



PACIFIC WATER TECHNOLOGY

INSTALLATION INSTRUCTIONS – ACTIVATED CARBON FILTER SKID





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1.0. Overview

1.1. System Design

The filtration skid has been designed to remove organic pollutants from water in three filters that operate in parallel. For the type of water, we are trying to target are organics and hydro carbons so need to offer a different carbon for the higher absorption of organic micro-pollutants such storm water & hydrocarbons. Based on the 1.2KL/Hr application (20LPM) with the 15 min EBCT with carbon, 120kg of activated carbon is required. The most economical way (also to prevent channelling through a larger bed/small flow rate) 3 x 16" vessels are being used in a parallel configuration. The filters are automatically backwashed using Autotrol 263-764F controls. By using these valves, the backwash is being initiated by both differential pressures, as well as timer based periodic backwashing.

There is 40kg of carbon in each vessel using Hub & Laterals for a more effective bed lift during Backwash. The source for the backwash is treated water being sourced from a filtered water tank, and a dedicated backwash pump. One filter is being backwashed at a time, allowing two filters to remain on-line.

System Specifications:

3 off 16"x65" Blue FRP Tank with 2½" Top Opening, 150psi
 263-742F-12v LOGIX Time Clock Filter Valve c/w "N Injector
 A20DPK30 Pressure Differential Switch Kit installed in a weatherproof box c/w Tubing kit.
 Assembly, Flow Control, Drain, 15GPM - External, 3/4" F x 1" BSPM
 Maric 20LPM x 25mm BSPT Female to Female Brass Service Flow Control
 Powder Coated Aluminium Skid 1600x1200x125mm c/w Fork Tynes penetrations
 5000 l slim line tank
 Grundfos CR3-8 A-A-A-E-HQQE 1x220/240 50HZ
 SOUTHERN TELEMEO Pressure Switch XMP12

Inlet Connection Raw water:1"

Outlet connection: Filtered water:1.5" at tank

Backwash Waste Water: 1.5"

1.2. Performance Criteria

These Criteria set the minimum performance requirements

- o Design flow rate 1.2m³ / hour
- o Operational period: 10 hours in a 24-hour cycle
- o Minimum Pressure: 2.5 bar during filter flushing



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- o Maximum Pressure: 8.0 bar
- o Filtered Water quality prior to discharge into the stormwater network:
 - ☑ Total Recoverable Hydrocarbons: maximum 2.5 grams in 9m³ feed volume per day
 - ☑ Physical appearance: No detectable visible film, sheen, discolouration on the water
- Physical appearance No

1.3. Pipework

The activated carbon filter skid has been pre-plumbed, with only the following requirements:

- 2" Backwash line to be connected from drain line to waste.
- 1" line to be connected as raw water feed to filter manifold.

1.4. Electrical

All filter valves are supplied as 24v complete with a transformer for 240v. A continuous supply of 240v, 5 VA is required which should be provided by an uninterrupted mains supply, which is separately 1 Amp fused, and does not have any additional switch. A plug is not provided with this filter since the cable should be connected to fused spur outlet. However, if that is not possible then a plug should be fitted to the cable with a 1-amp fuse. The socket used should be unswitched to prevent the filter from being inadvertently switched off.

1.5. Installation of Service Flow Restrictor

A 20 lpm Maric Flow restrictor has been installed after the control head to ensure required flow rate is not exceeded. This will ensure that a flowrate of 20 LPM is not exceeded during filtration, whilst still allowing the required flowrate of over 50 LPM during backwash.



2.0 Technical Data

Carbon filtering works by adsorption, in which pollutants in the fluid to be treated are trapped inside the pore structure[1] of a carbon substrate. The substrate is made of many carbon granules, each of which is itself highly porous. As a result, the substrate has a large surface area within which contaminants can be trapped. Activated carbon is typically used in filters, as it has been treated to have a much higher surface area than non-treated carbon.

Improper Activated Carbon Preparation: Improper wetting of granular activated carbon is the root cause of many operating system problems and poor performance, if activated carbon is placed on-line without being pre-wetted properly, air pockets develop in the carbon bed, causing high-pressure drop throughout the bed, premature organics breakthrough. As the water flows downward through the bed, the air forms pockets or bubbles that do not exit the bed but cause channelling, high-pressure drop, and premature organic breakthrough.

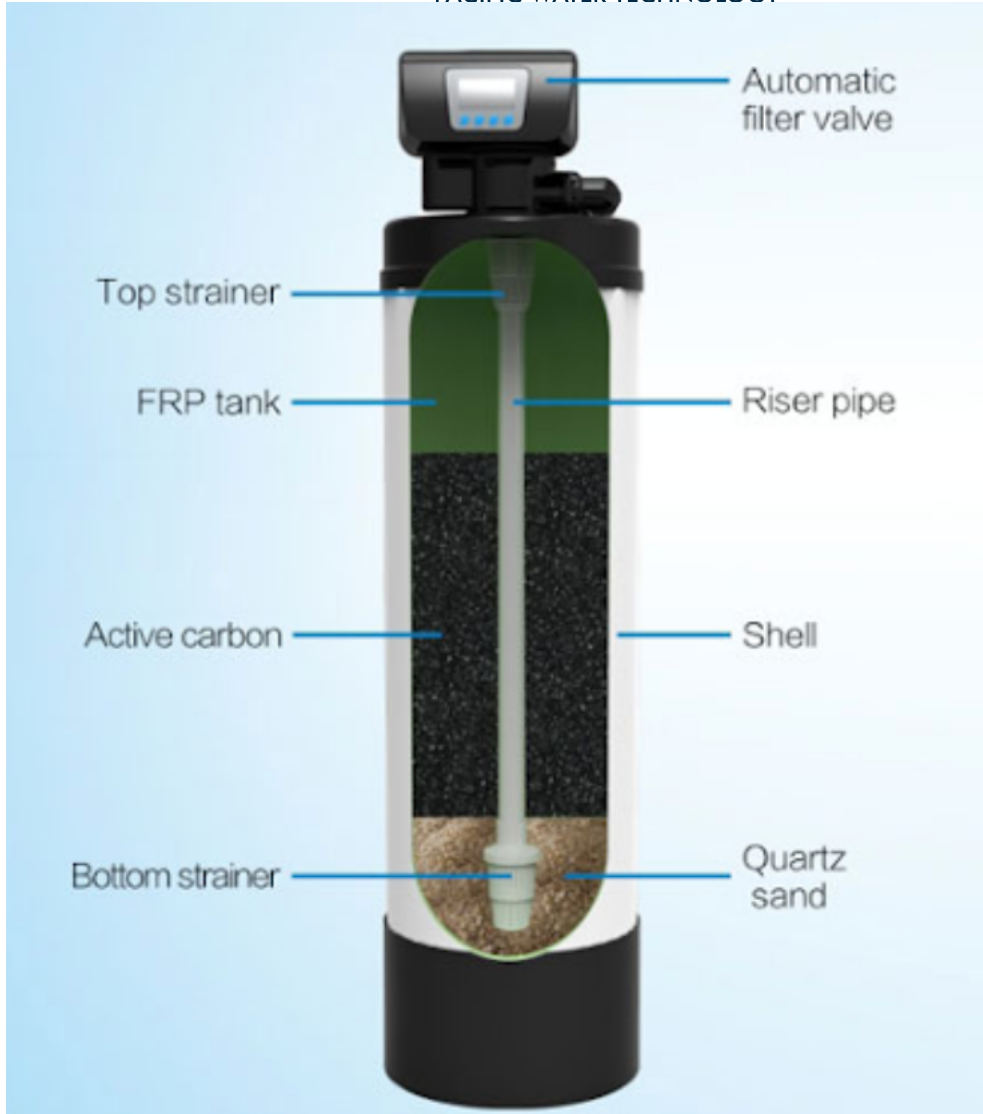
Wetting granular activated carbon properly is time consuming. In a typical system, carbon is only 90% wetted after 24 hours. Therefore, if an adsorber is put on-line immediately after being filled with granular activated carbon and water, pressure will build and premature organics breakthrough will occur. The adsorber should be filled with water and allowed to stand at least 24 hours. For systems not designed to be back-washed, water should be drained and the vessel refilled with water.

PH Rise Phenomenon: When most carbons initially are put on-line, effluent pH will rise to a value between 9 and 12, with the final value depending on the water source. This rise can hinder the carbons' ability to absorb sufficient amounts of certain organics and also can cause iron or calcium to precipitate. It is due to the carbon's adsorption of chlorides, sulphates, nitrates and other anions from the water. Water pH remains elevated until the carbons pores become filled with these anions. Typically, 100 to 200 bed volumes of water must pass through the carbon before pH drops to 8 or 8.5. The purchase of pre-oxidized carbons is one way to deal with and stop pH rise.

The Activated Carbon Water system just like any other media filter is composed of mineral tank (FRP or Steel), Valve controllers (Top or Side mounted) or Face-piping with Controllers (Digital Stagers or PLC), media (Gravel and Activated Carbon). ACF are available in different flow rate capacity and media volume. It can be configured to run as a single stand-alone unit or multiple-tanks which is running altogether or in sequence depending on the application. Smaller-sized units can have valve controllers like (Autotrol or Clack®). These multiport valves are top mounted connecting to the internal riser tube and laterals.



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2.2 Backwashing

Efficient and regular backwashing is a very important function of filtration. Without it, the bed can compact and 'channeling' can occur causing bypassing of unfiltered water, resulting in short and ineffective filtration cycles and high-pressure losses. Your filter is fully automatic so regular backwashing is assured. It also has high backwash flow rates and has variable backwash settings that allows you to set the backwash frequency to accommodate the loading of the raw water.

PACIFIC WATER TECHNOLOGY INSTALLATION INSTRUCTIONS
MANUAL – ACTIVATED CARBON FILTER SKID



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2.2.1 What controls the Backwash?

The Valve and Control. The frequency of backwashing is determined by the quality of the raw water, the more contaminated the raw water is, the more frequent the backwashing is required. The valve is fully automatic with optional water meter and incorporates Service, Backwash and Purge cycles. The backwash cycle for this filtration skid is controlled by timer as well as differential pressure. When a backwash is activated, the timer motor engages a piston that travels within a flow diversion cage and sequences the water flow as required during the different stages of the backwash cycle. Please note: The pump feeding the filter should be sized for the correct backwash flow rate.

Note: The filters will backwash every 3 days, for 10mins plus rinse, approximately 21 mins per backwash cycle. Only one filter will back wash at any time. There is a lockout cable between each filter so only one can run at a time. The filters are also set up on pressure differential switch and will backwash filter 1 first then 2 and then 3.

2.2.2 What are the stages of the Backwash cycle

- 1st Stage - Service Position In this position the filter delivers filtered water for usage. The filter is in this position prior to commencing the backwash cycle.
- 2nd Stage - Backwash Position The water flow is reversed and wash the media bed clean of entrapped sediment and particulate matter prior to purging.
- 3rd Stage - Purge Position The filter is purged with water to remove any remaining impurities and re-bed the media. The Backwash Cycle is now complete and the unit will return to the Service Position.

2.3 CAUTION!

The filter is not designed to remove microbiologically unsafe contaminants from the water supply. If the water is for potable use it should be disinfected prior to use.

IMPORTANT. FAILURE TO COMPLY WITH THE FOLLOWING COULD VOID WARRANTY!

- a. All plumbing must conform to Australian Standards guidelines and Local Council regulations.
- b. For filters subjected to permanent hydrostatic pressure an integral non-testable backflow prevention device in accordance with AS3500.1 and complying with AS 2845.1 Clauses 3.6.3, 3.6.4, 7.3.1 and 7.3.3 should be fitted in the inlet line.
- c. For filters subject to hydrostatic pressure in excess of 700 kPa a suitable pressure control device should be fitted in the influent line.
- d. Where the hot water system is a mains pressure storage type, a cold-water relief valve of suitable rating should be fitted (if not already installed), between the non-



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return valve and the cold-water inlet of the hot water system.

- e. For installations subject to excessive or prolonged water hammer, a water hammer arrestor should be fitted.
- f. Waste connections should comply with minimum air gap requirements as per AS3500.1

2.4 System Specifications

- Minimum Operating Pressure :280kPa
- Maximum Operating Pressure :800 KPa
- Minimum & Maximum Operating Temperature :4°C to 43°C
- Inlet & Outlet Connections: 1.5” male BSP
- Valve Drain Fitting: ¾” or 1” male BSP
- Mains Power Requirement: 240 Volt, 10 amp
- Control Valve Power: 12 Volt AC supplied by wall mount transformer supplied
- Transformer Output Current: 500mA
- Maximum Recommended Intermittent Flow Rate: 30 lpm

Higher flow rates than recommended could result in higher TOC levels in filtered water.

3 Installation

3.1 Locate the Filter

CHECKLIST

1. It is advisable to locate the filter and flow switch (if required) in a protected environment. If the unit is to be installed outside, or in the open, a protective shelter or shed is recommended.
2. The distance between the filter and a drain should be as short as possible.
3. Location should be easily accessible and have adequate height clearance to facilitate servicing.
4. Please ensure that there is aeration of the media prior to contacting the filter media. This can be achieved by feeding compressed air into the raw water at a controlled rate.
5. Hot water can severely damage the filter. If installing near a hot water service, ensure a minimum of 2 metres of piping between the outlet of the filter and inlet of the heater to help avoid heat transfer. Ensure a non-return valve on the inlet of the hot water system is present and functional.
6. Do not install filter where it or its connections (including drain and overflow lines) will ever be subjected to ambient temperatures under 1°C or over 49°C.



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7. The filter, compressor (if installed) and solenoid power supply will require standard 3 pin 240-volt 10-amp grounded power outlets

3.2 Media Loading & Filter Assembly

Note: The instructions below are generic and are relevant to individual filter vessels supplied. In this case, the three vessels come pre-plumbed. It is therefore necessary to remove the barrel unions on either side of the Autotrol valve first. This applied to the inlet, outlet and also waste water outlet connections. Once removed, the control valve can be unscrewed from the neck of the vessel. Be sure to retain the top screen which is fitted in the bottom of the valve. The riser tube and bottom screen have already been fitted in each vessel.

8. Position the filter tank in the selected location.
9. Place the distributor tube and basket assembly in the media tank. Ensure riser is sitting in recess in bottom of tank.
The top of the distributor tube should be level with or up to 5mm above the top of the filter tank.
- 10. Cover or plug the top of the distributor tube to stop the media entering the tube.**
11. Fill the tank approximately 2/3rds with water to prevent damage to the underdrain assembly when media filling. This will also help with soaking and displacing any air.
12. The amount of media required and order of filling is as per below.
Check you have the correct quantities. While holding the distributor tube central to the neck of the tank and exerting slight downward pressure to stop the tube from moving, pour in the underbed and then the Carbon media.

Media Loading

16x65" GS1000 High Absorption micro pollutants, Carbon Media Loading:

- 20kg 3-6mm #5 Underbed Gravel (Load in tank first)
- 10kg 8/16 #6 Underbed Gravel (Load in tank second)
- 40kg GS1000 Carbon (Load in tank last)

13. Remove the cover or plug from the tube and clean the media from the tank threads and the top of the distributor tube.
14. Completely fill the tank with water and allow to soak for at least 24 hours.



3.3 Water Line Connections

Note:

The instructions below are generic; the water filtration skid comes pre-plumbed with all interconnecting plumbing between the filters. Inlet and outlet pipework should be 1 to 1.5" mm minimum. Isolation valves should be fitted to each line. A full bypass line with isolation valves is recommended to ensure ongoing water supply during servicing.

15. Install the flow switch, and compressor line if required. They should be installed on the inlet water line before the filter tank as far downstream from the filter as possible. This will ensure good aeration prior to the filter.

Install the flow switch (if required) horizontally or in an upward flow vertical position. Do not install in a downward flow vertical position. The switch paddle should be cut and trimmed to suit the pipework. Ensure the paddle does not obstruct too much water flow. Refer to the 'F25 Flow Switch Installation Instructions', and 'Installation Layout Drawing' for further instructions.

16. Plumb the incoming raw water line to the valve inlet. The inlet is on the right-hand side and the outlet on the left-hand side of the valve. Flow direction arrows are on the valve barrels to show the correct flow.
17. Plumb the backwash connection at the top to the white flow restrictor fitting provided. The waste line should not be longer than 6 meters and be sure not to kink the hose as that will restrict flow.

If the filter is located where the drain lines must be elevated, you may elevate the lines up to 2 meters providing the run does not exceed 5 meters and the water pressure at the filter is not less than 280kpa. You can elevate an additional 610mm for each additional 70kpa pressure.

18. Where the drain line is elevated but empties into a drain below the level of the control valve, form a 180mm loop at the far end of the line so that the bottom of the loop is level with the valve drain line connection. This will provide an adequate siphon trap.
19. Where a drain empties into an overhead sewer line, a sink-type trap must be used.

Never connect a drain line and the wastewater to prevent the possibility of sewage being back siphoned into the filter. Always allow for an air gap.



3.4 Wiring Connections

A control panel has been fitted to the activated carbon filter skid, hence no additional wiring to the control valves or pump are required. The control panel requires a dedicated power supply of 240 V / 20 Amp. All backwash cycles have been set, and programming done in order to have the required backwash cycles based on timers and differential pressure.

3.5 System Start-Up

Please do at least 5 backwashes during startup of new filter.

3.6 Backwash

Initiating a manual backwash: Press the recycle button for 5 seconds to initiate manual backwash.









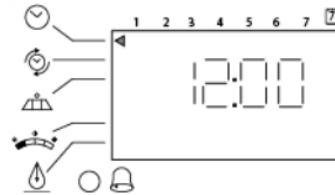


Setting the clock:

6.3.3. Time setting and winter time - summer time change

Set the current time.

- A** Press  when the time of the day is displayed.
→ Time flashes.
- B** Adjust displayed time with  and .
- C** Press  to validate the selection and advance to the next parameter using  or .



For more details refer to manual.

4. Troubleshooting

Please refer to Pentair Autotrol Manual

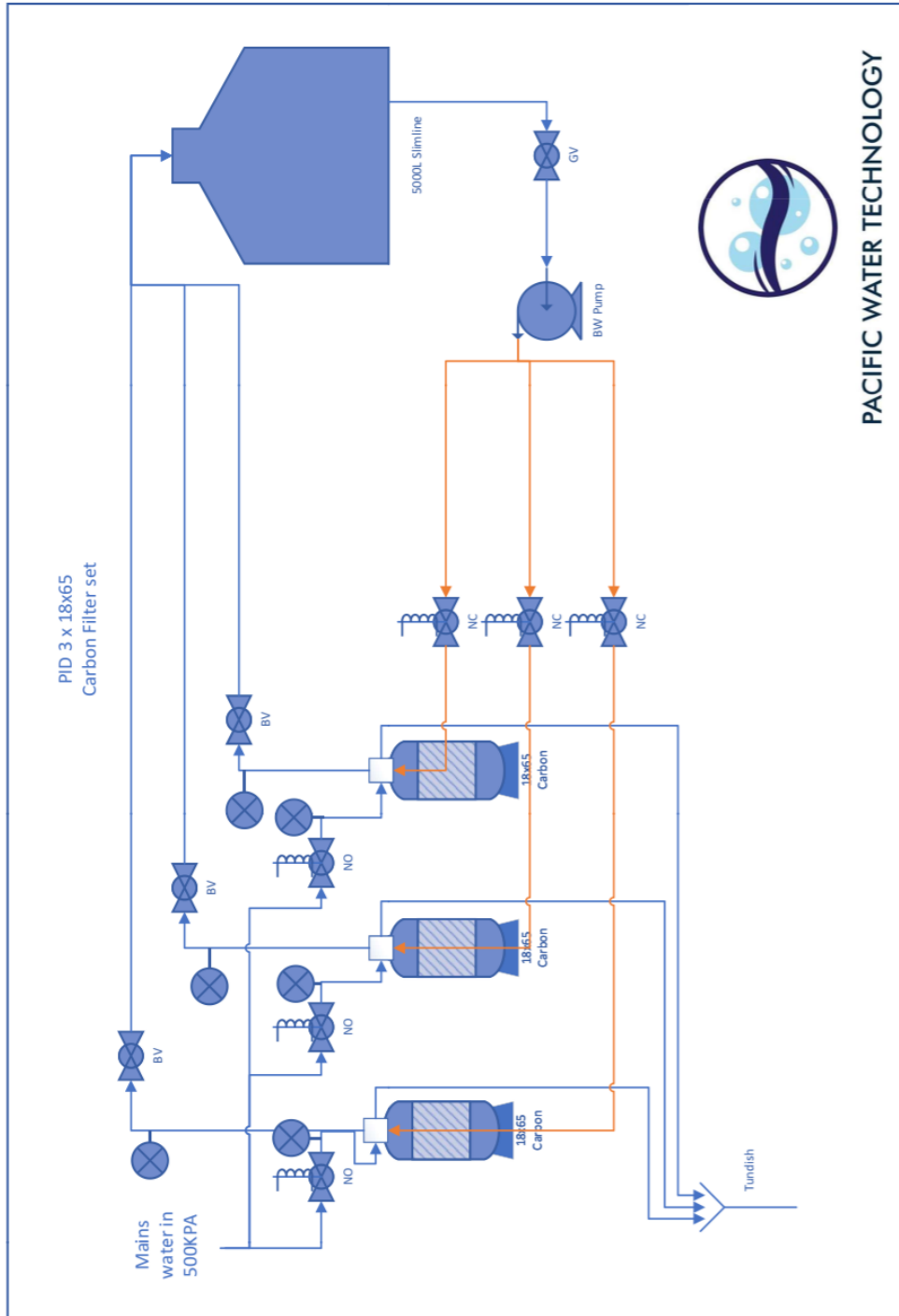
5. Maintenance

The filter system requires minimal maintenance. For any maintenance or repairs, please contact your water treatment supplier.



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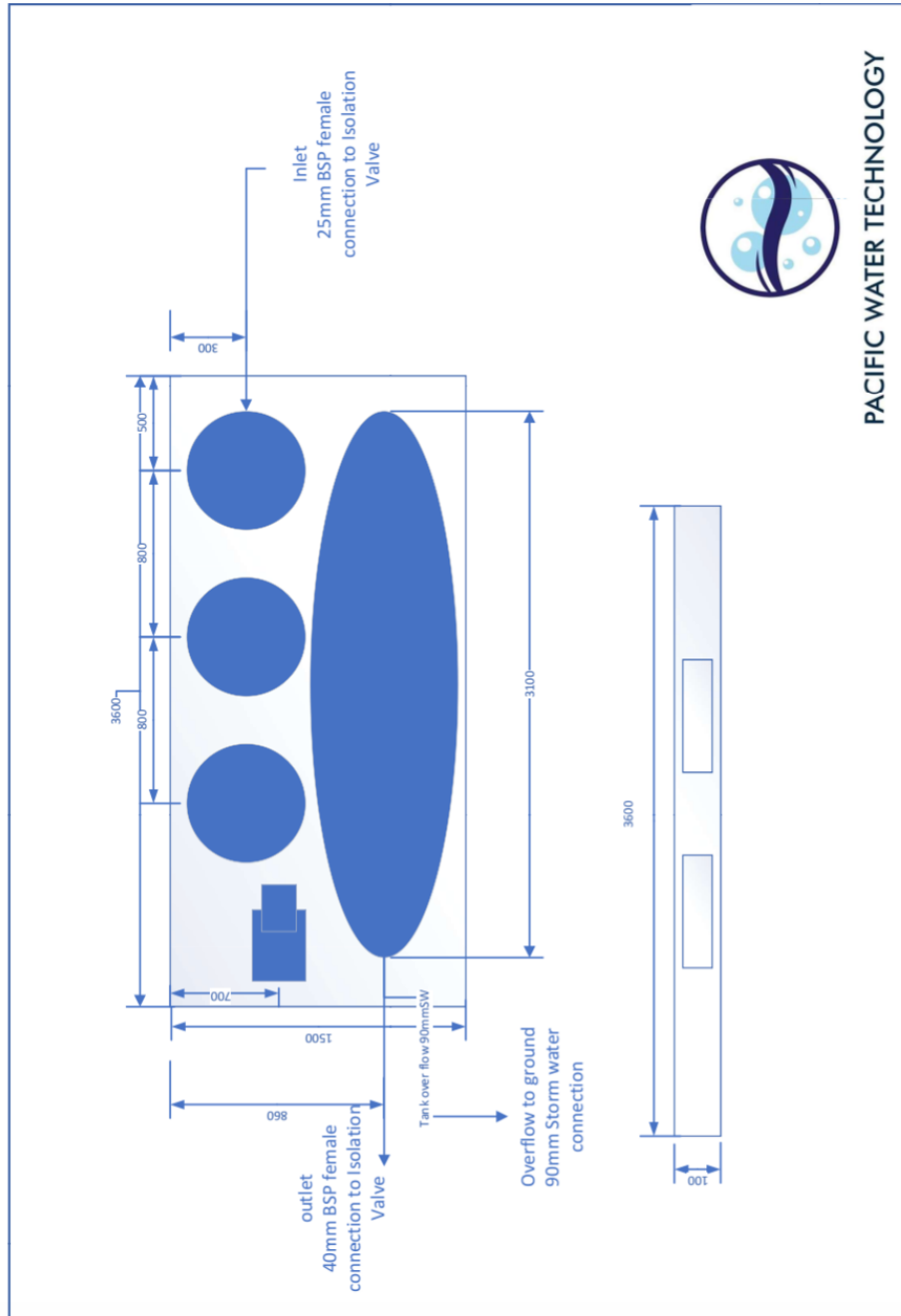
Overview of System





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Foot Print of filtration Skid





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AUTOTROL® LOGIX™ 764 MULTI-TANK RESIDENTIAL TIMER

EASY-TO-PROGRAM CONTROLLERS FOR FILTERS AND SOFTENER APPLICATIONS

MADE IN THE
USA
OF FOREIGN & DOMESTIC PARTS



FEATURES/BENEFITS

LCD display alternates between current flow rate and volume remaining

Large LCD display for simplified programming

Time of day super capacitor backup for power loss

Operates multiple systems in parallel, series, or twin alternating

Queued regeneration is indicated by a flashing icon

Remote lockout and regen input

Easy installation with plug-in wiring harnesses

Easy electronic programming

Displays regeneration step and time remaining during regeneration

Programming stored in memory and will not be lost due to power outages

Adjustable Time of Regeneration

Salt and water savings by using 100% capacity of the tank in service before switching to the second tank

Regenerates immediately when needed for continuous soft water

OPTIONS

No salt detector indicates when to add salt *

Timer wall mount kits

Refill first for dry salt storage

* Not available on Magnum

History

- Initial Setting Value
- Days since last regeneration
- Current Flow Rate
- Water used today since Time of Regeneration
- Water used since last regeneration in gallons or m³
- Total water used since reset
- Average usage for each day of week
- Average service cycle
- Peak Flow Rate
- Day and Time of Peak Flow Rate
- Months since service
- Water used since last regeneration - Tank 1
- Water used since last regeneration - Tank 2
- Number of regenerations since last serviced



UL recognized to the 979



Restriction of Hazardous Substance Compliant

FILTRATION & PROCESS

LOGIX 764 MULTI-TANK RESIDENTIAL TIMER



PACIFIC WATER TECHNOLOGY



AUTOTROL 263 & 268 RESIDENTIAL PERFORMA CONTROL VALVES



FEATURES/BENEFITS

Time-tested Duraflow flapper provides frictionless sealing for longer service life

Fiber-reinforced polymer valve body for superior strength and durability, non-corrosive, and UV-resistant

Optical sensor for precision cycle positioning

Designed with double backwash for reduced hardness leakage

Fully adjustable 5 or 8 cycle control for efficient and reliable water treatment system

Continuous service flow rate of 25 GPM with a backwash of 20 GPM

Backwash capability accommodates softener tanks up to 16" and filter up to 18" in diameter

Super capacitor for keeping time of day during power outage

Environmental protective cover for water resistance, corrosion resistance, and UV stability

Soft water refill for a cleaner brine tank

Programming stored in memory and will not be lost due to power outages

History data for valve performance

OPTIONS

Filter or softener control valves

Fiber-reinforced polymer bypass valve

Plumbing connections in .75"-1.25" NPT, BSP, and sweat

Internal Autotrol turbine

Variable reserve for increased efficiency

Auxiliary switch kits

Timer wall mount kits

740- Simple economic electronic time clock control.

764- Professional level metered control with fully programmable cycle times and salt amount for multiple tank applications.

760- Simple economic electronic meter control.

742- Professional level time clock control with fully programmable cycle times and salt amount.

762- Professional level metered control with fully programmable cycle times and salt amount.

460i - 3 settings for metered control

460TC - 3 settings for time clock control



TESTED and CERTIFIED by the WQA to NFS/ANSI Standard 44 for Water Softener Performance.



TESTED and CERTIFIED by the WQA to NFS/ANSI Standard 372 for Lead Free Compliance.




Restriction of Hazardous Substance Compliant

WATER QUALITY SYSTEMS

AUTOTROL® 263 & 268 RESIDENTIAL PERFORMA CONTROL VALVES



Details Grundfos Backwash Pump

Qty.	Description
1	<p>CR 3-8 A-A-A-E-HQQE</p>  <p>Note! Product picture may differ from actual product</p> <p>Product No.: 96511543</p> <p>Vertical, multistage centrifugal pump with inlet and outlet ports on same the level (inline). The pump head and base are in cast iron – all other wetted parts are in stainless steel. A cartridge shaft seal ensures high reliability, safe handling, and easy access and service. Power transmission is via a rigid split coupling. The pump is fitted with a 1-phase, fan-cooled asynchronous motor.</p> <p>Liquid: Pumped liquid: Water Liquid temperature range: -20 .. 120 °C Selected liquid temperature: 20 °C Density: 998.2 kg/m³ Kinematic viscosity: 1 mm²/s</p> <p>Technical: Pump speed on which pump data are based: 2759 rpm Actual calculated flow: 59.56 l/min Resulting head of the pump: 43.68 psi Pump orientation: Vertical Shaft seal arrangement: Single Code for shaft seal: HQQE Approvals on nameplate: CE,EAC,UKCA,WRAS,ACS Curve tolerance: ISO9906:2012 3B</p> <p>Materials: Base: Cast iron EN 1561 EN-GJL-200 ASTM A48-25B Impeller: Stainless steel EN 1.4301 AISI 304 Bearing: SIC SIC</p> <p>Installation: Maximum ambient temperature: 40 °C Maximum operating pressure: 16 bar Max pressure at stated temp: 16 bar / 120 °C 16 bar / -20 °C Type of connection: Oval / Rp Size of inlet connection: 1 inch Size of outlet connection: 1 inch Pressure rating for connection: PN 16 Flange size for motor: FT100</p> <p>Electrical data: Motor standard: IEC Motor type: 80B</p>



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Contact Details:

Local Service Agent: