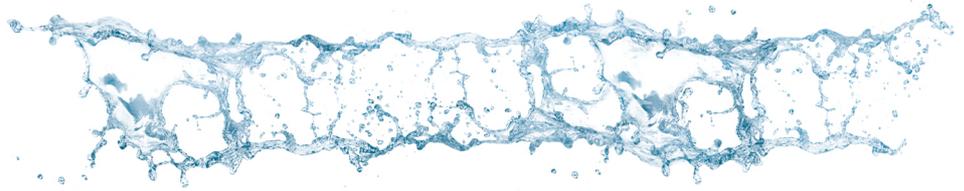


USER DOCUMENTATION

REVERSE OSMOSIS INSTALLATION: LK 120





ABOUT THIS DOCUMENTATION

This documentation was prepared in English by Lubron Waterbehandeling B.V.

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Version date: 05 November 2019
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PRODUCT IDENTIFICATION

This user documentation belongs to the following product:

Title: Reverse osmosis installation
Type: LK 120

For further identification:
see the details on the product nameplate.

THE MANUFACTURER

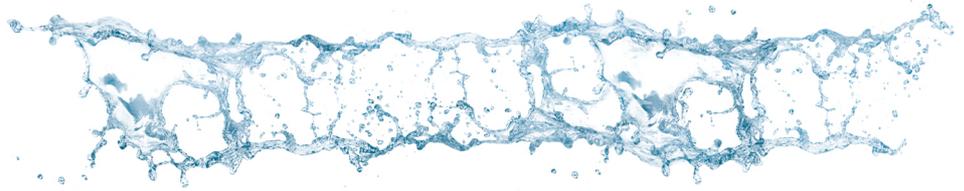
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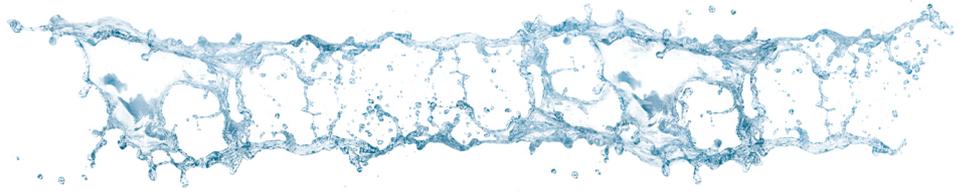
THE SUPPLIER

This reverse osmosis installation is supplied by:



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PREFACE

This document is part of the product. Keep the manual in a safe place and keep a copy near the installation. The manual contains information that is necessary for the safe operation and maintenance of the installation. If the installation is transferred to a new owner, the manual must also be provided to the new owner. A new copy of this manual can be obtained from the manufacturer.

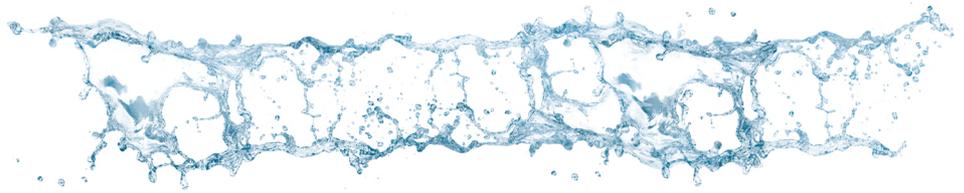
HOW TO USE THIS MANUAL

The instructions in this documentation are classified according to the type of user of the product. In chapter 2, is to specify which there are demands to the various users. The following names are used:

User:	The collective name for everyone who works on or with the product.
Operator:	This is the person who uses the product every day. Chapters that must be read: 1 "Introduction", 2 "Safety" and 3 "How to operate the installation".
Service personnel:	Persons with the training, experience and resources that are required for the work activities described. Chapters that must be read: ALL
Specialised service personnel:	Persons employed by the manufacturer who have the training, experience and resources required for the work activities described. Chapters that must be read: ALL
Safety official:	The person who is responsible for labour conditions on the user's site. Unless someone else was appointed, this will be the employer himself. Chapters that must be read: 2 "Safety" and 4 "Installation, commissioning and maintenance".
Product:	The product manufactured by Lubron Waterbehandeling B.V., described in this document under "Product Identification" and indicated on the type shield.

Any tasks not described in this documentation must be done by the manufacturer's personnel. Exceptions can be made, but only after consulting with .

The illustrations included in the text of this documentation are only for reference. They are only intended to illustrate the text, for example to clarify the position and function of the controls or parts. The actual design and dimensions may differ.



WARNINGS IN THIS DOCUMENT



WARNING!

A warning draws attention to possible dangerous situations that could cause serious injuries or even death.



ATTENTION!

This warning draws attention to possible situations that could result in damage to the installation.



HINT!

Hints give you important information that is useful during installation, operation and maintenance of the installation.



HINT!

Read this manual carefully before you use the installation and always keep a copy of the manual close to the installation.



ATTENTION!

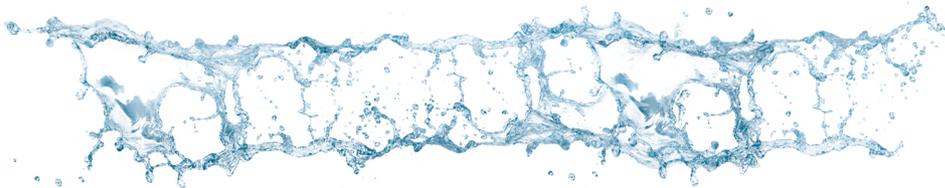
Installation, operation and maintenance may only be done by qualified personnel.



HINT!

Make sure the operational conditions of the installation (flows, pressures, water quality, and power supply) are within the limits of the technical specifications.

Lubron UK Limited guarantees correct operation of the installation when original components are used. Alternative components may only be used after explicit approval from Lubron.



SERVICE AND INFORMATION

For more information, please contact:

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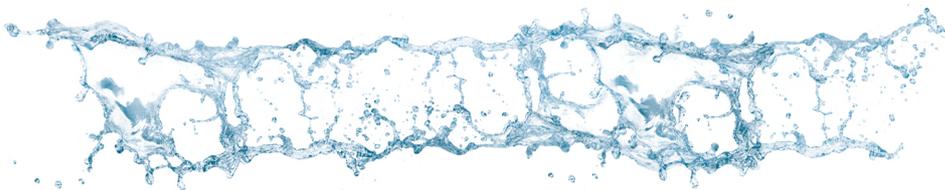
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WARRANTY AND LIABILITY

Warranty

The following warranty conditions apply, unless agreed otherwise in writing.

- ◆ The manufacturer provides the first user with a warranty for a period of 12 months after delivery.
- ◆ Defects must be reported to the manufacturer before the warranty period expires.
- ◆ The warranty applies to defects that:
 - Occur during normal use of the product.
 - Are caused by faulty construction or materials.
 - Are caused by inadequate expertise by the manufacturer.
- ◆ The warranty is void if defects are caused by:
 - Normal wear and tear.
 - Unskilled or incorrect use.
 - Use of consumables other than those prescribed.
- ◆ In case of defects, the manufacturer will:
 - Replace the parts; the manufacturer becomes the owner of the replaced parts.
 - Repair the defects.
 - Find a replacement or other solution if repair is not reasonably possible.

The customer must give the manufacturer the opportunity to remedy any defects.

- ◆ The warranty conditions of the relevant supplier apply to all components from third parties. The warranty period for third party components may differ from what is indicated above.
- ◆ The manufacturer reserves the right to change his products without prior written notice.

Liability

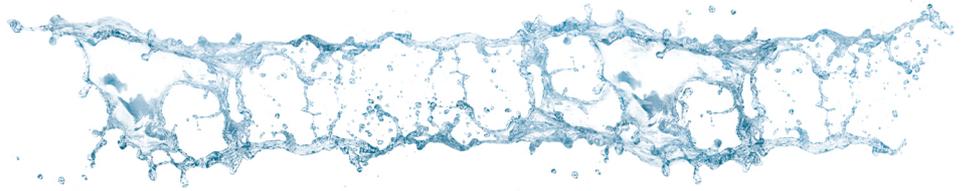
The "Warranty and Liability conditions", as included in the "General Delivery and Payment Conditions" of Lubron UK Limited" apply, unless agreed otherwise in writing.

We draw attention to the following restrictions in the liability:

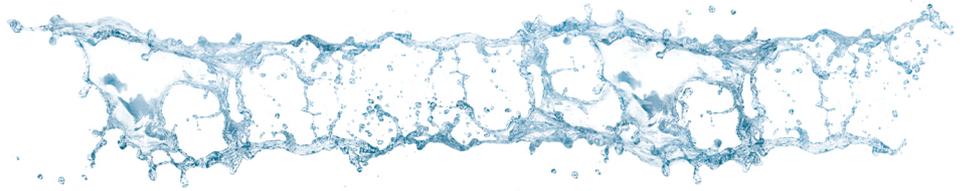
The manufacturer is **not liable** for unsafe situations, accidents or damage that results from ignoring the warnings or instructions shown on the product or in this documentation. Such as:

- ◆ Unskilled or incorrect use or maintenance.
- ◆ Use for other purposes or under other conditions than shown in this manual.
- ◆ The use of parts other than those prescribed.
- ◆ Repairs made without the manufacturer's permission.
- ◆ Modifications to the product, including:
 - Modifications to the controls.
 - Welding, mechanical adaptations.
 - Extensions to the product or the controls.

The manufacturer is also **not liable**:



- ◆ If the customer has not complied with all his obligations (financial and otherwise) to the Manufacturer.
- ◆ For consequential damage from breakdowns or defects to the product (for example damage to products (to be processed), business interruption, delays, etc.).



1 INTRODUCTION

1.1 Purpose and operation of the reverse osmosis installation

This very compact installation was developed specially to provide a glass washing machine with completely pure water during the rinsing cycle. This prevents streaking on the glassware when drying.

The installation purifies water to a higher quality. The water is desalinated according to the principle of reverse osmosis. The characteristic of osmosis is that two liquids which are separated by a semi-permeable membrane or cell wall attempt to achieve an equal salt concentration. This process frequently occurs in nature.

This principle of operation can be reversed, which is why we call it reverse osmosis. A mechanical force (higher operating pressure) must be applied on the concentrate-side (saltwater) of the membrane for this to happen. The semi-permeable membrane will only allow pure water (permeate) to pass as a result of this pressure. The physical and chemical quality of this purified water is high and over 98% of all the salts are removed. Some of the reject flow (high salt concentration) is re-circulated over the membrane and reused to increase the yield of the system. Only a small part of the concentrate goes to the sewer.

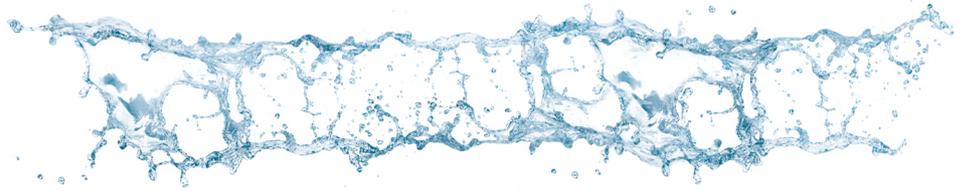
Reverse osmosis is generally recognised to be a clean, environmentally friendly method of desalination. Because of these benefits, this technique has been used for many years in a wide range of applications.

The LK 120 is suitable for both private and business use.

1.2 Accessories

The following (parts) or tools are supplied separately with each unit. Make sure everything is present.

- ◆ This user documentation.
- ◆ Drain hose \varnothing 8 mm.
- ◆ Connecting hose $\frac{3}{4}$ " synthetic, 1.5 metres.
- ◆ Power cable.
- ◆ Elbow adapter for drain hose 6-8 mm.



2 SAFETY

2.1 Preface

This product was designed and built in such a way that it can be safely used and maintained. This applies to the use, the conditions and instructions as described in this documentation. It is therefore **imperative** that everyone who works with or on this machine reads this documentation and follows the instructions. When used professionally, it is the responsibility of the employer that these instructions are made known and observed.

Extra safety precautions can be prescribed by the company or the country where the product is in use. They may relate particularly to labour conditions in the operating phase. This documentation does not show how they should be observed but the necessary information about the product is provided. When in doubt, consult the responsible safety official.

This documentation distinguishes between **normal use** (see chapter 3 "How to operate the installation") and **other activities** (see chapter 4 "Installation, commissioning and maintenance") of the product. This is because the requirements for service personnel are different from those for operators, especially regarding safety.

Simple maintenance work in the operating instructions can be carried out by the operators. Work not described in the operating instructions may only be carried out by skilled personnel.

2.2 Safety rules

The following general safety rules apply:

- ◆ The safety of the product could decrease from use over time. Make sure that it is adequately maintained.
- ◆ Do not use the product if safety components are damaged or do not work properly. Make sure that any failing safety component is repaired before you operate the equipment.

Special safety rules for relevant work are included in the instructions. At all times, pay special attention to:

- ◆ Live parts.
- ◆ Parts under pressure.

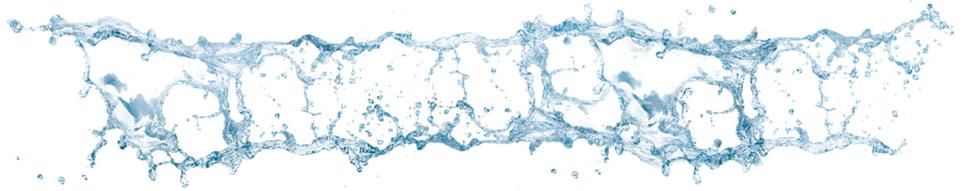
2.3 Users

2.3.1 Operators (level 1)

The product may only be operated by adults who are familiar with and abide by the contents of chapters 1 "Introduction", 2 "Safety" and 3 "How to operate the installation" in this documentation. Special training is not required.

2.3.2 Maintenance personnel (level 2)

Service personnel must be aware of the extra risks entailed in the work they carry out. As well as the



requirements mentioned in Operators (level 1) above, the following is required:

- ◆ Training or knowledge in the relevant skill at Intermediate Technical Level,
- ◆ Experience in servicing and/or maintaining machines,
- ◆ Availability of the correct resources (i.e. tools, measuring equipment).

2.3.3 Specialised maintenance personnel (level 3)

Personnel employed by the manufacturer, for whom the same requirements apply as for Maintenance personnel (level 2) and; who have extensive experience in servicing this type of machines.

2.4 Personal protective equipment

There is no special personal protective equipment required for operation and maintenance of the installation.

2.5 Visible warnings on the product

Pictograms and texts on the product, warning for dangers, must always be clearly visible. Replace any missing warnings.

The hazards involved are described in more detail in the installation, operating and maintenance instructions.

2.6 Hazardous substances and the environment

2.6.1 Hazards for health and environment



WARNING!

The bacteriological quality of the permeate produced by the reverse osmosis system cannot be guaranteed. This means the permeate produced is non-potable.

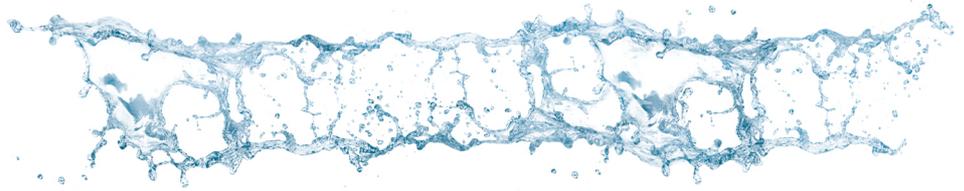
2.6.2 Disposal of the product

At the end of the products life, please follow local legislation and regulations for disposal of the product. Only commonly known products were used in the manufacture of the product. The waste processing methods for the product were known at the time of manufacture and no special risks to personnel charged with this task were known.

3 HOW TO OPERATE THE INSTALLATION

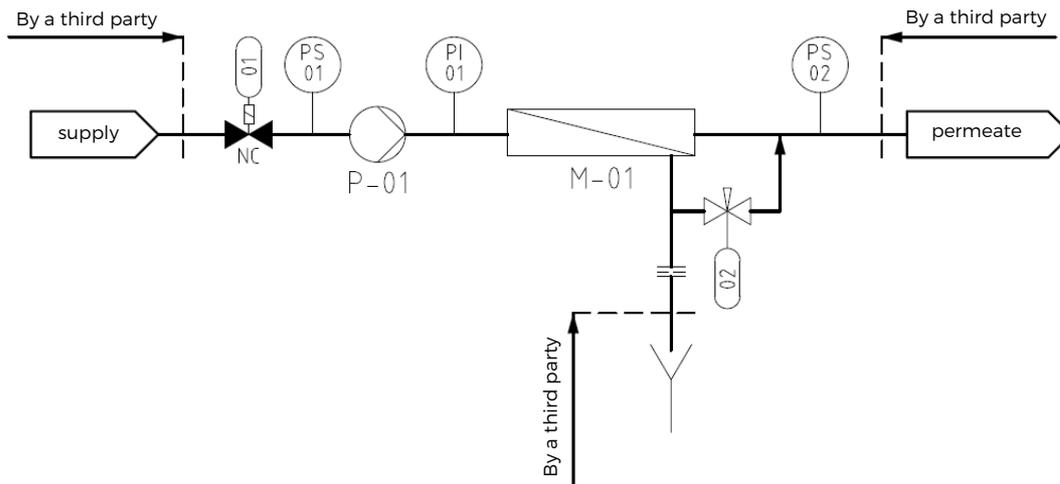
Make sure you have read and understand the information in Chapter 2, SAFETY before you operate the reverse osmosis installation.

This chapter contains information for operators as described in paragraph 2.3.1. Operators are forbidden to do any task that is not described in this chapter.



3.1 Operation of the reverse osmosis installation

Process diagram (P & ID) LK 120

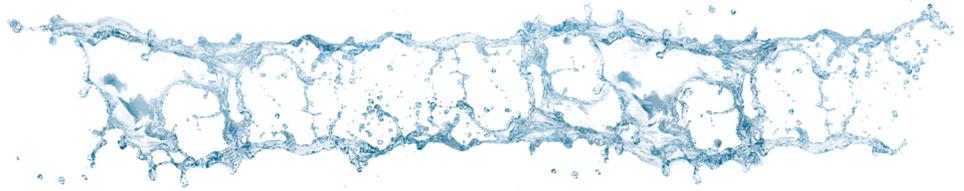


Through an (optional, not shown) bypass valve the entire installation can be cut off from the water supply and untreated water can be supplied to the users. See §4.3.2 "Instructions for installing a bypass".

Symbol	Description
01	Solenoid valve
PS-01	Pressure switch input pressure
P-01	High pressure pump
PI-01	Pressure gauge operating pressure
M-01	Membranes (4x)
02	Mixing valve
PS-02	Pressure switch output pressure

If the pressure on the output side decreases to below 1.5 bar, pressure switch PS-02 will start the RO-unit. Solenoid valve (01) opens and the pump starts immediately afterwards. Input water (either untreated or softened water) flows via the solenoid valve (01) to the high-pressure pump (P-01). The pressure switch (PS-01) measures the pressure of the incoming water. If the pressure of the input water is below 0.5 bar, switch PS-01 will cause a "low pressure" alarm. This will stop the system, to prevent damage to the pump by dry running.

The high-pressure pump (P-01) pumps the water through the reverse osmosis membranes (M-01). The pressure applied to the membranes can be read on the pressure gauge (PI-01). The pure water (permeate) leaves the device via the outgoing pipe (permeate connection). The concentrate (or reject) containing



dissolved salts is discharged via the sewer connection.

If the pressure in the outgoing pipe measured by PS-02 reaches 2.5 bar, the pump will stop, but valve 01 will remain open. After one minute, solenoid valve (01) will also close. In this minute the membranes are rinsed with feed water to prevent lime deposits (so-called "scaling") on the membranes and prolong their lifetime. Use mixing valve (02) to mix a certain amount of reject water with the permeate, when required. As a standard the reverse osmosis installation LK 120 is delivered with the mixing valve (02) closed.

3.2 Control of the reverse osmosis installation

Pressure switch PS-02 will automatically start the reverse osmosis system if water is required. When demand stops the unit switches off automatically. With the switch on the back side of the device (see picture on page 15) you can switch the unit off completely.

4 INSTALLATION, COMMISSIONING AND MAINTENANCE

The jobs described in this chapter may only be carried out by service staff as described in §2.3.2 "Maintenance personnel".

4.1 General



WARNING!

Make sure the power supply is switched off and there is no water pressure, before you start to do any work on the installation.

4.2 Storage

Store the unit in a cool, dry area and protect against frost. After prolonged storage the product must be inspected by service personnel before use. When in doubt, contact Lubron services department.

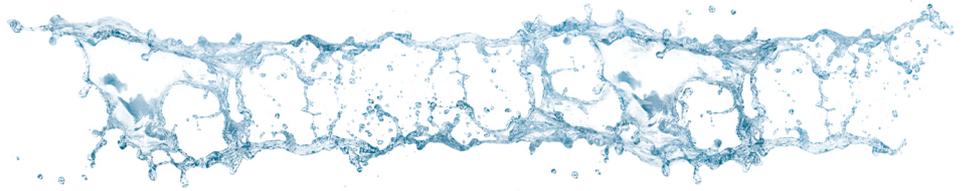


WARNING!

Condensation may occur if the product is moved from a cold to a warm space. This may occur in the internal electrical parts as well. Immediate use could damage the product and endanger the operator. Allow the product to acclimatise before starting.

4.3 Installation and commissioning

The device must be used within the following operating limits:



- ◆ The maximum allowed input water temperature is 25 °C.
- ◆ The maximum allowed input water pressure is 4.0 bar.
- ◆ The ambient temperature must be between 5°C and 35°C.

The maximum allowed supply pressure is 4.0 bar. Install a pressure reducer in the supply pipe if the supply pressure is too high.

4.3.1 Installation instructions reverse osmosis installation LK 120

Place the reverse osmosis installation LK 120 in a dry place, near a grounded power point and a sewage drain.

The water-side connection is protected against dust upon delivery. Protective caps are attached to the feed water inlet and permeate outlet. A plastic elbow is in the drain outlet. A second outlet is closed with a grey plug. Make sure to leave that plug in place.



Connect the drain hose. Push the grey release ring back with a screwdriver or a wrench and remove the red plastic plug from the elbow. If you pull out the plug without pushing the release ring, this will damage the seal. Press the 8 mm drain hose firmly into the knee and put the outlet side of the tube into the sewer drain.

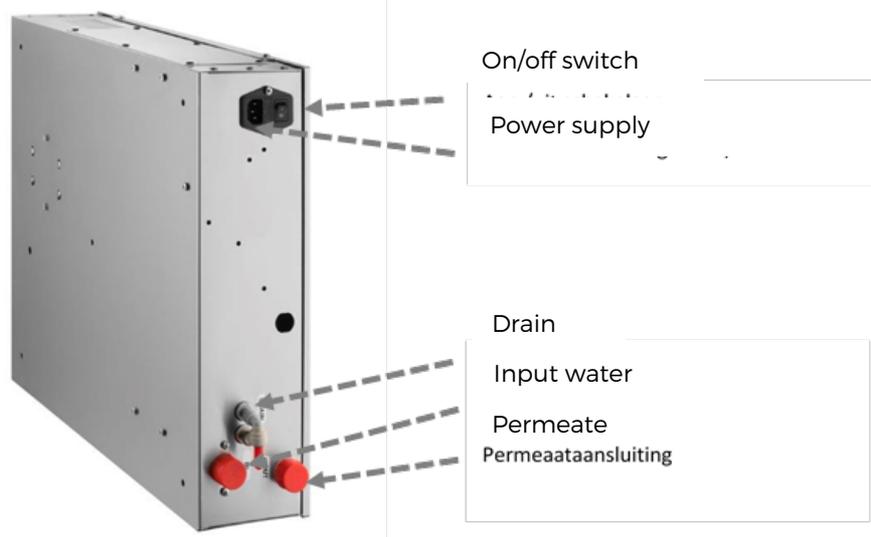
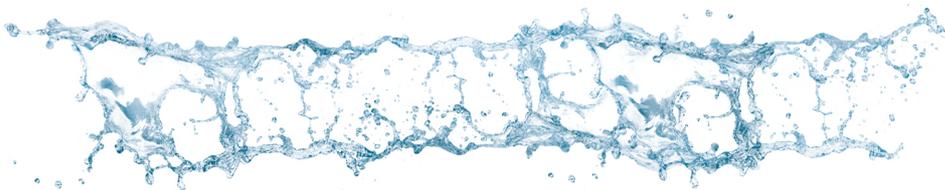


To prevent damage to the seals: Always use a wrench or a screwdriver to push back the grey release ring if the hose must be removed or replaced.



ATTENTION!

To prevent damage to the seals: Always use a wrench or a screwdriver to push back the grey release ring if the hose must be removed or replaced.



Before you start the installation, make the necessary connections as shown in the above picture. Connect the installation electrically, open the water supply and then switch on the installation. Make sure there are no leaks.

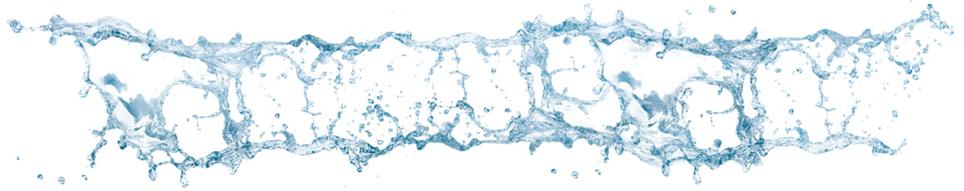


Operating pressure
Alarm light

Pressure surges (water hammer) can occur in the pipework when installed before a dishwasher, washing machine or directly in etc. Such pressure surges can cause osmosis installation. Install a water

In operation light

front of a single-handle mixing tap, damage to the reverse hammer arrestor in the pipe



directly after the LK-unit.

When installing, consider the possibility of leaks. Do not put the appliance directly next to or above anything that could be seriously damaged by water or take precautions to limit any damage to a minimum.

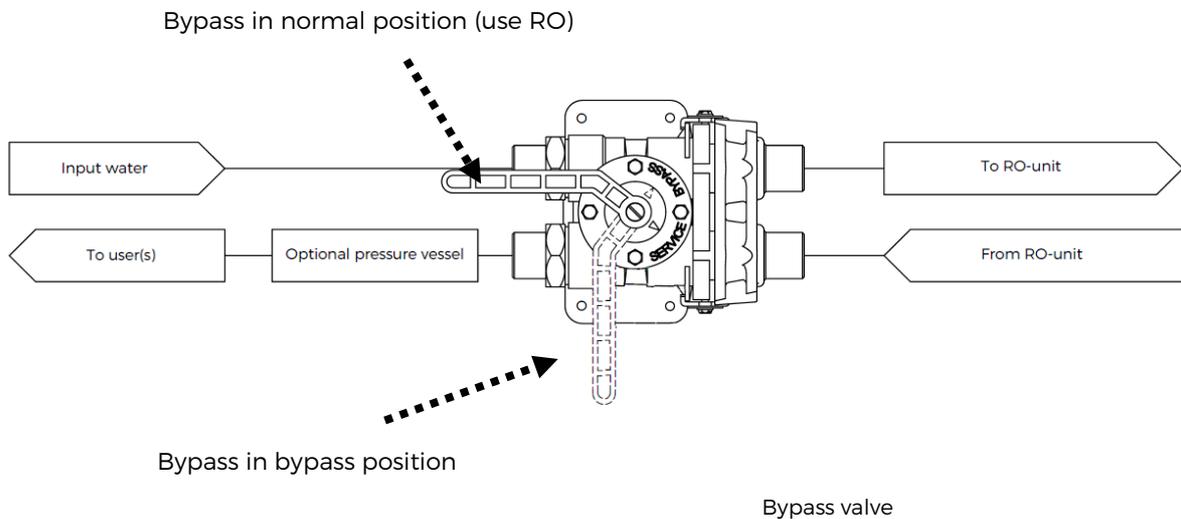


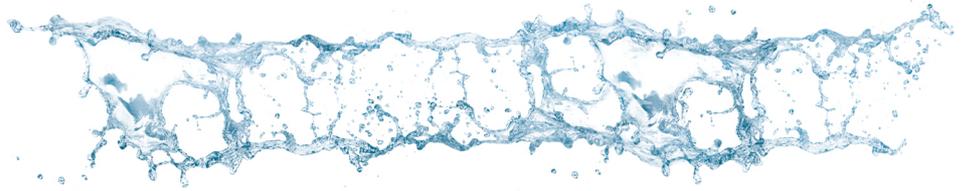
ATTENTION!
The warranty regarding leaks in the system will be void if the necessary precautions, as described above, are not taken.

4.3.2 Instructions for installing a bypass

A valve can be installed to temporarily bypass the osmosis installation, should there be a problem with the installation. To installing this bypass valve, connect the supply line and permeate line to the bypass as shown in the drawing below.

The reverse osmosis installation is connected to the black plastic 3/4" connections. Pay attention to the arrows that indicate the direction of flow of the water for a correct operation of the bypass. If there is a pressure vessel in the system, this vessel must be installed between the bypass and the consumer.





4.4 Repairs and maintenance

4.4.1 Maintenance with service subscription

Periodic inspection of your equipment reduces the chance of failures. That is why we developed a service subscription that is specifically aimed at reverse osmosis installations. This subscription means that once or twice a year a specialised Lubron engineer will inspect and maintain the system. Of course, we keep a detailed administration of the inspections carried out. Ask your equipment supplier or contact the Lubron service department for the available options.

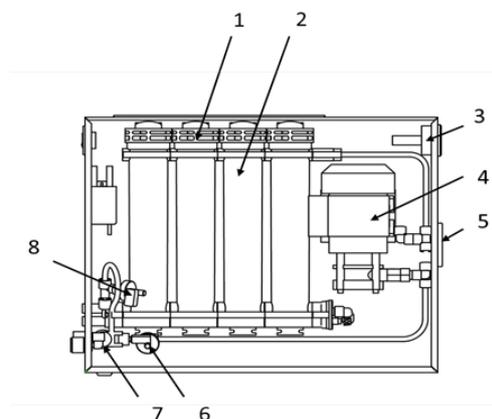
4.4.2 Repairs and replacement of parts.

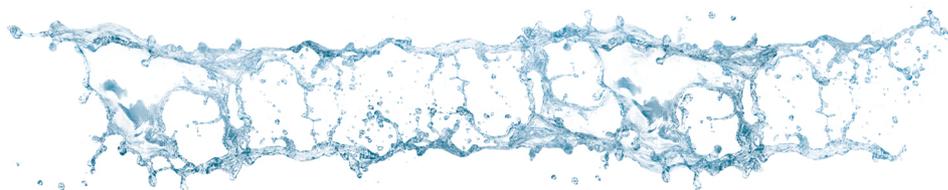
During the warranty period, repairs may only be carried out under the direction of the manufacturer. All parts that are replaced must at least meet the specifications of the original parts.

The membranes will wear over time, which reduces the water quality. This means the membranes must be replaced periodically.

Spare part overview

The figure and table below show the available spare parts.





Item #	Description	Service order nr.
1	Membrane housing, 4-fold	F4800100
2	Membrane, 150 GPD (4 pcs)	F4800101
3	Pressure gauge	F4800106
4	Pump	F4800102
5	Switch display	F4800107
6	Pressure switch input pressure (minimum 0.5 bar)	F4800104
7	Solenoid valve	F4800105
8	Pressure switch output pressure (maximum 2.5 bar)	F4800103

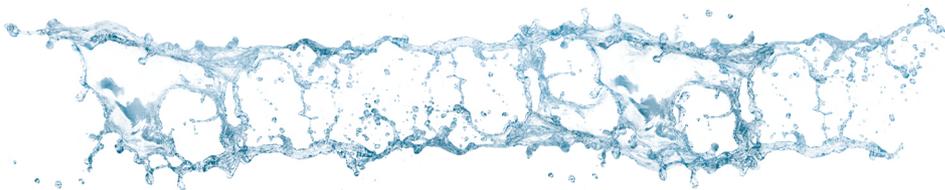
4.4.3 Maintenance of the pressure vessel (if installed)

When installing or replacing the pressure vessel, please make sure to set the correct pre-pressure before you start operation again. The initial pressure is set while the system is not under pressure. To drain the pressure from the system, switch off the osmosis installation, and empty the pressure vessel. Use the filling valve on top of the pressure vessel to set the correct pre-pressure. The pre-pressure must be 1,5 bar for optimum operation. The pressure vessel is already set to the correct pressure at Lubron.

4.4.4 Troubleshooting

Problem	Possible cause	Remedy / action
Reverse osmosis installation does not operate.	Power supply failure.	Inspect the power supply.
	Input valve failure.	Inspect the electrical connection of the solenoid valve. Replace the valve if necessary.
	Timer failure.	Inspect the time and replace it if necessary.
Alarm: slow (2 sec) sound and light signal	Low input water pressure.	Make sure the water drain is completely open. This alarm reset itself after he r set by the water pressure. By alternately switching on / off of the alarm, during use, the capacity of the can to e supply line are insufficient.

The service helpdesk can be reached from 8:30 to 17:00 on telephone number +44 1206 866 444.



5 SPECIFICATIONS

Permeate capacity	120 l/h at 15°C
Operating temperature	5 to 35°C
input water temperature	25 °C
Input water pressure	Between 2 and 4 bar
Required supply water flow	275 l/h
Water input connection	¾" thread hose connection
Drain connection	8mm hose
Permeate connection	¾" thread hose connection
Power supply	230V, 50Hz, 250W

5.1 Applied guidelines and standards

This machine is CE marked. This means that this machine meets the European directives on safety and health. The applied standards are indicated in the "Declaration of Conformity".

6 CE-TYPE SHIELD

Every reverse osmosis installation is provided with a CE type shield, on which the following information is stated:

	Description :	Details of this machine:
Type	Type	LK 120
Serial no.	Serial Number	
Year of construction	Construction year	
Voltage	Required voltage	230V, 50Hz
Max. pressure	Maximum pressure of the water input	4,0bar