Owner’s Manual
Installation, Operation and Maintenance Guide
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# Kit Contents

- **exhaust adaptor**
- **pump**
- **hose assembly**
- **c spanner**
- **Seradisc filters**
  - x 2
- **pressure vessel**
- **2” ball valve**
- **spare set valves**
About the Papa pump

Water powered pumping traditionally goes back 1000’s of years where it was used primarily for low head irrigation. More recently, from the late 1700’s hydraulic ram pumps were developed as an efficient and effective means of transporting water over long distances and great heights where they have been utilised to provide water in most parts of the world prior to the advent of ‘previously inexpensive’ mains water and electricity supplies. Developed within the UK in the mid-90s, the Papa Pump represents a modern, smaller, lighter and more effective alternative and is used in many countries to provide water for a wide variety of uses. With the addition of the revolutionary composite version, Papa continues to ensure that your water transport requirements are cost-effective and delivered in a reliable and sustainable system.

Simple water power

By utilising a naturally flowing water source, the Papa pump is able to transport up to 30% of that water to the desired location, allowing the residual water to be returned to the natural source. With minimal maintenance and zero fuel costs and emissions, the Papa Pump will provide you with a clean and efficient system for your water transportation requirements including agriculture, horticulture, irrigation, domestic and industrial use.

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**About the Papa pump**

Water Source

A: Catchment Tank  
B: Supply Tank  
C: Pump Chamber  
D: Water Storage

---

**Papa technology**

Exhaust port  
Adjuster  
Supply port  
Delivery port  
Main valve  
Non-return valve
How the Papa pump works

Water enters pump via supply port and flows around main valve to exhaust port.

As the flow increases around the main valve a differential pressure occurs causing the valve to suddenly close. The flow and mass of water is then directed through the non-return valve and into the delivery port at a higher pulsed pressure. This pressure suddenly reduces causing the main valve to reopen and the cycle repeats.

Turning the adjuster to open the valve allows flow through the pump to be regulated so that a greater flow generates a greater pressure and water delivery.

Installation principles

A natural water source is required

- river
- stream
- spring
- pond/lake
The greater the supply head, the more efficient the pump is!

MORE SUPPLY HEAD = MORE WATER!

A minimum Supply Head of 2 metres is required, but please ensure that the maximum head is achieved for best results.

MORE SUPPLY HEAD = MORE WATER!
The Supply Pipe length (L) should be between 4-7 x the Supply Head (SH) for optimum efficiency and pressure.

\[ L = 4-7 \times SH \]

NOTE! The PAPA pump can operate outside of these parameters but the performance will be affected.

The maximum Delivery Head (DH) is 30 x the Supply Head (SH).

\[ DH = \text{max} \ 30 \times SH \]

NOTE! Check that the Delivery Head (DH) does not exceed the pressure rating of pipes!

Feed Pipe should be straight with a low gradient (1:500) into the Supply Tank, but check pipe friction chart to establish the most suitable size and gradient.

Catchment Tank details & installations

Catchment method 1

90 deg bend facing downstream

Water flow

1 metre min

1 metre min
Catchment method 2

- Water ingress through holes drilled in tank
- Stones used as coarse filter

Feed Pipe

- Feed pipe
- NOTE! Larger diameter pipe may be required for multiple pump installations with more than 2 pumps. Please refer to friction chart. Add more Seradisc filters accordingly

Catchment tank

- Feed pipe
- Inlet from water source
- Seradisc filters

NOTE! The more Seradisc filters fitted, the better the reliability of the system

Overflow Pipe

- 4”
- NOTE! Larger diameter pipe may be required for multiple pump installations with more than 2 pumps.
Supply Tank details & installations

Supply Tank

- feed pipe
- Seradisc filter
- supply pipe
- overflow pipe
- removable stand pipe (used for draining down)
- socket

Supply Pipe - 1

- 1 metre min
- 2" (50mm)
- Galvanised steel or MDPE (see next page)

Supply Pipe - 2

- IF DELIVERY HEAD (DH) IS LESS THAN 15m
  - use 100% Galvanised steel
  - or MDPE

- IF DELIVERY HEAD (DH) IS MORE THAN 15m
  - either use 100% Galvanised steel or 100% MDPE
  - do not use 100% MDPE

- Pump Chamber details & installations

Pump Chamber

- supply pipe
- delivery pipe
- overflow pipe
- 150mm min (allows pump to be rotated inside chamber)
Pump Chamber

Note: Chamber requires a cover if a Sureflow flow valve is fitted

nr valve
ball valve
delivery pipe
supply pipe
overflow pipe
tank drain
pump support

NOTE! 2 pumps can be installed in a 1m diameter ring. Larger rings will be required for additional pumps

Delivery Pipe

25mm
delivery pipe

NOTE! The diameter of the delivery pipe may vary depending on the number of pumps and distance. Please refer to the pipe friction chart for the appropriate size

Multiple pump installations

Typical dual pump installation

support pumps
delivery pipe
delivery pipe manifold
NR valve
feed pipes

NOTE! Please check delivery pipe size by referring to the pipe friction chart when using multiple pumps or pumping over long distances.
Pipe friction chart

Pump performance chart

Delivery Head (lift) in metres

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* An average flow through a single pump is 1 litre/sec. (although this can vary with supply heads and pipe lengths)

NOTE! The more Seradisc filters fitted, the better the reliability of the system
Installation & commissioning

Delivery Pipework, Tanks and Troughs

The Delivery pipe should be sized to keep frictional losses to a minimum. A stop valve should be installed at the pump end to allow maintenance and replacement of non return valves etc. without having to drain the whole delivery pipe work. 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 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.

1. Using PTFE tape, fit the 2” lever shut-off valve supplied with the pump onto the supply pipe in the pump chamber.
2. Close this valve and allow the system to fill with water.
3. When the system is full, open the valve and allow water to exit for while to ensure all debris is washed from within the pipework, then close the valve.

Note: Particulate sizes are calculated. Due to the flexible nature of the discs, Seradisc filters fitted with lower numbers of discs may allow ingress of particulates slightly larger than as indicated on the graph.
4. Remove the overflow/flush standpipe in the supply tank to allow any loose material to be flushed away, then refit the standpipe and allow the system to refill.

* Ensure that Seradisc filters are installed on both the feed and the supply pipe intakes to prevent ingress of debris into the system during normal operation.

Installing the Papa pump

1. Using PTFE tape, screw the 2” BSP adaptor into the 2” lever supply valve.

2. Screw the Papa pump into the adaptor until hand tight and adjust the adaptor so that the pump is in the correct position i.e. with the exhaust facing upwards.

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

4. Unscrew the release coupling on the hose assembly and attach the assembly to the pump, ensuring that the rubber valves in the pump are present and correctly installed and that the securing tape has been removed. Check that the tee connector is vertical and refit the release coupling.

5. 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.
6. Adjust the air pressure in the pressure vessel to 0.5bar below the delivery head pressure (10m head = 1bar), e.g. with a delivery head of 50m, the air pressure will be set to 4.5bar. Using PTFE tape, install the pressure vessel into the delivery tee.

7. Install the exhaust insert into the exhaust port of the pump.

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 effectively than systems which have long pipes and gradual gradients.

Priming and adjustment

1. Turn the adjuster in the direction (+) to open the pump main valve fully. The ‘C’ spanner can be used to assist if required.

2. Open the supply lever 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 supply lever 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 (-) until the pump 'beats'. If the pump stops and no further water flows, close the supply lever valve, lift up the pressure relief valve located next to the pump exhaust port, and release. Re-open the supply lever valve. Repeat this process until the pump operates continuously.

4. 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. (If the pump operates with an irregular beat, this means that air is still present in the supply pipe. The pump will often 'self prime' when operating, provided the air is first removed and the pump does not stop. In extreme cases it may be preferable to first prime the whole system using a separate powered pump or pressurised water source to back-fill all the pipe work via the Papa pump exhaust port, although with time and patience priming can always be achieved using the described method.)

Note: After the pump has run, it may require re-adjustment.

5. 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.

   Note: The slower the pulse, the greater the flow through the pump and the amount pumped.

General maintenance

Regularly check and clean all inlets and Seradisc filters. If delivery rates drop, check both the non-return seal and main valve in the pump. Regularly check the air pressure in the pressure vessel.

Important: When removing the pressure vessel, first relieve the water pressure on the delivery side to avoid personal injury.

Consult the fault finding section at the end of this manual if faults occur.

Health & Safety

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

Changing the valves (8) & (11) is a straightforward procedure and can easily be carried out in the field if required. Firstly shut off the water supply to the pump via the supply lever valve. You can now slowly unscrew and separate the coupling (located after the tee) to release pressure. If the pressure is such that the coupling cannot be unscrewed, carefully loosen the worm drive clip nearest the pump securing the hose to the hosetail.

TO AVOID PERSONAL INJURY, DO NOT UNSCREW THE PRESSURE VESSEL UNTIL THE PRESSURE IS RELEASED.

How to change the pump valves

Unscrew the pressure vessel and remove the exhaust insert. Unscrew the pump from ball valve or leave attached if changing the valves in situ.
Using the C spanner, unscrew and remove the hose assembly adaptor and wing nuts.

Separate the cone from the body

Remove NR valves, noting orientation. Inspect and replace any worn or damaged valves.

Slacken the locknut, then turn the adjuster toward the ‘+’. This moves the barrel and main valve forward, allowing easy access to the main valve for removal.

Remove main valve using C spanner, noting orientation. Inspect for wear or damage and replace if necessary.

Clean the mating faces of the Body and Cone

Refit the wing nuts and first tighten by hand. Then, using the C spanner, tighten each wing nut further by turning 90° ONLY with the C spanner
Refit the adaptor and hose assembly, tighten using the C spanner.

Reassemble the pump to the supply lever 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 “Installation & commissioning” instructions to restart the pump.

Troubleshooting

Most likely causes, relating to system faults

Legend:

- water
- pipes
- air
- blockage
- technical

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<tr>
<th>Fault</th>
<th>Common causes</th>
<th>Action</th>
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<td>Pump beats once, then stops</td>
<td>Low delivery pressure</td>
<td>refer to ‘Priming &amp; adjustment’ p.25</td>
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<tr>
<td>Fault</td>
<td>Common causes</td>
<td>Action</td>
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<td>Air in supply pipe</td>
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<td>Low flow rate through pump</td>
<td>Air or blockage in supply pipe or pump</td>
<td>refer to ‘Priming &amp; adjustment’ p.25</td>
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<td>Check: Supply Head $\geq 2m$</td>
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<td>water escapes from valve when depressed</td>
<td>replace pressure vessel</td>
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<td>replace pressure relief valve</td>
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<td>check for blockage, damage and wear in pump valves</td>
<td>refer to Supply pipe requirements p.10,14 &amp; 15</td>
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Specifications:

Pump housing: Latigloss®
Valve members/O rings: EPDM
Exhaust insert: Polypropylene
Max output (l/day): 20,000
Max operating pressure (bar): 10
Weight (kg): 2
Length (cm): 30
Width (cm): 18
Height (cm): 16
Supply/exhaust ports: 2” BSP (50mm nb)
Delivery port: 1” BSP (25mm nb)