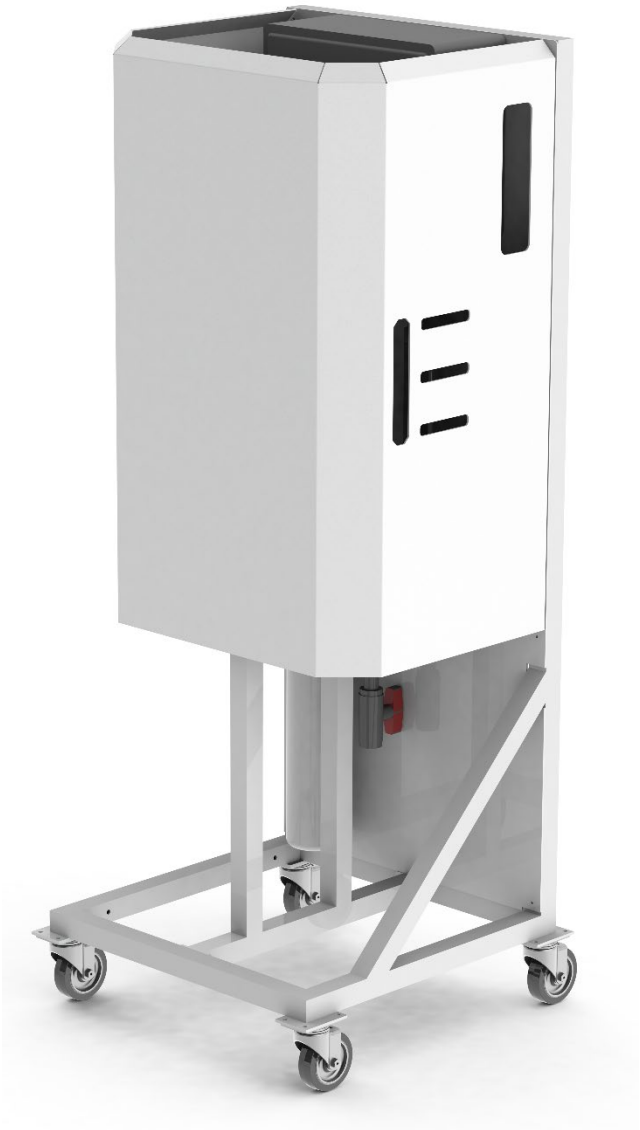
User's Manual

EDI - Series



EDI – 005 Pictured

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INTRODUCTION

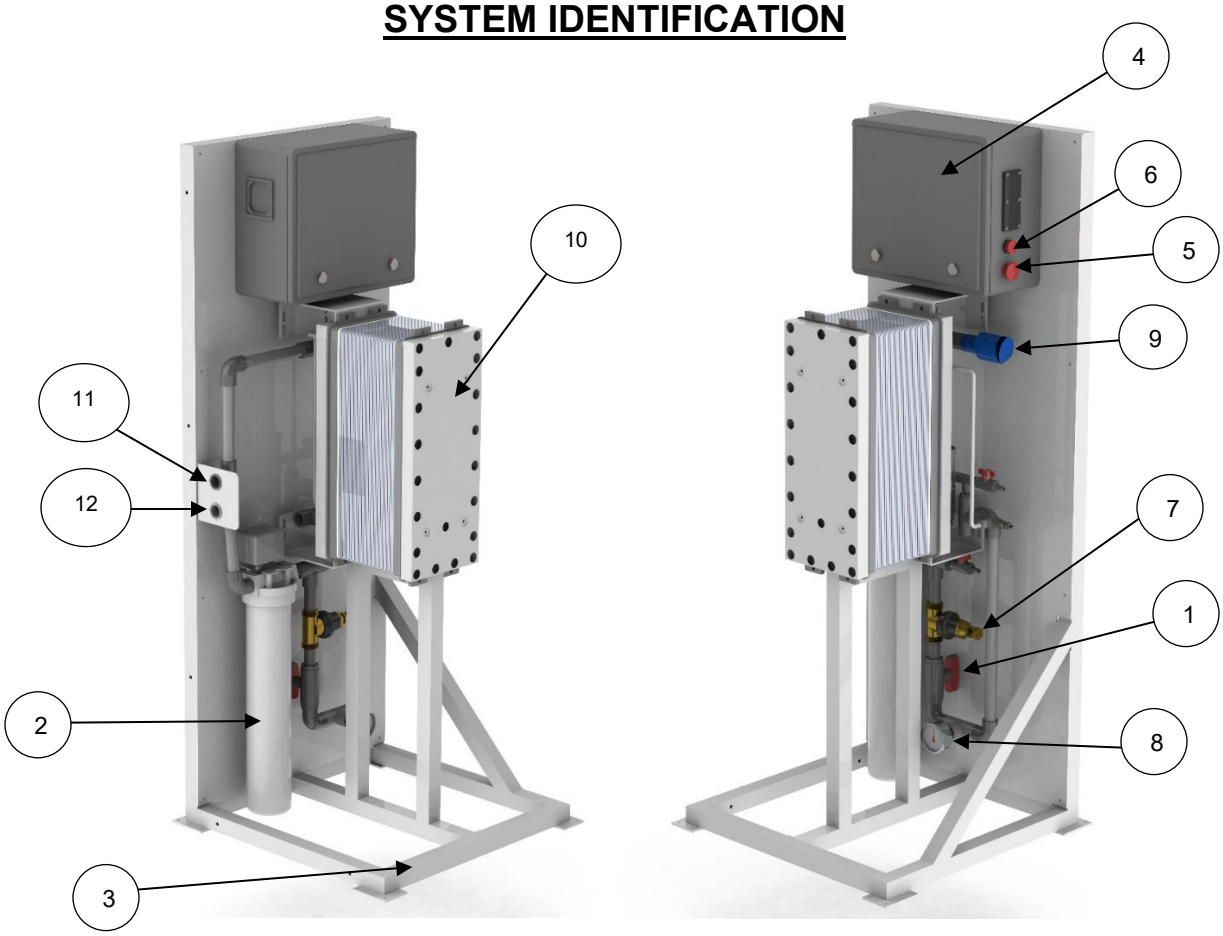
EDI, or electrodeionization, is a chemical free process to deionize water. Used with RO, or reverse osmosis, EDI systems can provide DI water continuously using electrical current. There is no need for periodic chemical regeneration. EDI systems typically operate at 90% recovery.

AXEON EDI systems are designed for light industrial and commercial installations that currently use portable exchange DI.

AXEON EDI systems, are sold to OEM Pure Water System Integrators. These can then be resold or leased to users. Installation, training, periodic maintenance, and troubleshooting are the responsibility of the OEM or dealer.

DI System Type: **DI Product Flow:**	**AXEON EDI System**
1 gpm (nominal)	EDI – 001
3 gpm (nominal)	EDI – 003
5 gpm (nominal)	EDI – 005
7 gpm (nominal)	EDI – 007

SYSTEM IDENTIFICATION



ITEM NUMBER	DESCRIPTION
1	FEED ISOLATION VALVE
2	5 – MICRON PRE – FILTER
3	ALUMINUM FRAME
4	NEMA 4X PANEL W/ POWER SUPPLY
5	MAIN ON/OFF SWITCH
6	LED POWER “ON” INDICATOR
7	FEED PRESSURE REGULATOR
8	FEED PRESSURE GAUGE
9	RESISTIVITY SENSOR WITH RED / GREEN LIGHTS
10	ELECTROPURE™ EDI MODULE
11	PRODUCT OUTLET
12	FEED INLET

BENEFITS AND FEATURES

AXEON EDI System Product Benefits:

- No Resin or Tanks to Exchange
- Operating Cost (Electrical) is Pennies Per Day
- Eliminates Disruptive Visits to Customers' Sites
- Ideal for Remote Locations
- Chemical-Free, Environmentally Friendly

AXEON EDI System Product Features:

- Simple: Minimal Instrumentation
- 2 MΩ DI Sensor with Red/Green Indicator Lights
- Compact Portable Stainless Steel Skid Design
- Sleek, Clean Laboratory Look
- Can Work with Existing RO Systems
- Internal Flow Orifices
- Includes 5–Micron Pre–Filter

SYSTEM REQUIREMENTS

SAFETY

- Proper grounding: note that proper grounding within the skid is intended to prevent stray voltages from being a safety hazard. Skid needs to be properly grounded per local code during installation.

- Proper venting: note that the electrode produces a small quantity of hydrogen gas (H_2), of oxygen gas (O_2), and dissolved chlorine (Cl_2). These are part of the small waste stream, and must be vented per local code during installation.

ELECTRICAL

176-264 VAC, 50/60 Hz, 1-Phase, FLA 15A

EDI – 001	EDI – 003	EDI – 005	EDI – 007
Nominal: 200W Max: 800W	Nominal: 300W Max: 1.2 kW	Nominal: 400W Max: 1.6 kW	Nominal: 600W Max: 2.4 kW

PLUMBING

Connections:

1. Inlet: ½ inch QC, 110% of product flow, RO permeate

2. Product: ½ inch QC, up to 10 ft (4 psi) of head pressure

3. Drain: ½ inch QC, Provide minimal back pressure, vented for H_2 and O_2 per local code

RO SUPPLY REQUIREMENTS

EDI product quality depends on the system design, proper operation, and RO permeate quality. The RO and EDI can be directly connected, or the EDI can be fed from a permeate storage tank. The RO should divert to drain, on each startup, until proper permeate quality is reached. If EDI is fed directly from the RO, then the supplied 5μm filter is not required.

Model	**EDI – 001**	**EDI – 003**	**EDI – 005**	**EDI – 007**
Nominal Capacity	1 GPM (200 LPH)	3 GPM (750 LPH)	5 GPM (1000 LPH)	7 GPM (1700 LPH)
Nominal Recovery	90%			
Feed Conductivity [1]	Optimum FCE <9μS/cm Max FCE 33μS/cm			
Total CO_2 + HCO_3	< 5 mg/l CO_2 + HCO_3^- (Optimum < 2 mg/l CO_2 + HCO_3^-)			
Hardness	< 1.0 ppm @ 90% recovery (ask about higher hardness)			
Organics	< 0.5 ppm TOC			
RO Permeate Pressure PSI (bar)	30 PSI (2 bar)	30 (2)	30 (2)	40 (3)
Metals	< 10 ppb			
Feed Temp	Optimum: 15º C—30º C Range: (5º C—35º C)			
Feed pH	Optimum: 7.0—7.5 Range: 5.0—9.5			
Feed Chlorine	ND			
Silica, SiO_2	< 0.5 ppm			

[1] FCE is Feed Conductivity Equivalent, and is a measure of the total load on the EDI system. FCE = Measured Conductivity (μS/cm) + 2.79*CO_2(ppm) + 1.94*SiO_2(ppm)

INSTALLATION

SAFETY

The AXEON EDI systems use electricity to treat RO permeate water. All efforts to reduce shock/electrocution hazards have been taken in the system design. Please use care and consideration when operating these systems. The waste streams of the AXEON EDI systems contain low levels of H_2, O_2, and dissolved Cl_2 that occur during normal operation and this should be taken into consideration with the location to install and operate this system.



CAUTION:

High-Voltage

Potential Shock/Electrocution Hazard

Before opening the control enclosure, please carefully read the following: Maintenance and diagnostics to be performed by trained technicians only. Make sure system is grounded per local code to prevent electrical shock.

DO NOT REMOVE POWER SUPPLY COVER or otherwise disassemble or modify the power supply.

DO NOT WASH DOWN
AXEON EDI systems are splash-resistant but are NOT rated for wash down.

LOCATION

AXEON recommends that the EDI systems be located indoors and/or undercover and protected from the elements, i.e. direct sunlight, rain, snow, etc. The EDI system is splash resistant but is not designed for harsh environments. Secure or restrain the EDI system to prevent movement in case of accidental contact or other event.

ELECTRICAL

All AXEON EDI systems come pre-wired with a six-foot power cord ready to plug into any available 208/220/240VAC, 1-Phase, 20A NEMA L6-20 power receptacle. If desired, the supplied plug can be removed and replaced with an appropriate plug or hard-wired per the customer's requirements, by trained personnel.

All EDI systems are grounded through the three-wire power plug. Check for any additional grounding requirements per local codes and ordinances.

WATER SOURCE

AXEON EDI systems will require RO permeate that meets the water quality parameters as shown in the table in Section 2 of this document.

If the AXEON EDI is supplied directly from the RO system then the 5µm filter is not required and can be removed from the housing. If the RO permeate is supplied to the system from a permeate storage tank, it is strongly recommended that the supplied 5µm filter be installed in the filter housing and included in the maintenance schedule for replacement on a regular basis.

PLUMBING

All AXEON EDI water fittings, EDI Feed, DI Water Product, and the Drain are Tubing 1/2" QC.

DRAIN

The AXEON EDI waste stream (plumbed to drain) is made up of both the concentrate stream and the electrode stream. A low-pressure pressure check valve is already installed in the drain line. Use the shortest length and minimal back pressure when sending to drain.

NOTE: WASTE WATER WILL INCLUDE H_2 AND O_2 GASES AS WELL AS Cl_2 AND SHOULD BE ADEQUATELY VENTED.

TRAINING

Consult your Dealer/Supplier.

TROUBLESHOOTING

The AXEON EDI System is designed to operate trouble-free. However, if there is an issue with the system operation or the water quality, go to page 16 of this manual or contact your Dealer/Supplier.

SAFETY

ELECTRICAL

EDI works by applying a DC voltage across a set of aqueous, conductive streams. Further, EDI systems are typically installed in wet areas. Because of this, electrical safety in the design of a system is critical to prevent accidents. Note that the customer is responsible for the safe design and installation of the system, and for the training of the operators. AXEON does not claim that the information below alone will ensure electrical safety.

Key system design reminders:

- Electrical installation should be done by qualified, trained electricians. Installation should be to local code.
- Proper grounding of the power supply and module is important. Ground fault interruption (GFI) circuits may be used, but can be unreliable with DC power supplies.
- Grounding should be tested on-site after installation, during operation, to be sure no voltage is present at any metal surface.
- Feed and concentrate streams contain ions, are conductive, and will carry current. These need to be grounded via the installation of a conductive material directly in the stream.
- Proper training and proper hazard warnings should be posted at the installation, and on all finished equipment.

CHEMICAL

The electrochemical reactions at the anode and cathode will produce gases under normal conditions. The oxidation at the anode produces acid, O_2 (gas), and Cl_2, and generates electrons. The reduction at the cathode produces hydroxyls and H_2 (gas), and uses electrons. The chlorine is totally soluble in the water, and the H_2 and O_2 form gas bubbles.

Primary Anode Reaction: $OH^- = ¼\ O_2(g) + ½\ H_2O + e^-$
Minor Anode Reaction: $Cl^- = ½\ Cl_2(dis) + e^-$

Primary Cathode Reaction: $H^+ + e^- = ½\ H_2(g)$

Gas bubbles will be present in the electrode waste stream. Venting of this stream is required to safely dispose of these gases according to local code. There will be up to 11 ml/minute of gas (H_2+O_2) evolved per Ampere based on Faraday's Law.

The lower explosion limit (LEL) of H_2 is 4%(v/v). For safe operation, the electrode gases should be vented to dilute the gases to less than 25% of the LEL, or less than 1%(v/v).

Safety is the responsibility of the OEM and the installation team.

INITIAL START–UP

STARTUP INSTRUCTIONS

The AXEON EDI system is designed to operate with a minimum of operator interface. All AXEON EDI systems will start when RO permeate provides adequate pressure and flow to the system. There is a pressure switch and flow switch engineered into the system, which protects it from applying voltage when there is no flow.

- All AXEON systems are configured and tested prior to shipment.

- Prior to starting the AXEON EDI System please check the following:
  - Check bolt torque on EDI module
  - Make sure plumbing has been flushed and is clear of all debris.
  - Confirm all piping connections are correct
  - If RO permeate is from a permeate storage tank, make sure the 5µm filter (supplied) is installed in the filter housing.
  - Check to ensure that there is power supplied to the EDI system.
    - This system requires a 200/240 VAC, 1-phase, 15A supply.
  - Turn Power "ON". This is a "twist-to-release" switch.
    - At this state the system is in a NO-FLOW CONDITION, the power supply display should illuminate but show zero voltage and current.

- Slowly open the isolation valve at the inlet of the EDI system.

- Slowly apply RO permeate pressure to the AXEON EDI system.
  - As soon as permeate pressure and concentrate flow are established, the power supply will display the voltage and current being applied to the EDI module.

    - EDI – 001 = 100VDC
    - EDI – 003 = 150VDC
    - EDI – 005 = 200VDC
    - EDI – 007 = 300VDC

  - Check the pressure gauge and compare the PSIG to the recommended pressure as shown on the sticker located on the frame next to the gauge. This pressure was set at the factory using the integrated pressure regulator.

- The EDI system is equipped with a quality indicator LED lamp:

  - Green – DI Water is at or better than set point (2 Megohm.cm).
  - Red – DI water is below set point, see Section 9 of this manual.

- The AXEON EDI system is equipped with a conductivity meter. Check the meter for water quality. If water quality does not meet specifications go to page 16 of this manual.

- You are now producing DI water, enjoy your new AXEON EDI system!

OPERATION

The AXEON EDI system will automatically start when both RO permeate pressure and flow to the EDI concentrate flow switch has been established. Very little, if any, attention is required to produce DI water.

MODEL	DI PRODUCT SETPOINT (GPM)	CONCENTRATE SETPOINT (GPM)	ELECTRODE SETPOINT (GPM)
EDI – 001	1.0	0.1	0.05
EDI – 003	2.0	0.2	0.05
EDI – 005	5.0	0.5	0.05
EDI – 007	7.0	0.75	0.05

AXEON recommends that a log book be maintained to record any quality issues, part replacement and maintenance that may occur on your AXEON EDI system.

OPERATING LOG

Company: _____ **Date of Start-Up:** _____

Location: _____

Week Of: _____

System Serial #: _____

DATE					
TIME					
HOUR OF OPERATION					
FILTER INLET PRESSURE (PSI)					
FILTER OUTLET PRESSURE (PSI)					
CONCENTRATE PRESSURE (PSI)					
PUMP DISCHARGE PRESSURE (PSI)					
FEED FLOW (GPM)					
PERMEATE FLOW (GPM)					
CONCENTRATE FLOW (GPM)					
RECYCLE FLOW (GPM)					
RECOVERY %					
FEED TEMPERATURE					
FEED TDS (PPM)					
PERMEATE TDS (PPM)					
REJECTION %					
FEED PH					
PERMEATE PH					
SCALE INHIBITOR FEED (PPM)					
IRON (mg/L)					
FREE CHLORINE (mg/L)					
HARDNESS (GPG $CaCO_3$)					

PERIODIC INSPECTION AND MAINTENANCE

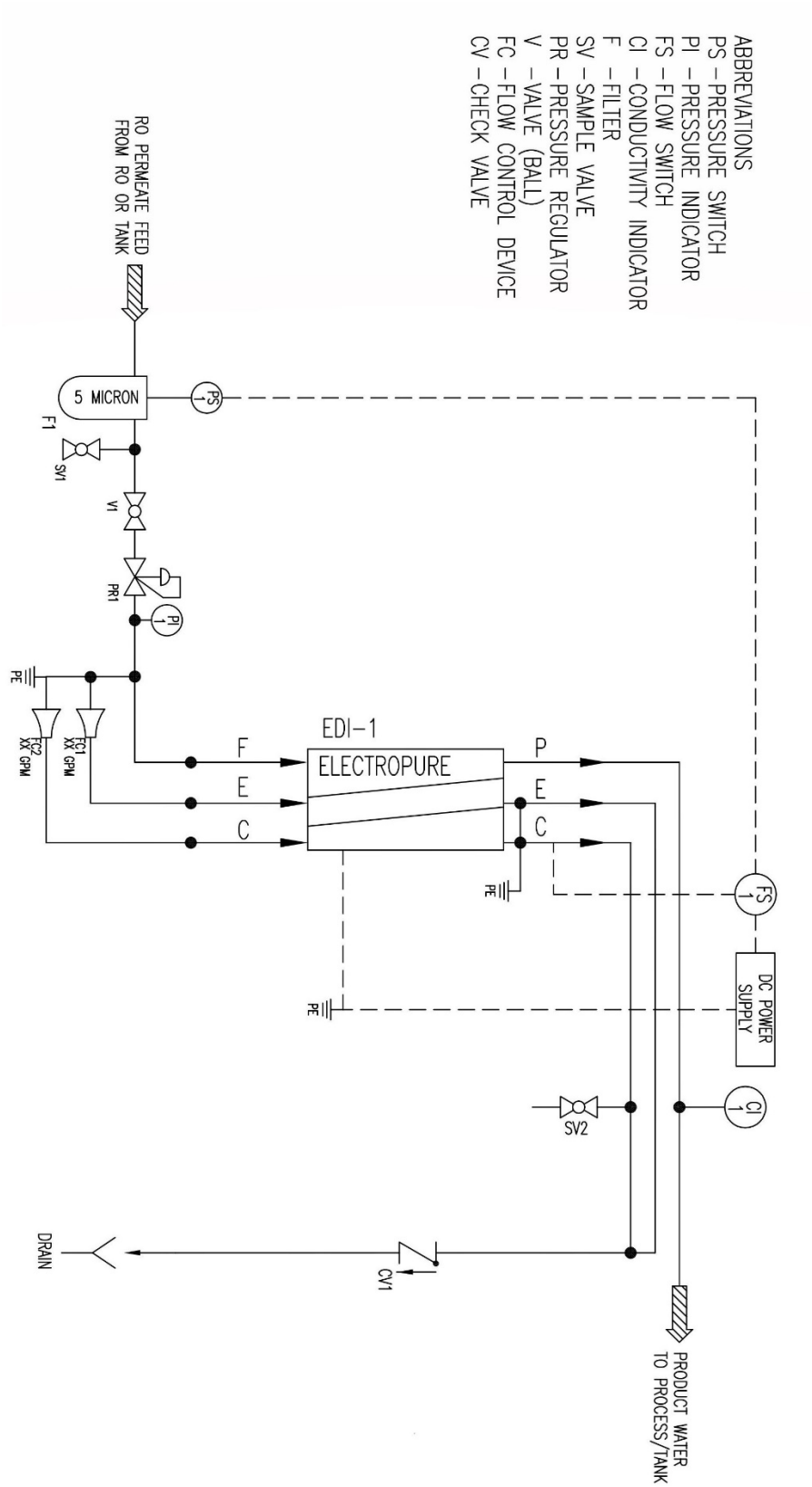
The AXEON EDI systems are designed to be almost maintenance free but below are some recommended checks to ensure proper operation of the system.

- Periodically check for leaks, if a leak is detected contact your Dealer/Supplier.
- Check electrical connections, grounds and power cord.
- Replace 5µm filter. See recommended spare parts.

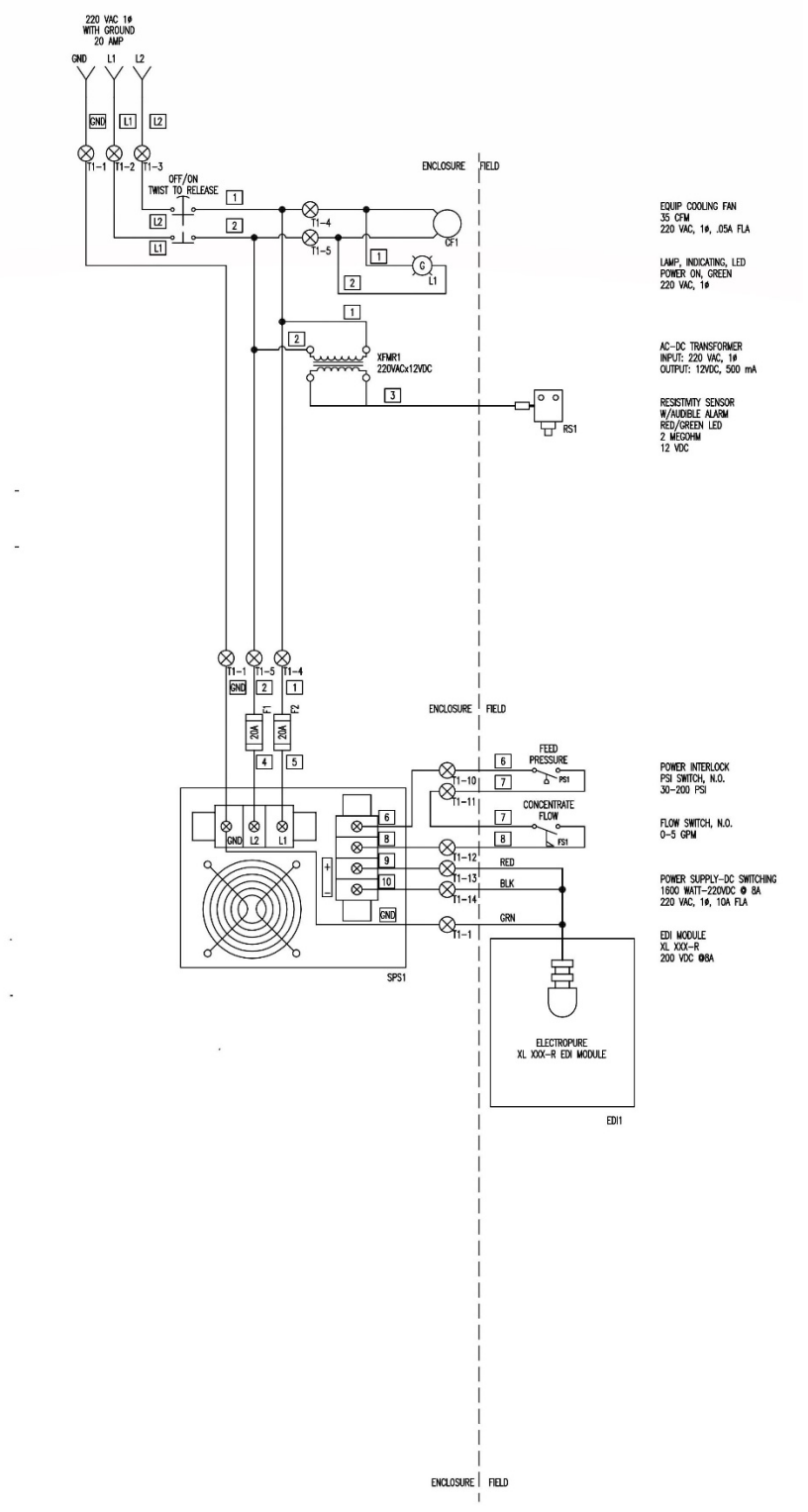
TROUBLESHOOTING

Trouble–Shooting Guide		
PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Product Water Conductivity is High	**Power:** (1) No power at electrodes. (2) Voltage set too low or too high.	Verify RO Permeate pressure and flows are being supplied to system and power supply is on. Check power supply display for voltage and current.
	Water Flow: (1) Flow of water through module below minimum. (2) Flow of water through module above maximum.	Readjust concentrate & electrode valves, and verify feed water pressure.
	Feed water: not to specifications.	Check RO permeate quality, especially TDS, Cl_2, pH, and CO_2.
	Module: fouled or scaled.	Contact your Dealer/Supplier; improve the pretreatment to the RO.
	Torque: too low.	Contact your Dealer/Supplier.
Product Flow Low	**Purifying stream**: fouled.	Check organic (TOC) contaminant concentration in feed water. Check filter to prevent debris from entering EDI? Replace as required
	Feed water pressure: too low.	Increase feed water flow rate. Clean module. Contact your Dealer/Supplier
	Oxidation of EDI:	Chlorine may have damaged resins and membranes.
	Temperature: too low.	Note viscosity of water at feed temp
Module Emits Too Much Gas	**Voltage:** set too high.	Reduce voltage.
Product Water pH High or Low	**Voltage:** set too high.	Reduce voltage.
Module Draws Excessive Current	**Conductivity** too high in feedwater	Check TDS of RO product.
	No flow of water through module.	**Ensure flow of water through module, otherwise it will be destroyed!**

EDI – SERIES
FLOW DIAGRAM



EDI – SERIES
ELECTRICAL SCHEMATIC



NOTES:
1. ALL CONTROL WIRING TO BE 14/16 AWG STRANDED CU WIRE, THHN INSULATION
2. ALL SIGNAL WIRING TO BE 16/18AWG, STRANDED CU WIRE, THHN INSULATION
3. USE SNOWPURE PART NO: E-115-2 POWER CORD, POWER SUPPLY TO EDI
4. BOND FRAME AND CONTROL PANEL TO POWER SUPPLY PANEL.

SYSTEM WARRANTY

One–Year Limited Warranty

Warranty Terms

AXEON warrants the EDI modules and systems manufactured by it against defects in materials and workmanship when used in accordance with applicable instructions and within the operating conditions specified for a period of one (1) year from the earlier of: (a) the date of installation, or (b) the 60th day following the date of shipment (the "LIMITED WARRANTY PERIOD"). AXEON MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. Any implied warranty of merchantability or fitness for a particular purpose applicable is limited in duration to the duration of this written warranty. Module replacement or repairs are the exclusive remedies under this written warranty. AXEON shall not be liable for incidental or consequential damages arising from personal injury, property damage, or for any economic loss (such as, but not limited to, loss of module or system use, inconvenience or storage) resulting from breach of this written warranty. SnowPure does not authorize any person to create for it any other obligation or liability in connection with the EDI module or system.

Only modules or systems purchased directly from AXEON, or its authorized distributor, are covered by this warranty. This warranty is invalid on any module sold to OEM customers who have not been expressly Qualified by AXEON. (See Terms and Conditions).

The warranty provided herein and the data, specifications, and descriptions of the EDI module or system appearing in AXEON's published product literature, may not be altered except by express written agreement signed by an authorized officer of AXEON. Representations, oral or written, which are inconsistent with this warranty, or such publications that are not so authorized, should not be relied upon.

In the event of a valid claim of the foregoing warranty, AXEON's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves to be defective in materials or workmanship within the warranty period; provided the EDI module is returned to AXEON promptly with all appropriate operational logs. The cost of shop labor for the above warranty period is included in the warranty. Freight and field labor costs shall be at the customer's expense. The exclusive remedy provided herein shall not be deemed to have failed of its essential purpose so long as AXEON is willing and able to repair or replace any non-conforming module or system or component part thereof.

In the interest of customer satisfaction, AXEON may offer exchange service on some EDI components. This service is intended to reduce the amount of time the module or system is not available for use due to repairs. Components used in exchange are service replacement parts which may be new, remanufactured, reconditioned, or repaired, depending on the component involved. All exchange components will be covered by the warranty AXEON then gives on such new components.

Products or components manufactured by companies other than AXEON or its affiliates ("Non-AXEON Products") are covered by the warranty, if any, extended by the Product Manufacturer. AXEON hereby assigns to the purchaser any such warranty.

If, for a period of two (2) years following the expiration of the Limited Warranty Period, any EDI module or system covered by this warranty becomes unusable for any reason within AXEON's control, upon prompt return of such EDI module along with all appropriate operational logs, if the warranty claim is valid according to AXEON's judgment, AXEON shall repair or replace, at its option, such EDI module on the basis set forth below under its prorated *Replacement Price*. Some examples of causes or conditions normally *beyond* AXEON's control are:

- Intentional alteration or modification of either the appearance or the physical characteristics of the EDI module;
- Damage caused by improper integration into a system, or improper operation of a system, or conditions resulting from tampering, abuse or neglect;
- Fire, theft, freezing, vandalism, explosion or objects striking the EDI module or system;
- Failure to follow the specifications and recommendations contained in AXEON's published product literature and OEM Manual, and failure to observe safety and maintenance precautions contained therein for the EDI module or system, and components specified therefore.

REPLACEMENT PRICE

After expiration of the Limited Warranty Period, the replacement price is determined by multiplying the customer's then current buying price by a fraction, the denominator of which shall be 36 months and the numerator of which shall be the number of full months elapsed since the failed module was placed in service. Taxes and freight will be added to the adjustment replacement price. If you receive an EDI module or associated parts under this warranty, it will be covered by the warranty AXEON then gives on that module.