Owner Installation Manual

DELTA SYSTEM

(SD675650 Issue 1)
11/11/15

HEALTH AND SAFETY WARNING

As the dehumidifier embodies electrical and rotational equipment,ONLY competent persons should carry out any work on this type of machine.

(See Guarantee)

Contents

HEALTH AND SAFETY WARNING

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 the use of the appliance in a safe way and understand the hazards involved. Children should not play with the appliance. Cleaning and maintenance shall not be made by children without supervision.

This machine is classified as "NOT ACCESSIBLE TO THE PUBLIC" and therefore should be located in a machine room and serviced by qualified personnel.

Disconnect from the mains supply and wait three minutes before removing panels and commencing work on this machine.

FEATURES OF THE CALOREX DELTA RANGE

The Calorex 'DELTA' range consists of 7 models 1, 2, 4, 6, 8, 10, 12, 14 and 16, all purpose built to provide swimming pool hall fresh air ventilation with heat recovery and heat pump dehumidification.

All DELTA models are supplied as packaged units with PLC logic and a 7" touch screen controller.

The model number increases in relation to the recirculated air flow, from 2500m^3/h for a DELTA 1 to 12000m^3/h for a DELTA 16.

All models contain a heat recovery heat pump that is controlled to remove unwanted humidity from the swimming pool hall and provide a majority of the swimming pool water heating. The process will also contribute significantly towards the hall heating requirements. The heat recovery process is optimised for a swimming pool hall environment and will provide efficiencies upwards of 250%.

For DELTA 4 upwards the heat recovery process is a reversible process that will cool incoming air when the swimming pool hall has exceeded its set point temperature.

All models have the facility to exhaust a percentage of the recirculating air and introduce a slightly lesser amount of fresh air through internal heat recovery circuits. The quantities of air can be adjusted on site to meet specific building needs. This facility provides a slight negative air pressure within the swimming pool hall that will help to prevent moisture from being driven into building fabric. This feature will also reduce the likelihood of swimming pool hall air migrating to other rooms connected to the swimming pool hall.

All models are fitted with a fully controlled air heater battery and pool water heat exchanger. These are designed to operate with LPHW at 80ºC/60ºC that is provided by a standard boiler. As an option all DELTA sizes can be supplied with oversized heat exchangers that are suitable for use with renewable technology heat sources and condensing boilers. Provision is made for all of these heat sources to be initiated by the 'DELTA' controller. In either case the heat source is not supplied as part of the DELTA.

All DELTA models have two fans, a main recirculating fan and a smaller exhaust fan and are designed for connection to distribution ducting, return air ducting and fresh air/exhaust ducting.

For connection sizes please refer to drawings that are shown further on in this manual.

DELTA models all use direct drive fans.

DELTA can be supplied with many air outlet configurations, including a down draft position. When this version of the unit is supplied an extra spigot flange and fitting kit that includes floor spigot, flexible ducting and securing straps are supplied.

All models have motor driven variable position exhaust dampers that are automatically controlled by excessive temperature or humidity within the swimming pool hall. As an option they can be controlled by an air quality sensor that measures the amount of pollutants within the pool hall. The DELTA controller automatically protects the LPHW circuit from frost damage in extreme climatic conditions. This is achieved by limiting the function of the damper and fresh air fan when the ambient temperature is below 6ºC. The DELTA also has volt free contacts that could be used to control a remote damper (not supplied), by activating a signal when the ambient air falls to 6°C.

The power to DELTA models 1 and 12 is fed directly into the electric box on the front of the unit. Two holes are cut in the cabinet to allow for cable entry. To make access easier there are two removable panels in the front of the unit. The lower one is for access to the power connections in the DELTA. The upper one is for access to the control wiring of the DELTA.

All DELTA sizes are fitted with pairs of "volt free" terminals that provide an interface for pool pump, heat source and setback control, as well as remote monitoring/control of the unit.

See section 3.6 Electrical Installation for a full list of these terminals.

MODEL NUMBERING FOR A CALOREX DELTA SYSTEM

The DELTA can be supplied in a range of configurations with optional extras or changes to the standard build.

Following the method shown here is a simple way of ordering the correct DELTA. Please note that it is important to order the correct DELTA as it may not be possible to change the features once the order is placed.

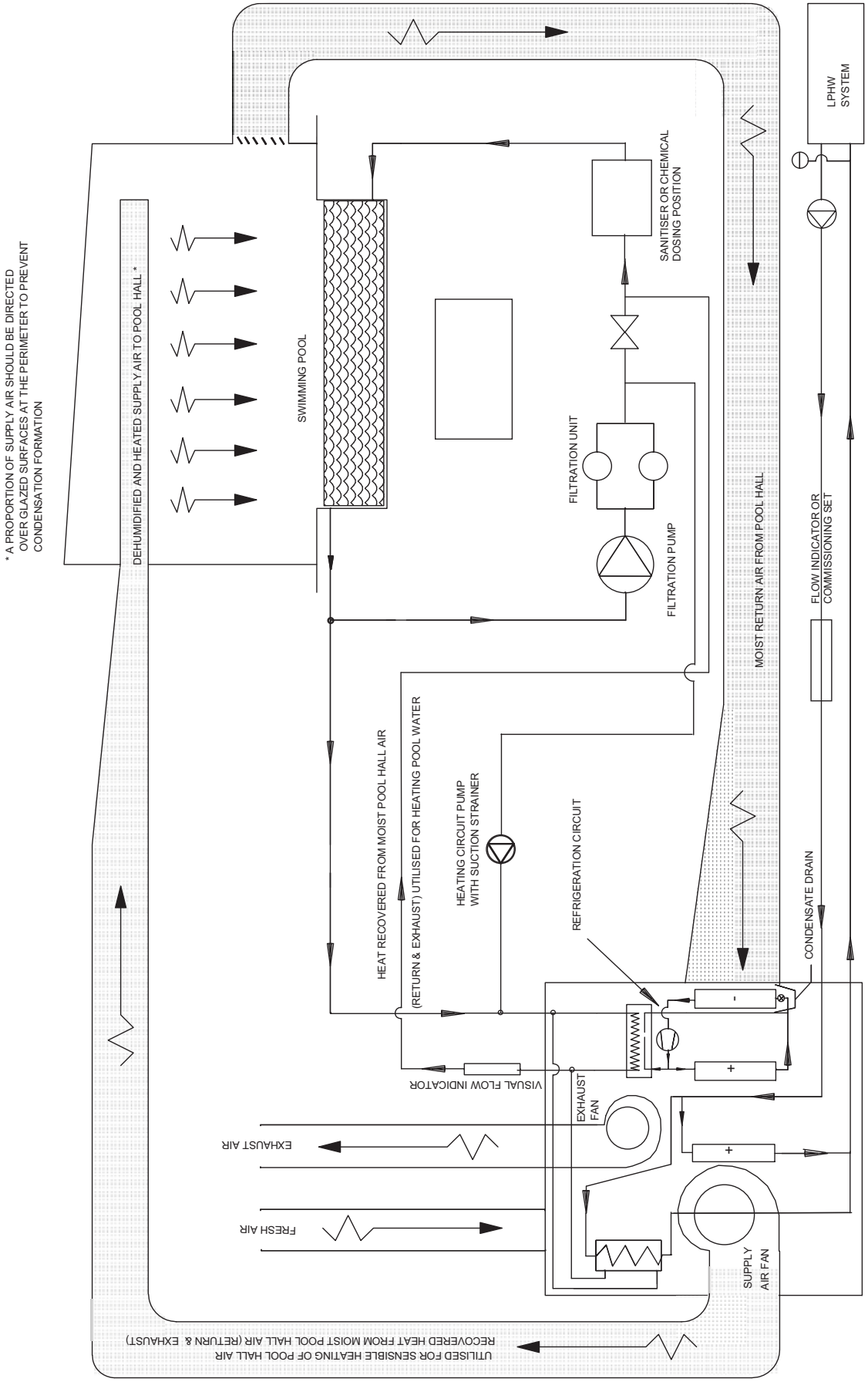
EXAMPLE. A DELTA 8B, Front Electrics, Air Off Top Outlet, with optional Fan Pressure Input Kit, Filter Input Kit and Air Quality Sensor Kit is ordered.

The part number for this would be 680521-BCD

Machine	Electrics	Air Off Position	Option Kits
6805	2	1	BCD

DIGITS	MEANING	CONFIGURATION	CODE
1-4	BASIC MACHINE		
		DELTA 1	6801
		DELTA 2	6802
		DELTA 4	6803
		DELTA 6	6804
		DELTA 8	6805
		DELTA 10	6806
		DELTA 12	6807
		DELTA 14	6808
		DELTA 16	6809
5	ELECTRICS		
		ELECTRICS FRONT: SINGLE PHASE	1
		ELECTRICS FRONT: THREE PHASE	2
		ELECTRICS BACK: SINGLE PHASE	3
		ELECTRICS BACK: THREE PHASE	4
		ELECTRICS FRONT: DAMPERS BACK	
		THREE PHASE DELTA 14/16 ONLY	6
		ELECTRICS FRONT: DAMPERS FRONT	
		THREE PHASE DELTA 14/16 ONLY	8
6	AIR OFF POSITION		
		TOP OUTLET	1
		SIDE OUTLET	2
		BOTTOM OUTLET	3
		FRONT OUTLET (DELTA 14/16)	4
		BACK OUTLET (DELTA 14/16)	5
LETTER	OPTIONS		
		EXPORT KIT	A
		FAN PRESSURE INPUT KIT	B
		FILTER INPUT KIT	C
		AIR QUALITY SENSOR KIT	D
		EXTRA CAPACITY LPHW KIT	E
		DUCT KIT	F

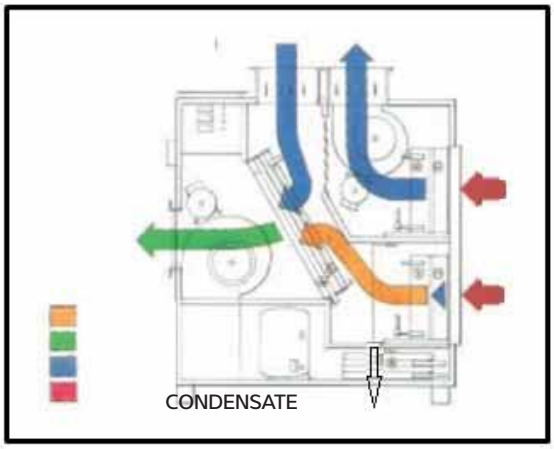
1.0 HOW THE CALOREX DELTA SYSTEM WORKS



DELTA HEAT RECOVERY DEHUMIDIFIER APPLIED TO AN INDOOR SWIMMING POOL

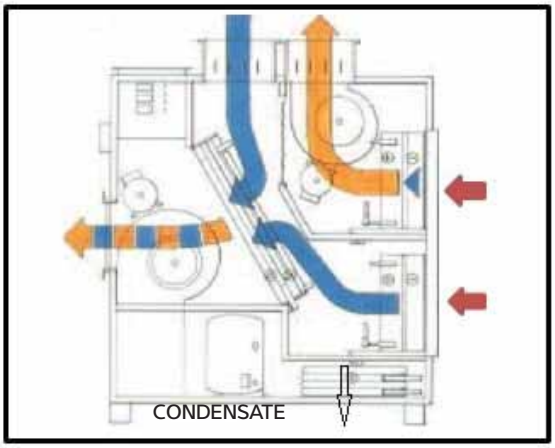
1.1 HOW THE AIR FLOWS THROUGH THE DELTA

FULL DEHUMIDIFICATION AND HEAT RECOVERY



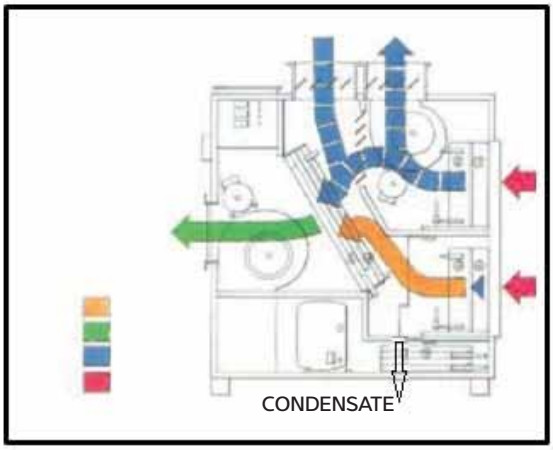
DELTA operating on maximum dehumidification of pool air with full heat recovery to pool water and air. Available energy is removed from exhaust air stream. Supplementary heat if required,supplied by LPHW (water to air).

AIR CONDITIONING



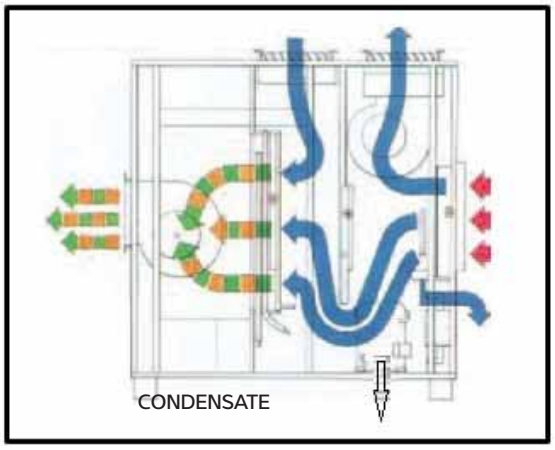
DELTA models 4 and above provide air conditioning facility to minimise the effects of solar gain from larger glazed areas or very high usage. Automatic damper and mode control.

LIGHT DEHUMIDIFICATION AND HEAT RECOVERY



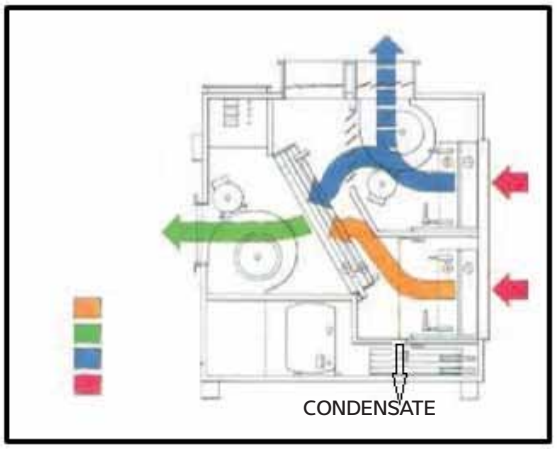
DELTA operating on light dehumidification with full heat recovery and reduced fresh air stream-control system automatically selects correct operating mode and damper position. LPHW heat available when required.

LIGHT DEHUMIDIFICATION AND HEAT RECOVERY



DELTA 1/2 operating on light dehumidification with full heat recovery and reduced fresh air stream. LPHW heat available when required.

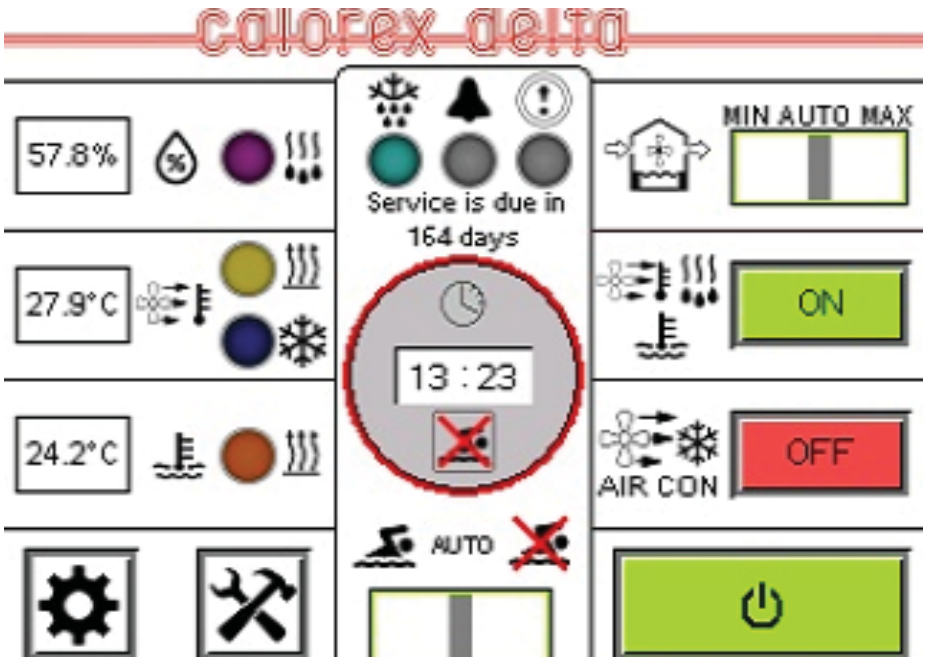
NIGHT SET BACK



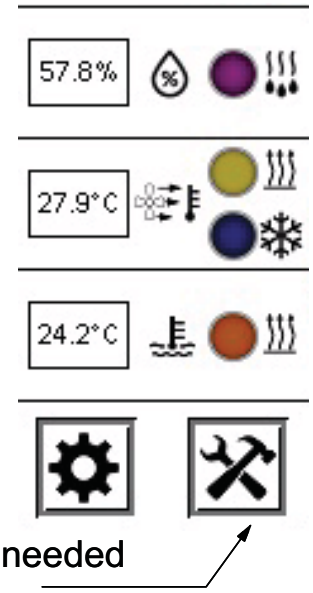
Air Temperature set back control is incorporated as standard in all DELTA units and is controlled by a time clock. Pool hall air is dropped to a lower temperature for maximum economy. Air recirculation is maintained, dampers allow low fresh air flow.

2.0 HOW TO USE THE DELTA

The DELTA is controlled by a PLC controller and has a touch screen on the front panel of the unit. This controls all the functions of the DELTA. Optional features are ready to be used within the controller. In general any setting shown with a white background can be modified. Any setting with a grey background cannot be modified.



Console Left Hand Side



Humidity Control

Air Temperature Control

Water Temperature Control

Owner Settings - Pin code needed

Engineer/ Service Settings - Pin code needed

The screen looks like this :

Console left hand side:

1. Relative Humidity setting: (Factory set at 60%): when the solid purple indicator lamp is illuminated, dehumidification is taking place. When the lamp is flashing, the compressor is running for air cooling.

2. Air Temperature setting: (Factory set at 28ºC) when the yellow lamp is illuminated, air heating is taking place. When the blue lamp is illuminated, air cooling is taking place.

3. Water Temperature setting: (Factory set at 26ºC) when the solid yellow lamp is illuminated, the LPHW valve is open to heat the pool water. The lamp flashes orange when there is a demand for water heating. It comes on immediately when the DELTA is in Occupied mode or after a delay of 60 minutes when the DELTA is in Unoccupied mode and there is a requirement for the pool pump to run.

4. Settings button (Cog): Allows the user to change the settings of the DELTA, needs a password.

5. Service Settings (Hammer and Spanner).

These parameters can only be changed by the service engineer and need a password.

Details of these parameters are in the Technical Manual.

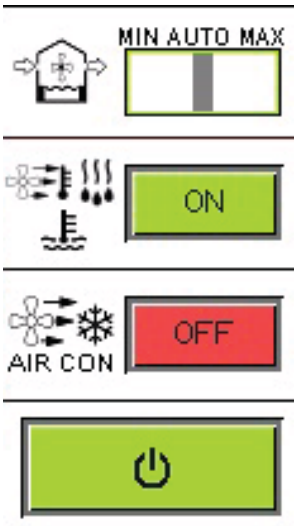
Console Right Hand Side

Damper Override Switch

Operation Switch

Air Conditioning Switch
(DELTA 4 and above)

Standby Switch



Console right hand side:

6. Damper Override Switch: enabling damper to be set to automatic operation (normal) or to be fully opened or fully closed manually. The MIN and MAX positions are for use by experienced operators to allow, for example, quick start up without air induction and quick ventilation should an emergency necessitate this.

7. Operation Switch: The switch enables the DELTA to function in full operation (ON – green) or water heating only (OFF – red). When in reduced operation there is a 60 minute delay when water heating is required. (This was previously called Economy mode).

8. Air conditioning Switch: Should be switched to ON, provides air conditioning when required. When switched to OFF, no air conditioning will be allowed. NOTE: Dampers will still be controlled automatically irrespective of air conditioning switch position.

9. Standby Switch: Please note that when this is OFF (orange) the machine is still powered up. Make sure the machine is isolated from the mains before any servicing or electrical work is attempted.

Console Centre

Lamps: Defrost, Alarm, Fault

Occupied/ Unoccupied time clock settings.
(UNOCCUPIED period shown).

Time clock override Switch

Console centre

10. Defrost Lamp.

A solid light blue lamp indicates the DELTA is defrosting. Defrosting is a normal function of the DELTA when the pool hall air temperature drops below 20ºC.
A flashing dark blue lamp indicates that frost protection is active.

11. Alarm Lamp. The severity of the problem grows from the top to the bottom of this list.

A solid purple lamp indicates that the clock needs resetting.
A flashing light blue lamp indicated that "dance hall mode" is enabled. Note that when dance hall mode is enabled pool water heating does not happen. If you leave the unit in dance hall mode for a long time you will end up with a chilly pool!
A solid dark blue lamp indicates that air quality or carbon dioxide alarms are active.
A solid yellow lamp indicates that fresh air or the air on filter alarms are active.
A solid red lamp indicates that the fire alarm is active.

A solid purple lamp with an S indicates that servicing is overdue. Contact Calorex to arrange servicing of the DELTA.

12. Fault lamp.

A solid yellow lamp indicates a fault with the Exhaust Fan.
A solid orange lamp indicates a fault with the Main Fan.
A solid purple lamp indicates a fault with the Compressor.
A solid blue lamp indicates a fault with the Pool Pump.
A solid red lamp indicates that there is a fault with the refrigeration circuit in the DELTA.
When the fault lamp is illuminated it should be investigated with reference to the Alarms section further on in the manual as there can be more than one fault with the DELTA.

13. The service countdown display shows either how long it is until the next service is due, or in some cases, how overdue the unit is for servicing.

14. The clock displays the current time and whether the pool is in an occupied or unoccupied period.

Pool occupied symbol

Pool unoccupied symbol

15. The switch underneath the clock is usually set to AUTO, making the time clock control the occupied and unoccupied periods of the DELTA . This switch can be set to the left, forcing the DELTA into the OCCUPIED mode, or set to the right to force the DELTA into the UNOCCUPIED mode.

OCCUPIED AND UNOCCUPIED DIFFERENCES.

The timer on the display determines the OCCUPIED and UNOCCUPIED periods according to its setting.

Note: It is expected that in the UNOCCUPIED periods the pool will be covered to conserve energy and reduce humidity.

In essence the unit operates in all modes in OCCUPIED condition. In UNOCCUPIED condition it operates similarly with the exceptions as follows:

a) No refrigerated air conditioning (models 4 upwards only)

b) Pool hall air temperature lowered to the night set back temperature.

c) Fresh air damper (if fitted) is driven to MIN in AUTO mode, unless forced by the damper override switch, poor air quality when the air quality sensor is fitted or high carbon dioxide levels when the carbon dioxide sensor is fitted. These sensors both drive the dampers to MAX.

d) There is a pool pump delay of sixty minutes when water heating is required.

Adjacent to the Display panel there is an Ethernet connection port to enable the DELTA to be connected an Internet router.

16. A red lamp is fitted in the frame of the machine adjacent to the console. This is illuminated when power is connected to the machine, including when the machine is in Standby Mode.

When the DELTA leaves the Calorex factory it has been set up so that when connected to the correct electrical supply, and correctly plumbed in to the pool circuit, it is ready to use.

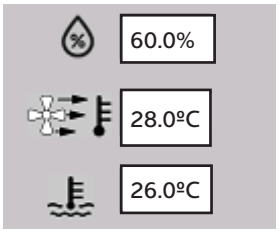
The DELTA should be connected to the mains supply via an isolator. When the isolator is energised, the red mains lamp adjacent to the display will be illuminated. Turning the Standby switch from OFF (orange) to ON (green) will start the operation of the DELTA.

During operation, the indicator lights will display the state of the DELTA. Lights will indicate dehumidification, air heating, water heating and air conditioning (only on models 4, 6 and 8).

PARAMETER CONTROLS

The parameters for Air temperature, Pool temperature and Humidity can be changed by touching the white area for the parameter that wants to be changed. A keypad appears.

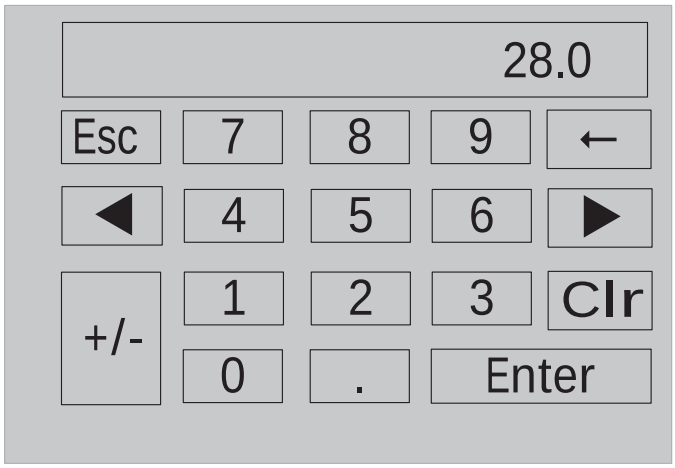
It is good practice to keep the air temperature in the pool hall above the water temperature as this increases user comfort and reduces condensation on cold surfaces within the building which could result in damage.



HUMIDITY %

AIR TEMPERATURE ºC

WATER TEMPERATURE ºC



Leaves screen without saving

Moves the cursor to the left

Type in the desired setting

Backspace key

Moves the cursor to the right

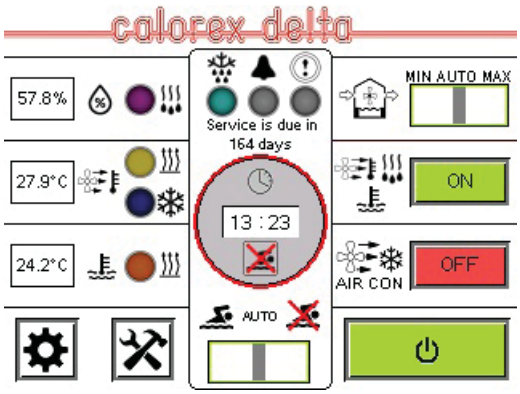
Clears setting

Saves setting and returns to main screen

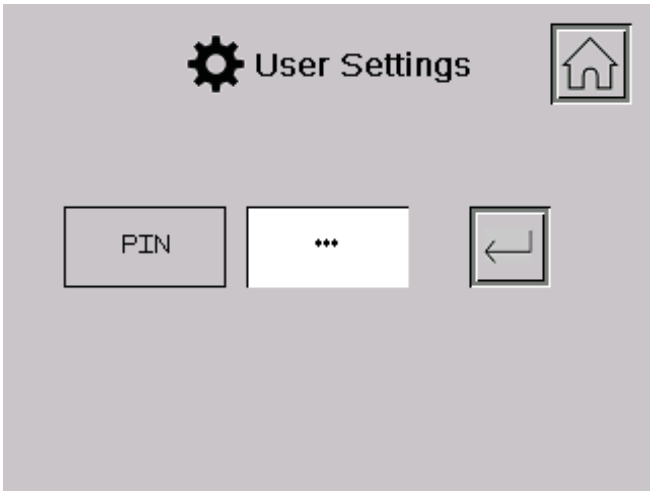
2.1 USER SETTINGS

There are some operations that cannot be performed/changed without a password.

To access the user settings press the Cog button on the console

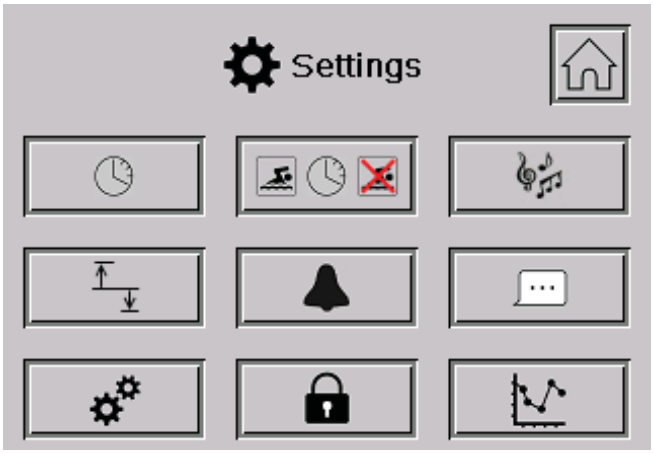


Insert the PIN and press return



The default PIN for accessing the user settings is 6016. Calorex recommends changing this, see Security Options.

The Setting screen appears

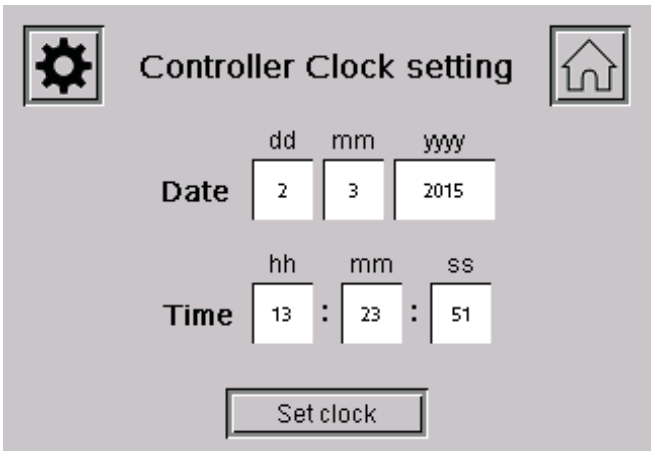


SETTINGS		
CONTROLLER CLOCK SETTINGS	OCCUPIED/UNOCCUPIED PERIODS	DANCE HALL
SET POINTS AND SWITCHES	ALARMS	LANGUAGE (ENGLISH ONLY AT PRESENT
ADVANCED SETTINGS	SECURITY	DATA MONITORING

Controller Clock setting

Press this button on the setting menu.

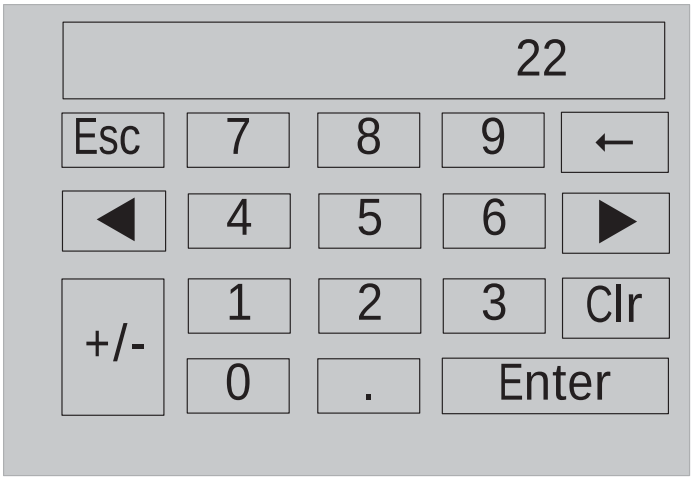
Cog Icon – Returns to User Settings



Home Icon – Returns to Home screen

Press Set Clock.

To change the information press in the white areas. A keypad appears to allow you to input the correct data.



Leaves screen without saving

Moves the cursor to the left

Type in the desired setting

Backspace key

Moves the cursor to the left

Clears setting

Saves setting and returns to main screen

Press Set Clock when the date and time are correct. Press the Cog icon to return to the User Settings Screen or if nothing else needs to be changed, press the Home icon to return to the home screen.

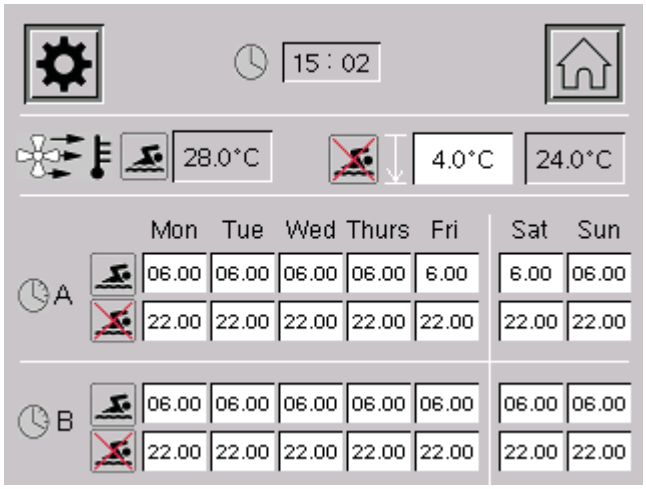
Once the time and date have been set this should not need to be done again as long as the DELTA is kept running or in Standby Mode. It may be necessary to repeat the process if the DELTA is isolated from mains electricity or if there is an interruption to the power supply which lasts longer than three days. The clock has a battery reserve fitted which, when charged, has an operating time of three days so that isolating the DELTA unit for short periods will not reset the clock.

United Kingdom Daylight saving is included in the settings so the clock will not need to be changed.

Time clock Settings

Press this button on the settings menu. 

When one of the time settings is touched the same number keypad as shown in the parameters



Start of occupied period A

End of occupied period A

Start of occupied period B

End of occupied period B

setting above comes up. Any one of the occupied settings can be changed by touching the time that need changing. There are two periods per day, A and B. The swimmer shows the beginning of the occupied period and the non swimmer shows the end of that occupied period.
If the two periods overlap, the machine will always try to operate in occupied mode if allowed by either set of times.
If the occupied period is once a day set A and B to the same start and end times.

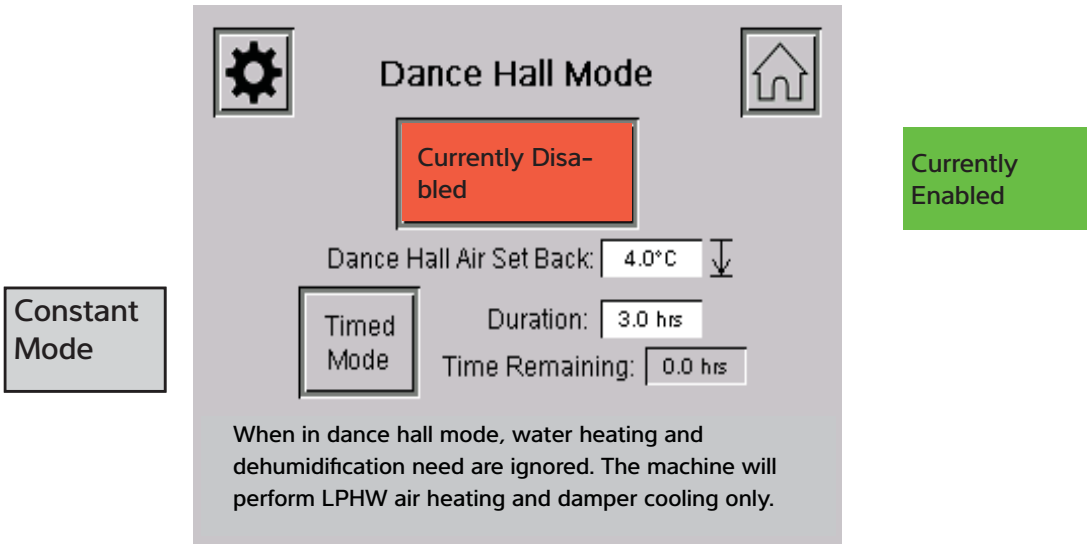
The current and night setback temperature are also shown. The difference between the set point and the night set back temperature can be changed in the box showing 4.0ºC. If this figure is changed then the associated night set back temperature will change automatically. The minimum night set back temperature controlled by the DELTA is 22ºC. This means that the greatest difference allowed is 6ºC.

It is also possible to change these settings from the main screen if it is decided that these parameters do not need password protection.

Press the Cog icon to return to the User Settings Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Dance Hall Mode

Press this button on the settings menu. 



To change the setting press in the white areas. A keypad appears to allow you to change the data.

Pressing the Currently Disabled button toggles between Currently Disabled and Currently Enabled.

By default, dance hall mode operates on its own timer, the duration of which can be entered here. (Maximum duration 9 hours). Pressing the Mode button toggles between Timed Mode and Constant Mode. Constant Mode will not turn off automatically.

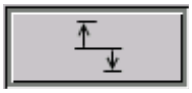
The dance hall setback temperature is shown. Having the dance hall set back temperature set at 4ºC drops the air temperature 4ºC below the Air temperature set point. There is no maximum set back temperature.

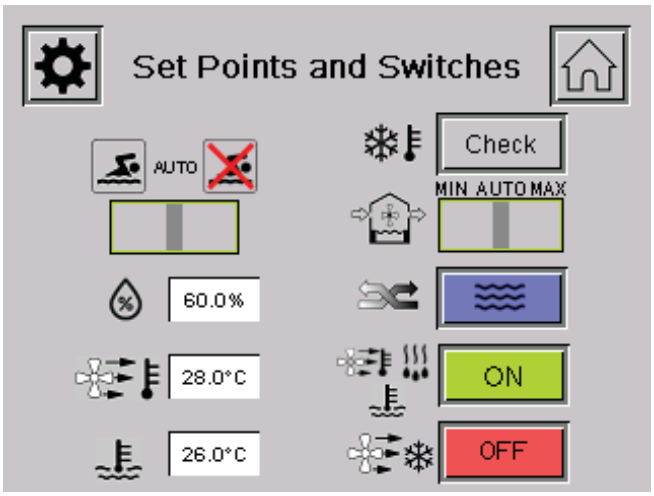
Remember that when dance hall mode is enabled for a long period water heating and dehumidification needs are ignored and if dance hall mode is enabled for a long time, the result will be a cold pool.

Press the Cog icon to return to the User Settings Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Set Points and Switches

Press this button on the settings menu.





Frost Protection check button. Only present when Frost Protection is active.

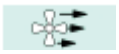
Air/Water priori-ty switch

Allows you to change all the settings from the home screen as instructed in Section 2.0, along with the Air/Water priority switch.

Pressing the button toggles the DELTA between water heating priority and air heating priority.

When the switch is dark blue this indicates priority to water heating.

When the switch is light blue this indicates priority to air heating.



Press the Cog icon to return to the User Settings Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Function of the Air to Water Priority Switch

By entering this screen the Air to Water Priority switch can be accessed. The switch determines the DELTA reheat priority between air heating and swimming pool water heating.

The switch is normally set to water priority.

There may be instances where setting the switch to air priority is an advantage.

A example of this would be in very cold weather when a primary heat source is being used to heat the air and the pool water.

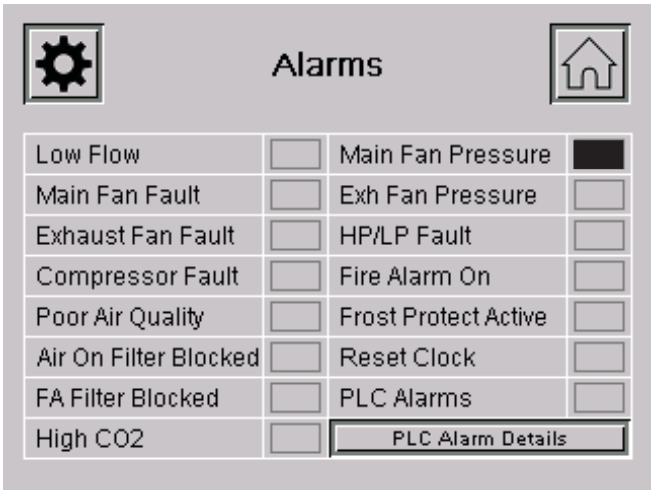
Frost Protection checking – When the outdoor temperature is below 6ºC and frost protection is active, an icon appears on the screen and gives an option to force a temperature check on the outdoor air temperature.

Alarms

Press this button on the settings menu.

The alarm screen displays problems with the DELTA. Alarms are shown by a red square next to the problem. The example shown above indicates that there is a problem with Main Fan Pressure which should be investigated.

Press the Cog icon to return to the User Settings Screen or press the Home icon to return to the home screen.



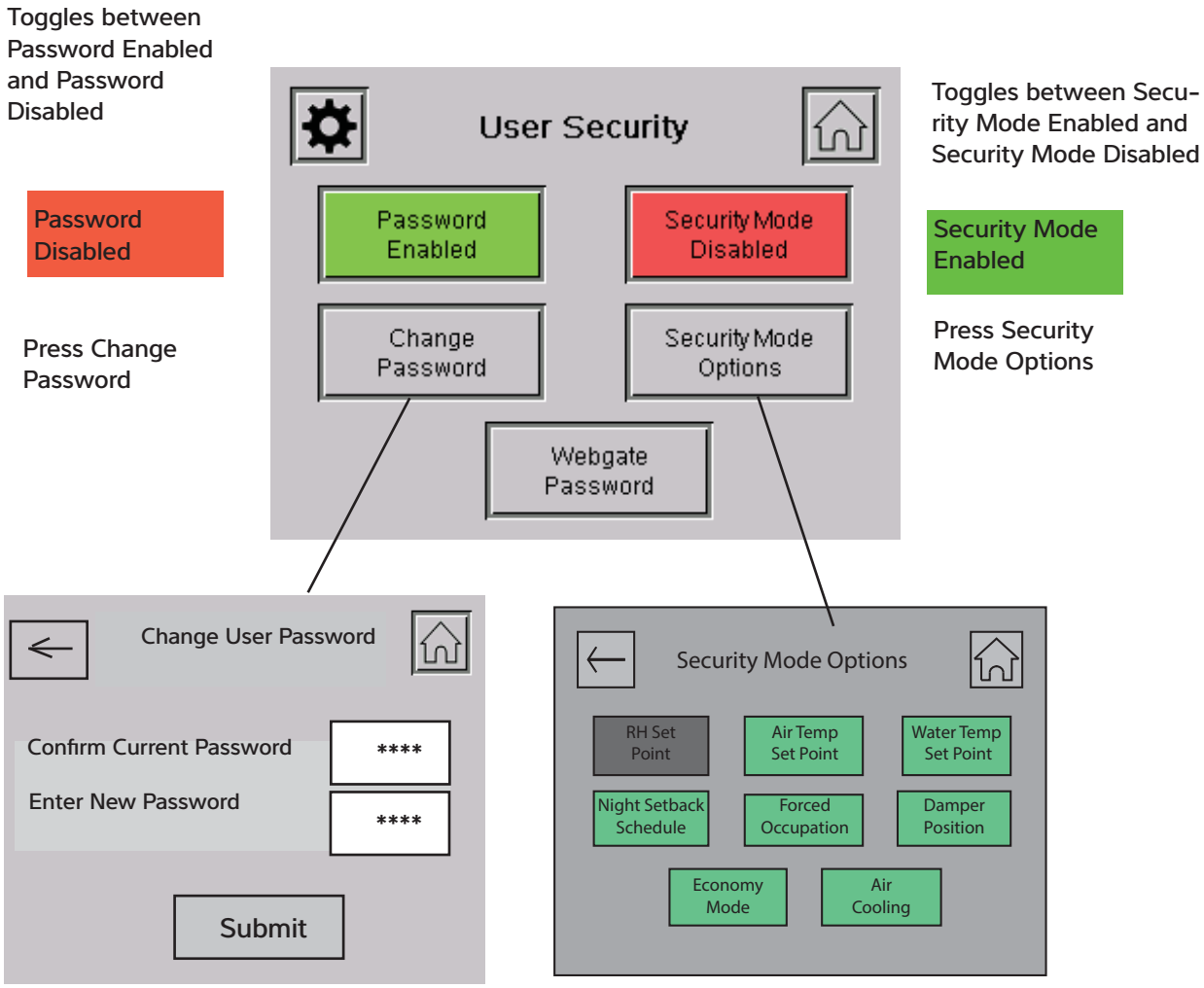
Language

Press this button on the settings menu.

Currently English is the only available language.

User Security

Press this button on the settings menu.



If the User Password needs to be changed, it can be changed here. As an aid to remembering the password you can write it in the box below and keep this manual in a safe place in case you need to be reminded.

User Password

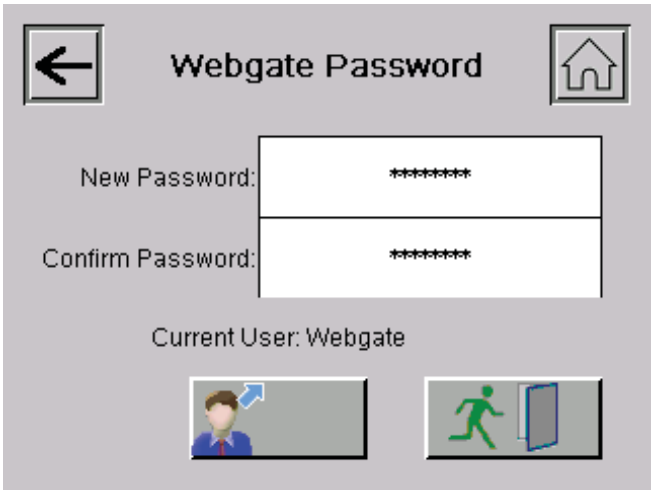
When Security Mode Options is enabled the buttons shown on the screen toggle between grey and green. Green settings are disabled on the Home screen and can only be changed after the password has been enabled. In the example shown above only the RH (humidity)set point can be changed from the main screen without inputting the Password. (In greyscale printing this is the darker block)

Press the Arrow icon to return to the User Security Screen.

Press the Cog icon to return to the User Settings Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Change Webgate Settings

Press this button



Press to confirm change

Icon performs same function as Home icon

The default password is DefaultPass.

For security reasons Calorex recommends that this password is changed.

As an aid to remembering the password you can write it in the box below and keep this manual in a safe place in case the password is forgotten.

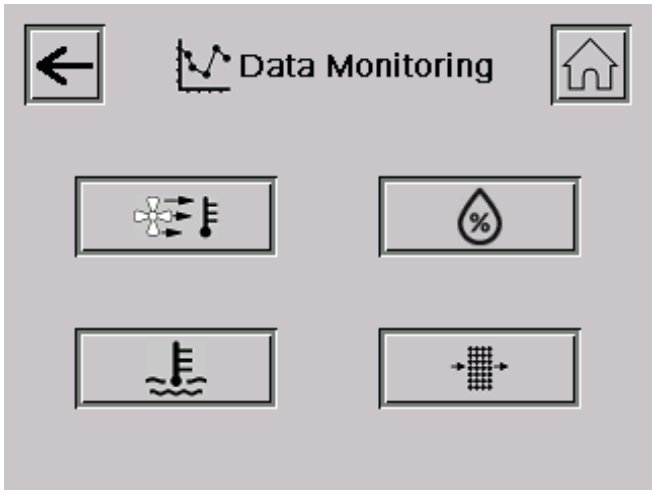
Webgate Password

Please note that if the password is forgotten the only way this can be resolved is for a service engineer to visit.

Press the Arrow icon to return to the User Security Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Data Monitoring

Press this button on the settings menu.



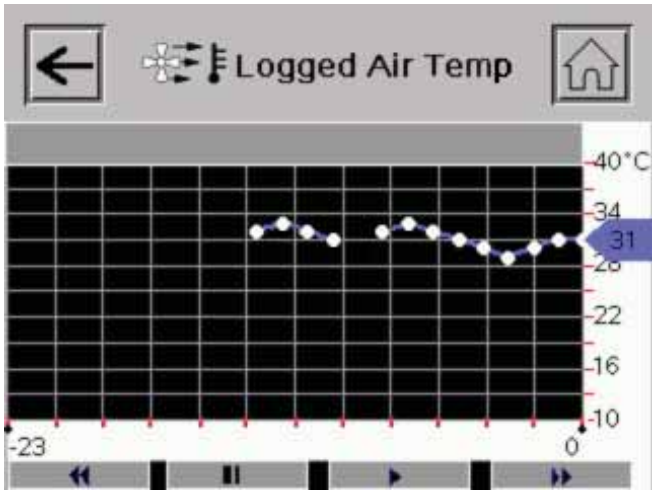
Air Temperature Logs

Humidity Logs

Water Temperature Logs

Filter conditions

Pressing the buttons brings up a graph of the condition pressed. The display is marked up in hours and shows the past 72 hours of activity. The example shown below displays a graph of the air temperature.



The Filter Condition Button is only present if filter pressure switches are fitted to the DELTA.

Press the Arrow icon to return to the User Settings Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

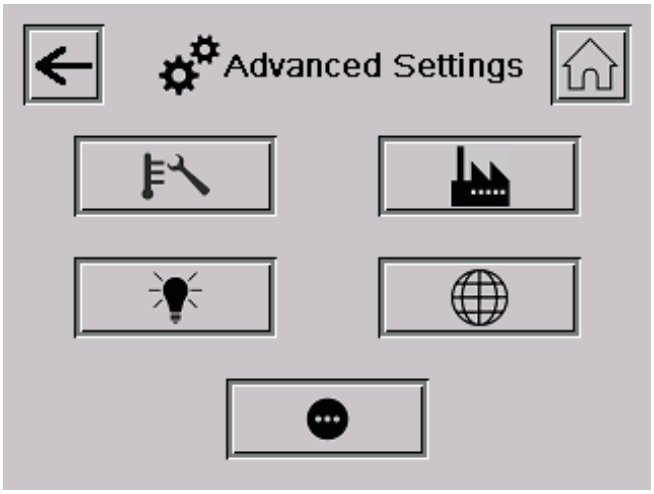
2.2 ADVANCED SETTINGS

Press this button on the settings menu. 

WARNING
ACCESSING THE ADVANCED SETTINGS BY PUTTING IN THE ONE TIME PASSWORD TAKES YOU INTO PARAMETERS THAT MAY HAVE SERIOUS IMPLICATIONS TO THE WAY THE DELTA BEHAVES. A SERVICE VISIT MAY BE NECESSARY IF THE PARAMETERS ARE CHANGED INCORRECTLY

The One time password for accessing these controls is 1842. Once this password has been entered you will not be prompted for this password in the future.

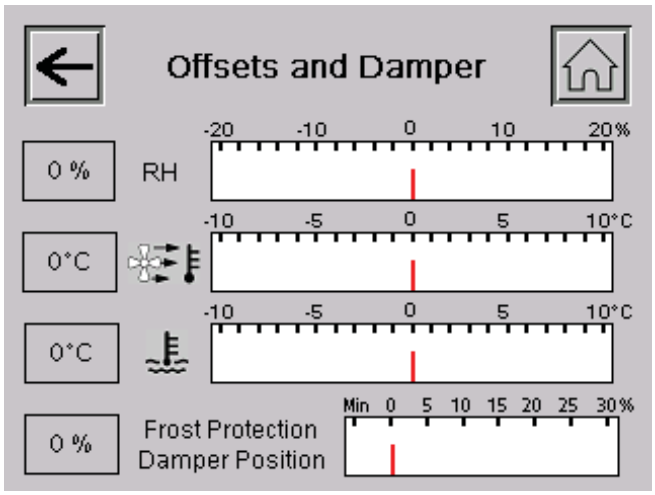
The Advanced Setting screen appears



Offsets and Damper

Press this button 

There are instances where the actual conditions in the pool may be slightly different to the conditions detected and shown on the display. An example would be if the display was showing a pool temperature of 26ºC and the pool water was actually measured as being 25ºC. In this example the offset needs to be decreased by 1ºC to enable the display and the actual temperature to be the same. Press in the left hand side of the white area to decrease the offset by 1ºC. The other settings can be changed in a similar way. If the displayed condition is lower than the actual condition, press in the right hand side of the white area to increase the displayed setting.



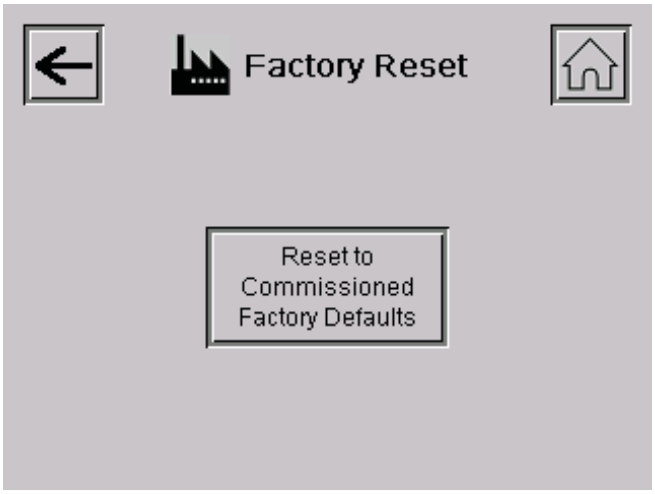
When the outdoor temperature is 6ºC or lower and the machine is protected by standard Frost protection, the amount of fresh air allowed by the dampers can be adjusted by increasing or decreasing the percentage of fresh air. Press in the left hand side of the white area to decrease the percentage. Press in the right hand side of the white area to increase the percentage.

Press the Arrow icon to return to the Advanced Setting Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

Factory Reset

Press this button 

If for any reason the settings have been changed which make the Delta behave in an unusual way the original commissioned settings can restored by pressing the Reset to Commissioned Factory Defaults button on this screen. After this has been pressed a confirmation appears, pressing again completes the reset.



Press the Arrow icon to return to the Advanced Setting Screen or if nothing else needs to be changed press the Home icon to return to the main screen.

Screen Settings

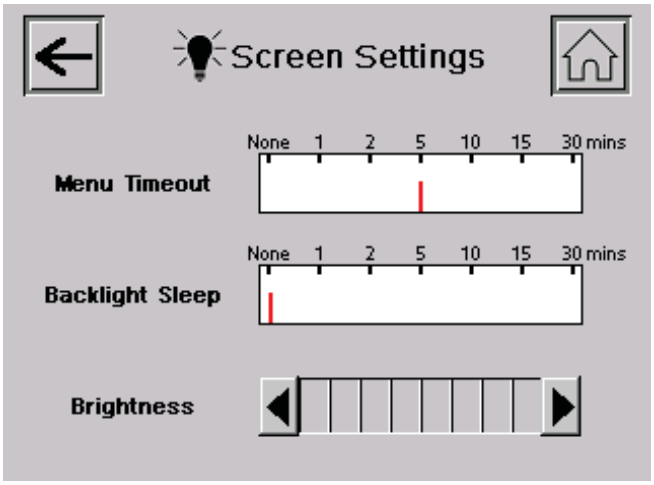
Press this button 

The screen settings can be changed here by pressing to the right or left of the red line to increase or decrease the desired parameter.

Menu Timeout is where, if no action is completed during the timeout period, the screen returns to the home screen.

Backlight Sleep is where, if no action is completed, the screen turns off to save energy.

The Brightness of the display is increased or decreased by pressing the left or right arrows.



Press the Arrow icon to return to the Advanced Setting Screen or if nothing else needs to be changed press the Home icon to return to the home screen.

IP Address Settings

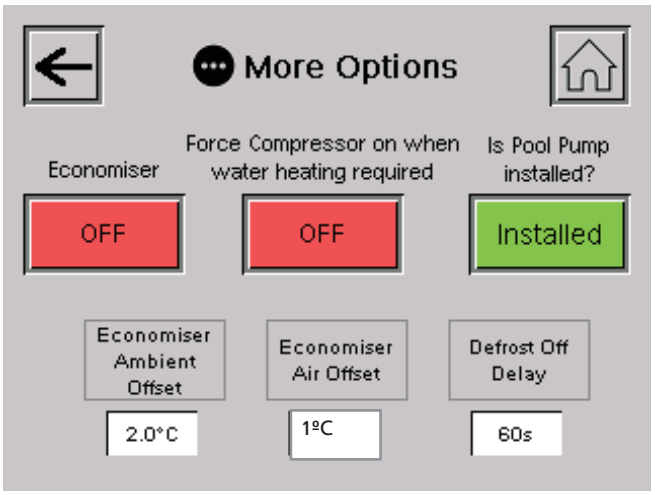
Press this button 

More Options

Press this button

ON

Icons toggle between OFF and ON



Uninstalled

Icon toggles between Installed and Uninstalled

The Economiser allows for "free" air conditioning by using the outdoor fresh air to cool the pool hall.

How this works.

For the Economiser to work two conditions need to be met.

1. The Ambient (outdoor) air temperature needs to be lower than the pool hall air temperature. This is set by the Economiser Ambient Offset in the figure above.

2. The Pool Hall Air temperature needs to be higher than set point, but not at the temperature where air conditioning comes on automatically. This is set by the Economiser Air Offset in the figure above.

When the Economiser is toggled ON the DELTA senses the ambient (outdoor) air temperature. If the above conditions are met, the DELTA will open the dampers and allow fresh air into the pool hall.

The "Force compressor on when water heating is required" toggles between ON and OFF.

"Is Pool pump installed" toggles between ON and OFF.

If the DELTA is not controlling the pool circulating pump, having this toggled off will prevent false errors from appearing on the Console.

Press the Arrow icon to return to the Advanced Setting Screen or if nothing else needs to be changed press the Home icon to return to the main screen.

2.3 REMOTE ACCESS TO THE DELTA

The DELTA can be controlled remotely either by computer or through a mobile device (Android/iOS).

To access the DELTA by a mobile device the VIJEO DESIGN´AIR app needs to be installed. A free version is available with a limited connection time or a paid version with unlimited access.

After installing the app, open it and select "Add Device". In the fields that appear enter a name (DELTA), the IP address of the Internet connection (this can be obtained by searching for "What is my IP" in a search engine) and leave the port number as the default setting.

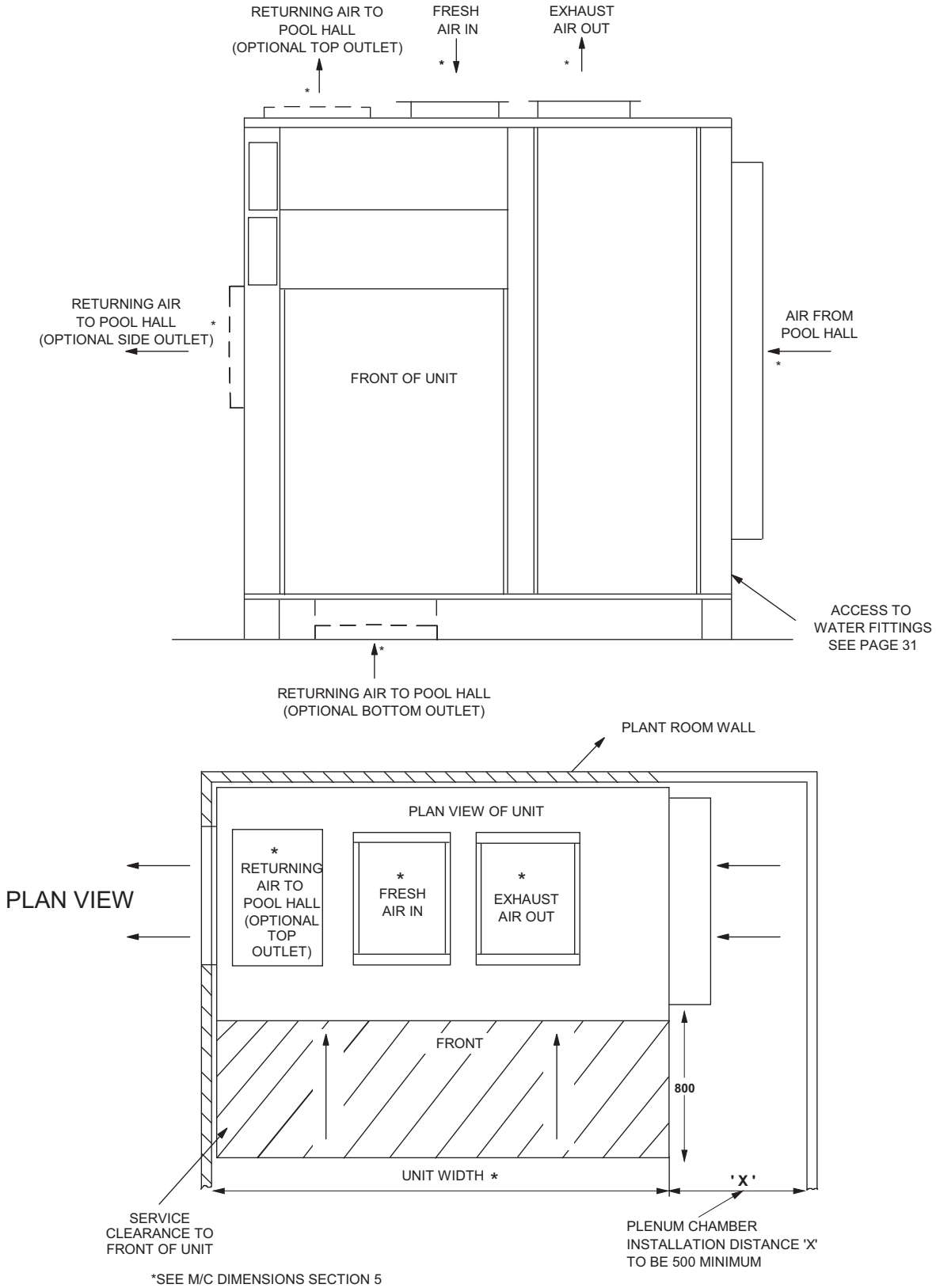
From now on the DELTA can be controlled from your mobile device by selecting it from "Favourites". Make sure the disclaimer is read before accepting the terms and conditions of the app. The box needs to be ticked before the OK button can be pressed.

To access the DELTA by computer a browser that can run ActiveX needs to be installed, such as Internet Explorer.

When the DELTA is accessed a screen similar to that shown below appears. To control the DELTA select "MONITORING" from the top menu bar followed by "IN FRAME" or "NEW WINDOW" from the "WEBGATE" section of the left menu bar.
Log in with the user name "Webgate" and your password. The DELTA can be controlled as if using it in person.

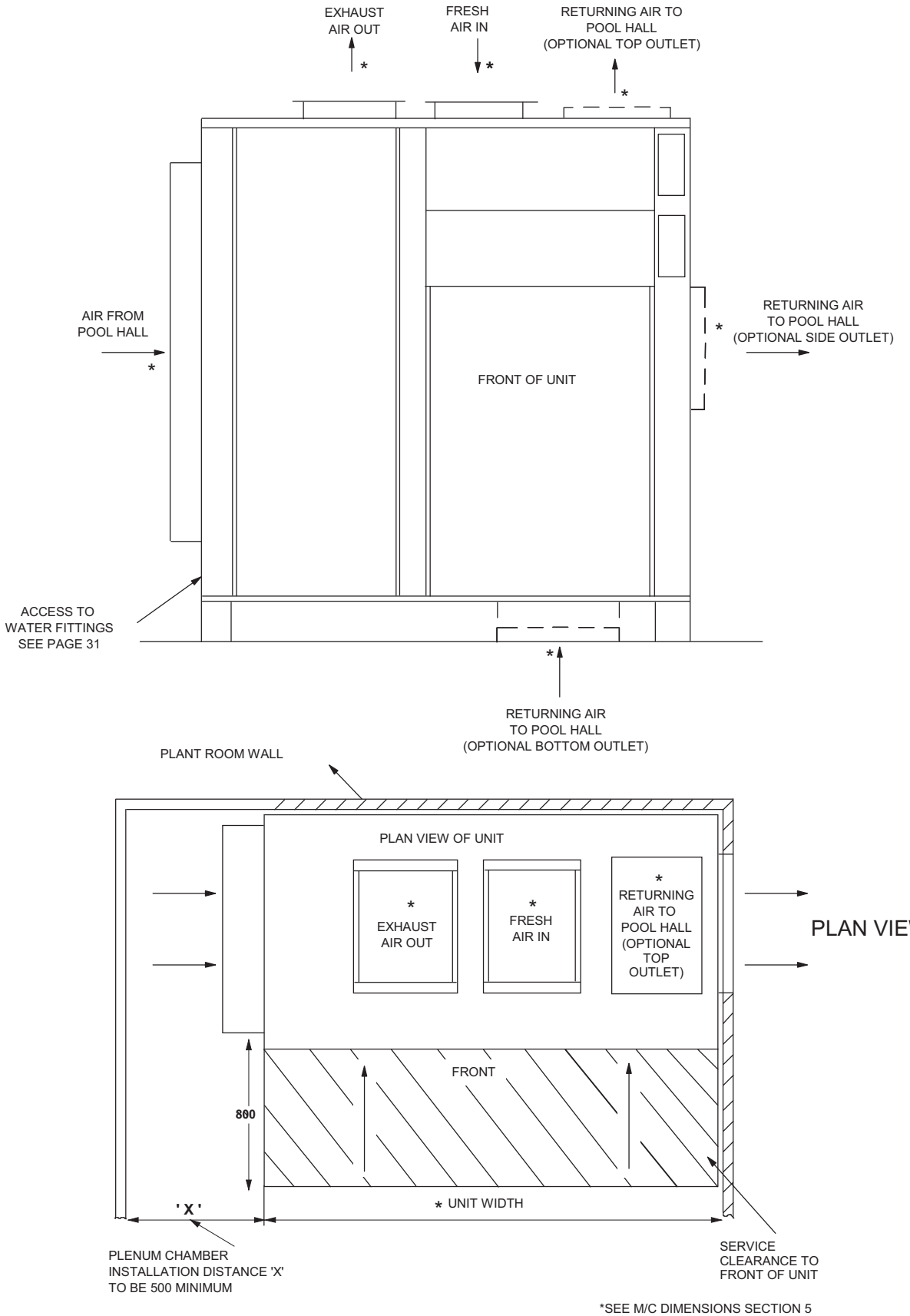
3.0 INSTALLATION
3.1 SITING, MACHINE LOCATION

STANDARD HAND



STANDARD HAND ORIENTATION

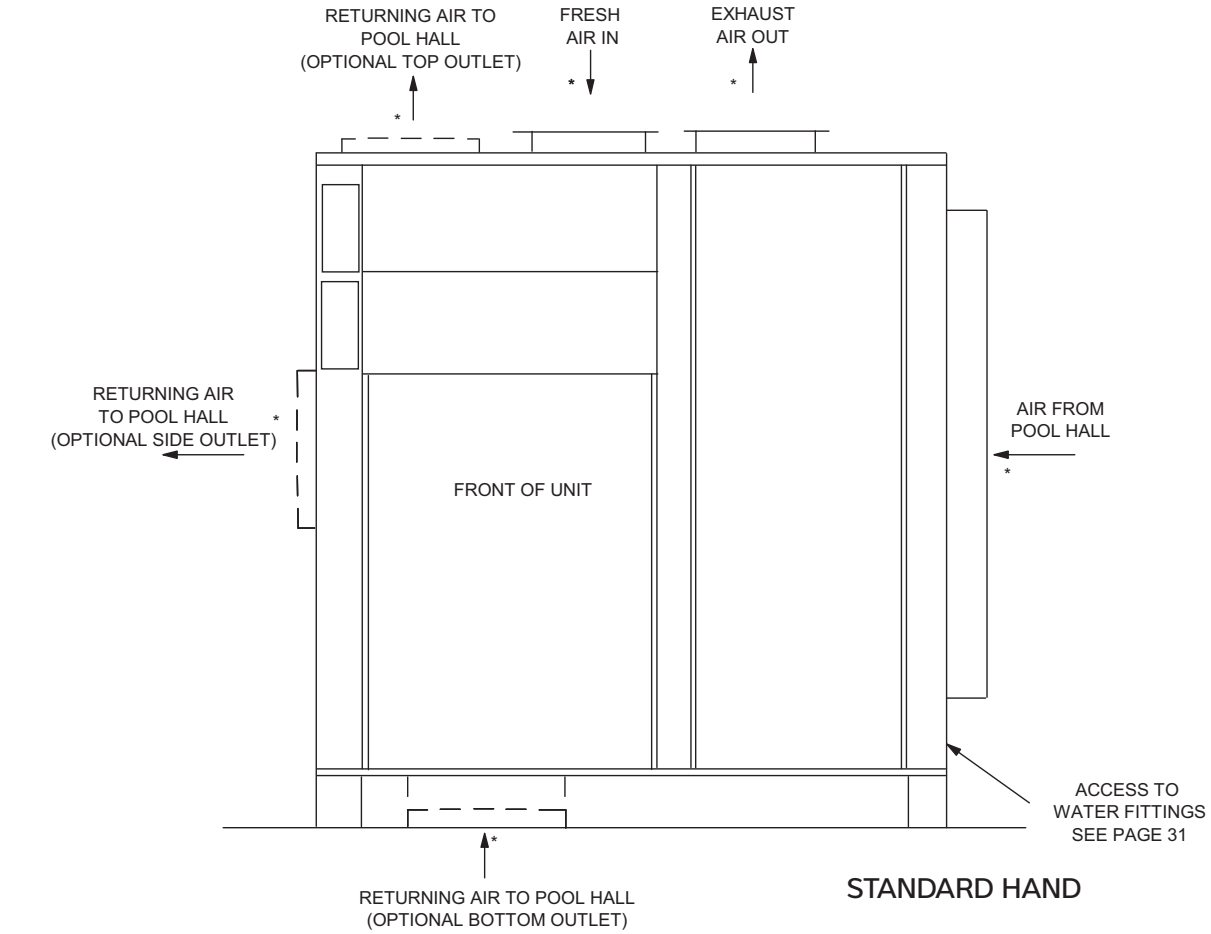
OPPOSITE HAND

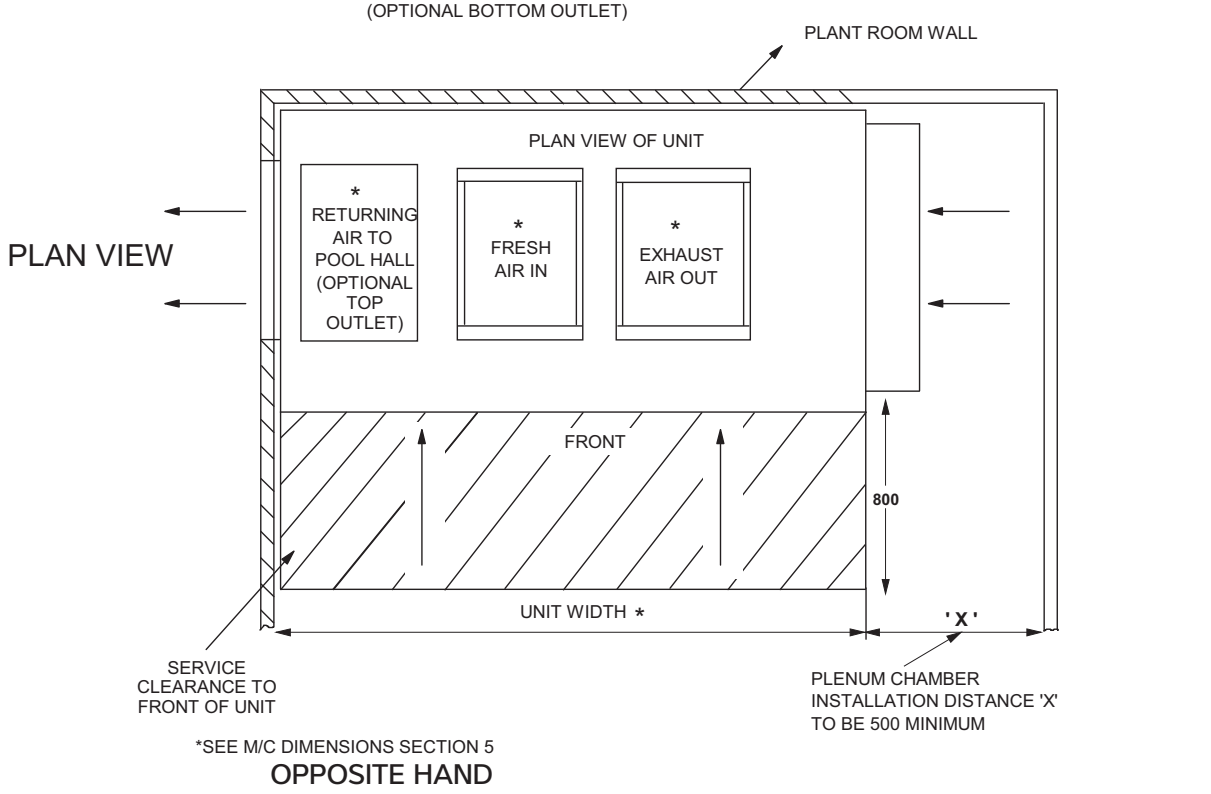


*SEE M/C DIMENSIONS SECTION 5

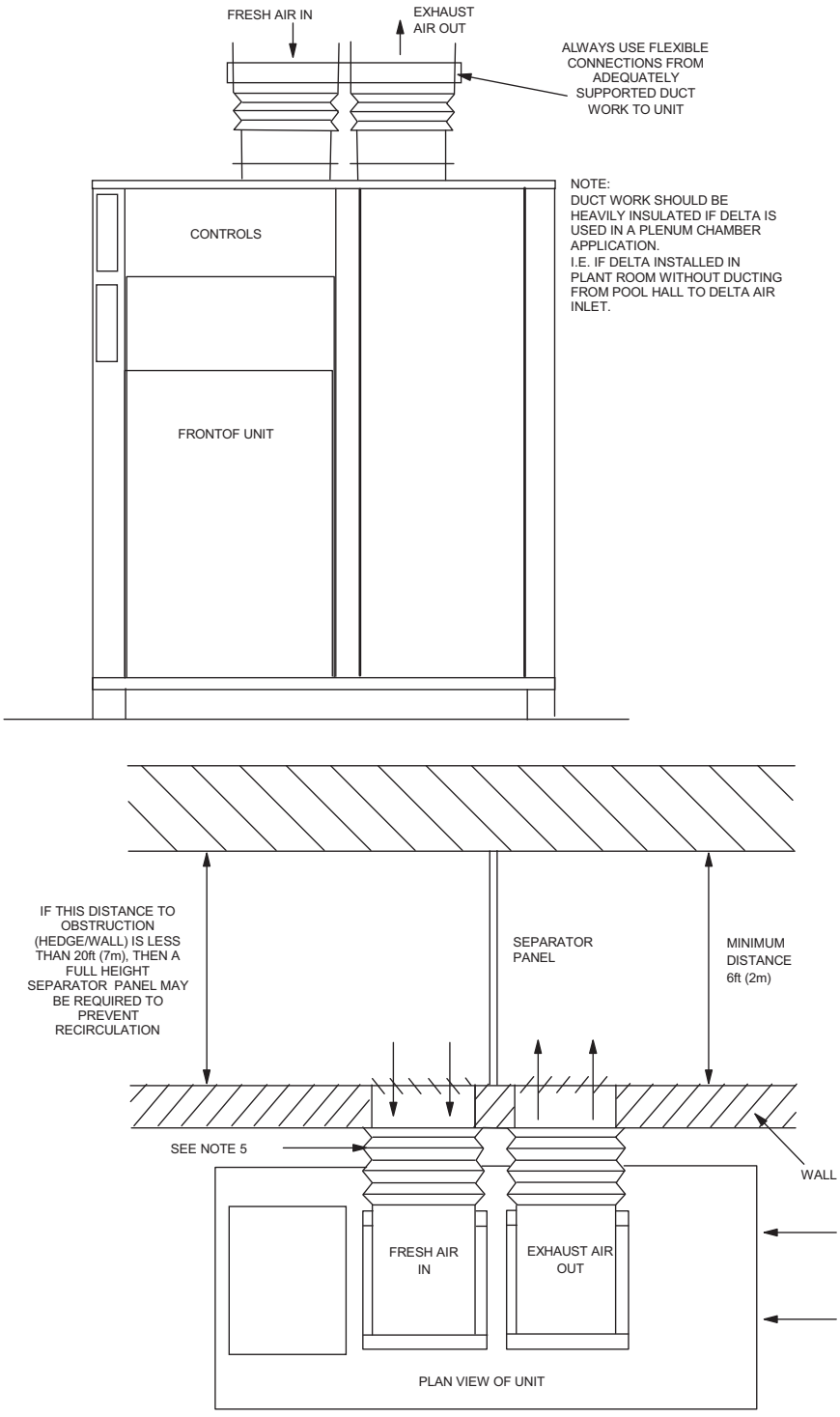
OPPOSITE HAND ORIENTATION

3.2 AIR FLOW (POOL HALL AIR)





3.3 FRESH AIR/EXHAUST AIR



NOTES:

1) Ensure duct work pressure drop including all inlet/outlet grilles does not exceed resistance given in Data Sheet.
2) Every effort must be made to prevent re-circulation of discharge back into inlet.
3) Ensure inlet does not become blocked by debris (leaves, grass cuttings, etc).
4) If unit is located in a plant room at pool hall air temperatures any ambient air ducting must be heavily insulated.
5) Ensure flexible couplings are used to seal the ambient suction and discharge spigots from each other to prevent cold air from entering the plant room.

3.4 PLUMBING

3.4.1) POOL WATER

a) The Calorex 'DELTA' must be connected after the filter in the return pipe to the pool. If an existing heater is being retained, then the 'DELTA' should be connected upstream of the existing heater (see following schematics).

b) Calorex 'DELTA' units have plastic stubs for connecting (solvent weld) the pool water inlet and outlet. On 'DELTA' 1 to 8 these stubs are 1" diameter. On 'DELTA' 10 to 16 these stubs are 1 1/2".

c) Suitable breakable couplings, isolation, and drain down valves should be installed in the pool water inlet/outlet pipes local to the 'DELTA' unit.

d) The heat exchanger in the 'DELTA' unit will on small pools, take the full flow rate of the recirculation system. On larger pools a bypass or separate auxiliary pump may be necessary. This method can also be used to reduce energy consumption, by the installation of a two speed or auxiliary pump by-passing the main pump/filter to satisfy pool water heating and dehumidification without the need for the main pump to be running. Further savings on both the above methods can be made by utilizing the standard feature on all 'DELTA' units to control the main or auxiliary pumps (see section 2.4 electrical wiring).

e) When the pipe work installation is complete the circulating pump(s) should be switched on and the system checked for leaks. Also check the filter gauge to see that there is not excessive back pressure.

f) A flow meter should be fitted (or pressure gauges).

3.4.2) CONDENSATE DRAIN

a) The condensate drip tray at the base of the 'DELTA' unit collects the water removed by the dehumidification process. It is therefore necessary to ensure that the 'DELTA' unit is placed on a level plinth so that the condensate can run away and not overflow the edges of the drip tray inside the machine.

b) All 'DELTA' units have a ¾" BSPM threaded condensate drain connection. The drain pipe should be run away with the adequate fall to waste i.e. ½" per foot min. DO NOT fit a trap as it is a standard fitting inside the unit. An air break or tun dish should be incorporated to prevent back flow of foul water and smells see Fig 3.1.

3.4.3) L.P.H.W. WATER PLUMBING

a) Calorex 'DELTA' 1/2/5/6/8/10/12 with single LPHWs have 28mm copper stubs whilst DELTA units with double LPHWs have 35mm stubs for connecting (compression or solder) the boiler water flow and return. Delta 14 and 16 with single LPHWs have 11/2" BSPM stubs.

b) Suitable breakable couplings, isolation and drain down valves should be installed in the boiler water flow/return pipes local to the 'DELTA' unit.

c) A mixing valve and/or bypass may be required to maintain a minimum boiler return temperature and/or keep a constant load to the boiler pump. Refer to the boiler manufacturers instructions before designing the pipe work system.

d) If boiler and water pump is not controlled by 'DELTA'' then a boiler bypass will be required.

e) A flow meter should be fitted (or pressure gauges).

f) A filter or "boiler buddy" should be added to the pipe work to help keep the heat exchangers in the DELTA free from blockages.

3.4.4) IMPORTANT GENERAL POINTS

a) Do not route water pipes across service access panels or Air inlet/outlet.

b) The water circuits to and from the 'DELTA' units should be capable of maintaining within the specified limits the water flow required. (see section 4, Data Sheet)

c) All pipe work must be adequately supported with allowance for expansion and contraction especially with regard to the plastic pipe work.

d) It is recommended that when installing water systems the last connections to be made should be adjacent to the 'DELTA unit to avoid undue stresses on the unit connections.

e) All pool Purifying Devices and Chemical Injection Systems must be fitted down stream of the DELTA unit with a non-return valve to prevent concentrated chemicals back feeding into the heat exchangers.

The practice of dosing chemicals direct into the Skimmer Basket which results in concentrated corrosive liquids passing over vulnerable metal components must not be allowed.

f) Water quality must be maintained not only relating to solids, etc. but for pH between 7.4± 0.4, (and if pool water is saline at a maximum concentration of 3% wt/wt). See section 6, Warranty Exclusions for total list of water quality limits.

3.4.5 DETERMINING WATER FLOW

a) Flow Meter Method (see fig 3)

Ensure isolation valves 'A' and 'B' and bypass valve 'C' are fully open. Slowly close down bypass valve 'C' until correct flow rate (see Data Sheet section 4) is shown on the flow meter. Remove handle and lock off valve 'C'.

b) Differential Pressure Method (see fig 3)

By simply installing two filter pressure indicating gauges, one each on the inlet and outlet of the heat pump, and a locking type gate bypass valve in the bypass line, the flow rate through the heat pump can be accurately determined by the difference in the readings of the gauges. This pressure drop is proportional to flow.
Flow rate should be set at the maximum differential with a clean filter if fitted. This differential pressure will drop as the filter becomes dirty. Provided the filter is cleaned before the minimum differential is reached (which would normally be the case with a well managed system) then no problems should be encountered.

Setting up the differential

When installation is complete, the procedure for setting the flow rate through the heat pump using two gauges is as follows:

1. With the heat pump switched off ensure isolation valves 'A', 'B' and bypass valve 'C' are fully open.

2. Note the System Pressure on both gauges – they should read the same, but due to manufacturing tolerances they may be different.

3. Switch on water circulating pump.

For example; with a water System Pressure of 5mhd the gauge on the inlet may read 5 and the outlet gauge 5.5 therefore there is a STATIC ERROR DIFFERENCE of 0.5mhd.

4. Gradually close the bypass valve 'C' until there is a difference in pressure between the two gauges that is equal to the required pressure drop (see data sheet) observing any static error on the gauges before beginning this process.

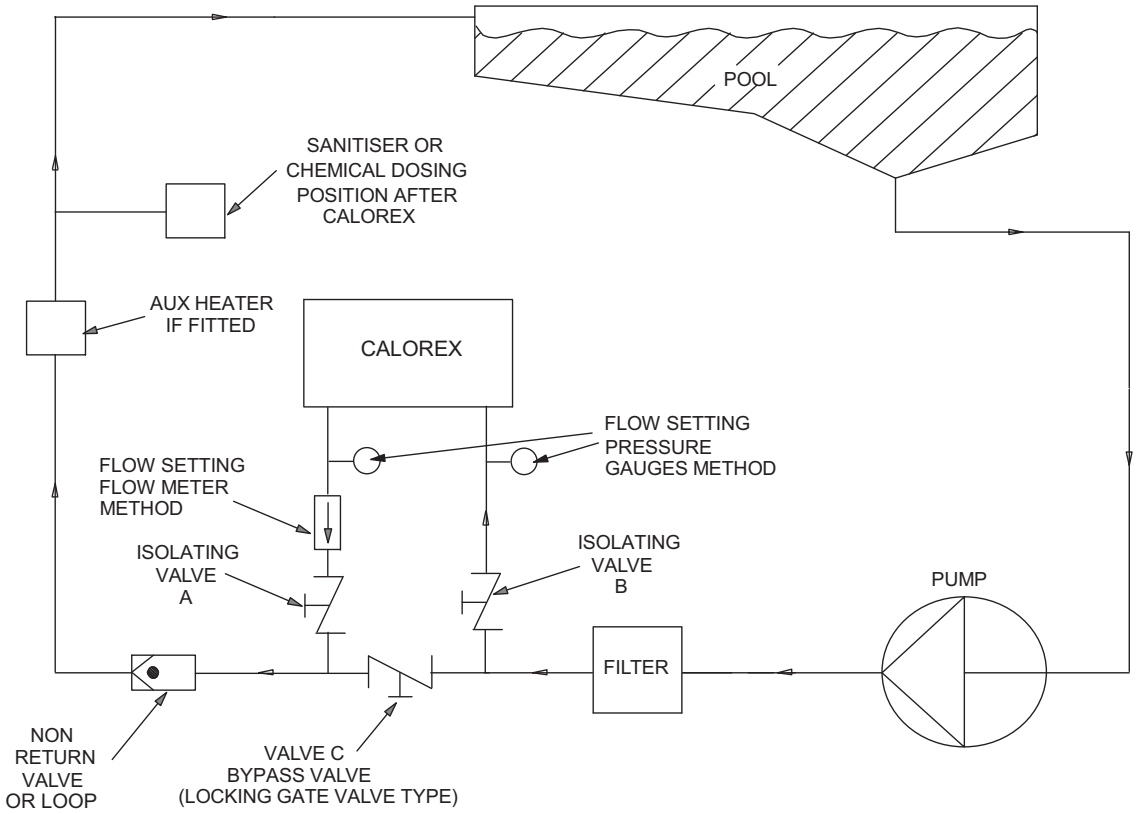
5. Lock the bypass valve, or render it tamper proof, when correct setting is achieved.

6. See data sheet (section 4) for correct water pressure drop.

Fig 3

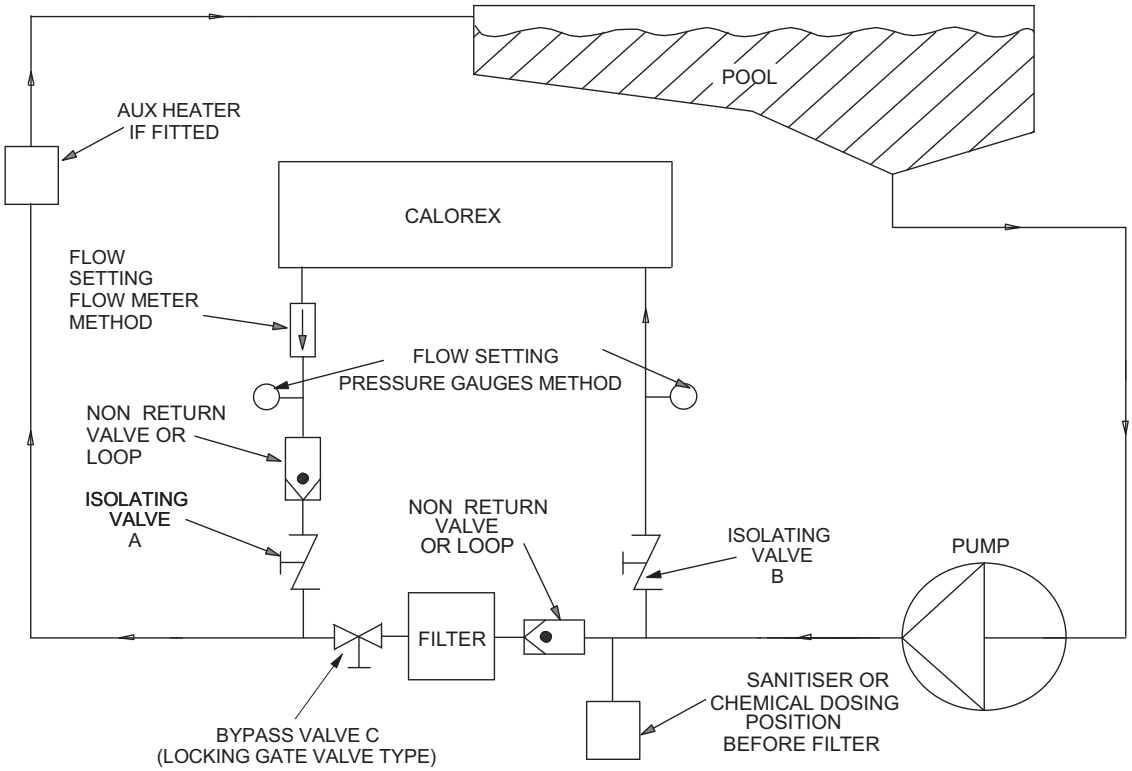
POOL WATER SCHEMATIC (STANDARD)

ENSURE POOL FILTRATION PUMP SELECTION ALLOWS FOR ALL SYSTEM RESISTANCE



POOL WATER SCHEMATIC (FILTER DOSING)

ENSURE POOL FILTRATION PUMP SELECTION ALLOWS FOR ALL SYSTEM RESISTANCE



3.4 PLUMBING (cont)

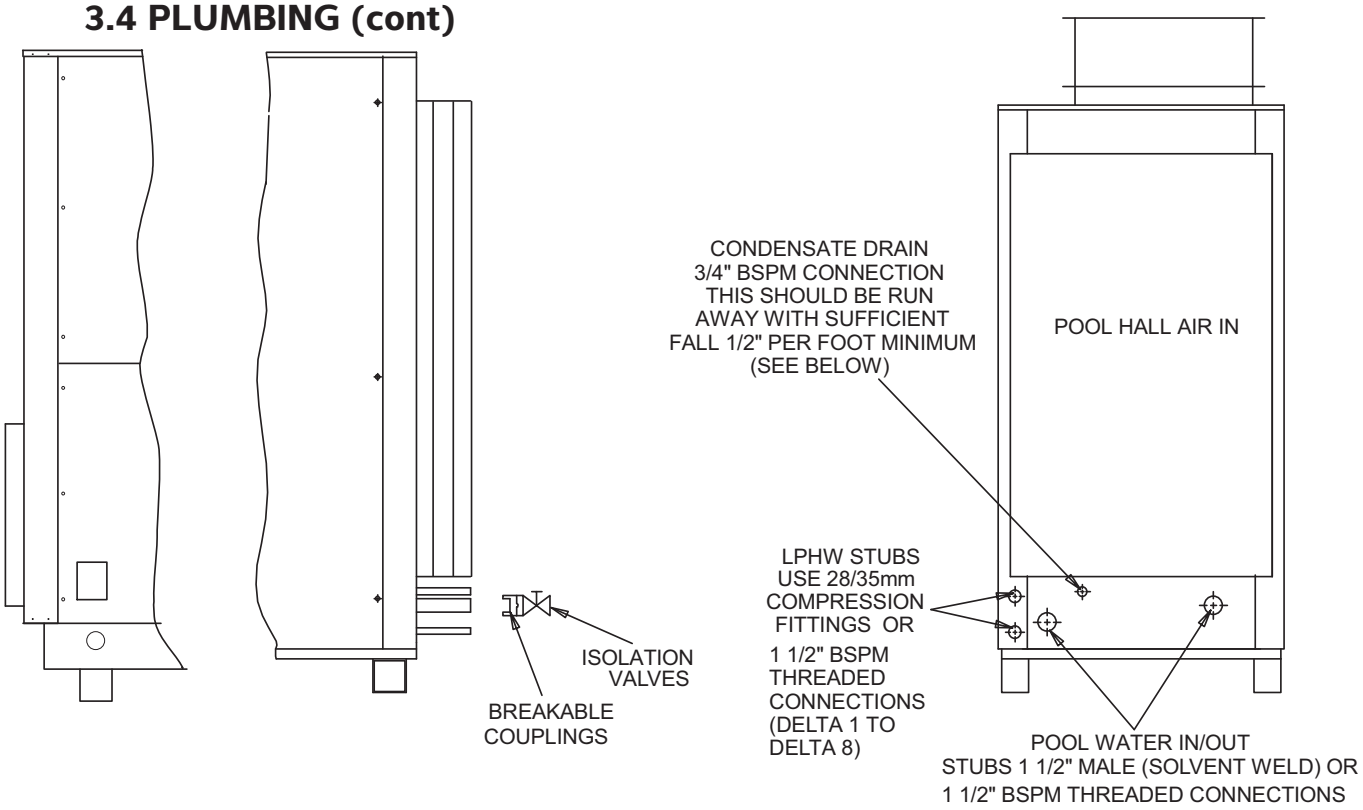
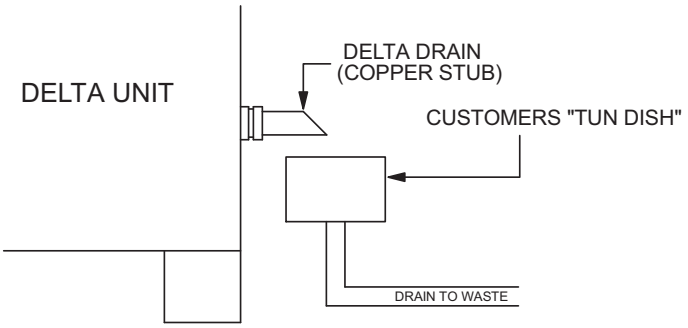
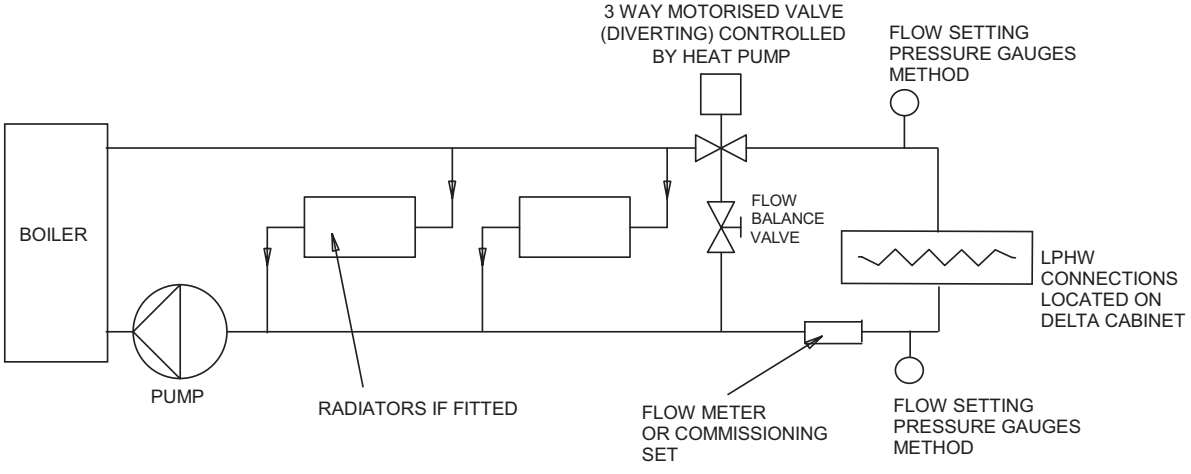


FIG 3.1 CONDENSATE DRAIN SCHEMATIC



LPHW SCHEMATIC



3.5 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.

A voltage of 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 10mm^2 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.

3.6 ELECTRICAL INSTALLATION

3.6.1 Electrical Safety – It is important to ensure that all aspects of the installation comply with the latest I.E.T. Regulations. It is also important to ensure that any remote devices which terminate within the pool hall are of the type and voltage as specified in the I.E.T. Regulations latest edition.

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

3.6.2 Protected Supply – Whilst not mandatory, Calorex recommend that an R.C.C.B. is always fitted or that the supply is to local electricity authority recommendations, and that all ducting is bonded in in accordance with these regulations.

The supply to the machine should incorporate fuses or motor rated circuit breakers (Type C) to specified rating, (see Data Sheet section 4.0). H.R.C. fuses are recommended. An isolator must be fitted within clear view and not more than 2 metres away. The isolator must have a minimum 3mm air gap in the off position.

All units must be correctly earthed/grounded. An earth leakage trip is recommended to be fitted to all pool electrics.

3.6.3 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:-

Voltage	Minimum	Maximum
Single phase machines	207V	253V
Three phase machines	360V	440V
Frequency	47.5Hz	52.5Hz

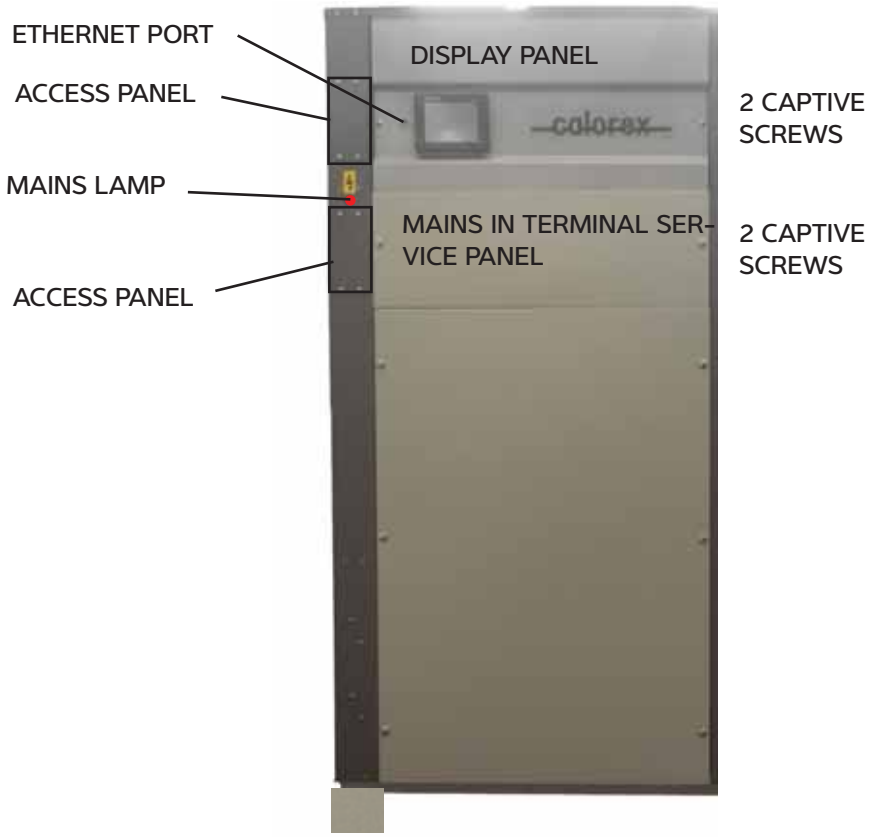
N.B The voltage must be measured at the heat pump mains terminals with all the fans/ compressors running at the rated load condition.

3.6.4 Correct Cable Sizing – The cable supplying electricity to a machine with a given load must increase in cross sectional area (C.S.A) as the length increases in order that the voltage drop within the cable does not exceed recommended limits. **Cable sizing should be calculated by an approved electrician with due consideration to I.E.E and local codes of practice.**

NOTE: Three phase DELTAS from DELTA 4 upwards are fitted with phase protection and will not run if phases are connected incorrectly.

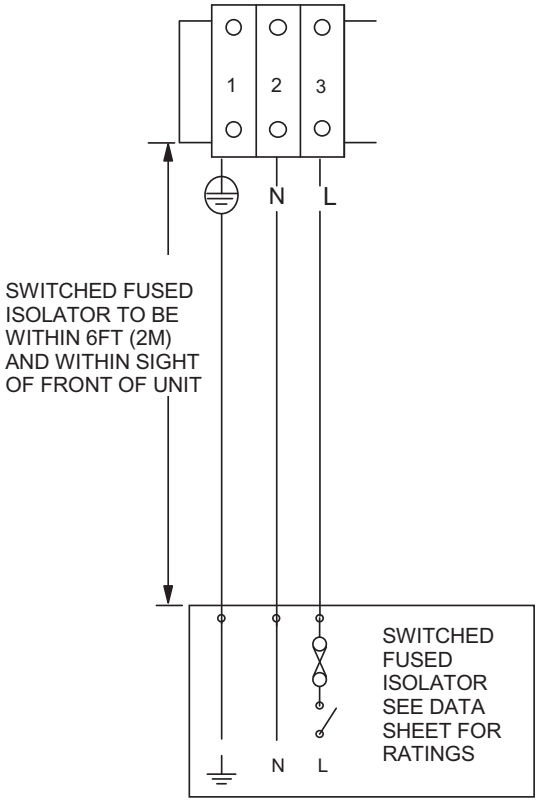
WARNING: the red lamp adjacent to the control panel indicates that the DELTA is live. It is necessary to wait 3 minutes after the supply is disconnected before removing any panels or commencing servicing of the DELTA.

LOCATION OF MAINS IN TERMINALS

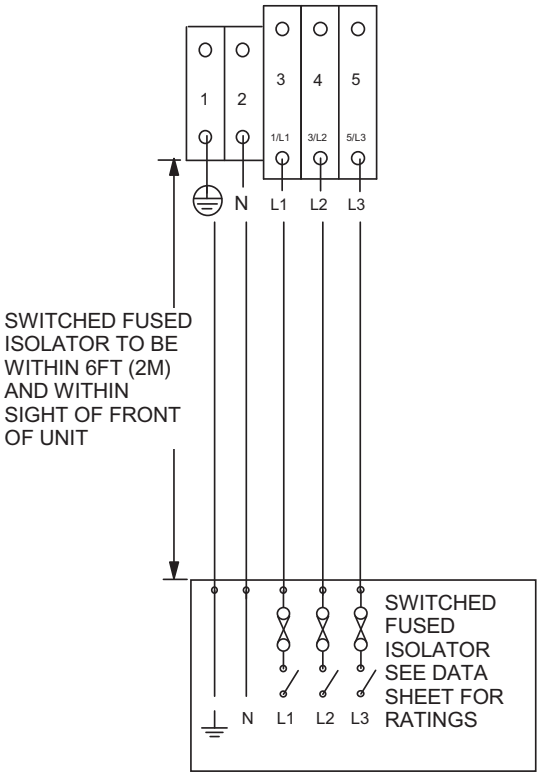


The volt free terminals are accessible by removing the display panel. Use the upper hole for cable access to volt free and customer terminals.The panel has been designed to hang on the mains in terminal service panel when not fixed in the normal operating position.
There are two cable access holes in the side of the machine. The access panels can be removed to make it easier to feed the cables into the DELTA.
Use the lower hole for cable access to the mains in terminals.

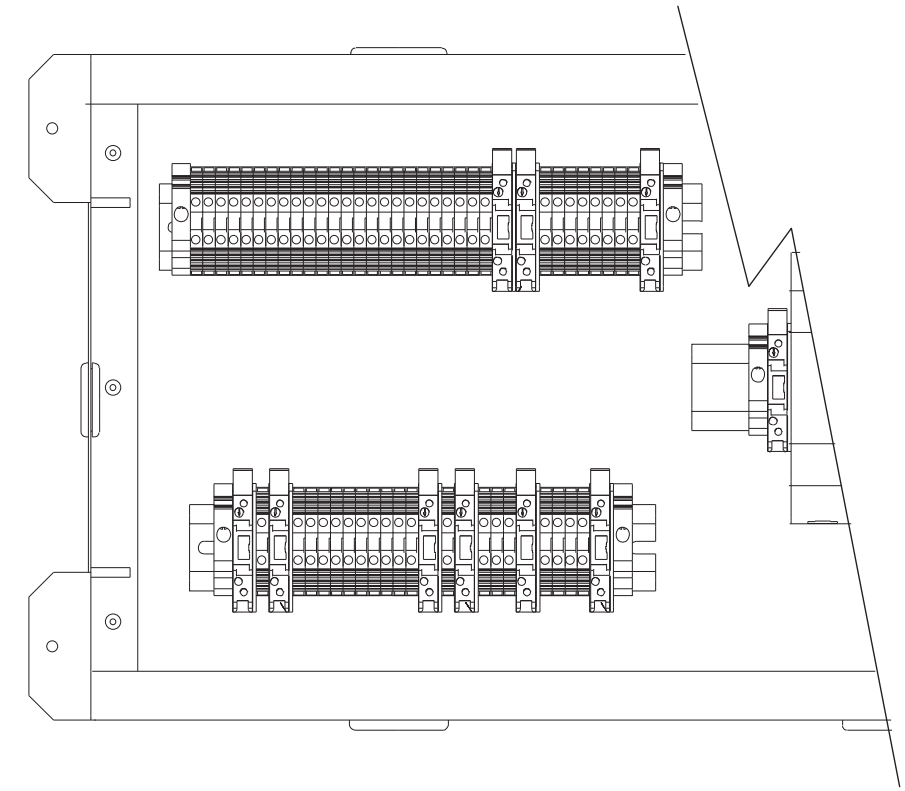
MAINS SUPPLY TERMINAL BLOCK LAYOUT SINGLE PHASE

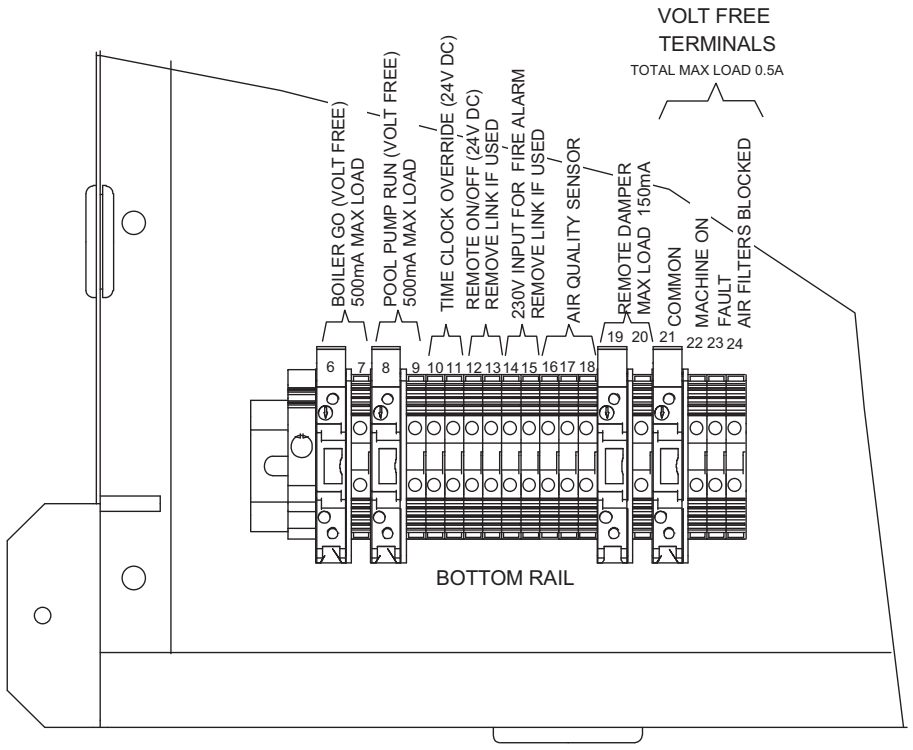


MAINS SUPPLY TERMINAL BLOCK LAYOUT THREE PHASE



VOLT FREE AND CUSTOMER TERMINALS





TERMINALS 6 TO 24

NOTE 1. REMOTE OCCUPIED/UNOCCUPIED (TIMECLOCK OVERRRIDE)

These contacts are to enable the set back air temperature to be remotely overridden.
Closing a remote switch will enable the unit to regain the normal operating air temperature for when the pool is in use.
This can be done via a voltage free pool cover switch or some other form of voltage free switch.
If this facility is used, the time clock on the control panel of the unit should be set to the "unoccupied" (right hand) position.
If this facility is not to be used then these terminals can be ignored.

NOTE 2. BOILER PUMP/GO SIGNAL
Terminals 6 and 7.
These are voltage free contacts rated at 0.5 Amp at 230 Volt.
If the low pressure hot water supply to unit is to be governed by the unit then these contacts should be utilised to bring water to the unit via the boiler, motorised valve, boiler pump etc.
This is dependent on how the low pressure hot water supply to the unit has been designed.
If the supply of low pressure hot water to the unit is not dependent on a signal from the unit these contacts can be ignored.

NOTE 3. POOL PUMP START SIGNAL

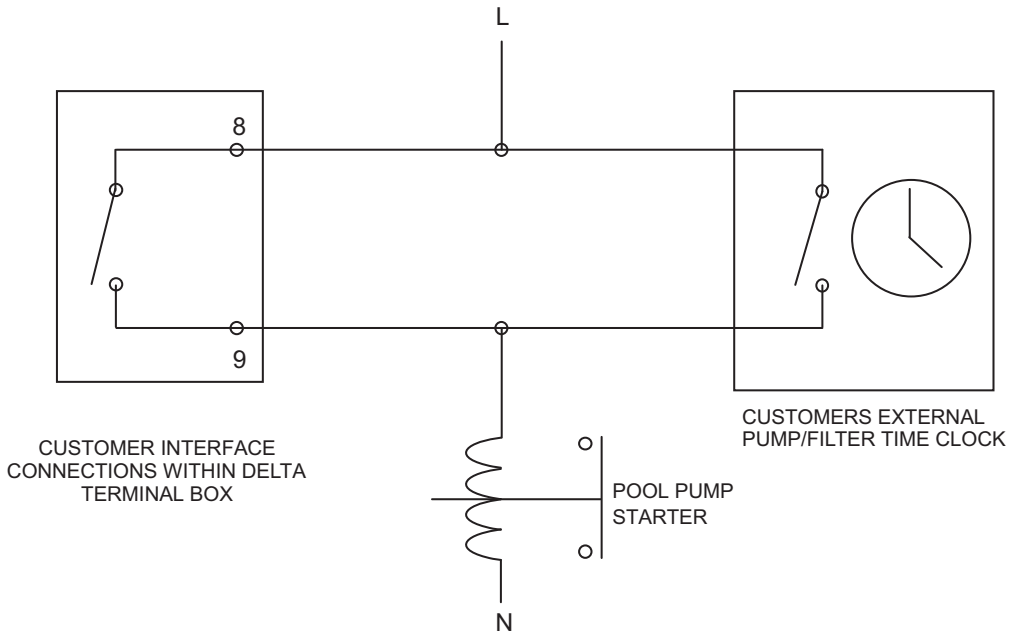
Terminals 8 and 9

These are voltage free contacts rated at 0.5 Amp at 230 Volt.
For Installations where the filter pump, which also provides water to your DELTA, is controlled by a time clock (supplied by the installer) your DELTA can override "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 run only when:

a) A block period of "pump running" has been set by the time clock for filtration purposes.

b) The pool requires heating.

If the pool water pump is to be run continuously these contacts can be ignored.



3.7 NETWORK CONNECTION

Local Network Information

Standard configuration – the DELTA is connected to a router via an Ethernet cable to the port on the front panel. A fixed IP address must be set (see section 2.3) as port forwarding must be completed. The Default IP address will be 192.168.8.99, but may be changed as required.

PORTS TO BE FORWARDED

80
6000
6002

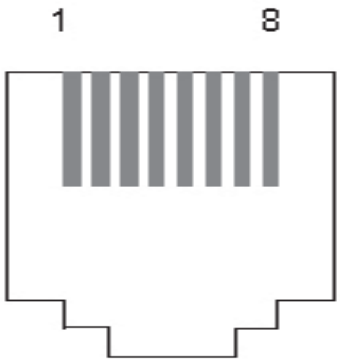
Once forwarded, the DELTA may be accessed remotely by going to: (Your IP address):80 in your ActiveX enabled browser such as Internet Explorer. If using the VIJEO DESIGN´AIR app, you will need to add a device to the favourites, enter your own IP address and leave the port number as default. See section 2.3 for more details.

BMS (Building Management System) SETTINGS

All DELTAS can be connected to a BMS with an RS485 serial connection, using the MODBUS protocol. A port is available for BMS communications and can be used by plugging in a cable with an RJ45 connector into the M168 controller and connecting it to your BMS. A split cable can also be used if your BMS does not use an RJ45 connector.

Connect the BMS to MODBUS Port 2 (MBS2) on the M168 controller – see the Circuit Diagram in Section 3.9

RJ45 Layout Description



RJ45 PIN	SIGNAL	DESCRIPTION
1	-	Not Connected
2	-	Not Connected
3	-	Not Connected
4	D1 (A	Transceiver terminal 1 V1 voltage
5	D0 (B	Transceiver terminal 0 V0 voltage
6	-	Not Connected
7	-	Not Connected
8	Common	Signal Common

While setting up the BMS it will be useful to check the two LEDs on the M168 controller. An explanation of the meaning of LEDs is shown in the table below.

COMMUNICATION AND STATUS INDICATORS

ORANGE LED FOR COMMUNICATION	DESCRIPTION
OFF	SERIAL PORT NOT CONFIGURED
FLASHING	SERIAL PORT CONFIGURED, COMMUNICATION IS OK
ON	SERIAL PORT CONFIGURED AS SLAVE, INVALID MODBUS PACKET RECEIVED

RED LED FOR ERRORS	DESCRIPTION
OFF	NO ERROR
FLASHING	COMMUNICATION CONFIGURATION: FRAME, PARITY OR OVERRUN ERROR
ON	COMMUNICATION DATA ERROR:CONFIGURATION: VALID PACKET RECEIVED BUT NOT PROCESSED, NOT ACKNOWLEDGED

MODBUS CONNECTION SETTINGS

BAUD rate (transmission speed) 19,200

Parity BIT –even

Stop BIT – 1

Controller address 1

Variable addresses Using the IEC61131 syntax, 1 based.

Cable length can be up to 1,200 metres.

3.8 RECOMMENDED PLANNED MAINTENANCE

Operations carried out during a planned maintenance visit are as follows: –

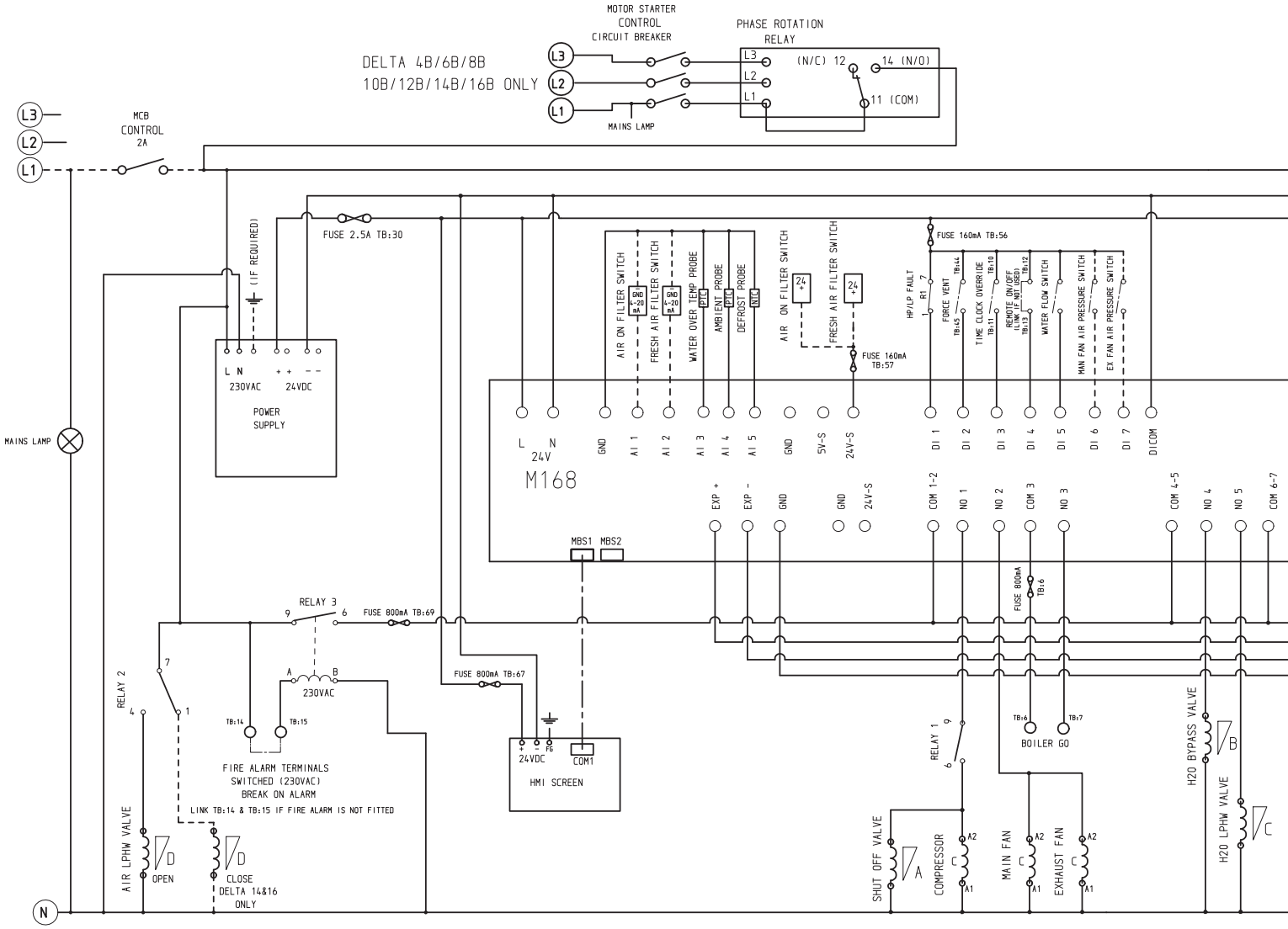
1. Replace all belts & filters where fitted.
2. Check operation and condition of all fans and compressors.
3. Check capacitor tolerances.
4. Check condition of all heat exchangers/evaporators.
5. Check refrigeration system parameters.
6. Check operation of control valves.
7. Check for water leaks.
8. Check drip trays and internal drain lines for blockages and clear.
9. Check operation of controls and calibrate as necessary.
10. Check operation of interlocks in use.
11. Final check on overall operation of unit.
12. Indicate on report any faults found or causes for concern.

Frequencies recommended are as follows:-

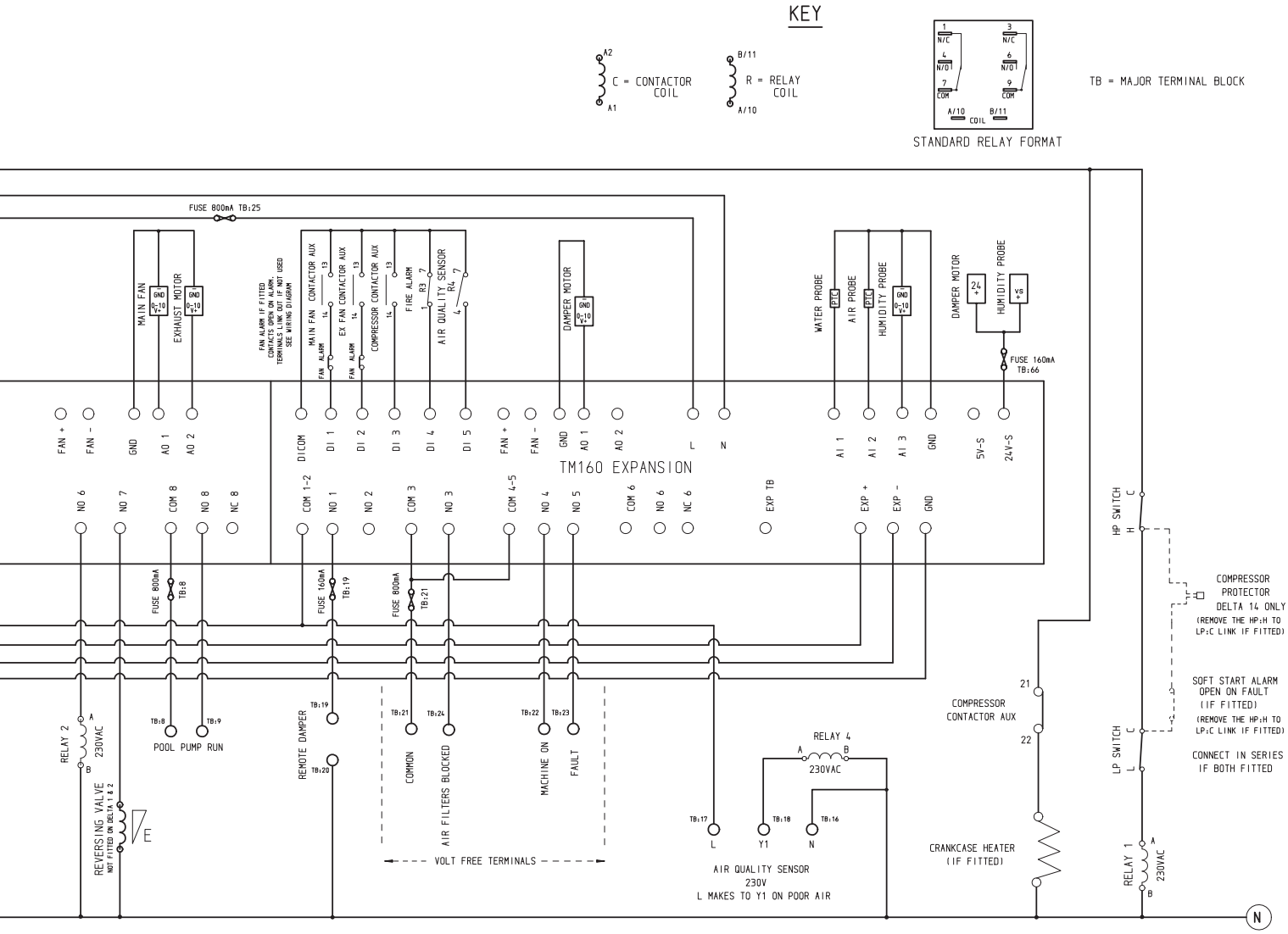
Model	**Light/Medium use**	**Heavy use**
DELTA 1 to 8	2 visits per year	4 visits per year

In order to comply with European Union F-Gas regulations, it is necessary to leak test hermetically sealed systems with more than 6kg refrigerant annually. The operator of the unit is responsible for seeing that this test is carried out. DELTA machines from DELTA 4 upwards need to have this test.

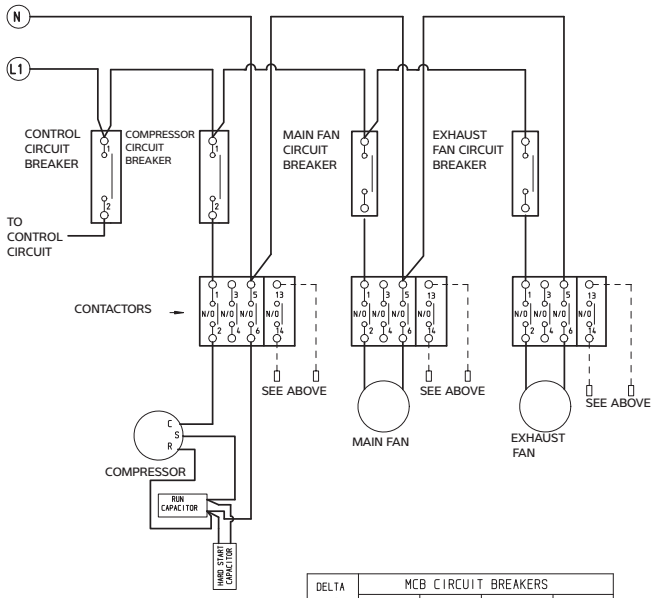
3.9 CIRCUIT DIAGRAMS
DELTA ELECTRICAL



CONTROL CIRCUIT SCHEMATIC MODELS 1 TO 16

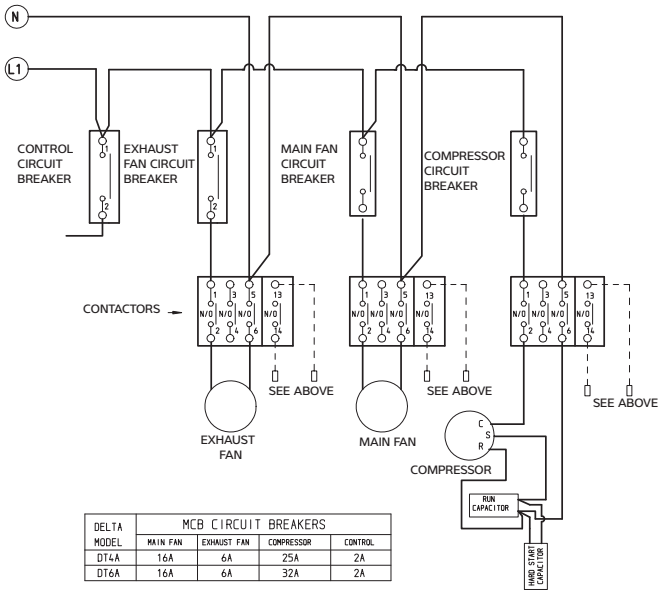


POWER CIRCUIT SINGLE PHASE DELTA 1A & 2A



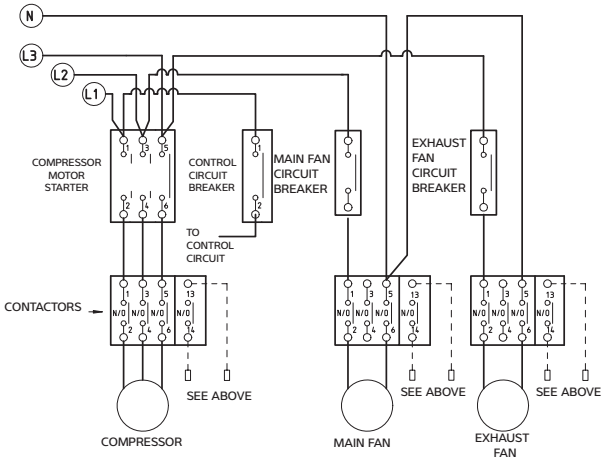
DELTA MODEL	MCB CIRCUIT BREAKERS			
	MAIN FAN	EXHAUST FAN	COMPRESSOR	CONTROL
DT1A	10A	6A	20A	2A
DT2A	10A	6A	25A	2A

POWER CIRCUIT SINGLE PHASE DELTA 4A & 6A



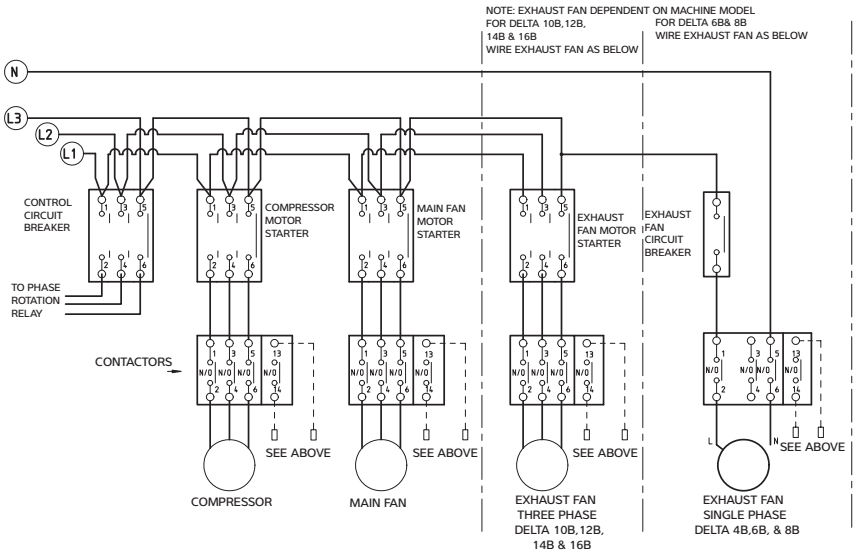
DELTA MODEL	MCB CIRCUIT BREAKERS			
	MAIN FAN	EXHAUST FAN	COMPRESSOR	CONTROL
DT4A	16A	6A	25A	2A
DT6A	16A	6A	32A	2A

POWER CIRCUIT SINGLE PHASE DELTA 1B & 2B



DELTA MODEL	MCB CIRCUIT BREAKERS			STARTER MOTOR OVERLOAD SETTING
	MAIN FAN	EXHAUST FAN	CONTROL	COMPRESSOR
DT1B	10A	6A	2A	4.8A
DT2B	10A	6A	2A	5.6

POWER CIRCUIT THREE PHASE DELTA 4B, 6B,8B,10B, 12B, 14B & 16B



FOR DELTA 4B, 6B & 8B EXHAUST FAN SETTING DENOTES SINGLE POLE MCB CIRCUIT BREAKER RATING

DELTA MODEL	CIRCUIT BREAKER		STARTER MOTOR OVERLOAD SETTING	
	MAIN FAN	EXHAUST FAN	COMPRESSOR	CONTROL CIRCUIT BREAKER
DT4B	4.0A	6A (SEE NOTE)	5.6A	1.8A

DELTA MODEL	MOTOR STARTER OVERLOAD SETTINGS			
	MAIN FAN	EXHAUST FAN	COMPRESSOR	CONTROL CIRCUIT BREAKER
DT6B	4.0A	6A (SEE NOTE)	8.8A	1.8A
DT8B	4.0A	10A (SEE NOTE)	9.5A	1.8A
DT10B	5.8A	4.0A	12.0A	1.8A
DT12B	5.8A	4.0A	13.1A	1.8A
DT14B	8.0A	6.2A	23.6A	1.8A
DT16B	8.0A	6.2A	32.0A	1.8A

Relay Functions, DELTA1 to DELTA 12

R1 Energised by healthy HP and LP switches (Soft Start if fitted)
A) Indicates the state of the LP and HP switches to the PLC (Closes on fault)
B) Allows the compressor to start (when required) if HP/LP switches are healthy.

R2 Energised by No. 6 on controller for LPHW air heating.
A) Opens LPHW valve for air heating.

R3 Energised by fire alarm being healthy (if required and item is fitted to machine).
A) Indicates the state of the fire alarm to the PLC (Closes in alarm).
B) Cuts the outputs to the PLC in the event of a fire alarm.

R4 Energised by poor air quality (if required and item is fitted to machine).
A) Indicates to the PLC that the air quality is poor (Closes when the air is poor).

4.0 COMMISSIONING CHECKLIST

a) Is the building finished in accordance with the original plans and specification?

b) Is the plenum chamber and all the duct work insulated? Special attention should be made to the insulation of the Exhaust Air ducting and Fresh Air inlet ducting to prevent condensation problems.

c) Are there any significant draughts in the pool hall or plant room (plenum installation) through poorly fitting doors, windows, pipe ducts, etc? This will let in unwanted Ambient Air raising the heating duty required.

d) Is Fresh Air suction and Exhaust Air discharge ducting perfectly sealed from plant room.

NOTE: (c) and (d) above should be checked by measuring plant room and pool hall air temperatures. If the plant room is acting as a plenum chamber both temperatures should correspond. If the plant room air temperature is lower, then ambient air is leaking in. This leak should be located and rectified.

e) Are the Fresh Air inlet and Exhaust Air outlet free from obstructions, i.e .undersized grilles, objects in path of Exhaust Air deflecting it back to the fresh air inlet, etc.

f) On three phase machines check that the fans are running in the correct direction. Note that wrong rotation gives a reduced air flow but not a reversed air flow. Correct the rotation by reversing two of the supply phases to the DELTA unit.

g) Are the settings in the DELTA control panel correct?

h) Are the Timer settings correct?

i) Is Start Up, Fresh Air Min feature required and if so is customer aware of when to switch machine back to Auto?

j) Is Pool Water flow rate set correctly as specified?

k) Is Boiler Water (L.P.H.W) flow rate as specified?

l) Are Air Flows balanced and at design as specified?

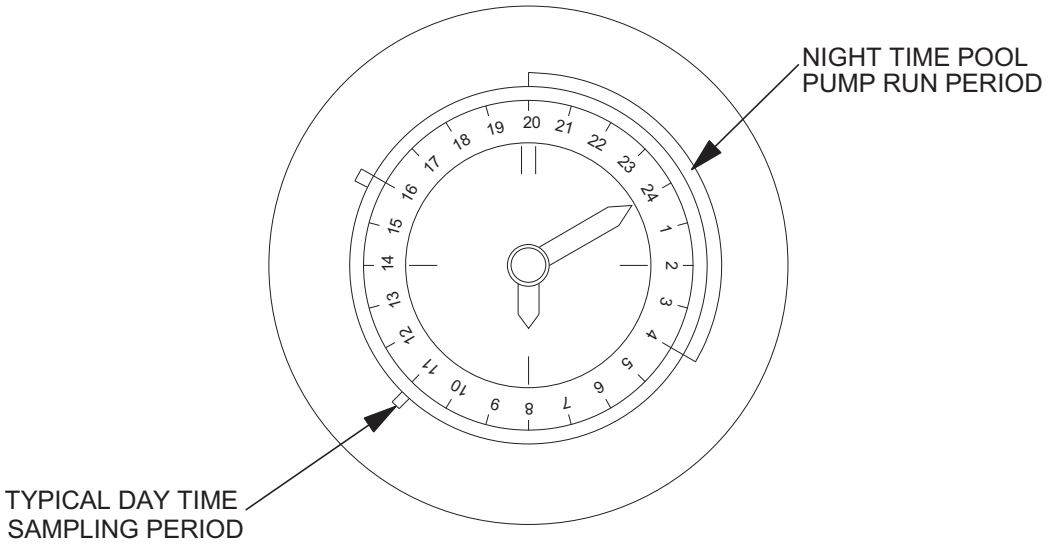
m) Is the water/air priority switch set to water?

4.1 EXTERNAL CUSTOMER SWIMMING POOL PUMP/FILTER TIME CLOCK

If pool pump is used during cheap tariff (i.e. economy 7), the customer's pool pump/filter time clock (not part of DELTA unit) should be set up as required but with approximately two fifteen minute sampling periods to allow the DELTA unit to maintain pool water temperature.

If the pool water temperature is not satisfied during the sampling periods the DELTA unit will continue to heat the pool water and run the customer's pool pump until the correct water temperature is achieved. (Pool water Set Point factory set at 26ºC).

PLEASE NOTE: THE DELTA UNIT MAY OVERRIDE THE TIMECLOCK.



4.2 OPTIONAL FEATURES

Please note that Frost Protection overrides these two sensors.

4.2.1 AIR QUALITY SENSOR

Located under the divider panel on the air on side of the machine and preset by the commissioning engineer to the required level.

The exhaust dampers are driven to maximum if the air quality drops below the set level at any time.

The position of the shorting plug on the sensor controls the quality of the air and should be set to the – position for adequate air quality with minimum energy consumption.

When the shorting plug is in the mid position a good air quality level is achieved giving optimum energy consumption.

When the shorting plug is in the + position a very good air quality level is achieved at the expense of increased energy consumption.

In the interests of safety the position of the shorting plug can only be changed by an electrician due to a danger of electric shock from touching mains carrying wires or parts.

The air quality sensor adapts itself to the local air quality. The sensor takes about one minute to reach its operating temperature, but takes about two days to stabilize. For this reason the power supply to the controller should not be interrupted.

4.2.2 ADVANCED FROST PROTECTION

(Used when the Remote Damper is installed)

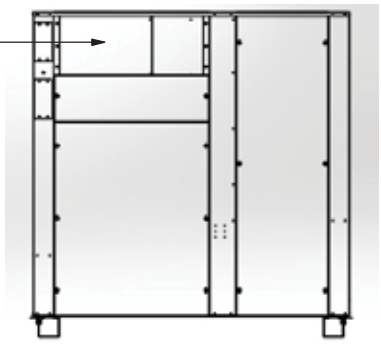
Advanced Frost protection behaves in the same way as the standard Frost protection with the addition of closing the remote damper. It also activates under the same conditions as standard, but will not deactivate when the temperature rises immediately. Instead, the machine will check the ambient temperature periodically (every 6 hours by default).

For each check, the remote dampers are opened for a short time (5 minutes), fresh air is allowed to reach the probe and if the temperature has risen above the set point then Advanced Frost protection is deactivated. If the temperature is still too cold, the machine remains in Advanced Frost protection mode until the next check. An option to force a check can be found on the Set points and switches screen in the user settings but only while Frost Protection is active.

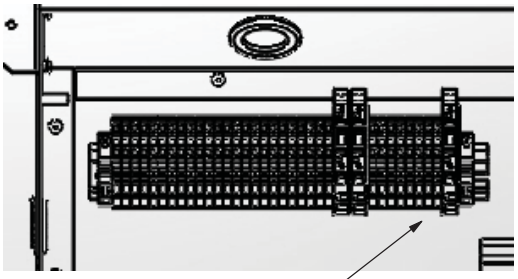
4.2.3 REMOTE SENSOR BOX

A remote sensor box is available allowing the air and humidity sensors to be mounted in the pool hall. When using 0.5mm² cable, the maximum total distance between the sensors and their terminals is 20 metres.

REMOVE COVERS

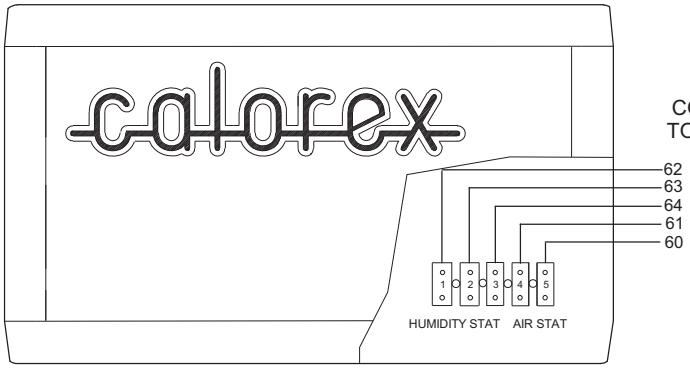


ALL DELTAS



DISCONNECT PROBE/SENSOR WIRES FROM TERMINALS 60-64 HERE
(MIDDLE OF CONTROL BOX)

REMOTE SENSOR BOX



CONNECT TERMINALS IN SENSOR BOX
TO CONTROL BOX TERMINAL NUMBERS

REPLACE COVERS

After the Remote Sensor Box has been connected it may be necessary to adjust the offsets. See section 2.2, DAMPERS AND OFFSETS for how to do this.

5.0 DELTA DATA SHEET

MODEL	Units	1	2	4	6	8	10	12	14	16
DEHUMIDIFICATION DUTY										
VIA HEAT PUMP 28ºC/60% RH Dampers MIN	litres/hr	4.5	5·5	6	8	10	12	14	28	30
TOTAL @ 18°C dewpoint (summer) Dampers MAX	litres/hr	6.5	7.3	9	12	15	18	21	41	48
TOTAL @7°C dewpoint (winter) Dampers MID	litres/hr	9.5	10.7	12.1	16.1	20.1	24.2	28.2	55	60.5
VDI 2089	litres/hr	7.6	8.2	9.5	12.6	15.8	19	22.2	42.5	51.4
TOTAL DH + VDI 2089 @12.5°C dewpoint - summer	litres/hr	9.8	10.9	12.5	16.6	20.8	25	29.2	56.5	62.4
HEAT TO AIR										
VIA HEAT PUMP - MODE A	kW	1.3	1.5	1.4	1.5	1.6	2	2.5	6	7
VIA HEAT PUMP - MODE B	kW	3.8	4.9	5.1	6.6	8	10	12.1	30	35
VIA SINGLE LPHW @ 80ºC	kW	20	22	25	30	35	38	42	85	90
TOTAL - MODE A/MODE B	kW	21.3/23.8	23.5/26.9	26.4/30.1	31.5/36.6	36.6/43	40/48	44.5/54.1	91/115	97/125
VIA DOUBLE LPHW @ 80ºC	kW	34	37.4	42.5	51	59.5	64.6	71.4	114.5	153
HEAT TO POOL WATER										
VIA HEAT PUMP MODE A	kW	4	5.5	5.8	8	10	12.5	15	35	43
VIA HEAT PUMP MODE B	kW	1.7	2.2	2.3	3	3.7	4.6	5.5	12	14
VIA LPHW @ 80ºC	kW	23	23	33	33	33	40	40	65	65
TOTAL	kW	27/24.7	28.5/25.2	38.8/35.3	41/36	43/36.7	52.5/44.6	55/45.5	100/77	108/79
Flow Rate Pool Water ± 10%	l/min	31.5	31.5	38	40	40	54	54	100	100
Pressure Drop @ Rated Flow	m/hd	1.4	1.4	2.5	2.5	2.5	3.5	3.5	3.5	3.5
Max working pressure	bar	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Internal Condenser Taco Pool water setting	l/min	17.5	17.5	24	24	24	29	29	N/A	N/A
COOLING DUTY	kW	mode A/B	mode A/B	mode A/B	mode A/B	mode A/B	mode A/B	mode A/B	mode A/B	mode A/B
COOLING DUTY - sensible		-2/N/A	-2.5 / N/A	-2.94	-3.85	-4.7	-5.9	-7.1	-13	-15
COOLING DUTY - total	kW	-3 / N/A	-4 / N/A	-4·2	-5·5	-6·7	-8.4	-10.1	-23	-28
RECOMMENDED MINIMUM BOILER CAPACITY	kW	30	32	35	45	50	65	70	150	150
RECOMMENDED MINIMUM BOILER CAPACITY	btu's/hr	102360	109184	119420	153540	170600	221780	238840	511800	511800
FLOW RATE STANDARD, SINGLE LPHW	l/min	27.5	27.5	35	39	42	49	53	115	115
FLOW RATE, DOUBLE LPHW	l/min	40	40	50	58	63	69	73	202	202
Pressure Drop @ Rated Flow	m/hd	2	2	2.5	2.5	2.5	2.8	2.8	4	4
Max DELTA system working pressure	bar	6	6	6	6	6	6	6	6	6
ELECTRICAL										
TOTAL POWER CONSUMED - nominal	kW	2.6	2.9	2.9	3.4	4.4	5.9	7.4	12.3	17.0
MIN' SUPPLY CAPACITY (Max F.L.A.) 1 ph N	amps	22	24	25	33	N/A	N/A	N/A	N/A	N/A
MIN' SUPPLY CAPACITY (Max F.L.A.) 3 ph N	amps	10	11	13	16	19	22	23	38	47
MAX' SUPPLY FUSE 1 ph N	amps	32	32	40	50	N/A	N/A	N/A	N/A	N/A
MAX' SUPPLY FUSE 3 ph N	amps	16	16	20	25	25	32	32	50	63
MAIN FAN - VARIABLE SPEED										
AIR FLOW	m^3/hr	2500	2600	3000	4000	5000	6000	7000	10000	12000
DESIGN CONDITION EXTERNAL STATIC PRESSURE	mmWg	15	15	20	20	20	25	25	25	25
MAX EXTERNAL STATIC PRESSURE SINGLE LPHW	mmWg	20	20	70	45	80	80	50	80	45
MAX EXTERNAL STATIC PRESSURE DOUBLE LPHW	mmWg	18.5	18.5	67.8	41	74	76	45	75	40.5
FLA - 1 ph N	amps	5.2	5.2	6.8	5.0	N/A	N/A	N/A	N/A	N/A
FLA - 3 ph N - SINGLE SPEED	amps	N/A	N/A	2.0	2.2	4.0	4.0	4.6	7.4	7.2
FLA - 3 ph N - LOW SPEED	amps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.1	7.0
FLA - 3 ph N- HIGH SPEED	amps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.0	8.0
EXHAUST FAN - VARIABLE SPEED										
AIR FLOW - summer	m^3/hr	1200	1300	1500	2000	2500	3000	3500	6700	8000
AIR FLOW (winter) ADJUSTABLE	m^3/hr	600	650	750	1000	1250	1500	1750	3350	4000
AIR FLOW (unoccupied) ADJUSTABLE	m^3/hr	120	130	150	200	250	300	350	670	850
DESIGN CONDITION EXTERNAL STATIC PRESSURE	mmWg	5	5	8	10	10	15	15	15	15
MAX EXTERNAL STATIC PRESSURE	mmWg	30	29	28	20	11	50	50	50	32
FLA - 1 ph N	amps	3	3	3	3	5.2	N/A	N/A	N/A	N/A
FLA - 3 ph N - SINGLE SPEED	amps	N/A	N/A	N/A	N/A	N/A	1.6	1.9	4.9	4.6
FLA - 3 ph N - LOW SPEED	amps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.5	4.2
FLA - 3 ph N - HIGH SPEED	amps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.2	6.2
COMPRESSOR										
NOMINAL POWER CONSUMED	kW	1.7	2.0	2.1	2.4	2.7	3.6	4.2	8.2	10.1
LRA - 1 ph N	amps	62	62	62	103	N/A	N/A	N/A	N/A	N/A
RLA - 1 ph N	amps	10.2	12.4	12.4	12.8	N/A	N/A	N/A	N/A	N/A
SOFT START AMPS 1 ph N	amps	28	28	28	34	N/A	N/A	N/A	N/A	N/A
LRA - 3 ph N	amps	38	42	42	48	48	48	101	102	174
RLA - 3 ph N	amps	3.2	3.8	3.8	4.7	5.1	6.4	8.9	14.1	22.4
SOFT START AMPS 3 ph N	amps	15	16	16	25	25	25	34	34	41
PART F ACTUAL SFP AT DESIGN CONDITION	W/l/s	1.27	1.23	0.94	0.89	1.23	1.35	1.64	1.47	2.07
GENERAL DATA										
HERMETIC SYSTEM										
GAS CHARGE - R407c	kg	3	3	6	7.8	7.8	9	8	21.5	11.5
WEIGHT APPROX - unpacked	kg	300	310	350	360	370	410	460	954	1020

FOR ACCURATE APPLICATION SIZING CONSULT CALOREX HEAT PUMPS LTD

MODE A RECOVERED HEAT BIASED TO POOL WATER POOL WATER TEMP NOT SATISFIED

MODE A RECOVERED HEAT BIASED TO POOL WATER POOL AIR POOL WATER TEMP SATISFIED

R407c GLOBAL WARMING POTENTIAL (GWP) 1774

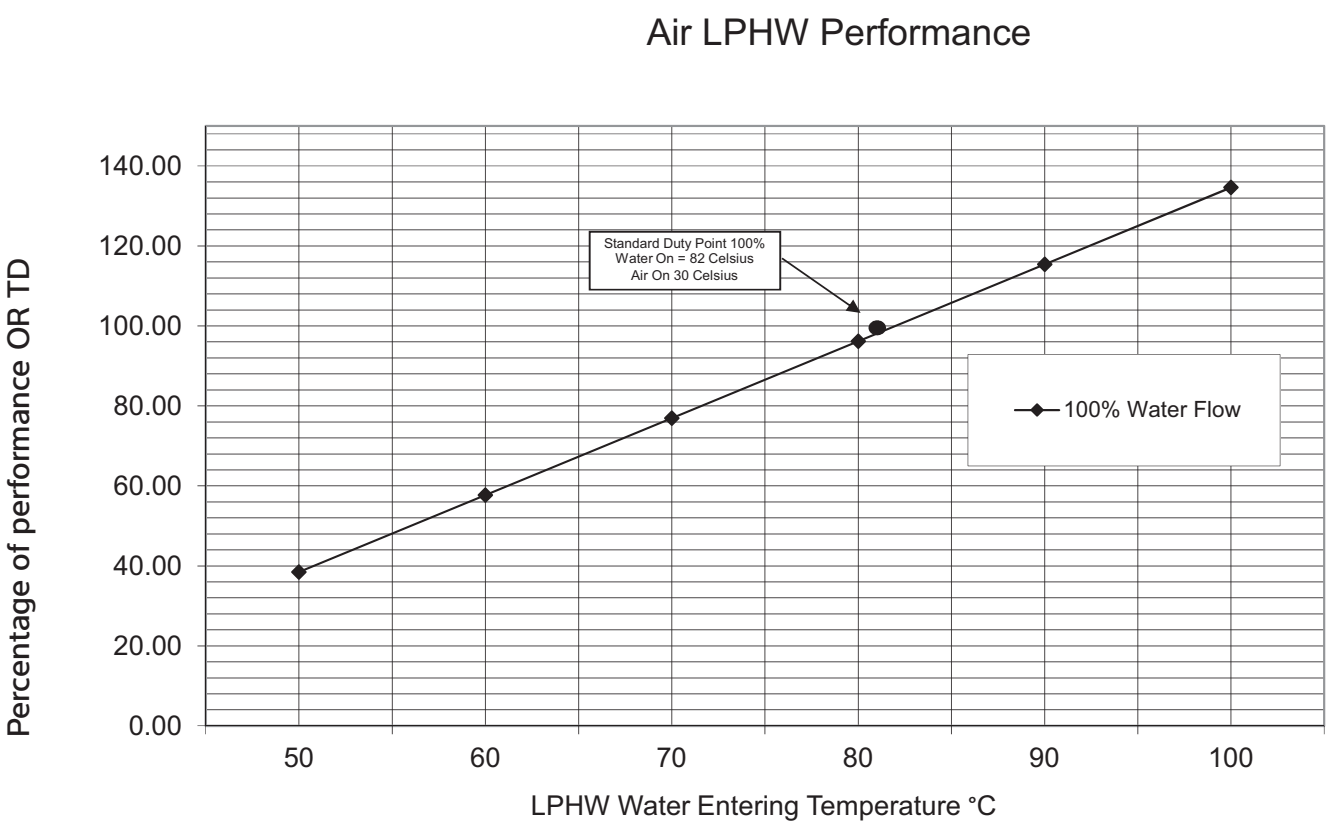
1mm WG = 9.8Pa

1mhd = 1.4psi

1L/min = 22gall/min

AIR LPHW PERFORMANCE

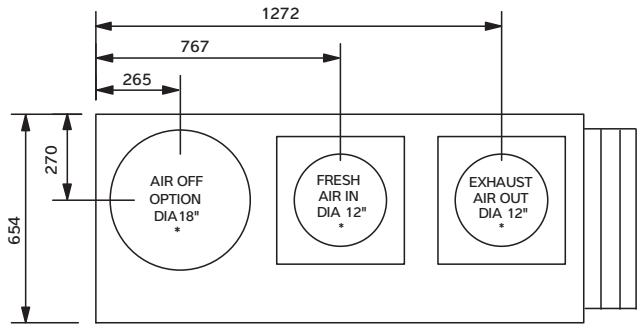
This table shows the difference in performance with temperature and water flow for all LPHWs, single and double capacity.



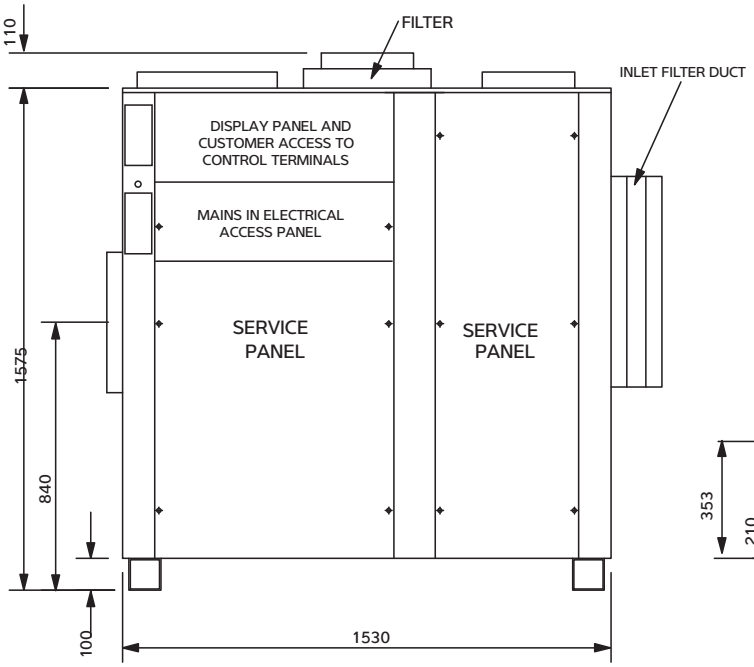
6.0 DIMENSIONS

DELTA MODEL
1 & 2

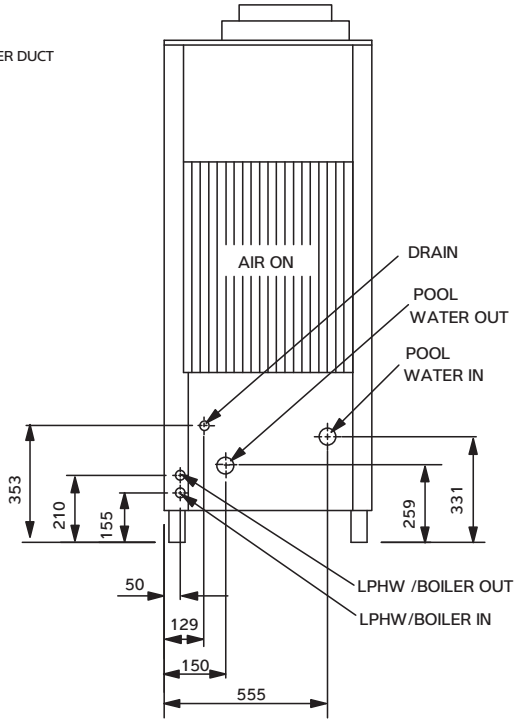
LPHW/BOILER WATER IN 28mm COPPER STUBS
LPHW/BOILER WATER OUT 28mm COPPER STUBS
POOL WATER IN 1" PVC STUB
POOL WATER OUT 1" PVC STUB
DRAIN 3/4" BSPM STUB
* SEE DUCT DIMENSION DATA



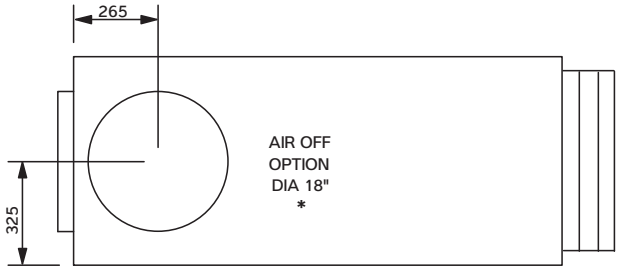
TOP VIEW



FRONT VIEW



SIDE VIEW



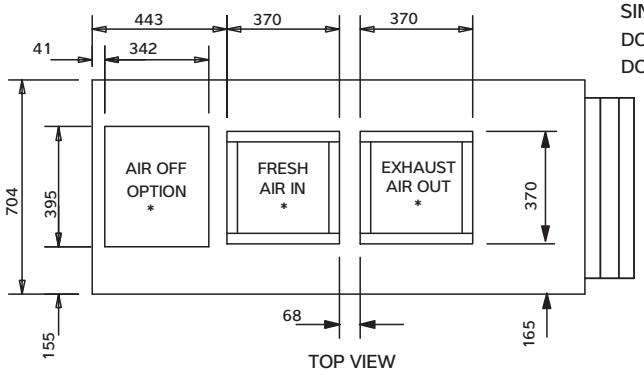
DELTA MODEL 4

SINGLE LPHW/BOILER WATER IN 28mm COPPER STUBS
SINGLE LPHW/BOILER WATER OUT 28mm COPPER STUBS
DOUBLE LPHW/BOILER WATER IN 35mm COPPER STUBS
DOUBLE LPHW/BOILER WATER OUT 35mm COPPER STUBS

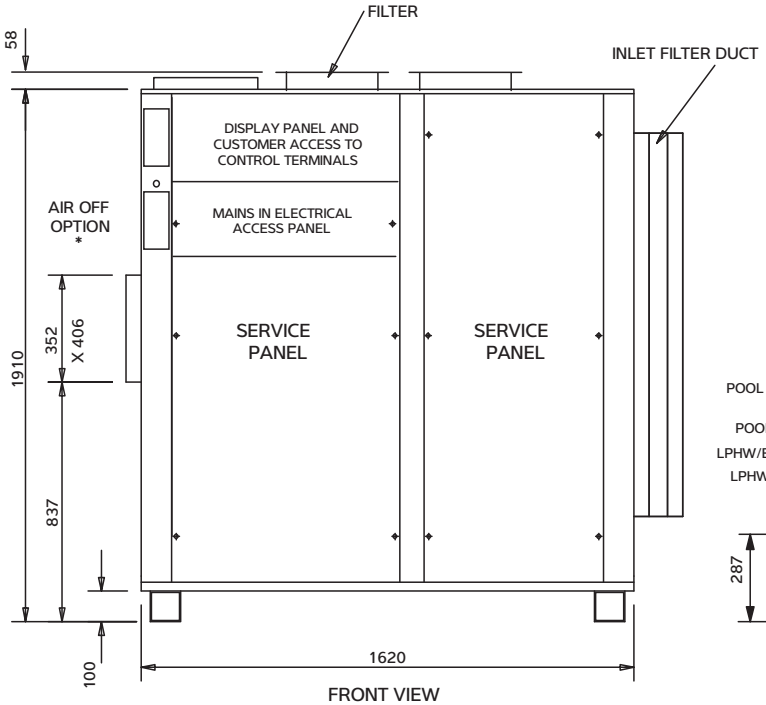
POOL WATER OUT 1" PVC STUB
POOL WATER IN 1" PVC STUB

DRAIN 3/4" BSPM STUB

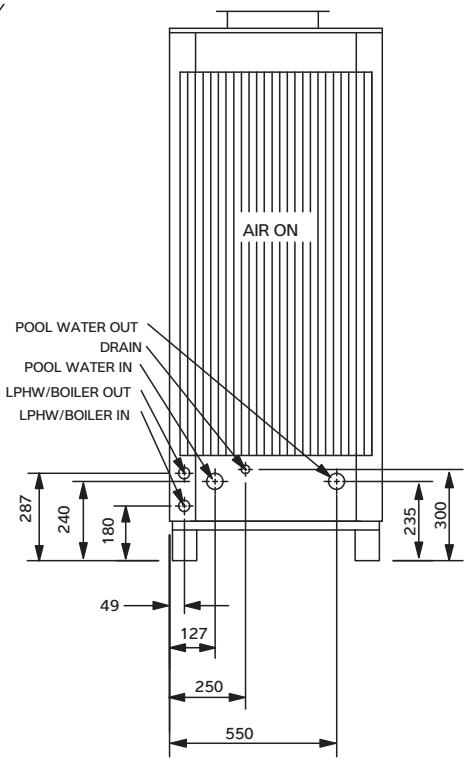
* SEE DUCT DIMENSION DATA



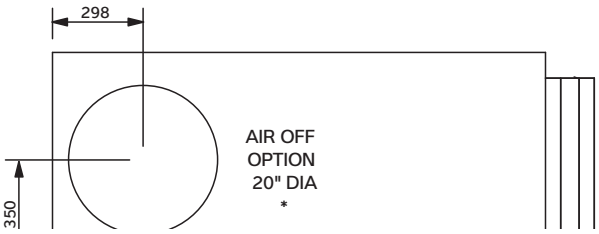
TOP VIEW



FRONT VIEW



SIDE VIEW



DELTA MODEL 4

(OPPOSITE HAND)

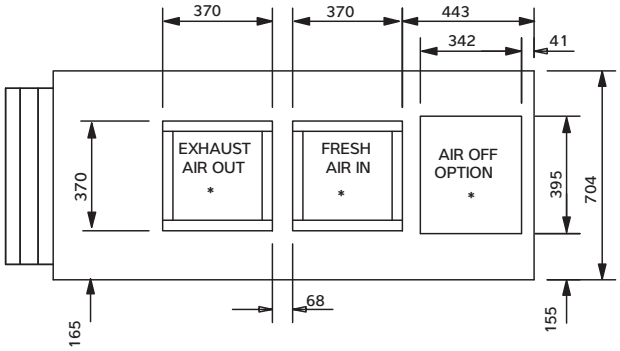
SINGLE LPHW/BOILER WATER IN 28mm COPPER STUBS
SINGLE LPHW/BOILER WATER OUT 28mm COPPER STUBS

DOUBLE LPHW/BOILER WATER IN 35mm COPPER STUBS
DOUBLE LPHW/BOILER WATER OUT 35mm COPPER STUBS

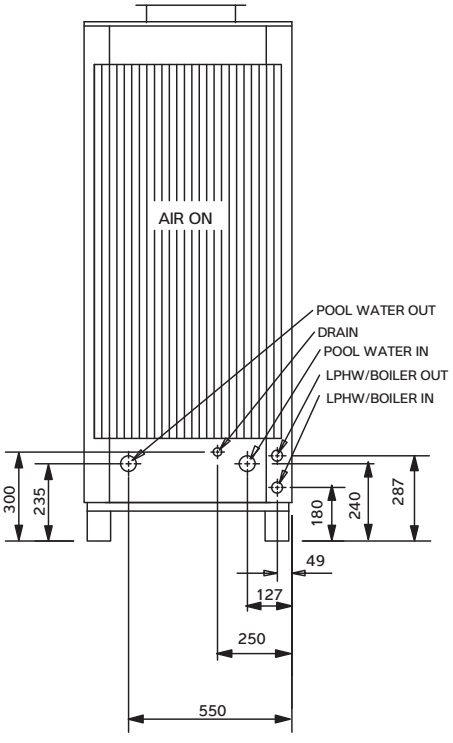
POOL WATER IN 1" PVC STUB
POOL WATER OUT 1" PVC STUB

DRAIN 3/4" BSPM STUB

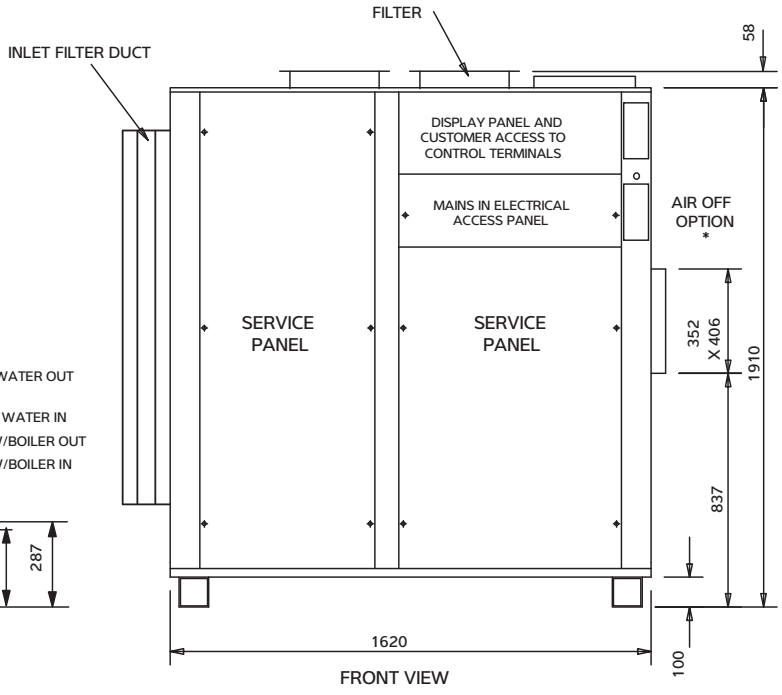
* SEE DUCT DIMENSION DATA



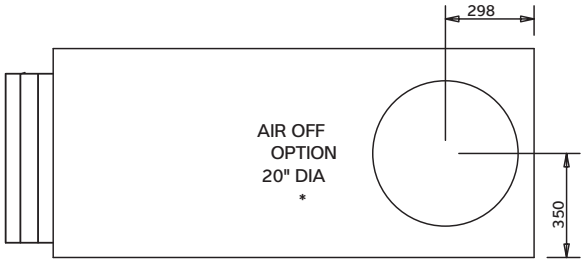
TOP VIEW



SIDE VIEW

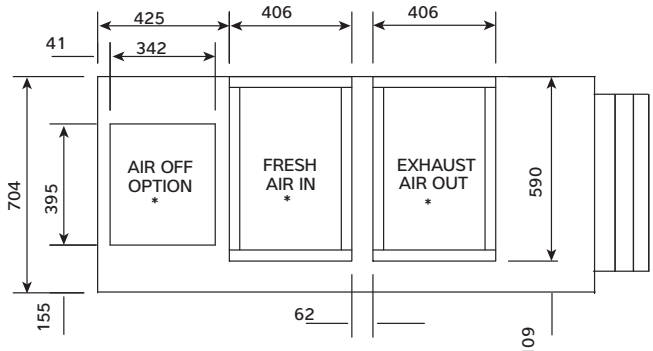


FRONT VIEW

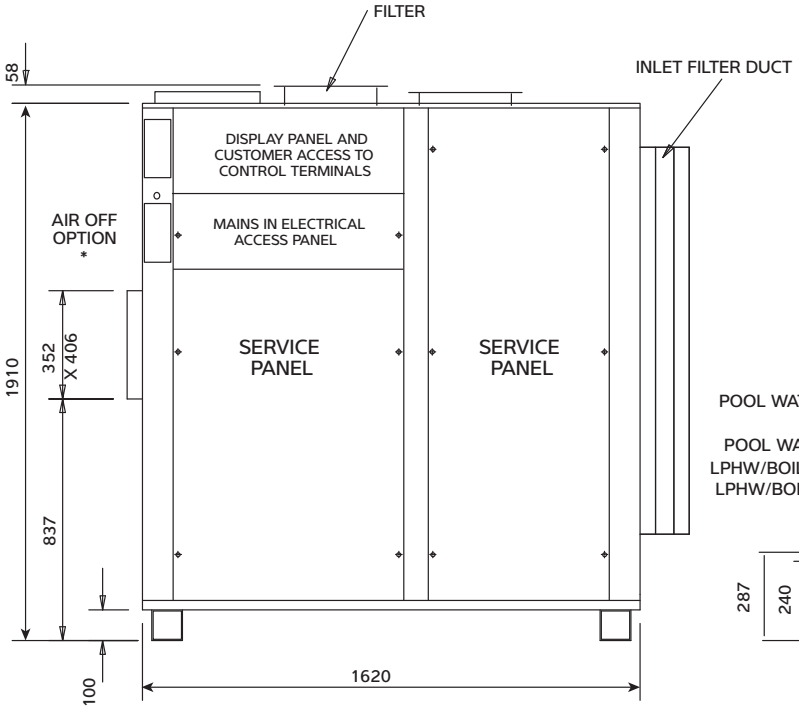


DELTA MODEL
6 & 8

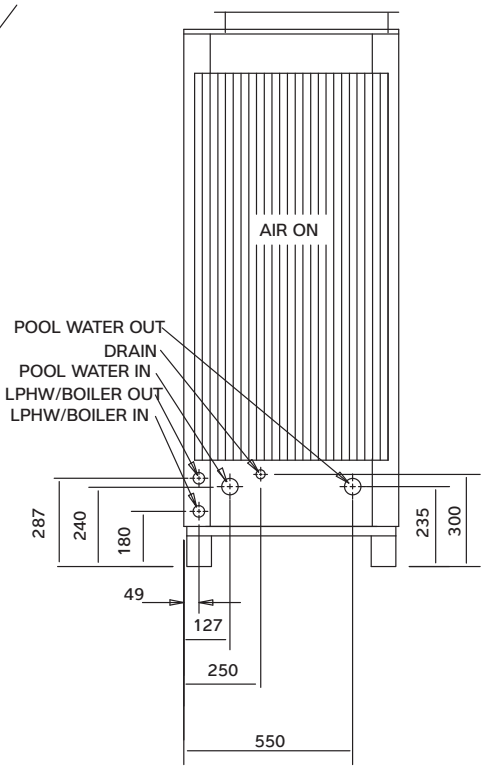
LPHW/BOILER WATER IN 28mm COPPER STUBS
LPHW/BOILER WATER OUT 28mm COPPER STUBS
POOL WATER IN 1″ PVC STUB
POOL WATER OUT 1" PVC STUB
DRAIN 3/4" BSPM STUB
* SEE DUCT DIMENSION DATA



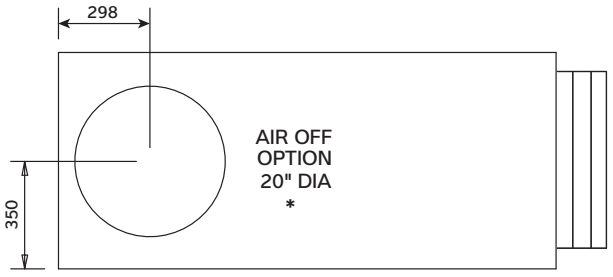
TOP VIEW



FRONT VIEW



SIDE VIEW

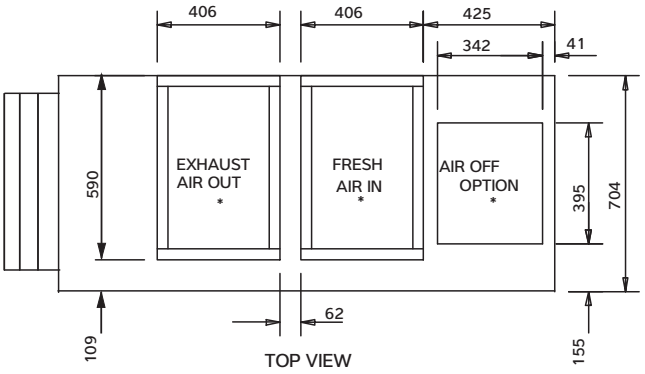


BOTTOM VIEW (BASE)

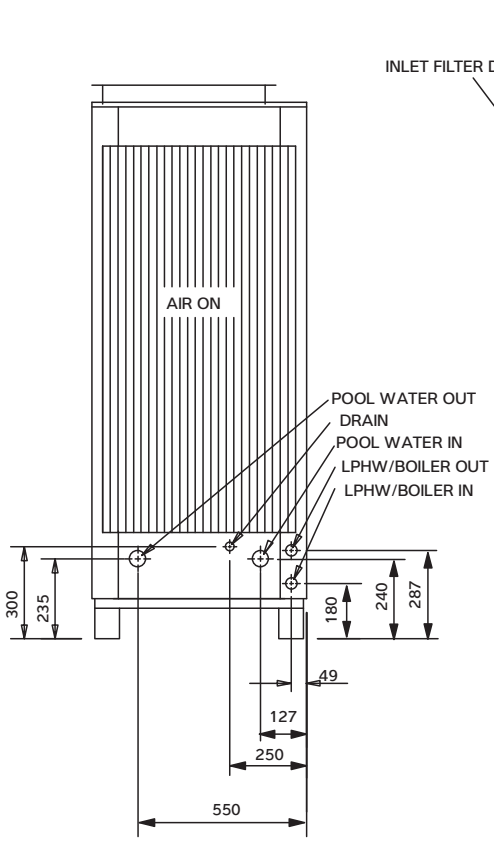
DELTA MODEL 6 & 8

(OPPOSITE HAND)

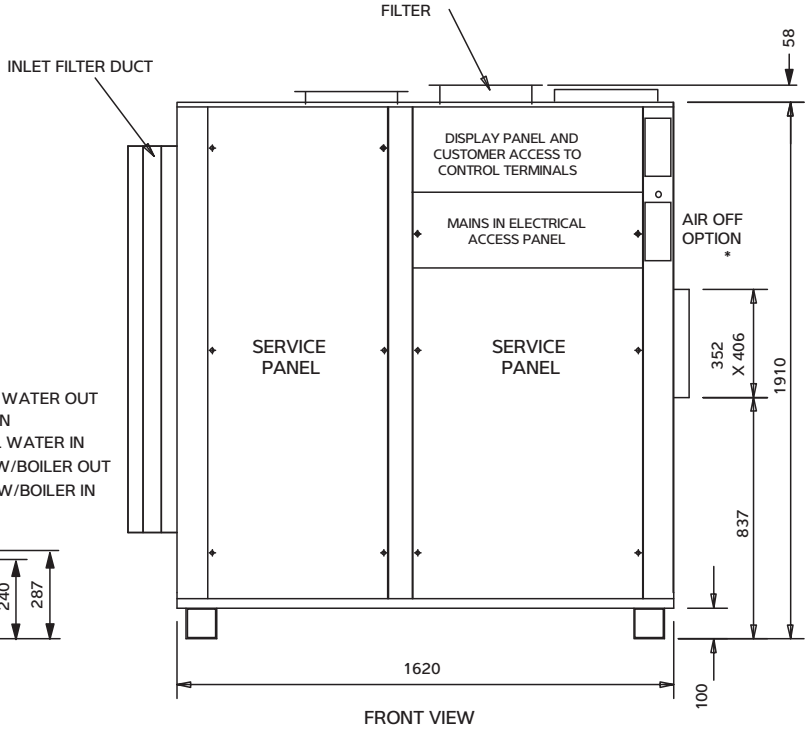
LPHW/BOILER WATER IN 28mm COPPER STUBS
LPHW/BOILER WATER OUT 28mm COPPER STUBS
POOL WATER IN 1" PVC STUB
POOL WATER OUT 1" PVC STUB
DRAIN 3/4" BSPM STUB
* SEE DUCT DIMENSION DATA



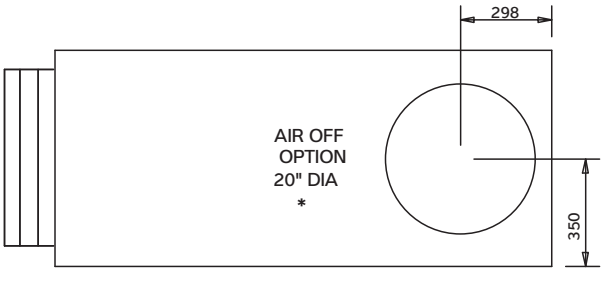
TOP VIEW



SIDE VIEW

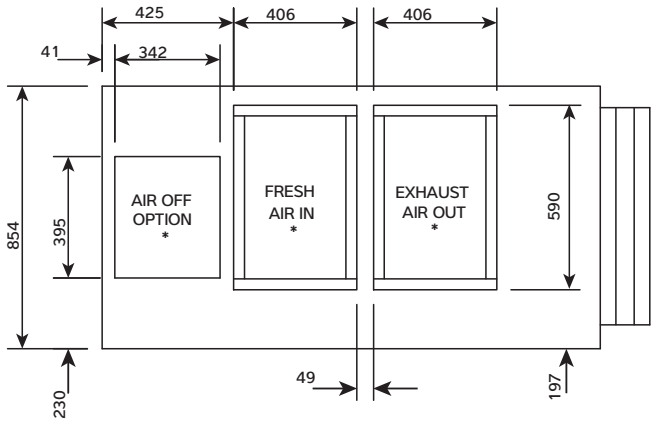


FRONT VIEW

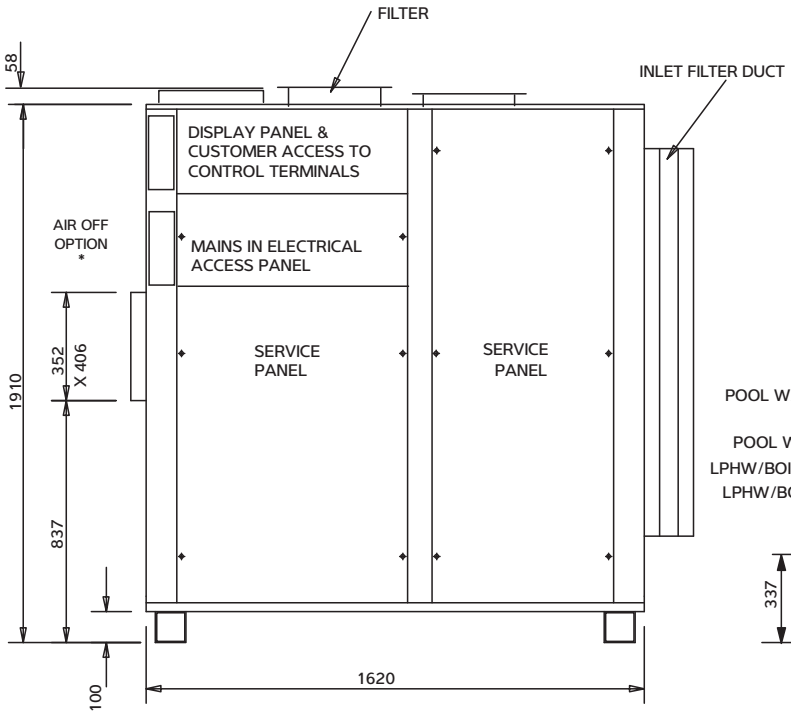


DELTA MODEL
10 & 12

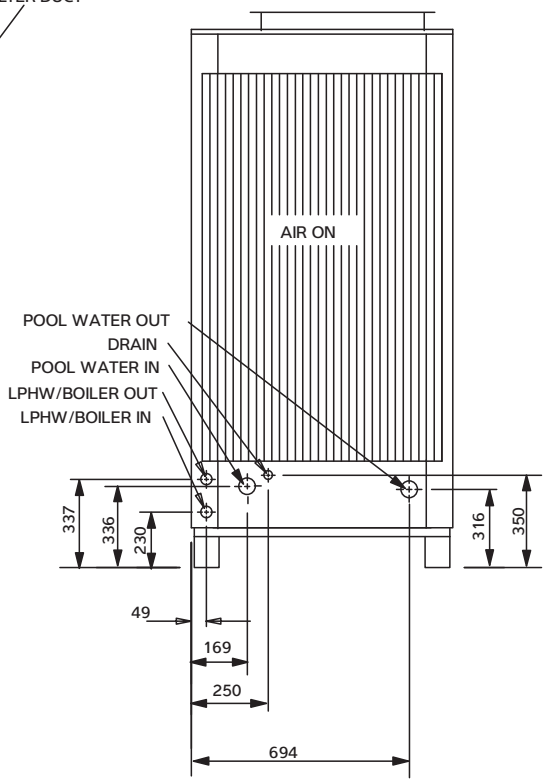
LPHW/BOILER WATER OUT 35mm COPPER STUBS
POOL WATER OUT 1 1/2" PVC STUB
DRAIN 3/4" BSPM STUB
* SEE DUCT DIMENSION DATA



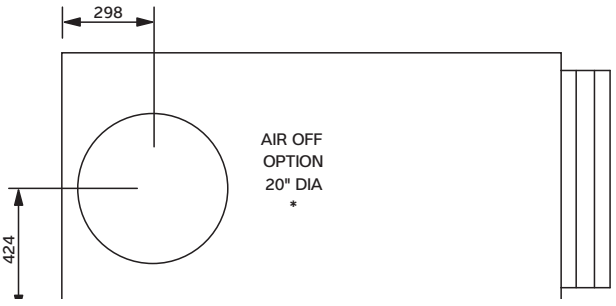
TOP VIEW



FRONT VIEW



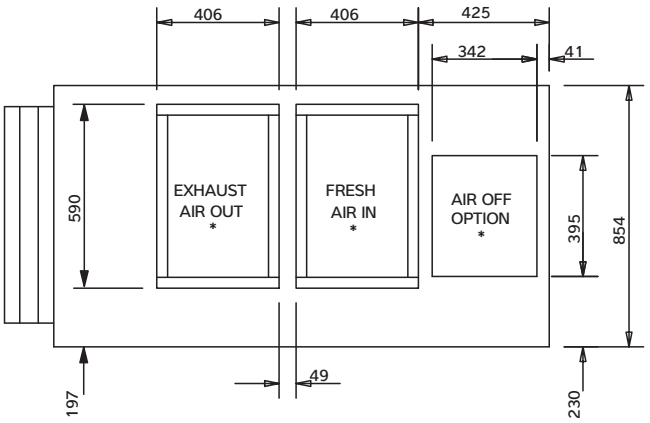
SIDE VIEW



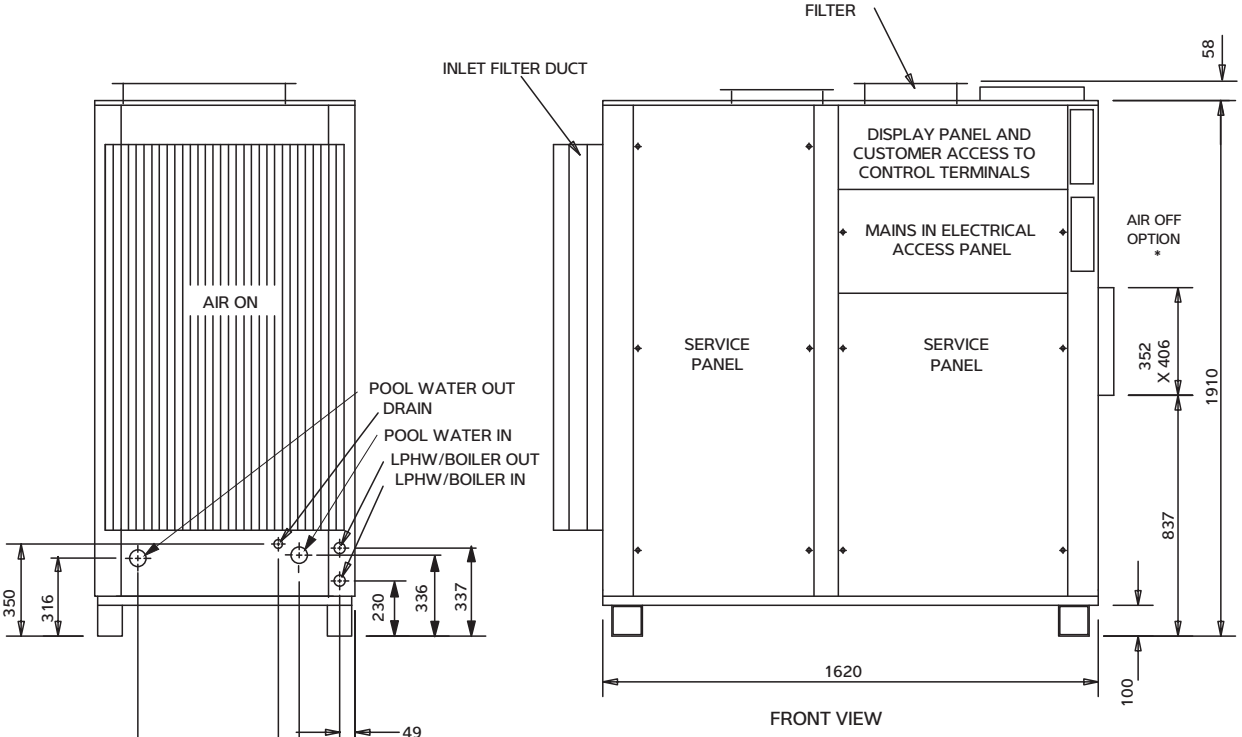
DELTA MODEL 10 & 12

(OPPOSITE HAND)

LPHW/BOILER WATER OUT 35mm COPPER STUBS
POOL WATER OUT 1 1/2" PVC STUB
DRAIN 3/4" BSPM STUB
* SEE DUCT DIMENSION DATA

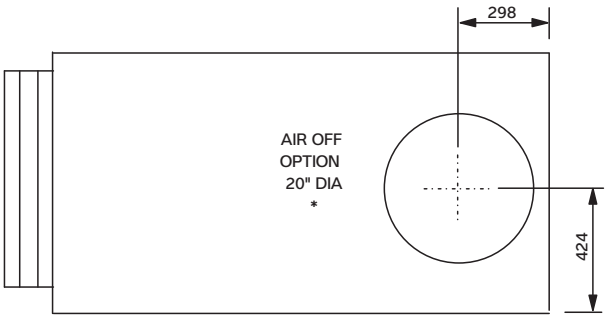


TOP VIEW



FRONT VIEW

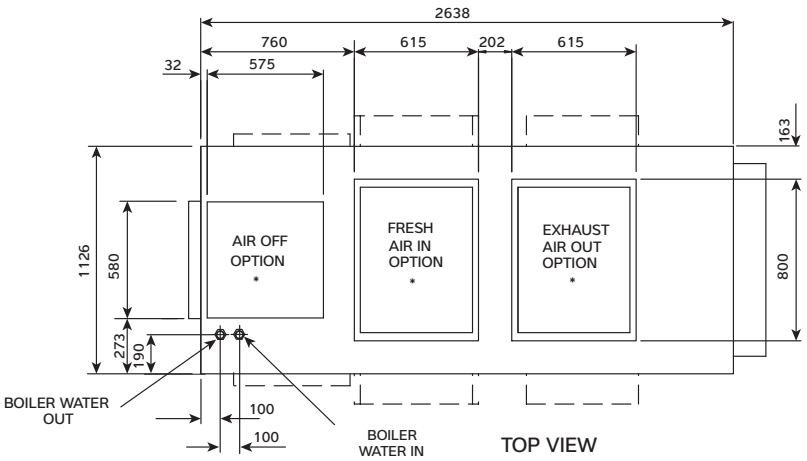
SIDE VIEW



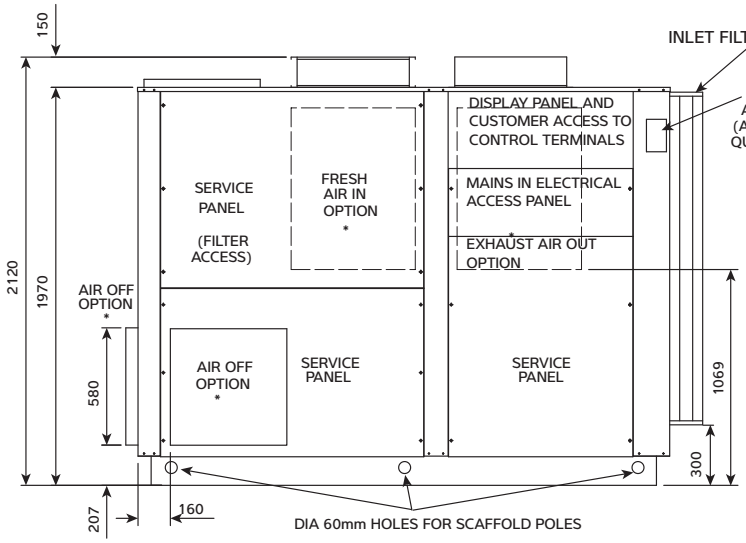
BOTTOM VIEW (BASE)

DELTA MODEL
14 & 16

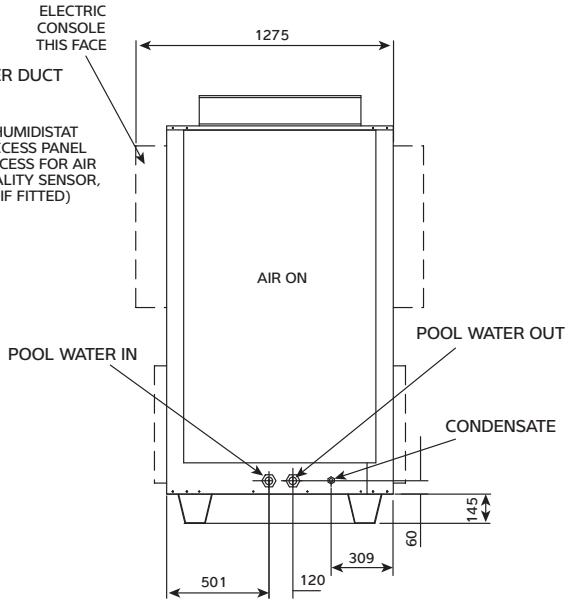
POOL WATER IN/OUT = 1 1/2 BSPM
BOILER WATER IN/OUT = 1 1/2 BSPM
DRAIN = 3/4 BSPM
* SEE DUCT DIMENSION DATA



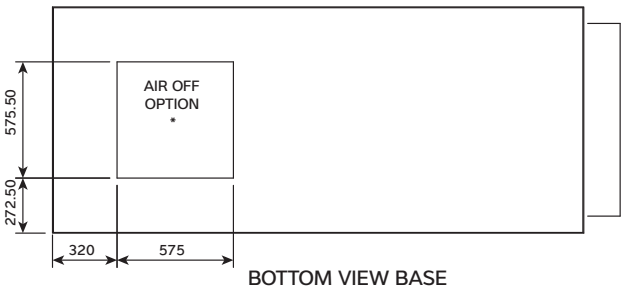
TOP VIEW



SIDE VIEW

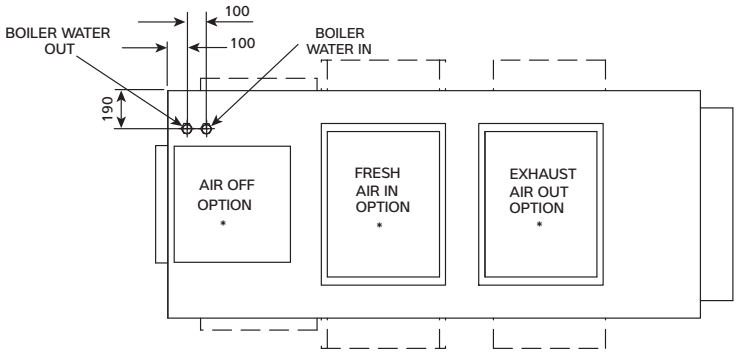


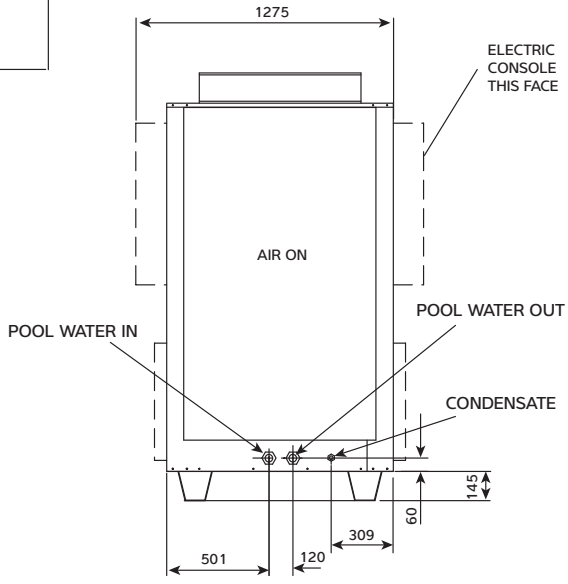
SIDE VIEW



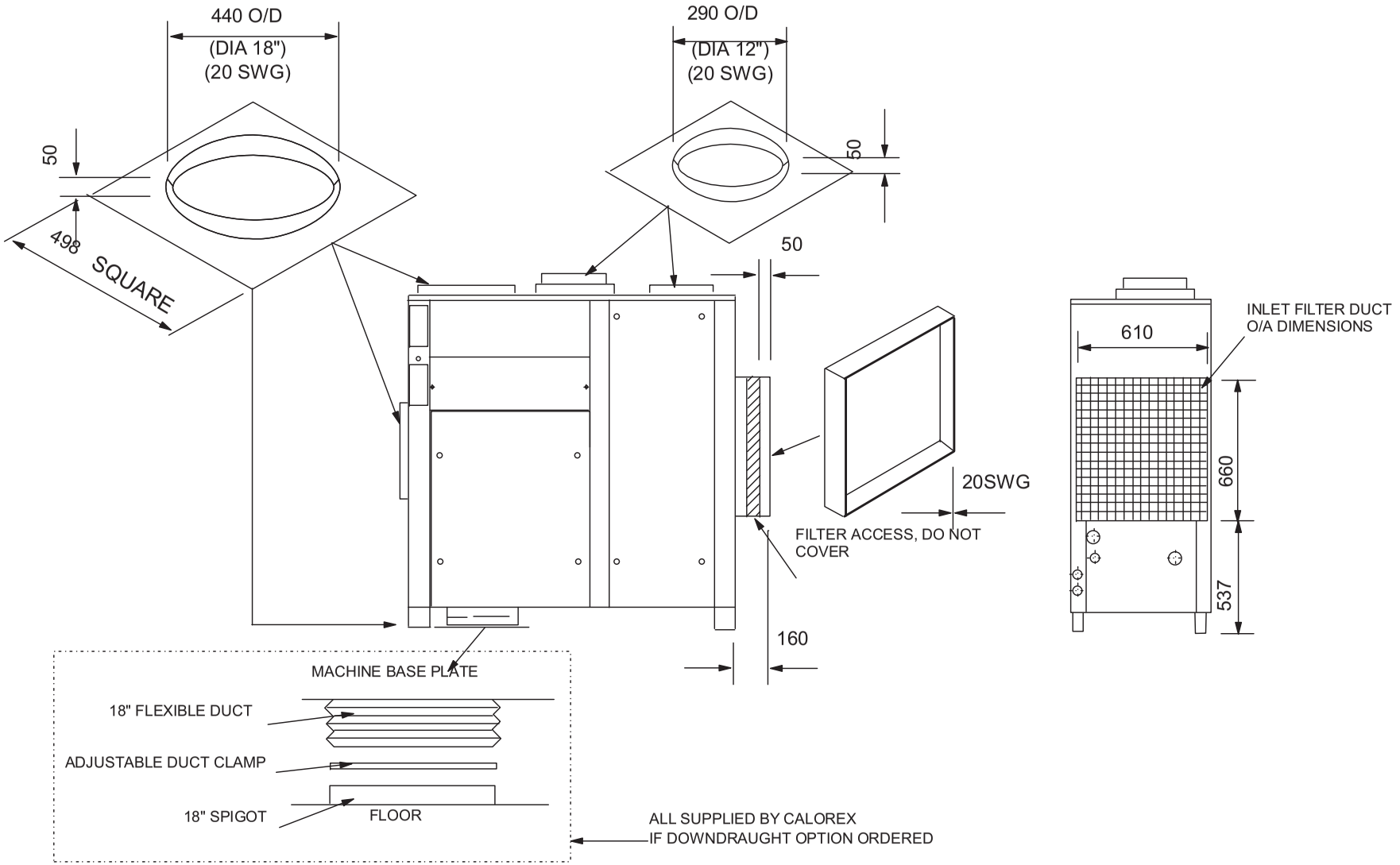
BOTTOM VIEW BASE

OPPOSITE HAND

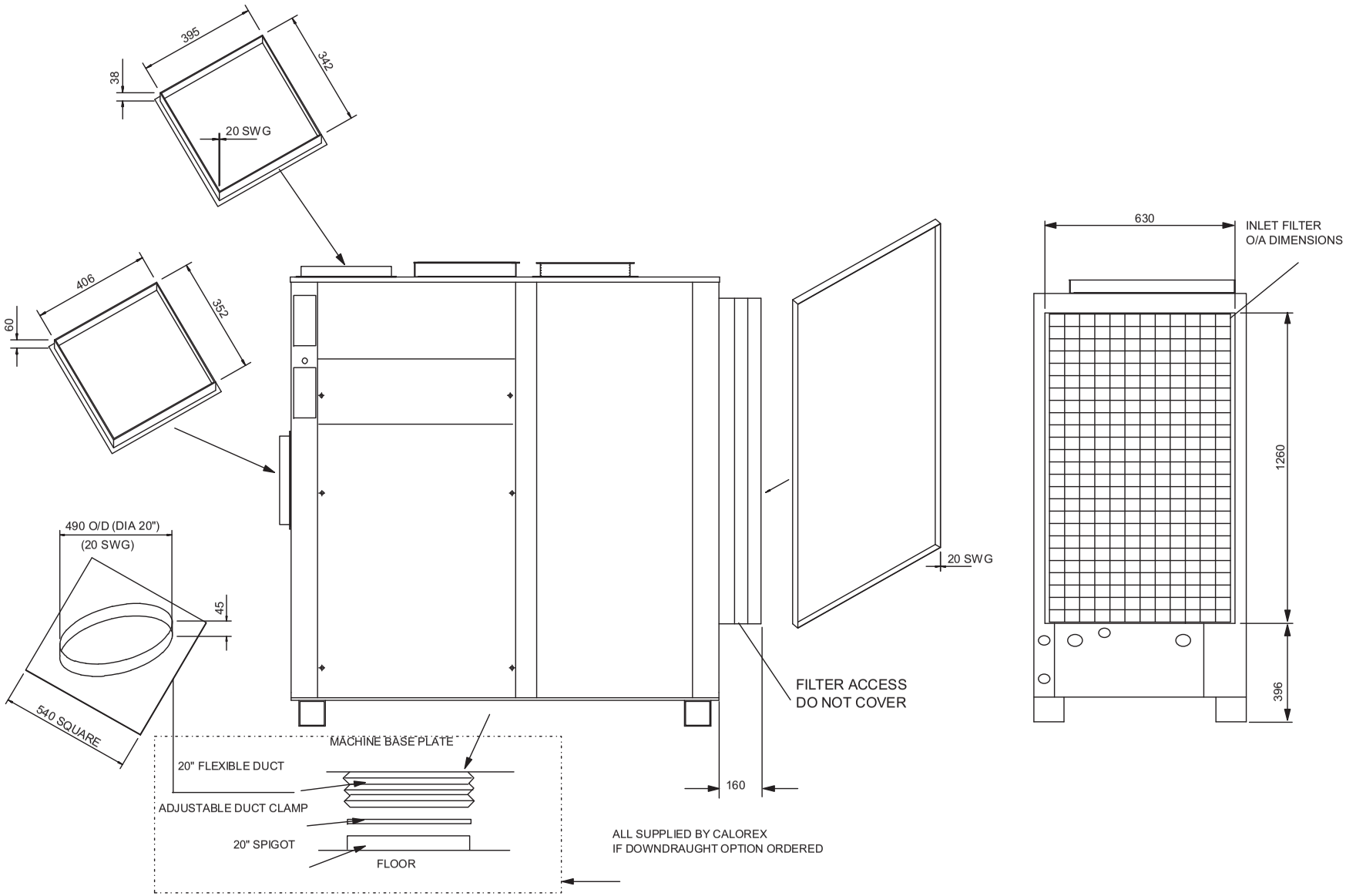




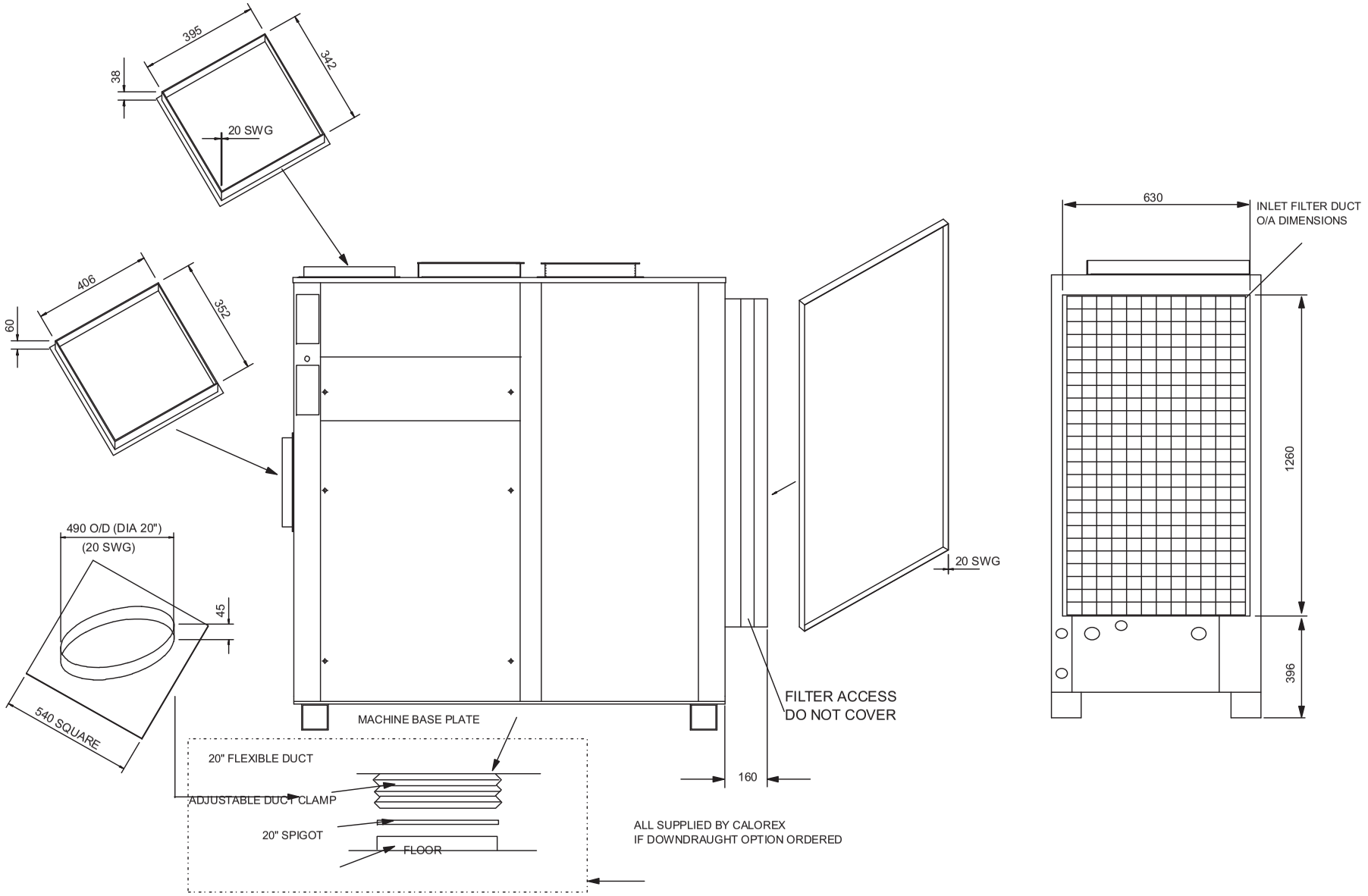
DELTA 1 AND 2 DUCT DIMENSION DATA



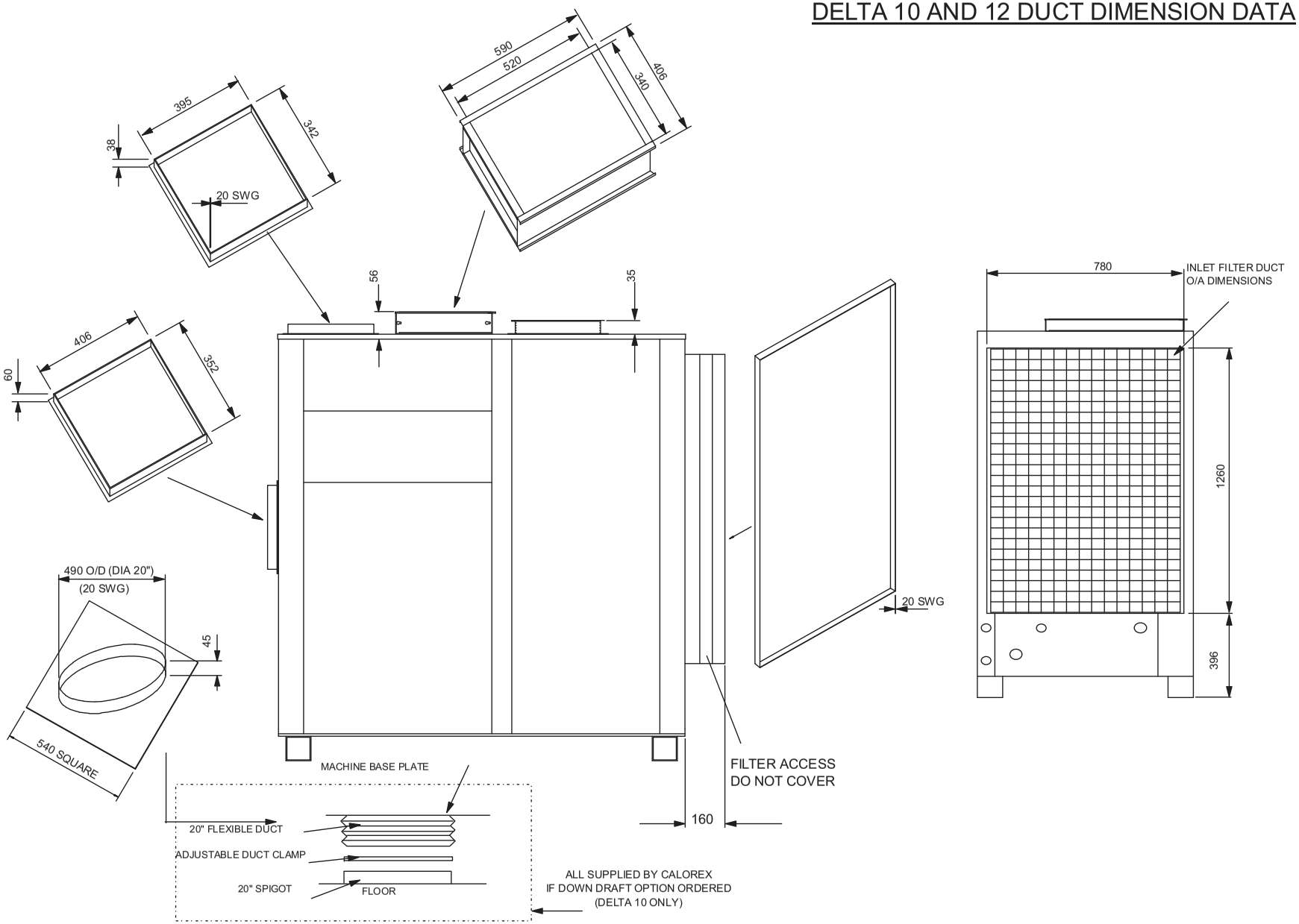
DELTA 4 DUCT DIMENSION DATA



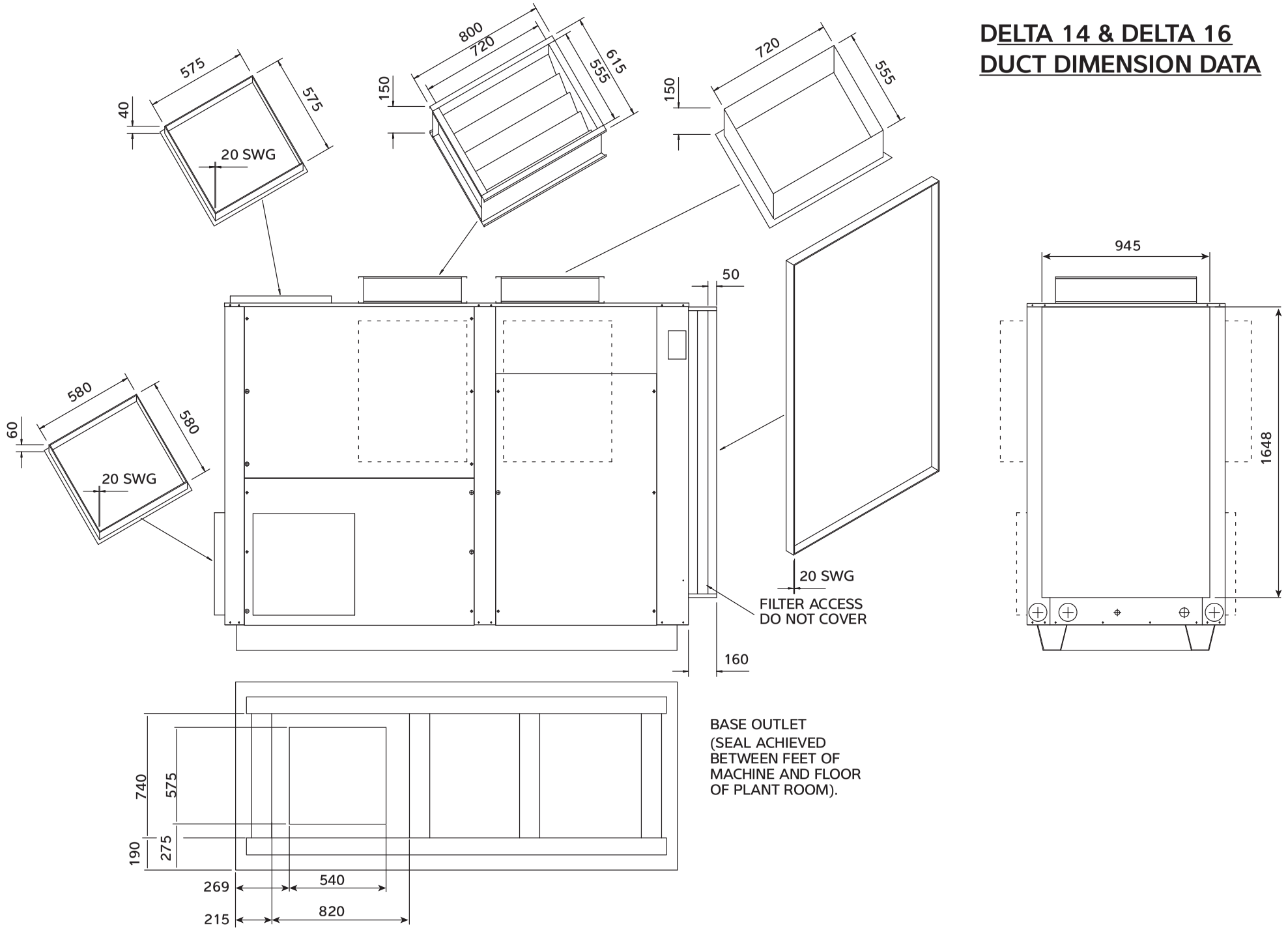
DELTA 6 AND 8 DUCT DIMENSION DATA



DELTA 10 AND 12 DUCT DIMENSION DATA



DELTA 14 & DELTA 16
DUCT DIMENSION DATA



7.0 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 CaCO3	ppm	80 - 120
Total Hardness, as CaCO3	ppm	150 - 250
Total Dissolved Solids	ppm	1000
Maximum Salt Content	ppm	8000
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 heat pump must be maintained in accordance with service requirements in section 2.6.

For details of extended warranty and maintenance packages please call the service number below.

IF IN ANY DOUBT PLEASE ASK

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 Calorex Service Department giving your name, address and serial number of your heat pump.
A card will be sent to you for completion.

Email service @ calorex.com

Web Site http://www.calorex.com

+44(0)1621 857171

+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.

8.0 MACHINE RECORD LOG

In order to comply with European F-Gas regulations, it is necessary for hermetically sealed systems with more than 6kg refrigerant to be leak tested annually. The operator of the unit is responsible for seeing that the test is carried out.
For machines affected see datasheet. A sample log sheet can be seen below.
Calorex is an Fgas registered company. Certificate number REF1011570.

General Information				
Plant Name				Serial Number
Location of Plant				
Plant Operator[1]				
Operator Contact[2]				
Refrigerant Type				Refrigerant Quantity installed (kg)
Plant manufacturer	Calorex Heat Pumps Limited			Year of installation

Refrigerant Additions				
Date	Engineer[3]		Amount Added kg	Reason for addition
	Company	Name		

Refrigerant Removals				
Date	Engineer		Amount Removed kg	Reason for removal What done with recovered refrigerant
	Company	Name		

Name and Address of Recycling or reclamation facility				Certificate number if applicable

Leak Tests				
Date	Engineer		Test Result	Follow up action required
	Company	Name		

Follow up Actions				
Date	Engineer		Related to test on	Actions taken
	Company	Name		

Testing of Automatic Leak Detection System (if fitted)				
Date	Engineer		Test Result	Comments
	Company	Name		

[1]Name and address of company operating plant.
[2]Contact details of operator's nominated person responsible for FGas compliance.
[3]Company and technician carrying out work, with details to provide evidence of compliance.
IMPORTANT The company carrying out refrigerant checking and removals, and the owner of the equipment need to keep records for FIVE YEARS.
When this machine is decommissioned the refrigerant gas is to be recovered in accordance with current environmental legislation.