Rainwater Harvesting

Installation and maintenance instructions

AA Eco Plus Rainwater Harvesting System



1. GENERAL NOTES

The points described in these instructions must be followed correctly. If not correctly observed, any right to claim on the warranty may be refused.
Any missing instructions must be requested directly from us.
A complete check of all the items/components for possible damage must be carried out before the assembly or installation begins.
The installation must be carried out in a professional manner.

Safety

The relevant accident prevention regulations according to BGV C22 must be observed during all works.

Furthermore, when carrying out assembly and installation work, inspection, maintenance and repairs, all work regulations and norms must be followed. You will find the advice in the appropriate sections of these instructions.

The installation of the system and/or single equipment parts must be carried out by a professional worker. The complete system must always be out of operation and guarded against unauthorized use when carrying out work on the plant or parts of the system.

Certain parts of the system are under electrical voltage and must not be opened. Working on the electrical system may only be carried out by a professional electrician.

All electrical wiring and connections must be in faultless condition. If damaged, the system may under no circumstances be brought into operation.

In case of damage, the equipment may lose water. The equipment may fall, so it is important to check that the wall material and the fixing brackets are adequate for the load.

The use of accessories that have not been approved by Graf results in the exclusion of warranty.

Identification obligation

THE WATER IN THESE SYSTEMS IS NOT SUITABLE FOR CONSUMPTION OR PERSONAL HYGIENE.

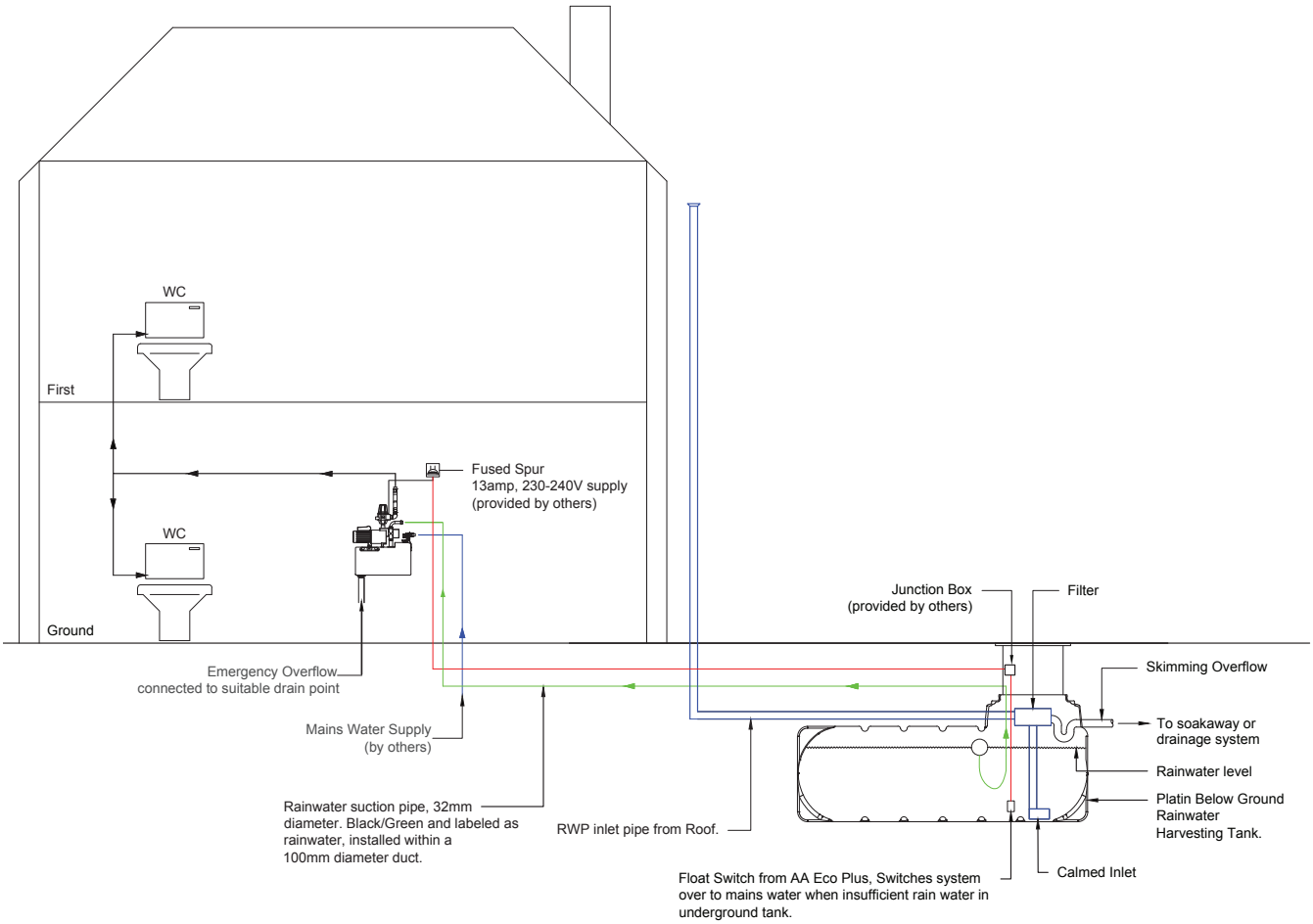
All pipe work and outlets of the water systems are to be labelled with the words "NOT DRINKING WATER" either in words or graphically so that after years of use, an accidental connection to the drinking water system is prevented. Even when correctly labelled it may be possibly mistaken, for example by children. For this reason, all the outlets of the systems process water must be fitted with child-proof locks.

2. APPLICATION

The AA Eco Plus is a float switch controlled management system for rainwater. It is intended for service water in private homes and small apartment developments. By using an automatic back-up supply from mains water that delivers water to the tank if required, the rainwater system guarantees supply of process water.

The process water may be used to water the garden, flush toilets and supply washing machines.

The AA Eco Plus must be installed in a frost free and dry environment that is above any flood levels. Further information regarding the systems specifications, assembly and operation are detailed in the following sections.

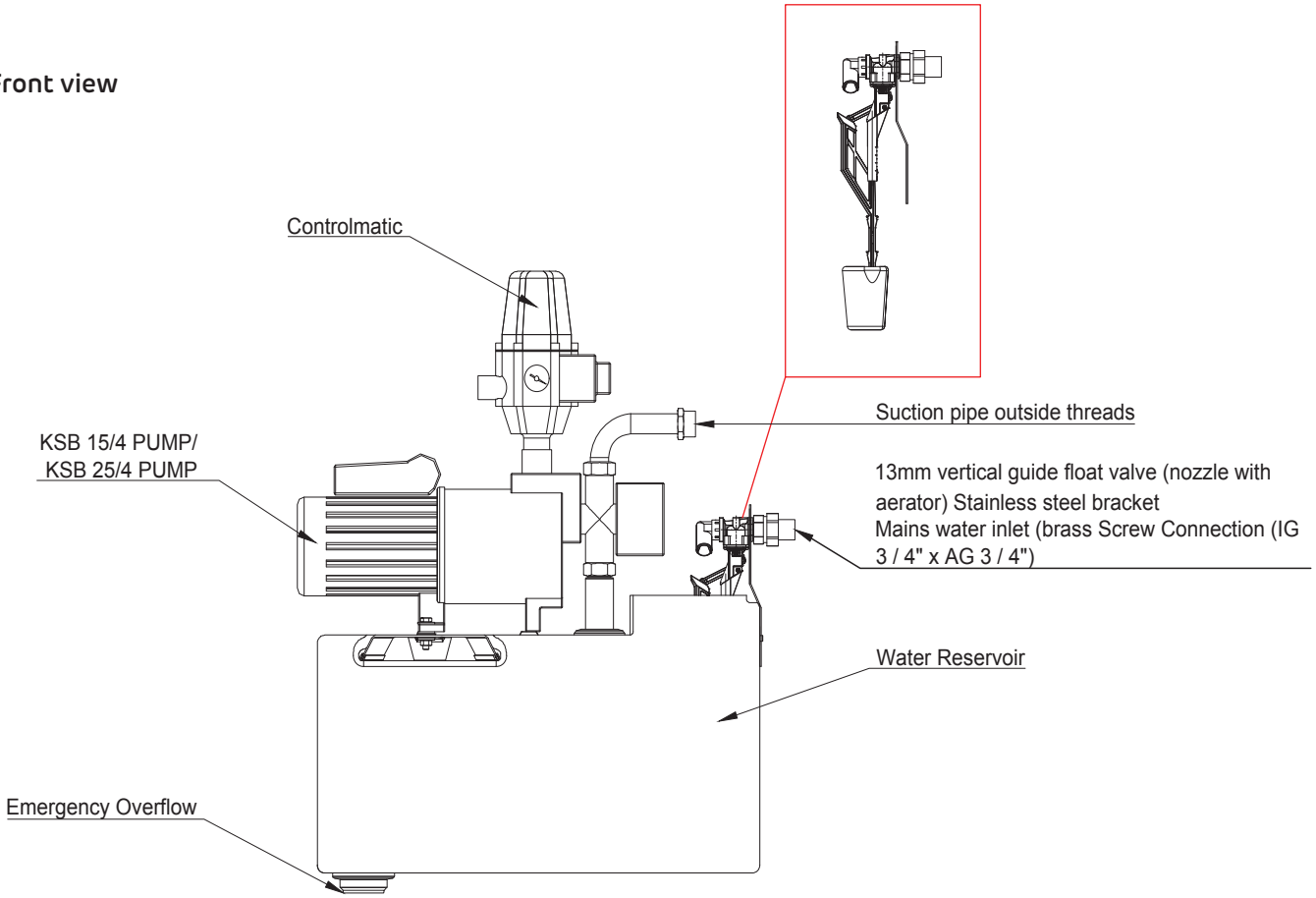


3. TECHNICAL DATA

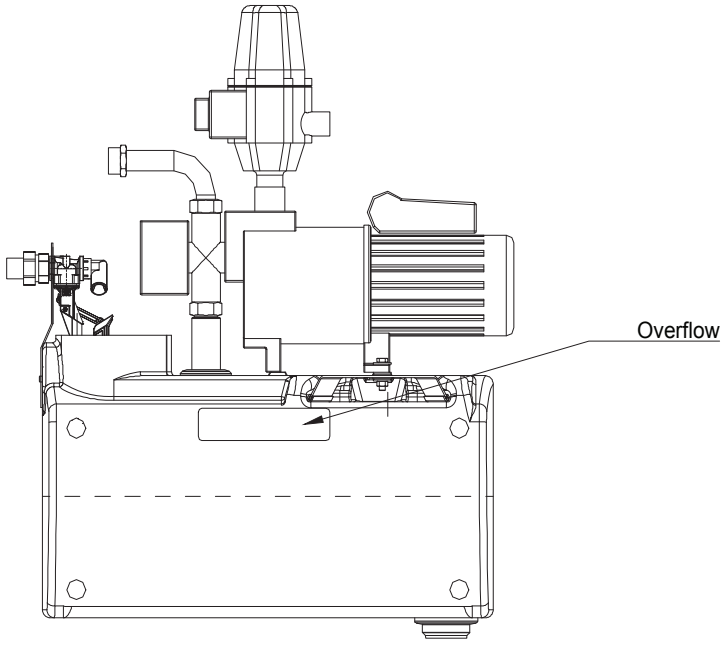
Dimensions and weight

Weight: approx. 30kg

Front view



Back view



4. SYSTEM CONTROL

Float Valve	
Operating temperature	30° max.
Operating pressure	0.3-4.5 bar
Cv-value	1.2-3.6 m^3/h
Connections	¾" AG

3 Way Valve	
Voltage/Frequency	230 V / 50Hz
Output	6 W
Max. flow rate	16m^3/h
Opening time	ca. 10 sec
Close time	ca. 5 sec
Max. pressure	10 bar
Allowable pressure differential	0.7 bar

Controlmatic (pressure and flow rate sensor)	
Voltage/Frequency	230 V / 50Hz
Protection classification	IP 44
Max. flow rate	10m^3/h
Min. flow rate	0.1m^3/h
Max. operating pressure	10 bar
Min. opening pressure	1.5 bar
Max. opening pressure	2.6 bar

Restarting after dry running the pump is possible by means of the "RESET" button.

If there is water pressure hammering in the system due to the rapid closing of valves (e.g. solenoid valve in the high pressure cleaner) then please contact Graf.

Pump	
Drive unit	Single phase AC motor 220-240 V / 50Hz with integrated overload protection IP 44, isolation class F.

KSB Superinox 15/4	
Power requirement	660 W
Max. pump head height	35m
Max. pressure	3.5 bar
Max. pump discharge rate	3600 l/h
Max. suction height	6m
Max. suction length	15m

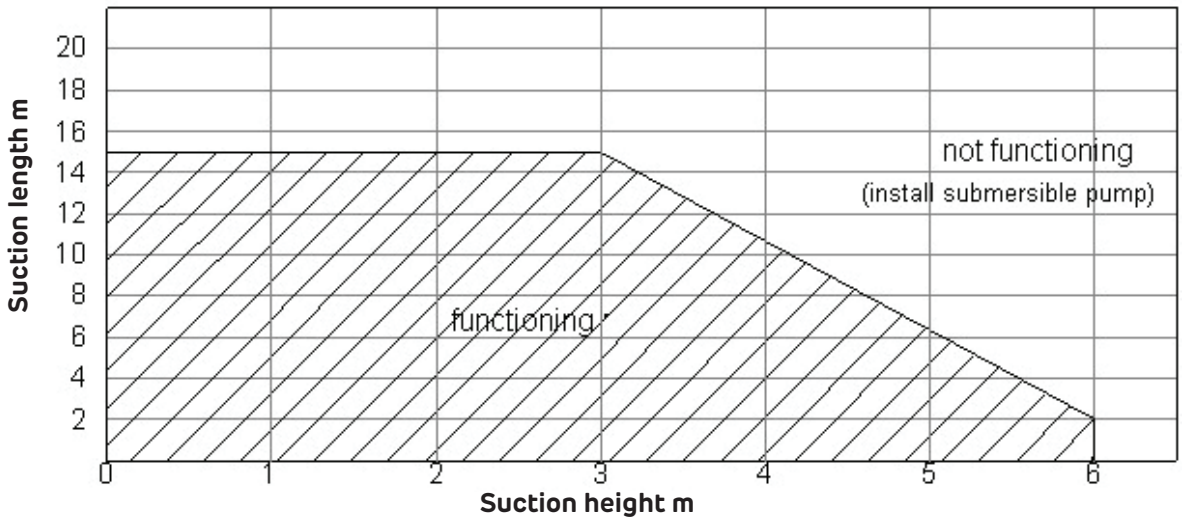
See diagram

4. SYSTEM CONTROL *continued*

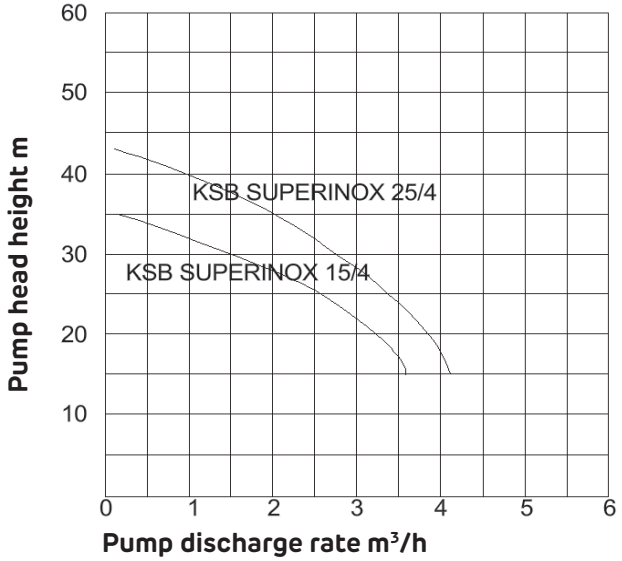
KSB Superinox 25/4	
Power requirement	800 W
Max. pump head height	43m
Max. pressure	4.3 bar
Max. pump discharge rate	4200 l/h
Max. suction height	6m
Max. suction length	15m

See diagram

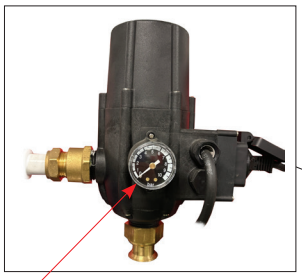
Suction height in relation to the suction length



Pump discharge rate in relation to pump head height

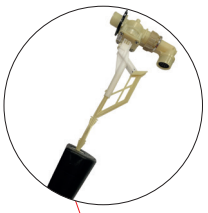


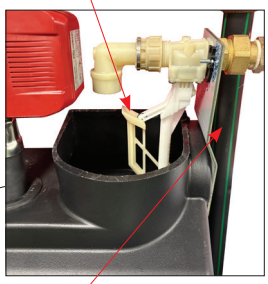
Pump Control Schematic



Controlmatic

DN 13 float valve (3/4" threaded connection





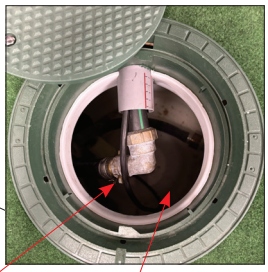
32mm black and green pipe

Figure 1



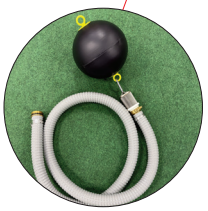


Emergency overflow - 40mm compression





Floating switch



Floating intake

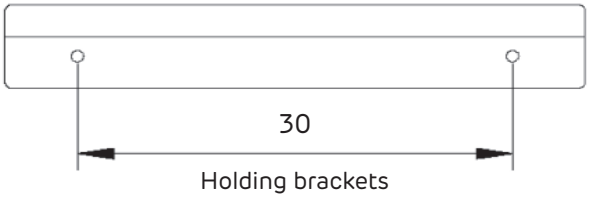
5. INSTALLATION AND ASSEMBLY

Remove the AA Eco Plus from its transport packaging. Firstly, check all the equipment for any possible damage. Any damage must be reported before assembly and installation begins.

Wall assembly

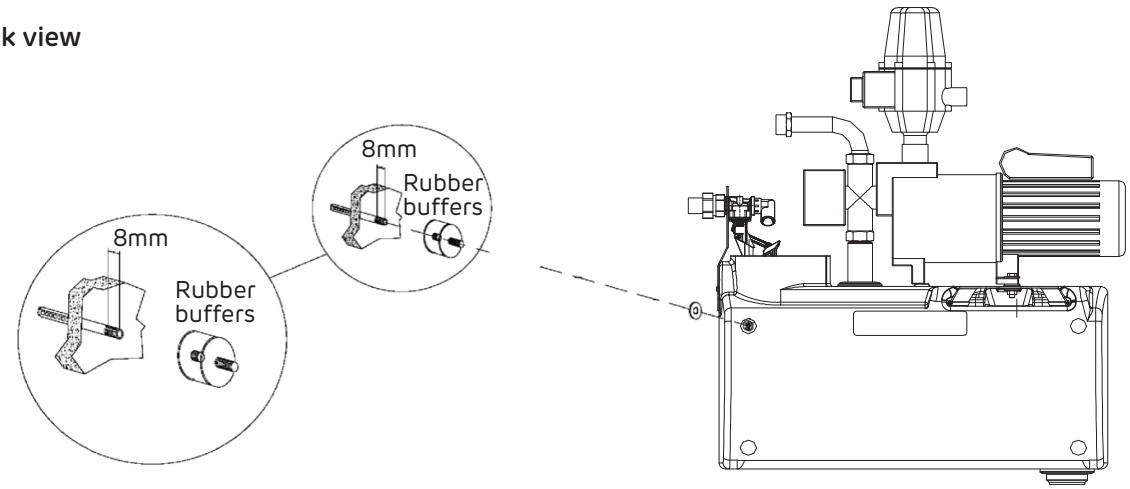
The AA Eco Plus must be installed above the back surge level and in a frost free and dry environment that is above any possible regional flood levels.

When choosing a position for installation, it is important to be sure that there is at least 50cm free space available above the equipment for any maintenance or adjustment regulation. The wall intended for mounting must be suitable for supporting the equipment with an approximate max. weight of 40kg when filled with water.



The holes to be drilled are marked out on the wall using the brackets as a template and then drilled with a 10mm masonry bit, the holes should be approximately 60mm deep. Insert the enclosed dowel plugs and then screw in the stud bolts so that approximately 8mm remains protruding. Attach the four rubber buffers to the outside corners at the rear of the water feeding module, ensuring a free flowing space is maintained for the overflow in accordance with WRAS requirements. Then place the unit into position.

Back view

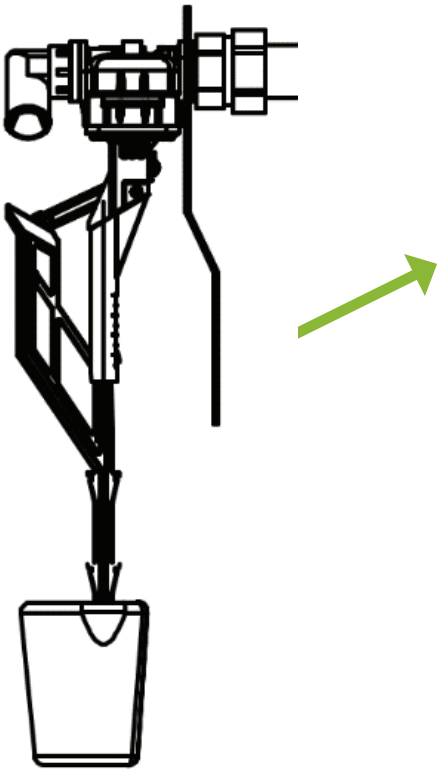


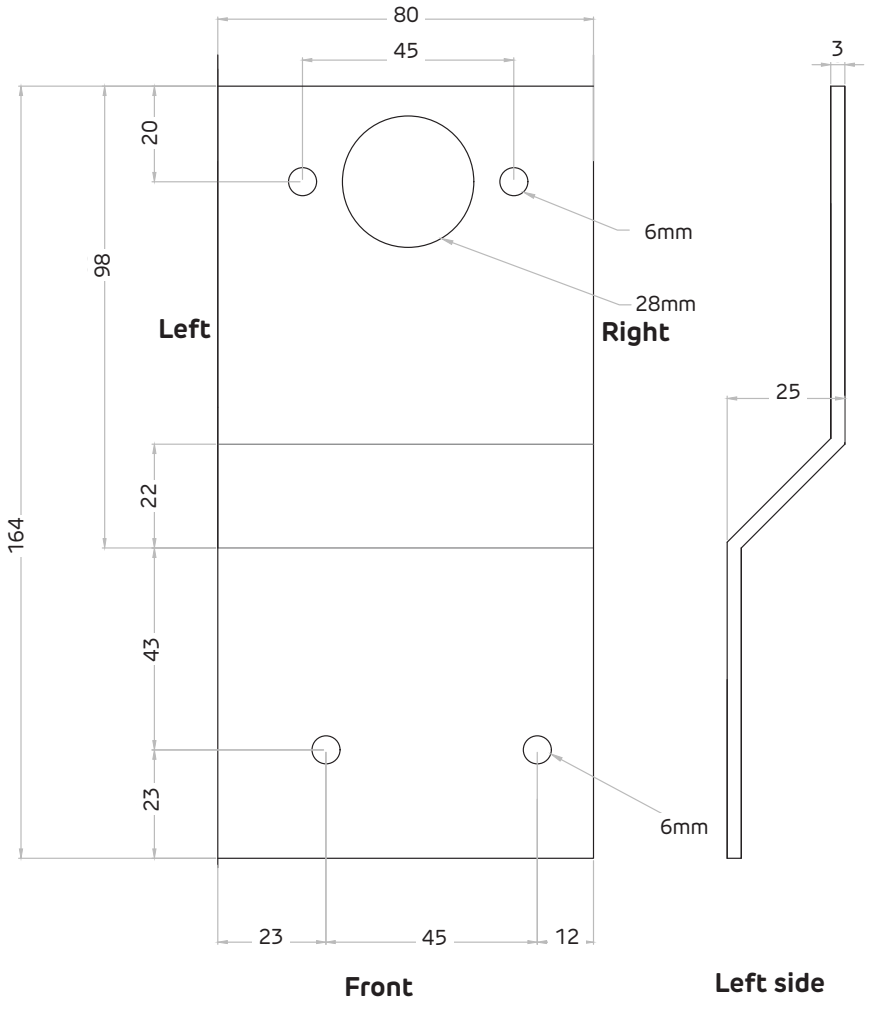
Emergency overflow connection

The emergency overflow connection is to be constructed with a 40mm waste pipe. In rooms with effective floor drains, it would be sufficient in the event of any overflowing water from the back-up unit, since under normal operating conditions, no water will overflow and an extra connection to the sewage canalisation is not required. If there is no floor drain, then it is necessary to install an emergency overflow that is connected to the drainage system.

Valve assembly

The DN 13 vertical guide float valve with aerator nozzle will come attached to the stainless steel bracket. The stainless steel bracket will have 4nr 6mm pre-drilled holes and is supplied with necessary nuts and bolts in situ.



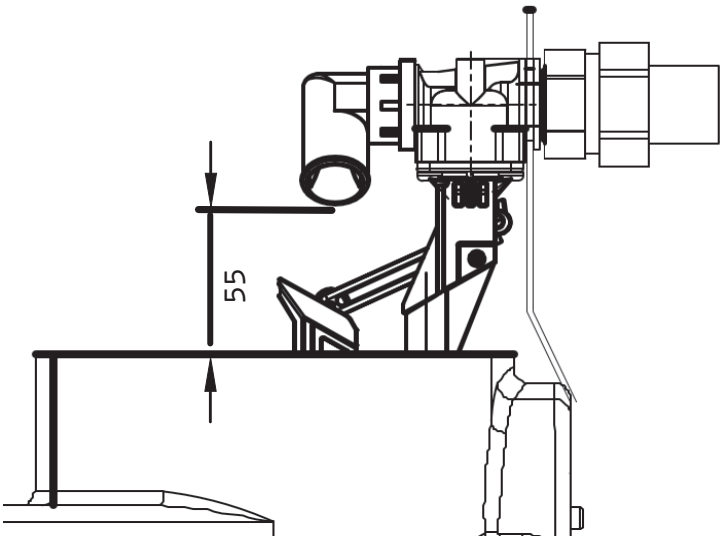


Remove the 2nr bottom bolts from the drill holes in the bracket and align the bracket with the holes on the left hand side of the mains water reservoir.

Once in place, secure the stainless steel bracket to the mains water reservoir using the nuts and bolts provided.

Note: you may need to temporarily remove the DN 13 vertical float valve from the bracket to fit the bracket to the mains water reservoir. Once complete, reattached the valve using the same fittings.

5. INSTALLATION AND ASSEMBLY *continued*



The inlet nozzle must have 35mm clearance both vertically and horizontally to comply with the British Standards listed below.

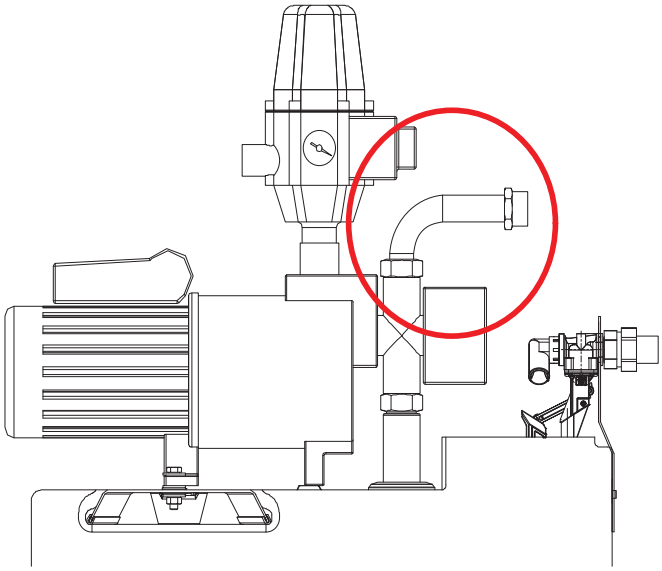
IT IS ESSENTIAL THAT THE VALVE ASSEMBLY IS EXACTLY AS ABOVE TO KEEP IN LIGN WITH BRITISH STANDARD EN 13076 – Devices to prevent pollution by backflow of potable water – Unrestricted air gap – Family A – Type A

Please check your system has been supplied with a **'Graf Eco Plus, Air Gap Family A – Type A DN 13, EN 13076'** designation sticker on the front of the mains water reservoir tank. If this is missing, please contact Graf for a replacement.

Mains water connection

For connecting the float valve to the mains water supply we recommend using a 22mm pipe with 3/4" female threaded fitting for direct connection on to the valve. **Take care when tightening the supply pipe that the valve does not twist. This will mean a problem free operation can no longer be guaranteed**. An additional shut-off isolation valve will also make any future maintenance works less complicated.

Before the installation the mains wate pipe system must be flushed through well. A fine filter (to be supplied by others) should be installed to guarantee a long life and trouble free function of the float and 3 way valves.



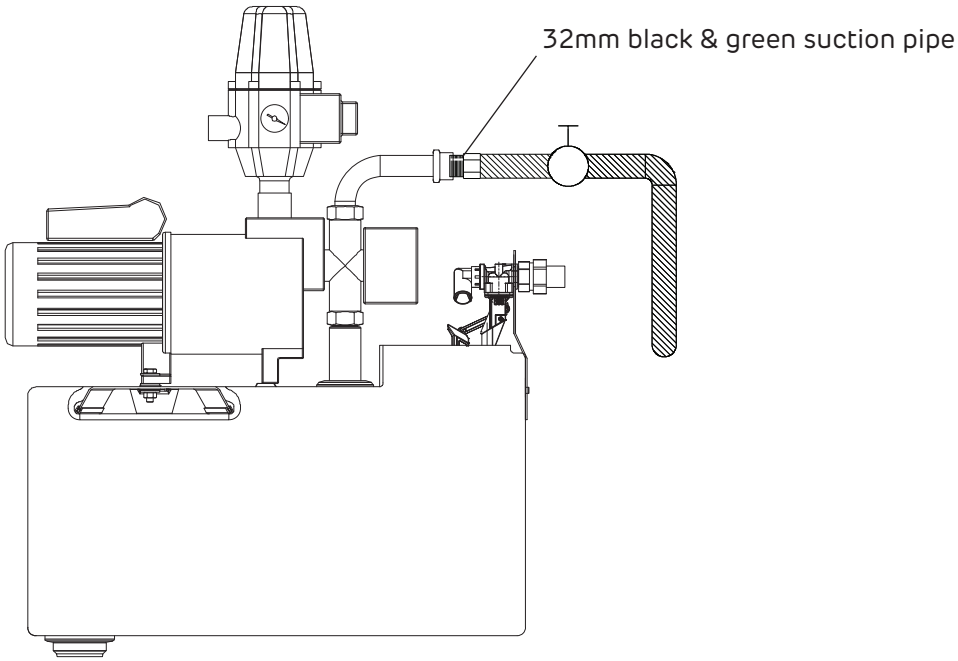
Attention:
Line pressure from the mains water max. 0.3 – 4.5 bar!

The 3/4" braided hose serves as a convenient connection to the KSB Superinox pump from the underground rainwater harvesting tank.

Suction pipe connection

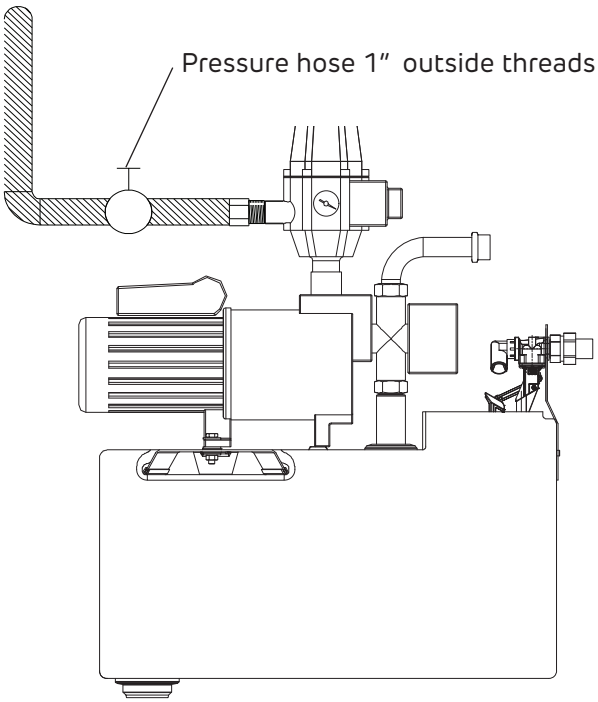
A 32mm black and green suction pipe is installed in an empty conduit between the underground tank and the AA Eco Plus unit.

The connection to the AA Eco Plus back-up supply unit is by way of the 3 way valve which has at it's top a brass 90 degree elbow connection and the 3/4" braided hose with brass compression fitting supplied.



Pressure hose connection

Connect the pressure hose to the 1" connection on the side of the Controlmatic device. This supply line enables the AA Eco-Plus to automatically send water on demand to the connected output devices. Securely fit the pressure gauge to the Controlmatic device. Confirm that the short screw is firmly in place on the connection's opposing side.

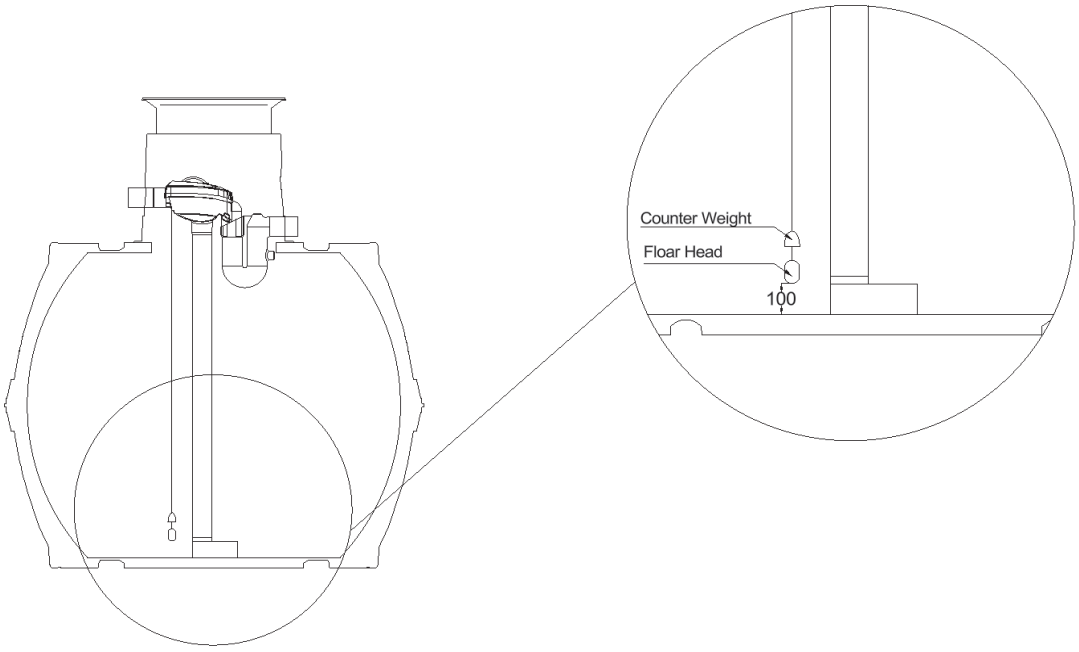


5. INSTALLATION AND ASSEMBLY

Float switch connection

The float switch cable from the underground tank is passed through the empty conduit to the mains water feeding module and the double plug is connected to the 230V socket. The 3 way valve is then connected to the double plug.

The float switch is positioned in the tank so that the float head is freely buoyant approximately 10 to 15 cm above the bottom of the tank when fully extended, the yellow counter weight is position approximately 20cm above the float head



6. GRAF FILTER INSTALLATION DETAIL

6.1 Minimax-Pro Filter internal - Connection DN 100

- The MINIMAX-PRO Filter is suitable for installation in a manhole or an underground tank.
- The difference in height between inlet and outlet is around 10 mm with a straight outlet and 80mm with a curved outlet.
- The filter is suitable for roof areas up to 350 m^2.
- The mesh width of the sieve insert is 0.35 mm.

6.2 Optimax-Pro Filter internal - Connection DN 100

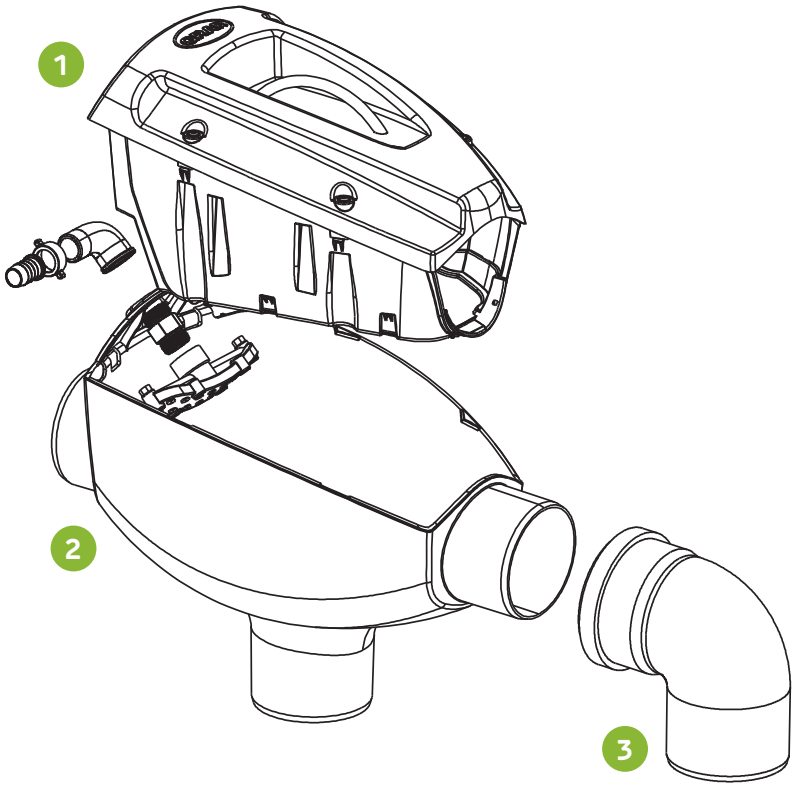
- The Optimax-Pro Filter internal is suitable for installation in a manhole or an underground tank.
- The difference of level between inflow and outflow is 165 mm.
- The filter is suitable for roof areas up to 350 m^2.
- The mesh width of the sieve insert is 0.35 mm.

6.2 Optimax XL Filter internal - Connection DN 150

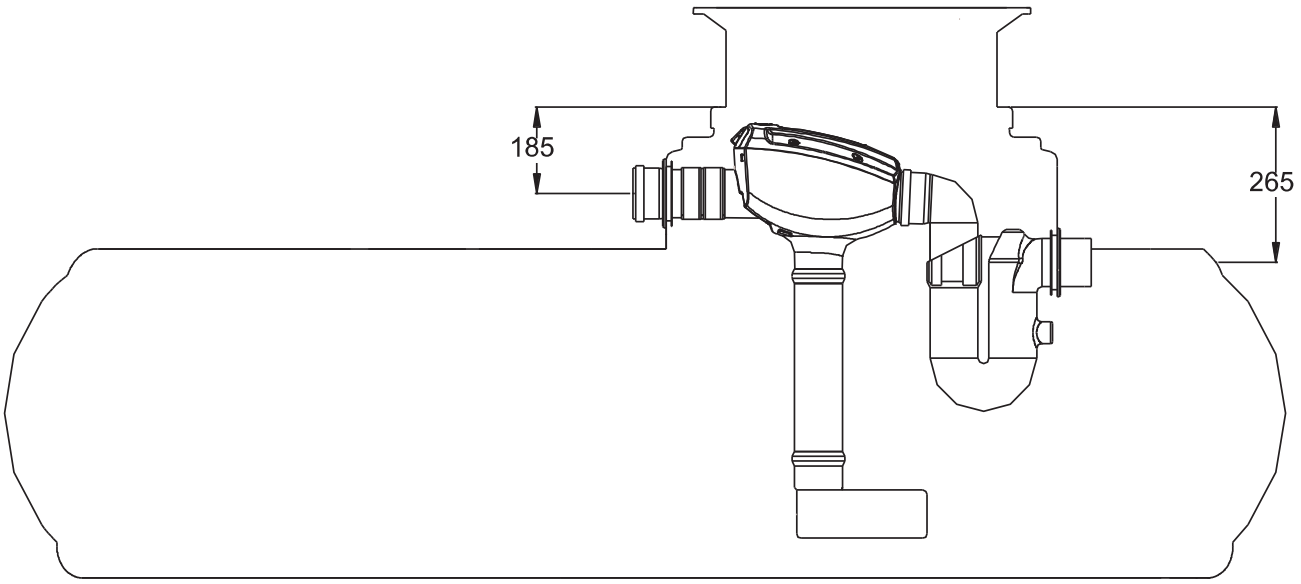
- The Optimax XL Filter internal is suitable for installation in a manhole or an underground tank.
- The difference of level between inflow and outflow is 165 mm.
- The filter is suitable for roof areas up to 750 m^2.
- The mesh width of the sieve insert is 0.35 mm.

7. ASSEMBLY OF THE GRAF MINIMAX-PRO FILTER INTERNAL

1. Clear transparent cover/filter insert
2. Housing including nozzle holder
3. Outlet bend 87°

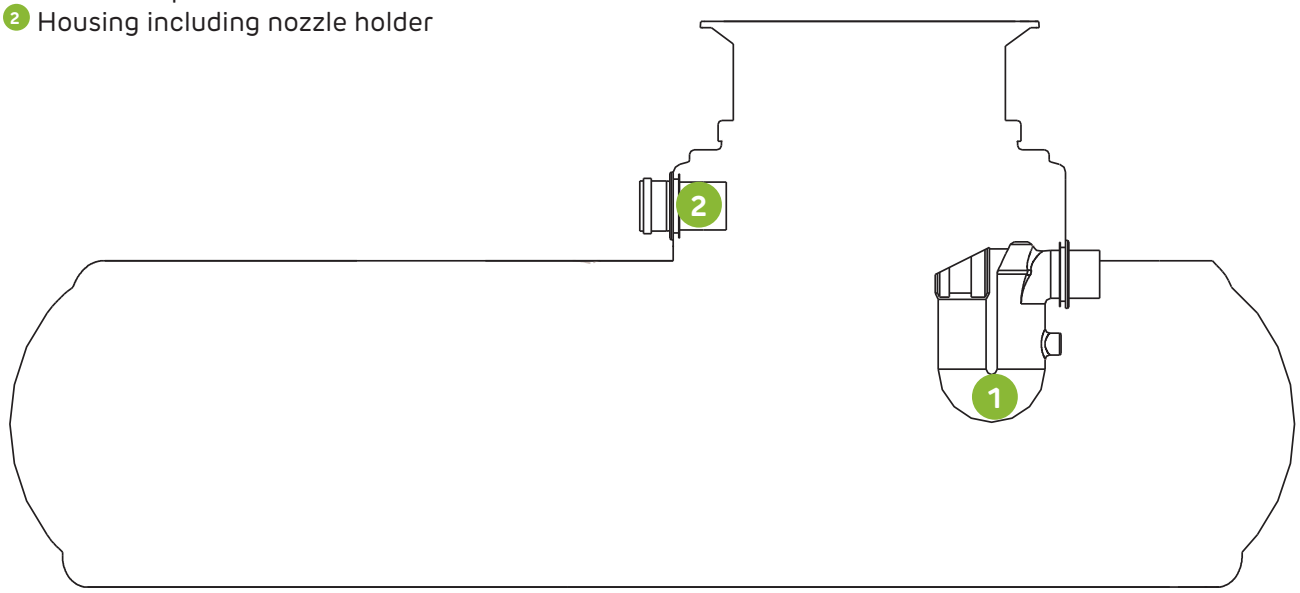


7.1 Overview Platin tank / Filter with curved outlet



7.2 Installation of inflow pipe and overflow siphon

1 Clear transparent cover/filter insert
2 Housing including nozzle holder

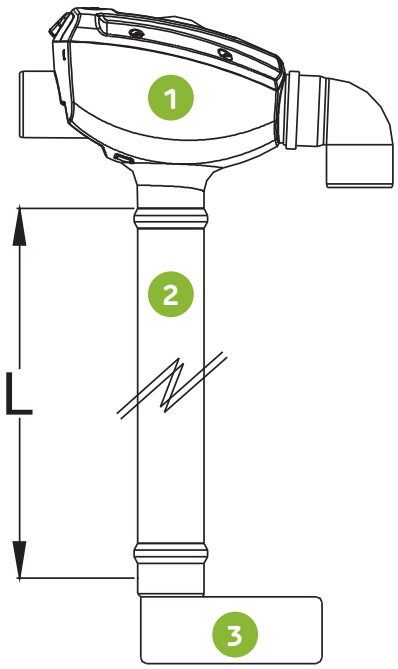


7.3 Preparation filter for installation

Connect the filter body 1 with a PVC pipe DN100 2 (on site) with the inflow calming foot 3 (contained in the filter package 342038).
Secure all connections with self tapping screws to prevent connections separating.

Platin Tank	1500 litres	3000 litres	5000 litres	7500 litres
(L)	520 mm*	550 mm*	725 mm*	1125 mm*

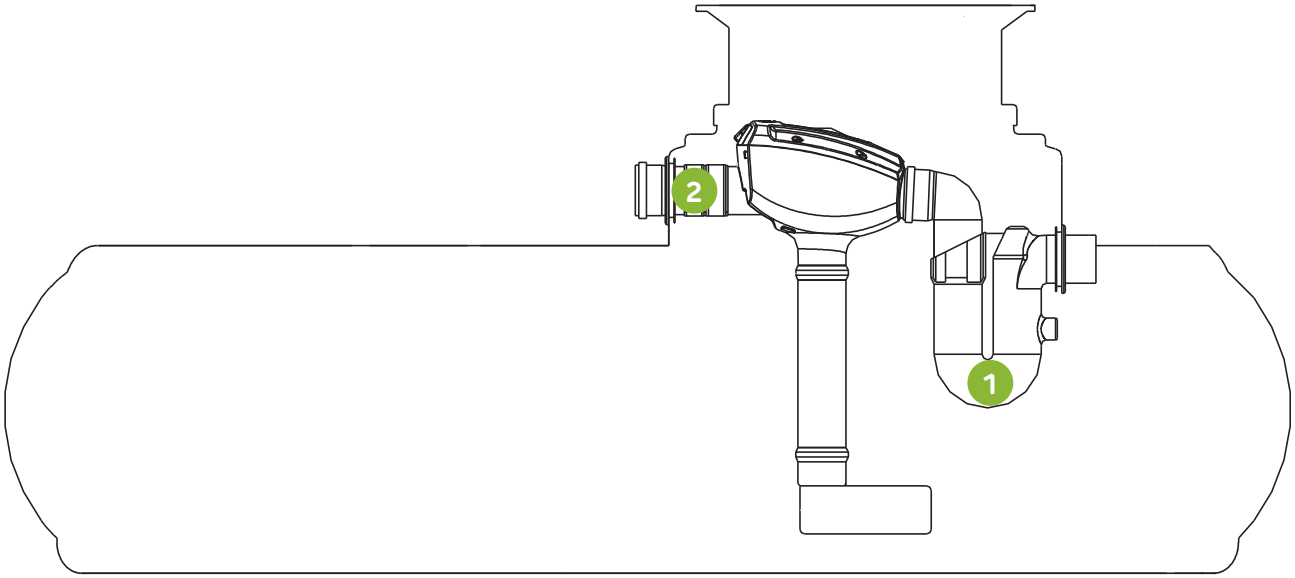
* (+/- 10mm)



7. ASSEMBLY OF THE GRAF MINIMAX-PRO FILTER INTERNAL

7.4 Insert the filter in to the tank

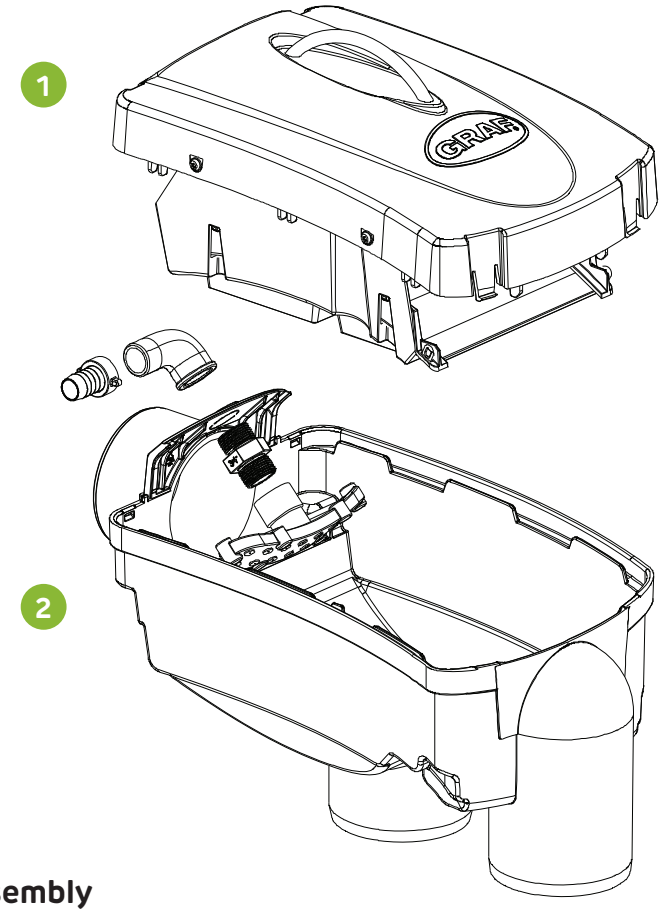
Insert the filter, prepared with the inflow calming foot, in the tank.
Slide the outlet bend of the filter into the overflow siphon 1 from above, align the supply pipe flush with the filter and then fix with the quick-connection sleeve 2 (included in filter package 342038).



8. ASSEMBLY OF OPTIMAX PRO/XL FILTER INTERNAL

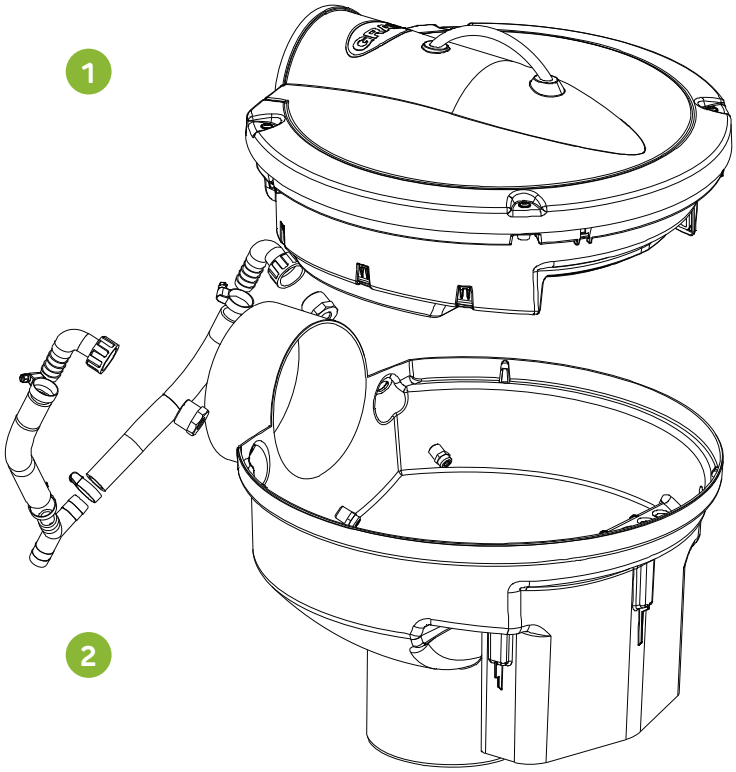
8.1 Optimax-pro filter internal (DN 100) Assembly

1. Clear transparent cover/filter insert
2. Filter body including nozzle holder



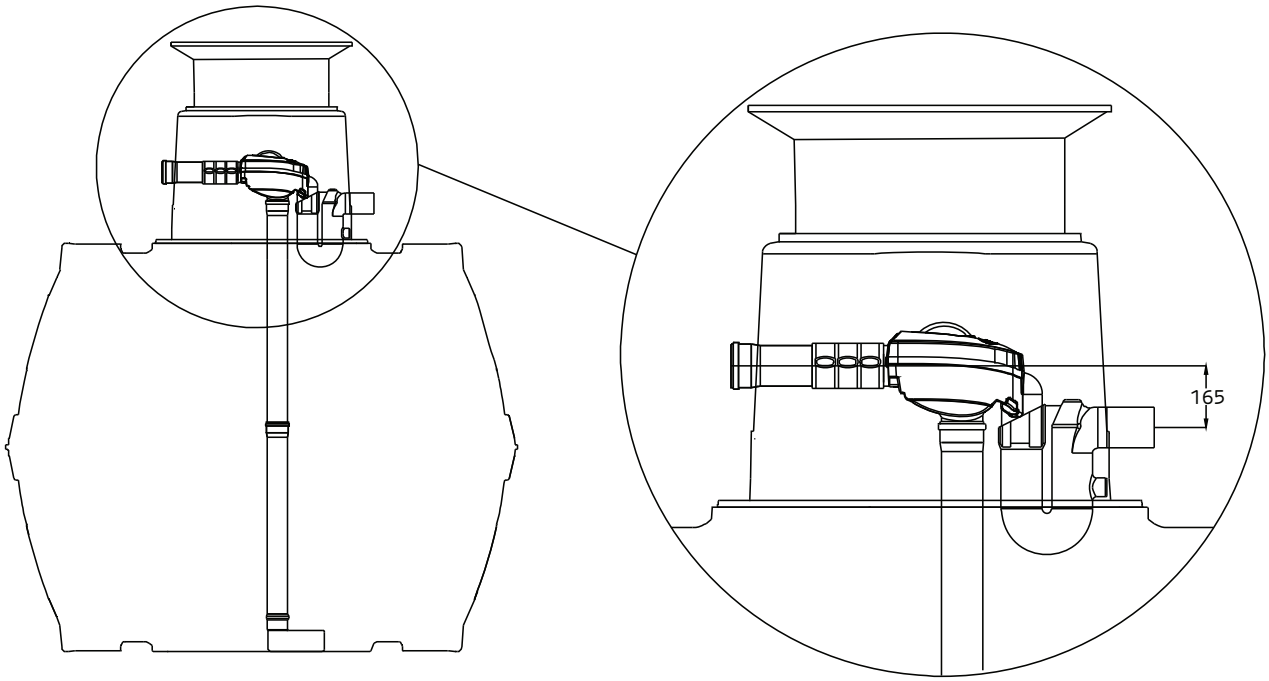
8.2 Optimax XL filter internal (DN 150) Assembly

1. Clear transparent cover/filter insert
2. Filter body including nozzle holder

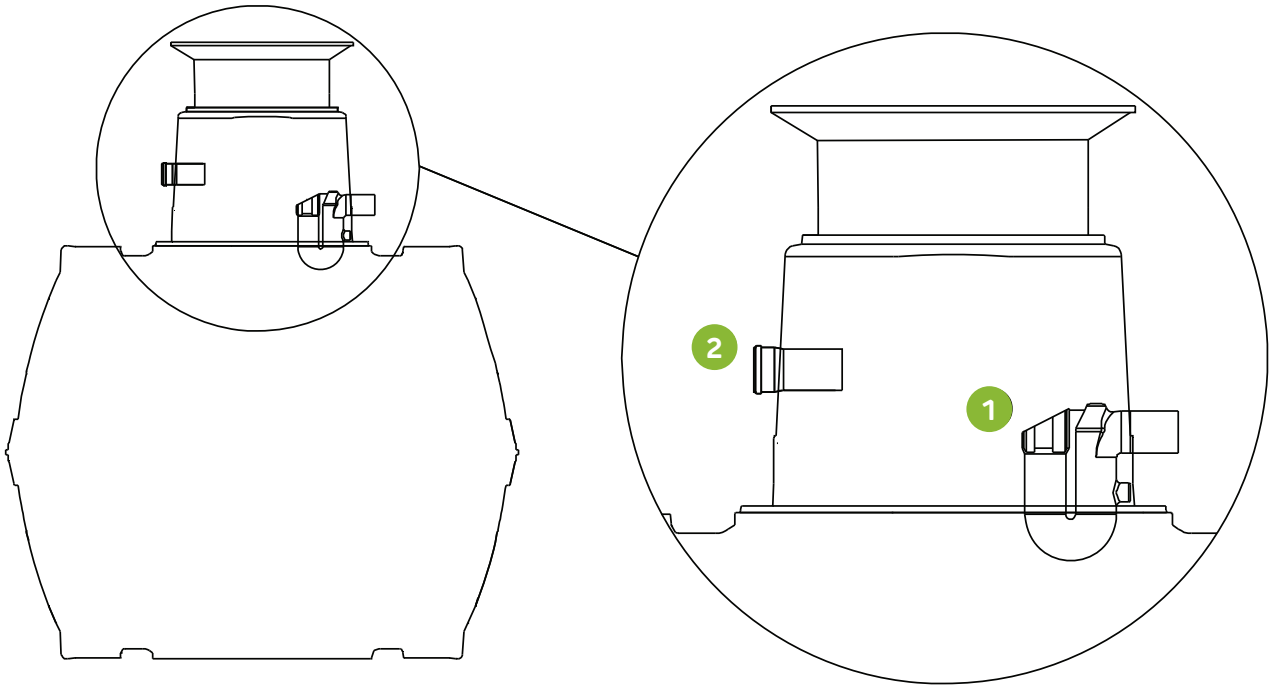


8. ASSEMBLY OF OPTIMAX PRO/XL FILTER INTERNAL

8.3 Overview



8.4 Installation of inflow pipe and overflow siphon



1. Insert the overflow siphon in the lower seal.
2. Insert the inflow pipe from outside.

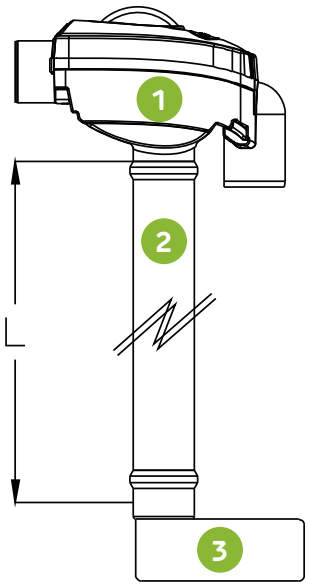
8. ASSEMBLY OF OPTIMAX PRO/XL FILTER INTERNAL

8.5 Preparation filter for installation

Connect the filter body 1 with a PVC pipe DN 100/150 2 (on site) with the inflow pot (calmed inlet) 3 (contained in filter package 3).
Fix all junctions with screws (against shift of pipes).

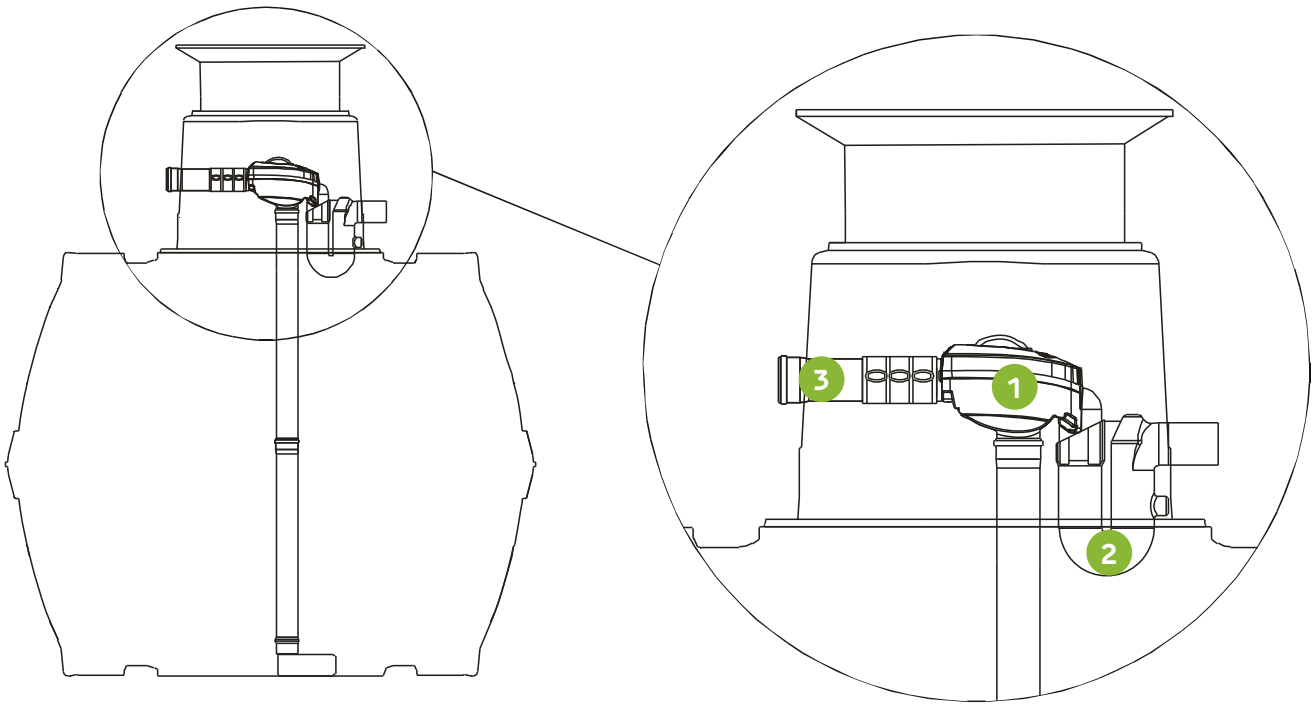
Carat volume (liter)	Optimax-Pro Filter internal Connection DN 100*	Optimax XL Filter internal Connection DN 150*
2.700	1370mm	1325mm
3.750	1550mm	1505mm
4.800	1780mm	1735mm
6.500	2070mm	2025mm
8.500	2053mm	2018mm
10,000	2253mm	2208mm
from 16.000	2513mm	2468mm

* (+ / - 10 mm)



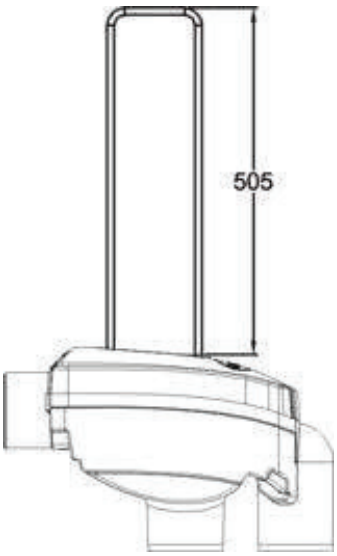
8.6 Insert the filter into the tank

Insert the overflow from filter 1 into the overflow siphon 2 and secure with the spannfix collar 3 (contained in filter package 3).



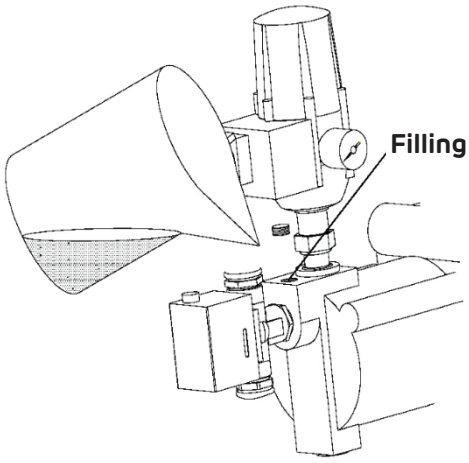
9. ACCESSORY

Handle Plus for Optimax and Minimax filters
Order No. 330220



10. COMMISSIONING

Before the commissioning of the system, all the inlet and outlet pipes must be thoroughly rinsed through. Small foreign objects up to 2mm can cause substantial damage to pumps and other equipment.



Never run pumps without water in the system!

Remove the threaded fill plug from the pumps' body and completely fill the housing with water.
Then fill the suction pipe with water. To do this, the cistern side end of a pipe is connected to the suction pipe (remove the basket) and an outlet in the house is opened. Be sure that the red 3 way valve is set to automatic [A]. By opening the inlet valve on the filling hose the complete system is filled with water until the water emerges free of air bubbles. With this method the system is reliably bled of air and is now ready for operation. Now make the electric connection to the mains plug (230 V / Fused 16 A) and the system will be running. If the pump does not run or cuts out after a short time, then press the reset button on the controlmatic. This procedure is to be repeated until the water emerges without air bubbles at the outlet which is then closed, the pump will reach it's maximum pressure and stop automatically.

If it is not possible to fill the suction pipe with this method then it is also possible to fill it at the AA Eco Plus unit, to do this, the flow valve of the suction pipe in the tank must be opened. The filling must continue until the water emerges at the cistern end. The system may now be put into operation as described above.

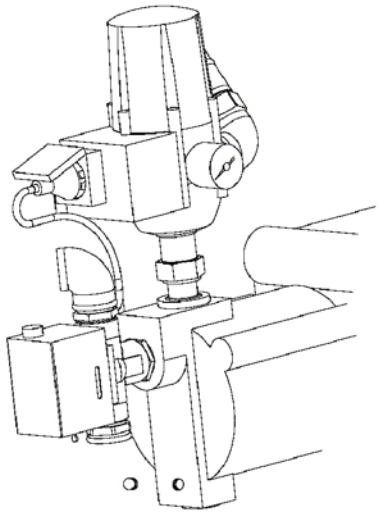
Finally, the commissioning is complete by opening the mains water supply to the back-up supply tank. This fills the tank and before the water flows out of the overflow the float valve must close off the inlet. If this does not happen then the polystyrene float that controls the valve must be adjusted.

(For details on commissioning of the control panel, see AA Eco Plus System Control guide.)

11. SERVICE AND CARE

Service

The complete system must be serviced at regular intervals (approximately per annum). For every service all of the threaded connections must be checked for leaks. Also the condition of the function of the float valve for the back-up tank must be checked. If the system has been out of use for a long period of time or there has been the danger of first, then the pump and controlmatic should be emptied. Any temporary storage should only be at a dry and well ventilated location.



Emptying plug

Care

For care and cleaning of the system it is sufficient to use a damp cloth, for more thorough cleaning a mild detergent may also be used. Under no circumstances should a solvent or cleaning agents containing solvent be used.

12. FAULT FINDING AND CORRECTIVE ACTION

Fault	Cause	Action
Pump does not run	No electric power	Plug into or check the electrical supply
	Pump impeller jammed	Professional pump overhaul or service and cleaning
Pump does not draw	Suction valve is not in the water	Suction valve should be brought below the waters surface
	Pump impeller without water	Fill the system with water
	Air in suction pipe	Air bleed the system and check for leaks
	Blocked suction basket	Clean the suction basket
	Max. suction height or length of suction pipe has been exceeded	Check the suction height or change the pump position or use a submersible pump
Pump does not switch off	Possibly an outlet is open (water left running)	Close the outlet
	Pressure hose or outlet is leaking	Repair the leaking pressure hose or outlet
Pump discharge rate insufficient	Suction height too high	Check the suction height or change the pump position or use a submersible pump
	Blocked suction basket	Clean the suction basket
	Dirt in system equipment	Clean all system components and overhaul or service the pump (by a professional)
	Pump head height too high	Check the pump head height or change the pump position or use a larger pump
Thermal circuit breaker shuts down the pump	Overloading due to dirt in the motor housing	Professional pump overhaul or service and cleaning/Prevent the drawing in of dirt and foreign objects

13. NOTES

RAINWATER HARVESTING

WASTEWATER MANAGEMENT

STORMWATER MANAGEMENT

WATER BUTTS & COMPOSTERS

MULTIPURPOSE CONTAINERS



Graf UK Ltd
Regen House
Beaumont Road
Banbury
Oxfordshire OX16 1RH

T: 01608 661500
F: 01295 211333
E: info@grafuk.co.uk
www.grafuk.co.uk

Graf UK Ltd (Scotland)
220 Blairtummock Road
Queenslie Industrial Estate
Glasgow
G33 4ED

T: 0141 465 1540
F: 01295 211333
E: info@grafuk.co.uk
www.grafuk.co.uk