



MAB SW30 INSTALLATIONS- OCH SERVICEMANUAL

Ulf Bergsten
ulf@watermaker.se



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1 Introduction

About this manual

Purpose and intended audience

This manual provides instructions for installing, operating, flushing, maintaining and troubleshooting the MAB SW30, together with technical information to facilitate servicing.

It is intended for MAB SW30 users, installers and service personnel.

Typographical conventions

Control names and important operating modes are shown in bold.

References to other documents are shown in italics.

Clickable links are coloured and underlined.

Related MAB Watermaker documentation

The user documentation listed in the table below is supplied with the MAB Watermaker in addition to this manual.



Important information for users

Intended use

The MAB SW30 is a manually operated watermaker that produces fresh product water from seawater or brackish water by reverse osmosis.

It is designed for recreational boats and other protected off-grid installations with a suitable feedwater source and a 12 V DC supply.

The MAB SW30 must be operated under supervision and is intended to supply a separate water tank or outlet.

Nominal production is approximately 30–45 litres per hour. Actual output depends on water temperature, salinity, membrane condition, supply voltage and operating pressure.

The user must

- Read and understand this manual
- Know how to stop the unit and disconnect power
- Check filters, hoses, valves and water flow before starting
- Check product water quality before directing it to the tank
- Ensure the feedwater inlet cannot draw in air due to heeling, waves or turbulence

Prohibited and improper use

- With water containing oil, fuel, chlorine, solvents or other chemicals that may damage the membrane
- With well water containing iron, manganese or other scale-forming substances without prior water analysis and appropriate pretreatment
- Without a mesh strainer upstream of the Marco UP2
- Without the specified prefilters
- Without a correctly rated fuse
- Above the specified maximum operating pressure
- Without supervision
- In rain, spray or submerged in water
- In explosive or flammable environments



Safety

Important safety instructions

WARNING – HIGH PRESSURE

The MAB SW30 normally operates at approximately 55 bar. Never disconnect hoses, fittings, valves or the membrane housing while the system is pressurised. Stop the unit and relieve the pressure before servicing.

WARNING – ELECTRICAL FIRE HAZARD

The 12 V system can draw high current. Use suitably sized cables, a correctly rated fuse and secure electrical connections. Disconnect power before electrical work.

CAUTION – OPEN THE NEEDLE VALVE BEFORE STARTING

Start with the needle valve open and low backpressure. Then increase operating pressure slowly.

NOTICE – FEEDWATER AND DRY RUNNING

Do not use water that may contain fuel, oil, chlorine or harmful chemicals. Check the feedwater flow and never allow the pumps to run dry. The SW30 has no automatic low-pressure shutdown for the high-pressure pump.

Place the unit in a dry, ventilated location without obstructing the motor ventilation openings. Lift by the frame, never by hoses, pressure gauges or valves. Flush after use as described in Flushing and preservation.



2 Product description

MAB SW30

The MAB SW30 is an integrated 12 V DC watermaker mounted on a load-bearing aluminium frame. The unit includes a booster pump, high-pressure pump, DC motor, membrane housing, pressure gauges, needle valve, safety relief valve, other valves and electrical controls.

The unit produces fresh water by filtering and pressurising feedwater and then forcing it through an RO membrane.

Purpose of the product

The MAB SW30 produces product water from seawater or brackish water. Once water quality has been checked, the product water can be directed to the boat's water tank, a separate buffer tank or a tap.

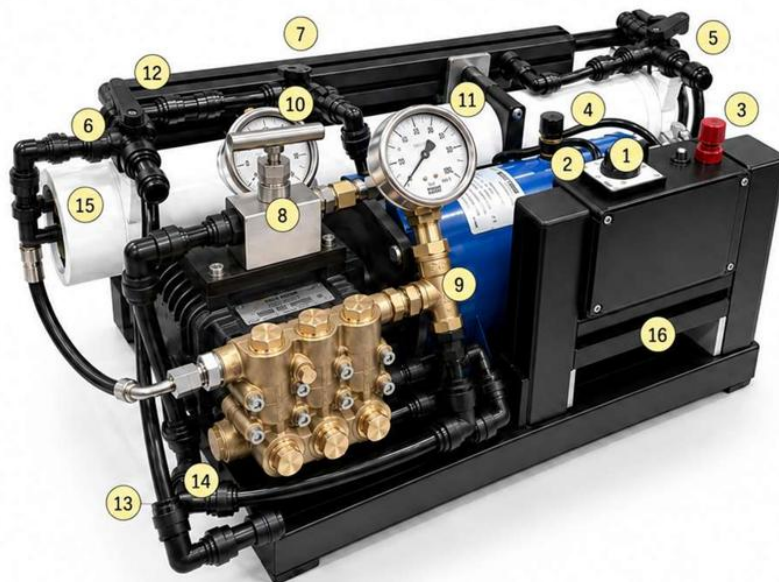
The MAB SW30 normally produces approximately 30–45 litres of product water per hour. Output depends primarily on feedwater temperature and salinity, operating pressure, membrane condition and supply voltage.

The MAB SW30 is not designed for untreated well water that may contain iron, manganese or other substances that cause fouling. Such water requires analysis and suitable pretreatment.

Main components

Description of the product components as supplied

Komponentöversikt – MAB SW30



- | | |
|-----|---|
| 1. | Manövernöred, driftläge 0–1–2 |
| 2. | Automatsäkring för boostpump |
| 3. | Plusanslutning, 12 V DC |
| 4. | Minusanslutning, 0 V DC |
| 5. | Väljare för råvatten eller rensningsvatten |
| 6. | Väljare för dricksvatten till tank eller tappställe |
| 7. | Tryckreglering för boostpump |
| 8. | Nålventil för inställning av arbetstryck |
| 9. | Säkerhetsventil för högtryckssystemet |
| 10. | Lågtrycksmanometer – matningstryck från boostpump |
| 11. | Högtrycksmanometer – arbetstryck till membranet |
| 12. | Utgående råvatten till förfilter |
| 13. | Ingående filtrerat vatten till högtryckspump |
| 14. | Spillvattenutlopp – brine |
| 15. | Membranhus |
| 16. | Lyfthandtag |

Selector switch

Position 0 – Stop

Both pumps are off.

Position 1 – Boost/flush

The Marco UP2 runs. The high-pressure pump is off.

Position 2 – Production

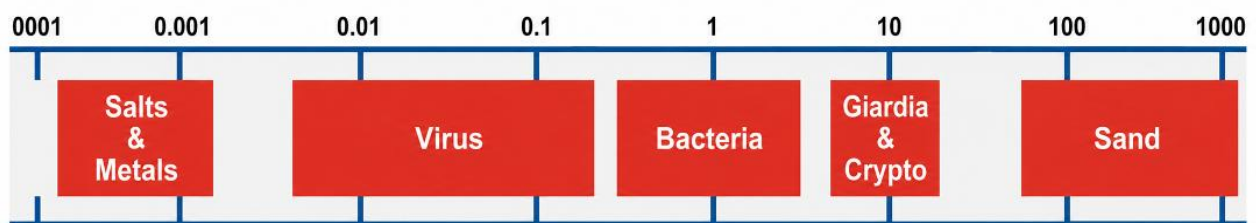
The Marco UP2 and high-pressure pump start when the selector is turned to position 2. Always start with the needle valve open, then raise operating pressure slowly.

Contaminants removed by reverse osmosis

Reverse osmosis removes a wide range of contaminants from drinking water, including:

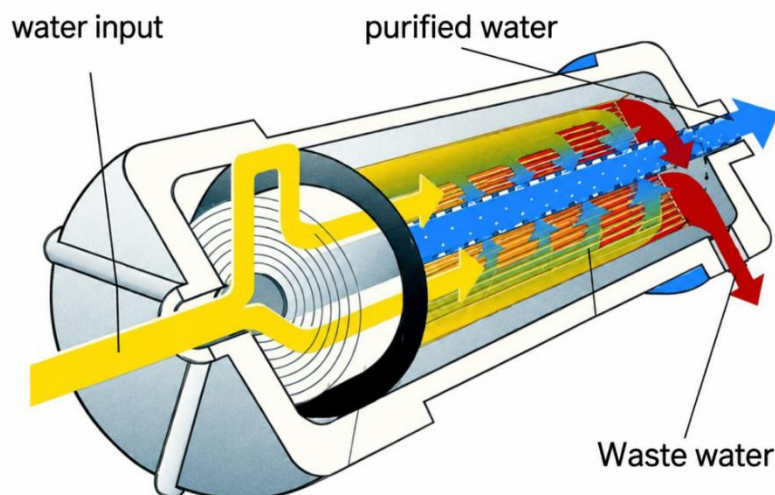
- Dissolved salts
- Dissolved organic compounds
- Viruses
- Bacteria
- Many other microparticles

Reverse osmosis is therefore well suited to seawater desalination. The illustration below shows the sizes of contaminants that an RO membrane can remove, from smallest on the left to largest on the right.



How water purification works

Reverse osmosis uses high pressure to force water through the RO membrane's microscopic pores, separating contaminants and purifying the water.



Water flow through a Reverse Osmosis Cartridge.

Figure 1. Illustration showing how water is forced through the RO membrane and purified.¹



Measuring water quality

Water quality is measured as TDS

Water quality is assessed by total dissolved solids (TDS), a measure of the dissolved inorganic substances in a water sample.

TDS may include calcium, magnesium, iron, sodium chloride (salt) and sulphides. A TDS meter measures electrical conductivity and displays an estimated value in ppm (parts per million).

TDS limits

Product-water TDS should normally be substantially lower than feedwater TDS and should stabilise after startup. A product-water reading below 300 ppm may be used as a practical operating check, but it does not replace a hygiene assessment. A reading significantly higher than the system normally produces is often a more useful warning sign than any single exact ppm limit.

Water quality after treatment with a MAB Watermaker

Performance at different water temperatures

RO membrane water production is specified at a seawater temperature of 25 °C and a salinity of 3.2%. According to the manufacturer, individual membrane elements may vary in fresh-water production by $\pm 20\%$.

Water flow changes with temperature:

- As water becomes colder, its viscosity increases and flow through the RO membrane decreases.
- As water becomes warmer, its viscosity decreases and flow through the RO membrane increases.

The exact temperature correction depends on the membrane specification. The stated MAB SW30 output is therefore nominal and may be significantly lower in cold water.



3 Installation

Location

Position the MAB SW30:

- On a stable, level surface
- In a dry, ventilated space
- Where pressure gauges and controls are visible
- Where filters can be inspected and replaced
- Where leaks can be detected
- With sufficient clearance around the motor ventilation openings
- Where the unit can be secured against movement in rough seas
- The ambient temperature must not exceed the value specified in the technical data. The unit must not be exposed to rain, spray or immersion.

Feedwater inlet

Connect the feedwater supply to the inlet on the right-hand side of the unit.

Feedwater must pass through the following components:

- Feedwater inlet
- Mesh strainer
- Shut-off valve
- Marco UP2 booster pump
- 20 µm prefilter
- 5 µm prefilter
- High-pressure pump

The mesh strainer must always be installed upstream of the Marco UP2. Running without it may allow particles to block or damage the pump.

Position the feedwater intake so that it cannot draw in air due to heeling, waves or turbulence.



Product water and brine

Connect the product-water hose to a tank or separate outlet. On startup, direct product water to a sampling outlet or drain until water quality has stabilised.

Discharge the brine freely back to the sea or to a suitable drain. The hose must not be obstructed, kinked or fitted with a valve that can shut off the flow completely.

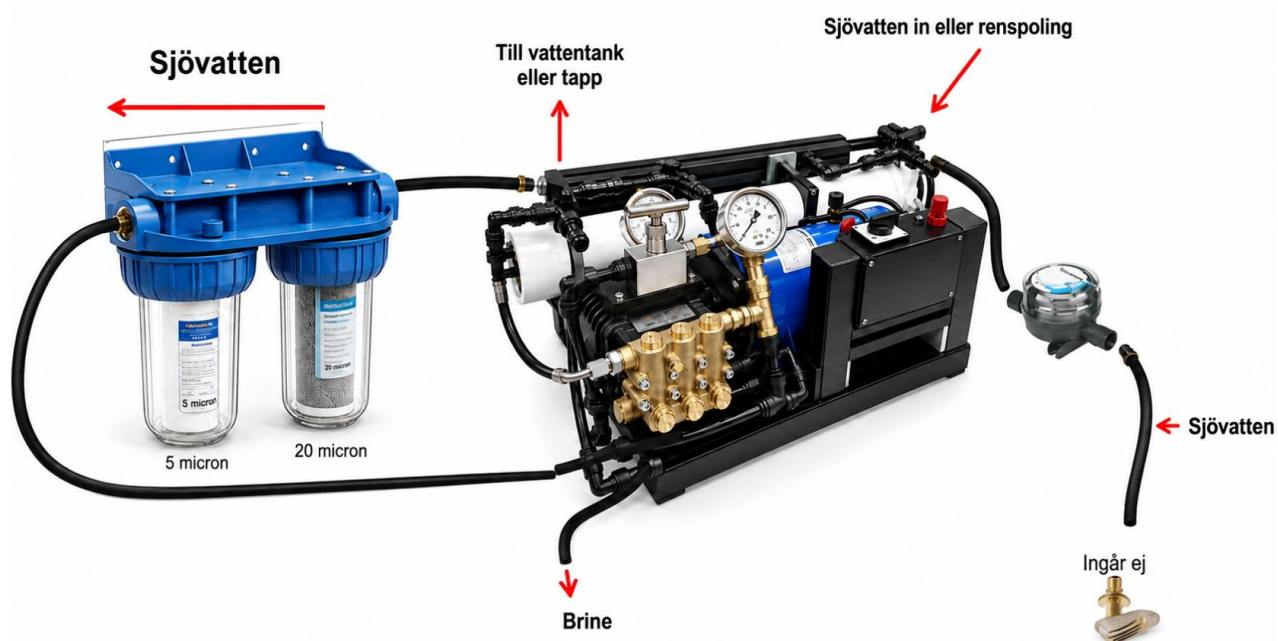
Electrical connection

The MAB SW30 must be connected to 12 V DC.

- Red terminal: positive (+)
- Black terminal: negative (-)
- Recommended main fuse: 60 A
- Install the fuse close to the battery positive terminal
- Recommended cable cross-section for up to 1.5 m positive and 1.5 m negative leads: at least 16 mm²
- For longer cable runs, increase cable size to limit voltage drop and heat buildup.
- Check polarity before connecting. Reverse polarity may damage electrical components.
- The installation must include a suitable main disconnect switch.

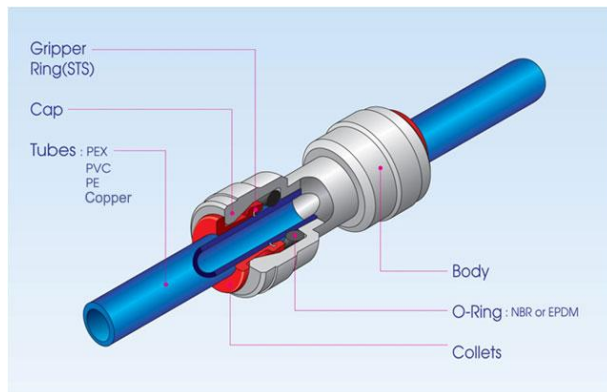
After installation, inspect all hoses and fittings for leaks. In particular, check that the suction line to the booster pump is airtight so the system cannot draw in air.

Basic hose connection diagram



Connecting hoses

Maximum operating pressure for hose fittings



The table below gives the maximum operating pressure of the hose fittings (with 12 mm hose) at different temperatures.

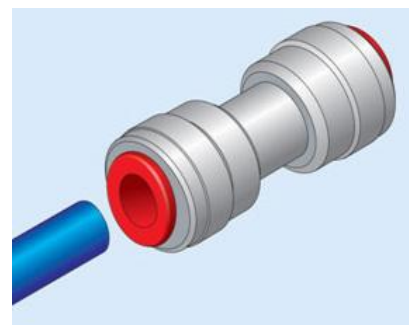
Temperature	Max. operating pressure
1 °C	11 bar
20 °C	11 bar
65 °C	7 bar

Connecting low-pressure hoses with push-fit fittings

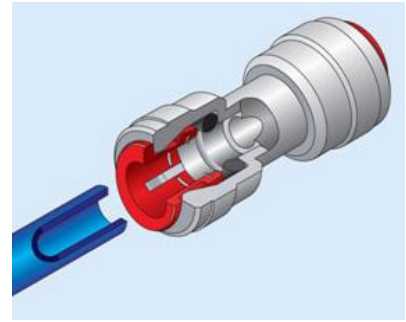
Push-fit fittings make it convenient to route hoses and connect the different parts of the MAB SW30 system.

Step	Instructions
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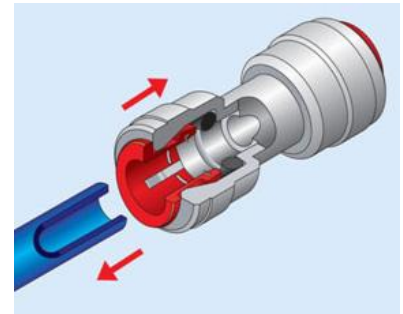
- | | |
|----------|---|
| 1 | <p>Cut the end of the hose squarely before inserting it into the fitting. Ensure the hose end is clean and free from dirt or cracks.</p> <p>Se till att använda en ren slangände utan smuts eller sprickor.</p> |
|----------|---|



- 2** Push the hose into the fitting until fully seated. Moderate force is needed; some resistance may occur just before the hose passes the O-ring seal.
- Det kräver måttlig kraft, men ibland kan det kärra lite precis innan slangen sluter tätt runt O-ringen i kopplingen.



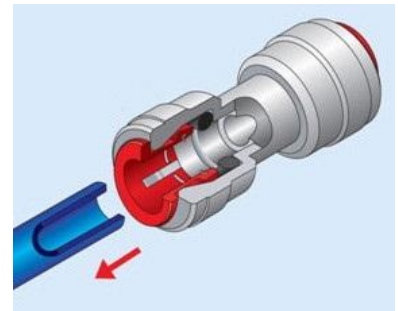
- 3** Pull gently on the hose to confirm that it is securely locked in the fitting.



- 4** **To release the hose from the fitting, press in the outer release ring and pull out the hose. A 12 mm open-ended spanner can be used to press in the release ring.**

Tryck in den yttersta ringen och låset släpper och slangen kan dras ut.

Ett hjälpmedel är att ta en 12 mm skiftnyckel för att trycka in kopplingens yttersta ring.





4 Operation

Quick start – normal operation

This quick-start procedure applies after the installation has been checked. Production normally starts directly in position 2 with the needle valve open. Position 1 is used for separate booster operation, priming and flushing.

1. Open the feedwater inlet and check that the mesh strainer and prefilters are clean.
2. Open the needle valve fully so the system starts without high backpressure.
3. Turn the selector to position 2. The Marco UP2 and high-pressure pump start.
4. Check that feedwater is flowing and adjust the booster pressure to approximately 1 bar. If there is no flow, stop and prime the system as described under Troubleshooting.
5. Slowly raise operating pressure with the needle valve to approximately 55 bar when using normal seawater.
6. Direct the initial product water to the sampling outlet and check TDS, appearance and odour.
7. Only direct product water to the tank once its quality has stabilised.
8. To stop: open the needle valve to reduce operating pressure. Turn the selector to position 1 for a separate flush with chlorine-free fresh water, then to position 0.

Pre-start checks

Check:

1. The unit is standing securely
2. The feedwater inlet is open
3. The mesh strainer is clean
4. The 20 and 5 µm prefilters are installed
5. The hoses are correctly connected
6. Product water can be diverted to the sampling outlet
7. The brine outlet is open
8. The needle valve is fully open before starting
9. Battery voltage is sufficient
10. There are no visible leaks

Starting water production

1. Open the needle valve fully before starting. Check that the feedwater inlet is open.
2. Turn the selector to position 2. The Marco UP2 and high-pressure pump start together.



3. Check that feedwater is flowing. Adjust booster pressure to approximately 1 bar and make sure the supply is steady.
4. If the system does not draw water, stop it. Prime the booster pump and hoses as described in Troubleshooting, then try again.
5. Check that the needle valve is still open before raising operating pressure.
6. Turn the needle valve clockwise until operating pressure rises.
7. Set operating pressure to approximately 55 bar for normal seawater.
8. Check that the safety relief valve is not discharging.
9. Direct the initial product water to the sampling outlet or drain.
10. Check TDS and the product water's appearance and odour.
11. Only direct water to the tank once quality has stabilised.

NOTICE

Approximately 55 bar is the normal operating pressure for seawater. Do not increase pressure to force production above the membrane's normal capacity. Brackish water requires a lower operating pressure; limit production to avoid exceeding the membrane's specified flow rate.

First startup with a new membrane

A new membrane contains preservative. Discard at least the first 10 litres of product water, or continue until the water is clear, odourless and its TDS has stabilised.

Stopping water production

1. Open the needle valve to reduce operating pressure to a low level.
2. Turn the selector to position 1. The high-pressure pump stops while the Marco UP2 continues running.
3. Select chlorine-free flushing water and perform the flushing procedure described in the next section.
4. Run until the seawater or brackish water has been displaced. Avoid dry running.
5. Turn the selector to position 0.
6. Close the feedwater valve in a permanent installation.



5 Flushing and preservation

Flushing

Flushing after normal operation

Purpose: to replace saline feedwater with clean, chlorine-free fresh water in order to reduce deposits and biological growth. Flushing is a normal shutdown procedure and is not the same as preservation during extended storage.

1. Open the needle valve fully to prevent high backpressure.
2. Using the three-way valve, select a container of chlorine-free fresh water. Use enough to displace feedwater from the pump, hoses and membrane housing; the required volume depends on hose routing.
3. Turn the selector to position 1. Only the Marco UP2 should run during flushing.
4. Continue until flushing water has passed through the system. Never run the pump dry.
5. Turn the selector to position 0.
6. Return the three-way valves and other valves to their normal operating positions.

Never pass chlorinated water directly through the RO membrane.

If municipal water is used, it must first pass through a suitable activated carbon filter.

Preservation during extended shutdown

Preservation is a separate procedure for extended periods out of service. It protects the RO membrane during storage rather than merely removing saltwater. Use a product intended for RO membranes and follow its current dosing and storage instructions. Prepare enough solution to fill the entire system.

1. First flush the system with clean, chlorine-free water.
2. Mix the preservation solution in a clean container according to the product's current dosing instructions.
3. Open the needle valve fully. Do not allow high backpressure to develop.
4. Select the container of preservation solution as the water source and run only the booster pump in position 1 until the solution has filled the system.
5. Stop before the container is emptied so the pump does not draw in air.
6. Close or cap hoses to retain preservation solution in the system, following the separate preservation instructions.



Before returning to normal operation, flush thoroughly and discard product water until TDS, odour and appearance have stabilised.

NOTICE – Never pass chlorinated water directly through the RO membrane. When using municipal water for flushing, remove chlorine with a suitable activated carbon filter. Do not confuse propylene glycol with ethylene glycol; never use ethylene glycol in the system.

Shutdown and winter storage

Flush the system after normal use. Preserve the membrane as described above for extended shutdown periods. Where freezing is possible, winterise the system according to separate instructions so that water cannot freeze inside pumps, membrane housing, filters or hoses.



6 Maintenance schedule

The intervals below are practical minimum inspection frequencies. Under heavy use, with dirty feedwater or abnormal readings, inspect and service more frequently.

Action	Interval / when
Check feedwater inlet and mesh strainer	Before each run
Check 20 and 5 µm prefilters	Before running and whenever feed pressure drops
Check hoses, fittings and leaks	Before running and regularly during operation
Flush with clean, chlorine-free water	After each use
Check TDS and product water	Every run, before directing water to the tank
Check electrical cables, terminals and fuse	At least annually and if abnormal heating occurs
Check high-pressure pump oil	According to the pump service instructions
Preserve RO membrane	During extended shutdown, according to preservation instructions



7 Troubleshooting

Symptom	Possible cause	Action
Marco UP2 does not start	No power, motor overload protection tripped, pump blocked	Check fuse, voltage and filters. Allow the pump to cool and reset the motor protection.
Motor protection trips	Blocked mesh strainer, clogged hose or pump	Stop and clean before resetting.
Feed pressure drops on startup	Clogged filter, air ingress or inadequate feedwater flow	Check filters, hoses and through-hull fitting.
Operating pressure does not rise	Needle valve open, air in system, pump fault	Prime the system and check needle valve and pump.
Safety relief valve opens	Excessive pressure	Reduce pressure.
Low production	Cold water, low voltage, low pressure, worn membrane	Check temperature, voltage, pressure and membrane.
High TDS	Pressure too low, air, damaged or worn membrane	Flush; check pressure and membrane.
Unusual noise	Air, cavitation, loose component or blockage	Stop and check feedwater flow and mountings.
Leak	Loose or damaged fitting/hose	Stop, disconnect power and relieve pressure.
High-pressure pump does not start in position 2	Electrical fault, inadequate supply voltage or motor/control fault	Stop and check 12 V supply, fuse, connections and motor. Check feedwater flow before restarting.
High-pressure pump stops during operation	Voltage drop, overload or electrical/motor fault	Stop the system. Check power supply, cable connections and motor. Do not restart until the cause has been corrected.



8 Technical data

Specification	MAB SW30
Supply voltage	12 V DC
Normal current	approx. 42–46 A
Power	approx. 500–600 W
Recommended fuse	60 A
Recommended cable	at least 16 mm ² for 3 m total cable length
Production	approx. 30–45 l/h
Normal seawater operating pressure	approx. 55 bar
Safety relief valve	relieves pressure above approx. 60 bar
Booster pressure	approx. 1 bar
Membrane	1 × 2521
Dimensions	approx. 68 × 45 × 34 cm
Weight	approx. 30 kg
Ambient temperature	Not established in this draft – to be verified in the CE documentation
Water temperature	Not established in this draft – to be verified against membrane specification
Protection rating	Not established in this draft



9 Warranty and complaints

Warranty

A warranty is a voluntary undertaking by MAB Watermaker AB. Its scope and period of validity are specified in the sales documents or separate warranty terms. The warranty does not affect a consumer's rights under mandatory law.

Where a warranty claim is accepted, the defect will be remedied in a manner appropriate to its nature. This may primarily involve repairing or replacing the defective component. Replacement of the complete unit will normally be considered only if repair or component replacement is unsuitable.

The warranty does not cover damage excluded under its terms, such as damage caused by incorrect installation or operation, inadequate maintenance, operation without the specified filters, contaminated feedwater, chlorine, freezing, overpressure, reversed polarity or unauthorised alterations. This does not limit liability under mandatory consumer legislation.

Consumer complaints and statutory rights

A warranty is not the same as the statutory right to complain about defects. Where a consumer purchases from MAB Watermaker AB, the Swedish Consumer Sales Act applies. The consumer may complain about defects for which the seller is responsible under the Act within three years of delivery. A voluntary warranty neither replaces nor restricts that right.

Remedies under the Swedish Consumer Sales Act may include repair or replacement. The consumer may have a right to choose a remedy, but the requested remedy need not be provided if impossible or disproportionately costly. For a repairable product such as the MAB SW30, a proven defect may therefore often be addressed by repair or replacement of the faulty component rather than the entire unit, provided the remedy meets statutory requirements.



How to request warranty service or make a complaint

Contact MAB Watermaker AB as soon as a fault is discovered, before dismantling, shipping or handing the unit to an external repairer. Provide the model, serial number, purchase date and a clear description of the problem.

To identify the cause, MAB may request photographs, video and relevant readings, such as feed pressure, operating pressure, TDS and supply voltage. Troubleshooting can often be carried out remotely before any part or complete unit needs to be shipped.

Depending on the fault, the remedy may involve technical support, shipment of a spare part, component replacement, local service by agreement, or return of the product for inspection and repair.

Do not order external repairs or expensive transport without first giving MAB an opportunity to assess the fault and propose a remedy. Costs incurred without prior agreement are not automatically reimbursed. This does not apply where the consumer is entitled to reimbursement under mandatory law in the circumstances.

Service and transport outside Sweden

If the product is used or located outside Sweden, contact MAB before arranging international transport or local service. MAB and the customer can then agree on a practical troubleshooting and repair approach. Options may include remote troubleshooting, dispatching a replacement component, approved servicing by a local technician or returning the unit to a designated service location.

The fact that a product is located abroad does not in itself remove a consumer's statutory rights. Responsibility for transport and service costs depends on the circumstances of the case, applicable law and any warranty terms. Always contact MAB before incurring costs.

Business-to-business sales

Where the buyer is a business, the warranty, complaints and delivery terms agreed between the parties, together with applicable law, govern the sale. The mandatory provisions of consumer sales law do not apply.