

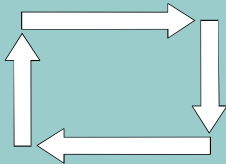


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Operator Guide—

Tilting Washer-extractor with Mark VI Controller



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

Applicable Milnor® products by model number:

68036F5N

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Chapter 1

Controls

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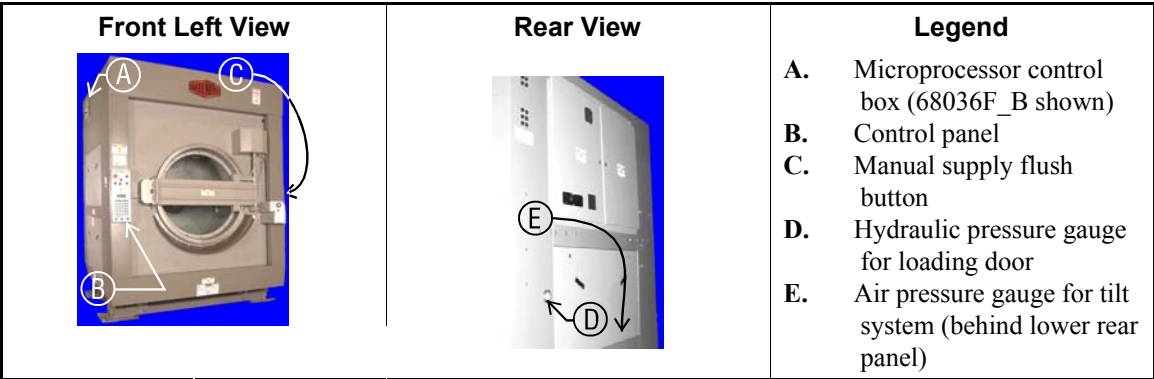
1.1. Controls on Mark VI Tilting Washer-extractors with Hydraulic Door

Refer to other parts of this document (Section 1.1.2 through Section 1.1.5) for the location and basic function of individual controls. Don't use this document as instructions for operating the machine.

1.1.1. Where are the Controls?

The essential controls for normal operation are located on the front control panel (Figure 1). Additional controls and connections are located elsewhere on the machine, as described here.

Figure 1: Locations of Controls



1.1.2. Where do I Connect the Data Storage Device?

The microprocessor box in the upper rear corner of the machine left side panel (see Figure 1) contains a DIN-type connection for serial communications. Use this connection, labelled as shown in Figure 2, with a serial data transfer device to save or restore machine programming and configuration memory.

Figure 2: Serial Connection for Data Transfer



1.1.3. What are the Operating Controls?

The primary operating controls are required to start and stop the machine, select wash formulas, and monitor machine operation.

Figure 3: Mark VI Control Panel

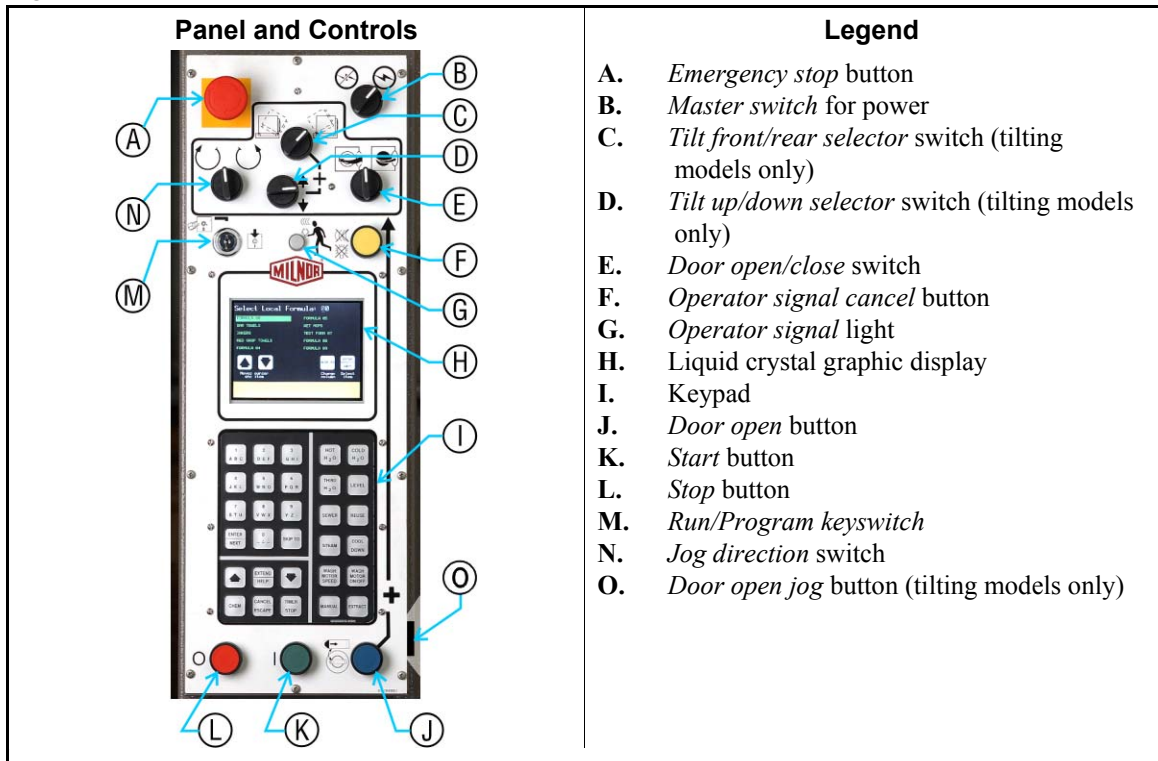


Figure 4: Keypad



Emergency stop button—disables the 3-wire circuit. This switch locks in when pressed, so you must turn it a quarter turn to allow it to return to the normal position to allow the machine to run.

Notice 1: Press the *emergency stop* button immediately in any emergency situation. This disables the 3-wire circuit, which stops all machine operation and causes the drain to open.

- When you reset this button, you have the option of cancelling or resuming the interrupted formula. The formula resumes where it was interrupted or at the beginning of the previous bath step, depending on the operation in progress when the *emergency stop* button was pressed.

Master power switch (☒ / ☑)—removes power from the control system. If you turn the *master switch* off (☒) while a formula is running, the immediate result is similar to pressing the *emergency stop* button: the machine stops and the drain opens. Unlike the *emergency stop* button, resumed formulas start at the beginning of the step in which power was lost, but chemicals are not injected in the resumed step.

Operator signal cancel button (🔊)—cancels the *operator signal*. Press this button to silence the buzzer and turn off the *operator signal* light (see below), or to allow injection of a chemical programmed to require a signal before injection.

Operator signal light—indicates that the machine has encountered an error or that the operator must perform some action, such as pressing the *start* button or unloading the machine. The *operator signal* circuit includes a buzzer behind the control panel, and may include an optional beacon light mounted separately from the control panel.

Liquid crystal graphic display—displays information and help about the machine. The information on the display changes according to the status of the machine and the function selected by the operator.

Keypad—allows the operator to communicate with the machine control system. The keypad is divided into three areas: alphanumeric buttons, general buttons, and function-specific buttons. Each button may perform more than one function, based on the current machine status. Some buttons are also used in combinations for additional functions.

Start button (ⓘ)—starts the selected wash formula. The *start* button energizes the 3-wire circuit to allow the machine to operate.

Stop button (⓪)—stops machine operation. Like the *emergency stop* button, the *stop* button disables the 3-wire circuit; however, the *stop* button doesn't require you to manually reset it after use.

Run/Program keyswitch (Ⓜ/Ⓟ)—in the *Program* position, allows changes to machine configuration and wash formulas, among other actions. In the normal *Run* position, formulas and configuration are protected and formulas can be run.

Air pressure gauge for tilt system—located behind the lower panel on the rear of the machine; monitors the air pressure used to tilt the machine.

1.1.4. What are the Loading Controls?

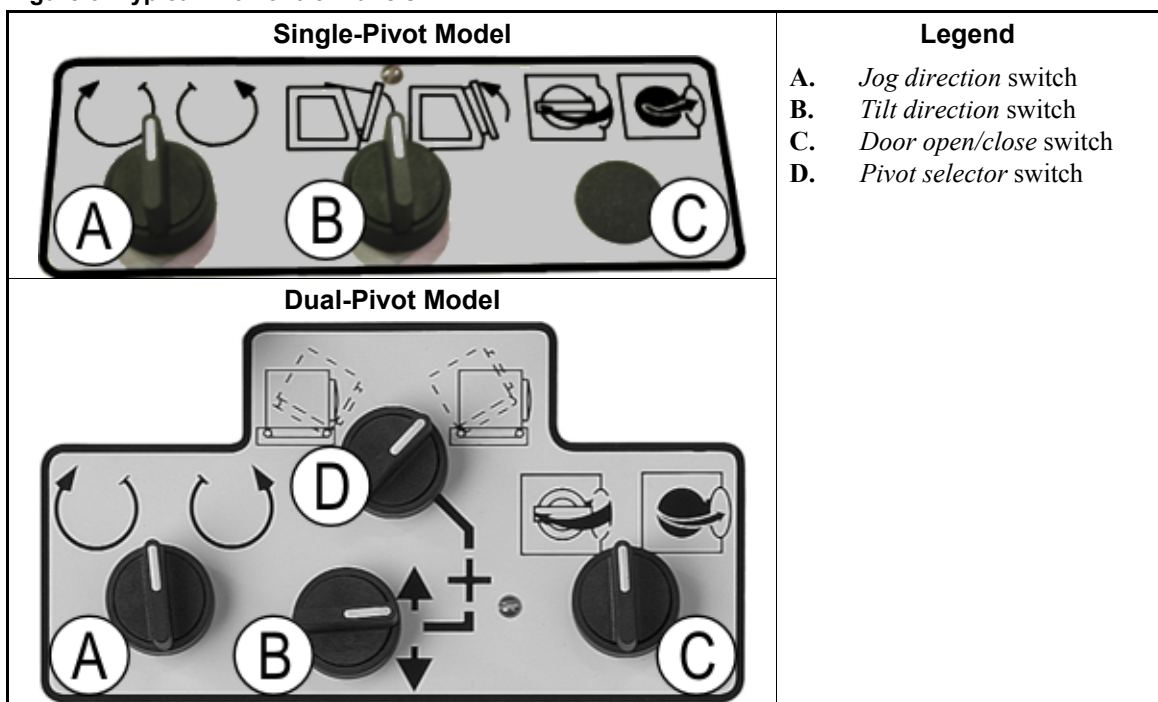
Loading controls allow you to open and close the door, as well as tilt and jog the cylinder; used primarily when loading and unloading a tilting machine.

Milnor manufactures machines with two different types of tilting mechanisms:

- **Single-pivot models**, including the E_N and J_N model lines, tilt hydraulically from a single pivot axis near the rear of the machine. These models tilt to unload by lowering the front of the machine below the normal operating position, and tilt to load by raising the front of the machine above the normal operating position.
- **Dual-pivot models**, including tilting models in the F_W line, tilt pneumatically from pivot axes near the front and rear of the machine. These models tilt to load by inflating air bladders below the front of the machine, and tilt to unload by inflating air bladders below the rear of the machine.

The symbols on the machine control panel vary according to whether the machine is a single- or dual-pivot model.

Figure 5: Typical Tilt Control Panels



Pivot selector switch (↔/↔)—determines whether the machine tilts on the forward or rearward pivot. Set this switch to the left position to facilitate unloading; use the right position to tilt the front of the machine up for easier loading.

Tilt direction switch—actuates the necessary devices to raise or lower the selected end of the machine. On dual-pivot machines, this switch works with the *pivot selector* switch to tilt the machine. With the *door open* button pressed, turn the switch up to raise the selected end of the machine, or down to lower it.

To tilt a dual-pivot machine backward for easier loading, first set the tilt front/rear selector switch to the right, as shown in [Figure 5](#). This determines that the machine will tilt on the rear pivot point. Next, hold the tilt direction switch in the *up* position and press the *door open* button (☞). The front of the machine will tilt up and back until the front is fully tilted or you release either of the two controls. Use similar procedures to lower the front of the machine to the normal position, or to raise the rear of the machine for unloading.

To tilt a single-pivot machine, hold the tilt direction switch in the desired position and hold the *door open* button (☞) until the machine reaches the desired angle.

Door open/close switch (☞/☞)—controls the automatic door system when the machine is idle. To open the door, turn the switch to the right (☞) while pressing the *door open* button (☞). Turn the switch to the left (☞) and press the *door open* button to close the door. Release the controls when the door is in the correct position. The hydraulic pump which powers the door shuts off automatically when the door is fully open or fully closed.

Door open button (☞)—enables other loading controls when the machine is idle. Pressing the *door open* button while the machine is operating removes power from the 3-wire circuit, stopping the machine. When the machine is idle, this button must be pressed to perform any other loading or unloading function. This requirement helps ensure that you have both hands safely on the control panel of the machine if the basket might turn under power while the door is open.



WARNING 2: Fall, Entangle, and Strike Hazards—Contact with the turning cylinder can crush your limbs. The cylinder will repel any object you try to stop it with, possibly causing the object to strike or stab you. The turning cylinder is normally isolated by the locked cylinder door.

- Do not tamper with or disable any safety device or operate the machine with a malfunctioning safety device. Request authorized service.

Jog direction switch (↺/↻)—allows you to jog the cylinder slowly in either direction to help in loading or unloading the machine. To jog the cylinder clockwise, hold the jog direction switch to the left (↺) while pressing the door open button.

Door hydraulic circuit pressure gauge—on the rear panel of the machine, this gauge displays the pressure in the hydraulic circuit when the door is opening and closing. During normal operation, this gauge registers 0 unless the hydraulic door opening or closing. When the door is moving, this gauge indicates about 900 psi (62 bar) when the hydraulic system is properly adjusted.

1.1.5. What does this Switch do?

Other buttons and switches are used to control additional standard and optional machine functions. These miscellaneous controls are located and described in this section.

Mildata/Local selector switch ([Figure 6](#))—located on the microprocessor control box (see [Figure 1](#)), allows the machine to communicate with a Mildata network. A Mildata network connects several machines together and allows them to share wash formulas and other data with the Mildata computer. When this switch is in the *Mildata* position (☐) and you enter a

formula number, the machine requests the contents of the formula from the Mildata computer. When set to the *Local* position (☑), only formulas present **in the machine** are available.

Figure 6: Mildata/Local Selector switch



Door open jog button (Figure 7)—This button, if provided, is located on the side of the control panel box near the *door open* button. To reduce the chance of soiled goods falling out of the machine as it descends, hold this button and the *door open* button depressed with one hand, and hold the *jog direction* switch in either direction with the other hand. The cylinder rotates slowly as the door closes and the machine descends to the normal operating position.

Figure 7: Door open jog button



Manual supply flush button (Figure 8)—On machines equipped with an optional flushing supply injector, press this button to spray water into the supply injector to flush any remaining chemicals into the cylinder. If you manually add supplies during a wash formula, press this button to flush any remaining undiluted chemicals out of the supply chute. If the machine is not equipped with the optional supply injector, press this button to flush the liquid chemical inlets with fresh water.

Figure 8: Manual Supply Flush button



— End of BICWCO02 —

Chapter 2

Normal Machine Operation

BICWCO03 (Published) Book specs- Dates: 20070924 / 20070924 / 20070924 Lang: ENG01 Applic: 68036F5N

2.1. Operating Instructions for Plant Personnel

2.1.1. Start Here for Safety

This document is meant to remind you, the person operating this washer extractor, of what is required to operate this machine. Do not attempt to operate this machine before an experienced, trained operator explains the details to you.



DANGER 3: Multiple Hazards—Careless operator actions can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.



DANGER 4: Electrocuting and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not unlock or open electric box doors.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.
- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.



CAUTION 5: Collision, Crushing and Pinch Hazards—Contact with moving components normally isolated by guards, covers, and panels, can entangle and crush your limbs. These components move automatically.

2.1.2. Check Switch Settings

Display or Action

Explanation



Check that the *run/program* keyswitch is at .










All emergency stop buttons must be unlatched and in the *ready* position to allow machine operation.





Check that the master switch is at .

2.1.3. How do I Load a Tilting Machine?






2.1.3.1. Automated (Rail or Shuttle) Loading

Display or Action	Explanation
	Open the door
	Set the <i>tilt front/rear selector switch</i> to the <i>front</i> position.
	Tilt the front of the machine up to receive the load.
	Select the formula (07, for example). Details about selecting a formula are described in Section 2.1.4 “How do I Select a Formula?” .
	Toggle column for formula selection if necessary.
	Move to the next or previous displayed formula in the current column.
	Confirm the selected formula.

Use the procedure defined by facility management to put the goods in the machine.

	Close the door.
	Tilt the front of the machine down to the normal position.

2.1.3.2. Manual Loading

Display or Action	Explanation
	Open the door.
	Select the formula (07, for example). Details about selecting a formula are described in Section 2.1.4 “How do I Select a Formula?” .
	Toggle column for formula selection if necessary.
	Move to the next or previous displayed formula in the current column.
	Confirm the selected formula.

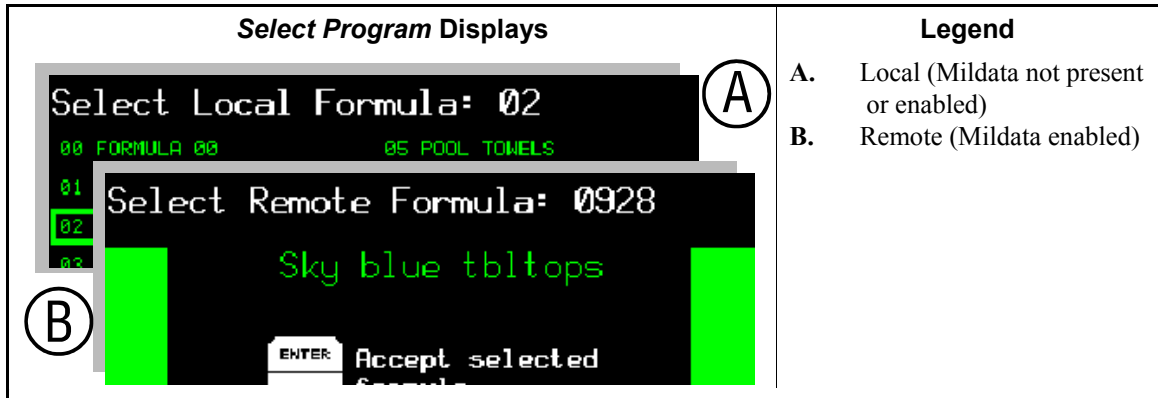
Use the procedure defined by facility management to put the goods in the machine.

	Close the door.
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2.1.4. How do I Select a Formula?

The Mark VI controller can operate in either *local* or *Mildata* mode. In *local* mode, the machine does not communicate with any other devices and runs formulas contained in local controller memory. In *Mildata* mode the machine downloads and runs formulas from the Mildata computer, and frequently updates the display on the Mildata computer.

Figure 9: Selecting a Local or Remote Formula



2.1.4.1. Selecting a Local Formula—If the machine is not part of a Mildata network, or if the Mildata network is not available, you can choose from any of the wash formulas stored in local memory on the machine. Use the *Select Local Formula* screen (Figure 10) to choose the correct formula for the goods in the machine.

Figure 10: *Select Local Formula* Screen



Display or Action

Explanation



Directly selects the formula you want to run (07, for example). When you enter a two-digit number, the selected formula moves to the top of the left column on this screen.



Toggles the column for formula selection if necessary. If the desired formula is visible on the screen, but is in the opposite column from the selection box, this keystroke moves the selection box to the other column of formulas.



Move to the next or previous displayed formula in the current column. If the desired formula is visible on the screen and in the same column as the selection box, you can use these two keys to move the selection box down or up to select the formula.



Confirm the selected formula. Place the selection box on the formula you want to run, then press **ENTER** to continue with the normal operation procedures.

Supplement 1

About Load Weight and *Metered Water*

Metered water is available on Mark VI washer-extractors equipped with optional flow meters on the incoming water lines. This feature allows the Mark VI controller to admit a quantity of water proportional to the weight of goods you enter after selecting the formula. If you enter a weight of 200 units when prompted, the machine will use twice as much water as if you entered 100 weight units. This option can save a significant amount of water if you enter accurate weights for each load.

Figure 11: Entering Load Weight for Metered Water



Display or Action

449

Explanation

Enter the weight of the goods loaded in the machine. The machine controller uses the weight to determine how much water is needed to wash the goods according to the programmed wash formula.

ENTER

Accept the entered goods weight and continue.

2.1.4.2. Selecting a Mildata Formula—If the machine is part of a Mildata network and the network is available, you can choose any wash formula stored on the Mildata computer. Use the *Select Remote Formula* screen (Figure 12) to choose the best formula for the goods in the machine.

Note 1: You can store up to 1000 different wash formulas on the Mildata computer. All of these formulas are available to all washer-extractors that are part of the Mildata network and have compatible hardware.

Figure 12: *Select Remote Formula Screen*



Display or Action

0 9 2 8

Explanation

Select formula 928 (example) stored on the Mildata computer. The Mark VI controller requests the formula from the Mildata computer and displays the formula name, as shown in [Figure 12](#).

ENTER

Confirm that the displayed formula name is the formula you want to run. If the displayed formula isn't the right one for the loaded goods, press **CANCEL** to clear the formula number, then enter another number.

After you've retrieved and verified the formula, the Mark VI controller prompts for any configured *batch data*.

2.1.4.3. Entering Mildata Batch Codes—The Mark VI controller uses a screen similar [Figure 13](#) to prompt you for the batch data fields selected in machine configuration (see the related section in document BICWCC01). The data you enter is sent to the Mildata computer for accounting and report generation.

Figure 13: Batch Data for Remote Formula Operation



Weight—the weight of the batch of goods in the machine. This information is usually used along with other batch data to calculate customer charges or employee productivity. In machines equipped with optional flow meters and configured for metered water, the weight value is also used to determine how much water is required to process the batch. The weight value can be up to three digits.

Customer Code—the identifying code for the customer. This information can help you determine how much work each customer is submitting. Ten digits are available for customer code.

Employee Number—the identifying code for the employee responsible for this batch. The employee number may be up to five digits long.

Pieces—the number of pieces in the machine. This value sometimes replaces the weight value, especially when charges are made by the piece rather than by weight. Four digits are available for the number of pieces.

Lot Number—the identifying code for several related batches or customers. At your discretion, the value entered here might represent a particular route number common to several accounts. A lot number can be up to 10 digits long.

2.1.5. Start the Selected Formula

Be sure you've completed these steps before you go any further in the operating procedure.

1. You've loaded the machine at or near its rated weight capacity.
2. You've selected a formula that's appropriate for the goods in the machine.
3. You've entered any batch data the machine controller requires for metered water or Mildata reporting.
4. You've closed the door.

5. If you tilted the machine to load it, you've returned it to the normal operating position.

Display or Action	Explanation
Ⓜ	Start the selected formula.

The machine begins the wash formula. The basket begins turning and water valves open. When a safe level is achieved, the steam valve may open to begin heating the bath. Operation from this point to the end of the formula is completely automatic unless a signal is programmed with a chemical injection (see [Supplement 2](#)).

Supplement 2

Chemical Injections with the Operator Signal

If you need to adjust the amount of a chemical injection from load to load depending on highly variable factors, the formula can be programmed to stop the timer and signal you when a chemical is required. Add the chemical, then press \times to resume the formula.

2.1.6. What Does the Run Display Tell Me?

While the machine is running the formula you selected, the display appears similar to the one shown in [Figure 14](#). The information shown here is explained below.

Figure 14: How to Read the Run Display

Typical Display	Legend
<p>The screenshot shows a digital display with the following information: <ul style="list-style-type: none"> Top line: F1 FORMULA 01 S1 Flush Second line: Remaining 20:24 Total 20:24 Third line: Formula: 04:00 Total 04:00 Fourth line: Step 1: 2-way Wash Bottom right: 25 RPM with a basket rotation graphic. Bottom left: A vertical bar with 'Hot' and 'Steam' indicators. Bottom center: A 'Formula Steps' list: <ul style="list-style-type: none"> 01 FLUSH 02:30 02 INT. EXTRACT 01:00 03 WASH 05:00 04 INT. EXTRACT 01:00 05 BLEACH 06:00 06 INT. EXTRACT 01:00 </p>	<ul style="list-style-type: none"> A. Formula number and name B. Step number and name C. Total time for formula and current step D. Basket rotation graphic and speed E. Remaining time for entire formula and current step F. Machine status message G. Formula steps: number, name, and duration H. Indicator for filling or draining I. Graphic bath level indicator J. Water valves indicators K. Indicator for optional steam and cooldown valves L. Graphic bath temperature indicator M. Bath temperature and level data

2.1.6.1. Formula and Step Information—The top line of the display always shows the number and name of the current formula and step. The *formula number* appears in the upper left corner of the display, following the letter “F.”The *formula name* follows the number.

The *step number and name of the current step* are displayed to the right of the formula information. The Mark VI controller updates the formula number and name when a formula starts and at the beginning of each subsequent step.

Below the formula and step names is *time information*. The numbers in the “Total” column (green numbers) show the total time required for the formula and step to run to completion, not including the factors described in [Note 2](#). The controller calculates the “Formula” value when the formula begins, and this value doesn't change while the formula is running. The controller calculates and displays the “Step x” value at the start of each step.

The numbers in the “Remaining” column of the time area (black numbers on a green background) indicate the *time remaining* in the formula and in the current step. These numbers indicate the **minimum** amount of time remaining (see [Note 2](#)).

Note 2: The duration of some wash formula events can't be estimated, so the controller stops the timer until a requirement is met. For example, the time required for the machine to fill to the desired level depends on the water pressure to the plant, the size of the piping to the machine, and how many other machines are filling at the same time. In addition to the time required to fill, the time required to achieve temperature or for an operator to verify a chemical injection are variable. Error conditions can also stop the timer.

The controller displays the current *machine status* below the step number and remaining time. Some of the possible machine states are listed in [Table 1](#). Error messages appear immediately below the machine status message when required.

Table 1: Machine Status Messages

Idle	Coasting
1-way Wash	Waiting to Discharge
2-way Wash	Waiting for Load
Soak	Power-up Delay
Pre+Final Extract	Draining to Sewer
Intermediate Extract	Draining to Reuse
Final Extract	Timer Stopped
Double Extract	Please Wait xx Seconds

2.1.6.2. Basket Rotation—The *basket rotation graphic* near the upper right corner of the display represents the relative basket speeds in wash, drain, and extract speeds. Immediately below the basket rotation graphic, the controller displays the desired basket speed in either revolutions per minute (RPMs) or in gravitational units (G's).

2.1.6.3. Bath Temperature and Level—*Water valve indicators* appear when the corresponding water valve is open.

The graphic *bath temperature indicator* shows the approximate temperature in the machine. The vertical indicator bar is solid red when the temperature in the machine is at the maximum allowable value of 205 degrees Fahrenheit (95 degrees Celsius).

The steam or cooldown indicator appears below the graphic temperature indicator when either of these optional features is enabled. “Steam” appears when the steam valve is open, and “Cooldown” appears when the cooldown output is enabled.

The graphic *bath level indicator* shows the percentage of the desired level that's achieved. The vertical indicator bar is solid blue when the programmed level is achieved, and solid white when there is no water in the machine.

The *level direction indicator arrow* points upward when the actual bath level in the machine is increasing (when the machine is filling), and points downward when the drain opens. The arrow is not visible when level is achieved, or during extract steps.

The controller displays *bath temperature and level data* between the temperature and level graphic indicators. The top line displays the temperature and level that are currently achieved in the machine, and the bottom line displays the desired values.

2.1.6.4. Formula Steps and Chemical Injection—When a formula begins, the controller displays the first six steps in the *formula steps list* in the lower left area of the screen. If the program contains more steps than can be displayed at one time, the list scrolls to display more steps as the earlier ones end. The current step is highlighted.

The list of programmed *chemical injections* replaces the formula steps list during each injection, with a highlight box on the chemical that's currently injecting.





2.1.7. Unload the Machine

When the formula ends, the operator signal sounds and the machine displays a message that it is waiting to discharge (see Figure 15). Use a procedure similar to the one outlined below to unload the goods.

Figure 15: Typical Message when Formula Ends



2.1.7.1. For any End Code—The Mark VI controller allows you to program one of four possible actions for the end of the formula: *stopped*, *reversing at wash speed*, *turning at drain speed*, or *tumbling*. You use the same unloading procedure for formulas using the first three actions. For the fourth action, you also have the option of using the procedure described in Section 2.1.7.2.

Display or Action	Explanation
	Remove power from the 3-wire circuit, silence the operator signal, and stop any basket motion in progress. This button also unlocks the door so you can open it.
	You can also remove power from the 3-wire circuit, silence the operator signal, and stop any basket motion that was in progress with any of these buttons. However, if you use any of these buttons, you'll still need to unlock the door with  before you can open it. If you use any of these buttons to stop a formula with <i>end code 3</i> (see Section 2.1.7.2), the formula is terminated and cannot be resumed.
	Open the door for unloading.

2.1.7.2. For End Code 3 (*Tumbling*)—End code 3 (*Tumbling*) allows you to open the door and remove some of the goods, then close the door and resume tumbling to loosen more goods from the basket.

Display or Action**Explanation**

Remove power from the 3-wire circuit, silence the operator signal, and stop any basket motion in progress. This button also unlocks the door so you can open it.

When the basket stops turning, open the door and remove some or all of the goods from the machine.




Open the door for unloading.

Remove any desired portion of the load.



Close the door.



Resumes the tumbling action without the operator signal. Tumbling continues for another two minutes, or until you press .

— End of BICWCO03 —

Chapter 3

Signals and Errors

BICWCT04 (Published) Book specs- Dates: 20070924 / 20070924 / 20070924 Lang: ENG01 Applic: 68036F5N

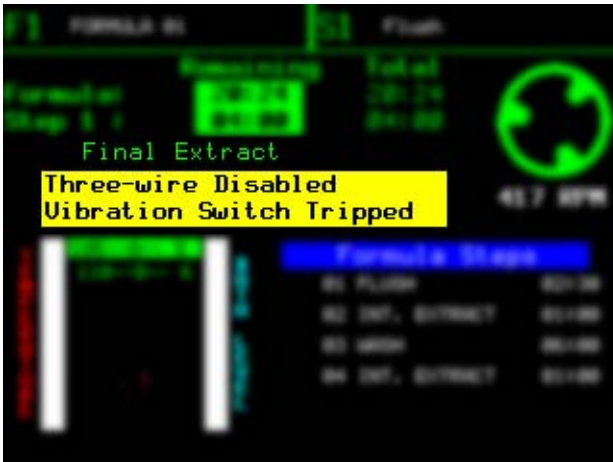
3.1. Operator Intervention

Once a formula starts, the machine usually runs automatically. The machine will sound the signal if an operator needs to make a decision or do something manually. The most common reasons you'll need to attend to the machine are errors, and to manually add chemicals in some cases.

3.1.1. Error with Operator Signal

The operator signal will sound and the beacon will flash if an error causes the machine to stop. These errors usually disable the three-wire circuit, and include a tripped vibration switch or a malfunction of the inverter that controls the motor. [Figure 16](#) shows how a vibration switch error appears on the display.

Figure 16: Typical Error with Operator Signal



To resume the formula, silence the signal and correct the cause of the error. Then, restart the formula.

Display or Action

Explanation



The Cancel key on the keypad stops the machine, silences the operator signal buzzer, and turns off the signal light. You'll have to restart the formula from the beginning.

Correct the cause of the error. If you don't know how to fix the problem, have someone check the reference manual for the machine.



If you've corrected the error, the Start button resumes the formula where it stopped. If the vibration switch caused the error, the machine goes through a distribution sequence to spread the goods around the basket, then resumes the interrupted extract step.

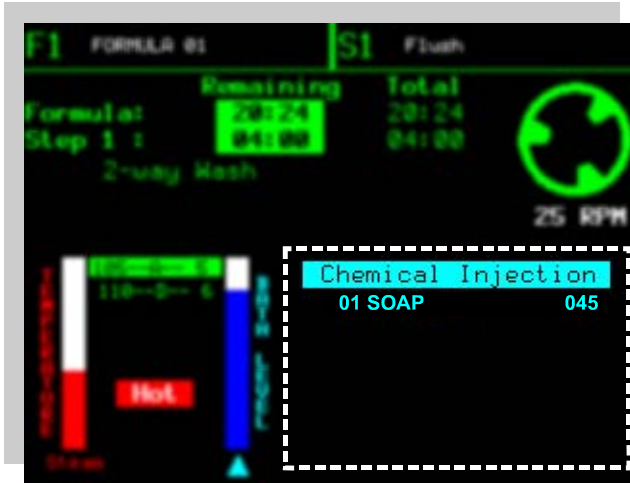
3.1.2. Operator Signal for a Chemical

This machine can control an automatic chemical pump system, or it can signal you to add chemicals manually. The display ([Figure 17](#)) appears the same in either case, but the operator signal sounds only if the signal is programmed.

If the formula is programmed to control a chemical pump system, the display shows the programmed chemical valve number, chemical name, and injection time. The injection time, shown at the right end of the chemical display, begins counting down immediately when the chemical injection begins.

If the formula is programmed to signal you to manually add chemicals, the machine will operate automatically until it needs a chemical, then the machine stops and waits for you to add the chemical and resume operation. The display changes to show you which chemical to add, but the injection time counter runs only after you cancel the operator signal.

Figure 17: Chemical Injection View on Run Display



Display or Action

Explanation

After you've added the chemical,



cancels the operator signal and starts the injection time counter.

— End of BICWCT04 —