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# MCR\_, MCT\_



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



# MKWCJH01U1/25215A

## 1. English

Maintenance Guide - Washer-extractor, Rigid Cabinet,  
Sealed Bearings, Vended, MCR\_, MCT\_

MKWCJH01EN/2021444



English

1





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# Maintenance Guide

## Washer-extractor, Rigid Cabinet, Sealed Bearings, Vended, MCR\_, MCT\_



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# 1 Machine Description and Identification

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## 1.1 About This Manual and Your Milnor® Machine

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This manual applies to two or more models that share the mechanical characteristics stated below. If you received this manual with your machine, your machine is one of the applicable models. However, before using this manual, verify that your machine does have these characteristics.

### 1.1.1 Description

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Washer-extractors wash linen using water and non-volatile chemicals then remove excess water by centrifugal force. This washer-extractor is the mechanical type described below.

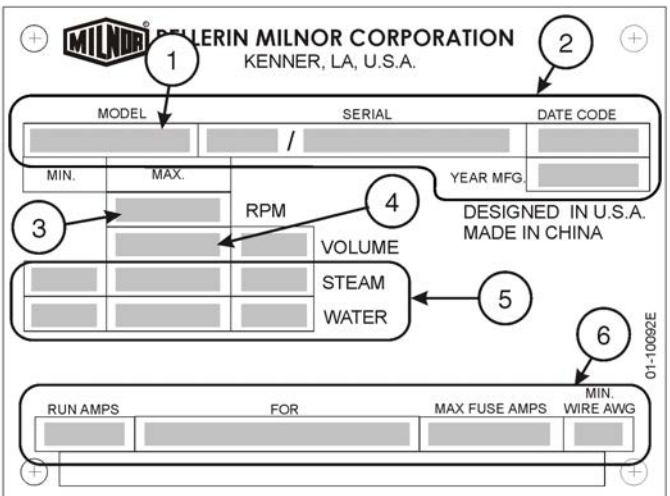
**MCR\_ or MCT\_** A machine represented by one of these partial model numbers is a rigid mount, cabinet style, washer-extractor with sealed bearings and a coin acceptor for use in coin laundries. The rated capacity can be 25 lb (12 kg) to 80 lb (36) kg depending on model.

### 1.1.2 Machine Identification

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**Machine Data Plate** — Find the model number and other data for your machine on the machine data plate affixed to the machine and described below.

Figure 1. Machine Data Plate

| View of Data Plate (English text shown)   | Legend   |
|---|--|
|  | <ol style="list-style-type: none"><li>1. Model number.</li><li>2. Data that uniquely identifies your machine. Refer to this data when you speak with your dealer or Milnor® about your machine.</li><li>3. Cylinder maximum rotation speed in revolutions per minute</li><li>4. Cylinder volume in the units of measure shown</li><li>5. Piped utility requirements</li><li>6. Electrical requirements</li></ol> |

## 2 Safety

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### 2.1 Safety — Rigid Washer Extractors

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#### 2.1.1 Safety Alert Messages—Internal Electrical and Mechanical Hazards

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The following are instructions about hazards inside the machine and in electrical enclosures.



**WARNING: 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 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: 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.

#### 2.1.2 Safety Alert Messages—Cylinder and Processing Hazards

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



**DANGER: 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.

- ▶ 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: 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.



**WARNING: 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: 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.

## 2.1.3 Safety Alert Messages—Unsafe Conditions

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### 2.1.3.1 Damage and Malfunction Hazards

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#### 2.1.3.1.1 Hazards Resulting from Inoperative Safety Devices

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**DANGER:** **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:** **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:** **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:** **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.

#### 2.1.3.1.2 Hazards Resulting from Damaged Mechanical Devices

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**WARNING:** **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.



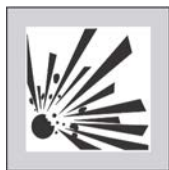
**WARNING:** **Explosion Hazards** — Cylinder—A damaged cylinder can rip apart during extraction, puncturing the shell and discharging metal fragments at high speed.



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



**WARNING: 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

### 2.1.3.2 Careless Use Hazards

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

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

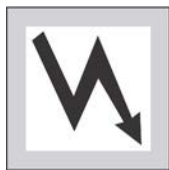
- ▶ Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.
- ▶ Do not operate a damaged or malfunctioning machine. Request authorized service.
- ▶ Do not attempt unauthorized servicing, repairs, or modification.
- ▶ Do not 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.

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

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**WARNING: Electrocuting 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: 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: 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.

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## 2.2 Daily Test of Door Interlock

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The door interlock on MCR\_ and MCT\_ models is designed to lock the door after the machine runs for approximately 60 seconds with the door closed. Test this vital safety mechanism daily to verify that it is functioning correctly.



**CAUTION: Contact with hot bath liquor** — can scald you.



- ▶ During the following test, hold the door firmly closed to prevent the door from springing open if the latch retracts during this test.

1. Permit the wash program to run for 90 seconds, but not much longer.
2. Hold the door closed and turn the door latch handle counter-clockwise.

The door handle **will** turn, but it **should not** operate the door latch mechanism.

- a. If the latch rotates (if the door unlocks), **remove the machine from service until the problem is identified and corrected.**
- b. If the latch does **not** rotate (if the door remains locked) and you find no other evidence of safety problems, return the machine to normal operation.

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## 2.3 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.**

## 2.3.1 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.

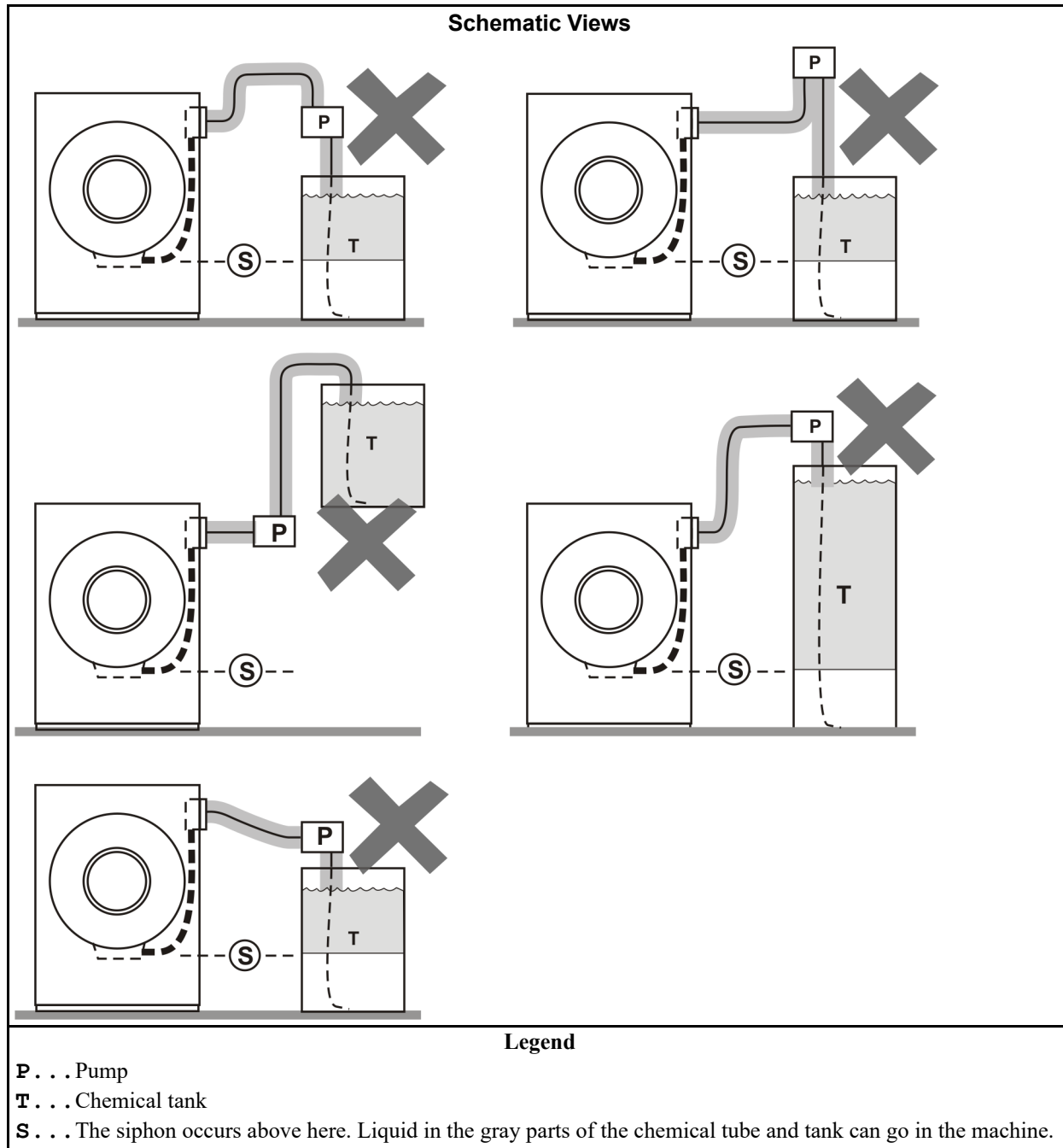
**Incorrect Configuration or Connection of Equipment** — Many chemical systems:

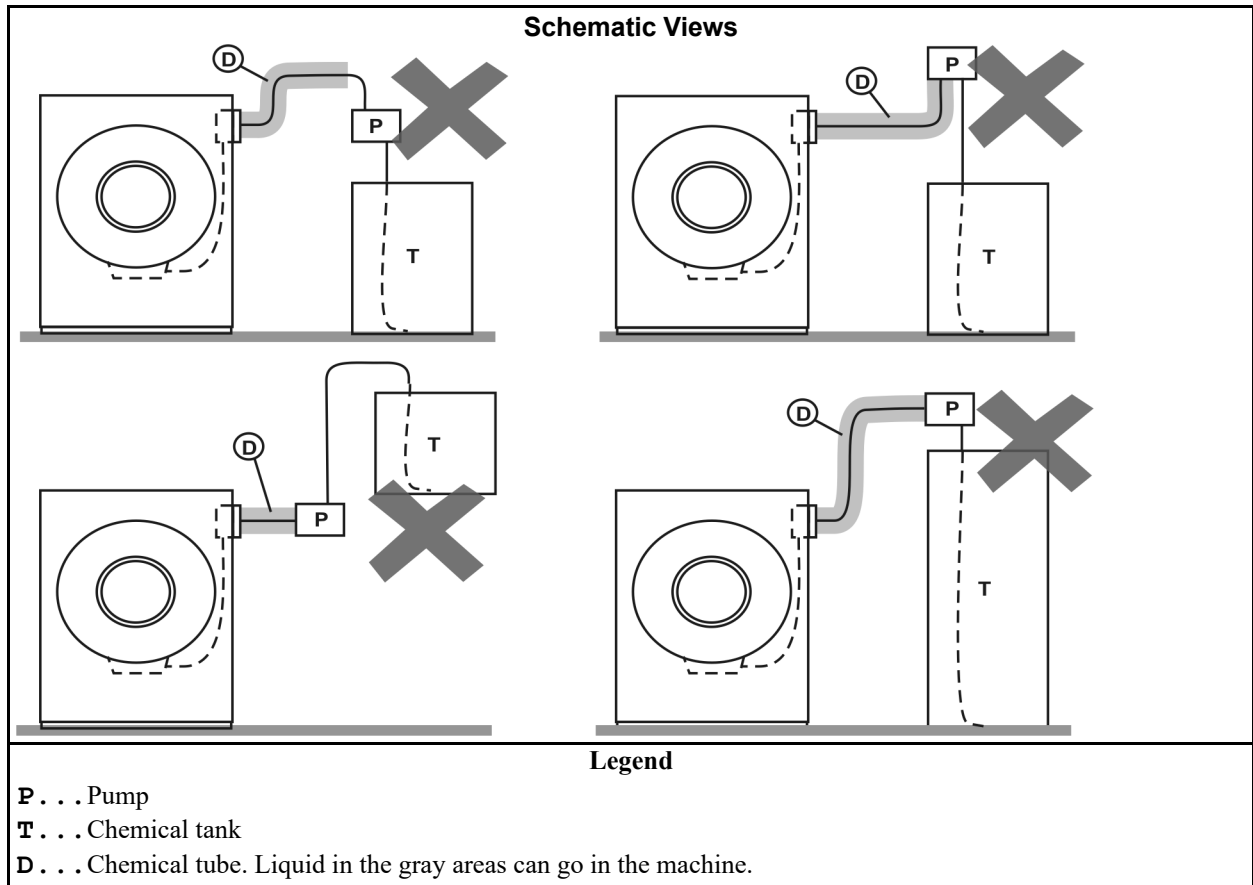
- do not prevent a vacuum in the chemical tube (for example, with a vacuum breaker) when the pump is off,
- do not prevent flow (for example, with a valve) where the chemical tube goes in the machine.

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 2, page 10](#)). Some can let chemical supplies go in the machine by gravity ([Figure 3, page 11](#)).



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

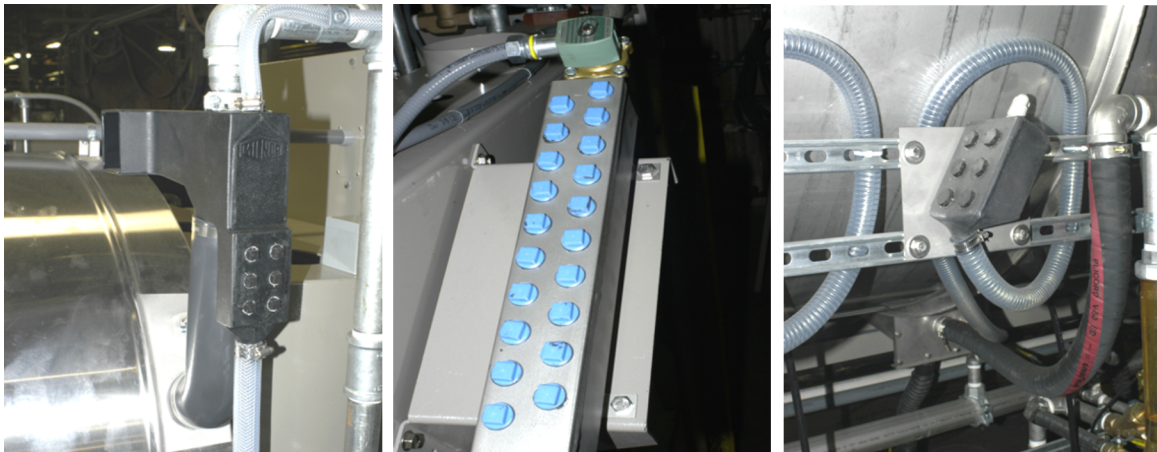


**Figure 3. Incorrect Configurations That Let the Chemical Supply Go In the Machine by Gravity**

## 2.3.2 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 4. Examples of Manifolds for Chemical Tubes. Your equipment can look different.**

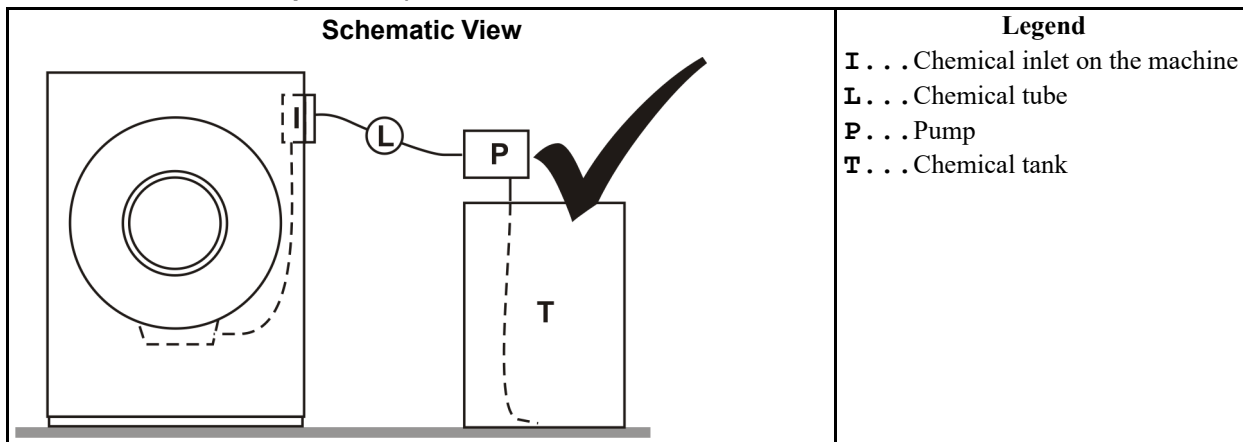
**Close the line.** — If the pump does not always close the line when it is off, use a shutoff valve to do this.

**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 5. 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.

# 3 Routine Maintenance

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## 3.1 Routine Maintenance

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Do the maintenance in [Section 3.1.1 : Maintenance Summary, page 13](#) to make sure that the machine is safe, keeps the warranty, and operates correctly. This will also decrease repair work and unwanted shutdowns. Speak to your dealer or the Milnor® Service department if repairs are necessary.



**WARNING:** Mechanisms — can pull in and mutilate body parts.



- ▶ Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- ▶ Do not service the machine with power on except when explicitly called for in the service instructions. Use extreme care when working near moving components.

- ▶ Replace guards and covers that you remove for maintenance.

If you use software to keep the maintenance schedule for your plant, add the items in the following maintenance summary to that schedule. If not, you can put marks on a calendar that work with the tables in the maintenance summary. See [Section 3.1.3 : How To Show the Maintenance On a Calendar, page 16](#)

### 3.1.1 Maintenance Summary

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Each of the following sections is for a type of maintenance. For example, the section “Guards and Related Components” says “Examine these items. If an item is damaged, missing, or has the wrong setting, correct this discrepancy immediately to prevent injury.” A table in each section identifies the applicable items and the frequency. The “More Data” column gives special instructions if necessary.

\* If the machine operates more than 12 hours each day, do the “day” items two times each day. Do the other items at the given hours or on the days that you show on a calendar (see Section 1). **Do all items in all sections for the maintenance intervals that apply (for example, day, 40 to 60 hours, and 200 hours).**



**TIP:** The maintenance summary has many links to the sections that follow the summary. These sections give more information about the maintenance items. After you learn this information, it is only necessary to look at the summary to do the maintenance.

### 3.1.1.1 Guards and Related Components

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Examine these items. If an item is damaged, missing, or has the wrong setting, correct this discrepancy immediately to prevent injury.

**Table 1. Guards and Related Components**

| Mark |   |   |   |   |   | Do this each | Component              | More Data  |
|------|---|---|---|---|---|--------------|------------------------|--|
| 1    | 2 | 3 | 4 | 5 | 6 |              |                        |  |
| x    |   |   |   |   |   | day*         | guards, covers         | Speak to your dealer or Milnor for replacement components.             |
| x    |   |   |   |   |   | day*         | safety placards        |  |
|      |   | x |   |   |   | 200 hours    | fasteners              | Fasteners must be tight.   |
|      |   | x |   |   |   | 200 hours    | anchor bolts and grout | Grout must be good. Bolts must be tight.                               |
| x    |   |   |   |   |   | day*         | door interlock         | See <a href="#">Section 2.2 : Daily Test of Door Interlock, page 8</a> |

### 3.1.1.2 Filters, Screens, and Sensitive Components

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Remove contamination from these items to prevent damage and unsatisfactory performance.

**Table 2. Filters, Screens, and Sensitive Components**

| Mark |   |   |   |   |   | Do this each   | Component                                   | More Data. See also <a href="#">Section 3.1.2 , page 15</a>  |
|------|---|---|---|---|---|----------------|---|--|
| 1    | 2 | 3 | 4 | 5 | 6 |                |   |  |
|      | x |   |   |   |   | 40 to 60 hours | inverter fans, vents, filters               | See <a href="#">Figure 8, page 19</a> . Keep good air flow.  |
|      |   |   | x |   |   | 600 hours      | motors                                      | Keep good air flow.  |
|      |   |   |   | x |   | 2400 hours     | entire machine                              | Remove excessive dust and dirt.  |
| x    |   |   |   |   |   | day*           | chemical inlet areas                        | Some chemical supplies that stay on machine surfaces will cause corrosion damage. See <a href="#">Section 3.2.3 , page 19</a> and <a href="#">Section 3.1.2 , page 15</a> . See also, <a href="#">Section 2.3 , page 8</a> for background information. |
|      |   |   |   |   | x | 2400 hours     | water inlet strainers if supplied by others | Remove strainers from incoming water lines and flush with water.   |

### 3.1.1.3 Components that Become Worn

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Examine these items. Tighten or replace the item if necessary, to prevent shutdowns and unsatisfactory performance. Speak to your dealer for replacement parts.

**Table 3. Components that Become Worn**

| Mark |   |   |   |   |   | Do this each | Component                       | More Data                                     |
|------|---|---|---|---|---|--------------|---------------------------------|---|
| 1    | 2 | 3 | 4 | 5 | 6 |              |                                 |   |
|      |   | x |   |   |   | 200 hours    | drive belts and pulleys         | See <a href="#">Section 3.2.1 , page 17</a>   |
|      |   | x |   |   |   | 200 hours    | tubes and hoses (non-hydraulic) | Examine hoses and hose connections for leaks. |

### 3.1.1.4 Mechanisms and Settings

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Make sure mechanisms are serviceable and settings are correct to prevent unsatisfactory performance.

**Table 4. Mechanisms and Settings**

| Mark |   |   |   |   |   | Do this each | Component                                | More Data  |
|------|---|---|---|---|---|--------------|--|--|
| 1    | 2 | 3 | 4 | 5 | 6 |              |  |  |
|      |   |   |   |   | x | 2400 hours   | controller circuitry                     | Examine wiring and connections in electrical boxes. Look for corrosion, loose connections. See <a href="#">Section 3.1.2</a> , page 15 |
|      |   | x |   |   |   | 200 hours    | bath level sensor that uses air pressure | Examine the air tube and connections. See <a href="#">Figure 10</a> , page 21  |

### 3.1.2 How To Remove Contamination

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**Table 5. Contamination Types, Cleaning Agents, and Procedures**

| Material or Component                   | Usual Contamination       | Example  | Cleaning Agent   | More Data  |
|---|---------------------------|--|--|--|
| machine housing                         | dust, dirt                | —  | compressed air or shop vacuum  | Air—no more than 30 psi (207 kpa). Do not push dust in mechanisms.   |
| fins and vents on electrical components | dust                      | motors, inverters, braking resistors                                 | shop vacuum, soft bristle brush, canned air for electrical components                | Do not push dust in mechanisms.  |
| electric box interior                   | dust                      | all electric boxes   |  |  |
| electrical connections                  | corrosion, varnish        | spade connector, molex connector, plug-in relay                      | spray solvent for electrical components  | Disconnect then connect it again. Use solvent if the bad connection continues.   |
| electronic sensors                      | dust                      | photoeye lens, reflector, laser, proximity switch, temperature probe | none   | Use a clean, soft, dry cloth.  |
|   | dirt                      |  | warm water with soap, then water flush   | Use clean, soft cloths.  |
| stainless steel                         | chemical spill            | shell, supply injector   | water  | Use a hose to flush the chemical supply from the surface fully. Do not get water on electrical components or mechanisms. |
| 300 series stainless steel              | chemical corrosive attack | shell interior, cylinder   | pickling and passivation   | Speak to your dealer or Milnor. This is not routine maintenance.   |
| painted metal, unpainted aluminum       | dust, dirt, grease        | frame members  | warm water with soap, then water to flush  | Use clean cloths. Do not get water in electrical components.   |
| rubber                                  | dirt, oil, grease         | drive belts, hoses   | warm water with soap, then water to flush  | Use clean cloths. Flush fully. Oil or soap must not stay on drive belts. Make sure that drive belts are serviceable.     |
| clear plastic, acrylic                  | discoloration (yellowing) | compressed air filter bowl, visual flow meter                        | warm water with soap, then water to flush, then acrylic cleaner. Do not use ammonia. | Use only the necessary cleaning agents. Wash and rinse with clean, soft cloths. Follow instructions on acrylic cleaner.  |
| glass                                   | discoloration (yellowing) | door glass, site glass   | ammonia and water solution and water rinse then acetone                              | Use clean, soft cloths. Use only the necessary cleaning agents. If necessary, soak in cleaner.                           |
| soft air filter, lint filter,           | dust, lint                | on inverter electric box door, in air line filter bowl, in dryers    | shop vacuum  | Replace the used with a new filter when the vacuum cannot remove contamination.  |

**Table 5 Contamination Types, Cleaning Agents, and Procedures (cont'd.)**

| Material or Component                     | Usual Contamination      | Example                                   | Cleaning Agent                           | More Data  |
|---|--------------------------|---|--|--|
| rigid strainers, screens for water, steam | mineral particles        | in water line, y-strainer                 | water                                    | Use a rigid bristle brush. Flush with a flow of water. |
| rigid strainers, screens for oil          | metal shavings           | in hydraulic line                         | carburetor cleaner or equivalent solvent | Soak. Use a rigid bristle brush.                       |
| steel drive components                    | dirt, hardened lubricant | bearings, roller chains, sprockets, gears | carburetor cleaner or equivalent solvent | Soak. Use a cloth or soft bristle brush.               |

### 3.1.3 How To Show the Maintenance On a Calendar

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You can put marks on a calendar that work with the tables in [Section 3.1.1 , page 13](#). The marks are the numbers 2, 3, 4, 5, and 6. It is not necessary to show the number 1 (items you do each day) on the calendar. The number 2 = items you do each 40 to 60 hours, 3 = each 200 hours, 4 = each 600 hours, 5 = each 1200 hours, and 6 = each 2400 hours. These are the "Mark" numbers at the top of the narrow columns on the left of each table in [Section 3.1.1 , page 13](#).

The table below shows where to put the marks on a calendar. For example, if your machine operates between 41 and 60 hours each week, the first three marks are 2, 2, and 3. Put these marks on the first, second, and third weeks after the machine starts operation. If you do routine maintenance on a given day of the week, put the mark on that day of each week. Continue to put marks on the subsequent weeks. **It can be necessary to do the 40 to 60 hour (2) maintenance more than one time each week.** If the machine operates between 61 and 100 hours, put a 2 on two days of the week. If the machine operates 101 or more hours, put a 2 on three days of the week.

On each date with a 3, do the items with an x in the 3 or the 2 column of each table in [Section 3.1.1 , page 13](#). On each date with a 4, do the items with an x in the 4, 3, or 2 column. Continue this pattern.

**Table 6. Where to Put Marks On a Calendar**

| Hours / Week | Week Number            |    |    |    |    |    |    |    |    |    |        |    |    |    |    |    |    |    |        |    |        |    |    |    |        |    |    |    |    |    |
|--------------|------------------------|----|----|----|----|----|----|----|----|----|--------|----|----|----|----|----|----|----|--------|----|--------|----|----|----|--------|----|----|----|----|----|
|              | 1                      | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11     | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19     | 20 | 21     | 22 | 23 | 24 | 25     | 26 | 27 | 28 | 29 | 30 |
| Up to 40     | 2                      | 2  | 2  | 2  | 3  | 2  | 2  | 2  | 2  | 3  | 2      | 2  | 2  | 2  | 4  | 2  | 2  | 2  | 2      | 3  | 2      | 2  | 2  | 2  | 3      | 2  | 2  | 2  | 2  | 5  |
| 41 - 60      | 2                      | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 2  | 4  | 2      | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 2      | 5  | 2      | 2  | 3  | 2  | 2      | 2  | 3  | 2  | 2  | 4  |
| 61 - 80      | 2                      | 2  | 3  | 2  | 3  | 2  | 4  | 2  | 2  | 3  | 2      | 2  | 3  | 2  | 5  | 2  | 3  | 2  | 2      | 3  | 2      | 4  | 2  | 2  | 3      | 2  | 2  | 3  | 2  | 6  |
| 81 - 100     | 2                      | 3  | 2  | 3  | 2  | 4  | 2  | 3  | 2  | 3  | 2      | 5  | 2  | 3  | 2  | 3  | 2  | 4  | 2      | 3  | 2      | 3  | 2  | 6  | repeat |    |    |    |    |    |
| 101 - 120    | 2                      | 3  | 2  | 3  | 4  | 2  | 3  | 2  | 3  | 5  | 2      | 3  | 2  | 3  | 4  | 2  | 3  | 2  | 3      | 6  | repeat |    |    |    |        |    |    |    |    |    |
| 121 - 140    | 2                      | 3  | 2  | 3  | 4  | 3  | 2  | 3  | 5  | 2  | 3      | 2  | 3  | 4  | 3  | 2  | 3  | 6  | repeat |    |        |    |    |    |        |    |    |    |    |    |
| Hours / Week | Week Number, continued |    |    |    |    |    |    |    |    |    |        |    |    |    |    |    |    |    |        |    |        |    |    |    |        |    |    |    |    |    |
|              | 31                     | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41     | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49     | 50 | 51     | 52 | 53 | 54 | 55     | 56 | 57 | 58 | 59 | 60 |
| Up to 40     | 2                      | 2  | 2  | 2  | 3  | 2  | 2  | 2  | 2  | 3  | 2      | 2  | 2  | 2  | 4  | 2  | 2  | 2  | 2      | 3  | 2      | 2  | 2  | 2  | 3      | 2  | 2  | 2  | 2  | 6  |
| 41 - 60      | 2                      | 2  | 3  | 2  | 2  | 2  | 3  | 2  | 2  | 6  | repeat |    |    |    |    |    |    |    |        |    |        |    |    |    |        |    |    |    |    |    |



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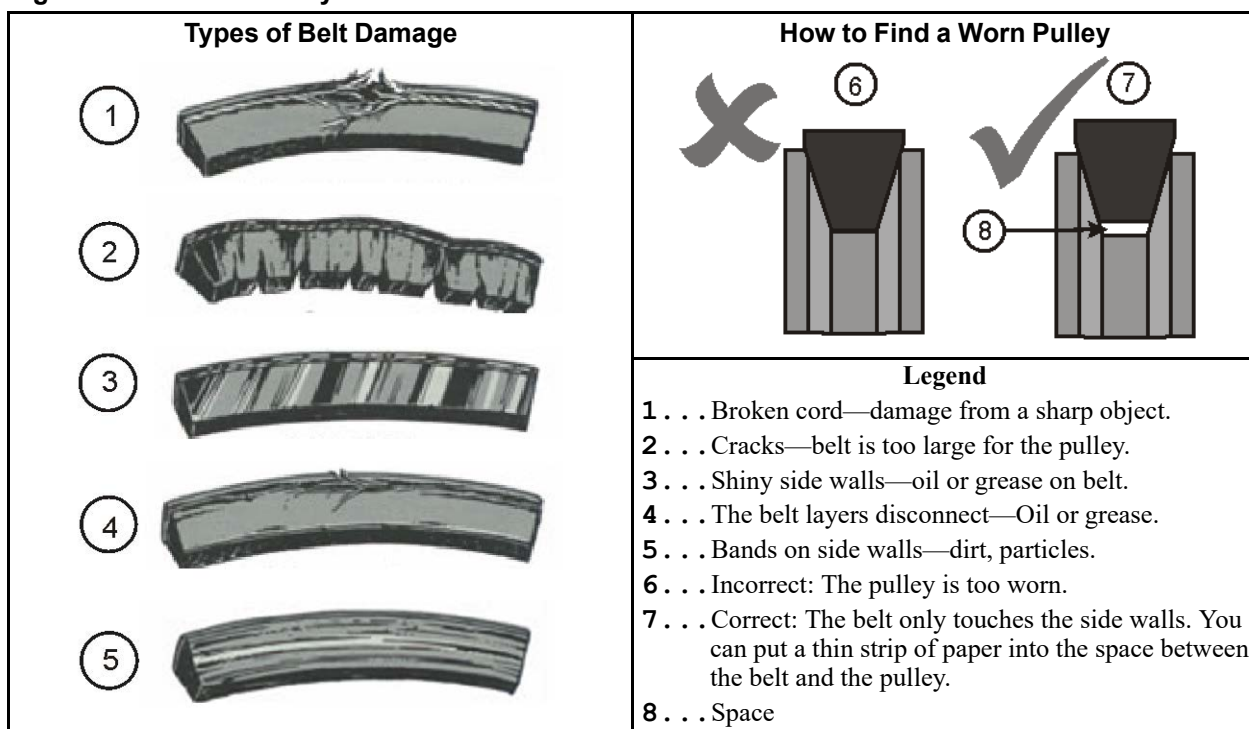
## 3.2 Maintenance Components—Machines and Controls Group

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### 3.2.1 How to Examine V-belts and Pulleys

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Figure 6. Belt and Pulley Conditions To Look For



#### With power removed:

- Look for dirt, dust, oil, and grease. Remove contamination.
- Look for belt damage as shown in the figure above.
- Look for worn pulleys as shown in the figure above.

#### With the machine in operation—Do not touch the machine. Look and listen:

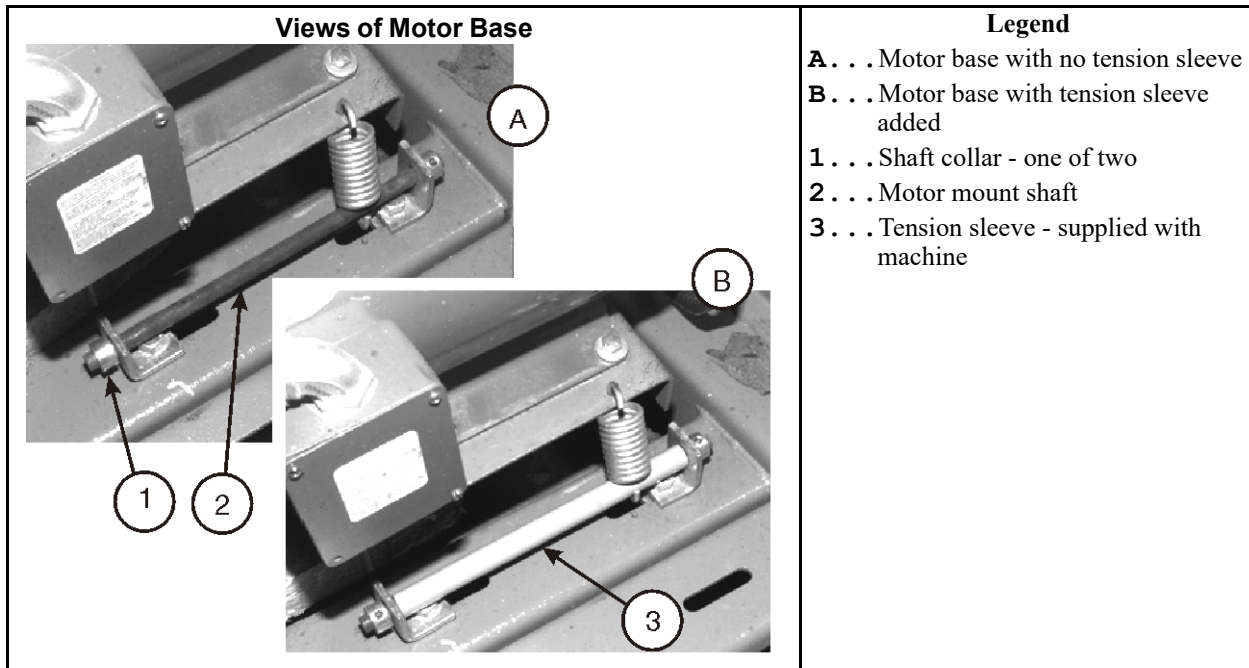
- A belt can have some vibration and not cause damage. It is necessary to correct this condition only if the vibration is large.
- A belt must have sufficient tension that there is no slippage on the pulley during operation. If slippage occurs, you can usually tell from the noise.

**About Component Replacement and Tension Adjustment**—Correct adjustment is very important to the service life of components and operation of the machine. Your Milnor® dealer can do this work. If you know how to do this work (for example, correctly align belts and pulleys), and you want to do it, speak to your dealer or Milnor® for part numbers. Replace worn components before you make tension adjustments.



- Machines that use rods with full threads and nuts to hold the position of the motor base—Turn the nuts on the rods as necessary to adjust tension. Tighten the nuts.
- Machines that use a spring to hold tension on the motor base—Use the belt tension sleeve supplied with the machine. Put the sleeve on the rod that the spring is attached to or remove the sleeve to increase or decrease tension (see the figure below). Replace the spring if necessary.

**Figure 7. How to Adjust Belt Tension On a Machine That Uses Spring Tension**



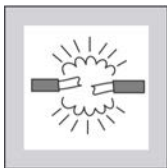
### 3.2.2 Inverters

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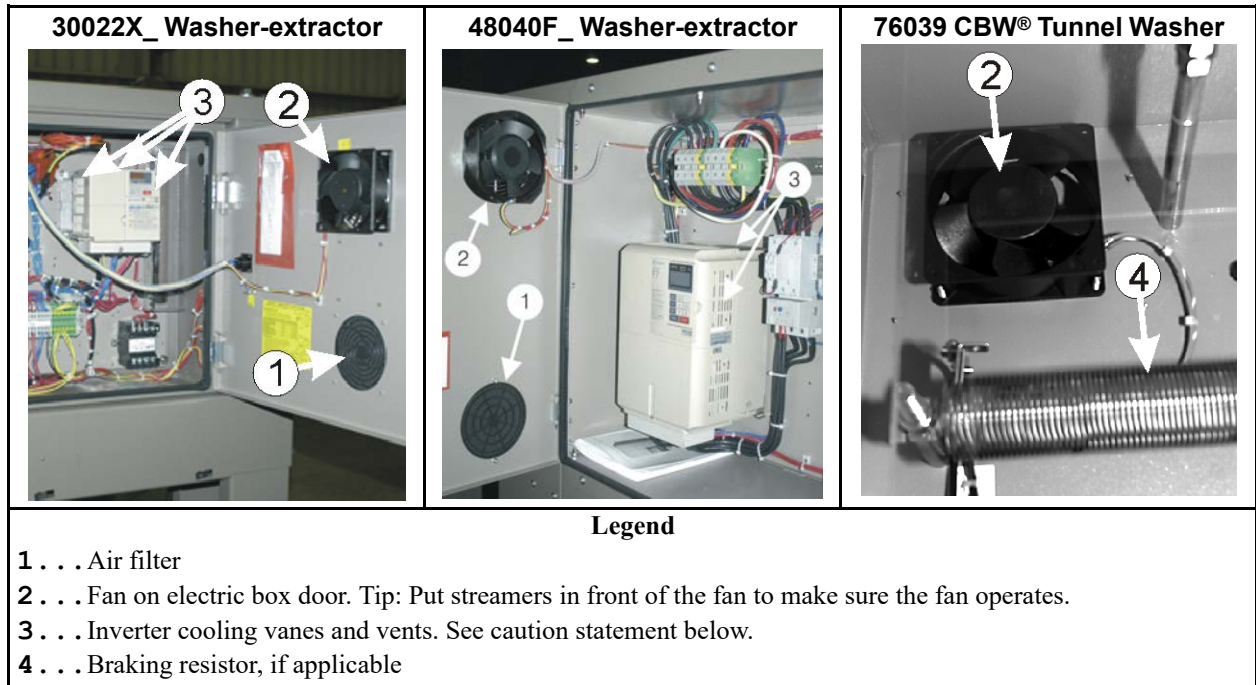


**CAUTION:** **Insufficient airflow** — will cause the inverter to burn out.

- Keep fans, filter, vents, and braking resistors clean.



**Figure 8. Electric Box and Inverter. These are examples. Your machine can look different.**



### 3.2.3 Chemical Devices

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**CAUTION: Chemical corrosion** — can damage the machine and the goods.



- ▶ Connect chemical tubes only to chemical manifold inlets.
- ▶ Stop leaks. Remove leaked supplies from surfaces.
- ▶ Speak to your dealer or Milnor® if you see corrosion damage.

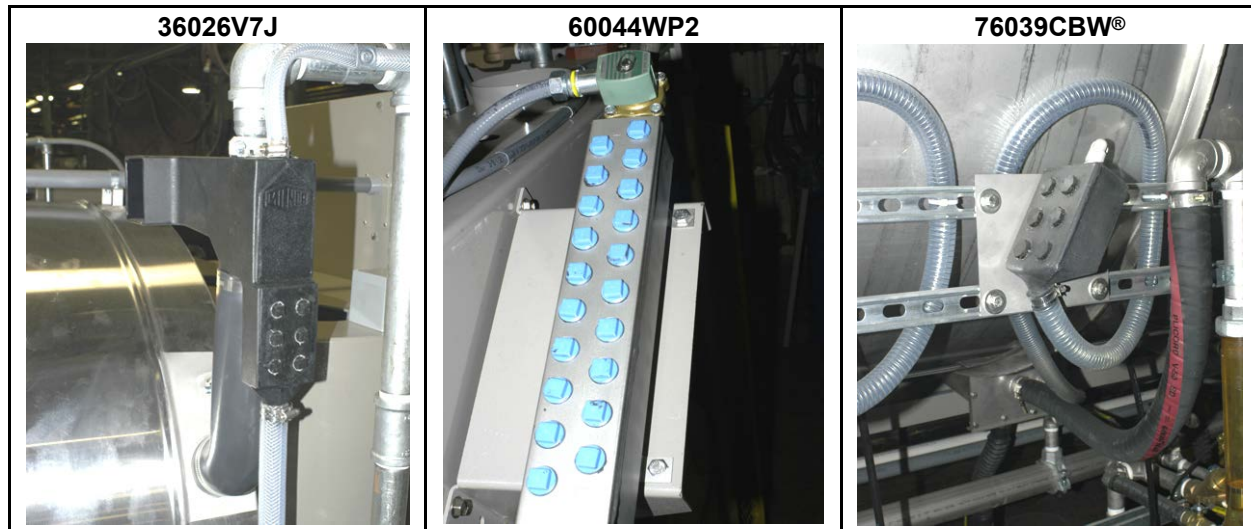


**CAUTION: High water pressure** — can cause laundering chemicals to splash on personnel and machine surfaces.



- ▶ Make sure the pressure is set as told in the maintenance summary.

**Figure 9. Chemical Inlet Manifolds for Chemical Pump Systems. See caution statement below. These are examples. Your machine can look different.**



### 3.2.4 Water and Steam Devices

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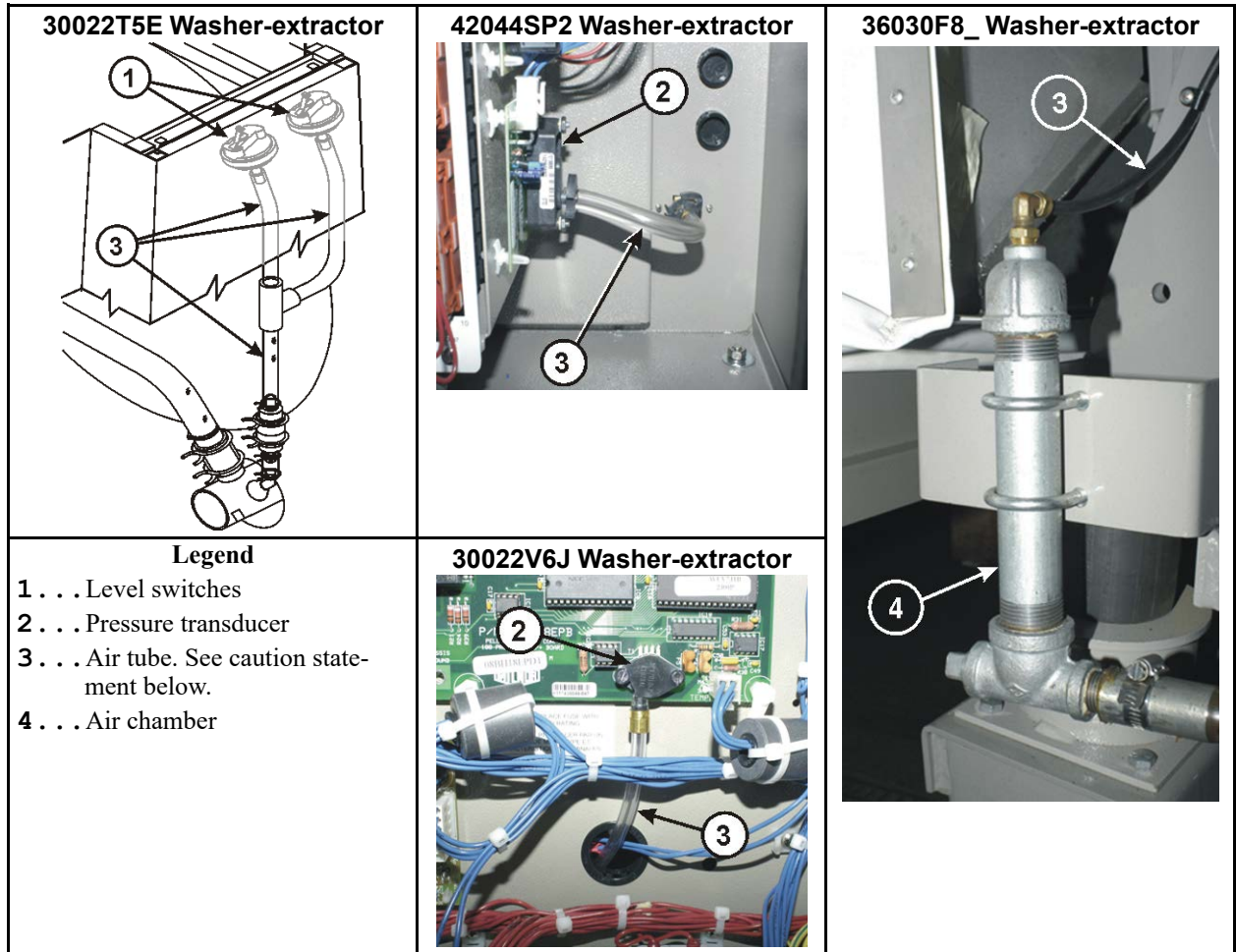


**CAUTION:** Restricted air flow — can cause incorrect level readings.



- ▶ Keep the connecting tube or hose free of blockages and leaks.
- ▶ Make sure that the connections are tight.

**Figure 10. Air Tube for the Water Level Sensor. These are examples. Your machine can look different.**



**Figure 11. Water Pressure Regulator for Chemical Flush. These are examples. Your machine can look different.**

