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MELAG

Operating Manual

Reverse-Osmosis Water treatment unit

MELA*dem*®47

Dear Doctor,

Thank you for placing your trust in this reverse osmosis water purifier.
Since 1951, MELAG has specialised in the production of sterilisation equipment for medical practice. During this period, our family-owned and operated company has succeeded in becoming a leading manufacturer of sterilisation equipment. More than 450,000 MELAG appliances world-wide testify to the exceptional quality of our sterilizers.
Before using the **MELA*dem*®47** please study this operating manual carefully.
In order to ensure a long working life for your reverse osmosis water purifier and to preserve its value, please make sure that it is serviced regularly.

MELAG management and personnel.

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1 Mode of operation

The MELA*dem*®47 demineralises water using the principle of reverse osmosis. Incoming water at mains pressure is passed through a semi-permeable membrane contained in a reverse-osmosis module. The mineral content of the water which permeates the membrane is reduced by approximately 95 %.
The incoming water is thus split up into two parts:

- a demineralised permeate, and
- a part with increased salt concentration (concentrate), which is disposed of.

In order to ensure that even poor quality mains water is purified sufficiently for the operation of medical equipment e.g. an autoclave, the permeate water from the reverse-osmosis module is also passed through an ion exchange unit. This contains an ion-exchange resin which is able to reduce any residual mineral contents of the permeate to a minimum. A storage container on the pressure is provided in which the purified water can then be stored. It can be connected by a pipe directly to the autoclave. When the storage container is full, the water inlet valve closes automatically. All operations are controlled by water pressure. An additional supply tap is provided so that purified water can be withdrawn to be used for other purposes, e.g. for an autoclave which does not have automatic refilling.

The MELA*dem*®47 can be used to provide the direct demineralised water supply for following MELAG autoclaves:

- Premium-Plus-Class
  (Vacuklav®40 B+, 41 B+, 43 B+, 44 B+)
- Premium-Class
  (Vacuklav®40-B, 41-B, 43-B, 44-B)
- Vacu*quick*®
- Pro-Class
  Vacuklav®23 B+, 24 B+, 24 B/L+, 30 B+, 31 B+)
- S-Class
  Euroklav®23 VS+, 29 VS+, 23 S+)
- Classics
  (Vacuklav®23-B, 24-B, 24-B/L, 30-B, 31-B and Euroklav®23V-S, 29V-S, 23-S, 29-S)

If the room in which the MELA*dem*®47 is installed has no floor drainage, then we recommend the installation of a Water Stop leak detector (MELAG Art. No.: 01056), which switches off the water supply at the mains by means of a solenoid valve if water leaks onto the floor.

WARNING! Before longer periods of inoperation, (up to 4 weeks), the water supply should be turned off and the storage container emptied.
The connection of the MELA*dem*®47 to the mains water supply should be carried out by the authorised MELAG service of your local dealer.

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2 Setup of the water purifier

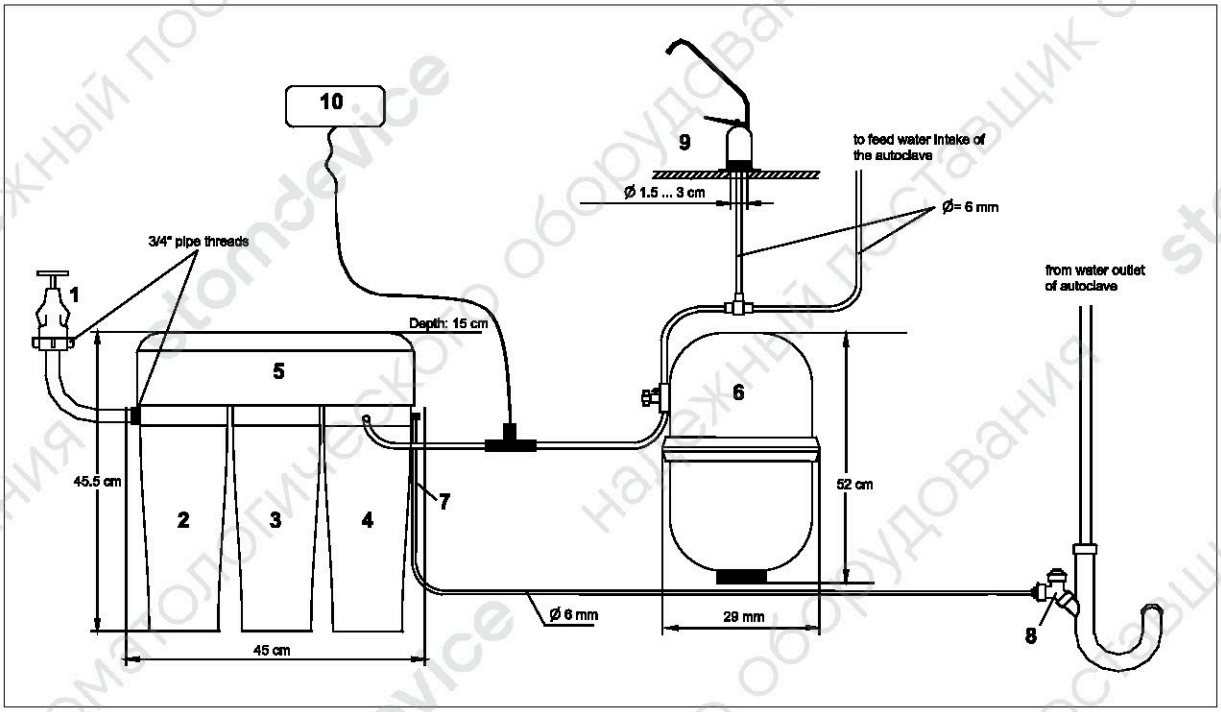


Fig. 1 : The setup of the installed system

1	Mains water supply connenction	6	Storage container
2	Fine filter (pre-filter)	7	Concentrate outflow pipe
3	Activated carbon filter	8	Waste water set
4	Ion exchanger	9	Additional supply tap
5	Reverse-osmosis module	10	Control monitor water quality (optional)

Pos. 1: Mains water supply connection
The water purifier is connected to the mains supply via a ¾" stop tap, which is normally left on at all times. The stop tap should be fitted with a non-return valve and an air-release valve in order to prevent water flowing back into the mains supply. It should only be closed if the system is not going to be used for a period of time (see Section 5), or during servicing and maintenance work. We also recommend fitting a Water Stop (MELAG Art. No.: 01056), in order to prevent damage due to leaks

Pos. 2: Fine filter (pre-filter)
A fine filter in an epchangeable filter cartridge helps to protect the sensitive reverse-osmosis membrane. It removes suspended particles, rust and other undesirable matter from the incoming mains water. The cartridge should be exchanged at least every 6 months, or more frequently if the water supply contains particularly high levels of impurities.

Pos. 3: Activated carbon filter
Further protection is provided for the reverse osmosis membrane by an activated carbon filter, again in an exchangeable cartridge. The activated carbon filter is intended primarily to remove free chlorine, which would damage the reverse-osmosis membrane. The activated carbon cartridge should also be replaced every 6 months, or more often if the chlorine level of the water supply is high.

Pos. 4: Ion exchanger
The permeate from the reverse osmosis module flows into an ion exchanger, where it is demineralised (conductivity < 1µs). The ion exchange resin in the storage container element should be renewed when it is exhausted.

Pos. 5: Reverse osmosis module
The reverse osmosis module is the key element in the water purifier. It consists of a thin, wound polyamide membrane. In addition to colloids, it also holds back many organic substances such as hydrocarbons, chloro-hydrocarbons, phenols, pesticides etc. The retention capability of the reverse osmosis filter is approx. 95%. The water which has passed through the filter, known as the permeate, flows on to the ion exchanger. The residual concentrate is disposed of.

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Pos. 6: storage container
After passing through the ion exchanger, the demineralised water is led into a plastic storage container where it is stored until needed.
If the storage container is full, a valve closes and cuts off the water supply to the water purifier.
As explained in Section 1, the storage container can be connected directly to any autoclave equipped for automatic water refilling.
Pos. 7: concentrate outflow pipe
The concentrate from the reverse osmosis is led away for disposal through the concentrate outflow pipe.
Pos. 8: waste water set
The waste water set supplied can be used to connect up the concentrate outflow pipe of the reverse osmosis unit and the waste water outflow from the autoclave to the existing waste-water plumbing.
Pos. 9: additional supply tap
An additional supply tap is provided, so that demineralised water is readily available for general purpose use at all times.
Pos. 10: quality control display (optional)
The MELA*dem*® 47 reverse osmosis water purifier can be equipped with a water quality control unit. This consists of a measurement cell for the conductivity installed at the inlet to the storage container, and a display unit.
Pressing the red button on the display unit should cause a green lamp to light up, showing that the purified water is of an acceptable quality. This should be checked on a daily basis.
If the red lamp lights up then the water quality is not acceptable, and the ion-exchange resin should be renewed.

Please note:
Turn on the additional supply tap and let the water run for a short time before testing the quality, in order to ensure that the measurement cell contains fresh water.
The quality of the permeate is lower at maximum pressure. Therefore, before discarding the ion-exchange resin, measure the water quality again after closing the inlet stop-tap slightly (let 0.5...1 litre water run through). The resin should only be exchanged if the red lamp still lights up

3 Installation

3.1 Installation requirements

3.1.1 Installation location

The reverse osmosis water purifier should be installed in a clean, well-ventilated position, free from frost. It is preferable for it to be close to a sink, or perhaps underneath this, in order to make it easier to connect up to the water supply and the outflow. However, the flexible modular set-up means that other variations are also possible. The components must be connected up as shown in Fig. 1.
The location should be carefully chosen to allow good access for installation, operation and subsequent maintenance.

3.1.2 Pressure of water supply

In order to ensure that the water purifier operates properly, the mains water supply should have a pressure of at least 2.5 bar.

3.1.3 mains water connection

A mains water connection in the form of a stop-tap with non-return valve and 3/4" external thread must be available near the installation location. Other installation options are described in section 3.2.1.

3.1.4 waste water outlet connection

It is also important that there is access to a waste-water outlet with a 1" external thread connection (preferably a washing machine connection before the siphon trap).

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3.2 Installation procedure

3.2.1 Connection to the mains water supply

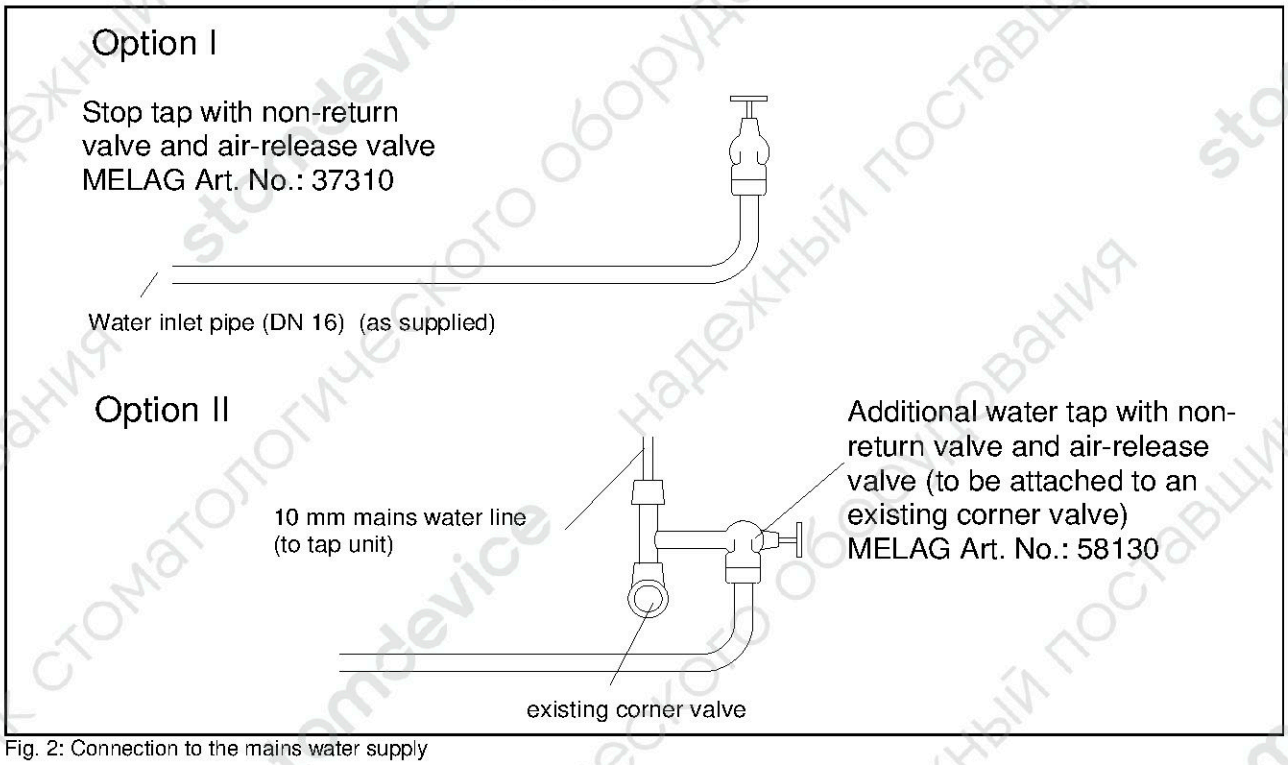


Fig. 2: Connection to the mains water supply

In order to ensure that connection to the mains water supply meets standard requirements (with non-return and air-release valves), we recommend one of the two options shown in Fig. 2.

Option I: Separate water supply (rated width DN15 with 1/2" coupling) is available. Installation of stop-tap with integrated security combination (MELAG Art. No.: 37310).
Option II : Cold water supply (e.g. to a sink unit) is available with corner valve and 10 mm supply line. (MELAG Art. No.: 58130) directly at the corner valve.

3.2.2 Installation of module containers

The module containers for the filters (2 and 3), the reverse osmosis unit (5) and the ion-exchanger (4) are fixed in position using the pre-drilled holes. Care should be taken to allow sufficient space for changing filters, removing the covering lid and for pipe connections.

3.2.3 Storage container

The storage container (6) can be installed in a convenient position near the autoclave. Before connecting up the pipes, the pressure at the valve on the bottom of the empty container should be adjusted to 0.2 bar using the manometer provided. If the pressure is greater than 0.2 bar, then it should be lowered by pressing the valve nipple; if it is too low, then the pressure must be increased using a foot pump.

NOTE: After installation of the storage container the tap at the top of the container must be opened (vertical position).

In the course of maintenance, or when exchanging filters or ion-exchange resin, the tap can be closed in order to keep demineralised water in the storage container

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3.2.4 Additional supply tap

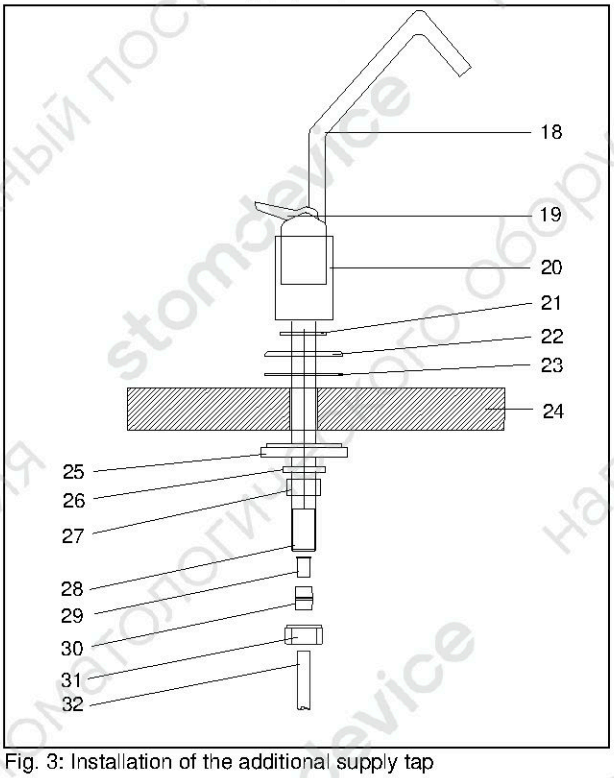


Fig. 3: Installation of the additional supply tap

18 Supply tap
19 Lever
20 Foot
21 Small rubber washer black
22 Chrome washer
23 Rubber washer black
24 Work-surface
25 Retaining washer
26 Tooth washer
27 Nut
28 Threaded connector
29 Stiffener
30 Squeeze ring
31 Union nut
32 Permeate inlet pipe Ø 6 mm

When deciding on the position of the additional supply tap (18) convenience of use should be considered. Generally, the supply tap will be positioned at the back of the sink, so that it does not get in the way when using the normal water taps.

The supply tap should be assembled as follows, with reference to Fig. 3:

- Drill a hole of 12 mm diameter in the required position on the work-surface and insert the supply tap.
- Set the small black rubber washer(21), the white chrome washer (22) and the bigger black rubber washer (23) tightly at the foot (20) of the supply tap.
- Apply whterproof sealant around the aperture and set the supply tap firmly in position, with the operating lever (19) to the left or the right.

Works beneath the work-surface:

- Introduce the retaining washer (25), the tooth washer (26) and the nut (27) according to Fig. 3.
- Position the components and lightly tighten the nut.
- Check and if necessary adjust the position of the supply tap.
- ZInsert the swing-arm of the tap in the aperture of the foot.
- Tighten the nut holding the foot of the supply tap. If necessary, re-adjust the position of the supply tap using a spanner
- Lightly tighten the stiffener (29), the squeeze ring (30) with the union nut (31) onto the threaded connector (28), insert the inlet pipe (32) and tighten the union nut.

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3.2.5 Installation of the wastewater disposal connections

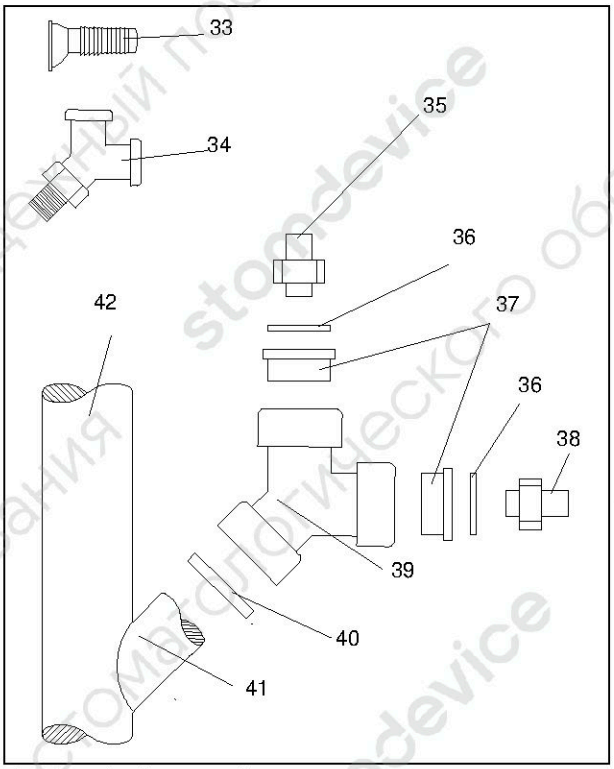


Fig. 4: wastwater connection

33 2x hose nozzle
34 1x Y-connection 1xR1/4“ AG, 2x G1/4“ IG (39820)
35 2x straight screw joint 8 mm (Art. No. 38710)
36 2 x CU-seal for 1/4“
37 2x wastewater adapter G1/4“ (Art.-No. 56930)
38 1x straight screw joint 6 mm (Art.-No. 53450)
39 1x dobble hose nozzle with anti-flooding flap (Art.-No. 37400)
40 1x rubber seal 3/4“ (Art.-No. 56950)
41 connection befores siphon trap 1“ AG
42 wastewater trap

- The wastewater connections should be made in accordance with Fig. 4, using the parts supplied; preferably directly before the wastewater trap of the sink. When installing the Y-connection (dobble hose nozzle Fig. 4, pos. 39) check that the anti-flooding flaps placed properly in the notches.
- Use the CU-seals or the teflon tape for sealing the joints as appropiate.

3.2.6 Installation of the water quality control display (optional)

Installation of the conductivity sensor

- Install the conductivity sensor, i.e. the T-piece with mounted conductivity probe (Fig. 1, pos. 6) between the reverse-osmosis module (Fig. 1, pos. 5) and the storage container (Fig. 1, pos. 6), by disconnecting the inlet hose and inserting the T-piece.
- Connect the cable of the conductivity sensor to the control monitor (Fig. 1, pos. 10 - connection “Probe”).

Adjusting the conductivity limit value on the control monitor

- The housing lid is loosely positioned on the control monitor upon delivery. Take off the housing lid.
- The conductivity limit value is adjusted to 0.5 µS/cm upon delivery. The blue jumper can be repositioned as needed. The numbers to the left of the PINs indicate the conductivity limit value.



Position of jumper	1	2	3	4	5	6	7	8
limit value µS/cm	0.5	1	2.5	5	10	20	50	100

- Put the lid on the housing and fasten it to the bottom with the four supplied screws. Then mount the grey covering caps.
- Insert the two supplied batteries (1.5 V AAA) into the battery compartment on the bottom of the control monitor.

Attachment of the control monitor

- Attach the conductivity monitor to an easily accessible and well-visible place, i.e. using a double-sided adhesive tape on the rear side of the control monitor.
- Remember that the maximum length of the connection lead is 0.8 m.

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3.2.7 Pipe connections

The components are connected by reinforced plastic piping (external diameter 6 mm; wall thickness 1 mm; supplied length 6 m). From the mains water supply to the reverse-osmosis unit a pressure line is used with ¾'' threaded coupling nut. The lengths of pipe should be appropriate for the layout chosen.

The plastic pipe must be free of kinks and compressions!

!

Warning ! In order to remove a cutting ring from the pipe, cut off the pipe behind the ring and then pull the ring from the pipe in the direction of the arrow, taking care to avoid injury! Pulling the ring in the wrong direction can damage it!

3.2.8 Connecting the reverse osmosis unit with the autoclave

The above mentioned autoclaves (see section 1) can directly be connected to the reverse-osmosis water purifier. For other autoclaves, i.e. older device types, an external solenoid valve may be necessary.

Please observe the instructions in the user manual of the respected autoclave.

4 Initial start-up

After carefully installing the components and pipe connections the MELA*dem*® 47 can be put into service by as follows:

- Unscrew the pipe from reverse osmosis water purifier at the storage container and put the end of the pipe in a sink, floor drain or bucket.
- Unscrew the bell of the ion exchanger (4), remove the container element for the resin and replace the empty cylinder.
- Open the mains water supply stop tap
- Allow the untreated water to flow through the system for approx. 30-40 minutes to swill it out thoroughly.
- After swilling through, close mains stop ta.
- Carefully unscrew the cylinder of the ion exchanger (4). **NOTE: This is full of water**.
- Pour the water away. Replace the container element with ion exchange resin bed in accordance to section 5.3 and screw back the cylinder.
- Refit the pipe to the screw connection on the storage container.
- Open the mains water supply stop-tap. Check the reverse-osmosis system and pipe connections for leaks.
- The stop-tap of the storage container must be fully open.
- Filling the storage container for the first time can take up to 2 hours, depending on the mains water pressure. Only then can the purified water be used in significant volumes.
- Check the water quality of the permeate using a conductivity meter or the autoclave checks the water quality automatically.
- Put the lid on the water purifier.

The reverse osmosis water purifier will now operate automatically.

! Warning!

Water-consuming devices should not be operated unsupervised for a longer period of time, e. g. over night.

Since the insurance protection of the building insurance might expire the shut-off valve of the water inlet or the main water barrier must be closed.

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4.1 Check quality of the purified water

If your autoclave does not have an internal conductivity measurement, you have to install a conductivity measurement (see section 3.2.6) or check the water quality with an external conductivity measurement. For measuring the conductivity observe the following instructions:

- The quality of the purified water should be tested every day using the control display (10) - if installed
- **WARNING!** Open the additional supply tap briefly to ensure that the measurement cell contains purified fresh water (permeat.
- Press the big button on the water in the middle of the quality control monitor ("TEST"). The lighting of the red or green lamp shows you if the sufficient water quality has been reached.
- If the green lamp lights then the quality of the purified water is acceptable (conductivity lower than the set limit value).
- If the red lamp lights, the conductivity may be too high. That could be happen after longer operation pauses. In these cases drain about 0.5-1 l of water and check the display again. If the red lamp lights again the ion-exchange resin is exhausted and must be replaced.
- If neither of the lamps lights up, then you should exchange the 1.5 volt battery in the control monitor housing.

The batteries should be exchanged periodically, in order to avoid false results.

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5 Maintenance

The following maintenance tasks should be carried out at the stated intervals in order to ensure trouble-free operation:

Frequency	***Maintenance task***
Daily	Check the permeate using the control monitor water quality (if installed)
Every 12 months	Replace the fine filter (pre-filter)
Every 12 months	Replace the activated carbon filter
Every 12 months	Checking the pipes and screw connections for leaks, compressions or kinks
Every 12 months	Check the pre-pressure of the empty storage container at the underside of the container
As necessary	Change of battery, periodically
As necessary (if conductivity values are poor)	Renew the ion-exchange resin cartridge

if the quality of the water is bad because of the local conditions, there must be carried out a half-yearly maintenance of the water treatment unit.

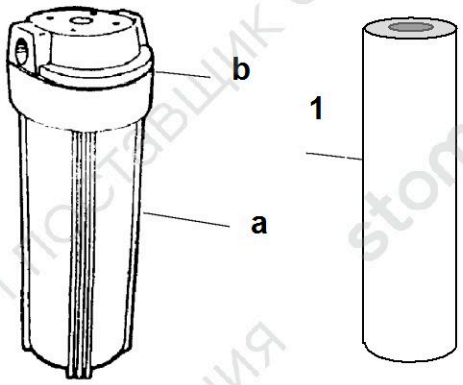
Various measures are necessary before or after periods of inoperation

Period of inoperation	***Precautionary measures***
Up to 2 weeks	Turn off water intake
Up to 4 weeks	Turn off water intake, empty storage container
On resuming operation after more than 4 weeks	Swill out equipment and storage container, and install new fine filter (pre-filter), activated carbon filter and ion exchange resin
As of 2 months	Desinfection of the unit, please speak to the Service

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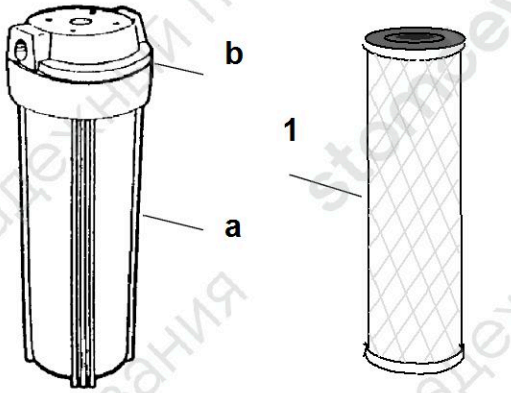
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5.1 Replacement of the Fine filter (pre-filter)



- A new fine filter cartridge should be inserted every 12 months, or more often if high levels of impurity have led to loss of pressure.
- Turn off the mains water supply and the stop tap of the storage container.
- Allow some water to flow out of the supply tap to equalise the pressure in the system.
- Unscrew the filter housing (a) with the filter wrench from the head (b). Lead the wrench from bottom to top through the filter housing and screw the filter wrench to the left.
  Warning! The filter housing is full to the brim with water. Pour off the water.
- Remove the filter cartridge (1) and wash out the housing with normal water.
- Take the sealing ring out of the housing (a), clean, give a slight coating of silicone and replace.
- Place the new filter cartridge in the housing.
- Screw down the housing slightly by using the filter wrench.
- Turn on the mains water supply and open the stop tap on the storage container.
- Check that all parts sit tightly, with no leaks.

5.2 Replacement of the activated carbon filter



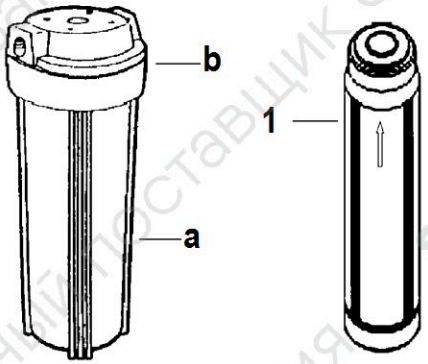
A new activated carbon filter should also be inserted every 12 months, or more often if necessary.

- Turn off the mains water supply and the stop tap of the storage container.
- Allow some water to flow out of the supply tap to equalise the pressure in the system.
- Unscrew the filter housing (a) with the filter wrench from the head (b). Lead the wrench from bottom to top through the housing and screw the filter wrench to the left.
  Warning! The housing is full to the brim with water. Pour off the water.
- Remove the activated carbon filter (1) and wash out the housing with normal water
- Take the sealing ring out of the housing (a), clean, give a slight coating of silicone and replace
- Place the new activated carbon filter in the housing (with the arrow pointing upwards!)
- Screw down the housing slightly by using the filter wrench.
- Turn on the mains water supply and open the stop tap on the storage container
- Check that all parts sit tightly, with no leaks.

IMPORTANT!: It is important to exchange the filter catridges regularly in order to avoid damage to the reverse-osmosis module which would shorten its operational life.

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5.3 Replacement of the ion exchange resin



When the mixed-bed resin is exhausted (inadequate water quality of the permeate) then it must be exchanged:

- Turn off the mains water supply and if necessary empty the storage container
- Unscrew the filter housing (a) with the filter wrench from the head (b). Lead the wrench from bottom to top through the housing and screw the filter wrench to the left.
  Warning! The housing is full to the brim with water. Pour off the water.
- Take out the mixed-bed resin (1) and replace it by a new mixed-bed resin.
- When placing it, please observe that the flat packing on the mixed-bed resin (1) is upwards (arrow pointing upwards).
- Take the sealing ring out of the housing (a), clean, grease slightly and replace
- Re-insert the mixed-bed resin into the housing (a).
- Tighten the housing slightly by using the filter wrench.
- Turn on the water supply and open the stop-tap of the storage container
- Check that all parts sit tightly, with no leaks.

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6 Technical data

Water source	Mains water supply
Bacteriological quality	Drinking water
Membrane	TFC-bacteria resistant, wound module
Permeate output	190 litre/day (at 4.5 bar/25°C) 127 litre/day (at 4.5 bar/15°C) 103 litre/day (at 4.5 bar/10°C)
Retention capability RO	Rated retention capability approx. 95%
Conductivity of purified water (permeate)	- approx. 20-30 µS/cm from 600 µS intake water - < 1 µS/cm from 600 µS intake water with ion exchanger
Water pressure min/max.	2 bar to 6 bar
Water temperature min/max.	5°C to 35°C
Water pH-value min/max.	4.0 to 10.0
Total mineral content of mains water	max. 1500 mg/l
Iron content of mains water	max. 0.1 mg/l
Yield	approx. 20 -25 %
Fine filter I	Fine particulate filter 10", 5 µm
Fine filter II	Activated carbon 10"
Post-treatment	Ion exchanger, contents approx. 0.5 litre resin
Dimensions H x W x D	approx. 470 mm x 420 mm x 150 mm
Overall weight (with filters)	approx. 10 kg
Dimensions, storage container ∅, H	approx. 280 mm, 510 mm
Capacity, storage container	approx. 6 litre (at pre-pressure 0.2 bar, final pressure 2 bar)
Empty weight, storage container	3.5 kg
Length of inlet / outlet pipes	approx. 2000 mm inlet pipe (3/4") approx. 6000 mm pressure line (6x1 mm)

7 Spare parts

Artikel-No.	Description of article
37450	Fine filter
37460	Activated carbon filter
37470	mixed-bed resin
37440	Container element for resin (cylinder)
37471	Reverse-osmosis module
28820	Pressure pipe, running metre
49100	Accessory set for supply tap

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