INSTRUCTIONS
FOR USE

RO-MAN®

Reverse Osmosis System Installation Guide for Twin 4040 System

Standard Installation Kit Contents

2 x 10″ Filter Housings (including O Rings)

2 x 40″ Stainless Steel Membrane Housing

20″ Spun Sediment Filter

20″ Carbon Block Filter

2 x 40″ Industrial Membrane

Auto Flush and Auto Stop Start

Inline TDS Meter

Pressure Gauge

½″ Threaded Fitting Connection of your choice

Built on Aluminium Backboard

Pump: Built on aluminium backboard with pump mounted separately
OR Built on frame with pump incorporated

Please read this entire guide prior to beginning installation.

If at anytime you are unsure how to proceed please contact the support team by emailing

helpdesk@ro-man.com

How Reverse Osmosis works

How Reverse Osmosis Works Reverse Osmosis (RO) is one of the most convenient and effective filtration methods available. Reverse Osmosis membranes can usually remove between 96% and 99% of most contaminants, including salts and minerals, dyes, particles, bacteria and hazardous metals.

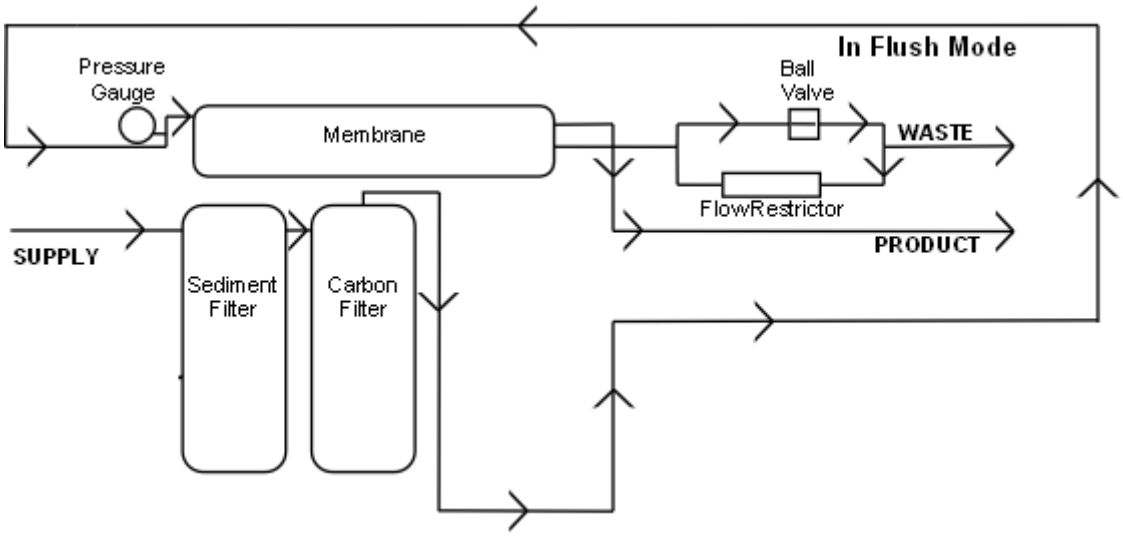
Simply put it is the process of osmosis backwards. Osmosis is the passage of water through a protein membrane to equalize the concentration of particles dissolved in the water. The membrane allows water to pass through however larger molecules like minerals, salts and bacteria cannot. In osmosis, water flows back and forth until the concentration is equal on both sides of the membrane. By using pressure, the water is forced to move away from the membrane rather than attempting to form an equilibrium like normal. This against-flow motion is where the “reverse” in Reverse Osmosis comes from.

In Reverse Osmosis, the process works by separating contaminants from water by forcing the water through a semi-permeable membrane. This membrane acts as a physical barrier to almost all molecules with a molecular weight greater than 200 grams/mole. This membrane is rated at 0.0001 micron which equals to 0.00000004 inch. For

example, the membrane may allow passage of water molecules, but blocks molecules of dissolved salt. Unwanted molecules are retained by the membrane while the ultra-pure water continues on for use or further treatment. This is the same technology used to make bottled water and is the only technology capable of desalinating sea water to be made into drinking water.

Non-RO water filters are much less effective with a larger pore size on these filter media, normally between 0.5 – 10 micron. They can only filter out coarse particles, sediments and elements up to their micron rating. Anything finer, as well as most dissolved substances, cannot be filtered out. As a result water is a lot less clean and safe compared to reverse osmosis filtration.

Schematics



Please note that the orientation of the membrane might be different than pictured above. However, the connections will be the same.

Before you begin

This water system has been designed for quick and simple installation and maintenance. If preferred, a local plumber can install the system for you. Please read this entire guide prior to beginning installation. If at any time you need additional advice, please contact us by emailing: helpdesk@ro-man.com.

By carefully reading this instruction manual and following the operational guidelines you will ensure a successful installation and reliable operation.

Routine maintenance is essential to the longevity and performance of the system. Filters should be changed every two to six months depending on the quality of the feed water supply and quantity of water produced. Important: this system is not designed for use where the water is microbiologically unsafe or of unknown quality.

Do not use this system where the water is microbiologically unsafe or of unknown quality.

Planning

Determine the location for the installation of the system. Avoid locations where the system might come in contact with hot water pipes, other hazards or exposed to extreme cold. (RO membranes can be damaged by frost.) This system may be mounted in either a vertical or horizontal position and must be positioned to allow access for servicing and filter cartridge changing.

Determine the location for the discharge of the waste water.

Determine the location of the cold water pipe. To assure you are using the cold water line, turn on both the hot and cold tap. After the water is warm to the touch, carefully feel the pipes under the sink. It will be easy to identify the hot and cold pipes.

Installation of Water Supply and Waste Line

- Locate the water shut-off valve for the cold water feed line of your mains supply and shut off the water.
- Accidentally hooking up the system to the hot supply line will permanently damage the membrane.
- Secure this cold water supply to the input on the 20” sediment filter.
- Once the water supply has been connected, connect the waste line from the unit to a drain line.

Start up Procedure

The flow restrictor valve, located at the top of the system, requires to be set at 1 product water to 4 waste water. The flush valve, located directly opposite this, should be closed when in production mode.

While we have already flushed the system, it is advisable to flush the current water out of the system. This can be done by running the system for approximately 10 minutes.

The TDS meter is located on the input and output pipes. The output will test the water coming from the membrane. This would be required to be as slow as possible, preferably in single figures or at least low double figures.

If you do not intend to permanently install the system in the immediate future, we would suggest that it is temporarily installed. This will allow for periodic flushing to maintain the membrane and filters, keeping these in a wet condition.

The system is now ready for use.

Turning off your RO System

To manually turn off your RO system it is recommended that a Ball Valve is fitted in the supply pipe. Should you anticipate frequently moving your system then a ball valve should also be fitted to the production pipe and the waste pipe. This will ensure that your membrane is kept wet at all times.

Maintenance

To keep your system producing quality water, please follow the sequence as below.

Flushing the System with the Flush Valve

- ALL RO-MAN systems are fitted with a flush valve. This valve is to extend the life of the membrane. The more often you can put the system in flush mode the better. Daily flushing is ideal but weekly is sufficient. Simply open the flush valve for 2-3 minutes each time, letting the water blast away any build up in the membrane.

Filter Changing

- The filters need changing every 6 months. Failure to do so could damage the membrane. We recommend using the RO-MAN replacement parts only to ensure your guarantee.

Conditions for Operation

Source Water: Community / Private / Non-Chlorinated / Chlorinated providing the carbon filter is utilised and replaced every 6 months or every the recommended output, whichever comes first.

SYSTEM PRESSURE (PRE-FILTRATION) 0 – 80 PSI

MEMBRANE PRESSURE RANGE 40 – 125

PSI TEMPERATURE 4º-38º C (40º-100º F)

PH RANGE 3.0-13.0

MAXIMUM SUPPLY TDS LEVEL 1500 MG/L

TURBIDITY <1.0 NET TURBIDITY (NTU)

HARDNESS (CACO.) <350 MG/L (<20 GPG)

IRON (FE) <0.1 MG/L

MANGANESE (MN) <0.05 MG/L

HYRODGEN SULFIDE (H2S) 0.00 MG/L

CHLORINE (CL2) 0.00 MG/L

Nominal Rejection Characteristics

Thin Film Composite Reverse Osmosis Membranes:

Calcium 93-99%	Iron 96-98%	Zinc 96-98%
Sodium 92-98%	Aluminium 96-98%	Mercury 94-97%
Magnesium 93-98%	Copper 96-99%	Hardness Ca & Mg 93-97%
Potassium 92-96%	Nickel 96-99%	Radioactivity 93-97%
Manganese 96-98%	Cadmium 93-97%	Chloride 92-98%

Ion 92-98%	Silicate 92-95%	Polyphosphate 96-98%
Bromide 90-95%	Silica 90-98%	Orthophosphate 96-98%
Phosphate 95-98%	Nitrate 90-95%	Chromate 85-95%
Cyanide 90-97%	Boron 50-70%	Bacteria 99+% Lead 95-98%
Sulphate 96-99%	Borate 30-50%	Arsenic 50-90%
Thiosulfate 96-98%	Fluoride 92-95%	

Membrane Performance

Performance of the reverse osmosis membrane element is affected by two key factors, temperature of the feed water and the net driving pressure across the element. These two factors must be taken into account before comparing or evaluating the performance of the membrane element of a reverse osmosis system.

The higher the temperature will provide more the product flow and a lower temperature will provide less product flow. All reverse osmosis membrane elements and systems are rated at 77º Fahrenheit (25ºCelsius).

To find the membrane permeate rate at different temperatures follow these steps:

1) Find the Temperature Correction Factor (TFC) from the table below.

2) Divide the rated permeate flow at 77º F by the TFC.

The result is the permeate flow at the desired temperature.

Feed Water Temperature ºC º	F	Correction Factor	Feed Water Temperature ºC º	F	Correction Factor	Feed Water Temperature ºC º	F	Correction Factor
5	41.0	2.58	14	57.2	1.54	23	73.4	1.09
6	42.8	2.38	15	59.0	1.47	24	75.2	1.04
7	44.6	2.22	16	60.8	1.39	25	77.0	1.00
8	46.4	2.11	17	62.6	1.34	26	78.8	0.97
9	48.2	2.00	18	64.4	1.29	27	80.6	0.94
10	50.0	1.89	19	66.2	1.24	28	82.4	0.91
11	51.8	1.78	20	68.0	1.19	29	84.2	0.88
12	53.6	1.68	21	69.8	1.15	30	86.0	0.85
13	55.4	1.61	22	71.6	1.11			

Example Question: If a thin-film membrane permeate rate at 77 degrees Fahrenheit = 100 gallons/day. What is the permeate rate at 59 degrees Fahrenheit?

Answer: Temperature correction factor (from table above) = 1.47 permeate flow at 59 degrees Fahrenheit = 100 ÷ 1.47 = 68.03 gallons (us)/day.

Net Pressure Correction

The membranes used in the systems referred to in these instructions are rated with water at 60 psi pressure and a temperature of 25 degrees Celsius. To calculate your expected production rate, first establish your expected production at a given temperature as explained above. This will be called Temperature Correct Flow (TCF).

Multiply TCF by the membranes rated pressure, for these membranes this is 60psi. Then divide by your water pressure supply (WPS). Expected production rate will = (TCF * 60) / WPS.

About Total Dissolved Solids (TDS)

Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals, salts or metals dissolved in a given volume of water. These are expressed in units of MG per unit volume of water (MG/L) and can also be referred to as parts per million (PPM). TDS is directly related to the purity and quality of water and water purification systems. This will affects everything that consumes, lives in or uses water and either organic or inorganic.

Dissolved solids refer to any minerals, salts, metals, cations or anions dissolved in water. This includes anything present in water other than the pure water (H2O) molecules and suspended solids. Suspended solids are any particles or substances that are neither dissolved nor settled in the water, e.g. wood pulp.

In general, the total dissolved solids concentration is the sum of the cations (positively charged) and anions (negatively charged) ions in the water. Parts per Million (PPM) is the weight to weight ratio of any ion to water.

TDS is based on the electrical conductivity (EC) of water. Pure H2O has virtually zero conductivity. Conductivity is usually about 100 times the total cations or anions expressed as equivalents. TDS is calculated by converting the EC by a factor of 0.5 to 1.0 times the EC, depending upon the levels. Typically, the higher the level of EC will give a higher conversion factor to determine the TDS.

Where do Dissolved Solids come from?

1. Some dissolved solids come from organic sources such as leaves, silt, plankton, industrial waste and sewage. Other sources come from runoff in urban areas, road salts used in winter as well as fertilizers and pesticides used on lawns and farms.

2. Dissolved solids also come from inorganic materials such as rock and air that may contain calcium bicarbonate, nitrogen, iron phosphorous, sulphur and other minerals. Many of these materials form salts, which are compounds containing both a metal and a non-metal. Salts usually dissolve in water forming ions. Ions are particles that have a positive or negative charge.

3. Water may also pick up metals such as lead or copper as they travel though pipes used to distribute water to consumers.

4. It is important to note that the efficacy of water purification systems in removing total dissolved solids will be reduced over time. It is highly recommended to monitor the quality of a filter or membrane and replace them when required.

Taste / Health	High TDS results in undesirable taste which could be salty, bitter or metallic. It could also indicate the presence of toxic minerals. The recommended maximum of TDS in water in 500 mg/l (500 ppm).
Filter Performance	Test your water to make sure the reverse osmosis or other type of water filter or water purification system has a high rejection rate and know when to change your filter (or membrane) cartridges.
Hardness	High TDS indicates hard water, which cause scale build-up in pipes and valves, inhibiting performance.
Aquariums	A constant level of minerals is necessary for aquatic life. The water in an aquarium should have the same levels of TDS and pH as the fish and reef's original habitat.
Hydroponics	TDS is the best measurement of the nutrient concentration in a hydroponics solution. Pools and Spas TDS levels could impede the functions of certain applications.
Colloidal Silver	TDS levels must be controlled prior to making colloidal silver.

Common Problems

Most problems are fixable and in general they will show up in the first 24-48 hours after the system is fully charged.

Problem: I have leakage from a push-in fitting.

Solution: The push-ins rarely leak but on the occasion that they do try pushing the line in harder. If this fails, take the line out and check the end of the tube. Check this is a clean square cut. If not, take a pair of sharp scissors or a sharp knife, cut it again and push it in again firmly.

Problem: The system is not making water.

Solution: This is almost always a psi problem with 40 psi being as low as possible. If the psi is low it can be a bad hole on the feed water pipe. Try drilling it out. If you have good psi to the inside of the pre-filters, then check the following:

a) Check to see if the water is flowing out of the green discharge line. If so, then the membrane is getting water.

b) Disconnect the blue line from the RO membrane housing. Check if there is any water.

c) If the green line is flowing and the blue is not, it may be blocked. Check the valve at the RO housing. There are two outlets on the out end of the RO membrane. One goes to the discharge saddle and the other is purified water. This outlet has a built in check valve inside the chrome plated brass part. Take this out and check if there is any water.

d) If unit has been in service for a while, the problem could be clogged filters. Pull the filters out and test them one at a time by putting them into the first filter position and seeing if it flows. Clogged filters are usually only associated with well water or with very turbid water.

e) The RO Membrane has silted up. This is very rare unless you have very bad feed water. The RO Membrane is self-flushing. Try back-flushing the membrane.

Problem: My filters are leaking.

Solution: You may have a loose O Ring. Take the housing off and make sure they are properly aligned. If the housing is not tight enough then tighten this further.

If you need advice, please contact us on 01823698813 or email us: helpdesk@ro-man.com

RO-MAN Options

Pressure Gauge

There are two reasons for fitting a pressure gauge:

1. To read the water pressure in order to check whether it is within specification. System pressure is very important too little pressure will make the production rate very slow and too much pressure will make the seals fail. Low pressure will make the TDS higher e.g. a system running at 65 psi may have a TDS of 5 while the same system running at 40psi could have a reading as high as 15.

2. To work out when the sediment filters are blocked.

Deionisation (DI)

Deionisation is used to polish the water making it 100% pure. TDS reading should be near zero if using a DI unit.

Inline TDS Meter

TDS (Total Dissolved Solids) meters are used to work out how well the reverse osmosis system is running. By measuring the feed water TDS and then measuring the output you can work out the rejection rate.

92% Rejection is OK 95% Rejection is GOOD 98% Rejection is EXCELLENT

Waste Clamp

This can be bought from www.ro-man.com and can be used to attach the waste pipe from the RO system to a 36mm domestic plastic waste pipe.

RO-MAN Integrated Pumpbox

We have developed a pump box that will increase the water pressure that drives the membrane. This pump box contains a pump, high pressure switch, to protect and help extend the life of the pump. The pump box also has a solenoid valve to stop water going through the system when the pump is not working.

Manufacturer Information

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Spares and accessories are available through our website: www.ro-man.com

RO-MAN®

For assistance and enquiries please contact the support team:

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