



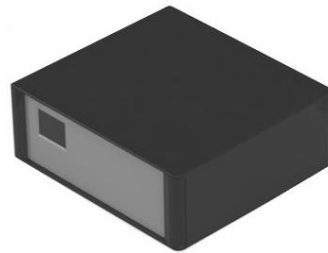
**Errata Notice**

This document contains references to e-MSion, which is now Agilent. This document is provided as a courtesy and is no longer kept current.



# ExD Controller

Models ExD19, ExD20



## User Guide

R004 • December 2023

## Notices

### Patents

This product is protected by U.S. patents 8,723,113 B2; 9,269,556 B2; 9,305,760 B2; and 10,283,335 B2. The exclusive license to these patents has been granted to e-MSion, Inc.

### Trademarks

All trademarks used in this document are the sole property of their respective owners.

### Warranty

The information in this document is subject to change without notice. e-MSion, Inc. is not responsible for any errors within this document, or incidental or consequential damages related to the use of this document.

## Safety Information

### Symbols

#### WARNING

A Warning indicates a hazard. If the contents of the message are not observed, the health and/or safety of personnel may suffer.

#### CAUTION

A Caution indicates a hazard. If the contents of the message are not observed, equipment may be damaged and/or data may be lost.

#### NOTE

A Note contains helpful information and tips.

### General Safety Precautions

- This product is intended for indoor use.
- Always shut down the instrument and disconnect the instrument power cord(s) before attempting maintenance.
- If the ExD Controller is external to the instrument, always disconnect the power supply for the ExD Controller before attempting maintenance.
- Do not place liquids near the ExD Controller or other electronics.
- The ExD Controller is **not user-serviceable**. Do not attempt to open.

### Safety and Regulatory Certification

The e-MSion ExD Controller has been tested to the following regulations on safety:

- IEC 61010-1:2010 + AMD1:2016

### WEE Compliance



This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEE) Directive 2002/96/EC.

## About this Guide

The purpose of this document is to provide:

- A functional description of the ExD Controller.
- Guidelines for ExD Controller maintenance and troubleshooting.

### Related Documentation

If existing for product model,

- *e-MSion ExD Option User Guide*

### Terms Used

In this document:

- *ExD* refers to a family of electron-based gas-phase molecular ion dissociation techniques.
- The *ExD cell* is a device that is installed in mass spectrometers. It is used for performing electron-based fragmentation.
- The *filament insert* is a consumable part that serves as the electron source inside the ExD cell.
- The *ExDControl software* facilitates user control of the ExD cell.

## Contact e-MSion

### Customer Feedback

e-MSion welcomes your feedback, questions, and suggestions for improvement on this guide.

You can reach us at [emsion-support@agilent.com](mailto:emsion-support@agilent.com). We deeply appreciate your assistance in our efforts to improve the quality of our documentation.

### Contact Us

For technical questions, contact e-MSion via the following:

Medium	Information
e-mail	<a href="mailto:emsion-support@agilent.com">emsion-support@agilent.com</a>
Mailing address	e-MSion, Inc. 2121 NE Jack London Corvallis, OR 97330 USA

# Contents

<b>1. Technical Description</b>	<b>4</b>
Technical indexes	4
<b>2. Installation</b>	<b>6</b>
Required parts	6
To install and configure the ExD Controller	6
<b>3. Operation</b>	<b>8</b>
To power ON/OFF the ExD Controller	8
<b>4. Maintenance</b>	<b>9</b>
<b>5. Troubleshooting</b>	<b>10</b>

# 1. Technical Description



Figure 1. ExD Controller, model ExD19.



Figure 2. ExD Controller, model ExD20.

The ExD Controller is a key component of the ExD Option. It supplies DC voltages to the ExD cell lenses and DC current and voltage to the filament according to values set in the ExDControl software.

The ExD Controller includes:

- Eight voltage outputs with a range [-60 V, +60 V] used to supply the ExD cell elements.
- Voltage offset capability. Any value between -60 V to +60 V may be used to shift the voltage output range between [-120 V, +120 V]. Voltage offset may be set in the ExDControl **Offset Voltage** window.
- A BNC Float connection. The float connection may accept input from an external power source within the range specified in [Table 5](#).

**NOTE**

The e-MSion ExD Option series adds electron-based fragmentation to a variety of mass spectrometers. For more information, refer to the relevant *ExD Option User Guide* for your product model.

## Technical indexes

Table 1. External power supply specifications.

Parameter	Specification
Input Voltage	100-240 VAC
Input Frequency	50-60 Hz
Output Voltage	24 V
Output Current (Max)	2.5 A
Power Consumption (Max)	60 W
Output Cord Connector	Female Barrel Plug 5.5mm x 2.5mm x 11mm
Operating Humidity	10-90%
Operating Temperature	0-50 °C
Storage Temperature	-10-70 °C

**Table 2.** ExD Controller specifications.

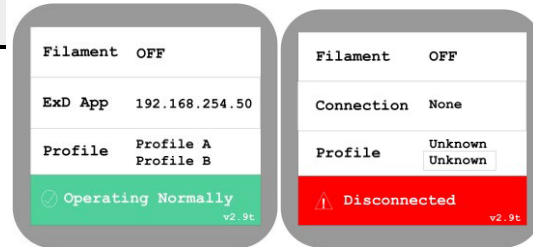
Parameter	Specification
Power Supply	See <a href="#">Table 1</a>
Input Voltage	24 VDC
Input Current (Max)	2.5 A
Power Consumption (Max)	35 W
Operating Temperature	0-40 °C
Storage Temperature	-10-80 °C
Humidity	0-95%, non-condensing
Maximum Altitude	2000 m
Dimensions	275 x 250 x 100 mm

**Table 3.** ExD Controller status description.

Status	Explanation
ON	Power is ON.
OFF	Power is OFF.

**Table 4.** ExD Controller LCD description.

Parameter	Explanation
Filament	<b>ON</b> if current is > 0 A. <b>OFF</b> if current is 0 A.
ExD App	<b>IP Address</b> if connected to ExDControl via Ethernet. <b>COM Port</b> if connected to ExDControl via USB.
Connection	<b>None</b> if not connected to ExDControl.
Profile	Names of ExDControl profiles selected for MS1 and MS2.
Firmware	ExD Controller firmware version (bottom right).



**Figure 3.** LCD when ExD Controller connected (left) and disconnected (right) to ExDControl software.

**Table 5.** Acceptable voltage range supplied to ExD Controller BNC Float connection.

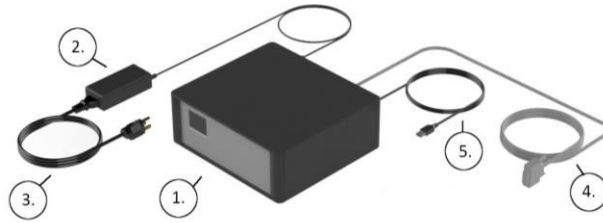
Model	Acceptable External Voltage Supplied to BNC Float
ExD19	[-120 V, +120 V]
ExD20	[-220 V, +220 V]

**WARNING**

To prevent electrical shock, do not exceed the floating voltage range for the input BNC connector.

## 2. Installation

### Required parts



**Table 6.** ExD Controller and associated parts.

Label	Part Description
1	ExD Controller
2	Power supply (optional)
3	Power supply cord
4	D-sub cable OR D-sub & ground cable assembly
5	Type A Male/Type B Male USB cable and/or Cat6 Ethernet Cable
-	BNC float cable (optional)

**NOTE**

Depending on the instrument model, either an Ethernet cable and/or a USB Cable is required.

**NOTE**

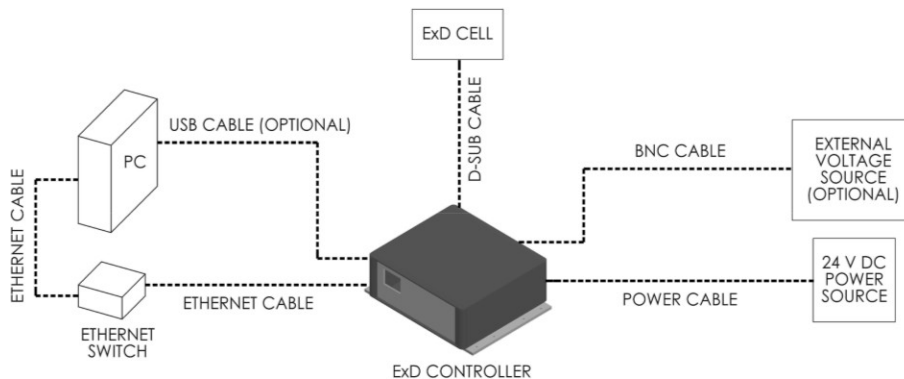
A power supply cord compatible with the destination of the ExD Controller is supplied.

### To install and configure the ExD Controller

**WARNING**

Falling objects can cause damage to the ExD Controller and the user. Follow guidelines for ExD Controller placement to mitigate risk.

Depending on your instrument type, the ExD Controller will either install external or internal to the instrument chassis.



**Figure 4.** Installation layout of the ExD Controller.

1. Place the ExD Controller upright on a clear, level surface:
  - At least 1.5 ft x 1.5 ft (0.45 m x 0.45 m).
  - Within 10 ft (3 m) of the instrument D-sub port.
  - Capable of supporting 10 lbs.
  - Allowing for airflow under and behind the ExD Controller.
2. Make sure the ExD Controller sits at least 1 inch (2.5 cm) from any edges.
  - For internal installations, the ExD Controller will mount to the instrument chassis.

**WARNING**

Do not touch cable ends while the ExD Controller is ON and power supply cord is plugged in.

**WARNING**

Run cables cleanly to minimize trip hazards and reduce the risk of dislodging the ExD Controller.



Figure 5. The ExD Controller back panel.

3. Connect the Ethernet cable to the **Ethernet** port and to the Ethernet switch used by the instrument.
  - If the instrument model requires use of the USB connection, connect the USB cable from the **USB** port to the instrument control PC.
4. Connect the D-sub cable to the **Filament** port and to the vacuum feedthrough for the ExD cell wiring.
  - If a D-sub & Ground cable assembly is provided, use a T10 torx screwdriver to attach the ground cable to **GND**. Secure the other end to a metal surface in the instrument chassis.
5. Connect the power supply and the power supply cord to the **Class 1** port and to an appropriate power outlet.
  - **For internal installations.** Attach appropriate power supply to the **Class 1** port.
6. If required for your instrument model, connect the BNC float cable to the **Float** port and to an appropriate external power supply.

**CAUTION**

If the BNC connection is not in use, ensure that the BNC float shorting cap is securely affixed to the port. The cap provides a ground reference; without it, output voltages will be incorrect.

### 3. Operation

**WARNING**

Hazardous voltages are present. The ExD Controller must be installed and serviced by trained personnel.

#### To power ON/OFF the ExD Controller

If *internal* to the mass spectrometer, the ExD Controller will power ON/OFF with the instrument.

If *external* to the mass spectrometer,

- Turn the ExD Controller **ON** by holding down the **ON/OFF** button on the back panel of the Controller until the front LCD screen lights up (**Figure 6**).
- Turn the ExD Controller **OFF** by holding down the **ON/OFF** button on the back panel of the Controller until the front LCD turns black (**Figure 7**).

**CAUTION**

After turning the ExD Controller **OFF**, wait at least 15 seconds before turning the system **ON** again to allow the internal electronics to reset properly.



Figure 6. The ExD Controller turned ON.



Figure 7. The ExD Controller turned OFF.

The ExD Controller should always be **ON** while the ExD Cell is installed, except during system maintenance. See **Maintenance**.



## 4. Maintenance

### WARNING

To avoid electrical shock, de-energize the ExD Controller before servicing Controller and/or instrument. If the ExD Controller is external to the instrument, before servicing,

1. Power off the ExD Controller and disconnect the power cord from the mains power.
2. If a float is provided to the ExD Controller from an external source, power off the external source and disconnect the BNC connector.

### CAUTION

The ExD Controller is not user-serviceable. Tampering with or self-repair of the ExD Controller will void its warranty, if applicable. Contact e-MSion or a supported distributor for servicing.

- If the ExD Controller is external,
  - Check and clean debris from the fan guard monthly to prevent build-up (Figure 8).
  - Check and clean debris or blockage from the bottom vents as necessary (Figure 9).



Figure 8. The fan guard on the back panel of the ExD Controller.

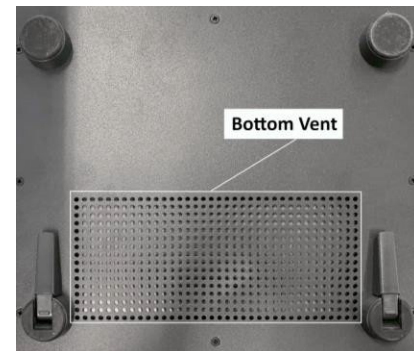


Figure 9. The bottom vent of the ExD Controller.

- If an ExD Controller cable needs to be replaced, contact e-MSion or a supported distributor to order a new cable.

### WARNING

Damaged cables can create a shock hazard. Only qualified electrical workers should replace damaged cables.

# 5. Troubleshooting

Table 7. Table for troubleshooting issues with the ExD Controller.

Problem	Potential Cause	Suggested Course of Action
ExD Controller cannot connect to ExDControl software, or connection lost during use.	Poor cable connection(s).	Check that cable connections are secure and correct. See <a href="#">Installation</a> .
	Firmware issue.	Restart the ExD Controller. See <a href="#">Installation</a> .
	Software issue.	Ensure that ExDControl software is running, and version is up to date. Restart ExDControl software.
	Network issue.	Ensure network is operational. Check that Ethernet switch (or equivalent) is powered on.  If available, refer to the <i>ExDControl Software User Guide</i> for instructions on reestablishing connection.
ExD cell lens voltage and/or filament current actuals not matching setpoints in ExDControl software.	Poor cable connection(s), software issue, or ExD cell, ExD Controller, or filament malfunction.	Check that cable connections are secure and correct and all cables are intact. See <a href="#">Installation</a> .  If available, refer to the <i>ExD Option User Guide</i> for your product model for additional guidance.
ExD Controller not turning on.	Power button.	Depress power button for at least 3 seconds.
	Power cord and/or source.	Ensure power cable is securely connected to ExD Controller and to power source. Ensure power source is operational and to specification. See <a href="#">Table 1</a> .



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Until its next release, this guide is valid for the 3.1.0 version or higher of the ExDControl software.

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