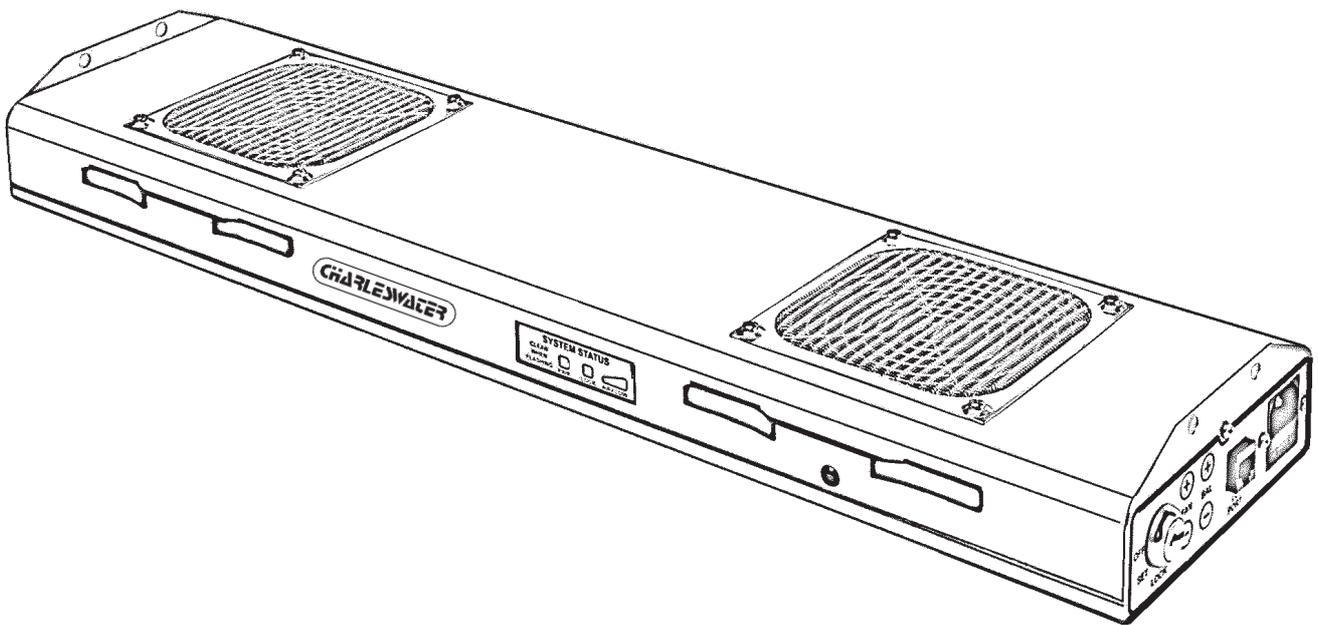




CHARLESWATER

CRITICAL ENVIRONMENT C/E SERIES OVERHEAD IONISER OWNER'S MANUAL



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Description

Ionisers are useful in preventing electrostatic charge generation, ElectroStatic Discharge, ElectroStatic Attraction, as well as preventing equipment latch-up and safety related shock. Ionisers. EN 61340-5-2 paragraph 5.2.9 states that "Ionisers should be considered as a method for charge neutralization in cases where grounding cannot be achieved." "Air ionisation can neutralize the static charge on insulated and isolated objects by producing separate charges in the molecules of the gases of the surrounding air. When a static charge is present on objects in the work environment, it will be neutralized by attracting opposite polarity charges from the ionized air." "Note that ionisation systems should not be used as a primary means of charge control on conductors or people."

Ionisation is used to neutralize charges on process necessary insulators and isolated semiconductors. Some examples of process necessary insulators are: the PC board itself, plastic test stands, plastic housing where a PCB may be mounted, as well as computer monitor screens and regular cleaning wipes. Examples of floating or isolated conductors are: loaded PCB mounted in a stand where the pins are not contacting the dissipative workstation.

Ionisation is not effective on items that have large capacitance, like people and trolleys; however, ionisers should be considered as a method for charge neutralization in cases where grounding cannot be achieved.

The Charleswater Critical Environment overhead ionisers are available in two models:

Model	Description
92260	61 cm C/E Ioniser, 220VAC
92261	122 cm C/E Ioniser, 220VAC
92662	Replacement Emitter Cassette

The 92260 is a 61 cm long unit with 2 fans, and the 92261 is a 122 cm long unit with 4 fans. Both models have the same features permitting the user to select the best size for the application.

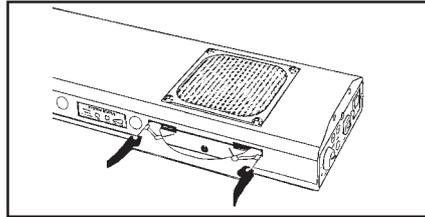


Figure 1. Removable emitter cassette

The C/E series offers many design improvements over previous overhead models, most notably, our patented (U.S. Patent No. 6,137,670) "Emitter Cassette" (see figure 1). While other manufacturers attempt to simplify or automate the cleaning of the emitter pins, what remains is one major flaw in the process - unless the ioniser is removed to another area, the contamination ends up on the workstation and on any product that happens to be nearby. The C/E series solves this problem. When the emitters need to be cleaned, the cassettes are easily removed from the unit and taken to another area to be cleaned. This takes the dirt away from the workstation and minimizes interruption of the work process. To eliminate downtime, a spare set of clean emitter cassettes can be dropped in. The others can be cleaned when convenient. This concept is so unique, that we have a patent on it.

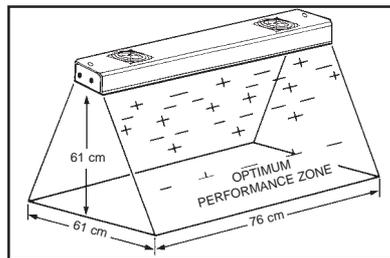


Figure 2. Area of optimum charge neutralisation for 92260

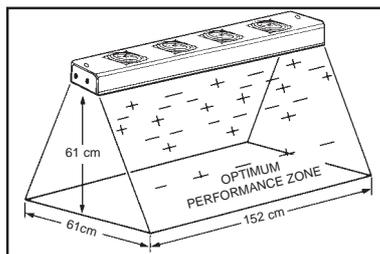


Figure 3. Area of optimum charge neutralisation for 92261

IMPORTANT: These units are designed to work with the live and neutral connections on the mains plug, being the correct polarity. On some European plug sockets the polarity can be either way round.

Before plugging in your Ioniser, please check the polarity of your mains socket, and ensure that the live and neutral match the live and neutral pins on the mains socket.

We cannot accept liability for Ionisers where the unit has been plugged into the mains socket, with the polarity reversed.

Please note that these units do require a properly grounded wall socket to function correctly.

Features

- Removable emitter cassettes allow you to minimize contamination of the work area.
- Closed-loop feedback electronic balance system continuously monitors output for best performance.
- Lockout key with distinctive front panel indicator prevents unauthorized adjustment.
- Balance individually adjustable at each fan zone.
- Flashing front panel signal indicates when cleaning is needed.
- IEC input and output connectors allow daisy-chaining of up to 2 units.
- Stainless steel and powder-coated aluminum construction for durability.

Specifications

Input Power:

220VAC 250mA (61cm model)
220VAC 400mA (122cm model)

IEC Outlet:

Allows a second unit to be daisy chained

Fuse:

5 x 20mm 3 amp time lag

Air Flow:

38-80 l/sec (61cm model)
76-160 l/sec (122cm model)

Emitters:

100% Tungsten, replaceable

Ionization Type:

Steady-state DC

Balance:

0+/-10 volts at set-up at 61cm above charged plate

Weight:

3 kg (61cm model)
5 kg (122cm model)

Size:

5cm x 15cm x 61cm
5cm x 15cm x 122cm

Mounting:

(2) 6mm mounting holes each end

Installation

The Charleswater C/E ioniser is designed to mount above the work area, providing even coverage without using valuable work surface area. Mounting is a matter of personal preference, and may be accomplished with brackets attached to a shelf, or the unit may be suspended by chain. Whatever method is used, care should be taken to insure that the mounting is secure and capable of supporting the weight of the unit. The power cord should be supported as well to provide protection against any hazard to the operator.

"S" hooks are provided with each unit to facilitate mounting using the chain suspension method. The ideal mounting height is 61cm above the work surface, although the ioniser may be located slightly higher or lower if required. Care should be taken to insure that the intake grills for the fans are not obstructed for maximum performance.

Turn the power key switch to the "OFF" position. Plug the IEC end of the cord into the ioniser and the other end into a properly wired outlet. We recommend that the outlet used by the ioniser be tested before use and periodically checked for correct wiring and a good solid ground. The C/E ioniser depends on a good ground for proper balancing.

Safety interlock switches are provided internally on each emitter cassette. This insures that power is cut off in the event that any cassette is removed or not fully installed.

The grills below each fan function as sensors and feed back a signal to the balance circuitry. Therefore, it is important not to hang or attach anything to the fan grills.

Controls and Functions

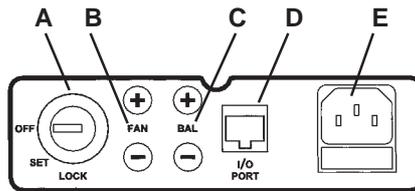


Figure 4. Control Panel

• The **CONTROL PANEL** is located on the right hand end of the ioniser. It provides controls for fan speed, balance, and a key switch to prevent unauthorised adjustment of the controls. Also located on the control panel is an I/O port that may be used for auto calibration (with optional accessory cable). It also is used to provide output signals to allow remote monitoring of ioniser status.

A. OFF/SET/LOCK key switch - this switch controls the power to the ioniser. When the SET position is selected, it allows the balance and fan speed to be adjusted. When the LOCK position is selected, a LOCK indicator is illuminated on the front panel of the ioniser. In this position, the balance and fan speed controls are disabled and the key is removable. In the OFF position, power is shut off to the ioniser and the key is removable.

B. FAN speed adjustment switches are used to set the fan speed to the desired level that provides the best performance while minimizing operator discomfort. With the key switch in the SET position, pressing and holding the "+" symbol will increase fan speed, and the "-" symbol will

decrease fan speed. Relative fan speed is displayed on the front panel indicator.

C. BAL controls are used to adjust the balance of the ioniser and are used in conjunction with a charged plate monitor. With a charged plate located directly under the ioniser, pressing the "+" symbol will shift the balance offset positive, while pressing the "-" symbol will shift it negative. The BAL controls, like the FAN speed, are only adjustable when the key switch is in the SET position.

D. I/O PORT serves a dual purpose. It accepts signals from a charged plate monitor and automatically calibrates the ioniser when the key switch is in the SET position. It also outputs ioniser status signals that can be useful for remote monitoring.

E. IEC INPUT CONNECTOR, based on the International IEC 60320 Standard, allows the power to be disconnected at the ioniser and provides a fuse drawer for a 5mm x 20mm fuse. The fuse drawer may be opened when the cordset is removed. In addition, an IEC Outlet on the opposite end of the ioniser can supply power for a charged plate monitor, or for up to 10 ionisers to be daisy-chained together.

Front Panel Display and Controls

See Figure 5.

System Status is the information center on the front of the ioniser. From it, the operator can easily check the operational status of the ioniser.

F. PWR - this indicator will normally be green when the ioniser is operating correctly. When the autobalance circuit can no longer adjust for dirty emitter pins, this indicator will turn red and begin to flash. It is normal for it to flash for a few seconds each time the ioniser is turned on. This indicator will be on when the key switch is either in the "SET" or "LOCK" position.

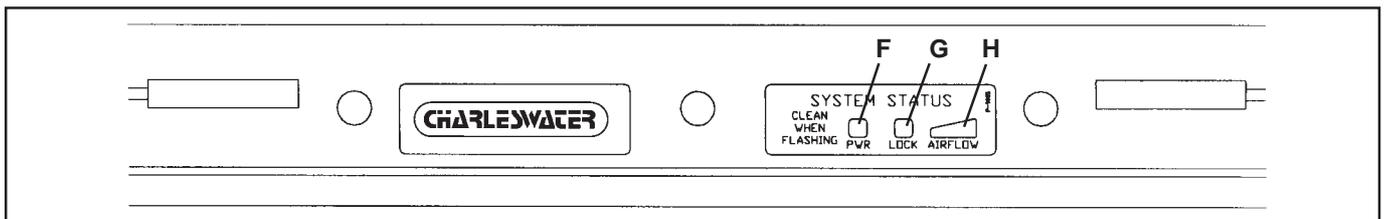


Figure 5. Front panel display and controls

G. LOCK - when the key switch on the end of the ioniser is set to lock, this indicator will display a distinctive blue light. This makes it readily apparent that the ioniser has its settings locked, preventing unauthorized adjustment.

H. AIRFLOW - this display indicates relative airflow output from the fans. If the key switch is in the "SET" position and the "+" or "-" button are pressed and held, the fan speed will increase or decrease with a corresponding change in the AIRFLOW display. As fan speed is increased, the display will move to the right.

Minor Adjustments (see figure 4) are provided for balancing each fan zone. These adjustments are designed for minor adjustments to balance one fan to another. Overall balance adjustments should be done with the "BAL" switches on the end panel.

• **VR6, VR5, VR2, and VR1** - are the zone balance adjustments for the zones 1 through 4 respectively. Zone 1 is closest to the right end. 61cm models will only have VR6 and VR5 adjustments. These adjustments are covered in the section titled "Calibration Instructions".

• **VR3 and VR4** - are adjustments to center the alarm and to change the alarm sensitivity. These adjustments are covered in the section titled "Calibration Instructions".

• **ALARM JUMPER** - this jumper is normally installed at the factory and provides an audible alarm to supplement the flashing red PWR light when the unit needs cleaning. Some units have a small switch in place of the jumper.

Operation

After the unit is mounted securely and connected to a properly wired outlet, turn the key switch to the set position. The performance of the ioniser is directly related to the airflow on the area to be protected. Generally, try to use the highest setting possible without disturbing the operator or the work in process. After allowing the unit to run for several minutes, a charged plate monitor can be used to check the balance and performance. We recommend doing this at the time of the initial installation, so that data can be collected and saved for future reference. Place the charged plate directly under each fan and record the float (balance) voltage. If all fans are

offset slightly in the same direction, the "+" or "-" BAL buttons can be used to correct the offset. If the balance varies from a positive offset to a negative offset between fans, the individual fan zone controls can be manipulated as required.

It is not uncommon to find differences between ionisers from bench to bench or even between fans on ionisers during initial setup. This is often caused by the presence of objects on or around the bench. Large metal objects nearby or machines or equipment on the bench will often cause a shift in the offset voltage at that area. The individual zone controls of the C/E ionisers allow this to be compensated for during initial setup.

After balance offsets have been checked, the decay performance of each fan should be measured and recorded. This information will be useful to establish a maintenance schedule. When decay times begin to increase significantly, or if the red PWR light begins to flash, emitter cleaning is usually indicated. By recording the time intervals between the first few cleanings, a maintenance schedule can be developed.

After initial setup and testing has been done, the key switch can be set to the LOCK position and normal workstation use resumed.

If the ioniser is used in a manner not specified by the manufacturer, the protection provided by the ioniser may be impaired.

Maintenance

"As with all ionisers, periodic maintenance will be needed to provide optimum performance." (Reference: EN 61340-5-2:1 paragraph 5.2.9).

The frequency of monitoring ionisers really depends on how and where they are used. Since the majority of them use a fan to transport the ions to the working area, the cleanliness of the air directly affects their performance over time and how often the emitters should be cleaned. Under normal conditions the ioniser will attract dirt and dust (especially on the emitter and fan guards). To maintain optimum performance, cleaning must be done on a regular basis. The electrodes should be cleaned at least every 6 months. However, more frequent cleaning may be required if used in environments with more contaminants.

Ionisers are listed under EN 61340-5-1 section 9.7 for Monthly checks. Per section 9.7.2 Ionization system "The ionization system, if fitted, shall be verified for functionality."

By nature, all electric ionisers attract contaminants to the high voltage emitter pins. For best performance, this contamination must be kept to a minimum. This was a major factor in the design process of the C/E ioniser. Although we could not eliminate the maintenance, we have made it far easier and much cleaner than ever before.

- Turn the key switch to the OFF position.
- Grasp the cassette ejector levers at the center and pivot outward about 90 degrees.
- Grasping the right and left corners, pull the cassette straight out of the ioniser.
- The cassettes can then be replaced with a spare set or removed to another area for cleaning.
- Cleaning of the cassette can be accomplished with a stiff brush or lint free swab and isopropyl alcohol or other residue-free cleaning solvent.
- The emitter cassettes or the individual removable tungsten emitters can also be cleaned in an ultrasonic cleaning tank.

Theory of Operation

By definition, materials that are insulators cannot have static charges removed via grounding as they do not conduct electricity. Ioniser emitters flood an area with millions of positive and negative charged electrons to neutralize statically charged insulators.

Charleswater overhead ionisers employ a safe non-nuclear Steady-State DC ionisation source. Steady DC systems consist of separate negative and positive ion emitters connected by a pair of high-voltage cables to their respective high-voltage power supplies. The ioniser's unique, closed loop monitoring circuitry monitors ion output and automatically adjusts the unit to reach an equilibrium at perfectly balanced ion flow. The ioniser is designed to achieve balance under extreme conditions and is uniquely able to maintain balance in almost any environment. Charleswater ionisers meet the EN 61340-5-1 Table 1 technical

requirement "to decay from 1,000 V to 100 V in 20 s maximum" tested per A.6 Test method.

Health

There are no known health risks associated with our devices. The emitters work at about 4-6 kV and can create ozone, but there have been no significant measurement of ozone from our emitter sets, as all our existing units test well below the OSHA limit of 0.05 ppm ozone. For additional safety information, see "Dispelling an Old Myth" written by William Metz of Hewlett-Packard published in Evaluation Engineering magazine, September 2001.

Calibration

See figure 6.

We recommend re-calibration every 12 months maximum, however, most users will often choose a much shorter interval, especially if the product being worked on is very sensitive. On very sensitive product, we recommend checking the calibration any time an emitter cassette is removed and replaced.

Warning! Do not attempt to calibrate this unit without proper equipment such as a charged plate monitor. Adjustments to the calibration controls should be performed by authorized trained personnel only.

Balance adjustment

Using a charge plate monitor, check each fan's balance. Use the "BAL" switches to zero the unit. If the fans are a little out of balance with each other use the fan adjustment pots to equalize them. VR5,6 and VR1,2 on 122cm model.

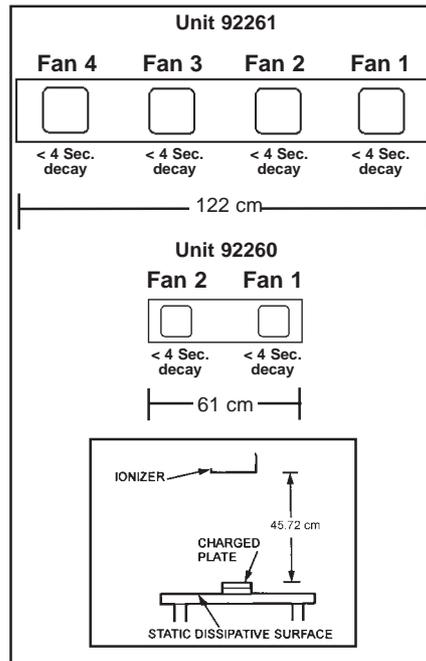


Figure 7. Balance under < 10 volts. When set under lab conditions, 5 volts is attainable.

NOTE: Each fan has its own balance circuit, however the alarm circuits tie them together. If one or more of the individual fan balance circuits are offset too much from the rest it could cause the alarm not to function correctly. If more than a slight amount of adjustment is required at any individual fan zone, we recommend that the unit be reset using the "Major Reset Adjustment" instructions below.

Major Reset Adjustments - Use this procedure only if the "Balance adjustment" above does not permit proper operation.

1. Turn key to "SET" position.
2. The potentiometers in this unit have a 24-turn range. Reset all of them by turning them at least 24 revolutions counter-clockwise.
3. Set the fan adjustment pots (VR1, VR2, VR5 and VR6) to center by turning them 12 revolutions clockwise.
4. Center the "BAL" control found on the control panel on the right end of the ioniser using the following process. Place a charge plate underneath any of the fans, push and hold the + BAL switch to find its most positive point, use the - BAL switch to find its most negative point, calculate the midpoint and set the balance using the "BAL" buttons to that point. Example: if the most positive point is +40V and its most negative point is -10V, you would set the balance to $\pm 15V$.
5. Fine-tune each fan by placing the charge plate underneath it and using its corresponding potentiometer to zero its balance. Turn clockwise for more positive and counter clockwise for more negative.
6. Turn alarm sensitivity (VR4) 3 revolutions clockwise. Alarm center (VR3) should be turned clockwise until "PWR" light turns green. VR3 should have two full revolutions in which the "PWR" light remains green. If VR3 doesn't have two full revolutions of green turn VR4 clockwise one turn and check again. If VR3 has a lot more than two full revolutions of green turn VR4 counter clockwise and check again. Finish by setting VR3 to the midpoint of green range.

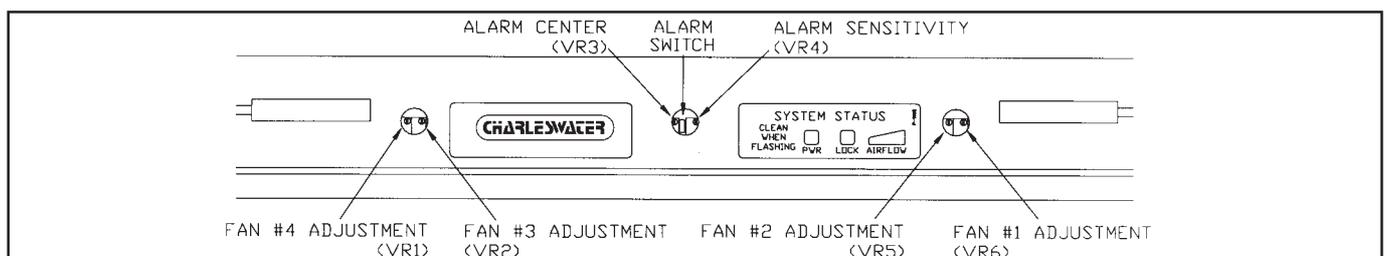


Figure 6. Calibrating C/E Ioniser

PROBLEM	POSSIBLE CAUSE	SOLUTION
Unit won't turn on	Key is on "OFF" position	Turn key to "SET" or "LOCK" position.
	One or more emitter cassettes are not fully inserted.	Push in emitter cassette(s) completely.
	No Power	Check power cord or fuse.
Fan speed or Balance won't adjust	Key is in "Lock " Position (Blue indicator On).	Turn key to "Set" position
	Button depressed too quickly, or pressed too lightly.	Push and hold buttons firmly
"PWR" light is flashing red.	Emitter pins are dirty or contaminated.	Remove emitter cassette and clean emitters.
"PWR" light is flashing after emitter cassettes have been cleaned.	Unit is out of calibration.	Refer to page 4 for calibration instructions.
There is no audible alarm when "PWR" light is flashing red.	Alarm switch/jumper is set to off.	Refer to page 4 for switch/jumper location.

Limited Warranty

Charleswater expressly warrants that for a period of one (1) year from the date of purchase Charleswater Ionizers will be free of defects in material (parts) and workmanship (labour). Within the warranty period, a credit for purchase of replacement Charleswater CE Ionizers, or, at our option, the CE Ionizer will be repaired or replaced free of charge. If product credit is issued, the amount will be calculated by multiplying the unused portion of the expected one year life times the original unit purchase price. Call Customer Service at 00 44 (0) 1892-665313 for Return Material Authorisation (RMA) and proper shipping instructions and address. Any unit under warranty should be shipped prepaid to the Charleswater You should include a copy of your original packing slip, invoice, or other proof of date of purchase. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, Charleswater will quote repair charges necessary to bring your unit up to factory standards. Call Customer Service at 00 44 (0) 1892-665313 for a Return Material Authorisation (RMA) proper shipping instructions and address. Units should be shipped prepaid.

Warranty Exclusions

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

Limit of Liability

Electronic ionisers use high voltage corona discharge and should not be used in or near flammable or explosive environments. In no event will Charleswater or any seller be responsible or liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, users shall determine the suitability of the product for their intended use, and users assume all risk and liability whatsoever in connection therewith.

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