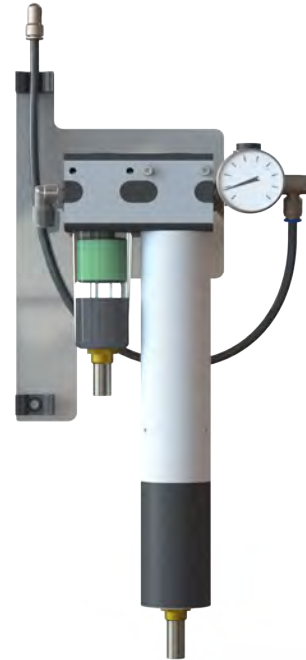


# OPERATION & INSTALLATION MANUAL

PRIMOZONE® EDM  
ENCLOSURE DRYER



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NOTE: Check your local regulations for any restrictions on ozone generators, power connections/regulation etc.

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# EDM Declaration of Conformity

We, Primozone Production AB, Terminalvägen 2, S-246 42 Sweden  
herewith declare that the product

**Product:** Enclosure Dryer

**Brand name:** Primozone® EDM

**Article numbers:** 110111, 110182

to which this declaration relates is in conformity according to the  
following.

The signatories are acting on behalf of and with the power of the  
attorney of the company management.

Löddeköpinge / Date: 2024-03-06



Jonas Augustinsson

Technical Manager

Manufacturer: Primozone Production AB

Product: Primozone EDM

## Conformity

PRIMOZONE certifies that the equipment is manufactured, tested and controlled, in accordance with the state of the art and PRIMOZONE rules.

It is the responsibility of the end user to ensure that such equipment is installed and used in accordance with the current regulations.

PED Directive 2014/68/EC: Pressurized equipment

Technical requirements of Article 4§3 indicate that Pressure equipment and assemblies below or equal to the limits set out in points (a), (b) and (c) of paragraph 1 and in paragraph 2 respectively shall be designed and manufactured in accordance with the sound engineering practice of a Member State in order to ensure safe use.

Without prejudice to other applicable Union harmonization legislation providing for its affixing, such equipment or assemblies shall not bear the CE marking referred to in Article 18. By design, this equipment may integrate pressure-relief valves or burst disks. In this case, according to paragraph 2, Annex II, these components shall not be CE marked.

In all other cases, pressure-relief valves and burst disks shall be CE marked.

ATEX Directive 2014/34/EC

The equipment is not in the scope defined in points a), b) et c) of the article of the ATEX Directive: consequently, it shall not be CE marked.

The equipment is not capable of causing an explosion through its own potential sources of ignition; therefore, it can be installed in ATEX zone 1 or 2, as far as respecting applicable regulations, rules, and operating instructions, in accordance with the sound engineering practice to be applied during installation and use.

Reminder: it is the end user's responsibility to define the ATEX zone.

## Inspections

Each unit of the equipment is inspected and has undergone a sealing test before packing.

# Table of Contents

<b>1 Safety Precautions</b> .....	<b>8</b>	<b>3 Retrofitting the EDM</b> .....	<b>16</b>
1.1 Working Precautions .....	8	3.1 Before Retrofitting .....	16
1.1.1 Warning Signs Related to Work Safety .....	8	3.1.1 Shut-down and Lock-out .....	16
1.2 Electricity .....	8	3.1.2 Tools and Materials .....	16
1.3 Chemical Precautions .....	9	3.1.3 Guidelines .....	16
1.3.1 Oxygen .....	9	3.2 EDM Retrofitting Instructions .....	17
1.3.2 Ozone .....	9	3.2.1 Preparations .....	17
<b>2 About the Primozone® Enclosure Dryer Module</b> .....	<b>11</b>	3.2.2 Use Drilling Templates .....	17
2.1 Manual Contents .....	11	3.2.3 Drilling and Threading .....	18
2.1.1 Date of Publication .....	11	<b>4 EDM Installation</b> .....	<b>20</b>
2.2 Purpose .....	11	4.1 Before Installation .....	20
2.3 Condensation and Dew Point .....	11	4.1.1 Shut-down and Lock-out .....	20
2.4 How the EDM Works .....	12	4.1.2 Tools and Materials .....	20
2.5 EDM Design and Components .....	12	4.2 EDM Installation Instructions .....	21
2.6 Important Information about the EDM .....	13	<b>5 EDM Operation, Inspection and Maintenance</b> .....	<b>22</b>
2.7 Prerequisites for EDM Installation and Use .....	13	5.1 Operation .....	22
2.7.1 Compatibility with Ozone Generators and Systems .....	13	5.2 Daily Inspection .....	22
2.7.2 Site and Environmental Requirements .....	13	5.3 Annual Inspection .....	22
2.7.3 GM Door/Hood and Seal Tightness .....	14	5.4 Test Function .....	22
2.7.4 Air-supply Requirements .....	14	5.5 Spare Parts .....	23
2.7.5 Installation or Retrofit? .....	14	<b>6 Disposal</b> .....	<b>24</b>
2.7.6 Ordering the Appropriate EDM Solution .....	15	<b>7 Technical Specifications</b> .....	<b>25</b>
		7.1 EDM Compressed-air Supply .....	25

7.2 Mechanical Drawings ..... 26

**8 Version History ..... 28**

**9 Glossary List ..... 29**

# 1 Safety Precautions

## 1.1 Working Precautions

All personnel must read and understand the safety precautions before installing or operating ozone systems, i.e. ozone generator modules (GM) and GM peripherals.

**NOTE!** In addition to the instructions and guidelines in this manual, make sure to follow all local safety regulations.

### 1.1.1 Warning Signs Related to Work Safety

This manual contains precautionary messages of two different levels of severity: warning and caution. The following examples display the appearance of these two messages, respectively:



#### **WARNING**

It is mandatory to follow the instructions of a warning message. Failure to do so may cause severe injury or death to personnel.



#### **CAUTION**

It is mandatory to follow the instructions of a caution message. Failure to do so may cause injury to personnel or severe damage to the equipment.

## 1.2 Electricity

The GM6-48 has an input voltage of 400 V, 50/60 Hz.

The GM1-4 has an input voltage of 230 V, 50/60 Hz.

The SC has an input voltage of 230 V, 50/60 Hz.



#### **WARNING: HIGH VOLTAGE**

Unauthorized personnel may not touch the inner components of the GM. Physical contact with electrical parts can cause severe injury or death.

Personnel trained in installation by Primozone may perform work on the inner components of the GM. The lockable main power switch must be locked in the 0 position during installation.



#### **WARNING: TURN OFF THE LOCKABLE MAIN POWER SWITCH**

Do not open the door of the ozone generator unless the main power switch has been turned OFF and locked.



Lock the main power switch in OFF position before any work on the electrical components is started.

*Figure 1 | Main Power Switch*



#### **CAUTION**

Do not open the ozone generator unless trained by Primozone personnel or in possession of written authorization.



## 1.3 Chemical Precautions



### **WARNING: OXIDIZING**

May cause or intensify fire; oxidizer.  
May cause fire or explosion; strong oxidizer.



### **WARNING: ACUTE TOXICITY**

Toxic if swallowed.  
Toxic in contact with skin.  
Toxic if inhaled.



### **WARNING: HEALTH HAZARD**

May cause respiratory, reproductive or organ toxicity that causes damage over time (a chronic, or long-term, health hazard).

### 1.3.1 Oxygen

Oxygen (ICSC no. 0138) is a colorless, odorless and tasteless gas. The risk of fire is increased if there is a leakage of oxygen from the system. If an oxygen leak is detected, make sure to minimize the risk of sparks or open flames, ventilate the area, and seek service personnel.

High oxygen concentration can cause oil and grease to spontaneously combust.



### **WARNING: OXIDIZING**

May cause fire or explosion; strong oxidizer. Keep away from open flames and combustible materials.



### 1.3.2 Ozone

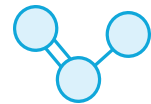
Ozone (ICSC no. 0068) is a pale blue gas with a characteristic odor. It is highly reactive and can cause harm to the skin and respiratory organs. An Ozone Material Safety Data Sheet can be found at:

[www.primozone.link/o3safety](http://www.primozone.link/o3safety)



### **WARNING: TOXIC GAS**

Ozone is a toxic gas. Do not inhale ozone. Do not eat, drink or smoke when using ozone equipment.





**WARNING: OXIDIZING**

May cause fire or explosion; strong oxidizer. Keep away from open flames and combustible materials.



**WARNING: HEALTH HAZARD**

Ozone causes damage to the lungs through prolonged or repeated exposure if inhaled.



**OZONE ALARM**

Install an ozone sensor within 2 meters of the ozone generator. Ensure good ventilation. See "1 Installation of external gas alarm" ► 1 for more information about the ozone alarm.

The human nose can detect ozone in the air at concentrations above 0.02 ppm. At 5 ppm, ozone may be directly lethal. Any off-gas from an ozonation process, that potentially could contain ozone, should be taken care of responsibly by installing a Primozone ozone destruct system, or equivalent.

**If breathing issues arise in presence of ozone, please:**

- Seek medical assistance.
- Ensure that the affected person has access to fresh air and remains at rest in a comfortable position for breathing.





## 2 About the Primozone® Enclosure Dryer Module





### 2.1 Manual Contents

This manual covers installation and daily operation of the Enclosure Dryer Module (EDM), which is a part of the Primozone ozone system.

Personnel should read and understand the instructions in this manual before installing, operating, or performing maintenance on the EDM. General usage permissions are displayed in 2.1 ► 11.

Table 1 | Usage permissions for Primozone equipment

				
	1	2	3	4
<b>Training</b>	✓	✗	✗	✗
<b>Service</b>	✓	✗	✗	✗
<b>Access to service settings</b>	✓	✓	✗	✗
<b>Installation</b>	✓	✓	✗	✗
<b>Access to ozone settings</b>	✓	✓	✓	✗
<b>Ozone production</b>	✓	✓	✓	✗
<b>Ozone destruction</b>	✓	✓	✓	✗

				
	1	2	3	4
<b>Operation</b>	✓	✓	✓	✗
	<ol style="list-style-type: none"> <li>Personnel approved in Service training by Primozone</li> <li>Personnel approved in Commissioning training by Primozone</li> <li>Personnel approved in Operation training by Primozone (Operators)</li> <li>Untrained personnel</li> </ol>			

#### 2.1.1 Date of Publication

This manual was published 13 Mar 2024.

### 2.2 Purpose

The purpose of the EDM is to remove moisture from the air entering the Primozone® ozone generator and reduce the risk of condensation.

Ozone generators contain high-voltage circuitry, electronics, sensors, and other moisture-sensitive components. Contact with condensation will decrease the reliability and lifetime of these components. The EDM helps ensure that air entering the GM will not carry excess moisture into the GM enclosure.

It is, however, important to know that while the EDM is a very effective additional barrier against condensation, it should not serve as the only means of protecting the GM interior from humidity.

### 2.3 Condensation and Dew Point

When a chilled container is removed from a refrigerator on a hot summer day, moisture droplets will appear on the container after a

time. Machines with active cooling are often subject to the same effect: *condensation*. This is because the chilled container – like the cold parts of the machine – cools the surrounding air to a temperature below its *dew point*.

Dew point is the temperature at which moisture in the air will condense. Dew point varies with ambient-air temperature and relative humidity.

Using air conditioning at the GM site can mitigate condensation effects, but is often far from enough. AC units have a limited rate of dehumidification and remove moisture only to a certain point. Depending on the combination of ambient temperature and humidity and the temperature of the coolant in the ozone generator, condensation can still arise, even with AC. Moreover, AC can also become overwhelmed whenever extra moisture enters the room, for example from opening room doors, extreme weather fluctuations, or increased ventilation.

In general, the greater the temperature difference between ambient air and coolant temperature, the higher the risk of condensation inside the machine.

## 2.4 How the EDM Works

All that is needed to use the EDM is a source of compressed air. The EDM takes a small amount of compressed air, runs it through a membrane dryer and injects a tiny flow of this dry air into the generator's enclosure, slowly flushing away moisture from the cabinet. Continuously flushing the air in the cabinet keeps any moisture from outside air from entering the enclosure.

## 2.5 EDM Design and Components

The EDM is installed on the ozone generator. Air enters the EDM through the air inlet shown in [Figure 2](#) ► 12.

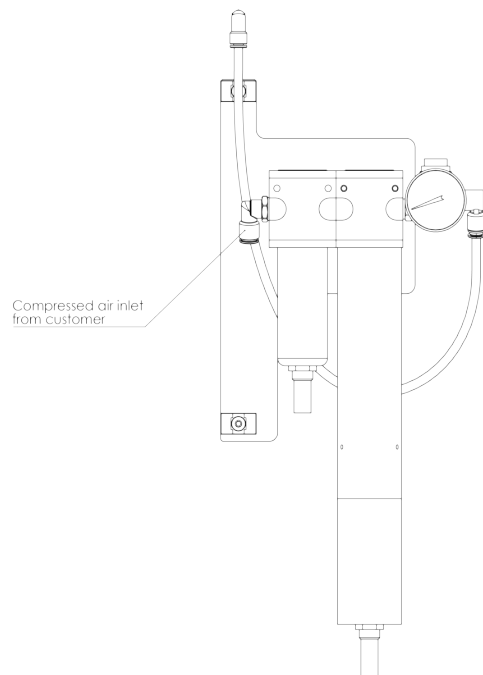
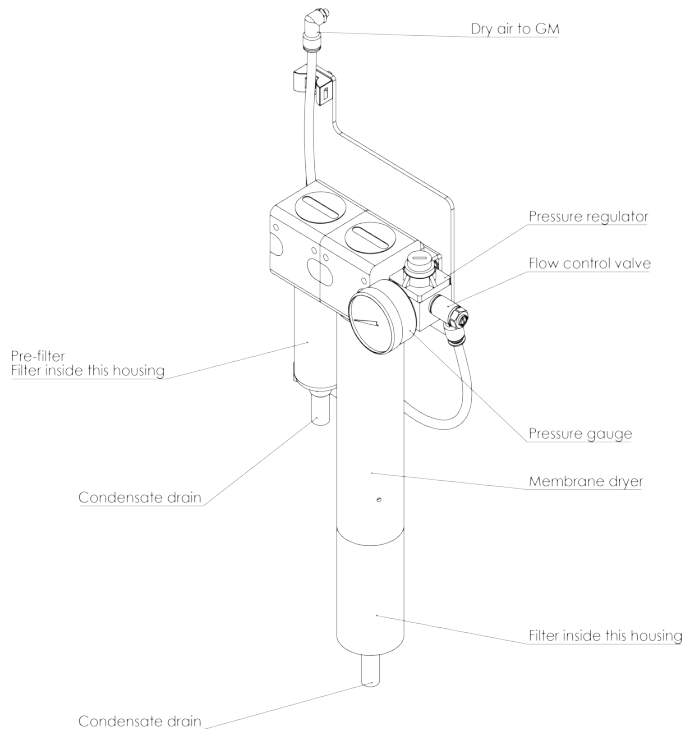


Figure 2 | EDM air inlet

The air is then pre-filtered and dried before exiting the EDM and continuing to the GM. The moisture removed from the air supply

leaves the EDM through drains. A flow control valve and pressure gauge help ensure proper EDM operation. See [Figure 3](#) ► 13.



**Figure 3** | Main components of the EDM

## 2.6 Important Information about the EDM

- A small quantity of air is always exhausting from the three holes on the EDM block. This is necessary for normal operation and is not leakage.

- Primozone recommends operation of the EDM at all times, even when the ozone generator is not powered.
- Do not adjust outlet pressure or flow. These are factory-set by Primozone.
- To purge the contamination from the filter bowls, unscrew the metallic purge nipples at the bottom of both EDM filter elements and allow air to escape for a few seconds.
- The pre-filter and main filter cartridges should be changed once per year to ensure EDM function over time.
- If the transparent bowl is regularly filled with water, consider adding an additional condensate trap upstream of the EDM.

## 2.7 Prerequisites for EDM Installation and Use

To ensure the best possible performance of the EDM, ensure that the following on-site and ordering requirements can be met prior to installation.

### 2.7.1 Compatibility with Ozone Generators and Systems

The EDM is designed to work with Primozone GM6-48 ozone generators.

It is not compatible with with GM1-4, or older models (GM1-3 and GMs equipped with largeSEPTs).

### 2.7.2 Site and Environmental Requirements

The EDM requires the same operational conditions as the GM. See "Environmental Requirements" in the GM6-48 Operation & Installation Manual for more information.

### 2.7.3 GM Door/Hood and Seal Tightness

1. Check that the sealing strips between the GM frame and the doors/hoods are in good condition and still flexible, without cuts or other damage. If the strips are damaged or brittle, contact Primozone regarding replacement. To order new sealing strips, refer to "5.5 Spare Parts" ► 23.
2. Make sure that the GM doors/hoods close tightly against the sealing strips, without any gaps.
3. Make sure that the transparent window is still securely glued to the GM door/hood. If not, the window must be re-attached. Contact Primozone for further information about how to re-attach a loose window.

### 2.7.4 Air-supply Requirements

Compressed air entering the EDM must meet the following quality requirements:

- "Oil-free", industrial compressed air, with basic filtering and condensate drain after the compressor
- No particles larger than 1 µm; no water droplets, oil content max 0.0 1mg/m<sup>3</sup>

See 7.1 ► 25 for air-supply technical specifications such as pressure limits and inlet fitting sizes.

### 2.7.5 Installation or Retrofit?

The EDM is supplied with fasteners and fittings for mounting the EDM on the generator. Installation takes only a few minutes.

The model and age of the ozone generator determines whether to install or retrofit the EDM, For GMs with pre-drilled attachment holes, the EDM can be installed without drilling. If the GM does not

have pre-drilled holes, a Primozone® Retrofit kit must be ordered, consisting of tools and drilling templates.

Before ordering an EDM solution, check the GM as follows for pre-drilled holes.

## GM 6-18

Check whether the three holes indicated by a red circle in *Figure 4*

► 14 are present:

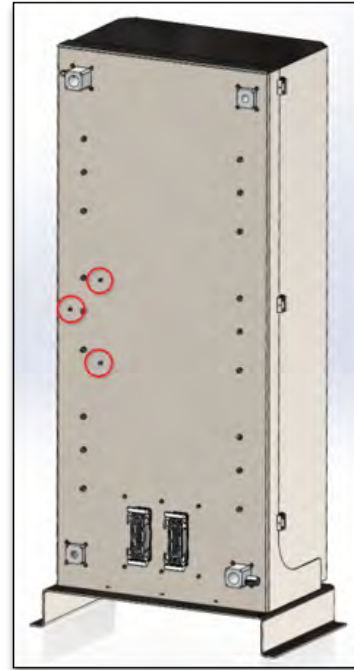


Figure 4 | Pre-drilled holes for EDM installation on GM6-18

## GM 24-48

Check whether the three holes indicated by a red circle in *Figure 5*

- ▶ 15 are present below the control cabinet:



*Figure 5* | Pre-drilled holes for EDM installation on GM24-48

### 2.7.6 Ordering the Appropriate EDM Solution

#### 1. Installation method

Depending on the GM model, the EDM can be installed directly on the GM enclosure using one of the two following alternatives:

- Pre-drilled holes
- Holes drilled with the help of the EDM Retrofit Kit

It is easy to determine the method by checking the GM according to the instructions in "2.7.5 Installation or Retrofit?" ▶ 14.

Primozone highly recommends installing the EDM directly on the GM enclosure. However, if space constraints require it, the EDM can be installed separately from the GM. In this case, ensure that the air hose between the EDM and the GM is no longer than 5 m. The customer must supply a 6/4-mm pneumatic hose.

Note: If the EDM will be installed close to the GM and not on the GM enclosure, and the pre-drilled holes will be used for cable attachment or similar, ensure that at least one threaded hole remains available for the air inlet.

#### 2. EDM product types and quantities

One EDM dryer module is required for each GM in the system. The Retrofit Kit can be used many times over, so if the kit is required for any or all of the GMs in the system, order only one Retrofit Kit in addition to the number of EDMs required.

## 3 Retrofitting the EDM

Retrofitting the GM enables dryer installation on site, exactly as it is done in the factory on newer machines. The Primozone EDM Retrofit Kit contains templates and tools for drilling and threading holes in the GM enclosure for EDM installation.

NOTE: The EDM itself is sold separately.

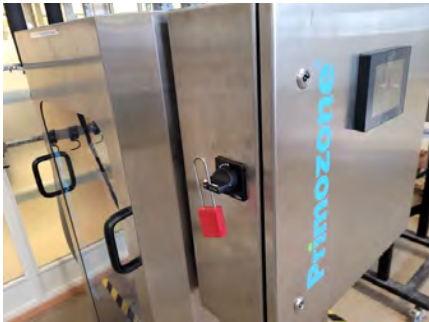
### 3.1 Before Retrofitting

#### Safety Risk Analysis

Before work begins, the customer must complete a risk analysis to ensure that work can be completed safely.

#### 3.1.1 Shut-down and Lock-out

- Shut down ozone production
- Shut off the main breaker
- Lock out the machine according to local regulations



#### 3.1.2 Tools and Materials

##### Retrofit Kit

- Drill bit (4.2 mm)
- Threading taps, set of 3 (M5)
- Drilling templates, set of 3 (GM6, GM12-18, GM24-48)
- Guide for drilling and threading (plastic, 3D-printed)
- Tap holder

##### Customer-supplied Tools, Materials, and Skills

- Drill
- Cutting oil/paste
- Industrial vacuum cleaner (to remove drilling waste)
- Personnel with appropriate training in drilling and threading techniques
- Other general materials for marking holes and cleaning

#### 3.1.3 Guidelines

Primozone does not recommend drilling holes in locations other than those specified in the Retrofit Kit drill templates.

The GM enclosure is made of stainless steel, which can be a challenging material to drill through. Use of cutting oil/paste such as Rocol RTD or similar is recommended to avoid damaging the drill bit or breaking a tap.

Drill holes at low RPMs and with firm, constant pressure. Excessively high drilling speeds will overheat and dull the drill bit instantly, especially if cutting oil is not used.

During drilling and threading, avoid letting metal chips and swarf fall on or into electrical components in the GM; failure to remove drilling debris could lead to short circuits or other hazards.



## 3.2 EDM Retrofitting Instructions

### 3.2.1 Preparations

Prepare the items listed in "3.1.2 Tools and Materials" ► 16 and read "3.1.3 Guidelines" ► 16.

Ensure that procedures in "4.1 Before Installation" ► 20 are completed.

Open the GM door/hood.

### 3.2.2 Use Drilling Templates

Select the appropriate drilling template according to GM size to mark drilling locations on the GM enclosure:

#### GM6

1. Bend the template along the perforation mark to a 90-degree angle. Place the angled section of the template on the upper edge of the GM as shown in [Figure 6](#) ► 17. Ensure that the rightmost edge of the template is 300 mm (11¾ in) from rightmost edge of the cabinet.



Figure 6 | GM6 template

2. Mark the three drilling locations as indicated by the template.

#### GM12 and GM18

Place the template as shown in [Figure 7](#) ► 17 and mark the three drilling locations as indicated by the figure.



Figure 7 | GM12 and GM18 template

#### GM24-48

Place the template as shown in [Figure 8](#) ► 18 and mark the two drilling locations as indicated by the red arrows in the figure.

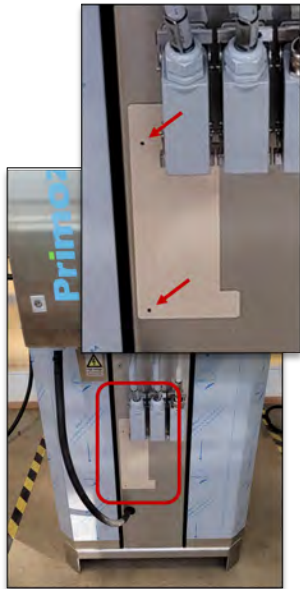


Figure 8 | GM24-48 template, Step 1

Move the template and place it as shown in [Figure 9](#) ► 18. Mark the one drilling location as indicated by the red arrow in the figure.



Figure 9 | GM24-48 template, Step 2

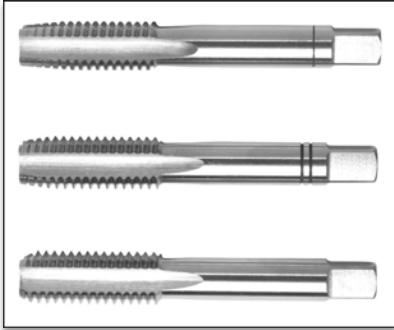
### 3.2.3 Drilling and Threading

When the three drilling locations have been marked on the GM enclosure, drill the holes ( $\varnothing$  4.2 mm). Use the plastic drill guide to keep the drill bit perpendicular to the GM enclosure.

Use the tap holder to thread the holes by hand. Do NOT use a power tool for threading.

- Use the plastic guide to keep the tap perpendicular

- Thread each hole in succession with the three taps, in the order shown in *Figure 10* ► 19:
  1. Tap with one ring
  2. Tap with two rings
  3. Tap with no rings



*Figure 10* | Threading taps for EDM retrofit

Make sure to remove any chips or swarf from inside the GM (vacuum cleaner is recommended). Remove any cutting-oil residues.

The GM enclosure is now ready for EDM installation.

## 4 EDM Installation

### 4.1 Before Installation

#### Safety Risk Analysis

Before work begins, the customer must complete a risk analysis to ensure that work can be completed safely.

#### 4.1.1 Shut-down and Lock-out

- Shut down ozone production
- Shut off the main breaker
- Lock out the machine according to local regulations



#### 4.1.2 Tools and Materials

##### Installation Kit

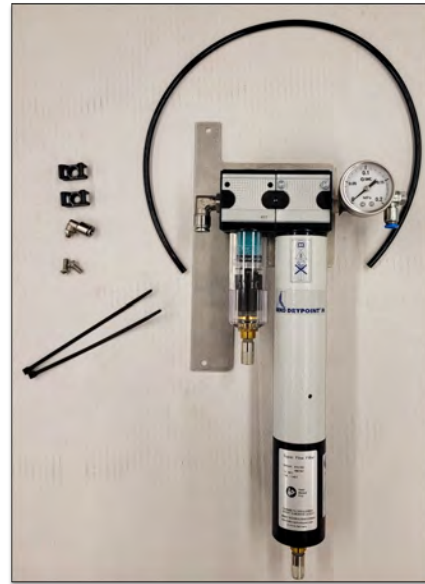


Figure 11 | EDM Installation Kit contents

- Dryer block
- 2x cable holders
- 2x M5x12-mm screws
- Dry-air fitting (6 mm to M5)
- Air hose
- Cable ties

##### Required Tools

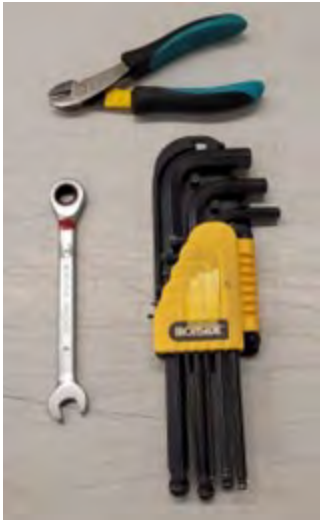


Figure 12 | Customer-supplied tools for EDM installation

- Metric Allen wrenches/keys(3 mm & 4 mm)
- 9-mm wrench
- Side cutters to trim cable ties

## 4.2 EDM Installation Instructions

1. Insert the two M5 screws in the upper two holes to attach the EDM to the GM. The third hole is for the air fitting.
2. Secure a cable tie between the attachment screws and the EDM backplate.
3. Install the air fitting. Attach hoses and secure them with cable ties as needed.
4. Supply compressed air to the EDM as specified and check that a very slight flow of air comes out of the air fitting into the cabinet.
5. Conduct a leakage test after the air supply has been installed and pressurized.
6. Clean up the area and the interior of the GM and close the GM door/hood.

The EDM is now ready for operation.

## 5 EDM Operation, Inspection and Maintenance

### 5.1 Operation

To start the EDM, open the feed air. Then resume normal ozone production.

During normal operation, the EDM outlet manometer should show a pressure of approximately 0.5 bar(g).

### 5.2 Daily Inspection

1. Check that the pressure gauge shows approx. 0.5 bar (0.05 MPa). If the gauge reading is 0 bar, check the air supply.
2. Visual check of the pre-filter bowl. If the bowl contains water, purge it by unscrewing the purge nipple for a few seconds to release collected water (must be done while unit is under pressure). If the bowl often contains water, consider improving the air supply to remove water content.

### 5.3 Annual Inspection

- Replace both the pre-filter and the microfilter. Both filters can be replaced while the GM is running.
1. Shut down air supply wait until pressure falls to 0 bar.
  2. Unscrew the pre-filter bowl.
  3. Replace the filter element.
  4. Clean the bowl if needed, then reinstall it.

5. Use the same procedure for the microfilter, but make sure to unscrew only the lower, black section of the EDM block, not the whole block.

### 5.4 Test Function

Testing must be done after the EDM has been running for a few hours.

#### Required tools:

One or two hygrometers. These hygrometers do not need to be calibrated or extremely accurate. The goal is simply to ensure that there is a significant difference in humidity between the inside and outside of the cabinet.

#### Testing with one hygrometer

1. Place a hygrometer somewhere close to the exterior of the generator. Do not place the hygrometer on top of the GM electrical cabinet; heat from the cabinet can skew the readings. After 30 minutes, note the humidity level. Place the hygrometer inside the GM enclosure so that the gauge can be read from outside the enclosure. Close the generator hood/doors.
2. After approximately one hour, note the humidity reading.
3. The reading from inside the cabinet should be significantly lower than the reading from outside the cabinet. This indicates that the dryer is working properly.

For simpler and faster testing

#### Testing with two hygrometers (faster method)

Use two hygrometers simultaneously (one inside and one outside the enclosure as described above) and compare their readings.

## 5.5 Spare Parts

### Primozone AB

E-mail: support@primozone.com Telephone: +46 46 12 31 32

Spare parts can be ordered from support@primozone.com.

### EDM filters

Article No.	Description
310200	EDM Pre-filter
310199	EDM Microfilter

### Sealing strips for GM6-48 doors and hoods

Sealing strips improve the tightness against leakage of GM doors and hoods. Replacing worn, damaged, or brittle sealing strips will in turn improve the effectiveness of the EDM and help protect the sensitive electrical components inside the GM.

Sealing strips can be ordered by length in millimeters. Always order a total length of minimum length + 25 to 50 mm to allow some margin for adjustment.

Article No.	GM Size	Minimum length (mm)
310100	GM6	2240 mm
310100	GM12	3400 mm
310100	GM18	4070 mm

Article No.	GM Size	Minimum length (mm)
303217	GM24	4200 mm x 2
303217	GM36	4200 mm x 2
303217	GM48	5100 mm x 2

## **6 Disposal**

The EDM contains no parts or chemicals that need special attention upon disposal.

Please follow local laws and guidelines when disposing of the EDM.  
Recycle any materials if possible.



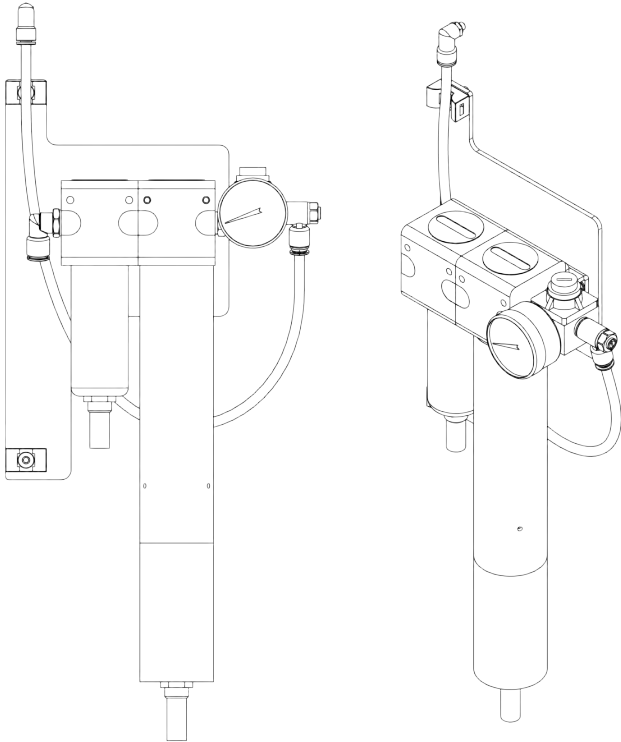
# 7 Technical Specifications



## 7.1 EDM Compressed-air Supply

<b>Desired pressure</b>	4 bar(g) / 58 psig <b>Note:</b> Up to 7 bar(g) / 101.5 psig is acceptable, will this will increase air consumption without providing any benefit.
<b>Absolute max pressure</b>	8 bar(g) / 116 psig
<b>Air consumption</b>	15 l/min at 4 bar(g) / 0.52 cfm at 58 psig
<b>Customer interface for air supply</b>	8 mm (5/16") O.D. pneumatic hose <b>Alternative:</b> G ¼" (ISO 228 or BSPP) female thread for air inlet fitting

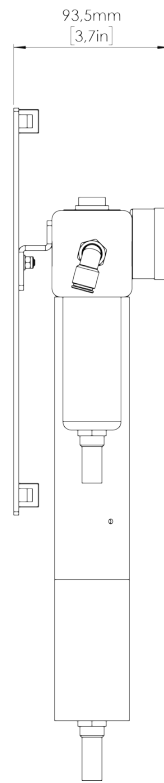
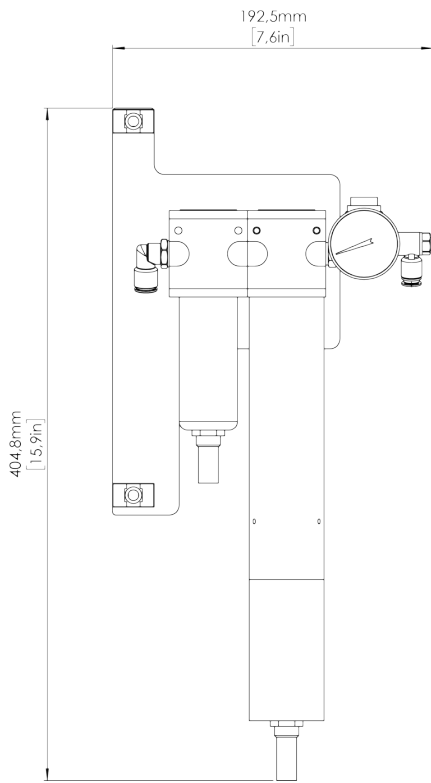
## 7.2 Mechanical Drawings

Revision	Description	Approved by	Approve Date
_02			



 Gen tolerancia SS-ISO 2768-M	State	Ro	Designed By Adrien	Date 2024-02-13
	Format A3	Scale 1:2	Remarks	Modified By Adrien
			Reviewed By	Date
			Description Dryer model for documentation	

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## 8 Version History

Hardware version	Date	Status	Author	Changes
1.0	Mar 2024	FINAL	PEOS	<ul style="list-style-type: none"><li>• First version</li></ul>
1.0	Mar 2024	FINAL	PEOS	<ul style="list-style-type: none"><li>• Incorrect article number 110192 corrected to 110182 in " EDM Declaration of Conformity" ► 4</li><li>• Updated bookmarks</li></ul>

## 9 Glossary List

### **BFP**

Back Flow Protector - A Primozone product which is used to prevent water from the site of dissolution from propagating back into the GM.

### **BSP**

British Standard Pipe.

### **GM**

Generator Module

### **HMI**

Human Machine Interface

### **LAH**

Level Alarm High.

### **LS**

Level Sensor.

### **NC**

Normally Closed.

### **PLC**

Programmable Logic Controller.

### **PTFE**

Polytetrafluoroethylene, a synthetic fluoropolymer of tetrafluoroethylene, for example Teflon.

### **SC**

System Controller.





