HYGROMATIK®

WL-ROC-25/40/80/140

Reverse osmosis system

MANUAL

WLROC.EN
E-8881186

Certain computer programs contained in this product [or device] were developed by HygroMatik GmbH ("the Work(s)").

WL-ROC-25, WL-ROC-40, WL-ROC-80, WL-ROC-140 EN

Current version of this manual to be found on: www.hygromatik.com

Information in this manual is subject to change or alteration without prior notice.

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!
All electrical work to be performed by certified expert staff (electricians or expert personnel with equivalent training) only.

1. Introduction

Dear Customer,

Thank you for choosing a HygroMatik reverse osmosis unit. HygroMatik reverse osmoses units are state of the art.

In order to operate your HygroMatik reverse osmosis unit safely, properly and efficiently, please read these operating instructions.

Only use the HygroMatik R.O. unit in faultless condition and for its intended use, being aware of safety and hazards, and observing all instructions in this manual.

If you have additional questions, please contact your expert dealer.

For all technical questions or spare parts orders, please be prepared to provide unit type and serial number (see name plate on the unit).

1.1 Typographic Distinctions

- preceded by a bullet: general specifications

» preceded by an arrow: Procedures for servicing or maintenance which should or must be performed in the indicated order

☑ Installation step which must be checked off.

italics Terms used with graphics or drawings

1.2 Documentation

Retention

Please retain these operating instructions in a secure, always accessible location. If the product is resold, turn the documentation over to the new operator. If the documentation is lost, please contact HygroMatik.

Versions in Other Languages

These operating instructions are available in several languages. If interested, please contact HygroMatik or your HygroMatik dealer.

1.3 Symbols in Use

Specific Symbols related to Safety Instructions

According to ANSI Z535.6 the following signal words are used within this document:

⚠DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

1.3.1 General Symbols

Please note

This symbol is used whenever a situation requires special attention beyond the scope of safety instructions.

1.4 Intended Use

HygroMatik reverse osmosis unit used to produce fully demineralized water. It may only be used in accordance with its intended purpose.

NOTICE

- Intended use also includes compliance with the assembly, disassembly and reassembly, commissioning, operating and maintenance conditions and disposal measures prescribed by us.
- Only qualified and authorized personnel may work on and with the system. Persons who carry out transport or work on and with the system must have read the relevant parts of the operating instructions and in particular the chapter "Safety instructions". In addition, the personnel must be informed by the operator of any hazards that may exist. Leave a copy of the operating manual at the place of use of the unit.
- The installation of additional equipment is only permitted with the written approval of the manufacturer.

Use of the system

- The system is intended for operation (with use of feed water in the drinking water sector) of humidification systems.
- The limit and guide values of the German Drinking Water Ordinance must be taken into account.
- Frost protection and protection against excessive moisture must be ensured
- The permitted surrounding temperature is between 5° C and 40° C
- The use of a system separator according to DIN 1988, part 4 is obligatory.

NOTICE

- Avoid water temperatures above 20°C to prevent possible germ growth.
- Due to their construction, HygroMatik reverse osmosis systems are not intended for outdoor installation.

1.5 Unit sizes

The following reverse osmosis units belong to the WL-ROC (Reverse-Osmosis-Compact) series:

WL-ROC-25: max. permeate production rate of 25 l/h

WL-ROC-40: max. permeate production rate of 40 l/h

WL-ROC-80: max. permeate production rate of 80 l/h

WL-ROC-140: max. permeate production rate of 140 l/h

The following reverse osmosis plants belong to the WL-ROL (Reverse-Osmosis-Large) series

WL-ROL-160: max. permeate production rate of 160 l/h

WL-ROL-320: max. permeate production rate of 320 l/h

WL-ROL-460: max. permeate production rate of 460 l/h

WL-ROL-600: max. permeate production rate of 600 l/h

WL-ROL-1000: max. permeate production rate of 1000 l/h

WL-ROL-1200: max. permeate production rate of 1200 l/h

2. Safety Instructions

These safety instructions are required by law. They promote workplace safety and accident prevention.

2.1 Guidelines for Safe Operation

2.1.1 Scope

Comply with the accident prevention regulation „DGUV Regulation 3“ to prevent injury to yourself and others. Beyond that, national regulations apply without restrictions. This way you can protect yourself and others from harm.

2.1.2 Unit control

Do not perform any work which compromises the safety of the unit. Obey all safety instructions and warnings present on the unit.

In case of a malfunction or electrical power disruption, switch off the unit immediately and prevent a restart. Repair malfunctions promptly.

⚠WARNING

Restricted use.
IEC 60335-1 stipulates as follows:
This device may be used by children of eight years of age and above as well as by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge so long as they are supervised or have been instructed regarding the safe use of the device and understand the hazards that may result from it. Cleaning and maintenance of the unit must not be undertaken by children without supervision.

NOTICE

The installation room must be adequately ventilated and be equipped with a floor drain. A water stop mechanism (e.g. leakage detector) can be used as an alternative.

2.1.3 Unit operation

⚠CAUTION

Danger of scalding!

Hot surfaces can cause injuries. Protect yourself with suitable protective equipment.

NOTICE

Water leaks possible due to defective connections or malfunctions.

- Before starting work, the water supply to the reverse osmosis system (RO system) must be shut off.
- The system may be under pressure. Release pressure before starting work.
- The reverse osmosis (RO) systems continuously produce permeate (product water) and concentrate (waste water). Connections and water-carrying components must be checked regularly for correct functionality.

NOTICE

Risk of material damage!

- The unit may be damaged if switched on repeatedly following a malfunction without prior repair. Rectify defects immediately!
- Regularly check that all safety and monito-ring devices are functioning normally. Do not remove or disable safety devices.

NOTICE

It is essential to leave the RO system connected to the power supply permanently. Only then the automatic rinsing can be carried out (protection against germs).

Switch device ON/OFF

The system can be switched on/off in different ways:

» Interrupt the power supply (pull the plug) or

» operate the main fuse switch (only WL-ROL units) or

» press the ESC key (for about 2 seconds).

2.1.4 Mounting, dismantling, maintenance and repair of the unit

NOTICE

The HygroMatik reverse osmosis units are IP20 protected. Make sure that the unit is not object to dripping water in the mounting location.

NOTICE

Do not install HygroMatik reverse osmosis systems above electrical equipment such as fuse boxes, electrical appliances, etc. In the event of a leakage, leaking water can damage the underlying electrical systems.

NOTICE

- Use genuine spare parts only
- After any repair work, have qualified personnel check the safe operation of the unit
- Attaching or installing of **additional components** is permitted only with the **written consent** of the manufacturer

2.1.5 Electrical

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!

Any work on the electrical system to be performed by certified expert staff (electricians or expert personnel with comparable training) only.

During maintenance or installation work, the device must be disconnected from the power supply and secured against being switched on again. The absence of voltage must be ensured by a measurement.

After electrical installation or repair work, test all safety mechanisms (such as grounding resistance).

NOTICE

Use only original fuses with the appropriate amperage rating.

Regularly check the unit‘s electrical equipment. Promptly repair any damage such as loose connections or burned wiring.

Responsibility for intrinsically safe installation of the HygroMatik reverse osmosis unit is incumbent on the installing specialist company.

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3. Transport

3.1 Overview

Please note

Proceed carefully when transporting the reverse osmosis unit in order to prevent damage due to stress or careless loading and unloading.

Protect the device from moisture during transport; the storage and shipping temperature is 5° to 40°C.

3.2 Interim Storage

Store the unit in a dry place and protect from frost and strong sunlight.

3.3 Check for complete and correct delivery of goods

Upon receipt of the unit, confirm that:

- model and serial number on the name plate match those specified in the order and delivery documents
- the equipment is complete and all parts are in perfect condition

Please note

In case of damage from shipment and/or missing parts, immediately notify the carrier or supplier in writing.

Time limits for filing freight claims with shipping companies are*:

Shipping company	After receipt of goods
Carriers	no later than 4 days
Parcel service	immediately

* Time limits for some services subject to change.

3.4 Scope of delivery

WL-ROC

- reverse osmosis unit incl. control
- 2 membranes (WL-ROC-25: only 1 membrane)
- 1 prefilter (WL-ROC-140: 2 prefilters)
- manual
- connection material: permeate hose (5m), concentrate hose (1.5m), screw-in connector (3/4" to 15mm JG)

WL-ROL

- Reverse osmosis unit incl. control
- 4 membranes (WL-ROL-160 and 320: only 2 membranes)
- 2 prefilters (5/10 µm)
- manual
- connection material: 2 screw-in connectors 3/4" to 15mm JG (only WL-ROL160 - 600)
- Antiscalant canister (for device versions with integrated antiscalant pump)

Options:

- Retrofit antiscalant WL-ROC-140
- Retrofit kit blending WL-ROC-140
- Retrofit kit blending WL-ROC-25/-40/-80
- UV-lamp
- expansion vessel

NOTICE

The scope of delivery does not include pipe clamps for fastening or stabilising the connection material to the specific wall or ceiling.

4. Function and structure

4.1 Mode of operation

General principle of reverse osmosis

Osmosis is a natural process, it is understood as the one-sided diffusion of a liquid (here the feed water) through a semi-permeable membrane. A semi-permeable membrane is only permeable for certain substances..

As the liquid moves through a semi-permeable membrane, the pressure on the side with the lower concentration decreases and at the same time the pressure of the more concentrated solution increases until a balance is reached, stopping the water flow. Pressure difference between the two liquids is called "osmotic pressure".

Reverse osmosis, on the other hand, is a technical process in which the natural process is reversed. It involves applying a pressure higher than the osmotic pressure to the concentrated liquid so that the water flows in the opposite direction through the semi-permeable membrane and thus separates the salts solved in the water.

Using this principle, water can be demineralized for drinking water as well as for process and industrial applications.

4.2 Influencing factors

The performance of the reverse osmosis membrane depends strongly on the following parameters:

Water inlet pressure at the membrane:

By lowering the working pressure, a reduction in permeate production can be achieved.

By increasing the working pressure, an increase in permeate production is also achieved.

The pump pressure can be changed by turning the screw on the pump (see chapter 8.4).

Be careful not to exceed the maximum pump pressure!

Salt content of the feed water:

The higher the salt content, the faster the membrane wear.

Temperature of the feed water:

The WL-ROC unit is set up for a feed water temperature of 15°C. Any difference from this temperature will affect the production quantity and the quality of the permeate.

The following table shows the variation of the permeate production quantity by 3% per differing 1°C.

Temperature	15 °C	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8
Correction factor	1	1,03	1,06	1,09	1,12	1,15	1,18	1,21	1,25

Temperature	15 °C	- 1	- 2	- 3	- 4	- 5	- 6	- 7	- 8
Correction factor	1	0,96	0,92	0,88	0,84	0,8	0,77	0,74	0,7

The colder the feed water, the lower the permeate production and the better/lower the conductivity.

The warmer the feed water, the higher the production quantity, but the lower the permeate quality.

4.3 Operating conditions of the unit

The WL-ROC system can be fed with water from the normal water supply if the water has a maximum hardness up to 20°dH.

In order to avoid a reduction of the operating capacity, the water to be treated must comply with certain parameters:

turbidity	< 1 NTU
Iron	< 0,15 ppm
Manganese	< 0,05 ppm
Aluminium	< 0,05 ppm
SDI (Silt Density Index)	< 3
Water temperature	5 to 25 °C
Free chlorine	< 0.25 ppm
Hardness	< 20 °dH(30 °F)
Oil and fat	< 0.1 mg/l
COD	< 10 mg/l
TOC	< 3 mg/l
TDS	< 1000µS/cm
SiO2	< 15 ppm
SO4	< 75 ppm

In some cases the reverse osmosis unit cannot be fed with water from the normal water supply because some elements contained in the water (free chlorine, iron, suspended solids, hardness minerals) would disturb the osmotic process and damage the membranes, sometimes irreversibly.

In these cases a pre-treatment is necessary, e.g: De-ironing, de-chlorination, softening with resins or chemical softening (dosing pump with anti-fogging agent), depending on the characteristics of the water to be treated.

4.4 Operating sequence

The feed water (raw water) is pumped through the pre-filter, which guarantees the de-chlorination and a final filter capacity of 5 µm. This ensures the necessary clarity of the water at the membrane inlet. The feed water pressure must be at least 2 to 5 bar during normal operation to ensure a correct supply pressure at the pump inlet.

The water then flows through the water inlet solenoid valve SV1 and is then directed by the pressure pump at high pressure to the membrane(s).

The pressure switch PS_{HIGH} provides a signal when the pressure exceeds 10 bar at the membrane inlet (WL-ROC140 only).

Pure water (permeate) passes through the membrane; the salts solved in the water are retained by the membrane and drained off (concentrate).

The permeate now flows via the pure water line (scope of delivery) to the expansion vessel or the permeate collecting tank.

The quality of the permeate leaving the system is controlled by the conductivity sensor ($EC_{PROBout)}$.

The production process stops automatically when the water outlet pressure has reached 4 bar at the pressure switch PS_{MAX}. The pressure in the following circuit is kept constant by the expansion vessel.

If the pressure in the following circuit at the pressure switch PS_{MIN} falls below 2 bar (when the expansion vesel is empty), the unit starts permeate production again.

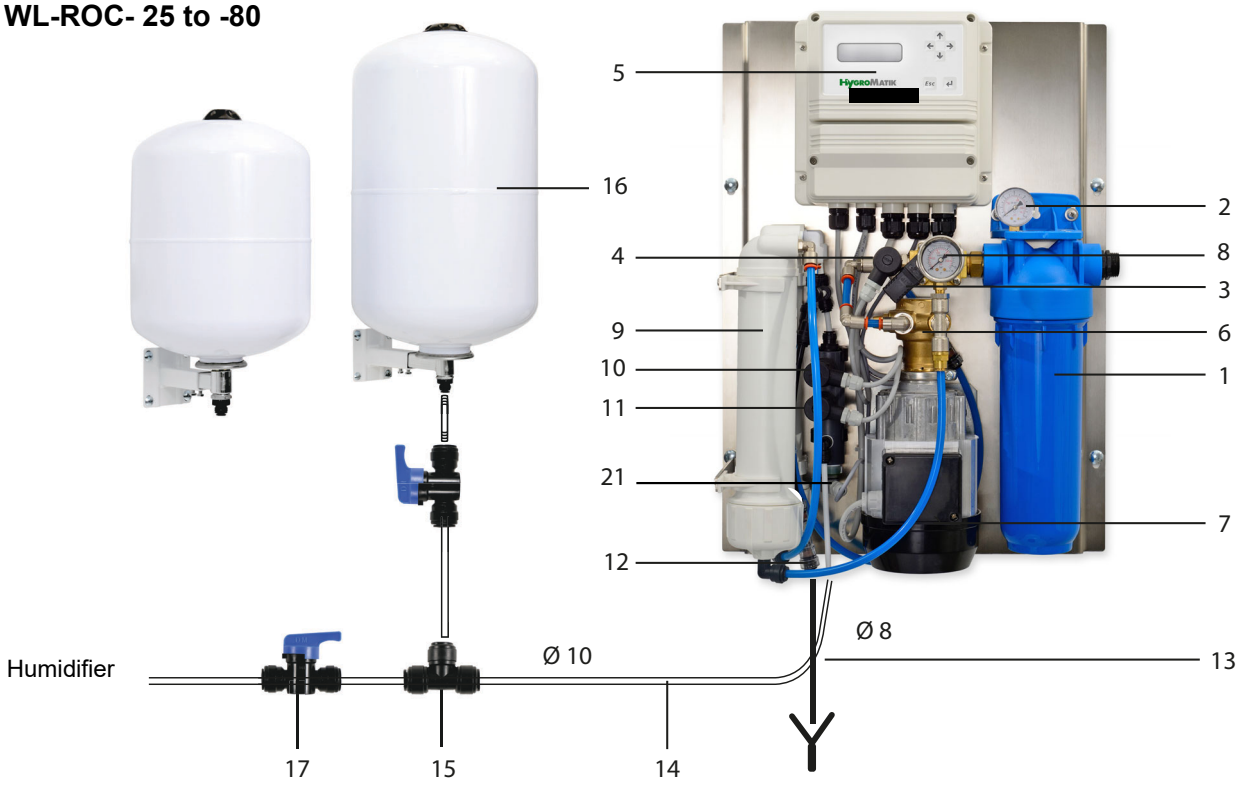
If the inlet pressure falls below 0.8 bar, the pressure switch PS_{LOW} gives the corresponding alarm and interrupts operation.

NOTICE

The reverse osmosis (R.O.) units of the WL - ROC series should not operate without an expansion vessel or permeate collecting tank.

4.5 Mechanical construction

WL-ROC- 25 to -80

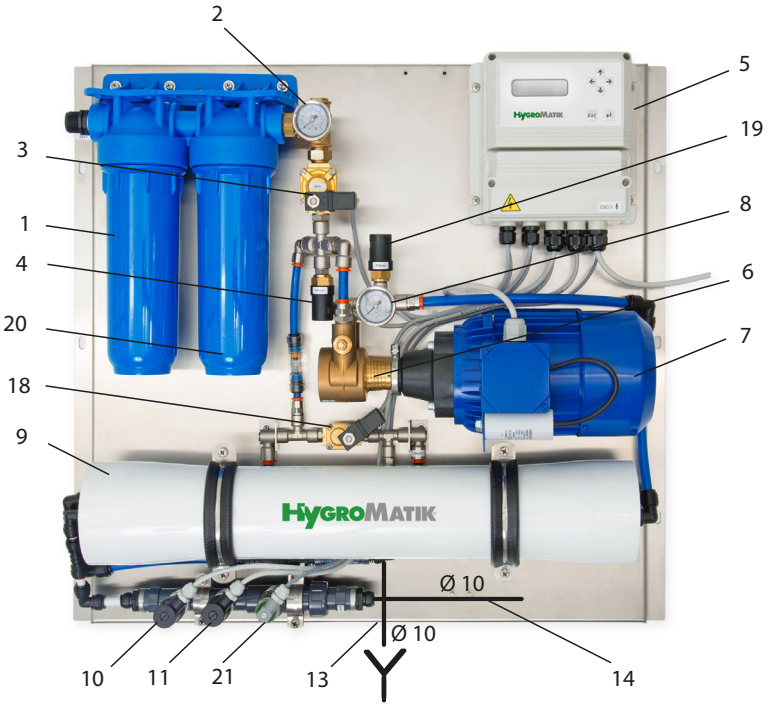


1	Prefilter/ CB-EC activated carbon filter*
2	Pressure gauge (feed water) / PI
3	Water inlet solenoid valve
4	Pressure switch PS HIGH
5	control
6	Rotary vane pump 150 l/h
7	Engine

8	Pressure gauge (permeate) / PI
9	Membrane pressure pipe
10	Pressure switch / PS MIN
11	Pressure switch / PS MAX
12	Flow limiter concentrate
13	Concentrate pipe
14	Permeate pipe

15	T-piece connection expansion vessel
16	Expansion vessel
17	Manual control valve / RV
18	Flush valve (solenoid valve)
19	Pressure switch / PS LOW
20	Prefilter sediment / CPP*
21	Conductivity sensor

WL-ROC-140



* activated carbon filter
- WL-ROC-25 - 80: 5µ
- WL-ROC-140: 10µ

** sediment filter
- only WL-ROC-140

The devices of the Hygro-Matik WL-ROC series are designed for wall mounting.

5. Installation arrangement

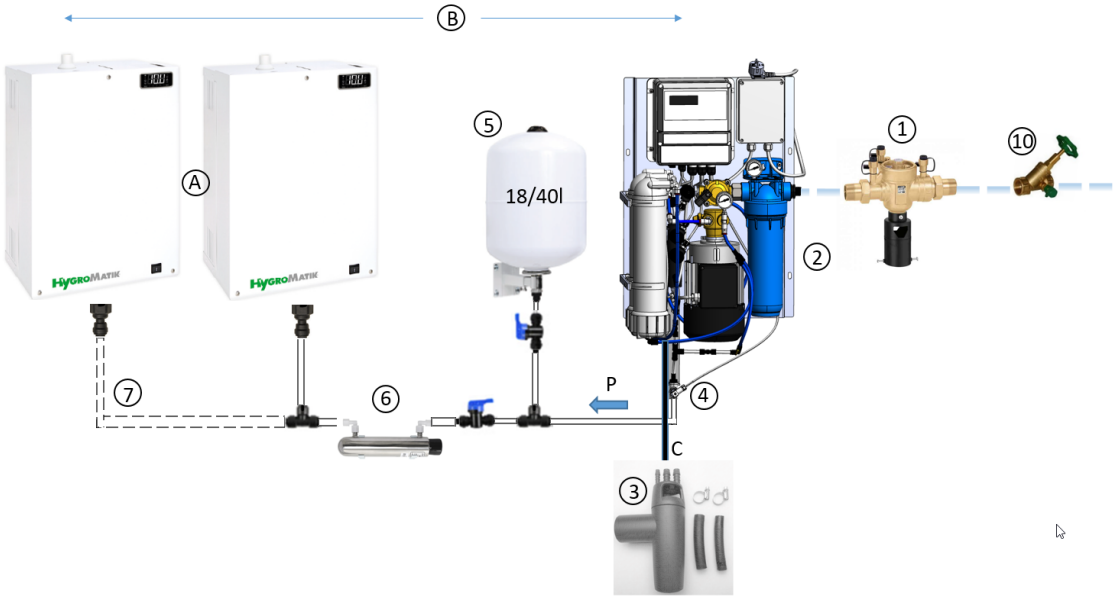
The following illustration shows an example of the installation arrangement of the reverse osmosis system, a pressure expansion vessel and existing consumers heatersteam humidifier or adiabatic humidifier.

A: consumer

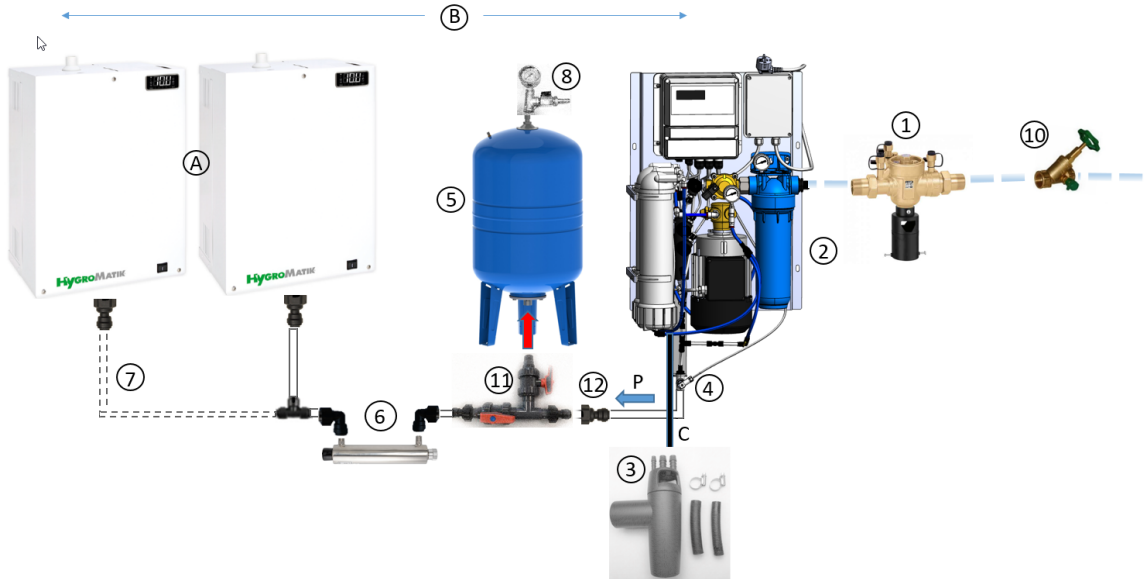
B: max. 15 metres (25 metres with fixed piping) total pipe length between the UO-system and the last consumer.

C: concentrate P: permeate

WL-ROC unit with wall-mounted expansion vessel (18/40 Liter)



WL-ROC unit with standing expansion vessel (80 - 500 Liter)



1: BA" ¾" system separator

2: WL-ROC-XX incl. connection material

3: Waste water connection set

4: Permeate quality blending kit (incl. needle valve and conductivity sensor, only for electrode steam humidifier)

5: Expansion vessel

6: UV disinfection with transformer, screw-in connectors

7: Connection set for another unit

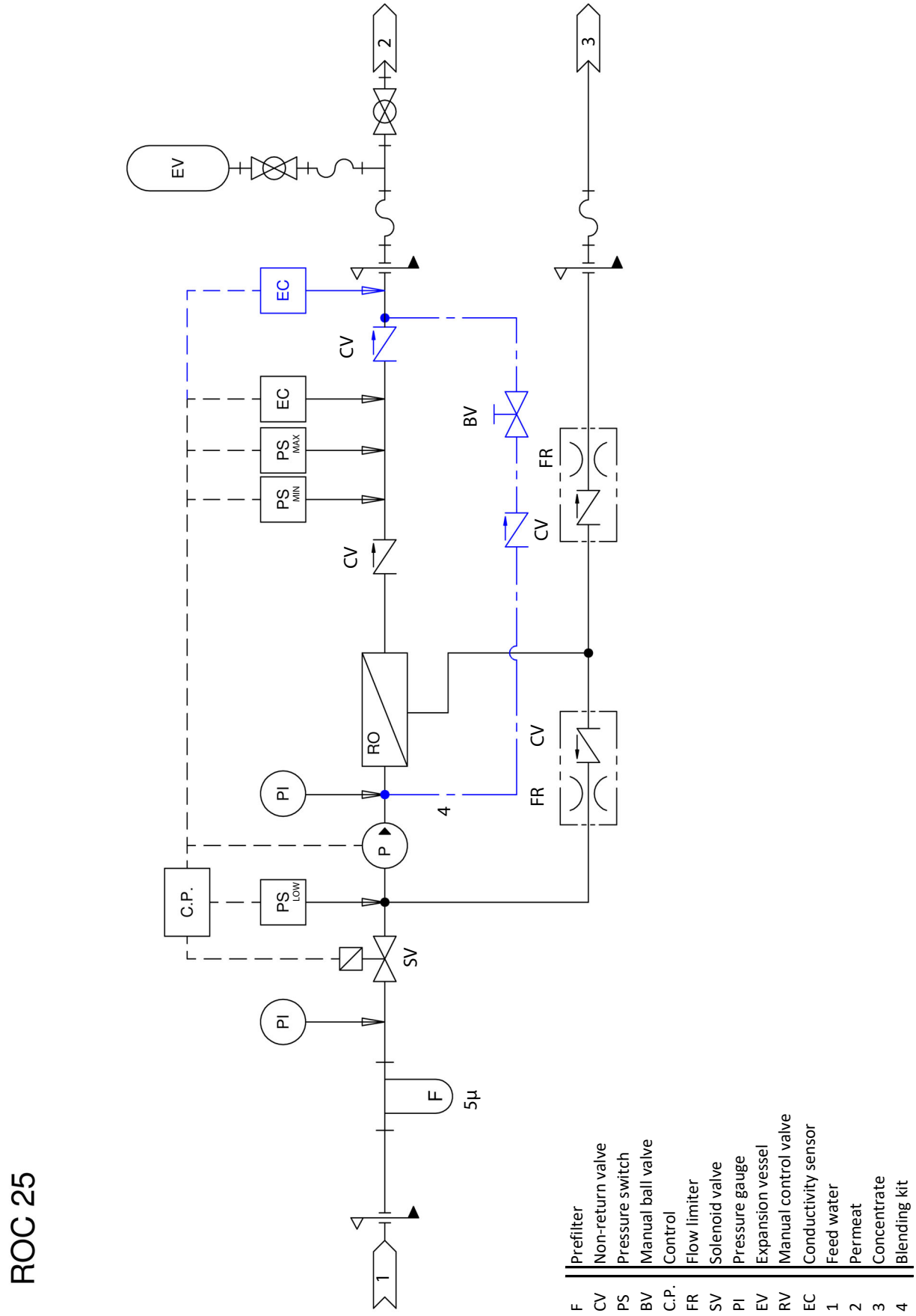
8: Stainless steel pressure gauge 0-6 bar with fitting and stopcock for expansion vessel (only for 100-500l)

10: shut-off by free-flow valve or stopcock.

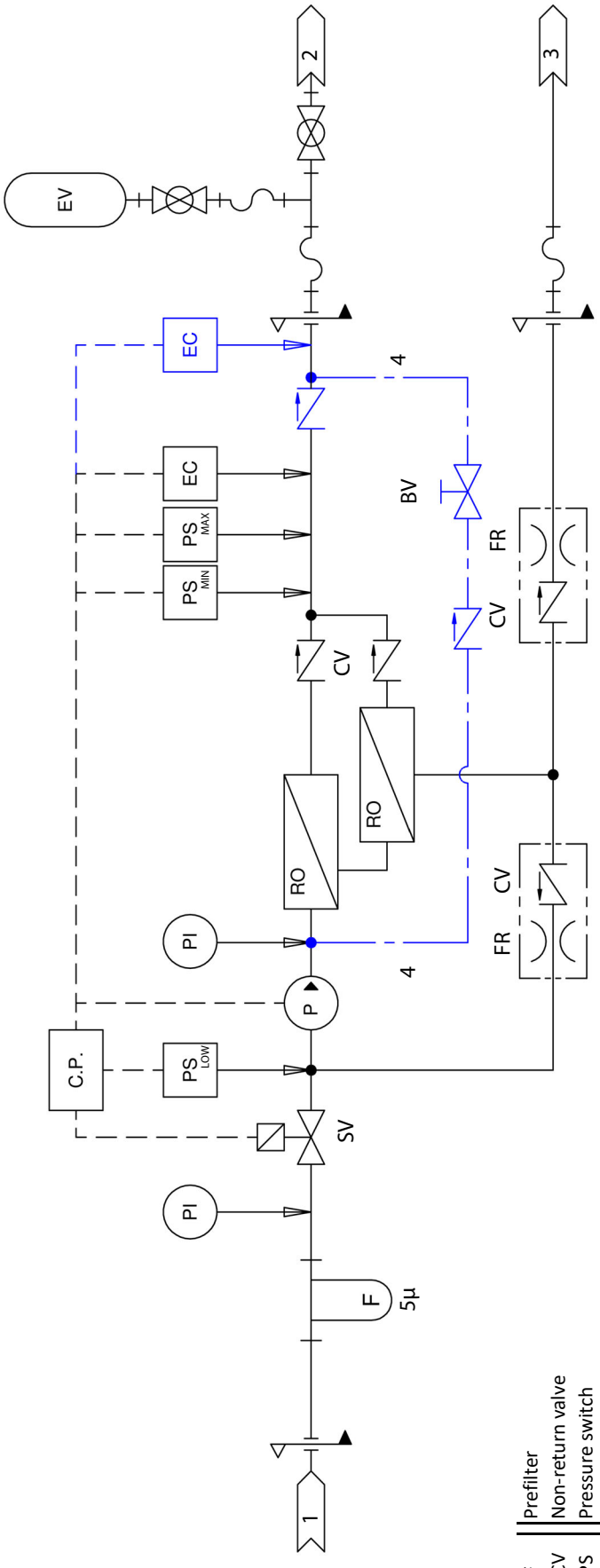
11: Connection set expansion vessel

12: Screw-in connector 3/4"

5.1 Flowchart

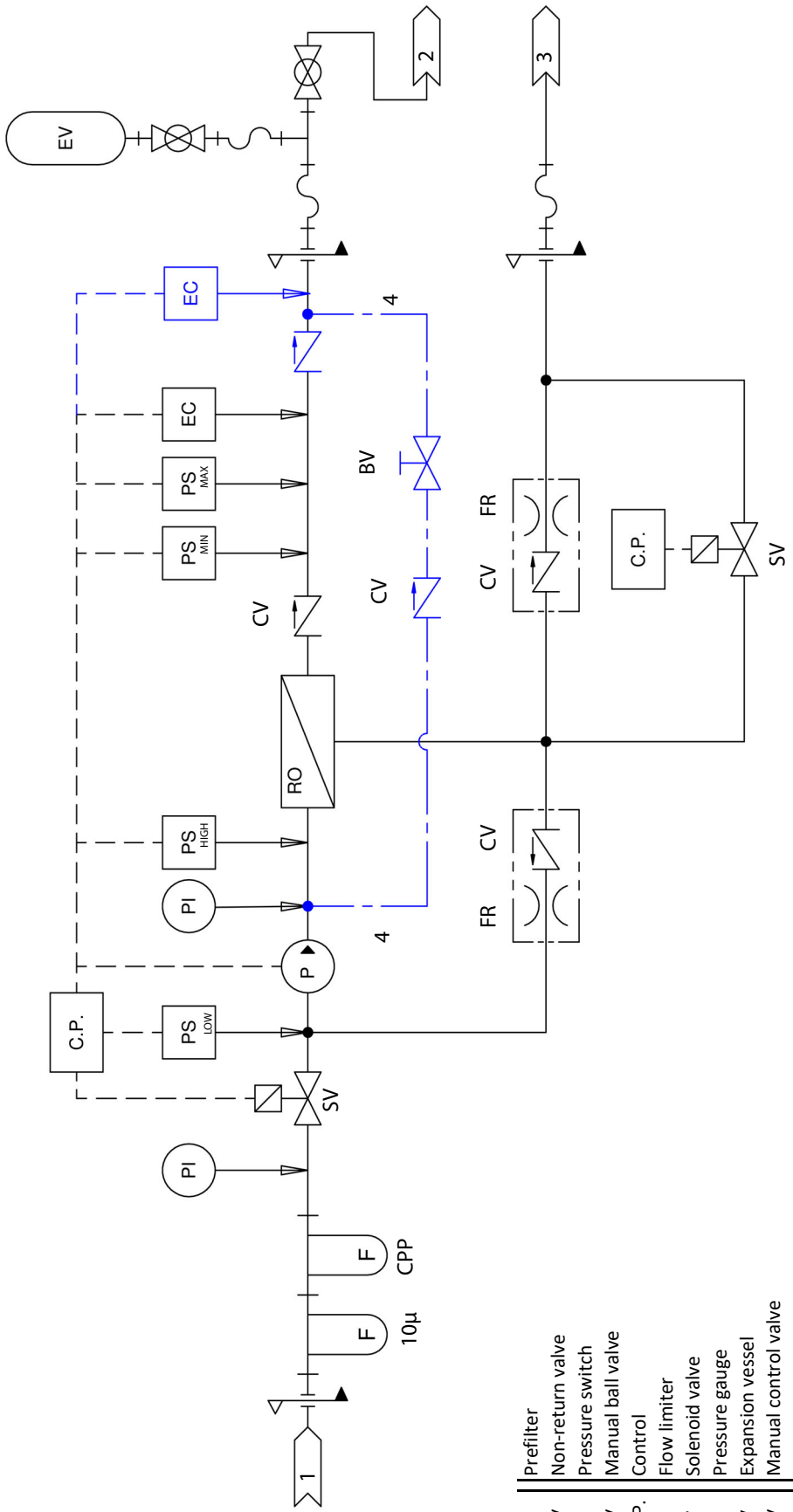


ROC 40-80



F	Prefilter
CV	Non-return valve
PS	Pressure switch
BV	Manual ball valve
C.P.	Control
FR	Flow limiter
SV	Solenoid valve
PI	Pressure gauge
EV	Expansion vessel
RV	Manual control valve
EC	Conductivity sensor
1	Feed water
2	Permeat
3	Concentrate
4	Blending kit

ROC 140



F	Prefilter
CV	Non-return valve
PS	Pressure switch
BV	Manual ball valve
C.P.	Control
FR	Flow limiter
SV	Solenoid valve
PI	Pressure gauge
EV	Expansion vessel
RV	Manual control valve
EC	Conductivity sensor
1	Feed water
2	Permeat
3	Concentrate
4	Blending kit

6. Mechanical installation

⚠WARNING

Risk of foot injuries!
Prevent unit from dropping during installation! Helping hand of a second person is advisable.

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage.
During installation, the unit must be disconnected from power supply and secured against being switched on again. The absence of voltage must be ensured by a measurement.

6.1 Environment Parameters to be met and Mounting Recommendations

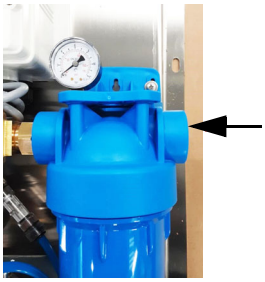
When selecting the installation site for the reverse osmosis unit, take the following into account:

- The minimum clearances indicated in the fitting measures section must be observed in order to ensure adequate unit ventilation and allow for unobstructed access in case of maintenance
- Protection class IP20
- By design, HygroMatik reverse osmosis units are not qualified for outdoor installation (electronical components and water-bearing parts may be damaged)
- Ambient temperature must lie between +5 and +40 °C (+41 and +104 °F) in order to protect the unit electronics against damage; frost may damage the solenoid valve and pump, as well as make hoses burst.
- Avoid environments with excessive humidity, as it could have negative effects on the electronics.
- Installation in closed rooms requires aeration and, if necessary temperature conditioning in order to meet the environmental conditions.
- Make use of existing water connections for supply and draining.
- Mount the unit on a stable, preferably solid wall with the required load-bearing capacity required (s. unit technical specifications). If such a wall is not at hand, the unit may be attached to a stand bracket firmly anchored to the floor.
- For correct operation it is necessary that the unit is mounted vertically and horizontally perpendicular.
- The optimal feed water pressure of the reverse osmosis (RO) units is in the range of 2 bar to 5 bar. If these values are not reached, the installation of a pressure reducer or a booster pump is necessary.
- The on-site waste water connection must be a free outflow according to DIN EN 1717.
- The installation room must be well ventilated and equipped with a floor drain. Alternatively, a water stop device (e.g. leakage detector) can be used.
- Install the reverse osmosis unit as close as possible to the consumer / humidifier. The maximum distance is 15 metres.

6.2 Installation steps

6.2.1 Feed water connection

» Connect the feed water inlet to the system. The diameter of the raw water pipe must be at least equal to the diameter of the connection piece.



» Observe the information in the technical data.

» Connect a shut-off valve upstream of the system.

6.2.2 Permeate line connection

» A short piece of hose is installed at the outlet port of the permeate in the factory. Remove this and replace it with the white hose Ø10 mm (included in the scope of delivery).

NOTICE

Never use the RO unit with the permeate line closed!

6.2.3 Connection of the expansion vessel

» Mount the holder* of the expansion tank on a stable wall.

» Seal the thread of the holder* (e.g. with Teflon tape).

» Mount the expansion tank on the holder*.

» Install the adapter* under the holder.

» Connect the following fitting to the Ø10 ball valve with a piece of white hose (diameter 10 mm).

» With the rest of the hose, connect the ball valve to the T-piece.

NOTICE

The expansion tank should be installed 3 - 5 m close to the R.O. unit.

NOTICE

Do not connect the permeate line to the expansion vessel until all other commissioning steps (especially flushing the membranes) have been completed.

* Included in the delivery of the optionally available expansion vessel.

6.2.4 Connection of the concentrate line

» Connect the free connection of the flow limiter (with integrated back-flow preventer) with the black hose (Ø see technical data) with slope to a free flow.

NOTICE

Ensure a free outlet and discharge according to DIN EN 1717. Pay attention to the minimum requirement for the free flow distance (between the drain hose and the siphon) of 26 mm to prevent microbial contamination.

NOTICE

The colour of the supplied hoses indicates their use:

White: for permeate Black: for concentrate

(PE hose connection: "John Guest" plug connection)

6.2.5 Inserting the prefilter cartridge(s)

Before installing the filter set in the preffilter container, it must be ensured that the feed water line is closed and thus no pressure is applied.

» Remove the filter container(s) using the screw driver supplied.

» Then install the new filter insert as shown.

» Refit the filter container(s) and screw tight.

NOTICE

If there are two prefilters (WL-ROC-140), insert the green activated carbon filter first.

Prefilter and membrane position

Fig.WL-ROC-25

6.2.6 Inserting the membrane(s)

Before installing the membranes in the membrane container, it must be ensured that

- the feed water line is closed and thus no pressure is applied.
- the unit is out of power.

WL-ROC-25/-40/-80:

» Unscrew the cap of the membrane container and install the membrane.

» Pay attention to the installation direction (black lip seal downwards).

» Make sure that the membrane is correctly inserted.

» Tighten the closure of the membrane container.

WL-ROC-140:

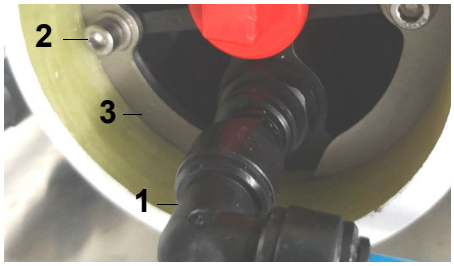
Inserting the membrane

NOTICE

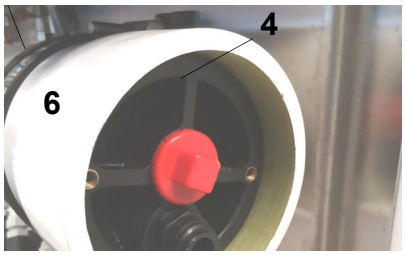
Use disposable gloves when installing the pre-filter(s) and membrane(s) to protect them from contamination.

» Unscrew the two quick fasteners (1) on the left-hand side of the membrane pressure pipe.

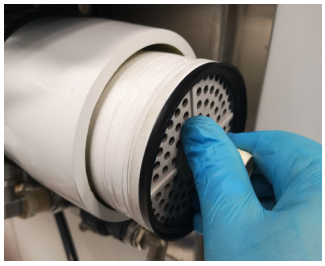
» "Remove the two Allen screws (2) and the half-moon shaped fastening rings (3) from the slot of the membrane pressure tube.



» Pull the end cap (4) out of the membrane pressure tube on both sides.



» Insert the membrane from the **right side** into the membrane pressure tube (6).



NOTICE

Pay attention to the correct installation direction of the membrane.

Only insert the membrane from the right-hand side, otherwise the lip seal may be damaged.

» Put the end cap back into the membrane pressure tube and fasten it with the half-moon shaped fastening rings (3) and the Allen screws (2).

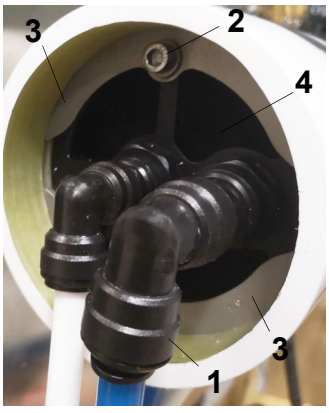
» Connect the quick fasteners (1).

Continue with the commissioning (chapter 9) and flushing of the membrane.

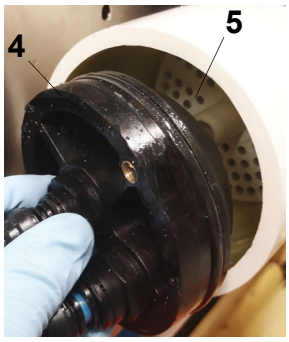
Membrane replacement

» Unscrew the two quick fasteners (1) on the left-hand side of the membrane pressure pipe and catch the leftover water.

» Remove the two Allen screws (2) and the half-moon shaped fastening rings (3) from the slot of the membrane pressure tube and and repeat it on the other side of the membrane pressure tube.



» Pull the end cap (4) out of the membrane pressure tube on both sides.



» Pull out the membrane (5) from the **left side** of the membrane pressure tube.

» Install a new membrane (see **Inserting the membrane**).

» Close both ends of the membrane pressure tube:

• Put the end cap back into the membrane pressure tube.

• Fasten it with the half-moon shaped fastening rings (3) and the Allen screws (2).

» Finally, connect the quick fasteners (1).

Continue with the commissioning (chapter 9) and flushing of the membrane.

7. Water connection

Have all plumbing work done only by qualified personnel (plumber or specialist with equivalent training) to minimize risks..

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!
Before starting installation work ensure that the unit is not yet connected to the power supply.

General Rules

- Obey local water utility regulations
- Verify that necessary safety measures have been taken – in compliance with either German Technical and Scientific Association for Gas and Water (DVGW) guidelines (DIN EN1717) or local regulations – that eliminate backflow of polluted water into drinking water treatment facilities. This may require the installation of a system separator, allowable only when free discharge into the drainage system is given.
- Ensure that there is a free outflow and drain according to DIN EN 1717. Pay attention to the minimum requirement for the free flow distance (between the drain hose and the siphon) of 26 mm to prevent microbial contamination.
- Supply water must not exceed 25°C (77°F)
- Allowable range of water pressure:
  1,5 to 4 bar / 22 to 58 psi (150.000 to 400.000 Pa). If the pressure is below 1.5 bar, install a pressure booster, if it is above 4 bar, install a pressure reducer after the reverse osmosis system.
- Install a drain tap shortly before the system to flush the pipe. Flushing the pipe prevents foreign particles such as swarf or sealing material from entering the system from the pipes.

Connection of the system supply

» Make sure that the flow rate and pressure correspond to the values given in the technical data.

» Ensure that the water supply stays closed. This system may only be supplied with water during commissioning (see chapter 8) !

Connection of the concentrate discharge pipe.

- The diameter of the concentrate pipe must be at least equal to the diameter of the connection piece (see technical data).

NOTICE

In any case, a particle filter (min. 100 µm) according to DIN 13443-1 should be installed before the reverse osmosis system. Without a water filter there is a risk of damage to the system.

NOTICE

The following applies to WL-ROL units:

- For safety reasons the water connections are not screwed during transport. They must be screwed during installation.
- Remove the transport locks from the flow pipes.

Water connections final check

Go down the following water installation checklist:

- ☑ ALL screw connections and hoses firmly connected?
- ☑ Water supply line flushed before making connections?
- ☑ Water connection properly installed?
- ☑ Water discharge properly installed?
- ☑ Does blow-down water drain freely?
- ☑ Water supply line and water discharge leakage-free?

8. Electrical connection

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage.
All work related to electrical installation to be performed by expert staff (electricians or expert personnel with equivalent training) only. Do not connect the reverse osmosis unit to the live power supply before all installation work has been completed.

Please note

The customer is responsible for checking expert staff qualification.

General installation rules

- All local rules concerning the implementation of electrical installations must be obeyed.
- Electric connector cables to be laid professional.

NOTICE

Possible electronical components destruction through electrostatical discharge!
Prior to commencing electrical installation work, steps must be taken to guard the sensitive electronical components of the unit control against damage from electrostatical discharge.

8.1 Procedure for electrical installation

» Insert the plug into a suitable socket. The performance values are given in the technical data.

No further wiring is required.

Exceptions:

- Connection of the internal alarm output to an external alarm detector
- Connection of a dosing pump (WL-ROC-140)

Fuses

Please note

HygroMatik recommends the use of main fuses with slow- to medium-load characteristic.

The reverse osmosis system should be operated by its own residual current circuit breaker.

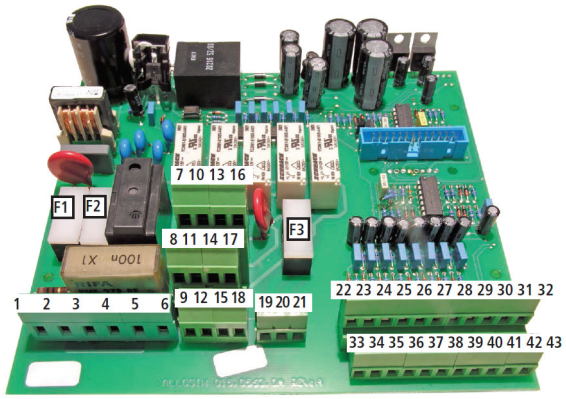
8.2 Electrical installation check list

Check electrical installation with respect to customer-site requirements and local power supply regulations.

☑ Supply voltage in accordance with name plate voltage rating?

☑ Have all electrical cable and plug connections been properly tightened?

8.3 Inputs and outputs of the main board



clamp	describtion	WL-ROC-025/-040	WL-ROC-060	WL-ROC-140
1[L] - 2[earth] - 3[N]	230-V 50/60 Hz-Input for system power supply	x	x	x
4[L] - 5[earth] - 6[N]	230-V-Output for pump supply	x	x	x
7[L] - 8[earth] - 9[N]	230-V-Output for dosing pump	/	/	x
10[L] - 11[earth] - 12[N]	230-V-Output for inlet valve	x	x	x
16[L] - 17[earth] - 18[N]	230-V-Output for flush valve	/	/	x
19[NO] - 20[C] - 21[NC]	alarm output optional	x	x	x
22[C] - 23[IN]	input pressure switch Feed water connection / Max pressure	x	x	x
24[C] - 25[IN]	input high pressure switch pump pressure	/	/	x
28[C] - 29[IN]	input alarm dosing pump	/	/	x
30[shielded] - 31 - 32	conductivity sensor feed water	/	/	x
33[C] - 34[IN]	input pressure switch Feed water connection / Min pressure	x	x	x
35[C] - 36[IN]	input low pressure switch	x	x	x
37[C] - 38[IN]	input Remote-On/Off optional	x	x	x
39[C] - 40[IN]	input softening filter	x	x	x
41[shielded] - 42 - 43	conductivity sensor row water	/	/	/

9. Initial start-up and flushing of the membrane(s)

When the system is started for the first time and each time it is put into operation after a period of non-use, you must remove the chemical maintenance solutions and/or standing water. If the system is not used for a longer period of time, the membrane(s) must be replaced

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!
Follow safety instructions for work on live components.

NOTICE

Do not use the water produced during this phase.

» Lead the hose for the permeate into the drain

» Make sure that the water supply is interrupted

» Close the valve to the expansion vessel

» Insert the membrane(s) and the 5µm prefilter into the pressure pipes

» Screw the covers of the pressure pipes tight

» Connect the unit to the power supply. The system goes into error mode due to lack of water

» Press "ENTER" for two seconds, the display shows: "PASSWORD 0000".

» Enter the service-password (see additional information attached to the unit/ membrane)

» Confirm with "**Enter**"

» Select **menu item 14** (system test)

» Open the water supply (solenoid valve) to the unit

» Press
(Open the water inlet valve / activate the solenoid valve to flush the membrane(s)).

» Let the system run for 10 minutes

» Press
(switch on the pump)

» Check the system for leaks

» Let the system run for another 10 minutes

» Press
(switch off the pump)

» Press
(this close the water inlet valve/ solenoid valve)

» Open the valve of the expansion vessel

» **Press "ESC" twice** (leaving the service level). The system starts to produce permeate

» Check whether the unit switches off after reaching the operating pressure (approx. 4 bar).

Check the pre-filling pressure of the expansion vessel.

This value must be 1.5 to 1.8 bar. To check the pressure, the outlet line of the vessel must be temporarily interrupted.

» Check the existing pressure with a suitable air pump (car valve adapter).

» If necessary, adjust the pressure by using the pump.

NOTICE

- At the start of each commissioning with the use of new membrane(s), the WL-ROC unit produces a higher permeate quantity in the first 2-4 hours, which is also accompanied by higher conductivity.
- Observe the note on the influencing factors (see chapter 4.1 mode of operation).
- The measured permeate conductivity value shown on the display of the controller will settle down to the actual value within the first minutes.

9.1 System start-up after initial commissioning

⚠WARNING

Danger due to incorrect operation!

Commissioning may only be carried out by qualified personnel (electricians or specialists with equivalent training)..

Step 1: Check mechanical integrity, water connection and cabling

» Check functionality of water and electrical installation.

» Check functionality of the pre-treatment system (if available).

Step 2: Check the feed water

» Check whether the feed water parameters are within the limits specified in chapter 4.3.

Step 3: Switch on the unit

» Switch on the main fuse

» Open the water supply shut-off tap

» Insert the power plug

Step 4: Observe device and check for leaks

» Let it run for 15 to 30 minutes

» If leaks occur, switch off the unit immediately.

Step 5: Remove leaks

» Locate and eliminate leaks

» Repeat leakage test

Step 6: Connecting the permeate line to the expansion tank

» see chapter 5 **mechanical installation**

NOTICE

The pump may only be operated with the water inlet valve open, otherwise it could be damaged. Exception: first commissioning.

9.2 Adjusting the metering pump

The WL-ROC140 allows the use of the optionally available antiscalant dosing pump.

When using the recommended antiscalant Pragmaclean 309, proceed as follows:

» Position the fl ow control knob at 30%

When the activity LED is green, the metering pump supplies an amount 10 times higher than the nominal value. Only use this setting after consultation with the specialist dealer or HygroMatik.

In **standard operation**, you use the dosing pump with the divider switched on (**orange LED lights up constantly).**

To supply the dosing pump with the antiscalant mixture from the canister, proceed as follows:

» Switch off the divider, the colour of the LED changes to green.

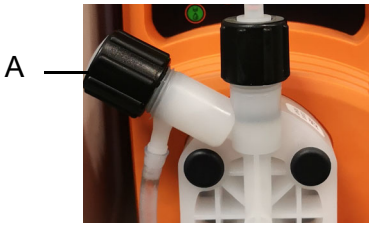
The **DIVIDER** is switched on and off as follows:

» **Short press** on the ON/OFF button (pump goes into standby mode).

» **Long press** on the ON/OFF button, after 4 short flashes the LED changes colour. Only then release the pressure on the button

» Set the rotary knob to 100% (fast pulse frequency).

» Open the vent screw (A)



» Close the vent screw (A) when the transparent tube is completely filled with the antiscalant mixture.

When the antiscalant mixture reaches the pump, the "knocking noises" of the dosing pump become quieter.

» Set the rotary knob to 30%.

When the antiscalant mixture is transported bubble-free in the tube:

» Switch on the divider, the **orange LED** lights up continuously.

NOTICE

During operation, you can directly change the frequency of the dosing pump via the control knob.

ED flashing states

status LED (flashes per sec.)	**status pump operation**
3x RED	Pump powered but voltage too low
2x RED	Pump powered but voltage too high
2x ORANGE	Pump OFF and powered
leuchtet ORANGE, schaltet bei jedem Klopfen aus	Pump ON
always on (RED)	Level alarm

NOTICE

When using the recommended antiscalant Pragmaclean 309, dose it according to the feed water quality (see technical data).

Only use diluted antiscalant!

10. Maintenance

10.1 General

Regular maintenance is essential to ensure that the HygroMatik units can achieve a long service life. The necessary maintenance work refers to components that are either subject to mechanical or electrical wear, or whose function is reduced by deposits.

The optimum function and required maintenance intervals of a reverse osmosis unit depend mainly on the existing water quality and the permeate quantity produced. Different water qualities can extend or shorten the maintenance intervals.

The following factors in specific could lead to an early blocking of the membranes:

- Blockage as a result of the deposit of iron or calcium sulphate and calcium carbonate
- Blockage with organic material

In general, a replacement of the membranes becomes necessary if a change in the following basic system parameters (at the same temperature and salinity) is noticed:

- Reduction of the permeate production to a value which is insufficient for the application downstream of the reverse osmosis system.
- Too much increase in the conductivity of the water produced to a value too high for the application downstream of the system.
- Increase of the membrane feed pressure.

10.2 Safety instructions for maintenance

⚠WARNING

Risk of electrical shock!
Hazardous electrical voltage!

Any work on the electrical system to be performed by certified expert staff (electricians or expert personnel with comparable training) only.

NOTICE

Take care of ESD protection!

The electronic components of the control are very sensitive to electrostatic discharges. In order to protect these components during maintenance, steps must be taken to guard against damage from electrostatic discharge.

NOTICE

Removal and replacement of components

If necessary, the parts of the UO unit may only be replaced by qualified personnel. Replacement work must always be carried out with the system at a standstill; contact the supplier or the manufacturer directly for this purpose.

NOTICE

Use disposable gloves when installing the pre-filter(s) and membrane(s) to protect them from contamination.

10.3 Change prefilter

Before replacing the prefilter, check

- that the WL-ROC system is switched off
- the inlet valve is closed and there is no pressure on the water line.

» Remove the pre-filter with suitable tools.

» Remove the old filter cartridge and clean the inlet.

» Replace the O-ring if necessary.

» Moisten the new O-ring and insert it.

» Insert a new filter cartridge.

» Mount the pre-filter with suitable tools.

» Open the feed water supply.

10.4 Membrane exchange

Before replacing the membrane(s), check the following:

- The WL-ROC unit is switched off.
- The inlet valve is closed, there is no pressure on the water line.

» Disconnect the black hose from the membrane container.

» Unscrew the cover and pull out the old membrane cartridge.

» WL-ROC-140: Open the lids on both sides of the container and slide the membrane cartridge out through the left opening.

» Remove the protective foil from the new membrane.

» If necessary, moisten the membrane with clean glycerine.

» Push the membrane carefully into the white membrane container without damaging the seal.

» WL-ROC-140: Insert the membrane cartridge through the right opening of the membrane container.

» Close the lid(s).

» Reconnect the black hose to the membrane container.

» Continue with the commissioning (chapter 9) and flushing of the membrane.

See chapter **Installation steps.**

10.5 Maintenance scheme

10.5.1 Daily check

» Check if the system is working correctly.

» Check that there are no leaks in the water-carrying components.

» Check the water inlet pressure.

NOTICE

The system supply pressure (after the pre-filters) must be at least 2 bar during normal operation. Replace the filter cartridges if the pressure loss is too high.

10.5.2 Weekly check

» Check the max. diaphragm pressure (max.10 bar!).

» Check the hardness of the water entering the system (20°dH)

» Check the water conductivity of the permeate with the control unit.

» Note down the data for the listed tests

NOTICE

- Note that the production quantity of the permeate increases with rising water temperature, while the quality of Permeate is decreasing. Conversely, the production quantity decreases with decreasing temperature, while the quality of the permeate improves.
- The indication of the measured permeate conductivity value on the display of the control unit settles down to the actual value within the first minutes.

10.5.3 Maintenance every two months

- Check that there is not too much free chlorine at the outlet (less than 0.25ppm).

Replace the prefilter cartridge::

» Every 2 months if the free chlorine content is between 0.15 ppm and 0.25ppm.

» Every 4 months if the free chlorine content is less than 0.15 ppm.

NOTICE

The lifetime of the pre-filter and membrane(s) depends on feed water quality and permeate production rate.

10.5.4 Maintenance by qualified staff

every 6 months:

Check the pre-filling pressure of the expansion vessel.

This value must be 1.8 to 2 bar. If there is no pressure gauge on the expansion vessel, the outlet line of the vessel must be temporarily interrupted.

» Drain the expansion vessel

» Check the existing pressure with a suitable air pump (car valve adapter).

» If necessary, adjust the pressure by using the pump.

A pressure gauge can also be permanently connected to the top of the expansion tank (up to 80l/ 1/8") for reading.

Generally:

» Check the parameters of the water entering the system.

» Check the conductivity of the feedwater and permeate with a conductivity meter.

» Record the data for the listed tests.

Maintenance schedule

<table>
<tr><th></th><th colspan="2">min. every 2/4 months</th><th>every 12 months</th><th colspan="3">as needed</th></tr>
<tr><th>unit / spare part</th><th>sediment filter</th><th>carbon filter</th><th>UV lamp</th><th>membrane (s)</th><th>o-ring</th><th>number</th></tr>
<tr><td>WL-ROC25</td><td rowspan="3">/</td><td rowspan="3">ROKC00FLT1</td><td rowspan="3">ROKC00UVLA
+
ROKC00UVOR</td><td rowspan="2">ROKC00MEMB</td><td rowspan="3">/</td><td>1</td></tr>
<tr><td>WL-ROC40</td><td rowspan="2">2</td></tr>
<tr><td>WL-ROC80</td><td>ROKC00ME00</td></tr>
<tr><td>WL-ROC140</td><td>ROKC00FLT3</td><td>ROKC00FLT2</td><td>ROKC00ME05</td><td>1</td></tr>
</table>

11. Decomissioning

The regular operation of the reverse osmosis unit is dependent on the continuous production of desalinated water.

Even during longer periods of non-use, the system must be connected to the power supply, as hygiene regeneration is regularly carried out in standby. Keep the power and water supply of the system connected.

If the system does not produce any permeate for more than 10 days, the membrane(s) must be replaced and rinsed before restarting **(see chapter Initial start-up and rinsing the membrane).**

11.1 Dismantling

Once the RO unit will no longer be used, dismantle (demolish or scrap) it by following the installation procedures in reverse order.

⚠WARNING

Dismantling of the unit may only be performed by qualified personnel. Electrical dismantling may only be performed by trained electricians.

Please note

Obey the safety guidelines in section “Safety Instructions,” especially the guidelines for disposal.

11.2 Disposal after dismantling

The reverse osmosis unit is made up of metal parts and plastic parts. In reference to European Union directive 2012/19/EU issued on 4 July 2012 and the related national legislation, please note that:

The components of the electrical and electronic devices must not be disposed of as municipal waste, and therefore the method of waste separation must be applied. The public or private waste collection systems defined by local legislation must be used.

NOTICE

The operator is responsible for the disposal of unit components as required by law.

12. Control

The whole operation of the reverse osmosis unit WL-ROL is controlled by a microprocessor.

The control-system enables the production process and the control of the RO-unit. The measured values are shown on a LC-display. The control has the protection class IP65.

12.1 The control panel

The control panel is separated into three zones:

- the 2 operating keys ESC, ENTER
- the 4 arrow keys
- LC-display

The **operating keys** are used to navigate through the menus and submenus. The function of the keys is:

ESC „ESC“: Cancel or return to the previous level

Arrow keys: Move within a menu, a submenu or a selection list

„ENTER“: Acceptance and storage of a selected setting

By pressing the arrow keys

you can call up the read values:

- Permeate conductivity
- Operating hours
- Remaining time (hours) until the next service

12.2 Access to the main menu:

» press or about 2 sec, the display shows “PASSWORD 0000“

» enter the password using the arrow keys (0077)

» confirm with

The control system regulates the automatic sequence for start-up, production, process shut-down, as well as for periodic rinses by controlling the following actuators:

- Feed water valve (V_{FEED})
- Permeate flush valve (V_{PER})
- High pressure pump (P_{HP})
- Dosing pump Antiscalant (P_{ASC})
- Fault signal/alarm (potential-free changeover relay)

The controller is equipped with the following digital inputs for monitoring the process:

- Overpressure switch (PS_{HIGH})
- Low pressure switch (PS_{LOW})
- Level of permeate vessel low (PS_{Min})
- Filling level permeate vessel full (PS_{MAX})
- External stand-by signal (IN_{SB})
- Error dosing pump antiscalant (IN_{PASC})
- Malfunction feed water pre-filter (IN_{FIL})

Furthermore, the controller has a conductivity measurement (not temperature compensated) for monitoring the permeate quality, with a freely adjustable limit value.

This means that the unit is switched off and a fault message is output if the limit value of the permeate conductivity is exceeded during operation.

The different operating states

Permeate production: Production of product water. The V_{FEED}, P_{HP} and P_{ASC} relays are energized.

STAND-BY: Unit is waiting on request. The unit is ready for operation, all relays are off.

Flushing (to prevent deposits on the membrane surface): Factory activated in the main menu, flushing (when the unit is switched on), before/after water production and/or cyclically after a certain number of hours. The cyclic flushing can also be done in STAND-BY mode.

NOTICE

Never deactivate the flushing function! (Avoidance of microbial contamination)

The production is controlled by the two level switches in the permeate tank:

- PS_{HIGH} starts the production
- PS_{LOW} stops production

In the MinPressure condition, the unit starts the water production: it opens the input solenoid valve and starts the pressure pump.

To avoid damage, a delay of 3 seconds is given after the input solenoid valve has opened.

When the MaxPressure condition is reached, the control unit goes into stand-by mode: the input solenoid valve closes and the pressure pump stops.

In the menu it is possible to deactivate one or both level switches and to operate the system with only one or no level switch at all. If both level switches are deactivated, the system goes into continuous production after switching on the power supply.

When the controller is switched on, a module flush is first carried out (if activated in menu 11).

After switching on the control system and module flushing (if activated in menu 10), the control system goes into production mode if the Min. pressure condition is underrun.

If programmed in menu 11 **CLEANING** the control unit starts an interval rinse during production as well as in standby (against standstill contamination) as soon as the countdown for the rinse interval has ended. The countdown for the rinse interval is reset at each rinse.

12.3 Operating states

After switching on the power supply, the version number of the control software appears for a few seconds.

Then the controller returns to the last operating state before switching off.

The following operating states may appear:

WAITING
START PUMP

The unit starts after the preset start delay has ended.

CLEANING: TIME
LEFT xxM xxS

PS_{LOW}= 0 und PS_{HIGH}= 0

The permeate tank is empty. First, a module rinse is carried out when production is started (if it is programmed). Then the RO plant goes into production.

SYSTEM WAITING!
HIGH LEVEL

PS_{LOW}= 1 und PS_{HIGH} = 0

The filling level in the permeate tank is between empty and full. The unit goes into stand-by mode.

CLEANING: TIME
LEFT xxM xxS

SYSTEM WAITING!
HIGH LEVEL

PS_{LOW} = 1 and PS_{HIGH} = 1

The pressure switch PSHIGH switches. The permeate tank is full. The unit performs a module rinse (if programmed) and then goes into stand-by mode.

COND. PERMEATE
008 µS

Shows the permeate conductivity

SERVICE IN
xxxxx Hr

Shows the remaining time (in hours) until the next service.

WORKING TIME
xxxxx Hr

Shows the system operating hours.

SYSTEM WAITING!
IN FILTER

The IN_{FIL} input for the feed water pre-filter or for the hardness sensor has switched (example: potential-free contact of an upstream softening unit). The unit stops. If the input is free again, the plant restarts automatically.

SYSTEM STOPPED!
FAILED DOSAGE

The IN_{PASC} input for the Anstiscalant dosing pump (optionally available for WL-ROC 140) has switched. The system stops. If the input is free again, the system restarts automatically.

SYSTEM WAITING!
IN STAND BY

The IN_{SB} input (external stand-by signal) has switched. The system stops. When the input is free again, the system restarts automatically.

PERFORM
MAINTENANCE

The service hour counter has been counted down. Please make a maintenance and reset the counter..

12.3.1 Alarm messages

If one of the following alarm messages appears, the system stops and the alarm relay switches on.

This message cannot be confirmed!

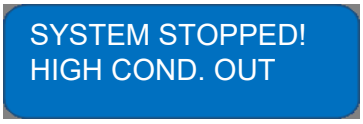
» Disconnect the system from the power supply and eliminate the cause of the alarm.

Further information can be found in the chapter Troubleshooting.

SYSTEM STOPPED!
MAX PRESSURE

The overpressure switch PS_{HIGH} for the max. permitted operating pressure has switched. The system stops.

The low-pressure monitor PS_{LOW} for the minimum acceptable feed water inlet pressure has switched. The system stops.



The max. limit value for the permeate conductivity has been reached. The unit stops.

You can return from the operating display level to the main menu by pressing the ENTER key.

12.4 Menu navigation

» use the arrow keys to move through the main menu to the relevant parameter

» press “ENTER“, to go to the selected submenu

» press “ESC“ for about 2 seconds to return to the main menu

Button < UP >:

Button < DOWN >:

At the operation display level: To scroll up/down the operation displays.

At the menu level: To scroll up/down the menu level.

In the relevant parameter: To count down the input value, and to enable (ENABLE) or disable (LOCKED) a function.

Button < LEFT >:

In the menu: For jumping back to the previous digit within the input field.

Button < RIGHT >:

In menu: For jumping to the next digit within the input field.

Button < ESC >:

In menu level: To leave the menu level and return to the operating display level.

In the parameter: To return to the previous iA longer press (2 sec) switches the system off and on.nput field/display or to leave the menu.

Pressing the button for a longer time (2 sec) switches the system off and on.

Button < ENTER >:

In the operating display level: To open the menu level.

At menu level: To open a menu.

In the parameter: To save the entry and jump to the next entry field or return to the menu level.

NOTICE

By "jumping back with ESC" the earlier entries in this menu item are not saved!

Always end the menu items with "Skip to next" by pressing the ENTER key until the menu item starts again. This is the only way to save the settings you have made.

12.5 Setting options at operator level

The following factory-set parameters can be changed at the operator level (password 0077).

Setting the required conductivity:

By pressing the arrow keys you can set the max. set point

» Confirm the selection with

Setting the required flushing time / flushing cycle:

By pressing the arrow keys you enter the duration of the flushing time for the periodic module flush..

» Confirm the selection with . The program jumps to submenu "11H".

By pressing the arrow keys you specify the time period between the periodic module flushes.

e.g. change 24h to 48h (usage pause)

» Confirm the selection with . The program jumps back to the main menu.

NOTICE

In the factory settings, parameter 11 **CLEANING** is preset to ON. If this setting has been changed to OFF in the service level, no entries can be made here in the operator level.

Reset service interval

By pressing the arrow keys you select if the service interval should be reseted.

Confirm the selection with . The program jumps back to the main menu.

Setting the required language:

In this submenu you can select the language shown on the display.

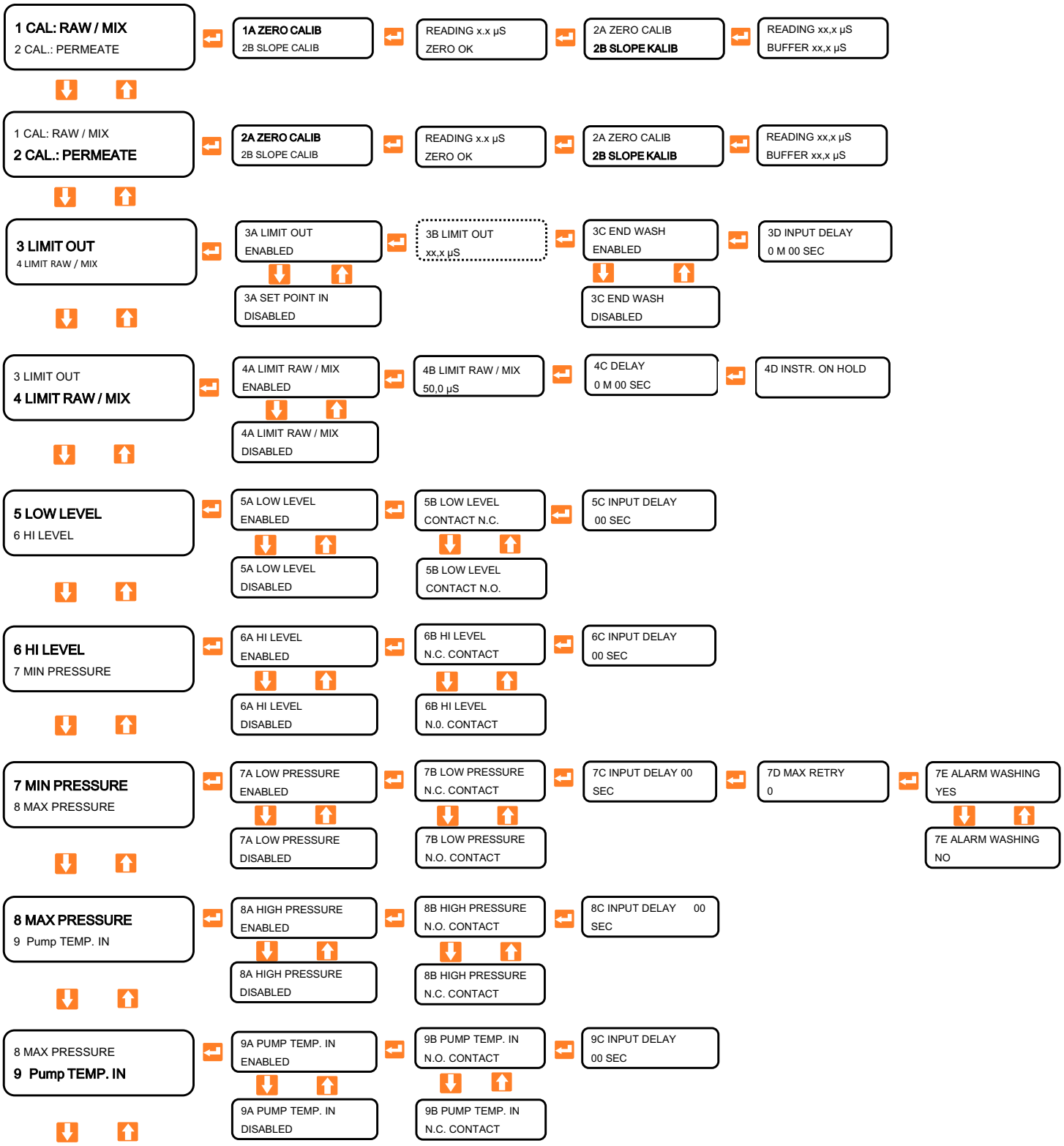
» Press the arrow keys to select your language

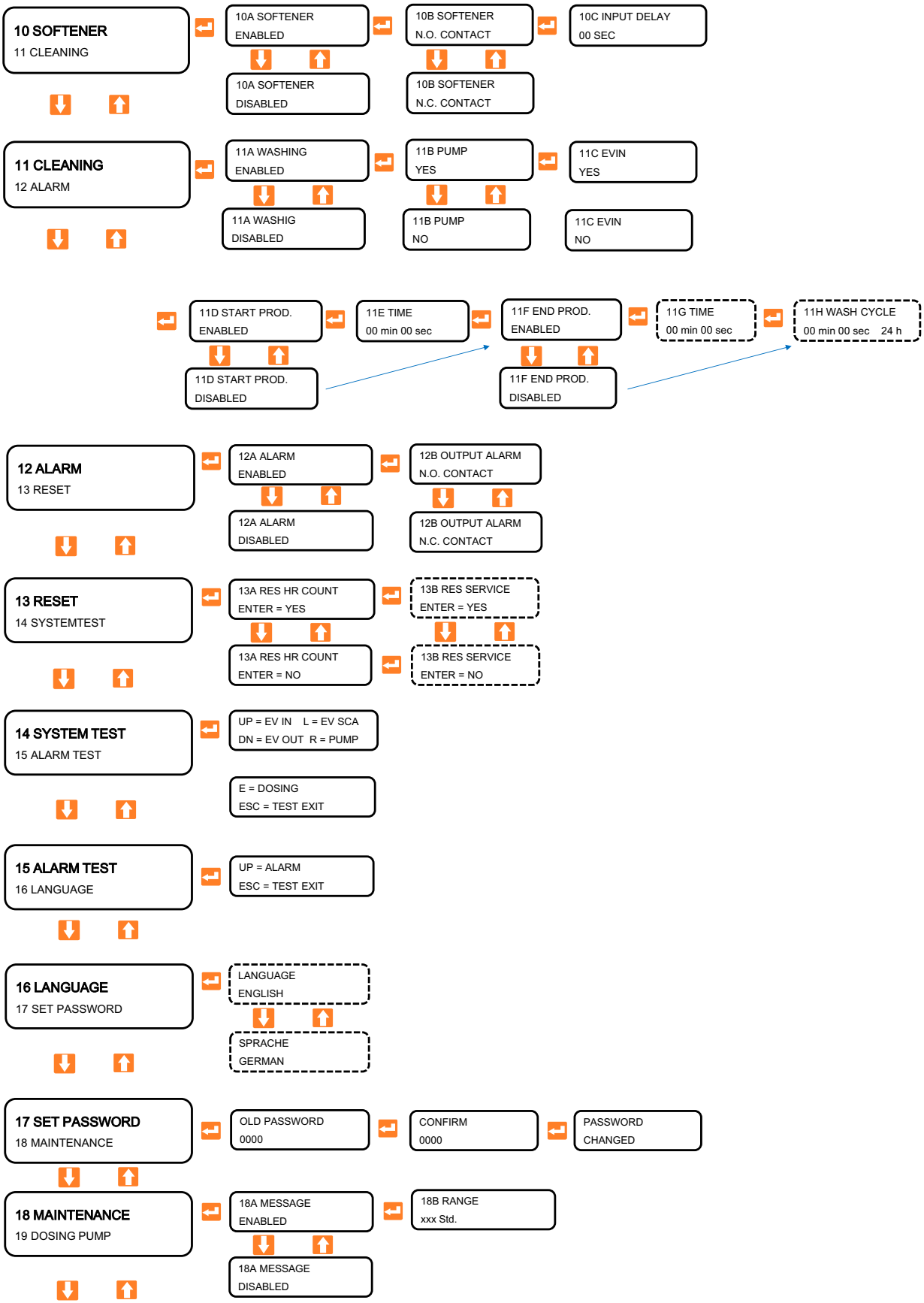
» Confirm the selection with . The program jumps back to the main menu.

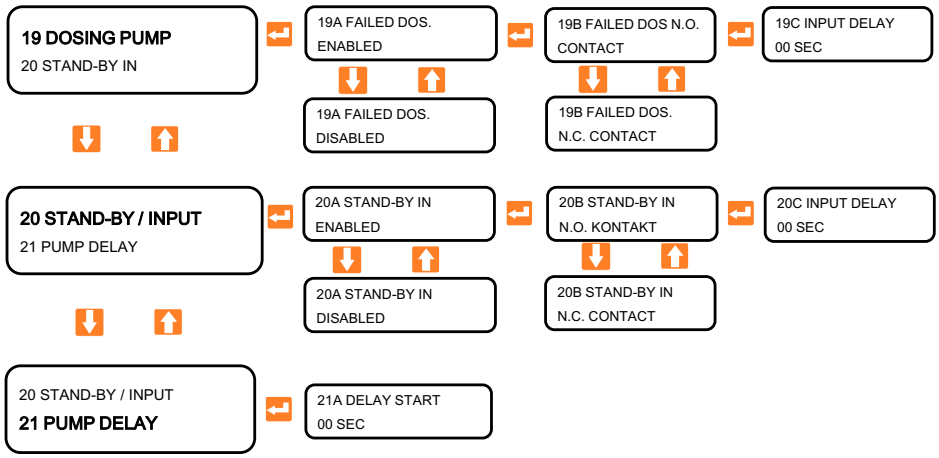
12.6 Menu Structure

The following menu list gives an overview of all parameters of the unit control.

At the operator level (password 0077) only the parameters shown here in dashed lines can be changed. The other parameters are only visible at the operator level. Changing them is only possible at the service level.




10 SOFTENER
11 CLEANING
10A SOFTENER ENABLED
10A SOFTENER DISABLED
10B SOFTENER N.O. CONTACT
10B SOFTENER N.C. CONTACT
10C INPUT DELAY 00 SEC
11 CLEANING
12 ALARM
11A WASHING ENABLED
11A WASHIG DISABLED
11B PUMP YES
11B PUMP NO
11C EVIN YES
11C EVIN NO
11D START PROD. ENABLED
11D START PROD. DISABLED
11E TIME 00 min 00 sec
11F END PROD. ENABLED
11F END PROD. DISABLED
11G TIME 00 min 00 sec
11H WASH CYCLE 00 min 00 sec 24 h
12 ALARM
13 RESET
12A ALARM ENABLED
12A ALARM DISABLED
12B OUTPUT ALARM N.O. CONTACT
12B OUTPUT ALARM N.C. CONTACT
13 RESET
14 SYSTEMTEST
13A RES HR COUNT ENTER = YES
13A RES HR COUNT ENTER = NO
13B RES SERVICE ENTER = YES
13B RES SERVICE ENTER = NO
14 SYSTEM TEST
15 ALARM TEST
UP = EV IN L = EV SCA
DN = EV OUT R = PUMP
E = DOSING
ESC = TEST EXIT
15 ALARM TEST
16 LANGUAGE
UP = ALARM
ESC = TEST EXIT
16 LANGUAGE
17 SET PASSWORD
LANGUAGE ENGLISH
SPRACHE GERMAN
17 SET PASSWORD
18 MAINTENANCE
OLD PASSWORD 0000
CONFIRM 0000
PASSWORD CHANGED
18 MAINTENANCE
19 DOSING PUMP
18A MESSAGE ENABLED
18A MESSAGE DISABLED
18B RANGE xxx Std.



12.7 Setting options at service level

The following chapter is only intended for certified service staff. The password for reaching the service level can be found in the additional information provided with the unit. HygroMatik is not liable for damages caused by incorrect parameter settings at this level.

The parameterisations listed below are possible at the service level. Only a few parameters can also be changed at the operator level (password 0077, see menu tree).

NOTICE

The parameters have already been configured ex works and may only be changed with the appropriate expertise.

The contact configuration is preset in all submenus. Do not change this carelessly! Otherwise there is a risk of damage to the system.

12.7.1 Conductivity sensors

The HygroMatik RO units WL-ROC 25-80 are equipped with one conductivity sensor (permeate).

The WL-ROL units (and WL-ROC-140 with blending kit) are equipped with two conductivity sensors. One sensor measures the conductivity of the feed water (ROH/ MIX), the other sensor that of the permeate. Both conductivity sensors are pre-calibrated ex works.

In the case of recalibration during maintenance, the calibration can be carried out either with the a help of a buffer solution with known conductivity, or with a conductivity tester according to the principle of comparative measurement.

NOTICE

When selecting the calibration liquid (not included in the scope of delivery), please note the selected measuring range:

- Note that this conductivity measurement is not temperature-compensated.
- To achieve a high measuring precision it is therefore recommended that the calibration liquid (or the water sample for the comparison measurement) has approximately the same conductivity and temperature as the permeate to be measured.

Display shows three lines:

After a few minutes of running time, measure the conductivity of the permeate and/or raw/ mixed water with an external conductivity meter and enter the measured value in the corresponding parameter:

3 LIMIT OUT

» Press ↓ + → at the same time
» Press ENTER to calibrate
» Press ESC to exit without calibrating

4 LIMIT ROH-/MIX

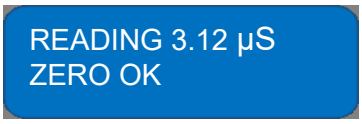
» Press ↓ + → at the same time
» Press ENTER to calibrate
» Press ESC to exit without calibrating

12.7.2 Calibration of the probe zero point

» Remove the conductivity probe from the flow assembly and dry it.
» Select **2A CAL ZERO** in the main menu

↵

↵



A conductivity value is now displayed in the upper line.

» Confirm the selection with ↵

The display value may be > 0 µS, but should remain < 50 µS, otherwise the controller would not accept the calibration. In this case the conductivity probe may be faulty and must be replaced. The display shows the message "ZERO ERROR cal.

» repeat the calibration or quit the parameter without saving with ESC

12.7.3 Calibration of the probe slope

↵

» In the main menu, select **2B SLOPE CALIB**
» Enter the conductivity of the buffer solution in the "BUFFER" field according to the table on the bottle label.
» Hold the sensor in the buffer solution and wait until the "READ" value has stabilized.

» press , to confirm the displayed slope value and exit the parameter

and press , to return to the main menu

or

» press ESC to exit the parameter without saving

The buffer value must not be 0, otherwise the calibration is not saved.

12.7.4 Permeate set point calibration

With the assistance of the permeate conductivity measurement and a freely adjustable limit value for the permeate conductivity, the unit can be stopped and an alarm message issued if the permeate quality is reduced.

» Select **3 LIMIT OUT** in the main menu

Press the arrow keys to select whether the set point function should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with

If the set point function has been activated, the program jumps to submenu "3B".

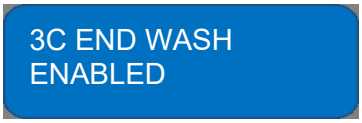
By pressing the arrow keys you can set the max. set point

» Confirm the selection with . The program jumps to the submenu "3C".

If the permeate conductivity exceeds the limit value set here during production, the system stops, the alarm message "ALARM CONDUCTIVITY" appears on the display and the alarm output relay picks up.

NOTICE

Parameter 3B can be changed at the operator level (password 0077).



By pressing the arrow keys you can select in the submenu "3C FLUSH TIME END" the reaction of the control system when the set point is reached at the end of a module flush.

SWITCHED ON: At the end of module rinsing before the transition to the standby state, the permeate conductivity exceeds the limit value. The alarm message "ALARM CONDUCTIVITY" appears on the display and the alarm output relay picks up.

The unit stops.

OFF: The conductivity control during and after module rinsing is deactivated.

» Confirm the selection with . The program jumps to the submenu 3D".

Enter a delay time by pressing the arrow keys. The delay is intended to prevent the system from being switched off abruptly due to temporary measurement value peaks.

0 Sec = no delay

(Causes an immediate switch-off when the set max. conductivity value is reached. See note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu.

If a module flush is followed by a longer standstill period, an increased conductivity value may temporarily occur. If the parameter 3C is set to ON, this will lead to an unintended shutdown of the system

12.7.5 RAW/MIX set point calibration

With the assistance of the feed water conductivity measurement and a freely adjustable limit value for the conductivity, the unit can be stopped and an alarm message issued if the feed water quality is reduced.

» Select **4 LIMIT RAW/MIX** in the main menu

Press the arrow keys to select whether the set point function should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with

If the set point function has been activated, the program jumps to submenu "4B"..

By pressing the arrow keys you can set the max. set point

» Confirm the selection with . The program jumps to the submenu "4C".

If the feed water conductivity exceeds the limit value set here during production, the system stops, the alarm message "ALARM CONDUCTIVITY" appears on the display and the alarm output relay picks up.

Enter a delay time by pressing the arrow keys. The delay is intended to prevent the system from being switched off abruptly due to temporary measurement value peaks.

0 Sec = no delay

(see note at the end of the chapter)

» Confirm the selection with . The program jumps to the submenu 4D".

Press the arrow keys to select whether the set point function (monitoring of the conductivity limit value during production) should be active or inactive.

YES= active

NO = inactive

Confirm the selection with . The program jumps back to the main menu.

12.7.6 Lower level switch LS_{LOW}

With the aid of the level switch, the minimum fill level in the permeate vessel can be monitored and the system can be started automatically if the pressure falls below the required level.

» Select **5 LOW LEVEL**

» Press the arrow keys to select if pressure switch should be active or inactive.

ENABLED= active

DISABLED = inactive

(not recommended)

» Confirm the selection with

If the set point function has been activated, the program jumps to submenu "5B".

Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact

» Confirm the selection with . The program jumps to submenu "5C".

» Press the arrow keys to set the time of delay

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu.

12.7.7 Upper level switch LS_{HIGH}

The pressure switch can be used to control the maximum level in the permeate vessel and stop production when this level is reached.

» Select **6 HIGH LEVEL** in the main menu

» Press the arrow keys to select if relay input should be active or inactive.

ENABLED= active (ex works)

DISABLED = inactive

» Confirm the selection with .

If the set point function has been activated, the program jumps to submenu "6B".

Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact **(not recommended)**

» Confirm the selection with . The program jumps to submenu "6C".

» Press the arrow keys to set the time of delay

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu

12.7.8 Calibration low pressure switch PS_{LOW}

With the help of a pressure switch between the feed water pre-filter and the high pressure pump the system inlet pressure can be monitored. If the pressure falls below a minimum pressure set on the pressure switch during production (e.g. due to a clogged pre-filter), production can be shut down and the system stopped.

» Press the arrow keys to select if pressure switch should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "7B".

By pressing the arrow keys you set switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact

» Confirm the selection with . The program jumps to submenu "7C"

NOTICE

N.C. contact is set ex works here. Do not change this! Otherwise there is a risk of damage to the system.

» Press the arrow keys to set the time of delay

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps to submenu "7D".

By pressing the arrow keys you set the number of start-up attempts (0-9).

» Confirm the selection with . The program jumps to submenu "7E".

The menu item is not assigned.

Function of the startup repeats:

If the number of start-up repeats is set to "0", the unit stops as soon as the low-pressure monitor switches (and any delay time set has ended). All output relays are switched off! The display shows

If the number of start-up repeats is set to e.g. "5", the unit stops as soon as the low-pressure monitor switches (and any delay time set has ended). The feed water valve SV1 stays activated. The display shows

If the minimum inlet pressure returns, the system starts up again automatically. If the system produces constantly for the next 10 minutes without any further disturbance, the repeat counter is reset to "0". If the pressure drops again, the system stops again and the counter is raised.

If the minimum inlet pressure does not return, the system will continue to start up within the next 20 minutes until the number of repetitions is reached. All output relays are now finally switched off! The display shows

12.7.9 Calibration high pressure monitor (only WL-ROL/ WL-ROC140) PS_{HIGH}

The system operating pressure can be controlled by means of a pressure switch between the high pressure pump and the RO modules. If a maximum pressure set on the pressure switch is reached during production (e.g. due to an overly restricted concentrate valve), the system can be stopped.

» Press the arrow keys to select if pressure switch should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "8B".

» Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact

» Confirm the selection with . The program jumps to submenu "8C".

NOTICE

N.C. contact is set ex works. Do not change this! Otherwise there is a risk of damage to the system.

» Press the arrow keys to set the time of delay

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu.

Menu item 9: "High pressure pump TS_{HP} " is not active.

12.7.10 Upstream softening system IN_{FIL}

If the upstream softening system is e.g. equipped with an automatic backwashing device and has a potential-free switching contact to show the backwashing, then the control system can shut down the WL-ROC system for the duration of the filter backwashing and put it on hold.

It is also possible to connect an upstream 1-column softening system to the control so that the RO unit goes into standby mode for the duration of the regeneration.

» Press the arrow keys to select if relay input should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "10B".

»

10B SOFTENER
CONTACT N.O.

» Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact

» Confirm the selection with . The program jumps to submenu "10C".

10C INPUT DELAY
00Sec

» Press the arrow keys to set the time of delay.

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu

12.7.11 Module flushing

In this submenu you configure the module flush(es). Four flushing procedures can be programmed:

- At start-up of production
- During shutdown of the production
- During production at a programmed time interval
- In standby mode against standstill germination (same time interval as during production)

10 SOFTENER
11 CLEANING

11A WASHING
ENABLED

» Press the arrow keys to select if relay input should be active or inactive.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "11B".

11B PUMP
YES

By pressing the arrow keys you set whether the high-pressure pump should run during flushing.

Yes = Pump ON

NO = Pump OFF

» Confirm the selection with . The program jumps to submenu "11C"

11C EVIN
YES

Press the arrow keys to select, if a flush should be done when **production is started up.**

YES = active NO = inactive

» Confirm the selection with . The program jumps to submenu "11D".

By pressing the arrow keys you set whether a flush should be carried out before each start.

» Confirm the selection with . The program jumps to submenu "11E".

By pressing the arrow keys you set the duration of the flushing time.

» Confirm the selection with . The program jumps to submenu "11F".

By pressing the arrow keys you set whether a flush should be carried out at the end of the production.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "11G".

By pressing the arrow keys you set the duration of the flushing time for the periodic module flushing.

» Confirm the selection with . The program jumps to submenu "11H".

By pressing the arrow keys you specify the time period between the periodic module flushes.

e.g. change 24h to 48h (usage pause)

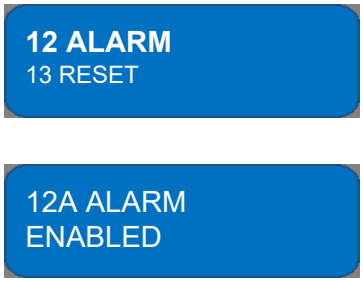
» Confirm the selection with . The program jumps back to the main menu.

NOTICE

Parameter 11G and 11H can be changed at the operator level (password 0077).

12.7.12 Configuration of the alarm - output relay

(See 12.8 wiring diagram)

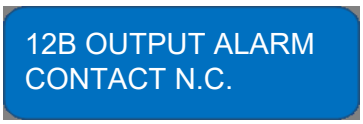


» Press the arrow keys to to turn the alarm output on or off.

ENABLED= active

DISABLED = inactive

» Confirm the selection with . The program jumps to submenu "12B".



» Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact.

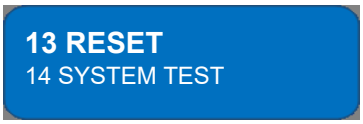
» Confirm the selection with . The program jumps back to the main menu.

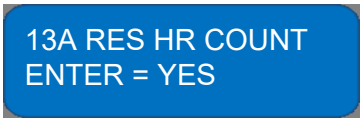
12.7.13 Operating and service hour counter

The operating hours counter always runs when the system is in production mode. It is for general information and has no further control function.

It counts down the time. As soon as the counter has reached "0 hours", the following message appears on the display: "EXECUTE MAINTENANCE" (do maintenance).

The counter is set in the " 18 MAINTENANCE" submenu.





» Press the arrow keys to select, if the operation counter should be reset.

» Confirm the selection with . The program jumps to submenu "13B".

By pressing the arrow keys you select if the service interval should be reseted.

» Confirm the selection with . The program jumps back to the main menu.

NOTICE

Parameter 13B* can be changed at the operator level (password 0077).

Resetting the parameters to factory settings (except password):

» Switch off the system

» Press and hold and and switch on the system. Only then release the buttons.

RESET Passwort:

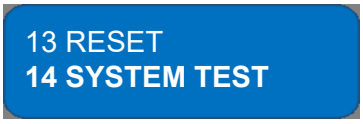
» Switch off the system

» Press and hold and ESC and switch on the system. Only then release the buttons.

* from software version 3.1

12.7.14 Function test relay outputs

In this submenu you can check the relay outputs.



Display changes automatically

» Press the keys described below to switch the relay.

UP	Feed water valve
DN	Permeate flush valve V_{PER}
L	Concentrate-flush valve V_{CONC}
R	High pressure pump H_P
E	Dosingpump Antiscalant P_{ASC}

» Press the key again to switch the relay back.

» Press ESC to return to the main menu

NOTICE

To avoid damage to the unit: Always activate the feed water valve first before activating the pump.

12.7.15 Function test alarm output relay

In this submenu you can manually activate the alarm output. The switched-on relay is then reset to its switching status as programmed in submenu 12.

» Press “UP“ , to switch the relay.

» Press the key again to switch the relay back.

» Press ESC to return to the main menu.

12.7.16 Select language

In this submenu you can select the language shown on the display.

» Press the arrow keys to select your language

» Confirm the selection with . The program jumps back to the main menu

NOTICE

Parameter 16 can be changed at the operator level (password 0077).

12.7.17 Change password

In this submenu you can change the password to program the main menu.

» Press the arrow keys to enter your latest password

» Confirm the selection with .

If the entry is correct, the program displays "PASSWORD ACCEPTED" and jumps to the next submenu.

» Press the arrow keys to enter your new password

» Confirm the selection with The program jumps to the screen:

Press the arrow keys to enter your new password again.

» Confirm the selection with The program jumps to the screen:

If the entry is incorrect, "CONFIRM ERROR" appears on the display for approx. 2 seconds before the programme jumps back to the "NEW PASSWORD" input display so that the new password can be entered again.

12.7.18 Reset password

To reset the password follow the steps below:

» disconnect the unit from the power supply

» press the two buttons ESC while reconnecting the plug (connect to power supply)

The display will show "RESET PASSWORD" for a few seconds before the pump is started up.

12.7.19 Setting the maintenance interval

In this submenu you activate the service interval and enter the countdown of the service hour counter. In the delivery status, the service hour counter is set to 00100 hours. (100 hours). Resetting the countdown is described in submenu 13.

» Press the arrow keys to activate or inactivate the service hour counter

» Confirm the selection with . The program jumps to submenu "18B".

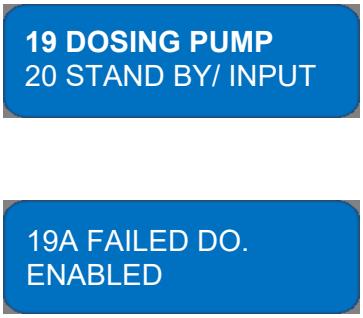
Press the arrow keys to enter the Serviceintervall in hours

» Confirm the selection with . The program jumps back to the main menu.

12.7.20 Dosing pump antiscalant IN_{PASC}

If a dosing pump for the dosing of antiscalant is installed instead of an upstream softening system, then either the potential-free fault signal output of the dosing pump or the level switch (empty indicator) in the dosing vessel can be connected to the controller.

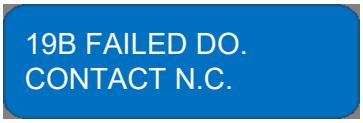
If the INPASC input is switched, the control system can switch off the RO system for the duration of the fault and put it in the waiting mode. As soon as the fault has been eliminated, the control system automatically returns the RO system to production mode.



» Press the arrow keys to select if relay input should be active or inactive.

» Confirm the selection with . The program jumps to submenu "19B".

»



» Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

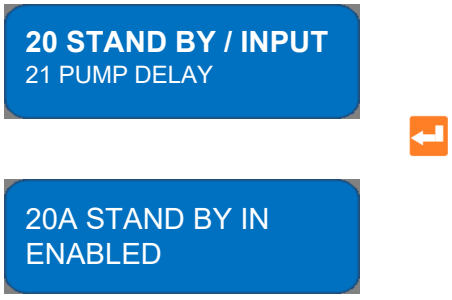
N.C. CONTACT = The input works as a normally closed contact

» Confirm the selection with . The program jumps to submenu "19C".

» Press the arrow keys to set time of delay.

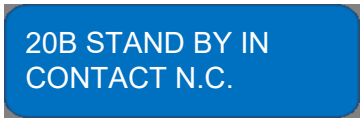
» Confirm the selection with . The program jumps back to the main menu.

12.7.21 Stand-by-Input IN_{SB} (Release contact)



» Press the arrow keys to select if relay input should be active or inactive.

» Confirm the selection with . The program jumps to submenu "20B".



» Press the arrow keys to set the switching direction.

N.O. CONTACT = The input functions as a normally open contact.

N.C. CONTACT = The input works as a normally closed contact

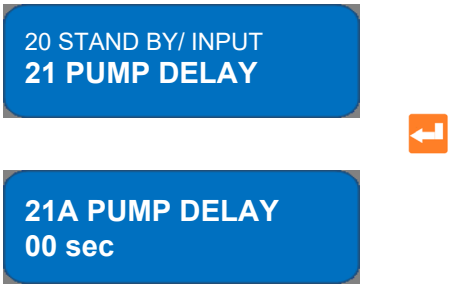
» Confirm the selection with . The program jumps to submenu "20C".

» Press the arrow keys to set the time of delay

0 Sec = no delay
(see note at the end of the chapter)

» Confirm the selection with . The program jumps back to the main menu.

12.7.22 Set start delay

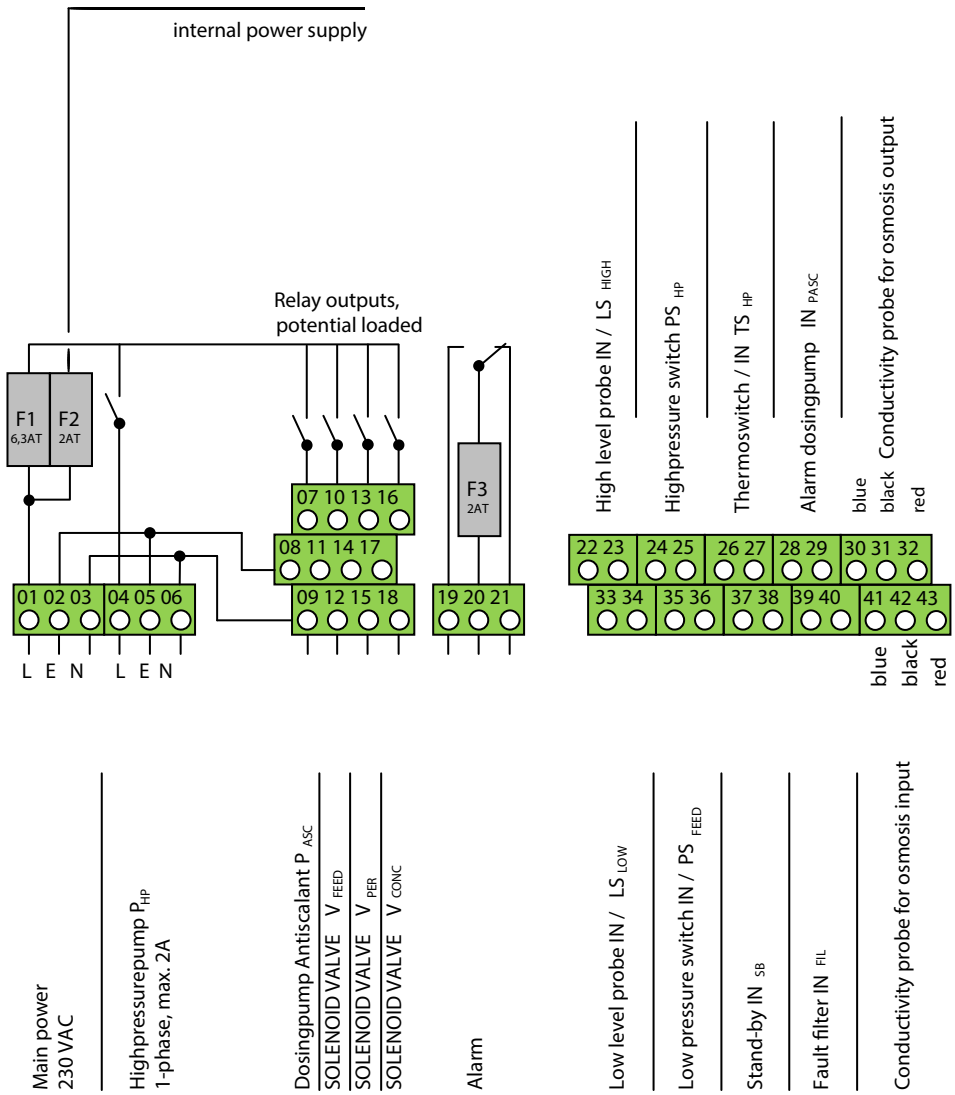


NOTICE

Output activation / delay:

In order to avoid pipeline damage due to "water hammer", a delay of 3 seconds between pump on (or off) and solenoid valve on (or off) and a delay of 2 seconds between pump on (or off) and pressure pump on (or off) has been set at the factory.

12.8 Wiring diagram



Power supply, output relay			
01	02	03	Main power IN 230 VAC
L	E	N	
04	05	06	Highpressurepump IN / P_{HP} 1-phase, max. 2A
L	E	N	

19	20	21	Alarm OUT
N.O.	C	N.C.	

E: ⏚

Output relay			
07	08	09	Dosingpump Antiscalant OUT/ P_{ASC}
L	E	N	
10	11	12	SOLENOID VALVE (EV IN) / V_{FEED}
L	E	N	
13	14	15	SOLENOID VALVE (EV OUT) / V_{PER}
L	E	N	
16	17	18	SOLENOID VALVE (EV Conc) / V_{CONC}
L	E	N	

Digital inputs	
22	High level probe IN / LS HIGH
23	
24	Highpressure switch IN / PS HP
25	
26	Thermoswitch IN (pressure pump motor) / TS HP
27	
28	Alarm dosingpump IN PASC
29	

Digital inputs	
33	Low level probe IN / LS LOW
34	
35	Low pressure switch IN /PS FEED
36	
37	Stand-By IN SB
38	
39	Filter IN FIL
40	

Conductivity measurement option 1		
30	blue	Conductivity probe for osmosis output ECDI/01 0,0 – 99,9 µS/cm
31	black	
32	red	

Conductivity measurement option 2		
41	blue	Conductivity probe for RAW/MIX water ECDI/1 0,0 – 999,9 µS/cm
42	black	
43	red	

13. Error description

If an error appears, the permeate production stops. The display in the control panel switches from the current display to the display of an error code.

List of possible faults and error codes

Alarm indication on the display	Possible cause	Action
ALARM - CONDUCTIVITY	The conductivity measuring instrument has lost calibration or is no longer working correctly.	Recalibrate or replace the conductivity sensor.
	The feed water parameters have changed.	Contact your supplier or the manufacturer.
	High permeate conductivity due to blocked membrane(s).	Replace the membrane(s).
	Piping blocked	Eliminate the cause of the blockage.
	Delay time too short	If the error occurs after a module flush, change the delay time in parameter 3D. If the error occurs during production, adjust parameter 4C.
	Conductivity limit value chosen too low	Check the conductivity limit value entered. Adjust if it`s necessary. Note the technical data of the consumer / humidifier.
SYSTEM STOP - MAX PRESSURE The PS_{HIGH} overpressure switch for the max. permissible operating pressure has switched. **Only for WL-ROC 140 an WL-ROL units**	The PS_{HIGH} pressure switch is not calibrated or is not working correctly.	Replace the pressure switch.
	Water pressure too high.	Re-adjust the pump pressure.
	Membrane(s) is/are blocked.	Replace membrane.
SYSTEM STOP - MIN PRESSURE The PS_{LOW} overpressure switch for the min. permissible operating pressure has switched.	The PS_{LOW} pressure switch for the min. permissible operating pressure has switched.	Do recalibration or replace the pressure switch.
	The PS_{LOW} pressure switch is not calibrated or is not working correctly.	Check an existing pre-treatment (if any). Replace the pressure switch.
	Decreasing flow rate. Blocking of filter cartridges..	Replace them.
	Water pressure too low.	Check the function of the solenoid valve. Check the water inlet pressure.
System STOP - DOS PUMP (only for systems with dosing pump	Dosing pump does not work.	Check the fuse and replace it if necessary .
		Dosing pump is not working, replace it.
	Dosing pump does not work, the magnet "knocks".	The suction filter in the anti-coating canister is blocked. Clean the filter.
	Dosing pump does not work, the magnet does not "knock" or only damped.	Dirt deposits in the valve or valve is blocked. Replace the dosing pump.
	The red LED in the display of the dosing pump lights up.	Level alarm. Refill with anti-calant.

List of possible faults and error codes (sequel)

Problem	Possible cause	Action
Reduction of the permeate rate.	Decrease of permeator inlet pressure	Check pump P, make sure it is running correctly, replace it if necessary.
		Readjust the pressure to the sizing values and adjust the bypass inside pump P if necessary.
	Increase the pressure loss at the membrane due to blockages caused by hardness minerals	Check the process parameters and contact the supplier to arrange for replacement of the membrane(s) if necessary.
	The pressure switches have lost calibration, are worn or no longer function correctly.	Adjust or reset the flow rate and pressure to match the process values.
		Check the electrical connections.
	Blocked piping.	Correct the cause.
	Reduction of the water flow rate.	If necessary, check the water supply or adjust the shut-off valves in front of the system.
		Filter cartridges blocked. Replace the filter elements.
	The parameters of the water entering the system have changed.	Contact your supplier or the manufacturer.
Immediate stop (within one minute after start-up).	The pressure switches installed on the PVC distributor of the permeate are not working correctly or are not calibrated.	Check the function of the pressure switches and replace them if necessary.
	Inlet pressure of the expansion vessel is too low. Membrane of the expansion vessel is damaged.	Check the inlet pressure of the expansion tank and replace it if it is damaged.
The solenoid valves do not open	Control board or the solenoid valve coil is not supplied with voltage.	Restore the power supply to the control board and/or check the connections and the solenoid valve supply.
	Solenoid valve is defective.	Replace the solenoid valve.
	Incorrect pressure.	Check the water inlet pressure.
	Process parameters not correct.	Check the parameter settings.
High permeate conductivity	The membrane(s) is/are blocked or contaminated.	Replace the membrane(s). Contact your supplier or the manufacturer.
Low water pressure	Low water pressure Inlet valves closed	Check the water inlet pressure.
		Check the function of the solenoid valve.
	Decreasing flow rate	Blocked filter cartridges. Replace them.
The osmosis production does not start although it is activated and no alarm has been given.	The pressure switches doesn`t supply a signal.	Check the connections and the function of the pressure switches and replace them if necessary.
	The fuse that protects the pump is blown.	Replace the fuse and test pump operation.
The system does not carry out the set sequences.	Power supply failure.	Check the power supply.

14. Declaration of Conformity

The manufacturer **ATLAS FILTRI ITALIA s.r.l. - Via Unità d'Italia 12 – 35010 Limena (PD) Italy**

hereby declares that the products:

Code NEA0550051 – Reverse Osmosis system 25 l/h – WL-ROC-25
Code NEA0550052 – Reverse Osmosis system 40 l/h – WL-ROC-40
Code NEA0550053 – Reverse Osmosis system 80 l/h – WL-ROC-80
Code NEA0550054 – Reverse Osmosis system 140 l/h – WL-ROC-140

Code NEA0550055 – Reverse Osmosis system 160 l/h with Antiscalant – WL-ROL-160AS
Code NEA0550056 – Reverse Osmosis system 320 l/h with Antiscalant – WL-ROL-320AS
Code NEA0550057 – Reverse Osmosis system 460 l/h with Antiscalant – WL-ROL-460AS
Code NEA0550058 – Reverse Osmosis system 600 l/h with Antiscalant – WL-ROL-600AS
Code NEA0550059 – Reverse Osmosis system 1000 l/h with Antiscalant – WL-ROL-1000AS
Code NEA0550060 – Reverse Osmosis system 1200 l/h with Antiscalant – WL-ROL-1200AS

Code NEA0550065 – Nano Filtration system 160 l/h with Antiscalant – WL-ROL-160NF
Code NEA0550066 – Nano Filtration system 320 l/h with Antiscalant – WL-ROL-320NF
Code NEA0550067 – Nano Filtration system 460 l/h with Antiscalant – WL-ROL-460NF
Code NEA0550068 – Nano Filtration system 600 l/h with Antiscalant – WL-ROL-600NF
Code NEA0550069 – Nano Filtration system 1000 l/h with Antiscalant – WL-ROL-1000NF
Code NEA0550070 – Nano Filtration system 1200 l/h with Antiscalant – WL-ROL-1200NF

Code NEA0550071 – Reverse Osmosis system 160 l/h – WL-ROL-160
Code NEA0550072 – Reverse Osmosis system 320 l/h – WL-ROL-320
Code NEA0550073 – Reverse Osmosis system 460 l/h – WL-ROL-460
Code NEA0550074 – Reverse Osmosis system 600 l/h – WL-ROL-600
Code NEA0550075 – Reverse Osmosis system 1000 l/h – WL-ROL-1000
Code NEA0550076 – Reverse Osmosis system 1200 l/h – WL-ROL-1200

have been designed and built in conformity with the following directives:

LOW VOLTAGE	**2014/35/EC**
ELECTROMAGNETIC COMPATIBILITY	**2014/30/EC**

The following standards have been consulted to check the conformity:
EN IEC-61000-6-2 - Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN IEC-61000-6-3 - Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

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EN 61000-3-2 - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)
EN 61000-3-3 - Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
EN60335-1 - Household and similar electrical appliances - Safety - Part 1: General requirements
EN60335-2-41 - Household and similar electrical appliances - SafetyPart 2: Particular requirements for pumps
EN62233 - Measurement methods for Electromagnetic fields of household appliances and similar apparatus with regard EN 62233/AC 2008-08 to human exposure

Limena (PD), November 2020

ATLAS FILTRI ITALIA srl

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15. Spare parts

WL-ROL	WL-ROC	Article. No.	Type	Description
	x	AUC018K000	Spare	Expansion vessel white 18L 3/4" M
	x	AUC040K000	Spare	Expansion vessel white 40L 3/4" M
x		AUC080K000	Spare	Expansion vessel white 80L 3/4" M
x		AUC100K000	Spare	Expansion vessel white 100L 3/4" M
x		AUC200K000	Spare	Expansion vessel white 200L 3/4" M
x		AUC300K000	Spare	Expansion vessel white 300L 3/4" M
x		AUC500K000	Spare	Expansion vessel white 500L 3/4" M
x		AUCK00BR34	Spare	Wall mouting bracket SS/painted 3/4" F-F for 18L or 40L expansion vessel
	x	ROKC00CV18	Spare	Check valve push-in 1/8"-compression fitting for tube Ø1/4" x 1/8" M (WL-ROC-25/40/80)
	x	ROKC00CV10	Spare	connection piece 90° incl. non return valve for membrane tube 10mm
x		ROKC00CV20	Spare	connection piece PVC 20mm
x		AUCK00PF15	Acc	Expansion vessel connection kit PVC 3/4" M - JG15 for expansion vessels AUC080/100/200/300/500
x		WF-50-00005	Acc	Expansion vessel connection kit stainless steel 3/4" (only for WL-ROL-1000/1200)
x		AUCK00MABV	Acc	Stainless steel fitting with pressure gauge and tap for connection to the top of the expansion vessel 100-500 L
	x	ROKC00DBKA	Acc	UV disinfection system incl. transformer and housing for WL-ROC-25/40/80/140
	x	ROKC00UVLA	Spare	UV lamp for ROKC00DBKA
	x	ROKC00QZLA	Spare	Glas for UV lamp (WL-ROC-25/40/80/140)
x		ROKL00DBK1	Acc	UV disinfection system incl. transformer and housing for WL-ROL-160/320/460/600
x		ROKL00UVL1	Spare	UV lamp for ROKL00DBK1
x		ROKL00QZL1	Spare	Glas for UV lamp in ROKL00DBK1
x		ROKL00DBK2	Acc	UV disinfection system incl. transformer and housing for WL-ROL-1000/1200
x		ROKL00UVL2	Spare	UV lamp for ROKL00DBK2 (ROL1K0-ROL1K2)
x		ROKL00QZL2	Spare	Glas for UV lamp in ROKL00DBK2
	x	ROKC00UVOR	Spare	O-Ring silicone for UV-lamp 1 pc for ROKC00UVLA, 2 pc for ROKL00UVL1 and ROKL00UVL2
x	x	ROKL00UVT1	Spare	Electronic ballast 230V 50-60HZ for lamp 10-21 W
	x	ROKC00BLD1	Acc	Blending kit for WL-ROC 25-80l/h with adjustable mixing ratio and conductivity sensor
	x	ROKC00BLD2	Acc	Blending kit for WL-ROC 140l/h with adjustable mixing ratio and conductivity sensor
x		ROKL00EC02	Acc	Kit inlet conductivity probe 1/2".
	x	ROKC00DPK1	Acc	Kit antiscalant for ROC140 with VCL200110000 pump,5 Bar injection valve, tank and fittings
	x	ROKC00DP01	Spare	Anti scalant metering pump VCL200110000. 1 l/h at 20 Bar. 230Vac Schuko (WL-ROC-
x		ROKL00DP00	Spare	Anti scalant metering pump VCL150210001. 2 l/h at 15 Bar. 230Vac Schuko (WL-ROL-160up to 1200)
x	x	ROKL00JV00	Spare	Injection valve 5 Bar
x	x	ROKL00AT00	Spare	20L tank with cap
x	x	ROKL00DPPI	Spare	Connection hoses kit for metering pump, injection valve and 20l tank
x	x	ROKL00AS10	Acc	Antiscalant Pragmaclean 309, EN 15040 compliant for DACH. 10Liter
x	x	ROKL00AS25	Spare	Antiscalant Pragmaclean 309, EN 15040 compliant for DACH. 25Liter
	x	ROKC00FR02	Spare	Kit flow restrictors ROC25
	x	ROKC00FR04	Spare	Kit flow restrictors ROC40
	x	ROKC00FR08	Spare	Kit flow restrictors ROC80
	x	ROKC00FR14	Spare	Kit flow restrictors ROC140
x	x	ROKC00KIT1	KIT	Connection to Humisonic when distance <= 3m, or additional humidifiers (double cylinder).
x	x	ROKC00KIT2	KIT	Connection to Humisonic humidifiers when 3m < distance <=20m or additional humidifiers (double cylinder).
x	x	ROKC00KIT4	KIT	Connection to Isothermal when distance <= 3m, or additional humidifiers (double cylinder)
x	x	ROKC00KIT5	KIT	Connection to Isothermal humidifiers when 3m < distance <=20m or additional humidifiers (double cylinder)

Spare parts (2)

WL-ROL	WL-ROC	Article. No.	Type	Description
x	x	ROKC00KIT3	KIT	Connection to optiMist / humiFog / chillBooster / MC. To be used with KIT1 or KIT2
	x	ROKC001810	Spare	Quick coupling brass straight, Ø10x 1/8" cylindrical for connecting WL-ROC to humidifier
	x	ROKC001007	Spare	LLPDE hose white 10/7 (20 m)
	x	WF-50-00018	Spare	LLPDE hose black 10/7 (20 m)
	x	WF-50-00020	Spare	LLPDE hose black 8/6 (20 m)
x		ROKC001511	Spare	LLPDE hose white 15/12 (20 m)
x		WF-50-00019	Spare	LLPDE hose black 15/12 (20 m)
x	x	ROKC003410	Spare	Adapter acetal 3/4" F - JG10 with flat inner gasket
x	x	ROKL003415	Spare	Adapter acetal 3/4" F - JG15 with flat inner gasket
	x	ROKC00TEE1	Spare	T-Piece black acetal 3x JG10
	x	ROKC00Y001	Spare	Y connection Ø10
	x	ROKC00VALS	Spare	Hand valve union connector JG10 F-F
x		ROKC00KY15	Spare	Y-Piece 15mm (with 2x reducers 10mm)
x	x	ROKL00EC01	Spare	Conductivity probe ECPROB OUT
x	x	E-5000134	Spare	LDOSIN control, Hygromatik branded
x	x	ROKL00PSHP	Spare	Pressure switch PSHIGH 12 bar; NC; 1/4" M brass - with plastic protective cups IP65
x	x	ROKL00PSHL	Spare	Pressure switch PSMAX 4 bar; NC; 1/4" M brass - with plastic protective cups IP65
x	x	ROKL00PSLL	Spare	Pressure switch PSMIN 2 bar; NC; 1/4" M brass - with plastic protective cups IP65
	x	ROKC00MA06	Spare	Pressure guage 6 Bar; SS case; 40mm diameter; Brass 1/8"G Back; glycerine filled (WL-ROC-140)
	x	ROKC00MA16	Spare	Pressure guage 16 Bar; SS case; 40mm diameter; Brass 1/8"G Back; glycerine filled (WL-ROC-140)
	x	ROKC00MR16	Spare	Pressure guage 16 Bar; SS case; 40mm diameter; Brass 1/8"G Radial; glycerine filled (WL-ROC-25 up to WL-ROC-80)
x		ROKL00MA06	Spare	Pressure guage 6 Bar; SS case; 63 mm diameter; Brass 1/4"G Radial, glycerine filled
x		ROKL00MA16	Spare	Pressure guage 16 Bar; SS case; 63 mm diameter; Brass 1/4"G Back, glycerine filled
	x	ROKC00VALN	Spare	Permeate check valve CV3 - diam. 6 mm (WL-ROC-25 / 40)
	x	ROKC00FLT1	Spare	Carbon block cartridge filter CB-EC 10" SX 5µm (WL-ROC-25/40/80)
x	x	ROKC00FLT2	Spare	Carbon block cartridge filter CB-EC 10" SX 10µm (WL-ROC-140, WL-ROL160/320)
x		ROKL00FLT5	Spare	Carbon block cartridge filter CB-EC 20" SX 10µm (WL-ROL-460 up to WL-ROL-1200)
x	x	ROKC00FLT3	Spare	Sediment melt-blown filter CPP 10" SX 5µm (WL-ROC-140, WL-ROL-160/320)
x		ROKL00FLT4	Spare	Sediment melt-blown filter CPP 20" SX 5µm (WL-ROL-460 up to WL-ROL-1200)
	x	ROKC00HOU1	Spare	Water inlet filter housing 10"; 1/2" GF
x	x	ROKC00HOUS	Spare	Water inlet filter housing 10" double; 3/4" GF (WL-ROC-140, WL-ROL-160/320)
x		ROKL00HOU2	Spare	Water inlet filter housing 20" double; 3/4" GF (WL-ROL-460 up to WL-ROL-1200)
x	x	ROKC00WREN	Spare	Spanner for 10" filter DP model (WL-ROC, ROL-160/320)
	x	ROKC00SPAN	Spare	Spanner for 2 inch membrane vessel (WL-ROC-25/40/80)
x		ROKL00WREN	Spare	Spanner for 20" filter 3P MODEL (WL-ROL-460 up to WL-ROL-1200)
x	x	ROKC00OR10	Spare	10" water inlet filter gasket kit (WL-ROC-140, WL-ROL-160/320)
x		ROKL00OR20	Spare	20" water inlet filter gasket kit (WL-ROL-460 up to WL-ROL-1200)
	x	ROKC00MEMB	Spare	RO membrane 2012-150 (WL-ROC-25/40)
	x	ROKC00ME00	Spare	RO membrane 2012-400 (WL-ROC-80)
	x	ROKC00ME05	Spare	RO membrane 4021XL (WL-ROC-140)
x		ROKL00ME10	Spare	RO membrane LOW4-2540 (WL-ROL-160/320)
x		ROKL00ME20	Spare	RO membrane LOW4-4040 (WL-ROL-460/1000)
x		ROKL00ME30	Spare	RO membrane LOW4 4040XL (WL-ROL-600/1200)
	x	ROKC00VESS	Spare	Membrane vessel 2012 (WL-ROC-25 / 40 / 80)
	x	ROKC00VESM	Spare	Membrane vessel 4021 (WL-ROC-140)
x		ROKL00VS25	Spare	Membrane vessel 2540 (WL-ROL-160/320)
x		ROKL00VS40	Spare	Membrane vessel 4040 (WL-ROL-460/600/1000/1200)
x		ROKL00OR25	Spare	O-ring for end cap for 2.5" RO membrane and membrane cylinder (WL-ROL-160/320)
x		ROKL00OR40	Spare	O-ring for end cap for 4" RO membrane and membrane cylinder (WL-ROL-460/600/1000/1200)

Spare parts (3)

WL-ROL	WL-ROC	Article. No.	Type	Description
x		ROKL00EXMB	Spare	Extraction kit for membrane vessels (WL-ROL-160/320
	x	ROKC00MOT5	Spare	Engine 245W 50Hz (WL-ROC-25/40/80)
x	x	ROKL00MOT5	Spare	Engine 550W 50Hz (WL-ROC-140, WL-ROL-160)
x	x	ROKL00AD00	Spare	Adapter M80 (WL-ROC-140, WL-ROL-160/320)
x	x	ROKL00EJ00	Spare	Coupling for motor 550W (WL-ROC-140, WL-ROL-160/320)
	x	ROKC00PUMP	Spare	Pump with bypass 150 lph for ROC25-40
	x	ROKC00PU00	Spare	Pump with bypass 300 lph for ROC80
	x	ROKC00PU14	Spare	Pump with bypass 1000 lph for ROC140
x		ROKL00PUMP	Spare	Pump with bypass 800 lph for ROL 160-320
x		ROKL00PUM5	Spare	Multistage centrifugal pump 3SV14F015M for ROL460-ROL600-ROL1000
x		ROKL00PUX5	Spare	Multistage centrifugal pump 3SV16F015M for ROL1200
x	x	ROKL00IV12	Spare	SOLENOID VALVE SV1 1/2" G F 230Vac (ELETTROVALVOLA + BOBINA)
x		ROKL00IV34	Spare	SOLENOID VALVE SV1 3/4" G F 230Vac (ELETTROVALVOLA + BOBINA), WL-ROL-460/600/1000/1200
x	x	ROKL00IV14	Spare	SOLENOID VALVE SV2 1/4" G F 230Vac (ELETTROVALVOLA + BOBINA), WL-ROC-80/140
	x	E-5000122	Spare	Flow restrictor with none-return valve 0,5l/h for WL-ROC-25
	x	E-5000124	Spare	Flow restrictor with none-return valve 0,9l/h for WL-ROC-40
	x	E-5000126	Spare	Flow restrictor with none-return valvel 1,1 l/h for WL-ROC-25/40
	x	E-5000128	Spare	Flow restrictor with none-return valve 1,4 l/h for WL-ROC-80
	x	E-5000130	Spare	Flow restrictor with none-return valve 2,15 l/h for WL-ROC-140
	x	E-5000132	Spare	Flow restrictor with none-return valve 8,4l/h for WL-ROC-140
x		ROKL00FL20	Spare	Flow meter D.20 - 320 lph (WL-ROL-160/320)
x		ROKL00FL25	Spare	Flow meter D.25 1000 lph (WL-ROL-460/600/1000/1200)
x		ROKL00FL32	Spare	Flow meter D.32 - 1600 lph (WL-ROL-1200)
x		ROKL00PVCA	Spare	PVC fittings for antiscalant injection (ROL100/ROL320)
x		ROKL00PVCB	Spare	PVC fittings for water inlet conductivity meter (ROL100÷ROL320)
x	x	ROKL00FC40	Spare	Cable L = 4 m and connector for ROL conductivity probe with common mode filter
x	x	ROKL00FC15	Spare	Cable L = 1.5 m and connector for ROL conductivity probe with common mode filter
x	x	ROKL00CP02	Spare	Conductivity probe 1/2" K=1 0-999uS
x	x	ROKL00CP01	Spare	Conductivity probe 1/2" K=0,1 0,0…99,9uS
x		WF-50-00008	Spare	Ball valve 3/4", two-part, DVGW
x	x	WF-50-00009	Spare	Freeflow valve 3/4", brass, DVGW

For ordering spare parts, a template can be found on the www.hygromatik.com website under the „Contact“ tab. Your spare parts order may as well be directed per e-mail to the HygroMatik main office using the address hy@hygromatik.de.

Please make sure to specify your unit model and serial number.

16. Commissioning report / maintenance documentation

Commissioning report for HygroMatik reverse osmosis systems WL-ROC-XX and WL-ROL-XX

Unit	Type	Serial number
	Type of pressure expansion vessel	Operating hours
	Date of maintenance	
	Company / name	
Customer	Commercial / Private	
	Street / Number	
	Postal code / City	
	Contact on site	Telephone number

		checked / Value	Remarks
Unit condition	Unit delivered complete?	☐ yes ☐ no	
	Transport locks removed?	☐ yes ☐ no	
	All hoses and connections checked for damage?	☐ yes ☐ no	
	All detachable PVC screw connections tightened? (WL-ROL-XX only)	☐ yes ☐ no	
	All electrical cables checked for external damage?	☐ yes ☐ no	
General	Distance appliance - pressure expansion vessel	meters	
	Distance pressure expansion vessel - consumer	meters	
	Pre-fill pressure expansion vessel	☐ yes ☐ no	
	Connection to the drinking water system	☐ yes ☐ no	
	Softening system connected?	☐ yes ☐ no	
	Hoses to the anti-scalant pump and canister connected (if available)?	☐ yes ☐ no	
	Prefilter and membranes in position?	☐ yes ☐ no	
Feed water	Total hardness	°dH	
	Conductivity	µS/cm	
	Temperature	°C	
	Water inlet pressure	bar	
Permeate / Konzentrate	Conductivity permeate	µS/cm	
	Conductivity concentrate	µS/cm	
	Conductivity Mixwater (only WL-ROC-XX with blending kit)	µS/cm	
	Membrane pump pressure	bar	
	Permeate quantity	l/h	
	Concentrate quantity	l/h	
	Demineralisation rate	%	
	Switch-on pressure	bar	
	Switch-off pressure	bar	
	Antiscalant dosing (if available) activated according to operating instructions and canister filled to mixing ratio?	☐ yes ☐ no	

Note: The commissioning values are to be documented as a basis for the system assessment.
Attach a water analysis to this protocol if the specified limit values will not be complied (see chapter **Operating conditions of the unit**). This can be obtained from the local water supplier or determined by a chemical drinking water analysis laboratory commissioned by the customer.

Date / Sign

Maintenance checklist for HygroMatik reverse osmosis systems WL-ROC-XX and WL-ROL-XX

Unit

Type _____ Serial number _____

Type of pressure expansion vessel _____

Date of maintenance _____

Company / name _____

Customer

Commercial / Private _____

Street / Number _____

Postal code / City _____

Contact on site _____ Telephone number _____

The following system components were tested (settings, setpoints, levels, etc.):	**Error-free operation Yes / No**		**Replacement Yes / No**		**Remarks**
Activated carbon prefilter	☐	☐	☐	☐	
Sediment prefilter (only for WL-ROL, WL-ROC140)	☐	☐	☐	☐	
Membrane(s)	☐	☐	☐	☐	
Electrical connections	☐	☐			
Dosing pump (if available)	☐	☐	☐	☐	
Tightness of the unit	☐	☐			
UV lamp (replace after 9000 hours or 1 year) if available	☐	☐	☐	☐	
Control	☐	☐	☐	☐	

Measured parameters		**Values at Commiss-ioning**	**Values at Mainte-nance**	**Remarks**
Operating hours	hours			
Feed water pressure	bar			
Water pressure behind prefilter	bar			
Total hardness feed water	°dH			
Conductivity feed water	µs/cm			
Temperature feed water	°C			
Conductivity permeate	µs/cm			
Conductivity mixed water (only WL-ROC-XX with blending option)	µs/cm			
Membrane pump pressure	bar			
Switch-on pressure (max 2 bar)	bar			
Switch-off pressure (max 4 bar)	bar			
Pre-fill pressure expansion vessel	bar			
Permeate quantity in relation to the feed water quantity used	☺ ☹			
Concentrate quantity in relation to the feed water quantity used	☺ ☹			
Reset service counter	☺ ☹			

Samples taken for analysis			**Remarks**
Feed water	☐		
Permeate	☐		

NOTE: The commissioning values are to be documented as a basis for the system assessment. Copy this form for multiple use.

Date / Sign _____

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17. Technical specifications

Technical Data WL-ROC (Reverse Osmosis Compact)					
		WL-ROC 25	WL-ROC 40	WL-ROC 80	WL-ROC 140
Permeat production [l/h] * (+/- 10%)		25	40	80	140
Concentrate production [l/h]*		25	40	80	140
Water consumption during operation [l/h]		50	80	160	280
Max. output Permeat [%]		50			
Advised membran pressure [bar]		8	8	5	10
Flow pressure [bar]		2 - 5			
Water pressure permeat max. [bar]		4			
Feed water temperature [°C]		5 - 25			
Water hardness		20 °dH without pre-treatment (otherwise: softening)			
Feed water Total Dissolved Salt [ppm]		< 750			
Feed water conductivity [µS/cm]		< 1000			
Number of membranes		1	2	2	1
Electrical connection		230V /1Ph /N /50-60Hz			
Electrical power [kW]		0,3			0,6
Operation weight (kg)		19	21	21	41
Dimensions	width	420			770
[mm]	height	580			700
	depth	235			220
Permeate pipe connection		John Guest 10 mm			
Water connection		3/4" external thread			
Drainage connection		John Guest Ø 8 mm			John Guest Ø12 mm
Drain function		/			✓
Conductivity measurement		Permeate monitoring and alarm function included			
Antiscalant pump		/			optional
Adjustable blending for ELDB		optional available			

* Specifications refer to the reference water quality: 15°C, TDS: 250 ppm, free of iron and chloride

** permanently pending feed water pressure behind the prefilters during permeate production

These values are theoretical because they can change with the temperature of the feed water and its chemical and physical qualities. These values were used for feed water with a TDS of 250 ppm and a water temperature of 16°C.

The temperature of the feed water has a great influence on the productivity and quality of the permeate. As the temperature increases, the permeate output also increases, but with a worse conductivity value.

The recovery value is calculated as follows:

$$\text{RECOVERY (\%)} = \frac{\text{Permeat*}}{\text{Permeat* + Concentrate*}} \times 100$$

* quantity

These options are available:

- Retrofit antiscalant WL-ROC-140
- Retrofit kit blending WL-ROC-140
- UV-lamp for WL-ROC-140
- Retrofit kit blending WL-ROC-25 to 80
- expansion vessel

18. Dosing Antiscalant

Dosage specifications:

When using the recommended antiscalant Pragmaclean 309, dose it depending on the feed water quality:

Soft water	
CaCO3 + MgCO3 [ppm] ?	250
total hardness [°fH]	25
total hardness [°dH] ?	5,6
PH	6,5-8
Sulfat [ppm]	<14,4

medium-hard water	
CaCO3 + MgCO3 [ppm] ?	325
total hardness [°fH]	32,5
total hardness [°dH]	5,7 - 11,2
PH	7,5-8,5
Sulfat [ppm]	<17

hard water	
CaCO3 + MgCO3 [ppm] ?	400
total hardness [°fH]	40
total hardness [°dH]	11,3 - 28
PH	8-9
Sulfat [ppm]	<20

How to proceed

» Fill the empty canister (20l) with the quantity of antiscalant specified for the existing feed water quality.

Example:

For a WL-ROC-140 with soft feed water, fill 1.3 litres of Pragmaclean 309 into the canister.

For a WL-ROC-140 with hard water, fill 1.7 litres of Pragmaclean 309 into the canister.

» Fill the canister up with permeate.

		WL-ROC-140
	Canister size [l]	20
Soft water	**Dosing antiscalant [l]**	1,30
	Dilution factor	15,40
medium-hard water	**Dosing antiscalant [l]**	1,5
	Dilution factor	13,3
hard water	**Dosing antiscalant [l]**	1,7
	Dilution factor	11,8

NOTICE

Use only diluted antiscalant!

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