

Operating Manual



HYPERION⁺
A Meech Innovation

Hyperion PulseDrive
Pulsed DC Controller

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1.Safety instructions

Before using this product, read the following safety and operating notes to ensure your own personal safety and to help protect your equipment. Failure to do so could result in injury. Connected equipment may require additional safety instructions. Observe all safety instructions for additional equipment before operating.

1.1.Definition of safety warnings & symbols

Safety and operating notes found in the document will be supplemented with the following warnings and symbols.

Safety warnings	Caution	A low-risk hazardous situation where minor or moderate injury can occur
	Notice	A low-risk hazardous situation where damage to the equipment & products can occur
Symbols	General hazard 	This symbol draws attention to a hazardous situation
	Electrical shock 	This symbol draws attention to the risk of electrical shock
	Notice 	This symbol draws attention where instructions must be followed
	Referral 	This symbol instructs the reader to consult to a separate information source

1.2.General safety

Before setting up the equipment:

- Read the operating instructions carefully and ensure you understand how to correctly use the equipment.
- Installation & testing must only be completed by suitably qualified personnel.
- Inspect the working environment and ensure it is clean and clear of hazards before removing equipment from packaging & product installation.
- Visually check all equipment for damage. If damaged, contact your local Meech representative before continuing.
- Always keep a copy of the operating manual close to the system to refer to.

1.3.Electrical safety

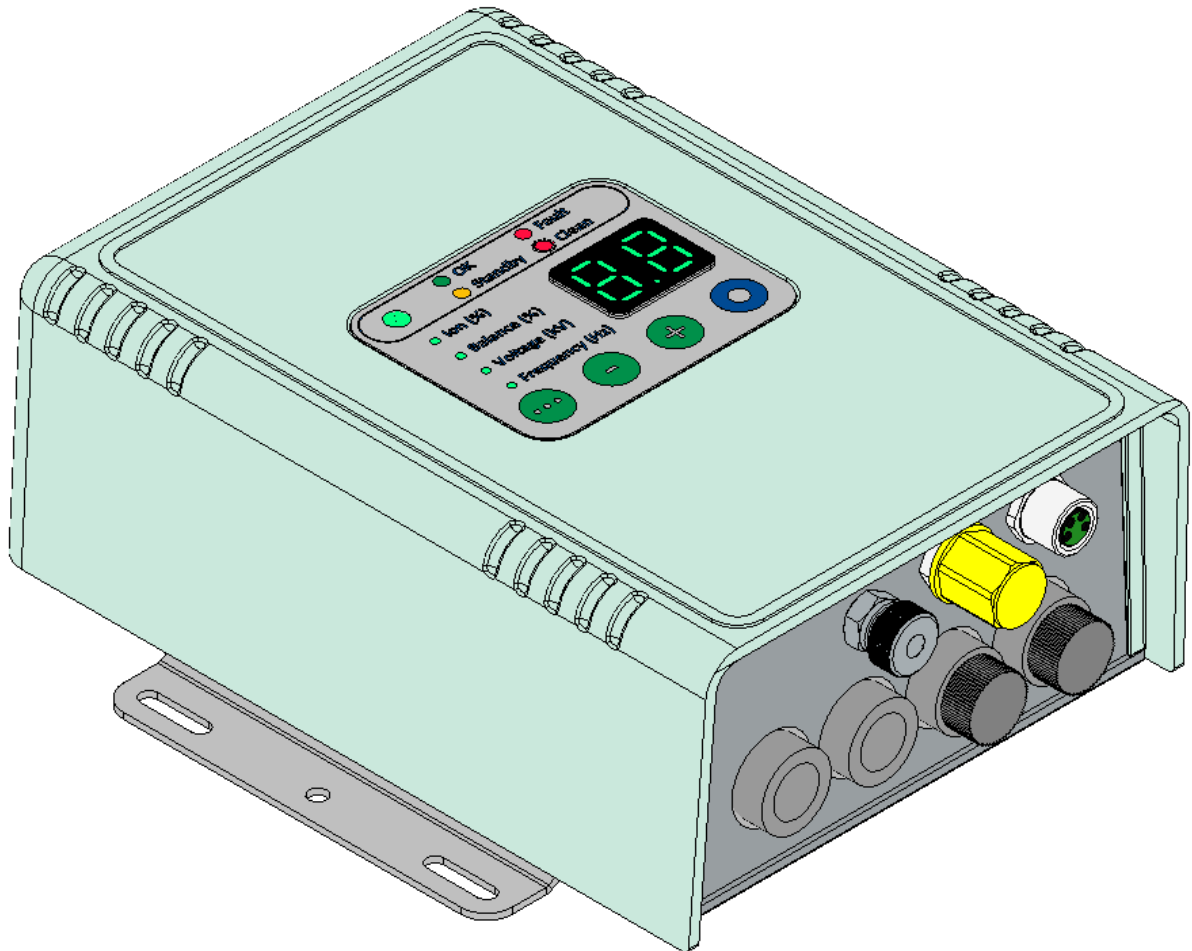
Before working on the equipment:

- Before installing, performing repairs or maintenance on the equipment, ensure the system is electrically isolated. Failure to do so could result in injury.
- Check the equipment and cables for any damage. If damaged, contact your local Meech representative before continuing.
- Ensure all wiring is completed by suitably qualified personnel.
- Check all wiring connections are correct in relation to the wiring diagrams later in this manual.

2.Introduction

The Hyperion PulseDrive Pulsed DC Controller is powered from a 24VDC power supply and produces an output of up to $\pm 15\text{kV}$ depending on the model variant, capable of driving Meech DC ionising equipment. Splitters can be used to provide additional output connections where needed.

Settings & configurations can be set with the following optional extra products: BarMaster controller or SmartControl Touch.



Hyperion PulseDrive Plus 15kV DC Controller

3.Package contents

The following items will be found inside the PulseDrive packaging:

Item	Product code	
1x Hyperion PulseDrive Pulsed DC Controller	PulseDrive Variant	Variant model code
	Lite 15kV	APD15-LITE-00
	Plus 15kV	APD15-PLUS-00
	Plus HL 5.5kV*	APD-HL5.5KV-PLUS-00
	Plus HL 9.0kV**	APD-HL9.0KV-PLUS-00
Universal Mounting Bracket Kit	KIT0286	
1x Quick start guide	PulseDrive Variant	Guide model code
	All variants	M0039

* = Suitable for 924EX

** = Suitable for 976EX

3.1.Options

The following items can be purchased from Meech to supplement & provide extra functionality to the PulseDrive.

Item	Product code
Switchmode power adaptor <i>Switchmode Power Adaptors take the local electrical supply and convert it to a stable and filtered 24VDC output.</i>	A900IPS-SM2MS
BarMaster Remote Programmer <i>The BarMaster is a remote programmer used for changing parameters on Hyperion products.</i>	A900IPS-BARMASTER
SmartControl Touch <i>SmartControl Touch allows the user to monitor, control and adjust the performance of multiple connected Hyperion ionising bars and sensors via the built-in touchscreen or remotely via PLC, tablet or remote desktop computer.</i>	ASMACTCON-TOUCH
4-pin M8 2m connection cable <i>For connection of the unit to a customer's own 24VDC power supply.</i>	A900IPS-PCS2 Contact your local Meech representative for options.

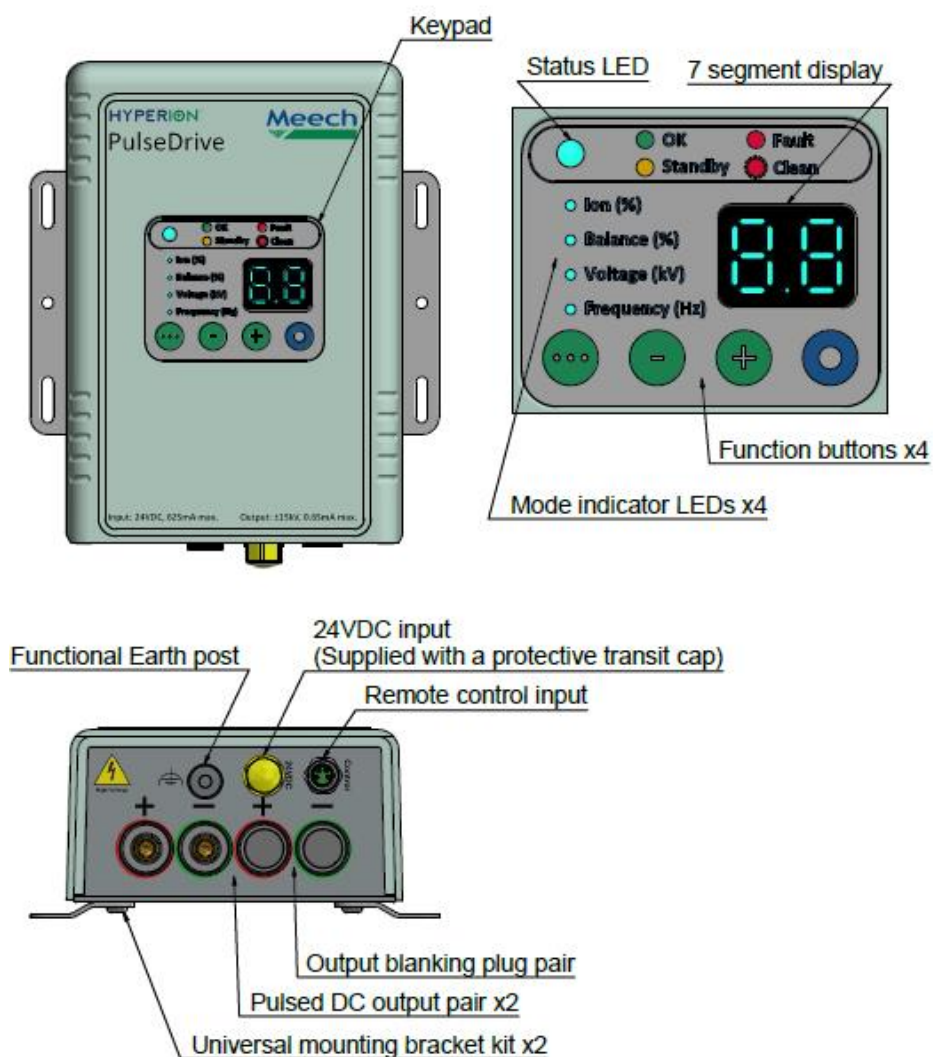
4.Unpacking the Hyperion PulseDrive Pulsed DC Controller

Carefully examine the packaging and its contents before use. If damage is evident, do not destroy the packaging and immediately notify the carrier of a possible damage claim. Shipping claims must be made by the consignee to the carrier.

5.Component overview

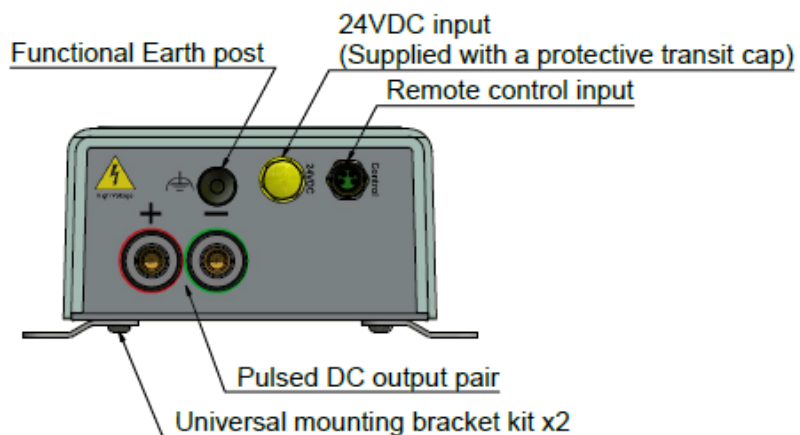
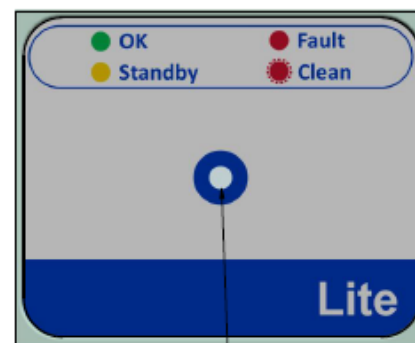
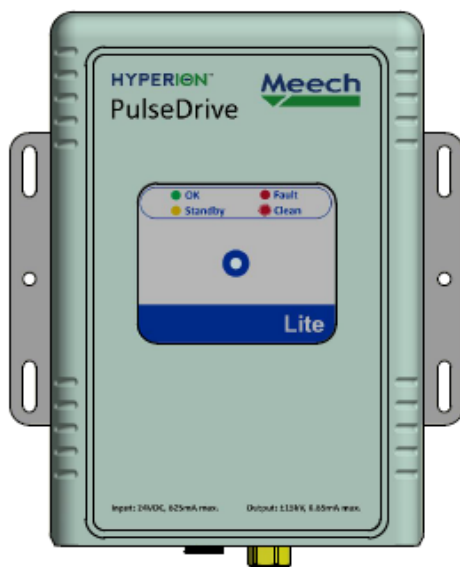
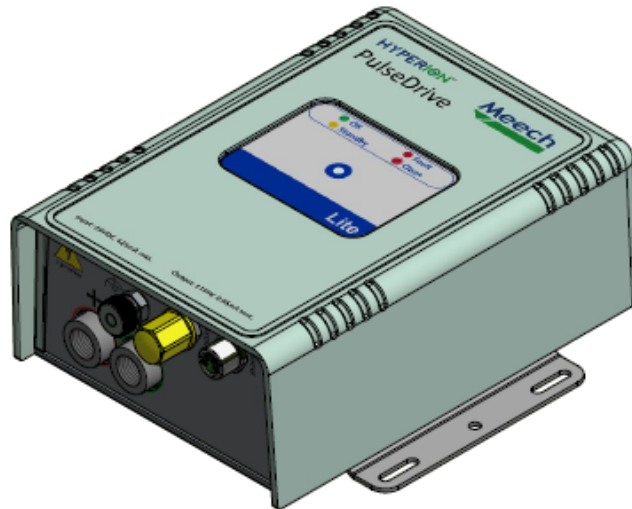
5.1.PulseDrive Plus

The PulseDrive Plus features a keypad with a seven-segment display to both view and modify its output settings. It also features a status LED to alert the user should any parameter fall outside a predetermined range.



5.2.PulseDrive Lite

The PulseDrive Lite features a status LED to alert the user should any parameter fall outside a predetermined range. A BarMaster or SmartControl is required to both view and modify its output settings.



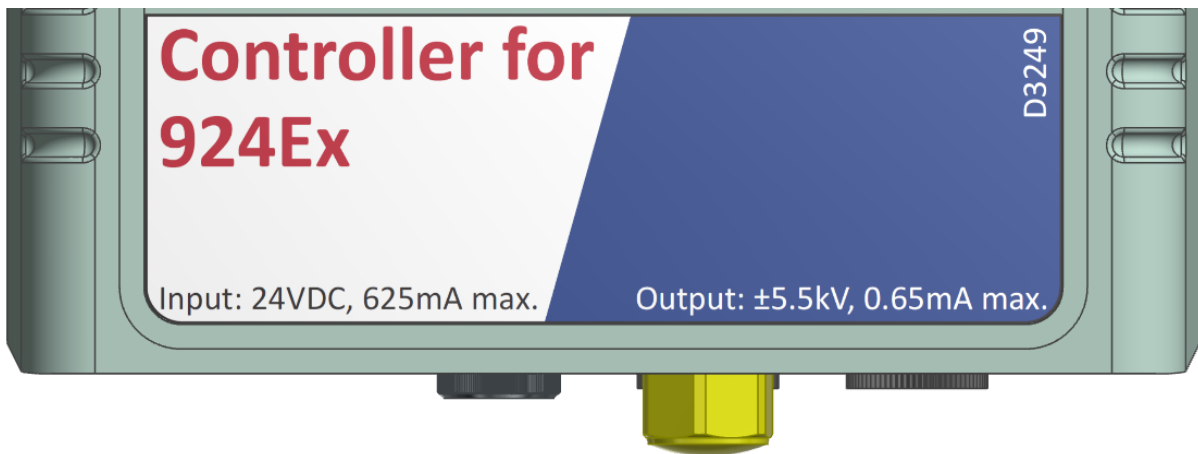
5.3.PulseDrive Plus HL variants



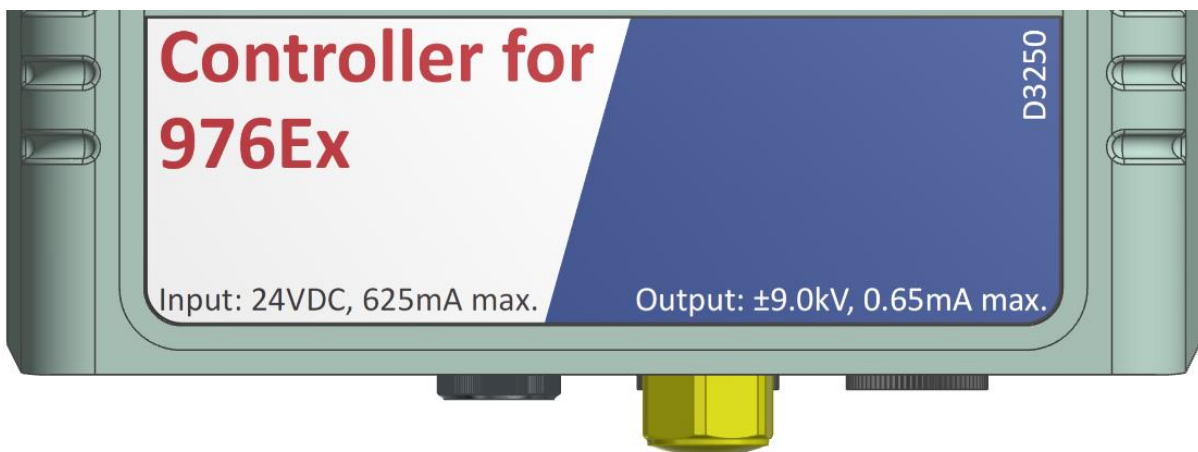
**Caution –
Risk of injury & equipment damage**

The PulseDrive must be positioned in a non-hazardous area.
The PulseDrive must **NOT** be used/placed in EX rated zones.

The PulseDrive Plus HL variants are intended to drive Meech EX ionising bars, which are designed for use within Hazardous Locations. Each HL variant has the bar it must be used with, as well as its maximum output voltage stated on the label on top of its casing.



HL 5.5kV label



HL 9.0kV label

6.Installation

6.1.Mechanical installation

The PulseDrive should be mounted on a surface capable of supporting 1kg, in a well-ventilated area, away from any sources of potential contamination. Clearance of 150mm is recommended to allow for electrical connections.

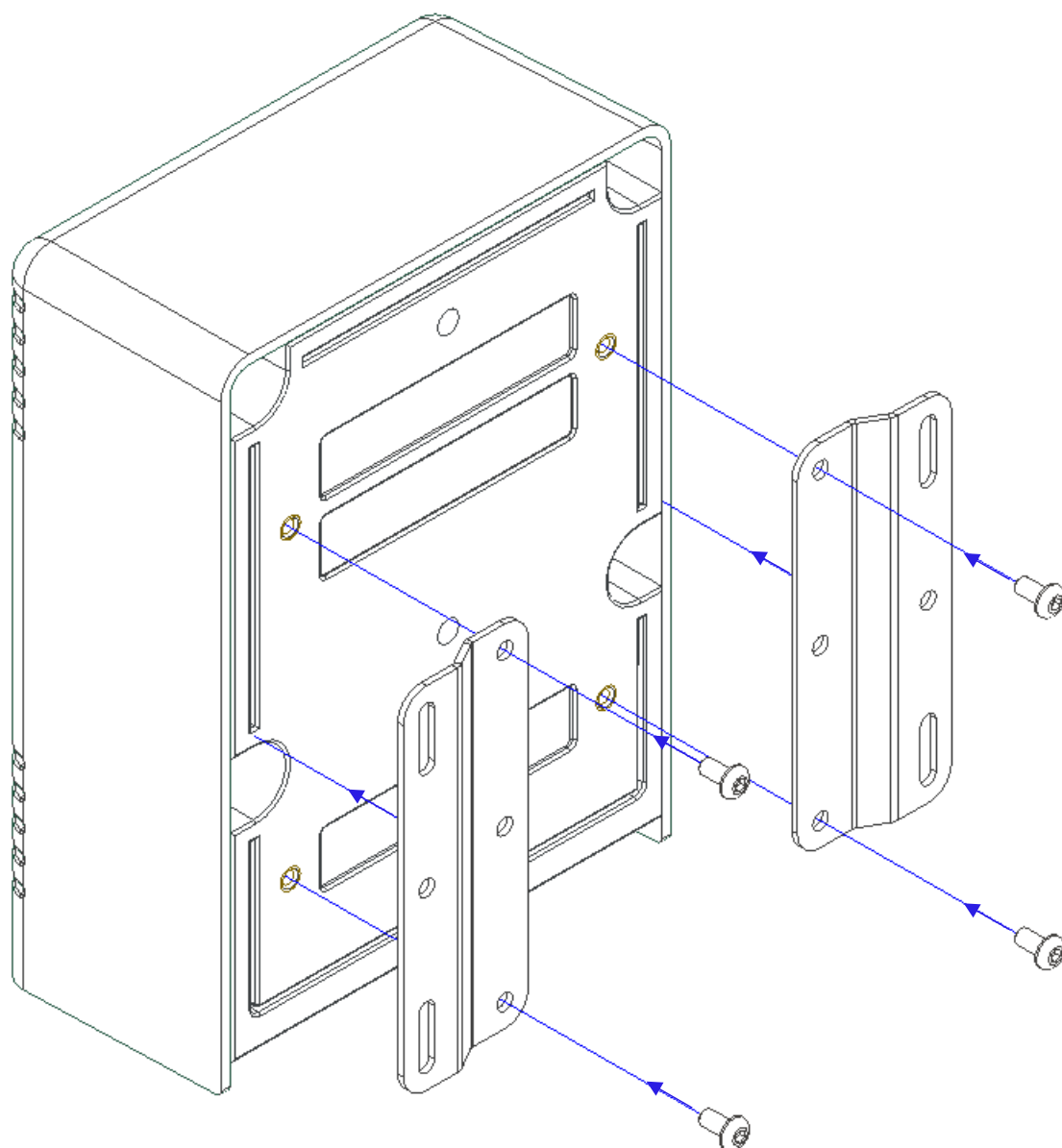


Notice –

Unit failure through contamination will invalidate the warranty.

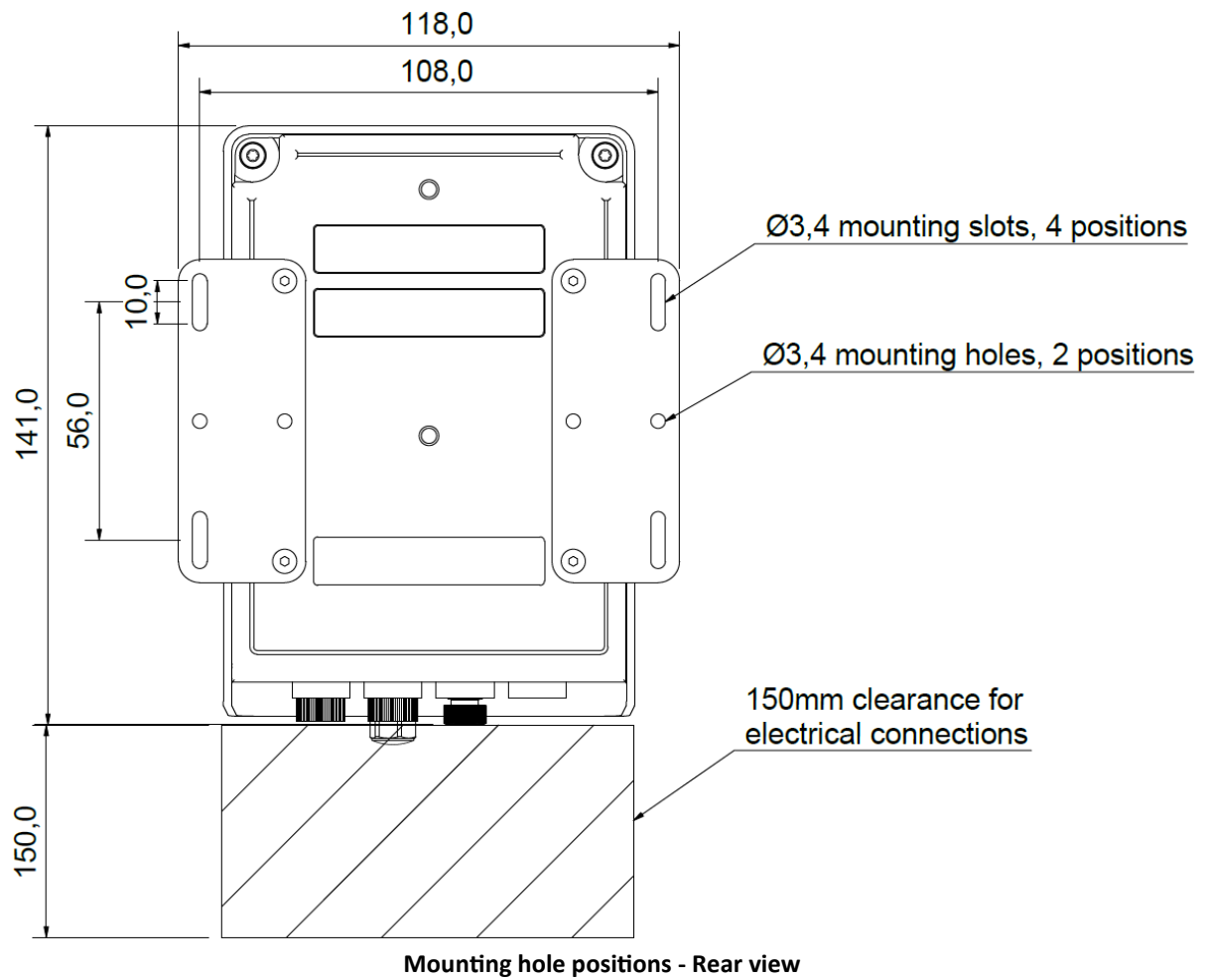
Ensure the unit is protected from sources of contamination.

1. Attach the Universal Mounting Bracket Kit to the rear of the PulseDrive using the supplied fasteners (KIT0286 - 2x mounting brackets & 4x M3x6 Hex SKT screws) with a 2mm hex key.



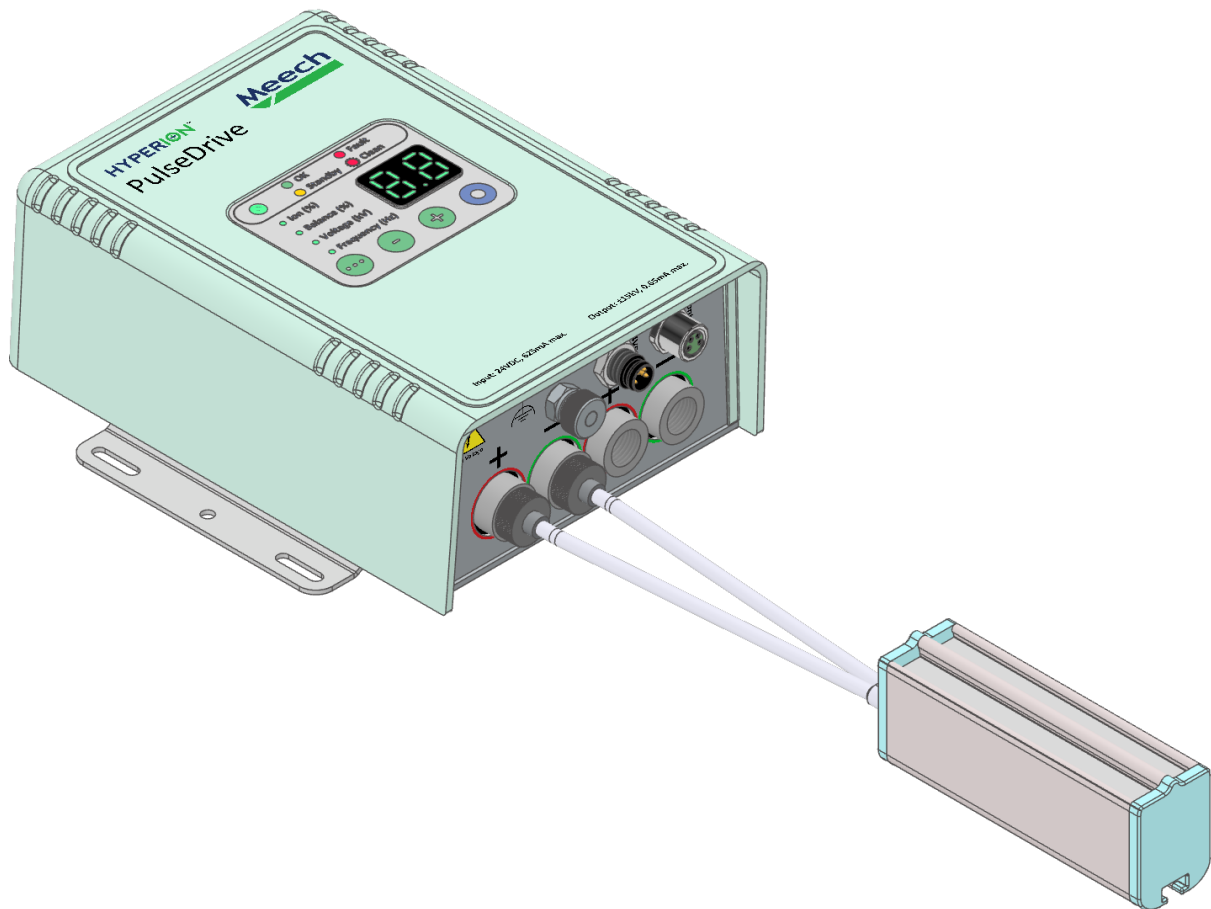
Mounting bracket installation

2. The set of 3.4mm holes & slots in the brackets are intended for mounting the unit.



6.2. Ionising product connection

The following sections detail how to directly connect 2x Meech DC ionising products via the ports on the connector end of the PulseDrive Plus, as well as detailing the necessary electrical inputs.



Example of safe connection to a Meech 924S product



Caution –

From the HV output sockets and beyond, an ES2 circuit (with respect to IEC62368-1) is present.



Please ensure that only Meech supplied products are connected to HV ports.

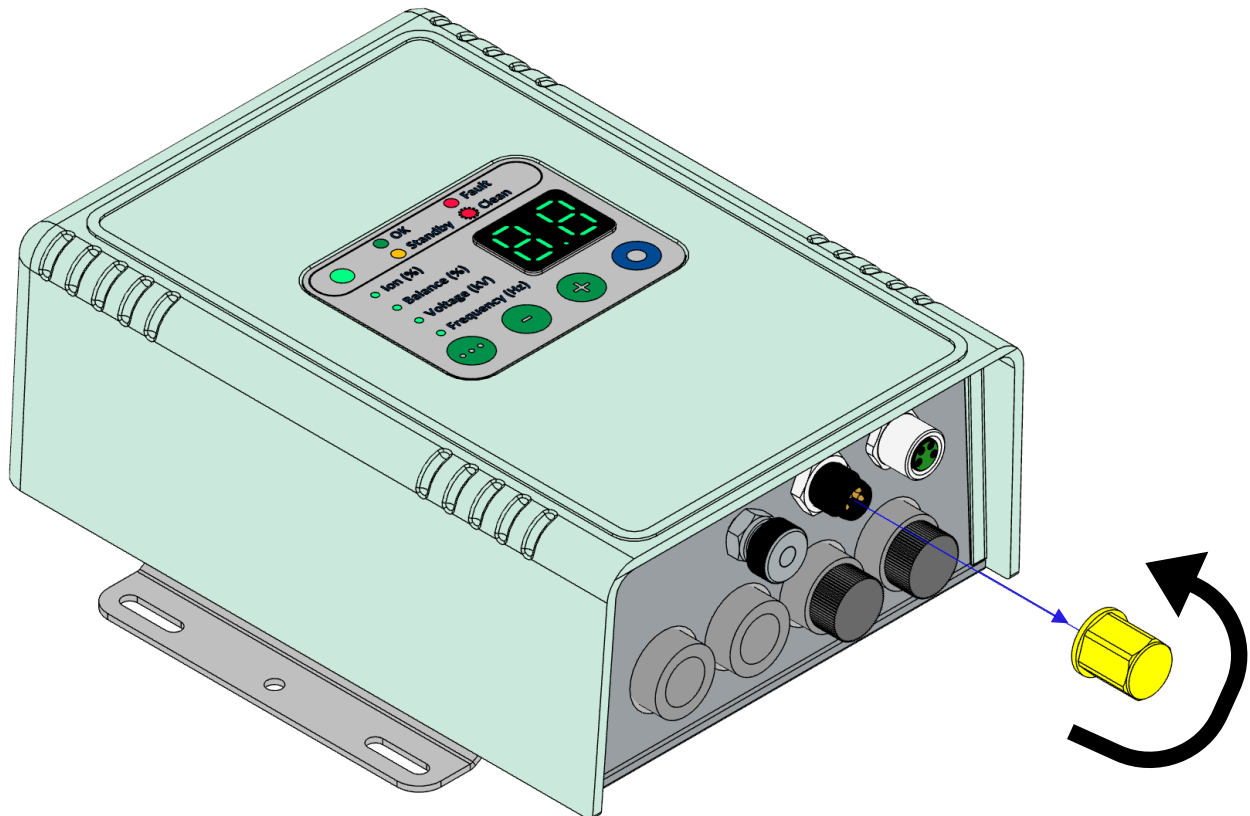
Images below show the PulseDrive Plus model, however the instructions are applicable to all variants.



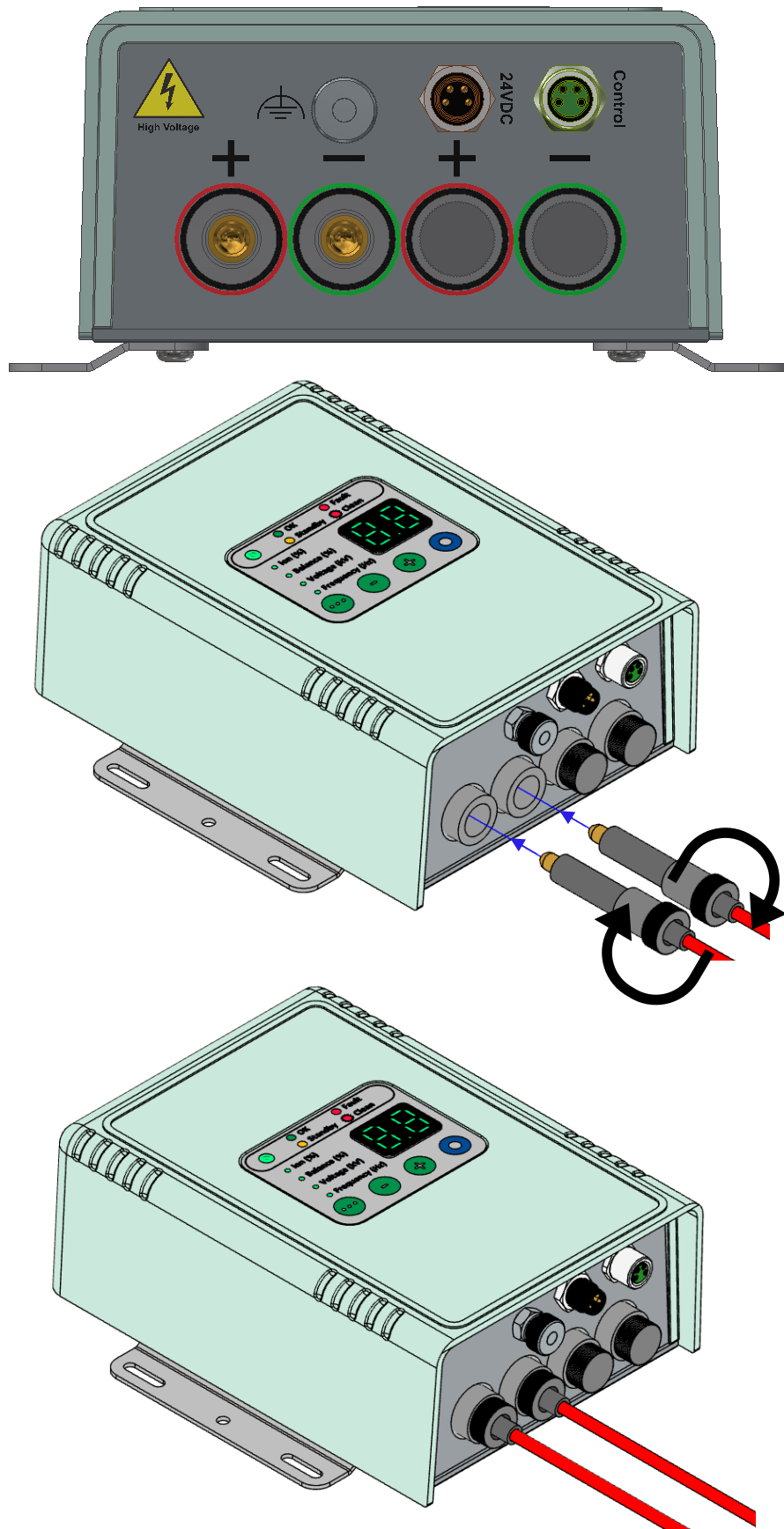
**Caution –
Injury due to electric shock.**

Before making any connections, ensure the PulseDrive is electrically isolated.

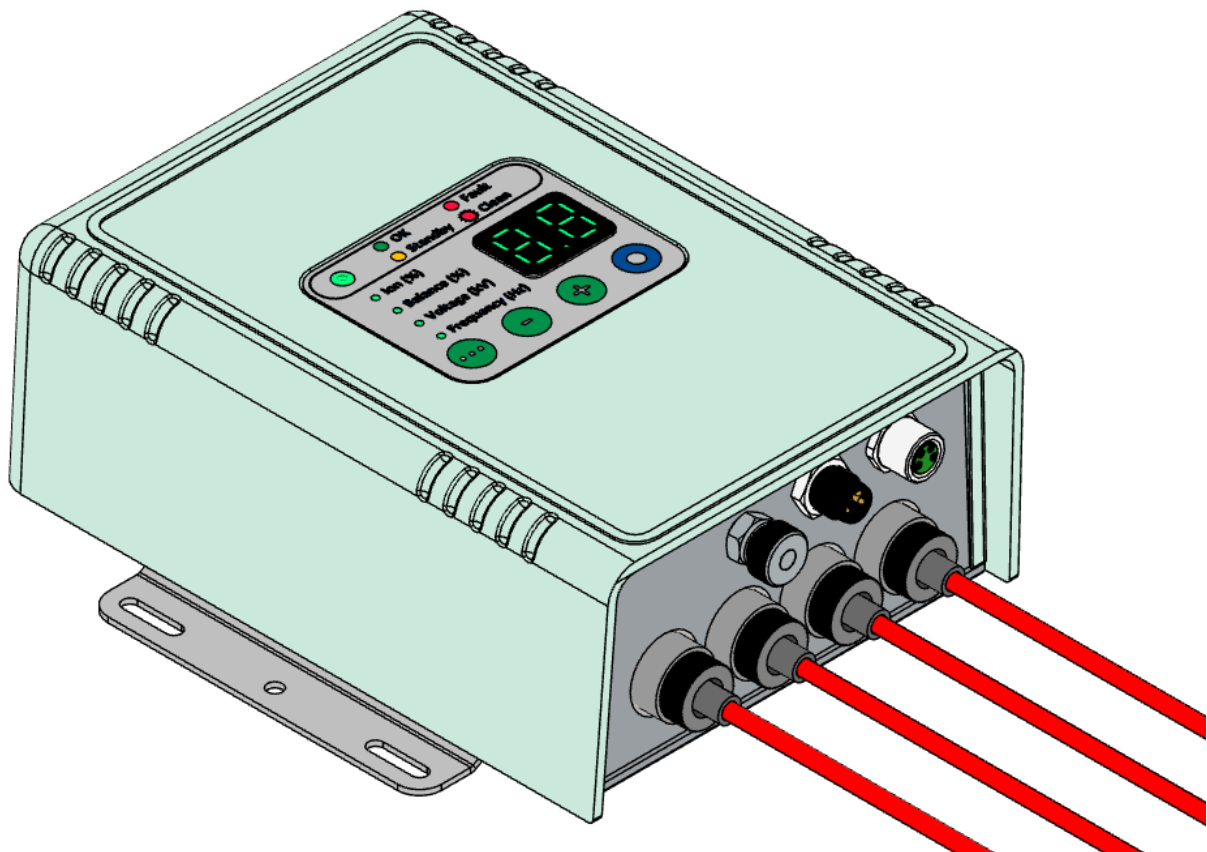
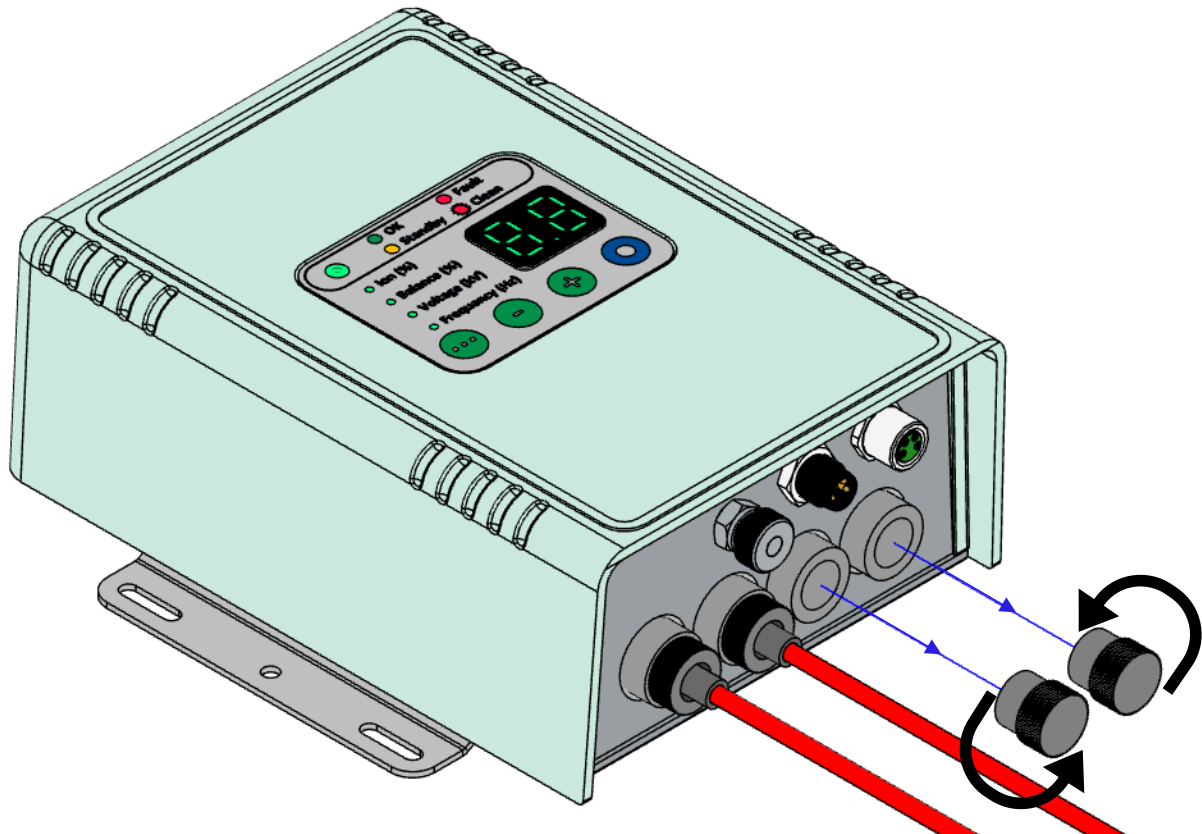
1. Remove the transit cap.



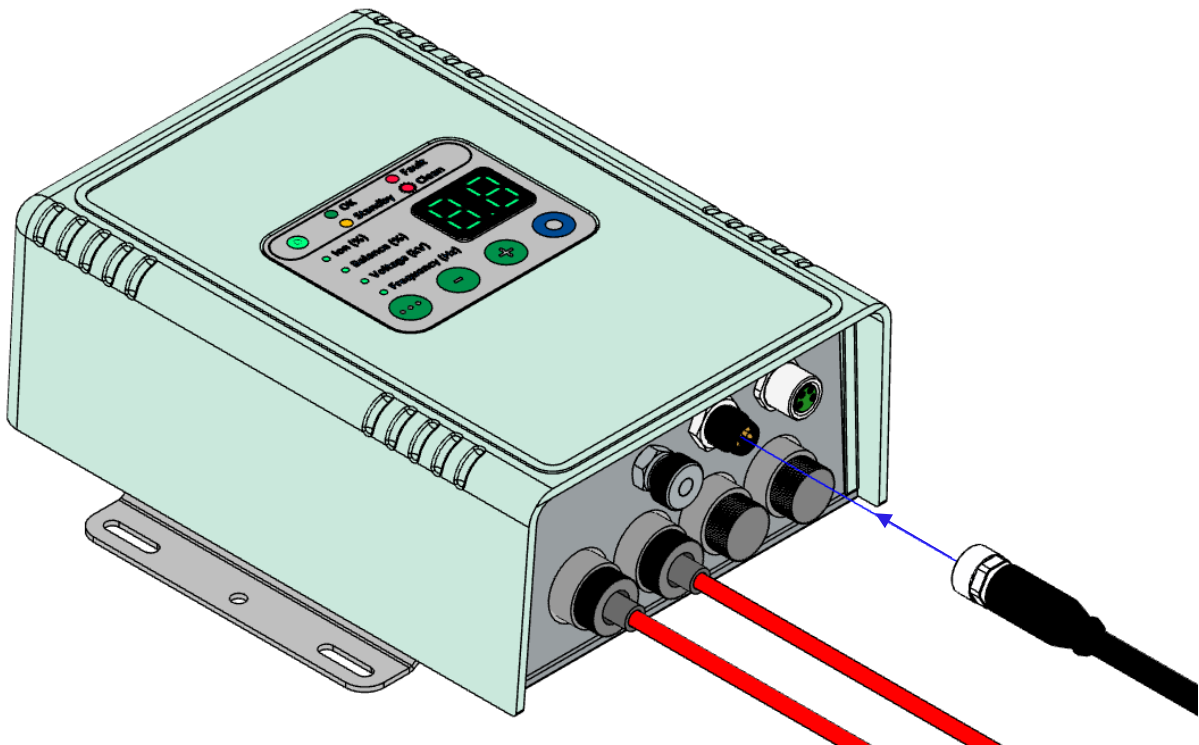
2. Insert the connectors of the DC ionising product into the PulseDrive, then fasten the threaded plug. Ensure the connection polarity is correct.



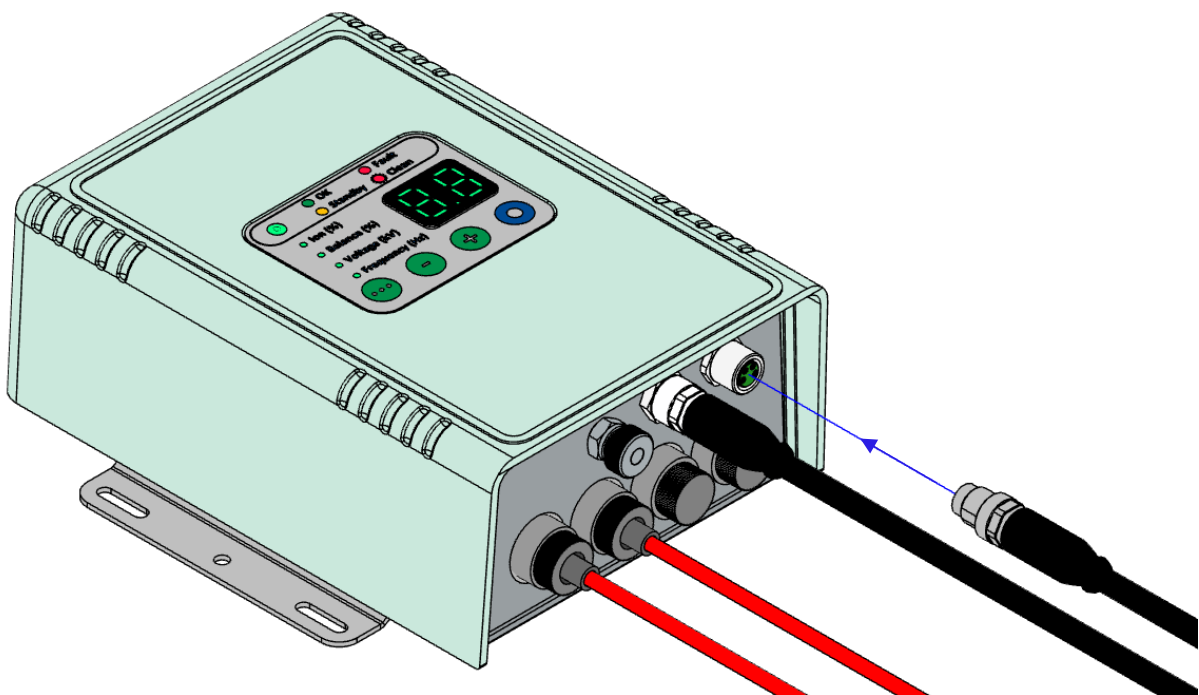
3. If 2x Meech DC ionising products are being connected (Plus variants only), remove the output blanking plugs and repeat step 2.



4. Connect the 24VDC supply cable into the 24VDC input port.



5. If required, connect the control cable into the remote-control input port.



7. Grounding & 24VDC supply

The PulseDrive must be grounded via the 24VDC supply, through Pin 3. It should also be grounded through the M4 Earth post on the unit. All power supplies used must be compliant with IEC62368-1 or IEC60950-1.



Notice –

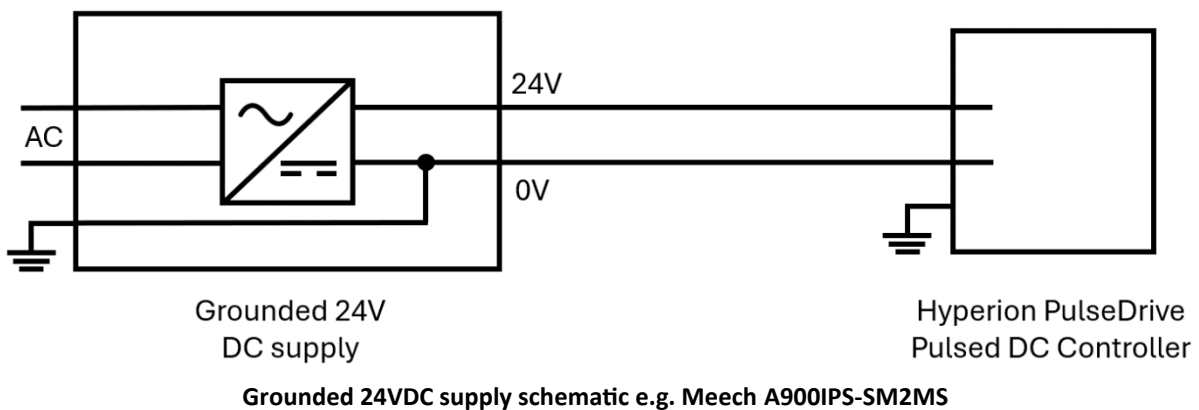
The PulseDrive must be electrically grounded.

Failure to do so may damage the equipment and will invalidate the warranty.

7.1. Powering using a Meech 24VDC power supply

This refers to the use of a Meech A900IPS-SM2MS to power the PulseDrive.

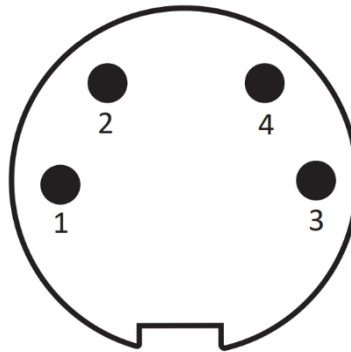
- Meech 24VDC power supplies are grounded internally & are supplied with a 3 wire IEC C5 cable.
- The ground connection must be correctly connected at the mains connection.
- The PulseDrive should also be grounded by using the M4 Earth post on the unit.



7.2.Powering using customers own 24VDC power supply

It is the customers responsibility to check that the 24VDC power supply being connected is grounded.

- The 24V power supply must be protected with a 2A fuse.
- Connection to the PulseDrive is through the M8 24VDC input 4-pin socket. The figure below shows the pin numbers of the connector. The 24V should be through Pin-1 and the ground on Pin-3.
- The PulseDrive should also be grounded by using the M4 Earth post on the unit.



Male connector on PulseDrive

Pin	Colour	Function	Specification
1	Brown	Vin	24V (22–26V)
2	White	Alert output	0V/24V
3	Blue	GND	0V
4	Black	Fault output	0V/24V



















8. Monitoring

The Meech Hyperion PulseDrive continually monitors its internal health and can trigger an alarm should any parameter fall outside a predetermined range. This includes parameters such as ion current monitoring, meaning that the user can be alerted when an ionising bar needs cleaning.

Alarms can be monitored either via the status LED, or through the alarm outputs.

8.1. Status LED

The LED colour combinations are as follows.





LED colours	Alarm status	Description – corrective actions
Green 	 Normal	Normal operation
Yellow 	 Normal	Standby
Flashing green 	 Normal	Normal operation – BarMaster/SmartControl connected
Flashing yellow 	 Normal	Standby – HV output is off, BarMaster/SmartControl connected
Red 	 Fault	HV (Overcurrent) – <i>Check outputs/reduce load</i>
Flashing red 	 Alert	Low ion current – <i>Check attached ionisers for contamination</i>
Flashing green/red 	 Fault	Internal issue – <i>Restart the device</i>
Flashing red/yellow 	 Fault	Real Time Fault Monitoring (RTFM) – <i>See table below</i>
Flashing green/yellow 	 Alert	Real Time Fault Monitoring (RTFM) – <i>See table below</i>

- **Alert** – The PulseDrive unit has a fault, and the output has been shut off.
- **Fault** – Attention may be required for the 945IPS.

8.1.1. Real Time Fault Monitoring codes

For the PulseDrive, the following RTFM codes may be observed through a red or green LED with yellow flashes to provide a more detailed status on the unit's health.

Below, red and green LEDs are shown as black for simplicity.

Yellow flashes	Description – corrective actions
2 	HV output: Over current – <i>Reduce output load</i>
3 	24VDC power supply: Under voltage – <i>Check power supply</i>
4 	24VDC power supply: Over voltage – <i>Check power supply</i>
5 	Internal temperature: Too high – <i>Ensure bar has sufficient cooling</i>

8.2.Electronic alarms

8.2.1.Remote monitoring

- Remote monitoring is provided by Pins-2&4 of the 24VDC input port. These signals output approximately 0V/24V and are suitable for direct connection to a PLC input, or to control an external 24V relay.
- On unit power-up, Pins-2&4 will remain in Hi state for up to 60 seconds before they are used as outputs.
- **Note: When a BarMaster remote programmer is connected, alert and fault outputs are temporarily disabled.**

8.2.2.Alarm outputs

- **Alert (Pin-2 White)**
This pin is used to report when attention may be required for the PulseDrive.
- **Fault (Pin-4 Black)**
This pin is used to report when the unit has a fault, and the output has been shut off.

8.2.3.Drive options

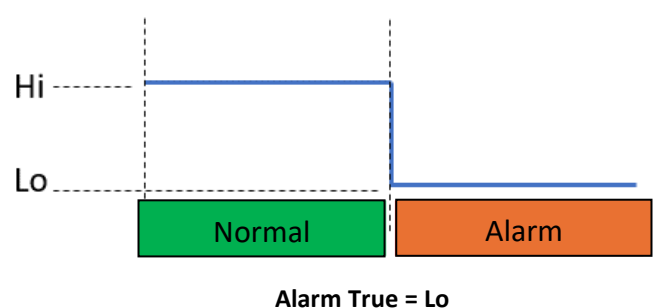
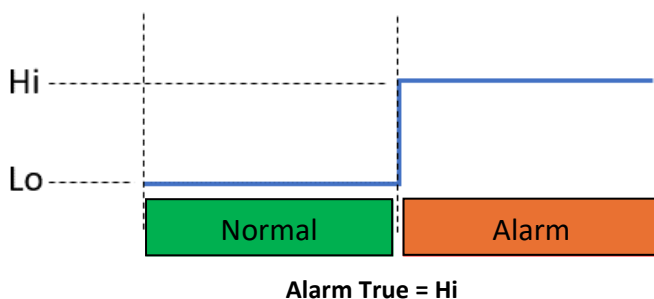
Using a BarMaster*, the output can be configured to meet most requirements. As standard, the PulseDrive will be supplied with a factory preset configuration of Output drive = NPN, where Alarm True = Lo.

There are 3 different output drive options which are designed to allow easy integration with most PLC equipment.

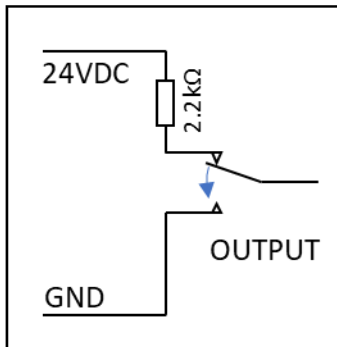
1. **Output drive = NPN** – 24V is supplied via an internal 2.2kΩ resistor, 0V is supplied directly. **
2. **Output drive = PNP** – 24V is supplied directly, 0V is supplied via an internal 2.2kΩ resistor. **
3. **Output drive = N+P** – Both 24V & 0V are supplied directly. ***

The output polarity (Alarm True) can be set to go to Hi (24V) or Lo (0V) when there is an issue.

1. **Alarm True = Hi** – This means the logic on both the alarm pins is active high.
2. **Alarm True = Lo** – This means the logic on both the alarm pins is active low.

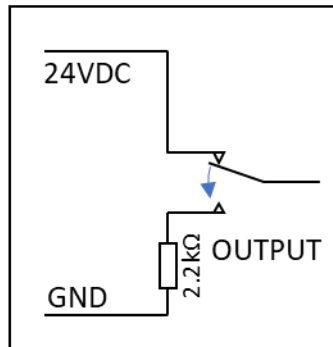


**Output Drive = NPN
Alarm True = Lo**

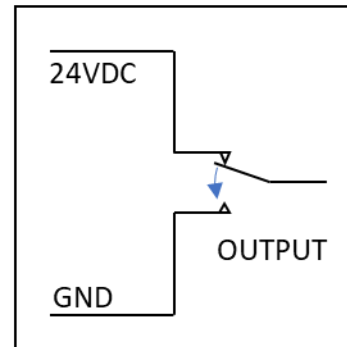


Default: Can be used for with multiple devices in parallel.

**Output Drive = PNP
Alarm True = Lo**

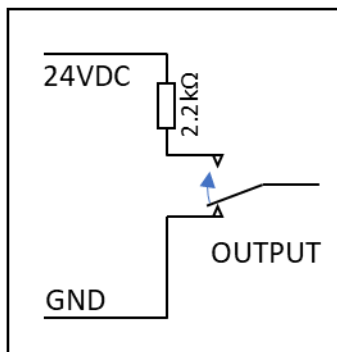


**Output Drive = N+P
Alarm True = Lo**

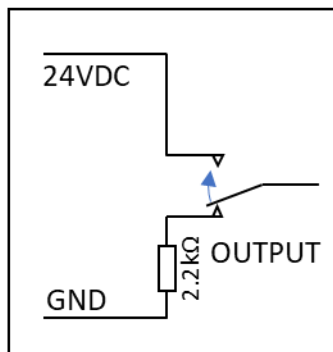


When Alarm True = Lo, OK = 24V & Alert/Fault = 0V

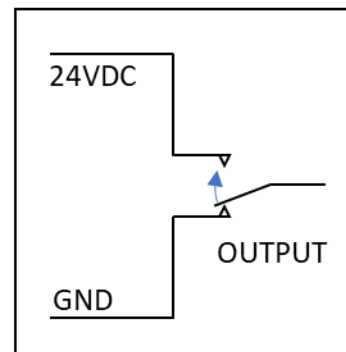
**Output Drive = NPN
Alarm True = Hi**



**Output Drive = PNP
Alarm True = Hi**



**Output Drive = N+P
Alarm True = Hi**



When Alarm True = Hi, OK = 0V & Alert/Fault = 24V

On power on, the output signal stays high for 60 seconds, so Alarm True=Hi may cause issues on power cycle.



* = Please refer to the BarMaster operating manual.

** = Using NPN (default Hi) or PNP (default Lo) allows for multiple products to be connected in parallel, triggering a common alert without interfering with each other's operation.

*** = Using N+P **does not** allow for any products to be connected in parallel.

9.Operation



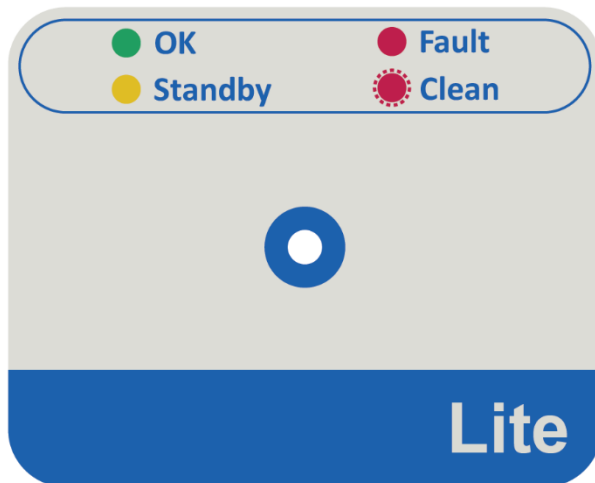
Notice –

Ionising equipment will not operate at their optimum and may be damaged if the PulseDrive's output parameters are incorrectly set.

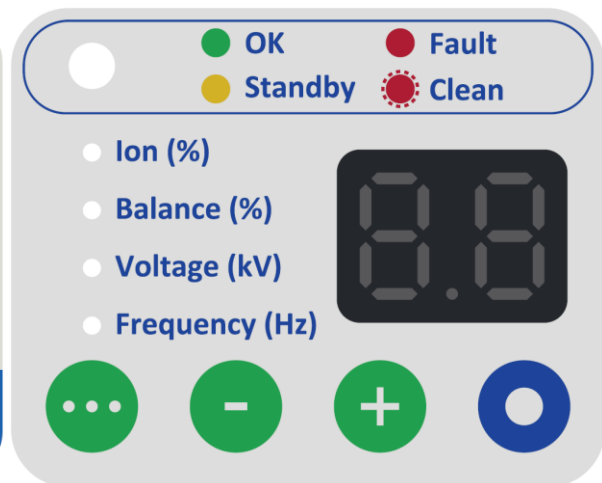
Ensure the PulseDrive's output parameters are correct for the connected ionising equipment.

There are multiple variations of PulseDrive, suitable for a wide range of applications. The main differences between the variants, are their output capabilities and the built-in functionality offered by the Plus.

All models have a status LED built-in to indicate if there are any alarms that may require attention. More details for this can be found in section 8.1.



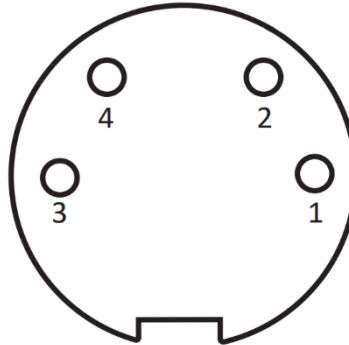
PulseDrive Lite



PulseDrive Plus

9.1.Remote control port

The 4-pin remote control input port on the connector end of the PulseDrive, can toggle the unit in and out of standby mode. This is done by connecting either Remote input A or B (Pin-2 or Pin-4) to 0V ground (Pin-3).









Female connector on PulseDrive




Pin	Function	Description
1	Not used	N/A
2	Remote input A	Toggles standby function when grounded
3	0V ground	Toggles standby function when connected to Pin-2 or Pin-4
4	Remote input B	Toggles standby function when grounded

9.2.Keypad operation (Plus variants only)

The keypad on the PulseDrive Plus allows the user to both view and modify the output settings (Ion %, Balance, Voltage, Frequency).

Lock / Unlock Keypad		
Lock/Unlock	  2s	Press & hold (2 seconds): Toggles the keypad's locked state

When Keypad is Unlocked		
Select parameter		Press to cycle through the output variable
Decrease value		Decreases the displayed variable value
Increase value		Increases the displayed variable value
Save		Saves the displayed variable value

When Keypad is Locked		
Reset ion reference	 &   5s	Press & hold both buttons (5 seconds): Reset ion reference

If an output variable has been changed but not stored within 120 seconds of the last adjustment, the changes will be discarded, and the keypad will lock.

10. Technical & construction data

Dimensions	141mm x 118mm x 55mm (LxWxH) (With mounting brackets) 141mm x 97mm x 51mm (LxWxH) (Without mounting brackets)	
Weight	600g	
Maximum ambient temperature	55°C	
Mounting	2x 3.4mm holes, 4x 3.4mmx10mm slots	
Mounting height	To comply with UL 62368-1, the PulseDrive must be mounted at a height $\leq 2\text{m}$	
Enclosure	FR ABS	
Electrical connections	2x 4-pin M8 & Earth terminal	
Input voltage	24VDC (22–26VDC)	
Input current	Maximum 625mA	
Maximum output voltage	Lite 15kV	$\pm 2\text{--}15\text{kV}$ (Default 9.0kV)
	Plus 15kV	$\pm 2\text{--}15\text{kV}$ (Default 9.0kV)
	Plus HL 5.5kV	$\pm 2\text{--}5.5\text{kV}$ (Default 5.5kV)
	Plus HL 9.0kV	$\pm 2\text{--}9.0\text{kV}$ (Default 9.0kV)
Output current	Maximum 0.65mA	
Output frequency	BarMaster or keypad adjustable between 1-20Hz (Default 20Hz)	
Output balance	Adjustable 80:20 to 20:80 Pos:Neg (Default 54:46 Pos:Neg)	
Output ports	Lite	2x High voltage connection ports (1 positive, 1 negative)
	Plus	4x High voltage connection ports (2 positive, 2 negative)
Alarm output	Dual outputs for Alert/Fault monitoring (0V/24V)	
Alarm output drives	Compatible with IEC 61131-2 type 1,2,3 plc inputs	
Local indication	Green/yellow/red LED	
Protection class	IP65 construction	

11. Technical drawings

For technical drawings, contact Meech customer services at customerservice@meech.com, providing the model code (see section 3).

12. Maintenance

The PulseDrive should be regularly cleaned with a dry cloth to keep it free from dust and other contaminants.

Should the unit become wet, ensure it is thoroughly dried before restoring power to it.

13. CE approval

A CE Declaration of Conformity for this product exists and can be provided on request.

14. Health & safety

- **Emission of Ozone**

Considerably lower than the international standard of 0.1ppm.

- **Output current**

The maximum output current is less than 5mA to prevent serious harm to the operator, nevertheless any contact with the output connectors should be avoided where possible.

15. Repairs & warranty

The Hyperion PulseDrive Pulsed DC Controller is warrantied by Meech International Ltd. to the original purchaser against defects in material and workmanship for 2 years after shipment.

For support, contact your local Meech representative. Alternatively, more details can be found at:

<https://meech.com>

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