

ILS

Industrial Laundry System

Installation and Operating Manual



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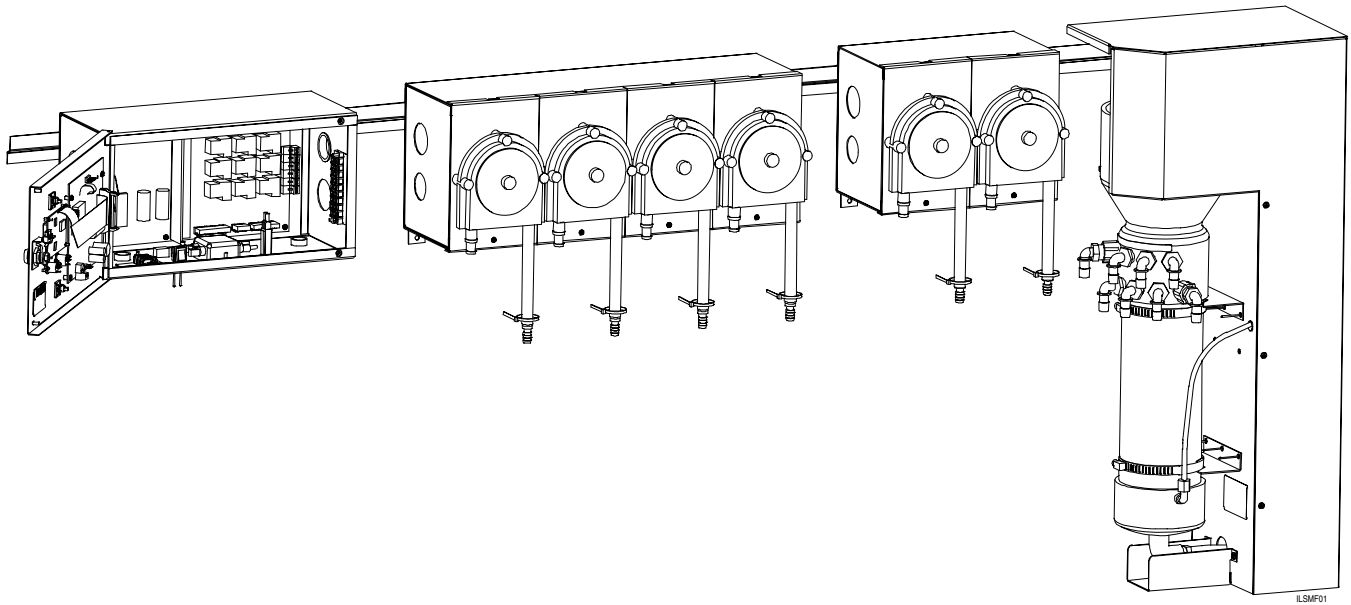


Figure 1. ILS Wall Mounted Components

INTRODUCTION

OVERVIEW

Industrial Laundry System (ILS) is a state-of-the-art system that accurately measures and delivers laundry chemicals to washers. The following are its most prominent features:

- Serves 1 or 2 medium to large washers
- Delivers up to 8 chemicals
- Provides viscous and normal product delivery modes
- Physically measures each chemical dose
- System may be located up to approximately 200 feet away from washers, depending on transport line pressure (maximum 45 psi)

EQUIPMENT

ILS Controller Module

The ILS Controller Module supervises the entire chemical delivery system and records its operation. It houses the ILS PCBs, washer signal processor, alarm display screen, reset buttons and communication ports for the PC.

Peri Pump Modules

The Peri Pump Modules house 2, 3, 4, or 6 peristaltic pumps, which deliver chemicals to the Transport Module. You can install any combination of these modules to achieve a maximum of 8 chemicals.

Transport Module

The Transport Module receives and measures each chemical feed and houses the transport pumps which deliver the chemical and flush water to the washers. A mixing chamber within the



Do not pump solvents of any kind through this system without prior consultation with Technical Services.

- Peristaltic pumps are automatically calibrated
- Tandem peri pumps provide up to two gallons per minute of chemicals
- Water dilution and post flush on every feed
- Modern modular components are easy to install and maintain
- Front panel screen displays status messages and alarm conditions
- Logged data is saved for management use
- Setup, monitoring and report generation is done at a laptop or desktop PC, used locally or remotely via modem, using the ILS ManageNet Windows

Transport Module holds the delivered chemicals prior to transport to the washer(s).

TR-7000-AC Trigger Module

The TR-7000-AC Trigger module is the interface between the washer triggers and ILS. It converts the 24-240 VAC washer signals to low voltage communications. The seven washer trigger inputs are connected to the TR-7000-AC via a 14-wire harnessed connector. An AlphaBus cable connects to each TR-7000-AC through a 5-pin Phoenix type connector.

RS-3000 Formula Selector

An optional RS-3000 Formula Selector mounted at a washer allows the operator to:

- Select chemical dosage and identify load classification for formula mode.
- Identify load classification for automatic or relay mode.

Detailed information about feed modes is provided in **Appendix A** and **Appendix B**.

Transformer

ILS requires 24 VAC line power at 10 Amps. The transformer provides voltage stepdown from the 120/240 VAC to 24 VAC for the ILS. Use only one transformer per ILS unit. We recommend an 0.5 KVA transformer.

ILS ManageNet Software

To setup the dispenser and for ongoing supervisory control of the system, you must install this Windows-based software on a PC that you connect to the ILS.

SPECIFICATIONS

OVERALL SYSTEM

Washers Served

Up to 2

Chemicals Delivered

Up to 8

Maximum Distance from Peri Pump to Washer

45 psi or approximately 200 feet (61 meters)

Water Service

5 gpm (19 liters/minute) minimum at a pressure of 20 psi (1.4 Bar) minimum

Hot flush water may be required for some chemicals.

Temperature Range

41 °F minimum and 120 °F maximum for flush water

Approvals

CE

ILS CONTROLLER

Communication Ports

RS-485 (for permanent connection of a desktop PC or modem more than 15 ft distant from the ILS Controller)

RS-232 (for temporary connection of portable PC or modem within 15 ft of the ILS Controller)

Keypad

5-key sealed membrane switch

Display

LCD, 4 lines, 20 characters per line

Memory

Nonvolatile (with battery backup)

Enclosure

304 stainless steel, key lock with override switch

Weight

13.5 lbs (6.1 Kg)

Power Requirements

24 VAC @ 10 Amps, 50/60 Hz

Dimensions

Height	Width	Depth
8.2	15.25	6.0 in
20.8	38.7	15 cm

PERISTALTIC PUMP MODULE

Type of Pumps

Peristaltic, self-checking, dual roller

Enclosure

304 stainless steel

Capacity of Pumps

100 oz/min (3 liters/min) nominal

Pump Motors

High torque D.C. motors, constant two-speed

Pump Squeeze Tubing Materials

Silicone, Beta Tube, C-Flex, Teflon or Nordel

Power

Supplied by ILS Controller

Pump Module Size

2 Pumps

Height	Width	Depth	Weight
8.2	10.65	6.0 in	14.5 lb
20.8	27	15 cm	6.6 kg

3 Pumps

Height	Width	Depth	Weight
8.2	16.0	6.0 in	21.1 lb
20.8	40.6	15 cm	9.6 kg

4 Pumps

Height	Width	Depth	Weight
8.2	21.32	6.0 in	27.4 lb
20.8	54	15 cm	12.4 kg

6 Pumps

Height	Width	Depth	Weight
8.2	32.0	6.0 in	40.85 lb
20.8	81.3	15 cm	18.5 kg

TRANSPORT MODULE

Pump Type

Diaphragm

Pump Manufacturer

SHURflo

Pump Capacity

3.6 gpm @ 0 psi
2.2 gpm @ 45 psi

Mixing Chamber

Chemical resistant PVC

Overfill Switch

Magnetic float

Water Connection

5 gpm (19 liters/minute) minimum at a pressure of 20 psi (1.4 Bar) minimum

Standard garden hose type 3/4 in hose bib

Feed Line Connection

Polyflow tubing , 5/8 inch OD [or]
barbed fitting for 1/2 inch ID nylonbraided tubing

Dimensions

Height	Width	Depth
32.0	13.25	9.00 in
81.3	33.6	22.9 cm

Weight

48 lbs (15.4 Kg)

Input Power

Supplied by ILS Controller

Voltage

24 VDC

Pressure Switch

45 psi shut-off

TRANSFORMER

Dimensions

Height	Width	Depth
8	6.5	5.0 in
20.32	16.51	12.7 cm

Weight

19 lbs (8.62 Kg)

Electrical

Input: 120-240 VAC
Output: 24 V @ 20 Amp
Power: 0.5 KVA

TR-7000-AC TRIGGER MODULE

Dimensions

Height	Width	Depth
4.75	6.75	1.5 in (less connectors)
12.1	17.2	3.8 cm

Weight

68 lbs (.3 Kg)

Power

5 VDC

Input Trigger

24-240 VAC, fully isolated (DC models available)

RS-3000 FORMULA SELECTOR

Dimensions

Height	Width	Depth
4.75	7.75	1.5 in
12.1	17.2	3.8 cm

Weight

0.6 lbs (0.28 Kg)

Power

5 VDC

PERSONAL COMPUTER REQUIREMENTS

- IBM compatible PC running Windows® '95, Windows® '98 or Windows® NT
- 486 or later processor
- At least 8 MB of RAM
- Color monitor (highly recommended but not required)
- At least 15 MB of available hard disk space for installing ILS ManageNet
- 3.5 inch floppy disk drive
- For printing reports, any printer that may be configured under the Windows Control Panel
- For local connections, an available serial port
- For remote connections, an approved modem. See APPENDIX E for a list of approved modems.

INSTALLATION PLANNING

You can use the following guidelines for deciding where to install the ILS equipment components, which components to order for an account and which plant utilities will be required.

WALL MOUNTED COMPONENTS

The Controller, Peri Pump Modules, and Transport Module are installed on wall-mounted rails in the chemical storage area. Allow a maximum vertical rise of 10 feet from the chemical drums to the peri pumps. Also be sure there is ample room on the wall and that 0.5 KVA at 120 or 240 VAC electrical power is available.

The Transport Module is mounted at the rightmost position on the rails and can be a maximum of 200 feet (61 meters) away from the most distant washer served, or up to 45 psi.

Mounting rails are shipped in the installation accessory kits. The rails in each kit provide for wall mounting the Controller, Peri Pump Module(s) and the Transport Module. The kit you should order depends on the configuration of Peri Pump Modules you

are installing. The Peri Pump Modules come with 2, 3, 4 or 6 peri pumps to allow you to configure anywhere from 2-8 pumps.

4 PERI PUMP KIT	34 IN RAIL	12 IN RAIL	12 IN RAIL
6 PERI PUMP KIT	34 IN RAIL	34 IN RAIL	
8 PERI PUMP KIT	34 IN RAIL	34 IN RAIL	12 IN RAIL

Order the following installation kit to get the right length of rails for the number of peri pumps you are installing.

If you are installing	Order
2 Peri pumps	4 Peri Pump Kit
3 Peri pumps	4 Peri Pump Kit
4 Peri pumps	4 Peri Pump Kit
5 Peri pumps	6 Peri Pump Kit
6 Peri pumps	6 Peri Pump Kit
7 Peri pumps	8 Peri Pump Kit
8 Peri pumps	8 Peri Pump Kit

WASHER COMPONENTS

The TR-7000-AC Trigger Module(s) and optional RS-3000 Formula Selector are mounted on the washer.

- Install at least one TR-7000-AC Trigger Module (for dosage selection) on each washer in the area of the washer controller.
- Install the optional RS-3000 Formula Selector (for load identification/manual close selection) on the washer so that the operator can easily access and see the dial selector.

CHEMICAL DRUMS

The 5-, 30- or 55-gallon chemical drums must be positioned immediately below the dispenser. Be sure to allow enough floor space to accommodate the number and size of the drums required for each dispenser. Avoid long runs of suction tubing, particularly if thick products will be pumped.

PLANT UTILITIES

The dispenser requires a water supply of 5 gallons per minute (19 liters per minute) minimum at a pressure of 20 psi (1.4 Bar) minimum.

EQUIPMENT INSTALLATION

This section describes how to install the ILS wall-mounted components and the modules that are installed on the washer(s). Installation of the ILS ManageNet software on a PC and connection of the PC to the ILS is described in the document DISPENSER NETWORKING SOFTWARE FOR WINDOWS, which is packaged with the software.



Installation must be done by qualified personnel only.

UNPACK COMPONENTS

Inspect the shipping containers for signs of damage and report any damage to the carrier. All claims for apparent or concealed damage should be filed with the carrier.

Some accessory components are packed separately. Unpack all the cartons and verify the contents of the shipment against the packing list to be sure the shipment is complete.

INSTALL CONTROLLER, PERI PUMP AND TRANSPORT MODULES

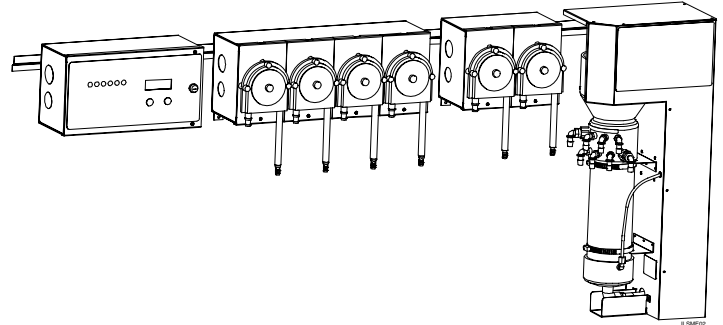


Figure 2. Components

1. Butt together and secure the mounting rails at eye level horizontally on the wall. Use expansion bolts or similar anchor fasteners.
2. In order from left to right, hang the Controller, the Peri Pump Modules, and the Transport Module on the rail(s) as shown in Figure 2. Temporarily leave about 1 inch between each section for making the electrical connections.

ELECTRICAL CONNECTIONS

1. Remove the cover of the Transport Module and the front plates (including pumps) from the Peri Pump Modules. Save the screws.
2. Open the front door of the Controller.
3. Thread the upper wire harness (connected to the green terminal on the PCB at J5) through the smallest hole in the right wall of the Controller.
4. From inside the pump modules, push black hole bushings into the smallest of the two holes.
5. Thread the lower wire harness (connected to the 3 white terminals on the PCB at J2, J3, and J8) through the largest hole in the right wall of the Controller.



For CE conformance, a ferrite bead must be installed around the lower wire harness (to the transport module) inside of the controller box. See Figure 3. (Ferrite bead is included in Installation Kit.)

6. Thread the upper wire harness through the upper holes of all the pump modules. Clip it into the harness clips on the ceilings of the pump modules. Coil the unused upper wire harness in the last pump module.
7. Thread the lower wire harness through the lower holes of all the pump modules.
8. Pull the end of the lower wire harness through the upper hole on the right side of the last pump module.
9. Put a hole plug in the lower hole from the outside.
10. Push the Controller together with all the pump modules.
11. Working from left to right, connect the quick disconnects of the upper wire harness to the terminals on the pumps. Connect the black harness wire to the red pump wire. See Figure 4 and Figure 5. Replace the pump plates (and pumps) in the pump modules as you work. Keep the lower wire harness under the pump motors.

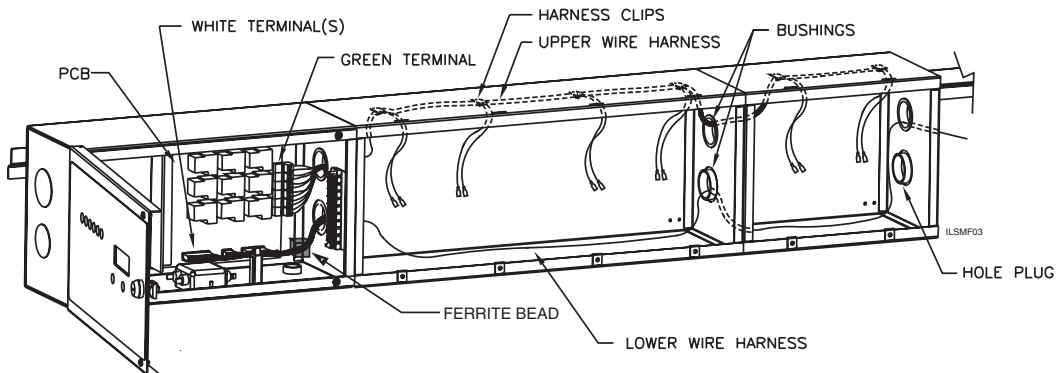


Figure 3. Controller to Pump Module Electrical Connections

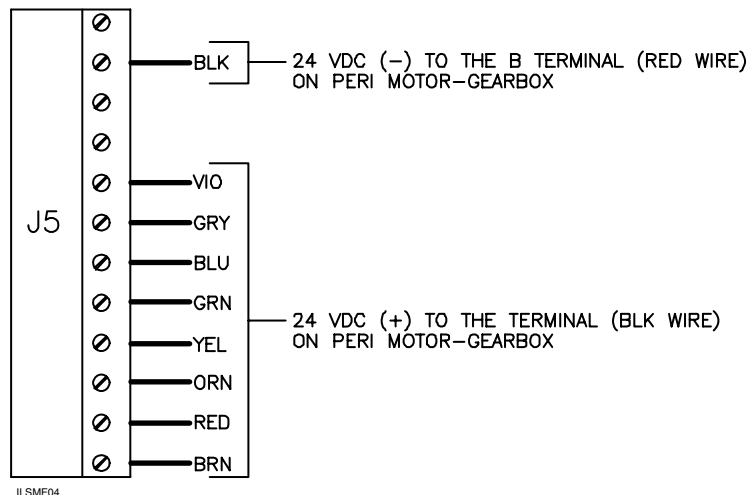


Figure 4. Upper Wire Harness Connections to Terminal Block

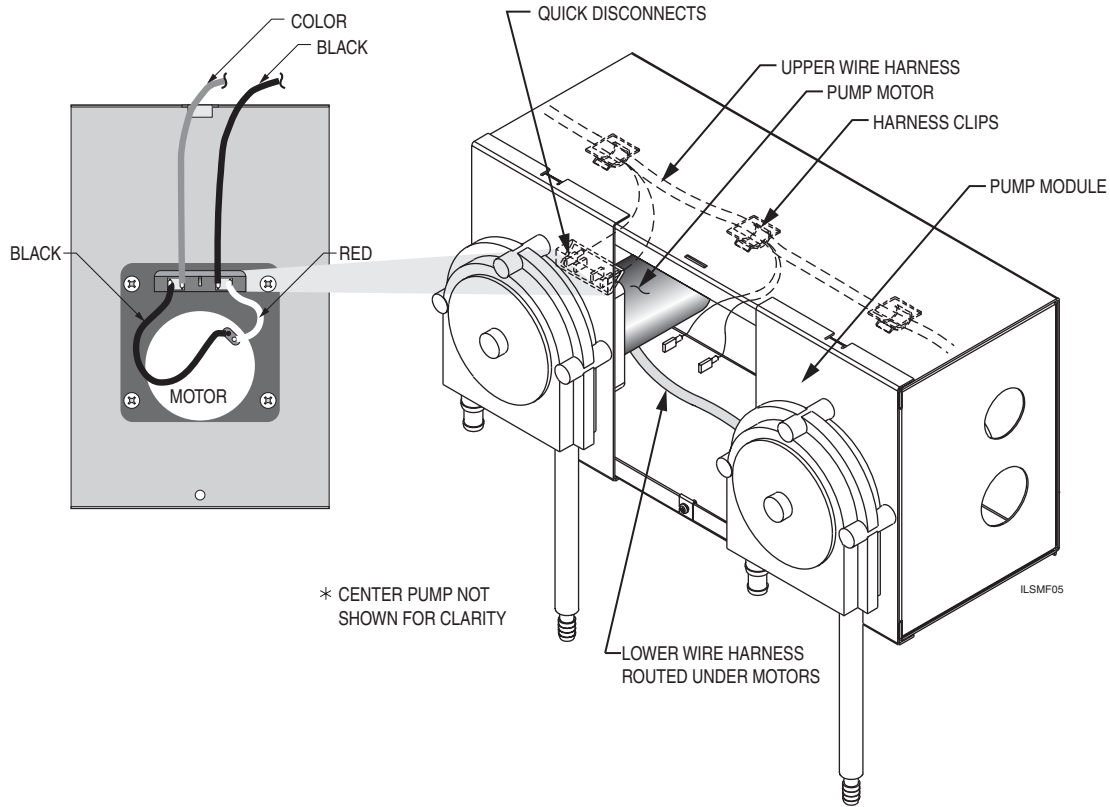


Figure 5. Pump Module to Pump Connection

12. You can optionally create up to two sets of tandem Peri Pumps, which increases the maximum number of pumps on a system to ten. A tandem set dispenses one chemical setup, so you are effectively doubling the volume of chemical you can deliver from a pump. To run two pumps in tandem, daisy chain them together at the colored wire terminal (A)

at the Peri Motor Gearbox using wire jumpers and the QDC adapter provided in the installation kit. See Figure 6. The illustration shows the wiring method for making both pump 1 and pump 2 a tandem set. The wire harness allows enough length for the tandem pumps to be located together at the leftmost, center or rightmost pump position.

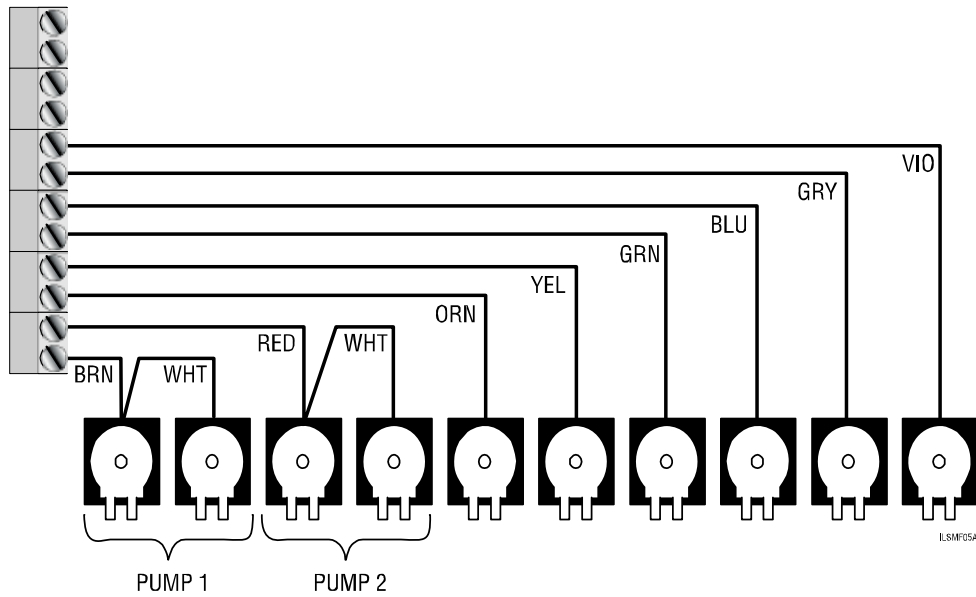


Figure 6. Electrical Connections for Tandem Peri Pumps

13. In the Transport Module (see Figure 7), thread the lower wire harness behind the upper section of the mixing chamber, through the hole in the support wall. You may need to loosen the hose clamp on the mixing chamber to pull the wire harness through the hole.
14. Thread the wire harness under the pressure sensor tube.
15. Attach the plug to the white terminal at the top of the support wall.



For CE conformance, a ferrite bead must be installed around the lower wire harness (to the transport module) inside of the controller box. See Figure 7. (Ferrite bead is included in Installation Kit.)

16. Push the Transport Module as close as possible to the pump modules. You may want to temporarily put the cover back on to correctly place the Transport Module.
17. Secure the lower edge of the ILS Controller, Peri Pump Modules and Transport Module to the wall using wall anchors.

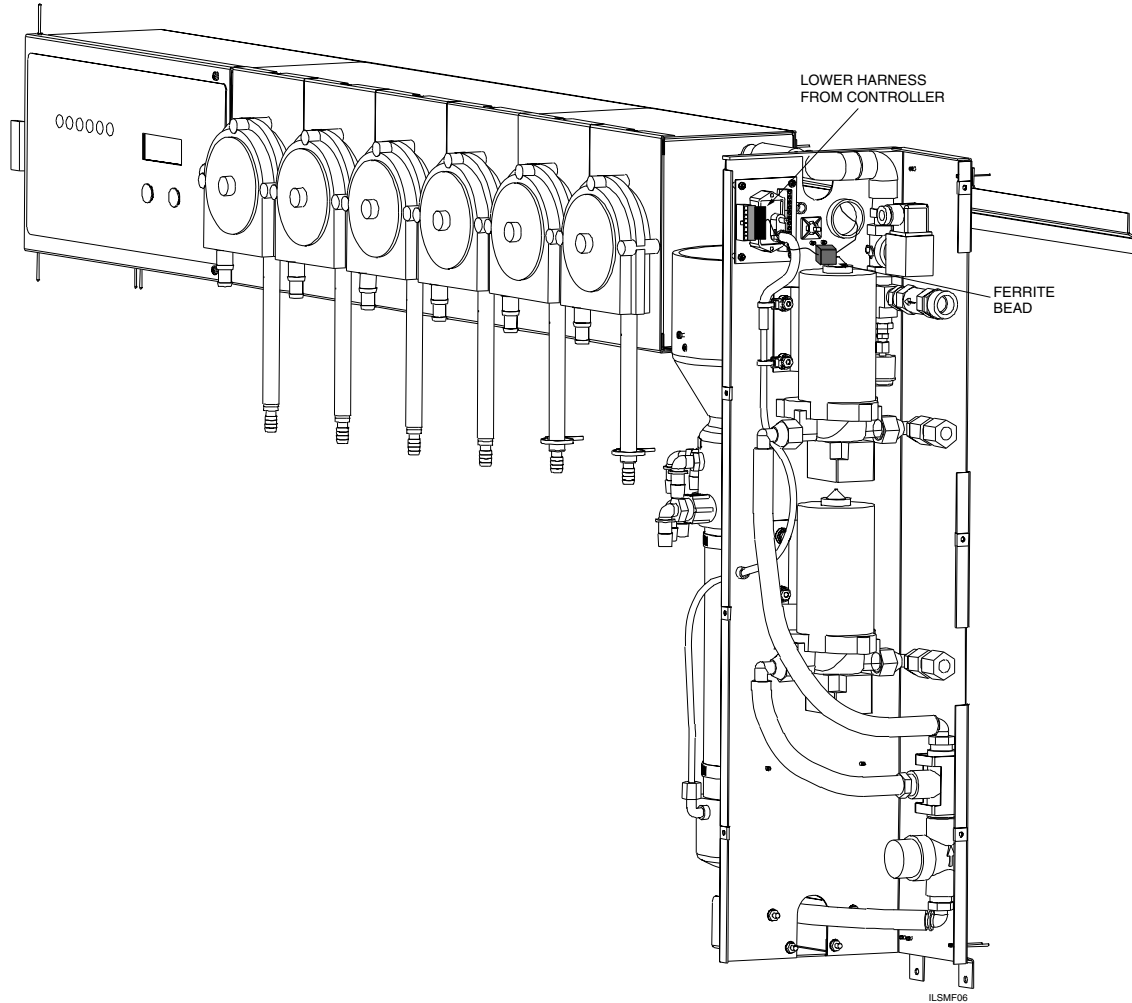


Figure 7. Transport Module Components and Connections

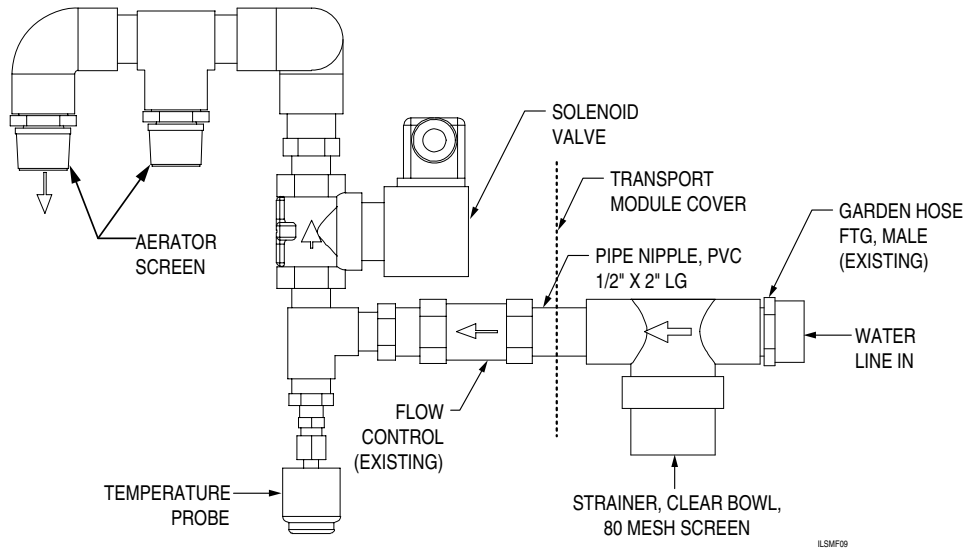


Figure 8. Adding Strainer to Input Water Line on ILS Transport Module

CONNECT WATER SUPPLY

ILS requires a water supply of 5 gallons per minute (19 liters per minute) minimum at a pressure of 20 psi (1.4 bar) minimum. Connect the water service hose to the garden hose fitting (3/4-inch hose bib) at the top of the Transport Module. For installations where there is an unfiltered water source, you can install a water strainer (available in the installation kit) on the input water line. See Figure 8 and the installation instructions within the kit.

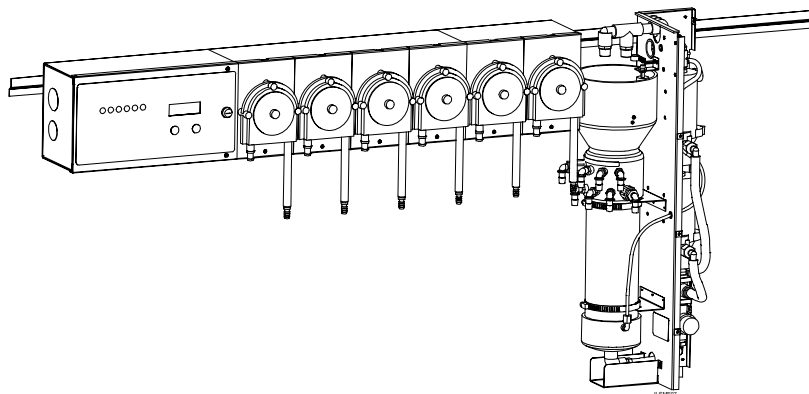


Figure 9. Squeeze Tubing Connections from Peri Pumps to Transport Module

CONNECT PUMPS TO TRANSPORT MODULE

- Using 1/2-inch ID vinyl tubing, connect the outlet (right side) of the pump squeeze tubing of each peristaltic pump to an elbow fitting on the mixing chamber.



For viscous products, connect to 1/2-inch pipe thread ports.

See Figure 9. The fittings are on the mixing chamber, above the clear section.

- When installing a tandem set of peri pumps, remove the black 1/2-inch barb from the discharge side of the feed tubes of both pumps that will comprise the pair. Next, insert both feed tubes into the supplied 1/2-inch Y fitting. Finally, run tubing from the bottom of the Y to the mixing bowl. See Figure 10.

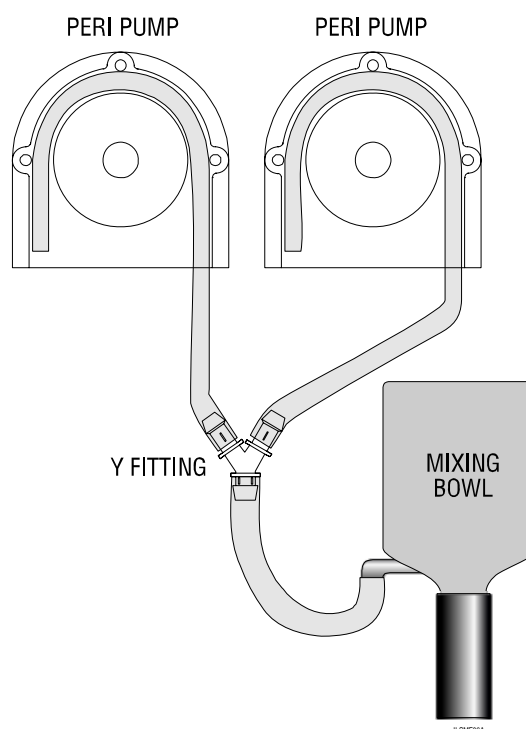


Figure 10. Tubing Installation for Tandem Peri Pumps

- Remove all unused elbow fittings from the mixing chamber and replace them with a threaded plug.
- Tighten the plugs to finger tight only.

CONNECT PUMPS TO CHEMICAL DRUMS

- Using 5/8-inch ID braided tubing, connect the inlet (left side) of the pump squeeze tubing of each pump to the chemicals. Route the tubing in the shortest distance possible.



For viscous chemicals, it is vital that the uptake tube not exceed 15 feet.

- For each chemical, push one end of the tubing onto a standpipe. Put the standpipe into the chemical drum. Make sure the standpipe reaches the bottom of the drum.
- Seal both ends of the braided tubing with a hose clamp to prevent vacuum leaks. See Figure 9.

CONNECT TRANSPORT MODULE TO WASHERS

- To use 5/8-inch OD polyflow tubing, connect the output (compression fitting(s)) of the Transport Module pump(s) to the washer(s). See Figure 7. The maximum tubing length between the Transport Module and the washer(s) is 200 feet. Avoid sags in the tubing.

Replace the cover of the Transport Module.

- To use 1/2 inch ID Nylobraid tubing, remove the 5/8 inch tube fitting from the pump output and replace it with the 1/2 inch FPT coupling and 1/2 inch barb fitting in the installation kit.

INSTALL TRANSFORMER

Observe the following requirements regarding the transformer:

- Use only one transformer per ILS unit.
- The transformer must be rated at 0.5 KVA.
- The ILS is a 24 VAC system. The secondary voltage to the unit must be 24 VAC +/- 10%.
- Do not bond or ground either leg of the 24 VAC secondary.
- If you are providing your own transformer, it must be connected as an isolation/stepdown transformer. **DO NOT CONNECT AS A BUCK/BOOST configuration with a common neutral.**

Do the following steps to install the transformer:

- Mount the transformer on the wall near the ILS Controller.
- Connect the secondary side of the transformer to the terminal strip in the left side of the ILS Controller using 3-conductor 16-gauge wire. See Figure 11.
- Connect the line voltage (120 or 230 VAC) to the primary side of the transformer as shown in Figure 12 and Figure 13, to conform to the local and national electrical codes.



Do not introduce voltages in excess of 24 Volts into the Controller cabinet for any purpose. This includes power wiring through the supplied external alarm relay contacts.

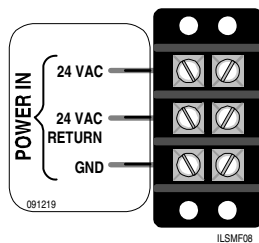


Figure 11. Transformer Connections

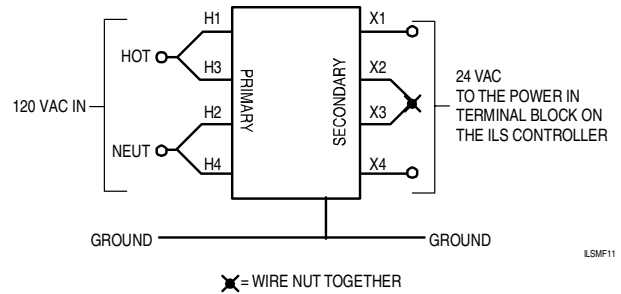


Figure 12. From a 120 VAC Supply

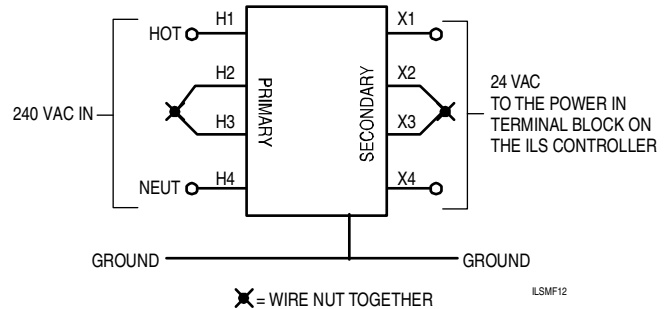


Figure 13. From a 240 VAC Supply

INSTALL TR-7000-AC TRIGGER MODULE

The TR-7000-AC enclosures are not sealed, so they should be placed in an area not subjected to hose down or splashing. They are designed to be mounted within the washer control enclosure, if possible, but can be mounted externally inside an appropriate enclosure if necessary.

- Install the TR-7000-AC in the washer control cabinet by securing it to the cabinet side wall with double-sided tape, Velcro straps or optional bracket.
- If you are mounting a TR-7000-AC externally, use the NEMA enclosure.

INSTALL RS-3000 FORMULA SELECTOR

- Secure the optional RS-3000 Formula Selector on the outside of the washer in a location convenient for operator viewing and access. The RS-3000 Formula Selector includes a 15-foot (5 meter) cable.
- Connect the cable from the RS-3000 Formula Selector to the AlphaBus at the TR-7000-AC Trigger Module.

CONNECT ALPHABUS

The AlphaBus cable is a power and communication link between each TR-7000-AC Trigger Module, optional RS-3000 Formula Selector and the ILS Controller. This link consists of +5 volt, ground and signal.

- Make the AlphaBus connections at each washer with the 4-position Phoenix type connector with 18-gauge stranded wire. Refer to Figure 14 and Figure 15.



For CE conformance, this alpha bus cable must be shielded, and the shield terminated as shown in the following illustrations.



The ILS System is a true network. You may connect any component (whether you are installing one or two washers) to the AlphaBus at any juncture.

- Thread the AlphaBus cable through the hole at the bottom of the ILS Controller.
- Connect the four colored wires of the AlphaBus cable to the AlphaBus connections on the terminal barrier inside the ILS Controller. A label adjacent to the terminal barrier identifies the AlphaBus connection locations. Connect the shield to the earth ground at barrier strip only.

AlphaBus Cable Colors	Connection Location
White	+5V
Red and Black	RX
Green	GND
Shield	Shield

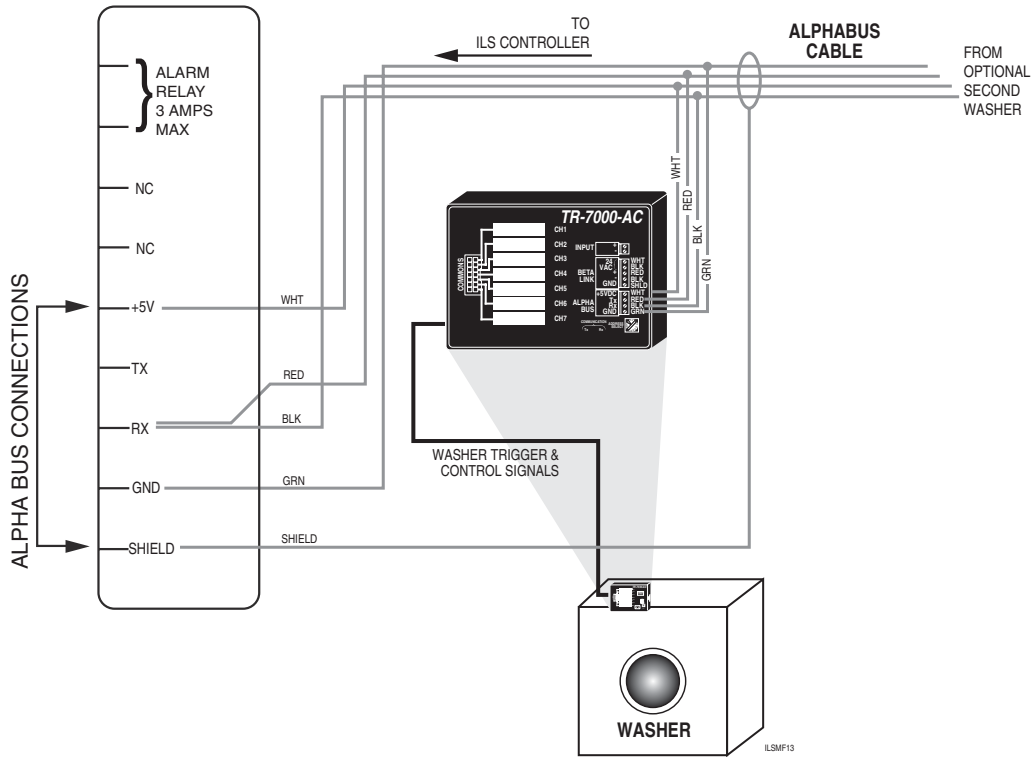


Figure 14. AlphaBus Connections for One TR-7000-AC Trigger Module

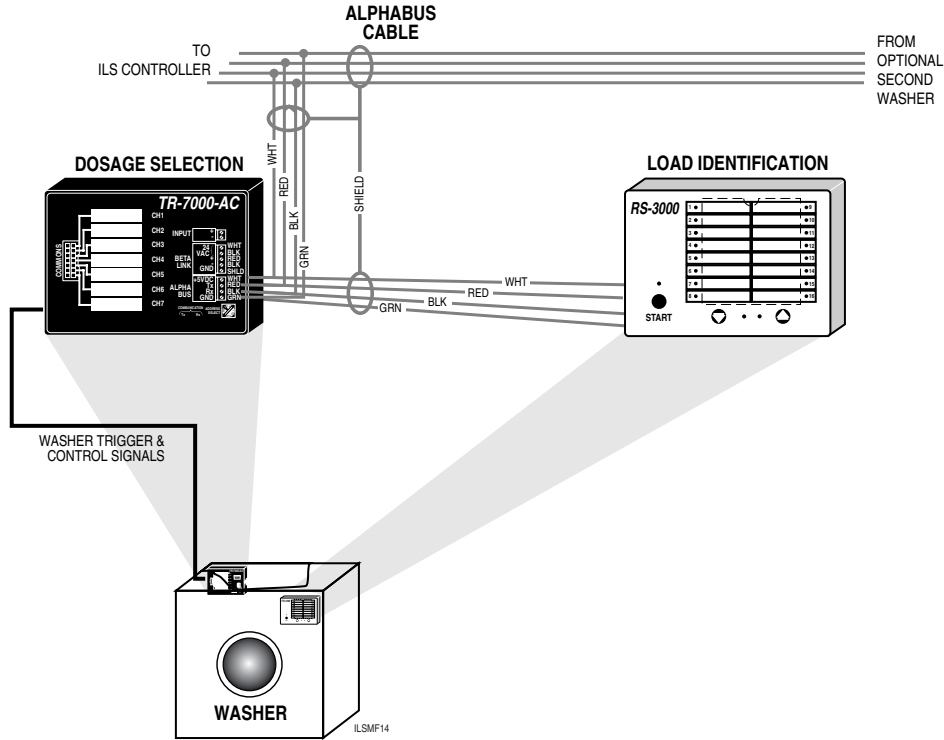


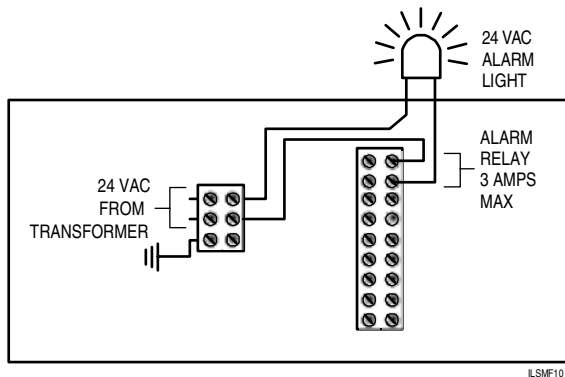
Figure 15. AlphaBus Connections for One TR-7000-AC and One RS-3000

EXTERNAL ALARM

The top two terminals on the relay ILS alpha bus/alarm terminal strip are dry contact relay outputs for tying in an external alarm. This relay is normally closed (the circuit opens if there is power to ILS and no alarm exists). If the Beta Technology 24 VAC strobe light alarm is to be used, you may use the 24VAC power from the secondary side of the transformer powering the ILS unit.



Do not introduce voltages in excess of 24 Volts into the Controller cabinet for any purpose. This includes power wiring through the supplied external alarm relay contacts.



CONNECT TR-7000-AC TO WASHER SUPPLY SIGNALS

Each Trigger Module has 7 trigger channels, which are isolated from each other and from the ILS PCB. You can connect them individually or tie them together using a common return. The input requirement for the triggers is 24-220 VAC. The trigger circuit draws approximately 3 mA.

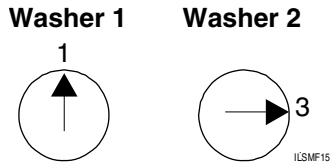
1. Connect the primary TR-7000-AC (at each washer) to the washer's supply signal sources. Use the solid colored harness. Wire colors in the harness correspond to the RETMA color code as follows:

Black	0 (Common)
Brown	Trigger Channel 1
Red	Trigger Channel 2
Orange	Trigger Channel 3
Yellow	Trigger Channel 4
Green	Trigger Channel 5
Blue	Trigger Channel 6
Violet	Trigger Channel 7

2. Tie the commons together as necessary.

SET TR-7000-AC AND RS-3000 ADDRESSES

1. Set the rotary switch located on the TR-7000-AC Trigger Modules as illustrated below. A TR-7000-AC on washer 1 must be set to address 1, and on washer 2 to address 3.



2. If you are installing an RS-3000 Formula Selector on washer 1, its address must be 2. If you are installing an RS-3000 Formula Selector on washer 2, its address must be 4. To set the address:
 - At the RS-3000, simultaneously press and hold the s and t keys until one of the formula LED's starts blinking (approximately four seconds).
 - Press either the up or down arrow key until the LED corresponding to the desired address is blinking. After about 4 seconds of no key activity, the RS-3000 will accept the new address and revert to normal operation. The address will be remembered even when the power is off.



While you are changing its address, the RS-3000 cannot communicate with the ILS Controller.

POST INSTALLATION CHECKOUT



A Quick Reference Guide to commands and functions is available in Appendix F.

Following installation, do the following checks:

1. Power up ILS and observe the screen on the front panel of the Controller. If the following run screen is not displayed, see **ILS Controller Screen Off** and **ILS Controller Screen Shows Bars** below.

```

I L S  V 3 . 1 1    0 8 / 3 1 / 0 2
S E P  0 4 , 0 2    1 8 : 3 2 : 0 8

S Y S T E M   T E S T S   O K
    
```

ILSMS01

2. Refer to **Test Mode** in the **Operations** section of this manual, and purge logged data and setup data using the Test Mode at this screen. This step creates a clean slate for this installation.
3. In Test Mode, prime the pumps. Power up the ILS in Test Mode. Prime the system by running the peristaltic pumps forward until the chemical rises to within 3 inches of the peristaltic pump.
4. In Test Mode, test the functioning of the peri pumps, water supply and transport pumps.

5. Refer to **Interrogation Mode** in the **Operation** section of this manual. In Interrogation Mode, verify that the TR-7000-AC and RS-3000 Formula Selector are communicating properly.

ILS Controller Screen Off

1. Check main power to the ILS transformer.
2. Check the output of the transformer for 24 VAC.
3. Check the incoming power line circuit breaker and reset if necessary.
 - a) If circuit breaker continues to trip, check system for short circuit in the 24 Volt distribution wiring.
 - b) Check wiring to transport modules.
 - c) Check AlphaBus connections.
4. Check ribbon cable connection from the Relay board to the Model 100 PCB.
5. Check ribbon cable connection from the LCD display to the Model 100 PCB.
6. Check DC voltages at Relay PCB.
7. Check DC voltages at Model 100 PCB.

ILS Controller Screen Shows Bars

If the ILS Controller screen displays two lines of solid blocks, then the system is not booting (starting up) properly.

1. Verify that the EPROM (program memory chip) is installed properly.
2. Check the ribbon cable to the LCD screen.

SETUP USING ILS MANAGENET SOFTWARE

ILS setup is done using ILS ManageNet. ManageNet is supervisory software that runs on a Windows-based PC that you connect to the ILS. The program allows you to connect all of the dispensers at a single account site into one network and communicate with the network from a local or remote PC.

Please refer to the document DISPENSER NETWORKING SOFTWARE FOR WINDOWS for information on connecting the dispenser network, installing ManageNet™ on your PC and connecting the PC to the ILS. Once installed, you can use the program's online help to learn how to:

- Set your personal logon name, password and access level during the first session.
- Setup the ILS dispenser(s).
- Print setup and performance reports and graphs.
- Retrieve and view logged data.

OPERATION

For a quick reference guide on ILS functioning modes and basic keyboard functions, see **Appendix F. Command and Function Quick Reference Guide**.

Using the screen and keypad on the ILS Controller front panel, you can perform a subset of setup functions, monitor normal

operation, and troubleshoot problems. Listed below are the available functions.

Setup Functions

- Purge ILS setups and logged data at initial installation
- Change time and date
- Change account name and network address
- Enable/disable a washer when you need to service it

Run Mode

- View status display
- Clear alarm and alarm messages
- Retry a chemical feed that was aborted due to an alarm message

Interrogation Mode

- Monitor temperature
- Watch triggers as they occur during normal operation
- View real time system events and errors

Test Mode

- Individually test chemical pumps
- Individually test transport pumps, alarm relay and water inlet solenoid valve, or empty the mixing chamber
- Verify functioning of trigger modules

- View calibration of the pressure sensor in the mixing chamber

NORMAL OPERATION AND MESSAGES

Copyright Screen

When you power up the ILS Controller, the following screen flashes briefly.



ILSMS02

Run Screen

The run screen is displayed after power up and continually when no alarm conditions exist.



ILSMS03

Table 1 lists normal operation messages that appear on the run screen to reflect ILS activity.

Message	Meaning
Feed Request Fixed Dose Mode	ILS acknowledgement of a chemical feed request
Feed Request Relay Mode	ILS acknowledgement of a chemical feed request
Feed Request from Network	ILS acknowledgement of a chemical feed request
Delivery Complete	ILS verification of normal delivery
Feed Retry, Manual	The operator pressed the DOWN arrow key to request a feed retry after a feed error.
Error Reset Wash: 1 Chem	The operator pressed the UP arrow key to clear a system alarm, or the DOWN arrow key to retry and clear a system alarm.
Manual Memory Purge: Logged Data Cleared	The operator purged logged data. Normally done only at the factory.
Manual Memory Purge: Setup Data Cleared	The operator purged setup data. Normally done only at the factory.

Table 1. Normal Operation Messages

ACCESSING MODES AND USING SCREENS

To access the various modes from the run screen, press the left and right arrow keys simultaneously. There are three possible modes you can access in this fashion: normal run mode (the run screen), setup mode and interrogation mode.

To use the screens within a mode:

- Press the MENU key to cycle through screens.

- To change data in a setup screen, press the left or right arrow key to move to a changeable field, and use the ^ and v keys to enter new data or toggle to desired settings.
- When entering alphanumeric information, the following shortcuts may be useful.
 - ◆ If a lowercase character is blinking, press ^ once to clear the character. All uppercase characters, symbols, and numbers may be cleared by pressing the ^ and v keys simultaneously.

- ◆ Press and hold the ^ or v key to cause the selection to scroll, first at a one-character rate, and then at a 3-character increment.
- In illustrations of screens, information that you may change is in **bold** type.

SETUP FUNCTIONS

Purge Logged Data

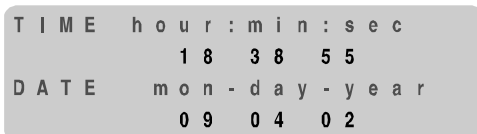
To purge all logged data in memory, hold down the left and right arrow keys while you power up the ILS Controller. Hold the keys until the Purged message is displayed. Do this only at initial installation.

Purge Setup Data

To purge all setup data in memory, hold down the ^ and v keys while you power up the ILS Controller. Hold the keys until the Purged message is displayed. Do this only at initial installation. After purging the setups, you must set the network ID in order to communicate with the dispenser via ILS ManageNet.

Change Time and Date

Use this screen to change the time and date at the ILS if necessary.



ILSMS04

Change Account Name or Network ID

Use this screen to change the account name of the ILS if necessary. After a setup purge, the network ID field defaults to 00. **You must set it to a non-zero unique (per dispenser) number.** For example, if you have two dispensers in one dispenser network, set one dispenser to have network ID 01 and the other to have network ID 02.



ILSMS05

Enable/Disable a Washer

Use this screen to disable and later enable a washer should you need to service it. This prevents the ILS from feeding chemicals to this washer. The flashing selection is currently chosen.



ILSMS06

INTERROGATION MODE

Interrogation mode allows you to view screens that display more detail on ILS performance in real time.

Temperature

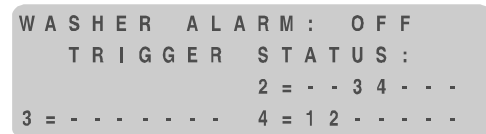
This screen shows the temperature in the mixing chamber.



ILSMS07

Trigger Status

This screen displays the signal status as monitored by the TR-7000-AC Trigger Module and RS-3000 Formula Selector. It also indicates the status of the washer alarm. Only trigger modules actually connected are displayed.



ILSMS08

View Real Time System Events and Alarms

This screen shows the most recent ILS system event. Since this screen is updated as events occur, it is a view of ILS operations as they occur. Use this screen to display alarms and, after the situation is corrected, clear the alarm. For more information, see **Clearing Alarms**.

```

0 4 S E P 0 2   1 6 : 0 9 : 0 5
O V E R F L O W   S W I T C H   O F F
w : 0   c h : 0   0 . 0 0 0 L

```

ILSMS09

You may scroll through the entire system event file using the ^ and v keys. The ^ key scrolls forward in time and the v key scrolls back in time. Events are stored in chronological order with the date and time displayed on the top line of the screen. Press a key once to increment one record at a time, or hold the key down to scroll at high speed through the records. If you exit and then redisplay this screen, it will display the most recent event.

Feed Detail

```

A D
      W A S H E R   X   C H E M   X
      P H A S E   X   T I M E   X
D O S E                X   T O T A L   X

```

ILSMS10

This screen shows diagnostic information for factory troubleshooting.

Interrogation Mode Error Messages

Table 2 lists ILS error messages that may appear on the screen in interrogation mode. These messages indicate an abnormal condition, or that a chemical feed may not have been successfully completed. By analyzing these messages, you can troubleshoot many chemical injection problems.

Message	Meaning	Action Required
Lost Contact with Trigger Module	A washer's trigger module is no longer talking to ILS.	Check wiring of each TR-7000-AC. Repower the ILS. If the error still occurs, replace the TR-7000-AC Trigger Module.
Lost Contact with Formula Selector	A washer's formula selector is no longer talking to ILS.	Check wiring of each RS-3000. Repower the ILS. If the error still occurs, replace the RS-3000.
Error: No Transport Verify	ILS turned on transport pump but the level in the mixing chamber did not go down.	Run the pump in Test Mode.
Error: Too Long to Empty Mixing Cell	Change did not empty after 30 seconds of transport pumping.	Check wiring to the mixing chamber. Repower the ILS. If the error still occurs, replace the transport pump.
Error: No Hot Water	Water temperature is less than the required 27°C.	Run washer pump and transport pump in Test Mode until warm water arrives.
Error: Mixing Cell Overflow	Level sensor at top of chamber was reached.	Check air tube to pressure sensor. Pump water in and out in test mode. If A/D readings don't change, replace the pressure sensor.
Error: Water Supply Problem	After 30 seconds of running water, the chamber level is still below the metering level.	Run water in Test Mode. Troubleshoot water supply and pumping.
Error: Chemical Supply Problem	After 30 seconds of pumping chemical, the level did not rise by the required amount.	Verify that the chemical drum is not empty and that the feed tube is immersed in the chemical.
Fast Calibration Too Low	Pump calibration at fast speed fell below 30 oz/minute.	Run chemical pump in Test Mode. Verify that chemical drum is not empty.
Slow Calibration Too Low	Pump calibration at slow speed fell below 10 oz/minute	Eliminate air in the intake tube.
Feed Rejected: High Water Temp	Water temperature above 70°C	Reduce temperature of water supply. If this message occurs with cold water, replace temperature sensor.

Table 2. Error Messages

CLEARING ALARMS

If an external alarm is wired to the system, it will be triggered when one of these alarm conditions occurs.



Be certain to correct the indicated problem before clearing the alarm. Clearing the alarm without correcting the reported problem may result in local or system performance degradation or missed chemical feeds.

Up to 6 alarms can be saved by the ILS for display and clearing. Each must be cleared individually. If you clear the alarm without correcting the condition that caused it, the alarm will be triggered again by the next feed request.

You can clear an alarm in two ways—clear alarm only or retry and clear.

Clear Alarm Only

To reset the alarm, press the ^ key on the keypad. This will turn off both the system and local washer alarms, and clear the LCD screen. The cleared message event will be logged in the System Events Report.

Retry and Clear

The Last Feed Retry feature allows you to tell the system to retry the last feed that had an error. If you determine, by reviewing the error message, that an injection was probably missed, press the v key to cause ILS to reinject the missed feed.

The error will be cleared and feed retry messages will be logged in the System Events Report. The alarm will also be cleared if the feed is successful.

TEST MODE

Test mode allows you to control and monitor various ILS functions and equipment components while the ILS is not dispensing chemicals.



These procedures should only be used by experienced technical personnel, as all of the normal functional and procedural lockouts are disabled.

To access test mode:

1. Turn off power to the ILS Controller and then open its lid. The front door key must be in the unlocked position.
2. While holding down the MENU key, turn on power to the ILS Controller.
3. Continue to press the MENU key until the first test mode screen appears. Now you can use the MENU key to advance from one test screen to the next; the screens will continue cycling while you are in test mode.
4. When you are finished using test mode, turn off power to the ILS Controller and then turn it on again (without holding down the MENU key).

Chemical Pump Control

```
PUMP # 0 1      TEST      1
l e v s e n s 3 8 4 , 1 5 2
d n = t o g g l e x p t P u m p
r t , l t = R v s / F w d c h e m
```

ILSMS11

Use this screen to control the individual chemical pump drives. The selected pump remains on, in the direction selected, as long as you press the appropriate key. You can use this screen to prime and verify operation of the peristaltic pumps.



Use caution when running the pumps in this mode, as the transport system is not running. As such, once the pump is primed, further running of the chemical pump may cause chemical to be pumped into the mixing chamber.

Pump Box Outputs

```
PUMP BOX OUTPUTS      2
l e v s e n 3 8 4 , 1 5 3 6
T R - P M P : U P = 1   D N = 2
< / > = W A T E R / a l a r m O N
```

ILSMS12

Use this screen to individually control the transport pumps, the alarm relay and the water inlet solenoid valve for verifying their operation or for emptying the mixing chamber.

Alpha Bus Status

```
ALPHABUS STATUS      4
```

ILSMS13

Use this screen to view the trigger status of all TR-7000-AC Trigger Modules and RS-3000 Formula Selectors connected via the AlphaBus. Use this screen to verify the operation of the TR-7000-AC Trigger Module(s) and RS-3000 Formula Selector(s).

A/D Calibration

```
A / D CALIBRATION TEST
. 0 0 1 ML / AD      2 0 8 6
N E W V A L U E      2 0 8 6
0 4 9 6 / 1 9 8 4 m l w a t e r
```

ILSMS14

This screen allows the factory to test the calibration of the mixing chamber's pressure sensor circuitry. Factory technical support may ask you to report the numbers displayed here in certain troubleshooting situations.

MAINTENANCE

The ILS has a modular architecture and open design to facilitate easy and rapid replacement of all critical components in the system. For information on testing the various equipment components and cycling the chemical and transport pumps, please see **Test Mode in Operation**.

REPLACEMENTS



ILS is an automatic system. Always disconnect power to the pump module before doing any service. The system can trigger automatically and cause severe injury if the power is not disconnected.

Relay PCB Replacement



If the system has an alarm circuit powered by a separate branch circuit, power may still be present within the pump module or at the relay PCB, even when power to the pump module is disconnected. Disconnect all power to all elements of the system before servicing.

1. Disconnect power to the ILS.
2. Disconnect all connections to the relay PCB.
3. Remove the mounting screws.
4. Remove the old relay PCB and insert the new one.
5. Insert the mounting screws.
6. Reconnect all connections to the PCB. Note the tab on the ribbon cable/locking clips, and locking ramps on the harness housings.
7. Reconnect power to the pump module.

Model 100 PCB Replacement



When replacing the Model 100 PCB, use extreme caution to prevent shorting the two battery-backed RAMs. These devices are under power at all times, even with the PCB completely removed. **DO NOT PLACE THE PCB ON ANY CONDUCTIVE SURFACE, such as the lid of the adjacent pump modules or a metal work bench. This could result in the loss of all stored data and destruction of the PCB.**

1. Disconnect power to pump module.
2. Disconnect keypad, RS-232 to RS-485 port, PC port, lock switch and ribbon connectors.
3. Remove the mounting screws.
4. Remove the old Model 100 PCB.
5. Install the new Model 100 PCB, reversing steps above.
6. Power up and observe system.

ILS Controller Model 100 Board EPROM Change (Software)

At times, a new EPROM with updated software will be issued for the ILS Controller. To install the new EPROM, follow the steps below to exchange the EPROM.

1. Turn off power to the system.
2. Open the front door.
3. Locate the EPROM socket on Model 100 board.

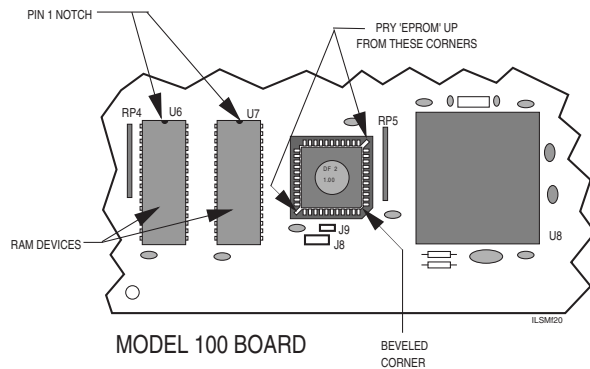


Figure 14. EPROM and EPROM Replacement

4. Remove EPROM from socket using an IC pulling device. Be careful when removing the device, as the pins may be easily bent.
5. Place new EPROM in socket with the bevel in the upper left corner. Check that the pins align properly and press in firmly to seat the EPROM.

Clearing Memory

Random Access Memory is (RAM) normally cleared prior to shipment from the factory. Although the setup information may always be changed by the user using ManageNet, the setups may also be cleared to the factory defaults by a special procedure.

The historical data (chemical use, cycle data and stored strip data) cannot be altered by any normal means, but may also be cleared (erased) by a special procedure.



Use the following procedures with extreme caution as the entire ILS memory content is vulnerable.

Clear All Setup Data (Leave Logged Data)
Turn off power to the ILS.

1. Press and hold ^ and v keys and turn on power to the system.
2. Continue to press both keys until purge is indicated.



A record of the setup data being cleared will be logged in the stored strip record.

Clear All Logged (Historical) Data Only (Leave Setups)

1. Turn off power to the ILS.
2. Press and hold the left and right arrow keys and turn on power.
3. Continue to press both keys until purge is indicated.



A record of the logged data being cleared will be logged in the stored strip record. At this point, there is no other logged data in the stored strip record so, in effect, this is the starting point for all future records.

Keypad Replacement

The keypad is a non-repairable assembly. If the keypad is defective, the front label assembly must be replaced.

Peristaltic Pump Tube Replacement

1. Using Test Mode, cycle the chemical pump in reverse to clear pump tube of chemical.
2. Disconnect power to the pump module.
3. Disconnect the chemical uptake tube from the pump fitting.
4. Disconnect mixing bowl inlet tube from pump tube at barbed nipple.
5. Remove screws from pump cover.
6. Remove pump cover.
7. While uptake tube connector bushings are still in the housing, remove pump tube. Do not discard barbed nipple installed in the end of the pump tube.
8. Slide new pump tube onto uptake tube connector and then into housing. The uptake tube connector is flat on one side. Be certain that this flat surface is properly aligned with the left side of the pump housing.
9. Be sure tube is against pump housing outer wall.
10. Replace pump cover and screws.
11. Again, check that pump tube is not pulled from outer edge of housing.
12. Reinstall barbed nipple from old pump tube into new pump tube.

13. Reconnect mixing bowl inlet tube and chemical uptake tube.
14. Reset tube life via ManageNet at the PC (see **Service Data in Setup**).

Peristaltic Pump Motor/Gearbox Replacement

A peristaltic pump motor/gearbox can be replaced by removing the front pump plate.

1. Using Test Mode, cycle chemical pump in reverse to clear pump tube of chemical.
2. Disconnect power to the pump module.
3. Remove the screw securing the pump panel and gently pull out, then up on the bottom of the panel.
4. Remove motor wires from gearbox (note color codes).
5. Remove pump tube (see **Pump Tube Replacement**).
6. Unscrew four screws from rear pump housing.
7. Remove motor/gearbox assembly.
8. Install new motor/gearbox assembly by reversing the above steps (take care to replace motor wires by color-coded locations).
9. Reset the Pump Life via ManageNet at the PC (see **Service Data in Setup**).

Transport Pump Replacement

The transport pumps may be individually replaced, or repaired in place if desired. If the motor does not turn, the entire pump must be replaced.

1. Using Test Mode, cycle **one** transport pump to clear the Mixing Chamber and Manifold of chemicals.
2. Disconnect power to the Transport Module.
3. Remove the Transport Module front panel cover.
4. Remove tubing from pump head inlet fitting of transport pump being replaced.
5. Disconnect motor drive wires of pump being replaced.
6. Loosen and remove four nuts securing the pump to the mounting surface.
7. Remove and replace defective motor.
8. Reassemble in reverse order.
9. Run the transport pump and check all fittings for leaks.
10. Reset the pump life via ManageNet at the PC (see **Service Data in Setup**).

Transport Pump Head Replacement

Although repair kits are available for the diaphragm pump, it is recommended that the entire pump be replaced with a new or rebuilt pump. This will expedite repair of the system and allow it to be returned to service more quickly.

Replacement of the pump head can be completed in the following manner if necessary.

1. Using Test Mode, cycle **one** transport pump to clear Mixing Bowl and Manifold of chemicals.

2. Disconnect power to the Transport Module.
3. Remove the Transport Module front panel cover.
4. Removing tubing from pump head inlet fitting of transport pump being replaced.
5. Disconnect tubing from discharge side of transport pump.
6. Remove screws securing transport pump head.
7. Remove pump head by sliding down from motor.
8. Remove inlet fitting and outlet fittings from old pump head and install on new part.
9. Slide the pump head up into motor.
10. Reverse above steps.



To replace pump head on transport pump #1, you must remove transport pump assembly #2.

Transport Module PCB Replacement

1. Disconnect power to the Transport Module.
2. Remove Transport Module front panel cover.
3. Cut tie wrap and remove tubing from pressure sensor PCB. Note the location (the lower of the two inlets).
4. Disconnect Transport Module wiring harness and unscrew all wires connected to PCB terminal block. Note orientation of all wires.
5. Remove PCB mounting screws.
6. Remove and replace pressure sensor PCB.
7. Reverse above steps.

Solenoid Valve Replacement

1. Disconnect power to the Transport Module.
2. Disconnect water supply connection.
3. Disconnect the square black DIN connector from the solenoid valve.
4. Remove entire water inlet plumbing assembly.
5. Disassemble water inlet plumbing assembly by unscrewing fittings above and below solenoid valve.
6. Install new solenoid valve in water inlet plumbing assembly.



Turn coil on the solenoid valve 90° so that DIN connector is facing up.

7. Reinstall water inlet plumbing assembly.
8. Reconnect the square black DIN connector and temperature probe wires.
9. Reconnect water supply.
10. Connect power to the Transport Module.
11. Operate unit and check for leaks.
12. Reinstall Transport Module front panel cover.

Mixing Chamber Replacement

1. Using Test Mode, cycle all chemical pumps in reverse to clear tubes of chemicals.
2. Using Test Mode, cycle the transport pumps to clear Mixing Chamber and Manifold of chemicals.
3. Disconnect power to the Transport Module.
4. Remove Transport Module front panel cover.
5. Disconnect chemical inlet tubes and pressure sensing tube from Mixing Chamber.
6. Disconnect tubing from transport pump inlet.
7. Loosen hose clamps securing Mixing Chamber.
8. Remove Mixing Chamber and place in suitable work area.
9. Remove 90° elbows, hole plugs (if any), transport pump inlet manifold and Mixing Chamber deflector cap from old Mixing Chamber. Install in new Mixing Chamber.
10. Install new Mixing Chamber in reverse order (steps 8 - 3).

PARTS LISTS

The following parts lists include reference numbers that equate to the numbers marked **REF** in the associated assembly drawings. You'll find the drawings in **Appendix D**.

System Components

Item #	Description
087279	ILS Controller, CE
096623	2 Peri Pump Module
096624	3 Peri Pump Module
096625	4 Peri Pump Module
096626	6 Peri Pump Module
1201127	ILS Transport Module, 3 gpm
094488	RS-3000 Formula Selector
099022	TR-7000-AC Trigger Module with Cable
057279	NEMA Enclosure
099050	ILS ManageNet Software

Bulk Installation Materials (Specify length when you order)

Item #	Description
041971	1/2 in Nylobraid Hose (Chemical Drum to Pump)
092358	5/8 in Nylobraid Hose (Chemical Drum to Pump)
051373	Cable, 16 gauge (Transformer to ILS Controller)
041762	Cable, 4-conductor 24-gauge, shielded (ILS Controller to TR-7000-AC Trigger Module)

Kits

The following 3 kits include mounting rails and wall mounting hardware, water hose, standpipes, water strainer kit and a power cord.

Item #	Description
087316	Installation Accessory Kit ILS 4 Pump, 3 gpm, CE
087317	Installation Accessory Kit ILS 6 Pump, 3 gpm, CE
087319	Installation Accessory Kit ILS 8 Pump, 3 gpm, CE

The following kits are available to connect the ILS to a PC.

Item #	Description
097906	Protocol Converter/Port Selector with power adapter
097962	Protocol Converter/Port Selector without power adapter (Euro)
094114	Cable Assembly, ILS to PC, RS-232 - DB9

RECOMMENDED SPARES

In order to ensure minimum down time should an ILS part fail, the following minimum spares should be kept onsite or readily available.

Miscellaneous Parts

Item #	Description
051281	Transformer, 24 VAC, 500 VA
067261	Transformer, 24 VAC, 500 VA, CE Compliant
092917	Standpipe, 3/4" x 46" LG
042206	Check Valve, 1/2" FPT x 1/2" FPT
087318	Ferrite Bead

ILS Controller Parts

Item #	Description
091155	Model 100 PCB
094220	Display PCB
1203862	Relay PCB, CE
1206709	Cover Label

Peri Pump Module Parts

Item #	Description
038835	Pump Motor
017708	Pump Front Housing
017709	Pump Rear Housing
1206377	Pump Inlet Connector
016805	Pump Outlet Connector
017434	Silicone Pump Tube
035931	C- Flex Pump Tube
019369	Beta Pump Tube
017710	Roller Assembly

Transport Module Parts

Item #	Description
069947	Transport Pump (Viton valves)
069947	Transport Pump (Santoprene valves)
097805	Transport Pump, 3 GPM Suction-Side Fitting
097806	Transport Pump, 3 GPM, Discharge-Side Fitting
097808	Elbow Shield
068964	Pump Shield
098583	Pump Head Rebuild Kit (Santoprene valves)
1201024	Pump Head Rebuild Kit (Viton valves)
041923	Solenoid Valve
069580	Solenoid Valve Repair Kit
099607	Valve Repair Kit, (Santoprene Valves)
068636	Valve Repair Kit, (Viton Valves)
098569	Mixing Chamber
090941	Transport Module PCB
099839	Temperature Probe

ILS Transport Module (Drawing 13470-00)

Ref #	Item #	Description
02	097679	Cover, stainless steel
05	098569	Mixing bowl assembly
06	041923	Solenoid valve, 2 W, 3/8 FPT, 24VDC
07	042595	Float switch, SPST, on/off, 1 Amp
08	069947	Solid diaphragm pump, 3 gpm
09	090941	Printed circuit board assembly
10	091035	Bushing, cable, 1.5 OD x 1.31 ID, nylon
11	017481	Pipe fitting tee, 3/8, brass
12	091015	Pipe fitting, bushing, 3/8 x 1/8, brass
13	099838	Probe assembly, TP-3409
14	041952	Nipple, hex, 3/8 MP x 1/2 MPT, brass
15	097839	Flow regulator, 1/2 FPT, brass, 4 gpm
16	091019	Hose adapter, 3/4 MGH x 1/2 MPT, brass
17	1200158	Nipple, 1/2 x close, polypropylene
27	041085	Nut, tinnerman, 8-32
29	091032	Elbow, 1/2 B x 3/8 MPT, polypropylene
30	091034	Hose clamp, stainless steel
31	041793	Elbow, 1/4T x 1/4 MPT
32	041772	Tubing, polyethylene
33	041300	Bushing, 7/16, plastic
36	041957	Tee, 1/2 FPT, Pvc
39	026928	Tubing, vinyl, 1/2 ID x 3/4 OD x .66 ft.
40	026928	Tubing, vinyl, 1/2 ID x 3/4 OD x 1.33 ft.
41	041125	Washer, flat, #10, stainless steel
42	041072	Nut, 10-32
43	040992	Screw, Phillips, pan head, 6-32 x 3/4, stainless steel
44	099563	Stand off, 1/4 hex, 6-32 x 3/4, alum.
45	025329	Screw, Phillips, pan head, 6-32 x 1/4, stainless steel
46	091018	Transport chamber cap
47	035037	Spacer, .140 x 1/8L
48	050172	Screw, Phillips, pan head, #6 x 1/2, stainless steel
49	026131	Screw, Phillips, pan head, 8-32 x 3/8 stainless steel

Ref #	Item #	Description
50	032984	Screw, pan head, #6 x 3/4 , stainless steel
55	091214	Elbow, PVC
57	097841	Pvc pipe, 1/2 x 2.4
58	091212	Pvc pipe, 1/2 x 1.38
59	041129	Washer, #6
60	051301	Elbow, 1/2 B x 1/2 MPT
61	055707	Hose fitting, 1/2 B x 1/2 MPT
70	091215	Elbow, 1/2 x 1/2 FPT
81	094136	Aerator kit
82	094142	Reducer bushing, 1/2 x 3/8 FPT
99	096093	1/2 FPT Strainer, 20 mesh

ILS Controller Wiring Diagram (Drawing 12411-00)

Ref #	Item #	Description
01	090973	Stainless steel door
03	1205777	Printed circuit board, model 100
04	1203874	Stainless steel enclosure
05	057459	Ribbon cable, 26 GA
06	1203861	Harness Connector, 3GPM
07	051283	Line filter, power, 20 amp, EMI/RFI
08	051267	Circuit breaker, 250 VAC, 15 amp, 50/60 hz
09	1206665	LCD, 4 line x 20 characters
10	050046	Spacer, #2 x 3/16, aluminum
12	025329	Screw, phillips pan head, 6-32 x 1/4, stainless steel
13	026131	Screw, phillips pan head, 8-32 x 3/8, stainless steel
16	041088	Nut, kep, 6-32
20	091093	Hole plug, 1 1/2", nylon, black
25	042844	Terminal block
26	043590	Terminal block
34	031618	Bushing, 7/8 OD x 9/16 ID, nylon
35	091035	Bushing, 1.5 OD x 1.31 ID, nylon
36	1203862	Printed circuit board, relay, 24V, CE
37	041129	Washer, threaded
38	030324	Hex nut, 2-56, 3/16, stainless steel
39	091092	Hole plug, 1 3/4", nylon
46	057419	Harness, din plug, din to molex connector
47	094036	Harness, din plug, din to 2 leads
50	041075	Nut, hex, 4-40, stainless steel
51	041142	Washer, #4, stainless steel

Ref #	Item #	Description
52	1203869	Switch, DPST, rocker, on/off, 4A, 250V
53	050644	Switch, Dummy, plastic
57	087286	Shield, stainless steel, M100, ILS Cont.
59	041158	STDF, M-F, 1/4" Hex, 6/32 X 3/4" NP
65	087336	Cable, Ribbon, 14 pos.
67	017973	Tape, Elec. 3/4 Vnl
90	1206709	Cover label, Beta

Peri Pump Module (Drawing 12412-00)

Ref #	Item #	Description
01	090966	Stainless steel enclosure
02	090965	Stainless steel door
07	026131	SCR, PH PNH 8-32X3/8 SST
71	1205241	GR MOT, 19VDC, 200RPM, 50 OZ, CE
268	087558	RLR ASSY, 50 OZ
269	041011	SCR, PH FLH, 10-32X5/8
270	017709	HSG ASSY, PMP, REAR, 50 OZ, CLR
1P		Call Customer Service for further info.
2P		Call Customer Service for further info.
3P		Call Customer Service for further info.
4P		Call Customer Service for further info.
5P		Call Customer Service for further info.
6P		Call Customer Service for further info.



Reference numbers 11, 19, 21, 23, 24, 48, 92, 620 - Lock Assembly are sold as a kit only. Please contact customer service for the item number.

TROUBLESHOOTING

Problem	Possible Cause	Solution
Setup fields changing on their own	Insulation on ribbon cable that goes from the PCB through the door to the membrane switch on the front of the ILS controller module has worn off, causing a short.	Check insulation on ribbon cable. If you notice wear, insulate it with electrical tape. Reposition the ribbon cable so that it does not come in contact with the enclosure walls.
Network ID changes on its own.		
ILS is performing erroneous/unwanted feeds.		

APPENDIX A. CHEMICAL FEED MODES

This appendix:

- Defines each non-PDCI chemical feed mode, which you specify during washer setup.
- Shows the trigger assignments that are used by the TR-7000-AC Trigger Module for each feed mode.
- Lists the trigger timing limitations imposed by each feed mode.



Pre-Dose Classification Identification (PDCI) chemical feed modes are covered in Appendix B.

RELAY MODE

Relay mode is for microprocessor-controlled washers. The washer controller delivers a signal of specified time to ILS, which converts the duration of the signal into a chemical feed amount. This mode requires one trigger for each chemical and the trigger associations cannot be changed. For example, trigger channel #1 triggers chemical pump #1, trigger channel #2 triggers chemical pump #2, and so on.

Trigger channels 1-6 are for pumps 1-6 as needed. Trigger channel 7 is reserved for the machine on signal. If the account requires more than six chemicals, you must use Enhanced Relay Mode.

The TR-7000-AC channels equate to the trigger functions listed in **Table 3**.

TR-7000-AC Trigger Module	
Trigger Channel	Function
1	Chemical Pump 1
2	Chemical Pump 2
3	Chemical Pump 3
4	Chemical Pump 4
5	Chemical Pump 5
6	Chemical Pump 6
7	Machine On

ILSMT03

Table 3. Relay Mode TR-7000-AC Trigger Assignments

ENHANCED RELAY MODE

Enhanced Relay Mode is for microprocessor-controlled washers where you have more chemicals than available signals. Like Relay Mode, signal on time determines the amount of chemical. Unlike Relay Mode, triggers are combined to activate each chemical pump.

The TR-7000-AC trigger channels equate to the washer functions listed in **Table 4**.

TR-7000-AC Trigger Module	
Channel	Trigger Assignment
1	Channels 1-4 are used for the Enhanced Relay Mode trigger combinations shown in the next table.
2	
3	
4	
5	Unused
6	Unused
7	Machine On

ILSMT04

Table 4. Enhanced Relay Mode TR-7000-AC Trigger Assignments

Trigger Input Channel	Chem Pump 1	Chem Pump 2	Chem Pump 3	Chem Pump 4	Chem Pump 5	Chem Pump 6	Chem Pump 7	Chem Pump 8	Cycle Start	Cycle End
1	ON	off	off	off	ON	ON	ON	off	off	off
2	off	ON	off	off	ON	off	off	ON	ON	off
3	off	off	ON	off	off	ON	off	ON	off	ON
4	off	off	off	ON	off	off	ON	off	ON	ON

ILSMT05

Table 5. Enhanced Relay Mode Chemical Pump Triggers

FORMULA MODE

Formula mode is typically used in conjunction with mechanical cycle timers. Chemical amounts are established in setup screens. Trigger channels 1-6 are used as supply triggers. Up to three fixed amounts may be delivered for each trigger signal received. A supply trigger can occur more than once per load.

You can get 16 formulas by installing a manual formula select module. The formula chosen is determined by the formula signals that are present at the instant the Machine On signal occurs, signaling a new load is starting.

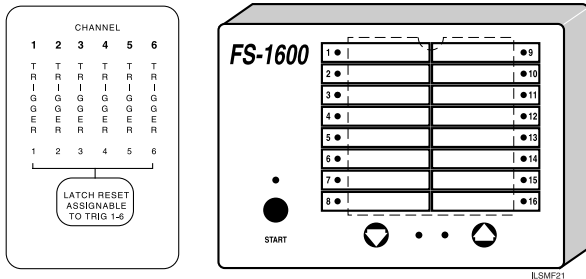


Figure 16. Formula Mode Trigger Assignments

In formula mode, there is a 45-second qualifier between successive allowable washer triggers on the same channel. A valid signal must be a minimum 2 second duration. A new signal will not be accepted if it occurs less than 45 seconds after the previous signal has ended. Refer to **Trigger Timing Limits** for more detailed information.

LATCHED FORMULA MODE

Latched Formula Mode is the same as formula mode but each trigger can only occur once per load. Subsequent trigger signals are ignored until the next load begins. This mode may be useful in situations where the supply signal is periodically interrupted because of water level change, etc.

AUTOMATIC MODE (STROBED/STROBELESS)

This mode provides the capability of triggering one of 32 different functions. A function can be considered an injection group (for example, alkali and detergent form a main wash function). A function can consist of a group of up to 3 different chemicals.

Automatic Mode, Strobeless is for fixed cycle microprocessor washers. Chemical triggers are encoded. This type of washer is rare.

Automatic Mode, Strobed is for washers with chart or card controllers. Chemical triggers are encoded. In Strobed mode, channel 1 is used as a strobe or read signal, while channels 2-6 are used as binary encoded chemical inputs.

The chemical trigger inputs (channels 2-6) will not be read until the strobe (channel 1) is activated for at least 10 seconds. This eliminates the need for all of the chemical triggers from the controller to activate simultaneously (the card need not be cut precisely). Channel 7 is unused.

If the washer controller has only four triggers available, then it will only be possible to call eight functions (channels 2, 3, and 4 for pump control and channel 1 for strobe).

A function is called based on the unique trigger pattern of the five trigger inputs (channels 2-6). **Table 6** shows the possible trigger patterns.

Function	Trig Channel 2	Trig Channel 3	Trig Channel 4	Trig Channel 5	Trig Channel 6
1	OFF	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF
4	ON	ON	OFF	OFF	OFF
5	OFF	OFF	ON	OFF	OFF
6	ON	OFF	ON	OFF	OFF
7	OFF	ON	ON	OFF	OFF
8	ON	ON	ON	OFF	OFF
9	OFF	OFF	OFF	ON	OFF
10	ON	OFF	OFF	ON	OFF
11	OFF	ON	OFF	ON	OFF
12	ON	ON	OFF	ON	OFF
13	OFF	OFF	ON	ON	OFF
14	ON	OFF	ON	ON	OFF
15	OFF	ON	ON	ON	OFF
16	ON	ON	ON	ON	OFF
17	OFF	OFF	OFF	OFF	ON
18	ON	OFF	OFF	OFF	ON
19	OFF	ON	OFF	OFF	ON
20	ON	ON	OFF	OFF	ON
21	OFF	OFF	ON	OFF	ON
22	ON	OFF	ON	OFF	ON
23	OFF	ON	ON	OFF	ON
24	ON	ON	ON	OFF	ON
25	OFF	OFF	OFF	ON	ON
26	ON	OFF	OFF	ON	ON
27	OFF	ON	OFF	ON	ON
28	ON	ON	OFF	ON	ON
29	OFF	OFF	ON	ON	ON
30	ON	OFF	ON	ON	ON
31	OFF	ON	ON	ON	ON
32	ON	ON	ON	ON	ON

Table 6. Automatic Mode Trigger Patterns

TRIGGER TIMING LIMITS

Table 7 lists the timing limitations that must be considered when programming the wash wheel. For more information, see **Appendix C**.

Note that all patterns must first be returned to the off state for one second before the next trigger pattern is called by the washer.

Signal and Trigger Timing Limits		
Signal	Mode	Time
Machine On Signal	All Modes	2-second minimum state change for on/off recognition
Chemical Triggers	Relay Mode and Enhanced Relay Mode	1/2-second minimum on/off time. 1-second resolution. Signals from 1/2 to 3/8 seconds are logged and interpreted as 1 second; signals from 1-1/2 to 2-3/8 seconds are treated as 2 seconds, and so on.
Chemical Triggers	Formula Mode and Automatic Mode	2 seconds minimum on time 45 seconds minimum off time
Formula Select Triggers	Formula Mode	2 seconds minimum on/off time
Strobe	Automatic Mode	5 seconds minimum on time 45 seconds minimum off time
Washer Triggers	Formula Mode and Automatic Mode	2-second minimum is required between when formula select triggers are turned off and the next chemical request. 2-second minimum is required between when formula select signals are asserted and the next chemical request.

Table 7. Trigger Timing Limits

APPENDIX B. PRE-DOSE CLASSIFICATION

When running ILS with ROM 3.11 and ManageNet 1.0 or higher, you can use Pre-Dose Classification Identification (PDCI) trigger modes as well as the trigger modes covered in Appendix A.

INTRODUCTION TO PDCI

An ILS Controller in PDCI mode reads multiple triggers by “accumulating” all triggers that occur during a defined time period, whether they appear simultaneously or not. The only requirement is that no more than 12 seconds separate qualified triggers. The advantage of this method is that washer controllers that can activate only one or two supply outputs at one time can generate sufficient information for ILS to automatically identify cycle start and end, and wash classification. By using PDCI, it is no longer necessary to install an RS-3000 or locate an alternate machine on signal.

When using PDCI mode, there are three fundamental differences from the other ILS trigger modes to consider when programming the washer controller:

1. Cycle start and cycle end depend on the presence of trigger input 6 to the TR-7000-AC. When trigger 6 alone is present

it identifies the end of a wash cycle. When trigger 6 is accompanied by other triggers it identifies cycle start and the specific wash classification.

2. Trigger inputs to the TR-7000-AC are interpreted with binary values as shown in **Table 8**. Supply outputs from the washer (trigger inputs to TR-7000-AC) are interpreted whether energized at the same time or sequentially, provided the time between qualified triggers is less than 12 seconds. This new function is called accumulating triggers.

ACCUMULATING TRIGGERS

A washer supply output is normally wired to the corresponding numbered input on the TR-7000-AC Trigger Module (for example, supply output #1 to trigger input #1, supply output #2 to trigger input #2, and so on). TR-7000-AC trigger output is connected to the alpha bus, which carries it to the ILS Controller. PDCI processing uses TR-7000-AC trigger inputs 1 through 6 only.

When the first TR-7000-AC trigger appears, accumulation begins. During the accumulation period the first trigger may disappear, and other triggers may also come and go. As long as the gap between qualified triggers is less than 12 seconds, accumulation continues. Accumulation ends when all qualified triggers are off for more than 12 seconds. The sum of all

qualified triggers that appeared during the accumulation period is presented to the PDCI decoding logic in the ILS controller.

It is not necessary for triggers to be accumulated one at a time. All of the desired triggers may be applied simultaneously if the washer controller supports this. Even if applied simultaneously, the triggers are not recognized until 12 seconds after they all turn off. Trigger 7, the machine on trigger for non-PDCI trigger modes, is not used in PDCI modes and should not be connected.

Washer Supply Output	TR-7000-AC Trigger Input	PDCI Value (binary)
a	1	1
b	2	2
c	3	4
d	4	8
e	5	16
f	6	Cycle Start, End or Wash Classification

Table 8. Binary Trigger Values in PDCI Mode

PDCI CONTROL CODES

When TR-7000-AC trigger input 6 is present as part of an accumulating trigger PDCI logic identifies it as a control code for the start or end of a wash cycle. If one or more of triggers 1 to 5 is present along with trigger 6 in the accumulating trigger, then triggers 1 to 5 identify the specific wash classification cycle being started, as detailed in **Table 9**. If none of triggers 1 to 5 are present along with trigger 6, then the cycle is ended.

If trigger 6 is not present in the accumulating trigger, then PDCI logic identifies the code as a chemical request (see later sections).

Control Codes	TR-7000-AC Trigger Input					
	Trigger 1	Trigger 2	Trigger 3	Trigger 4	Trigger 5	Trigger 6
End Any Classification	OFF	OFF	OFF	OFF	OFF	ON
Start Classification 1	ON	OFF	OFF	OFF	OFF	ON
Start Classification 2	OFF	ON	OFF	OFF	OFF	ON
Start Classification 3	ON	ON	OFF	OFF	OFF	ON
Start Classification 4	OFF	OFF	ON	OFF	OFF	ON
Start Classification 5	ON	OFF	ON	OFF	OFF	ON
Start Classification 6	OFF	ON	ON	OFF	OFF	ON
Start Classification 7	ON	ON	ON	OFF	OFF	ON
Start Classification 8	OFF	OFF	OFF	ON	OFF	ON
Start Classification 9	ON	OFF	OFF	ON	OFF	ON
Start Classification 10	OFF	ON	OFF	ON	OFF	ON
Start Classification 11	ON	ON	OFF	ON	OFF	ON
Start Classification 12	OFF	OFF	ON	ON	OFF	ON
Start Classification 13	ON	OFF	ON	ON	OFF	ON
Start Classification 14	OFF	ON	ON	ON	OFF	ON
Start Classification 15	ON	ON	ON	ON	OFF	ON
Start Classification 16	OFF	OFF	OFF	OFF	ON	ON
Start Classification 17	ON	OFF	OFF	OFF	ON	ON
Start Classification 18	OFF	ON	OFF	OFF	ON	ON
Start Classification 19	ON	ON	OFF	OFF	ON	ON
Start Classification 20	OFF	OFF	ON	OFF	ON	ON
Start Classification 21	ON	OFF	ON	OFF	ON	ON
Start Classification 22	OFF	ON	ON	OFF	ON	ON
Start Classification 23	ON	ON	ON	OFF	ON	ON
Start Classification 24	OFF	OFF	OFF	ON	ON	ON
Start Classification 25	ON	OFF	OFF	ON	ON	ON
Start Classification 26	OFF	ON	OFF	ON	ON	ON
Start Classification 27	ON	ON	OFF	ON	ON	ON
Start Classification 28	OFF	OFF	ON	ON	ON	ON
Start Classification 29	ON	OFF	ON	ON	ON	ON
Start Classification 30	OFF	ON	ON	ON	ON	ON
Ignored	ON	ON	ON	ON	ON	ON

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Table 9. PDCI Control Codes for Identification of Cycle Start, End and Wash Classification

PDCI CHEMICAL REQUEST CODES FOR RELAY MODE

PDCI Relay Mode processes TR-7000-AC trigger inputs to determine the desired chemical request according to the codes shown in **Table 10**.

The amount of chemical requested depends on the total length of time that at least one trigger input is present. In cases where a

chemical request is being accumulated one trigger at a time, the amount of chemical requested depends on the total amount of time that at least one trigger is on. Periods of time where all triggers are off do not affect the requested amount.

To clarify this: Suppose trigger 1 appears for five seconds, then disappears. Three seconds later, trigger 3 appears for six seconds, then disappears. Then 12 seconds elapse with no triggers present. In this case a request for 11 seconds (five

seconds of trigger 1, plus six seconds of trigger 3) worth of chemical 5 (trigger 1 plus trigger 3 = chemical 5) will be generated.

When using accumulating triggers, the chemical feed will not begin until the end of the chemical request code which is 12 seconds after all qualified triggers disappear. This delay should be kept in mind when making lengthy chemical requests.

PDCI Relay Mode will process chemical request codes even when no wash cycle is running. This is done so that if the pump box should miss the start of the cycle for some reason, it will still deliver the requested chemicals, and only the logging of the cycle will be affected.

TR-7000-AC Trigger Input						
Chemical Request Code	Trig 1	Trig 2	Trig 3	Trig 4	Trig 5	Trig 6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
All other codes (with trigger channel 6 OFF) are unused.						

Table 10. Chemical Request Codes for PDCI Relay Mode

PDCI CHEMICAL REQUEST CODES FOR FORMULA MODE

In PDCI Formula Mode, for each wash classification (see **Table 2**) the washer can generate up to six unique chemical request codes as shown in **Table 11**. Up to three chemical doses may be delivered for each chemical request code. The doses may vary depending on which classification the washer is running.

Note that in PDCI formula mode trigger inputs are coded; the on/off status of all trigger inputs is used. This is unlike non-PDCI formula modes where single trigger inputs are sufficient. Because of this, it is not possible to generate multiple chemical request codes simultaneously.

Because the chemical doses may vary depending on the wash classification, the dispenser will not honor chemical requests that arrive while it thinks that no cycle is running. Such chemical request codes will cause an error to be logged, and will activate an alarm if one is connected.

TR-7000-AC Trigger Input			
Chemical Request Code	Trigger 1	Trigger 2	Trigger 3
1	ON	OFF	OFF
2	OFF	ON	OFF
3	ON	ON	OFF
4	OFF	OFF	ON
5	ON	OFF	ON
6	OFF	ON	ON
All other trigger inputs and codes are unused with PDCI.			

Table 11. Chemical Request Codes for PDCI Formula Mode

PDCI CHEMICAL REQUEST CODES FOR AUTOMATIC MODE

PDCI Automatic Mode allows up to 30 different chemical request codes using the TR-7000-AC trigger inputs shown in **Table 12**. Up to three chemical doses may be delivered for each chemical request code.

PDCI Automatic Mode will process chemical request codes even when no wash cycle is running. This is done so that if the pump box should miss the start of the cycle for some reason, it will still deliver the requested chemicals, and only the logging of the cycle will be affected.

Chemical Request Code	TR-7000-AC Trigger Input					
	Trigger 1	Trigger 2	Trigger 3	Trigger 4	Trigger 5	Trigger 6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF

L5M112

Table 12. Chemical Request Codes for PDCI Automatic Mode

TIMING LIMITS FOR ACCUMULATING TRIGGERS

Table 13 lists the timing limitations that must be considered when programming the wash wheel. PDCI Relay Mode is designed for use with microprocessor controlled washers, and so has no filtering of the trigger inputs. PDCI Formula mode is designed for use with chart or card driven controllers, and so has substantial trigger input filtering. PDCI Automatic mode has adjustable trigger input filtering, for use with either type of controller.

Based on these time limits the maximum gap for unqualified triggers is shown in **Table 14**.

Code	PDCI Mode	Time
Control or Chemical Request Codes	Relay	1/2 second minimum on/off time. 1 second resolution. Signals from 1/2 to 1 3/8 seconds are logged and interpreted as 1 second; signals from 1 1/2 to 2 3/8 seconds are treated as 2 seconds, and so on.
	Formula	10 seconds minimum on time 25 seconds minimum off time
	Automatic, Chart	10 seconds minimum on time 25 seconds minimum off time
	Automatic, Micro	1/2 second minimum on/off time
	All	All triggers off for 12 seconds beyond end of qualification off time

ILSM13

Table 13. PDCI Trigger Limit to Time

PDCI Mode	Maximum Gap in Seconds
Relay	12
Formula	27
Automatic, Chart	27
Automatic, Micro	12

ILSM14

Table 14. Maximum Gap for Unqualified Triggers

OPERATION WITH FEWER SUPPLY OUTPUTS

Six programmable washer supply outputs are required to make full use of PDCI mode. However, fewer supply outputs may be used if some reduction in functionality is acceptable. **Table 15** summarizes the possibilities.

When using only five supply outputs, connect triggers 1 through 4, and trigger 6. Leave trigger input 5 unconnected. When using

only four supply outputs, connect triggers 1 through 3, and trigger 6. Leave trigger inputs 4 and 5 unconnected.

Capability	4 Outputs	5 Outputs	6 Outputs
Number of classifications that may be identified	7	15	30
Number of chemicals in PDCI Relay Mode	7	8	8
Number of chemical requests in PDCI Formula Mode	6	6	6
Number of chemical requests in PDCI Automatic Mode	7	15	31

ILSM15

Table 15. PDCI Capabilities With Reduced Washer Supply Outputs

APPENDIX C. WASHER TRIGGER CONNECTION AND MODE SELECTION

The following is a general guide to connecting the washer supply triggers to the TR-7000-AC trigger module inputs. This information is of a general nature since it is not practical to detail every washer.

COMMON (RETURN) CONNECTIONS

The TR-7000-AC provides for isolated common or return circuits for each of the 7 trigger channels. In most cases, the washer supply signals all have a single common and you can tie these trigger commons together. The most frequent exception to this is in washer control schemes that lock out certain, but not all, supply triggers until the proper water level has been reached. You may need to connect an individual common to each portion of such a circuit.

RELAY MODE

If the washer is microprocessor-controlled, you will most likely be operating in the Relay Mode.

Normal Relay Mode requires one trigger signal per chemical. Trigger channel 1 controls pump 1, channel 2 pump 2, and so on. Connect trigger channel 1 (brown wire) to supply signal 1, channel 2 (red) to supply 2, and so on, up to and including channel 6 to supply 6.

If your account uses more than six chemicals, use Enhanced Relay Mode. Likewise if you have more chemicals than supply triggers, you will need to use Enhanced Relay Mode.

In most cases, you may tie all the common (black) wires together and connect them to the supply common signal. Consult the washer schematic or IWD for exact connections.

PDCI Relay Mode

PDCI relay mode operates much like enhanced relay mode, but it offers the additional advantage of PDCI operation. The combination of supply triggers applied determines which chemical is selected, and the duration of the signals determines the amount requested. Accumulating triggers are used, so the feed will not begin until all of the supply signals turn off.

Connect supply signal 1 to trigger channel 1 (brown wire), signal 2 (red) to channel 2, and so on up to and including signal 6 to channel 6. Supply signal 5 need not be connected if 15 different cycle types are adequate; all eight chemicals are still available in this case. Supply signals 4 and 5 need not be connected if seven different cycle types are adequate; seven chemicals are available in this case.

ENHANCED RELAY MODE

Use this Enhanced Relay Mode if you are using all 8 peri pumps to deliver chemicals. Typically, the washer microprocessor has 4 supply triggers (fewer triggers than chemicals) and can turn more than one on at the same time.

The chemical amount is still controlled by the length of time the supply signal is on, but the chemical pump selection is controlled by the combination of supply triggers (see **Table 5**).

Connect supply signal 1 to trigger channel 1 (brown), signal 2 to channel 2, signal 3 to channel 3, and signal 4 to channel 4. These four signals are all that are required to pump up to 8 different chemicals and to indicate start and end of cycle.

FORMULA MODE

Formula Mode and Formula Mode Latched provide up to 16 different formulas.

There is also an optional Start Cycle and End Cycle trigger you can use if a machine on signal is not readily available at the washer. In setup, you assign “pump 9” to Start Cycle and “pump 10” to End Cycle (there is no 9th or 10th peri pump) and then program these signals at the washer.

This mode of triggering is intended for use when the washer is controlled by a mechanical chart or card controller. The relationship of supply triggers to chemical pumps and injection amounts is controlled entirely by how you connect the washer signals to the TR-7000-AC Trigger Module.

If you are using an RS-3000 Formula Selector for this washer, connect the TR-7000-AC Trigger channel 1 (brown wire) to supply signal 1, channel 2 (red) to supply 2, and so on up to and including channel 6 to supply 6 (if available).

PDCI Formula Mode

PDCI formula mode is similar to conventional formula mode, but it offers the additional advantage of PDCI operation. The five individual “formula triggers” of conventional formula mode are replaced with coded combinations of supply triggers 1 through 3. Accumulating triggers are used, so the feed will not begin until all of the supply signals turn off.

Connect supply signal 1 to trigger channel 1 (brown wire), signal 2 (red) to channel 2, and so on up to and including signal 6 to channel 6. Supply signal 5 need not be connected if 15 different cycle types are adequate; all five formula triggers are still available in this case. Supply signals 4 and 5 need not be connected if seven different cycle types are adequate; all five formula triggers are still available in this case.

AUTOMATIC MODE

Automatic Mode can be used for both mechanical and microprocessor controller applications. The Automatic Mode Strobed is for mechanical controls. Automatic Mode Strobes is used in microprocessor applications.

In both cases, up to 5 washer trigger signals are used to create up to 32 chemical injection functions. A function can contain up to 3 different chemicals, each with its own amount (referred to as dose in the trigger setup screen).

Connect the washer supply signals 1 through 5 to trigger channels 2 through 6, respectively. (You can use fewer channels for less functions.)

There is also an optional Start Cycle and End Cycle trigger you can use if a machine on signal is not readily available at the washer. In setup, you assign “pump 9” to Start Cycle and “pump 10” to End Cycle (there is no 9th or 10th peri pump) and then program these signals at the washer.

If you are using the strobed mode, connect an unused supply trigger to trigger channel 1. This signal will be the strobe (read) signal. The strobe signal is used so that the other signals need not be activated exactly simultaneously, a difficult requirement in mechanical controls. (Strobeless mode does not use this signal, but instead generates its own read signal 12 seconds after any of the other trigger channels are turned on.)

PDCI Automatic Mode

PDCI automatic mode is similar to strobeless automatic mode, but it offers the additional advantage of PDCI operation. It may be used with either mechanical chart/card or microprocessor driven controllers. Accumulating triggers are used, so the feed will not begin until all of the supply signals turn off.

Connect supply signal 1 to trigger channel 1 (brown wire), signal 2 (red) to channel 2, and so on up to and including signal 6 to channel 6. Supply signal 5 need not be connected if 15 different cycle types and 15 chemical injection functions are adequate. Supply signals 4 and 5 need not be connected if seven different cycle types and seven chemical injection functions are adequate.

MACHINE ON CONNECTION

Trigger channel 7 of the TR-7000-AC Trigger Module is dedicated to the machine on function regardless of the triggering mode selected. In PDCI modes, this input is unused, and may be left unconnected.

Connect the violet wire to a signal that most closely represents when the washer is actually running a load. In many cases, this signal may utilize, or be referenced to, a different common than the supply triggers described above. For this reason, you may need to connect the specific common wire associated with the machine on channel 7. This common is the black wire connected to the pin just below the violet wire.

WASHER CONNECTIONS FOR RELAY MODES

If you are using relay mode, the only consideration is that the signals be a minimum of 1 second in duration. For greater dosing accuracy, it is recommended that you set up the relay rate such that the feed signals are on for 5 seconds or more. For example, if you want a 10 oz feed, it is better to set the rate at 2 oz per second and the trigger signal duration at 5 seconds than to set the rate at 10 oz/sec and the trigger signal duration at 1 second.

Any and all signals may be activated as required by your wash process. If you are using a drain signal, the supply requests must not occur when the drain is open.

If you are using enhanced relay mode, the supplies must be called by individual steps of the wash process. To use this mode, you must be able to program the washer to activate two supply triggers at the same time. After each supply request, all of the triggers must be off for a minimum of 2 seconds before the next chemical request.

Enhanced Relay Mode Example

1. Fill
2. Supply 1 - The supply trigger is on for chemical 1 (for example, DET).

3. Short step (or other no-op)
4. Supply 2 - The supply trigger is on for chemical 2 (for example, ALK).
5. Wash
6. Rinse
7. Other baths
8. Supply 1 & 2 - This decodes as supply trigger on for chemical 5 (for example, SOUR).
9. Short step (or other no-op)
10. Supply 1 & 3 - This decodes as supply trigger on for chemical 6 (for example, SOFT).
11. Other steps



Once a trigger pattern has been established (the one or two signals have been on for 1 second or more), any change in the pattern will be interpreted as the end of the request. This is to prevent the code from changing and a wrong chemical from being called should a single output signal fail during a feed request.

CARD AND CHART CONTROLS

Formula Mode

The minimum on time for a formula mode trigger is 2 seconds. Also remember that a second trigger (on the same channel) will be ignored if it happens within 45 seconds of the end of the previous signal. As with all other triggering modes, do not begin the supply request until after the drain is closed. (This requirement does not apply to formula select bits.)

Formula select bits (alternate formula tracks) should be cut to begin prior to, and continue into, the supply request cut.

Automatic Strobed Mode

Automatic mode trigger signals have the same 2 seconds on, 45 seconds off requirement as the formula mode triggers. Cut the function request pattern first, followed by the strobe cut. Allow enough time (5 to 15 seconds) between the beginning of the function cuts and the strobe cut to compensate for any timing irregularities caused by switch or finger misalignment.

PDCI MODES

In the three PDCI feed modes the trigger inputs perform the additional function of tracking and identifying wash cycles, besides their usual job of requesting chemicals. This additional function requires some extra thought when programming the washer.

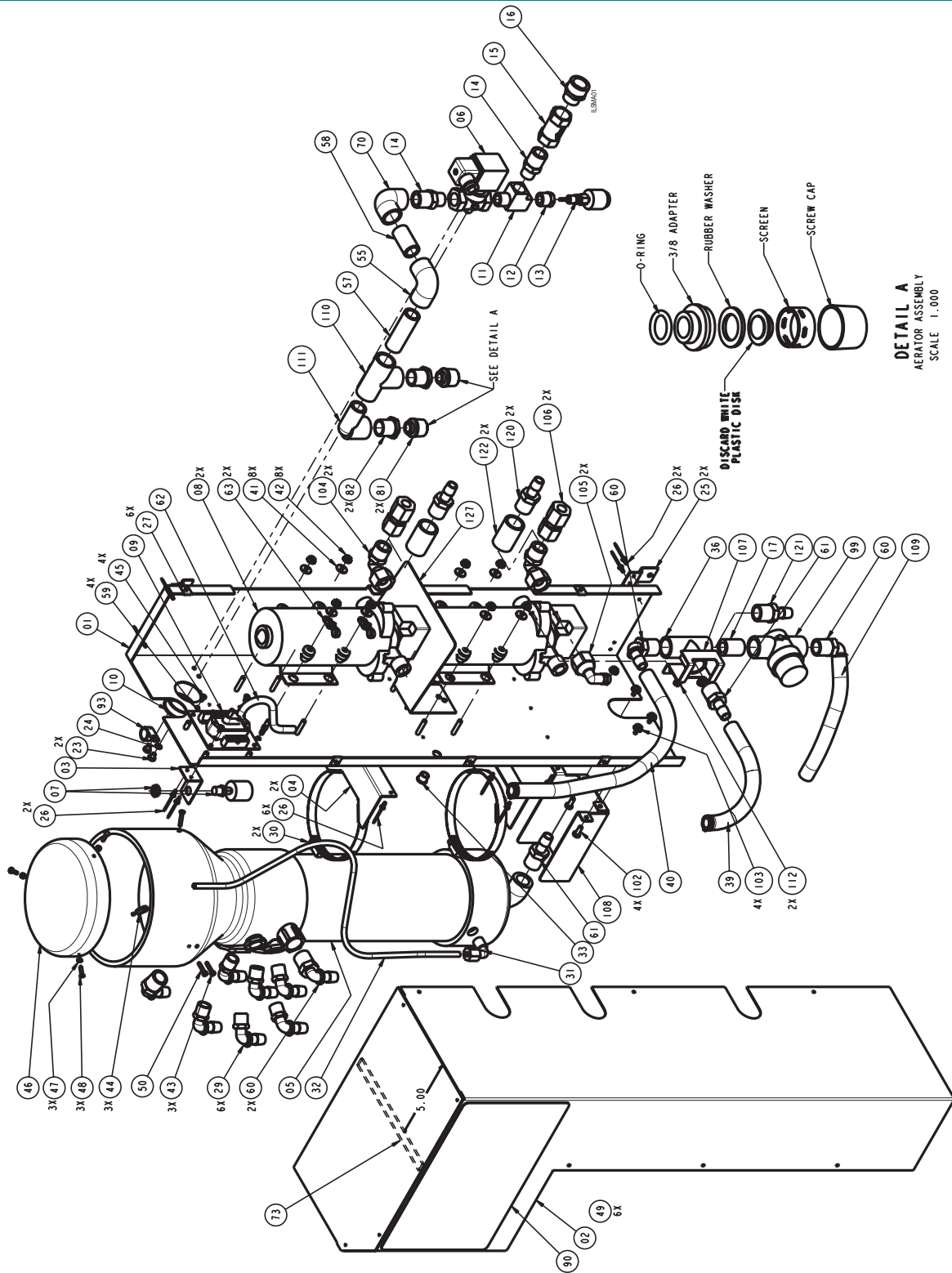
For accurate cycle timing, the cycle start/identification and cycle end codes should be programmed to occur as close to the actual start and end of the wash cycle as possible. Some washers may have interlocks that prevent chemical triggers when there is no water in the washer, which prevents accurate cycle timing. The dispenser can compensate for this by means of the "add time" setting accomplished when you setup the washer.

Chart driven washers often use the same chart for several different wash formulas, using a formula selector module to determine which formula is being run. This can be accommodated when using PDCI triggering by "stacking"

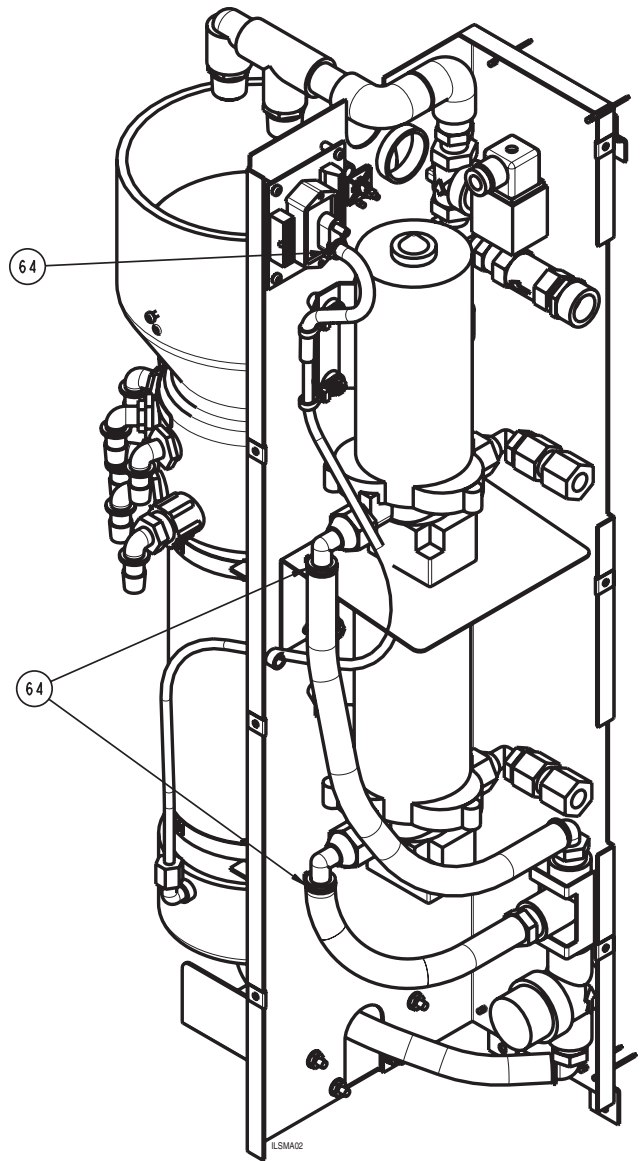
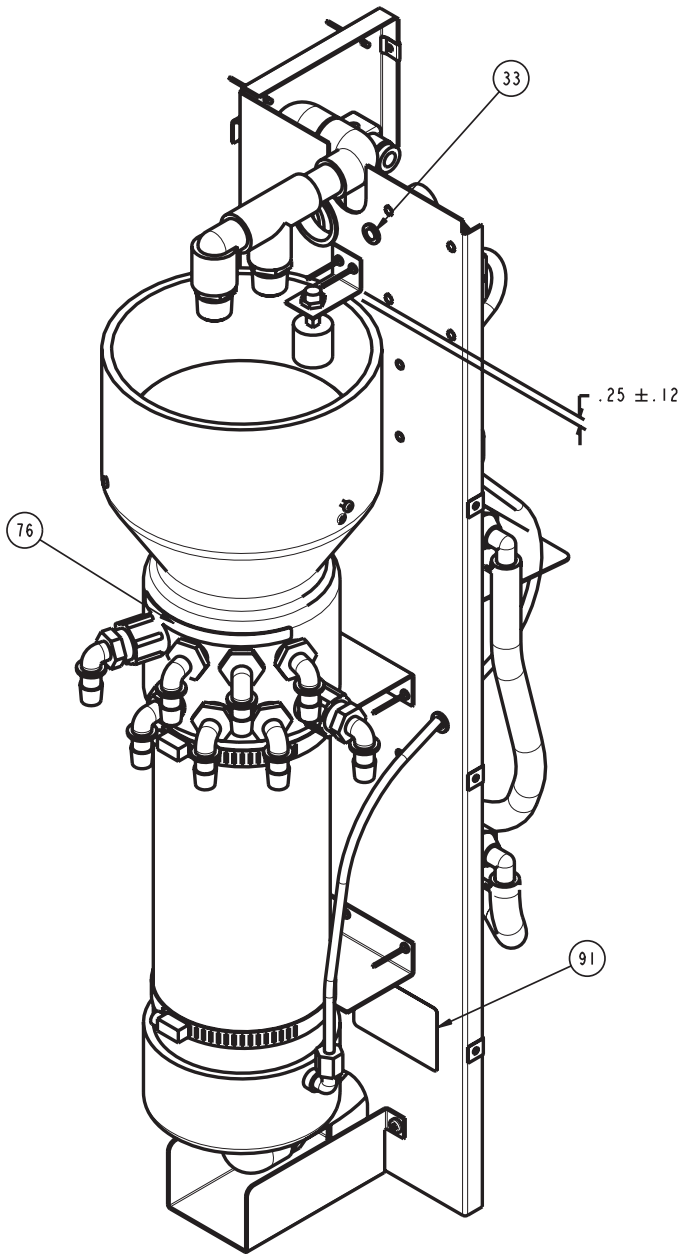
several different cycle start codes together at the beginning of the chart, with a minute or two between them. The dispenser will log the first such cycle start code it detects, and will ignore those following it.

Ideally (if there's room for it), a PDCI cycle end code would be programmed prior to each cycle start code (except when start codes are "stacked", as explained above). This end code forces an end to any cycle that might be left running if the controller (particularly a mechanical controller) is "jumped ahead" to start a new cycle before the previous cycle has completely ended.

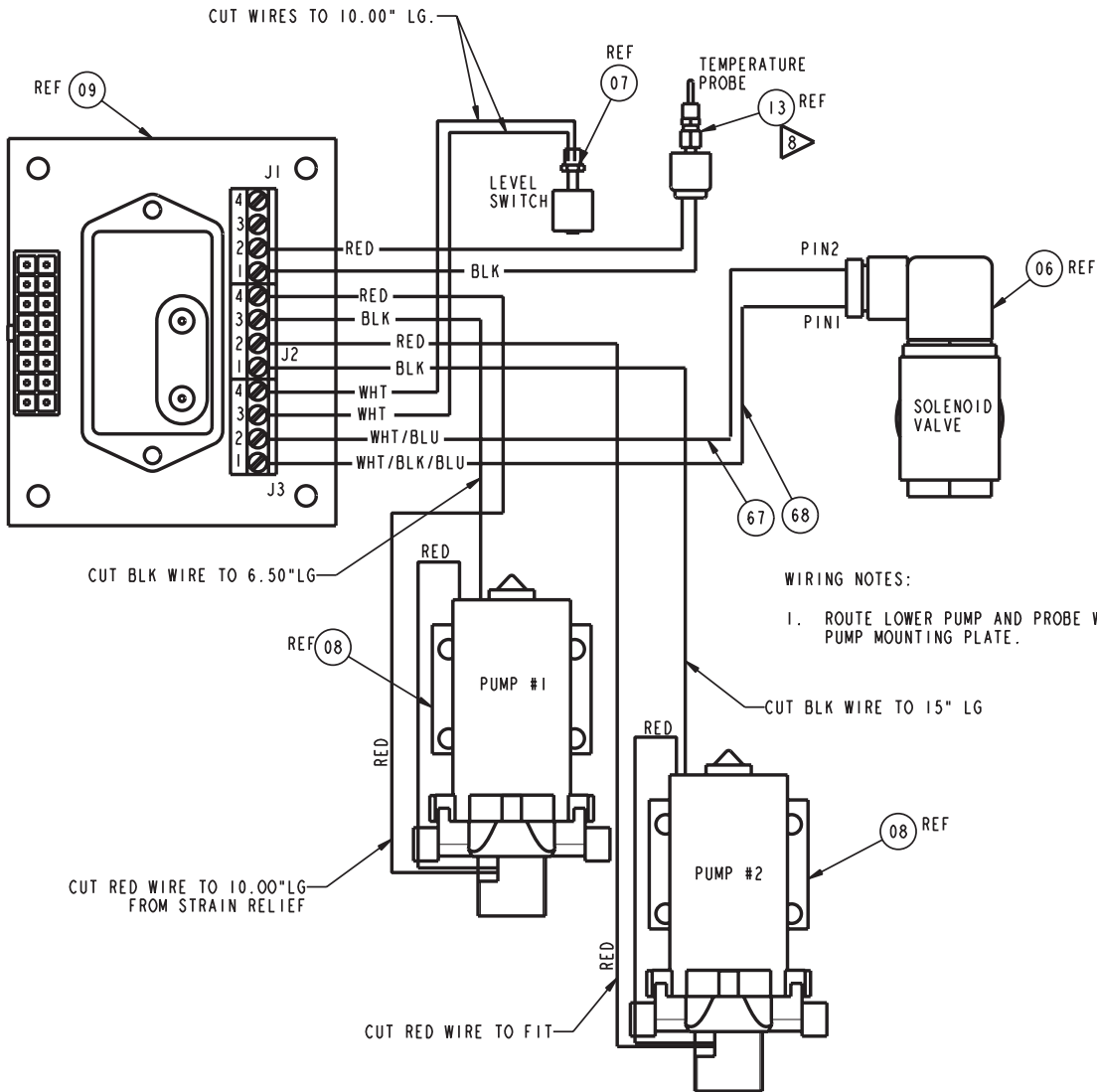
APPENDIX D. ASSEMBLY DRAWINGS



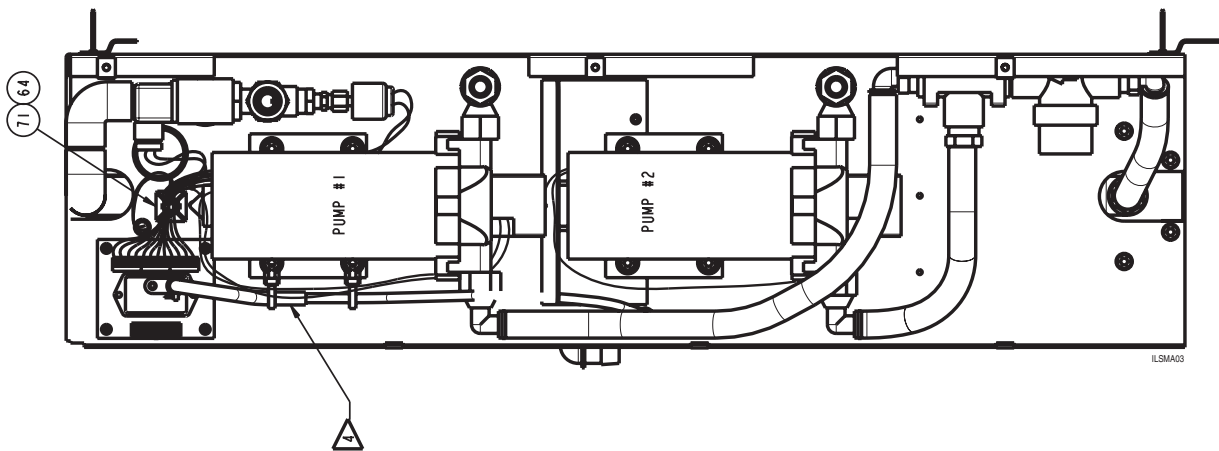
ILS TRANSPORT MODULE 3 GPM
 ASSEMBLY DWG N° 13470-00
 SHT 1 OF 3



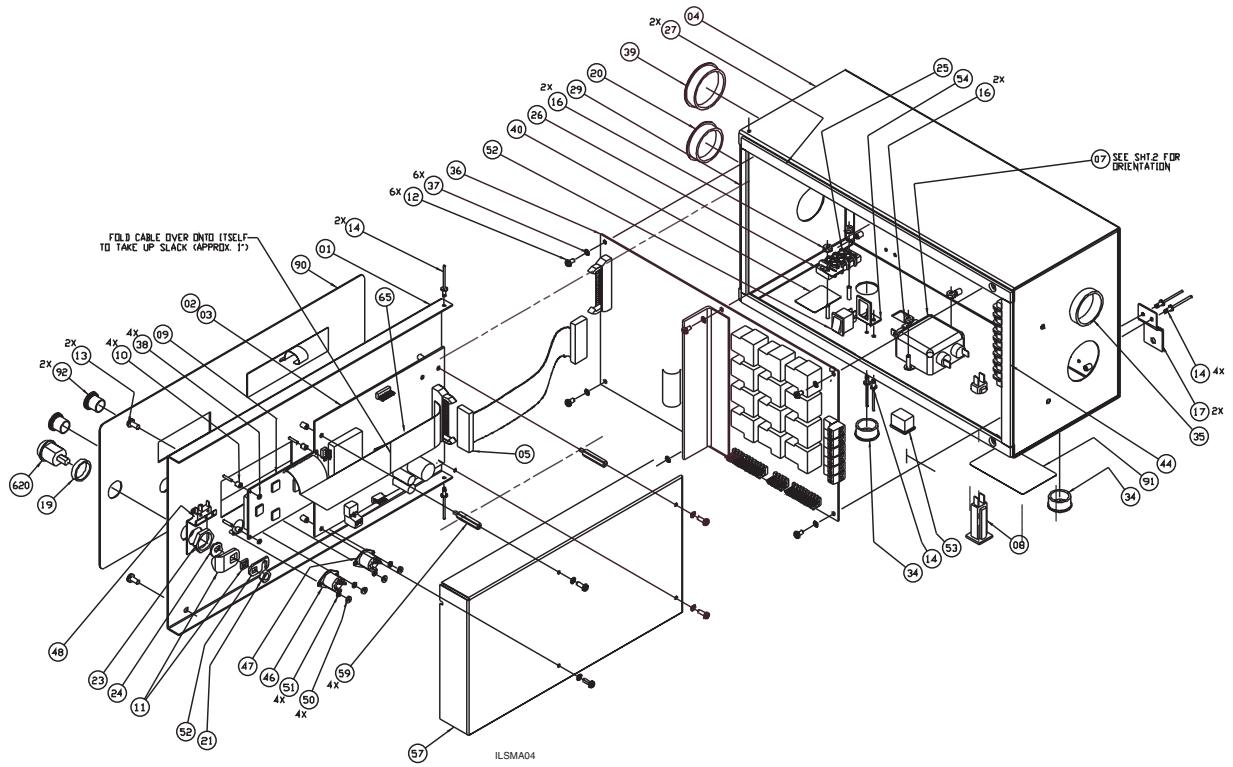
*ILS TRANSPORT MODULE 3 GPM
 ASSEMBLY DWG N° 13470-00
 SHT 2 OF 3*



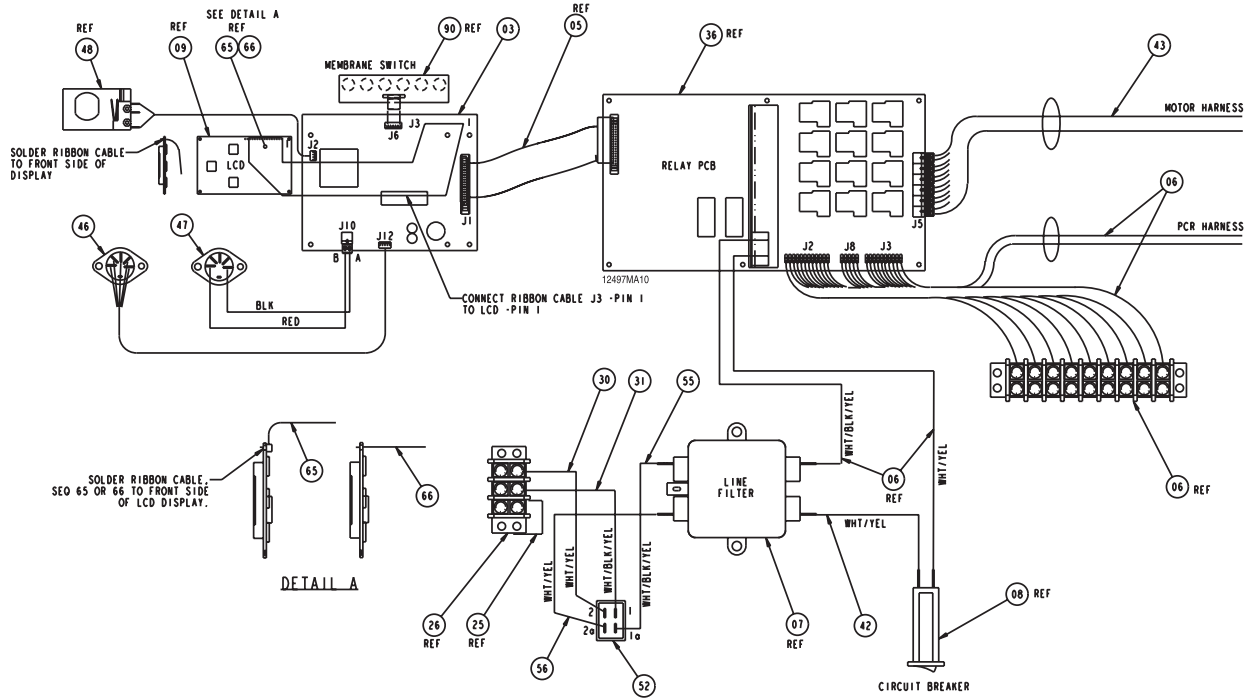
WIRING DIAGRAM



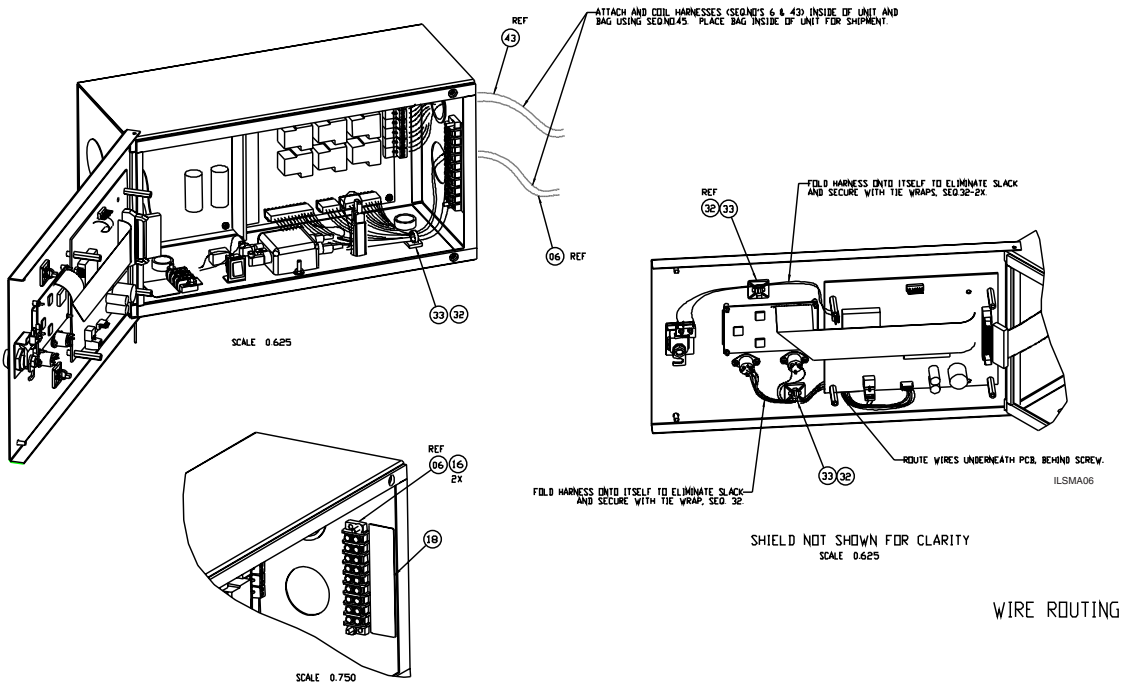
TRANSPORT MODULE
ASSEMBLY DWG N° 13470-00
SHT 3 OF 3



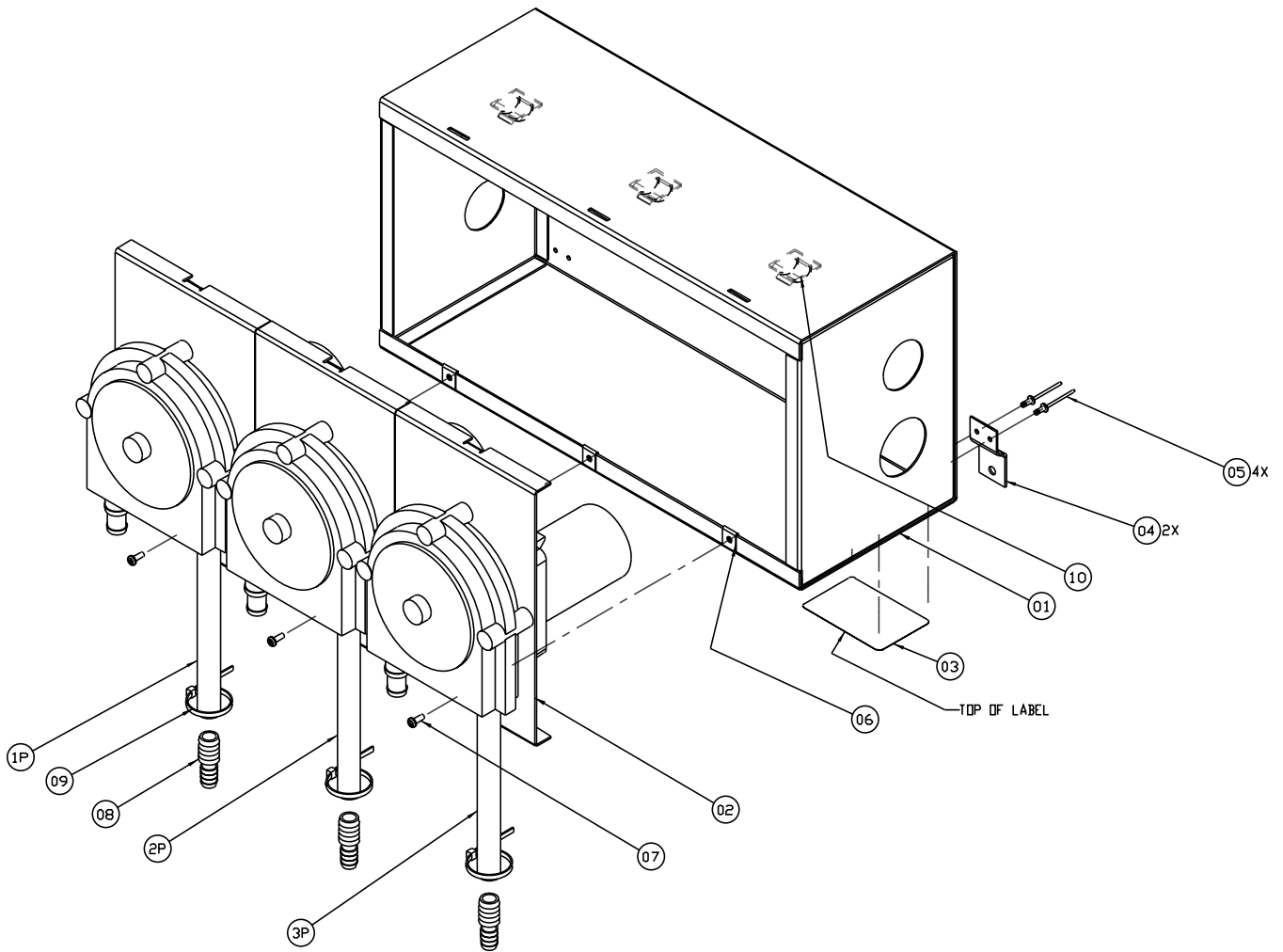
ILS CONTROLLER
ASSEMBLY DWG N° 12411-00
SHT 1 OF 3



ILS CONTROLLER
 ASSEMBLY DWG N° 12411-00
 SHT 2 OF 3



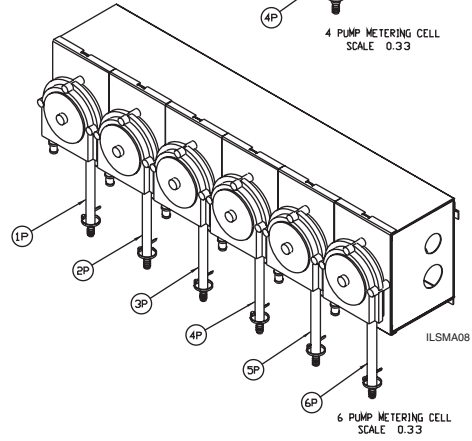
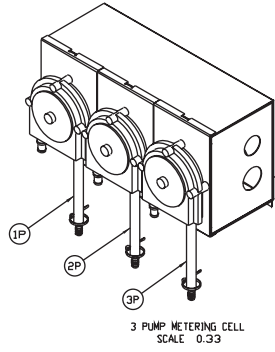
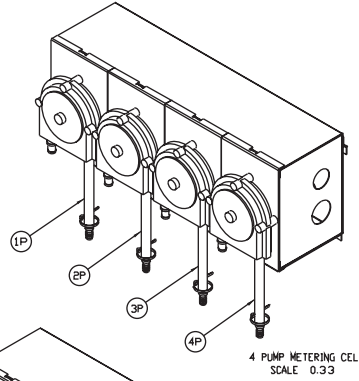
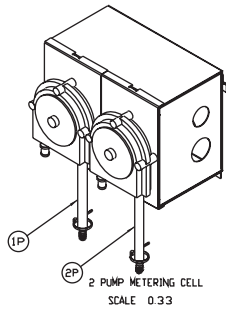
ILS CONTROLLER
 ASSEMBLY DWG N° 12411-00
 SHT 3 OF 3



ILSMA07

3 PUMP METERING CELL SHOWN AS REF.

*ILS PUMP 2, 3, 4 & 6
 ASSEMBLY DWG N° 12412-00
 SHT 1 OF 2*



*ILS PUMP 2, 3, 4 & 6
ASSEMBLY DWG N° 12412-00
SHT 2 OF 2*

APPENDIX E. LIST OF APPROVED MODEMS

It is imperative that the proper modem be used with ManageNet software and the ILS controller. Appendix 1 gives the list of the approved ManageNet modem and the initialization string for use with ILS. Appendix 2 gives the list of the approved ManageNet modems for use with the PC.

While other modems will work it is highly likely that there will be installation and operation problems if the initialization string is not correct. The initialization strings for all the equipment and

PC modems can be found in the file `dnmodem.ini` and `awmodem.ini` respectively. If the approved modem can not be purchased in your area, call technical support to discuss other options such as using a different initialization string or purchasing an approved modem from Beta.

Be sure to use the Modem Configuration Utility to properly configure the ILS external modem that is connected to the protocol converter. If the Utility is not used the ManageNet software may not work properly.

Currently the ManageNet software is compatible with Win3.1, Win95, Win98 and WinNT. The software does not support WinME or Win2000.

LIST OF APPROVED ILS MODEMS AND INITIALIZATION STRINGS (DNMODEM.INI)

The only approved modem for use with the ILS is the U.S. Robotics 56k Fax/Modem Model No. 5686.

[U.S. Robotics 56K Voice Faxmodem]

CurrentSettings=ATI4

FactoryDefaults0=ATZ3

DNetConfig=AT&D0&R1&U6S0=1

SaveToNVRAM0=AT&W0

BootFromNVRAM0=ATY0

LIST OF APPROVED PC MODEMS (AWMODEM.INI)

1200 baud Hayes clone

2400 baud Hayes clone

v.32 or v.32bis Hayes clone

ACEX 9600 v.32

Anchor 2400i half-card

AST 2X9600

AT&T Dataphone II 2212C

ATI 2400etc

ATI 2400etc/e & 2400etc/i V.42

ATI 9600etc/e V.32/V.42

Boca v.32bis 14400 FAXmodem

Boca V.34 Data Fax 28.8

Cardinal 2400 MNP

Cardinal 28.8 Data/Fax PnP

CompuCom Speedmodem

Compaq Presario 192-VS/288-VS

DallasFax 14400 FAX/Modem

DallasFax 96/96 v.32

Digicom 9624LE/9624PC V.32bis

Digicom Scout 14400 v.32bis

Digitan Hi*IQ ZX1896 2400

Dynalink 1414VQH

E*Tech Bullet E9696M V.32 MNP

E*Tech Bullet PC2400MH MNP

Everex 12e External (EV-936)

Everex 24e External (EV-945)

Everex Evercom 24+ MNP

Everex EverFax 24/96

Fastcomm FDX 2424 (MNP 5)

Fastcomm FDX 2496

Fastcomm FDX 9696 (V.32&MNP 5)

FlashTalk LinePowered LP2400

Forval IM14400/SA14400 V.32bis

Gateway 2000 TelePath v.32bis

GVC 14400 v.32bis FAXmodem

GVC 9600 V.42

GVC SM96 V.42bis

Hayes Accura 24/96/144

Hayes Accura 288 V.34+FAX

Hayes Optima PCMCIA 144/288

Hayes Personal Modem 2400

Hayes SmartModem 1200 External

Hayes SmartModem 1200B Full

Hayes SmartModem 1200B Half

Hayes SmartModem 2400

Hayes Ultra/Optima 14400

Hayes V-Series 2400

Hayes V-Series 9600

Hayes V-Series 9600 V.42

Hayes V-Series ULTRA 9600

Incomm Midget 24FXI FAX/Modem

Intel 2400EX MNP

Intel 9600EX V.32/V.42bis

Intel 14400EX V.32bis/V.42bis

Intel SatisFaxion 400 FAX

InterQuad M2400E

InterQuad M2400I

LightCom 144F

LightCom 2400 Baud

LightCom 9600 Baud

LightCom 96F or 96/550

LightCom 144F or 144/550

MaxTech XPM336I PnP

Megahertz PC Card 288

Microcom AX/1200 AX/2400

Microcom AX/1200c AX/2400c MNP

Microcom AX/9624c AX/9612c

Microcom QX/V.32c

Microcom QX/4232hs

Motorola VoiceSURFER 288/336

Multi-Tech 224EC/224PC MNP

Multi-Tech 224EH5 (MNP 5)

Multi-Tech 224EH7 (MNP 7)

Multi-Tech 224PC5

Multi-Tech 696E

Multi-Tech 932EC

Multi-Tech II v.32bis

Multi-Tech V.32

Multi-Tech V.32/V.42bis

Multi-Tech ZDX

NEC N9631 V.32 MNP

NEC N9635 V.32 MNP
OKITEL 2400 Plus
OKITEL 9600 v.32
Penril Alliance V.32
PPI PM2400
PPI PM2400SA MNP
PPI PM9600SA V.32
PPI PM14400FX PKT
PPI PM14400FXSA
PPI PM288MT II V.34
PPI PM336 Voice/Data/Fax
Prometheus 9600 Plus or EC
Psion GoldCard PCMCIA
QuickCom v.32
Quicktel Series 9600 V.32/V.42
Racal Vadic Auto Dial VA212
Supra 14400 FAXmodem
Supra 9600 FAXmodem
Supra Express 288/288 PnP
Sysdyne MDM 24H
Telebit Qblazer 9600 v.32
Telebit T2000&Trailblazer Plus
Telebit T2500
Telebit T3000

Toshiba T24D/X w/o EC
Toshiba T24D/X w/ EC
TwinCom 14400
TwinCom 96/42i
UDS 2440
UDS V.3224/V.3225 (V.32)
USR 16800 Dual Standard w/FAX
USR 16800 HST or Dual Standard
USR Courier 2400e/2400PC MNP
USR Direct 1200PC internal
USR Direct 2400PC/Sportster 24
USR HST (96x ROM)
USR HST (144x ROM)
USR HST (144x ROM) V.42
USR HST Dual Standard
USR HST Dual Standard V.42bis
USR MicroLink 2400
USR Password 1200 internal
USR Sportster 14400
USR Sportster 28800
USR Sportster 9600 v.32
USR Sportster 33.6 Voice
USR Sportster 28.8/33.6 WinMdm
USR V.32bis

USR V.32bis & Dual Std V.32bis
USR Courier V.Everything
USR VARmodem 2400
Ven-Tel 2400 Half Card
Ven-Tel 2400-33
Ven-Tel Pathfinder 18K
ViVa 24m 2400 MNP
Viva v.32bis 14400 FAX/Modem
Zoltrix 14400 FAX/modem
Zoltrix 9600 FAX/modem
ZOOM/Modem 14400 FAX/modem
ZOOM/Modem 2400 V.42bis
ZOOM/Modem HC2400R
ZOOM/Modem HC2400S SendFax
ZOOM/Modem MX2400R
ZOOM/Modem MX2400S SendFax
ZOOM/Modem V.32 Turbo
ZOOM/Modem V.32 with V.42bis
ZOOM FaxModem V.34 28.8
ZyXEL Elite 2864 V.34 Data/Voic
KTX Modem

APPENDIX F. COMMAND AND FUNCTION QUICK REFERENCE GUIDE

BASIC KEY COMMANDS

COMMAND	KEYS	DETAIL
Purge logged data	< and > (press and hold)	Power up and hold until purge message is displayed.
Purge setup data	^ and v (press and hold)	Power up and hold until purge message is displayed.
Reset alarms	^ (press)	
Retry last feed	v (press)	

MODE DESCRIPTIONS

MODE	DOOR/LOCK POSITION	FUNCTIONS
Test	Key in unlocked position—hold MENU key and power up.	<ul style="list-style-type: none"> • Control Outputs (chemical, transport, etc) • AlphaBus Status • A/D Calibration
Interrogation	Door in locked position, unit powered up Press < and>, press MENU key to access screens	<ul style="list-style-type: none"> • Temperature • Trigger Status • Real Time System Events • Feed Detail
Setup	Door in unlocked position, unit powered up Press < and> twice	<ul style="list-style-type: none"> • Time • Account ID • Washer Enable/Disable



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