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Controller Reference

MilTouch™ Washer-extractor

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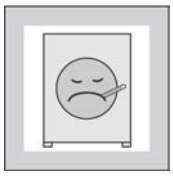
1 Preface

1.1 About MilTouch™ Machines, the MilTouch™ Controller, and This Manual

NOTICE: MilTouch™, MilTouch-EX™, and MilTouch-EX™ WTB are variations of the same controller design, each of which applies to an exclusive family of washer-extractors. This manual applies to MilTouch™ software version 3.2.101. This manual also applies to all consecutively subsequent software versions that do not affect the user experience described herein. For the MilTouch-EX™ reference manual, refer to manual MCCLWB01.

The Milnor® MilTouch™ washer-extractor controller uses a touch-sensitive display screen to operate the machine. All the functions and information you need to configure, program, and run the machine appear on this screen.



CAUTION: Excessive pressure — can damage the display screen.

- Do not push hard on the glass.
- Use only a finger to touch the glass. Do not touch the screen with a tool.

Operators will use the MilTouch™ controller to run wash formulas. However, the MilTouch™ controller also has features that are accessible when the machine is idle. These features will interest specialists, such as service technicians and chemical suppliers who work with the machine. These features are the subject of this manual. Refer to the operator guide for operator instructions.

The MilTouch™ controller contains several displays organized into a hierarchy. Top-most is the **Home** display (Figure 1: The Home Display, page 8). Each display contains buttons that access lower level displays.

The chapters in this manual are organized, not by display, but by types of specialist activity. Examples are given in the following table. For a hierarchal tour of the displays, see Section 1.1.3 , page 9.

Table 1. Examples of Specialist Activity

Specialist	Type of Activity	Section & Page
Factory tester	Initial configuration	Section 2.1.1 : The Configuration Display, page 11
Chemical supplier	Create and modify wash formulas.	Section 3.2.1 : The Wash Formula Maintenance Display, page 48

Table 1 Examples of Specialist Activity (cont'd.)

Specialist	Type of Activity	Section & Page
	Test a wash formula.	Section 4.4 : Formula Intervention, page 77
	Transfer formulas to/from the machine.	Section 5.2 : Data Transfer with the MilTouch™ Controller, page 100
	Closely monitor machine operation.	Section 1.1.2 : When a Formula is in Progress (The Run Display), page 8, Section 4.5.1 : The Diagnostics Display and Available Views, page 81
Laundry management	View logs of machine operation.	Section 4.2 : Data Logs, page 64
	Change settings to accommodate regional preferences such as temperature units in Fahrenheit or Celsius.	Section 2.1.3 : The Configuration Decisions, page 13
	Set lockout passwords to prevent personnel from accessing certain functions.	Section 2.2.1 : Enable and Define Lockout Passwords, page 18
	Configure a machine to run remote Mildata® formulas.	Section 6.3 : Running Remote Formulas with the Mildata® Product, page 115
Service technician	Troubleshoot error conditions.	Section 4.3.1 : MilTouch™ Error Messages, page 73
	Change settings to accommodate newly added hardware such as a reuse water valve.	Section 2.1.3 : The Configuration Decisions, page 13

1.1.1 When the Machine is Idle (The Home Display)

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The display pictured in the following figure, subsequently referred to as the **Home** display, is the top-most display in the hierarchy of MilTouch™ displays and is used to access all the other displays. It appears when no other display has been accessed, when you touch  from another display, or when you back up to the **Home** display with  or  .

From the **Home** display, you can select and run wash formulas. If your machine is part of a Mildata® network, you can also run formulas programmed into the Mildata® computer remotely from this display. See the operator guide for instructions on how to run wash formulas.

Figure 1. The Home Display

Legend

C.	Access the **Configuration** display
D.	Access the **Diagnostics** displays
Dc.	Display the Pellerin Milnor Corporation contact information
Dt.	Access the **Data Transfer** display
Fn.	The wash formula names
F#.	The wash formula numbers
L.	Access the **Data Log** displays
M.	Run a formula from the Milda-ta® computer
P.	Turn machine power OFF
S.	Run a formula
Sc.	Scroll between pages to view more formulas
Se.	Search for a formula
V.	The version data
Vd.	View the software build
W.	Access the **Wash Formula Maintenance** display

1.1.2 When a Formula is in Progress (The Run Display)

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The **Run** display appears when you run a formula. From the **Run** display, you can monitor the wash formula progress and the machine status.

You can also use formula intervention to change the water temperature and level, the formula time, the drain type, and the cylinder speed for the formula in progress. See Section 4.4 : Formula Intervention, page 77 for instructions on how to use formula intervention.

See the operator guide for more information on how to interpret the **Run** display.

Figure 2. The Run Display

1.1.3 The MilTouch™ Display Hierarchy

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In Table 2, page 9:

- The **Home** display is the default display. It appears when no other display has been accessed, when you touch  from another display, or when you return to the **Home** display with  or  .
- Access a display from the less-indented (parent) display above it. The icon following the display name is the button on the parent display that accesses it. Example: Touch  on the **Home** display to access the **Data Transfer** display.
- Display names in parentheses are implied; that is, the name does not appear on the display.
- The term "display" refers to the view that remains active until you access another display. Many other windows and dialog boxes, not shown here, will appear only until you make a selection or complete an entry. Example: the User Password Window.

Table 2. The MilTouch™ Display Hierarchy

Display Name and Button	See
(Home) 	Figure 1: The Home Display, page 8
(Run)  or 	Section 1.1.2 : When a Formula is in Progress (The Run Display), page 8
Error Causes/Solutions 	Figure 26: Error Causes/Solutions Display, page 76 (only available when the machine encounters an error)
(Data Transfer) 	Section 5.2 : Data Transfer with the MilTouch™ Controller, page 100
(Wash Formula Maintenance) 	Section 3.2.1 : The Wash Formula Maintenance Display, page 48
(Steps in a Wash Formula) (touch the number of steps on the parent display)	Section 3.2.1.5 : To Change a Wash Formula, page 50
(Step Decisions) (touch the step type on the parent display)	Section 3.2.1.10 : The Step Decisions, page 53
Configuration 	Section 2.1.1 : The Configuration Display, page 11
SYSTEM SETTINGS 	Section 2.2 : System Settings, page 17

Table 2 The MilTouch™ Display Hierarchy (cont'd.)

Display Name and Button	See
(Date Selection) 	Section 4.2.1 : Date Selection, page 65
(Production History) 	Section 4.2.2 : Production History, page 66
(Configuration and Programming History) 	Section 4.2.3 : Configuration and Programming History, page 66
(Error History) 	Section 4.2.4 : Error History, page 67
(Production Reports) 	Section 4.2.5 : Production Reports, page 68
DIAGNOSTICS 	Section 4.5.1 : The Diagnostics Display and Available Views, page 81
DIAGNOSTICS (Digital Inputs) 	Section 4.5.1.1 : Digital Inputs, page 82
DIAGNOSTICS (Digital Outputs) 	Section 4.5.1.2 : Digital Outputs, page 83
(DIAGNOSTICS) Analog Channels 	Section 4.5.1.5 : Analog Channels (A/D inputs and D/A outputs), page 83

2 Configuration

2.1 Machine Configuration

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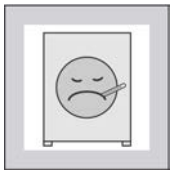
Your machine was configured at the factory and the configuration values were recorded on the MilTouch™ Configuration form included with your machine. You will find a copy of this completed form in the packet of documentation shipped in the machine cylinder. The values set at the factory and recorded on the MilTouch™ Configuration form are the optimum or required settings for your machine.

Most configuration decisions are hardware-dependent. The only reason to modify hardware-dependent settings is to accommodate modifications to your machine's hardware.



CAUTION: Careless modification of hardware-dependent settings — is likely to degrade machine performance and may cause damage or malfunction.

- Do not make unauthorized changes to hardware-dependent configuration settings.
- Consult Milnor® Technical Support before you change hardware-dependent settings.

2.1.1 The Configuration Display

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From the **Configuration** display, you can configure the MilTouch™ controller based on your machine's model, features, and capabilities.

Touch  on the **Home** display to view the **Configuration** display, shown in the following figure.

Figure 3. The Configuration Display

Legend

A . . . The configuration decisions
B . . . Scroll between pages and view more configuration decisions
C . . . Calibrate the flow meter
D . . . Access the **System Settings** display
E . . . Save changes and return to the **Home** display
F . . . Abandon changes and return to the **Home** display

2.1.2 How to Make Configuration Changes

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Some configuration decisions present a list to select from, some permit you to enter a value, and some are either enabled or disabled. Touch a configuration decision to change it. One of two types of windows (not shown) appears.

- A selection list appears. Touch the value you want to use.
- A window with a text box and a keypad appears.
  - Touch the value in the text box. Use the backspace button to delete the current value.
  - Enter the new value on the keypad.
  - Touch  to save the new value.

- A window does not appear. Touch the decision to toggle between enabled (YES ) and disabled (NO ).
- Save or abandon your changes:
  - To abandon the most recent changes and return to the **Home** display, touch  .
  - To save the changes and return to the **Home** display, touch  .

NOTE: The configuration changes you make are recorded in the data logs. See Section 4.2.3 : Configuration and Programming History, page 66.

2.1.3 The Configuration Decisions

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Use the following information to configure the controller based on your machine's features and specifications, as well as your laundry needs.

The configuration decisions that are hardware-dependent are marked "Avoid modification" in the following explanations. A few configuration decisions are not hardware-dependent, but it is important to understand the consequences of changing these values, as explained.

Type (Avoid modification) — Select the machine model number. This information is on the name plate on the rear of the machine.

Name — Give this machine a name. If the machine is connected to a Mildata® network, the name of the machine appears on printed reports.

Laundry Type — Select the type of laundry facility where this machine is located. The default formulas associated with this laundry type become active.

Language — Select the language that will appear on the displays.

The following language options are available:

- English
- Spanish
- Chinese
- French
- German
- Italian
- Korean
- Russian

NOTE: The formula names do not change if you change the controller language. To change the name of a formula, touch  on the **Wash Formula Maintenance** display (see Section 3.2 : Formula Creation and Modification, page 47).

TIP: If you are using the 10 default formulas, you can perform the default formula restoration process (Section 3.1.4 : To Restore the Default Formulas, page 47) to rename them in the current controller language.

Water Unit — Select the unit, either inches or centimeters, that the controller uses to measure and display the bath height.

NOTICE: The numerical values for water levels do not automatically change to reflect unit changes. For example, if water level 1 is set to 13.0 inches and you change the water unit to centimeters, the water level will be 13.0 centimeters, not 33.02 centimeters (the correct converted value). If you change the water unit, you must also manually change the water level 1, 2, and 3 values, as well as all user-defined levels, to reflect the unit change.

Water Offset (Avoid modification) — A numeric value used to correctly display the bath level on the **Run** display.

Water Levels (Avoid modification except to change the water unit) — Enter the values for the water levels used in formulas. Values use the unit you choose in the **Water Unit** configuration decision. Water Level 1 must be less than or equal to Level 2. Level 2 must be less than or equal to Level 3.

Temperature Probe (Avoid modification) — Select whether this machine has a temperature sensor. A temperature sensor allows programming a specific temperature for each bath step.

NOTE: The machine must have a temperature sensor to use steam or cooldown.

Temperature Unit — Select the unit, either degrees Fahrenheit or degrees Celsius, that the controller uses to measure and display the bath temperature.

Steam Error (Avoid modification) — Select the time allowed for the machine to use steam to achieve the programmed bath temperature before the controller issues an error. See Section 4.3 : Errors, page 72 for more information.

Cooldown Error (Avoid modification) — Select the time allowed for the machine to complete a cooldown to a programmed bath temperature before the controller issues an error. See Section 4.3 : Errors, page 72 for more information.

Extra Water (Avoid modification) — Select whether this machine is attached to a reuse water source.

Reuse Drain (Avoid modification) — Select whether this machine has a second drain valve that discharges to a reuse water reservoir.

RinSave® (Avoid modification) — Select whether this machine is provided with the RinSave® feature.

Fill Error (Avoid modification) — Select the time allowed for the machine to achieve the desired water level before the controller issues an error. See Section 4.3 : Errors, page 72 for more information.

Counts per 10 RPMs (Avoid modification) — The number of counts from the digital-to-analog board required to change the cylinder rotation speed by 10 RPMs. The correct value (as set at the Milnor® factory) is extremely important to obtain the expected machine function.

Mildata® — Select whether this machine is part of a Mildata® network. This decision provides access to 10 optional decisions for additional Mildata® network communications.

Contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125 for more information on the Mildata® product.

NOTE: You can run local wash formulas from the controller OR remote wash formulas from a Mildata® computer. When you enable your controller to run Mildata® formulas, the local formulas become disabled.

- **Address**—Enter the machine address on the Mildata® network.
- **Formula**—Select whether this machine will pass formula data for each load to the Mildata® computer.
- **Work Order**—Select whether this machine will pass the work order for each load to the Mildata® computer.
- **Goods Code**—Select whether this machine will pass the goods code for each load to the Mildata® computer.

- **Customer**—Select whether this machine will pass the customer code for each load to the Mildata® computer.
- **Employee**—Select whether this machine will pass employee data for each load to the Mildata® computer.
- **Weight**—Select whether this machine will pass weight data for each load to the Mildata® computer.
- **Pieces**—Select whether this machine will pass the number of pieces for each load to the Mildata® computer.
- **Lot**—Select whether this machine will pass the lot number for each load to the Mildata® computer.
- **Group**—If this machine is part of a group of machines that will use the same formulas, enter the group number for this machine.

Door Latch (Avoid modification) — Select whether this machine has a turn– or push–type door latch.

Prompt Weight (Avoid modification) — Select whether this machine will prompt you to input the load weight and customer number before it runs a formula locally. Machines running a newer software version have a "HELMS" configuration decision instead.

HELMS (Avoid modification) — Select whether this machine uses a chemical delivery system with a 32 bit, synchronous data protocol. If you answer  YES to this configuration decision, the controller will prompt you to input the load weight and customer number before it runs formulas locally.

NOTE: For more information about the optional chemical delivery system with a 32 bit, synchronous data protocol, contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125.

Capacity (Avoid modification) — Enter your machine's maximum weight capacity in kilograms. This depends on your machine model.

 # Compartments (Avoid modification) — If your machine is a divided-cylinder machine, enter the number of compartments in the cylinder. Enter 1 if your machine is an open-pocket machine (not a divided-cylinder machine).

Weigh Machine (Avoid modification) — Select the method you will use to enter the actual weight of the load in the machine.

None The controller does not prompt for the weight of the goods in the machine.

Load Cells Load cells automatically weigh the goods and prompt you to confirm the weight on the controller.

Manual Entry The controller prompts the operator to enter the actual weight before the machine starts a formula.

Ratio by Weight (Avoid modification) — Select whether this machine uses the weight of the goods in the machine to determine how much water to use to wash the goods. Requires a flow meter. See Section 2.3.1 : About the Liquor Ratio Control Feature, page 21.

Flow Meters (Avoid modification) — Select whether this machine is equipped with flow meters to measure incoming water.

Pulses per Unit (Avoid modification) — Define the number of flow meter pulses that equal one water unit, according to your flow meter calibration. Ex. 2 pulses = 1 Liter

Offset Valve Time (Avoid modification) — Enter the number of tenths of a second **before the desired number of counts is accumulated** for the controller to command the water valves to close. This reduces overshoot.

Normally-Opened Drain (Avoid modification) — Select whether this machine has a normally-opened drain valve (usually the drain valve to the sewer).

Barcode (Avoid modification) — Select if this machine has the optional GearTrace™ feature.

Require Initial — Select whether the machine will prompt the operator to input his/her initials before he/she runs a formula. This decision is only available on machines with the optional GearTrace™ feature.

2.2 System Settings

From the **System Settings** display, you can set a password to restrict access to formula modification, configuration settings, and manual functions. You can also set the date and time for the controller, recalibrate the touchscreen, and enable an Ethernet connection.

Touch  on the **Configuration** display to access the **System Settings** display, shown in the following figure.

Figure 4. System Settings Display

Legend

- **D . . .** Enter the current date
- **E . . .** Set up an Ethernet connection
- **Ex . .** Exit (return to the **Configuration** display)
- **P . . .** Password Area. See Section 2.2.1 , page 18.
- **R . . .** Recalibrate the touchscreen, as explained in Section 2.2.2 : Recalibrate the Touchscreen, page 19
- **Sc . .** Scroll pages if there is more than one page
- **T . . .** Enter the current time

2.2.1 Enable and Define Lockout Passwords

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When a lockout password is enabled (YES), the lockout password will be necessary to access certain functions. You can enable and define a lockout password from the password area (Figure 5, page 18) on the **System Settings** display.

Figure 5. Password Area of the System Settings Display

Legend

- **C . . .** Define a configuration password
- **F . . .** Define a formulas password
- **M . . .** Define a manual functions password
- **Pc . .** Enable a configuration password
- **Pf . .** Enable a formulas password
- **Pm . .** Enable a manual functions password

1. Touch a button in the left column of the password area, labelled **Lockout Password**, to enable (YES) or disable (NO) a lockout password.
   - **Configuration** (Pc) controls access to the **Configuration** display, the **System Settings** display, and the **Data Transfer** display.
   - **Formulas** (Pf) controls access to the **Wash Formula Maintenance** display.
   - **Manual** (Pm) controls access to **Formula Intervention** on the **Run** display.
2. Touch a button in the right column of the password area to define a lockout password.
3. The **User Password** window (shown in the following figure) appears.

Figure 6. User Password Window

a. In the **User Password** window, touch the **New Password** box.

b. Enter the same password in both the **New Password** box and the **Verify Password** box. The lockout passwords are not case-sensitive.

c. Touch  to save the password and return to the **System Settings** display.

4. A dialog box (not shown) will appear, which indicates the password was saved. Touch  to dismiss the dialog box.

NOTICE: To recover a lost password, contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125. Call or e-mail during normal business hours and provide the encrypted password below the Password Entry box (shown in the following figure). The Milnor® staff can decode the password for you.

Figure 7. Sample Encrypted Password

2.2.2 Recalibrate the Touchscreen

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If the touchscreen becomes less responsive to touch, you can recalibrate it to improve touch input accuracy.

NOTE: If you cannot access the recalibration screen because your touchscreen inputs are too inaccurate, visit the milnor.com Technical Knowledge Base under "Support and Safety" and search "force recalibration," or contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125.

1. Touch the button labelled **Recalibrate Touchscreen** (R) on the **System Settings** display.
2. A dialog box (not shown) appears, which prompts you to confirm your decision. In the dialog box, touch ✔ to recalibrate the touchscreen.
3. The controller restarts, and the calibration screen appears.
4. Use a stylus or the end of a pen to touch each of the five crosshair symbols only one time as they appear.

   NOTICE: You can use your finger to calibrate the touchscreen, but it is less accurate than a stylus and may generate multiple inputs with one touch. If you touch a crosshair symbol more than one time, you must repeat the calibration procedure.
5. A timed dialog box (not shown) prompts you to confirm or reset your calibration. In the dialog box:
   - Touch ✔ before the timer expires to confirm the calibration. You have 12 seconds.
   - Do not touch ✔ and allow the dialog box timer to expire to calibrate the screen again. Repeat steps 3 through 5.
6. The controller restarts after you confirm the calibration.

2.2.3 Set the System Date and System Time

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The date and time fields are displayed on the **Home** display and used when data is collected.

1. Touch the button labelled **Date** on the **System Settings** display. The **System Date** window (not shown) appears. In the **System Date** window:
   a. Enter today's month, day, and year.
   b. Touch ✔ to save your changes and return to the **System Settings** display.
2. Touch the button labelled **Time** on the **System Settings** display. The **System Time** window (not shown) appears. In the **System Time** window:
   a. Enter the current time in 24-hour format.
   b. Touch ✔ to save your changes and return to the **System Settings** display.

2.2.4 Enable an Ethernet Connection

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If your MilTouch™ machine is part of a Mildata® network, the MilTouch™ controller must have a Cat 5 Ethernet connection with the Mildata® computer and you must enable this connection in order for the machine to communicate with the Mildata® computer.

To enable the connection, touch the button labelled **DHCP** on the **System Settings** display so that it displays  YES to enable DHCP or  NO to disable DHCP.

- Enable DHCP and the server will automatically assign an IP address to your machine.
- Disable DHCP to manually assign a static IP address to your machine.
  - If the Mildata® network is tied to your wireless network, your network administrator must provide the static IP information.
  - If the Mildata® network is isolated to your Milnor® equipment, a Milnor® technician must provide the static IP information.

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2.3 How to Configure your Machine for the Liquor Ratio Control Feature

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2.3.1 About the Liquor Ratio Control Feature

BNCLWP03.C05 0000216316 C.5 E.3 I.2 12/13/21, 9:07 AM Released

The Liquor Ratio Control feature uses the weight of the goods in the machine to determine how much water to use to wash the goods.

Machines so equipped use a flow meter to achieve a specified ratio of water per weight unit of goods, as an alternative to using a pressure transducer to achieve a specified water level.

To use Liquor Ratio Control,

1. your machine must be equipped with, and configured for a flow meter, and
2. you must calibrate it.

For instructions on how to use Liquor Ratio Control in a formula, see Section 3.4 : How to Use Liquor Ratio Control in a Formula, page 60.

2.3.1.1 How to Configure your Machine for Liquor Ratio Control

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To use Liquor Ratio Control, your machine must have the following equipment:

- A flow meter, calibrated
- A separate air-operated fresh water inlet

You must configure your machine for the following settings:

- Flow meters enabled (Flow Meters = **YES**)

- Ratio by Weight enabled (Ratio by Wt = **YES**)
- Weigh Machine enabled (Weight Machine = **Load Cells** or **Manual Entry**)
- A non-zero value for Capacity
- A non-zero value for Pulses per Unit

NOTE: If you run formulas with the Liquor Ratio Control feature remotely from the Mildata® computer's programmer application, the controller will use the machine capacity from the machine's local memory to calculate the liquor ratio.

2.3.1.2 How to Calibrate the Flow Meter

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MilTouch™ machines can be equipped with two types of flow meters:

- magnetic flow meters
- electro-mechanical (paddlewheel) flow meters

Magnetic flow meters measure the quantity of water that enters the machine by measuring the voltage created when water moves through the flow meter's magnetic field. The flow meter converts the voltage signal into pulses, which the controller uses to determine the velocity of the water. Most magnetic flow meters have a programmable interface that is used to operate and calibrate the device. Use the instructions provided in your magnetic flow meter's user manual to calibrate this type of flow meter.

Electro-mechanical (paddlewheel) flow meters measure the quantity of water that comes into the machine using the paddlewheel located in the path of incoming water. The paddlewheel spins as water flows past it, and each revolution of the paddlewheel sends a pulse to the machine controller. Use the following calibration procedure if your machine is equipped with a paddlewheel flow meter.

Once the flow meter is calibrated, the MilTouch™ controller can use the count of the pulses to determine how much water has flowed into the machine and close the water valves when the desired amount of water per weight unit of goods is achieved.

2.3.1.2.1 Prepare the Calibration Container

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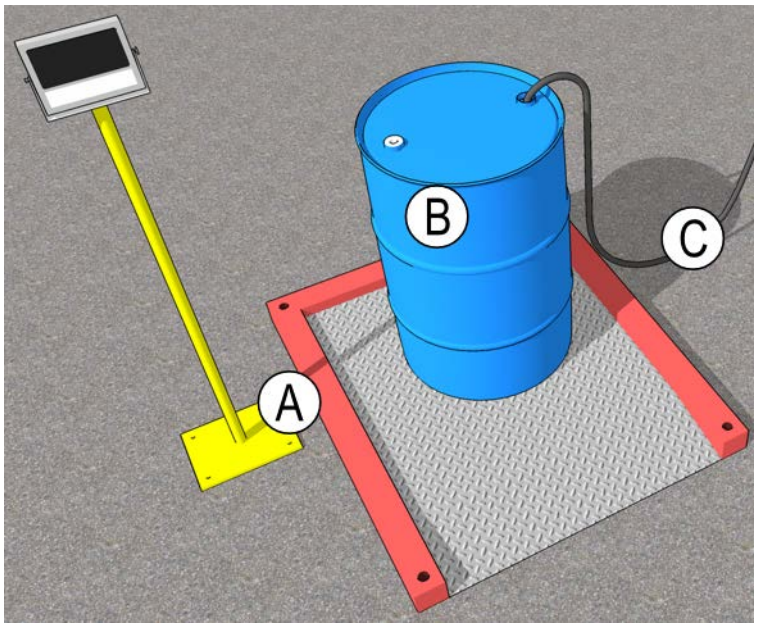
The paddlewheel flow meter calibration procedure requires you to temporarily redirect water from the washer-extractor to a container using a setup similar to the one depicted in Figure 8, page 23.

Figure 8. Suggested Setup



Legend
A. Weighing scale
B. Clean, empty drum
C. Hose from flow meter output

Depending on the units you choose for metering the water when the machine is operating, you must be able to accurately weigh the container and its contents or accurately determine the volume of water in the container.

The following are common unit conversions:

Gallons (US) = 0.12 x Pounds (US)

Gallons (US) = 0.264 x Liters or Kilograms

Kilograms = 1.0 x Liters

Kilograms = 0.454 x Pounds (US)

Liters = 1.0 x Kilograms

Liters or Kilograms = 3.785 x Gallons (US)

Pounds (US) = 8.3 x Gallons (US)

Pounds (US) = 2.2 x Kilograms

1. Prepare a large calibration container, such as a barrel or bucket, to fill with water. Larger containers provide more accurate calibration.
2. Attach a hose with a large diameter to the calibration container so that one end of the hose is inside the container and the other end is free.
3. Place the calibration container on an accurate weighing scale. You can choose any convenient unit for calibration. Liters, kilograms, pounds, and gallons are example units.
4. Disconnect the water inlet hose that runs between the flow meter/machine's water source and the machine cylinder from the machine's water source so that no hose is connected to the machine's water source.

5. Connect the free end of hose inside the calibration container to the machine's water source so that when the water valves open, the water that would normally flow through the flow meter and into the machine cylinder instead flows into the calibration container.

   TIP: Allow unimpeded flow from the machine water source to the calibration container. Restrictions, such as a smaller hose diameter, can make the calibration less accurate.

6. Tare the scale so that it reads zero (0) with the empty container and hose in place.

2.3.1.2.2 The Flow Meter Calibration Procedure

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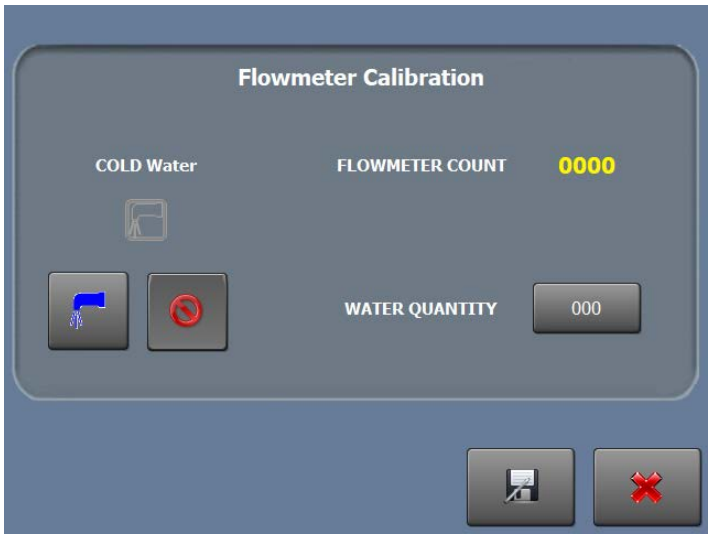
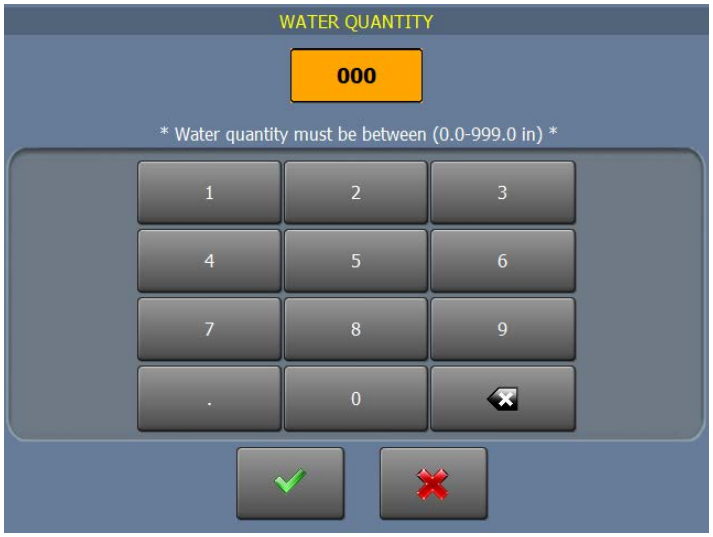
1. From the **Home** display, touch  to access the **Configuration** display.
2. Ensure that the controller is configured for a flow meter (**Flow Meters** = YES on page 1).
3. At the bottom of the **Configuration** display, touch  . The **Flow Meter Calibration** window appears (shown in the following figure).

Figure 9. Flow Meter Calibration Window



4. Wait for the **Flow Meter Count** value (the value in yellow) to reset to 0.
5. Touch  to open the water valves. Water flows into the calibration container. The flow meter count value increases as water flows past the flow meter.
6. When the desired weight or volume of water is in the container, touch  to close the water valves. Do not overfill the container!
7. Touch the value labelled **Water Quantity** to open the **Water Quantity** window (shown in the following figure).

Figure 10. Water Quantity Window



a. In the **Water Quantity** window, enter the quantity of water that is in the calibration container. Record the quantity of water in your unit of your choice (Liters, kilograms, pounds, gallons, etc.).

NOTE: Remember to write down what unit of measure you used to calibrate the flow meter, as flow meter units do not appear anywhere on the controller interface.

b. Touch  to confirm the value and return to the **Flow Meter Calibration** window.

8. Touch  to save your data and complete the calibration.
9. Re-connect the water inlet hose to the water inlet on the machine cylinder.

3 Formulas and Formula Maintenance

3.1 Preset Formulas

The Commercial Laundry formulas, also known as the RinSave® formulas, are a set of preset formulas available for MilTouch™ machines by default. MilTouch™ machines can also be programmed at the factory to contain a different set of preset industry-specific formulas, such as the GearTrace™ formulas for fire department use.

You can modify the formulas for your specific needs using the procedures in Section 3.2 : Formula Creation and Modification, page 47. However, Milnor® recommends you keep backup copies of your wash formulas before you modify them. See Section 5.2.2 : How to Export Files from the MilTouch™ Controller, page 102. Alternatively, the preset formulas as prepared by the Milnor® factory are documented in this section, so users can manually replace modified formulas with the presets if necessary.

The tables below list the preset formulas available for the MilTouch™ controller. Detailed descriptions of each formula follow.

Table 3. Commercial Laundry Formulas

Formula #	Application	Formula #	Application
1	Standard Wash	6	Heavy Soil (White)
2	Light Soil (White)	7	Heavy Soil (Colored)
3	Light Soil (Colored)	8	Multi-flush
4	Medium Soil (White)	9	Stain Soak
5	Medium Soil (Colored)	10	Quick Wash

Table 4. GearTrace™ Formulas

Formula #	Application	Formula #	Application
1	Light Soil Turnouts	6	Brush Gear
2	Heavy Soil Turnouts/Gloves	7	Hoods and Suspenders
3	Moisture Barriers	8	Wash Out (No Gear)
4	Breathable Vapor Barriers	9	Stationwear
5	Oil-contaminated Gear	10	Linens

3.1.1 The Commercial Laundry (Default) Formulas

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Table 5. Formula 01: Standard Wash

	Step 1: Wash	Step 2: Rinse 1	Step 3: Intermediate Extract	Step 4: Rinse 2	Step 5: Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	6:00	1:00	1:00	3:00	6:00
Temp	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	OFF	N/A
COLD Water	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.				
Chemicals	01, 02	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A
Drain Type	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

Table 6. Formula 02: Light Soil — White

	Step 1: Wash	Step 2: Rinse 1	Step 3: Intermediate Extract	Step 4: Rinse 2	Step 5: Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	8:00	2:00	1:00	4:00	6:00
Temp	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	OFF	N/A
COLD Water	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.				
Chemicals	01, 02	None	N/A	3, 4	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A
Drain Type	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

Table 7. Formula 03: Light Soil — Colored

	Step 1: Wash	Step 2: Rinse 1	Step 3: Intermediate Extract	Step 4: Rinse 2	Step 5: Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	8:00	2:00	1:00	4:00	3:00
Temp	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	OFF	N/A
COLD Water	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.				
Chemicals	01	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A
Drain Type	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

Table 8. Formula 04: Medium Soil — White

	Step 1: Wash	Step 2: Bleach	Step 3: Rinse 1	Step 4: Intermediate Extract	Step 5: Rinse 2	Step 6: Final Extract
Type	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	7:00	7:00	2:00	1:00	4:00	6:00
Temp	0° F	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	ON	N/A	OFF	N/A
COLD Water	OFF	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.					
Chemicals	01	02	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	NO	N/A	N/A	NO	N/A
Drain Type	Standard	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	0:03	N/A	0:03	N/A

Table 9. Formula 05: Medium Soil — Colored

	Step 1: Wash	Step 2: Rinse 1	Step 3: Intermediate Extract	Step 4: Rinse 2	Step 5: Intermediate Extract	Step 6: Rinse 3	Step 7: Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	7:00	7:00	1:00	2:00	1:00	4:00	6:00
Temp	0° F	0° F	N/A	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	ON	N/A	OFF	N/A
COLD Water	OFF	OFF	N/A	ON	N/A	ON	N/A
3rd Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.						
Chemicals	01	None	N/A	03, 04	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A	NO	N/A
Drain Type	RinSave®	Standard	N/A	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop +Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 10. Formula 06: Heavy Soil — White

	Step 1: Wash 1	Step 2: Rinse 1	Step 3: Wash 2	Step 4: Bleach	Step 5: Rinse 2	Step 6: Rinse 3	Step 7: Finish	Step 8: Final Extract
Type	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract
Time	10:00	2:00	7:00	7:00	2:00	2:00	4:00	6:00
Temp	0° F	0° F	0° F	0° F	0° F	0° F	0° F	N/A
HOT Water	ON	ON	ON	ON	ON	OFF	OFF	N/A
COLD Water	OFF	OFF	OFF	OFF	ON	ON	ON	N/A
3rd Water	OFF	OFF	OFF	OFF	OFF	OFF	OFF	N/A
Level	Level 1	Level 3	Level 1	Level 1	Level 3	Level 3	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.							
Chemicals	01	None	01	02	None	None	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	With Fill	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	0:40	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	No	N/A	No	No	N/A	N/A	No	N/A
Drain Type	Standard	Standard	Standard	RinSave®	Standard	Standard	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop +Signal
On Time	0:20	0:20	0:20	0:20	0:20	0:20	0:20	N/A
Off Time	0:03	0:03	0:03	0:03	0:03	0:03	0:03	N/A

Table 11. Formula 07: Heavy Soil — Colored

	Step 1: Wash 1	Step 2: Rinse 1	Step 3: Wash 2	Step 4: Rinse 2	Step 5: Rinse 3	Step 6: Rinse 4	Step 7: Finish	Step 8: Final Extract
Type	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract
Time	10:00	2:00	7:00	7:00	2:00	2:00	4:00	6:00
Temp	0° F	0° F	0° F	0° F	0° F	0° F	0° F	N/A
HOT Water	ON	ON	ON	ON	ON	OFF	OFF	N/A
COLD Water	OFF	OFF	OFF	OFF	ON	ON	ON	N/A
3rd Water	OFF	OFF	OFF	OFF	OFF	OFF	OFF	N/A
Level	Level 1	Level 3	Level 1	Level 3	Level 3	Level 3	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.							
Chemicals	01	None	01	None	None	None	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	With Fill	N/A	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	0:40	N/A	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	NO	N/A	N/A	N/A	NO	N/A
Drain Type	Standard	Standard	RinSave®	Standard	Standard	Standard	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop +Signal
On Time	0:20	0:20	0:20	0:20	0:20	0:20	0:20	N/A
Off Time	0:03	0:03	0:03	0:03	0:03	0:03	0:03	N/A

Table 12. Formula 8: Multi-Flush

	Step 1: Flush 1	Step 2: Flush 2	Step 3: Flush 3	Step 4: Wash	Step 5: Bleach	Step 6: Rinse	Step 7: Inter-mediate Extract	Step 8: Finish	Step 9: Final Extract
Type	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	2:00	2:00	2:00	7:00	7:00	2:00	1:00	4:00	6:00
Temp	0° F	0° F	0° F	0° F	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	ON	ON	ON	ON	N/A	OFF	N/A
COLD Water	ON	ON	OFF	OFF	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	OFF	OFF	OFF	OFF	N/A	OFF	N/A
Level	Level 3	Level 3	Level 3	Level 1	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.								
Chemicals	None	None	None	01	02	None	N/A	03, 04	N/A
When to Inject Chemicals	N/A	N/A	N/A	With Fill	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	N/A	N/A	N/A	0:40	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	N/A	N/A	N/A	NO	NO	N/A	N/A	NO	N/A
Drain Type	Standard	Standard	Standard	Standard	RinSave®	Standard	N/A	Standard	N/A
Re-se Drain	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop +Signal
On Time	0:20	0:20	0:20	0:20	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	0:03	0:03	0:03	0:03	N/A	0:03	N/A

Table 13. Formula 09: Stain Soak

	Step 1: Flush	Step 2: Soak	Step 3: Rinse	Step 4: Intermedi-ate Extract	Step 5: Finish	Step 6: Final Extract
Type	2-Way Wash	Soak Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	0:15	25:00	2:00	1:00	4:00	6:00
Temp	0° F	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	ON	N/A	OFF	N/A
COLD Water	ON	ON	ON	N/A	ON	N/A
3rd Water	OFF	OFF	OFF	N/A	OFF	N/A
Level	Level 3	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.					
Chemicals	None	None	None	N/A	03, 04	N/A
When to Inject Chemicals	N/A	N/A	N/A	N/A	With Fill	N/A
Chemical Injection Duration	N/A	N/A	N/A	N/A	0:40	N/A
Signal with Chemical Injection	N/A	N/A	N/A	N/A	NO	N/A
Drain Type	Do Not Drain	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	0:03	N/A	0:03	N/A

Table 14. Formula 10: Quick Wash

	Step 1: Wash	Step 2: Rinse	Step 3: Intermediate Extract	Step 4: Finish	Step 5: Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	5:00	1:00	1:00	4:00	5:00
Temp	0° F	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	OFF	N/A
COLD Water	OFF	ON	N/A	ON	N/A
3rd Water	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See Section 3.1.3 : Wash and Extract Speeds by Model, page 46.				
Chemicals	01, 02	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A
Drain Type	RinSave®	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

3.1.2 The GearTrace™ Formulas

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Table 15. Formula 01—Light Soil Turnouts

	Step 1: Wash	Step 2: Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Intermediate Extract	Step 6:Rinse 3	Step 7:Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	7:00	2:00	1:00	1:00	1:00	1:00	6:00
Temp	105° F	105° F	N/A	105° F	N/A	105° F	N/A
HOT Water	Raise Fill Temp	ON	N/A	Raise Fill Temp	N/A	OFF	N/A
COLD Water	ON	ON	N/A	ON	N/A	ON	N/A

Table 15 Formula 01—Light Soil Turnouts (cont'd.)

	Step 1: Wash	Step 2: Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Intermediate Extract	Step 6:Rinse 3	Step 7:Final Extract
Extra Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46						
Chemicals	01	None	N/A	03, 04	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A	NO	N/A
Drain Type	Stop w/Fill +Drain	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop+Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 16. Formula 02—Heavy Soil Turnouts/Gloves

	Step 1: Wash	Step 2: Rinse 1	Step 3: Wash 2	Step 4: Rinse 2	Step 5:Inter-mediate Extract	Step 6: Rinse 3	Step 7:Inter-mediate Extract	Step 8: Rinse 4	Step 9: Final Extract
Type	2-Way Wash	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	7:00	2:00	7:00	1:00	1:00	1:00	1:00	1:00	6:00
Temp	105° F	105° F	105° F	105° F	N/A	105° F	N/A	105° F	N/A
HOT Water	Raise Fill Temp	ON	Raise Fill Temp	ON	N/A	Raise Fill Temp	N/A	OFF	N/A
COLD Water	ON	ON	ON	ON	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	Level 3	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46								
Chemicals	01	None	01	None	N/A	03, 04	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	With Fill	N/A	N/A	With Fill	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	0:40	N/A	N/A	0:40	N/A	40	N/A
Signal with Chemical Injection	NO	N/A	NO	N/A	N/A	NO	N/A	NO	N/A
Drain Type	Stop w/ Fill +Drain	Stop w/ Fill +Drain	Stop w/ Fill +Drain	Stop w/ Fill +Drain	N/A	Stop w/ Fill +Drain	N/A	Stop w/ Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop +Signal
On Time	0:20	0:20	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 17. Formula 03—Moisture Barriers

	Step 1:Wash	Step 2:Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	5:00	1:00	1:00	1:00	4:00
Temp	105° F	105° F	N/A	105° F	N/A
HOT Water	Raise Fill Temp	Raise Fill Temp	N/A	Raise Fill Temp	N/A
COLD Water	ON	ON	N/A	ON	N/A
Extra Water	OFF	Off	N/A	Off	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46				
Chemicals	01	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	No	N/A
Drain Type	Stop w/ Fill +Drain	Stop w/ Fill +Drain	N/A	Stop w/Fill+Drain	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

Table 18. Formula 04—Breathable Vapor Barriers

	Step 1:Wash	Step 2:Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Final Extract
Type	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	5:00	1:00	1:00	1:00	5:00
Temp	105° F	105° F	N/A	105° F	N/A
HOT Water	Raise Fill Temp	Raise Fill Temp	N/A	Raise Fill Temp	N/A
COLD Water	ON	ON	N/A	ON	N/A
Extra Water	OFF	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46				
Chemicals	01	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	N/A
Drain Type	Stop w/Fill +Drain	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A

Table 19. Formula 05—Oil Contaminated Gear

	Step 1: Wash	Step 2: Soak	Step 3: Rinse 1	Step 4: Wash 2	Step 5: Rinse 2	Step 6:Inter-mediate Extract	Step 7: Rinse 3	Step 8:Inter-mediate Extract	Step 9: Rinse 4	Step 10: Final Extract
Type	2-Way Wash	Soak Wash	2-Way Wash	2-Way Wash	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract	2-Way Wash	Standard Extract
Time	1:00	15:00	2:00	7:00	1:00	1:00	1:00	1:00	1:00	8:00
Temp	105° F	105° F	105° F	105° F	105° F	N/A	105° F	N/A	105° F	N/A
HOT Water	Raise Fill Temp	Raise Fill Temp	Raise Fill Temp	Raise Fill Temp	Raise Fill Temp	N/A	Raise Fill Temp	N/A	Raise Fill Temp	N/A
COLD Water	ON	ON	ON	ON	ON	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	OFF	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 1	Level 3	Level 1	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	NO Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46									
Chemicals	01	None	None	01	01	N/A	None	N/A	03, 04	N/A
When to Inject Chemicals	With Fill	N/A	N/A	With Fill	With Fill	N/A	N/A	N/A	With Fill	N/A
Chemical Injection Duration	0:40	N/A	N/A	0:40	0:40	N/A	N/A	N/A	0:40	N/A
Signal with Chemical Injection	NO	N/A	N/A	NO	NO	N/A	N/A	N/A	NO	N/A
Drain Type	Stop w/ Fill +Drain	Stop w/ Fill +Drain	Stop w/ Fill +Drain	Stop w/ Fill +Drain	Stop w/ Fill +Drain	N/A	Stop w/ Fill +Drain	N/A	Stop w/ Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	To Sewer	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	N/A	0:20	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	N/A	0:03	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 20. Formula 06—Brush Gear

	Step 1:Wash 1	Step 2:Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Intermediate Extract	Step 6:Rinse 3	Step 7:Final Extract
Type	2-Way Wash	2-Way Wash	Staged Extract	2-Way Wash	Staged Extract	2-Way Wash	Standard Extract
Time	8:00	2:00	1:00	1:00	1:00	1:00	6:00
Temp	105° F	105° F	N/A	105° F	N/A	0° F	N/A
HOT Water	Raise Fill Temp	Raise Fill Temp	N/A	Raise Fill Temp	N/A	OFF	N/A
COLD Water	ON	ON	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46						
Chemicals	01	None	N/A	None	N/A	None	N/A
When to Inject Chemicals	With Fill	N/A	N/A	N/A	N/A	N/A	N/A
Chemical Injection Duration	0:40	N/A	N/A	N/A	N/A	N/A	N/A
Signal with Chemical Injection	NO	N/A	N/A	N/A	N/A	N/A	N/A
Drain Type	Stop w/Fill +Drain	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 21. Formula 07—Hoods and Suspenders

	Step 1: Wash 1	Step 2: Rinse 1	Step 3:Intermediate Extract	Step 4: Rinse 2	Step 5:Intermediate Extract	Step 6: Rinse 3	Step 7:Final Extract
Type	2-Way Wash	2-Way Wash	Staged Extract	2-Way Wash	Staged Extract	2-Way Wash	Standard Extract
Time	6:00	1:00	1:00	1:00	1:00	1:00	5:00
Temp	105° F	0° F	N/A	105° F	N/A	0° F	N/A
HOT Water	Raise Fill Temp	ON	N/A	Raise Fill Temp	N/A	OFF	N/A
COLD Water	ON	OFF	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 3	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46						
Chemicals	01	None	N/A	None	N/A	None	N/A
When to Inject Chemicals	With Fill	N/A	N/A	N/A	N/A	N/A	N/A
Chemical Injection Duration	0:40	N/A	N/A	N/A	N/A	N/A	N/A
Signal with Chemical Injection	No	N/A	N/A	N/A	N/A	N/A	N/A
Drain Type	Stop w/Fill +Drain	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A	Stop w/Fill +Drain	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 22. Formula 08—Wash Out — No Gear

	Step 1: Wash	Step 2: Rinse	Step 3: Rinse 2
Type	2-Way Wash	2-Way Wash	2-Way Wash
Time	8:00	3:00	3:00
Temp	0° F	0° F	0° F
HOT Water	ON	ON	ON
COLD Water	OFF	OFF	OFF
Extra Water	OFF	OFF	OFF
Level	Level 3	Level 3	Level 3
Steam	NO Steam	NO Steam	NO Steam
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46		
Chemicals	01	None	03, 04
When to Inject Chemicals	With Fill	N/A	With Fill
Chemical Injection Duration	0:40	N/A	0:40
Signal with Chemical Injection	NO	N/A	NO
Drain Type	Standard	Standard	Standard
Re-Use Drain	To Sewer	To Sewer	To Sewer
How to End	Stop	Stop	Stop
On Time	0:20	0:20	0:20
Off Time	0:03	0:03	0:03

Table 23. Formula 09—Stationware

	Step 1:Wash 1	Step 2:Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Intermediate Extract	Step 6:Rinse 3	Step 7:Final Extract
Type	2-Way Wash	2-Way Wash	Staged Extract	2-Way Wash	Staged Extract	2-Way Wash	Standard Extract
Time	8:00	4:00	1:00	1:00	1:00	1:00	6:00
Temp	0° F	0° F	N/A	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	ON	N/A	OFF	N/A
COLD Water	ON	ON	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 1	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46						
Chemicals	01	None	N/A	None	N/A	None	N/A
When to Inject Chemicals	With Fill	N/A	N/A	N/A	N/A	N/A	N/A
Chemical Injection Duration	0:40	N/A	N/A	N/A	N/A	N/A	N/A
Signal with Chemical Injection	No	N/A	N/A	N/A	N/A	N/A	N/A
Drain Type	Standard	RinSave®	N/A	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

Table 24. Formula 10—Linens

	Step 1:Wash 1	Step 2:Rinse 1	Step 3:Intermediate Extract	Step 4:Rinse 2	Step 5:Intermediate Extract	Step 6:Rinse 3	Step 7:Final Extract
Type	2-Way Wash	2-Way Wash	Staged Extract	2-Way Wash	Staged Extract	2-Way Wash	Standard Extract
Time	7:00	1:00	1:00	1:00	1:00	1:00	6:00
Temp	0° F	0° F	N/A	0° F	N/A	0° F	N/A
HOT Water	ON	ON	N/A	ON	N/A	ON	N/A
COLD Water	OFF	ON	N/A	ON	N/A	ON	N/A
Extra Water	OFF	OFF	N/A	OFF	N/A	OFF	N/A
Level	Level 1	Level 1	N/A	Level 3	N/A	Level 3	N/A
Steam	NO Steam	NO Steam	N/A	NO Steam	N/A	NO Steam	N/A
Speed	Varies by model. See, Section 3.1.3 : Wash and Extract Speeds by Model, page 46						
Chemicals	01	None	N/A	None	N/A	None	N/A
When to Inject Chemicals	With Fill	N/A	N/A	N/A	N/A	N/A	N/A
Chemical Injection Duration	0:40	N/A	N/A	N/A	N/A	N/A	N/A
Signal with Chemical Injection	NO	N/A	N/A	N/A	N/A	N/A	N/A
Drain Type	Standard	RinSave®	N/A	Standard	N/A	Standard	N/A
Re-Use Drain	To Sewer	To Sewer	N/A	To Sewer	N/A	To Sewer	N/A
How to End	Stop	Stop	Stop	Stop	Stop	Stop	Stop + Signal
On Time	0:20	0:20	N/A	0:20	N/A	0:20	N/A
Off Time	0:03	0:03	N/A	0:03	N/A	0:03	N/A

3.1.3 Wash and Extract Speeds by Model

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The minimum and maximum wash and extract speeds depend on the model of your machine. The default wash and extract speeds are given in the following table.

Table 25. Wash and Extract Speeds by Model

Model	Wash Speed	Intermediate and Final Extract Speeds	Model	Wash Speed	Intermediate and Final Extract Speeds
300 22/15V8Z	38	685	48040F/H	30	664
36021V5Z	38	541	MWF27Z8	38	830
36021V7Z	34	694	MWF45Z8	34	750
36026V5Z	34	541	MWF63 Z/Y7	32	694
36026V7Z	34	694	MWF77 Z/Y7	32	694

Table 25 Wash and Extract Speeds by Model (cont'd.)

Model	Wash Speed	Intermediate and Final Extract Speeds	Model	Wash Speed	Intermediate and Final Extract Speeds
42026V6Z	32	586	300 22/15VZZ	38	685
42030V6Z	32	586	MWF12Z	43	400
420 26/32X7Z	32	586	MWF100 Z/Y7	30	400

3.1.4 To Restore the Default Formulas

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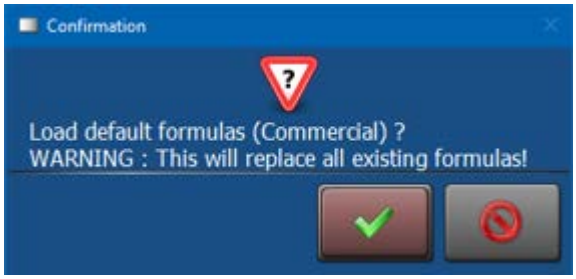
Use the following procedure to replace the formulas in your machine's memory with the Commercial Laundry (default) formulas. Note that other preset formula sets, such as the GearTrace™ formulas, cannot be restored using this method.

CAUTION: If you restore the default formulas, your current formulas will be deleted. To save a backup file of your wash formulas, see Section 5.2.2 : How to Export Files from the MilTouch™ Controller, page 102.

1. Touch  on the **Home** display to show the **Configuration** display (Section 2.1.1 : The Configuration Display, page 11).
2. Touch the configuration decision labelled **Laundry Type** on the **Configuration** display.
3. A selection list appears. Select **Commercial** from the list.
4. The dialog box in Figure 11, page 47 appears, which warns that all the formulas will be replaced with the default formulas. In the dialog box, touch  to replace all existing formulas with the 10 default formulas.

Figure 11. Confirmation Dialog Box



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3.2 Formula Creation and Modification

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Wash formulas consist of steps, which consist of decisions. Add, change, and delete formulas, steps, and decisions from the **Wash Formula Maintenance** display.

NOTE: The formula changes you make (add a new formula, delete a step, change a step decision, etc.) are recorded in the data logs. See Section 4.2.3 : Configuration and Programming History, page 66.

3.2.1 The Wash Formula Maintenance Display

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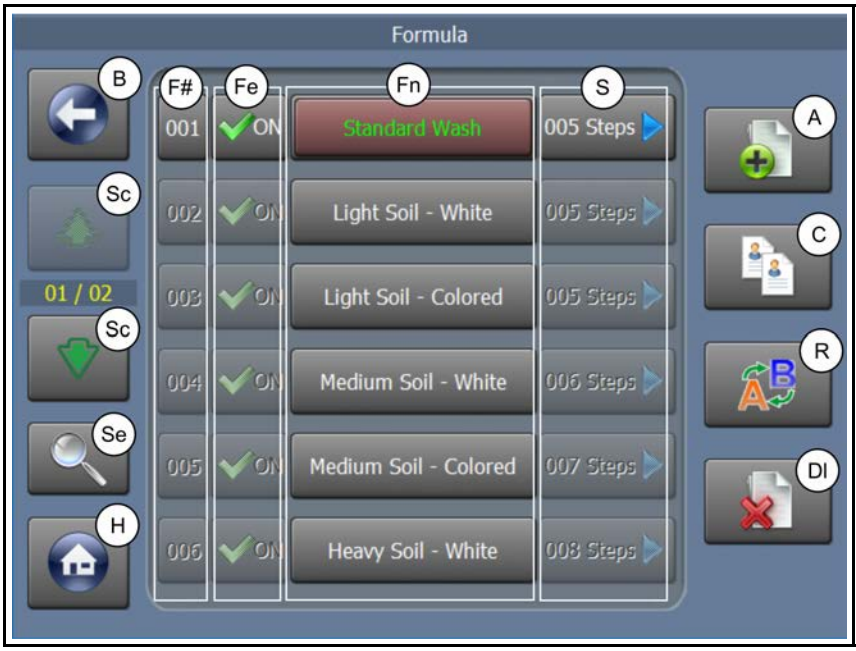
Touch  on the **Home** display to view the display shown in the following figure. This display is subsequently referred to as the **Wash Formula Maintenance** display.

Figure 12. The Wash Formula Maintenance Display



Legend

A.	Add a new formula
B.	Go back one level, to the **Home** display
C.	Copy a formula
Dl.	Delete a formula
F#.	Change a formula number
Fe.	Enable/disable a formula
Fn.	The wash formula names
H.	Return to the **Home** display
R.	Rename a formula
Sc.	Scroll between pages
Se.	Search for a formula
S.	Access the **Steps in a Wash Formula** display

3.2.1.1 To Add a New Wash Formula

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Create a new, empty wash formula without any steps (you must add steps).

1. On the **Wash Formula Maintenance** display, touch  to add a new wash formula. The controller gives the new wash formula a name similar to `[N] Formula xxx`, where *xxx* is a number.
2. Touch  to change the wash formula name. The **Formula Name** window (not shown) appears. On the **Formula Name** window:
   a. Touch the **[Clear All]** button to delete the formula name that the controller provided.
   b. Use the keypad to enter a new formula name.
   c. Touch  to save the new formula name.

3.2.1.2 To Copy a Wash Formula

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Make a copy of a wash formula.

1. Use  and  on the **Wash Formula Maintenance** display if necessary to scroll between pages and show the wash formula you want, or use  to search for the wash formula by its formula number.
2. Touch the button that displays the wash formula name (Fn).
3. Touch  to copy the formula. The controller gives the new formula a name similar to `(Copy) F-xxx`, where *xxx* is the number of the formula that you copied.
4. Touch  to change the wash formula name. The **Formula Name** window (not shown) appears. On the **Formula Name** window:
   a. Touch the **[Clear All]** button to delete the formula name that the controller provided.
   b. Use the keypad to enter a new formula name.
   c. Touch  to save the new formula name.

3.2.1.3 To Delete a Wash Formula

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Delete a wash formula from the controller's memory.

1. Use  and  on the **Wash Formula Maintenance** display if necessary to scroll between pages and show the wash formula you want, or use  to search for the wash formula by its formula number.
2. Touch the button that displays the wash formula name (Fn).
3. Touch  to delete the formula.
4. A dialog box (not shown) appears, which prompts you to confirm your decision. On the dialog box, touch  to delete the formula.

NOTE: Formula numbers are not sequential. For example, if you delete formula #2, formula #3 will remain #3 and there will be no formula #2.

3.2.1.4 To Change the Number of a Wash Formula

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Change the number assigned to a wash formula.

1. Use  and  on the **Wash Formula Maintenance** display if necessary to scroll between pages and show the wash formula you want, or use  to search for the wash formula by its formula number.
2. Touch the button that displays the formula number (F#). The **Change Formula Number** window (not shown) appears. In the **Change Formula Number** window:
   a. Touch the backspace button to delete the formula number that the controller provided.
   b. Use the keypad to enter a new formula number. The controller will not accept a formula number that is already in use.
   c. Touch  to save the new formula number.

3.2.1.5 To Change a Wash Formula

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Change the step decisions or the number of steps in a wash formula.

1. Use  and  on the **Wash Formula Maintenance** display if necessary to scroll between pages and show the wash formula you want, or use  to search for the wash formula by its formula number.
2. Touch the button that displays the wash formula name (Fn).
3. Touch the button that displays the number of steps (S) to the right of the wash formula name to view the display shown in the following figure. This display is subsequently referred to as the **Steps in a Wash Formula** display.

Figure 13. The Steps in a Wash Formula Display

Legend

A.	Add a step
B.	Go back one level, to the **Wash Formula Maintenance** display
C.	Copy a step
Dl.	Delete a step
H.	Return to the **Home** display
R.	Rename a step
Sc.	Scroll between pages
S#.	The Step numbers
Sn.	The Step names
St.	Change the step decisions

3.2.1.6 To Add a Step

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Create a new step in the wash formula.

1. Touch  on the **Steps in a Wash Formula** display to add a new step to the wash formula.
   - If you have a step selected, the controller prompts you to choose where it will insert the new step— before the selected step, after the selected step, or at the end of the formula.
   - If you do not have a step selected, the controller will insert the new step at the end of the formula.

   A new step appears with a step type of **End Formula** (00:00). The controller gives the new step a name similar to `[N] Step xxx`, where *xxx* is a number.

2. Touch  to change the step name. The **Step Name** window (not shown) appears. In the **Step Name** window:
   a. Touch the **[Clear All]** button to delete the step name that the controller provided.
   b. Use the keypad to enter a new step name.
   c. Touch  to save the new step name.

3.2.1.7 To Copy a Step

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Make a copy of a step in a wash formula.

NOTE: The controller prevents the duplication of an extract step. This prevents two consecutive extract steps.

1. Use  and  on the **Steps in a Wash Formula** display if necessary to scroll between pages and show the step you want.
2. Touch the button that displays the step name (Sn).
3. Touch  to copy the step. The controller prompts you to choose where it will insert the copy of the step:
   - before the original step
   - after the original step
   - at the end of the formula

   The controller gives the copy of the step a name similar to `(Copy) Step xxx`, where *Step xxx* is the name of the step you copied.
4. Touch  to change the step name. The **Step Name** window (not shown) appears. In the **Step Name** window:
   a. Touch the **[Clear All]** button to delete the step name that the controller provided.
   b. Use the keypad to enter a new step name.
   c. Touch  to save the new step name.

3.2.1.8 To Delete a Step

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Delete a step from a wash formula.

NOTE: The controller prevents the deletion of a step if the result would be two consecutive extract steps.

1. Use  and  on the **Steps in a Wash Formula** display if necessary to scroll between pages and show the step you want.
2. Touch the button that displays the step name (Sn).
3. Touch  to delete the step.
4. A dialog box (not shown) appears, which prompts you to confirm your decision. On the dialog box, touch  to delete the step.

3.2.1.9 To Modify a Step

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Change the step decisions for a step in a wash formula, such as the step type, the step time (duration), etc.

1. Use  and  on the **Steps in a Wash Formula** display if necessary to scroll between pages and show the step you want.
2. Touch the button that displays the step name (Sn).
3. Touch the button that displays the step type (St) next to the step name (Sn). The controller will display the decisions, as shown in Figure 14, page 53. See the next section for a description of all the step decisions.
4. Touch the step decision you want to change. One of two types of windows (not shown) appears.
   - A selection list appears. Touch the value you want to use.
   - A window with a text box and a keypad appears.
     a. Touch the value in the text box. Use the backspace button to delete the current value.
     b. Touch the desired numbers or letters to enter the new value.
     c. Touch  to save the new value.

Figure 14. The Step Decisions Display

Legend

A. Abandon changes
S. Save changes
Sd. The step decisions

5. Save or abandon your changes:
   - To abandon the most recent changes and return to the **Steps in a Wash Formula** display, touch  .
   - To save the changes and return to the **Steps in a Wash Formula** display, touch  .

3.2.1.10 The Step Decisions

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This section describes all the decisions that can comprise a step.

Type

End Formula The formula is completed and causes the controller to query for how to end the formula.
1-Way Wash a bath step in which the cylinder turns in one direction
2-Way Wash a bath step in which the cylinder turns in the two directions. A wash step can be used to cool down the previous bath. See Section 3.3 : How to Use Cooldown, page 58.
Soak Wash a bath step in which the cylinder does not turn
Staged Extract an extract step specifically applicable to goods such as cotton towels and rubber mats. See Section 3.6 : The Sequence of Actions in a Staged Extract, page 63 for more information.
Standard Extract an extract step which accelerates cylinder rotation to the speed entered in the speed decision and maintains that speed for the time entered in the time decision.

Time — Set the hours, minutes, and seconds that the step timer will run before it declares that this step is complete.

TIP: Some step types start the step timer only after requirements are met, such as water level. The time required to meet these requirements will increase the total time of the step and the formula.

Temperature — Set the desired temperature for a bath step. The units are degrees Fahrenheit or Celsius, as configured. The valid range is 50 to 205 degrees Fahrenheit (10 to 96 degrees Celsius), or 50 to 190 degrees Fahrenheit (10 to 87 degrees Celsius), depending on your machine model.

NOTE: The following three step decisions control the temperature of incoming bath water. You can use the techniques described in Section 3.5 : How to Modulate Water Valves to Regulate Incoming Water Temperature, page 62 to achieve the fastest possible fill that also achieves the desired bath temperature.

Hot Water

OFF Do not open the hot water inlet valve while the machine is filling.
ON Use hot water while the machine is filling.
Raise Fill Temperature The hot water valve opens only to increase the bath temperature to the desired temperature while the machine is filling.

Cold Water

OFF Do not open the cold water inlet valve while the machine is filling.
ON Use cold water while the machine is filling.
Lower Fill Temperature The cold water valve opens only to decrease the bath temperature to the desired temperature while the machine is filling.

3rd Water

OFF Do not open the 3rd water inlet valve while the machine is filling.
ON Use 3rd water while the machine is filling.
Raise Fill Temperature The 3rd water valve opens only to increase the bath temperature to the desired temperature while the machine is filling.

Lower Fill Temperature The 3rd water valve opens only to decrease the bath temperature to the desired temperature while the machine is filling.

Water Level

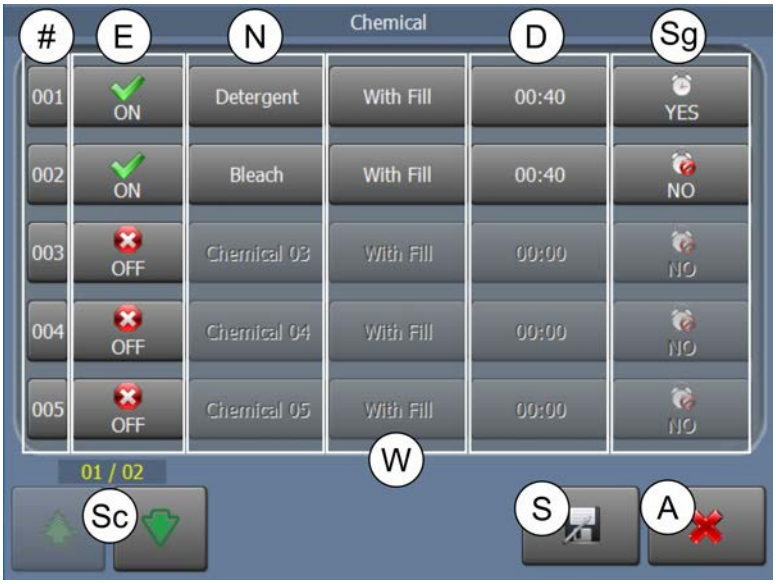
Level 1, 2, and 3 Fill to the level that was configured for Level 1, 2, or 3.
User Defined Fill to a level you input using the keypad, for this step only.

Steam

NO Steam Do not use steam in this step to achieve or to restore the bath temperature.
After, Runs After the desired bath level is achieved, run the step timer, and use steam to achieve and to maintain the bath temperature.
Stops After the desired bath level is achieved, use steam to achieve the bath temperature with the step timer stopped. Do not use steam to maintain the temperature.
After, Stops After the desired bath level is achieved, use steam to achieve the bath temperature with the step timer stopped. If necessary, use steam to maintain the temperature.
Early, After, Runs At the lowest safe bath level, use steam to achieve the bath temperature. Start the step timer when the desired level is achieved. If necessary, use steam to maintain the temperature.
Early, Stops At the lowest safe bath level, use steam to achieve the bath temperature. Start the step timer when the desired level and temperature are achieved. Do not use steam to maintain the temperature.
Early, After, Stops At the lowest safe bath level, use steam to achieve the bath temperature. Start the step timer when the desired level and temperature are achieved. If necessary, use steam to maintain the temperature.

Chemical — Touch this decision to access the **Chemical** display, shown in the following figure.

Figure 15. The Chemical Display



Legend

#. The fixed display of the chemical number.
A. Abandon changes and return to the **Wash Formula Maintenance** display.
D. The duration, in seconds, of the chemical injection. Touch to edit the number of seconds the injection will last.
E. Enable (use) the chemical in this step.
N. The name of the chemical. Touch to rename it.
S. Save changes and return to the **Wash Formula Maintenance** display.
Sc. Scroll between pages to view more chemicals
Sg. Select whether to sound the operator signal and require the operator to press  (which silences the signal) before the injection begins
W. Choose the **With Fill** option to start the chemical injection when the water valves open to fill the cylinder. Choose the **Level OK** option to start the chemical injection when the water level in the cylinder is achieved. Choose the **Level + Temp** option to start the chemical injection when the water level in the cylinder is achieved and the desired temperature is achieved.

Speed

Wash Speed (RPM) Range varies by model.
Extract Speed (RPM) Range varies by model.

Drain Type

Standard The cylinder rotates at slightly above 1 G-force for the drain duration. Actual speed is determined by the configured machine type. The drain valve opens after a distribution delay.

2-Way Wash The cylinder rotates in both directions at wash speed while draining. The drain valve opens when the step timer expires.

Do Not Drain The drain valve remains closed to keep the bath liquor for the next step. The next bath step determines how the cylinder rotates.
Stop with Fill The cylinder does not rotate while the machine is filling. The drain valve opens after a distribution delay.
Stop with Drain The cylinder does not rotate while the machine is draining. The drain valve opens when the step timer expires.
Stop with Fill and Drain The cylinder does not rotate while the machine is draining. The drain valve opens when the step timer expires.
RinSave® The cylinder rotates according to a specific sequence, described in the following section. The drain valve opens 10 to 15 seconds after the step timer expires.

The RinSave® Drain Sequence

1. When the bath ends, the cylinder turns clockwise at wash speed for 8 seconds.
2. Before the drain valve opens, the cylinder accelerates to the standard drain speed for 4 seconds.
3. The drain valve opens and the cylinder turns at standard drain speed for a time determined by the configured machine type.
4. The cylinder accelerates to RinSave® speed for the remainder of the drain sequence.
5. If the next step is an extract step, the cylinder accelerates to the programmed speed. If the next step is a bath step, the cylinder decelerates to a stop.

Reuse Drain

To Sewer Drain this extract step to the sewer.
Reuse Tank Drain this extract step to a reuse tank through a secondary drain valve.

How to End

Stop The operator signal sounds, and the cylinder coasts to a stop.
Reversing The operator signal sounds, and the cylinder reverses for 20 seconds in each direction with 3 seconds of dwell time between reversals.
Rotating The operator signal sounds, and the cylinder rotates clockwise at wash speed.
Tumble The operator signal sounds, and the cylinder reverses at wash speed.
Stop + Signal The operator signal sounds and the cylinder coasts to a stop. The operator signal stops sounding after 2 minutes.
Reversing + Signal The operator signal sounds, and the cylinder reverses for 20 seconds in each direction with 3 seconds of dwell time between reversals. The operator signal stops sounding after 2 minutes.
Rotating + Signal The operator signal sounds, and the cylinder rotates clockwise at wash speed. The operator signal stops sounding after 2 minutes.
Tumble + Signal The operator signal sounds, and the cylinder reverses at wash speed. The operator signal stops sounding after 2 minutes.

On Time — When a bath step turns in two directions, this is the number of seconds the motor is ON, turning the cylinder.

Off Time — When a bath step turns in two directions, this is the number of seconds the motor is OFF, letting the cylinder coast.

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3.3 How to Use Cooldown

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A cooldown bath is used to gradually lower the temperature of goods (usually synthetics and blended fabrics) to reduce the chance of setting wrinkles.

3.3.1 Configure your Machine for Cooldown

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To use cooldown, your machine must be equipped with and configured for:

- A separate cooldown water valve.
- A temperature probe/sensor (Temp Probe = YES).
- Cooldown enabled (Cooldown Error = 05 Minutes, 10 Minutes, or 20 Minutes).

See Section 2.1 : Machine Configuration, page 11.

3.3.2 Program a Cooldown

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A cooldown is programmed as a separate bath step following the bath in which the cooldown is desired. There is no explicit step decision for a cooldown. A cooldown occurs automatically in a step if the formula meets the following criteria:

- The cooldown step follows a high-temperature step, usually a steam step; the cooldown step cannot be the first step.
- The high-temperature bath step before the cooldown step is programmed with:
  - A step type = **1-Way Wash** or **2-Way Wash**
  - A non-zero temperature
  - A drain type = **Do Not Drain**
  - A bath level lower than Level 3
- The cooldown step after the previous (high-temperature) bath step is programmed with:
  - A step type = **1-Way Wash** or **2-Way Wash**
  - A non-zero temperature lower (cooler) than the temperature of the previous (high-temperature) bath step
  - All water valves (HOT, COLD, 3rd) set to **OFF**
  - A Level 3 bath level, or a bath level higher than the bath level of the previous step

NOTE: The programmed cooldown temperature must always be at least 15 degrees Fahrenheit (8 degrees Celsius) hotter than the hottest ambient temperature or the hottest cold water temperature that will be encountered. If this rule is not followed, it may take a long time to achieve the desired cooler temperature, or even be impossible.

3.3.3 The Cooldown Sequence

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The cooldown step begins after the high-temperature bath step in which the cooldown is desired. It performs the following sequence of actions:

1. The cooldown valve opens. On the **Run** display, the  icon illuminates in the **Machine Status** area.

   NOTE: See the operator guide for instructions on how to interpret and use the **Run** display.

2. The water temperature falls and the water level rises, as indicated on the **Machine Status** area.
3. When the high water level is achieved, the cooldown valve closes. The  icon extinguishes in the **Machine Status** area.
4. The drain valve opens.
   - The water drains to the sewer and the  icon illuminates in the **Machine Status** area.
   - If your machine is equipped with, and configured for, an optional reuse tank, the  icon illuminates in the **Machine Status** area.
5. The water level falls.
6. When the water level falls below high level, the drain closes.
   - If the drain valve to the sewer closes, the  icon extinguishes in the **Machine Status** area.
   - If the drain valve to the reuse tank closes, the  icon extinguishes in the **Machine Status** area.
7. The cooldown valve re-opens. The  icon illuminates in the **Machine Status** area.
8. The drain and cooldown valves continue to open and close as needed to reach the desired water level and temperature.
9. The step timer starts 15 seconds after the desired cooldown temperature is achieved. The timer runs for one minute.
10. When the step time expires, the cooldown valve closes and the drain opens. The drain remains closed only if the machine was programmed to not drain, as to prolong the cooldown or allow the injection of chemicals into the cooler bath.

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3.4 How to Use Liquor Ratio Control in a Formula

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Liquor Ratio Control is used to fill the cylinder with water based on your desired ratio of water to goods and the weight of goods in the machine.

The ratio of water to goods is based on:

- the machine capacity, as configured in Section 2.1 : Machine Configuration, page 11
- the amount of water you program for each bath step inside the **Level** step decision (see Section 3.4.1 , page 60)

When the operator loads the machine, he/she enters the actual weight of the load (as described in Section 3.4.2 , page 61), then the machine calculates the number of flow meter counts required to achieve the programmed ratio. The controller opens the water valves to admit water into the machine, and automatically closes the valves when the desired amount of water per weight unit of goods is achieved.

It is possible to run both local and remote formulas with the Liquor Ratio Control feature.

To use Liquor Ratio Control, your machine must be equipped with, and configured for a flow meter, and you must calibrate it. See Section 2.3.1.1 : How to Configure your Machine for Liquor Ratio Control, page 21 and Section 2.3.1.2 : How to Calibrate the Flow Meter, page 22 for more information.

3.4.1 Program the Ratio of Water to Goods

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For each step that will use Liquor Ratio Control:

1. Touch  to access the **Wash Formula Maintenance** display.
2. Select the formula that contains the bath step in which you want to use Liquor Ratio Control.
3. Touch the button that displays the number of steps to the right of the wash formula name to view the **Steps in a Wash Formula** display.
4. Touch the bath step in which you want to use Liquor Ratio Control.
5. Touch the button that displays the step type next to the step name. The controller displays the step decisions.
6. Touch the **Level** step decision. A drop-down list appears.
7. From the list, choose **User Defined**. The **Water Level** window (not shown) appears. On the **Water Level** window:
   a. Use the keypad to enter your desired units of water per maximum capacity. The unit of measure will correspond with the unit you used to calibrate the flow meter (such as liters, milliliters, kilograms, pounds, etc.).

NOTE: To enable Liquor Ratio Control, you must enter a value higher than the highest configured water level (Level 3). For example, if Level 3 is set to 20 inches, you must enter a value higher than 20. If you enter a value less than or equal to the highest configured water level, the machine controller will use the programmed water level (the pressure transducer) to control the bath level instead of Liquor Ratio Control (the flow meter).

b. Touch  to confirm the value and return to the step decisions.

c. Touch  to save your changes and return to the **Steps in a Wash Formula** display.

8. Touch  to return to the **Home** display.

3.4.2 Enter the Actual Load Weight

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Before a formula starts, the controller prompts for the weight of each load. The controller will proportionally reduce the amount of water admitted into the cylinder according to this equation and the programmed ratio of water to goods:

*(actual weight/ machine capacity) * water units*

The operator can use the optional weighing system (load cells) to weigh the goods, or use a separate laundry scale to weigh the goods and enter the weight manually. See the operator guide for instructions on how to enter the weight of a load.

3.4.3 Example

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Assume you want to program a bath step to use 90 kilograms of water per 45 kilograms of goods (the maximum capacity for your machine).

1. From the **Wash Formula Maintenance** display, access the step decisions for the bath step.
2. Touch the **Level** step decision. A drop-down list appears.
3. From the list, choose **User Defined**. The **Water Level** window (not shown) appears. On the **Water Level** window:

   a. Use the keypad to enter 90.

   b. Touch  to confirm the value and return to the step decisions.

   c. Touch  to save your changes and return to the **Steps in a Wash Formula** display.

Your ratio of water to goods is 90 kg of water per 45 kg of goods.

4. Touch  to return to the **Home** display.

5. On the **Home** display, select the formula that contains the bath step you programmed to use Liquor Ratio Control.
6. Touch  to run the formula.
7. The controller prompts you for a customer number and the actual weight of the load. Follow the procedures in the operator guide to enter the weight of the goods.

The controller will proportionally reduce the amount of water admitted into the cylinder based on your ratio of water to goods.

For example, if the load weight is 40 kilograms, the controller will proportionally reduce the amount of water admitted into the cylinder according to this equation:

*(40 / 45) * 90 = 80*

Therefore, the controller will admit 80 kilograms of water into the cylinder.

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3.5 How to Modulate Water Valves to Regulate Incoming Water Temperature

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When using both hot and cold water valves to achieve a programmed temperature, you can achieve a more constant and accurate fill temperature more quickly if you understand the relationship between the desired temperature and the temperature of a split fill (hot and cold valves open simultaneously).

- If the desired temperature is hotter than the normal split temperature, program the hot water valve open (HOT Water =  ON) and the cold water valve to open only to lower the fill temperature (COLD Water =  Lower Fill Temp).
- If the desired temperature is colder than the normal split temperature, program the hot water valve to open only to raise the fill temperature (HOT Water =  Raise Fill Temp) and the cold water valve to remain open constantly (COLD Water =  ON).

NOTE: To program a bath step with a specific temperature, your machine must be equipped with, and configured for, a temperature probe/sensor (Temp Probe = YES). See Section 2.1 : Machine Configuration, page 11.

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3.6 The Sequence of Actions in a Staged Extract

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A staged extract can reduce the tendency for cotton goods to adhere to the sides of the cylinder during extraction. A staged extract can also improve extraction with impermeable goods (such as rubber mats). A staged extract performs the following sequence of actions:

1. The cylinder rotation speed increases from drain speed to a fixed speed (staged RPM) for a fixed duration of time (staged delay). The staged RPM and staged delay time are set at the factory based on your machine's model number.
   - If the cylinder rotation speed increases to the set speed before the staged delay time expires, the controller holds the speed until the staged delay time expires.
   - If the cylinder does not accelerate to the set speed, acceleration continues until the staged delay time expires.
2. After the staged delay time expires, the step timer stops.
3. The cylinder performs a preemptive recycle. In a recycle, the machine will decelerate to a stop, reverse a few times in wash speed, then redistribute in drain speed and attempt to achieve the set extract speed.
4. The step timer runs while the cylinder accelerates to the staged RPM.
5. The controller monitors the vibration switch or the excursion switch and performs a recycle if the vibration switch or the excursion switch trips. See Section 6.1 : Out-of-balance Detection and Balancing for Washer-extractors, page 113 for more information.
6. The step ends when the step timer reaches 0.

4 Troubleshooting and Performance Analysis

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4.1 Types of Troubleshooting and Analysis Information

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Most troubleshooting and analysis procedures are explained here. Some procedures are explained in other parts of the manual.

If you need to…

- recalibrate your touchscreen, see Section 2.2.2 : Recalibrate the Touchscreen, page 19
- recover a lost password, see Section 2.2.1 : Enable and Define Lockout Passwords, page 18
- view production records, changes made to configuration decisions and wash formulas, and records of the errors encountered, see Section 4.2 : Data Logs, page 64
- resolve an error, see Section 4.3 : Errors, page 72
- test a formula or troubleshoot a formula in production , see Section 4.4 : Formula Intervention, page 77
- troubleshoot inputs and outputs, see Section 4.5 : Troubleshooting Inputs and Outputs, page 81
- troubleshoot the balancing system, see Section 6.1 : Out-of-balance Detection and Balancing for Washer-extractors, page 113
- update software, see Section 6.4 : Software Update Procedure, page 118

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4.2 Data Logs

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The controller records certain actions you perform and events that occur— such as when you start a formula, change the machine configuration, or encounter an error— in data logs. Each data log displays a short description of the action that took place, what date and time it took place, and how many actions took place that day.

You can also generate cumulative reports of a machine's production history, which you can then export to a USB flash drive to print or keep as backup data.

If your machine is equipped with the optional GearTrace™ feature, you can generate GearTrace™ production reports as well.

NOTE: If the machine is connected to a Mildata® network, the Mildata® product automatically accumulates production and error data, which can be viewed on the Mildata® computer. The product also provides sophisticated tools to analyze this data.

Touch on the **Home** display to access data logs. Choose a log date using the calendar that appears (see Section 4.2.1 , page 65).

The controller records three categories of data:

- production history
- configuration and programming history
- error history

Touch , , and to cycle among the three types of data logs.

4.2.1 Date Selection

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Touch to access the calendar. Touch a date to view the log files for that date. You can use the arrow buttons (M and Y) to change the month and the year.

Figure 16. Calendar

Legend

- **C . . .** View configuration and programming history
- **D . . .** View the calendar and choose a log date
- **E . . .** View error history
- **Ex . . .** Exit (return to the **Home** display)
- **M . . .** Change the log month
- **P . . .** View production history
- **R . . .** Generate production reports
- **Sc . . .** Scroll between data history pages
- **Y . . .** Change the log year

4.2.2 Production History

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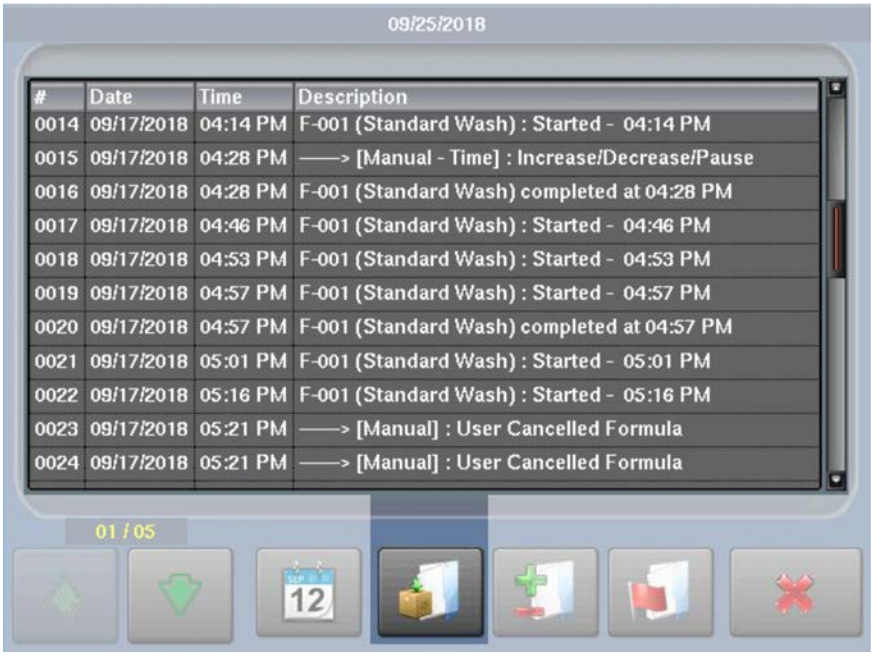
Touch  to view the machine's production history for the date you selected. The production history records:

- what formulas you run
- when formulas start
- when formulas finish
- when you make manual changes to the step timer
- when you cancel formulas

Figure 17. Production History



4.2.3 Configuration and Programming History

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Touch  to view the machine's configuration and programming history for the date you selected. The configuration and programming history records what changes you make to the configuration settings and wash formulas.

Figure 18. Configuration and Programming Changes

Legend

1 . . . Example: In the configuration decisions, changed Cooldown Error from NO Cooldown to 5 minutes

2 . . . Example: In the configuration decisions, changed Steam Error from NO Steam to 5 minutes

3 . . . Example: In Formula 001, Step 001, changed the Steam step decision from NO Steam to After, Runs

4 . . . Example: In Formula 001, inserted new Step 002 and set the Step Type decision to 1–Way Wash

4.2.4 Error History

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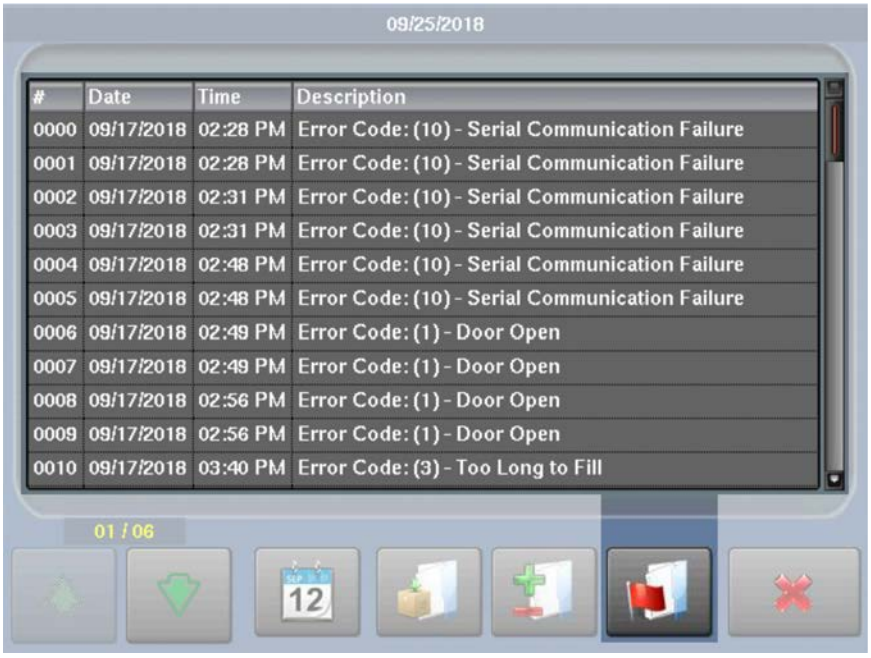
Touch  to view the machine's error history for the date you selected. The error history records the error conditions that the machine encounters.

Figure 19. Errors History



4.2.5 Production Reports

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You can generate cumulative reports of the machine's production history for a given day, month, or year. You can then export these reports as text (.txt) files to a USB flash drive to print or keep as backup data.

You can generate two kinds of production reports:

- Formula production and error history report
- GearTrace™ production report

4.2.5.1 About the GearTrace™ Tracking System

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The optional GearTrace™ tracking system for MilTouch™ controllers allows users to maintain and share production history for specialized goods with stitched-in barcodes, such as fire-fighting Personal Protective Equipment (PPE).

The user scans the barcodes on the goods with the included scanner. The MilTouch™ controller uses the barcode data to identify each garment, and track when and how each garment is processed in the washer-extractor. This production data is stored inside the MilTouch™ controller's memory, and can be used to generate GearTrace™ production reports. The user can export GearTrace™ production reports as text (.txt) files to view, print, and share, or as comma-separated value (.csv) files to be exported to other data management systems.

See your machine's operator guide for instructions on how to scan and track goods using the GearTrace™ tracking system. See this section for instructions on how to generate GearTrace™ production reports.

4.2.5.2 The Data in a Production Report

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Each production report contains the following information:

Formula production and error history report	GearTrace™ production report
• Which formulas were processed in the washer-extractor • How many times each formula was processed • The total number of formulas processed • The total run time for all the times a formula was processed • The total run time of all the formulas processed • Which formulas were cancelled • How many times each formula was cancelled • The total number of formulas cancelled • The total run time for all the times a formula was processed before it was cancelled • The total run time of all cancelled formulas before they were cancelled • Which fault codes were encountered • The number of times each fault code was encountered • The total number of fault codes encountered	• Which garments were scanned (via bar-code) and processed in the washer-extractor • How many times each scanned garment was processed • The total number of scanned garments processed • Which employees processed the scanned garments (optional) • Which formulas were used to process the scanned garments • The total run time for all the formulas that processed tracked garments • The run time of each formula that processed a tracked garment • On which dates the scanned garments were processed

4.2.5.3 How to Generate a Production Report

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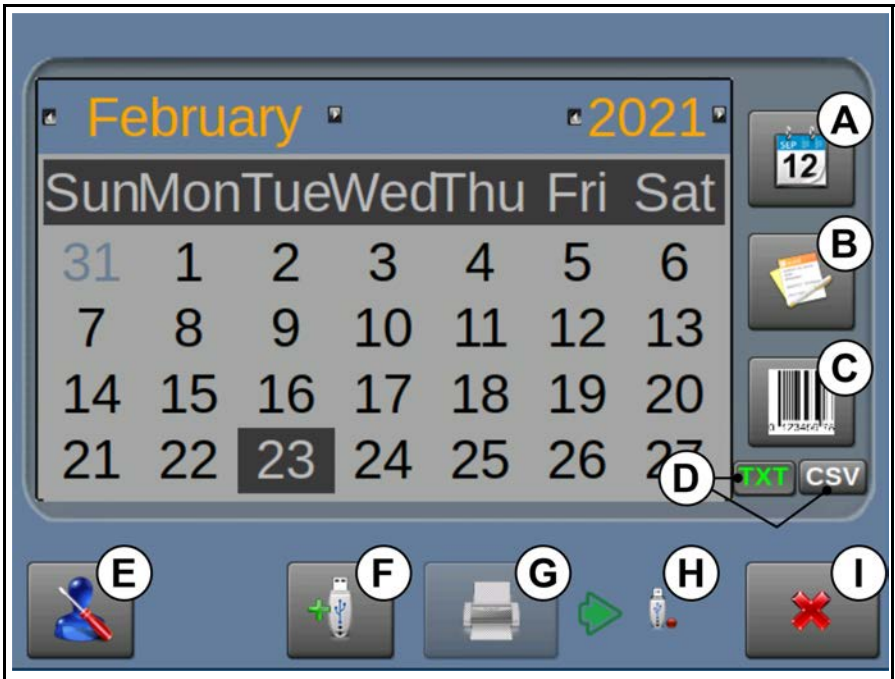
To generate a production report:

1. Touch  . The **Production Reports** display, shown in the following figure, appears.

Figure 20. Production Reports Display



Legend

- **A . . .** Display the calender to choose a date
- **B . . .** Generate a formula production and error history report for the selected day, month, or year
- **C . . .** Generate a **GearTrace™** production report for the selected day, month, or year
- **D . . .** Choose to export production reports as .txt files or .csv files (**GearTrace™** production reports only)
- **E . . .** Display the Pellerin Milnor Corporation contact information
- **F . . .** Mount or unmount a USB flash drive
- **G . . .** Export the production report as a .txt file to a USB flash drive
- **H . . .** Available media indicator
- **I . . .** Return to the **Home** display

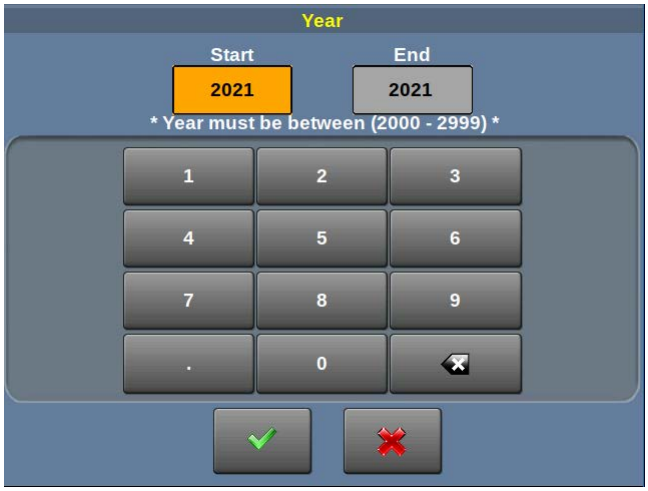
2. On the calendar (like the one in Figure 16: Calendar, page 65), touch a date to view the production report for that date. You can use the arrow buttons to change the month and the year.
3. On the **Production Reports** display, choose which kind of production report to generate:
   - Touch  to generate a formula production and error history report.
   - Touch  to generate a GearTrace™ production report.

   A selection list appears.
4. Make a selection from the list:
   - Select “Day” to view the production report for only the date you selected (Ex. September 18th 2020).
   - Select “Month” to view the production report for the month of the date you selected (Ex. September 2020).

- Select “Year” to view the production report for the year of the date you selected (Ex. 2020).

If you chose to generate a GearTrace™ production report and you selected “Year” from the list, the Start/End Year window appears, as shown in the following figure. The Start/End Year window allows you to generate a GearTrace™ production report that spans several years.

Figure 21. Start/End Year Window



5. In the Start/End Year window, use the keypad to enter a start and end year for the report. To generate a report that only spans one year, enter the same year in both fields.

6. Touch the  button to generate the production report.

A production report, such as the one in the following figure, appears on the **Production Reports** display. Use the scroll bar on the right to scroll up and down and view the whole report.

Figure 22. Example Production Report

Touch  to choose a different date and view a new production report.

4.2.5.4 How to Export Production Reports as Text Files

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To export a production report as a text (.txt) file:

1. Mount a flash drive to the MilTouch™ controller as described in Section 5.2.1 : How to Mount a USB Flash Drive to the MilTouch™ Controller, page 101.
2. Touch  to export the production report as a .txt file.

   NOTE: You can export GearTrace™ production reports as either .txt files or .csv files by touching the “TXT” or “CSV” button.
3. The controller prompts you to name the file. The File Name window (not shown) appears. In the File Name window:
   a. Use the keypad to enter a file name.
   b. Touch  to confirm the file name and export the file.
4. A dialog box (not shown) appears, which indicates the file was exported to the root of the USB flash drive. Touch  to dismiss the dialog box.
5. Touch  to unmount the flash drive. The available media indicator changes from green to red (), which indicates the controller no longer recognizes a connected USB device.
6. Remove the USB flash drive.

4.3 Errors

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If your machine encounters an error while it runs a formula, the formula halts, the operator signal sounds, and an error code dialog box (Figure 23, page 72) appears on the **Run** display.

See the next section for a list of all the error codes and the possible causes/solutions.

Figure 23. Sample Error Code Dialog Box

4.3.1 MilTouch™ Error Messages

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The following are error messages the controller can issue, possible causes, and solutions. Operation stops and cannot be resumed until the cause of the error is corrected. This can require a maintenance or chemical technician.

Door Opened — The controller cannot confirm that the door to the washer-extractor is closed. If this occurs while a formula is in progress, the controller turns off all outputs, cancels the wash formula, and returns to the **Home** display.

The Door Opened: Close the door.

Electrical failure: If the door is not open, electrical troubleshooting is required.

Too Long to Fill — The water in the machine did not reach the specified level within the configured **Fill Error Time**. The controller closes all water valves and turns off all chemical injections. The **Fill Error** timer resets after you correct the error.

Fill Time Configured too Short: Do a check of the configured fill time in your machine's configuration decisions. It may be necessary to increase the fill time.

Low Water Pressure: Do a check of the water pressure and volume to the machine.

Water Valve Malfunctioned: Use the electrical schematic manual to do a check of the water valves and the circuits that control the valves.

Too Long to Drain — The water in the machine did not drop to the specified level within the allotted drain time. The controller issues an error but the drain remains open. If a slow drain caused the error, the error clears and the formula resumes when the transducer senses that the water level has dropped to the desired level.

Drain Blocked: The drain pipe from the machine to the sewer may be blocked. Check the drain pipe and remove any obstruction.

Transducer Tube Blocked: The tube from the shell to the pressure transducer (Figure 24, page 73) may be blocked. Check the tube and remove lint or other obstructions.

Drain Valve Malfunctioned: The drain valve or drain valve solenoid may have malfunctioned. Electrical troubleshooting is required (see Figure 25, page 73).

Figure 24. Transducer Tube

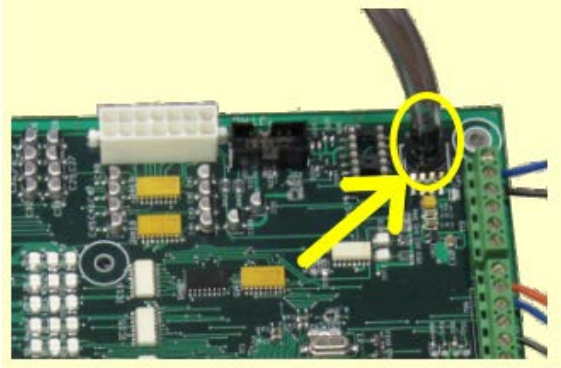
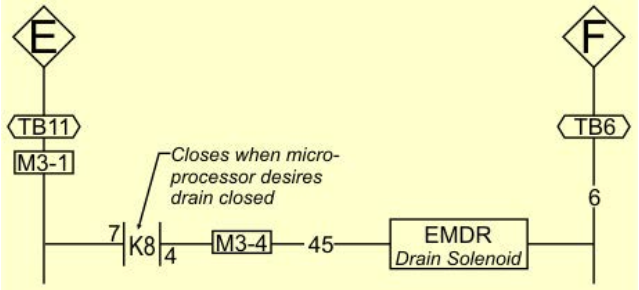


Figure 25. Schematic of Typical Drain Circuit



Too Long to Steam — The temperature in the machine did not reach the specified temperature within the configured **Steam Error** time. The controller issues an error but the steam valve remains open. If the temperature probe senses that the machine has reached its target temperature, the error clears and the formula resumes.

Low Steam Pressure: Do a check of the steam pressure from the boiler to the machine.

Steam Time Configured too Short: Do a check of the configured steam time in your machine's configuration decisions. This value represents the time required to apply steam to cold water at high level to achieve the hottest temperature used.

Steam Valve Malfunctioned: Use formula intervention to turn the steam valve on to confirm proper operation.

Too Long to Cool — The temperature in the machine did not drop to the specified temperature within the configured **Cooldown Error** time. The controller issues an error but continues to perform the cooldown. If the temperature probe senses that the machine has dropped to its target temperature, the error clears and the formula resumes.

Cooldown Time Configured too Short: Do a check of the configured cooldown time in your machine's configuration decisions. It may be necessary to increase the cooldown error time.

Low Water Pressure: Do a check of the cold water pressure and volume to the machine.

Cooldown Valve Malfunctioned: Do a check of the cooldown valve for proper operation.

Temperature Circuit Malfunctioned: Do a check of the temperature probe and the analog-to-digital board for proper operation.

Check Temperature Probe — The temperature probe detected a temperature below 32° F (0° C) or above 230°F (110°C). The controller turns off all outputs, cancels the wash formula, and returns to the **Home** display.

The Probe is Disconnected: Electrical troubleshooting is required. Check for an open circuit.

The Probe Malfunctioned: If the probe connections are found good, disconnect the probe and measure the resistance between the leads. The resistance between the leads should be between 2K and 35K Ohms. The resistance between either lead and the ground should be infinite.

Level Still Made — The water level in the cylinder is at or above the configured low water level at the start of the formula, before the first bath step. The controller issues an error but the drain remains open. If a slow drain caused the error, the error clears when the transducer senses that the water level in the cylinder is less than the configured low water level.

Drain Blocked: Do a check that the drain valve and drain outlet are clear of debris.

Transducer Tube Blocked: The tube from the shell to the pressure transducer may be blocked. Check the tube and remove lint or other obstructions.

Drain Valve Malfunctioned: The drain valve or drain valve solenoid may have malfunctioned. Electrical troubleshooting is required.

Serial Communication Failure — A peripheral board in the control box has lost communication with the processor board. The controller stops cylinder rotation and waits for serial communication to resume. This error dialog box closes when serial communication resumes.

Board Failure: A peripheral board in the control box cannot communicate with the processor board. Electrical troubleshooting is required.

Failed Speed Sensor — The controller cannot verify that the cylinder is turning. If the speed sensor fails at extract speed, the machine cancels the extract sequence and coasts for the default coast time. The default coast time must expire before the door will unlock.

Speed Sensor Failure: The cylinder speed sensor has stopped working. Electrical troubleshooting is required.

Inverter Tripped — The inverter that controls the motor had an error. The controller turns off all outputs, cancels the wash formula, and returns to the **Home** display.

Inverter error: The machine controller cannot tell about the specific error. See the inverter manual for details. The inverter manual was shipped in an electric box on your machine or with the packet of documentation inside the machine cylinder.

External Fault Error — This message is triggered by a device external to the MilTouch™ machine. This error usually originates with the chemical supply system.

Loadcell Comm Failure — This error can occur on machines with the optional weighing system (load cells). The controller issues this error when it cannot receive data, or receives an unexpected data stream from the load cell controller.

Level Too Low — After the machine fills to the configured minimum (low) water level, the controller turns off all outputs and signals this error if the water level drops below half of the minimum water level and remains below half of the minimum water level for 30 continuous seconds.

Brake Pressure Fault — If the air pressure in the brake system is less than the required pressure 8 seconds after the beginning of the step, the controller stops the wash program and turns off all the outputs. The 8-second timer resets after you correct the error.

Low Air Pressure: The air pressure inside the brake release cylinder is too low. This can be caused by a leaking air cylinder piston cup, leaking/pinched air lines, leaking quick-release air valves, or a faulty pressure switch or pilot air valve.

Bearing Pressure Fault — If the main bearing pressure is less than the required pressure 8 seconds after the beginning of the step, the controller stops the wash program and turns off all the outputs. The 8-second timer resets after you correct the error.

Injecting less than 5 PSI (34.5 kPa): The machine is injecting less than 5 PSI (34.5 kPa) behind the excluder seal to protect the bearings. Do a check of the air supply and the sensor circuit.

4.3.2 Error Correction

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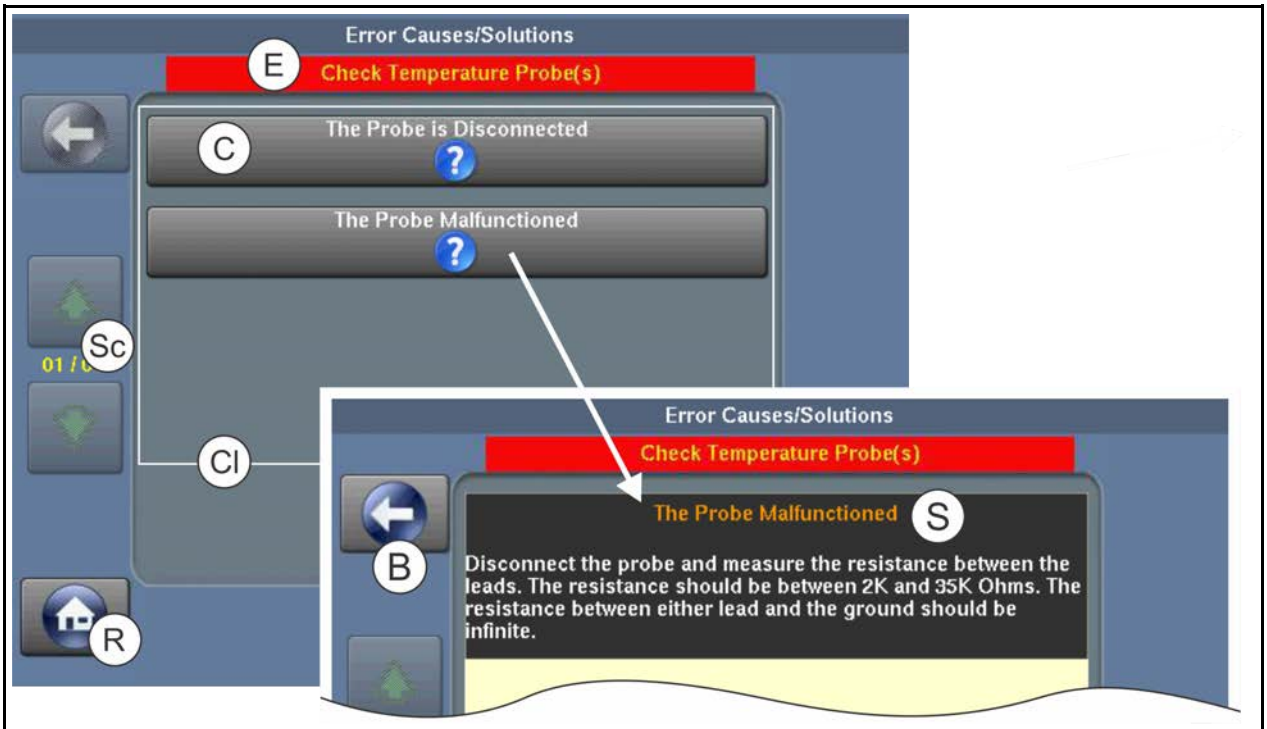
Touch  (in the error code dialog box, Figure 23: Sample Error Code Dialog Box, page 72) to view the **Error Causes/Solutions** display (shown in the following figure).

The **Error Causes/Solutions** display gives a list of possible causes for the error. Touch one of the error causes in the list for an explanation of how to correct it.

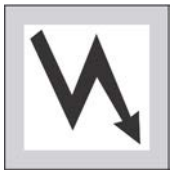
Some errors do not have additional details on how to solve them.

Figure 26. Error Causes/Solutions Display



Legend

B . . . Return to the list of possible error causes
Cl . . . A list of possible error causes
C . . . Touch to view the solution for this cause
E . . . The error description
R . . . Return to the **Run** display
S . . . A possible solution to the error
Sc . . . Scroll pages if there is more than one page.



WARNING: High voltage and/or moving parts — are present inside the machine when troubleshooting.

- Qualified technicians only
- Use care to avoid contact with live or moving parts
- Keep bystanders away.

1. Follow the instructions on the **Error Causes/Solutions** display for how to correct the error.
2. Touch  to return to the **Run** display.
3. In the error code dialog box, touch  to silence the operator signal, close the error code dialog box, and resume the wash formula at the current step. Some error code dialog boxes close automatically when you resolve the error.

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4.4 Formula Intervention

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Formula intervention allows you to manually alter a wash formula in production (while it runs). You can adjust the:

- step timer
- water valves
- drain and reuse valves
- steam and cooldown controls
- cylinder speed
- bath temperature and level

The changes you make while in formula intervention mode do not alter the programming of the formula (the step decisions). Formulas proceed normally in formula intervention mode aside from the changes you make.

Chemical suppliers and service technicians can use formula intervention to test formulas and confirm proper operation of the machine components. For example, a service technician may want to turn the steam valve on to confirm proper operation.

Operators might also use formula intervention if it is necessary to make a temporary, or one-time change to a wash formula. For example, the operator may want to stop the timer to slowly add a chemical through the soap chute.

Touch  on the **Run** display to start formula intervention. Controls in the **Names and Timers** area and the **Machine Status** area of the **Run** display become active so that you can change the formula in progress. Green boxes on the display identify the formula control areas, or the settings that can be changed, as shown in Figure 27, page 78.

NOTE: A password may be required to use formula intervention.

In formula intervention mode, touch a box to display the pop-up controls for that setting. The pop-up controls available correspond with your machine's equipment and your configuration decisions.

Figure 27. Formula Control Areas

Legend

C.	Cylinder speed controls
Ca.	Cancel the formula
D.	Drain and reuse controls
E.	End formula intervention
H/C.	Heat and cool (steam and cooldown) controls
Lw.	Bath level controls
St.	Step timer controls
Tw.	Bath temperature controls
W.	Water valve controls

NOTICE: The MilTouch™ controller prevents the activation of certain controls when their activation would be inappropriate. For example, the controls for the water valves are not available when the bath water is at its maximum level.

Modify Step Timer — Touch the box identified by item St on Figure 27, page 78.

Figure 28. Pop-up Controls for Step Timer

 Add 1 minute to the remaining step time.

 Subtract 1 minute from the remaining step time. If there is less than 1 minute remaining on the step timer, the timer is reduced to 00:00 and the controller moves on to the next phase in the current step, or the next step if there are no more phases.

 Pause the current step timer. The formula will remain on the current step, which prevents formula resumption, until this button is touched again.

 **NOTE:** Outputs that the controller actuates during a step remain actuated even when the step timer is paused (unless the actuation of the output is inappropriate). For example, if the cylinder is turning when you touch  , the cylinder will continue to turn even while the step timer is paused.

 Close the window.

Modify Water Valves — Touch the box labeled “Water” on the display.

Figure 29. Pop-up Controls for Water Valves

 Open the hot water inlet valve. If the hot water inlet valve is open, touch to close it.

 Open the cold water inlet valve. If the cold water inlet valve is open, touch to close it.

 Open the 3rd water inlet valve. If the 3rd water inlet valve is open, touch to close it.

 Close the window.

Modify Drain Valves — Touch the box labelled “Drain” on the display.

Figure 30. Pop-up Controls for Drain Valves

 Open the drain valve to the sewer. If the drain valve to the sewer is open, touch to close it.

 Open a secondary drain valve to a reuse tank. If the secondary drain valve is open, touch to close it.

 Close the window.

Modify Steam and Cooldown — Touch the box labelled “Heat/Cool” on the display.

Figure 31. Pop-up Controls for Steam and Cooldown Valves

 Inject steam to raise or maintain the bath temperature. If the steam inlet valve is open, touch to close it.

 Inject cool water to gradually lower the bath temperature (perform a cooldown). If the cooldown inlet valve is open, touch to close it.

 Close the window.

Modify Cylinder Speed — Touch the box identified by item C on Figure 27, page 78.

Figure 32. Pop-up Controls for Cylinder Speed

 Increase the rotation speed of the cylinder by 1 RPM.

 Decrease the rotation speed of the cylinder by 1 RPM.

 Close the window.

Modify Water Temperature — Touch the box identified by item Tw on Figure 27, page 78.

Figure 33. Pop-up Controls for Water Temperature

 Increase the desired bath temperature by 1 degree (Celsius or Fahrenheit).

 Decrease the desired bath water temperature by 1 degree (Celsius or Fahrenheit).

Close the window.

Modify Water Level — Touch the box identified by item Lw on Figure 27, page 78.

Figure 34. Pop-up Controls for Water Level

Increase the desired bath water level by 1 unit (centimeters or inches).

Decrease the desired bath water level by 1 unit (centimeters or inches).

Close the window.

When you are finished making changes to the wash formula, touch to end formula intervention.

4.5 Troubleshooting Inputs and Outputs

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WARNING: High voltage — Is present in electric boxes even when power switches on the machine are off.

- Qualified technicians only.
- Lockout power at the external disconnect box before you make repairs.

If your machine displays an error message or exhibits any abnormal behavior, this document, along with the diagnostic tools on the machine, can help you resolve the problem.

The diagnostic tools include the **Diagnostics** display, on which you select from three types of information, and the status lights on the input/output (I/O) board.

4.5.1 The Diagnostics Display and Available Views

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The **Diagnostics** display allows technicians to monitor inputs and outputs from the MilTouch™ controller.

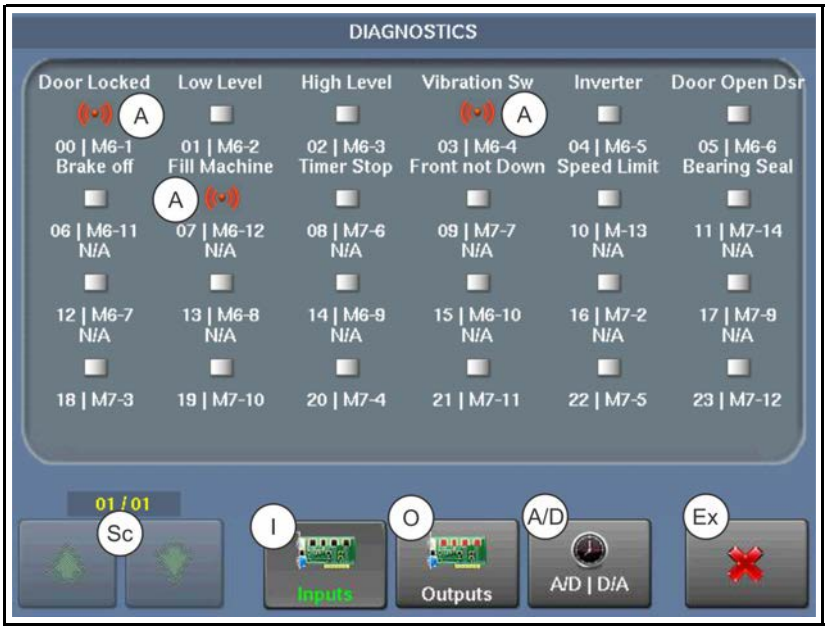
You can select any of three views on the **Diagnostics** display:

- **Inputs**—view the status of digital inputs in real time (the default view)
- **Outputs**—view and actuate digital outputs

- **A/D | D/A** (Analog Channels)—view the status of analog inputs and outputs in real time

Touch  on the **Home** display to access the **Diagnostics** display. This display defaults to digital inputs. Buttons at the bottom of the display provide access to the other views, as shown in the following figure.

Figure 35. The Diagnostics Display with Inputs (the default view) Selected



Legend

A.	Examples of actuated inputs
A/D.	View analog inputs and outputs
Ex.	Exit (return to the **Home** display)
I.	View the digital inputs (pictured)
O.	View the digital outputs
Sc.	Scroll between pages if a view has more than one page.

4.5.1.1 Digital Inputs

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If you previously selected a different view, touch  **Inputs** to view the digital inputs (Figure 35, page 82) in real time. For example, you can use this display to verify that the door is locked or that the vibration switch has not tripped.

4.5.1.2 Digital Outputs

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There are two ways to use digital outputs:

- When a formula is in progress, view the status of outputs in real time.
- When the machine is idle, manually actuate outputs to test them.

Touch  **Outputs** to view the digital outputs on the **Diagnostics** display (Figure 36, page 83).

Figure 36. Digital Outputs

4.5.1.3 Digital Outputs— Machine Idle

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When the machine is idle, you can actuate outputs to verify that the machine responds correctly.

Touch an output button to actuate the output. The actuated output displays  . Touch the button again to turn the output OFF. All outputs turn OFF when you exit the **Diagnostics** display with  and return to the **Home** display.

4.5.1.4 Digital Outputs— Formula in Progress

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Diagnostic control of outputs is disabled while the machine runs a formula. However, when a formula is in progress, you can monitor the outputs to observe certain events as they occur in a wash formula cycle. For example, you can monitor when the water valves open and close.

4.5.1.5 Analog Channels (A/D inputs and D/A outputs)

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Touch  to view analog inputs and outputs (shown in the following figure) to monitor the bath temperature and level, the board voltage, and other conditions.

Figure 37. Analog-Digital Values

Legend

A. The actual (current) value for the output or the input

A/D. View analog inputs and outputs (pictured)

C. (A/D) The digital counts value from the A/D converter used by the microprocessor to calculate the actual/desired units
(D/A) The digital counts value sent from the microprocessor to the D/A converter that allows the proper voltage to be sent to the inverter for motor control

Ch. The input's connection on the MilTouch™ input/output circuit board

D. The desired value for the input

Ex. Exit (return to the **Home** display)

I. View the digital inputs

O. View the digital outputs

U. The units that quantify the values given in the "Actual" (A) and "Desired" (D) columns

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4.6 The MilTouch™ Input/Output Board

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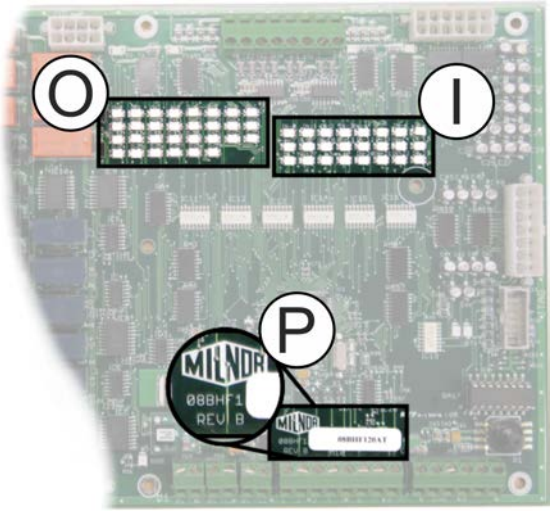
Two banks of LEDs— one for inputs and one for outputs— are located on the I/O board. When an input is actuated, the LED for that input illuminates green. When an output is actuated, the LED for that output illuminates red.

When any input or output is actuated, both the LED on the I/O board and the indicator on the Inputs or Outputs view of the **Diagnostics** display should indicate the input or the output is actuated. In the unlikely event that these indicators do not agree, there is a problem with the controller. Contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125.

Figure 38. Board Identification



Legend

O.	Output indicators
I.	Input indicators
P.	Part number and revision

4.6.1 Input Status Lights on the I/O board

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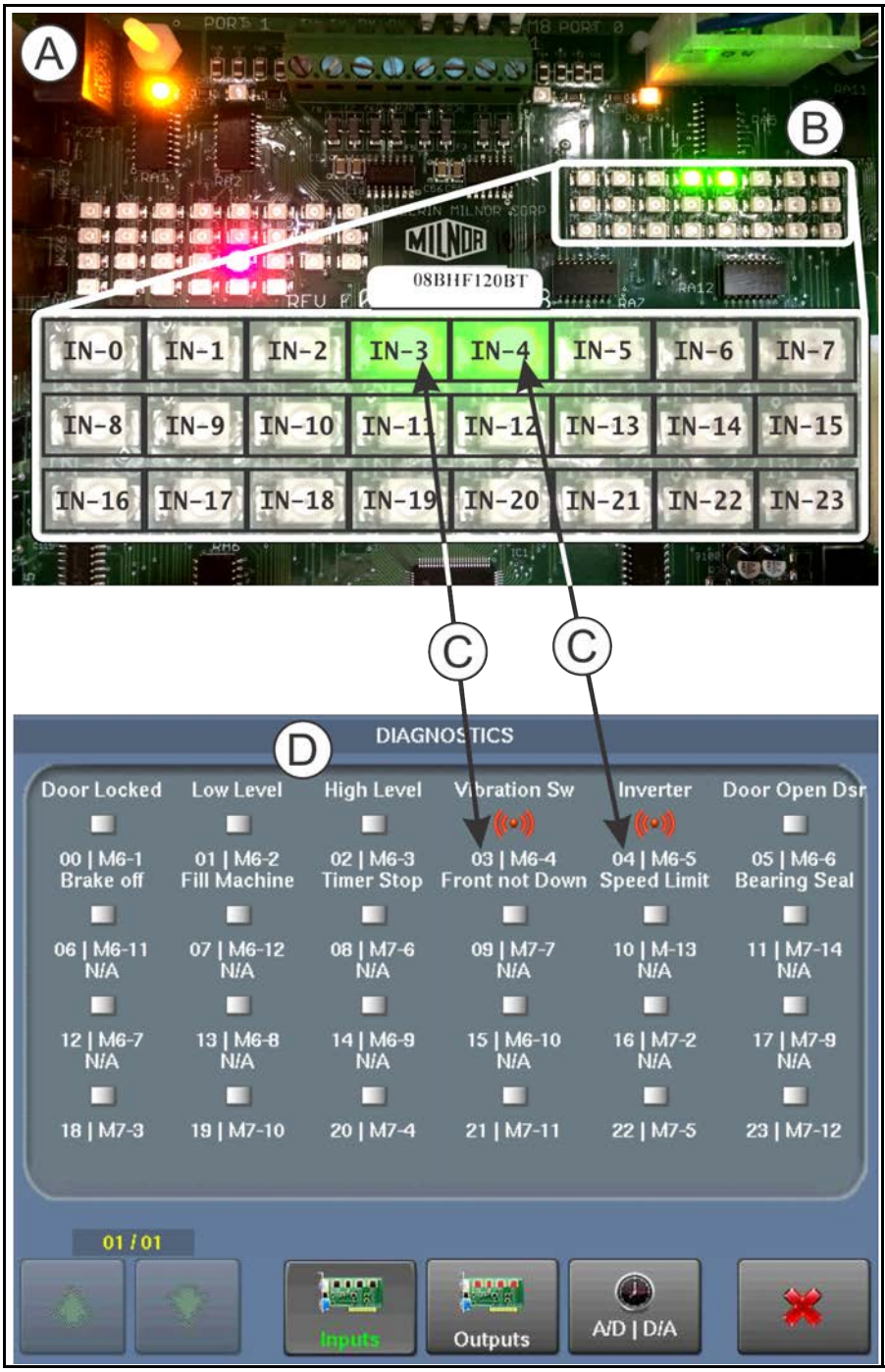
The input status lights on the input/output (I/O) board and the labels on the Inputs view of the **Diagnostics** display correspond, as shown in Figure 39, page 86. For example, input status light IN-**3** corresponds to the label “Vibration Sw **03**/M6–4” on the display, where 03 is the input number and M6-4 is the connector and pin number (see Table 26: List of Digital Inputs, page 88).

There are 24 digital inputs, designated 0 through 23. When a digital input is actuated, the status light on the I/O board illuminates green and  appears at the corresponding label on the **Diagnostics** display.

Figure 39. Input Status Lights on the I/O board and Corresponding Labels on the Diagnostics Display



Legend

A . . . Input/output (I/O) board

B . . . Input status lights

C . . . Actuated input

D . . . The Diagnostics display with **Inputs** selected.

4.6.2 Output Status Lights on the I/O Board

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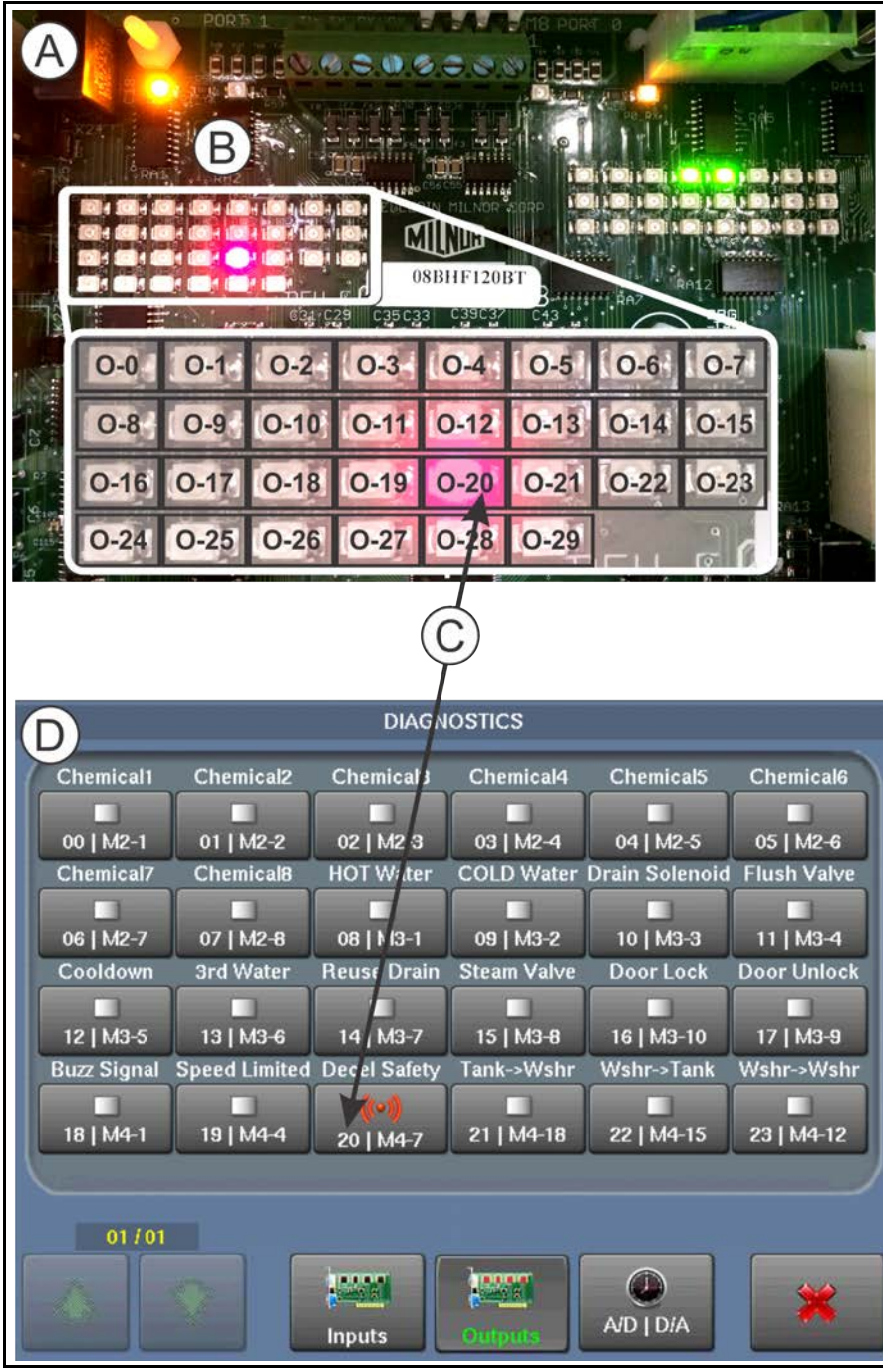
The output status lights on the input/output (I/O) board and the labels on the Outputs view of the **Diagnostics** display correspond, as shown in Figure 40, page 87. For example, output status light

O–**20** corresponds to the label “Decel Safety **20**/M4–7” on the display, where 20 is the output number and M4–7 is the connector and pin number (see Table 27: List of Digital Outputs, page 89).

There are 30 digital outputs, designated 0 through 29. When a digital output is actuated, the status light on the I/O board illuminates red and  appears at the corresponding label on the **Diagnostics** display.

Figure 40. Output Status Lights and Corresponding Labels on the Diagnostics Display



Legend

A . . . Input/output board
B . . . Output indicator lights
C . . . Actuated output
D . . . Digital outputs on the **Diagnostics . .** display

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4.7 Lists of Inputs and Outputs

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The inputs and outputs and their corresponding status lights on the input/output board are listed in the following tables, along with descriptions of their functions and additional information about the electrical connection points on the board.

4.7.1 Inputs

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Table 26. List of Digital Inputs

Input	Function	Connector and Pin	Description
IN-0	Door is closed	M6-1	This input is **actuated** when the washer door is locked.
IN-1	Reserved	M6-2	Was Low Level Achieved in a previous software version.
IN-2	Reserved	M6-3	Was High Level Achieved in a previous software version.
IN-3	Vibration switch tripped	M6-4	This normally closed circuit opens when the vibration switch actuates due to imbalance during high-speed extraction.
IN-4	Inverter input	M6-5	This circuit opens when the inverter is enabled and closes if an inverter fault occurs.
IN-5	Door open desired	M6-6	This circuit closes when the operator presses the door open button.
IN-6	Brake is off	M6-11	On machines that have a brake, this circuit closes when the brake is released. This occurs when the cylinder can turn safely.
IN-7	External fault	M6-12	This normally open circuit is closed by an external device, such as a chemical system, to indicate that device had a fault.
IN-8	Timer stop	M7-6	This circuit closes when the operator halts the step timer.
IN-9	Front is not down	M7-7	On tilting machines, this circuit closes when the machine is in the load position.
IN-10	Speed limit desired	M7-13	On older machines with the “Exact Extract” option, this circuit closes when the machine is out-of-balance. When this system opens the circuit, the extract step resumes at the speed the cylinder was turning when the circuit closed.
IN-11	Bearing seal	M7-14	On machines with a positive pressure (pressure greater than that of the atmosphere) in the bearing housing, this circuit closes when the pressure drops.
IN-12	Drain saver	M6-7	Prevents multiple machines from draining at the same time when doing so would overflow the trench.

Table 26 List of Digital Inputs (cont'd.)

Input	Function	Connector and Pin	Description
IN-13	Reserved	M6-8	—
IN-14	Reserved	M6-9	—
IN-15	Reserved	M6-10	—
IN-16	Reserved	M7-2	—
IN-17	Reserved	M7-9	—
IN-18	Reserved	M7-3	—
IN-19	Reserved	M7-10	—
IN-20	Reserved	M7-4	—
IN-21	Reserved	M7-11	—
IN-22	Reserved	M7-5	—
IN-23	Reserved	M7-12	—

4.7.2 Outputs

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Table 27. List of Digital Outputs

Output	Function	Connector and Pin	Common	Snubber	Description
O-0	Chemical 1	M2-1	M2-10	M2-9	Actuate to inject chemical 1, usually alkali or detergent
O-1	Chemical 2	M2-2			Actuate to inject chemical 2, usually detergent or bleach
O-2	Chemical 3	M2-3			Actuate to inject chemical 3, usually bleach for 36-inch or larger models; sour for other models.
O-3	Chemical 4	M2-4			Actuate to inject chemical 4, usually softener.
O-4	Chemical 5	M2-5			Actuate to inject chemical 5, usually starch; also used to signal that a chemical delivery system desires to inject chemical.
O-5	Chemical 6	M2-6			Actuate to inject chemical 6.
O-6	Chemical 7	M2-7			Actuate to inject chemical 7.
O-7	Chemical 8	M2-8			Actuate to inject chemical 8.
O-8	Hot water valve	M3-1	M3-15	M3-16	Actuate to open the hot water inlet valve.
O-9	Cold water valve	M3-2			Actuate to open the cold water inlet valve.
O-10	Sewer drain solenoid	M3-3			Actuate to open the drain valve to the sewer.

Table 27 List of Digital Outputs (cont'd.)

Output	Function	Connector and Pin	Common	Snubber	Description
O-11	Flush valve	M3-4			Actuate to open the flush valve for chemicals.
O-12	Cooldown valve	M3-5			Actuate to open the optional cool-down valve.
O-13	Third water valve	M3-6			Actuate to open the optional third water inlet valve.
O-14	Reuse drain solenoid	M3-7			Actuate to open the optional reuse drain valve.
O-15	Steam valve	M3-8			Actuate to open the steam valve.
O-16	Door lock	M3-10 & M3-12	—	M3-11	Actuate to lock the door.
O-17	Door unlock (pulsing latch)	M3-9 & M3-14	—	M3-13	Actuate to unlock the door.
	Speed limited (non-pulsing latch)		—		Actuate to test the cylinder speed detector.
O-18	Operator signal	M4-1 & M4-2	—	M4-3	Actuate to sound the operator signal.
O-19	Door unlock (non-pulsing latch)	M4-4 & M4-5	—	M4-6	Actuate to unlock the door.
	Speed limited (pulsing latch)		—		Actuate to test the cylinder speed detector.
O-20	Alt. decel safety	M4-7 & M4-8	—	M4-9	Actuate to send a signal to the inverter that indicates it is safe to decelerate the motor. This output is actuated whenever the machine is fully powered on.
O-21	Tank to machine	M4-18 & M4-17	—	M4-16	Actuate to fill the machine from the overhead tank.
O-22	Machine to tank	M4-15 & M4-14	—	M4-13	Actuate to drain bath water from the machine to the overhead tank.
O-23	Machine to machine	M4-12 & M4-11	—	M4-10	Actuate to recirculate drained bath water back into the machine.
O-24	See Section 4.7.3 , page 91	M5-1	M5-8	—	See Table 28, page 91
O-25		M5-2		—	

Table 27 List of Digital Outputs (cont'd.)

Output	Function	Connector and Pin	Common	Snubber	Description
O-26		M5-3		—	
O-27	Reserved	M5-4		—	—
O-28	Reserved	M5-5		—	—
O-29	Reserved	M5-6		—	—

4.7.3 Rotation Type Outputs

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Outputs O-24, O-25, and O-26, which cannot be manually actuated, are used in conjunction with the step types and speeds programmed in the wash formulas, for rotation speed control. These signals are required by the inverter. They function automatically, as shown in the following table:

Table 28. Rotation Type Outputs

Rotation Type	O-24	O-25	O-26
Clockwise Wash or Drain or RinSave®	ON	OFF	OFF
Counter-clockwise Wash	OFF	ON	OFF
Extract	ON	OFF	ON
RinSave® or Extract Decelerate	OFF	OFF	ON

NOTE: The previous version of MilTouch™, which did not provide programmable speeds, used six output signals (O-24 through O-29) to provide several selectable, fixed speeds. In this MilTouch™ version, which does have programmable speeds, outputs O-27, O-28, and O-29 are unused.

4.7.4 External Use Input and Output Specifications

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Two inputs are available for the customer's use. These are:

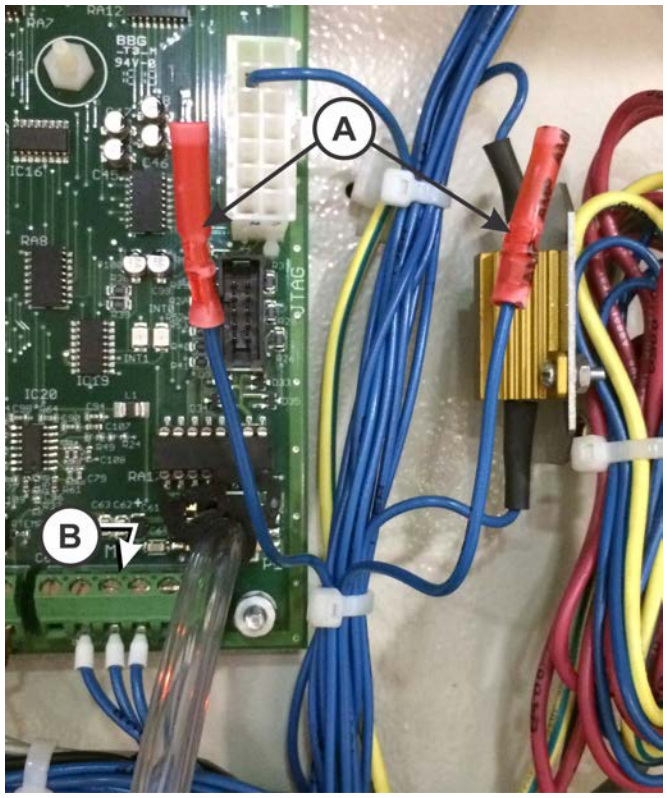
- Timer Stop (timer halt), which suspends the formula timer when the input is actuated.
- External Fault, which causes the controller to issue the External fault error when the input is actuated.

Item A in Figure 41, page 92 identifies the Timer Stop and External Fault butt connectors. The Timer Stop input is connected between the butt connector with wire number 138 and a ground terminal at Item B. The External Fault input is connected between the butt connector with wire number 139 and a ground terminal at Item B.

The controller applies 12 VDC to digital inputs. The customer must connect the input to a potential-free (dry) contact.

Chemical signal outputs are intended for the customer's use. The terminal blocks shown in Figure 42: Types of Pre-Wired Chemical Supply Terminal Blocks, page 93 provide the connection points for chemical signals. The type of terminal block varies by machine model. The controller applies 220 VAC – 240 VAC to digital outputs. The customer is advised to use these output signals to operate a relay and connect the load to potential-free (dry) relay contacts.

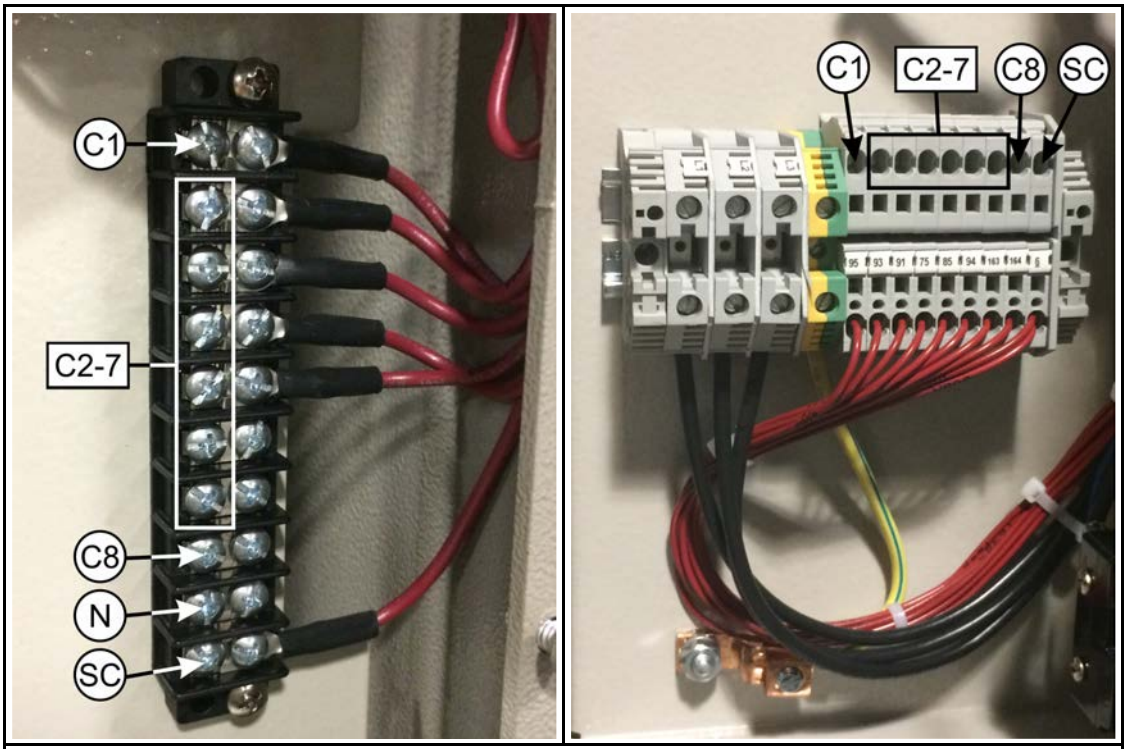
Figure 41. Butt Connectors for External Use Inputs



Legend

A . . . Butt connectors
B . . . DC ground terminal for inputs

Figure 42. Types of Pre-Wired Chemical Supply Terminal Blocks



Legend

C1. . . Chemical #1
C2–7. . . Chemical #2–7 connection points
C8. . . Chemical #8
N. . . Not used
SC. . . Supply common

NOTE: On some models, only chemicals 1 through 5 are pre-wired between the terminal block and the Input/Output board. On these models, inputs are available for chemicals 6, 7, and 8, but are not pre-wired.

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4.8 Troubleshooting Examples

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The following examples illustrate how to use the troubleshooting tools.

4.8.1 Example: The machine will not extract.

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The machine will not accelerate to extract speed and the “Recycling” messages (Recycle Coast, Recycle CCW, etc.) persist on the **Run** display.

1. You look for mechanical causes and find none. Examples of mechanical causes: the machine was under-loaded and the goods cannot distribute evenly around the cylinder, anchor bolts

have come loose causing the vibration switch to trip, the shipping restraint on the vibration switch was not removed after installation.

2. You review Table 26: List of Digital Inputs, page 88 for any inputs that may be related to this condition. The **Vibration switch tripped** input (IN-3) is a likely candidate.
3. You view the Diagnostics display with **Inputs** selected (Figure 35: The Diagnostics Display with Inputs (the default view) Selected, page 82) and you see that input IN-3 is not actuated. This input must be actuated; otherwise, the controller senses that the vibration switch is tripped. This input is **not** actuated, therefore this input is the likely reason that the machine will not extract.
4. You view the status light for this input on the input/output (I/O) board (Figure 39: Input Status Lights on the I/O board and Corresponding Labels on the Diagnostics Display, page 86).
   - If the input IN-3 status light is not illuminated, both the status light and the display show that the input is not actuated (the status light agrees with the information on the display). This indicates the problem is external to the controller.
   - You suspect an open in the wiring between the vibration switch and the controller or a faulty switch. Refer to the electrical schematic manual for your machine to troubleshoot the vibration switch circuit. The schematic manual identifies connection points, wire numbers, and electrical component part numbers. Some common causes of electrical problems are corroded connections, a lightning strike, a chemical spill.
   - If the vibration switch circuit is not faulty, you review the Section 6.1 : Out-of-balance Detection and Balancing for Washer-extractors, page 113 and contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125 for further assistance.
   - If the status light is illuminated, the light does not agree with the information on the display. This should never occur. Consult Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125 to further troubleshoot the controller.

4.8.2 Example: Desired temperature is not achieved.

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The bath does not achieve the desired temperature on a machine not equipped with steam.

A machine not equipped with steam injection uses modulation, as explained in Section 3.5 : How to Modulate Water Valves to Regulate Incoming Water Temperature, page 62, to achieve the programmed bath temperature. With modulation, the machine is dependent on the laundry facility to provide sufficiently hot water to achieve the desired temperature in the time required to fill the cylinder to the programmed level.

1. The operator reports that the wash doesn't seem hot enough. To confirm this, you monitor the Diagnostic display with **A/D | D/A** selected, as shown in Figure 37: Analog-Digital Values, page 84 while a formula runs. You see that the temperature achieved remains significantly below the temperature desired when the machine stops filling.
   - If the temperature achieved does not rise at all, you suspect that the hot water valve does not open during modulation. You will test this further, in the next steps.

- If the temperature achieved rises, but not to the temperature desired, you suspect that a problem external to the machine prevents sufficiently hot water from reaching the machine (see note below). Some possible causes are a clogged water filter in the hot water line, a shutoff valve in the hot water line not fully open, water heater temperature not adjusted hotter for winter conditions, water line break, a temporary increase in hot water demand by other devices.

NOTE: If you observe the actual temperature rise, but not fast enough to reach the desired temperature in time, this can also be because an inefficient method was used to program modulation of the hot and cold water valves (see Section 3.5 : How to Modulate Water Valves to Regulate Incoming Water Temperature, page 62).

2. You suspect that the hot water valve is not functional. With the machine idle, you use the Diagnostics display with **Outputs** (Figure 36: Digital Outputs, page 83) selected to view or actuate outputs. You actuate the Hot Water output (output O-8) and observe that the hot water valve does not open.
3. With the output actuated, you observe the corresponding light on the Input/Output (I/O) board (Figure 40: Output Status Lights and Corresponding Labels on the Diagnostics Display, page 87).
   - If the Output O-8 status light is illuminated, both the status light and the display show that the output is actuated (the light agrees with the information on the display). You suspect an open in the wiring between the I/O board and the electrically operated hot water valve or a faulty valve. Refer to the electrical schematic manual for your machine to troubleshoot the hot water valve circuit. The schematic manual identifies connection points, wire numbers, and electrical component part numbers.
   - If the status light is illuminated, the light does not agree with the information on the display. This should never occur. Consult Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125 to further troubleshoot the controller.

5 Data Transfer

5.1 Data Transfer Purposes, Components, and Best Use

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All wash formulas and configuration settings can be exported to external storage devices. It is also possible to import wash formulas and configuration settings from an external storage device to a MilTouch™ machine. We refer to this flow of data as “data transfer.”

Data transfer has three purposes:

- creating backups
- sharing formulas with similar or identical machines
- formula development on a PC

5.1.1 Data Backup

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Your machine's wash formulas and configuration settings can be lost due to data corruption, unauthorized changes, tampering, or controller hardware failure. If backup files were correctly maintained, you can restore the data and return the machine to production quickly.

You can select from either of the following two media on which to store backup files:

- **Internal SD card**—This card, which should never be removed from the machine unless it becomes damaged, stores all of a MilTouch™ machine controller’s internal memory. The active wash formulas and configuration data currently used by the machine are stored in one (small) partition of this card that only the controller can access. The other (large) partition, approximately 1.8 gigabytes of available memory, is available as a convenient location to store backup files. Although the SD card is located inside the machine controller, the storage partition of the controller’s SD card is considered an external storage location for the sake of this manual.
- **USB drive (memory stick)**—A USB flash drive can be used with or instead of the internal SD card. As a removable medium, a USB drive can keep your data safe in case your SD card becomes damaged. Every time wash formulas and/or configuration settings are changed and finalized, transfer a backup copy of this data to a USB drive. Use only a blank flash drive or a flash drive you previously set aside for data backup (see Section 5.1.4 : The USB Flash Drive Formatting Requirement, page 99). If you plan to use the USB drive as the final storage location, clearly label it and place it in a secure location. A USB drive of good quality is more important than one with a large memory size.

There are four recommended ways to store data for backup:

- MilTouch™ machine —> SD card
- MilTouch™ machine —> USB flash drive
- MilTouch™ PC programmer application —> computer hard drive
- MilTouch™ PC programmer application —> USB flash drive

5.1.2 Formula Sharing

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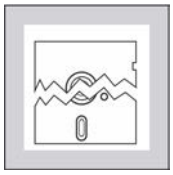
After you have developed a wash formula or set of wash formulas, you can transfer the formulas (a single set) to one or multiple other MilTouch™ machines with a USB flash drive. Hence you can share formulas among a group of MilTouch™ machines without repeating the development process on each machine.

There are two recommended ways to share formulas between MilTouch™ machines:

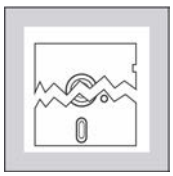
- MilTouch™ machine —> USB flash drive —> similar or identical MilTouch™ machine (one or more)
- MilTouch™ PC programmer application —> USB flash drive —> MilTouch™ machine (one or more similar or identical machines)

If you import wash formulas to a new machine with either method, you must ensure that the formula step decisions that are hardware-specific align with the target (receiving) machine's hardware, including its model, capabilities, and configuration settings. A machine's hardware has a major effect on wash formula programming. For example, machines with different cylinder diameters and depths have different extract speed ranges and maximum water levels.



CAUTION: Incorrect configuration data — Can cause formula errors.

- Never attempt to import configuration settings to a machine from any source other than that machine's backup data.



CAUTION: Incorrect formula data — Can cause machine malfunctions or damage to goods.

- Ensure that the formula step decisions that are hardware-specific align with the target (receiving) machine's hardware.
- Only transfer wash formulas between machines with similar or identical models and equipment.

5.1.3 About the MilTouch™ Programmer Application for Windows PCs

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The free MilTouch™ PC programmer application lets you create and edit wash formulas on a Windows-based computer, and transfer them to your MilTouch™ machines with a USB flash drive. This capability lets you:

- learn how to use the MilTouch™ interface away from the production environment
- do formula development work for a machine while it's in operation
- apply the same formulas to multiple machines

Each machine controller variation (MilTouch™, MilTouch-EX™, and MilTouch-EX™ WTB) has its own version of the PC programmer application. All versions of the PC programmer application are available for download at `milnor.com/controls`.

The PC programmer application uses the same interface as the controller on the machine to help you program formulas and manage their deployment. The contents of this manual apply to both the controller and the PC programmer, with the following exceptions:

- In the PC programmer, the displays described in Section 4.5 : Troubleshooting Inputs and Outputs, page 81 do not reflect the state of any real hardware. The PC application does not simulate inputs and outputs.
- The PC programmer will not simulate the actions of a formula or the **Run** display (Section 1.1.2 : When a Formula is in Progress (The Run Display), page 8).
- The PC programmer can hold up to 5 different sets (groups) of formulas and 5 different sets of configuration data. See Section 5.1.3.1 , page 98.

When you develop formulas using the PC programmer application, be sure to configure the programmer application with the same configuration decisions as the target (receiving) machine. This practice allows you to see potential conflicts between formulas and configuration data before you transfer the formulas to the machine.

If your facility uses the Mildata® product and you download the PC programmer application to your Mildata® computer, you can run the formulas you develop on the PC programmer remotely from your machine's MilTouch™ controller. See Section 6.3 : Running Remote Formulas with the Mildata® Product, page 115 for more information.

5.1.3.1 Formula Creation and Data Transfer with Formula Groups

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The MilTouch™ PC programmer application can store up to 5 different sets of formulas, called formula groups (numbered 0-4). The formula groups feature allows users to program or import more than one set of formulas without overwriting the existing data in the application's internal memory. Each formula group can have its own set of configuration settings as well.

On the **Home** display, touch a group number to select that formula group as the active group. The active group is displayed in green, as indicated by Group 0 in the following figure. Change wash formulas, configure your machine, and import data like you would on your machine's MilTouch™ controller. All the changes you make will be saved to the active group.

Figure 43. Formula Groups on the Home Display

NOTE: The formula groups feature is only available on machines running the software versions listed in Table 29, page 99, or later software versions, on both the machine controller and the PC programmer application. If you are running an older version of the PC programmer application, you must uninstall it, then re-install the latest version. Your formulas and configuration settings from the old version will be retained on the new version of the programmer application.

Table 29. Formula Group Software Versions

Controller Variation	Software Version
MilTouch™	WUMTGUIA / 3.2.100
MilTouch-EX™	WUMTGUIB / 4.2.000
MilTouch-EX™ WTB	WUMTGUIC / 6.2.000

5.1.4 The USB Flash Drive Formatting Requirement

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CAUTION: An unreliable USB flash drive — Can prevent data restoration.

- Use only good quality USB hardware.
- Dedicate a USB flash drive to a specific machine or group of machines.

Before you attach a USB flash drive to your MilTouch™ controller for the first time, format the drive to make it compatible with the MilTouch™ controller software. To format your USB flash drive, use the procedure in Section 6.4.1 : Format your USB Flash Drive, page 118.

5.1.5 Data Directory Structure and Files

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When you transfer data either to a personal computer or to a USB drive, a hierarchy of directories and files similar to that shown in the following table are created.

Table 30. Example of Directory and File Structure After Data Transfer

Directory or File	Description
USB Drive (D)	USB drive root directory (example). Alternatively, this could be the root of the large partition on the internal SD card.
36026V7Z-1.cfg temporary.cfg	Examples of configuration files that you transferred from the machine. The file names before the `.cfg` extension are the names you assigned to these configuration files. These files are proprietary. Only the controller and the PC programmer application can use these files.
L0_Commercial.set	The directory that contains the default formulas that you transferred from the machine. The structure under this directory is not shown.
Test_Formulas.set	An example directory that contains a formula set in development. The directory name before the `.set` extension is the name you assigned to this formula set.
f-001 ... f-010	Directories that hold the individual formula data—one per formula. Only directory f-010 is expanded to show its content.
s-001_chems.dat s-004_chems.dat steps.dat	Proprietary files that hold the data for the steps in this formula. These files are accessible only by the controller and the PC programmer application.
formulas.dat	A proprietary file that holds data for all formulas. This file is accessible only by the controller and the PC programmer application.

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5.2 Data Transfer with the MilTouch™ Controller

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NOTE: If you are using the MilTouch™ PC programmer application, see Section 5.3 : Data Transfer with the MilTouch™ PC Programmer Application, page 105.

From the **Data Transfer** display, you can export wash formula sets from the MilTouch™ machine controller to a USB flash drive for sharing. You can also export wash formula sets and configuration files to a USB device or SD card to keep as backup data.

Touch  on the **Home** display on the controller to show the **Data Transfer** display.

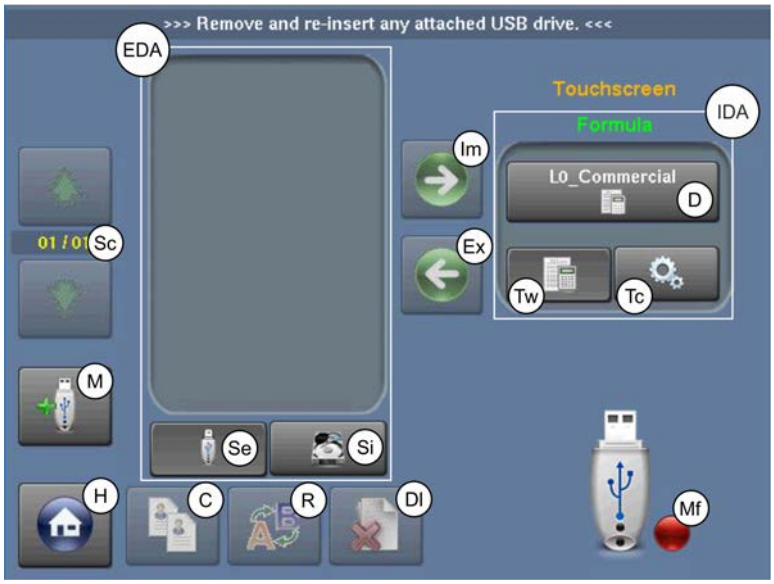
The following figure illustrates how the **Data Transfer** display appears on the MilTouch™ controller. In the following figure, these definitions apply:

internal pertains to a data storage location that only the controller can use. Changes you make in the **Configuration** and **Wash Formula Maintenance** displays apply to the data at this location.

external pertains to the root of the USB flash drive or on the storage partition of the controller's SD card.

export copy data from the internal to an external data storage location.
import copy data from an external to the internal data storage location.

Figure 44. The Data Transfer Display on the Controller



Legend

C.	Copy a data set
D.	The name of the data set saved to the machine's internal memory
Dl.	Delete a data set
EDA.	External Data Area
Ex.	Export a data set
H.	Return to the **Home** display
IDA.	Internal Data Area
Im.	Import a data set
M.	Mount or umount a USB flash drive
Mf.	The available media indicator
R.	Rename a data set
Sc.	Scroll between pages
Se.	Transfer data in external storage area
Si.	Transfer data in internal storage area
Tc.	Transfer configuration files
Tw.	Transfer wash formulas

5.2.1 How to Mount a USB Flash Drive to the MilTouch™ Controller

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Follow these instructions to mount a USB flash drive to the machine, and troubleshoot the controller if it does not recognize a connected USB device after a few seconds.

1. Insert your USB flash drive to the machine's USB port.

   If the available media indicator in the bottom right of the display changes from red to green  , the controller recognizes a connected USB device and you have successfully mounted the USB flash drive to the machine.

2. If the available media indicator does not turn green after a few seconds, touch  to mount the USB flash drive to the controller.

3. If the available media indicator does not turn green after you touch  , remove the USB flash drive, wait 10 seconds, reinsert the flash drive into the USB port, and touch  again.

4. If the controller does not recognize the USB flash drive after your remove and re-insert it, you need to format your USB flash drive. To format your USB flash drive, follow the procedure in Section 6.4.1 : Format your USB Flash Drive, page 118.

5. If you format your USB flash drive and the controller still does not recognize the device, use a different USB flash drive.

5.2.2 How to Export Files from the MilTouch™ Controller

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To export wash formulas and configuration files from the MilTouch™ controller to an external storage device (USB flash drive or SD card):

1. Touch  on the **Home** display to access the **Data Transfer** display.
2. If you are exporting files to a USB flash drive, mount the flash drive to the MilTouch™ controller as described in Section 5.2.1 , page 101. If there is already a flash drive attached to the controller, remove and re-insert it.
3. Choose to export either wash formulas or configuration files. In the Internal Data Area:
   - Touch  to select the formula set as the data that will be exported.
   - Touch  to select the configuration file as the data that will be exported.
4. Touch the button that displays the data set name in the Internal Data Area. Based on your choice from the previous step, the Internal Data Area will appear in one of the two ways shown in the following figure.

Figure 45. The Two Alternative Internal Data Area Views

5. To change the name of the formula set or configuration file, if desired, touch  . The **File Name** window (not shown) appears. In the **File Name** window:
   a. Touch the **[Clear All]** button to delete the current file name.
   b. Use the keypad to enter a new file name.
   c. Touch  to save the new file name and close the window.
6. A dialog box (not shown) appears, which indicates the file was renamed. Touch  to dismiss the dialog box.

7. Choose to export the files to either the USB flash drive or the SD card. In the External Data Area:
   - Touch  to select the root of the USB flash drive as the destination for the files.
   - Touch  to select the SD card as the destination for the files.
8. Touch  to export the file. The file appears in the External Data Area.
9. A dialog box (not shown) appears, which indicates the file was exported. Touch  to dismiss the dialog box.
10. If you exported files to a USB flash drive, touch  to unmount the flash drive. The available media indicator in the bottom right of the **Data Transfer** display changes from green to red  , which indicates the controller no longer recognizes a connected USB device.
11. Remove the USB flash drive.

5.2.3 How to Import Files to the MilTouch™ Controller

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To import wash formulas and configuration files to the MilTouch™ machine controller from a USB flash drive or from the SD card:

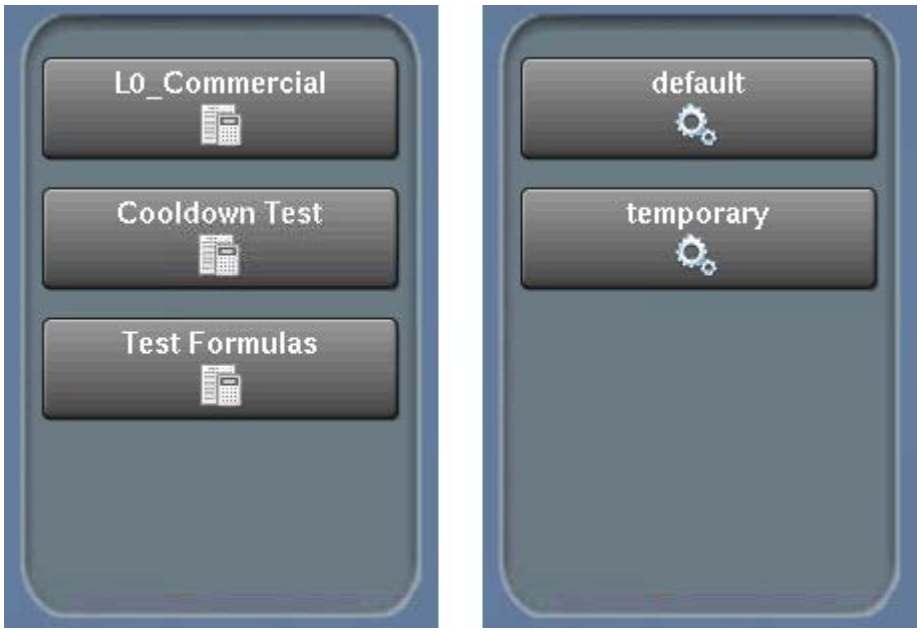
NOTE: Wash formulas can be imported to one or more MilTouch™ machines, but you should only transfer wash formulas between machines with similar or identical model numbers, equipment, and configuration.

NOTE: Your machine was configured with the optimum or required settings at the factory. Configuration files can be imported to one or more MilTouch™ machines, but this is not recommended. Save a backup copy of each machine's configuration file for restoration to that machine only, if necessary in the future.

1. Touch  on the **Home** display to access the **Data Transfer** display.
2. If you are importing files from a USB flash drive, mount the flash drive to the MilTouch™ controller as described in Section 5.2.1 , page 101. If there is already a flash drive attached to the controller, remove and re-insert it.
3. Choose to import the files from either the USB flash drive or the SD card in the controller. In the External Data Area:
   - Touch  to select files from the root of the USB flash drive.
   - Touch  to select files from the SD card.

4. Choose to import either wash formulas or configuration files. In the Internal Data Area:
   - Touch  to select the wash formulas as the files that will be imported.
   - Touch  to select the configuration file as the file that will be imported.
5. A list of files available for import will appear in the External Data Area. Based on your choice from the previous step, the External Data Area will either display the available wash formula sets or the available configuration files. Touch the button that displays the data set name of the file you wish to import.

Figure 46. Example Wash Formulas and Configuration Files Available for Import



6. To change the name of the formula set or configuration file, if desired, touch  . The **File Name** window (not shown) appears. In the **File Name** window:
   a. Touch the **[Clear All]** button to delete the current file name.
   b. Use the keypad to enter a new file name.
   c. Touch  to save the new file name and close the window.
7. A dialog box (not shown) appears, which indicates the file was renamed. Touch  to dismiss the dialog box.
8. Touch  to import the file. The file appears in the Internal Data Area.

9. A dialog box (not shown) appears, which indicates the file was imported. Touch  to dismiss the dialog box.

10. If you imported files from a USB flash drive, touch  to unmount the flash drive. The available media indicator in the bottom right of the **Data Transfer** display changes from green to red  , which indicates the controller no longer recognizes a connected USB device.

11. Remove the USB flash drive.

5.3 Data Transfer with the MilTouch™ PC Programmer Application

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NOTE: If you are not using the MilTouch™ PC programmer application, see Section 5.2 : Data Transfer with the MilTouch™ Controller, page 100.

From the **Data Transfer** display, you can export wash formulas prepared with the MilTouch™ PC programmer application to a USB flash drive for sharing. You can also export wash formula sets and configuration files to a USB device or the hard drive of the computer running the programmer application to keep as backup data.

To begin data transfer:

1. Touch  on the **Home** display on the MilTouch™ PC programmer application to show the **Data Transfer** display on the programmer application.
2. A dialog box (not shown) appears, which reminds you that only files saved in the root of the USB flash drive are available for import. In the dialog box, touch  to dismiss it.

The following figure shows how the **Data Transfer** display appears on the MilTouch™ programmer application.

In the following figure, these definitions apply:

internal pertains to a data storage location that only the programmer application can use. Changes you make to configuration and wash formula decisions with the programmer application apply to the data at this location.
external pertains to the root of the computer's hard drive or the root of the USB flash drive.
export copy data from the internal to an external data storage location.
import copy data from an external to the internal data storage location.

Figure 47. The Data Transfer Display on the PC Programmer Application

Legend

C.	Touch to copy a data set
Cp.	Current path to the external data sets
D.	Data set name
Dl.	Touch to delete a data set
EDS.	External Data Area
Ex.	Touch to export a data set
H.	Touch to return to the **Home** display
IDA.	Internal Data Area
Im.	Touch to import a data set
P.	Touch to print data to a text file
R.	Touch to rename a data set
S.	Touch to launch the file browser window
Sc.	Touch to scroll between pages
Tc.	Touch to work with configuration files
Tw.	Touch to work with wash formula sets

5.3.1 How to Export Files from the PC Programmer Application

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To export wash formulas and configuration files prepared with the MilTouch™ PC programmer application to a USB flash drive or to the hard drive of the computer running the programmer application:

1. Touch  on the **Home** display to access the **Data Transfer** display.
2. If you are exporting files to a USB flash drive, insert the blank flash drive into the personal computer running the MilTouch™ programmer application. If there is already a flash drive attached to the computer, remove and re-insert it.
3. Choose to export either wash formulas or configuration files. In the Internal Data Area:
   - Touch  to select the formula set as the data that will be exported.
   - Touch  to select the configuration file as the data that will be exported.

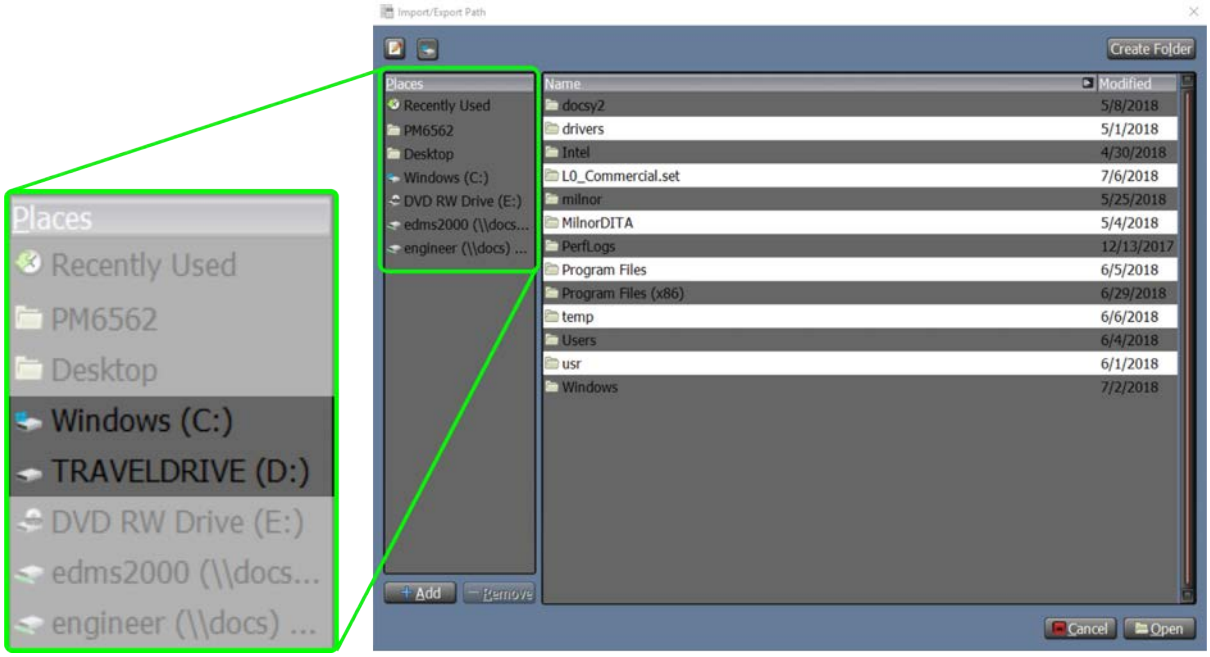
NOTE: If your programmer application uses the formula groups feature, ensure that you are exporting formulas from the correct formula group.

4. Touch the button that displays the data set name in the Internal Data Area. Based on your choice from the previous step, the Internal Data Area will appear in one of the two ways shown in the following figure.

Figure 48. The Two Alternative Internal Data Area Views

5. To change the name of the formula set or configuration file, if desired, touch  . The **File Name** window (not shown) appears. In the **File Name** window:
   a. Touch the **[Clear All]** button to delete the current file name.
   b. Use the keypad to enter a new file name.
   c. Touch  to save the new file name and close the window.
6. A dialog box (not shown) appears, which indicates the file was renamed. Touch  to dismiss the dialog box.
7. Touch  . The file browser window shown in the following figure appears.

Figure 49. File Browser Window



a. Choose to export files to either a USB flash drive or to the hard drive of the computer running the PC programmer application. In the left column of the file browser window:
   - Touch the drive letter of the USB flash drive (such as D:) to export the files to the root of the USB flash drive.
   - Touch the C: drive to export files to the hard drive of the computer running the programmer application.

b. Touch the button that displays **Open** in the bottom right corner of the window to confirm your selection.

8. Touch  to export the file. The file appears in the External Data Area.

9. A dialog box (not shown) appears, which indicates the file was exported. Touch  to dismiss the dialog box.

10. If you exported files to a USB flash drive, remove the flash drive.

5.3.2 How to Import Files to the PC Programmer Application

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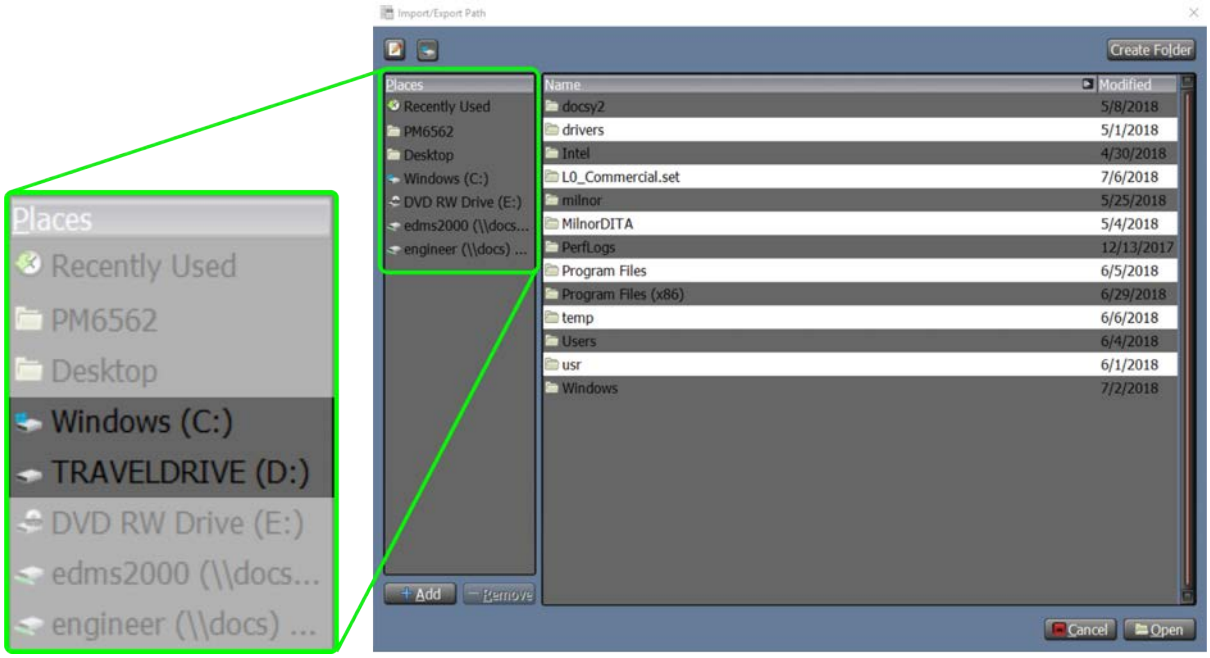
To import wash formulas and configuration files to the MilTouch™ PC programmer application from a USB flash drive or from the hard drive of the computer running the programmer application:

1. Touch  on the **Home** display to access the **Data Transfer** display.

2. If you are importing files from a USB flash drive, insert the blank flash drive into the personal computer running the MilTouch™ programmer application. If there is already a flash drive attached to the computer, remove and re-insert it.

3. Touch  . The file browser window shown in the following figure appears.

Figure 50. File Browser Window



   a. Choose to import files from either the USB flash drive or the hard drive of the computer running the PC programmer application. In the left column of the file browser window:

      - Touch the drive letter of the USB flash drive (such as D:) to import the files from the root of the USB flash drive.
      - Touch the C: drive to import files from the hard drive of the computer running the programmer application.

      NOTE: Although you can create and select folders from the file browser window, you can only import files from the root of a drive. Files located in a sub-folder are not available for import.

   b. Touch the button that displays **Open** in the bottom right corner of the window to confirm your selection.

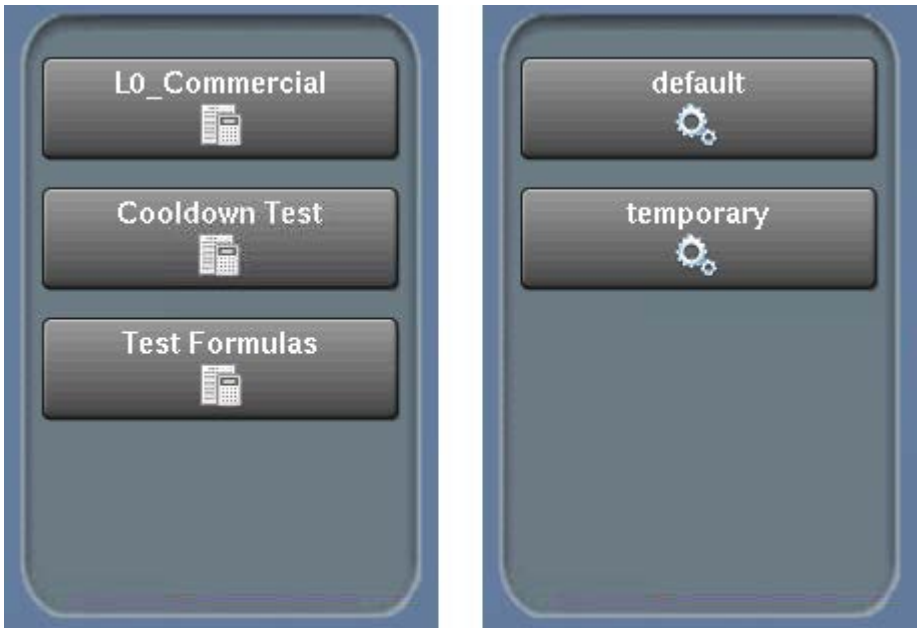
4. Choose to import either wash formulas or configuration files. In the Internal Data Area:

   - Touch  to select the wash formulas as the files that will be imported.
   - Touch  to select the configuration file as the file that will be imported.

NOTE: If your programmer application uses the formula groups feature, ensure that you are importing formulas to the correct formula group.

5. A list of files available for import will appear in the External Data Area. Based on your choice from the previous step, the External Data Area will either display the available wash formula sets or the available configuration files. Touch the button that displays the data set name of the file you wish to import.

Figure 51. Example Wash Formulas and Configuration Files Available for Import



6. To change the name of the formula set or configuration file, if desired, touch . The **File Name** window (not shown) appears. In the **File Name** window:
   a. Touch the **[Clear All]** button to delete the current file name.
   b. Use the keypad to enter a new file name.
   c. Touch to save the new file name and close the window.
7. A dialog box (not shown) appears, which indicates the file was renamed. Touch to dismiss the dialog box.
8. Touch to import the file. The file appears in the Internal Data Area.
9. A dialog box (not shown) appears, which indicates the file was imported. Touch to dismiss the dialog box.
10. If you imported files from a USB flash drive, remove the flash drive.

5.3.3 How to Export Formula and Configuration Data as Text Files

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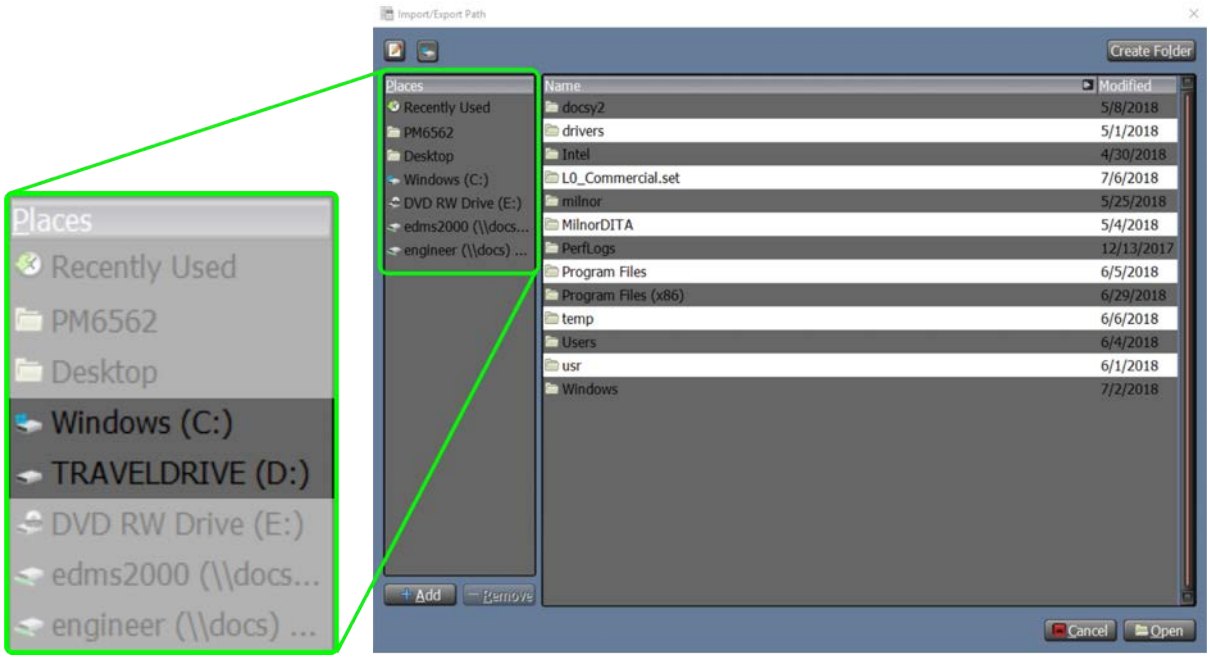
Use the function to export the formula or configuration data in the Internal Data Area as a text (.txt) file to an external storage location. This feature can be used to print formula and configuration data, or save formula and configuration data in a format your computer can read. This feature is only available on the MilTouch™ PC programmer application.

1. Touch to return to the **Home** display, then touch on the **Home** display to access the **Data Transfer** display.

   NOTE: If you touch any buttons other than , , and , the (export as text file) function will not work.

2. Touch . The file browser window shown in the following figure appears.

Figure 52. File Browser Window

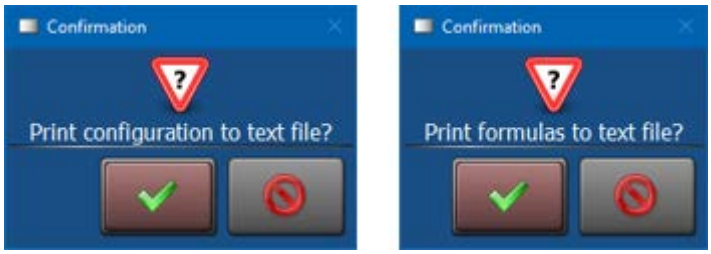


   a. Choose to export files to either a USB flash drive or to the hard drive of the computer running the PC programmer application. In the left column of the file browser window:

      - Touch the drive letter of the USB flash drive (such as D:) to export the files to the root of the USB flash drive.
      - Touch the C: drive to export files to the hard drive of the computer running the programmer application.

3. Touch the button that displays **Open** in the bottom right corner of the window to confirm your selection.
4. Choose to export either wash formulas or configuration files. In the Internal Data Area:
   - Touch  to select the formula set as the data that will be exported.
   - Touch  to select the configuration file as the data that will be exported.
5. On the Data Transfer display, touch  . One of the dialog boxes shown in the following figure appears. Touch  to export the data as a text file.

Figure 53. Confirmation Dialog Boxes



6 Supplemental Information

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6.1 Out-of-balance Detection and Balancing for Washer-extractors

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This document describes how the out-of-balance (OoB) detection and machine balancing features work on MilTouch™ washer-extractors to mitigate vibration before and during extract steps in a wash formula. The OoB detection feature is provided only on certain machine models, as listed.

Consult this document if your washer-extractor:

- experiences persistent recycles, or
- consistently cannot reach the programmed extract speed.

There are two types of OoB detection systems:

- OoB detection with an accelerometer
- OoB detection with a vibration/excursion switch

6.1.1 Out-of-balance Detection with an Accelerometer

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The washer-extractor will achieve the programmed speed for the extract step except when the OoB detection system detects an excessive imbalance. When the OoB detection system detects an excessive imbalance, the cylinder will stop accelerating and remain at the current speed for the remainder of the extract step. When the cylinder speed is limited, the time remaining for the extract step, shown on the controller display, appears with an asterisk.

6.1.1.1 MilTouch™ and MilTouch-EX™ Models

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Applicable Models MWF18Z8, MWF27Z8, MWF45Z8, MWF63Z7, MWF63Y7, MWF77Z7, MWF77Y7, MWF100Z7, MWF100Y7, MWF125Z7, MWF125Y7, 30022X8R, 36026X8R, 42026X7R, 42032X7R

The OoB detection process begins when the cylinder reaches drain speed. The accelerometer outputs a voltage to the controller throughout the extract step. The controller software reads the value and uses it to determine the amount of imbalance inside the cylinder.

1. The OoB detection system compares the amount of imbalance to a table of threshold values.
   - If the imbalance is within the allowed threshold (set at the factory), the washer-extractor completes the extract step at the programmed speed.

- If the imbalance exceeds the allowed threshold, the OoB detection system signals the inverter to limit speed.

2. The OoB detection system continues to monitor the imbalance until the end of the step.

6.1.2 Out-of-balance Detection with a Vibration or Excursion Switch

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Throughout an extract step, the machine monitors the vibration switch or the excursion switch and performs a recycle if the excursion or vibration switch trips due to imbalance. In a recycle, the machine will decelerate to a stop, reverse a few times in wash speed, then redistribute in drain speed to balance the load. After every recycle, the machine will attempt to achieve the programmed extract speed again.

6.1.2.1 MilTouch™ Models

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Applicable Models 30015V8Z, 30022V8Z, 36021V7Z, 36026V7Z, 42026V6Z, 42030V6Z, 30015VZZ, 30022VZZ

The OoB detection process begins when the cylinder reaches drain speed.

1. The OoB detection system compares the amount of imbalance to a table of threshold values.
   - If the imbalance is less than the lowest threshold value, the machine completes the extract step at the programmed speed.
   - If the imbalance is greater than the lowest threshold value, the machine completes the extract step at a reduced speed that is proportional to the amount of imbalance.
2. The OoB detection system continues to monitor the imbalance until the end of the step.

6.1.2.1.1 If the Vibration Switch Trips

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If the vibration switch trips while the cylinder accelerates to the programmed extract speed, the following events occur:

1. The machine performs a recycle.
2. The OoB detection system recalculates the amount of imbalance.
   - If the new imbalance is less than the lowest threshold value, the machine completes the extract step at the programmed speed.
   - If the new amount of imbalance is greater than the lowest threshold value, the machine completes the extract step at a reduced speed that is proportional to the amount of imbalance.
3. The machine monitors the vibration switch and repeats the recycle process if the switch trips.

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6.2 About the Mildata® Product

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The Mildata® product allows a commercial laundry to associate customer data with each load of goods processed and automatically accumulate production data for analysis. The machine also reports error info to the Mildata® computer.

Your machine must be connected to the Mildata® network (see Section 2.2.4 : Enable an Ethernet Connection, page 21) and configured to use the Mildata® product (Mildata = YES, see Section 2.1 : Machine Configuration, page 11) for the machine to communicate with the Mildata® computer.

If your facility uses the Mildata® product and you download the MilTouch™ PC programmer application to your Mildata® computer, you can run the formulas you develop on the Mildata® computer's programmer application remotely from your machine's MilTouch™ controller. See Section 6.3 , page 115 for more information.

The Mildata® product is a laundry management tool with capabilities not explained here. Contact Milnor® Customer Service/Technical Support using the contact information in Section 6.6 : How to Contact Milnor®, page 125 for more information.

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6.3 Running Remote Formulas with the Mildata® Product

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To run remote formulas:

- Your machine must be connected to the Mildata® network (see Section 6.2 , page 115).
- You must download the MilTouch™ PC programmer application to your Mildata® computer (see Section 5.1.3 : About the MilTouch™ Programmer Application for Windows PCs, page 97).

If your facility uses the Mildata® product and you download the MilTouch™ PC programmer application to your Mildata® computer, you can run the formulas you develop on the programmer application remotely from your machine's MilTouch™ controller.

Download the PC programmer application to your Mildata® computer as you would any Microsoft Windows-based computer. Ensure you download the PC programmer application that corresponds with your controller variation. A machine can only run remote formulas from the programmer application version that matches its controller variation.

Running remote formulas shares all the benefits of using the PC programmer application to develop and share formulas, but eliminates the need to import the formulas to each machine with a USB flash drive.

NOTE: With the Mildata® product, it is not necessary to import formulas to your machine to run them. However, it is recommended that you save backups of your formulas in case communications between the machine and the Mildata® computer are interrupted. See Section 5.1.1 : Data Backup, page 96.

6.3.1 Remote Formulas and Formula Groups

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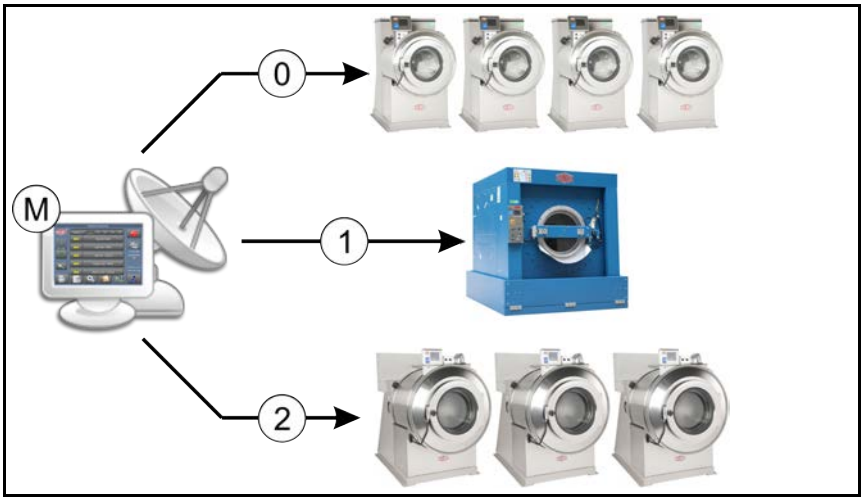
The MilTouch™ PC programmer application can hold up to 5 different groups (sets) of formulas (numbered 0-4), and each formula group can have its own configuration settings. This capability allows laundries with up to 5 different machine models (that use the same controller variation) to all run formulas remotely from the same PC programmer application. Furthermore, each formula group can apply to multiple machines if the machines have similar or identical model numbers, equipment, and configuration. An example laundry that utilizes 3 formula groups is shown in the following figure.

Figure 54. Example Laundry



Legend

- **M . . .** Mildata® computer running the MilTouch™ PC programmer application
- **0 . . .** Formula Group 0 (30022V8Z x4)
- **1 . . .** Formula Group 1 (48040F7D x1)
- **2 . . .** Formula Group 2 (42030V6Z x3)

See Section 5.1.3.1 : Formula Creation and Data Transfer with Formula Groups, page 98 for more information on formula groups.

NOTE: To run remote formulas using formula groups, you must configure your Mildata® computer to use DLL file `MDMT3001.dll`, or later. This file is included in the zip folders for the PC Programmer software versions listed in Table 29: Formula Group Software Versions, page 99 .

6.3.2 How to Assign a Formula Group Number to a Machine

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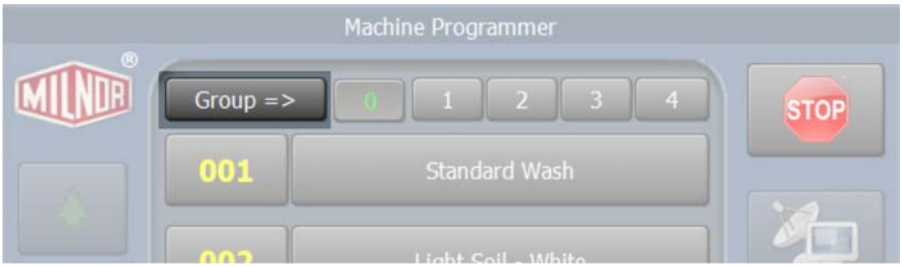
To run remote formulas from a nonzero formula group, you must input your machine's Mildata® address into the PC programmer application and assign a formula group number for the machine to use. If you don't assign a formula group number to the machine, it will use group 0 by default.

To assign a formula group number to a machine:

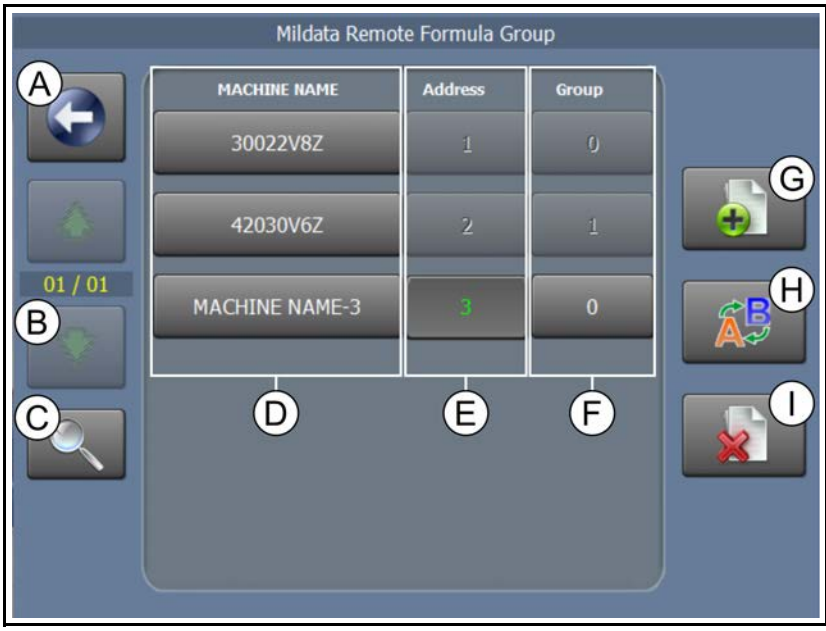
1. On the **Home** display, touch the button labeled "Group =>" (shown in the following figure).

Figure 55. Group Button



2. The **Mildata® Remote Formula Group** window appears, shown in the following figure.

Figure 56. Mildata® Remote Formula Group Window



Legend

- **A . . .** Return to the **Home** display
- **B . . .** Scroll between pages to view more Mildata® addresses
- **C . . .** Search for a machine by its Mildata® address
- **D . . .** Machine name column
- **E . . .** Mildata® address column
- **F . . .** Formula group number column
- **G . . .** Add a new Mildata® address
- **H . . .** Rename a machine
- **I . . .** Delete a Mildata® address

3. To add a new Mildata® address:

   a. On the **Mildata® Remote Formula Group** window, touch  . The **Address** window (not shown) appears.

   b. In the **Address** window, use the keypad to enter your machine's Mildata® address.

   c. Touch  to confirm your entry.

   The controller creates an entry in the **Mildata® Remote Formula Group** window for your machine. The controller automatically names the machine "Machine Name-#" (where # is the number for the Mildata® address), and assigns Group 0 as the formula group number, as illustrated by the third machine in Figure 56, page 117.

4. To rename the machine:

   a. Touch the "Machine Name-#" button in the column labeled "Machine Name" for your machine.

b. Touch  . The **Machine Name** window (not shown) appears.

c. In the **Machine Name** window, touch the **[Clear All]** button to delete the machine name that the controller provided.

d. Use the keypad to enter a new name for the machine.

e. Touch  to save the new machine name and close the **Machine Name** window.

5. To change the formula group number:

a. Touch the "0" button in the column labeled "Group" for your machine. The **Group** window (not shown) appears.

b. In the **Group** window, use the keypad to enter the number for the formula group (0–4) your machine will use to run remote formulas.

c. Touch  to confirm your entry and close the **Group** window.

Repeat steps 1–5 for every machine in your laundry that will run remote formulas. It is possible for several machines to use the same group number if the machines have similar or identical model numbers, equipment, and configuration.

See your machine's operator guide for instructions on how to run remote wash formulas from the Mildata® computer.

6.4 Software Update Procedure

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The Milnor® factory occasionally makes changes to MilTouch™ software. In some cases, we recommend that the change is applied to all machines. For these updates, we notify dealers of the change in an e-mail, and provide the software update file as an attachment so that dealer technicians can install the update on any MilTouch™ machines in their territory. This document is for the technician who will install the update. In this procedure, the technician will save an update file to a computer, copy it to a USB flash drive, and apply the update to the machine controller.

NOTE: If a software update will affect formula programming, configuration decisions, or customer procedures, there will be an explanation in the update e-mail.

6.4.1 Format your USB Flash Drive

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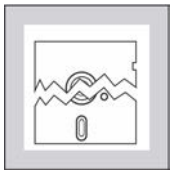
Format your USB flash drive to make it compatible with the MilTouch™ controller software. To complete this procedure, you must have a Windows™ computer with an available USB port and a blank USB flash drive with a capacity of at least 1 gigabyte (GB).

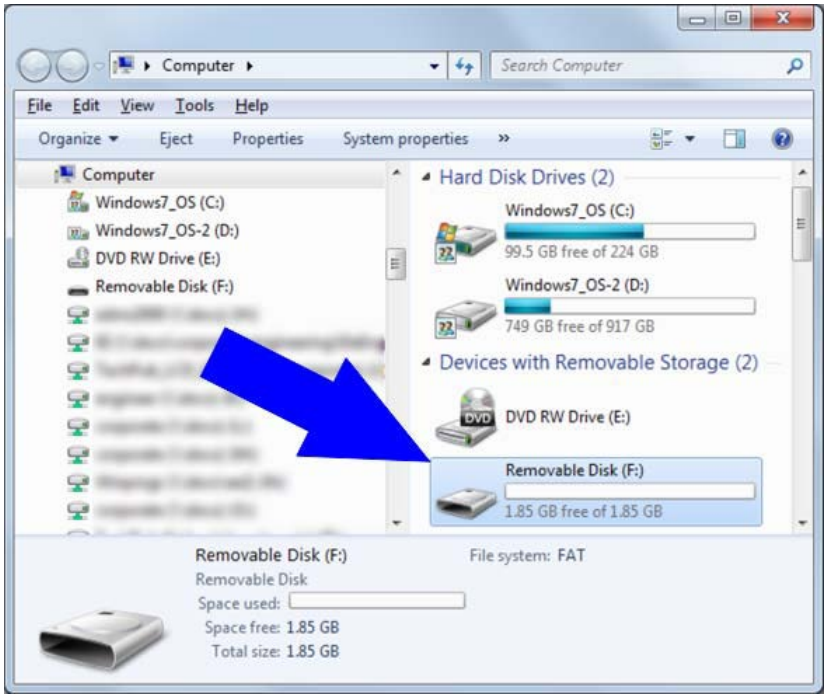


CAUTION: Formatting — removes all data from the USB device.

- Verify that the USB device you have selected to format is either unformatted or contains no data.

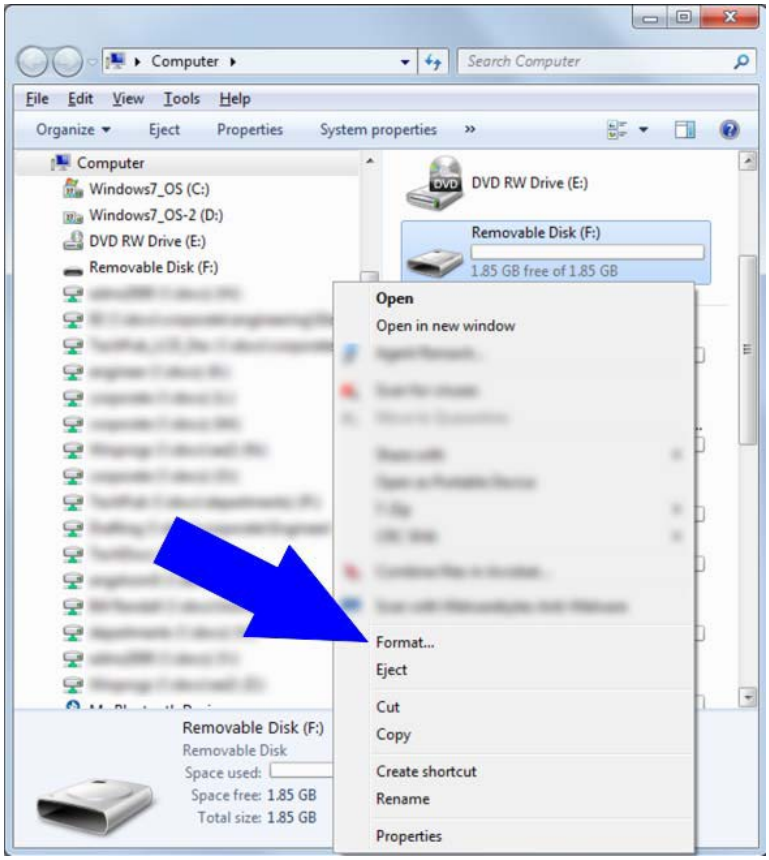
1. Insert the USB flash drive into an available USB port on your Windows™ computer.
2. Open File Explorer.

Figure 57. Typical View of USB Flash Drive in File Explorer



3. In Explorer, right-click on the USB flash drive to display the context menu.
4. Left-click on **Format...** in the context menu.

Figure 58. Typical File Explorer Context Menu



5. The **Format Removable Disk** window appears (shown in the figure below). In the **Format Removable Disk** window:

Figure 59. Format Removable Disk Main Window

a. Set the **File system** to **FAT** or **FAT32**

b. Click **Start** to format the device.

6. A confirmation window appears (not shown), which warns that the next action will erase all data on the device. Click **OK** to continue with the procedure.
7. When the computer formats the device, a confirmation window (not shown) will appear. Click **OK** to dismiss the window.
8. Click **Close** to close the **Format Removable Disk** window and return to File Explorer.

6.4.2 Save and Copy the Update File to the USB Flash Drive

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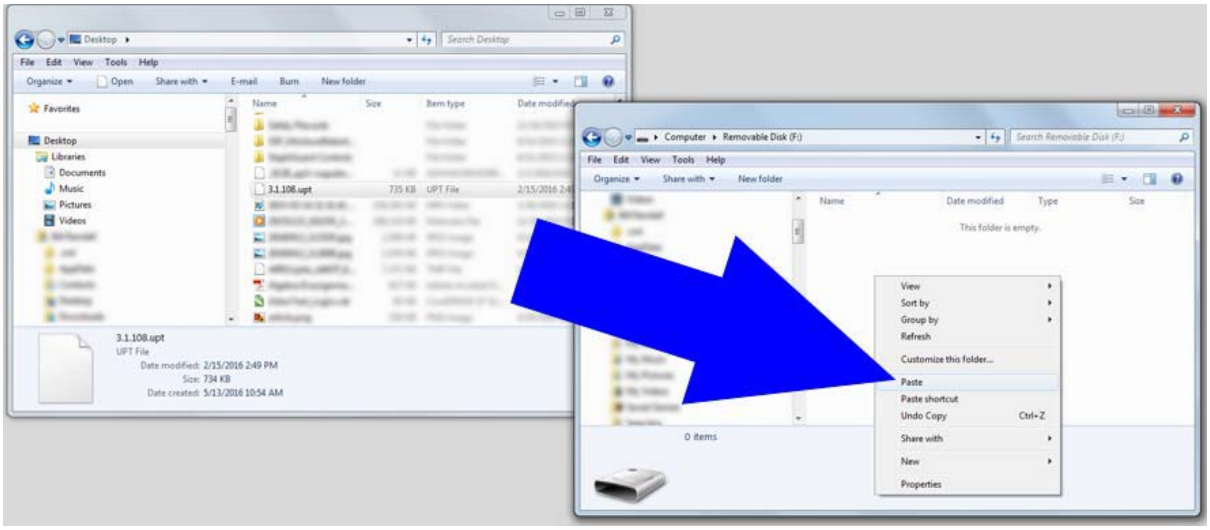
To save and copy the update file to the USB flash drive, you must have a Windows™ computer with an available USB port and the blank, formatted USB flash drive (as described in Section 6.4.1 , page 118) with a capacity of at least 1 gigabyte (GB).

1. Identify and save the software update file to your computer.
2. Open File Explorer.
3. Locate and right-click on the saved update file on your computer (similar to Item 1 in the following figure). A context menu appears.

Figure 60. File Explorer Context Menu, Copy Command Indicated

4. In the context menu that appears, click on **Copy** (Item 2 in the previous figure).
5. Open a second File Explorer window and navigate to the USB flash drive.
6. Right click in the blank USB flash drive window to open the context menu.
7. In the context menu that appears, click on **Paste** (indicated by the arrow in the following figure). The update file will appear in the USB flash drive window.

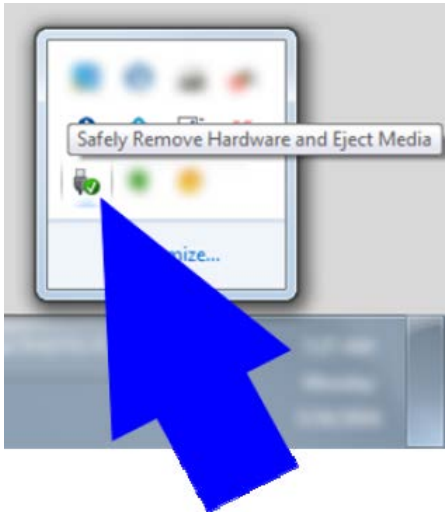
Figure 61. USB Flash Drive in File Explorer



NOTE: Make sure that you save the update file in the root of the USB flash drive (not inside of a folder on the USB drive).

8. Close the File Explorer windows.
9. In the Windows status area (bottom right of your screen), click the **Safely Remove Hardware** icon (shown in the following figure) to command the computer to release the USB flash drive.

Figure 62. Safely Remove Hardware Icon



10. Your computer notifies you when you can safely remove the USB flash drive. Remove the USB flash drive from the Windows computer.

6.4.3 Apply the Update File to the Machine Controller

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To apply the software update to a MilTouch™ or MilTouch-EX™ machine controller, you must have a USB flash drive prepared as described in Section 6.4.1 , page 118 and Section 6.4.2 , page 121. At the machine:

1. Touch  on the **Home** display to open the **Data Transfer** display.
2. Mount the flash drive that contains the update to the MilTouch™ controller as described in Section 5.2.1 : How to Mount a USB Flash Drive to the MilTouch™ Controller, page 101.
3. A confirmation window (not shown) appears, which prompts that a new version of the MilTouch™ controller software is available. Touch  to download the update. The controller signals when it begins initializing the update.
4. A second update window (not shown) appears.
   a. Touch the **Update MilTouch™** button to begin the download of the new software to the controller.
   b. The controller creates a restore point to prevent data loss if the update process is interrupted.
   c. A progress bar indicates the progress of the update.
5. When the update downloads, an information window (not shown) appears that prompts you to restart the controller. Touch the **Power Cycle Machine** button. The machine controller shuts down and restarts.
6. Remove the flash drive from the USB port when the **Home** display appears.

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6.5 MilTouch™ Update: WUMTGUI/2.1.xxx

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This section contains important information for operators using a version of the MilTouch™ controller software earlier than MilTouch™ 2.1.118.

6.5.1 Does my machine need this update?

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Your machine requires this update if the **Home** display shows a software version data (V) earlier than WUMTGUI/2.1.118 or WUMTCOM/21012.

Machine software version WUMTCOM/21012 includes these changes:

- Disables the **Door Open** button when the **Diagnostics** display () is visible.
- Enables low wash speed.
- Enables extract speed E2.

- Turns off all the outputs when **Formula Intervention** () is actuated and the **Door Unlock** button is pushed. Disables the **Door Unlock** button when **Formula Intervention** () is actuated and the bath level is not below low level.

User interface software version WUMTGUI/2.1.xxx included with this document makes these changes:

- Removes the manual inverter control outputs display.
- Prevents the removal of a wash step if the result would be two consecutive extract steps.
- Prevents the duplication of an extract step. This prevents two consecutive extract steps.
- Corrects the behavior of  (formula search function) on the **Home** display when the formula list includes inactive formulas.
- Improves the stability of the USB import and export functions in multi-operation sessions.
- Allows you to recalibrate the touchscreen.

6.5.2 How do I save my wash formulas and configuration files?

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Although this update preserves the programmed formulas and the configuration settings, it is good practice to keep a backup copy of the formulas and configuration files for each machine in your facility.

1. Turn power to the machine OFF.
2. If there is a flash drive in the USB (universal serial bus) port, remove it.
3. Turn power to the machine ON. All machines have a power-up delay that lasts at least 60 seconds.
4. To save a backup copy of your wash formulas and configuration files, follow the procedure in Section 5.2.2 : How to Export Files from the MilTouch™ Controller, page 102.

6.5.3 How do I update the machine software?

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To update the MilTouch™ controller software, see Section 6.4 : Software Update Procedure, page 118.

6.5.4 How do I restore my formulas and configuration data?

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To restore backup wash formulas and configuration files, follow the procedure in Section 5.2.3 : How to Import Files to the MilTouch™ Controller, page 103.

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6.6 How to Contact Milnor®

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Your authorized Milnor® dealer can assist you with your Milnor® machine and knows about the local conditions that may be pertinent to the installation, use, or maintenance of the machine. Contact your dealer first. For assistance from the Milnor® factory, refer to Table 31, page 125 for contact information.

Table 31. Pellerin Milnor® Corporation Contact Information

Purpose	Department	Telephone	FAX	E-mail/Web site
Order or ask about replacement parts	Parts	504–712–7775 or 800–299–1500	504–469–9777	parts@milnor.com
Get advice on installing, servicing, or using	Customer Service/ Technical Support	504–712–7780	504–469–9777	service@milnor.com www.milnor.com (Customer Service)
Learn about, request, or enroll in Milnor® service seminars	Training	504–712–7716	504–469–9777	training@milnor.com
Determine warranty eligibility or claim status	Warranty Administration	504–712–7735	504–469–9777	service@milnor.com (Attention: Warranty)
Ask about, comment on, or report an error in equipment manuals	Technical Publications	504–712–7636	504–469–1849	techpub@milnor.com
European contacts	Milnor® International	+ 32 2 720 5822	—	milnor@milnor.be
Ask about the shipping weight of your machine before it arrives at your facility	Logistics Department	504–712–7686	504–471–0273	—

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