FDS WATERBEHANDELING



Manual

Reverse Osmosis

Types: 800 / 1500 / 3000 / 4500 / 6000 / 12000

- **Installation and Commissioning**
- **Operation and Settings**
- **Maintenance and Troubleshooting**

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General information

When installed, operated, and maintained correctly, the RO system can provide reliable performance over a long period of time. This manual also includes guidance on troubleshooting and routine maintenance procedures.

All specifications in this manual are based on standard test conditions of 1,000 ppm TDS feed water, a water temperature of 25°C, and an inlet pressure of 4.2 bar.

1. Effect of Temperature on Water Production

The quantity and quality of the water produced depend on both the pressure and the temperature of the feed water. The stated production capacity of the system is based on standard operating conditions. If the water temperature falls below this standard value, the production of demineralized water will decrease..

Table 1 – Relationship Between Temperature and Production Capacity

Water Temperature (°C)	Production Capacity (% of Standard Conditions)
4	0.48
10	0.60
16	0.73
21	0.88
25	1.00
27	1.06
32	1.26

2. Water Pressure

For proper operation, the RO system must be supplied with a minimum water pressure of 2.8 bar. The maximum allowable water pressure is 6.3 bar.

3. Feed Water Requirements

For proper operation, the feed water must meet the requirements listed below. Exceeding these limits may lead to membrane fouling. In such cases, pre-treatment of the feed water is required.

Table 2 – Feed Water Quality Requirements

Description	Maximum Value
Hardness	< 1 gram per gallon
Free Chlorine	0 ppm
TDS	< 1,000 ppm
SDI	< 5
pH	3 – 11
Iron	< 0.01 ppm
Silica	< 10 ppm
Manganese	< 0.05 ppm
Turbidity	< 1 NTU
Temperature	4 – 32°C
Pressure	2.8 – 6.3 bar

4. Components

The system consists of various components that work together to produce demineralized water.

The main components are:

- Pre-filters
- Main power switch
- High-pressure pump
- Solenoid valve
- Pressure regulating valve

- Computer controller with display
- Pressure gauges
- Flow meters
- Membrane housing
- Motor protection switch
- Low-pressure switch
- Float switch connection

5. Installation

5.1 System Location

The RO system must be installed in a location protected from direct sunlight, wind, and rain. The ambient temperature must not fall below 4°C or exceed 32°C. Exceeding these limits may result in damage to system components.

5.2 System Preparation and Connections

Your system consists of the following components:

- Reverse Osmosis System
- Membrane (vacuum packed)
- 5 meters of flexible tubing
- Filter housing wrench
- Box with swivel casters (optional for installation)

To prepare the system for operation, the following connections must be made:

The water supply should be connected to the first filter housing. This can be done using a water hose, for example with a Gardena screw connector or a washing machine hose with threaded fitting (not included).

On the rear side of the control panel, two quick-connect fittings are provided:

- Wastewater connection (wastewater sight glass)
- Demineralized water connection (pure water sight glass)

Connect a section of the supplied flexible tubing to each fitting. Ensure that:

- The wastewater line can drain freely without back pressure.
- The demineralized water line is connected to the storage tank.

Use plastic or stainless steel piping. The use of copper piping is not recommended.

5.3 Demineralized Water Outlet

The demineralized water line is connected to the rear of the control panel and routed to the storage tank.

During initial start-up or after membrane replacement, the system must be flushed for one hour before the water can be used.

5.4 Wastewater Outlet

The wastewater line is connected to the rear of the control panel and routed to a suitable drain.

No pressure may build up in this line. Blockages can cause back pressure and may damage the system.

5.5 Float Switch

Many installations use a float switch or level switch in the storage tank. This allows the system to start and stop automatically depending on the water level.

When the message "FULL" appears on the display, it indicates that the storage tank is full or that the level switch connection (green wires) is interrupted.

5.6 Pre-Filters

The pre-filters reduce dirt particles to approximately 5 microns before the water reaches the membranes.

Regular replacement of the pre-filters helps extend membrane life. If the water pressure drops by 10% or more, the filters should be replaced.

5.7 Membrane Installation

The membrane is vacuum packed to prevent drying out and should be installed immediately before initial start-up.

An arrow on the membrane housing indicates the direction of water flow. Water enters the membrane from the side with the black rubber seal.

Correct membrane installation is essential. Improper installation may damage the membrane and reduce system performance.

The TDS value of the produced water provides an indication of system performance. An increasing TDS value or decreasing production rate may indicate that the membrane requires cleaning or replacement.

5.8 Initial Start-Up

After all tubing and components have been installed, the system can be started for the first time.

1. Fully open the pressure regulator (**mix valve**) on the panel by turning it counterclockwise.
2. Start the system. Initially, only the wastewater flow meter will show flow.
3. Wait until most of the air bubbles have been removed from the system.
4. Slowly turn the pressure regulator clockwise until the desired water production rate is achieved.
5. Adjust the demineralized water flow to the desired value (liters per minute).

Typical Capacities:

- RO 800: maximum 2.3 liters per minute
- RO 1500: maximum 4 liters per minute

With a new membrane, the TDS value will initially be higher. This is caused by the membrane preservative solution. The first 100 liters of water are required to flush the membrane clean.

5.9 Controller Settings

After start-up, the controller can be adjusted according to the water quality. The controller is factory preset. To modify the settings:

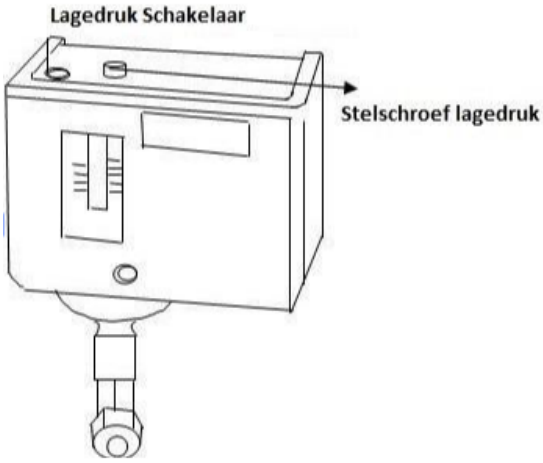
1. Press and hold the **Set** button for 3 seconds.
2. Parameter **P1** will appear on the display.

→ For a complete description of the computer controller, see Chapter 6.

→ For the recommended settings, see Section 6.6.

5.10 Low-Pressure Switch Adjustment

If the message "LOW" remains visible on the display, the low-pressure switch can be adjusted. Using a screwdriver, turn the adjustment screw until the "LOW" message disappears from the display.



6. Computer Controller

The computer controller is factory preset but can be adjusted as required.

6.1 Button Functions

- **Set** button: access to the settings menu
- **Up** button: navigate and increase values
- **Down** button: navigate and decrease values

6.2 Display Functions

The display shows various operating parameters:

- **Timer:** Displays the water production time. Initially in minutes and seconds; after one hour, in hours and minutes. The countdown to the next flush cycle is also displayed. After 9,999 hours, the counter resets automatically.
- **TDS:** Indicates the water quality.
- **LOW:** Indicates that the water pressure is too low.
- **FLUSH:** Indicates that the system is flushing.
- **MAIN PUMP:** Indicates that the high-pressure pump is active.
- During start-up, **FLUSH** and **MAIN PUMP** illuminate simultaneously.
- **FULL:** Indicates that the storage tank is full or that the float switch is providing a signal.

6.3 Manual Flush

A manual flush can be started by pressing and holding the **Up** and **Down** buttons simultaneously for five seconds.

6.4 Timed Flush

After activating the manual flush, the countdown can be paused by pressing the **Down** button. Pressing the **Down** button again resumes the process.

6.5 Settings Menu

The settings menu can be accessed by pressing and holding the **Set** button for three seconds. Use the **Up** and **Down** buttons to navigate through the various settings.

6.6 Program Settings

Parameter	Function	Recommended Setting
P1	Flush duration setting	60 seconds
P2	Start-up delay setting	0
P3	Automatic flushing during production	3
P4	Automatic flushing in standby mode	24
P5	TDS alarm setting	30
P6	TDS fine adjustment	Default
P7	Storage of the last 5 shutdown events	–
P8	Start screen	–

7. Troubleshooting

Problem	Possible Cause	Possible Solution
RO unit does not produce enough water	Water temperature too low	Check water temperature
	Low inlet water pressure	Check pre-filters for contamination
	RO membranes fouled	Clean or replace membranes
	Pump pressure too low	Increase pressure using the valve below the membrane housing
RO unit produces too much water	Membrane O-ring leaking	Remove membrane and inspect O-ring
	Chlorine damage to membrane	Replace membrane
	Water temperature too high	Check water temperature
	Faulty control valve	Check control valve
TDS value too high	Membrane O-ring leaking	Remove membrane and inspect O-ring
	Chlorine damage to membrane	Replace membrane
	RO membranes fouled	Clean or replace membranes
	Faulty control valve	Check control valve
RO pump starts and stops repeatedly	Low water pressure to the unit	Check pre-filters and water pressure
RO system running but no water production	Flush valve not closed	Check flush valve (clean if necessary)