



NOVA CONTROLS
LEADING THE WAY
A **Hydro** Systems Company

MERCURY TL

LAUNDRY DISPENSING SYSTEM



Reference Manual

LM-700 Series

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1

Theory of Operation

Overview

The Mercury TL's six operating modes provide for maximum flexibility in small OPL and Top Load washer laundry applications. In this chapter, you will learn about the following:

- Automatic Mode
- Push Button Mode
- Occurrence Mode
- SP Mode
- Relay Mode
- HC Mode (HC Automatic)
- Automatic Formula Selection (Automatic, Push Button, Occurrence and SP Modes)
- Flush Manifold Operation

Automatic Mode

Automatic Mode is a basic mode of operation (similar to Timer Mode in the Eclipse or Orion dispensers). Each trigger signal input number matches the corresponding pump number (i.e. trigger 1 = pump 1, trigger 2 = pump 2, etc.). Pump delay times are programmable (in seconds) to delay pumps after trigger signals in situations where pump delays are required to prevent dosing on dry linen, etc.

Pumps 1 and 2 have two product levels, A and B. The A level dispenses on the first occurrence of the trigger signal in a formula. The B levels dispense on the second occurrence of the same trigger signal within the same formula. Pump 3 only has one product level.

The Pump Lockout feature, when turned on, prevents any unwanted pump activations due to false signals from washers that send noisy or multiple output supply signals.

Loads are counted each time the highest pump number with an amount programmed (unique to each formula) is run. The Pump Lockout timer and (pumps 1 and 2) A/B levels will be reset 5 minutes after the counted pump runs or the Lockout period ends, whichever comes first. If the load needs to be restarted, the dispenser wash formula may be terminated early by pressing the Enter key for 2 seconds.

Push Button Mode

Push Button Mode is used for manual operation; the machine operator selects a formula and presses the Enter key to start and run the dispenser wash formula. A dispenser wash formula consists of up to 5 programmed pump amounts (1a, 1b, 2a, 2b, and 3 are the five programmable pump amounts from three physical pumps). Pump Delay times (programmed in minutes) stagger the programmed pump doses throughout the wash load.


The Pump Lockout feature (programmed in minutes) prevents the machine operator from starting multiple doses in the same wash load. If the load needs to be restarted, the dispenser wash formula may be terminated early by pressing the Enter key for 2 seconds. Loads are counted each time the highest pump number with an amount programmed is run.

Occurrence Mode

Occurrence Mode paces the dosing of products off the washer fill valves (by counting each time the machine fills) to identify the sequence of machine steps. This mode of operation is ideally suited for machines with no chemical supply signal outputs, such as domestic-style, top-load washers.

While all three of the trigger signal inputs are active and may be used, typically only two will be used. Typical trigger signal wiring (generally used with hot and cold fill valves) is to wire one of the available trigger signal inputs to one fill valve and another trigger signal input to the other fill valve. It does not matter which input goes to which fill valve; the dispenser responds to any of the trigger inputs.

The dispenser counts the machine fill occurrences and runs pumps based on an assignment of the pumps to the machine step sequence.

Note 	Careful attention must be paid when programming the signal Filter Time to account for any false fills resulting from level and/or temperature controls in the washer. For more information, please see <i>"Filter Duration "Fd"" on page 6-6</i>
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A dispenser wash formula consists of up to 5 programmed pump amounts (1a, 1b, 2a, 2b, and 3 are the five programmable pump amounts from three physical pumps). Any of these available amounts may be programmed to any (up to 9) machine steps.

The Pump Lockout feature may be used to prevent each programmed pump amount from running more than once per dispenser wash formula. The dispenser wash formula terminates either:

- Five minutes after the last pump runs (within a programmed sequence of pumps), OR
- When the Lockout period (when on) ends, whichever comes first.

If the load needs to be restarted, the dispenser wash formula may be terminated early by pressing the Enter key for 2 seconds.

SP Mode

SP Mode operates in the same manner as Occurrence Mode, with one exception: The Pump Lockout feature functions differently. The Pump Lockout period (when set) may be used to prevent each programmed pump amount from running more than once per dispenser wash formula.

In SP Mode, the dispenser will not terminate the wash formula five minutes after the last pump runs, but will **ONLY** end the wash formula at the completion of the Lockout period. Unwanted trigger signals are therefore blocked for the entire duration of the Lockout period.

The Lockout Period should be set to approximately match the time it takes to run a complete wash cycle to avoid delays in starting the next cycle. For information on setting this feature, see *"Lockout Period "LP"" on page 6-4*.

If a load needs to be restarted, the dispenser wash formula may be terminated early by pressing the Enter key for 2 seconds.

Relay Mode

Relay Mode runs pumps for the duration of washing machine supply signals. This mode is typically used on fully-programmable, microprocessor controlled washing machines where the installer opts to control the dispensing equipment from the washing machine control system instead of the dispenser's control system. The load counter increments each time Pump 1 is run in Relay Mode.

HC Mode (HC Automatic)

HC Mode (HC Automatic) is similar in programming to Automatic Mode but differs in its response to trigger inputs. HC Mode supports certain European machines that execute a discretionary pre-wash phase, then main wash phases. The main wash phase utilizes two trigger inputs (taken from the hot and cold machine solenoids) to ensure that Mercury TL dispenses product on all Formulas, at all temperatures, and negates the requirement for an added relay.


Trigger signal input numbers are mapped as follows:

- Trigger signal input 1 is for the pre-wash phase.
- Trigger signal inputs 2 and 3 are for the main wash phases.
- Trigger signal input 4 is for the final rinse stage.

The first occurrence of Trigger 1 causes Pump 1 and Pump 2 to dispense the amounts programmed for Formulas “1A” and “2A”, including any programmed “1A” and “2A” delays. Subsequent occurrences of Trigger 1 signals are ignored.

The first occurrence of either Trigger 2 or Trigger 3 causes Pump 1 and Pump 2 to dispense the amounts programmed for Formulas “1B” and “2B”, including any programmed “1B” and “2B” delays. Subsequent occurrences of Trigger 2 or Trigger 3 signals are ignored.

Trigger 4 causes Pump 3 to dispense the amount programmed for Formula “3A”.

Note 	If Trigger 2 or 3 occurs before Trigger 1, the Mercury TL will assume that the pre-wash phase has been bypassed and will disallow all Trigger 1-based dispensing for the duration of the wash cycle.
--	--

Automatic Formula Selection

Auto Formula Selection allows the machine to automatically select the formula at the start of the wash load. It may be used whenever a spare washer supply signal output is available that can be programmed to the second. It is available in Automatic Mode, Push Button Mode, Occurrence Mode and SP Mode.

Program the washer to send this signal at the start of the wash load (prior to any chemical supply signals), for two seconds times the desired formula number (i.e. for Formula 2, program 2 secs * F2 = 4-6 seconds signal time. The results will be as follows:


- F1 = 2 - 4 seconds signal time
- F2 = 4 - 6 seconds signal time
- F3 = 6 - 8 seconds signal time
- F4 = 8 - 10 seconds signal time

Flush Manifold Operation (Optional)

Some units are equipped with a Flush Manifold, a single unit that includes a water valve and manifold all in one convenient assembly. It is designed to provide the easiest and most cost-effective means of flushing liquid laundry products when used with the Mercury TL laundry dispensing system.

The Flush Manifold transfers liquid laundry products from the dispenser to the washer using water flow (or “flush”) via a single discharge tube. The dispenser pumps into the manifold via the check valves. The flush valve controls water flow through the manifold, which in turn transfers product to the washer. To enable flush manifold operation, the Flush Time (“FLu”) must be set between 1-999 seconds. A Flush Time of zero seconds (000) disables flush manifold operation.

Installation and setup are described in a separate manual titled “*Flush Manifold for Liquid Laundry Supply Systems*” P/N 20-07539-00. Please read this document prior to programming the Mercury TL.

<p>Warning</p> 	<p>The Flush Manifold is not equipped with a flow switch. Do not run bleach and sour into the same manifold. Either feed one of these products directly into the washer or use a separate manifold.</p>
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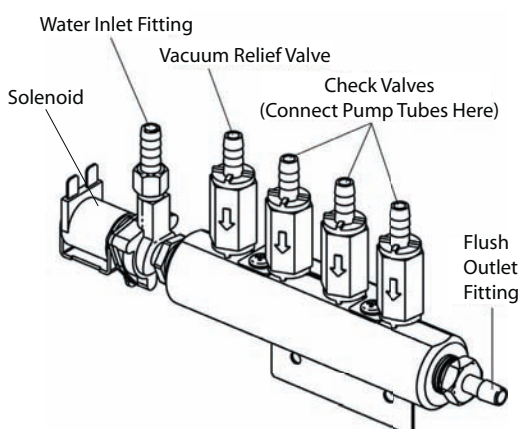


Figure 1-1 Flush Manifold System Diagram




Flush Manifold Typical Installation

With flush manifold operation enabled, the Mercury TL dispenses only one product at a time. When a product is scheduled to be dispensed (or triggered) during the time in which the Mercury TL is *already* dispensing a product, the next scheduled products are placed in a queue. The Mercury TL maintains a first-in / first-out memory, which assures that products are dispensed in the order in which they were placed in the queue. In the event that more than one pump is programmed to begin dispensing at the same exact time, the lowest number pump (the pump on the left) will operate first, and the highest number pump will operate last.

Dispensing Sequence

When a product is triggered, or otherwise scheduled to be dispensed, the following sequence occurs:

1. **Pre-flush period**—During the pre-flush period, the Flush Manifold solenoid turns ON, and the pump remains OFF, for three seconds.
2. **Dispensing period**—After the pre-flush period, dispensing begins and continues for the amount of time programmed for that pump. During the dispensing period, the Flush Manifold solenoid remains ON.
3. **Post-flush period**—When product dispensing is complete for all requests in the queue, the post-flush period begins. During the post-flush period, the Flush Manifold solenoid remains ON for the number of seconds that have been programmed in Flush Time “FLu.”

<p>Note</p> 	<p>The post-flush period does not occur if there are other products in the queue waiting to be dispensed. Instead, a three second pre-flush period occurs which is followed by dispensing of the next product. This sequence reoccurs until all scheduled products in the queue have been dispensed.</p>
--	--


2

Mechanical Installation

Overview

This chapter describes the hardware installation for the Mercury TL. In the chapter you will learn to:

- Wall Mount the Unit
- Install Rinse and Detergent Supply and Discharge Hoses

Caution 	The Mercury TL dispensing system is intended to be installed by experienced installers in accordance with all applicable electrical and plumbing codes. Disconnect all power to laundry machine and dispensers during installation and/or any time the dispenser cabinet is opened.
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Flush Manifold installation and setup are described in a separate manual titled “Flush Manifold for Liquid Laundry Supply Systems” P/N 20-07539-00. Please read this document prior to programming the Mercury TL.

Wall Mounting

Choose an installation location that:

- Is close to product containers.
- Is at a reasonable height for easy service access.
- Provides easy front panel access for the machine operator (if Push Button Mode is to be used).

To mount the unit:

1. Using mounting bracket as a template, mark hole for upper mounting bracket screw wall anchor. See *Figure 2-1 “Mounting Bracket and Mounting Slot on Unit”* for more information.
2. Drill one hole in wall at that mark.
3. Install wall anchor and temporarily attach bracket to the wall (do not tighten screw completely).
4. Level bracket, using built-in level, then mark and drill locations for lower mounting screw holes.
5. Swing bracket out of the way, drill lower holes, and install lower wall anchors.
6. Screw bracket into place and tighten all three screws.
7. Lower unit onto Wall Mounting Bracket and press down until unit locks into place.
To remove unit from bracket, depress lock button on the top of the bracket as you lift the unit from the mounting bracket.

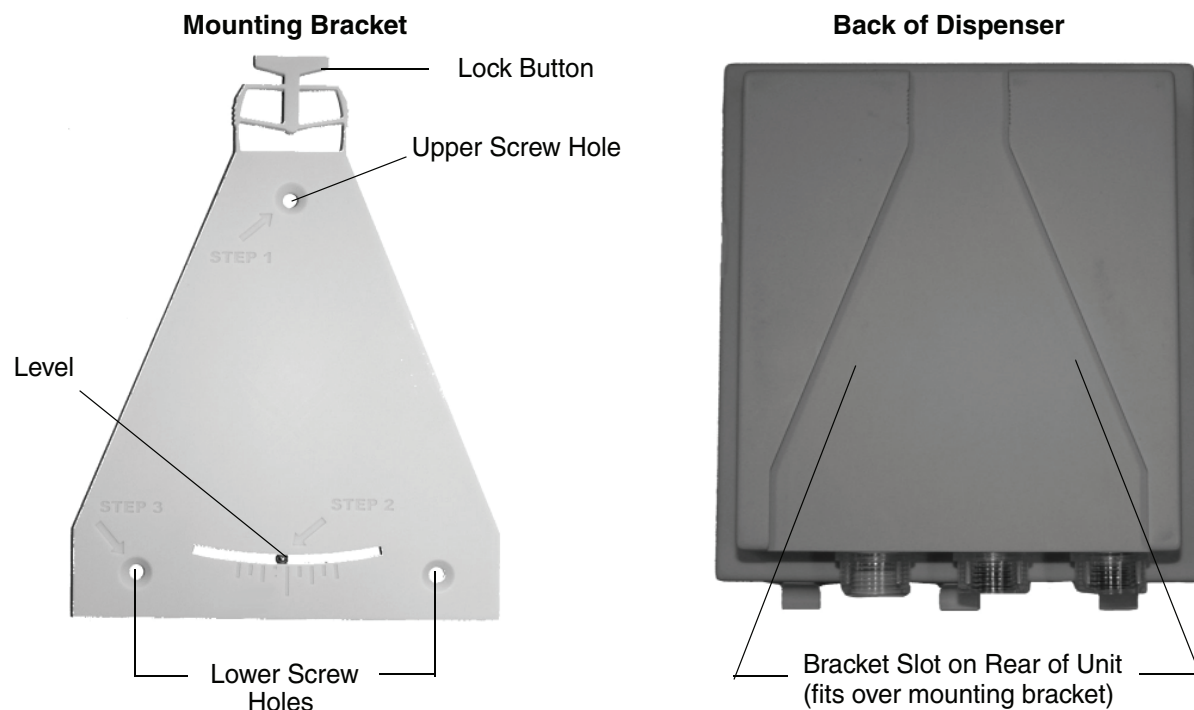



Figure 2-1 Mounting Bracket and Mounting Slot on Unit

Supply and Discharge Hoses

<p>Note</p> 	<p>Supply and discharge hoses are not included with the unit.</p>
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We recommend use of 3/8" ID hose for supply and discharge hoses. Use of smaller size ID hose/tube may result in reduced flow rates, premature pump tube failure, or both.

The maximum combined distance for supply and discharge hoses must not exceed 50 feet. The maximum supply side hose distance must not exceed 15 feet. The maximum vertical height from product container to pump must not exceed 10 feet.

Use hose clamps to secure supply and discharge hoses to pump tube hose barbs. Route supply hose to product pails and discharge hose to washer, per industry standard practices.

3

Electrical Installation


Overview


This chapter describes the electrical connections and requirements for the Mercury TL. In this chapter you will learn to connect:

- Main Power Cables
- Trigger Signal Wiring
- Auto Formula Select Wiring
- Remote Formula Select Switch

The Mercury TL includes two separate wiring cables for Main Power and Input Trigger Signal connections. These cables will route through either one or two conduit fittings, as required.

A Terminal Block wiring information label is adjacent to the terminal blocks inside the unit enclosure.

Cautions 	The Mercury TL dispensing system is intended to be installed by experienced installers, in accordance with all applicable electrical and plumbing codes. DISCONNECT POWER to laundry machine and dispenser during installation and/or any time the dispenser cabinet is opened. Always verify all voltage sources with a meter.
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Note 	To maintain the IP rating of the unit, watertight, flexible conduit should be used to route electrical cables. Failure to use flexible, watertight conduit will impair the water resistance of the unit enclosure.
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Main Power Wiring – Single-Phase Power Systems

Connection Instructions For Single-Phase Power Systems

1. Power input to the Mercury can be any voltage, from 100–240VAC nominal, 50Hz or 60 Hz. The neutral source is connected to the Light Blue wire of the three-wire harness.
2. The Hot source is connected to the Brown wire.
3. The Green/Yellow stripe wire must be connected to Earth/Ground.

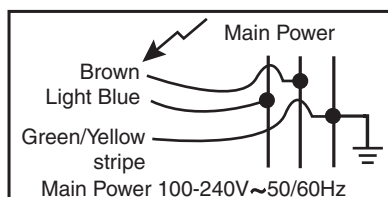


Figure 3-1 Single-Phase Power Wiring Diagram

Main Power Wiring – 3-Phase Power Systems

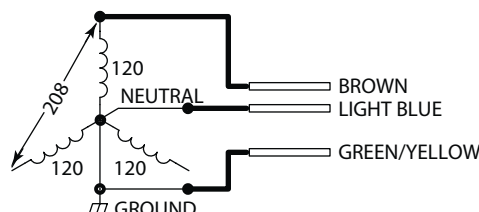
The Mercury can be connected to many common three-phase power systems, if all requirements outlined in “*Requirements for 3-Phase Power Connections*” (below) are met. After meeting these requirements, refer to the illustrations shown in *Figure 3-2 "Connection Diagrams for 3-Phase Power Systems."* Use the diagram that applies to the power system at your site.

Requirements for 3-Phase Power Connections

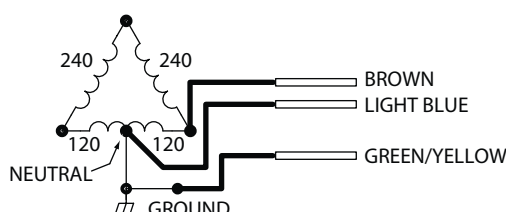
1. The Mercury is a single-phase load. Line voltage is applied using just two wires (Brown and Light Blue). A separate safety ground is required and must be connected (Green/Yellow wire).
2. Avoid interconnection to power systems that are not ground-referenced.
3. Where several connection options exist, choose a connection between a line (phase) and neutral. Connect the Light Blue wire to the neutral line.
4. The nominal AC voltage (between Brown and Light Blue wires) MUST NOT exceed 240 volts.
5. The Green/Yellow wire is for interconnection to earth ground only. Do not connect line, phase or neutral wires to the Green wire.
6. For operation from 220/380 and 240/415 power systems, a neutral connection MUST be available.

Connection Diagrams for 3-Phase Power Systems

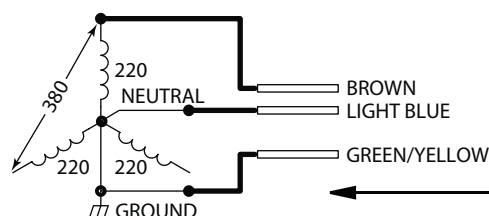
① 120/208 VAC WYE includes Neutral and Ground



② 120/240 VAC Delta with High Leg



③ 220/380VAC or 240/415VAC WYE, includes Neutral and Ground




Note:

An accessible neutral is required. Connect between line and neutral ONLY.

Figure 3-2 Connection Diagrams for 3-Phase Power Systems

Trigger Signal Wiring – Automatic, Occurrence, SP & Relay Modes

Cautions 	Do not use these instructions for “HC Mode” Wiring! See section titled “ <i>Trigger Signal Wiring – HC Mode Only</i> ” on page 3-3.
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All trigger signal inputs are optically isolated, high impedance input circuits. Washer supply signal voltages may range from 24-249VAC Nominal, 50/60Hz (20mA maximum draw) or 12-24VDC (5mA maximum draw) that accommodates the range typically found in most washing machines.

Please note that:

- Each signal input connects to a pair of signal input wires (solid color and white w/colored stripe).
- If washing machine has a single common for supply signals, connect all the signal input common wires (white with colored stripes) to the machine's signal common wiring location.
- In Automatic or Relay Mode, trigger inputs match pump numbers (i.e. trigger 1 = pump 1, etc.).
- In Occurrence and SP Modes, connect wire pairs from each machine fill valve to two trigger inputs (it does not matter which two of the three available trigger inputs are used for Occurrence or SP Modes).

Trigger Signal Input wire colors are as follows:

Trigger Signal 1 (+ DC) = Black
Signal Common 1 (- DC) = Black/White Stripe

Trigger Signal 2 (+ DC) = Brown
Signal Common 2 (- DC) = Brown/White Stripe

Trigger Signal 3 (+ DC) = Red
Signal Common 3 (- DC) = Red/White Stripe

Trigger Signal Wiring – HC Mode Only

In HC Mode (HC Automatic), Trigger input 1 is for the pre-wash phase and trigger inputs 2 and 3 are for the main wash phase. Trigger input 4 is for the final rinse stage.

Signal Input wire colors are as follows:

Trigger Signal 1 (+ DC) = Black NORMALLY
Signal Common 1 (- DC) = Black/White StripePRE-WASH

Trigger Signal 2 (+ DC) = Brown
Signal Common 2 (- DC) = Brown w/White StripeNORMALLY

Trigger Signal 3 (+ DC) = Red MAIN WASH
Signal Common 3 (- DC) = Red/White Stripe

Trigger Signal 4 (+ DC) = Orange NORMALLY
Signal Common 4 (- DC) = Orange/White StripeFINAL RINSE

Auto Formula Select Wiring


Input specifications are the same as for trigger signal inputs in the Automatic Mode. The Auto Formula Select signal must be programmable, to the second, on the washing machine control system. Program the washer to send this signal at the start of the wash load (prior to any chemical supply signals) for a duration of 2 seconds multiplied by the desired formula number (i.e. for Formula 2, program for 2 sec. * F2 = 4 seconds signal time). The results will be as follows:

- F1 = 2 - 4 seconds signal time
- F2 = 4 - 6 seconds signal time
- F3 = 6 - 8 seconds signal time
- F4 = 8 - 10 seconds signal time


Auto Formula Select input wire colors are as follows:

Auto Formula Select Signal (+ DC) = Orange

Auto Formula Select Signal Common (- DC) = Orange/White Stripe

Note 	In HC Mode, Auto Formula Select (AFS) is not available.
--	---

Remote Formula Select Switch Installation

Warning 	Make sure to DISCONNECT POWER to laundry machine and dispenser before installing and connecting the Remote Formula Select Switch.
--	---

The Remote Formula Select Switch is an optional feature that allows the user to remotely operate and select formulas for the dispenser. The following instructions describe the mechanical and electrical installation required to connect a Remote Formula Select Switch.

Installing the Remote Formula Select Switch

1. After shutting off all power (supply and signals) to the unit and laundry machine, remove the two cabinet screws on the front cover.
2. Invert the cover assembly along top edge hinge and rest cover atop the cabinet. If surface is not stable, remove the entire cover assembly by unplugging all connections to the main controller PCB and removing the two tethers along the top edge.
3. As shown in *Figure 3-3*, remove the lower internal partition by pressing on the snap detail of the upper partition and pulling outward on one of the two cylindrical handles. Tilt the partition outward and bring it forward to gain access to the pressure switch and wiring locations.

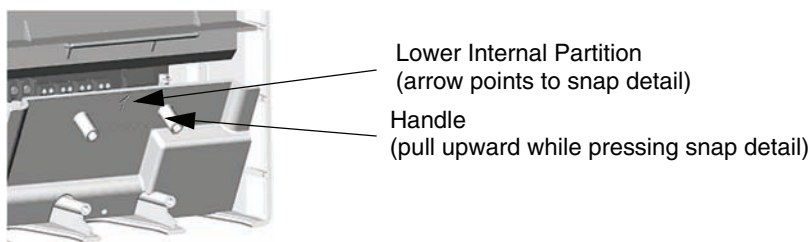


Figure 3-3 Access to Pressure Switch and Wiring

4. Choose a mounting location for the remote switchbox that meets these requirements:
 - Surface must be clean and dry.
 - Location should be within reach of the operator and close to the dispenser (approx. 10'). Make sure to leave some extra wire remaining for internal wiring to the unit.
5. Mark the mounting location, but do not permanently affix the switchbox yet. To be certain that location is correct, it is helpful to wait until all wiring has been completed before mounting the switchbox with the double-stick adhesive pads.

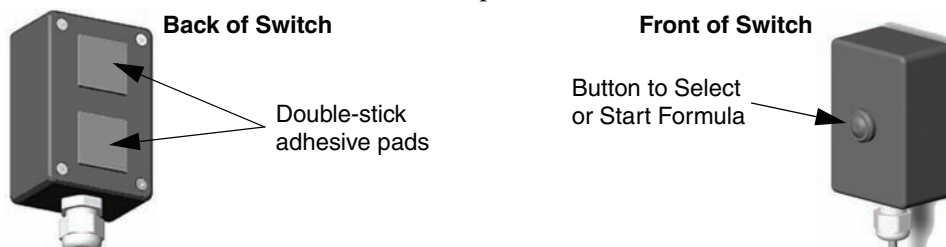


Figure 3-4 Remote Switchbox

6. If no other external options are installed, there will be a conduit plug in the third position conduit (See *Figure 3-5*). Locate the seal-tight fitting (provided); remove one of the dowel pins and the tightening nut. Remove the conduit plug and install the seal-tight fitting.
7. With the fitting installed, slide the nut over the wire and insert the wire through the hole but do not tighten the nut

Note 	Do not tighten the nut until the wire is routed into the compartment of the dispenser with enough extra length to make the connection to the terminal block.
-----------------	--



Figure 3-5 Conduits on Bottom of Dispenser

Terminal Block Wiring

Note 	The terminal block is removable to make wiring easier. Press the area above the terminals with a screwdriver to snap out the terminal block.
-----------------	--

1. Install switchbox wires into the first and second terminals (see *Figure 3-6*) and secure each wire. Wires must be completely secured to insure proper operation of the unit.
2. If you removed the terminal block, plug it back into the receptacle on the board and tighten the seal-tight nut.

3. With the wiring complete, replace the lower partition by tilting it in (bottom first) and then pushing back until it snaps into place. The partition must be securely snapped in place.

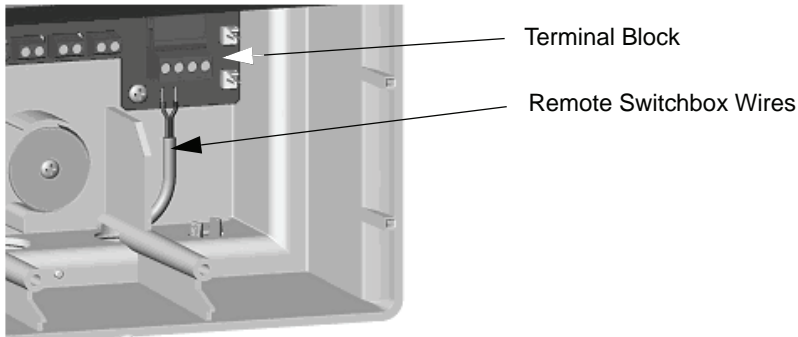


Figure 3-6 Terminal Block Connections

Closing Unit and Completing Installation

1. Replace the cover assembly. If the cover was completely removed, you must also:
 - (a). Make all the appropriate connections to the main controller PCB.
 - (b). Press the cover tethers into the slots on the rear enclosure and pivot the cover assembly from the top edge, downward.
2. Insure that front assembly is properly engaged along the edges and that no wires are pinched.
3. Secure the cabinet with the two screws.
4. Route remote switchbox wiring so it does not interfere with the operation of any equipment.
5. Making sure that the mounting surface for the selection switch is clean and dry, remove the backing from the adhesive mounts and press the switchbox firmly into place.
6. Restore power and confirm proper operation.

WARNING



For operator safety and effective operation of the system, make sure that all ground connections are properly made.

Testing Operation of Switch

To test switch operation, press the button.

Note



At least two (or more) formulas must be programmed into the dispenser in order for the switch to function. Without at least two formulas from which to choose, the switch has no effect.

See *"Program Mode Operation"* on page 6-1 of this manual for more information about programming formulas.

Description of Controls

Overview

The Mercury TL makes use of only 3 buttons and a 3-digit LED display for dispenser operation and programming. Your dispenser may also be equipped with a Remote Formula Select Switch, an external push button used to select formulas and start the dispenser.

In the section, you will learn the how to use the following:

- **NEXT** Key
- **SCROLL** Key
- **ENTER** Key
- Remote Formula Select Switch

Use the menu screen illustrations as a guide when learning to program the Mercury TL. We suggest that you power up a unit and become familiar with the programming steps in a quiet environment, with the manual, prior to the first installation.

Use the **NEXT** key to move to all available main menu screens in Program Mode.

Key Description

Use the menu screen illustrations as a guide when learning to program the Mercury TL.

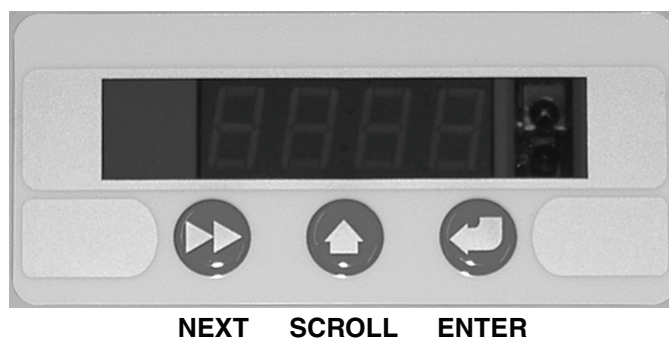


Figure 4-1 Program Mode Key Descriptions

NEXT Key

Use the **NEXT** key to move to the next menu or task. The tasks under the **NEXT** key are:

- User Mode - Moves through User Mode menu screens.
- Program Mode - Moves through the Program Mode menu screens.
- Input Screens - Moves blinking digit to the right.

SCROLL Key

Use the **SCROLL** key to change the blinking digit value. The tasks under the **SCROLL** key are:

- User Mode - Selects formula. Changes the values of blinking digits (Password entry).
- Program Mode - Changes value of blinking digits. Selects menu group.
- Input Screens - Changes value of blinking digits.

ENTER Key

Use the **ENTER** key to perform a task or set a value. The tasks under the **ENTER** key are:

- User Mode - Momentary press starts Push Button Mode wash formula. Press and hold 2 seconds to access Password input screen. Starts and stops prime. Performs actions as prompted in User Mode menu screens.
- Program Mode - Accesses all input screens from main menu loop (via **NEXT** key). Performs actions in certain screens. Exits program mode.
- Input Screens - Sets the displayed value in all input screens (via **SCROLL** key). Exits back to main menu loop.

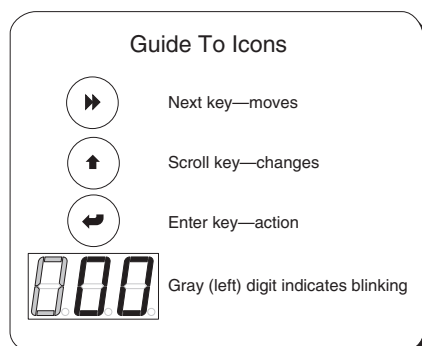


Figure 4-2 Guide to Icons

Remote Formula Select Switch

The Remote Formula Select Switch can be used to select formulas and, when the dispenser is in Push Button Mode, to start the selected formula.

Select a formula: Press and immediately release the button.

Start a formula (in Push Button Mode only):

1. Press and hold the button for at least three seconds. The display will momentarily go blank and the formula will start.
2. When the formula starts, release the button.

5


User Operation

Overview

This chapter describes the operation and use of the six modes of operation. In this chapter, you will learn to use:

- Automatic Mode
- Push Button Mode
- Occurrence Mode
- SP Mode
- Relay Mode
- HC Mode
- User Menus
 - Formula Selection
 - Start Formula (Push Button Mode Only)
 - View Load Counter
 - ID Mode
 - Prime Pumps (when enabled)

Modes of Operation

Note 	Password input and/or power failure will reset the lockout timer and end the wash load in all modes (except Relay Mode, in which Lockout timer is disabled).
--	--

Automatic Mode and HC Mode

Automatic Mode and HC Mode run each pump program (program = delay time + run time) when there is a qualified input to the respective signal input. When on (not set to 000), the Lockout Timer begins at the start of the first pump program's start (beginning of delay time). During this lockout period, no pump amount may run more than once regardless of the number of times the signal input occurs.

The LED display shows signal status, pumps running, and lockout status. The machine operator selects the desired formula number with the Scroll key. Auto Formula Select is active in Automatic Mode (but may be overridden by machine operator input). In HC Mode, Auto Formula Select is not available.

Push Button Mode

Push Button Mode relies on a user to push the button to start the wash formula program. Auto Formula Select is always active, but may be overridden by machine operator input. The machine operator selects the formula number with the Scroll key, then starts the wash formula program by pressing and releasing the Enter key for less than 2 seconds. Pumps run as programmed via programmed delay and run times. During the lockout time, all button presses to start the formula program are ignored (except Password input).

The LED display shows pumps running and lockout status.

Occurrence Mode

Occurrence Mode is an alternate automatic logic where signals from input numbers 1, 2 and 3 act as a single logic input signal. Occurrences of the signals are counted (simultaneous input signals count as one signal occurrence) to determine when each pump runs, based on pump-assignments in the (“A1A”) assignment screen in the formula programming menu.

Pumps 1 and 2 have two programmable amounts, A and B, which are treated in Occurrence Mode as separate pump programs. Auto Formula Select is always active, but may be overridden by machine operator input.

The LED display shows signal status, pumps running, and lockout status.

SP Mode

SP Mode operates in the same manner as Occurrence Mode, with one exception: The Pump Lockout feature functions differently. The Pump Lockout period (when set) may be used to prevent each programmed pump amount from running more than once per dispenser wash formula.

In SP Mode, the dispenser will not terminate the wash formula five minutes after the last pump runs, but will ONLY end the wash formula at the completion of the Lockout period. Unwanted trigger signals are therefore blocked for the entire duration of the Lockout period.

The Lockout Period should be set to approximately match the time it takes to run a complete wash cycle to avoid delays in starting the next cycle. For information on setting this feature, see “*Lockout Period “LP”*” on page 6-4.

If a load needs to be restarted, the dispenser wash formula may be terminated early by pressing the Enter key for 2 seconds.

Relay Mode

Relay Mode requires no machine operator interaction since all dispensing system control is turned over to the washing machine control system. Lockout timer is disabled in Relay Mode

User Menus

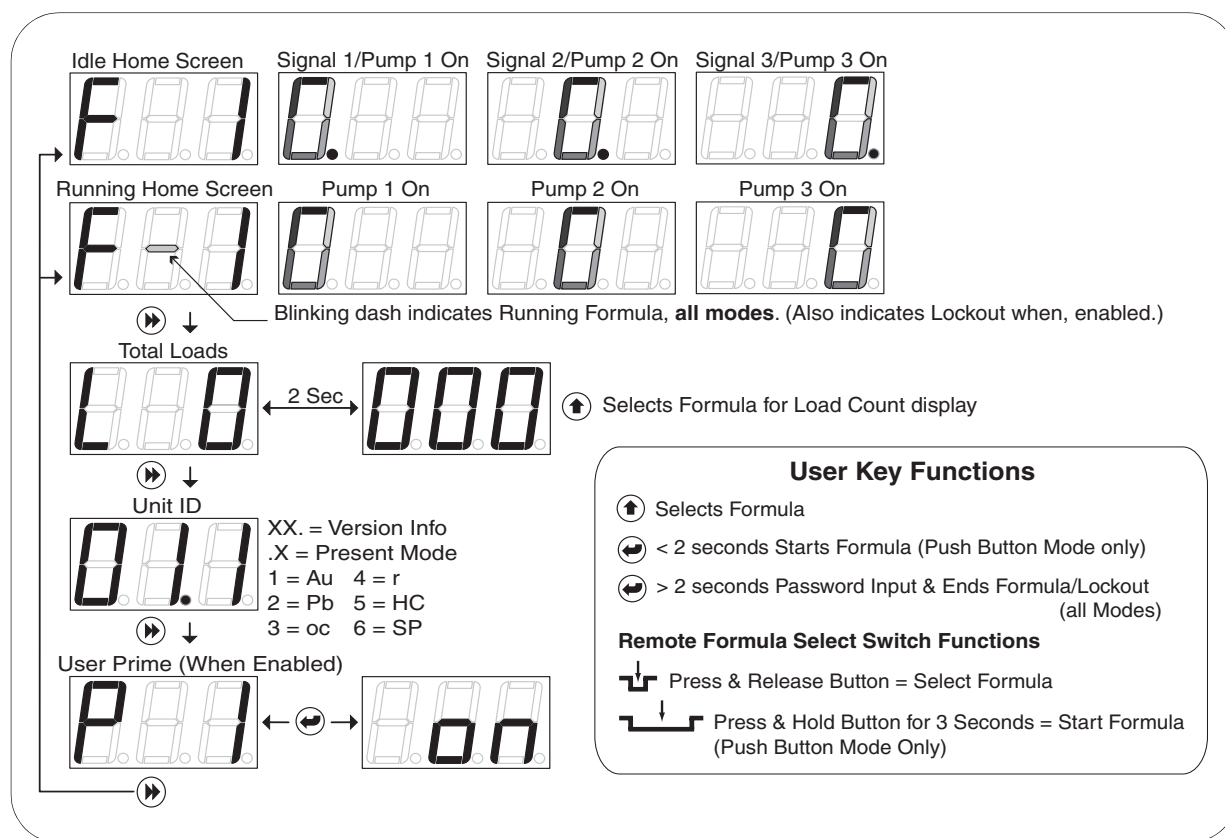


Figure 5-1 User Menus

User Menu Screens

Use the NEXT key to step through all available User Mode menu screens.

Note 	The display will revert to the Mode Home Screen after 30 seconds of inactivity.
-----------------	---

Formula Selection

Any of up to four pre-programmed formulas may be selected. If a formula does not have a programmed amount entered, it does not display and you cannot select the program.

Selection Via Front Panel

From the Home Screen, press SCROLL to select programmed formulas (1-4).

Selection Via Remote Formula Select Switch

If your dispenser is equipped with a Remote Formula Select Switch (RFS), press and release the button on the RFS to select the desired formula (1-4). The formula number displays on the dispenser's screen; each button press advances to the next formula.

Start Formula (Push Button Mode Only)

Selection Via Front Panel

To trigger dispensing from the Idle Home Screen, press and release ENTER for less than 2 seconds.

To terminate wash formula before the end of lockout period and revert to Idle Home Screen, press and hold ENTER longer than 2 seconds, release, and press ENTER again. The screen will revert to the Idle Home Screen.

Remote Formula Select Switch

If your dispenser is equipped with a Remote Formula Select Switch (RFS), press and hold the button on the RFS for three seconds to start the selected formula. Release the button when the formula starts.

View Load Counter (Total Loads)

1. From the Home Screen, press NEXT once to display "L 0".
2. Press SCROLL to select a formula number (0-4).
3. Total loads will display for each formula as you cycle through the formula numbers.
"L 0" displays the total loads run for all formulas.

Every 2 seconds, the display will flash between the selected formula and the count for the selected formula.

Unit ID

Unit ID is usually needed only by Technical Support staff during troubleshooting phone calls. The firmware ID number and the currently selected operating mode can display.

From the Home Screen, press NEXT twice.


The left and middle digits indicate the firmware ID number. The right digit indicates the current Operating Mode (oP) selected:

1 = Automatic 2 = Push Button 3 = Occurrence 4 = Relay 5 = HC Mode

User Prime (when enabled)

Use this menu to prime the pumps.

1. From the Home Screen, press NEXT three times to display "P 1".
2. Press SCROLL to select pump number to prime.
3. Press ENTER to turn selected pump on. Press ENTER again to turn pump off.

Note 	User Prime is only available when unit is not in a lockout timer period. If the dispenser is in a lockout timer period, the display will indicate P-0 and the Scroll key will not be able to select a pump number.
--	--


6

Program Mode Operation

Overview

This chapter describes how to program the Mercury TL. In this chapter, you will learn how to:

- Access Program Mode with the Password
- Prime Pumps – “P-1”
- Clear Load Counter – “CLr”
- Set Operating Parameters – “oP”
- Set Lockout Period – “LP”
- Set Flush Time – “FLu”
- Program Formula – “F-1”
 - Pump Amount – “P1A”
 - Delay Time – “d1A”
 - Assign Pump – “A1A”
 - Finish Program – “Fin”
- Set Filter Duration – “Fd”
- Set User Prime – “uPr”
- Edit Password – “Pin”
- Restore Factory Settings “FAC”
- Exit Program Mode – “End”

<div>Note</div> <div></div>	Flush Manifold installation and setup are described in a separate manual titled “Flush Manifold for Liquid Laundry Supply Systems” P/N 20-07539-00. Please read this document prior to programming the Mercury TL.
--	--

Program Mode

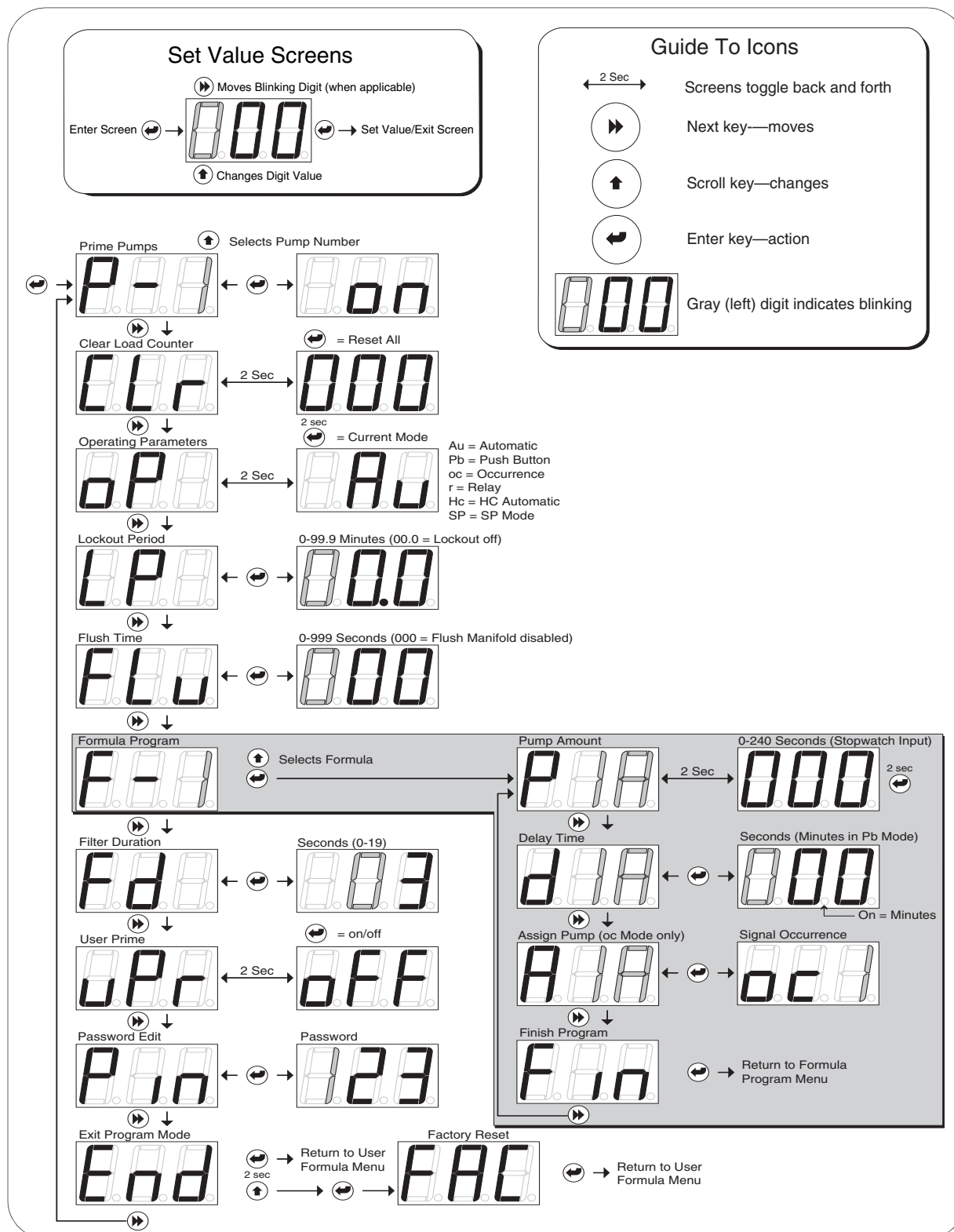



Figure 6-1 Program Mode Screens

Password Access to Program Mode

1. From the Home Screen (with “F (1-4)” displayed), press and hold ENTER for 2 seconds to access the Password input screen. The factory-set password is 123.
2. Press SCROLL to change the blinking digit to the desired value.
3. Press NEXT to move the blinking digit.
4. Press ENTER when the desired number is present in all digits to enter Program Mode.
The Prime Pumps screen, P-1, will appear once you are in Program Mode.

Note 	If an incorrect password is entered, or password entry is not completed within 30 seconds, the display returns to the User Home Screen. To retry password entry, go back to step 1 of Password Access.
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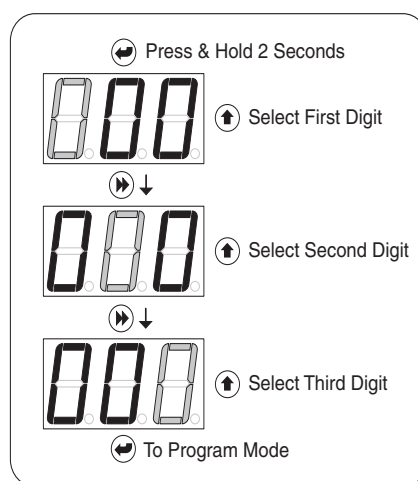



Figure 6-2 Password Access to Program Mode

Prime Pumps “P-1”

1. Press SCROLL to select pump number.
2. Press ENTER to turn pump on. Press ENTER again to turn the pump off.

Note 	Pump prime automatically shuts off after 5 minutes if pump is left on.
--	--

Clear Load Counter “CLr”


Display toggles every two seconds between CLr and load count (all formulas).

To reset the Load Counter, press and hold ENTER for two seconds.

Operating Parameters “oP”


Display toggles every two seconds between oP and the current selection.


Press ENTER to select the desired mode of dispenser operation. Choose from: Au (Automatic), Pb (Push Button), oc (Occurrence), r (Relay), Hc (HC Automatic Mode), SP (SP Mode).

Note 	The five operating modes, Lockout Period, and other related operational details are described in more detail in <i>Chapter 1, “Theory of Operation.”</i>
--	--


Lockout Period “LP”

Press ENTER to display/edit Lockout Period value, in minutes. Input method is the same as Password input. 00.0 = Lockout off. The range of adjustment is 00.0-99.9 minutes.

Note 	In Automatic, Occurrence, SP and Push Button Modes, you must program the Lockout Period to: 1. Be longer than total time of all programmed pump run and delay times and 2. Approximately match the washer cycle time for a complete load.
--	---

Note 	Lockout Period (“LP”) is disabled in Relay Mode.
--	--

Flush Time “FLu”


Note 	If the dispenser is not equipped with a flush manifold, or if flush manifold operation is not desired, enter a time of 000 seconds to disable flush manifold operation.
--	---

Flush Time refers to the amount of time the Flush Manifold solenoid remains ON after the pump amount is dispensed (also called post-flush period). See “*Flush Manifold Operation (Optional)*” on page 1-3 for a complete description of Flush Manifold operation.

1. Press ENTER to display Flush Time (in seconds).
2. Press SCROLL to set the value for the blinking digit.
3. Press NEXT to move the blinking digit. Set the value for each digit.
4. Press ENTER to save the chosen Flush Time.
The range of adjustment is 000-999 seconds.

Formula Program “F-1”

1. Press SCROLL to select the formula number (1-4) you wish to program.
2. Use NEXT to step through all available menu screens in this loop.

Note 	Formula Programming is not available for use in Relay Mode. If data is input in this menu and Relay Mode is later selected, all values will be saved and can be used again if Relay Mode is cancelled.
--	--

Pump Amount “P1A”


The display toggles every two seconds between stored run time (in seconds) and the selected pump number.

1. Press SCROLL to select the desired pump number (P1A, P1B, P2A, P2B, or P3).
2. To set a pump run time, press and hold ENTER for two seconds to start the pump (display will increment seconds and pump will run).
3. When desired time/volume is reached, press ENTER again to stop pump and set value.
4. Repeat for all desired pumps within the current formula selection.
The range of this adjustment is 000-240 seconds.

Delay Time “d1A”

1. Press SCROLL to select the desired pump delay number (d1A, d1B, d2A, d2B, or d3).
2. Press ENTER. Input delay time in the same manner as Password input.
In Push Button Mode, program Delay Times in minutes (display will read 00.0).
For all other modes, program Delay Times in seconds (display will read 000).

Assign Pump “A1A”

Note 	This screen is only active in Occurrence Mode.
--	--

Assign pump numbers to signal sequence occurrences.


1. At the “A1A” screen, press SCROLL to select desired pump number (A1A, A1B, A2A, A2B, or A3) to assign to a machine step occurrence.
2. Press ENTER to access occurrence input screen (oc).
3. Press SCROLL to assign the previously selected pump number to the machine step occurrence (1-9) in which you wish that pump to run.
4. Press ENTER to set and return to the formula programming sub-menu loop.
5. Repeat for all pumps/occurrences.

Finish Program “Fin”

Press ENTER here to return to the F-1 Home Screen in the main menu loop.

Filter Duration “Fd”

Press ENTER to view/set Signal Filter Duration. Input Signal Filter Duration in the same manner as Password input. Program Signal Filter Duration time in seconds (0-19). The default setting is 3 sec.

Note 	In Occurrence Mode, set the Filter Duration time so it is long enough to filter out excess fill signals that may occur as the washer calls for more water, etc. In Automatic and Relay modes, you would typically leave Filter Duration at the default setting.
--	--


User Prime “uPr”

Every 2 seconds the screen alternates between Upr and current User Prime setting (on or off). Press ENTER to change this setting.

Password Edit “Pin”

You may change the password from the factory default setting (**123**) to any three-digit number.

1. Press SCROLL to change the blinking digit to the desired value.
2. Press NEXT to move the blinking digit. Repeat for all digits.
3. Press ENTER when the desired password is present.

Note 	Be sure to make note of any password changes. Access to Program Mode is not available if the password is lost. If your password is lost, contact Nova Controls Technical Support.
--	--

Restore Factory Settings “FAC”

To clear all values and restore factory settings in the dispenser:

1. Press and hold SCROLL for two seconds, and then press ENTER (while still pressing Scroll).
The display will go to “FAC” to indicate that you have restored factory settings and cleared the dispenser’s memory (including resetting the counter zero).
2. Press ENTER again to return to User Home Screen.

Exit Program Mode “End”

Press ENTER to exit Program Mode and return to User Mode.

7

Troubleshooting

Overview

This chapter covers some common problems that can occur and suggests possible causes and solutions. You will learn what to do in the following situations:

- No voltage to main power terminals
- No AC power to logic PCB at J3
- No AC power at J12
- No DC power at J13
- LED display not lit
- Password will not access Program Mode
- Pump runs slowly or not at all
- Pump runs but will not deliver product
- Pumps are scheduled to run simultaneously, but only one pump runs at a time
- Poor results on laundry
- Dispenser does not dispense

Power Supply Input and Output

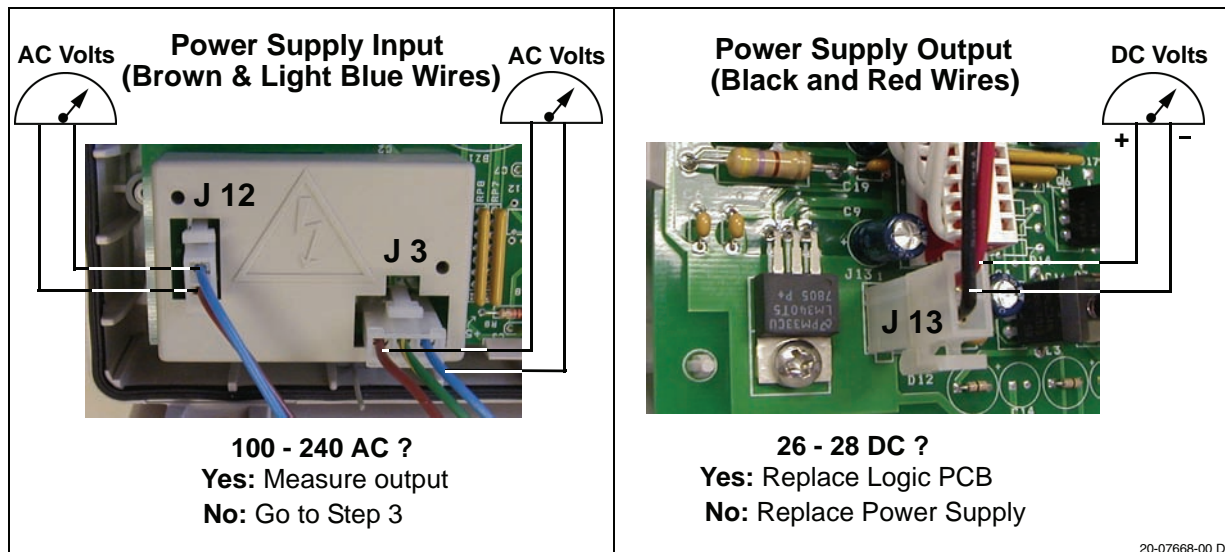


Figure 7-1 AC and DC Readings

Problems and Solutions

Please refer to *Figure 7-1 “AC and DC Readings”* on page 7-1 for more information.

Problem	Possible Cause	Solution
No voltage to main power terminals.	1. Tripped breakers or blown fuses at power source. 2. Main power wires.	(a). Reset breakers or replace fuse at power source. (b). Check connections at plug or washer power terminals.
There is power at the main power terminals, but: <u>NO power to Logic PCB at J3</u> (3-input connector) outside pins.	1. Blown fuses on the power supply board.	(a). Replace the power supply assembly (board and power supply)
There is power at the main power terminals and at J3, but: <u>NO power at J12.</u>	1. Power switch may be off. 2. Bad power switch.	(a). Turn power switch on. (b). Replace Logic PCB.
There is AC power at main power terminals, and at J3 and at J12, but: <u>NO DC power at J13 (24VDC).</u>	1. Bad power supply.	(a). Replace power supply module.
The correct voltages are present at all four locations (main power terminals, J3, J12 and J13) but: <u>there is NO LED display.</u>	1. Damaged logic board.	(a). Replace the logic PCB.
Password will not access Program Mode.	1. Password had been changed.	(a). Call Nova Controls technical service.
Pump runs slowly or not at all.	1. Pump not properly plugged in. 2. Pump failure.	(a). Verify pump electrical connectors are plugged in properly. (b). Replace failed pump.
Pump runs but will not deliver product.	1. Squeeze tube failure. 2. Product tubing plugged. 3. Pump roller failure.	(a). Replace squeeze tube. (b). Replace product tubing. (c). Replace pump roller.
Pumps are scheduled to run simultaneously, but only one pump will run at a time.	1. Flush Manifold may be enabled. See “ <i>Flush Manifold Operation (Optional)</i> ” on page 1-3 for explanation.	(a). If not using Flush Manifold, set Flush Time (“FLu”) to 000 to disable it.
Poor results (assumes that product is not being properly delivered).	1. See Possible Causes, above, for “Pump runs but will not deliver product.”	(a). See Solutions, above, for “Pump runs but will not deliver product.”
Dispenser does not dispense upon request from washer.	1. Incorrect Operating Mode (“Op”) selected in programming menu. 2. Signal wires are loose or wired incorrectly.	(a). Select appropriate Operating Mode (“Op”) in the programming menu. (b). Check signal wiring to washer.

8

Maintenance and Service

Overview

This chapter describes the dispenser maintenance needed and includes a list of spare parts:

- Routine Maintenance
- Service Access
- Replacement Parts


Routine Maintenance

Routine maintenance includes:

- Keeping the dispenser wiped clean with a damp cloth
- Periodic Pump Tube replacement (recommended to occur *prior to* tube failure)

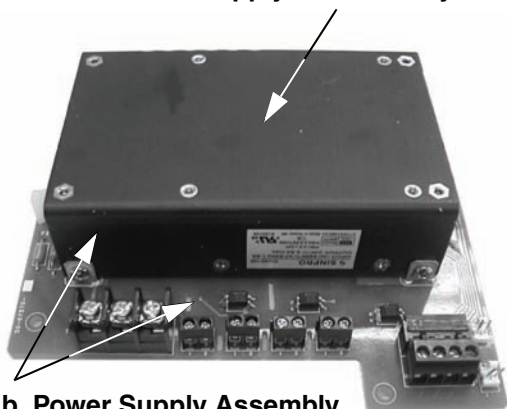
Service Access

1. Remove two lower cabinet front screws.
2. Hinge cabinet-front upwards and lift off.
3. Rest cabinet front upside-down on top of dispenser enclosure for service position.
An alternative service position is to remove the cabinet front by disconnecting five cable plugs (depress locking tabs to remove).
4. Lift internal barrier straight out of cabinet (no fasteners secure the barrier).

Caution 	Barrier must be reinstalled upon reassembly. Failure to reinstall barrier is a misapplication that will void warranty coverage.
---	---

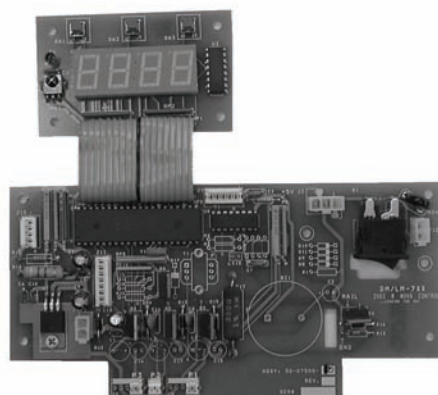
Replacement Parts Listing

1a. Power Supply Module Only



1b. Power Supply Assembly
(includes module, PCB, harness)

2



3



4



6



5



7



REF


NO.	PART NO.	DESCRIPTION
1a	13-07724-00	Power Supply Module Only
1b	13-07724-01	Power Supply Assembly (includes Module, PCB, and Harness)
2	13-07725-00	Logic Circuit Board
3	13-06524-01	Pump Motor Detergent (2-pin plug)
4	13-06396-00	Pump Spinner Assembly
5	13-06398-00	Pump Front, w/Captive Screw
6	13-07028-10	Pump Tube, Epdm, w/ 3/8" Barb, 10-pack
7	13-07862-00	Remote Formula Select Switch
*	13-07756-00	Power Cable
*	13-07758-00	Signal Cable
*	37-07584-02	Cabinet Front
*	37-07585-02	Cabinet Rear
*	13-07268-06	Power Switch Cover
*	13-07122-00	Mounting Bracket (Accy Kit)

* Denotes items not shown.

9

Specifications

General and Environmental Specifications

Note 	Specifications subject to change without notice.
--	--

Dimensions	
Size	8" W x 9" H x 6" D (20.3 cm W x 22.2 cm H x 15.4 cm D)
Weight	5.5 lbs. (2.47 kg)
Power Requirements	
Total Amperage draw during operation	100 to 240 VAC nominal, 50/60 Hz., 1.0 amps (max.)
General	
Pump Flow Rate	6.0 oz./minute (177 mls/minute)
Environmental	
Pollution	2
Installation Category	II
Temperature	10° to 50° C (50° to 120° F) (max.)
Humidity	95% relative humidity (max.)
Indoor Installation	Approved for indoor use only. Must not be installed outdoors.
Altitude	Install at or below 9,700 ft. (3000m) max.

Limited Warranty

SELLER warrants solely to BUYER the Products will be free from defects in material and workmanship under normal use and service for a period of one year from the date of completion of manufacture. This limited warranty does not apply to (a) hoses; (b) and products that have a normal life shorter than one year; or (c) failure in performance or damage caused by chemicals, abrasive materials, corrosion, lightning, improper voltage supply, physical abuse, mishandling or misapplication. In the event the Products are altered or repaired by BUYER without SELLER'S prior written approval, all warranties will be void.

NO OTHER WARRANTY, ORAL, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, IS MADE FOR THESE PRODUCTS, AND ALL OTHER WARRANTIES ARE HEREBY EXPRESSLY EXCLUDED.

SELLER'S sole obligation under this warranty will be, at SELLER'S option, to repair or replace F.O.B. SELLER'S facility in Watsonville, California any Products found to be other than as warranted.

Limitation of Liability

SELLER'S WARRANTY OBLIGATIONS AND BUYERS REMEDIES ARE SOLELY AND EXCLUSIVELY AS STATED HEREIN. SELLER SHALL HAVE NO OTHER LIABILITY, DIRECT OR INDIRECT, OF ANY KIND, INCLUDING LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER CLAIMS FOR DAMAGE OR LOSS RESULTING FROM ANY CAUSE WHATSOEVER, WHETHER BASED ON NEGLIGENCE, STRICT LIABILITY, BREACH OF CONTRACT OR BREACH OF WARRANTY.



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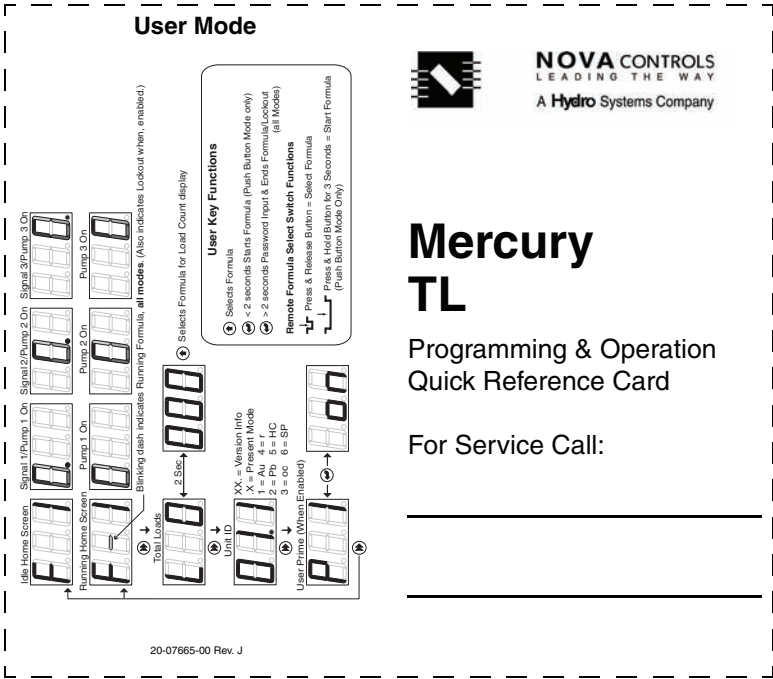
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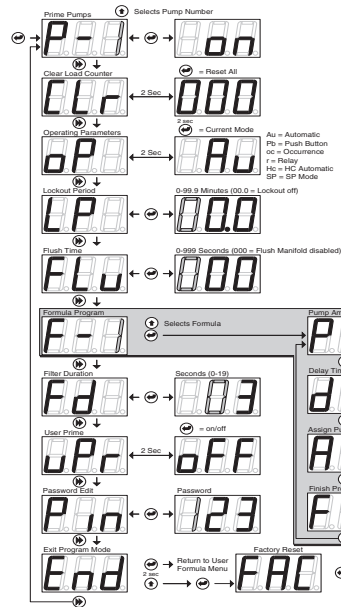
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Program Mode



Password Input

