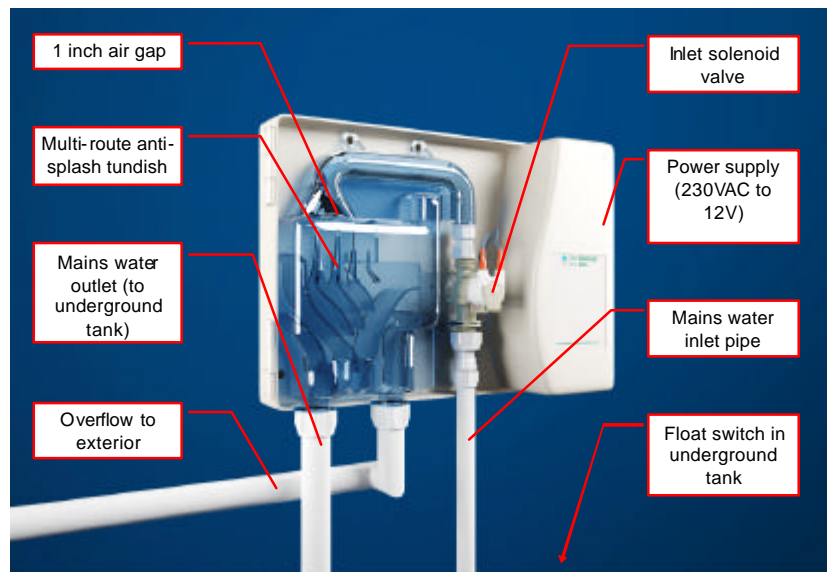




RainBackup in a Box[®]

Plug-and-play mains water backup for direct feed rainwater harvesting systems

Rainwater harvesting plays a large role in reducing the dependence of any building on expensive treated water from the mains. Toilet flushing, clothes washing and any outdoor use of water can be assured by rainwater pumped, in this case, by direct feed from the submersible pump in the rain storage tank. But what happens if stored rainwater runs out? Every system needs a means by which mains water is re-introduced into the system to keep the appliances going. The principle for a direct feed system is simple; a float switch detects when the rainwater storage tank is empty and opens an electrically-actuated solenoid valve so that mains water flows into the bottom of the tank.



When the float switch floats off the bottom of the tank it closes the solenoid valve. The bulk of the storage tank remains empty ready to admit the water from the next rain shower.

U.K. Building Regulations require that rainwater cannot possibly flow back into the mains water supply. For this reason all mains backup devices must have an air gap where the mains water flows into the rainwater tank. The simplest way to do this is for the mains water to flow through open air into an inverted conical or inverted cup-shaped device called a tundish. The 2012 evolution of the Rain Backup in a Box (Product ID RWH-BUB01) features a multi-route anti-splash "tundish" and overflow incorporated into one transparent blue injection moulded. It is housed with the solenoid in an off-white injection-moulded cabinet 325 L x 260 H x 95 D millimetres. The injection-moulded components enable mass-production and even keener pricing of the Rain Backup in a Box. The float switch is provided with 15 metres of cable and is connected under the right hand panel.

The **Rain Backup in a Box[®]** is fitted inside the building where the occupiers can, when rainwater has run out, hear any mains water running from the solenoid valve. It replaces a higgly piggle of components with a single wall mounted unit, one electric plug to a wall socket, mains water input and a pipe to the underground storage tank. Wall mounting is with screws through holes in the back of the cabinet.

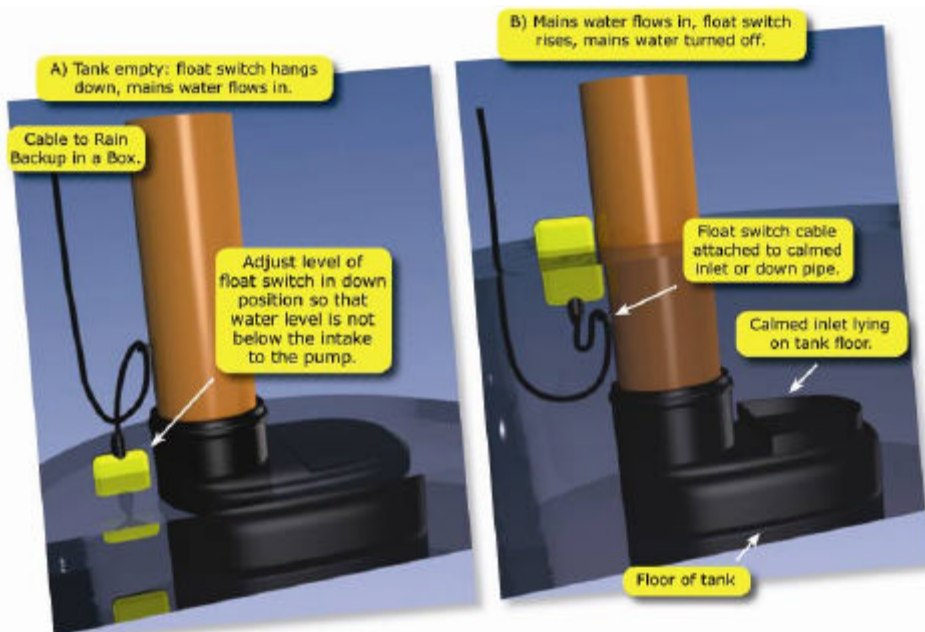
Rain Backup in a Box[®] is optimised for a direct feed system in which the appliances are kept under pressure. The alternative is a gravity feed system: enquire about the Rain Director[®] which uses less electricity, reduces wear and tear on the pump and appliances, and which ensures water supply during power cuts.

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Installation instructions

These instructions assume the separate installation of a rainwater system in the building with rainwater flowing off the roofs through a filter into an underground storage tank and a pump to take the rainwater through a separate pipe network for toilets, washing machine and outdoor use.

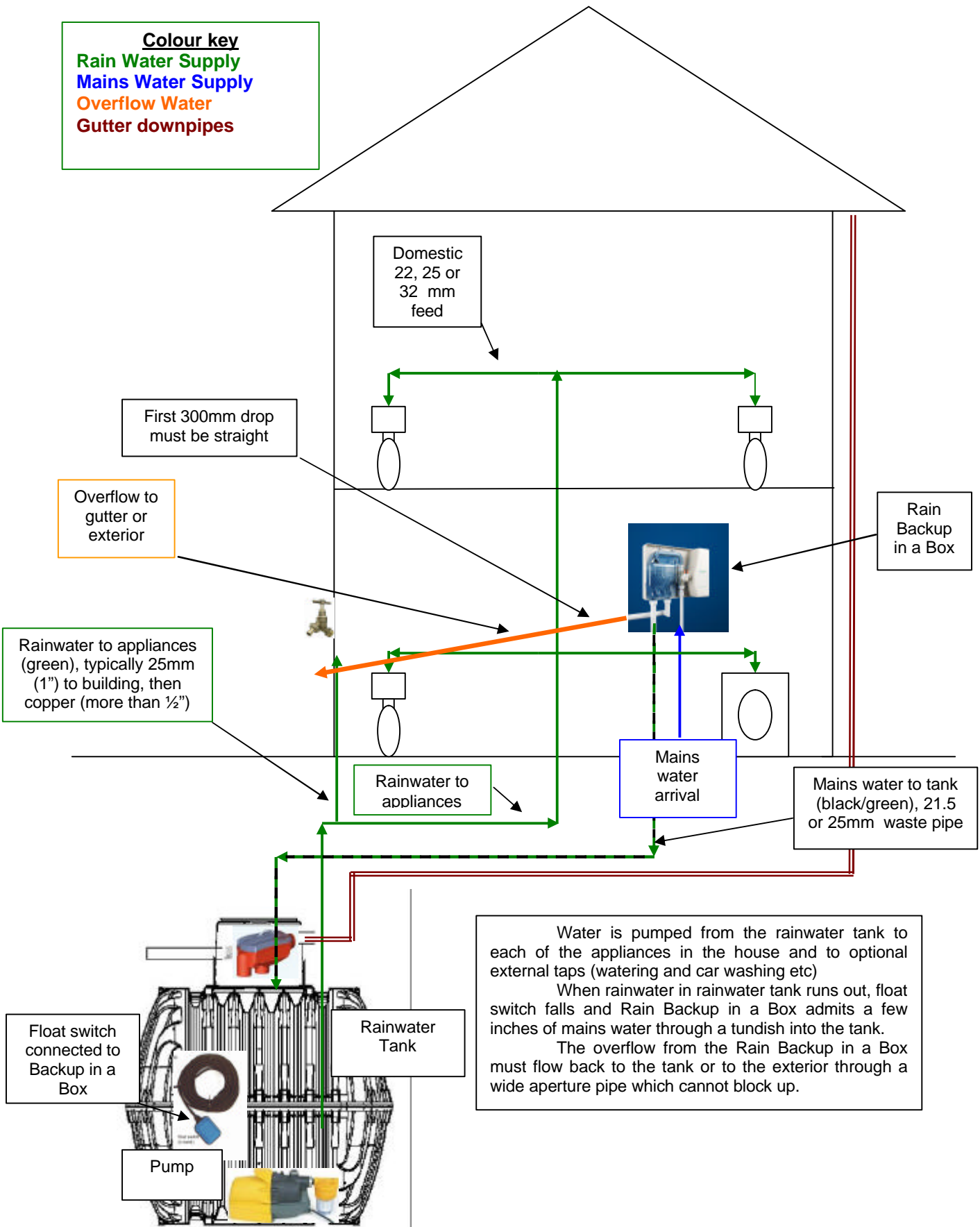
- a) Locate the best position for the **Rain Backup in a Box**[®] unit.
 - a. Inside the building where the occupiers can see and hear it,
 - b. Within a metre of a 220v AC wall socket into which to connect the plug,
 - c. Accessible to a mains water pipe, and
 - d. Above the top of the underground storage tank so that the backup mains water flows by gravity.
- b) Mount the unit securely to the wall and pipe the mains water to the inlet at the bottom left of the unit.
- c) Pipe the outlet of the tundish using 21.5mm waste pipe from the bottom right of the unit to the rainwater storage tank. **The first 300mm must be straight**; any angle close to the unit risks the water backing up and flowing back out of the tundish. In most installations this outlet can be channelled to the closest possible rainwater downpipe from the roof. This backup water supply does not have to be piped separately to the storage tank.
- d) The overflow pipe at the bottom right of the Rain Backup in a Box should flow to the exterior through a pipe which offers no constriction. It is designed to avoid flooding of the house if the pipe from the tundish to the underground tank is blocked up, and to provide a visual alert to the building occupants. Run the overflow to the exterior of the building to discharge over the ground or gully or connect to an adjacent rainwater down pipe.
- e) Channel the float switch cable to the underground storage tank. Typically this is through a service pipe made of 4 inch (110 mm) plastic which also carries (i) the mains electricity supply to the submerged pump (if so fitted) and (ii) the return pipe carrying rainwater from the storage tank back to the appliances in the house.
- f) Attach the wire of the float switch, at a point about 1 inch (25 mm) away from the float switch, with a nylon tie wrap to a suitable point near the base of the storage tank. Typically, the 4 inch (110mm) downpipe from the filter to the calmed inlet on the floor of the tank is the best securing point, or the calmed inlet itself. Either can be drilled for the tie wrap.
- g) The float switch should be positioned so that, at its lowest level, hanging down, the water level is not below the pump inlet. So, ensure that the water level at which the mains backup cuts in is above the level from which the pump draws water; this then avoids the pump sucking air and stopping.
- h) Connect the unit's 12 volt DC adapter to a 220V AC mains socket. Power should be maintained to the unit at all times.
- i) The installation is finished. Some mains water will continue to flow into the storage tank until the float switch rises.
- j) Note that the rate of refill of the rainwater tank with mains water by this product is typically slower than the water flow out of the submersible pump. If you are watering the garden and the rainwater tank runs low it is possible that the pump will shut down due to absence of water, even if the backup mains is flowing. Some pumps need a mains electricity reset (turn switch on and then off).



Consult the schematic diagram on the next page.

Plumbing Schematic: Rain Backup in a Box[®]

Colour key
Rain Water Supply
Mains Water Supply
Overflow Water
Gutter downpipes



Wiring of the solenoid: Rain Backup in a Box®

12 volt charger and float switch

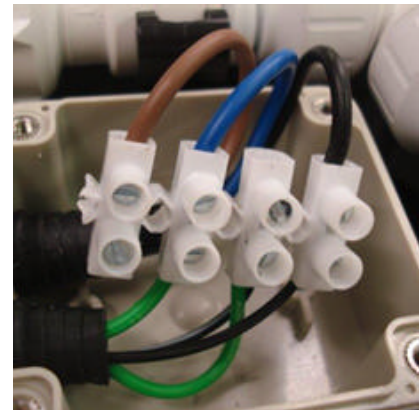
In the event any wire has to be detached from the Rain Backup in a Box, for example when pulling the float switch wire through a service pipe, we show here the wiring for the 4 pole connector strip inside the box under the coloured logo.

Notes:

The polarity of the solenoid (green) and charger (black) connections is not critical.

The brown from the float switch is not used in this application

	1	2	3	4
From float switch	Brown	Blue	-	Black
From solenoid	-	Green	Green	-
From 12v wall charger	-	-	Black	Black



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