

# XL

## Installation and Operating Manual



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### SAFETY



This symbol on the front of the unit means Caution (refer to accompanying documents).

Ce symbole situé sur la partie avant de l'appareil signifie « Mise en garde (consulter les documents joints).

Dieses Symbol vorne auf dem Gerät bedeutet ‚Vorsicht (siehe beiliegende Unterlagen)‘.

These symbols on or inside the unit mean:

Les symboles suivants apposés à l'intérieur ou à l'extérieur de l'appareil signifient:

Die Symbole an oder im Gerät bedeuten Folgendes:



Direct current

Courant continu

Gleichstrom



Alternating current

Courant alternatif

Wechselstrom



PROTECTIVE CONDUCTOR TERMINAL

BORNE DE PROTECTION POUR CONDUCTEUR

SCHUTZLEITERANSCHLUSS



On (Supply)

En marche (Alimentation)

Ein (Stromversorgung)



Off (Supply)

Arrêt (Alimentation)

Aus (Stromversorgung)



Caution, risk of electric shock

Attention : risque de choc électrique

Vorsicht! Gefahr eines elektrischen

Schlages



High voltage. Disconnect all power to this unit before servicing. Servicing should only be performed by qualified service personnel.

Mise en garde haute tension. Couper toutes les alimentations électriques de l'appareil avant de procéder à l'entretien ou à des réparations. L'entretien et les réparations doivent être effectués par un personnel qualifié conformément à la réglementation en matière de câblage électrique.

Vorsicht: Hochspannung. Vor der Wartung vom Netzstrom entfernen. Die Wartung darf nur von qualifiziertem Servicepersonal und gemäß den örtlichen Bestimmungen für elektrische Verdrahtung erfolgen.



- High voltage trigger signals may be present even when the dispenser is switched off.



- We recommend that personal protective equipment (such as safety glasses, gloves, face shields and aprons) be worn during installation and servicing.
- Adding or replacing pumps, pump tubes or other components should only be performed by qualified personnel.
- Ajouter ou remplacer des pompes, des tuyaux de pompes ou d'autres composants ne doit être effectué que par un personnel qualifié.
- Der Einbau oder Ersatz von Pumpen, Pumpenschläuchen oder anderen Komponenten sollte nur von qualifiziertem Fachpersonal durchgeführt werden.



- Electrical connections should only be performed by trained personnel in accordance with local electrical wiring regulations.
- Les connexions électriques doivent être effectuées par un personnel qualifié en se conformant au code de l'électricité local.
- Elektrische Anschlüsse sollten nur von Fachkräften gemäß den anwendbaren Bestimmungen für elektrische Installationen vorgenommen werden.



- Acid (or other potentially reactive or incompatible chemicals) must not go directly into the flush manifold.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Wird das Gerät nicht gemäß den Herstelleranweisungen verwendet, kann die Schutzvorrichtung des Geräts beeinträchtigt werden.



- Only use trigger and main power wiring hole connections which provide strain relief, such as cable glands, strain reliefs, or conduit connections. Conduit is recommended.
- Use only double-insulated (0.8 mm) reinforced wire for main power and trigger connections, subject to local electrical code requirements.
- Auxiliary enclosure ground wire must be connected to the right ground lug stud, under the lock nut.



Trigger voltages must all be either above or below 42 VAC/60 VDC. Do not mix trigger voltages less than 42 VAC/60 VDC and greater than 42 VAC/60VDC on the same unit.

Les tensions de déclenchement doivent être toutes soit supérieures soit inférieures à 30 V tension RMS/42 V crête/60 V courant continu. Ne pas mélanger des tensions de déclenchement inférieures ou supérieures à ces limites sur le même appareil.

Alle Auslösespannungen müssen entweder über oder unter 30 V Effektivspannung / 42 V Spitzenspannung / 60 V Gleichspannung liegen. Auslösespannungen über und unter diesen Grenzwerten dürfen nicht am gleichen Gerät kombiniert werden.

## INTRODUCTION

XL is a two-to-eight pump, 16-formula dispenser designed for laundry and industrial applications. Though required for formula selection, calibration and priming, the programmer doesn't need to remain attached after a Relay, AFS or TAFS Mode installation. The programmer is required for most non-Relay Mode installations because it is used by the operator to view alarms and select which formula to run, and by technicians for setting up the dispenser and retrieving data.

Installations that use only one formula, such as coin laundries where each pump delivers the same amount of detergent each time to a different washer, don't require formula selection. Therefore, there is no need to have a separate programmer for each account. The same programmer can be used to install other units.

The XL enclosure holds up to six 600 Series (16.9 oz/min) or 2000 Series (67.6 oz/min) pumps. A two-pump auxiliary enclosure can be added if needed.

For enhanced accuracy, XL has a dose verification feature that allows you to check the volume of chemical dosed against the volume shown on the programmer.

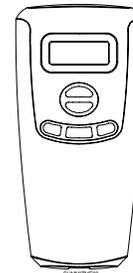


Figure 1. Programmer

## SPECIFICATIONS

### XL PUMP BOX

Width	Height	Depth	Weight
82 cm	23 cm	15 cm	19 kg
32 in	9 in	6.0 in	42 lbs

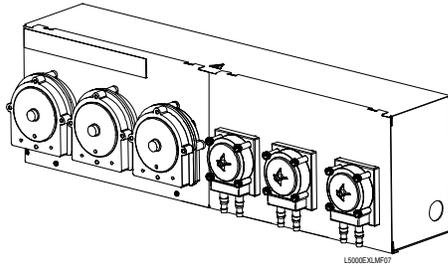


Figure 2a. XL Pump Box

### XL AUX BOX

Width	Height	Depth	Weight
28 cm	23 cm	15 cm	19 kg
11 in	9.5 in	6 in	42 lbs

### RATINGS AND CONFORMANCE FOR ALL SYSTEM MODULES

CSA, UL, CE: EN61010, EN61326, using Pollution Degree 2, Installation Category II.

TUV: GS (pump box only, not required on low-voltage programmer)

Intended for indoor use only.

### Enclosure Material

Stainless 304

### Pumps (2000 or 600 Series)

Peristaltic, dual roller, self-priming and self-checking

### Power (not CE Compliant)

90-260 VAC, 47-440 Hz, 200 watts (XL) or 65 watts (E)



*The XL uses ONLY the 98 RPM 2000 Series motor. The 200 RPM 2000 Series motor should not be used with XL.*

### CE Compliant Power

100-240 VAC 50/60 Hz, mains supply fluctuations not to exceed  $\pm 10\%$

### Transport Tubing

12mm or 1/2" nylobraid, EVA, or equivalent for 2000 Series pumps

10mm or 3/8" nylobraid, EVA, or equivalent for 600 Series pumps

10mm or 3/8" nylobraid, EVA, or equivalent for 100 Series pumps

### Water Valve Output

24 VDC, 0.5 Amps

### Altitude

Maximum operating altitude 2000 meters (6500 feet)

### Pump Drive Outputs

24 VDC, 1 amp nominal (2 amp max)

### Power Switch

On/off rocker switch on pump box

### Internal Ambient Temperature Range

41 - 104°F (5 - 40°C)

### Humidity

Maximum humidity 90% at up to 40°C (104°F)

### Mounting

Screw-mounting, using holes on back of box, or optional rail-mounting. Indoor use only.

### Nominal Flowrate

2000 Series Pump: 2000 ml/min (67.6 oz/min) with standard Biwall tubing

600 Series Pump: 500 ml/min (16.9 oz/min) with standard EPDM tubing

100 Series Pump: 100 ml/min (3.4 oz/min) with standard high-flow flex tubing

Eight XL pumps can run simultaneously. XL's maximum pump run time is 5 minutes on 20 minutes off with up to 3 pumps running simultaneously, or 30 seconds on 2 minutes off with up to 8 pumps running simultaneously.

With a manifold attached to washer extractors, only one pump runs at a time. When multiple chemicals are requested simultaneously, the highest number pump runs first to minimize wait time for ancillaries.

When a tunnel flush manifold is attached, one pump per module runs simultaneously. When multiple chemicals are requested simultaneously for the same tunnel module, the highest number pump runs first.

### Pump Distance

The distance you can pump depends on:

- Pump size
- Transport tube diameter
- Chemical viscosity

### Pump Distance Guidelines

100 Series pumps can pump up to 15 feet (4.6 meters)

600 Series pumps can pump up to 20-30 feet (6-9 meters)

2000 Series pumps can pump up to 50 feet (15 meters)

Long tube runs shorten tube life, so we recommend avoiding them. When you need to transport chemical farther than 50 feet, or transport a viscous chemical, use a flush manifold. Generally, we only recommend using manifolds for distances

up to 100 feet (30 meters) away, but some users have found they function well even at a distance of 200 feet (60 meters).

### Alarm Output

Alarm output: 24 VDC, 0.5 Amp max

## TRIGGER MODULE

### TR-8000

Width	Height	Depth	Weight
13.3 cm	10.2 cm	3 cm	0.15 kg
5.25 in	4 in	1.2 in	0.33 lbs

### TR-8000 L

Width	Height	Depth	Weight
13.4 cm	11.13 cm	4.5 cm	0.15 kg
5.25 in	4.38 in	1.0 in	0.33 lbs

### Trigger Inputs

TR-8000: 8, optically-isolated (one common)

TR-8000 L: 8, optically-isolated, independent (separate common)

### Trigger Input Ratings

For TR-8000: 24 - 120 VDC, 24 - 240 VAC, 47K ohm impedance\*

For TR-8000 L: 24 - 120 VDC, 24 - 240 VAC, 47K ohm impedance\*



*\*47k-ohm impedance limits the trigger input current to 5mA or less. See **Programming** section for voltage sensitivity setting. Each of the trigger channels is optically isolated from the system.*

### Power

5 VDC, supplied by pump box

### Connection

Plug-and-play, 8-pin RJ-45 telephone cable, connected to pump box. Maximum distance from pump box to trigger module is 100' (30.5 meters).

## PROGRAMMER

Width	Height	Depth	Weight
7.6 cm	15 cm	3.8 cm	0.15 kg
3 in	6 in	1.5 in	0.32 lbs

### Display

2-line, 8-character LCD, "Super Twist"

### Power

5 VDC, supplied by pump box

### Connection

8-pin, RJ-45 telephone-type plug-and-play cable, connected to trigger module. Maximum distance from pump box to programmer is 100' (30.5 meters).

## FLUSH MANIFOLD (OPTIONAL)

### Material

Polypropylene manifold, polypropylene check valve with Viton ball, EPDM flow control.

### Water Inlet

Minimum 1.2 liters (0.3 gallons) per minute, (about 10-60 psi/0.7-2.8 bar, issues "no flow" alarm if flow is out of range)

If exceeding 60 psi, use a pressure regulator (such as #050892)

OPL manifold inlet = 1/2" barb, outlet = 1/2" barb

XL manifold inlet = 1/2" barb, outlet = 1/2" barb

Tunnel manifold inlet = 3/4" barb, outlet = 1/2" barb

### Power

24 VDC, supplied by pump box

### Maximum Water Temperature

140° Fahrenheit (60° Celsius)

## MODES OF OPERATION

### Sequence Mode

- Operator selects load class name formula from the programmer, just as in Formula Mode.
- Operates using only the drain signal as a trigger.
- Useful for non-programmable, fixed-cycle washers, or washers where triggers are difficult to find.
- Performs one step per drain signal. Possible steps are:
  - "I" to ignore a particular trigger (wait for next trigger signal).
  - Pump actions. Up to 3 different pumps may be activated per step, each pump having its own distinct chemical amount. In addition, each pump may be programmed with its own delay time. Delay time countdown begins when the trigger signal is received.
  - "E" to end a sequence.
- Allows you to program up to 16 formula sequences.
- Allows you to program up to 16 steps per sequence. You can configure them to run with or without a drain signal, or without pressing the start button. By using the auto-start feature, the sequence will automatically begin when the operator starts the washer.

### Formula Mode

In Formula Mode, each of the 7 triggers\* can initiate up to 3 pump actions.

- Use with washers that have mechanical or chart-type controllers.
- Allows for 16 formulas, where you can run up to 3 pumps from any of the 8 triggers.
- Allows you to program delay times prior to each pump's run cycle. Pump amounts are set volumetrically.

- Runs a single formula if the programmer is disconnected.
- Automatic Formula Selection (AFS) available. AFS allows the dispenser to automatically select the desired formula or load class based on the timing of electrical signals from the washer to trigger 8 (T8) on the TR-8000 trigger module. **AFS is only available for Formula and Latched Modes.**

*\*T8 cannot be used for pump actions. It is only used for AFS monitoring*

### Latched Formula Mode

Latched Formula Mode is a variation of Formula Mode. In Latched Formula Mode, the XL “latches” a trigger signal the first time it occurs during the wash cycle, ignoring subsequent requests from that trigger until the programmed “End” pump finishes its assignment.

- Used with systems that have electrical noise, reoccurring triggers, or supply signals that are periodically interrupted because of water level changes.
- Programming is the same as Formula Mode, except you must specify an “End” pump that will signal the system to unlatch.
- Automatic Formula Selection (AFS) available. AFS allows the dispenser to automatically select the desired formula or load class based on the timing of electrical signals from the washer to trigger 8 (T8) on the TR-8000 trigger module. **AFS is only available for Formula and Latched Modes.**

### Smart Relay Mode

Smart Relay Mode is a time-controlled triggering Mode. The length of the trigger signal determines the pump amount; the dispenser pumps a programmed volume of chemical per second of trigger on-time.

- In Smart Relay Mode, the XL pumps are controlled by triggers sent directly from the washer.
- Used with programmable, microprocessor-controlled washers.
- The length of the washer trigger signal determines the volume to be pumped. The XL delivers a preset amount of chemical for each second of trigger on-time.
- Up to 8 pumps can run at one time. With the manifold attached, only one pump runs at a time. When multiple chemicals are requested simultaneously, the highest number pump runs first to minimize wait time for ancillaries. With the tunnel flush attached, up to one pump per module run simultaneously.
- After installation, the programmer is not required for operation.

### TAFS: Tunnel Automatic Formula Selection

- For TAFS, dose volumes and delays are programmed for each pump in each formula.
- Pumps are assigned to tunnel modules.

- Using T1 as a batch-transfer signal, the dispenser tracks which load class is in which module so it can dose the correct formula into each module.
- All the pumps run simultaneously if no flush is attached. If flush is attached, up to one pump per module runs simultaneously.
- Formulas are logged as complete as soon as the dispenser receives the first batch transfer signal.

## DOSE VERIFICATION

This feature is available with PCB firmware versions 3.10 and higher. Dose verification allows you to verify the accuracy of programmed pump volumes without starting the washer in Formula or Latched triggering modes. See **Dose Verification** in the **Programmer-Level Access** section in the **PROGRAMMING** chapter for directions.



*When using a flush manifold, it is VERY important that you disconnect the discharge tube from it before starting the dose verification procedure. Dose verification ignores the presence of a flush manifold and if you attempt to run dose verification without disconnecting the discharge tubing from the flush manifold, chemical will enter into the manifold without water flushing, potentially creating a chemical--mixing hazard.*

## ORDERING INFORMATION

### Recommended Spare Parts and Accessories (will need to add new part numbers pertaining to upgrade)

XL Printed Circuit Board	1205112
XL Power Supply Printed Circuit Board	1206790
Sour Flush Kit	069505
Cable Extension Kit, 25 Feet	068855
100' Cable	1204588
Low Level Drum Lance	1201180
Low Level Sonic Alarm	1200452
Temperature Hygiene Probe Kit	068976
Strain Relief PG16 0.5"	090369
Alarm I/O Connectors	1201005
2000 Series Motor/Gearbox 98 RPM	1203895
600 Series Motor/Gearbox	093493
100 Series Motor/Gearbox	051351
Straight fitting, 1/2" MPT-1/2" B polypropylene	055707
Straight fitting, 3/8" B-, 3/8" B polypropylene	1202524
Straight fitting, 3/8" B-1/2" B polypropylene	1202525

Straight fitting, 3/8" B-3/4" B polypropylene	1202526
T Fitting, 1/2" MPT, 1/2" B-1/2" B, polypropylene	1202520
T Fitting, 1/2" MPT, 1/2" FPT-1/2" FPT, PVC	1202521
T Fitting, 3/4" MPT, 3/4" B-3/4" B, polypropylene	1202527
XL Flush manifold, 8 port w/4 hole plugs, 6 check valves, flow switch, pressure switch, 60 psi flow washer, water strainer and brass solenoid	1204845
Flush manifold check valve	1203747
T Fitting, 3/4" MPT, 3/4" FPT-3/4" FPT, PVC	1202528
T Fitting, 1 x 1/2" B, 2 x 3/4" B, PVC	035517
Hole plug, 1/2" MPT, polypropylene	1202529
Hole plug, 3/4" MPT, polypropylene	1202530
Strain relief, PG16, 3/4"	090369
Clog-resistant check valve	1203747
Standpipe for single 3/8" ID-1/2" OD Nylobraid tube, PVC snap-in 1/2" ID x 18" long	1202756
Standpipe and footvalve, 1/2" ID, 1/2" FPT w/ 1/2" MPT-1/2" B fitting	1202522
Standpipe and footvalve, 3/4" ID, 3/4" FPT, w/ 3/4" MPT-3/4" B fitting	1202523
RP2 backflow prevention valve without distribution manifold	035297
Suction lance w/ low level alarm, 3/8" B	1201071

## OPERATION

In Sequence, Formula and Latched Modes, laundry workers use the +/- buttons to select the formula name.

- When working in Smart Relay Mode, no formula selection is necessary, and the programmer doesn't need to be attached except during installation. But it will be required to prime or read data.
- When working in Sequence Mode, the end user pushes the ACTION button to start the sequence. If automatic start is enabled with a "start" trigger on T3, it is only necessary to select the sequence name with the +/- buttons).
  - To cancel a sequence that is in progress, hold the ACTION key down for 5 seconds.
  - If the programmer is disconnected while in Latched, Formula or Sequence Mode, the dispenser will continue to run the formula that is selected.
  - When working in TAFS Mode, the formula is automatically selected so the operators don't need to use the programmer for formula selection.

- When AFS is in use, the programmer's "+" and "-" keys cannot be used to manually select the formula.



*If the power is toggled, formula will reset to formula/sequence #1.*

*On E pump boxes, a light on the front of the pump box shows when the power is on.*

## INSTALLATION AND SETUP

### Factory Default Programming Values

- Trigger Mode: Relay
- Formula names: F1 to F16
- Trigger voltage selection: High ("h") (65 – 240 VAC)
- Language: English
- Units: oz
- AFS—off (blank field)

### Mounting Pump Box



- For non-flushed systems, install pump box 5 meters (15 feet) or less from the washer, with a maximum vertical rise of 3 meters (10 feet).
- For flushed systems, install the pump box within 17 meters (50 feet) of the washer with a maximum vertical rise of 3 meters (10 feet).
- Mounting the XL too high may result in compromised flow rates and excessive tube wear.

1. Install screws into the wall such that pump box will be at eye level.
2. Mount pump box(es) directly onto the wall by aligning the keyhole slots with the screws.

### Connecting Pump and Transport Tubing

#### Pump Tubing



*To protect against pressurized chemical spray, wrap a rag around tube connections when replacing tubes, and always wear gloves and safety glasses.*

*Pour une protection contre les projections de produits chimiques pressurisées, entourer les connexions avec un chiffon pendant le remplacement des tubes.*

*Zum Schutz vor unter Druck stehenden Chemikalien sollte beim Austauschen der Rohre ein Lappen um die Anschlüsse gewickelt werden*

Position chemical drums as close to the dispenser as possible to minimize the suction tube run length.

## Transport Tubing



Do not run tube above electrical connections and boxes. Provide adequate clearances near steam pipes and other hot surfaces.



The viscosity of the products being pumped will impact flow rate and the maximum distances chemical can be transported without flush.

For 100 or 600 Series pumps we recommend 10 mm or 3/8" ID tubing. Connect the transport tube to the right pump barbs and run the tube to the washer or a flush manifold. Special 100 Series pump tubing like Viton for dry cleaning or solvent pumping applications may require 1/4" transport tubing.

For 2000 Series pumps, use a 1/2" ID or larger tubing for chemical suction and transport to the washer. Because the manifold uses 3/8" fittings, only use 3/8" between the pumps and the manifold. For viscous chemicals, use 3/4" ID tubing for suction and transport to the washer.

Regardless of the pump size, we recommend stiff tubing such as nylobraid when pumping viscous chemicals, especially if the product is over 100 centerpoise.

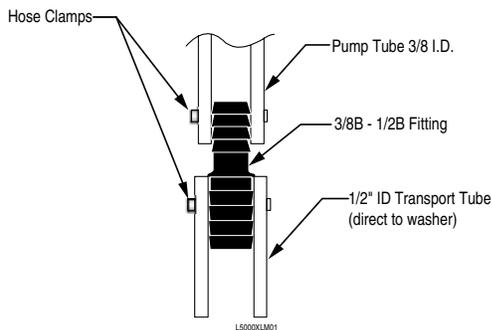


Figure 2a. 2000 Series Tube Fitting Connection  
(from drum and direct to washer)

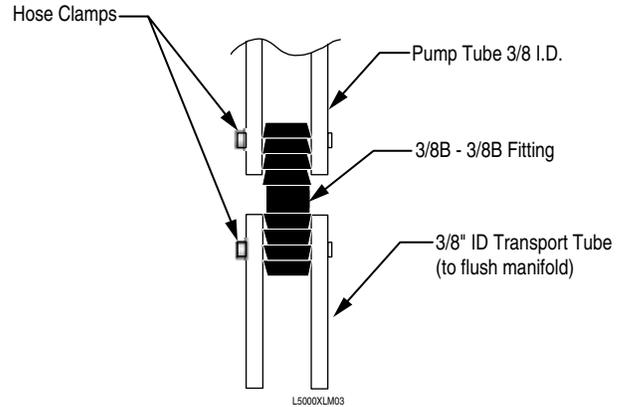


Figure 2b. 2000 Series Tube Fitting Connection  
(to flush manifold)



Never use transport tubing under 3/8" ID, except with 100 Series pumps. Smaller tubing can reduce the flow rate, especially when pumping chemicals without flush over longer distances. You may need larger diameter tubing if pumping chemicals over 4.5 meters (15 feet).

1. Connect transport tubing to pump inlet/outlet barb fittings.
2. Secure with metal hose clamps.

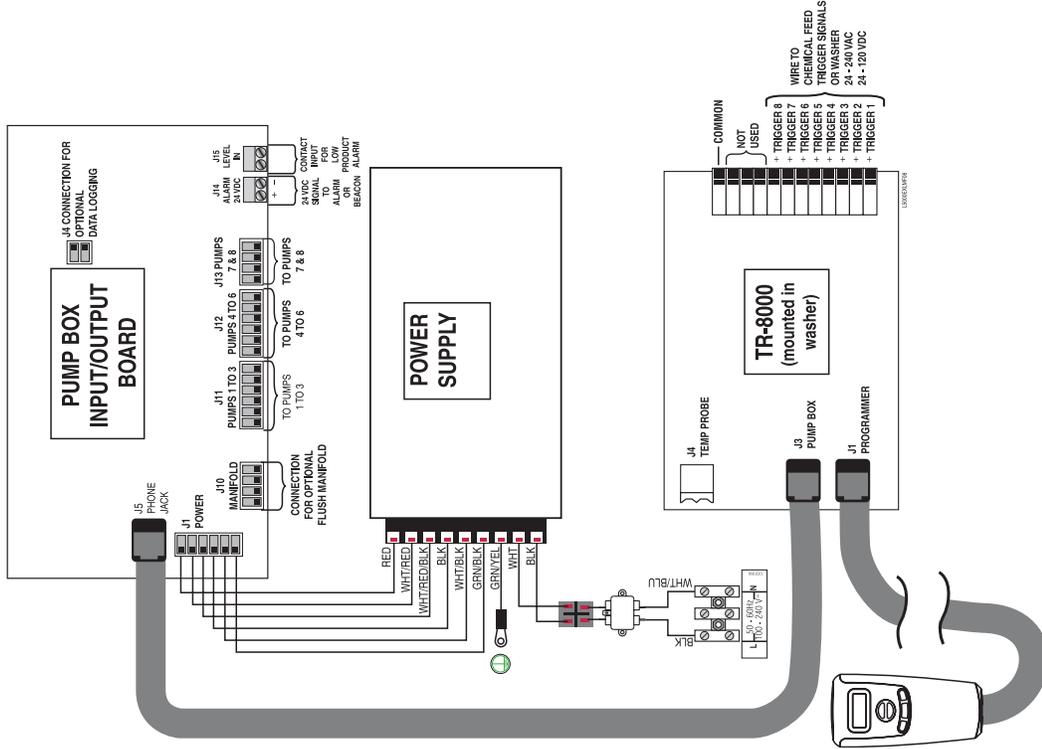


Figure 3. XL System Pump Box Wiring with TR-8000

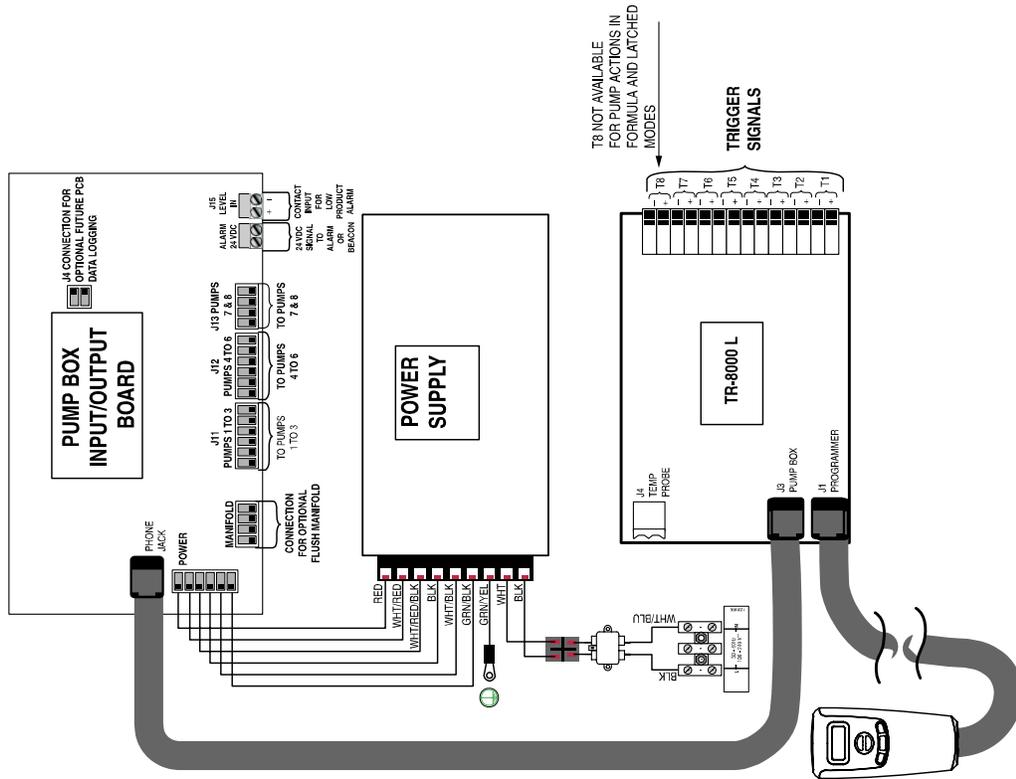


Figure 3a. XL System Pump Box Wiring with TR-8000 L

## Wiring: Main/Ground Connections

### Opening the Unit

1. On an E pump box, loosen the screws on the front of the dispenser cover. The lid can then be lifted and door tilted open.
2. On an XL pump box, remove the two screws from the faceplate, swing the bottom of the door open and lift the backplate up out of the pump box. Hang XL faceplates on the front lip as shown below.

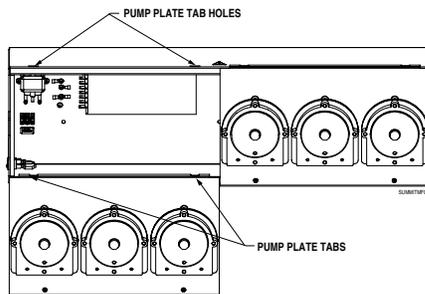


Figure 3b. XL Hanging faceplate on front lip.



- Use only double-insulated (0.8 mm) reinforced wire for main power and trigger connections, subject to local electrical code requirements.
- Trigger and main-power wiring must have connections that provide strain relief, such as cable glands, strain reliefs or conduit connections. Conduit is recommended.
- A circuit breaker must be included in the building installation. It must be installed in close proximity to the equipment and within easy reach of the operator, and it must be marked as the disconnecting device for the equipment.
- Hole plugs must be used on holes through which you have not routed wires.

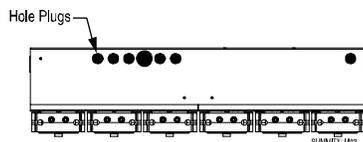


Figure 3c. XL, 6-Pump, Bottom View

- If wires are routed through holes, the holes must also be plugged using cable glands, conduit, etc.
- Use 15 amp branch circuit protection.
- When installing power wiring through a conduit fitting, electrical insulation must be provided to prevent the wires from wearing against possible sharp edges of the fitting.

- Utiliser un câble renforcé à double isolation (0,8 mm) pour les connexions de l'alimentation principale et celles de déclenchement, en se conformant aux exigences du code de l'électricité local.
- Les câbles de déclenchement et d'alimentation principale doivent être dotés de connexions fournissant une réduction de tension telles que goupilles de câble, réducteur de tension ou raccords de conduit. Les raccords de conduit sont recommandés.
- Un disjoncteur doit faire partie de l'installation de bâtiment. Il doit être installé à proximité de l'équipement, être facilement accessible par l'opérateur et porter l'indication qu'il est destiné à déconnecter l'équipement.
- Des bouchons doivent être posés sur les trous par lesquels aucun câble ne passe.
- Si les fils électriques passent dans des trous, les trous doivent également être bouchés à l'aide de goupilles de câble, d'un conduit, etc.
- Utiliser une protection de la dérivation de 15 ampères.
- Lorsque les fils électriques sont installés en passant par un raccord de conduit, prévoir une isolation électrique afin d'éviter que les câbles ne s'usent au contact des angles à vif du raccord.



- Für Netz- und Auslöseanschlüsse dürfen nur doppelt isolierte (0,8 mm), verstärkte Drähte verwendet werden, die alle anwendbaren Bestimmungen und Normen für elektrische Installationen erfüllen.
- Die Anschlussseiten der Auslöse- und Netzleitungen müssen mit einer geeigneten Spannungsentlastung, wie z. B. Kabelstutzen, Spannungsentlaster oder Kabelrohrverbindungen, ausgestattet sein. Ein Kabelrohr ist empfehlenswert.
- Bei der Gebäudeinstallation muss ein Leistungsschalter verwendet werden. Dieser Schalter muss in unmittelbarer Nähe des Gerätes installiert werden, leicht für den Bediener erreichbar und als Trennvorrichtung für das Gerät gekennzeichnet sein.
- Öffnungen, durch die keine Drähte geführt werden, müssen mit Blindstopfen verschlossen werden.
- Wenn die Kabel durch Löcher hindurch verlegt werden, müssen die Löcher durch Kabelverschraubungen, Kabelrohre usw. zugestopft werden.
- Den Schaltkreis mit einer 15-A-Sicherung schützen.
- Beim Installieren von Stromkabeln durch einen Kabelrohranschluss muss elektrische Isolierung verwendet werden, um die Leitungen vor den ggf. scharfen Kanten des Anschlusses zu schützen.



Never splice XL telephone cables together, because this frequently results in an unreliable connection and "system errors". Instead, use the Cable Extension Kit, #068855 to join two 25' (7.6 meter) cables together into a 50' (15.2 meter) cable. A 100' cable can be used between the pump box and the trigger module if in Relay Mode with no programmer, but you must never use two 100' cables as problems will result.

1. Crimp a 10-12 GA (4mm<sup>2</sup>) ground wire to one of the ring terminals on the bottom of the pump box using a Panduit CT550 or CT-100 installation tool.

Sertir un fil de mise à la terre de 4 mm<sup>2</sup> sur l'une des cosses situées sur la base de l'âme de la pompe à l'aide d'un outil Panduit CT550 ou CT-100.

Einen 10-12 ga (4 mm<sup>2</sup>) Erdungsdraht unter Verwendung des Panduit CT550 oder CT-100 Installationswerkzeugs an einen der Ringkabelschuhe an der Unterseite des Pumpenkastens crimpen.



Grounding is required for safety. It also increases the dispenser's resistance to electrical noise.

La mise à la terre est requise pour des raisons de sécurité. Elle protège également la résistance du distributeur contre les parasites d'origine électrique.

Zur Gewährleistung der Sicherheit ist ein Erdungsanschluss erforderlich. Dadurch wird auch die Beständigkeit des Spenders gegen elektrisches Rauschen verbessert.

2. Connect the mains voltage to terminal strip according to its "L" (hot) and "N" (neutral) label designations (See Figure 3). The mains input is rated for 100-240 VAC, 50-60 Hz, 320 watts (for XL) or 65 watts (for E). There is no difference in wiring between 100 and 240 volt power supply.



Failure to properly ground the system may cause the system to exceed emissions standards.



The ground wire must be longer than the mains wires.



Power connections must be made by qualified service personnel in accordance with local wiring codes. The mains connection should contain a service disconnect and circuit breaker suitable for the application.



We recommend that you attach the main system ground to the bottom ring terminal to provide a more secure ground connection.

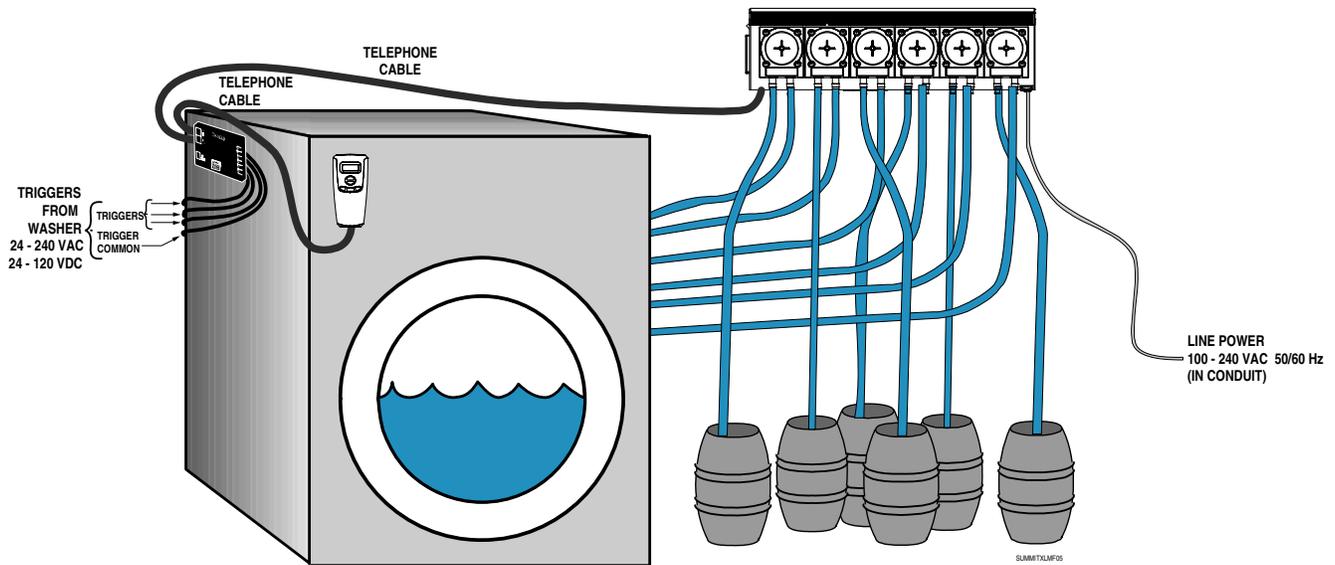


Figure 4. XL Installation with TR8000 Trigger Module (must be mounted inside washer)

## Wiring: Trigger Signals



Ensure that the trigger wire voltage and temperature rating are suitable for the application.

As the current required for the triggers is only 5mA, the wires may be of any convenient size. Wires must have the appropriate insulation for the trigger voltages being used.

The trigger circuit board serves as the high-voltage interface between the washer supply trigger signals and the XL.

The TR-8000 always comes in a separate enclosure for mounting inside the washer. Inside washer mounting must be in a location that restricts access to its high-voltage wiring connections and ensures that all creepage and clearance distances are maintained between primary and secondary circuits.

1. If using an external trigger board, use the second cable to attach the trigger board to the pump box PCB.



If the cable is too long, coil the extra cable and tie wrap it to a fixed point so the weight of the cable won't be pulling on the cable plug socket.

If the washer is more than 25' (7.6 meters) from the pump box, use a Cable Extension Kit (068855) to extend the wire. Maximum length from the pump box to the programmer is 100' (30.5 meters). If the cable is extended over 100', system errors could result. Do not splice wires, as this often creates an unreliable connection. Special crimping tools and training are required to do this reliably.

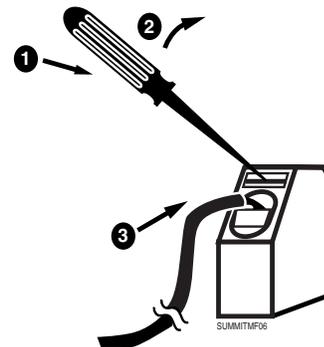


Figure 5. Opening Wire Clamp Window

2. Connect supply triggers to terminals: trigger wire #1 to trigger #1"+", trigger wire #2 to trigger #2"+ and so on, going from left to right as you face the terminal strip. As shown in Figure 5, insert a small screwdriver into the top hole to open the wire clamp windows.
3. Connect common: The TR-8000 uses one common (indicated by a "-") for all eight triggers. Connect common to "- (T1-T7\*)". The TR-8000 L has separate signal commons with jumpers between them, so one common from the washer supply connects to any one of the jumpered connections. But you can attach separate commons if needed from washers (normally older) that do not have a single common. Be sure to remove the required jumpers if commons are separate.

\*T8 is not available as a pump action trigger signal in Formula and Latched Modes.

## Sequence Mode Connection Information

### Manual-Start Connections

For standard Sequence Mode installations, connect the drain signal to trigger 1 (T1“+”). Pushing the ACTION button will start the sequence.

### Auto-Start Connections

For automatic start triggering in Sequence Mode, connect the T1 signal as described above. Connect a “start” signal to T3. The start signal can be any signal that indicates the start of the wash process, such as machine-on light. In this mode, it is not necessary to press the ACTION key (the T3 signal represents this action.).

### Formula Mode Connections

The Formula Mode trigger signals are typically derived from flush hopper solenoid signals, or are dedicated supply signals provided by the washer manufacturer. Consult the washer schematic.

### Smart Relay Mode Connections

Smart Relay Mode triggers are generally available as dedicated outputs from the washer microprocessor. Typically, they have a single common connection.

### AFS Mode Connections

Same as Formula Mode trigger signals, only T8 will be monitored and used to select formulas automatically based on programmed trigger timing schemes. See **Timing Schemes for Other Dispensers** in the APPENDIX for details about timing schemes.

### TAFS Mode Connections

TAFS Mode uses Formula Triggers and a Set Formula Trigger from the washer. These triggers provide information on what formula is being loaded into the tunnel. Also, a Batch Transfer Trigger tracks the load through the tunnel so the right chemicals for that load type get dosed into the appropriate module.

The simplest TAFS programming involves:

- Have all trigger signals off for 10 seconds minimum
- Turn on the Formula Triggers Required for 5 seconds, then turn them off
- Five seconds after the last Formula Trigger is turned off, turn on the Set Formula Trigger T7 for 5 seconds, then turn it off
- Turn on the Batch Transfer Trigger T8 whenever the load transfers, then turn it off. Ensure that it has remained off for 5 seconds minimum before turning on the other triggers.

Formula number	Formula Triggers Required	Set Formula Trigger	Batch Transfer Trigger
No chem	None	T7	T8
1	Turn on T1	T7	T8
2	Turn on T2	T7	T8
3	Turn on T1 + T2	T7	T8
4	Turn on T3	T7	T8
5	Turn on T1 + T3	T7	T8
6	Turn on T2 + T3	T7	T8
7	Turn on T1 + T2 + T3	T7	T8
8	Turn on T4	T7	T8
9	Turn on T1 + T4	T7	T8
10	Turn on T2 + T4	T7	T8
11	Turn on T1 + T2 + T4	T7	T8
12	Turn on T3 + T4	T7	T8
13	Turn on T1 + T3 + T4	T7	T8
14	Turn on T2 + T3 + T4	T7	T8
15	Turn on T1 + T2 + T3 + T4	T7	T8
16	Turn on T5	T7	T8

### Notes:

- Any trigger must be on for two seconds to qualify.
- Any trigger must be off for two seconds to be counted as off ( to qualify as off).
- Formula Triggers can be turned on simultaneously and/or sequentially, but there must not be a gap between them of 10 seconds or more; after 10 seconds with all Formula Triggers off, Formula Triggers previously received will be disregarded.
- **The Set Formula Trigger must be received within 10 seconds of the last Formula Trigger, or no chemical will be dosed.**
- If a given Formula Trigger is received more than once prior to the Set Formula Trigger, no error will result and it will still be counted as having been received once.
- If the Batch Transfer signal is received without previously or simultaneously getting the Set Formula Signal, no formula will be set and no chemical will be dosed to that load as it travels through the tunnel.
- At your option, you may use a single signal for Set Formula and Batch Transfer, connecting the signal wire to T7 and jumping it to T8. If you do this you have to be sure the last Formula Trigger occurs within 10 seconds of the start of the Set Formula/ Batch Transfer Signal, or no formula will be set.
- If any Formula Trigger is left on continuously, the Formula Triggers will not clear.

- Always keep the Formula Triggers off for 10 seconds after the Set Formula Trigger, so they are cleared out of memory and don't get counted as Formula Triggers for the next batch after transfer.
- If the Formula Triggers do not clear, and no new Formula Triggers are received, the same formula will be set for the next load. If the Set Formula triggers and Batch Transfer triggers keep getting received with each transfer, the same formula will be set continuously.
- If the Formula Triggers do not clear, and a new Formula Trigger is received, upon receipt of the next Set Formula trigger the formula setting will change to that of a new trigger if the total combination of triggers is a valid combination for one of the formula numbers above.
- Any receipt of a formula trigger combination that is invalid will result in no chemical being dosed for that load as it moves through the tunnel.

### Low Level Alarm Input Wiring

Connect low-level sensor input(s) to LEVEL IN on the pump box's circuit board. If there are too many inputs to fit, combine all wires of the same color with wire nuts, and have another wire go from each wire nut to LEVEL IN. Any contact closure across the input will cause the dispenser to display a LOW CHEM alarm, while also providing a 24 VDC 0.5 Amp alarm output.

### Alarm Output Wiring

XL provides a 24 VDC output. It will activate whenever an alarm condition is present.

- To activate an alarm with the 24 VDC output, connect any 24 VDC alarm device to ALARM 24V. When using the audible alarm (code #1200452), mount the alarm in a conduit hole under the unit. Use wire nuts to extend the wires, and connect the red wire to ALARM 24V+ and the black wire to ALARM 24V-.



24 VDC alarm output is fuse-limited to 0.5 Amp.

### Hygiene Temperature Probe Connection

Connect the temperature probe (#068976) to the Temp Probe input on the washer interface module. On external trigger modules a picture of a thermometer is above this connection.

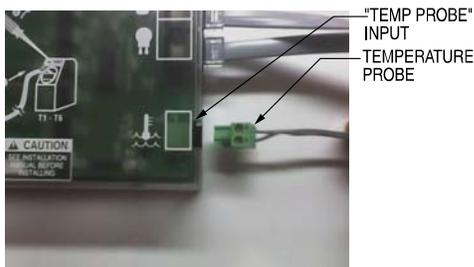


Figure 5.1 Temperature probe connecting to Temp Probe input on washer interface module.

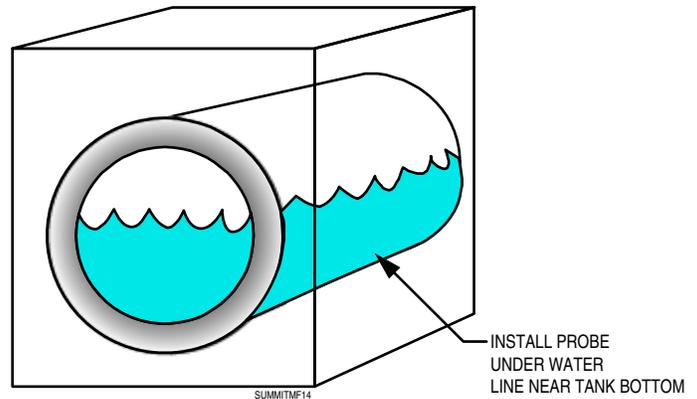


Figure 6. Hygiene Probe Connection

Clean tank wall surface near bottom of tank, and put heart-shaped adhesive insulating pad over probe, placing flat surface of probe against tank wall. Use heavy-duty tape over the insulating pad to ensure it is adequately insulated and will not fall off when exposed to moisture and thermal shock.

### Auxiliary Pump Box Wiring

The optional auxiliary pump box has no PCB or power supply.

1. Route the auxiliary pump wires through the left side of the auxiliary pump box into the main pump box.
2. Connect to the pump drive connector pins.
3. Connect the auxiliary enclosure ground wire to the right ground lug stud, between 2 lock nuts.



Do not remove the covers from the motors. A small amount of conductive dust could, over time, come out of the motors and damage the PCB.

### Chemical Pump Assignment

- Pump assignment is from left to right. Pump 1 is the leftmost pump, and pump 2 is the next pump to its right.
- Smart Relay Mode triggering associates trigger numbers with numerically corresponding pump numbers: trigger 1 with pump 1, trigger 2 with pump 2, etc.

### Programmer Mounting

1. Attach the programmer to the washer at about eye level. You can attach it to the washer using the Velcro strips provided, or you can mount it with the mounting feet and screws.
2. Choose a surface not prone to excessive vibration, direct water spray, or excessive steam.
3. Using the cable provided, connect the programmer to the trigger module.

## FLUSH MANIFOLDS

XL flush manifolds are equipped with a safety interlock that prevent chemical from being pumped if there is inadequate water flow. Prior to the first feed, approximately 2 seconds of water flow will occur in order to establish flow.

In the case of multiple product feeds, there will be a 2-second flush between feeds to re-establish flow and “separate” the chemicals. On tunnel flush, the 2-second flush will occur between pump feeds to the same module. After the last chemical feed, the system will pause for one second and then flush the manifold for the programmed transport time.



*The user is responsible for connecting the manifold in accordance with local plumbing codes or water board regulations. This may include, but is not limited to, the use of a reduced-pressure principal back flow preventor, or other means of domestic water supply isolation.*

## XL FLUSH MANIFOLD

The XL flush manifold is specially designed to work with the higher-pressure output of the XL dispenser 2000 Series pump.

The XL flush manifold comes with 8 ports.

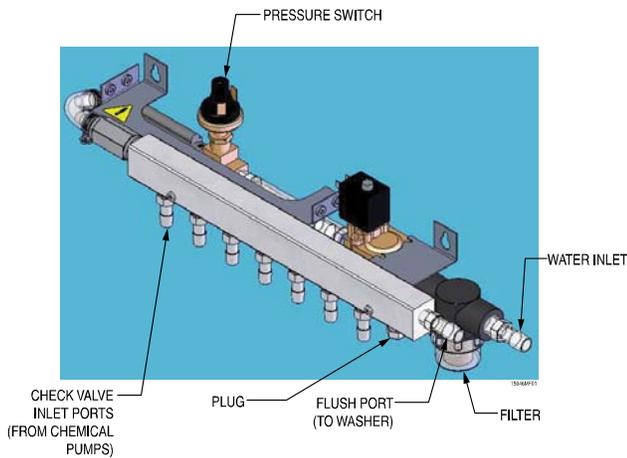


Figure XL1. XL Flush Manifold (1204845)

## XL Manifold Installation

XL flush manifolds come with wall-mount keyholes in the manifold bracket. The manifold should always be mounted with the check valve inlet ports facing down as shown in Figure XL1.

1. Before installing the manifold, verify that the dispenser is off by disconnecting the power and turning the switch off.
2. Position the manifold under the XL dispenser allowing adequate space for delivery lines and easy servicing. For best results, center the manifold under the dispenser, about 8 to 10 inches below it. This will allow adequate space for the wiring harness, which limits the allowable distance between manifold and dispenser.
3. Fasten the manifold to the wall using the keyhole slots in the mounting bracket. Use screws that are appropriate for the wall surface.

## XL Manifold Plumbing



- We recommend that you use 1/2" ID inlet tubing and 1/2" ID outlet tubing.

1. Connect the water inlet tubing to the manifold (see Figure XL1).

2. Remove check valves that are not being used and replace them with plugs (extra plugs are provided).
3. Connect the chemical lines from the outlet side of the chemical pumps to the check valves on the manifold and fasten them with hose clamps. Be sure to leave sufficient slack in these lines to allow service access.
4. Run the delivery line to the washer.



**IMPORTANT:** Dynamic water pressure should always be within the range of 15 to 60 PSI (1.0-4 bar). For optimal performance, inlet pressure should be set higher than 20 psi (1.4 bar). This will allow for adequate flow, even during pressure/flow fluctuations that occur during normal laundry operation.

*If inlet dynamic water pressure falls below the minimum of 15 PSI, the dispenser system assumes that there is not enough water for chemical delivery and the unit will stop pumping and will display a “No Flow” error.*

*If inlet dynamic water pressure goes above 60 PSI, the dispenser system assumes that the chemical delivery lines are blocked; the dispenser will stop pumping and will display a “No Flow” error.*

## XL Manifold Wiring

1. Pass the wire harnesses through one of the available holes in the bottom of the dispenser.

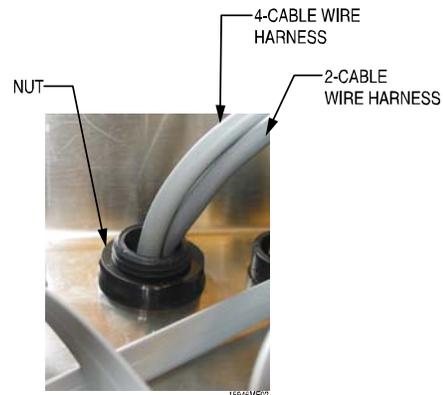


Figure XL2. Wire harnesses passing through bottom of dispenser, held in place with nut

2. Place the nut over the wires and gently tighten.
3. Connect the 2-pin and 4-pin Molex connectors to the 2 and 4-pin positions on the-PCB harness adapter.
4. Connect PCB harness adapter to the position on the Main PCB labeled **Manifold**.

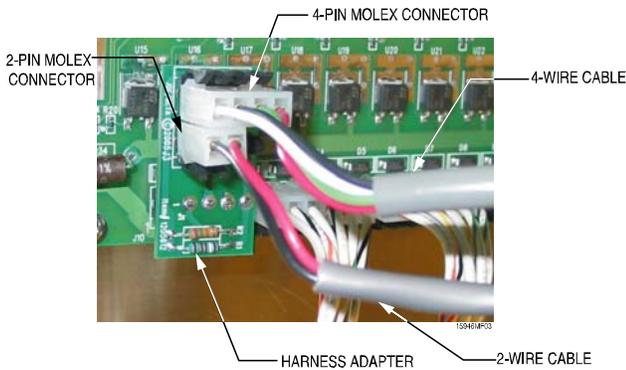


Figure XL3. 2 and 4-pin Molex connectors connected to PCB harness adapter, which is connected to MANIFOLD on the main PCB.

5. Use available tie wrap and wrap base to secure the wire inside the dispenser housing and provide additional strain relief.
6. Adjust the length of the cables/wires as needed and tighten the strain relief nut.
7. XL automatically detects the presence of the manifold. If it is not plugged in at power up, switch the power off, plug in the manifold connector and turn the power on. You will need to program the transport time.



*Unit comes pre-wired. However, if you ever disconnect the wiring it is important that the specified groups of wires go to the area on the manifold specified below. Polarity of the wires within these parameters is not important.*

1. From harness: black and white wires go to flow switch.
2. Red and green wires go to solenoid.
3. Black and red wires from the 2-wire cable connect to the pressure switch.

## XL Manifold Safety



*It is important that incompatible chemicals not be injected into any flush manifold together.*

*To prevent the mixing of any chemicals, the XL, in combination with the XL flush manifold will flush the manifold with water before and after chemicals are pumped. Despite this safeguard, you must not run sour and bleach or other incompatible chemicals together into the manifold. Instead, route one to the manifold and the other downstream via a separate delivery line. A Sour Flush Kit (#069505) is available for this type of installation. See Figure 6a and **Routing Incompatible Chemicals** later in this section.*

*Extra plugs are provided with the XL flush manifolds to plug any port that is not in use. Unused ports should always be*

*plugged. The XL flush manifold comes with one port plugged. Additional check valves are included with the XL flush manifold in the event that an eighth, non-reactive chemical is to be injected into the manifold.*

## TUNNEL FLUSH MANIFOLD

The Tunnel Flush Manifold is designed to work exclusively with XL dispenser firmware version 2.0 or higher. If you are uncertain as to whether your dispenser is compatible with the Tunnel Flush Manifold, check the main PCB and firmware.

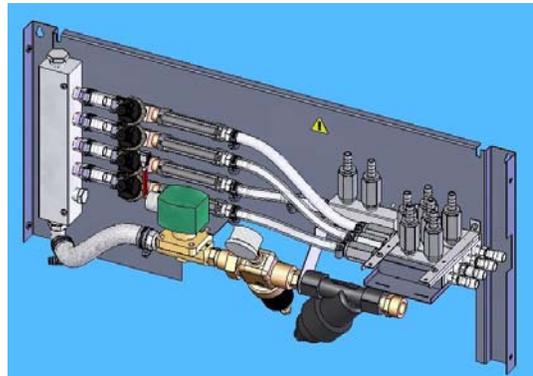


Figure T1. Tunnel Flush Manifold

- Tunnel Flush Manifold comes ready to flush up to 8 chemicals into 4 unique delivery zones in a tunnel washer.
- If you want to add a fifth flush module to allow chemical feed into 5 delivery zones in the tunnel washer, order an expansion kit (#1204847).
- All flush modules flush simultaneously.
- If more than one chemical is injected into a flush module they will be flushed in the order they have been programmed, with a water break of 3 seconds in between to avoid unwanted chemical mixing.
- Up to 4 chemicals can be dosed into a single delivery zone.
- The Tunnel Flush Manifold comes set up for 8 chemicals and 4 flush modules.
- Each module comes setup with 2 injection ports. However, module 1 is capable of up to 4 injection ports. Plugs are included to customize setup.

An existing XL can be upgraded to a Tunnel Flush Manifold-capable unit by changing the main PCB. Spare main PCBs are available through Customer Service (#1205112).

## Installation of the Tunnel Flush Manifold

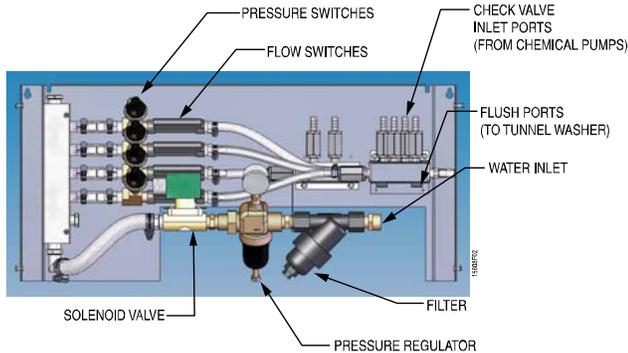


Figure T2. Tunnel Flush Manifold, Front View

1. Verify that the dispenser is off by disconnecting the power (the LED should not be lit).
2. Mount Tunnel Flush Manifold 10 to 12 inches below and centered under the XL dispenser, allowing the wire harness to easily reach between the dispenser and manifold

### Tunnel Flush Plumbing

1. Connect the water inlet to the manifold with 3/4-inch garden hose. Because the manifold requires enough water to flush up to 5 zones simultaneously, we recommend that the delivery line be at least 3/4-inch.
2. Define which chemicals are to be dosed to which zones and add or remove check valve inlet ports as necessary (extra check valve inlet ports area included). Use Teflon tape to seal all threaded connections. Remove check valves that are not being used and replace them with plugs (extra plugs are included).
3. Connect the chemical lines from the outlet side of the chemical pumps to the check valve inlet ports on the individual flush modules. Be sure to leave sufficient slack in these lines to allow service access.
4. Bundle the chemical lines as necessary using the available tie wraps.
5. Connect the deliver lines to the flush ports on the flush modules to their respective injection points, fastening them with hose clamps.



**IMPORTANT:** Dynamic water pressure should always be within the range of 15 to 35 PSI. For optimal performance, water pressure should be between 25 and 30 PSI. This will allow the inlet water pressure to always remain above the minimum of 15 PSI throughout water pressure variations that occur during normal laundry operation. Use the pressure regulator (included) to adjust the pressure if necessary. Adjustments should be done while water is flowing (dynamic water pressure).

If inlet dynamic water pressure falls below the minimum of 15 PSI, it is assumed that there is not enough water for chemical delivery and

the Tunnel Flush Manifold will stop pumping and will mark a “No Flow” error.

If inlet dynamic water pressure goes above 35 PSI, it is assumed that the chemical delivery lines are blocked; the dispenser will stop pumping and a “No Flow” error will be displayed.

### Tunnel Flush Wiring



It is important that the specified groups of wires go to the area on the manifold specified in this instruction. However, polarity of the wires within these parameters is not important. For example, the red and black wires from the 2-wire cable (Figure T4) **MUST** connect to pressure switches, but it doesn't matter which wires connects to which connector.

1. Pass the wire harness through one of the available holes in the bottom of the dispenser.

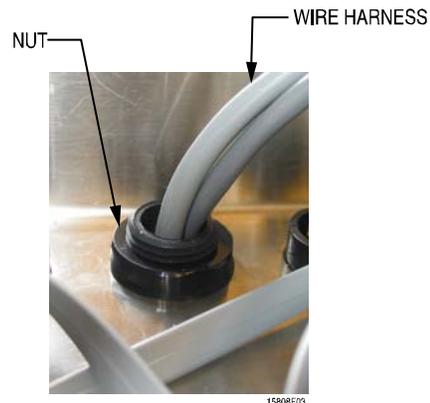


Figure T3. Wire harness passing through bottom of dispenser, held in place with nut

2. Place the nut over the wires and gently tighten.
3. Connect the 2 and 4 pin Molex connectors to the 2 and 4 pin positions on the Tunnel Flush Manifold-to-PCB harness adapter.
4. Connect the Tunnel Flush Manifold-to-PCB harness adapter to the J10 position on the Main PCB labeled **Manifold**. See Figure T4 for position.

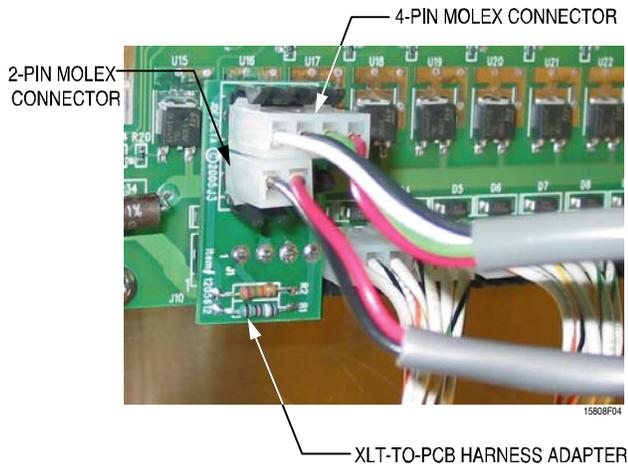


Figure T4. 2 and 4-pin Molex connectors connected to Tunnel Flush Manifold-to-PCB harness adapter, which is connected to J10 on the main dispenser PCB

5. Use available tie wrap and tie wrap base to secure the wire inside the dispenser housing and provide additional strain relief.
6. Run the other end of the wire harness to the Tunnel Flush manifold. Connect the two-wire cable to the pressure switches using the red connectors. Polarity does not matter.

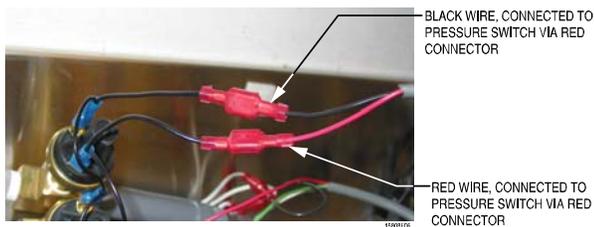


Figure T5. Red and black wires from 2-wire cable connected to pressure switches

7. Connect the red and green wire from the 4-wire cable to the solenoid valve using the red connectors. Polarity does not matter.



Figure T6. Red and green wires from 4-wire cable connecting to solenoid valve

8. Connect the black and white wires from the 4-wire cable to the flow switches using the red connectors. Polarity does not matter.

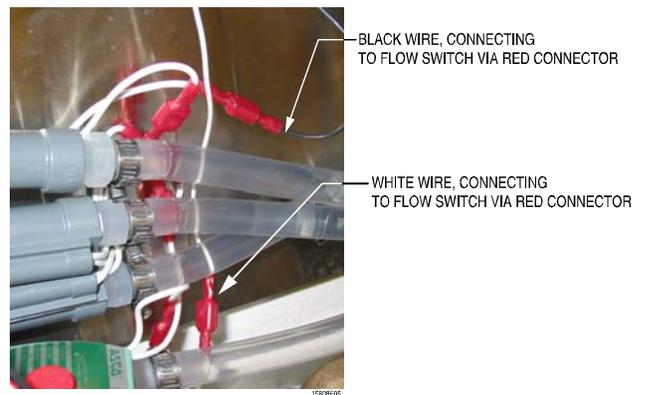


Figure T7. Black and white wires from 4-wire cable connecting to flow switches

9. Use available tie wrap and tie wrap base to secure the wire inside the flush manifold housing and provide additional strain relief.
10. Adjust the length of the cables/wires as needed and tighten the strain relief nut.
11. Once these things have been done follow the steps for programming in **TAFS Mode** (Tunnel Automatic Formula Select) in the **PROGRAMMING** chapter.

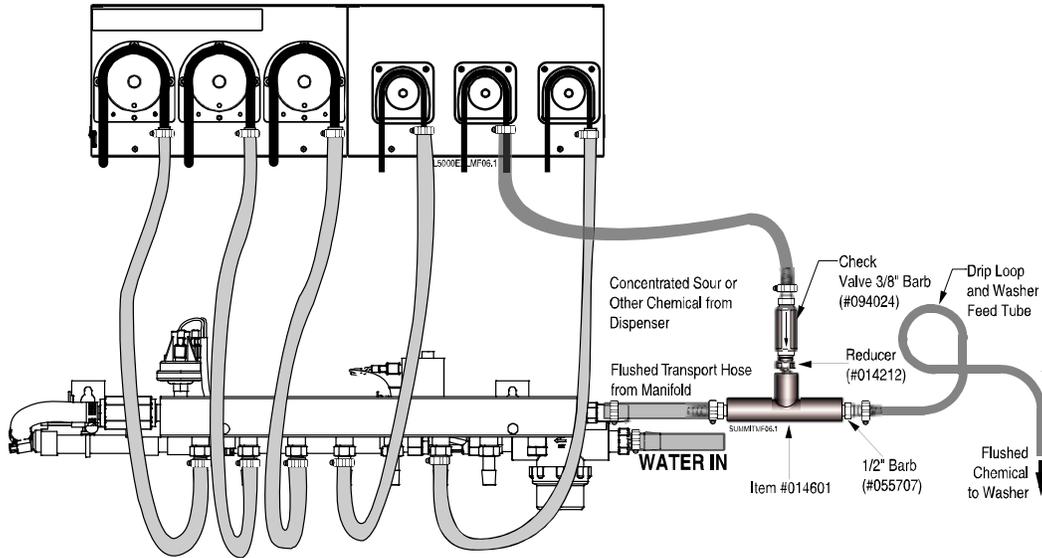


Figure 6a. XL Flush Manifold, Mounted on Wall with Sour Flush hook-up

## Routing “Incompatible” Chemicals

For safety reasons, you must not run sour and bleach or other incompatible chemicals together into the E or XL manifolds or into the same section within the Tunnel Flush manifold. Instead, route one to the manifold and the other downstream. Because the incompatible chemical’s delivery tube is not flushed, the product can remain in the tube, dripping onto the washer feed hopper or collecting in the washer shell. Over time, this could cause corrosion, even on stainless steel. Figure 6a above describes how to configure your system to prevent chemical drip. These parts are all in our Sour Flush Kit, item #069505.

In cases where a cornstarch-based starch is being used, it may be best to route the bleach separately and inject the acid into the manifold upstream from the starch to prevent starch buildup. **In cases where synthetic, non-cornstarch starch is used, it is critical to keep air leaks out of the starch line, as these can cause clogging.**

## PROGRAMMING

All programming, data retrieval, and system diagnostics are done from the programmer, using the following keys:

 OR 	+ or – keys change the value of the blinking number or letter. Pressing + and – simultaneously will change any alphanumeric character to “M”, and will change any numeric field to its minimum value.
	CURSOR key: Moves the cursor around the screen, changing which field is selected.
	ACTION key: Initiates an action such as priming. This button does not change settings.
	MENU key: Advances to the next menu screen.

## PASSWORDS

Passwords are used to control access to programming and technician levels of the system. The screens and functions of the XL are organized into 3 levels of access.

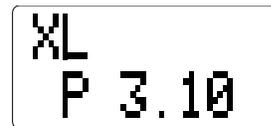
The first, or default password level is “Operator”. This level requires no password. The screen access of this level is limited to diagnostic screen viewing and formula selection.

Entering the technician default password “123” will provide access to the second level “Technician” screens. This level permits pump priming, viewing of formula count logs, viewing of pump run time and several diagnostic screens.

By entering the Programmer password, “890” you will have complete access to all screens and features. This access includes the ability to change passwords. It cycles through the Technician screens before the Programming screens.

### Operator-Level Access (no password entry required)

When you first power up the XL, you will see this screen:



Screen 0a. Power-Up Screen

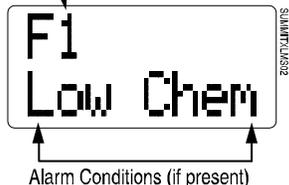
The software version of the pump box displays for two seconds along with “XL”, which someone with programmer-level access selected (see **Screen 7a** under **Selecting the Pump Box in Programmer-Level Access**).



*"P.2.00" will display on the programmer for about 2 seconds before the "v3.10".*

After the Power-Up screen disappears, the following screen appears:

Name of Formula Used Most Recently  
(or formula number if name  
has not been assigned)



Screen 0b: Formula Select Screen

Pressing "+" displays the next formula (F2).\*



*\*When AFS is used, the programmer's "+" and "-" keys cannot be used to manually select the formula.*

*When AFS is in use and formula "F0" is active, (either at power-up after a formula has ended or when the T8 trigger has qualified but has not yet deactivated) the programmer's Operator-Level Access screen will display "NONE" as the current formula selection until AFS selects a new formula.*



Once you have programmed names to each of your formulas, this screen will display the 2-line name of the formula most recently used, with the exception of TAFS Mode, which displays "None" at power-up and then formula names as they are selected by triggers from the washer.

If an alarm condition(s) exists, the bottom line will alternately flash the alarm message(s) with the second line of the name of the formula most recently used. The top line name will not flash. For example, let's say you have a formula named "White Sheets", and Low Chemical and No Flow alarms occur. The top line will continue to say "White", while the bottom line will flash alternately between "No Flow", "Low Chem" and "Sheets".



*If in Sequence Mode AND a sequence cycle is active AND the second line of the selected formula name is not blank, then the second line of the formula name will be displayed periodically on the bottom line of the LCD display, along with any alarm messages.*

You can cancel alarm messages by pressing the ACTION key, or correcting the alarm condition. No-flow alarms will clear when the "End" pump runs. If a no-flow alarm is displayed

continuously, you probably need to change the "End" pump setting. Pressing the ACTION key will only cancel the alarm displayed on the screen. You will need to press the ACTION key once for each separate alarm while the alarm message is displayed on the screen.

## Alarm Messages

### "Low Chem" Alarm

If you have connected a low-level sensor to the "Level" input on the pump box I/O board, a "Low Chem" message appears when the contact closure is open. If you clear this alarm without correcting the low-product condition, the alarm will again reactivate after 15 minutes. As the intent of the low-level alarm is to warn the operator that the product supply is about to run out, the XL will continue pumping despite the alarm.

### "No Flow" Alarm

A no-flow alarm occurs when:

1. An electrical or mechanical problem prevents a pump from working.
2. In a system equipped with a flush manifold, flow is insufficient, or in the case of XL, water pressure exceeds 20 psi during a flush. The pressure is monitored during the entire feed process.

If a no flow alarm occurs, the planned feed aborts. The dispenser will attempt to perform subsequent feeds, aborting them if the no flow condition persists. Feeds will only resume when flow and pressure meet the requirements.

3. A trigger is active for longer than 5 minutes in Smart Relay Mode. In this mode, each trigger has a 5-minute time limit. If a trigger is active for longer than 5 minutes, then the XL assumes that the trigger is "stuck", and a no flow alarm will occur. No more feed commands will be sent to the pump box for that trigger until the trigger turns off and then turns back on.
4. The pump box detects that a pump has been running continuously for 10 minutes, at which point it turns off and a No Flow alarm is issued.

### Hygiene Alarm

A Hygiene alarm occurs when wash water temperature fails to maintain the programmed minimum temperature for the programmed time duration required for a specific formula. For example, if hygiene codes require that wash water for a certain application be 85° Celsius (185° Fahrenheit) for 4 minutes, and the water temperature drops below 85° after 2 minutes, the Hygiene alarm message will appear at the end of the cycle. The dispenser will continue feeding normally during a Hygiene alarm condition.

A Hygiene error will be logged if a Low Chem alarm occurs during the formula run.

### System Alarm

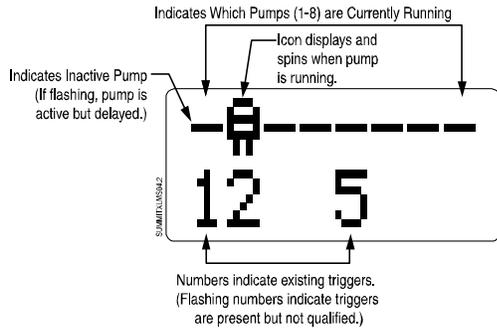
A system alarm indicates system components (trigger board, pump box, or programmer), cannot communicate.



System alarms cannot be canceled. They will be cleared automatically by the system only when the fault is corrected.

### Diagnostic Information (for Formula, Latched, TAFS and Smart Relay Modes)

When in Operator-Level access, pressing and holding the CURSOR key displays diagnostic information.



Screen 1. Diagnostic Information for Formula, Latched and Smart Relay Modes

Screen 1 shows an example of some system diagnostic information. From this screen, we can see that pump 2 is currently running, and pumps 1, 3, 4, 5, 6, and 7 and 8 are not. Triggers 1, 2, and 5 are active, and triggers 3, 4, 6 and 7 are not.

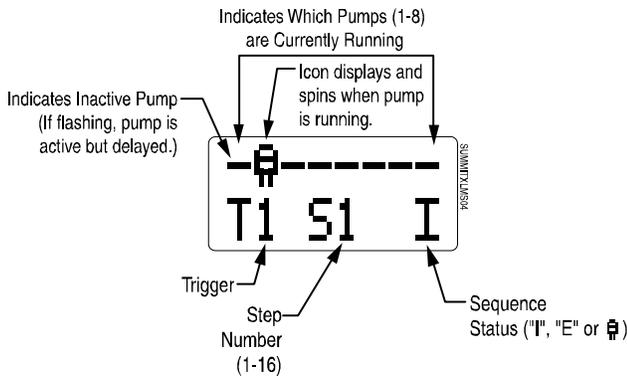


If AFS is selected in Formula or Latched Modes, you can use this screen to verify that T8 is active even though it cannot be used for pump actions.

If a trigger is active, but not yet qualified, its number flashes. See **Trigger Qualification** sections for more information.

### Diagnostic Information for Sequence Mode

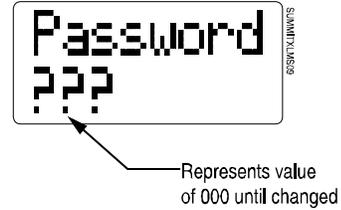
The status of the “Sequence” is displayed on the bottom line. For this example, the bottom line shows that trigger 1 (T1) is active, you are on step 1 (S1), and that the function of S1 is “I” (Ignore trigger). The other sequence status options are “E” for “End” a blank space for a delay or flush, or a pump icon if one or more pumps is running.



Screen 1a. Diagnostic Information, Sequence Mode

### Password

Pressing and holding the MENU key for 5 seconds takes you to the **Password** screen. The default Technician-Level password is 123. The default Programmer-Level password is 890. See **Change Passwords** section for directions on setting passwords.



Screen 2. Password Screen

The bottom line will display “???” represents a value of “000” until you change it to your password.

1. Use the “+” or “-” keys to enter the correct number, and press the CURSOR key to navigate to the next number until you’ve entered the entire password. If you enter an incorrect password, you will return to Operator Level access.
2. Press MENU key to advance to the next level of menu screens.

Once in Technician or Programmer-Level access, holding down the MENU button for 5 seconds will send you back to Operator-Level access. To prevent the unit from being inadvertently left in Technician or Programmer-Level access, the screen returns to Operator access if no buttons are pressed for 15 minutes.

### Technician-Level Access

#### (Technician or Programmer Password Entry Required)



XL will still respond to triggers in Technician-Level access.

### Prime Pumps

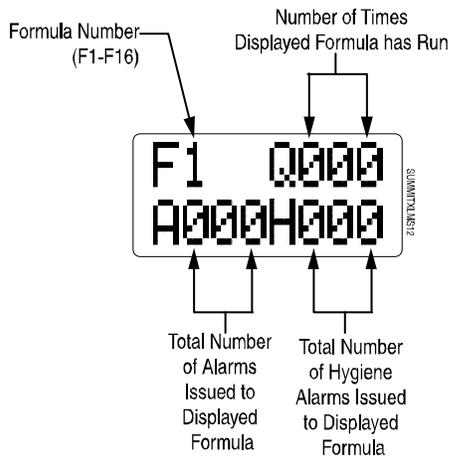
Select pumps 1 through 8 using the “+” or “-”keys. Press and hold the ACTION key to prime the selected pump.



Screen 3. Prime Pumps

The displayed pump icon spins to indicate that it is priming. Press MENU key to proceed to next screen.

## Formula Count



Screen 4. Formula Count Values

Screen 4 automatically updates to show the latest formula count values. The formula number (F) in the upper-left corner is selectable between 1 and 16 using the “+” or “-” keys. The letters Q, A, and H represent different formula count values as noted above.

To view the total count for all formulas, select “FA11”.



Screen 4a. Counts for All Formulas

A formula can only log one “A” and one “H” alarm for each time it runs.

Alarms will not be logged if they occur between formulas in Sequence Mode.

With Programmer-Level access, you can clear all logged counts for the selected formula by pressing and holding the ACTION key for 2 seconds.

To clear formula counts for all formulas at once, go to Programmer-Level access and select “FA11” then press and hold the ACTION key for 2 seconds.

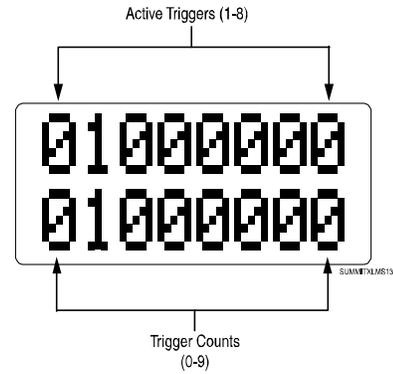


*In TAFS Mode, the formulas are logged as complete as soon as the dispenser receives the first batch transfer signal.*

## Trigger Status and Counter

This diagnostic screen can be used to view the current state (on/off) of the supply trigger signals. It can also be used to “capture” trigger events that occur during the wash cycle. This screen automatically updates to show the latest trigger status.

This screen can also be used to log trigger counts for Sequence, TAFS and Formula Mode programming, or to troubleshoot wrong or unwanted signals issued by the washer controller.



Screen 5. Trigger Status

Trigger 1 is on the left and trigger 8 is on the right. Once a trigger’s count has reached 9, it remains there until a new wash load begins. With Programmer-Level access, pressing the ACTION key resets the selected trigger’s count to 0.

The Screen 5 example shows that trigger 2 is active, and that the remaining 7 are inactive. Trigger 2 has executed once, and the remaining 7 triggers have never executed.

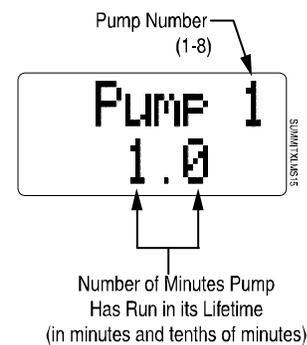


*For a trigger to be counted, it must meet the **Trigger Qualification** screen’s criteria for duration and voltage. If it doesn’t, the XL will read the signal as electrical noise and disregard it.*

Smart Relay Mode has no filter time, so the programmer will count triggers of any duration. See **Smart Relay Trigger Qualification** for more information.

## Pump Run Times

This screen automatically updates to show total run time for the selected pump.



Screen 6. Pump Run Times



*Because we test our systems prior to shipment, your XL might show a pump runtime value such as 0.1 instead of 0.0 at its initial power-up.*

The maximum value for this screen is 6500.



The pump run time data may be reset to zero (in Programmer-Level access only) by pressing and holding the ACTION key for 2 seconds.

### Temperature Probe Reading

This screen only appears if at least one formula is set to use hygiene verification. This value includes the offset value entered in Screen 20. The screen shows current water temperature in real time so technicians can demonstrate compliance with health regulations to inspectors.

Fahrenheit is abbreviated as “F” rather than “°F” because the upper case indicates Formula.



Screen 7. Temperature

The temperature is displayed as 000-099° C (if units are set to “ml” in Screen 8) or 032-210° F (if units are set to “oz” in Screen 8).

If no temperature probe is connected, “---” is displayed as the temperature.

### Programmer-Level Access

From the password screen, enter the Programmer-Level access password. The following screens and functions will then be presented:

**NOTE** *XL will not respond to triggers in Programmer-Level access. Entering Programmer-Level access in TAFS Mode will reset the memory of which load classes are located in which tunnel module at that moment.*

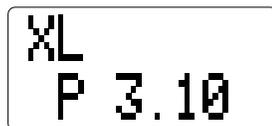
### Selecting the Pump Box



Screen 7a. Power-Up Screen Before Pump Box Selection

This screen allows you to select the appropriate pump box (“E/Plus” or “XL”). The bottom line of the screen toggles between “E/Plus” and “XL” when you press the “+” or “-” key. Use this screen to select “XL”.

Once you have selected the appropriate pump box, the power-up screen will always display your selection when you power up, unless you intentionally change it:



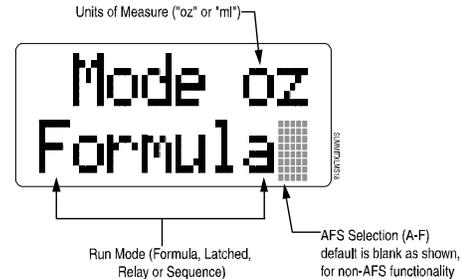
Screen 7b. Power-Up Screen, after pump box has been selected



*“P .2.0” will display on the programmer for about 2 seconds before the “P 3.10”.*

Never set up an E up as an XL, because the unit could draw too much power and reset, canceling pumps feeds. Changing the pump box size will reset all calibration values. Press and hold the “+” or “-” key for several seconds to change this setting.

### Setting Mode and Units of Measure



Screen 8. Setting Mode and Units of Measure Screen, Formula Mode. AFS not Selected

The Screen 8 example shows the units of measure set to “oz”, and the mode set to “Formula”. Automatic Formula Selection is not selected.

Because “oz” is the default unit of measure, press the “+” or “-” keys to select “ml”.

Press the CURSOR key to move to the bottom line and select trigger mode.

Press and hold the “+” or “-” key for 2-3 seconds on each mode option until you reach the desired mode: “Formula”, “Latched”, “Relay”, “Sequence” or “TAFS”.

### Selecting AFS (for Formula and Latched Modes Only)

This screen also allows you to select AFS functionality. For more information about AFS, see **Formula Mode** in the **MODES OF OPERATION** section.

- To select AFS, use the CURSOR key to navigate to the far-right position on the bottom line.
- Select the desired timing scheme (A-F). See **Timing Schemes for Other Dispensers** in the **APPENDIX**.
- Press and hold the “+” or “-” for 5 seconds on each value until you reach the desired A, B, C, D, E or F value.

AFS is also available in Latched Mode.



Screen 8a. Setting Mode and Units of Measure Screen, Formula Mode. AFS Value “A” Selected (CLAX Revoflow).



Once you have selected “oz” or “ml”, all subsequent units of measure will be based on it.

### Dose Verification



When using a flush manifold, it is **VERY** important that you disconnect the discharge tube from it before starting the dose verification procedure. Dose verification ignores the presence of a flush manifold and if you attempt to run dose verification without disconnecting the discharge tubing from the flush manifold, chemical will enter into the manifold without water flushing, potentially creating a chemical--mixing hazard.

Dose verification allows you to verify accuracy of programmed pump volumes without starting the washer in Formula or Latched triggering modes. With the dose verification feature, you verify the dose by running the pump and catching the amount that flows out of the discharge tube of the pump.

Follow these steps to perform a dose verification:

1. Use a graduated cylinder or other measuring container
2. Using the programmer, CURSOR to the desired pump number and volume for that formula (P110.0 on the screen below).
3. Ensure that the cursor is on one of the numbers of the displayed pump volume. For example, in Screen 8b below, you would want it to be on the “1” or the “0” of the 10.0 ounces.



Screen 8b. Formula or Latched Mode Screen

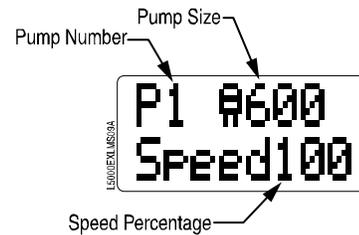
4. Press and hold the ACTION key for 5 seconds to begin the selected volume dose. You must keep the ACTION key pressed during the entire verification time. Releasing the ACTION key in the middle of the dose verification process will automatically stop the pump.
5. Release the ACTION key when the desired volume of chemical has dosed into the measuring container. Look at the value on the screen and make sure it matches the volume in the container.

The resulting pump volume shown on the programmer screen is based on the current calibration of the pump. If the dose is inaccurate, the calibration for that pump may be the problem. Refer to **Pump Calibration** section.



Dose verification does not wait for delay times to elapse; the pump activates immediately.

### Speed Control and Pump Size



Screen 9a. Speed Control

Reducing pump speed bolsters dosing accuracy and increases tube life with viscous products such as built detergents. Generally, if you find a chemical has a flow rate 1/2 that of thinner chemicals, you should reduce pump speed to 40%. If the flow rate is only 1/3 less than other chemicals, reduce the flow rate to 60%. **Always recalibrate after reducing speed because the flow rate can change.**

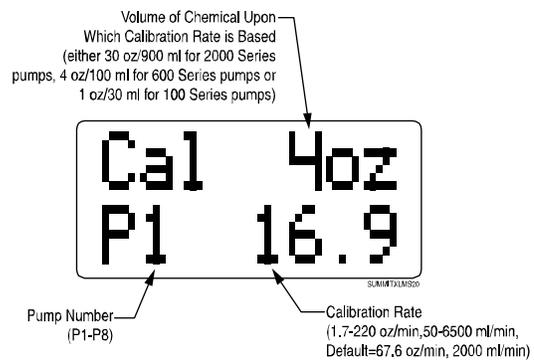
The pump size is factory preset and doesn't need to be changed during installation. If you change the size of a pump or add a pump this setting needs to be changed. To change the setting:

1. Select the pump number and press the CURSOR key to highlight the pump size.
2. Hold down the “+” or “-” key for two seconds.

You can select 100, 600 or 2000 Series.

### Pump Calibration

XL pumps chemical based on volumetric calibration. This means that once you have calibrated the pumps, you will not need to adjust your formula for differing flow rates when changing chemicals or compensating for tube wear. Also, for Smart Relay Mode, you will define the volumes you want to pump without having to use the calibrated flow rate in defining trigger on-time.



Screen 9. Calibration

Screen 9 shows that pump 1 (P1) pumps 16.9 ounces (500 ml) per minute, calibrated from a pump volume of 4 ounces.

Calibration rate is displayed in the lower right corner. The calibration rate is displayed as xxxx if “ml” is selected, and xxx.x if “oz” is selected.

## How to Calibrate XL Pumps

1. Position the end of the selected pump's discharge tube over measuring cylinder.
2. The volume to pump is shown on the top right of the screen:
  - 900 ml (30 oz) for the 2000 Series pump
  - 100 ml (4 oz) for the 600 Series pump
  - 30 ml (1 oz) for the 100 Series pump
3. Press and hold the ACTION key, collecting the calibration amount in a measuring cylinder. The calibration rate field is replaced with a spinning pump icon.
4. When the calibration amount has been pumped, release the ACTION key.
5. The new flowrate will be automatically calculated, displayed in place of the default setting, and saved to memory.



*As you approach the desired amount, you may "pulse" the pump on and off until the proper amount is pumped. Calibration is not "memorized" until you exit calibration screen or change the pump number selection.*

If you do not run the pump long enough to create a realistic calibration value, "----" will be displayed. Press the ACTION key again to resume calibration.



*Try to get to the calibration amount within 2-3 presses of the ACTION key, because tapping the ACTION key repeatedly to pump the whole calibration amount will make the calibration inaccurate. If you have to press the ACTION key more than three times, it is best to change the pump number back, and recalibrate to ensure maximum accuracy.*

If you overshoot the calibration amount, switch to another pump, and then switch back and repeat steps 1-4.

## Creating Formula Names

XL lets you use both the top and bottom lines of the screen to name your formulas. The top line is called "Line 1" and the bottom line is "Line 2". Entering formula name data is not required for system operation.



Screen 10a. Creating Formula Names, Line 1

You will begin by naming the top line of F1.



*If the programmer language selected is Japanese, only Japanese katakana characters will be selectable.*

1. "Line 1" flashes on the top line.

2. Use the "+" and "-" keys to change each digit of the bottom line. Press "+" and "-" simultaneously to change the "F" to "M".
3. Use the CURSOR key to advance to the next character.



4. CURSOR back to top line of the screen, and then press the "+" or "-" key to advance to change to "Line 2", and repeat steps 2 and 3 to name the second line of F1.



Screen 10b. Assigning Formula Names, Line 2



Screen 10c. 2-Line Formula Name

5. Once you have entered the first formula name, press the CURSOR key to return to the top line.
6. Press the "+" key to enter the next formula (F2) name. Repeat steps 1 to 5 for all formulas.

## Making Formulas Non-selectable

There is a simple method to prevent a specific formula number from being selectable, so formulas not being used are not displayed on the programmer.

6. Go to the Formula Names screen and CURSOR to one of the characters in the formula name.
7. Press and hold the ACTION key for 5 seconds. The formula name will change to blank characters and the formula will not appear in Run Mode.

## Mode Programming

Only the selected Mode's programming screen will appear on the programmer.



*When scrolling through the different Modes you must press and hold the "+" or "-" key for 2-3 seconds on each Mode until you reach the one you want.*

## Formula Mode Programming

In Formula Mode, you can program as many as 3 separate pump actions ("a", "b", and "c") for each trigger. Pump actions consist of a delay (bottom left of screen) and a pump amount (bottom right of screen).

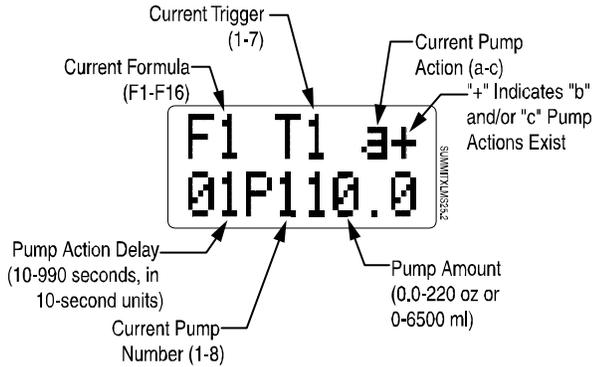


*Only triggers T1-T7 are available for pump actions.*



If you want to use AFS and are not replacing a different dispenser or are not replacing any of the dispensers listed in the chart in the **APPENDIX**, review the timing scheme for each of the values (A-F) on the chart and select the one that best corresponds to the desired timing scheme.

### Programming Formulas in Formula Mode



Screen 11a. Formula Mode Programming

Screen 11a shows each Formula Mode programming element, with examples of programmed parameters. These parameters show that in Formula 1 we want trigger 1 (T1), to tell pump 1 (P1) to pump 10 oz of formula 1 (F1) after a 10-second delay.

The “+” to the right of the “a” indicates we have programmed T1 to initiate additional pump actions (“b” and/or “c”).

- Using the “+” and “-” keys, scroll to the formula (F1 to F16) that you will program.
- CURSOR to the trigger (T) field, and scroll to desired trigger. Remember that T8 is not available for pump actions.
- CURSOR past the “a”, and set pump delay time (if any) for pump action “a” in 10-second increments.
- CURSOR to pump (P) number field and scroll to select the number of the pump that will perform pump action “a”.
- CURSOR to the pump amount field and select the volume of chemical for the pump to dispense.
- Repeat steps 3-5 for pump actions “b” and/or “c” for selected trigger.
- Repeat steps 2-6 for all triggers for selected formula.
- Repeat steps 1-7 for all formulas.

Once a trigger is received and qualified (see **Trigger Qualification for Formula, Latched or Sequence Mode**), the pumps will initiate their assigned delays and actions whether the trigger stays on or not. If the trigger occurs twice, the pump will perform the action for the formula twice. Use Latched Formula Mode if you want the XL to only react to each trigger once per load.

#### Can I change which formula is being dosed mid-cycle?

This can be done in Formula or Latched Mode, but with the following stipulations:

- The current pump action will complete.

- You must change the formula prior to basing any later pump actions on it. Because the last “End” pump is usually counted as formula completion, the new formula is the one that would be logged. An exception to this would be if the “End” pump setting was left as P1, and P1 ran prior to switching the formula name.

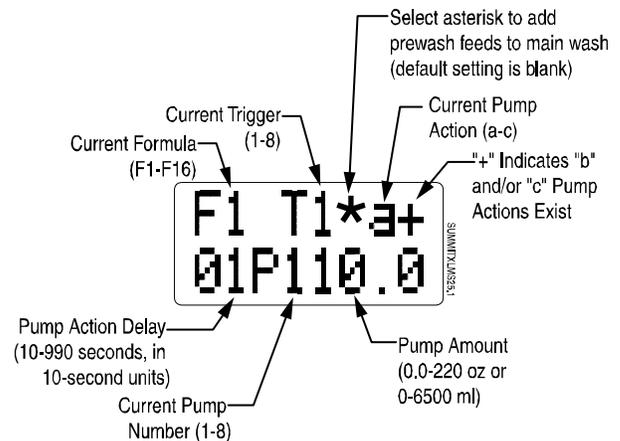
### Latched Mode Programming

Latched Mode is the same as Formula Mode, except triggers are ignored or “latched out” after they have occurred once.



You cannot use hot/cold fill option (prewash feeds to main wash) in Latched Mode with AFS.

You will program the same as with Formula Mode. You will also need to assign an “End” pump (See **Screen 12, End Pump Assignment**) so the XL knows when the formula has completed and can “unlatch” the trigger.



Screen 11b. Latched Mode Programming

The “latch” function operates on the trigger signal. It will unlatch whenever the “End” pump’s signal is received.

- If “\*\*” is selected, T2 or T7 triggers both T1 and T2 pump actions (or just T2 if T1 has already occurred). If “\*\*” is not selected, T2 or T7 triggers just T2.



T2 and T7 are latched out after either signal is received, until the end pump signal is received.

- If “\*\*” is on when copying setups from one dispenser to another, the “\*\*” setting will get copied over as well.
- If the “\*\*” is selected (by highlighting the space with right arrow key and pressing “+” to select), it will be on for all formulas. It can’t be turned on for some and off for others.

In many cases, the last chemical pumped is softener, using a rinse solenoid. If this solenoid turns on and off during final rinse, the softener pump will not be an acceptable End pump because each time the “End” pump signal is received the formula will be counted as complete in the data. In this situation perform the following steps:

1. Add a second pump action after the softener, running pump with a “0” volume with enough delay time for the load to finish.
2. Set pump 8 to be the End pump, so the latch won’t clear until pump 8’s pump action completes. For example, if your last pump action for formula 1 was as follows:

F1 T6 a  
00P6200.

You would change the “a” to a “b” so that there would be a second pump action for T6 as follows:

F1 T6 b  
60P800.0

With P8 as the End pump, the latch will clear 10 minutes after T6 is received, giving enough time for the rinse to complete, due to the 10-minute (600-second) delay.

Changing any “End” pump will reset all latches.

If using AFS, you can select “F0” as the new “End” formula after a load has run. If you choose “F0”, the next formula will be “NONE” until AFS selects a new formula. You can also select F1-16 as “End” formulas, but with AFS the default “End” formula is “F0”. If you are not using AFS, the default “End” formula is the current formula number.

### Smart Relay Mode Programming

In Smart Relay Mode, size of the chemical dose is simply the call rate volume on the screen, multiplied by the number of seconds the trigger is on.

So, for a 6-ounce dose, use the default call rate of 2.0 ounces, and program a 3-second trigger from the washer. For a 20 ounce dose, use the same 2.0 ounce call rate and a 10-second trigger.

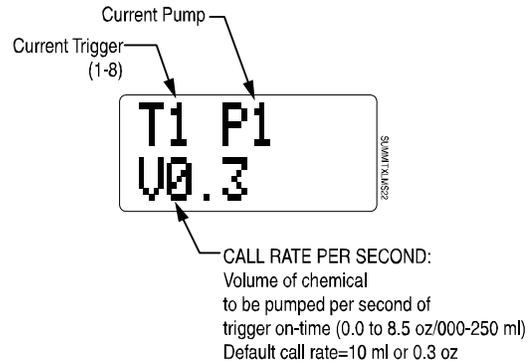
The advantage of programming chemical volumes as (call rate\*trigger time) is that it makes the math easy. You don’t need to factor in the calibrated flow rate, which varies from pump to pump. You only have to program chemical volumes using call rate and trigger time. The XL will calculate the actual pump run time based on the amount it has been instructed to pump and its calibrated flow rate.



*Never use a trigger time of 1 second or less.*



*At lower call rates, the XL will pulse the pump on and off while pumping the programmed volume. To avoid this, use the default call rate of 0.3 oz (10 ml)/second with 600 Series pumps. Use 2 oz (60 ml)/second with 2000 Series pumps and 0.1 oz (3 ml) per second with 100 Series pumps. Preventing the pump from pulsing will maximize dosing accuracy and tube life; allowing the pump to pulse can also cause a trouble call if laundry workers see it and think it is malfunctioning.*



### Screen 11c. Smart Relay Mode Programming

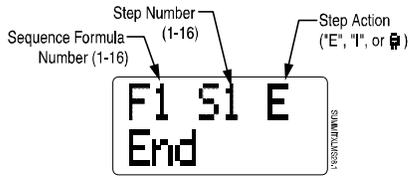
1. Use the “+” and “-” keys to select trigger (T) and pump (P) numbers.
2. CURSOR to the bottom of the screen, and input desired call rate (if different from default). The only time you need to use a smaller call rate than is recommended is when using small doses. For smaller doses, we recommend using a smaller call rate and longer trigger. For example, rather than pumping a 0.5 ounce dose with a 0.5 call rate and 1-second trigger, use a 0.1 call rate and a 5-second trigger. This will ensure consistent dosing and wash quality.
3. Repeat for all triggers.

In Smart Relay Mode, each trigger has its own independent time limit of 5 minutes. If a trigger is active for longer than 5 minutes, then the XL system assumes that the trigger is “stuck on” and will issue a No Flow alarm. No more feed commands will be sent to the pump box for that trigger until either:

1. You press the ACTION key to cancel the alarm. Pumping will resume after the alarm is cancelled, but will stop again in 5 minutes if the trigger is still present.
2. The trigger is deactivated. Subsequent triggers will then be accepted.

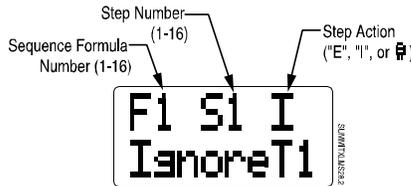
### Sequence Mode Programming

In contrast to Formula Mode’s usual use of fill-valve signals to trigger chemical pumps, Sequence Mode typically uses the drain valve signal to indicate a drain has just ended, and a wash or rinse is beginning. By counting the number of drains, you determine when to dose chemical. For example, if for “bright colors” (or some other load class), we find that the washer drains twice before pre-wash, we would program step 1 and step 2 as “I” (Ignore). Step 1 is performed when the sequence is started, typically by pressing the ACTION button. Step 2 would be performed when the first drain signal is received after the pre-wash. We would program a pump action for step 3, which would be dosing the main wash. If there were 2 rinses after main wash, before final rinse, we would set steps 4 and 5 to “I” (Ignore), and step 6 to a pump action to add softener. We would then set the step after the last pump action to “E” (End), which logs the load as completed in the Formula Count screen.

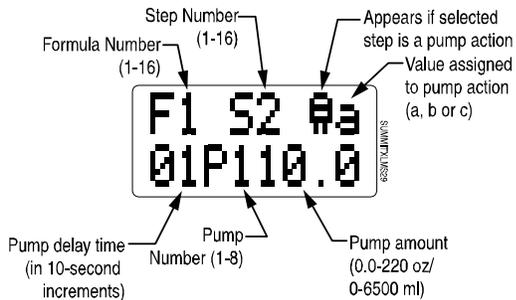


Screen 11d. Sequence Mode Programming. "E"(End) is the default value for each step and is used as the last step in a sequence.

Use the "+" and "-" keys to scroll to desired step (S) and formula (F) numbers, and to the step action ("E", for End "I" for Ignore, or pump icon for a pump action) to be associated with each sequence step.



Screen 11e. Sequence Mode Programming. "I"(Ignore) selection on the far right causes the system to skip a trigger.



Screen 11f. Sequence Mode Programming, Programming Pump Actions.

In the Screen 11f example, step 2 (S2), pump action "a" consists of pump 1 (P1) taking a 10-second delay before pumping 10 ounces of formula 1 (F1). If there were one or more other pumps actions for S2, a "+" sign would appear in place of the "a" in the top right of the screen. No other pump actions exist for S2 in this example.



The pump information on the second line of Screen 11f only appears when a pump action (rather than "I" or "E") is assigned for the step action.

To program a pump action:

1. Select desired formula (F) number.
2. CURSOR to step number (S) and use the "+" and "-" keys to select desired number.
3. CURSOR to the bottom line, and select a pump delay time, if desired, in 10-second increments.
4. CURSOR to the right side of the pump (P) field and input the volume of the formula to be pumped following the delay.

5. If you want to program "b" and/or "c" pump actions for this step, repeat steps 3 and 4.
6. Repeat these steps for all sequences.



Pressing the ACTION key while a step number is flashing inserts a new step and shifts the previously-displayed step number down (e.g., the previous S2 becomes S3) and the new step's default state value is "I" (IgnoreT1).

### Operational Details

- T1 and T2 are ignored during pump delays, pump actions, and flushes.
- While T2 is active, consecutive pump steps run without needing T1 triggers to activate them.
- If the first step (S) #1 is a pump amount (instead of "I"), the pump will start immediately when the sequence is started (after any delay programmed for that step).
- The "E" event is initiated by the completion of the previous (last) pump event. There need not be an actual T1 event.
- If the same pump receives a second instruction to feed while already feeding, it will wait until the first feed is complete before beginning the second feed. The second feed will not be cancelled, nor will its volume be reduced.

### Sequence Mode Configuration Options

#### Washer with no triggers

To run sequences without a T1 signal, set T2 to "-" in the **Trigger Qualification** screen. Sequences will rely on pump delay times to "know" when to pump during the wash cycle. Setting the T2 to a "-" tells the system to run without a T1 signal.

The sequence is started when the operator presses the ACTION key. The sequence will then run to completion. After completion of the formula sequence, pressing the ACTION key will start another formula sequence.

#### Automatic start

If trigger 3 (T3) is attached to the washer-on signal, the sequence displayed on the programmer will start automatically. This eliminates the need to push the ACTION button, though you will still need to select the correct load type/sequence name. Leave the T2 default setting as "+" to wait for a T1 signal before starting each successive step.

#### Automatic start with no T1 drain triggers

Set T2 to "-" in the **Trigger Qualification** menu and connect the washer-on signal to T3. Sequences of pump steps will occur automatically when the washer-on signal is received.

### TAFS Mode Programming



Screen 11g. TAFS Mode Programming

In TAFS Mode you assign pump volumes per pump per formula. The pump box knows when to dose the amount based on the assignment of pumps to tunnel modules, and batch transfer signals which allow the pump box to track the load through the tunnel so the pump box knows which load is in which module.

In the Screen 11g example, pump 1 will deliver 300 ml of chemical whenever a formula 1 load is in the module that pump 1 is assigned to.

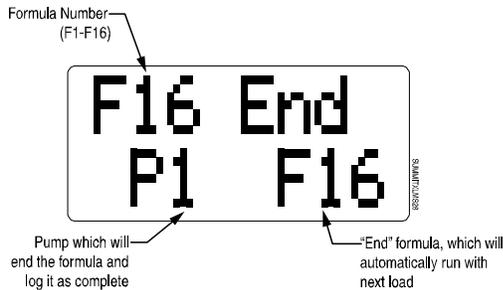
D = delay time prior to pumping after the batch transfer signal is qualified.

V = pump volume, 300 ml in the Screen 11g example.

### End Pump Assignment (for Formula, Latched, and Smart Relay Modes)

Pressing the MENU key from Formula, Latched or Smart Relay programming screens takes you to the End Pump Assignment screen. The “End Pump” determines which pump action will log the formula as complete, and allows the system to change the formula number automatically when a formula ends.

The default “End” pump is P1. You will select the pump that will signal the end of the selected formula (F1-F16), and log the formula as complete. Each formula can have a different “End” pump.



Screen 12. End Pump/End Formula Assignment

The Screen 12 example shows pump 1 (P1) will be the last pump that runs for formula 16 (F16). Once P1 has finished its assignment, F1 will log as complete in the Formula Counts screen.

1. Use the “+” and “-” keys to scroll to the formula number (F) for which you will create an “End” pump.
2. CURSOR to the bottom line, and make sure it says “End” on the left side.
3. CURSOR to the pump (P) field, and use the “+” and “-” keys to select the “End” pump.

### Example of End Pump Assignment

Suppose the “End” pump is set to pump 8 on a washer using only 3 triggers, and none of those 3 triggers has a pump action for pump 8. The XL will perform each pump action once, and then wait indefinitely for the pump 8 action that will reset the latch for the next wash load. Because that action never occurs, the latch never resets and continues ignoring signals. Changing the formulas will not reset the latch, because the dispenser will still be waiting for pump 8, but turning the power off and on will reset the latches.

### General Notes on End Pump Assignment

- This menu does not appear in Sequence Mode. In Sequence Mode, the formula is logged as complete when the “E” step is reached.
- Formulas will be logged as complete regardless of whether an alarm occurred. Alarms will be logged at the same time as the formulas are logged.

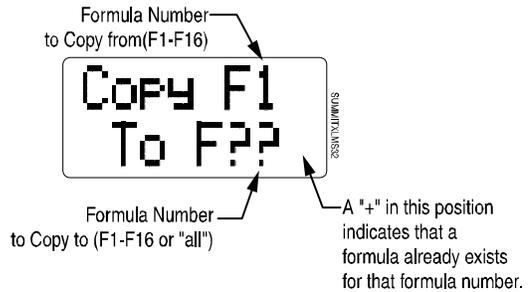
### New Formula Assignment

This option allows another formula to be automatically chosen when a certain formula is complete. This is especially useful for preventing the addition of bleach if the operator forgets to select a new formula for the next load.

Any formula number can be assigned as the “End” formula (F1-16). The default “End” formula is the current formula.

### Formula Copy (for Formula, Latched and Sequence Modes)

The Formula Copy feature allows you to copy an existing formula and all of its properties to another formula for faster programming.

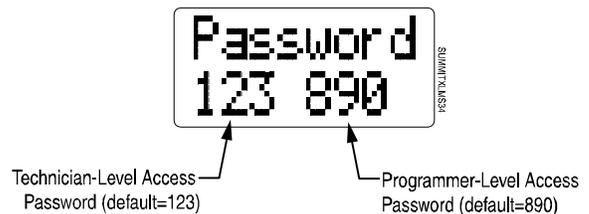


Screen 13. Formula Copy

Press and hold the ACTION key for 2 seconds to copy the formula shown on the top line to the formula shown on the bottom line.

- NOTE**  Copying a formula to “all” will overwrite all other formulas.
- When a “+” is displayed in the lower right corner, a formula already exists for the formula number to which you are copying. The existing formula will be overwritten after you press the ACTION key.

### Change Passwords



Screen 14. Creating Technician/Programmer-Level Passwords

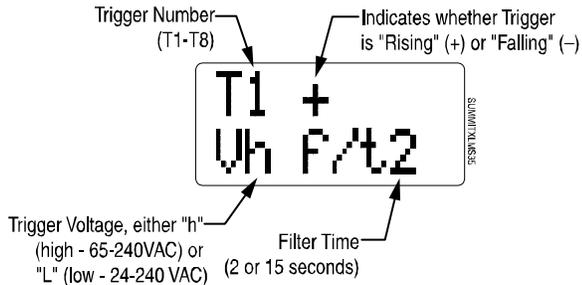
Change passwords using the “+” and “-” keys and the CURSOR key to move across the screen.

Entering a “000” password for either level means that no password is required for that level of access. Entering 000 for

the Programmer level access will allow anyone access to all screens, and the ability to alter programming data, regardless of whether the technician level access is 000.

### Trigger Qualification

Set voltage and filter time parameters in this screen to protect against false or intermittent trigger signals. The system can also be programmed to accept high or low voltage signals. In most installations, you will not need to modify these settings.



Screen 15. Trigger Setup

The Screen 15 example shows that trigger 1 (T1) is “rising” (+). A rising trigger edge indicates that the trigger activates when voltage is present, where a “falling”(–) trigger edge indicates that the trigger activates when voltage disappears. Default setting is “+”. The most common reason for changing trigger polarity is changing the T1 signal when in Sequence Mode.

Screen 15 also shows that the trigger is high (h) voltage, indicating that it is between 65 and 240 VAC. Either the “h” or “L” setting can be used with 24-120 VDC.

**NOTE** *The trigger circuit is designed to withstand voltages up to 240 VAC independent of the threshold setting. No damage will occur if you select an inappropriate setting. The trigger voltage selection is a detection threshold setting only.*

The filter time (f/t) is the amount of time you want the trigger to be active before the dispenser acts upon it. Screen 15 shows that the XL will begin the trigger action after the signal has been active for the default time of 2 seconds. Select 15 if your system is particularly vulnerable to erroneous triggering caused by electrical noise.

1. Using the “+” and “–” keys, select the trigger you wish to qualify.
2. Use the CURSOR key to move to the bottom line, and select high (“h”) or low (“L”) voltage.
3. Use the CURSOR key to move to the filter time (f/t) field, and select a filter time of either 2 or 15 seconds.

**NOTE** *Filter time is not applicable to TAFS and Smart Relay Mode triggering. The voltage selection applies to all modes. +/- selection applies to all modes except Smart Relay.*

### Copying (“Cloning”) Washer Setup Data from One Pump Box to Another

This feature allows you to copy or “clone” setup information from the XL main pump box to a programmer, and then download the setup to other pump boxes. This allows you to do

all programming for several XL’s at one time, rather than having to configure each washer or account individually. Even if you are copying to a dispenser with different pump and dose sizes for a different-size washer, copying will save you time because you won’t need to re-enter formula names. Also, it is faster to adjust a formula rather than re-enter it completely.

This feature can also be used when troubleshooting, to overwrite an XL’s programming with either blank settings or different settings.

The only information that cannot be copied is pump run time data, trigger counts, calibration amounts and formula counts.

### Receiving Cloned Setups

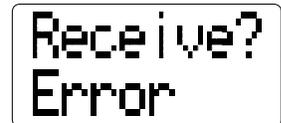


Screen 17. Receiving Cloned Setups

Pressing the ACTION key from Screen 17 “clones” all of the XL’s programmed setups from its main pump box to the programmer. During cloning, a right arrow icon flashes in the lower left-hand corner of the display.



If an error occurs during cloning, “Error” will be displayed at the bottom of the screen. If this occurs, check the cable connections and try again.



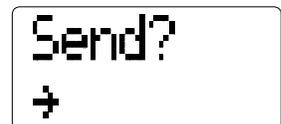
When cloning (upload from pump box to programmer) is done, the bottom line returns to its original state as shown in Screen 17.

### Sending Cloned Setups



Screen 18. Sending Cloned Setups

Pressing the ACTION key from Screen 18 copies all data from the programmer to the XL’s main pump box memory. Any existing run time data, trigger counts, and calibration amounts in the pump box will remain the same. During cloning, a right arrow icon flashes in the lower left-hand corner of the display.



If an error occurs during cloning, the screen will display the word "Error" on the bottom line. If this occurs, check the cable connections and try again.



### Language Selection

Pressing the "+" or "-" keys takes you through the different language options.



Screen 19. Language Selection

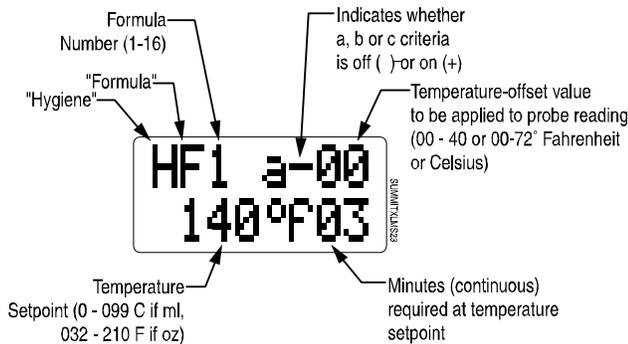
Available language selections are English, Portuguese ("Portuges"), French-Canadian ("FrCanada"), Finnish, Turkish, French, German, Spanish and Japanese. Default language is English.

### Hygiene Verification

The Hygiene Verification issues an alarm whenever the wash water fails to maintain a certain temperature for a certain amount of time.

3 different criteria, (a, b, or c) may be set for hygiene verification. This is intended to accommodate time/temperature options such as 90° for 3 minutes OR 80° for 10 minutes.

Only ONE criterion needs to pass per formula. An alarm will only occur if the formula fails ALL criteria. For example, if a, b OR c is met, the formula passes. If neither a, b NOR c is met, the formula fails.



Screen 20. Hygiene Verification

Screen 20 shows that criterion "a" requires that the wash water maintain a temperature of 140 degrees Fahrenheit for 3 minutes. The "-" in the top center of the screen indicates that for formula 1 (F1), criterion "a" is turned off. This means that temperature and duration requirements for "a" do not apply to F1, but may apply to another formula.

### Temperature Offset Value

Screen 20 also shows an "temperature offset value" of "00". The temperature offset value can be set to correct for a temperature

probe that may vary a few degrees from the actual temperature. For example, if you know that your temperature probe reading is 10 degrees below the actual temperature of the wash water, you can create an offset value of 10. The programmer will incorporate this offset value in its temperature reading, so you will always see the actual temperature of the wash water when you view this screen.

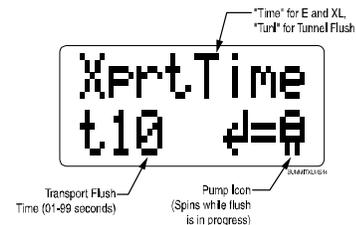
1. By default, criterion "a" is turned off, as indicated by the "-" in the top center of the screen. If you want criterion "a" active for the current formula, use the "+" or "-" key to change the "-" to a "+".
2. CURSOR to the top right of the screen to enter an offset value, if desired, between 0 and 40 degrees Fahrenheit (if oz is selected) or Celsius if ml is selected.
3. Advance to the bottom line using the CURSOR key, and set the temperature and duration requirements for criterion "a".
4. Repeat for criteria "b" and "c".
5. Repeat for all formulas that have hygiene requirements, setting the "+"/"-" appropriately based on hygiene requirements.



- Changing a criterion affects all other formulas using that criterion. a, b, and c are the same for all formulas.
- To pass hygiene a criterion, the formula's time at or above the temperature setpoint must occur over a continuous time period.

### Flush Transport Time

This screen is only visible when the flush manifold wire harness is plugged into the pump box PCB prior to turning on power. If screen does not appear, turn off power to pump box and turn back on. After setting up a unit with flush, if you wish to disconnect the flush you must unplug it, change the transport time to 0 and then turn power off and back on or you will get a no flow error with every feed.



Screen 21. Flush Transport Time

The transport time setting (t) tells the system how long the flush water must flow after pumping chemical. The example shows that the flush water will flow for 10 seconds after pumping chemical. Set the flush time to one second per three feet (one meter) to the washer, thus for a 15-foot distance to the washer use a transport time of t05. If you suspect low water pressure, use a flush time of one second per two feet (0.6 meters).

This screen defaults to "Xprt Time" with a time of 10 seconds ("t10") and is the programming screen used for E and XL

manifolds. If you are using a Tunnel Flush manifold, press the “+” or “-” button to select “Xprt Tunl” if it does not appear.

In TAFS Mode, the top line will be displayed as “Xprt Tunl”. When using a tunnel flush with Smart Relay Mode, use the CURSOR key to select “Time” and the “+” key to change it to “Tunl”.

Use the “+” and “-” keys to set the transport flush time (t), 0 to 99 seconds (default setting is 10).

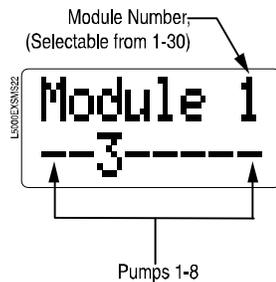
To initiate a manual flush, press the ACTION key. Press the ACTION key again to stop the flush.

### Disconnecting a Flush Manifold

If you want to remove a flush manifold from a system, change the flush time to 00, disconnect the manifold and turn the power off and on.

### Tunnel Module Pump Assignment (Tunnel Only)

This screen appears if the flush mode is set to “Xprt Tunl”, either by changing the flush type in Smart Relay Mode, or by selecting TAFS Mode. This screen is used to assign pumps to modules, which is required so TAFS can track loads through the tunnel and dose at the right time.



Screen 22. Tunnel Module

For each module to receive chemical, select the module number and change the pump’s “—” to its number to assign the pump to the module number on the top line. In the example below, pump 3 will pump to module 1. You must assign the pumps. If the pumps are not assigned to modules, they will not run.

## MAINTENANCE

### PUMP MOTOR AND TUBE REPLACEMENT SCHEDULE



Switch the XL power off at the pump box to ensure trigger signals do not initiate dosing during maintenance.

Die XL am Pumpenkasten ausschalten, um sicherzustellen, dass das Auslösesignal während der Wartungsarbeiten die Dosierung nicht auslöst.

Because every installation is different, an exact tube replacement schedule is difficult to specify. 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. We recommend 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. Once the flow rate goes down to 50% of its original flow rate, it has reached the end of its flex life and should be replaced. Replacing tubes at regularly scheduled intervals ensures more accurate product use and reduces service calls. In general, using short, large-diameter feed lines will improve pump tube life and tubes will last over a year with optimal hydraulic and chemical conditions.



It is very important not to let the tubes wear to the point where they tear and allow chemicals to leak.

Die Schläuche dürfen sich nicht so weit abnutzen, dass sich Risse bilden und ein Austreten der Chemikalien möglich wird.



To protect against pressurized chemical spray, wrap a rag around tube connections when replacing tubes.

Pour une protection contre les projections de produits chimiques pressurisées, entourer les connexions avec un chiffon pendant le remplacement des tubes.

Zum Schutz vor unter Druck stehenden Chemikalien sollte beim Austauschen der Rohre ein Lappen um die Anschlüsse gewickelt werden.



We recommend that personal protective equipment (such as safety glasses, gloves, face shield and apron) be worn during servicing.



Before servicing, be aware of potential static head pressure and the possibility of chemical exposure from the manifold.



- Other than occasional wiping of external surfaces with a dry cloth, no cleaning of equipment is required.
- À part essuyer de temps en temps les surfaces extérieures avec un chiffon sec, cet appareil ne nécessite aucun entretien.
- Die Außenseite des Gerätes gelegentlich mit einem trockenen Tuch abwischen. Ansonsten ist keine Reinigung erforderlich.

# TROUBLESHOOTING

## ALARMS

Problem	Possible Cause	Solution
System Alarm	<ol style="list-style-type: none"> <li>System components cannot communicate</li> <li>You are not using the correct programmer.</li> </ol>	<ol style="list-style-type: none"> <li> <ol style="list-style-type: none"> <li>Check telephone cord connections to the trigger module, programmer and main PCB.</li> <li>Remove telephone cord and replace. Try this a couple of times to see if connection is established.</li> <li>Try a different telephone cord. System Alarms cannot be cleared without correcting problem.</li> <li>If you spliced or crimped the cord connections, splice/crimp them again. We recommend that you use the cord that comes with the unit, uncut, because field-crimped telephone cord connections are a leading cause of system errors.</li> </ol> </li> <li>Make sure you are using the XL GREY programmer. The white programmer is for the Summit OPL.</li> </ol>
Hygiene Alarm	Wash water temperature didn't meet the programmed parameters	Check wash water temperature. Incidents will be recorded. Most alarms can be cleared by pressing the ACTION key. <b>See Screen 4.</b>
Low Chemical Alarm	Chemical level is low.	Check chemical supply.
No Flow Alarm	<ol style="list-style-type: none"> <li>Water flow past the flow switch has dropped below the required minimum flow of 1.1 liters (0.3 GPM).</li> <li>Debris obstructing flow switch operation or damaged plunger or spring in flow switch</li> <li>Trigger present for more than 5 minutes</li> <li>Flush disconnected</li> </ol>	<ol style="list-style-type: none"> <li>Check water source for required flow. See Specifications. If flow is within specifications, inspect flow switch plunger and spring for damage or debris.</li> <li>Alarm condition will clear automatically once correct water flow is restored.</li> <li>Press CURSOR key to check if a trigger is locked on. Reprogram that trigger if micro-controlled washer. If not, use a different trigger.</li> <li>After setting up an dispenser with flush, if you want to disconnect the flush you must unplug it, change the transport time to 0 and then turn the power off and on. If you don't, the system will behave as though a flush is still connected, issuing a no flow alarm with each feed.</li> </ol>

## FLUSH MANIFOLD

System pumps but flush doesn't operate.	No apparent flush activity yet pumps dose chemical into manifold.	Check flow switch for proper operation. No flow (or flow < 1.1 liter/.0.3 GPM) should indicate an "open" contact across flow switch white leads. Check with Ohmmeter. Ensure water pressure is within specification limits.
Transport time, Screen 21, does not appear when programming and using flush manifold.	Pump box is not recognizing the flush manifold	Check electrical connection from manifold harness, manifold PCB and J10 on the pump box PCB. NOTE: The pump box only recognizes the flush manifold if it is plugged in before the unit is powered up.
Solenoid valve will not open	Water pressure too high	Install a water pressure regulator where pressure exceeds 60 PSI (4.14 Bar) on input water supply to unit. See Specifications for flush manifold operation.
Solenoid valve will not open	Electrical problem	<ol style="list-style-type: none"> <li>1. Ensure 24 VDC to coil from PCB while manually priming.</li> <li>2. Check resistance (ohms) of solenoid coil. Disconnect wires from solenoid valve and measure across two coil terminals. Should measure approx. 60-130 ohms.</li> </ol>
Manifold flushes continuously and no chemical pumps activate	Triggering non-existent pumps	<ol style="list-style-type: none"> <li>8. In Relay mode, non-existent pumps (unused pump positions which can be up to position 8) must have a call rate of zero, or if they are triggered, the higher-numbered pump will activate first (in this case, the non-existent pump) and the flush will come on and remain open, making it appear as though the solenoid is stuck open.</li> <li>9. In other modes, non-existent pumps must have a dose amount of zero or a similar scenario could occur.</li> </ol>

## VOLTAGE TRIGGER PROBLEMS

Valid triggers received, but pumps do not pump	<ol style="list-style-type: none"> <li>1. Incorrect programming of voltage type (high or low) or state (rising or falling).</li> <li>2. Flickering triggers caused by electrical noise. If in Formula Mode, chemical volumes not programmed.</li> <li>3. Filter time set to 15 seconds.</li> <li>4. Still in programming mode.</li> </ol>	<ol style="list-style-type: none"> <li>1. Correct programming. (See Screen 15 or 16, depending on mode of operation selected).</li> <li>2. Use diagnostics Screen 5 to validate presence of triggers. If triggers present but flashing, indicates not acted upon yet. If electrical noise, use filter time qualifier (See Screen 15, filter time qualifier for Formula, Latched or Sequence Mode). Ensure chemical dosage amounts are programmed, if in Formula Mode.</li> <li>3. If filter time set to 15 seconds, pump will not start pumping until after the 15 seconds is reached.</li> <li>4. Pumps will not activate while still in programming mode. Exit programming mode.</li> </ol>
No display at programmer Keine Anzeige am Programmiergerät.	<ol style="list-style-type: none"> <li>1. No incoming power or blown power supply. <i>Keine Stromversorgung oder Netzteil durchgebrannt.</i></li> <li>2. Problem with communications cables. <i>Problem mit den Kommunikationskabeln.</i></li> </ol>	<ol style="list-style-type: none"> <li>1. Check incoming power. Replace power supply if necessary. <i>Stromversorgung überprüfen. Falls erforderlich, Netzteil ersetzen.</i></li> <li>2. Check communications cable from programmer and connections to internal pump box modules. <i>Kommunikationskabel vom Programmiergerät und Verbindungen zu den internen Pumpenkastenmodulen überprüfen.</i></li> </ol>
System will only run Formula 1.	Programmer not attached	Without the programmer attached, there is no way to change formula numbers. The system will keep running the same formula (except when in Smart Relay or TAFS Mode). Reattach the programmer if formula selection is required.

## PUMP PROBLEMS

One pump not working, or runs backwards.	<ol style="list-style-type: none"> <li>1. Wires to motor may be reversed.</li> <li>2. Incorrect polarity.</li> <li>3. No chemical amount programmed for the pump.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check pump wiring connections. Correct if reversed.</li> <li>2. Check trigger signal polarity (in most cases polarity should be "+").</li> <li>3. Set a chemical amount for the pump.</li> </ol>
All pumps not working <i>Pumpen funktionieren nicht.</i>	<ol style="list-style-type: none"> <li>1. Power off. <i>Gerät ausgeschaltet.</i></li> <li>2. Trigger signal not being received from the washer <i>Auslösesignal wird nicht von der Waschmaschine empfangen.</i></li> <li>3. Wire from pump box to programmer is too long. <i>Kabel vom Pumpenkasten zum Programmiergerät ist zu lang.</i></li> <li>4. XPRT TUNL flush selected by pump module assignments not done.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure power is on. <i>Überprüfen, ob die Pumpe eingeschaltet ist.</i></li> <li>2. Make sure that a trigger signal is being received from the washer. <i>Die Sicherung im Netzteil überprüfen. Bei durchgebrannter Sicherung Netzteil ersetzen.</i>  Make sure trigger signal is being received from the washer, unless running in triggerless Sequence Mode. <i>Sicherstellen, dass das Auslösesignal von der Waschmaschine empfangen wird.</i></li> <li>3. Make sure that the wire length from the pump box to the programmer is under 100' (30.5 meters). <i>Sicherstellen, dass das Kabel vom Pumpenkasten zum Programmiergerät nicht länger als 30,5 m ist.</i></li> <li>4. Assign pumps to tunnel modules.</li> </ol>
Pumps won't prime	<ol style="list-style-type: none"> <li>1. Flush water flow is insufficient or off.</li> <li>2. Flush used to be attached, but is no longer.</li> </ol>	<ol style="list-style-type: none"> <li>1. Restore water flow.</li> <li>2. Ensure flush PCB isn't attached to pump box PCB. Go to Transport screen, change transport time to "0" and turn power off then on.</li> </ol>
Pumps on but not pumping chemical.	Too much vacuum created.	<ol style="list-style-type: none"> <li>1. Make sure supply line is not up against the side or bottom of the chemical drum.</li> <li>2. Supply lines may be too small for viscous chemicals, or run is too long.</li> <li>3. Check for kinks in intake supply.</li> <li>4. Pump tube may be worn, or there may be an air leak on intake side of pump.</li> </ol>
Pump turns on too late.	<ol style="list-style-type: none"> <li>1. A delay has been programmed for that pump.</li> <li>2. Trigger qualifier screen is set for incorrect voltage type/state.</li> <li>3. System current consumption too high</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce delay time in Programming screen (see Screens 11a and 11b).</li> <li>2. See "Valid triggers received but pumps do not pump" under <b>Voltage/Trigger Problems</b>.</li> <li>3. Verify that tubing is installed as recommended. Using small tubing can increase pumps' electrical current consumption such that a pump delay is possible when attempting to run all pumps at once.</li> </ol>
Wrong pump runs.	<ol style="list-style-type: none"> <li>1. Incorrect pump/trigger assignment.</li> <li>2. Incorrect pump motor wiring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check programming to ensure that correct pump is assigned to correct trigger.</li> <li>2. Check pump motor wiring harness to ensure that it is correctly connected to the main PCB. It could be one pin off.</li> </ol>
Pumps turn on and off repeatedly while dosing.	Smart Relay Mode call rate low.	<ol style="list-style-type: none"> <li>1. The system is designed so the pumps can cycle on and off. Running in this manner will not effect performance or motor longevity.</li> <li>2. To prevent pumps from turning on and off, use a call rate larger than the flow rate shown on the calibration screen. For example, if the flow rate is 20 oz/min, use a call rate that is over 0.3 oz/min, such as 0.5 oz/min.</li> </ol>

## PASSWORDS

My password doesn't work.	Someone has changed the password.	Contact Technical Support
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## LATCHED MODE PROGRAMMING

In Latched Formula Mode, pumping occurred on the first wash load but not on the second or third loads.	End pump is set to pump that doesn't receive triggers, and the latch fails to reset	Change end pump assignment to a pump that receives a trigger. See <b>Latched Formula Mode</b> programming section.
Each load is being logged as two loads.	Usually occurs when the "End" pump signal is received, and then occurs again prior to the wash load's completion.	This may happen if the final rinse solenoid is the "End" pump, and it is used twice. To prevent this from happening, assign a pump delay and a '0' dosage amount to any pump other than the "End" pump, as a separate pump action for the "End" pump trigger signal. The pump delay must last until the final spin cycle to ensure that no further erroneous signals are received. While pump delay is active, all signals will be ignored, and the wash load will only be counted as one complete formula.

## CLONING

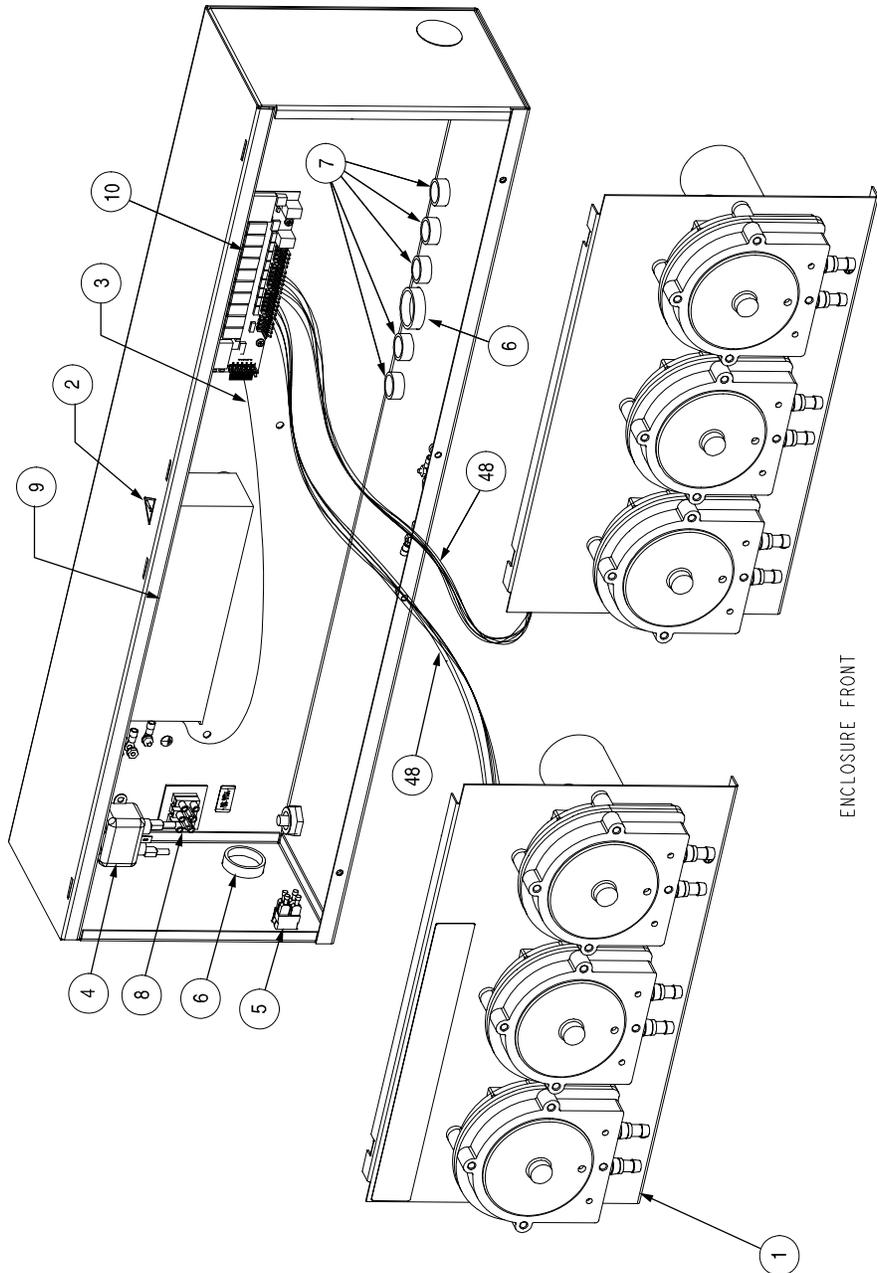
"Error" is displayed when I attempt to clone my programmer.	<ol style="list-style-type: none"> <li>1. Damaged cable.</li> <li>2. Defective programmer.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check communications cables and plugs for damage. Replace as necessary.</li> <li>2. Plug both programmers into pump box and verify working.</li> </ol>
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## OTHER PROBLEMS

Pressing the ACTION key doesn't cancel the System alarm.	System alarms cannot be cancelled. A System alarm indicates the dispenser components are not communicating.	<ol style="list-style-type: none"> <li>1. Turn power off.</li> <li>2. Check cables for damage. If any cables have exposed wires, replace them and proceed to #5.</li> <li>3. Disconnect and reconnect the telephone-type connectors, making sure they are free of moisture, dirt, or other foreign matter.</li> <li>4. Restore power.</li> <li>5. If the alarm is still displayed on the programmer, use a voltmeter to check the alarm output on the pumpbox PCB's 24 VAC alarm output. If there is no voltage output for the alarm, the pump box PCB probably needs to be replaced.</li> <li>6. If there is a voltage output, turn the power off and replace the washer interface module. Then restore power.</li> <li>7. If the alarm is still displayed, turn power off again, replace original washer interface module, and attach a different programmer.</li> </ol>
<b>I exited Program mode and a No Flow alarm started flashing</b>	Trying to prime or calibrate a pump that is not attached will cause this symptom.	<ol style="list-style-type: none"> <li>1. Cancel the alarm by pressing the ACTION key.</li> <li>2. If the alarm persists, check programmed information to be sure that you have not programmed pump amounts to pumps that do not exist.</li> </ol>

# DRAWING LIBRARY

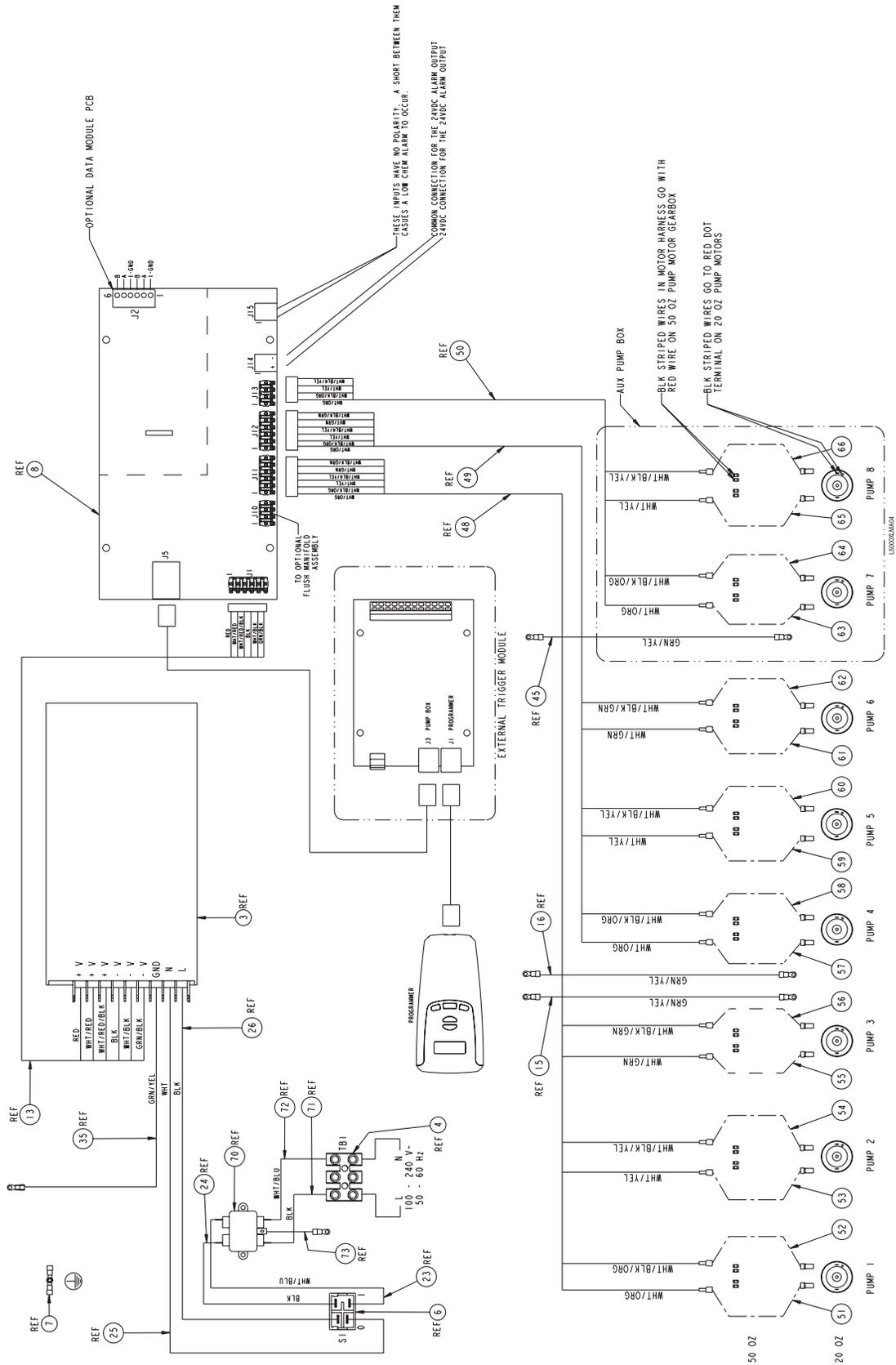
## XL ENCLOSURE



Seq#	Description	Code #
1	Front panel, w/o pumps or label	1203880
2	Label, high voltage inside exclamation point	1200104
3	Wire harness, power supply to PCB	1202182
4	AC line filter, 250V, 5A 50/60 Hz	091973

Seq#	Description	Code #
5	On/off rocker switch	037598
6	Hole plug, 1 3/8" black nylon	1204777
7	Hole plug, 7/8" black plastic	1204865
8	Terminal block, 3x2, 10 mm	1201500
9	Power supply	1206790
10	Pump drive PCB	1205112
48	Wire harness, pumps 1-3	068646

# XL WIRING DIAGRAM



## APPENDIX A-XL DATA

The XL Data Module consists of a data logging PCB which can be used with L5000Plus and XL. To determine if your dispenser is compatible with Data, look for **all three** of the following components on the dispenser's main PCB:

- A Molex pin connector (J13) labeled "PUMPS 7-8"
- A pin connector (J4) labeled "Data Module"
- A light-emitting diode (LED) labeled "D11"

See Figure D1 for the position of these components.

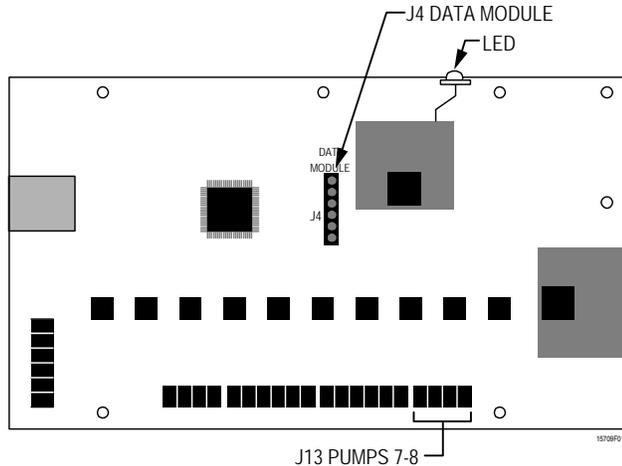


Figure D1. Dispenser main PCB, component locations

The XL Data Module must be used in conjunction with ManageNet Software (sold separately).

For detailed instruction on the use of ManageNet software see the ManageNet Installation and Operation Manual. This document assumes the user has at least a rudimentary knowledge of ManageNet.

### INSTALLATION OF THE DATA MODULE

1. Ensure that the dispenser is off by disconnecting the power (the LED should not be lit).
2. Remove the Data PCB from the packing material.
3. Place the Data PCB over the Main PCB as shown. The six pins of pin connector J4 (labeled "Data Module") near the center of the main PCB must insert into the complementary connector on the underside of the Data PCB. The pins must be lined up correctly, with one pin in each hole with the outer edges of the Data PCB exactly aligned with those of the dispenser main PCB. Be careful not to bend the pins. See Figure D1a.

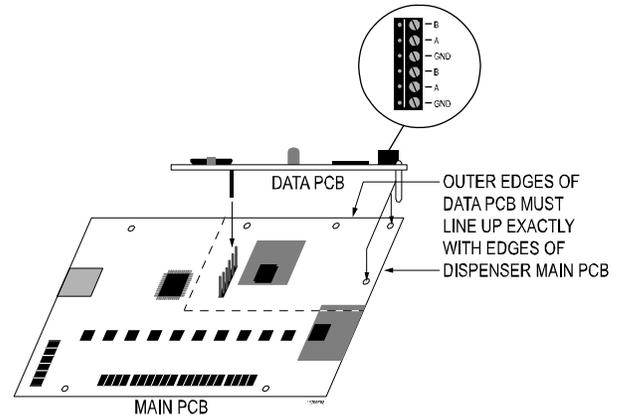


Figure D1a. Data PCB alignment over main PCB

4. The white spacers will line up with their respective holes as shown. Click the PCB into place.

Proceed with software installation as described in the software installation and operation manual.

### GENERAL TIPS FOR USE OF XL DATA MODULE

1. In order for a Data Module-equipped XL to work with ManageNet software, it is necessary that it emulate an ILS dispenser.
2. When setting up XL with the Data Module, these dispensers do not appear in the ManageNet 3.11 pick list. Select **ILS** for each XL you plan to set up. A graphic of ILS will appear (see Figure D2).
3. When connecting a Data Module-equipped XL, you must set the clock and purge the memory prior to setup. Purging the memory will not affect the formulas. Information on setting the clock and purging memory is discussed later in this document.

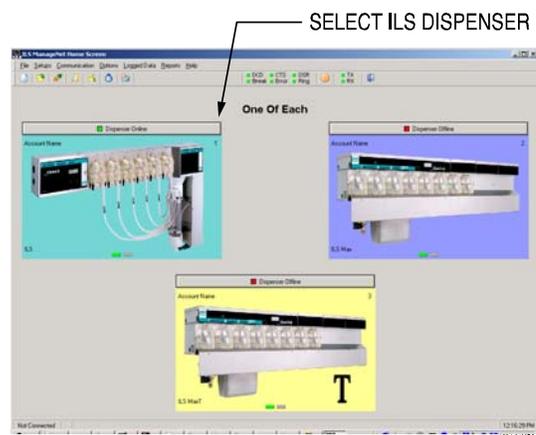


Figure D2. Data-capable XL will appear as ILS in ManageNet

4. Cloning of formulas must be done with the handheld programmer and can not be done via the ManageNet Software.

## COMMUNICATION CAPABILITY

1. Communication between ManageNet and the XL Data Module is one way (for the most part). ManageNet can retrieve and log data from the Data Module but cannot program the dispenser. **All programming of the dispenser must occur at the dispenser using the handheld programmer.**
2. ManageNet does have access to setups used exclusively for data-logging purposes. These setups can be viewed and/or set remotely using ManageNet. These setups are not accessible via the handheld programmer, and may not be copied to another XL Data by cloning.

### Communication Summary

Setups related to the actual dispensing of chemicals may be made only via the handheld programmer, not by ManageNet. Setups related to data logging may be made only via ManageNet, and not by the handheld programmer.

## VERSIONS OF MANAGENET SUPPORTED

Data Module-equipped XL may be used with either version 2 or version 3 of ManageNet. It was specifically tested with versions 2.1 and 3.11. This document refers to the use of Data Module-equipped XL with ManageNet version 3.11. Older versions may have slight differences in operation.

## BASIC SETUP

The Data Module in an XL connects to a ManageNet-capable computer in the same manner as an ILS or an ILS Max. A two-wire cable (A and B, with an optional ground wire) is run from the J2 terminal block on the Data Module to an RS-232 to RS-485 converter or to a protocol converter.

The A terminal on the Data board connects to the B terminal on the protocol converter. The B terminal on the Data board connects to the A terminal on the protocol converter.

When daisy-chaining multiple Data boards together, A terminals connect to A terminals and B terminals connect to B terminals. See Figure D3 for the location of the J2 terminal block on the Data Module.

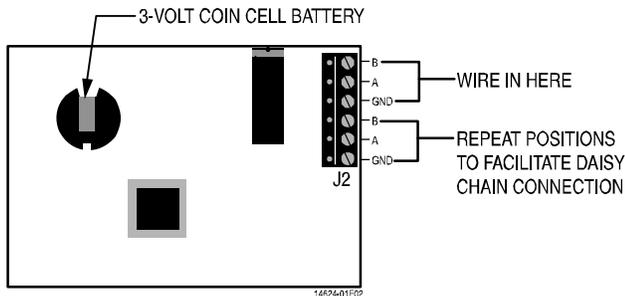


Figure D3. Data Module

As with the ILS and ILS Max, the XL Data Module may be built into a dispenser network via a daisy chain arrangement. The connector positions (A, B & GND) repeat on the J2 terminal block to facilitate daisy chaining (see Figure D3). Consult the

ManageNet installation and operating manual for further details on wiring multiple dispensers.

The network address of Data Module-equipped XL's is set using the handheld programmer. When a Data Module is plugged in, a new setup screen appears, allowing the network ID to be set to any number between 01 and 99. Each dispenser in a network must have a unique address.

When using ManageNet to connect to or create an account containing Data Module-equipped XLs, **ManageNet must be told that the Data Module-equipped dispenser is an ILS.** If ManageNet is told to poll the network to see which dispensers are present, it will recognize the Data Modules in the network as ILS dispensers.

Data Module-equipped XL's will appear in the ManageNet main window as ILS dispensers (the graphic will be that of an ILS).

**Important:** It is difficult to tell the difference between XL Data and ILS from the ManageNet software screens without actually looking at the dispensers. Be sure to record the address you assign to each dispenser to avoid confusion.

## SETTING NETWORK ID ADDRESSES

Each dispenser must have its own unique network ID address in order to track its performance with Data. To create network ID address for each dispenser:

1. Make sure programmer is connected to dispenser for which you are setting network ID.
2. Press the MENU button until you get to the following screen:



Figure D4. Network ID screen

3. Press the SCROLL button until you get to the number on the bottom line and assign an address number to the dispenser between. The number can be from 1 to 99.
4. Repeat for each dispenser, giving each dispenser a unique ID number.

## SETTING THE CLOCK AND PURGING THE DATA LOGGING MEMORY

After selecting the dispenser's network address, use ManageNet to set the clock at the **Synchronize Clocks Window**. The chemical pump run time and squeeze tube time in service dates will be set to the current clock time and date, so the clock time should be checked and adjusted if necessary **prior to performing a purge.**

### The Purge Screen

The purge screen allows the logged data to be purged (erased). It is important to purge a Data Module before setup to ensure that no old data is present. **This purge has no effect on the formulas;** it clears the data logged in ManageNet to allow the

program to start logging data with empty files. This helps avoid confusion and erroneous reporting.

To perform a purge, go to the “**Purge?**” screen (see Figure D4a); press and hold the ‘action’ button until a flashing arrow appears to signify that the purge is in progress.

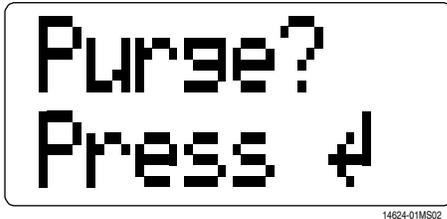


Figure D4a. Purge Screen

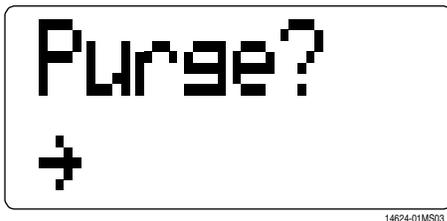


Figure D4b. Purge in progress

The purge takes 30 to 60 seconds to complete, at which time the flashing arrow will disappear.

After a purge, the logged data memory will be blank, and all of the setups that affect that Data Module will be gone. The clock is not affected by a purge. The setups may be restored after the purge by resending them from ManageNet.

## BACKUP BATTERY

The Data Module has a 3 volt coin cell battery (see Figure D3) to run the internal clock (BR2330 Panasonic).

Under normal circumstances, this battery should last several years. A bad battery will cause the clock setting to revert to the default value if power to the unit is lost. Cycle records will show incorrect dates and times after the power loss. If the battery ever needs replacing, you can slip it out and slip a new battery into the battery holder (code #058942). When you replace the clock battery, you must reset the clock. Set the clock from the **Synchronize Clocks Window** as described under **SETTING THE CLOCK AND PURGING THE DATA LOGGING MEMORY**. Following this, you should perform a logged data purge to properly clear any corrupted data.

## MANAGENET SETUPS, WINDOW BY WINDOW

### Account Setup Window

All the settings adjusted in this window will be recognized and accepted by the Data Module except the metric/US units setting. The Metric/US units setting must be done at the dispenser using the handheld programmer as well as in the General Account Setup Window. Be sure the same units (metric or US) are used in both areas.

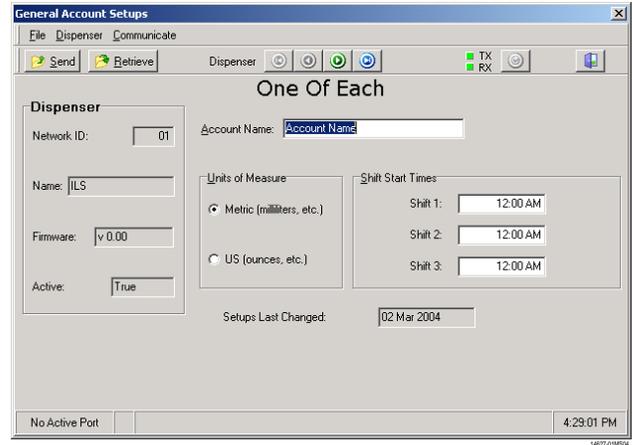


Figure D5. General Account Setup Window

### Chemical Supply Setup Window

- The Dilution Factor, Minimum Water Temperature, and Force Slow Speed settings will be ignored by the Data Module, and default values will be returned when read.
- The Pump Speed Calibrations from this window will not be accepted by the Data Module. A value of zero will be displayed. Calibration of the pumps on Data Module-equipped XL must be done using the handheld programmer.

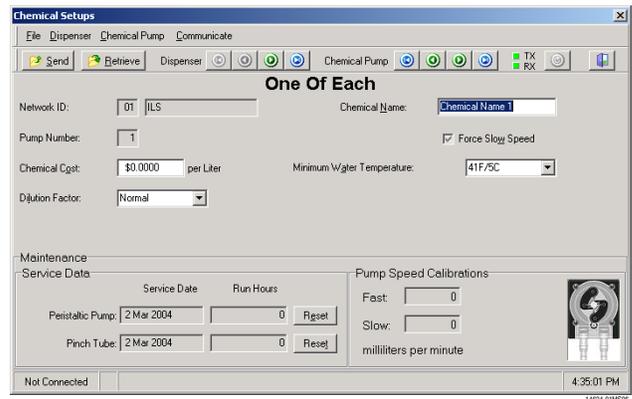


Figure D6. Chemical Supply Setup Window

Other settings on this screen relate to data logging, and will be honored by the Data Module.

### Washer / Transport Pump Setup Window

Only the Washer Name setting from this window will be recognized by the Data Module. All other settings modified in the screen will be ignored. The Transport Pump Service Date and Run Hours are fixed, and can not be changed.

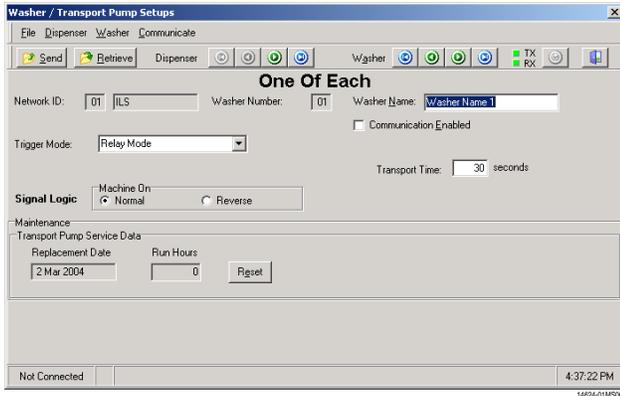


Figure D7. Washer/Transport Pump Settings

## Load Classification Setups Window

All the settings in this window will be recorded and used by the Data Module. However, special consideration must be given to the classification names. The classification names are used for reporting only and will not appear in the Formula Name screens on the handheld programmer. **Classification names must be programmed in ManageNet and formula names must be programmed at the dispenser using the handheld programmer.** Mismatched names could cause confusion in the washer cycle log, so the person doing the setup must ensure that the two sets of names agree.



*Data Module-equipped XL has a maximum of 16 formulas; the **Load Classification Window** in ManageNet allows you to input up to 30. Therefore, only formulas 1 through 16 will be used and classifications 17 through 30 will not be logged. Unlike an ILS, the Data Module will never log an unidentified cycle, so there is no need to enter the run time and weight for unidentified cycles into classification 30.*

## Trigger Setup Window

None of the settings made via this screen apply to data logging so all will be ignored by the Data Module.

## Synchronize Clocks Window

This window works just as with an ILS, setting the date and time used by the battery-backed clock on the Data Module.

## Backup (Retrieve All) and Restore (Send All)

These two operations work with Data Module-equipped XL as they do with ILS. All setup information can be sent or retrieved in a single operation.

The Data Module will ignore those settings that don't apply to it such as information intended for a second washer (a feature supported by ILS but not supported by XL). When ManageNet retrieves setups information from the Data Module, the Data Module will send back default data for those settings it doesn't support.

## Retrieve RAM Image and Send RAM Image

These two operations do not work with Data Module-equipped XL. Attempting to use them will cause dispenser communication errors.

For more information on the operation of ManageNet see the ManageNet Installation and Operation Manual.

## APPENDIX

### TIMING SCHEMES FOR OTHER DISPENSERS

Use this chart if you want to use AFS and are replacing one of these commonly-used dispensers with XL. If you are not replacing any of the listed dispensers, review the timing schemes listed here and select the value (A-F) that best corresponds to your desired timing scheme.

<i>Formula Selection</i>	<i>Clax Revoflow (A)</i>	<i>Nova (B)</i>	<i>Dema (C)</i>	<i>Knight-1 (D)</i>	<i>Knight-2 (E)</i>	<i>Knight-5 (F)</i>
<i>unchanged</i>	<i>&lt; 1.5 sec</i>	<i>&lt; 1 sec</i>	<i>&lt; 0.5 sec</i>	<i>&lt; 0.5 sec</i>	<i>&lt; 1 sec</i>	<i>&lt; 2.5 sec</i>
<i>1</i>	<i>2 sec (1.5-3.9)</i>	<i>2 sec (1-2.9)</i>	<i>1 sec (0.5-1.9)</i>	<i>1 sec (0.5-1.4)</i>	<i>2 sec (1-2.9)</i>	<i>5 sec (2.5-7.4)</i>
<i>2</i>	<i>6 sec (4-7.9)</i>	<i>4 sec (3-4.9)</i>	<i>3 sec (2-3.9)</i>	<i>2 sec (1.5-2.4)</i>	<i>4 sec (3-4.9)</i>	<i>10 sec (7.5-12.4)</i>
<i>3</i>	<i>10 sec (8-11.9)</i>	<i>6 sec (5-6.9)</i>	<i>5 sec (4-5.9)</i>	<i>3 sec (2.5-3.4)</i>	<i>6 sec (5-6.9)</i>	<i>15 sec (12.5-17.4)</i>
<i>4</i>	<i>14 sec (12-15.9)</i>	<i>8 sec (7-8.9)</i>	<i>7 sec (6-7.9)</i>	<i>4 sec (3.5-4.4)</i>	<i>8 sec (7-8.9)</i>	<i>20 sec (17.5-22.4)</i>
<i>5</i>	<i>18 sec (16-19.9)</i>	<i>10 sec (9-10.9)</i>	<i>9 sec (8-9.9)</i>	<i>5 sec (4.5-5.4)</i>	<i>10 sec (9-10.9)</i>	<i>25 sec (22.5-27.4)</i>
<i>6</i>	<i>22 sec (20-23.9)</i>	<i>12 sec (11-12.9)</i>	<i>11 sec (10-11.9)</i>	<i>6 sec (5.5-6.4)</i>	<i>12 sec (11-12.9)</i>	<i>30 sec (27.5-32.4)</i>
<i>7</i>	<i>26 sec (24-27.9)</i>	<i>14 sec (13-14.9)</i>	<i>13 sec (12-13.9)</i>	<i>7 sec (6.5-7.4)</i>	<i>14 sec (13-14.9)</i>	<i>35 sec (32.5-37.4)</i>
<i>8</i>	<i>30 sec (28-31.9)</i>	<i>16 sec (15-16.9)</i>	<i>15 sec (14-15.9)</i>	<i>8 sec (7.5-8.4)</i>	<i>16 sec (15-16.9)</i>	<i>40 sec (37.5-42.4)</i>
<i>9</i>	<i>34 sec (32-35.9)</i>	<i>18 sec (17-18.9)</i>	<i>17 sec (16-17.9)</i>	<i>9 sec (8.5-9.4)</i>	<i>18 sec (17-18.9)</i>	<i>45 sec (42.5-47.4)</i>
<i>10</i>	<i>38 sec (36-39.9)</i>	<i>20 sec (19-20.9)</i>	<i>19 sec (18-19.9)</i>	<i>10 sec (9.5-10.4)</i>	<i>20 sec (19-20.9)</i>	<i>50 sec (47.5-52.4)</i>
<i>11</i>	<i>42 sec (40-43.9)</i>	<i>22 sec (21-22.9)</i>	<i>21 sec (20-21.9)</i>	<i>11 sec (10.5-11.4)</i>	<i>22 sec (21-22.9)</i>	<i>55 sec (52.5-57.4)</i>
<i>12</i>	<i>46 sec (44-47.9)</i>	<i>24 sec (23-24.9)</i>	<i>23 sec (22-23.9)</i>	<i>12 sec (11.5-12.4)</i>	<i>24 sec (23-24.9)</i>	<i>60 sec (57.5-62.4)</i>
<i>13</i>	<i>50 sec (48-51.9)</i>	<i>26 sec (25-26.9)</i>	<i>25 sec (24-25.9)</i>	<i>13 sec (12.5-13.4)</i>	<i>26 sec (25-26.9)</i>	<i>65 sec (62.5-67.4)</i>
<i>14</i>	<i>54 sec (52-55.9)</i>	<i>28 sec (27-28.9)</i>	<i>27 sec (26-27.9)</i>	<i>14 sec (13.5-14.4)</i>	<i>28 sec (27-28.9)</i>	<i>70 sec (67.5-72.4)</i>
<i>15</i>	<i>58 sec (56-59.9)</i>	<i>30 sec (29-30.9)</i>	<i>29 sec (28-29.9)</i>	<i>15 sec (14.5-15.4)</i>	<i>30 sec (29-30.9)</i>	<i>75 sec (72.5-77.4)</i>
<i>16</i>	<i>62 sec (60-63.9)</i>	<i>32 sec (31-32.9)</i>	<i>31 sec (30-31.9)</i>	<i>16 sec (15.5-16.4)</i>	<i>32 sec (31-32.9)</i>	<i>80 sec (77.5-82.4)</i>

### NOTICE REGARDING CHANGES

Material in this manual is subject to change without notice. Special circumstances involving important design, operation, or application information will be released via Equipment Technical Bulletins. Every effort has been made to ensure this information is accurate, but no guarantee is made as to the accuracy or completeness of this document.



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