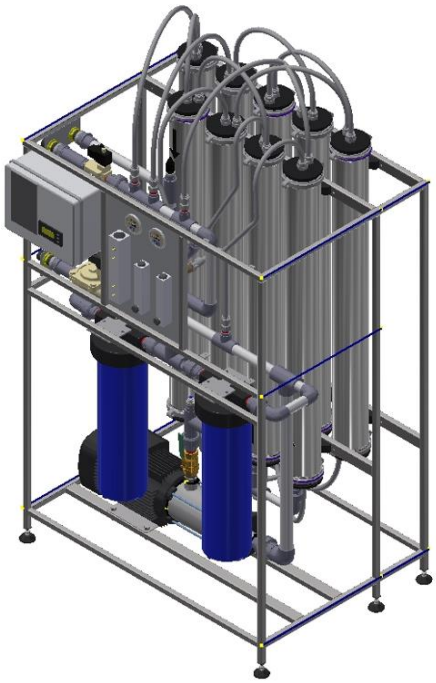
Euro-Clear Ltd.
Tel: +36 96 544-240 • E-mail: contact@euro-clear.eu • Web: www.euro-clear.eu

MANUAL FOR INDUSTRIAL REVERSE OSMOSIS SYSTEMS

BC-RO-90-R
BC-RO-150/R
BC-RO-300/R
BC-RO-500/R
BC-RO-300/4-G
BC-RO-600/4-G
BC-RO-900/4-G
BC-RO-1200/4-G
BC-RO-1500/4-G
BC-RO-2000/4-G
BC-RO-2500/4-G



Euro-Clear

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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 OF THE EQUIPMENT

The RO equipment consists of five main parts:

1. safety fine filter
2. high pressure pump

3. module / membrane housing + membrane/

4. safety and control parts

5. control unit

2.1. BlueClear-RO equipment's main parts:

2.1.1. Filter housing.

Type	:	BC-FH-12 / FH20B1
Connection	:	½" - 1"
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.

Type	:	FCPPS-10005 / FCPPS-20B005
Material	:	polypropylene
Permeability	:	max. 1 m3/hour - 4 m3/hour
Operating temperature	:	min. 4 °C
	:	max. 62 °C
Nominal pore diameter	:	0,5 micrometer
Quantity	:	1, 2 or 5 piece

2.1.4. High pressure pump.

Manufacturer	:	NUERT / Grundfos / Shimge
Transported quantity	:	340 liter/hour – 7500 liter/hour
Engine performance	:	0,37 kW – 5,8 kW – 3,2 kW
Power	:	220V,50Hz - 400V, 50 Hz

2.1.5. Membrane housing. Alloy steel column. 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.

Quantity	:	1 piece – 9 pieces
Diameter	:	4”
Length	:	21” - 40”
Feedwater connection	:	1/2” - 1”
Permeate connection	:	1/2” – 1”
Concentrate connectio	:	1/2” – 1”

2.1.6. 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	:	ULP21-4021 / ULP21-4040
Quantity	:	1 piece – 9 pieces
Capacity to trap salt min.	:	98%
Permeate production	:	150 – 2500 liter/hour
pH during operation	:	3-10
Membrane diameter	:	4”
Membrane length	:	21” - 40"
Operating temperature max.	:	35°C
Operating pressure max.	:	16 bar

2.1.7. Safety and control equipments

- Pressure switches
  They are meant to protect high pressure pump against running dry and for permeatum pressure change the equipment’s start / stop.

- 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.

- Solenoid valves

The incoming solenoid valve is opening / closing the raw water's way, the rinsing valve ensures the required water flowing speed during the membranes rinsing.

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

2.1.8. Control unit: takes care of the equipment's automatic operation.

Selection of the control mode:

1. Manual or local operation mode: the equipment is not monitoring the tank's level, it is operating until the switch is in manual state

2. Remote or external signal: In case of remote control, we can allow or forbid the equipment's operation with an external switch. When allowing, the change in the tank's level will start or shut down the equipment. In case of forbidding, it will not take into account the tank's level, but it will execute the programmed rinsing cycle. Wiring diagram can be seen under point eight.

3 Automatic: The change in the tank's level will start or shut down the equipment. The programmed rinsing cycle will be executed.

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:

- dosage of stuff obstructing crystallization: it obstructs the crystallization of CaCO3, CaSO4, BaSO4, SrSO4, CaF2, SiO2, etc.

- softening with ion-exchange: it changes all the cations into Na+ ions, so there will be Na salts that absorb in water,- meszes előlágyítás: 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-floculation-filtration combinations

A thorough water analysis is required before the equipment is designed and built. After this we can create the proper pretreatment and the most ideal membrane combination. This ensures long service life and the highest possible output even with continous operation.

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.

4.2 THE PROCESS OF THE EQUIPMENT'S INSTALLING

Before putting into the filter housing, the filter cartridge needs to be thoroughly washed.
The membranes have to be placed into the membrane housing with the marked direction, with the water's flowing direction. Please check the electronic connections and the pump's spinning direction. The RO controller needs to be adjusted according to the attached user's guide.

Conduct a pressure test with the networking water pressure. Before it, by all means check the shut-off valve's position. In order to fully fill the equipment with water, first we have to air-bleed the system, after that on the RO's outlet every shut-off valve have to be in CLOSED state and on every inlet (raw water) shut-off valve have to be in OPEN state.
After the succesful pressure test, switch back the shut-off valve's state to the starting state. Set the valve that is after the high pressure pump to half open state. Set the concentrate regulator's valves to half open state. Outflow has to be ensured for the permeate. Please set the raw water's valve to OPEN state.
Check the raw water's pressure. After the 0,5 micron filter cartridge the water pressure has to be minimum 3 bar. Set the pressure-mushroom to the value of 3 bar.

Start the RO equipment with turning the main switch and set the control mode switch to manual state. With the help of the concentrate regulator valve set the permeate to 50%, and the concentrate to 50%. During this, continuously check the pressure. Aim for a pressure level, which equals the value on the membrane's data sheet depending on the given water's parameters. In case of the RO equipment's permeate ratio is less than

50%, please in 2-3 steps set the permeate's ratio to above 50%. Between the steps keep a 10-15 minute break, to let the equipment get back to it's balanced state.

After we finished setting the permeate rate and pressure, check the outflow water's conductivity. It is important that the membranes could take hours till they reach the required conductivity level.
Ater installing the equipment in manual operating mode, switch the controlling mode selection switch to automatic state. Check if the permeate tank's level switch starts and shuts down the RO equipment appropriately. Check if during starting and shutting down the membranes automatic washing works as intended. In case of continuous membrane usage the maximum value to set the washing on the RO's controller is eight hours.
Turn off the main shut-off valve, turn off the main switch.
Train the operator staff.
With filling the installation log and signing the equipment's take-over record, hand over the equipment to the operator.
Please pay extra attention to appropriate training of the RO equipment's operators and for the appropriate filling of the operating log.
Please read the user's guide carefully, and follow it's instructions.

IMPORTANT!

During startup, in the beginning lower the capacity/yield to 50%, and slowly in 3-5% steps, this will be increased to the max capacity/yield. Between some steps take a 12-15 minute break, to let the equipment balance itself out. Only execute the next change after the break is over.

4.3. THE EQUIPMENT'S STARTUP

After the startup, the open the main shut-off valve and check the incoming water pressure on the RO equipment prefilter's (0.5 micrometer) manometer. This has to be min. 3bar and max 6 bar.
Turn on the main switch. Of course the equipment will only start if the feed tank's level controller will require water or if we set the control mode selector switch to local state.

Check if the equipment's pump regulator's valve and concentrate regulator's valve are in the adjusted position at startup. During startup the equipment's valves are adjusted by the manufacturer's expers with the goal of optimal outcome. Changing these settings of the valve can lead into loosing your warranty.

ATTENTION!

Exceeding the prescribed values like the quantity of permeate, pressure or outcome may lead into membrane errors. And ultimately, it can lead into loosing waranty.

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 +35°C
pH range	:	between 3-10

5.2. THE RO EQUIPMENT'S MAIN MECHANIC PARAMETERS

Part number	Flow	Connection	Electric data
	25-10 °C		
BlueClear-RO-150/R	175-150 L/h	Inlet—1/2"	370 W
		Outlet—1/2"	220V
		Drain—1/2"	3.2 A
BlueClear-RO-300/R	350-300 L/h	Inlet—1/2"	750 W
		Outlet—1/2"	220 V
		Drain—1/2"	5.4 A
BlueClear-RO-500/R	550-500 L/h	Inlet—1/2"	750 W
		Outlet—1/2"	220 V
		Drain—1/2"	5.4 A
BlueClear-RO-300/4	380-300 L/h	Inlet—1/2"	1,58 - 2,2 kW
		Outlet—1/2"	3x400 V
		Drain—1/2"	3.25 - 4,7 A
BlueClear-RO-600/4	750-600 L/h	Inlet—1/2"	1,58 – 2,2 kW
		Outlet—1/2"	3x400V
		Drain—1/2"	3.25 – 4,7 A
BlueClear-RO-900/4	1080-900 L/h	Inlet—1"	1,58 – 2,2 kW
		Outlet—1/2"	3x400V
		Drain—1/2"	3.25 – 4,7 A
BlueClear-RO-1200/4	1410-1200 L/h	Inlet—1"	2,2 kW
		Outlet—1/2"	3x400V
		Drain—1/2"	4.7 A
BlueClear-RO-1500/4	2000-1500 L/h	Inlet—1"	2,2 kW
		Outlet—1"	3x400V
		Drain—1"	4.7 A

BlueClear-RO-2000/4	2500-2000 L/h	Inlet—1”	2,2 kW
		Outlet—1”	3x400V
		Drain—1”	4.7 A
BlueClear-RO-2500/4	3000-2500 L/h	Inlet—1”	3,2 kW
		Outlet—1”	3x400V
		Drain—1”	4.7 A

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 cartfidge of prefilter has to be changed in case of 0,5 bar pressure drop. Changing of filter cartfidge has to be registered in the operating log.

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 3000 working hours. Chemical cleaning can be executed only by the experts of the manufacturer.

ATTENTION!

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

8. ROC Reverse osmosis regulator – installation and operation manual

Read this manual carefully before any operation.

8.1. Introduction

This is an easy to use RO controller with programmable controlling and protection device. RO controller is specially designed for reverse osmosis water purification unit by contacting dosing pump, solenoid valve, electrical meter.

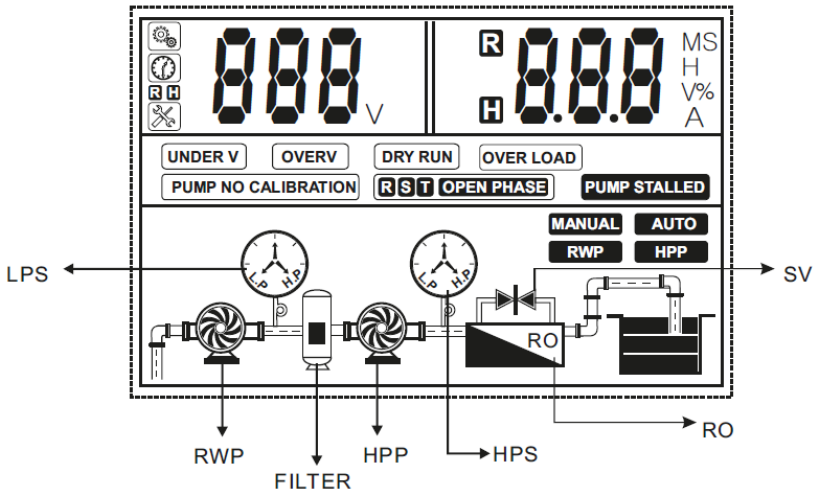
Technical parameter & features

- specially designed for revese osmosis water purification unit
- auto / manual switch
- protect the pump against many faults
- dynamic LCD displaying RO unit running informations
- accumulative pump running time displaying
- pump fault record displaying

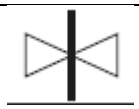
The following charts shows main technical parameters:

<table>
<tr><td colspan="3">Main technical characteristic</td></tr>
<tr><td colspan="2">Control characteristic</td><td>pressure control</td></tr>
<tr><td colspan="2">Control method</td><td>manual / auto</td></tr>
<tr><td colspan="2">Pressure control characteristic</td><td>pressure switch</td></tr>
<tr><td colspan="3">Main technical specification</td></tr>
<tr><td colspan="2">Rated input voltage</td><td rowspan="2">refer to nameplate</td></tr>
<tr><td colspan="2">Rated output power</td></tr>
<tr><td colspan="2">Rated output voltage for silenoid valve (V2), dosing pump</td><td>AC 220 / 50 HZ</td></tr>
<tr><td rowspan="3">Rated output power</td><td>solenoid valve</td><td>15 W</td></tr>
<tr><td>dosing pump</td><td>25 W</td></tr>
<tr><td>electrical meter</td><td>3 W</td></tr>
<tr><td colspan="2">Unit dimension (L x W x H)</td><td>30.2 x 24 x 12 cm</td></tr>
</table>

Meaning of the icons show non the LCD

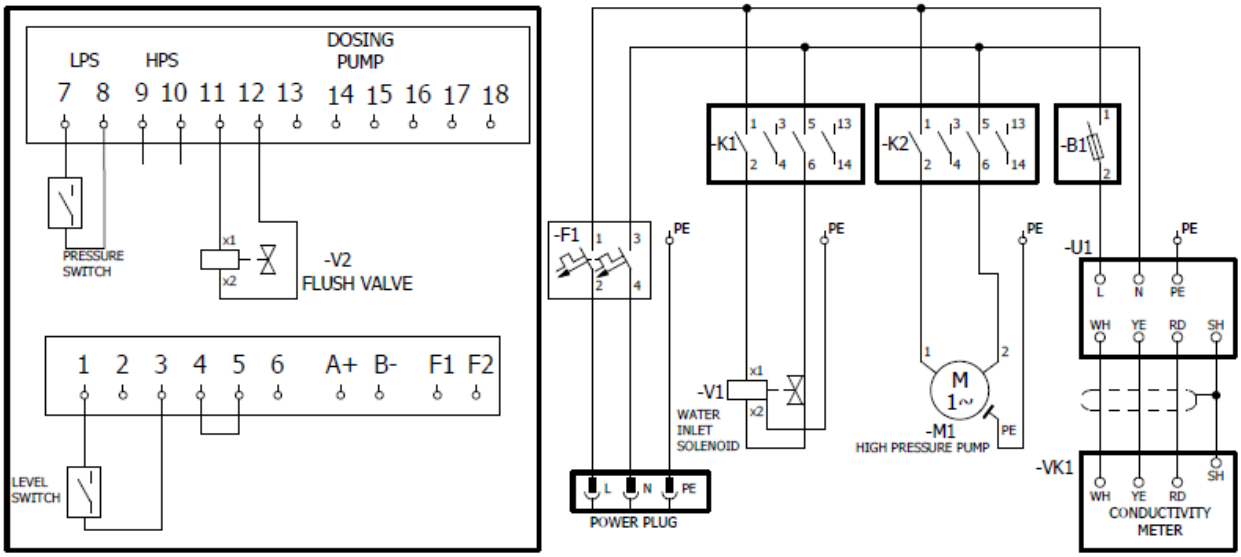


Icon	Meaning / Description
	pump parameter configuration icon, when this icon appears, RO controller is in parameter adjusting menu
	time displaying icon, when this icon appears, RO controller is displaying some parameter of time, eg: running time of solenoid valve, dosing pump
	R means RWP; H means HPP
	pump fault icon, when this icon appears, RO controller is displaying some fault information
	pump no running
	pump running

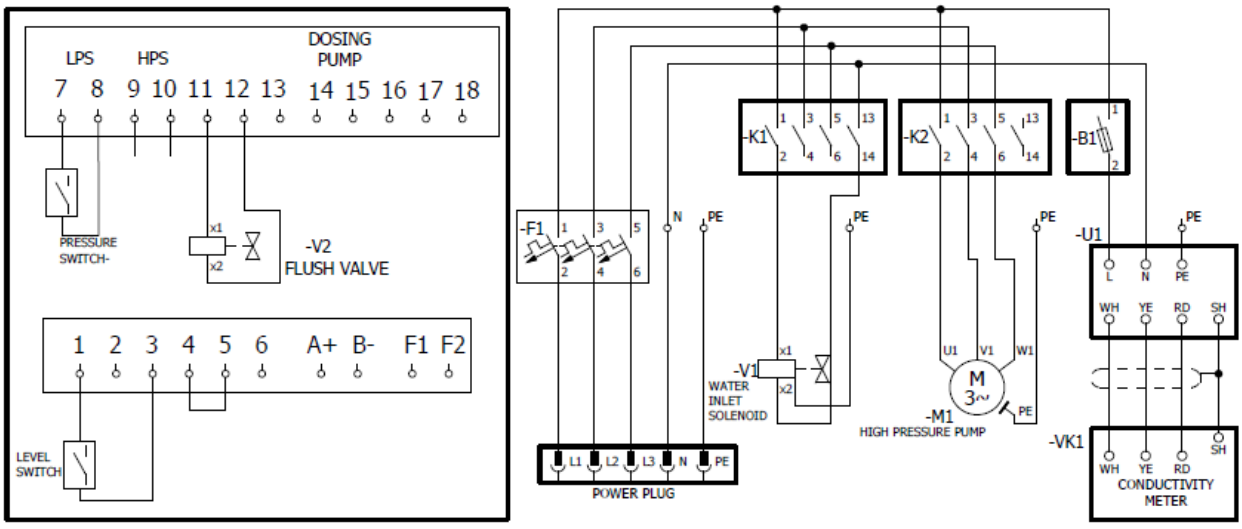
	low pressure value or lack of pressure
	high pressure value or full of pressure
	solenoid valve no running
	solenoid valve running
	storage tank empty
	Storage tank full
V	voltage
M	minute
S	second
H	hour
%	percent
A	ampere

Electrical connection scheme

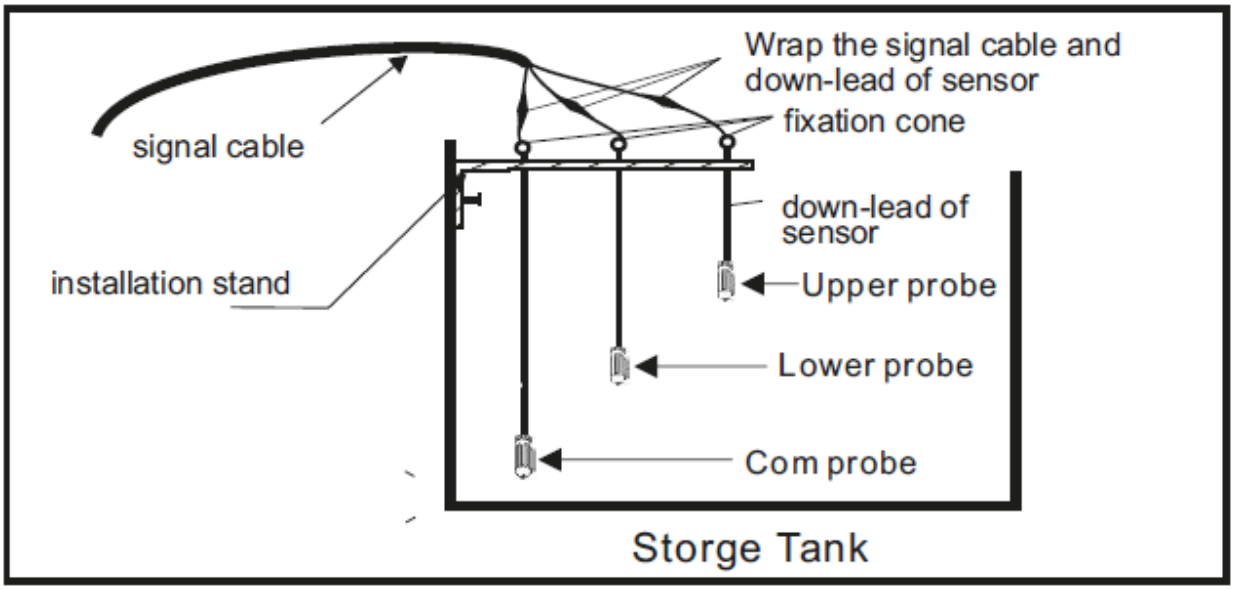
1 phase:



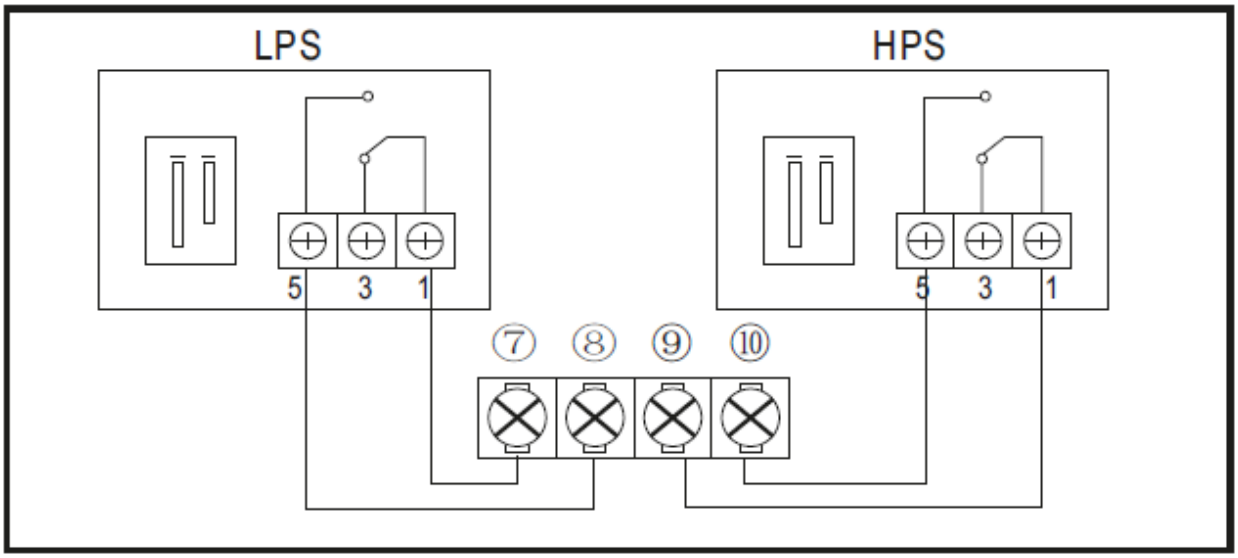
3 phases:



Connection of the water level probe



Electrical connection of the high and low pressure switch



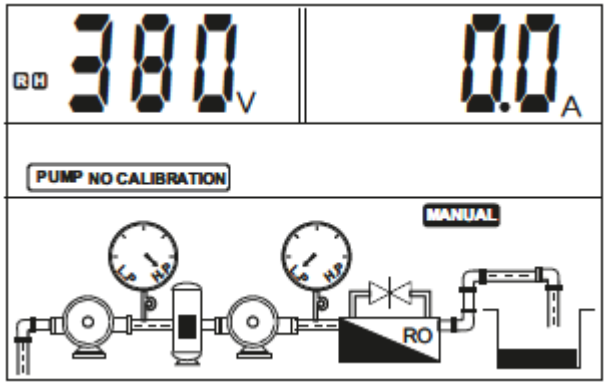
Note 1: pressure switch of LPS is a normaly open contacting point

Parameter calibration setting and erasing

To achieve best level of protection of the pump, it is essential that the parameter calibration must be done immediately after succesful pump installation or pump maintenance.

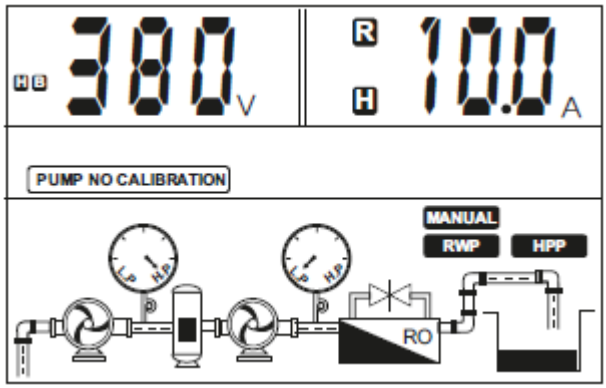
Setting the parameter calibration

- Press the MODE key to switch to manual state, make sure the pump not running and LCD screen displaying:



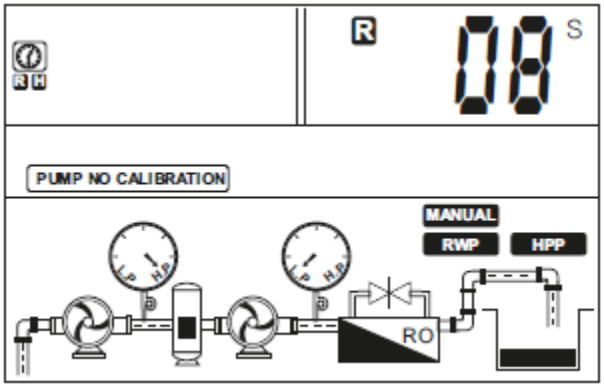
- Press the RWP and HPP key tor un pump, confirm the two pumps and all pipe network in normal state (including voltage, running ampere etc.)

The LCD screen displaying:



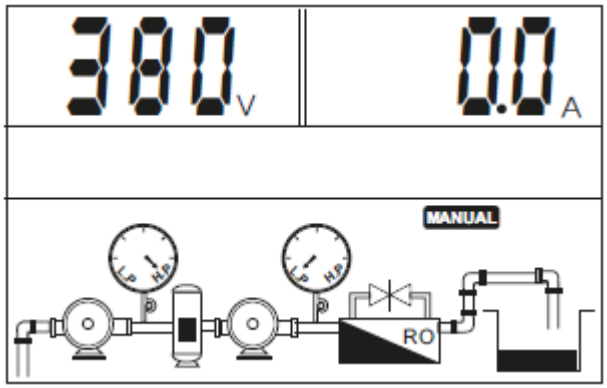
- Press the STORE button, the RO makes a „beep” sound and starts 20 seconds countdown.

The LCD screen displaying:



- Two pumps stop running and parameter calibration is completed.

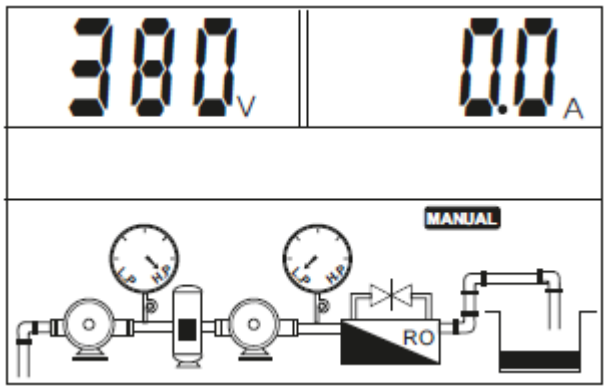
The LCD screen displaying:



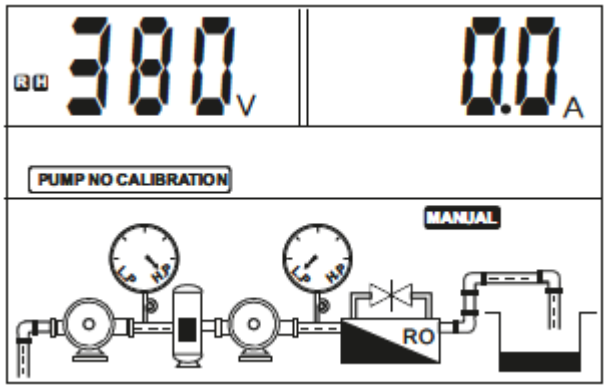
Erasing former parameter calibration

When pump reinstalled after maintenance or new pump is installed, user must erase the former parameter calibration and a new calibration must be done.

- Press the MODE key to switch to manual state, make sure the pump not running and LCD screen displaying:



- Press the STOP key and release till RO maked a „beep” sound, RO recover the default factory seetting and LCD screen displaying:



Basic operation

- Pressing the MODE key, user can alternate between the manual or auto mode which will be displayed ont he LCD screen by icon.

Switching to AUTO mode

Press the MODE key to switch to auto state, RO controller is under the auto control state. If (optional) float switch in water well is upper level, the water level in the storage tank is bellow probe nr. 2 and pressure value in the pipeline reaches the bottom level of LPS, the RO controller will open the inlet solenoid valve, than the controller will start HPP with two dosing pumps and flush valve. After 5 minutes the flush valve closes, but other equipment will keep running. When the inlet pressure drops bellow minimum the HPP will stop with two dosing pumps, the controller make an alarm tot he user that give reminder pressure value is low. The LPS have recovery time, the default time is 10 minutes (adjustable), after 10 minutes over, the HPP will start working with two dosing pump and flush valve will working for 5 minutes. This is a full controller working cycle, this cycle will be repeated again and again until water level is the storage tank reaches probe nr. 3, than the flush valve will work for 5 minutes. This time is adjustable. When this time is over, all of system devices will stop. In case of dry run, under voltage, over voltage, over load, open phase the system will stop immediately.

Switching to MANUAL mode

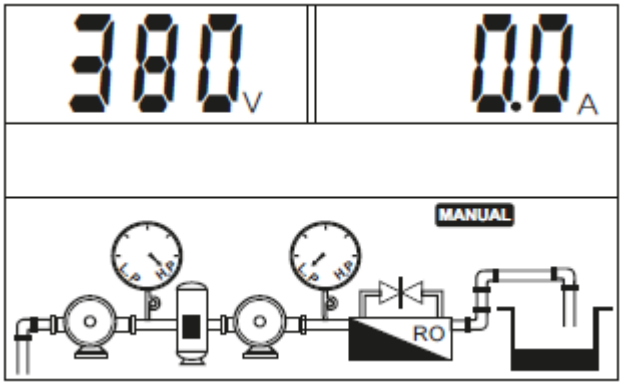
Press the MODE key to switch to the manual mode. After pressing the RWP key, the controller checks whether the water level in water well reaches the upper level to run RWP only and press STOP key to stop running. When press HPP the controller checks whether the inlet pressure value reaches the minimum level. If yes the controller will start HPP with two dosing pumps and the flush valve will run for 5 minutes. After the time is over the flush valve stops, other equipment will keep running until water level in the storage tank reaches probe nr. 3. In case of dry run, under voltage, over voltage, over load, open phase the system will stop immediately.

Fault record displaying

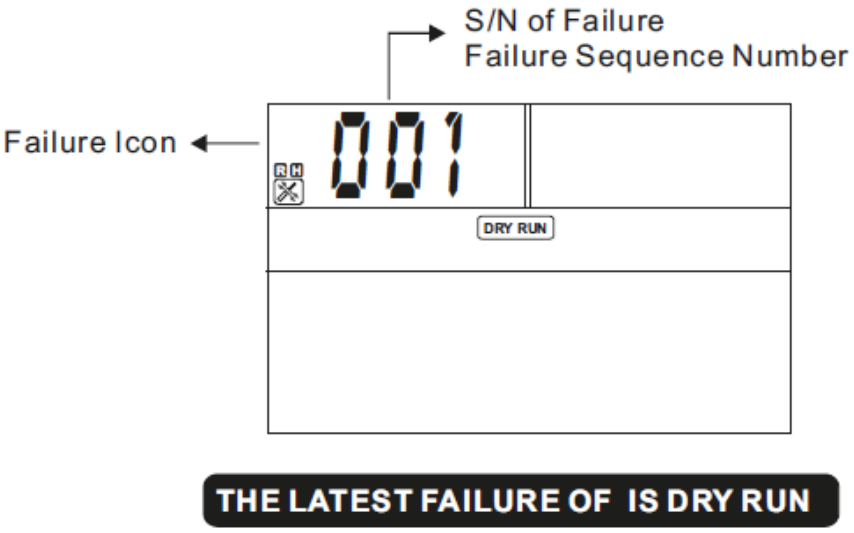
The RO controller can memorize the last five faults wich cause the whole system stop running, so it is very convenient for the user to analyse the whole RO system working status.

Displaying the last five faults

- Press the MODE key to switch to manual state, make sure to no any pumps running and LCD screen displaying:



- hold pressing STOP key and press MODE key, the controller makes a „beep" sound and displays fault record:

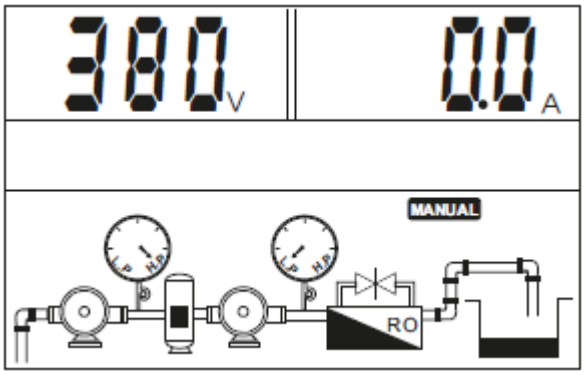


- Press STOP key to quit the fault record displaying

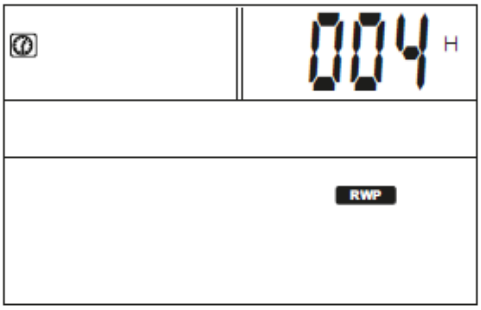
RO controller accumulative runnin time displaying

The RO controller can memorize how many hours of the whole system operated. So it is very convenient for the user to analyse the RO system working status and do maintenance.

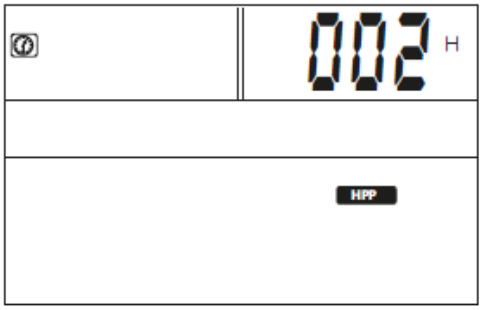
- Press the MODE key to switch to manual state, make sure that no any pump working and LCD screen displaying:



- Hold pressing STORE key and press STOP key, the controller makes a „beep" sound and displays the cumulated time:



THE RWP HAS RUN FOR 4 HOURS



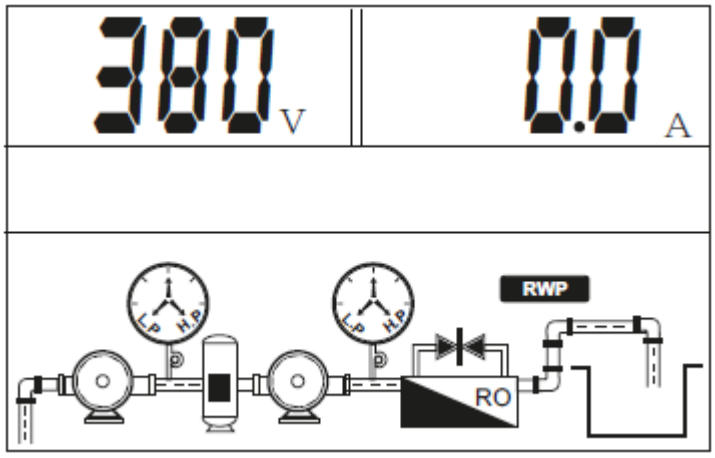
THE HPP HAS RUN FOR 2 HOURS

- Every two seconds RWP and HPP running time will be alternated displaying
- press STOP key to quit

RO controller parameter setting mode

Step 1: press MODE key to switch to manual state, the LCD displays:

make sure the pump is not running



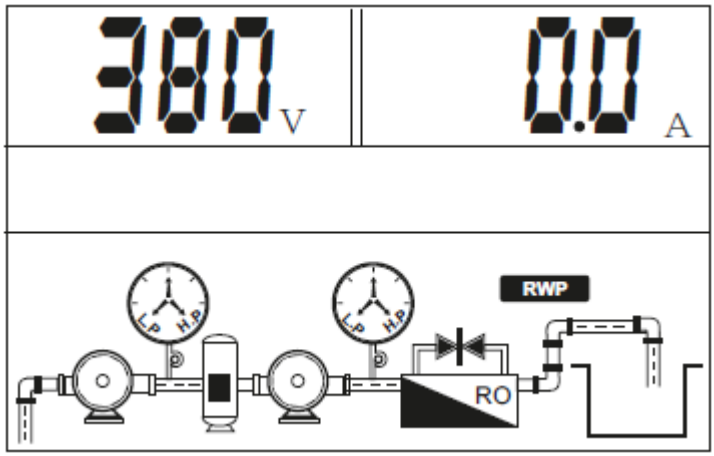
Step 2: hold pressing MODE button for at least 5 seconds, till controller makes a „beep" sound and LCD displaying:

Loosen the MODE key and enter into parameter adjusting mode.

Step 3: after entering parameter setting, press MODE button to select the parameter code

Step 4: press RWP button to add or press HPP button to decrease the parameter setting value according tot he user's specific technical requirement

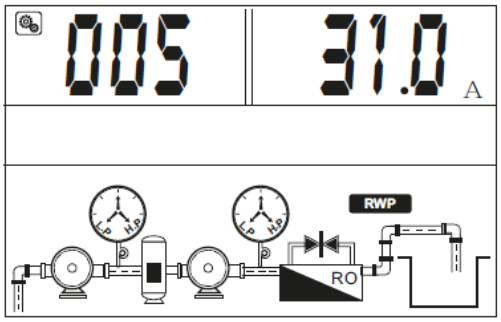
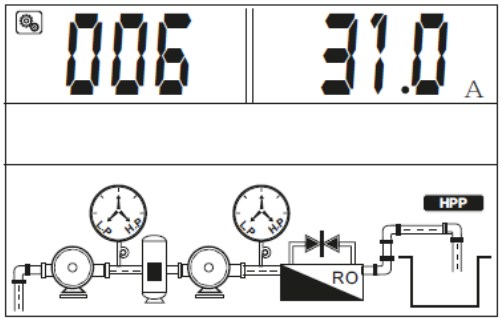
Step 5: after adjusting completed, hold pressing STORE button for 5 seconds, till controller makes „beep” soundand LCD displays:

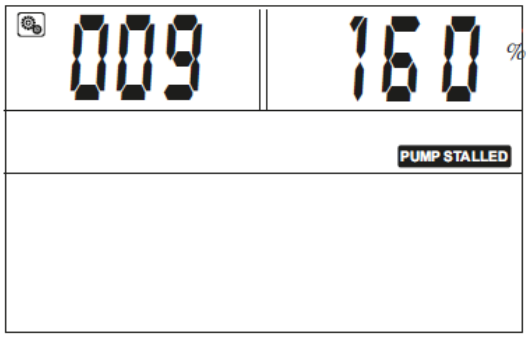
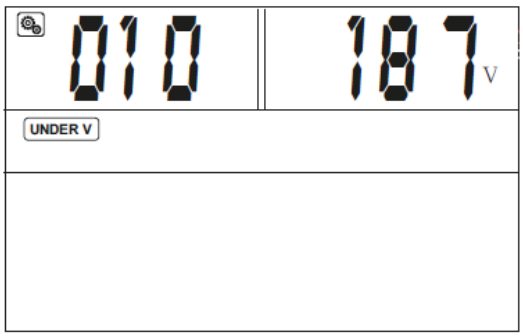


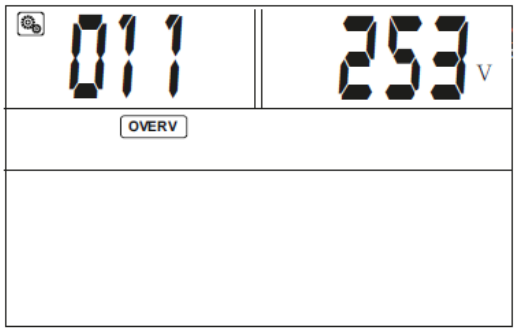
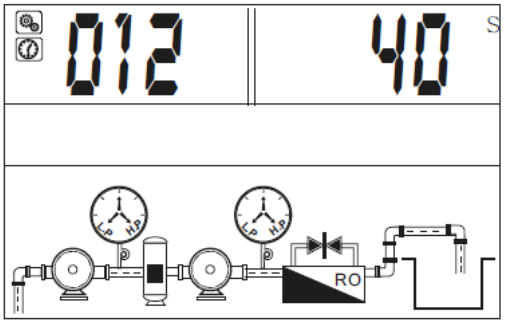
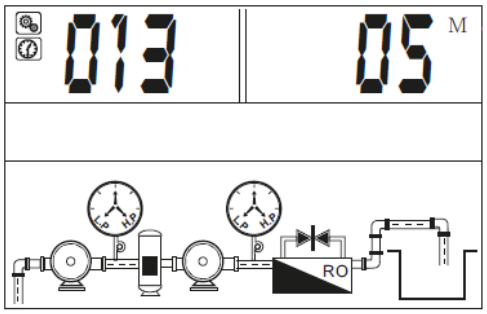
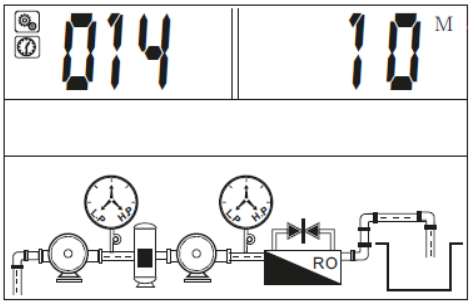
Loosen STORE button, adjusting store completed.

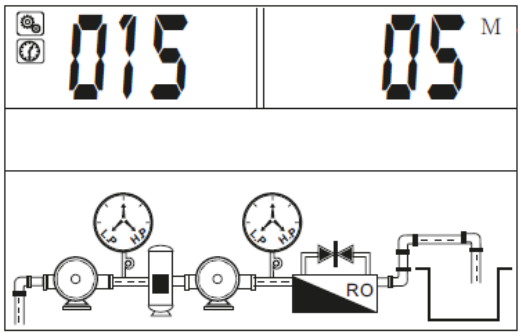
Parameter manual and code meaning:

LCD displays	Meaning
	dry-running protection without pump load, range: 1 - 60 seconds, recommended setting: 5 seconds
	recovery time after dry run error, so many minutes waiting for recovery, range: 1 - 254 minutes, recommended setting: 1 minute

	recovery time after overload protection, how many minutes waiting for recovery, range: 1 - 60 minutes, recommended setting: 1 minute
	recovery time after low voltage or overvoltage fault, so many minutes waiting for recovery, range: 1 - 60 minutes, recommended setting: 1 minute
	setting of the nominal flow of the inlet water solenoid valve, range: 0.1 - 31A, recommended setting: 0.1A
	setting of the nominal current of the high-pressure pump, range: 0.1 - 31A, recommended setting: based on actual pump current

	setting for dry running protection without pump loadn if its permanently exceeds the set value, range: 0 - 95% recommended setting: 70%
	setting of overload protection, if it permanently exceeds the set value, range: 0 - 150% recommended setting: 135%
	setting of protection against pump jams if the power consumption exceeds the set nominal value, range: 0 - 170% recommended setting: 160%
	low-voltage protection, range: 0 - 295V recommended setting: 1 phase: 187V 3 phases: 323 V

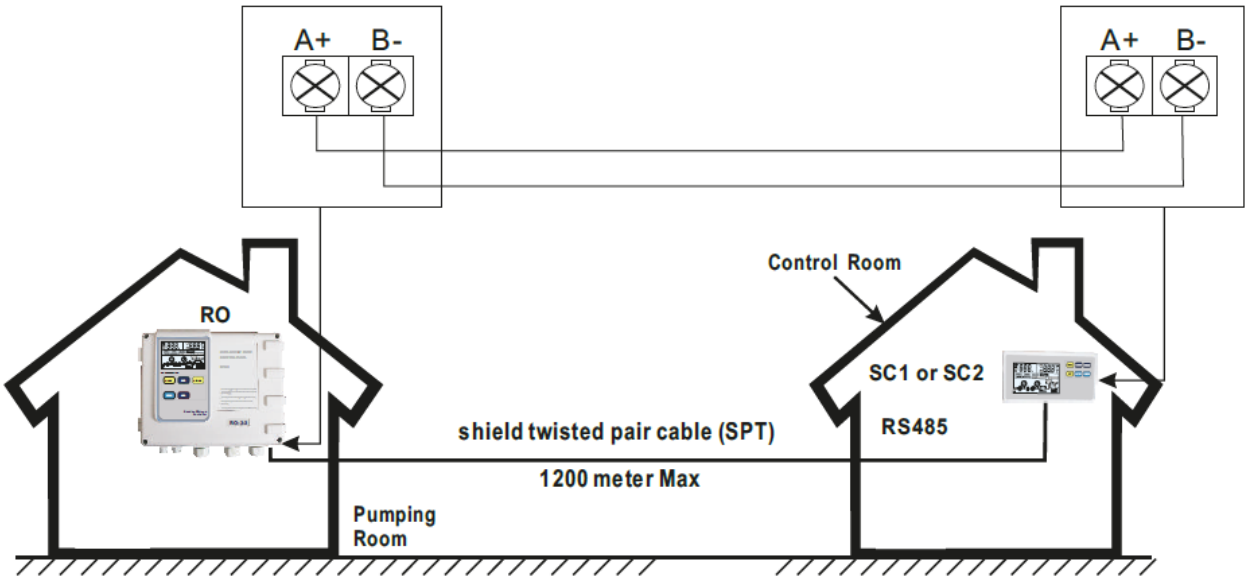
	high voltage protection, range: 0 - 295V recommended setting: 1 phase: 253V 3 phases: 427V
	start delay, high-speed pump start delay, range: 0 - 120 seconds recommended setting: 10 seconds
	start-up flushing time, range: 0 - 254 minutes recommended setting: 1 minute
	HPP starting delay time, default is 10 minutes, recommended setting: 1 minute

	flushing time when the permeate level reaches a high level, range: 0 – 254 recommended setting: 1 minute

Communication link

This RO controller has communication interface. To adopting simple peripheral equipment (slave controller), pump users can realize long distance monitoring function.

This function is applied fo RO installed in the basement, pumping room etc., but pump users require to monitor and control the pump on the ground or in the control room.



Basic function

Slave controller, model SC1 with communication interface can realize long distance monitoring function. In the control room, pump users can realize all functions of RO (master controller) through SC1, including: voltage and ampere displaying, pump fault displaying, auto/manual switch, pump start/stop switch, pump running status displaying etc.

Special application

As adopting communication interface, the wire communication distance is less than 1200 metres. For those installation environment which require long distance communication users can adopt RS485 extender, wireless comunication or GSM system.

Technical parameter

The following chart shows main technical parameters of communication link between RO and slave controller (SC)

Main technical date	
Physics interface	RS485 Bus interface: asynchronism semiduplex
Data format	1 start bit, 8 data bit, 1 stop bit, no verify 1 satrt bit, 8 data bit, 2 stop bit, no verify Default: 1 start bit, 8 data bit, 1 stop bit, no verify
Baud rate	1200 bps, 2400 bps, 4800 bps, 9600 bps, default: 9600 bps
Communication address	Setting range of controller adress: 1-126 127: broadcast address, host computer broadcasting, slave machine responsion forbidden
Protocol type	Modbus Protocol (RTU)
Rated input voltage for SC	AC220V/50Hz

Main installation data	
Wire communication distance	max 1200 metres by shield twisted pair cable (STP) for RS485 and CAN max 5000 metres by STP and RS485 extender
STP	STP-120 one pair 20AWG for RS485 @ CAN
RS485 extender	5000 metres (9600 bps)

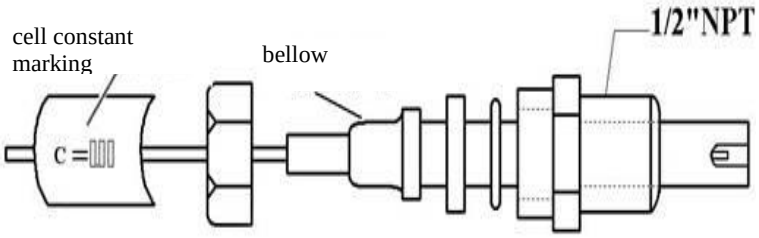
Troubleshooting guide

Fault message	Possible cause	Solution
UNDER V flashing	the real running voltage is lower than the calibrated voltage, pump is in under voltage protection state	report low lone voltage tot he powersupply company
		RO controller will attempt to restart the pump every 5 minutes until line voltage is restored to normal
OVER V flashing	the real running voltage is higher than the calibrated voltage, pump is in under voltage protection state	report high lone voltage tot he powersupply company
		RO controller will attempt to restart the pump every 5 minutes until line voltage is restored to normal
PUMP STALLED flashing	pump motor running ampere increasing was greater than the normal running ampere (calibrated ampere) by more than 200%	cut off power supply & repair or replace pump immediately

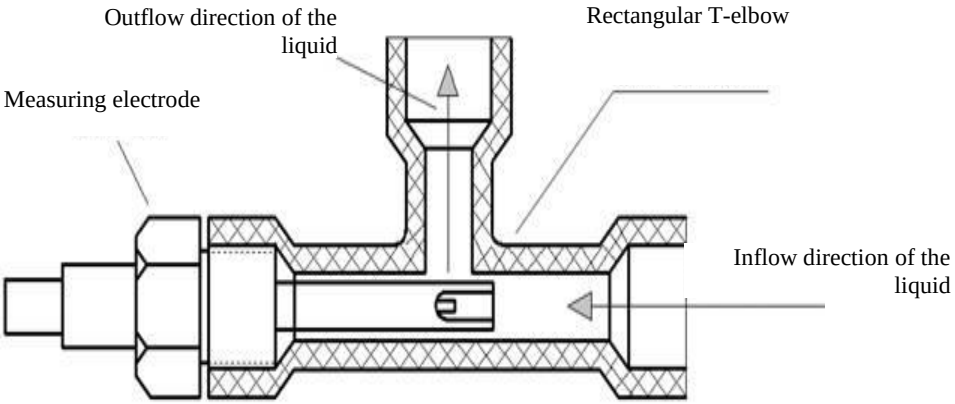
OVER LOAD flashing	the real running ampere is higher than the calibrated running ampere, pump is over load protection state	RO controlled will attempt to restart the pump every 30 minutes until running amere is restored to normal
	pump impeller is jammed / pump motor dragging / pump bearing broken	check pump impeller or bearing
OPEN PHASE flashing	power supply lose phase	report to the power supply company
	controller inlet wire or pump cable broken	repair inlet wire or pump cable
PUMP NO CALIBRATION flashing	parameter calibration not completed	refer to parameter calibration setting
DRY RUN flashing	liquid level in the well / sump is below the pump intake, pump stops running	RO controller will attempt to restart the pump every 30 minutes until liquid level above the pump intake

9. Electrode (cell) adjustment

In order to ensure the measured results are valid, data distortion caused by bleb or standing water in the leading cell needs to be avoided. The set up needs to strictly follow the steps that can be seen on the pictures.



1. External view of the CELL



2. Pipeline set up mode

Comments:

(1) The electrode needs to be installed to the pipeline's lower part, where the flow rate is constant and bleb can rarely arise.

(2) It does not matter, that the conductivity measure cell is built in vertically or horizontally, it has to penetrate deeply into moving water.

(3) The conductivity signal is a weak electronic signal, the collector cable needs to be built in seperately. It is forbidden to connect them to the same cable connection group or terminals, as the power supply.

(4) If the measure cable needs to be lengthend, it is suggested that you use a cable that is given by to manufacturer. If it needs to be even larger, the cable length (<30m) needs to be agreed on before shipment, and if the length is bigger than 30m, a transmitter needs to be used.

10. Maintenance

(1) The conductivity measuring cell, which is a refined component can not be disassembled. Unless the electrode cell is not needed, it can not be taken out of the measuring cell. The conductivity measuring cell needs to be cleaned regularly in order to keep the surfaces clean. If the electrode's platinum coating would get tainted, put it into a 10% hydrochloric acid for two minutes, then dip it's surface into clear water in order to keep them clean.

(2) The measuring cable is a special component and it can not be changed as we wish, because it can cause some severe errors.

(3) A special auxiliary electrode cell needs to be used in case of damage.

11. Troubleshooting

1） The solenoid valve can not be opened --- the solenoid valve's wrong selection, high-voltage solenoid valve has to be used.

2） Low pressure warning in the rinsing valve's open state --- way too big opening on the rinsing valve, wrong selection or way too big bore can cause decreasing in the pressure. An appropriate solenoid valve needs to be chosen or fitting valve needs to be used before the solenoid valve.

12. The whole equipment's stock

Measuring panel	1	Sensor	1
Shackle	1	Book of instruction	1

Operating log

Date	*Working hours* (h)	*Pressure before filters* (bar)	*Pressure after filters* (bar)	*Pressure after booster pump* (bar)	*Flow of permeate* (l/min)	*Flow of concentrate* (l/min)	*Conductivity* (µS/cm)	*Water termperature* (°C)	*Others*	*Signature*

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 Ltd 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

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 equpment'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	.....µs
2.5	Pressure of membrane	.....bar
2.6	Quantity of permeatum	.....L/h
2.7	Quantity of concentrate	.....L/h
2.7	Quantity of recirculation	.....L/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

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 occured.

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

QUALITY CERTIFICATE

<table>
<tr><td colspan="2">1. Issuer of the quality certificate:

Euro-Clear Ltd.</td><td colspan="2">2. Producer:

Euro-Clear Ltd.</td></tr>
<tr><td colspan="4">3. Punctual name of product (its function):
Automatic reverse osmosis device. Type: BlueClear……..</td></tr>
<tr><td>4. Quantity

1</td><td colspan="2">5. Weight and (or) size:</td><td>6. Date of production:

……..……</td></tr>
<tr><td colspan="2">7. Can be used</td><td colspan="2">8. Identifying product
a./ Control valve number:
b./ ITJ-number:
c./ Part number:
d./ Other identifying details:</td></tr>
<tr><td colspan="2">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.</td><td colspan="2">10. Wrapping:
Cardboard.</td></tr>
<tr><td colspan="4">11. Important features of the product (with punctual technical data, results of measurement):

Flow of volume: ……...….litre/hour

Quality and classifying: Convenient!</td></tr>
<tr><td colspan="2" rowspan="3">14. Other details:
Serial number:</td><td colspan="2">12. Method of inspection for checking the quality of the product: During production</td></tr>
<tr><td colspan="2">13. Regulation for use and handling:
As it is mentioned in the guide for use and handling</td></tr>
<tr><td colspan="2">15. Signature of the person issuing the quality certificate:

Date:
Gönyű, 20……..…..

.....
Signature, stamp</td></tr>
</table>