



I-PAC inverter heat pump

IPT 8, 12, 16, 22, 28.

Owner Installation Manual 1005494 iss 1



HEALTH AND SAFETY WARNING

This product contains electrical and rotational equipment. **ONLY** competent trained people should work on this device, and must be isolated electrically before removing access panels.

This appliance can be used by children from 8 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 should not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.



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1.0 FOREWORD

Thank you for choosing this product, which is designed for quiet and energy efficient operation. It is the ideal way to heat your pool in an environmentally friendly way.

1.1 SAFETY PRECAUTIONS

Important safety information is contained in this manual and on your heater.

Please read and follow all safety advice.

The refrigerant used in this heat pump is R32. This refrigerant is environmentally friendly, but safety instructions must be strictly adhered to.



The **WARNING** sign denotes a hazard. It calls attention to a procedure or practice, which if not adhered to could result in injury. Warning signs and procedures must be complied with.

If a refrigerant leak is suspected stop using the heat pump and contact Dantherm Group UK service.
service.department@dantherm.com

	The heat pump must be kept away from sources of fire or naked flames.
	The heat pump must be installed in well ventilated area. Closed areas are not permitted.
	Repair and disposal must be carried out by F-Gas registered engineers.
	Completely de-gas the refrigerant before any brazing is performed. Brazing can only be carried out by technicians trained to EU 517/2014.

1.2. ATTENTION

Please read the following instructions before installation, use and maintenance.

- Installation must be carried out by competent people, in accordance with this manual.
- A refrigerant leak test must be performed after installation.
- Only manufacturers recommended procedures may be used to defrost, or to accelerate the defrost of the heat pump, to avoid damage.
- If a repair is required, please contact the nearest after-sales service centre.
- To avoid over heating or over cooling set the desired temperature on the control panel.
- Do not place obstructions that will block air flow near the inlet or outlet.
- Do not use or store combustible gas or liquids near the heat pump.
- The heating performance can be improved by insulating the flow and return pipework. it is recommended that a cover is used on the swimming pool to reduce heat losses.

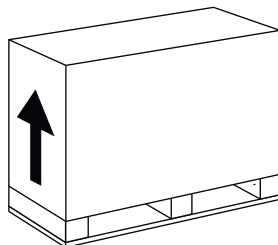
1.3. SAFETY

- Mains power isolator should be out of reach of children.
- After a power cut, when the power supply is restored, the heat pump will start up.
- Electric storms can damage electronic equipment. Ideally the heat pump should be switched off at the mains.
- Risk assessments must be carried out before maintenance or repairs are started.
- If R32 gas leaks during the installation process, stop the installation immediately and call the service centre.

2.0 ABOUT YOUR HEAT PUMP

2.1. TRANSPORTATION

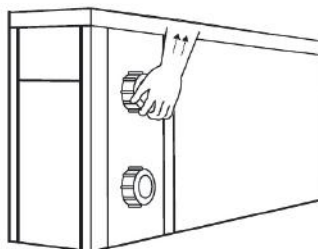
Always keep the heat pump upright.



Do not lift the heat pump by the water inlet or outlet connections.

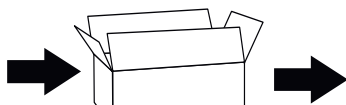
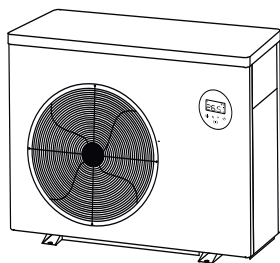
(If this is done the titanium heat exchanger inside the heat pump could be damaged).

X



2.2. ACCESSORIES

These accessories are provided with the heat pump.



Water union connectors
2 x 1½,
2 x 50mm



Drainage kit



2.3 OPTIONAL ACCESSORIES

The following items are additional accessories available for purchase.

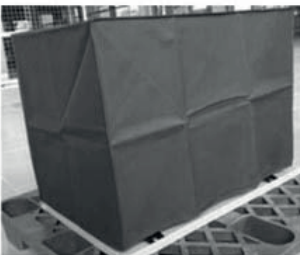
Rubber mounting kit.
(pack of 4 mounts).



Remote LED control kit for indoor installation.
(10m extension cable).



Winter cover.



2.3. FEATURES

- Stepless DC inverter compressor
- EEV Technology (Electronic Equalisation Valve)
- Quick hot gas defrosting with Saginomiya 4-way valve
- High-efficiency twisted titanium heat exchanger
- High pressure and low pressure protection
- Soft start and wide voltage application
- Stable inverter control system

2.4. OPERATING CONDITIONS AND RANGE

Air temperature operating range:



-5-43°C (X) -10-43°C (Y)

Heating temperature setting range: 18°C-40°C

Cooling temperature setting range: 12°C-30°C

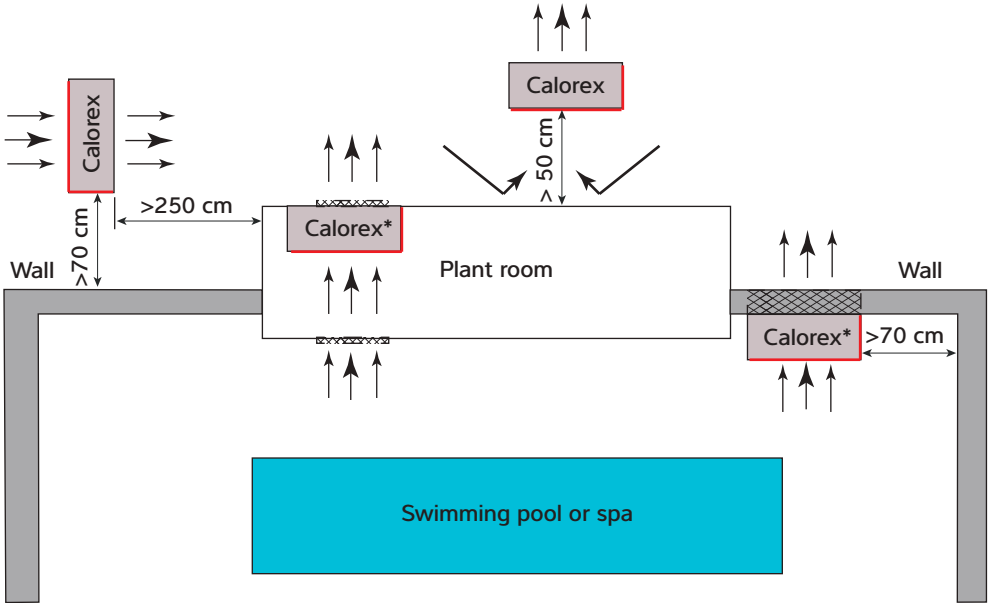
2.5. OPERATING MODES

The heat pump has two modes: Boost mode and Whisper mode.

Mode	Modes	Characteristics
	Boost mode	Heating capacity: 20% to 100% capacity Intelligent optimization Fast heating
	Whisper mode	Heating capacity: 20% to 80% capacity Sound level: 3dB (A) lower than Boost mode

3.0 INSTALLATION

Possible positions of a Calorex heat pump



 Suitable opening

 Calorex The red lines represent the air inlet area

*** Controls are obscured by the wall. Connect to Remote control panel or Wi-Fi before installing the heat pump in position.**

Required free areas to provide air flow to and from heat pumps when installed in an enclosed area or where required to pass air through a wall etc.

Free area is the available area through which air can pass through a grille or louvres.

Minimum free areas m ²	
Model	Discharge area
IPT 8	0.169
IPT 12	0.169
IPT 16ALX	0.169
IPT 16ALY	0.229
IPT 22	0.301
IPT 28	0.301

3.1. INSTALLATION REMINDER

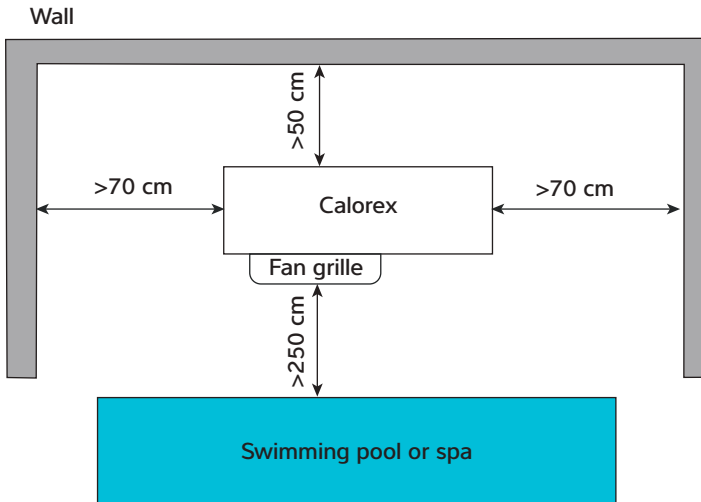
Installation must only be attempted by competent personnel.

Location and dimensions.

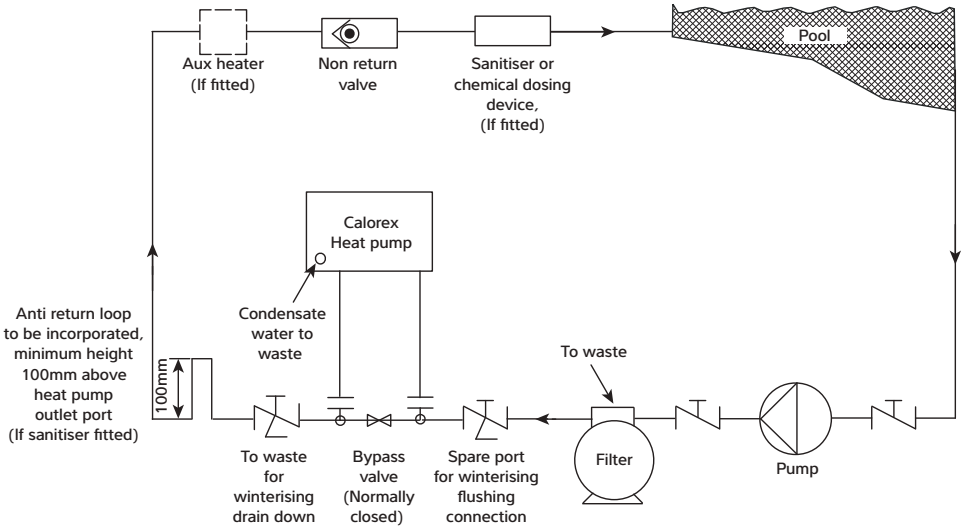


The heat pump must be positioned in a well ventilated area. Minimum distances between the heat pump and any obstructions are shown below.

- The heat pump must be fixed by M10 bolts to a concrete base or mounting brackets. These must be solid and fixed securely. Brackets must be corrosion proof.
- Do not block inlet or outlet grilles.



3.2. POOL WATER CIRCUIT



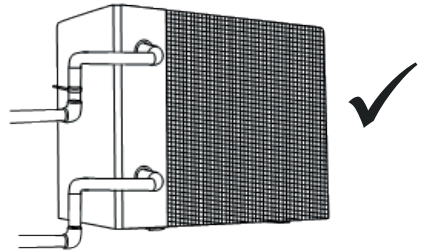
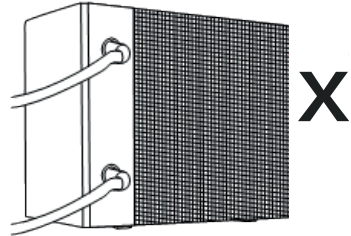
KEY	
Isolation valve	
Breakable coupling	
Three way valve	

3.3. PLUMBING

IMPORTANT

Before installing the heat pump ensure the blanking disks are removed from the pool water in/out connections. These should drop out when the adaptors are unscrewed.

1. Ensure that bypass is installed and set to achieve the recommended flow rates stated in the data sheet.
2. Ensure that the condensate drain kit supplied is fixed and is drained to a drain or soak-away.
(It is best to do this first before the heat pump is fixed to pipework or the ground).
3. Inlet and outlet pipework must be supported to avoid excessive strain on the connections.



3.4. INITIAL CHECKS

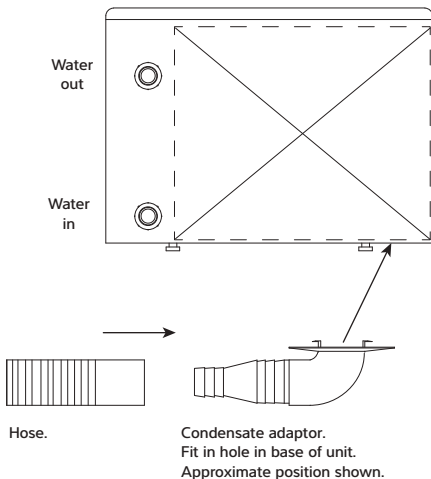
Start the filtration pump before the heat pump is switched on, and turn off the heat pump before the filtration pump.

Note. Heat pump must be turned off prior to backwashing.

Before starting the heat pump, please check for any leakage of water; and set the required temperature on the thermostat, and then switch on power supply.

In order to protect the swimming pool heater, the machine is equipped with a time lag starting function. When starting, the fan will run for one minute before the compressor starts, and when power to the machine is turned off it will stop running one minute after the compressor stops.

After starting up, please check for any abnormal noise from the machine.



Note: Fittings shown at larger scale for clarity.

4.0 ELECTROLYTIC CORROSION IN SWIMMING POOLS

Electrolytic corrosion will occur when dissimilar metals that are in contact with each other create a potential difference between themselves. Sometimes separated by a conductive substance known as an electrolyte, the dissimilar metals will create a small voltage (potential difference) that allows the ions of one material to pass to the other.

Just like a battery, ions will pass from the most positive material to the more negative material.

Anything more than 0.3 volts can cause the most positive material to degrade.

A swimming pool with its associated equipment can create this effect. The pool water being an ideal electrolyte and components of the filtration circuit, heating system, steps, lights etc providing the dissimilar metals needed to complete the circuit.

Whilst these small voltages are rarely a safety threat, they can create premature failure through corrosion. Not dissimilar to corrosion through oxidation, electrolytic corrosion can cause complete failure of a metallic material in a very short period of time.

In order to prevent this type of corrosion all metallic components in contact with swimming pool water should be bonded together using 10mm² bonding cable. This includes non-electrical items such as metal filters, pump strainer boxes, heat exchangers, steps and handrails. It is highly recommended that bonding be retrofitted to existing pools, which may not be protected by this system.

4.1 ELECTRIC WIRING AND SUPPLY

All electrical work to be carried out in accordance with I.E.E. regulations, latest issue, or local codes of practice as applicable.

The machine should be installed in accordance with EMC2004/108/EC.

Protected supply fuses or motor type circuit breakers (Type GU, FAZC) to specified rating, (see below). H.R.C. fuses are recommended. An isolator which disconnects all poles must be fitted within 2m and in line of sight of the heat pump.†

All units must be correctly earthed- Grounded and an earth leakage trip installed.

Inconsistent electrical supply

The following voltage limits must not be exceeded. Failure to achieve the necessary voltages will invalidate the warranty.

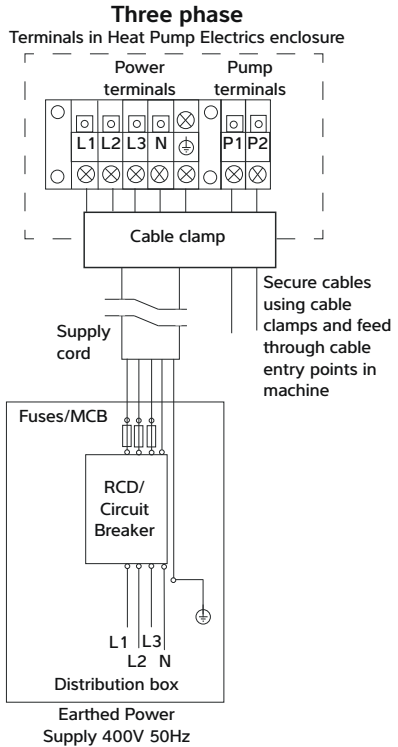
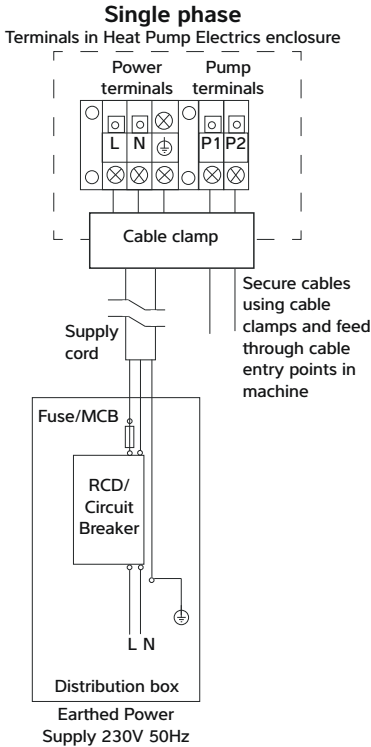
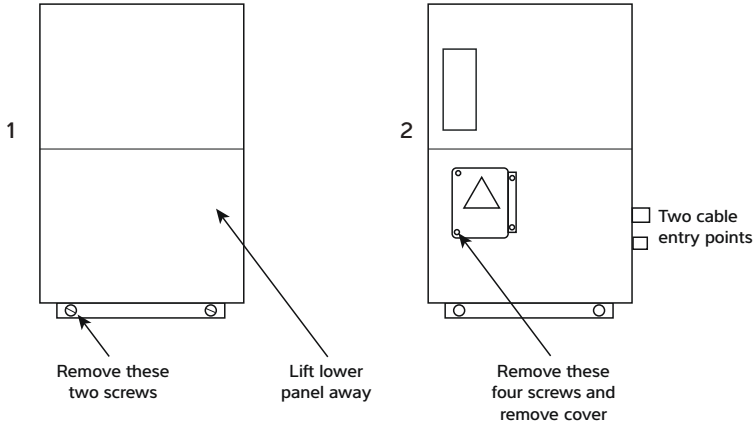
	Minimum	Maximum
Voltage		
Single phase machines	207V	253V
Three-phase machines	360V	440V
Cycle frequency (50Hz)	47.5Hz	52.5Hz

The voltage must not drop below the above figures when starting the machine.

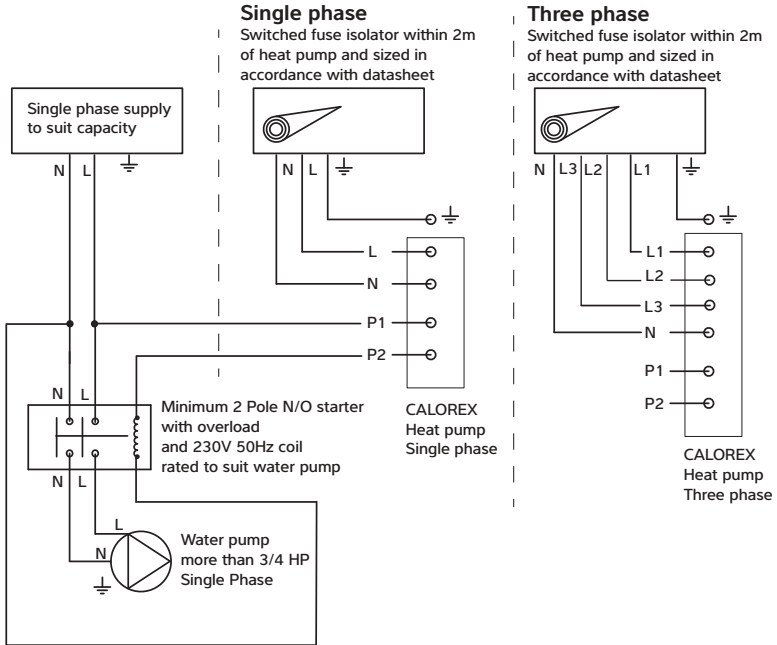
Note. This voltage must be available at the heat pump whilst running.

† Note. The isolator must have a minimum of 3mm air gap when turned off.

4.2 CONNECTING THE MACHINE TO THE POWER SUPPLY



Recommended electrical installation for Calorex heat pump
(Single or Three phase) with single phase water pump



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4.3 POOL PUMP SYNCHRONISATION

For installations where a time clock controls the filter pump, which also provides water for the heat pump, your heat pump can over-ride "pump off" periods.

By doing so, your filter pump will only run when

- a) a block period of pump "running" has been set on the time clock for filtration purposes.
- b) the pool requires heating

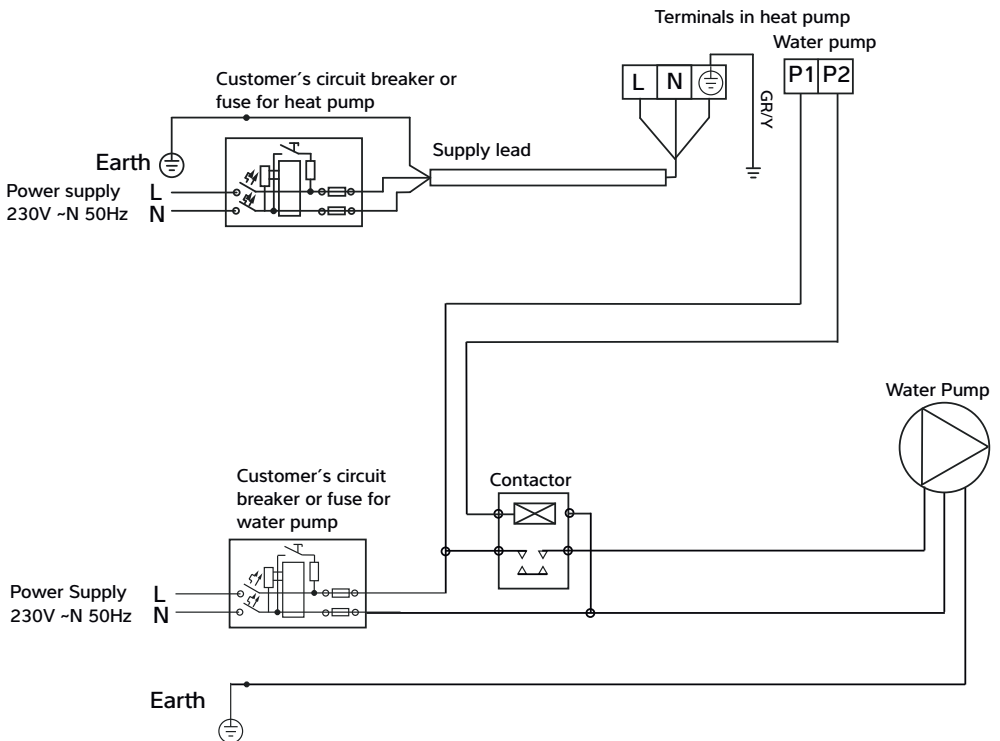
This feature operated by over-riding the time clock for five minutes each hour. This allows pool water to be circulated through the heat pump

During this sampling period if the heat pump detects a need for water heating, it will continue to over-ride the time clock until the pool water temperature is satisfied.

If water heating is not required, the over-ride will stop, and the filter pump will turn off, and not restart until the next hourly sampling period, or pre-set run time.

This feature will reduce the filter pump run time, and consequently save energy as well as unnecessary filter pump wear and tear.







To activate this option please speak to your installer.





5.0 USING YOUR HEAT PUMP

5.1. THE KEY PAD




Symbol	Designation	Function
	On/Off	Power On/Off Wi-Fi Setting
	Unlock Heat Mode	Lock/Unlock Screen Mode switching for heating, cooling or automatic heat/cool.
	Speed Mode	Two mode for switching, Boost  or Whisper 
	Up/Down	Temperature Setting and Display

Attention:



- Standby mode or Screen lock: Only  lights up, screen and other buttons turn dark.
- Power off: Only  lights up, No display on screen.
- The controller has a power-saving function.

5.2. OPERATING INSTRUCTIONS

a. Screen lock

- 1) Press  for 3 seconds to lock or unlock the screen.
- 2) Automatic lock period: 30 seconds if no operation.


b. Power on

- Press  for 3 seconds to unlock screen.
- Press  to power on machine.






c. Temperature setting

- Press  and  to display and adjust the set temperature.


d. Heat Mode selection



- Press  to switch between
- Heating mode
 - Cooling mode
 - Automatic heat cool mode

e. Speed Mode selection

- Press  to switch between Boost mode  and
- Whisper mode. 
- Default mode: Boost. 
- Please choose Boost mode  for initial heating.

f. Wi-Fi







When the screen is on, press  for 3 seconds, after  flashes, enter Wi-Fi connection.

Connect Wi-Fi on mobile phone and input password, then control equipment by Wi-Fi. When APP connects Wi-Fi successfully  light is on. When setting by APP,  flashes.

Clear Wi-Fi setting history:

When screen is on, press  for 10 seconds, after  flashing for 10 seconds,  lights off.

g. Defrosting

1. Automatic defrosting: When machine is defrosting, the  lamp flashes; after defrosting the  lamp stops flashing.
2. Forced defrosting: When machine is heating and the compressor has been running continuously for 10 minutes, press  and  simultaneously for 5 seconds to start forced defrosting. The  lamp flashes and defrost starts, when the  lamp stops flashing defrosting stops.

Note: The minimum interval between periods of forced defrosting should be more than 30 minutes.

Attention: The controller has power-down memory function.

5.3 USING THE APP

a. APP Download



Android mobile please download from



iPhone please download from



b. Account registration

1. Register by mobile or email



c. APP Pairing

2. Email registration

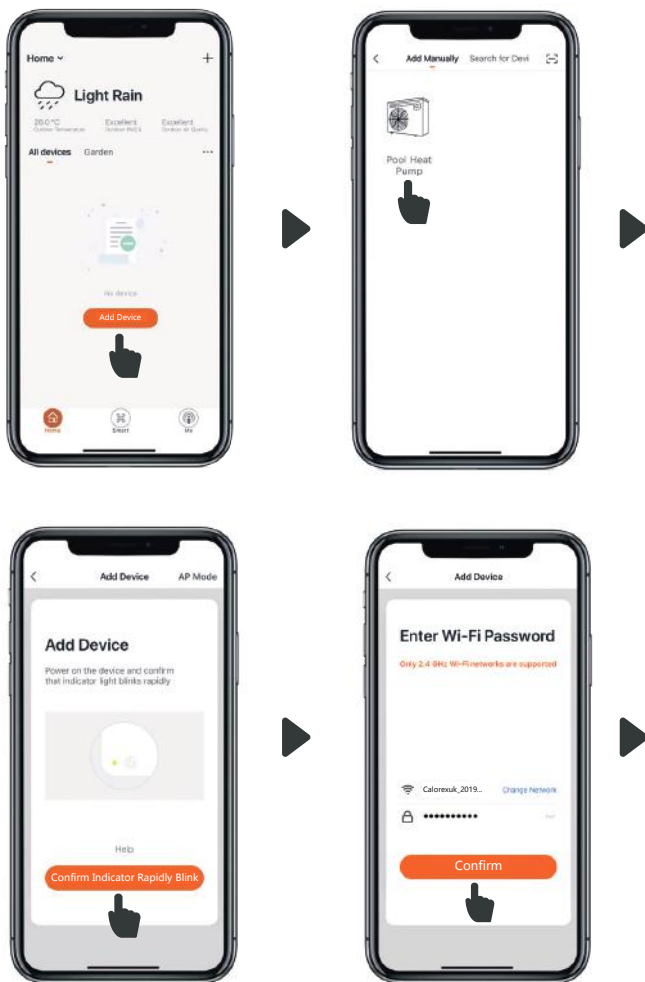


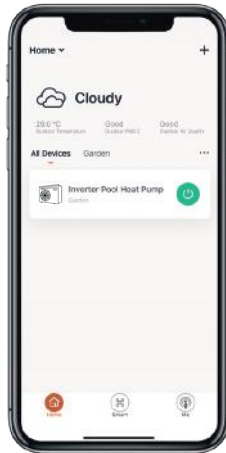
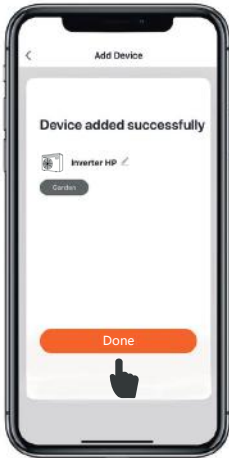
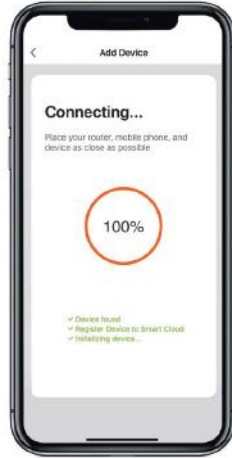
Please make sure you are connected to the Wi-Fi.

1. Press "🔒" for 3 seconds to unlock the screen, press "🔊" for 3 seconds then release, after hearing the "beep", enter Wi-Fi code. During connection, "📶" flashes. When the APP connects to the Wi-Fi successfully, the "📶" light will come on.



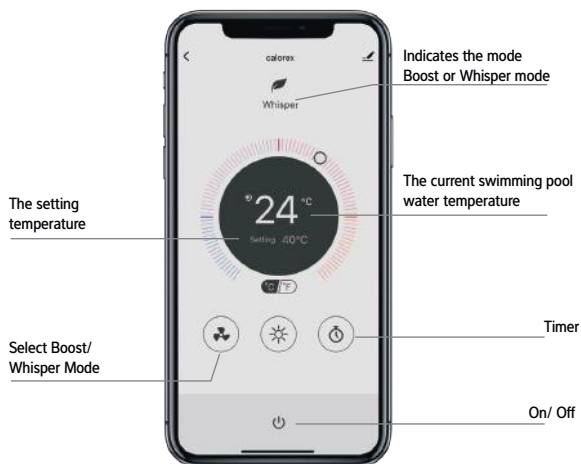
2. Click "Add device", and then follow the instructions to pair the device.



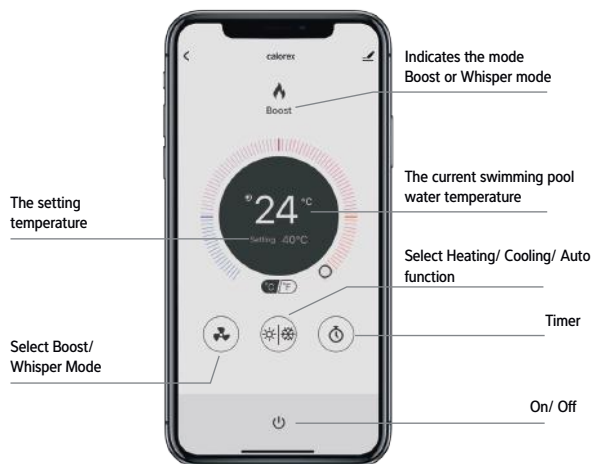


d. Operation

1. For heat pump with heating function only:



2. For heat pump with heating and cooling function:



Notes:

1. The weather forecast is just for reference.
2. The APP is subject to updating without notice.

6.0. TESTING

Inspect heat pump before use

- Check that the fan, air inlets and outlets are not obstructed.
- It is prohibited to install refrigeration pipe or components in corrosive environment.
- Check that the electric wiring conforms to the electric wiring diagram and that the machine is earthed.
- Double check that the main power switch is off.
- Check the temperature setting.

6.1 HEAT PUMP MALFUNCTION

Fault	Reason	Solution
Heat pump doesn't run	No power	Wait until the power is restored
	Power is switched off	Switch on the power
	Fuse has blown	Check and change the fuse
	The breaker is off	Check and turn on the breaker
Fan running but with insufficient heating	Evaporator blocked	Remove the obstructions
	Air outlet blocked	Remove the obstructions
	3 minutes start delay	Wait for the delay timer to time out
Display normal, but no heating	Set temperature too low	Set desired heating temperature
	3 minutes start delay	Wait for the delay timer to time out
Inaccurate switch action.	Stop the machine, and cut off the power supply immediately, then contact your dealer	
The fuse blows frequently or leakage circuit breaker trips frequently		
If above solutions don't work, please contact your installer with detailed information and your model number. Don't try to repair it yourself.		

6.2 PROTECTION CODES

These codes indicate machine stopping due to external circumstances.

These are not faults with the heat pump.

NO.	Display	Reason	Solution
1	E3	No water flow through the heat pump.	Check water circuit and pool pump.
2	E4	Three phase rotation protection.	Check phases connected correctly (Electrician required)
3	E5	Voltage of power supply to heat pump is out of range.	Check the power supply.
4	E6	Low water flow indicated by more than 10°C difference in inlet and outlet temperature.	Check water flow and pool pump.
5	Eb	Ambient temperature is out of range, either lower than -5°C (-10°C Y version) or higher than 43°C.	If outside, wait for ambient conditions to improve (winterisation may be required). If installed in a sheltered place, check for air recirculation.
5	Ed	Frost protection. The heat pump runs in heating mode for a short time when in standby mode to prevent frost build up. This does not replace winterisation.	Heat pump will resume standby once process is completed.

6.3 FAULT CODES

When the heat pump displays these error codes please contact your installer for advice.

NO.	Display	Description of fault code
1	E1	High pressure alarm
2	E2	Low pressure alarm
4	E7	Water outlet temp out of range alarm
5	E8	High exhaust temp alarm
6	EA	Evaporator overheat alarm (only in cooling mode)
7	P0	Controller communication failure
8	P1	Water inlet temp sensor failure
9	P2	Water outlet temp sensor failure
10	P3	Gas exhaust temp sensor failure
11	P4	Evaporator coil pipe temp sensor failure
12	P5	Gas return temp sensor failure
13	P6	Cooling coil pipe temp sensor failure
14	P7	Ambient temp sensor failure
15	P8	Cooling plate sensor failure
16	P9	Current sensor failure
17	PA	Restart memory failure
18	F1	Compressor drive module failure
19	F2	PFC module failure
20	F3	Compressor start failure
21	F4	Compressor running failure
22	F5	Inverter board over current protection
23	F6	Inverter board overheat protection
24	F7	Current protection
25	F8	Cooling plate overheat protection
26	F9	Fan motor failure
27	Fb	Power filter plate - no power protection
28	FA	PFC module over current protection

7.0. MAINTENANCE



Isolate the power supply of the heater before cleaning, examination or repair.

Cover the machine body when not in use.

Please clean this machine with household detergents or clean water, NEVER use gasoline, thinners or any similar fuel.

Check bolts, cables and connections regularly.

Repair, service and disposal of redundant heat pumps must be completed by authorised technicians. It is illegal to allow refrigerant gases to escape to air.

Do not attempt to work on the equipment by yourself. Improper operation may cause danger.

8.0. TROUBLE SHOOTING COMMON FAULTS



Requirements for service personnel

Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, F-Gas registered.

Do not attempt to work on the equipment by yourself.

Strictly comply with the manufacturer's requirements when charging R32 gas. This chapter focuses on special maintenance requirements for swimming pool heat pump with R32 gas. Please refer to the technical service manual for detailed maintenance operation.

The heat pump must be completely de-gassed before any brazing. Brazing must only be carried out by trained personnel.

9.0. DATASHEET

MODEL	UNITS	IPT8 ALX	IPT12 ALX	IPT16 ALX	IPT22 ALX
PERFORMANCE CONDITION: Air 27°C/Water 27°C/RH 80%					
Heating capacity	kW	9.5	13.0	20.0	25.0
COP range		13.2-5.4	13.5-5.6	13.5-5.7	13.8-5.8
PERFORMANCE CONDITION: Air 15°C/Water 26°C/RH 70%					
Heating capacity	kW	7.0	9.5	13.5	17.0
COP range		6.9-4.2	7.0-4.0	7.0-4.2	7.2-4.0
PERFORMANCE CONDITION: Air 35°C/Water 28°C/RH 80%					
Cooling capacity (kW)		3.9	5.2	7.4	9.4
TECHNICAL SPECIFICATIONS					
Operating air temperature	°C	-5°C to 43°C			
Power supply		230V Single Phase			
Rated input power	kW	0.3-1.79	0.40-2.38	0.57-3.21	0.69-4.25
Rated input current	A	1.38-7.58	1.82-10.8	2.60-14.61	3.16-19.32
Maximum input current	A	9.5	12.5	19.5	20
Rated RCD	A	30	30	30	30
Rated fuse/MCB type C	A	16	25	25	25
Sound level at 10m	dB(A)	19.6-31.5	21.9-32.0	24.3-36.1	24.9-36.7
Advised water flow rate	m ³ /h	3.0-5.0	4.0-6.0	7.0-10.0	10.0-12.0
Pool water connections	Inches	1½" or 50mm Female			
Hermetic system					
Refrigerant charge R32	kg	0.6	0.9	1.1	2.0
Net dimensions (w x d x h)	mm	864 x 359 x 648	864 x 359 x 648	954 x 359 x 748	1084 x 429 x 948
Packed dimensions (w x d x h)	mm	950 x 375 x 675	950 x 375 x 675	1040 x 375 x 775	1130 x 445 x 985
Net weight	kg	47	49	68	90

NOTES:

Heat pump performance parameters are subject to change without notice. Always refer to the nameplate.

Global warming potential (GWP) R32 - 675.

OWNER/INSTALLATION MANUAL

MODEL	UNITS	IPT 12 ALY	IPT16 ALY	IPT22 ALY	IPT22 BLY	IPT28 BLY
PERFORMANCE CONDITION: Air 27°C/Water 27°C/RH 80%						
Heating capacity	kW	15.0	21.0	27.5	27.5	36.0
COP range		15.0-6.6	14.8-6.4	15.0-6.5	15.0-6.5	14.8-6.0
Average COP at 50% Speed		10.6	10.3	10.3	10.3	10.2
PERFORMANCE CONDITION: Air 15°C/Water 26°C/RH 70%						
Heating capacity	kW	11.5	14.5	18.0	18.0	23.9
COP range		7.7-4.6	7.1-4.6	7.5-4.6	7.5-4.6	7.5-4.6
Average COP at 50% Speed		6.4	6.3	6.3	6.3	6.3
PERFORMANCE CONDITION: Air 35°C/Water 28°C/RH 80%						
Cooling capacity	kW	6.7	9.5	11.9	11.9	16.0
TECHNICAL SPECIFICATIONS						
Operating air temperature	°C	-10°C to 43°C				
Power supply		230V Single Phase			400V Three Phase	
Rated input power	kW	0.27-2.28	0.41-3.15	0.408-3.91	0.48-3.91	0.64-5.20
Rated input current	A	1.17-9.91	1.78-13.69	2.08-17.00	0.69-5.66	0.92-7.53
Maximum input current	A	13.5	17	20	7	9.5
Rated RCD	A	30	30	30	30	30
Rated fuse/MCB type C	A	16	16	25	10	16
Sound level at 10m	dB(A)	20.8-24.5	20.4-33.7	23.0-34.4	23.0-34.4	22.1-34.2
Advised water flow rate	m ³ /h	5.0-7.0	8.0-10.0	10.0-12.0	10.0-12.0	12.0-18.0
Pool water connections	Inches	1½" or 50mm Female				
Hermetic system						
Refrigerant charge R32	kg	0.9	1.2	2.0	2.0	2.7
Net dimensions (w x d x h)	mm	954x359x648	954x429x755	1084x429x948		1154x539x948
Packed dimensions (w x d x h)	mm	1040x445x655	1040x445x655	1130x445x985		1200x555x985
Net weight	kg	52	68	90	93	120

NOTES:

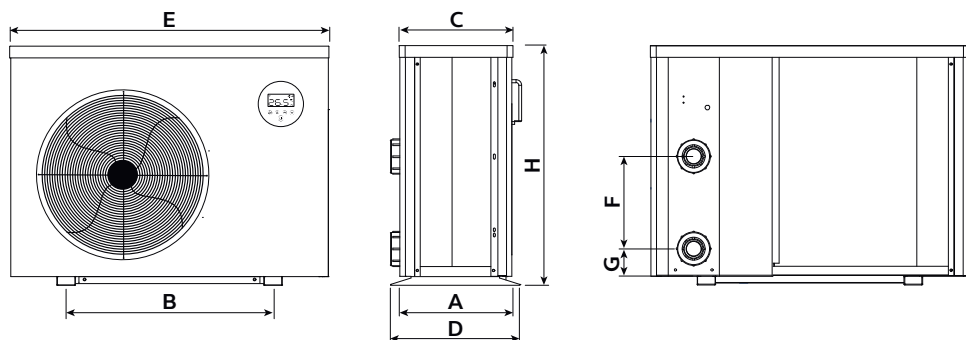
Heat pump performance parameters are subject to change without notice. Always refer to the nameplate.

Global warming potential (GWP) R32 - 675.

The data is subject to modification without prior warning.

The data is subject to modification without prior warning.

10.0. DIMENSIONS



	A	B	C	D	E	F	G	H
IPT8 ALX	334	560	318	359	864	250	74	648
IPT12 ALX	334	560	318	359	864	320	74	648
IPT16 ALX	334	590	318	359	954	390	74	748
IPT22 ALX	404	720	388	429	1084	640	74	948

	A	B	C	D	E	F	G	H
IPT12 ALY	334	590	318	359	954	?	74	648
IPT16 ALY	404	590	388	429	954	460	74	755
IPT22 ALY	404	720	388	429	1084	620	74	948
IPT22 BLY	404	720	388	429	1084	620	74	948
IPT28 BLY	514	790	498	539	1154	650	74	948

11.0 WINTERISATION PROCEDURE

WARNING. Isolate machine before opening! As heat pump embodies electrical and rotational equipment, it is recommended for your own safety that a competent person carries out the following procedure.

(Drain Down Procedure)

ALL MODELS

Objective

To provide frost protection

To eliminate corrosion problems

To inhibit electrical components

1. Switch off electrical supply to heat pump.
2. Remove external fuses and keep in safe place away from heat pump to prevent accidental operation of heat pump.
3. Ensure water circulation pump is switched off.
4. Drain water from heat pump by:
 - a) Drain valve if fitted.
 - b) Disconnecting pipework to and from heat pump.
 - c) Remove condenser drain down cover.
 - d) Flush through water circuit in heat pump by using CLEAN TAP WATER (NOT POOL WATER) via hose into outlet connection – run for 10 minutes minimum, use spray nozzle if available.
 - e) Allow to drain – fit plastic bags secured by elastic bands over water connections.
5. Uncover electrical enclosure (page 14) and liberally spray interior of unit, with moisture repellent aerosol WD-40 or similar, reseal enclosure.
6. If heat pump located outside, protect from weather by covering with VENTILATED cover. A bespoke cover is available. Do not use plastic sheet as condensation can occur within unit.

If this procedure is not adopted and frost or corrosion damage results then the warranty will become invalid.

11.1 START UP PROCEDURE AFTER WINTERISATION

1. Replace covers (if not fitted).
2. Remove front grille – using soft brush clean finned surfaces of heat pump. Replace panel.
3. Remove plastic covers on water connections and reconnect water piping or close drain valve.
4. Start up water circulating pump and leave running for at least ¼ hour to establish flow and enable any air in system to escape.
5. Replace fuses to heat pump circuit.
6. Switch on heat pump.
7. Check control thermostat is set to required pool temperature.
8. Check daily to ensure pool water is at correct pH and has correct chemical balance. See section 3.3 Plumbing.

12.0 WARRANTY CONDITIONS

Where commissioning is provided in the UK and Ireland, this must be carried out by factory trained and approved personnel.

The following exclusions apply to the warranty given by Dantherm Ltd. No claims will be accepted if:

1. The heat pump is installed in any way that is not in accordance with the current procedures as defined by Dantherm Ltd.
2. The heat pump has not been maintained in accordance with the service requirements in the Regular Planned Maintenance section.
3. The heat pump has been worked upon or is adjusted by anyone other than a person authorised to do so by Dantherm Ltd.
4. The heat pump is incorrectly sized for the application.
5. The water flow through the machine is outside the specified limits.
6. The water pH level and/or chemical balance is outside the following limits:

Acidity pH	pH	7.2 - 7.8
Total Alkalinity, as CaCO ₃	ppm	80 - 120
Total Hardness, as CaCO ₃	ppm	150 - 250
Total Dissolved Solids	ppm	1000
Maximum Salt Content	ppm	35000
Free Chlorine Range	ppm	1 - 2 Domestic
Free Chlorine Range	ppm	3 - 6 Commercial
Superchlorination	max	30ppm for 24 hrs
Bromine	ppm	2 - 5
Baquacil	ppm	25 - 50
Ozone	ppm	0.9 Max
Maximum Copper Content	ppm	1
Aquamatic Ionic Purifier	ppm	2 Max

7. The heat pump has suffered frost damage.
8. The electrical supply is insufficient or in any way incorrect.
9. The fan amps and duct pressure are outside the specified limits.
10. The air flow to and from the machine is outside the specified limits.

If in doubt or if advice is required please contact the Dantherm Group UK Service Department by calling +44 (0)1621 856 611 (option 4) or email service.department@dantherm.com

Note: The Reply Paid Warranty Registration Card must be returned, to ensure that the correct warranty is given. If you do not find a Registration Card with your heat pump please contact the Dantherm Group UK Service Department giving your name, address and serial number of your heat pump. A card will be sent to you for completion.

Please give **MODEL NUMBER** and **SERIAL NUMBER** of your heat pump when making technical or service enquiries. This will assist in correct diagnosis and ensure service can be provided with the minimum delay.



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Calorex is a brand of
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