

# ROS

## REVERSE OSMOSIS UNIT OPERATOR MANUAL



**STARLINE®**  
PROFESSIONAL WASH SYSTEMS

## Warnings



Before installation and commissioning, you must read the safety instructions and warnings carefully and all the warning labels attached to the equipment.

Equipment contains dangerous voltages and can be hazardous if installed or operated incorrectly. Non-compliance with warnings or failure to follow the instructions contained in this manual can result in loss of life, severe personal injury or serious damage to property.

Before installation or repair, you must read the instructions and warnings carefully and all the warning labels attached to the equipment.

All service/repair work must be carried out by qualified personnel only and ensure compliance with all local codes and standards including AS/NZS 3500.1.

## Important Information



Failure to comply (even partially) with the instructions given in this manual will invalidate the product warranty and relieves the manufacturer of any responsibility.

The alteration of machine operation, design or the replacement of parts not approved by the manufacturer may void warranties and approvals.

This machine is intended for commercial use only.

The machine is designed solely for cleaning crockery (porcelain, glass, ceramic, temperature-resistant plastics, stainless steel or similar) from the food industry.

This machine is not intended for washing: containers that do not come into contact with foodstuffs, animals, textiles or foodstuffs intended for further consumption.

We have checked that the contents of this document correspond to the model described. There may be discrepancies nevertheless, and no guarantee can be given that they are completely identical. The information contained in this document is reviewed regularly and any necessary changes will be included in the next edition. We welcome suggestions for improvement.

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# Safety Instructions

## Installation

- Use qualified, skilled personnel.
- Follow installation instructions.
- Connect to correct voltage and supply current.
- Ensure fully accessible electrical isolation switch and water supply valves.

## Training and Supervision

- Read and understand these operating instructions and train all staff.
- This appliance must not be operated by children or infirm persons.
- Machine panels must only be removed by suitably qualified and trained personnel – internal hazards may include live electrics and very hot surfaces.
- No part of this appliance is intended for use as a stepladder.

## Cartridge Replacement

- Turn off power and unplug machine from mains before replacing water filtration cartridge.
- Turn off the water valve in the tank and release water pressure from the lines.

## Chemicals

- Commercial dishwashing detergents are hazardous – handle with care.
- Read and follow the safety information found on the labels of detergent containers and Material Safety Data Sheets.
- Use protective eyewear and clothing if decanting containers.

## Improper Use

- This unit is only intended to supply filtered water to a commercial glasswashing machine and should not be used for any other purpose.

## Cleaning

- Do not hose down the machine or splash water over the exterior.

## Water Leaks

- If the unit develops a leak disconnect the power by pulling the plug out of the wall socket, then turn off the water supply and contact your service agent.

## Service/repair

- Under no circumstances the user should attempt to carry out repairs.
- All service/repair work must be carried out by qualified personnel only.

## Power Cord Replacement

- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person in order to avoid a hazard.

## Warnings



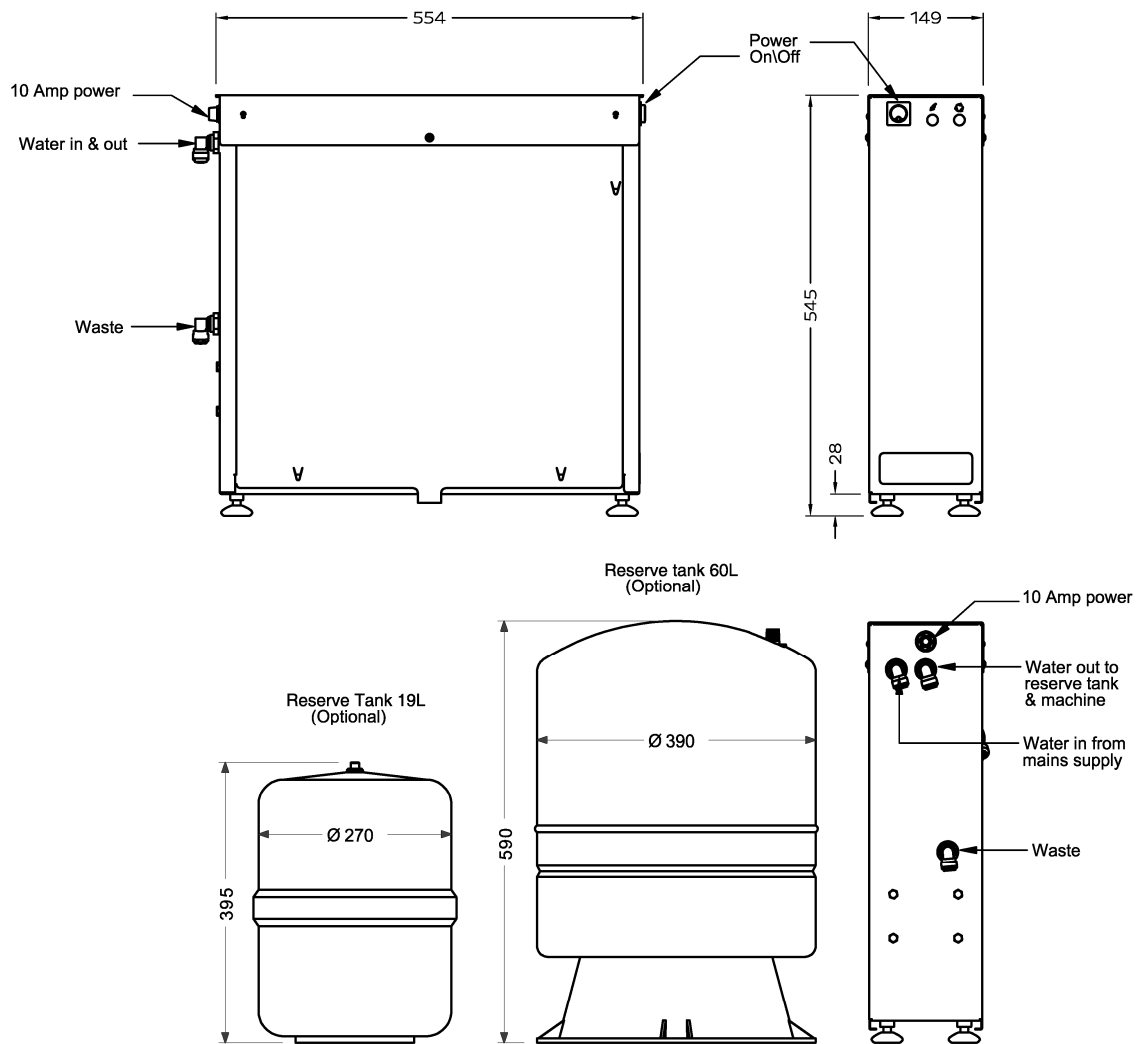
Equipment contains dangerous voltages and can be hazardous if installed or operated incorrectly. Non-compliance with Warnings or failure to follow the instructions contained in this manual can result in loss of life, severe personal injury or serious damage to property.

Installation and servicing must be carried out by a suitably qualified person in compliance with all local codes and standards including AS/NZS 3500.1.

# Installation Diagram

## ROS Installation Diagram

- Part #: B4090004
- Date: 18/11/2018
- Version: 3-C



### Services

- A Cold water
- B Waste - tank drainage point
- C Electrical connection

Single phase 240V 50Hz

Quick connect  
Quick connect  
0.3A

Note: Isolating switch must be within 1m of, and not directly behind the machine. Isolating water valve must be readily accessible

# Installation Instructions

## Unpack

- Unpack the machine, check for damage and complete delivery.
- It is supplied with 2x tubes with 20mm female fittings. The first is to connect the inlet water to the ROS. The second is to connect the outlet water from the storage tank to the glasswasher.
- The other 2 tubes supplied connect the outlet on the ROS to the tank and the RO to the drain.

## Positioning

- Place machine on sound waterproof self draining floor.

## Inlet Water – Cold

- Temperature: 5°C to 20°C.
- Connection: 20 mm (3/4" BSP) male – flexible hose supplied.



NOTE: Flush supply lines before connection. Poor quality water supply or excessive water hardness may affect performance or damage the ROS filtration unit and/or the dishwasher.

- Flow rate required: minimum 5L per minute.
- Pressure required: no greater than 350 kPa.

## Power

- Electrical supply required is 1p/0.3A 230V 50Hz via switched outlet adjacent to the unit.
- Supplied with cord set including 1p/10A plug.

## Waste

- Connect bypass water output hose to a suitable drain waste.

## Installation Troubleshooting

- If machine doesn't fill after switching on power, check and ensure that cold water supply tap is open and lines have been flushed.

## Water Quality:

- Simple on site tests of the incoming Total Dissolved Solids (TDS) and outgoing TDS and pH levels should be taken and recorded during the installation of the ROS unit (see Calibration and Maintenance sections for full details).
- If there are any concerns around the water quality, a formal water test should be completed.  
NOTE: While difficult to test for onsite, areas with known higher chlorine levels should have an increased frequency of Carbon Filter replacement.



NOTE: Like all RO filters, the quality of the outgoing polish-free water from the ROS unit is proportional to the quality of the incoming water. As such, sites with incoming water quality that fluctuate over time will experience fluctuations in their polish-free results when using the ROS unit.

NOTE: Post filters are available to increase the pH back up to a suitable level so as not to damage the glasswasher.

## Dishwasher Setup

- Press the UP, DOWN and START key simultaneously for a few seconds.
- Navigate through settings by pressing the POWER till you reach Fill Timeout
- Increase the Fill Timeout value to 20 minutes by pressing the UP key.
- Press START to save changes and exit the menu

# Installation Instructions

## Important

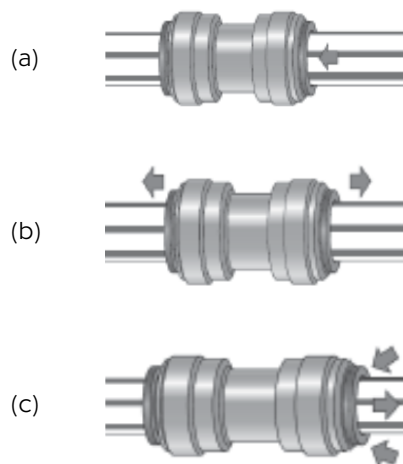
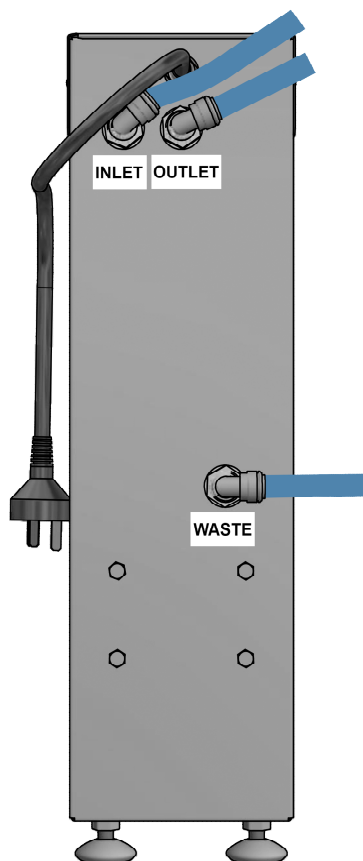
The hoses supplied with this unit must be used for the purposes indicated on the label

## Installation Steps:



1. Cut the tubes using a professional pipe cutting tool to a suitable length as required at the site.

2. Insert them into their labelled points at rear of the unit. Push the tube into the fitting until the tube stop (a). Pull on the tube to check that it is secured (b). To disconnect, push the collet square against the fitting (c). With the collet held in this position tube can be removed.



4. Fit the other ends as follows:

Outlet to the external storage tank or the solenoid valve of the glasswasher.

Inlet to the isolating valve on the water main supply.

Waste to an appropriate drain point.

# Operator Use Guide

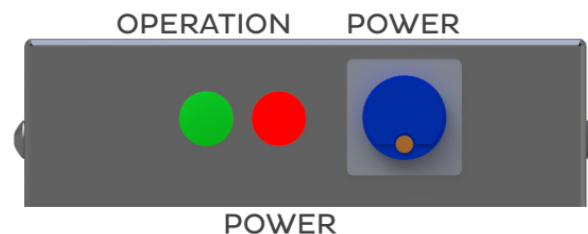
## ROS Operation

- Once the ROS unit has been plumbed and the water is turned on, plug the power lead for the unit into a power point and turn on the switch.
- Press the POWER switch on.
- Both the POWER (red) light and OPERATION (green) light will glow. The pump in the unit will now run to build up pressure in the storage tank and fill this.
- The OPERATION light will turn off once pressure has built up and the storage tank or dishwasher is being filled.



NOTE: The high pressure switch controls the pump so that the pressure in the tank cannot exceed 350Kpa. The low pressure switch will cut the pump off in the event of loss of water at the inlet to the unit.

NOTE: The operating light will not turn on if the water supply to the ROS unit has been turned off, or if there are any obstructions to the water supply to the ROS unit.



## Poor polish free results

- Before working on the ROS or glasswasher, ensure that:
  - 1) the glasswasher is being cleaned and maintained correctly,
  - 2) the correct chemicals are being used at the right dosages, and
  - 3) that nothing has changed recently e.g. moved to thinner glassware or started washing dirty cutlery through the machine rather than washing in the main dishwasher and polishing through the glasswasher.
- Check that the incoming water supply to the ROS unit isn't hot, as this will have damaged the RO membranes.

## Slow water flow rate from the system

- The ROS has an outgoing flow rate of approx. 0.8L/min. If the rate falls significantly below this, the cause is likely to be blocked filters needing replacement or potentially an issue with the internal pump or hoses.
- Always check the water quality inside the sediment filter and TDS differential for the system before replacing filters or membranes; and once pump and hoses have been confirmed as ok, start by replacing the sediment and carbon filter before replacing the RO membranes.



NOTE: when replacing the membranes, always replace the two pre-filters as well.

## Poor drying results

- Check the rinse fluid being used and that the correct dosages are being set. If the customer has moved to thinner glassware recently, these will take longer to dry. Either way, moving to tilt racks if they haven't already is a good way to accelerate drying and improve overall results. Drying tables are also available to further improve results.



# System Calibration

## Important



To achieve optimal polish free results, Washtech have designed Starline glasswashers to be run on a specially formulated detergent and rinse fluid.

To ensure best product performance it is strongly recommended that you use a professional machine servicing agent to install and calibrate the system and service it over it's useful life. Settings will depend on machine and chemical types along with how the machine is operated.

## User Settings on your Starline Glasswasher:

- Press the UP and DOWN key simultaneously for a few seconds.
- Navigate through settings by pressing the POWER key to change the Fill Detergent (F-Det), Cycle Detergent (W-Det) and Cycle Rinse Fluid (W-RF) injection times.
- Parameter values can be changed using the UP or DOWN keys.
- Press the START key to save changes and exit menu.
- Run multiple cycles to test the results.



NOTE: Higher dosages of high quality rinse fluid are recommended to accelerate the drying results which optimises the polish free finish. The fizz in carbonated drinks may be compromised when using alternative rinse fluids not specifically designed for use as part of a polish free system. A test should be carried out at the calibration stage to ensure that the fizz in a glass of coke, beer etc. is not impacted, with the rinse fluid dosage to be reduced if it is.

Calibrating the Service Notification to provide a reminder when the pre-filters should next be replaced and the RO membranes checked:

- Press the UP and DOWN and START keys simultaneously.
- Use the POWER key to scroll to the Service Notification section.
- Program in the correct frequency - usually between 7,500 and 18,000 cycles depending on chlorine (and TDS if tested) levels at the site - using the UP and DOWN keys to select the necessary number.
- Let the customer know to call you when the service warning is displayed so you can schedule a time to return and replace the Sediment and Carbon filter, and check the remaining life of the ROS membranes.

When using the recommended Ultimate and Optimum chemicals and the inbuilt chemical pumps, the following fill (F) and cycle (W) dosage settings should be used:

Model	F-Detergent	W-Detergent	W-Rinse Fluid
GM	23sec (9.2mL)	10sec (4.0mL)	30 sec (3.0mL)
GL	10sec (4.0mL)	10sec (4.0mL)	30 sec (3.0mL)
UD	15sec (6.0mL)	10sec (4.0mL)	30 sec (3.0mL)
UL	13sec (5.2mL)	10sec (4.0mL)	30 sec (3.0mL)
M2C	38sec (15.2mL)	10sec (4.0mL)	24 sec (2.4mL)



NOTE: The Starline Polish Free system has been successfully calibrated to work with a range of other chemicals available in the market although it has often required different dosages to do so. If in doubt, please speak with Starline directly and/or your Chemical Specialist.

NOTE: Not all chemicals available on the market will provide polish-free results however and a change in chemical types or brands may be required.

# System Optimisation

## Chemical

- This dishwasher is supplied with Detergent and Rinse Fluid injector pumps which are easily adjustable via the control panel.
- To connect to chemicals, insert pump inlet hose into containers of commercial low foam detergent and rinse fluid. See System Calibration page for instructions on adjusting the dosages.



NOTE: Polish free results are dependent on using the right concentrations of the right chemicals. An RO system is inclusive of your glasswasher, RO unit, chemicals, operation procedures and drying area. If one of these components is altered without recalibration of the system, inferior polish free results can be expected.

## Recommended Chemicals

Starline has worked with Chemical Solutions Ltd (CSL) to develop the following chemicals to be used with a Starline Glasswasher and Starline Reverse Osmosis system.



### Ultimate Detergent

Automatic liquid detergent for commercial dish and glass machines, designed for reverse osmosis automatic glass and ware machine units. Safe when used as directed on all commercially automatically washed items. Not recommended for aluminium or sensitive metal-constructed kitchen items.

#### Features & Benefits

- Delivers exceptional results.
- Ideal for use with any machine type.
- Fitted with the Kemlock closed loop system.
- Septic tank safe, when used as directed.



### Optimum Rinse Fluid

A drying aid concentrate specifically designed for reverse osmosis automatic glass and ware machine units. Significantly reduces or eliminated the requirement for post-clean drying and polishing of glass and dishware, leaving rinsed surfaces dry and spotlessly streak-free.

#### Features & Benefits

- Leaves surfaces dry and spotlessly streak-free.
- Ideal for use with any machine type.
- Fitted with the Kemlock closed loop system.
- Septic tank safe, when used as directed.

## Important



If you use different chemicals, you will have to carefully recalibrate the chemical injection levels to compensate for the different formulations and concentrations. Without suitable recalibration, the polish-free results may be negatively impacted.

# System Optimisation

## Pre-rinsing

- Heavily soiled glasses such as those that contained smoothies or other granular drinks should be pre-rinsed.
- Pre-rinse glasses with fresh water only. Do not use chemicals as they will contaminate the machine.

## Machine care

- Carry out proper shut down and cleaning procedures every night to ensure optimum performance of your Starline glasswasher.
- If arm jets and filters are not adequately cleaned blockages can form. This will result in a reduction of spray area, which will reduce the amount of water and chemical dispersed over each glass ultimately having a detrimental impact on both the wash quality and the polish-free results.
- Cleaning instructions are provided with each Starline glasswasher. If you however require copies of these instructions please contact your local Starline dealer.

## Drying Time

- Even with an optimal dosage of Rinse Fluid, glasses must be given the appropriate space and time to dry.
- If space and time is an issue we recommend using both tilt racks and potentially a drying table.

## Tilt Racks

- We recommend using Tilt racks with any Starline Polish Free systems to aid in and accelerate the drying process.



NOTE: Concaved bases of glassware allow chemical saturated water to pool and not drain off of the glasses while in the machine. Once removed from the machine, if the water is allowed to run down the side of the glassware and dry, this is likely to impact the quality of the final polish free result.



## Drying Table

- Drying tables facilitate fast drying of glasses following the washing process generating a quicker polish-free glassware that's ready to be stored and/or reused.

Talk to a Starline dealer about tilt rack and drying tables

# Maintenance

## Warnings



Turn off power and unplug machine from mains power supply before replacing water filtration cartridges.  
To prevent flooding turn the valve of the storage tank off before removing/replacing the cartridges.

## Scheduled Maintenance

- When correctly maintained, the RO Membranes in the Starline ROS unit will last for tens of thousands of polish free glasswashing cycles.
- The Starline ROS also contains one Sediment Filter cartridge and one Carbon Filter cartridge which protect the RO Membranes and will need to be replaced more frequently.
- The correct maintenance involves the following replacement cycles for the filters as follows.

## Sediment Pre-Filter Maintenance

- The sediment filter is designed to prevent the largest of particulars from progressing through the ROS unit and clogging both the carbon filter and RO membranes.
- Checking this is relatively easy - simply tip the excess water inside the filter once it's removed from the system, with a noticeable difference between this and the incoming water a clear indicator that a replacement is required.
- Unless the site has hard water, the Sediment Filter should have a longer life than the Carbon Filter.



NOTE: As this is also the lowest cost filter and the first layer of protection for the other 3 filters in the system, we recommend replacement of this whenever replacing the Carbon filter (as follows) and/or RO membranes to ensure these subsequent and more expensive filters have the best protection from incoming sediment.

## Carbon Pre-Filter Maintenance

- The carbon filter's primary purpose is to absorb chlorine and protect the membranes from this damaging chemical.
- While there is not a simple on site test for this, in an average to low chlorine environment, the carbon filter should last around 15,000 to 20,000 cycles.
- The newest programming from Starline includes a service reminder which can be programmed to display a warning to the customer once their machine needs a service - or the filters replaced. We recommend setting this interval to 15,000 on areas with average chlorine levels, and as low as 7,500 cycles in areas known to have higher chlorine levels with the Carbon Filter to be replaced soon after the warning notification starts displaying on the machine.



NOTE: the useful life will reduce as chlorine levels in the site's water supply increase, with a strong recommendation to err on the side of caution.

## RO Membranes (x2) Maintenance

- The RO membranes are what produce the highly filtered water necessary to generate polish free results.
- When adequately protected from larger sediments and chlorine through an adequate and regular replacement rhythm, these should last most polish-free glasswashing for years. The primary test of the remaining life of the RO Membrane is to test the TDS level of the incoming water to the ROS unit and the TDS level (TDS metre required) of the water leaving the system for use in the glasswasher. A new ROS unit operating correctly will provide a >90% reduction in the TDS levels whereas older membranes beginning to fail will be down to around a 60% reduction. The quality of the polish free results will have started to deteriorate well before this point at most sites.

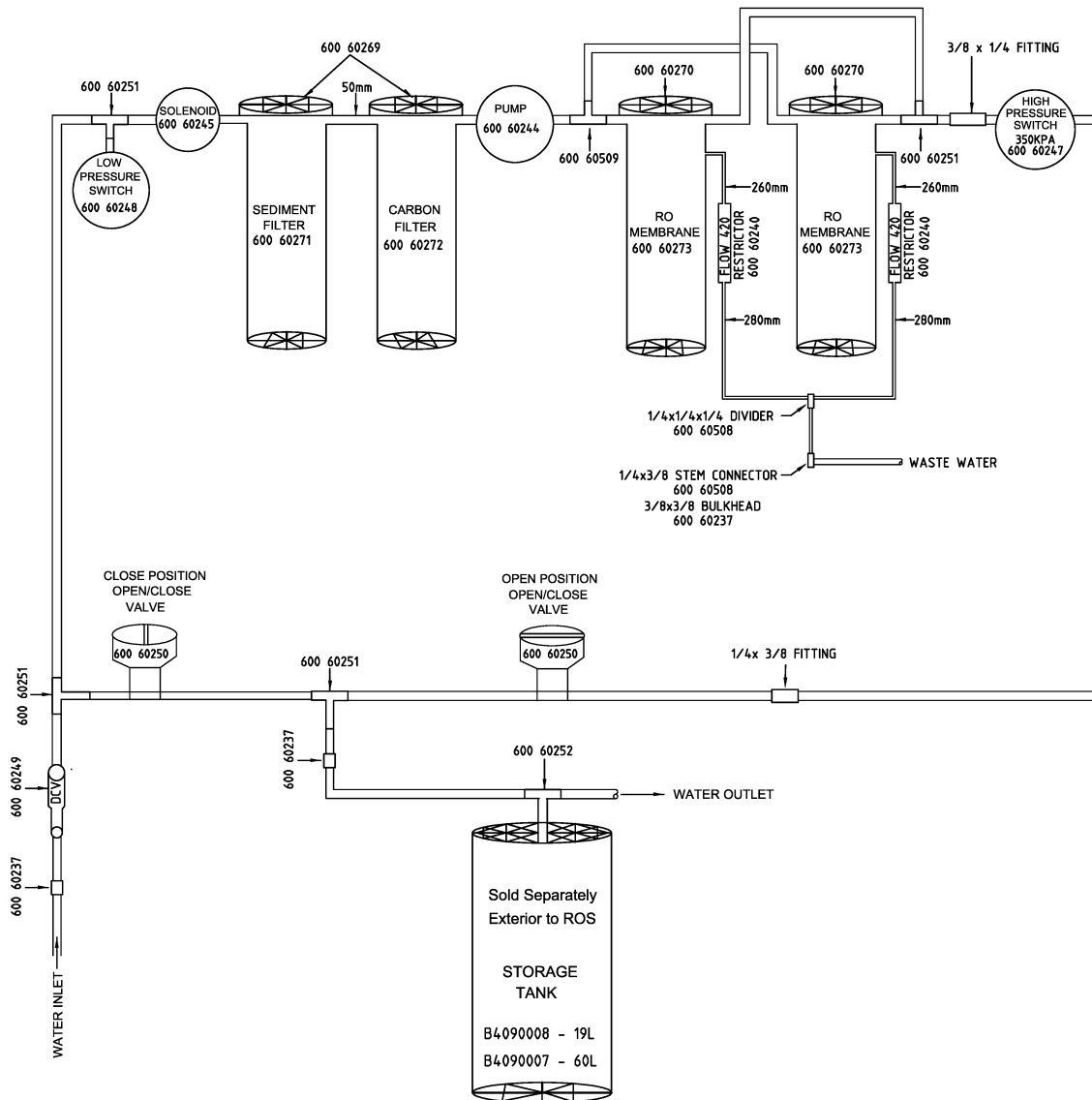


NOTE: RO membranes must be connected to cold inlet water, and are damaged by hot incoming water.

# RO Layout Diagram

## ROS Layout Diagram

- Part #: RO 0002
- Date: 15/11/18
- Version: 3-G



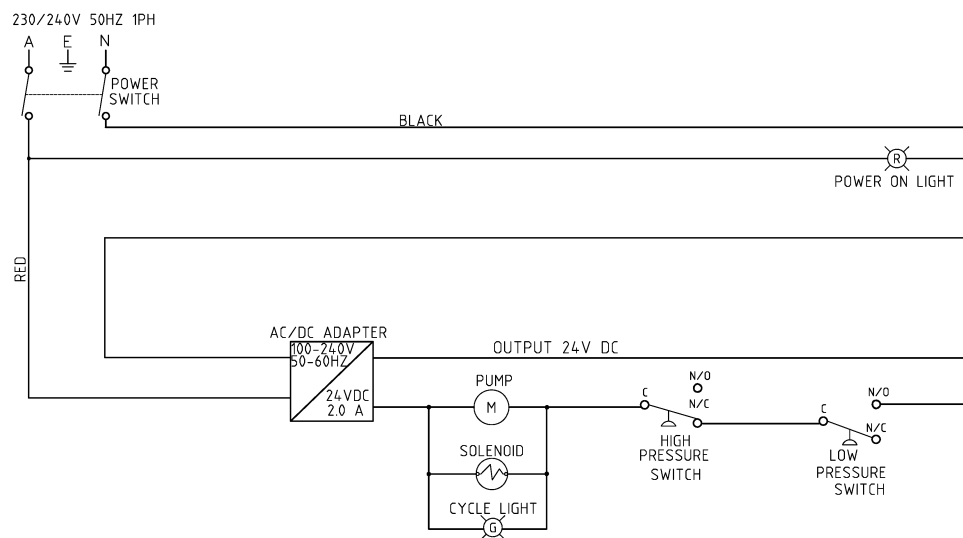
ITEM	CODE	DESCRIPTION	QTY
1	600 60271	SEDIMENT FILTER CARTRIDGE	1
2	600 60272	CHLORINE FILTER CARTRIDGE	1
3	600 60273	RO MEMBRANE FILTER CARTRIDGE	2
4	600 60269	FILTER CARTRIDGE IN/OUT CAP	2
5	600 60270	RO UNIT CAP	2
6	600 60237	3/8 X 3/8 TUBE BULKHEAD FITTING	6
7	600 60238	3/8 TUBE X 3/8 NPT UNION	3
8	600 60239	3/8 X 3/8 STEM ELBOW	8
9	600 60240	FLOW RESTRICTOR 420cc	2
10	3222	CORD GRIP	2
11	600 60243	TRANSFORMER 24VOLTS	1
12	600 60244	PUMP 200G	1
13	600 60245	SOLENOID VALVE	1
14	600 60246	19L STORAGE TANK	1
15	600 60247	HIGH PRESSURE SWITCH	1
16	600 60248	LOW PRESSURE SWITCH	1

ITEM	CODE	DESCRIPTION	QTY
17	600 60249	PRESSURE LIMITING VALVE	1
18	600 60250	BALL VALVE	2
19	600 60251	3/8 X 3/8 X 3/8 TEE	3
20	600 60252	1/4 X 1/4 X 1/4 TEE	1
21	600 60253	1/4 NPT X 3/8 TUBE CONNECTOR	3
22	600 60254	1/4 X 3/8 TUBE CONNECTOR	3
23	600 60255	3/8 STEM X 1/4 TUBE CONNECTOR	2
24	600 60256	1/4 STEM X 1/4 NPT CONNECTOR	1
25	600 30215	POWER BUTTON	1
26	600 30161	LENS & NEON ASSY (RED)12MM	1
27	600 60508	1/4 X 1/4 X 1/4 DIVIDER	2
28	600 60509	3/8 X 3/8 X 3/8 DIVIDER	1

# Schematic Drawing

## ROS Layout Diagram

- Part #: 180100
- Date: 07/02/13
- Version: 1-A



ITEM	CODE	DESCRIPTION	QTY
1	600 30459	POWER SWITCH	1
2	600 30161	RED LED LENS & NEON	1
3	32271	TERMINALBLOCK	2
4	600 60247	HIGH PRESSURE SWITCH	1
5	600 60248	LOW PRESSURE SWITCH	1
6	600 60245	SOLENOID 24V DC	1
7	600 60244	PUMP 24VDC	1
8	600 60243	AC / DC ADAPTOR 240VAC - 24VDC	1
9	600 30433	LED GREEN	2

# Notes

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