Data I/O

PSV7000 Ionizer Kit

© 2018 | Data I/O Corporation

Contents

Chapter 1: Introduction

The PSV7000 Ionizer Kit from Data I/O is a hardware ionizer designed to neutralize static electricity within the system. The ionizer is implemented in compliance with the requirements of International Standards IEC 61340-5-1 and IEC 61340-4-7. This kit includes all mounting hardware, system ionizer(s), air pressure regulator, and Power and Air cables.

The ionizer operates as follows under normal operation:

- the ionizer generates ions of different polarity alternately to de-ionize the air and optimize ion balance to within ±10V in energy-saving static electricity elimination mode
- small holes along the ionizer serve as emitter points for the neutralizing ions
- these holes improve the distribution and coverage of ions that eliminate static electricity (factory settings eliminate static electricity within 3.2 seconds at 1000 mm distance)

This document provides instructions for mounting the ionizer hardware, connecting and routing the Power and Air cables, and testing the ionizer for static electricity reduction/elimination.

> **Note:** For Dual Ionizer configurations, this document notes any variations (between single and dual ionizers) with an indented Note paragraph.

Safety Warnings

To avoid personal injury and equipment damage, it is required that you comply with all safety rules and regulations. Although the PSV7000 Ionizer Kit involves no moving parts, the ionizer carries an electrical charge when installed.

The system can be dangerous if safety precautions are ignored. Do not operate the system unless you have been thoroughly trained. Do not disable or attempt to defeat any of the safety features of the system. Failure to adhere to safety warnings, operate the equipment properly under normal use, and apply safety practices constitutes a violation of your warranty agreement.

WARNING: Electric Shock Hazard!

Injury or death may result from contact to parts inside the equipment. Do not remove covers. There are no user-serviceable parts. Tampering with the ionizer and/or any of its components may result in damage, personal injury, electrical shock, or fire.

Never connect Power to any component that appears compromised, damaged, or tampered with (ex. covers removed, wires hanging loose, etc.). Prior to connecting Power of any kind, confirm the voltage requirements of your unit.

Keep hands and fingers away from ionizer emitter points to avoid electrical shock.

Ozone condensation can increase in enclosed spaces. Use ionizers in a well-ventilated facility to reduce ozone exposure. For information about ozone condensation, refer to the documentation from the ionizer manufacturer: http://content2.smcetech.com/pdf/IZN10.pdf.

Data I/O is not responsible for any defects or failures in the equipment caused by user negligence, including but not limited to abuse, accident, improper maintenance, inattention, or unauthorized repair, alteration, or installation.

Package Contents

A. Ionizer (with mounting brackets)

B. Air hose/tubing (3 meters)

C. Air pressure regulator

D. Electrical wiring

Specifications

Length: ………………….. 25.329 cm / 9.972 in.

Width: ………………….. 5.890 cm / 2.319 in.

Height (w/ platform): 11.227 cm / 4.420 in.

Total Height: …………. 12.700 cm / 5.000 in.
(w/ extension arm)

Requirements

This page lists the tools and items required to install the PSV7000 Ionizer Kit.

Tools

- Power drill with 4.5 mm drill bit
- Metric hex key set
- Screwdriver set
- Adjustable utility wrench and/or pliers
- Cutter (for snipping wire/zip ties and air tubing)
- Handheld electrostatic/ESD meter

Additional Guidelines and Considerations

Consider the following guidance when working with the PSV7000 Ionizer Kit:

- The PSV7000 system is tested and certified to meet ANSI/NCSL Z-540-1 and national standards for Ground Bond/PE resistance compliance (to meet electrical safety standards, **the ground points of the system are certified to be well connected**—measured to 100mΩ at 20.0A for 1.0 sec)
- The PSV7000 system is tested and certified to meet ANSI/NCSL Z-540-1 and national standards for high voltage/potential insulation (to meet electrical safety standards, **the electrical components of the system are sufficiently isolated**—measured to 17.00mA or under with 1.24KVAC for 1.0 sec)
- The majority of PSV7000 exposed surfaces are metallic, conductive, and bonded to earth ground; the following **surfaces are tested and certified** to meet ANSI/NCSL Z-540-1 and national standards **for digital surface resistance compliance**:
    - Upper doors (front and rear)
    - Interior workspace (front and rear)
    - Pick-and-Place (PnP) probes with tensioner
    - Tray feeder
    - Tape-In feeder
    - Tape-Out module
- PnP probes use **conductive rubber** nozzles/tips
- **Static-dissipative Plexiglas®** (grounded) is used for all clear-paneled access doors and windows
- Minimal use of electrically insulated materials are used within the PSV7000 system, except for:
    - Adapter boards and sockets
    - Air tubing/hoses/lines
   - PnP probe vacuum chamber

The PSV7000 Ionizer Kit helps to address potential ESD within the interior workspace of the PSV7000, including but not limited to the insulated materials above.

Chapter 2: Mounting the Hardware

Complete the following steps to mount the hardware for the PSV7000 Ionizer Kit. This process largely involves mounting the ionizer and routing its cables (air/electricity).
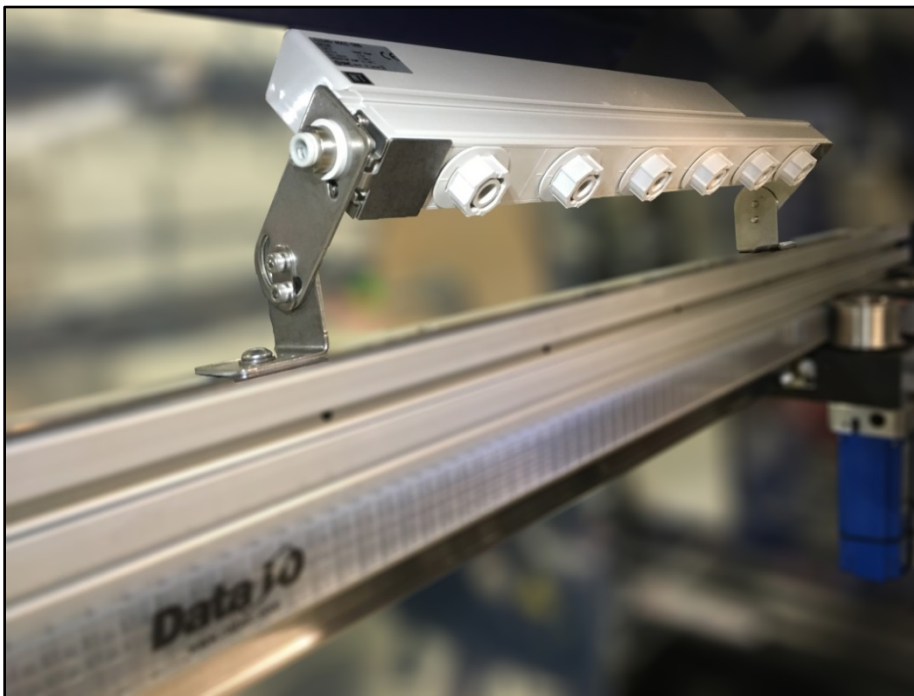
Mount the Ionizer

1. Position the ionizer above the left-side gantry (when facing the front of PSV7000), then use a 3 mm hex key to secure it to the chassis with 2 screws (M8x1.25x20mm)—one at each end of ionizer.
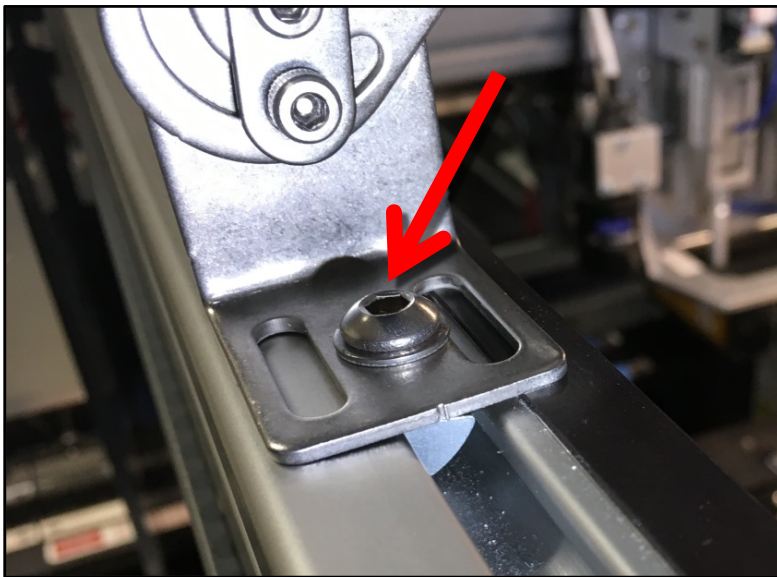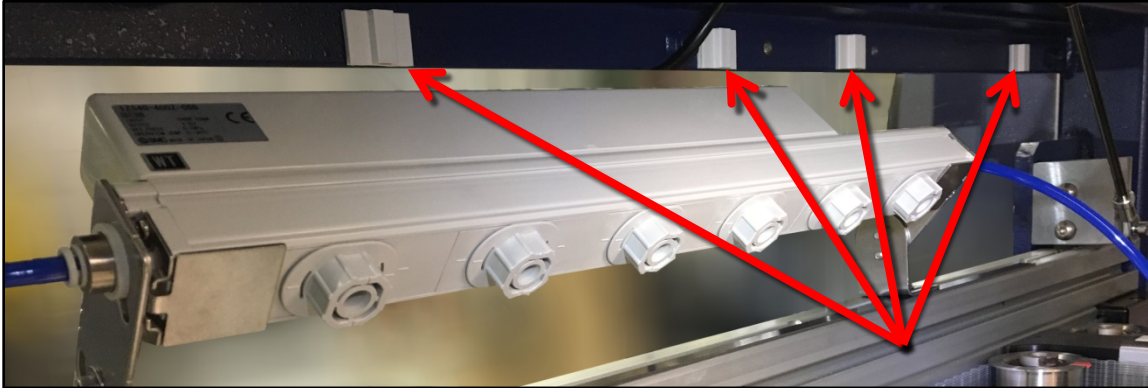
Secure ionizer bracket to gantry.

2. Confirm that the ionizer is mounted securely to the gantry and nothing is loose.

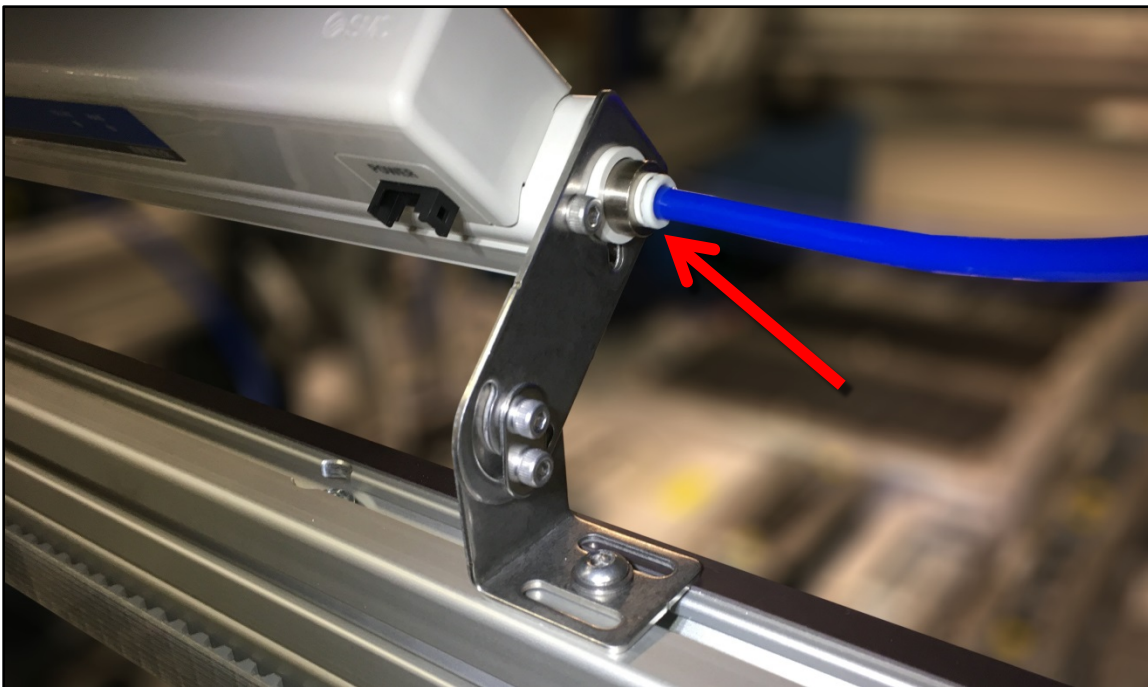**Confirm ionizer is mounted securely.**

Connect the Air Tubing

1. Stick 4 adhesive cable tie mounts vertically to the upper beam of the system chassis.


Stick cable tie mounts to upper beam.

2. Cut the included air tubing into 3 pieces: 240 cm, 30 cm, and 30 cm.

3. Take a 30-cm length and insert it into one end/side of the ionizer.

**Insert short length (30 cm) of air tubing into ionizer.**

4. Repeat the previous step to insert the other 30-cm length of air tubing into the other end of ionizer. (both of the short lengths—30 cm—of air tubing are now used)

5. Connect the 2 loose ends of the air tubing (one from each end/side of the ionizer) with a **Y-fitting**.
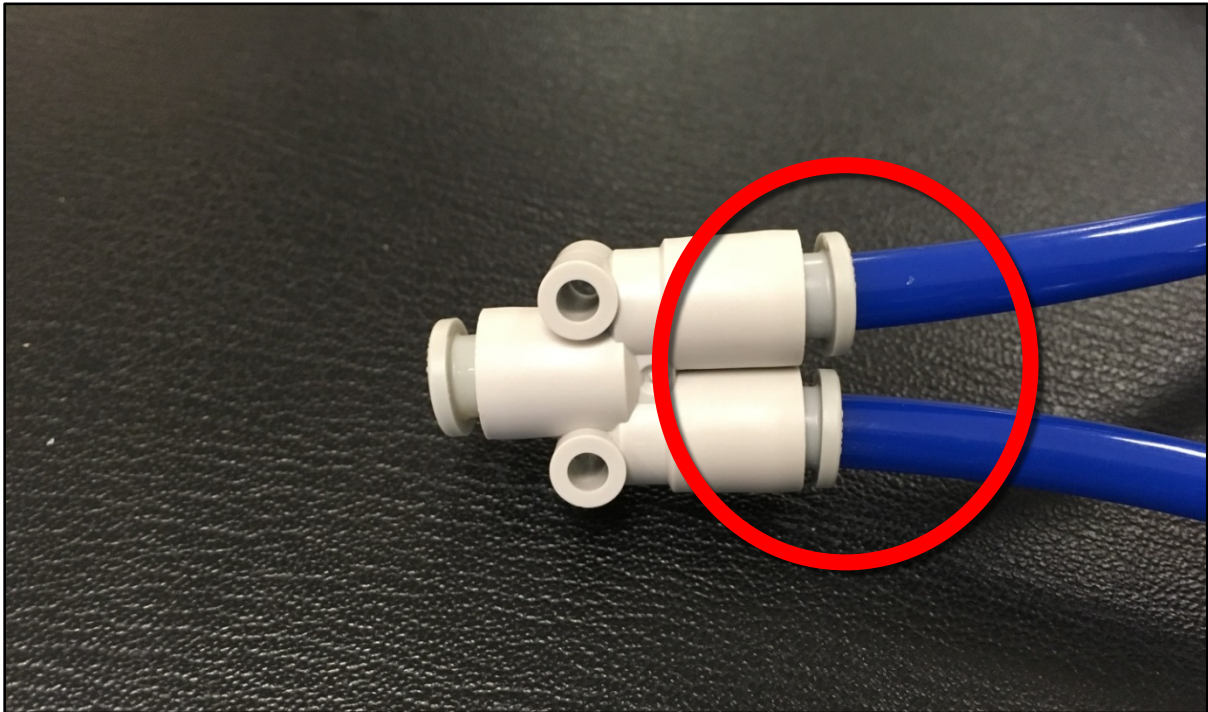
Connect air tubing with Y-fitting/adapter.

6. Now take the remaining 240-cm length of air tubing and insert one end into the **Y-fitting**. (the other end ultimately connects to the air pressure regulator, which connects to main/incoming air)
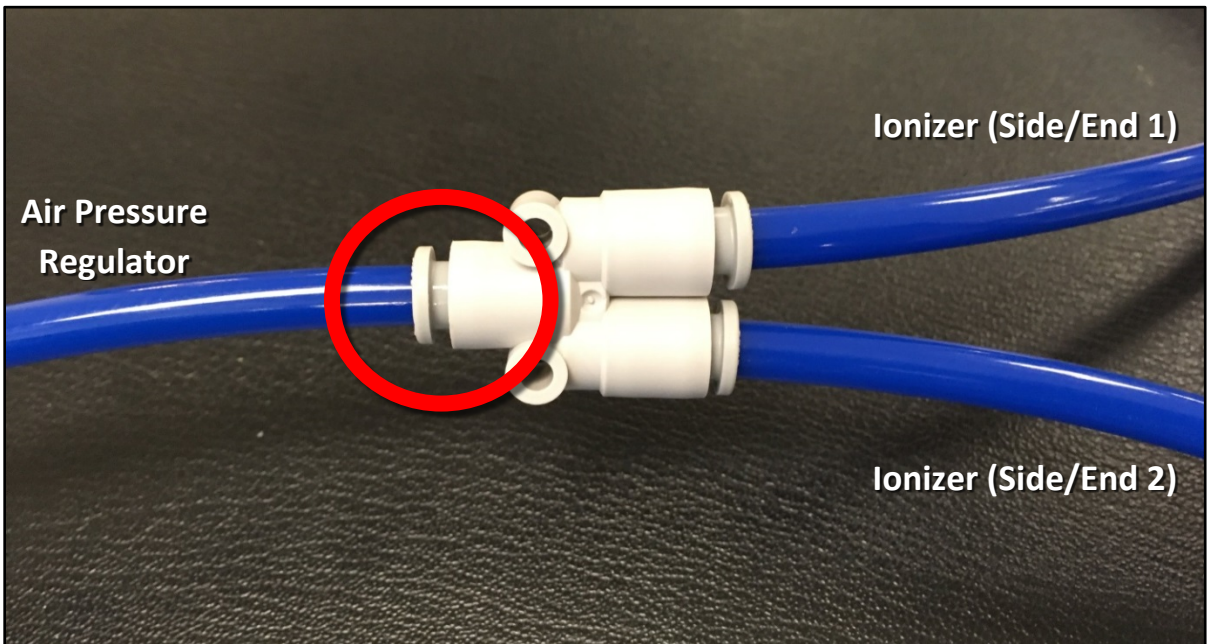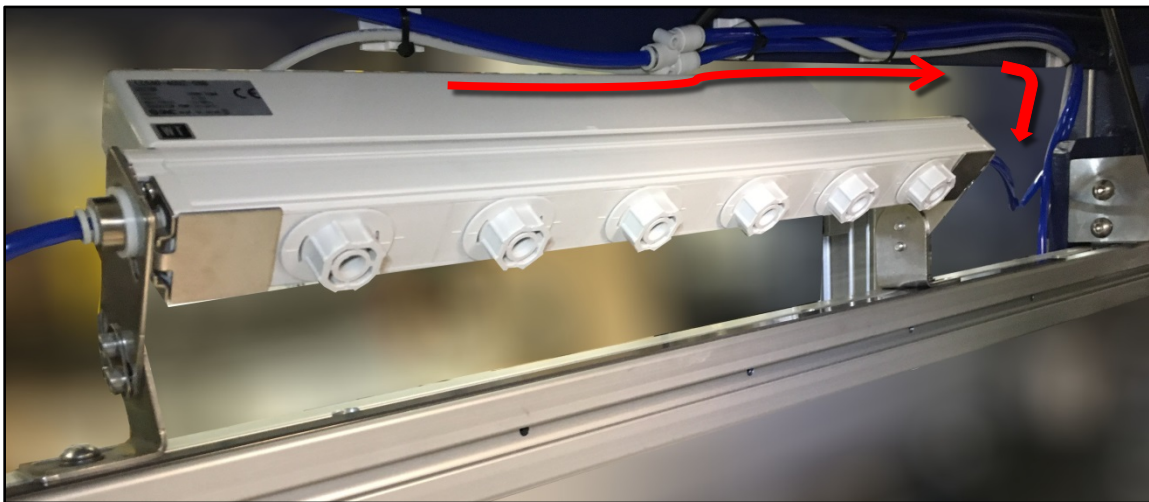

Insert long length (240 cm) of air tubing into Y-fitting.

7. Connect the Power adapter to the back of the ionizer.
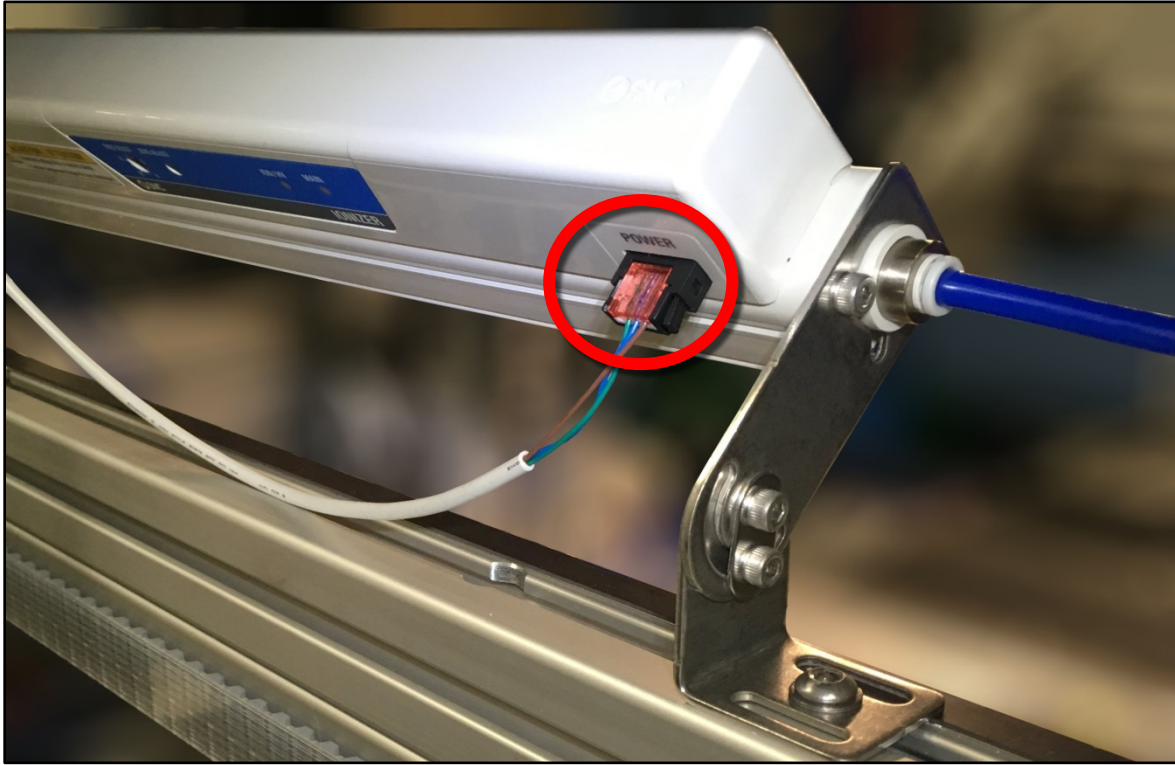
Plug-in the Power adapter.

8. Route the Power and Air cables along the top of the blue chassis and towards the rear of the system, and then secure using 4 zip ties (looped through each adhesive cable mount from Step 1).

Route and secure cables toward rear.

9. From the top rear corner, now route the cables down and through the opening in the chassis.

Route cables down through chassis opening/access cut-out.

10. From the rear of the PSV7000, access the bottom corner/opening of the blue chassis to pull the cables through (from top to bottom).
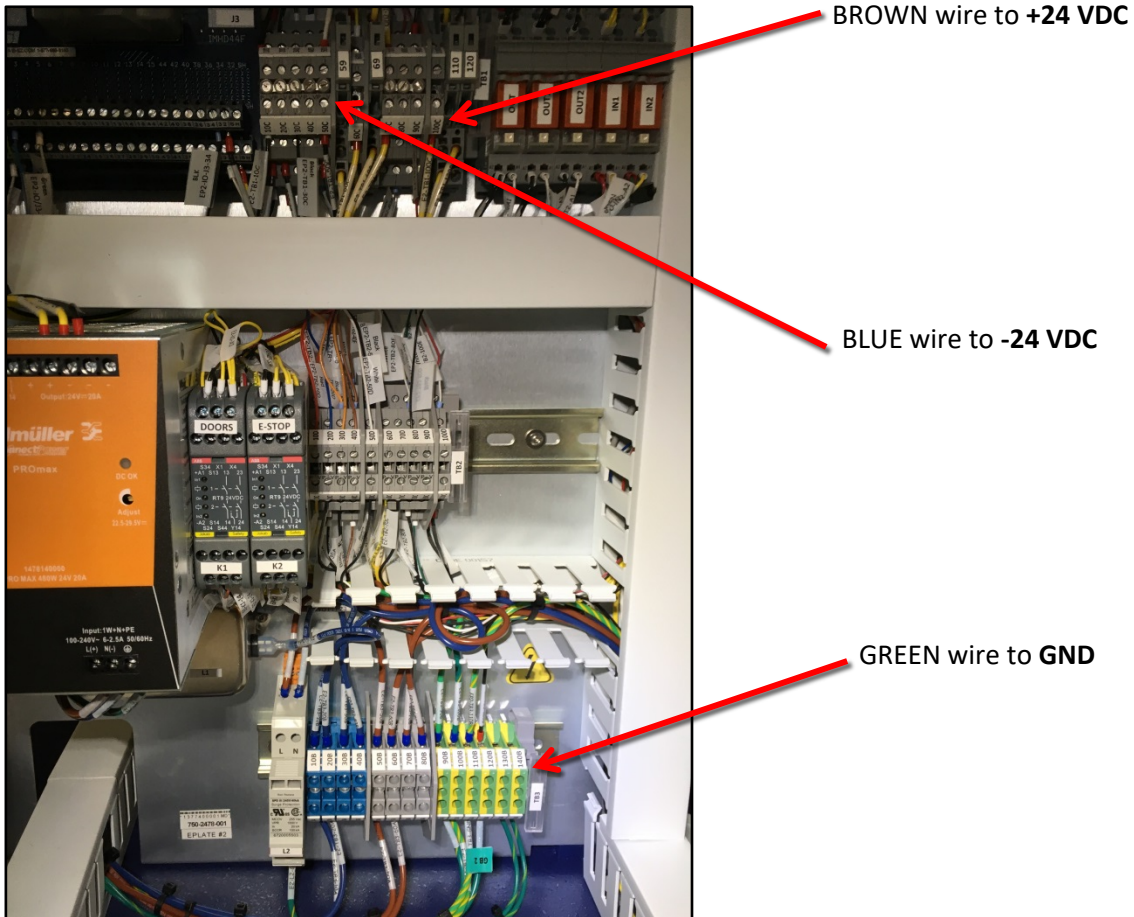

Pull cables through bottom corner/chassis opening.

11. Route the electrical cable(s) along the bottom towards ePlate #2 as depicted below.

Route cables toward ePlate #2.

12. Connect the electrical wiring as follows:

BROWN wire to **+24 VDC**

BLUE wire to **-24 VDC**

GREEN wire to **GND**

Ionizer connections to ePlate #2.

Mount the Air Pressure Regulator

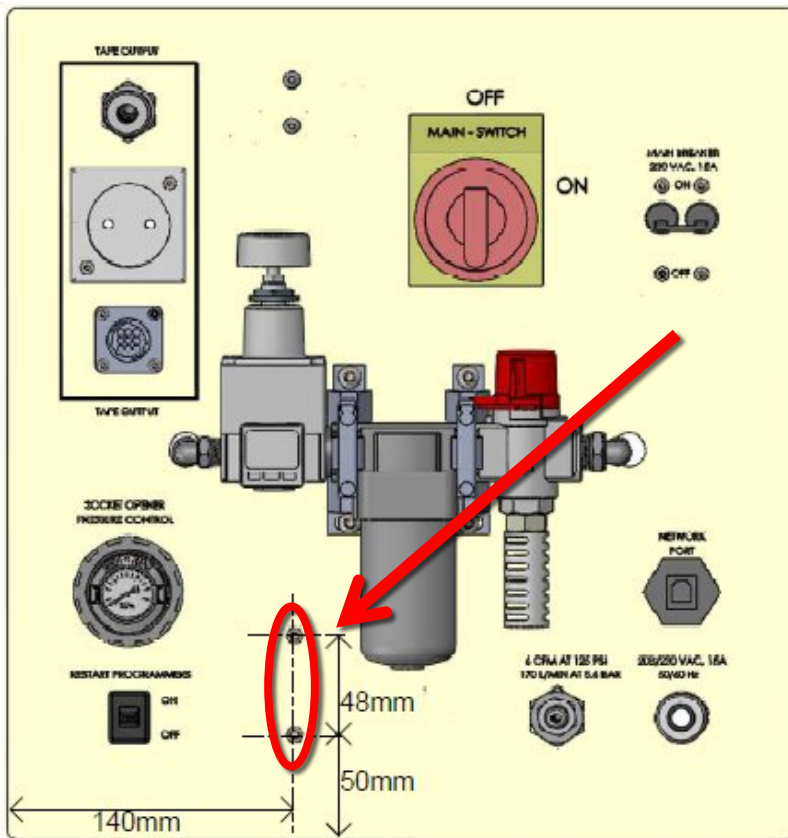The air pressure regulator mounts with 2 screws to the PSV7000 Utility Panel.

1. On the outside of the utility panel, prepare the area for drilling.

Prepare area for drilling.

Note: Many systems have these two holes pre-drilled. If your unit has these holes in the utility panel already, then skip to Step 4.
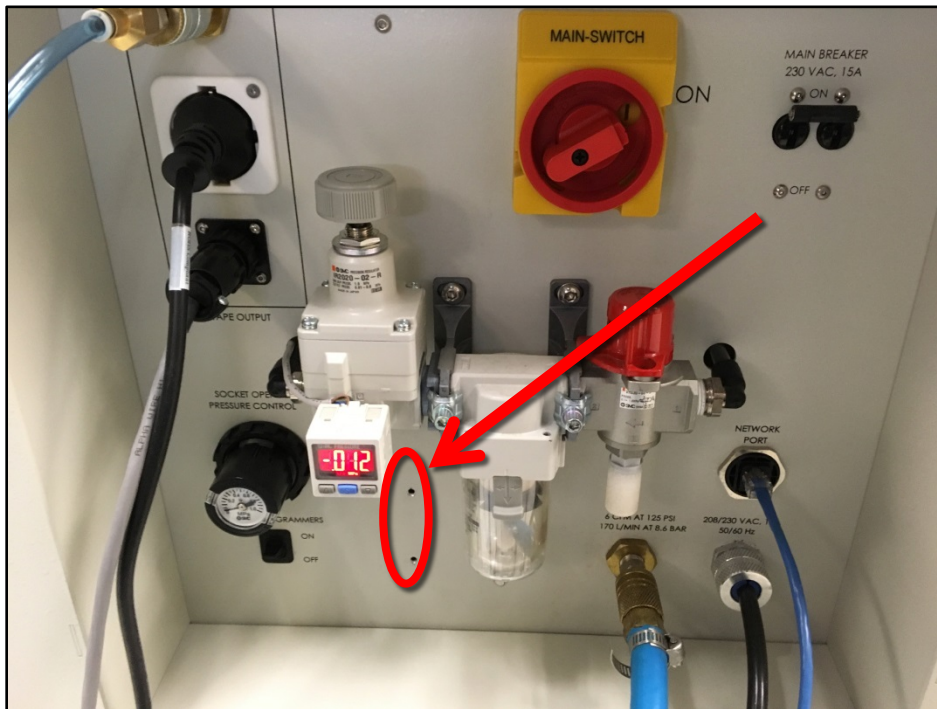
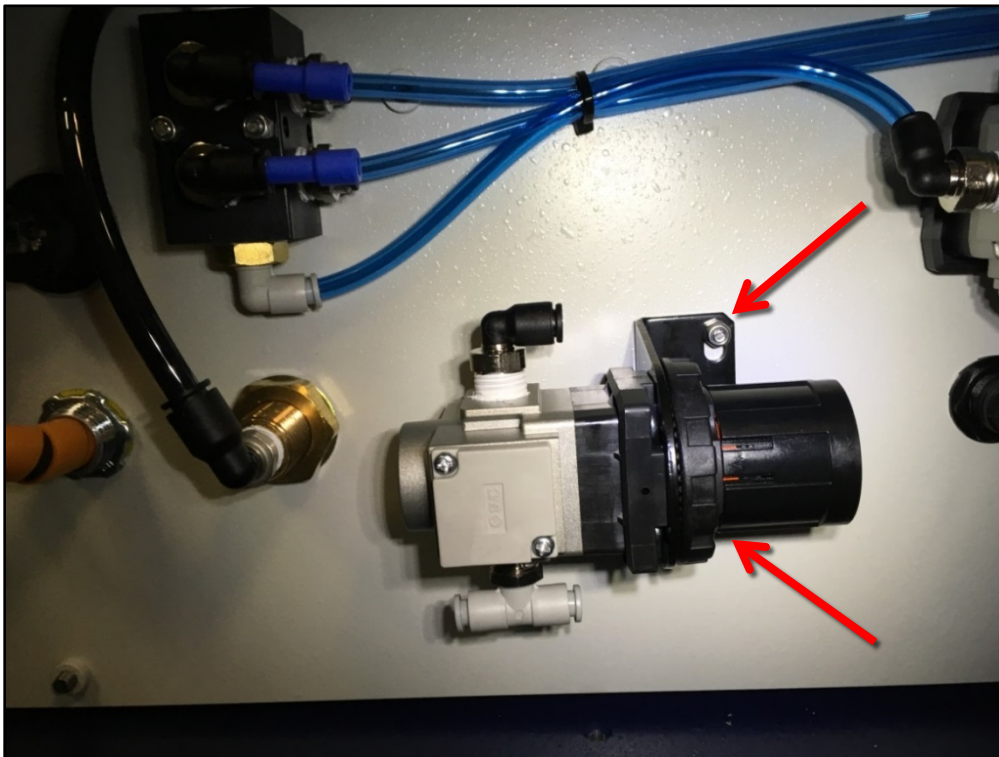2. Measure the 2 holes depicted below, and mark them.

Measure and mark two holes for drilling.

3. Using a 4.5 mm drill bit, drill the 2 marked holes.

Two holes drilled in Utility Panel.

4. On the inside of the PSV7000, use 2 screws (PN: 220-0025-001) and 2 lock nuts (PN: 210-0039-001) to mount the regulator (the 2 holes in the regulator bracket align with the 2 holes drilled).


Air pressure regulator mounted (as viewed from inside of PSV7000).

5. To connect air to the newly installed air pressure regulator, first disconnect the incoming air hose from the distributor block, and re-route it to the air pressure regulator as depicted below.
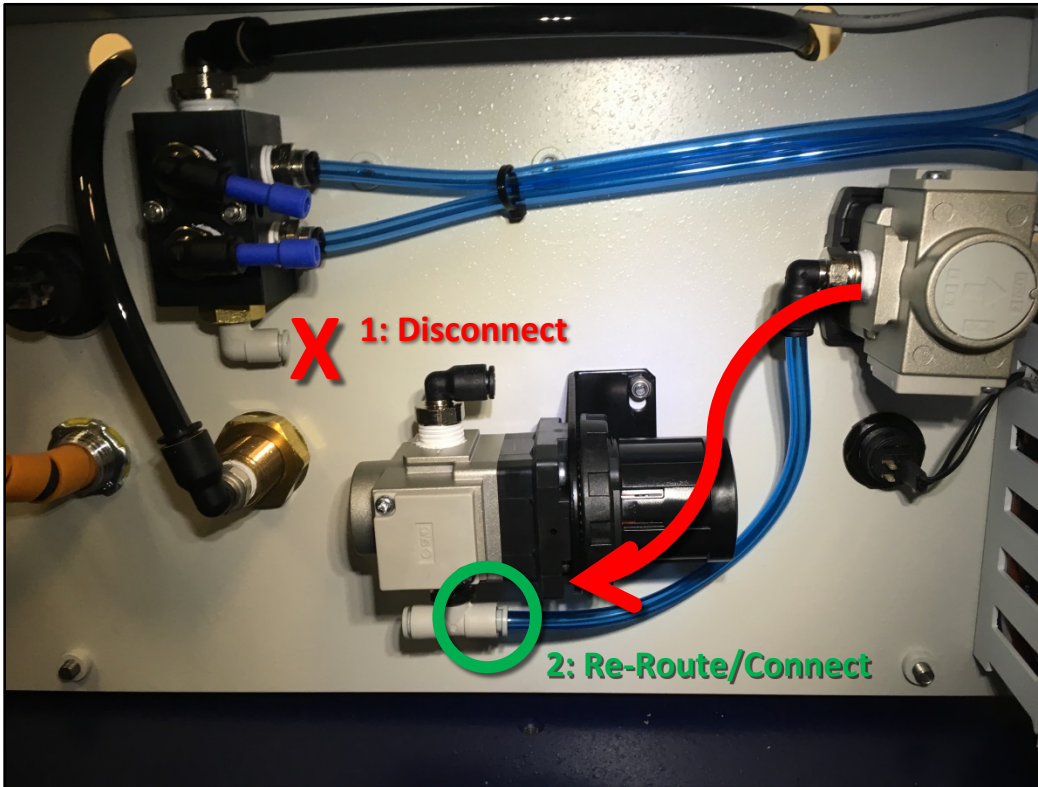
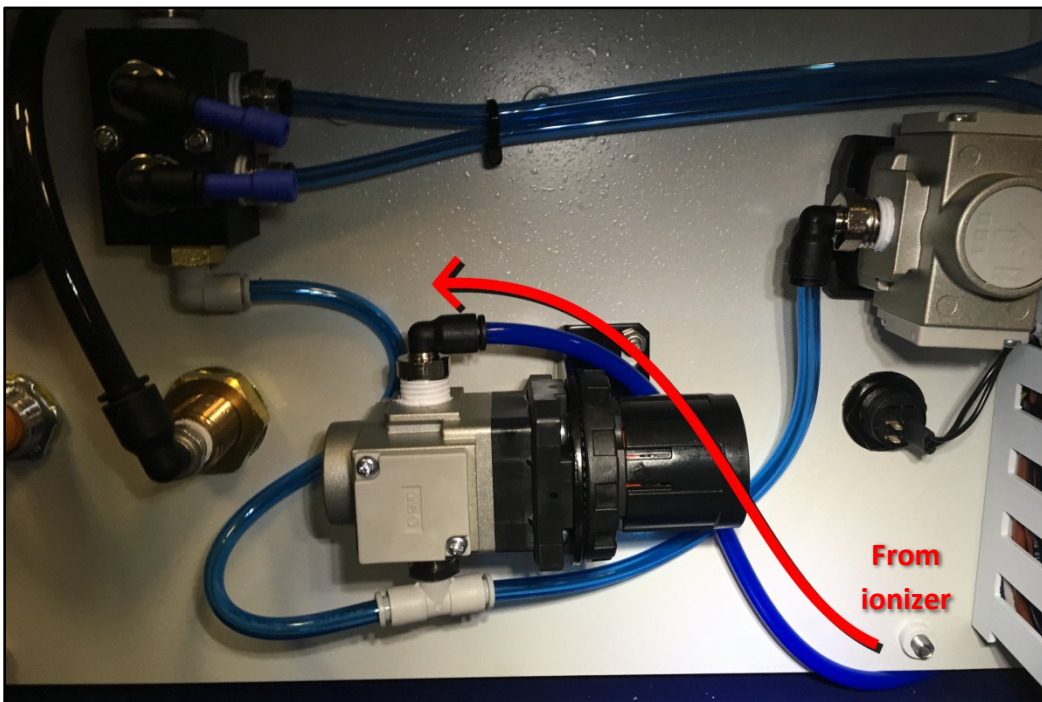**Disconnect incoming air from distributor and re-route to air pressure regulator.**

6. Add/cut approximately 15 cm of air tubing to connect the air regulator to the distributor block.
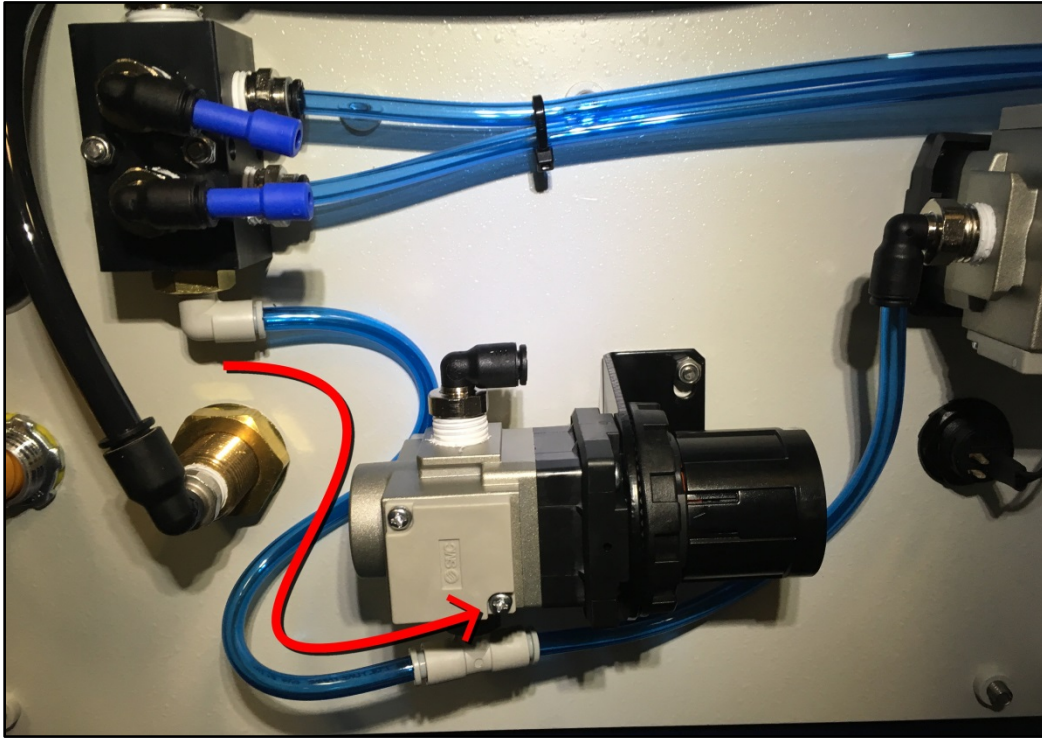
Connect air tubing from distributor block to air pressure regulator.

7. Connect the air tubing from the ionizer to the remaining valve on the air pressure regulator.

Connect air tubing from ionizer to air pressure regulator.

Chapter 3: Testing the Ionizer

With the ionizer installed and ready to go, now Power-Up the system and verify functionality.
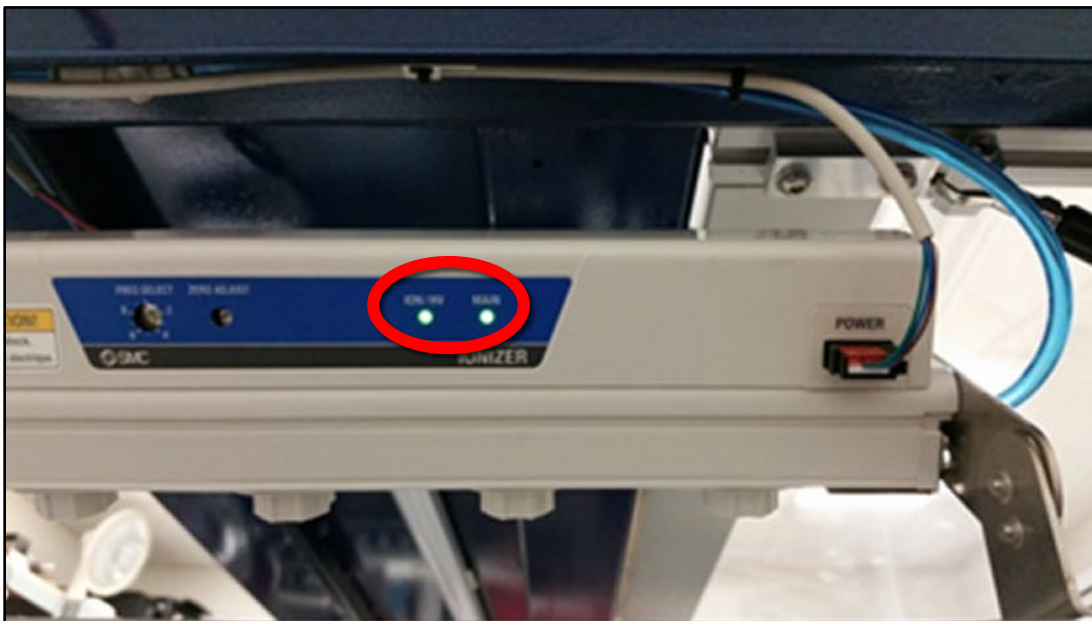
Verify Air and Power

1. With the air supply ON, ensure the air pressure regulator shows a reading between the green markers of **0.10** and **0.14 MPa** (15 - 20 PSI).

Verify reading on air pressure regulator.

2. On the back of the ionizer, verify that the **ION**izer and **MAIN**tenance lights are both GREEN.
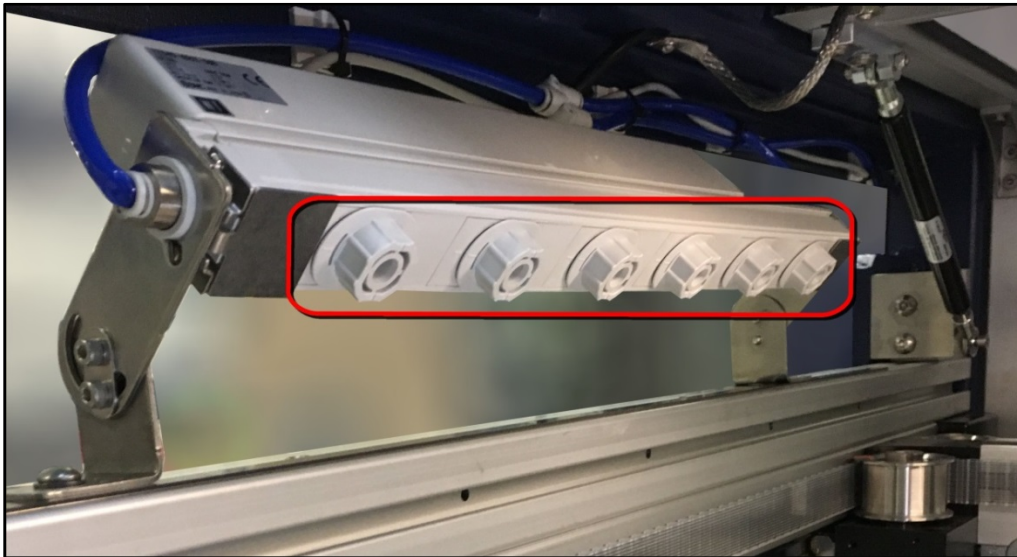

Verify GREEN status lights.

3. Ensure the **Frequency** control is positioned at setting **#7** (which is the factory default of 30 Hz).

Set Frequency control to setting #7.

4. On the front of the ionizer, ensure that air is blowing out from each of the nozzles.

Each nozzle blows air (polarized ions).

Verify ESD Elimination

5. Use an ESD field meter to measure the amount of ESD voltage present in the PSV7000 workspace without (and with) the ionizer running. ESD readings with ionizer running should be near zero.

ESD near zero with ionizer running.

Chapter 4: Optimizing and Maintenance

On the ionizer itself, you can directly adjust the following:

- **Direction** in which the emitter nozzles blow (loosen screws on ionizer hinge mount, rotate the ionizer nozzle bar to desired angle/direction, then re-tighten screws)
- **Power** and force in which the ions blow (adjust pressure on air regulator to desired level/MPa)
- **Frequency** at which the ionizer generates ions (rotate the **FREQ SELECT** dial on the ionizer itself)
- **Balance** and polarity of discharged ions (rotate the **ZERO ADJUST** dial)

Knowing when to adjust a particular control up or down is dependent on the environmental conditions and technical requirements of your specific setting. In general:

- **Establish ESD test locations:** Determine where on the system is ESD elimination absolutely critical (ex. at programmer sockets, at media output—Tape-Out, Tray-Out, Tube-Out, etc.).
- **Benchmark the default electrostatic field magnitude at test locations:** Use an ESD field meter to record the Voltage (in Volts) at each test location <u>WITHOUT</u> the ionizer running. This measurement establishes a baseline for the level of ionizer effectiveness.
- **Measure the operating electrostatic field magnitude at test locations:** Now run the ionizer and use an ESD field meter to record the Voltage at each test location. This measurement quantifies the level of ionizer effectiveness (the amount by which electrostatic field voltage is reduced or eliminated).

Check the Ionizer Electrode(s)

Complete the following steps to check/replace an ionizer electrode.

⚠️ WARNING: Electric Shock Hazard!

To avoid electrical shock, ensure the ionizer is Powered OFF before contacting the nozzle(s)/electrode(s).

1. To check, clean, or replace the ionizer electrode(s), shut-off Power and Air from the ionizer.
2. On the ionizer, unlock the desired electrode by rotating it 90° counter-clockwise, then pull it out.
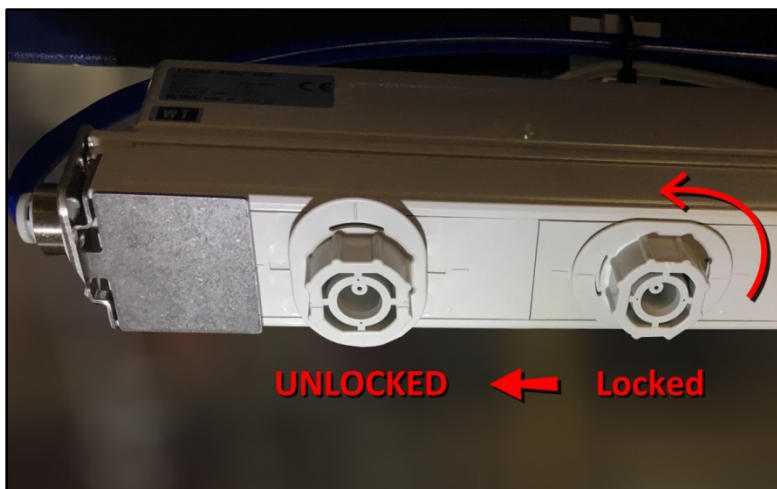
Twist electrode 90° counter-clockwise, then pull it out.

3. Carefully inspect the electrode needle/probe for any damage or contaminants (such as dust or dirt).

Inspect electrode needle/probe for contaminants.

Maintenance Schedule

Use the following maintenance schedule to ensure proper ionizer operation (your specific environmental conditions may vary).

- **At the start of each job** (with the loading of new reels/devices), ensure that the Maintenance LED status indicator is GREEN.
- **On a weekly basis**, check the nozzle(s) to ensure proper ion discharge (ionizer is not damaged and its emitter points are clear/unblocked); also check and monitor electrostatic field magnitude with meter to ensure proper operation.
- **On a monthly basis**, check the electrode needle to ensure there is no corrosion or condensation (the needle should be clean and clear of contaminants).

Obtain Parts and Supplies

To order consumable ionizer parts from Data I/O, please refer to the following part numbers.

Part Name	Description	Data I/O Part Number
Electrode Cleaner	Tip cleaner for electrode needle/probe	565-0223-001
Electrode Cartridge (De-ionizing, Tungsten)	1 cartridge for the Ionizer (with no electrode needle/probe)	420-0011-001
PSV7000 Ionizer Self-Service Kit	6 cartridges and 1 electrode needle cleaner	952-0533-001