BETA

REVERSE OSMOSIS SYSTEM

BETA 250 - 500

USER MANUAL

IMPORTANT SAFETY AND ENVIRONMENTAL INSTRUCTIONS & CONSUMER RIGHTS

HUMAN and ENVIRONMENTAL HEALTH

• Check the device regularly for water leaks.

• Filter changes should be made using gloves, put dirty filters in a garbage bag and put them in the garbage bin after binding the bags close.

• For your health and water quality, the filters should be replaced within the times specified in this manual.

• Since the membrane filter in the device has the ability to filter microorganisms, do not interfere with the membrane filters you have changed with cutting tools and do not open them.

2. The rights of free repair or replacement of the materials with ones free of defect can also be used against the manufacturer or importer. The seller, manufacturer and importer are severally responsible for the fulfillment of the rights in this paragraph.

3. In the event that free repair or replacement of the materials with ones free of defect will bring disproportionate difficulties for the seller, the consumer may use one of the rights of withdrawal from the contract or offer discount from the price at the rate of defect. In the determination of the rate of defect, matters such as the non-fault value of the goods, the importance of the defect and whether applying for other optional rights will be a problem for the consumer are taken into consideration.

CONSUMER COMPLAINT and OBJECTION APPLICATIONS

• Consumers may apply to the Ministry of Customs and Trade, General Directorate of Consumer Protection and Market Surveillance, unless a warranty certificate is issued by the seller.

• The consumer may apply to the consumer arbitration committee or consumer court where the place of residence is located in case of disputes that may arise in relation to the exercise of its rights arising from the warranty.

CONSUMER SELECTIVITY RIGHTS

1. If it is understood that the goods are defective, the consumer shall be entitled to;

• Withdraw from the contract by declaring that the consumer is ready to return the sold,

• Detain the sold and to request a discount from the sales price at the rate of defects,

• Request the free repair of the sold at the seller's expense if it does not require an excessive cost,

• If it is possible, requesting the replacement of the sold with one free of defects may exercise one of its optional rights. The seller is obliged to fulfill this request preferred by the consumer.

ISSUES TO BE CONSIDERED DURING HANDLING AND TRANSPORTATION

First of all, follow the occupational safety rules.

• Drain the water in the storage tank during handling or transportation.

• Turn off the water line to the storage tank and carefully unplug the electrical plug if your device has pump.

• Carefully remove the purifier from its location.

• Do not leave your device hanging on a high place.

• Make sure that the parts of your device are kept in the same place without separating them.

• Keep your device in a dry and closed place.

• Be careful not to drop the product during a displacement, not to shake it, and not to damage it from impact, heat, moisture and dust. Do not expose to the sun.

• You can get support from our authorized services to avoid unexpected damage during transportation and transportation.

1 SAFETY, WARNINGS, FIRST AID AND OPERATION CONDITIONS

1.1 SAFETY

While this device is running, some parts of the device will have electricity. Failure to know the operating procedure of the device may result in property damage, injury or even death. Work on the device should only be carried out by trained and/or knowledgeable persons. Repair and maintenance of the device must only be carried out by qualified technical personnel.

The owner or user of the system/device is obliged to comply with all applicable laws in order to ensure a safe working environment. In order to protect the plant, it is necessary to pay attention to the following important points:

This manual must be read and understood in order to be able to use or service the device beforehand. This manual must be stored for future use. At the end of each section, there is a note sheet for important information that the operators can show.

The system should only be used for water treatment purposes.

The system must be operated at the flow rates specified in the operation and maintenance manuals. Pay attention to the feed water quality for system performance. The operating temperature is in the range of 5-40 °C and the system should not be operated at temperatures outside this range.

The inlet-outlet valves of the system must never be closed while the system is in operation. Maximum working pressure values must not be exceeded. Set values of low pressure switch and high pressure switch in the system should not be changed. The valve in the system drainage line must never be closed.

It is very important that the system is not operated with chlorine-containing water. Materials such as membranes, resins are not resistant to chlorine or any oxidizing substances.

Attention should be paid to condensation that may be caused by temperature changes. The system must be protected against the risk of freezing.

During the fire extinguishing process, water should not be thrown into the panel, main energy should be cut off and dry powder fire extinguisher should be used. Use suitable fire extinguishers for chemical areas and control panels.

Do not remove the caution label on the device under any circumstances. When warning or other identifying labels are removed from the device, the device is not covered by the warranty.

Operation or maintenance work other than those specified in the operating manual must not be carried out.

Any line or equipment with unknown or pressurized pressure should not be removed without bleeding the air.

The MSDSs of chemicals must be read carefully. The use of chemicals can be extremely dangerous. For this reason, it is necessary to be very careful in the follow-up of the measures taken to prevent damage to the personnel. It is the responsibility of the customer to ensure that personnel are properly trained in the use of chemicals.

The panel cover should not be opened while the panel is energized. High voltage may be exposed.

Earthing connections have to be made in accordance with international standards. Do not remove the grounding cable under any circumstances. Do not use an extension cord in the device connection.

The power must be cut off before working inside the panel. It should be verified that there is no energy with a suitable control equipment.

Precautions should be taken against issues related to phase change or voltage drop.

The electrical line to supply the system must be earthed.

Equipment and instruments should not be intervened until the electrical connection is disconnected.

1.2 FIRST AID

All employees should be provided with clear information on first aid available in the workplace, including the location of first aid kits, the names and locations of first aiders, the first aid room and the place of procedures.

The following chemicals may be used together with this device.

-Sodium hypochlorite, Sodium chloride, SMBS, acid (HCL, H2SO4, etc.), caustic, antiscalant, iron III chloride, and corrosion inhibitor.

Since these chemicals have a corrosive effect, the points to be considered are given below.

In case of eye contact, the eye area should be washed with plenty of water for at least 15 minutes.

It is necessary to know where and how the first aid is immediately applicable. First aid application should be started immediately.

If the vapour of the chemical is inhaled, the patient should be taken to fresh air immediately. In case the patient stops breathing, artificial respiration should be applied.

All clothes contaminated with chemicals must be removed. The affected areas of the patient's body should be washed with plenty of water for at least 15 minutes.

In case of burning, oil or ointment should be applied to the burnt areas. If there is a flame burn and synthetic clothing is stuck to the skin, it should not be removed.

If the chemical is ingested and the patient is conscious, the patient's mouth should be flushed with plenty of water. It has to be ensured that the patient's tongue is in the forward position and the regularity of breathing has to be checked. The patient should not be attempted to vomit. If the patient is unconscious, nothing should be given orally.

In case of electric shock, the electric current should be disconnected from the switch or the contact of the casualty with the bare cable should be disconnected with a non-conductive object. In the accident environment, first aid should be provided immediately, if the victim has loss of consciousness, burns or fractures due to falling, it should be transported without standing up.

1.3 OPERATIONAL CONDITIONS

Prior to installation of the system, it is necessary to create a suitable environment for the smooth operation of the system and equipment.

MAIN POWER SUPPLY:

The system operates with 220 - 240 VAC 1 phase energy supply.

Power outages, power outages can create adverse conditions for equipment operation and operation. This information should be recorded and reported to the manufacturer.

PRODUCT WATER:

Must have a reliable water source for the water treatment system. The characteristics of the raw water may vary seasonally, which affects the product water quality and system performance. The pressure of the water supplying the system must be minimum 3 bar.

DRAINAGE WATER:

Drainage water outlet is a requirement of the system. As long as the system is in operation, the ducts and pipes where the drainage water (waste water) will be easily discharged should be open and ideally sized.

TEMPERATURE:

The performance and efficiency of the system depends on the raw water temperature. The ideal design temperature of the system is 20-25 degrees. If the feed water temperature drops below the minimum temperature, the system product flow for each degree will decrease accordingly.

WARNING:

Since high raw water temperature will damage materials such as membrane and resin, this value should be recorded with the help of a temperature transmitter.

CAUTION

Due to the damages that may occur to materials such as membrane, resin and the system, materials such as membrane, resin inside the system should be protected against freezing.

2 TECHNICAL INFORMATION

2.1 REVERSE OSMOSIS SYSTEM

The application of the reverse osmosis process to solve water treatment problems requires a full understanding of a number of issues such as the basic principles of the process, RO design criteria and pre-treatment requirement.

The basis of the RO process is the semi-permeable membrane, which allows the passage of water while simultaneously limiting the passage of dissolved ionic substances. By applying pressure to impure water on one side of such a membrane; pure water is passed to the other side of the membrane and leaves behind most of the substances in its body. The separation of dissolved ionic substances from water by the membrane is a function of the molecular weight and ion charge of the ion. For example, in an RO system an average removal of sodium chloride of 90% is expected, meaning that the concentration in the product water passing through the membrane is about one-tenth that of the raw water supplied to the membrane. While the removal of calcium carbonate (hardness) is approximately 95%, the removal efficiency of many metallic salts is around 98-99%.

In order to remove the materials held by the membrane from the membrane surface, the feed side is rinsed intermittently with a water flow increased by 2 to 5 times the product water flow rate (flushing). This process has an effect that prevents the membrane surface from clogging and crusting. The rinsing process can be automatic or can be done with manual washing apparatus.

In RO systems, it is important that the flow value of the water is maintained at the same level throughout the membrane. Water entering the module with high pressure passes through the membrane, leaving a large part of the dissolved substances in it on the membrane surface. This layer formed on the surface of the membrane is called the "boundary layer". The TDS concentration of this layer increases in the direction in which the water comes out of the module. In this case, since the deionization efficiency of the membranes is constant, the TDS concentration of the product water coming out of the parts close to the outlet point will be much higher than that of the parts close to the inlet. (Example: In a system operating with 5% deionization efficiency, if the TDS concentration of the water in contact with the membrane is 500 ppm, the concentration of the product water passing through the membrane at that point will be around 25 ppm. However, at a different point of the membrane, the TDS concentration of the water in contact with the membrane may be 1000 ppm. In this case, the concentration of product water passing through the membrane will be 50 ppm.) In order to prevent this situation, which negatively affects the deionization efficiency of the system, a flow movement is designed to ensure that the "boundary layer" is homogeneous throughout the membrane.

As explained before, if the concentration of the water fed to the system decreases, the product water quality to be obtained will be better.

When the RO system is shut down, the product tends to increase the concentration of dissolved matter on the water side to the same level as in the raw water, as the raw water being fed is in a “ standby ” position around the membrane. As a result, the first sample of product water taken after the system is reactivated will have a higher concentration than normal, but this will return to normal after the system has been in operation for a while.

The quality of pure water produced by the RO system is roughly a constant percentage of raw water quality. For example, if the raw water TDS value is 1000 pmm, the purified water TDS value will be around 40-100 ppm (removal of dissolved substances by 90%). However, if the raw water TDS is at the level of 500 ppm, the purified water TDS will be around 25-50 ppm.

In case of need and need;
With antiscalant dosage, the precipitation limits of silica, carbonate, bicarbonate and metalloxides that may cause obstruction of RO membranes are increased, thus ensuring that ions are discharged to the drain without precipitation on the membrane surface. Antiscalant dosage is a factor that directly affects membrane performance. In this way, longer life of the membranes is ensured.

NOTES

- Excessive pressure deforms or shrinks the membrane. Shrinkage reduces the permeability of the membrane and thus the amount of product water. The maximum working pressure of reverse osmosis devices is 15-16 bar.
- Hydrolysis is the negative effect of some chemicals present in raw water on the membrane. In general, this is the case if the raw water temperature is high and the pH value is <2.5 or >7. The pH value for optimum membrane life should be between 5 and 6.
- Temperatures above 35°(Max. 40° C) cause deterioration in the physical structure of the membrane and accelerate the effects of hydrolysis and shrinkage.
- The design and operating temperature of the reverse osmosis devices is 20° C, the minimum operating temperature is 10 ° C and the maximum operating temperature is 40° C. If the operating temperature changes, the product water values will vary.

Frequently used terms related to RO

- **Feed water:** Water supplied to RO membrane modules.
- **Product water:** Purified water produced by RO membranes.
- **Reject water:** Water that cannot pass through the membranes and is thrown directly into the drain.
- **Membrane:** A semi-permeable cylindrical filter called as a " membrane element " separate from the pressure-resistant membrane sheath. The membrane divides the entering water flow into two currents. In other words, some of the raw water fed to the membrane forms the product water (pure water) and the remaining part forms the waste water (drainage) flow.
- **Module:** Complete name given to one or more membranes placed inside with pressure-resistant membrane sheath.
- **Water flux:** Water flow rate through the unit membrane surface area (m3/m2-h or gallon/ft2 day). The water passage rate is directly proportional to the net pressure difference between the osmotic equilibrium pressure and the supply pressure. As the pressure applied in addition to the osmotic equilibrium pressure increases, the water flow rate through the unit area increases.
- **TDS (Total dissolved solids):** The sum of the substances in the form of ions dissolved in water. Total Dissolved Solid Matter (TCM) is expressed in mg/l or ppm. The high TDS value in raw water means that the osmotic equilibrium pressure is also high. At the same time, as TDS rises in raw water, the amount of ion passing through the membrane to the pure water side increases.
- **PPM (Parts per million):** It means “one in a million by weight”. RO is the expression of the TDS value of the product water and is the main criterion in measuring the product water quality. Equivalent to mg/lt for water.
- **System efficiency (Percent recovery):** It is the amount of water produced as distilled water by RO membranes. For example, if 70 m3 of distilled water is obtained by feeding 100 m3 of raw water to the membranes and 30 m3 of water is discharged as waste water, the efficiency percentage is 70%. Factors limiting the percentage of yield are osmotic equilibrium pressure, product water quality, solubility values of soluble salts and the design of the system.
- **Ion removal efficiency (Percent rejection):** Quantity or percentage of salts separated from raw water by RO membranes.

2.2 USE OF ELECTRICAL PANEL

BETA RO BOARD

In-Panel Materials;

- On-Off Button
- Power supply
- Fuse
- Motor protection switch
- Contactor
- Time relay
- Relay assembly
- Conductivity analyzer

Phase-neutral-ground cable connections are made to the power cable inputs in the panel. The main fuse and motor protection switch are turned to the on position. On-Off button on the panel is turned to "ON" position. The RO device is automatically activated.

3 ASSEMBLY, TRANSPORTING AND PLACING MEMBRANE

3.1 HANDLING

Loading and transportation and unloading of reverse osmosis devices should be done with one person or two people in small models by hand, pallet trucks in large models, forklifts and, if necessary, cranes.

3.2 PLACING THE MEMBRANE

The vertical and horizontal membrane modules of reverse osmosis devices can be placed in membrane sheaths with one or two people. The parts required for the placement of membranes in the membrane sheath consist of membrane module, intermediate adapter, cover adapters.

First, the instruction prepared by the manufacturer of the membrane sheaths on how to open and close the membrane sheath covers must be read carefully. Lubricate seals with glycerin (purity > 97%glycerin) and place on top of covers. Prevent damage to the membranes at all times. Slightly push the adapters into the clean water pipe at the center of the membrane modules. Make sure that the gaskets do not slip. Remove the covers of the membrane sheath.

To load membrane into the single-element membrane sheath, the sheath cover is opened precisely. The membrane is placed in the sheath in the step direction.

In systems with two elements or more membranes, push the membrane module (with the cover on the adapter) halfway into the membrane sheaths. The intermediate adaptor should be mounted on the next membrane and the membrane should be pushed slightly so that the adaptor enters the clean water pipe at the center of the first membrane. Make sure that the gaskets do not slip. Push the second membrane halfway into the sheath. Repeat this process until the membrane is last placed inside the sheath. Do not pull on the inserted membranes, the intermediate adapter seals may move. If it is absolutely necessary to remove the membranes, you should push them from the other side of the membrane sheath. Ensure that the serial numbers of the membranes inside their sheaths are on the same side.

3.3 ASSEMBLY

The area and working environment in which the RO device can be placed before installation must meet the following conditions.

* - RO device is designed to be used indoors. It must not be placed and operated in an open area.
* - The environment in which the device will be placed must comply with the temperature, humidity, condensation, frost and similar conditions related to the working environment given in the warnings in the operation and maintenance manual.

* - The installation of the system has to be completed mechanically and electrically. After the mechanical installation is completed, electrical installation is made and tests are applied. As a result of the tests, the installation is completed and checks are made before commissioning.

* Installation works can be carried out after the system elements and equipment are lowered to the site and placed in place. RO device is shipped to the site with the equipment on the chassis installed. Piping of device supply, product and drainage lines out of chassis is performed on site.
* Loading of RO membrane / membranes, installation of additional equipment, if any, on the chassis, device feeding, installation of product and drainage lines should be carried out by authorized personnel on site.
* All piping and fittings to be used in the installation must be undamaged and suitable.
* The installation place and bases must be prepared before starting the installation.
* If there is equipment, installation is started by placing it on its bases.
* All stainless steel, carbon steel, polyethylene and PVC materials to be used must be welded appropriately.
* Appropriate ambient conditions have to be provided for the welding process to be performed and appropriate electrode and method have to be selected.
* All PPRC/PE/PVC pipes to be used must be fixed to ensure proper placement.
* After the installation is completed, hydrostatic tests of the pipelines have to be carried out and it has to be ensured that the sealing is ensured.
* Pipes and fittings used should be included in PN10 / PN16 pressure class.

3.4 ELECTRICAL INSTALLATION

Electrical Panel Assembly:

In RO systems, the electrical panel is fixed to the chassis. In addition, electrical panel shall not be installed.

During the transportation and stacking of the panels, no impact should occur on the panel. Board parcels should be opened carefully and should not be subjected to impact. The panels must be stacked vertically.

Issues to be Considered in Electrical Installation:

1- After the panel assembly is completed, electrical installation is continued.

2- Cable lugs must be used when making cable connections.

3- In screwing applications inside the panel, the screw should not be loose. Heating occurs in the energized parts of the screw connections left loose.

4- In screwing applications within the panel, the screw should not be tightened too much. Teeth damage and deformation occur in over-tightened screws.

5- The system energy supply line must be grounded. Connection can be made to the yellow-green terminals in the panel for earthing.

CABLE COLOUR	DESCRIPTION
Red	Refers to + 24 VDC energy, used as PLC Output output.
Black	Refers to -24 VDC Energy.
Orange	Refers to PLC Input inputs.
Purple	refers to the PLC anolog inputs.
Brown	Single phase 220 VAC 50 Hz, L1, L2, L3 refers to 380 VAC 50Hz energy between phases.
Blue	Refers to the neutral connections.
Yellow Green	Refers to grounding.

4 COMMISSIONING and OPERATION

4.1 PRE-COMMISSIONING CHECKS

It is necessary to check the entire system before commissioning the system whose mechanical and electrical installation is completed. Pre-treatment may be required according to the character of the water that will supply the system before the Reverse Osmosis device. Filtration and softening systems can be included in the pre-treatment, and the water can be brought to the desired values with the help of chemical dosage. Pre-treatment systems should also be ensured to operate smoothly during pre-commissioning checks. The following checks must be carried out before commissioning:

4.2 COMMISSIONING

Commissioning procedures are carried out by the authorized service after the installation and pre-commissioning checks are completed and the necessary supervision is provided.

* The control panel main power switch is turned to the “On” position when the device is switched on.

* Raw water supply pump is operated, water is supplied to the system by opening the supply line inlet valve, high pressure pump switch on the control panel is turned to "of" (off) position,

* At low pressure and flow, all air is expelled from the system.

* The pump is started by turning the high pressure pump switch to the “on” position.

* Pressure gauges, flow meters, and pressure switches, instrumentation and other equipment are checked for proper operation.

* The efficiency of the RO system is adjusted by opening or closing the membrane supply valve in sufficient amount with the wastewater valve. Nominal supply pressure is set on the membrane supply pressure gauge. Adjustment continues until the product water and wastewater flow rates reach the desired level.

* The following checks must be carried out during commissioning and then the device must be left in working condition.

4.3 OPERATION

* Water is subjected to chemical pre-treatment before entering the RO unit.

* In the pre-treatment process, antiscalant, acid, chlorine, caustic or sodium metabisulfide chemicals are dosed according to the character of the water. Whether this is necessary or not is determined by the relevant project company.

* The feed water, which has been pre-treated, is filtrated with a 5 micron cartridge mounted on the RO chassis. It is a measure for the protection of RO membranes and high pressure pump.

* After the cartridge filter, there is a low pressure switch in the High pressure pump suction to prevent the pump from running dry. At the same time, an existing high pressure switch at the pump outlet will provide protection against overpressure operation of the pump.

* Raw water brought to the desired properties is pressed into RO membranes. With the help of high pressure, the reverse of the natural osmosis event is realized in the membranes and the raw water with high conductivity is passed through the membranes and the product water with low conductivity is obtained.

* The RO treatment system has been designed for automatic and continuous operation since the pressure and flow settings have been made.

* During the normal operation of the RO system, a regular recording system should be established with respect to operating data and observations. This recorded data is useful for troubleshooting and performance evaluation. The form in which the data will be recorded and the necessary information are given in ANNEX 1.

* Chemical analysis should be performed on samples to be taken from raw water, product water and waste water at as frequent intervals as possible.

* Regular sampling and on-site measurement with portable measuring devices is recommended.

* A few important points to be considered during normal operation are summarized below.

1- The flows must be checked daily.

2- Operating the RO system at capacities lower or higher than the design may cause problems such as clogging or strain on the pump motor over time.

3- There should never be chlorine in the raw water line. Seret chlorine parameter should be checked in the samples to be taken daily at the RO entrance and if there is chlorine in the water, HSC authorized service should be notified.

5 MAINTENANCE

5.1 ROUTINE MAINTENANCE

Although there is a recommended maintenance program for the general maintenance of this system, the content of this maintenance program can be determined by authorized personnel or user in the long term in line with the experience related to the operation of the facility. Since there are many components in the system, the maintenance requirements of different equipment may also be different.

The following headings contain information on the type and frequency of inspection and adjustment recommended to be included in the maintenance schedule to be prepared.

5.2 DAILY-WEEKLY CHECK

Daily, weekly and monthly control data should include system operating conditions. The following operations can be performed by the operator every day.

Water Data

1- Flows

2- Pressures

3- Pressure Losses

4- Yield

5- Chemical Consumptions

Mechanic data

1- Pumps, valves and motors

2- Control of compressed air line (Accumulated water should be drained.)

3- Adjusting the flows

4- Pipes, fittings and valves (Leaks have to be checked.)

5- Cleanliness (All equipment must be cleaned.)

6- Checking the alarm warning lamps

6 TROUBLESHOOTING CHART

A	Failure Symptom - General	Possible Cause	Interventions to be Performed
1	Decrease in product water is present		* Visually check manual valves. Check that there is a valve on the line that should be open and accidentally closed. * Check that the pumps are working properly. * Check the proper functioning of the actuated valves. Check that the valves are supplied with air or energy. * After prolonged operation of the system, there may be jams in the valve flaps and they may not open and close, check.
2	Product water quality is low		* Check if all instruments are correctly calibrated. * Check if there is any other fluid mixed in the product water.

B	Symptom of Failure - Chemical Dosage	Possible Cause	Interventions to be Performed
1	Chemical dosing pump does not operate	1. Electric connection problem 2. Dosing pump failure	* Check dosing pump electrical connection * Check dosing pump fuse * Call for service
2	The chemical solution is not diminishing.	1. Dosing pump failure 2. Air entrapment in the suction/discharge line 3. Clogging of suction/discharge lines 4. Diaphragm failure 5. Wrong line connection 6. Fault at the point of suction, discharge and dosage	* Check dosing pump electrical connection and fuse * Bleed air with bleed valve * Check suction/discharge hoses and modules, clean * Clean and check diaphragm * Check connections of all valves and equipment on the line according to P&ID drawing * Check check valve modules at pump suction and discharge, Clean valves in reverse direction with compressed air * Call for service
3	Although there is a chemical in the chemical tank, the chemical lower level lamp on the electrical panel is on, the system does not activate.	1- The dipstick is stuck. 2- The dipstick is defective.	* Check the dipstick, correct it if necessary. * Replace the dipstick. * Call for service.

C	Symptom - Pump	Possible Cause	Interventions to be Performed
1	Pump general malfunction	1. Pump bearing / motor temperature high 2. Pump running noisy 3. Pumps have high vibration 4. The pump is not pumping enough water/ chemicals.	* Check from the pump operating manual
2	Continuous fluctuation of the red button in the pump motor protection (thermal fluctuation)	1- Amperage range not appropriate 2- Overheating present	* Check the amperage pulled from the engine. Set it through the engine conservation. * Check the amps, make sure there are three phases. * Call for service.
3	Centrifugal pump not running	1. No power supply 2. Fuse failed 3. Motor with single phase supply	* Check power supplies * Check the fuses * Check motor cables
4	No flow in centrifugal pump	1. Air in suction line 2. Suction line blocked or closed valve present 3. Pump wheel blocked 4. Pump running at low speed 5. Pump connection direction incorrect	* Bleed out the air and fill with water * Check suction line, place gaskets * Check suction line and valves * Check motor voltage, frequency and speed * Check pump operation direction
5	Low flow in centrifugal pump	1. Pump running at low speed 2. Blocked as pump wheel part 3. Insufficient NPSH	* Check motor voltage, frequency and speed * Pump running at poor vibration * If the pump is running in a baffle, the level of the tank suctioned check
6	Low pressure in centrifugal pump	1. Pump operates out of curve 2. Pump running at low speed	* Check pump curve * Check motor voltage, frequency and speed
7	High energy consumption in the centrifugal pump	1. Pump motor power high 2. Running at high speed	* Check pump bearing, junction box * Check pump speed
8	Vibration in centrifugal pump	1. Poor alignment 2. Insufficient NPSH 3. Failure of impeller 4. Fault in bearing	* Check pump pedestal mounting, check coupling settings * Check pump operating conditions, installation and manometers * Check vibration harmonics and pump alignment * Check bearing distances
9	Vibration in the engine	1. Poor alignment 2. Fault/problem in the bearing 3. Engine impeller failure/ problem	* Check pump pedestal mounting, check coupling settings * Check vibration harmonics and Bearing distances * Check loose motor bars

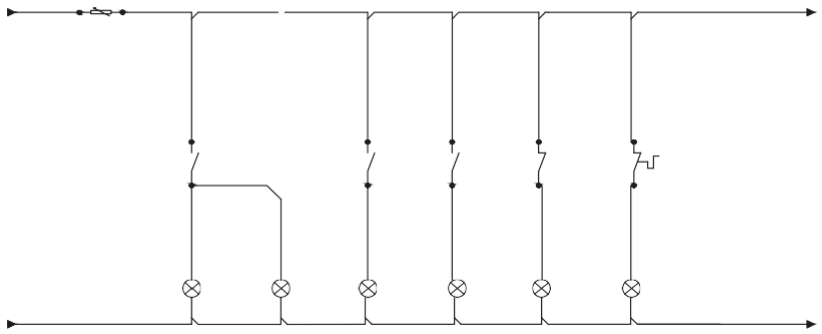
D	Symptom - Valves	Possible Cause	Interventions to be Performed
1	Valve with one or more electric actuators and solenoid valve do not operate	1. There is a broken solenoid valve on the panel 3. Broken actuator available 4. Broken valve positioner	* Check that the solenoid valve is not magnetic when activated * Check that the positioner also rotates while the valve is running * Replace valve and positioner with new one if defective
2	Problem with valve flanges and connections	1. Problem in the lines 2. Problem in the valve	* Check the lines, whether there is sufficient support, whether the linearity of the lines is correct. * Check flap, lever and actuator for problems

E	Symptom - Pre-Treatment	Possible Cause	Interventions to be Performed
1	Blur high at MMF filter outlet	1. Filter too clogged 2. Leakage from filter by-pass line to product water 3. Broken nozzle on filter base plate or broken distribution system 4. Filter speed too high 5. Turbidity sensor defective	* Check service time counter, check filter DP, backwash * If any, have a backwash with air. Check filter media * Empty filter media and check nozzles and equipment that may be broken * Check the filter flow rate according to the flow rate and design * Clean and check turbidity sensor
2	Raw water turbidity value too high, system fails	1. Turbidity sensor defective 2. There is high turbidity in the water towards reading	* Clean and check the turbidity sensor. * Check raw water supply and do not operate system if possible

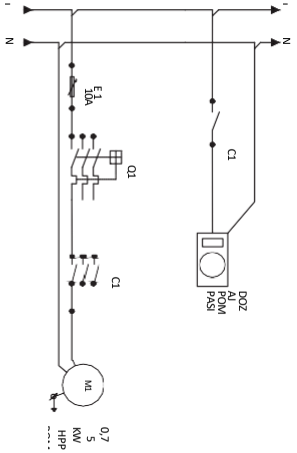
F	Malfunction Symptom - RO Device	Possible Cause	Interventions to be Performed
1	The device does not activate. (There is no power on the control panel.)	1. Power outage/problem 2. Line closed on power distribution board 3. Problem with power/control panel connection 4. RO power switch off	* Check the phases in the power line coming from the mains * Check voltage on power line from mains * Check power distribution board * Check device power/control panel electrical connection * Turn the device power switch to the “On” position
2	His device won't activate. (There is power on the control panel - no alarm - the feed pump does not activate)	1. RO system start switch is off. 2. The high-pressure pump start switch is off. 3. The level switches are stuck. 4. Failure of high pressure pump.	* Turn the system start switch to the “Auto” position * Turn the high-pressure pump start switch to the “Auto” position * Correct the level switch. Change the switch if the problem is not solved * Call for service
3	Device efficiency is low. (Product water flow rate is lower than normal - wastewater flow rate is higher than normal)	1. Flow setting is required 2. Water temperature low 3. Membrane supply pressure is low. 4. The membranes are clogged.	* Check inlet and outlet valves * Check water temperature * Adjust the membrane supply pressure with the high pressure pump outlet valve * Call for service

BETA SERİSİ R.O ELEKTRİK PROJE 220V AC 50HZ

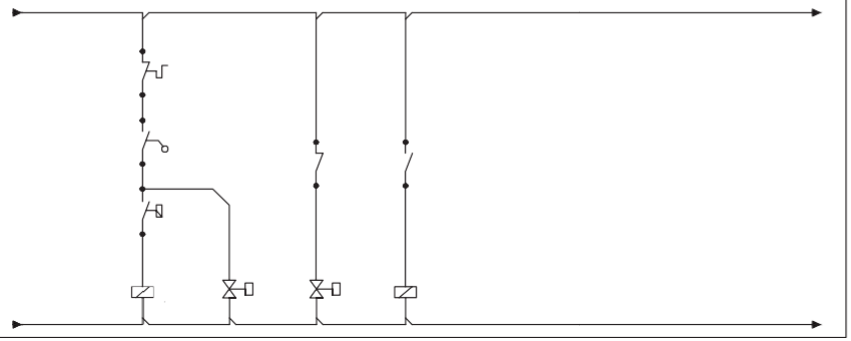
LED (UYARI LAMBALARI) BAĞLANTI ŞEMASI



DOZAJ POMPASI VE POMPA BAĞLANTI ŞEMASI



OTOMASYON KUMANDA DEVRESİ BAĞLANTI ŞEMASI



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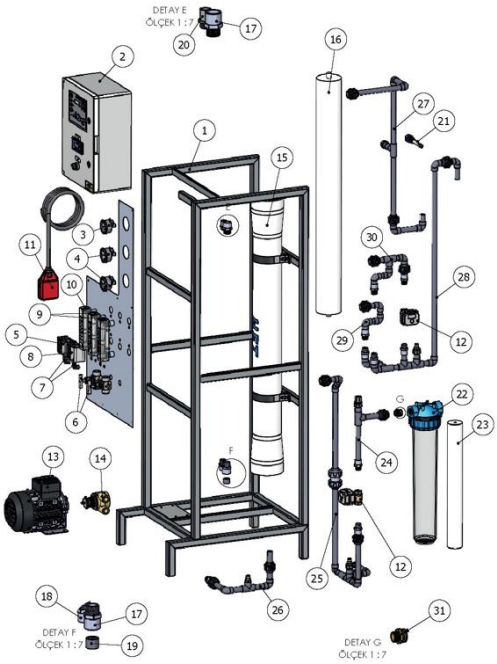
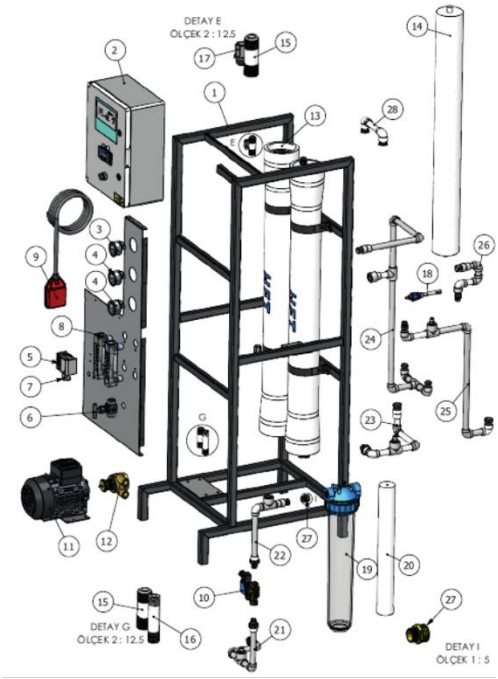
RO BETA SPARE PARTS LIST



BATCH NO.	CODE	DESCRIPTION	PCS
1	8-10-BT-0250-500-ST37	RO-250-500 BETA CHASIS	1
2	8-18-ç-ÇP5003	40x30 ELECTRICAL BOARD	1
3	3-71-002-63MM-P16	16 BAR MANOMETER	1
4	3-71-002-63MM-P25	25 BAR MANOMETER	2
5	3-71-011-LF5508	LOW PRESSURE PROCESSOR	1
6	3-72-20	½ NEEDLE VALVE	1
7	3-RF-Q4044-1	QUİCK ¼ INNER THREADED 4-6 ELBOW	1
8	3-81-060-420	1-7 FLOWMETER	2
9	3-71-010	5 MT.CABLE LEVEL FLOAT	1
10	3-71-25-24	½ SELONOİD VALVE 220V	1
11	3-32-0,55	RPM MOTOR 0,55 KW	1
12	3-31-600	NUERT RO PUMP 600 lt/h ½	1
13	3-2-HFT-4040-E	HFT 40x40 MEMBRANE HOUSING	1
14	-	40x40 INNER MEMBRANE	1
15	8-15-PLASTİK-25-01	¾ DOUBLE SIDED PLASTIC NIPPLE	2
16	8-15-PLASTİK-20-01	½ DOUBLE SIDED PLASTIC NIPPLE	1
17	8-15-PPRC-K-27-20-001	½ PPRC BLIND PLUG	1
18	3-4-KP-CON1134-13	CONDUCTIVITY METER PROB	1
19	5-FK-A-M3P-AFO-SX-AS	20" STANDARD FILTER HOUSING ¾	1
20	6-02-20-05	20" 5 MİCRON SPUN FILTER	1
21	8-18-B250-T-NO1	ENTRANCE INSTALLATION NO1	1
22	8-18-B250-T-NO2	ENTRANCE INSTALLATION NO 2	1
23	8-18-B250-T-NO3	PUMP-MEMBRANE INSTALLATION	1
24	8-18-B250-T-NO4	PRODUCTION INSTALLATION	1
25	8-18-B250-T-NO5	WASTE INSTALLATION	1
26	8-18-B250-T-NO6	WASTE SETTING INSTALLATION	1
27	8-17-ORN-SR-005	¾-½ PROPORTIONAL YELLOW NIPPLE	1

RO-BETA-500 SPARE PARTS LIST



BATCH NO	CODE	DESCRIPTION	PCS.
1	8-10-BT-0250-500-ST37	RO-250-500 BETA CHASIS	1
2	8-18-ç-ÇP5003	40x30 ELECTRICAL BOARD	1
3	3-71-002-63MM-P16	16 BAR MANOMETER	1
4	3-71-002-63MM-P25	25 BAR MANOMETER	2
5	3-71-011-LF5508	LOW PRESSURE PROCESSOR	1
6	3-72-20	½ NEEDLE VALVE	1
7	3-RF-Q4044-1	QUİCK ¼ INNER THREADED 4-6 ELBOW	1
8	3-83-0060-660	1-11FLOWMETER	2
9	3-71-010	5 MT.CABLE LEVEL FLOAT	1
10	3-71-25-24	½ SELONOİD VALVE 220V	1
11	MEMBRANE ASSEMBLY	RPM MOTOR 0,75 KW	1
12	3-31-1000	NUERT RO PUMP 1000 lt/h ½	1
13	3-2-HFT-4040-E	HFT 40x40 MEMBRANE HOUSING	2
14	.	40x40 INNER MEMBRANE	2
15	8-15-PLASTİK-25-01	¾ DOUBLE SIDED PLASTIC NIPPLE	4
16	8-15-PLASTİK-20-01	½ DOUBLE SIDED PLASTIC NIPPLE	2
17	8-15-PPRC-K-27-20-001	½ PPRC BLIND PLUG	2
18	3-4-KP-CON1134-13	CONDUCTIVITY METER PROB	1
19	5-FK-A-M3P-AFO-SX-AS	20" STANDARD FILTER HOUSING ¾	1
20	6-02-20-05	20" 5 MİCRON SPUN FILTER	1
21	8-18-B250-T-NO1	ENTRANCE INSTALLATION NO1	1
22	8-18-B250-T-NO2	ENTRANCE INSTALLATION NO 2	1
23	8-18-B500-T-NO3	PUMP-MEMBRANE INSTALLATION	1
24	8-18-B500-T-NO4	PRODUCTION INSTALLATION	1
25	8-18-B500-T-NO5	WASTE INSTALLATION	1
26	8-18-B250-T-NO6	WASTE SETTING INSTALLATION	1
27	8-17-ORN-SR-005	¾-½ PROPORTIONAL YELLOW NIPPLE	1
28	8-18-B500-T-NO7	2. MDK ENTRANCE INSTALLATION	1

BETA

REVERSE OSMOSIS SYSTEM

BETA 250 - 500

USER 'S MANUAL