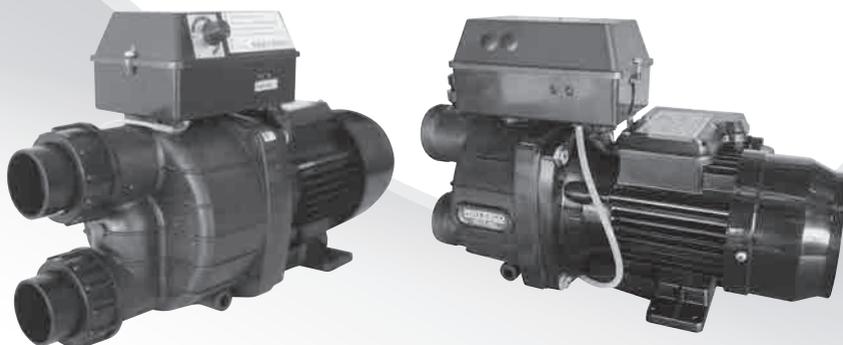


PORTAPAC / DELTA HOT

Installation and Operation Manual



WARNING

This equipment must be installed and serviced by a qualified technician. Improper installation can create electrical hazards which could result in property damage, serious injury or death. Improper installation will void the warranty.



Notice to Installer

This manual contains important information about the installation, operation and safe use of this product. Once the product has been installed **this manual must be given to the owner/ operator of this equipment.**

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IMPORTANT SAFETY INSTRUCTIONS

When using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS

- **! WARNING:** Disconnect all AC power during installation.
- **! WARNING:** In order to avoid the possibility of hyperthermia (heat stress) occurring it is recommended that the average temperature of the spa water does not exceed 40°C.
- Note: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- In certain situations unexpected start up may occur when the appliance is in automatic mode. The installer should assess the risk associated with unexpected start up of any connected device which, in any circumstance should have no hazardous effect.
- Portapac is not meant to provide safety protection for connected devices. All connected devices should have their own protection for safe operation.
- Portapac should be deactivated if the spa has been drained.
- Portapac products operate with 240 volts and must be installed by a suitably qualified person in accordance with current Australian Standards, the Australian Wiring Rules (AS3000) and local statutory authority regulations.
- Parts containing live parts, except parts supplied with safety extra-low voltage not exceeding 12V, must be inaccessible to a person in the spa.
- Parts incorporating electrical components, except remote control devices, must be located or fixed so that they cannot fall into the spa.
- The appliance should be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA.
- A terminal marked "Earth" is located inside the wiring compartment. To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply service panel with a continuous copper wire as sized to comply with current Standards and local statutory authorities in relation to the circuit conductors supplying the equipment.
- If the supply cord is damaged, it must be replaced by an authorized service agent.
- A cable connector is provided on this unit to connect a suitably sized copper conductor between this unit and any metal equipment, metal enclosures of electrical equipment, metal water pipe, or conduit within 1.5m of the unit via equipotential bonding.
- **SAVE THESE INSTRUCTIONS.**

INTRODUCTION

Thank you for choosing the Waterco Limited Portapac / Delta Hot portable spa pool and spa bath pumps designed to be simple to install and easy to operate.

The pumps have been designed to fit within the surroundings of a portable spa and are supplied with flexible electrical cable and plug for single phase power supply connection.

Air Switch Model Portapacs (Demand & Demand Elite) are supplied **WITHOUT** an Air Switch which may be purchased separately. Portapac models are available with either a 10 or 15amp electrical rating.

Waterco Limited portable spa and spa bath pumps are designed to comply with Australian Standard AS/ NZS 3136 and AS/ NZS 3350-2-41.

Portapac / Delta Hot models included in this manual include:

Air Switch Models

- Portapac Demand 10A
- Portapac Demand Elite 15A

Delta Hot

- Delta Hot Pump 50 MK2
- Delta Hot Pump 75 MK2

INSTALLATION REQUIREMENTS

- Ensure the Portapac has adequate ventilation to avoid overheating. Allow minimum 100mm free space behind the motor fan cowl for free airflow to cool the motor. If the pump is enclosed, ensure the enclosure has adequate ventilation ports to enable the hot air to escape.
- Ensure Portapac is accessible for maintenance purposes and thermostat temperature adjustment on top of the pump (where fitted).
- Ensure Portapac is located in a position which is NOT prone to flooding.
- The installation must comply to relevant electrical standards and local authority rules. Contact your electricity supply company for further information on electrical requirements.
- The external temperature sensor MUST be installed to ensure accurate and reliable operation, refer to “Installing the Temperature Sensor” on page 5 of this manual.

15A Unit to have 15A Circuit Breaker and 10A Unit to have 10A Circuit Breaker

Hydraulic Layout

When connecting the Portapac to the spa hydraulic system the following instructions must be followed:

1. Connect the pipe to the PVC half unions supplied with the pump.
2. Use minimum size 40mm pipe or larger for both suction and return hydraulic lines.
3. Portapac must be securely fixed to an adequate support to prevent vibration and stress on hydraulic lines.
4. Pipe supports must be installed to reduce load on the equipment and excess stress on the hydraulic lines.
5. Install Portapac below water level as it is NOT a self priming pump. Install suction hydraulic line without high points to prevent trapped air.
6. Minimise the use of bends (elbows) and fittings where possible.
7. The Portapac must be connected to at least two (2) separate suction points in the spa via a common line, no less than 600mm apart. Check local codes for correct installation requirements.
8. The spa suction points (pump suction hydraulic line) should be located as far below the water level as possible to prevent the pump from running dry. Spa jets (return hydraulic line) should be located well below the water level.
9. If the pump is installed below water level, shut off valves (either Waterco diverter or ball valves) should be installed on both the suction and discharge piping to prevent back flow of pool water during routine servicing of the pump and other circulation equipment.

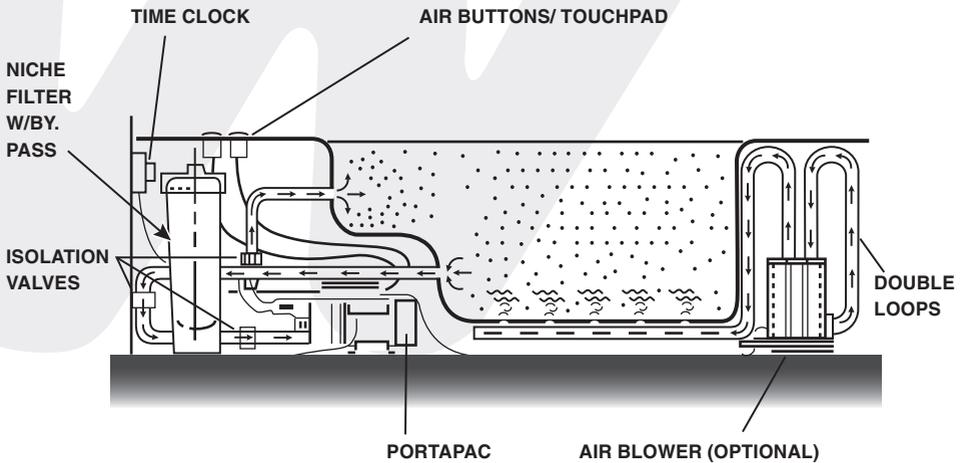


Figure 1

When a blower is installed ensure water does not enter the blower though the hydraulic lines. An electrical hazard may result. A double loop in the hydraulic line fitted prior to the blower is recommended. Consult your blower manual for further details.

INSTALLING THE TEMPERATURE SENSOR

All Portapac models are supplied complete with a temperature sensor and sensor housing. The temperature sensor / probe are an integral part for the correct operation of this equipment. If the sensor and housing are not installed correctly the Portapac will not function correctly.

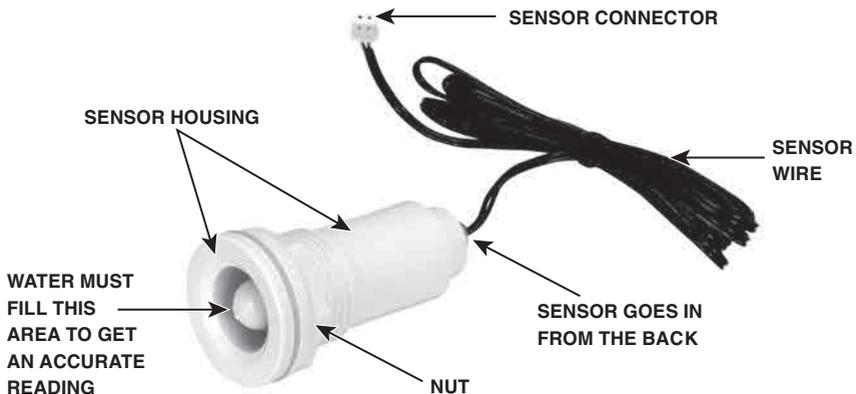


Figure 2: Temperature Sensor and Housing

Mounting Instruction (Figure 3)

1. Mark the position for the sensor housing on the wall of the spa approximately 200mm below the water surface level where there is free water flow.
2. Remove some of the thermal insulation on the rear side of the spa wall to enable access for sensor housing installation and tightening nut.
3. Drill a 30mm diameter hole in the spa wall.
4. Place the gasket on the sensor housing and insert the housing through the hole in the spa wall. Place the nut on the housing and tighten.
5. Insert the sensor probe into the housing ensuring it is pushed to the end of the probe well. The result should look similar to that shown in Figure 3.

NOTE: It may be necessary to secure the sensor in the housing. Avoid placing anything on the metal part of the temperature sensor as this will affect the accuracy of the readings.

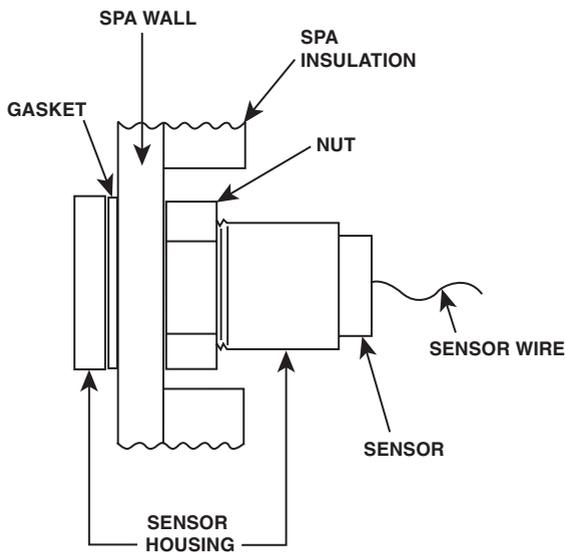


Figure 3 - Side view of installed sensor and housing

Connection Instruction (Figure 4)

Portapac Air Switch Models require connection of the sensor connector plug to the corresponding socket on the side of the Portapac control box. The sensor connector plug will only insert into the socket if they are correctly oriented.

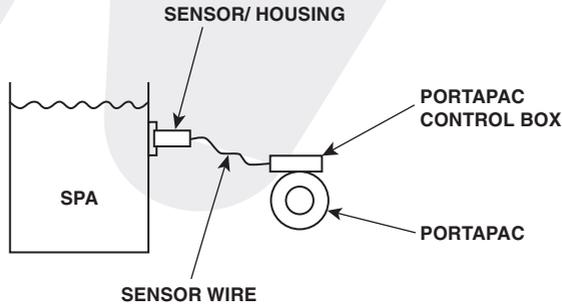


Figure 4

Do not allow the probe wire to touch the ground, metal or the motor of the pump as this can affect the temperature reading. Make sure the probe wire is not bundled up. The result should look similar to that shown in Figure 4.

INSTALLING THE AIR SWITCH

Air Switch Model Portapacs (Demand & Demand Elite) are supplied **WITHOUT** an Air Switch which may be purchased separately. Consult your air switch installation instructions. However, consider the following for all Air Switches.

1. The Air Switch must be connected to the clear flexible tube supplied with the Portapac.
2. The clear tube must remain free of kinks and blockages.
3. The Air Switch should be no further than 2.8m from the Portapac.

OPERATION – AIR SWITCH MODELS

Demand & Demand Elite

MANUAL OPERATION

Demand and Demand Elite Portapac models are controlled by an adjustable thermostat and a four-stage sequential “air switch”. The button for the air switch will most likely be located on the spa coping or timber cabinet.

When switched on at the power supply the Portapac will default into Demand Mode. Demand Mode is also the 4th press of the button.

Fully depress the “air switch” button and the Portapac will change modes in the following sequence:

Press 1 - STANDBY Mode.

Power is supplied to the Portapac but the pump, heater and blower are switched off. The power indicator light will be illuminated on the side of the control box.

Press 2 - PUMP Mode.

The Pump is switched on. The heater will automatically switch on whenever the spa temperature drops by approximately 2°C below the preset temperature. The preset temperature is set using the dial on the Portapac control box.

Press 3 - BLOWER Mode.

The blower is switched on and the heater is switched off. The pump remains operational. The heater is switched off to compensate for the electrical load drawn by the blower. This is commonly called “load shedding”.

Press 4 - DEMAND Mode.

The blower is switched off. When the spa temperature drops by approximately 2°C both the pump and heater will automatically switch on to heat the spa to the preset temperature. The preset temperature is set using the dial on the control box of the Portapac.

Demand Mode is best suited for when the spa is not being used. The Demand Cycle will keep the water at the desired temperature 24 hours a day. In some spa pool applications this may be more efficient than warming the water from cold each time the spa is used.

Note: *The use of a spa cover or blanket will help maintain spa temperature and greatly improve the efficiency of the Portapac.*

WARNING

Do not run the Portapac dry. Doing so may cause serious damage to the pump and will void the warranty.

EMPTYING THE SPA

If you intend emptying the water from the spa, disconnect the Portapac from the power supply (e.g. at the wall socket) to ensure the Portapac will not be accidentally switched on while the spa is empty. If the Portapac is run without water in the spa, serious damage or injury may result.

OVER-TEMPERATURE DEVICE (45°)

The Over-Temperature device is safety mechanism that will ensure the water in the spa do not rise above 45°C. If for any reason the water inside the Portapac reaches 45°C, the Over-Temperature device will automatically shut down the Portapac and the Power Indicator Light (1) will begin blinking.

If this scenario occurs, the cause of the problem must be identified and repaired (refer to Troubleshooting on page19). Once resolved the small RESET button located on the side of control box on top of the Portapac (shown in figure 8) should be pressed.

This should be done whilst power to Portapac is off and only done after water in Portapac has cooled below 40°C. After a short delay the Portapac will be ready for operation again. If the problem has not been resolved, the Over- Temperature device will automatically shut down the Portapac again.



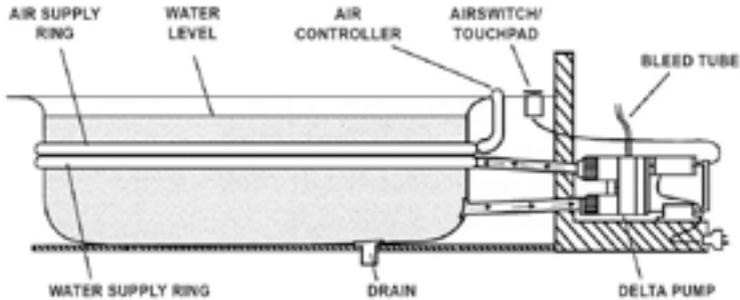
Figure 8 - Portapac Control Box

⚠ WARNING

This safety device indicates a significant fault in the spa system and should not be ignored or tampered with.

SPA BATH (DELTA PUMPS ONLY)

Installation



To comply with health regulations and to prevent stagnant water from forming in the system, the bath pump must drain fully after **EVERY** use.

The **pump** suction port must be 5mm to 10mm above **bath** suction port. This will enable the pump and pipe work to drain all the water to the bath drain. (illustrated above).

As per the Australian Standard **AS3000** clause **6.3.7.2(b)** the unit must be connected to a 30 mA Residual Current Device (**RCD**).

The pump must be accessible for maintenance and must be installed so it will not be subject to either flooding or overheating.

DELTA PUMP AIR BLEED ASSEMBLY

In some situations the outlet pipe may slope up toward the pump.

This may cause an air lock inside the pump when filling the spa bath. In this case for correct operation the air bleed valve should be changed to the open position.

To change the air bleed valve to the **open** position:

DELTA COLD PUMP

- (a) Remove the transparent seat by removing the screws.
- (b) Lift up the poppet and turn it upside down so the o-ring is up.
- (c) Replace the seat and secure the screws (refer above)

DELTA HOT PUMP

- (a) Unscrew the cap.
- (b) Lift the poppet and turn it upside down so the o-ring is up.
- (c) Screw the cap firmly back on.
- (d) Fit the bleed tube to the seat (refer above)

WATER CHEMISTRY

All Waterco Limited portable spa and bath pumps have been designed to withstand the harsh environments of spa or bath systems. Non corrosive (non metallic) materials are used extensively, however metal parts are used in the heater element.

The heater element can be damaged due to incorrect chemical balance of the spa water. It is very important to maintain the chemical balance of your spa. By doing so you will help prevent corrosion of the heater element and ensure a long, trouble free life.

The chemical balance of water is a relationship between its pH, total alkalinity, calcium hardness and water temperature. Testing kits are available to test water yourself or alternatively a professional pool and spa shop can test your water to ensure that it is chemically balanced in accordance with the Langelier saturation index.

Chlorine levels should not exceed **5.0ppm** and have an ideal range of between **1.5ppm & 3.0ppm**. It is recommended that in water that exceeds 30°C, you should use bromine as an effective sanitizer with a similar concentration to chlorine.

High levels of chlorine, bromine and ozone may corrode the heater element and stainless steel components as well as the pump mechanical seal.

Extremely hard water above 300ppm of calcium with a high pH level can cause scaling of the heater element. This will cause a reduction in heating efficiency.

NEVER ADD CHEMICALS TO YOUR SPA VIA YOUR SKIMMER BOX.

When adding chemicals always mix them into a bucket of water and evenly disperse the mixture over the spa surface.

The water must be maintained at all times to the following

pH Level	7.2 - 7.8
Total Alkalinity	80 - 150 ppm
Calcium Hardness	150 - 300 ppm
Langelier Saturation Index	-0.2 to +0.2

Failure to meet these requirements may void the warranty.

WARNING

KEEP CHEMICALS OUT OF REACH OF CHILDREN.

TROUBLESHOOTING

The spa pump should only be serviced by qualified service technicians. However, some problems can be checked and rectified by the owner before making a service call.

FAULT	POSSIBLE CAUSE	ACTION
Portapac will not run	No power	Check the flexible electrical supply cord is plugged in and not damaged.
	Blown fuse	Check the power circuit fuse or circuit breaker has not blown or tripped.
	RCD tripped	Reset RCD.
	Pump impeller jammed	Call service.
	Motor burnt out	A strong smell of plastic will be present if burnt out. Call service.
	Air switch	Check air tube is connected and not blocked/ kinked (air switch models only).
	Touch pad	Check electronic touch pad is connected to Portapac. If not, call service.
	Over-Temperature Device tripped.	See " Over-Temperature Device tripped " below.
Constantly Flashing Heater Indicator Light (touch pad models)	Over-Temperature Sensor not properly connected.	Call service to check Over-Temperature Sensor connections.
Over-Temperature Device tripped	Water inside Portapac reached, and stayed at, 45°C (spa water still cold)	Check for and remove blockages in the filter and pipe-work. Call service to check for blockages in the impeller. Press Over-Temperature RESET.
	Water in spa reached 45°C	Properly secure sensor in housing (refer to " Installing the Temperature Sensor "). Press Over-Temperature RESET.
Over-Temperature Device tripped shortly after power-up	Over-Temperature Sensor not connected or faulty	Call service to connect or replace.
Heater will not operate	Water level too low	Add water to operate pressure switch.
	Faulty element	Call service.

FAULT (cont)	POSSIBLE CAUSE (cont)	ACTION (cont)
Water temp too low	Thermostat setting too low	Rotate clockwise to increase temp.
	Temperature sensor not operating correctly	Properly secure sensor in housing (refer to "Installing the Temperature Sensor"). Call service to replace if sensor is faulty.
	Faulty element or switch	Call service.
	Temperature Sensor not operating correctly	Properly secure sensor in housing (refer to "Installing the Temperature Sensor").
		Air switch models - Plug Temp Sensor into side of control box or replace if faulty.

 WARNING

If the Waterco Limited Product is within the stated warranty period and you experience faults always contact your supplier or the nearest Waterco Limited branch for advice. Failure to do this may void the warranty. Refer to Warranty Terms and Conditions supplied with the pump.

All electrical work is to be carried out by an Authorised Electrician. Under no circumstances should you attempt repairs on the electrical components of Waterco Limited products unless you are qualified to do so.

TECHNICAL SPECIFICATIONS

Model	Max. Amps	Pump HP	Heater kW	Blower Max. kW	Aux Max. kW	Operating Temp °C
Demand	10	1	1.6	1.2	X	20 - 40
Demand Elite	15	1.5	2.4	1.2	X	20 - 40
Delta Hot						
50	10	0.5	1.6	X	X	40°C
75	10	0.75	1.6	X	X	40°C

If the water temperature is below the operating temperature of the Portapac, the Portapac will run in Demand Mode until the set temperature is reached.

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