

LS-3000 SERIES

LAUNDRY/INDUSTRIAL DISPENSER

INSTALLATION AND OPERATING MANUAL



PREFACE

This manual describes how to install, set up, operate and maintain the LS-3000 Series Laundry/Industrial Dispenser.

Material in this manual is subject to change without notice. Manual revisions will be made on an as needed basis. Special circumstances involving important design, operation or application information will be released via Technical Service Bulletins.

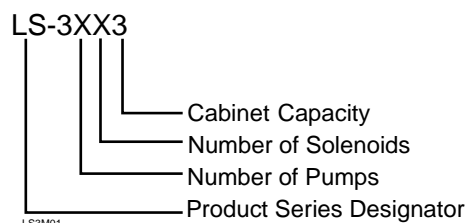
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INTRODUCTION

APPLICATION DESCRIPTION

The LS-3000 series of dispensers provides direct trigger-controlled pumps and solenoid valves used in the delivery of liquid and powder or solid chemical products for laundry and industrial operations.

Model numbers are determined by the following:



Pumps and solenoid valves are triggered by an external voltage (from the washmachine or other device) and can be programmed to operate in a wide range of times and delays. Each pump or solenoid valve is controlled by a dedicated Multi-Time Module.

MODES OF OPERATION

The LS-3000 with the Multi-Time Module can operate the pumps/solenoid valves in the following four modes:

Mode 0 - Relay Mode

The pump/solenoid valve is energized for the duration of a valid trigger signal.

Mode 1 - Recycle Timing Mode

The pump/solenoid valve cycles on and off at programmed intervals for the duration of a valid trigger signal.

Mode 2 - Timed Run Mode

Upon receipt of a trigger signal, the pump/solenoid valve is energized for a user-programmed run time.

Mode 3 - Timed Run Mode with Delay

Upon receipt of a trigger signal, the pump/solenoid valve is energized for a user-programmed delay, followed by a user-programmed run time.

TERMS

Line

Tubing that carries chemical supply from the source to the pump or from the pump to the washer.

Squeeze Tube

Tubing installed in peristaltic pumps.

Pipe

Metal or plastic rigid pipes, plumbing.

INSTALLATION & SETUP PROCEDURES

PHYSICAL INSTALLATION



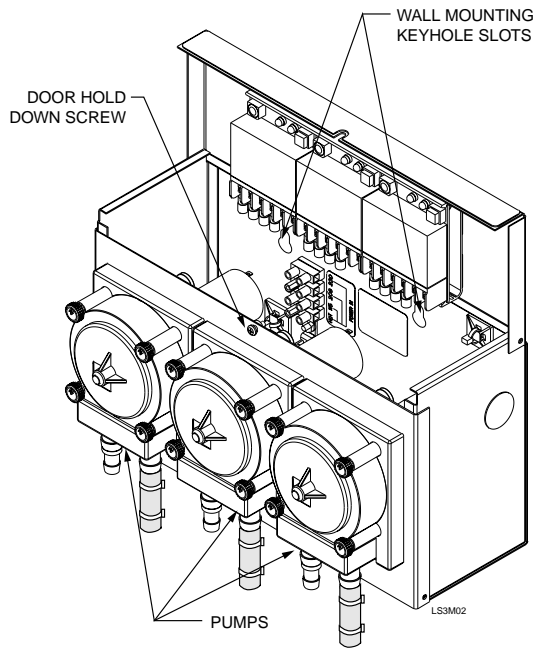
Refer installation and service to qualified personnel only.

Installation must comply with all applicable plumbing & electrical codes.

Mounting the Unit

Carefully select a place to mount the unit. Remember that there must be room around it for access to switches, wires and tubing, and to swing the top door open for both installation and maintenance. The unit is normally mounted against a stable vertical surface with the pumps side-by-side and their tube openings at the bottom. Avoid steam and other sources of moisture, such as from spray or splash; and do not subject it to temperatures outside the range from 36° to 120° F (2° to 49° C).

Wall mounting can be accomplished using the two keyhole slots on the interior back panel. No mounting template is required.



The top door is held closed by a captive hold down screw that fits through a slot in the door. The pump door is held closed by the top door. There are no user serviceable parts that are accessible without proper tools.

Pump Input Lines

Connect the 1/2 inch ID input lines to the barbed fittings on the left (suction side) of the pump squeeze tube with the silicone tube connector. Make sure the connection is airtight. Run the input lines to the chemical drums, and secure the end of each supply line into its respective container.



To prevent excessive vacuum pressure in the suction tube when pumping high viscosity chemical, cut the 3/8" barbed section of the adaptor fittings off at the groove just below the 1/2" barbed section of the fitting.



Make sure that pump tube doesn't touch the bottom of the chemical barrel while unit is running.

Pump Output Line

Connect the 1/2 inch ID output line to the barbed fitting on the right side of the pump squeeze tube, using the silicone tube connector. Run the feed line to the washer or process tank. Use as short a run of line as possible and keep the lines away from steam pipes, open flues or any other place where they may be accidentally damaged by the machine operators. In this and other output line runs, always try to avoid uphill runs. Secure the lines into the fitting with tie wraps on clamps.

Plumbing Connections to Water Solenoid Valve

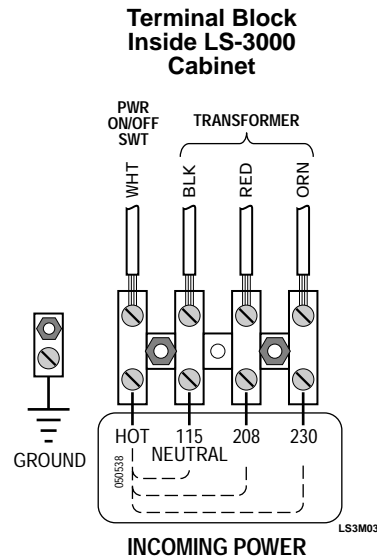
Solenoid valves are used to supply water to a powder or solid detergent dispenser. The compression fittings on the solenoid valve inlet and outlet accept either 1/4 inch OD plastic line or 1/4 inch OD copper tube (not supplied with unit). Follow the flow arrows on the solenoid valve when making connections. Consult the instructions supplied with the detergent dispenser.

ELECTRICAL CONNECTIONS



Dangerous voltages are wired into this unit and are present in the cabinet even when the Power Switch is set to Off.

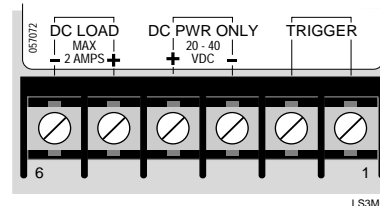
Provide electrical power to the terminal block of the LS-3000, which is on continuously while the dispenser is in operation. Always connect a ground wire from the ground lug provided in the LS-3000 unit to a ground.



Trigger Signals

Connect trigger signal leads to terminals 1 and 2—the rightmost two terminals—of each Multi-Time Module from a source at the washmachine or other device. The signal will operate the pump or solenoid valve at the appropriate time in the process cycle. The terminal portion of a Multi-Time Module is illustrated below.

Multi-Time Module Terminals



The trigger may be 24 to 240 VAC or 24 to 130 VDC. Polarity must be observed as shown by the plus and minus sign above the appropriate terminals.

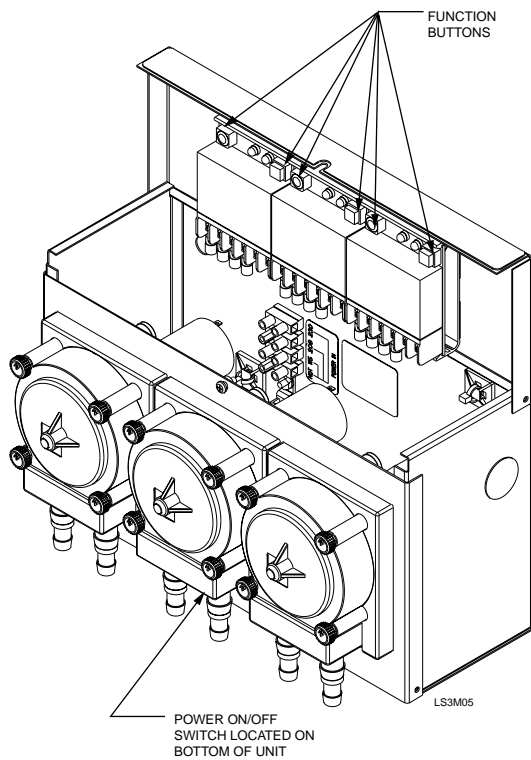
CONTROLS DESCRIPTION

Power On/Off Switch

This double pole single throw switch provides control over the incoming power to the LS-3000.

Pump/Solenoid Valve Prime Switch

Push the function button at the upper right corner of each Multi-Time Module to manually energize each pump/solenoid valve for priming and testing.

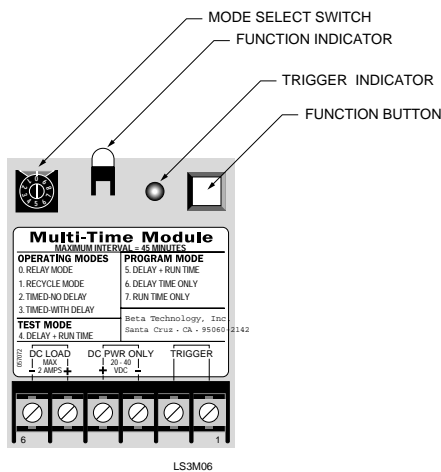


Multi-Time Module

Each pump/solenoid valve is controlled by a Multi-Time Module which is located directly above the pump/solenoid valve in the top door.

Function Button

This button is used for all programming functions, manual priming, and testing as noted in the Mode 4 function description.



Trigger Indicator

This indicator light illuminates whenever a valid electrical signal is present across the two trigger input terminals.

Mode Select Switch

This switch is used to select the mode. To move it, use a 1/8 inch (or smaller) standard screwdriver. Switch positions 8 and 9 are not used at this time.

Function Indicator

This indicator light illuminates whenever the pump/solenoid valve is activated. It flashes slowly whenever a delay time is being programmed or when a programmed delay time is counting down after a valid signal is received. Note that in the Recycle Mode, this indicator light does not flash during the programmed off time.

PROGRAMMING THE MULTI-TIME MODULE

Mode 0 - Relay

1. Turn the Mode Select switch to position 0.
2. Setup is complete since the pump/solenoid valve is always on during the trigger signal.

Mode 1 - Recycle Timing

1. Turn the Mode Select switch to position 7 to set the run time.
2. Press the Function button. Release the button when the pump/solenoid valve activates and the Function indicator light illuminates.
3. Press the Function button again after the desired run time elapses. The pump/solenoid valve and the function indicator light will turn off.
4. Turn the Mode Select switch to position 6 to set delay time.
5. Press the Function button. Release the button when the function indicator light begins to flash.
6. Note that the indicator light will flash continuously during the delay time programming. Press the Function button again after the desired delay time elapses. The Function indicator light will turn off.
7. Turn the Mode Select switch to position 1.

Mode 1 - Recycle Timing Alternate Setup

Use this alternate procedure to do off and run time setup simultaneously.

1. Turn the Mode Select switch to position 5.
2. Press the Function button until the Function indicator light begins to flash.
3. Press the Function button again when the desired off time elapses. The pump/solenoid valve will activate and the Function indicator light will stop flashing and fully illuminate.
4. Press the Function button again after the desired run time elapses. Both the delay time and run time are now programmed.
5. Turn the Mode Select switch to position 1.

Mode 2- Timed Run

1. Turn the Mode Select switch to position 7.
2. Press the Function button. Release the button when the pump/solenoid valve activates and the Function indicator light illuminates.
3. Press the Function button again after the desired run time elapses. The pump/solenoid valve and the function indicator light will turn off.
4. Turn the Mode Select switch to Mode 2.

Mode 3 - Timed Run With Delay

1. Turn the Mode Select switch to position 7 to set run time.
2. Press the Function button. Release the button when the pump/solenoid valve activates and the Function indicator light illuminates.
3. Press the Function button again after the desired run time lapses. The pump/solenoid valve and the function indicator light will turn off.
4. Turn the Mode Select switch to position 6 to set delay time.
5. Press the Function button. Release the button when the Function indicator light begins to flash. Note that the indicator light will flash continuously during the delay time programming.
6. Press the Function button again after the desired delay time elapses. The Function indicator light will turn off.
7. Turn the Mode Select switch to position 3.

Mode 3 - Timed Run With Delay Alternate Setup

Use this alternate procedure to set delay and run time simultaneously.

1. Turn the Mode Select switch to position 5.
2. Press the Function button until the Function indicator light begins to flash.
3. Press the Function button again when the desired delay time elapses. The pump/solenoid valve will activate and the Function indicator light will stop flashing and fully illuminate.
4. Press the Function button again after the desired run time elapses. Both the delay time and run time are now programmed.
5. Turn the Mode Select switch to position 3.

Mode 4 - Test

1. Turn the Mode Select switch to position 4.
2. Press the Function button until the Function indicator light begins to flash. The programmed delay time will count down, then the pump/solenoid valve will turn on for the programmed run time. This allows you to verify that the correct times are programmed.

Programming Notes

1. When in Mode 0 or 1, pressing the Function button causes the pump/solenoid valve to be activated until the button is released.
2. When in Modes 2 or 3, pressing the Function button causes the pump/solenoid valve to be activated only for the programmed run time.
3. Programming a run or delay time erases the previous data and enters the new time into memory.
4. Programmed times are retained indefinitely (approximately 10 years with power off).
5. If the Mode Select switch is turned to one of the three programming modes and the Function button is not pressed, the previously programmed time will remain in memory.

6. If you attempt to program run times or delay times in excess of the maximum allowable time, the counters will roll over to zero time and continue counting from that point.
7. In Mode 4 (Test), an incoming trigger signal will cause the module to operate as if it were in Mode 3 (run with delay).

OPERATION

Since all pumps and solenoid valves are controlled by the triggers to the Multi-Time Modules, there are no manual switching requirements during normal operation.

SPECIFICATIONS

Size	Height	Width	Depth
	6.5	11.5	6.0 in
	16.51	29.21	15.24 cm

Weight

8.2 lbs (3.72 kg)

Material

Cabinet
Type 304 Stainless Steel

Mounting

Wall mounted with (2) key hole slots in the back plate

Electrical Power Configurations

115, 208 or 230 Volts AC ($\pm 10\%$) 50/60 Hz
Over 240 Volts AC optional transformers required

Ambient Temperature Range

32° to 132° F (2° to 49° C)

Pumps

Peristaltic, dual roller, self priming and self-checking.
Intermittent duty cycle, maximum 15 minutes on/15 minutes off.

Material

Silicon, standard, other options available.

Run Speed

100 rpm, 28.4 oz per minute (840 ml per minute) at normal voltage

Pump Operating Conditions

Inlet Vacuum

8 inches (200 millimeters) of mercury, maximum

Outlet Pressure

20 psi (1.4 bar) maximum

Trigger Voltages

24 to 240 Volts AC or 24 to 130 Volts DC

Run Time

Solenoid pump

Range 1/10 second to 45 minutes

Peristaltic pump

Range 1/10 second to 15 minutes maximum (with 15 minute "off" cycle)



Design and specifications subject to change without notice.

MAINTENANCE

PUMP & SQUEEZE TUBE

REPLACEMENT SCHEDULE

Since every installation is different (chemicals, tube runs, operating frequency and so on), an exact tube replacement schedule cannot be specified. With use, the tube slowly evolves from round to oval and the amount of chemical pumped decreases. By regularly checking the amount of chemical pumped, you can determine general tube life. It is recommended that you closely monitor the time it takes the original tube to reach the end of its flex life, and then establish a replacement schedule. Replacing tubes at regularly scheduled intervals ensures more accurate product use and reduces service calls. In general, short feed lines of a large diameter will improve pump tube life.



It is very important not to let the tubes become worn to the point where they tear and allow chemicals to saturate the pump housing.

REPLACING PUMP CARTRIDGES

600 Series SnapHead Pumps



Wear adequate protective clothing such as gloves and glasses.

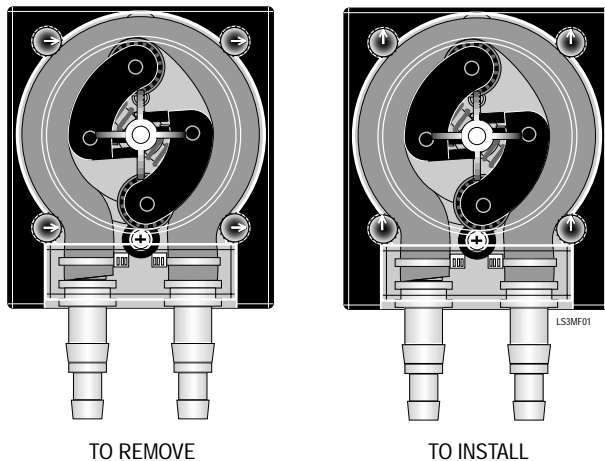


Figure 1. Removing and Installing 600 Series SnapHead Pump Cartridge

To Remove

1. Turn off electrical power to LS-3000.
2. Remove the supply and feed tubes from the old cartridge fittings.
3. Remove the cartridge from the motor housing by twisting the four snap pins at top and bottom, 90 degrees clockwise or counter clockwise.

To Install

1. Align and engage the pump drive spline with the gearbox shaft by rotating the cartridge assembly. It might be necessary to squeeze the housing to get it to seat properly into the face plate.
2. Turn the snap pins so that the arrow is pointed up, then push until you hear a distinct click.
3. Connect the supply and feed tubes to the new cartridge fittings.
4. Turn the power back on.

Refer to Recommended Spare Parts and Accessories and the Parts List and assembly drawings in **Appendix**. Please order replacement and spare parts using the item number.

CHANGING PUMP SQUEEZE TUBING ASSEMBLY

600 Series SnapHead Pumps



Wear adequate protective clothing such as gloves and glasses.

1. Turn off electrical power to the LS-3000.
2. Remove the chemical pump cartridge from the motor housing by twisting the four snap pins in the corners of the cartridge.
3. Pull the roller assembly rearward to release the pump squeeze tubing assembly.
4. Lubricate pump squeeze tube with proper lubricant as indicated in Beta Tube Selection Chart (Beta drawing number 13091-00).
5. Replace the pump squeeze tubing assembly.
6. Push the roller assembly onto the cartridge shaft by compressing the springs of the upper roller arm.

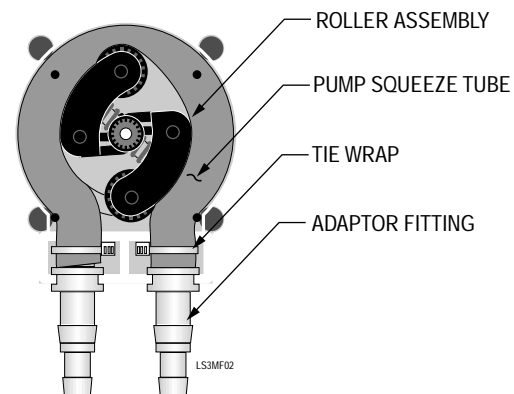


Figure 2. Replacing 600 Series SnapHead Pump Squeeze Tubing Assembly

7. Reconnect cartridge to face plate (Refer to **REPLACING PUMP CARTRIDGES**)
8. Turn on electrical power to LS-3000.

REPLACING PUMP MOTOR/GEARBOX ASSEMBLY

600 Series SnapHead Pumps

1. Turn off electrical power to LS-3000.
2. Turn the four snap pins on pump cartridge assembly 90 degrees left or right and remove pump cartridge assembly from the unit. Suction and discharge lines need not be removed. Support the cartridge as required.
3. Loosen the screw that fastens the front door, and open the front door (door will hang open).
4. Remove 2 motor wire connectors from motor contacts for the pump motor/gearbox to be replaced. Note polarity.
5. Swing front door up and hold the door and pump motor while unscrewing the two motor mounting plate screws from the front of the unit.
6. Note the orientation of the red dot on the end of the motor. Remove motor/gearbox assembly and the gearbox mounting plate from the unit.

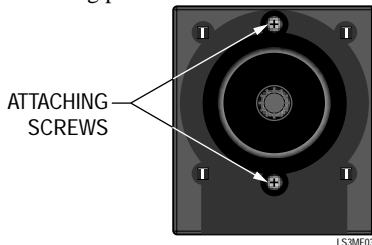


Figure 3. Pump Motor Attaching Screws

7. Reinstall in the reverse order.



If the spline for the spinner in pump cartridge assembly is not aligned properly with the spline for pump gearbox assembly, the snap pins will not seat properly upon reinstallation. Also, the wiring harness accommodates both sizes of pumps. Select the connector which matches the motor contacts.

8. Turn on electrical power to LS-3000.
9. Prime pump to verify proper rotation (clockwise). If the direction is wrong, switch the motor wires.

TROUBLESHOOTING

Pump/Solenoid Valve Not Working

If a pump/solenoid valve is not working, check that power is on and that a trigger signal is being received from the wash machine or other device.

If the pump/solenoid valve still does not function properly, replace the affected Multi-Time Module and do the setup procedure for this pump/solenoid valve.

No Power

1. Is the On/Off switch on?
2. Is proper line power voltage connected to the power input terminals in the unit?

Properly Rated Fuse Blows Repeatedly

1. Is there a mechanical problem with a pump assembly or an electrical problem with the solenoid valve (e.g., jammed tubing or frozen gears in the gearbox)?
2. Do the pump motor and/or solenoid valve resistance measurements fall in the approximate range from 4 to 100 ohms? If not, replace suspect part(s) as a shorted motor or solenoid valve will cause the fuse to blow.



Resistance must only be measured with the power turned off. A short will typically measure less than 0.2 ohms. An open will typically measure more than 2000 ohms.

Pump Will Not Pull the Chemical Out of the Drum

1. Too much vacuum created —the supply line in the chemical drum may be up against either the side or bottom, the supply lines may be too long or too small in diameter for a viscous product, or there may be a crimp in the intake supply line, thus exceeding the pump's inlet vacuum specifications .
2. There may be an air leak somewhere in the input supply line. Most often this is caused by inadequate sealing of the supply line to the squeeze tube fittings.
3. Squeeze tube is worn and the rollers can no longer squeeze the tube properly. Correct by replacing squeeze tube with one made of material appropriate for the chemical being pumped.

RECOMMENDED SPARE PARTS AND ACCESSORIES

This list provides a quick reference for ordering spare or replacement parts. It also lists accessory items that may be needed which are not on the detailed assembly drawings.

Spare Parts

Item Description	Item #
Multi-Time Module	056824
Pump Roller Assembly	094564
Pump Housing	093868
Motor Gearbox Assembly	093493
Quarter Turn Pin/Pump	093869
Solenoid Valve Assembly	093278
Transformer, 120/208/240 VAC - 24 VAC, 20 W, 60 Hz	050562
Beta Tube Kit	096171
Nordel Tube Kit	096172
Bi-Wall Tube Kit	096173
Silicone Tube Kit	096174
Viton Tube Kit	099270

TECHNICAL ASSISTANCE

If you require technical assistance or additional product technical information contact the appropriate Technical Support Department. See **Preface** for company information and telephone numbers.

PRODUCT REPAIR

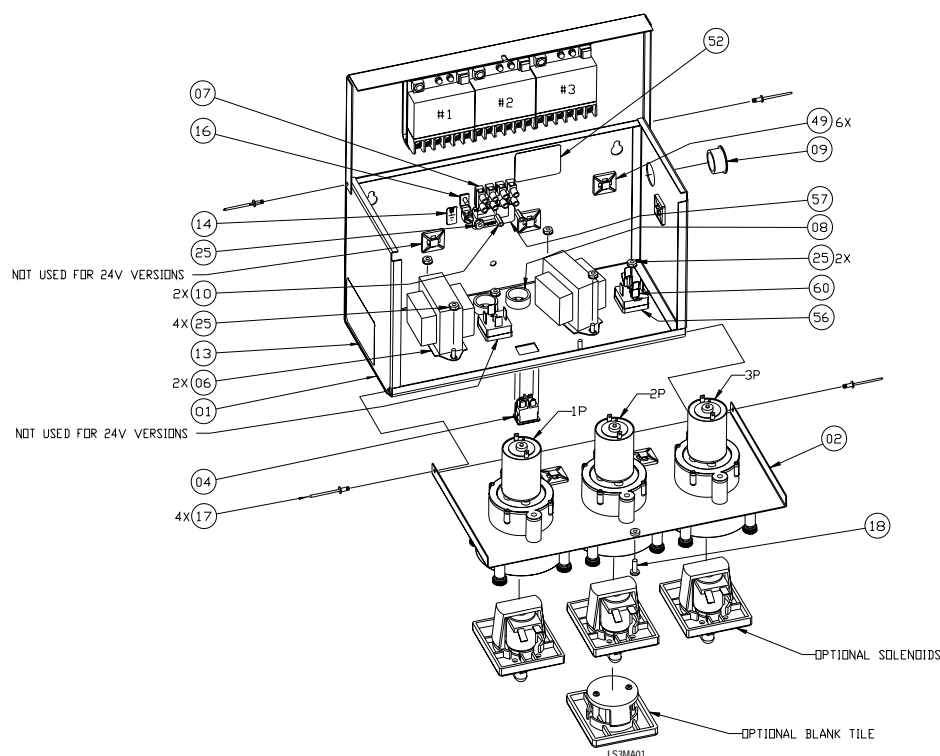
If you need to return an item for repair you must call or write to obtain an "RPR" number **before** you may return the product. The Repair Department will issue a unique Return Product Request (RPR) number for any product that satisfies the Warranty requirements. Multiple items in a single shipment will not normally require multiple RPR numbers,

but always make sure that the Repair Department knows the entire extent of your shipment in case this general rule doesn't apply. Refer to this number in all your documentation, prominently display it on the outside of the shipping container, and refer to it if you need to call for information about the status of the repair.

It is very helpful to the Repair Department if you include in the shipping container a description of the problem, symptoms, failure or abnormality that precipitated the equipment's return.

Failure to obtain an authorization number before sending an item in for repair or replacement may seriously delay the repair and/or return of your equipment.

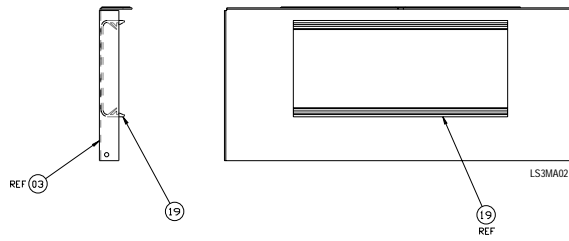
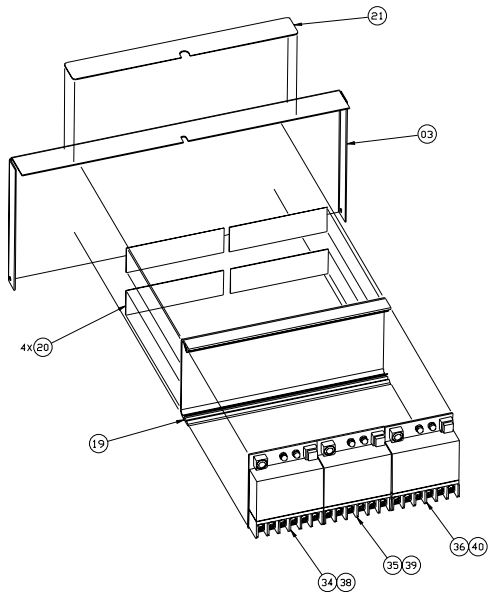
APPENDIX



Seq # Item # Description

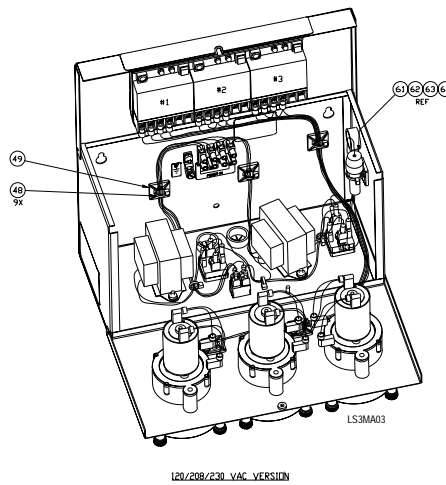
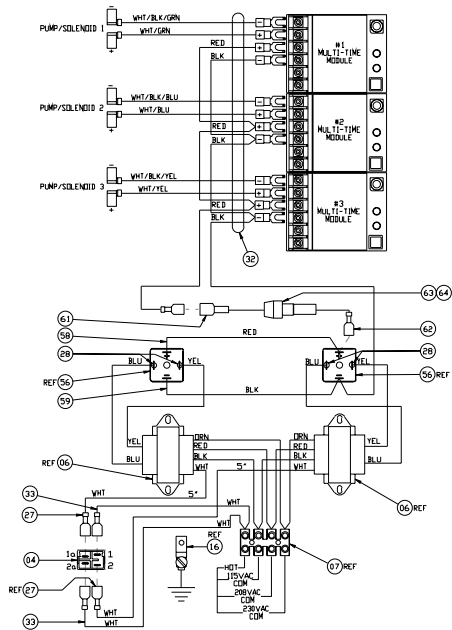
1	099171	ENCL BASE, SST, LS3 3 PROD
2	093842	DOOR, FRNT, SST, L2000, 3 PROD
4	037598	SW, DPST, RKR, ON/OFF, PNL, 4A/250V
6	050562	XFMR, PWR, 120/208/240, 40 VA
7	051124	TERM, BLK, 10MM, SCR, 4X2
8	031618	BSHG, SHTR, 7/8OD X 9/16ID, NYL
9	041235	HL PLG, PLSTC, 7/8", BLK
14	039409	LBL, GROUND SCREW
16	041711	TERM BLK, 1 X 1, PNL, GND LUG, #8
17	041155	RVT, POP, 1/8" X 1/8", DOME, SST
18	040993	SCR, PH PNH, 6-32 X 3/8, SST
21	098328	LBL, CVR
25	041088	NUT, KEP, 6-32
49	041323	TIWRP. AHR, ADH, RB, 3/4", NYL, NAT
52	038090	LBL, HZR, WARN, DSCNT PWER, HI V
56	043251	BRDG RECT, 50V, 25A, MDA2500, CMP
57	055708	LBL, TB, 4 P, 115-230V, HOT/NEUT

APPENDIX



Seq #	Item #	Description
3	093843	DR, TOP, SST, L2000, 3 PROD
10	041175	STDF, 3/16 HEX, 4-40 X 1/2, AL
19	056871	SNAP TRAC, CLTH, LS2, 7.00, LS2

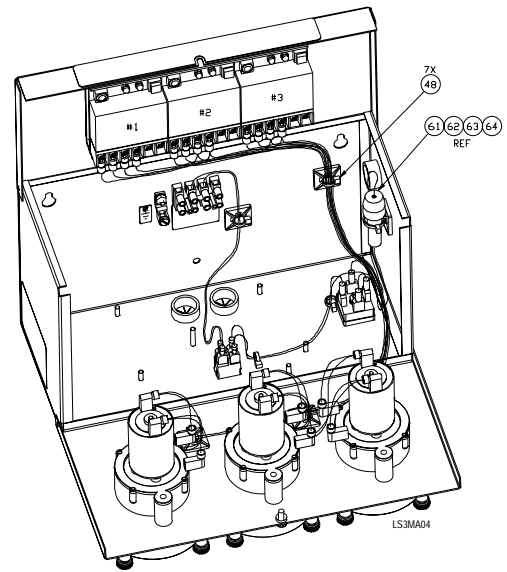
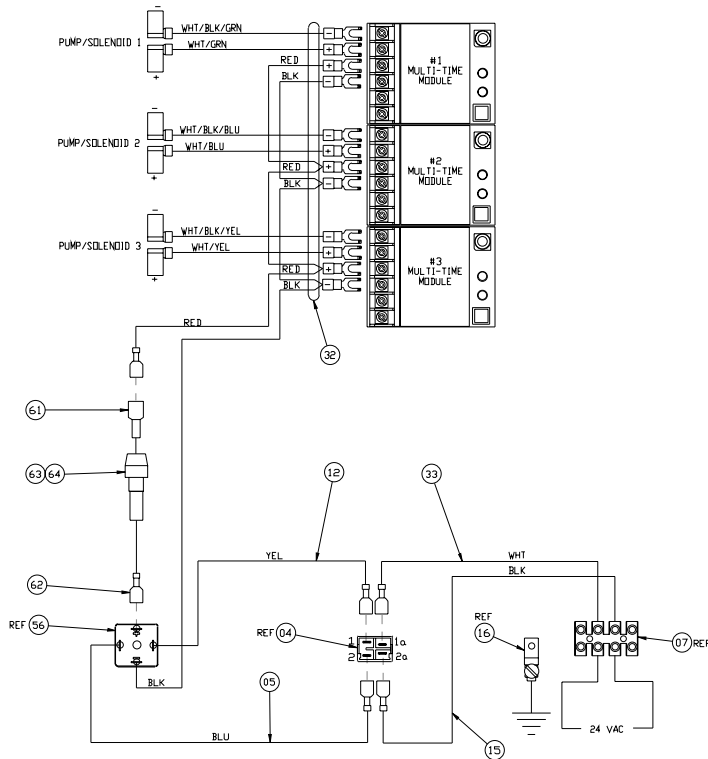
Seq #	Item #	Description
20	096070	ADH, SHT, ACR, 1 X 3.38, DBL S,15
34, 35, 36	097502	PCB ASSY, DC MULTI-TM
38, 39, 40	057753	PCB ASSY, MULTI-TM, DUMMY



Seq #	Item #	Description
4	037598	SW, DPST, RKR, ON/OFF, PNL, 4A/250V
6	050562	XFMR, PWR, 120/208/240, 40 VA
7	051124	TERM BLK, 10MM, SCR, 4 X 2
16	041711	TERM BLK, 1 X 1 PNL, GND LUG, #8
27	039569	TERM, CRP, QDC, 0.188 X 0.032, 22-18

Seq #	Item #	Description
28	050537	TERM, CRP, 18-22, QDC, 1/4F, INSUL
32	099182	HARN, LS3, 3 PROD
33	099257	WIRE, 18GA, 10, WHT, 3/16 FQDC
48	041318	TIWRP, 0.10 X 4L, NYL, NAT
56	043251	BRDG RECT, 50V, 25A, MDA2500, CMP

APPENDIX



24 VAC VERSION

Seq #	Item #	Description
4	037598	SW, DPST, RKR, ON/OFF, PNL, 4A/250V
5	099256	WIRE, 18 GA, 8, BLU, 1/4-3/16 FQDC
7	051124	TERM, BLK, 10MM, SCR, 4 X 2
12	099255	WIRE, 18 GA, 8, YEL, 1/4-3/16 FQDC
15	099254	WIRE, 18 GA, 10, BLK, 3/16 FQDC

Seq #	Item #	Description
16	041711	TERM BLK, 1 X 1, PNL, GND LUG, #8
32	099182	HARN, LS3, 3 PROD
33	099257	WIRE, 18GA, 10, WHT, 3/16 FQDC
48	041318	TIWRP, 0.10 X 4L, NYL, NAT
56	043251	BRDG RECT, 50V, 25A, MDA2500, CMP



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