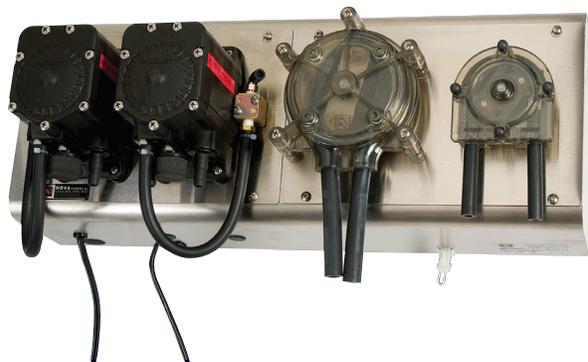


Orion LL-80000 Liquid Laundry Supply Dispenser

Reference Manual Installation and Operation



The LL-80000 Laundry Dispensers from Hydro Systems are designed to be easily connected to large commercial washing machines at least 250 lbs. and above. For increased flexibility and safety, an optional FM500 industrial flush manifold can be connected to the LL-80000 dispenser to safely flush chemical products to the washers. The LL-80000 with high output air diaphragm pumps is an ideal solution for dispensing liquid laundry chemicals to CBW and tunnel washers of all sizes.

Online and downloadable Product Manuals and Quick Start Guides are available at www.HydroSystemsCo.com

Please check online for the latest version of this Reference Manual.

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Theory of Operation

System Overview

The ORION LL-80000 system dispenses liquid laundry chemicals directly from the shipping containers into a commercial laundry washer. All product additions are made automatically. Multiple modes of operation allow for maximum flexibility in washer application. This makes the ORION LL-80000 suitable for use with any commercial laundry washer.

The ORION LL-80000 system consists of three components (and an optional Flush Manifold):

- The Machine Interface module accepts the washer signals and converts them to safe, low-voltage inputs.
- The Control Module provides a timesaving menu display system to aid program setup.
- The Pump Module provides heavy duty, high capacity peristaltic pumps for product transfer and provides an interface for the optional Flush Manifold.
- The optional Flush Manifold provides an alternative means of chemical transfer to the laundry machine. In flush configuration, the ORION LL-80000 is a complete, integrated water flush chemical dispensing system.

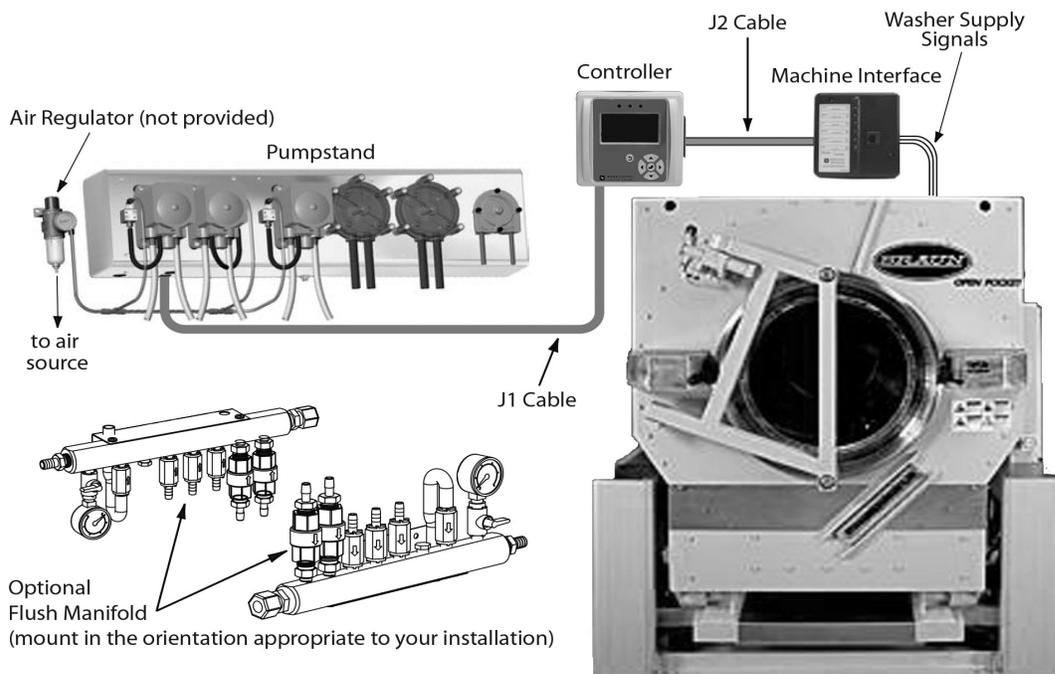


Figure 1 Orion LL-80000 Liquid Laundry Supply Dispenser System Overview

Theory of Operation

Features

Flexible Mounting

The ORION LL-80000 system can be tailored to your location, taking advantage of the unique modular construction. Now you can put your pumps where you need them, close to the product, and put the controller conveniently on the washer.

Fast Setup

The ORION LL-80000 uses modern technology to reduce setup time.

Use On Any Washer

The ORION LL-80000 has all the modes required to work with any commercial washer that you encounter. The unit can be used with programmable washers, card, chart, or microprocessor controlled fixed-cycle washers—use it even with washers lacking any dedicated supply signals.

Customized Formulas

With a Total Eclipse Controller, you can program and select up to 20 different chemical formulas, maximizing the effectiveness of your chemicals.

High Capacity Pumps

The ORION LL-80000 can be supplied with up to 8 pumps. Each pump has a capacity of up to 46 oz. (1.1 liter) per minute output for the peristaltic pumps, and 2 gals. (7.57 liters) per minute for the diaphragm pumps, to provide fast and efficient transfer of the chemical dose.

NOTE: Peristaltic pumps with Viton tubing have a capacity of up to 30 oz./minute output.

Flush Option

The standard Eclipse and the Total Eclipse controller provides flush logic that, when used with a Hydro flush manifold, has special safety interlocks combined with full control over the water flush manifold. When using the flush manifold, water flow is sensed whenever the Controller calls for water flush. If no flow is sensed, or water flow falls below .65 GPM, the safety interlock shuts down all pumps.

When using the high-output pumps, continue flushing after pumps stop running (“post flush” operation). See the standard Eclipse or Total Eclipse Controller Reference Manual for flush programming instructions. The Flush Manifold may be mounted in any orientation that is appropriate to your installation. Refer to the Flush Manifold Installation and Operation Manual for more information.

NOTE: A flush jumper is located at the flush connector on the Pumpstand. For flush operation, remove this jumper and connect the Flush Manifold Interface Cable in its place. (Retain the flush jumper for possible future use.) Pumps will not run without either the flush jumper or a functioning Flush Manifold connected.

Pump Module

Location—Locate the pump module close to your product containers and within power cord length of a power outlet. A vertical wall behind the washer at a 4-5 ft. (1.2-1.5 meter) height is usually suitable.

Mounting—To ease installation, you may detach the front plates (including pump/motor assembly) by loosening the upper plate mounting screws, removing the lower plate mounting screws, and unplugging the pump motor harnesses (see Figure 2, “Pump Module Assembly Mounting”).

Mechanical Installation

1. Mark and install a single screw fastener in the wall at the center of the pump module.
2. Hang the pump module's center keyhole on the screw fastener and make it level.
3. Mark and install the remaining fasteners through the pump module, in the appropriate positions.

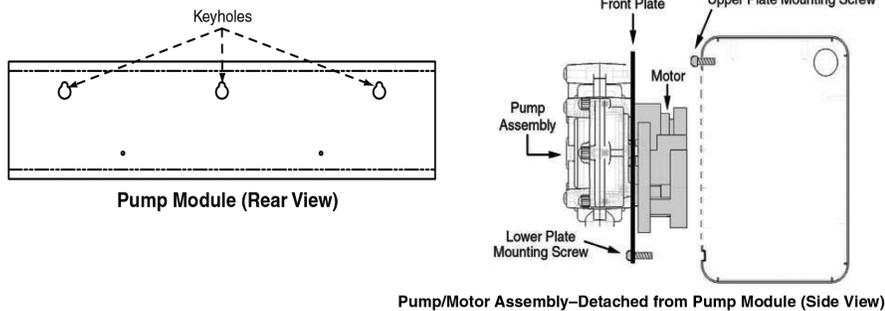


Figure 2 Pump Module Assembly Mounting

NOTE: If access is required for electrical connections, do not replace pump/motor assemblies (Step 4) until the electrical installation is complete.

4. Reattach the pump/motor assemblies with the four screws for each plate. Make sure that all pump motor harnesses are reconnected.
5. Install the poly tubing to connect from the pumps to the washer or flush manifold, and from the pumps to the supply containers. Use tie wraps to secure pump output tubes.
6. The Pump Module has a resettable circuit breaker on the left bottom of the cabinet.



WARNING/ADVERTENCIA:

To avoid serious injury, disconnect all power to the wash machine and dispenser during installation and/or any time the unit is opened. These installation, operation and servicing instructions are for use by qualified personnel only. The ORION LL-80000 is intended to be installed by experienced installers, in accordance with all applicable electrical and plumbing codes.

Mechanical Installation

Control Module

ORION LL-80000 compatible Controllers include the standard Eclipse (up to 6 pumps), the Total Eclipse (up to 8 pumps).

NOTE: Use the installation instructions contained in the Reference Manual for your specific Control Module. Only use the controller installation instructions in this manual if your Reference Manual does not have installation instructions.

Supply Tubing

System Limits—We recommend that you do not exceed 50' (15.25 meters) total supply tubing length, 12' (3.66 meters) maximum vertical rise.

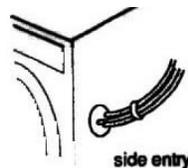
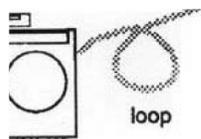
Supply Tubing Size—For short total tubing runs (less than 10' or 3 meters from product container to pump to washer), with low viscosity product and minimum vertical rise, 3/8" poly tubing is adequate.

For longer tubing runs, high viscosity products or high vertical lifts, you should use 1/2" supply tubing. If the supply tube size is too small for the hydraulics of the system, then pump output will be lowered and pump tubing life will be shortened.

Connectors and Foot Valves—Hydro pumps are designed to provide internal backchecking. It is not necessary to use foot valves or strainers on the product pickup tubes. Any tube-to-tube connectors used in the tubing runs should be of large internal bore.

Tubing Placement—The ideal situation to minimize any product drip at the washer is to have the supply tube sloped up to the washer entry point. Otherwise, form a loop in the supply tube as close to the washer entry point as possible to stop drip at the top of the loop.

Washer Entry Point—The supply tubes can be brought into the washer via the washer's built-in powder supply compartment or through a side entry port (preferable since it adds chemical to the water, not on top of the load). If you add through top mounted compartments, allow washer to fill with water before adding chemical. Securely fasten tubes at the washer entry point.



Mounting and Connecting Machine Interface (MI)

If you are unfamiliar with the washer to which you are wiring, either contact the washer manufacturer or Hydro Systems for technical assistance. (See “Washer Wiring—Contacts for Manufacturers” on page 12 for a list of phone numbers.) Use the mounting instructions for the style of Machine Interface that is included with your system.

Machine Interface



1. Route MI signal wires through 1/2 inch knock-out on washer (within wiring area.)
2. Use lock nut on MI 1/2 inch nipple to secure MI to washer.
3. Route J2 cable to controller.
4. Plug J2 cable into Machine Interface.
5. Bundle excess J2 cable outside the washer.
6. Connect the other end of the J2 cable into the J2 connector on the Controller.

NOTE: See Figure 4 “Control Module Connections” on page 9 for more information. Electrical wiring connections for supply triggers are to be done inside the junction box. See “Supply Trigger Wiring” on page 8 for connection information.



WARNING/ADVERTENCIA:

To avoid serious injury, disconnect all power to the wash machine and dispenser during installation and/or any time the unit is opened.

Keep Machine Interface and communication cable away from high voltage wires and relays. NEVER parallel the cable with high voltage lines.

Supply Trigger Wiring

1. Identify the washer supply signals. Check with technical service or with the washer manufacturer if you are not sure of the connections. (See “Washer Wiring–Contacts for Manufacturers” on page 12 for a list of phone numbers.)
2. Use appropriate terminal connectors to connect the signal wires to the Machine Interface wires. Use these color codes for “Timer” and “Relay” modes:

	Supply Signal	Signal Common
Signal 1	Black wire	White/Black
Signal 2	Brown wire	White/Brown
Signal 3	Red wire	White/Red
Signal 4	Orange wire	White/Orange
Signal 5	Yellow wire	White/Yellow
Signal 6	Blue wire	White/Blue

Trigger Signal Wiring Notes:

- If one or more pump signals are not used, they do not need to be connected.
- If you are triggering more than one pump from a single signal, connect all of the Machine Interface pump signal wires for those pumps to that signal.
- Tape off or wire nut unused wires. If washer has a single common, wire nut all commons together.
- Each of the 6 LEDs on the MI lights up when the corresponding valid signal is received.

Rear Signal Wire Style MI

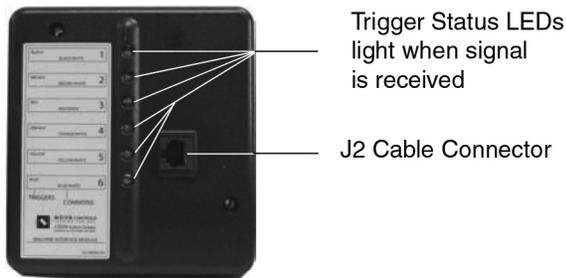


Figure 3 Machine Interface LEDs and J2 Cable Connection

NOTE: Signal input wires are not shown in this illustration.

“Event Mode” Wiring

	Hot	Common/Neutral
On Light	Black wire	White/Black
Hot Fill	Brown wire	White/Brown
Cold Fill	Red wire	White/Red
Drain	Orange wire	White/Orange
n/c	Yellow wire	White/Yellow
n/c	Blue wire	White/Blue

Signal Voltage

The Machine Interface will work with any signal voltage between 24 and 240 VAC. With DC signals, polarity must be observed. Common is negative. The signals should be positive voltages.

Control Module Installation

After connecting the J2 cable (see “Mounting and Connecting Machine Interface (MI)” on page 7), plug the J1 cable from the Pump Module into the labelled J1 jack on the Control Module. The J1 cable may be extended (up to a maximum of 75 feet or 22.86 meters) with an extension cable available from Hydro Systems. To order additional cables, contact Hydro Systems Customer Service.



CAUTION:

Always verify all voltage sources with a meter.

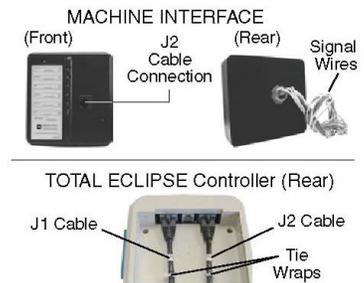


Figure 4 Control Module Connections

Controller Programming

The LL-80000 can be used with the standard Eclipse (6 pumps max) and the Total Eclipse (up to 8 pumps) Controllers.

Calibrate Pumps

NOTE: Refer to your Controller's Reference Manual to determine the proper calibration method (timed or volume) for your Controller.

You must calibrate all pumps, via the Controller, using either the volume or timed methods of calibration. If you do not calibrate a pump properly, your pumped amounts could be wrong or the pump may not run. Calibrate pumps according to instructions in your controller's manual.

Maintenance

Pump tubes should be replaced regularly. Products, product throughput and operating conditions determine tube life. Try to replace tubes before they fail and leak chemical into the pump housing.

Tube Replacement

1. Loosen either the knurled thumbscrews on the small pump faceplate or the five Phillips screws on the large pump faceplate.
2. Lift off faceplate and pull tubing out.
3. If tube was broken, clean out residual chemical with a damp cloth.
4. With roller assembly at a 1:00 / 7:00 orientation, place left end of tube in housing.
5. Rotate roller assembly clockwise as you push the tubing into the housing. This will aid the insertion of stiff or large tubes.
6. Lubricate tubing, if needed ("Correct Lubrication for Various Tube Types" below to see appropriate lubricant for your tube type).
7. Replace faceplate and finger tighten the thumbscrews or tool tighten the steel screws.

Tube Lubrication

New tubes for the peristaltic pumps may be lubricated lightly with the appropriate lubricant. Excessive lubricant will cause premature tube wear. Use the lubrication recommended in the table below for your tube type.

Tube Type	Lubrication
Santoprene, EPDM, Viton	Silicone Lube
Silicone	Silicone or Vaseline-type Lube
C-Flex	No Lube

Periodic Cleaning

Wipe soil from housings, pump housings, etc. with a damp cloth.

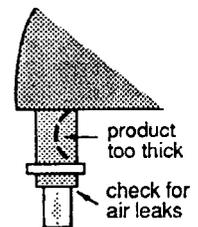
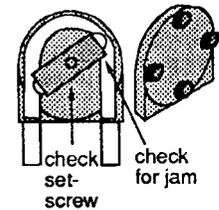
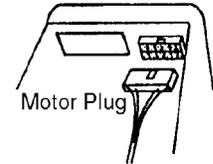


CAUTION:

Always wear eye protection when working with strong or hazardous chemicals.

Troubleshooting

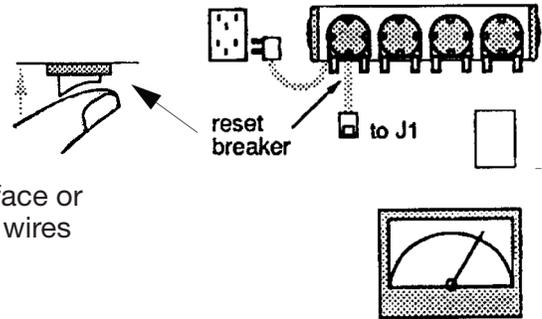
Symptom	Possible Solution	Action
No display on Control Module	1. Check AC Power Source. Is Pump Module plugged in? Is outlet live?	1. Restore AC Power.
	2. Check if circuit breaker on Pump Module is tripped.	2. Reset circuit breaker. See Circuit Breaker Reset on next page.
	3. Check Control Module to Pump Module wiring.	3. Reconnect or replace cable.
	4. Possible defective Pump Module PCB.	4. Replace Pump Module PCB.
Pump / Diaphragm pump does not run on Prime. See also * Diaphragm Pumps below.	1. Check Pump Module internal wiring.	1. Reconnect wiring harness.
	2. Check Control Module to Pump Module wiring.	2. Reconnect or replace cable.
	3. Check if motor is overheated, may be in thermal shutdown.	3. Allow motor to cool.
	4. Switch pump leads with another pump motor and retry priming suspect pump with new pump number.	4a. If suspect pump now primes, replace Pump Module PCB. 4b. If suspect pump still won't prime, replace the pump motor. 4c. Check pump for jammed or loose roller assembly.
Pump / Diaphragm pump runs on prime, but not when signalled. Note: If more than two pumps are programmed to run simultaneously, they will be "queued" to run one after another.	1. Check Machine Interface to controller cable.	1. Reconnect or replace cable.
	2. Is Controller set for Event Mode? Are pumps calibrated? Does formula call for non-zero qty? Does formula call for delays?	2a. Reprogram Controller to Timer Mode. 2b. If all checks okay, depower Controller to reset. If unsuccessful, replace Controller.
	3. Verify if valid signal is present by watching Machine Interface LEDs during washer operation. If LEDs light, check Controller/ Machine Interface communication via the Trigger Status menu on the formula run screen.	3a. Confirm signal lasts longer than the programmed Signal Filter time. 3b. If no signals displayed, check Machine Interface to Controller cable; if good replace Controller. 3c. If signals displayed, replace Controller.
	4. If no LEDs, Verify presence of valid supply signal with a voltmeter. See Trigger Signal Test on next page.	4a. Check supply trigger wiring. 4b. Troubleshoot washer for no signals. 4c. If signals are good, replace the Machine Interface.
Pump runs but no product pumped.	1. Check pump tube.	1. Change pump tube.
	2. Check for input tube air leaks.	2. Change input tube or fittings.
	3. Check if product is too viscous and/or if tubing run is too long.	3. Remedy this condition.
	4. Check for clogged pickup tube.	4. Clear clog.
Not counting formulas.	1. Check if the last (highest number) programmed non-zero pump run?	1. Correct signal or programming error.
* Diaphragm pumps run slowly, or not at all.	1. Check air regulator; verify air supply is connected to air inlet on pump, with pressure at approx. 20-30 psi.	1. Inspect air line, regulator & filter for leaks or clogs. Clean or replace as needed.
	2. Check solenoid electrical connections.	2. Clean electrical contacts.
	3. Check to see if solenoid is stuck "open" position due to faulty diaphragm or coil.	3. Replace faulty solenoid.



Troubleshooting

Circuit Breaker Reset

If the Breaker (left bottom rear of Pump Module) needs resetting, verify that all motors are okay and no pumps are jammed or the unit will shut down again.



Trigger Signal Test

If you cannot obtain indication of signals on the Machine Interface or Control Module, use a meter to verify voltages between signal wires and common connections.

Repair Procedures

If you need to return items for repair, please obtain a returned product authorization number from Hydro Systems (RPA#) and a note describing the symptoms encountered.

Washer Wiring—Contacts for Manufacturers

If you are unfamiliar with the washer to which you are wiring, either contact the washer manufacturer or Hydro Systems for technical assistance. The following list of manufacturers and contact numbers is supplied for your reference. This list, current at the time of publication, may become outdated if manufacturers cease doing business or change their phone numbers.

When contacting a washer manufacturer, have the model and serial numbers of the machine handy, as ongoing washer upgrades may change the wire numbers from time to time.

The ORION Machine Interface can accept any single phase voltage signal from 18 VAC - 240 VAC or DC.

Washer Manufacturers/Wash Machine Names	Location	Contact
Alliance Laundry Systems (Huebsch)	Ripon, WI	800.553.5120
Alliance Laundry Systems (Speed Queen)	Ripon, WI	800.345.5649
Alliance Laundry Systems (UniWash, UniMac, Ajax)	Ripon, WI	800.587.5458 or 920.748.3121
Brim Laundry Machinery Co.	Dallas, TX	800.527.5886 or 214.630.4517
Dexter Co.	Fairfield, IA	641.472.5131
Edro Corp. (DynaWash)	East Berlin, CT	860.828.0311
Ellis Corp.	Itasca, IL	800.453.9222
G A Braun Inc.	Syracuse, NY	800.432.7286 or 315.475.3123
Girbau Co.	Oshkosh, WI	800.256.1073 or 920.231.8222
IPSO, USA	Panama City, FL	800-872-4776
Jensen (Senking, D'Hooge, L-TRON)	Fort Mills, SC	803.548.3653
Kannegiesser USA (Favorit, Futura, PowerTrans, RotaFlex)	Grand Prairie, TX	800.344.0403
Pellerin Milnor	Kenner, LA	800.469.8780 or 504.467.9591
Wascomat, Inc. (Wascomat, Wascator)	Inwood, NY	800.645.2204 or 516.371.4400
Washex / Lavatec	Wichita Falls, TX	800.433.0933 or 940-855-3990

Specifications & Limited Warranty

Specifications

LL-80000 Pump Module (6 pump) Dimensions

Size	33" W x 8" H x 5.5" D (83.8 cm W x 20.3 cm H x 14 cm D) (cabinet length varies by type of pump)
Weight	68 lbs. (30.9 kg.)

General

Temperature	120° F. (49° C.) Maximum
Power	115 VAC (+/- 10%), 60 Hz 240 VAC, 50 Hz optional
Circuit Breaker	6 amps
Signal Inputs	From Control Module, up to 75 ft. (22.9 m)
Total Amperage draw during operation	< 6 amps
Pump Flow Rate	3 gal (11.36 liters) / min, High-Output, Double-Diaphragm air pump (with water-like viscosity product) 40 oz. (1.2 liters) / minute capacity, Peristaltic type 30 oz. (.89) / minute capacity, Peristaltic type w/ high-torque motor 18 oz. (532 mls) / minute capacity, modified Peristaltic type

Machine Interface Dimensions

Size	5.0" W x 5.25" H x 1.5" D (12.7 cm W x 13.3 cm H x 3.8 cm D)
Weight	10 oz. (.28 kg.)

NOTE: Specifications subject to change without notice.

Power Requirements for Control Modules

Power	Supplied by Pump Module
Signal Inputs	via Machine Interface, 6 channels, 18 to 250 VAC
Temperature	120° F. (49° C.) Maximum

Limited Warranty

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

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

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

Limitation of Liability

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