



4475 Alicia Lane
Cumming, GA 30028
(770) 889-2533

Rainflo IG Package Rainwater Harvesting System Maintenance

The RainFlo IG rainwater harvesting systems (700, 1000, 1250, and 1700 in ground systems) have been designed to be as low maintenance as possible. The three main components that will require periodic maintenance are the rainwater pre-filters, the rainwater storage tanks, the rainwater pumping systems. The maintenance for these components is outlined below. For additional instruction or questions contact RainHarvest Systems at (770) 889-2533.

Rainwater pre-filters:

Graf Optimax Pro Internal Rainwater Pre-Filter:

Description: The Graf Optimax Industrial filter is an in-tank, gravity fed screen filter that filters rainwater prior to its entry into the storage tank to approximately 350 microns via a removable stainless steel sieve insert.

Maintenance: It is recommended to remove the stainless steel screen filter insert from the plastic filter housing and clean it at least once quarterly. The filter insert can be cleaned with a water hose and soft bristle scrub brush by simply spraying the screen with water and scrubbing the filter area with the scrub brush. The Optimax filters can also be outfitted with an optional “self cleaning” spray head that is designed to spray the filter screen periodically to keep the filter operating at its highest efficiency level. Even when the optional spray head is utilized it is recommended to clean the internal filter screen twice annually.

Rainwater Storage Tanks:

****ALWAYS OBSERVE OSHA GUIDELINES FOR ENTERING CONFINED SPACES BEFORE AND DURING THE ENTRY AND SERVICE OF RAINWATER STORAGE TANKS!! ALWAYS DISCONNECT ANY POWER LINES INSIDE THE RAINWATER STORAGE TANKS BEFORE ENTERING THE TANKS!!****

Graf Carat S 1700 Gallon Below Ground Rainwater Storage Tank



4475 Alicia Lane
Cumming, GA 30028
(770) 889-2533

Description: Graf Carat S 700, 1000, 1250, or 1700 gallon below ground rainwater storage tank. Made from polypropylene (Duralen). Dimensions vary by tank size.

Maintenance: It is recommended to clean Graf Carat rainwater harvesting tanks once every three years. Cleaning the Carat tanks will require the tanks to be 95% emptied. When the tanks are emptied it is recommended to agitate the sediment bed in the bottom of the tank so that the sediment particles become suspended in the remaining water in the tank. Once the particles are suspended the remaining water and sediment can be removed with a wet-dry vacuum or a vacuum truck. The tanks do not need to be emptied during the winter months.

RainFlo Pump Systems:

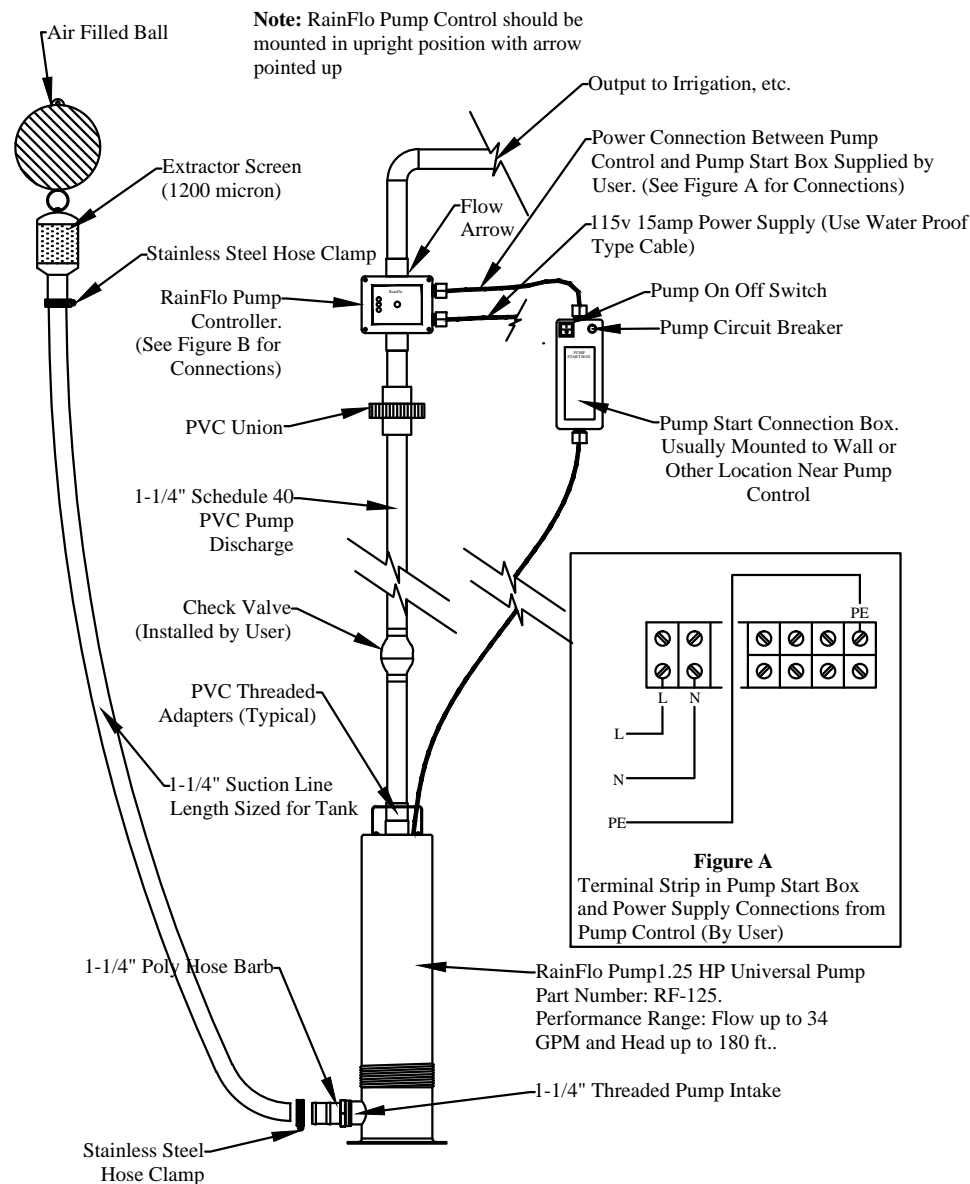
RainFlo .75 or 1.25 HP submersible pumps

Description: 115V .75 or 1.25 submersible pump system with float switch for low water shut-off. The RainFlo pump system utilizes a submersible pump with integral floating extractor, and the RainFlo PC115A speed pump controller. The RainFlo pump system begins pumping water automatically based on a drop in pressure in the pressurized water line on the discharge side of the pump.

Maintenance:

****ALWAYS DISCONNECT THE POWER SUPPLY TO THE PUMP SYSTEM BEFORE PERFORMING ANY SERVICE TO THE PUMP STATION OR BEFORE ENTERING THE RAINWATER STORAGE TANKS!!****

The only maintenance required for the RainFlo pump is the winterization of the pressurized water line from the pump to the irrigation/plumbing system. The pump does not need to be removed from the tank during the winter, however if the pressurized water line from the pump to the irrigation/plumbing system is buried within the freeze zone of the soil the owner will be required to power off the pump/controller and drain the pressurized water line prior to the first freeze of winter. The pressurized line should be drained back so that there is no water in the water line above that of the water level in the tank. The pump needs to be removed from the rainwater storage tank for service by disconnecting the discharge piping, and lifting the unit out by the lift chain/rope that is attached to the Flow Inducer Pump Housing.



Note: RainFlo Pump Control should be mounted in upright position with arrow pointed up

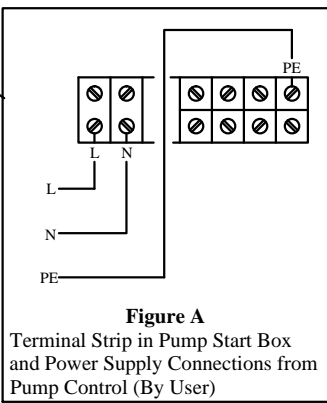
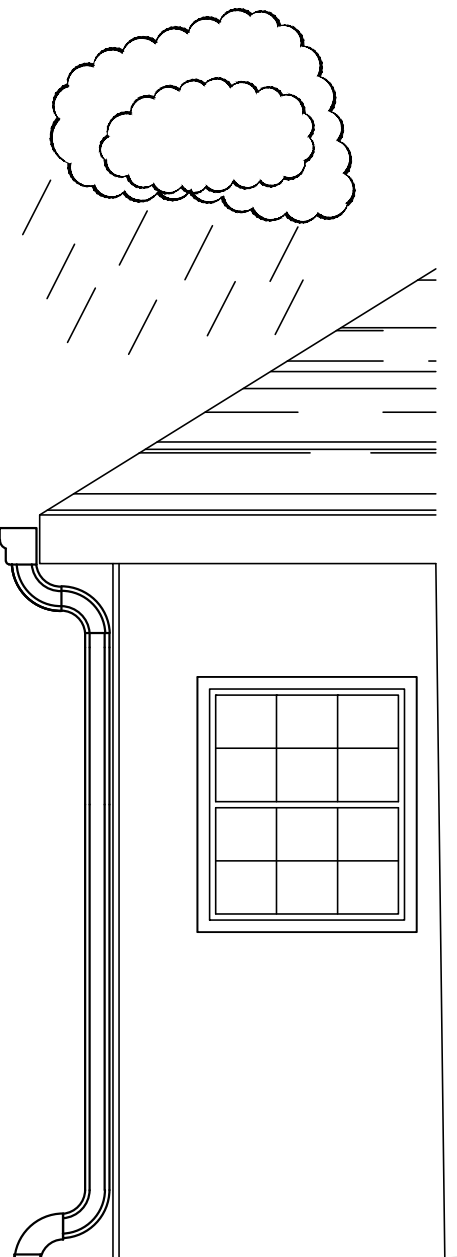


Figure A
Terminal Strip in Pump Start Box and Power Supply Connections from Pump Control (By User)

Legend	
1.	GRAF Carat S 1700 Gallon Underground Tank.
2.	GRAF Optimax Pro Internal High efficiency, self-cleaning, In Tank filtration system.
3.	4" overflow drain to storm drain or other. Typically 4" PVC Sewer and Drain.
4.	1-1/4" Bulkhead Fitting for plumbing thru tank or riser assembly.
5.	115v Power supply.
6.	Overflow siphon.
7.	GRAF 1-1/4" Floating Pump Extractor with 1200 Micron Coarse Screen
8.	RainFlo 1.25 HP 115v Submersible Rainwater Pump High performance submersible rainwater pump with stainless steel base and 1-1/4" threaded inlet for use with a floating filter.
9.	4" Pipe Gasket.
10.	4" PVC from Roof Gutters and Downspouts (By Others).
11.	1 1/4" Schedule 40 PVC Pump output to use.
12.	Calming inlet to prevent the disturbance of the fine sediment layer at bottom of tank.
13.	Adjustable Riser and Childproof Lid.
14.	4" Pipe Coupler.
15.	Pump Output Line to Irrigation (By Others).
16.	Dome and Shaft Seal Gaskets.

USER'S Responsibility
Untreated Rainwater is NON-Potable water. Warning do not drink water supplied from RainHarvest Systems rainwater systems and related equipment. We will be happy to offer suggestions on the use of our various products either by way of printed material or through direct contact with RainHarvest Systems team members. However, since we have no control over the use of our products once they are shipped, **NO WARRANTY WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE** is made beyond the repair, replacement, or refund of purchase price at the sole discretion of RainHarvest Systems. Users shall determine the suitability of the product for the intended application before using, and the users assume all risk and liability whatsoever in connection therewith, regardless of any team members suggestions or statements as to the application or construction. In no event shall any remedy exceed the purchase price of the product. Consult local building codes for the system use.

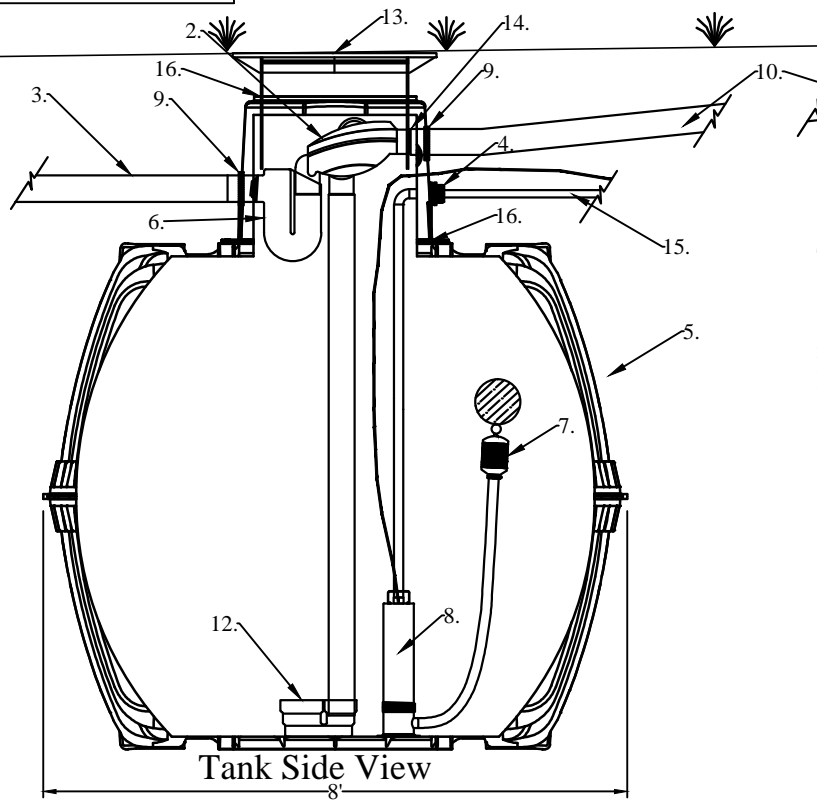
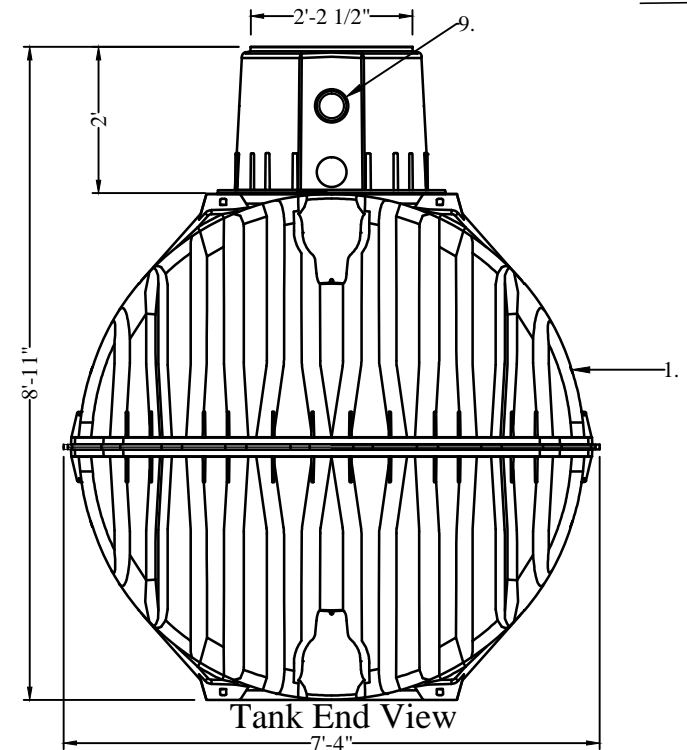


GRAF Optimax High efficiency, Self-Cleaning, In Tank Filtration System:

- * Filter specially developed for rain water harvesting
- * Low maintenance; self cleaning
- * Only 6.5" height offset between inlet and outlet
- * 0.35mm (.01") mesh filter
- * Transparent cover for easy maintenance
- * Optional Opticlean® Sprayhead
- * Over 95% yield
- * Self-cleaning filter
- * Max. 3,750 sq. ft. with 4" connections
- * Space saving filter technology integrated in the tank

GRAF Carat S 1700 Gallon Tank Specifications:

- 1. Variable burial depth: 30" to 42" (59" Max. with optional dome extension and "Maxi" telescopic riser).
- Unique in the world! – a global innovation: unique manufacturing process produces the highest stability due to latest techniques.
- Unique fit accuracy of the components thanks to new production process.
- Consistent quality due to TÜV safety testing and production monitoring.
- Vehicle-bearing (with telescopic cast iron manway kit). Groundwater stable up to the middle of the tank due to extremely rigid construction.
- Secure investment with market leading 15-year warranty. Made from high quality Duralene; easy to recycle.
- Can be expanded as required.



Tank height should be set and plumbing pitched to best utilize existing grade. A site assessment should be done prior to installation to determine the optimum levels for filter and plumbing so as to provide positive drainage to tank and stormwater overflows.



NOTE: This drawing is for illustrative purposes only. Actual systems and designs may vary. Always check with local building codes as they will apply. Electrical work to be performed by licensed professional. Points of use shall be labeled as: "Non Potable water, Do Not Drink!"

CHK BY:	APP BY:	DRAWN BY: CMG	QUOTE NO.:	SH# 1 OF 1
RainFlo 1700IG GRAF Rainwater Collection System				
		RainHarvest Systems LLC. 6075 Parkway North Drive Suite D Cumming, GA 30040 Tel: 770-889-2533 Fax: 770-889-2577		

STORAGE TANK

Graf Carat-S Rainwater Tanks

The new generation of Carat rainwater underground tanks has been specially developed for rainwater harvesting

The Carat-S Underground Tank:

The lineup consists of four modular tank units ranging from 700 gallons to 1,700 gallons which are expandable up to thousands of gallons. The precision, modular, and ultra-high strength design of the Carat-S makes it the choice of professionals worldwide. The Graf Carat tank is guaranteed not to collapse when empty when installed per the manufacturer's specifications.



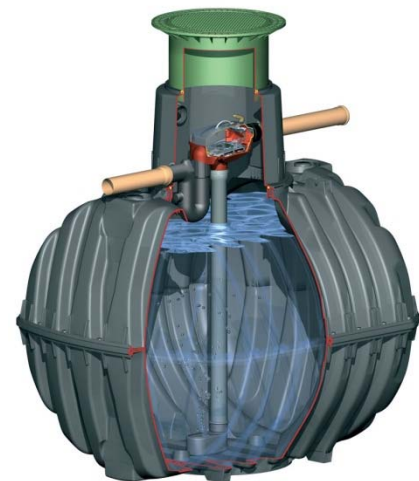
Carat-S Rainwater Tank Features:

- 15 Year manufacturer's warranty
- Suitable for vehicle loading (when combined with the cast iron lid option)
- Variable installation depth with double-sealed telescopic riser
- Convenient 31-1/2" manway opening
- Attractive locking green lid
- Internal pre-filtration option
- Easy to transport and install
- Ultra-high strength materials and design
- Frost-proof installation underground
- Groundwater stable to the middle of the tank

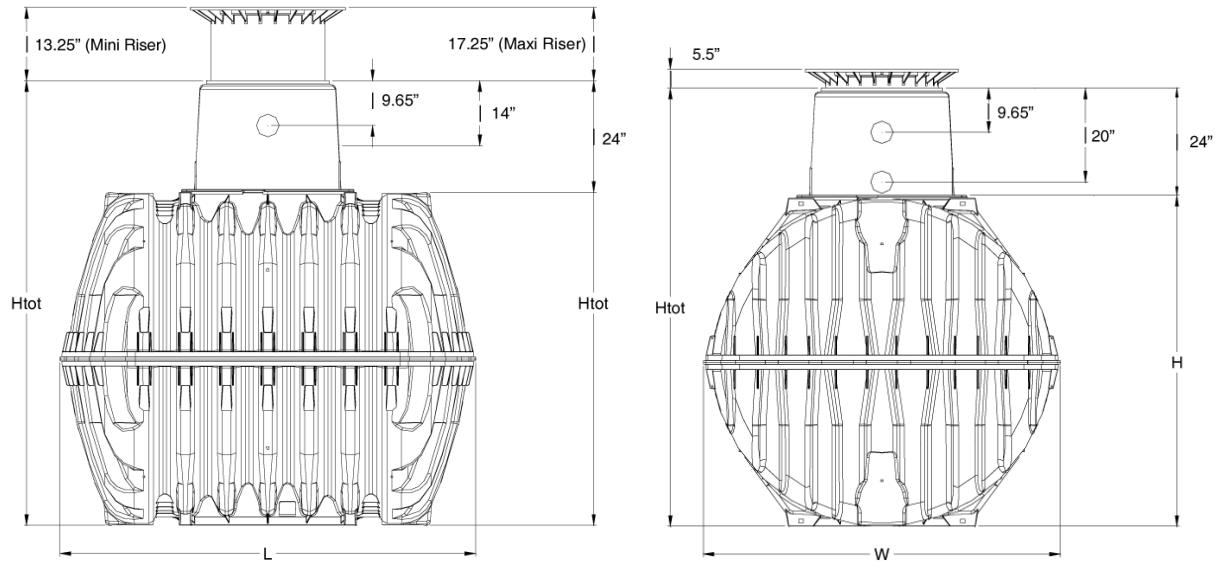
Internal Filter Package Option:

Specially designed for rainwater harvesting, the Graf Optimax Pro® internal self-cleaning filter uses patented filter technology to filter debris from roof areas up to 3,750 sq. ft.

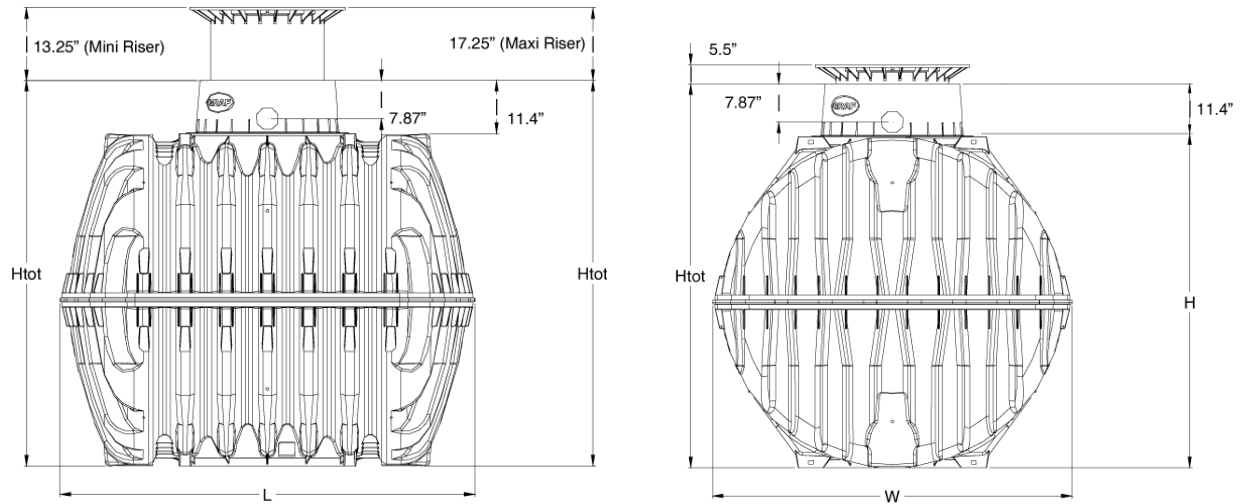
- Greatly simplified installation
- Only one manway and lid in the yard
- Provides over 95% water yield
- Self-cleaning
- Very low maintenance



Dimensions with Maxi Tank Dome:



Dimensions with Mini Tank Dome:



Tank	700 US Gallons	1000 US Gallons	1250 US Gallons	1700 US Gallons	1700 US Gallons (Expansion Tank)
Part No.	372001	372002	372003	372004	372014
Weight	265 lb.	331 lb.	408 lb.	485 lb.	485 lb.
L	82"	90"	90"	94"	94"
W	62"	69"	78"	86"	86"
H	55"	62.5"	71.5"	82.5"	82.5"
Htot*	79"	86.5"	95.5"	106.5"	NA
Htot**	66"	73.5"	82.5"	93.5"	NA

*Htot = total height **with Mini Tank Dome. Deeper burial depths can be achieved using optional extension rings

Installation and maintenance instructions for GRAF rainwater storage tank, Carat -S- series

700 US-gallons P/N 372024

1000 US-gallons P/N 372025

1250 US-gallons P/N 372026

1700 US-gallons P/N 372027



The points described in these instructions must be observed under all circumstances. All warranty rights are invalidated in the event of non-observance. Separate installation instructions are enclosed in the transportation packaging for all additional articles purchased from GRAF.

Missing instructions must be requested from us immediately.

The tank must be checked for any damage prior to insertion into the trench under all circumstances.

Installation must be carried out by a specialist company.

Installation must be performed in accordance with manufacturer's specifications.

Table of contents

1. GENERAL NOTES	2
1.1 Safety	2
1.2 Identification obligation	2
2. INSTALLATION CONDITIONS	3
3. TECHNICAL DATA	4
4. TANK STRUCTURE	5
5. INSTALLATION AND ASSEMBLY	5
5.1 Tank assembly	6
5.2 Construction site	6
5.3 Trench	7
5.4 Insertion and filling	8
5.5 Routing connections	8
6. ASSEMBLING THE TANK DOME AND TELESCOPIC DOME SHAFT	9
6.1 Assembling the tank dome	9
6.2 Assembling the telescopic dome shaft	9
6.3 Telescopic dome shaft on which persons may walk	9
6.4 Telescopic dome shaft over which passenger cars may drive	9
6.5 Assembling the adapter	10
7. INSPECTION AND SERVICING	10

1. General notes

1.1 Safety

The relevant accident prevention regulations must be observed during all work. Particularly when walking on the tanks, a 2nd person is required to secure the tank.

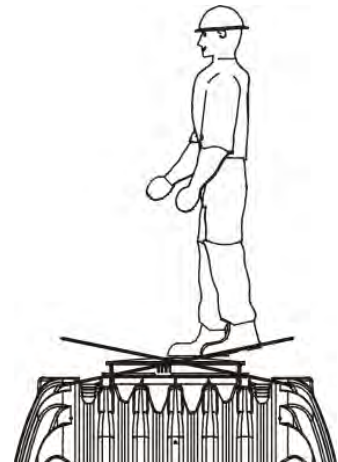
The relevant regulations and standards must additionally be taken into consideration during installation, assembly, servicing, repair, etc.

The system or individual parts of the system must be installed by qualified specialists.

During all work on the system or parts of the system, the entire system must always be rendered inoperable and secured to prevent unauthorised reactivation.

Except in the event of work carried out in the tank, the cover of the tank must always be kept sealed, as this otherwise constitutes a maximum risk of accident. Only original GRAF covers or covers approved in writing by GRAF must be used.

GRAF offers an extensive range of accessories, all of which are designed to match each other and which can be extended to form complete systems. The use of other accessories may lead to impediments to the system's functional capability, therefore invalidating liability for resulting damage.



1.2 Identification obligation

All service water pipes and outlets must be identified in writing with the words **"Not drinking water"** or in the form of images in order to avoid inadvertent connection with the drinking water mains even after a number of years. Mix-ups, e.g. by children, may still occur even in the case of correct identification. All service water extraction points must therefore be installed with valves with **child-proof locks**.

1.3 Scope of supply

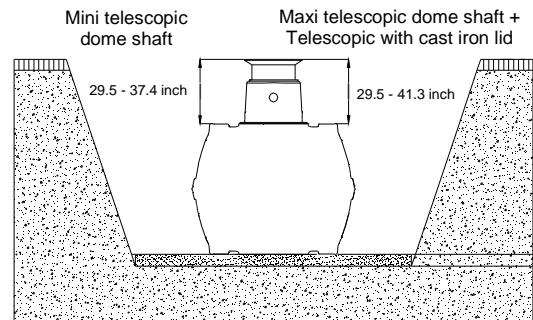
The scope of supply of the basic tank Carat includes the following components:

- Carat half-shell bottom
- Carat half-shell top
- Accessory-package Carat "S"
 - Carat S sealing
 - Carat S connection clips
 - Carat S centring pins
 - Carat crane eye
 - Lubricant tube

2. Installation conditions

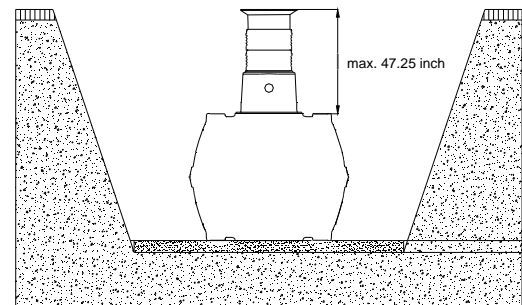
Coverage heights with telescopic dome shaft in pedestrian areas.

The mini dome shaft produces a depth of cover of between 420 – 620 mm (16.54 – 24.41 inch).



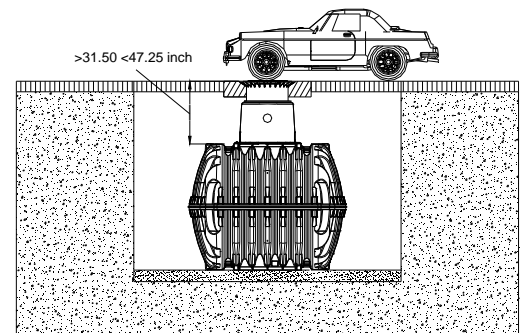
Maximum coverage heights with extension sections and telescopic dome shaft.

(in pedestrian areas only, without groundwater or stratum water)

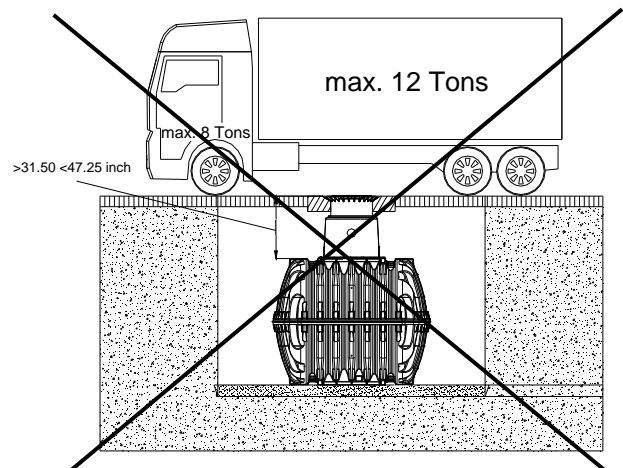


Coverage heights with cast telescopic dome shaft (class B) in areas used by passenger cars.

(without groundwater and stratum water)

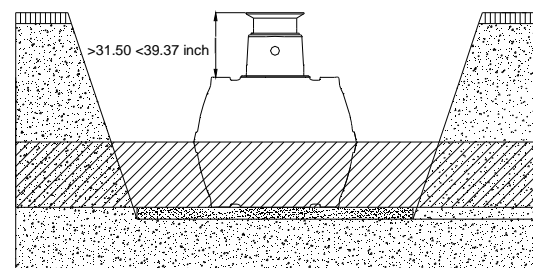


The Carat – S series tanks must not be installed below areas used by vehicles which are heavier than passenger cars.

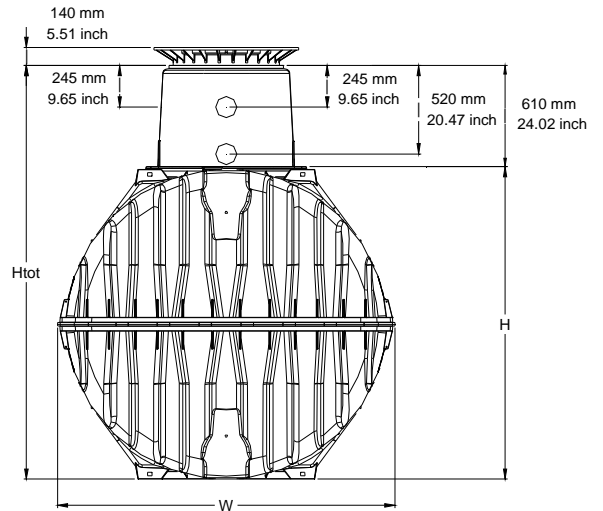
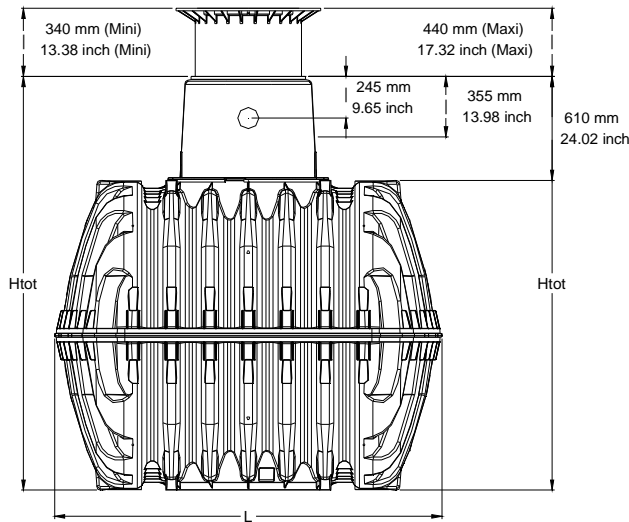


Coverage heights on installation in groundwater – the hatched area specifies the permissible immersion depth for the tanks.

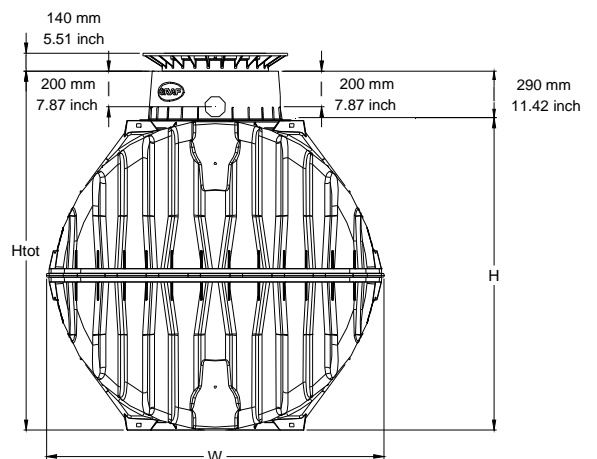
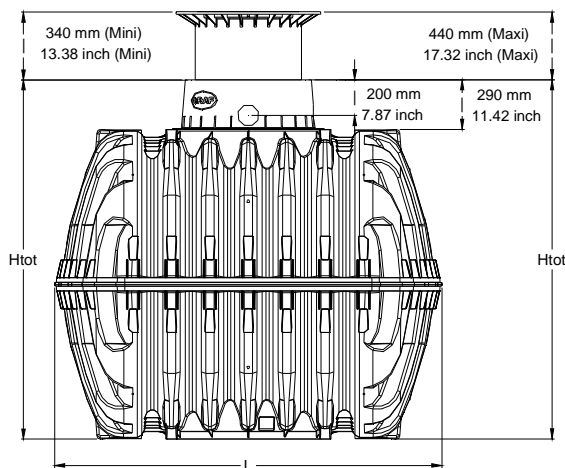
(not under areas used by passenger cars or trucks)



3. Technical data



with tank dome Maxi



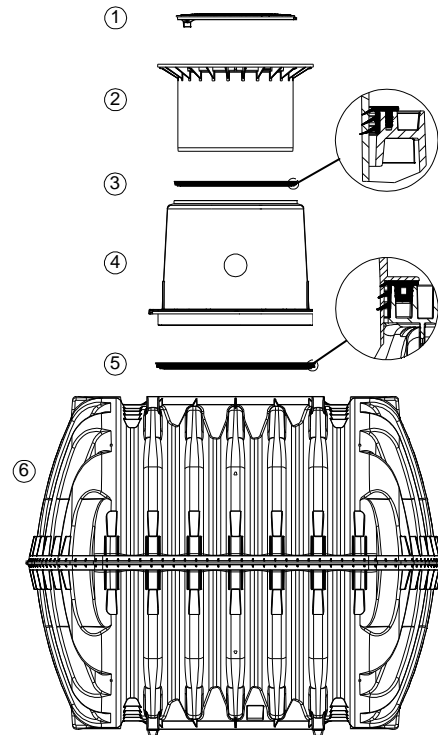
with tank dome Mini

Tank	700 US-gallons 2700 litres	1000 US-gallons 3750 litres	1250 US-gallons 4800 litres	1700 US-gallons 6500 litres
Art. No.	370001	370002	370003	370004
Weight	120 kg / 264.55 lbs	150 kg / 330.69 lbs	185 kg / 407.86 lbs	220 kg / 485.02 lbs
L	2080 mm 81.89 inch	2280 mm 89.76 inch	2280 mm 89.76 inch	2390 mm 94.09 inch
W	1565 mm 61.61 inch	1755 mm 69.09 inch	1985 mm 78.15 inch	2190 mm 86.22 inch
H	1400 mm 55.12 inch	1590 mm 62.60 inch	1820 mm 71.65 inch	2100 mm 82.68 inch
Htot*	2010 mm 79.13 inch	2200 mm 86.61 inch	2430 mm 95.67 inch	2710 mm 106.69 inch
Htot**	1680 mm 66.14 inch	1870 mm 73.62 inch	2100 mm 82.68 inch	2380 mm 93.7 inch

* Htot = total height ** with mini tank dome

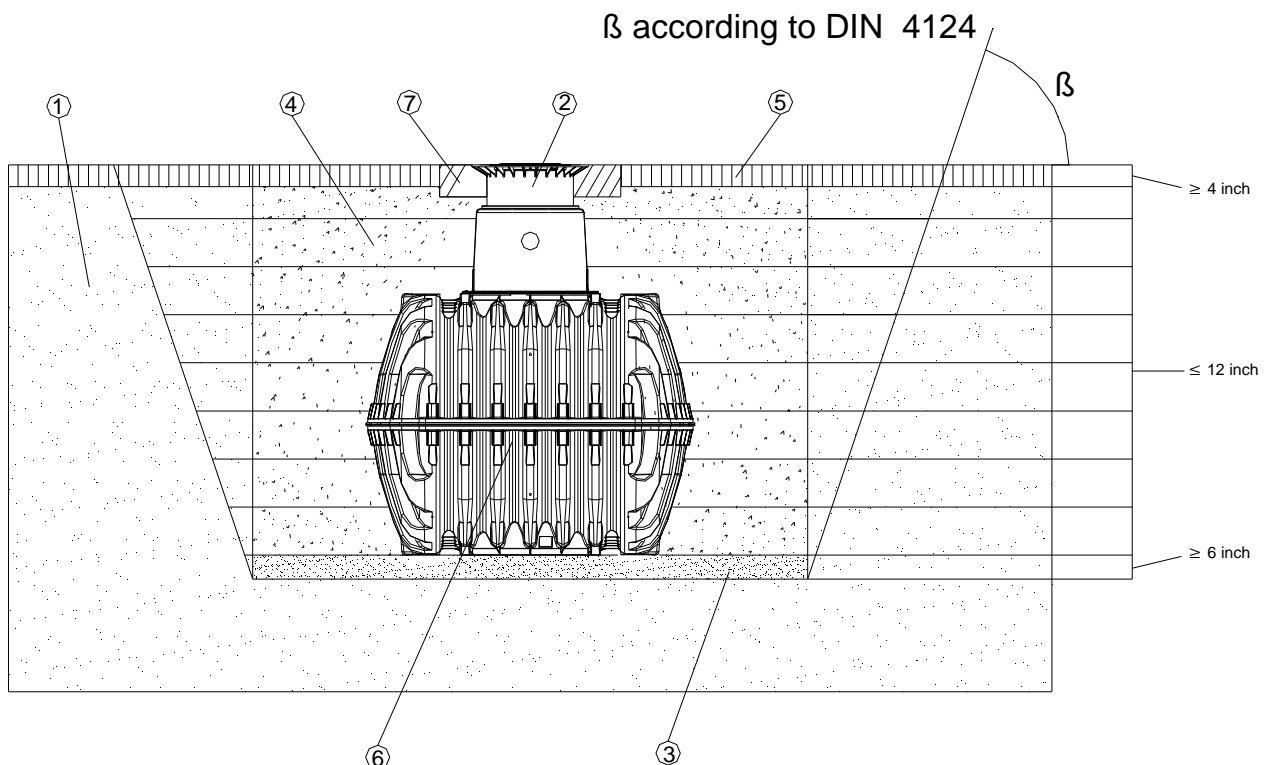
4. Tank structure

- ① Cover
- ② Telescopic dome shaft (can be inclined by 5°)
- ③ Profile seal
- ④ Tank dome (can be rotated by 360°)
- ⑤ Tank - tank dome seal
- ⑥ Carat underground tank



5. Installation and assembly

- ① Subsoil
- ② Telescopic dome shaft
- ③ Compacted foundation
- ④ Surrounding (round-grained gravel, max. grain size 8/16 mm – 0.31/0.63 inch)
- ⑤ Covering layer
- ⑥ Carat underground tank
- ⑦ Concrete layer for surfaces used by passenger cars

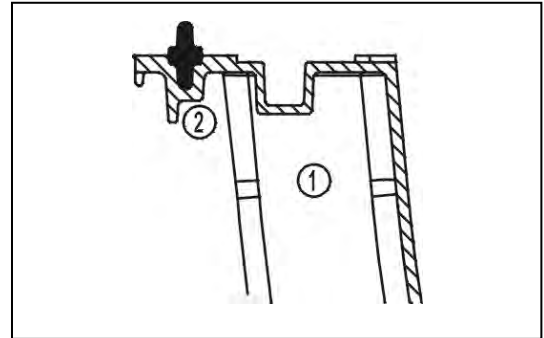


5. Installation and assembly

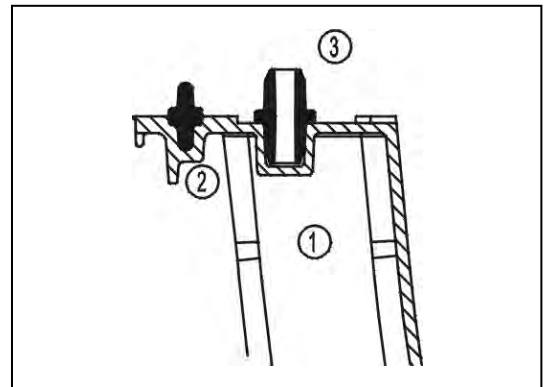
5.1 Tank assembly

First insert the circumferential profile seal ② into the sealing groove in the lower half shell ①. Lightly coat the seal with the enclosed soft soap.

Please take care: The soft soap must not get in contact with your eyes!



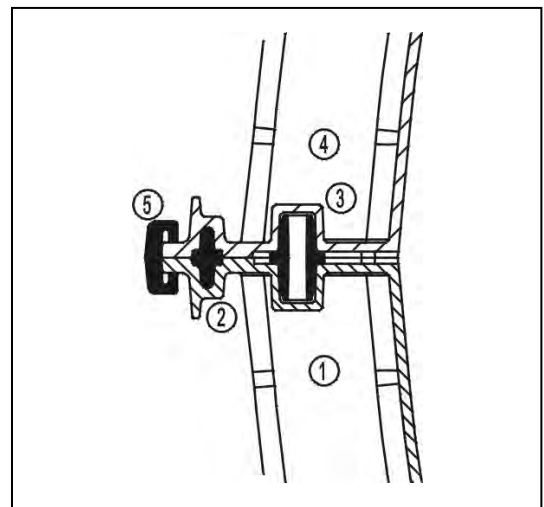
Then insert the centring pins ③ into the intended mountings around the circumference.



The upper half shell ④ is now positioned onto the lower half shell ① and the quick connectors ⑤ are installed. To do this, each 2nd quick connector is pre-adjusted in the 1st step and is secured with a hammer and a wooden support. The quick connectors engage in their end position. The remaining quick connectors are then installed.

Attention: When positioning the upper half shell, it must be ensured, under all circumstances that the seal does not slip out of the groove.

Please take care: Be careful when assembling the half shells of the tank. Don't pinch your fingers within the half shells!



5.2 Construction site

Under all circumstances, the following points must be clarified prior to installation:

- The structural suitability of the ground according to DIN 18196
- Maximum groundwater levels which occur and drainage capability of the subsoil
- Types of load which occur, e.g. traffic loads

An expert ground report should be requested from the local planning authority to determine the physical characteristics of the subsoil.

5. Installation and assembly

5.3 Trench

To ensure that sufficient space is available for working, the base area of the trench must exceed the dimensions of the tank by 500 mm (19.69 inch) on each side; the distance from solid constructions must be at least 1000 mm (39.37 inch).

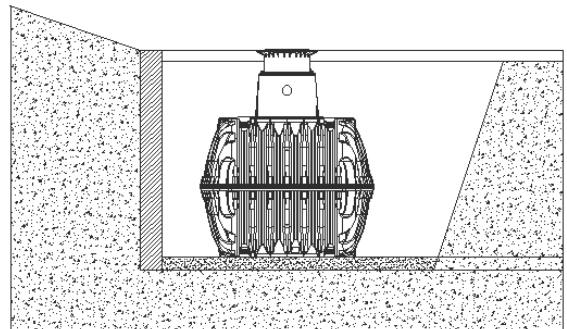
The trench embankment must be designed so that slippage or collapse of the embankment wall is not to be anticipated. The construction site must be horizontal and plane and must guarantee sufficient load-bearing capacity.

The depth of the trench must be dimensioned so that the max. earth coverage (see point 2 – installation conditions) above the tank is not exceeded. To use the system throughout the entire year, it is necessary to install the tank and those parts of the system which conduct water in the frost-free area. Precise information in this regard can be obtained from the responsible authority.

A layer of compacted, round-grain gravel (grain size 8/16 mm (0.31/0.63 inch), thickness approx. 150 – 200 mm; 5.91 – 7.87 inch) is applied as the foundation.

5.3.1 Slope, embankment, etc.

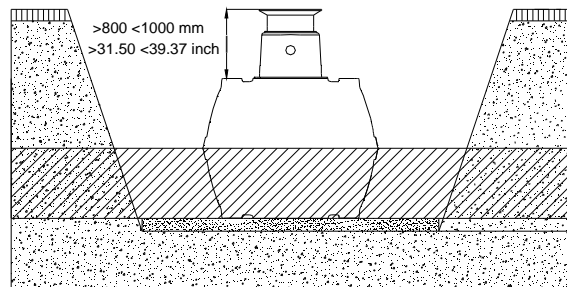
On installation of the tank in the immediate vicinity (< 5 m; 196.85 inch) of a slope, earthen mound or slope, a statically calculated supporting wall must be erected to absorb the soil pressure. The wall must exceed the dimensions of the tank by at least 500 mm (19.69 inch) in all directions, and must be located at least 1000 mm (39.37 inch) away from the tank.



5.3.2 Groundwater and cohesive (water-impermeable) soils (e.g. clay soil)

If it is anticipated that the tanks will be immersed deeper into the groundwater than is shown in the adjacent figure, sufficient dissipation must be ensured. (See table for max. immersion depth).

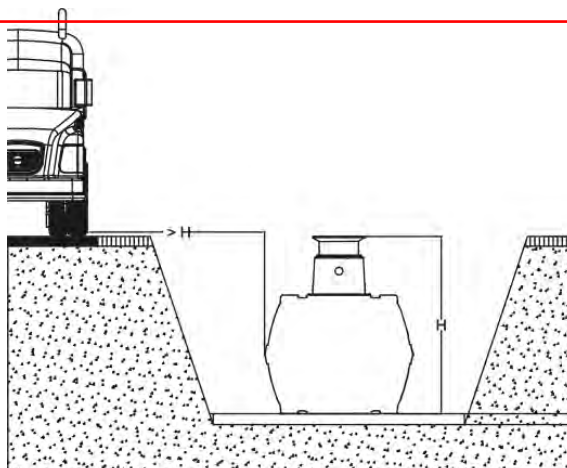
Dissipation of the drainage water (e.g. via an annular drainage system) is recommended in the case of cohesive, water-impermeable soils.



Tank size	700 US-gallons 2700 L	1000 US-gallons 3750 L	1250 US-gallons 4800 L	1700 US-gallons 6500 L
Immersion depth	700 mm 27.56 inch	795 mm 31.30 inch	910 mm 35.83 inch	1050 mm 41.34 inch

5.3.3 Installation adjacent to surfaces used by vehicles

If the underground tanks are installed adjacent to surfaces which are used by vehicles heavier than passenger cars, the minimum distance away from these surfaces is at least the depth of the trench.

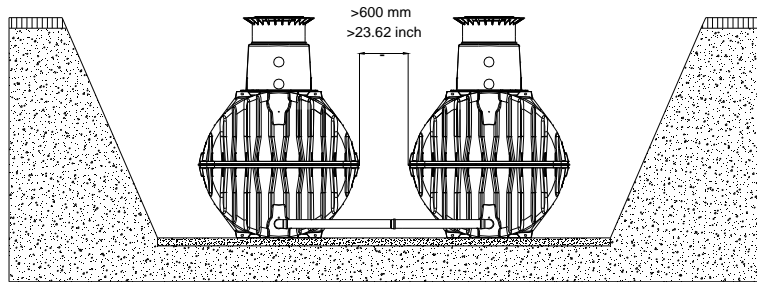


5. Installation and assembly

5.3.4 Connection of several tanks

Two or more tanks are connected via the assembly surfaces by means of GRAF special seals and basic pipes (to be provided at construction site).

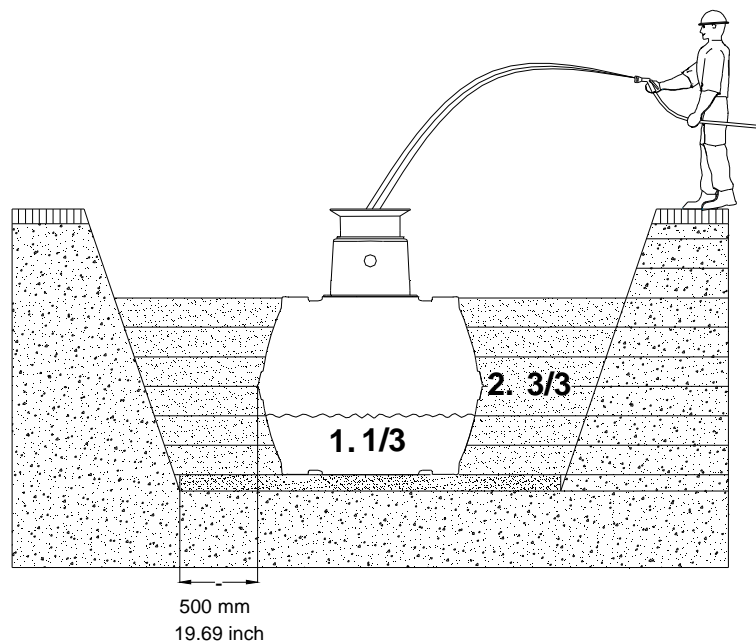
The apertures must be drilled to the corresponding size using only the GRAF special crown bit. It must be ensured that the distance between the tanks is at least 600 mm (23.62 inch). The pipes must project at least 200 mm (7.87 inch) into the tanks.



5.4 Insertion and filling

The tanks must be inserted, impact-free, into the prepared trench using suitable equipment. To avoid deformities, the tank is filled 1/3 with water before filling in the tank surrounding.

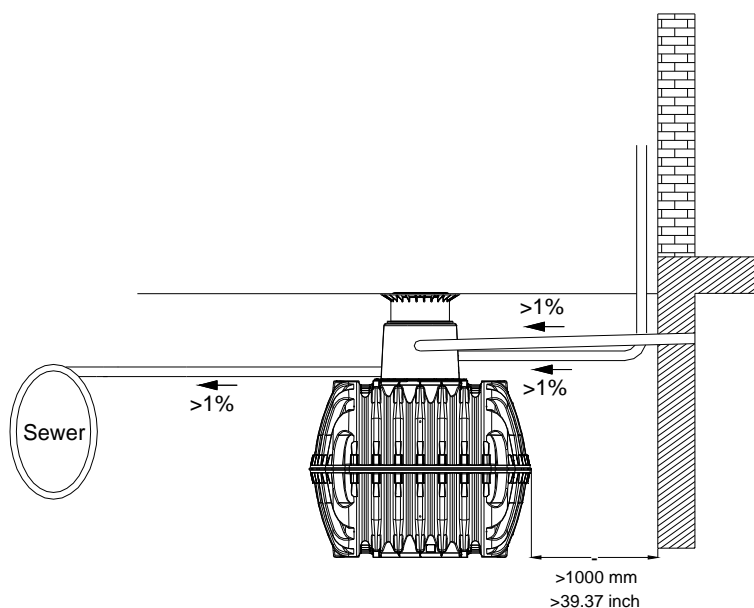
Afterwards the surrounding (roundgrain gravel, max. grain size 8/16 mm; 0.31/0.63 inch) is then filled in layers of max. 30 cm (11.81 inch) steps and is compacted. The individual layers must be well-compacted (manuel tamper). Damage to the tank must be avoided during compaction. Mechanical compaction machines must not be used under any circumstances. The surrounding must be at least 500 mm (19.69 inch) wide.



5.5 Routing connections

All feed and overflow pipes must be routed with a decline of at least 1% in the direction of flow (possible, subsequent settling must be taken into consideration in this case). If the tank overflow is connected to a public sewer, this must be protected against reflux by means of a lifting station (mixed sewer) or reflux seal (pure rainwater sewer) according to DIN 1986.

All suction, pressure and control lines must be routed in an empty pipe, which must be routed as straight as possible, without bending, to the tank with a decline. Necessary bends must be formed using 30° moulded sections.

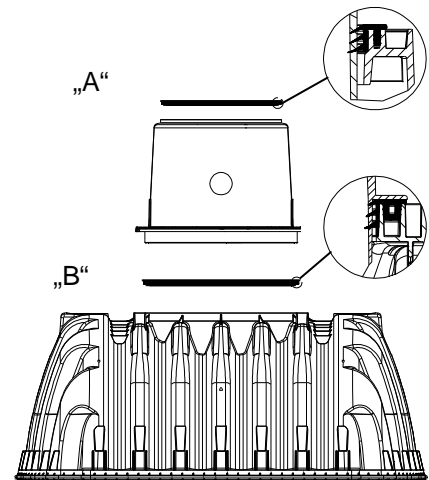
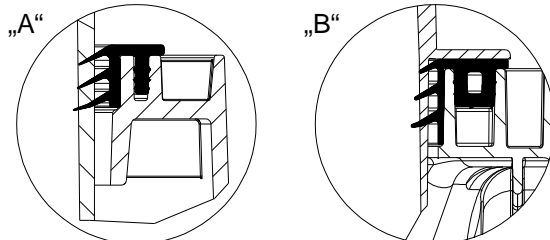


Important: The empty pipe must be connected to an opening **above** the max. water level.

6. Assembling the tank dome and telescopic dome shaft

6.1 Assembling the tank dome

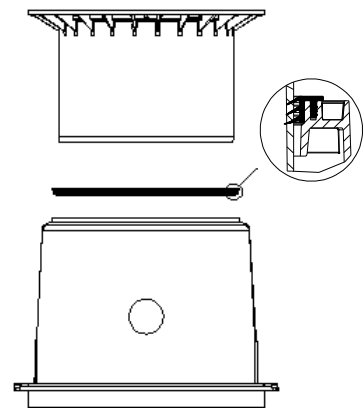
Prior to assembly, the enclosed seal is inserted into the tank domes' groove „B“. The tank dome is then aligned with the piping connections and is locked to the tank neck. It is essential to make sure that the upper seal "A" is correctly installed.



6.2 Assembling the telescopic dome shaft

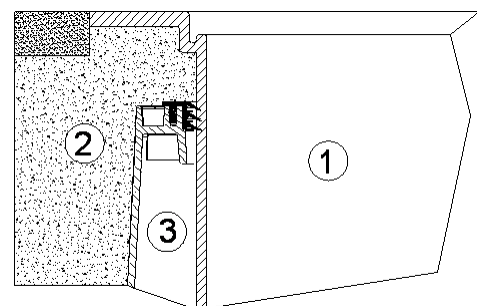
The telescopic dome shaft enables infinite adaptation of the tank to given site surfaces with earth coverage of between 750 mm and 950 mm (29.53 and 37.40 inch; Mini telescopic dome shaft) or 750 mm and 1050 mm (29.53 and 41.34 inch; Maxi telescopic dome shaft).

For assembly purposes, the enclosed profile seal (material EPDM) is inserted into the tank dome's sealing groove and is coated generously with soft soap (do not use mineral oil-based lubricants, as these attack the seal). The telescope is then greased, inserted and aligned with the surface of the site.



6.3 Telescopic dome shaft on which persons may walk

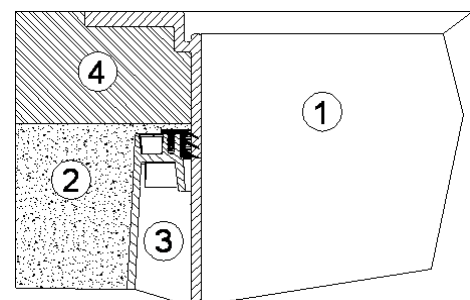
Important: To prevent loads from being transferred onto the tank, round-grain gravel ① (max. grain size 8/16 mm; 0.31/0.63 inch) is filled in in layers around the telescope ② and is evenly compacted. Damage to the tank dome ③ and telescope must be avoided during this step. The cover is then positioned and is sealed to prevent entry by children. **Tighten the threaded connection on the cover so tightly that it cannot be opened by a child!**



6.4 Telescopic dome shaft over which passenger cars may drive

If the tank is installed under areas used by passenger cars, the collar area of the telescope ① (colour anthracite) must be supported with concrete ④ (load class B25 = 250 kg/m²; 551.16 lbs/m²). The layer of concrete to be installed must be at least 300 mm (11.81 inch) wide and approx. 200 mm (7.87 inch) high all around. The minimum coverage above the shoulder of the tank is at least 800 mm (31.50 inch) – max. 1050 mm (41.34 inch) with telescope, coverage up to max. 1200 mm (47.25 inch) possible with intermediate section.

Attention: Use the cast cover under all circumstances.



6. Assembling the tank dome and telescopic dome shaft

6.5 Assembling the adapter

For larger coverage heights an adapter is needed. To insert the adapter into the tank dome, soft soap is needed. Into the highest groove of the adapter the profile seal is inserted and greased generously. Afterwards push the telescopic dome shaft into the adapter and adapt it to the planned area surface.

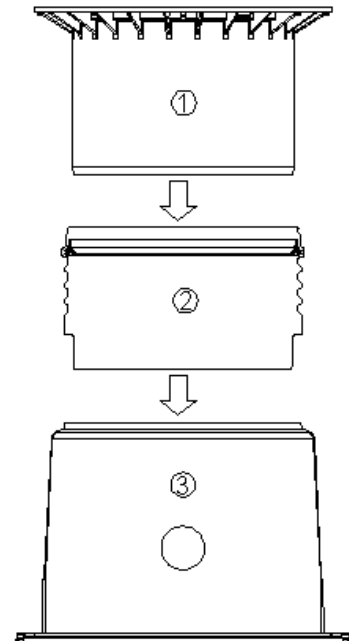
1 Adapter = max. earth-cover 1200 mm (47.25 inch)

(in each case in connection with the Maxi telescopic dome shaft)

① Telescopic dome shaft (can be inclined by 5°)

② Adapter

③ Tank dome (can be rotated by 360°)



7. Inspection and servicing

The entire system must be checked for leaks, cleanliness and stability at least every three months.

The entire system should be serviced at intervals of approx. 5 years. In this case, all parts of the system must be cleaned and their function checked. Servicing should be carried out as follows:

- Drain the tank completely
- Clean surfaces and internal parts with water
- Remove all dirt from the tank
- Check that all internal parts are firmly seated.

If there are any ambiguities, please don't hesitate to contact the Otto Graf GmbH via the below mentioned addresses, telephone numbers or our direct e-mail address: info@graf.info.

RAINWATER PRE-FILTER



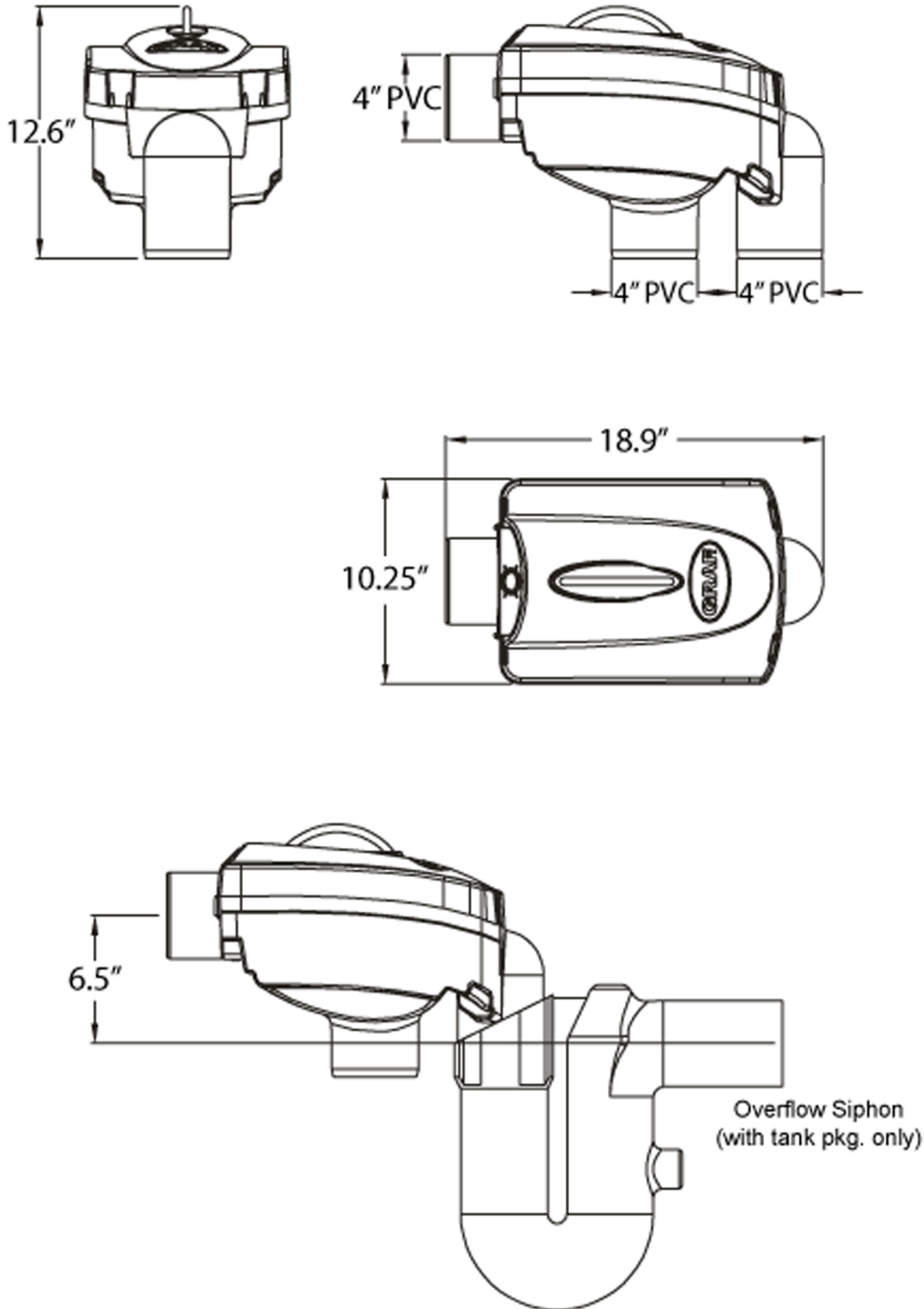
Optimax[®] Pro Internal Filter

Part Number

340037

US Adaptation by RainHarvest Systems

Dimensions:



Otto Graf GmbH
Kunststofferzeugnisse
79331 Teningen

Carl-Zeiss-Str. 2-6
Telefon 07641/589-0
Telefax 07641/589-50
Email: info@graf-online.de
www.graf-online.de

RainHarvest Systems, LLC
6075 Parkway North Drive
Cumming, GA 30040
Tel: 770-889-2533 Fax: 770-889-2577
www.RainHarvest.com

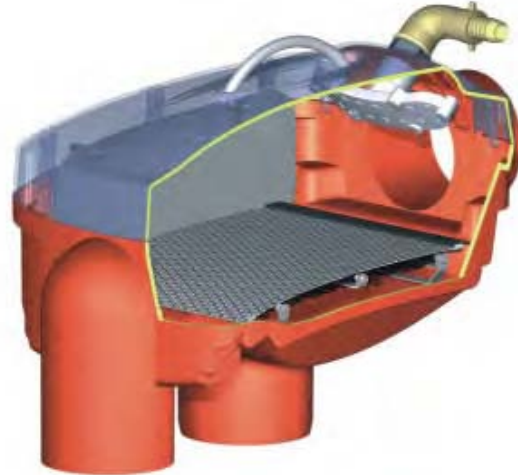
Instruction for installation and maintenance Optimax-Pro Filter internal

Manual applies to:

Optimax-Pro Filter internal
Item No.: 340037

and

Filter package 3
Item No.: 342005



Contents:

1. General advice	Page 2
2. Installation conditions	Page 2
3. Technical specs	Page 3
4. Assembly	Page 4
5. Installation	Page 5
6. Accessory	Page 6
7. Maintenance	Page 6

1. General advice



Please read and follow all instructions provided by this manual. In case of non-compliance, any warranty claim is void. For every accessory supplied by GRAF you will receive separate installation instructions which will be enclosed in the transport packaging.

Any missing instructions have to be requested immediately.

Previous to installation and mounting, it is necessary to test all components for possible damages.

1.1 Safety

For all work performed, please observe the relevant domestic rules for accident prevention.

Furthermore all relevant rules and norms should be observed during installation, assembly, maintenance and repairing. Please find relating advice in the respective chapters of this instruction manual.

The installation of this rainwater harvesting system and its different components should be performed in a professional manner and according to the enclosed instruction manual.

For all workings on the system and its components respectively the whole system has to be stopped and protected against unauthorized resetting.

GRAF offers a wide range of accessories which are all matched to each other and which can be extended to complete systems. The use of other accessories may lead to dysfunctions and the suspension of the liability for resulting damages.

1.2 Marking responsibility

The processed water is not suitable for consumption and for body hygiene.

All plumbing and tapings of process water must be marked with **non-potable water** stickers, writing or by illustrations according to the relevant domestic rules, in order to avoid the wrong connection with the drinking water pipework even after years of use. Improper use may even arise with correct marking, e.g. by children. Therefore all process water tapings should be installed with **child-safe** valves.

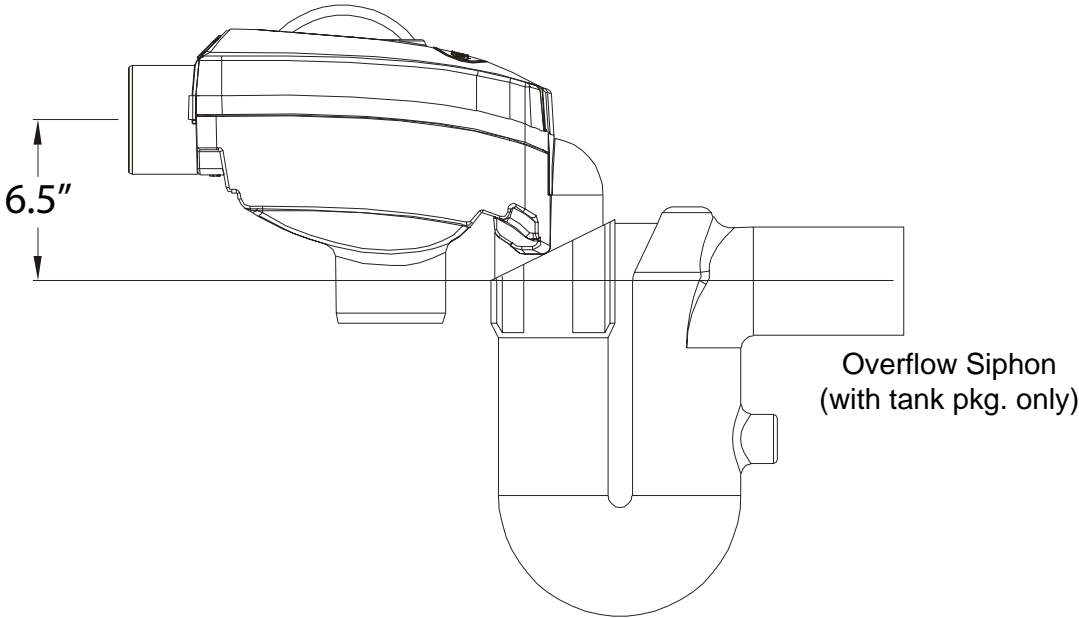
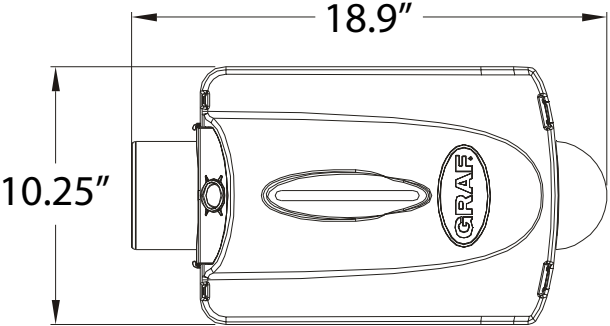
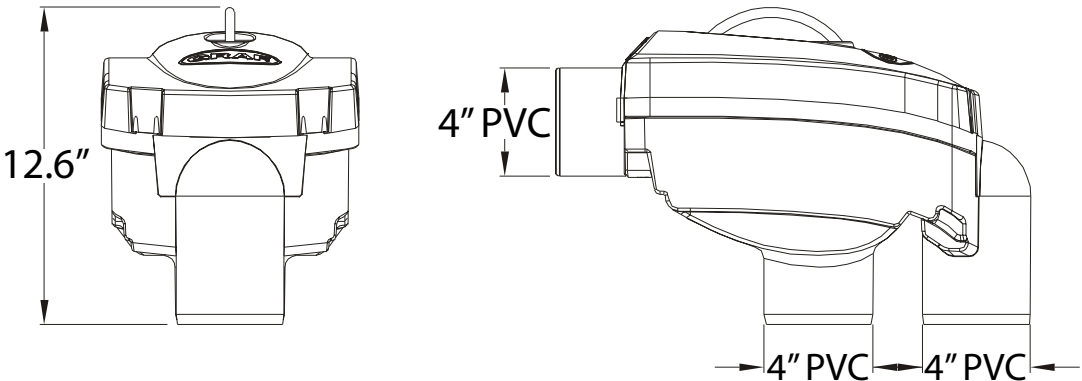
2. Installation conditions

2.1 Optimax-Pro Filter internal

- The Optimax-Pro Filter is suitable for installation in a manhole or underground tank.
- The difference between inflow and outflow is 6.5".
- The filter is suitable for roof areas up to 3,750 ft².
- The mesh width of the sieve insert is 0.35 mm.

3. Technical Specifications

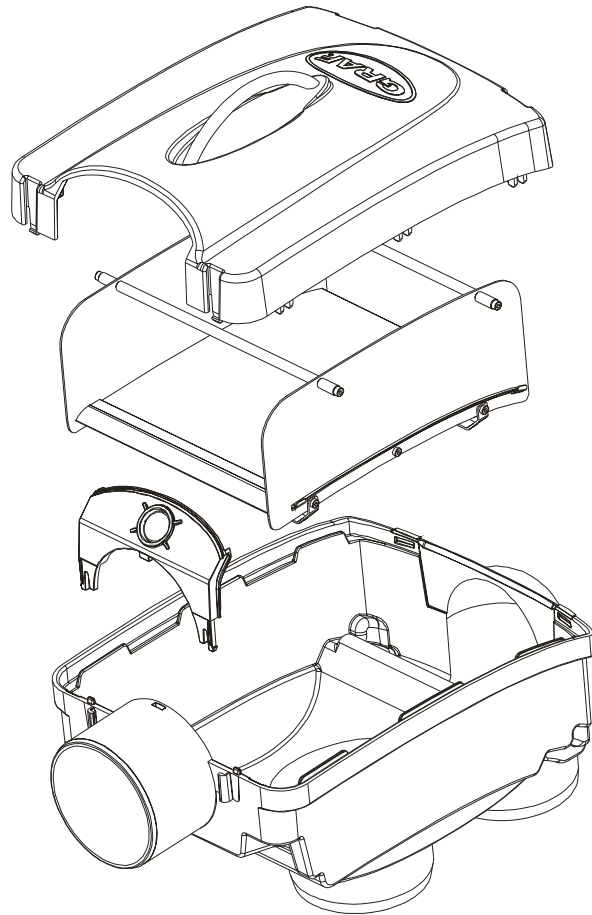
Dimensions:



4. Assembly

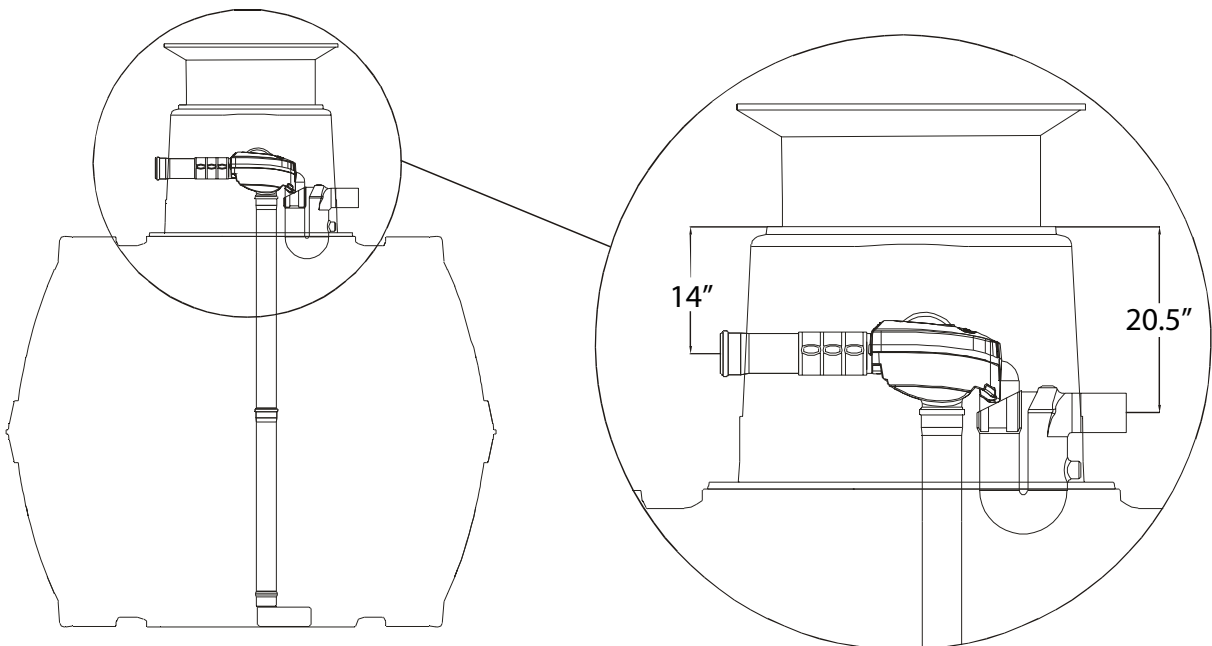
Components:

- ① Transparent cover
- ② Stainless Steel Filter Insert
- ③ Support for optional Opticlean sprayhead
- ④ Filter body



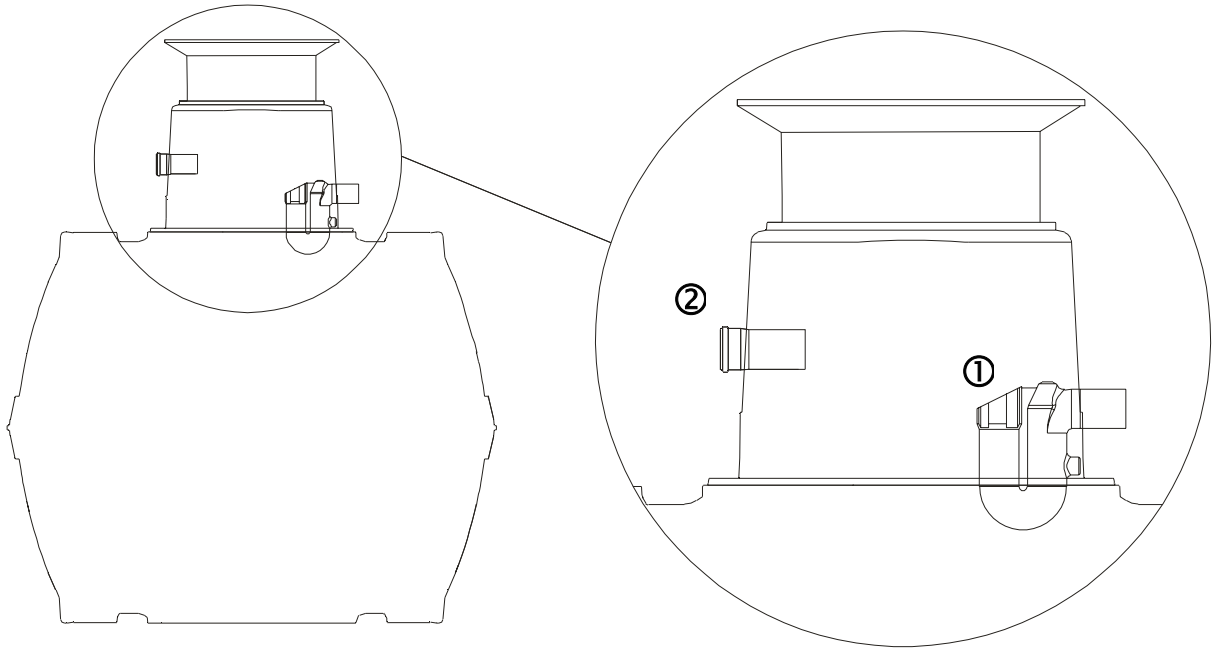
5. Installation in Graf Carat Tank

5.1 Overview



5. Installation

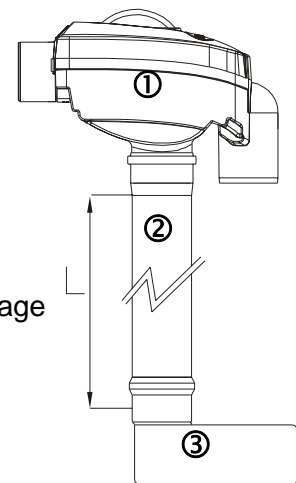
5.2 Installation of inflow pipe and overflow siphon



- ① Insert the overflow siphon in the lower seal until stop touches the tank side.
- ② Insert the inflow pipe from the outside

5.3 Prepare filter for installation

Connect the filter body ① with a 4" PVC pipe ② (on site) with the calming inlet ③ (contained in filter package 3).
Fix all junctions with screws (to prevent shifting of pipes).

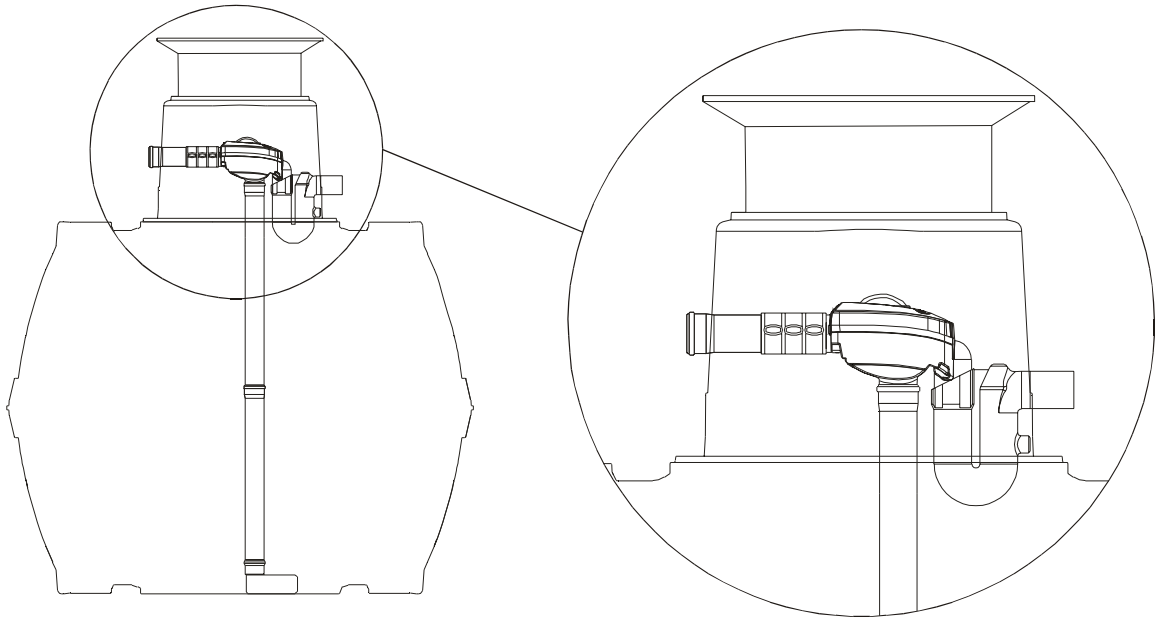


Dimension "L" is 80.7" in the 1700 gallon Carat tank package

Carat	2700 L	3750 L	4800 L	6500 L	7500 L	9800 L	13000 L
[L]	1330 mm	1550 mm	1800 mm	2050 mm	1550 mm	1800 mm	2050 mm

5. Installation

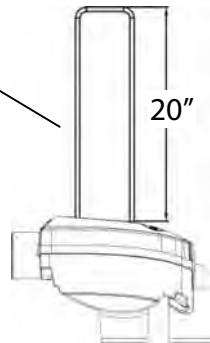
5.4 Insert the filter into the tank



Insert the filter, fitted with the downpipe and the calming inlet, into the tank.
Insert the overflow from top into the siphon and fix the filter inflow with the spannfix collar (contained in filter package 3).

6. Accessory

Handle XL for
Optimax – Pro Filter
Item-No. 330220



7. Maintenance

Depending on the amount and type of debris, the filter sieve may need to be cleaned up to several times a year. Remove the transparent cover from the filter body. The sieve and the cover is one unit which removes easily. The optional Opticlean sprayhead can minimize or eliminate the need for manual cleaning.

PUMPING SYSTEM

Universal Rainwater Pumps

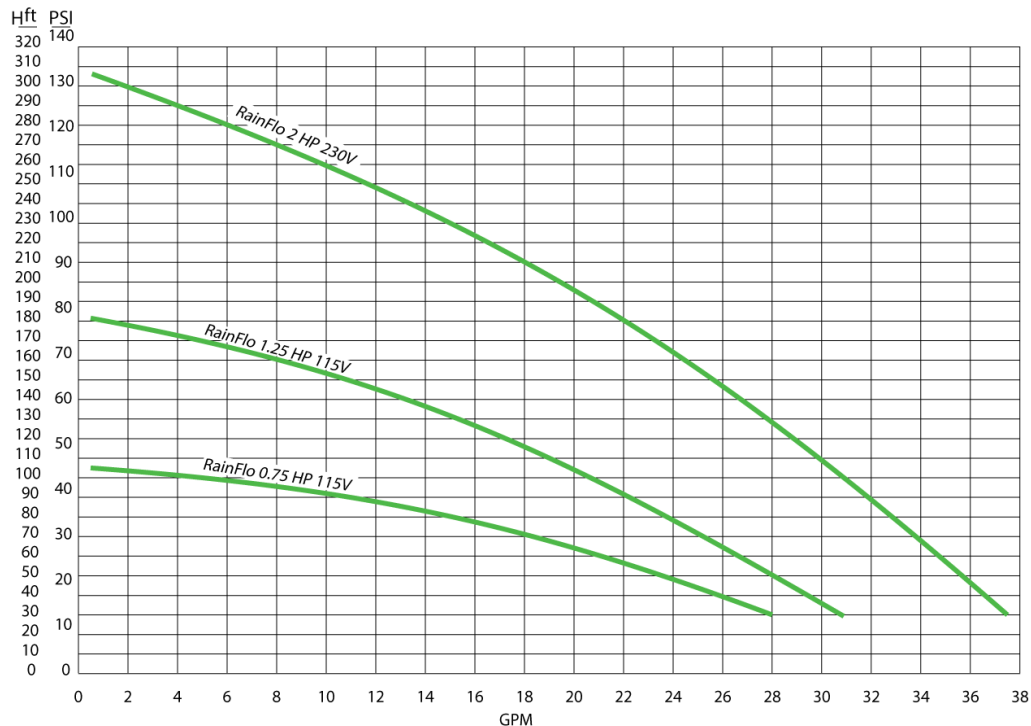
High performance multi-stage rainwater pumps for residential, commercial, and light-industrial rainwater collection systems.

Submersible and External Mounted Capability:

RainFlo universal pumps are specially designed for the unique requirements of rainwater collection systems. Equipped with a large threaded bottom inlet large for internal flow-based cooling and connection to a floating filter, these pumps can be installed vertically or horizontally and they can either be submersed inside a tank or mounted externally on the ground or other platform. Other features include a stainless steel base, adjustable float switch for run-dry protection, external capacitor housed in a wiring box with circuit breaker and master on/off switch for long life and ease of maintenance.



Pump Performance:



Durable, Dependable and High Performance:

Available in 0.75HP/115V, 1.25HP/115V and 2.0HP/230V models, construction consists of 304 stainless steel housings, dual Italian mechanical seals, American thermal protection, GE-Noryl diffuser and impellers, external starting capacitor and a 45 foot power cord. The pump is particularly quiet and durable from its solid construction. The water end is installed under the motor which keeps the motor cooled with the pumped water. The Noryl impellers and diffusers offer high abrasion resistance while the Italian double mechanical seals ensure long life and enhanced reliability.

The oil chamber is filled with non-toxic cooling oil. Ball bearings are self-lubricating and internal cast iron components are electrocoated with polybutadiene varnish to prevent corrosion which is sometimes associated with the typical lower pH of rainwater.

Installation may be oriented either vertical or horizontal so long as water is available at the intake to prevent a run-dry condition.

Specifications:

RainFlo Submersible Pumps			
Model No.	RF075-S	RF125-S & SC	RF200-S
Horsepower:	0.75	1.25	2.0
Nominal Voltage Range:	115V, 60Hz, 8.6A max.	115V, 60Hz, 14A max	230V, 60Hz, 9A max.
P1kW:	1.0	1.24	2.3
P2kW:	0.6	0.95	1.6
Impeller stages:	2	3	5
Maximum flow:	29 GPM	34 GPM	36 GPM
GPM at 50 psi (0 Head):	See Curve	17 GPM	29 GPM
GPM at 40 psi (0 Head):	8 GPM	22 GPM	31 GPM
Maximum head:	105' TDH	180' TDH	310' TDH
System pressure:	Up to 46 PSI	Up to 78 PSI	Up to 135 PSI
Inlet/Outlet size:	1-1/4" FPT	1-1/4" FPT	1-1/4" FPT
Weight:	36 Lbs.	41 Lbs.	46 Lbs.
Dimensions:	7" X 7" X 20" (incl. base)	7" X 7" X 22" (incl. base)	7" X 7" X 24" (incl. base)
Thermal protection:	Yes	Yes	Yes
Motor:	2-pole induction, Continuous duty	Same	Same
RPM:	3450	3450	3450
Cooling:	Water cooled/intake	Water cooled/intake	Water cooled/intake
Insulation class:	F	F	F
Protection:	IP68	IP68	IP68
Certifications:	CE	CE	CE
Warranty:	1 Year	1 Year	1 Year

Installation Instructions

Mounting location:

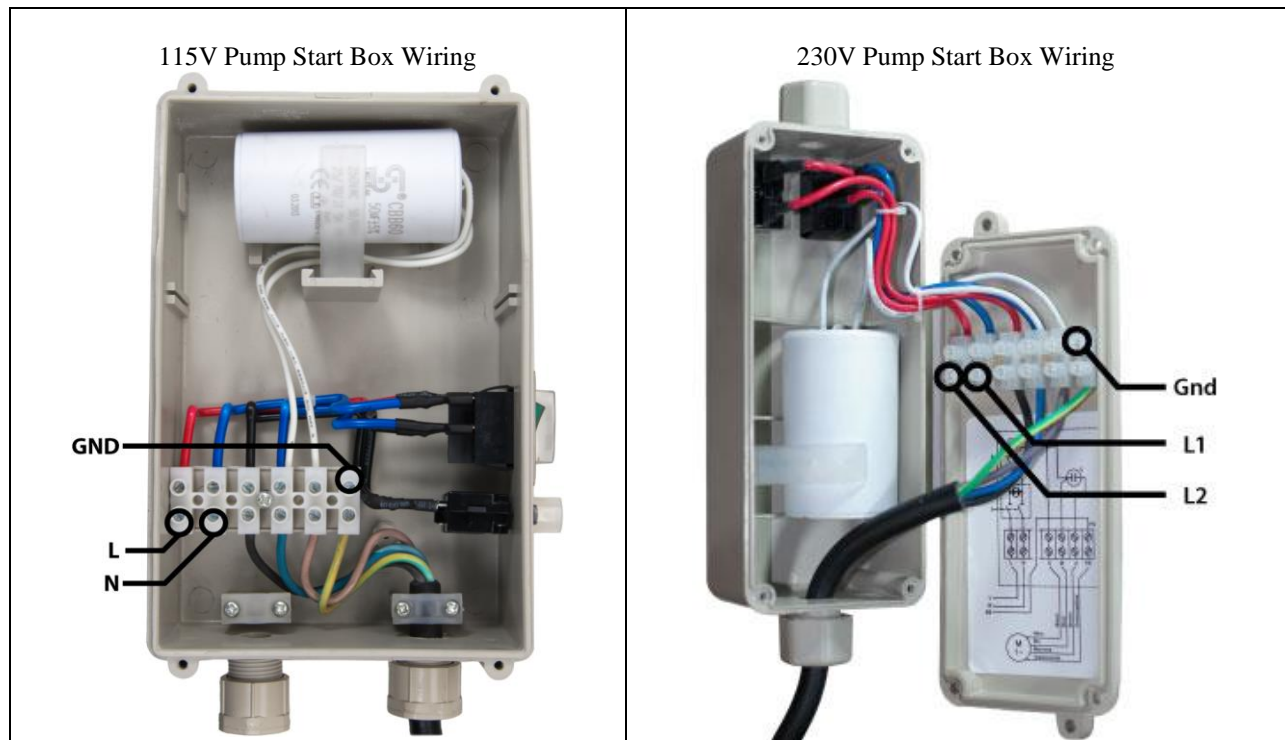
The pump may be mounted vertically or horizontally and may be fully or partially submersed or mounted externally on the ground or other sturdy platform. When mounted externally, the pump must be safely and securely mounted in a manner which prevents exposure to electrical connections and in a location which prevents damage and exposure to freezing temperatures.

Environmental considerations:

If the pump may be exposed to freezing temperatures, the pump must be fully drained and protected with a food-grade antifreeze. The pump start box offers water resistance but should be mounted in a location away from direct exposure to rain, humidity, snow, excessive heat and direct sunlight.

Pump to Start Box Wiring:

All electrical connections should be made by a licensed professional. The pump ships pre-wired to the pump start box as shown below. Excess wire between the pump and pump start box can be removed so long as the wires are re-connected properly.

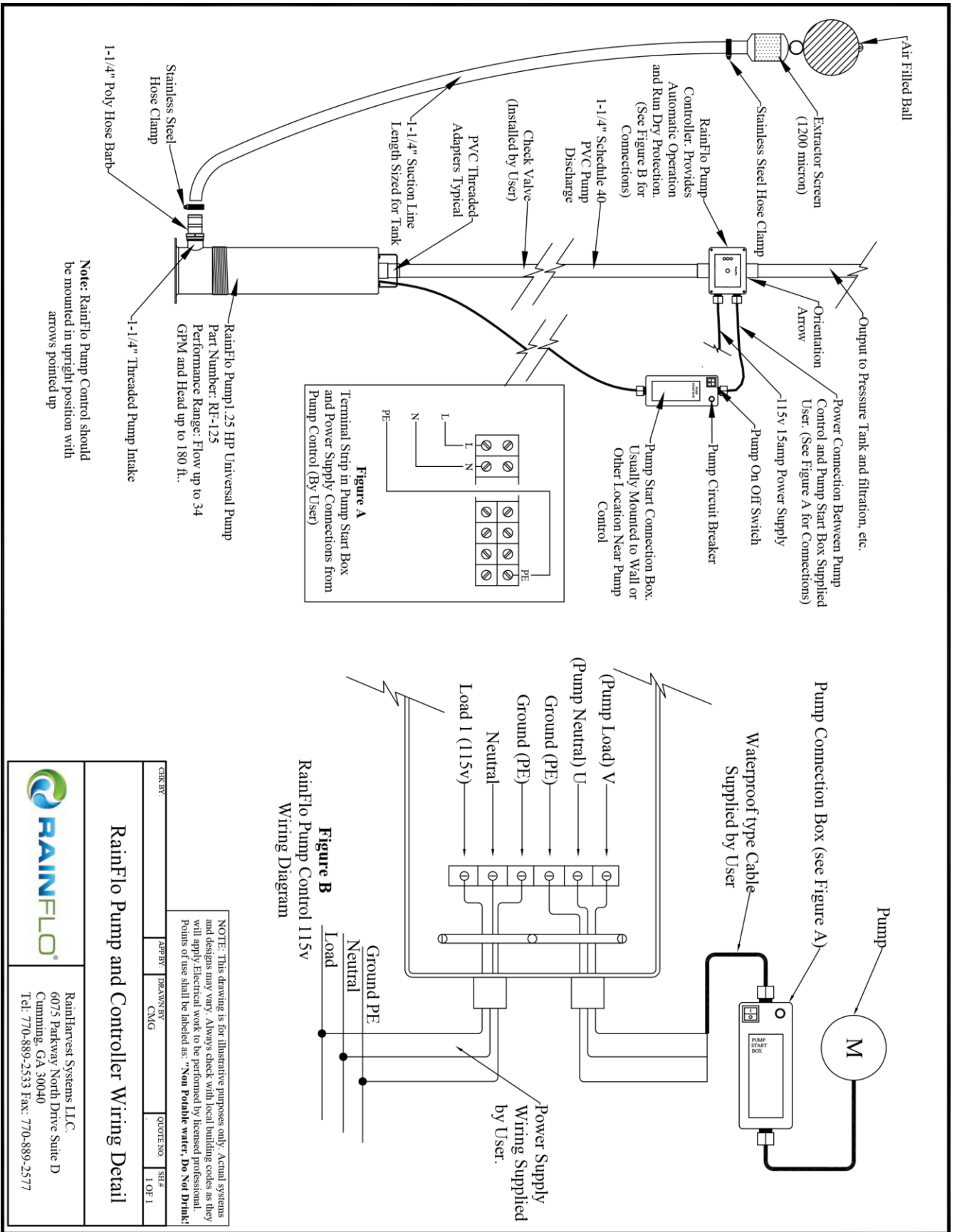


Pump Start Box to Pump Controller Wiring:

The pump start box serves as housing for the start capacitor and on/off control for maintenance and is not intended for regular pump starting and stopping operation. For regular pump control and run-dry protection, an intelligent pump control such as the RainFlo Pump Control or a pressure switch assembly should be used. The pump controller is wired between the main electrical power source and the Gnd/N/L(115V) or Gnd/L1/L2(230V) terminals inside the pump start box. Follow the wiring instructions for your particular pump control device. When wiring is complete, the plastic watertight fittings on each end of the pump start box should be hand-tightened and the cover re-secured. Do not over-tighten the fittings or they can possibly break.

For additional information, see schematic next page

Schematic Diagram





Installation instructions for the PC115A Pump Controller

It is the installer's responsibility to read, understand and comply with these instructions.



Thank you for your purchase of a RainFlo Pump Control.

Your commitment to saving water through the use of harvested rainwater is commendable, and is a very important step towards increasing your personal water sustainability.

To match your commitment to saving water we have committed to ensuring that the pump controllers we offer are of the highest quality available. This pump controller has been tested and certified ROHS compliant for your safety.

Parts included:

Qty-1: Pressure activated pump controller

Qty-1: Instruction manual

Overview:

The RainFlo PC115A provides automatic multifunction control for your water pump including start and stop control based on user demand (flow), demand-side pressure display via built-in pressure gauge, run-dry protection and a check valve (non-return valve) function. It provides direct control of water pumps up to 1.25 horsepower at 115V. As with most pump controllers, the system high pressure is based on the pump output. The pump start pressure (low pressure threshold and start trigger), is adjustable through a screw on the back side of the unit.

Pressure Gauge:

Your PC115A pump controller features a built-in pressure gauge located on the right side of the unit. As with many hydraulic devices, this gauge displays pressure in units called “bar”. One bar is approximately equal to atmospheric pressure at sea level. In terms of water pressure, 1 bar = 14.5037 PSI.

Pressure Gauge (bar)	Pressure (PSIG)
2.0	29.0 PSI
3.0	43.5 PSI
4.0	58.0 PSI
5.0	72.5 PSI
6.0	87.0 PSI
7.0	101.5 PSI

Important Notice:

Read carefully before proceeding with product assembly and commissioning operations. For the pump, refer to its manual.

The PC115A features an internal check valve which requires the unit to be installed with the water inlet facing downward and the output above (arrows near the pressure gauge facing up).

1. Applications and Operation:

The PC115A electronic controller commands the starting and stopping of single-phase electric water pumps whenever a tap or valve connected to the installation is opened or closed, respectively. When the pump is started, it keeps running as long as any connected tap remains open, supplying the network with the required flow at the related pressure.

2. Construction Characteristics:

- Inlet connection : 1”
- Outlet connection : 1”
- Non-water hammer check valve.
- Dry-running protection system.
- Pressure gauge.
- Manual start button (RESET).
- AUTORESET function for automatic start after a failure.
- Power supply LED (POWER).
- Pump switch-on LED (ON).
- Safety system activation LED (FAILURE).

3. Specifications:

- Power supply voltage: 1~115-125V
- Maximum current : 16 A
- Max pump power : 1100W(1.25 HP) at 1-115-125V
- Frequency : 50/60 Hz
- Protection class : IP 65 (*)
- Ambient temperature : 0 /+140° F
- Liquid temperature : 0 /+140° F
- Max flow rate : 44 GPM
- Adjustable starting pressure : 20 - 35 PSI
- Max operating pressure : 145 PSI

(*)Provided the cable glands and screws in cover have been suitably tightened

4. Handling and Inspection:

Handle with care. Dropping and impact can damage the product.

Before proceeding with installation, make sure the unit shows no visible signs of damage, otherwise contact your dealer.

5. Installation:

This device must be assembled and installed by personnel qualified in accordance with local laws, regulations and codes.

5.1 Water Connection (Fig.1)

The PC115A must always be installed with the arrows pointing upward, connecting the 1” threaded inlet to the pump’s outlet and the 1” threaded outlet to the point of use.

Use flexible pipes for connection to the water network, protecting the appliance from any bending loads and vibrations, a ball valve to isolate the pump system from the network, and a foot valve to maintain prime for suction inlets (Fig.1).



Before starting up the unit, fill the suction inlet with water as specified in the pump’s manual.

WARNING: The maximum operating height between the pump and the highest point in the system will depend on the pump start pressure setting. The maximum pressure of your pump must exceed the value of the start pressure setting. Both these limits are specified in the table below.

START PRESSURE	MAX. OPERATING HEIGHT	MAX. PUMP PRESSURE GREATER THAN
22 PSI	33 ft	44 PSI
29 PSI	49 ft	51 PSI
36 PSI	66 ft	58 PSI

5.2 Electrical Connection (Fig. 2)



The connections must be made by a qualified electrician. Install a GFCI for protection against lethal electric shock. Be sure the circuit and device are properly grounded.

Make sure that the voltage supply corresponds to the rated voltage. Remove the cover (faceplate) from the electronic board and make the electrical connection according to the instructions shown inside. This controller can also be used with a single-phase pump with electrical demand greater than 16A, or a three-phase pump, using an auxiliary remote control switch (115V coil). In this case the electrical connections must be made as shown in the diagram, Fig. 3.

WARNING: Power supply voltages other than those specified or improper connections can permanently damage the electronic components and will void the warranty.



H07RN-F3G1.5 type cables (9 - 12 mm) or equivalent must be used in order to ensure IP 65 protection.

6. Start Up:

1. Check that the pump is primed properly, then partially open a tap in the user circuit.
2. Turn on power to the controller; the power LED will light up (POWER).
3. The pump will start up automatically and within 20 to 25 seconds the system should reach approximately the maximum pressure delivered by the pump. While the pump is running, the

- corresponding LED (ON) will remain illuminated.
4. Close the tap mentioned under step (1). After 10-12 seconds the pump will stop running, but the power supply LED (POWER) will remain lit. Any malfunctions occurring after these operations will be caused by improper priming or failure to prime.

7. Starting Pressure Adjustment: (P. Start):

The pump controller is factory set to start with a minimum pressure of 21.75 PSI (1.5 bar). This pressure can be increased up to 36.25 PSI (2.5 bar) by rotating the screw found at the back of the cone-shaped end of the device, (see Fig. 4).

To set the pump start pressure:

1. Read the pressure indicated by the gauge when the pump is started.
2. Disconnect the power supply.
3. Open a tap to discharge the pressure.
4. Adjust the screw clockwise to increase (or counter-clockwise to decrease) the start pressure.
5. Supply power to the the controller; if you are not satisfied with the adjustment, repeat the operations described above until you obtain the desired pressure value.

NOTE: The maximum pressure of the pump (closing contact pressure) and the minimum start pressure must comply with the values shown in the table under paragraph 5.1 otherwise the controller will go into FAILURE mode.

8. Automatic Reset Function:

If the device goes into failure mode, the automatic reset function will execute a series of automatic starts to attempt to restore operation without any manual intervention via the RESET button. The system operates as follows: The appliance is in failure mode due to water failure, for example; after 5 minutes in this condition the system will do a 25-second RESET, attempting to prime the pump. If the system is able to prime the pump, the failure will disappear and the pump will be ready to operate. However, if the failure persists, the system will do another RESET after 30 minutes, and will continue in this manner systematically every 30 minutes for 24 hours. If the failure still persists after all these attempts, the system will remain in this condition until the problem has been resolved by manual intervention or when power is recycled.

9. Troubleshooting:

1.- THE PUMP DOES NOT STOP:

- A) Water loss exceeding 0.8 gpm. Make sure that all the taps along the pipeline are closed and that there are no leaks.
- B) The electrical connection is incorrect: refer to the instructions in Fig. 2.
- C) Electronic board malfunction: replace the electronic board.

2.- THE PUMP DOES NOT START:

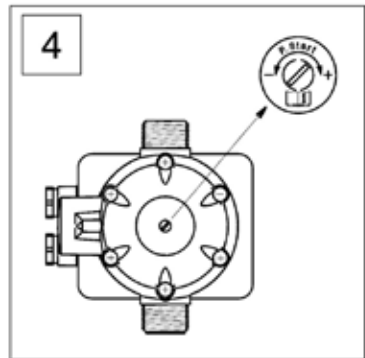
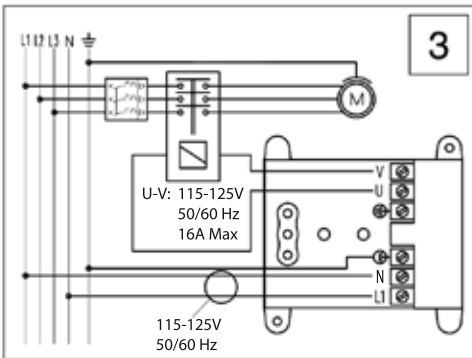
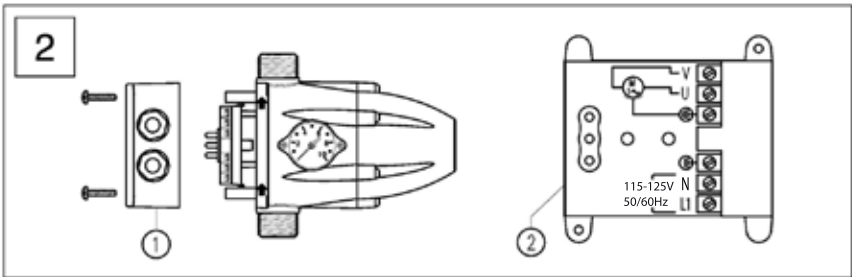
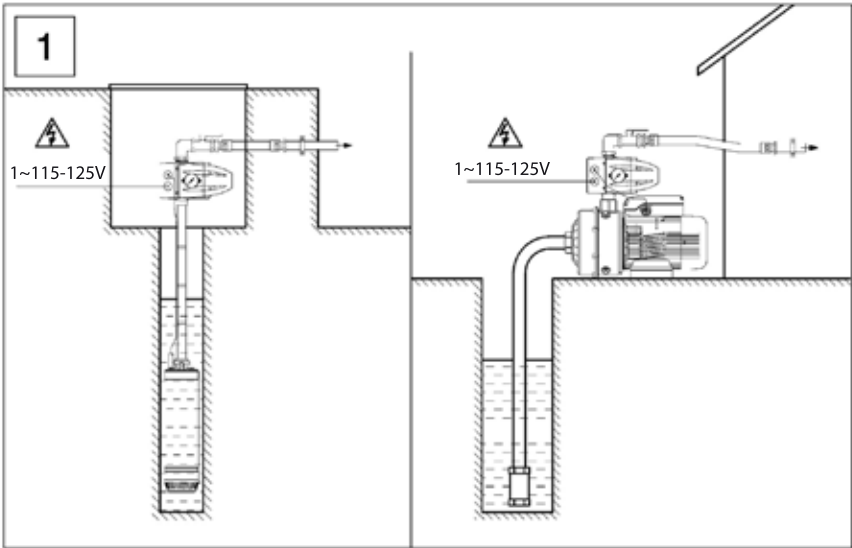
- A) The pump is not primed; dry-run protection is active and the FAILURE LED is on: prime the water pipe and check by pressing the manual start button (RESET).
- B) The pump has shut down: the safety system has stepped in and the FAILURE LED is on. If you press the manual start button (RESET) and the LED (ON) lights up; if the pump does not start test the output with another device such as a lamp.
- C) Electronic board malfunction: disconnect the pump from the electrical mains and re-connect it; the pump should start, if it does not replace the controller.
- D) No power supply: check the electrical connections, the POWER LED must be illuminated.
- E) The pump delivers insufficient pressure, the safety system has stepped in and the corresponding LED (FAILURE) is illuminated: make sure that the pump pressure corresponds to the pressure value specified in the relevant table in section 5.1.
- F) Air is entering the pump through the suction side: the pressure is well below normal, with

constant fluctuations. The safety system will engage and stop the pump, the FAILURE LED will light up. Check the seal and connections in the suction pipe.

3.- THE PUMP KEEPS STARTING AND STOPPING:

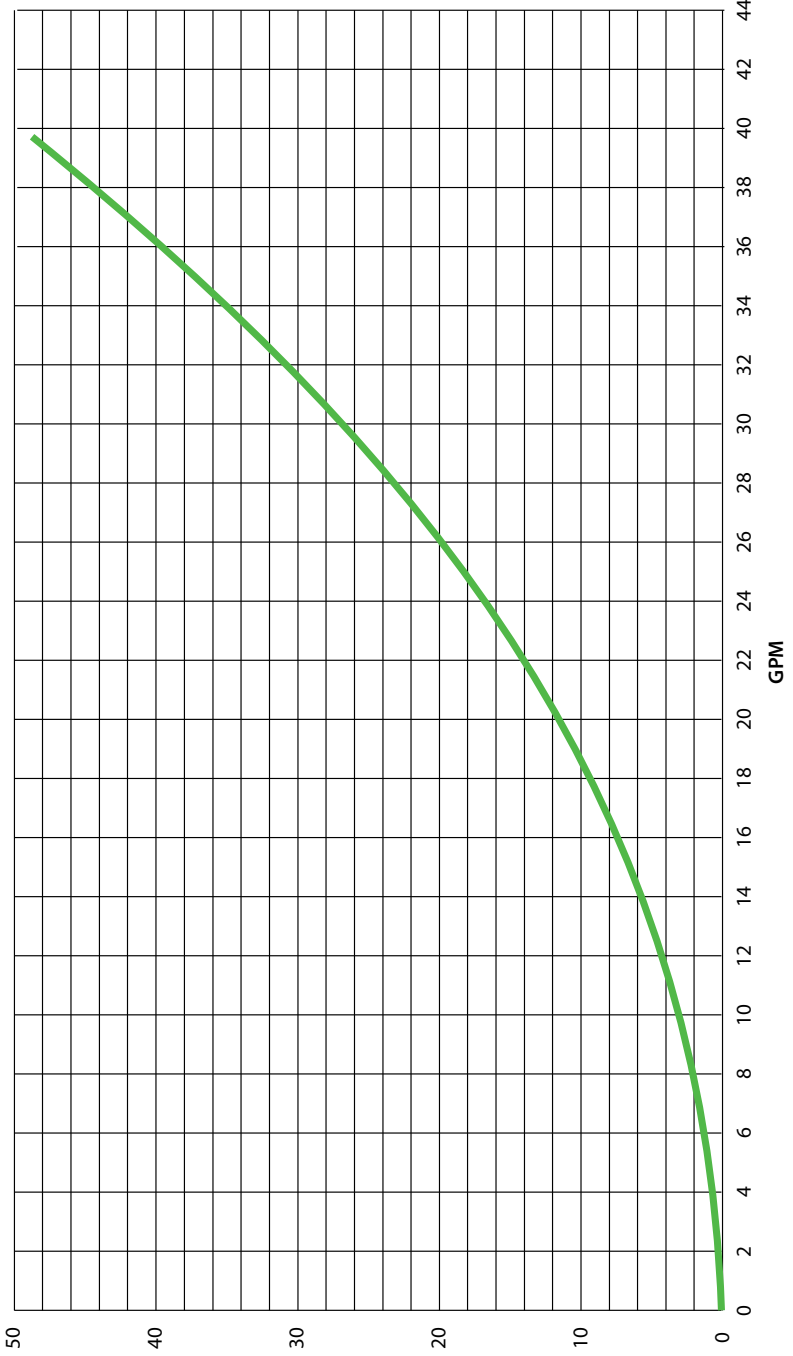
There is a small leak in the delivery pipeline: check for any leaking taps or running toilets.

10. Installation Illustrations:



PC115A Friction Loss

Hft





PC115A Pump
Controller

Rev. 012115