INSTRUCTION MANUAL

Demineralizer

Model: 24R Two Stage Deioniser

Brand: VEOLIA Water Systems
24R
Two Stage Deioniser
Operating Instructions
IMPORTANT
It is most important that this instruction book is retained with the 24R Two Stage Deioniser for future reference. Should the unit be sold or transferred to another owner, or should you move premises and leave the unit, always ensure that the book is supplied in order that the new owner can be acquainted with the functioning of the unit and the relevant warnings.
Declaration of Conformity

Veolia Water Systems

24R TWO STAGE DEIONISERS

Conform to the following EC Directives where required:

The Electromagnetic Compatibility Directive 89/336/EEC
(including any additions or amendments thereafter)

and

The Low voltage Directive (Electrical Safety) 73/23/EEC
(including any additions or amendments thereafter)

Development Manager: Patrick Darnes
DEIONISER PRODUCT WARNINGS

THESE WARNINGS ARE PROVIDED IN THE INTEREST OF SAFETY. YOU MUST READ THEM CAREFULLY BEFORE INSTALLING OR USING THE PRODUCT.

Isolate the equipment and turn off the water if the system is not to be used for long periods of time. See shut down procedures in manual, under Operation.

Any plumbing work to install this equipment should be carried out by a qualified plumber or competent person.

Any electrical work required to install this equipment should be carried out by a qualified electrician or competent person.

This equipment is designed to be operated by staff fully trained at the commissioning of the deioniser. Staff not fully trained or inexperienced should not be allowed to operate the product controls.

This product should be serviced by Veolia Water Systems via the UK Service Network, and only genuine Veolia Water Systems spare parts should be used.

This product must not be modified in any way without the express permission in writing from Veolia Water Systems. Modification could cause failure to the product and create a Health and Safety Risk.

Care must be taken to ensure that the equipment does not stand on or impede the electrical supply cable.

Veolia Water Systems Deionisers are designed to be used for treating normal feed waters, free from iron, manganese, chlorine, suspended solids and any other substances, which may affect the performance of the unit. Water that is contaminated by petrol, paint, steel or iron debris, must not be passed through the deioniser.

Following any servicing work the control panel must be closed, as electricity is potentially hazardous.

Under no circumstances must you open the electrical control panel whilst the equipment is in operation. Always turn off the equipment before carrying out any examinations. Similarly no mechanical work such as the removal of a fitting or valve should be undertaken, whilst the unit is under pressure. The system should be isolated from the main water supply and all feed pressure pumps, turned off.

Under no circumstances should you attempt to repair the equipment yourself. Repairs carried out by inexperienced persons may cause injury and more serious malfunctioning. Refer to Veolia Water Systems Service department. Always insist on genuine Veolia Water Systems spare parts.
Health and Safety

HEALTH AND SAFETY WARNINGS - DEIONISERS

USE OF CHEMICAL AND SAFETY

Veolia Water Systems are fully committed to the Health and Safety aspects of water treatment plant operation. This plant contains ion exchange resins and utilises hazardous chemical in its operation. We do not however, provide these chemicals as part of our supply and recommend that the user liaises directly with their chemical supplier to obtain specific recommendations.

Health and Safety Data Sheets should be provided by chemical supplier.
## Technical Data

<table>
<thead>
<tr>
<th>MODEL</th>
<th>UNITS</th>
<th>24R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum treatment flow</td>
<td>L/hr</td>
<td>400</td>
</tr>
<tr>
<td>Minimum treatment flow</td>
<td>L/hr</td>
<td>60</td>
</tr>
<tr>
<td>Maximum economy flow</td>
<td>L/hr</td>
<td>200</td>
</tr>
<tr>
<td>Maximum feed water temperature (at maximum pressure)</td>
<td>°C</td>
<td>30</td>
</tr>
<tr>
<td>Minimum feed water temperature</td>
<td>°C</td>
<td>5</td>
</tr>
<tr>
<td>Maximum working pressure</td>
<td>bar</td>
<td>7.0</td>
</tr>
<tr>
<td>Minimum working pressure</td>
<td>bar</td>
<td>1.5</td>
</tr>
<tr>
<td>Pressure loss at maximum flow</td>
<td>bar</td>
<td>2.2</td>
</tr>
<tr>
<td>Pressure loss at economy flow</td>
<td>bar</td>
<td>0.5</td>
</tr>
<tr>
<td>Capacity based on 100 ppm total Anions (as CaCO₃)</td>
<td>m³</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>Regeneration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100% pearl or flake caustic soda</td>
<td>kg</td>
<td>1.2</td>
</tr>
<tr>
<td>or 30% w/w caustic soda</td>
<td>litre</td>
<td>2.7</td>
</tr>
<tr>
<td>or 46% w/w caustic soda</td>
<td>litre</td>
<td>1.75</td>
</tr>
<tr>
<td>32% w/w hydrochloric acid</td>
<td>litre</td>
<td>3.5</td>
</tr>
<tr>
<td>Effluent volume per regeneration (Maximum)</td>
<td>litre</td>
<td>400</td>
</tr>
<tr>
<td>Maximum flow per regeneration (at maximum working pressure)</td>
<td>litre/hr</td>
<td>700</td>
</tr>
<tr>
<td>Regeneration time</td>
<td>minutes</td>
<td>90</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall width</td>
<td>mm</td>
<td>430</td>
</tr>
<tr>
<td>Overall height</td>
<td>mm</td>
<td>1050</td>
</tr>
<tr>
<td>Overall depth</td>
<td>mm</td>
<td>360</td>
</tr>
<tr>
<td>Raw water inlet tube (1.5 metres supplied)*</td>
<td>mm/(inches)</td>
<td>9.5 O/D (0.375)</td>
</tr>
<tr>
<td>Treated water outlet tube (1.5 metres supplied)*</td>
<td>mm/(inches)</td>
<td>9.5 O/D (0.375)</td>
</tr>
<tr>
<td>Rinse/Drain tube (4 metres supplied)</td>
<td>mm/(inches)</td>
<td>12.7 O/D (0.5)</td>
</tr>
<tr>
<td>Overall working weight (unit only)</td>
<td>kg</td>
<td>60</td>
</tr>
<tr>
<td>Overall shipping weight (unit only)</td>
<td>kg</td>
<td>45</td>
</tr>
<tr>
<td>Overall shipping volume</td>
<td>m³</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Volts</td>
<td>9V</td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td>PP3 or equivalent</td>
</tr>
</tbody>
</table>

* Two connectors supplied (9.5mm O/D tube to 3/8" BSP male)  
** Recommended strength
UNPACKING AND INSPECTION
The unit will be delivered in a carton with a wooden base from which the upper packing is mounted.

IMPORTANT

- Keep the carton vertical when being moved.
- Remove the staples holding the upper packing to the wooden base.
- Withdraw the upper packing vertically to clear the unit without damage and remove packing pieces.
- Lift the unit clear of the wooden base. Stand the unit on its own feet on an even floor.
- Examine the plant to ensure it is complete as indicated under "Plant Identification", and inspect for damage. Report any damage to Veolia Water Systems or your local Agent immediately.
# PLANT IDENTIFICATION

Plant Comprising
- Two Ion Exchange Vessels
- Control Panel
- Valves
- Conductivity/Resistivity Meter
- Chemical and Rinse Drain Tube
  - (12.7mm outside diameter plastic tube - 4 metres)
- Acid Storage Bottle and Tube
- Caustic Storage Bottle and Tube
- Mounted together on frame

Inlet and Outlet Tubes (9.5mm outside diameter plastic tube - 1.5 metres each)

Two Adapters
- (9.5mm outside diameter tube x 3/8" BSP Male)
- In Plastic Bag

Regeneration Sequence Chart
- For easy reference during unit operation

To be provided by customer:
1. Water Supply Pipework and fittings and drain facilities
2. Chemicals for Regeneration
See "Installation"
OPTIONAL EXTRAS

The following equipment specified in the raw water pipework (see Fig. 3 under 'Installation') may be obtained from Veolia Water Systems:

- **Break Tank** comprising a water tank with float valve and/or float switch control, raw water booster pump and non-return valve, may be supplied.

- **Valve Pack (VP1S)** comprising three isolating valves, a combined non-return and vacuum breaking valve and water sample valve (Order Part Number 532 001).

Note: Options above may be required to conform to Local Water Authority Regulations.

- **Cartridge Filter**

  Order Part Numbers:
  - Filter Housing: 466 420
  - Pack of 5 elements (10 micron): 466 510

Note: The cartridge filter is required for raw water with a high level of suspended solids and turbidity.

- **Pressure Gauge**

  Pressure gauge 0 -10 bar (Order Part Number 303 012).

Note: Required to monitor inlet water pressure to the unit (see Technical Data for operating pressures).
INTRODUCTION

The chemical formula for pure water is H₂O but as chemical analysis will show, there are many other substances in local water supplies in addition to hydrogen and oxygen.

The other substances are dissolved minerals that have been picked up by the ground water on route to rivers and local water works. The minerals do not remain in the water, but precipitate out on boiler tubes, turbine blades, pipework, central heating systems, in fact on any item of plant in contact with the water where they will do harm and tarnish or taint the finish of the process.

It is to overcome the disadvantages of untreated water supplies that the 12R and 24R units have been designed and developed.

TWO STAGE DEIONISATION

The 12R and 24R Two Stage Deioniser Units produce water of very high purity. This is done in two stages by a process called 'ion-exchange'. In the first stage, dissolved substances in the water supply, such as calcium, magnesium and sodium are removed and exchanged for hydrogen ions (H⁺), and in the second stage, substances such as sulphates, chlorides and nitrates are removed and exchanged for hydroxyl ions (OH⁻). The overall effect is that the dissolved minerals in the water supply are removed and exchanged on a one to one basis for H⁺ and OH⁻ ions, which combine to form pure water H₂O.

REGENERATION

The ion-exchange process is carried out on a material consisting of small beads (less than 1mm diameter) of synthetic resin. The resin used in the first stage is referred to as Cation resin and when treated (i.e. regenerated) with hydrochloric acid (HCl) the calcium, magnesium and sodium (removed by the resin during two stage deionisation), is replaced by hydrogen ions. The resin used in the second stage is referred to as an Anion resin, and when regenerated with Caustic Soda (NaOH), the sulphates, chlorides and nitrates, held on the resin, are replaced by hydroxyl ions. In this manner the dissolved minerals removed by the resins are dispelled to drain, and the resins 'regenerated' ready for further two-stage deionisation.

The processes of two-stage deionisation and regeneration are summed up in the following diagram.

The regeneration procedure is carried out manually by operating the valves in a given sequence as described under 'Operation'.
Description

Two Stage Deionisation

1st STAGE
- Cation Resin Exchanges
- Calcium
- Sodium and Magnesium for Hydrogen Ions H⁺

2nd STAGE
- Anion Resin Exchanges
- Sulphate Chlorides and Nitrates for Hydroxyl Ions OH⁻

Raw Water → Acidic water (water containing H⁺ Ions) → High Purity Water

TWO STAGE DEIONISATION

Hydrochloric Acid (HCl)
- Acid removes Calcium
- Magnesium
- Sodium from Resin and Replaces Hydrogen Ions H⁺

Caustic Soda (NaOH)
- Caustic Soda Removes Sulphate Chlorides Nitrates and replaces Hydroxyl Ions OH⁻

To Drain Calcium Magnesium Sodium

To Drain Sulphates Chlorides Nitrates

REGENERATION
INTRODUCTION

The work detailed in the following paragraphs must be carried out by a competent plumber, with reference to the typical installation shown below:

TYPICAL INSTALLATION DIAGRAM

Note: A pressure gauge is important, however, a filter, water meter and flow indicator are optional equipment. The equipment to prevent back syphonage, that is the vacuum breaking valve and non-return valve (see ‘Optional Extras’) may be required to conform to Local Water Authority regulations. Alternatively a break tank may be required.
INITIAL PREPARATION

- Because deionised water can be contaminated easily locate the plant as close as possible to the point of use of the treated water.

- Hydrochloric acid and sodium hydroxide (caustic soda) used to regenerate the resins are very corrosive and consequently must be kept out of the way of the public and uninformed staff.

FOUNDATIONS AND DRAIN

- No special foundations are required, providing that a firm and level surface capable of supporting the working weight of the deioniser (see Technical Data) is available.

- A drain capable of handling the 15% solution of acidic and alkaline effluents (see Technical Data for maximum flows to drain) from the deioniser must be available or constructed within 3 metres of the installation.

- Because of the corrosive nature of the waste effluents, the Local Water Authority must be consulted before disposal into local rivers, streams or municipal sewers.

HEAD ROOM AND OPERATING SPACE

When installing the deioniser it is important to ensure there is:

- Adequate space to change and manoeuvre the acid and caustic soda storage bottles (250mm minimum at each side of the unit).

- Access to the rear of the installation is available for maintenance work (250mm minimum).

- Access to the front panel and valves (500mm minimum above the height of the unit and 1000mm minimum in front of the unit).

The overall dimensions of the plant are given in the Technical Data.

WATER PRESSURE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1.5 bar</td>
</tr>
<tr>
<td>Maximum</td>
<td>7.0 bar</td>
</tr>
</tbody>
</table>

AMBIENT TEMPERATURE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>30°C</td>
</tr>
<tr>
<td>Minimum</td>
<td>10°C</td>
</tr>
</tbody>
</table>

Note: The minimum ambient temperature is specified because below 15°C caustic soda becomes very viscous and starts to freeze, making chemical injection into the unit extremely difficult. If the ambient temperature is between 10 and 15°C only use caustic soda between 28%-30%.
CHEMICALS

- The required strength of hydrochloric acid and caustic soda is given in the Technical Data.
- Make arrangements to obtain regular supplies.
- The acid and caustic soda is drawn from the storage bottles by the acid and caustic injectors which form an integral part of the pipework assembly.

WARNING: Both of these chemicals are corrosive and therefore, chemical goggles, rubber gloves, boots and protective clothing must be worn when handling and charging the storage bottles. The operating staff must be properly trained and instructions for first aid and the handling of spilt chemicals must be displayed in the area. Everyone who handles these chemicals must be continuously cautious, observant and alert.

PIPEWORK CONNECTIONS

- Supply and fit isolating valves in the raw water and treated water pipework. All treated water pipework must be made in uPVC, PVC (Polyvinyl chloride), ABS (Acrylonitrile Butadiene Styrene), polypropylene, stainless steel or suitable lined piping - standard plumbing materials, such as copper or galvanised piping are not to be used.
- Place the deioniser into position. The valves and conductivity meter on the front panel must be easily accessible and observable. Ensure the chemical storage bottles can be removed easily.
- Using the adapters supplied (9.5mm (3/8") outside diameter tube x 3/8" BSP male) connect the deioniser inlet and outlet tubes (which are labelled "INLET" and "OUTLET") to the raw water and treated water connections respectively. To connect the adapter to the plastic tube, release the nut, push tube fully into the fitting and re-tighten the nut.
**Installation**

- The 12.7mm (0.5 inch) outside diameter clear plastic tube is the Chemical/Rinse Drain tube.
- Run the Chemical/Rinse Drain tube to an open drain or gully which is within 4 metres of the unit.
- If the drain is more than 4 metres from the unit, connect the Chemical/Rinse Drain tube to the open drain as shown.

Do NOT increase the Chemical/Rinse Drain tube length by attaching more tube.

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**BATTERY INSTALLATION**

- Unscrew retaining screw holding the black rear cover of the Conductivity Meter.
- Remove cover by rotating.
- Fit 9V PP3 or equivalent battery to battery connector studs and slide into holder.
- Replace rear cover.

Note: Battery should be replaced at least every 12 MONTHS.
CHEMICAL DRAW ADJUSTMENT

- The only adjustment required is to set the volume of the chemical drawn in the stated times during regeneration:

<table>
<thead>
<tr>
<th></th>
<th>VOLUME</th>
<th>24R TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric Acid (32% w/w)</td>
<td>one marked section of the chemical storage bottle</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Caustic Soda (30% w/w) **</td>
<td>of the chemical storage bottle</td>
<td>20 minutes</td>
</tr>
<tr>
<td>or Caustic Soda (46% w/w) **</td>
<td>recommended strength</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

The chemical draw adjustment is to be set on the 1st Regeneration of the unit (see 'Operation, Regeneration').

- To adjust the chemical draw proceed as follows: See 'Operation, Regeneration'

Before the unit is put into the 'Cation Acid Injection' fully tighten the 'ACID CHEMICAL DRAW ADJUSTMENT VALVE'.

Put the unit into 'Cation Acid Inject'.

SLOWLY open the 'ACID CHEMICAL DRAW ADJUSTMENT VALVE' until the ACID is drawn from the ACID STORAGE BOTTLE.

Monitor the rate of ACID draw and finely adjust the 'ACID CHEMICAL DRAW ADJUSTMENT VALVE' until the ACID is drawn in the time stated.

Continue the Regeneration Sequence to 'CATION ACID RINSE' inclusive.

Repeat for 'Anion Caustic Inject' and the adjustment for the 'CAUSTIC CHEMICAL DRAW ADJUSTMENT VALVE'.

Complete the Regeneration Sequence.

- Monitor the time in which the ACID and CAUSTIC is drawn on the second regeneration of the unit.

Re-adjust if necessary.

- Further re-adjustment will be required if the operating conditions of the unit change, for example 'raw water pressure'.

- Check the chemical draw times every FIFTH Regeneration.
Commissioning

Chemical draw adjustment valve (caustic)

Bottle Cap

Unclip press-stud to release strap

Retaining Strap

Open valve to regulate chemical draw
REGENERATION

As the deioniser is supplied with the ion exchange resins in their exhausted form it will require regeneration prior to being put to service.

- Ensure operation of "Start Up and Shut Down' has been completed.
- Check the CHEMICAL STORAGE BOTTLES hold sufficient chemicals for a regeneration. See "Acid and Caustic Soda Storage Bottle Filling"

PROCEDURE

Note: It is important to operate the valves in the sequence specified; especially "Cation : Acid Injection" and "Anion : Caustic Injection". This avoids pressurising the chemical suction lines, which is undesirable.

Stop
All valve handles Vertically Downwards.
Chemical Isolating valves CLOSED.
**Operation**

**Cation: Acid Injection**
Cation Drain Valve then Cation Injection Valve - TURN HANDLES HORIZONTAL
Acid Isolating Valve 'OPEN' - TURN HANDLE THROUGH 90°
Ensure the specified amount of acid is drawn from the Acid Storage Bottle in approximately 20 minutes.
If chemical is drawn too fast or slow adjust the 'CHEMICAL DRAW ADJUSTMENT VALVE ' see 'COMMISSIONING'.

**Cation: Displacement Rinse**
CLOSE the Acid Isolating Valve
LEAVE in this position for 10 minutes.

**Cation Acid Rinse**
RETURN Cation Injection Valve - HANDLE to VERTICAL
LEAVE in this position for 15 minutes.

**Anion: Caustic Injection**
RETURN Cation Drain Valve - HANDLE to VERTICAL.
Anion Drain Valve - TURN HANDLE HORIZONTAL
Anion Injection Valve - TURN HANDLE HORIZONTAL
Caustic Isolating Valve 'OPEN' - TURN HANDLE THROUGH 90°
Ensure the specified amount of caustic, for strength used, is drawn from the Caustic Storage Bottle in approximately 20 minutes.
If chemical is drawn too fast or slow adjust the 'CHEMICAL DRAW ADJUSTMENT VALVE ' see 'COMMISSIONING'

**Anion: Displacement Rinse**
CLOSE the Caustic Isolating Valve
LEAVE in this position for 15 minutes.

**Anion: Caustic/Final Rinse**
RETURN Anion Injection Valve - HANDLE to VERTICAL.
LEAVE in this position for 15 minutes.
CHECK WATER QUALITY
If the quality is better than 30 µS/cm (or customer's requirement) RETURN the unit to SERVICE.
If the quality is greater than 30 µS/cm (or customer's requirement) CONTINUE in the Caustic/Final Rinse.

**Service:**
RETURN Anion Drain Valve - HANDLE to VERTICAL.
ADJUST the Service Valve Handle from VERTICAL to HORIZONTAL. The POSITION regulates the water flow to SERVICE from zero to maximum.
Operation

**CATION: ACID INJECT**
- **Time:** 24R = 20 MINUTES

**CATION: DISPLACEMENT RINSE**
- **Time:** 24R = 10 MINUTES

**CATION: ACID RINSE**
- **Time:** 24R = 15 MINUTES

**ANION: CAUSTIC INJECT**
- **Time:** 24R = 20 MINUTES

**ANION: DISPLACEMENT RINSE**
- **Time:** 24R = 15 MINUTES

**ANION: CAUSTIC RINSE & FINAL RINSE**
- **Time:** 24R = 15 MINUTES

**SERVICE FLOW**

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Refer also to the paragraph on 'Chemicals' under 'Installation' and Fig. below.

- When the level of chemical in the bottles is such that a regeneration cannot be completed the bottles require filling.

- When viewed from the Front of the unit the Acid Storage Bottle is on the left and the Caustic Storage Bottle is on the right. Both bottles are situated at the rear of the unit.

Note: Warning: Both of these chemicals are corrosive and therefore, chemical goggles, rubber gloves, boots and protective clothing must be worn when handling and charging the storage bottles. The operating staff must be properly trained and instructions for first aid and the handling of spilt chemicals must be displayed in the area. Everyone who handles these chemicals must be continuously cautious, observant and alert.

To remove:

- Unlatch the press-stud and release the retaining strap (ONE BOTTLE AT A TIME).
  - Unscrew the bottle cap (of the chemical bottle to be filled), remove the draw tube complete with cap from the bottle.
  - Remove the bottle from the tray and take to a SAFE area for filling.
  - Fill the bottle, using a funnel, with the specified chemical.
  - Reverse actions (a), (b) and (c) to refit the chemical bottle.

- If concentrated chemical is spilt onto the unit paint work during filling, it is recommended the unit be flushed or hosed with water to clean.

**CAUSTIC LIQUOR FROM PEARL OR FLAKE**

Warning: Both of these chemicals are corrosive and therefore, chemical goggles, rubber gloves, boots and protective clothing must be worn when handling and charging the storage bottles. The operating staff must be properly trained and instructions for first aid and the handling of spilt chemicals must be displayed in the area. Everyone who handles these chemicals must be continuously cautious, observant and alert.
**Operation**

- The amount of 100% w/w caustic pearl/flake and deionised water required to fill the storage bottle is:
  
  - 46% NaOH: 3.5 kg Caustic Soda and 5 litres deionised water
  - 30% NaOH: 2.3 kg Caustic Soda and 5 litres deionised water **

  (Note: The deionised water (better than 40 µS/cm) obtained from the unit just prior to regeneration is of acceptable quality for mixing purposes).

- Mixing:

  DO NOT mix in the caustic storage bottle or the unit.
  The mixing to be done in a well ventilated, SAFE area.
  Add the caustic pearl/flake, in 50/100g doses, to the deionised water and thoroughly mix. Allowing to cool between doses.
  The mixing causes a reaction resulting in the solution becoming VERY HOT, therefore use mild steel, stainless steel or enamelled steel mixing container and implement.
  Wash away any spilt chemical with water.

**Recommended Strength**
START UP AND SHUT DOWN

Now that the unit has been regenerated it is ready. To operate:

- Ensure:
  
  The inlet and outlet isolating valves are closed.
  
  The unit valves are in the 'STOP' position.

- Open the inlet and outlet isolating valves SLOWLY.

- The unit may require a Rinse to drain if it has been left standing or used intermittently as the water quality may be worse than 30 µS/cm.

  Operate the valve as shown (reference 'FINAL RINSE' of 'Operation, Regeneration')

  Check the water quality periodically, see "Water Quality Check".

  When the water quality is below 30 µS/cm (or the required quality) return the unit to the 'STOP' position.
Operation

- Open the unit Service Valve SLOWLY. Note: Positioning the valve between open and closed will provide a coarse flow adjustment.

- Use the treated water outlet isolating valve for fine flow adjustment.

- To Shut Down the unit:
  Return the unit to the 'STOP' position.
  Shut the inlet and outlet isolating valves.

BATTERY CHECK

- Press the button with the red symbol:

- A good battery is indicated by the meter needle being in the RED zone.
  An exhausted battery is indicated by the meter needle being in the amber or green zones.
  Battery requires replacement.

WATER QUALITY CHECK

- Check the battery is 'good'.
- Press the button with the blue symbol:

- The meter needle will indicate water quality in μS/cm or MΩ/cm.

CHANGING THE BATTERY

To replace the battery see 'Battery Installation'.
TREATED WATER QUALITY AND QUANTITY

- A typical exhaustion profile of a unit (i.e. quality of water versus quantity of water during a service run) is shown in the graph below:

From above:

\[ x = \text{water quantity before carbon dioxide breakthrough}, \text{ dependent on:} \]
\[ \quad \text{A function of the inverse ratio of Alkalinity to Total Anions} \]

\[ y = \text{average run quality is dependent on:} \]
\[ \quad \text{Raw water Total Dissolved Solids} \]
\[ \quad \text{Regeneration level} \]
\[ \quad \text{Sodium to total cation ratio of raw water} \]

\[ z = \text{plateau after carbon dioxide breakthrough, dependent on:} \]
\[ \quad \text{The raw water Total Dissolved Solids.} \]
TREATED WATER QUANTITY

- The conductivity indicator gives an indication of water quality in µS/cm or MΩ/cm as shown below.

- The quality of water produced by your system will depend on the characteristics of the raw water supply. Typically, the conductivity will be between 20-25 microsiemens, at commencement of the service period. This may improve during service but will revert to the initial conductivity value on exhaustion of the Resin Beds, indicating that regeneration is required.

TREATED WATER QUANTITY

The amount of treated water obtained will vary with the quality of the water supply used. For example when treating water with Total Anions 100 ppm (as CaCO₃) the units will produce 5.0m³ to 30µS/cm.
CHECK LIST IN CASE OF DIFFICULTIES

No Treated Water Flow

Check that:
Hydraulics:
- The inlet, outlet and plant isolating valves are open.
- Sufficient water pressure is available for correct operation (see Technical Data).
- There is no Ion Exchange resin visible in the plant connecting tubes causing a blockage.
- All valves are in the correct position for 'SERVICE', see 'Operation, Start Up and Shut Down'.

Poor Water Quality

Check that:
Hydraulics
- The flow has not been stopped for a long period. Rinse as in 'Anion Final/Caustic Rinse' see 'Operation, Regeneration'.
- The raw water quality has not changed excessively.
- The unit requires regeneration. See 'Operation, Regeneration'.
- The flow is not excessive or below the minimum specified (see Technical Data).
- All valves are in the correct position for 'SERVICE' see 'Operation, Start Up and Shut Down'.
- It may be found or suspected that there is fouling of the ion exchange resins, especially the anion. If this is thought to be the case, please contact Veolia Water Systems for advice.

Electrical
- The conductivity cell leads and connectors are dry and fully located.

Low Treated Water Volume

Check that:
Hydraulics
- The raw water total dissolved solids have not increased excessively.
- The flow is not excessive or below the minimum specified (see Technical Data).
- The preceding regeneration was carried out in the correct sequence and with the correct chemical volumes/strengths.
- It may be found or suspected that there is fouling of the ion exchange resins, especially the anion. If this is thought to be the case, please contact Veolia Water Systems for advice.

Electrical
- The conductivity cell leads and connectors are dry and fully located.
Regeneration Problems

No Chemical Draw

Check that:

Hydraulic
- There is above the specified minimum water pressure available for correct operation (see Technical Data).
- The chemical storage bottles have the specified volumes of chemical for a regeneration.
- The hydraulic injectors are not blocked (see below).
- The valves are in the correct positions, see 'Cation Inject' or 'Anion Inject' under 'Operation, Regeneration'.
- The 'Chemical Adjustment Valves require adjusting, see 'Commissioning' and/or a blockage in the chemical draw tube.
- The chemical non-return valves are not blocked.

No Water Flow To Drain

Check that:
- The hydraulic injectors are not blocked (see below).
- The valves are operated in the correct positions, see 'Operation, Regeneration'.

INJECTOR (TEE PIECE)
For all Service requirements contact:

VEOLIA WATER SYSTEMS

*Information given in the O&M Manual*

Address:
Telephone Number:
Service Help Desk:
Fax Number:
E-mail:
Website:
24R Two Stage Deionisers

General Arrangement Diagram