UNGER

Quality Tools for Smart Cleaning

HiFlo RO-Mobil

Umkehr-Osmose-Filter • Reverse osmosis filter
Filtre à osmose inverse • Omkeerosmosefilter
Filtro a osmosi inversa • Filtro de ósmosis de inversión

DEUTSCH

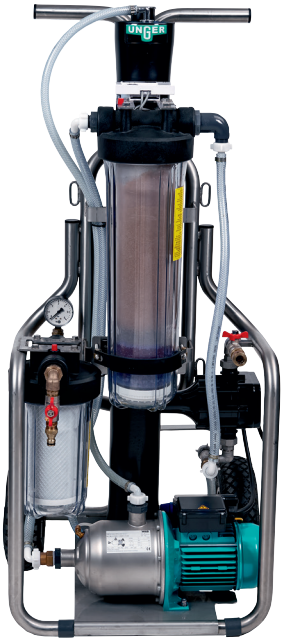
ENGLISH

FRANCAIS

Betriebsanleitung
Operating Manual

Mode d'emploi • Gebruiksaanwijzing
Istruzioni per l'uso • Instrucciones de uso

RO30G



RO30C

RO60S

Status: Juli 2016

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We thank you for your decision to purchase our product. To ensure many years of enjoyment, we ask you to follow the instructions provided for the use and operation of the system. We reserve the right to make technical changes.

1 Safety regulations

1.1 General

Please observe the applicable rules and regulations, as well as the effective accident prevention regulations.
We are not liable for any occurring water damage.

The fed water must comply with the specifications of the German Drinking Water Ordinance. When operating with water other than from drinking water system, e.g. from a well, a water analysis must be performed prior to application to determine if the water is suitable.

Once the system is switched off, it can remain shut down for a maximum of 7 days without operation, otherwise the filter must be prepared for storage with amembrane protection agent or the system must then be flushed with clear water.

The filter element of the pre-filter should be replaced according to the level of contamination, at the latest however every 6 months.

Recommendation: Install an external residual-current circuit breaker between the power supply in order to exclude risks as a result of surges. These are available from specialist retailers.

1.2 Intended use

This system may cause danger if it is improperly installed, not regularly maintained or not used as intended.

The system is applied for desalination of drinking water.
The concentrate of the reverse osmosis system produced in this process must be drained.
Cannot be used to remove bacteria.
The system is not approved for the US American market.

1.3 Shelve life

In the manufacturing facility, the reverse osmosis systems receive a date of manufacturing, which is indicated on a type plate, and a membrane protection agent is applied to the osmosis modules. It is recommended to change the membrane protection agent approx. once a month to ensure maximum performance. The system must be protected against frost. The temperatures in the service room must be at least 5°C (max. 40°C).

1.4. Operating temperatures, pressures and connections

Depending on the composition of the raw water, the treated water can be more or less aggressive. Thus, the parts coming in contact with the treated water must be made of suitable material.

This could be plastic material, like for instance PE, PP, PVC, or stainless steel. When using copper pipes, corrosion cannot be ruled out over the course of time.

Ambient temperature of system: ..... 5 – 40 °C
Water temperature: ..... 5 – 25 °C
Inlet pressure: ..... 0-6 bar
Operating pressure: ..... max. 10 bar
Power supply, to be provided by customer: 230 V / 50 Hz

1.5 Protection types of electric RO components

Electric motor: ..... IP 54
Pump control system: ..... IP 65

1.6 Conversions and modifications to the device

Due to safety reasons, unauthorised modifications are not allowed. Original parts and accessories are specifically designed for this reverse osmosis system.

Any liability by the manufacturer for damage resulting from modifications to the system or from using parts other than original parts is excluded and results in expiration of the warranty.

The warranty/guaranty expires in case of:

- Operating and installation errors.
- Opening/disassembly of housing other than by Unger.
- Replacing connections and hoses, other than by Unger.
- Replacing spare parts that are not included in the official Unger spare parts price list.
- Performing unauthorised modifications to the design.
- Use of unauthorised chemical additives.
- Non-compliance with safety regulations (e.g. anti-freeze protection).
- Inadequate maintenance (1x per year by the authorised dealer or Unger).
- Non-use of drinking water

2. General information on reverse osmosis

The reverse osmosis process is an eco-friendly, physical technology for desalination of drinking water without chemicals, for the purpose of generating pure water for industry and cleaning.

The advantages of the reverse osmosis process compared to other desalination methods are substantial:

- Maximum removal of all dissolved and dispersed water constituents (anions and cations of salts, airborne particles, colloids, organic compounds, etc.).
- Low operating costs, high use-value, quick amortisation.
- Minimal pre-treatment.
- Continuous operation.
- Small space requirement.
- High and consistent pure water quality.
- User-friendly and eco-friendly method, requiring no regeneration of the membrane since no acids or bases are used as in chemical desalination.

Important information

To prevent damage to the system and modules, please thoroughly read and observe the operating instructions prior to installation and start-up!

ATTENTION!

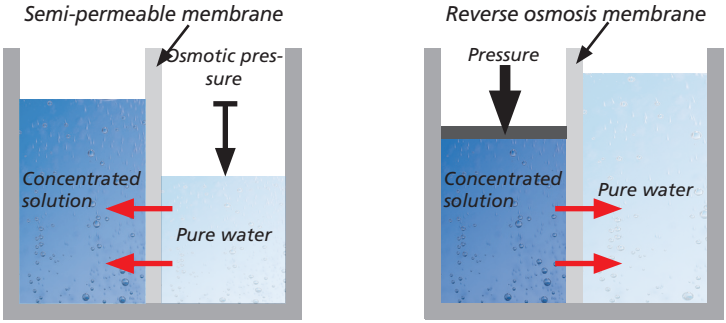
The fed water must be in compliance with the German Drinking Water Regulation. It must be completely free of iron-manganese heavy metals (max. 0.05 mg/l manganese, max. 0.2 ml/l iron); the maximum silicate (SiO2) content may not exceed 20 mg/l. In addition, the feed water must not contain any barium and strontium. If the water contains chlorine, an additional activated charcoal pre-filter must be used (at RO30G). The models RO30C and RO60S are already equipped with a carbon pre-filter as standard equipment.

It is essential to also observe the following:

- The system must be connected to a cold water supply.
  The water temperature shall be max. 25°C.
- If the raw water supply or power supply is interrupted for more than 1 week, the system must be prepared according to the storage regulations. Another possibility is to operate the system at least every 7 days for approx. 5 minutes.
- Preparation for storage regulations, see also item 7.
- Please make sure filters are replaced on a regular basis (pre-filters, as well as any installed activated carbon filter).

2.1. Function of reverse osmosis

When separating saline solution from pure water by a semi-permeable membrane, the system tries to establish concentration compensation.



The water passes through the membrane without the influence of external forces and dilutes the solution until a balance is established. This process is called osmosis.
In the balance, the static pressure in the solution is the same as the osmotic pressure.
The process is reversible when applying pressure to the saline solution, thus overcoming the osmotic pressure. During this process of reverse osmosis, pure water is transported through the membrane, while the saline solution is concentrated.
In the technical reverse osmosis process, the concentrated solution is referred to as concentrate, which is continuously drained from the system and which produces pure water permeate. Thus, when speaking about performance, permeate output or pure water output is indicated.

2.2. Capacity of the carbon pre-filter (RO30C & RO60S)

- The capacity of the special carbon pre-filter depends on the chlorine content of the water.
- At 2ppm of chlorine the filter works for approx. 100 000 litres of water.
- Assumption: if you work 6 hours per day and 5 days a week, this capacity would last:
- approx. 200 working hours or approx. 40 working days or approx. 2 months

You can use ph-test stripes to test the chlorine level of the water. To check if the pre-filter works correct, test the water at the concentrate outlet on the back of the filter. If the value is above 0 ppm, you have to exchange the pre-filter.
The following chart shows the capacity at several chlorine ppm values, please check your local situation:

17512

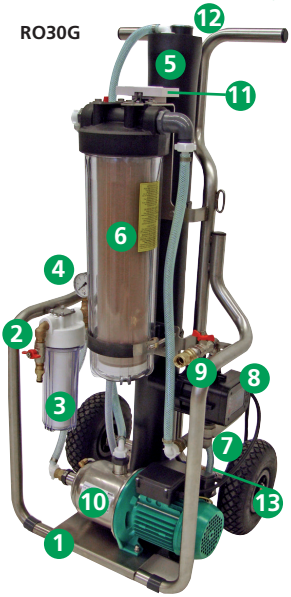
CARBON PRE-FILTER CAPACITY						
Chlorine content:	0.5 ppm	1 ppm	2 ppm	3 ppm	4 ppm	5 ppm
hours:	800	400	200	133	100	80
days:	160	80	40	27	20	16
months:	8	4	2	1	1	0.8

3. Technical Data

	RO30G & C	RO60S
Electrical connection, primary	230 V/50 Hz	
Inlet pressure	0-6 bar	
Max. operating pressure	10 bar	
Suction capacity (with 1" line, 15°C)	5m/-0.5 bar	
Yield	approx. 60 %	
Water temperature	5°C-25°C	
Max. capacity	at 15°C	
Salinity in raw water	max. 1000 mg/l	
Salt retention rate	100% (resin filter)	
Blocking index	max. 3	
SiO2 content in raw water	20 mg/l	
Permeate output at 15°C water temperature l/h	300-350l	650-710l
Pump connection	0.75 kW	1.1 kW
Standard feed water connection	G3/4"	1"
Standard concentrate connection	G3/4"	
Standard permeate connection	G3/4"	
Height	1230 mm	1230 mm
Width	580 mm	750 mm
Depth	510 mm	510 mm
Weight	approx. 55 kg	approx. 83 kg

3.1. Scope of delivery

RO30G

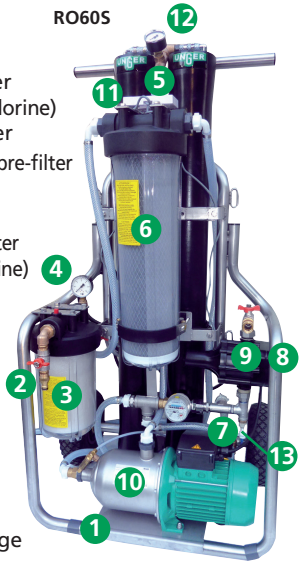


RO30C

1. Robust stainless steel trolley
2. Water supply connection
3. RO30G: 2.5"x 10" standard pre-filter
   RO30C: 4.5" x 10" carbon pre-filter (chlorine)
   RO60S: 4.5" x 10" standard pre-filter
4. Pressure gauge water inlet downstream pre-filter
5. RO30G&C: main membrane
   RO60S: double membrane
6. RO30G & C: 4.5" x 20" secondary resin filter
   RO60S: 4.5" x 20" carbon pre-filter (chlorine)
7. Concentrate outlet
8. Pump control system
9. Permeate outlet
10. Pump
11. TDS-meter
12. Pressure indicator, pump
13. Pressure relief valve

- Filter wrench, filter cup (small)
- Filter wrench, filter cup (large)
- Feed pipe for preparation for storage

RO60S



4. Shipping & packing

The water treatment system has been carefully checked and packed prior to dispatch. However, damage during shipment cannot be ruled out.
Thus, each system should be checked for intactness when accepting the goods while the delivery person is present.

4.1. Receiving inspection

Check completeness of shipment by using the illustration on page 7.
Perform visual inspection of the device for shipping damage, check manufacturing date for observance of maximum shelf live.

The system must be put into operation at the latest 6 months after the manufacturing date.

4.2 Claims

If the device was damaged during shipping:

- Report the damage to the company in whose name the shipping company delivered the system to you.
- Please save the packing material for return shipment (only if delivered by a forwarding agent).

Claims based on shipping damage cannot be accepted without written confirmation of the shipping company or in the case of unconditional acceptance!

5. Start-up

5.1 Initial start-up procedure to flush out the membrane protection agent

- Before window cleaning can begin, the system must be disconnected from the electric power supply and then thoroughly flushed to remove contamination, sediments and membrane protection agents. This applies in particular after a longer standstill or after application of the membrane protection agent.
- The water supply must always be started before the power is connected.
- Check all hose connections and lines for tightness, since jolting during transport of the system can result in possible leaks.

1. Connect hoses to the system (drinking water, concentrate and permeate)
2. The pre-filter has already been installed. Check by means of a visual inspection.
3. First open the water tap of the water supply line and then the tap of the water inlet of the RO filter.
4. Check if water flows through the system without switching on the pump. The pressure gauge (12) at the filter outlet must show the current municipal water pressure.
5. Flush system for 5 minutes until water comes out colourless and bubble-free (this indicates that the membrane protection agent has been flushed out).
6. **(Only RO30G & C):** Interrupt the water supply and activate the resin cartridge in the circulation system. To do this, connect the hoses to the filter housing. Always keep the double thread adapter that has been removed for later application of membrane protection agent.
7. Connect the system to the power supply. The pump must run quietly; the pump's pressure gauge reaches approx. 7-9 bar (depending on the water temperature).
8. The system must now be flushed again for 5 minutes to remove any remaining bubbles. Press the red button on the resin filter (6) to vent.
9. The cleaning water is now available.

ATTENTION! Avoid banking-up of the concentrate. The hose to the concentrate outlet must move freely and must not be kinked as otherwise, the membrane(s) will be damaged.

5.2 Daily start-up

- Connect hoses to the system (drinking water, concentrate and permeate)
- The system must now be flushed to ensure bubble-free operation (without pump)
- When the water is nearly bubble-free, the high-pressure pump can activated. To do so, connect the power supply.
- It is absolutely essential that the entire hose is without kinks as otherwise, the high pressure pump switches off due to insufficient pressure.
- Always open the water supply tap first, then switch on the power!
- The operating pressure (membrane pressure) (12) should always be approx. 4.5 bar (with 15°C water temp.) higher than the inlet pressure (4). This ensures constant good filter values.
- The operating pressure must not exceed 10 bar, if necessary, reduce the inlet pressure via the ball valve (2).

Warning:

- The unit is under pressure during operation. If hoses are removed during operation, the water flows out at high pressure!
- Even when the unit is no longer in operation, the hoses are still under pressure. Always open both cocks before dismantling in order to depressurise the unit.
- Always ensure that the tyres are completely filled with air. The surface on which the unit is standing must always be level so that it cannot fall over.

6. Description of use of the osmosis system

Depending on raw water quality and pre-treatment, the maximum permissible yield is approx. 60% (**RO30G & C**: at 15°C approx. 350l/h, at **RO60S**: approx. 710l/h.).
This is a fixed setting and must not be changed!

Temperature factors RO

Water temperature T (°C) feed water litres / hour	RO30	RO60	Water temperature T (°C) feed water litres / hour	RO30	RO60	
25	480	890	16	364	720	
24	469	860	15	350	710	Design basis
23	455	840	14	336	700	
22	441	800	13	325	680	
21	427	800	12	315	650	
20	417	800	11	301	630	
19	403	790	10	287	610	
18	388	770	09	273	600	
17	378	750	08	259	550	

In practice this means that the permeate output of the osmosis can deviate widely, depending on the raw water temperature. Water temperatures in Germany generally range between 8 - 10°C in winter and between 13 -17°C in summer.

Depending on the line arrangement in the building, these figures may also be corrected upwards.

Use of the osmosis system

6.1. Switching off the system

- Cut off the water supply (2) and wait until the system switches off.
  Now cut off the water at the water line and remove the hose.
  Remove the system from the power supply.
- Now close the water outlet (9) and pull the hose off the pole.
- Now open both water connections (2) & (9) again in order to depressurise the line and allow the rest of the water to run out.

6.2. Maintenance and care

If the system is shut down for a prolonged period (7 days), it must be prepared for storage to prevent contamination of the membrane.
It is recommended to have the system serviced 1x per year by an authorised dealer or Unger.

6.2.1. Pre-filter

Prior to each start-up, visually check the degree of contamination of the pre-filter (3) and replace, if necessary.

6.3. Anti-freeze protection

The system must be protected against frost. Minimum ambient temperature 5°C.

CAUTION

Never use any other chemicals, since all agents used must be tested for membrane compatibility.

7. Preparation for storage

The reverse osmosis system supplied must not be shut down for more than 7 days, i.e. the raw water supply must not be interrupted for more than 7 days, or the system must be operated at least every 7 days.
If the system is shut down for more than 7 days, it must be prepared for storage. For this purpose, we have designed a preservation kit for mobile osmosis specifically for this system. This must be requested from an authorised dealer when required.

1. (RO30G & C only): Before you perform the following steps, the resin filter must be bridged without fail, since it will be damaged by the membrane protection agent. To do this, unscrew the two hoses and connect them with the double thread element, with which they were also connected when delivered.
2. Unscrew the filter cup in the pre-filter group and remove the filter element. Insert the feed pipe supplied in the black filter attachment from below. The end with the transverse hole must be at the bottom.
3. Next, fill the supplied membrane protection agent into the filter cup and firmly attach it again.
4. Connect the system to the water supply only. (No power!)
5. Permeate outlet and concentrate outlet must remain open; it is recommended that you place a collecting container with a volume of approx. 2-3l under the outlets.
6. Make sure that the system is switched off.
7. Open the water inlet valve and allow the inflowing water to flow freely through the system, without starting operation of the system.
8. The membrane protection agent is now flowing through the system due to the water inlet pressure.
9. As soon as the membrane protection agent runs out from the concentrate outlet at the rear, close the water inlet valve.
10. The system is now prepared for storage. The ingress of air into the system must now be prevented by closing the two red valves (2) & (9).
11. It is recommended to change the membrane protection agent once a month to maintain its effect.
12. Make sure that the water inlet valve does not remain open too long. There is a risk that the entire membrane protection agent will be flushed out completely in the drain and will be lost.

8. RO30G & C: The integrated resin filter

8.1. Use

- A reverse osmosis system filters the water to a purity of approx. 95-98%. In order to achieve 100% filtering, this unit has an additional resin filter. This is important in areas with very hard water or on special surfaces.
- However, you only obtain an optimum filtering result if the cartridge is completely filled with water.
- To vent, press the red button above the filter. Hold it down until water flows out instead of air.
- If necessary, repeat this procedure until the cartridge has completely filled with water.

8.2. Start-up

- When delivered, the resin filter has been bridged.
- This is connected with the application of the membrane protection agent prior to delivery. This fluid MUST NOT flow through the resin filter.
- Therefore, flush the unit for approx. 5 minutes and only then connect the hoses to the right and left sides of the resin filter.
- Please do not confuse the inlet and outlet.
- Vent the resin filter by pressing the red button.

8.3. Replacing the resin

- Always check the value of the filtered water with the TDS meter.
- When the “Out“ value is higher than 0, this shows that the resin is slowly becoming spent and must soon be replaced.
- You should replace the resin when the “Out“ value is approximately the same as the “In“ value since, then, so to speak, nothing more is filtered through the resin.

1. Vent the system by pressing the red button on the resin filter.
2. Carefully unscrew the transparent filter cup.
   (be careful, it could still be filled with water).
3. Remove the resin cartridge and unscrew it at the upper end.
4. Remove the foam lining and dispose of the resin in a container or sack.
5. Fill the cartridge with new resin.
6. Replace the foam and close the cartridge.
7. Place the cartridge in the transparent filter cup and screw this tightly onto the unit again. Ensure correct alignment of the cartridge and correct seating of the O-rings.

9. The integrated TDS meter

9.1. Use

- Press the “POWER“ button to activate the unit.
- RO30G/C: To show the value of the incoming pure water in the resin filter, press “IN“. This value shows the quality of the water after filtering through the osmosis filter. The value of the filtered, outgoing water downstream the resin filter is shown with “OUT“.
- RO60S: The diode for the inlet value “IN” has been connected directly downstream the pre-filter and the diode for the outlet value “OUT” downstream the membranes. Thus, you are measuring the value of the incoming water and the water filtered by the system.
- The value takes a little time to adjust. The most precise value is indicated after approx. 10 seconds.
- When the “x10“ indication appears, a value of over 999 ppm has been measured.
  Now multiply the value indicated by 10.
  If then, e.g., “143“ is indicated in this mode, the correct value is 1430 ppm.
- The TDS meter switches off automatically after approx. 30 seconds.

9.2. Care

- In principle, this TDS meter does not require any care. Nevertheless, the following points should be observed:
- Never touch the sensors, as the oil in the skin can affect the correct TDS values.
- Use alcohol to clean the sensors and allow them to dry in the air.
- If you find that the values indicated can no longer be correct, replace the batteries.

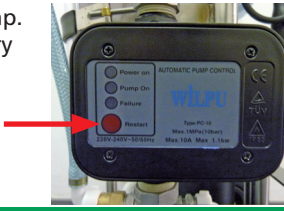
9.3. Replacing the batteries

- If the display becomes pale or shows faulty indications, the batteries should be replaced.

1. Unscrew the four metal screws (not the plastic screws) on the bottom and remove the panel.
2. Remove the batteries.
3. Always replace both batteries (Type AA). Ensure that the polarity is correct.
4. Close the panel again and screw it tight. It is not necessary to recalibrate the device.

10. Pump control system

The pump control system is in the black box on the right above the pump. The unit is reset and restarted with the red button. This is, e.g., necessary if there is too little pressure at the inlet.



Notes