Installation procedure for the Wisy Rainwater system

Guidance notes for the installation of header tank system with WFF vortex filter, submersible Multigo pump and float switch control.

RAINHARVESTING SYSTEMS

PLEASE READ THIS ENTIRE DOCUMENT CAREFULLY.

These notes are intended as a guide only; the individual components have their own instructions. Details may vary from system to system, depending on such factors as layout and type of tank used. The use of non-standard European-style electrical plugs prevents other non-compatible appliances being connected into the system.

System design

There are three important principles of rainwater storage that ensure the quality of stored water. Firstly, water that enters the tank must be 'calmed' - i.e. rather than openly discharge into the tank it should be directed to the bottom where it can gently percolate upwards, below the minimum water level.

Secondly, the tank must overflow periodically, at least twice per year, in order that any floating debris can be removed by the skimming effect of a suitable overflow device. For this reason the volume of the tank should be carefully calculated to ensure that overflow conditions occur.

These first two principles are taken care of by the 'smoothing inlet' and the 'multisiphon' overflow trap fitted to RainSava tanks as supplied by ourselves. If you have sourced or constructed out own tank, similar arrangements should be incorporated into the design.

Thirdly, water should be extracted from the cleanest part of the tank; i.e. just below the surface, as achieved by the use of a fixed or floating suction filter. This ensures that the water extracted avoids both floating debris and bottom sediments. It is important that this bottom sediment is not disturbed as in time it will form a beneficial biological layer that assists in maintaining water quality.

Your rainwater system has been designed with these principles in mind and it is important for the well-being of the system that they are observed. It is also important that any water entering the tank should be as clean as possible and this is ensured by use of Wisy rainwater filters. It must therefore be observed that the filter elements are only removed for cleaning purposes and that this is done when no water is flowing through the unit (i.e. in dry weather!)

It is most important that these filters are kept clean and we therefore recommend that the stainless steel filter element of all Wisy FS or WFF filters is removed for cleaning

approximately every two months (or more often if it proves necessary). A visual check is not sufficient. Often the filter element is dirty even when it appears clean to the naked eye; a biofilm can develop within the fine mesh, effectively blocking the holes. Cleaning is achieved by either brushing with a fine nylon brush with washing up liquid and running water or in a dishwasher. Blowing through with a high pressure air-line has also proved effective.

This is the only routine maintenance necessary for the operation of the system, although we do recommend a visual check of the tank and its' components on an annual basis.

The system is made up of a number of separate components. Some of these are to be located in the underground storage tank, whilst the header tank the mains water top-up assembly and the level gauge (if used) are to be fitted in a convenient location within the building (e.g. utility or plant room). The schematic diagram below gives a general overview of the layout.

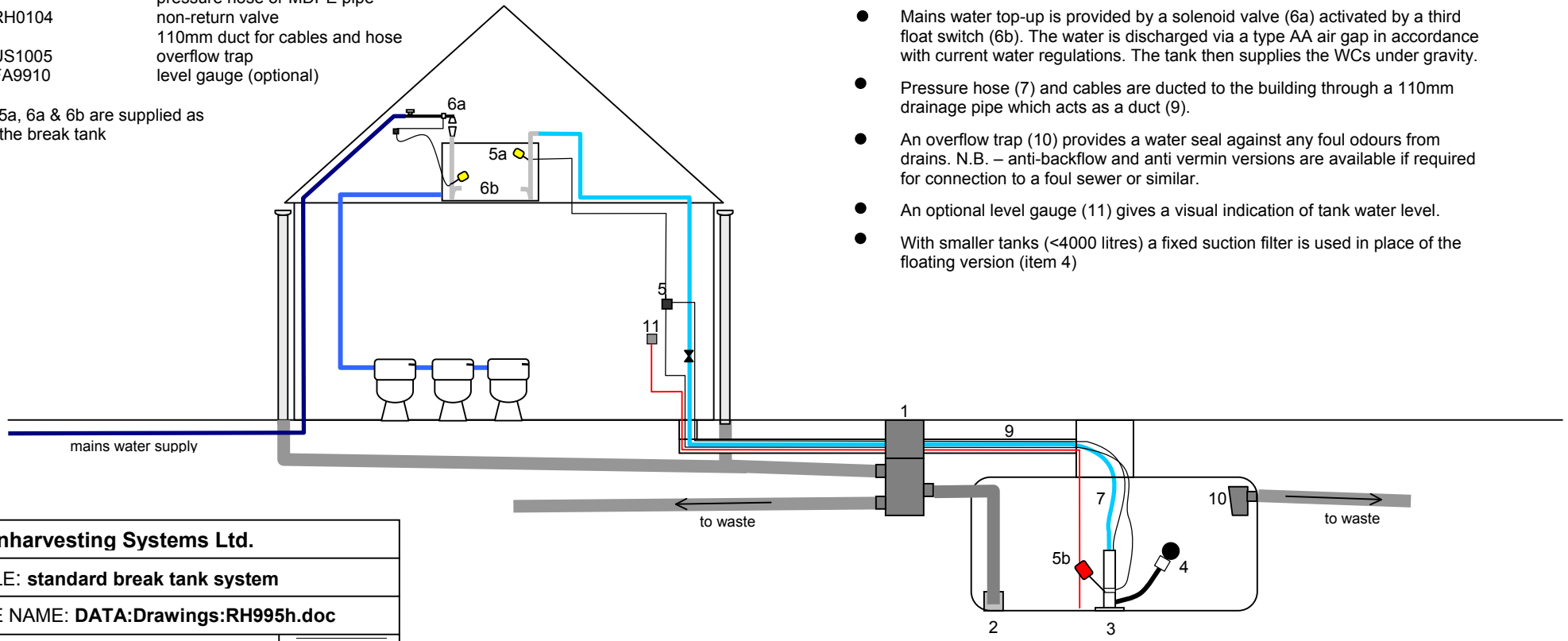
IMPORTANT:
Please read and understand these notes fully and plan where each of the components will be fitted before commencing work.
Decide upon the location of the components considering dry frost-free positions for components not housed within the tank
Refer to the accompanying drawings.
The 32mm MDPE pipe should ideally be black, not blue, or else marked to distinguish it from the mains water supply.
Interior pipework should also be clearly identified as non-potable. We stock a self-adhesive marker tape for this purpose.
Install the WFF filter following the instructions included with it.
For Domestic systems a UK adapter and special 'piggy-back' plug is supplied with the mains top-up kit.
All electrical work should be carried out by a qualified electrician.

WISY rainwater system with WFF filter, submersible pump, and mains top-up to header tank

Components

1.	WF1011	WFF filter
2.	EB0300	calmed inlet
3.	UP0199	submersible pump
4.	SS9931	floating suction filter
(or	SF9921	fixed suction filter)
5.	EBSPCP	control panel
5a	SS1004*	demand float switch
5b	SS1013	dry-run protect float switch
6.	HT0100/25/35/50	internal break tank
6a.	TW9901*	solenoid valve & tundish
6b.	SS1004*	top-up float switch
7.		pressure hose or MDPE pipe
8.	RH0104	non-return valve
9.		110mm duct for cables and hose
10.	US1005	overflow trap
11.	FA9910	level gauge (optional)

*items 5a, 6a & 6b are supplied as part of the break tank



- Rainwater is collected from the roof drainage system by the underground Wisy WFF vortex filter or filters (1). This filters out the debris from the water and diverts about 90% of it into the storage tank. The remaining water goes to soakaway or storm drain in the usual manner, as does the excess water from the tank. As water enters the tank it passes through a calmed inlet (2) which calms the flow of water and prevents disturbance of the float switch and any sediments.
- Water is then supplied on demand by the submersible pump (3) through a floating suction filter (4) to the header tank and so to WCs etc. The pump is controlled from a panel (5) that receives inputs from a float switch (5a) in the header tank to detect demand, and a float switch (5b) in the rain tank to provide dry-running protection.
- Mains water top-up is provided by a solenoid valve (6a) activated by a third float switch (6b). The water is discharged via a type AA air gap in accordance with current water regulations. The tank then supplies the WCs under gravity.
- Pressure hose (7) and cables are ducted to the building through a 110mm drainage pipe which acts as a duct (9).
- An overflow trap (10) provides a water seal against any foul odours from drains. N.B. – anti-backflow and anti vermin versions are available if required for connection to a foul sewer or similar.
- An optional level gauge (11) gives a visual indication of tank water level.
- With smaller tanks (<4000 litres) a fixed suction filter is used in place of the floating version (item 4)

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TITLE: **standard break tank system**	
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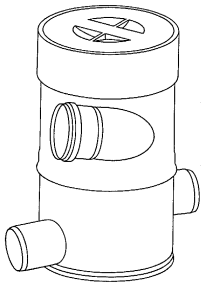
DATE: **Jan 02**	
SIZE: **A4**	

Installation Procedure

Pipework. When using a storage tank located below ground with the WFF vortex filter, three entry holes will be required into the tank, Please note the sizes below refer to systems with only one filter – tank connections will be upsized for systems with multiple WFF100/150 or WF300 filters.
One to accept the 110mm pipe from the filter unit
One to accept a 110mm pipe to act as a duct through which can pass the power supply cables to the pump and the float switch, and the tube from the level indicator, if used.
One to accept a 110mm pipe for the overflow to the soakaway - *NB - this must be the lowest entry point.
Be sure to obtain a tight seal wherever pipes connect to the tank! One method is to use a rubber connector such as Osma part no. 4S.206 in a hole 115mm diameter.
Rainsava tanks supplied by ourselves are pre-fitted with the necessary connections.

Stage 1 - Groundwork
A fall of at least 1:100 must be provided for the water inlet pipes. All pipework in the ground should be bedded and surrounded with 150mm pea gravel or sand.

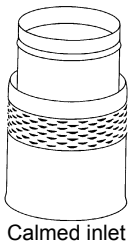


Install the WFF filter according to the instructions supplied with it.

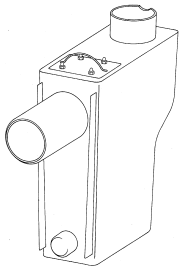
Locate the tank in the ground allowing for a sufficient fall from the WFF filter outlet. With some tanks it may be necessary to fit an inspection chamber over the top of the tank lid in order to bring it to ground level. Some tanks are specifically designed for below ground installation. Others will require a chamber to be constructed.to house the tank Seek advice from your tank supplier. *Rainsava* tanks supplied by ourselves are supplied with full installation instructions.

Lay the pipework to and from the WFF filter and from the tank to the soakaway. Rainwater downnpipes should join directly to drainage pipes via drain connectors and not via gully traps. This avoids the risk of someone inadvertently pouring undesirable liquids into the system, resulting in contaminated water. (e.g. painters slops, garden chemicals etc.) The pipe leading into the filter must only be connected to rainwater downpipes and must not receive surface water run off. The WFF100 filter accepts standard 110mm pipe. The WFF150 filter accepts 150mm pipe for the rainwater in and wastewater out connections and 100mm pipe for the pipe to the rainwater tank. The WFF300 filter accepts 300mm pipe for the rainwater in and wastewater out connections and 200mm pipe for the pipe to the rainwater tank

Stage 2 - Storage tank
The pipe from the filter to the tank must be of the correct size and should enter and then continue right to the bottom of the tank where it should terminate in a **calmed inlet** (Wisy part no. EB 03 00, or you could make your own). If using a *Rainsava* tank purchased through us this item is pre-fitted.



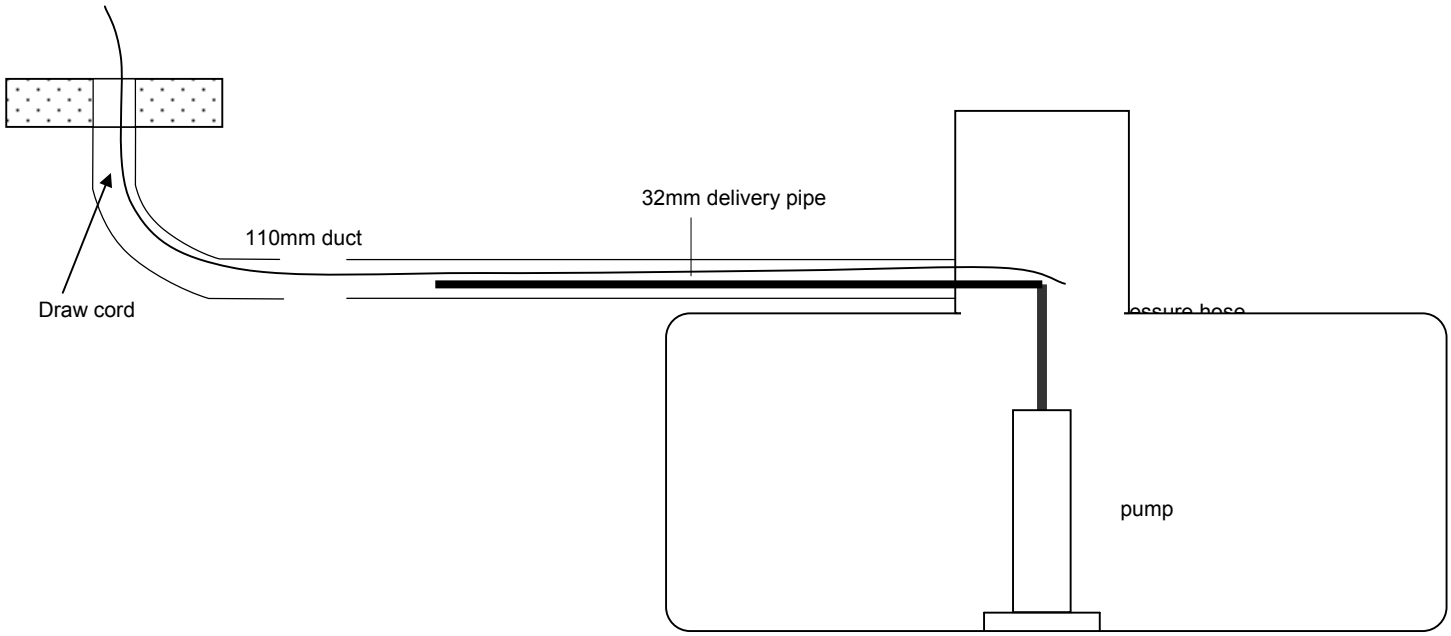
Calmed inlet



Wisy overflow trap

The overflow pipe from the tank should have an **overflow trap** on the inside of the tank in order to prevent foul odours entering. Either assemble your own or use a purpose made unit available from us (Wisy part no. US 10 05). If using a *Rainsava* tank purchased through us this item is pre-fitted.

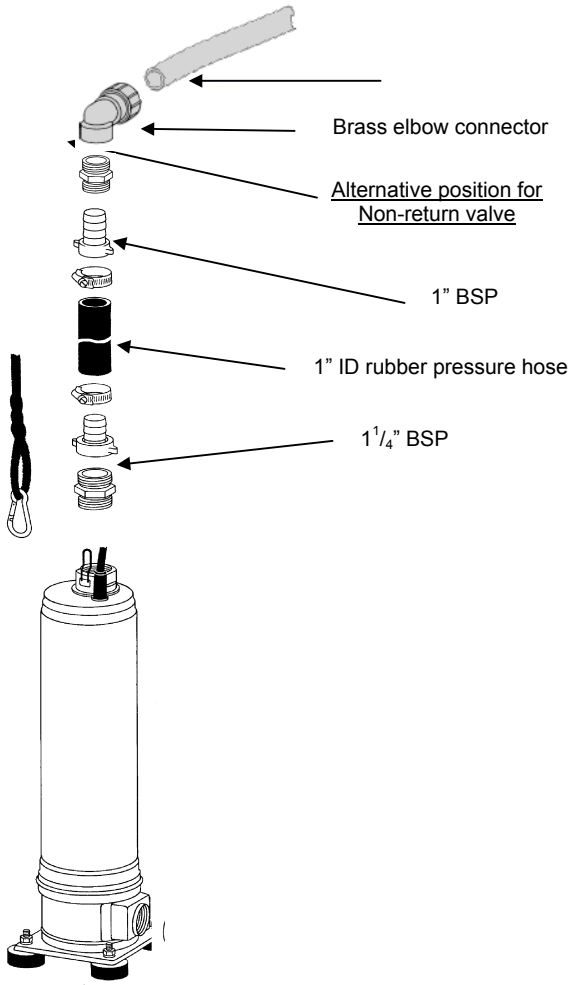
Lay the 110mm pipe to act as ducting from the building to the tank. Avoid sharp bends to ease the task of feeding the pipe and cables through the duct (use two 45º bends rather than one 90º). A nylon draw-cord should be placed into the duct when it is laid to enable the cables to be pulled through. Do not backfill any trenches until the installation is complete and the system has been tested.



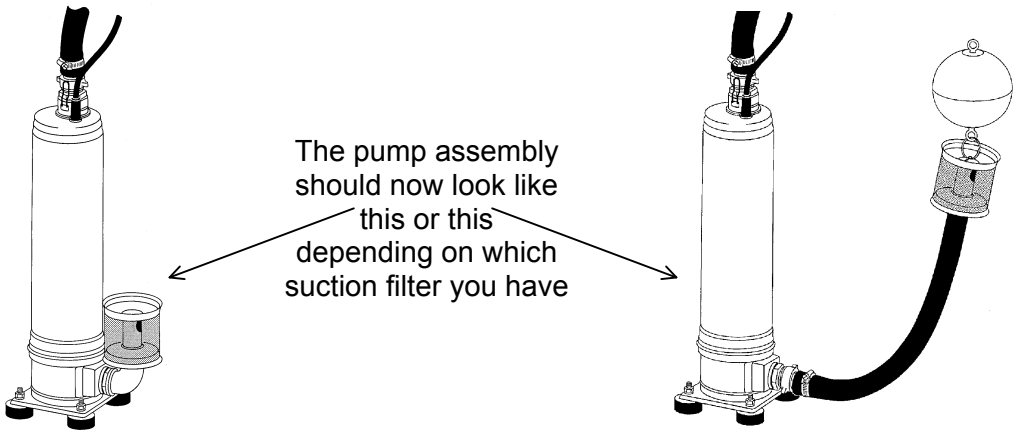
Lay the 32mm MDPE pipe from the house to the tank: the pipe should be of sufficient length to reach from the centre of the tank directly above the pump to the location of the pump controller in the house (see page 8).

Pump. Follow the separate instructions for the Multigo pump and remember to fit the rubber feet to the baseplate. Assemble the short length of plain rubber pressure hose and the brass fittings and the worm-drive hose clamps as shown in the diagram. Connect this to the outlet (top) port of the pump. The flexible rubber hose will have to be cut to length so that it will be straight when the pump is in position. This can now be connected to the MDPE pipe from the duct – this can be measured with the pump in the tank on its platform.

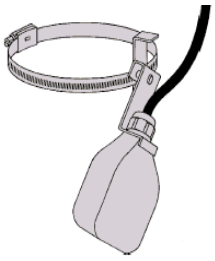
N.B. - Use a thread sealant (e.g. Loctite) on the brass nipples where they fit into the pump body



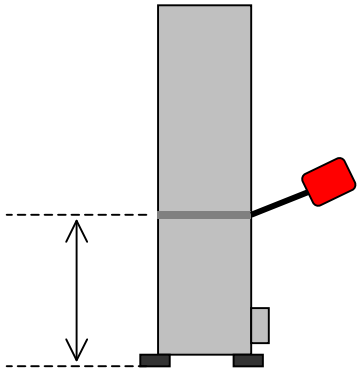
Suction Filter. You will have been supplied with either a fixed suction filter (FAFF) or a floating suction filter (SAFF). To fit the fixed filter, screw the brass nipple into the pumps' suction port and then screw on the 90º bend attached to the filter. To fit the floating filter, attach the 1m length of suction hose (with pre-fitted brass fittings) to the inlet (bottom) port of the pump in the same way. The floating suction filter can now be fitted to the other end of this hose. Ensure all joints are tight.



Float switch.



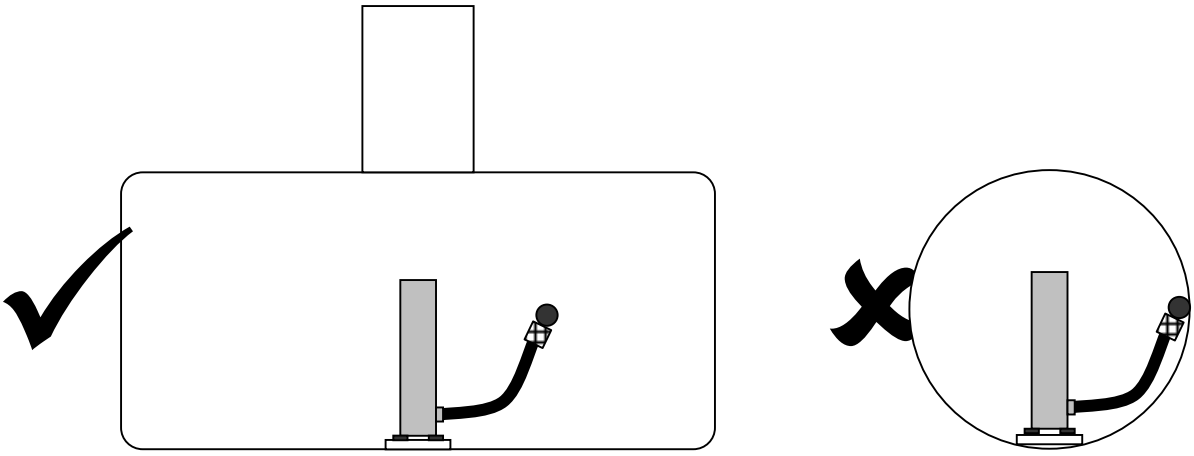
Fit the float switch assembly according to the instructions supplied with the unit. The worm-drive clamp can be fitted to the body of the pump, but ensure it is not likely to foul on the suction filter. The 'switch point' of the float switch must be above the level at which the suction filter can no longer extract water, we recommend fixing the clamp approximately 30cm above the base of the pump.



Carefully lower the complete assembly (pump, float switch and suction filter) into the tank using the cord supplied that attaches to the ring on top of the pump. This cord must remain attached in case you ever need to remove the pump. The loose end should be tied to a convenient point where it can be easily reached. (it may be a good idea to fit a brass or stainless steel eye to the inside of the tank for this purpose) *N.B. - Rainsava tanks are fitted with a platform directly below the access shaft on which the pump should stand.*

The cables from the pump and the float switch must be fed through the duct pipe to the building. These can be pulled through using the draw cord that was previously placed in the duct. Note – if you are installing a tank level gauge with your system, it is wise to also include the tubing supplied with this with the cables, thus drawing all three through the duct at the same time.

For pumps fitted with a floating suction filter (SS 99 31) - Once in the tank, orientate the pump so that the suction filter is facing along the length of the tank – this ensures that there is no risk of the filter becoming caught on the side of the tank as it empties. N.B. - Systems using smaller tanks (3000L or less) are supplied with a fixed suction filter (SF 99 21) and this eliminates the problem.

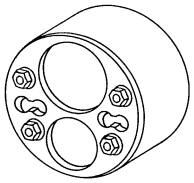


With the pump in its final position, connect the 32mm MDPE pipe from the service duct to the brass elbow fitting at the top of the rubber pressure hose. Ensure the pump sits steadily on its platform. It should be vertical and should not have any lateral pressure exerting upon it from the outlet hose

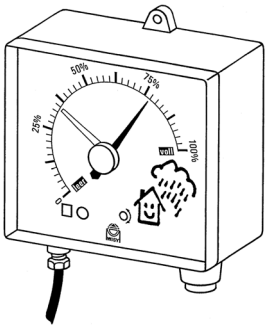
Stage 3 - Interior work

The duct from the tank should terminate in a convenient location within the building (e.g. utility room). The following services should be present within the duct:
Delivery pipe from pump
Pump power supply cable
Dry run float switch cable
Small-bore tube from pneumatic level gauge (if used)

If a proprietary pipe bung is to be used then the pipes and cables should be passed through it at this point. The bung can then be inserted into the end of the duct pipe to form a seal. Alternatively, the end of the duct should be sealed by some other means to prevent cold moist air from the tank entering the building.



Pipe bung



Water Level Indicator (if supplied). Mount the display unit in a suitable location inside the building. Follow the separate instructions supplied with this unit.

The air tube that is supplied with the unit should be long enough to reach to the base of the tank. Additional tube and connectors are available if required.

Control Panel

Locate the panel on a suitable internal surface and make the electrical connections indicated on the drawing below. The two most common alarm configurations are: -

a, As shown in the drawing on the following page.

b, With the dry run and demand switches in series across terminals G1 at A and a link joining com and max terminals at B and D so that the alarm condition only occurs when the panel's current protection has tripped the pumps out.

Non return Valve

The fittings include a MDPE to 1" bsp fitting and a Non-return valve, these are usually located close to where the duct enters the building. If this is an inaccessible position then we would advise fitting the non-return valve in the position shown on the pump fittings diagram above (this would require an additional 1" nipple).

Header tank -

The header tank serves two purposes; firstly as a temporary store of water in the event of pump or power failure. Secondly, it serves as a convenient location for the mains water connection which gives an automatic backup to the rainwater supply.

The mains connection must be set up so that the mains water only comes in when the water level is below the rainwater pump switch on level.

If a header tank and assembly has been supplied by us then it will be as shown in the drawing below with the two inlets and float switches pre fitted. Please fit in accordance with the tank manufacturers notes provided with the tank.

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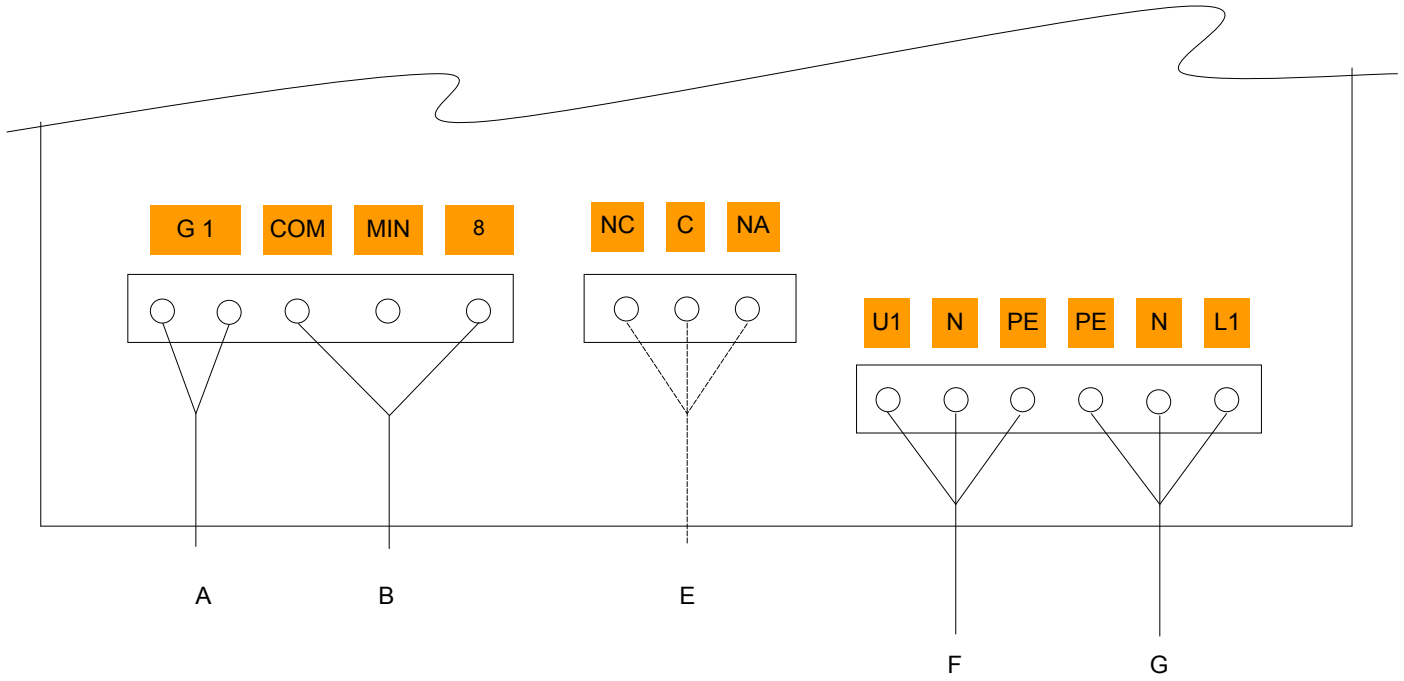
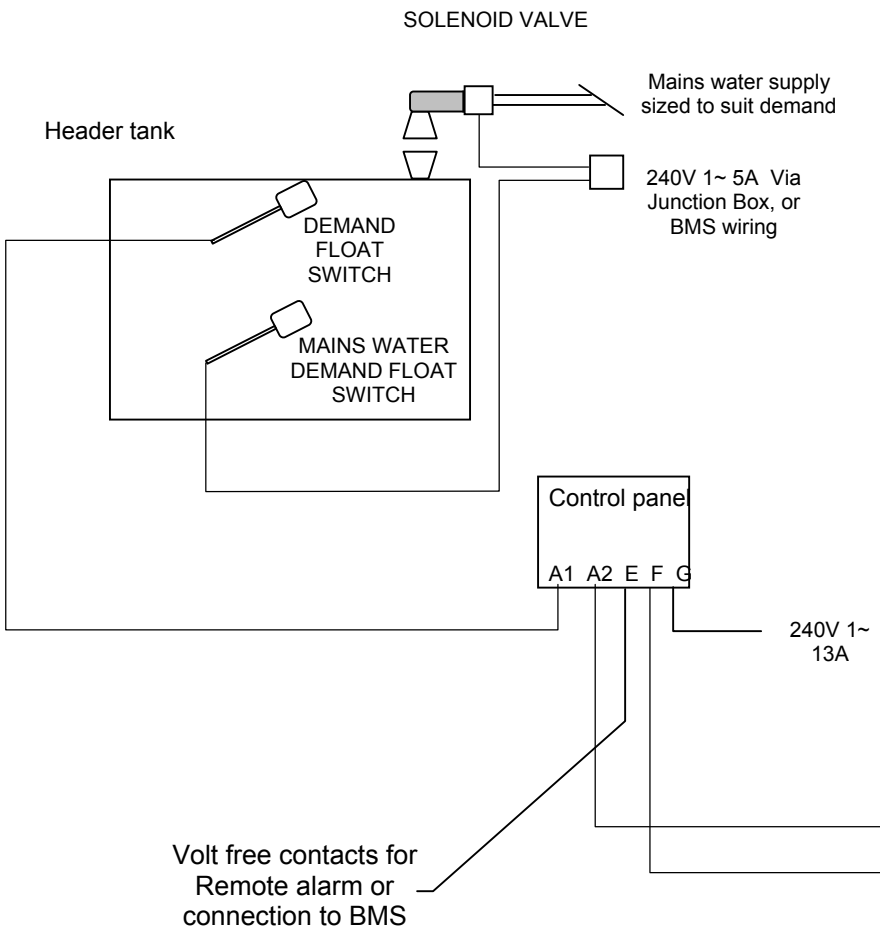
Single Pump Control panel. Configuration for simple header tank system.

This configuration is most useful where no external alarm is fitted (or an ambiguous external alarm can be tolerated)



A	Demand Switch - yellow float switch (or sinker switch) in header tank,
B	Dry run protection switch / alarm - red float switch in Rain tank - check that configuration link marked "S R SEL SONDE" is across the S contacts. Alarm light will then show either when Rain tank is "dry" or when current protection circuit has isolated the pump (in the latter case the pump tripped light will also show)
E	Alarm volt free contacts for remote output, - alarm on and alarm off - if required. (will give alarm conditions as above)
F	Pump power (U1 = Live, N =neutral, PE = earth)
G	Power from main switch 240V 20 Amps. Live is via current sensor, Earth direct from incoming cable

NB Panel is to IP55 and also contains:-
- -Door interlock main switch
- -Sensitivity and time delay adjustment for current protection circuit, (set to 2 secs and 6 Amps for 40/06 pump)
- -Sensitivity adjustment for level switches/probes (alarm) circuit, (set to "min" for systems using switches)
- -Fuses for pump and auxiliary circuit protection
- -Enclosure is to IP55 and is drilled with four holes and supplied with cable glands
- -Configuration links for: - empty or fill switching (in alarm circuit), disable alarm, disable current protection.



WIRING SCHEMATIC FOR SYSTEM WITH SINGLE PUMP CONTROL PANEL AND HEADER TANK.
(With “pump tripped” alarm function from panel)

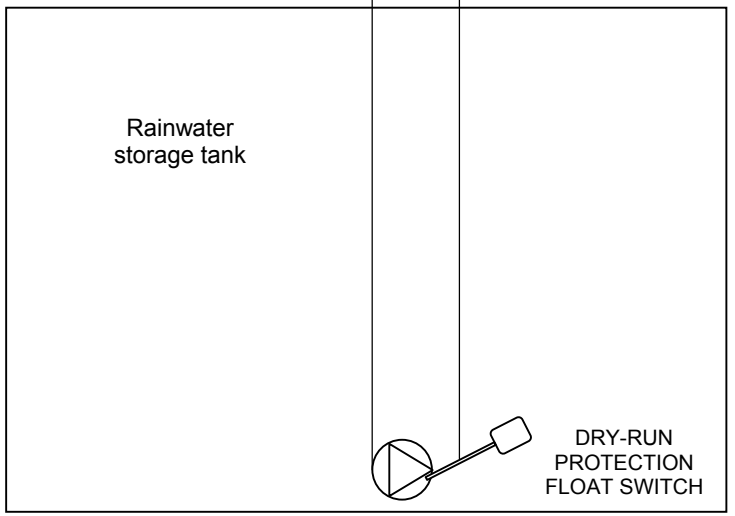
Note:
Pump cable is 20m length,
Solenoid valve is supplied with 1.5m cable
Float switches are all pre-wired (with lengths of cable available at 3m or 20m.)

The pump control and the top-up control are on two independent circuits.

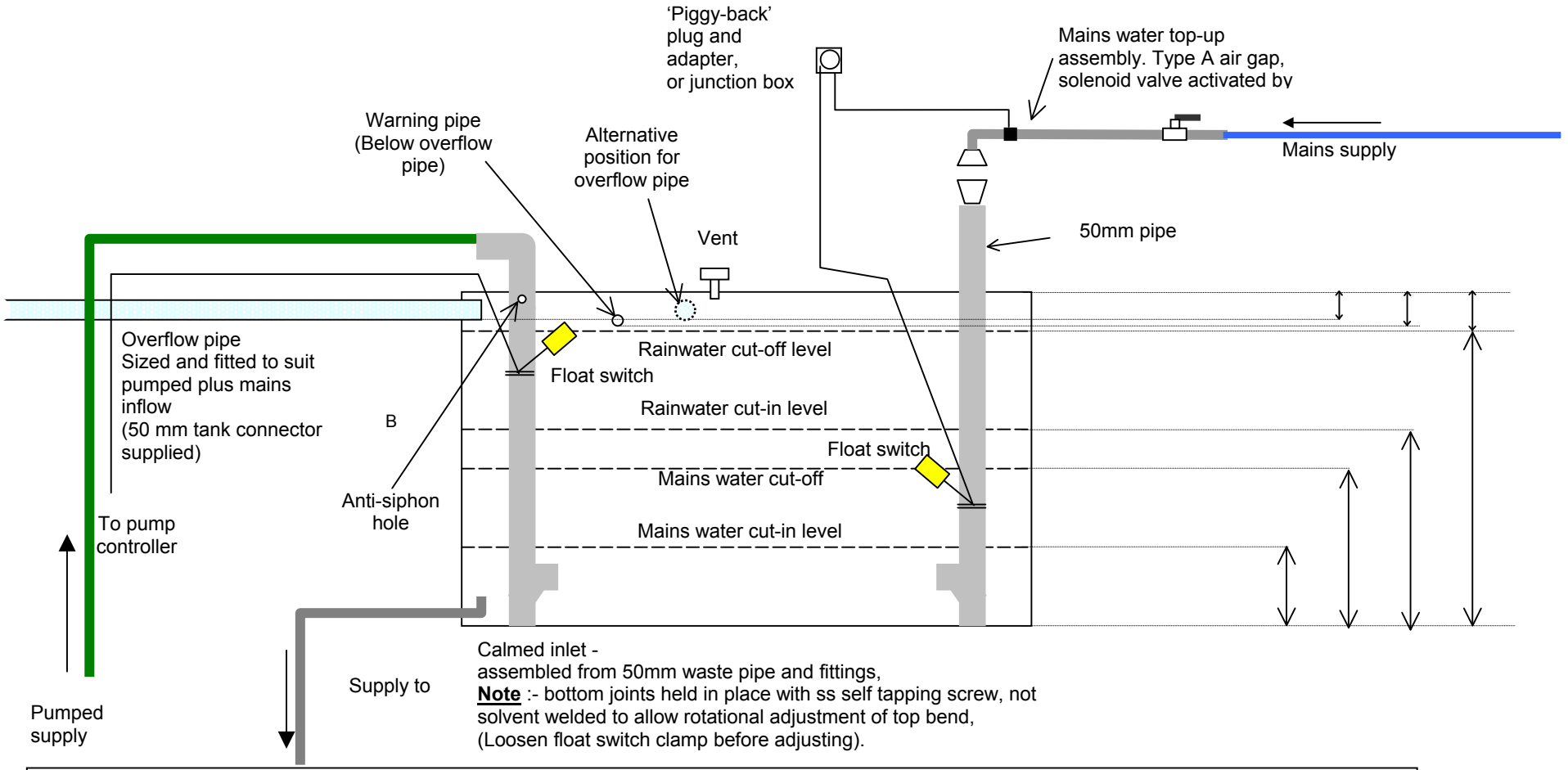
The junction box to control the mains water top-up should be wired as a simple switched circuit with the yellow float switch operating the solenoid valve. In domestic situations a piggy-back plug may be used in place of the junction box and fused spur.

This diagram should be read in conjunction with the wiring detail drawing for the control panel (page 10)

If an electric tank level gauge is used, this will require an additional 240v 5 Amp supply.



Header Tank Detail
Arrangement with two inlets



How It Works.

The lower float switch activates the solenoid valve, which provides mains water during dry periods when there is no rainwater available, or if the pump should fail.

The upper float switch controls the pump, switching it on and off when required.

Note the distance between the on and off switching points for each float switch can be set at either 4 or 9cm. The setting will depend upon the overall depth of the tank, but we recommend using the wider 9cm setting where possible to reduce wear on the pump.

The rainwater ON level must be higher than the mains water ON level with a tolerance to allow for some difference between inflow and outflow.

The overflow may be connected to a discreet outlet provided that the warning pipe discharges to provide nuisance. If there is any possibility that the overflow pipe will not easily take the combined flow from pump and mains water top-up then it is advisable to bund the tank

Mains water top-up assembly. This consists of four items;

i).a special ‘piggy back’ plug (except non-domestic or larger systems).
ii).a UK 2-pin adapter (except non-domestic or larger systems).
iii).a special float switch mounted on a worm-drive clamp
iv).a solenoid valve/tundish assembly.

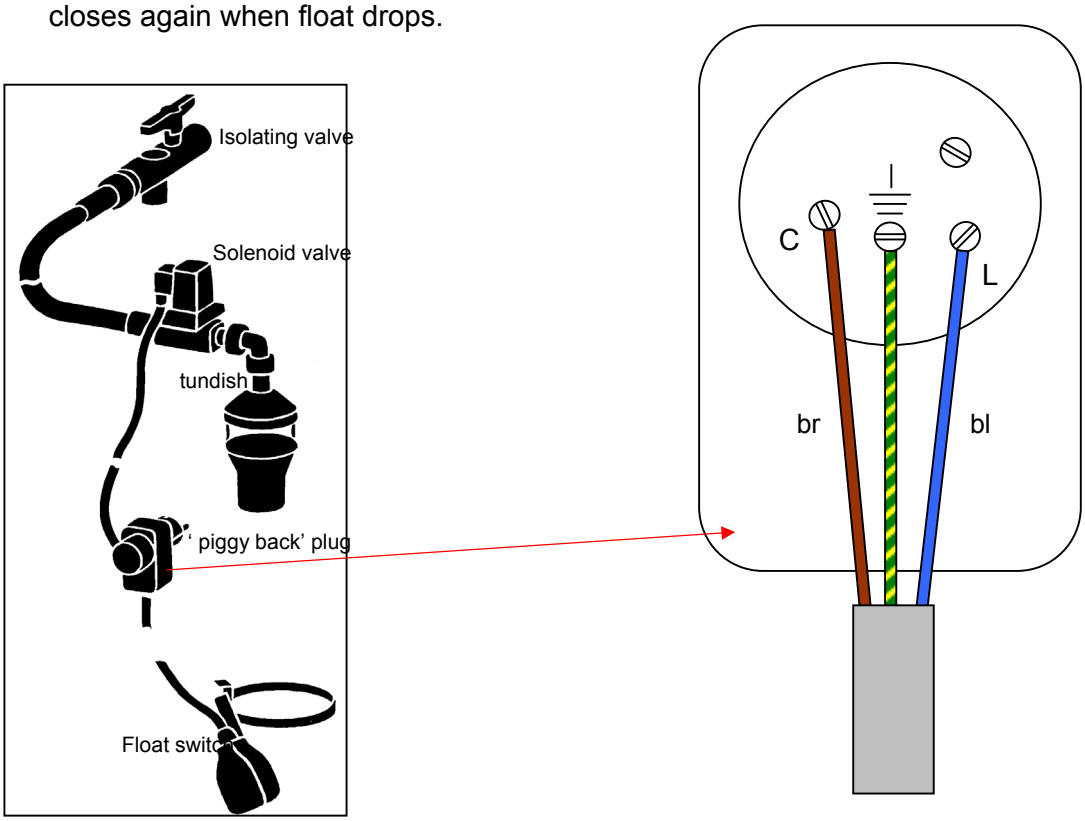
The float switch is fitted to the 50mm inlet pipe in the header tank.

Fit the hose with the solenoid valve and tundish assembly. The tundish fits directly into the 50mm waste pipe installed in the header tank. Connect the other end of the assembly to the mains water supply, having first closed the integral manual isolating valve.
N.B. – built into this valve is a dirt strainer designed to protect the solenoid valve from any particles that may cause it to malfunction. This strainer should be periodically removed and cleaned if necessary.

Connect the lead from the float switch into the special ‘piggy back’ adapter according to the instructions below, (or use a suitable electrical junction box).

N. B. The cable from the float switch can either be connected into a junction box or into a special European ‘piggy back’ plug, which also acts as a socket for the plug from the solenoid valve. The cable from the float switch should be wired into this plug as shown in the diagram below. Note that the BLUE wire is connected to the live terminal.

- Plug the lead from the solenoid valve into the “piggy back” plug, and then plug this in turn into the UK adapter. (Alternatively, the float switch and solenoid valve cables can be ‘hard-wired’ into an switched fused outlet.)
- Check that the solenoid opens when the float is moved to the up position and closes again when float drops.



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Stage 4 - Commissioning procedure

A. Comission the header tank and mains top-up kit first, check that it is in accordance with the drawing (RH 994a) above and record the mains water switch on/off levels on the drawing above.

B. Check that the header tank insulation jacket has been carefully installed, to avoid heating and/or cooling of the stored water.

C. Ensure that there is enough water in the rain tank to raise the dry run switch(es) and that the suction filter is below water level.

D. Check all wiring connections to the control panel.

E. Check all configuration links and trip current settings in the control panel.

F. Check the plumbing connections from suction filter to header tank.

G. With pump switch(es) to off, switch on power to the panel.

H. Panel alarm (thermal cut outs and/or dry run protection) should be off.

I. Switch pump to automatic, The power to pump lamp should light up (if not check demand float switch and wiring) and the pump should activate and begin pumping water, If not go to (Y) below

J. Allow the header tank to fill and check the operation of the header tank, fittings and float switches, record the switch on/off levels for the rainwater, and the warning pipe and overflow pipe invert levels. Continue attempting to fill the tank to ensure that the overflow can easily take the combined flow from the pump and mains water top-up. Check that the warning pipe will provide a warning.

K. If the pump thermal protection trips put then check that the threshold setting is appropriate to the pump and that the time delay is set to 2 secs. if the pump trips out at these settings then investigate possible pump operation problems.

L. Check all pipes and joints for signs of leaking and rectify accordingly. At the same time check that there is no flow back through the non-return valve immediately after the pump switches off.

M. Ensure that marker tape is applied to all pipes in the building that are connected to the system, such as the supply pipes to the WCs and washing machine. The pipes should be clearly labelled along their entire length and should state that the pipes content is ‘unwholesome’, ‘non-potable’, ‘not for drinking’ or similar. This clearly identifies the water as being other than from the mains supply:

RECLAIMED WATER	NON-POTABLE

Similarly, any taps, valves and any other outlets connected to the system should be clearly identified. We stock a self adhesive label for this purpose;

Remedial measures in the event of commissioning failure

(Y) Check that the pump is primed, it may be necessary to open a connection at the top of the flexible hose to release air from the system. Check that the pump thermal protection has not isolated the pump.

If you encounter any problems or are unsure about how to proceed with any part of the installation, please call our support line on 01452 772000.

If for any reason you need to prevent the WFF filter from operating (e.g. work on the storage tank or the inlet pipe), a ‘blind’ filter insert is available (for sale or hire) from Rainharvesting Systems Ltd. This allows all the water to pass directly to the dirtywater outlet.

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Operation and Maintenance

Your rainwater system is now operational. The most frequent maintenance required is cleaning of the filter, see below, it also is worth performing a system check annually, which could be based on the commissioning procedure above, to review performance and check that the system is performing as it did when new. ***Note*** *if the alarm indicators are not obvious then a frequent and regular review of their status may be required*

Cleaning the WFF filter, the filter requires regular checking and cleaning of the filter insert. Normally, three - four times yearly is enough, but check regularly at first until you establish the appropriate time interval for your situation. If a lot of dust is present the cleaning times may be more frequent. N.B. it is very important that the filter is kept clean and failure to do so will result in a decrease in efficiency

We are continually striving to improve our products and we welcome any feed back from clients and installers that may assist us.

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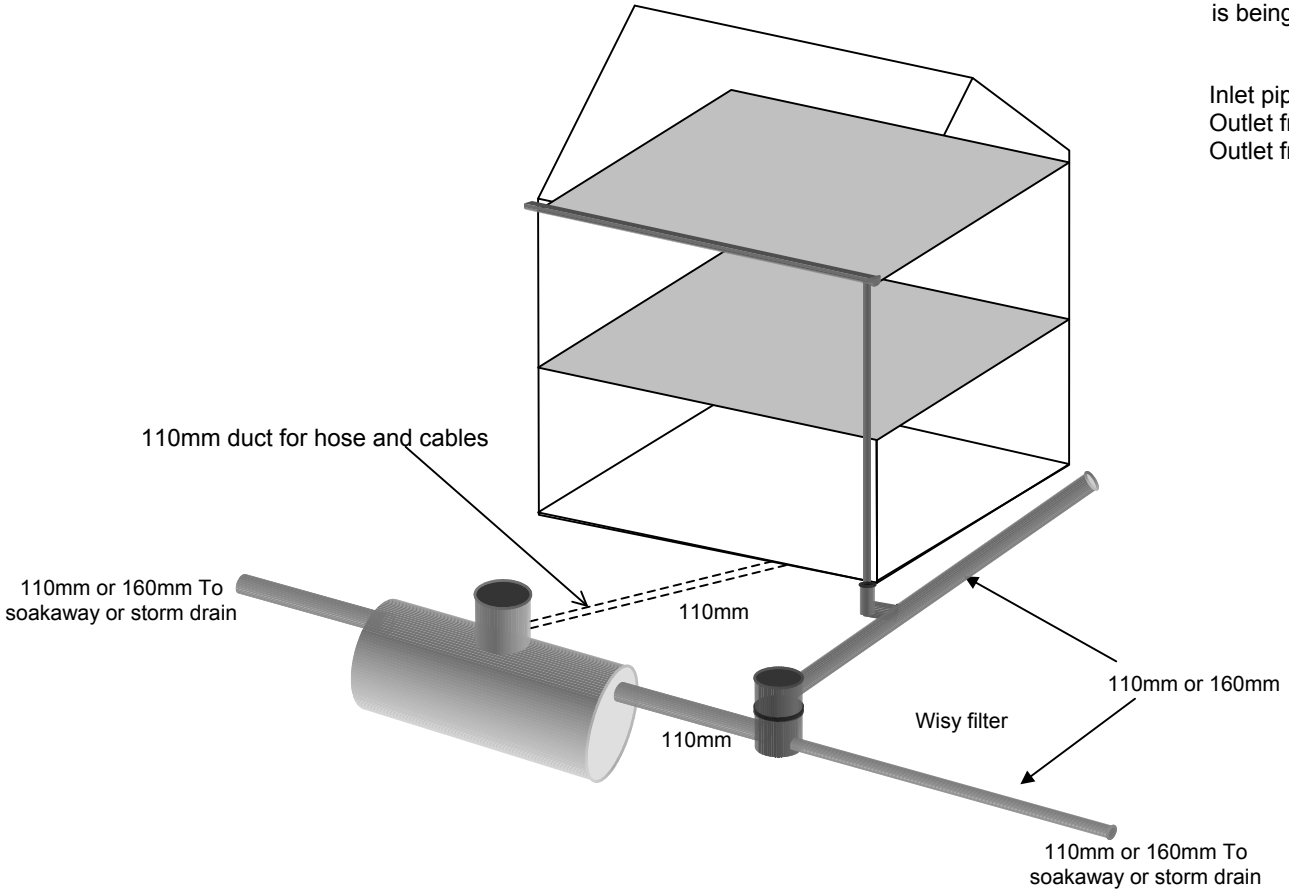
Suggested layout for drainage pipes connected to the filter and storage tank. For clarity other components are not shown here.



Note: pipe sizes will vary depending on which WFF filter is being used. The filter connections are as follows:

	WFF100	WFF150
Inlet pipe to filter	110	160
Outlet from filter to tank	110	110
Outlet from filter to drain	110	160