FRASER
Anti-Static Techniques

OPERATING INSTRUCTIONS

IONFIX COMPACT

WITH CONSTANT-POWER OPERATION

CE

LLOYD'S REGISTER QUALITY ASSURANCE
AS9100
UKAS MANAGEMENT SYSTEMS
001

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2015

Contents **Page**

1. Introduction

This manual applies to the Fraser IONFIX Compact Generator product range:

- IONFIX Compact, 24 V DC input, 30 kV DC output, positive or negative output polarity.
- IONFIX Compact, 85-264 V AC input, 30 kV DC output, positive or negative output polarity.

It is essential that you read and understand the complete manual before installing and using this equipment. This is important for both safety and warranty cover.

Where the word 'generator' is used within this manual, it refers exclusively to the Fraser IONFIX Compact Generator.

Explanation of Symbols

Throughout this manual the following symbols are used to draw attention to important information.

Warning: This symbol refers to operations which, if carried out improperly, may result in serious personal injuries.

Caution: This symbol refers to operations which, if carried out improperly, may result in damage to property.

Information: This symbol refers to information which relates to obtaining the best performance and operating life from the product.

2. Safety

Safety Concepts

The Fraser IONFIX Compact is a high-voltage switched-mode power supply. It has been designed in accordance with the safety requirements of EN 62368-1:2014 (Audio/video, information and communication technology equipment, Part 1: Safety requirements). This standard is harmonised under the EU Low Voltage Directive and recognised by UL.

The high-voltage output of the generator is a Class 2 electrical energy source, as defined in EN 62368 1:2014. This means that it is capable of causing pain if contact is made with a body part, but is not likely to cause an injury requiring medical attention.

The dimensions of the industry-standard high-voltage output connectors are such that they may not be considered to provide insulation between a body part and the outer surface of the connector.

The generator must therefore be used only by instructed persons, as defined in EN 62368-1:2014. An instructed person is someone who is instructed or supervised by a skilled person with regard to hazards posed by electrical energy sources.

If the generator is to be operated by ordinary persons, it must be installed in such a manner that the high voltage output connectors are not accessible in normal operation, for example by mounting within an enclosure or providing appropriate guards.

AC-powered generator variant

The user-accessible remote interfacing circuits of the generator are isolated from mains voltages by an AC-DC power supply unit conforming to the requirements of EN 60950.

Warning: The AC-powered variant of the IONFIX Compact contains potentially lethal voltages. Disconnect the mains supply and wait 5 minutes allowed for stored energy within the mains power supply unit to be automatically discharged.

DC-powered generator variant

Warning: The negative pole of the 24 V DC supply provided to the generator must be permanently earthed.

Safety Warnings

- Installation and maintenance work on the generator must only be carried out by suitably qualified personnel.
- The protective earthing (PE) terminal of the generator must be permanently connected to the main earthing terminal of the electrical installation by a conductor of at least 1.5 mm^2 cross-sectional area.
- Disconnect the power supply before performing any installation and maintenance work on the generator or electrodes.
- Connect only approved charging accessories to the high voltage outputs of the generator.

2. Safety

- Avoid contact with the high-voltage output connector and the charging electrode(s) when energised.
- Do not insert or remove high voltage connectors when the generator is powered or its output energised.
- Any changes to the equipment without written consent of the manufacturer will invalidate the warranty and CE certification.

3. Use and Operation

The Fraser IONFIX Compact is a controlled high-voltage power supply designed to power charging electrodes providing temporary adhesion between materials in industrial applications.

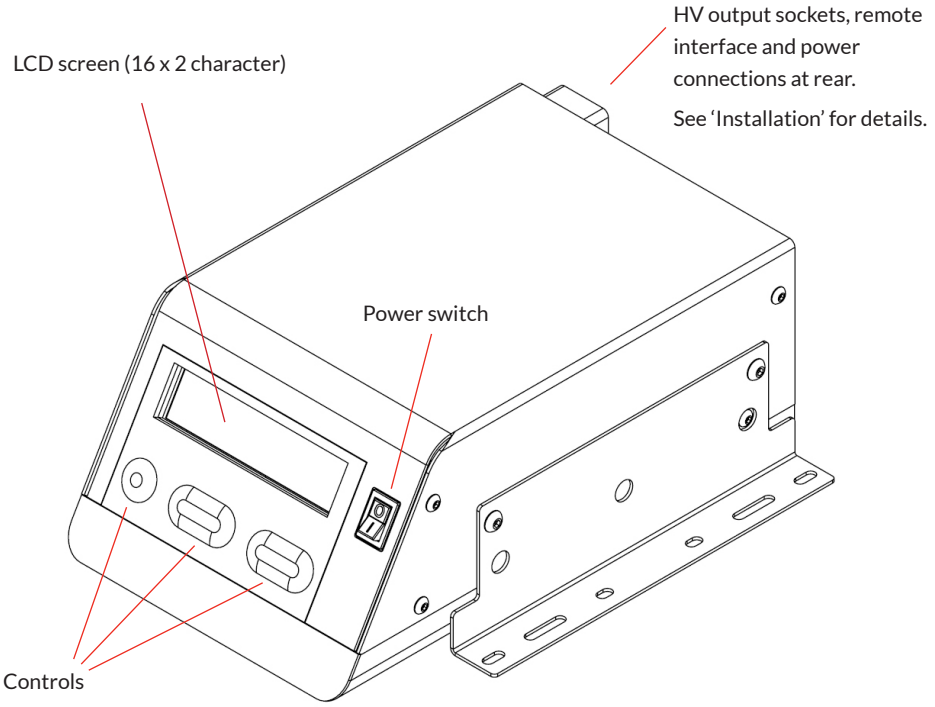
The IONFIX Compact has simple front-panel controls allowing the output voltage to be set precisely to match the process requirements. The output current is electronically limited, and this limit may be reduced if necessary to suit the particular application.

The IONFIX Compact has a remote control interface, providing remote switching of the high-voltage output and remote setting of the output voltage. Overload or fault conditions are also signalled on this interface, allowing remote monitoring of the generator.

The unique flexible power control feature of the generator allows it to provide a higher output current at lower voltages, maintaining full charging power over a wider range of output voltages.

Overview

The diagram below shows the main features of the IONFIX Compact generator.

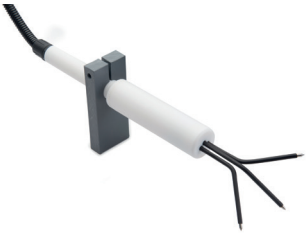


Accessories

Fraser Anti-Static Techniques manufacture a range of compatible charging electrodes to suit many temporary adhesion applications:

7081 charging Bar

7130 charging Bar



7093 edge pinner

7090 spot pinning electrode

7095 pinner

Your local Fraser distributor can advise on the use and installation of these electrodes. Alternatively, please visit our website (www.fraser-antistatic.com) for further information on applications of these products.

4. Installation

Checking on delivered equipment

The equipment leaves our factory in suitable protective packaging. Please check that it is undamaged when it arrives.

If there is visible damage contact the supplier immediately.

Check that the parts which have been delivered are the same as you have ordered.

Front panel rotation

The front panel display and controls of the generator may be rotated by 180° in order to accommodate different mounting orientations.

To rotate the display from 'desktop' to 'wall-mounted' orientation, follow the steps below:

1. Ensure the generator is switched off and disconnected from its power supply (24 V or mains connection isolated and removed).
    a. AC variant: Allow 5 minutes for stored charge to dissipate before opening cover.
2. Remove the 8 M4 x 8 mm screws securing the lid of the generator using a 3mm hex key or driver. Disconnect the earthing connection from the lid.
3. Remove the 2 M3 screws securing the front panel assembly to the generator chassis (underneath the generator).
4. Undo the 4 M3 x 15 mm threaded spacers securing the display and control assembly to the generator front panel, using a 5.5 mm spanner.
5. Rotate the display and control assembly by 180°. Ensure that the flexible cable connecting the display and controls to the main PCB does not become trapped or kinked.
6. Secure the display and control assembly in its new orientation, then re-fit the front panel assembly to the generator chassis.
7. Re-connect the earthing wire to the generator lid, replace the lid and secure using the 8 M4 screws.

Mounting

The generator is provided with mounting brackets to allow mounting to a wall or panel, under a table or shelf, etc. Use only the hardware provided (M5 x 10 mm) to affix the mounting brackets to the generator.

If wall-mounted, use fixings suitable for the wall material and generator weight to secure the generator. Ensure that the generator is securely mounted and that all mounting fasteners have been tightened before use.

Earthing

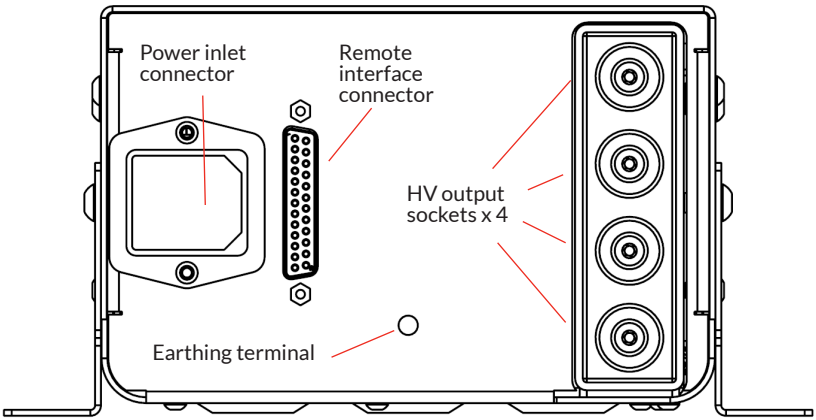
The M5 protective earthing (PE) terminal of the generator must be permanently connected to the main earthing terminal of the electrical installation by a conductor of at least 0.5 mm2 cross-sectional area (20 AWG).

DC variant: the 0 V rail of the 24 V supply MUST be permanently connected to earth.

AC variant: an earthed IEC 320 C13 cable MUST be used with the generator, and the socket outlet supplying the generator MUST be earthed correctly.

Electrical installation

This section describes the electrical installation of the generator. The electrical connections are shown below.

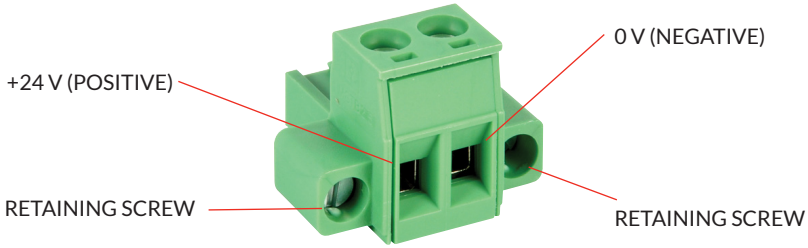


1. Ensure that the generator is earthed as described above.
2. Connect the high-voltage electrode(s) to the HV output sockets at the rear of the generator. Note that the 4 sockets are internally connected in parallel. Ensure that any unused sockets are plugged with the supplied blanking plugs (Fraser P/N 730218) to prevent dirt ingress.

   - Do not route HV cables near to sharp metal components.
   - Avoid bends or kinks in the HV cables.
   - Route HV cables separately from low-voltage cables.
   - Keep HV cables as short as practically possible.

3. Connect the remote interface cable to the 25-way D-type connector at the rear of the generator. For details of the remote interface, see 'Remote Interface' section of this manual.

4. Connect the power input cable to the generator.
    a. DC variant: connect +24 V to the left-hand terminal of the 'Combicon' pluggable terminal block (viewed from rear of generator), and 0 V to the right-hand terminal of the 'Combicon' pluggable terminal block. It is recommended to fit bootlace ferrules to the stripped ends of the 24 V input cable. Insert the terminal block into the 'Combicon' socket at the rear of the generator and tighten the retaining screws.



    b. **AC variant**: insert the IEC 320 C13 plug into the socket at the rear of the generator, ensuring it is fully and firmly seated.
5. Connect the power input cable to the supply.
    a. **DC variant**: connect the 24 V and 0 V lines to the 24 V DC supply of the machine/control cabinet.
    b. **AC variant**: connect the plug to an earthed socket outlet, or into the AC supply of the machine/control cabinet.

5. Commissioning and Operation

For advice about tuning the generator settings to best suit a particular process, please contact your local Fraser representative.

Before turning the generator on for the first time, ensure that:

- The power input and case are correctly grounded as described in 'Electrical Installation'.
- The charging electrodes are correctly connected to the output sockets, with no loose connections or damaged cables.
- Any wiring connected to the remote interface is configured correctly. If the remote interface is configured to override the front panel controls, ensure that the charging electrodes becoming energised does not pose a safety risk.
- The generator is securely mounted.

Generator front panel controls and display

The diagram below shows the front panel controls and display of the generator. The function of the controls is described in brief below the diagram.

- **Display**: Indicates the settings and output parameters of the generator, and any warning messages.
- **LED Indicators (HV, Remote, Current Limited)**: Show the operating status of the generator at at glance.
- **RUN/STOP Button**: Toggles the high voltage output of the generator on and off.
- **Voltage +/- Buttons**: Allow the high voltage output level of the generator to be adjusted.
- **Current Limit +/- Buttons**: Allow the output current limit level of the generator to be adjusted.

Operating the generator

Switching the generator on

To power up the generator, put the main power switch on the front panel into the 'ON' position.

The LCD backlight will illuminate and the following text will be displayed on the screen as the generator initialises and performs self-checks:

```
Fraser IONFIX C+
Startup = V: 100
```

The LCD will then switch to the normal operating display (positive generator shown):

```
V:   0.0 kV   SP
I:   1.00 mA  SP
```

If any of the generator remote interface functions are enabled the 'Remote' LED indicator will illuminate. Note that in this case, the HV output of the generator may be enabled remotely at any time.

If the remote on/off function is not enabled, the generator HV output will always be OFF when the generator is powered up. If it is necessary for the generator to power up with the HV output enabled, use the remote on/off function to achieve this.

Setting output voltage

When the HV output is not enabled, the generator voltage and current setpoint values are shown on the display, along with 'SP' to indicate that these are setpoint values.

By default, the generator output voltage is initially set to 0.0 kV. The setpoint value is stored in non-volatile memory and does not need to be re-set every time the generator is powered on.

To adjust the generator output voltage setpoint, use the 'Voltage +' and 'Voltage –' buttons. For example, if the voltage setpoint was increased to 12.5 kV, the following would be displayed:

```
V:   12.5 kV  SP
I:   1.00 mA  SP
```

Press the appropriate button once to increase or decrease the voltage in 0.1 kV steps. Press and hold the appropriate button to make larger adjustments.

On negative polarity generators, the 'Voltage +' button increases the magnitude of the voltage setpoint, making it more negative. This corresponds to a greater pinning effect at the generator electrode.

If the voltage setpoint is adjusted whilst the HV output is enabled, the setpoint value followed by 'SP' will be shown briefly on the display.

Setting current limit

The output current of the generator is electronically limited to protect the generator and minimise electrode wear. The current limit level can be adjusted using the front-panel controls. By default, the generator current limit is set to its maximum value of 1 mA.

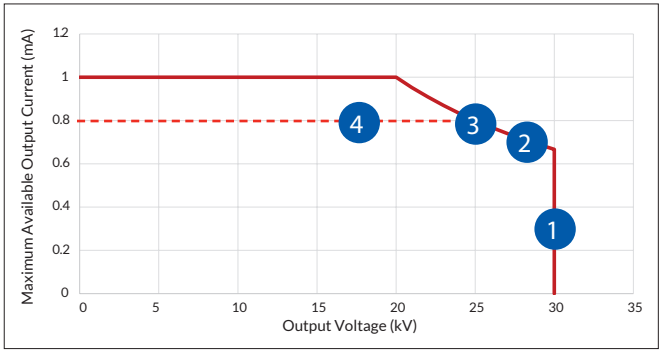
When the current limit is active, the 'Current Limited' LED indicator will illuminate.

If the voltage setpoint is greater than 20 kV, the actual current limit will be reduced accordingly to maintain a maximum output power of 20 W. At 30 kV, a maximum of 0.66 mA is available.

The current limit value can be set to 1 mA independently of voltage setpoint, however the full 1 mA is only available at 20 kV or less.

For example, if the voltage setpoint is 30 kV and the current limit is 0.8 mA, the following sequence describes the behaviour of the generator as the load is increased (numbers refer to the diagram below):

1. Output voltage 30 kV, current increasing from 0 to 0.66 mA. Output power < 20 W.
2. Output voltage reducing from 30 kV, current increasing from 0.66 mA towards 0.8 mA. Output power = 20 W.
3. Output voltage 25 kV, output current 0.8 mA. Output power = 20 W.
4. Output voltage reducing below 25 kV, output current limited to 0.8 mA. Output power < 20 W.



With a voltage setpoint greater than 20 kV, the 'Current Limited' LED indicator will illuminate if the 20 W power limit is reached, even if the programmed current limit is not reached.

To adjust the current limit, use the 'Current –' and 'Current +' to change the setpoint value. For example, if the current setpoint was reduced to 0.5 mA, the following would be displayed:

```
V:   12.5 kV  SP
I:   0.50 mA  SP
```

If the current limit is adjusted whilst the HV output is enabled, the setpoint value followed by 'SP' will be shown briefly on the display.

Switching high voltage on/off

To enable the high voltage output of the generator, press the 'RUN/STOP' button. The 'HV' indicator LED will illuminate to signal that the High Voltage output is active, and 'SP' will be replaced with 'OP' on the LCD. This indicates that the displayed values are the current measured outputs.

```
V:   12.5 kV  SP
I:   0.31 mA  SP
```

If the remote on/off function is not enabled, the RUN/STOP button toggles the high voltage output on and off.

If the remote on/off function is enabled, but the HV output is not turned on via the remote interface, the RUN/STOP button can be used to temporarily override the remote on/off input for testing or commissioning purposes. If the HV output is already turned on via the remote interface, the RUN/STOP button will have no effect.

Operation with remote interface active

This section describes the operation of the front panel display and controls when the remote interface is in use. For details of the remote interface, see the 'Remote Interface' section of this manual.

'REMOTE' LED indicator

If **any** of the remote control functions (remote on/off, remote voltage setpoint, remote current limit) are enabled via the remote interface connector, the 'REMOTE' LED indicator on the generator front panel will illuminate.

If the remote on/off function is enabled, the HV output of the generator could be enabled at any time via a remote signal.

Remote on/off input

If the remote on/off input is enabled, the 'REMOTE' LED indicator will illuminate as described above. When the HV output is enabled using the remote on/off input, the 'HV' indicator will illuminate.

Remote voltage setpoint

If the remote voltage setpoint function is enabled, an 'R' will be added to the 'SP' or 'OP' after the voltage readout on the generator display.

For example, with HV off and remote voltage setpoint enabled:

```
V:   17.2 kV  RSP
I:   0.50 mA  SP
```

With HV on and remote voltage setpoint enabled:

```
V:   17.2 kV  ROP
I:   0.16 mA  OP
```

If the front panel voltage adjustment buttons are pressed in this state, the following error message will be shown:

```
ERR: REMOTE VL
1
```

Remote current limit

If the remote current limit function is enabled, an 'R' will be added to the 'SP' or 'OP' after the current readout on the generator display.
For example, with HV **off** and remote current limit enabled:

```
V:   14.5 kV  SP
I:   0.32 mA  RSP
```

With HV on and remote current limit enabled:

```
V:   10.1 kV  OP
I:   0.32 mA  ROP
```

If the front panel current limit adjustment buttons are pressed in this state, the following error message will be shown:

```
ERR: REMOTE IL
2
```

If both the remote voltage setpoint and remote current limit are enabled, the following will be shown (HV **off**):

```
V:   17.2 kV  RSP
I:   0.32 mA  RSP
```

HV **on**:

```
V:   14.3 kV  ROP
I:   0.32 mA  ROP
```

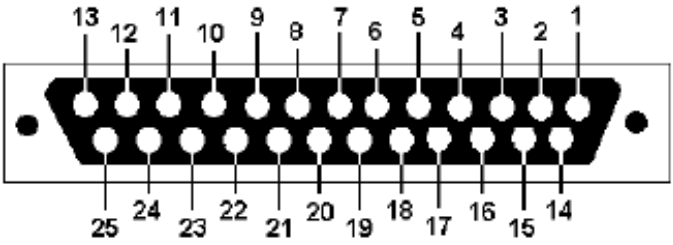
6. Remote interface

The generator is equipped with a remote control and monitoring interface permitting remote setting and operation of the generator.
The following functions are provided:

- **Remote on/off enable**: enables operation of the remote on/off input.
- **Remote on/off input**: permits the HV output of the generator to be switched on or off using a voltage signal.
- **External voltage setpoint enable**: enables operation of the external voltage setpoint input, overriding the value set using the front panel controls.
- **External voltage setpoint input**: permits the HV output of the generator to be controlled from 0-100% according to an analogue voltage signal, e.g. from a PLC output.
- **External current setpoint enable**: enables operation of the external current setpoint input, overriding the value set using the front panel controls.
- **External current setpoint input**: permits the output current limit of the generator to be controlled from 0-100% according to an analogue voltage signal.
- **Operating signal output**: signals when the generator is operating normally.
- **Overload/limit signal output**: signals when the generator maximum output current is reached, or when an arc or overload condition occurs at the generator output.

Pin assignment

The remote interface electrical connections are provided by a 25-pin subminiature D-type socket at the rear of the generator. The pins are numbered as shown below (**viewed looking into socket on rear of generator**):



The corresponding 25-way D-type plug is Amphenol L717DB25P or equivalent. Any standard 25-way D-type connector, cable or breakout board can be used to make connections to the remote interface.

The interface connections are as follows:

Pin No.	Function	Pin No.	Function
1	Remote on/off input +ve	**14**	Remote on/off input -ve
2	External current setpoint input	**15**	GND (0 V)
3	External voltage setpoint input	**16**	GND (0 V)
4	Remote voltage monitor output	**17**	GND (0 V)
5	Remote current monitor output	**18**	External voltage setpoint enable
6	+24 V reference output	**19**	GND (0 V)
7	+12 V reference output	**20**	GND (0 V)
8	Reserved	**21**	Reserved
9	Overload open collector	**22**	Overload open emitter
10	Operating open collector	**23**	Operating open emitter
11	External current setpoint enable	**24**	GND (0 V)
12	Not connected	**25**	Remote on/off enable
13	Not connected		

Pins which are identified as 'reserved' should be left disconnected and not 'tied' to any potential (e.g. ground, 24 V, etc.) These pins are used for production testing and are connected to internal circuitry within the generator.

Pins which are identified as 'not connected' can be connected to ground potential without damaging the generator.

Electrical and functional characteristics

The remote interface functions and the electrical characteristics of the interface are described in detail below. The pins of the interface are grouped according to the function they provide.

The remote control functions (HV on/off, remote voltage setpoint, remote current limit) may be used in any combination. The remote monitoring functions are always active.

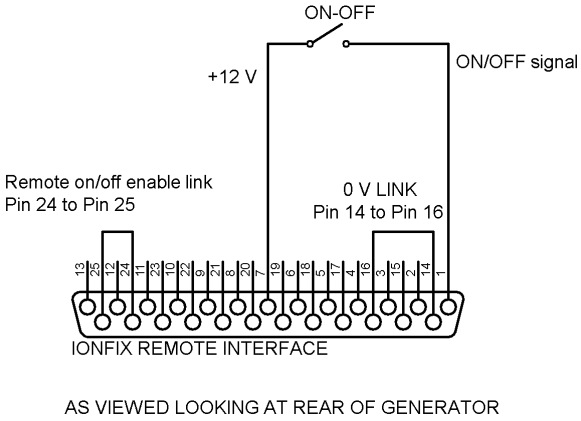
Remote on/off input (pins 1, 14, 24, 25)

The remote on/off input allows the high voltage output of the generator to be turned on or off by a voltage signal.

To use the remote on/off function, it must first be enabled by connecting **pin 25** (remote on/off enable) to **pin 24** (GND).

To turn the high voltage output on, a signal level of 10-30 V must be applied between **pin 1** and **pin 14** (**pin 1** positive with respect to **pin 14**). This is a low impedance input, and will draw approximately 8 mA from the signal source at 10 V rising to 35 mA at 30 V.

The wiring example below shows how to connect an external HV on/off switch to the generator using the internal 12 V supply to provide the signal voltage.



The front panel 'RUN/STOP' button may be used to momentarily over-ride the remote on/off input for testing/commissioning purposes. The HV output of the generator will be enabled whilst the 'RUN/STOP' button remains pressed. It is not possible to turn the HV off using the 'RUN/STOP' button if it is enabled via the remote on/off input.

External voltage setpoint input (pins 3, 17, 18)

The external voltage setpoint input (pin 3) allows the high voltage output level of the generator to be programmed by an analogue voltage signal.

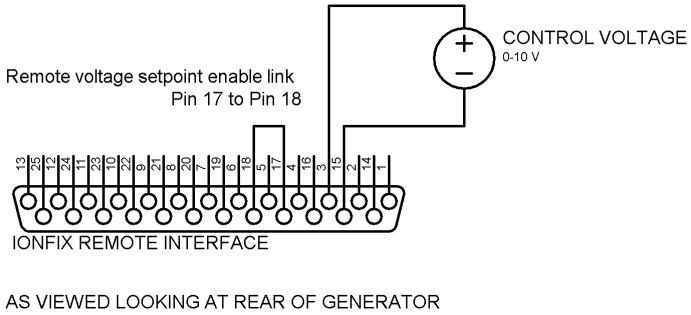
To use the remote voltage setpoint function, it must first be enabled by connecting pin 18 (external setpoint enable) to pin 17 (GND).

The external voltage setpoint input (pin 3) accepts a ground-referenced signal of 0-10 V, where 0 V represents 0% and 10 V represents 100% (i.e. 30 kV). The input impedance is 13 kΩ to GND.

The signal ground may be connected to any of the GND pins in the table – pin 15 or pin 16 are most convenient.

The input is protected against transient over-voltage but may be damaged by applying a low-impedance voltage source exceeding 28 V.

The wiring example below shows the remote voltage setpoint function enabled and supplied by an external control voltage source (e.g. a PLC analogue output).



If the front panel voltage setpoint adjustment buttons are pressed when the external voltage setpoint function is enabled, an error message will be shown.

External current setpoint input (pins 2, 11, 20)

The external current setpoint input (pin 2) allows the output current limit of the generator to be programmed by an analogue voltage signal.

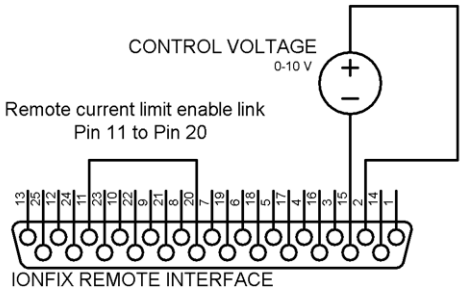
To use the remote current setpoint function, it must first be enabled by connecting pin 11 (external current setpoint enable) to pin 20 (GND).

The external current setpoint input (pin 2) accepts a ground-referenced signal of 0-10 V, where 0 V represents 0% and 10 V represents 100% (i.e. 1 mA). The input impedance is 13 kΩ to GND.

The signal ground may be connected to any of the GND pins in the table – pin 15 or pin 16 are most convenient.

The input is protected against transient over-voltage but may be damaged by applying a low-impedance voltage source exceeding 28 V.

The wiring example below shows the remote voltage setpoint function enabled and supplied by an external control voltage source (e.g. a PLC analogue output).



If the front panel current limit adjustment buttons are pressed when the external current limit function is enabled, an error message will be shown

Remote voltage monitor output (pin 4)

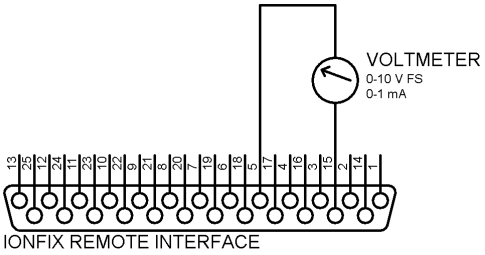
The remote voltage monitor output (pin 4) allows the present output voltage of the generator to be monitored remotely. This signal may be fed into a PLC system, or used to drive a panel meter (10 V full-scale sensitivity).

The voltage monitor output is always active, and always reports the actual measured output voltage of the generator. Note that if the current limit is active, the actual output voltage will be less than the demanded setpoint voltage (e.g. if the generator is heavily loaded).

The remote voltage monitor output provides a ground-referenced signal of 0-10 V, where 0 V represents 0% and 10 V represents 100% (i.e. 30 kV). Any of the GND pins may be used as a reference for this signal.

The voltage monitor output is protected against short circuit to GND, and applied voltages up to +28 V. The output impedance of the signal driver circuit is approximately 150 Ω.

The wiring example below shows a panel meter connected the remote voltage monitor output.



AS VIEWED LOOKING AT REAR OF GENERATOR

Remote current monitor output (pin 5)

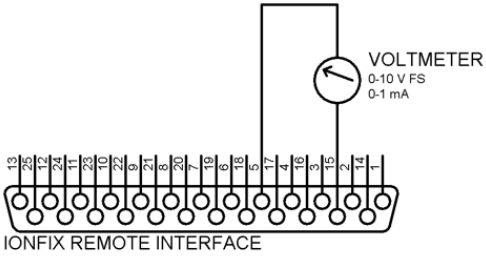
The remote current monitor output (**pin 5**) allows the **present** output current of the generator to be monitored remotely. This signal may be fed into a PLC system, or used to drive a panel meter (10 V full-scale sensitivity).

The current monitor output is always active, and always reports the **actual** measured output current of the generator. Note that if the current limit is not active, the actual output current will be lower than the demanded current limit (e.g. if the generator is lightly loaded).

The remote current monitor output provides a ground-referenced signal of 0-10 V, where 0 V represents 0% and 10 V represents 100% (i.e. 1 mA). Any of the GND pins may be used as a reference for this signal.

The current monitor output is protected against short circuit to GND, and to voltages up to +28 V. The output impedance of the signal driver circuit is approximately 150 Ω.

The wiring example below shows a panel meter connected the remote current monitor output.



AS VIEWED LOOKING AT REAR OF GENERATOR

Overload output (pins 9, 22)

The overload output is activated when any of the following conditions are present:

- Output current limit reached (e.g. due to material not being present between charging and counter-electrodes).
- Load impedance less than 1.5 MΩ (overload condition including output short circuit).
- HV output arcing detected.

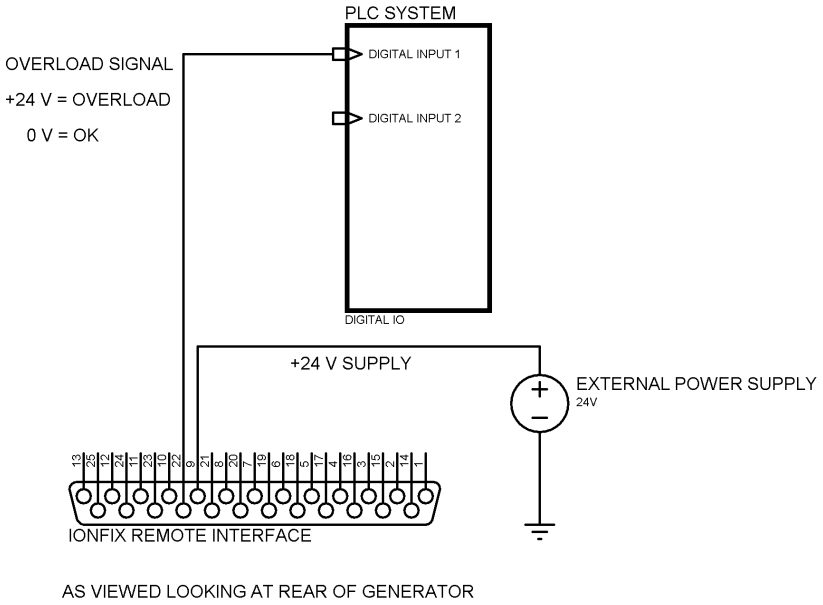
In the case of an overload or arc fault, the overload output will remain active whilst the generator HV output is disabled for a period of 4 seconds.

The overload output signals that a condition exists which is preventing the generator HV output level from reaching the demanded voltage setpoint.

This is an optically-isolated switching output, with the open collector on **pin 9** and open emitter on **pin 22**. This output can switch up to 30 V with a load current of 50 mA in order to drive a relay, indicator, PLC input etc.

To provide a PLC-compatible signal, connect +24 V (supplied externally or from **pin 6**) to **pin 9**, and the PLC input to **pin 22**.

The wiring example below shows the overload output connected to a PLC system using an external power source to provide the 24 V signal level.



Operating output (pins 10, 23)

The operating output is activated when all of the following conditions are satisfied:

- HV output enabled via **either** the front panel run/stop button or the remote on/off input.
- Voltage setpoint **not** set to zero.
- Current limit **not** set to zero.
- **No** fault conditions present (input under-voltage, arc fault, over temperature, etc.).

The operating output therefore signals that the generator is producing a high voltage output and is not experiencing any fault conditions.

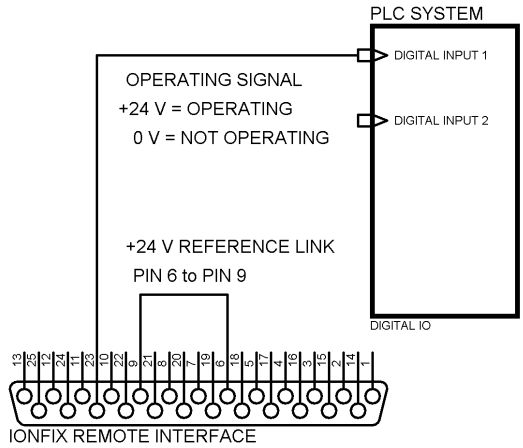
This is detailed in the truth table below:

Remote on/off input 0: low (ENABLE = 0) 1: high (ENABLE = 1)	**Front panel run/stop button** 0: not pressed/toggled 1: pressed/toggled	**Voltage setpoint & current limit** 0: either = 0 1: neither = 0	**Fault (any)** 0: not present 1: present	**Operating signal**
0	0	0	0	INACTIVE
0	0	0	1	INACTIVE
0	0	1	0	INACTIVE
0	0	1	1	INACTIVE
0	1	0	0	INACTIVE
0	1	0	1	INACTIVE
0	1	1	0	**ACTIVE**
0	1	1	1	INACTIVE
1	0	0	0	INACTIVE
1	0	0	1	INACTIVE
1	0	1	0	**ACTIVE**
1	0	1	1	INACTIVE
1	1	0	0	INACTIVE
1	1	0	1	INACTIVE
1	1	1	0	**ACTIVE**
1	1	1	1	INACTIVE

This is an optically-isolated switching output, with the open collector on **pin 10** and open emitter on **pin 23**. This output can switch up to 30 V with a load current of 50 mA in order to drive a relay, indicator, PLC input etc.

To provide a PLC-compatible signal, connect +24 V (supplied externally or from **pin 6**) to **pin 10**, and the PLC input to **pin 23**.

The wiring example below shows the overload output connected to a PLC system using **pin 6** (+24 V reference output) to provide the 24 V signal level.



AS VIEWED LOOKING AT REAR OF GENERATOR

+24 V reference output (pin 6)

A 24 V reference output is supplied on pin 6 of the remote interface. This may be used to provide a signal for the overload and operating outputs. The maximum current that may be drawn from this output is 20 mA.

+12 V reference output (pin 7)

A 12 V reference output is supplied on pin 7 of the remote interface. This may be used to provide a signal for the remote on/off input. The maximum current that may be drawn from this output is 20 mA.

7. Technical Specifications

Power Supply Requirements

DC Variant

Input voltage:	24 V DC nominal, 21-28 V operating range.
Input current:	2 A max.
Maximum input power:	48 W
Input connector:	Phoenix Contact 'Combicon' 2-pole pluggable terminal block. Mating plug type Phoenix Contact MSTB 2,5/ 2-STF, manufacturer P/N 1786831. Fraser P/N 730215.

AC Variant

Input voltage:	85 – 264 V AC, 47 – 63 Hz
Input current:	1 A max.
Maximum input power:	74 W
Input connector:	IEC 60320 C14 inlet. Mating plug IEC 60320 C13.

Electrical Output Characteristics

Output voltage:	0 – 30 kV, adjustable in 0.1 kV increments.
Output polarity:	Fixed positive or negative, specified at time of order.
Output current limit:	1 mA max. up to 20 kV, reducing to 0.67 mA at 30 kV. Adjustable from zero to max. in 0.01 mA increments.
Maximum output power:	20 W, available from 20 kV to 30 kV.
Output voltage rise time:	<15 ms.
Output voltage fall time:	**[TBD] ms full-load, [TBD] ms no-load.**
Output connector type:	4 x Fraser 30/60 kV tubular spring-contact HV connector.

Protection

Short-circuit protection:	Continuous output current electronically limited.
Output arcing protection:	HV output disabled for 4 seconds in event of arcing.
Thermal protection:	HV output disabled if internal temperature exceeds safe limit.
Minimum load impedance:	1.5 MΩ – below this, output will be disabled.

Remote Interface

Connector type:	25-pin subminiature D-type, female. Mating plug Amphenol L717DB25P or equivalent.
Remote control functions:	HV on/off (digital, 10-30 V 'on', 10-25 mA input current). Voltage setpoint adjust (analogue, 0-10 V = 0-100 %). Current setpoint adjust (analogue, 0-10 V = 0-100%).
Remote monitoring functions:	Overload signal. Open collector/emitter outputs, 50 V/50 mA maximum load. Operating signal. Open collector/emitter outputs, 50 V/50 mA maximum load. Remote voltage monitor (analogue, 0-10 V = 0-100%). Remote current monitor (analogue, 0-10 V = 0-100%).
Auxiliary power supply:	12 V, 20 mA. May be used to drive remote on/off input.

Environmental Conditions

Ambient temperature:	0 – 50 °C
Relative humidity:	Maximum 70%, non-condensing. Tested to IEC 60068 2 30:2005 (Damp heat, cyclic), 55 °C, 6 cycles.
Ingress protection:	IP20 (must not be exposed to falling, splashing or spraying water).
Vibration:	Installation location must be vibration-free.

Mechanical

Dimensions (D x W x H):	277 mm x 163 mm x 106 mm
Mass (AC variant):	4.6 kg

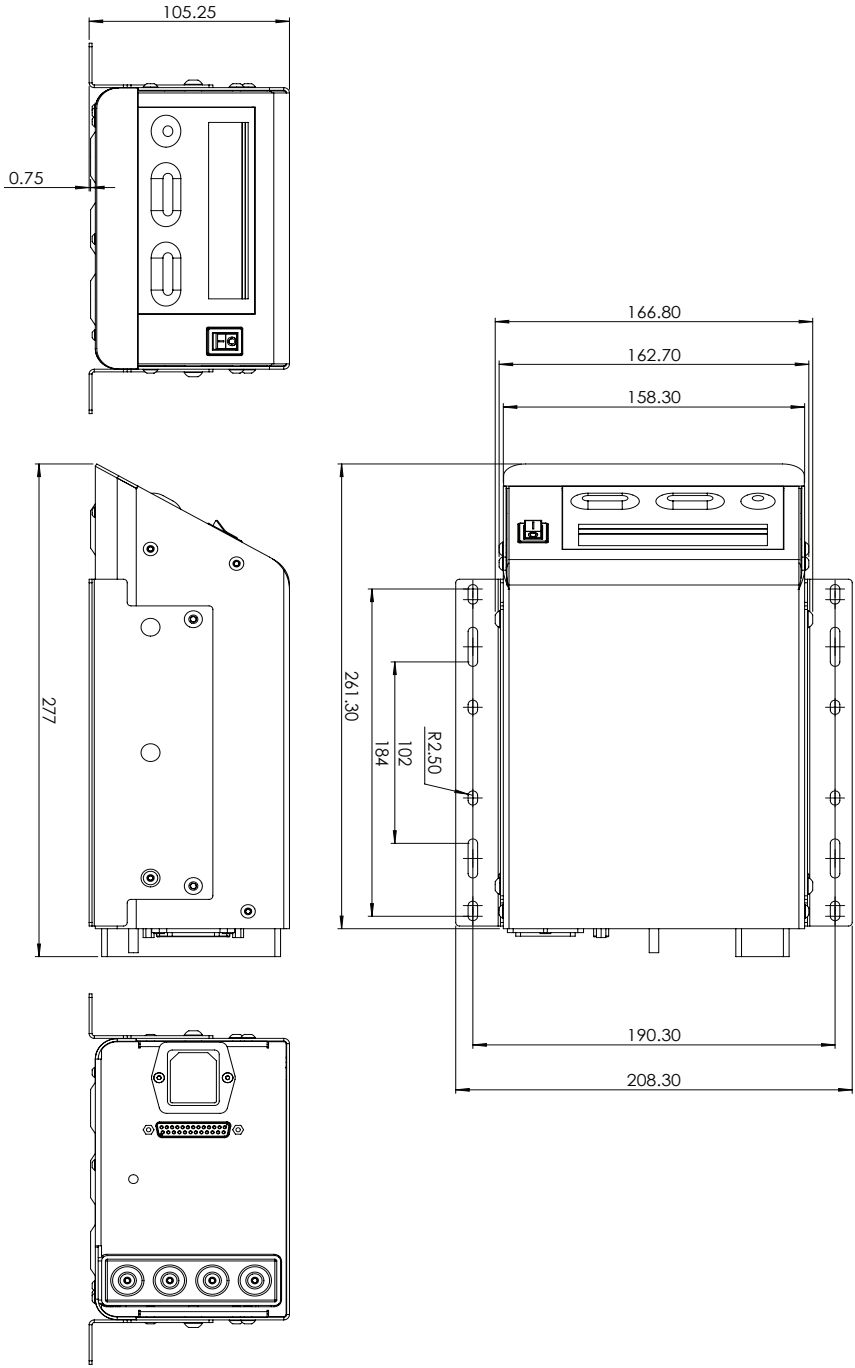
Regulatory

CE Marking:	EU LVD (2014/35/EU) Electrical safety: EN 62368-1:2014 EU EMCD (2014/30/EU) Emissions: EN 61000-6-3:2007 Immunity: EN 61000-6-2:2005 Harmonics: EN 61000-3-2:2006+A2:2009

Options

No-cost options:	Display orientation ('desktop' or 'wall-mount').

Dimensions


105.25
0.75
166.80
162.70
158.30
277
261.30
184
102
R2.50
190.30
208.30

8. Troubleshooting

In case of problems with the generator, consult the following table to aid diagnosis and remedy.

Problem	Cause	Remedy
No output voltage Display off	Power supply not connected or energised.	Check power supply connections.
	AC variant: inlet fuse blown.	Replace fuse.
	Hardware fault.	Contact distributor.
No output voltage Display on	IP20 (must not be exposed to falling, splashing or spraying water).	Change setpoint using Voltage +/- buttons or provide 0-10 V signal on remote interface.
	Remote on/off enabled, but no remote on/off signal provided.	Provide remote on/off signal.
	Current limit set too low.	Increase current limit using Current +/- buttons.
All LEDs flashing 'OVERLOAD' shown on display	Arcing or short-circuit on HV output due to electrode or cable fault.	Check and rectify electrode or cable faults.
	Generator overloaded.	Move charging electrode(s) further from counter-electrode.
All LEDs flashing 'OVER TEMP' shown on display	Generator internal temperature too high.	Move generator to cooler location. Reduce loading on generator.
All LEDs flashing 'UNDER VOLTAGE' shown on display	Supply voltage too low.	Check supply voltage.
All LEDs flashing 'OVER VOLTAGE' shown on display	Supply voltage too high.	Check supply voltage.
All LEDs flashing Any other message shown on display	Internal fault with generator.	Contact distributor.

9. Maintenance and Repair

Maintenance

Keep the generator dry and free of dust, dirt, corrosive substances and solvents. Avoid touching the plastic barrel of the high voltage connectors when connecting or disconnecting charging electrodes.

Regularly check the earthing of the generator to ensure continued safety and correct operation.

Regularly inspect the high-voltage connectors and cables for mechanical or electrical damage.

There are no parts requiring periodic maintenance within the generator.

Repairs

In the event of a fault with the generator which cannot be rectified by following the steps detailed in 'troubleshooting', contact your Fraser distributor in the first instance.

The generator has been designed to allow the major internal components to be easily replaced. This must only be carried out by suitably qualified and trained persons, and using genuine replacement parts supplied by Fraser Anti-Static Techniques.

In some cases it may be necessary for the generator to be returned to Fraser Anti-Static Techniques for investigation and repair. Please ensure the generator is suitably packaged and clearly indicate the symptoms of the fault encountered, including any error messages displayed by the generator.

10. Disposal

Dispose of the generator in accordance with local environmental regulations pertaining to electrical waste.

11. Spare Parts

The following spare parts are available for the IONFIX Compact Generator.

Part No.	Description
TBD	Fraser HV connector kit, 30/60 kV
TBD	DB-25 connector, solder buckets
TBD	Fuse (5 x 20 mm, type xxxx)
730218	Blanking plug for HV socket
730215	Combicon input plug for DC variant

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