

Reverse Osmosis System Aquaphor



M A N U A L O F I N S T A L L A T I O N A N D O P E R A T I O N

MODEL: _____

SERIAL NUMBER: _____

PLACE OF INSTTALATION _____

COMMISSIONING DATE _____

CONTENT

INTRODUCTION	3
2. CORRECT USE	3
3. DESIGNATION AND AGGANGED SETS	4
3.1. Designation	4
3.2. Arranged sets	5
4. TECHNICAL FEATURES	6
5. REQUIREMENTS TO THE QUALITY OF THE SOURCE WATER	6
6. DEVICE AND PRINCIPLE OF OPERATION	7
6.1. Device	7
6.2. Technological scheme of the reverse osmosis system Aquaphor	8
7. REVERSE OSMOSE SYSTEM INSTALLATION	11
7.1. Caution	11
7.2. Connection	11
7.3. Running	11
7.4. Security measures	11
7.5. Start-up	11
7.6. Operation	12
7.7. Technical service	12
7.8. Operating regime	13
8.0. CONTROLLING SYSTEM	13
8.1. Controlling and indication system	13
8.2. Process controller	13
8.3. Technical parameters of the controller	14
8.4. Control panel indication	14
8.5. Linking up and turning of the controller	15
8.6. Electrical circuits	17
8.7. Dimensions of reverse osmosis systems Aquaphor	23
8.8. Table of correspondence marked in Russian and English	
8.9 Possible defects	26
9. Washing Regime on place	28
10. Storage rules and transportation	29
11. GUARANTEE	29
12. Guarantee ticket	31

1. INTRODUCTION

The reverse osmosis system Aquaphor (hereinafter OO system) was manufactured by "Westaqua-Invest OÜ" (Estonia), by order of Aquaphor Ltd (Russia, St. Petersburg).

The OO system is designed to reduce the total salt content on the principle of reverse osmosis (demineralization, deionization, reduction of electrical conduction) from the water of municipal and local water nets (artesian wells, fountain, etc.) in accordance with the requirements established by this manual.

The OO system is the most effective and safe water demineralized generator.

Caution: The OO system is not designed to solve all the problems associated with water purification and is not usually installed (as the main stage of purification). Its proper operation requires pre-cleaning.

The OO system is allowed for importation in accordance with hygienic indicators for the purpose of selling it on the territory of the Russian Federation as a filter to reduce the total salt content in the water, provided that the sanitary norms and rules of use are observed.

Materials of the OO system are safe, non-toxic and do not release into the water substances dangerous for health and the environment. On hygienic and sanitary-chemical indicators, the OO system corresponds to the hygienic requirements.

2. CORRECT USE

2.1. The OO system is designed for water demineralization, i.e. elimination of dissolved salts, including hardness salts, heavy metals, fluorides, nitrates, ammonium, etc., organic substances, bacteria, viruses and allows to receive water in accordance with the norms of SanPiN 2.1.4.1074-01 "DRINKING WATER, HYGIENIC REQUIREMENTS TO THE QUALITY OF WATER OF CENTRALIZED SYSTEMS OF DRINKING WATER SUPPLY. CONTROL "and better, as well as high-quality water for technological needs.

2.2 The OO system of the L version is installed at the objects (apartment houses, enterprises, boiler rooms, etc.), where the power of the electrical networks, the main line of water supply and water removal lines meet the requirements of this manual.

2.3. The OO system is designed and manufactured to take into account continuous operation, throughout the whole life time, meet the requirements set out in this manual. Cases of stops are depended on carrying out the routine maintenance, the ordinary maintenance, chemical rinsing, etc.

2.4. For the optimal choice of the OO system and types of membranes installed in it, the customer must provide the results of the water research or a sample of water for conducting analysis and the requirements for the purified water quality.

2.2. DESIGNATION AND AGGANGED SETS
(formula) Reverse osmosis systems Aquaphor

DESIGNATION

Reverse osmosis system Aquaphor model T RO X- Y- L-NNN- Z-QQ-UJH-G-T-A

Designation	explanation of the designation	decoding of the designation
T	Trade name (if any)	AP (Aquaphor Professional)
RO	type of the system	reverse osmosis
X	Form factor of the system	S - small
		L - standard
		I – industrial
Y	Nominal system capacity for clean water	from 125.... to 500000 , l/h
L	Type (s) of the prefilter (s) * (if any) (* - no designation in the case of a standard prefilter set)	UF - ultrafiltration
		MF - microfiltration
		BG – bag type
		MC - multipath filter
		CF - angulous
		SF-softening
		SC - rinsing netted or disk
		UV - disinfect
		PP - polypropylene
		AF - settling
		BF-deironing
		Y1-Y100 - set of prefilters
NNN	membrane * (* - no designation in the case of the membrane 21H(seria S), 22H (seria L) , 23H (seria I))	N - selectivity: 1-special 2-high-selective 3-low selective
		N - membrane size: 1 - 4021 2-4040 3 - 8040 N - membrane type: H - high-pressure U - low pressure X - extra low pressure S - to sea water A - resistant to oxidizer F - on organic water N - nanofiltration
Z	pump(s) (if any)	C – CNP (Hydro)
		G - Grundfos
		W - Lowara
		T - Fluid-o-Tech
		P - Procon
		X – Pentax Pump
Q	dosing pump (if any)	D
Q	Number of dosing pump	from 1 to 10
U	Ablution Flushing (if any)	F
J	Permeate ablution (if any)	PB
H	Completion for chemical ablution (if any)	CIP - "set" for ablution
G	Postfilter type (s) * (if any)	FC - conditioning
		UV - deironing
		UF - ultrafiltration

	(* - no designation in the case of a standard set of postfilter)	M - mineralization
		MF - microfiltration
		V1-V100 - a set of post filters
T	Storage capacity (if any)	Capacity from 0.01 m3 to 100 m3
A	Modification (to specification)	from 1 to 100

Example: **Reverse osmosis system Aquaphor model AP RO L-22S-300-G-D-F-PB**

The system version is medium, the nominal capacity of the system is 300 l / h, with the Grundfos pump, with the metering pump, the basic version (prefilter PP + CB / PP, membrane 22S highly selective membrane 4040, S - salt water), with washing drainage, with the discharge of the primary permeate.

3.2 System complicity

№	NAME	TYPE	QUANTITY OF ELEMENTS				
			AP RO L-300- 22S	AP RO L-600- 22S	AP RO L-825-22S	AP RO L-1000- 22S	AP RO L-1500- 22S
F01-F02	filter frame	Gross 10(20)"	2	2	2	2	2
	Polypropylene (or coal)	PP 20 µm (B510(20)-12)	1	1	1	1	1
	Polypropylene	PP 5 µm 20(10)"	1	1	1	1	1
LPS 01- LPS 02	Low pressure switch	SS316, 10bar	2	2	2	2	2
HPS 01	High pressure switch	SS316, 35bar	1	1	1	1	1
XV-01	Input EM Valve	1", 220B, SS316	1	1	1	1	1
XV-02	Crane with servo drive for drainage washing	1/2", 220B, SS316, 2W	1	1	1	1	1
XV-03	Valve with servo drive of permeate discharge	1/2", 220B, SS316, 3W	1	1	1	1	1
PI1- PI3	Pressure indicator	0-10 bar SS316	2	2	2	2	2
		0-40 bar SS316	1	1	1	1	1
V01-V02	Crane for CIP provisioning	3/4", 1"	2	2	2	2	2
P-01	High pressure pump	CNP (Hydroo TM), Grundfos, др. SS316	1	1	1	1	1
MV-XX	Membrane frame (XX - frame number)	4040 SS316	2	4	4	6	8
		or 4080 SS316				3	4
RV01	Regulating cock of pump adjustment	1", SS316	1	1	1	1	1
RV02-RV03	Regulating cock	½" (¾" / 1") , SS316	2	2	2	2	2
CV01-CV05	Check disk	½" (¾" / 1")	4	4	4	4	4
FL01-FL03	Fluid meter	½" (¾" / 1")	3	3	3	3	3
ECT-20	Conductivity sensor	CON3134-14	1	1	1	1	1
	Process Controller	CCT-7320	1	1	1	1	1
	Electrical cabinet	380B	1	1	1	1	1
	Frame	SS304	1	1	1	1	1
	Membrane	4040	2	4	4	6	8
	Passport		1	1	1	1	1
	Packaging		1	1	1	1	1

ATTENTION: The APRO system, having the designation D, 2D, 3D, ... in its name, is equipped with a dosing pump

(pumps), instructions for its adjustment and connection are not included in this manual, but are provided separately with other documentation.

4. Technical features

MODEL	AP RO-L-300-22S	AP RO-L-600-22S	AP RO-L-825-22S	AP RO-L-1200-22S	AP RO-L-1500-22S
Supply	380В, 50Гц				
Reducing salinity,%		to 99,7			
Type and number of membranes	2 x 4040	4 x 4040	4 x 4040	6 x 4040	8 x 4040
Productivity on pure water, l / h	300	600	825	1000	1500
Flow of inlet water at a pressure of 3 bar, m3 / h	0,8—1,1	1,2—1,65	1,6—2,2	2,4—3,3	3,2—4,4
Degree of permeate selection %	45-85				
Net weight, kg	159	180	199	230	255
Energy input, W	3000		4000	5500	
Dimensional specifications, mm	1850 / 1160/ 900			with frames 4080 1500 / 2200/ 800 with frames 4040 1850 / 1160/ 900	
Porting pattern inlet / outlet / other.	1" / ¾" / ¾" NPTF				

5. REQUIREMENTS TO THE QUALITY OF THE SOURCE WATER

- 4.1 Chlorine. Often, municipal water is chlorinated for its sterilizing, in this case, a pre-filter is required to be installed for removing chlorine (as a rule, based on coal sorbents). The reverse-osmosis membranes are made from the special film webs, and free chlorine can destroy the membrane.
- 4.2 Hardness. For continuous operation of the OO membrane, the source water hardness should not exceed 0.34 meq / l (17 ppm). To ensure this parameter, it is necessary to install softening equipment. If this parameter is not kept, to restore the working capacity of the membranes their chemical washing out may be required.
- 4.3 Iron. If the concentration of Fe²⁺ + iron ions in the input water is more than 0.1 mg / l (total iron up to 0.3 mg / l), deferrizing equipment must be installed.

The membranes performance is indicated at a source water temperature of 25 ° C, it decreases together with a decrease in the temperature of the source water.

For example: lowering of the temperature of the input water at 1 ° C can reduce the performance by 3%.

Operational parameters of the source water

PARAMETER	SIZE
Input water temperature	+5...+35 °C
Minimum pressure of the inlet water	40 PSI (2,8 kg/sm ²)
Minimum flow of inlet water	2,0 m ³ /h
Maximum discdraining into the drainage	1,25 m ³ /h
Operating temperature range	4 ÷ 45 °C
Permissible (optimal) pH range	3 ÷ 10 (7 ÷ 7,5)

Hardness	max 0,34 mg-equiv/l (17 mg/l)*
Suspended load	max 5 SDI
Petroleum derivatives	none
Synthetic surfactants	none
Salinity (TDS)	12000 mg/l
Iron total	max 0,1 mg/l
Oxidizers (chlorine, ozone, KMnO ₄)	max 0,1 mg/l
Manganese (Mn)	max 0,05 mg/l
Organic impurities	max 5 mgO ₂ /l

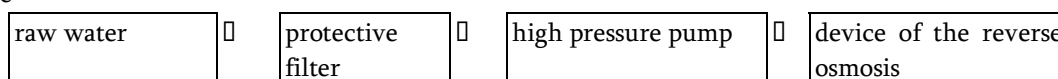
* The value is given for crude estimate. Is determined by the Langelier index in the concentrate line after the last step. To prevent clogging of membranes with hardness salts, the value of Langelier should be negative.

Note: If your water does not meet the presented requirements, a special equipment must be installed before the OO system. Recommendations for the installation of the additional equipment are issued by a specialist of the service department on the basis of water analysis, binding to geodetic and architectural-planning conditions of the customer.

Attention: While filtering water from unknown sources, in order to prevent biofouling, incoming water must be decontaminated - MANDATORY. Optimal for these purposes is the ultrafiltration system Aquaphor ULTRA, providing 100% guarantee for the removal of microorganisms without the use of reagents.

6 DEVICE AND PRINCIPLE OF OPERATION

6.1 Device



6.1.1 Process diagram

Protective filter:

The Gross 10 (20) filter with module B520-12- is installed at the inlet of the unit to protect the membranes of the OO system from the action of active chlorine (B520-12). It is made of sintered powdered activated carbon in a polymer matrix (Carbon Block technology). Or with the PP20 module for protection against mechanical suspensions.

The Gross 10 (20) filter with PP5 µm module is installed after B520-12 or PP20 to prevent particles larger than 5 µm from entering into the membrane modules of the TOE system. The filter element is made of polypropylene.

It is necessary to regularly replace the filter modules to maintain the water supply rate, as well as to prevent the entry of chlorine and particulate matter into the membrane modules.

Replacing instruction: Deenergize the installation, make sure that there is no pressure (if the pressure remains, close the water supply to the OO system to relieve the pressure), place a suitable container for the drained gross to collect the drained water, attach the flare nut of the gross housing with the key, and unscrew it holding the body cup, remove the old module, pour out the water, if necessary, wipe the glass and the top cover, install a new module, set the glass of the case back vertically, tighten the body nut manually and lightly pull it with a key to a full seal.

After replacing or inspecting the modules, it is necessary to open the exhaust valve at the top of the protective filter in order to vent air in the beginning of operation. Modules should be replaced when the pressure difference before and after them is > 0.06 MPa. It is required to regularly replace modules, usually every one to three months. This is necessary to prevent them from clogging or damaging the membranes of the reverse osmosis plant with solid particles or chlorine.

6.1.2 High-pressure pump of reverse osmosis system

The TOE system can be equipped with pumps of various manufacturers and brands, the algorithm of the OO system operation does not change

User's manual:

6.1.2.1. Establish a pressure regulator to provide the recommended pressure at the entrance to the TOE system, switch the pump to automatic mode. Automatic operation of the pump is provided by means of water level sensors of the source water tank, clean water tank, and the input pressure switch.

6.1.2.2 Before starting the pump, unscrew the air outlet screw located at the top of the pump to vent air.

6.1.2.3 If the pump is used after a long period of inactivity, first check that the fan of the motor can freely rotate, as corrosion may be seized.

6.1.3. Installation of reverse osmosis.

Before installing the membranes, it is necessary to flush the piping of the unit in order to avoid the ingress of dust generated during installation or other debris into the high-pressure system of the reverse osmosis unit. Caution: the direction of installation of membranes is strictly defined and indicated by arrows.

6.1.4 Principle of water purification in the reverse osmosis system.

In the system, the osmotic membrane (s) is back. With proper maintenance of the TOE system, the life of the membranes is 3-5 years or more. This manual provides operating and maintenance procedures that maximize the benefits of the installation and extend the life of the reverse osmosis membranes. The operation of the TOE system is based on the membrane separation method, which allows the removal of salt ions, organic compounds, colloid particles, bacteria and other impurities from water to desalinate or purify it. The principle is based on the principle of separating the solvent (pure water) and the solution (contaminated water) with a membrane. Water (solvent) tends to get into the solution - this process is called osmosis. There is an osmotic pressure between the water and the solution. If the pressure is applied to the solution more than the osmotic, the solvent (water) will be filtered through the membrane back out of the solution. Thus, it is desalinated by reverse osmosis. At sufficient pressure, the raw water passes through the reverse osmosis membranes, after which purified water comes out of the unit. The concentration of dissolved substances and suspended particles gradually increases. Then this solution is drained in the form of drain water. This is the principle of the water purification system based on reverse osmosis.

6.2. Flow chart of the reverse osmosis system.

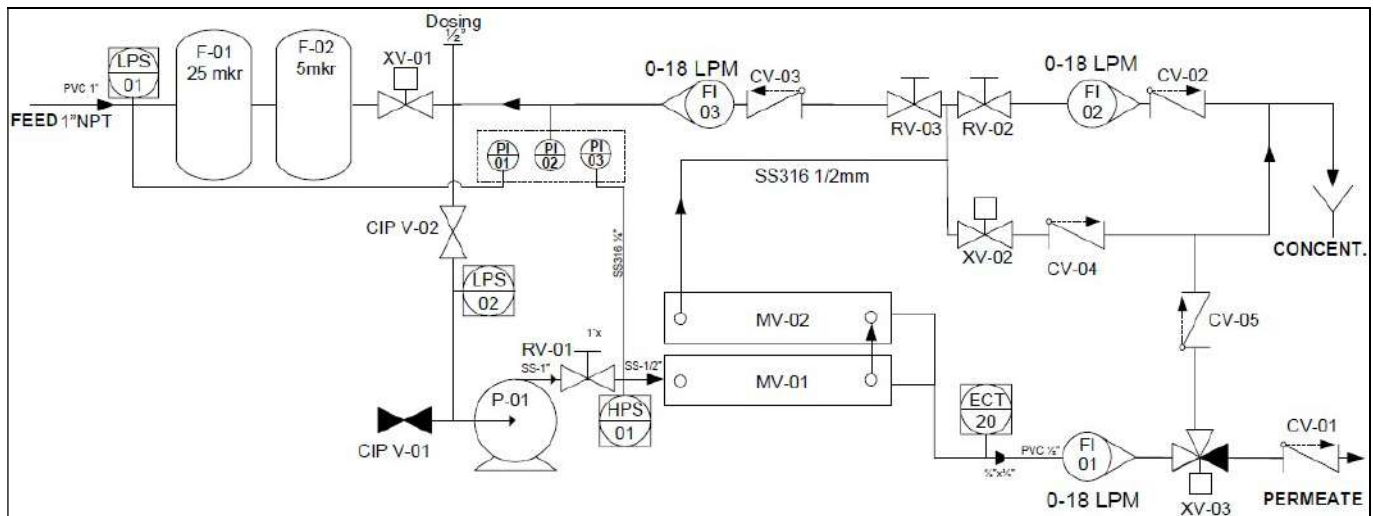
Unrefined water passes through protective filters that allow the removal of chlorine (in models completed with module B510-12 or B520-12) and most of the suspended particles, and enters a high-pressure pump that raises it to 0.6-1.5 MPa (the required pressure depends on the type of membrane used). Then, the water is fed to a reverse osmosis unit under pressure. The unit consists of casings in which reverse osmosis membranes are installed separating permeate (product, ie purified water) and concentrate (drainage). Permeate and concentrate come out of the housing through different openings. Concentrate passes through the entire body and enters the drain pipe. The concentrate consumption is regulated by a special crane. A concentrate flowmeter is used to measure concentrate consumption. Part of the concentrate can be returned to ensure the economy of the TOE system. The recirculation flow rate is regulated by a special crane. To measure the flow of recirculation, the flowmeters of the concentrate and permeate (product) are used in conjunction with the high-pressure meter. Permeate (product), obtained with reverse osmosis membranes, enters a clean water tank, its flow rate is measured by a permeate (product) flowmeter

Nº	name	Nº	name
F-01	Mechanical cleaning filter	MV-XX	Membrane frame (XX - frame number)
F-02	Mechanical cleaning filter	RV-01	Regulating cock of pump adjustment
LPS01	Low pressure switch for dirty water	RV-02	Regulating cock of concentrate adjustment
LPS02	Low pressure switch after filters	RV-03	Regulating cock of recycle
HPS02	High pressure switch	CV-01	Reverse valve of permeate (product)
XV-01	Crane with servo drive 2W	CV-02	Reverse valve of concentrate
XV-02	Crane with servo drive 2W	CV-03	Reverse valve of recycle
XV-03	Valve with servo drive 3W	CV-04	Reverse valve of washing range
PI1	Source water pressure indicator	FL-01	Meter run of permeate
PI2	Pressure indicator after filters	FL-02	Meter run of concentrate
PI3	Diaphragm pressure indicator	FL-02	Meter run of recycle
V-01, 02	Crane for CIP provisioning	ECT-20	Sensor of electrical conduction
P-01	High pressure pump		

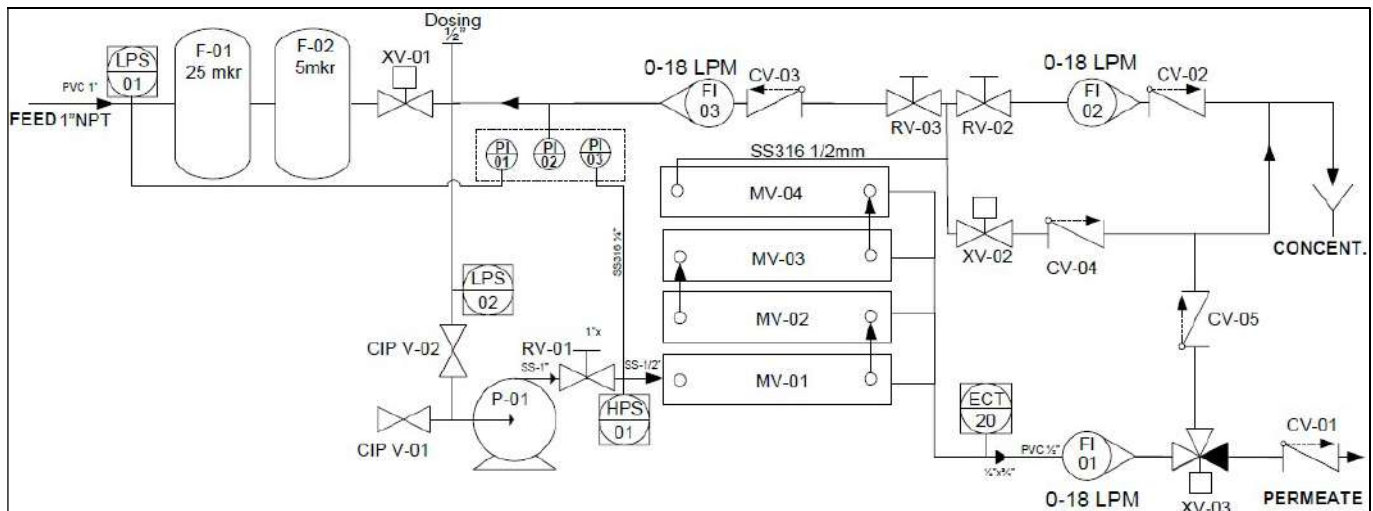
ATTENTION: The manufacturer reserves the right to make design changes that do not degrade the technical

characteristics, but are the result of work to improve the product or its production technology, without prior notice and reflecting them in this manual.

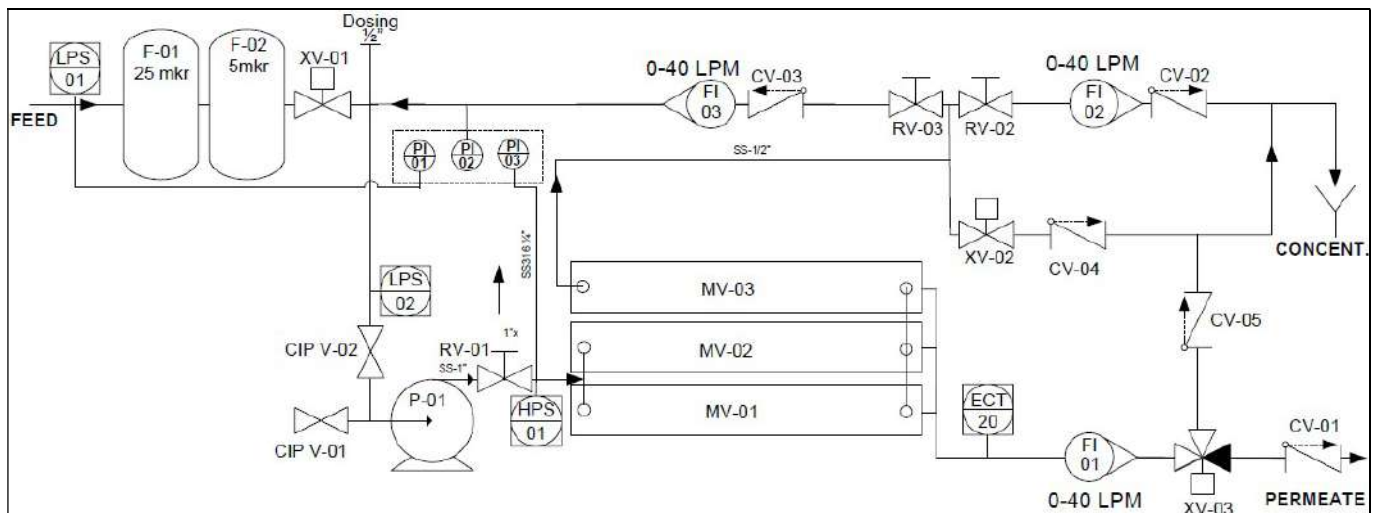
Technological scheme of the reverse osmosis system Aquaphor model AP RO-L-300-22S



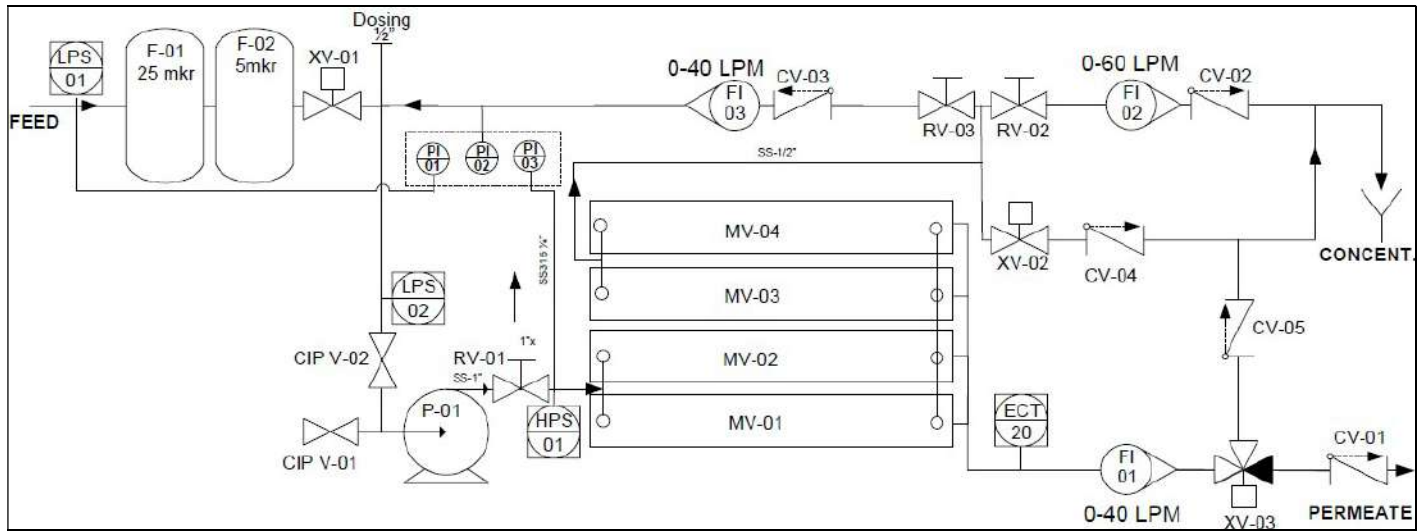
Technological scheme of the reverse osmosis system Aquaphor model AP RO-L-600/825-22S



Technological scheme of the reverse osmosis system Aquaphor model AP RO-L-1000-22S



Technological scheme of the reverse osmosis system Aquaphor model AP RO-L-1500-22S



7. Reverse osmosis system installation

7.1. Attention

- The OO system must be installed in a dry place out of direct sunlight. Increased humidity can lead to the functional loss of the electrical components.
- Ensure that the installation place is hard enough. While installing the OO system, provide enough space for its maintenance.
- In case of mismatch the source water parameters with the requirements of this passport,
- Install the necessary water conditioning elements recommended by the representative of the service provider or the supplier of the OO system: sediment protection filter, deionizer, carbon sorbent filter, softener, ultrafiltration system, etc. While installing equipment for water conditioning, provide enough space for its maintenance.
- The columns of OO system must be lined up with the help of a special level.
- To prevent the OO system breaking down, the temperature in the room where it is installed must be within $4 \div 45^{\circ} \text{C}$
- The level in the container with purified water cannot be more than 1.5 m of the level of the permeate line (outlet from the membrane), otherwise, the system may break down (for option without a reverse valve on the permeate line).
- The diameter of the supply main must not be less than the diameters of the connecting dimensions of the OO system.
- Please, carefully make the connection according to the electrical scheme, and also check the characteristics of the electrical network.

7.2. Connection

7.2.1. It is desirable to place the OO system near the supply line and the electric network.

7.2.2. Connect the inlet outlet and drainage of the OO system to the source water line, permeate line and drain line, respectively.

7.2.3. Connect the power supply, make sure that the frame of the OO system is grounded, turn on the power supply, the power indicator should light up.

7.2.4. Before submitting water to the input of the OO system it is recommended to start and rinse each prefiltration stage, if it is installed.

7.2.5. After the prefilters have been flushed, switch them to the "service" position.

7.3. Running

7.3.1. Run a raw water pump and maintain a low pressure of at least 2 kg / cm². Turn the system operation switch to the manual control position (CIP). Open the taps V-01 and RV-01, cover, but do not completely close the taps RV-02 and RV-03.

7.3.2. Pass water through reverse osmosis equipment for 10 ~ 15 minutes to remove air.

7.4. Security measures

7.4.1. To the OO system operation are allowed the personnel who had briefed on safety methods, are familiar with the principle of operation, the device, and the operating rules.

7.4.2. On the OO system, all safety methods are generalized for the operation of electrical equipment with a voltage of 220 / 380V 50Hz.

7.4.3. The OO system must be connected to a grounded power source. In the absence of grounding, the frame part of the OO system must be reliably grounded to the ground loop of the room where it is installed.

7.4.4. Do not open the electrical control cabinet, control controller, or manipulate the electrical components of the OO system (pump motor, a solenoid of the electromagnet valve, pressure switch, etc.) with the power supply connected.

7.4.5. It is forbidden to open, "draw up" or "loose the structural components that are under pressure.

7.5 Start-up

7.5.1. Pre-starting procedure (is carried out with manual mode):

As there are preservatives in the new reverse osmosis membranes, they must be thoroughly rinsed before use. Fully open the cranes RV-01 and RV-02, close the RV-03 valve, start the raw water pump and the high-pressure pump. Achieve steady operation of the pump by covering the RV-01 (! With the high-pressure pump running, close the VR-01 valve by more than 2/3 DO NOT!).

ATTENTION: Correct adjustment of the RV-01 crane is necessary to exclude the effect of cavitation. In case of the necessary experience absence, do not try to configure the system yourself, contact the service department.

The incorrect setting can lead to high-pressure pump breaking down.

7.5.2. Reverse Osmosis System Operation:

After washing the membranes, slowly adjust the RV-02 concentrate cock and the RV-03 recirculation valve, increasing the working pressure to 0.6-1.5 MPa (depending on the type of membrane element). Achieve the ratio of permeate and concentrate 70/30% (60/40, 80/20, etc., depends on the salt content, the quality requirements for purified water, and the type of membrane element), permeate productivity should be ~ 500-2000 l / h, and for concentrate 150-600 l / h depending on the model.

Caution: Depending on the composition of the source water, its salt content and the type of membrane element, the ratio of concentrate and permeate may vary. Optimum ratio of permeate and concentrate to the service department, this requires a complete analysis of water with the layout of cations and anions of dissolved salts.

If the flow rate of the concentrate or permeate does not match these values, adjust the flows with the RV-02 and RV-03 cranes. Not matching the nominal ratio of fluxes towards increasing permeate will result in precipitation of insoluble impurities, which will shorten the interval between reagent cleaning and reduce the life of reverse osmosis membranes.

7.5.3. Check the operating pressure and compare it with the results of the first test and the technical specifications.

7.5.4. Check for water at the outlets.

7.5.5. Check the system for leaks, repair them if necessary. Before work, disconnect the unit, bleed the pressure.

7.5.6. Check the concentrate consumption.

Note: After the start up, record the indications of the elements of the OO system operation indexing, it will help to predict the maintenance schedule of the system (WARRANTY REPAIR TICKET (2 sheets))

7.6. Operation

7.6.1. 7.6.1. Pressure and degree of regeneration.

The system operates at design pressure. The operator must adjust the concentrate discharge valve so that the working pressure is 0.6-1.5 MPa (depending on the type of membrane), maximum 1.5 MPa, and the permeate flow is within 50-90% of the feed water flow. In this case, guided by the following principles.

7.6.1.1.1. The pressure in the system should not be more than the maximum permissible.

7.6.1.1.2. The concentrate volume will be in the working range.

7.6.1.1.3. Productivity for purified water (permeate) is calculated depending on the temperature of the source water.

7.6.1.1.4. If the flow of clean water or the total flow of water decreases, the system must be rinsed.

7.6.2. Replacement of reverse osmosis membranes.

If the degree of demineralization decreases after replacing the reverse osmosis membranes or servicing the membranes, the annular seal or its displacement may have been damaged. Before installation, the annular seal must be coated with a water-soluble lubricant, e.g. glycerin.

7.6.3. This OO system has a locking function. If the initial water or water pressure after the prefilter is below the minimum operating pressure, the operation of the OO system will stop at the low-pressure switch signal.

7.6.4. Never close the concentrated controller and the pump clamp fully. This will lead to a sudden increase in pressure and damage to the OO system. Also, the OO system will be under high pressure, which is not safe for maintenance personnel.

7.6.5. By the conductivity sensor installed on the purified water, you will be able to evaluate the efficiency of the OO system.

7.6.6. At the first start, to rinse the OO system, it is necessary to drain the purified water during the first hour of operation

7.7. Technical service on shutdown

7.7.1. Short-time shutdown (1 ~ 3 days)

At an ambient temperature of 5 ~ 35 ° C, a normal shutdown can be made. After switching on, the reverse osmosis system must be operated for at least 1 ~ 2 hours.

7.7.2. Long shutdown (more than one week)

It is recommended that you do the following:

7.7.2.1. Soak the membranes in a 1% solution of sodium bisulfate.

7.7.2.2. Soak the membranes in a 0.5% solution of formaldehyde (this chemical is not recommended for installations operating in the food and medical industries).

7.7.2.3. If the ambient temperature is below 0 ° C, add antifreeze.

Sodium bisulfate 2%

Propylene glycol 40%

Pure water 58%

The solution of the above-described formulation is pumped through a reverse osmosis system. Drain the liquid chemical agents together with the draining water for 3 minutes. Stop the pump and close the valves RV-01, RV-02 and RV-03. The above solution cannot be stored for more than two months. If the downtime is more than 2 months, it is necessary to pour fresh solution.

7.8. Operating regime.

Installation has two modes of operation - automatic and manual. The fully automatic mode is implemented using a PLC, a water level sensor of the pressure sensor and a TDS meter. In most cases, the system is capable of providing a continuous supply of water automatically.

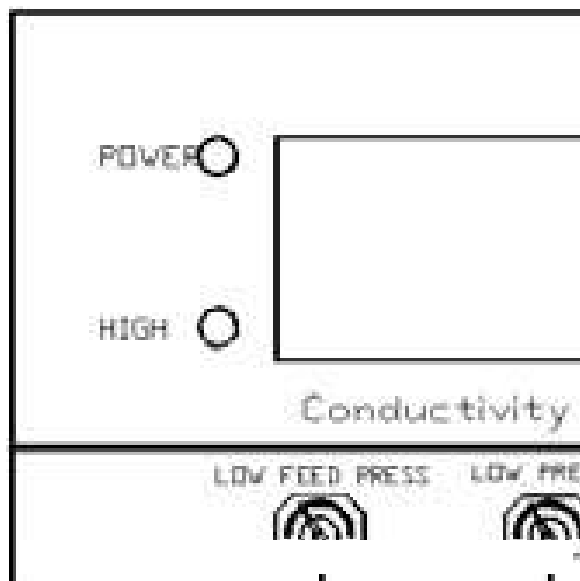
8. CONTROLLING SYSTEM

8.1 Controlling and indication system

The OO system is equipped with a mode switch "AUTO" - automatic mode, "OFF" - start disable and "MANUAL" or "CIP" - manual mode. Fully automatic mode is realized with the help of the control controller, the water level sensor of the pressure sensors and the TDS meter. In most cases, the system is capable of providing a continuous supply of water automatically. If necessary, it is possible to go into manual mode, for example, to flush the membrane. In this case, it is necessary to switch the toggle switch from the "AUTO" position to the "MANUAL" or "CIP" position. The "EMERGENCY STOP" switch - de-energizes the entire electrical circuit and is activated by turning, in the direction of the arrows on it (usually clockwise). To re-energize the OO system, it is necessary to press the EMERGENCY STOP switch. To reset the control controller in case of an emergency shutdown by the signal from one of the sensors, use the "RESET" button.

Signal lamps "POWER" or phase designation "L1", "L2", "L3" - supply of power, "SYSTEM IN OPERATION" - inclusion of the OO system in operating mode, "RO ROUGH FAULT" are displayed on the instrument panel for visual display of the OO system operation. "- triggering the protective mechanism for shutting down the pump for overload.

8.2 Process controller. Your system is equipped with a control controller with a TDS meter function with a temperature compensation mode, if there is an appropriate conductivity sensor, the screen will show the conductivity of the purified water in the online mode. The controller monitors the status of various sensors and controls the operation of the OO system, relying on an adjustable algorithm that is standard for most osmoses. The pictorial display of the work is intuitively clear and immediately gives an idea of the state and operation of various modules of the OO system.



8.3 Technical parameters of the controller

Voltage	AC 220V±15% 50 Hz
Energy input	≤2 W
Operating temperature range	0-45°C
Interval of operating humidity	≤85%
Permissible load on output contacts	5A/250VAC (steady load)

8.4 Control panel indication

The above picture shows the panel with indicators responsible for the following functions and parameters: indicating that the displayed value is the current value of the liquid temperature.

μS / cm (μS / cm) - the indication of the conductivity value, pointing that the displayed value is the value of the conductivity at the current moment.

M1 (CHARGING PUMP) - indicates the operation of the charging pump, displays its switched state.

INLET VALVE - switching on indication of inlet electromagnetic valve displays its switched state.

M2 (HIGH-PRESSURE PUMP) - indication of the operation of the high-pressure pump, displays its switched state.

FLUSH VALVE (flushing valve) - indication of the activation of the flushing solenoid valve, displays its switched state.

FULL - indication of the clean water tank filling, displays the achievement of the upper limit of the clean water level in the tank.

LOW FEED PRESS (Low level of feed water) - the indicator of low water level alarm. Burns in lack or short water cases in the raw water tank.

LOW PRESS (low pressure) indication shown by the pressure sensor at the inlet of the high-pressure pump. Burns when the water pressure at the inlet of the high pressure pump is too low.

HIGH PRESS (high pressure) - indication of the very high pressure of the high-pressure pump. Burns at very high pressure on the outlet of the high-pressure pump (for the models with index "S" the sensor is not included in the set).

CD max (maximum conductivity) - signaling of excess of the conduction limit.

SLP (holding) (displays in the nixie tube) - the external switch ECS isn't switched and the system is in the holding mode.

FULL (displays in the nixie tube) - the water tank is full, the "FULL" lamp is burning.

ALARM (warning) (displays in the nixie tube) - in case of warning, the "ALARM" lamp is burning.

Control and adjustment buttons:



---- parameter key, select parameters to change or display



---- Circular choice of the discharge - thousands, hundreds, tens and units, the selected digit flashes.

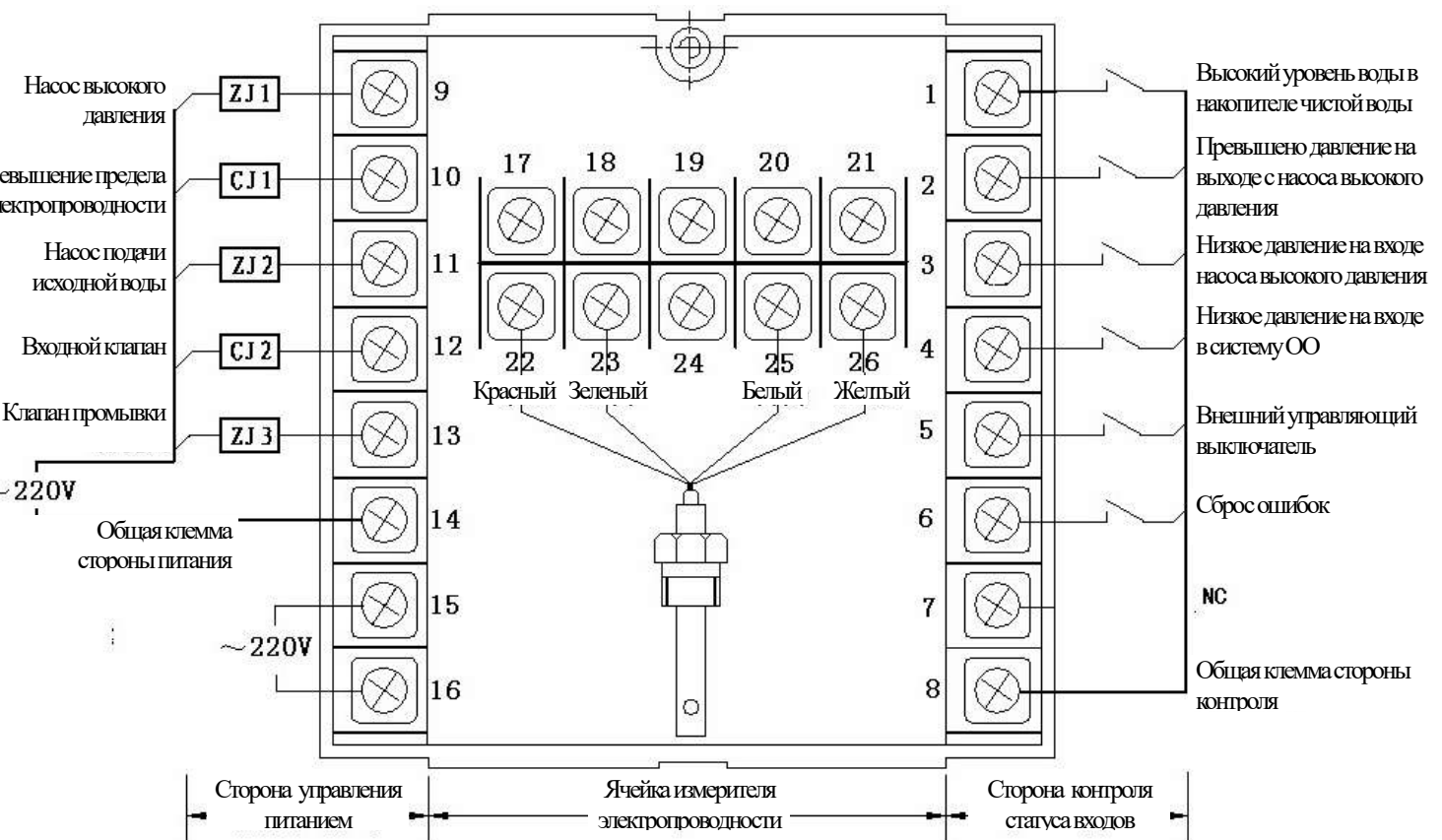


---- setting the value of the selected item (cyclically from 0 to 9)



---- C / T key, confirms the saved parameter or switches between the conductivity value and the temperature in the measurement mode.

8.5. Linking up and turning of the controller



(left part)

Насос высокого давления - High pressure pump

Превышение предела электропроводности - Exceeding the limit of electrical conductivity

Насос подачи исходной воды - feed pump of source water

Входной клапан - in gate valve

Клапан промывки - washing valve

Общая клемма стороны питания - general clean of supply side

(right part)

Высокий уровень воды в накопителе чистой воды - high level of water in the pure water accumulator

Превышено давление на выходе с насоса высокого давления - exceeds pressure at the outlet of high pressure pump

Низкое давление на входе насоса высокого давления - low pressure at the outlet of high pressure pump

Низкое давление на входе в систему ОО - low pressure at the outlet to OO system

Внешний управляющий выключатель - external control switch

Сброс ошибок - error reset

NC

Общая клемма стороны контроля - general clean of the control side

(bottom part)

Сторона управления питанием - control end of supply

Ячейка измерителя электропроводности - conductivity meter box

Сторона контроля статуса входов - side of input status checker

Note: Low-power relays are installed in the controller, while using a large inductive load, intermediate relays or contactors

must be used. Direct connection will damage the contact or shorten its life time.

Designations ZJ - intermediate relay

CJ - magnetic contactor

The diagram shows the connectors located on the back panel. The panel is equipped with the following connectors:

Connectors from top to bottom on the left side:

- 9 - output of control signal on / off of high pressure pump (normally open, passive)
- 10 - output of control of the upper limit of conductivity (normally open, passive)
- 11 - output of control signal on / off low pressure pump (normally open, passive)
- 12 - output of control signal on / off the input valve (normally open, passive)
- 13 - output of control signal on / off the magnetic flush valve (normally open, passive)
- 14 - common connector (used together for control signals of outputs 9, 10, 11, 12 and 13)
- 15, 16 - power supply terminals of 220 V.

Connectors from top to bottom on the right side:

- 1 - input of a high water level sensor in a pure water tank (normally open, closes in case of a low water level in the pure water accumulator)
- 2 - input of the high pressure pump relay (normally closed, opens if the permissible pressure is exceeded)
- 3 - input of the low pressure source water relay (normally open, closed at the pressure target value)
- 4 - input of lack of feed water sensor (normally open, closed in the lack of water).
- 5 - external switch contact, ECS (the system operates when the contact is closed). "ECS" can start the controller with a push-button installed on the control panel. If the pushbutton is not used, short the pins 5 and 8. This contact can be used to control the TOE system by the water level in the source water tank using a standard float switch.
- 6 - Reset signal, can be connected to the reset button on the control panel used to unlock and reset in case of high and low pressure alarms.
- 8 - common output used for the signals of contact sensors 1,2,3,4,5 and 6

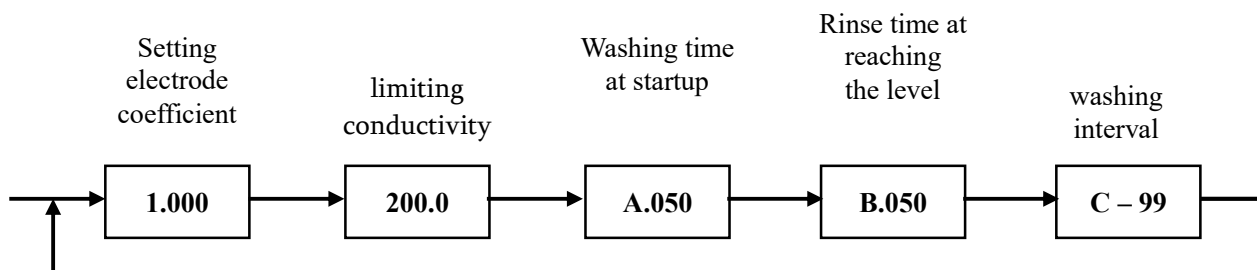
Connectors left to right in the middle:

- 22 - input wire of the conductivity measuring electrode (green wire)
- 23 - input wire of the conductivity measurement electrode (red wire)
- 25 - the input wire of the conductivity measurement electrode (white wire)
- 26 - input lead of the conductivity measurement electrode (yellow wire)

The other connectors, including contacts 7, 17, 18, 19, 20, 21, 24 do not have an internal connection.

Operating regime

When the controller is on, the "POWER" lamp is on, and the conductivity value is displayed on the display panel. Switch ECS (external control switch) the system will be started to filter the water, if ESC is turned off, the system will be on hold. Press the "SET" key, "1.000" (electrode constant) will be displayed on the display panel. Press the "SET" button again, the following menu items will be displayed sequentially:



"1.000" Constant of the electrode. This value for the electrodes supplied is complete, for other electrodes the value should be changed in accordance with the manufacturer's recommendations. The default value is 1.000.





"200.0" The limiting electrical conductivity for a standard electrode. The default value is "100.0"

Flushing time "A-050" "005" is the default value in seconds, the setting range is from 0 to 249 seconds. If set to "90", it will flush 90 seconds each time the system is started.

Washing time "B - 050" "005" is the default value, the range is 0-249 seconds. If "90" is set, it will flush 90 seconds each time the system stops after filling the clean water tank or after restarting the system in case of a low water level in the source water

tank.

The interval between flushes: "C - 99" "03" is the default value in hours, in the range 0-99 hours. If "03" is set, the membrane will be flushed every 3 hours for continuous operation or standby.

If you are not satisfied with the above parameters, you can change them using the , , and . When the changes are made, press the button , to save the changed data and return to the monitoring and measurement mode (if you do not press this key, the system will return to the monitoring and measurement mode automatically after 3 minutes, but the changes will not be saved).

When there is a membrane washing function (index F)

ATTENTION: *In your system, not an EM valve, but a CRANE WITH A SERVO-DRIVE is installed as the membrane rinsing device. This solution is more reliable and better suited for OO systems operating at high pressure (more than 1 mPa). A valve with a servo drive eliminates such factors as: rupture of the membrane of the EM valve and clogging of the valve with salts falling out of the drainage water, which leads to uncontrolled drainage of the concentrate around the drainage limiter.*

As a result of this decision, changes are made to the logic of the system operation, namely:

Rinse time A - not less than 50 seconds

Washing time B - not less than 50 seconds

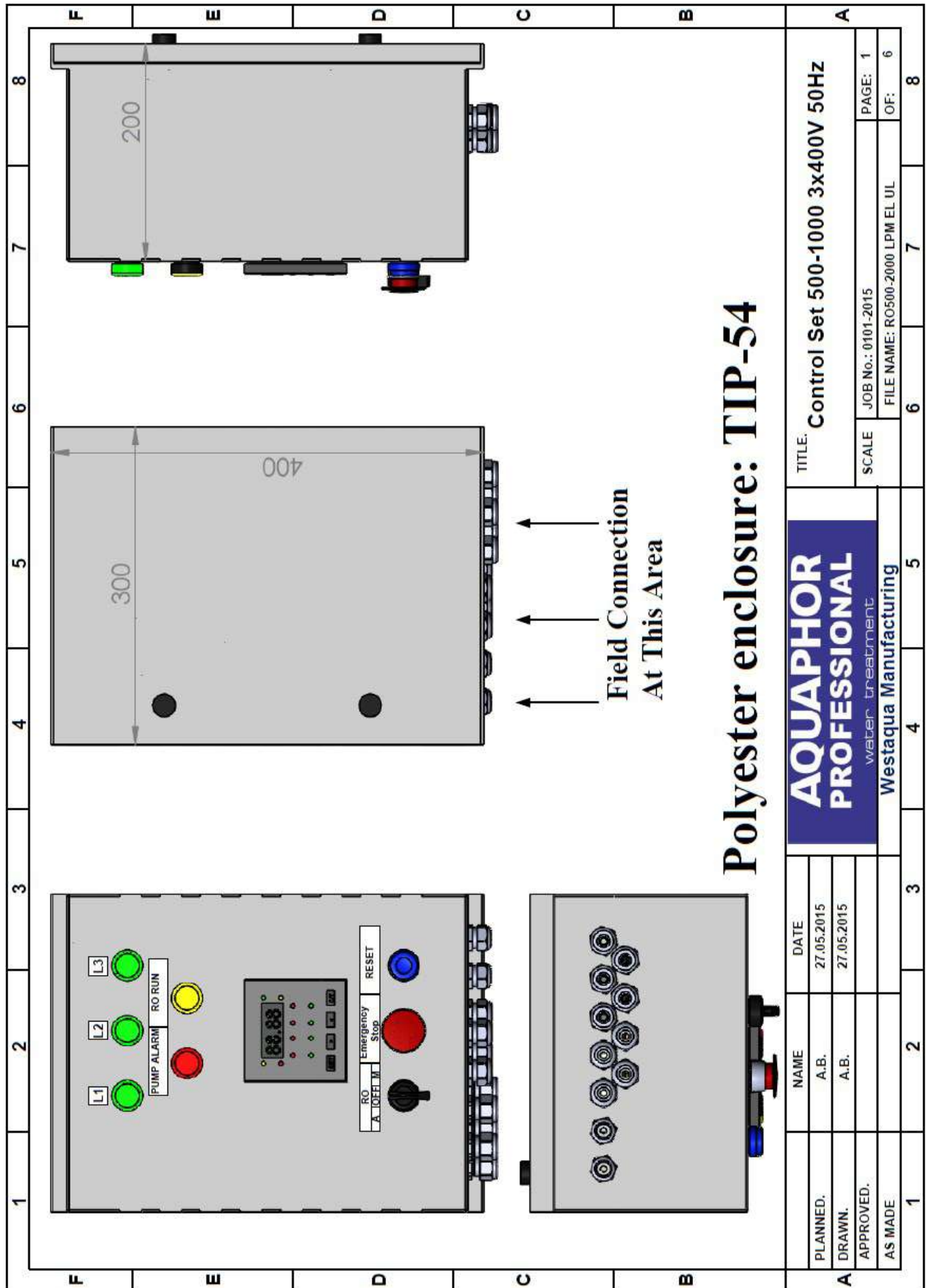
This time is necessary for the complete closing of the crane with the servo drive (~ 45 sec). In this case, the valve with the servo drive is opened in the position of the switch "RO control" "OFF" and "CIP", and the red indicator will be on it. In addition, the position of the crane can be determined by a mechanical indicator - the arrow that is located on the drive cover. When switching to the "AUTO" position, the tap will close.

In this case, the high pressure pump will also be started with the pause set, when the valve is completely closed. This is done in order to prevent the system from shutting down by the activation of the pressure sensors of the supply water, as well as the exhaustion (becoming under the vacuum) of the input line. With sufficient inlet pressure and flow, the washing time can be shortened for the purpose of intensive washing of the membranes.

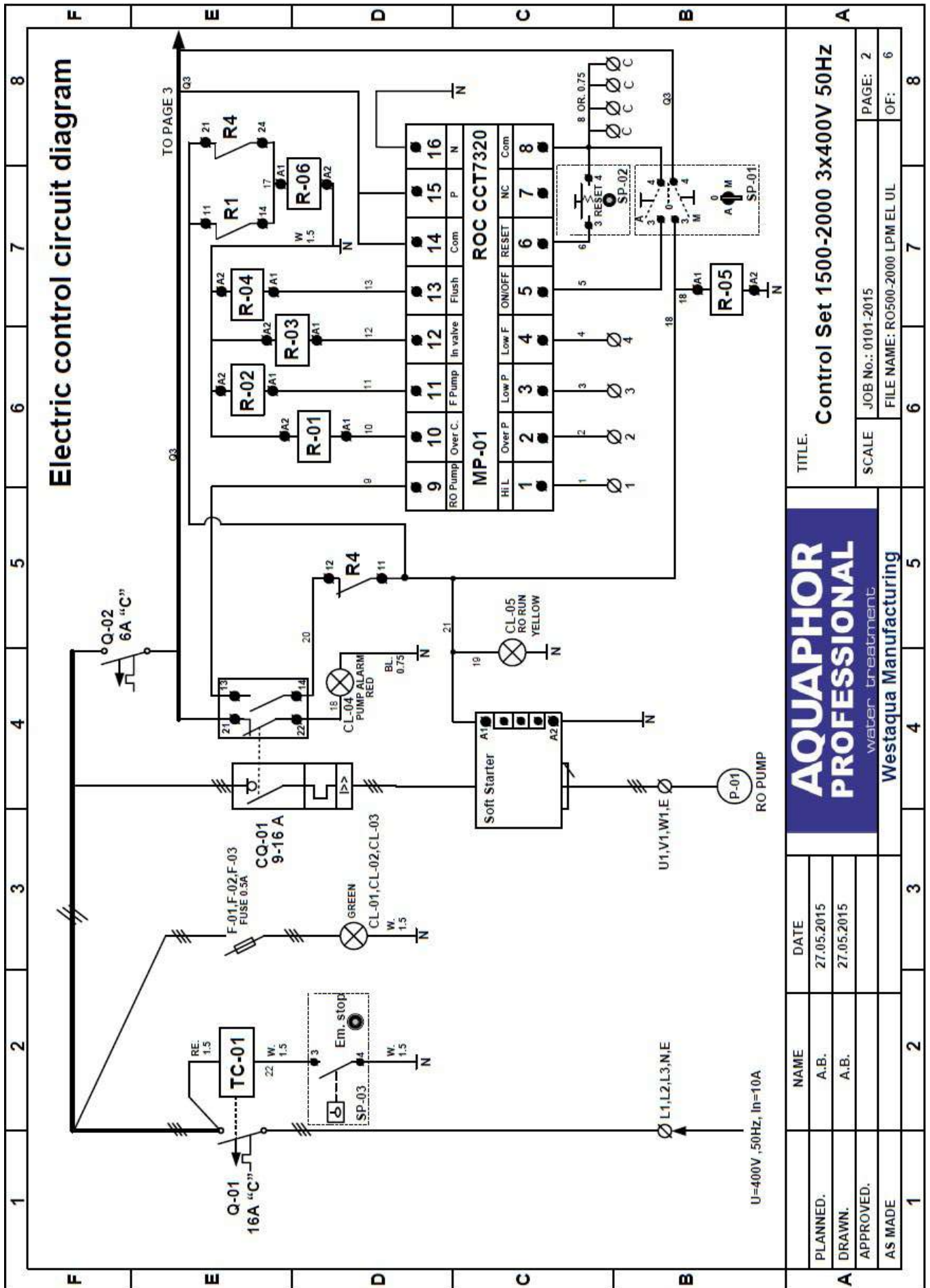
NOTE: The concentrate is drained after filtration without a high-pressure pump with the drainage valve closed, due to the supply water pressure and no recirculation of the drainage.

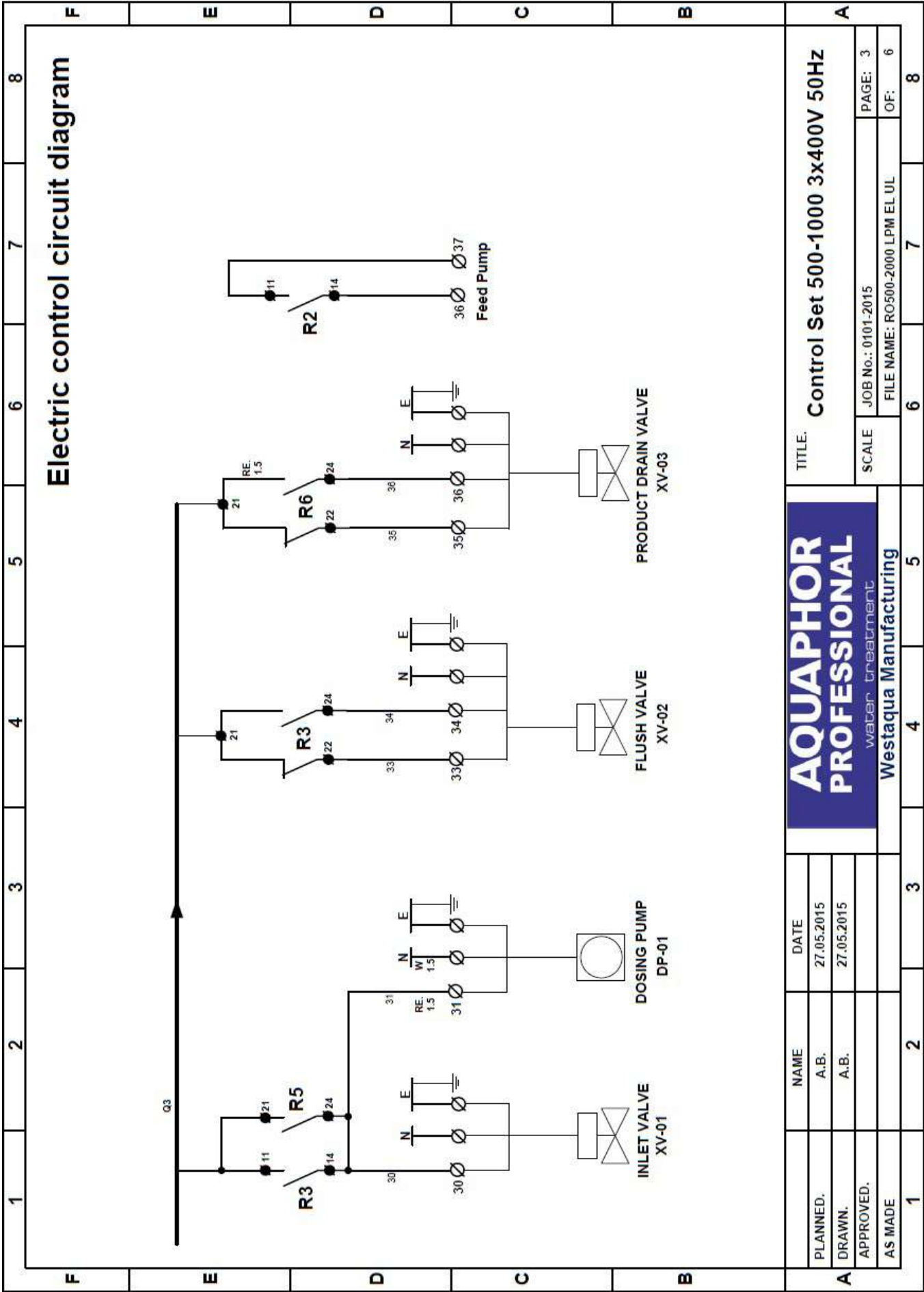
8.6. Electrical circuits

General view of the electrical board 380VA



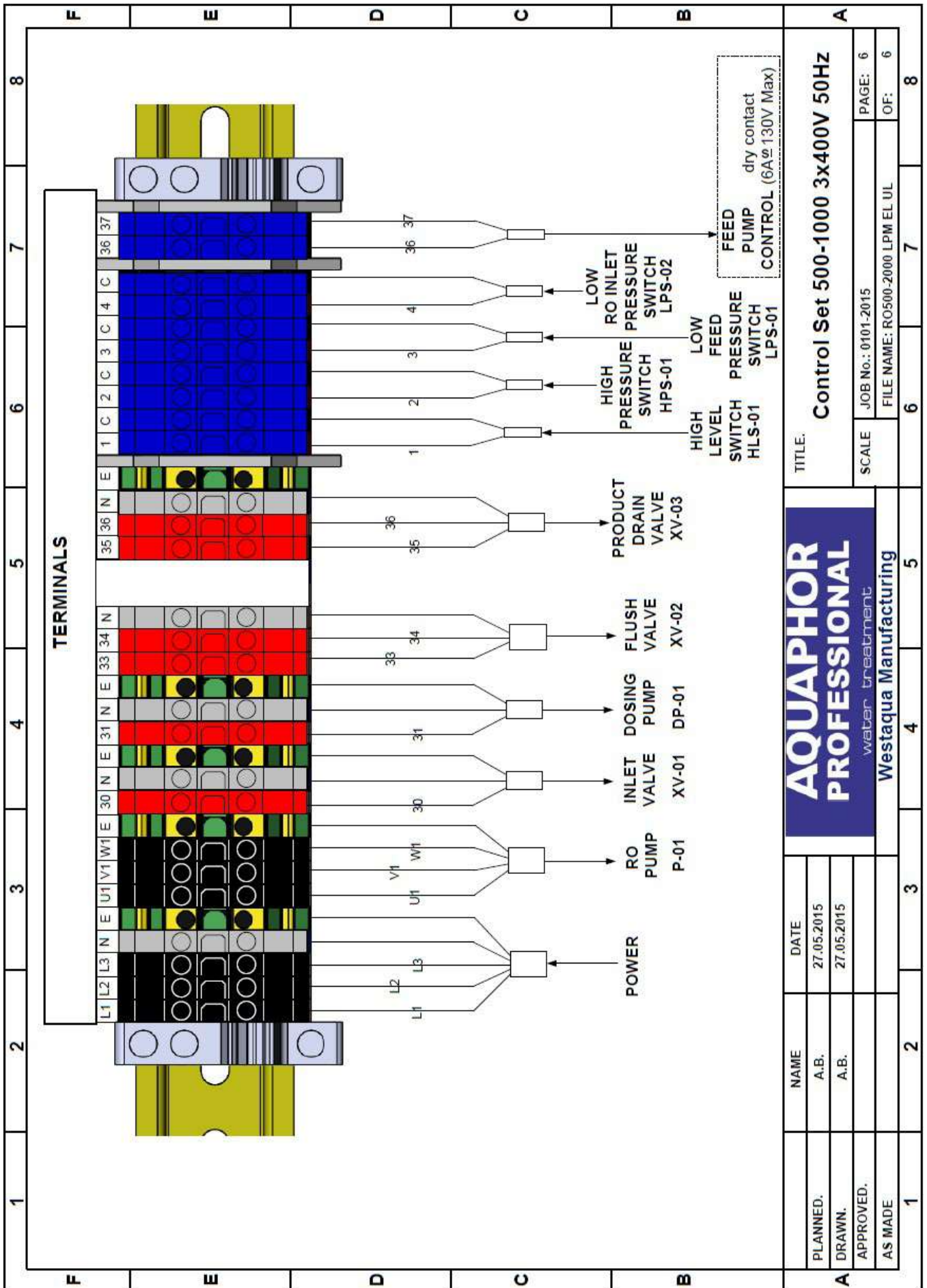




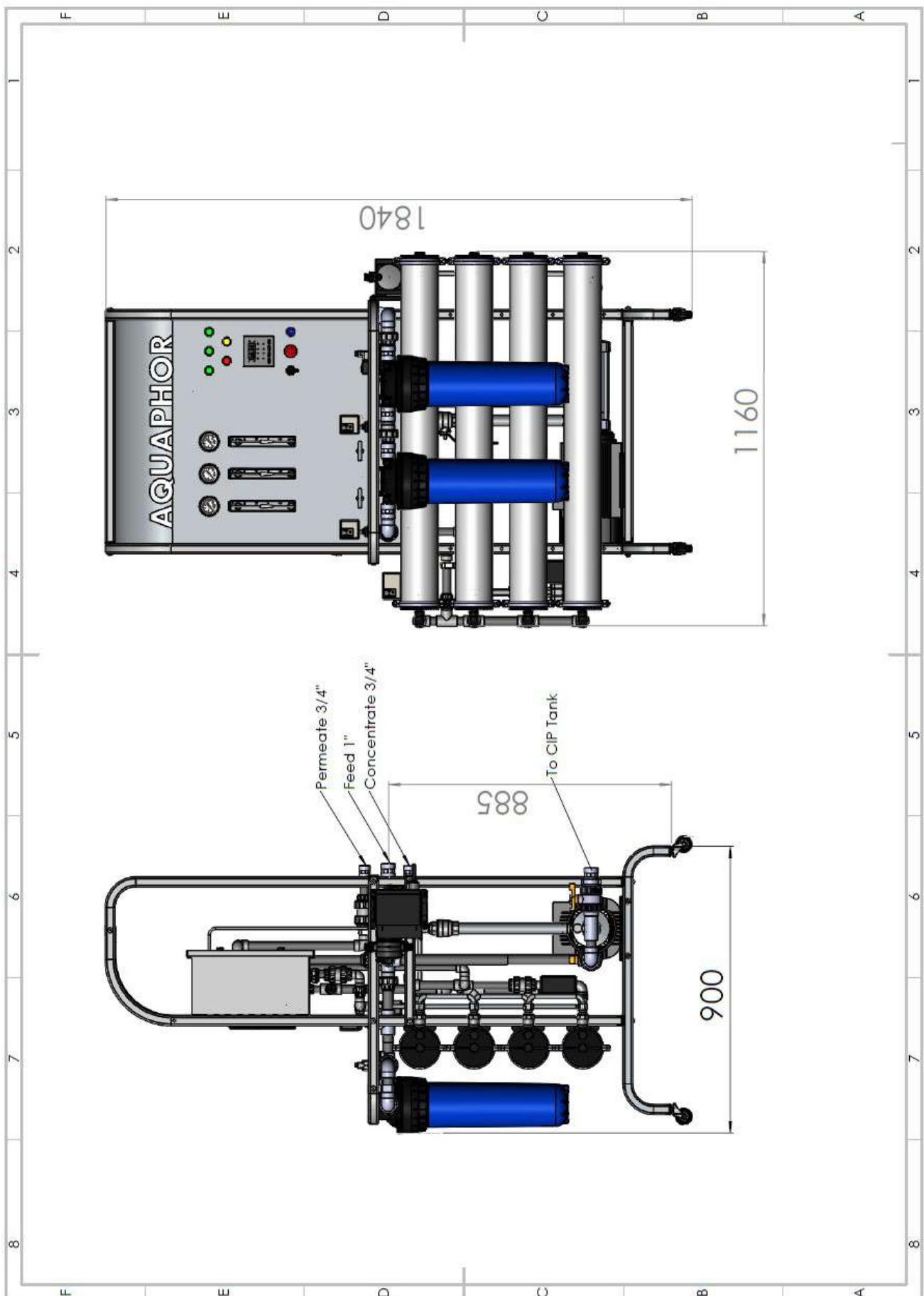




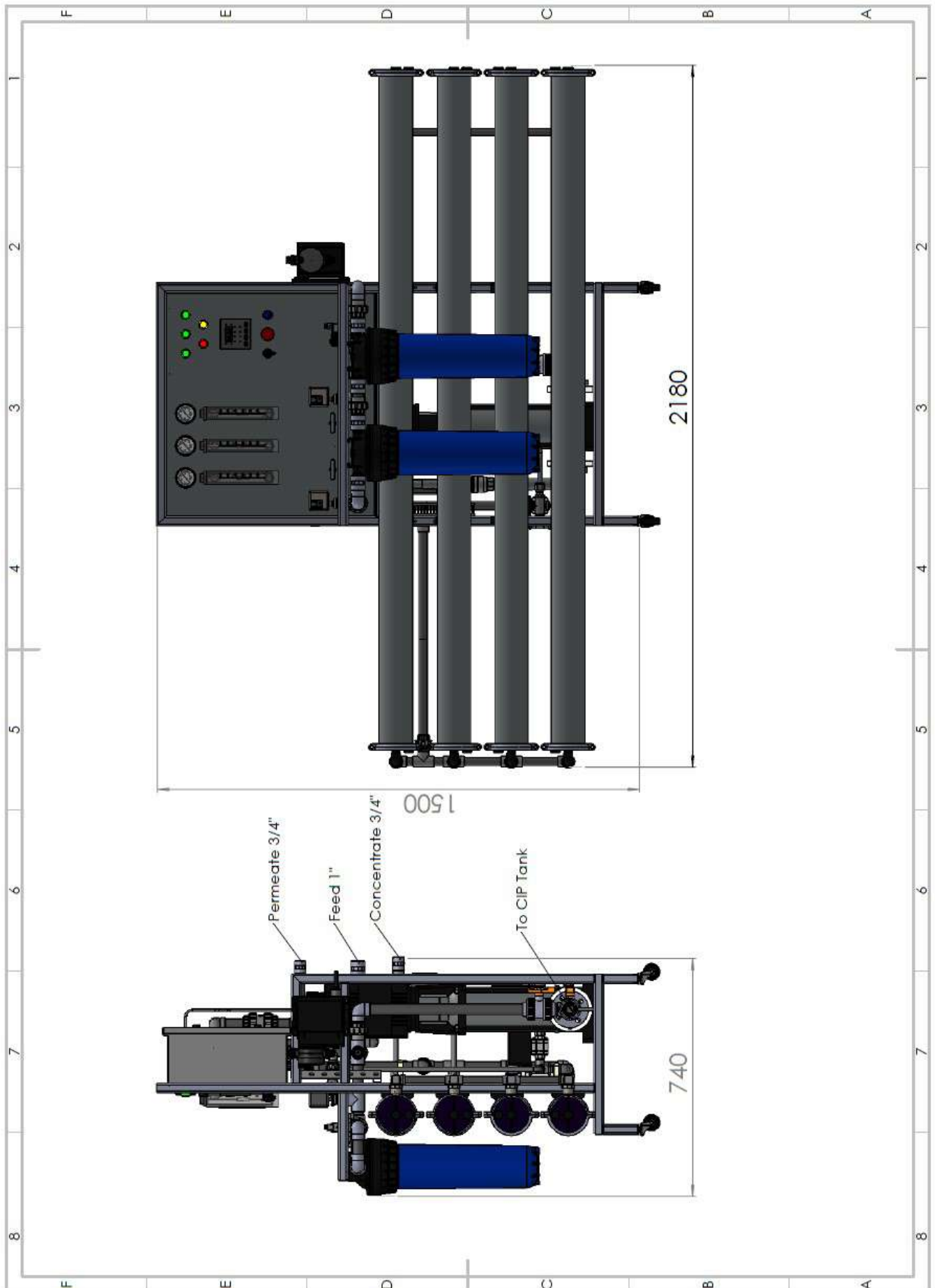
Electrical circuits 380VAC contact bank



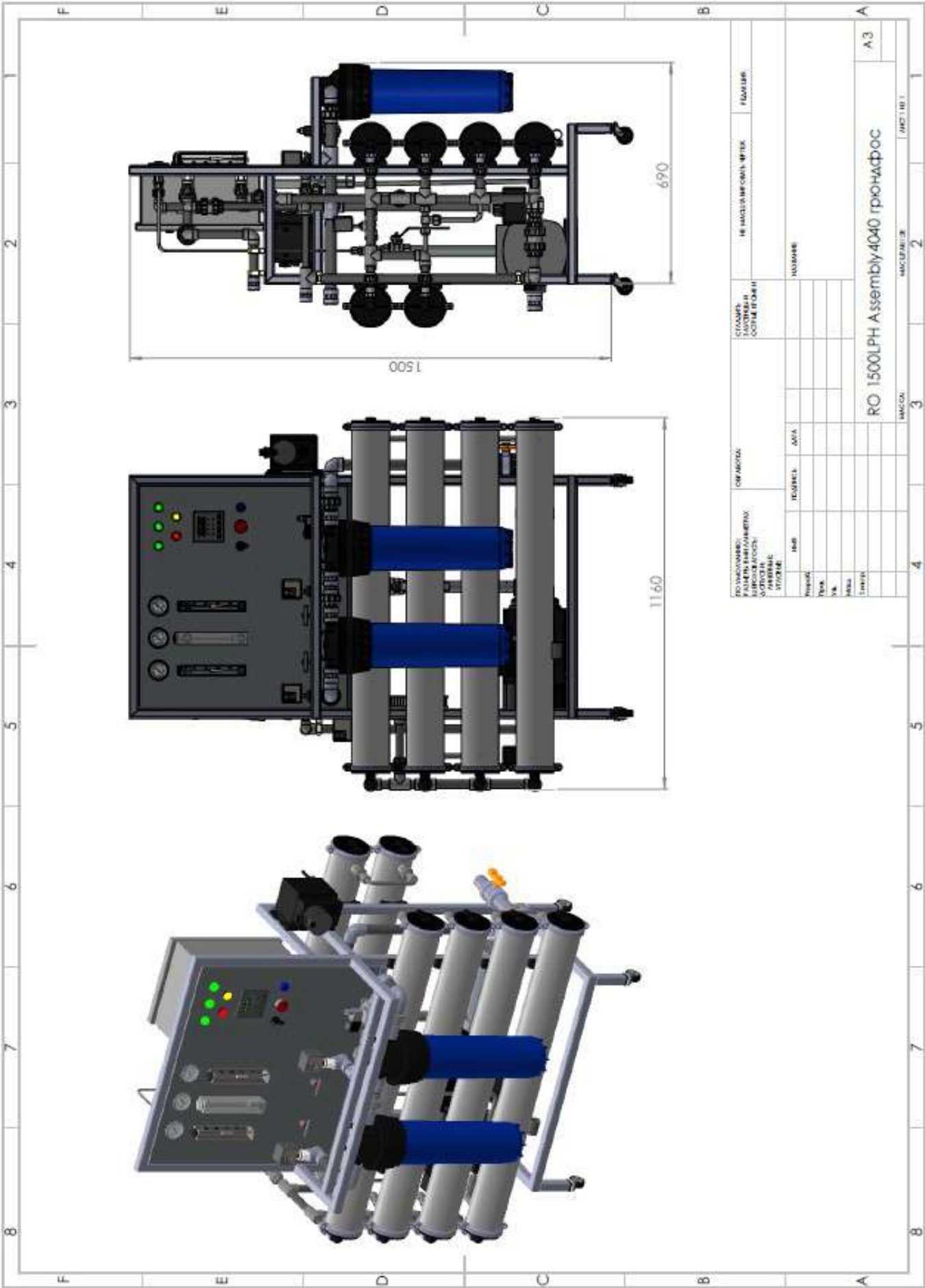
8.7. Dimensional specifications of reverse osmosis systems Aquaphor
models APRO-L-300/600/825



Dimensional specifications of reverse osmosis systems Aquaphor
models APRO-L-1000/1500 (variant 4040)



Dimensional specifications of reverse osmosis systems Aquaphor
models APRO-L-1000/1500 (variant 4040)



8.8. Table of correspondence of marks in Russian and English

1.	PUMP ALARM	НЕИСПРАВНОСТЬ НАСОСА
2.	POWER	ПИТАНИЕ
3.	PERMEAT FLOW	ПОТОК ПРОДУКТА
4.	CONCENTRATE FLOW	ПОТОК КОНЦЕНТРАТА
5.	RECIRCULATION FLOW	ПОТОК НА РЕЦИРКУЛЯЦИЮ
6.	CARBON FILTER	УГОЛЬНЫЙ ФИЛЬТР
7.	RUN	ЗАПУСК
8.	EMERGENCY STOP	АВАРИЙНАЯ ОСТАНОВКА
9.	FEED PRESSURE	ДАВЛЕНИЕ НА ВХОДЕ
10.	INLET PRESSURE	ДАВЛЕНИЕ ПОСЛЕ ФИЛЬТРОВ
11.	PUMP PRESSURE	ДАВЛЕНИЕ НАСОСА
12.	20 MICRON FILTER	20 мк ФИЛЬТР
13.	RESET	СБРОС
14.	PUMP PRESSURE SWITCH	ДАТЧИК ЗАЩИТЫ МЕМБРАНЫ
15.	FEED PRESSURE SWTCH	ДАТЧИК ДАВЛЕНИЯ В СЕТИ
16.	PUMP PRESSURE REGULATOR	РЕГУЛЯТОР ДАВЛЕНИЯ НАСОСА
17.	CONCENTRATE FLOW REGULATOR	РЕГУЛЯТОР ПОТОКА КОНЦЕНТРАТА
18.	RECIRCULATION FLOW REGULATOR	РЕГУЛЯТОР ПОТОКА РЕЦИРКУЛЯТА
19.	5 MICRON FILTER	5 мк ФИЛЬТР
20.	PUMP PRESSURE	ДАВЛЕНИЕ НА МЕМБРАНЕ
21.	INLET PRESSURE SWTCH	ДАТЧИК ЗАЩИТЫ НАСОСА
22.	RO AUTO OFF MANUAL	УПРАВЛЕНИЕ RO АВТО ВЫКЛ. РУЧНОЕ
23.	PERMEATE	ПРОДУКТ
24.	CONCENT.	КОНЦЕНТРАТ
25.	FEED	ВХОД
26.	L1	L1
27.	L2	L2
28.	L3	L3

8.8. Impending problems

№	problem	reason	method
1.	The OO system does not start after pressing the "Start" button	a. Damage to the wiring, fuse blown, no power wires connected	Check for mains voltage, power connection and wiring
		b. Overheat protection element in the "overheating" position	Reseat the overheating protection element
		c. No inlet pressure	Check the water supply
2.	The inlet valve does not open	a. the power supply is not connected	Connect the power supply
		b. The relay is out of order	Replace relays
		c. Valve servo is out of order	Replace servo
3.	The pump starts but does not reach its rated power	a. wrong rotation	Check that the pump power supply is connected correctly.
		b. The fine filtration module	Clean or replace the module
		c. Air in the pump	Bleed the air
		d. Flushing valve included *	Check the operation of the pump after flushing
4.	Too noisy pump operation when pressure builds up	a. Control unit or valve wiring element	Check and replace the wiring element or control unit
5.	The flushing valve is not switched off	a. Clogging or failure of the washing solenoid *	Replace solenoid or repair it
6.	The system stops due to pressure drop	a. Not enough water at the entrance	Check the operation of the source water pump
		b. The fine filtering module is clogged	Clean or replace the module
		c. Not properly adjusted drainage flow	Adjust the drainage flow regulator, maintain a pressure drop of 20 psi (1.4 kgf / cm ²)
7.	Pressure on the drainage line does not reach the nominal	a. Leaks in the pipeline.	Check the pipeline
		b. The drainage solenoid is not completely blocked *	Check and if necessary clean or replace the drain solenoid
8.	No pressure is indicated; The readings of the measuring devices do not reach real values	a. The manometer tube was clogged or broken	Check the inlet pipe
		b. Air in the supply pipe of a manometer	Remove air from the tube
		c. Damaged manometer	Replace the pressure gauge
9.	Deterioration of quality of purified water	The OO membrane has become contaminated or has failed	Carry out chemical cleaning of the membrane, if not help, replace
10	The productivity of purified water decreased	a. the OO membrane hammered	Carry out chemical cleaning of the membrane, if not help, replace
		b. The temperature of the source water has changed to a lower side	Recalculate the performance according to the actual temperature

* Modification of the system with automatic washing module

9. Washing regime on the place (CIP)

Your system is equipped with cranes and an appropriate inlet for chemical membrane washing. To carry out the washing, a reagent container (not included) of 50-100 liters with a flexible armored section of not less than 1 "is required, which is filled with 1 / 2-2 / 3 washing solution. Also, the presence of tees and locking valves on the permeate (product) line and the concentrate with exits for flexible hoses (not included). Washing will be done by a regular pump.

For carrying out the washing:

- Switch the cranes on the permeate line to supply water through the flexible permeate hose, lower the hose into the reagent tank.
- Fill the reagent tank with osmotic water in the required volume.
- Place the "RO CONTROL" switch in the "OFF" position.
- Switch the cranes of the concentrate line to feed through the flexible hose of the concentrate, lower the hose into the reagent container.
- Turn off the V-01 and RV-01 cock, open the RV-03 completely.
- Completely open the RV-02 in models with the absence of a drainage tap.
- Connect the reagent container to the input labeled "CIP" by removing the plug, if any. Open the CIP valve if it is.
- Open the RV-01 by about 1/3.
- Place the "RO CONTROL" switch in the "CIP" position.

In this case, the pump will start to work and suck the reagent from the tank. The reagent passed through the system will merge back into the tank through the appropriate hoses. Continue the procedure for 3-5 minutes.

- Add concentrate reagent for washing in the proportion recommended by the manufacturer.
- Continue the procedure in accordance with the reagent supplier's recommendation (but not less than 30 minutes), monitor the readings of the pressure and flow meters, adjust the RV-01, RV-02 cranes as needed.

Note: The pressure at the inlet to the membrane should not exceed 2 - 2.5 bar.

- At the end of the rinse, turn the "RO CONTROL" switch to the "OFF" position
- Switch the valves of the concentrate line to the working position, transfer the permeate hose to the drain. Turn the tap V-01 (tap open) and CIP (closed the tap or screw the plug) into the working position.
- Place the "RO CONTROL" switch in the "CIP" position, if necessary, adjust the RV-01.
- Continue the procedure for about 15 minutes, then adjust the cranes RV-01 ... RV-03 to the operating state. Observe the readings of the pressure gauges during the adjustment.
- Continue draining the permeate into the drain for at least 15 minutes, monitor the TDS sensor reading.
- If all instrument values are normal, switch the permeate line valves to the operating position.

ATTENTION: The system is washed with chemical reagents. It is important to properly wash the RO membrane after carrying out the chemical washing procedure. In addition, improper adjustment of cranes RV-01 ... RV-03 can lead to the failure of membranes and high-pressure pump. The procedure should be carried out by trained personnel. In case of lack of skills in carrying out such work, contact the service department.

9. RULES OF STORAGE AND TRANSPORTATION

The OO system is stored in a polyethylene packaging, in a closed paperboard packages, in enclosed buildings with natural ventilation, at a relative humidity of not more than 80%, at a temperature not lower than +3 ° C and not higher than 50 ° C.

The transportation and storage of the OO system are carried out in the vertical position. It is forbidden to tilt the filtration system, subject to hitting and other mechanical influences

The OO system is transported in concealed form by any kind of covered transport in a fixed state, except for unheated aircraft compartments.

The storage period of the OO system before the start of operation is no more than 5 years from the date of manufacture under the observance of storage conditions

Attention: The complete set of reverse osmosis system includes membrane elements, their transportation in unheated transport, as well as storage under the influence of negative temperatures, can adversely affect their performance. When transporting in the winter season, as well as at the risk of exposure to negative temperatures, it is recommended to transport APRO systems by heated transport, and storage in a warm room.

10. GUARANTEE

Quality guarantee

Aquaboss Ltd. guarantees the compliance of the Aquaphor reverse osmosis system further in the text of the OO system, the requirements provided in this manual, during the guarantee period. The quality guarantee of the GS system extends to the OO system and to all its constituent parts (component parts, modules).

The service lives of the prefiltration modules, polypropylene modules are no more than -3 months after the start of the operation. The service life of the modules is established for water filtration, corresponding to the current sanitary standards, and can be changed depending on the quality of the source water. After the end of service life, the modules should be replaced.

The service life of the membrane is 1 year from the time of the operation.

Guarantee period

The guaranty period of the OO system is one year from the date of sale of the OO system. This date is fixed on the warranty card. The guaranty period for component items is equal to the guaranty period for the OO system and begins simultaneously with the guarantee period for the OO system.

The guaranty period for modules of the OO system is 1 month from the date of sale of the OO system and begins simultaneously with the guaranty period for the OO system

The guarantee period lasts for a period of time during which the OO system could not be used because of the detected defects in it, provided that the Manufacturer is notified about the detected defects within ten days from the time of their detection.

On the OO system (component items) transferred by the Producer to the consumer instead of the OO system (component items), in which the defects were detected during the guarantee period, for which the Manufacturer is responsible, the guarantee period with the same duration is established as for the replaced one.

Disclaimer of guarantee

The quality guarantee is provided under the following conditions:

- a. clearing of the OO system and its consisted parts defects detected by the customer during the guarantee period made exclusively by the organization is authorized by LLC "Aquaboss" for maintenance of the OO system and its constituent parts;
- b. keeping by the consumer the service rules of OO system and its storage, established by this manual;
- c. matching of the parameters of the source water (water supplied at the input) with the technical requirements specified in this manual;
- d. matching of the quantity and quality of electric power supplied to the OO system with the requirements provided in this manual.

The manufacturer is not responsible for the defects of the OO system and its consisted parts if these defects were detected after OO system transmission to the consumer in view of these:

- a. violation of the use specification rules of OO system or its storage and transportation by the consumer, including as a result of the supply of water to the input of the OO system, the initial parameters of which do not meet the requirements specified in this manual, or electric energy supply to the OO system the quantity and quality of which do not meet the requirements, provided in this manual
- b. any actions of the consumer or third parties not authorized by the manufacturer to accept claims from consumers and for the repair and maintenance of the OO system, for repairs and maintenance,
- c. system or its consisted parts, or
- d. any actions of third parties
- e. acts of force majeure

In case of any defects detected in the OO system or its component items, the consumer must call the representative of the organization authorized for repair works and technical services of the OO system to determine the cause of the defect. If the OO system is installed not on the territory ..., the consumer is obliged to pre-pay the travel of the representative of the organization authorized for repair works and technical services of the OO system to the OO system installation place. If the defects of the OO system or its component items detected before arose prior to its transfer to the consumer or during the guarantee period, for reasons that arose before that time, the organization authorized for repair works and technical service of the OO system performs guarantee repair. Guarantee repair is free of charge. In the event of guarantee repair, the costs paid by the customer for the travel of the representative of the organization authorized for repair works and technical service of the OO system are compensated at the place of OO system installation. If the OO system defects detected during the guaranty period after its transfer to the consumer as a consequence of the consumer violating the rules for the use of the OO system or its storage, or the actions of third parties, or the force majeure, the elimination of the OO system defects is carried out on the basis of a compensated contract concluded by the consumer and the organization, authorized for repair works and technical service of the OO system. The OO system defects detected after the expiration of the guarantee period are eliminated by the organization authorized or repair works and technical service of the OO system on the basis of a commutative

contract with the consumer.

Utilization in accordance with environmental, sanitary and other requirements established by national standards in the field of environmental protection and ensuring sanitary and epidemiological welfare of the population. Electrical and electronic devices must be utilized separately from household waste.

Ticket for guarantee repair (2 sheets).

Sheets 1 from 2

Reverse osmosis systems Aquaphor model _____

Factory № _____

"AkvaBoss" Ltd _____ S.P.

Guarantee period - 1 year from the date of sale

Date of sale _____

Shop mark for sale _____

Salesman's signature _____

I read and understood the basic rules of installation, start-up, and operation, and guarantee, the outer appearance of the product and have no claims.

The composition of the supplied water meets the requirements set forth in this manual.

Client's signature _____ / _____ Full name.

FIRMS, CARRYING OUT INSTALLATION, GUARANTEED AND AFTERSALE SERVICES

reverse osmosis systems Aquaphor

1. "AkvaBoss" Ltd Russia, Saint-Petersburg, Sestroretskaya Street, Building 3, Salon "Aquafor" Phone (812) 430-55-06 E-mail: aquaboss@aquaboss.ru	3. "A-Service" Ltd Russia Moscow, 3rd Khoroshevskaya str, 18 build. 1 Phone: (495) 66-08-100 E-mail: waterboss.msk@aquaphor.ru
2. "AkvaBoss" Ltd Russia, St. Petersburg, Pionerskaya street, house 41, engineering center "Aquafor" Phone (812) 235-67-96 E-mail: aquaboss@aquaboss.ru	

Manufacturer

«Westaqua -Invest OÜ»

40231, Estonia, Sillamäe, L. Tolstoy Street, Building 2a

by order

"AQUAFOR" Ltd

Russia, 197110, St. Petersburg, Pionerskaya St., Building 27, building A



The quality management system "Westaqua-Invest OÜ", "Aquafor" Ltd is certified in compliance with ISO 9001: 2008 by TUV NORD CERT firm (Germany)



Certificate No. 1-077-110/2016

The manufacturer reserves the right to introduce improvements into the design of the OO System without reflecting them in the installation and operation manual.



The reverse osmosis system Aquaphor

Registration number of declaration of conformity: TC N RU D-EE.H003.B.00191

Date of registration of the declaration of compliance: 21.09.2015

Declaration of Compliance was approved:

"Akvafor" Ltd, 197110, Russia, St. Petersburg, Pionerskaya str, 27, building

Ticket for guarantee repair (2 sheets).

Sheets 2 from 2

Source composition:

PARAMETERS	VOLUME
Input water temperature	
Input water pressure	
Flow of inlet water at operating pressure	
pH	
Hardness, mgEq / L	
Turbidity, mg / l	
Petroleum products, mg / l	
Synthetic surfactants, mg / l	
Salinity (TDS), mg / l	
Iron total, mg / l	
Oxidizers (chlorine, ozone, KMnO4), mg / l	
Manganese (Mn), mg / l	
Organic impurities, mgO2 / l	

[illegible]

Salesman's signature_____

Installation date _____

Signature of the person who carried out the installation /decryption/

Signature of the person who conducted the launch _____/decryption/

Date of start-up _____

I do not have any claims to the appearance of the product or accessories.

The composition of the supplied water meets the requirements set forth in this manual.

Client's signature _____/_____ full name.