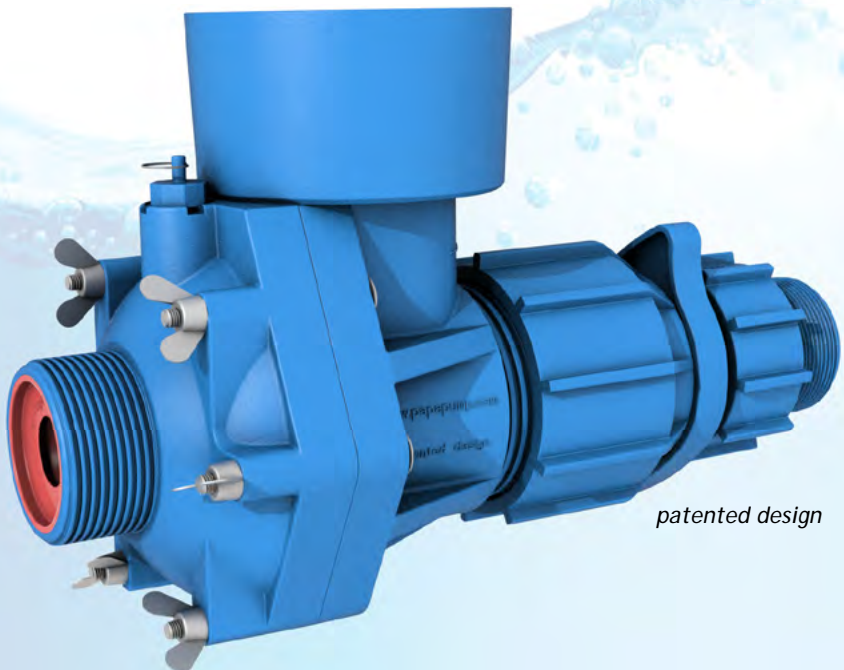


# Papa Pump<sup>®</sup>

## MANUAL

### Installation, Operation and Maintenance

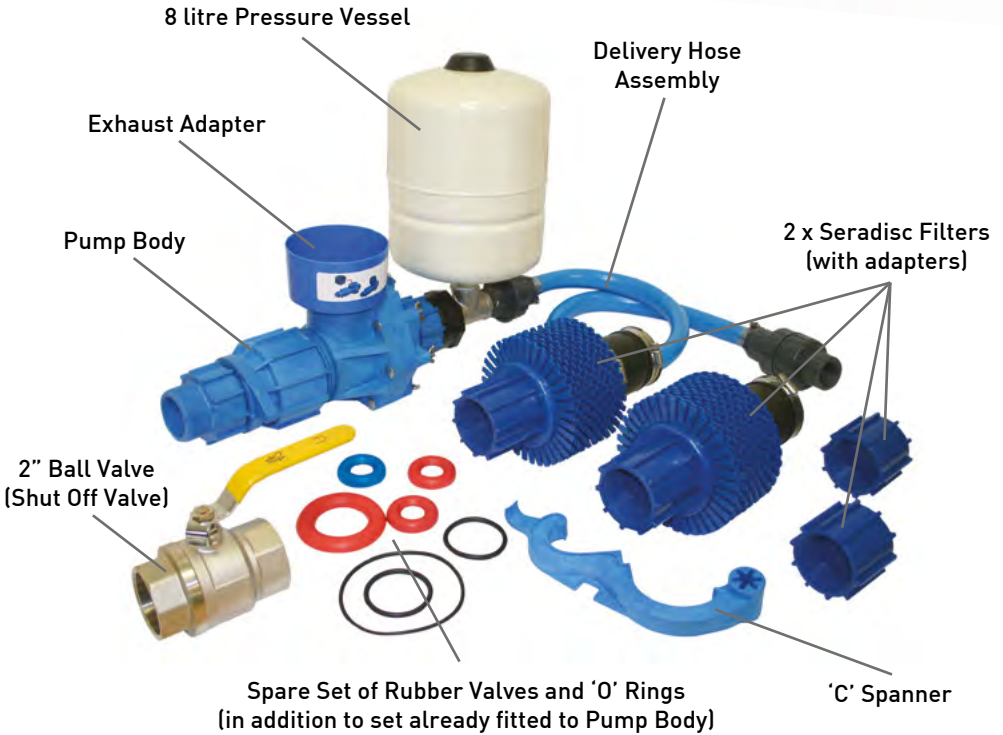


# Index

pg	
3	The Papa Pump Kit
4	Pump Parts
5	What is a Papa Pump?
6	How the Pump works
7	Technical Information
7	Pipe Friction
8	The Pressure Vessel
9	System Layout
10	Site Measurements
11	Water Delivery - How much and how high?
11	Pump Performance Chart
12	Multi-Pump Systems
13	Water Catchment
14	The Supply Pipe and Supply Tank
15	The Pump Chamber
16-17	The Seradisc Filters
18-20	Installation and Commissioning
21	Priming and Fitting the Pressure Vessel
22	Fitting the Exhaust Insert
22	Starting the Pump
23	Adjusting the Pump
24	Pump Parts List
24	Pump Maintenance
26-27	How to re-assemble the Pump Barrel
28-31	Troubleshooting

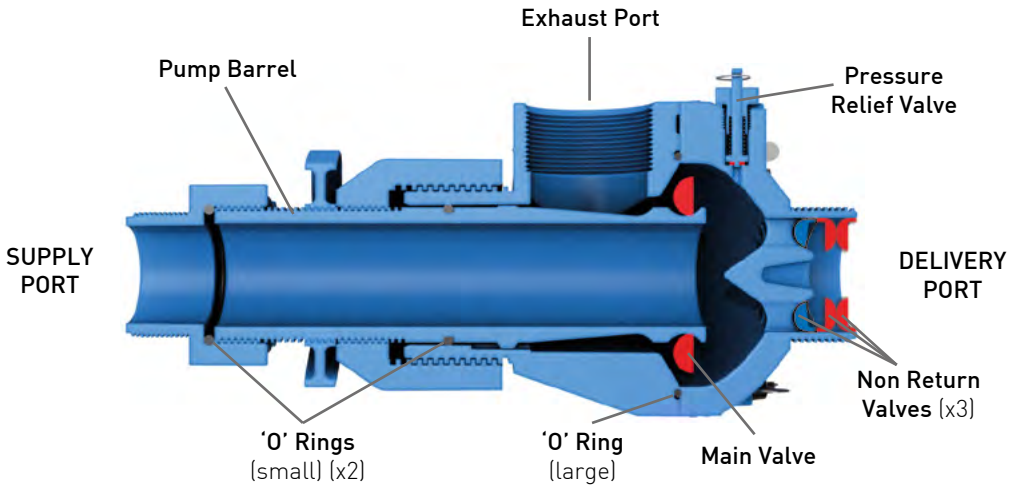
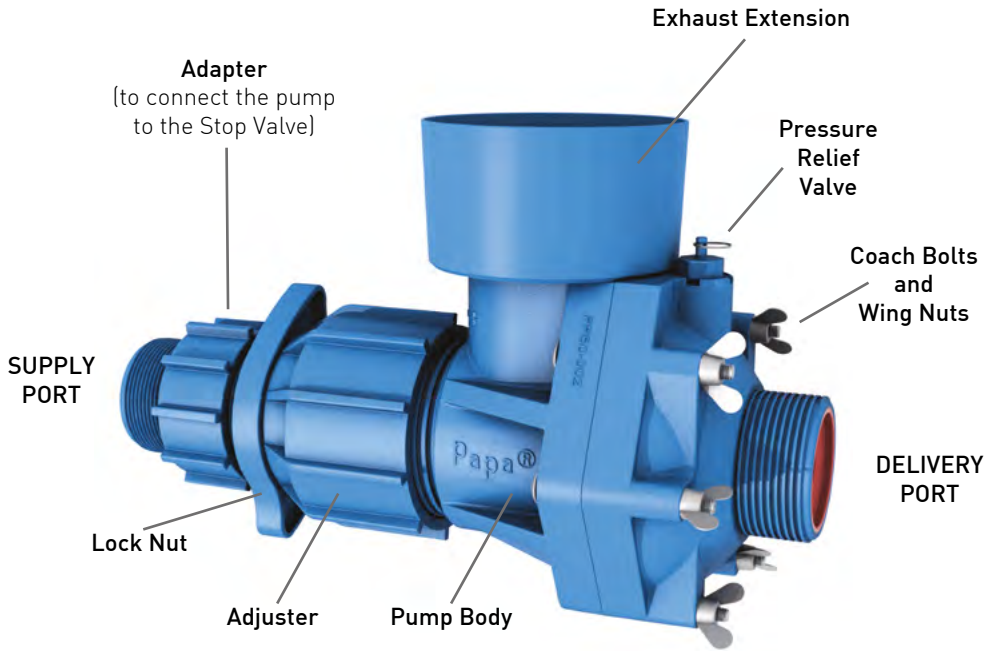
# The Papa Pump Kit

The Papa Pump Kit comes in a box weighing only 13kg and includes the following kit conten



2 x metal BSPT/NPT Adapters  
(Included in kits sold in North and South America)

# Pump Parts



# What is a Papa Pump?

The Papa Pump is a modern 'hydro ram' based on the principles of a traditional ram pump but with a redesigned and patented new 'Venturi Valve' and manufactured using modern composite (plastic and glass) material giving it non-corrosive, light but incredibly durable properties. The result is a smaller, lighter and more efficient 'Zero Energy' pump.

The **Venturi Valve** is an EPDM valve with a profile similar to an aircraft wing which automatically opens and closes, redirecting the water flow to either the delivery port or the exhaust port. The material is also very durable and may last 2 to 3 years of constant use before the valves need replacing.

**Zero Energy** pumping allows the pump to run without the use of any fuel or electricity - it just uses the natural power of flowing water, captures it, and uses it to pump water over long distance and to higher elevations.

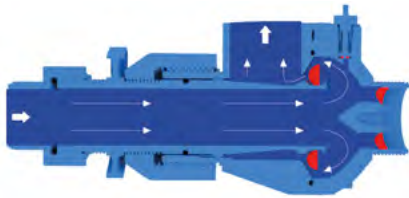
Main Benefits: **Uses no fuel or electricity**  
**Pumps 24/7 without attendance**  
**Little maintenance** (inexpensive valves changed 2-3 years)  
**Uses surface water** (doesn't affect ground water levels)  
**Can make big savings on utility costs**  
**Inexpensive compared with equivalent pump systems**  
**Guaranteed for 5 years**

Applications: **Off-grid or remote location free water delivery**  
**Agriculture - livestock watering and irrigation**  
**Large scale water users** (e.g. golf courses, fish farms, etc.)  
**Water utility applications** (water spraying and pulsing)  
**Non potable water** (free water for sanitary and cleaning use)  
**Humanitarian projects** (helping developing communities)

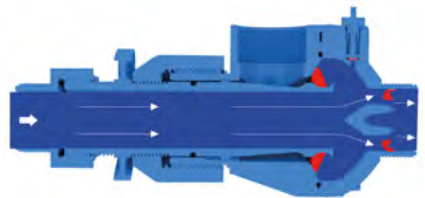
# How the Pump works

The valve cleverly redirects the flowing water to go to 2 separate ports - over 70% of the water is de-pressurised and is expelled through exhaust port - up to 30% of the water is pressurised and directed to the delivery port. This higher pressure is what allows it to be delivered over long distances and to higher elevations.

## The Pumping Cycle

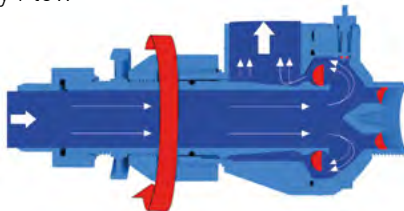


**LOW PRESSURE EXHAUST** - The water flows around the main valve to the exhaust port. As the flow increases around the main valve a differential pressure occurs causing the valve to close....



**HIGH PRESSURE DELIVERY** - The flow and pressurised water is then directed through the non return valves at the delivery port. The pressure suddenly reduces, causing the main valve to re-open and the cycle repeats...

## Adjusting the Supply Flow




**TO ADJUST THE SUPPLY FLOW** - If you turn the adjuster as shown, it will increase the flow into the pump. As you do this the beat will get deeper and the pulse will slow. This indicates more water is flowing through the pump, generating a greater pressure and increasing water delivery.



Watch the video on how to adjust the supply flow at <https://vimeo.com/248286223>



# Technical Information

Pump Housing	Latigloss®  High Performance Thermoplastics
Valves/'O' Rings	EPDM
Exhaust Insert	Polypropylene
Maximum operating pressure	10 bar
Pump Weight	2 kg
Length/Width/Height	30cm/18cm/16cm
Supply Port / Exhaust Ports	2" BSPT (2" NPT)
Delivery Port	1" BSPT (1" NPT)

## Pipe Friction

Pipe Friction has a minimal effect on the flow of water through the pipes except where there are long distances involved. If you are delivering water over long distances, you should consider pipe friction loss. The loss will depend on the amount of flow, the pipe size (diameter), the pipe material and of course, the length of the pipe. The link below will take you to an quick and easy calculator to work out the friction loss on any long delivery pipe.

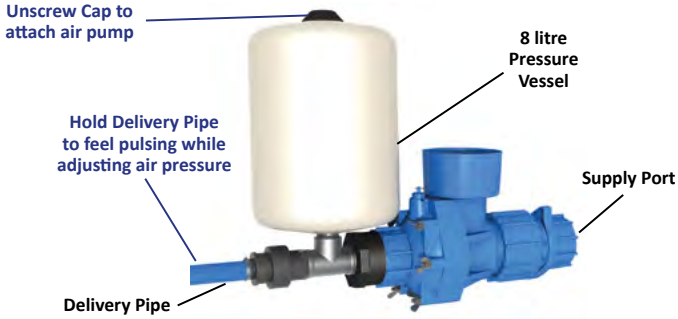
[http://www.calculatoredge.com/mech/pipe\\_friction.htm](http://www.calculatoredge.com/mech/pipe_friction.htm)

# The Pressure Vessel

An 8 litre Pressure Vessel comes with the Papa Pump Kit. It should be attached to the delivery port and will reduce pulsing in the delivery pipe.

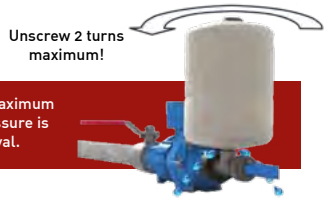
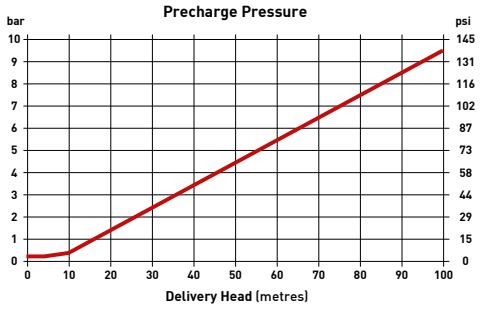
**The pressure should be set to 1 bar for every 10 metres of delivery head, less 0.5 bar.** For example a 50 metre delivery head would require a pressure of 5 bar less 0.5 bar so the correct pressure would be 4.5 bar.

**THE PRESSURE SHOULD BE SET BEFORE ATTACHING TO THE SYSTEM.**




## Pre-charging the Pressure Vessel


1. Stop the Pump
2. Unscrew the Pressure Vessel **a maximum of 2 turns** to release pressure.
3. When pressure has been fully released, re-tighten the Pressure Vessel
4. Adjust pressure by using an air pump attached to the top of the Pressure Vessel
5. Re-start the Pump



**CAUTION! DO NOT FULLY UNSCREW THE PRESSURE VESSEL WHILE PRESSURISED** Stop the pump and unscrew a maximum of 2 turns. Wait until water pressure is fully released before removal.



Watch the video on how to adjust and prime the pressure vessel  
<https://vimeo.com/248481867>





# System Layout

Planning your layout is essential to an efficient system and maximising the potential water delivery.

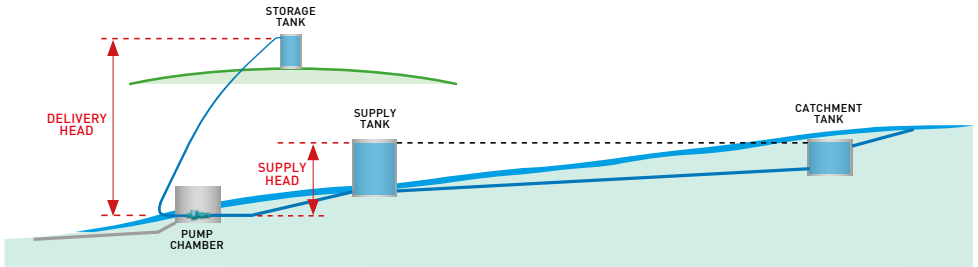
## Maximising the Supply Head is most important.

(the difference in height from your supply tank to the pump)

The greater the Supply Head, the more water you can pump.

The greater the Supply Head, the higher you can pump it.

**Your first task is to find the highest water catchment point and the lowest point you can place your pump to maximise the Supply Head.**

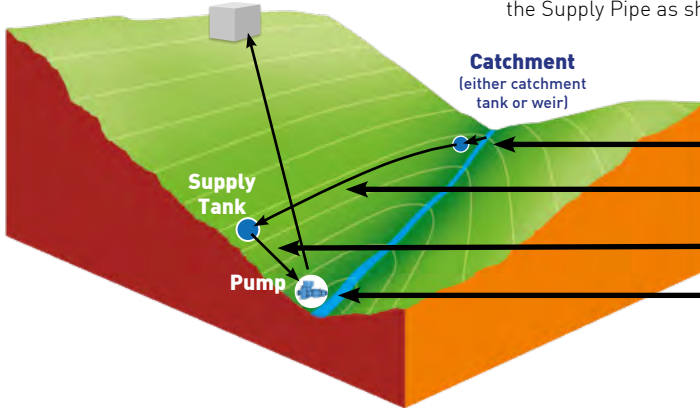


**Point of Delivery**  
(tank, trough or lagoon)



## Good Layout

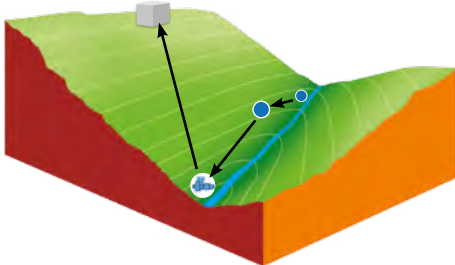
maximising the Supply Head while keeping the Supply Pipe as short as possible



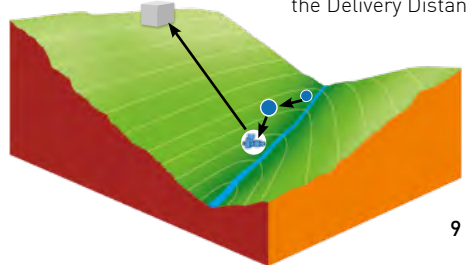
Water taken from Stream or River at the **highest possible point**.  
Use the contours of the land to feed your Supply Tank...  
...which means it can be closer to your pump and give the **Best Supply Head**.  
The Pump should be sited at the **lowest possible site**.



A short (plastic) Feed Pipe and long (metal) Supply Pipe is an inefficient and expensive layout.



Resist placing the pump closer to the delivery point if it means reducing the Supply Head. The Supply Head is much more critical than the Delivery Distance.



# Site Measurements

## Measuring the Flow of a Stream

There is a minimum flow required for the Papa Pump to operate. You can measure the flow rate from your stream or spring by the following method:

You can use a wide board to dam the stream. Before you place the board across the stream, cut a 'V' shape into the top of the board.

When water flows through the 'V', time how long it takes to fill up a litre jug. E.g., if it takes a second to fill up a litre jug then this equates to 60 litres per minute, which is more than the recommended 60 litres per minute minimum to operate a Papa Pump.



 Above is the method to use for a small stream. If you have a larger river, see this pdf on how to measure river flows. Download at [www.waterpoweredtechnologies.com/wp-content/uploads/2018/05/Measuring-Flow-Rate.pdf](http://www.waterpoweredtechnologies.com/wp-content/uploads/2018/05/Measuring-Flow-Rate.pdf)



## Measuring the Supply Head

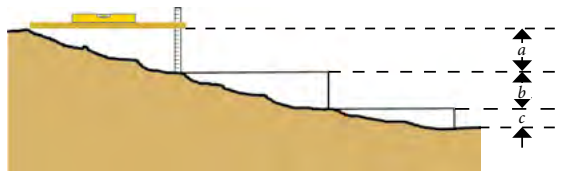
The minimum Supply Head required is 1 metre.

In the absence of professional surveying equipment or an accurate GPS device, there are a few simple methods for measuring your Supply Head:

1. Take a hose pipe and stretch to the point where you can get your maximum Supply Head. Fill the hose with water. At the bottom of the incline, the point at which water starts to come out of the hose is the height you should measure to give you the Supply Head.



2. Use a plank, a measuring stick and spirit level to measure steps down the incline. Repeat until you reach the bottom and then add up your measurements to give you the Supply Head. e.g.  $a+b+c = \text{Supply Head}$ .



# Water Delivery - How much and how high?

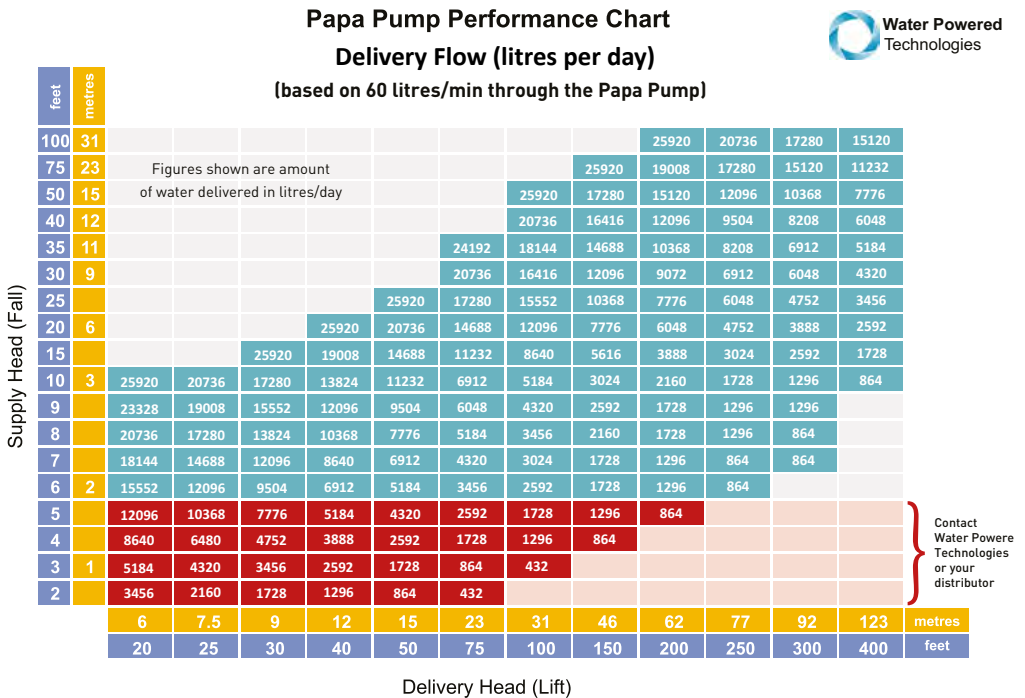
The amount of water your Papa Pump System will deliver depends on many variables but the main factors are:

## How much water is supplied to the Pump

## The height of the Supply Head

## The height of the required Delivery Head

The following Pump Performance Chart shows an indication of the amounts of water you can expect based on 60 litres per minute being supplied to a Papa Pump.



## Delivery Head (Lift)

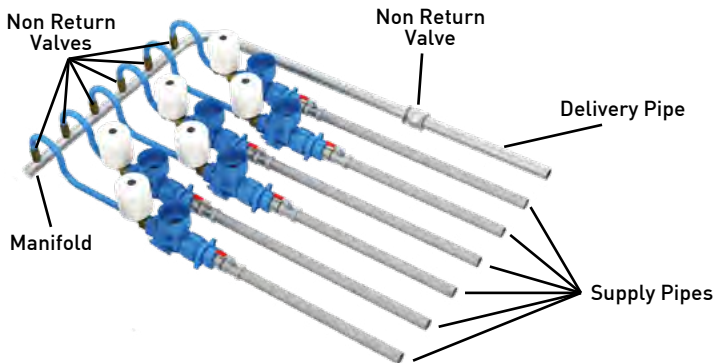
As an example: If you had a supply flow of 60 litres per minute, a supply head of 6 metres, and you wanted to deliver your water to a height of 46 metres, then the amount you could deliver would be 7776 litres per day.


## Water Delivery - How Far?

The Papa Pump can pump water for miles! The only loss in pressure is due to pipe friction which is minimal. See page 7.


# Using multiple Papa Pumps for larger systems and flows

This is a typical multi-pump configuration.





See how a 5 pump system works for a community in Nepal. Download the case study at [www.waterpoweredtechnologies.com/wp-content/uploads/2018/03/Papa-Pump-Nepal-Case-Study.pdf](http://www.waterpoweredtechnologies.com/wp-content/uploads/2018/03/Papa-Pump-Nepal-Case-Study.pdf)



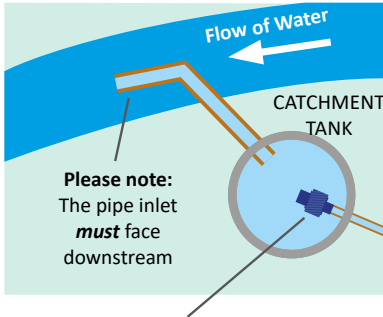
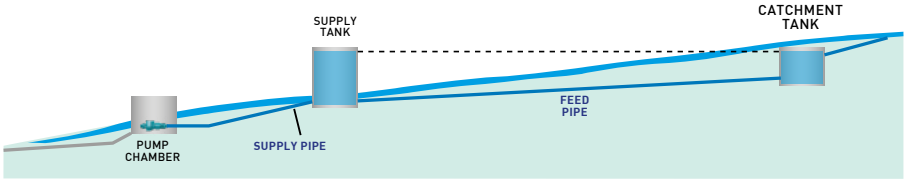
If your supply flow is large and you need more water delivered, you can use a multi pump system. To estimate your delivery flow, use the chart on the previous page and multiply the stated delivery flows by the number of pumps in your system. The table below illustrates some examples.

## Papa Pump Performance Chart for Multiple Pumps

The delivery amounts for multi pump systems are simply the single figure duplicated by the number of pumps, e.g.,

Supply Head (metres)	Delivery Head (metres)	Delivery Amount (litres per day)					Supply Head (metres)	Delivery Head (metres)	Delivery Amount (litres per day)				
		1 Pump	2 Pumps	3 Pumps	4 Pumps	5 Pumps			1 Pump	2 Pumps	3 Pumps	4 Pumps	5 Pumps
1	6	5184	10368	15552	20736	25920	6	31	12096	24192	36288	48384	60480
1	12	2592	5184	7776	10368	12960	6	77	4752	9504	14256	19008	23760
1	31	432	864	1296	1728	2160	6	123	2592	5184	7776	10368	12960
2	6	15552	31104	46656	62208	77760	9	31	16416	32832	49248	65664	82080
2	12	6912	13824	20736	27648	34560	9	77	6912	13824	20736	27648	34560
2	31	2592	5184	7776	10368	12960	9	123	4320	8640	12960	17280	21600
2	77	864	1728	2592	3456	4320	12	31	20736	41472	62208	82944	103680
3	6	25920	51840	77760	103680	129600	12	77	9504	19008	28512	38016	47520
3	12	13824	27648	41472	55296	69120	12	123	6048	12096	18144	24192	30240
3	31	5184	10368	15552	20736	25920	23	77	17280	34560	51840	69120	86400
3	77	1728	3456	5184	6912	8640	23	123	11232	22464	33696	44928	56160
6	12	25920	51840	77760	103680	129600	31	62	25920	51840	77760	103680	129600

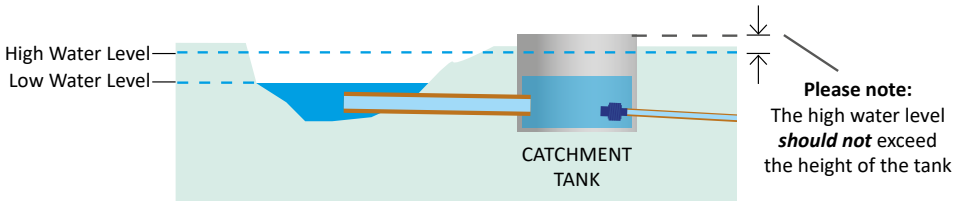
# Water Catchment



The Catchment Tank (or Weir) acts as the first stage of filtration from large debris and allows the settlement of sediment.

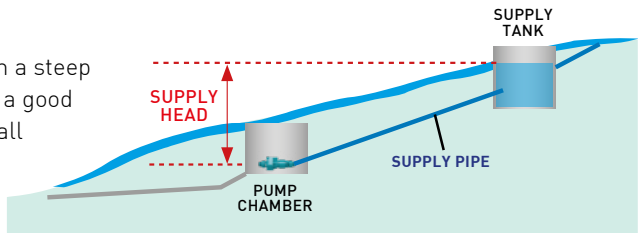
A Catchment Tank is recommended for rivers and streams where there is a great difference between high and low water levels or for small flows (for instance, water from a spring).

It is highly recommended that a Seradisc Filter is fitted to the Feed Pipe to protect the Pump from debris.



## When a Catchment Tank is not required.

If the Spring/Stream is on a steep gradient you can achieve a good Supply Head within a small distance. In this case, water can be fed directly to the Supply Tank.



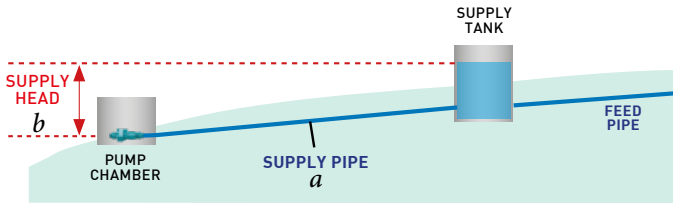
Seradisc Filters are a specially designed high performance filter/screens which will protect your pump from ingress of debris and air. 2 Seradisc Filters are supplied with every Pump Kit.

# The Supply Pipe and Supply Tank

All Papa Pump systems require a Supply Tank to regulate the flow into the Pump.

**A minimum Supply Head of 2 metres is recommended for efficient pumping** - contact Water Powered Technologies for advice if you have a small Supply Head (below 2m). However, there are alternative valve rings that can be used for lower supply heads.

For efficient pumping, the Supply Tank should ideally be close to the Pump Chamber so that the length of the Supply Pipe is between 5 and 7 times the Supply Head. (e.g. If the Supply Head is 2 metres, the Supply Pipe should be between 10 and 14 metres)



$$a = b \times 5 \text{ (min.) to } 7 \text{ (max.)}$$

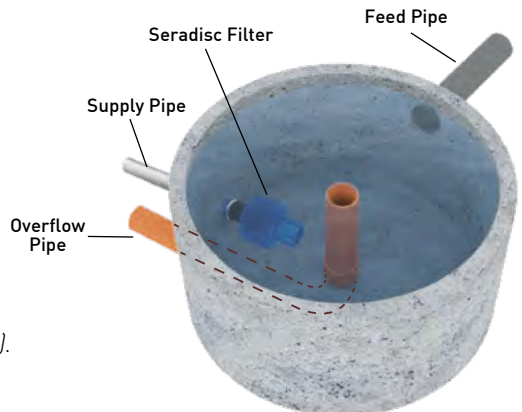
The Supply Pipe should be solid - we recommend using **2 inch<sup>Ⓞ</sup> (internal diameter) threaded Steel Pipe** (illustrated right) for this part of the system. **Plastic Pipe will absorb some of the energy and reduce efficiency.**



It is essential that the **pipe is straight and on a consistent gradient**. Bends in the pipe will reduce flow and undulations in the pipe will generate air locks and damage the pump.

For long supply pipe lengths contact WPT for options.

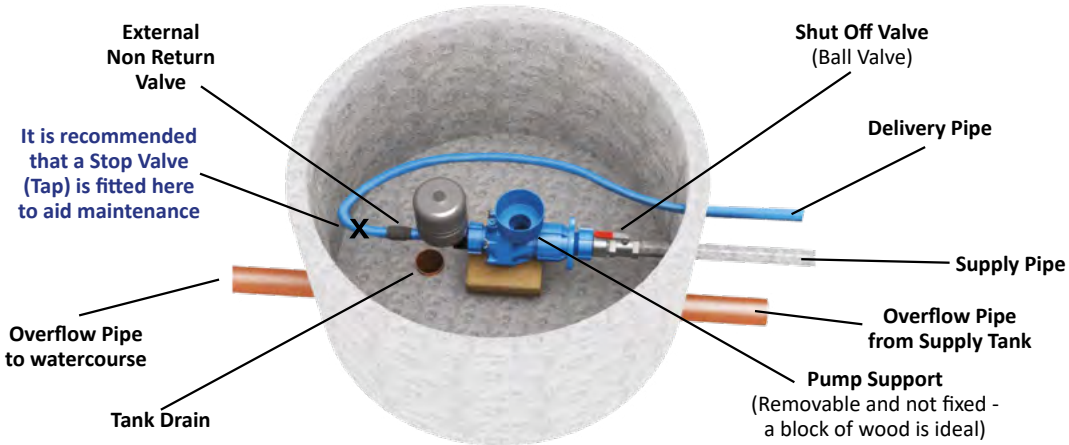
The Supply Tank is a reservoir that regulates the flow to the pump. A concrete ring is the ideal vessel for this but otherwise the tank must be water tight and have enough capacity to supply the pump. A cover or lid will also protect from debris (leaves, etc.) and animals. We recommend fitting a removable stand pipe for overflow and draining for maintenance (as shown).



# The Pump Chamber

A 1 metre depth and 1 metre diameter tank can house up to 2 Papa Pumps. If 3 or more pumps are required you will need a bigger chamber. **Cover your chamber to keep free of debris.**

**It is important that the supply pipe comes into the tank 150mm off the floor.** This is so that you can easily screw on the pump body. Once installed the pump will need then to be supported, but with a temporary support that can be removed for maintenance.



**TIP:** We recommend, when installing tanks and chambers, that you fit a Conduit Pipe (32mm MDPE) from the top of the Supply Tank to the Pump Chamber, as future proofing for further installations such as a Sureflow Valve.



We recommend using concrete rings wherever possible. However, in some situations, cost and availability can be prohibitive and alternative materials or constructions can be used for your pump chamber.

**The important thing is to have enough space to work and also to give the pump some good protection.** It is also recommended that a good lid or cover is fitted to keep out debris and animals. It will also suppress any noise from the pump.



Watch the step by step guide on how to install a Papa Pump  
<https://vimeo.com/242753193>



Good filtration is essential for pump protection. Water Powered Technologies have developed the Seradisc Filter because its screens finer particles, reduces blockages and helps prevent vortexing and cavitation (air formed in the water from turbulence). Good protection for your pump will extend the life of any pump and reduce maintenance costs.

The Seradisc Filter is **very easy to fit** and **very easy to clean**

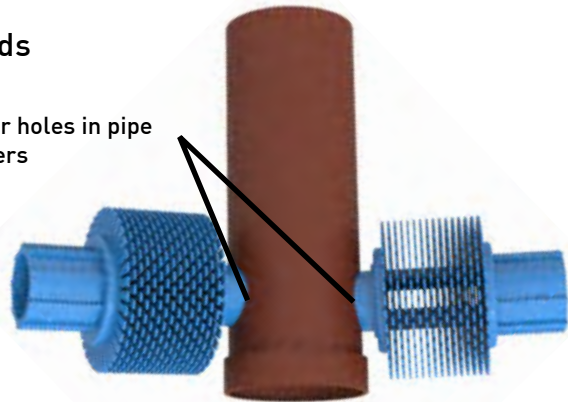
It is made of strong non-metallic material so **will not rust**

It is designed for **modular assembly** and connectible in **multiple configurations**

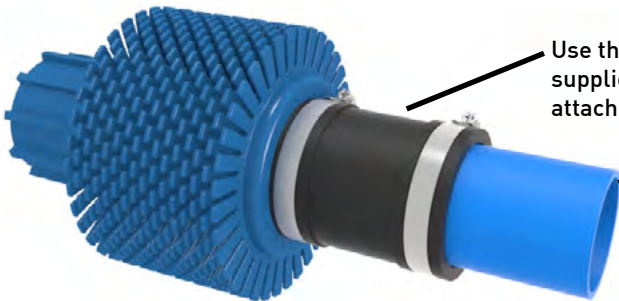
It has a **cage and float accessory** for floating applications

## Installation methods

Cut 2½" diameter holes in pipe and screw in filters



Use the flexible coupling supplied with the filter to attach it to your 2" pipe.



Watch the video on how to fit a Seradisc Filter  
<https://vimeo.com/238088405>







# Adding discs for finer filtration

Your Seradisc Filters come with 16 discs which will screen particulates of 5mm and above. If you need finer filtration you can order extra discs and increase the number of discs on each filter to a maximum of 42 discs - this would screen particulates of 0.1mm and above.



 See more about the Seradisc Filter including how to add discs  
<https://vimeo.com/142393666>



# Modular Assembly

For increased capacity or larger diameter pipes. Units may be connected in multiple configurations.

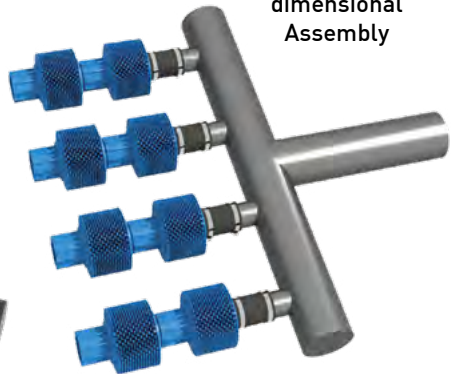
**In-line Assembly**



**In Parallel Assembly**



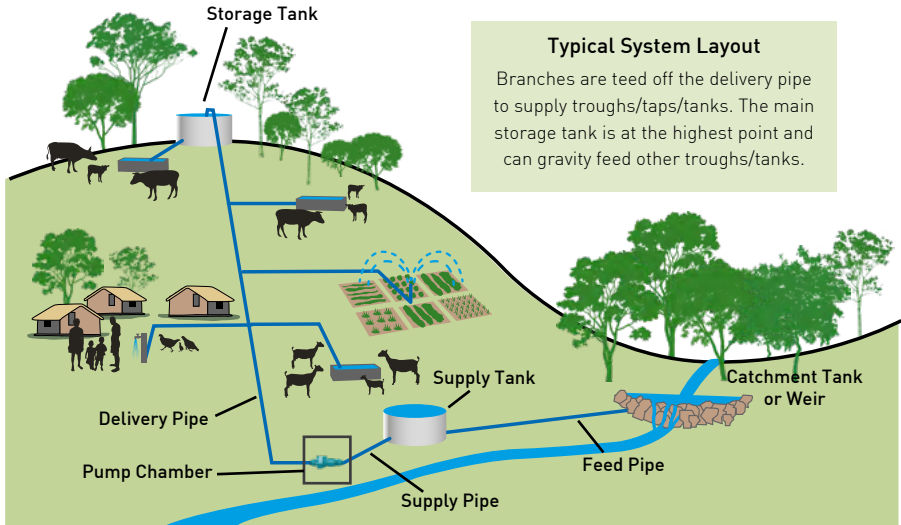
**Multi-dimensional Assembly**



For more details and technical information please go to:  
[www.seradisc.com](http://www.seradisc.com)

# Installation and Commissioning

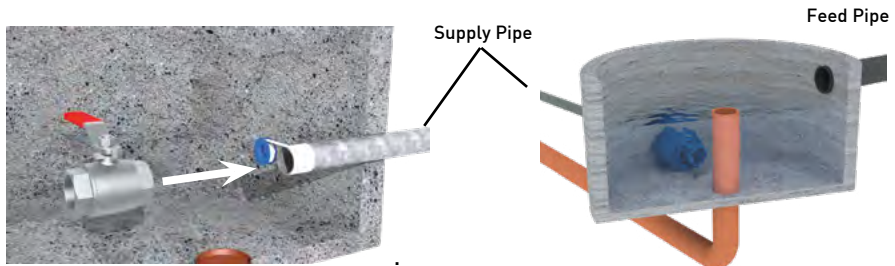
Water troughs can be branched off the main delivery pipe as long as they are fitted with float valves. In these cases the delivery pipe should be plumbed into the bottom of the reservoir/storage tank to allow for back flow when demand is high. The highest off-take requires an overflow either back to the source or ditch.



## Flushing the system prior to pump installation

It is **VERY IMPORTANT** to prevent the ingress of harmful stones and debris which will cause serious damage to the pump.

### Flushing the supply pipe



1. Using PTFE tape, fit the Shut Off Valve onto the Supply Pipe in the Pump Chamber.
2. Close the Shut Off Valve and allow the Supply Tank to fill with water.



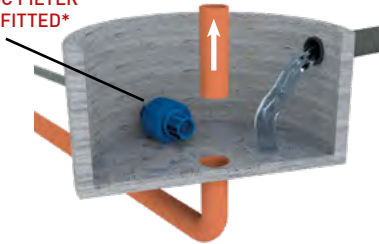
3. When the Supply Tank is full, open the valve and allow the water to run through for about 30 seconds. Then repeat a few times.



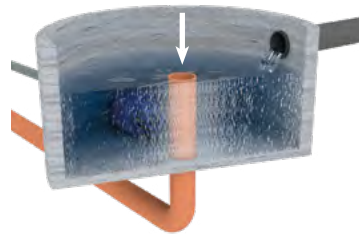
4. Close the Shut Off Valve and you are ready to fit the pump.

### Flushing the supply tank

**A SERADISC FILTER  
MUST BE FITTED\***



1. Remove the overflow/flush standpipe in the Supply Tank to allow any loose material to be flushed away.



2. Refit the standpipe and allow the system to fill.

**\*Ensure that Seradisc Filters are installed on both the Feed Pipe and the Supply Pipe intakes to prevent the ingress of debris into the system during normal operation.**

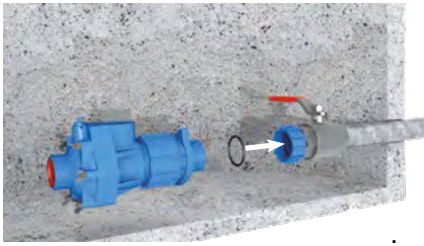
### Installing the Papa Pump



1. Apply PTFE tape to the 2" BSP Adaptor.



2. Screw the Adaptor into the Shut Off Valve until hand tight and then use the supplied 'C' Spanner to tighten a couple of turns.



3. Ensuring the 'O' ring is in place in the adaptor, screw the pump body onto the adaptor until hand tight.



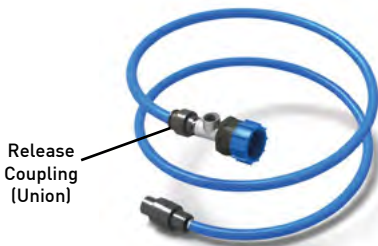
4. Make sure the final pump position is with the exhaust facing upwards.



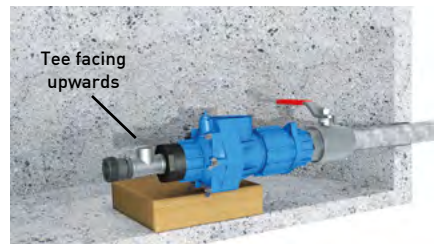
5. Support the underside of the pump with a suitable wooden block to alleviate the weight on the lever valve.



6. Make sure the 3 rubber valves are correctly alternatively orientated as shown above and that the securing tape has been removed before fitting.



7. Unscrew the release coupling on the hose assembly and attach the assembly to the pump.



8. Tighten with the 'C' Spanner and adjust so that the Tee is facing upwards.



9. Refit the Delivery Hose onto the Release Coupling.



10. Using PTFE tape, install the non-return valve onto a suitable pipe connector and fit to the delivery pipe, ensuring that the pipe is not tight or twisted.

## Priming and Fitting the Pressure Vessel

1. Calculate the pressure for your vessel by taking the delivery head (height from your pump to the highest point in the system, usually storage tank or reservoir) - every 10 metres in height equals 1 bar pressure. From the total take away half a bar pressure to get the final pressure vessel setting. For example:

**30 metre delivery head** = 3 bar - 0.5 bar  
Pressure Vessel should be set to **2.5 bar**

**50 metre delivery head** = 5 bar - 0.5 bar  
Pressure Vessel should be set to **4.5 bar**

**80 metre delivery head** = 8 bar - 0.5 bar  
Pressure Vessel should be set to **7.5 bar**

**The maximum pressure for the vessel is 10 bar** - for delivery heads above 105 metres, please contact Water Powered Technologies.



2. Use an air pump to prime the vessel to the correct pressure.

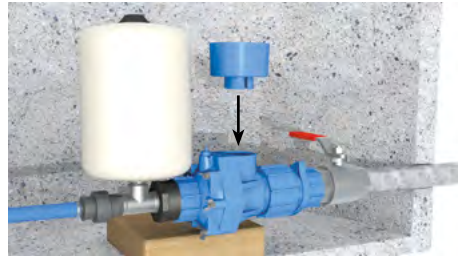


3. Using PTFE tape, screw the Pressure Vessel onto the Tee .

**IMPORTANT: DO NOT REMOVE THE PRESSURE VESSEL WITHOUT DE-PRESSURISING FIRST** - Unscrew the vessel for two turns only, releasing some air, and then leave until it has been completely de-pressurised and only then can you continue to remove the Pressure Vessel.

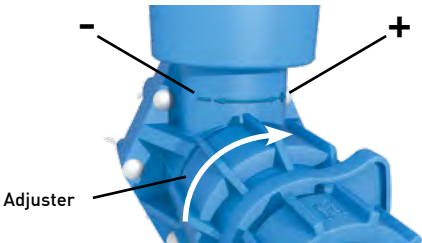
## Fitting the Exhaust Insert

Install the Exhaust Insert into the Exhaust Port of the pump. Just push down and it will clip on.



## Starting the Pump

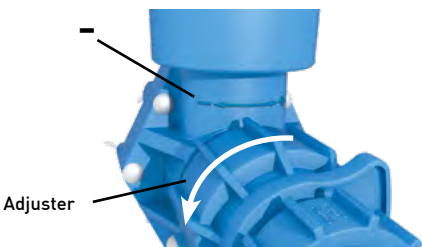
To start your pump, any air present needs to be expelled from both the supply pipe and the pump. This process is referred to as 'priming' and the time required to achieve this will depend on the pipe length and gradient. A short pipe and steep gradient will allow the system to be primed more quickly than systems which have long pipes and gradual gradients.



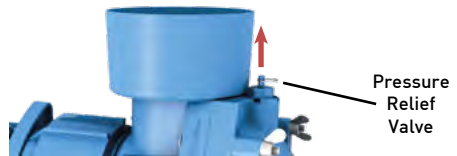
1. Turn the adjuster in the direction of the '+' sign to open the main pump valve fully. The 'C' spanner can be used to assist if required.



2. Open the shut off valve so that water is allowed to flow through the pump and expel any air. **Be careful not to allow the Supply Tank water level to fall thus allowing air to enter the Supply Pipe when priming.** The shut off valve can be closed intermittently to allow this level to be maintained during the priming process.



3. With most of the visible air removed, turn the adjuster in the opposite direction (towards the '-') until the pump beats.



4. If the pump stops and no further water flows, close the shut off valve, lift up the Pressure Relief Valve located next to the pump exhaust port and release. Re-open the Shut Off Valve. Repeat until the pump operates continuously. This process is only necessary when first installing the pump.

## Adjusting the Pump

Adjust the pump setting with the adjuster so that a small overflow is permitted from the supply tank. Lock the adjuster with the lock nut.

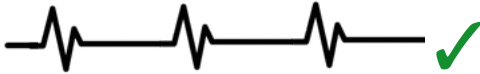
### Listen to the beat...



A regular beat means that the pump is working properly.



An irregular beat means that there is air in the supply pipe. You must repeat the process of starting the pump again.



The longer the beat, the more water you are pumping.

**Self Priming.** The Papa Pump will often 'self prime' - which means it will automatically start as soon as you open up the Shut Off Valve.

Please also refer to the previous section on page 22 ('Starting the Pump') for new installations.

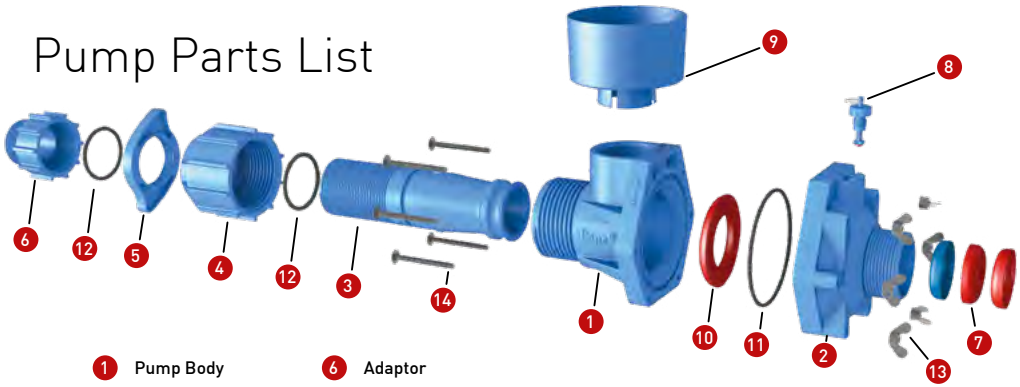
**Please note:** After the pump has run for a while, it may need a final adjustment.

**Checking your delivery.** Check the delivery of the pump at the highest point using a measuring jug. Remember that, depending on the delivery pipe length, it can take a long while for the system to fill. You can also check the performance of the pump by fitting a pressure gauge on the delivery pipe.

## Health and Safety

Before commencing work, refer to current safety publications relative to your location.

# Pump Parts List



- |                      |                                 |                               |
|----------------------|---------------------------------|-------------------------------|
| <b>1</b> Pump Body   | <b>6</b> Adaptor                | <b>11</b> Body 'O' Ring       |
| <b>2</b> Pump Cone   | <b>7</b> Non Return Valve x 3   | <b>12</b> Small 'O' Rings x 2 |
| <b>3</b> Pump Barrel | <b>8</b> Pressure Release Valve | <b>13</b> Wing Nuts x 6       |
| <b>4</b> Adjuster    | <b>9</b> Exhaust Insert         | <b>14</b> Coach Bolts x 6     |
| <b>5</b> Locknut     | <b>10</b> Main Valve            |                               |

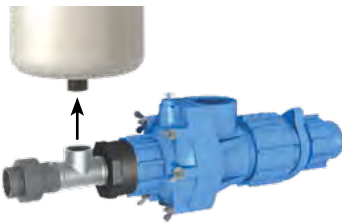
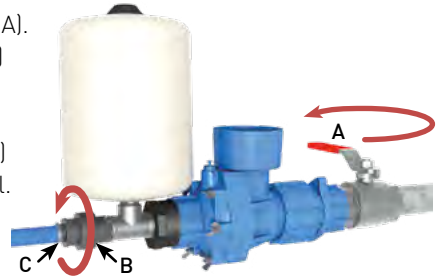
# Pump Maintenance

## How to change the pump valves

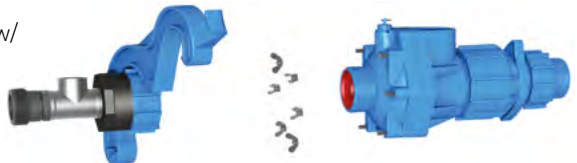
Changing the valves (7 & 10) is a straightforward procedure and can easily be carried out in the field if required.

**IMPORTANT - TO AVOID PERSONAL INJURY, DO NOT FULLY UNSCREW THE PRESSURE VESSEL UNTIL THE PRESSURE IS RELEASED**

1. Shut off the water supply via the Shut Off Valve (A). Then slowly unscrew and separate the coupling (B) (located after the tee) to release pressure. If the pressure is such that the coupling cannot be unscrewed, carefully loosen the worm drive clip (C) nearest the pump securing the hose to the hosetail.

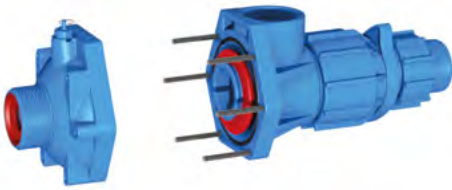


2. Unscrew the pressure vessel and remove the exhaust insert. Unscrew the pump from shut off valve or leave attached if charging the valves in situ.

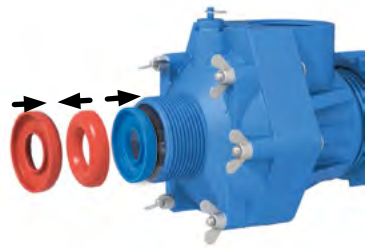


3. Use the 'C' Spanner to unscrew/ remove the hose assembly adaptor and wing nuts.

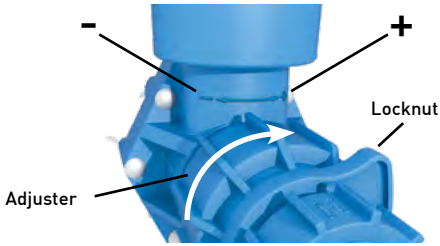




4. Separate the cone from the body.



5. Remove the Non Return Valves, noting orientation. Inspect and replace any worn or damaged valves.



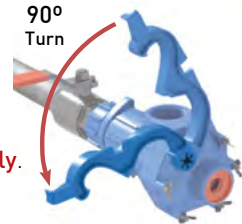
6. Slacken the locknut, then turn the adjuster towards the '+'. This moves the barrel and main valve forward, allowing easy access to the main valve for removal.



7. Remove the main valve using the 'C' Spanner, noting orientation. Inspect for wear/damage and replace if necessary. Also replace 'O' ring if necessary.



8. Clean the mating faces of the Pump Body and Pump Cone. Then reverse the process and re-assemble the pump.



9. Tighten the Wing Nuts by hand, then use the 'C' Spanner to **tighten each nut by a further 90° only**.



10. Refit the adaptor and hose assembly and tighten using the 'C' Spanner.

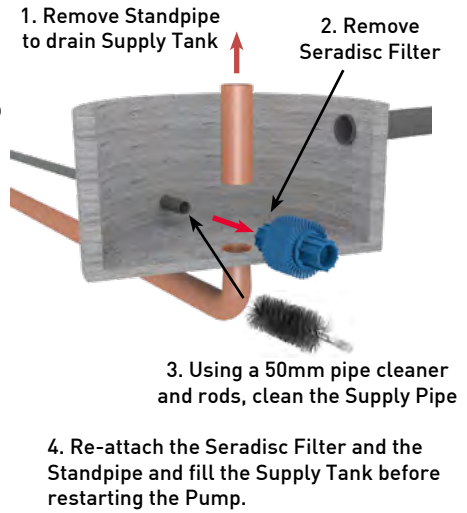
11. Reassemble the pump to the Shut Off Valve and the Hose Assembly Coupling. Refit the Pressure Vessel and the Exhaust Insert and follow the steps shown in the section 'Installing the Papa Pump' in the 'Installing and Commissioning' instructions to re-start the pump.



## Cleaning the Supply Pipe

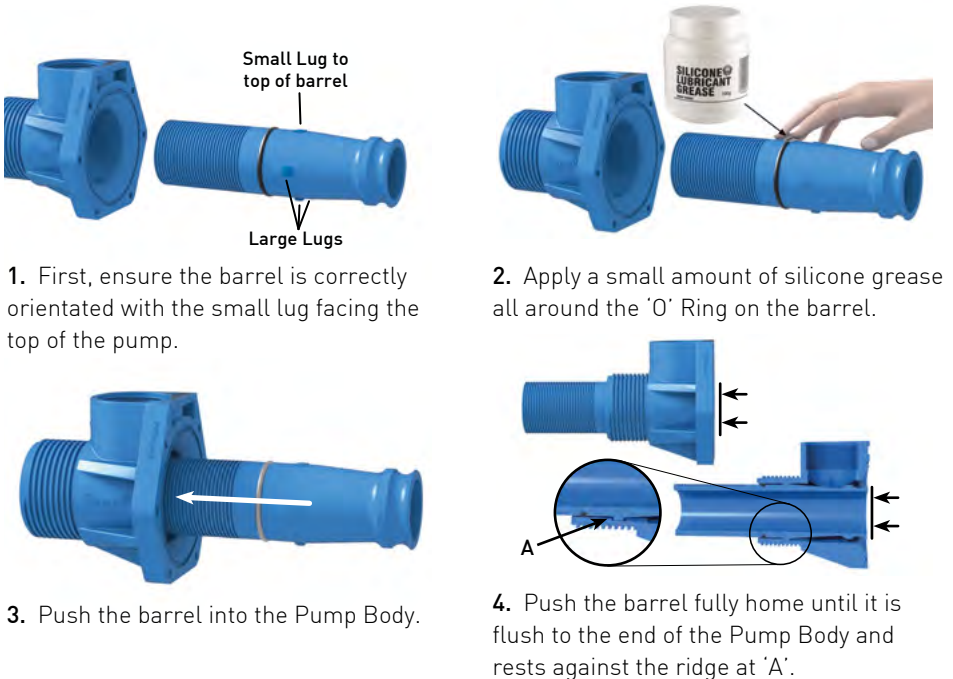
Some water sources contain minerals such as Iron or Manganese which could, in time, build up on the inside of the Supply Pipe, restricting the flow and reducing the efficiency of the pump. If there is evidence of these mineral deposits (such an orange-red coating) you can clean the Supply Pipe by first stopping the pump, then removing the Filter in the Supply Tank and pushing a pipe cleaner down the Supply Pipe.

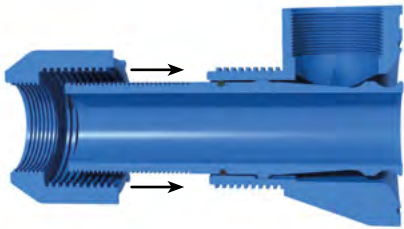
**THERE IS NO NEED TO TAKE THE PUMP OFF AND CLEAN IT.** It is often assumed that these deposits will affect the pump but this is incorrect - **YOU ONLY NEED TO CLEAN THE SUPPLY PIPE.**



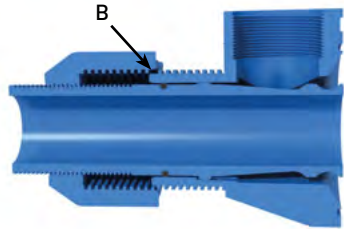
## How to re-assemble the Pump Barrel

**NORMAL MAINTENANCE WILL NEVER REQUIRE REMOVAL OF THE ADJUSTER AND BARREL.** Incorrect re-assembly could result in the main valve not being able to function properly. If your pump has been taken apart, please follow the re-assembly guidelines shown in the following animation.

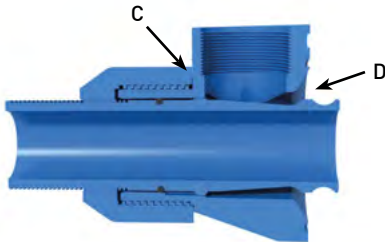




5. Screw the Adjuster onto the Pump Barrel.



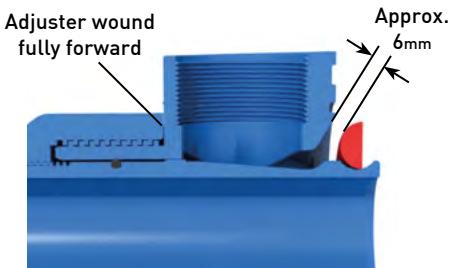
6. Screw on until the Adjuster engages with the Pump Body ('B').



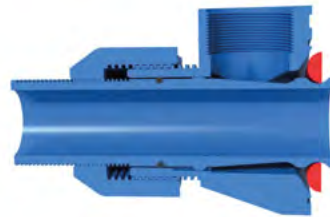
7. Continue screwing the Adapter on to the Pump Body until it butts up against the Body at 'C'. It will also move the Pump Barrel back out of the Pump Body ('D').



8. Push the rubber Main Valve on to the end of the Barrel at 'E'.



9. With the Adjuster wound fully forward, the gap between the rubber valve and the Pump Body should be around 6mm.



10. Open the Adjuster to roughly the position shown above. From there you can start the pump and adjust until you get the pump working with a steady slow beat. (The slower the beat the more water you will be pumping and the greater the efficiency.)

**IF THE GAP IS NOT APPROX. 6mm WHEN THE ADJUSTER IS FULLY WOUND FORWARD IT WILL MEAN THE PUMP WILL NOT WORK AT OPTIMUM EFFICIENCY.** If the gap is too large or too small you should go back to Step 4 and carefully follow the instructions. Should there still be a problem, you should contact Water Powered Technologies for advice.

# Troubleshooting

Identifying the most likely causes, relating to system faults.

Legend:



water



pipes



air



blockage



technical

Single Beat



Fault



Pump beats once, then stops.

Common Causes



Low delivery pressure.

**ACTION**

Refer to 'Priming' on page 21

Pump beats but then stops



Fault



Pump beats, but then stops after a period of time.

Common Causes



Air in Supply Pipe



Supply Tank level too low



Blocked Filter or Pipes

**ACTION**

Refer to 'Priming' on page 21

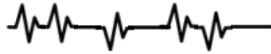
Make sure Supply Tank is kept full.  
Re-prime pump.

Clean filters and pipes.  
Re-prime pump if necessary.

## Irregular pump beat



Fault



Irregular pump beat

Common Causes



Air in Supply Pipe

SUPPLY PIPE IS NOT THE REQUIRED 5-7 TIMES THE SUPPLY HEAD

ACTION

Refer to 'Priming' on page 21

Refer to 'Supply Pipe' on page 14.

## Excessive Pump Vibration



Fault



Pump shakes excessively during operation

Common Causes



Incorrect Pressure in the Pressure Vessel



Water escapes from valve when depressed



Supply Pipe not straight



No Pump Support

ACTION



Use an air pump to correct the pressure



Replace the Pressure Vessel



Relay pipe straight



Support Pump with block of wood or concrete

Low flow rate



Fault



Pump beat is normal but delivery flow less than it should be.

Common Causes

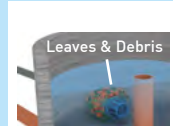


Check for blockages, or wear on the non return valves



Air or blockage in Pump or Supply Pipe

INSUFFICIENT SUPPLY HEAD or INCORRECT SUPPLY PIPE SPECIFICATION



Blocked Filter or Supply Pipe

ACTION

Clear any blockages and replace any damaged valves. See page 25

Refer to 'Priming' on page 21

Refer to 'Supply Pipe' information on page 14

Clean filters and pipes. Re-prime pump if necessary

notes

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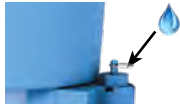
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Pressure Relief Valve leaking



Fault



Water leaks from Pressure Relief Valve

Common Causes



Pressure Vessel incorrect pressure



Water escapes from valve when depressed



Pressure Relief Valve damaged

DELIVERY HEAD is above 100m

ACTION



Correct pressure in Vessel



Replace the Pressure Vessel

Replace Pressure Relief Valve

Check with Water Powered Technologies for solution

notes \_\_\_\_\_

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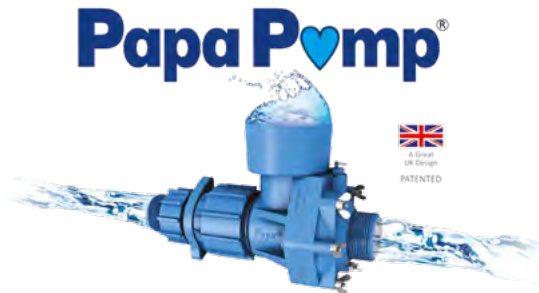
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**the pump that uses no fuel!**

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