

Published Manual Number/ECN: MPIMCRXXBE/2010316A

- Publishing System: TPAS
- Access date: 8/19/2010
- Document ECN's: Latest Available



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

Installation and Service—

MCR12E5, MCR16E5, MCR18E4, MWR12E5, MWR16E5, MWR16J5, MWR16X5, MWR18E4, MWR18X4, MWR18J4 Washer Extractor



Please Read

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

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

Best Available Information—This manual contains the most accurate and complete information available when Milnor shipped your machine/software. Products are occasionally released with the best available documentation, even though the device identification (model numbers, etc.) on the documentation does not explicitly include the delivered model. In such cases, use the documentation provided.

Although unlikely, incorrect manuals may have been shipped with your machine. If you believe you received the wrong manuals, or if you need specific information about any aspect of your machine not addressed in the provided documentation, contact the Milnor Customer Service group.

References to Yellow Troubleshooting Pages—This manual may contain references to “yellow pages.” Although the pages containing trouble-shooting procedures are no longer printed on yellow paper, troubleshooting instructions, if any, will be contained in the easily located “Troubleshooting” section. See the table of contents.

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

CBW [®]	E-P OneTouch [®]	Gear Guardian [®]	Mildata [®]	Milnor [®]	Staph-Guard [®]
E-P Express [®]	E-P Plus [®]	Mentor [®]	Milnet [®]	MultiTrac [™]	Visionex [™]

Trademarks of Other Companies—The following terms, some of which may be used in this publication, are trademarks of their respective companies:

Acronis [®]	Microsoft Windows 2000 [®]	Yaskawa [®]	Siemens [®]
Atlas 2000 [®]	Microsoft Office XP [®]	Microsoft Access [®]	Seagate Crystal Reports [®]
IBM [®]	Microsoft Windows NT [®]	Microsoft Windows XP [®]	

Comments and Suggestions

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

Pellerin Milnor Corporation
Attn: Technical Publications
P. O. Box 400
Kenner, LA 70063-0400
Fax: (504) 469-1849

Table of Contents for MPIMCRXXBE/2010316A

MCR12E5, MCR16E5, MCR18E4, MWR12E5, MWR16E5, MWR16J5, MWR16X5, MWR18E4, MWR18X4, MWR18J4

Page	Description	Document/ECN
1	Limited Standard Warranty	BMP720097/2008272A
2	How to Get the Necessary Repair Components	BIUUUD19/20081231
3	Safety Placard Use and Placement - MCR12E5, MCR16E5, MCR18E4, MCR27E5	BMP050019/2009442B
5	Safety Placard Use and Placement - MWR12E5, MWR16E5, MWR18E5, MWR18J4, MWR18X4, MWR27E5	BMP050050/2009442B
7	Guards and Covers	BMP050007/2009412B
9	About the Forces Transmitted by Milnor® Washer- extractors	BIWUUI02/20001108
11	Understanding the Tag Guidelines	BIUUUI02RC/20100115
14	Avoiding Damage from Allied Remote Chemical Delivery Systems	BIWUUI03/20030306
19	Handling and Setting Procedures for Rigid Mount Washer-Extractors	BIRUUI01AB/20050221
22	External Fuse/Breaker, Wiring, and Disconnect Requirements	BFUUUF01/20051027
23	MCR09E5, MWR09E5, MCR12E5, MWR12E5	BFRCAF01/20071203
24	MCR16E5, MWR16E5, MWR16J5, and MWR16X5	BFRCCF01/20100325
25	MCR18E4, MWR18E4, MWR18X4, MWR18J4 (no steam and steam)	BFRCBF01/20080211
26	MWR18J4 with Electric Heat	BFRCBF02/20090313
27	Service Connections	BIRQVI01CU/20071203
31	Section 1: Service and Maintenance	
32	Preventive Maintenance	BIIFUM02RC/20091027
37	Motor Preventive Maintenance	BIUUUM03/20071029
40	Fastener Torque Requirements	BIUUUM04/20080506
49	Section 2: Drive Assemblies	
50	Drive Chart	BMP050008/2009412B
51	Motor Mount	BMP050004/2009412B
53	Section 3: Bearing Assemblies	
54	Bearing Assembly & Installation	BMP060001/2009412B
56	Bearing Assembly & Installation - MWR18J6	BMP100028/2010316A
59	Section 4: Shell and Door Assemblies	
60	Servicing the Door to Open it with Power Off or with a Malfunctioning Door Lock	BIRH3M02/20080731
65	Door Installation	BMP040094/2009412B
68	Door Lock Mechanism	BMP060002/2009412B
70	Door Locking Handle	BMP070030/2009412B

Table of Contents, cont.

Page	Description	Document/ECN
73	Section 5: Control and Sensing	
74	Coin Acceptor & Vault - MCR12E5, MCR1E65, MCR18E4, & MCR27E5	BMP040093/2010332B
76	Level Switch	BMP050006/2009412B
78	Vibration Safety Switch Adjustments	MSSMA408BE/9273BV
80	Vibration Safety Switch	BMP050009/2009412B
81	Section 6: Chemical Supply	
82	Soap Chute - MCR12E5, MCR18E4, MCR16E5, MCR27E5	BMP060004/2010243B
85	Soap Chute - MWR12E5, MWR16E5, MWR18E4, MWR18J4	BMP060005/2009412B
88	Soap Chute - MWR18X4	BMP060056/2009412B
91	Section 7: Water and Drain	
92	Water Inlet Installation - MCR12E5, MCR16E5, MCR18E4	BMP050003/2009412B
94	Water Inlet Installation - MWR12E5, MWR16E5, MWR18E4, MWR18X4, MWR18J4	BMP060006/2010124B
97	Drain Installation	BMP050005/2009412B
99	Section 8: Dimensional Drawings	
101	Dimensional Drawing - MCR12E5, MWR12E5	BDMCR12EAE/2010193D
103	Dimensional Drawing - MCR16E5, MWR16E5, MWR16X5, MWR16J5	BDMCR16EAE/2010313D
105	Dimensional Drawing - MCR18E4, MWR18E4, MWR18X4, MWR18J6	BDMCR18EAE/2010285D
107	Dimensional Drawing - Pedestal for (1) MCR/MWR12E5	BDMCRBB1BE/2007492D
108	Dimensional Drawing - Pedestal for (2) MCR/MWR12E5	BDMCRBB2BE/2007492D
109	Dimensional Drawing - Pedestal for (4) MCR/MWR12E5	BDMCRBB4BE/2007492D
110	Dimensional Drawing - Pedestal for (1) MCR16E5	BDMCRBK1AE/2010175D
111	Dimensional Drawing - Pedestal for (1) MCR/MWR18	BDMCRBL1AE/2008387D
112	Dimensional Drawing - Pedestal for (2) MCR/MWR18	BDMCRBL2AE/2008387D
113	Dimensional Drawing - Pedestal for (4) MCR,MWR18	BDMCRBL4AE/2008387D

PELLERIN MILNOR CORPORATION LIMITED STANDARD WARRANTY

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

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

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

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

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

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

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

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 —

Safety Placard Use and Placement
MCR12E5, MCR16E5, MCR18E4, MCR27E5

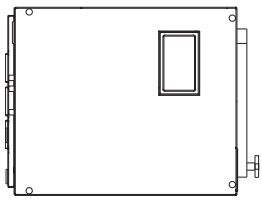
BMP050019/2009442B
(Sheet 1 of 2)



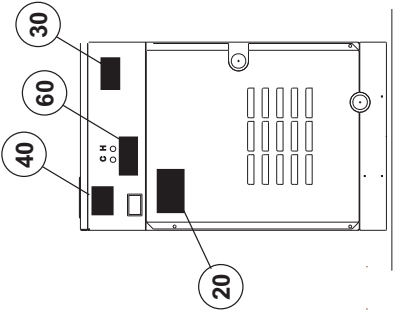
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

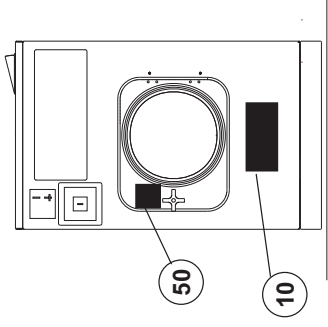
- Notes:**
- 1. Replace placard immediately, if removed or unreadable.
 - 2. Approximate locations of placards are shown. Mounting holes are provided on machine. If aluminum placard use #8 self-tapping screws.



PLAN VIEW



REAR VIEW



FRONT VIEW



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

Litho in U.S.A.

Parts List—Safety Placard Placement

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

Used In	Item	Part Number	Description	Comments
<hr/>				
			ASSEMBLIES	
			none	
<hr/>				
			COMPONENTS	
all	10	01 10707B	NPLT:WARNING FRT SHELL MW COIN	
all	20	01 10708B	NPLT:REAR WARNINGS MW COIN	
all	30	01 10375D	NPLT:ELEC HAZARD MW-TCATA	
.	40	01 10092E	NPLT:SPEC PLT-MD IN CHINA-ENG	MCR12E5, MCR16E5 MCR18E4, MCR18J4, MCR18X4
.	40	01 10093E	NPLT:SPEC PLT+CODE-ENGLISH	MCR27E5
all	50	01 10709B	NPLT:DOOR ILOC INST MCR	
all	60	01 10710A	NPLT:CAUTION CHEMICAL SYSTEM	

Safety Placard Use and Placement
MWR12E5, MWR16E5, MWR18E5, MWR18J4, MWR18X4, MWR27E5

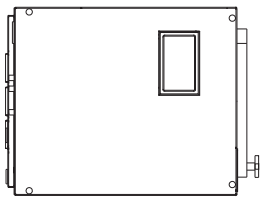
BMP05050/2009442B
(Sheet 1 of 2)



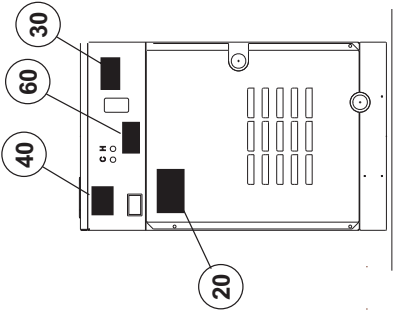
Pellerin Milnor Corporation
P. O. Box 400, Kenner, LA 70063-0400

Litho in U.S.A.

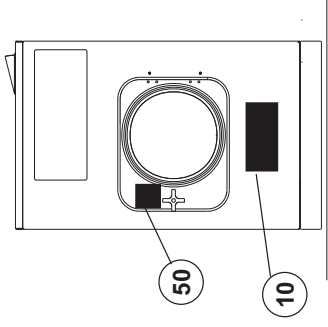
- Notes:**
1. Replace placard immediately, if removed or unreadable.
 2. Approximate locations of placards are shown. Mounting holes are provided on machine. If aluminum placard use #8 self-tapping screws.



PLAN VIEW



REAR VIEW



FRONT VIEW



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

Litho in U.S.A.

Parts List—Safety Placard Placement

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

Used In	Item	Part Number	Description	Comments
<hr/>				
			ASSEMBLIES	
			none	
<hr/>				
			COMPONENTS	
all	10	01 10707B	NPLT:WARNING FRT SHELL MW COIN	
all	20	01 10708B	NPLT:REAR WARNINGS MW COIN	
all	30	01 10375D	NPLT:ELEC HAZARD MW-TCATA	
.	40	01 10092E	NPLT:SPEC PLT-MD IN CHINA-ENG	MWR12E5, MWR15E5, MWR18E5, MWR18J4, MWR18X4
.	40	01 10093E	NPLT:SPEC PLT+CODE-ENGLISH	MWR27E5
all	50	01 10709B	NPLT:DOOR ILOC INST MCR	
all	60	01 10710A	NPLT:CAUTION CHEMICAL SYSTEM	

Guards and Covers

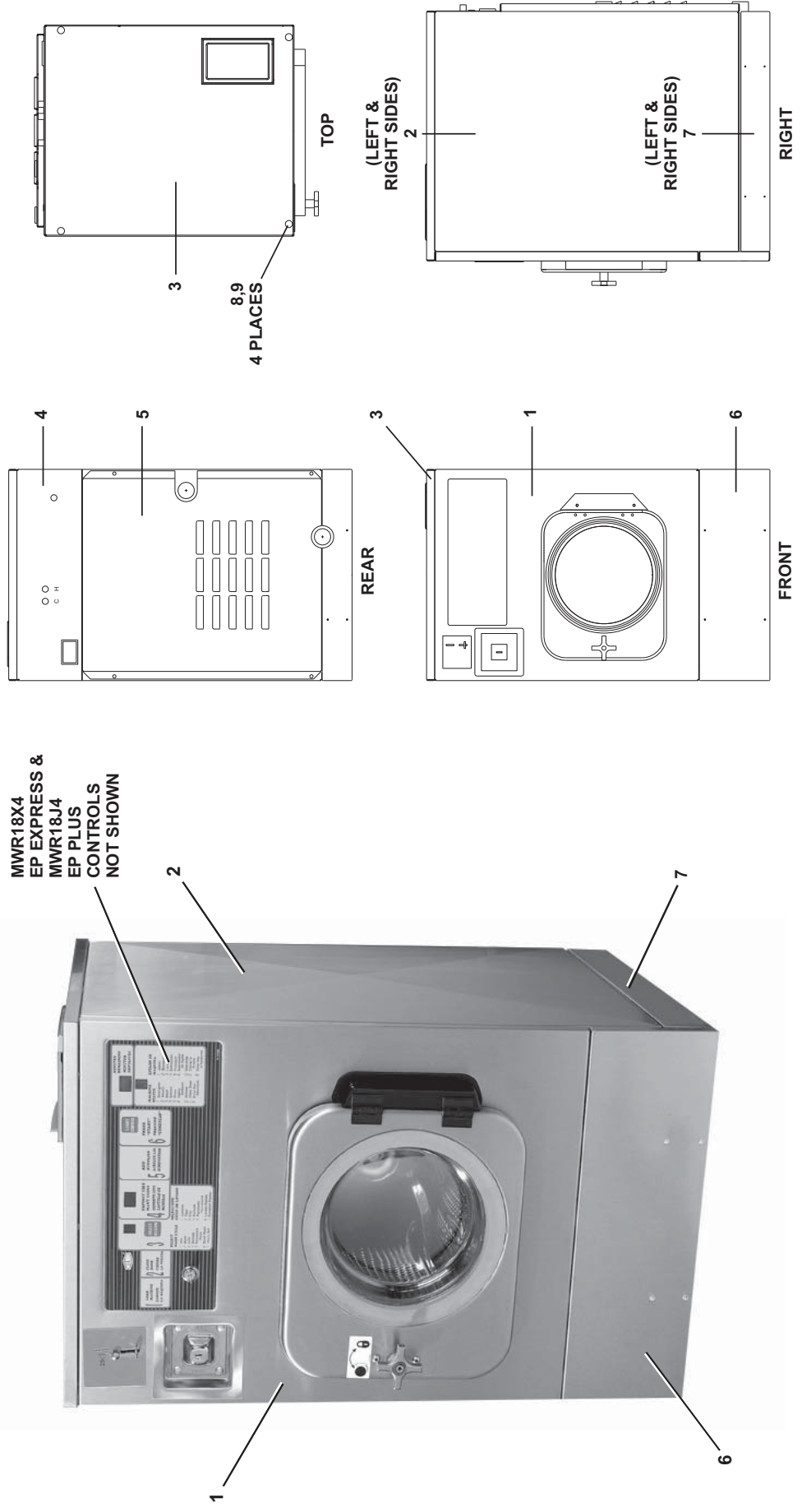
MCR12E5, MCR16E5, MCR18E4, MWR12E5, MWR16E5, MWR18E4, MWR18X4, MWR18J4

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

BMP050007/2009412B
(Sheet 1 of 2)

Litho in U.S.A.

MWR18X4
EP EXPRESS &
MWR18J4
EP PLUS
CONTROLS
NOT SHOWN





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

Litho in U.S.A.

Parts List—Guard & 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
<hr/>				
ASSEMBLIES				
	A	GHG575X347	2314 CABINET ASSEMBLY 9KG	MCR12E5
	B	GHG2318001	2318 CABINET ASSY 16KG	MCR16E5
	C	GHG700X468	CABINET 18KG	MCR18E4
	D	GHG9KG OPL	CABINET 9KG-OPL	MWR12E5
	E	GHG2318002	2318 CABINET 16KG OPL	MWR16E5
	F	GHG18KG OPL	CABINET 18KG-OPL	MWR18E5
				MWR18X4
				MWR18J4
<hr/>				
COMPONENTS				
A	1	03 40001	CABINET FRONT 575X347	
B	1	03 40101	CABINET FRONT 16KG	
C	1	03 40201	CABINET FRONT 18KG	
D	1	03 40001A	CABINET FRONT 9KG-OPL	
E	1	03 40101A	CABINET FRONT 16KG OPL	
F	1	03 40201A	CABINET FRONT 18KG-OPL	
AD	2	03 40002	PANEL SIDE STAINLESS 9KG	
BE	2	03 40102P	CABINET SIDE 16KG C/S (COLOR=WARM GRAY)	
CF	2	03 40202	PANEL SIDE STAINLESS 18KG	
AD	3	03 40003	CABINET TOP 575X347	
BE	3	03 40103	CABINET TOP 2318	
CF	3	03 40203	CABINET TOP 700X468	
AD	4	03 40004	CABINET REAR VAL MT 575X347	
BE	4	03 40104	CABINET REAR MTBKT 2314	
CF	4	03 40204	CABINET REAR MTBKT 700X468	
AD	5	03 40027	CABINET BACK COVER 575X347	
BE	5	03 40127	CABINET REAR GUARD 16KG	
CF	5	03 40227	CABINET REAR GUARD 18KG	
AD	6	03 40040	LOWER FRONT GUARD 9KG	
BE	6	03 40140	LOWER FRONT COVER 16KG	
CF	6	03 40240	LOWER FRONT COVER	
AC	7	03 40040A	PANEL LOW STAINLESS 9KG	
BE	7	03 40140P	LOWER SIDE COVER LF/RT C/S (COLOR=WARM GRAY)	
CF	7	03 40240A	PANEL LOW STAINLESS 18KG	
all	8	15K120M	HXCAPSCREW M8X40 8.8 FULTH	
all	9	17N070M	CAGE NUT M8 1.8-3.2MM THK	

About the Forces Transmitted by Milnor® Washer-extractors

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

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

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

1. Rigid Machines

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

2. Flexibly-mounted Machines

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

3. How Strong and Rigid?

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

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

Figure 1: How Rotating Forces Act on the Foundation

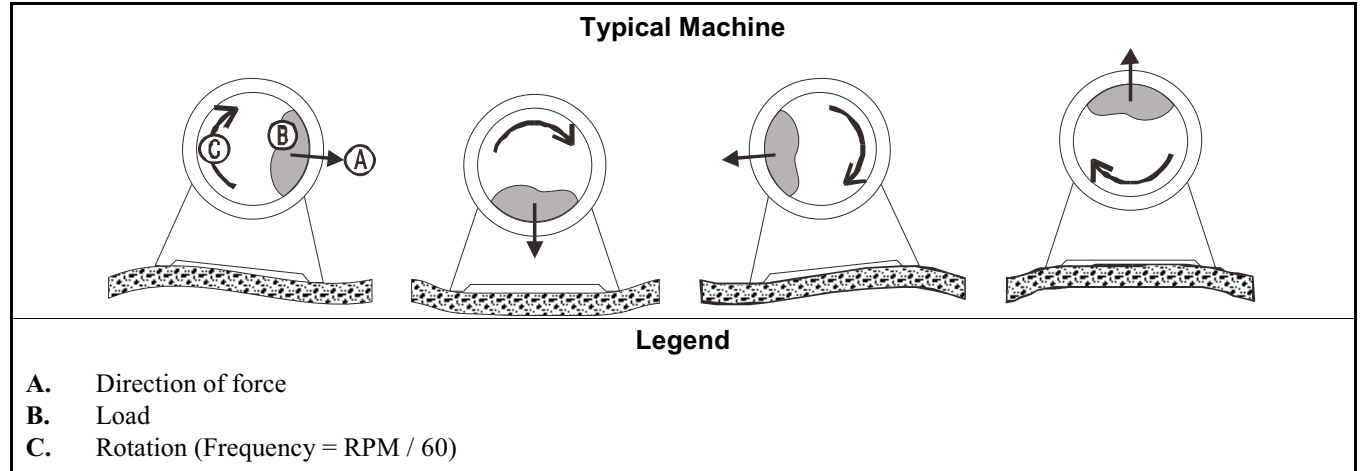


Figure 1 above is intended to depict both on-grade and above-grade installations and is equally applicable to flexibly-mounted washer-extractors, as well as to rigid models installed either directly on a floor slab or on a foundation poured integrally with the slab. Current machine data is available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

— End of BIWUUI02 —

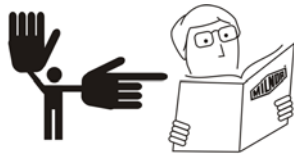
Understanding the Tag Guidelines for the Models Listed Below

30010CGE 30015C4A 30015C4E 30015C4T 30015CGE 30022C4A 30022C4E
30022C4T MCR09E5- MCR12E5- MCR18E4- MCR16E5- MCR27E5-

Several installation guidelines and precautions are displayed symbolically, on tags placed at the appropriate locations on the machine. Some are tie-on and others are adhesive tags. Tie-on tags and white, adhesive tags may be removed after installation. Yellow adhesive tags must remain on the machine.

Most tags contain only symbols (no words). A few are worded. The explanations below, start with the tag part number (displayed on the tag). If a tag contains no words, the meaning of the tag is explained below. If the tag contains words, the explanation below simply repeats the wording.

Display or Action



Explanation

Read the manual before proceeding. This symbol appears on most tags. The machine ships with a complete set of manuals. The safety, installation, and electrical schematic manuals are particularly important to installers.



B2TAG88005: This carefully built product was tested and inspected to meet Milnor performance and quality standards by



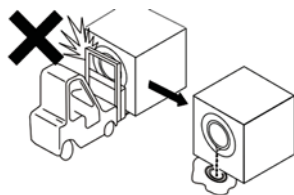
B2TAG93013: This bearing housing was lubricated at the Milnor factory before shipment. (This tag not used on MCR coin models.)



B2TAG94081: Motor must rotate in this direction. 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.



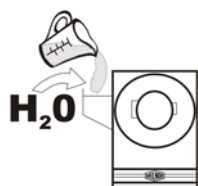
B2TAG94099: Do not strike the shell door when fork-lifting. This can cause the door to leak.



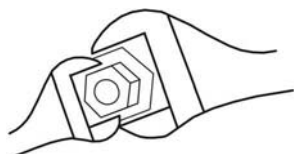
B2T2001013: Hot water connection.

Display or Action**Explanation**

B2T2001014: Cold water connection.



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



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.



B2T2003002: CAUTION: Equipment and Textile Damage Hazards—Chemicals leaked into the machine, particularly when it is idle, can destroy machine components and textiles left in the machine.

Ensure the chemical system prevents dribbling, siphoning, or any other unintentional release of chemicals.

Inspect regularly for proper operation and evidence of damage. Consult Milnor document BIWUUI03 “Avoiding Damage from Allied Remote Chemical Delivery Systems”.



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 BIUUI02 —

Avoiding Damage From Allied Remote Chemical Delivery Systems

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

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

Figure 1: Pumped Chemical Inlets on CBW Batch Washer



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

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

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

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

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



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

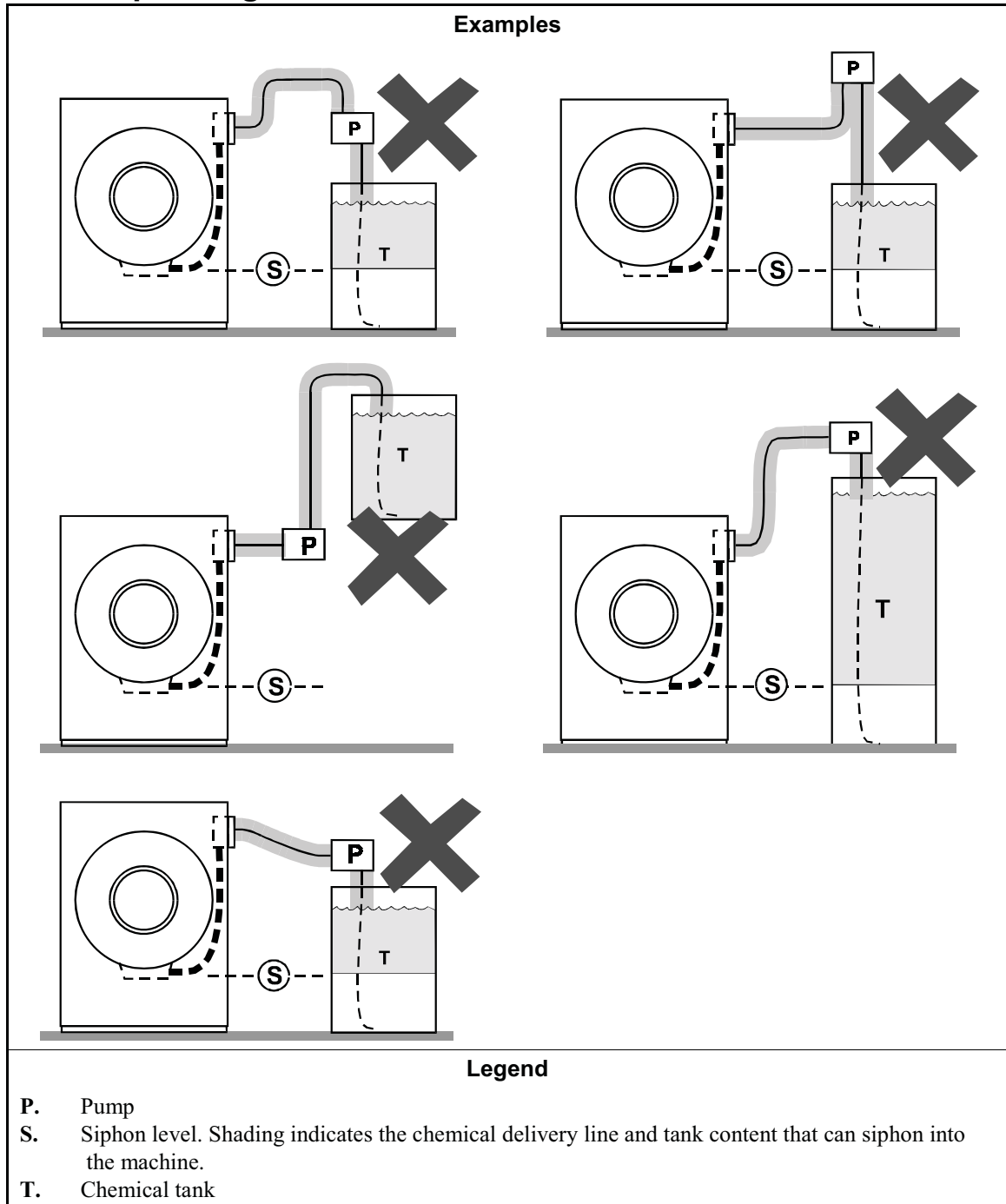
- Ensure that the chemical system prevents unintentional release of chemicals.
- Inspect regularly for proper operation and evidence of damage.

2. Requirements for Chemical Systems Used With Milnor Machines

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

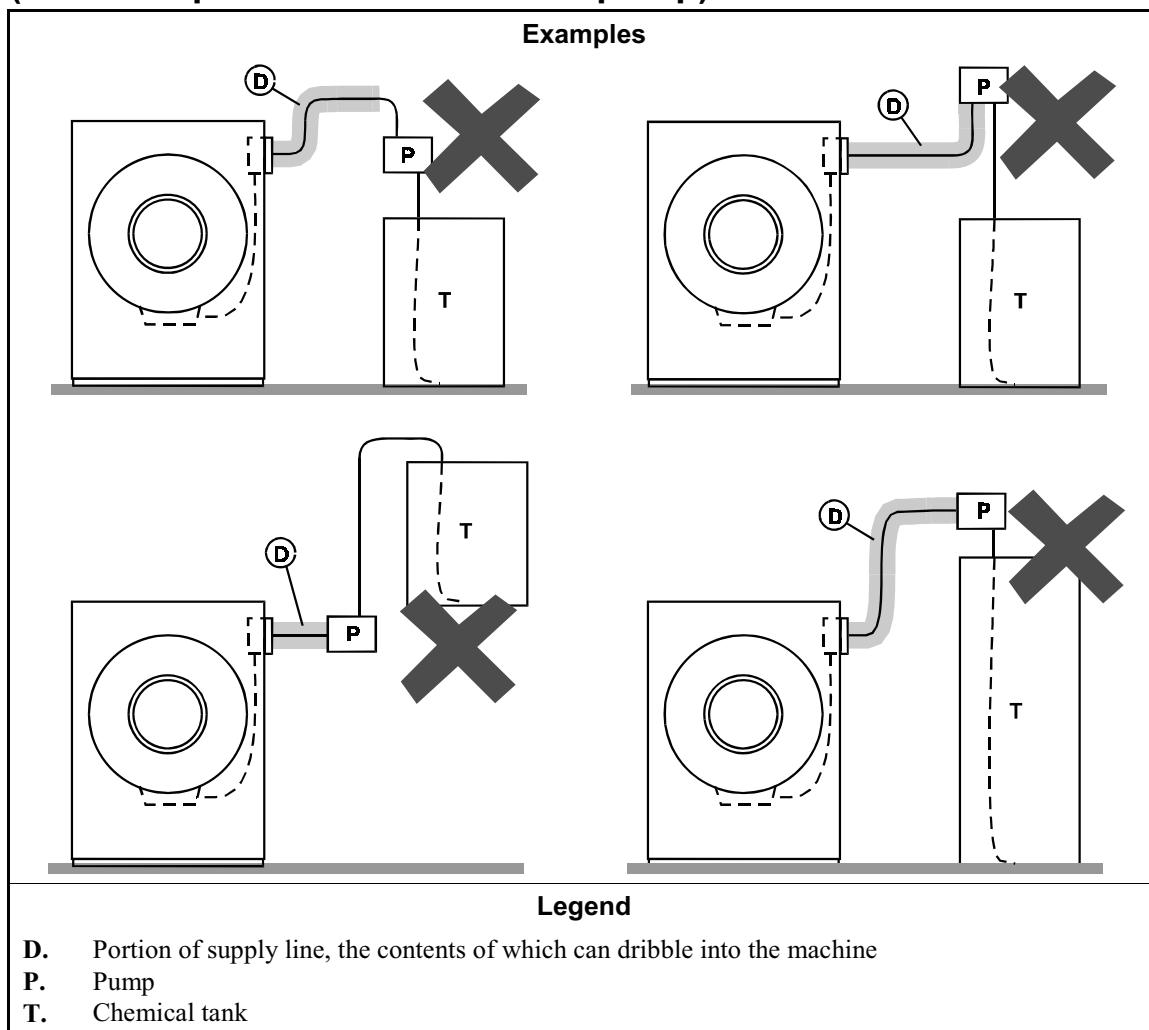
- 2.1. **Ensure the System Cannot Siphon.**—The supply system must be designed to counteract any siphoning that could occur as a result of having a sealed supply line between the bottom of the chemical tank and the internal machine connection at the drain trough. As shown in the Figure 2 examples, if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

Figure 2: Siphoning From the Chemical Tank into the Machine



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

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



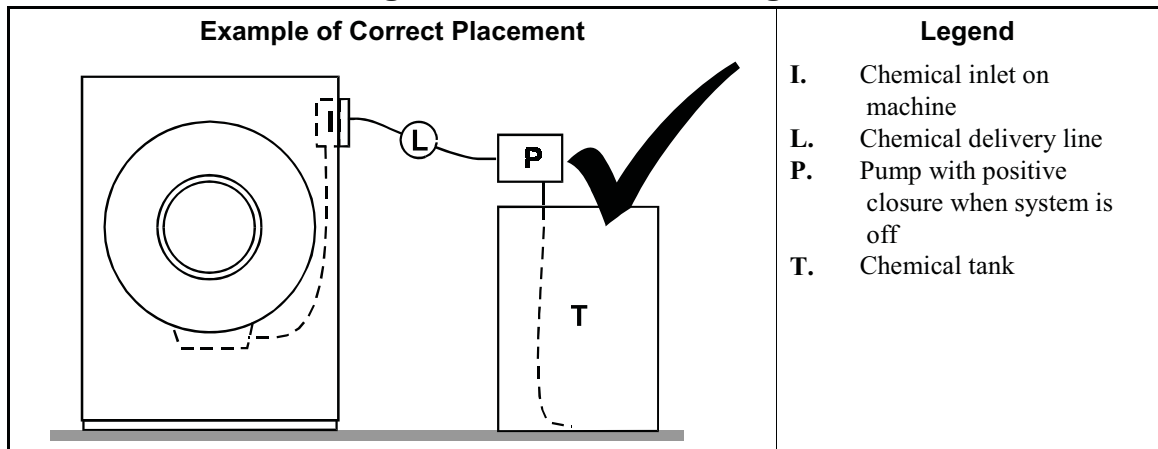
3. Design and Installation Recommendations

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

- 3.1. **Siphoning: Positively close the line.**—If the pump does not provide positive closure when the system is off, employ a shutoff valve in the line to serve this purpose.
- 3.2. **Siphoning: Break the siphon.**—Provide an air gap or vacuum breaker in the chemical delivery line. This must be located above the “full” line of the tank.
- 3.3. **Dribbling: Flush the entire chemical delivery line.**—If any concentrated chemical that remains in the injection line between the pump and the machine is free to flow into the machine, employ a system that flushes the entire line between the pump and the injection point with fresh water after each injection.

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

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



4. Guarding Against Leaks

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

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



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

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

— End of BIWUUI03 —

Handling and Setting Procedures for Rigid Mount Washer-Extractors

1. Handling Precautions

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

Note 1: Once the machine is given to the carrier for delivery, it is the sole 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.

2. Consult Milnor® for instructions if crane lifting is required.
3. Use skids with the forklift. If possible, leave the machine on the shipping skids until it is about to be placed in its final position. Once the skids are removed, take care in placing forks under the machine. **Do not allow the forks to come in contact with valves, piping, motors, etc., located under the machine.**
4. Never push, pull, or exert pressure on any components that protrude from the machine frame (shell front, door, supply injector, electric boxes, controls, belt guard, conduits, inlet piping, etc.).
5. Ensure that the shell door is closed and secured.

2. Site Requirements

2.1. Space Requirements

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.

2.2. Operational Requirements

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

- 2.3. **Foundation Requirements**—The machine must be anchored in accordance with the installation instructions. 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. See “ABOUT THE FORCES TRANSMITTED BY MILNOR® WASHER-EXTRACTORS” (See Table of Contents) for more information.

3. Anchoring Requirements

Machines must be securely anchored to an adequate pedestal base (supplied by others) or a concrete foundation. The bolt holes in the pedestal top flange should be located and drilled only after the machine is on site and can be used as a template for bolt hole locations (See the pedestal base dimensional drawings in this manual). Customer must determine location of bolt holes in bottom flange if the machine is to be bolted to a foundation. Foundation templates are available for some machines. Consult Milnor if any obstruction prevents the installation of any anchor bolt. **Properly install anchor bolts at ALL anchor bolt holes on the machine. Anchor bolts cannot be indiscriminately omitted.**



CAUTION [1]: STRIKE AND MACHINE DAMAGE HAZARDS—A machine can “rip” away from its foundation if the machine is not anchored and grouted in strict accordance with the dimensional drawing and setting instructions provided in this manual. Damage resulting from improper installation is not covered by warranty.

- Strictly follow setting instructions and dimensional drawing guidelines when anchoring and setting this machine.

4. Setting Procedures

1. With the machine near the final location, unbolt the shipping skids.
 - If using a pedestal mount (and after observing all precautions), lift machine level with top of pedestal and slide onto pedestal. Bolt or weld machine to pedestal as desired (See the pedestal base dimensional drawings for additional information).
 - If using a foundation (and after observing all precautions), lift the machine off the skid and onto temporary blocking. Install anchor bolts, taking care to align the bolts with the base plates to avoid bolt thread damage. **Determine that the minimum clearance between each base plate and floor surface is as specified (see dimensional drawings).** Shim the machine at temporary blockings to level the machine from left to right and front to back. Use a carpenter's level along the right and left side of the base to determine if the machine is level from front to back. Place a level laterally across the base plates to determine if the machine is level from right to left then see the grouting instructions below.



CAUTION [2]: MACHINE DAMAGE AND MALFUNCTION HAZARDS—

Tightening anchor bolt fasteners onto spacers (without grout or with improperly applied grout) twists the machine frame and causes cylinder misalignment.

- Never tighten anchor bolt fasteners before grouting.
 - Grout must displace total clearance between base plate and existing foundation floor. Voids must not exist!
1. After determining the final position of the machine, apply grout between the existing foundation floor and base, while observing the following considerations:
 - All machines are designed to be grouted under the full area of all base plates. Grout prevents the anchor bolts from distorting the frame when the fasteners are tightened. Total area under each base plate must be completely filled with grout (see dimensional drawings). Voids under base plates can magnify vibration, causing unsatisfactory operation. Use only industrial strength non-shrinking grout.
 - If the grout (after mixing) is of proper consistency, pack or trowel it by hand.

- If the grout (after mixing) is too thin (causing it to flow from under the base pads), install temporary cardboard framing around the pads to retain the grout until it cures.
2. After the grout has completely cured, raise the machine sufficiently to remove all temporary blocking and shims. **Be careful to avoid disturbing or damaging grout.**
 3. Lower machine onto grout and tighten all foundation fasteners until they contact the top of the base plate.
2. Tighten all fasteners evenly, using only one-quarter turn on each fastener 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 fasteners, check each fastener at least twice.

— End of BIRUII01 —

External Fuse/Breaker, Wiring, and Disconnect Requirements

An external fuse **or** circuit breaker and a disconnect switch must be provided in the facility for (and dedicated to) the machine. These may be in the same or separate, **permanently mounted** electric boxes. Electric power and ground connections will be made between the incoming power junction box on the machine and this external box (or one of the boxes).

1. Fuse or Circuit Breaker Size

Refer to the “External Fuse and Wire Sizes...” document for your machine model. This document will be found either in the machine's installation manual or in manual MAEFUSE1AE “External Fuse and Wire Sizes for Milnor Machines.” Choose the fuse or circuit breaker from the appropriate column of the table provided, as follows:

- 1.1. **If a fuse is used**—Match the fuse listed in the “Fuse” column for your machine's voltage. The specified fuse sizes are consistent with the USA National Electric Code (NEC), section 430-52, exception No. 2, Part B, which states: “The rating of a time-delay (dual-element) fuse shall be permitted to be increased, but shall in no case exceed 225 percent of the full-load current.”
- 1.2. **If a standard circuit breaker is used**—Match the amperage rating listed in the “Breaker” column for your machine's voltage.
- 1.3. **If an inverse time circuit breaker is used**—Match the characteristics (amperage rating) of the fuse listed in the “Fuse” column for your machine's voltage. When applied to an inverse time circuit breaker, the specified fuse sizes are consistent with the USA National Electric Code (NEC), section 430-52, exception No. 2, Part C, which states: “The rating of an inverse time circuit breaker shall be permitted to be increased, but shall in no case exceed 400 percent for full-load currents of 100 amperes or less.”

2. Wire Size

Use wiring no smaller than that listed for your machine's voltage in the “Wire size...” column in the “External Fuse and Wire Sizes...” document. The table value applies to runs up to 50 feet (15 meters). Use the next larger size for runs 50 to 100 feet (15 to 30 meters). Use wire two sizes larger for runs greater than 100 feet (30 meters). If an inverse time circuit breaker is used and local codes require a larger wire size than that specified by Milnor, abide by the local code.

Notice 1: The specified wire size may appear too small for the fuse or circuit breaker shown. However, it is consistent with both the load imposed and with the USA National Electric Code.

3. Ground

The ground wire and connections must ensure a reliable earth ground (zero potential). Use wiring of at least as large a gauge as that required for incoming power. Do not rely on conduit, machine anchorage, etc. Use the ground lug provided in the incoming power junction box on the machine.

4. Disconnect Switch for Lockout/Tagout

The disconnect switch must permit personnel to disconnect and lockout/tagout electric power from the machine. In the USA, refer to OSHA standard 1910.147 “The control of hazardous energy (lockout/tagout)”. Refer to the USA National Electric Code for requirements on locating the switch. In other locales, abide by these standards if no other local codes apply.

External Fuse or Breaker and Wire Sizes for Washer-extractors MCR09E5, MWR09E5, MCR12E5, MWR12E5

Table 1: Specifications (Largest motor: 1 HP)

Volt Code	Voltage (VAC) See note 1	Running Amps - See note 2	Phase	Cycles (Hz)	Fuse OR circuit breaker		Wire size for 50 ft (15 m) run (AWG/mm ²) See notes 4, 5
					Fuse (Amps) See notes 3, 5	Breaker (Amps) See notes 3, 5	
37	120	7	1	60	FRN15	15	14 / 2.50
46	200	4	3	50	FRN6	6	14 / 2.50
62	220	3	3	50	FRN6	6	14 / 2.50
71/74	208/240	4/3	1 or 3	60	FRN6	6	14 / 2.50
82	380	3	3	50	FRS5	5	14 / 2.50
83	380	3	3	60	FRS5	5	14 / 2.50
84	400	3	3	50	FRS5	5	14 / 2.50
85	415	2.5	3	50	FRS5	5	14 / 2.50
88	440	2.5	3	50	FRS5	5	14 / 2.50
96	480	2	3	60	FRS5	5	14 / 2.50
99	600→480	1.5	3	60	FRS5	5	14 / 2.50

Notes:

1. Not all voltages available in all models.
2. Running amps are for the portion of the cycle with the highest, steady-state demand (after the motor is up to speed) and are approximate.
3. If fuses are used, they must be Bussmann Fusetron or similar lag type. If standard circuit breakers are used, they must match the amperage rating listed in the "Breaker" column. If inverse time circuit breakers are used, they must match the characteristics (amperage rating) listed in the "Fuse" column. An over-sized fuse or breaker poses a fire hazard (see caution below). An under-sized fuse or breaker will trip needlessly.
4. Wire size is per the USA National Electric Code. **Use wire size shown for runs up to 50 feet (15 meters). Use next larger size for runs 50 to 100 feet (15 to 30 m). Use wire two sizes larger for runs greater than 100 feet (30 m).** Under-sized wiring poses a fire hazard (see caution). This can also cause voltage drops even if the wire's current-carrying capacity exceeds that of the fuse/breaker. Voltage drops cause machine faults and reduce motor starting torque (e.g., a 5% voltage drop causes a motor to produce only 90% of rated torque). Voltage drop is greatest the instant the motor is energized, when highest torque is required.
5. See document BFUUF01 "External Fuse...Requirements" for more information.



CAUTION [1]: Fire hazard—An over-sized fuse/circuit breaker or under-sized wiring can permit the wiring to overheat and cause a fire.

- Always use the fuse/circuit breaker and wire size specified here.

— End of BFRCAF01 —

External Fuse or Breaker and Wire Sizes for Washer-extractors MCR16E5, MWR16E5, MWR16J5, and MWR16X5

Table 1: Specifications (Largest motor: 1 HP)

Volt Code	Voltage (VAC) See note 1	Running Amps - See note 2	Phase	Cycles (Hz)	Fuse OR circuit breaker		Wire size for 50 ft (15 m) run (AWG/mm²) See notes 4, 5
					Fuse (Amps) See notes 3, 5	Breaker (Amps) See notes 3, 5	
46	200	6	3	50	FRN10	10	14 / 2.50
62	220	5	3	50	FRN10	10	14 / 2.50
71/74	208/240	6/5	1 or 3	60	FRN10	10	14 / 2.50
82	380	4	3	50	FRS8	8	14 / 2.50
83	380	4	3	60	FRS8	8	14 / 2.50
84	400	4	3	50	FRS8	8	14 / 2.50
85	415	3	3	50	FRS6	6	14 / 2.50
88	440	3	3	50	FRS6	6	14 / 2.50
96	480	2.5	3	60	FRS6	6	14 / 2.50
99	600→480	1.5	3	60	FRS6	6	14 / 2.50

Notes:

- Not all voltages available in all models.
- Running amps are for the portion of the cycle with the highest, steady-state demand (after the motor is up to speed) and are approximate.
- If fuses are used, they must be Bussmann Fusetron or similar lag type. If standard circuit breakers are used, they must match the amperage rating listed in the "Breaker" column. If inverse time circuit breakers are used, they must match the characteristics (amperage rating) listed in the "Fuse" column. An over-sized fuse or breaker poses a fire hazard (see caution below). An under-sized fuse or breaker will trip needlessly.
- Wire size is per the USA National Electric Code. **Use wire size shown for runs up to 50 feet (15 meters). Use next larger size for runs 50 to 100 feet (15 to 30 m). Use wire two sizes larger for runs greater than 100 feet (30 m).** Under-sized wiring poses a fire hazard (see caution). This can also cause voltage drops even if the wire's current-carrying capacity exceeds that of the fuse/breaker. Voltage drops cause machine faults and reduce motor starting torque (e.g., a 5% voltage drop causes a motor to produce only 90% of rated torque). Voltage drop is greatest the instant the motor is energized, when highest torque is required.
- See document BFUUF01 "External Fuse...Requirements" for more information.



CAUTION 1: **Fire hazard**—An over-sized fuse/circuit breaker or under-sized wiring can permit the wiring to overheat and cause a fire.

- Always use the fuse/circuit breaker and wire size specified here.

— End of BFRCCF01 —

External Fuse or Breaker and Wire Sizes for Washer-extractors MCR18E4, MWR18E4, MWR18X4, MWR18J4 (no steam and steam)

See BFRCBF02 for MWR18J4 with electric heat.

Table 1: Specifications (Largest motor: 3 HP)

Volt Code	Voltage (VAC) See note 1	Running Amps - See note 2	Phase	Cycles (Hz)	Fuse OR circuit breaker		Wire size for 50 ft (15 m) run (AWG/mm ²) See notes 4, 5
					Fuse (Amps) See notes 3, 5	Breaker (Amps) See notes 3, 5	
46	200	7	3	50	FRN15	15	14 / 2.5
62	220	7	3	50	FRN15	15	14 / 2.5
71/74	208/240	9/8	1 or 3	60	FRN15	15	14 / 2.5
82	380	4.5	3	50	FRS8	15	14 / 2.50
83	380	4.5	3	60	FRS8	15	14 / 2.50
84	400	4.5	3	50	FRS8	15	14 / 2.50
85	415	4.5	3	50	FRS8	15	14 / 2.50
88	440	3.5	3	50	FRS5	15	14 / 2.50
96	480	3.5	3	60	FRS5	15	14 / 2.50
99	600→480	3.5	3	60	FRS5	15	14 / 2.50

Notes:

1. Not all voltages available in all models.
2. Running amps are for the portion of the cycle with the highest, steady-state demand (after the motor is up to speed) and are approximate.
3. If fuses are used, they must be Bussmann Fusetron or similar lag type. If standard circuit breakers are used, they must match the amperage rating listed in the "Breaker" column. If inverse time circuit breakers are used, they must match the characteristics (amperage rating) listed in the "Fuse" column. An over-sized fuse or breaker poses a fire hazard (see caution below). An under-sized fuse or breaker will trip needlessly.
4. Wire size is per the USA National Electric Code. **Use wire size shown for runs up to 50 feet (15 meters). Use next larger size for runs 50 to 100 feet (15 to 30 m). Use wire two sizes larger for runs greater than 100 feet (30 m).** Under-sized wiring poses a fire hazard (see caution). This can also cause voltage drops even if the wire's current-carrying capacity exceeds that of the fuse/breaker. Voltage drops cause machine faults and reduce motor starting torque (e.g., a 5% voltage drop causes a motor to produce only 90% of rated torque). Voltage drop is greatest the instant the motor is energized, when highest torque is required.
5. See document BFUUF01 "External Fuse...Requirements" for more information.



CAUTION [1]: Fire hazard—An over-sized fuse/circuit breaker or under-sized wiring can permit the wiring to overheat and cause a fire.

- Always use the fuse/circuit breaker and wire size specified here.

— End of BFRCBF01 —

External Fuse or Breaker and Wire Sizes for Washer-extractors MWR18J4 with Electric Heat

See BFRCBF01 for no steam and steam heat.

Table 1: Specifications (Largest motor: 3 HP)

Volt Code	Voltage (VAC) See note 1	Running Amps - See note 2	Phase	Cycles (Hz)	Fuse OR circuit breaker		Wire size for 50 ft (15 m) run (AWG/mm ²) See notes 4, 5
					Fuse (Amps) See notes 3, 5	Breaker (Amps) See notes 3, 5	
46	200	46	3	50	FRN50	50	8 / 10
62	220	41	3	50	FRN50	50	8 / 10
74	208/240	44 / 38	3	60	FRN50	50	8 / 10
82	380	28	3	50	FRS40	40	8 / 10
96	480	19	3	60	FRS25	25	10 / 12

Notes:

- Not all voltages available in all models.
- Running amps are for the portion of the cycle with the highest, steady-state demand (after the motor is up to speed) and are approximate.
- If fuses are used, they must be Bussmann Fusetron or similar lag type. If standard circuit breakers are used, they must match the amperage rating listed in the "Breaker" column. If inverse time circuit breakers are used, they must match the characteristics (amperage rating) listed in the "Fuse" column. An over-sized fuse or breaker poses a fire hazard (see caution below). An under-sized fuse or breaker will trip needlessly.
- Wire size is per the USA National Electric Code. **Use wire size shown for runs up to 50 feet (15 meters). Use next larger size for runs 50 to 100 feet (15 to 30 m). Use wire two sizes larger for runs greater than 100 feet (30 m).** Under-sized wiring poses a fire hazard (see caution). This can also cause voltage drops even if the wire's current-carrying capacity exceeds that of the fuse/breaker. Voltage drops cause machine faults and reduce motor starting torque (e.g., a 5% voltage drop causes a motor to produce only 90% of rated torque). Voltage drop is greatest the instant the motor is energized, when highest torque is required.
- See document BFUUF01 "External Fuse...Requirements" for more information.



CAUTION [1]: Fire hazard—An over-sized fuse/circuit breaker or under-sized wiring can permit the wiring to overheat and cause a fire.

- Always use the fuse/circuit breaker and wire size specified here.

— End of BFRCBF02 —

Service Connections

1. General

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

1. Piped inlets and outlets (cold water, hot water, flush water, third water, direct steam, compressed air, 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

Notice [1]: Machine Damage—Plastic water valves can fail if improper connectors are used.

- Only use garden hose bib type connectors.
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. Thoroughly flush all water lines before making connections.
 3. We recommend installing 40 mesh strainers or filters in front of the cold, hot and third water valves.
 4. 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.
 5. Suds overflow (if so equipped) to drain, must be vented per plumbing code.



CAUTION [2]: 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.

3. Piped Inlets

Table 1: Piped inlets for MCR09E5, MCR12E5, MCR18E5 and MWR09E5, MWR12E5, MWR18E5 models

Connection Description	Source Requirements	Piping Requirements, Comments
Cold water inlet	3/4" garden hose thread @ 10 - 75 psi (69 - 531 kPa)	Pipe material per plumbing code
Hot water inlet		
Flush water inlet	3/4" garden hose thread with 1/2" hose @ 10 - 75 psi (69 - 531 kPa)	

4. Piped Outlets

Table 2: Piped Outlets for MCR09E5, MCR12E5, MCR18E5 and MWR09E5, MWR12E5, MWR18E5 models

Model	Connection Description	Destination Requirements or Description	Piping Specifications
MCR09E5, MCR12E5, MWR09E5, and MWR12E5	Drain	2" ID hose connection	Rubber hose, PVC or other approved material per plumbing code
	Suds Overflow	2" ID hose connection	Per code
MCR18E5 and MWR18E5	Drain	3" OD hose connection	Rubber hose, PVC or other approved material per plumbing code
	Suds Overflow	2" OD hose connection	Per code

5. Power Connections and Precautions



WARNING [3]: Electrocutation and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

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

Notice [4]: Machine Damage—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.
1. Electrical connections must be made by a competent electrician.
 2. Machine must be grounded by connecting to a grounded metal, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal on the machine.
 3. Stinger leg, if any, must be connected to terminal L3, never to terminals L1 or L2.
 4. Make power connections within junction boxes on the rear of the machine.
 5. Verify motor rotation ([Figure 1](#)). 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.
 6. Machines ordered for 208/240 volt operation are shipped set for 240 volt operation from the factory ([Figure 2](#)). If the supply voltage is 208 volts, then remove the top, and place the line voltage switch in the 208 volt position.

Figure 1: Correct Rotation During Drain and Extract (when viewing front of machine)

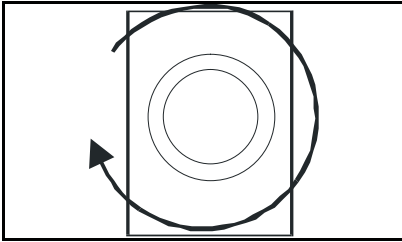


Figure 2: Line Voltage Switch

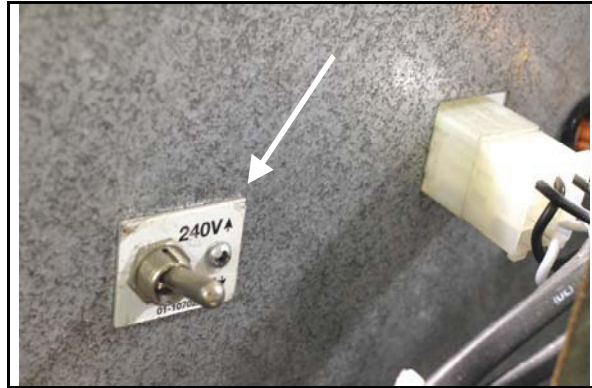


Figure 3: Vibration Switch

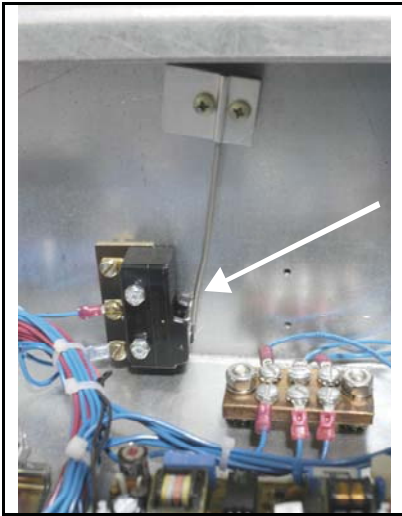


Figure 4: Motor Mount Blocking



6. Remove Shipping Restraints

Remove all shipping restraints (usually marked in red). Restraints may be located behind access panels. Restraints may include the vibration switch (Figure 3) restraint, motor mount blocking (Figure 4).

7. Check Cylinder Surface

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

— End of BIRQVI01 —