



OPERATION & MAINTENANCE
MANUAL

DI WATER GENERATOR **E350-RO**



INDEX

- 3 Introduction
- 3 Overview of the system
- 4 General Advice
- 4 Dangers to the system
- 5 Operation
- 5 Maintenance
 - 1. Taking TDS Reading
 - 2. Panel gauges
 - 3. Flushing
 - 4. Pre filter
 - 5. Particle
 - 6. Membranes
 - 7. Resin
- 13 Troubleshooting Guide

Introduction

Congratulations on purchasing one of the finest pure water generators available.

This E 350 RO machine has been designed by engineers, with reliability, build-quality, robustness and ease of use paramount in their considerations.

Like all engineered equipment, maintenance is an integral part of ensuring continuity in design performance and will guarantee tireless production of top-quality pure water for many years to come.

We would recommend that you take the time to read this manual to fully appreciate that, with just a few simple routine operations, you can protect your investment, whilst minimising any potential downtime.

This manual will give you an overview of the system, the location of significant fittings and controls, and a quick guide to get you up-and-running.

Then a more detailed explanation of the settings and routine maintenance, along with troubleshooting and longer-term maintenance.

The Brodex E 350 RO machine utilises pre-filtration, Reverse Osmosis Filtration and Mixed Bed Resin filtration to produce Pure Water in the most economical fashion.

We are confident you will be extremely pleased with your new system.

Overview of System

Following the installation and commissioning of your system you will have been given a rundown of your system how it works and all its components, along with a guide to basic maintenance, testing and resin changes, all of which are covered in this manual.

However it is a lot to take in therefore we have produced this manual to help you familiarise yourself with your machine and all the components that go with it, all of which are referenced in this manual.

What you have is a pure water generator with a holding tank, this converts tap water into deionised water by sending water through a polish of mixed bed resin, to give you a water reading of TDS 000 parts per million or conductivity 1.3 micro siemens.

General Advice

Remember to check the pressure of your mains water supply – typically about 50PSI – as this can seriously affect the performance of your system.

The nature of RO membranes is that they perform better and better the higher the feedwater pressure – right up to 150psi. Unfortunately, the low and inconsistent pressure delivered to businesses by the water board is very far from achieving this, often below 60 psi and sometimes as low as 30.

When this becomes significant it may be necessary to consider adding a booster pump.

Quite simply, the higher the water pressure, the purer the water (and that's by a considerable amount).

Many advantages include greater production rate (considerably quicker fill-time for your machine), the less blockages caused by scale deposits and more efficient flushing procedure, hence prolonging the life of your expensive membranes.

In practical terms RO Systems work quite satisfactorily where your mains pressure is 50psi for more, and the lifetime of membranes is generally acceptable to the average user. Even so, you might like to consider the Booster Pump as a long-term investment given the obvious benefits listed above.

But, where you are in the 30-40psi region, or lower, a Booster pump is an essential addition to your system and will soon pay for itself. Please call us for more information.

Dangers to System

Freezing - this system has been designed to be exceptionally resistant to frost damage, but, as you would expect from any system filled with water, allowing it to freeze can cause expensive damage.

We suggest you take every possible precaution to protect your investment usually by keeping the area heated so not to fall below 5 degrees C.



Membrane flushing - this should be carried out at least once a week, the method of carrying out this is covered in the maintenance section



LOW PRESSURE BLOCKS THE MEMBRANE AND USES EXCESS RESIN

Low mains water pressure of around 30-40psi results in premature scale build-up on the membrane surfaces, this blocks the pores and reduces flow-rate of product, and also dramatically increases the TDS of the product water which consumes a lot more resin, ultimately costing you far more than necessary.



Operation

Step. No 1 – Open the drain gauge fully (turn anti-clockwise)

Step. No 2 – Turn on the mains water supply from the bib tap or shut off valve, you will notice the drain and product gauge will burst into life, leave it running for 15 to 20 minutes to flush.

Step. No 3 – The drain gauge should now be adjusted by turning do this until the level of water to drain is no less than 2.0 lpm.

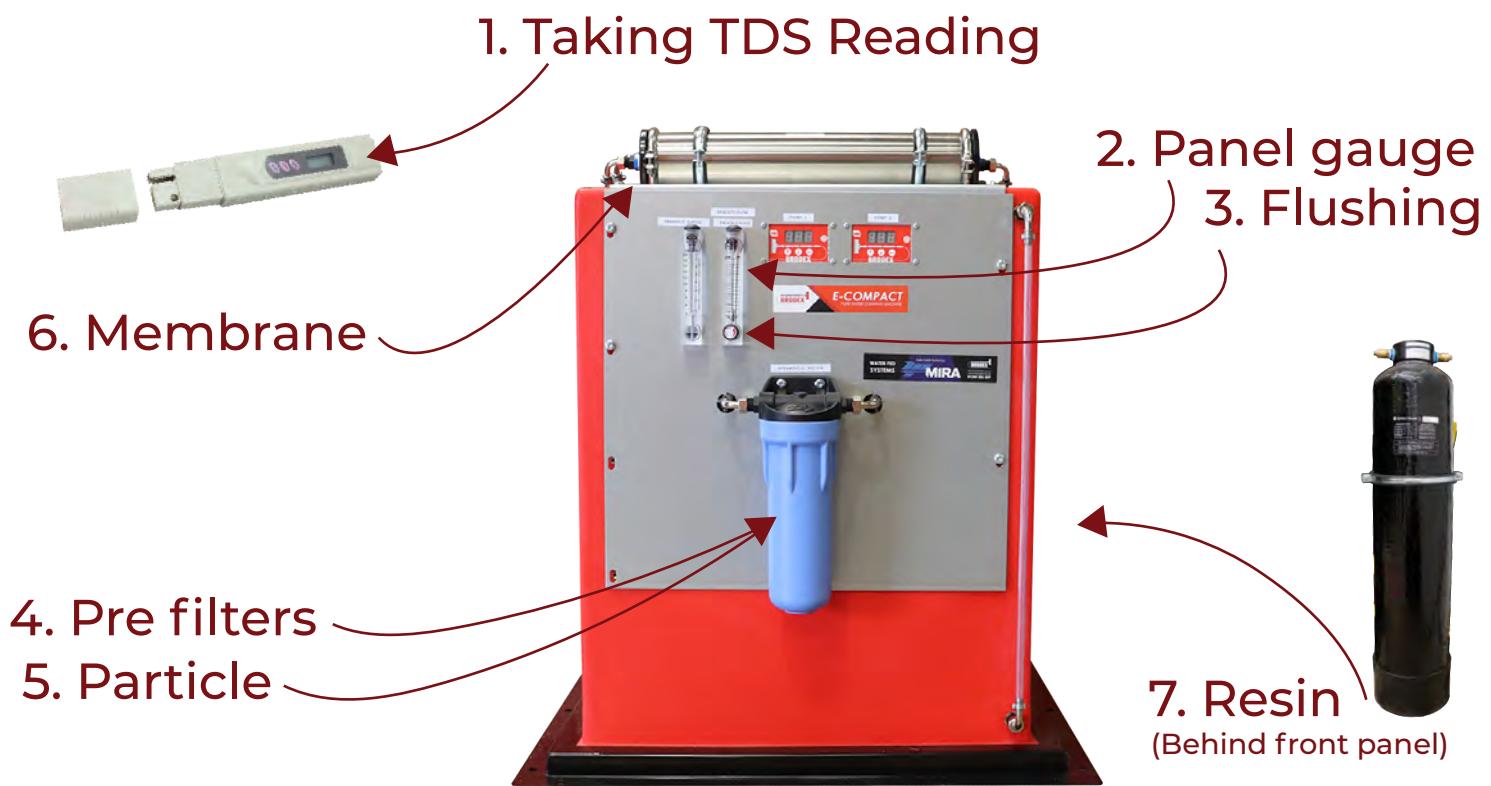
Step. No 4 - Pure water will now be produced and sent to the holding tank and Concentrate waste water will be sent to drain.

Step. No 5 - The holding tank will shut off the production when full.

Step. No 6 - To extract the product from holding tanks, turn on the switch and the delivery pumps will activate

Maintenance

The ongoing maintenance of the system comprises of 7 main areas;



Taking a TDS Reading

Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals salts or metals dissolved in a given volume of water, it is expressed in parts per million (ppm) or milligrams per litre (mg/L), Our industry tends to work in ppm.

Specific instructions will have been included with your meter, but generally it will be as follows:

Remove the protective cap, turn the meter on and immerse the sensor into the water to be measured usually no more than 2", as the whole unit may not be waterproof! Lightly stir the meter to dislodge any air bubbles.

Wait about 10 seconds, until the display has stabilised, then read your ppm from the LCD screen. Some models may have a "hold" button to enable you remove the unit from the water and still read the display.

As a general guide, mains water in soft water areas will usually be in excess of 050ppm, and in hard water areas in excess of 300ppm, While Pure (deionised) Water will be 000 - 002ppm, and sodium chloride used to calibrate TDS meters is 342ppm.



It is advisable to use the TDS meter to measure the ppm readings at three points:

1. Incoming mains
2. RO water directly from the membrane
3. Water delivered after the resin vessel

This will help you diagnose problems before they arise and cure them when they do occur.

Panel Gauge

This gauge enable the user to obtain an accurate numerical value of the amount of water that is converted into the waste water and sent down the drain.

The drain gauge has a control valve which is operated by twisting the tap in or out to adjust the flow which will control the amount of water which passes to drain.

As this valve is adjusted this will in turn, adjust the amount of pure water produced into the tank, whilst this can be adjusted to increase (clockwise) or decrease (anti- clockwise) the product quantities.

We recommend that it is adjusted to allow a minimum of 2 litres per minute to flow to drain, this is the minimum amount of water required to maintain healthy membranes.

If no water is allowed to drain at all, product will still enter the tank, but the membranes will be irreparably damaged within several tank fills.



Flushing

Flushing is required once a week minimum, while the system is in fill mode you need to open up the tap on the front of the drain gauge (anti clockwise) you will view the stainless steel "mushroom" rise inside the gauge carry on unscrewing until it turns no more, leave this for at least 30 minutes, this is forcing water out the membranes under pressure dislodging any deposits hanging on to the face of the membrane, after 30 minutes adjust the tap back down to balance with the product gauge this action is now complete.

The only exception to the above is in low pressure areas where the balance falls below 2 litres per minute the drain must be given priority to 2 LPM, if this is the case the addition of a booster pump should be considered.



Pre-filters

Pre-filtration is essential to protect to Reverse Osmosis membranes from damage caused by suspended and some dissolved solids present in ordinary tap water.

The most cost effective way is to use 10" disposable cartridge filters to remove any suspended solids that would block the membrane.

We recommend replacement every 2 - 3 months, but be aware that, if you see brown coloured town's main water in your area, due possibly to local water authority repairs, the filters can block very quickly, however they are cheap to replace and ensure the health of your membrane which is the most expensive single filter component on your machine.

Pre-filter maintenance is an insurance policy on your machine, please remember to log dates in your owners' manual when you change them. Replacement is straightforward, please follow steps on the next page.



- Ensure any booster pumps are turned off and that the machine is de-pressurised. Put a bucket under the housing to catch any water spillage.
- Using your housing spanner supplied with your machine, locate onto the moulded ribs of the housing and turn anti-clockwise from housing body.
- Viewed from above the direction is clockwise to loosen. Watch closely for a rubber "O" ring which must be refitted to prevent leaks.
- The filter housing bowl will detach from the black gauge body.
- Remove the old 10" filter and discard.
- Replace with the new filter and discard.
- Replace with a new filter ensuring that all packaging is removed.
- Refit bowl hand-tight, ensuring "O" ring is still in correct position.
- Once the filter is replaced, pressurise the machine and bleed air from the top of the housing by depressing the red toggle button on top of housing body.
- Once clear water bleeds out of the red recess, the filter is now back on line protecting the membranes.

Particle Filter

The new filter delivers exceptional 97% efficiency, with a low clear pressure drop at an affordable price, finer fibres used in the construction create a more accurate level of filtration, whilst maintaining a high dirt holding capacity.

The filter with its melt-bonded exterior minimises any fibre migration, whilst its single, one-piece, graded density and thermally bonded fibre construction made from 100% polypropylene introduces no binders, lubricants, or other additives in its manufacture.



Reverse Osmosis Membranes and Replacing Reverse Osmosis Membranes

Membranes usually take out 95% of the heavy metals and calcium out of the water, these are held in a stainless steel housing attached to the front face of the main panel.

- Remove the 21" inch Membrane Housing from the machine by disconnecting the hoses using a 19mm spanner.
- Then remove the whole cylinder from its two Cobra clamps by undoing the allen key bolts on each.
- Position housing on bench and pay attention to the end of the housing with a single pipe inlet and a black plastic plug.
- Undo the clamp which holds the end cap in place using two 14mm spanners.
- This clamp takes the form of two C pieces, held together by a pair of bolts, loosen one, but leave in position, and remove the other entirely, as shown.
- The black end cap has a recess which the clamp fitted into. Place the tip of a broad blade screwdriver in this recess and, using a hammer, gently tap to ease it out of the steel tube.
- Once a reasonable gap has opened up, insert the screwdriver in this, and twist to open further, taking care not to damage the rubber "O" ring which is now exposed.



- Once the cap is removed, the white membrane can be seen. Take care to retain the rubber “O” ring and, if damaged, replace.
- Grasp the central spigot with a pair of pliers and pull gently, turning membrane as necessary and withdraw the membrane fully from the housing.
- Fit new membrane in reverse order of the above, smear the central spigot on both ends with silicone gel or petroleum Gel.
- Note: insert new membrane in direction of flow arrow.
- Ensure “O” ring is in good condition and correctly positioned, as you reinsert black endcap.
- Refit pair of “C” clamps, ensuring outer lip grips the recess in the plastic end cap and the other fits over the stainless steel lip at the end of the membrane housing. Tighten bolts equally, so that a similar gap is on either side of the cap.
- Replace housing on machine and reconnect hoses.

You must now flush out the membranes to get rid of the preservatives, while the system is in fill mode you need to open up the tap on the front of the drain gauge (anti clockwise) you will view the stainless steel “mushroom” rise inside the gauge carry on unscrewing until it turns no more, leave this for at least 30 minutes, this is forcing water out the membranes under pressure dislodging any deposits hanging on to the face of the membrane, after 30 minutes adjust the tap back down to balance with the product gauge this action is now complete.

Resin Vessel

To be changed according to usage but as a guide we recommend every 3/4 months. Resin To be changed when TDS readings dictate. Typically after 30,000L.

The resin that needs to be changed is found to the rear of the panel in the black resin vessel.

With time and use, this resin will become exhausted and will need replenishing with fresh resin, this is available from Fluid Science in convenient 25 litre sack.

Please follow the instructions carefully to ensure that your machine will produce good quality purified water, as verified by using your water purity testing TDS meter.



SAFETY NOTICE

Ensure that the vessel is de-pressurised before removing any connecting pipe work. This can be achieved by simply connecting an open outlet hose to the machine pure water outlet on the machine or on the associated security manifold. Wear approved eye safety equipment.

Instructions

- Disconnect the inlet and outlet pipes from the vessel body— IN and OUT are clearly marked, simply take care to note which side is which and duplicate this when reconnecting.
- Undo the nuts on the U-shaped bracket that secures the vessel to the panel.
- Unscrew in an anticlockwise direction the head assembly of the vessel which will then separate from the vessel body, taking care not to lose the black “O” ring which may fall away.
- Withdraw the cap assembly taking care not to damage the riser tube and end distributor.
- The riser tube can be slowly withdrawn out the vessel by shaking the vessel till fully out, you must inspect this tube to ensure that the plastic distributors at the top and bottom are intact and undamaged again at this time ensure that the black rubber “O” ring is safe.

- Taking the riser tube and distributor assembly, gently pull the rise tube out of the vessel head. There are 2 rubber “O” rings located within the female recess that accommodates the riser tube.
- Ensure on re-assembly that the riser tube is pushed gently but firmly home into the head assembly, this will ensure a water tight seal and prevent “tracking” of hard water to service flow.
- Cover the end of the tube with some sticky tape to ensure that resin does not pass down the tube whilst filing.
- Empty the old resin out of the vessel and place into a plastic bag and throw away with domestic waste. The resin is non-hazardous to the touch and can be handled safely. Rinse the vessel out with a hose to remove any remaining old resin.
- Place the taped-up riser tube inside the bottle.
- Once the riser tube is centrally positioned into the empty vessel, start to fill the vessel with mixed bed resin.
- A cut down funnel is a useful tool to assist filling.
- Fill the vessel up to the shoulder position, as indicated, shake the container frequently to ensure a good settlement and compaction of resin.
- Do not overfill and ensure that the riser tube remains central during the procedure.
- Apply a smear of petroleum jelly (i.e. Vaseline) to the rubber “O” ring on the vessel head assembly. This will assist in a good watertight seal. If the “O” ring is damaged, replace accordingly.
- Remove the sticky tape from the top of the riser tube and slide on the head assembly as far as it will go, now slowly screw on the head in a clockwise direction, ensuring that you do not cross-thread until it is tight to the hand, make sure that the top of the vessel and the shoulder of the head are sandwiching the rubber “O” ring.
- Reconnect the bottle to the machine; ensure that the inlet port goes into the left hand side port on the machine. Do take care to reconnect your “IN” and “OUT” as noted at disassembly.

Troubleshooting

Symptom	Cause	Remedy
High TDS reading from tank	Resin Exhausted	Check TDS of membrane water from torpedo feed to tank, if good, replace resin in torpedo accordingly.
High TDS in membrane water	1. Low mains water pressure 2. Leak inside tank (raw water contamination)	1. Flush/Replace membranes 2. Install mains booster pump (40PSI Ideal Minimum) 3. Check for leaks & repair fittings accordingly.
Slow Filling	1. Blocked Pre-Filters 2. Blocked membrane 3. Kinked pipe	1. Change filters 2. Change membranes
Tank Overflows	1. Faulty Ball Valve 2. Pivot pin dislodged	1. Replace ball valve 2. Refit pin