

# LC-PLUS SERIES

*Reverse Osmosis System User Manual*

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## Your LC PLUS-Series Reverse Osmosis System

is a durable piece of equipment which, with proper care, will last for many years. This User Manual outlines installation, operation, maintenance and troubleshooting details vital to the sustained performance of your system.

If your system is altered at the site of operation, or if the feedwater conditions change, please contact your local dealer or distributor to determine the proper recovery for your application.

### PLEASE NOTE




- Do not under any circumstances remove any caution, warning, or other descriptive labels from the system.
- Prior to operating or servicing the reverse osmosis system, this user manual must be read and fully understood. Keep this and other associated information near the system for future reference and for new operators or qualified personnel near the system.
- In order to maintain the manufacturer's warranty, an operating log must be maintained. Copies will need to be sent to your local dealer or distributor for review.
- Please read the entire manual before proceeding with the installation and START-UP. Failure to follow instructions or operating parameters may lead to the product's failure, which can cause property damage and/or personal injury.



# SAFETY










The Safety section of this User Manual outlines the various safety headings used throughout this manual's text and are enhanced and defined below:

## Warning Labels

|   |  |
|---|--|
|  | <b>Warning:</b> Indicates statements that are used to identify conditions or practices that could result in injury or loss of life. Failure to follow warnings could result in serious injury or even death. |
|  | <b>Caution:</b> Indicates statements that are used to identify conditions or practices that could result in equipment or other property damage.  |
|  | <b>Electrical Hazard:</b> Indicates statements that are used to identify high-voltage and potential shock/electrocution.   |

**STATEMENTS IN BOLD AND ALL CAPITALS ARE ADVISORY OR INFORMATIONAL STATEMENTS OF PARTICULAR IMPORTANCE TO THE HEADING UNDER WHICH THEY ARE FOUND.**

## Precautions

|   |  |
|---|--|
|  | Do not use where the water is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. |
|  | Always turn off the unit, shut off the feedwater, relieve pressure, and disconnect the electrical power before working on the unit.    |
|  | Do not close the concentrate valve completely.   |
|  | Do not operate the system with insufficient feed flow. Never allow the pump to run dry.  |
|  | Pre-treatment must be sufficient to eliminate chemicals, organics or inorganics that could attack the membrane material.               |
|  | Never allow the unit to freeze or operate with a feedwater temperature above 85°F.   |
|  | Do not permit chlorine to be present in the feedwater.   |
|  | Do not shut down the system for extended periods. It is best to run the system as much as possible on a continuous basis.              |
|  | Electrical installation should be done by qualified, trained electricians. Installation should be to local codes.                      |

# OPERATING LIMITS

Nothing has a greater effect on a reverse osmosis system than the feedwater quality. If your system is altered at the site of operation or if the feedwater conditions change, please contact your local dealer or distributor to determine the proper recovery for your application. Before starting the RO system it is strongly suggested to obtain an up to date water analysis of the water to be treated.



**It is very important to meet the minimum feedwater and operating requirements outlined in this manual.** Failure to do so will cause damage or failure of the system components and membranes. Damage to the system due to operation outside of the specifications outlined in this manual will void the manufacturers warranty. Check your feedwater chemistry and, if necessary, consult with your local dealer or distributor before start up of the system.

## OPERATING LIMITS<sup>A</sup>

|   |       |
|---|-------|
| <b>Design Temperature (°F)</b>          | 77    |
| <b>Maximum Feed Temperature (°F)</b>    | 85    |
| <b>Minimum Feed Temperature (°F)</b>    | 40    |
| <b>Maximum Ambient Temperature (°F)</b> | 120   |
| <b>Minimum Ambient Temperature (°F)</b> | 40    |
| <b>Maximum Feed Pressure (psi)</b>      | 70    |
| <b>Minimum Feed Pressure (psi)</b>      | 40    |
| <b>Maximum Operating Pressure (psi)</b> | 90    |
| <b>Maximum SDI Rating</b>               | < 3   |
| <b>Maximum Turbidity (NTU)</b>          | 1     |
| <b>Maximum Free Chlorine (ppm)</b>      | 0     |
| <b>Maximum TDS (ppm)</b>                | 1,000 |
| <b>Maximum Hardness (gpg)</b>           | 1     |
| <b>Maximum pH (continuous)</b>          | 10    |
| <b>Minimum pH (continuous)</b>          | 4     |
| <b>Maximum pH (cleaning 30 minutes)</b> | 12    |
| <b>Minimum pH (cleaning 30 minutes)</b> | 2     |

A. System pressure is variable due to water conditions. Permeate flow will increase at a higher temperature and will decrease at a lower temperature.



Higher TDS and/or lower temperatures will reduce the system's production.



Do not exceed the maximum operating pressure.

## OPERATING DO'S AND DON'TS

### Do:

- Change the cartridge filters regularly.
- Monitor the system and keep a daily log.
- Run the system as much as possible on a continuous basis.
- Adjust the system recovery to the recommended value.
- Always feed the pump with filtered water.

### Don't:

- Permit chlorine to enter or be present in the feedwater.
- Shut down the system for extended periods.
- Close the concentrate valve completely.
- Operate the system with insufficient feed flow or pressure.
- Operate the pump dry.

# SYSTEM SPECIFICATION CHART

| MODELS   | LC-750 PLUS  | LC-1500 PLUS   |
|--|--|--|
| <b>Design</b>  |  |  |
| Configuration  | Single Pass  | Single Pass  |
| Feedwater Source (ppm) <sup>A</sup>                        | TDS < 1,000  | TDS < 1,000  |
| Standard Recovery %  | Up to 75   | Up to 75   |
| <b>Flow Rates<sup>B</sup></b>                              |  |  |
| Permeate Flow Rate (gpd / lpd)                             | 750 / 2,838  | 1,500 / 5,677  |
| Permeate Flow Rate (gpm / lpm)                             | 0.52 / 1.97  | 1.04 / 3.94  |
| Minimum Concentrate Flow Rate (gpm / lpm)                  | 1.70 / 6.44  | 1.70 / 6.44  |
| <b>Connections</b>   |  |  |
| Feed (in)  | 1/2 QC   | 1/2 QC   |
| Permeate (in)  | 3/8 QC   | 3/8 QC   |
| Concentrate (in)   | 3/8 QC   | 3/8 QC   |
| <b>Membranes</b>   |  |  |
| Membrane(s) Per Vessel                                     | 1  | 1  |
| Membrane Quantity  | 1  | 2  |
| Membrane Size  | 3018   | 3018   |
| Nominal TDS Rejection %                                    | 98   | 98   |
| <b>Vessels</b>   |  |  |
| Vessel Array   | 1  | 1:1  |
| Vessel Quantity  | 1  | 2  |
| <b>Pumps</b>   |  |  |
| Pump Type  | Rotary Vane 411 Stainless Steel                          | Rotary Vane 611 Stainless Steel                          |
| Motor HP   | 1/3  | 1/2  |
| RPM at 60 Hz   | 1725   | 1725   |
| <b>System Electrical</b>                                   |  |  |
| Standard Voltage and Amp Draw <sup>C</sup>                 | 110V, 50 / 60HZ, 1PH, 7.4A<br>220V, 50 / 60HZ, 1PH, 4.1A | 110V, 50 / 60HZ, 1PH, 8.5A<br>220V, 50 / 60HZ, 1PH, 4.8A |
| <b>System Dimensions</b>                                   |  |  |
| Approximate Dimensions <sup>D</sup><br>L x W x H (in / cm) | 17 x 13 x 34 /<br>43.18 x 33.02 x 86.36                  | 17 x 13 x 34 /<br>43.18 x 33.02 x 86.36                  |
| Approximate Weight (lbs / kg)                              | 50 / 22.68   | 60 / 27.22   |

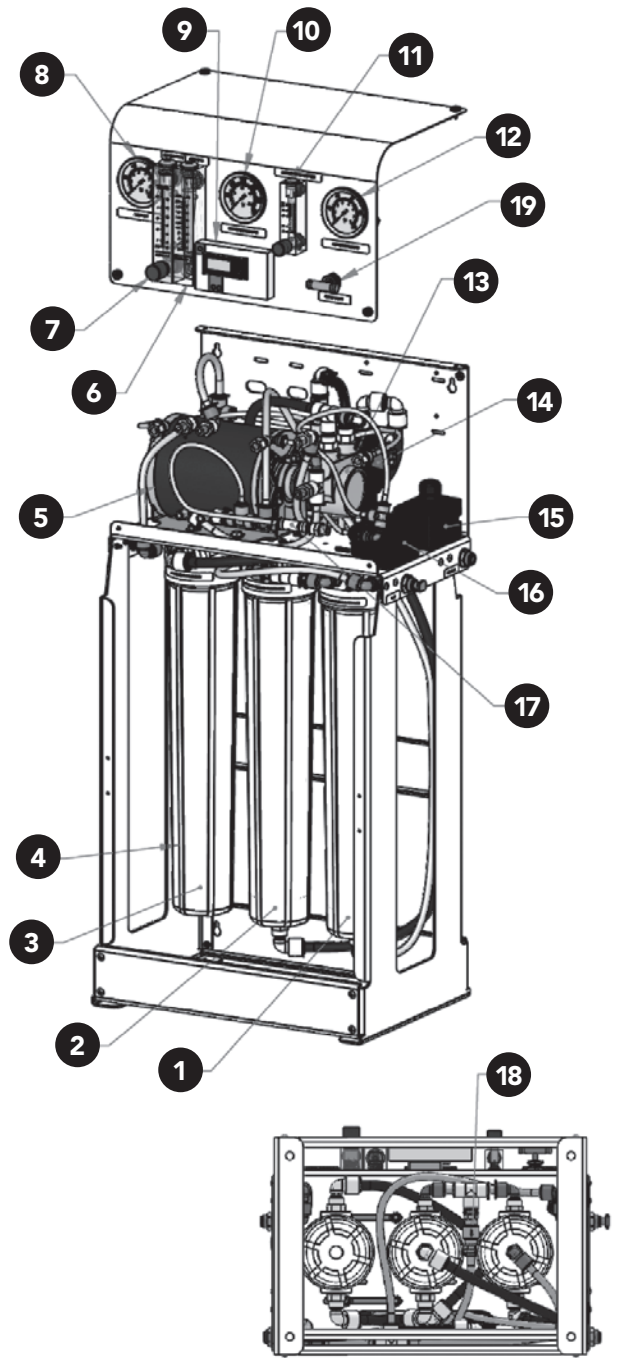
**Warranty Evaluation Test Conditions:** Permeate flow rates and salt rejection based on the following test conditions—550 ppm, filtered and dechlorinated municipal tap water, 77°F / 25°C, 15% recovery, 7.0 pH and the specified operating pressure for membrane element type. Data taken after 60 minutes of operation.

- A. Low temperature and feedwater quality, such as high TDS levels will significantly affect the systems production capabilities and performance. Computer projections must be run for individual applications which do not meet or exceed minimum and maximum operating limit conditions.
- B. Product flow and maximum recovery rates are based on feedwater conditions as stated above. Do not exceed recommended permeate flow.
- C. Varies with motor manufacturer.
- D. Does not include operating space requirements.

# COMPONENT IDENTIFICATION

## LC-750 Plus System

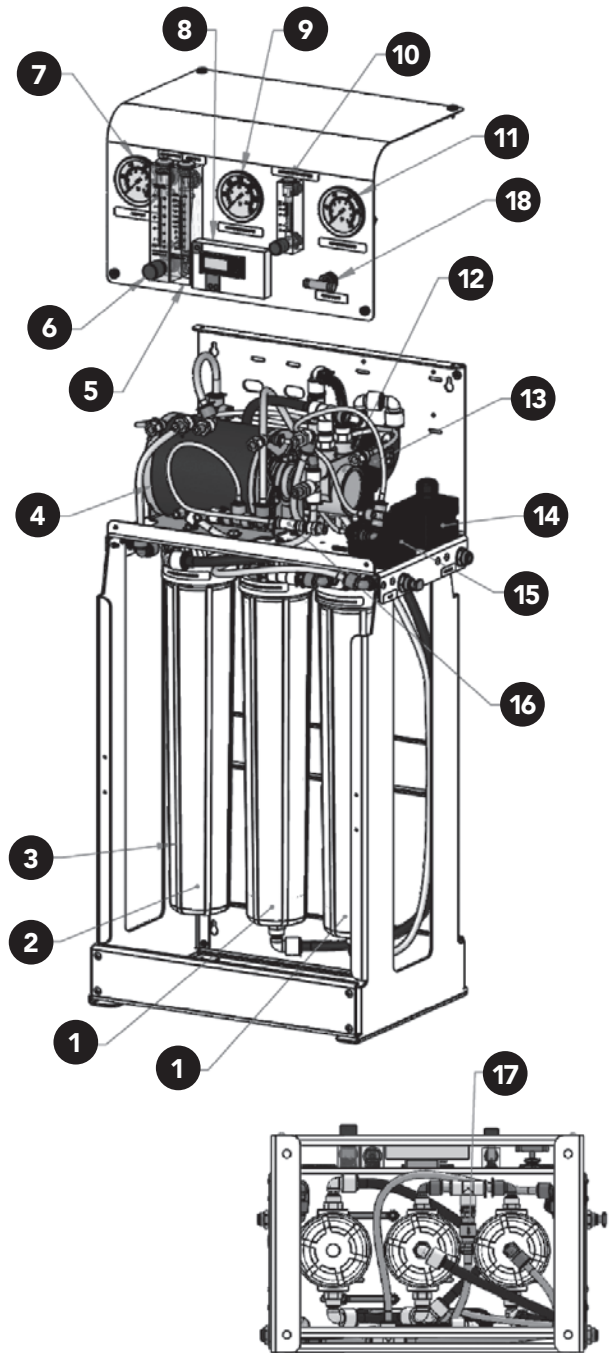
- 1 Membrane, HF5, 3018, Dry, Axeon (Part #209175)
- 2 Cartridge, Carbon, Block, 2.5" X 20", 10 MIC, CBF-25-2010, Axeon (Part #200659)
- 3 Cartridge, Depth Filter, Polypro, 2.5" X 20", 5 MIC (Part #200626)
- 4 Housing, Filter, WHT/WHT, 2.5" X 20", SGL O-Ring, NPR, 3/8" FNPT (Part #207295)
- 5 Motor, Carbonator, 1/3 HP, 110 / 220V 50 / 60 Hz, 48Y, US (Part #200808)
- 6 Meter, Flow, PM, 0.2-2 GPM, 1/2" MNPT X 1/4" FNPT, SS FTG, Axeon (Part #211447)
- 7 Meter, Flow, PM, 0.5-5 GPM, SS Valve, 1/2" MNPT X 1/2" MNPT, Axeon (Part #205104)
- 8 Gauge, BKM, GLY Fill, 0-100 Psi/Bar, 2.5" DIA, 1/4" MNPT, Axeon (Part #204165)
- 9 Meter, TDS, DM-2, HM DGTL, With Bracket (Part # 203385)
- 10 Gauge, BKM, Fill, 0-300 Psi/Bar, 2.5" DIA, 1/4" MNPT, Axeon (Part #200904)
- 11 Meter, Flow, PM, 4". 85 GPH, SS304, Valve, 1/2" MNPT X 1/2" MNPT (Part #209246)
- 12 Gauge, BKM, GLY Fill, 0-100 Psi/Bar, 2.5" DIA, SS, 1/4" MNPT, Axeon (Part #205099)
- 13 Pump, Vane, SS, Bypass, 2.3 GPM, 411, Fluid-O-Tech (Part #200780)
- 14 Valve, Solenoid, 2-Way, Composite, 120V, N/C, 1/2" FNPT, ASCO (Part #207216)
- 15 Switch, Pressure, High, N/C, 40-60, 1/4" FNPT (Part #200907)
- 16 Switch, Pressure, Low, 1/4" FNPT (Part #200906)
- 17 Valve, Check, 1/4" QC X 1/4" QC (Part #200961)
- 18 Valve, Check, Acetal, 3/8" QC X 3/8" QC, JG (Part #200962)
- 19 Valve, Needle, SS 316L, 1/4" FNPT, Axeon (Part #201004)



# COMPONENT IDENTIFICATION

## LC-1500 Plus System

- 1** Membrane, HF5, 3018, Dry, Axeon (Part #209175)
- 2** Cartridge, Depth Filter, Polypro, 2.5" X 20", 5 MIC (Part #200626)
- 3** Housing, Filter, WHT/WHT, 2.5" X 20", SGL O-Ring, NPR, 3/8" FNPT (Part #207295)
- 4** Motor, Carbonator, 1/2 HP, 110 / 220V 50 / 60 Hz, 48Y, US (Part #200809)
- 5** Meter, Flow, PM, 0.2-2 GPM, 1/2" MNPT X 1/4" FNPT, SS FTG, Axeon (Part #211447)
- 6** Meter, Flow, PM, 0.5-5 GPM, SS Valve, 1/2" MNPT X 1/2" MNPT, Axeon (Part #205104)
- 7** Gauge, BKM, GLY Fill, 0-100 Psi/Bar, 2.5" DIA, 1/4" MNPT, Axeon (Part #204165)
- 8** Meter, TDS, DM-2, HM DGTL, With Bracket (Part # 203385)
- 9** Gauge, BKM, Fill, 0-300 Psi/Bar, 2.5" DIA, 1/4" MNPT, Axeon (Part #200904)
- 10** Meter, Flow, PM, 4". 85 GPH, SS304, Valve, 1/2" MNPT X 1/2" MNPT (Part #209246)
- 11** Gauge, BKM, GLY Fill, 0-100 Psi/Bar, 2.5" DIA, SS, 1/4" MNPT, Axeon (Part #205099)
- 12** Pump, Vane, SS, Bypass, 3 GPM, 611, Fluid-O-Tech (Part #200782)
- 13** Valve, Solenoid, 2-Way, Composite, 120V, N/C, 1/2" FNPT, ASCO (Part #207216)
- 14** Switch, Pressure, High, N/C, 40-60, 1/4" FNPT (Part #200907)



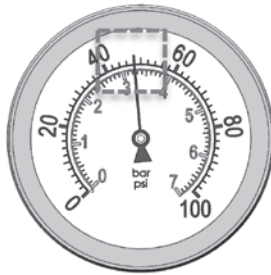
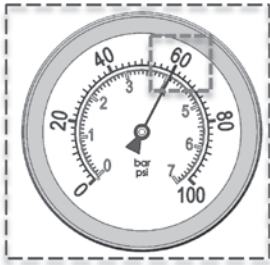
- 15** Switch, Pressure, Low, 1/4" FNPT (Part #200906)
- 16** Valve, Check, 1/4" QC X 1/4" QC (Part #200961)
- 17** Valve, Check, Acetal, 3/8" QC X 3/8" QC, JG (Part #200962)
- 18** Valve, Needle, SS 316L, 1/4" FNPT, Axeon (Part #201004)

## PRE-FILTRATION

LC PLUS–Series systems are supplied with a 5–micron sediment filter and a 10 micron carbon block filter (LC–750 PLUS only). Change the cartridge once a month or when a 10–15 psi differential exists between the feed source pressure and the filter out pressure

### Pre-filtration Pressure Gauge

LC PLUS systems come standard with a filter out pressure gauge. This gauge measures the pressure of the feedwater as it exits the sediment filter (LC–1500 PLUS) or carbon block filter (LC–750 PLUS). A pressure differential of 10-15 PSI or more between your system's incoming water pressure and the filter out pressure gauge indicates that the pre-filters require replacement.



**FILTER OUT**



**NOTE:** A feed pressure gauge is required to see the differential pressure between the two gauges. Should you choose to add one, please have it installed by a qualified technician.

## COMPONENT DESCRIPTIONS



### Solenoid Valve

Cost effective utilizing composite material and features a high flow design.



### Permeate, Concentrate, and Recycle Flow Meter

These flow meters indicate the flow rates of the permeate, concentrate and recycle water. The measurements, when added together, also indicate the feedwater flow rate or (total flow rate).



Excessive recycling may cause premature fouling or scaling of the membrane elements.



### Pump

The pump type used on the LC PLUS-Series systems is a stainless steel rotary vane pump. If any damage occurs to your system's pump, a re-build kit may be available. Contact your local dealer or distributor and inform them of your system and pump model.



### High Pressure Switch

The high pressure switch shuts off the system when the permeate pressure reaches 60 psi and restarts the system automatically when the pressure falls below 40 psi.



### Low Pressure Switch

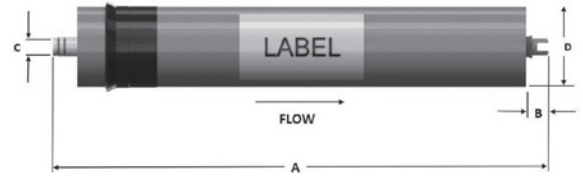
The low pressure switch shuts off the system when the feedwater pressure drops below 15 psi, preventing damage to the pump. The system restarts automatically when there is a constant pressure of 35 psi or more.



If you notice the pressure fluctuating, and the system cycling off and on, turn the system off and ensure that proper feed flow and pressure are available to the system.

# MEMBRANE INFORMATION

LC PLUS–Series Reverse Osmosis Systems are equipped with Thin Film Composite (TFC) HF5–3018 Ultra Low Energy membranes, unless otherwise specified. General membrane element performance characteristics are listed below.



## HF5–3018 ULTRA LOW ENERGY MEMBRANES—SPECIFICATIONS/OPERATING LIMITS

|  |                               |
|--|-------------------------------|
| <b>Membrane Type</b>                               | Polyamide Thin–Film Composite |
| <b>Maximum Operating Temperature (°F)</b>          | 113                           |
| <b>Maximum Operating Pressure (psi)</b>            | 400                           |
| <b>pH Range (Continuous Operation)<sup>A</sup></b> | 2–11                          |
| <b>pH Range (Short Term Cleaning—30 Min.)</b>      | 1–13                          |
| <b>Maximum Feed Silt Density Index (SDI)</b>       | 5                             |
| <b>Chlorine Tolerance (ppm)</b>                    | 0                             |
| <b>Maximum Feed Flow Rate (gpm)</b>                | 3.0"=9                        |

A. Maximum temperature for continuous operations above pH 10 is 95 °F / 35 °C.

## PRODUCT SPECIFICATIONS

| Part # | Description | Applied Pressure (psi) | Permeate Flow Rate (gpd) | Nominal Salt Rejection (%) |
|--------|-------------|------------------------|--------------------------|----------------------------|
| 209175 | HF5-3018    | 90                     | 750                      | 98                         |

## DIMENSIONS (IN)

| Description | A     | B    | C    | D    |
|-------------|-------|------|------|------|
| HF5-3018    | 19.88 | 0.90 | 0.71 | 3.00 |

**Warranty Evaluation Test Conditions:** Permeate flow and salt rejection based on the following test conditions—250 ppm, filtered and dechlorinated municipal tap water, 77°F / 25°C, 15% recovery and the specified operating pressure. Minimum salt rejection is 96%. Permeate flows for warranty evaluation may vary +/- 20%. Maximum pressure drops at 13 psi / 0.9 bar.

Proper start–up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Before initiating system start–up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Avoid any abrupt pressure or cross–flow variations on the spiral elements during start–up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start–up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30–60 second time frame.
- Cross–flow velocity at set operating point should be achieved gradually over 15–20 seconds.
- Permeate obtained from first hour of operation should be discarded.
- Maximum pressure drops across an entire pressure vessel (housing) is 15 psi / 1.05 bar.
- Avoid static permeate–side backpressure at all times.

# MEMBRANE WARRANTY

Under certain conditions, the presence of free chlorine, chloramines and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, the manufacturer recommends removing all oxidizing agents by pretreatment prior to membrane exposure. Please contact the manufacturer or your supplier for more information.

Do not use this initial permeate for drinking water or food preparation. Keep elements moist at all times after initial wetting. To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution. Rinse out the preservative before use. For membrane warranty details, please contact the manufacturer or your supplier for more information.

If operating limits and guidelines given in this product specification sheet are not strictly followed, the warranty will be null and void. The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements. Use of any such chemicals or lubricants will void the warranty. These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale. The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

No freedom from infringement of any patent owned by the manufacturer or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, customer is responsible for determining whether products and the information in this document are appropriate for customer's use and for ensuring that customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. The claims made may not have been approved for use in all countries. The manufacturer assumes no obligation or liability for the information in this document. AXEON reserves the right to update this information periodically for the purposes of quality and accuracy.

**NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

## MEMBRANE PERFORMANCE

LC PLUS–Series Reverse Osmosis Systems are designed to produce up to 750 GPD at 77°F (nominal) of permeate water per membrane at 98% rejection under the proper conditions. For example, the ELC–750 produces 750 gallons per day of permeate water at the listed operating test conditions.

### Rejection

The amount of total dissolved solids (TDS) rejected by the membrane is expressed as a percentage. LC PLUS–Series reverse osmosis systems are designed to reject up to 98% NaCl depending on feedwater chemistry. A 98% rejection rate means that 98% of total dissolved solids do not pass through the membrane. To calculate the percent of rejection, use the following formula:

|         |   |   |     |   |               |
|---------|---|---|-----|---|---------------|
| FORMULA | $\frac{\text{Feed TDS} - \text{Permeate TDS}}{\text{Feed TDS}}$ | x | 100 | = | % Rejection   |
| EXAMPLE | $\frac{430 \text{ TDS} - 8.6 \text{ TDS}}{430 \text{ TDS}}$     | x | 100 | = | 98% Rejection |

### Recovery

The amount of permeate water recovered for use is expressed as a percentage. To calculate percent of recovery, use the following formula:

|         |  |   |     |   |              |
|---------|--|---|-----|---|--------------|
| FORMULA | $\frac{\text{Product Water Flow Rate}}{\text{Feed Water Flow Rate}}$ | x | 100 | = | % Recovery   |
| EXAMPLE | $\frac{5.55 \text{ GPM}}{8.55 \text{ GPM}}$                          | x | 100 | = | 65% Recovery |



All flow rates must be expressed in the same units, typically gallons per minute (gpm).

# SYSTEM INSTALLATION

## Mounting

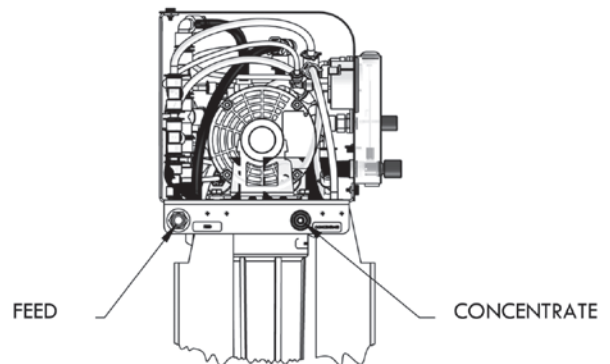
When choosing a location to install the system, select an area with enough head room to remove the membranes and easily access components and connections. Make sure there is enough room for service to be performed on the system. Take into consideration where your electrical power supply is located and where the nearest drain is located. Do not install system in direct sunlight or subject the system to temperature extremes (see operating limits chart pg. 2) and/or excess humidity. The free standing system should be bolted down or securely fastened in compliance with local regulation standards.

## Plumbing

The membranes and high pressure pumps used on LC PLUS-Series systems require a continuous flow of water with a minimum feed pressure of 40 psi, not to exceed 60 psi.

### Feed Water Connection

- Locate the 1/2" quick connect tube fitting labeled "FEED" on the left side of the frame.
- Attach the inlet tubing to the 1/2" feedwater inlet.
- Be certain that all of the components of the feedwater are soluble at the concentrations attained in the system.



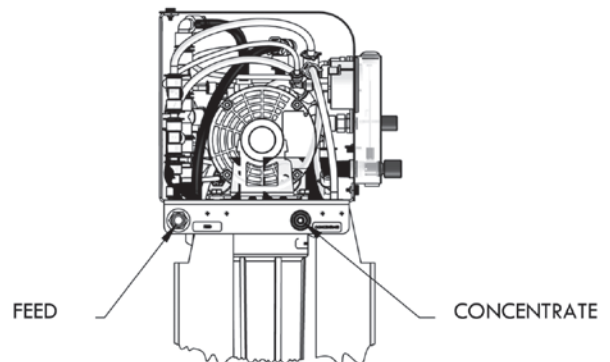
Feed line must be a minimum of 1/2" inch.

### Concentrate (Waste Water) Connection

Locate the 3/8" quick connect tube fitting labeled "CONCENTRATE", and attach 3/8" tubing to a drain. Run the concentrate line to an open drain in a free and unrestricted manner (no backpressure).



Any restrictions or blockage in the drain line can cause backpressure, which will increase the system's operating pressure. This can result in damage to the system's membranes and components.



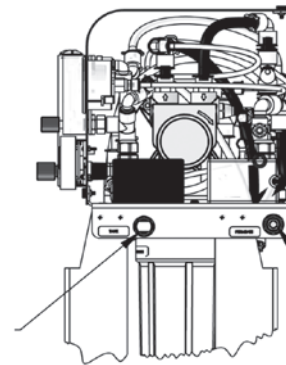
## Permeate / Holding Tank (Product Water) Connections

Locate the 3/8" quick connect tube fitting on the right side of the frame labeled "PERMEATE". Attach 3/8" tubing and connect it to the point of use. This system is equipped with a permeate high pressure switch and is designed to fill a pressurized storage tank. When using a pressurized storage tank locate the 3/8" quick connect tubing fitting labeled "HOLDING TANK" on the left side of the frame. Attach 3/8" tubing and connect it to the pressurized storage tank. Ensure that the permeate water can flow freely with no backpressure. Backpressure can cause irreversible damage to the membrane elements. The permeate line can be run to the point of use with Polypropylene or other FDA approved materials so the material being used does not dissolve into the permeate water.



The pH of the reverse osmosis permeate water will typically be 1 or 2 pH units lower than the feedwater pH. A low pH can be very aggressive to some plumbing materials such as copper piping.

HOLDING  
TANK



PERMEATE

## Electrical

The motor used on the LC PLUS is available in either 110 VAC 50/60 Hertz 1 Phase or 220 VAC 50/60 Hertz 1 Phase. Each LC PLUS–Series system is equipped with an eight-foot electrical cord.

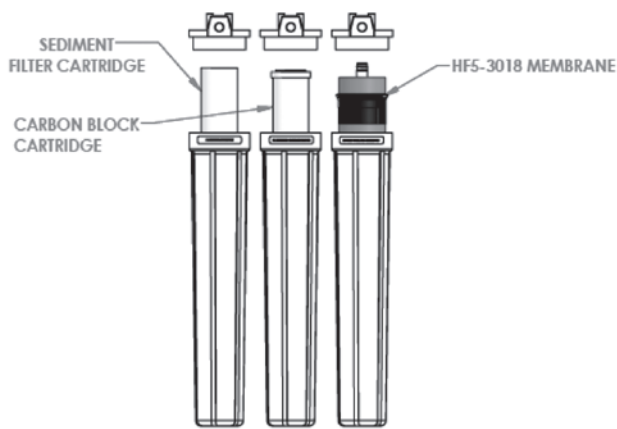
Ensure that the electrical circuit supplying the system is compatible with the requirements of the specific LC PLUS–Series model you are installing.

**IT IS RECOMMENDED THAT A LICENSED ELECTRICIAN WIRE YOUR SYSTEM IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES (NEC).**

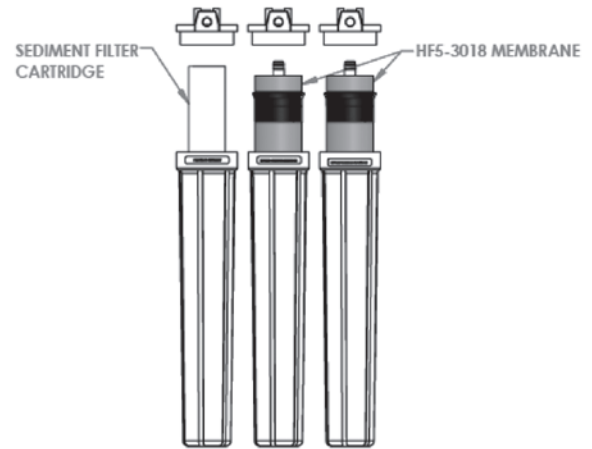


To reduce the risk of electrical shock, the incoming power supply must include a protective earth ground.

# MEMBRANE INFORMATION AND HANDLING



LC-PLUS 750



LC-PLUS 1500

## Membrane Installation/Replacement

Installation and replacing membranes in the pressure vessels is an easy process if you have the proper information and tools at hand. Please refer to the following instructions when removing and replacing membrane elements:



All pressure gauges must read zero before beginning this procedure. Turn the system off, disconnect the power, and bleed all water pressure from the system.

## Membrane Installation/Replacement (Cont.)

1. Disconnect the tubing from the bottom of the membrane housing. Unscrew membrane housing from the system (counter-clockwise). Remove old membrane.
2. Remove the replacement membrane element(s) from the shipping box; the membrane(s) should be contained within a plastic bag.



Wear gloves for the following steps in order not to contaminate the membrane.

3. Cut the bag open as close as possible to the seal at one end of the bag, so the bag may be re-used if necessary.
4. Make sure that all parts are clean and free from dirt. Examine the brine seal, and permeate tube for nicks or cuts.
5. Flow directions should be observed for installation of each element into their respective pressure vessels.



The brine seal must be in the correct position for each membrane element housing. The brine seal is a rubber seal that protrudes on one side of the membrane and is always on the feed side of the membrane element. For LC PLUS–Series reverse osmosis systems the brine seal should be on the top side of the membrane housings.

6. Lubricate the brine seal and O–rings with a non–petroleum based lubricant, such as Dow Corning® 111. Do not use a petroleum–based lubricant.
7. Install membranes with brine seal location (refer to pg. 13) for LC PLUS-1500 or for LC PLUS–750.
8. With a smooth and constant motion, push the membrane element into the housing.
9. Screw the membrane housing back onto the system and reattach the tubing.
10. Reconnect any fittings that may have been disconnected when the membrane pressure vessels were disassembled.
11. To start–up the system, please refer to the Initial Start–Up section of this User Manual.



The membranes must be flushed for at least 30 minutes to remove the preservative from the membrane. Discard all of the permeate produced during the flush period.

## SYSTEM PURGING/INITIAL START-UP



Carefully inspect your system before initial start up. Check that all the plumbing and electrical connections are in place and securely fastened.

1. Fully open the concentrate valve by turning it counter-clockwise.
2. Fully close the concentrate recycle valve by turning it clockwise.
3. Plug the RO system in and adjust the concentrate (waste) valve, recycle valve and pump bypass valve (PUMP ADJUSTMENT located on the back plate) to the designed flow and pressure.
4. Inspect the system for leaks.
5. Allow the system to run 30 minutes to flush the preservative solution from the system.
6. After 30 minutes, shut down the system.
7. Re-direct the permeate water back to the tank and then turn the system back on.
8. Record the readings daily for a week; after one week record the readings once a week.



### Flushing the Unit



The system should be flushed weekly to remove sediment from the surface of the membranes. To manually flush the system, follow these steps:

1. The system must be operating during the flush procedure.
2. Fully open the concentrate valve by turning it counter-clockwise.
3. Allow the system to run for 10 to 20 minutes.
4. After 10 to 20 minutes, close the concentrate valve to its previous setting. Ensure the proper concentrate flow rate is going to the drain.
5. The system is now ready to operate.

# SYSTEM STORAGE

## Preparing the Unit for Storage

If the system is to be shut down for an extended period, a membrane preservative should be used to preserve the membranes.

|   |   |
|---|---|
|  | <p>Prior to storing your system, the system should be cleaned with AXEON C-10 and C-20 cleaners, flushed with permeate water and M-100 solution for membranes to protect it from biological attack.</p>                                       |
|  | <p>The pressure vessels and plumbing lines of the system must be completely drained or filled with 10-40% propylene glycol mix (to prevent freezing). Any water remaining in the plumbing of a system may freeze, causing serious damage.</p> |

1. Completely immerse the elements in the membrane housings using 2% M-100 solution<sup>A</sup>.
2. Separate the preservative solution from the air outside by closing all valves. Any contact with oxygen will oxidize the M-100 solution.
3. Check the pH once a week. When the pH becomes 3 or lower, change the preservation solution.
4. Repeat this process at least once a month.

A. For cold weather/winter storage add 20-40% by weight Propylene Glycol to the 2% M-100 solution. Add Propylene Glycol **AFTER** the 2% M-100 solution has been mixed. Refer to the chart below for the weight percent to be added.

### FREEZING POINT DEPRESSION OF PROPYLENE GLYCOL SOLUTION BY % WEIGHT

|                     |    |    |    |    |
|---------------------|----|----|----|----|
| Freezing Point (°F) | 26 | 18 | 7  | -8 |
| Propylene Glycol %  | 10 | 20 | 30 | 40 |

EXAMPLE

If the lowest temperature the system would experience in storage is 15 °F, it would be advisable to mix a 30% by weight solution of Propylene Glycol in your 2% M-100 preservative solution. The 30% solution will prevent freezing at temperatures down to 7 °F.

## TEMPERATURE CORRECTION FACTORS

A membrane's stated permeate production rate is based on a water temperature of 77 °F degrees Fahrenheit. Temperatures above or below 77 °F will increase or decrease the membrane's production rate.

Find the temperature correction factor (TCF) for your water temperature on the table located on the next page. Divide the rated permeate flow by the temperature correction factor. The result is the nominal permeate flow rate the system should achieve at actual water temperature. Permeate flow should be within 20% of the rated production, after correcting the feedwater temperatures above or below 77 °F. Check your permeate flow meter to determine the permeate flow rate.

EXAMPLE

5 GPM at 59 °F

→

$$\frac{5 \text{ GPM}}{1.422}$$

=

3.52 GPM

EXAMPLE

5 GPM at 77 °F

→

$$\frac{5 \text{ GPM}}{1}$$

=

5 GPM

EXAMPLE

5 GPM at 84 °F

→

$$\frac{5 \text{ GPM}}{.892}$$

=

5.62 GPM

## TEMPERATURE CORRECTION TABLE

| Temp °F (°C) | TCF   | Temp °F (°C) | TCF   | Temp °F (°C) | TCF   | Temp °F (°C) | TCF   | Temp °F (°C) | TCF   |
|--------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|
| 50.0 (10.0)  | 1.711 | 57.2 (14.0)  | 1.475 | 64.4 (18.0)  | 1.276 | 71.6 (22.0)  | 1.109 | 78.8 (26.0)  | 0.971 |
| 50.2 (10.1)  | 1.705 | 57.4 (14.1)  | 1.469 | 64.6 (18.1)  | 1.272 | 71.8 (22.1)  | 1.105 | 79.0 (26.1)  | 0.968 |
| 50.4 (10.2)  | 1.698 | 57.6 (14.2)  | 1.464 | 64.8 (18.2)  | 1.267 | 72.0 (22.2)  | 1.101 | 79.2 (26.2)  | 0.965 |
| 50.5 (10.3)  | 1.692 | 57.7 (14.3)  | 1.459 | 64.9 (18.3)  | 1.262 | 72.1 (22.3)  | 1.097 | 79.3 (26.3)  | 0.962 |
| 50.7 (10.4)  | 1.686 | 57.9 (14.4)  | 1.453 | 65.1 (18.4)  | 1.258 | 72.3 (22.4)  | 1.093 | 79.5 (26.4)  | 0.959 |
| 50.9 (10.5)  | 1.679 | 58.1 (14.5)  | 1.448 | 65.3 (18.5)  | 1.254 | 72.5 (22.5)  | 1.090 | 79.7 (26.5)  | 0.957 |
| 51.1 (10.6)  | 1.673 | 58.3 (14.6)  | 1.443 | 65.5 (18.6)  | 1.249 | 72.7 (22.6)  | 1.086 | 79.9 (26.6)  | 0.954 |
| 51.3 (10.7)  | 1.667 | 58.5 (14.7)  | 1.437 | 65.7 (18.7)  | 1.245 | 72.9 (22.7)  | 1.082 | 80.1 (26.7)  | 0.951 |
| 51.4 (10.8)  | 1.660 | 58.6 (14.8)  | 1.432 | 65.8 (18.8)  | 1.240 | 73.0 (22.8)  | 1.078 | 80.2 (26.8)  | 0.948 |
| 51.6 (10.9)  | 1.654 | 58.8 (14.9)  | 1.427 | 66.0 (18.9)  | 1.236 | 73.2 (22.9)  | 1.075 | 80.4 (26.9)  | 0.945 |
| 51.8 (11.0)  | 1.648 | 59.0 (15.0)  | 1.422 | 66.2 (19.0)  | 1.232 | 73.4 (23.0)  | 1.071 | 80.6 (27.0)  | 0.943 |
| 52.0 (11.1)  | 1.642 | 59.2 (15.1)  | 1.417 | 66.4 (19.1)  | 1.227 | 73.6 (23.1)  | 1.067 | 80.8 (27.1)  | 0.940 |
| 52.2 (11.2)  | 1.636 | 59.4 (15.2)  | 1.411 | 66.6 (19.2)  | 1.223 | 73.8 (23.2)  | 1.064 | 81.0 (27.2)  | 0.937 |
| 52.3 (11.3)  | 1.630 | 59.5 (15.3)  | 1.406 | 66.7 (19.3)  | 1.219 | 73.9 (23.3)  | 1.060 | 81.1 (27.3)  | 0.934 |
| 52.5 (11.4)  | 1.624 | 59.7 (15.4)  | 1.401 | 66.9 (19.4)  | 1.214 | 74.1 (23.4)  | 1.056 | 81.3 (27.4)  | 0.932 |
| 52.7 (11.5)  | 1.618 | 59.9 (15.5)  | 1.396 | 67.1 (19.5)  | 1.210 | 74.3 (23.5)  | 1.053 | 81.5 (27.5)  | 0.929 |
| 52.9 (11.6)  | 1.611 | 60.1 (15.6)  | 1.391 | 67.3 (19.6)  | 1.206 | 74.5 (23.6)  | 1.049 | 81.7 (27.6)  | 0.926 |
| 53.1 (11.7)  | 1.605 | 60.3 (15.7)  | 1.386 | 67.5 (19.7)  | 1.201 | 74.7 (23.7)  | 1.045 | 81.9 (27.7)  | 0.924 |
| 53.2 (11.8)  | 1.600 | 60.4 (15.8)  | 1.381 | 67.6 (19.8)  | 1.197 | 74.8 (23.8)  | 1.042 | 82.0 (27.8)  | 0.921 |
| 53.4 (11.9)  | 1.594 | 60.6 (15.9)  | 1.376 | 67.8 (19.9)  | 1.193 | 75.0 (23.9)  | 1.038 | 82.2 (27.9)  | 0.918 |
| 53.6 (12.0)  | 1.588 | 60.8 (16.0)  | 1.371 | 68.0 (20.0)  | 1.189 | 75.2 (24.0)  | 1.035 | 82.4 (28.0)  | 0.915 |
| 53.8 (12.1)  | 1.582 | 61.0 (16.1)  | 1.366 | 68.2 (20.1)  | 1.185 | 75.4 (24.1)  | 1.031 | 82.6 (28.1)  | 0.913 |
| 54.0 (12.2)  | 1.576 | 61.2 (16.2)  | 1.361 | 68.4 (20.2)  | 1.180 | 75.6 (24.2)  | 1.028 | 82.8 (28.2)  | 0.910 |
| 54.1 (12.3)  | 1.570 | 61.3 (16.3)  | 1.356 | 68.5 (20.3)  | 1.176 | 75.7 (24.3)  | 1.024 | 82.9 (28.3)  | 0.908 |
| 54.3 (12.4)  | 1.564 | 61.5 (16.4)  | 1.351 | 68.7 (20.4)  | 1.172 | 75.9 (24.4)  | 1.021 | 83.1 (28.4)  | 0.905 |
| 54.5 (12.5)  | 1.558 | 61.7 (16.5)  | 1.347 | 68.9 (20.5)  | 1.168 | 76.1 (24.5)  | 1.017 | 83.3 (28.5)  | 0.902 |
| 54.7 (12.6)  | 1.553 | 61.9 (16.6)  | 1.342 | 69.1 (20.6)  | 1.164 | 76.3 (24.6)  | 1.014 | 83.5 (28.6)  | 0.900 |
| 54.9 (12.7)  | 1.547 | 62.1 (16.7)  | 1.337 | 69.3 (20.7)  | 1.160 | 76.5 (24.7)  | 1.010 | 83.7 (28.7)  | 0.897 |
| 55.0 (12.8)  | 1.541 | 62.2 (16.8)  | 1.332 | 69.4 (20.8)  | 1.156 | 76.6 (24.8)  | 1.007 | 83.8 (28.8)  | 0.894 |
| 55.2 (12.9)  | 1.536 | 62.4 (16.9)  | 1.327 | 69.6 (20.9)  | 1.152 | 76.8 (24.9)  | 1.003 | 84.0 (28.9)  | 0.892 |
| 55.4 (13.0)  | 1.530 | 62.6 (17.0)  | 1.323 | 69.8 (21.0)  | 1.148 | 77.0 (25.0)  | 1.000 | 84.2 (29.0)  | 0.889 |
| 55.6 (13.1)  | 1.524 | 62.8 (17.1)  | 1.318 | 70.0 (21.1)  | 1.144 | 77.2 (25.1)  | 0.997 | 84.4 (29.1)  | 0.887 |
| 55.8 (13.2)  | 1.519 | 63.0 (17.2)  | 1.313 | 70.2 (21.2)  | 1.140 | 77.4 (25.2)  | 0.994 | 84.6 (29.2)  | 0.884 |
| 55.9 (13.3)  | 1.513 | 63.1 (17.3)  | 1.308 | 70.3 (21.3)  | 1.136 | 77.5 (25.3)  | 0.991 | 84.7 (29.3)  | 0.882 |
| 56.1 (13.4)  | 1.508 | 63.3 (17.4)  | 1.304 | 70.5 (21.4)  | 1.132 | 77.7 (25.4)  | 0.988 | 84.9 (29.4)  | 0.879 |
| 56.3 (13.5)  | 1.502 | 63.5 (17.5)  | 1.299 | 70.7 (21.5)  | 1.128 | 77.9 (25.5)  | 0.985 | 85.1 (29.5)  | 0.877 |
| 56.5 (13.6)  | 1.496 | 63.7 (17.6)  | 1.294 | 70.9 (21.6)  | 1.124 | 78.1 (25.6)  | 0.982 | 85.3 (29.6)  | 0.874 |
| 56.7 (13.7)  | 1.491 | 63.9 (17.7)  | 1.290 | 71.1 (21.7)  | 1.120 | 78.3 (25.7)  | 0.979 | 85.5 (29.7)  | 0.871 |
| 56.8 (13.8)  | 1.486 | 64.0 (17.8)  | 1.285 | 71.2 (21.8)  | 1.116 | 78.4 (25.8)  | 0.977 | 85.6 (29.8)  | 0.869 |
| 57.0 (13.9)  | 1.480 | 64.2 (17.9)  | 1.281 | 71.4 (21.9)  | 1.112 | 78.6 (25.9)  | 0.974 | 85.8 (29.9)  | 0.866 |

°F=(°C x 9/5) + 32

Corrected Flow Rate= (Measured Flow Rate) \* (TCF @ Feed Water Temp.)

# REVERSE OSMOSIS OPERATING LOG

Company Name \_\_\_\_\_

Day of Start Up \_\_\_\_\_

Location \_\_\_\_\_

Date of Last Cleaning \_\_\_\_\_

Week Of \_\_\_\_\_

System Serial No. \_\_\_\_\_

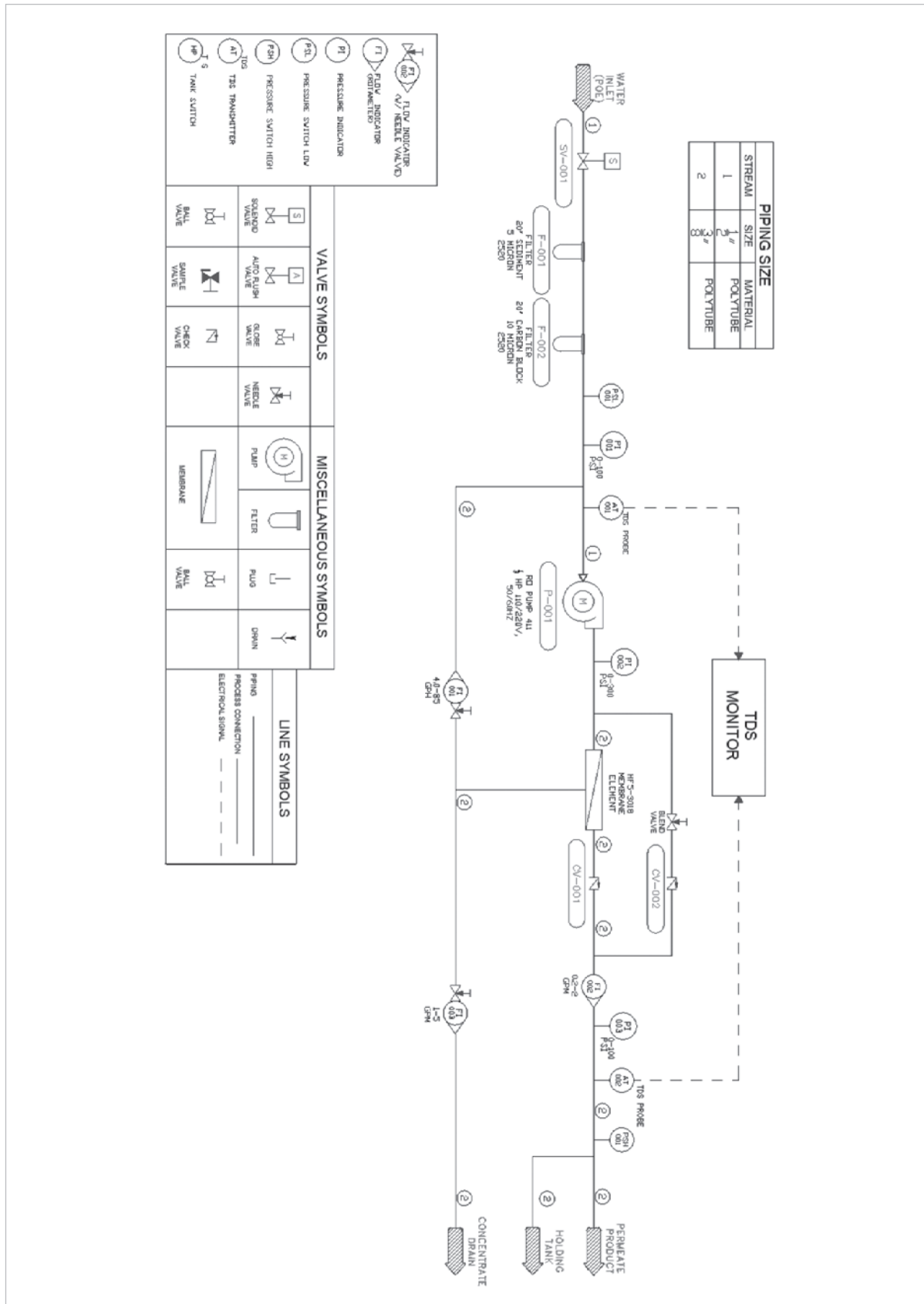
|  |  |  |  |  |  |
|--|--|--|--|--|--|
| <b>Date</b>                            |  |  |  |  |  |
| <b>Time</b>                            |  |  |  |  |  |
| <b>Hour of Operation</b>               |  |  |  |  |  |
| <b>Filter Inlet Pressure (psi)</b>     |  |  |  |  |  |
| <b>Filter Outlet Pressure (psi)</b>    |  |  |  |  |  |
| <b>Pump Discharge Pressure (psi)</b>   |  |  |  |  |  |
| <b>Concentrate Pressure (psi)</b>      |  |  |  |  |  |
| <b>Feed Flow (gpm)</b>                 |  |  |  |  |  |
| <b>Permeate Flow (gpm)</b>             |  |  |  |  |  |
| <b>Concentrate Flow (gpm)</b>          |  |  |  |  |  |
| <b>Recycle Flow (gpm)</b>              |  |  |  |  |  |
| <b>Recovery %</b>                      |  |  |  |  |  |
| <b>Feed Temperature</b>                |  |  |  |  |  |
| <b>Feed TDS (ppm)</b>                  |  |  |  |  |  |
| <b>Permeate TDS (ppm)</b>              |  |  |  |  |  |
| <b>Rejection %</b>                     |  |  |  |  |  |
| <b>Feed pH</b>                         |  |  |  |  |  |
| <b>Permeate pH</b>                     |  |  |  |  |  |
| <b>Scale Inhibitor Feed (ppm)</b>      |  |  |  |  |  |
| <b>Iron (mg / L)</b>                   |  |  |  |  |  |
| <b>Free Chlorine (mg / L)</b>          |  |  |  |  |  |
| <b>Hardness (gpg CaCO<sub>3</sub>)</b> |  |  |  |  |  |

# TROUBLESHOOTING

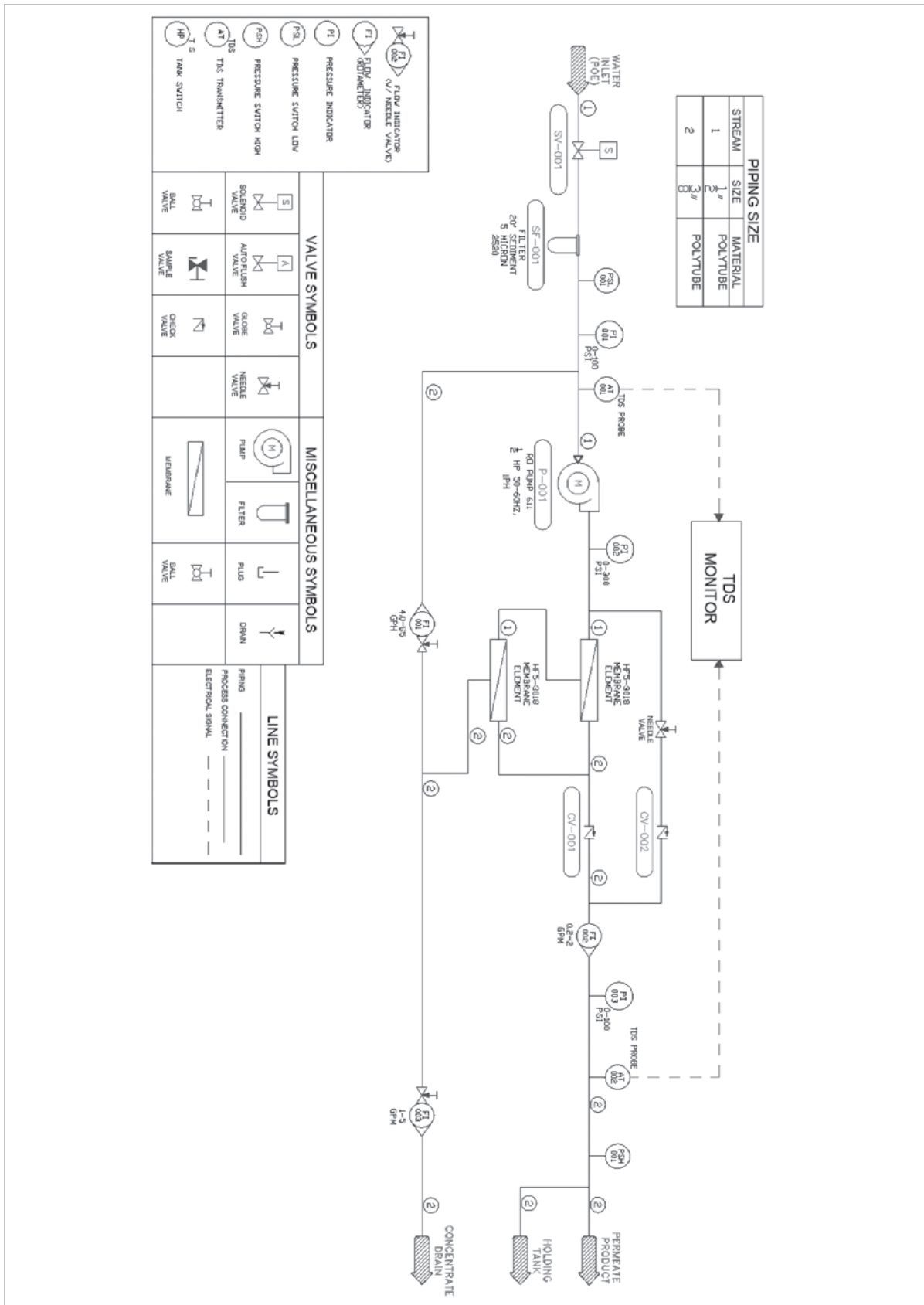
| SYMPTOM               | POSSIBLE CAUSES  | CORRECTIVE ACTION  |
|-----------------------|--|--|
| Low inlet pressure    | Low supply pressure  | → Increase inlet pressure  |
|                       | Cartridge filters plugged  | → Change filters   |
|                       | Leaks  | → Fix any visible leaks  |
| Low permeate flow     | Low inlet flow   | → Adjust concentration valve   |
|                       | Cold feedwater   | → See temperature correction sheet   |
|                       | Low operating pressure   | → See low inlet pressure   |
|                       | Defective membrane brine seal  | → Inspect and/or replace brine seal  |
|                       | Fouled or scaled membrane  | → Clean membranes  |
| High permeate flow    | Exceeding maximum feed water temperature   | → See temperature correction sheet   |
|                       | Damaged or oxidized membrane   | → Replace membrane   |
|                       | Damage product tube O-rings  | → Inspect and/or replace   |
| Poor permeate quality | Damaged or oxidized membrane   | → Replace membrane   |
|                       | Damage product tube o-rings  | → Inspect and/or replace   |
|                       | Low operating pressure   | → See low inlet pressure   |
| Membrane fouling      | Scaling ( $\text{CaSO}_4$ , $\text{CaSO}_3$ , $\text{BaSO}_4$ , $\text{SiO}_2$ ) | → Increase acid addition and antiscalant dosage for $\text{CaCO}_3$ and $\text{CaSO}_4$ . Reduce recovery. Clean with acid cleaners                  |
|                       | Biological fouling   | → Shock dosage of sodium bi-sulfate. Continuous feed of sodium bi-sulfate at reduced pH; chlorination and de-chlorination. Replace cartridge filters |
|                       | Organic fouling  | → Activated carbon or other pretreatment. Clean with high pH cleaner.  |
|                       | Colloidal Fouling  | → Optimize pretreatment for colloid removal. Clean with high pH anionic cleaners   |
|                       | Metal oxide fouling  | → Improve pretreatment to remove metals. Clean with acid cleaners  |
|                       | Abrasion of membrane by crystalline material                                     | → Improve pretreatment. Check all filters for media leakage  |

**If technical assistance is required, contact your local dealer or distributor. Prior to making the call, have the following information available: system installation date, serial number, daily log sheets, current operating parameters (e.g. flow, operating pressures, pH, etc.), and a detailed description of the problem.**

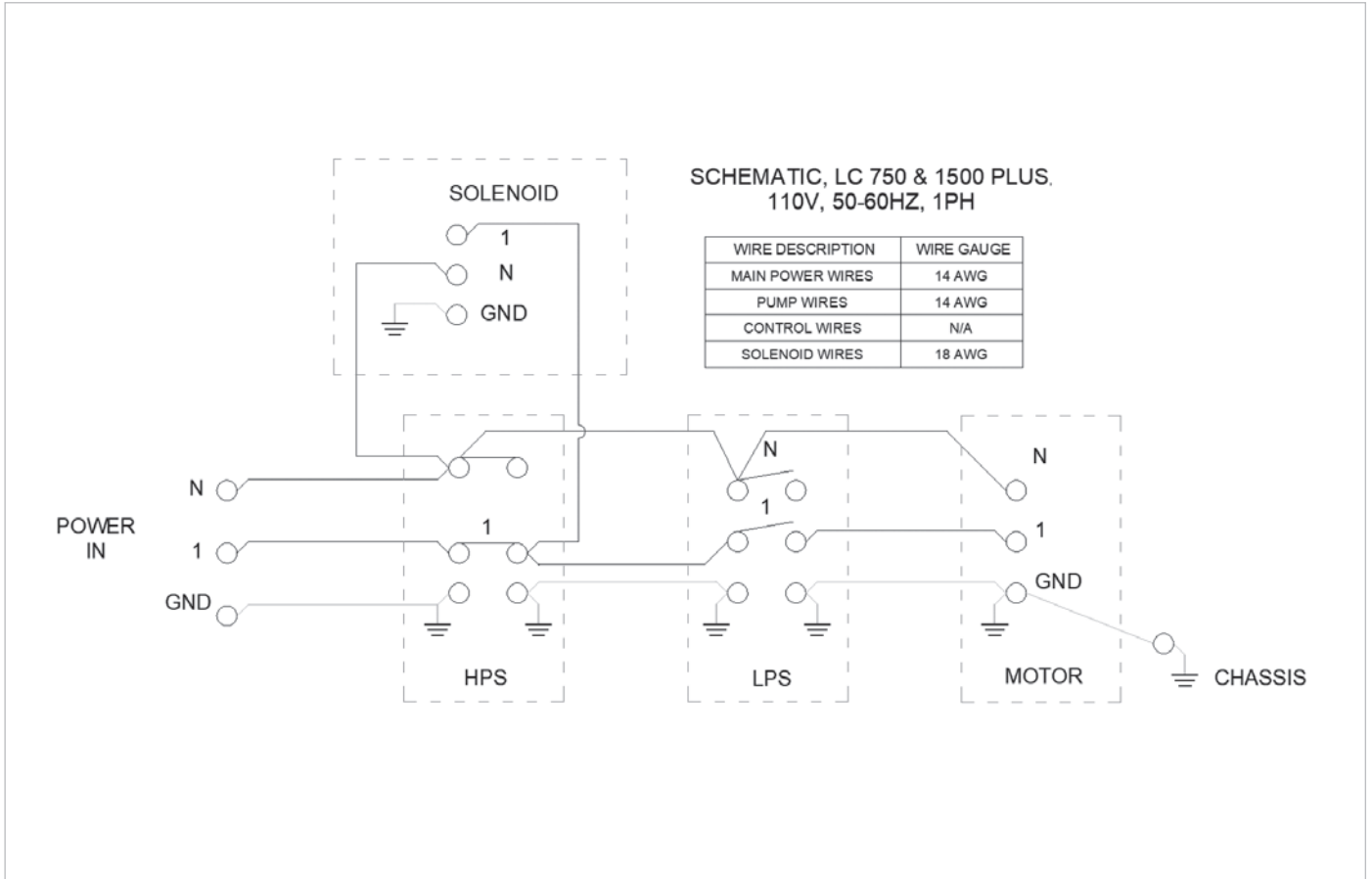
# LC-750 PLUS SYSTEM FLOW DIAGRAM



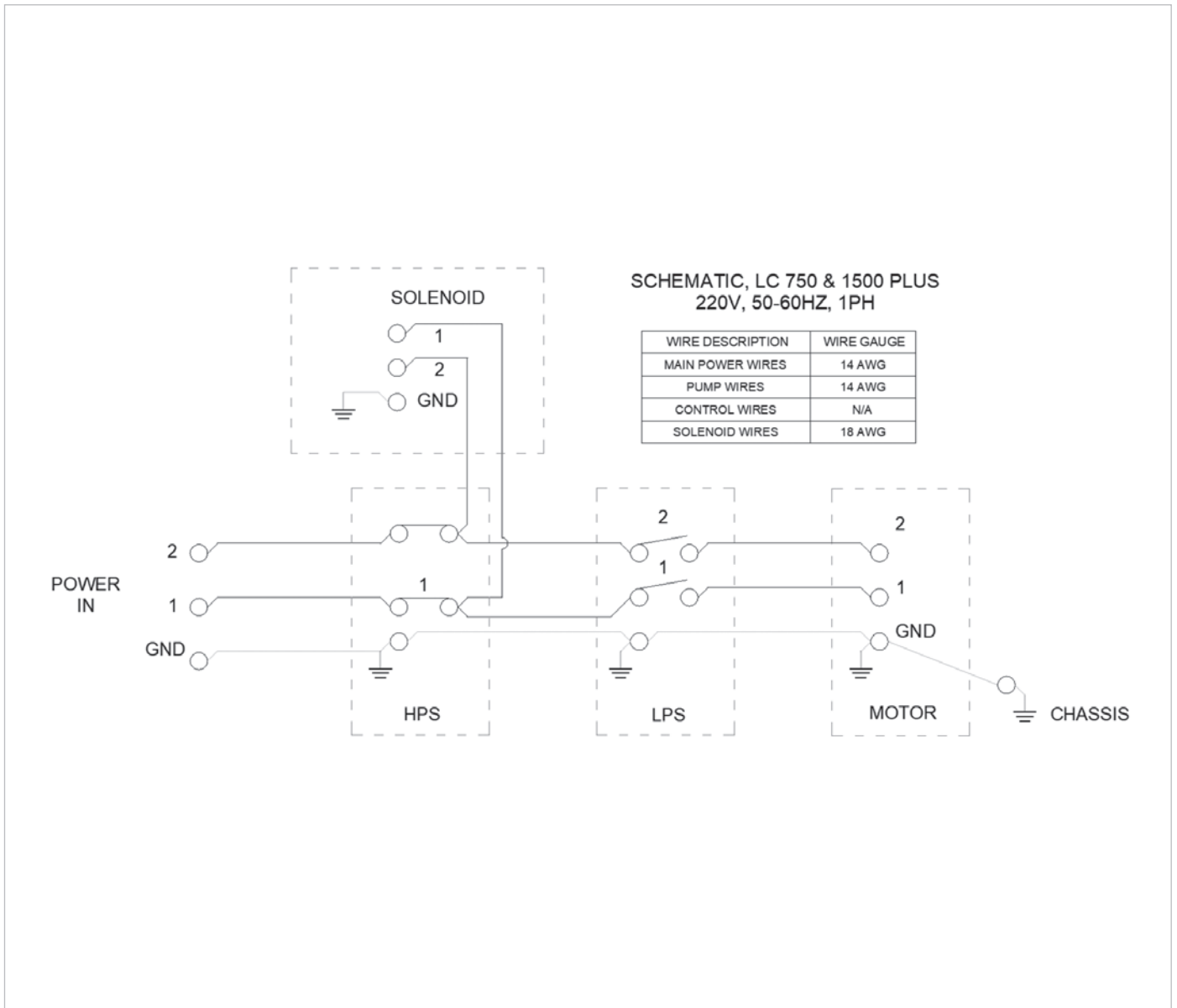
# LC-1500 PLUS SYSTEM FLOW DIAGRAM



# LC-750 / 1500 PLUS 110V ELECTRICAL DIAGRAM



# LC-750 / 1500 PLUS 220V ELECTRICAL DIAGRAM



# SYSTEM WARRANTY

## Warranty Terms

Subject to the terms and conditions set forth hereinafter, the manufacturer (hereafter "Manufacturer") warrants to the original purchaser (hereafter the "Customer") that the systems and products manufactured by the Manufacturer are free from defects in material and in workmanship for twelve (12) months from the Warranty Commencement Date (as defined below) only when used strictly in accordance with the applicable operating instructions and within the range of the operating conditions specified by the Manufacturer for each such product.

This Warranty does not extend to systems, equipment, or components manufactured by others, nor to systems, equipment, or components manufactured by others and distributed by the Manufacturer. This Warranty does not extend to equipment or components manufactured by others which have been incorporated into a Manufacturer product but, if allowable the, Manufacturer hereby assigns, without warranty, to the Customer its interest, if any, under any Warranty made by the Manufacturer of such equipment or component. This Warranty does not cover disposable items such as fuses, O-rings, regeneration materials/chemicals, or other such disposable items, which must be replaced periodically under the normal and foreseeable operating conditions of the goods warranted hereby.

## Warranty Commencement Date

The Warranty Commencement Date for each Manufacturer product shall be the later of the date of: (1) receipt by the Customer, or (2) the date of installation at the Customer's premises provided that such installation must occur within three (3) months of shipment from the Manufacturer's manufacturing facility. In no event shall the Warranty Commencement Date exceed three (3) months from the shipment from the Manufacturer's manufacturing facility. The Customer shall provide proof of purchase in order to exercise rights granted under this Warranty. If requested by the Manufacturer, the Customer must also provide proof of the installation date.

## Warranty Service

THE MANUFACTURER'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT (AT MANUFACTURER'S SOLE DISCRETION) OF ANY PRODUCT, OR COMPONENT THEREOF, PROVED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP WITHIN THE COVERED WARRANTY PERIOD.

The Customer, at the Customer's risk and expense, shall be responsible for returning such product or component, only after obtaining a Return Goods Authorization (RGA) number from the Manufacturer, arranging for freight prepaid, and in conformance with any special packaging and shipping instructions set forth on the operation documentation or RGA instructions, or as otherwise reasonably required, to the Manufacturer, together with (1) RGA number issued by the Manufacturer at Customer's request; (2) proof of purchase and, if necessary, proof of installation date; (3) a Return Goods Authorization Form; (4) a description of the suspected defects; (5) the serial number of the Manufacturer product alleged to be defective; (6) a description of the type of water and pretreatment equipment which has been utilized in connection with the product, if any. The Manufacturer shall, in the Manufacturer's reasonable discretion, be the sole judge of whether a returned product or component is defective in material or workmanship. Required or replaced products or components shall be returned surface freight.

In genuine emergency situations, the Manufacturer will (at the Manufacturer's sole discretion) forward replacement parts to the Customer without waiting for authorized return of the questionable part(s). In such cases, Customer will issue a purchase order or other payment guarantee prior to shipment. If the returned part is found to have been misused or abused, or the defective part is not received by the Manufacturer within thirty (30) days; the Customer will be invoiced for the replacement part(s) provided. This Warranty does not cover or include labor and/or travel to the Customer's premise or location or any other location. Charges of \$1000 per day plus associated travel expenses will be incurred by the Customer in providing the Warranty Service at any location other than the Manufacturer's main headquarters; that is if the Manufacturer deems that the product is not covered by said Warranty. The Manufacturer reserves the right to precondition such travel to Customer's premises upon prepayment of the Manufacturer's anticipated costs of attending such premises.

## Voidability of Warranty

This Warranty shall be void and unenforceable as to any Manufacturer product which has been damaged by accident, mishandling, abuse or has been repaired, modified, altered, disassembled or otherwise tampered with by anyone other than the Manufacturer or an authorized Manufacturer service representative; or, if any replacement parts are not authorized by the Manufacturer have been used, or, the product has not been installed, operated and maintained in strict accordance and adherence with the operating documentation and manuals for such product. Any expressed Warranty, or similar representation of performance set forth in the operation documentation for media or resin incorporated into the Manufacturer product shall be void and unenforceable unless the feedwater requirements set forth in the operating documentation for such product are unequivocally and strictly adhered to.

## Limitations and Exclusions

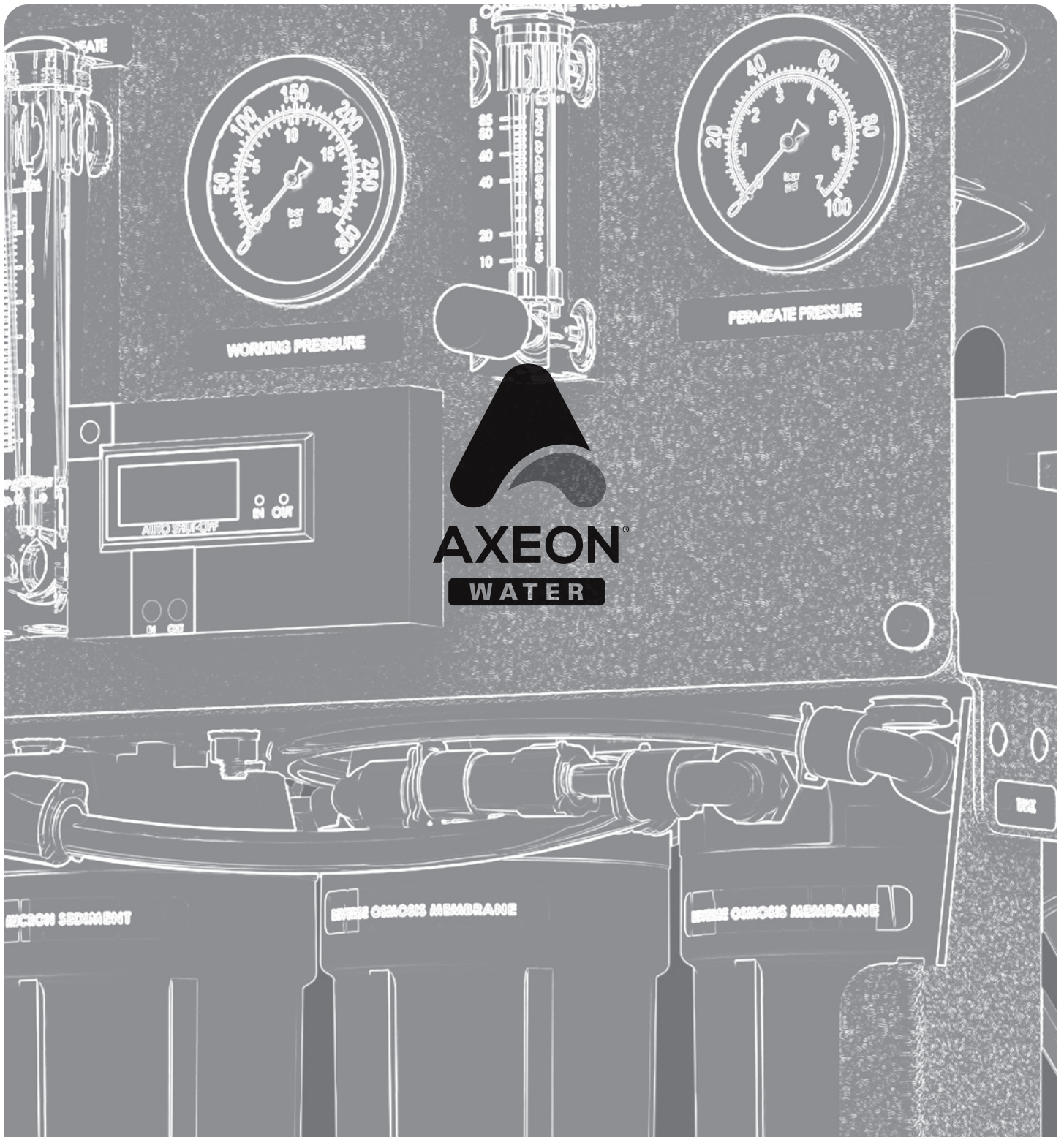
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THIS WARRANTY GIVES THE CUSTOMER SPECIFIC LEGAL RIGHTS AND THE CUSTOMER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. THE PARTIES RECOGNIZE AND AGREE, THAT IN ALL RESPECTS THE LAWS OF THE STATE OF CALIFORNIA SHALL APPLY TO AND SHALL GOVERN ANY INTERPRETATION OR LEGAL SIGNIFICANCE OF THIS DOCUMENT.

NO WARRANTY OR OTHER LIABILITY OF THE MANUFACTURER TO CUSTOMER UNDER THIS AGREEMENT OR OTHERWISE WILL IN ANY EVENT EXCEED THE COST OF REPLACEMENT OF THE APPLICABLE MANUFACTURER PRODUCT, PART, OR ACCESSORY THAT IS SUBJECT TO ANY BREACH OF THE MANUFACTURER'S WARRANTY. THE MANUFACTURER WILL NOT BE LIABLE FOR ANY DAMAGE TO ANY PROPERTY OF CUSTOMER OR TO CUSTOMER'S CUSTOMERS FOR ANY CONSEQUENTIAL, INCIDENTAL, OR ECONOMIC LOSS OR COMMERCIAL DAMAGE WHATSOEVER. REMEDIES HEREIN PROVIDED ARE EXPRESSLY MADE THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY OR OTHER OBLIGATION HEREUNDER EXPRESS OR IMPLIED OR FROM THE OPERATION OF LAW.

**For more information, visit  
us at [AXEONWater.com](http://AXEONWater.com) or  
call 800-320-4074**





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