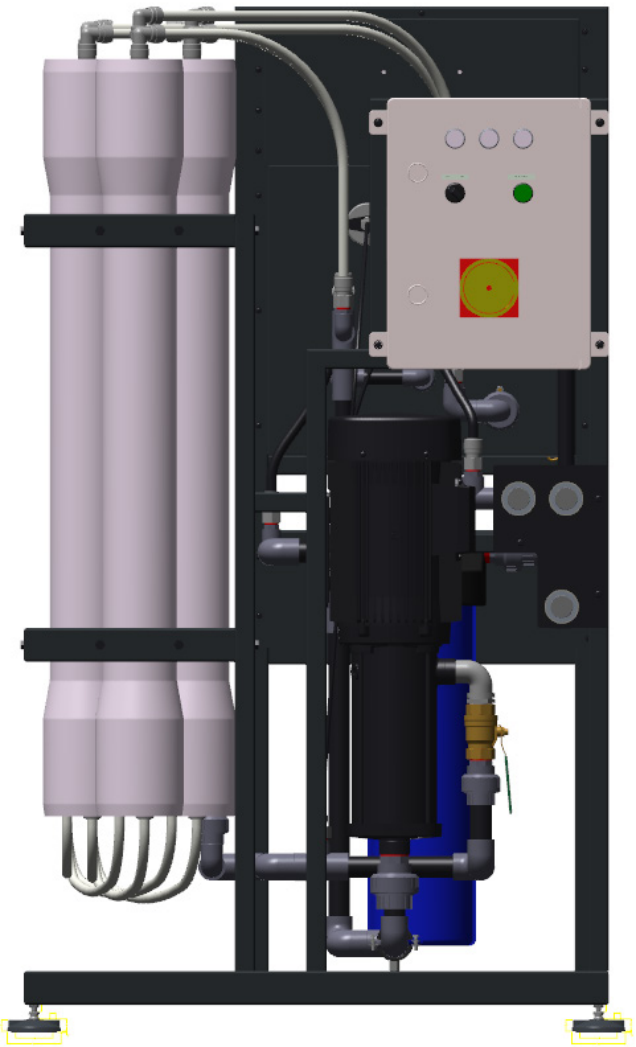
Owners Manual

ARCTON

by euro-clear

ULP RO Systems



- Please read carefully before proceeding with installation. Your failure to follow any attached instructions or operating parameters may lead to the product's failure. Keep this manual for future reference.
- Do not use the water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Test the water periodically to verify that the system is performing satisfactorily.

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1. DEFINITION AND FUNCTION

1.1 WHAT IS REVERSE OSMOSIS?

Reverse osmosis (RO) is a membrane-technology filtration method that effectively removes numerous types of large molecules and ions from solutions. This is achieved by applying pressure to the solution on one side of a selective membrane. As a result, the solute is retained on the pressurized side of the membrane, while the pure solvent is allowed to pass through to the other side. For a membrane to be considered "selective," it must prevent the passage of large molecules or ions through its pores, yet freely permit smaller components of the solution, such as the solvent, to pass.

In the typical osmosis process, the solvent naturally migrates from an area of low solute concentration, across a membrane, to an area of high solute concentration. This movement of a pure solvent, aiming to equalize solute concentrations on both sides of a membrane, generates osmotic pressure. Therefore, applying external pressure to reverse this natural flow of pure solvent is what defines reverse osmosis. While this process shares similarities with other membrane technology applications, there are crucial distinctions between reverse osmosis and conventional filtration. The primary removal mechanism in membrane filtration is straining, or size exclusion; thus, the process can theoretically achieve complete exclusion of particles irrespective of operational parameters like influent pressure and concentration. In contrast, reverse osmosis involves a diffusive mechanism, meaning its separation efficiency is dependent on factors such as solute concentration, applied pressure, and the rate of water flux.

1.1 WORKING PRINCIPLE

The operational principle of reverse osmosis is based on leading the water to be treated onto a semi-permeable membrane under high pressure. The solvent molecules (pure water) then pass through the membrane, while the dissolved salts are retained. Both resulting solutions are continuously drawn off: the pure solution as permeate and the salt solution as concentrate. Water purification occurs solely through physical principles, without the use of chemical processes. However, to ensure a long membrane lifespan, pre-treatment of the water is essential. The membrane requires initial washing upon startup, as well as periodic chemical washes (at least every six months).

Pre-treatment methods can vary:

- **Acid dosage:** Used to stabilize hardness.
- **Crystallization inhibitor dosage:** Prevents the crystallization of substances like $CaCO_3$, $CaSO_4$, $BaSO_4$, $SrSO_4$, CaF_2, and SiO_2.
- **Ion-exchange softening:** Converts all cations into Na^+ ions, resulting in soluble sodium salts.
- **Pre-softening with lime:** Reduces the effects that could harm the membrane.
- **Coagulation-flocculation-filtration combinations:** Can decrease or eliminate membrane malfunctions caused by iron (Fe), aluminum (Al), bacteria, oxidizing materials, and organic matter.

1.2 WORKING PROCEDURES

During the operation of the application, we differentiate the following stages:

Water Production: In this stage, the inlet solenoid valve is open, and the high-pressure pump is operating. The controller monitors the permeate conductivity, the inlet water pressure, and the storage tank water level.

Stand-by Stage: During this stage, the inlet solenoid valve is closed, and the high-pressure pump is in stand-by mode. The controller checks the permeate tank pressure but does not monitor the inlet pressure or the permeate conductivity. When the pressure level reaches its minimum, the controller automatically initiates water production.

Rinsing / Washing Stage: In this stage, the inlet solenoid valve is open, and the high-pressure pump is operating. The controller does not check the pressure level in the tank. The concentrate solenoid valve is in the open position.

Out-of-Order Stage (Main Switch Closed): During this stage, the inlet solenoid valve is closed, and the high-pressure pump is not operating.

Before designing and building the equipment, a thorough water analysis is crucial. This analysis provides the necessary information to properly configure the pre-treatment system and create the optimal membrane combination. This approach ensures continuous operation and a long lifespan for the system, achieving the best possible outcome.

Model	Arcton Elite ULP 300	Arcton Elite ULP 600	Arcton Elite ULP 900	Arcton Elite ULP 1200	Arcton Elite ULP 1500	Arcton Elite ULP 2000	Arcton Elite ULP 2500
Product code	**AE-ULP-300**	**AE-ULP-600**	**AE-ULP-900**	**AE-ULP-1200**	**AE-ULP-1500**	**AE-ULP-2000**	**AE-ULP-2500**
Controller type	ROC-8100	ROC-8100	ROC-8100	ROC-8100	ROC-8100	ROC-8100	ROC-8100
Pump type	Grundfos CM3-12	Grundfos CM3-12	Grundfos CM3-12	Grundfos CM3-14	Grundfos CM3-14	Grundfos CM3-14	Grundfos CM5-13
Membrane type	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040
Pressure vessel type	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Frame	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
Isolation valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve
Inlet connection	1/2"	1/2"	1"	1"	1"	1"	1"
Permeate connection	1/2"	1/2"	1/2"	1/2"	1"	1"	1"
Drain connection	1/2"	1/2"	1/2"	1/2"	1"	1"	1"
Permeate capacity (L/h)	300	600	900	1200	1500	2000	2500
Electrical requirements	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz
Power consumption	1,58 kW	1,58 kW	1,58 kW	2,2 kW	2,2 kW	2,2 kW	3 kW
Operating pressure	10 - 14 bar						
Max. operating pressure	15 bar						
Prefiltration rating	0,5 µm						

Item	Requirement
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 °dH
Temperature	+5°C ~ +40°C
pH range	between 3-10

For desalination the salinity of the filtered and softened or chemically conditioned water can be 1500 mg/l, above that salinity the working conditions of the device are going to be changed.

Inlet water has to be free of Chlorine, colloidal Silica, parameters as Ba, Sr, Mn, Al, F, PO4 and COD to be within WHO standards, turbidity ≤ 0.5 NTU and SDI ≤ 3.

Model	Arcton Standard ULP 300	Arcton Standard ULP 600	Arcton Standard ULP 900	Arcton Standard ULP 1200	Arcton Standard ULP 1500	Arcton Standard ULP 2000	Arcton Standard ULP 2500
Product code	**AS-ULP-300**	**AS-ULP-600**	**AS-ULP-900**	**AS-ULP-1200**	**AS-ULP-1500**	**AS-ULP-2000**	**AS-ULP-2500**
Controller type	ROC-2210	ROC-2210	ROC-2210	ROC-2210	ROC-2210	ROC-2210	ROC-2210
Pump type	Grundfos CM3-12	Grundfos CM3-12	Grundfos CM3-12	Grundfos CM3-14	Grundfos CM3-14	Grundfos CM3-14	Grundfos CM5-13
Membrane type	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040	ULP21-4040
Pressure vessel type	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Frame	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
Isolation valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve	Motorized ball valve
Inlet connection	1/2"	1/2"	1"	1"	1"	1"	1"
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Permeate capacity (L/h)	300	600	900	1200	1500	2000	2500
Electrical requirements	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz	400V, 50Hz
Power consumption	1,58 kW	1,58 kW	1,58 kW	2,2 kW	2,2 kW	2,2 kW	3 kW
Operating pressure	10 - 14 bar						
Max. operating pressure	15 bar						
Prefiltration rating	0,5 µm						

Item	Requirement
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
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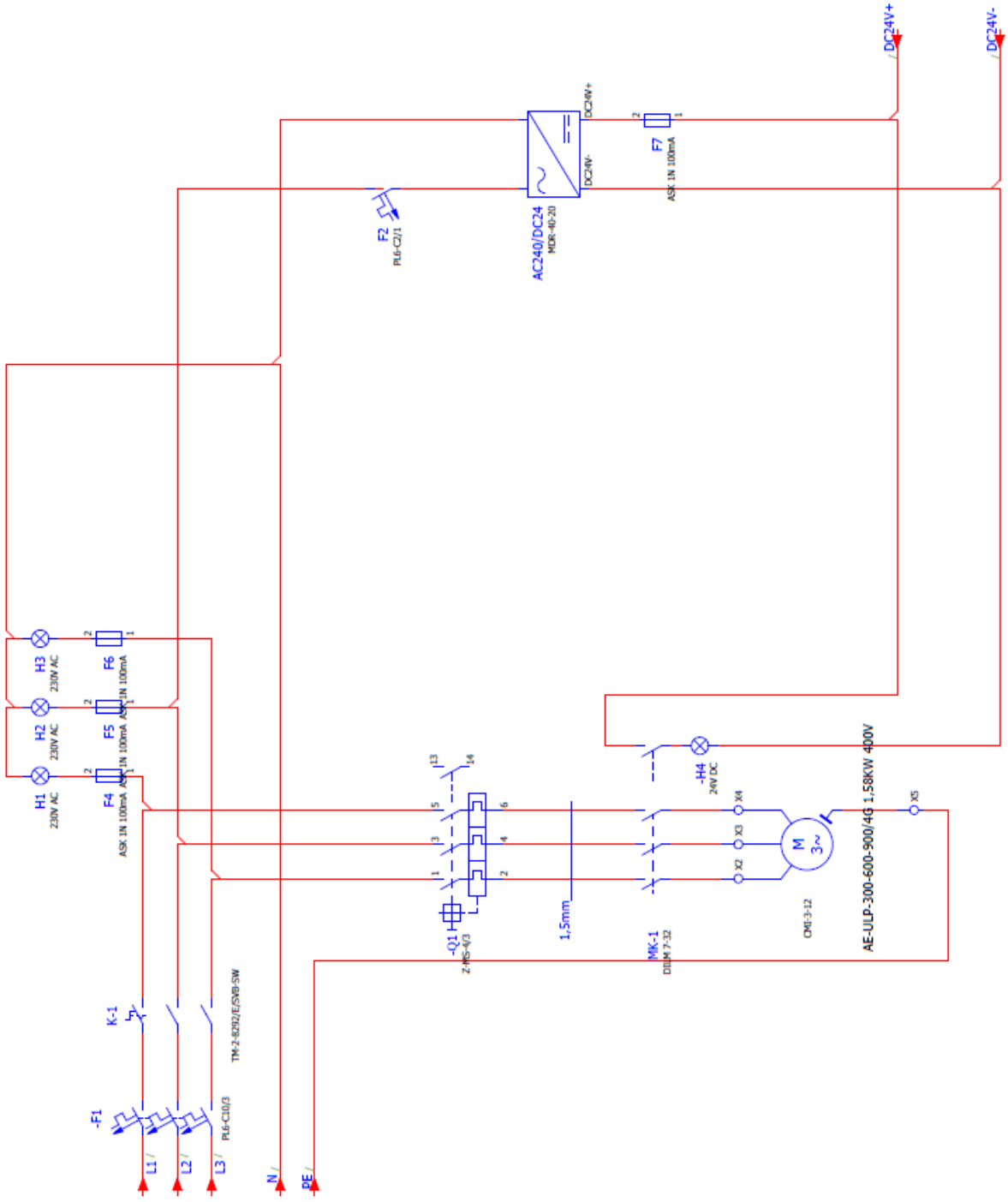
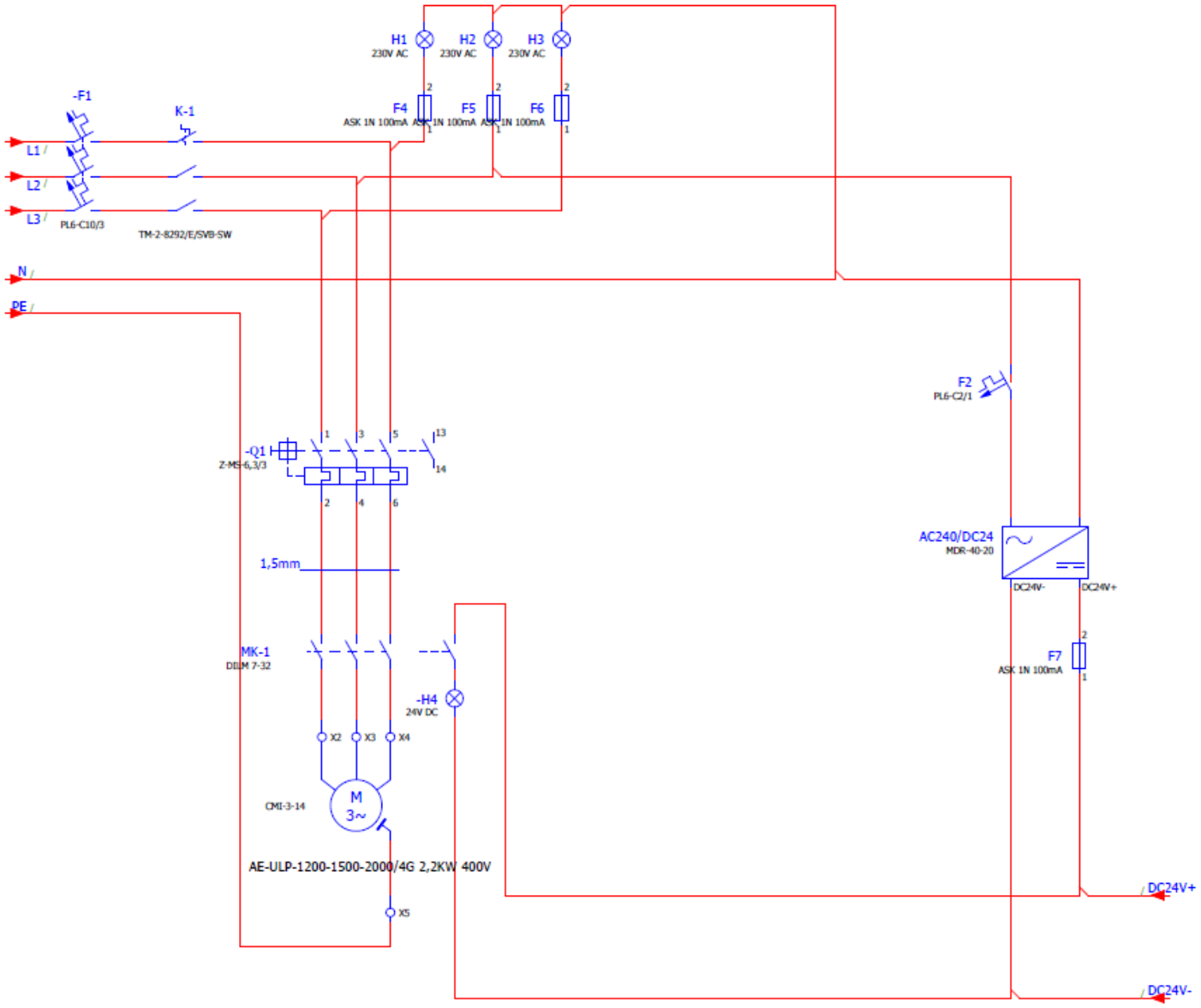
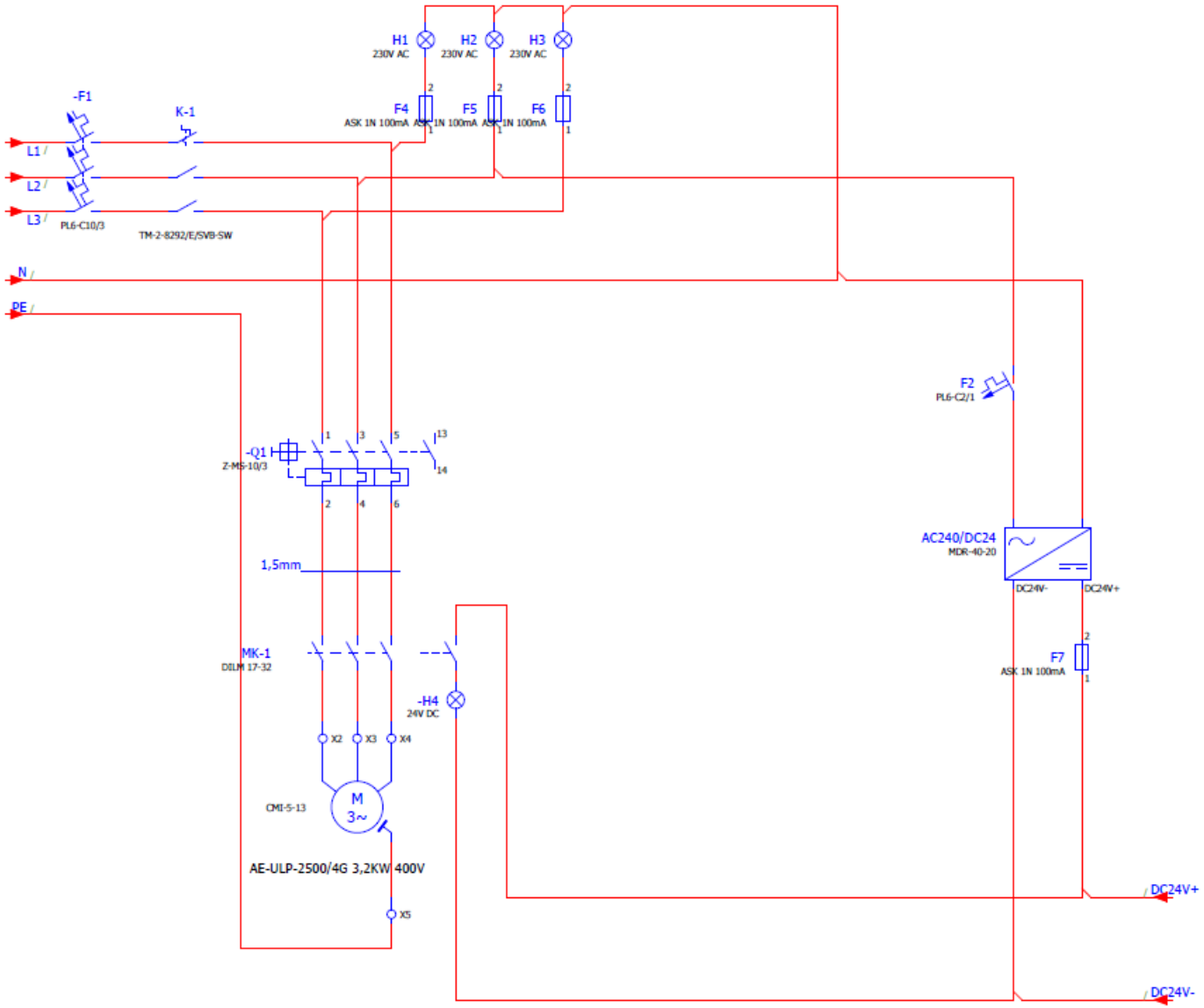
1.4 ELECTRICAL SCHEMES



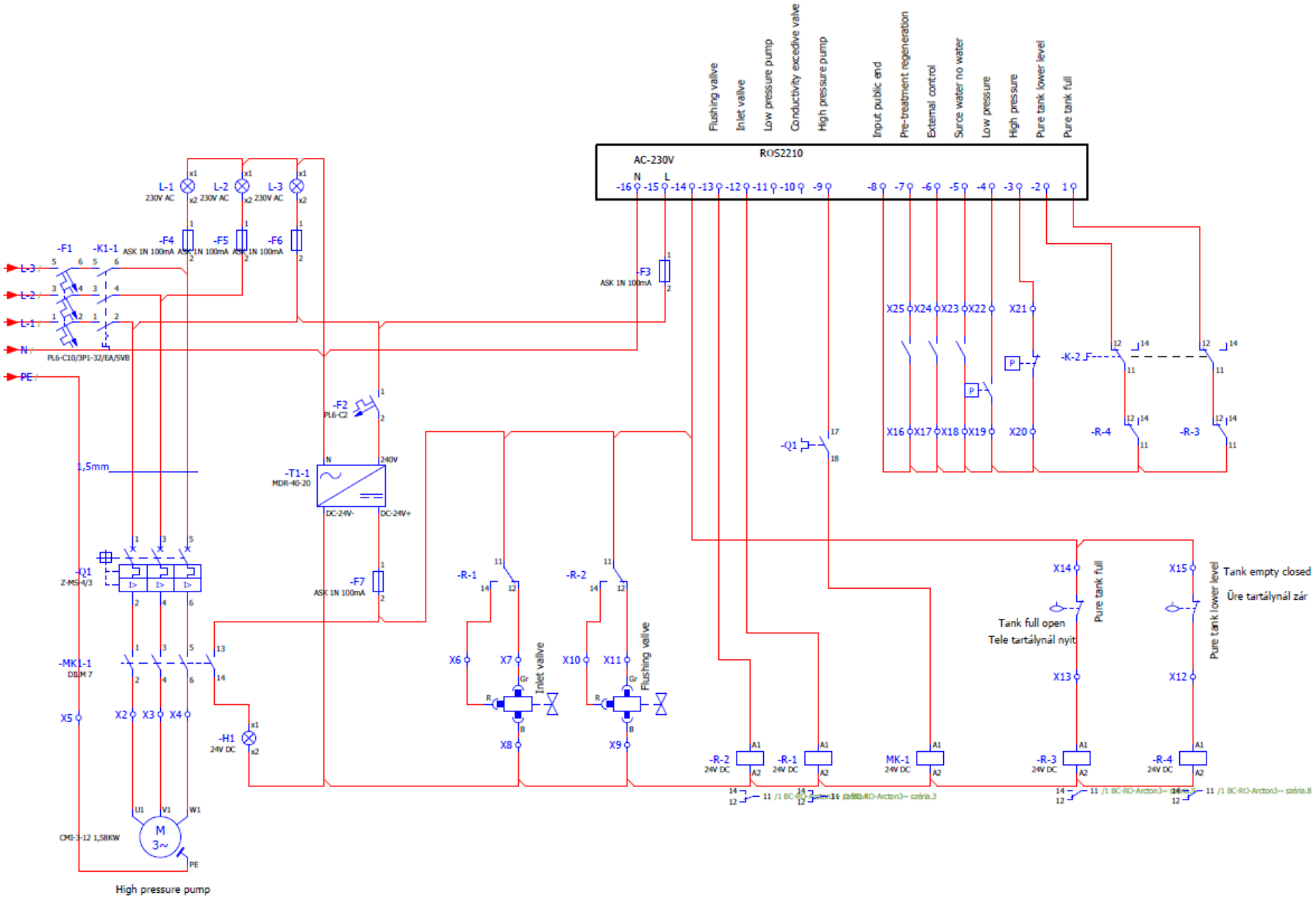
Arcton Elite 300 - 600 - 900 equipments



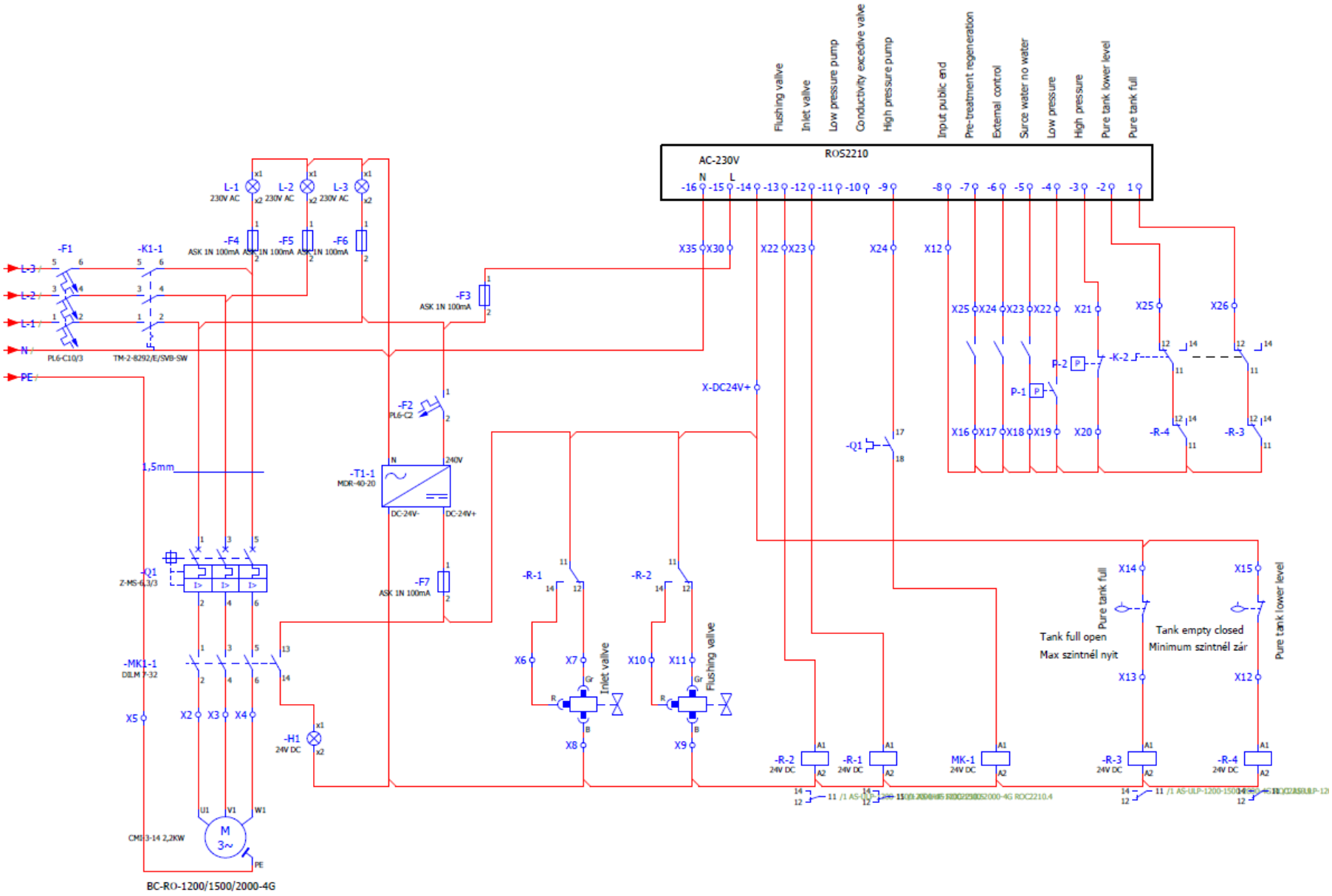
Arcton Elite 1200 - 1500 - 2000 equipments



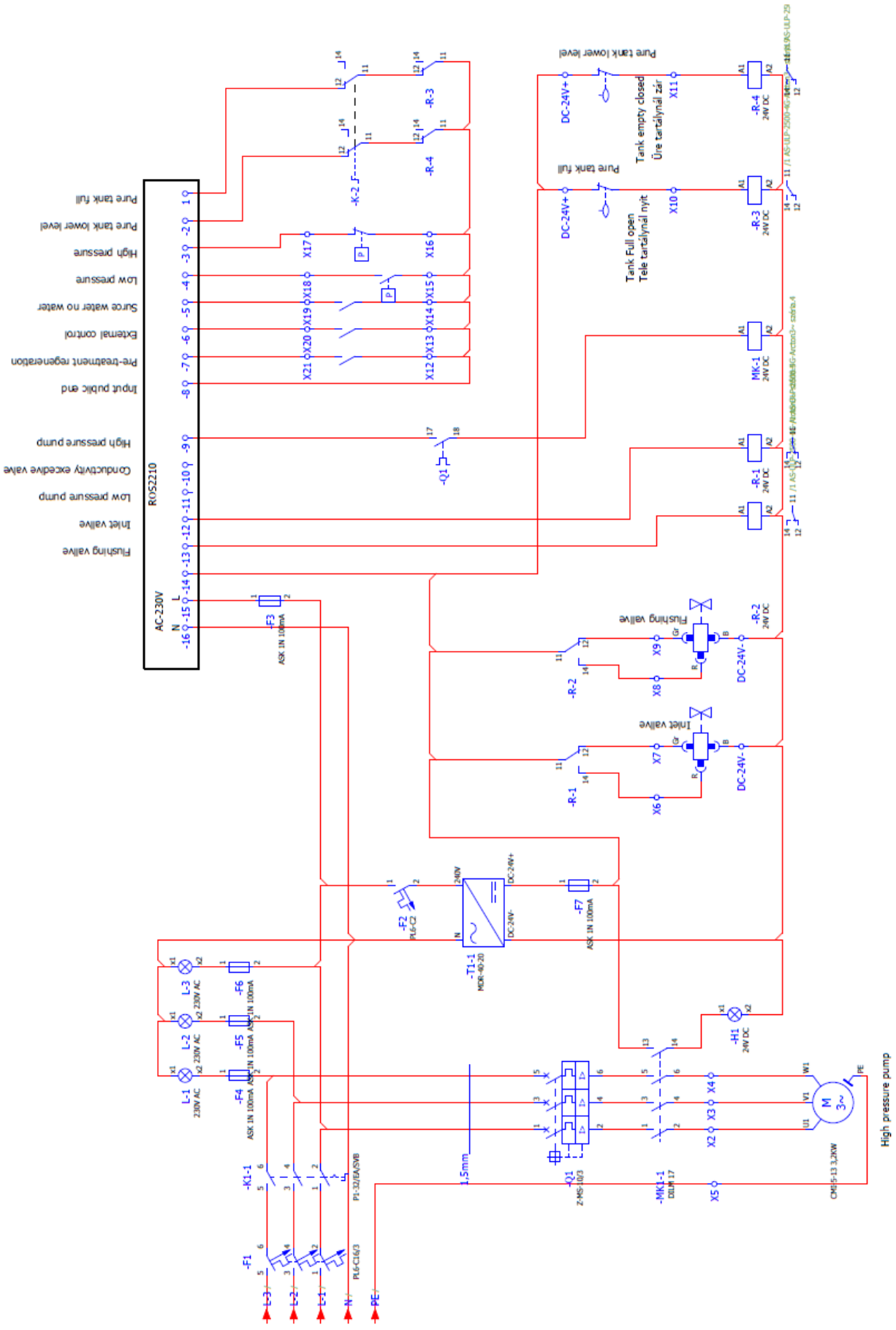
Arcton Elite 2500 equipments



Arcton Standard 300 - 600 - 900 equipments



Arcton Standard 1200 - 1500 - 2000 equipments



Arcton Elite 2500 equipments

2.INSTALLATION, STARTUP AND MAINTENANCE

2.1 INSTALLATION

The equipment must be installed on a flat, level surface capable of supporting its weight. It is important to inspect the entire RO system carefully for any damage before proceeding with connection and startup. The installation and setup of the unit must be undertaken by a qualified professional. The room or area where the unit is installed must comply with local building codes and workplace standards.

The RO system must be installed with two independent level sensors (a lower-level switch/sensor and an upper-level switch/sensor) in the feedwater or permeate storage tank.

The equipment is designed and approved for operation only when both level controls are properly installed and functional. Operation without these level sensors is strictly prohibited and may result in equipment malfunction, safety risks, and loss of warranty coverage.

2.2 ENVIRONMENTAL CONDITIONS

- The RO system must be installed indoors. It must not be operated in outdoor environments or exposed to adverse weather conditions such as rain, extreme temperature fluctuations, proximity to heating equipment, or direct sunlight.
- The ambient air quality at the installation site should be free of corrosive vapors, airborne dust, and fibrous matter.
- The operating temperature for the system's feed water is between 5°C and 40°C.
- It is important to protect the system from freezing temperatures and excessive heat.
- To allow for maintenance and repair, ensure that enough clearances are available from other equipments and structures.

2.3 EQUIPMENT INSTALLATION AND STARTUP PROCEDURE

For the installation of the equipment, only manufacturer-certified experts are authorized. If the initial installation after the equipment's delivery is not performed by the manufacturer's experts, the warranty will be void.

Before inserting the filter cartridge into its housing, ensure it is thoroughly flushed with clean, low-ionic water to remove manufacturing residues and any preservatives. Membrane modules must then be installed carefully, aligning their internal arrow marking with the feedwater flow direction to guarantee correct orientation. Prior to energizing the system, verify that all electrical connections are secure and confirm pump rotation direction to avoid hydraulic damage.

Set up the RO controller following the supplied instruction manual, configuring mode parameters and safety thresholds. Conduct a preliminary hydrostatic test using low-pressure mains water to check for leaks—but first ensure all isolation valves on the feed side are fully opened, while those on the permeate side remain tightly closed. To completely purge air and fill the system, open all feed-side isolation points and maintain permeate-side valves closed. Once the pressure test confirms system integrity, return the valves to their operating positions: set the post-high-pressure pump valve and the concentrate/recycle control valves to half-open, while permitting free flow through the permeate line. The feed water valve should remain fully open.

Inspect the feed pressure; following a 0.5 µm cartridge, it must read at least 3 bar before proceeding. Adjust the pressure regulator (gauge) to maintain this setpoint. Engage the RO unit by turning on the main power switch and selecting Manual mode on the controller. Use the concentrate bypass valve to initially balance the system to a 50 % permeate / 50 % concentrate ratio, monitoring the pressure carefully, and adjusting towards the target operating pressure specified on the membrane datasheet for your feedwater conditions. If permeate output remains below 50 %, gradually increase it in two or three increments—allowing 10–15 minutes between adjustments to let the system stabilize.

After achieving the correct permeate-to-concentrate balance and pressure, measure the permeate conductivity. Bear in mind membranes may take several hours to approach stable conductivity. Once conductivity is within acceptable range, switch the controller to Auto mode. Confirm that the permeate tank's level sensors correctly start and stop the RO operation, and that automatic membrane flushing cycles function properly—setting flush intervals to no more than every 8 hours for continuous use.

Finally, close the main isolation valve and power down the system. Provide comprehensive training to operating personnel, complete the commissioning logbook, and formalize system handover with an acceptance report. Emphasize the importance of operator training and diligent maintenance of the operation log, and review the full user manual thoroughly to ensure compliance and safe operation. Important: Begin operation with approximately 50 % recovery and increase gradually in 3–5 % steps, allowing 12–15 minutes between increments to achieve equilibrium.

2.4 COMMISSIONING OF THE SYSTEM

After the commissioning process and handover, open the main isolation valve and verify the incoming feed pressure at the 0.5 µm prefilter gauge. The operating feed pressure must remain within the range of minimum 3 bar and maximum 6 bar.

Switch on the main power switch. The RO system will only start if the feedwater tank level controller is requesting water or if the mode selector switch is set to Local operation.

Confirm that the regulating valve on the high-pressure pump and the concentrate control valves are positioned according to the commissioning adjustments. These valves were calibrated by the manufacturer's technicians during startup to ensure optimal recovery and safe membrane operation.

Unauthorized changes to valve settings by the operator may cause equipment malfunction and invalidate the warranty.

Exceeding the specified operating values—including permeate flow, system pressure, and recovery ratio—is not permitted, as this may result in permanent membrane damage and will void the warranty.

2.5 OPERATION OF THE SYSTEM

The RO unit operates automatically and does not require permanent supervision. During normal operation, operator intervention is limited to visual inspection.

Once per shift, the operating logbook must be updated with current performance values. This provides a documented history of system operation and ensures compliance with warranty conditions.

It is essential that the operator replaces the prefilter cartridge immediately if a pressure drop of 0.5 bar is observed across the filter. Every filter replacement must be recorded in the operation logbook without exception.

Routine visual checks and timely logbook updates are sufficient to keep the system within safe and efficient operation.

2.5 MAINTENANCE OF THE SYSTEM

The RO system requires periodic preventive maintenance every 1000 operating hours. In the event of a malfunction, contact the distributor or manufacturer's service department. They are responsible for the supply and proper installation of genuine spare parts to maintain long-term reliability.

The reverse osmosis membranes must undergo chemical cleaning every 3000 operating hours. This cleaning procedure must be carried out exclusively by qualified personnel from the manufacturer to ensure proper handling and avoid membrane damage.

Failure to maintain or irregular completion of the operating logbook will result in loss of warranty coverage.

Please ensure that all operating personnel are properly trained, that the Operating Logbook is maintained, and that the equipment is operated strictly in accordance with the User Manual. Failure to comply with these conditions may result in loss of warranty coverage.

Date	Working hours (bar)	Pressure before filters (bar)	Pressure after filters (bar)	Pressure after pump (bar)	Permeate flow (l/min)	Concentrate flow (l/min)	Conductivity (µS/cm)	Water temperature (°C)	Notes	Signature

3. INSTALLATION DATA SHEET

Contact details for the installation expert:	
Name:	
Phone number:	
E-mail address:	
Company name:	
Mailing address:	
Contact details for the equipment operator:	
Name:	
Phone number:	
E-mail address:	
Company name:	
Mailing address:	
Details of the installed equipment:	
Type:	
Serial number:	
Date of installation:	

_____

Stamp and signature of the installer

4. COMISSIONING CHECKLIST

1. Verification of mechanical and electrical connections:	
Feedwater pressure within required range (2.5 - 6 bar)	
All piping and mechanical connections properly installed and leak-free	
Electrical supply verified	
Protective earth (PE) / equipotential bonding connected correctly	
Control panel wiring and sensor connections secured	
2. Controller Programming and System Checks	
RO Controller programmed as per startup instructions	
Tank level switches tested and operating correctly	
Post-prefilter pressure verified in operating mode	
Conductivity reading (µS/cm):	
Feed pressure (bar):	
Permeate flow (L/h):	
Concentrate flow (L/h):	
Recycle flow (L/h):	
Recovery ratio adjusted to commissioning setpoint	
Pressure set to membrane manufacturer's recommended value	
Permeate TDS/conductivity within acceptable range	
3. Functional Tests	
Main isolation valves checked (feed side open, permeate side closed during pressure test)	
High-pressure pump rotation direction verified	
Automatic flushing sequence tested (start/stop cycles)	
Alarm and fault logging tested	
Emergency shutdown tested	
4. Documentation and Training	
Operating personnel instructed in system operation and safety	
Operation Logbook provided and explained	
Maintenance schedule communicated (prefilter replacement, membrane cleaning, periodic service)	
Warranty Certificate and Commissioning Report completed and signed	
5. Documentation and Training	
Commissioning Checklist completed and signed	
Copy returned to manufacturer/distributor (condition of warranty validity)	
Additional Notes / Observations:	

5. WARRANTY CERTIFICATE

Place of the printed label:

Commissioning date:
_____ Signature / Stamp

The manufacturer warrants that the equipment, when used in accordance with its intended purpose and under normal operating conditions, will be free from defects in materials and workmanship for a period of **24 months from the date of commissioning**, but no longer than **30 months from the date of the quality certificate**.

Warranty terms

- The warranty is valid only if the commissioning of the equipment is carried out by Euro-Clear Kft. or by an authorized service partner, and if the completed Warranty Certificate and Commissioning Report are duly provided.
- The Warranty Certificate and Commissioning Report must be fully completed and signed. Failure to provide these documents will result in the loss of warranty rights.
- The Warranty Certificate, Commissioning Report, and Quality Certificate must be carefully retained by the owner and may be required as proof for any future warranty claim.

Exclusions

- Normal wear-and-tear components (e.g. filter cartridges, gaskets, seals)
- Damage resulting from improper installation, misuse, or failure to follow the user manual
- Unauthorized modifications or repairs performed by non-approved personnel
- Operating conditions outside the limits specified in the Technical Specifications

Warranty Support

To register commissioning and maintain warranty validity, please contact us at support@euro-clear.eu

5. QUALITY CERTIFICATE

1. Quality certificate issuer: Euro-Clear Kft.	**2. Producer:** Euro-Clear Kft.
3. The specific name of the product (purpose): Automatic water softener.	Type: .....
4. Quantity: 1 pc	
5. Product identification: a) Control valve serial number: ..... b) Item number: ..... c) Other identification data:	**6. Transport and storage regulations:** It can only be transported and stored 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-prone.
7. Wrapping: Cardboard paper	**8. The test method used to check the quality of the product:** Inter-production
9. Instructions for use and handling: According to the handling and use instructions.	**10. Production date:**
11. Essential product features (with complete technical data, measurement results): Flow of volume: ..... m^3/h **Qualification, classification: Adequate!**	
12. Other data: Serial Number:	**13. Signature of the issuer of the quality certificate:** Dated, Gönyű, ... signature, stamp