PRECISION ACOUSTICS

Water Treatment Kit

The Water Treatment Kit is a means to provide water that is conditioned for ultrasonic measurements in a manner compatible with the recommendations IEC TR 62781. It is a recommended extra to be used in conjunction with our UMS system. It includes the following equipment.

- Flo-Jet Water Pump
- Welch Vacuum Pump
- Sabre UV Housing & Lamp (Lamp not pictured)
- 3M Liqui-Cel Degassing Unit
- 2 x Filter Housings
- 2 x Filter Cartridges (1µm & 25µm)
- Spanner for Filter Housings (Not Pictured)
- 15mm & 20mm Jubilee Clips (Not Pictured)
- 2 x UV Mounting Clips (Not Pictured)
- 1 x 13.5mm T-Piece (Not Pictured)
- 5m of 18.5mm hose & 2m of 13.5mm hose (Not Pictured)

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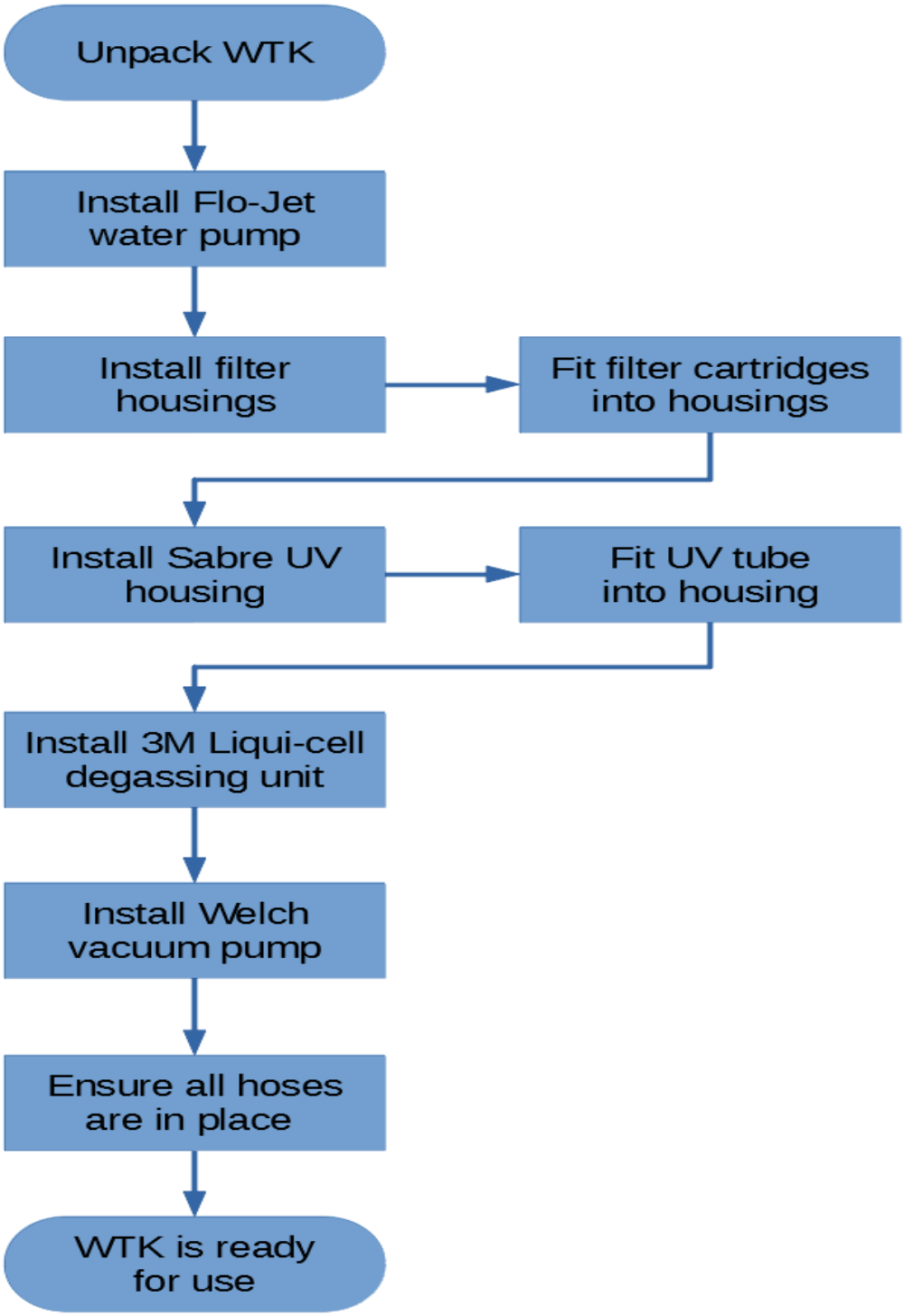
Quick Start Flow Chart FOR INSTALLATION



INTRODUCTION

Good water quality is essential for accurate measurement of acoustic fields and is required by many IEC measurement standards. Precision Acoustics Ltd supply a kit of parts which can be assembled to provide water sanitization and de-gassing. It is strongly recommended that a source of deionised water is obtained, preferably better than 5 µS/cm. There is no facility for deionisation within the WTK.

The WTK is supplied as a kit for self-assembly. If supplied with a Precision Acoustics Ltd UMS system, it can be mounted on the tank framework, as illustrated below.

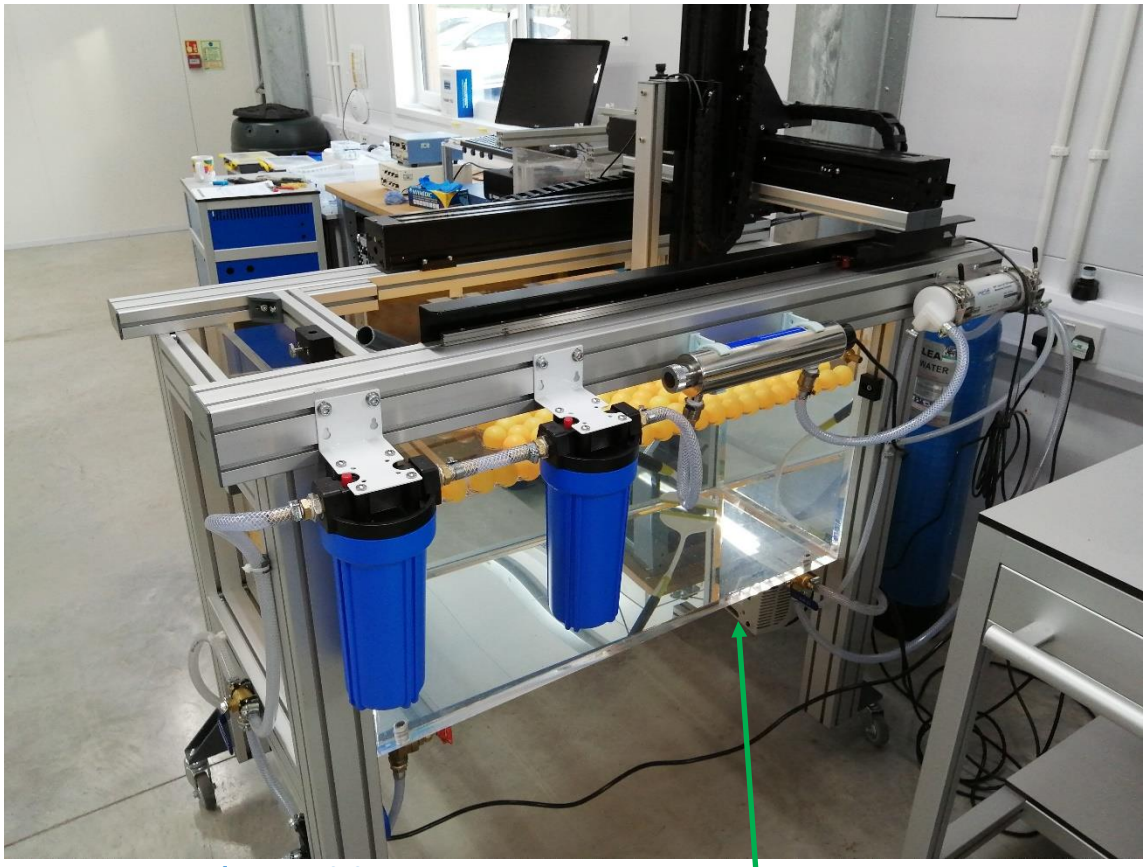


Figure 1 - WTK Mounted on UMS System

Note: the Welch Vacuum Pump is supported underneath the Tank frame as indicated by the green arrow in Figure 1. Also note that the two filters, UV housing and degassing unit are all in a line to facilitate good flow through the system. The above photo shows an additional deionisation cylinder which is recommended, but NOT included, in the WTK. This document assumes that the system is being mounted onto such a framework, but the final choice on this is left to the user.

There are three parts of the WTK, all of which have water circulating through them:

1. UV Sterilisation – inhibits growth of biological contaminants
2. Particulate Filtration – removal of suspended particulates
3. Removal of Dissolved Gas – dissolved gas (bubbles) can cause errors in acoustic measurement and act as sources of cavitation, potentially causing damage to hydrophones.

System flow is illustrated in
Figure 2 below:

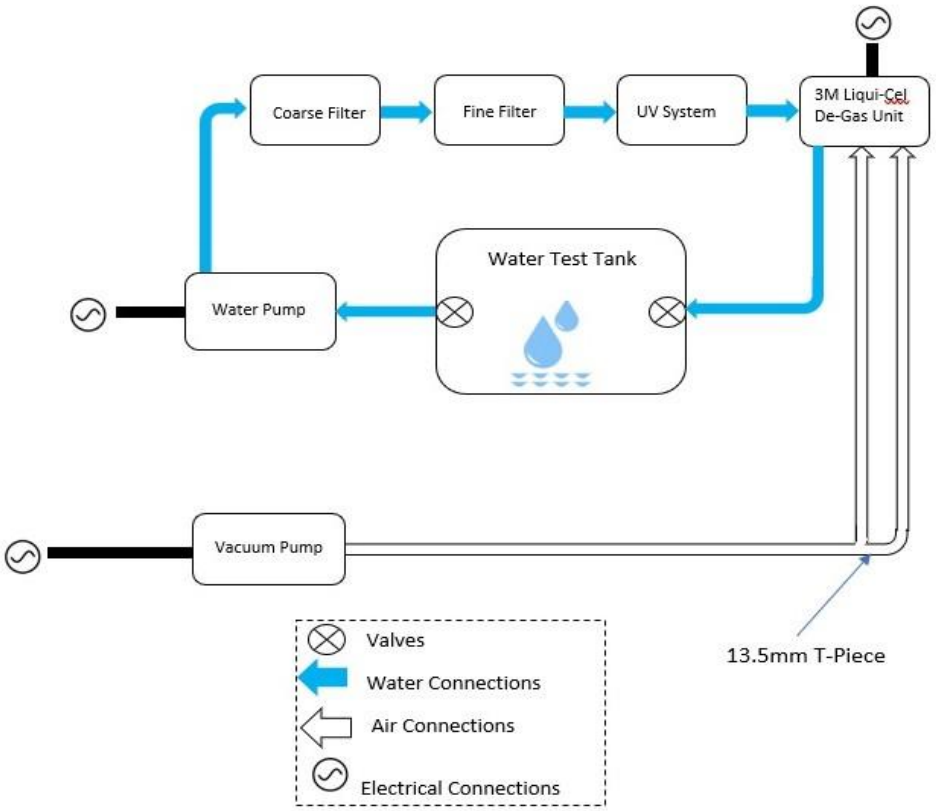


Figure 2 - WTK Flow Diagram

The WTK requires maintenance based on the working life of the UV and filter cartridges. It is recommended that UV bulbs undergo the following maintenance:

- cleaned every 3-6 months
- inspected for scratches and reduced visibility every 24 months
- replaced after 9000 hours of use

If the WTK is producing water with an unusual colour or flow, then it is likely the filters need changing. The filter replacement interval is dependent on system usage, but it is good practice to change at least once every 6 months.

It is recommended that all mains-powered WTK modules (UV, water pump and vacuum pump) are connected to the mains power supply using a residual-current circuit breaker (RCD). This is for electrical safety, as the system is used with water.

INSTALLATION

The components should be installed to maintain the connecting hoses from water pump to degasser in a straight horizontal line, as far as practicable. It is recommended that the vacuum pump is placed above floor level (as shown in Figure 1) to avoid any water leak causing damage to it or causing an electrical hazard. The major steps in installation are outlined below:

1. Install the filter cartridges into the housings, ensuring the 25 µm filter is next to the water pump (first filter in the chain). See figures below for guidance.
2. Note the spigot in the bottom of the filter housing (see Figure 3).

Figure 3 - Location of spigot

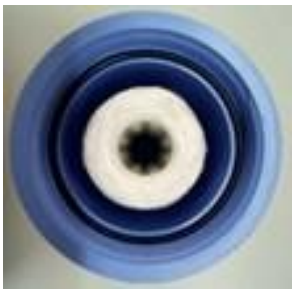


Figure 4 - Filter cartridge installed in housing

3. Lower the filter cartridge to fit completely over the spigot and ensure it fits centrally within the housing as shown in Figure 4.
4. Refit the filter housing and ensure O-rings are seated correctly. Tighten with filter spanner supplied. Repeat process on the other filter.
5. Mount the UV housing next to the fine filter housing. Install the lamp / bulb in the UV housing see the section entitled Installing / Replacing UV lamp, for additional information.
6. Mount the components according to Figure 1, ensuring that as far as practicable the hose connections run in a straight horizontal line. The exception to this is the vacuum pump which can be mounted below the other components. It can be free-standing, but not be placed on the floor. This is to prevent damage or an electrical hazard because of water leak.
7. Connect all hoses, using Figure 1 as a guide. Note that the smaller gauge hose is for the vacuum connections, larger gauge for water connections.
8. The vacuum pump is installed, via its handle, to the bottom frame of the test tank using the 4 cable ties supplied. Note that the pump is at the same end of the tank as the degassing unit, which allows for a shorter hose run. The T-piece fitted on the vacuum pump outlet of the pump enables connection to both 13.5mm ends of the 3M Liquid-Cel degassing unit.
9. Now fill the measurement tank; this enables the system to be tested in its working configuration. If necessary, it can be tested with a large container of water and then afterwards connected to the measurement tank. This may however introduce air bubbles which will need to be excluded.
10. Connect the 18.5mm hoses to either end of the WTK and to the measurement tank. The hoses can either be suspended in water or preferably connected via jubilee clips and hose connectors to predrilled holes in the side of the tank. If this direct connection is used, it is advisable to install valves on the tank inlet and outlet.

11. Connect the vacuum pump, water pump and UV to mains power, preferably via an RCD.
12. Turn everything on and monitor flow through the system. The outlet hose into the tank should start producing bubbles. If this is not happening, check the hoses for air pockets and press the red buttons on the filters. Do not allow the water pump to run dry for more than 1 minute.
13. If necessary, the outlet house can be removed from the tank and run into a large water container, so that the water flow can be more easily monitored.
14. If air locks are persistent, use a pressurised source of water (i.e. mains water) to pre-fill the system and thus prime the pumps, see Troubleshooting and FAQ for more information
15. Contact Precision Acoustics Ltd for further advice if needed.

INSTALLING / REPLACING UV LAMP

Before commencing installation or replacement of the UV lamp please note that the lamp and the quartz sleeve are easily damaged. Hold UV lamp by its ends only and wear protective gloves when handling quartz sleeves.

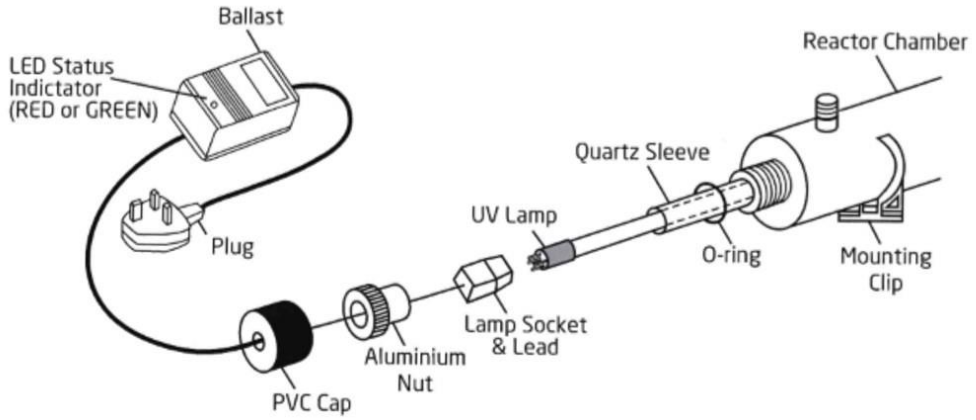


Figure 5 - Installation of UV lamp

1. Attach mounting clips to side of tank.
2. Attach UV Reactor Chamber to mounting clips.
3. Insert UV Lamp into quartz sleeve tube using protective glove, and then insert the sleeve into the Reactor Chamber.
4. Fit O-rings over each end of the quartz sleeve and screw the Aluminium Nut to secure the quartz sleeve in the Reactor Chamber.
5. Attach the Lamp Socket and Lead to the end of the UV lamp and then apply the PVC Cap over the Aluminium Nut to secure the UV tube in place.

The system is connected and running but outward flow is not matching the flow expected based on the input.

The most likely cause is air leaks in the system. Check all connections are tight enough, ensure O-rings are correctly seated and monitor for air leaks.

Water is not flowing from the outlet hose

The water pump is not exerting enough pressure to push the air out. Remove the outlet hose from the tank and coil into a bucket or similar water storing component on the floor next to the WTK. Water should now flow through the hose. Refit the hose on the tank and check that water is flowing satisfactorily from the outlet hose. If the water stops flowing at some point whilst returning the hose to the tank then try and lower the tank to beneath the point where the water stops flowing, else the pump is not strong enough for the configuration of your tank.

A loud whirring noise comes from the system

The system may have reduced flow along with this issue. The noise is caused by air passing through the pump from either a leak, the filters not being bled, or the system not being primed correctly. Turn off the system and check for water leaks. If this cannot be resolved, contact Precision Acoustics Ltd for technical support.

To resolve a bleeding issue

With all valves open press the red button on top of both filters, which should produce a small amount of water at the top of the filter housing. Check that water is in the inlet hose. At this point turn on the system, which should resolve this issue.

To resolve a priming issue:

If water won't enter the inlet hose automatically then the system will need to be primed, by filling the hoses and re-connecting them whilst filled with water. The above description of bleeding the system needs to be followed if any air is seen in the inlet hose. Place a water container next to the WTK and place the outlet hose into it. Fill the inlet hose with water that can be continually added to - a container used as a reservoir above the WTK, with valve is recommended. However, a tap or other similar solution can be used.

With all valves open the user will see water coming from the outlet hose. At this point the WTK can be turned on again. The noise is likely to continue, but the noise should subside as water begins to flow through the pump.

With the outlet hose moving water into the tank, then prepare to move the inlet hose quickly to the connection where water is expected to leave the tank and enter the inlet hose. When the connection has water flowing through correctly, then the system should run with no further issue.

The system will need to be primed more than once if air enters the inlet hose.