atlantic
Experts in **Electric Heating and Hot Water**

GROUPE ATLANTIC
UK, ROI & NORTH AMERICA DIVISIONS

CALYPSO

INSTALLATION MANUAL

All electrical appliances produced for the Company are guaranteed for one year against faulty material or workmanship. This applies only if the appliance has been used for purposes in accordance with the instructions provided and has not been connected to an unsuitable electricity supply, or subject to misuse, neglect, damage or modified or repaired by any person not authorised by the Company. This guarantee is offered to you as an extra benefit and does not affect your legal rights. The correct electricity supply voltage is shown on the rating label attached to the appliance. Reasonable care has been taken to ensure that this guide is accurate at the time of printing. In the interest of progress the Company reserve the right to vary specifications from time to time without notice.

10 / 2026
UIN 248735 A06

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This manual is to be left with the end user as it includes instructions for maintenance, troubleshooting, after sales service, and is used as a service record. The products included in this manual have been independently confirmed to comply with BS EN 12897: 2016.

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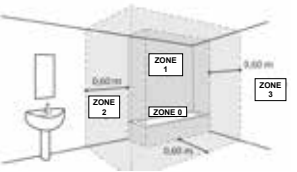
WARNINGS

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. Children should be supervised to ensure that they do not play with the appliance. This appliance can be used by children aged from 3 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision. Children aged from 3 to 8 years are only allowed to operate the tap connected to the water heater.

INSTALLATION:

CAUTION: Heavy product, handle with care:



1/ Install the appliance in a frost-free room. The appliance is not covered by the warranty if it is permanently damaged as a result of overpressure caused by the expansion relief valve being blocked.
2/ Ensure that the floor can support the weight of the appliance filled with water.
3/ If the appliance has to be installed in a room where the ambient temperature is constantly higher than 35°C, then provide ventilation for this room.
4/ In a bathroom, do not install this product in Zone 0, Zone 1 or Zone 2 designated areas. Any low voltage equipment installed into zone 1 or zone 2 needs a minimum rating of IPX4. Electrical wiring can be routed through zone 2.
5/ This product is intended to be used at a maximum altitude of 2,000 m.
6/ Place the appliance in an accessible location.
7/ Refer to the installation drawings in the Installation chapter.
8/ The water heater must be fixed to the floor (in accordance with article 20 of EN 60335-1) using the fixing system provided for this purpose.
9/ The HPWH installation must be in accordance with the relevant requirements of the Building Regulations, IET Wiring Regulations and the Water Fitting Regulations (England and Wales) or Water Byelaws (Scotland).
10/ Calypso is covered by Section G3 of the Building Regulations (England and Wales) Technical Standard P3 (Scotland) and Building Regulation P5 (Northern Ireland). Compliance can be achieved via a Competent Person Self Certification Scheme or notification of installation to the Local Authority Building Control Department. It must be installed by a competent person as defined by the relevant regulations. Manufacturers notes must NOT be taken as over-riding statutory obligations.
11/ Calypso is factory fitted with a temperature & pressure relief valve that must not be used for any other purpose or removed.

12/ Calypso is factory fitted with an immersion heater with thermal cut outs. Immersions without thermal cut outs must not be fitted.
13/ This product has been manufactured using many recyclable materials, including the approved HCFC/CFC free polyurethane foam insulation. At the end of its useful life, it should be disposed of at a Local Authority Recycling Centre, to maximize the products full environmental benefits.

14/ This product contains refrigerant gas, national rules in force concerning the handling of refrigerant gas must be adhered to. Do not use devices other than those recommended by the manufacturer, to speed up the appliance's defrosting or cleaning processes. The appliance must be stored in a room in which there are no permanent sources of ignition (open flames, gas appliance or electric heater in operation, for example). Do not pierce or burn.

CAUTION: Refrigerant fluid is odourless.

FLAMMABLE REFRIGERANT FLUID:

Any work procedure which affects safety must only be performed by competent persons who have knowledge about the particular properties and risks of R290 refrigerant.

Maintenance or repair on the hermetically sealed refrigerant circuit should be done by competent persons in accordance with industry standard safety procedures and practices for working with hydrocarbons. Specialist knowledge about handling flammable refrigerants, the correct corresponding tools and personal protective equipment are required.

Before any work takes place, leak detection must be undertaken in accordance with the procedure outlined under **2. Detecting flammable refrigerant fluid.** Failure to follow this procedure may lead to ignition due to the flammable fluid.

In case of maintenance on the refrigerant circuit, the following steps should be taken;

- Secure the area you are working in
- Inform people of the risks involved in the work
- Carry out leak detection both before and during the work.
- Ensure access to CO2 dry powder extinguisher

1. Checking the refrigerant equipment

When replacing electrical components, they must be suitable for use and meet the required specifications. The manufacturer's maintenance and servicing directives must be followed. If in doubt, contact the technical department for help. The following checks must be applied for installations using flammable refrigerant fluids:

- The amount of refrigerant charge is suited to the size of the room in which the refrigerant circuit is installed as required by EN IEC 60335-2-40
- The ventilation system operates correctly, and the openings are not obstructed

- The markings on the equipment must always be visible and legible. Any markings and identifications which are illegible must be corrected.
- The pipework and the components of the refrigerant circuit are installed in a position where it is unlikely that they are exposed to substances likely to corrode components containing refrigerant fluid, unless the components are designed from materials which are naturally resistant or protected from such corrosion
- The pipework and the components of the refrigerant circuit are installed in a way that it is unlikely that they are exposed to vibration, and that the pipe supports are appropriately spaced

2. Detecting flammable refrigerant fluid

Under no circumstances can a potential ignition source be used to search for or detect refrigerant fluid leaks. A halide lamp (or any other detector which uses a naked flame) must not be used. The following detection methods are deemed acceptable for refrigerant circuits:

- Check the circuit for leak tightness by carrying out a test of the refrigeration components with an appropriate R290 sniffer.
- The gas sniffer itself must not be an ignition source. The gas sniffer must be calibrated to R290 refrigerant and set to ≤ 25% of the lower explosive limit.
- Leak detection fluids are also appropriate for use with most refrigerant fluids, but the use of detergents containing chloride must be avoided as the chloride can react with the refrigerant fluid and corrode the copper piping.

Note: Examples of leak detection fluids

- Bubble method
- Fluorescent agent-based method
- Check whether the components of the refrigerant circuit show any signs of rust or traces of oil.
- Check the units components for wear or defective items.

3. Checking the electrical equipment

The repair and maintenance of electrical components must include initial safety checks, including a refrigerant leakage test and inspection procedures of components. If a fault which could compromise safety is found, then no power supply must be connected to the circuit until this problem is dealt with in a satisfactory manner. If the fault cannot be dealt with immediately, but it is necessary to continue the intervention, a suitable temporary solution must be used. This must be reported to the equipment owner so that all the parties concerned are aware.

The initial safety checks must include:

- That the capacitors are discharged: this must be performed safely to avoid the risk of sparks
- That no live components or live electrical cables are exposed when charging, recovering or purging the refrigerating circuit
- That there is continuity of the earth connection

4. Wiring

Check that the wiring will not be subject to wear, corrosion, excessive pressure, vibrations, sharp corners or other unfavourable effects of the environment. The check must also take into account the effects of ageing and sources of continuous vibrations such as compressors or fans.

If a refrigerant leak is suspected, all sources of ignition, including naked flames, must be immediately extinguished or eliminated.

If a leak is confirmed the area must be ventilated thoroughly until the refrigerant has been measured to be fully dissipated. The equipment should be safely moved outdoors with no ignition sources within 6metres of the equipment.

At the end of the product lifecycle, disposal of the product should be undertaken in accordance with WEEE Directive 2012/19/EU.

WEEE DIRECTIVE 2012/19/EU
Waste Electrical and Electronic Equipment Directive

- At the end of the product life, dispose of the packaging and product in a corresponding recycle centre.
- Do not dispose of the unit with the usual domestic refuse.
- Do not burn the product.
- Remove the batteries.
- Dispose of the batteries according to the local statutory requirements and not with the usual domestic refuse.

MAINTENANCE:

Modifications should not be made to this product. Replacement parts, including immersion heaters, should be purchased from Atlantic, or agents approved by them. Unvented hot water storage vessels need regular routine checks, and these are detailed below. It is for this reason that this manual must always be left with the Calypso.

It is essential that these checks be carried out at the time of heat pump maintenance by a qualified installer:

1. Manually open the relief valves in turn, and check that water is discharged from the valves and runs freely through the tundish and out at the discharge point. Ensure that the valves re-seat satisfactorily. (Note - the water may be very hot).

2. It is important to check that the discharge pipework is carrying the water away adequately. Check for blockages etc. if it is not.

3. Isolate the cold supply to the cylinder. Remove the inlet control valve. Inspect the mesh filter on the inlet side and remove any debris.

4. Check the charge pressure in the expansion vessel and re-charge if required

5. Re-fill the system and ensure that all relief valves have re-seated.

6. The Benchmark Service Record should be updated at each service.

7. Check the water pressure downstream of the combination valve is 3 bar in static condition.

The Registered Installer is responsible for the safe installation and operation of the system. The installer must also make his customer aware that periodic maintenance of the equipment is essential for safety. Maintenance periods will vary for many reasons.

Atlantic recommend a maximum of 12 months to coincide with heat pump maintenance. Experience of local water conditions may indicate that more frequent maintenance is desirable, eg, when water is particularly hard, scale-forming or where the water supply contains a high proportion of solids, eg, sand.
After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of this document.

HYDRAULIC CONNECTION:

This unit is supplied with an inlet control group. The pressure reducing valve is set at 3.0 Bar and the expansion relief valve is set at 4.5 Bar. This must be fitted to the water inlet pipe in a frost-free environment.
The Inlet control group supplied with this product will stand a maximum mains pressure of 16 Bar. We advise that if the mains pressure is consistently above 6 Bar consider fitting another pressure reducing valve (PRV), and if the mains pressure is greater than 9 Bar fit another PRV. Adjustable PRV's are available. The additional PRV's need to be fitted upstream of the inlet control group and in multiple occupancy sites may be fitted as a whole site solution.

The expansion relief valve can be coupled with the TPRV discharge pipework prior to the tundish. This way any discharge should run away out of the building.

Discharges from the expansion relief valve usually indicate a fault which needs to be addressed. For example the expansion vessel charge pressure is too low.

If the discharge is hot and continuous, turn the power off, but do not turn off the cold water to the appliance until the discharge is cold.

Note: The discharge should stop by itself as the discharge cools.

However, in both cases you must call the registered installer / a suitably qualified, competent tradesperson, advise them that you have an unvented cylinder and request a maintenance visit.

DO NOT, at any time, tamper in any way with the safety valves or overheat thermostats.

There is a port on the inlet control group which can be used to connect the expansion vessel. In any case the expansion vessel should be fitted here or between the inlet control group and the cylinder.

The Calypso is supplied with a drain elbow. This should be fitted to the cold water supply connection to enable draining the cylinder.

IMPORTANT - DRAIN DOWN PROCEDURE:

1. Switch off the HPWH.
2. Open the nearest hot tap and run all hot water until cold, then close it.
3. Close the incoming cold main at the stop tap
4. Hold open the pressure and temperature relief valve until water stops discharging into the tundish and leave it open
5. Open the cold taps starting from the highest point and working down to the lowest tap, leaving them open
6. When the cold taps have stopped draining, open the hot taps starting from the highest and working down to the lowest tap
7. Open the drain cock and ensure the pressure and temperature relief valve is held open until the cylinder is empty

Note: The cold supply elbow c/w drain tapping must be to the cold water tapping. A flexible hose can then be connected to the drain tapping. The cylinder contents can be drained to the tapping level. This is adequate for all servicing requirements. If the cylinder is being disconnected and removed then it may be tilted to drain any water remaining in the cylinder.

ELECTRICAL CONNECTION:

WARNING: Do not attempt the electrical work unless you are competent to do so.

Before removing the cover, ensure that the power supply is switched off to avoid any risk of injury or electric shock. The electrical installation must include an all-pole cut-out device (circuit breaker, fuse) upstream of the appliance in accordance with BS 7671 Requirements for electrical installations. The appliance requires protection which can be provided by a 30mA Residual current device. Please refer to the wiring diagrams on the back of the cover.

Connection to ground is compulsory. A special terminal, designated ⏚, is provided for this purpose. Ensure local isolation is provided within 1m (Double check with the commentor).

DESCRIPTION

1. Technical Characteristics

Product Details			
Product reference		CALYPSO 2 FS 172L	CALYPSO 2 FS 210L
Model Code/Number		876608	886131
Product Name		ATL CV5 STAINLESS STEEL FS 172L	ATL CV5 STAINLESS STEEL FS 210L
Heat Pump Performance			
Air operating range (ducted configuration)	°C	-5 °C to 43 °C	
Air operating range (Ambient air configuration)	°C	5 °C to 43 °C	
Achievable hot water temp via heat pump	°C	62	
Max. electrical power input (heat pump AND immersion)	W	600 + 1600 = 2200	
Max.Thermal power output from heat pump ONLY at 45°C	W	2500	
Air flow	m³/h	Nominal air flow 400m3/hr to 240m3/hr with associated maximum ducting pressure drop 50Pa to 175Pa.	
Sound power level	dB(A)	47	
Refrigerant	/kg	R290/0.15	
Air ducting method		Separate inlet & outlet to exterior	
Coefficient of performance (M profile, 7°C)	-	2.98	3.11
Energy efficiency (ηwh)	%	125.2	131.8
Heating time from cold (10°C to 54°C)	h	6h08	7h01
Standing power input	W	18	19
Maximum usable hot water volume (V40, EN16147(2017))	litres	229.9	265.1
Presure loss during test	Pa	46	41
Airflow during test	m3/h	287	385
Coefficient of performance (L profile,7 °C)	-	3.35	3.37
Energy efficiency (ηwh)	%	138	139
Heating time from cold (10°C to 54°C)	h	6h10	7h08
Standing power input	W	17	17
Maximum usable hot water volume (V40, EN16147(2017))	litres	225.5	265.5
Presure loss during test	Pa	45	40
Airflow during test	m3/h	289	334

Dimensions and Connections			
Dimensions	mm	1716 x 600 x 650	1906 x 600 x 650
Weight with packaging	kg	69	73.5
Weight without packaging	kg	62	67
Weight Full	kg	233	269
Air duct diameter	mm	160	
Max. ducting pressure drop		50Pa @ 400 m³/hr	
		175Pa @ 240m³/hr	
Water connections	mm	3/4''	
Condensate tube	mm	16 int / 20 ext	
Average condensation production at 7°C - 86% RH	L/h	0.32	
Electrical supply (nominal voltage)	V	220-240V 50Hz +15%/-10%	
IP rating		IPX1B	
RCBO/MCB Type C	Amp	16	
Hot Water Cylinder			
Body Material		Stainless steel	
Insulation thickness (cylinder body to case)	mm	72	
Maximum water supply pressure	bar	12	
Maximum inlet pressure (pressure regulator)	bar	3.0	
Maximum design pressure (expansion relief pressure)	bar	4.5	
Temperature and pressure relief valve (EN1490)	°C	90	
	bar	6	
Integrated electric Immersion	W	1600	
Max temperature with immersion	°C	62	
Over heat thermostat operating temperature	°C	80 +/-5	
Cylinder Capacity	litres	172	202
Heat loss	W	50	55
	kWhr/24h	1.20	1.31
Expansion vessel size	litres	22	22
Expansion vessel pre-charge	bar	3	
Approvals		KIWA Building regulations, KIWA Water regulations, WRAS. (applications in progress)	
Accessories		Ventilation fitting	
Guarantee		5 years Tank, 2 years other components	

2. Declaration of conformity

This device complies with the following directives:

- 2014/35/EU with respect to low voltage
- 2014/53/EU with respect to RED (Radio Equipment Directive), as supplemented by (EU) 2022/30
- 2014/30/EU with respect to electromagnetic compatibility (EMC)
- 2015/863/EU and 2017/2102/EU with respect to restricting hazardous substances (RoHS)
- 2013/814/UE supplementing Ecodesign directive 2009/125/EC
- Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023

States that the product complies with the essential requirements of directive RED 2014/53/EU, as designated below:

Designation:	Heat Pump Water Heater
Type :	BLE AND WIFI 2400 A 2483.5 MHz RADIO TRANSMITTER-RECEIVER

Hereby, CICE (Fontaine site) and ATLANTIC (La Roche-sur-Yon site) declares that the radio equipment type reference below is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

https://bit.ly/calypso-2-hot-water-heater

Description: Floor Standing thermodynamic water heater
Models: 172l and 210l

Specifications:
Radio frequency bands used by the Transmitter-Receiver:
Wi-Fi 2.4G: 2400 MHz to 2483.5 MHz
BLE: 2400MHz to 2483.5MHz
Maximum radio-frequency output WIFI: <20dBm
Maximum radio-frequency output BLE: <10dBm

Class 2 radio equipment: can be marketed and commissioned without restriction.
Radio range: from 100 to 300 metres in free field, variable according to the linked equipment (the range may be affected by the installation conditions and the electromagnetic environment).

Software version: IHM : HM009 SF HWNM11 DHW

3. Safety instructions

Installation and commissioning work on heat pump water heaters can be hazardous due to high pressures and live parts.

Heat pump water heaters must be installed, commissioned and maintained by trained and qualified personnel only.

4. Transportation and storage

Please follow the transportation and handling recommendations shown on the water heater packaging.
We will not be liable for any product defect resulting from product transportation or handling that is not in accordance with our recommendations.
Stacking this product is strictly forbidden.

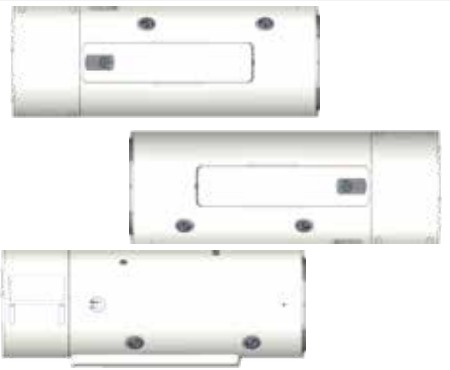
5. Packaging contents

Item	Description		Qty
1	Calypso 2 HWHP		1
		Pressure and temperature relief valve (supplied fitted to comply with UK Building Regulation G3*) -Opening pressure of P & T Relief Valve 6 bar -Opening temperature of P & T Relief Valve 90°C	1
		1600w Immersion Heater (inc. O-ring seal)	1
		PCB Connectors (PV)	2
		Floor attachment bracket with screws	1
		Installation instructions	1
Item	**Description**		**Qty**
2	Calypso Hardware Pack (Inc. G3 Kit)		1
		Cold water inlet PRV combination valve/expansion relief -Maximum inlet pressure to16 bar -Operating pressure (PRV setting) 3 bar -Expansion relief valve setting 4.5 bar	1
		Tundish	1
		Set (four parts packaged) consisting of: 2 x compression nuts - 22 mm 2 x copper olives - 22 mm	1
		90 degree drain elbow	1
		Compression 22 mm X 3/4 inch fitting	2
		Expansion vessel/mounting bracket -Expansion vessel charge pressure 3 bar	1

6. Handling

The product has several handles in order to facilitate handling to the installation site.

To transport the water heater to the installation site, use the top and bottom handles.

	
☺ Accepted transport position	☹ Prohibited positions

Respect the transport and handling recommendations which appear on the packaging of the water heater.

Ensure that the control display remains pointed upwards and the product is not rotated leaving the control display facing to the side or towards the ground.

Please follow the transportation and handling recommendations shown on the water heater packaging. The front column must always remain on top when carrying horizontally.

7. Manual handling

Description

Manual handling means any transporting or supporting of a load (including lifting, putting down, pushing, pulling, carrying or moving) by hand or bodily force.

Scope

This assessment will cover the largest unit within each product range.

For specific weights and dimensions please refer to technical data section.

Main Hazards

Vision may not be clear due to the size of the products.
Adopting an incorrect method of lifting may cause injury, attempting to lift these products will require help from others. (Team lifts)

Control Measures

Manual lifting procedure

The lift, key factors in safe lifting are:

a. **Balance**
b. **Position of back**
c. **Positioning of the arms and body**
d. **The hold**
e. **Taking the lead for team lifts**

a. **Balance -** Since balance depends essentially upon the position of the feet, they should be apart about hip breadth with one foot advanced giving full balance sideways and forward without tension. In taking up this position, lifting is done by bending at the knees instead of the hips and the muscles that are brought into use are those of the thigh and not the back.

b. **Position of back** - Straight - not necessary vertical. The spine must be kept rigid, this coupled with a bent knee position, allows the centre line of gravity of the body to be over the weight so reducing strain.

c. **Positioning of arms and body** - The further arms are away from the side, the greater the strain on the shoulders, chest and back. Keep elbows close to the body arms should be straight.

d. **The hold** - Before lifting ensure you have a good hold.

e. **Taking the lead for team lifts**- As more than one person is required for these products ensure that one person is taking the lead. **This may be you** so ensure that each person that is helping is made aware of the weight and of the items listed within this assessment. Make sure you and any others helping know the route you intend to take that it is clear of any obstructions. Never jerk the load as this will add a little extra force and can cause severe strain to the arms, back and shoulders. If there are steps involved decide on where you will stop and take a rest period. Move smoothly and in unison taking care to look and listen to others helping with the lift. Where possible use a sack truck to move the product over long flat distances, only lift the products when necessary. If in doubt stop and get more help.

Individual capability

Individual capability plays an important part in handling these products. Persons above average build and strength will find it easier and should be in good health. Persons below average build and strength may require more rest periods during the handling process.

Pregnant women should not carry out this operation.

Persons who are not in good health should seek medical advice prior to commencing any lifting or manual handling operation.

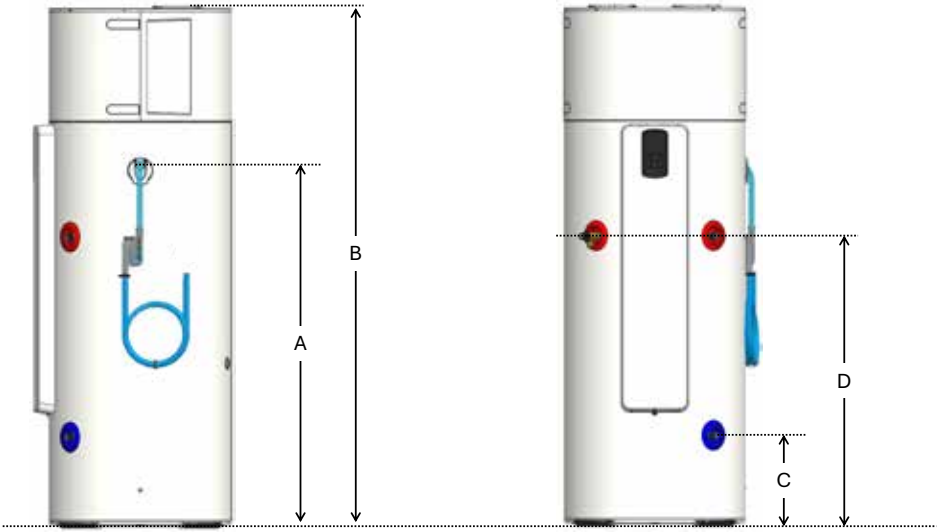
Residual risk

Following the guidelines given above will reduce any risk to injury.

All persons carrying out this operation must be fully trained and copies of the specific risk assessment made available for inspection and use in their training process.

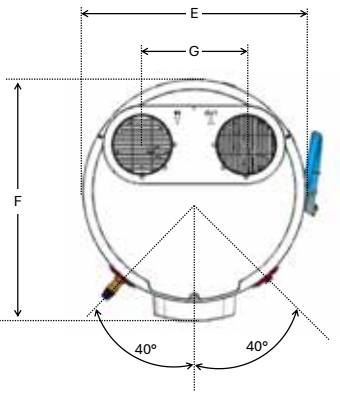
Further guidance on Manual Handling can be obtained from the Health and Safety Executive. Manual Handling Operations Regulations 1992 (amended by Health and Safety (Miscellaneous Amendments) Regulations 2002.

8. Dimensions



REF	MODEL	172L	210L
A	Condensate outlet	1200	1390
B	Total height	1716	1906
C	Cold water inlet	300	
D	Hot water outlet	950	1150
E	Total width	600	
F	Total depth	650	
G	Outlet centre distance	280	

Dimensions (mm)



9. Installation

INSTALLATION

The water heater must be fixed to the floor (*in accordance with article 20 of standard EN 60335-1***) using the fixing strap provided for this purpose.**

The Calypso product must be ducted to provide the necessary air inlet and air exhaust connections. Typically, the air connections are ducted to the outside of the building however it is possible to extract air from another space that must not be within the thermal envelop of the building, i.e. an insulated loft space or garage that is adequately ventilated.

Irrespective of the selected installation configuration, the installation site must comply with protection index IP X1B, in accordance with the requirements of BS 7671.
The floor must be able to support a minimum load of 400 kg (*surface area underneath the water heater*).

Failure to follow the installation recommendations may cause the system to underperform.

Leave a 500 mm space in front of the electrical equipment and at least 100 mm of space in front of the hydraulic equipment, in order to grant access to the water heater for periodic maintenance.

The maximum pressure drop across the appliance must be respected when designing the air inlet and air exhaust ducting routes

All ducting must be installed and insulated effectively by a component person to ensure correct operation of the appliance and that no condensation forms on the ducting routes. The appliance manufacturer will not take responsibility for poorly designed or fitted ducting installations.

10. Hydraulic connection

Installing a secondary circulation loop on the appliance is prohibited. If the appliance fails on an installation with looping, the warranty does not apply. For more information, please contact the after-sales service.

The highest hot or cold water draw off point should not exceed 10 metres above the Pressure Reducing Valve.

An ascending spray type bidet or any other appliance with a Class 1 back-syphonage risk requiring a type A air gap should not be used.

If the supply to the mixer fittings (other than a dual outlet type) is not taken from the balanced supply the system will become over pressurized and cause the pressure relief valve to discharge. Over time this could also cause the premature failure of the appliance itself which will not be covered by the warranty

In larger properties with a number of bathrooms/en-suites and long pipe runs we would recommend that the balance cold supply is provided with its own pressure reducing valve and is not taken from the balanced cold connection on the combination valve. In this case it will also be necessary to fit a small expansion vessel on the balanced cold water system to accommodate the pressure rise caused by the increase in temperature of the balanced cold water.

Check the performance requirements of the terminal fittings with regard to flow/ pressure are suitable.

In relation to potable water systems, expansion vessels shall be installed in a vertical orientation and located so that the length of the connecting pipe work is kept to a minimum.

Aerated taps are recommended to prevent splashing.

Any type of shower mixing valve can be used as long as both the hot and cold supplies are mains fed. However, all mains pressure systems are subject to dynamic changes particularly when other hot and cold taps/showers are opened and closed, which will cause changes in the water temperature at mixed water outlets such as showers. For this reason and because these are now no more expensive than a manual shower we strongly recommend the use of thermostatic showers with this appliance. These must be used in 3 storey properties where the impact on pressure/temperature of opening another tap in the system is greater than normal. The shower head provided must also be suitable for mains pressure supplies.

The cold water inlet is marked with a blue flange, the hot water outlet with a red flange. Both water connections have a Male 3/4'' BSP thread.

Plastic Pipework

This appliance is suitable for use with plastic pipework as long as the material is recommended for the purpose by the manufacturer and is installed fully in accordance with their recommendations.

10.1. Cold water connection

Before connecting the hydraulics, check that the mains pipes are clean. Inlet control group 3 bar pressure reducing valve and 4.5 bar expansion relief valve. Also an expansion vessel must be fitted.

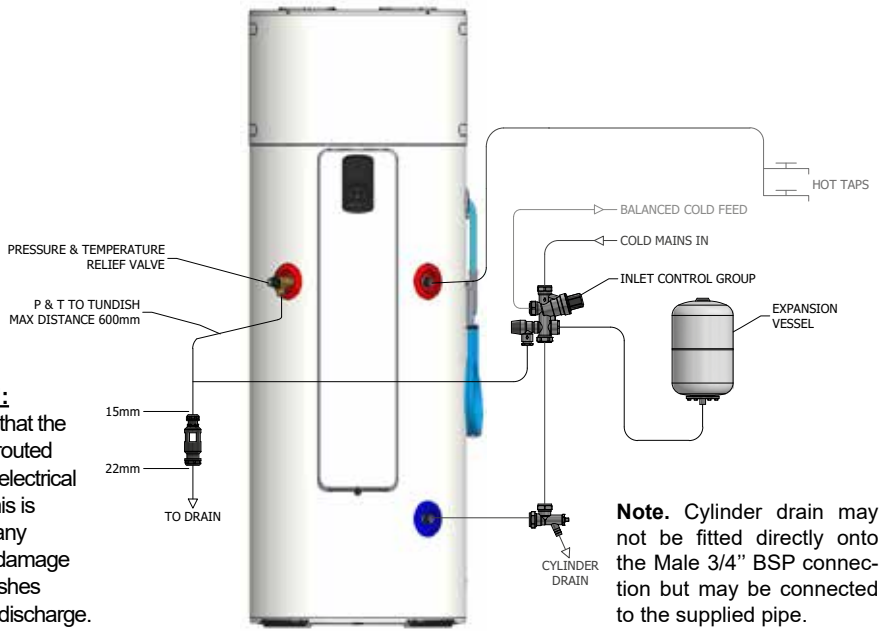
Mains Water Supply

Existing properties with a 15mm supply will be satisfactory provided the local mains pressure is good, but should be confined to single bathroom properties. For new properties where simultaneous demand is required to more than one bathroom or a bathroom and one or more en-suites, the communication and service pipe into the dwelling should be a minimum of 22mm (usually in the form of a 25mm MDPE supply). The optimum performance is achieved if the inlet pressure is 3 bar dynamic. However, the Calypso will function with lower inlet pressures, but this will reduce the performance. For optimum performance, 30L per minute incoming mains flow should be present, however the Calypso will work at lower flow rates, although performance will be affected. Normally Calypso provides well in excess of 40 litres/min in most conditions. Flow rates for ALL mains pressure systems are subject to district pressures and system dynamic loss. Particularly on larger properties with more than one bathroom, the pipe sizes should be calculated in accordance with BS EN 806-3:2006 and BS 8558:2011.

The Installation of the components supplied with the Calypso should be installed as per the schematic below.

Note. The schematic shows pipework infront of the appliance. Normally pipework will be routed behind the appliance within the 120mm service space. This prevents the panel from being trapped by the pipework.

No valve must be placed between the cylinder and the inlet control group.



CAUTION:
Make sure that the Tundish is routed away from electrical devices. This is to prevent any accidental damage due to splashes during any discharge.

Note. Cylinder drain may not be fitted directly onto the Male 3/4'' BSP connection but may be connected to the supplied pipe.

10.2. Hot water connection

WARNING: When showering or bathing water above 44°C increases the risk of serious injury, scalds or fatality. Reference HSE document HSIS6 for further information.

WARNING: Storing hot water at temperatures below 60°C can increase the risk of Legionella bacteria growth. Reference HSE document HSG274 for further information.

Recommendation: Do a risk assessment of the installation property and choose a method of control which reduces the risks arising from the above warnings. Further guidance and recommendations can be found in the Water Regulations Guide, and Building regulation part G3.

If synthetic pipes (e.g. PEX, multi-layer) are used, it is mandatory to install a thermostatic regulator at the water heater outlet. It must be adjusted according to the performance of the material used.

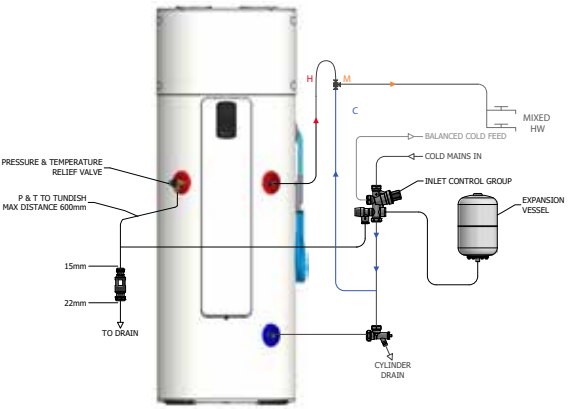
Fitting Blending Valves to the Calypso Appliances

When fitting a blending valve to the unvented appliances, it is important that the installation does not contravene the G3, WRAS and Health and Safety directives or the manufacturers recommendations. If this is the case, then the warranty should be null & void. The key requirements to comply with these regulations are:

1. Any fitting or material in contact with potable water (e.g. a blending valve) must be approved by WRAS or an equivalent body.
2. Connections or wiring arrangements must not bypass any safety devices.
3. Any expansion due to heating must not be allowed to expand back into the cold mains.
4. The settings of any safety devices must not be tampered with or adjusted.

The figure below shows the cold port of the blending valve connected to the cold water supply to the vessel after the inlet control group. It is recommended that the installer should ensure that there is no gravity circulation in the pipework connected to the cold port. If necessary, this can be achieved by fitting a non-return valve or using a thermal trap (Under sink thermostatic mixing valves and thermostatic showers are alternative approaches to control hot water outlet temperatures).

Cold port of the blending valve connected to mains supply to the vessel after the inlet control group.

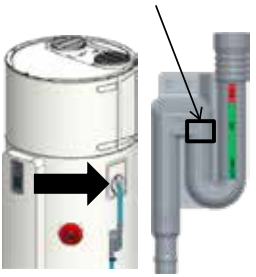


10.3. Condensates drainage

10.3.1. Implementation of the siphon

Cut the terminating end of the condensates drain pipe so that it does not create a loop in the pipe connect the end of the pipe to the waste water drain.

With the product stopped, fill the siphon with water up to the arrow via the condensates drain tube.



Please note: this operation must not be performed when installing in an ambient environment. For a ducted product, the full siphon is used to check the compliance of the ducting on the intake side.

Do not add a siphon downstream of the one already present on the product, <u>waste water discharge must be free</u>. Risk of condensates overflowing at the heat pump.

10.3.2. Use of the siphon

With the fan, compare the water level with the strip. If the level remains in the OK zone, the intake side network is good.	If the water level is in the Red (KO) zone, the extracted flow is too low. The intake side duct network is: • obstructed/crushed • and/or too bent • and/or too long

10.4. Tips and recommendations

If the drawing points are not equipped with thermostatic mixing valves, a temperature limiter must be installed at the outlet of the water heater to limit the risk of scalding.

Scale

In hard water areas it is recommended that an in-line scale inhibitor is fitted. Reducing the temperature of the stored water will reduce the rate at which scale forms. If the recovery rate is badly affected, this is an indication that scaling may have occurred. In this event, follow the procedures as recommended by a reputable Water Treatment Company.

Disinfection

If this appliance is to be installed in other than a single domestic dwelling i.e.. in an apartment block or student flats etc., the hot and cold water system will need to be disinfected in accordance with BS EN 806:4 2010 section 6.3 and the Water Regulations.
The Calypso is manufactured from stainless steel. Due to this, the use of chlorine as the disinfection agent can cause damage unless the appliance is adequately flushed and refilled with the mains water immediately on completion of the disinfection procedure.

Damage caused through a failure to do this adequately will not be covered by the warranty. For the reasons mentioned, we recommend the use of a non chlorine based disinfectant such as Fernox LP Sterox as manufactured by Cookson Electronics when carrying out disinfection of systems incorporating these appliances.

Benchmark

At the time of commissioning, complete all relevant sections of the Benchmark Checklist located on the inside back pages of this document.

This must be completed during commissioning and left with the product to meet the Warranty conditions offered by Atlantic.

10.5. Insulate the Pipework

In new systems, pipes should be insulated to comply with building regs, the maximum permissible heat loss is indicated in the table opposite, and labelled accordingly as follows:

i. Primary circulation pipes for domestic hot water circuits should be insulated through their length, subject only to practical constraints imposed by the need to penetrate joists and other structural elements.

ii. All pipes connected to hot water storage vessels, including any vent pipe, should be insulated for at least 1 metre from their points of connection to the cylinder (or they should be insulated up to the point where they become concealed).

In replacement systems, whenever a hot water storage vessel is replaced in an existing

system, any pipes that are exposed as part of the work or are otherwise accessible should be insulated as recommended for new systems, or to some lesser standard where practical constraints dictate.

Insulation of Pipework

Pipe outside diameter	Maximum heat loss
15 mm	7.89 W/m
22 mm	9.12 W/m
28 mm	10.07 W/m
35 mm	11.08 W/m

Further guidance on converting heat loss limits to insulation thickness for specific thermal conductivities is available in TIMSA “HVAC guidance for achieving compliance with Part L of the Building Regulations”.

10.6. Pressure and Temperature/expansion relief valve pipework

The temperature and pressure relief valve (TPRV) should be installed to discharge in accordance with G3 of the Approved Document of the Building Regulations and should be piped to where it is visible, but will not cause danger to persons or damage to materials.

The following information is taken from Approved Document G3 of the Building Regulations and is provided to assist with the design and installation of the discharge pipework. However, the information is not exhaustive and reference should always be made to Approved Document G3 of the Building Regulations. The final decision regarding any arrangements rests with Building Control and it is recommended that their advice is sought if you have any concerns regarding this aspect of the installation.

The two safety valves will only discharge water under fault conditions. When operating normally water will not be discharged.

The tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible and within 600mm of the TPRV.

The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal and:

a) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the TPRV, between 18 and 27m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to the table and the worked example.

An alternative approach for sizing discharge pipes would be to follow BS EN 806-2:2005

Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

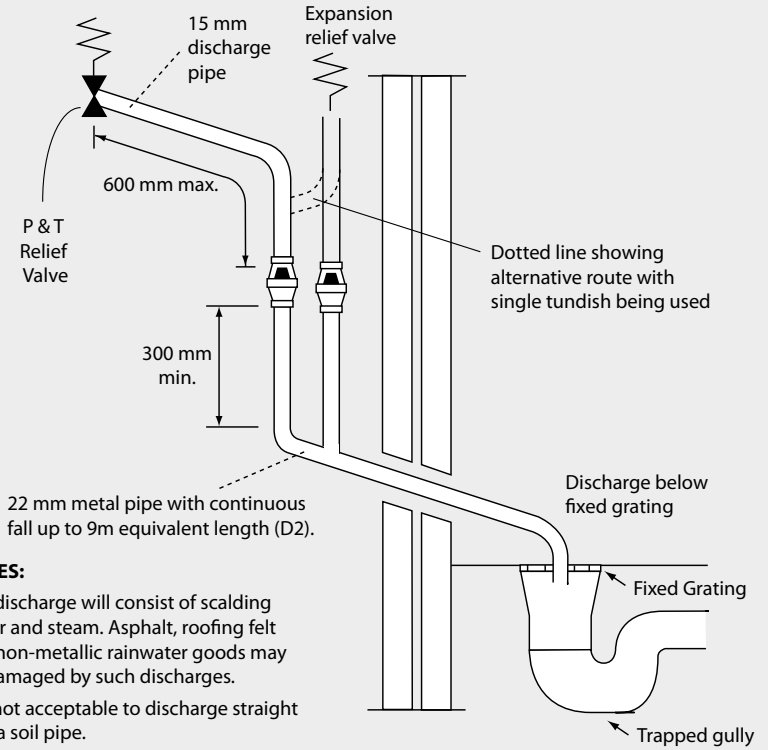
b) Have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipe work.

c) Be installed with a continuous fall.

d) It is preferable for the discharge to be visible at both the tundish and the final point of discharge but where this is not possible or practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:

1. Ideally below the fixed grating and above the water seal in a trapped gulley.
2. Downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc are acceptable providing that where children play or otherwise come into contact with discharges, a wire cage or similar guard is positioned to prevent contact whilst maintaining visibility.

Typical Discharge Pipe Arrangement



NOTES:

The discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

It is not acceptable to discharge straight into a soil pipe.

3. Discharges at a high level; e.g. into metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering systems that would collect such discharges.

4. Where a single common discharge pipe serves more than one system, it should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected.

5. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

Worked Example

The example below is for G1/2 temperature relief valve with a discharge pipe (D2) having 4 elbows and length of 7m from the tundish to the point of discharge. From the table below:

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve is: 9m subtract the resistance for 4 x 22mm elbows at 0.8m each = 3.2m.

Therefore the maximum permitted length equates to: 5.8m.

5.8m is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to: 14m.

As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

Sizing of copper discharge pipe 'D2' for a temperature relief valve with a G1/2 outlet size (as supplied)		
Size of discharge pipework	Maximum length of straight pipe (no bends or elbows)	Deduct the figure below from the maximum length for each bend or elbow in the discharge pipe
22mm	Up to 9m	0.8m
28mm	Up to 18m	1m
35mm	Up to 27m	1.4m

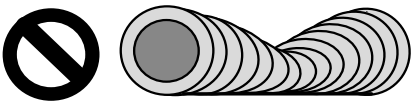
11. Air connection

The energy performance capability of the heat pump water heater is linked to the temperature of the intake air. The warmer the intake air, the better the COP (Coefficient of Performance).

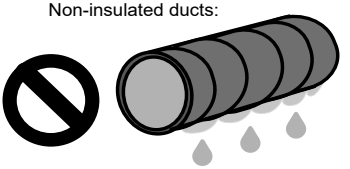
- In the case of ducting, 160 mm diameter insulated air ducts should be selected. The use of flexible ducts is by no means recommended.
- Use the template available on the water heater packaging to drill the walls.
- The accessories supplied with the thermodynamic water heater must be used.

Poor ducting (crushed ducts, excessive length or number of elbows ...) can result in reduced performance and malfunctions. **As a result, we do not recommend using flexible ducts.**

Crushed ducts:



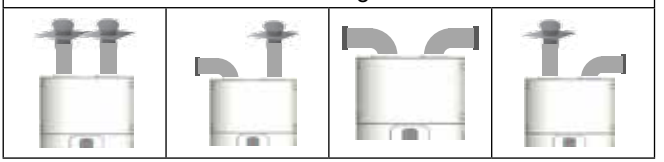
Non-insulated ducts:



The ducting scheme must be designed and installed by a competent person.

The ducting installation can be designed and installed in various directions and configurations; some examples are shown in the below diagram.

Standard configurations



The Calypso product must be ducted to provide the necessary air inlet and air exhaust connections. Typically, the air connections are ducted to the outside of the building however it is possible to extract air from another space that must not be within the thermal envelop of the building, i.e. an insulated loft space or garage that is adequately ventilated.

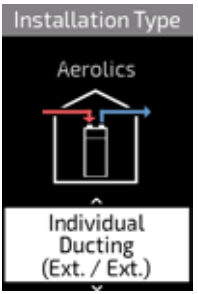
11.1. Authorised ducting

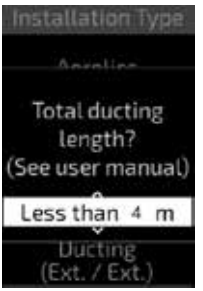
The ducting plan must be designed and installed by a competent person. Appropriate insulation must be used on all ducting components to avoid condensation forming. The total length of ducting components, straights, bends, elbows, terminals, adaptors etc must be carefully considered to ensure the minimum airflow and maximum pressure drop of the system is respected - please consult the below ducting configuration table and select the duct length setting in accordance with the ducting components and associated Minimum Airflow (m3/hr) and Maximum Pressure drop (Pa) requirements.

The example provided is for reference and a guide only. When selecting the exact ducting components to be used, please reference the technical data of the manufacturer. Always use manufacturer data for pressure drop and ensure the total pressure drop calculations are carried out by a competent person.

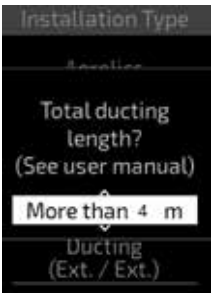
Ducting configuration

Ext./Ext. duct configuration - recommended ducting configuration for UK homes. During configuration of the product, please select the correct Duct Length from the menu screens based on the information in the table below;





OR



Selected Duct Length	Fan Speed (rpm)	Minimum Airflow (m3/hr)	Maximum Pressure Drop (Pa)
Less than 4m	1590	240	120pa
		320	80pa
		400	50pa
More than 4m	1950	240	175pa
		320	150pa
		400	100pa
Note: If the above information is unknown 'More than 4m' must be selected on the HMI during the commissioning set up in a ducted configuration.			

MVHR Mode

If the product is configured to utilise MVHR Mode, the selection for the Ducting configuration will be made automatically.

'Less than 4m' ducting parameter should only be selected where the observable ducting run terminates directly out of the wall from the Heat Pump Water Heater

The total length of the ducting must be <u>Less than 4 m</u>

For any other type of installation, the choice must be for 'More than 4 m' sheathing.

Worked example:

Air Inlet Calculations			
Component	**Pressure drop [Pa]**	**Qty**	**Total [Pa]**
Straight 1m	3.0	5	15.0
Elbow	10.0	2	20.0
Inlet terminal	30.0	1	30.0
Total pressure drop for air outlet duct plan			65.0

Air Outlet Calculations			
Component	**Pressure drop [Pa]**	**Qty**	**Total [Pa]**
Straight 1m	3.0	6	18.0
Elbow	10.0	2	20.0
Outlet terminal	30.0	1	30.0
Total pressure drop for air outlet duct plan			68.0

The total ducting calculated pressure drop is 65.0 + 88.0 = 133 Pa

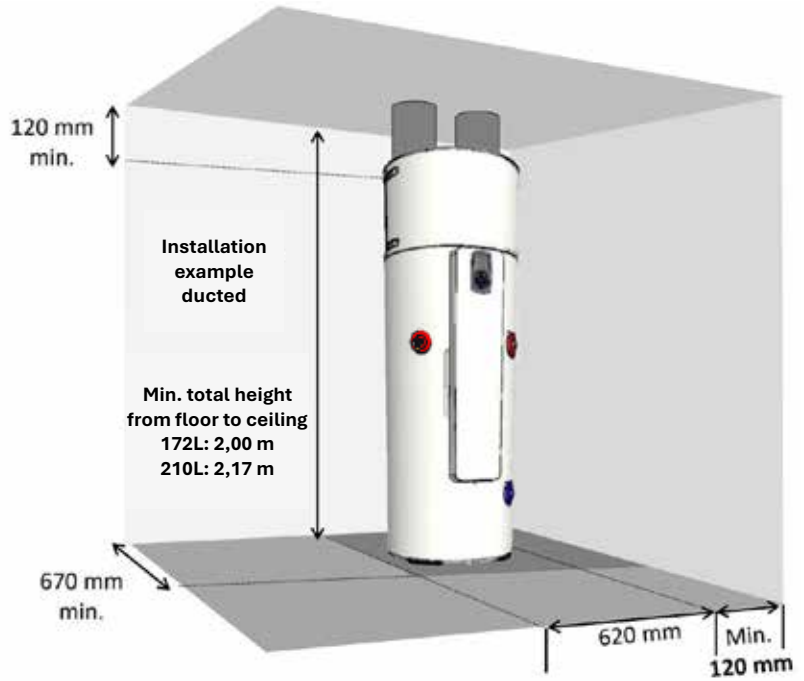
11.3. Installing the duct fitting accessory

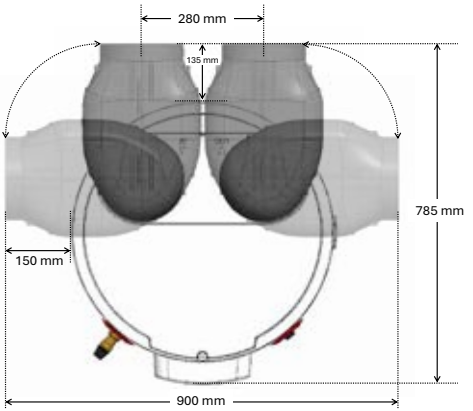
1. Go to top of product
2. Unclip the grilles
3. Fit the duct adapters (if necessary)

This operation must be performed by a qualified person with the power off (*only if ducts are used, otherwise do not dismantle the grids*).

Note: Duct adapters come in 2 parts, the duct adapters will need to be assembled by clipping the 2 parts together before they are installed on the product.

11.2. Installing the ducting connections





The wall grids must orient downwards to prevent any water ingress in the pipes.

✓ **At least a frost-free room (*T > 1°C*)**

Selected installation parameter: Outside/Outside (*see chapter 19.5*)

✓ Recommended room: living space (heat loss from the water heater is not lost), close to the outside walls. Avoid placing the water heater and/or the pipes close to bedrooms for the sake of noise comfort.

Examples of a room:

- laundry room, basement, cupboard in the entrance.

11.4. Prohibited configurations

- Water heater drawing air from a heated room.
- Shared ducting with MVHR system.
- Not at prohibited location unless it is heated.
- Ducting to the outside air at the intake and release of fresh air inside the room.
- Connection to a shallow geothermal system.
- Water heater that is installed in a room containing a natural draught boiler and is only ducted to the discharge on the outside.
- Pneumatic connection of the appliance to a tumble dryer.
- Installation in dusty rooms.
- Drawing air containing solvents or explosive materials.
- Connection to exhaust hoods discharging greasy or polluted air.
- Installation in a room subject to frost.
- Objects placed on top of the water heater.

12. Electrical connection

Please refer to the electrical connection diagrams on the back of the cover.

Only switch on the water heater after it has been filled with water.
The water heater must have a constant electrical power supply.

Qualified personnel must complete the electrical connection with the power off.
The water heater must be connected to a 230 V single phase 50Hz AC mains supply.
The electrical connection must comply with the most recent version of BS 7671 Requirements for Electrical Installations and with the current recommendations in the country of installation of the heater.
The installation must include:

√ A 16A all-pole circuit breaker (*minimum curve C*) with a contact opening of at least 3 mm.

Never directly power the heating element.

√ Protection by a 30 mA differential circuit breaker.

The safety thermostat fitted to the electric booster must not be repaired outside our facilities under any circumstances. Failure to comply with this clause voids the warranty.

13. Connecting optional equipment

To connect optional equipment, Electrically isolate the product and then:

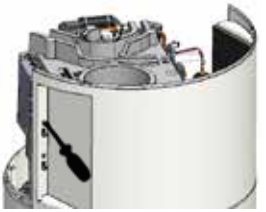
1. Remove the locking screw from the column.

2. Lift the column off the inserts at the bottom, paying attention to the control screen cable and the earth cable.

3. Unscrew the 2 rear screws on the top and then unclip it.

4. Remove the covers and unscrew the 4 screws on the front cover of the heat pump.

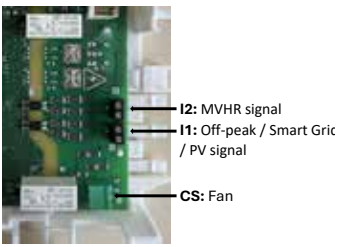
5. Tilt the cover forward.



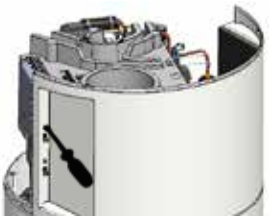
6. Loosen the cable clamp on the rear cover to pass the optional equipment cable (not supplied) through it.

We recommend using a 2x0.75 mm² multi-strand cable with crimped ferrules (not supplied).

7. Route the cable through the passage specifically designed for access to the PCB.



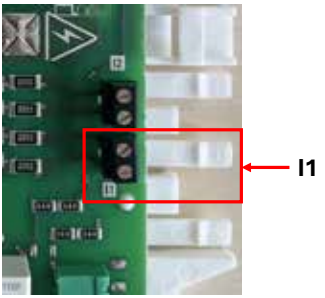
8. Screw the cable to the appropriate connector depending on the equipment connected.



9. Lock the cable clamp and repeat the steps in reverse order to close the product.

13.1. Connection to the Off-peak/Peak (OP/P) signal

The OP/P signal is wired to terminal I1 on the PCB.



13.2. Connection to the Smart Grid function

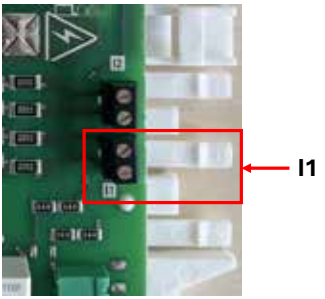
For appliances to be connected to a Smart Grid installation, the EMS (Energy Management System) needs to be connected to the water heater.
The wiring must be connected to terminal **I1** of the PCB, according to the following EMS states:

PCB input I1	EMS states	Operating mode
0	0:0	Normal Operation
1	1:0	Switch-on recommendation

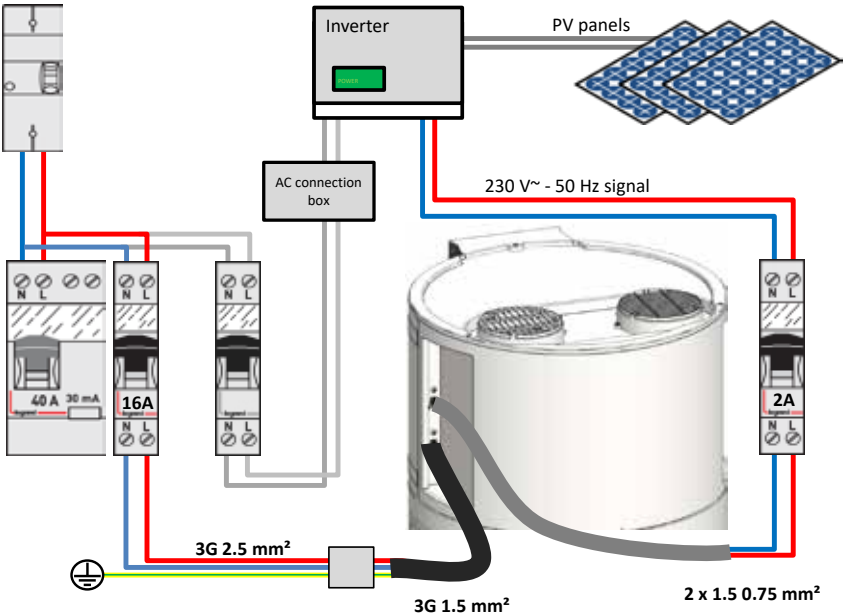
13.3. Connection to a PV system

For devices that will be connected to a PV system, the station must be connected to the water heater.
The signal from the PV station dedicated to the water heater must be configured (inverter, EMS system, etc.) for different trigger thresholds:
- Heat pump only: 450 W
- Heat pump and electric heating element: 1650 W

The PV station must be wired to terminal **I1** on the PCB.



Example of a connection to a PV system:



13.3.1. External control

The water heater can be connected to an Off-Peak signal, a PV own consumption signal or a Smart Grid signal.

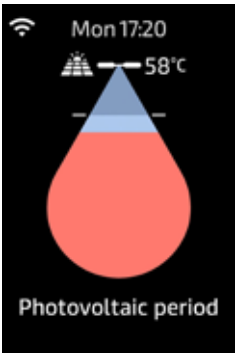
- Off-Peak signal:

In this mode, the electric heating element can only operate when the signal is present.
Depending on the user's selection, the heat pump is authorised to operate:
- As soon as necessary (to maximise comfort)
- From 10 am to 5 pm only (to maximise the efficiency of the heat pump)
- Only when the signal is present (to save as much as possible)

- Connecting to a PV system:

When combined with a PV system, the energy produced can be stored in the form of hot water.
The signal from the PV station dedicated to the water heater must be configured (inverter, EMS system, etc.) for different trigger thresholds:
- Heat pump only: 450 W
- Heat pump and electric heating element: 1650 W

When the signal is received, regardless of the time of day, the setpoint is automatically set at 62 °C (which can be modified in the Expert menu) and appears on the display.



Without a PV signal, the system is authorised to operate using one of the following settings:
- either daytime only (10 am to 6 pm)
- or daytime (10 am - 6 pm) and night-time (midnight - 4 am)

- Smart Grid signal:

The Smart Grid is an intelligent electrical network that can be used to optimise electricity distribution and consumption in real time. Our product is certified with the SG Ready label.

Without a Smart Grid signal, the system is authorised to operate on one of the following two settings:
- as required
- during programmed time slots only

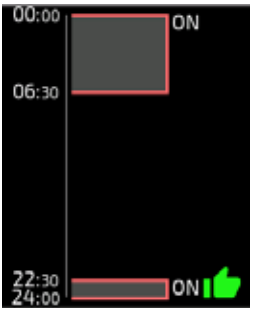
Depending on the Smart Grid signals received, the system is forced to start heating or is prohibited from heating, as described below:
- Receiving a signal on I1: the water heater operates up to a setpoint of 62 °C only with the heat pump.
- Receiving no signal on I1: the water heater operates to the customers chosen set point. Heating is possible only within the programming range (schedule).

Configuration	Time slots used	Terminals input I1	Time slot status	Heating possible	Setpoint
Smart Grid	Time slots programmed by the user	OFF	Within the programming range	YES	Customer setpoint
			Outside the programming range	NO	
		ON	Within the programming range	YES	Max. (62 °C)
			Outside the programming range	YES	

13.3.2. Heating time slot (time programming)

This parameter defines the permissible time slots for starting the heat pump and the electric backup in accordance with the hot water requirements. It can be configured if there is no connection to the off-peak signal, or to the PV own consumption signal.

The configuration is made for each day of the week. A day must include between one and three time slots totalling at least 8 hours of heating. Settings are made in 15-minute increments.
Examples:



13.3.3. Electric backup

This menu is used to set the electric heating element authorisation time:

- as little as possible: only outside the heat pump's operating range or in the event of a heat pump fault
- top up hot water. The immersion heater can be used in addition to the heat pump to guarantee an increased volume of hot water

13.3.4. Setpoint management

This function is used to select the mode:

- Eco+: the water heater autonomously programs consumption to adapt to the user's needs, and save energy while guaranteeing comfort. In this mode, the user has no control over the setpoint and it is not visible on the HMI. The water heater automatically adjusts the setpoint based on the usage.
- Manual: the user can set the water heating temperature to between 50 °C and 62 °C.

14. Filling the water heater

1. Make sure the pressure on the air side of the expansion vessel = 3 bar. This must be done when the water in the cylinder is free to expand in atmospheric pressure or the cylinder and relevant pipe work is empty.
2. Make sure that the drain cock is closed, and open all the cold and hot water taps and other terminal fittings. Allow the system to fill with water, and to run until there is no air left in the system. Close the taps and inspect the system closely for leaks.
3. Open the Relief Valves one by one and check that water is discharged and runs freely through the tundish and out at the discharge point. The pipework should accept full bore discharge without overflowing at the tundish, and the valve should seat satisfactorily.
4. In line with good plumbing practice, use of excessive flux should be avoided. When soldering above the cylinder, ensure flux/solder does not contaminate the cylinder below, since this can cause corrosion.
5. Flushing should be done performed as per BS EN 806:4 2010 section 6.2.
6. Allow the cylinder to heat to normal working temperature, then thoroughly flush the domestic hot and cold water pipework through each tap.

15. System start-up

15.1. Filling the water heater

1. Open the hot water tap(s).
2. Open the cold water tap on the safety unit (ensure that the safety unit drain valve is closed).
3. Close the hot water valves after draining them. The water heater has been filled with water.
4. Check the sealing of the pipe socket connections.
5. Check the operation of the hydraulic components, by repeatedly opening the safety unit drain valve to eliminate any residue in the discharge valve.

15.2. Initial set-up

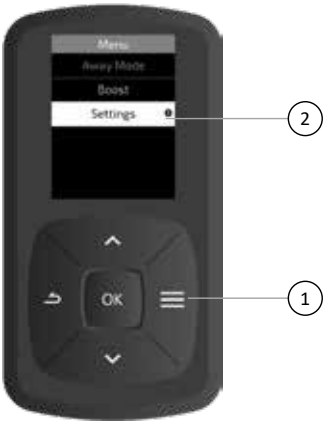
If the water heater has been tilted, wait at least 1 hour before powering on.

1. Power on the water heater.
2. When you do so for the first time, the setting instructions will be displayed.
   Follow these instructions carefully to apply the settings
   - Language selection
   - Date and time setting
   - Installation type:
     -> Ventilation (Ducting Configuration)
   - External control
   - Heating times (Time programming)
   - Electric heating element
   - Setpoint management

To return to the settings at a later date, or for more information on commissioning, refer to the “Installation parameters” paragraph.
For the first heating, activate the BOOST to heat the water quickly.

15.3. Installation settings

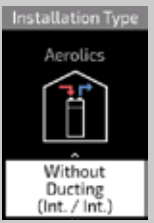
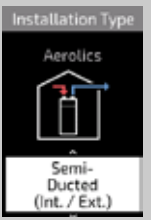
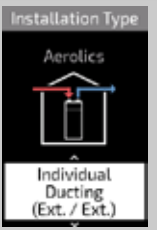
(unless these have been made during the initial set-up)
To access the various installation settings again:



15.3.1. Installation type

15.3.2. Ducting Configuration

Configure the product according to its installation.

Installation type	Ambient	Semi-ducted	Ducted
HMI visual			

Note: Ext. / Ext. is the recommended configuration for UK homes

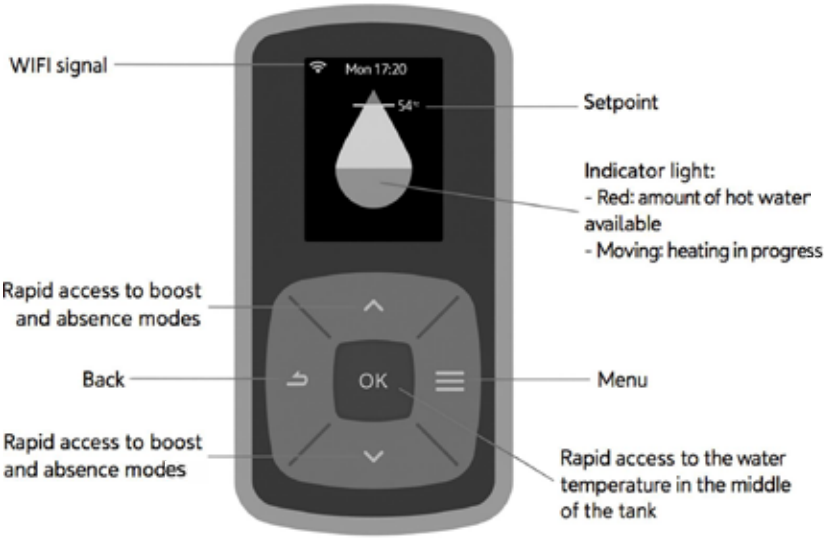
Please refer to section 11.1 to ensure the correct total ducting length is selected in accordance with the ducting components and associated minimum airflow (m^3/hr) and maximum pressure drop (Pa).

15.3.3. MVHR Mode

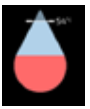
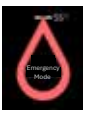
Calypso 2 can be configured to make use of a special MVHR mode. In this mode the product will take an on/off signal from an external MVHR unit to adjust the product fan speed. The product will remain operational, heating to hot water demand while reducing the sound power output whilst the external MVHR unit is also in operation.

Note: Ducting length max pressure drop must not exceed 50Pa if MVHR mode is utilised.

16. Control Panel



17. Description of pictograms

	Storage tank temperature setpoint		Absence recorded Absence in progress
	Boost in progress		Anti-Legionella cycle
	Water temperature middle of the tank		PV
	Smart Grid		Off-peak hours
	Emergency mode		ECO+

18. Menu

18.1. Energy Consumption

This menu allows you to view estimated consumption:

- the energy consumption in kWh for hot water production, for the current month, the previous month, the current year and the previous year since set-up
- the percentage of heat pump operation

If the date and times are not entered (e.g. due to a power outage), the energy consumptions will not be counted.

18.2. Away mode

This menu can be used to set an absence:

- continuous from the current date
- up to a programmed date. On your return, the water in the tank will be hot.

During this absence period, the water temperature will be kept above 15 °C.
An anti-legionella cycle is run if you are absent for more than 2 days, starting 24 hours before your return. The function can be stopped at any time by clicking the OK button.

18.3. Boost

This function temporarily increases hot water production:

- once, until the tank is full
- for several days (up to 7 days)

The heat pump and the electric heating element start up at the same time, at a setpoint of 62 °C. Boost mode takes priority over the other modes. When the set period expires, the water heater will return to its previous mode.

18.4. Setpoint management

This function is used to select the mode:

- Eco+: the water heater automatically programs consumption to adapt to the user's needs, and save energy while guaranteeing comfort. In this mode, the user has no control over the setpoint and it is not visible on the HMI. The water heater automatically adjusts the setpoint based on the usage.
- Manual: the user can choose the temperature at which the water is heated, between 50 °C and 62 °C.

18.5. Settings

18.5.1. Language

This menu is used to select the display language.

18.5.2. Date/Time

This menu is used to correct the time: if the power is cut for more than 5 minutes, it may be necessary to update the date and time.

18.5.3. Heating period (time programming)

This parameter defines the permissible time slots for starting the heat pump and the electric backup in accordance with the hot water requirements. It can be configured if there is no connection to the off-peak signal, or to the PV own consumption signal.

The configuration is made for each day of the week. A day must include between one and three time slots totalling at least 8 hours of heating. Settings are made in 15-minute increments.

18.5.4. Electric backup

This menu is used to set the electric back up (immersion) heating element authorisation time:

- as little as possible: only outside the heat pump's operating range or in the event of a heat pump fault
- top up hot water. The immersion heater can be used in addition to the heat pump to guarantee an increased volume of hot water

18.5.5. Wi-Fi

The Calypso 2 water heater is compatible with the Cosytouch app which can be used to manage the appliance

To connect your device to Wi-Fi please download the Cozytouch App your device.
Cozytouch is available to download on iPhone & Android:

Cozytouch

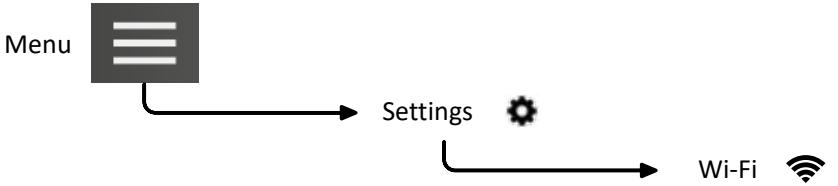
Download on the App Store

GET IT ON Google Play

Follow the steps in the Cozytouch App to create an account & pair the device.

Note: To pair the device you must select the correct HMI display screen from the options provided & ensure Cozytouch has access to your location.

Then navigate to the Wi-Fi screen in the menu settings:



Scan the QR code displayed on the Calypso HMI to join the Wi-Fi network while in the Cozytouch app.

Note: The Calypso will connect to the Wi-Fi network your device is connected to. Ensure your device is connected to the home Wi-Fi network.

For more information and tutorials on how to connect your Calypso 2 water heater to your Wi-Fi network scan the QR code

Or visit: https://cozytouch-app.com/tutorials/

18.5.6. Manual

The QR code displayed on the screen can be used to access the online manual.

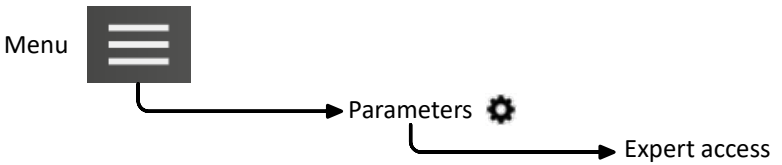
18.5.7. Expert access

This menu provides access to the advanced information, settings and test functions.
See section 19 on “Accessing the Expert menu and Emergency mode”.

Caution! These settings are reserved for qualified personnel.

19. Accessing the Expert menu and Emergency mode

To access the Expert menu:



19.1. Installation type

See installation section “10.3.1. Installation type”.

19.2. Electric backup

This menu is used to set the electric (immersion) heating element start time:

- when necessary: see the “Electric heating element” section in the User section
- never: Caution! Disabling the electric back up (immersion) may lead to a shortage of hot water

19.3. Anti-Legionella

This menu is used to activate or deactivate the cycle, and to set its frequency and setpoint.
By default, the anti-legionella cycle is activated once every four weeks at a setpoint of 62 °C.
The anti-legionella cycle can be set down to a daily or weekly occurence.

19.4. External Control - Off-peak, PV & Smart grid settings

See the “External control” section in the installation section (13.5.1).

19.5. Diagnostic

This menu can be used to access:

- The alarm log
- The system data
- Test mode

The Alarm log lists the last 10 errors reported by the product. These error codes are explained in the “Troubleshooting” section of the Maintenance section.
Clicking on each error provides a range of diagnostic information.
The system data provides access to sensor temperatures, actuator status, etc.
The test mode is used to check that the water heater is operating correctly.

- Heat pump test: start-up of the various heat pump actuators (fan, hot gas valve, compressor)
- Fan test: fan start-up at different setpoints
- Electrical heating element test: electric heating element start-up
- Defrosting test: start-up of the heat pump and then the hot gas valve

Some tests are not available if the heating elements (heat pump and electric heating element) are faulty or unavailable.

19.6. Emergency mode

This mode is used in the event of a fault.
In this mode, the product operates only with the electric heating element at a setpoint of 62 °C.
Time programming is no longer available and only half the volume of water is heated.

19.7. Software

This menu is used:

- To display the software versions for the control panel, the control system and the WIFI.

19.8. Reset

This menu is used to return to the default settings and the starting tunnel.

20. Commissioning checklist

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropirate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not afect statutory rights.

Customer name:	Telephone number:
Address:	
Cylinder Make and Model	
Cylinder Serial Number	
Commissioned by (PRINT NAME):	Registered Operative ID Number
Company name:	Telephone number:
Company address:	
	Commissioning date:
To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:	
Building Regulations Notification Number (if applicable)	

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)				
Is the primary circuit a sealed or open vented system?	Sealed		Open	
What is the maximum primary flow temperature?				°C

ALL SYSTEMS						
What is the incoming static cold water pressure at the inlet to the system?					bar	
Has a strainer been cleaned of installation debris (if fitted)?		Yes		No		
Is the installation in a hard water area (above 200ppm)?		Yes		No		
If yes, has a water scale reducer been fitted?		Yes		No		
What type of scale reducer has been fitted?						
What is the hot water thermostat set temperature?					°C	
What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)?					l/min	
Time and temperature controls have been fitted in compliance with Part L of the Building Regulations?					Yes	
Type of control system (if applicable)	Y Plan		S Plan		Other	
Is the cylinder solar (or other renewable) compatible?		Yes		No		
What is the hot water temperature at the nearest outlet?					°C	
All appropriate pipes have been insulated up to 1 metre or the point where they become concealed					Yes	

UNVENTED SYSTEMS ONLY						
Where is the pressure reducing valve situated (if fitted)?						
What is the pressure reducing valve setting?					bar	
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?		Yes		No		
The tundish and discharge pipework have been connected and terminated to Part G of the Building Regulations					Yes	
Are all energy sources fitted with a cut out device?		Yes		No		
Has the expansion vessel or internal air space been checked?		Yes		No		

THERMAL STORES ONLY		
What store temperature is achievable?		°C
What is the maximum hot water temperature?		°C

ALL INSTALLATIONS		
The hot water system complies with the appropriate Building Regulations	Yes	
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes	
The system controls have been demonstrated to and understood by the customer	Yes	
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes	

Commissioning Engineer's Signature
Customer's Signature
(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE MARK THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

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www.centralheating.co.uk

While this Checklist can be used for any installation covered by its description, only appliances manufactured by Scheme Members will be covered by the rules and requirements of the Benchmark Scheme.

21. Service record

SERVICE RECORD

It is recommended that your hot water system is services regularly and that the appropriate Service Record is completed.

Service Provider

Before completeing the appropriate Service Record below, please ensure you have caried out the service described in the manufaturer's instructions.

SERVICE 01	Date:	SERVICE 02	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No:		Telephone No:	
Comments:		Comments:	
Signature		Signature	

SERVICE 03	Date:	SERVICE 04	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No:		Telephone No:	
Comments:		Comments:	
Signature		Signature	

SERVICE 05	Date:	SERVICE 06	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No:		Telephone No:	
Comments:		Comments:	
Signature		Signature	

SERVICE 07	Date:	SERVICE 08	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No:		Telephone No:	
Comments:		Comments:	
Signature		Signature	

SERVICE 09	Date:	SERVICE 10	Date:
Engineer name:		Engineer name:	
Company name:		Company name:	
Telephone No:		Telephone No:	
Comments:		Comments:	
Signature		Signature	

Servicing, Maintenance and Troubleshooting

22. Maintenance advice

The water heater must be drained when the Absence mode cannot be used or when the appliance is powered off.

Should the water heater need to be drained please follow the 'Drain down procedure' outlined in the 'Warnings' section at the beginning of this manual.

23. Maintenance

In order to maintain the performance of your water heater, it is recommended to perform regular servicing.

Servicing of the water heater should be carried out by a competent person in accordance with the Warnings section of this manual. Advice on the installation and maintenance of hydraulic and electrical connections as well as working with flammable refrigerant is provided.

What	When	How
Safety unit	Once a year	Operate the safety valve. Check that the flow is correct. Conduct a refrigerant leak test on the unit.
General condition	Once a year	Check the general condition of your appliance: no error codes, no water leaks from the water connections, etc.
Condensate drainage	Once a year	Check the cleanliness of the condensate drain pipe.
Check the hydraulic sealing	Once a year	Check that there are no signs of seepage: - hot / cold water connector - electric heating element hatch seal

The appliance must be switched off before opening the covers/column.

What	When	How
Ductwork	Once a year	Check that the water heater is connected to the ducts. Check that the ducts are in place and not crushed. Check that the ventilation system is not obstructed (ducts, wall or roof inlets and outlets).
Condensate drainage	Once a year	Check the cleanliness of the condensate drain pipe.
The electrical connection	Once a year	Check that no wires are loose on the internal and external wiring and that all the connectors are in position.

What	When	How
Electric heating element	Once a year	Check the correct operation of the electric heating element by measuring the power.
Scaling	Once a year	If the water supply to the water heater has scale, perform descaling.

Access to the expansion valve adjustment screw is prohibited, except to refrigeration engineers.
Any expansion valve adjustment without the approval of the manufacturer may void the product warranty.
It is recommended that the expansion valve is only adjusted once all the other repair solutions have been exhausted.

What	When	How
Heat exchange with the heat pump	Once a year	Check that the heat pump exchange is correct.
The heat pump components	Once a year*	Check that the 2-speed fan and the hot gas valve are operating correctly.
Evaporator	Once a year*	Clean the evaporator using a nylon brush and non-abrasive and non-corrosive products.

** for dusty environments, increase the maintenance frequency*

24. Troubleshooting

In case of anomalies, no heating or vapour release when drawing water, turn off the power supply and notify your installer.

Repair work must only be performed by a professional.

24.1. Error code display

Code displayed	Causes	Consequences	Troubleshooting
Err W.3	Faulty thermowell sensor (water T°)	Water temperature cannot be read: no heating	Check the connection (A1) and correct positioning of the sensor. Check the ohmic value of the sensor (see table below). If necessary, replace the sensor.
Err W.7	No water in the tank or ACI line open	No heating	Fill the tank with water. Check the ACI circuit (ACI connection, wiring and water conductivity, etc.).

Code displayed	Causes	Consequences	Troubleshooting
Err W.10	No communication between the screen and the power board	Electric heating element heating in degraded mode up to 62 °C and no screen display update.	Check the connections and link cables between the screen and the power board.
Err W11	No Off-Peak signal detection	The water heater operates without taking off-peak periods into account.	Check the wiring and transmission of the off-peak signal. Change the start authorisation settings.
Err H.15	Date/Time not set	The water heater disregards the programmed time slots.	Enter the date and time.
Err W.19	The control detects that the product is connected as peak/off-peak	The tank is no longer protected against corrosion.	Check the electrical wiring to ensure that the power supply is permanent.
Err P.21	Air temperature sensor faulty	Heat pump stops. Heating via electric backup.	Check the connection (A4) and correct positioning of the sensor. Check the ohmic value of the sensor (see table below). If necessary, replace the sensor.
Err P.22	Evaporator sensors faulty	Heat pump stops. Heating via electric backup.	Check the connection (A4 and A2) and correct positioning of the sensor. Check the ohmic value of the sensor (see table below). If necessary, replace the sensors.
Err P.25	HP pressure switch or Klixon compressor open or capacitor faulty	Heat pump stops. Heating via electric heating element.	Check the connections to the compressor (R1), the start-up capacitor pressure switch and the hot gas valve (T2). Check the compressor winding resistors.
Err P.27	Discharge sensor faulty	Heat pump stops. Heating via electric heating element.	Check the connection (A4) and correct positioning of the sensor. Check the ohmic value of the sensor (see table below). If necessary, replace the sensor.
Err P.29	Return flow temperature fault	Heat pump stops. Heating via electric heating element.	Seek professional assistance.

Code displayed	Cause	Consequence	Troubleshooting
Err. P.30.1	Inefficient heating	Heat pump stops. Heating via electric heating element.	Check that the fan and compressor are operating correctly in "test" mode in the "Expert" menu.
Err P.30.2	Lack of fluid	Heat pump stops. Heating via electric heating element.	Check that the fan and compressor are operating correctly in "test" mode in the "Expert" menu.
Err P.30.3	Lack of fluid or defective heat pump components or lack of ventilation	Heat pump stops. Heating via electric heating element.	Check the operation of the ventilation and its connections (CS (France) or T1 (export) mark + M1 and M2). Check that the evaporator is clean.

In the case of code P.40, the heat pump is not faulty but is outside its operating temperature range (air and/or water).

Table of temperature/resistance values for the product's air, evaporator and thermowell sensors (NTC 10 kΩ).

Temperature in °C																				
-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
97.9	73.6	55.8	42.7	32.9	25.5	20	15.8	12.5	10	8	6.5	5.3	4.4	3.6	3	2.5	2.1	1.8	1.5	1.3
Resistance in kΩ																				

Table of temperature/resistance values for the compressor discharge sensor (NTC 100 kΩ).

Temperature in °C														
0	10	20	25	30	40	50	60	70	80	90	100	110	120	130
347	207	126	100	80	52	34	23	16	11	8.1	6	4.4	3.3	2.5
Resistance in kΩ														

24.2. Other faults without error codes displayed

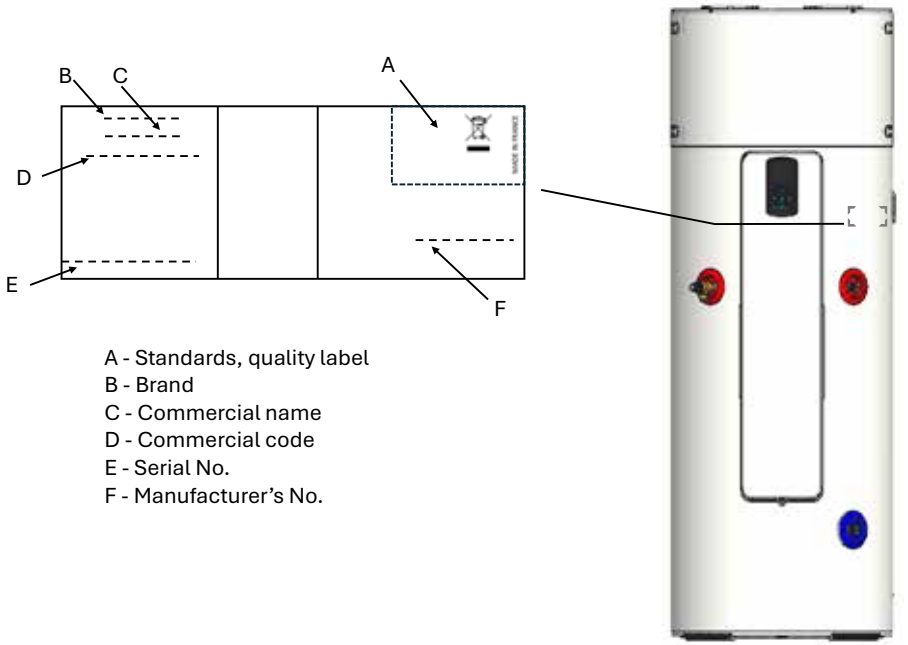
Failure observed	Possible cause	Diagnostics and troubleshooting
No display	The screen is out of order. The screen is not powered.	Check that the product is receiving the power supply. Check for a voltage of 12 V DC between the red and black wires on the screen connector.

Failure observed	Possible cause	Diagnostics and troubleshooting
No hot water.	The power supply to the water heater is not continuous.	Ensure the appliance has a continuous power supply. Check that no cold water is flowing back into the hot water circuit (possible faulty mixing valve).
	Setpoint temperature too low.	Set the setpoint temperature higher.
	Electric heating element in "never" mode.	Toggles the mode to "when necessary".
	Heating element or its wiring partially out of order.	Check the resistance on the wiring harness connector and that the wiring harness is in good condition. Check the safety thermostat.
	Hot water distribution leak.	Locate and repair the leak.
	Hot water loop.	Resize the loop function (installation section).
Heating stops. No hot water.	No power supply to the water heater: fuse, wiring, etc.	Check that there is no voltage on the supply wires. Check the installation parameters (see operating ranges).
Insufficient hot water at max. setpoint (62 °C).	Water heater is under-sized.	Check the length of the programming time slots.
	Heat pump operating limit coupled with complete inhibition of the electric heating element.	Check that the electric heating element is not completely disabled in "Expert" mode or that it is out of order.
Low flow to the hot water tap.	Scaling of the water heater.	Descale the water heater.
	Water circuit clogged.	Seek professional assistance.

Failure observed	Possible cause	Diagnostics and troubleshooting
Continuous water loss from the safety unit outside heating periods.	Safety unit damaged or clogged. Network pressure too high.	Replace the safety unit. Check that the pressure at the water meter outlet does not exceed 0.5 MPa (5 bar), otherwise install a pressure reducer set to 0.3 MPa (3 bar) at the main water distribution system outlet.
The electric backup is not working.	Mechanical thermostat in safety mode. Electric thermostat faulty. Resistor faulty.	Reset the thermostat safety device on the resistor. Replace the thermostat. Replace the resistor.
Condensate overflow.	Condensate drain blocked. Incorrect installation of the condensate drain pipe.	Check the heat pump compartment for dirt. If it is dirty, clean the compartment and the condensate drainage system. Check that the installation is correct (see the "Condensate drainage" section in the installation section).
Odour.	No siphon on the safety unit or the condensate drain. No water in the safety unit siphon.	Install a siphon. Fill the siphon.

25. After-sales service

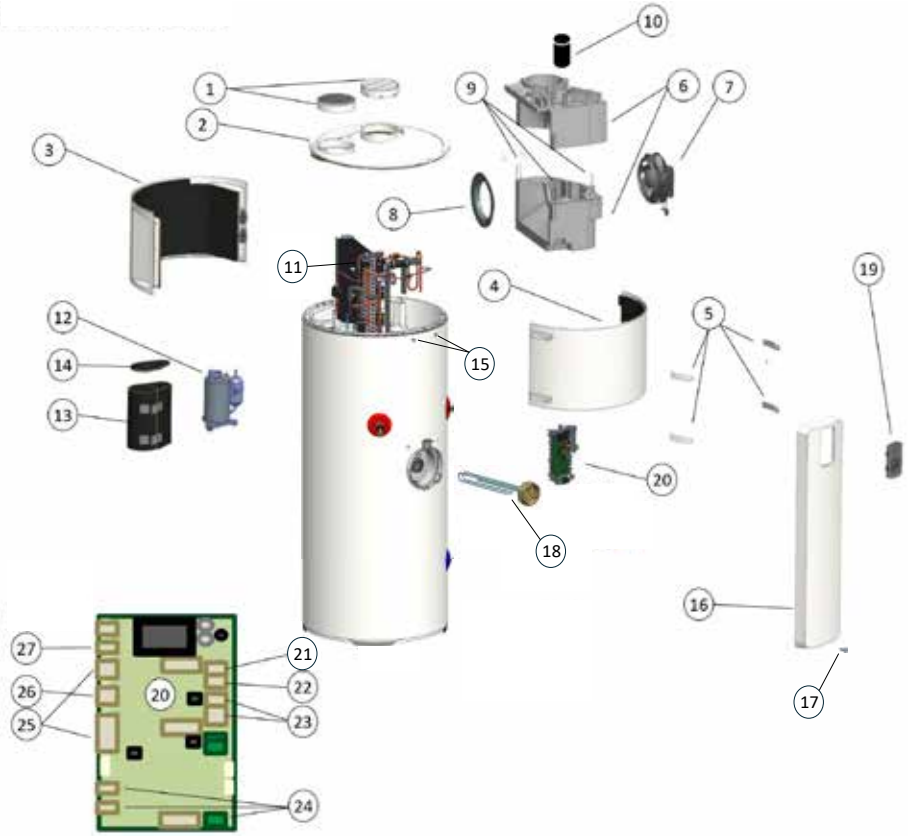
Only use original manufacturer's spare parts.
Any work undertaken on the electrical parts must be performed by a specialist.



A - Standards, quality label
B - Brand
C - Commercial name
D - Commercial code
E - Serial No.
F - Manufacturer's No.

The appliance must be switched off before opening the cover (*to open the cover, please refer to the "Maintenance" paragraph***).**

25.1. Spare Parts List



1	Vents	11	Hot gas valve coil	21	Electric heating element wiring
2	Top cover	12	Compressor	22	Supply wiring
3	Rear cover	13	Compressor jacket	23	Heat pump wiring
4	Front cover	14	Jacket cover	24	Fan wiring
5	Screw caps	15	Column support rail	25	Heat pump sensor wiring
6	Volute assembly	16	Front column	26	Interface wiring
7	Fan	17	Plastic cover screw	27	Water sensor wiring 1
8	Fan sheet metal roof	18	Heating element		
9	Volute elastic	19	Interface assembly		
10	15µF capacitor	20	Control board		

TERMS AND CONDITIONS OF YOUR ATLANTIC WARRANTY

Atlantic ("We", "Atlantic") only do business upon the Conditions which appear below and no other. Unless we so agree in writing these Conditions shall apply in full to any supply of goods by us to the exclusion of any Conditions or Terms sought to be imposed by any purchaser. These Conditions of Warranty Terms override those which are contained on the Invoice Forms and all Sales are now subject to these Conditions of Warranty terms only. The warranty is provided by Ideal Boilers Limited, National avenue, Hull, HU5 4JB.

Atlantic provide warranty to the components including controls, valves and electrical parts for two years from the date of purchase. IT SHOULD BE NOTED THAT THE FACTORY FITTED TEMPERATURE AND PRESSURE RELIEF VALVE MUST NOT BE REMOVED OR ALTERED IN ANY WAY OR THE WARRANTY WILL NOT BE VALID. IDEAL HEATING WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE HOWEVER IT IS CAUSED.

The warranty for the stainless steel vessel is for twenty five years against material defect or manufacturing faults Provided that:

1. The Hot Water Cylinder must have been installed and commissioned within 12 months of the date of manufacture by a suitably qualified engineer, in accordance with the guidelines in the installation and servicing manual provided.
2. The Hot Water Cylinder installation must be registered with Atlantic within 30 days.
3. The Atlantic warranty will be activated on the date the Hot Water Cylinder is registered following commissioning.
4. At the end of each 12-month period after commissioning, the hot water cylinder must be serviced by a suitably competent person in accordance with the process in the manufacturer's instructions. Should this condition not be met the warranty will lapse. A record of this service must be made on the Benchmark Service Record.
5. All necessary inlet controls and safety valves have been fitted correctly.
6. The hot water cylinder has only been used for the storage of potable water supplied from the public mains. The water quality shall be in accordance with European Council Directive 98/83 EC, or revised version of the date of installation, and is not fed with water from a private supply. Particulor;
   - Chloride content: Mon 200 mg/l
   - Sulphate content: Mon 200 mg/l
   - Combination chloride/sulphote. Max. 300 mg/l (in total)
7. If the newly fitted water heater is not in regular use, then it must be flushed through with fresh water for at least 15 minutes. Open at least one hot water taps once per week, during a period of at least four weeks.
8. Any disinfection has been carried out strictly in accordance with BS6700.
9. If the Hot Water Cylinder suffers a mechanical or an electrical breakdown, please contact Atlantic Customer Care on 0333 0040391.

Normal working times are: 8am -6pm Monday to Friday, Saturdays and bank holidays excluding Christmas day 8am -4pm, Sunday 8am -12 noon.

For Republic of Ireland please contact: Ideal Energy, Ascot House, Kinsealy Lane, Malahide, County Dublin, K36 HH42 on +35319 617700. Opening hours Monday - Friday 8am - 5pm. Registered in England. Company No. 652026.

Claim/Contact Procedure

We will arrange for an Atlantic or authorised contractor, to inspect and repair, or where in our sole opinion repair is not economic, arrange to replace the goods with the closest substitue in the case of any obsolete product.

Please note:

a. Engineers will only undertake work where it is considered by the engineer that the installation does not pose a risk to health and safety.

b. Clear access around the cylinders or ancillaries must be available, the external unit must be accessible from the ground.

c. A permanently fixed access ladder must be available to service installations in lofts or attics. Adequate lighting and permanently fixed flooring must also be available.

d. We will not accept responsibility for costs involved in gaining access to the unit, such as the removal of cupboards, kitchen units or trims in order to gain access for repairs.

e. In the event of the inner stainless-steel vessel cylinder failing within the warranty period, a full diagnosis into the cause of the failure is required and usually is only possible in a laboratory test environment, where the product can be fully assessed and tested. We will require the return of the cylinder which develops a leak for inspection. Proving our expert examination confirms a manufacturing fault or defect, this will be resolved under the cylinders warranty accordingly.

f. If the stainless-steel vessel proves to be defective either in materials or workmanship, we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Scotland and Wales (excluding all islands). Our normal working hours (excluding bank holidays) are 8am – 6pm Monday to Friday, 8am – 4pm Saturday, 8am – 12 noon Sunday.

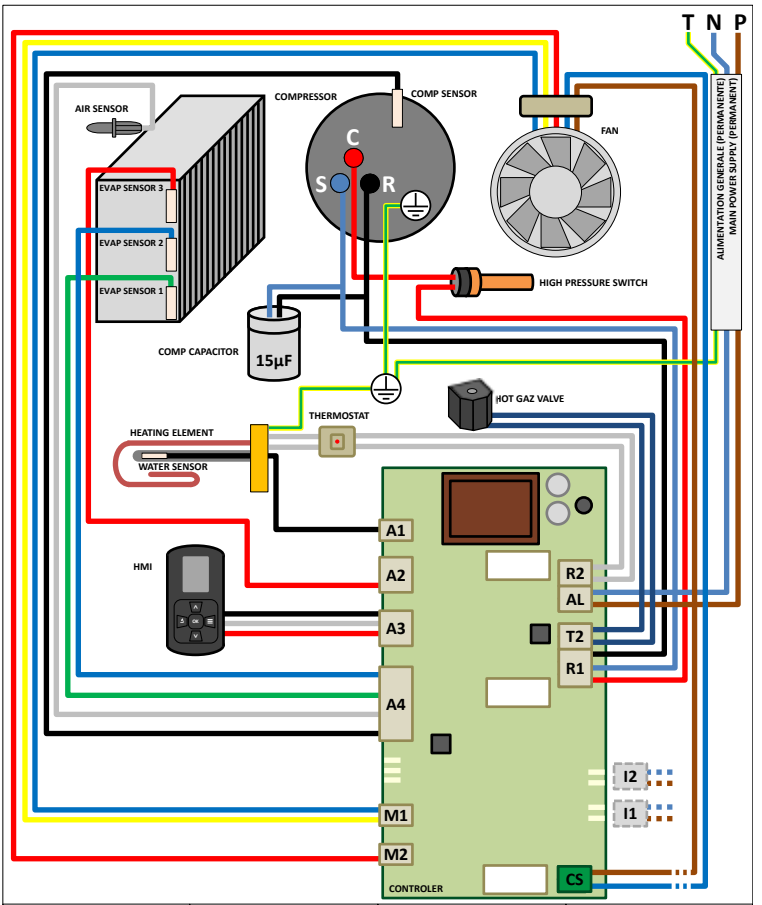
g. Evidence of purchase and date of supply, along with a copy of the completed annual service record and commissioning checklist should be submitted with any claim.

10. The warranty does not apply:
    a. If the registered product is removed from its place of installation without our prior consent.
    b. To any defect, damage or breakdown caused by inadequate servicing of the product or by deliberate action, accident, misuse or third-party interference including modification or an attempted repair which does not fully comply with industry standards.
    c. To any defect, damage or breakdown caused by the design, installation, and maintenance of the system.
    d. To de-scaling or other work required as a result of hard water scale deposits or from damage caused by aggressive water or sludge resulting from corrosion, including the cleaning of filters or strainers.
    e. To damage caused to the product by freezing.
    f. If the claim/contact procedure is not adhered to.
    g. To any other costs or expenses caused by or arising as a result of a breakdown of the product.
    h. To any defect resulting from the incorrect installation of the product.
    i. To any costs incurred during delays in fixing reported faults.
11. We reserve the right to charge a call-out fee where:
    a. A fault cannot be found or the fault is unrelated to the Atlantic product installed.
    b. The breakdown or fault has been caused by an event, which is excluded from the warranty – refer to section 10.
    c. Failure to cancel an agreed appointment prior to our engineer's visit.
    d. The product is outside the period of warranty, or the conditions of the warranty have not been met.
12. If we fit replacement parts or replace a Hot Water Cylinder it will not extend the period of the warranty.
13. The warranty applies only where the product has been installed in a domestic dwelling in mainland UK and ROI for its designed purpose.

This warranty is offered in addition to your statutory rights provided under consumer law. Details of these rights can be obtained from your local Trading Standards Authority or a Citizen Advice Bureau. Guarantor – Ideal Boilers Ltd, National Avenue, Hull, HU5 4JB.

WIRING DIAGRAM

For your heat pump water heater maintenance



Compressor winding :	Compressor connector :	Hot gaz valve coil :	Heating element :
RC ≈ 8 ohm, CS ≈ 9 ohm, SR ≈ 17 ohm, U = 230V	NB ≈ 16 ohm, BR ≈ 9 ohm, RN ≈ 8 ohm, U = 230V	R ≈ 1 à 2 Kohm, U = 230V.	R ≈ 31,5 to 36,75 ohm U = 230V.

atlantic

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T: 0844 3350 549 F: 0844 5436 180
E: enquiries@atlantic-heat.co.uk
Atlantic | PO Box 103, National Avenue,
Kingston Upon Hull, HU5 4JN

GROUPE ATLANTIC
UK, ROI & NORTH AMERICA DIVISIONS

Atlantic is part of Ideal Boilers Limited. Ideal Boilers Ltd. pursues a policy of continuing improvement in the design and performance of its products. The right is therefore reserved to vary specification without notice.

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