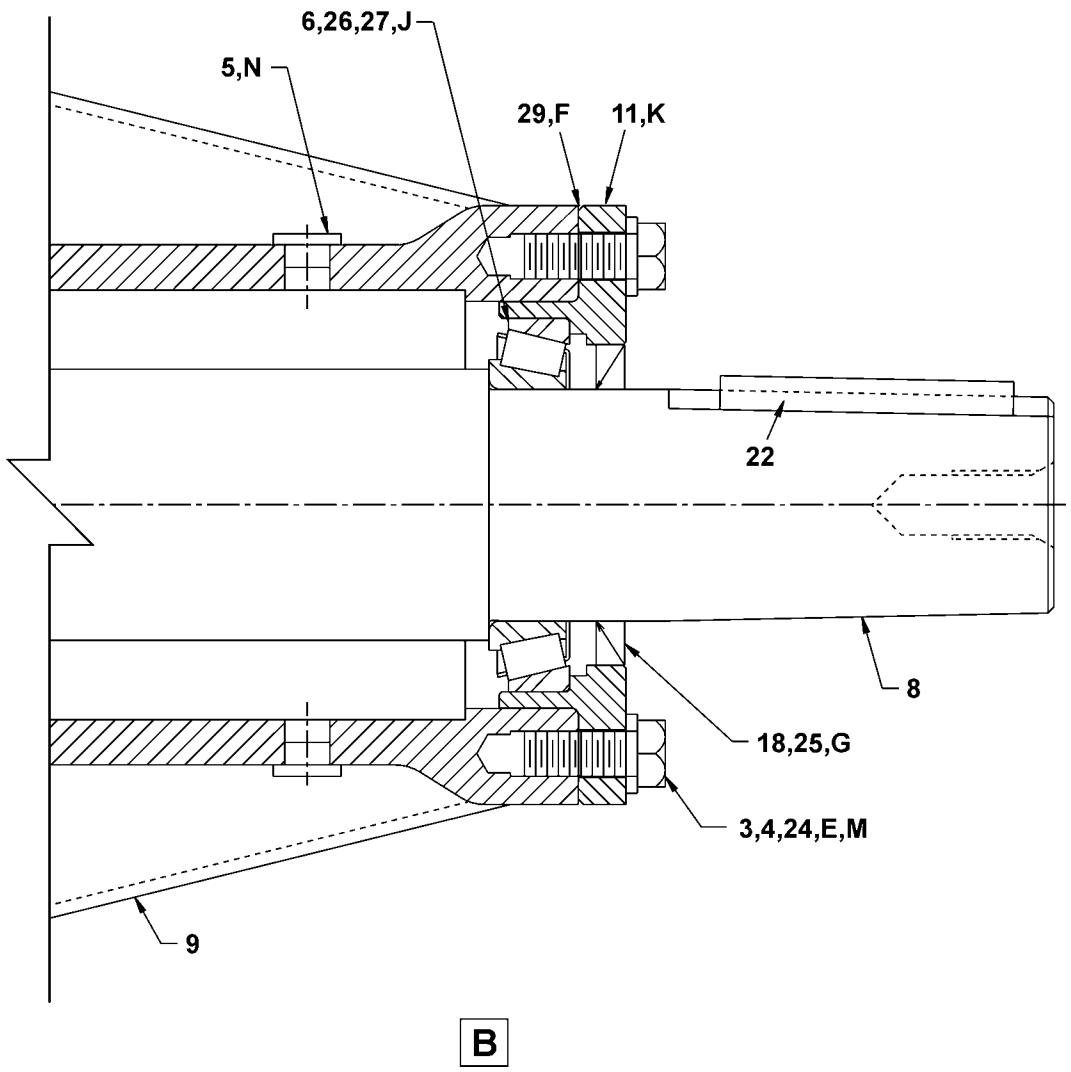


Legend

A. Detail view of the bearing housing front.
C. Apply anti-seize compound to the bolt.
D. Clean the shaft and the inner sleeve. Make sure that they are clean and free from oil. Apply adhesive, then the sleeve. Make sure of a bond on a minimum of 75% of the surface.
E. Apply adhesive to the bolt.
F. Add shims to a thickness of .004 inches — .005 inches. The shaft must turn in the housing. For details of the recommended procedure, refer to the document MSSM0261AE.
G. Apply adhesive to the outer circumference of the seals. Let the adhesive dry 24 hours. Make sure that all surfaces are clean and free from oil before you assemble.
H. Set the set screw to be flush with the outer edge of the seal holder.
K. The seal holders must be fully down before you tighten the fasteners.
L. When you change the seal holder, torque item 17 to 150 IN. LBS. This bolt has a nylon insert and a hole to let grease to the water seals. Torque all remaining bolts to the standard torque.

Bearing Housing Components MWF27

Figure 3. Bearing Housing Rear



Legend

B. Detail view of the bearing housing rear
E. Apply adhesive to the bolt.
F. Add shims to a thickness of .004 inches — .005 inches. The shaft must turn in the housing. For details of the recommended procedure, refer to the document MSSM0261AE.
G. Apply adhesive to the outer circumference of the seals. Let the adhesive dry for 24 hours. Make sure that all applicable surfaces are clean and free from oil before you assemble.
J. Apply primer and adhesive to the rear bearing cup and holder housing.
K. The seal holders must be fully down before you tighten the fasteners.
M. instances 8
N. instances 4

Bearing Housing Components MWF27

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	
	Z	98CMCR3015	MAIN BEARING ASSY=30X8	COMPLETE ASSEMBLY
			Components	
all	2	15Q068A	SOKSETSCR CUP10-32X1/4 SS	
all	4	98CX773513	FLATWASHER, D12 ZINC	
all	5	27A253	PLUG FOR 1/2BOLTHOLE CAPLUG #4	
all	6	54A915916	TIM#JLM710949C/JLM710910-2.5"BORE	
all	7	54A593597	TIMKEN CUP# 39521(OR CUP# 39520)/CONE# 39590= 2.625"BORE (EA=SET)	
all	8	98CMCR3021	30X8 MAIN SHAFT, METRIC	
all	9	98CMCR3020	30X8 BEARING HOUSING, METRIC	
all	10	98CMCR3022	30X8 FRONT SEAL HOLDER, METRIC	
all	11	X2 03832	MACH=REAR SEAL HOLDER 3022F	
all	12	02 03825	SLEEVE=BEARING SHAFT 3022F	
all	13	02 03826	COVER=V-RING SEAL 3022F	
all	14	02 03823A	GASKET=3022F V-RING SEAL	
all	15	15H089S	SPRINGPIN 1/8"DIA X 5/8" LONG	
all	16	02 02294A	SHAFT KEY 3/8 X 3/8	
all	18	24S053	SEAL 2.625X3.625X.437#10051L5	BUNA
all	18	24S053V	SEAL 2.625X3.625X.437#10050H5L	VITON
all	19	24S052A	SEAL 2.559X3.55X.315 CR#25430	BUNA
all	19	24S052V	SEAL 2.559X3.55X.315VTCR#25431	VITON
all	20	60C151A	ORING 4+1/4ID1/8CS BUNA70#244	
all	21	24S105FN	SEAL 2.48X2.68X2.28X.20V65A-N	
all	23	20C009	THRDLKSEAL LCT#27731 50CC	
all	24	20C007H	THDLK REMVBL-#24221	
all	25	20C012D	RETAINCMPD ADH LCT#1835205 10CC	
all	26	20C011B	RETAIN CMPD ADH LCT#60905 .5CC	
all	27	20C006P	PRIMER-N #7649 LCT#21348-4	
all	28	20C020	ANTISEIZE TEFLON SEALANT 50ML	
all	29A	02 03818J	SHIM=.003 CRS GREEN	
all	29B	02 03818K	SHIM=.005 CRS BLUE	
all	29C	02 03818L	SHIM=.0075 CRS BLACK	
all	29D	02 03818M	SHIM=.010 CRS RED	
all	30	98CX961708	GREASE FITTING, 1/8BSP ZINC	

Bearing Installation MWF27

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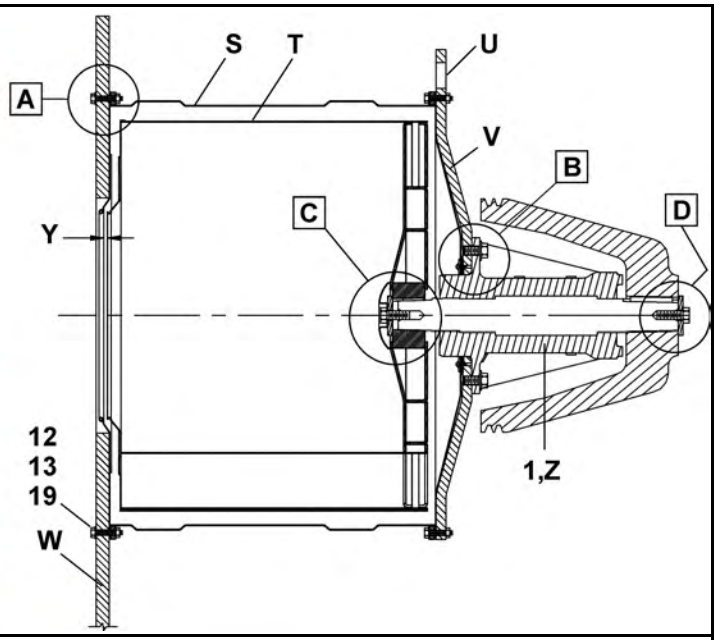
Figure 1. Cross Section: Shell, Cylinder, Bearing, Pulley

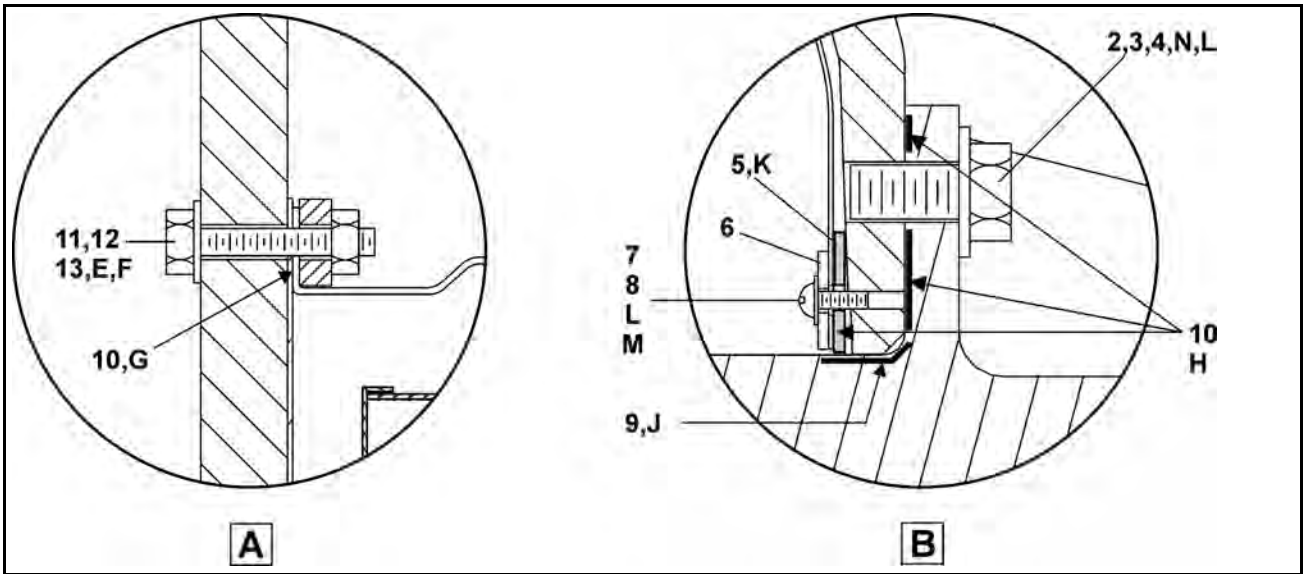


Legend

A. Top connection between the shell front and the shell side sheet.
B. Connection between the shell rear and the bearing housing
C. Connection between the cylinder rear and the bearing housing
D. Connection between the bearing housing and the pulley
S. Shell
T. Cylinder
U. Holes to lift the machine
V. Shell rear
W. Shell front
Y. This dimension must be in this range: .25 inches [6mm] — .625 inches [15mm].
Z. Bearing Housing Components, see BPWMAB03.

Bearing Installation MWF27

Figure 2. Details A & B: Shell front to Shell, Shell rear to Bearing

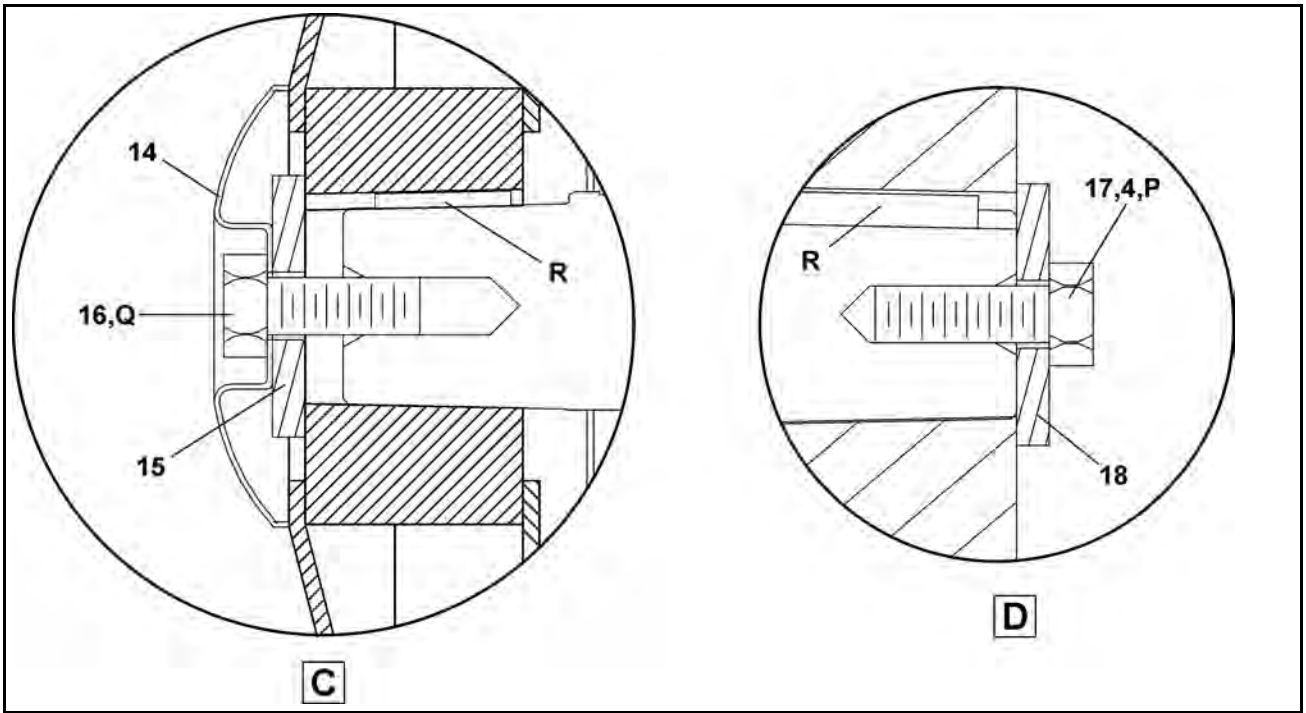


Legend

A. Top connection between the shell front and the shell side sheet
B. Connection between the shell rear and the bearing housing
E. instances 24
F. Apply adhesive to the bolt, torque to 44 FT. LBS.
G. Apply silicone between the inner shell front and shell, fully around the hole pattern.
H. Apply silicone between the rear bearing housing and the shell rear, fully around the hole pattern.
J. Apply adhesive to the circumference.
K. Apply silicone between the lining and the shell rear, fully around the hole pattern.
L. instances 8
M. Torque to 36 IN. LBS.
N. Apply adhesive to the bolt, torque to 199 FT. LBS.

Bearing Installation MWF27

Figure 3. Details C & D: Shell rear to Bearing, Bearing to Pulley



Legend

C. Connection between the cylinder rear and the bearing housing
D. Connection between the bearing housing and the pulley
P. Apply adhesive to the bolt torque to 361 FT. LBS.
Q. Apply adhesive to the bolt, torque to 236 FT. LBS.
R. Key. See Bearing Housing Components, BPWMAB03.

Bearing Installation MWF27

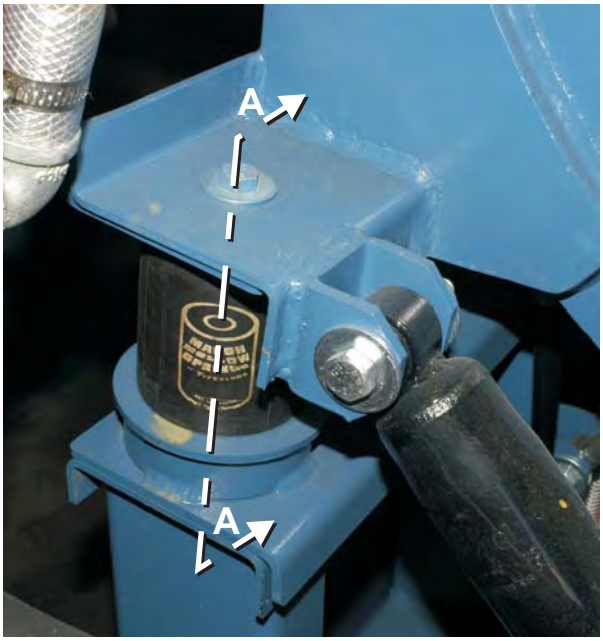
Find the assembly for your machine and the letter shown in the "Item" column. The components for your machine will show this letter or the word "all" in the "Used In" column. The numbers shown in the "Item" column are those shown in the illustrations.

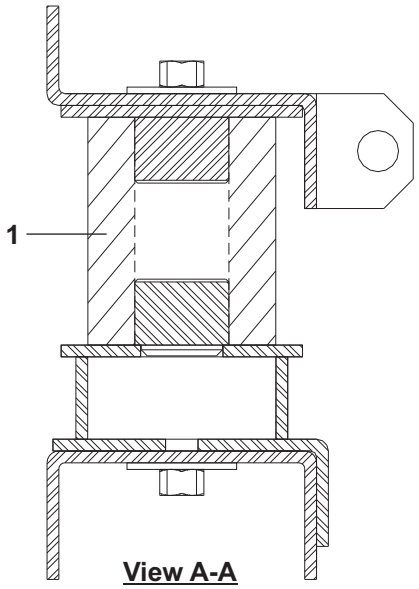
Used In	Item	Part Number	Description/Nomenclature	Comments
			Components	
all	1	98CMCR3015	MAIN BEARING ASSY=30X8	BEARING ASSEMBLY
all	2	15K215M	CAPSCR M16X40 CLS 10.9 Z	
all	3	15U316M	FLTWASH D16 HARD HV200 D16 Z	
all	4	20C007G	THDLOCKSEAL LCT24231 RMUBL50CC	
all	5	02 03258	GASKET=SHELLBACK LINER,3022H	
all	6	02 03279	DOUBLER=SHELLBK LINER,3022H	
all	7	15K032MS	BUTSOKCAP SCR M6*20 SS	
all	8	15U137	FLTWSHR M6-1 18-8 SS	
all	9	20C005	ADH/SEALANT 50CC LCT#271-31	
all	10	20C040B	SUPERFLEX CLR RTV SIL 10.1OZ	
all	11	15K180M	M10-1.5X50HX HD CAP SCR DIN931	
all	12	15U266	FLATWASHER 1"0DX7/16"IDX3/16"	
all	13	15G206M	HEX NUT M10 ZINC	
all	14	98CMCR0949	COVER SHAFT RETAINER METRIC	
all	15	98CMCR0950	SHAFT RETNR SPACER METRIC	
all	16	15B201	HEXCAPSCR M20-2.5 X 50M 18-8	
all	17	15K232	HEXCAPSCR 3/4-10UNC2X2 GR5 ZIN	
all	18	98CMCR3023	SHAFT RETNR SPACER=3022X CSM	
all	19	15K127M	HEXFLGSCR 3/8-16 X2.5 GR8 ZINC	

Suspension 4

Marshmallow Suspension

MWF27J8, MWF27Z8

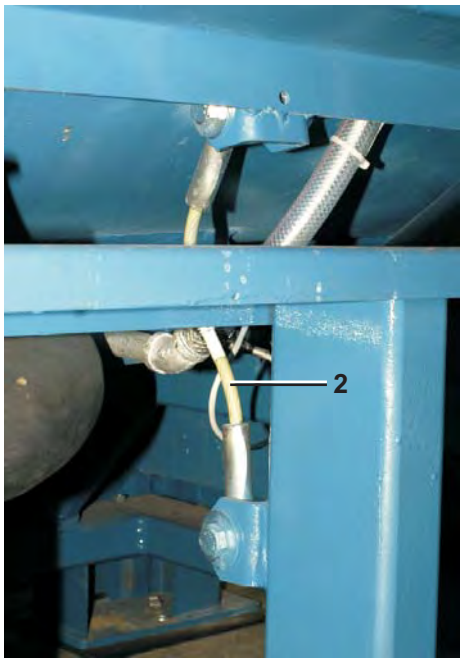




View A-A
4 Places

Marshmallow Suspension

MWF27J8, MWF27Z8



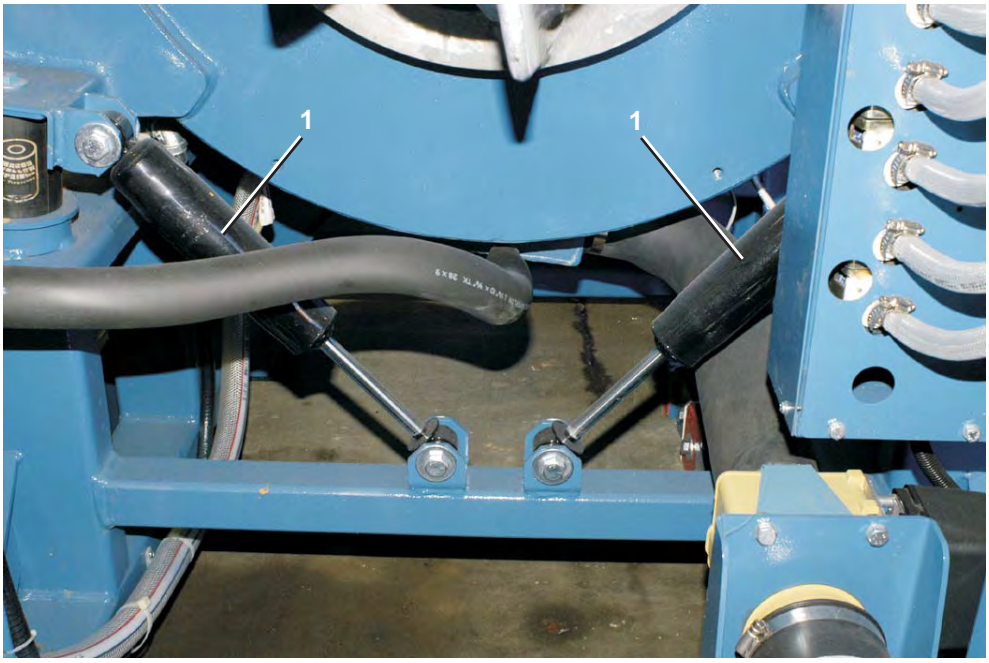
Parts List—Marshmallow Suspension

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

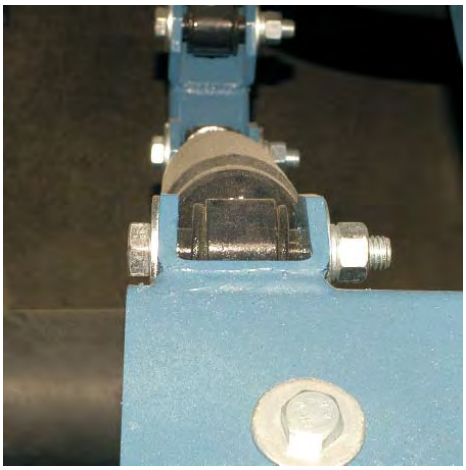
Used In	Item	Part Number	Description	Comments
----------COMPONENTS----------				
all	1	60B135	MM SPRG 3X1X4 F#W223580047	
all	2	27A969	CABLE ASSY SAVA#205801	

Shocks

MWF27J8, MWF27Z8



Rear Shocks



Front Shocks

Shocks

MWF27J8, MWF27Z8

Parts List—Shocks

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

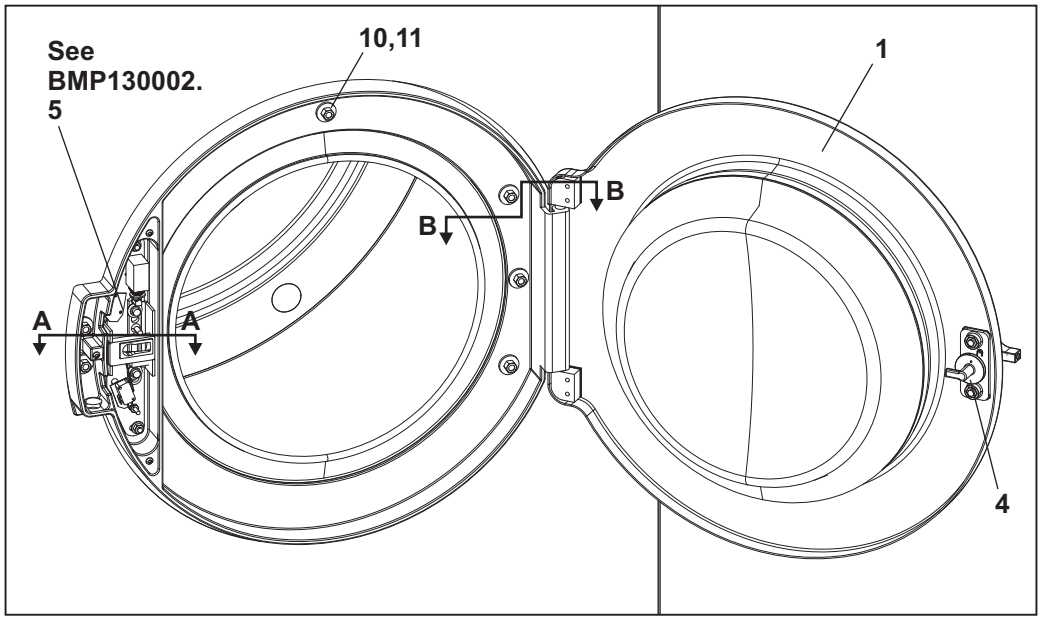
Used In	Item	Part Number	Description	Comments
----------COMPONENTS----------				
all	1	60BS6838	SHOCK ABSORBER = ARVIN #65907340E	

Shell and Door Assemblies 5

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

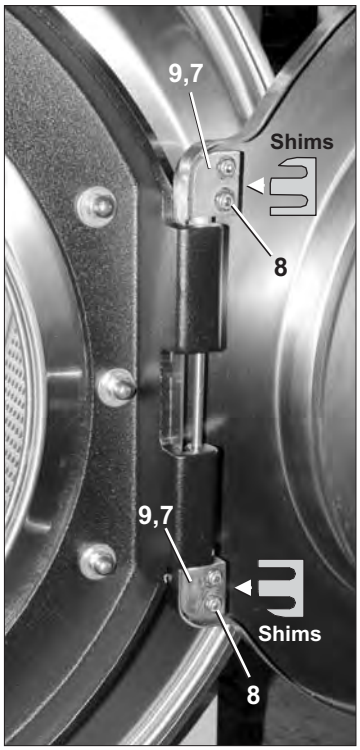
Litho in U.S.A.

Door Installation



Door Lock Cover

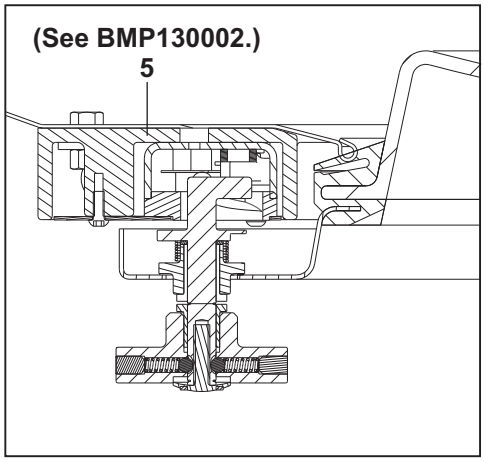
Add or remove shims until the door locks properly and seals.



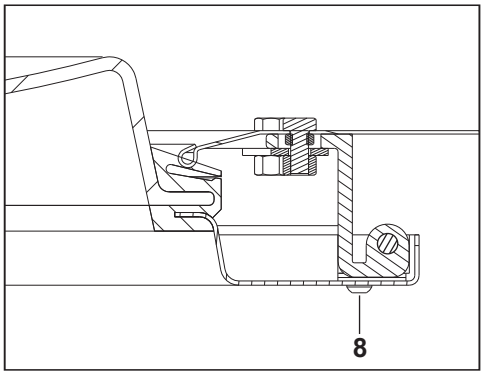
Hinge

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

Litho in U.S.A.



Section A-A: Door Installation



Section B-B: Door Installation

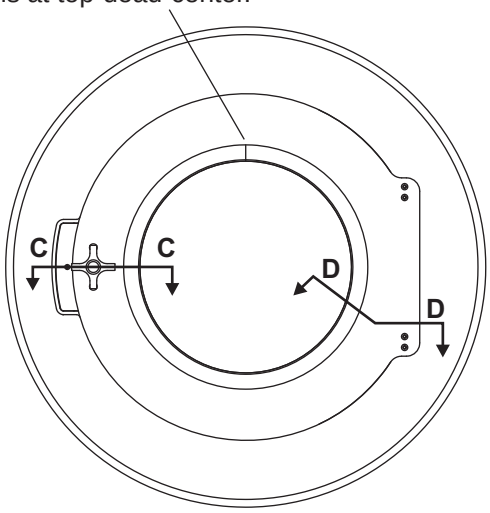
Door Assembly:

Door Glass Installation

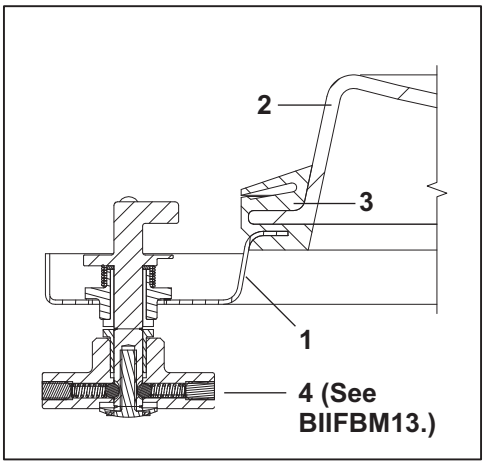
1. Apply a continuous bead of silicone completely around the rubber seal, in the area where the glass is to be seated.

2. Install the gasket into the door before installing the glass. Observe the location of the rubber seal joint line and adjust if necessary.

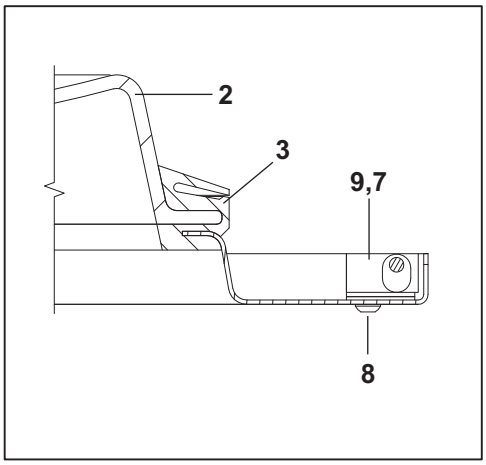
3. While installing the glass into the rubber seal, ensure that no silicone is exposed on outer surface of the rubber seal.



Door Assembly



Section C-C:



Section D-D:

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

Litho in U.S.A.

Parts List—Door Assembly

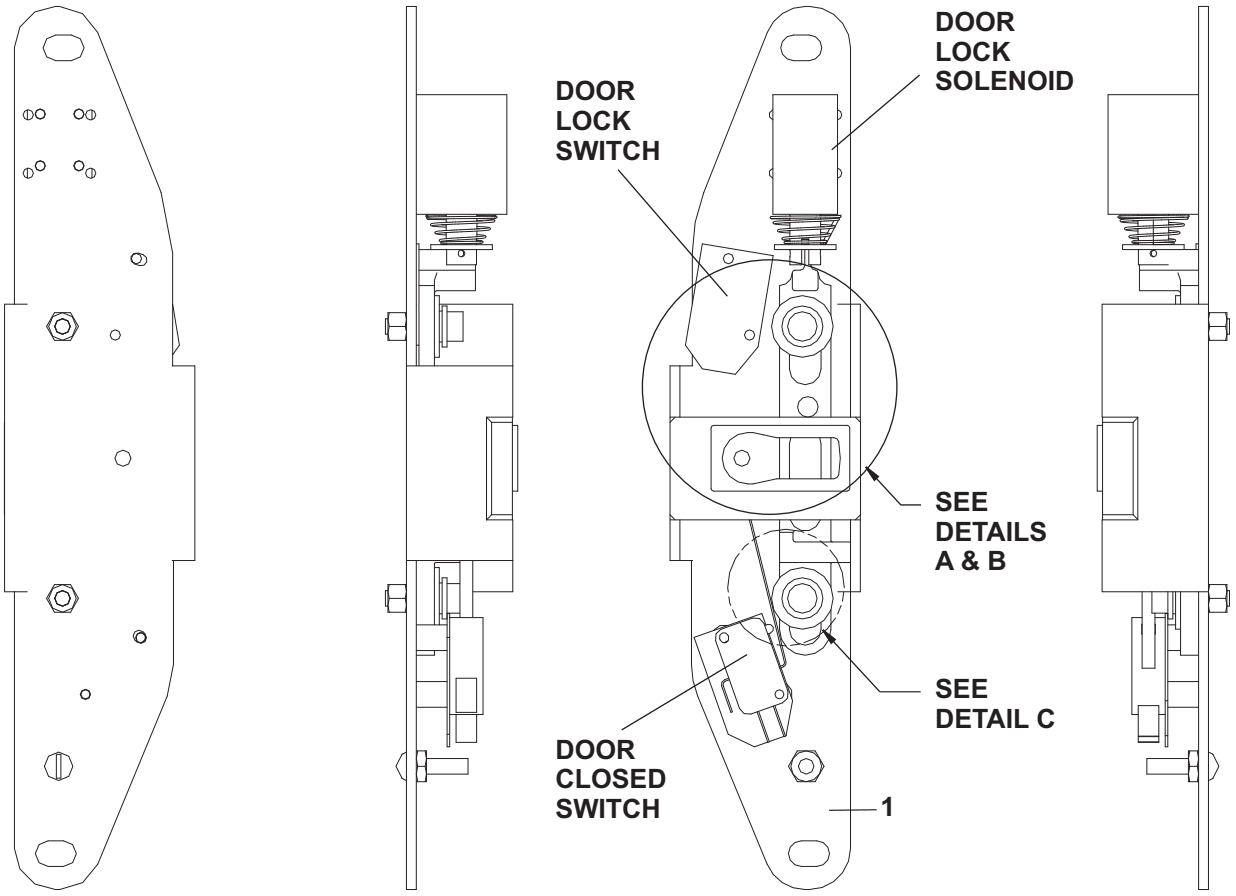
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	02 03229A	30" SHELL DOOR	
all	2	02 03251	DOOR GLASS, 3022H7	
all	3	02 03200	DOOR GASKET, 3022H7	
all	4	98CMCR0925	ASSY=DR HNDL MECH	
all	5	98CMCR0971	DOOR INTERLOCK ASSY V8Z VRJ MILNOR ASSY A33 03226B	
all	7	02 03260	30" SHELL DOOR HINGE RIGHT	
all	8	15K031	BUTSOKCAPSCR 1/4-20X1/2 SS18-8	
all	9	02 03260A	30" DOOR HINGE LEFT	
all	10	27A271	.843"ID X 1.496" BASE CAP NCS36	
all	11	27A270	.843"ID X 1.496" BASE NCS35	

Door Lock Mechanism

MCR27E5, MWR27E5; 3015T6X,VRJ,V8Z,VZZ; 30022T6X,VRJ,V8Z,VZZ; MWF27J8, MWF27Z8; 30022X8R 36021V5Z, 36021V7Z, 36026V5Z, 36026V7Z, 42026V6Z, 42030V6Z

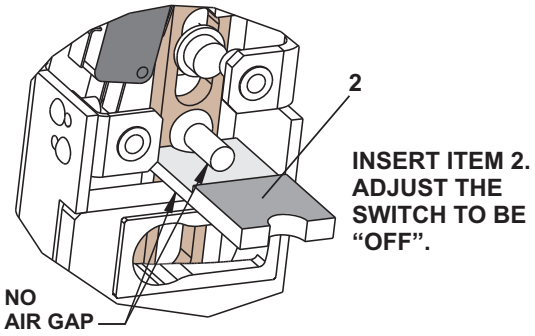
Figure 1: Components



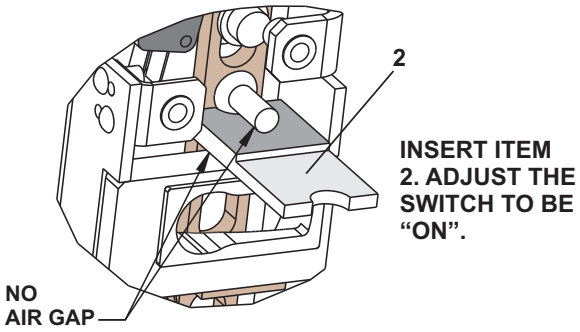
Door Lock Mechanism

MCR27E5, MWR27E5; 3015T6X,VRJ,V8Z; 30022T6X,VRJ,V8Z; MWF27J8, MWF27Z8; 30022X8R 36021V5Z, 36021V7Z, 36026V5Z, 36026V7Z, 42026V6Z, 42030V6Z

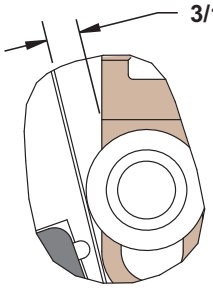
Figure 2: Slider and Settings



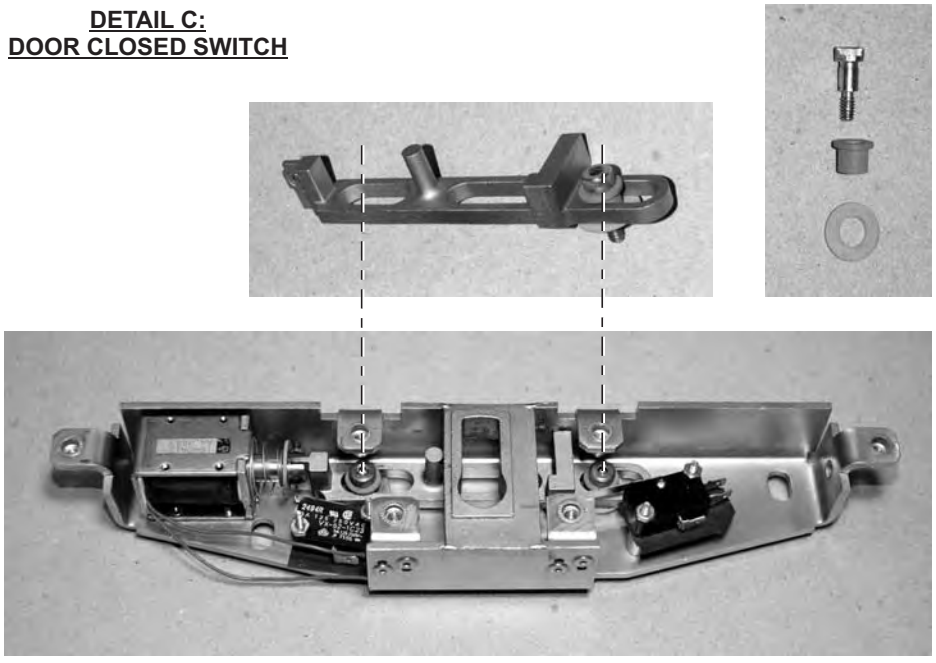
DETAIL A:
DOOR LOCK SWITCH "OFF"



DETAIL B:
DOOR LOCK SWITCH "ON"



DETAIL C:
DOOR CLOSED SWITCH



Door Lock Mechanism

MCR27E5, MWR27E5; 3015T6X,VRJ,V8Z; 30022T6X,VRJ,V8Z; MWF27J8, MWF27Z8; 30022X8R 36021V5Z, 36021V7Z, 36026V5Z, 36026V7Z, 42026V6Z, 42030V6Z

Parts List—Door Lock Mechanism

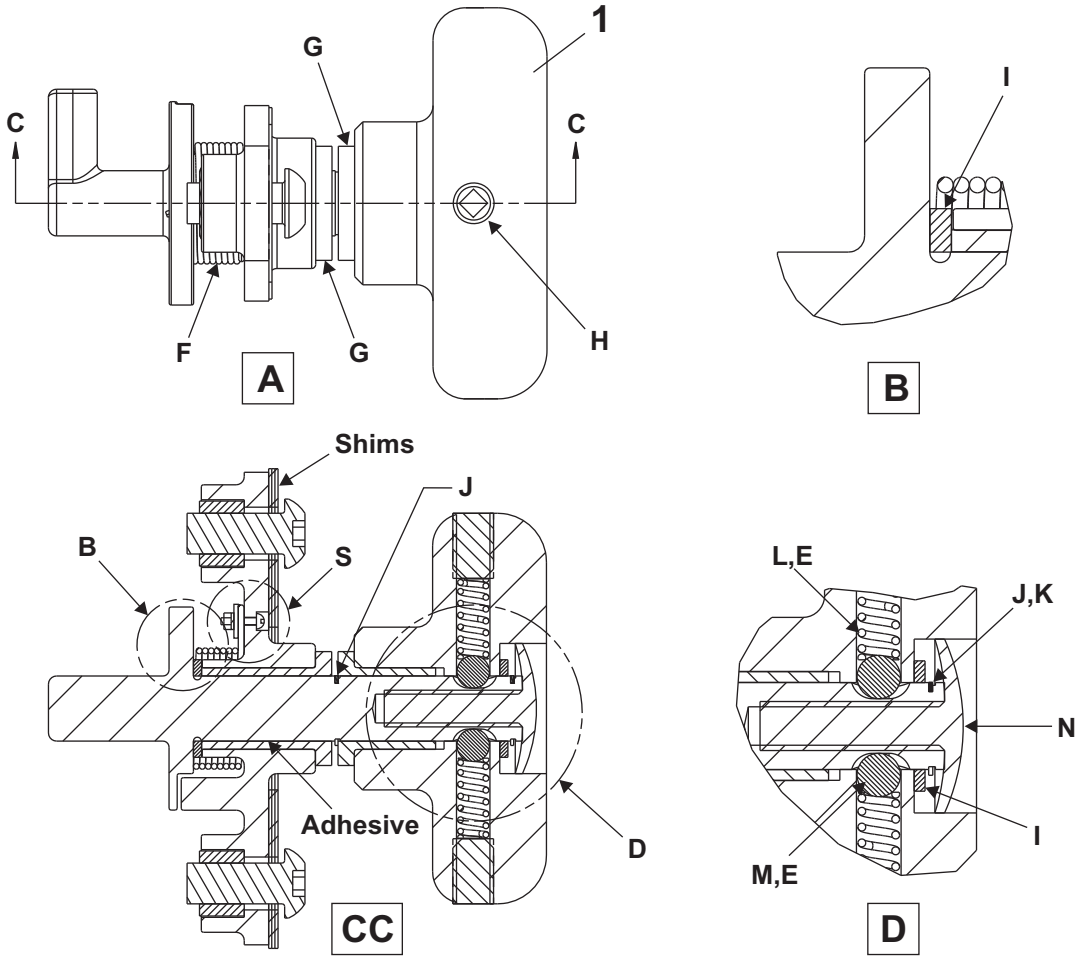
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
All	1	98CMCR0971	DOOR INTERLOCK ASSY V8Z VRJ MILNOR ASSY A33 03226B	
All	2	X2 03306A	MACH=GAGE DR LOCK SWITH,MCR	

Door Handle and Lock Actuator

MWF27J8, MWF27Z8

Figure 1: Detailed Views



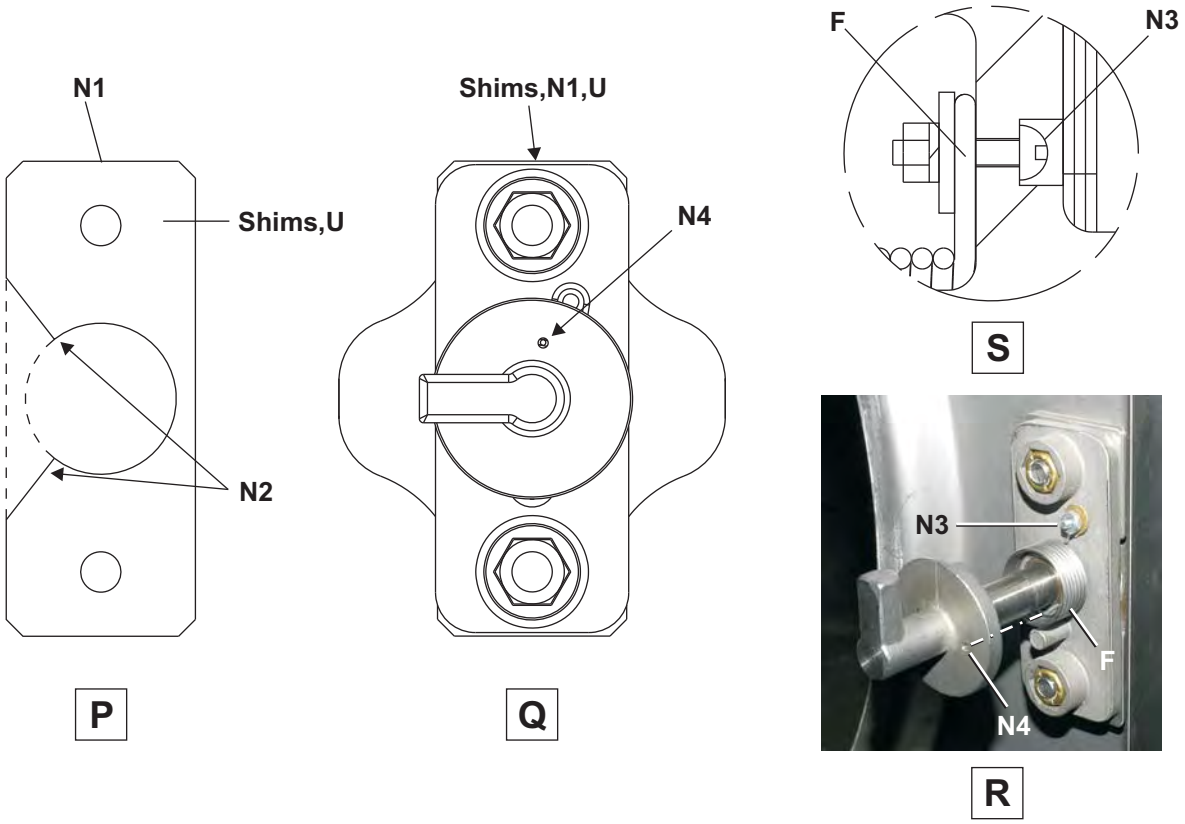
Legend

A. Top
B. Detailed view
CC. Cross section
D. Detailed view
E. Instances 4
F. Torsion spring
G. Flange bearing
H. Bolt
I. Thrust washer
J. Retaining ring
K. Do not open the ring more than necessary to get it on the shaft.
L. Spring
M. Roller ball
N. Retainer

Door Handle and Lock Actuator

MWF27J8, MWF27Z8

Figure 2: Add or remove shims until the door locks correctly and seals.



Legend

N1. Add shims to make the latch looser. Remove shims to make the latch tighter. To add shims, add a notch to the shims as shown. Then you will not have to remove the handle assembly. When you remove or add shims, always start with the thinnest shim.

N2. Make a notch as shown.

N3. Put in the machine screw. Put the eye of the torsion spring on the screw then put the flat washer, lock washer, and nut on the screw to hold the eye. Tighten the nut.

N4. Put the free end of the spring into this hole.

P. The shim with the added notch

Q. Rear view

R. Inside view

S. Detailed view

T. Torsion spring

U. The shims are (.230 inches) and (.015 inches) thick.

Door Handle and Lock Actuator

MWF27J8, MWF27Z8

Parts List—Door Handle and Lock Actuator

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

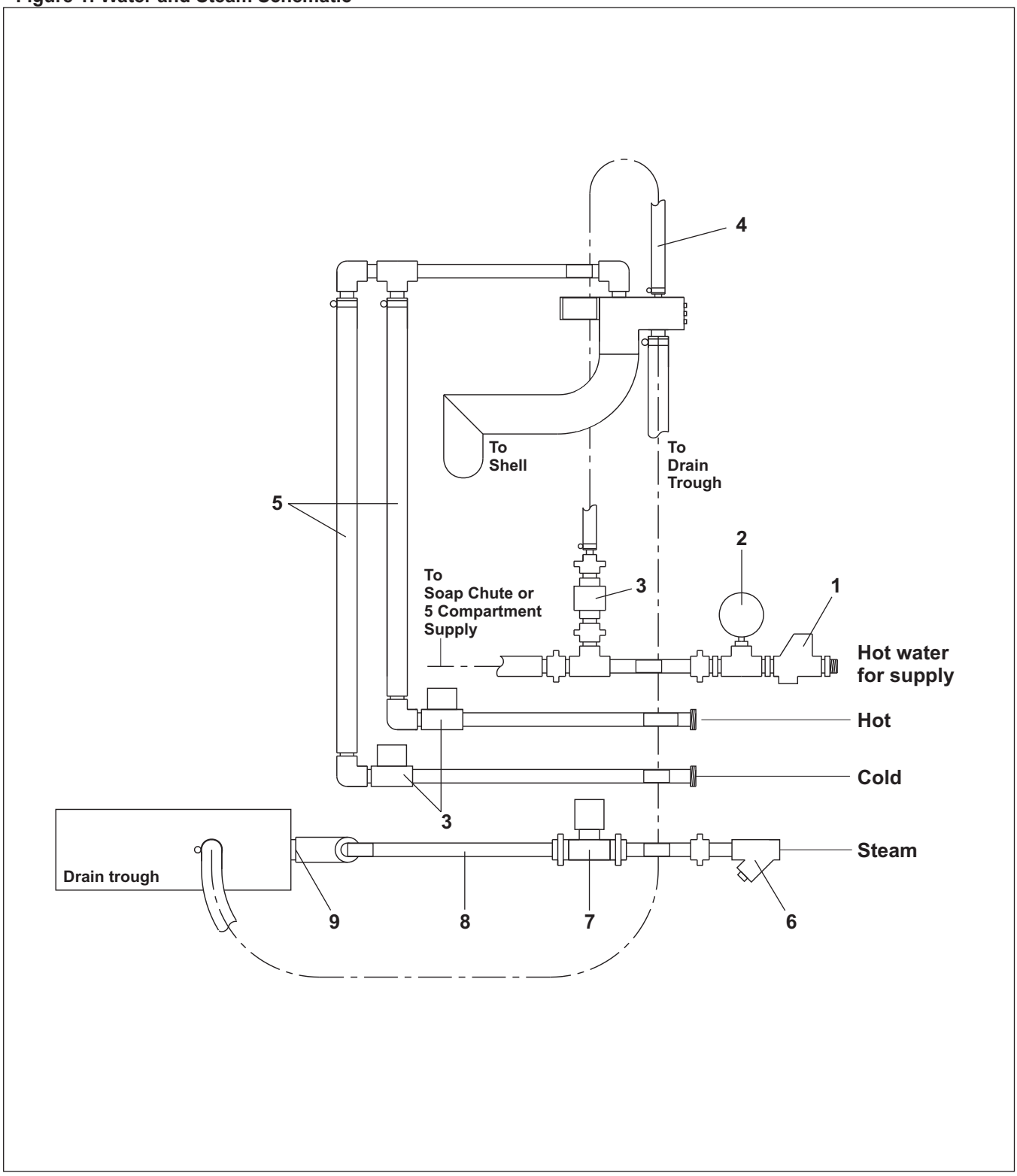
Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	98CMCR0925	ASSY=DR HNDL MECH	

6 Water and Steam Piping and Assemblies

Water & Steam Components

MWF27J8, MWF28Z8

Figure 1: Water and Steam Schematic



Water & Steam Components

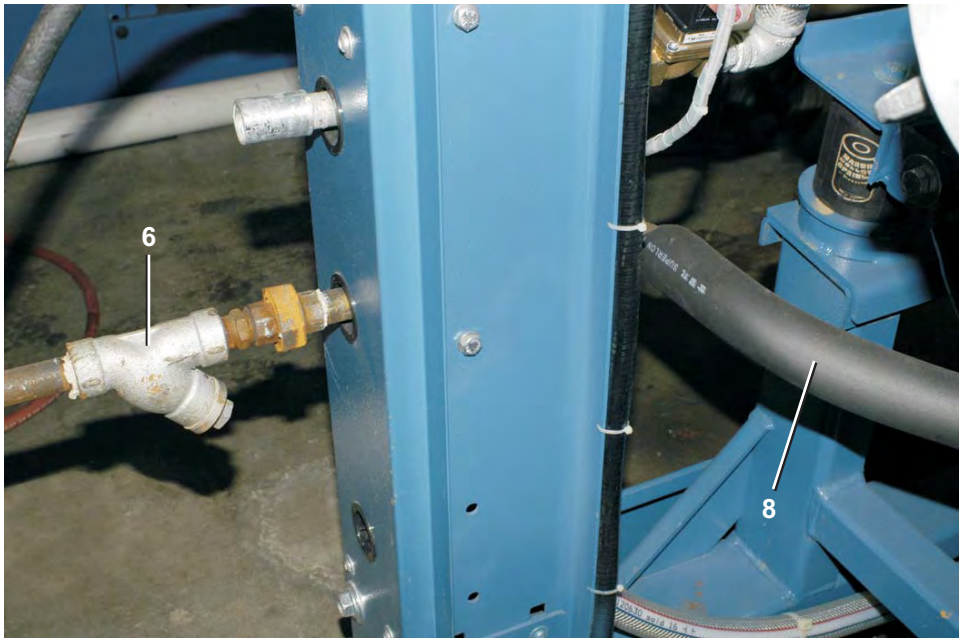
MWF27J8, MWF28Z8

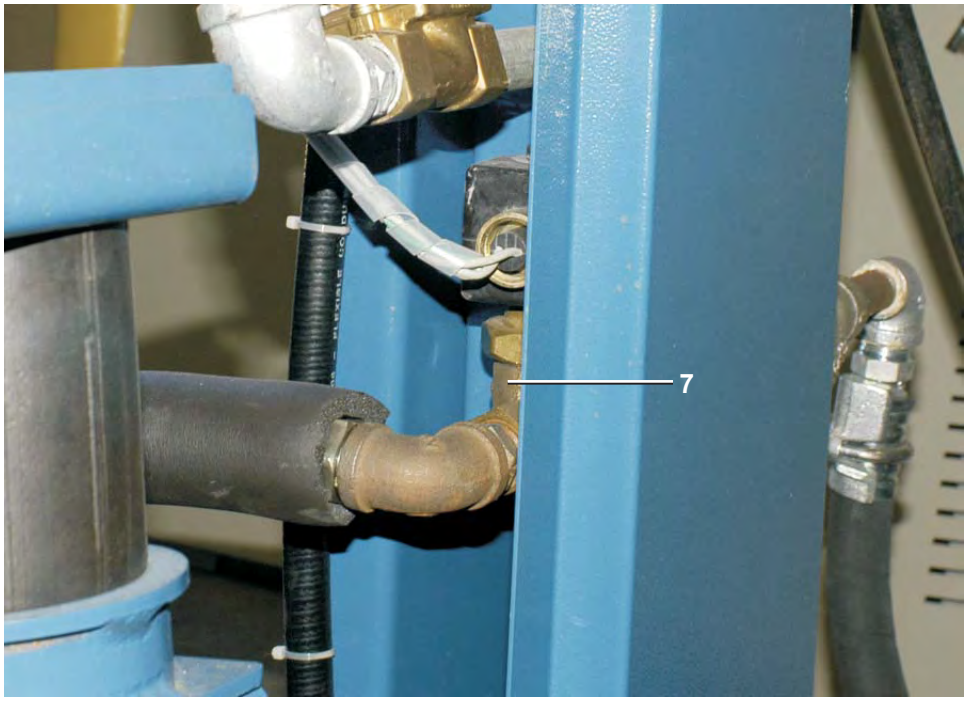
Figure 2: Water and Steam Inlets

Water & Steam Components

MWF27J8, MWF28Z8

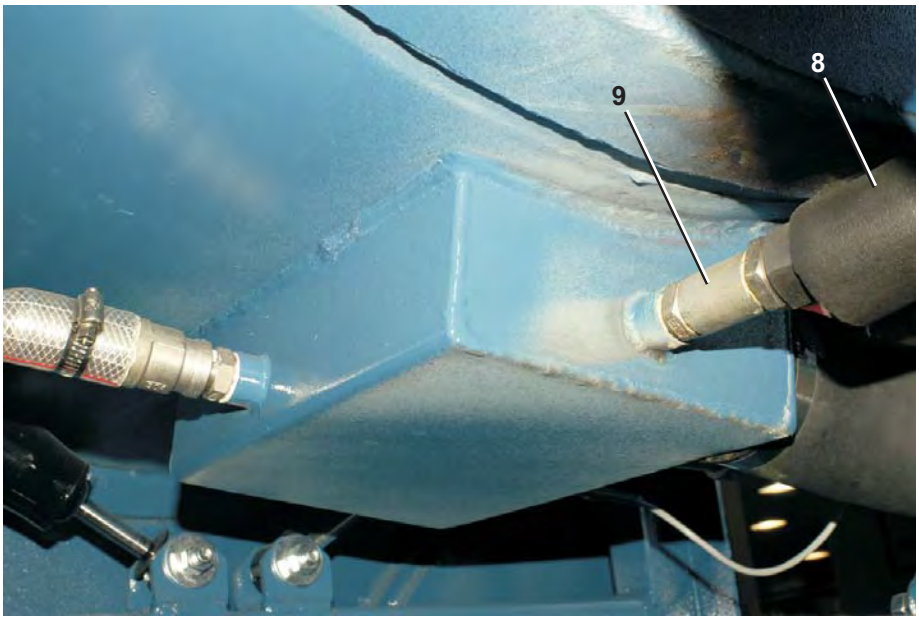
Figure 3: Steam Inlet





Water & Steam Components

MWF27J8, MWF28Z8



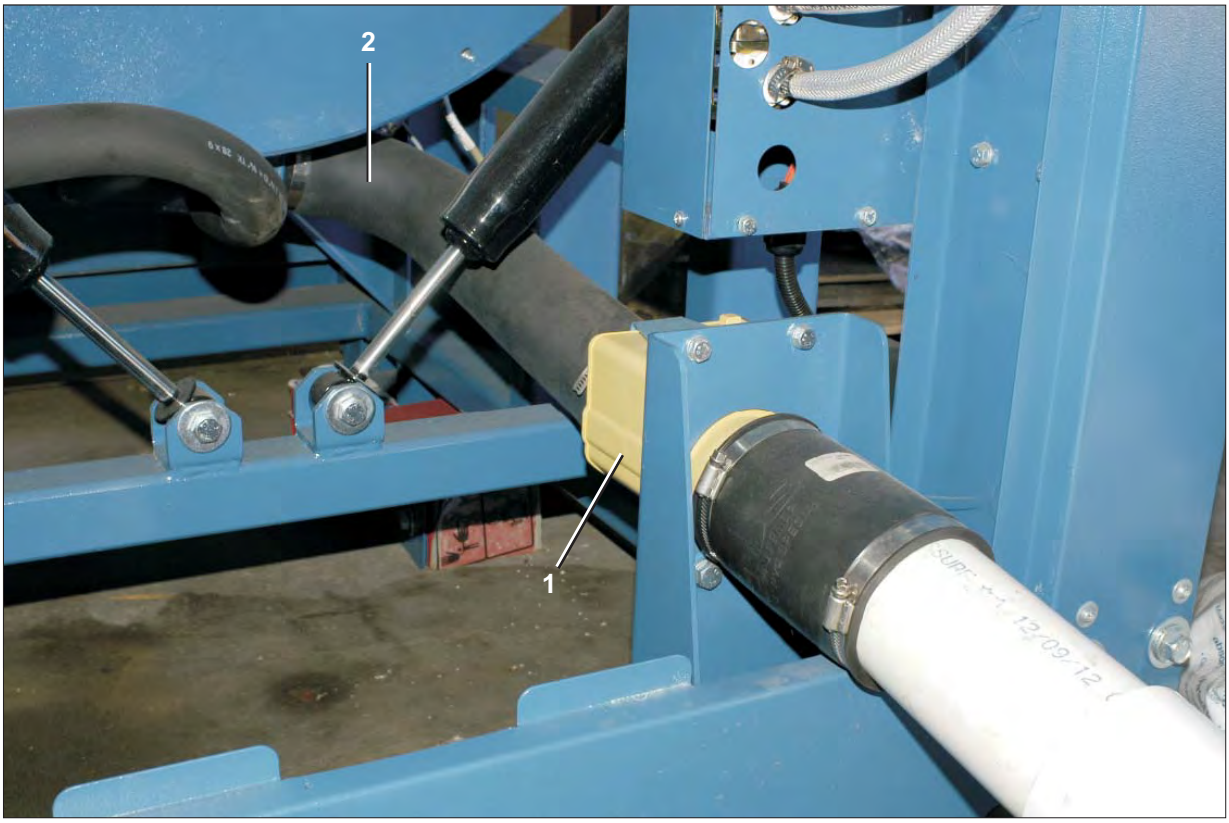
Parts List—Water & Steam Components

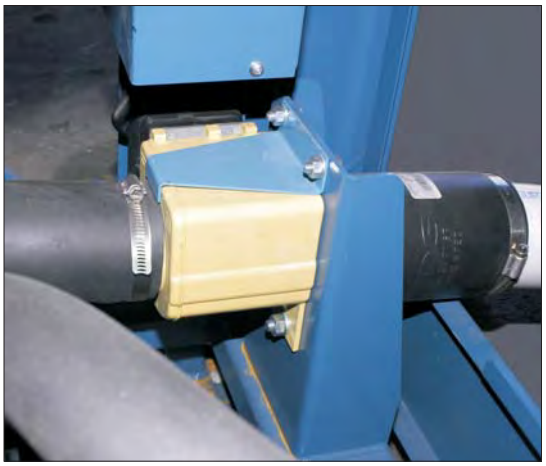
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	98CX820821	PRESSURE REGULATOR, 1/2 28PSI	
all	2	98CX902450	PRESSGAUGE R1/4",0-28PSI	
all	3	96P057B71	1/2"NPT X 1/2"ORIFICE 240V 5/6 PARKER	
all	4	98CX489037	FLEXIBLE TUBING	
all	5	98CX489038	FLEXIBLE TUBING	
all	6	98CX820601	Y-STRAINER, 1/2	
all	7	96P039A71	1/2"STEAMVAL240V50/60C 150PSI	
all	8	98CX800416	STEAM HOSE, 1/2	
all	9	98CX02555A	STEAM SPARGER 42X	

Drain

MWF27J8, MWF27Z8





Drain

MWF27J8, MWF27Z8

Parts List—Drain

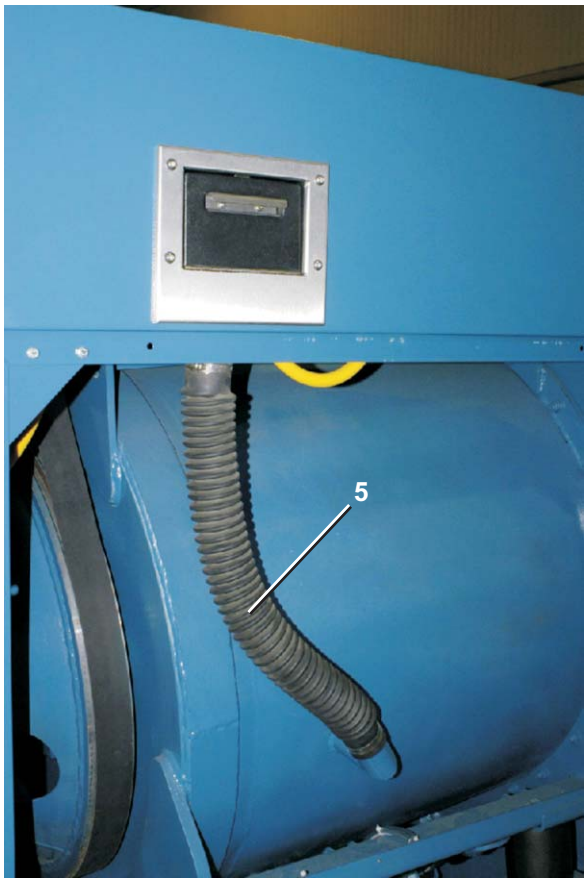
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

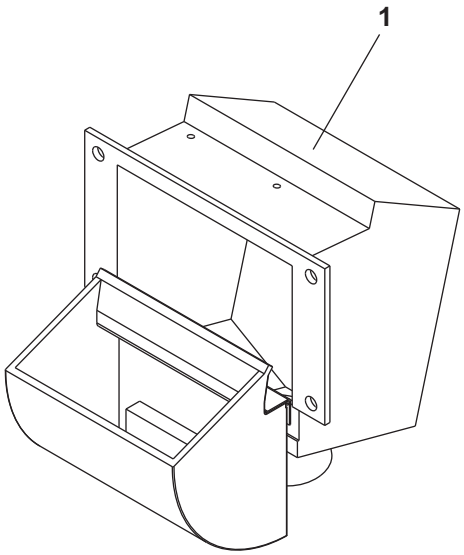
Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	96D350A71	DRINVAL 3"N/O MTRDR240V 50/60C W/COVER DEPENDO	
all	2	98CX03588C	DRAIN HOSE	
all	3	27A088S	HOSECLAMP 3+1/16-4"SSSCR#HSS56	

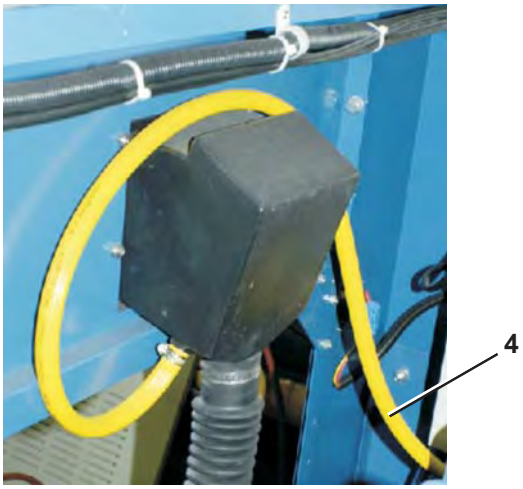
Chemical Supply Devices 7

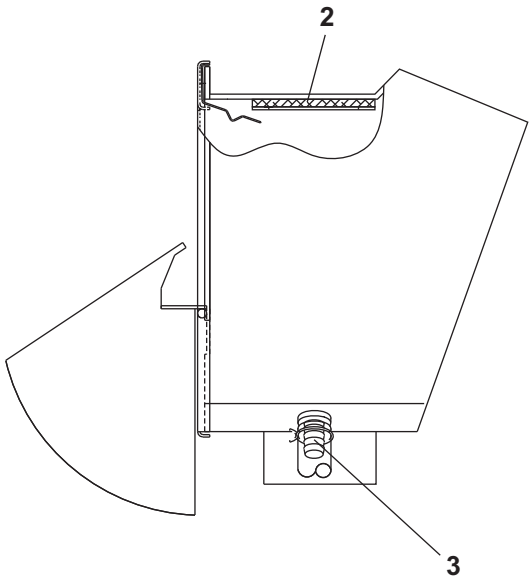
Soap Chute

MWF27J8, MWF27Z8









Parts List—Soap Chute

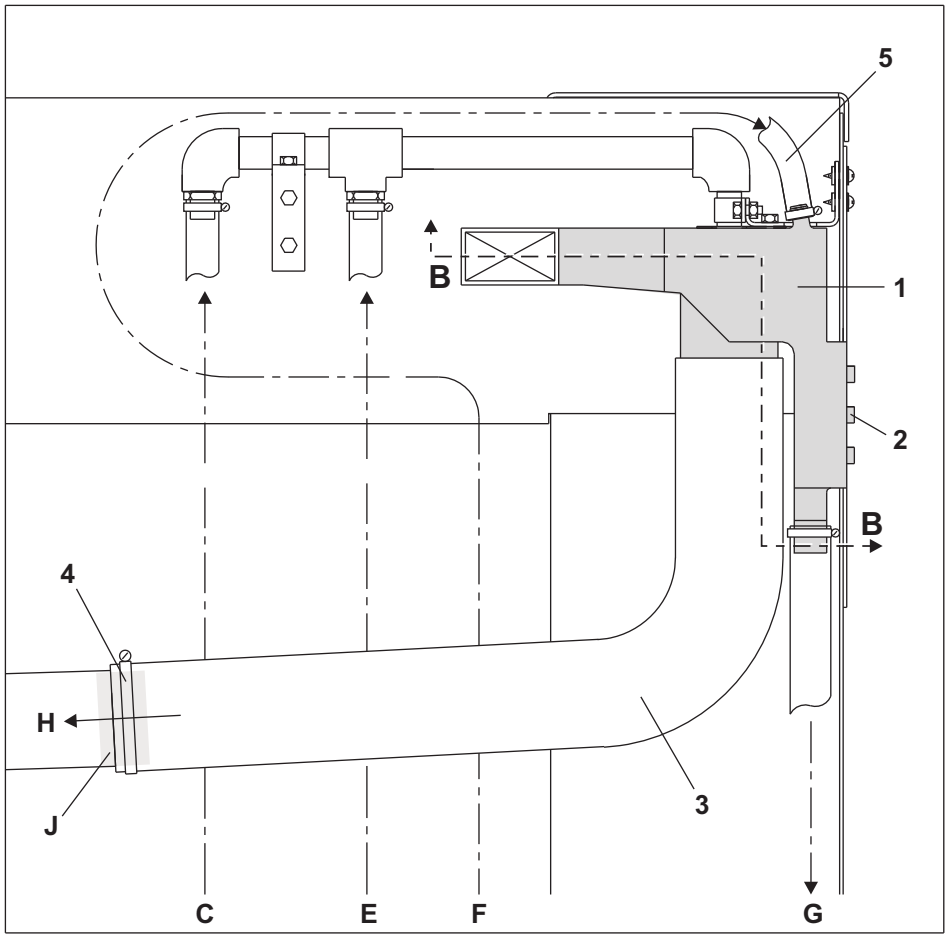
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
-			----------COMPONENTS----------	
all	1	AWS30211A	PLASTIC SOAP ASSY	
all	2	98CX972828	PAD	
all	3	51BB0KN00B	BULKHD FITT 1/2"BARBED,POLYPRO	
all	4	98CX489041	FLEXIBLE HOSE	
all	5	02 03870D	FLEXTUBE=2"ID X 14"LG W/CUFFS	

Peristaltic Supply

MWF27J8, MWF27Z8

Figure 1: Cross Section Peristaltic Inlet

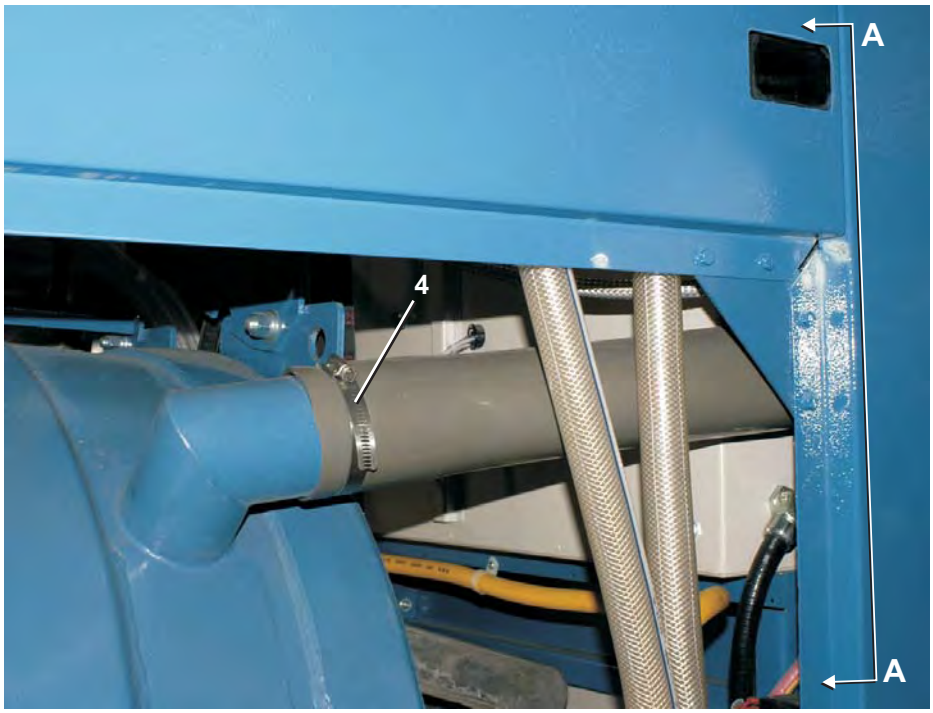


View A-A

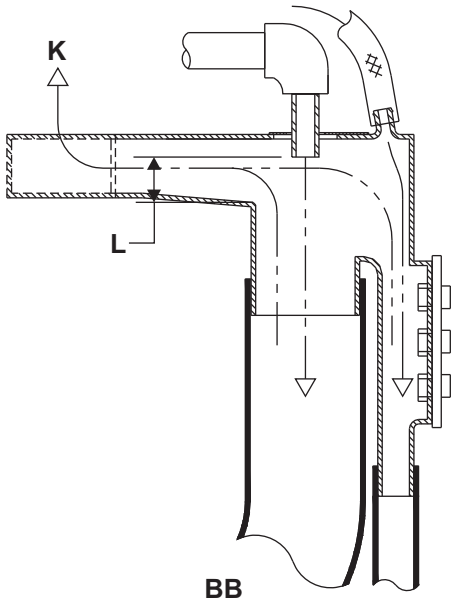
AA. Cross section
C. Cold water line
E. Hot water line
F. Hot water to flush the chemical supplies
G. Water and chemical supplies to the shell
H. Hot and cold water to the shell
J. Apply adhesive to the surfaces that connect. Then, tighten the clamp.

Peristaltic Supply

MWF27J8, MWF27Z8



Cross Section



Legend

BB. Cross section
K. Vent
L. Air space: 1 inch(25MM)

Peristaltic Supply

MWF27J8, MWF27Z8

Parts List—Peristaltic 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
			----------COMPONENTS----------	
all	1	02 03588M	PERISTALTIC/WATER INLET 3022H	
all	2	98CX489021	NPT PLASTIC PLUG	
all	3	98CX03588X	FLEXIBLE HOSE	
all	4	27A088S	HOSECLAMP 3+1/16-4"SSSCR#HSS56	
all	5	98CX910814	FLEXIBLE HOSE ID12XOD18X44M	

5 Compartment Supply

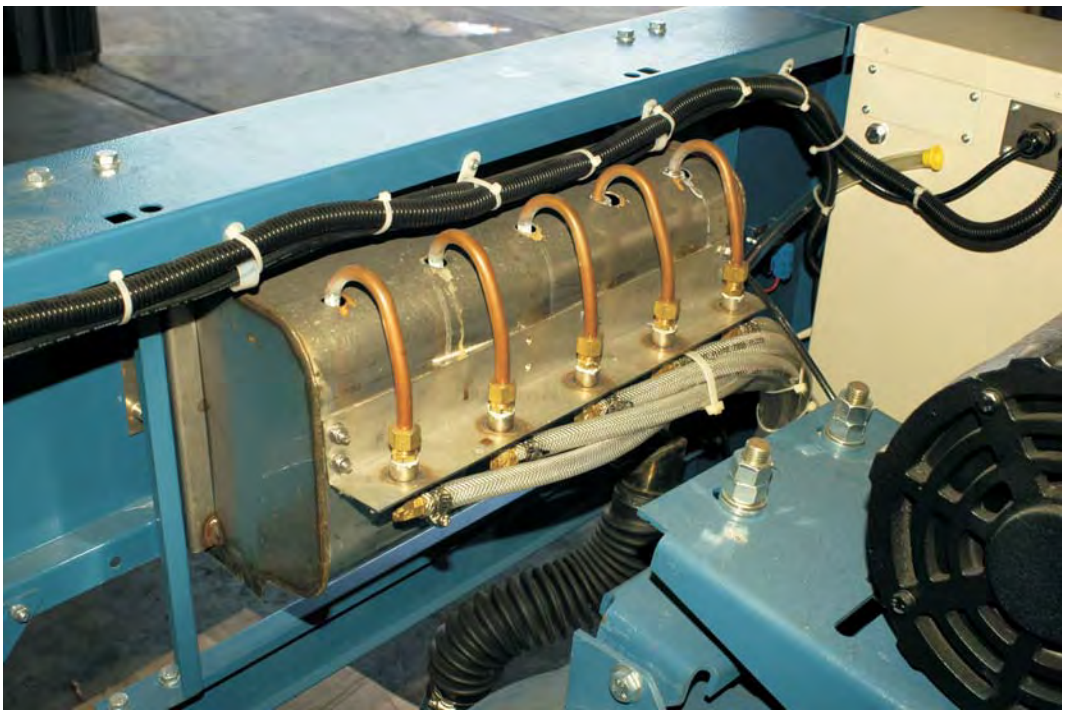
MWF27J8, MWF27Z8

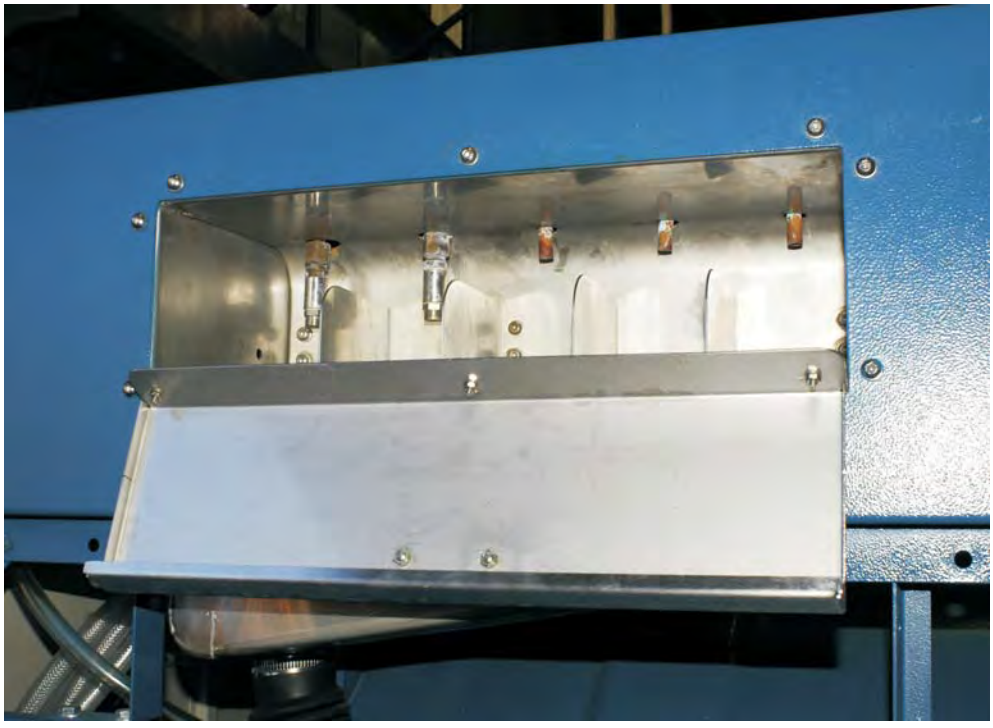
Figure 1: 5 Compartment Supply

5 Compartment Supply

MWF27J8, MWF27Z8

Figure 2: Water Nozzles





5 Compartment Supply

MWF27J8, MWF27Z8

Figure 3: Valve Manifold

5 Compartment Supply

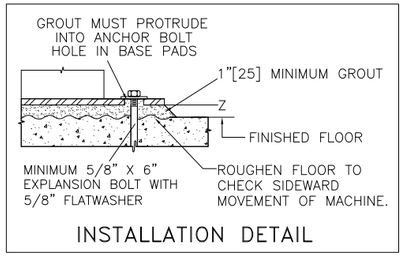
MWF27J8, MWF27Z8

Parts List—5 Compartment Supply

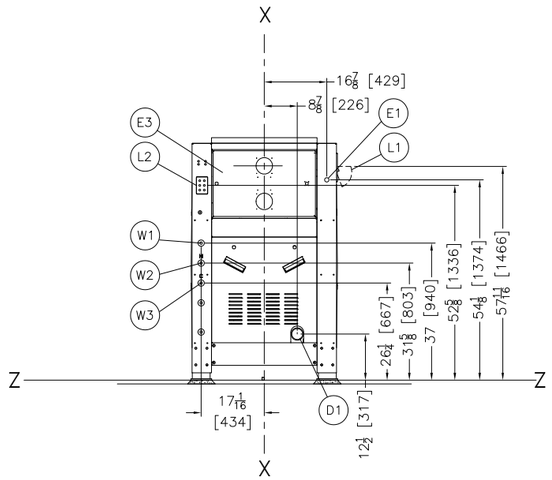
Find the correct assembly first, then find the needed components. The item letters (A, B, C, etc.) assigned to assemblies are referred to in the "Used In" column to identify which components belong to an assembly. The item numbers (1, 2, 3, etc.) assigned to components relate the parts list to the illustration.

Used In	Item	Part Number	Description	Comments
			----------COMPONENTS----------	
all	1	02 03870D	FLEXTUBE=2"ID X 14"LG W/CUFFS	
all	2	96P013B71	3/4" 2WAYPLASTICVAL 240V60C W/L-BRACKET	

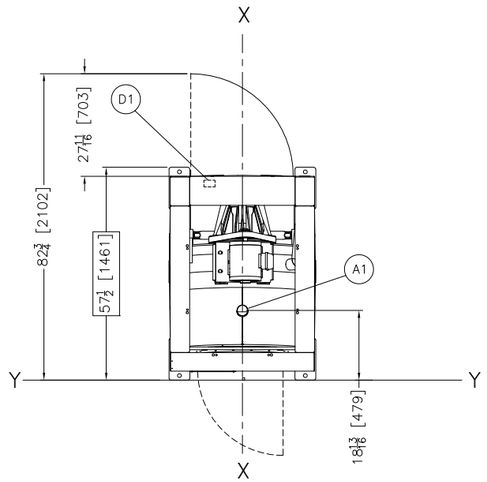
Dimensional Drawings 8



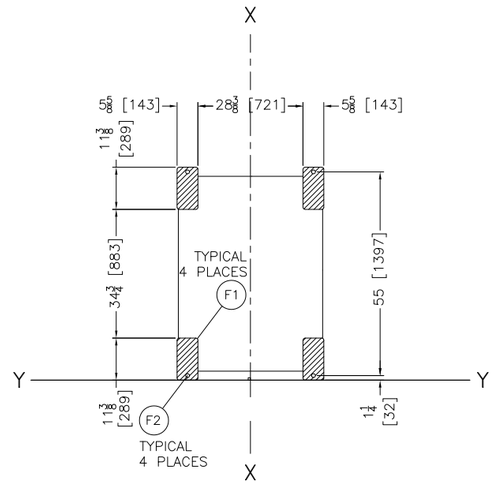
INSTALLATION DETAIL



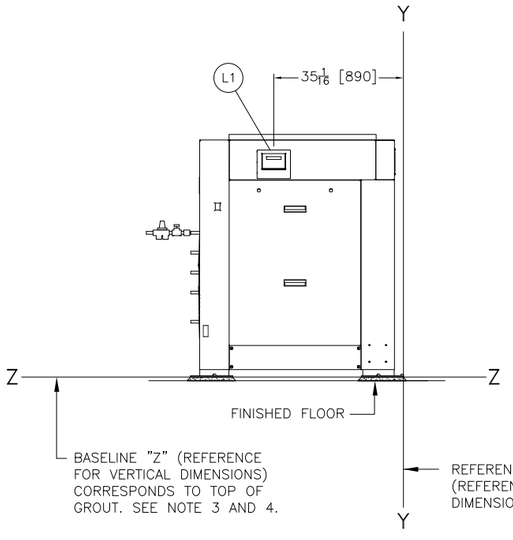
REAR VIEW



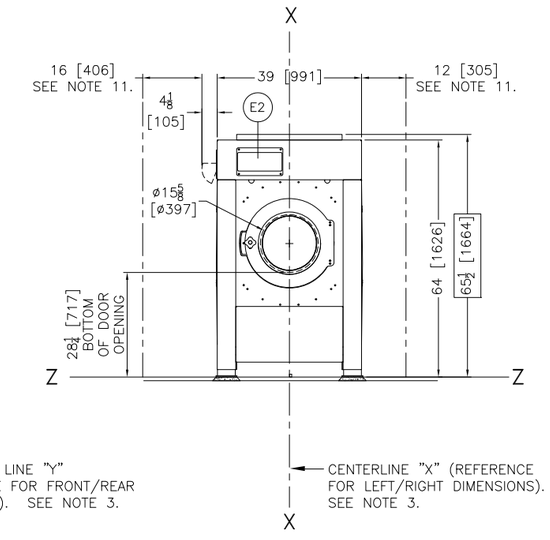
PLAN VIEW



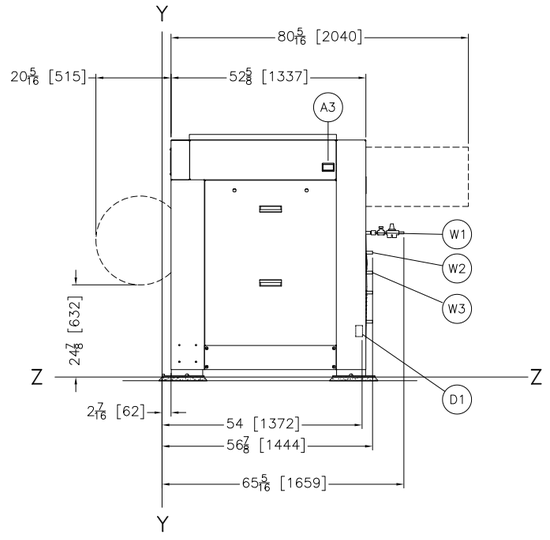
FOUNDATION PLAN



LEFT VIEW



FRONT VIEW



RIGHT VIEW

W3	COLD WATER INLET, 3/4" GARDEN HOSE, MALE THREAD CONNECTION. SEE NOTE 12.
W2	HOT WATER INLET, 3/4" GARDEN HOSE, MALE THREAD CONNECTION. SEE NOTE 12.
W1	HOT WATER FOR SUPPLY, 3/4" NPT CONNECTION, PRESSURE REGULATOR ASSEMBLY, REMOVED FOR SHIPPING, MUST BE ADDED AT INSTALLATION.
L2	STANDARD LIQUID SUPPLY INLETS. SEE NOTE 10.
L1	STANDARD SOAP CHUTE
F2	(4) 1-1/16" DIAMETER ANCHOR BOLT HOLES, USE 5/8" X 6" BOLTS MINIMUM.
F1	BASEPADS, SEE NOTE 8.
E3	MICROPROCESSOR CONTROL BOX
E2	E-P Plus ® Controller – MWF27J8 MODELS, MilTouch ™ Controller – MWF27Z8 MODELS
E1	MAIN ELECTRICAL CONNECTION
D1	DRAIN TO REAR, ELECTRIC, 3" PIPE SOCKET JOINT.
A2	VENT FOR LIQUID SUPPLY
A1	VENT 3"ø
ITEM	LEGEND

NOTES

12 THIS MACHINE USES 1/2" WATER VALVES WITH 3/4" GARDEN HOSE CONNECTIONS. ADAPTERS ARE PROVIDED WITH 3/4" GARDEN HOSE, MALE THREAD, TO 1/2" FEMALE THREAD.

11 12"[305] MINIMUM CLEARANCE IS RECOMMENDED FOR SERVICE TO MACHINE ON SIDES NOT REQUIRING OPERATOR ACCESS. 16"[406] MINIMUM IS RECOMMENDED FOR OPERATOR ACCESS TO SOAP SUPPLY. SEE LOCAL ELECTRIC CODES FOR REQUIRED CLEARANCES.

10 STANDARD LIQUID SUPPLY INLETS COMES WITH THREE SETS OF FIVE FITTINGS. ONE SET OF 3/8" FITTINGS, ONE SET OF 1/2" FITTINGS, AND ONE SET OF PLUGS WHICH ARE SHIPPED ON MACHINE.

9 SHIM TO LEVEL THE MACHINE AND ALLOW FOR 1" [25] MINIMUM GROUT. ANCHOR ALL LABELED ANCHOR BOLT HOLES, USE 5/8" X 6" BOLTS, MINIMUM. SEE INSTALLATION MAINTENANCE MANUAL FOR FURTHER INSTRUCTIONS.

8 SHADED AREA DENOTES BASE PADS WHICH MUST BE CONTINUOUSLY SUPPORT.

7 DO NOT PRE-PIPE ANY CLOSER THAN 60 [1524].

6 AS OF THIS WRITING, THE MINIMUM CLEARANCE REQUIRED BY U.S. NATIONAL ELECTRIC CODES, FROM ELECTRIC BOX TO ANY OBJECT IS:
36 [914] IF OBJECT IS AN UNGROUNDED (INSULATED) WALL.
42 [1067] IF OBJECT IS A GROUNDED WALL (ie. BARE CONCRETE, BRICK, ETC.)
48 [1219] IF OBJECT IS ANY LIVE PART.
CHECK LOCAL ELECTRIC CODES FOR FURTHER RESTRICTIONS.

5 CUSTOMER TO SUPPLY CIRCUIT BREAKER OR FUSED BRANCH CIRCUIT DISCONNECT (SAFETY) SWITCHES WITH LAG TYPE FUSES FROM POWER SOURCE TO MACHINE. A SEPARATE GROUND WIRE MUST BE CONNECTED FROM DISCONNECT TO EQUIPMENT.

4 BASELINE "Z" IS THE SAME FOR ALL MILNOR MACHINES AND IS SHOWN ON ALL DIMENSIONAL DRAWINGS. THE DISTANCE BETWEEN BASELINE "Z" AND THE FINISHED FLOOR MAY VARY (WITH CHANGES IN FLOOR HEIGHT) AS REQUIRED TO INSURE THAT BASELINE "Z" IS HORIZONTAL AND ALL COMPONENTS REQUIRING GROUT ARE SET ON A MINIMUM 1" [25] THICK GROUT BED.

3 USE REFERENCE LINES "X", "Y", AND "Z" TO LOCATE ALL SERVICE CONNECTIONS.

2 NUMBERS IN BRACKETS [] DENOTE DIMENSIONS IN MILLIMETERS.

1 ALL DIMENSIONS SHOWN ARE APPROXIMATE, SUBJECT TO NORMAL MANUFACTURING TOLERANCES, AND TO OCCASIONAL CHANGES WITHOUT NOTICE THROUGH REDESIGN AND/OR RELOCATION OF COMPONENTS, ETC. DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED, AND IN NO EVENT PRE-PIPE CLOSER THAN FIVE FEET FROM MACHINE. FACTORY MUST BE CONSULTED FOR DIMENSIONS IF MACHINE IS TO BE MOVED THROUGH NARROW OR LOW CORRIDORS OR OPENINGS.

ATTENTION

MOST REGULATORY AUTHORITIES (INCLUDING OSHA IN THE USA) HOLD THE OWNER/USER ULTIMATELY RESPONSIBLE TO MAINTAIN A SAFE WORKING ENVIRONMENT. ACCORDINGLY, THE OWNER/USER MUST RECOGNIZE ALL FORESEEABLE SAFETY HAZARDS, FURNISH SAFETY INSTRUCTIONS AND GUIDANCE TO ALL PERSONNEL WHO MAY COME IN CONTACT WITH THE INSTALLATION, AND PROVIDE ALL NECESSARY ADDITIONAL SAFETY GUARDS, FENCES, RESTRAINTS, DEVICES, ETC., NOT FURNISHED BY THE EQUIPMENT MANUFACTURER OR VENDOR.

ATTENTION

THE FLOOR AND/OR OTHER SUPPORT COMPONENTS MUST HAVE SUFFICIENT STRENGTH (AND RIGIDITY WITH DUE CONSIDERATION FOR NATURAL OR RESONANT FREQUENCY THEREOF) TO WITHSTAND THE FULLY LOADED WEIGHT OF THE MACHINE INCLUDING THE GOODS, THE WATER, AND ANY REPEATED SINUSOIDAL (ROTATING) FORCES GENERATED DURING ITS OPERATION. WRITE THE FACTORY FOR ADDITIONAL MACHINE DATA FOR USE BY A COMPETENT SOIL AND/OR STRUCTURAL ENGINEER.

MWF27J8, MWF27Z8

DM 0 0.5M
INCHES 0 12 24

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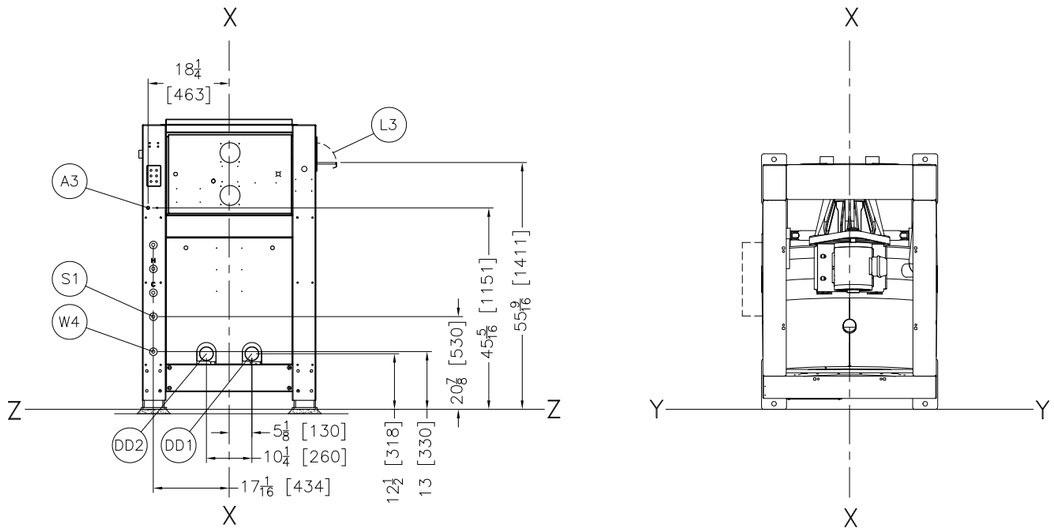
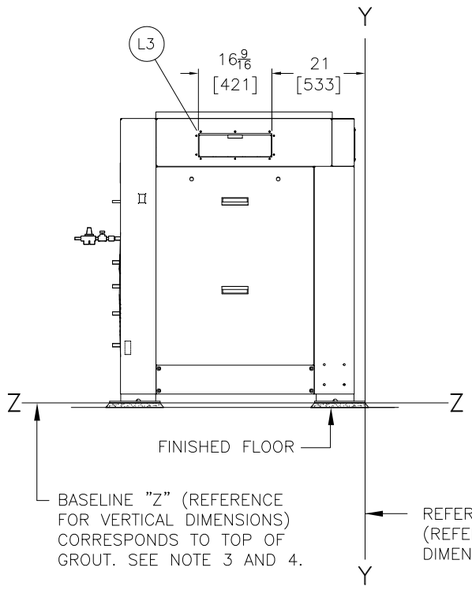
FAX 504/468-3094, Email: milnorinfo@milnor.com

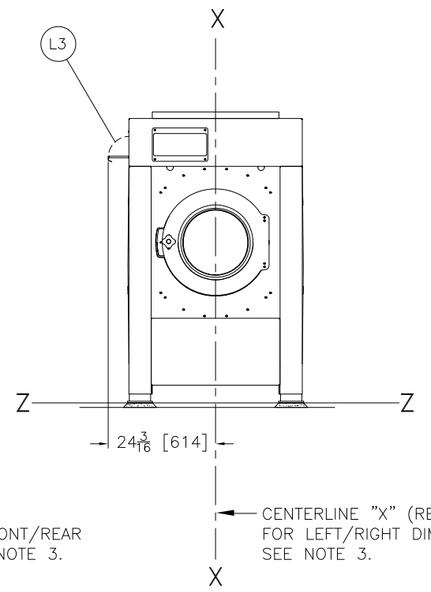


REAR VIEW

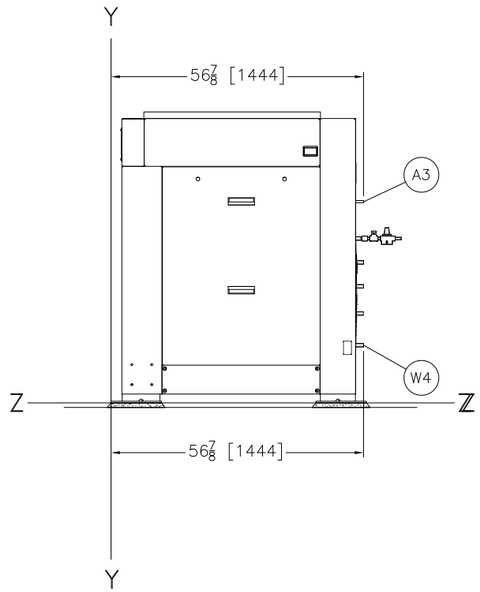
PLAN VIEW



LEFT VIEW



FRONT VIEW



RIGHT VIEW

W4	THIRD WATER INLET, 3/4" GARDEN HOSE, MALE
	THREAD CONNECTION.
S1	AIR-OPERATED STEAM INLET 1/2"NPT. CUSTOMER MUST
	SUPPLY A Y-STRAINER TO THIS INLET.
L3	5 COMPARTMENT SUPPLY
DD2	DUAL DRAIN TO REUSE 3"[76] HOSE CONNECTION
DD1	DUAL DRAIN TO SEWER 3"[76] HOSE CONNECTION
A3	1/4"NPT AIR INLET, USED WITH OPTIONAL AIR-OPERATED
	STEAM, CUSTOMER MUST SUPPLY AIR STRAINER.
ITEM	LEGEND

NOTES

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48 [1219] IF OBJECT IS ANY LIVE PART.
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3 USE REFERENCE LINES "X", "Y", AND "Z" TO LOCATE ALL SERVICE CONNECTIONS.

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MWF27F,J,W OPTIONS

DM 0 0.5M
INCHES 0 12 24

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