OWNER/INSTALLATION MANUAL
FOR

PPT8/12/16/22L/LY

(SD617650 Iss.B 12/03/10)

Health and Safety Warning:
As the heat pump includes electrical and rotational components it is required that only trained and competent persons should remove panels giving internal access to the unit.

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Thank you for choosing Calorex!

Your Calorex heat pump has been specially designed for pool heating using high quality components that are carefully chosen to provide maximum efficiency and reliability. Please read this manual carefully as it provides useful operation and maintenance information that will maximise the benefits your Calorex heat pump can offer.

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1.0 Introduction

The Calorex 'Propac' range of air to water heat pumps is designed for swimming pool heating and consists of 4 models. Heat pumps in this manual are designed to heat pool water and spas within the range of 10°C to 40°C. Standard units are suitable for outdoor pools operating in ambient temperatures above 10ºC. Reverse cycle defrost models operate in ambient temperatures down to -15ºC.The water heat exchanger is a full flow type, manufactured from titanium tube, which is a highly corrosion resistant material. The heat pumps are suitable for use in fresh water and salt water pools. PPT8/12 heat pumps are fitted with rotary compressors and PPT16/22 heat pumps are fitted with scroll compressors. Both types of compressor are known for quiet running. A 6 minute compressor start delay timer is incorporated for compressor protection. With these features the heat pump is designed to have a long, trouble free life.

All units have integral safety devices to protect the heat pump from internal and external faults. Indicator lamps indicate operating mode. An adjustable digital thermostat controls water temperature.

Calorex Heat Pumps Limited is an ISO9001:2000 certified company.

All Calorex heat pumps are CE approved

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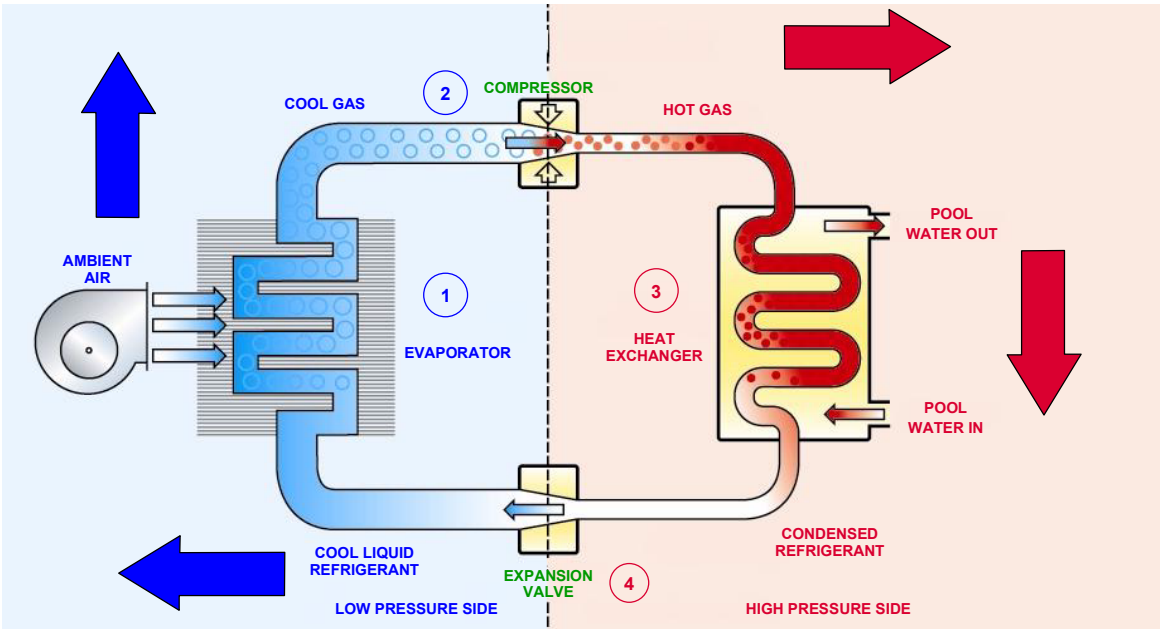
1.1 Function

The Calorex Swimming pool heat pump provides thermodynamic heating by means of a vapour compression cycle, (similar to that employed in a conventional refrigerator), in addition to acting as an active solar collector.

1. THE EVAPORATOR collects the heat from the outside ambient air, pre-heated by the sun. In the Calorex swimming pool heat pumps, high volumes of outside air are drawn into the unit by the fan expelled through the evaporator fins. The evaporator has liquid refrigerant passing through it which is at a considerably lower temperature than the ambient air. Therefore the air gives up its heat to the refrigerant which then vaporises.This preheated vapour now travels to -

2. THE COMPRESSOR where it is compressed and upgraded to a much higher temperature. The hot vapour now enters -

THE HEAT PUMP CYCLE



4. THE EXPANSION DEVICE and from there, now at normal pressure, it is returned to the evaporator and the cycle starts again.

3. THE CONDENSER where it is surrounded by the pool water. The heat is given up to the cooler pool water and the now cooler refrigerant returns to its former liquid state but still under high pressure from the compressor.

This pressure is released by passing the liquid through -

Coefficient of Performance

The efficiency of a Heat Pump is usually called its 'Coefficient of Performance' - (C.O.P.) which is simply a ratio of heat output to energy input, both being expressed in kW. Thus a Heat Pump absorbing 1 kW of electricity, collecting 4 kW of energy from the air, and delivering 5 kW of heat to the pool water is said to have a C.O.P. of 5:1.

This ratio will vary according to the temperature of the water and the ambient air.

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2.0 Installation

a) Ensure heat pump on site is as ordered, i.e. model, electrical supply and factory fitted options.

b) Inspect unit for damage, in particular inspect the evaporator (finned side) to ensure that it is undamaged. (Minor indentations in the fins do not affect performance). If severely damaged, endorse delivery note in presence of the driver and send a recorded delivery letter to transport company giving details. Protect unit if installation is delayed.

2.1 Siting

a) Provide a firm level base capable of supporting operational weight of unit; spread load if mounted on timber floor.

b) Ensure water cannot collect under unit, it is recommend that units are installed on plinths 100mm above finished floor level. This also aids condensate drainage.

c) Allow adequate clearance to service panels on unit; recommend 500mm minimum.

d) All Calorex heat pumps are by design as quiet as is practical, however due consideration should be given to siting the heat pump in order to minimise the noise coming from the machine, for example by positioning the machine so that the inlet/outlets are parallel to occupied premises.

e) Ensure loose debris such as leaves, grass cuttings, etc will not block air inlet grilles.

f) Consider protection from extreme weather conditions if installed externally, i.e. lean-to-cover or building

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2.2 Air flow

Due consideration must be given to air flow i.e. do not obstruct inlet or outlet and ensure discharge to air cannot recirculate to inlet. (See below).

POSSIBLE POSITIONS OF A CALOREX HEAT PUMP

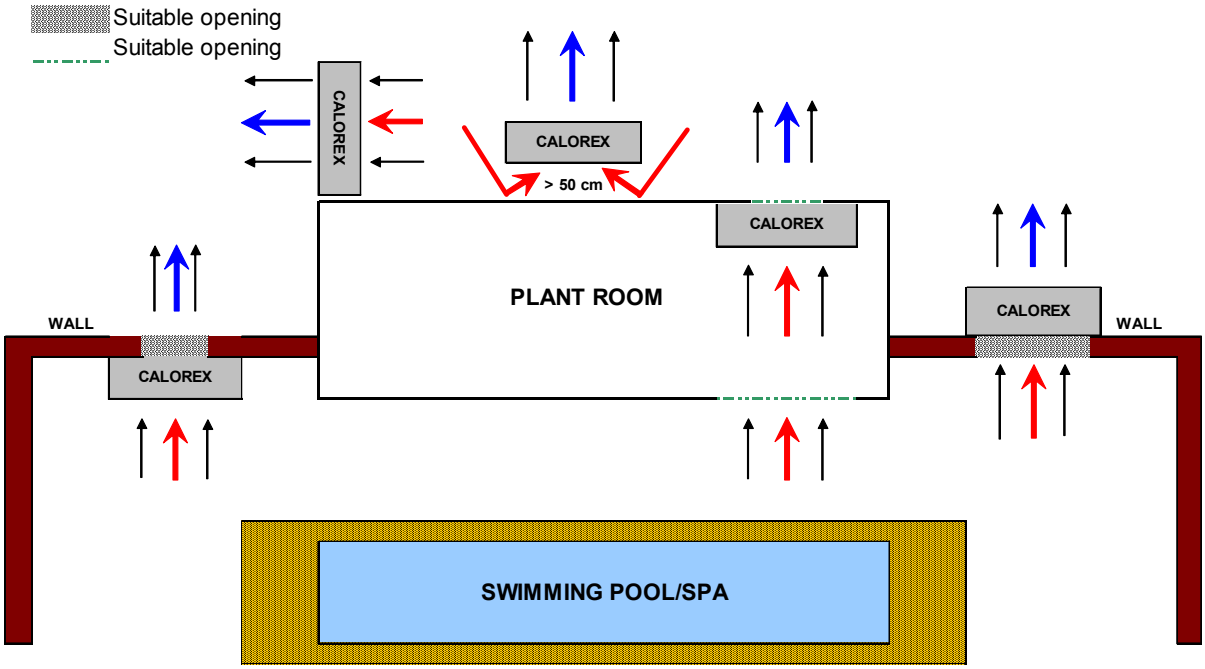

TABLE 1

MODEL	Minimum Free Area m²	
	Inlet	Discharge
PPT8	0.157	0.168
PPT12	0.264	0.168
PPT16	0.264	0.173
PPT22	0.308	0.173

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

IMPORTANT

If multiple units are installed in an enclosed area then the inlet free areas required for each unit can be added together to form one inlet aperture. BUT discharge from each unit must be kept separate and must not be incorporated into one common duct system.

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3.0 Plumbing

a) Calorex Heat Pumps have water inlet/outlet connections as follows:

All models have 1½" BSP parallel, male threads.

b) The heat pump is supplied with bungs fitted in the water connection fittings These need to be removed before the heat pump is installed. (See section 3.2).

c) The Calorex Heat Pump must be connected after the filter in the return pipe to the pool. If an existing heater is being retained, then the Calorex Heat Pump should be connected between the filter and the other heater. (See section 3.1).

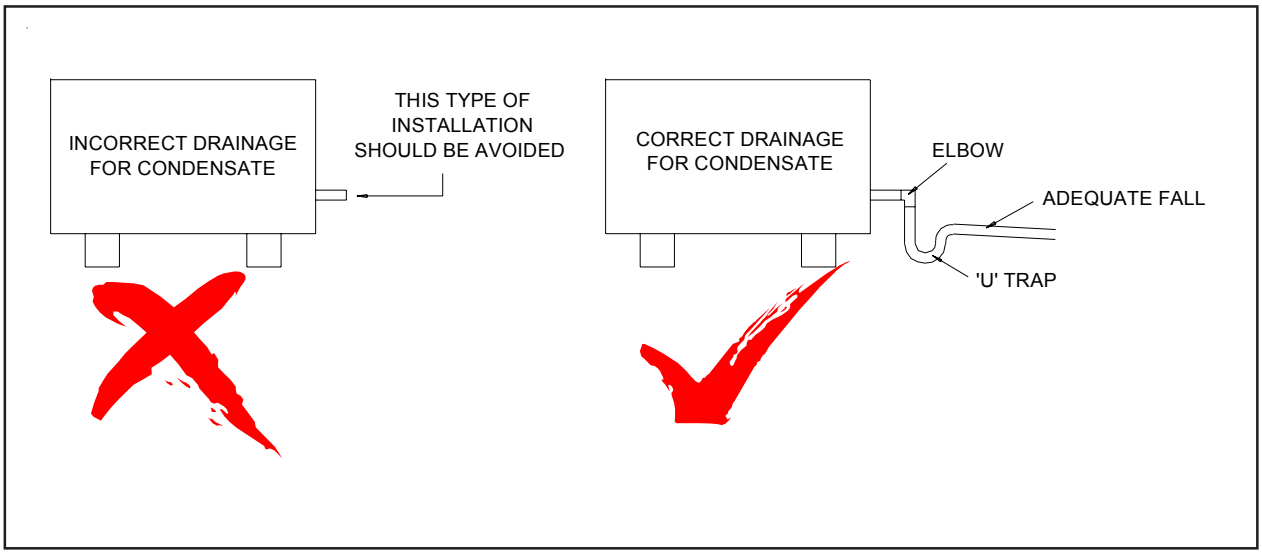
d) Suitable breakable couplings should be installed local to the heat pump.

e) If the heat pump is installed at a lower level than the pool then isolation valves should be fitted.

f) A drain valve or plug should be fitted to the lower pipe to facilitate drain down in the winter period.

g) Connections on all models are by BSP parallel male threaded fittings. These should be hand tightened only, otherwise damage may result to the threads of the plastic fittings.

h) The condensate drain at the base of the unit collects condensation from the evaporator fins. This should run away to waste via ¾" domestic waste piping. It is therefore necessary to ensure that the Calorex Heat Pump is placed on a level plinth so that the condensate water can run away with adequate fall to waste i.e. ½" per foot minimum and must incorporate a "u" trap as to not overflow the edges of the drip tray inside the heat pump. See below.



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i) When the pipework installation is complete the pool pump should be switched on and the system tested for leaks. Also check the filter gauge to see that there is not an excessive increase in back pressure. If everything is then working normally the water circulating system is ready for use.

j) Water circuit to and from the unit is to be capable of maintaining within specified limits the rate of flow required by the heat pump. (See section 10).

k) All pipework must be adequately supported with allowance expansion/ contraction especially with plastic pipework.

l) It is recommended that when installing water systems the last connections to be made in the system should be breakable connections to avoid any stresses on the unit connections.

IMPORTANT

1. All Pool Purifying Devices and Chemical Injection Systems to be fitted down stream of the heat pump (see section 3.1) unless installation is as per filter dosing. This includes the practice of dosing chemicals direct into skimmer basket, which results in concentrated corrosive liquids passing over vulnerable metal components.

2. Water quality must be maintained as follows:

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 Max
Maximum Salt Content	ppm	35000 Max
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

3. Maximum pressure of water in heat pump circuit should not exceed 2.5bar for PPT8/12 (35 psi) and 3.5bar for PPT16/22 (50 psi).

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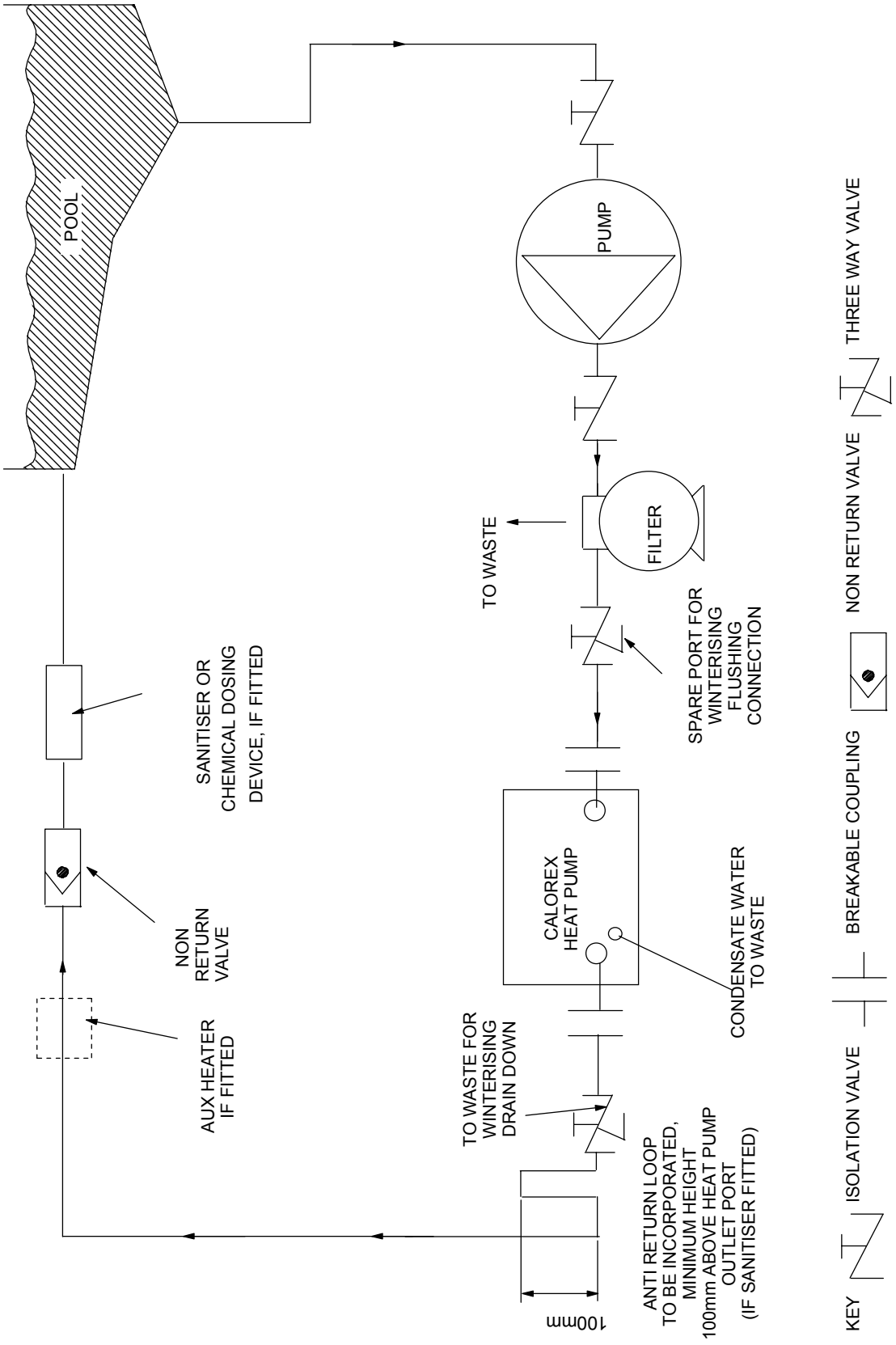
3.1 Recommended Plumbing Schematic



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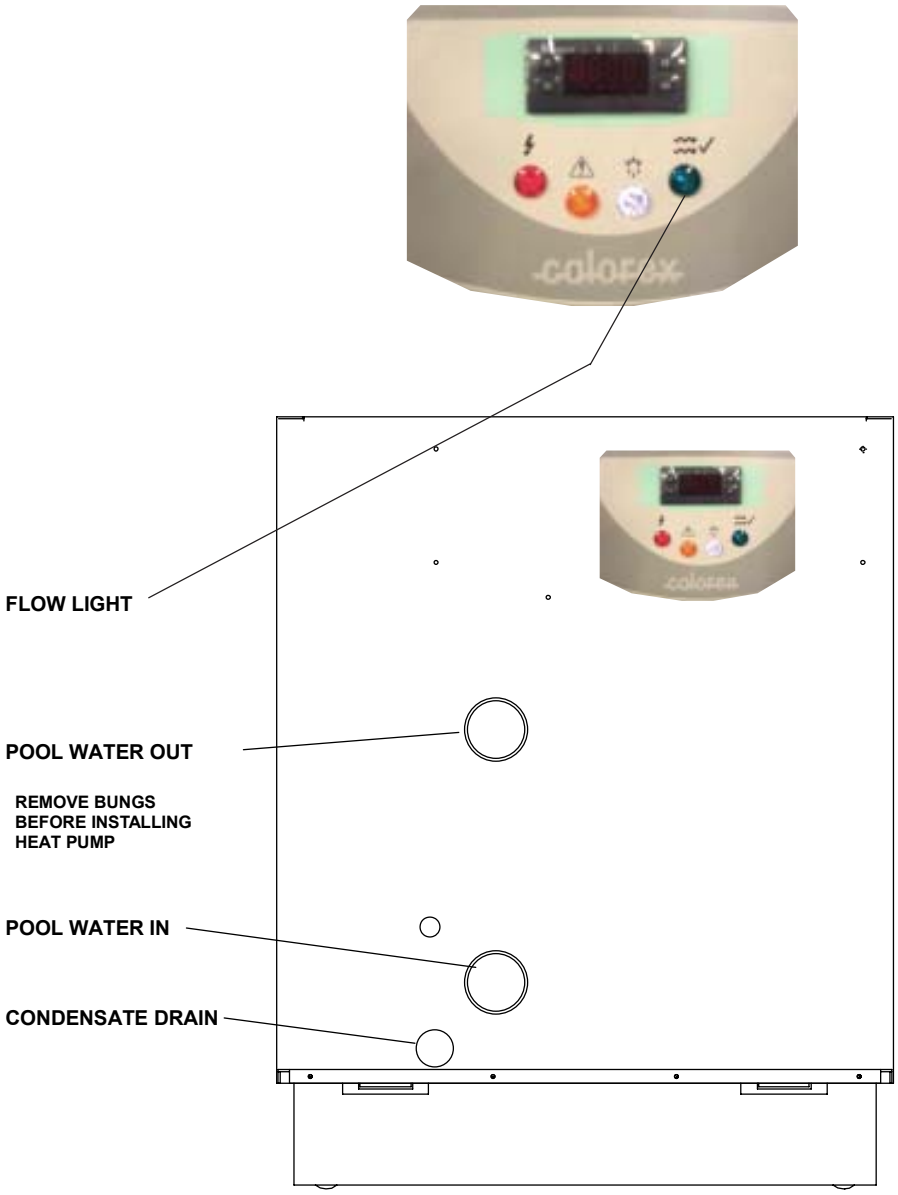
3.2 Determining Water Flow

The heat pump is fitted with a water flow switch which inhibits the operation of the heat pump when the water flow is below 5000l/h (83.33l/min). Adjust the flow rate until the flow light (green lamp) is illuminated. This lamp indicates that the water flow through the heat pump is adequate.



HEAP PUMP SIDE

PPT8/12 FLOW RATE 115 litres per minute
PPT16/22 FLOW RATE 123 litres per minute

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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.

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4.1 Electrical (Machine Wiring and Supply)

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

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

Protected supply to incorporate fuses or motor type circuit breakers (Type C) to specified rating, (see Data Sheet). H.R.C. fuses are recommended. An isolator which disconnects all poles must be fitted within 2m and in sight of machine.†

All units must be correctly earthed-grounded. An earth leakage trip of the Current operating type (30mA) is recommended to be fitted to all pool electrics.

INCONSISTENT ELECTRICAL SUPPLY

The following limits of operation must not be exceeded if Calorex machines are to be guaranteed either in performance or warranty terms:

	Minimum	Maximum
Voltage single phase	207V	253V
Voltage three phase	360V	440V
Frequency - Hz	47,5	52,5

This voltage must be made available at the heat pump while running.

† Note the Isolator must have a minimum of 3mm air gap when turned off.

NOTE: Three phase heat pumps are fitted with a phase protection relay and will not run if the phases are not connected in the correct order (phase sequence) or if the supply voltage is 15% less than the nominal voltage (415V for 3N~ 50Hz). The lamp on the phase rotation relay (situated in the electric box is illuminated when the phases are correctly connected and the voltage is sufficient.

IMPORTANT

The user should be made aware that THE WHOLE installation should be isolated when working on ANY PART.

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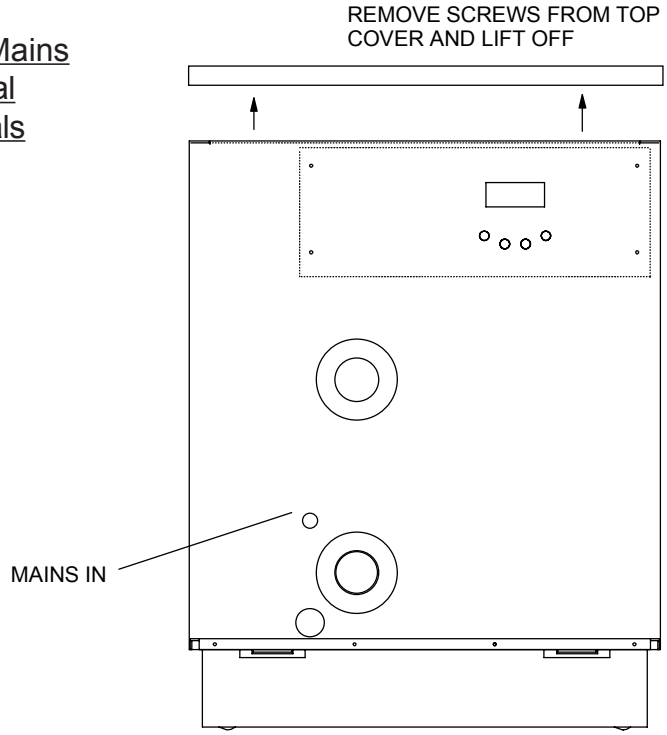
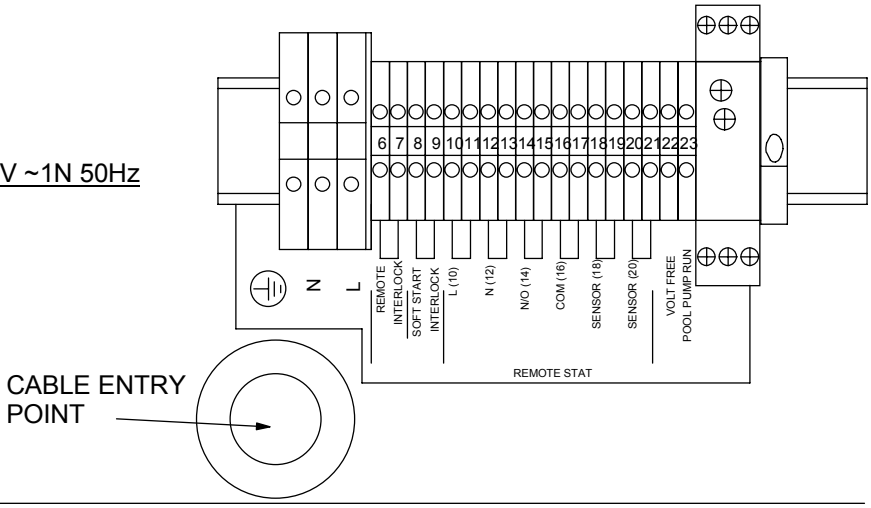
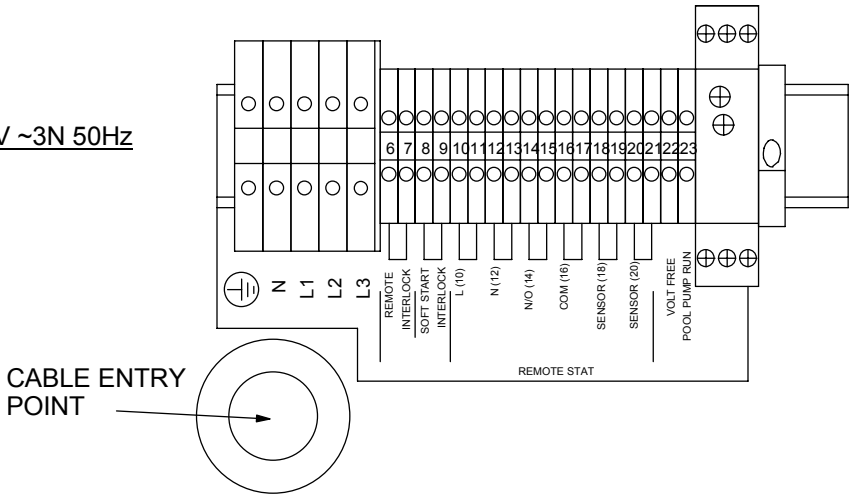
4.2 Location of Mains Input and External Interlock Terminals



SINGLE PHASE 230V ~1N 50Hz



THREE PHASE 400V ~3N 50Hz



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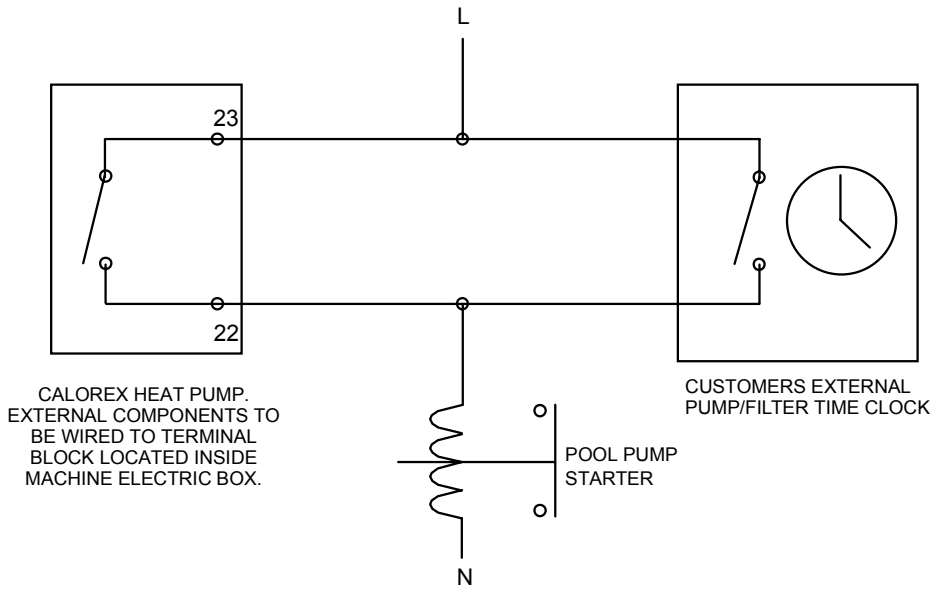
4.3 Pool Pump Synchronisation

For installations where the filter pump, which also priovides water to your heat pump, is controlled by a time clock (supplied by the installer) your Calorex heat pump can overridde “pump off” periods set on the time clock so that the filter pump will run if your swimming pool requires heating. 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 operates by overriding the filter pump time clock for three minutes each hour so that water is pumped through the heat pump. If during this sampling period the heat pump detects a need for water heating it will continue to override the time clock until the swimming pool temperature is satisfied. If water heating is not required the filter pump will turn off after the three minute sampling period and not restart untl the next hourly sampling period or time clock pre set run time. This feature will reduce filter pump run time and consequently save energy as well as unnecessary filter pump wear and tear.



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5.0 Controls and indication lamps

CONSOLE

	MAINS	RED	Electrical supply on
	FAULT	AMBER	Internal or external fault condition
	DEFROST	WHITE	Defrost Mode
	WATER FLOW	GREEN	Water flowing at adequate rate

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5.1 Digital Thermostat

An adjustable single stage digital thermostat controls and maintains the water temperature.

Press and release the P key to display required temperature. To alter required temperature press the up or down keys. After 5 seconds the display reverts to actual water temperature.

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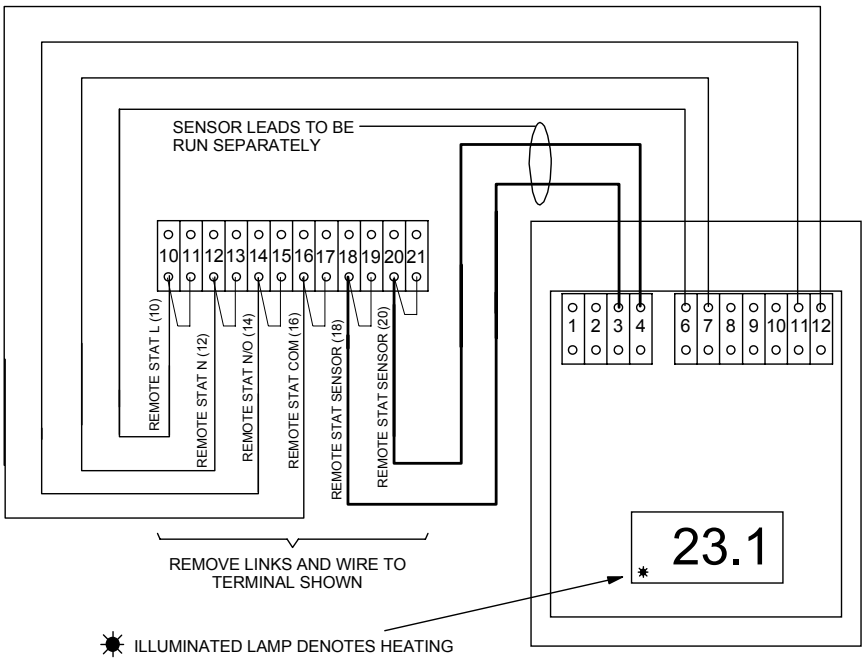
6.0 Optional Features

6.1 Remote Thermostat

A remote thermostat kit is available which allows the user of the heat pump to control the setting of the heat pump away from the heat pump, for example from inside the home. Please note the thermostat is rated at IP40 and is not suitable for outdoor use.

With the heat pump isolated electrically, remove lid from heat pump and disconnect the links as shown. Connect wires between heat pump and remote thermostat as shown in the diagram below. See label inside thermostat cover for further information. When correctly connected replace lid of heat pump and restore power to the heat pump.



To change the temperature press and release the P key to display required temperature. To alter required temperature press the up or down keys. After 5 seconds the display reverts to actual water temperature.

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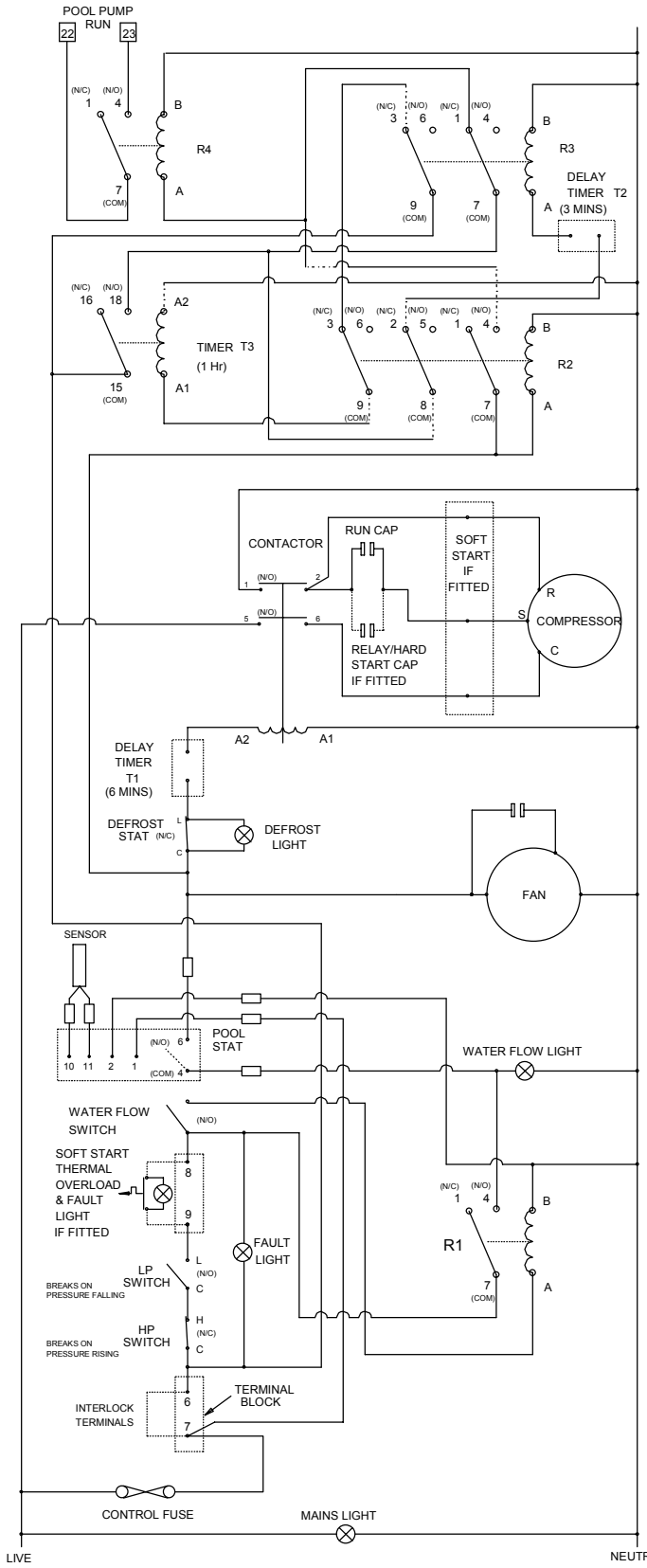
7.0 Circuit Diagrams PPT8/12 AL SINGLE PHASE 230V~1N 50Hz



FUSE RATINGS

MODEL	FUSE
PPT8AL	3A
PPT12AL	3A

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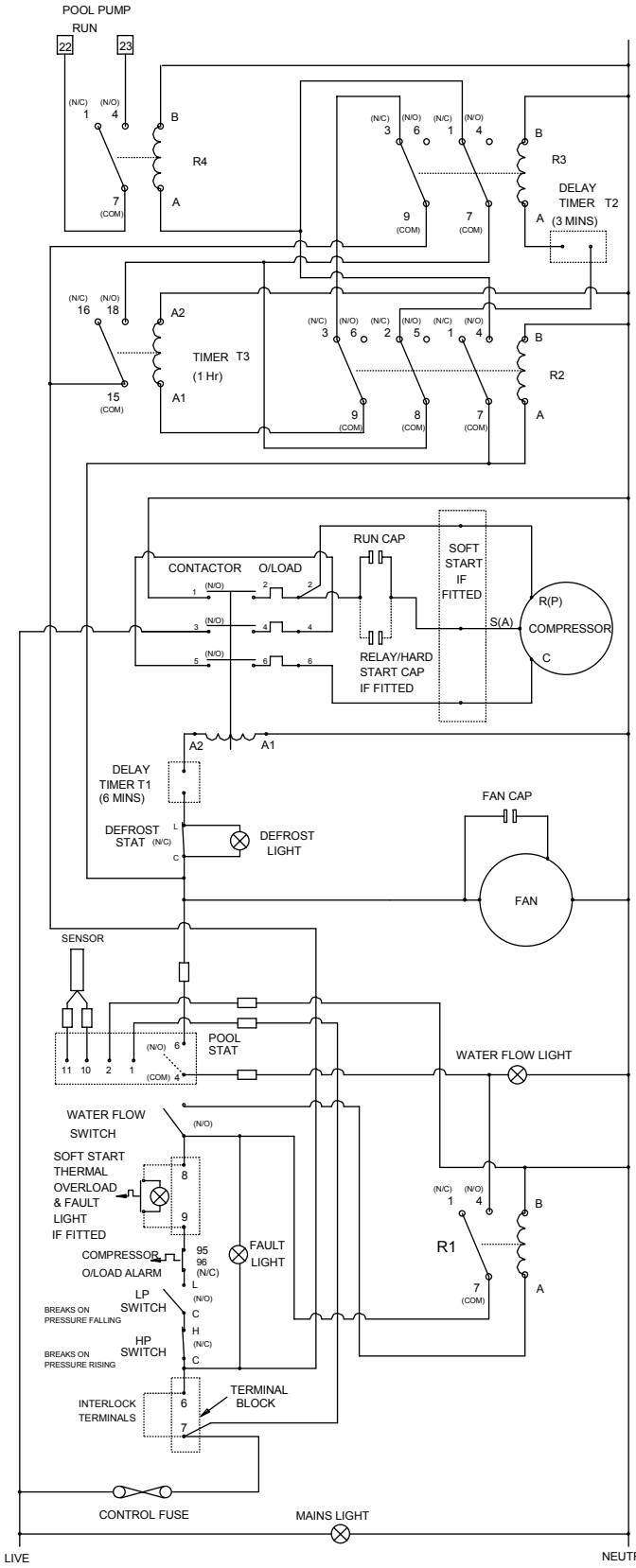
PPT16/22 AL SINGLE PHASE 230V~1N 50Hz



FUSE RATINGS

MODEL	FUSE
PPT16AL	3A
PPT22AL	3A

OVERLOAD SETTING

MODEL	
PPT16AL	23.9A
PPT22AL	29.7A

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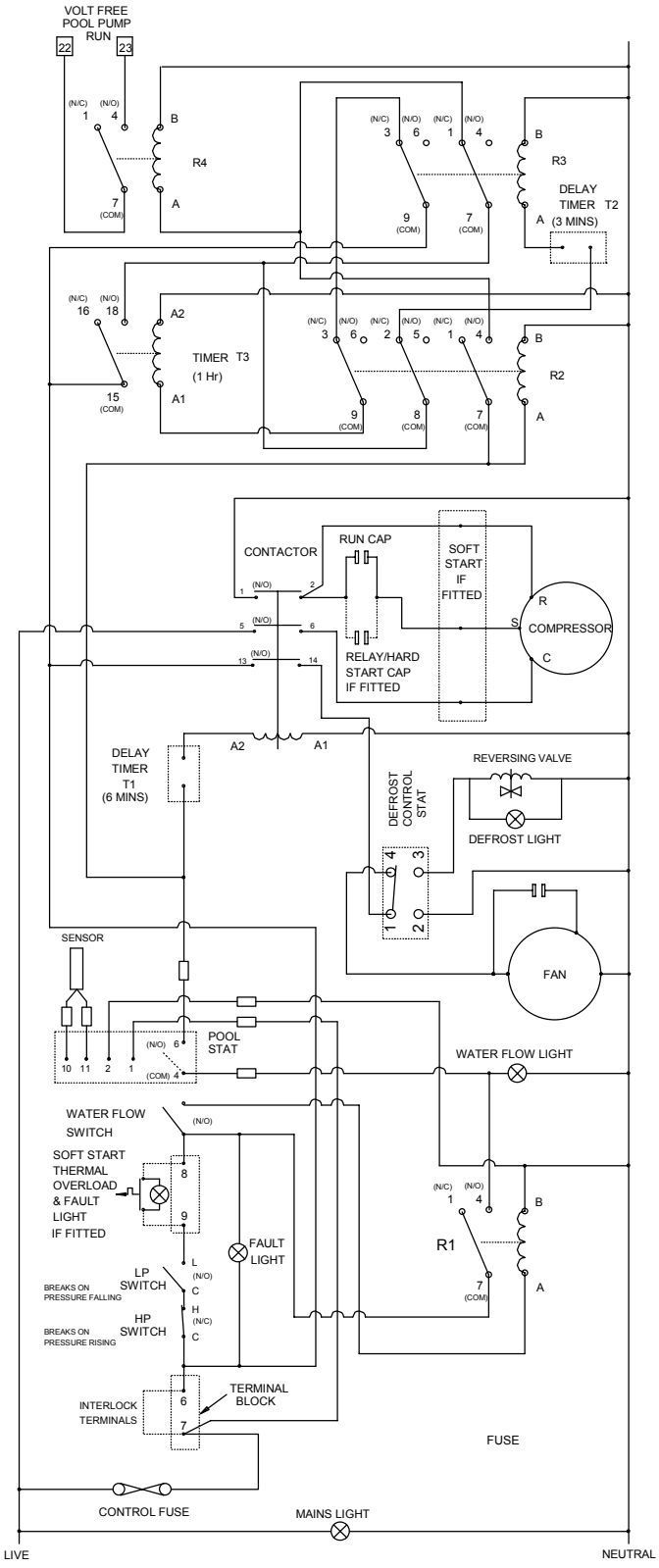
PPT8/12 ALY SINGLE PHASE 230V~1N 50Hz



FUSE RATINGS

MODEL	
PPT 8ALY	3A
PPT 12ALY	3A

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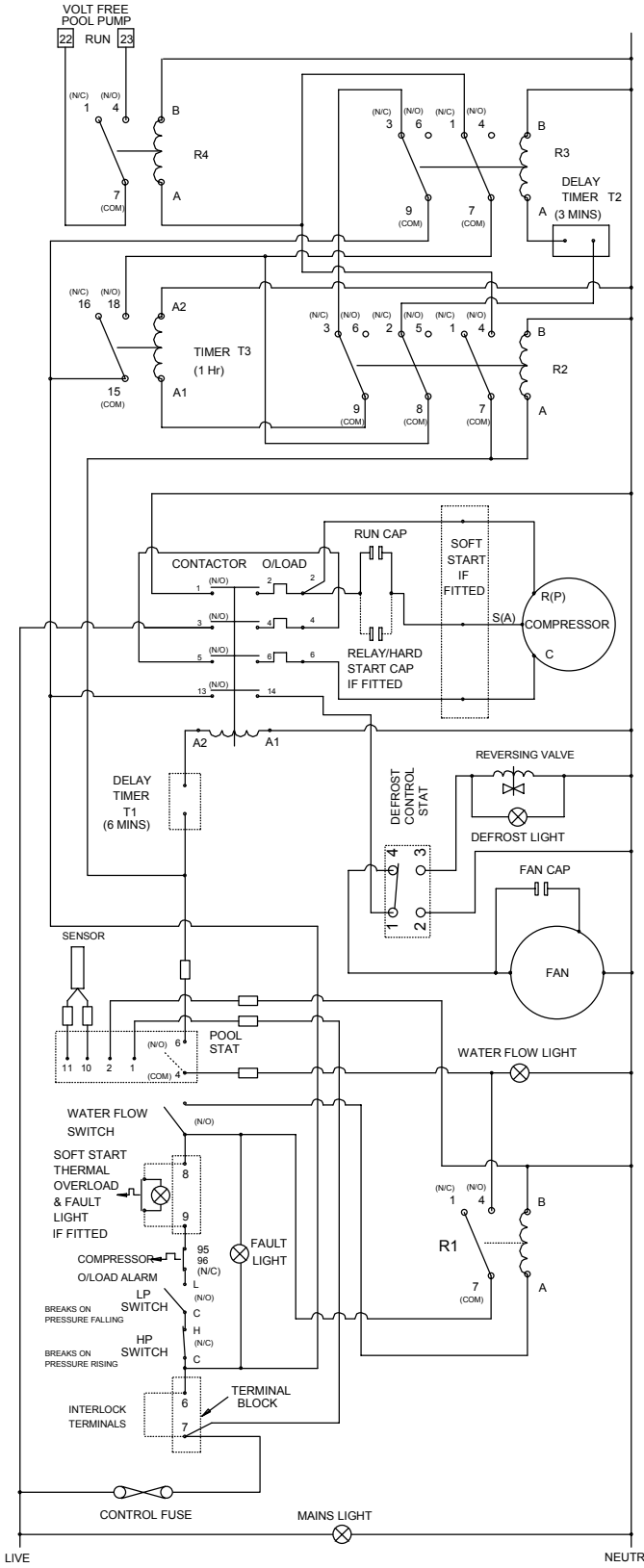
PPT16/22 ALY SINGLE PHASE 230V~1N 50Hz



FUSE RATINGS

MODEL	FUSE
PPT16ALY	3A
PPT22ALY	3A

OVERLOAD SETTING

MODEL	
PPT16ALY	23.9A
PPT22ALY	29.7A

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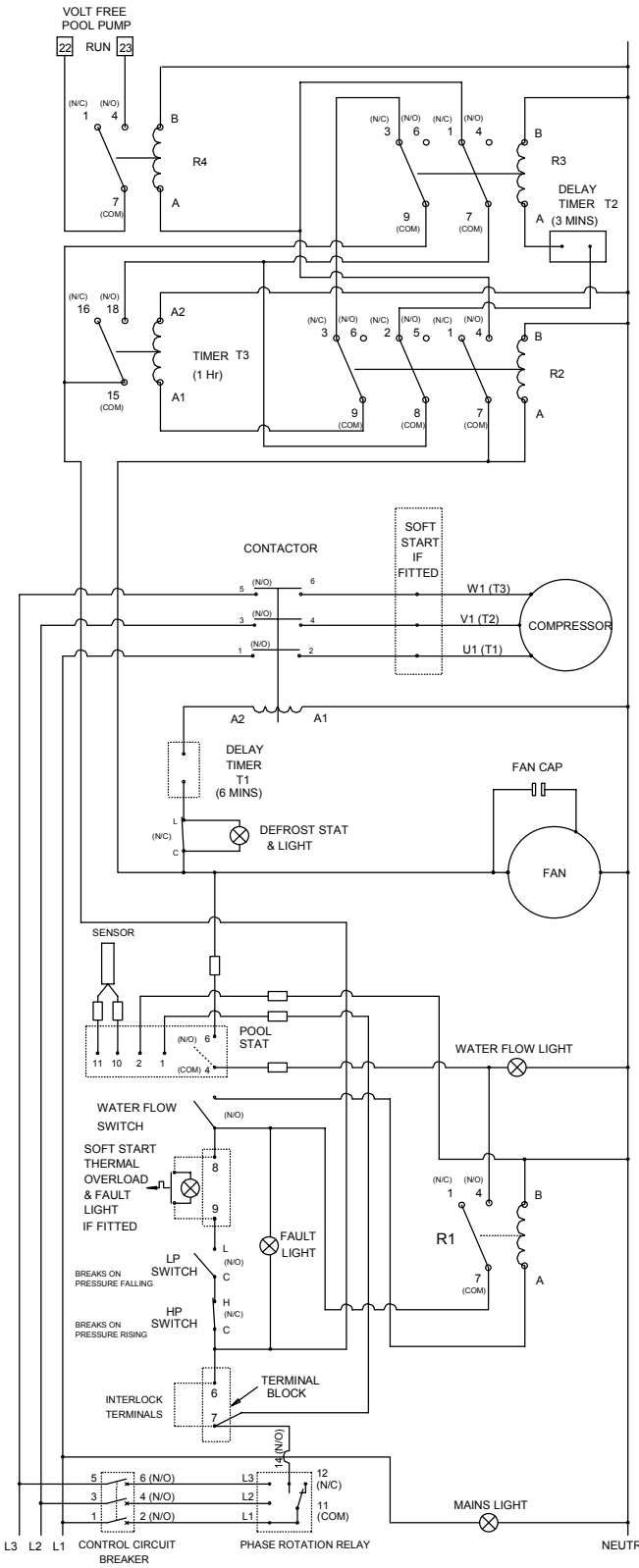
PPT8/12/16/22 BL THREE PHASE 400V~3N 50Hz



MCB SETTING

MODEL	FUSE
PPT8BLY	2.5A
PPT12BLY	2.5A
PPT16BLY	2.5A
PPT22BLY	2.5A

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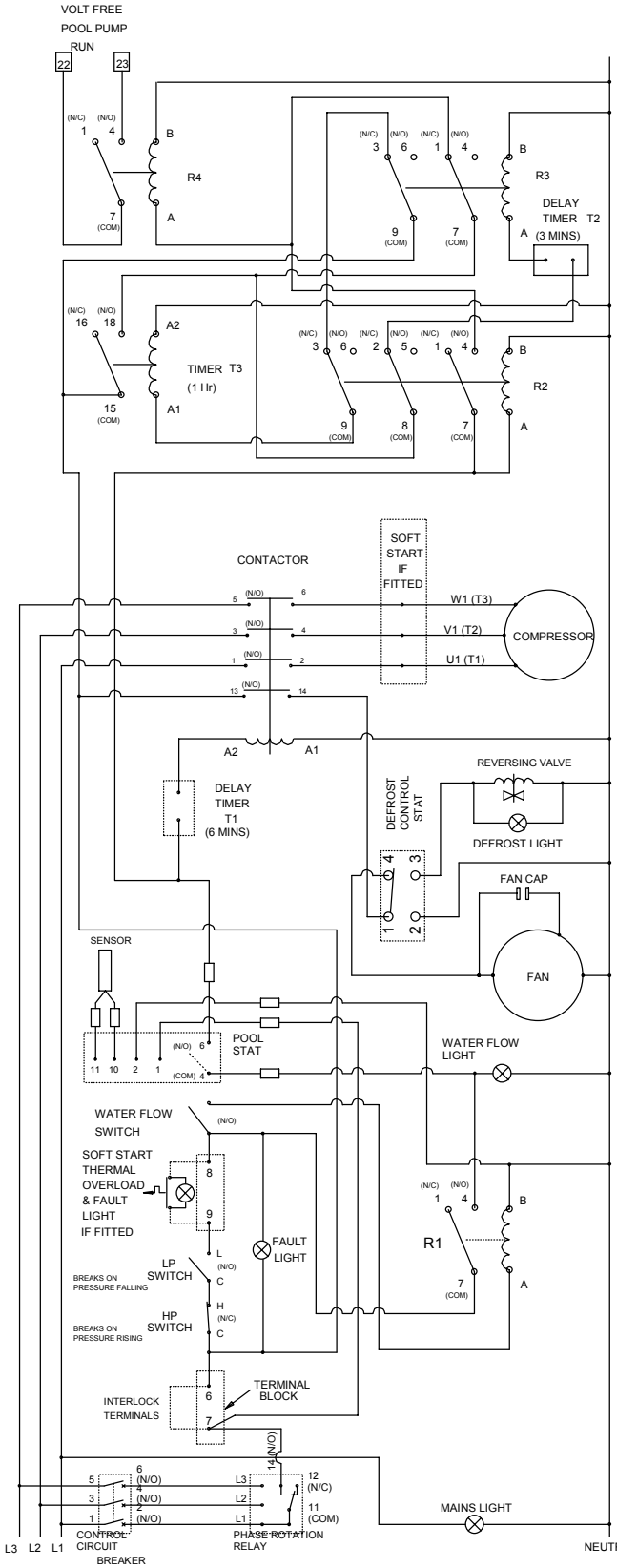
PPT8/12/16/22 BLY THREE PHASE 400V~3N 50Hz



FUSE RATINGS

MODEL	FUSE
PPT8BLY	2.5A
PPT12BLY	2.5A
PPT16BLY	2.5A
PPT22BLY	2.5A

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8.0 Regular planned maintenance

Operations to be carried out during a regular planned maintenance visit are as follows:

1) Clean the evaporators. (This action may be required more frequently than regular servicing).
2) Check operation of fans and compressors.
3) Check capacitor tolerances - where fitted.
4) Check condition of all heat exchangers/evaporators.
5) Check refrigeration system parameters.
6) Check operation of control valves.
7) Check for water leaks.
8) Check driptrays and internal drain lines for blockages and clear.
9) Check operation of controls and calibrate if necessary.
10) Check operation of interlocks in use.
11) Final check of overall operation of unit
12) Indicate on Service report any faults found or causes for concern.
13) Recommended servicing frequencies:
    - Light to medium use: one visit per year
    - Heavy use: two visits per year

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9.0 Heat Pump Malfunction

WARNING: Isolate heat pump electrically before entering heat pump or removing panels.

The user check list should be carried out before initiating a service call.

Do not attempt to interfere with any internal control settings as these have been factory calibrated and sealed.

Any sign of abnormal operation such as water dripping should be reported immediately to an installer or Calorex. If in doubt or if advice is required contact Calorex Service Department.

9.1 User Check List

LAMP				ACTION
UNIT DOES NOT OPERATE				
MAINS	RED		OFF	Check mains supply- external fuses - isolator etc.
FAULT	AMBER		OFF	
DEFROST	WHITE		OFF	
WATER FLOW	GREEN		OFF	
MAINS	RED		ON	Water flow inadequate or faulty flow switch.
FAULT	AMBER		OFF	
DEFROST	WHITE		OFF	
WATER FLOW	GREEN		OFF	
MAINS	RED		ON	First check water flow, then Check unit control fuse on single phase machine. Check MCB on three phase machine
FAULT	AMBER		OFF	
DEFROST	WHITE		OFF	
WATER FLOW	GREEN		OFF	
MAINS	RED		ON	Check water and air flows are not restricted. Check thermal cut out on Soft Start if fitted and that air flow is not restricted. Check unit control fuse on single phase machine. Check MCB on three phase machine.
FAULT	AMBER		ON	
DEFROST	WHITE		OFF	
WATER FLOW	GREEN		OFF	

CONTINUED OVERLEAF

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LAMP				ACTION
FAN ON COMPRESSOR OFF				
MAINS	RED		ON	Unit on defrost (heating mode) check that air temperature is not below 7°C.(-15ºC for Y models)
FAULT	AMBER		OFF	Check evaporator is clean.
DEFROST	WHITE		ON	
WATER FLOW	GREEN		ON	
UNIT OPERATES INTERMITTENTLY				
MAINS	RED		ON	Check water and air flows are not restricted, and that electrical supply is adequate.
FAULT	AMBER		ON/OFF	Check airflow to machine.
DEFROST	WHITE		OFF	Check that linked in external equipment is not the cause of the fault.
WATER FLOW	GREEN		OFF	

9.2 Outdoor swimming pool heat pump checklist

Check the status of the warning lights. During normal operation:

The RED mains light should be illuminated

The GREEN water flow light should be illuminated

The AMBER fault light should **not** be illuminated

The WHITE defrost light should **only** be illuminated in cold ambient conditions and when the heat pump is carrying out a defrost.

Mains light

If the RED mains light is off, power is not connected to the unit.
This light is wired between the incoming live and neutral cables and therefore illuminates when the incoming supply is healthy.

Water flow light

If the GREEN water flow light is not illuminated, check for adequate water flow through the heat pump. Ensure the flow rate from the water pump exceeds the minimum requirements. Ensure that the pool water bypass valve (if applicable) is sufficiently closed to achieve minimum flow, isolating valves to/from the heat pump are fully open and that the sand filter does not require backwashing.

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Defrost light	If the WHITE defrost light is illuminated, the heat pump is carrying out an automatic defrost to remove ice formed on the evaporator. In air temperatures below 15ºC, automatic defrosting may occur as part of the normal operation of the heat pump. If abnormal defrost operation is observed, or in air temperatures above 15ºC: a) Check that the heat pump is installed such that exhausted cold air leaving the heat pump can not recirculate back into the heat pump air inlet. This can be checked by measuring the air temperature at the point where it enters the heat pump and comparing this to the actual ambient air temperature. They should be the same. If the temperature of the air entering the heat pump is lower, recirculation is occurring. This will cause premature defrosting and poor performance. b) Check that the airflow is not restricted by nearby obstructions, that the air inlet is free from debris and that the evaporator coil is clean. If dirty, clean with a soft brush. Greasy debris can be removed with a mild chemical cleaner and pressure washer.
Fault light	a) The heat pump has lost its refrigerant gas. This can be checked by measuring continuity across the low pressure switch (see manual for details of pressure switch position). If the heat pump has lost its gas a specialist refrigeration technician should investigate further. b) When fitted with a soft-start, if the soft-start cut-out has activated.
Indication lights correct, but no operation	a) If the RED mains light is illuminated but the digital display is off, check the 3 amp control fuse (single phase units) or control circuit breaker (three phase units) in the electric box. b) Check external devices connected to the interlock. Examples of these devices are an external time clock or volt free terminals on the filter pump contactor, which would be wired across the terminals labelled as “interlock” on the terminal block in the heat pump electric box. These devices can intentionally prevent the heat pump from operating. c) Check thermostat set point is higher than the measured water temperature. If the thermostat is not satisfied with the temperature, the red LED above the label “Out” on the digital display will be illuminated. d) If the compressor attempts to start then stops very quickly, it is possible that the power supply to the heat pump is delivering inadequate voltage. This will occur if the voltage drops below 380 volts. It could be caused by either an inadequately sized cable or general problems with the voltage supply on site.

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Three phase units only:

e) Three phase units incorporate a phase rotation and voltage sensing relay. If the RED mains light is illuminated but the digital display is off, check the red lamp (situated on the phase rotation relay located within the electrics box) indicating correct phase connection is illuminated. If this light is not illuminated isolate and change over two of the incoming heat pump supply phases. Note that this relay also protects against low voltage and loss of one or more phases, so check this possibility if the heat pump has previously operated normally.

f) Larger three phase heat pumps utilise thermal overloads that will trip in the event of "single phasing." These are located as part of the compressor contactor and can be reset by pressing the rectangular red button located at the base of this contactor. See manual for exact position of contactor.

Water leaks

A swimming pool heat pump condenses water vapour from the atmosphere during operation. This condensate is collected in a drip tray at the base of the heat pump, from where it drains through a condensate connection on the side of the machine, which should be connected to a waste pipe to be discharge into a drain. If either the pipe or connector becomes blocked with dirt, condensate will overflow from the internal tray and leak from the base of the heat pump, rather than falling away to waste. In this case the pipe and connector should be cleaned.
In the event that the heat pump appears to have a water leak but this water is not overflowing from the drip tray, carefully inspect all the joints within the heat pump heat exchanger assembly for pool water leaks and repair as necessary.

General rule of thumb check list

a) After switching on, the heat pump will take approx six minutes to start.This is due to inbuilt time delays within the heat pump that protect the compressor from short-cycling.

b) Air leaving the heat pump should be 8 to 10°C colder than its entering temperature.

c) Water leaving the heat pump will typically be no more than 3°C warmer than its entering temperature.

d) On warm days a steady trickle of condensate water should discharge from the condensate drain.

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10.0 Datasheets

HEAT PUMPS FOR OUTDOOR POOLS SUMMER SEASON (AL/BL)

MODEL	Units	PPT8	PPT12	PPT16	PPT22
HEAT TO POOL WATER					
AMBIENT 10°C, WATER 24°C	kWh	7.2	9.9	12.4	17.7
AMBIENT 20°C, WATER 24°C	kWh	9.20	12.5	15.6	22.4
ELECTRICITY					
ELECTRICAL SUPPLY 1 PHASE		230V/~1N/ 50Hz			
ELECTRICAL SUPPLY 3 PHASE		400V/~3N/ 50Hz			
TOTAL POWER CONSUMED					
AMBIENT 10°C, WATER 24°C	kWh	1.8	2.3	2.6	4.1
AMBIENT 20°C, WATER 24°C	kWh	2.0	2.5	2.8	4.3
MIN SUPPLY CAPACITY (Max F.L.A.) 1 ph N:-	A	14.0	17.0	21.0	31.0
MIN SUPPLY CAPACITY (Max F.L.A.) 3 ph N:-	A	6.0	6.4	8.0	13.0
RECOMMENDED SUPPLY FUSE 1 ph N:-	A	20.0	25.0	30.0	42.0
RECOMMENDED SUPPLY FUSE 3 ph N:-	A	10.0	10.0	15.0	20.0
WATER FLOWS ETC					
POOL WATER FLOW RATE:-	L/min	115	115	123	123
POOL WATER PRESSURE DROP (@ Rated Flow):-	m hd	2.5	2.5	3.5	3.5
MAX WORKING PRESSURE POOL WATER:-	bar	2.5	2.5	3.5	3.5
POOL WATER CONNECTIONS:-	inches	1 1/2" BSPM			
CONDENSATE DRAIN CONNECTIONS:-	inches	3/4" DOMESTIC WASTE			
COMPRESSOR					
NOMINAL POWER CONSUMED	kWh	1.8	2.14	2.6	3.8
L.R.A. 1 ph N:-	A	66	63	100	115
R.L.A. 1 ph N:-	A	11.4	14	17	25
SOFT START AMPS 1 ph N:-	A	18	18	35	36
L.R.A. 3 ph N:-	A	32	30	48	48
R.L.A. 3 ph N:-	A	4	4.7	7.3	10
SOFT START AMPS 3 ph N:-	A	14	14	17	25
MAIN FAN					
AIR FLOW (Anemometer @ air on grille. Dry evaporator):-	m^3/hr	2200	3300	3500	4900
F.L.A. 1 ph N:-	A	0.8	0.8	0.8	1.2
GENERAL DATA					
HERMETIC SYSTEM					
GAS CHARGE R407c	kg	1.4	1.95	2.24	2.52
PHYSICAL DIMENSIONS					
WIDTH (Unpacked):-	mm	1049	1227	1377	1377
DEPTH (Unpacked):-	mm	593	593	602	602
HEIGHT (Unpacked):-	mm	720	720	720	720
WEIGHT (Unpacked):-	kg	93	104	132	133

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NOTES
1) Weight and dimensions nett.
2) Performance design limitations: Ambient = 7ºC min 40ºC max, Water = 10ºC min, 40ºC max.
3) Pool water to have correct balance, pH 7.2-7.8, Free Chlorine 1.0 - 2.0ppm domestic, 3.0 - 6.0 commercial.
4) Allow 500mm clearance to service panels.
5) Calorex reserve the right to change or modify models without prior notice.
6) R407c Global warming potential (GWP) 1700.
1mm WG = 9.8 Pa
1mhd = 1.4 psi
1l/min = 0.22gall/min

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HEAT PUMPS FOR OUTDOOR POOLS REVERSE CYCLE DEFROST (ALY/BLY)

MODEL	Units	PPT8Y	PPT12Y	PPT16Y	PPT22Y
HEAT TO POOL WATER					
AMBIENT 10°C, WATER 24°C :-	kWh	7.2	9.9	12.4	17.7
ELECTRICAL					
ELECTRICAL SUPPLY 1 PHASE		230V/~1N/50Hz			
ELECTRICAL SUPPLY 3 PHASE		400V/~3N/50Hz			
TOTAL POWER CONSUMED:-					
AMBIENT 10°C, WATER 24°C :-	kWh	1.8	2.3	2.6	4.1
AMBIENT 20°C, WATER 24°C :-	kWh	2.0	2.5	2.8	4.3
MIN SUPPLY CAPACITY (Max F.L.A.) 1 ph N:-	A	14.0	17.0	21.0	31.0
MIN SUPPLY CAPACITY (Max F.L.A.) 3 ph N:-	A	6.0	6.4	8.0	13.0
RECOMMENDED SUPPLY FUSE 1 ph N:-	A	20.0	25.0	30.0	42.0
RECOMMENDED SUPPLY FUSE 3 ph N:-	A	10.0	10.0	15.0	20.0
WATER FLOWS ETC					
POOL WATER FLOW RATE:-	L/min	115	115	123	123
POOL WATER PRESSURE DROP (@ Rated Flow):-	m hd	2.5	2.5	3.5	3.5
MAX WORKING PRESSURE POOL WATER:-	bar	2.5	2.5	3.5	3.5
POOL WATER CONNECTIONS:-	inches	1 1/2" BSPM			
CONDENSATE DRAIN CONNECTIONS:-	inches	3/4" DOMESTIC WASTE			
COMPRESSOR					
NOMINAL POWER CONSUMED:-	kWh	1.8	2.14	2.6	3.8
LRA:- 1 ph N:-	A	66	63	100	115
RLA:- 1 ph N:-	A	11.4	14	16.6	25
SOFT START AMPS 1 ph N:-	A	18	18	35	36
LRA:- 3ph N:-	A	32	30	48	48
RLA: -3 ph N:-	A	4	4.65	7.3	10
SOFT START AMPS 3 ph N:-	A	14	14	17	25
MAIN FAN					
AIR FLOW (Anemometer @ air on grille. Dry evaporator):-	m^3/h	2200	3300	3500	4900
FLA:- 1 ph N:-	A	0.8	0.8	0.8	1.2
GENERAL DATA					
HERMETIC SYSTEM					
GAS CHARGE R407c	kg	1.9	2.3	3.3	3.0
PHYSICAL DIMENSIONS					
WIDTH (Unpacked):-	mm	1049	1227	1377	1377
DEPTH (Unpacked):-	mm	593	593	602	602
HEIGHT (Unpacked):-	mm	720	720	720	720
WEIGHT (Unpacked) :-	kg	102	111	141	142

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NOTES
1) Weight and dimensions nett.
2) Performance design limitations: Ambient = -15ºC min 35ºC max, Water = 10ºC min, 40ºC max.
3) Pool water to have correct balance, pH 7.2-7.8, Free Chlorine 1.0 - 2.0ppm domestic, 3.0 - 6.0 commercial.
4) Allow 500mm clearance to service panels.
5) Calorex reserve the right to change or modify models without prior notice.
6) R407c Global warming potential (GWP) 1700.
1mm WG = 9.8 Pa
1mhd = 1.4 psi
1l/min = 0.22gall/min

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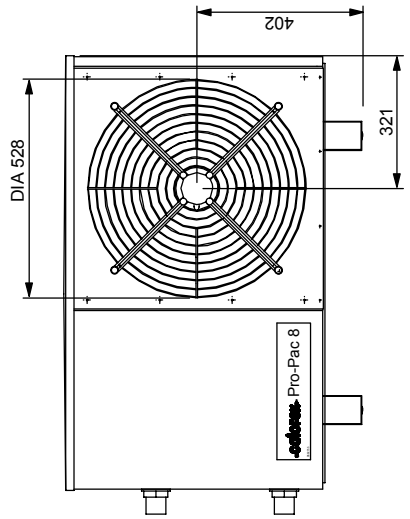
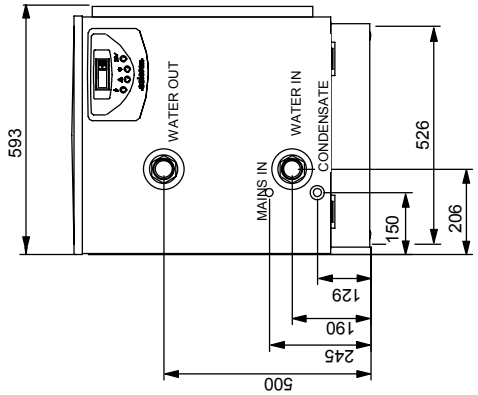
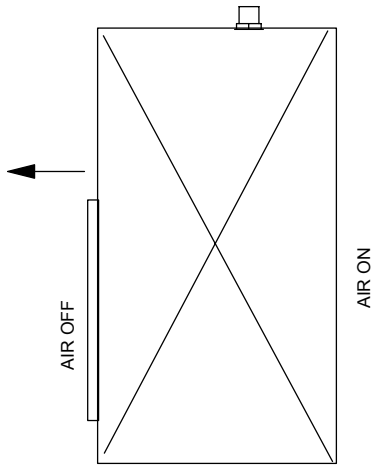
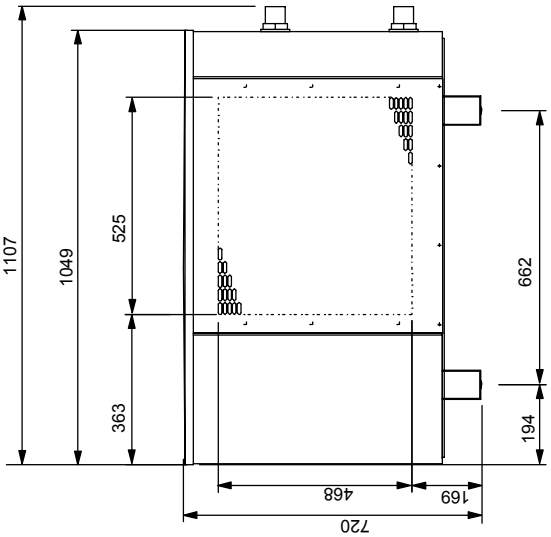
PPT8
WATER IN/OUT 1½" BSPM
CONDENSATE ¾" DOMESTIC WASTE





11.0 Installation Drawings





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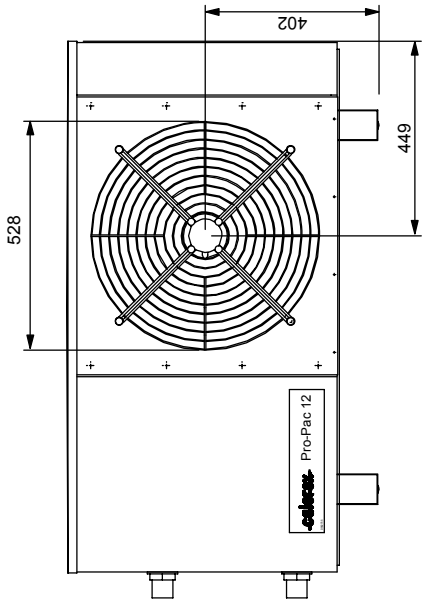
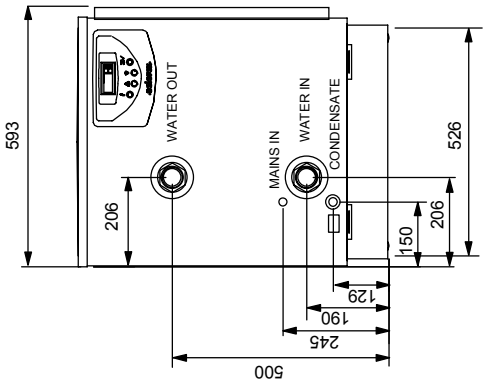
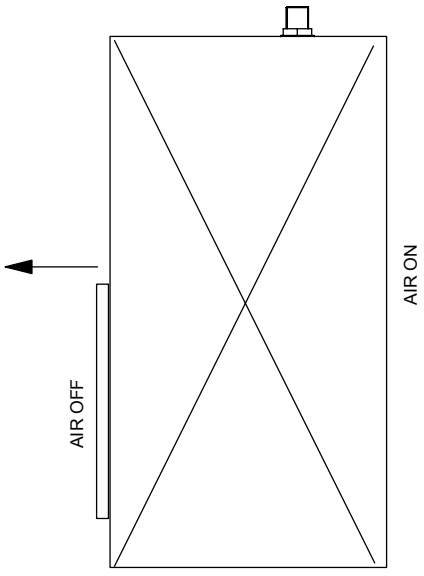
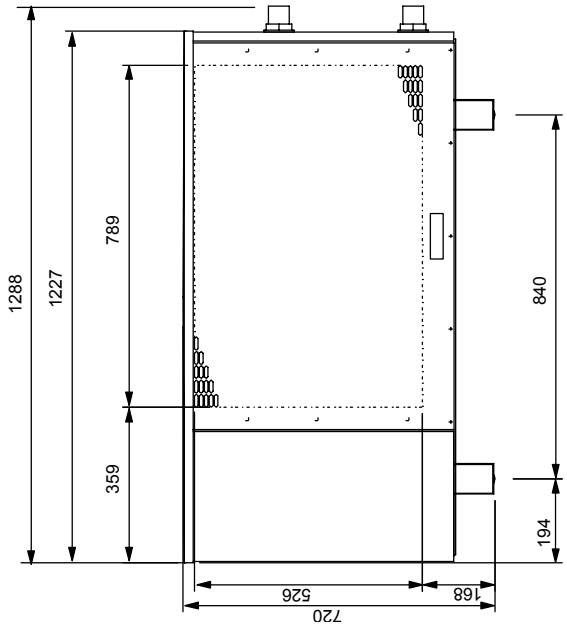
PPT12
WATER IN/OUT 1½" BSPM
CONDENSATE ¾" DOMESTIC WASTE









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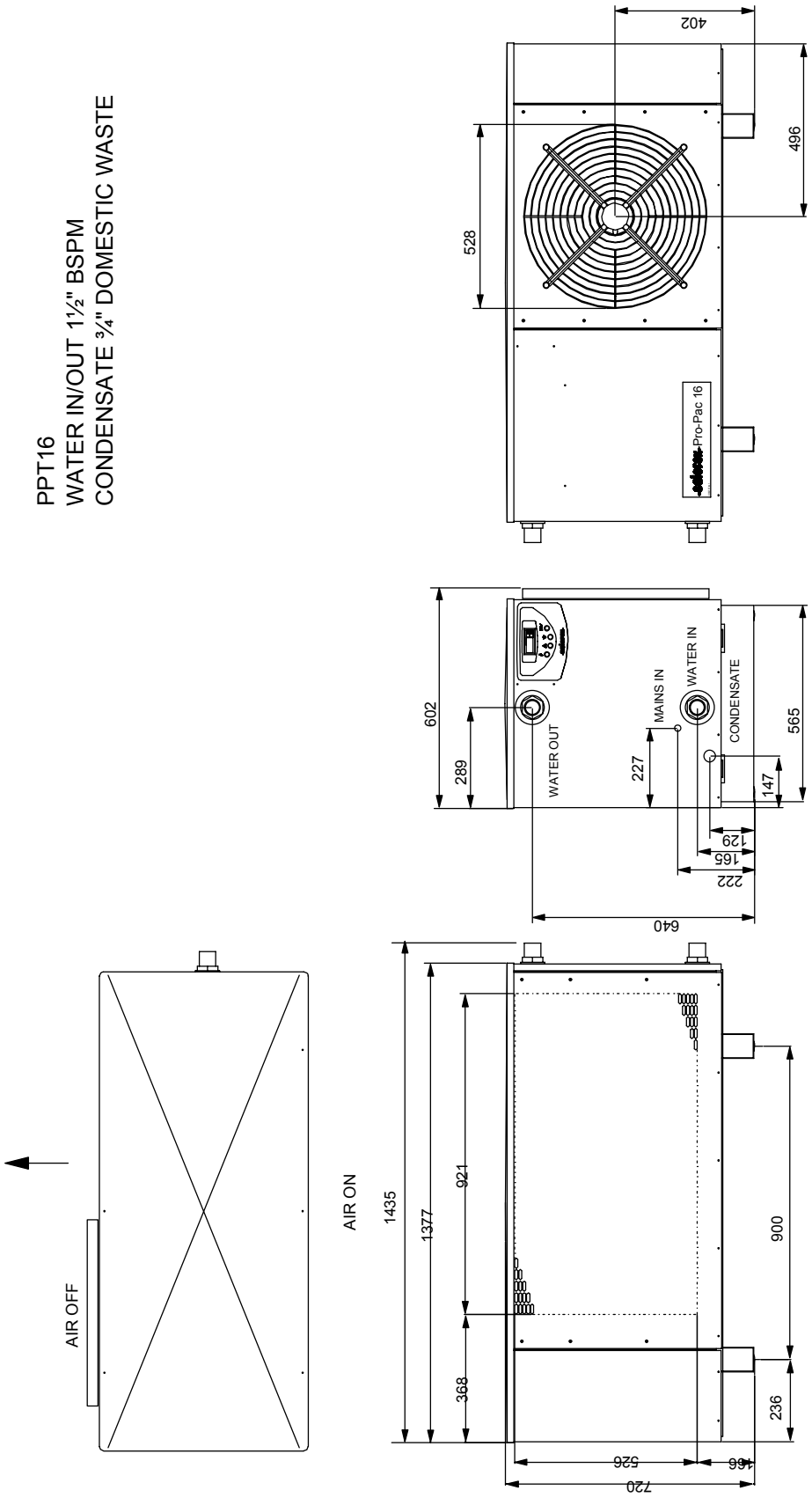
PPT16
WATER IN/OUT 1½" BSPM
CONDENSATE ¾" DOMESTIC WASTE



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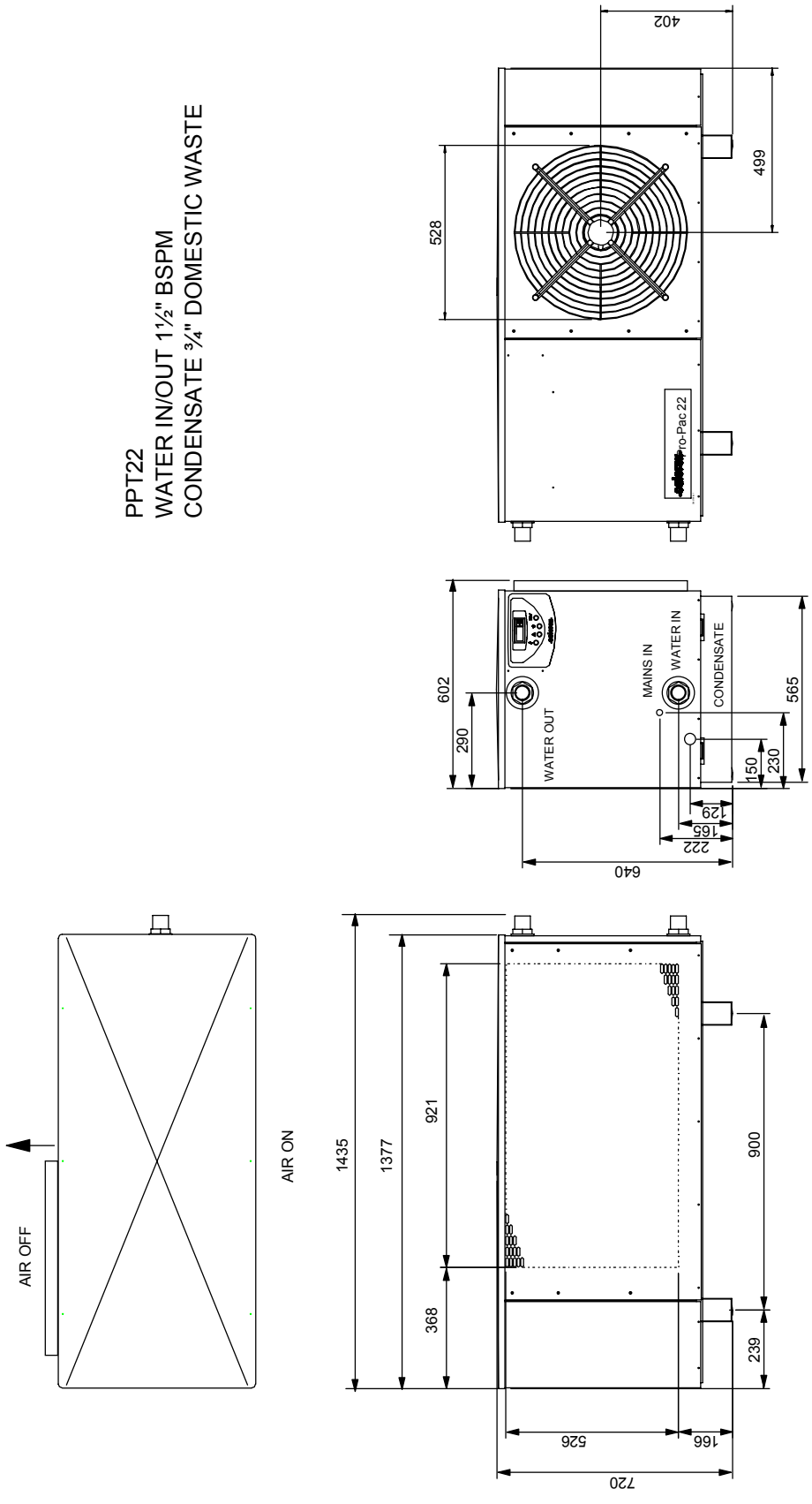
PPT22
WATER IN/OUT 1½" BSPM
CONDENSATE ¾" DOMESTIC WASTE



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12.0 Winterisation Procedure

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

ALL MODELS

Objective

To provide frost protection

To eliminate corrosion problems

To inhibit electrical components

1) Switch off electric 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

5) Flush through water circuit in heat pump by using CLEAN TAP WATER (NOT POOL WATER) via hose into outlet connection - run the hose for 10 minutes minimum; use spray nozzle if available.
6) Allow to drain - when drained, fit plastic bags secured by elastic bands over water connections.
7) Uncover electrical enclosure (see section 4.2) and liberally spray interior of unit, with moisture-repellant aerosol WD40 or similar; reseal enclosure.
8) If heat pump located outside, protect from weather by covering with VENTILATED cover. Do not use plastic sheet as condensation could occur within unit.

IMPORTANT

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

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12.1 Start up Procedure After Winterisation

1) Replace covers (if not fitted).
2) Remove front grille. Using a 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 1/4 hour to establish flow and enable an air in piping 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 pool water daily to ensure it is at correct pH and has correct chemical balance. (See Section 3 Plumbing).

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13.0 Warranty Conditions

The following exclusions apply to the Warranty given by Calorex Heat Pumps Ltd. No claims will be accepted if : -

1) The heat pump is incorrectly sized for the application.
2) The heat pump is installed in any way that is not in accordance with the current procedures as defined by Calorex Heat Pumps Ltd.
3) The heat pump has been worked upon or is adjusted by anyone other than a person authorised to do so by Calorex Heat Pumps Ltd.
4) The air flow to and from the machine is outside the specified limits.
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 Max
Maximum Salt Content	ppm	35000 Max
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.

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14.0. Contacting Calorex

Email: service@calorex.com

Website: http://www.calorex.com

Tel: +44 (0)1621 857171 or +44 (0)1621 856611

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.