

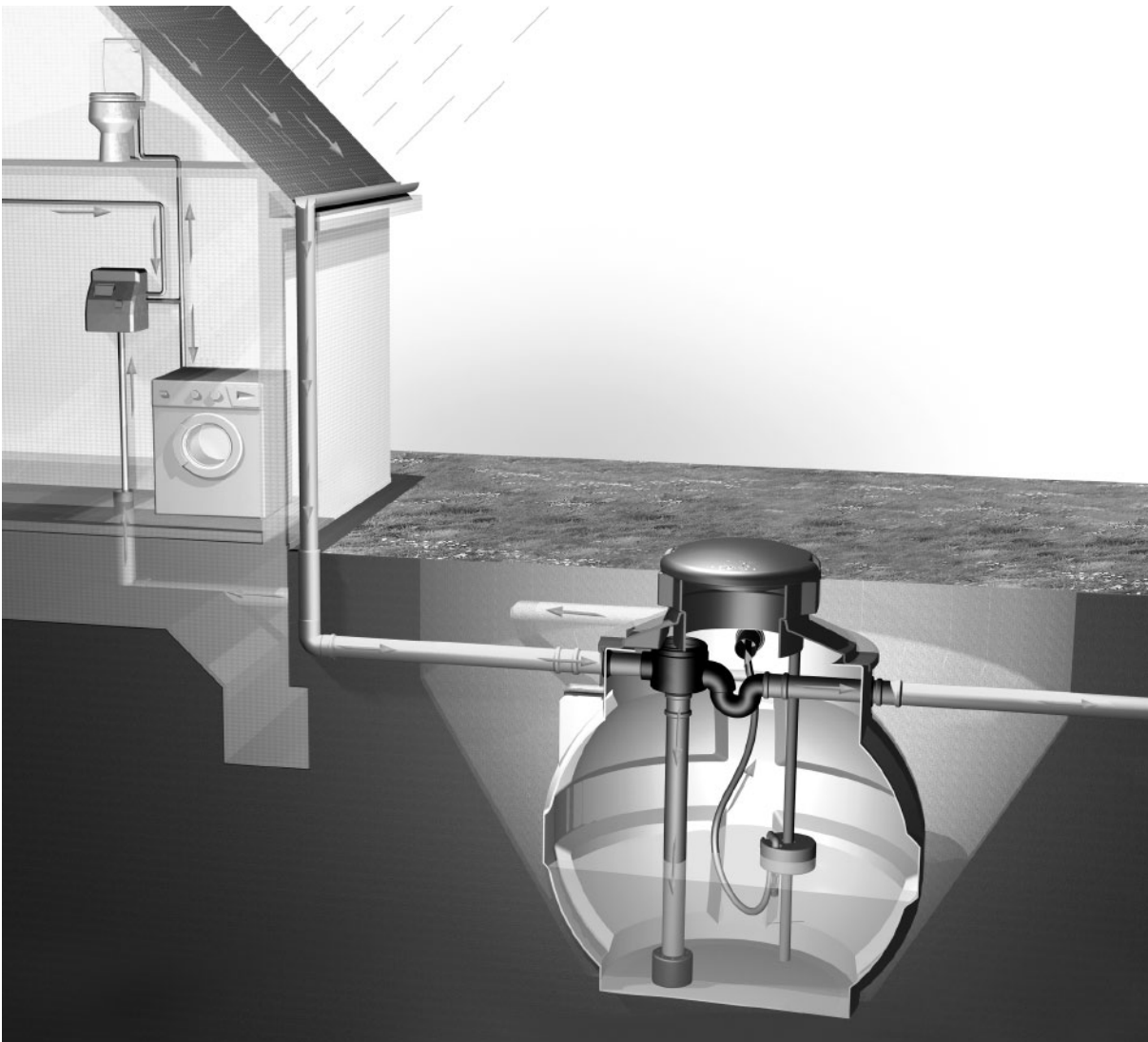
# BALMORAL TANKS

## Installation and operating instructions

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Home-Harvest rainwater system™

Garden-Harvest rainwater system™



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## Health and safety

**The advice given in this booklet is provided with your safety in mind. We strongly advise reading the whole booklet before installing and using your Balmoral rainwater harvesting system.**

Installation of the equipment should only be undertaken by qualified personnel. These guidelines must be adhered to at all times.

All electrical work should be carried out by a qualified electrician.

All plumbing work should be carried out by a qualified plumber.

When covers are removed from underground tanks – during installation and maintenance - precautionary measures must be taken to ensure no-one can accidentally fall into the tank.

All maintenance activities should include appropriate measures to isolate electrical and water sources before undertaking non-operational work with equipment.

At all times, safe working practices should be observed and adopted to avoid accident and injury when working with the equipment.

This document should be retained for future reference and remain in the household should a new occupier move in.

## Maintenance

Regular maintenance of the equipment ensures the proper and reliable functioning of the equipment.

Please refer to page 6 "**filter cleaning**" for full water filter maintenance instructions.

Remove build-up of deposits within the tank. Regular visual checks within the tank when the water level is low will indicate if a build-up of sediment requires removal. Frequency of such checks will vary dependent upon each installation. As a guide, six to twelve monthly checks should be adequate. Any deposit build-up should be removed by a competent contractor.

*Note: Suction hoses must be clean to avoid contamination.*

The pump system requires minimal maintenance. Please refer to page 11 "**troubleshooting**" to address any issues that might require attention.

This tank system is designed to collect and store rainwater. It should not be used for any other purpose without the prior agreement of Balmoral Tanks.

## Free advisory service

Balmoral Tanks Site Services offers a nationwide service to cover all aspects of maintenance on the Balmoral environmental product range. Services can be tailored to customer requirements from basic annual maintenance contracts, including on-going support and advice, through to emergency call out. Call +44 (0)1224 859100 for further information.

**Figure 1**  
**Home-Harvest rainwater system**

The Balmoral Home-Harvest rainwater system heralds a new level of quality and performance in domestic rainwater harvesting.

Designed for easy installation and reliable operation, each system provides the highest quality non-potable rainwater for toilet flushing, washing machines, garden irrigation and vehicle washing purposes.

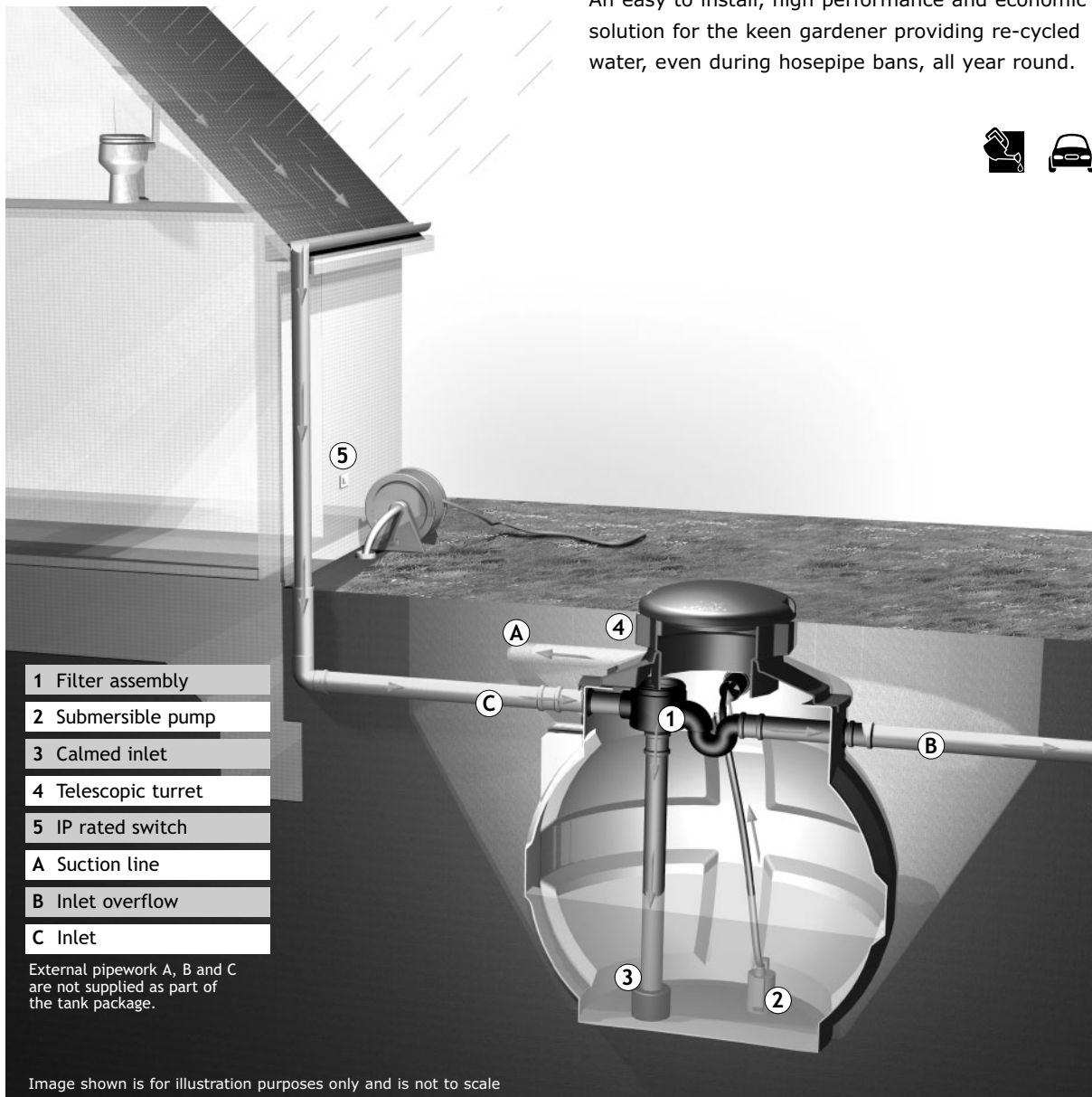


Image shown is for illustration purposes only and is not to scale

**Figure 2**  
Garden-Harvest rainwater system

The Balmoral Garden Harvest Rainwater System is an integrated rainwater harvesting system for garden irrigation.

An easy to install, high performance and economic solution for the keen gardener providing re-cycled water, even during hosepipe bans, all year round.



## Tank installation instructions

### Tank construction

Balmoral rainwater tanks are produced in four sizes, ie, 2728, 3800, 4546 and 6000 litres, and are rotationally moulded in tough polyethylene which offers a very high level of impact resistance.

### Tank design features

The tanks have Ø50mm moulded-in lifting eyes for use during handling and installation (only to be used when the tank is empty).

The standard rainwater tank is designed to cater for drain invert depths to a maximum of 900mm, the neck can be cut down to suit shallower invert depth to a minimum of 600mm. See page 6 for directions to reduce the invert depth of the tank

A secure pedestrian duty manhole cover is supplied as standard to comply with statutory regulations.

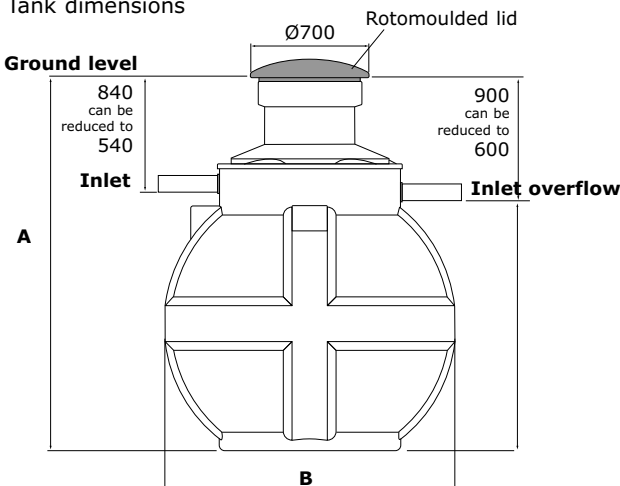
A safety grille can also be supplied as an optional item to fit across the access shaft as an additional safety feature.

The tanks have a flat base for stability during transportation and storage prior to installation.

### Tank dimensions

The specified invert depth of 900mm must not be exceeded. Failure to adhere to these design parameters will render any warranty null and void and may cause severe structural damage to the tank.

**Figure 3**  
Tank dimensions



Tank dimensions (See figure 3)		
Tank	A	B
BST 27	2515	1860
BST 38	2755	2060
BST 45	2885	2180
BST 60	3120	2380

All dimensions are approximate (mm)

### Storage

Tanks should be set on a smooth level base and securely tied or propped to prevent them from overturning and causing damage or injury.

### Handling

The rotationally moulded polyethylene tanks should be handled by crane or other suitable equipment using the Ø50mm lifting eyes provided (Lift only when empty). For confirmation of product weights, please contact Balmoral Tanks.

### Siting

The following points should be considered before installation of the equipment:

Position the unit at a minimum distance of **five metres** from the face of the building to avoid affecting either the structural integrity of the building or the tank.

Consider placing inspection points in the feed line before the tank and at the overflow after the unit.

If the overflow discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage. **The soakaway must not drain back into the tank.**

Do not install the unit deeper than necessary, ensure that you purchase any required extension neck with the tank. Units installed with an invert greater than 900mm will require a civil design specific to the installation.

Adequate access to the unit must be provided for routine maintenance.

## Superimposed loads

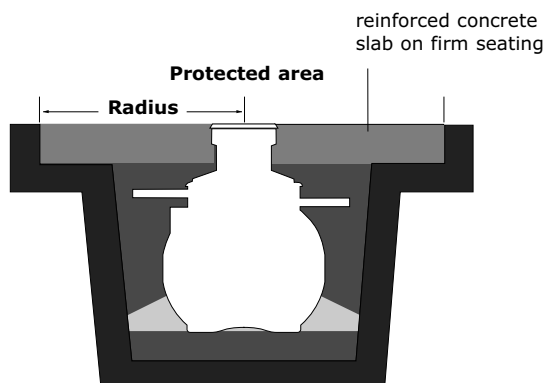
No superimposed loads, such as vehicles, should be allowed within the protective area of the tank as shown in figure 4.

If vehicular or other superimposed loads are required to come within the protected area of the tank a concrete surround or reinforced concrete slab, designed by a qualified civil/structural engineer, must be in place so that no loads are transmitted directly onto the tank (see figure 4).

The pedestrian duty lid cannot be used where vehicular traffic is likely to come within the protected area.

If a reinforced concrete slab is not provided for vehicle superimposed loads then the area of the tank should be fenced off as shown in the chart below.

**Figure 4**  
Superimposed loads and protected areas



### Protected area around tank for superimposed loads

Tank stock number	Radius from centre of tank (m)
BST 27 - HH/GH	3.0
BST 38 - HH/GH	3.5
BST 45 - HH/GH	3.75
BST 60 - HH/GH	4.0

## Installation

**It is recommended that a full risk assessment be completed for the site, installation process and on all parts prior to installation.**

**These tanks cannot be installed in conditions where the ground water may rise above the base of the tank at any time.**

Excavation should allow for a minimum of 200mm space all round the tank and 150mm below the tank. When difficult ground conditions are encountered, ie, in unstable ground or shrinking clay, etc, it will also be necessary to allow for an additional depth (as much as deemed necessary by the supervising engineer) to be excavated to allow for hardcore and sand blinding to provide a firm base for the concrete bed.

Place wet concrete (slump test 30mm, strength 25N/mm) in base of excavation and grade and level to within 20mm.

Lower tank carefully onto concrete and check tank is true and level.

Fill tank with water to approximately 50% and place and consolidate additional concrete carefully under tank. Thereafter haunch concrete up and around the bottom third of the circumference of the tank.

Continue to fill the tank with water and carefully place concrete around the tank in 150mm thick layers, ensuring that there are no voids remaining around the tank, and that the level of water inside the tank is maintained at a level approximately 450mm higher than that of the concrete backfill.

**Do not use a vibrating poker.**

Continue to fill the tank with water until it reaches the height of the outlet pipe.

The neck extension can only be surrounded in concrete after the concrete around the tank has hardened (approx 24 hrs).

**Failure to adhere strictly to these installation instructions will render any warranty null and void.**

**Manhole cover**

The pedestrian duty manhole cover and frame are manufactured in tough, durable rotationally moulded polyethylene and fit directly onto the neck of the tank.

**Low invert - tank neck cut down instructions**

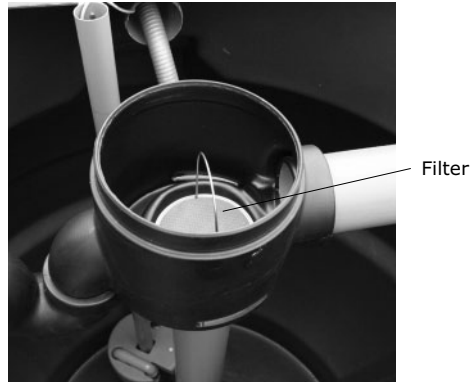
The tank neck can be cut down to suit a lower invert depth. Cut the neck using a jigsaw or a small hand saw at the cut line shown on figure 5. You may need to trim the cut line on the lower part of the neck to allow the top part to slide down within it. Use 4x25mm wood screws on the inside to secure the two parts of the neck.

**Safety**

We would strongly recommend the purchase of a Balmoral safety grille for fitting in the neck of the tank. This provides an added safeguard in the event of the cover being left off while the tank is unattended.

**Filter cleaning**

You should regularly check and clean the stainless steel filter.

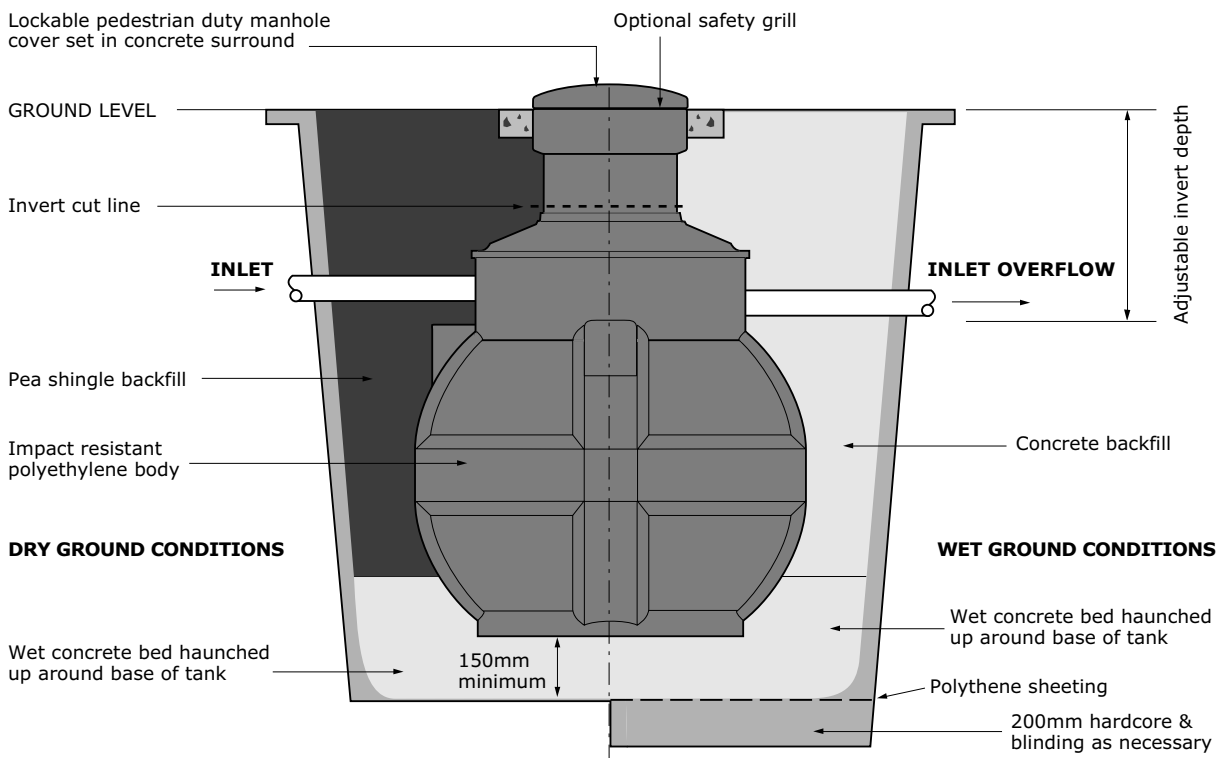


Remove the manway cover to reach the filter. The filter is attached to the manway using a rope. Use the rope to lift out the filter whilst taking care not to spill any filter debris into the tank.

*Continued...*

**Figure 5**

Site installation



**Do not lean into the tank to remove the filter.**

In normal conditions the filter will require cleaning every two to three months but, initially, it should be checked regularly to determine the best cleaning cycle for any specific site and its conditions.

It is very important to keep the filter clean. Failure to do so will result in a decrease in efficiency.

## Pump control system for Home-Harvest models (Figure 6)

### Introduction

The pump control system provides excellent long term service and minimal maintenance. The integrated unit design offers simple system installation, lower system installation costs and easy maintenance.

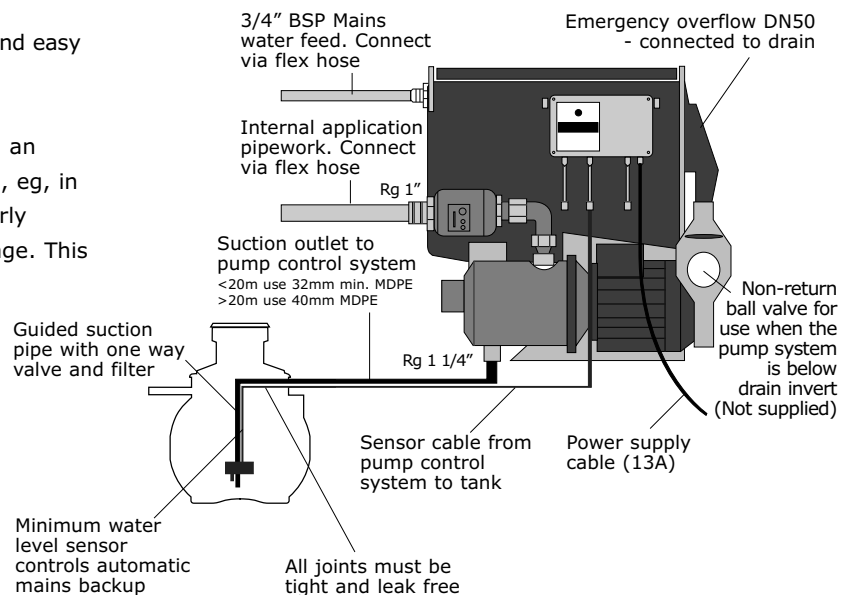
Locate the wall mounted integrated unit on an outside wall for minimal noise transmission, eg, in a basement, utility room, toilet, or if properly insulated against frost protection, in a garage. This can be housed in either a cupboard or a purpose built enclosure. The application pipework leading to appliances must not be connected to mains/drinking water piping. To meet industry regulations the rainwater pipework must be kept separate from mains/drinking water supplies to avoid contamination risks. The mains water backup meets industry regulations for water system separation by depressurising the mains/drinking water in the 10L break tank with a 50mm gap between the mains inlet point and the highest water level at the weir overflow. Internal pipework with rainwater should be marked accordingly to fully comply with regulations. Each appliance where rainwater is used should also be marked with a label to fully meet regulations and best practice.

### Functional description

The multi-stage rotary suction pump sucks water from the tank and pressurises the

internal/application pipework at 4bar. The pump starts upon a signal from the pressure control switch based on a detected pressure drop when an application valve opens. A tank located sensor sends a signal when the tank is empty. This opens the motorised ball valve (within 60 seconds) to automatically allow mains water to be used as above. When it rains the reverse occurs. The mains water break tank will refill based on the float valve position. The user can manually switch from rain to mains water. The maximum mains water pressure allowable is 6bar.

**Figure 6**  
Pump control system

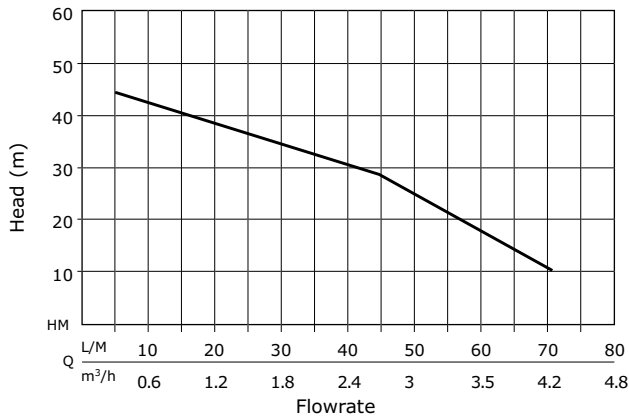


### Pump specifications

Rating: 1~230V, 50Hz  
 Pumped flowrate: Max 4.2m<sup>3</sup>/h - 70L/m  
 Height: Max 45m  
 Pressure: Max 4.5bar  
 Max motor power: 700W  
 Suction height: Max 7m  
 Suction linear: Max 20m

Continued...

**Figure 7**  
Balmoral pump curve



**Connections from tank**

During installation the connections should be made between the tank and pump control unit. The tank is supplied with the suction hose outlet and sensor cable secured to the 110mm service duct. To release for connection simply snip the securing tie, taking care to prevent them falling back into the tank.

For ease of installation, the Balmoral Home Harvest rainwater system has only two connections between tank and pump control unit.

**Suction outlet**

Consists of a 1.25" female threaded coupling at the tank. This should be connected to the pump control unit using 32mm MDPE pipe to a maximum of 20m length from tank and maximum 7m suction height. Use the washer provided in installation pack for 32mm MDPE pipe connection. Best practice is to push MDPE pipe 0.5m back into tank for ease of access.

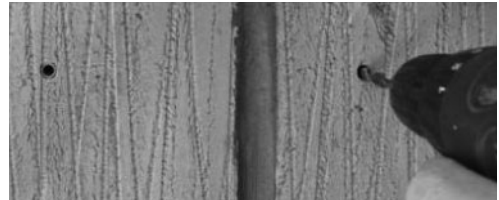
**Tank sensor**

Consists of a 20m length of continuous cable that plugs directly into the pump control unit. Take care not to pull too hard at the tank end as this could dislodge the sensor in the tank.

It is recommended that the suction pipes and sensor cable are routed underground in 110mm pipe to a minimum depth of 600mm for frost protection.

**Installation and commissioning**

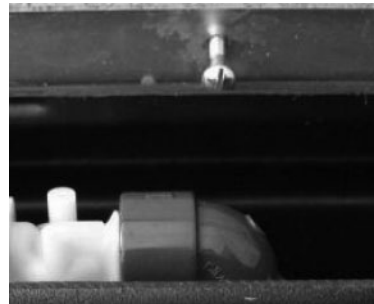
- 1 Mark and drill level bracket holes approximately 1.4m from floor



- 2 Secure wall bracket using fixings and rubber mounts provided



- 3 Locate pump control unit on wall bracket. To prevent accidental movement, secure with third fixing



- 4 Connect mains water supply with .75" female BSP flexible hose (not supplied) and leave isolation valve closed.

*Note: You must hold copper fitting inside break tank when tightening mains feed connector to secure fitting and prevent damage to internal float assembly*



Continued...

- 5 Fill 32mm MDPE suction pipe (not supplied) with clean water until full then connect to 1 .25" BSP male pump feed. Remove internal shipping plug if fitted. **Refer to 'Connections from tank - Suction outlet'**



- 6 Connect internal pipe work using a 1" BSP female flexible connector (not supplied) to the pressure switch
- 7 Connect emergency overflow to drain using DN50 pipe (not supplied)
- 7a Connect emergency overflow to a one way ball valve (not supplied) if the unit is mounted below the drain level (can occur if the unit is in the basement)



- 8 Remove filling nut from top of pump and fill with water to prime. Retighten filling nut on pump



- 9 Connect tank sensor cable to Rewamatik control unit



- 10 Connect the unit power supply to a 13A fused socket

- 11 **Installation complete, you are now ready to commission the unit**

Open the isolation valve fitted to the mains water supply pipe and allow break tank/cistern to fill

When you switch on the power the pump will immediately start until either the dry-run protect kicks in (most likely) or an appliance valve is open and water is pumped until flow stops and the pump stops

- 12 When the power is first enabled the motor will likely run for about 15 seconds and stop. The pump needs re-priming at this stage. Open an appliance valve (toilet cistern or tap connected to the rainwater harvester) then press the blue 'reset' button on the pressure switch to start the pump cycle again. Listen for water being drawn through the pump until the pump stops (approximately 15 seconds)

*Note: The green LED on the pressure switch is a power indicator and should illuminate. On the Rewamatik box, at start-up the orange LED should illuminate only.*



Continued...

- 13 If, after several attempts of resetting the pump via the blue 'reset' on the pressure switch, you still cannot hear any water drawing through the pump, press the blue button on the Rewamatik control box once to illuminate the green 'Supply is Active' LED. Wait 60 seconds whilst the motorised ball valve opens to allow mains water into the pump. Now press the blue 'reset' button on the pressure switch to start the pump again. Water should now pump to the appliance. Close the motorised valve by pressing the blue button on the Rewamatik control box and wait 60 seconds. Now create water demand again by opening an appliance and see if water is pumped from the main underground rainwater tank



- 14 In order to 'see' what is happening if pumped water is still not coming out of the appliance when the valve is opened you could remove the connection to the internal plumbing pipes and connect a temporary hose pipe and valve. Use a bucket to catch any water. Open the hose pipe valve to create water demand and press the blue 'reset' on the pressure switch to start the pump. Repeat several times until water flows. If water is still not produced, repeat stages 5 and 8 and restart commissioning from stage 11



- 14a The pressure gauge will increase or fluctuate as water enters the pump. The gauge will remain steady at 3-4bar when the pump is fully primed. If air remains in the system the pressure is unlikely to reach 3-4bar



- 15 Press the blue button on the Rewamatik box once to illuminate the 'Supply is Active' green LED only
- 16 During a 60 second period the motorised ball valve will open (white cover behind pump with a red circle and arrow) to allow mains water to be pumped. Open an appliance (or the temporary hose pipe) to create demand and the pump should now start automatically



- 17 Press the blue 'reset' button once again to revert to the 'Automatic' status and illuminate a single orange LED (the motorised ball valve will slowly close)
- 18 To test the tank sensor disconnect the plug and socket connected in stage 9. You should hear a 'click' then both LED's on the Rewamatik will illuminate and the motorised ball valve will open. Reconnect the sensor cable and another 'click' can be heard and the motorised ball valve will close (only the orange LED will now be illuminated again). Alternatively, you can test this by lifting the tank sensor above the water line in the tank to achieve the same response

**19 Commissioning is now complete**

Replace temporary hose pipe with permanent appliance pipe work if used

- 20 If you still have problems check the troubleshooting section on the following pages. If this does not solve any issues, please contact Balmoral Tanks.

## Troubleshooting

### Rewamatik control box operation and indicators

Mode	LED status	Description
<b>Ready status</b> (after all connections made)	Green off Orange on	Pump extracts water from rainwater storage when an appliance creates demand. <b>Motorised ball valve is closed. 'ASP' will remain constant</b>
<b>Mains water only operation</b> (using only mains/drinking water)	Green on Orange off	The unit is switched to manual operation via the control panel (blue button). Pushing the control panel blue button will toggle between 'Ready status' and 'Manual operation'. The motorised ball valve will open slowly and only mains water will be used until manually switched back
<b>Automatic operation</b> (when main storage tank is empty)	Green on Orange on	Tank sensor has signalled that the storage tank is empty and the motorised ball valve has opened to allow mains water back up to be used
<b>Automatic flushing after four weeks of not using module</b>	Green flashes Orange on	<p><b>Mains water only is switched on</b> when the pump operates via application demand for a minimum of three minutes. Afterwards the automatic flushing mode is switched off. Flushing mode can be stopped via the TEST button. In case the cistern has not enough water the module continues operating in 'Automatic operation'</p> <p><i>Note: You cannot test the automatic flushing feature. Every modal switch of the Rewamatik box resets the timer</i></p>

Continued...

## Troubleshooting

### General issues

<b>Problem</b>	<b>Solution</b>
<b>Pressure fluctuates, is low or falls over time</b>	<ol style="list-style-type: none"> <li>1 Air in system (check suction side and pressure side, bleed pump)</li> <li>2 Leak in the suction pipework – check all joints</li> </ol>
<b>Tank is full but Rewamatik control box does not switch automatically to rainwater supply</b>	<ol style="list-style-type: none"> <li>1 Blue button on control panel has been pressed and Rewamatik has been set to manual drinking water feeding only – press Blue button to switch back to automatic mode</li> <li>2 Sensor cable is unplugged - replug</li> <li>3 Cable connection to motorised ball valve is loose - replug</li> <li>4 Sensor is not in water or is dirty - clean sensor and lower in to water</li> </ol>
<b>Tank is empty, but Rewamatik control box does not switch</b>	<ol style="list-style-type: none"> <li>1 Sensor lies in sediment layer, pressure guard indicates breakdown because air is sucked - raise sensor out of sediment</li> <li>2 Cable connection to motorised ball valve is loose - replug connection</li> </ol>
<b>Tank to unit suction pipe does not fill with water when filled for commissioning purposes</b>	Pipes are leaking or not connected - check all joints
<b>Pump switches on automatically without any appliance being opened to create demand</b>	<ol style="list-style-type: none"> <li>1 Pump or appliance doesn't close correctly causing a pressure drop in the internal pipework. Check the following: close shut-off gate on the internal pipework immediately downstream of the unit in order to ensure that no water demand is evident and see if this fixes the problem. If so you have a faulty appliance</li> <li>2 High amount of dirt/sediment prevents check valve in pressure guard from closing. Try to flush pressure guard opening an outside application</li> </ol>
<b>Pump makes rubbing noises</b>	Ventilation wheel rubs on cover, remove and re-fix
<b>Pump doesn't suck water through</b>	<ol style="list-style-type: none"> <li>1 Did you remove the plastic plug fitted to the 1.25" BSP inlet to the pump for transport purposes?</li> <li>2 Are all screw connections tightened and not leaking on all pipe work joints?</li> <li>3 Does the one way valve in suction pipe work? - check that the spring in the one way valve is working</li> </ol>
<b>Feeding valve doesn't close</b>	The mains water feed valve in the break/cistern tank is a mechanical component that has contact with the mains water supply. If in a hard water area the valve may be dirty or furred up
<b>Motorised ball valve doesn't close completely</b>	<ol style="list-style-type: none"> <li>1 Plug connection to Rewamatik control panel is loose</li> <li>2 An object fell into feeding box and prevents ball valve from closing/opening</li> </ol>

Continued...

### Attention should be given to the following notes:

- 1 Sensor cables should not be extended or shortened, resistance would be changed and can lead to malfunction
- 2 Maximum operating pressure for drinking water connection to break tank/cistern is 6bar
- 3 When choosing the installation site consider that lightweight walls resonate noise easily. You should work with sound absorbing material or mount to an outside wall
- 4 Suction pipe should have a minimum diameter of 32mm and should slightly rise up from the main underground tank to the unit
- 5 The 10L break tank water will automatically be exchanged every four weeks to prevent stagnation

## Pump control system for Garden-Harvest models

### Introduction

The Garden Harvest model is delivered with a submersible, centrifugal, multi-stage pump. It is specifically designed for the movement of clean water from tanks and wells.

During installation, the installer should fit the delivery hose to the pump then lower the assembly into the tank using the rope provided. Make sure the pump is standing vertical on the tank base then pass the delivery line through the vacant service duct. Refer to '**Balmoral Delivery Outlet**' for external tank fixings.

### Functional description

Water is drawn through the submersible pump and along the 1.25" delivery hose. A float switch automatically turns the pump off when the tank water reaches its minimum level. The pump automatically switches back on when the tank refills above the minimum level. The submersible

pump is rated to IP68 and contains a thermal overload protection device. The pump is sited at the base of the tank (after installation). Use rope provided to raise and lower pump.

**Never use the power cable, delivery line or float cable to lift or handle the pump unit.**

### Pump specifications

Rating: 1~230V ±10% 50Hz  
 Pumped flowrate: Max 4.2m<sup>3</sup>/h – 70L/m  
 Pressure: Max 10bar  
 Max motor power: 1000W  
 Rated delivery height: 10m  
 Rated delivery linear: 20m  
 Maximum liquid temperature: 40°C  
 Mass: 15kg (when drained of water)

### Operation

The Garden Harvest pump is issued with a timer switch which is to be wired into the pump. Always switch the pumped water flow off and on using the timer switch. The timer switch must be set by an electrician for 15 minutes operation. After 15 minutes the pump will automatically turn off. The timer switch protects the pump from running with a closed outlet.

**Please refer to the specific product literature supplied in your document pack for further details.**

**Always switch off pump system after use. Failure to do so may seriously damage internal components.**

### Connections from tank

During tank installation, connection should be made between the tank and an outside tap or other water product connector. The tank is supplied with a 1.25" delivery hose outlet and electrical cable which is secured to the 110mm service duct during transport. Release both hose and cable for connection by simply cutting the securing cable tie, Take care to prevent the hose and cable falling back into tank.

### Balmoral delivery outlet

The Balmoral delivery outlet is a 1.25" female threaded coupling at the tank. This should be connected to an outside tap or other water product connector using a 32mm MDPE pipe to a maximum of 20m length from the tank and a maximum of 10m suction height. **Use the washer provided in installation pack for tank to 32mm MDPE pipe connection.** For ease of access, push MDPE pipe 0.5m into tank.

It is recommended that the delivery outlet is routed underground in 110mm pipe to a minimum depth of 600mm for frost protection. The 32mm MDPE piping should be stepped down to .75" piping immediately prior to the outlet connection, and connected to an outside tap or other water product connector.

### Electrical connection

The submersible pump is provided with 10m of electrical cable. It is recommended that the electrical cable is routed underground in 110mm pipe to a minimum depth of 600mm for frost protection. The electric cable should be wired into the IP rated timer switch (provided). The timer should be preset to 15 minutes (refer to page 13 'Operation'). The IP-rated timer switch should be fitted onto a robust vertical surface at least one metre above ground level. All cabling must be protected.

**All electrical work must be carried out by a qualified electrician.**

**Always switch off pump system after use. Failure to do so may seriously damage internal components.**

### Troubleshooting

Please refer to the submersible pump product literature and the troubleshooting guide for assistance. If this does not resolve the issue, call Balmoral Tanks.

## BALMORAL TANKS

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