

ELECTROPURE™ EDI MODULE INSTALLATION CHECKLIST

1. Safety
2. Bolt Torque
3. Handling the Module
4. Mounting Options
5. Module Orientation
6. Pipe and Tubing Connections
7. Power Connection & Wire Conventions
8. Grounding
9. Module Startup

1. Safety

Please read and understand the Safety Section of the Electropure™ EDI OEM Technical Manual before installation. Please **train your colleagues** regarding the safe design and operation of EDI modules. Key safety topics are the use of electricity around water and the handling of the gases produced at the electrodes. Include a safety section in the customer site maintenance manual.

2. Bolt Torque

Bolt torque is important to maintain high product resistivity and to prevent leakage. Plate-and-frame devices require occasional torquing for proper sealing. If the modules become loose, water from the concentrate can leak and form crystals. It is the customers' responsibility to prevent leakage and crystal formation.

The bolts should be torqued (while there is no water flow or internal pressure) at the following times:

- 1) after it has been mounted to the skid,
- 2) before operation at the customers' site,
- 3) after water pressure has been applied,
- 4) periodically (weekly) for the first month until all of the internal plastic parts have fully compressed, and
- 5) whenever the product quality declines a little.

SnowPure

High Technology Water

SnowPure, LLC ♦ 130-A Calle Iglesia ♦ San Clemente, CA 92672 USA ♦ +1.949.240.2188 ♦ www.snowpure.com

The module is torqued at proper levels at the factory before shipping. After the module is installed and before the module is operated, the torque should be reset per the procedure in the technical manual. It is important to use the torque sequence in order to prevent distortion of the hardware and to assure an even internal pressure level.

Too much torque will result in deformation of the stack. Too little torque will result in internal and external leaks. The normal torque is 15-20 ft-lbs (20-27 N-m). Failure to follow torque recommendation can result in damage to the module hardware.

Failure to keep the torque at the minimum can result in irreversable leakage and the formation of corrosive crystals formed from leaking concentrate.

3. Handling the Module

The module is designed to be compact and lightweight. However, **do not lift by the plumbing or electrical connections**. Do not lift by the end covers. There are 8 lifting and mounting points on the aluminum frames.

4. Mounting Options

Mount the modules so that the 19 face bolts are accessible for torquing with a torque wrench.

The module can be mounted in different ways. The most popular way is to install L- or U- brackets on the skid, which provide a secure track for module to sit in. Alternately, the module may rest on on a single, central rectangular rail. The module must then be secured at the top via two of the mounting holes on the top, either at the front or the back, but not both. See the "Mounting Methods" drawing in the Electropure™ EDI OEM Technical Manual.

Do not bolt both the front and rear of the module to fixed points as this can constrain and stress the module hardware during torquing. One of the endplates needs to be able to move to allow unrestricted torquing.

5. Module Orientation

Electropure™ EDI modules are designed to be installed in an upright, or vertical position. In a horizontal position, gas can become trapped in the chambers and interfere with ion removal.

SnowPure

High Technology Water

SnowPure, LLC ♦ 130-A Calle Iglesia ♦ San Clemente, CA 92672 USA ♦ +1.949.240.2188 ♦ www.snowpure.com

6. Pipe and Tubing Connections

The standard modules are provided with 1" female pipe thread fittings (US Standard FNPT) for the main feed and the product. Sanitary Quick-Disconnect connections are the Sanitary product option (this option comes with two 1" Sanitary Sani-tech™ flange fittings, complete with Buna-N seals, endcaps for sealing and protection, and clamps).

SnowPure recommends using the high strength filled-nylon clamps provided. Avoid using steel clamps which are designed for metal flanges. The clamps provided by SnowPure apply an even pressure around the circumference of the flange.

Use Teflon® tape for sealing the threads. **Do not use pipe sealants made for metal threads as it often contains solvents that will weaken the plastic.** Even "FDA-approved" pipe sealants may contain these solvents. The use of such pipe sealant voids the SnowPure, LLC Limited Warranty.

It is very important that the threads are protected before installation to prevent damage and subsequent leaks. Secure the fittings with a tool to prevent twisting them during threading. If the fittings are not "backed up" during tightening, they may crack and need to be returned to the factory for repair.

Do not over-tighten the threads. Starting with the second full thread and continuing over the length, wrap Teflon™ thread tape in the direction of the threads. Overlap each wrap by one-half the width of the tape. Screw the male fitting into the 1" female port (be sure to backup this fitting) on the module and tighten by hand. Using a strap wrench only, further tighten the connection an additional one to two threads past hand tightness. Avoid excess torque as this may cause manifold or fitting damage. Read the full threading instructions accompanying the module.

The tubing connections for the concentrate and electrolyte are 3/8" and 1/4" (see module drawing), and are push-in-type, self-sealing (John Guest™) connections. The electrolyte outlet tubing is colored "yellow" and should be directed to waste.

There is a **metric conversion kit** available which converts the 3/8 inch and 1/4 inch to metric tubing sizes (8 mm). Contact SnowPure for details and pricing.

7. Power Connection & Wire Conventions

The connection between the module and the power supply is a water-tight gold-plated, three-connector fitting. The module is provided with a keyed male fitting at the bottom of one face of the module. A 12 foot (4 meter) power cord, with female connector, is provided with each module. The GREEN (o), BLACK (-), and WHITE (+) wires at the end of the power cord should be connected to the appropriate terminals and ground of the DC supply.

The **(DC -) cathode** is always **BLACK**.
The **(DC +) anode** is **RED** (on older models it was WHITE).
The **Ground** is always **GREEN**.

8. Module and Water Stream Grounding

The module should be grounded in 3 distinct ways.

Primarily, the module is grounded through the green wire in the main DC electrical power connection. All conductive parts of the module are grounded together to the green wire of the connection. This should be grounded to a suitable ground by a qualified electrician. The system frame should be grounded to the same ground.

The module may also be physically grounded to the system frame via its mounting.

Since the water streams are also conductive, current from the anode and cathode can flow through the various water streams looking for ground. It is good design to provide a "T" connection in various water streams, through which a conductive piece can be connected directly to ground (e.g., stainless steel rod with wire attached). Without grounding, the current in the water may cause metal pieces remote from the EDI system to present a high voltage, causing a safety concern.

SnowPure recommends the following streams be thus grounded:

1. Ground the feed between the module and any conductivity probes in the RO permeate.
2. Ground the concentrate outlet (most conductive stream).
3. Ground both the electrolyte inlet and outlet (these have the highest potential for transmitting voltage).

4. Do not ground the high resistivity EDI product stream because byproducts from the electrochemistry may introduce undesirable trace iron or other metal ions into the stream.

Note that electrical measuring devices, like conductivity and resistivity probes, can give erroneous readings if their streams either measure stray current/voltage or measure resistance to ground via the conductive piece.

9. Module Startup Considerations

The key to proper startup is to run as little water through the modules as possible during the plumbing checkout before applying power. The more water and ions that enter the modules the longer the initial regeneration procedure will be.

Make all mechanical, plumbing, and electrical connections.

Ensure that there is a filter just before the EDI system. This will prevent construction debris from entering the EDI modules, especially when the EDI system is fed from an intermediate RO permeate storage tank.

If the EDI is fed from a separate tank, the prefilter should be very fine (5 micron to 20 micron) to prevent silt from entering and fouling the modules.

Have data sheets and startup notebook on hand. Record initial data and any observations. Call Technical Service at SnowPure with any questions.

Bleed all air out of plumbing system by first filling the manifold(s) and modules slowly with water, then "pulsing" water to all three streams to knock bubbles loose. The manifold(s) should be designed to have no dead legs that can trap air. Removing the air at startup is important because airlocks in only some of the modules will prevent all modules from getting the same flow of water. There may be bacteria in the modules after shipment and storage, which can be dislodged at this point. (Initial sanitization to come later.)

Check all plumbing connections for leaks, and repair if needed.

SnowPure

High Technology Water

SnowPure, LLC ♦ 130-A Calle Iglesia ♦ San Clemente, CA 92672 USA ♦ +1.949.240.2188 ♦ www.snowpure.com

Apply DC power after as little time as possible. If too much water (with ions) is sent through the module(s) before power is supplied the excess ions will need to be removed with a longer regeneration procedure.

Check to be sure all three (3) streams for all modules are flowing at the recommended, design flows.

Check that the pressure drops of all three (3) streams are approximately correct.

Check all modules for startup current. The amperage may be higher than normal on startup and should drop to a nominal level within 1 hour. All modules should have similar currents to one another. If they are not, then this may mean that different modules have different concentrate flows and therefore different concentrate conductivities.

Check that the ion concentrations in the concentrate streams are all high. If the module(s) are running at 90% recovery, then the concentrate should have about 11 times the concentration of the feed. Perform a mass balance on the inlet and outlet ions to determine if the module(s) are regenerating (excess ions in outlet) or underpowered (too few ions in outlet).

Check all system permissions and interrupts. Check all flow and pressure sensors to ensure that minimum flows are set properly and the correct signals are presented to the control system.

If not immediately, then after about one (1) hour, the product resistivity should rise to the proper level. If excess ions were introduced during the startup procedure, then a regeneration cycle may be required before quality is achieved.

Check torque in the **unpressurized** state (with no pressure) and re-adjust. Follow up with the recommended periodic torque procedure.

Perform a sanitization, especially if the site is for USP Purified Water.

Leave a maintenance manual at the site with the customer.