

HOME BIOGAS[®]

Bio-Toilet

user manual

version 080322



contents

To get this manual in other languages,
and view installation videos, scan the
QR code or contact
support@homebiogas.com



Introduction	3
Location Planning	6
Installing the Toilet	8
Effluent Management	16
Using the toilet	19
Maintenance	20
Troubleshooting	21
Service Kit	23
Warranty	27



CAUTION:

DO NOT begin using the HomeBiogas toilet unless you have completed system activation according to the HomeBiogas User Manual.

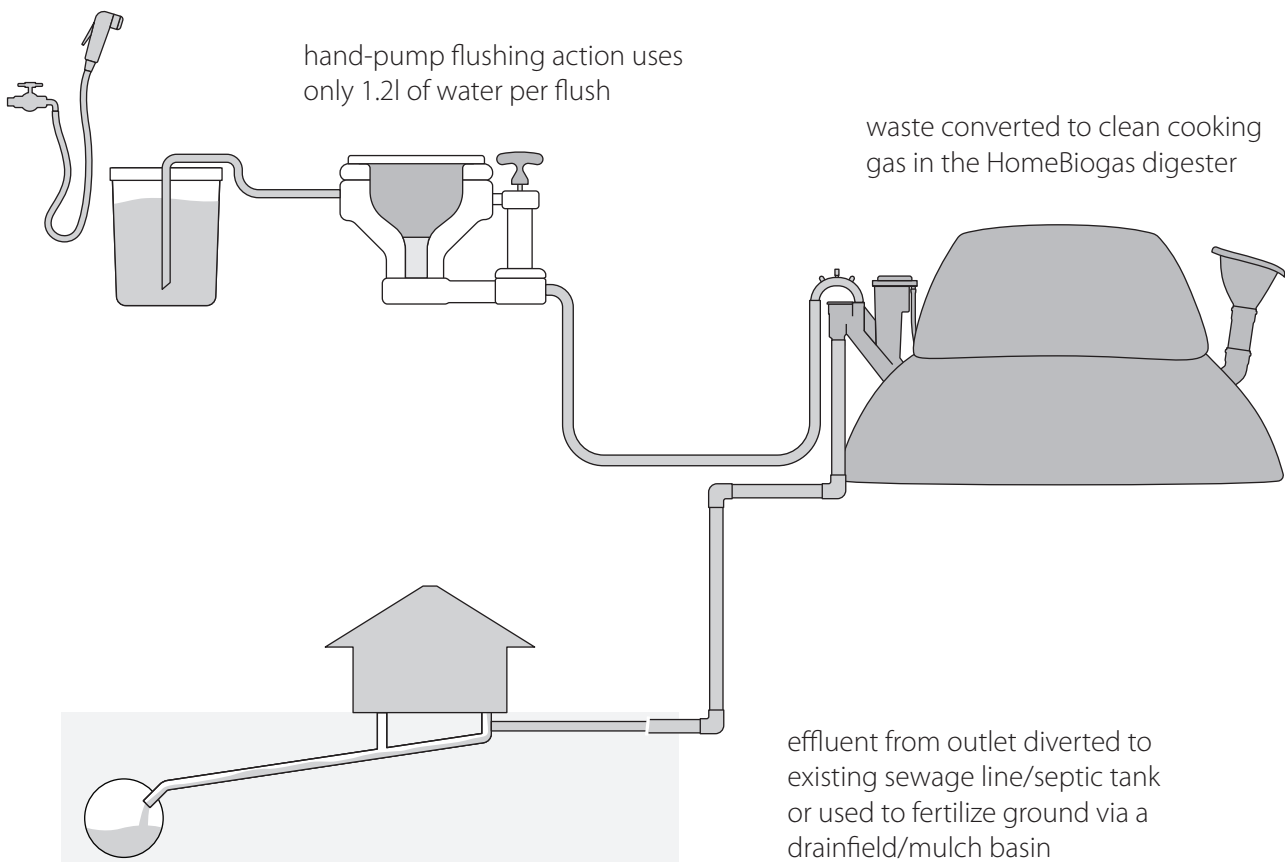
The system cannot properly break down waste before activation and this will make the system produce unpleasant smells.

introduction

The HomeBiogas toilet is an add-on to the HomeBiogas domestic biogas system that allows users to turn human waste into clean energy in the form of cooking gas.

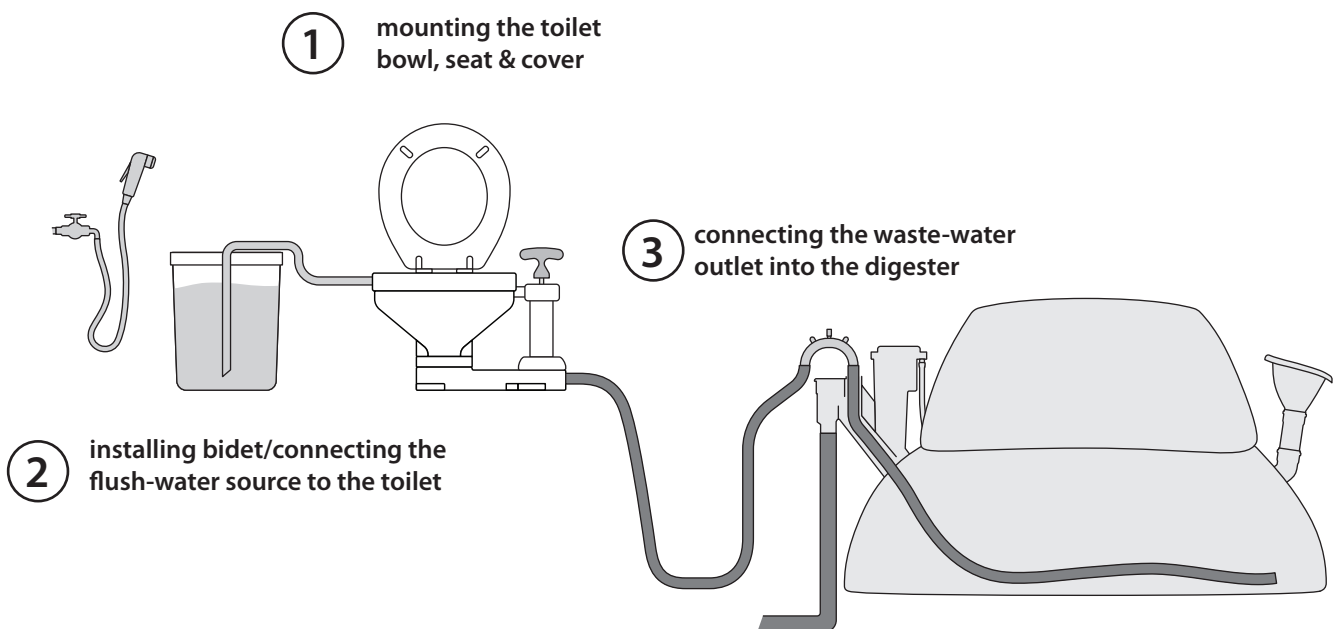
The HomeBiogas digester only provides primary and partial wastewater treatment for the connected HomeBiogas toilet. While rich in nutrients, effluent from the system requires further treatment according to local wastewater treatment regulations.

Fully off-grid-ready toilet
can use various water
sources for flushing

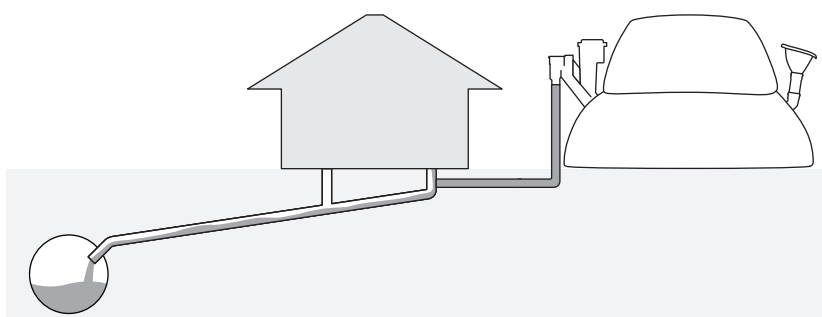


overview of toilet installation:

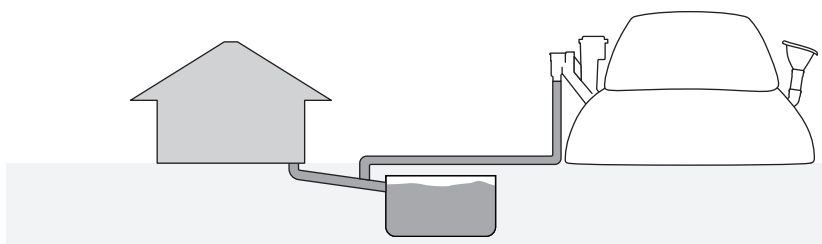
1. installing the toilet in a suitable location and connecting it to the system



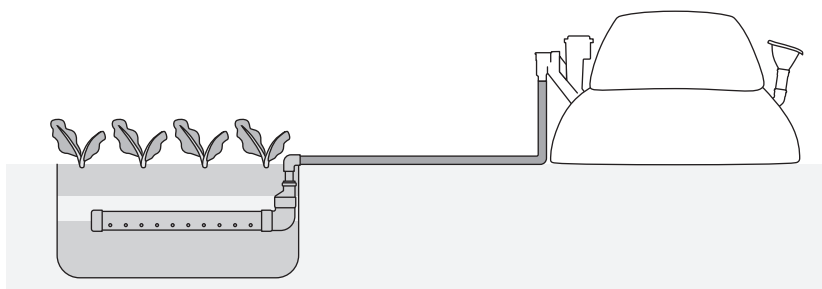
2. planning a suitable effluent management system & connecting the effluent output from the homebiogas digester



option 1 (preferred):
connect to existing sewage system



option 2:
connect to existing septic tank

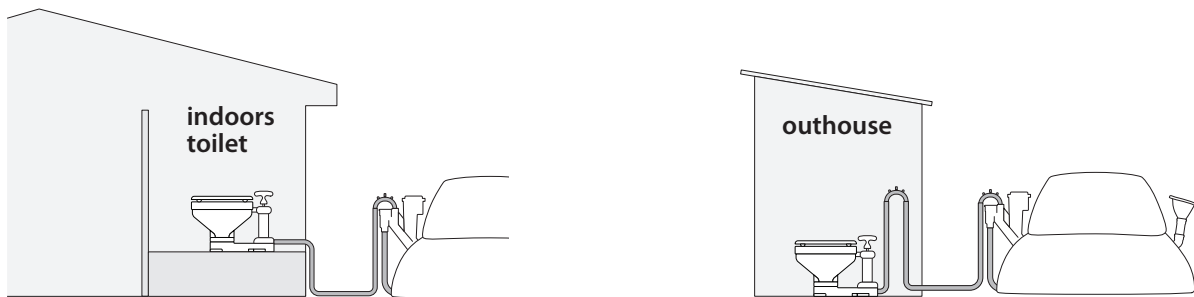


option 3 (If option 1 and 2 not possible):
build a drainfield/mulch basin

location planning

To ensure a smooth installation process and a well-functioning bio-toilet after installation, it is important to properly plan for the toilet's location, mounting surface, and plumbing connections to the system, as well as a suitable effluent management method.

You can install the bio-toilet indoors as a replacement for a regular toilet, or construct an outhouse for the toilet nearer to your biogas system.



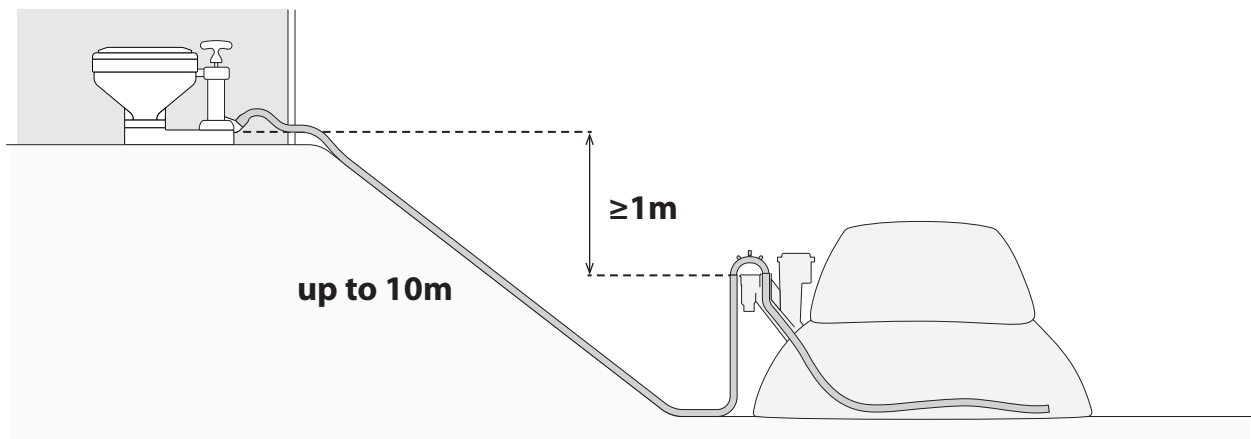
It is important to plan the bio-toilet's installation within the maximum distance of the connecting piping (see next page).

There are 2 main ways to connect the bio-toilet to your HomeBiogas system - the option you choose will affect where you can locate the bio-toilet (maximum distance from system).

Option 1 (Recommended):

The toilet's discharge elbow must be at least 1m above the fertilizer outlet opening (where the wastewater pipe enters the system)

In this type of installation, the toilet can be located up to 10m (33ft) from the HomeBiogas system.

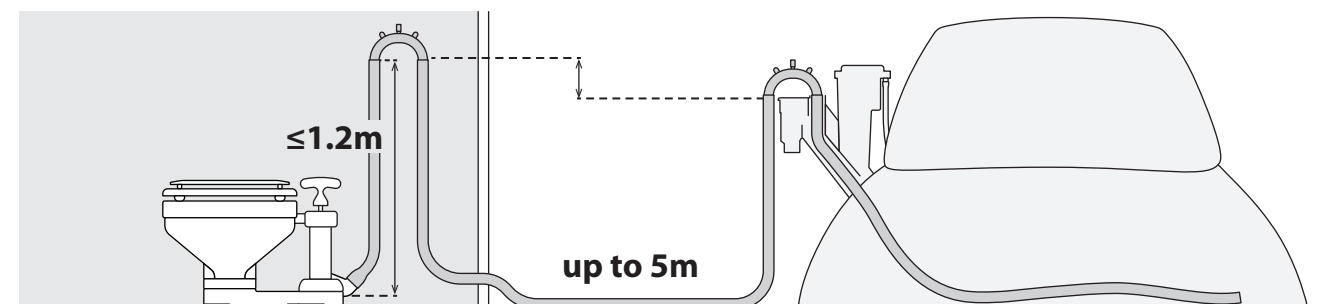


Option 2 (where option 1 is not possible):

The toilet is on the same level as the system (discharge elbow of the toilet **MUST NOT** be lower than the base of the system)

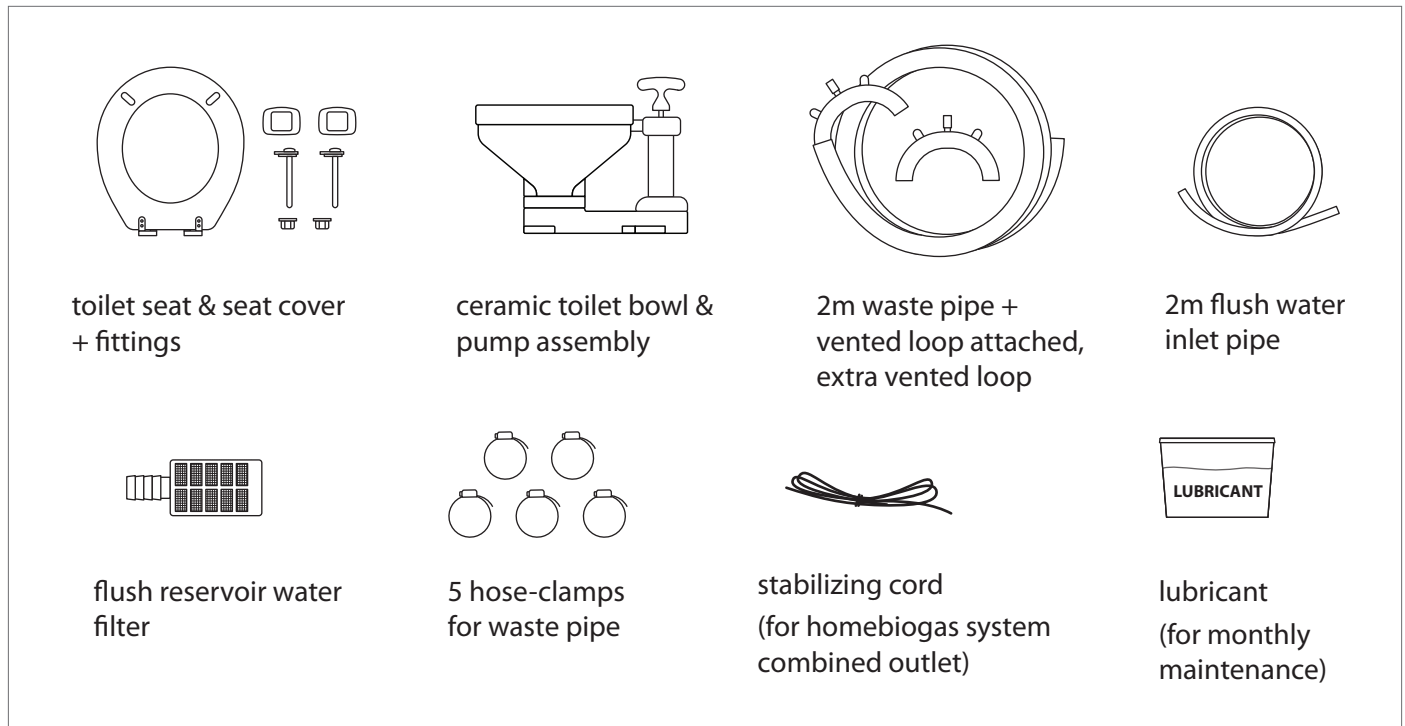
A second vented loop must be installed along the wastewater pipe, close to the bio-toilet. The first vented loop near the toilet must be **LESS THAN 1.2m ABOVE** the toilet discharge elbow, and positioned **HIGHER** than the fertilizer outlet vented loop.

In this type of installation, the toilet can be located only up to 5m (16ft) from the HomeBiogas system.



installing the toilet

Parts supplied in the box



Parts/Materials to prepare (not supplied)

- Flexible, reinforced sanitation hose (38mm/1.5in) of suitable length to connect toilet to system. An **odor-proof sanitation hose** is recommended, especially for indoors toilet connections.
- 8mm diameter bolts for mounting toilet bowl (length depending on flooring/platform)
- PVC pipes and fittings to connect fertilizer outlet to chosen effluent system (length depending on toilet location - p15)
- Optional ball valve for 38mm/1.5in pipe, to install after pipe for easier maintenance

If constructing drainfield/mulch basin (optional - refer p16):

Drainfield:

- large gravel (1-2" diameter), 180 - 360 liter
- fine gravel (0.25-0.75" diameter), 25 - 75 liter

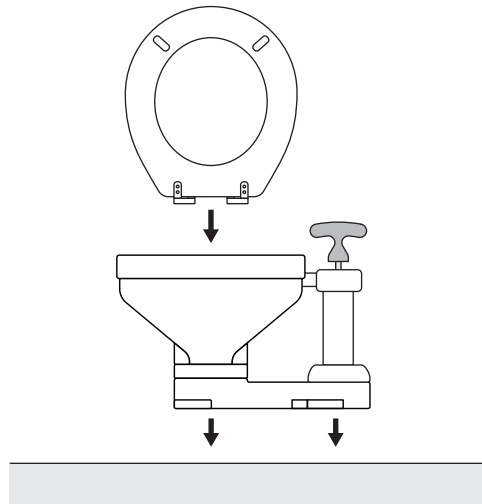
Mulch Basin

- landscaping mulch, large wood chips, fine wood chips/sawdust

Other tools required:

- Power drill (holes for mounting toilet bowl)
- Screwdriver (flat) for hose clamps
- Shovel for drainfield construction

1

Mounting the toilet bowl and attaching the toilet seat

The toilet is shorter than a regular home toilet. It must be bolted down securely onto the floor or on a raised platform. If installing onto a platform, it should be level, rigid and strong enough to support the weight of an adult. Do not mount the toilet on shipping pallets or other weak surfaces. The platform should measure at least 52x63cm (W x L).

Parts & Tools:

- Toilet bowl & Pump assembly
- Toilet Seat and Cover assembly
- 4x 8mmØ steel bolts (with matching nuts if mounting on platform)
- Plastic seat fittings (see picture)
- Power drill (holes for bolts)
- Pen/marker for marking drilling location



1. Place the toilet on the mounting surface and mark the positions of the 4 bolt holes.

2. Drill out the marked holes and bolt the toilet down to the surface with the appropriate bolts/screws/fasteners for your chosen surface.



3. Prepare plastic seat fittings (2 plastic bolts and nuts, 2 rectangular washers)



4. With the seat and cover facing cover-side up, slide bolts into position on the seat joints.



5. Fit both the rectangular washers in place over the plastic screws.



6. Hold the seat and cover assembly along with the bolts, and slide the bolts into the holes on the back end of the toilet bowl.



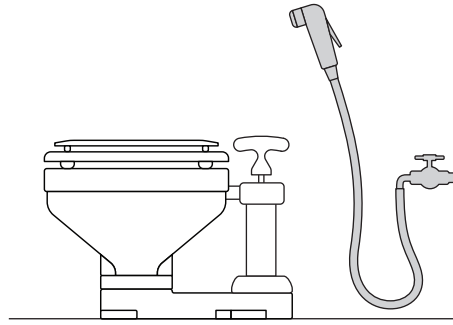
7. Screw the plastic nut onto the bolts, all the way until the plastic nut is snug against the porcelain of the bowl.

2

setting up the fresh/greywater reservoir for flushing the toilet

Parts & Tools:

- 19mmØ water inlet pipe
- flush reservoir water filter
- suitable water reservoir (bucket/tank etc) - not provided with the toilet
- utility knife/cutter



You can install a bidet beside the toilet both for cleaning up and as a water source. Using a bidet will simplify the process of flushing the toilet.

Handheld Bidet:

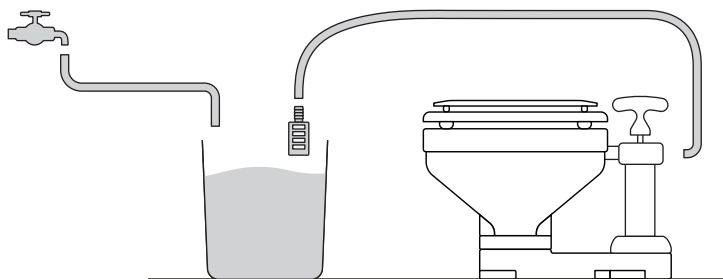


Note:

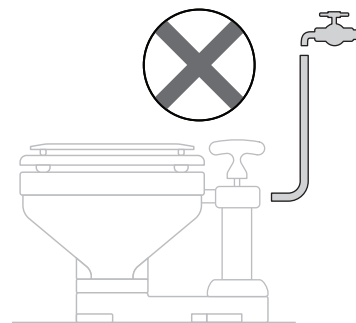
With a bidet installed, the flush control level can be permanently set to the right (wastewater out) position since there is no need to pump in clean water.

This will be covered in more detail in 'using the toilet' (page 14)

1. Install the bidet close to the toilet.



Alternatively, connect the toilet's water inlet to a suitable water reservoir (e.g. a large covered bucket). You can fill the reservoir with tap water, or use rainwater/well water/other water sources. The bucket can be located inside or outside the washroom - up to 1m lower than the toilet if necessary.



DO NOT connect toilet's water inlet directly to mains water - the water pressure will damage the bio-toilet!

Water reservoir:



1. Attach water filter to one end of the 19mm hose included in the kit - this is the water inlet pipe connected to the flush water reservoir.



2. Pass the other end of the pipe through the bucket's lid so the filter is in the bucket when the lid is closed.



3. The filter should be immersed in water when the bucket is filled.



4. Connect the other end to the toilet's water inlet, making sure the hose is snugly fitted onto the pipe.

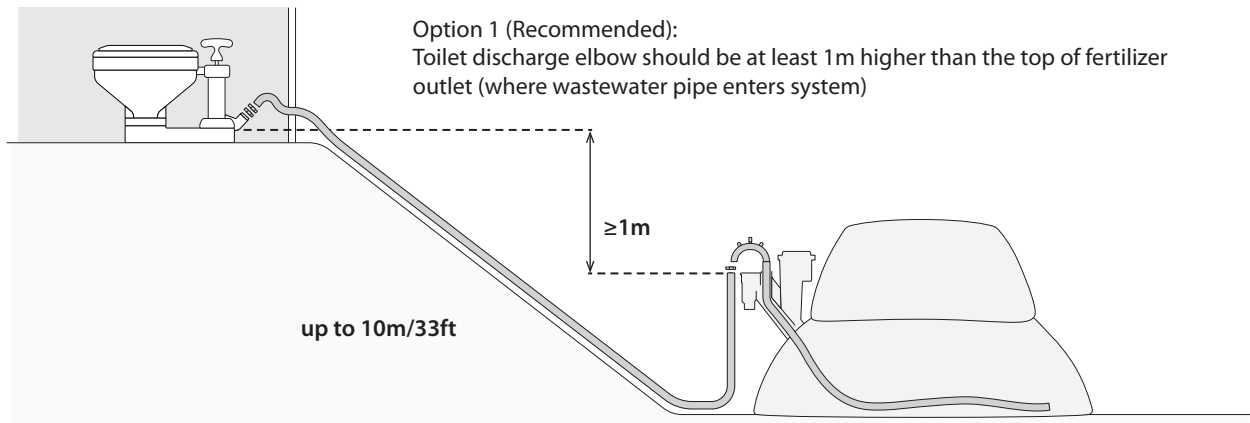
3

Connecting the wastewater outlet into your HomeBiogas system

There are 2 ways to connect the toilet to your Homebiogas system, depending on the location of your toilet and system. We recommend using option 1 where possible, with the toilet placed higher than the system.

If option 1 is not possible, install the 2nd vented loop (included in the box) at a higher point than the fertilizer outlet.

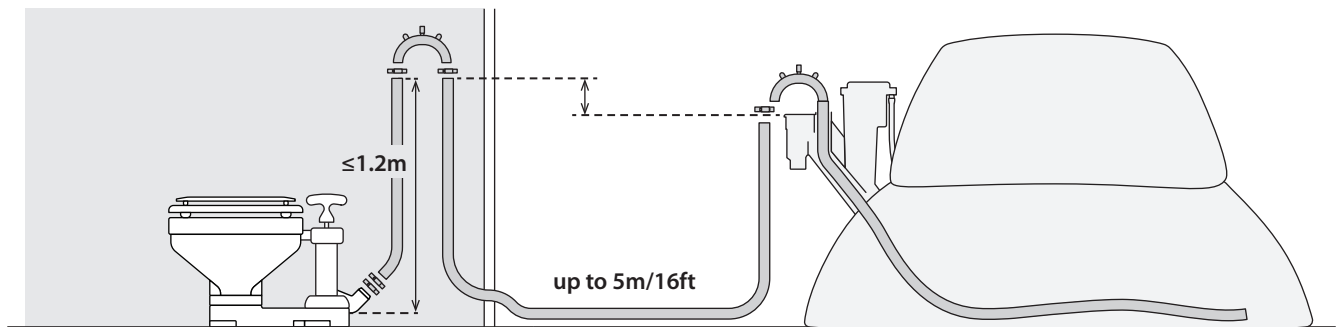
The toilet-system connecting waste pipe should be as short as possible, maintain a downward slope toward the system (no upward angles) and free from kinks and free from (u-shaped/up-and-down) bends.



Option 2:

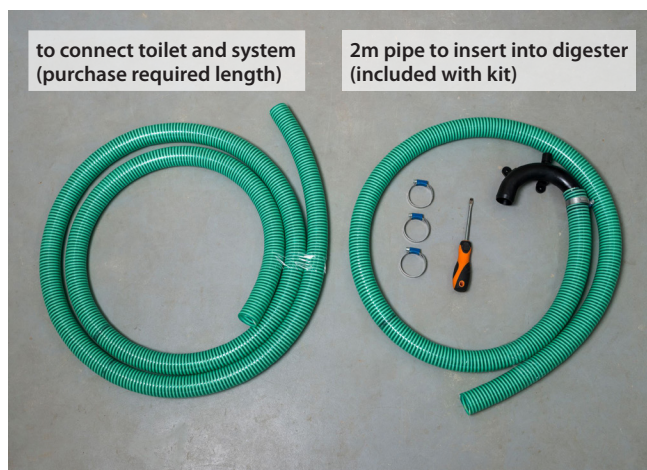
Toilet level with Homebiogas system (toilet cannot be lower than system base)

The vented loop next to the toilet must be **less than 1.2m above** the toilet discharge elbow, and positioned **higher** than the vented loop at the system.



Parts & Tools:

- 2m 38mmØ flexible pipe (vented loop attached)
- 38mmØ flexible pipe (length according to toilet location) - **not included in kit - need to purchase**
- 38mmØ steel hose clamps
- stabilizing cord
- screwdriver (flat)



1. Measure and cut the length(s) of pipe needed to connect your toilet and the system. Refer to the diagrams for vented loop positions if needed.

Note:

Discharge pipe should be kept to the minimum necessary length. Avoid any kinks, dips or bends in the pipe - maintain a suitably large bend radius in the pipe and keep the pipe at a downward slope towards the Homebiogas system.



- Slide a loose hose clamp over one end of the discharge pipe, then fit the pipe over the open end of the vented loop. Dip the pipe end in hot water to soften it if the fit is too tight.



- Securely tighten the clamp around the section where the pipe overlaps with the vented loop. Repeat with the other vented loop connections if necessary.



- Use 2 hose clamps to connect the pipe to the discharge elbow on the toilet. Rotate the clamps before tightening so that the bands are aligned differently on the pipe. This prevents leakage.



- Ensure the stabilizing cord is correctly attached, and the combined outlet is properly aligned vertically, as shown in the user manual.



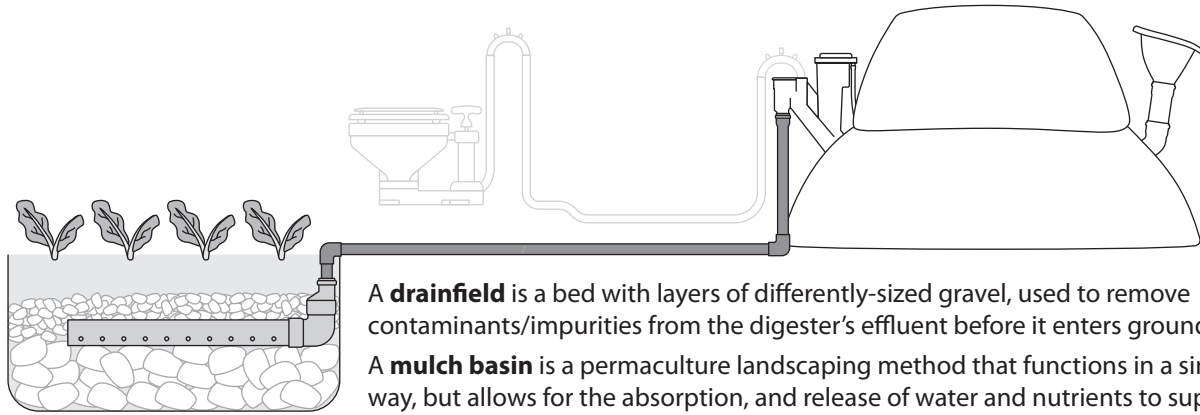
- Snap off the plastic circle on the Fertilizer Outlet cover of the HomeBiogas system.



- Insert the discharge pipe into the system from the round hole on the cover. Push the pipe into the digester until the vented loop is flush with the entry hole.

effluent management

With the Bio-toilet connected, the HomeBiogas system's liquid fertilizer should be safely diverted directly to a treatment solution **WITHOUT** potential for user contact. The effluent should **NOT** be fed directly to plants.



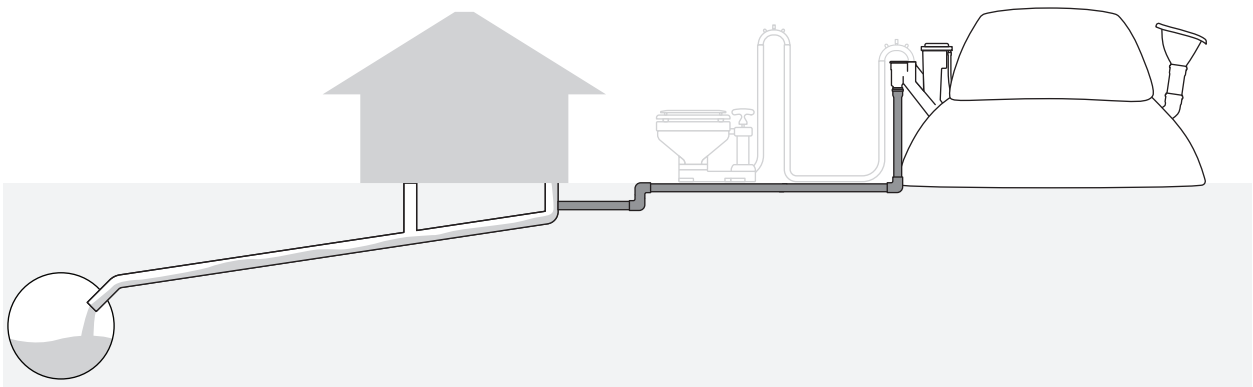
A **drainfield** is a bed with layers of differently-sized gravel, used to remove contaminants/impurities from the digester's effluent before it enters groundwater.

A **mulch basin** is a permaculture landscaping method that functions in a similar way, but allows for the absorption, and release of water and nutrients to supply nearby plants/crops.

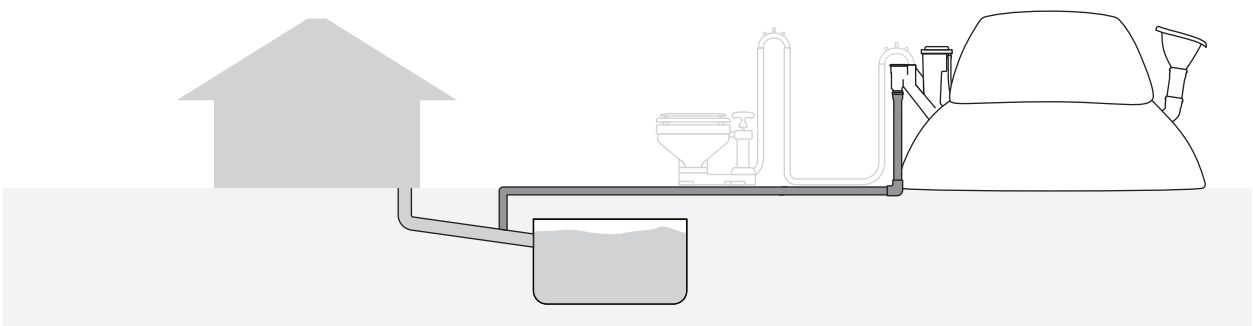
Drainfield/mulch basin usage must meet local regulations for wastewater treatment and disposal/reuse. The size of the drainfield/mulch basin must be adjusted according to the expected usage volume of the Homebiogas toilet, to avoid any ponding of the effluent.

When constructing a drainfield, pick a location that is:

- clear of trees within a 3.5m (10ft) radius.
- at least 15m (50ft) from any downhill slope greater than 25% (15 degrees)
- at least 30m (100ft) from any private wells
- 3.5m (10ft) away from any property boundary



Alternatively, you can consider diverting the effluent into the existing sewage system or a septic tank. Do observe local regulation and consult a professional when working with sanitation plumbing.



Constructing a Drainfield or Mulch Basin

Drainfields/Mulch basins must be sized appropriately for the expected usage/effluent output of the digester: HomeBiogas 4.0 and 7.0 systems will require larger drainfields/mulch basins.

The following drainfield dimensions are sized for these general usage requirements:

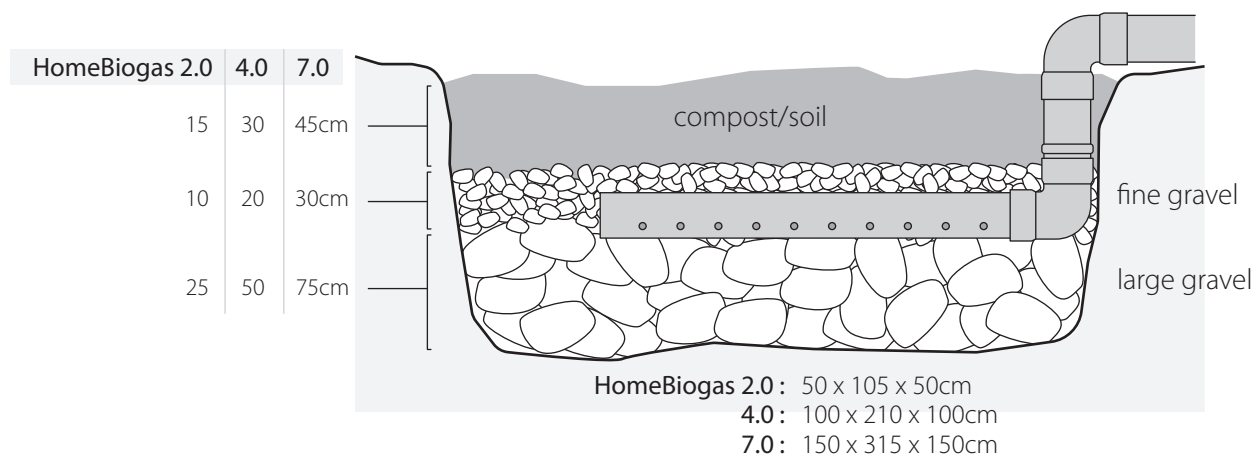
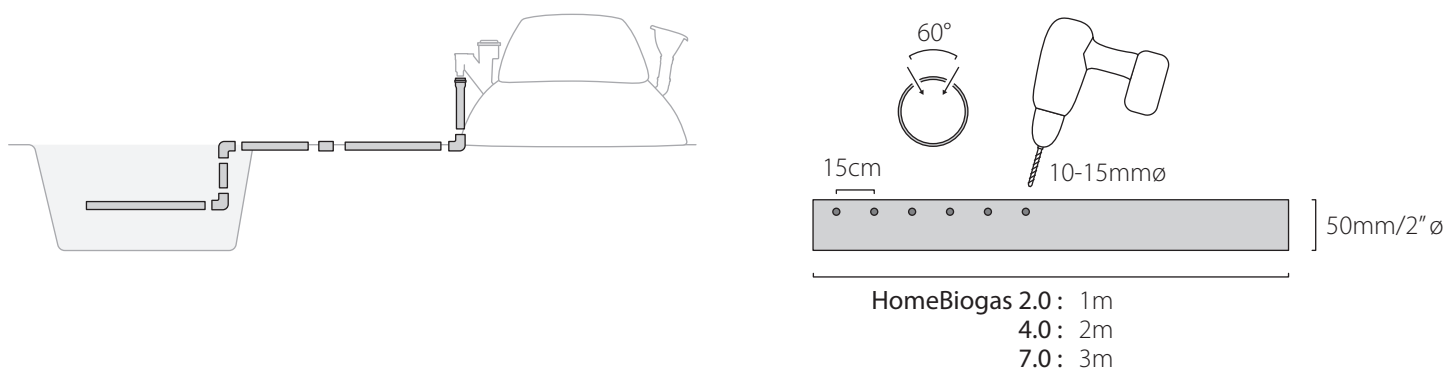
HomeBiogas 2.0 - **25 flushes per day** / 4.0 - **50 flushes** / 7.0 - **75 flushes**

Parts & Tools:

- 2"Ø PVC piping, fittings and connectors
- large gravel (1-2" diameter)
HomeBiogas 2.0 - **180 liter** / 4.0 - **240 liter** / 7.0 - **360 liter**
- fine gravel (0.25-0.75" diameter)
HomeBiogas 2.0 - **25 liter** / 4.0 - **50 liter** / 7.0 - **75 liter**
- shovel
- power drill & 10-15mm bit

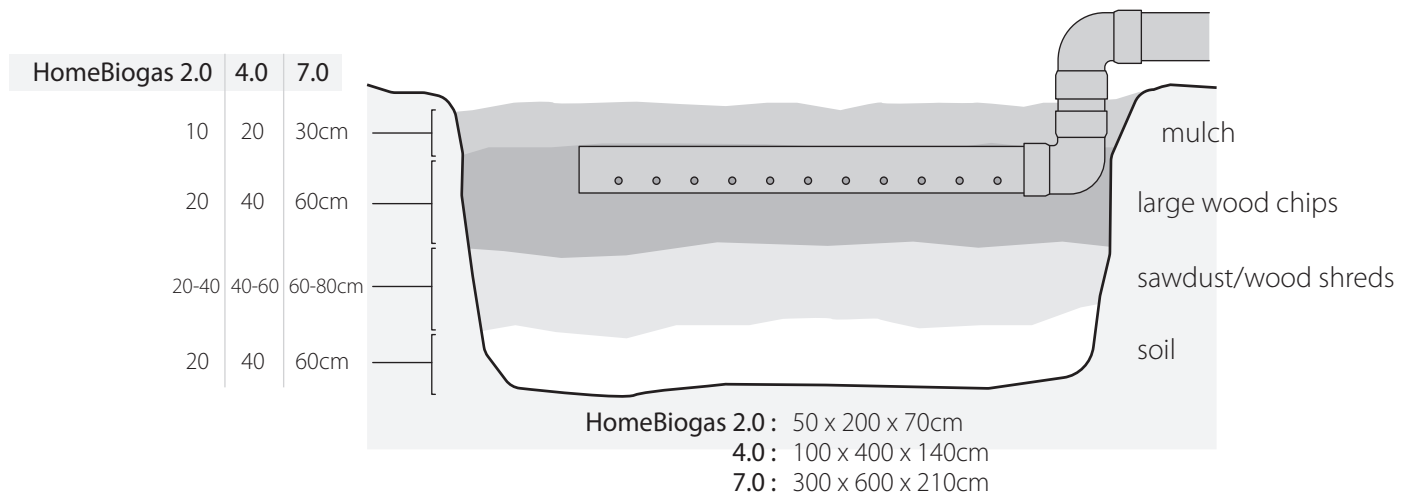
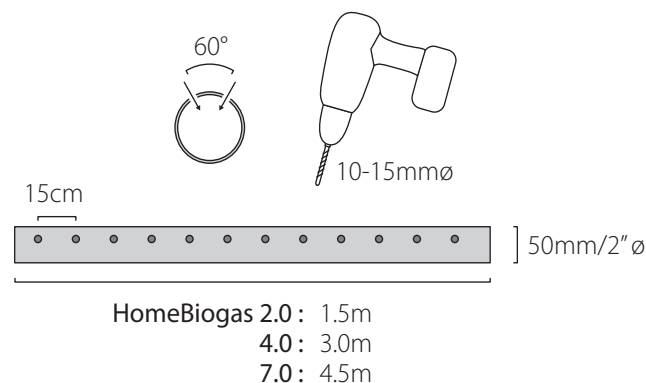
Drainfield

1. Measure and prepare piping of the correct length required to connect the system's fertilizer outlet to the drainfield location.
2. Prepare perforated 2"Ø distribution pipe (HomeBiogas 2.0 - **1m** / 4.0 - **2m** / 7.0 - **3m**).
Drill two rows of holes in a 60-degree arc, at roughly 15cm intervals along the 2" pipe.
3. Measure out and dig the drainfield pit in the chosen location, according to the required dimensions for your HomeBiogas system model.
Fill the pit with the first layer of large gravel. Install the 2" distribution pipe on top of the large gravel layer with holes facing downwards, and then place more large gravel around the pipe.
Add a layer of fine gravel to the pit. Cover and fill up the rest of the pit with a final layer of soil/compost.



Mulch Basin

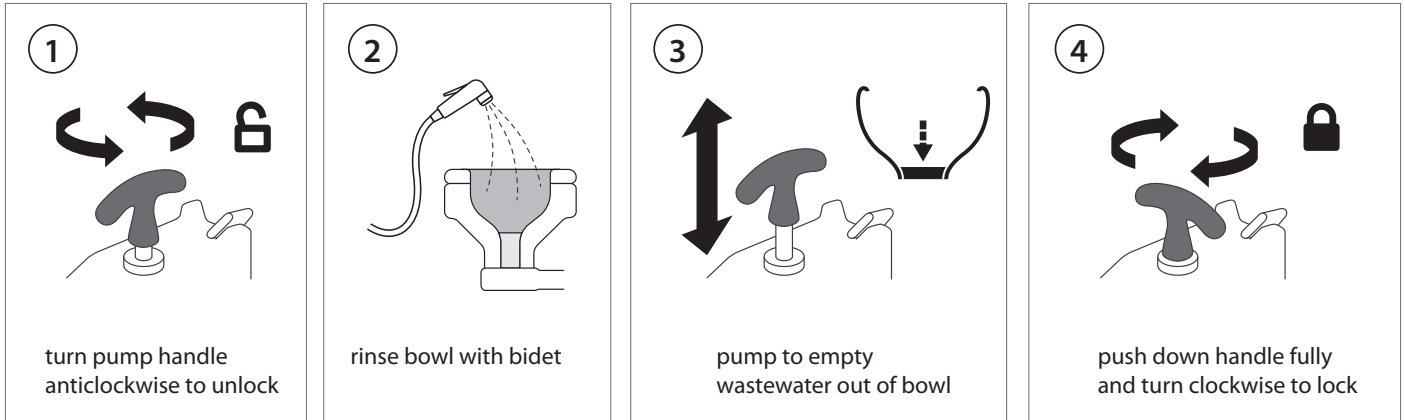
1. Measure and prepare piping of the correct length required to connect the system's fertilizer outlet to the mulch basin location.
2. Prepare perforated 2"Ø distribution pipe (HomeBiogas 2.0 - **1.5m** / 4.0 - **3m** / 7.0 - **4.5m**).
Drill two rows of holes in a 60-degree arc, at roughly 15cm intervals along the 2" pipe.
3. Measure out and dig the mulch basin pit in the chosen location, according to the required dimensions for your HomeBiogas system model.
Fill the pit first with a layer of soil/compost, followed by a layer of sawdust or wood shreds, then a layer of large wood chips. Install the 2" distribution pipe on top of the large wood chips with holes facing downwards, and add more wood chips until the pipe is covered. Fill up the pit with a final layer of landscaping mulch.



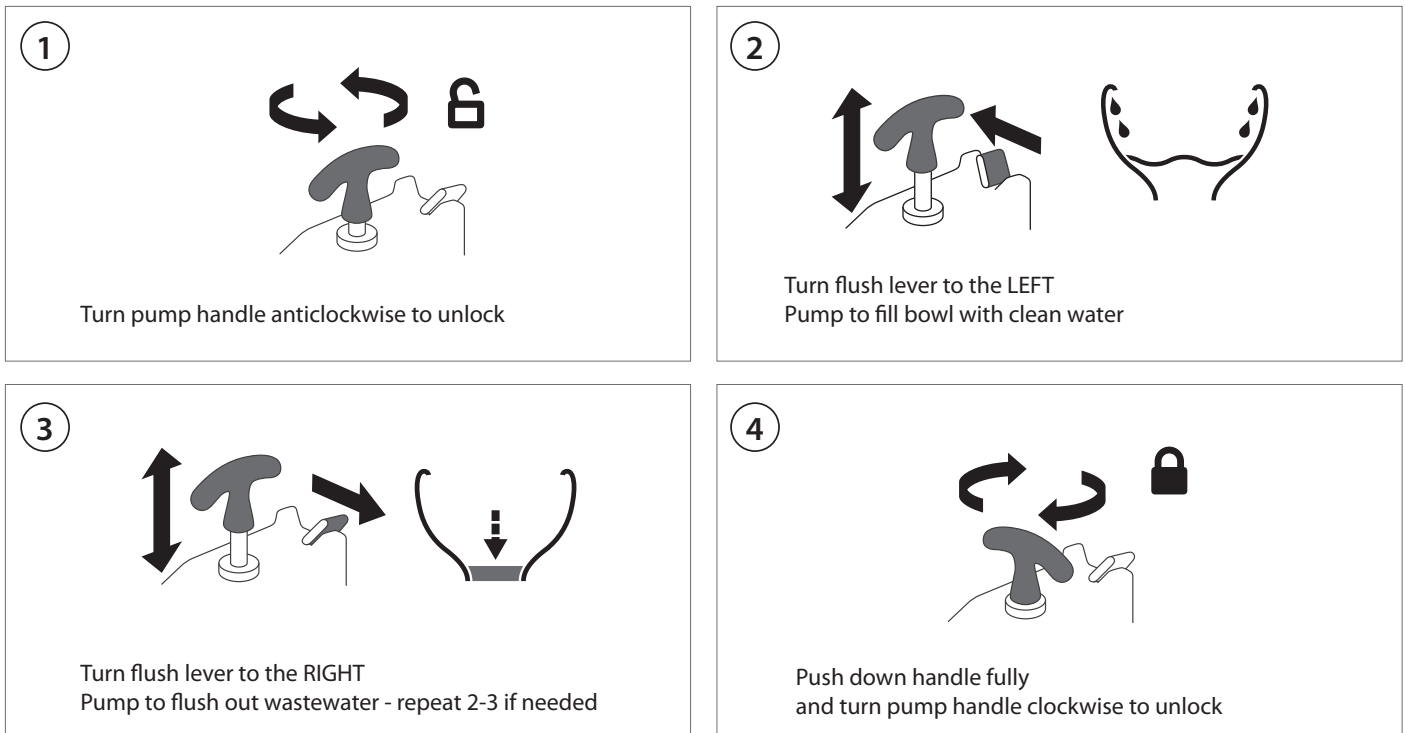
using the toilet

Handheld Bidet:

When using a bidet with the bio-toilet, keep the flush control lever always turned towards the right, on the 'pump out' setting - there is no need to pump in clean water as the bidet provides the running water.



Water reservoir:



Maximum feeding volume:



DO NOT exceed the recommended daily feeding amounts or the system will be unable to properly digest the waste.

HomeBiogas 2.0 - **6 liters + 25 flushes** / 4.0 - **12l + 50 flushes** / 7.0 - **18l + 75 flushes**

maintenance

Regular cleaning

1. Clean the toilet bowl with all-natural cleaners or vinegar.
Avoid chemical cleaners like bleach or Clorox which will kill the bacteria in the system.
2. Do not use abrasive pads on any part of the toilet.
3. Clean with a dry cloth only.

Regular maintenance

1. Lightly lubricate the piston metal rod of the bio toilet pump with the silicone grease (included in the box). Repeat this step every 2 weeks. **IMPORTANT!!!**
2. Empty the toilet. Pour half a cup of vinegar into the toilet. Pump once and wait a few hours before use. Repeat every month.
3. Check there are no water leakages.
4. Check all bolts, nuts, and clamps are fastened tight

Periodic maintenance (Service Kit)

A service kit is provided with the toilet, containing 3 parts that need replacement after prolonged usage (piston o-ring, base valve gasket, joker valve).

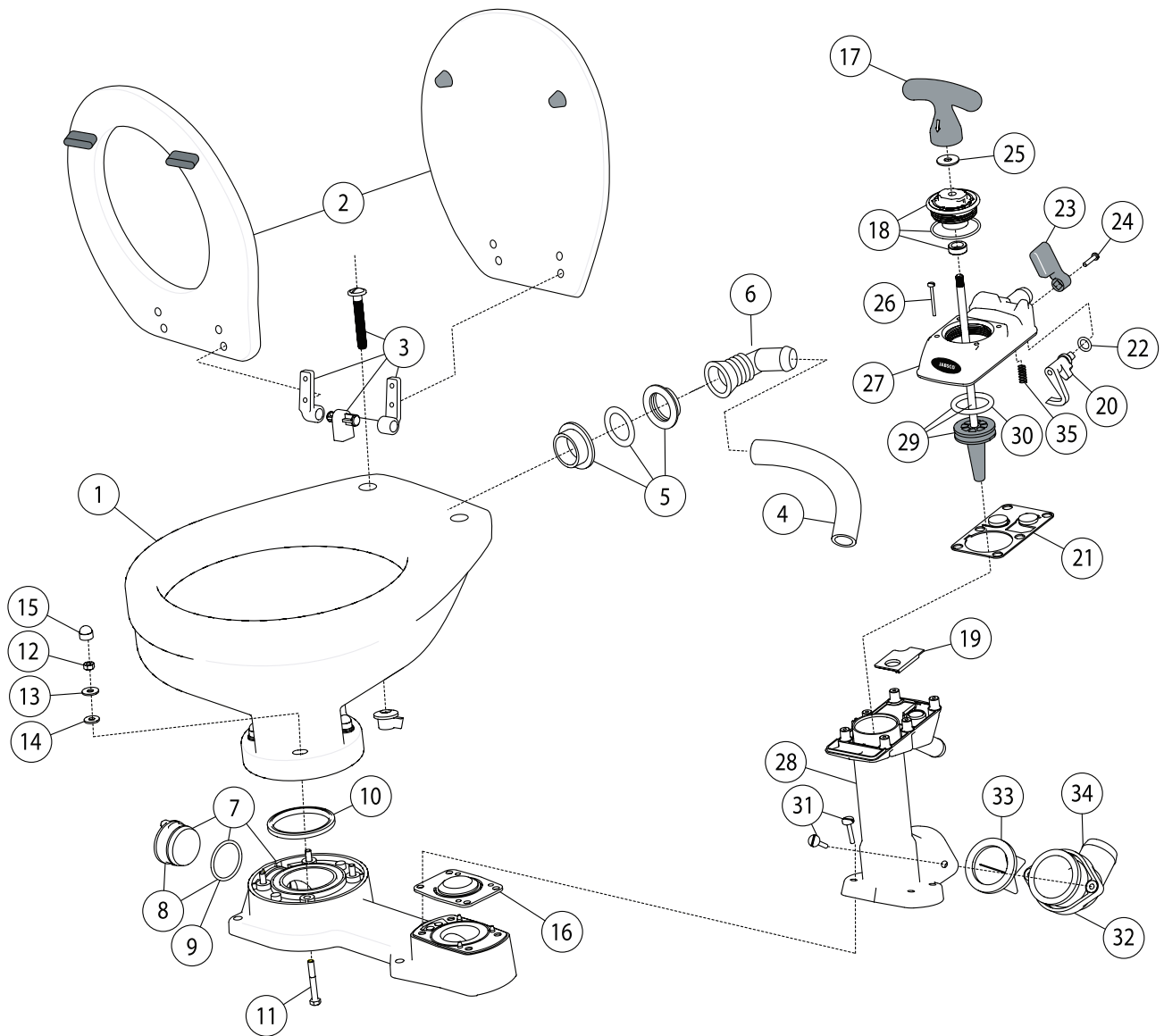
Check the toilet every 6 months and change the parts if necessary (refer to the Service Kit section on page 22 for detailed instructions).

Safety

1. Effluent from fertilizer outlet should be diverted directly to a treatment solution **WITHOUT** potential for user contact.
2. Effluent from fertilizer outlet should **NOT** be fed directly to plants, but rather incorporated into a treatment solution.
3. Any usage of the effluent must meet with local regulations and guidelines for wastewater reuse.

troubleshooting

Bowl fills when toilet not in use	<ul style="list-style-type: none"> • Fit vented loops
Wastewater re-appears in bowl	<ul style="list-style-type: none"> • Check bottom valve (16) and joker valve (33)
Bowl does not empty & difficult to push handle down	<ul style="list-style-type: none"> • Fully shut flush control lever • Check joker valve (33) or discharge hose for blockage
Bowl does not empty and difficult to pull handle up	<ul style="list-style-type: none"> • Remove pump and check for blockage
Bowl does not empty although handle is easy to push and pull	<ul style="list-style-type: none"> • Check piston o-ring (30), bottom valve gasket (16) & joker valve (33)
Water does not come in and handle springs up if pushed down	<ul style="list-style-type: none"> • Fully open flush control lever (23)
Water does not come in although handle is easy to push and pull	<ul style="list-style-type: none"> • Open flush control lever (23) • Check top valve gasket (21) and o-ring (30) • Check inlet hose connections are airtight
Flush water is slow to appear during pumping	<ul style="list-style-type: none"> • Shorten inlet hose from water source • Do not fit a vented loop between water source and pump • Fit between pump and bowl • Fit non-return valve in inlet
Leakage around the piston	<ul style="list-style-type: none"> • Replace seal assembly (18)
Wastewater re-appears in bowl	<ul style="list-style-type: none"> • Make sure handle is in locked position. Check bottom valve (16) and joker valve (33)
Pumping is difficult	<ul style="list-style-type: none"> • Lightly lubricate the piston metal rod of the bio toilet pump with the • silicone grease (included in the box). Full effect after 2 days.

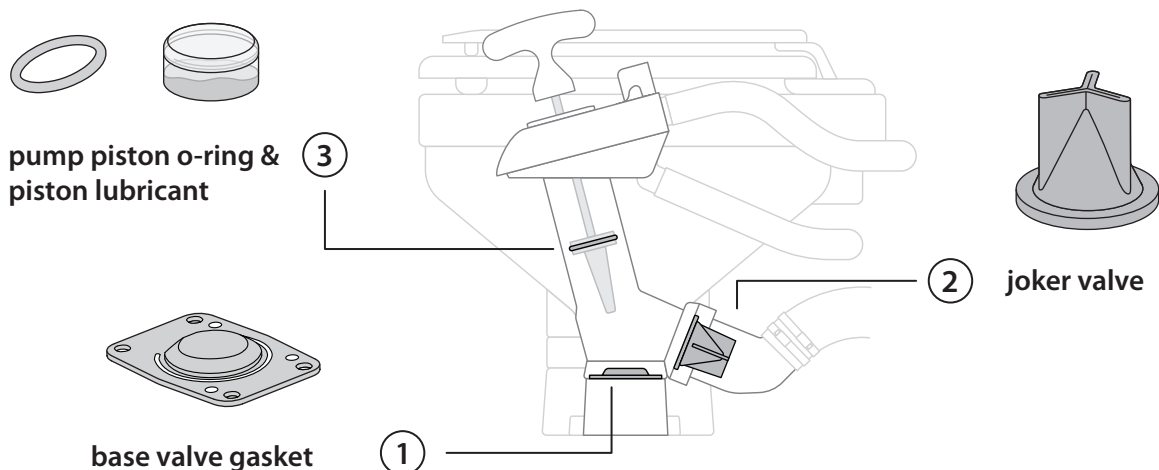


1	Bowl Regular	29096-1000
2	Seat & Cover	58104-1000
3	Hinge Set	58105-1000
4	Hose Regular Toilet	29035-1001
5	Intake Seal	58107-1000
6	Intake Elbow	58107-1000
7	Base, Plug + O-Ring Assy	29041-1000
8	Plug + O-Ring Assy	29028-2000
9	O-Ring (Plug)	-
10	O-Ring (Bowl)	-
11	Bolt (S/S) (x4)	-
12	Nut (S/S) (x4)	-
13	Washer (S/S) (x4)	-
14	Washer (Nylon) (x4)	-
15	Cap (x4)	-
16	Base Valve Gasket	29043-0000
17	Handle	-
18	Seal Housing Assy	29044-3000

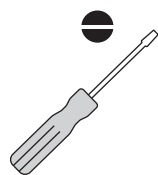
19	Top Valve Seat	
20	Cam	
21	Top Valve Gasket	29042-0000
22	O-Ring (Flush Lever)	-
23	Flush Control Lever	-
24	Screw (Flush Lever)	-
25	Buffer	-
26	Screw (Valve Cover) (x6)	-
27	Valve Cover	-
28	Pump Cylinder	-
29	Piston, Rod & O-Ring Assy	29046-3000
30	O-Ring (Piston)	-
31	Screw (Pump Cylinder) (x6)	-
32	Discharge Flange	29091-1000
33	Joker Valve	29092-1000
34	Discharge Elbow	29029-1000
35	Valve Spring	-

service kit

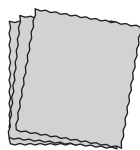
The service kit contains replacements for 3 wearing parts of the toilet, which need to be inspected/changed periodically to ensure that you continue to get the best performance from your Homebiogas Bio-toilet.



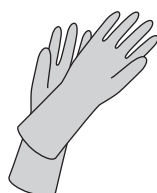
tools/equipment needed for installation



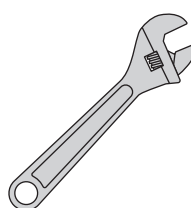
screwdriver (flat)



towels/rags to absorb liquids



rubber gloves to protect hands



wrench/vise to open piston housing cap



stiff cleaning brush/
cleaning scrub/steel scrub



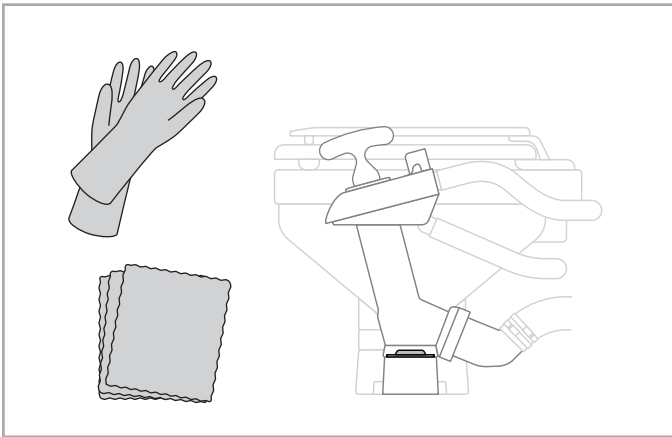
Before starting work on the Bio-toilet, carry out the following actions:

- Ensure the cap of the vented loop is open (not closed completely)
- Pump enough clean water to completely flush out the flexible pipe connecting the toilet to the system (may require a few fills and flushes of the bowl depending on pipe length)

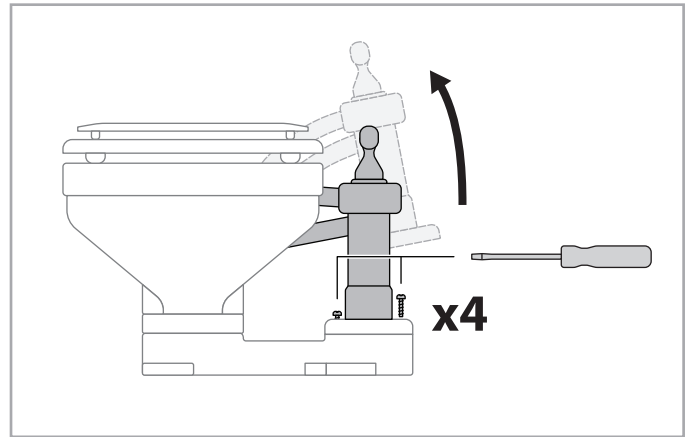
This guide describes the handling of components that have been in contact with sewage/wastewater. Make sure to wear gloves/protective equipment and take appropriate safety precautions when working on these components! Sanitize tools and the work area after servicing, and properly dispose of any cleaning items.

1

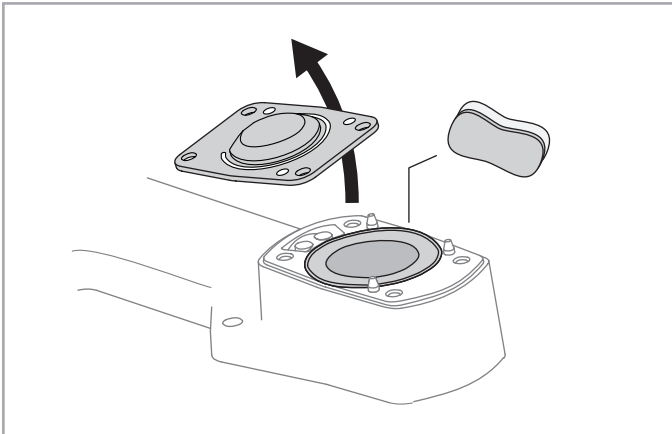
Changing the Base Valve Gasket



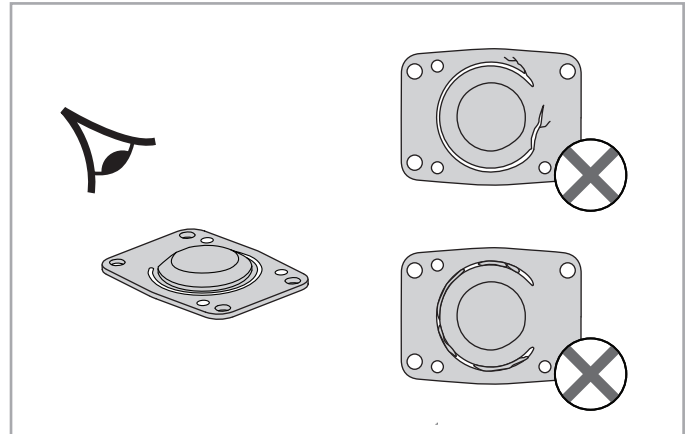
1. Wear gloves/ protective equipment. Place towels or rags around the pump assembly to absorb liquids that may spill out during disassembly.



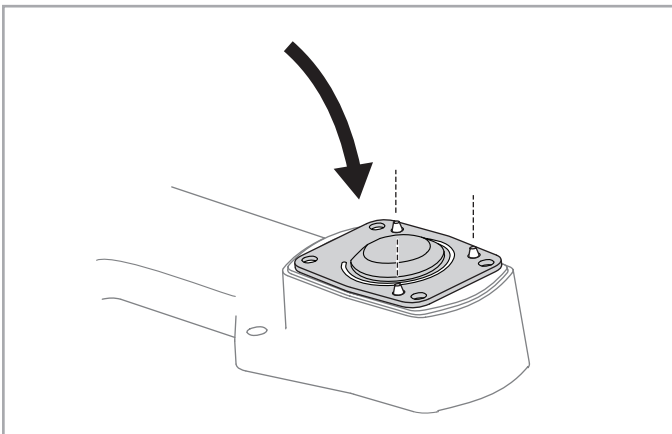
2. Use a screwdriver to loosen and remove the four screws at the base of the pump assembly, and lift the top of the pump assembly from the base.



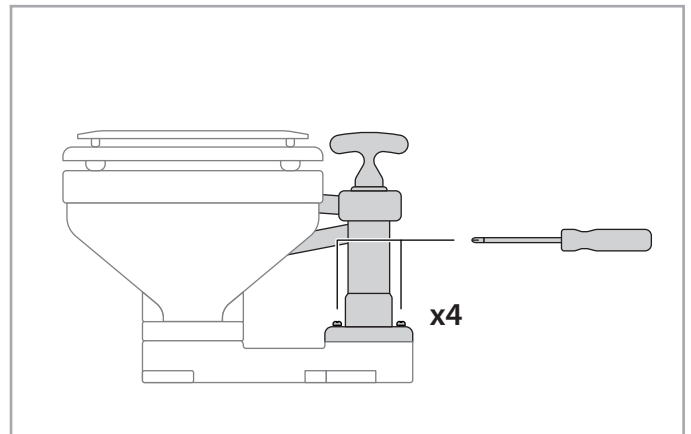
3. Remove the old base valve gasket. Clean and rinse off any sediment built up on and around the valve seating.



4. Clean and inspect the gasket for wear and damage. The rubber should not be cracked, brittle, or deformed, and the c-shaped slit should not be clogged with scale/sediment buildup.



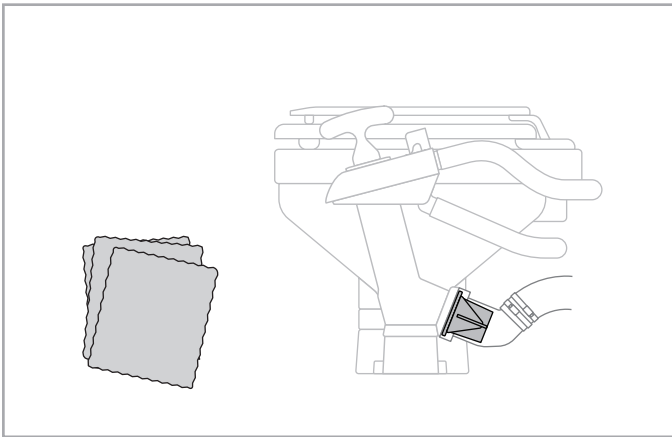
5. If the the gasket is damaged or too worn, dispose of it safely, then install the new gasket from the kit. Fit the gasket into its slot on the base, aligning the holes in the gasket with the 3 pins.



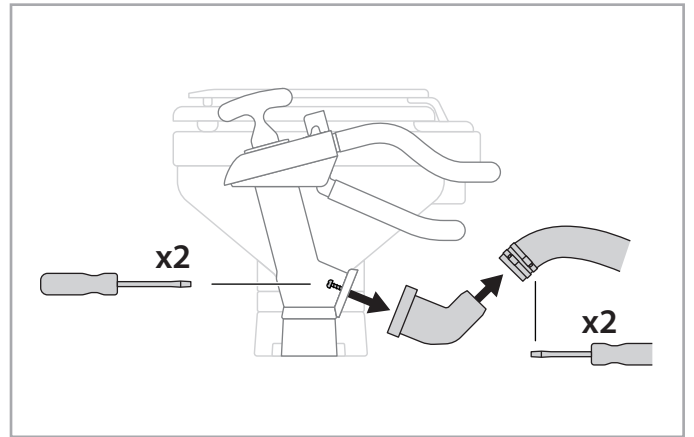
6. Replace the top of the pump assembly onto the base and tighten the screws. Note: Try to find the original threads in the plastic to prevent stripping the plastic base !

2

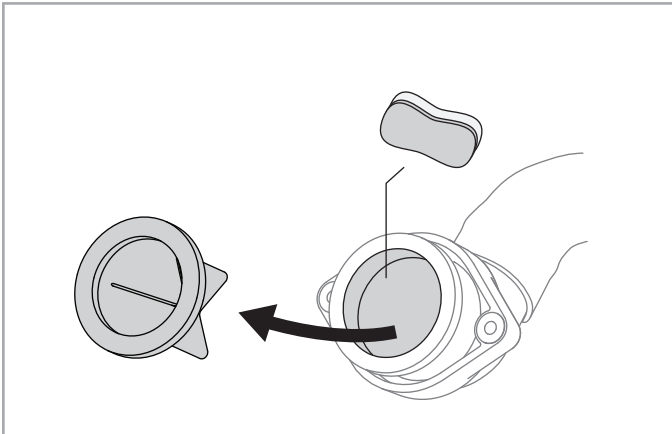
Changing the Joker Valve



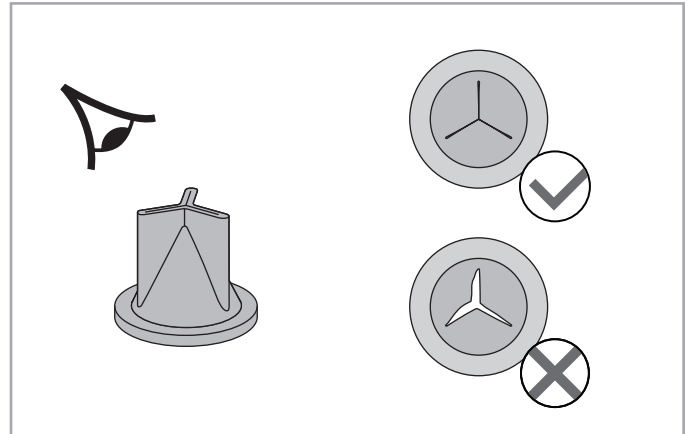
1. Place towels/rags or a pan under the discharge elbow to catch residual liquids that may spill out during disassembly.



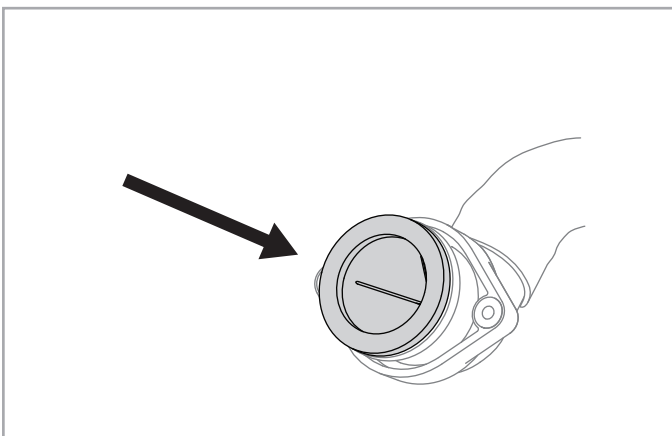
2. Loosen pipe clamps and disconnect flexible waste pipe from the discharge elbow, then unscrew and disconnect discharge elbow from pump assembly.



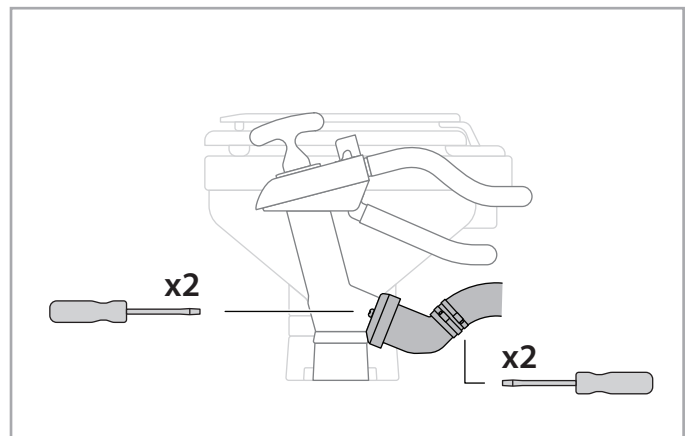
3. Remove the old joker valve. Clean and rinse off any sediment built up on and around the valve seating.



4. Clean and inspect the joker valve for wear and damage. The rubber should not be cracked, brittle, or deformed. The valve slits should be closed when held up to the light.



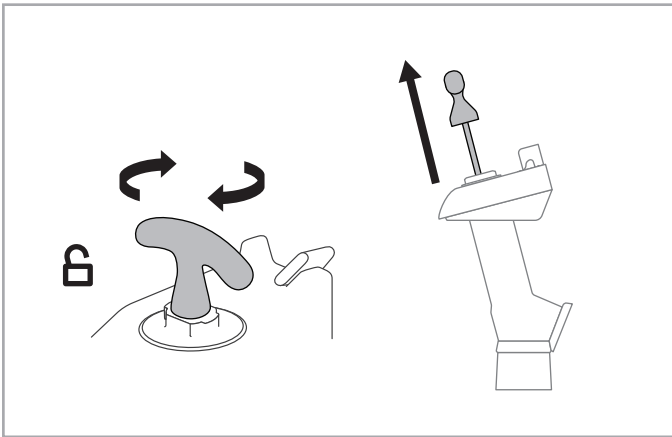
5. If the the valve is damaged or too worn, dispose of it safely, then install the new valve from the kit. Insert the joker valve into its seating in the discharge elbow.



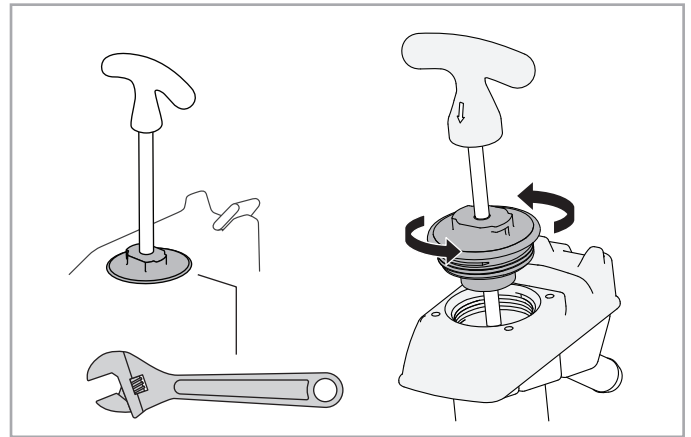
6. Insert the discharge elbow back in place and fasten to the pump assembly with its two screws. (Try to find the original threads in the plastic to avoid stripping the plastic). Connect the waste pipe back to the discharge elbow.

3

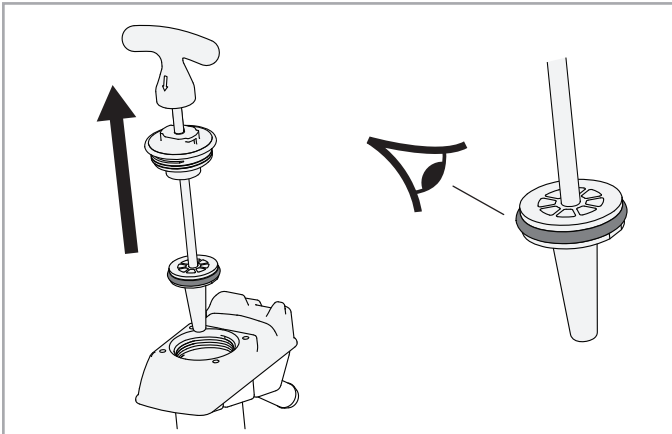
Changing the Pump Piston O-ring



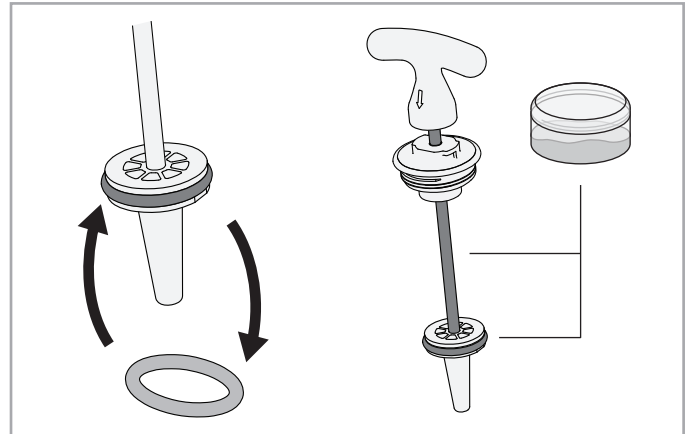
1. Turn pump clockwise to the Unlock position and lift the pump handle. **Take care not to scratch or damage the piston rod in the following steps!**



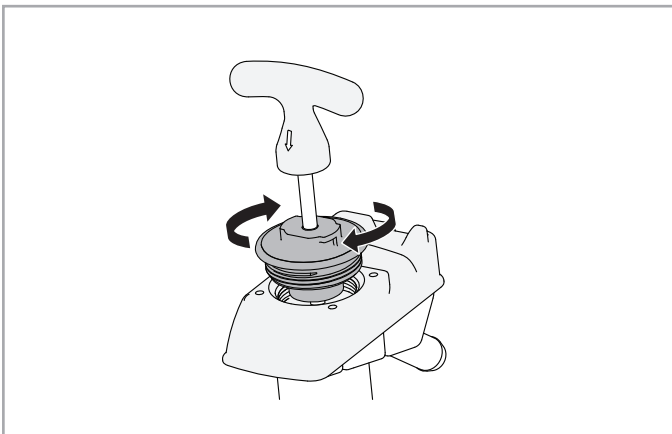
2. Use a wrench/wise to grip the flat section of the piston seal housing cap. **Do not grip the piston rod!** Turn anticlockwise to loosen and remove the cap.



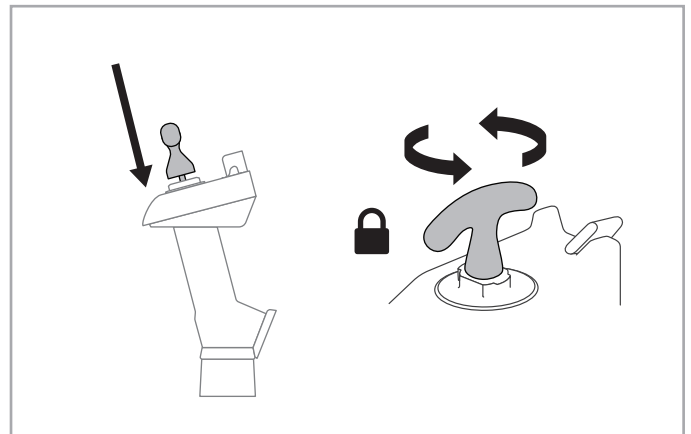
3. Lift the pump piston, together with the housing cap, out of the chamber. Clean the pump piston and check the o-ring for damage, deformation or sediment buildup.



4. If needed, replace the O-ring from the pump piston with the new one from the service kit. Apply lubricant to the pump piston and the new piston o-ring.



5. Slide the pump piston back into the chamber, and screw the seal housing cap back into place (the 'Lock' positions should be at 9 and 12 o'clock).



6. Push down pump fully and turn anticlockwise back to the Lock position.

WARRANTY

HOME BIOGAS LIMITED WARRANTY WARRANTS THIS PRODUCT TO BE FREE OF DEFECTS AND WORKMANSHIP FOR A PERIOD OF 2 YEARS. THE WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO THE GOODS PROVIDED HEREUNDER, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. EXCEPT AS OTHERWISE PROVIDED BY LAW, BUYER'S EXCLUSIVE REMEDY AND SELLER'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES ARE LIMITED TO REPAIRING OR REPLACING THE PRODUCT AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE BUYER HEREUNDER. IN NO EVENT IS SELLER LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION. THIS WARRANTY IS ONLY A REPRESENTATION OF THE COMPLETE LIMITED WARRANTY. FOR A DETAILED EXPLANATION, EMAIL support@homebiogas.com.



CAUTION:

DO NOT begin using the HomeBiogas toilet unless you have completed system activation according to the HomeBiogas User Manual.

The system cannot properly break down waste before activation and this will make the system produce unpleasant smells.

