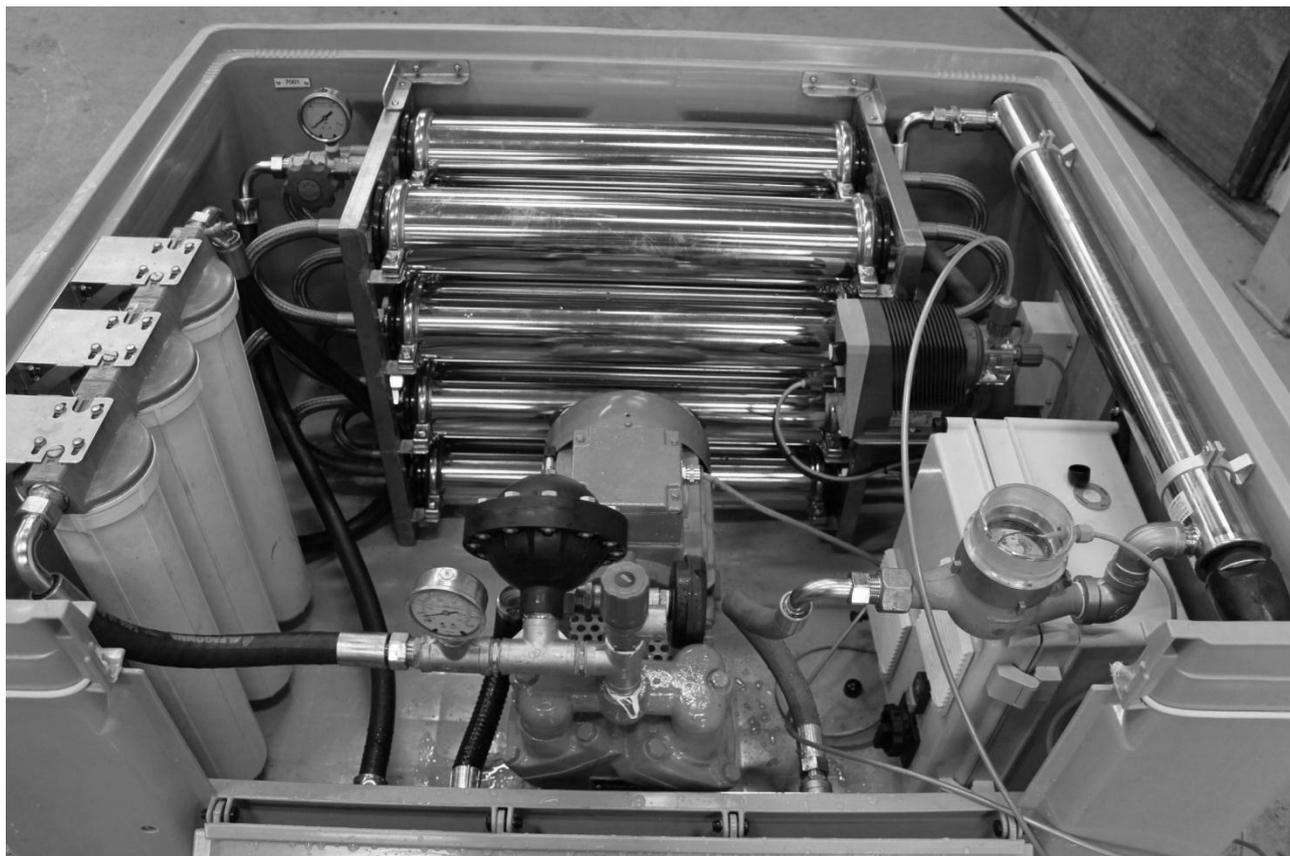




Ver. Jul 2013

Bluebox 1800UF Operating Manual

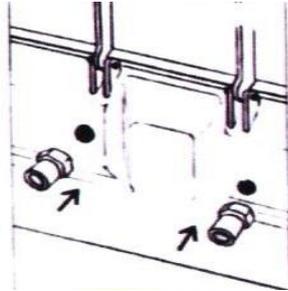


BlueBox 1800UF. Customized with UV disinfection and post chlorination system

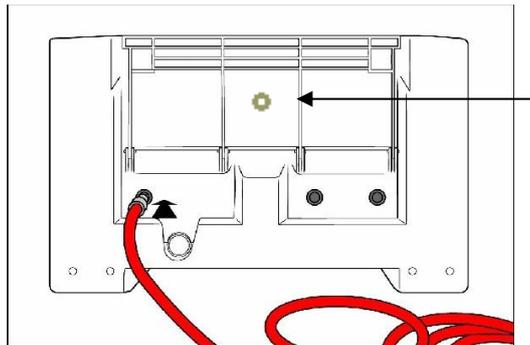
PART 1

Before using Bluebox 1800UF

1. Affix the three coupling houses on the outside of the container (see ill.) if it has not already been done before delivery

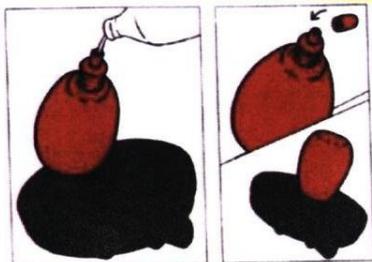


2. Press red and blue 3/4" hoses into the quick couplings (see ill.) follow the colour codes, red sign red hose, blue sign, blue hose e.g.



Plugs for grease lubrication

3. Fill the black absorption tube with water and press the 1" hose into the quick coupling (see ill.).

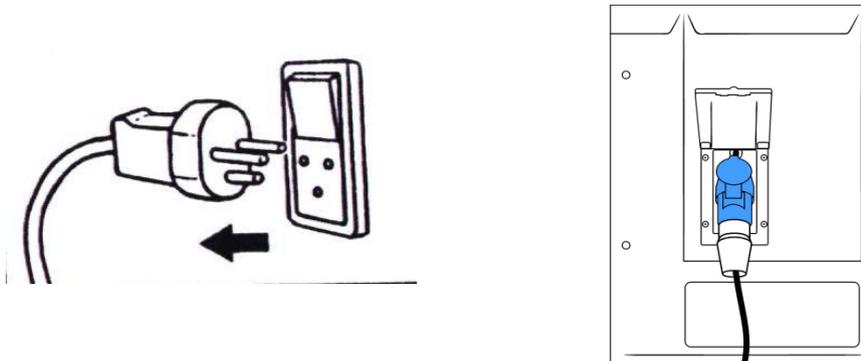


4. Affix the float filter as shown. The floating position can be adjusted with water. The more water, the deeper it will sink (see ill.).

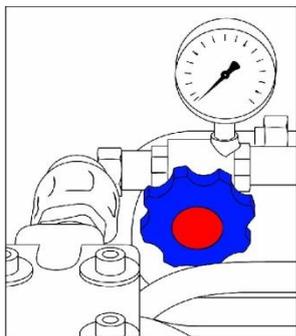
PART 2

Starting the Bluebox 1800UF – Electrical version.

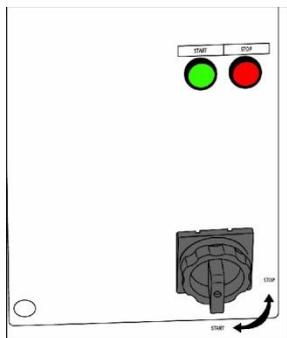
1. Connect the unit to a 230 V power supply (see ill.).



2. Before starting the pump makes sure that the blue handle is in open position (see ill.). The Bluebox **must not** be started with pressure on, the 3 pre-filters might blast.

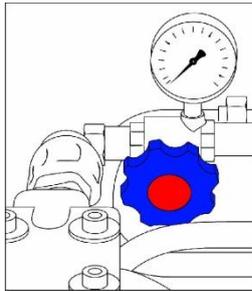


3. Switch on the black button to ON position.

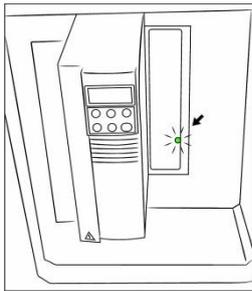


4. Start the pump by pressing the green button (see ill.).

5. Let the pump run for 1-2 minutes until no more bubbles are detected from the red hose.
6. Turn the blue pressure valve on the main block clockwise until the pressure get to approx. 2-3 bars. (see ill.).

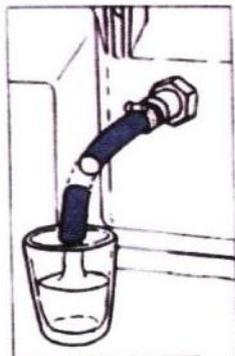


7. Open the grey electricity box to check that the UV-indicators display shows green light if the UV-disinfection option is installed (see ill.).



8. Unclean water will come out of the red hose while drinking water can be tapped from the blue hose. The volume of clean water per minute is shown at the flow-meter.

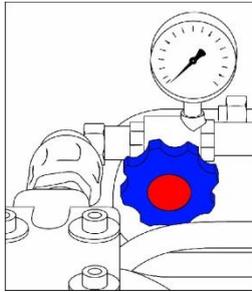
Warning ! Never drink the water from the blue fresh-water tube before the Bluebox 1800UF has been working for at least 5 minutes!!!!



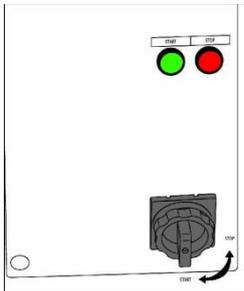
PART 3

After using the BlueBox 1800UF – Electrical version

1. Carefully turn the blue pressure regulating handle on the main block counter-clockwise until the pressure reads 0 bar (see ill.).



2. Let the Bluebox work 1 minute without pressure.
3. Press on the red button (see ill.).
4. Switch off the black button to OFF position.
Never stop the Bluebox with pressure on.

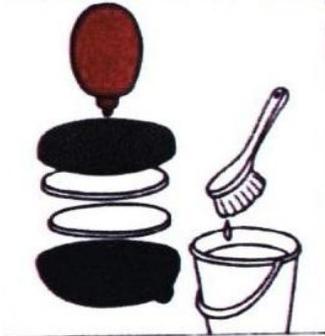


PART 4

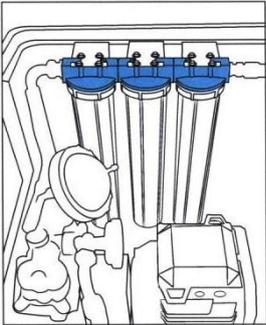
Maintenance of Bluebox 1800UF

Daily

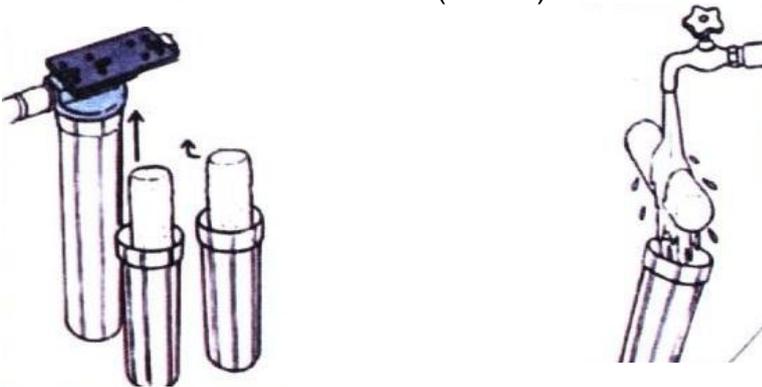
- 1. Cleaning of the float-filter:
Screw off the red balloon and plastic top. Remove the nylon and metal filters. Rinse them in clean water with a brush. Affix the filter and check that the crude filter is placed on top (see ill.).



- 2. Cleaning of the three pre-filters:
a) Screw off the three white filter housings using the admitted key to avoid damage on the houses. (See ill.).



- b) Remove the filter from the plastic pipes and rinse both the pipes and the filters with clean water (see ill.).

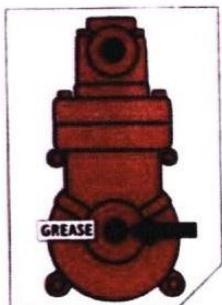


The filters must not be wrought or squeezed to get remaining water out.

3. Reinstall the filters in the pipes and screw them into the sockets.
4. **The front filters should be changed when clogged. Pay special attention to filter 2 (05 micron) and the Activated Carbon filter should be changed every 4 months of operation irrespective of its visual condition(se ill.).**
5. Filers on the front of the electric box, these filters have to be cleaned from dust e.g. every day.
6. **The filters on the electric box have to be changed every month.**

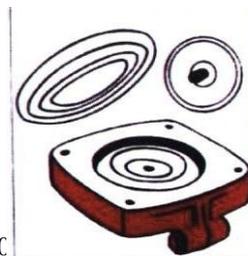
Every month

1. Lubrication of the pump.
The pump is lubricated with grease at the point where the arrow marked "grease" (see ill.). Remove the black plugs on the front of the Bluebox, to reach the grease point (see ill. Side 2)



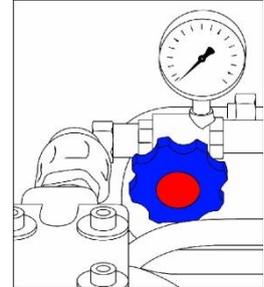
2. Maintenance routines:

Check that all the connections and clamps are tightened.
Tighten front filters, RO filters and UV-light bulb.
Check that the drainage pipes in the container are not blocked.
Check all hoses for holes, tears and other breaches of water-tightness.
Check the pump's membrane (if there is water leaking out of the small hole at the bottom of the pump, the membrane is not watertight and must be changed).



Cleaning

To make sure that the prescribed cleaning fluids are working correctly, the system must be run **with** and **without** pressure, which means that the blue handle at the main block (see ill.) are in open position and then turned to closed position.



For cleaning, a clean tank with a capacity of approx. 50 litres must be used, and clean water must be available.

1. On screw the pre-filters and pull the inside out. Screw the filter housings on again without the filters in.

2. Pre-rinse with clean water for 10 minutes.

3. Alkali cleaning (Divos 116)

If using RoClean or similar powder detergent, please revert to separate dosing procedure in the back of the manual.

Dilute 0.25 liter DIVOS 116 with 50 litres of water in the tank.

Start Bluebox 1800UF and let the system rinse without

pressure (blue handle in open position = "pressure off") for 10 minutes. After that the blue handle are turned to "Pressure on" and the Bluebox 1800UF must work at this setting for 30 minutes at 2-3 bar's of pressure.

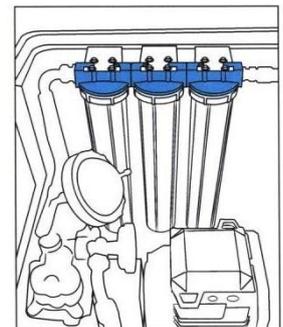
4. The system must now rinse with clean water for 10 minutes without pressure, and then 10 minutes at 2-3 bar's pressure.

5. Acid Cleaning (Divos 2)

If using RoClean or similar powder detergent, please revert to separate dosing procedure in the back of the manual.

Dilute 0.5 liter DIVOS 2 with 50 litres of water in the tank. Start the Bluebox 1800UF and let the system rinse without pressure (blue handle in open pressure = "pressure off") for 10 minutes. After that the handles are turned to "Pressure on" and the Bluebox 1800UF must work at this setting for 30 minutes at 2-3 bar's pressure.

6. After 30 minutes have passed, the tubes are placed in the tank, which is now filled with clean water, and the system has to run for 15 minutes in "Pressure of". After that let the pump run for 15 minutes with the blue handle turned to "pressure on" so that Bluebox 1800UF is rinsed all the way through.



7. When the cleaning is finished, the system is closed down as described in “Part III – After using Bluebox 1800UF” (see ill.) and the 3 front-filters have to be changed. If the first filter, 25 micron, is not too damaged (clogged), it can be rinsed and brushed down and reinstalled (see ill.).
8. After more than 14 days of standstill and before storing, the Bluebox 1800UF must undergo a complete cleaning process as described above.
9. If the unit is not in use for longer than 14 days or stored, the membranes can be treated with a 20% glycol solution, which will also protect it against freezing temperatures. Pure H2O can also provide a membrane conservation product in powder form for optimal transport. This product does not possess an anti-freeze feature.
10. Remember to run a cleaning process of the system before taking into use afterwards.

Cleaning Procedure with RoClean products

The RO plant is organically or biologically fouled and requires cleaning. Avista Technologies recommend cleaning with low pH then high pH cleaners RoClean P303 and RoClean P3111. This stepwise approach has been found to give good results in the past with each wash reaching deeper layers of the foulant.

Caution

When cleaning with low pH first it should be certain that no hydrocarbon fouling can have occurred on the membranes. If in doubt reverse the order of cleaner application and start with the high pH clean.

All cleaning procedures should be carried out within the membrane manufacturers' guidelines which in this case are:

DO NOT EXCEED	LIMIT
Cleaning Temperature	45°C
Cleaning pH (not below lower or above upper)	2 – 11
Cleaning Flowrate	9-10 m ³ /hr/8" pressure vessel
Cleaning differential pressure (MAX)	65 psi (6 element vessel)

Each array of membranes should be cleaned in parallel and the production of permeate should be minimised by keeping the differential pressure low. The permeate lines should be kept slightly open to prevent backpressure damage.

We would additionally recommend that the differential pressure should not exceed 40psi during recirculation and that temperature should be raised as close to the membrane temperature limit as practical to achieve the most efficient clean possible. This is most important for the alkaline clean.

The following procedure should be repeated for each bank of membranes to be cleaned.

Detailed Cleaning Procedure

1. Flush Train

The train to be cleaned should be shut down and flushed with dechlorinated potable water until the brine and feed conductivities are within 10% of each other (approx. 10 minutes).

2. Acidic Wash

A 2% w/v solution of RoClean P303 should be made up by adding 1kg of RoClean P303 per 50 litres of heated potable water. The water should be heated to a minimum of 15°C and a maximum of 45°C. The total volume of cleaning solution required should be detailed in your Operating and Maintenance manual.

Once the solution is mixed and the pH has been verified to be 2.5 > pH < 3.5 introduce the cleaning solution to the (feed/brine side of the) plant at a low flow and displace the flushing water to drain before diverting the flow to the CIP tank. Keep the cleaning fluid in contact with the membranes for a total of 2 hours stopping and starting the recirculation pump every 15 minutes to allow deep soaking and scouring action on the foulant layer. The recirculation flow should be increased to the point where the differential pressure reaches 40psi or where the flow reaches 10 m³/hr/pressure vessel.

Note the pH, temperature, differential pressure, flowrate and any discolouration/changes to the cleaning solution on a half hourly basis as before.

At the end of this period pump the solution out of the system and drain down to remove as much solution as possible.

3. Flush out Remaining Acidic Solution

Rinse out the cleaning tank and then fill it with un-chlorinated potable water. Rinse each pressure vessel until the conductivity of the outlet is within 20% of the inlet.

4. Make Up High pH Cleaning Solution and Circulate It

A 2% w/v solution of RoClean P111 should be made up by adding 1kg of RoClean P111 per 50 litres of heated potable water. The water should be heated to a minimum of 30°C and a maximum of 45°C and it should be confirmed that the pH of the solution is between 10 > pH < 11.

Introduce the cleaning solution to the (feed/brine side of the) plant at a low flow and displace the flushing water to drain before diverting the flow to the CIP tank. Keep the cleaning fluid in contact with the membranes for a total of 2 hours stopping and starting the recirculation pump every 15 minutes to allow deep soaking and scouring action on the foulant layer. The recirculation flow should be increased to the point where the differential

pressure reaches 40psi or where the flow reaches 10 m³/hr/pressure vessel. The permeate valve should be left (slightly) open to prevent any membrane damage.

Note the pH, temperature, differential pressure, flowrate and any discolouration/changes to the cleaning solution on a half hourly basis.

At the end of this period pump the solution out of the system and drain down to remove as much solution as possible.

5. Flush out Remaining Alkaline Solution

Rinse out the cleaning tank and then fill it with un-chlorinated potable water. Rinse each pressure vessel until the conductivity of the outlet is within 20% of the inlet.

6. Restart the Plant

Return the plant to operating mode and start up the unit. Allow the unit to settle down for an hour and take a set of readings.

The feed pressure and differential pressure should have improved significantly but the product quality might have drifted off slightly. The quality will be expected to improve over the next 24 hours as the membranes tighten up again after high pH cleaning.

If any faults should occur...

Symptom	Reason	Solution
Pump cannot produce any pressure.	Float-filter is clogged.	Dismantle red float and clean net-filters with brush (see ill. On page 5)
	Absorption tube is not filled with water.	Dismantle black absorption hose and fill with water (see ill.).
	Contra vent in absorption tube is stuck.	Take apart contra vent and clean inside.
	Membranes in pump are defective.	Pump is dismantled by loosening the bolts - membranes are loosened and changed (see ill.)
	Vent valves in pump Are defective or clogged.	Pump is dismantled by loosening bolts and vents are cleaned or changed (see ill.).
	The pump is letting in air.	Tubes are tightened on absorption side on pump.
Clean water capacity falls	Check reasons in pump section.	Check solutions in pump section.
	The system must undergo a cleaning process.	Follow the cleaning guide. (see Part 5, "Every month").
	The system is not working at normal work pressure.	Adjust work pressure to 2 bar (see ill.) and check that the manometer on main-block shows approx. 2 bar.
	The lifting height (max. 6 meters) has been exceeded.	The lifting height must be reduced to under 6 meters between the feed water source and the BlueBox.
	Clean water tube is blocked or clogged	Make sure that there is free passage in the blue clean water hose and that the flow meter are not clogged by obstacles.

UV-light bulb gives no light

Plug for light is not connected.

Plug in lights.

UV-light bulb is not

Dismantle UV-housing and tighten bulb screwed tight in its socket.

Defective bulb.

Change bulb and check whether light housing is tight (avoid looking directly at UV-light for more than a couple of seconds).

Transformer is defective.

Change transformer, please contact Pure H2O A/S or your local distributor for further assistance

There is water coming out from the bottom of the pump

Defective membrane- or membranes.

Change membrane- or membranes (See ill.).

[IMPORTANT NOTE]

Please be aware of the following:

- Make sure that the electricity supply is stable.
- The purification membranes in the Bluebox 1800UF system normally have to be changed every 2 years depending on the working hours and quality of feed water.
- Please do not place the system in directly sunlight. Heat may affect the electronics in the switch board box.
- As the UV-light contains glass, the system must not be affected by hard shock.
- The system must be free of dust and dirt.
- The system must not be exposed for frost. Temperatures below 0 (cero) degrees Celsius can ruin the membranes. E.g. during a long-haul flight, the Bluebox should be started with low pressure for a while in order to defrost the membranes without damaging them. For long term storage in freezing temperatures, please contact www.pureh2o.net (pure@ellegaard.com).
- As an industrial standard for Reverse Osmosis, membranes output decreases with temperature of raw water. (3% reduction per 1 degree C measured from 25 degree C)
- The industrial standard for Ultrafiltration membranes shows a lesser effect from colder feed water, but the capacity should be expected to be reduced.
- Beware of silt, humus and high levels of iron in the raw water. These compounds will eventually spoil the membranes, since very small “plates” from these compounds will fill up the membranes over time. The only way to deal with this is to install an improved pre-filtration system.



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