



Installation & Operation Manual



Rainwater Harvesting Home & Garden



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1. INTRODUCTION

Warning!

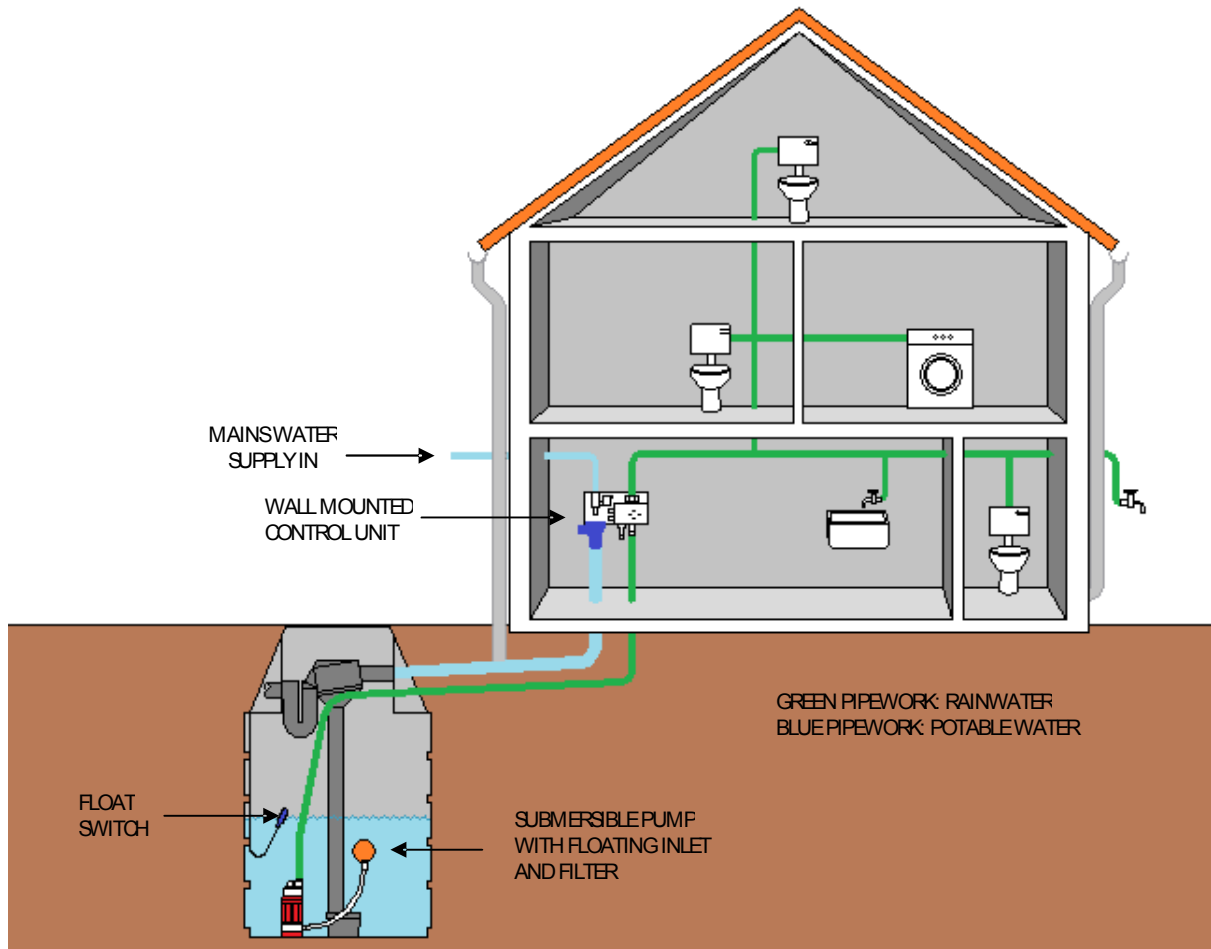
Note: Electrical installation must comply with current IEE wiring regulations and Part P of Building Regulations where applicable. During installation, as well as during any maintenance operations, the electrical power supply must be disconnected by removing the fuse from the spur or using an isolator switch. The electrical connection must be made by a qualified electrician following the safety regulations in force.

Please read this leaflet to ensure that you install your system correctly to ensure you get the most from your system.

Health & Safety

This plant should be installed in accordance with all current Building regulations, Health and Safety and electrical legislation. Please consult your local authority if in doubt.

2. PRODUCT OPERATION



Rainwater is collected in the harvesting tank from the roof via the guttering and downpipe. The rainwater enters the tank via a filter and calmed inlet, any debris passes across the filter and downstream.

Upon demand, ie toilet flush, the submersible pump will deliver water to the point of demand. When the system reaches maximum pressure i.e. when all appliances are closed and no flow rate is detected, the pump will stop. If an appliance is opened, the pressure will drop and the pump will start up until maximum pressure is again reached.

In the event that the harvesting tank runs dry, the float switch will drop and activate the solenoid valve to provide mains water back-up. The mains water will only top-up sufficiently to re-engage the float switch until it indicates to the solenoid to close off. This ensures that there is a minimum volume of water in the tank and that the priority is always to use harvested rainwater.

In the unlikely event that there is no water in the tank, the system is equipped with dry run protection which will automatically switch the pump off to prevent it from burning out.

3. COMPONENTS

- HDPE Tank
 - Filter
 - Calmed Inlet
 - Overflow c/w Vermin Grill
 - Submersible pump with non return valve
 - Floating inlet hose with filter
 - Float switch with 20m cable and fitted with a plug
 - Delivery Hose with compression couplings
- Control Unit, pre assembled on a stainless steel bracket.
 - Fixing hardware
 - Tundish
 - Mains water back-up valve
 - Control Panel
 - Compression and transition fittings
 - Solenoid Valve



Floating Inlet Hose with Filter



Float Switch



Pre-assembled Control Unit

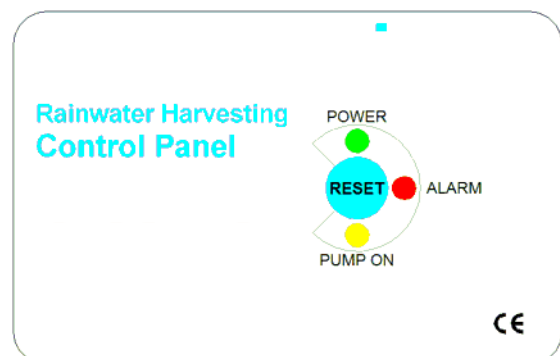
4. CONTROL PANEL

The Aquarius has an automatic electronic device, designed to regulate pump operation, performing the following:

- 1) Controls pump operation, automatically and without interruption, with constant pressure and delivery during supply. The pump starts when the pressure of the system is less than the fixed pressure (std 1.5 bar) and stops when the system no longer detects an appreciable outlet flow (see point 2).
- 2) Keeps the pump operating for a brief period (approx 5 sec) after supply has stopped at the tap closing.
- 3) If there is no water at the suction point the pump will 'block'. It releases automatically when a pressure above the one required to start the motor-driven pump is injected in the delivery line.

NOTE: In case of block due to lack of water, the system is designed to activate the pump every 30 minutes, which is the equivalent of pressing the manual RESET button.

- 4) It is supplied with a flow sensor, manufactured with a geometry which reduces the loading losses even with very high flows.
- 5) Lights indicate the various operation phases:
 - Green LED on: power supply present
 - Yellow LED on: pump working





Red LED on: blocked due to lack of supply water

Tundish

The Tundish acts as an air gap to prevent contamination of the mains water supply, meeting the requirements of BSEN 13076.

Submersible Pump

The submersible pump is self priming and comes fitted with a 2 pin Schuko plug which connects to the socket provided with the control panel.

Floating Inlet Hose

The floating inlet hose connects to the pump via the 1" BSP male brass fitting.

Float Switch

The float switch is factory fitted in the tank suspended approximately 300mm above the base of the tank. The float switch is fitted with a 2 pin plug which fits a socket on the underside of the control panel.

5. DELIVERY & HANDLING

- The unit(s) will be delivered to a hard standing area whereupon the customer is responsible for offloading. Check that the units and any parts have not been damaged in transit. Any visible damage should be reported immediately.
- Care must be taken when offloading your system as pumps and other equipment are fitted. Ensure that there is no water inside the tank before lifting. Do not use pipework as sling points when lifting tanks.
- The use of slings or lifting straps is recommended (do not use chains or wire ropes, these may damage the unit).
- Note : Some of our tanks have locating lugs - These are not lifting eyes and should not be used for that purpose.
- When moving tanks care should be taken to avoid sharp objects. Lift the tanks to move them.

Throughout the installation please ensure that the tank is not subjected to impact or contact with sharp objects.

6. TANK INSTALLATION

Please note that this guide is provided for installation in the absence of site detail and ground conditions. Alternative installation methods may be used but it is the responsibility of the customer/ contractor to ensure suitability.

1. The tanks are not designed to be subjected to vehicle loading. A load bearing slab should be constructed where this is likely to occur. Consult a qualified structural engineer if in doubt.
2. The excavation should be de-watered, if necessary, using suitable pumping equipment and this should continue until the installation is complete and concrete is completely set.
3. Ensure there is a water supply available to fill the tank(s). This is essential in the installation. Tanks must not be installed without the water level in the tank in accordance to the instructions.

Please Note : Failure to adhere to these instructions will invalidate any warranty on the tank and subsequent systems



To decide on the best location for your tank consideration should be given to the location of your mains power supply, existing drainage runs and access for machinery.

- A. After choosing the site, excavate to allow for the minimum recommended backfill to the tank, as below:

| Model Ref | Total Excavation Depth (mm) | Base Slab Depth (mm) | Excavation Width (mm) | Excavation Length (mm) |
|-----------|-----------------------------|----------------------|-----------------------|------------------------|
| 1200 | 1700 | 150 | 1560 | 1560 |
| 2000 | 2440 | 150 | 1560 | 1560 |
| 3500 | 2670 | 150 | 2060 | 2060 |
| | | | | |

- B. All systems require a duct from the tank into the property for cables and hose. The tank has a pre-drilled hole to accept 110mm drainage pipe for this purpose. NOTE this pipe will be used for carrying water from the property into the tank – it is very important to have a gradient on this pipe in the direction of the tank.
- C. Excavate out the trench leading from the rainwater down pipe to the inlet of the tank . Existing drainage runs may be adapted.
- D. Lay three (3) draw ropes through the duct.
- E. Place concrete onto base slab/bed (concrete min grade 15 N/mm² / slump 25mm). Concrete bed should be a minimum thickness of 150mm as detailed above. Lightly tamp the concrete.
- F. Lower the tank onto the semi wet concrete base slab and allow the concrete to set, checking levels throughout.
- G. Connect all the pipework and, using the draw ropes, pull cables and black/ green hose through the duct into the property.

At this stage the control system can be installed inside the property per the instruction supplied. This is an opportunity to test the system before you commence backfilling.

- H. Start filling the tank to approximately a third full of clean water, then haunch a substantial amount of concrete around bottom section of tank to a height just below the water level. Care must be taken to ensure that the base of the tank is uniformly supported, thereby avoiding point loads.
- I. Continue to backfill with concrete, proceeding in at least 2 pours. The water level inside the tank should always be higher than the level of the concrete. Efforts should be made to ensure that there are no voids within the concrete. Under no circumstances should a vibrating poker be used. Concrete should not be allowed to fall directly onto the tank.
- J. It is recommended that the concrete is left to set at the third pour, before continuing with final backfill. Securely connect all pipework in accordance with manufacturer's instructions.
- K. The cover, and any extension shaft(s), should then be fitted and then top of tank with concrete. Once the concrete is set then you can finish with top soil or stone.

7. INSTALLATION OF THE CONTROL PANEL

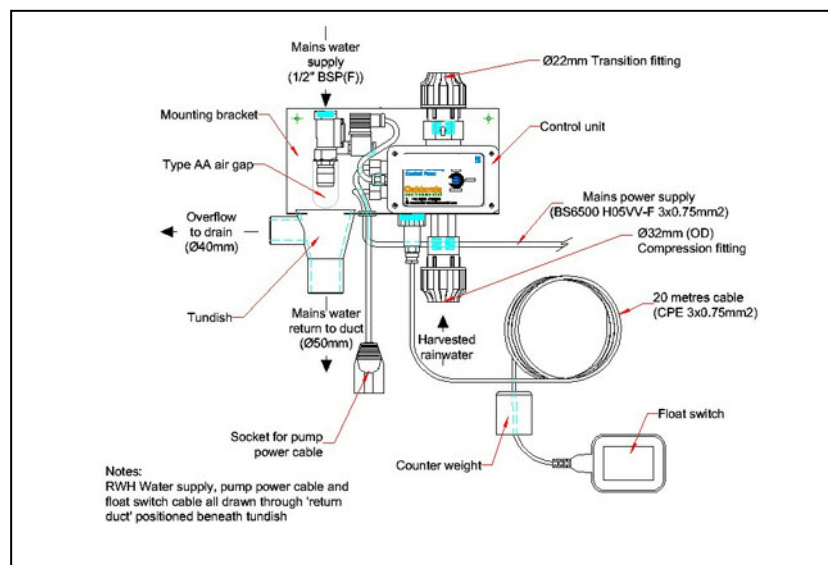
Choose your location for the Control Panel and fix the mounting plate in place. The Aquarius Control Panel is wall mounted and must be above the water level of the tank.

The Control Panel is not waterproof – DO NOT install in the tank turret.

Cables and connections

Coming from the tank via the 110mm duct that was installed are the three draw ropes (see page 6). Feed them through to the property, one at a time in this order (do not pull all three together otherwise they may roll and snag, making it very difficult to remove if necessary);

1. Float cable with connector (the float is factory fitted in the tank to the correct depth)
2. Pump power cable with plug
3. 32mm Green/Black hose (not supplied). Connect the hose to the compression elbow. Take care not to lose the O rings when opening the coupling and ensure the coupling is watertight.



Connections can be seen on the above drawing (A4 copy available upon request):

- The pump plug connects to the 'Socket for the pump cable'.
- The connector for the float fits into the socket on the underside of the control panel. This fitting has a screw cap to ensure it is correctly located.
- The black/green hose (not supplied) fits into the 32mm compression fitting shown as 'Harvested Water'. Take care not to lose the O rings when opening the coupling and ensure the coupling is watertight.
- The tundish should be above the 110mm duct pipe. If required 50mm pipe (not supplied) can be used to 'direct the flow' into the duct pipe where the water will flow back to the tank. The 40mm side connection on the tundish can be capped or used as an overflow to a convenient drainage location.
- The outlet on the control panel is fitted with a transition coupling to suit 22mm pipe. This is the feed to the toilet(s), for example. Take care not to lose the O rings when opening the coupling and ensure the coupling is watertight.
- Connect a supply from the mains water to the solenoid valve. An isolating valve (not supplied) can be installed in this section to assist future maintenance. The solenoid valve is pre-wired to the panel.
- Ensure all water fittings are made using PTFE tape.
- Ensure all water fittings and compression couplings are water tight.
- Connect the control panel to the mains supply, typically via a 10A fused spur or isolator switch. A 3 core mains flex (2 metres long) is provided. All electrical terminations are factory made with the exception of the mains supply.



8. PRE-COMMISSIONING

Before switching the system on the following should be checked (use the boxes to tick off):

- Is the tank installed correctly ?
- Is the tank free of debris ?
- Is there clean water in the tank ?
- Is the pump located on the base of the tank ?
- Is the float inside the tank ?
- Is the 110mm duct fitted on a gradient ?
- Is the green/black hose connected to the compression elbow in the tank ?
- Is the filter clear of building debris ?
- Has the system been purged prior to use ?
- Is the black/green hose connected to the control unit ?
- Is the float switch connected to the control unit ?
- Is the pump cable connected to the control unit ?
- Is the flow from the tundish above or guided into the opening of the duct ?
- Is the mains water supply connected to the solenoid valve ?
- Is the 22mm delivery pipe connected to the control panel ?
- Are all services connected ?
- Are all fittings and couplings watertight ?
- Is the control unit connected to the mains ?

If the answer to any of these is 'NO' then that issue needs to be addressed before proceeding.

If the answer to each of these is 'YES' then we are ready to commission the Aquarius Rainwater Harvesting system.

9. COMMISSIONING PROCESS

1. Switch mains power on.
2. Open all/ any isolating valves.
3. Create a demand by flushing a toilet.
4. Check the tank to make sure the pump is running.
5. The pump will deliver water to the cistern.
6. Check pipework for leaks.
7. When the cistern is filled the pump will switch off.
8. To test the float lift it out of the water in the tank and turn upside down. The float will open the solenoid valve and mains water will pass through the solenoid and down the tundish. The water will enter the tank via the 110mm cable duct.
9. Replace the float within the tank and after a few seconds the solenoid will close.
10. Switch off the system until the property is occupied.



10. TROUBLESHOOTING

Before proceeding with troubleshooting, isolate the unit from the mains power supply.

THE PUMP JAMS (red LED on)

Check the following:-

The water level in the Harvesting Tank

The installation and functionality of the float switch

The installation and functionality of the non return valve on the pump

THE PUMP GOES ON AND OFF CONTINUOUSLY:

The pump or one of the appliances has a leak

THE EQUIPMENT IS COMPLETELY OFF (NO LIGHT ON) AND WILL NOT START AGAIN:

Check the power supply, the fuse for the system and the main distribution board.

THE TANK IS EMPTY

Check the float switch is functioning properly and trips the solenoid valve.

Check for water pressure at the solenoid valve

Check the tank for punctures.

For any other faults, please contact Brett Martin on 01246 280 000



11. SPECIFICATIONS

Control Unit

The control panel conforms with the following directives:
 2006/95/CE (Low Voltage Directive)
 2004/108/CE (Electromagnetic Compatibility Directive)
 and with the following standards:
 EN 60204-1: 06 (Electrical Equipment of Machines)

| | |
|----------------------------|--|
| Max. Working Pressure | 15 BAR |
| Standard Starting Pressure | 1.5 BAR |
| Max. Liquid Temperature | 35°C |
| Power Supply | 220 – 240V, 50 – 60 Hz |
| Max. Current | 10A |
| Protection | IP55 |
| Connections | IN = 1" BSP Male, OUT = 1.25" BSP Female |

Float Switch

| | |
|----------------------------|----------------------|
| Contact Voltage (Max) | 250Vac |
| Contact Current (Max) | 15A |
| Casing Material | Polypropylene |
| External Length | 103mm |
| External Width | 81mm |
| Cable Material | CPE synthetic rubber |
| Cable Length | 20 metres |
| Max. Operating Temperature | 70°C |
| Specific Gravity | 0.9 to 1.3 |
| Max. Submerged Depth | 20 metres |

Solenoid Valve

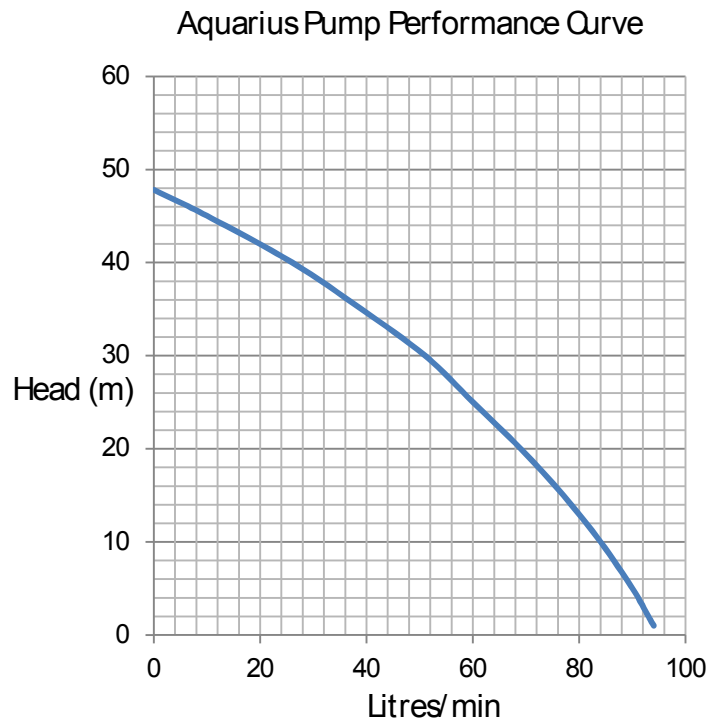
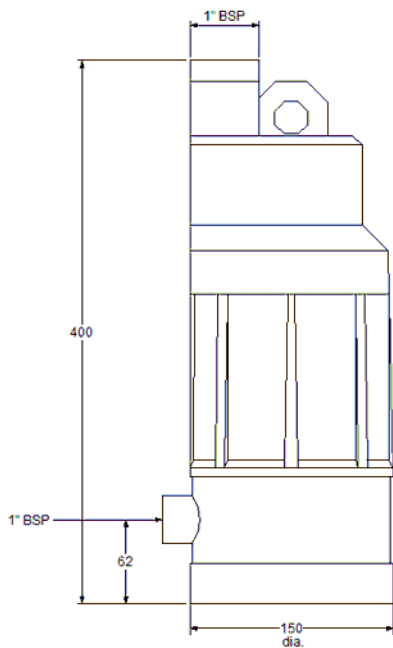
| | |
|----------------------------|---|
| Coil Voltage | 230Vac, 50Hz |
| Min. Operating Temperature | -10°C |
| Max. Operating Temperature | +90°C |
| Inlet Connection | ½" BSPP |
| Min. Operating Pressure | 0.1 Bar |
| Max. Operating Pressure | 15 Bar |
| Flow Rate | 3.8 m ³ /hour (3,800 litres/ hour) |



Submersible Pump

| | |
|----------------------|-------------------------|
| Supply Voltage | 230Vac, 50Hz |
| Power consumption | 0.75kW |
| Nominal current | 4.8A |
| Degree of protection | IP68 |
| Rated speed | 2800 RPM |
| Pump Output | See 'performance curve' |

- Manufactured with non-corrosive and rust proof materials
- Ceramic shaft sleeve for long life and sand resistance
- Energy efficient motor with double ball bearing construction,
- stainless steel shaft and motor housing
- built in overload protection
- Environmentally safe, oil-free
- Perfect cooling allows running of pump even if partially submerged
- Stainless steel intake screen



Full copy drawings available upon request

