



armorac™

**Series 2050
Installation Guide**

**MODEL NUMBERS:
2050-AF-SR, 2050-AF-WC, 2050-SC-SR, 2050-SC-WC**

**SERIAL NUMBERS:
2050-A-XXXX**

**VERSION:
2.0**

Intellectual Property

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The ARMARAC™ storage unit is covered by USA Design Patent 567776.

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The ARMARAC™ storage unit is Patent Pending in the following countries:*

Australia	2007259487
Canada	2654043
China	200780022106.X
Europe EPO	07808651.9
Japan	2009-515328
New Zealand	573545
United States of America	12/304,626

Liability

Thureon cannot accept responsibility for the completeness and correctness of the information. In particular, we accept no liability for damages which result from incorrect use or operation of the product.

Standards

The Armarac has been designed in compliance with the following guidelines and regulations:

IEC60297/EIA-310-D

ISO1170.0-2002

ISO1664.1-1997

Safety

Handling Safety

- Be careful. Do not lift heavy loads without assistance.



<18 kg (<40 lb.)



32-55 kg (70-120 lb.)



18-32 kg (40-70 lb.)



55 kg (120 lb.)

- Equipment with casters is built to move on a smooth surface without any obstacles.
- Do not use a ramp inclined at more than 10°

Safe Operation

The Armarac is supplied in a perfectly safe condition. Thureon can only warrant to the original purchaser the safety, reliability and performance of the Armarac system and accessories if it is assembled, operated, extended and modified as specified in this manual.

- The manual must always be kept near the Armarac.
- Please refer to the documentation of additional devices.
- Use the Armarac only if in a technically correct condition. Have any damage or faults repaired immediately by authorized personnel.
- Use only original accessories.
- Only the activities described in this manual should be undertaken by the operator. No responsibility whatsoever can be accepted for unauthorized modifications or repairs!
- Maintenance and cleaning only to be carried out by specialists.

Electrical Safety

- Do not work alone under hazardous conditions.
- High short circuit current through conductive materials could cause severe burns.
- A licensed electrician is required to install permanently wired equipment.
- Check that the power cord(s), plug(s), and sockets are in good condition.
- To reduce the risk of electric shock when grounding cannot be verified, disconnect the equipment from the AC power outlet before installing or connecting to other equipment. Reconnect the power cord only after all connections are made.
- Do not handle any kind of metallic connector before the power has been removed.
- Connect the equipment to a three wire AC outlet (two poles plus ground). The receptacle must be connected to appropriate branch circuit/mains protection (fuse or circuit breaker). Connection to any other type of receptacle may result in a shock hazard.

Packaging and Disposal

All the materials used for the packaging, the Armarac and accessories are suitable for recycling.

- Keep the original packaging for later transport.

All parts must be disassembled and disposed of in accordance with legally applicable requirements!

WEEE (Waste electrical and electronic equipment)



This symbol on the product, accessories or its packaging shows that the product may not be disposed of with residual waste. The device must be handed in at a corresponding point for disposal or electrical and electronic equipment recycling. Further information on where old electrical equipment can be handed in for recycling can be had from the local authorities, recycling centers or the place where the equipment was bought.

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Appendix i – Installation Examples

Section A – Preparation

1. Tools Required

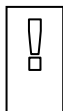
The following tools will be required to successfully complete the installation and configuration of your 2050 Series Armarac:

- Hex Allen Key Set - Metric
- Spirit Level
- Ø10mm (or 3/8-inch) drill bit for timber (if mounting to timber framed wall)
- Ø10mm (or 3/8-inch) drill bit for masonry (if mounting to brick or concrete wall)
- Rotary power drill (hammer function if mounting to masonry wall)
- 13mm (1/2 inch) long socket and socket driver wrench
- Pencil (for marking out)

2 Recommended Fastening System

Introduction

The Armarac is designed primarily for mounting flat against a clear, unobstructed wall.



Due to the weight of the Armarac enclosure and wall mount bracket, and that of the possible equipment it may contain, it is essential to ensure that the wall and fasteners are of adequate strength to accept the resultant loading. It is possible that a 2050-SC-SR Armarac fully loaded with equipment could weight up to 240kg (530lb).




If in any doubt please consult an engineer before proceeding.

Note: if the proposed walls' load bearing rating is not adequate then we strongly recommend using the Armarac Support Stand (2055-STND). Please consult your reseller or contact Thureon for more information.

Anchoring Systems

The Armarac wall mount bracket is designed to fasten to the wall with two vertical columns of four M8 (5/16in) anchors down each side, spaced horizontally @ 600mm (24in) or 400mm (16in) centers.

Note: Please drill all holes using the wall mount bracket as the template.

Substrate	Recommended System	
Wooden Frame; Carpentry	Hilti HSL Heavy Duty Anchor HUS-H Universal Screw Anchor <i>Or equivalent</i>	
Masonry; Concrete Block, Concrete Slab Brick	Hilti HSL Expansion Anchor (M8) [note suitable for brick] <i>Or equivalent</i>	
	Hilti HIT-HY Series Chemical Anchor System, and Hilti HAS Threaded Anchor Rod (M8) <i>Or equivalent</i>	
<i>For more information and availability see www.hilti.com</i>		

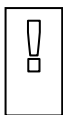
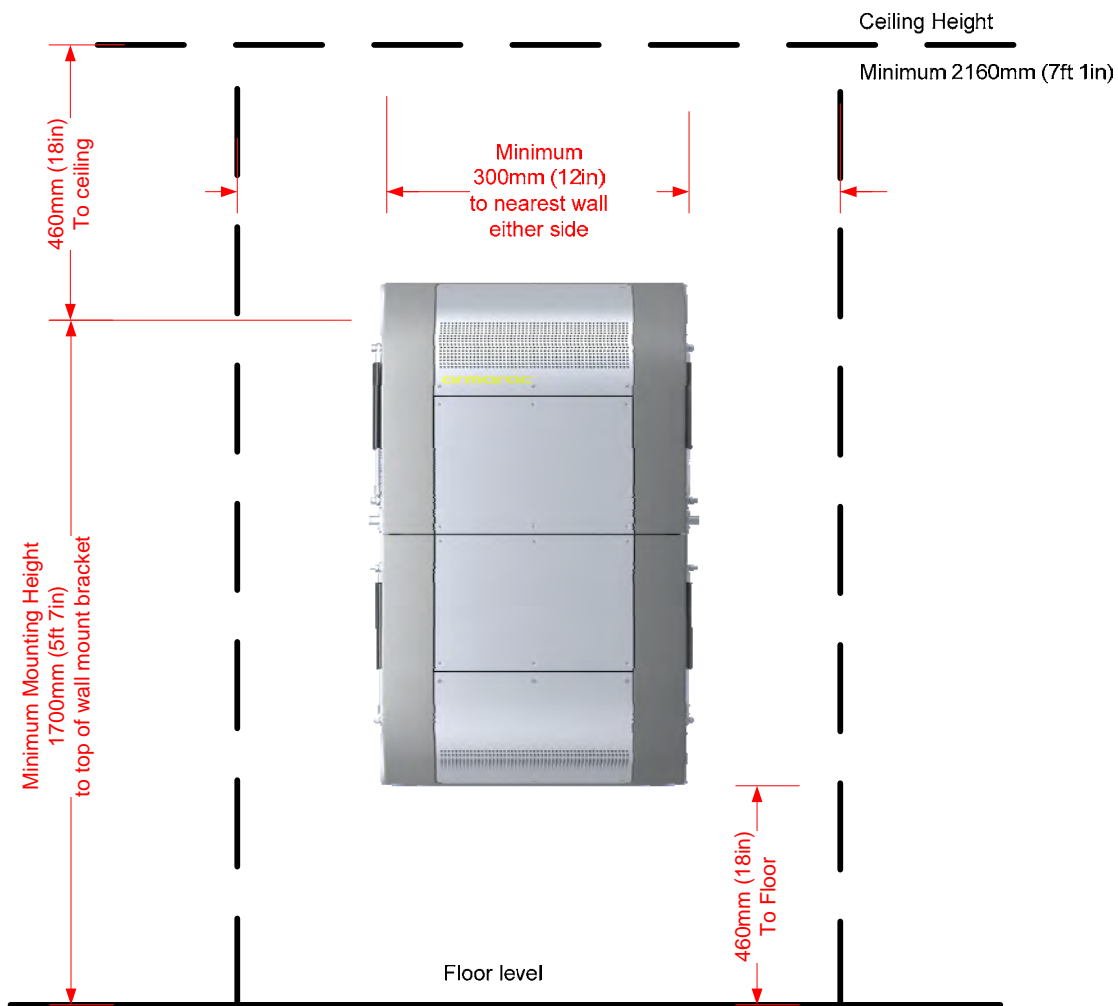
When using the 2055-STND Support Stand; eight (8) M8 fasteners are used to secure the *wall mount bracket* to the Stand. Additionally four (4) M10 (3/8in) anchors should also be used to secure the stand in to the floor. And another two (2) M8 (3/8in) fasteners to secure the top of the wall mount bracket to the wall for added stability. Refer to recommended fastening systems above.

If in any doubt please consult with an engineer as to the best anchoring system to use for your environment.

3. Recommended Spacing and Clearances

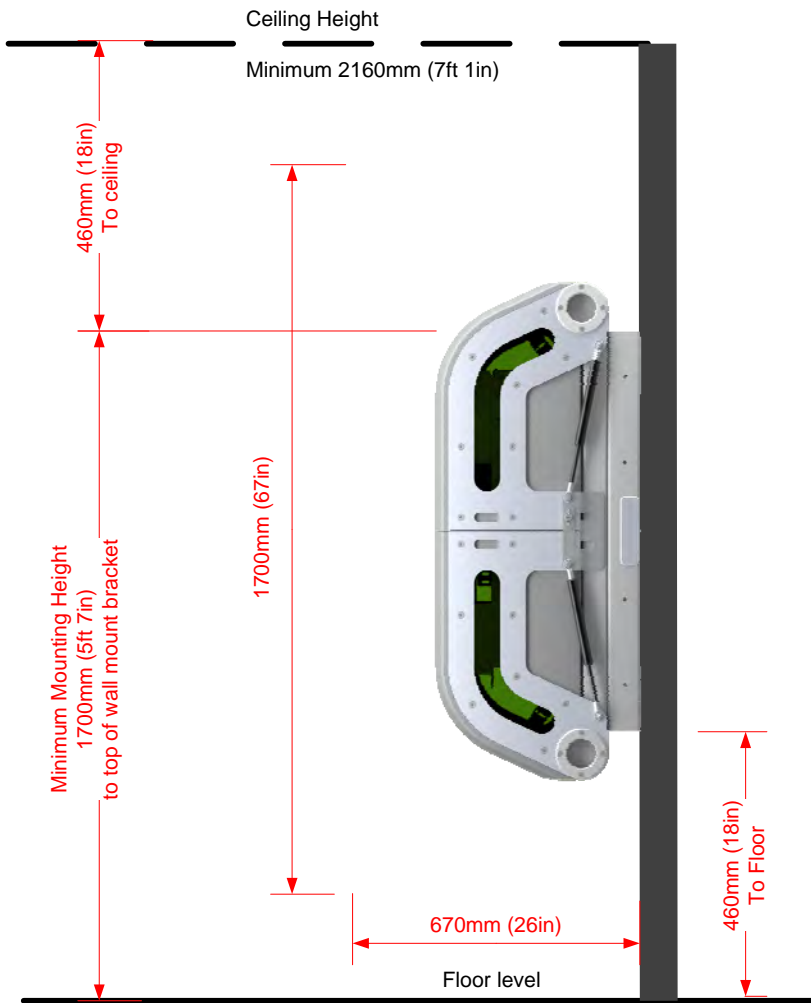
For the Armarac to function correctly it is essential to provide enough clearance above, below and to either side of each Armarac. Access to the equipment will be compromised if the following minimum clearances are not maintained.

3.1 Single 2050-AF Armarac



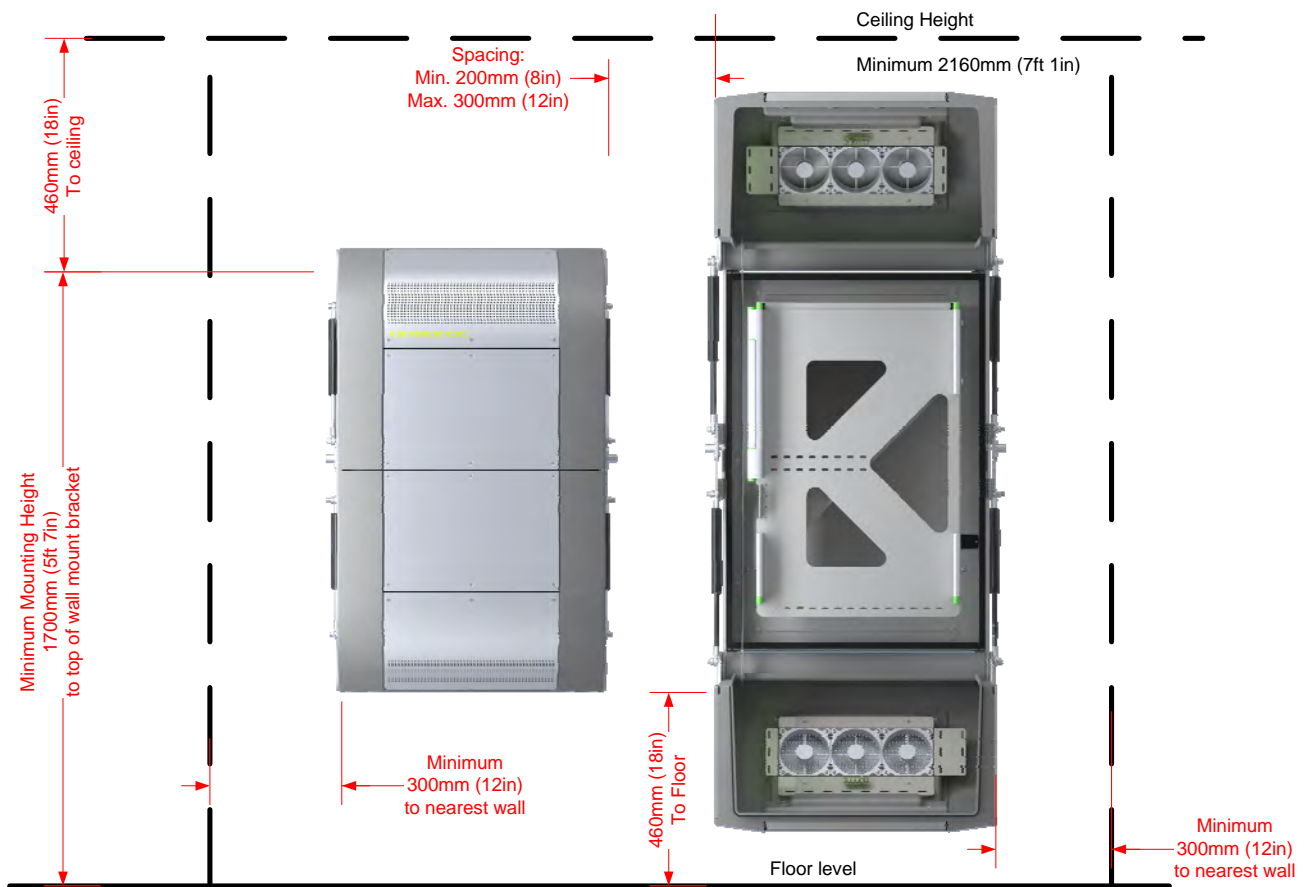
Note: Please consider future expansion requirements when positioning your Armarac. If you have the room, then you may consider allowing space for a second enclosure.

3.1 Single 2050-AF Armarac (continued)



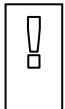
3.2 Multiple 2050-AF Armarac's

Two or more Armarac's can be mounted together, sharing the LCD/Keyboard module by connecting a KVM switch in each enclosure.



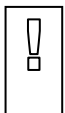
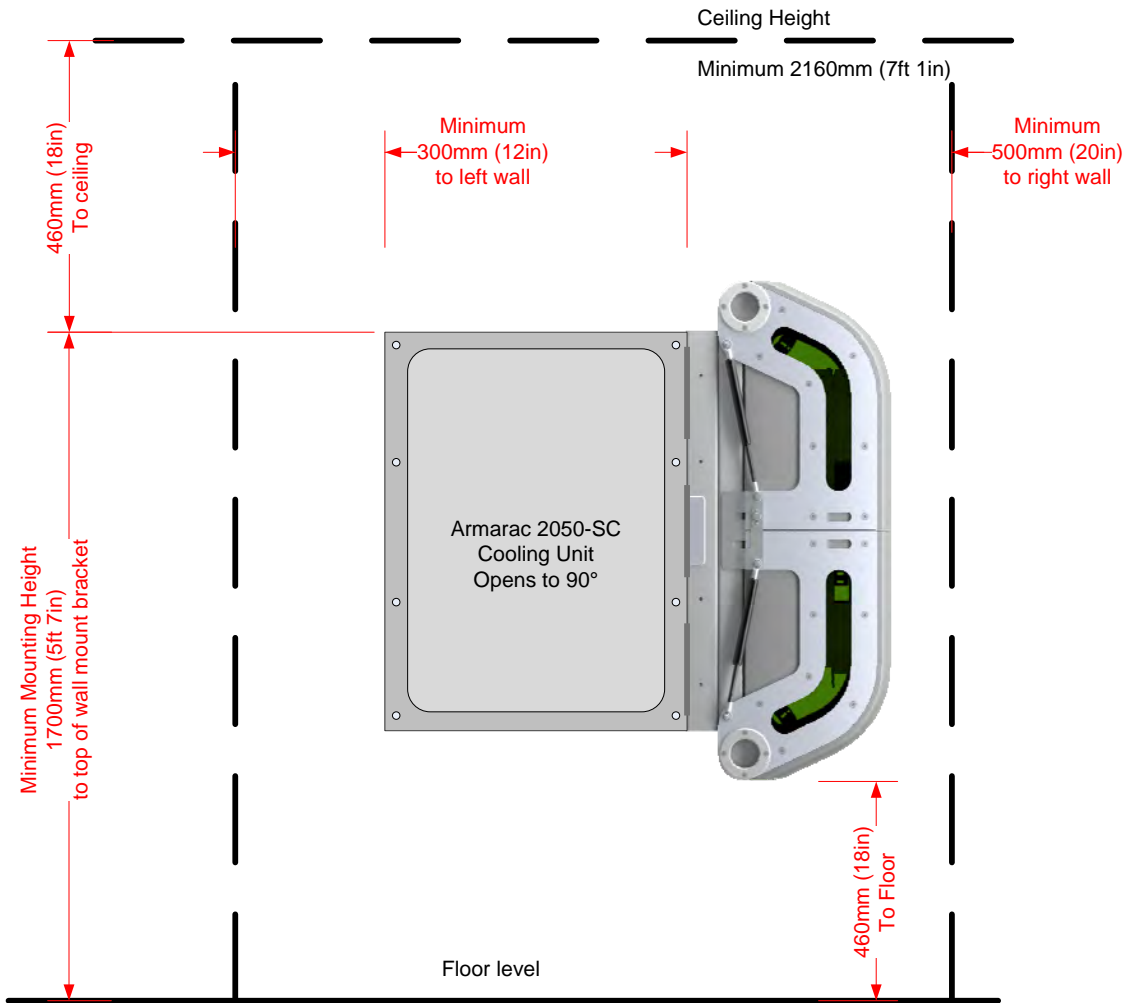
3.4 2050-AF Armarac(s) with Support Stand

Follow the same spacing and clearance requirements as those above.



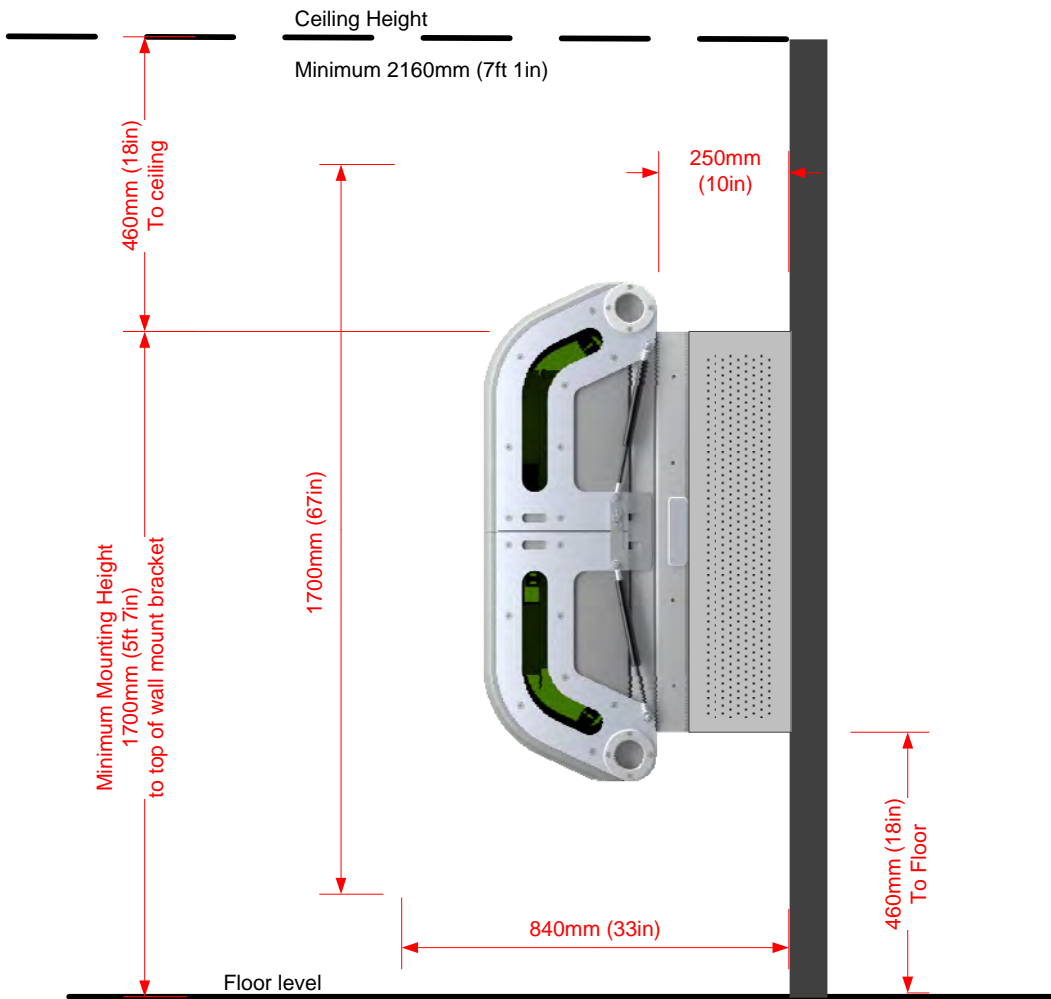
When fitted to the Support Stand the Armarac is still ideally suited to being positioned flat against a wall to enhance security of the installation.

3.5 Single 2050-SC Armarac



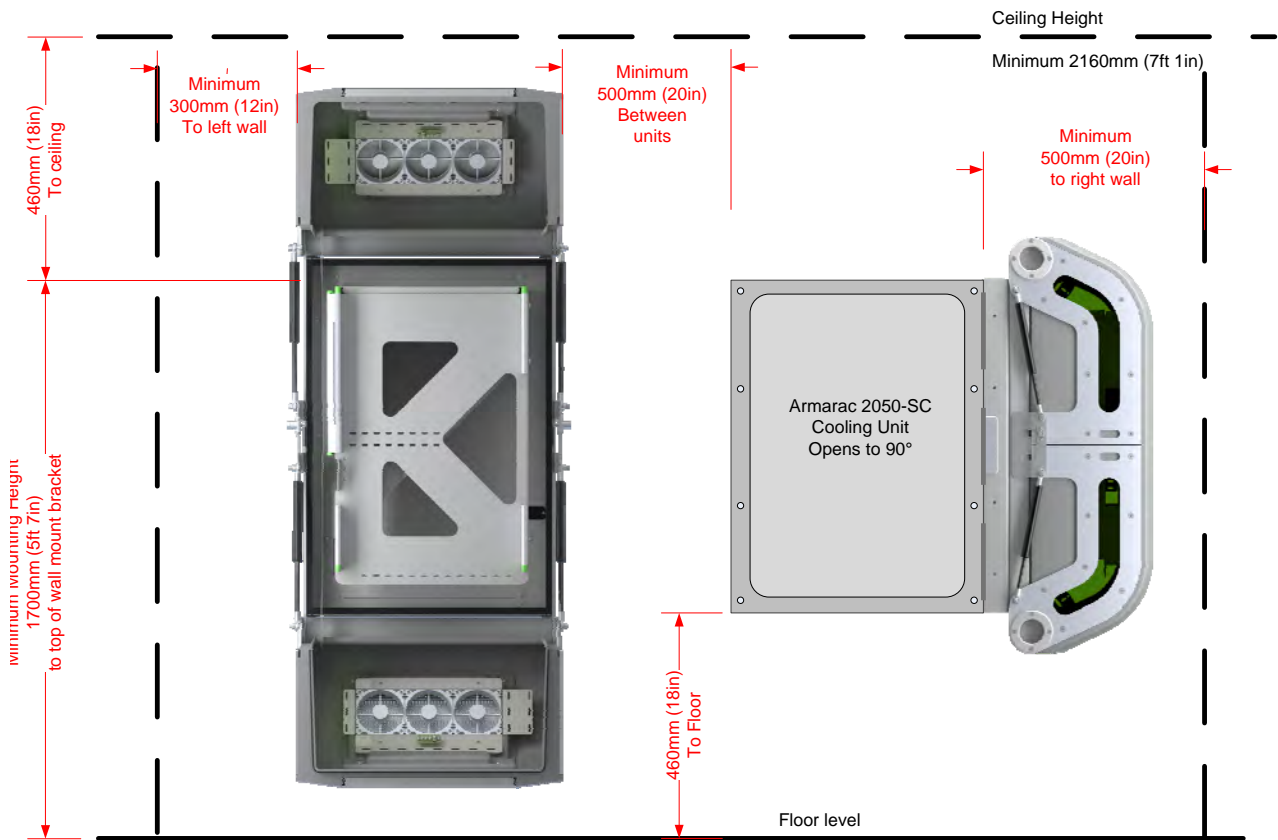
Note: Please consider future expansion requirements when positioning your Armarac. If you have the room, then you may consider allowing space for a second enclosure.

3.5 Single 2050-SC Armamarac (continued)



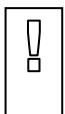
3.6 Multiple 2050-SC Armarac's

Two or more Armarac's can be mounted together, sharing the LCD/Keyboard module by connecting a KVM switch in each enclosure.



3.7 2050-SC Armarac(s) with Support Stand

Follow the same spacing and clearance requirements as those above.



When fitted to the Support Stand the Armarac is still ideally suited to being positioned flat against a wall to enhance security of the installation.

Section B – Enclosure Mounting 2050-AF-SR or 2050-AF-WC

4 Mounting the 2050-AF Armarac to a load bearing wall (stand not required)

Step 1 – Separating the wall mount bracket

De-box your Armarac.

Lift out Armarac and place on the floor (minimum 2 people required – approx 70kg/155lb).

Unlock the Armarac clam shell doors using the key barrel locks located between the gas struts on either side of the Armarac.

Whilst still laying flat on the floor open the upper and then the lower door.

Remove the chassis retaining bolts, located either side of the 19-inch patch panel cut-out (x2 M8) with a 5mm (3/16in) hex head Allen key. (These will be required again in Step 10).

Remove the M6 brass earthing screw from the copper earth bar on the wall mount bracket.



For 2050-XX-WC models it is recommended to also remove the 2U cable gland plate from the wall mount bracket (4x M5 screws)

Close the Armarac lower door and then close the upper door.

Slide the Armarac towards the top of the wall mount bracket to disengage the rear mounting lugs.

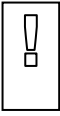
Lift the Armarac up and off the wall mount bracket and place on the ground to one side (minimum 2 people required).



You now have the Armarac and wall mount bracket sitting separately on the floor.

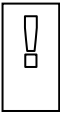
Step 2 – Identify the Armarac installation location

Identify the wall to which the Armarac is to be mounted.



Verify that the wall is load bearing and capable of holding a possible load of 195kg (430lbs). Consult with an engineer if in any doubt.

If installing on a wooden framed wall; locate the vertical stud centers. NOTE the *wall mount bracket* must be secured directly in to these framing studs.



Note that the 2050-XX-SR and 2050-XX-WC Models are suitable for 600mm (24 inch) or 400mm (16in) stud center timber framed walls. For solid masonry walls use the 600mm (24in) holes– all other mounting substrates are required to use the Armarac Support Stand (2055-STND).



Step 3 – Mark the position of the Wall Mount Bracket

Taking in to account minimum and recommended clearances and spacing referred to Section A – 3 above, proceed to mark out the wall.

Hold the *wall mount bracket* against the wall and mark the top left hole centre (approx 8kg/18lb).

Alternately measure 1640mm (5ft 4½ in) up from floor level and mark the hole center on the centreline of the vertical framing stud or on the brick/block concrete wall.



Step 4 – Drilling the first holes

Drill the first hole with the appropriate drill bit size to the recommended depth for the chosen fasteners suitable for the type of wall and anchoring system.

Fit the fastener in to the hole through the *wall mount bracket* (start with top left hole).

Note if using a chemical masonry anchor it will need to cure before taking the weight of the wall mount bracket.

Using a spirit level on the top and sides of the *wall mount bracket* to ensure the bracket is square, mark the top right mounting hole center.

Remove the bracket; drill the hole to the recommended size and depth for the anchoring system being used.



Step 5 – Terminate the power supply

Remove the *power cable shield* from the rear of the *wall mount bracket* using a hex Allen key exposing the rear terminals of the IEC C20 power termination socket.

Connect the electrical power circuit to the IEC C20 power socket with adequate cable length for the final position of the *wall mount bracket*. Remember the cable cover will need to be on the cable before final termination to the power socket.

Refit the *power cable shield* to the *wall mount bracket*.

Earth your Armarac enclosure to the building earth grid using the copper earth bar located on the rear of the *wall mount bracket*.

Refit the *wall mount bracket* to the wall using both of the top fasteners. (Careful to note curing times if you're using chemical masonry anchors).



Step 6 – Drill the remaining holes

With the *wall mount bracket* in place, drill the remaining six holes through the *wall mount bracket* pre drilled holes.

Fit and tighten the remaining six fasteners.

Step 7 – Confirm bracket is secure

Confirm all eight (8) fasteners have secured the *wall mount bracket* to the wall.

Verify all recommended torque (and if applicable curing times) specified by the anchoring system manufacturers have been met.



Step 8 – Structure cabling access (2050-XX-SR only)

Ensure the buildings structured cabling can feed through the 3U 19-inch patch panel mounting slot cut-out on the *wall mount bracket* from the rear.

At this point the structured cabling can be terminated on to your 19-inch patch panel(s).

The patch panel(s) can then be installed on to the *wall mount bracket* from the front using four M5 (10/32) fasteners for each patch panel.

Step 9 – Mounting the Armarac

Using a minimum of two (2) people, lift the Armarac up and position it against the *wall mount bracket* aligning the mounting hooks to the matching slots in the wall mount bracket.

Note: an empty Armarac weighs approx 45kg (100lb)

Once aligned, lower the Armarac so that the mounting hooks are fully engaged.



Step 10 – Securing the Armarac

Carefully open the Armarac upper clam shell door and then open the lower door.

Fully open the Vertiblade bracket to gain access to the lower chassis area.

Ensure the two security retention fastener holes are aligned with *wall mount bracket* threaded holes.

Fit and tighten the two M8 hex socket heads screws (removed during Step 1) to secure the Armarac chassis to the *wall mount bracket*.

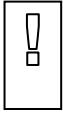
Refit the M6 brass earthing screw through the chassis in to the copper earth bar on the rear of the *wall mount bracket*.

Close the Vertiblade, close the Armarac lower door then and close the Armarac upper door.



You have now successfully installed your Armarac and are ready to start installing your equipment – see Section E.

5 Mounting the 2050-AF Armarac to the (2055-STND-AF) Support Stand



Verify that the floor is suitable for anchoring the Armarac and support stand. Select the appropriate anchoring system for the floor substrate type. (Refer Section A) **If in any doubt consult an engineer.**

Step 1 – De-box your Support Stand

Remove the packet of fasteners and carefully lift the two *uprights*, two *feet* and *cross-member* out of the packaging and lay on the floor.



Step 2 – Assemble the Stand

Taking care, position the left-hand and right-hand *feet* and *uprights* in the correct orientation ensure the holes in the *uprights* face inwards and that the *cross-member* flat surface faces to the front.

Assemble the left-hand *foot* to the cross member through the left-hand upright using the four M8x120mm bolts, washers and nuts provided. (Note this is easier with two people)

Assemble the right-hand *foot* to the *cross-member* through the right-hand *upright* using the remaining four M8x120mm bolts, washers and nuts.



Step 3 – Fit the wall mount bracket

Using at least one person to hold the wall mount bracket in place, from the rear fit and tighten the eight M8 x120 bolts through the *wall mount bracket* and in to the support stand *uprights*.

Step 4 – Terminate the power supply

Remove the *power cable shield* from the rear of the *wall mount bracket* using a hex Allen key exposing the rear terminals of the IEC C20 power termination socket.

Connect the electrical power circuit to the IEC C20 power socket with adequate cable length for the final position of the *wall mount bracket*. Remember the cable cover will



need to be on the cable before final termination to the power socket.

Earth your Armarac enclosure to the building earth grid using the copper earth bar located on the rear of the *wall mount bracket*.

Refit the *power cable shield* to the *wall mount bracket*.



Step 5 – Structure cabling access

Position the *support stand* and *wall mount bracket* in the desired location against the wall. Refer Section A – 3 for spacing requirements.

Ensure the structured cabling can feed through the 3U 19-inch patch panel mounting slot cut-out on the *wall mount bracket* from the rear.

At this point the structured cabling may be terminated on to your 19-inch patch panel(s).

The patch panel(s) can then be installed on to the *wall mount bracket* from the front using four M5 (10/32) fasteners for each patch panel.

Step 6 – Starting to Secure the Support Stand

Ensure the *support stand* and *wall mount bracket* are in the correct position.

Mark and drill the left rear hole through the left foot in to the floor. Size and depth of the hole as specified by your chosen manufacturers anchoring system.

Fit and tighten the first anchor bolt through the left rear foot.

Step 7 – Secure the Support Stand

With the first anchor secured (adhering to manufacturers recommended curing times if using a chemical masonry anchor fastener system), mark and drill the remaining three anchoring holes through the support stand feet.

Fit and tighten the remaining three anchor bolts.



Note if you are installing against a wall you may also wish to secure the wall mount bracket directly to the wall by fastening through the wall mount bracket mounting holes into the wall substrate.

Step 8 – Mounting the Armarac

Using a minimum of two (2) people lift the Armarac up and position it against the *wall mount bracket* taking care to align the mounting hooks to the matching slots in the *wall mount bracket*.

Once aligned, lower the Armarac so that the mounting hooks are fully engaged.

Step 9 – Securing the Armarac

Carefully open the Armarac upper clam shell door and then open the lower door.

Fully open the Vertiblade bracket to gain access to the lower chassis area.

Ensure the two security retention fastener holes are aligned with *wall mount bracket* threaded holes.

Fit and tighten the two M8 hex socket heads screws (removed during Step 1) to secure the Armarac chassis to the *wall mount bracket*.

Refit the M6 brass earthing screw through the chassis in to the copper earth bar on the rear of the *wall mount bracket*.

Close the Vertiblade, close the Armarac lower door and then close the Armarac upper door.



You have now successfully installed your Armarac and are ready to start installing your equipment – see Section C. (note: Series 980-B wall mount bracket shown in picture)



Section C – Enclosure Mounting 2050-SC-SR or 2050-SC-WC

6 Mounting the 2050-SC Armarac to a load bearing wall (stand not required)

The Armarac 2050-SC Cooling Unit is position sensitive.

Thureon recommends the unit to remain in the proper upright position for a minimum of 24 hours before initial operation. This is to ensure the oil has returned to the compressor. Operation before the 24 hour time period may cause damage to the compressor, hence shortening the life of the system.

Note: Operating the unit before maintaining an upright position for 24 hours will void all warranties.

Step 1 –Opening the 2050-SC active cooling enclosure

De-box your 2050-SC active cooling enclosure.

Lift out enclosure and place on the floor (continue to keep the unit upright).

Unlock the cooling unit door using the key provided. Then use an 8mm hex Allen key to disengage the cam lock.



Step 2 –Removing the front section of the enclosure

Remove the front section of the enclosure away by lifting the hinge pins clear of the lower part of the hinges. Disengage the entire front section and lift clear of the rear of the unit.

Carefully place the front section of the enclosure (containing the air conditioner unit) upright out of the way of damage or being knocked over.



Step 3 –Installing the wall mount bracket

Using the recommended positioning and spacing information from Section-A of this document, fix the rear section of the active cooling enclosure to your wall.

Note this bracket is suitable for mounting to brick, block , concrete and 600mm (24in) center timber framed walls.

Mark and drill the top left corner hole in to your wall.

Install the appropriate fastener for the weight and substrate.

Using a spirit level, ensure the wall mount bracket is level and mark the remaining fastener holes.

Remove the bracket and drill the seven (7) remaining holes in to the wall.

Re-mount the bracket and secure it to the wall with the eight (8) fasteners. Ensure mixing/drying times are adhered to if using chemical anchors before proceeding any further.



Step 4 –Reattach the front section of the cooling unit

Reinsert pins in to the hinges.

Carefully lower the front section of the cooling enclosure in to place guiding the hinges in to their other half.

Close the front section on to the rear section using the 8mm hex Allen key to engage the cam lock.



Step 5 –Terminating the power supply

Remove the IEC-C20 power socket from the front section of the cooling enclosure with a hex Allen key. Terminate your power supply on the rear of the socket. Ensure your leave enough slack cable to allow the front section to hinge open freely. Reinstall the socket with the hex Allen key.



Note this IEC-C20 power socket only provides power to the inside of the Armarac and specifically for electronic equipment which it will house. Do not connect the air conditioner to the UPS feed.

The air conditioner module has its own power supply and termination point. Run this out via the supplied cable gland and ensure enough flex is available for the unit to freely swing open to its full extent to assist in maintenance.

Earth your Armarac enclosure to the building earth grid using the copper earth bar located beside the IEC-C20 power socket.

Step 6 –Mounting the Armarac

De-box your Armarac unit. Ensure the clam shell doors remain locked.

Using a minimum of two (2) people lift the Armarac up against the closed cooling unit enclosure. Position the Armarac so that the mounting hooks engage in their recesses and then lower the Armarac down for them to lock in to place.



Step 7 –Securing the Armarac

Unlock the Armarac doors. Open the Armarac upper door and then gently open the lower door.

There are four (4) M8 security bolts to be installed: Two (2) slightly above and to either side of the cable ingress slot in the lower chassis. And another two (2) located directly above them towards the top of the chassis. These bolts need to be tightened to the point that the foam seal between the SC and Armarac compresses down evenly from 6mm (1/4") to 3mm (1/8in).

Now re-connect the 2050-SC cooling unit control cables to the remote control panel. Additionally connect the Ethernet cable if fitted.



You have now successfully installed your Armarac and are ready to start installing your equipment – see Section E. **Also see pre-installation tests listed in Section 23.**



7 Mounting the 2050-SC Armarac to the 2055-STND-SC support stand

Verify that the floor is suitable for anchoring the 2050-SC Armarac and support stand. Select the appropriate anchoring system for the floor substrate type. (Refer Section A) **If in any doubt consult an engineer.**

The Armarac 2050-SC Cooling Unit is position sensitive. Thureon recommends the unit to remain in the proper upright position for a minimum of 24 hours before initial operation. This is to ensure the oil has returned to the compressor. Operation before the 24 hour time period may cause damage to the compressor, hence shortening the life of the system.

Note: Operating the unit before maintaining an upright position for 24 hours will void all warranties.



Step 1 – De-box your Support Stand

Remove the packet of fasteners and carefully lift the two *uprights*, two *feet*, two *angle brackets*, one *outrigger* and *cross-member* out of the packaging and lay on the floor.

Step 2 – Assemble the Stand

Taking care, position the left-hand and right-hand *feet* and *uprights* in the correct orientation ensure the holes in the *uprights* face inwards and that the *cross-member* flat surface faces to the front.

Assemble the left-hand *foot* to the cross member through the left-hand upright using the four M8x120mm bolts, washers and nuts provided. (Note this is easier with two people)

Assemble the right-hand *foot* and the *outrigger* to the *cross-member* through the right-hand *upright* using the remaining four M8x120mm bolts, washers and nuts.

Fit the two *angle brackets* to the inside of the left and right *uprights* with the flat face facing outwards.



Step 3 – Fit the 2050-SC active cooling enclosure

Open the 2050-SC cooling enclosure with the key provided to unlock the cam-lock. And using an 8mm hex Allen key to release the compression latch.

Remove the front section of the enclosure by lifting the bracket with the air conditioner attached directly upward to disengage the three hinges on the right hand side.

Using at least one person to hold the rear of the 2050-SC cooling enclosure in place against the *angle brackets*, install and tighten the eight M8 x25 bolts through the *wall mount bracket*.



Step 4 –Reattach the front section of the cooling unit

Reassemble the front section of the cooling bracket to the rear section by carefully aligning and sliding the three sets of hinges together.

Close the front section of the cooling enclosure and engage with the compression latch by turning the 8mm hex Allen key.

Step 5 –Terminating the power supply

Remove the IEC-C20 power socket from the front section of the cooling enclosure with a hex Allen key. Terminate your power supply on the rear of the socket. Ensure you leave enough slack cable to allow the front section to hinge open freely. Reinstall the socket with the hex Allen key.

Note this IEC-C20 power socket only provides power to the inside of the Armarac and specifically for electronic equipment which it will house. Do not connect the air conditioner to the UPS feed.

The air conditioner module has its own power supply and termination point. Run this out via the supplied cable gland and ensure enough flex is available for the unit to freely swing open to its full extent to assist in maintenance.

Earth your Armarac enclosure to the building earth grid using the copper earth bar located beside the IEC-C20 power socket.



Step 6 –Mounting the Armarac

De-box your Armarac unit. Ensure the clam shell doors remain locked.

Using a minimum of two (2) people lift the Armarac up against the closed cooling unit enclosure. Position the Armarac so that the mounting hooks engage in their recesses and then lower the Armarac down for them to lock in to place.

Step 7 –Securing the Armarac

Unlock the Armarac doors. Open the Armarac upper door and then gently open the lower door.

There are four (4) M8 security bolts to be installed: Two (2) slightly above and to either side of the cable ingress slot in the lower chassis. And another two (2) located directly above them towards the top of the chassis.

Now re-connect the 2050-SC cooling unit control cables to the remote control panel. Additionally connect the Ethernet cable if fitted.

You have now successfully installed your Armarac and are ready to start installing your equipment – see Section E. **Also see pre-installation tests listed in Section 23.**

Section D – Equipment Mounting: 2050-XX-SR Server Room

8 Vertiblade Conversion

Armarac's Vertiblade system allows the user to configure the equipment mounting brackets for either 1 Unit (1U) or 2 Unit (2U) devices. Typically the 2050-SR Armarac will arrive configured for two half-depth 1U devices at the front, two full-length 2U devices at the rear (such as a UPS and a server) and one 1U full-depth device in the second bay.



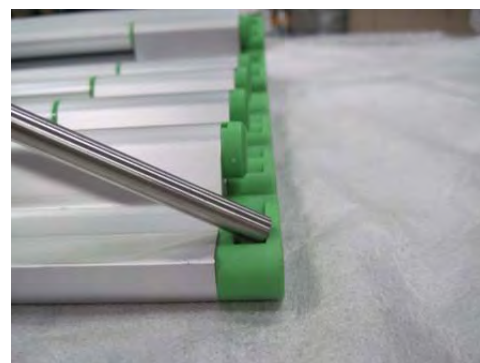
Converting from Two 1-Unit (2x 1RU) brackets to One 2-Unit (1x 2RU) Bracket

Note: the brackets to be converted must be adjacent and of the same depth i.e. both full length Vertiblade panels or both double headed Vertiblade panels.

Step 1 – Remove the Server Screw Adapters

Using a diameter 8mm drift and mallet gently tap to remove the existing green nylon screw adapters from both of the left-hand Vertiblade extrusions.

Do not remove the green nylon screw adapters from the right-hand extrusions.



Step 2 – Remove the Vertiblade panel from the front bracket

Open the Vertiblade system so that the foremost of the two brackets to be converted has exposed the fasteners on the back of the panel. Using a hex head Allen key remove the two (2) left-hand countersunk screws and the four (4) right-hand screws. Carefully remove the panel from the Vertiblade hinge extrusion and store for future use.

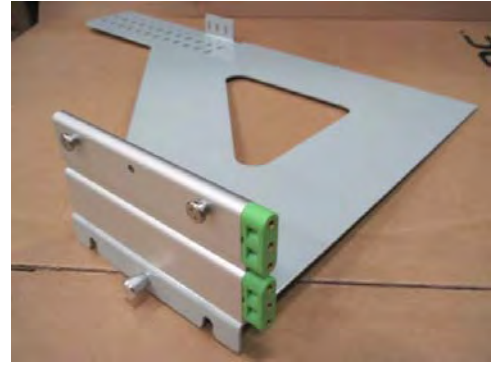


Step 3 – Remove the Vertiblade extrusion from the second bracket.

Using a hex head Allen key remove the two (2) countersunk screws holding the right-hand 1U Vertiblade extrusion in place. Carefully remove the extrusion from the Vertiblade panel and store for future use.

Step 4 – Fit the right-hand 2U Extrusion and Screw Adapters

Firstly ensure that you have the correct 2U *Screw Adapter* thread to match your device. Place the 2U Vertiblade extrusion on to the Vertiblade panel. Carefully align the mounting holes in the Vertiblade extrusion with the corresponding holes in the Vertiblade panel. Using a hex head Allen key install and tighten the two (2) countersunk screws



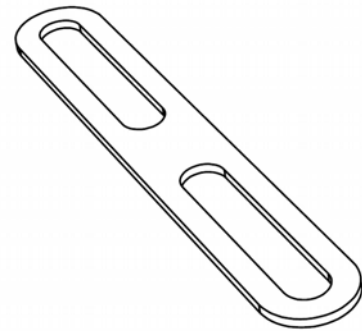
Step 5– Convert the left hand extrusions to a 2U pair

Firstly ensure the four green nylon screw thread adapters supplied are the correct thread for your equipment.

Place the 2U *Extrusion Adapter* across the top of the two left-hand Vertiblade extrusions that you wish to join. Carefully place the two new green nylon *Screw Adapters* through the extrusion adapter plate and in to the top of the Vertiblade extrusion, aligning the base of each to sit squarely inside the extrusion.

Using a soft mallet gently but firmly tap the screw Adapters down one at a time until the base sits flush against the extrusion adapter plate and the top of the Vertiblade extrusion.

Repeat this process for the bottom of the two Vertiblade extrusions being converted in to a single 2U bay.



Step 6– Refit the Vertiblade panel with the 2U right hand extrusion

Open the Vertiblade system so that the rear of the two brackets converted exposes the four (4) mounting holes on the back of the extrusion. Using a hex head Allen key install and tighten the four (4) countersunk screws.



This Vertiblade bracket is now ready to accept 2U devices.

9 Screw Adapters

Different equipment manufacturers often use different retention screw thread sizes to hold their equipment to the rack kits. The Armarac has a series of corresponding server *Screw Adapters* to suit each type of thread to ensure that all equipment is securely fastened to its Vertiblade.

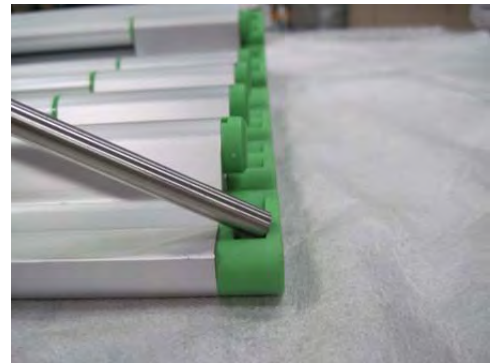


Step 1 – Determine the correct thread requirement

Choose between the M4, M5 (10/32) and M6 Vertiblade *screw adapters* to match your equipment manufacturer's server retention screw thread size.

Step 2 – Remove the current thread adapters

Using a diameter 8mm drift and mallet gently tap to remove the existing green nylon screw adapter.



Step 3 – Install the correct thread adapters

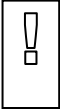
Carefully place the new *Screw Adapter* on top of the Vertiblade extrusion, aligning the base to sit squarely inside the extrusion.

Using a soft mallet gently but firmly tap the screw Adapter down until the base sits flush against the top of the extrusion as shown.



10 Installing Your Equipment

It is recommended to start with the equipment at the rear of the Armarac and that the heaviest equipment should be installed at the rear e.g. Uninterruptible Power Supply (UPS).



Please configure your Armarac for the correct Unit sizes (refer Section D – 8 above) e.g. setting up 1U and 2U combinations to match the equipment you intend to install.



Please ensure the correct manufacturer specific retention thread *screw adapters* have been fitted (refer Section D– 9 above).



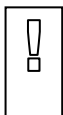
Step 1 – Open the rear Vertiblade

Open the front Vertiblade brackets to gain maximum access to the rear mounting space. Noting that the rear most equipment bay does not hinge.



Step 2 – Install your first device

Carefully lift the device in to the 19-inch opening. Take care to align the manufacturers' retention screws with the holes in the *Screw Adapters* on both the left-hand and right-hand Vertiblade extrusions.



Note take care to ensure the “top” surface of the equipment faces outward. This will ensure easy access to server mainboards and DVD/CD drives.



Step 3 – Secure your first device

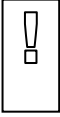
Install and fasten the manufacturers' retention screws securely in to the Vertiblade Screw Adapters on both sides of the 19-inch bay. Close the Vertiblade bracket in front of the device to ensure correct spacing has been achieved.

Step 4 – Install remaining devices

Repeat Steps 1 to 3 above for each device to be installed in your Armarac.

11 Cabling Guide

Armarac provides facility to install and correctly manage all of the cabling required for a full 6U of equipment. To avoid excess cable clutter we recommend using cables that are 1.0m to 1.5m in length (3ft, 4ft, 5ft long).



Note due to the nature of the Vertiblade articulated hinging system all cabling is required to run on the left-hand side of the enclosure to ensure each bracket can open properly for full device access.

Step 1 – Main Power Supply

Connect the wall mount bracket power outlet [IEC-C19] to your UPS inlet or power distribution unit (PDU) using an IEC-C20 plug and flex. **Do not turn your UPS on yet.**



Step 2 – Fan Power Supply (2050-AF-XX models)

From your UPS (or PDU) run an IEC-C8 AC power circuit to the fan power supply unit located on the lower fan mount tray inside the bottom door.



Step 3 – Device Power Distribution

Continue to run AC power cables from your UPS (or PDU) to each device that you have installed in the Vertiblade brackets.

For each device open its Vertiblade bracket up to 90 degrees to ensure the correct length and positioning of the cable. Use the slots at the bottom of each Vertiblade panel to cable-tie the power cables in to position.

Once all of the cables are run, group them in to looms and cable-tie to the transverse cable management slots across each Vertiblade. Ensure each bracket, one by one, can fully open without pinching or pulling the cables.



Step 4 – KVM Cables

If you have purchased your Armarac with the optional 2055 LCD module; run a video (DB15) and USB cable from each server to the interface of your chosen KVM switch.

Following the same procedure of opening each Vertiblade bracket up to 90 degrees, and ensuring each cable connects at each end without pulling or pinching when the bracket is opened and closed.



Step 5 – Networking

Now install the networking cables from each of your devices; either from one device to another, or to the 19-inch patch panel installed on the wall mount bracket.

Cable-tie these cables to the power and KVM to create cable looms to each Vertiblade bracket. Ensure the Vertiblade can open to 90 degrees without interference from the cabling.



Step 6 – Tape/Backup Drive

If you purchased the *tape drive module*, install your device in the standard 5.25-inch half-height device bay and run your 12V/5V power supply connector from your server to the device.

NOTE: LTO drives require a minimum of a 400W ATX



power supply to function correctly.

Now you can install the SCSI or USB cable from your server, down the Armarac 'cable snake' on the left hand side and in to the drive mount cavity.

Ensure the cable has enough flex by opening each Vertiblade to 90 degrees and checking for pulling or pinching of cables.

Note we recommend the use of unshielded SCSI cables when connecting to the tape drive module.



Step 7 – Excess Cable

Take care to choose cables that are as close as possible to the correct length.

Ideal power, VGA video, networking and USB cables are 1.0m, 1.2m and 1.5m (3ft, 4ft and 5ft).

However, if there is excess cable to be managed then carefully contain the excess at the rear of the Vertiblade. Do not try to manage excess cable across the Vertiblade brackets.



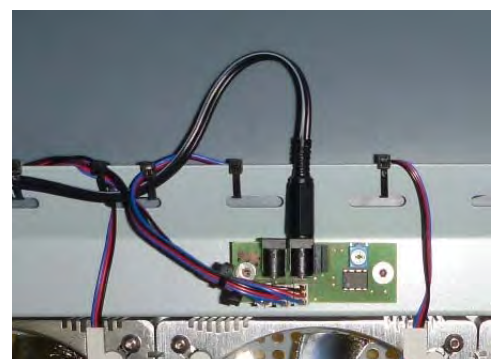
Step 8 – Adjust ventilation fans (2050-AF-XX only)

The upper and lower ventilation fans on the Armarac enclosure are speed adjustable. Using a No1 Phillips screwdriver slowly and gently rotate the blue and white potentiometer to vary the fan speed. Do not use excessive force as this will damage the component.

A lower fan speed will result in a lower noise level from the Armarac.

Note: if fan speed is too low, and insufficient air volume is circulating through your equipment then damage may result.

Note: some equipment such as servers may increase their own internal fans to compensate for insufficient airflow which will result in a higher noise output.



Section F – Equipment Mounting: 2050-XX-WC Wiring Closet

12 Installing Your Equipment

The Armarac Wiring Closet (2050-XX-WC) model is designed to provide housing for up to 144 ports networking equipment.

Space is provided for;

- one 1U or 2U/19-inch rackmount uninterruptible power supply,
- six 24-port 1U/19-inch Cat-5 or Cat-6 patch panels,
- three 48-port 1U/19-inch rackmount LAN switches.

Step 1 – Install UPS

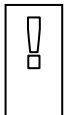
Install the uninterruptible power supply in the rear most Vertiblade bracket (refer Section C - 6 above if the bracket requires changing from 2U to 1U).



Step 2 – Install LAN Switches

Install the first 48-port switch in the top of the front Vertiblade bracket.

The second 48-port switch in the top of the second Vertiblade bracket and the third switch in the lower bay of the second bracket.



Note these switches must not exceed a depth of 350mm (14in) or two will not fit on the second Vertiblade bracket.

Secure the switches by use the manufacturer recommended screw fastener. Ensure that the Vertiblade extrusions have the corresponding screw thread adapter installed (refer Section C – 7 above).



Step 3 – Install the Patch Panels

Install the six 24-port 1U patch panels vertically in the zigzag Vertiblade bracket.

The RJ45 ports should be to the front and number port number 1 to the bottom.

Use four M5 (10/32) bolts to secure each patch panel in to cage nuts.



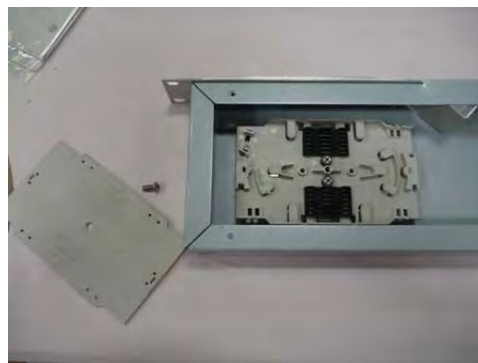
13. Fiber Termination Box

Step 1 – Fitting your connectors

Remove the fiber termination box from the Armarac (or leave in place if you prefer).

Using a 2mm hex allen key remove the four fasteners holding the front cover in place to gain access to the fiber termination cassette located inside.

Fit your SC connectors in to the slots provided along the top fascia of the fiber box.



Step 2 – Terminate your fiber

Terminate your incoming fiber through the hole in the lower left hand corner of the fiber box in to the splice cassette.

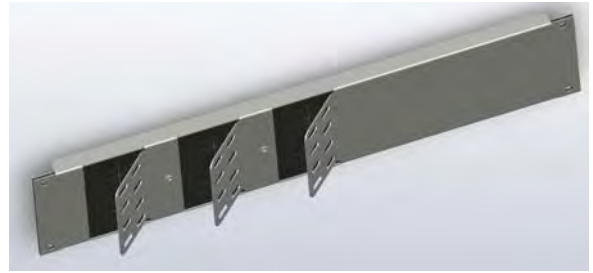
Refit the front cover when complete.



14 Cabling Guide

Step 1 – Structured Cabling

Installed in the 3U slot in the Armarac wall mount bracket is a cable gland bracket. This bracket has six (6) openings for bundles of 24 Cat-5 or Cat-6 cables from the buildings structured cabling field outlets.



Install the looms of 24 cores through each opening in the gland plate. Note the plate automatically directs these cables to the left.

Feed the cables around on to the tray at the rear of the zigzag bracket.

Ensure the cable tails are long enough to fully open the Vertiblade zigzag to access the UPS in the rear mounting bay.

Terminate each loom on the appropriate patch panel in accordance with the cabling standard being adopted (Cat-5 or Cat-6).

Check that the Vertiblade brackets can open and close without causing strain on the structured cabling or interfering with the hinging mechanism.



Step 2 – Power Distribution

Refer Section E - 14 (above) for power reticulation from the UPS (or PDU) to each of the LAN switches.

Step 3 – First 24 Patch Leads

Open the Vertiblade to 90 degrees to access the zigzag bracket with the six patch panels.

Using 1.0m (3ft) approved patch leads, connect from Port 1 on the front LAN switch to Port 1 on the left most patch panel.



Repeat for all 24 ports. Carefully loom the 24 cores together adhering to cabling standards.

Step 4 – Second 24 Patch Leads

Repeat the process in Step 3 for the second 24 ports on the first/front 48-port LAN switch.

Starting at Port 25 on the LAN switch, using a 1.0m (3ft) approved patch lead connect to Port 1 on the second 24-port patch panel on the left-hand side of the zigzag bracket.

Repeat for all 24 ports. Carefully loom the 24 cores together adhering to cabling standards.



Step 5 – Second 48-port Switch

Repeat Steps 3 and 4 above for the second 48-port switch installed in the top slot of the second Vertiblade bracket.

Connect switch ports 1 to 24 to the fifth 24-port patch panel installed in the Vertiblade zigzag bracket.

Connect switch ports 25 to 48 to the sixth (right-hand side) 24-port patch panel installed in the Vertiblade zigzag bracket.



Step 6 – Third 48-port Switch

The third 48-port switch is installed in the second Vertiblade bracket lower mounting bay.

Open the Vertiblade to 90 degrees to access the zigzag bracket with the six patch panels.

Using 1.0m (3ft) approved patch leads, connect from Port 1 on the LAN switch to Port 1 on the third patch panel in from the left-hand side.



Repeat for all 24 ports. Carefully loom the 24 cores together adhering to cabling standards.

Step 7 – Third 48-port Switch – Second 24 ports

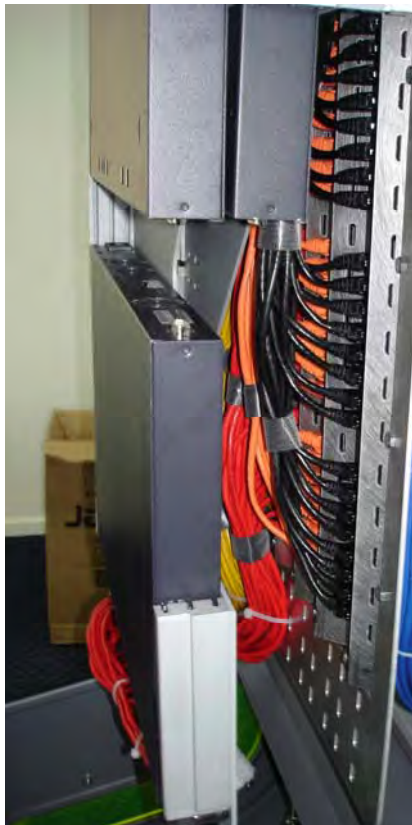
Using 1.0m (3ft) approved patch leads, connect from Port 25 on the LAN switch to Port 1 on the fourth patch panel in from the left-hand side.

Repeat for all 24 ports. Carefully loom the 24 cores together adhering to cabling standards.

Step 8 – Check for Interference

Ensure that each Vertiblade bracket can fully open without cables pinching or pulling on any device or patch panel.

Ensure that the Armarac clam-shell doors can close without causing interference with any cables or the *ventilation fans*.



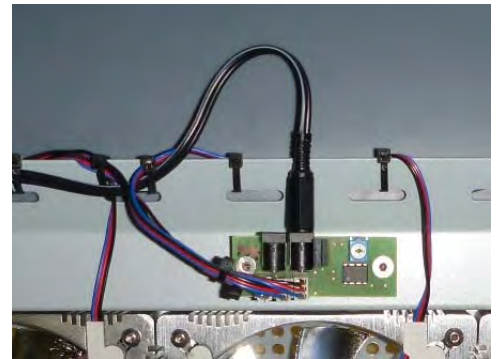


Step 9 – Adjust ventilation fans (2050-AF-XX only)

The upper and lower ventilation fans on the Armarac enclosure are speed adjustable. Using a No1 Phillips screwdriver slowly and gently rotate the blue and white potentiometer to vary the fan speed. Do not use excessive force as this will damage the component.

A lower fan speed will result in a lower noise level from the Armarac.

Note: if fan speed is too low, and insufficient air volume is circulating through your equipment then damage may result.



Step 10 – Cat-6A patch panel bracket (where fitted 2050-AF-WC only)

Due to the increased bend radius requirements of Cat-6A cabling the optional 4U Cat-6A patch panel bracket may be used to offset the patch panels from the wall mount bracket.

Install the adapter with the split/hinging bracket on the left hand side of the wall mount bracket. Fix with two M5 (10/32) screws.

Mount the second bracket and insert cage nuts for mounting your patch panels.

Ensure you leave enough excess cable when termination on to the patch panel to be able to swing the Cat-6A patch panel bracket open to terminate more cables in the future.

Excess cable may be contained behind the wall mount bracket or in the ceiling cavity.



Section F – Options

15. Tape Drive Mounting Module (2055-TAPE)

The Armarac front bay enclosure is designed to accept an "internal" or "bare" 5¼" half-height tape drive

It is possible to install any brand and format of tape drive (e.g. DLT, LTO or even a DVD/RW) in the bay. Obviously the data connection for the drives varies between USB, SATA, SCSI and SAS cables. The 5V/12V power feed are usually the 4-pin Molex or SATA type cables.

Installation:

1. **HARDWARE**; install the bare drive as previously described in section X and orientation as shown in the photos.
2. **POWER**; as the drive requires both a 12V and 5V supply run an extender cable from the server's ATX power supply, out through a spare PCI slot blanking plate at the rear of the server (or a PCI bracket adapter), and across the Vertiblade, down the cable snake and up in to the tape drive bay module (cable tie where necessary allowing enough flex for the Vertiblade and doors to open fully).
3. **DATA**; dependant on whether you have a SCSI, SAS, USB or SATA cable you may have an external connector on the rear of your server to connect the cable to. If not, then connect the cable internally within the server (e.g. to the SCSI or SAS controller) and exit the server chassis through a blank PCI slot cover plate as described above. Many SAS and SCSI extension cables are available online for almost all types of interface.

Important Note: for LTO-3 and LTO-4 internal drives the power consumption (especially on the 5V side) is extremely high and users can experience random drop outs unless these drives are feed from at least a 400W power supply. Ensure the server has a sufficiently sized power supply to run the installed drive or consider installing a separate 1U ATX power supply just for the tape drive.



19. Electronic lock connection and operation (2055-ELOCK)

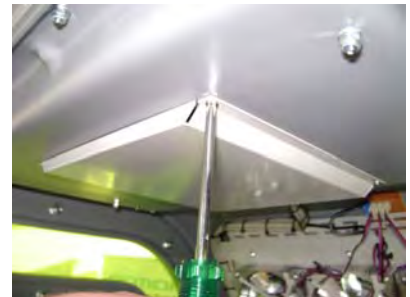
[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

20. LCD/Keyboard module (2055-KBLCD)

[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

However, if you need to reset your LCD screen back to “PC” input then remove the LCD cover plate from the inside of the upper plastic door with a No2 Philips screwdriver. Remove the four (4) screws and keep for when you replace the cover.

Locate the LCD control panel (as shown). Ensure the LED is lit either RED or Green. The LED will automatically change to GREEN when it detects an input signal. If the LED is not lit then check the 12V DC plug connection is secure at the LCD and on the fan-speed controller board located on the top door (2050-AF models only).



The LCD control panel:

- PC/AV cycles the input from AV to SVGA
- ON/OFF power cycles the LCD

Once your server/KVM output is being displayed correctly on the LCD panel replace the cover plate and re-insert the retaining screws.



21. Touch screen LCD module (2055-TSLCD)

[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

22. Wireless Access Point module (2055-WLSS)

[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

23. Active Cooling Unit module (2050-SC)

INTRODUCTION:

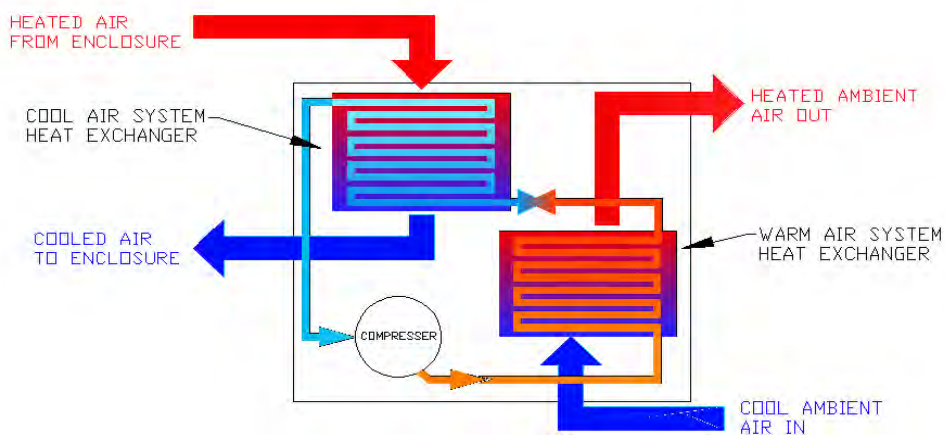
Thureon have partnered with Ice Qube to provide specialist active cooling modules to work with the 2050 series of Armarac Enclosures. Ice Qube's Thermal Management System, TMS, is designed to cool, dehumidify or heat the internal environment of modern electrical enclosures. Ice Qube offers efficient and aesthetically appealing packages that can be mounted on top or on the side of your enclosure. Our closed-loop circulation design protects your equipment from air-borne dust and contaminants which may hinder equipment operations, causing unnecessary down time. Ice Qube is able to provide cooling capacities from 800 to 20,000 BTU per hour - a wide range of cooling systems to satisfy many of your conditioning needs.

BASIC OPERATION:

The Ice Qube's Thermal Management System, TMS, is actually a combination of three independent systems which function simultaneously to maintain environmentally friendly conditions for various types of electronic equipment enclosures. These three thermal related systems are: the closed-loop cool air system; the warm air system; and the vapor-compression refrigeration system. Please refer to Figure 1.

The closed-loop cool air system circulates cold air from the Ice Qube TMS to the electronics enclosure. This air returns to the Ice Qube system bringing with it unwanted heat and humidity from inside the enclosure. Heat and humidity is then removed by a heat exchanger located within the Ice Qube TMS. This heat exchanger is part of the vapor-compression refrigeration system.

At the heart of the vapor-compression refrigeration's system is a quiet, energy efficient rotary compressor which circulates environmentally friendly NON-CFC refrigerant. The main purpose of this compressor is to transfer heat laden refrigerant from the evaporator, located within the closed-loop cool air system, to a condenser, located in the warm air system. In the warm air system, air is circulated from the ambient surrounding the enclosure, through a filter, and across the warm air system heat exchanger. Here, heat from the enclosure is transferred from the warm air heat exchanger into the warm air stream and dissipated to the ambient.



PRE-INSTALLATION TEST:

Before installing the Ice Qube system on the enclosure, it is recommended the unit operate for 20 to 30 minutes to ensure it is functioning properly. Although the Ice Qube TMS has been tested at the factory, internal damage may have occurred during shipping which may have not been apparent during the unpacking inspection.

1. Place the system on a solid base such as a workbench or table. Verify whether the unit is a Top or a Side Mount air conditioner. Be sure to allow adequate space for airflow. There are two air streams that must not be restricted, the cool air stream and the warm air stream. Top mount units must be elevated to provide adequate airflow for the cool air stream located on the bottom of the system.

Top mount units can only be mounted on a flat horizontal surface. Side mount units can only be mounted on a flat vertical surface.

2. Check that the warm air system filter is in place, location varies with model type.

Models with the optional rain or wash down hood do not have a warm air filter and will require regular routine condenser maintenance.

3. Check the data tag for proper electrical requirements. The data tag lists the design voltage and amperage requirements of the system. Verify that the electrical outlet where the system will be connected has the proper capacity. After noting the above, connect the power cord to a properly grounded electrical connection. The use of an extension cord is not recommended.

NOTE: If any unusual noise or vibration is present during the testing procedure, immediately disconnect the power cord and inspect the unit for the cause of the noise or vibration. Contact Ice Qube immediately.

4. As soon as power is supplied to the system, the cool air evaporator blower will begin to operate, (excluding Top mount models – see following note). The compressor and warm air condenser blower will not operate if the room air temperature is below 80°F. This is due to the fact the programmable controller has a factory setpoint of 80°F. (The digital display on the face of the controller will be displaying room temperature.) If the display is indicating 80°F or warmer, the “Cool” status LED will flash for 3½ minutes before the compressor and the warm air condenser blower will operate.

NOTE: Top mount unit evaporator blowers are electrically connected to cycle with the compressor and condenser blower.

If the display is indicating a temperature less than 80°F, adjust the setpoint to a temperature lower than the room temperature in order for the compressor and warm air condenser blower to operate. Refer to the “Programming the Controller” section of this manual in order to change the factory set points.

5. With the compressor and both blowers functioning, allow the unit to operate for 20 to 30 minutes. This will provide sufficient time for the vapor compression system to achieve equilibrium. Measure the cool air outlet temperature with an accurate thermometer. This temperature should be at least 10 degrees colder than the inlet air temperature, (if the room temperature is warmer than 70°F). Inlet air temperature will be displayed on the programmable controller. In areas of high humidity, the temperature difference may be less than 10 degrees.

6. After completing the above check points, the electrical enclosure is ready to be prepared for the installation of the Ice Qube system.

PREPARING THE ENCLOSURE:

Ice Qube air conditioning systems have been designed to be light weight for ease of installation. Side enclosure or vertical mount units have been designed with a simple “two stud” alignment feature to make initial fastening to the enclosure quick and easy. A few modifications must be made to the enclosure to provide proper airflow, to maintain enclosure integrity, and to assure a secure installation. Required modifications will vary with each air conditioner model.

1. Determine the location of the Ice Qube system on the enclosure.

Verify the weight of the air conditioning system will not cause the enclosure to become unbalanced. Equipment instability may cause bodily harm or equipment damage. For units mounted on enclosure doors, confirm the hinges will support the weight of the Ice Qube system. Refer to system specifications for model weights.

2. Upon deciding the location of the Ice Qube system on the enclosure, attach the included template to the enclosure surface. This template drawing will assist the installer in placing the air conditioning unit on the enclosure. Be sure the Ice Qube system will be mounted level and the cool air inlet and outlet connections will not be restricted by equipment or shelving within the enclosure. Also check that the air flow of the warm air stream will not be effected or restricted by the surroundings.

3. Outline the modifications for the enclosure with a marking pencil. Note the bolt hole locations, the cutouts for the inlet and outlet air streams, the power cord and the locations for any optional equipment. Additional cable openings may be required for units with optional heating or alarm outputs, or for units connected to a network communications link.

4. Using a drill, make the holes for the studs, bolts and power cord and any other option. The bit size will need to vary depending upon the model. Protect any equipment located within the enclosure from debris produced during the installation procedure.

5. Drill a pilot hole for a saber saw to cut the inlet and outlet air passages. File all cuts to provide a uniform cutout.

6. Slide the mounting studs through the matching holes in the enclosure. Verify that all of the openings are aligned. Top mount units do not have mounting studs.

7. After checking that all openings and bolt holes are in alignment, apply the gasket material provided to the Ice Qube air conditioning system cabinet to ensure enclosure integrity.

***** CAUTION *** Be careful while removing the backing on the gasket material. The material may stretch and the holes will not align.**

NOTE: If the enclosure is not air tight or the air conditioning system operates with the enclosure door(s) open, moisture will condensate inside the air conditioning system and may cause the condensate management system to overflow.

After the gasket material has been installed, mount the Ice Qube system onto the enclosure and fasten it using the supplied nuts and bolts. Check to see if the power cord and all optional cables are in place. Fasteners need to be tightened securely and the gasket material needs to be in place in order to maintain

enclosure integrity. The gasket material should be slightly compressed with no visible gaps. The Ice Qube system is now ready to begin operation.

NOTE: Near the bottom or on the side of the Ice Qube system cabinet is a nipple for condensate overflow. Although all vertical or side mounted Ice Qube air conditioners have built-in condensate management systems, it may be necessary to attach a drain hose to this nipple on enclosures which are located in extremely humid conditions, or where enclosure doors are left open or the door seals are leaking.

In order for the drainage system to operate properly, the factory supplied drain kit with a “Tee” must be installed per factory instructions. Ice Qube cannot be held responsible for improper installation.

OPERATING THE SYSTEM:

Once the Ice Qube system has been installed onto the enclosure and the power cord has been attached to a properly grounded electrical outlet with adequate voltage and current supply, the unit is ready for operation. As soon as electrical power is supplied to the Ice Qube system, the cool air stream blower will start to operate, (except for Top mount units). The blower will run continuously so that the controller can monitor the enclosure’s internal temperature. The enclosure temperature will be displayed on the face of the controller.

If the enclosure temperature is greater than the factory cooling setpoint of 80°F, the “Cool” status LED will flash. This indicates that the compressor’s automatic off cycle timer is working. (The off cycle timer is factory set at 3½ minutes). At the end of 3½ minutes, the compressor and the condenser air blower will begin to operate. This signifies that the cooling system has begun operation to remove heat and humidity from the enclosure. This procedure may take 20 to 30 minutes before it reaches full capacity.

If the heat load within the enclosure is less than the cooling capacity of the Ice Qube system, the temperature on the digital display will begin to decrease. When the temperature inside the enclosure decreases 7 degrees Fahrenheit below the “Cooling on” setpoint, the compressor and the condenser blower will cycle off. The cool air blower will continue to operate, circulating air within the enclosure. The controller has a factory programmed temperature differential of 7 degrees Fahrenheit. Example: “Cooling on” @ 80°F; “Cooling off” @ 73°F.

Ice Qube also offers an optional External Heat Output (EHO) to provide power to an external heater, typically located within the equipment enclosure. If the enclosure temperature is below the factory heating setpoint of 50° F, the heat status LED will be “on”. This indicates the heat relay has been energized and is providing power to the field connected heater. (There is no time delay before heating begins). When the temperature of the enclosure rises 7 degrees Fahrenheit above the setpoint, the controller will de-energize the heat relay and cycle the heater “off”.

NOTE: There is a dead band programmed into the controller that prevents heating and cooling from operating simultaneously.

See label attached to the rear of the air conditioner for maximum wattage heater that may be connected to the External Heat Output (EHO).

PROGRAMMING THE CONTROLLER:

The digital controller has many features that may or may not be required for your application. However, the controller has been programmed at the factory with typical default settings for immediate system operation. Please review the following default settings:

- 1. Cooling system on temperature 80° F
- 2. Heating system on temperature 50° F (optional)
- 3. High enclosure temperature alarm 100° F
- 4. Low enclosure temperature alarm 40° F
- 5. Audible and Visual alarm "ON"
- 6. Digital display in degrees Fahrenheit
- 7. Filter maintenance alarm 0 days - Disabled
- 8. High condenser temperature alarm 170° F

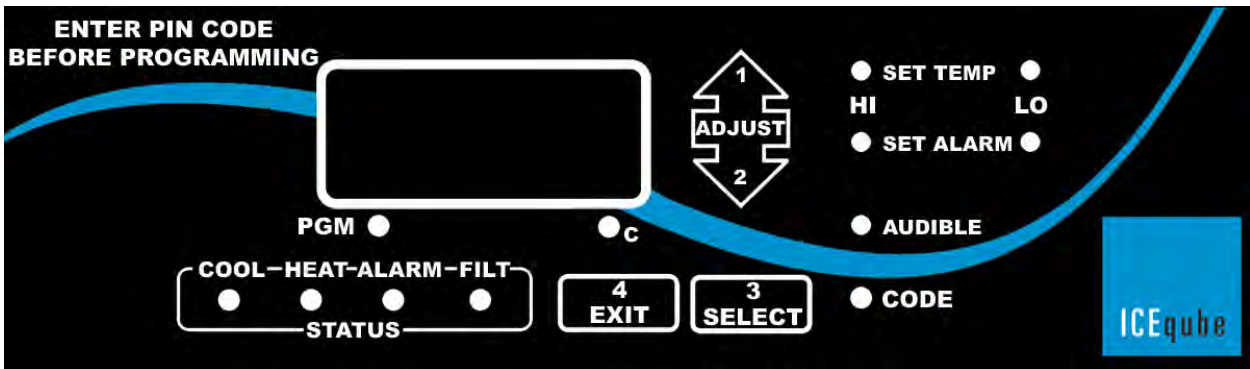


Figure 4: Digital Controller

To change the factory default settings, enter the programming code sequence:

"1 Adjust-up" arrow

"2 Adjust-down" arrow

"3 Select"

"4 Exit"

After pressing the above sequence the program LED should illuminate along with three alternating flashing boxes on the display face, indicating the code was accepted. If no selection is made within one minute, the system returns to the normal operating mode.

Note: Pressing the "4 Exit" button at any time while in the programming mode returns the controller to the normal operating mode.

Press the “3 Select” button to continue programming. The set temperature “HI” LED illuminates with the display indicating the ‘cooling on’ setpoint. The compressor will begin operation at this temperature and will remain operating until the enclosure temperature decreases approximately seven degrees Fahrenheit (four degrees Celsius). Press the “1 Adjust-up” or “2 Adjust-down” arrow until the desired set point is displayed. The range for this adjustment is 70° to 126°F, (21° to 52°C). When the adjustment is complete, press the “3 Select” button to continue.

The set temperature “LO” LED is *on* with the display indicating the (optional) ‘heating on’ set point. The heating system will begin operation at this temperature and remain operating until the enclosure temperature increases approximately seven degrees Fahrenheit (four degrees Celsius). Press the “1 Adjust-up” or “2 Adjust-down” arrow until the desired set point is displayed within a range of 0°F to 63°F (-17.8°C to +17°C).

NOTE: Review alarm settings if the ‘cool on’ or ‘heat on’ set points have been changed.

Press the “3 Select” button to continue. The set alarm “HI” LED is *on* with the display indicating the high temperature alarm setpoint. The alarm will activate at this temperature and will automatically reset at two degrees Fahrenheit (one degree Celsius) below this temperature. Press the “1 Adjust-up” or “2 Adjust-down” arrow to change the alarm setpoint within a range of 8°F (or 4°C) above the set temperature “HI” set point, to 135°F (or 57°C).

Press the “3 Select” button to continue. The set alarm “LO” LED is *on* with the display indicating the low temperature alarm set point. The alarm will activate at this temperature and will automatically reset at two degrees Fahrenheit (or one degree Celsius) above this temperature. Press the “1 Adjust-up” or “2 Adjust-down” arrow to change the alarm setpoint within a range of 8° F (4°C) below the set temperature “LO” set point to -20°F (or -29°C).

Press the “3 Select” button to continue. The alarm LED will flash and the display will show “ALL”, indicating the “ALL” alarm on/off status. Press “3 Select” and the display will show either “ON” or “OFF”, indicating current alarm status. Press “1 Adjust-up” or “2 Adjust-down” to toggle the mode as desired. If the “OFF” mode is selected, no alarms will activate and the audible on/off select function is skipped.

Press the “3 Select” button to continue. The audible LED will flash and the display will show “AUD”, indicating the audible alarm on/off status. Press “3 Select” and the display shows “ON” or “OFF” indicating the current audible alarm status. Press “1 Adjust-up” or “2 Adjust-down” arrow to toggle the mode desired.

Press the “3 Select” button to continue. The “C” LED flashes and the display shows either “F” for degrees Fahrenheit or “C” for degrees Celsius. Press the “1 Adjust-up” arrow or “2 Adjust-down” arrow to toggle the mode as desired.

Press the “3 Select” button to continue. The code LED is on and the display shows “PIN”. To set a new user PIN code, press the “1 Adjust-up” button. The display will flash “4”, prompting an entry of a four button sequence using the “1 Adjust-up”, “2 Adjust-down”, “3 Select” and/or “4 Exit” buttons. (Any sequence of the four buttons may be programmed as the code.) As the buttons are pressed, the display will show the number of buttons that were pressed.

NOTE: After pressing a button, there will only be 5 seconds to press the next button. If the next button is not pressed within the allotted time, the system will default to no PIN code, indicated by “0” on the display. Once the sequence is entered the display will no longer flash, and will show “4”.

To program the no PIN code mode, press “2 Adjust-down” and the display will show “0”, indicating no PIN code. With no PIN code, pressing any button will permit access to the program.

***** CAUTION *** Always record the selection sequence (PIN code) and store in a secure place.**

Press the “3 Select” button to continue. The filter LED flashes and the display will show “FIL”, indicating the filter alarm days selection. Press the “3 Select” button and the display will show the number of days that the alarm is set in one-half day increments. (Example: 10.5 indicates the alarm will activate every ten and one-half days).

Press the “1 Adjust-up” or the “2 Adjust-down” arrow to vary the desired number of days. Programming 0 days will disable the alarm.

NOTE: The required number of days to set this alarm will be determined by the ambient air conditions. If rain or wash down hoods are installed on the system, no filter is supplied and the filter alarm should be set to “0”. This will disable the filter alarm.

Press the “3 Select” button to continue. *(Making adjustments to this setting is necessary only for installation of the ICENET communication network. Omit this otherwise.)*

The program LED will be lit and the display will show “Add”. This is where the numerical address of the Ice Qube air conditioning system communication network, ICENET, is inputted. Press the “1 Adjust-up” or the “2 Adjust-down” arrow until the desired numerical address is displayed. (Maximum range is 0.5 to 32.0 in 0.5 increments). Please make record of this numerical address and system location in order that it may be entered into the ICENET Unit Description folder on the Options Screen.

Programming of the microprocessor is now complete. Press the “3 Select” button to review all of the settings. Press the “4 Exit” button to enter the selected settings and to return to the normal operating mode.

NOTE: If the “(4) Exit” button is not pressed, any changes to the program settings will not be saved.

ALARM OPERATION:

The enclosure temperature is above or below the alarm setpoint:

The alarm LED will light, the display flashes, either “HI” or “LO” LEDs flash with the display and the audible alarm sounds (if activated). The enclosure temperature must rise or fall two degrees Fahrenheit (one degree Celsius) before the alarm will reset.

The condenser temperature is above the condenser alarm setpoint:

The alarm LED lights, the display flashes the condenser temperature, and the audible alarm sounds (if activated). The condenser temperature must fall four degrees Fahrenheit (two degrees Celsius) before the alarm will reset. The above alarms can be manually reset by entering the PIN code into the system.

1. The filter day timer has expired:

The alarm LED lights, the display flashes showing “FIL”, the filter LED flashes with the display and the audible alarm sounds (if activated). The filter alarm may be cleared by pressing “4 Exit”.

Optional Alarm Output:

Ice Qube also offers an optional alarm output that is provided through an alarm relay. This option is a dry contact (no voltage) set of contacts that may be configured as:

Normally Open	(X01 – close on alarm condition)	Black & White wires
Normally Closed	(X02 – open on alarm condition)	Black & Red wires
Normally Open and Normally Closed	(X03 – close on alarm condition)	Black, White & Red wires.

Sensor Malfunctions:

E-O - Evaporator sensor open

E-C - Evaporator sensor shorted

C-O - Condenser sensor open

C-C - Condenser sensor shorted

NOTE: An alternating E-O ... C-O display may indicate the sensor connector has become disconnected from the rear of the controller.

Incorrect Voltage Supply

A continual flashing value of "3.15" on the display screen indicates the supply voltage is either too high or too low.

21. Low Ambient Heating (2055-SC-LAH)

[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

22. Remote Controller for Active Cooling Unit (2055-SC-IPC)

[This is a factory installed option. Please contact Thureon for more information support@thureon.com]

Section G – Maintenance

23 Replacing Fans

From time to time the *ventilation fans* inside the Armarac enclosure may reach the end of their life-cycle and need to be replaced.

This replacement can be carried out without interrupting the power or equipment operation. The Armarac can continue to provide power to the remaining fans as these fans are powered by 12Volts DC.

Step 1 – Identify the fan which has failed

Unlock and open the upper and lower clamshell doors.

Take note of which fans are not spinning. Or that are spinning more slowly than the rest.



Step 2 – Remove the faulty fan

Disconnect the fan's power feed from the *fan-speed controller PCB* board.

Using a hex Allen key unscrew the four set screws from each corner of the fan body. Keep the fasteners that you remove.



Step 3 – Fit the replacement fan

Position the new fan so that the four mounting holes align with the holes in the *fan mount tray*.

Using a hex Allen key screw the four set screws in to each corner of the fan body.

Reconnect the fan's power feed to the *fan-speed controller PCB* board.



24 Replacing Fan Power Supply (2050-AF models only)

From time to time the *ventilation fan power supply* inside the Armarac enclosure may reach the end of its life-cycle and need to be replaced.

Note this power supply also provides 12V power to the **2055-LCDKB** module if fitted.



Step 1 – Disconnect power input from UPS

Remove the IEC-C8 power cord from the end of the faulty power supply..

Remove the faulty power supply's output 2.5mm DC plug from the fan-speed controller board.

Step 2 – Remove the faulty Power Supply

Remove the Velcro straps from the faulty power supply. Retain the Velcro to re-install the replacement power supply.

Dispose of the faulty power supply in an appropriate manner and in accordance with local legislation and regulations.



Step 3 – Fit the replacement Power Supply and Reconnect

Install the new power supply in the same place and orientation on the fan mount tray. Secure with Velcro straps.

Reconnect the output cable of the power supply in to the 2.5mm DC socket of the fan-speed controller board.

Reconnect the IEC-C8 power cable from the UPS.



All upper and lower fans should now be functioning. If fitted the 2055-LCDKB screen will now be active.

25 Active Cooling Unit2050-SC Maintenance

The Ice Qube air conditioning system is designed to provide many years of trouble-free operation with minimal amount of maintenance. Primary maintenance consists of checking the condition of the ambient air filter and the condensate management system.

1. **Ambient Air Filter:** It is recommended that the ambient air filter be inspected and cleaned regularly, at least every 30 days, or more frequently depending upon ambient conditions. To check the condition of the air filter, it is recommended to first remove electrical power from the Ice Qube system. Next, locate the filter cover and filter, (location will vary by model). Slide the filter from the filter rack through the end slot and clean by soaking in warm soapy water. Rinse with clean water. Use a shop-vac to remove excess water from the filter before returning it to the system. Replace the filter if it is showing signs of deterioration.

NOTE: If rain or wash down hoods have been installed, a filter would not have been supplied, therefore no filter maintenance is required. However systems equipped with rain or wash down hoods will require regular condensing section maintenance by qualified personnel. For systems equipped with filters, it is recommended to have a spare clean filter in stock in order to prevent prolonged cooling system downtime. The dirty filter may be cleaned at a more convenient time.

2. **Condensate Management System:** The condensate management system should be checked periodically for scale, sludge and debris that may cause the system to fail. On open type enclosures and in areas where the enclosure door is opened frequently within dirty or industrial environments, maintenance should be performed on a regular basis. On sealed enclosures, clean environments, or where the door is not opened frequently, maintenance may be performed annually. *The type of environment will determine the frequency of required maintenance.*

Maintenance of the condensate management system will require removal of electrical power from the Ice Qube system and removal of the cover. To remove the cover, use a screw driver to loosen the screws which attach the cover to the base.

***** CAUTION *** Electrical wires are connected from the cover to the base.**

Removing the cover will allow access to the primary condensate management pan, which is located below the evaporator. Inspect the condensate pan and the drain nipple for signs of scale, sludge or debris that may prevent water flow through the nipple. To clean the debris from the pan, use a clean absorbent cloth or shop-vac. Nipples may be cleaned using a ¼ inch tubing brush, then flush with clean water.

Also inspect the neoprene tubing that is attached to the nipples on the condensate management system. Replace the tubing if it appears to have internal build-up or has become brittle.

NOTE: If there is a secondary condensate management pan, maintenance will need to be performed in the same manner as explained above.

After all debris has been removed from the system, replace the cover onto the unit – being careful not to pinch or damage the wiring connecting the cover to the base.

3. **Cooling system cabinet:** The cooling system cabinet may also need to be cleaned occasionally. To clean the system cabinet, simply wipe it with a damp, lint free cloth. A mild soap solution may be used if necessary.