



# INSTRUCTION MANUAL

Ecosoft Vending RO System

KA250

KA60

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## VENDING RO SYSTEM

### 1 Overview

Ecosoft water vending machines are standalone water treatment and water dispensing systems. Ecosoft water vending machines (hereinafter referred to as the vending RO machine) can be used to demineralize low to medium salinity feed water. The machine is equipped with two industry standard 4,5" pre-filter housing, 4,0×40" membrane housing for KA250 model and three 1,8×12" membrane housing for KA60 model, and can be used with standard cartridges and membranes of the above size. The operation is completely automated with Ecosoft OC7000GR process controller. Purified water is collected in storage tank of 80 L for KA250 model and 200 L for KA60 model.



This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Vending RO machine operation can be described as follows. First, raw water is fed through 5 µm polypropylene sediment filter in order to remove particulates and filter with granular activated carbon to remove dissolved chlorine.

KA250 machine is equipped with an antiscalant filter preventing deposition of impurities on the membrane.

Reverse osmosis membranes fully reject the antiscalant molecules, so the purified water does not contain any residue.

Then, high pressure pump feeds the prefiltered water into the membrane module, inside which feed stream undergoes reverse osmosis process and separates into permeate and concentrate streams. Permeate exits the membrane module via permeate outlet and runs down the permeate line. In KA60, all concentrate is discharged via concentrate outlet to the drain.

In KA250, part of the concentrate stream is bled to drain; the rest is fed back to suction end of the high pressure pump via recycle line. Recycle flow control throttles flow of concentrate thereby maintaining working pressure in membrane module. Flow rates in recycle line and drain line can be manually adjusted with respective flow controls.

Treated water is collected in a water tank. Float switch mounted in the tank halts the machine when the maximum level of permeate is reached. For KA250 model, when the float switch is high, the controller first runs forward flush rinse then brings the machine to a halt. During forward flush, the membrane module is rinsed with raw water for 60 seconds.

During water dispensing mode water from the storage tank is fed through post-filters with calcite for pH correction and carbon-block for odor and taste improvement. Then the water passes UV sterilizer for finish disinfection and pour into the customer's bottle.

The RO system is fitted out with measuring and control instrumentation. For a detailed reference on RO system components, see Annex A of the manual.

## VENDING RO SYSTEM

### 2 Technical information

#### 2.1 Technical information

Table 1. Delivery terms

No	Description	Unit	Quantity
<b>Ecosoft KA250 (base model)</b>			
1	Robust metal enclosure	Pcs.	1
2	Filter housing 4.5 x 20"	Pcs.	2
3	PP sediment cartridge (5 µm, 4.5 x 20")	Pcs.	1
4	Active carbon cartridge for chlorine removal (4.5 x 20")	Pcs.	1
5	Filter housing 2.5 x 10	Pcs.	3
6	Carbon block cartridge (10 µm 2.5 x 10")	Pcs.	1
7	Cartridge with calcite for pH correction (2.5 x 10")	Pcs.	1
8	High Pressure Pump GRUNDFOS 230V 0.7 kW	Pcs.	1
9	Membrane vessel PV 4040	Pcs.	1
10	RO Membrane Dow Filmtec XLE4040	Pcs.	1
11	Antiscalant cartridge	Pcs.	1
12	Ultraviolet disinfection system HR60	Pcs.	1
13	Measuring and control instrumentation	set	1
14	Control panel	Pcs.	1
15	Controller OC-7000 Gr	Pcs.	1
16	Dispensing unit	kit	1
17	Storage tank (80L)	Pcs.	1
<b>Ecosoft KA60 (base model)</b>			
1	Robust metal enclosure	Pcs.	1
2	Filter housing 4.5 x 20"	Pcs.	2
3	PP sediment cartridge (5 µm, 4.5 x 20")	Pcs.	1
4	Active carbon cartridge for chlorine removal (4.5 x 20")	Pcs.	1
5	Filter housing 2.5 x 10	Pcs.	2
6	Carbon block cartridge (10 µm 2.5 x 10")	Pcs.	1
7	Cartridge with calcite for pH correction (2.5 x 10")	Pcs.	1
8	High Pressure Pump RO 300GPD	kit	1
9	Membrane housing HM-252	Pcs.	3
10	RO Membrane TW30-1812-100	Pcs.	3
11	Storage tank (200L)	Pcs.	1
12	Dispensing pump 24V (12L / min)	kit	1
13	Ultraviolet disinfection system HR60	Pcs.	1
14	Measuring and control instrumentation	kit	1
15	Control panel	Pcs.	1
16	Controller OC-7000 GR	Pcs.	1
17	Dispensing unit	kit	1

Options			
18	Bill acceptor	Pcs.	1
19	Coin acceptor	Pcs.	1
20	Mineral dosing station	Pcs.	1
21	LCD monitor	Pcs.	1
22	The heater with thermostat and fan 230V <sup>1</sup>	Pcs.	1
23	Pressurize drainage pump CONLIFT1	Pcs.	1



<sup>1</sup>This option is provided to ensure the normal operation of the machine in poorly heated rooms, but it does not allow placing it outdoors.

Table 2. Physical details

Model	KA250	KA60
Nominal capacity, LPM LPH	3,4 – 4,0 200 – 250	0,9 – 1 55 – 60
Maximum capacity, l / day	6 000	1 400
Water use per forward flush, L	-	-
Power consumption, kW, max	1,0	0,5
Electrical rating	230V, 50Hz	
The diameters of the connections: drain water supply	DN15 DN32 - gravity feed DN15 - pressurized	DN15 DN32 - gravity feed DN15 - pressurized
Dimensions (H x W x L), mm, max	1880 x 850 x 760	
Dry mass of unit, kg, max	150	100
Weight with water, kg, max	200	300
Operating specification <sup>2</sup>		
Water consumption, LPH	500 – 600	110 – 130
Permeate flow rate, LPM LPH	3,4 – 4,0 200-250	0,9 – 1,0 55 – 60
Drain flow rate, LPM LPH	1,0- 1,7 60 - 100	0,9 – 1,0 55 – 60
Recycle flow rate, LPM LPH	8 – 10 300 - 400	–
Pressure in membrane module, MPa	8 – 11	5 -7

<sup>2</sup> feed water must comply with requirements in Table 3.

Table 3. Inlet water limitations<sup>3</sup>

Hardness	150 mg/L CaCO <sub>3</sub>
	8,5 °dH
Iron	0,1 mg/L
Manganese	0,05 mg/L
Silicate	20 mg/L
Total dissolved solids	1500 mg/L
Chemical oxygen demand	4,0 mg/L O <sub>2</sub>
Residual chlorine	0,1 mg/L

<sup>3</sup> if using antiscalant/oxygen scavenger, above limitations can be exceeded

Inlet pressure	0,2...0,4 MPa
Temperature of water	10...25 °C



Tap feed water has to be pre-filtered from suspended solids and residual chlorine before entering the RO system. Well water may contain impurities such as hardness, iron, manganese, silica, hydrogen sulfide that can quickly lead to membrane failure. Perform a detailed laboratory analysis of your well water and consult a water treatment specialist to see if you need special equipment for treating your well water supply.

## 2.2 Construction and main components of the vending RO machine

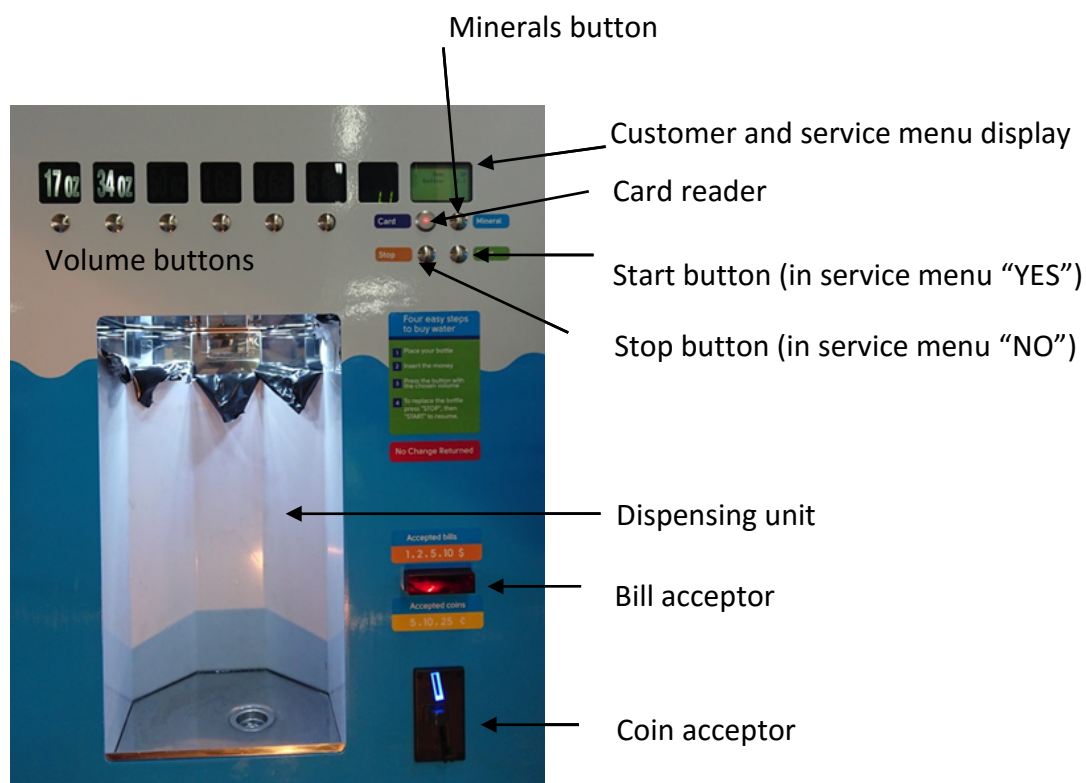


Figure 1. Vending machine front panel

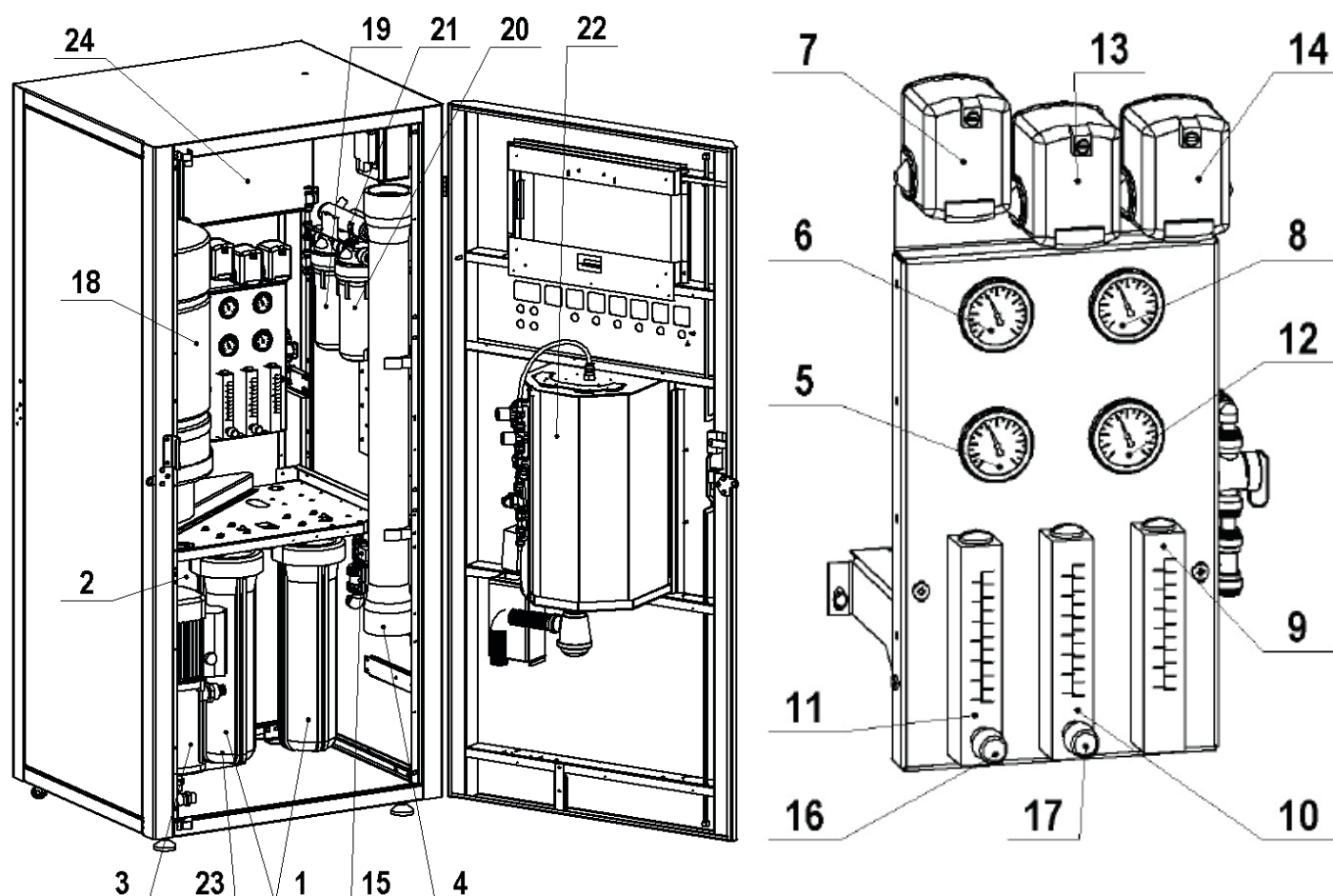


Figure 2. Layout of KA250 vending machine

Table 4. Main components of KA250

Item	Description	Item	Description
1	Prefilters	13	Permeate pressure switch
2	Antiscalant cartridge	14	Alarm pressure switch
3	High Pressure Pump	15	Entry solenoid valve
4	Membrane array	16	Recycle flow control
5	Feed water pressure gauge	17	Drain flow control
6	Pressure gauge after prefilters	18	Storage tank
7	Low feed pressure switch	19	Post filters (carbonblock, calcite)
8	Membrane module pressure gauge	20, 21	Ultraviolet disinfection system HR60
9	Permeate rotameter	22	Dispensing unit
10	Drain rotameter	23	Pressurized drain pump
11	Recycle rotameter		
12	Permeate pressure gauge		



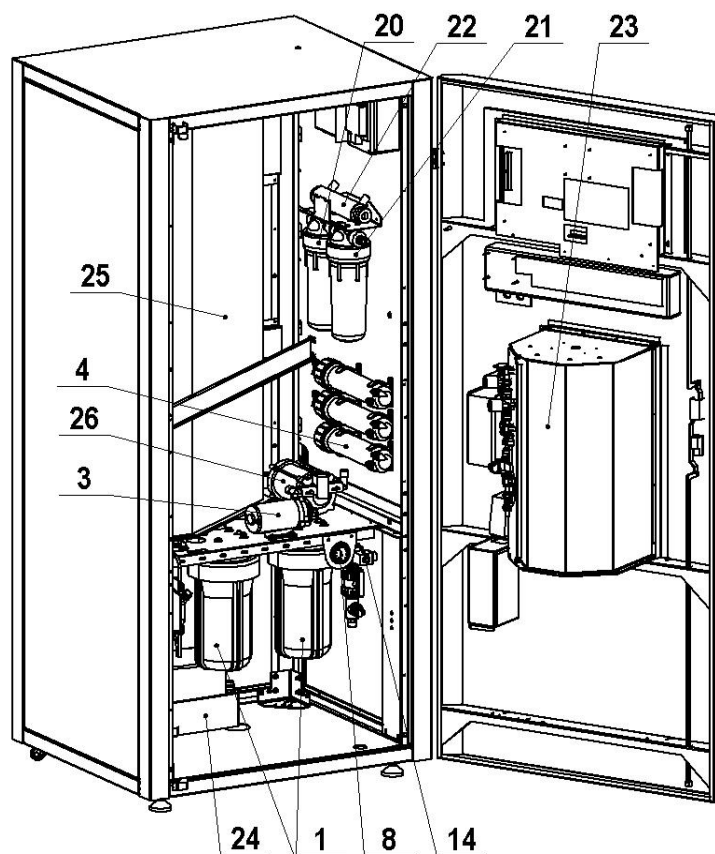


Table 5. Main components of KA60

Item	Description
1	Prefilters
3	High pressure pump
4	Membrane housings
8	Membrane module pressure gauge
20, 21	Postfilters (carbonblock, calcite)
22	Ultraviolet disinfection system
23	Dispensing unit
24	Pressurized drain pump
25	Storage tank
26	Water dispensing pump

Figure 3. Layout of KA60 vending machine

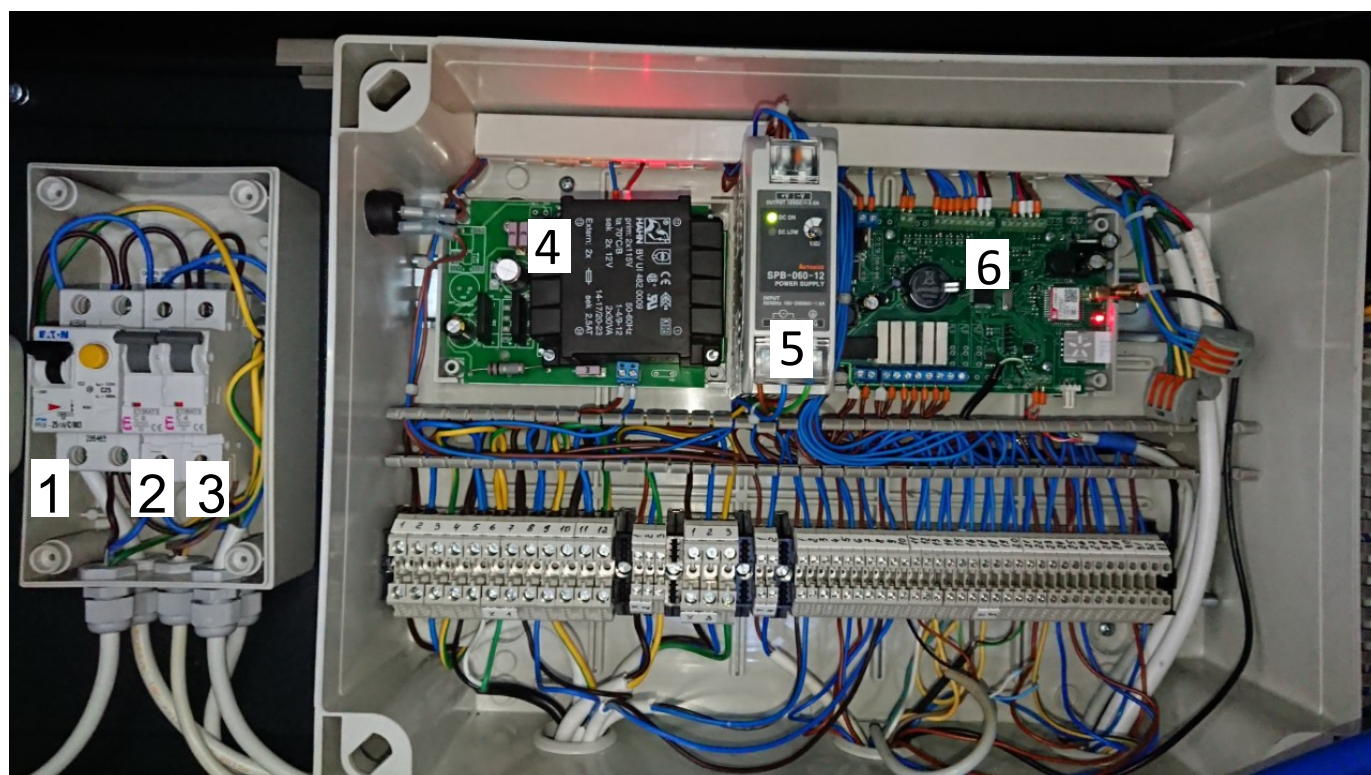


Figure 4. Power and control cabinet: 1—switch of controller and UV-sterilizer power supply; 2 – switch of controller, bill and coin acceptors; 3 – switch of monitor; 4 – power supply of controller, entry, forward flush and dispensing solenoid valves; 5 – power supply of controller, water counter, bill and coin acceptors; 6 – controller.



## 2.3 Principle of operation

P.I.D. diagrams of the Ecosoft KA-250 and Ecosoft KA-60 are given in Annex B.

Both models include water treatment and water dispensing units. The principle of machines work can be described as follow.

Ecosoft RO vending machines can operate in one of three modes:

- PRODUCTION mode;
- FLUSH mode;
- STANDBY mode.

KA250 model operates in all of these modes, whereas the model KA60 only in PRODUCTION mode and STANDBY.

The PRODUCTION mode activation takes place when the machine is turned on and in absence of the signal dry running from low feed pressure switch (7). The signal of the purified water (under the maximum pressure) from permeate pressure switch (13) must be absent too. In PRODUCTION mode entry solenoid valve (15) is open and high pressure pump (3) is turned on.

Machines are connected to the water supply with the inlet fitting at the back wall of machine enclosure. Low feed pressure switch (7) is activated after decreasing the pressure level in the water storage tank. As a result, entry solenoid valve (15) is opened and the high pressure pump (3) switches on.

Potable water is fed through the pre-treatment filters (1) to remove sediment impurities and dissolved chlorine before membrane module.

Antiscalant (2) is dosed in to the water flow to protect RO membrane surface from the fast fouling (option for KA250 only).

Then water is supplied to the high pressure pump (3). The pressure before the pump is measured by a gauge (6). In the case of low inlet water pressure, low feed pressure switch (7) automatically turns off the pump by "dry running". After high pressure pump water is fed to the RO membrane module (4). Permeate is accepted in the exit of module. The flow rate is measured by rotameter (9).

Concentrate is discharged into the drain. Pressure in the membrane module, or concentrate pressure, is measured by the gauge (8). In order to reduce the waste of the concentrate, part of it is recycled to the input of the high pressure pump (co-called recycling of concentrate). To increase the volume of recycling and decrease discharge, the manually regulation of the control valve (17) and rotameter (11) are used. Concentrate discharge flow rate is measured by rotameter 10 and regulating with valve 18.

Purified water accumulates in the storage tank (19). When water dispensing is on, water from storage tank is fed through the carbonblock filter, calcite cartridges and ultraviolet disinfection system (20, 21 and 22).

Switch off (on) of reverse osmosis is provided with a signal from the permeate pressure switch (13). If the pressure decreasing below minimum (float switch signal (14)) the machine will switch off. If water

dispensing is on, pressure of purified water in the storage tank is decreasing and the machine is switches to the PRODUCTION mode.

If the storage tank is full and there is no water dispensing, the “STANDBY” mode is on. In this mode, the high pressure pump (3) is switched off and entry solenoid valve (15) is closed. Purification is not provided. After a certain period of time in the “STANDBY” mode (measured by timer), system controller switches on the forward flush solenoid valve (16) and machine is switched to “FORWARD FLUSH” mode. During this, RO membrane is rinsed with high flow of inlet water for 60 seconds. Water is discharged into the drain.

All pressurized and free-flow discharges of the appliance, including the concentrate discharge during the operation, discharges of flushing water, drain from the bottling terminal is sent to the free-flow drain piping at the back wall of machine enclosure.

The technological process in the model Ecosoft KA60 is similar to Ecosoft KA250 with the exception of FLUSH mode. Purified water is retained in storage tank with the volume 200 L without pressure. For KA60 model the PRODUCTION mode is activated as a result of receipt of a signal from the upper level float switch.

To turn off the machine it is necessary to relocate switches on the right side at the top in OFF position. In this mode water is not supplied to the input and output of the appliance.

## VENDING RO SYSTEM

### 3 Installation and startup

- 3.1 Rest the machine on a flat level surface capable of supporting its weight (see Table 1). Inspect the RO system carefully for damage, including piping, valves and instruments, pump, pressure vessels, pre-filter housings, power cabinet before proceeding with connection and startup.
- 3.2 Check the inlet water pressure. For adequate machine operation inlet water pressure in the pipeline should be no less than 0.2-0.4 MPa.
- 3.3 Check the quality of GSM/GPRS signal at the place. For this purpose, you can use your mobile phone. If the signal is OK on your phone, it also OK at the place. Also you can estimate the level of GPRS signal using vending machine. Put your service key to card reader to log in into the service menu of controller. Using 10 (UP) and 19 (down) buttons get to the menu item “4.2.4 RSSI”. For a good level of GPRS signal the RSSI value should be no less than 15. Otherwise it is recommended to try the sim-card of another mobile operator or more powerful antenna.
- 3.4 Install sediment and activated carbon cartridge in filters housing (BB20).



Newly used activated carbon filter at the beginning of its work can leach carbon dust. To prevent RO membrane clogging with carbon dust it is recommended to rinse the

filter before system start up. For this purpose, disconnect the piping after carbon filter, open the raw water supply of the machine and rinse carbon filter till the absence of carbon dust in filtered water. For collection of rinse water use any container of appropriate volume. After that shut off the water supply and connect all the piping.

### 3.5 Install membrane in pressure vessel as follows.

Disconnect pressure vessel from piping. Remove locking clips from quick connect fittings installed in the pressure vessel. Pull out flexible tubing (permeate outlet is in the center of pressure vessel lid, feed water and concentrate outlets are eccentric). Remove PVC pipes joined with the vessel, if any. To remove PVC pipe connection, locate closest union connector and dismantle it. If necessary, dismantle next closest connector to remove the entire piping fragment joined with the vessel. Put a tag on each freed end of tube to indicate where it connects to the vessel.



Observe direction of arrow on pressure vessel when installing membrane. Use glycerol or a similar RO-compatible lubricant as needed. Avoid touching membrane with hands. Use sterile rubber gloves when handling membrane.

Remove the lid at the feed end of pressure vessel. First, remove spiral retaining ring by pulling bent tab towards the center of circle. If the pressure vessel lid is retained by half rims, remove the fastening screws and pull half rims out of circular groove. Take out the lid with membrane adapter.

Make a cut in membrane packaging bag and insert membrane in the pressure vessel brine seal last. Central tube of the membrane has to mate with membrane adapter installed at the concentrate end of pressure vessel. If necessary, remove the lid at the concentrate end before installing the membrane.

Install the lid back in place. Put spiral retaining ring (or half rims) in the groove, fasten half rims with screws. Re-assemble the RO system in reverse order.

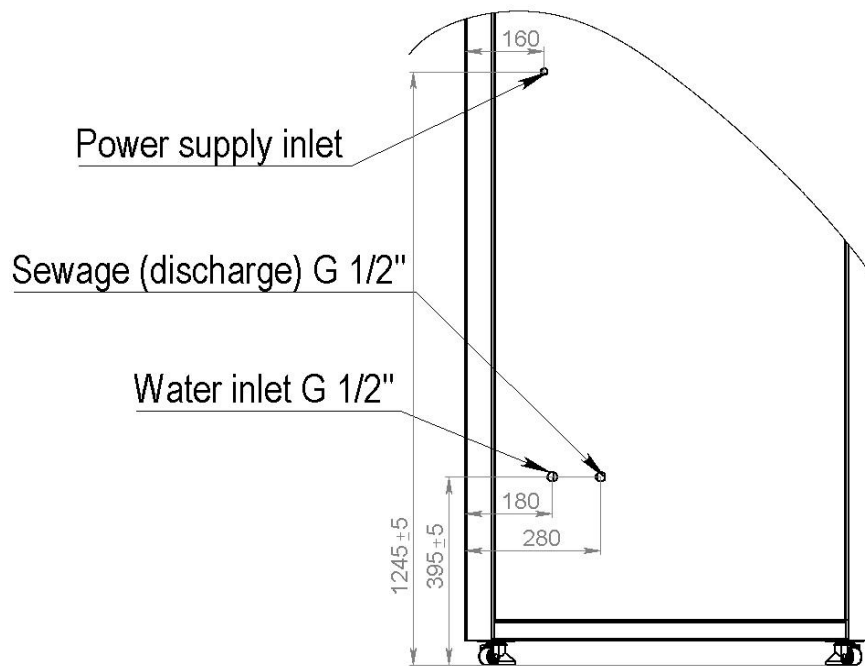
3.6 Install the cartridge for the pH correction and carbon block cartridge. Newly used carbon block filter at the beginning of its work can leach carbon dust. To flush out the dust it is recommended to rinse the filter after system start up. For this purpose, disconnect the piping after carbon block filter, and rinse carbon filter till the absence of carbon dust in filtered water. For collection of rinse water use any container of appropriate volume.

3.7 Install the UV-lamp in to the ultraviolet disinfection system according to instruction.

3.6 Close the permeate supply to the storage tank.

3.7 Connect the machine to the power supply.

- 3.8 Connect raw water pipe from water main/pump to the entry solenoid of the RO system. Recommended pipe size is DN15, plastic/composite tube or rigid non-kinking hose. Use appropriate fittings as necessary.
- 3.9 Connect drain tube or hose with drain outlet of the RO system and run it to drain pipe. Ensure air gap at the end of drain line to prevent back siphon age. Recommended pipe size is DN40 (DN15 for machine with pressurized drain pump), plastic/composite tube or rigid non-kinking hose. Use appropriate fittings as necessary. The distance between machine and drain line should not exceed 2 meters.



### 3.1 START UP THE SYSTEM AS FOLLOWS:

- Ensure recycle and drain flow controls are fully open before starting. Run the permeate tube to drain for the duration of the first run of the RO system.
- Switch on main circuit breaker to start the machine. After the controller starts up and RO system starts operating, tighten drain flow control until drain rotameter reading meets specifications (see Table 1). Then, start turning down recycle flow control. This will raise pressure in the membrane module shown on pressure gauge. Stop when permeate flow rate meets specification or pressure in the membrane module rises above upper limit (see Table 1). After setting proper operating pressure, readjust drain flow rate (if it deviates in the process) to ensure that system operates with proper recovery (75% unless specified otherwise). To find out target drain flow rate, perform below calculation:

$$\text{Drain flow rate} = \frac{\text{Permeate flow rate}}{\text{Recovery}} - \text{Permeate flow rate}$$

For example:

Permeate flow rate = 4 l/min = 240 l/h

Recovery = 75% = 0,75 (default)

$$\text{Target drain flow rate} = \frac{4}{0,75} - 4 = 1,33 \text{ l/min} = 80 \text{ l/h}$$

Make sure that the permeate flow rate and drain flow rate conform to your recovery calculation. After you have finished setting up operating flow rates, rotameter and pressure gauge readings must stay within specification in Table 1.



Take care not to exceed 1,6 MPa in membrane module at any time. If membrane pressure rises above the upper limit in specification, open recycle flow control to bring it down.



Take care not to exceed proper Recovery. If you are unsure what recovery your system should be operated with, contact Ecosoft Product support for assistance.



Turn flow control knobs smoothly when regulating recycle and drain flow. Do not make rapid turns or apply disproportionate force as this can damage the machine.

- Let the machine run for 1-hour discarding permeate and concentrate to drain to flush out membrane preservative. Watch pressure and flow rate readings to make sure these do not exceed requirements. After 1 hour of operation stop the machine. Switch off main circuit breaker. Connect permeate tube/hose to permeate tank.

### 3.10 SET UP THE ANTISCALANT DOSING PUMP AS FOLLOWS: (option for KA250 model only)

- The solution of antiscalant should be prepared on demineralized water. Recommended antiscalant brands and doses are listed in Table 8.

Table 6

No	Antiscalant	Recommended dose, g/m <sup>3</sup> (ml/m <sup>3</sup> )	How to prepare dilute solution
1	Ecotec 1000	10	170 ml per 10 L can
2	Ecotec 2000	7	120 ml per 10 L can
3	Ecotec 3010	5	80 ml per 10 L can
4	Vitec 3000	3	50 ml per 10 L can



If the water quality and the technical parameters of machine differ from specified in table 2 and table 3 it is recommended to contact the technical support for consultation.



It is not recommended to use antiscalant of the brands not listed in the table 6. Usage of unknown antiscalant can lead to membrane clogging.

3.10.2 If raw water quality and the technical parameters of machine fit data in table 2 and table 3, simplified procedure of antiscalant dilute solution preparation can be used. For this purpose, just use the recommendations of table 6 column 4 and go to item 3.10.4.

3.10.3 If raw water quality and the technical parameters of machine do not fit data in table 2 and table 3, concentration of antiscalant dilute solution should be calculated and prepared as follow:

- to find out the concentration of antiscalant, perform below calculation:

**Antiscalant concentration = Raw water flow rate \* Recommended antiscalant dose / Dosing flow rate,**

where **Raw water flow rate** – sum of permeate and concentrate flow rates. Can be read from permeate and drain rotameters.

**Recommended antiscalant dose** – taken from table 6, column 3 “Recommended dose, g/m<sup>3</sup>”;

**Dosing flow rate** – velocity with which dosing pump soak solution of antiscalant (L per hour). To measure this parameter, turn the pump switch on position 20%, put the soak tube of dosing pump into measuring cylinder with antiscalant solution, measure the volume of solution that pump soak during 1 minute and multiply on 60.

**For example:**

Permeate flow rate = 4 l/min or 0.24 m<sup>3</sup>/hour

Concentrate flow rate 2 l/min or 0.12 m<sup>3</sup>/hour

Dosing flow rate = 0.25 l/hour (or 4.2 ml/min)

Antiscalant brand – Ecotec 3010

Recommended antiscalant dose = 5 g/m<sup>3</sup> or

$$\text{Antiscalant concentration} = (0.24 + 0.12) * 5 / 0,25 = 7 \text{ g/L or } 7 \text{ ml/L}$$

3.10.4 Set the necessary dosing rate using the dosing pump's knob (see the dosing pump instruction for more detail).

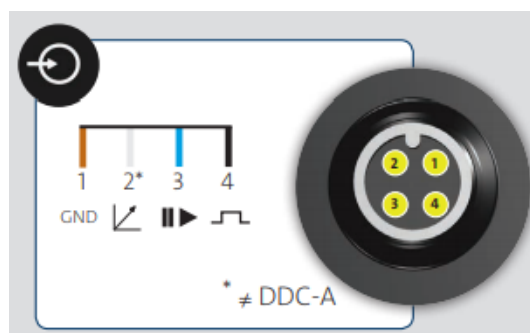
Consumption of the antiscalant solution depends on the quality of potable water and the water pressure. The dilute solution of antiscalant should be stored in the manufacturer's packaging, or in plastic, enamel, glass, stainless steel containers with a covered lid. Dilute solution of antiscalant should not be stored over 14 days.

### 3.11 SET UP THE MINERAL DOSING PUMP AS FOLLOWS: (option)

The dosage of mineral solution occurs by the dosing Grundfos pump DDC 6-10 series. Metering pump controlled by the process controller OS-7000GR.

Setting the metering pump is shown below:

- metering mode must be set to a impulse dosing position;
- frequency of the dosage selector must be on position 0.5- 5.0ml/h;



The consumption of the working solution is about 1.0 liters on the water flow rate 0,25m<sup>3</sup> / hour. The working solution should be stored in the manufacturer's packaging, or in plastic, enamel, glass stainless steel containers, with a covered lid. The storage time of working solution is not more than 30 days. In the case of application the concentrated solution or "dry mixture" should observe the rules of preparation of these solutions. The regulations are listed in the passport for these products. Water quality control is carried out after remineralization by TDS measurement and by means of tests on hardness, as well as in a laboratory, by measuring these parameters in the average volume which is 10 liters.



### 3.12 INSTALL SIM-CARD AS FOLLOWS:

- install the sim-card and get all the setting of GSM/GPRS for it using your mobile phone
- remove the power from the machine;
- take off the cover of control cabinet;
- take off the cover of controller;
- install sim-card in its slot, shown on the below (3);
- if the sim-card include insert for nano- and micro-sim modification, use SIM-adapter or scotch tape to improve better contact of sim-card and prevent disconnect of it;
- switch on the power of the machine;
- red light near the sim-card will star to blink frequently (4);
- in short time the frequency of indicator blinking will become once per 3-4 seconds.

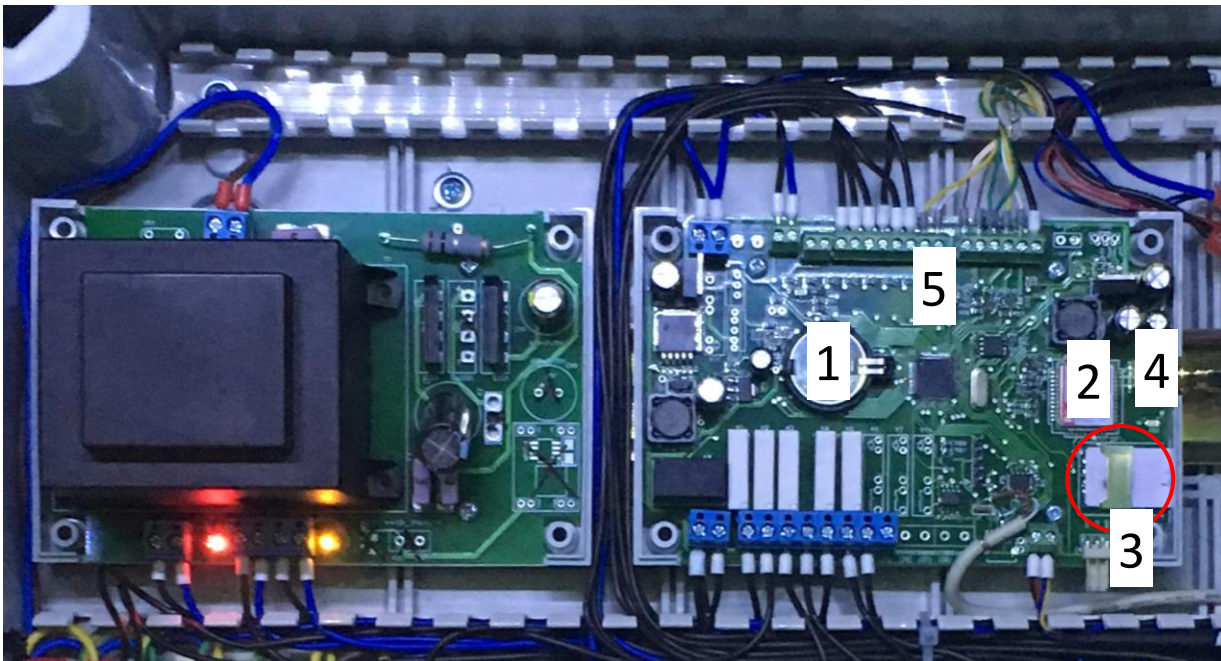


Figure. Control cabinet layout: 1 — battery of controller; 2 — GSM/GPRS modem; 3 — signal indicator; 4 — sim-card; 5 — controller board.

### 3.13 SETUP WATER COST AS FOLLOWS:

The price of 0.25 UAH/USD/EUR per liter is set by default in the controller. In order to change the cost, it is necessary:

Enter your online cabinet via web-site, menu Devices → Detailed state(choose the id)→ Prices.

Choose the cost settings for separate device or whole chain.

Select the desired unit from dropdown list.

Fill the price for 1L. (36oz.) water without minerals.

Fill the price for 1L. (36oz.) water with minerals.

Press the Save button.

Press the “No/Pause” button 4 times on the machine to ensure the acceptance of the settings by controller or they will be automatically accepted in 20 minutes.

The screenshot displays the 'Prices' configuration page for a specific device. The left sidebar contains navigation links: Main, Devices, List, Detailed state, and Statistics. The main panel has tabs for Details, Settings, Prices (active), and Campaigns. Under the 'Prices' tab, there's a checkbox 'Set as branch price for all devices' which is checked. Below this, there are two input fields for 'water cost': one for 'without minerals' and one for 'with minerals', both currently set to '1 UAH/L'. An 'Auto' button is next to the 'without minerals' field. A table follows, allowing for setting costs for different water volumes (0.5L, 1L, 1.5L, 2L, 5L, 6L, 10L, 15L, 19L) for both 'water cost, UAH' and 'With minerals, UAH'. Each volume has a corresponding input field, all of which are currently set to their respective volume values. At the bottom right, there is a 'Cost with minerals for legacy controllers' field set to '1'. A green 'Save' button is located at the bottom right corner of the form.

	water cost, UAH		With minerals, UAH	
0.5L	0.5	0.5L	0.5	
1L	1	1L	1	
1.5L	1.5	1.5L	1.5	
2L	2	2L	2	
5L	5	5L	5	
6L	6	6L	6	
10L	10	10L	10	
15L	15	15L	15	
19L	19	19L	19	

Cost with minerals for legacy controllers: 1

Save

The cost of water can also be set via the controller menu if there is no connection to the network. For that end, enter the controller service menu with the service key and select menu 2.3 “Prices”. Set the water cost without mineralization for all volumes (0.5...9 L) in the menu 2.3.1...2.3.7 with 10 (up) and 19 (down) fixed filling buttons. Similarly, set the cost of water with mineralization in menu entry 2.4 "Cost with minerals".

### 3.13 VERIFY THE FILLING ACCURACY AS FOLLOWS:

The filling accuracy is determined by the number of pulses, which the water counter measures during the filling of chosen water volume. These settings are set in the production. However, it is recommended to verify this parameter during the start-up of the appliance and to adjust it if needed. Check the filling accuracy of the machine by using the bottles with volume of 1 L, 5 L (or 6 L) and 19 L.

If the volume of the filled water corresponds to bottles' volume, all settings and filling accuracy are correct.

In case of volume disparity, visit your on-line cabinet via website and enter menu Devices → Detailed state → Settings. Set the value of 250 (number of pulses of water counter) for 1 L water volume. Press the Save button.

Press "Send price for water and meters reading" (or "Update status").

Press the "No/Pause" button 4 times on the appliance to ensure the acceptance of the settings by controller.

The screenshot shows a web application interface for configuring water meter settings. On the left is a navigation sidebar with a 'Detailed state' section expanded, showing 'Statistics', 'Sensors', 'Cards', 'Settings', and 'Administration'. The main panel has tabs for 'Details', 'Settings', 'Prices', and 'Campaigns', with 'Settings' selected. Under 'Settings', there's a section 'Accuracy of pouring' with a green checkmark and a label 'Автоматизировано'. Below this is a table for setting impulses per liter (imp./L) for various volumes. The table has two columns: 'calculate from' (volume in L) and 'impulses'. The values are: 0.5L (135), 1L (280), 1.5L (405), 2L (540), 5L (1350), 6L (1620), 10L (2700), 15L (4050), and 19L (5130). A 'Save' button is at the bottom right.

calculate from	imp./L
0.5L	135
1L	280
1.5L	405
2L	540
5L	1350
6L	1620
10L	2700
15L	4050
19L	5130

Put the bottle of 1 L on the bottling terminal, insert money and pour the water into the bottle.

If the filling water volume does not correspond to the determined volume, change the number of pulses on the site for 1 L (mainly in the range of 250-300, step 10) and repeat paragraphs 2.6-2.8.

If the filling water volume corresponds to the determined one, set the number of pulses for the rest of the water volumes as shown below:

Number of pulses for volume (X L) = Number of pulses for volume of 1 L · X.

Example. Number of pulses for 1 L = 250, while for 5 L = 250×5=1250. In similar fashion Number of pulses for all water volumes is determined in the similar way. Type the value in the corresponding fields.

Press the SAVE button.

Press “Send price for water and meters reading” (or «Update status»).

Press the “No/Pause” button 4 times on the machine to ensure the acceptance of the settings by controller.

Check the filling accuracy of the machine by using the bottles with volume of 1 L, 5 L (or 6 L) and 19 L. Adjust if needed.

The filling accuracy also can be set via the controller menu if there is no connection to the network. For that end, enter the controller service menu with the service key and select menu 2.2 “Counters”. Set the number of pulses for 1 L (p. 2.2.2) with 10 (up) and 19 (down) fixed filling buttons. Check the filling accuracy and adjust if needed. The calculation of number of pulses for the rest of the volumes (0.5-19 L) is similar to the website one. Set these values in menu 2.2.1-2.2.7.

## VENDING RO SYSTEM

### 4 Installation precautions

- Installation and setup of the machine should be undertaken by a qualified professional. Room or area where the machine is to be installed must meet workplace standards of local building code.
- The doorway should provide a seamless transport of the appliance to the installation zone.
- The machine must not be operated in outdoor environments. Do not expose to weather conditions (rain, temperature fluctuations, proximity of heating equipment, direct sunlight etc). The room temperature must be in the range of 20± 10 °C, relative humidity less than 75%.
- Air at workplace should be free of corrosive vapors, airborne dust, and fibrous matter.
- To provide access to the machine for maintenance and repair purposes, respect the following clearances between the machine and building structures: 500 mm to the left or right, 200 mm above.
- Electrical connections must comply with local electrical code. Make sure to follow applicable grounding and insulation rules. The main supply parameters should fit: Wattage - 1.1 kW; Power supply – 230V, 50Hz.



**Caution!** The unit must not be operated without proper connection of protective earth. If socket is not earthed, run a dedicated grounding wire to protective earth clamp on the system's metal frame.

- Supply, drain, and delivery pipework must comply with local plumbing code and have sufficient flow capacity. Drain line of the machine must be separated from floor drain with an air gap.
- The diameter of the connection to the water pipe DN-15; the connection from the water supply to the appliance execute through a flexible hose 1". The pressure in the water supply system must be in the range of 0.2-0.4 MPa. The permissible variation must be no more than  $\pm 0.5$  bar; the maximum water flow is 1.0 m<sup>3</sup> / h.
- Drain line must provide flow rate up to 0.5 m<sup>3</sup> / h; The diameter of the drain outlet is DN 40 mm. The connections to the sewer should be ensuring "break of stream" and the water seal; The total distance from the appliance to the "break of stream" must not exceed 2m.

## VENDING RO SYSTEM

### 5 Operating precautions

5.1 Operator of the machine must strictly follow these guidelines and general electrical safety precautions.



If power supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified person in order to avoid hazard.

5.2 When operating the machine, ensure that pressure and flow rates are within specification limits and that power supply is clean and uninterrupted.

5.3 Perform the following at least once a month:

- verify that readings on pressure gauges and rotameters fall within the specified range per requirements specification;
- verify tightness of hydraulic connections and integrity of parts.

5.4 In order to monitor performance of the RO machine, regularly keep record of operation and write down parameter readings. Use membrane manufacturer's software tools for normalization to control for fluctuations of pressure, temperature, and other operating conditions.

5.5 Change polypropylene cartridge when it has clogged. Pressure drop of 0,1 MPa or greater on the sediment filter indicates that filter cartridge needs to be replaced as soon as possible.

5.6 Perform CIP or another suitable chemical cleaning protocol when any of the following conditions are encountered:

- normalized permeate flow rate drops 10-15% of its initial value;
- normalized conductivity of permeate increases 10-15% of initial value, raw water conductivity remaining at the same level;

- normalized pressure drop along the membrane module increases 10-15% of its initial value.

5.7 After installing freshly cleaned membrane, perform 1 hour rinse discarding all permeate and concentrate. If chemical cleaning fails to restore normalized flow or rejection to design specifications, membrane element is irreparably fouled and has to be replaced.

5.8 To prevent microbial contamination, the machine should be operated for at least 1 hour a day. In case 48 hours or longer shutdown is to occur, membrane should be treated with preservative solution. Preservative treatment is accomplished by circulating 1% sodium metabisulfite solution through the membrane module for 30 minutes or by preparing metabisulfite solution of the above strength in the module. Before resuming operation of a machine that had been treated with preservative, rinse the membrane.



**Do not** use supply water with over 0,1 mg/L of free chlorine without pre-treatment with activated carbon or other means of dechlorination. Chlorine will destroy the membrane.

Table 7 Frequency of spare parts replacement

No	Description	Type	Frequency of replacement	Control	Replacement
1.	Sediment PP filter	5 $\mu$ m, 4.5 x 20"	Pressure drop > 0.05 MPa	Pressure drop. Every week. By owner.	Qualified professional
			Once in three months		
			After 30m <sup>3</sup> of purified water		
2.	Active carbon cartridge filter	4.5 x 20"	Pressure drop > 0.05 MPa	Pressure drop. Every week. By owner.	Qualified professional
			Once in three months		
			After 30m <sup>3</sup> of purified water		
3.	Antiscalant (cartridge)	2.5 x 10"	After 40m <sup>3</sup> of purified water	Water quality test. Every month.	Qualified professional
4.	Membrane	Dow Filmtec XLE4040	Up to 3 years*	Indicators of rotameters and manometers Every week. By owner.	Qualified professional
5.	Storage tank (80L)		If necessary - replacing, increasing the air pressure, disinfection	Every week. By owner.	Qualified professional
6.	Cartridge with calcite for pH correction	2.5 x 10"	Once in three months After 30m <sup>3</sup> of purified water	Water quality test. Every month. By owner.	Qualified professional

7.	Carbon block cartridge	Filter 1 (10 $\mu\text{m}$ 2.5 x 10")	Once in three months After 30m <sup>3</sup> of purified water	Water quality test. Every month. By owner.	Qualified professional.
8.	Mineral solution (option)		Every 14 days	Visually. Water quality test. Every month. By owner.	Qualified professional
10.	Ultraviolet lamp	For HR-60 disinfection system	Once a year	Visually. Water quality test. Every month. By owner.	Qualified professional

\* In case of timely cleaning of the membrane (CIP)

5.9 To replace sediment and activated carbon filter cartridges proceed as follows:

- remove the power from the machine;
- shut off water supply and relieve pressure;
- screw off filter bowl and remove it, taking care not to spill water on parts of the machine;
- remove spent cartridge from the bowl, place a clean one inside and screw the bowl back on.



**Do not** torque over 2 kgf×m when tightening bowl.

5.10 To replace membrane element proceed as follows:

- remove the power from the machine;
- shut off water supply and relieve pressure;
- disconnect feed, permeate, and concentrate tube connections at membrane module outlets;
- unfasten clamps holding the pressure vessel and take down the vessel;
- remove caps from the pressure vessel;
- push the membrane element from the feed end towards the discharge end (in the direction of the arrow). Extract the membrane element by pulling it at the discharge end of the vessel;
- install new membrane element, observing flow direction as indicated by the arrow;
- fasten the caps and install the vessel back in place;
- re-connect tubes back to the vessel.



**Do not** perform any maintenance, repair, cleaning, moving the machine or ancillary units (permeate tank, media filters etc), when the machine is connected to power and water supply.





**Do not** subject pressure vessel to mechanical impact (shocks, static load etc).



The manufacturer shall not be held liable for any damages incurred by the owner of the machine or any third party due to failure to adhere to the safety precautions or installation guidelines herein.

5.11 To replace post filter cartridge proceed as follows:

- remove the power from the machine;
- shut off storage tank faucet and relieve pressure;
- screw off filter bowl and remove it, taking care not to spill water on parts of the machine;
- remove spent cartridge from the bowl, place a clean one inside and screw the bowl back on.

5.12 To replace UV lamp proceed as follows:

- remove the power from the machine;
- shut off water supply and relieve pressure;
- Holding the electrical connector, carefully remove the UV lamp from the quartz sleeve.
- Holding the UV lamp unplug the power connector.
- Insert the half of the length of the new lamp to the quartz sleeve.
- Connect the power supply correctly.
- Enter the lamp into the housing until it stops and install the plastic cap.
- Restore the water supply to the disinfection system and check the leak tightness.
- Turn on the power. Make sure that the disinfection system is working properly. This is indicated by green indicator on the power supply.



Recommended service life of the UV lamp is 9000 hours (approximately 1 year of continuous operation). It is not recommended to use the UV lamp after 9000 hours of continuous operation, because it reduces the intensity of emission and does not provide high level of water disinfection.



Never turn on the UV lamp power when the lamp is out of metal chamber. This can result in damage of the eyes and, as consequence, a deterioration or loss of vision.

Replacing the UV lamp, it is also recommended to clean the quartz sleeve. Do not use abrasives, as it may reduce the permeability of the sleeve and therefore reduce the effectiveness of the water disinfection. Carefully remove the O-rings located at the ends of the quartz sleeve, avoiding the water ingress into the electrical connectors. Use the cotton gloves to prevent contamination of UV lamp surface.

5.14 Storage tank, postfilter housings and dispensing unit should be periodically disinfected to maintain system clean and safety. This procedure should be provided twice per year or as needed. Solution of sodium hypochlorite is the most appropriate for this purpose. You may use bleach or another product that contain sodium hypochlorite. To disinfect the system, proceed as follows:

- remove the power from the machine;
- shut off water supply and relieve pressure;
- remove all cartridges (pre-,post-) and reverse osmosis membrane.
- drain the water from the storage tank;
- prepare the disinfection solution: 500 ml of bleach (average hypochlorite concentration should be 70 - 100 mg /L) per 9.5 liter of permeate (in 10 L can);
- put the dosage frequency of the antiscalant dosing pump on the position 100%;
- open water supply and start to dose the disinfection solution into the system;
- using panel with volume buttons, start to pour the water until you mentioned chlorine odor.
- stop water dispensing and shut off the water supply;
- leave the system filled with hypochlorite solution for 30 - 60 minutes for effective disinfection;
- open water supply and water dispensing and rinse the system thoroughly up to complete absence of chlorine odor;
- shut off water supply, install membrane and all cartridges, and open water supply.



Disinfection of the storage tank in place can be provided only for KA250 model with 80 L tank. Disinfection and cleaning of the storage tank (200 L) for KA60 model is provide outside the machine, so previously it should be dismounted.

5.15 To be sure about machine adequate work and guaranty of water quality it is highly recommended to provide water analysis regularly. You may use your own express-test kits or provide the water samples for testing in certified laboratories. Main water parameters that should be controlled thoroughly are listed in the table 8.

Table 8 Water quality parameters

№	Parameter	Unit	Frequency of analysis	Method of analysis	Recommended value
1.	Total dissolved solids (without mineralization)	mg/L	once per week	TDS-meter, laboratory	≤50
2.	Total dissolved solids (with mineralization)	mg/L	once per week and after each preparation of the fresh mineral solution	TDS-meter, laboratory	200-500
3.	Total hardness	mg/L CaCO <sub>3</sub>	once per week and after each preparation of the fresh mineral solution	test analysis, laboratory	0 – 75 (without mineralization) 75 – 350 (with mineralization)
4.	Taste, odor, color	-	once per week and after each preparation of the fresh mineral solution	Organoleptic	Tasty, Fresh, transparent
6.	Total microbial count	CFU	once per month	laboratory	10 FU/100ml

## VENDING RO SYSTEM

### 6 Controller

All the processes in machine work are carried out by use of a controller OS-7000GR, installed on the faceplate.

Controller performs the following functions:

- control the operation of the reverse osmosis system;
- dispensing process;
- lock operation in emergency situations;
- display of warning and alarm messages;
- remote transmission of alarms and modem messages in SMS form;
- data transfer to Internet resource via GPRS with report of the sensors responses;
- amount of released bottled water,
- sum of money in bills and coins in the acceptors;
- error reports and other technical data.

To enter the service menu of controller a special card "SERVICE" is used. Put the card to card reader on the front panel of the machine. If card is OK, you will get into service menu that starts with the item

"1. Cash". The controller remembers the last used card. To enter the service mode with a new card is required GPRS connection with server where the card must be registered as a "SERVICE".

If the GPRS connection with server is absent, there is the opportunity of an emergency entrance to the Service menu. Start up controller to work for a 10 seconds and lock the "Door" (door closed). Then unlock the door contacts up to a full loading of controller.

After repeated reading the card, controller will display the service menu. Click "Start" button to adjust the relevant setting values. Corrected value is indicated with «~». To confirm the value click "Start". To cancel the action, click "Stop". Repeated pressing of "Stop" leads to the next menu level.

The structure of menu is following:

#### Controller OS-7000GR. Functions.

Item	Description	Value	Note
<b>1. Cash</b>			
1.1 All liters	Display the volume of the water dispensed by machine since it was launch	XX	Liters
1.2 Bills encashment	Display the amount of the bills gathered in the bills receptor after the last encashment. Pressing "Start" button you get the request "provide the encashment?". Press "Start" to confirm. After that data are sent to the server.	XX	Displays the amount of bills in cash value
1.3 Coins encashment	Display the amount of the coins gathered in the coins receptor after the last encashment. Pressing "Start" button you get the request "provide the encashment?". Press "Start" to confirm. After that data are sent to the server.	XX	Displays the amount of coins in cash value
1.5 Water quality (option)	Service engineer evaluates the quality of the water using TDS-meter, enters parameters to the menu and sending to the server. The statistics of the water quality can be found at the site: Apparatus- Statistics-Water quality.	Not active	Active in the presence of the built-in TDS-meter
1.6 Free water	Activation of free water dispensing mode.	On / off	
<b>2. Water</b>			
2.1 Give water	Check the dispensing. After pressing "Start" from the right side of the screen "~" symbol is appeared. Select the required volume of water using the buttons 10 L (Up) or 19 L (Down). After the pressing "Start" again, the required amount of water will be received.	XX	Selection the control volume for water dispensing (XX = 0,5 – 19L)

2.2 Counters			Factory settings.
2.2.1 0.5 L ...1, 2, 5, 6, 10 L 2.2.7 19 L	Setting of pulse quantity for water dispensing for volumes of 0.5, 1, 2, 5, 6, 10 and 19 liters. Use «Start" to set the value of pulse quantity and buttons 10 L (Up) or 19 L (Down) to change this value. After pressing "Start» record will be appeared in controller and on the website.	XX	Easier to set via on-line tool. Used if there is troubles with machine connection to server.
2.3 Prices	Setting of the price for purified water.		Easier to set via on-line tool.
2.3.1 0.5 L ...1, 2, 5, 6, 10 L 2.3.7 19 L	By turs enter the prices for 0.5, 1, 2, 5, 6, 10 and 19 L	XX	May be used if there is troubles with machine connection to server.
2.4 Prices Mineral.	Setting of the price for purified water with minerals.		Easier to set via on-line tool
2.4.1 0.5 L ...1, 2, 5, 6, 10 L 2.4.7 19 L	By turs enter the prices for 0.5, 1, 2, 5, 6, 10 and 19 L	XX	Used if there is troubles with machine connection to server.
<b>3. Hardware</b>			
3.1 Check period	Setting of the period of time between the entry solenoid valve opening to check the water presence in the water supply	0 min	Factory settings
3.3 Pump switch	Setting of the period of time between high pressure pump switching on. If 5 attempts fail SMS will be sent. It may be cause by low water pressure in water supply, not enough for pump start or there is not water in the water supply.	60 sec	Factory settings
3.4 Mineral pulse	Setting of the quantity of pulses for mineral dosing pump. Pulses corresponding to one pulse of the metering pump.	100	Factory settings
3.5 Membr. rinse	Setting of the time (in seconds) of membrane forward flush solenoid valve opening before closing the inlet water solenoid.	0	Factory settings
3.6 Devices	Manual switching on and off of all devices: inlet valve, high pressure pump, dispensing valve 1, dispensing valve 2, membrane forward flush solenoid valve, control pulse of dosing pump. Press "Start" to enter the variation mode. Press buttons 10 L (Up) or 19 L (Down) to switch the device on or off. After repeating «Start" the state is saved.		Factory settings
3.6.1 In. solen.		Off	
3.6.2 In. pump		Off	
3.6.3 Dispens. 1		Off	
3.6.4 Dispens. 2		Off	
3.6.5 Rinse val.		Off	
3.6.6 Mineral		Off	

<b>4. System</b>			
4.1 ID/FID	FID – identify number of the chain, which the machine belongs to. ID – a unique machine number.	Auto	Factory settings
4.1.1 ID/FID			
4.1.2 Version	Display the version of controller firmware	Auto	
4.2 GSM/GPRS			
4.2.1 Version	Display the version of GSM module firmware	Auto	
4.2.2 IMEI	Display the IMEI of GSM module.	Auto	
4.2.3 Sim Card	Display the name of mobile operator and APN	AUTO	
4.2.4 RSSI	Indicator of GPRS signal quality.	0-31	Appropriate if value is more than 15.
4.2.9 Reboot	Reboot of GSM module without switching off the power supply of controller.	On/off	
4.2.10 Reset ID	Automatic registration of the machine on the web recourse by IMEI	On/off	Factory settings
4.3 Sensors	Analog sensors are used		
4.3.1 State	DV1 DV2 DV3 DV4 DV5 DV6 DV7 DV8 Before the threshold value of each sensor the symbols «+» ON and «-» OFF are displayed. When entering the menu, the controller shows the state of the sensor at the current time.	-950 +60 +60 +60 +60 -950 - 950 -950	Factory settings
4.3.2 Threshold	Display the set thresholds for each sensor in the following order: DV1 DV2 DV3 DV4 DV5 DV6 DV7 DV8 Values: 10 - constantly open, 1010 - constantly closed, 50-950 - set threshold. The sensor switches from ON to OFF when the threshold will exceed 50 units, and back if the value on 50 units less than the set threshold.	650	Factory settings To change the settings use the website.
4.3.4 dv - state	The default settings of normal state of the sensors are following: DV1 - Open DV2 - Open DV3 - Open DV4 - Open DV5 - Open DV6 - Closed DV7 - Closed DV8 - Open		
4.3.4.1 dv1		Unlock	Factory settings
4.3.4.2 dv2		Unlock	
4.3.4.3 dv3		Unlock	
4.3.4.4 dv4		Unlock	
4.3.4.5 dv5		Unlock	
4.3.4.6 dv6		Lock	
4.3.4.7 dv7		Lock	
4.3.4.8 dv8		Lock	

4.8 Temperature	Temperature sensor	-	Not active
4.9 Accumulator	Accumulator of the controller	-	Not active
4.10 Bills acceptor			
4.10.1 Pulse/SIO	Display the protocol of bill receptor work. Type of protocol depends on the bills acceptor firmware and controller firmware.	pulse	Factory settings
4.10.2 SIO speed	Setting communication protocol SIO 9600 or 300.	9600	Factory settings
4.10.3 Banknotes			
4.10.4 Max. cash	Setting of the maximum bills value that may be accepted, if payment is provided by cash	XX	
4.10.5 Max. card	Setting of the maximum bills value that may be accepted if payment provided by cash and customer also used the RFID card	XX	
4.10.6 Val / pulse	Setting of the price for one pulse if the protocol of the bill receptor is "pulse".	1	Factory settings
4.11 Coins recept			
4.11.1 Protocol	Display the protocol of coins' receptor work. Type of protocol depends on the coins acceptor firmware and controller firmware.	pulse	Factory settings
4.11.2 Val / pulse	Setting of the price for one pulse if the protocol of the coins receptor is "pulse".	5	Factory settings
4.12 Fisc.Module (option)	Setting of the fiscalization unit	off	Factory settings
4.13 Device ver.	Display the machine model	5 buttons	Factory settings
4.14 Language	Choose the language of the controller (Ukrainian, Russian or English).	XX	
5. Guarde		-	Not active



## VENDING RO SYSTEM

### 7 Troubleshooting

#### 7.1 Troubleshooting

Problem	Possible cause	Corrective action
The machine is not starting after switching on	Power outage	Ensure 230 V, 50 Hz electrical power supply to the system
	Power cord is damaged	Use a multimeter to check that 230 VAC is being supplied to main circuit breaker terminals.
	Other	Contact your dealer's product support
High pressure pump is not starting after the controller has started up	System is in Standby mode	Check if permeate tank is full Check that permeate tube is not blocked or shut off with a valve
Low feed pressure fault	Insufficient pressure of water supply	Ensure adequate supply of water per requirements in Chapter 2
	The system is connected to water supply using flexible hose or small size pipe	Set up proper connection to water supply pipe. Avoid long runs of small size pipe
	Clogged pre-filter cartridge	Check the filter cartridge and replace if necessary
	Other	Contact your dealer's product support
High permeate TDS	Water temperature is higher than allowed	Test temperature of feed water and check that it conforms with requirements in chapter 2
	System is not operating with proper concentrate pressure and flow rate	Write down readings on pressure gauges and rotameters and contact your dealer's product support
	Water quality does not meet requirements	Check that the water analysis conforms with requirements in chapter 2
	Damaged brine seal or membrane adapter O-ring	Contact your dealer's product support
	Fouled or damaged membranes	Replace or chemical clean the membrane
	Other	Contact your dealer's product support
Low permeate flow rate	Water temperature is lower than allowed	Test temperature of feed water and check that it conforms with requirements in chapter 2
	System is not operating with proper concentrate pressure and flow rate	Write down readings on pressure gauges and rotameters and contact your dealer's product support
	Fouled membranes	Carry out chemical cleaning, contact your dealer's product support if membranes get fouled too often
Other		Contact your dealer's product support

## 7.2 Indication of alarm situations on the controller display and service informing via SMS

In "EMERGENCY" mode the reception of money is blocked and machine is out for use. Display shows "technical fault" and service engineer or owner should receive the report via SMS. The exit from "EMERGENCY" mode carry out by restarting the device by service engineer.

SMS	Possible Cause
Low water flow	Valve (solenoid) is open but the water flow is very low (minimum flow rate, which is set in the program)
Power failure	Option (using backup battery) In the absence of power supply 230V
No water in the storage tank	No permeate in the storage tank. Purified water pressure drop
Refuse of the bill 10 times	If bill is refused 5 times, bill receptor will be automatically rebooted. When this problem is repeated 10 <sup>th</sup> times, the acceptor will be again automatically rebooted and controller will send SMS. Possible reason is in the attempt to insert the defective or jammed note.
Bills receptor is busy	Banknote is stuck in the acceptor or it is fully stocked with bills
No minerals	The level of mineral solution in the can is low. Ability to choose the water with minerals is blocked.
No antiscalant	The level of antiscalant solution in the can is low. After sending an SMS machine can dispense 800 liters of water. Then entering solenoid valve is closing. When the storage tank become empty, on the machine display appears a notification «No water».
No inlet water supply	Trigging of the low pressure sensor within 30 seconds after entering solenoid valve opening. Re-check for the inlet water is given in Sec. 3.1 the menu "check period".
Frequent switching of the pump	5 attempts of high pressure pump to start fail during the time set in Sec. 3.3 of controller menu. Possible causes: <ul style="list-style-type: none"> <li>- low pressure of the inlet water.</li> <li>- prefilters are clogged.</li> <li>- inlet line is damaged</li> </ul>

“No inlet water supply” (if the inlet valve is closed or no water in the water supply line) - is not an alarm situation. When the water will appear again the machine will automatically switch on to the operation mode. But in the absence of inlet water the activation of the reverse osmosis is impossible and after emptying the storage tank water dispensing is impossible too. On the machine’s display will appear a notification «No water».

## VENDING RO SYSTEM

### 8 Usage instruction

The machine can fill the bottles with volume of 0.5 L - 19 L.

#### 8.1 Free water dispensing mode

In this mode, the machine does not accept bills and coins. To set the free dispensing mode, enter the service menu in the controller, choose menu 1.6 "Free water" and select "on" mode (press 'off' to switch off the free water mode).

Water dispensing is proceed as follows:

- put the bottle on the dispensing terminal
- press the button of desired volume (1, 2, 5, 6, 10, 19 l)
- the water pouring starts automatically
- press "Stop" button in order to stop the water pouring
- press "Start" button to resume water pouring

#### 8.2 Paid dispensing mode (bills, coins)

In this mode, the machine accepts bills and coins. Calculation of the water volume is carried out by the controller based on the input amount of money and in accordance with the set water cost.

Water dispensing is proceed as follows:

- put the bottle on the bottling terminal
- insert money into bill or coin acceptors
- the water volume indicators, which are available for input amount of money will be lighted out on the fixed bottling menu. Available water volume and input amount of money are additionally displayed on LCD monitor above user buttons
- to select water with minerals (if option is available), press "Minerals" button. In this case, controller recalculates the water volume according to the determined cost of water with the minerals
- press the button of desired volume (1, 2, 5, 6, 10, 19 l)
- the water pouring starts automatically
- press "Stop" button in order to stop the water pouring
- press "Start" button to resume water pouring

#### 8.3 Paid dispensing mode (bills, coins, **card**)

In addition to the cash payment (described in section 7.2), contactless payment cards can be used in paid bottling mode. The cards are programmed using the machine and edited via profile on the web-site (menu Cards → List) by the owner of the machine.

Using magnetic card customer may proceed following action:

#### 8.3.1 Deposit the card through the machine.

- hold up the card to the reader
- insert money
- press the NO/PAUSE button 2 times
- the funds will be added to the cart in the value of liters

#### 8.3.2 Cashless payment.

- hold up the card to the reader
- the available amount of liters will be shown on the display
- select the desired water volume by pressing the fixed bottling button and fill the bottle
- the water pouring starts automatically
- press “Stop” button in order to stop the water pouring
- press “Start” button to resume water pouring

#### 8.3.3 Deposit of the change to the card with cash payment.

Example. Water cost 1 Euro/Liter. Hold up the cart to the reader, insert 10 Euro, fill the 5 L bottles, the change of rest 5 L are added to the card.

## 9 Shipping precautions

- The machine must be stored indoors. Ambient air quality must meet workplace standards.
- Carry out preservative treatment of membrane elements when preparing for an extended downtime.

- The machine in its original packaging can be shipped by all types of air, sea or ground transport.

During transportation, the machine must be protected from exposure to low temperatures and jolts/vibration.

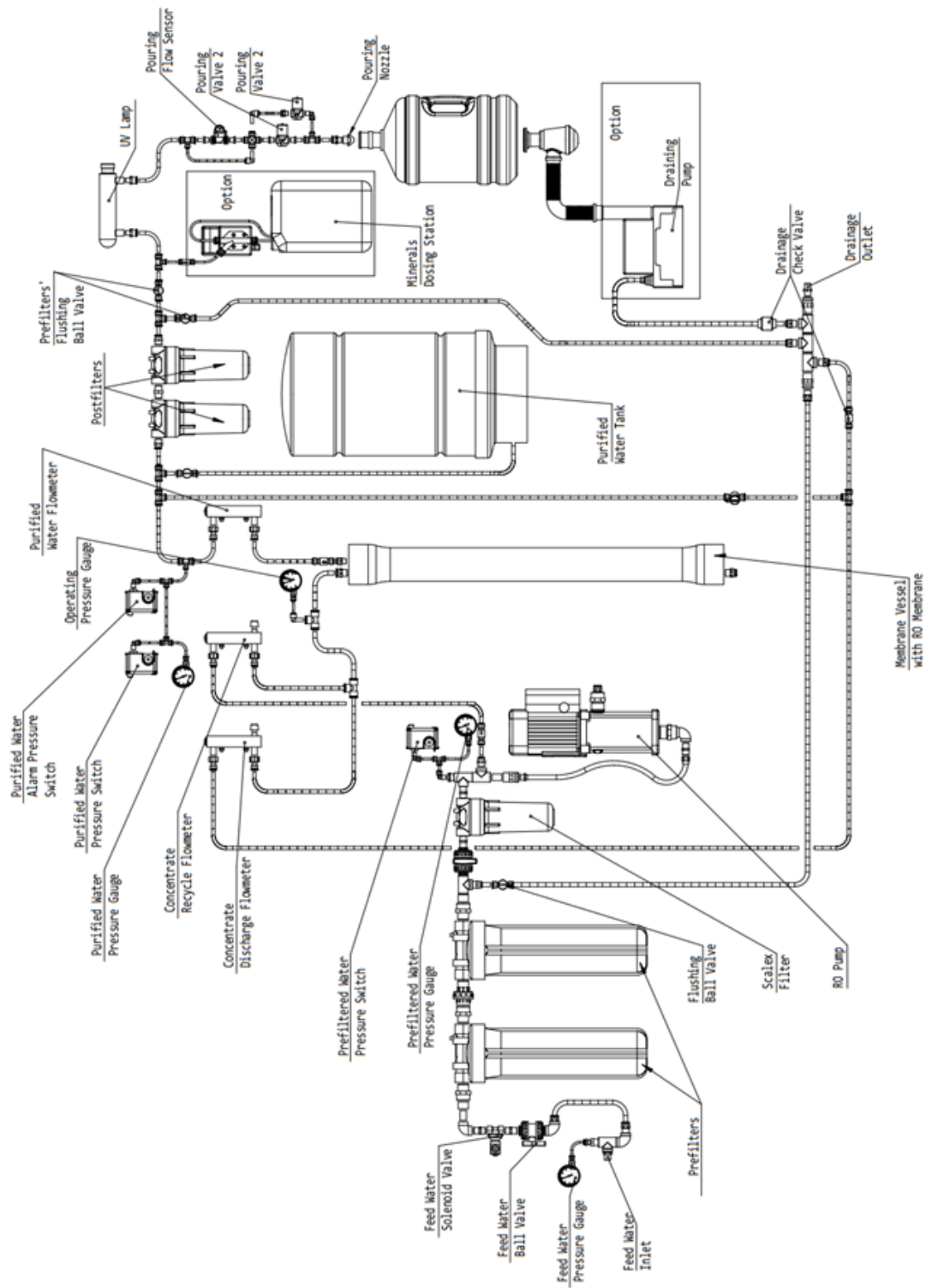
## ANNEX A

## Operation record

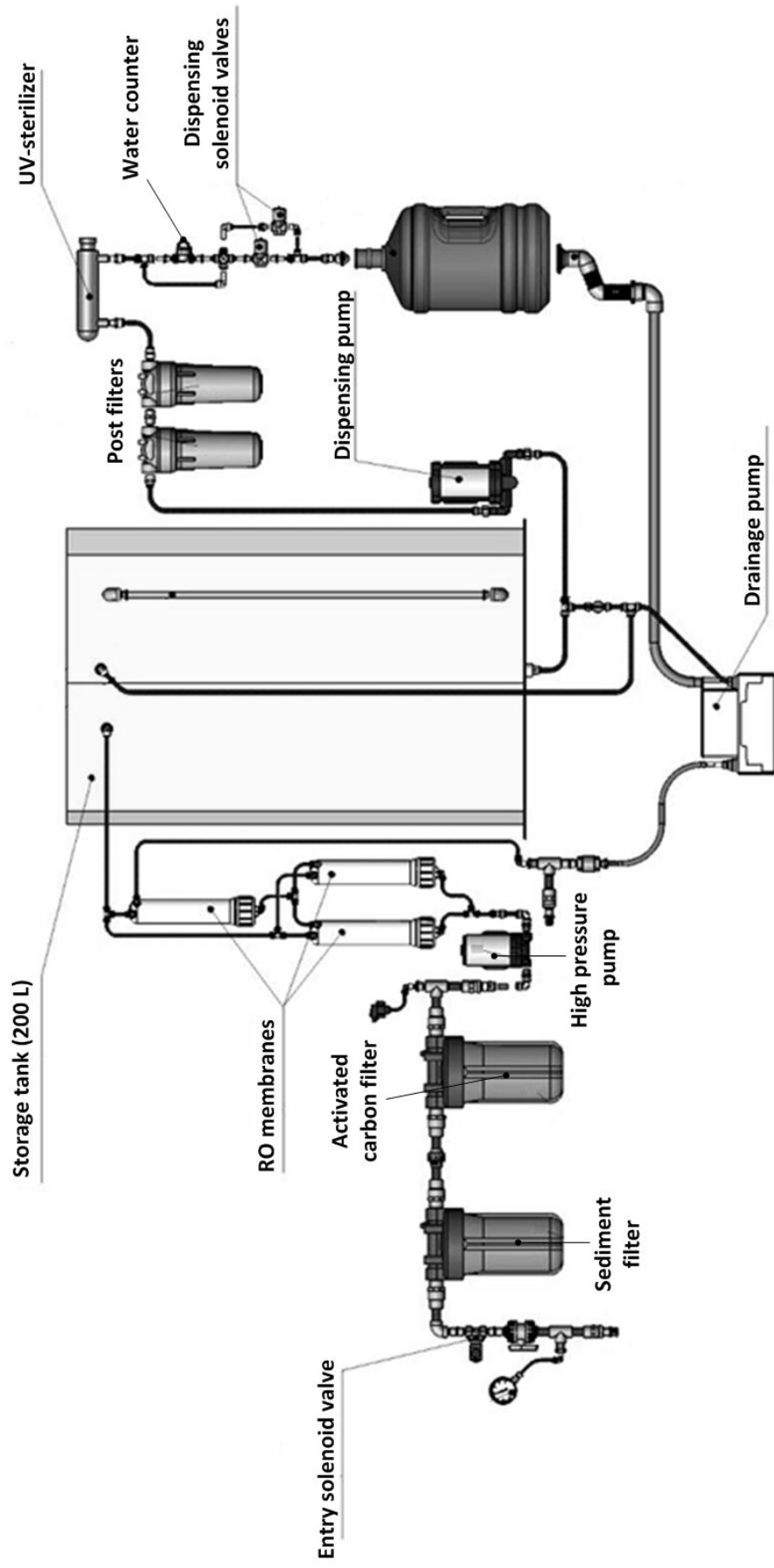
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## ANNEX B

## Layout drawings



Layout of Ecosoft KA250 RO water vending machine



Layout of Ecosoft KA60 RO water vending machine



