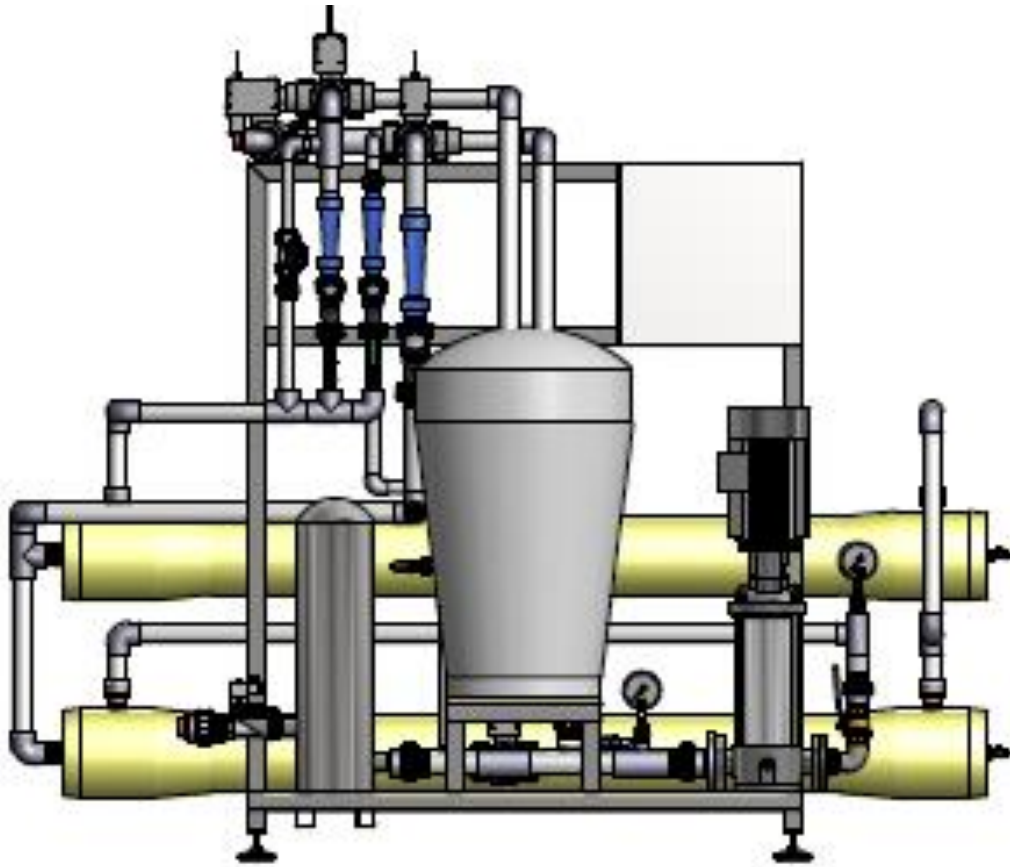


USER MANUAL FOR INDUSTRIAL REVERSE OSMOSIS SYSTEMS



Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

Types:

- BlueClear RO-3000
- BlueClear RO-4000
- BlueClear RO-5000
- BlueClear RO-6000
- BlueClear RO-8000
- BlueClear RO-10000
- BlueClear RO-12000
- BlueClear RO-15000
- BlueClear RO-20000
- BlueClear RO-25000

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

TABLE OF CONTENTS

1. Definition and function
2. Main parts
3. The way it works
4. Installation and startup
5. Operation parameters
6. Instruction about handling
7. Maintenance
8. Warranty document and Quality Certificate

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

1. DEFINITION AND FUNCTION

1.1. WHAT IS REVERSE OSMOSIS?

The technic that is based on reverse osmosis is one that is based on an phenomenon that occurs in nature.

Reverse osmosis (RO) is a membrane-technology filtration method that removes many types of large molecules and ions from solutions by applying pressure to the solution when it is on one side of a selective membrane. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side. To be "selective," this membrane should not allow large molecules or ions through the pores (holes), but should allow smaller components of the solution (such as the solvent) to pass freely.

In the normal osmosis process, the solvent naturally moves from an area of low solute concentration, through a membrane, to an area of high solute concentration. The movement of a pure solvent to equalize solute concentrations on each side of a membrane generates osmotic pressure. Applying an external pressure to reverse the natural flow of pure solvent, thus, is reverse osmosis. The process is similar to other membrane technology applications. However, there are key differences between reverse osmosis and filtration. The predominant removal mechanism in membrane filtration is straining, or size exclusion, so the process can theoretically achieve perfect exclusion of particles regardless of operational parameters such as influent pressure and concentration. Reverse osmosis, however, involves a diffusive mechanism so that separation efficiency is dependent on solute concentration, pressure, and water flux rate.

1.2. FUNCTION OF THE EQUIPMENT

The equipment is meant to produce water that has low level salt without using any chemical processes, fulfilling the user's needs.

2. MAIN PARTS

Basically, the RO equipment consists of five main parts:

1. prefilter,
2. high pressure pump,
3. modul /membrane housing + membrane/,
4. safety and control parts,
5. controlling unit.

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

2.1. Main parts of BlueClear-RO equipment

2.1.1. Filtration housing.

2.1.1.2. Sizes from BlueClear RO-3000 to BlueClear RO-6000 are made of alloy steel, with the length of 20". The filter housing is equipped with air-bleeding and a pressure gauge.

Type	:	FH2020SS
Connection	:	2"
Operating pressure	:	6 bar
Operating temperature	:	max. 93 °C

2.1.1.3. Sizes from BlueClear RO-7000 to BlueClear RO-25000 are made of alloy steel, with the length of 40". The filter housing is equipped with air-bleeding and a pressure gauge.

Type	:	FH4020SS
Connection	:	2"
Operating pressure	:	6 bar
Operating temperature	:	max. 93 °C

2.1.2. Filter cartridge. Polypropylene interline of one layer. Thanks to the high purity of polypropylene, the construction is an excellent mechanical filter and it resists to chemicals.

2.1.2.1. Sizes from BlueClear RO-3000 to BlueClear RO-6000

Type	:	FCPPS-2005
Material	:	polypropylene
Permeability	:	max. 2 m ³ /hour/piece
Operating temperature	:	min. 4 °C
	:	max. 62 °C
Sizes (D X M)	:	d101x251 mm
Nominal diameter of pore	:	0,5 micrometer

2.1.2.2. Sizes from BlueClear RO-6000 to BlueClear RO-25000

Type	:	FCPPS-4005
Material	:	polypropylene
Permeability	:	max. 4 m ³ /hour/piece
Operating temperature	:	min. 4 °C
	:	max. 62 °C
Sizes (D X M)	:	d61x1002 mm
Nominal diameter of pore	:	0,5 micrometer

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

2.1.3. Membrane housing: Fiber reinforced polyethylene pillar. The membrane will be placed here. It ensures the liquid to be led to and from, and that it is sealed enough for a safe operation.

2.1.3.1. Sizes from BlueClear RO-3000 to BlueClear RO-25000

Number of pieces	:	1 – 4 items
Diameter	:	8"
Length	:	40"-240"
Inlet water connection	:	5/4"-3"
Permate connection	:	1"-2"
Concentrate connection	:	1"-2"

2.1.3.2. Membrane. Polimaid-polysulfone thin film composit membrane.

Structure: thin film membrane, layer to lean, layer to lead water away.

Structural design: rolled on central perforated permeatum pipe.

Type	:	ULP22-8040
Number of pieces	:	1 – 24 items
Capacity to trap salt	:	min. 98%
Permeatum production	:	700 – 1200 liter/hour/membrane
pH during operation	:	3-10
Diameter of membrane	:	8"
Length of membrane	:	40"
Temperature	:	max. 35 °C
Pressure during operation	:	16 bars

The exact membrane types and item numbers for the different RO devices can be found in the manual at point 5.2 in the table.

2.1.3. Safety technical and regulating fittings

- Pressure switches

They are meant to protect high pressure pump against running dry and to make puffer tank full.

- Valves to regulate

We use them to choke the concentrate and concentrate recirculate. It is meant to circulate the concentrate back in front of the pressure increasing pump. It is also used to regulate the working point of the pressure increasing pump.

- Magnet valves

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

They are meant to protect high pressure pump against running dry, to make the puffer tank full and to wash membrane.

- Manometers

They are meant to indicate different pressures. They are filled with glycerine.

2.1.4. Electric control cabinet

Main parts:

- 1.1 Three green L1-L2-L3 lamps, which are showing the voltage
- 1.2 Control unit. See at ROC-2313 detailed operating manual
- 1.3 Selector switch of the operating mode: Local, Long-range, Automatic
- 1.4 Selector switch of the function: Factory CIP Rinse
- 1.5 Switch of CIP: 0- CIP on
- 1.6 CIP start-stop-cip pump operating lamp
- 1.7 Emergency button (DO NOT SWITCH OFF ELECTICITY)
- 1.8 Main switch
- 1.9 Control sockets of the chemical feeder pumps

3. THE WAY IT WORKS

The basis of the operation is that water to be treated is led onto the semi permeable membrane under high pressure. The molecules of the dissolvent (pure water) pass through the membrane while the dissolved salts get trapped. The two solutions get led away permanently (pure solution-permeatum, salt solution-concentrate) The purification of the water is done without chemical processes, only on physical principals. However, to ensure long life of the membrane the water needs pre-treatment. When starting the membrane it needs washing and periodical washing with chemicals (at least every six months). Pre-treatment can be different:

- acid dosage: to stabilize hardness,
- dosage of stuff obstructing crystallization: it obstructs the crystallization of CaCO_3 , CaSO_4 , BaSO_4 , SrSO_4 , CaF_2 , SiO_2 , etc.
- softening with ion-exchange: it changes all the cations into Na^+ ions, so there will be Na salts that absorb in water,- meszes előlágýtás: csökkenti a membránt károsító hatásokat,
- pre-softening with lime: it decreases the effects harming the membrane,
- malfunction of the membrane caused by Fe, Al, bacteria, oxidizing material and organic material can be decreased or eliminated by coagulation-flocculation-filtration combinations

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

Before the equipment's design and building a profound water analysis is required. With this knowledge pretreatment can be put into shape, furthermore to create the ideal membrane combination. This way continuous operating and a long life span are both achievable with the best outcome.

3.1. *Working procedures:*

during working of the application we differentiate the following stages

3.1.1. *Water production:*

In this stage inlet magnet valve is in open position. High pressure pump is in working position. Controller checks conductivity of permeatum, pressure of inlet water and water level of storage tank.

3.1.2. *Stand-by stage*

In this stage inlet magnet valve is in close position. High pressure pump is in stand-by position. Controller checks permeatum tank pressure but does not check inlet pressure and conductivity of permeatum. As pressure level reaches minimum controller starts water production automatically.

3.1.3. *Rinsing / washing stage*

In this stage inlet magnet valve is in open position. High pressure pump is in working position. Controller does not check pressure level in tank. Concentrate magnet valve is in open position.

3.1.4. *Out-of-order stage (closed main switch)*

In this stage inlet magnet valve is in close position. High pressure pump does not work.

4. **INSTALLATION AND STARTUP**

4.1. **INSTALLATION OF THE EQUIPMENT**

There is not any special requirement for the site where applicaton is installed. Installation has to be made on flat surface with concrete cover.

4.2. **Climate circumstances**

Application has to be installed in a place with temperature in range of +5°C and +40°C. Treated inlet water temperature must not exceed +40°C-ot. Is is prohibited to install application in dusted or high vapoured place. It has to be protected from freeze, heat, UV stream. After installation application has to be connected to earlier built connection points.

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

4.3 THE PROCESS OF THE EQUIPMENT'S INSTALLING

For the installation of the equipment the only people who are entitled to do are the manufacturer's experts. If the first installation after the equipment's installation was not done by the manufacturer's experts, the warranty will be lost.

- 4.3.1. Filter cartridges have to be washed with heavy water flow before placing into the filter housing.
- 4.3.2. Membranes have to be placed into membrane housing in line with water flow direction. Please place outer diameter stay at output section of 8" membrane housing and place possibly necessary leak lamination at input section of 8" membrane housing.
- 4.3.3. Please check electric connections. **Please check spinning direction of the engine.**
- 4.3.4. Please use settings of RO controller according to the detailed manual.
- 4.3.5. Please make pressure probe with network water pressure. Beforehand, please check the appropriate position of the ball-ends. In order to fully fill the equipment with water, first use air-expulsion on the system. Steps: Open the raw water side's main throttle-valve, turn the mode selector switch to Automatic state and the function selector switch to CIP state. Turn on the main switch and turn the function selection switch to rinse state (magnetic valves will open). Hold this operation state until bubble-free water will not flow on the concentrator rotameter. Then the equipment is air-expulsed. Set the ball ends to CLOSED state on the RO outlet side, and set the input side's (raw water) ball-ends to OPEN state. Then the equipment is under pressure. If there is no leak, then the pressure probe was successfully executed. Open the output's ball-ends and set the control switches to default state (under the 4.3.6 point).
- 4.3.6. After successful pressure probe, please set closing valves of the RO equipment according to start position. Please set pressure side switch of high pressure pump to 50% position. Please OPEN ball-ends of concentrate and permeate. Permeate section has to have free output flow. In case RO equipment has CIP option, ball-ends of CIP have to be set into CLOSE state. Please OPEN raw water ball-ends.
- 4.3.7. Please check raw water pressure. Raw water pressure after 0.5 micron cartridge has to be minimum 3 bar (during operation also min 1.5 bar).
- 4.3.8. Please set pressure switch to a value between 1.5 and 3.
- 4.3.9. **Starting of RO:** After turning the main switch choose the local operation mode. The equipment will start according to how it got programmed. With setting the the operating mode selector switch to long-distance control state it will stop according to the program.
- 4.3.10. Please set 50% permeate and 50% concentrate with the help of concentrate controller and pump controller.
- 4.3.11. In case permeate rate of RO equipment exceeds 50%, please reach target permeate rate over 50% in 2-3 steps. Please keep 10-15 minutes time between each step, so that RO equipment can reach balance position.
- 4.3.12. In case of recirculation the permeate's and the concentrate's ratio is 70% - 30%. During adjustment, continuously check the concentrate's and permeate's ratio. With the help of concentrate's regulator, pump regulator and recirculation regulator valves, try to achieve a pressure level, which equals the membrane's value depending on the given water's parameters.
- 4.3.13. After setting the final permeate rate and pressure position, please check the output water conductivity. **It is important** that membranes may require more hours for reaching required conductivity level.
- 4.3.14. Please check if the permeate container's level switch starts and stops the RO equipment properly.
- 4.3.15. Please check if the automatic washing of membranes is working properly during starting and stopping. In case of continuous membrane operation, please set membrane washing to max. 8 hours (can be set at the RO controller).
- 4.3.16. Set the operation mode selector switch according to the desired operation mode.
- 4.3.17. At the end of the set-up, stop the equipment, turn off the main switch, turn the raw water's ball pivot off. Train the staff for the equipment's operation and only start when they have enough knowledge about it.
- 4.3.18. Please pay extra attention to the staff, who are operating the RO equipment. They always must be up to date with their knowledge. Also, pay attention for the operating log's appropriate writing.
- 4.3.19. Please read the guide carefully and follow the instructions precisely.

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

IMPORTANT!

During the set-up's beginning decrease the capacity (yield) to 50%, and slowly increase it with 3-5% in steps until reaching the max. value. Between every step take a 12-15 minute long break to let the equipment balance itself out. Only make a change after the break.

THE EQUIPMENT'S OPERATION

After setting up the equipment, open the raw water side's main throttle-valve and check the incoming water's pressure on the RO-equipment's prefilter's (0.5 micrometer) manometer. This has to be min. 3, max. 6 bar. Check if the equipment's network of pipes and fittings are leakproof or not. On the equipment the operation mode can be set to local, long-distance or automatic state. In local state the equipment will immediately start according to the default program. In long-distance state the equipment's automatic operation can be allowed or denied on a remote switch. After allowing, the treated water's tank level controller will control the equipment. It will start in automatic mode, when the treated water tank's level controller will request water. The outer signal's will be wired into the control unit. The wiring's data can be found under the 8th point.

The equipment's valves are tuned by the manufacturer's experts when it is being set-up with the optimal values. Changing the valves's settings can lead into errors and even losing warranty.

ATTENTION!

Exceeding the prescribed values, like the quantity of the permeatum, the pressure or the capacity (yield) are not allowed, and can lead into membrane errors. It can also lead into losing warranty.

5. OPERATION PARAMETERS

5.1. PARAMETERS OF TREATED WATER

Free Chlorine	:	max. 0,1 ppm
Fe and Mn together	:	max. 0,1 ppm
SDI (silt density index)	:	max. 3
Turbidity	:	max. 0,5 NTU
Hardness	:	max. 0,5 nk°
Temperature	:	between +5°C and +40°C
pH range	:	between 3-10

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

5.2. THE RO EQUIPMENT'S MAIN TECHNICAL PARAMETERS:

Part number	Flow	Connection	Electric data
	25-10 °C		
BlueClear-RO-3000	3540-2610 L/h	Inlet—5/4"	5.8 kW
		Outlet—1"	3x400V
		Drain—1"	11.8A
BlueClear-RO-4000	4720-3480 L/h	Inlet—6/4"	5.8 kW
		Outlet—5/4"	3x400V
		Drain—5/4"	11.8A
BlueClear-RO-5000	5900-4350 L/h	Inlet—6/4"	5.8 kW
		Outlet—5/4"	3x400V
		Drain—5/4"	11.8A
BlueClear-RO-6000	7080-5220 L/h	Inlet—6/4"	5.8 kW
		Outlet—5/4"	3x400V
		Drain—5/4"	11.8A
BlueClear-RO-8000	9440-6960 L/h	Inlet—2"	7.5 kW
		Outlet—6/4"	3x400V
		Drain—6/4"	15.2A
BlueClear-RO-10000	11800-8700 L/h	Inlet—2"	7.5 kW
		Outlet—6/4"	3x400V
		Drain—6/4"	15.2A
BlueClear-RO-12000	14160-10440 L/h	Inlet—2"	11 kW
		Outlet—6/4"	3x400V
		Drain—6/4"	21.5A
BlueClear-RO-15000	17700-13050 L/h	Inlet—2 1/2"	11 kW
		Outlet—6/4"	3x400V
		Drain—6/4"	21.5A
BlueClear-RO-20000	23600-17400 L/h	Inlet—2 1/2"	15kW
		Outlet—2"	3x400V
		Drain—2"	28.7A
BlueClear-RO-25000	29500-21750 L/h	Inlet—3"	15 kW
		Outlet—2"	3x400V
		Drain—2"	28.7A

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

6. INSTRUCTION ABOUT HANDLING

The equipment works automatically without requiring any continuous handling or supervising. It is recommended only to check periodically main parameters. Operating log of the application has to be filled in every shift and has to be sent to the manufacturer monthly. It is important that filter cartidge of prefilter has to be changed in case of 0,5 bar pressure drop. Changing of filter cartidge has to be registered in the operating log.

ATTENTION!

If the operating log is not updated continuously, the warranty will be lost.

7. MAINTENANCE

The equipment requires regular maintenance after 1000 working hours. In case of breakdown please contact professionals of distributor or manufacturer who ensure professional replacement of original components. Reverse osmosis membranes have to get chemical cleaning after 1000 working hours. Chemical cleaning can be executed only by the experts of the manufacturer.

7.1 CHEMICAL CLEANING (CIP)

On picture 1.1, the BlueClear-RO-3000-CIP's water way can be seen. Based on the picture's numbering:

Load the RO water to the CIP tank and then mix in the cleaning chemical.

On the control box, set the operating mode selector switch to external signal state and the function selector switch to CIP state.

Close the 1-25-27 ball ends.

Open the 24-26-30-33 ball ends. Make sure that the CIP pump is air-bleeded.

Start the CIP pump with the CIP start button.

With the end of chemical cleaning, empty the CIP tank with opening the 29 tap.

Close the 24-27-30-33 ball ends and then open the 23-27-1 ball ends.

On the control box, set the CIP switch to 0 state and the function switch to rinse state. Wash the rest of the chemicals out of the equipment.

After rinsing, open the 25 ball end and close the 23 ball end.

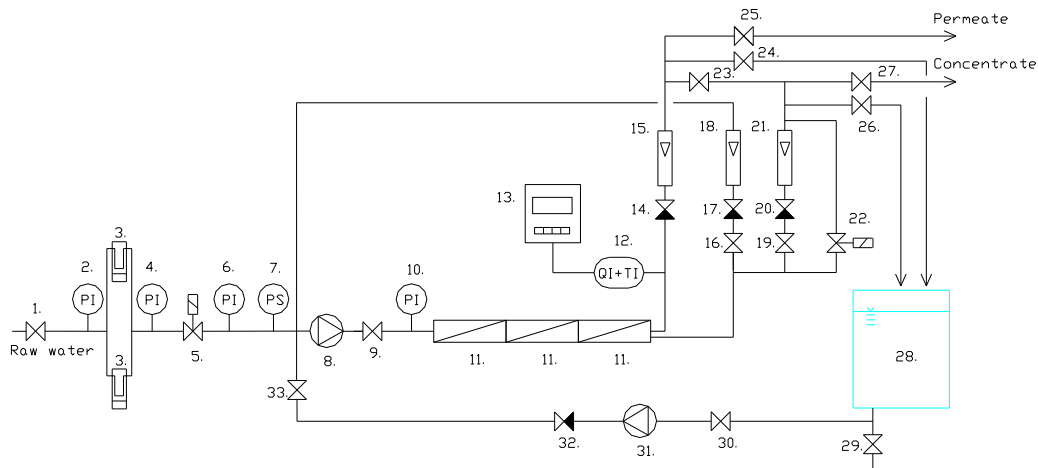
Set the function selector switch to operation state and the operating mode selector switch to automatic state.

AFTER CHEMICAL CLEANING THE RO EQUIPMENT NEEDS TO BE RE-REGULARIZED!

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

1.1. Flow sheets: BlueClear RO-3000-CIP:



1. Inlet ball-end
2. Pressure gauge
3. Mechanical filter 5micron
4. Pressure gauge
5. Solenoid valve
6. Pressure gauge
7. „Pressure mushroom”
8. High pressure Grundos pump
9. Ball-end
10. Pressure gauge
11. Membrane modul and membrane
12. Conductivity and temperature sensor
13. Controll system with main switch
14. Non-return valve
15. Permeatum flow meter
16. Concentrate regulation valve
17. Non-return valve
18. Concentrate by-pass flow meter
19. Concentrate regulation valve
20. Non-return valve
21. Concentrate flow meter
22. Magnetic valve for washing
23. Ball-end for CIP washing
24. Ball-end for CIP's process
25. Permeatum ball-end
26. Ball-end for CIP's process
27. Concentrate ball-end
28. CIP tank
29. Ball-end for emptying CIP's tank
30. Ball-end for CIP's process
31. Grundos CIP pump
32. Non-return valve
33. Ball-end for CIP's process

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

INSTALLATION DATA SHEET

Name of the expert who will do the installation:

Contacts of the expert who will do the installation:

- Phone number:
- E-mail adress:
- Distributor company's name:
- Mail adress:
- Phone number:
- E-mail adress:

Name of the equipment's operator:

- Phone number:
- E-mail adress:

Installed equipment's type: BC-RO

Serial number:

Date of the installation:

.....
signature, stamp

The warranty and the warrantee are only valid if the installation was done by Euro-Clear Kft or one of it's accredited expert. The equipment's installation can be ordered from the following contacts:

Euro-Clear Ltd.
9071 Gönyű, Béke u. 2.
Tel: +3696/544-240
contact@euro-clear.eu

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

Installation data sheet

- Yes
1. Please make sure that on the equipment the mechanic and electronic wiring are as the following:
 - 1.1. Is the raw water's pressure appropriate? (2,5 – 6 bar)
 - 1.2. Are the equipment's mechanic connection appropriate?
 - 1.3. Is the electrical connection appropriate? (400V, 50HZ)
 - 1.4. Is the wiring of the grounding wire (EPH) appropriate?
 - 2.1 Program the ROC controller
 - 2.2. Check the tank's level switches appropriate working
 - 2.3. Check the pressure after the filter during operation
 - 2.4. Value of conductivity μ s
 - 2.5. Pressure of membranebar
 - 2.6. Quantity of permeatumL/h
 - 2.7. Quantity of concentrateL/h
 - 2.7. Quantity of recirculationL/h
 4. Operator staff's training
 5. Filling the warranty
 6. Sending back the filled installing data sheet, with signature (condition of the warranty) to the following adress:

Euro-Clear Ltd.
9071 Gönyű, Béke u. 2.
Tel: +3696/544-240
contact@euro-clear.eu

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

WARRANTY DOCUMENT

In case the device is properly used, the producer undertakes a warranty of **12 months** starting from the setting up, but maximum **18 months** starting from the date of issuing the quality certificate.

DATE OF SETTING UP:

.....

.....
signature, stamp

The warranty and guarantee are only valid in case the setting up has been completed by Euro-Clear Ltd. or its agent. You can order the setting up of the device at the details mentioned below.

Please send us back the warranty document, setting up data sheet completely filled. In other case the warranty is not valid.

Please keep the warranty document, setting up data sheet and quality certificate for administration purposes in the future.

In case of a breakdown or fault, please inform us in written at the e-mail address contact@euro-clear.eu about the problem that has occurred.

Defects, damage and problems caused by improper transport and storage of the product are not covered by the warranty.

Euro-Clear Ltd.

water treatment equipment manufacturer and wholesale distributor

QUALITY CERTIFICATE

1. Issuer of the quality certificate: Euro-Clear Ltd.		2. Producer: Euro-Clear Ltd.	
3. Punctual name of product (its function): Automatic reverse osmosis device. Type: BlueClear.....			
4. Quantity 1	5. Weight and (or) size:	6. Date of production:	
7. Can be used		8. Identifying product a./ Control valve number: b./ ITJ-number: c./ Part number: d./ Other identifying details:	
9. Delivery and storage regulations: Transportation and storage must be done in standing position. Store in a dry, cool place, away from water and precipitation. Do not expose to direct sunlight or UV radiation. Extremely frost-hazardous.		10. Wrapping: Cardboard.	
11. Important features of the product (with punctual technical data, results of measurement): Feed water volume:litre/hour Feed water pressure:bar Permeate volume:litre/hour Quality and classifying: Convenient!			
14. Other details: Serial number:		12. Method of inspection for checking the quality of the product: During production	
		13. Regulation for use and handling: As it is mentioned in the guide for use and handling	
		15. Signature of the person issuing the quality certificate: Date: Gönyü, 20..... signature, stamp	