# IONIX FILLING STATION

# INSTRUCTIONS

**Elexion Water Treatment Limited**
Unit 3 The Glenmore Centre Fancy Road, Poole BH12 4FB
T: 01256 678268 E: info@elexion.uk
**www.elexion.uk**

Contents:




**IONIX FILLING STATIONS**

**FS50 / FS25 / FS15**

## 1. Overview.

IoniX filling stations from eleXion are an industry leading range of ion exchange resin vessels designed for technical water treatment applications.
System top up water and circulation water can be treated to known chemical free guidelines such as VDI 2035.
Each filling station is supplied with a combined electrical conductivity and water meter, which allows for real time monitoring of the outlet conductivity and system fill volume.
The internal meter is available in two options, AA battery powered or 240v (3 pin UK plug). The 240v option is compatible with a BMS system, via volt free alarm output. When the resin outlet setpoint has been exceeded, the internal contact breaks. A separate Modbus water meter can also be supplied for monitoring annual fill rates via a BMS panel.

## 2. General safety information.

The ioniX range of filling devices should only be installed and operated in accordance with this instruction manual and should only be operated by suitably trained personnel.

Each filling station is manufactured from high grade 316 stainless steel.

Only the supplied valve kit and electrical conductivity meter should be used when installing the ioniX filling station.

The 8" quick release lid has been manufactured to withstand pressures of up to 10 bar, with the supplied gasket being designed to withstand temperatures of up to 90 degrees with a long service life. All filling stations are pressure tested at the factory to ensure they are compliant with the information in this manual.

The devices should never be exposed to higher temperatures or pressures than listed in the below technical data.

IoniX mobile and mobile plus should only be used with the wheels and handle supplied.

IoniX filling stations can be operated under high temperatures and pressures, precautions should take place when handling or servicing the filling station.

Onsite risk assessments and appropriate PPE should be worn before working on any eleXion system.

IoniX filling stations should never be worked on until the filling station is electrically isolated from the power supply (Combo meter ES099V), hydraulically isolated from the mains supply and/or system pipework, the pressure drained from the vessel and once the filling station is at a temperature where it is safe to handle.

The ioniX filling station must be installed with an electrical isolation switch which is earthed. The filling station should always be both electrically and hydraulically isolated before carrying out any maintenance work. Failure to do so may result in personal harm.

Di water produced is intended only for technical use and not human consumption.

Personal injury and property damage resulting from the failure to comply with these instructions are not covered by the Product Liability. The manufacturer also assumes no liability for any other damage caused by the failure to comply with these instructions.

Please read these instructions carefully before using the device. For your own safety and others, it is essential to follow the safety instructions in this instruction manual.

You must always adhere to the relevant local safety regulations. It is the installers' responsibility to comply with the local regulations that apply to them and to keep to up to date with the latest regulations.

## 3. Application.

IoniX filling stations from eleXion have been specially designed for the use in both heating and cooling systems, allowing them to become complaint with "chemical free guidelines" and in line with many of the world's leading HVAC manufactures technical instructions and their requirements for water treatment.

**Compatible guidelines:**

- VDI 2035
- SWKI BT 102-01
- ÖNORM 5195-1
- EN12828
- DIN50930
- BSRIA BG50
- CIBSE CP1

IoniX filling stations are designed to be used with ion exchange resins for the complete desalination of the fill water or softening of the fill water, depending on application.
When used with Xi+ resin (our in house mixed bed ion exchange resin), the Di water produced will be suitably conditioned for use in both heating and cooling systems.

Caution should be taken with third party resins, as they may not be suitable for use in HVAC systems.

Other technical applications and industries can also utilise the Di water produced from ioniX filling stations.

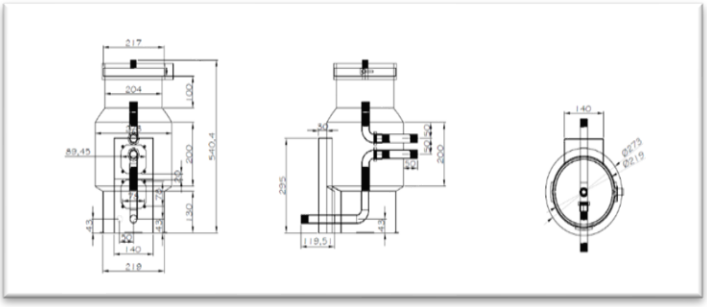
## 4. Product Datasheet.

Technical details:

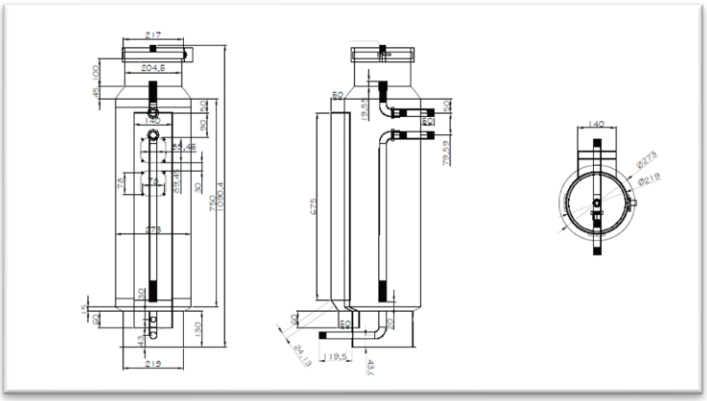
| | ioniX 15 | ioniX 25 | ioniX 50 |
|---|---|---|---|
| Maximum operating pressure | 10 bar | | |
| Test pressure | 15 bar | | |
| Maximum operating temperature | degrees | | |
| Minimum operating | -10 degrees | | |
| Capacity | 15 litre | 25 litre | 50 litre |
| Maximum flow rate lpm | 10 lpm | 18 lpm | 28 lpm |
| Estimated capacity limit @ 300 µS/cm | 1,995 | 3,350 | 6,700 |
| Estimated capacity limit @ 600 µS/cm | 997.5 | 1,675 | 3,350 |
| Connection sizes inlet/outlet | ¾" | | |
| Drain connection | ¾" | | |
| Air vent connection | ½" | | |
| Combo meter ES099 Power supply | AA alkaline batteries (3) | | |
| Combo meter ES099V Power supply | 240v plug | | |
| Combo meter flow rate | 3-100 lpm | | |
| Combo meter temperature operation | 0-80 degrees | | |
| Combo meter maximum pressure | 10 bar | | |

Drawings:

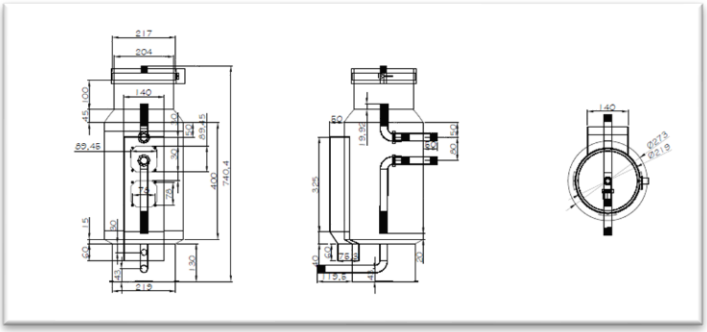
## IoniX FS15




## IoniX FS 25




## IoniX FS 50



## 5. Combo meters ES099 and ES099V.

Every ioniX filling station is supplied with an outlet monitoring computer, ioniX mobile filling stations are supplied with two measuring computers (measuring the inlet and outlet of the filling stations).

The standard Combo meter ES099 requires 3 x AA alkaline batteries, the advanced combo meter ES099V requires a 240v plug supply.

When connecting the ES099V meter to an electrical socket, please ensure the electrical connection is safe from any possible contact with water and that the electrical supply has been checked by a qualified electrician beforehand.

## 6. Estimated capacity limits.

To estimate the total volume of water that can be conditioned with an ioniX filling station using Xi+ resin the following estimates can be applied.

| Xi+ resin treated volume based on inlet feed electrical conductivity (1 litre of resin) | | | | |
|---|---|---|---|---|
| Cond | TDS | TDS | Conversion Factor | OBR |
| µS/cm | mg/l or ppm | meq/l as CaCO3 | | BV* |
| **10** | 5 | 0.10 | 400 | **4000** |
| **50** | 25 | 0.50 | 400 | **800** |
| **100** | 50 | 1.00 | 400 | **400** |
| **150** | 75 | 1.50 | 400 | **267** |
| **200** | 100 | 2.00 | 400 | **200** |
| **250** | 125 | 2.50 | 400 | **160** |
| **300** | 150 | 3.00 | 400 | **133** |
| **350** | 175 | 3.50 | 400 | **114** |
| **400** | 200 | 4.00 | 400 | **100** |
| **450** | 225 | 4.50 | 400 | **89** |
| **500** | 250 | 5.00 | 400 | **80** |
| **550** | 275 | 5.50 | 400 | **73** |
| **600** | 300 | 6.00 | 400 | **67** |
| **650** | 325 | 6.50 | 400 | **62** |
| **700** | 350 | 7.00 | 400 | **57** |
| **750** | 375 | 7.50 | 400 | **53** |
| **800** | 400 | 8.00 | 400 | **50** |
| **850** | 425 | 8.50 | 400 | **47** |
| **900** | 450 | 9.00 | 400 | **44** |
| **950** | 475 | 9.50 | 400 | **42** |
| **1000** | 500 | 10.00 | 400 | **40** |

*BV = L/L means volume of treated water per liter of resin.

- To calculate ioniX 25 (BV x 25)
- To calculate ioniX 50 (BV x 50)

**Example: the local tap water has an electrical conductivity of 400 µS/cm.**
**Using the ioniX 25 filling station it is possible to treat 2500 litres of water (25 x 100).**

A critical factor is knowing the incoming conductivity supply of the raw water supply or the electrical conductivity of the circulating water if completing inline conditioning.
It is always preferable to have completed an onsite analysis of the fill or circulation water. However, if this is not available you can search the local water supplier's website to find their latest reports for the area in question. Please note, this is only useful information for initial filling and not inline circulation where contamination could affect the estimated capacity of Xi+ resin.
If the water supplier's details are unknown, you can visit www.water.org.uk/customers/find-your-supplier where you will be able to identify the local water supplier (providing they are not supplied privately).

***The above calculatios are an estimation tool only; these figures are based on natural water while performing treatment at the recommended flow rates. Chemically treated water or water which contains undesirable solids will have a negative effect on resin output.***

## 7. ioniX sizing for permanent installations.

The ioniX filling station should be sized based on the following parameters:

- System volume.
- Yearly estimated top up volume.
- Fill rate required.

For large industrial systems or heat networks multiple ioniX filling stations can be installed in parallel to achieve higher flow rates and capacity limits.

## 8. ioniX permanent connection.

The ioniX system can be installed as a permanent connection to any sealed system.

Installation of the ioniX filling station should be compliant with this instruction manual and local building regulations.

A permanent connection can be subject to technical requirements depending on national or local regulations.

A break tank or device with a minimum CAT 4 protection is usually required when connecting to a commercial system.

A suitably approved backflow protection device, complaint with DIN EN 1717 may be required when connecting the ioniX filling station to a fill and spill type pressurisation unit.

When directly connecting to the mains supply or a system without the appropriate category of fluid protection it is recommended that the system incorporates an RPZ valve (BA separator part number 570005).

Where an ioniX filling station is installed direct to the mains and there is a hydraulic break between the heating/chilled system, a suitable CAT 3 double check valve will need to be installed.

Please check with your local water board to ensure the protection provided is sufficient and in line with building regulations/local water bylaws.

eleXion holds no responsibility for the incorrect use or classification of back flow prevention and it is the responsibility of the installer to ensure compliance.

IoniX filling stations should be positioned so that all future top up water passes through the filling station, ensuring all future top up/initial fill water is conditioned and in line with required guidelines.

Both manual fill and automatic top up device positions should be considered when positioning an ioniX filling station.

Where the inlet pressure exceeds 10 bar, a suitable pressure reducing valve should be fitted to prevent exceeding the maximum recommended pressure.

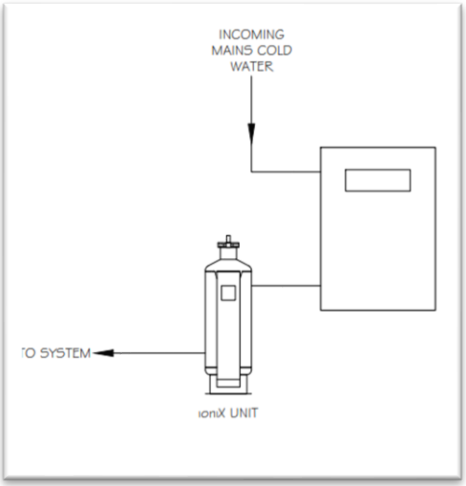
The valve kit supplied allows for a flexible installation onsite where any orientation of the pipework can be achieved.

The filling station should be installed on a secure and level base, suitable to take the weight of the filling station when at full capacity and weight.

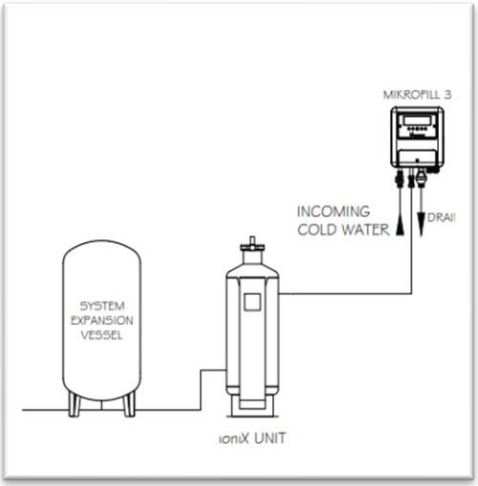
Please refer to the schematics on page 8 for installation assistance.

INSTALLATION EXAMPLES:

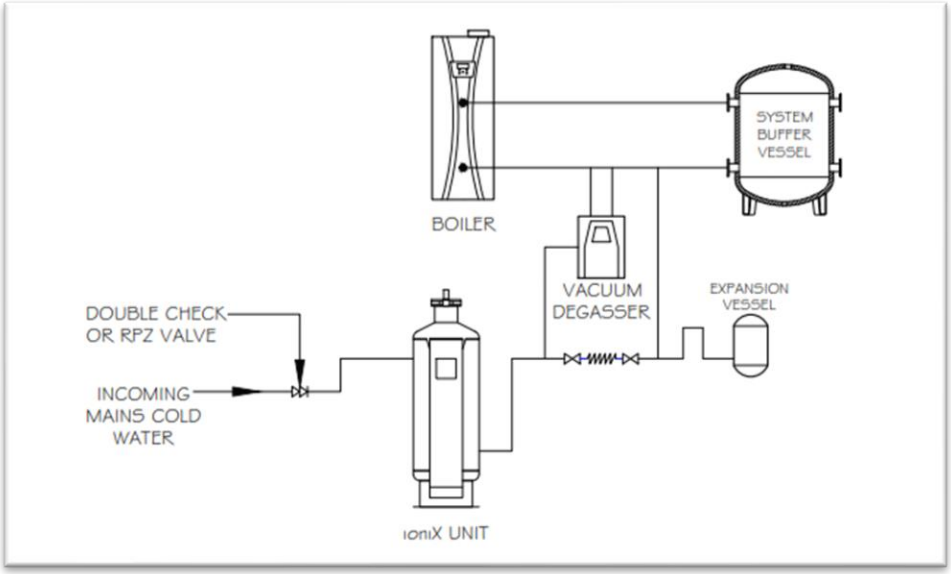
STANDARD PU INSTALLATION




MIKROFILL INSTALLATION




DIRECT CONNECTION TO MAINS / VACUUM DEGASSER / FILL & SPILL FILLING STATION



## 9. Inline conditioning.

Where a standard ioniX filling station can be installed as a permanent fixture to any system to prevent any untreated top up water from entering the system, there are also applications where inline treatment may be required using the ioniX mobile filling station.

## 10. What is inline conditioning.

Inline treatment is where a system is initially filled with raw water. Then, by using the side stream method, the system water is gradually conditioned bringing down the conductivity of the circulating water in line with required parameters and industry guidelines.

This method can be used on new systems where the system has been filled with raw water or on existing fouled systems where incorrect water treatment has resulted in unwanted corrosion deposits, bacteria, biofilms and scale build up.

XI+ mixed bed ion exchange resin is manufactured to remove organic matter only (natural salts and minerals), when using to extract stagnated chemical additives, it will heavily influence the capacity of the resin and its performance.

It is always advisable to reduce the chemical concentration of any system prior to inline conditioning.

A prefilter is advisable to prevent any contaminates from entering the resin bed and to protect the resin.

IoniX filling stations can be used on the vast majority of systems while in operation as they are rated to 90 degrees at 10 bar, however when operating at above 60 degrees the capacity of the resin will be negatively affected.

It would be preferable to reduce the operating temperature of the system to 60 degrees while completing the inline treatment.

At above 60 degrees degradation of anion resin causes poor silica removal capacity, resulting in the deterioration of the treated water quality.

## 11. Inline conditioning processes.

On completion of the system being filled, fully vented and pressure tested, inline conditioning can take place.

1. Ensure all parts of the system are open, all pumps and valves are operational. We need to ensure that circulation is achieved throughout the entire system.

2. Using suitably pressure and temperature rated hoses, connect the ioniX filling station to the system. Please refer to below schematics for examples.

3. Please take precautions when handling the equipment as it can be subject to high temperatures and pressures.

4. Before opening the 8" quick connection lid, always ensure the system has been isolated from the circulation system, the vessel pressure has been released and the filling station is electrically isolated from the power supply.

5. The ideal position for the connection of the ioniX filling station is at any flow/return circuit where the system flow temperature does not exceed 60 degrees.

6. The ioniX filling station can also be connected to the flushing bypass connection supplied with the elector tank. It is preferable to use the flushing bypass of the elector tank as these are subject to flow restrictors ensuring the recommended flow rate is not exceeded. The flow restrictor cartridge can however be removed for temporary filtration should the flow rate be too low.

7. Always respect the flow rate at the outlet of the ioniX filling station, failure to do so will result in inefficient water conditioning where minerals/salts slip through the resin bed.

8. Using the supplied digital flow meter, you can measure the flow rate through the filling station. If the flow rate is too high simply close the inlet valve until the desired flow rate is achieved.

9. Install the prefilter to the inlet of the ioniX filling station, this will protect the resin from being polluted by foreign matter. It is recommended that a filter no greater than 30 Micron is used on the inlet of the filling station. NB. The smaller the pre filter the better protected the resin will be.

10. Once connected to the system via the hoses, fill and vent the filling station slowly ensuring no leaks are present.

11. IoniX mobile filling stations consists of two combo meters, one on the inlet and one on the outlet.

12. Ensure the combo meters are appropriately connected and the set values are correct. It is advisable that the outlet computer is set to raise an alarm when 15 µS/cm is exceeded. It is advisable for most applications for the circulation water be in the range of 10-100 µS/cm and the inlet computer should represent the limit you are trying to achieve.

13. To ensure the capacity limits are not exceeded it is not advisable to leave the ioniX filling station unattended unless you can calculate expected conditioning time.

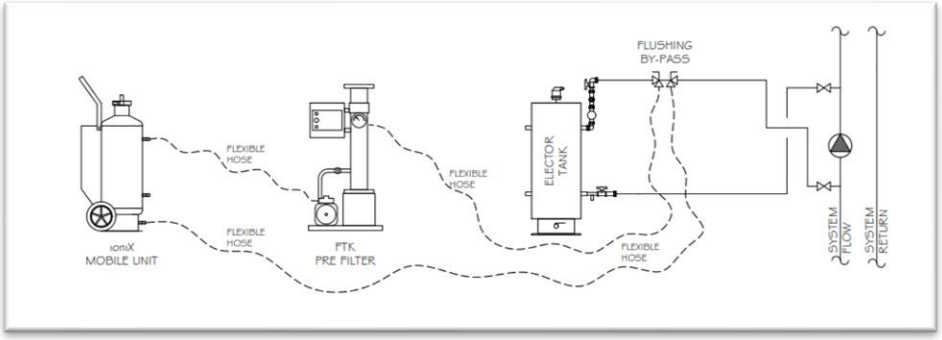
14. During the process of inline treatment it is advisable to check all parts of the systems are receiving circulation.

15. Water sampling of the pH and electrical conductivity via onsite testing equipment is advisable. Sample points have been provided on the inlet/outlet of the ioniX filling stations.

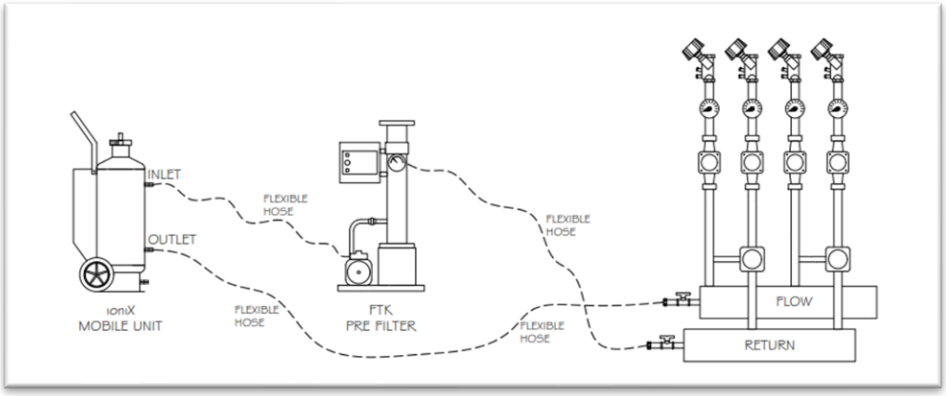
16. Once the required water conditioning parameters have been achieved and meet the recommended guidelines, the ioniX mobile filling station can be safely disconnected from the system. Ensure that the pressure has been removed from the vessel and if hot the vessel has been allowed to cool before disconnecting.

INLINE TREATMENT EXAMPLES:

IN-LINE TREATMENT USING IONIX MOBILE + FTK PRE FILTER UTILISING FLUSHING BYPASS FROM ELECTOR TANK INSTALLATION




IN-LINE TREATMENT USING IONIX MOBILE + FTK PRE FILTER CONNECTING TO SYSTEM PIPEWORK AT THE LOWEST TEMPERATURE POINT



## 12. Replacing the resin.

Before initial use and after the resin has been exhausted (indicated via the outlet computer) the resin will require changing.

After replacing the resin, it is always advisable to flush through the resin with raw water. It is not advisable to transfer resin from site to site when using an ioniX mobile filling station, if the resin is transferred, please thoroughly flush this through before using.

The filling station should be flushed through with a quantity of water corresponding to twice the filter volume before use.

1. Isolate the power supply if using combo meter ES099V.
2. Ensure the filling station is isolated from the system closing the inlet and outlet isolation valves supplied.
3. On existing installations and/or after inline treatment the existing resin will need removing (not the case for first time fills).
4. Connect a suitable 3/4" full bore hose to the base drain of the ioniX filling station.
5. The system is subject to high pressures and the drain hose must be made secure when draining the filling station.
6. The drain hose should be positioned into the supplied woven bag.
7. The bag should be positioned on top of a drain or within a bucket large enough to take the water volume of the filling station.
8. Open the drain valve to release the pressure from the filling station.
9. Resin should start to flow into the woven bag with the water being expelled into the drain/bucket.
10. Open the inlet isolation valve to the ioniX filling station slowly, this aids in rinsing the vessel of any resin stuck within the vessel.
11. Continue the process until the water runs clear and no resin in seen entering the woven bag.
12. Once all water has been drained from the ioniX filling station, carefully open the top of the filling station, using the quick release lid system.
13. Looking inside the filling station, ensure all the resin has been removed.
14. On conformation that all resin has been removed from the base, the drain can now be closed.
15. Open the vacuumed packed, ion exchange resin Xi+ and carefully pour into the ioniX filling station (two x 12.5 litre bags for a 25 litre filling station and four x 12.5 litre bags for the 50-litre version).
16. Inspect the rubber gasket before closing the lid, if the rubber is damaged or worn, please replace.
17. Once the lid is closed, the filling station can be filled by opening the inlet isolation valve slowly.
18. Slowly open the air vent connection located on the lid of the ioniX filling station, once this has stopped venting close the air vent.
19. Then fully open the inlet isolation valve and slowly start to open the outlet isolation valve.
20. Check all connections are watertight.
21. Reinstate the power supply to the filling station if required.
22. Take note of the water meter fill rate and log for future diagnostics.

## 13. Assembling the valve kit.

The ioniX filling stations have been designed to allow for a multitude of possible orientations.

It is possible to have the inlet and outlet connections fitted at any angle or orientation to assist with connecting onto the system.

The valve kit supplied has been pre-formed to show the installer how the valves and connections need to be fitted.

Where the valves and connections have been made hand tight with no sealant, the purpose is purely to show the formation of the valve set up.

The installer can then choose the orientation they require for the installation and seal all joints with the appropriate sealing PTFE, Teflon string etc.

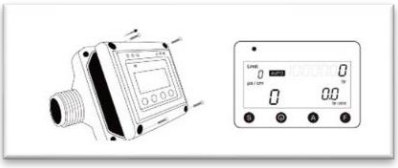
Please see image of the valve configuration.

FILTER GASKET BASKET TO POINT TOWARDS THE BRASS METER UNION

SAMPLE POINT MUST BE UPSTREAM OF ISOLATION VALVE HANDLE AS PICTURED

VALVE KIT COMPONENTS

## 14. Setting the combo meter ES099V.



1. Installing the battery

Taking out the screws of the front case, put three no. AA alkaline batteries into the battery holder. The front case can be rotated from 90, 180 to 270 degrees for better reading.

2. Setting litres or gallons mode

The default setting of the ES099A Combo meter is litres. You can switch the mode from litres to gallons by pressing the button “F” when the battery has been inserted. When you hear a “beep”, the setting is switched.

The screen shows “gal / min”.

3. Turn on and turn off

Hold the “⏻” button for three seconds to turn the Combo meter on or off.

4. Setting TDS or conductivity

The default setting of the ES099A Combo meter is a conductivity mode. The screen shows “uS/cm”. You can switch the mode between the conductivity and TDS (Total Dissolved Solid) by the pressing the button “⏻”.

5. Measuring flow

The ES099A Combo meter shows real time flow rate and accumulated volume. The maximum accumulated volume is 1999999 litres (gallons).

6. Manual measuring TDS / Conductivity

Press the “A” button can measure the TDS or conductivity and keep showing the value on the screen. The maximum TDS and conductivity can be measured is 1999 ppm and 1999 uS/cm.

7. Automatic TDS/Conductivity monitoring

Pressing the “S” button can set the TDS or conductivity value to monitor. The increment is 10 ppm for TDS and 15 uS/cm for conductivity. Keep pressing the “S” button can reset the setting to be zero.

Once the setting is done, go to set automatic monitoring function. Press the “A” button to do manual test first, then press the “A” button again, the ES099A Combo meter goes into automatic monitoring function. The screen shows “AUTO” in the middle. The ES099A Combo meter measures the TDS / conductivity for every 10 litres. If the measured value is under the setting value, the green light blinks for 30 seconds. If the measured value is over the setting value, the red light keeps blinking, and the alarm sounds.

8. Automatic / Manual mode

Pressing the “A” button can switch between the automatic and manual mode for the TDS/Conductivity measuring.

9. Release the alert

By pressing the “A” button to select manual mode will release the alert status.

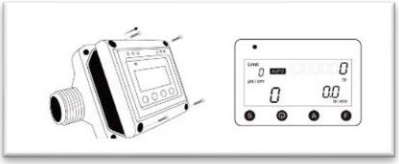
10. Low battery power alert

When the battery power is low, the empty battery symbol on the screen blinks. Replacing the battery with new ones can release the alert. The last data will be memorised and restored when battery power is off.

## 15. Setting the combo meter ES009V.

1. Connecting power

Plug the connector of the power adapter into the DC jack hole at the bottom of combo meter. The input of the power adapter is 100-220 VAC and output is 5V 1A. The front case can be rotated from 90, 180 to 270 degrees for better reading.



2. Connecting the potential free contact

Opening the top case, put the wire through the hole at the bottom of the combo meter. Then connect the wires with the connector on the board.

3. Turn on and turn off

Hold the "⏻" button for 3 seconds, this will turn on or turn off the Combo meter.

4. Measuring flow

The ES099V Combo meter shows real time flow rate and accumulated volume. The maximum accumulated volume is 1999999 liters.

5. Setting TDS or conductivity

The default setting of the ES099V Combo meter is a conductivity mode. The screen shows "uS/cm". You can switch the mode between the conductivity and TDS (Total Dissolved Solid) by the pressing the button "⏻".

6. Manual measuring TDS / Conductivity

Pressing the button "A" can measure the TDS or conductivity and keep showing the value on the screen.
The maximum TDS and conductivity that can be measured is 1999 ppm and 1999 uS/cm.

7. Automatic TDS/Conductivity monitoring

Pressing the button "S" can set the TDS or conductivity value to monitor. The increment is 10 ppm for TDS and 15 uS/cm for conductivity. Keep pressing the button "S" to reset the setting to be zero.

Once the setting is done, then go to the set automatic monitoring function. Press the button "A" to do a manual test first, then press the button "A" again, the ES099V Combo meter gets into automatic monitoring function. The screen shows "AUTO" in the middle. The ES099V Combo meter measure the TDS / conductivity for every 10 liters.

8. Automatic / Manual mode

Pressing the button "A" can switch between the automatic and manual mode for the TDS/Conductivity measuring.

9. Over TDS/Conductivity value alert

The combo meter will generate a beep sound alarm, blink red light and close the potential free contact if the consecutively measured conductivity/conductivity value is over the setting value twice.

10. Release the alert

By pressing the button "A" to choose the mode to be manual mode will release the alert status.

## 16. Replacement parts list.

| Image | Description | Image | Description |
|---|---|---|---|
|  | IoniX lid gasket |  | ¾” M/F angled Isolation valve |
|  | Conductivity meter (230v) |  | ¾” F/F Isolation valve + Sample point |
|  | Conductivity meter (Battery) |  | ½” M/F Isolation valve |
|  | Manual air vent |  | ¾” M/F Isolation valve |
|  | Filter gasket |  | ¾” M/F Meter connection pack (Pair) |
| | | | |
| | | | |

## 17. Water treatment log.

| Service date | Water meter reading | Fill volume since last service visit | Conductivity meter reading | Resin replaced Y/N | Resin expected to last until next service visit Y/N |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

ioniX
FILLING STATION


**Elexion Water Treatment Limited**
**ioniX Filling Station**

eleXion WATER TREATMENT

**Elexion Water Treatment Limited**
Unit 3 The Glenmore Centre Fancy Road, Poole BH12 4FB
**T: 01256 678268 E: info@elexion.uk W: www@elexion.uk**