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## 4800 DC IONISED AIR NOZZLE WITH INTEGRATED REMOTE MONITOR





Fraser static control equipment has been designed to give you many years of productive service. However, the science of static control has unique rules which must be followed to allow the equipment to give a good return on your investment.



Please read the following operating and maintenance instructions carefully.

| Contents                                  | Page |
|---|------|
| 1 Introduction                            | 4    |
| 2 Checking On Delivered Equipment         | 5    |
| 3 Safety                                  | 6    |
| 4 Electrical Connections                  | 7    |
| 5 Air Connection and Supply               | 9    |
| 6 Mounting and Location                   | 10   |
| 7 Monitoring: LED and Remote              | 11   |
| 8 Commissioning and Operation             | 12   |
| 9 Maintenance                             | 13   |
| 10 Troubleshooting                        | 14   |
| 11 Technical Specification and Dimensions | 15   |
| 12 Remote Interface and Wiring Examples   | 18   |
| 13 Accessories                            | 26   |

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## 1. Introduction

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The Fraser 4800 DC Ionised Air Nozzle ('the Ioniser') is part of a high-performance range of static eliminators from Fraser Anti-Static Techniques. These products are used by leading manufacturers throughout the world to increase safety and productivity.

Before you install the Ioniser, please follow the installation instructions carefully for maximum benefit.

### 1.1. Features and Benefits

- The Fraser 4800 DC Ionised Air Nozzle is designed to neutralise and clean electrostatically charged surfaces and small products.
- The use of Pulsed-DC high voltage provides excellent charge decay performance even at longer distances, and ion balance suitable for most industrial applications.
- The flat nozzle produces intense airflow, which transports the ionised air at high speed for optimal cleaning and blow-off capability.
- Powered by 24 V DC, it features integrated high voltage supplies meaning that no high voltage cabling is required.
- The status of the Ioniser, including need for cleaning, is indicated by a single LED. An 'ATTENTION' output signal and a 'STANDBY' input signal enable integration with control system/PLC.
- The 24 V DC power supply and remote signalling connections are made via an M8, 4-pin connector. An external AC-DC PSU can be ordered if 24 V DC is not available.
- Mounting onto the machine is achieved with fixing holes integrated into the product body.
- The Ioniser is intended for use in indoor factory environments only. It is not suitable for outdoor use.

### 1.2. Explanation of Symbols

#### Warning!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in serious personal injuries.



#### Caution!

This symbol appearing in the operating instructions refers to operations which, if carried out improperly, may result in damage to property.



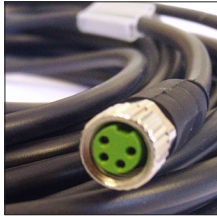
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## 2. Checking On Delivered Equipment

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Before starting the installation please check that the Ioniser has not been damaged in transit. If the packaging material is damaged, please report this immediately to the vendor.

Check that the additional items are present with the Ioniser:



### Power Supply Cable

If ordered, a 24 V power supply cable with an M8 x 4-pin connector will be supplied.

See Section 13 for details of cables and other accessories.



### AC-DC Power Supply Unit

If ordered, a 24 V DC output, 100 - 250 V AC input PSU (Part No. E3024-PSU) will be supplied. The 0 V output is earthed and a secondary safety earth connection is provided.

**IMPORTANT:** DO NOT USE standard 'computer style' PSUs without earthed outputs to avoid risk of operator shocks and damage to the PSU or Ioniser.



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### 3. Safety

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The Ioniser has been designed in accordance with the safety requirements of the EU Low Voltage Directive.

#### Warnings:

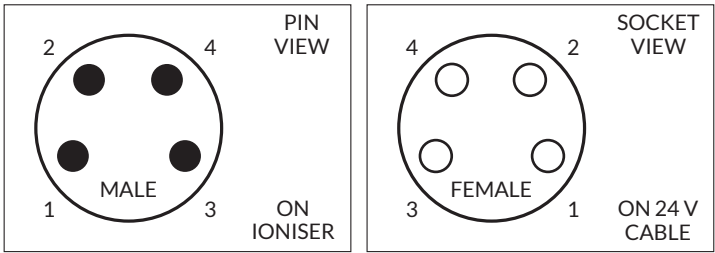


- The product should be cleaned regularly. The product **should not** be cleaned while powered.
- The emitter pins are a Class 1 electrical energy source. Direct contact with the emitter while the product is powered will not result in electrically-caused injury, but may cause a detectable sensation due to the small current that will flow.
- The emitter pins are necessarily sharp. The emitter pins are a Class 2 mechanical energy source. Contact with the emitters during cleaning may be painful, but will not cause an injury requiring emergency medical attention.
- Installation and maintenance must only be carried out by suitably qualified personnel.
- The negative pole of the 24 V DC supply provided to the product must be permanently earthed.
- Adequate installation earth / ground is required to ensure safe and proper operation.
- Do not connect or disconnect the M8 cable from the Ioniser while it is powered.
- A small amount of ozone will be produced as part of the ionisation process. When installed correctly the level of concentration of ozone is less than 0.1 ppm and is within internationally accepted limits.
- Faulty air hoses and connectors can cause serious injury. Only install compressed air hoses when depressurised.
- Noise levels must be checked in final installation and operating air pressure.

## 4. Electrical Connections

### 4.1. M8 Pin Assignments

The M8 connector pin numbering scheme is shown below. Note that due to the ‘STANDBY’ input, this numbering scheme differs from other Fraser products, such as the 3024 and 3014 bars.



The pin assignment and typical wire colours are given in the table below. This refers to cables supplied by Fraser. Other cables may have different colour schemes.

| Pin | Wire Colour | Function                  | Details  |
|-----|-------------|---------------------------|--|
| 1   | Brown       | +24 V                     | 21 – 28 V operating range, 0.25 A maximum current.   |
| 2   | White       | ‘STANDBY’ Input Signal    | Applying a voltage of between +21 V and +28 V causes the product to enter ‘STANDBY’ mode, in which the high voltage output is disabled and the LED flashes red. Either leave disconnected or connect to 0 V if not required. 5 k $\Omega$ nominal input impedance. |
| 3   | Blue        | 0 V and GND               | 0 V <b>must</b> be connected to ground.  |
| 4   | Black       | ‘ATTENTION’ Output Signal | +24 V nominal output voltage, 3 k $\Omega$ output impedance in active state. Low impedance connection to 0 V in inactive state.  |

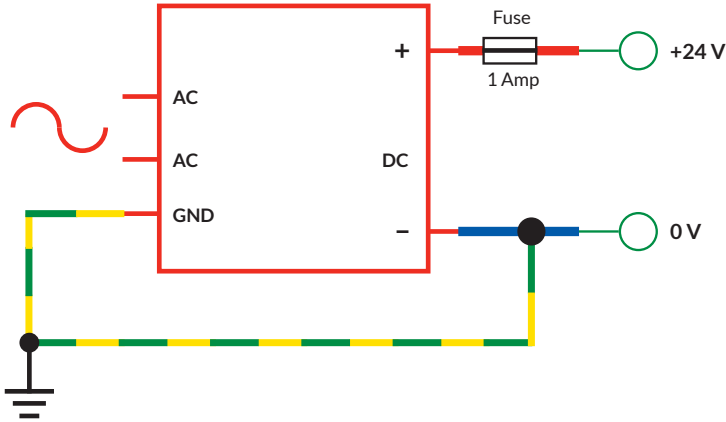
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## 4. Electrical Connections

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### 4.2. Power Supply Connections

The diagram below shows the power supply connection requirements when using the 24 V DC power supply on the customer's machinery.



The 24 V supply connection (Pin 1, brown wire) **must be** fitted with a 1 A fuse. It is recommended that a type 'T' or 'G' fuse is installed.

The 0 V supply connection should be earthed. This connection should be made at the power supply output terminal if possible.

The earthing terminal on the product **must** be connected to installation protective earth (PE).

**WARNING:** If the product is not properly earthed, there is a risk of the operator receiving an electric shock from the product.

**CAUTION:** If the product is not earthed the residual ion balance of the product cannot be guaranteed.

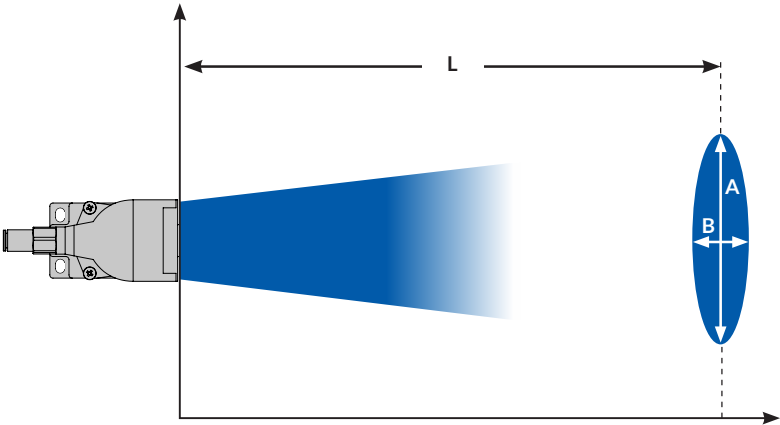




## 5. Air Connections and Supply

- Connect a 6 mm airline to the air inlet mounted on the rear of the nozzle of the Ioniser. Only use oil-free, dry and filtered compressed air.
- Compressed air hoses should be kept as short as possible. Kinks and bends less than 3x hose diameter should be avoided. Unnecessary quick-lock couplings in the air hose should be avoided to minimise pressure loss.
- A pressure regulator is recommended to set the best pressure for the job to be done. The maximum pressure that the Ioniser can accept is 10 Bar (145 psi).
- Exceeding the maximum pressure of 10 Bar will damage the nozzle.

### Jet Pattern of the 4800 DC Ionised Air Nozzle

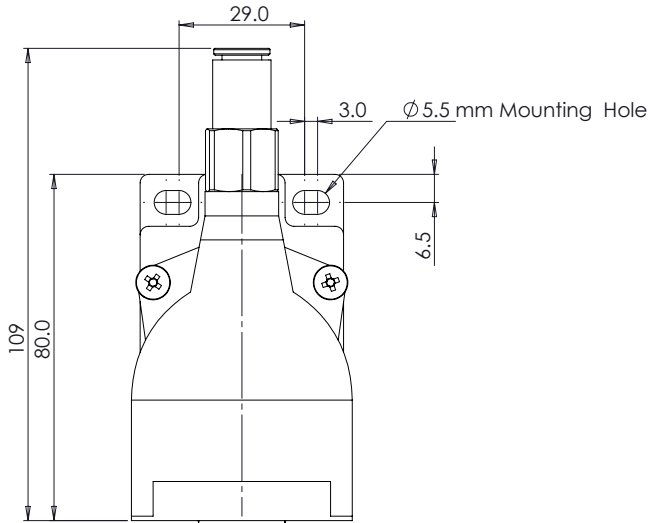


| Pressure        | 1 Bar | 3 Bar | 5 Bar |
|-----------------|-------|-------|-------|
| Distance L (mm) | 750   | 900   | 900   |

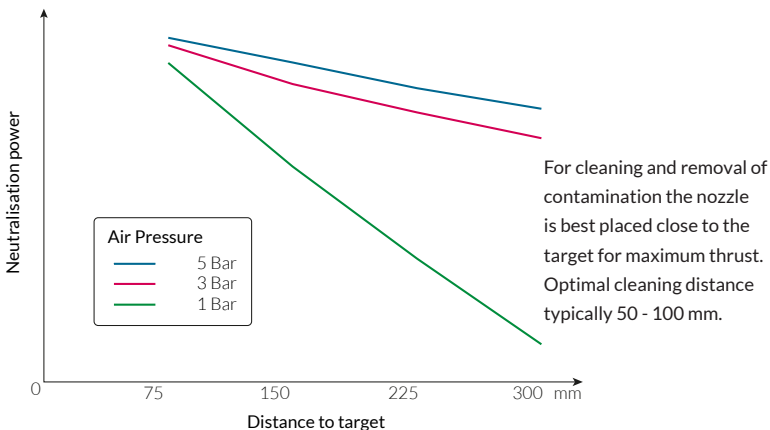
### Jet dimensions at L

|        |     |     |     |
|--------|-----|-----|-----|
| A (mm) | 170 | 210 | 240 |
| B (mm) | 150 | 180 | 210 |

## 6. Mounting and Location



- Use M5 fastenings through the 5.5 mm diameter holes to mount the Ioniser.
- The emitters of the Ioniser should face the product to be neutralised, and the emitters should both be mounted a minimum of 25 mm (ideally at least 50 mm) from an earthed metal object.
- Sharp metal edges within 50 mm of the emitters should be avoided.
- Neutralisation power is a function of distance to target and air pressure. See the graph below.



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## 7. Monitoring: LED and Remote

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The LED on the loniser indicates its status as follows:

| LED Indication     | loniser Status  | Ionisation |
|--------------------|---|------------|
| Green              | OK  | Active     |
| Green/Red flashing | Cleaning/attention required   | Active     |
| Red                | Overload, over temperature, hardware fault, supply voltage out of range | Inactive   |
| Red Flashing       | 'STANDBY' mode  | Inactive   |
| Not illuminated    | loniser not powered   | Inactive   |

The loniser is equipped with a remote monitoring interface which allows the operating status of the product to be fed into a PLC system or checked remotely.

Please see Section 12 for wiring instructions and examples for the remote monitoring interface.

**Please read these instructions carefully before installing the loniser, because the electrical specifications and signalling scheme of the remote monitoring interface differ from those of other Fraser 24 V DC static eliminator products (3014, 3024 and NEOS series bars).**



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## 8. Commissioning and Operation

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Before turning the Ioniser on for the first time, check:

- The positioning and mounting of the Ioniser. The emitters of the Ioniser should face the product to be neutralised, and the emitters should both be mounted a minimum of 25 mm (ideally at least 50 mm) from an earthed metal object. Sharp metal edges within 50 mm of the emitters should be avoided.
- All metal objects, structures and surfaces in proximity to the product are earthed, such that the proximity of the high voltage emitters does not cause these objects to become electrically charged.
- The electrical installation of the Ioniser has been completed in accordance with the wiring instructions in this document. In particular, ensure that the 0 V supply return is connected to earth.
- Noise levels have been checked in final installation and at operating air pressure.
- If using the external AC-DC power adapter, ensure that the supplementary grounding wire is connected to the installation protective earth.
- Any operators who will work in close proximity to the Ioniser are aware of its presence and familiar with its operation.

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## 9. Maintenance

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**WARNING: Always disconnect power before working on the Ioniser.**  
**Only disconnect and connect compressed air hoses when depressurised.**



Cleaning is the only maintenance required. Dirt around the emitters will reduce ionisation effectiveness and result in unsatisfactory static neutralisation performance.

The frequency of cleaning will depend on the process and the environment in which the Ioniser is installed. The Ioniser should be cleaned when an 'ATTENTION' state is indicated by the LED, or after approximately 1 month of continuous operation, whichever occurs first.

To ensure best performance, the Ioniser should be visually inspected on a regular basis and cleaned whenever convenient.

A cleaning kit is available from Fraser, Part No. 81220. This is the ideal solution for regular Ioniser cleaning. Alternatively a toothbrush or soft nailbrush can be used. Do not use a wire brush as this may cause damage to the Ioniser.

Alternative cleaning materials are warm soapy water, or isopropyl alcohol (IPA). The Ioniser must be dry before the power is switched back on.

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## 10. Troubleshooting

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In the event of problems with the product, please use the following checks:

| Symptom   | Cause(s)   | Solution(s)  |
|---|--|--|
| No LED<br>(not illuminated)                       | Product not powered.                                       | <ul style="list-style-type: none"><li>• Check power supply and connections.</li><li>• Check external fuse.</li><li>• Check supply cable for damage.</li></ul>                                |
| Constant Red LED                                  | Power supply voltage outside of specified range.           | <ul style="list-style-type: none"><li>• Check and adjust power supply voltage.</li><li>• Ensure appropriate power supply cable used.</li><li>• Ensure power supply not overloaded.</li></ul> |
|   | Internal fault.  | <ul style="list-style-type: none"><li>• Contact supplier.</li></ul>  |
| Flashing Red LED                                  | Product in 'STANDBY' mode.                                 | <ul style="list-style-type: none"><li>• Connect pin 2 of the M8 connector (usually white wire) to 0 V, or leave disconnected. Refer to installation instructions.</li></ul>                  |
| Flashing Red/<br>Green LED                        | Emitters need cleaning.                                    | <ul style="list-style-type: none"><li>• Power off product, clean emitters.</li></ul>   |
| Poor Ionisation/<br>Neutralisation<br>Performance | Emitters need cleaning.                                    | <ul style="list-style-type: none"><li>• Power off product, clean emitters.</li></ul>   |
|   | Emitters worn.   | <ul style="list-style-type: none"><li>• Check emitters for excessive wear.</li></ul>   |
|   | Ioniser installed too far from material to be neutralised. | <ul style="list-style-type: none"><li>• Review installation, move ioniser closer to material if possible. Refer to installation instructions.</li></ul>                                      |
|   | Emitters too close to earthed metal surfaces.              | <ul style="list-style-type: none"><li>• Review installation, move ioniser further away from earthed metal surfaces if possible. Refer to installation instructions.</li></ul>                |

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# 11. Technical Specification and Dimensions

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## Power Supply

|                      |   |
|----------------------|---|
| Input Voltage:       | 24 V DC nominal, 21 - 28 V operating range<br>0 V earthed |
| Input Current:       | 0.25 A max  |
| Maximum Input Power: | 7 W   |
| Input Connector:     | M8, 4-pole, male  |

## Output

|                        |  |
|------------------------|--|
| Ionisation Method:     | Pulsed DC  |
| Output Voltage:        | +/- 7 kV nominal   |
| Output Frequency:      | 10 Hz as standard<br>Other frequency on request from 1 - 50 Hz |
| Emitter Material:      | Tungsten   |
| Emitter Touch Current: | <100 $\mu$ A   |

## Monitoring

|                        |   |
|------------------------|---|
| LED Status Indication: | Flashing Green: OK, Ioniser operating normally<br>Flashing Red / Green: Ioniser requires cleaning<br>Constant Red: Supply voltage out of range or internal fault<br>Flashing Red: Ioniser in 'STANDBY' mode |
|------------------------|---|

## Remote Monitor Output

|                           |  |
|---------------------------|--|
| Signalling Output:        | 'ATTENTION' output signal on pin 4 (black wire)  |
| Output Signalling Levels: | 24 V output, 3 k $\Omega$ output impedance   |
| Output Current:           | Sourcing (+24 V): 8 mA<br>Sinking (0 V): 20 mA<br>Limited to 50 mA max (output low) by internal protection |
| PLC Compatibility:        | Compatible with IEC 61131-2 Type 3 PLC inputs  |
| Remote Monitor States:    | +24 V: Ioniser OK<br>0 V: Ioniser requires cleaning, Ioniser fault,<br>Ioniser in 'STANDBY' mode           |

## Remote Input

|                          |   |
|--------------------------|---|
| Signalling Input:        | 'STANDBY' input signal on pin 2 (white wire)  |
| Input Signalling Levels: | 0 V / 24 V nominal signal level (28 V max)<br><1 V or disconnected: Ioniser operates normally<br>>21 V: Ioniser in 'STANDBY' mode |
| Input Signalling Delay:  | <1 s  |
| Input Impedance:         | 5 k $\Omega$ nominal input impedance  |

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# 11. Technical Specification and Dimensions

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## Protection

|                             |  |
|-----------------------------|--|
| <b>Internal Protection:</b> | Under-/over-voltage indication, surge protection, reverse supply polarity protection<br>HV supplies protected against internal overload and short-circuit<br>Signalling output protected against short-circuit |
|-----------------------------|--|

## Air Supply

|                         |                   |
|-------------------------|-------------------|
| <b>Air Pressure:</b>    | Maximum 10 Bar    |
| <b>Air Fitting:</b>     | 6 mm OD push fit  |
| <b>Air Consumption:</b> | 300 L/min @ 2 Bar |
| <b>Blowing Force:</b>   | 2.4 N @ 2 Bar     |

## Environmental Conditions

|                             |  |
|-----------------------------|--|
| <b>Ambient Temperature:</b> | 0 – 55 °C                                    |
| <b>Relative Humidity:</b>   | Maximum 70 % rH, non-condensing              |
| <b>Ingress Protection:</b>  | IP67   |
| <b>Vibration:</b>           | Installation location must be vibration-free |

## Mechanical

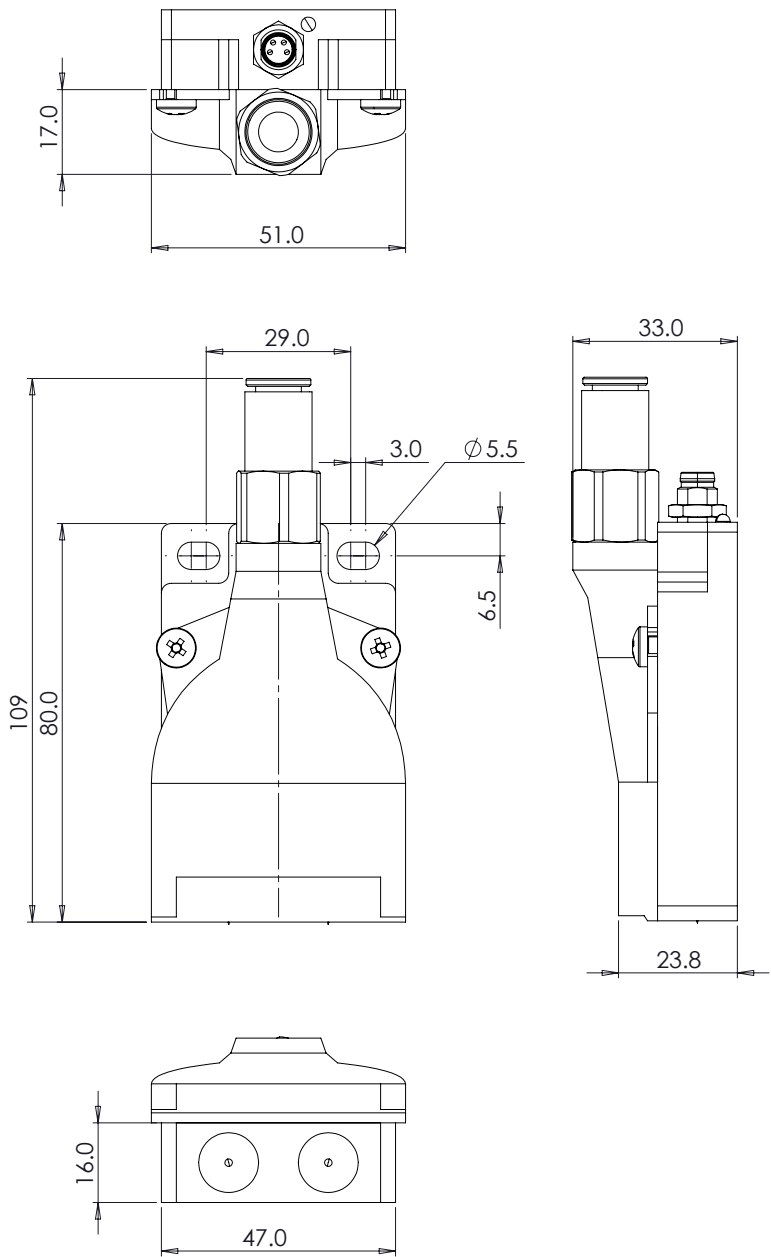
|                    |   |
|--------------------|---|
| <b>Dimensions:</b> | 80 mm x 51 mm x 33 mm (excluding connector)                           |
| <b>Mass:</b>       | Static Eliminator 100 g, Nozzle 60g                                   |
| <b>Materials:</b>  | PVC body, epoxy resin encapsulant, tungsten emitter, aluminium nozzle |

## Regulatory

|                   |  |
|-------------------|--|
| <b>CE Marking</b> | EU LVD (2014/35/EU)<br>EU EMCD (2014/30/EU):<br>EN 61000-6-3:2007, EN 61000-6-2:2005 |
| <b>Approvals</b>  | UL Certified (3024 Ultra-Compact incorporated within 4800 DC)                        |



11. Technical Specification and Dimensions



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## 12. Remote Interface and Wiring Examples

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This section describes the functioning of the remote monitoring interface in more detail and provides wiring examples for common installation types.

### 12.1. Remote Output Signalling Scheme

The remote monitoring interface has one output signal, '**ATTENTION**'.  
The signalling scheme is described in the following table:

| Condition  | Ionisation        | ATTENTION<br>(Black, Pin 4)                    |
|--|-------------------|--|
| Ioniser powered, all OK                                  | ACTIVE (HV ON)    | ACTIVE (24 V)                                  |
| Ioniser powered, requires attention (e.g. cleaning)      | ACTIVE (HV ON)    | INACTIVE (0 V)<br><b>Will sink current</b>     |
| Overload, hardware fault,<br>supply voltage out of range | INACTIVE (HV OFF) | INACTIVE (0 V)<br><b>Will sink current</b>     |
| Ioniser in STANDBY                                       | INACTIVE (HV OFF) | INACTIVE (0 V)<br><b>Will sink current</b>     |
| Ioniser not powered                                      | INACTIVE (HV OFF) | INACTIVE (0 V)<br><b>Will not sink current</b> |

**IMPORTANT:**  
Because the output is implemented using an electronic switch rather than a relay,  
when the ioniser is not powered, the output will not sink current.

## 12. Remote Interface and Wiring Examples

### 12.2. Remote Output Electrical Specifications

The ‘ATTENTION’ signal is designed to allow direct connection to PLC digital inputs conforming with IEC 61131-2 Type 3 characteristics. The detailed specification of the remote signalling output is given in the table below.

| Characteristic  | Specification           | Notes  |
|---|-------------------------|--|
| High-level output voltage, open-circuit                               | $V_{IN} - 0.5\text{ V}$ | $V_{IN}$ is nominally 24 V. High-level output voltage depends on power supply voltage. |
| Output impedance, high-level  | 3 k $\Omega$            | Internal pull-up to $V_{IN}$   |
| Maximum output current, high-level, $V_{IN} = 24\text{ V}$ (sourcing) | 8 mA                    | Output shorted to 0 V  |
| Low-level output voltage, open-circuit                                | 0 V                     | Connected internally to 0 V by low-impedance switching device                          |
| Output impedance, low-level   | <50 $\Omega$            |  |
| Maximum output current, low-level (sinking)                           | 20 mA                   | Protected by internal self-resetting fuse  |
| Maximum externally applied voltage                                    | 28 V                    | Signal output is also protected against transient over-voltage                         |

### 12.3. Remote Input Signalling Scheme

The remote interface has one input signal, ‘STANDBY’.  
The signalling scheme is described in the following table:

| STANDBY (White, Pin 2) | Ionisation        | LED                  |
|------------------------|-------------------|----------------------|
| Low (<0.5 V)           | ACTIVE (HV ON)    | Flashing Green       |
|                        | ACTIVE (HV ON)    | Green / Red Flashing |
|                        | INACTIVE (HV OFF) | Constant Red         |
| High (+21 V to +28 V)  | INACTIVE (HV OFF) | Flashing Red         |

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## 12. Remote Interface and Wiring Examples

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### 12.4. Remote Input Electrical Specifications

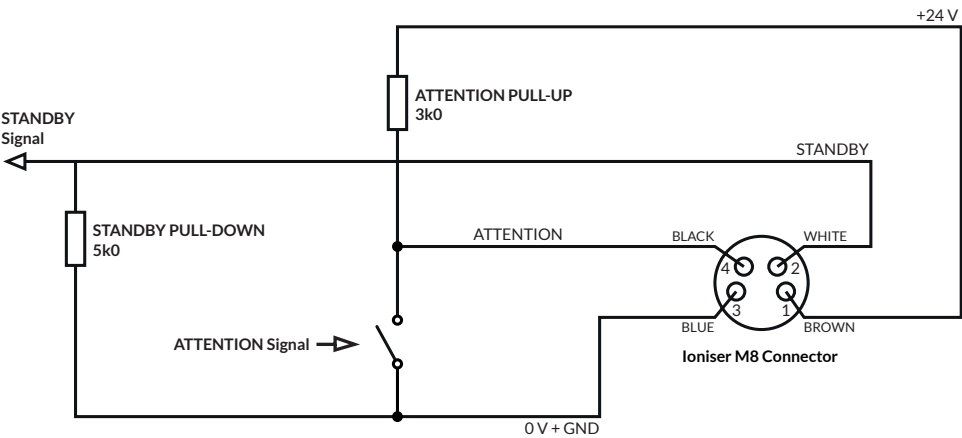
The 'STANDBY' input signal is designed to allow direct connection to a PLC digital output, a switch or a relay contact. The detailed specification of the remote signalling input is given in the table below:

| Characteristic                                     | Specification               | Notes   |
|--|-----------------------------|---|
| Nominal drive voltage                              | 0 V / 24 V                  | Digital input with 24 V logic-level   |
| High-level threshold voltage                       | 8 V typical<br>20 V maximum | A high-level drive voltage of at least 21 V is recommended  |
| Low-level threshold voltage                        | 6 V typical<br>1 V maximum  | A low-level drive voltage of less than 0.5 V is recommended   |
| Input impedance                                    | 5 kΩ +/- 10 %               | Internal pull-down to 0 V   |
| Maximum input current,<br>input connected to +28 V | 6 mA                        | Limited by internal resistor  |
| Maximum externally applied voltage                 | 28 V                        | Input is protected against transient over-voltage. However, prolonged exposure to voltages higher than 28 V may permanently damage the product. |
| Minimum externally applied voltage                 | -1 V                        | Drive voltages below 0 V are not recommended. Prolonged exposure to voltages lower than -1 V may permanently damage the product.                |

## 12. Remote Interface and Wiring Examples

### 12.5. Remote Interface Schematic

The simplified schematic diagram below shows the implementation of the remote signalling input and output on the Ioniser. This is a simplified model of the electronic interface within the Ioniser.

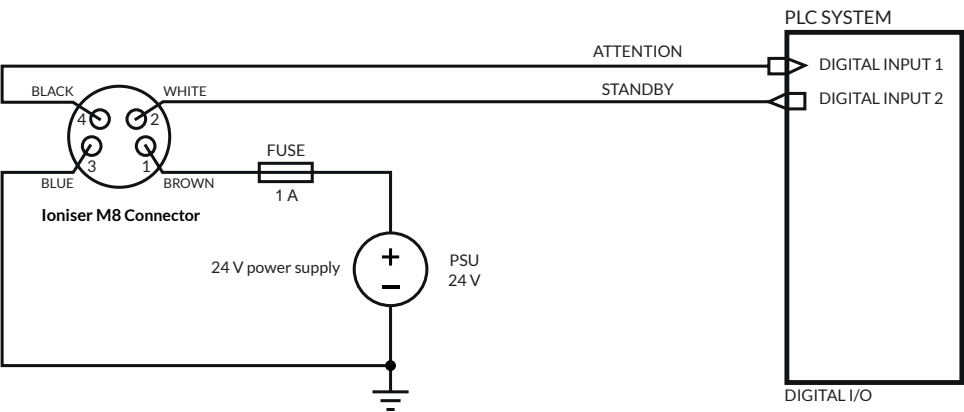


The switch in the diagram above is shown in the position corresponding to 'Ioniser powered, all OK'.

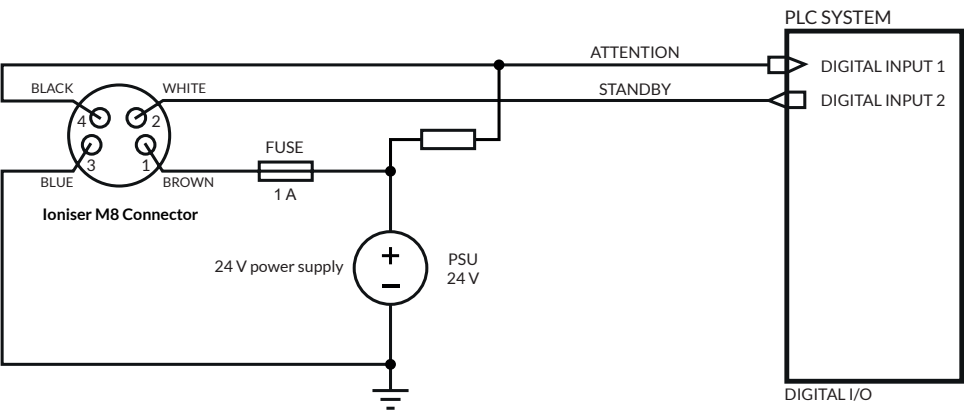
## 12. Remote Interface and Wiring Examples

### 12.6. Interfacing with PLC Systems

To interface the Ioniser with a PLC digital input conforming with IEC 61131-2 Type 3 characteristics, simply connect the 'ATTENTION' output from the Ioniser to the PLC digital input module as shown below. The 'STANDBY' line may be driven directly from a 24 V digital output.



To interface the Ioniser with a PLC system having IEC 61131-2 Type 1 or Type 2 input characteristics, fit an external 1 k $\Omega$  pull-up resistor to supply the current required by these input types, as shown below. The resistor should have a power rating of at least 1 W.



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## 12. Remote Interface and Wiring Examples

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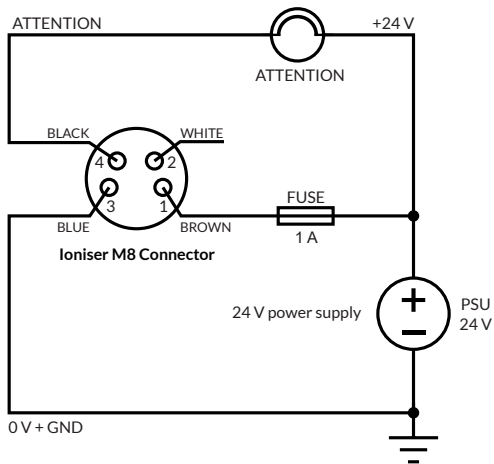
### 12.7. Powering the Ioniser directly from a PLC digital output

A typical 24 V, 0.5 A, PLC output is capable of supplying the average current required by the Ioniser, and can be used to power the Ioniser directly.

It is possible that over-current trips may be experienced on PLC outputs due to the pulsing of the HV supplies in the Ioniser. This will depend on the characteristics of the PLC output module. In this case, use the PLC output to control a relay which switches the main 24 V supply to the Ioniser.

### 12.8. Connecting an external indicator to the ATTENTION output

Typical 24 V LED-based industrial indicators with rated current of 20 mA or less can be driven by the remote signalling output. The recommended wiring scheme for an external indicator is shown below. The indicator will illuminate when the Ioniser signals an 'ATTENTION' state.



**IMPORTANT:** Connecting indicators with higher current requirements to the Ioniser will not damage it, but it is unlikely that satisfactory brightness will be obtained.



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## 12. Remote Interface and Wiring Examples

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### 12.9. Connecting an external relay to the ATTENTION output

To provide potential-free contacts or switch a higher voltage or current level, a relay can be installed between the Ioniser and external control circuit.

External relays must be connected with the Ioniser output **sinking** current to energise the relay coil.

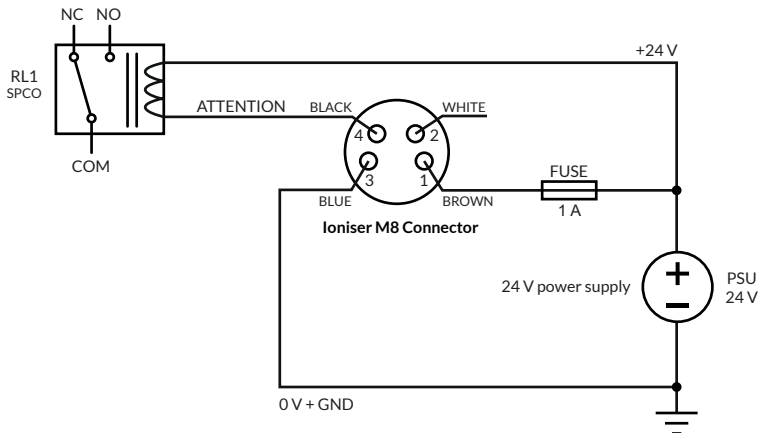
PLC interfacing relays with high-sensitivity 24 V DC coils should be used to interface with the Ioniser. Some examples are:

- Phoenix Contact PLC-RSC series
- Wieland FLARE-24DC series
- Finder 38 series
- Omron G2RV series

**IMPORTANT:** Relay coil drive current at 24 V should not exceed 20 mA.

**IMPORTANT:** The external relay should be fitted with a coil suppressor.

The recommended wiring scheme for an external relay (using an SPCO relay) is shown below.

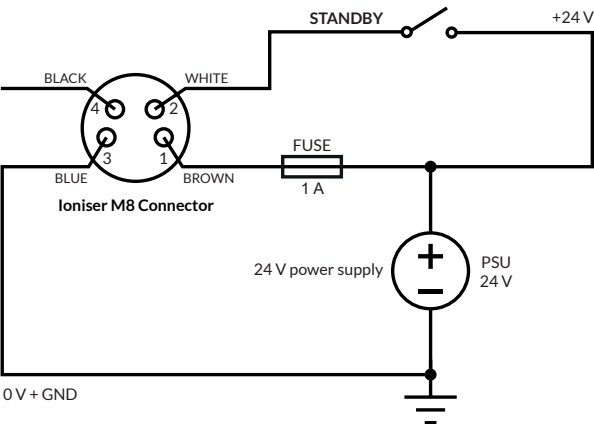




## 12. Remote Interface and Wiring Examples

### 12.10. Controlling the STANDBY line from a switch or relay contact

The recommended wiring scheme for controlling the Ioniser from an external switch or relay contact is shown below. When the switch or relay contact is closed, the Ioniser is in 'STANDBY' mode. When the switch is open, the Ioniser is active.





### 13. Accessories

A range of accessories to assist with installation and maintenance of the Ioniser is available from Fraser Anti-Static Techniques. Please contact your local distributor to enquire regarding pricing and delivery of these items.

| Item Picture   | Description   | Part No. |
|--|---|----------|
|    | 3 m cable M8 female, Bare ends.<br>Straight socket.   | 80892    |
|    | 5 m cable M8 female, Bare ends.<br>Straight socket.   | 80930    |
|    | 7.5 m cable M8 female, Bare ends.<br>Straight socket. | 80931    |
|    | 10 m cable M8 female, Bare ends.<br>Straight socket.  | 80932    |
|  | 3 m cable M8 female, Bare ends.<br>90° socket.        | 80933    |
|  | 5 m cable M8 female, Bare ends.<br>90° socket.        | 80934    |

13. Accessories

| Item Picture  | Description   | Part No.  |
|---|---|-----------|
|    | 7.5 m cable M8 female, Bare ends.<br>90° socket.  | 80935     |
|    | 10 m cable M8 female, Bare ends.<br>90° socket.   | 80936     |
|    | Universal AC-DC power supply:<br>100 - 250 V AC, 24 V DC output<br>Fitted with 1.5 m of cable.  | E3024-PSU |
|    | M8 male to M8 female 4-pin<br>extension cable for AC-DC power<br>supply unit.<br>(Available in 2 m lengths)   | 80937     |
|  | Fraser Ioniser Cleaning kit<br>containing: <ul style="list-style-type: none"><li>• 500 ml of Cleaning Fluid.</li><li>• Soft bristle hand brush.</li><li>• Instructions for use.</li></ul> | 81220     |

For more information about static and to view the full range  
of our products, please visit **[www.fraser-antistatic.com](http://www.fraser-antistatic.com)**



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