

Split Tri-Capacity

Installation and Commissioning Guide



OUTDOOR UNITS

CAY500T
CAY620T
CAY700T



INDOOR UNITS STANDARD PROFILE

EVY500T
EVY620T
EVY700T



INDOOR UNITS LOW PROFILE

ELY500T
ELY620T
ELY700T

IMPORTANT NOTE:

Please read this manual carefully before installing or operating your air conditioning unit.

That's better. That's Actron.



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01. INTRODUCTION

01.01. Product Inspections

Check your air conditioning unit and all items against the invoice upon receiving your shipment. Inspect the unit, components and accessories for any sign of damage. If there is any damage to the unit, contact ActronAir Customer Care Department immediately on: **1300 522 722** to obtain a Return Material Authorisation (RMA).

Check the unit nameplate to verify the model, serial number, electrical rated specifications are correct.

01.02. Codes, Regulations and Standards

The installer and/or contractor assumes responsibility to ensure that unit installation complies with the relevant council, state / federal codes, regulations and building code standards. All electrical wiring must be in accordance with current electrical authority regulations and all wiring connections to be as per electrical diagram provided with the unit.

02. GENERAL INFORMATION

The ActronAir Ducted air conditioning units are designed for applications where superior performance, high efficiency, reliability, supply air quality and quiet operation are the prime priorities. The units are built with the latest technology, EC indoor fans, low-noise outdoor fans and an intelligent electronic control.

For optimum efficiency, your air conditioning unit will deliver just the right amount of cooling or heating capacity you demand. Even in extreme conditions, the unit will still supply the required demand at peak performance.

Energy Efficient Refrigeration Circuits

The ActronAir Ducted system is designed with a variable capacity refrigeration circuit that delivers only the amount of cooling or heating actually required to maintain your desired comfort at the most optimum efficiency.

The refrigeration circuit consists of:

- High efficiency scroll compressors
- Hydrophilic coated condenser coil designed for optimum performance and efficiency with corrugated fins and ruffled tubing
- Hydrophilic coated evaporator coil designed for optimum performance and efficiency with lanced fins and ruffled tubing
- Thermal expansion valve (TXV), to maintain efficiency at different operating conditions

Evaporator Section

The evaporator section has EC fans which deliver just the right amount of airflow, depending on requirements. The fans provide superior performance for your comfort at optimum efficiency:

- Highly efficient variable speed EC motor that uses less energy than the traditional AC motor.
- Capable of high external static pressure application (up to 500 Pa)
- Easy indoor fan commissioning via control interface
- Low noise operation

Condenser Section

- Scroll compressor
- Efficient axial fans with direct drive AC motor
- Low noise operation

Electrical Section

The electrical section consists of:

- EMC filters
- Switchgears
- 3 Phase motor protection
- 7 Segment Display menu and fault code
- Adjustable indoor airflow pot
- Optional soft start, BMS card, ActronAir Group Control

Durable Design and Construction

ActronAir is an Australian manufacturer with proven high quality air conditioning products. Known for their durability and reliable performance, these products are designed and built to withstand the extreme weather conditions.

The heavy gauge galvanised steel cabinet, with powder coated Hydrophilic coated finish, resists the toughest conditions. The louvered outdoor coil guard protects the condenser coil from any potential damage brought by hail, stones and other solid objects that may be projected to the unit.

Hydrophilic coated condenser coil fins provide protection to your heat exchangers and enhanced heat transfer with increased performance efficiency.

System Flexibility

ActronAir units are the first choice for office, schools and other air conditioning facilities applications, both for new construction or retrofitting projects.

Sustainability and Environmentally Friendly

The air conditioning system is supplied with zero ozone depleting R-410A refrigerant, which has no phase out or replacement concern.

With cooling and heating performance capacity that are among the best in the market, the ActronAir units are the solution for the reduction of energy consumption, CO₂ emission, high fuel dependency and high network grid demand.

Refrigerant Handling and Accountability

ActronAir strongly urges that all service technicians make every effort possible to reduce the emission of refrigerants to the atmosphere. Everyone must act in a responsible manner to conserve refrigerants in accordance to the industry code of practice.

03. SAFETY PRECAUTION

- Only licensed HVAC technicians* should install and service this air conditioning equipment. Improper service or alteration by an unqualified technician could result in significant and major damage to the product or property which may render your warranty null and void. Such unqualified service could also lead to severe physical injury or death. Follow all safety instructions in this literature and all warning labels that are attached to the equipment.
- Prevailing WH&S regulations must be observed and will take precedence to the safety instructions contained on this manual. Safe work practices and environment must be the paramount importance in the performance of all the service procedures.
- Ensure that unit installation complies with relevant council regulations and building code standards.
- All electrical wiring must be in accordance with current electrical authority regulations and all wiring connections to be as per electrical diagram provided.
- Secure the fans against accidental contact. Beware of pinch point and sharp edges which can cause cutting injury.
- Always wear appropriate PPE, remove any dangling jewellery and protect long hair by wearing a cap.
- Make sure that safety guards and panel covers are always firmly secured and not damaged.
- This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely. Young children should be supervised to ensure that they do not play with the appliance.
- Installer must incorporate a means of electrical disconnection (isolator) in the sub mains fixed wiring in accordance with the latest edition of the AS/NZS 3000 (also known as Australian Wiring Rules).
- Secure the power cords and control cables that goes in/out the unit. Use the cable ties provided in the control box.
- This unit is fitted with Indoor EC Motors with high power capacitors, which can have dangerous voltages at terminals for up to 5 minutes after main power has been isolated. Wait at least 5 minutes after power isolation and test for high voltage before performing service work.
- EC Plug Fan fitted to this unit has dual power supplies, i.e. 400V/3Ph/50Hz motor power supply plus 10VDC control power supply. Care must be taken to ensure both are safely isolated to prevent personal injury and damage to the equipment.
- This unit is designed for use with R-410A refrigerant only.

*Qualifications required will be appropriate Electrical, Refrigeration and Refrigerant Handling License and Training, dependent on local State/Territory regulations.

DANGER

Hazardous Voltage - Risk of Electrocution.

TURN-OFF the power from main isolator before proceeding with any service work of the unit. Observe proper LOCK-OUT/TAG-OUT (LOTO) procedures for electrical appliances in order to prevent accidental switching-on of the power supply.

WARNING

EC Motors are fitted with high power capacitors and can have dangerous residual voltages at motor terminals after power has been isolated. Wait at least 5 minutes after power isolation and test for any residual voltage before beginning service work.

CAUTION

Beware of Rotating Fans!

Ensure that indoor and outdoor fans are isolated and have come to a complete stand still before servicing the equipment. Beware of pinch point and sharp edges which can cause cutting injury. Secure the fans against accidental contact. Always wear appropriate PPE and remove any dangling jewellery and protect long hair by wearing a cap. Ensure that no loose clothing can be caught / entangled in moving parts.

VISUAL INSPECTION and WORK ASSESSMENT

Work areas and conditions must first be assessed and evaluated for any potential hazardous conditions. It is also important to be familiar with the unit parts and components before proceeding with any service task.

04. INSTALLATION INFORMATION

All service technicians handling refrigerant must be licensed to handle refrigerant gases.

Recover and Recycle Refrigerants

Never release refrigerant to the atmosphere! It is an offence in Australia to do so. Always recover, recycle and reuse refrigerants. When removing from the system, properly contain and identify refrigerants in its dedicated container for proper disposal and/or storage. Always consider the recycle or reclaim requirements of the refrigerant before beginning the recovery procedures. Obtain a chemical analysis of the refrigerant if necessary. Refer recovered refrigerant and acceptable refrigerant quality to existing standards and regulations.

Refrigerant Handling and Safety

Consult the refrigerant manufacturer's Material Safety Data Sheet (MSDS) for information on proper handling and to fully understand health, safety, storage and disposal requirements. Use the approved containment vessels and refer to appropriate safety standards. Comply with all applicable transportation standards when shipping refrigerant containers.

Service Equipment and Recovery Procedures

Always use refrigerant reclaiming equipment in order to minimise refrigerant emissions. Use equipment and methods which will pull the lowest possible system vacuum while recovering and condensing refrigerant. Equipment capable of pulling a vacuum of less than 500 microns is required.

Do not open the system to the atmosphere for service work until refrigerant is fully removed and/or recovered. Perform refrigeration system evacuation, prior to charging, in accordance with AIRAH / IRHACE Refrigerant handling code of practice.

Let the unit stand for 1 hour and with the vacuum not rising above 500 microns. A rise above 500 microns indicates a leak from the system and a leak test is required to locate and repair any leak.

CAUTION

A leak test is always required on any repaired section of the refrigeration system.

Charge refrigerant into the system only after the equipment does not leak or contain moisture. Ensure that R-410A is only charged in liquid form. Take into consideration the correct amount of refrigerant charge specified for the system to ensure efficient unit operations. When charging is complete, reclaim refrigerant from charging lines into an approved refrigerant container. Seal all used refrigerant containers with approved closure devices to prevent unused refrigerant from escaping to the atmosphere. Take extra care to maintain all service equipment directly supporting refrigerant service work such as gauges, hoses, vacuum pumps and recycling equipment.

INSTALLATION PREPARATION (Pre-Installation considerations)

The following items must be considered before beginning the unit installation:

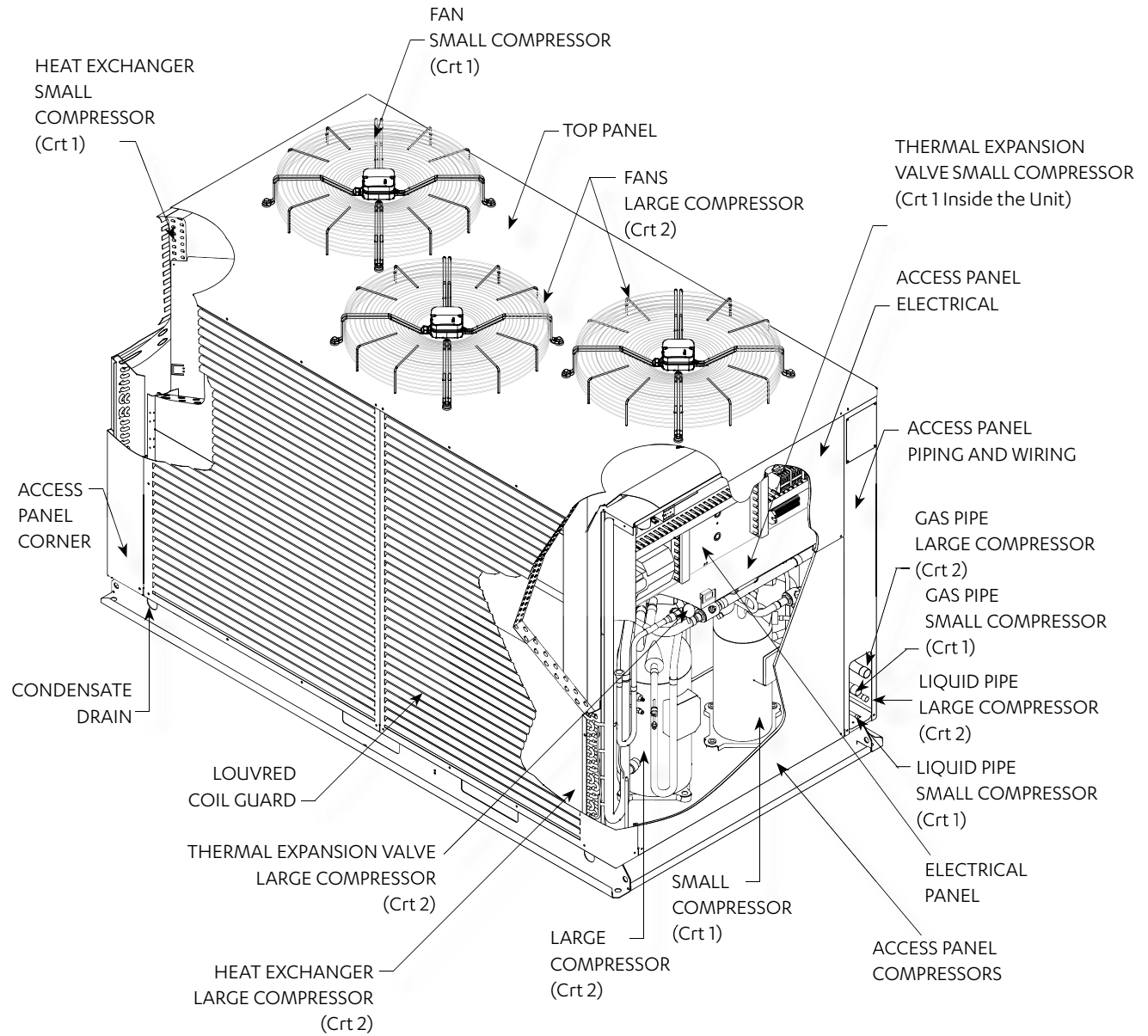
- Verify the unit capacities and ratings with the unit nameplate
- Make certain the floor or foundation is level, solid and have sufficient structural strength to support the unit and accessories weight.
- Allow minimum recommended clearances for periodic maintenance and service access.
- Allow sufficient space above the unit for the outdoor air discharge. Condenser air inlet, located on the coil side of the unit, requires sufficient airflow clearance for the optimum unit performance.
- Note the conditioned supply air and return air location. Ensure sufficient spaces are allocated for these purposes.
- Refer connection and location of condensate drain in the unit drawing and dimensions section of this manual.
- Wiring connections must be in accordance with the wiring diagram provided with the unit.
- Make sure all wirings are in accordance with local electricity authority regulations and standards.
- Do not install the unit close to an area where there is a danger of fire due to volatile, explosive, flammable and/or hazardous materials.
- Ensure that spaces around the unit are free from any obstructions for optimum unit performance.
- Installer to ensure correct size/type that main circuit breaker and cable is installed in unit sub-mains to protect the sub-mains and unit wiring.
- Installer to ensure correctly rated residual current device (RCD) is installed as per with the latest edition of the AS/NZS 3000 (also known as Australian Wiring Rules).
- Secure the power cords and control cables that goes in/out the unit. Use the cable ties provided in the control box.

05. UNIT MOUNTING AND LOCATION

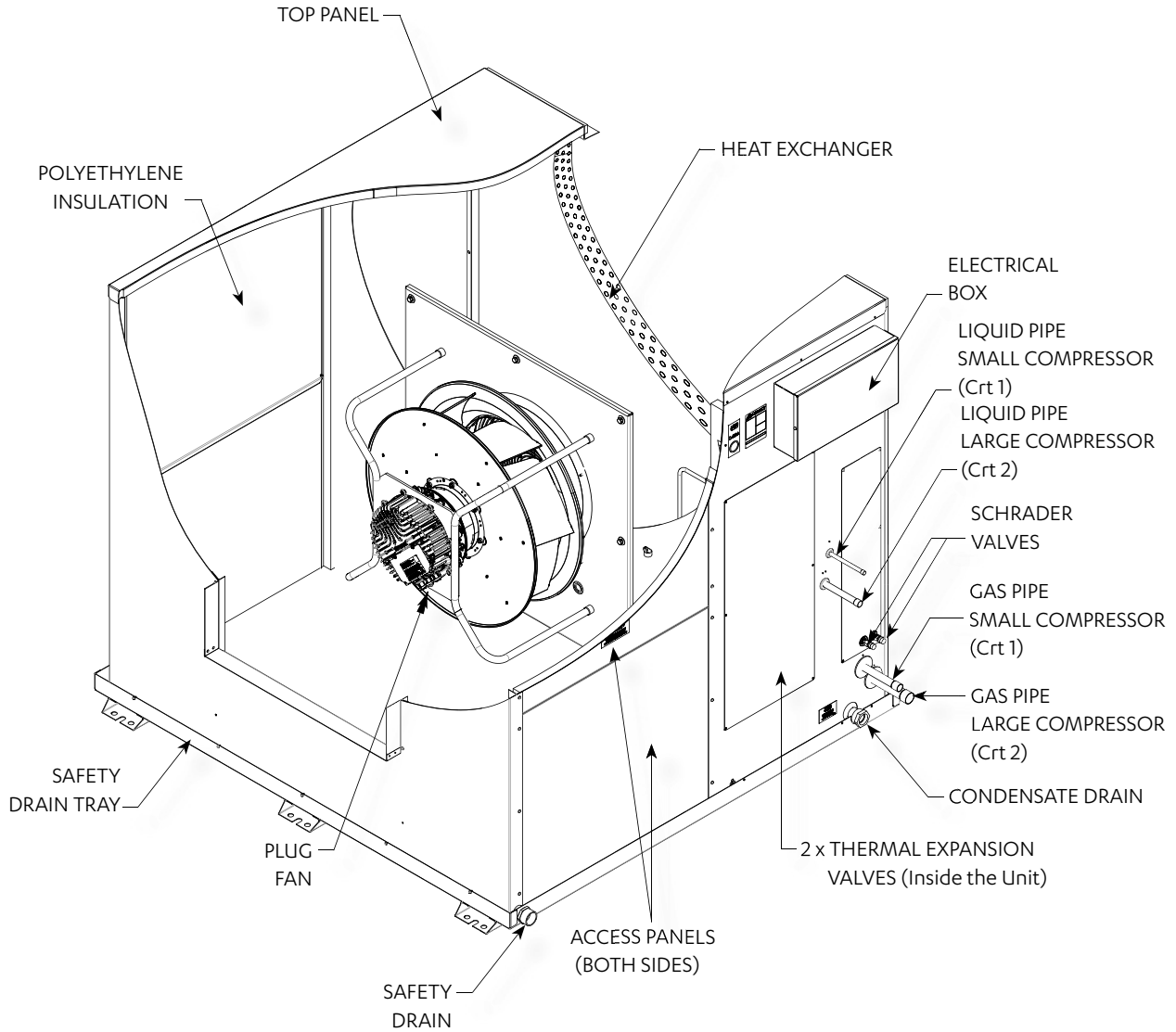
1. The units must be installed in accordance with relevant authority regulations.
2. Install the unit on a level and strong foundation.
3. Install anti-vibration rubber or isolation mounts (installer to supply) under **all of the unit's feet** to help reduce noise and minimize vibration transfer through the foundation. Ensure that all anti-vibration rubbers are rated to provide stable support without impairing the unit's structural integrity.
4. Diameter or width of anti-vibration rubber's must be at least equal to the width of the actual feet to prevent deformation overtime.
5. Level the unit to ensure good condensate drainage away from the unit.
6. Ample service access areas and minimum space allowance for airflow must be provided.
7. Avoid installing the unit in such a place where there is danger of fire due to leakage of inflammable fluid.
8. Ensure that the spaces around the unit are free from any obstructions for optimum unit performance.

06. COMPONENTS OVERVIEW

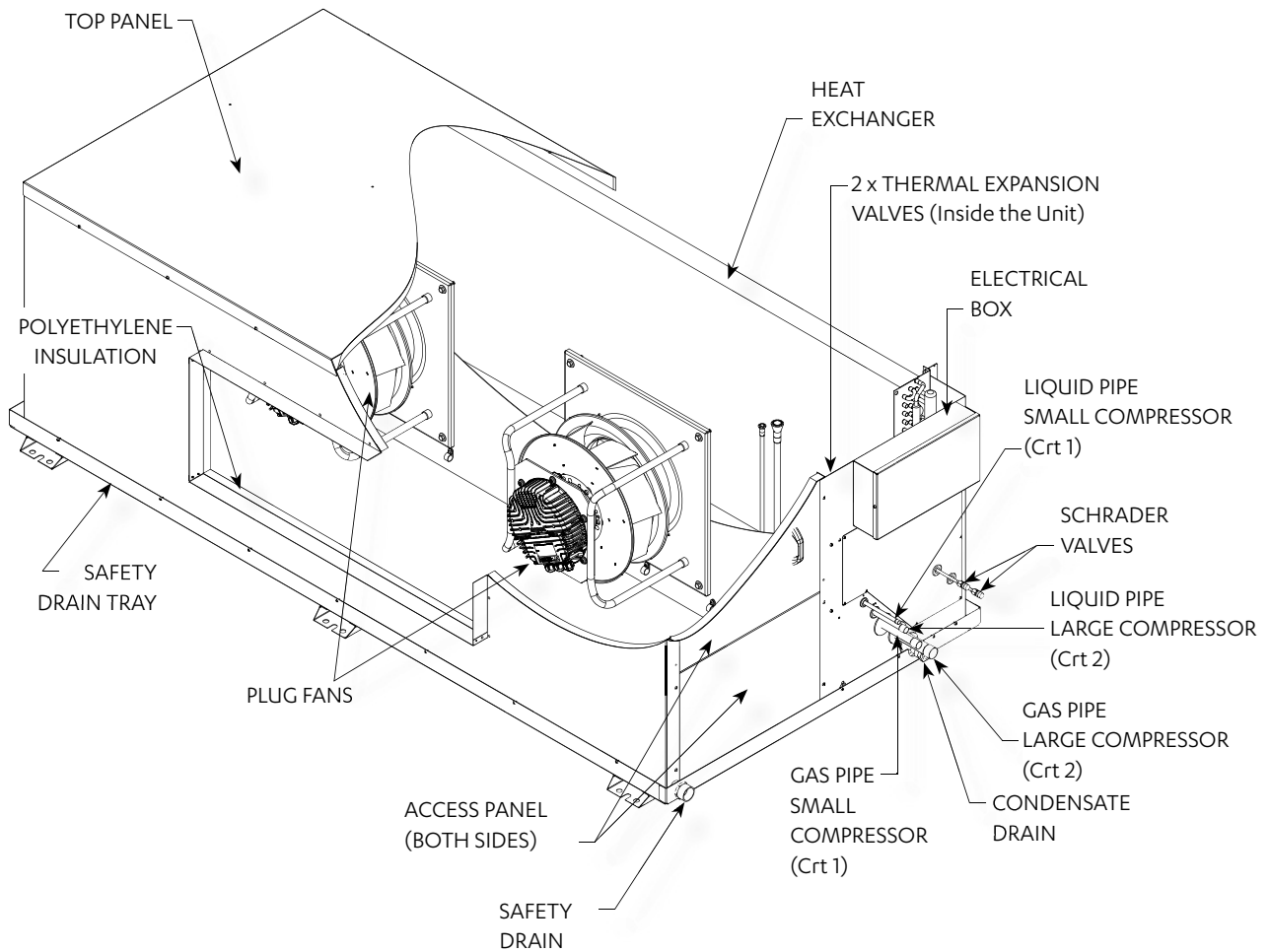
06.01. Outdoor Unit



06.02. Indoor Unit - Standard Profile

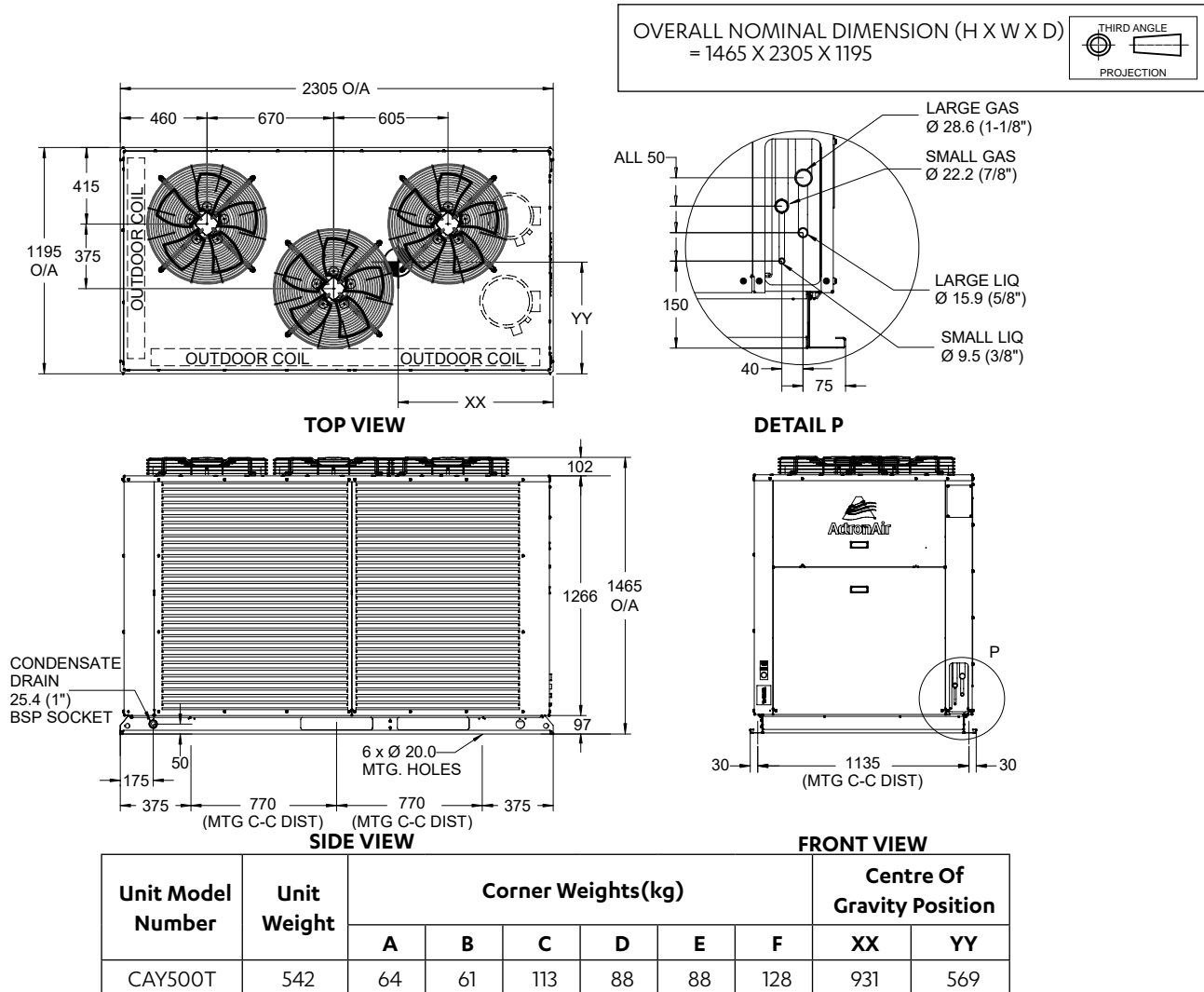


06.03. Indoor Unit - Low Profile

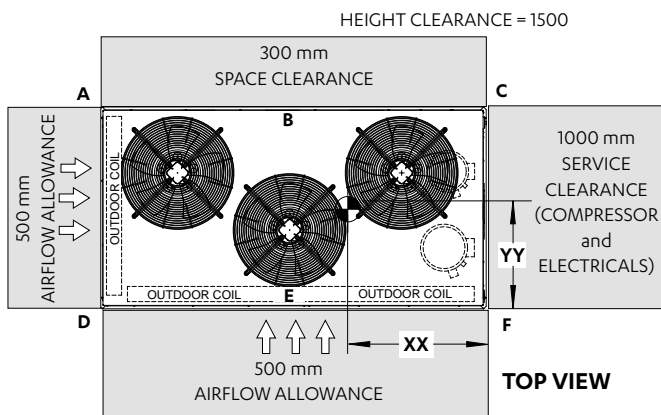


07. OUTDOOR DIMENSIONS

07.01. CAY500T Unit Dimension



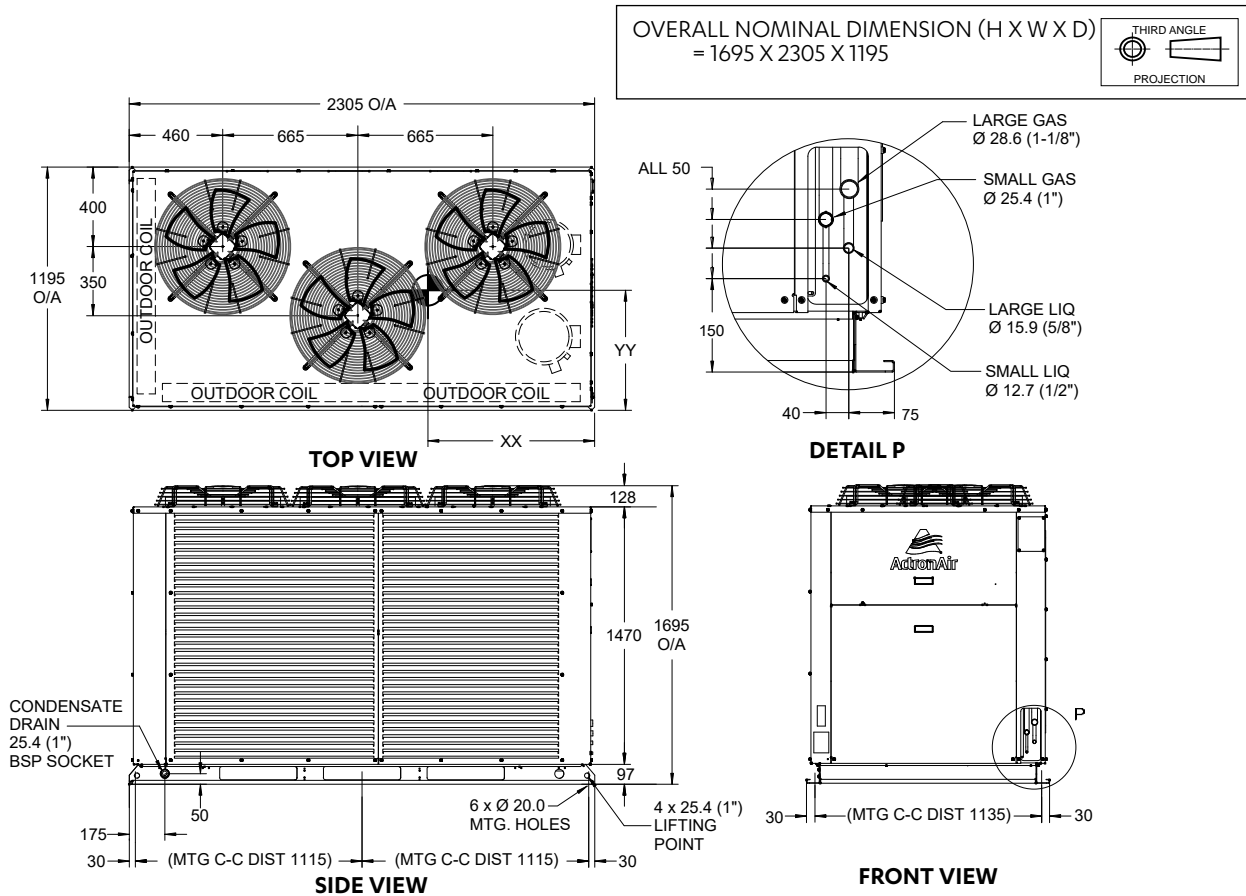
SERVICE ACCESS AREAS



NOTES:

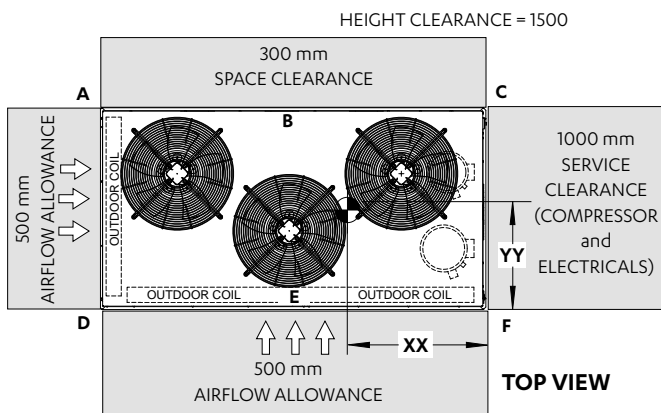
- Do not scale drawing. All dimensions are in mm unless specified. Refer to corresponding unit dimensional drawing for mounting hole details.
- Service Access Areas and Spaces for Airflow Clearances given are suggested minimum based on the condition that the spaces around the units are free from any obstructions and a walkway passage of 1000mm between the units or between the unit and the outside perimeter is available.
- Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.
- Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
- Maximum External Static of Outdoor Fans is 20 Pa.
- STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
- Refer to Pipe Connection Details on Specifications Sheet.
- MTG C-C DIST = Mounting Centre to Centre Distance.
- Use M12 bolt for feet mounting.

07.02. CAY620T - CAY700T Unit Dimension



Unit Model Number	Unit Weight	Corner Weights(kg)						Centre Of Gravity Position	
		A	B	C	D	E	F	XX	YY
CAY620T	577	68	65	121	93	93	137	931	569
CAY700T	604	71	68	126	98	98	143	931	569

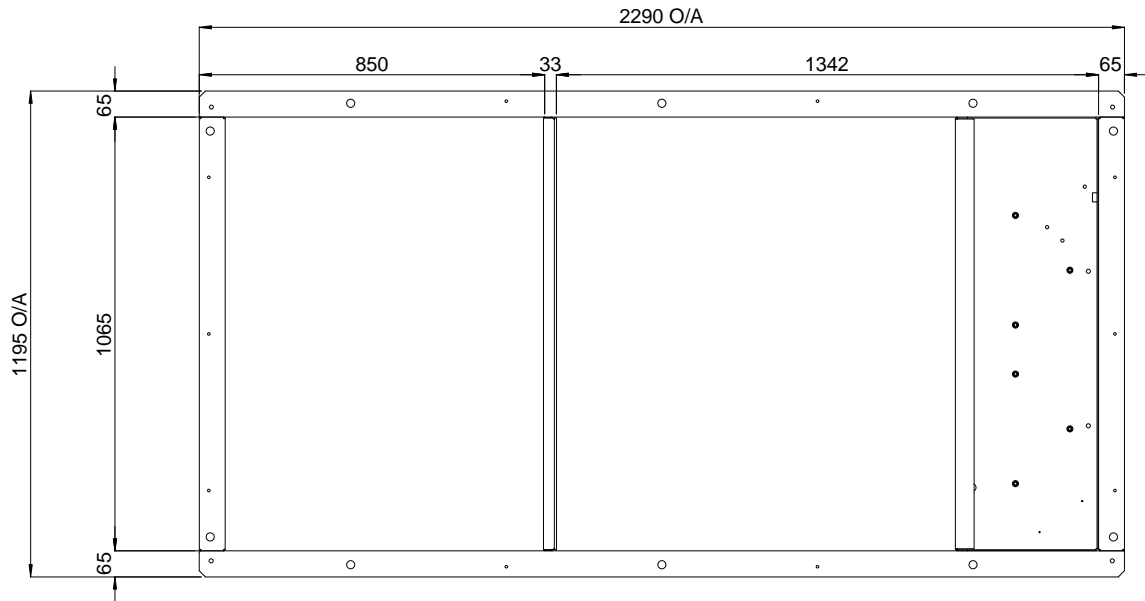
SERVICE ACCESS AREAS



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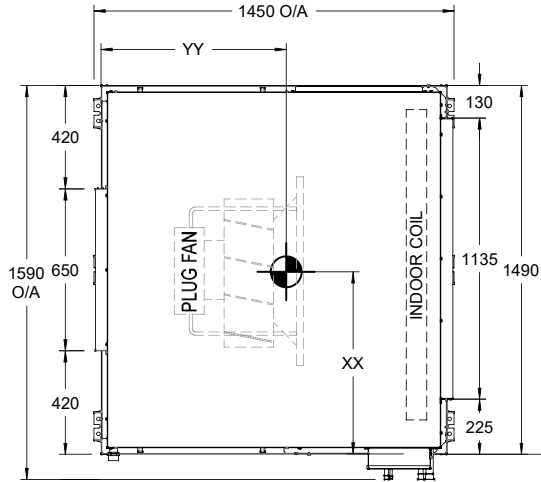
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- Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.
- Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
- Maximum External Static of Outdoor Fans is 20 Pa.
- STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
- Refer to Pipe Connection Details on Specifications Sheet.
- MTG C-C DIST = Mounting Centre to Centre Distance.
- Use M12 bolt for feet mounting.

07.03. Outdoor Base Dimension
CAY500T/CAY620T/CAY700T



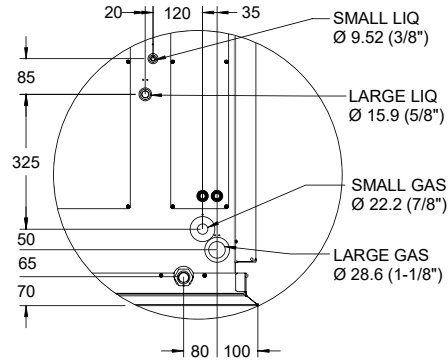
08. INDOOR DIMENSIONS

08.01. EVY500T Unit Dimension

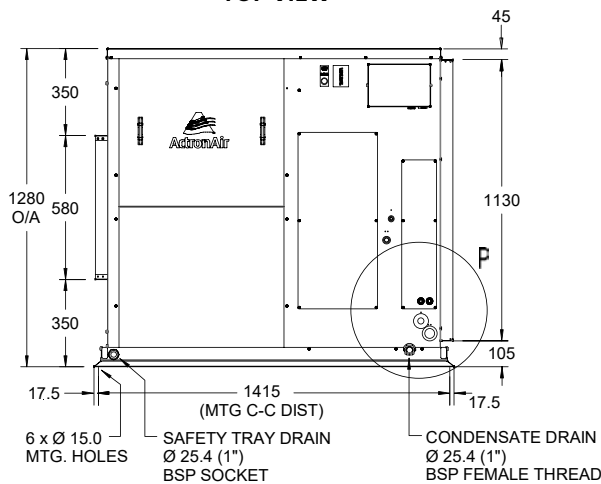


TOP VIEW

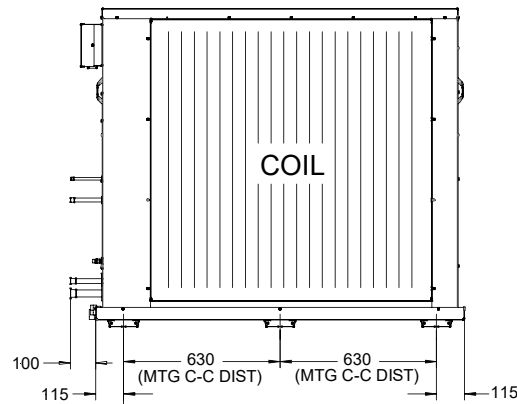
DIMENSION (H X W X D) = 1280 X 1590 X 1450
 SUPPLY DUCT (H X W) = 580 X 650
 RETURN DUCT = 1130 X 1135
 USE M12 BOLT FOR FEET MOUNTING



DETAIL P



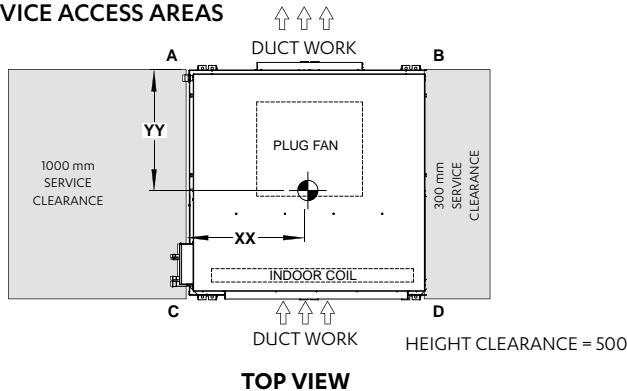
FRONT VIEW



SIDE VIEW

Unit Model Number	Unit Weight	Corner Weights(kg)				Centre Of Gravity Position	
		A	B	C	D	XX	YY
EVY500T	298	68	68	81	81	730	771

SERVICE ACCESS AREAS

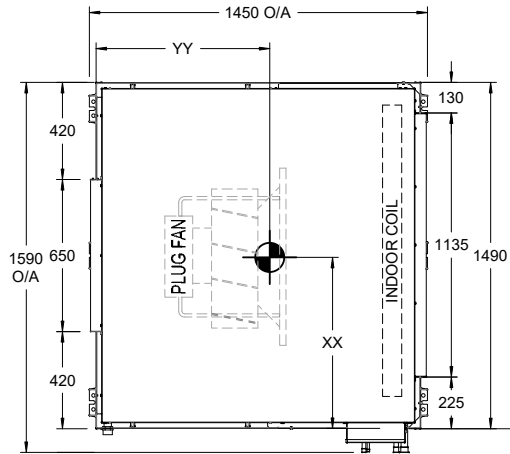


TOP VIEW

NOTES:

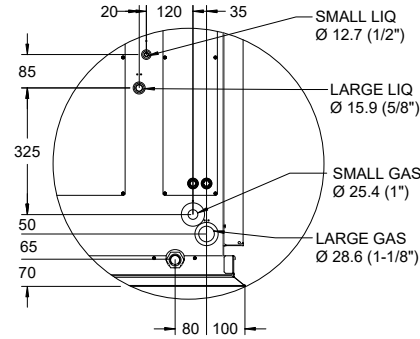
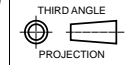
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3. Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.

08.02. EVY620T - EVY700T Unit Dimension

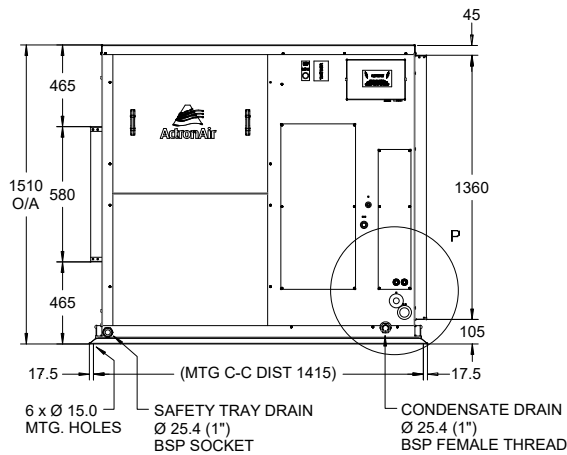


TOP VIEW

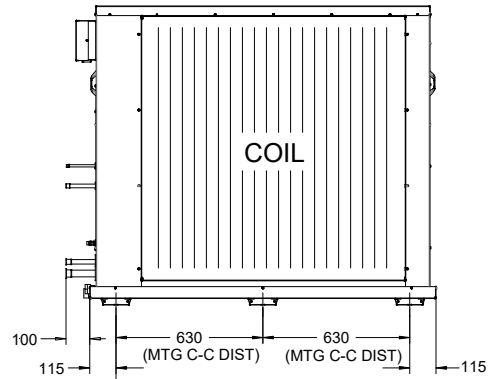
DIMENSION (H X W X D) = 1510 X 1590 X 1450
 SUPPLY DUCT (H X W) = 580 X 650
 RETURN DUCT = 1360 X 1135
 USE M12 BOLT FOR FEET MOUNTING



DETAIL P



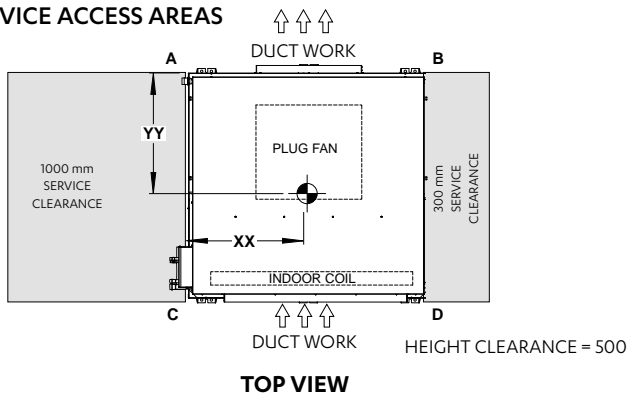
FRONT VIEW



SIDE VIEW

Unit Model Number	Unit Weight	Corner Weights(kg)				Centre Of Gravity Position	
		A	B	C	D	XX	YY
EVY620T / EVY700T	340	79	79	91	91	730	771

SERVICE ACCESS AREAS

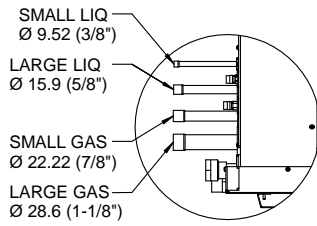


TOP VIEW

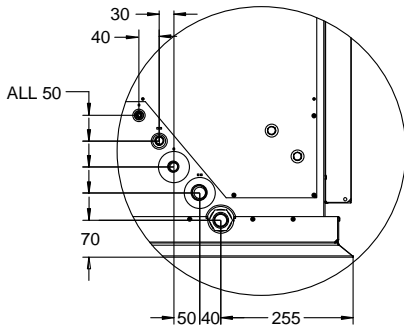
NOTES:

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2. Service Access Areas and Spaces for Airflow Clearances given are suggested minimum based on the condition that the spaces around the units are free from any obstructions and a walkway passage of 1000mm between the units or between the unit and the outside perimeter is available.
3. Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.

08.03. ELY500T Unit Dimension

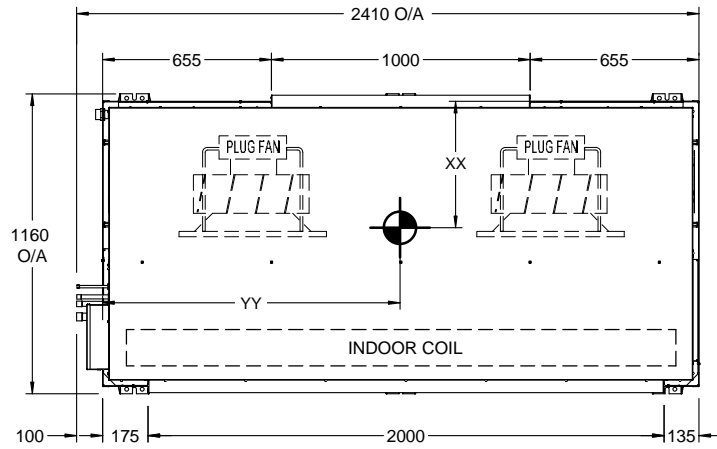
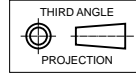


DETAIL T

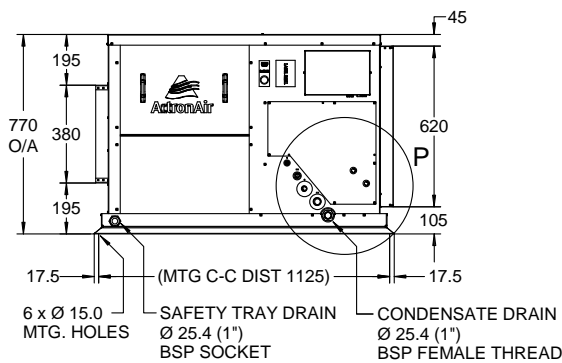


DETAIL P

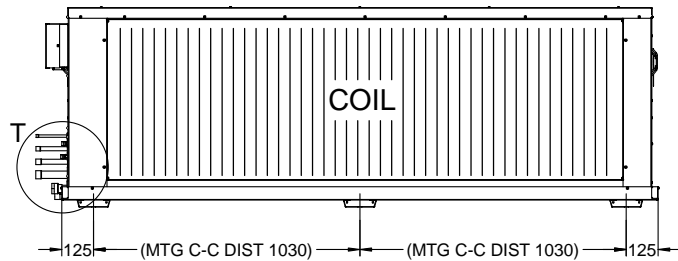
DIMENSION (H X W X D) = 770 X 2410 X 1160
 SUPPLY DUCT (H X W) = 380 X 1000
 RETURN DUCT = 745 X 2000
 USE M12 BOLT FOR FEET MOUNTING



TOP VIEW



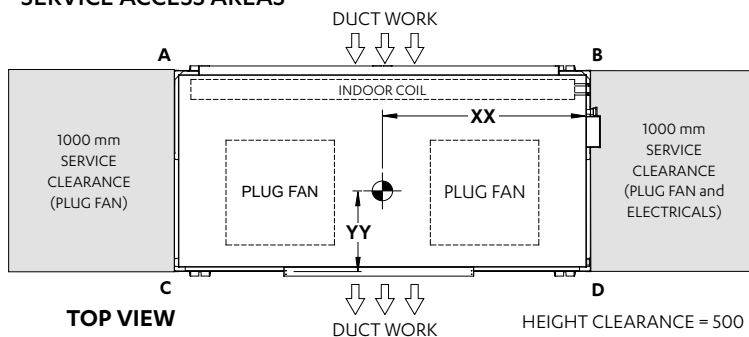
FRONT VIEW



SIDE VIEW

Unit Model Number	Unit Weight	Corner Weights(kg)				Centre Of Gravity Position	
		A	B	C	D	XX	YY
ELY500T	239	68	71	49	51	1130	462

SERVICE ACCESS AREAS

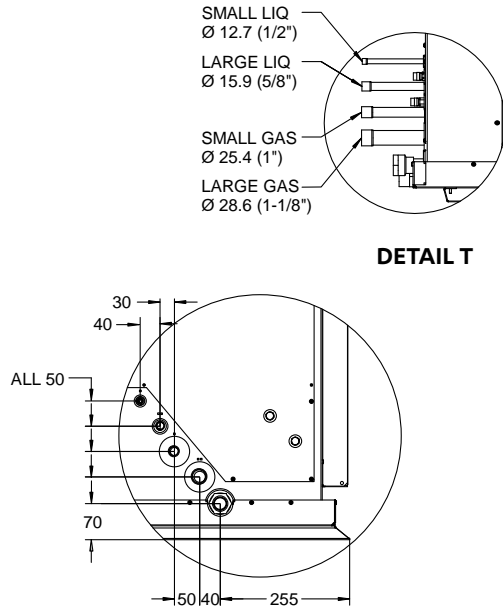


TOP VIEW

NOTES:

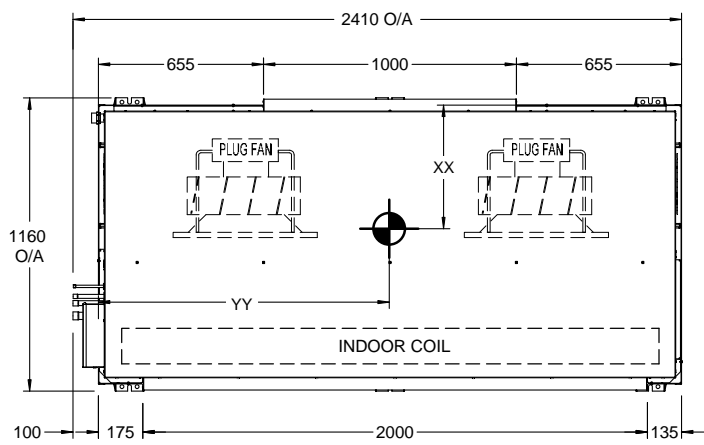
1. Do not scale drawing. All dimensions are in mm unless specified. Refer to corresponding unit dimensional drawing for mounting hole details.
2. Service Access Areas and Spaces for Airflow Clearances given are suggested minimum based on the condition that the spaces around the units are free from any obstructions and a walkway passage of 1000mm between the units or between the unit and the outside perimeter is available.
3. Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.

08.04. ELY620T - ELY700T Unit Dimension

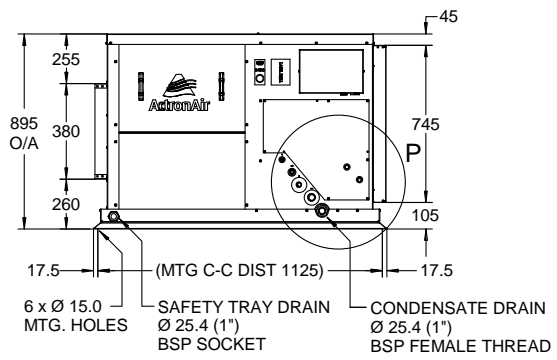


DIMENSION (H X W X D) = 895 X 2410 X 1160
 SUPPLY DUCT (H X W) = 380 X 1000
 RETURN DUCT = 745 X 2000
 USE M12 BOLT FOR FEET MOUNTING

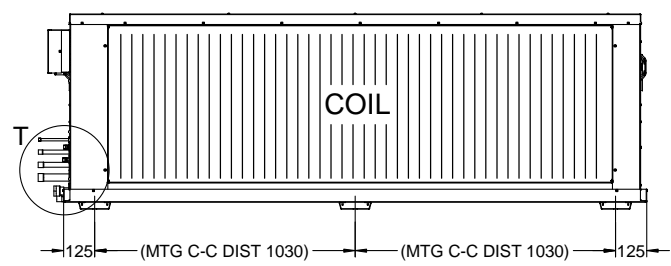
THIRD ANGLE PROJECTION



TOP VIEW



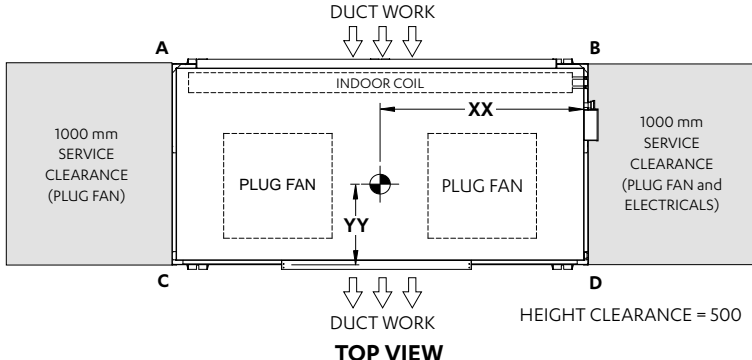
FRONT VIEW



SIDE VIEW

Unit Model Number	Unit Weight	Corner Weights(kg)				Centre Of Gravity Position	
		A	B	C	D	XX	YY
ELY620T / ELY700T	274	78	81	56	59	1130	463

SERVICE ACCESS AREAS



TOP VIEW

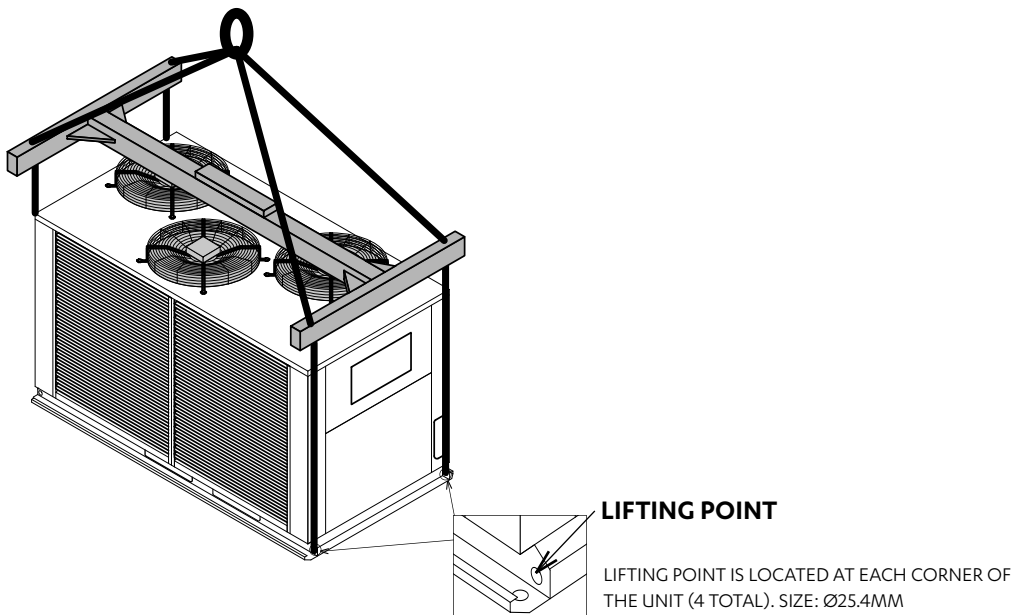
- NOTES:**
- Do not scale drawing. All dimensions are in mm unless specified. Refer to corresponding unit dimensional drawing for mounting hole details.
 - Service Access Areas and Spaces for Airflow Clearances given are suggested minimum based on the condition that the spaces around the units are free from any obstructions and a walkway passage of 1000mm between the units or between the unit and the outside perimeter is available.
 - Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.

09. UNIT LIFTING PROCEDURE

09.01. Crane Lifting Method

NOTE

Crane lifting is recommended over fork lift method.



CAUTION

WH&S regulations must be observed and will take precedent during lifting process.

Equipment required for crane lifting:

- 4 x shackles
- 2 x nylon slings
- Spreader bar

NOTE

Refer to catalogue for unit weight before selecting shackles.

Procedure:

1. Remove all screws and washers that secure the unit to the timber pallet.
2. Use 4 x Bow or Dee shackles to connect the lifting holes.
3. Slip nylon slings through all shackles.
4. Ensure slings are protected by rubber pads or similar, if slings are draped across unit edges and corners. This will prevent the unit from being damaged during lifting.
5. SPREADER BAR must be used when lifting the unit.

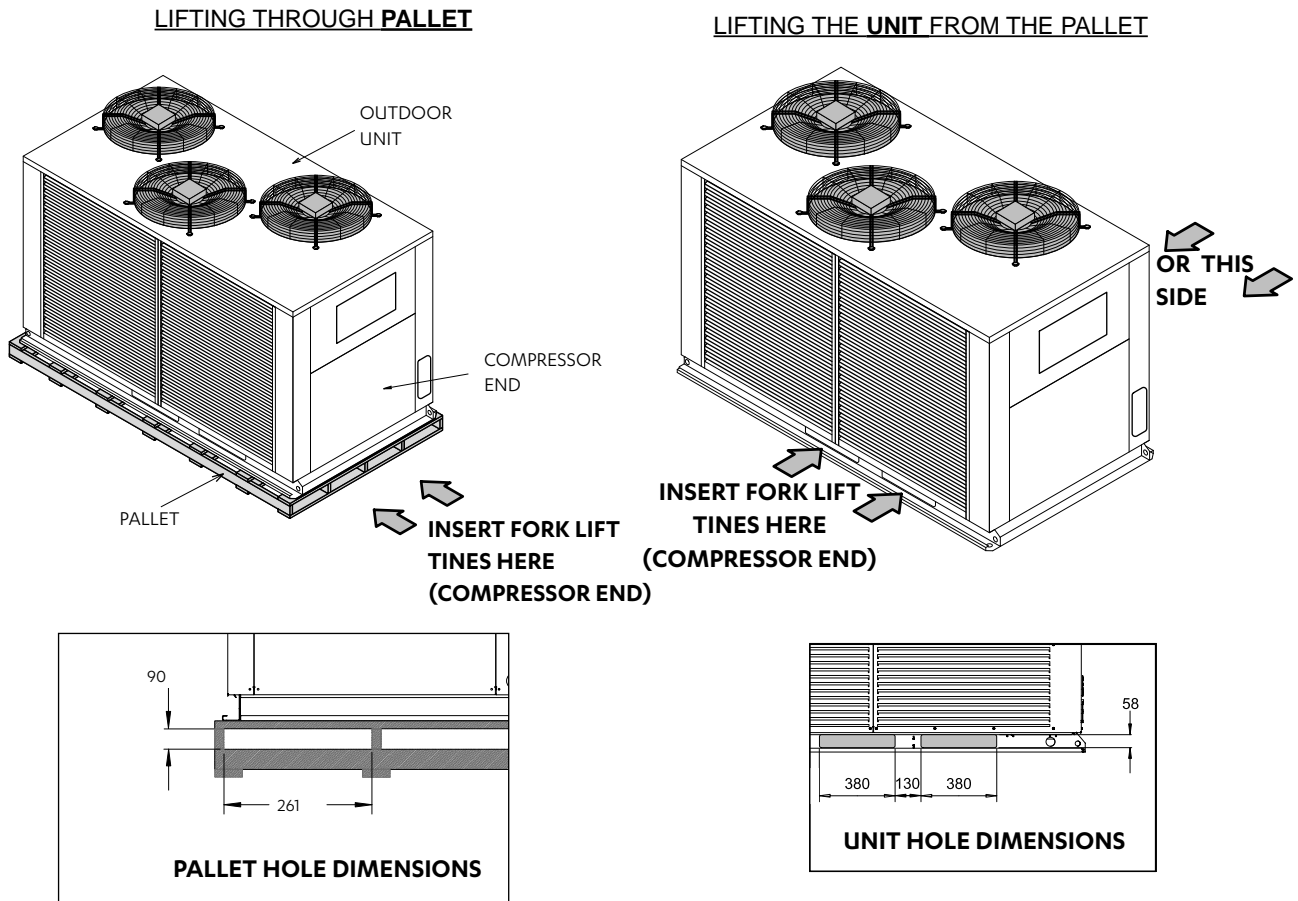
09.02. Fork Lift Method

Procedure:

1. To move the unit around with the pallet, it is required to insert the fork through the pallet (not the unit feet).
2. Only fork the unit through compressor end (see illustration for location of compressor end).

NOTE

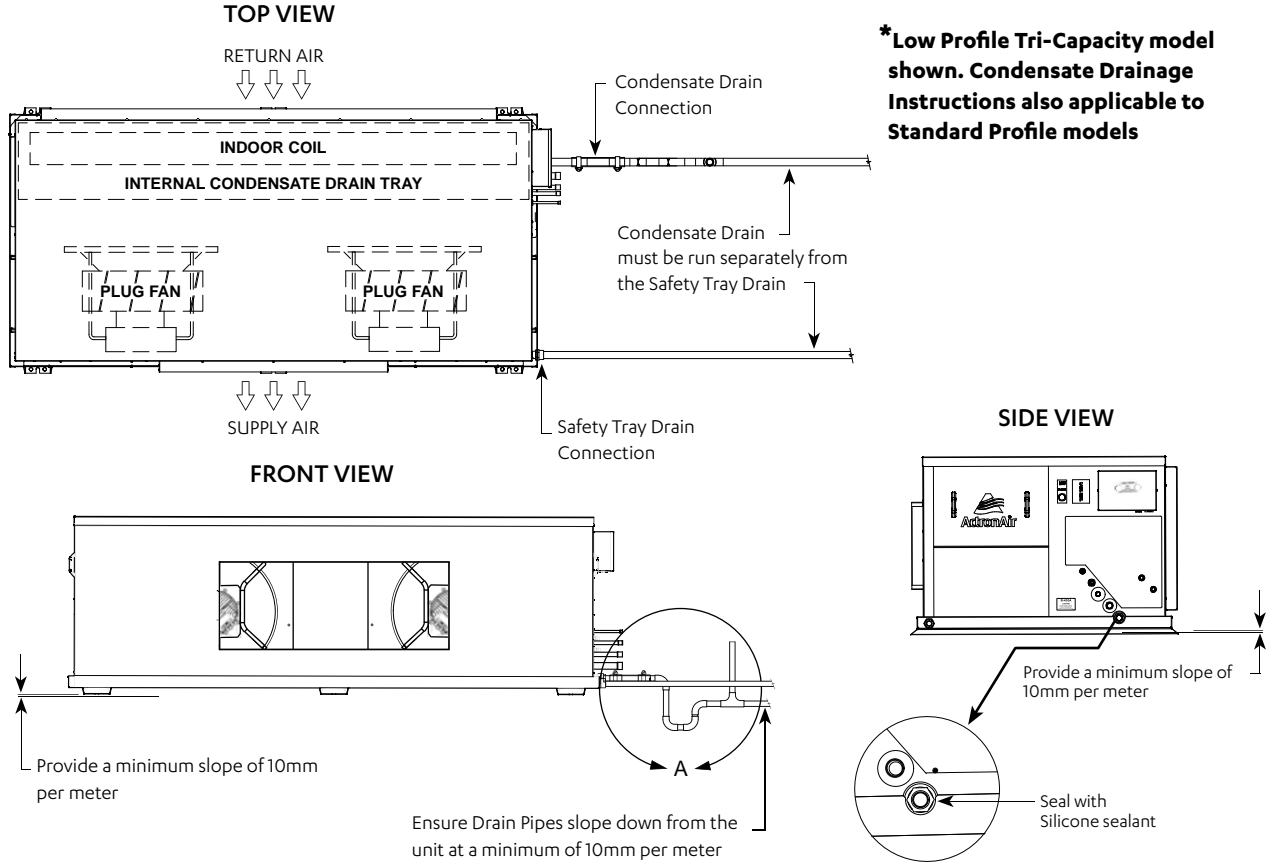
Ensure that the screws and washers are only removed when it is required to disassemble the unit from the pallet.



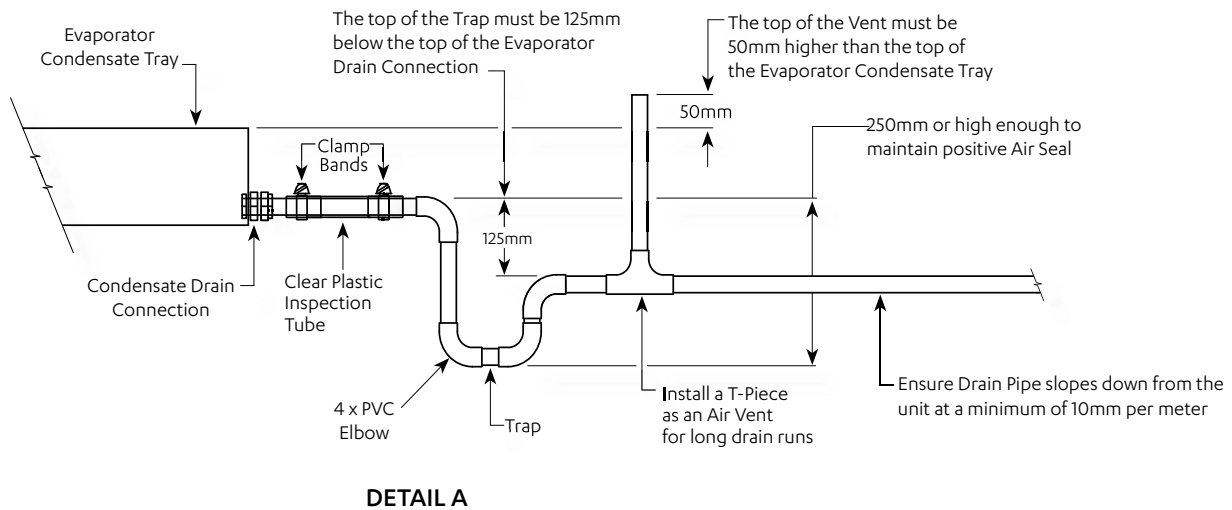
ALL DIMENSIONS IN MM.

10. CONDENSATE AND SAFETY TRAY DRAINAGE INSTRUCTIONS

Suggested Minimum Slope to Ensure Correct Drainage



Suggested Drain Trap Details

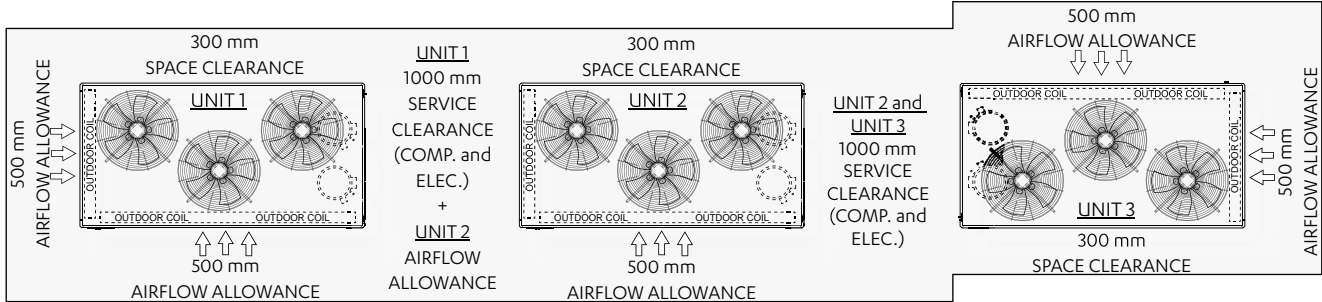


NOTES

- Parts for the Condensate Trap are not supplied with the unit.
- Refer to Unit Dimensions page of the Technical Selection Catalogue For specifications of drain connectors.

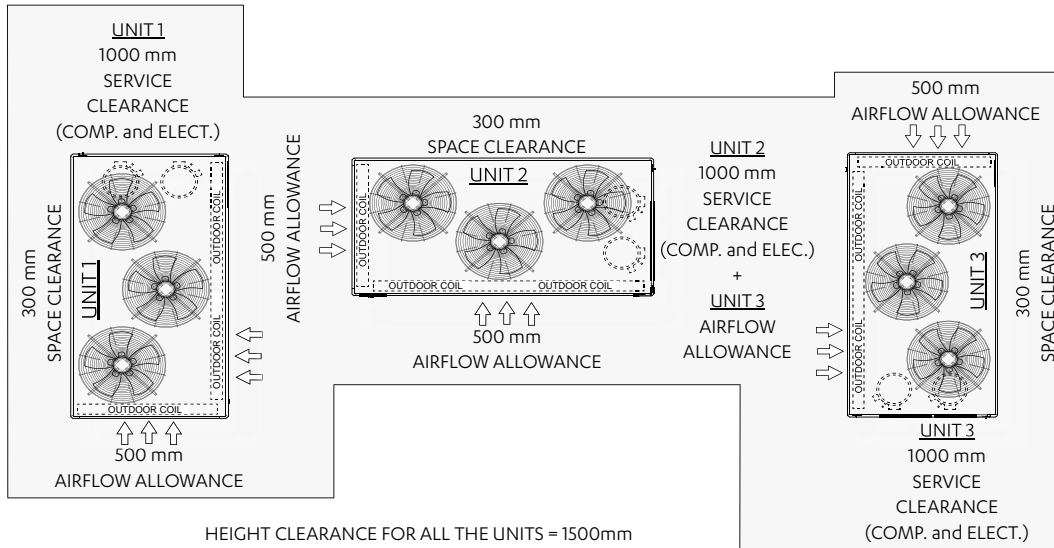
11. BANKING OF OUTDOOR UNITS

11.01. End-To-End Configuration



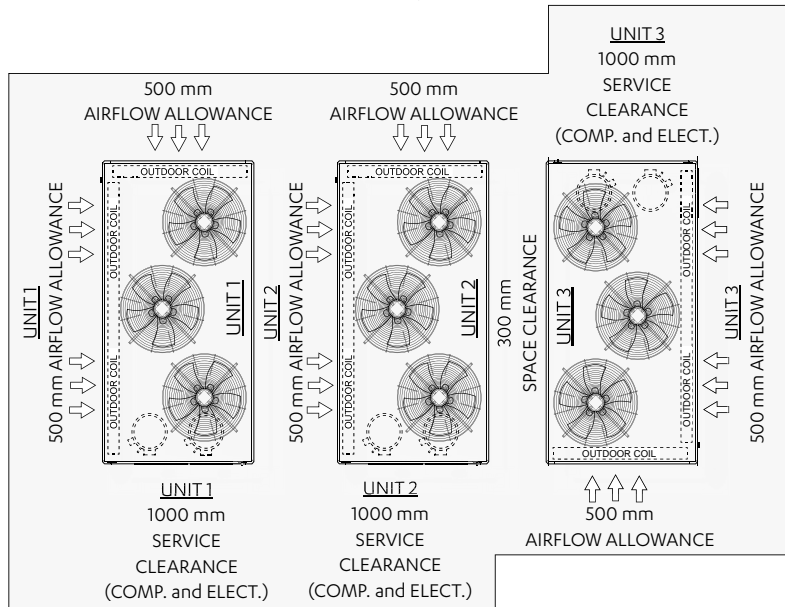
HEIGHT CLEARANCE FOR ALL THE UNITS = 1500mm

11.02. Cluster Configuration



HEIGHT CLEARANCE FOR ALL THE UNITS = 1500mm

11.03. Side-By-Side Configuration

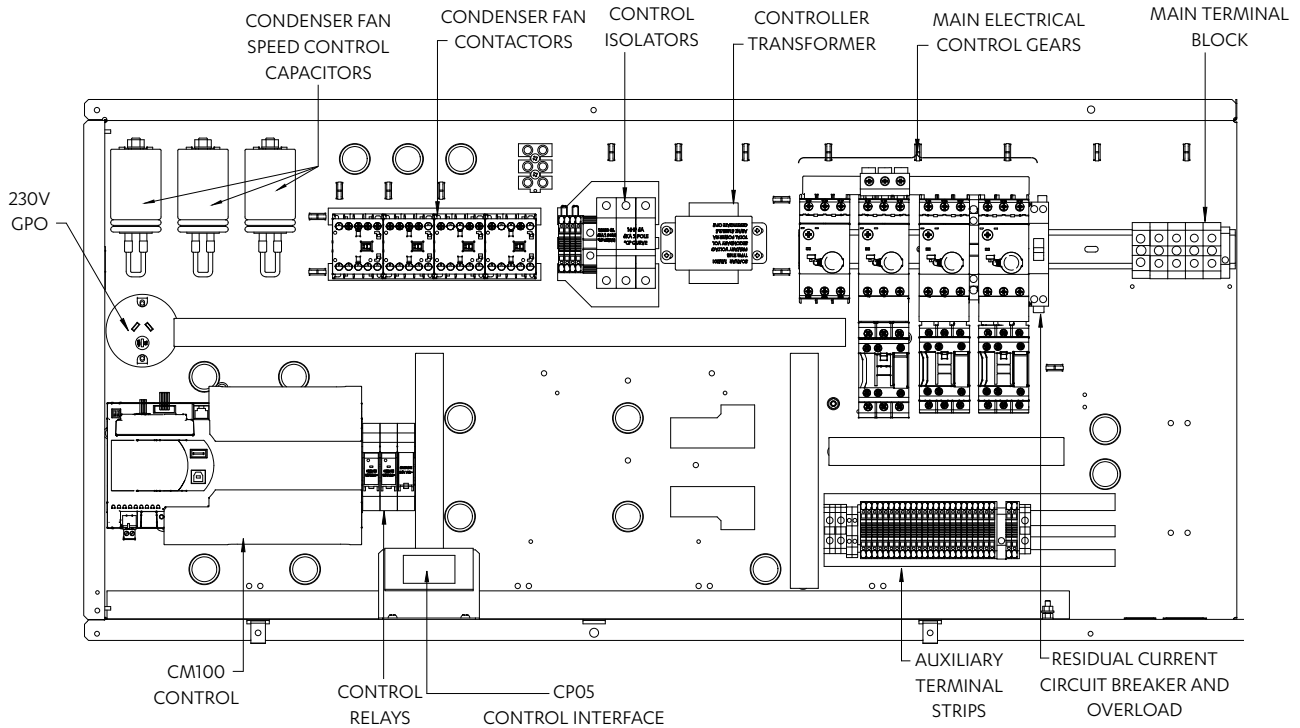


NOTES

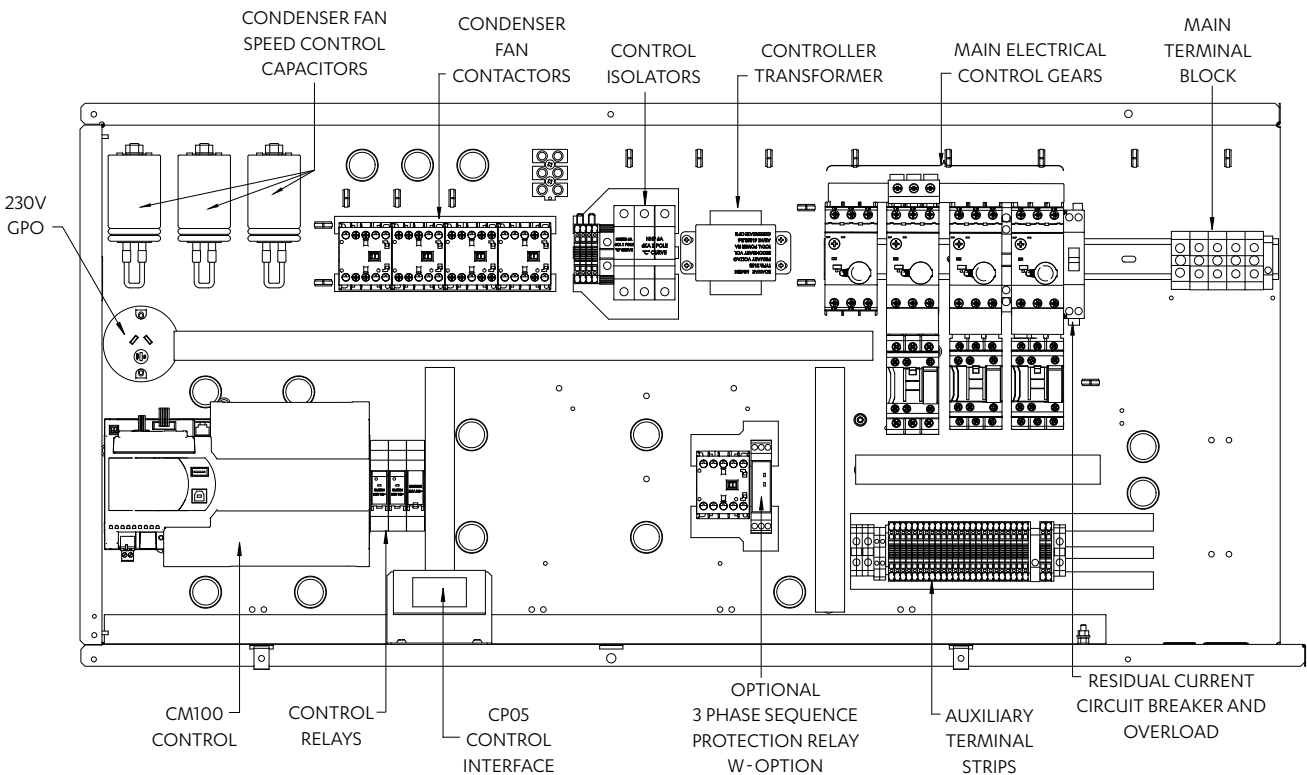
- The suggested Clearance and Airflow Allowances (given above) are the minimum and based on the condition that the spaces around the units are free from any obstructions and walkway passage of 1000mm between the units or between the unit and the outside perimeter is available.
- Minimum service access areas and spaces for airflow are responsibilities of the installer, ActronAir will not be held responsible for any extra charges incurred due to lack of access and space for airflow.

12. LAYOUT - OUTDOOR UNIT CONTROL BOX

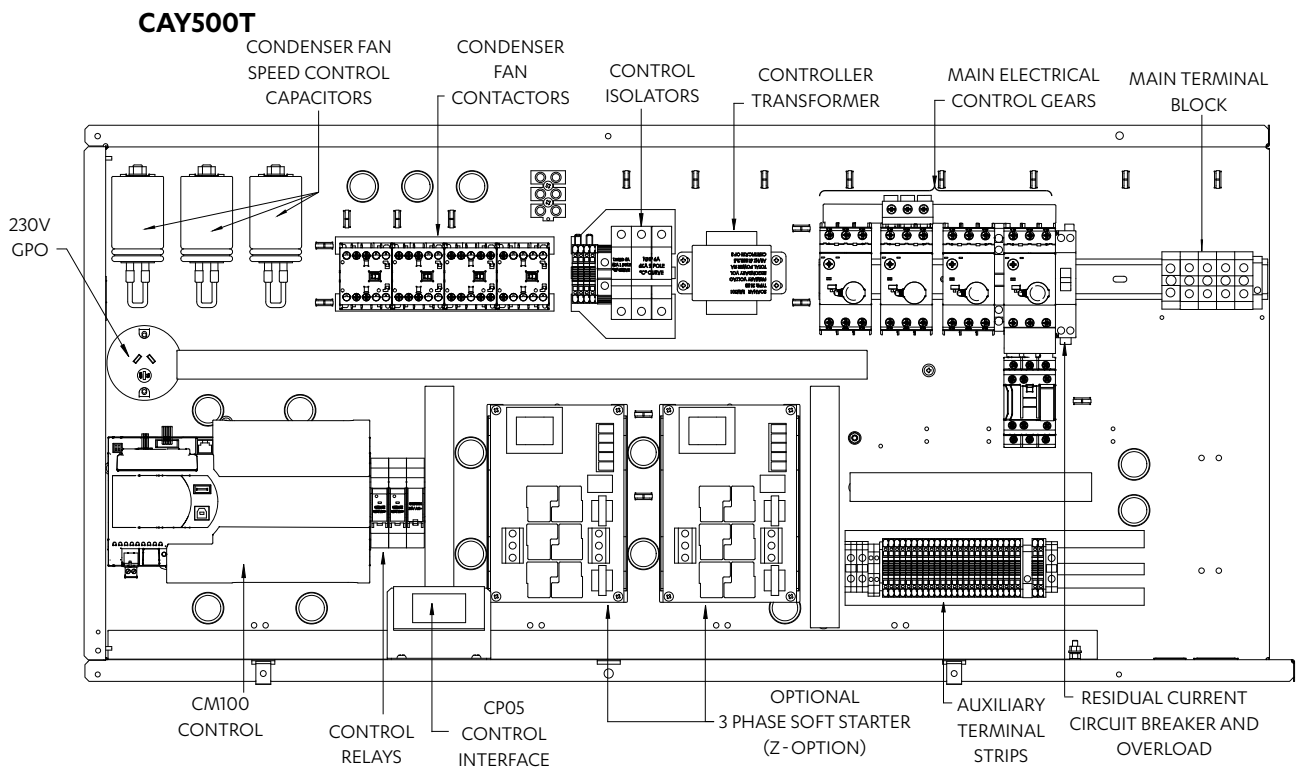
12.01. Standard Model



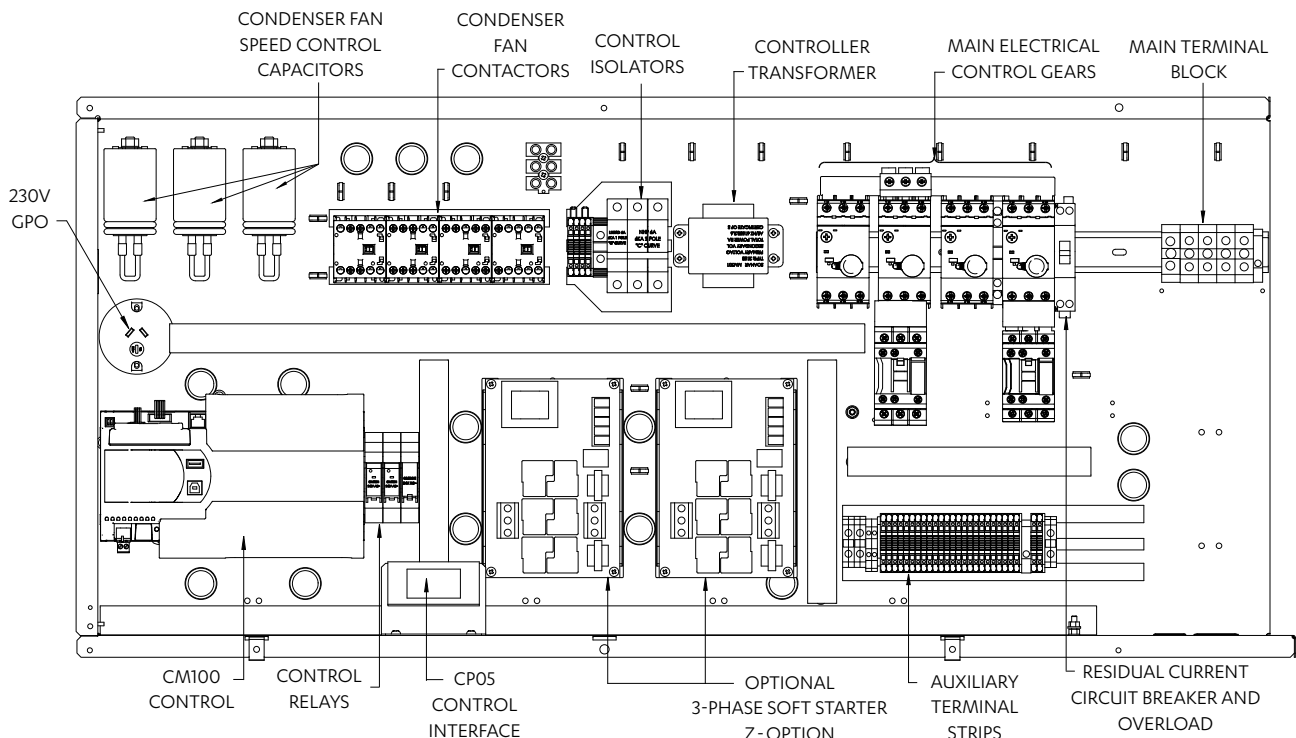
12.02. Standard Model with Optional 3-Phase Protection Relay



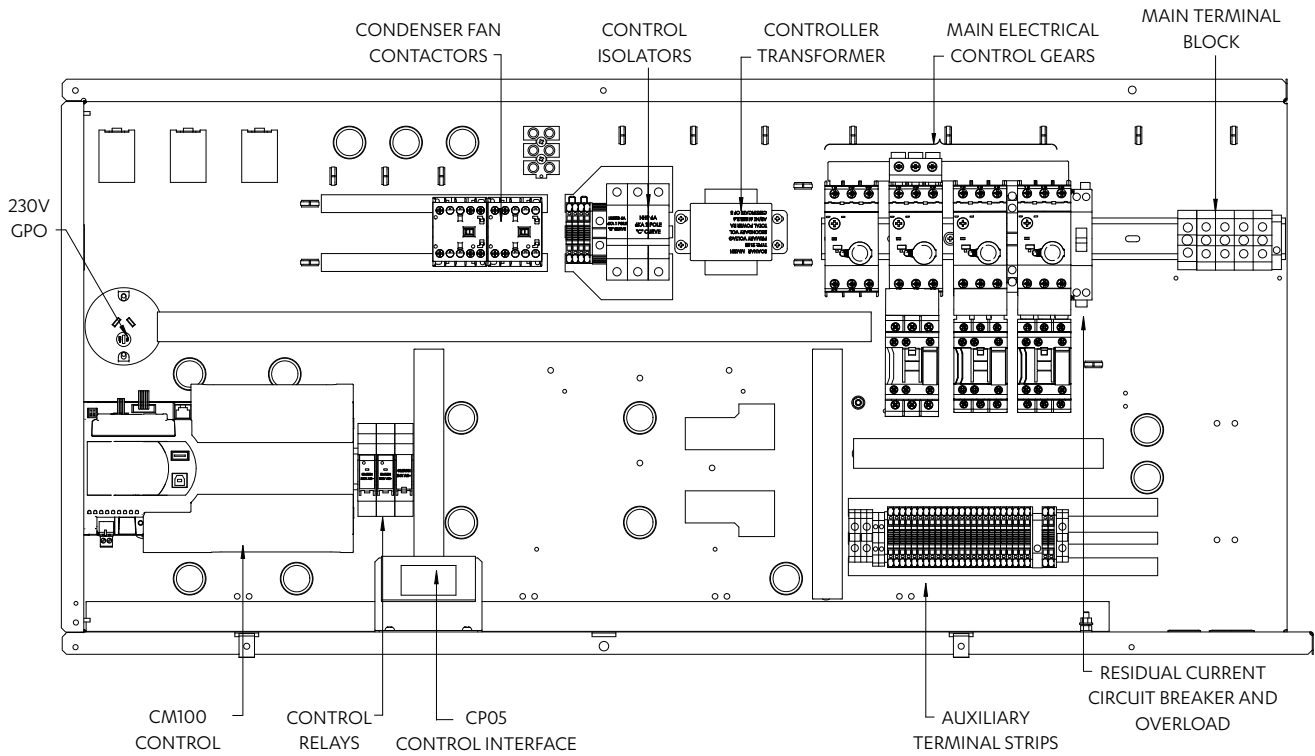
12.03. Standard Model with Optional 3-Phase Soft Starters



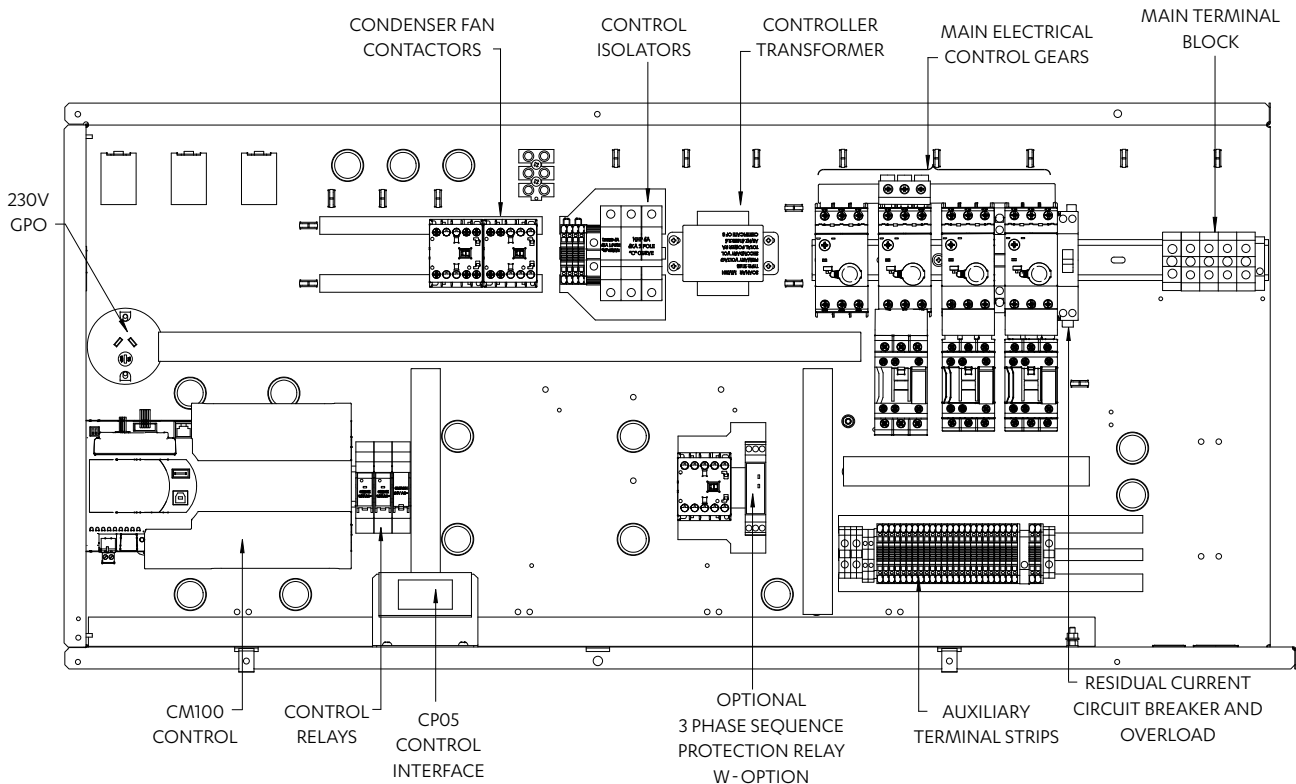
CAY620T and CAY700T



12.04. With Optional EC Outdoor Fans

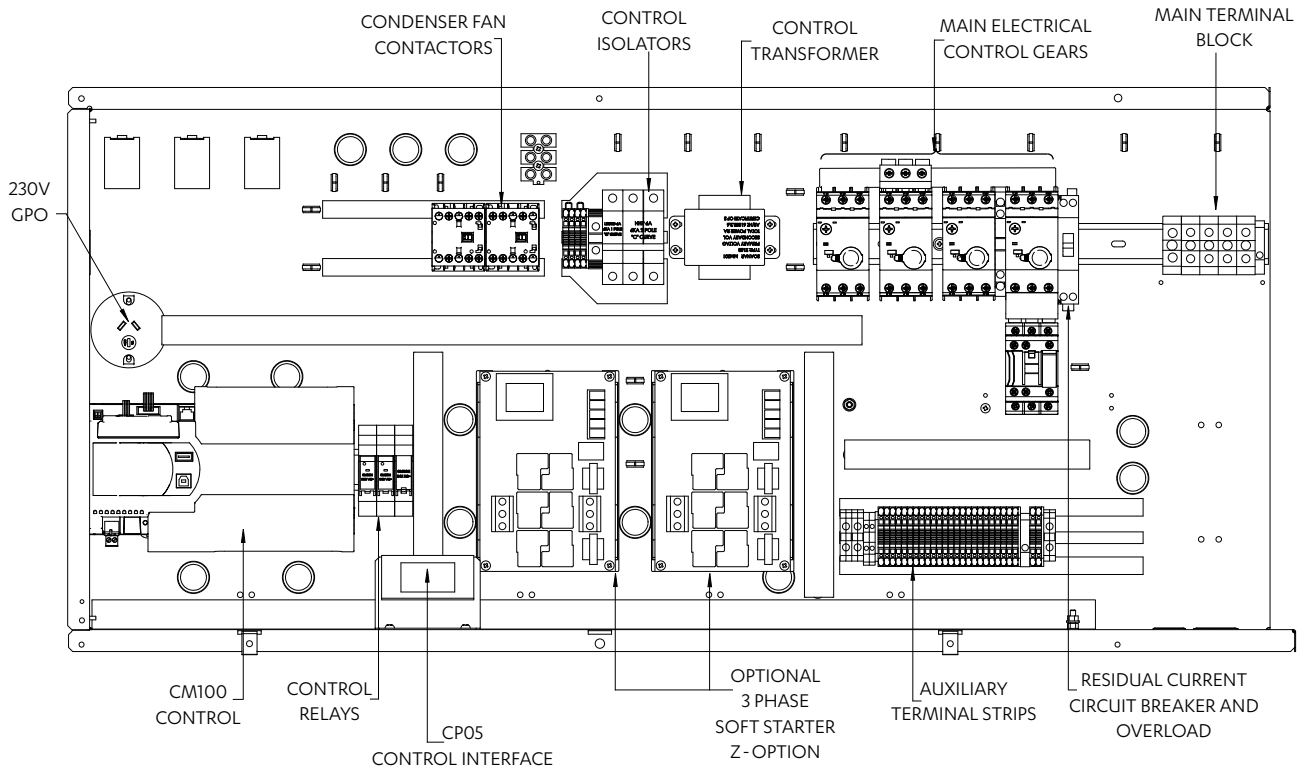


12.05. With Optional EC Outdoor Fans and 3-Phase Protection Relay

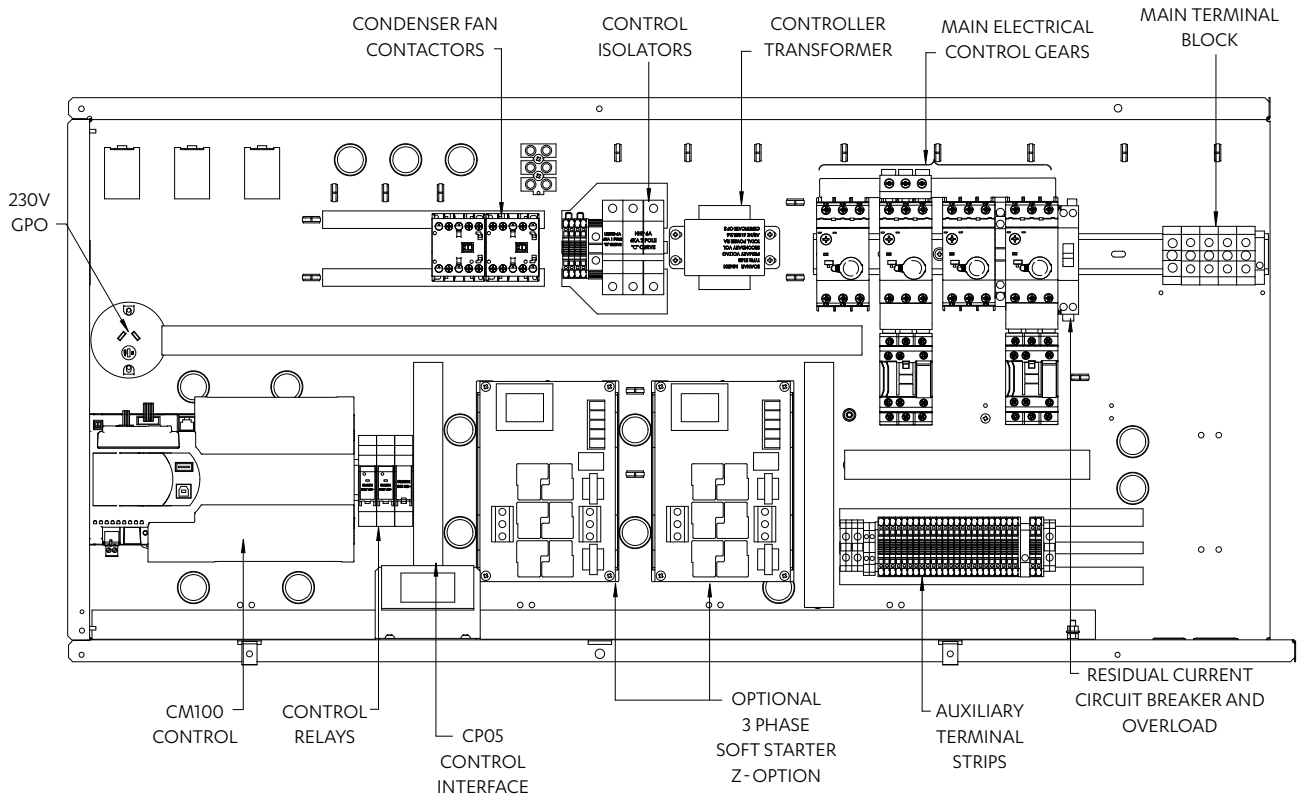


12.06. With Optional EC Outdoor Fans and 3-Phase Soft Starters

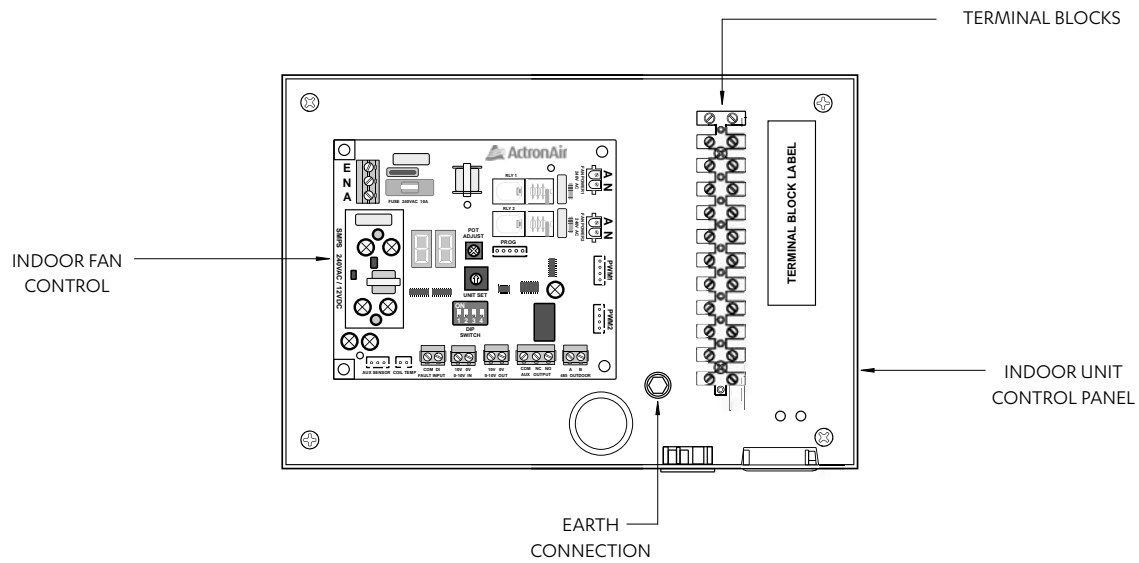
CAY500T



CAY620T and CAY700T

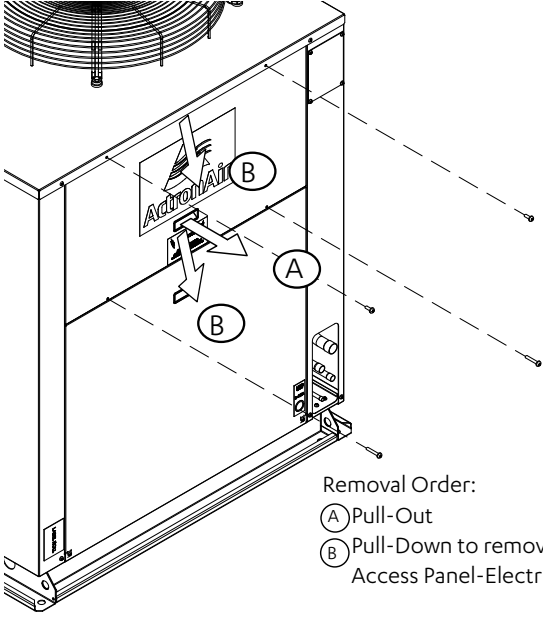
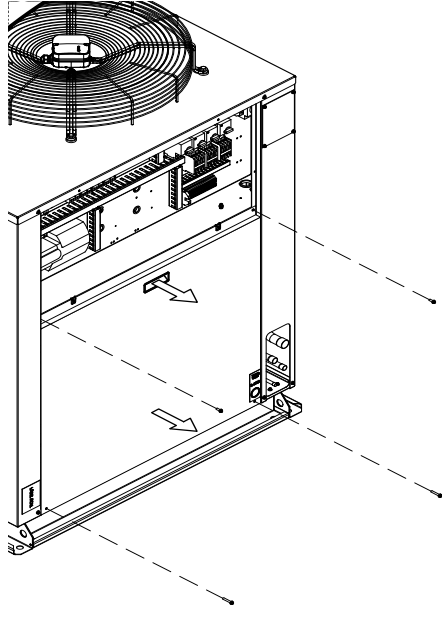
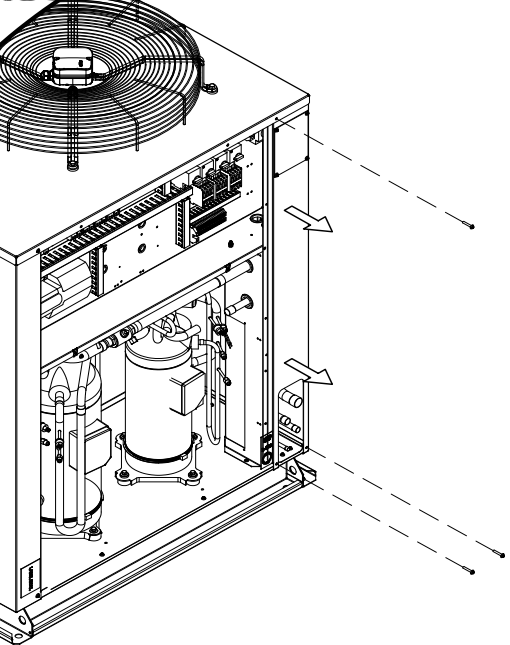
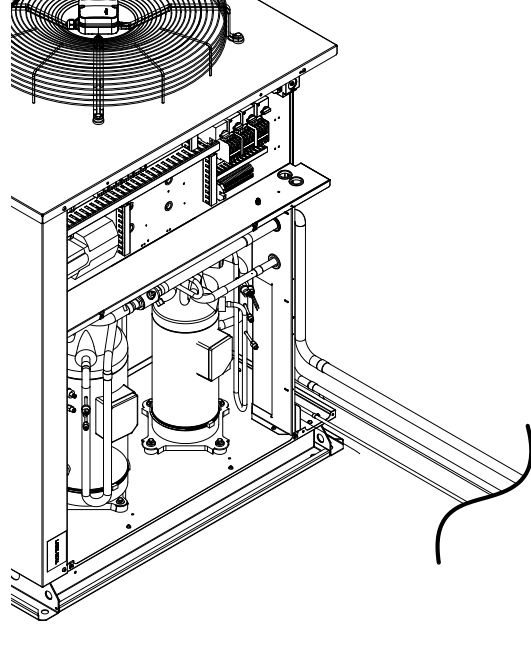


12.07. Indoor Unit Control Box - Standard Models

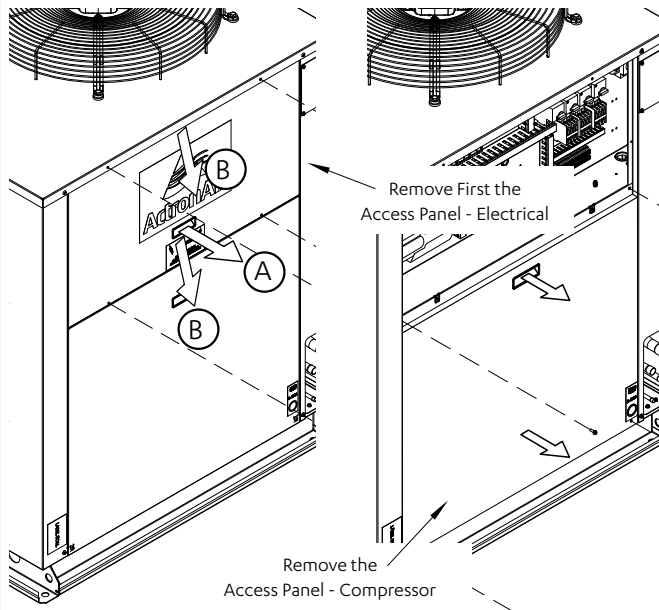


13. UNIT PREPARATION

13.01. Outdoor Unit - Interconnecting Pipes Installation

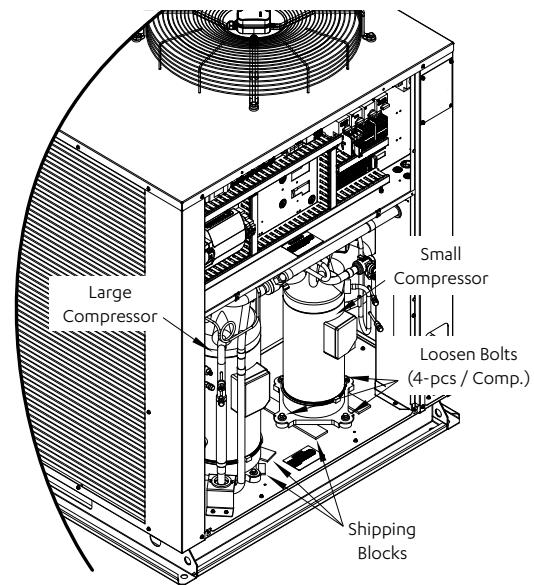
 <p>Removal Order: (A) Pull-Out (B) Pull-Down to remove Access Panel-Electrical</p> <p>1. Remove Access Panel-Electrical</p> <ul style="list-style-type: none"> Remove mounting screws (4 pcs). Remove Access Panel-Electrical as shown in the above illustration. 	 <p>2. Remove Access Panel-Compressor</p> <ul style="list-style-type: none"> Remove mounting screws (4 pcs). Remove Access Panel-Compressor as shown in the above illustration.
 <p>3. Remove Access Panel-Piping</p> <ul style="list-style-type: none"> Remove mounting screws (6 pcs). Remove Access Panel-Piping as shown in the above illustration. Remove all Foil Faced PE protection from pipes. 	 <p>4. Install Interconnecting Pipes</p> <ul style="list-style-type: none"> Solder refrigeration piping. Refer to piping sections for details of field pipe sizes and piping installation procedure.

13.02. Compressor Shipping Blocks Removal



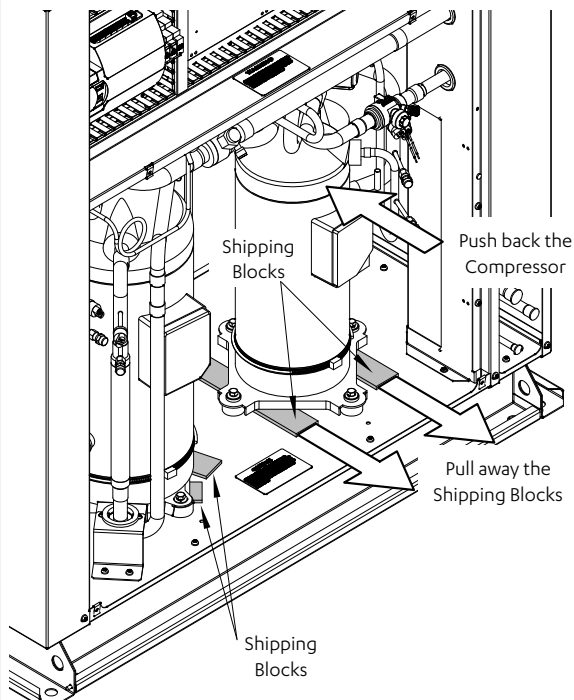
1. Remove Access Panel-Compressor

- Remove the Access Panel - Compressor by following the Access Panels removal procedure from previous page.



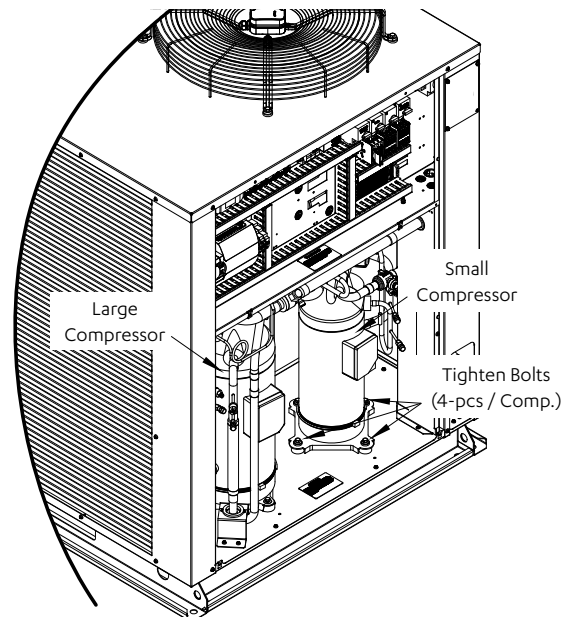
2. Loosen the Bolts - Compressor Mounting

- Loosen the bolts that hold the compressors down onto the unit (4 pcs. each).



3. Remove the Shipping Blocks

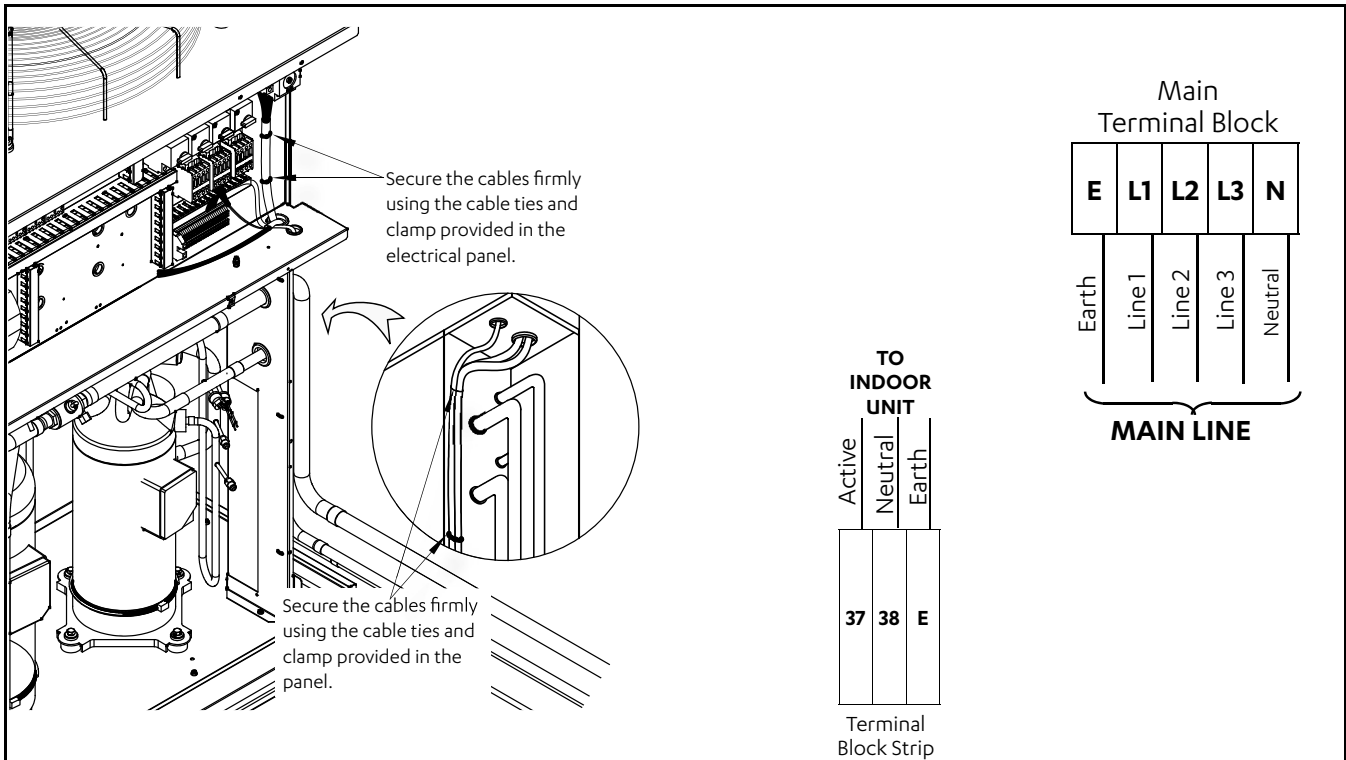
- Push the Compressor back, taking care not to exert too much force that may cause damage to the pipes.
- Remove the Shipping Blocks by pulling them away.
- Repeat the same procedure for the 2nd compressor.



4. Tighten Back the Bolts

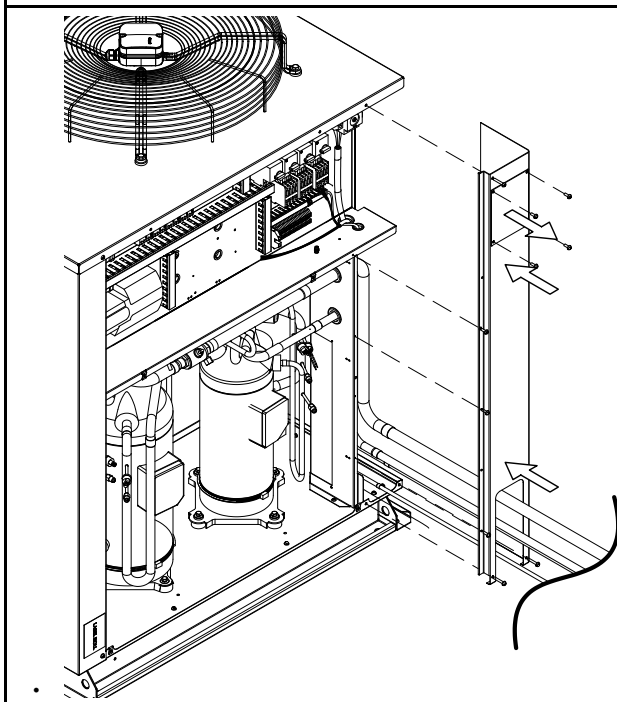
- Firmly tighten the bolts to secure back the compressors onto the unit. Recommended torque is 13 ± 1 Nm. It is critically important for the grommet not to be compressed.
- Check to make sure that there are no damage to the piping systems.

13.03. Electrical Mains



1. Connect electrical and control wirings

- Route electrical mains cable, indoor cable connections and wall control wires as shown above.
- Refer to electrical section for electrical and control connections.



2. Re-install Access Panel-Corner.

- Re-install Access Panel-Corner as shown.

14. PIPING

14.01. Piping Connection

NOTES

The units described in this guide use R-410A refrigerant which operate at approximately 1.6 times higher than a similar systems using R-22. When installing equipment using R-410A refrigerant, there are number of standards that must be met:

- A polyolester (POE) oil is used for R-410A.
- It is important to work with absolute cleanliness.
- Brazing must be done with the use of Nitrogen to avoid carbon deposits into the pipes.
- The system must be evacuated thoroughly to 500 microns (see evacuation procedure).
- The system must always be charged with R-410A refrigerant in liquid state.

Maximum allowable total equivalent field pipe length is 75 metres, see diagram below. This includes all the equivalent pipe fitting losses and vertical height difference. Vertical height difference must not exceed 20 metres.

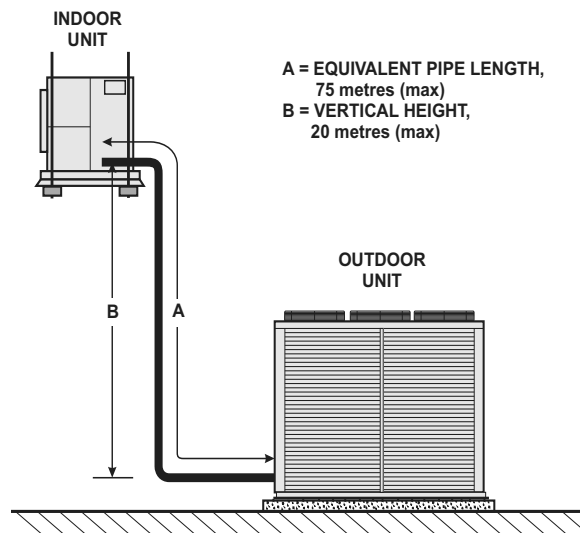
Table below shows the equivalent straight pipe length of elbow fittings.

EQUIVALENT STRAIGHT PIPE LENGTH OF ELBOW FITTINGS (M)				
Pipe size Nominal Diameter	90° Long Radius Elbow	90° Short Radius Elbow	45° Long Radius Elbow	45° Short Radius Elbow
9.5 (3/8")	0.24	0.36	0.09	0.14
12.7 (1/2")	0.27	0.41	0.12	0.19
15.9 (5/8")	0.30	0.45	0.15	0.23
19.1 (3/4")	0.40	0.60	0.18	0.27
22.2 (7/8")	0.46	0.69	0.21	0.32
25.4 (1")	0.52	0.78	0.24	0.36
28.6 (1-1/8")	0.55	0.83	0.27	0.41

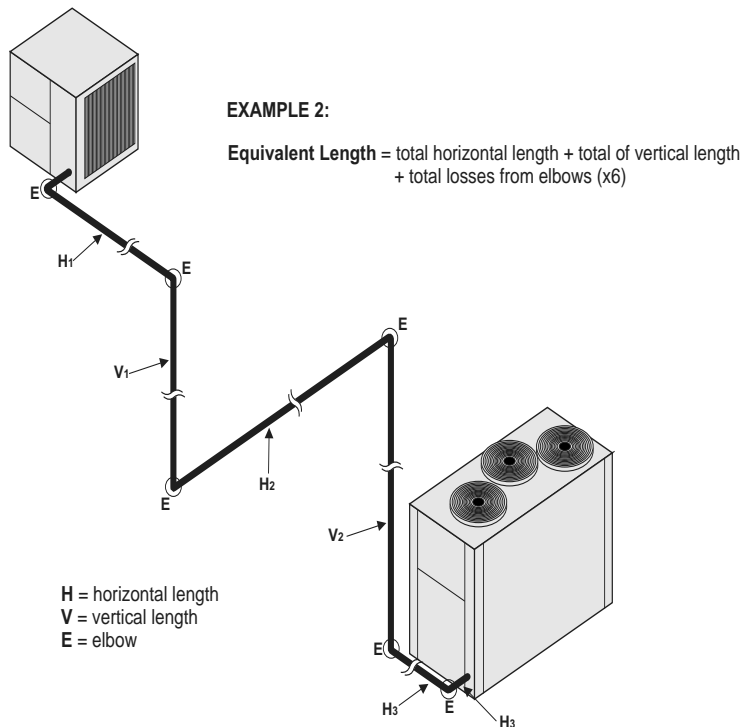
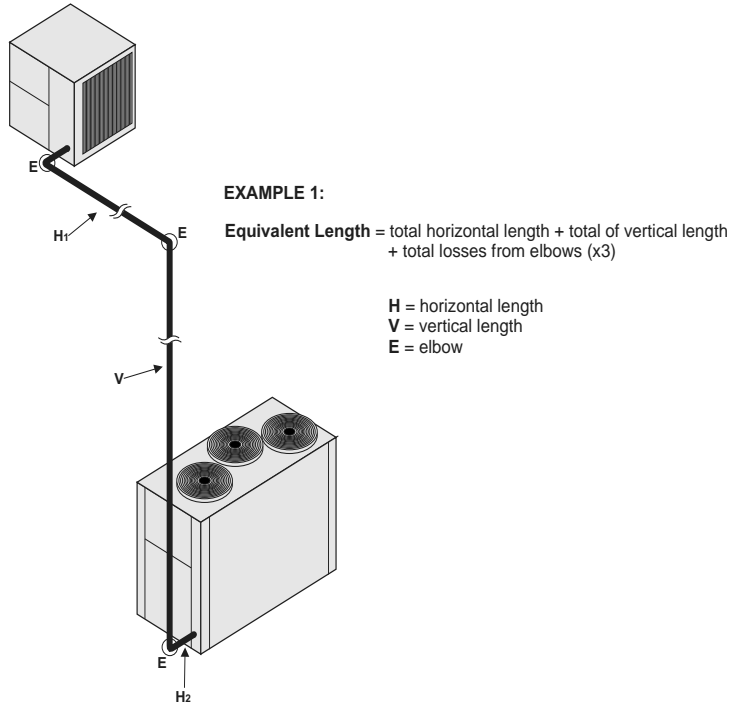
Selected field pipe sizes must match the recommended sizes in table above. If the installation requires different field pipe diameter due to different application condition other than recommended, contact ActronAir for advice.

Most of unit pipe connections are factory swaged to easily fit to the recommended field pipe diameter.

When it is required to install other refrigeration devices, such as refrigerant driers, solenoid valves, etc. include the equivalent straight pipe length of the devise in the calculation of total equivalent field pipe length.



14.02. Example Total Equivalent Field Pipe Length Calculations



Above illustrations are shown as calculation examples only. It is the responsibility of the Installer to design an efficient refrigeration piping lay out for optimum unit performance.

REFRIGERATION PIPING			CAY500T EVY500T ELY500T	CAY620T EVY620T ELY620T	CAY700T EVY700T ELY700T
Outdoor Model	Indoor Model				
Maximum Equiv. Pipe Length Range	metres		0 - 75	0 - 75	0 - 75
Maximum Vertical Height Difference*	metres		20	20	20
Field Pipe Sizing					
Liquid Circuit #1	mm (inch)		9.5 (3/8)	12.7 (1/2)	12.7 (1/2)
Gas Circuit #1	mm (inch)		22.2 (7/8)	25.4 (1)	25.4 (1)
Liquid Circuit #2	mm (inch)		15.9 (5/8)	15.9 (5/8)	15.9 (5/8)
Gas Circuit #2	mm (inch)		28.6 (1-1/8)	28.6 (1-1/8)	28.6 (1-1/8)
Outdoor and Indoor Unit Connection (SWAGED PIPE)					
Liquid Circuit #1	mm (inch)		9.5 (3/8)	12.7 (1/2)	12.7 (1/2)
Gas Circuit #1	mm (inch)		22.2 (7/8)	25.4 (1)	25.4 (1)
Liquid Circuit #2	mm (inch)		15.9 (5/8)	15.9 (5/8)	15.9 (5/8)
Gas Circuit #2	mm (inch)		28.6 (1-1/8)	28.6 (1-1/8)	28.6 (1-1/8)

NOTE

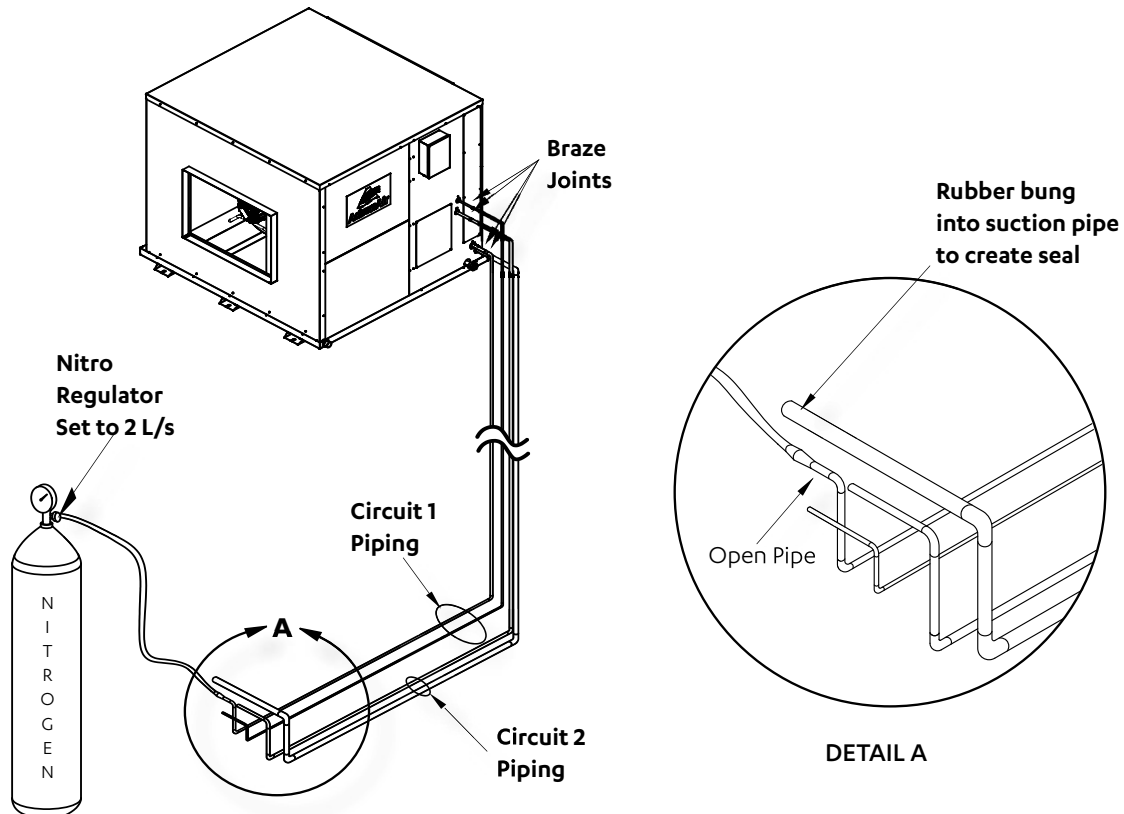
*Included in maximum field pipe length.

14.03. Pipe Installation

⚠ PRECAUTION

Brazed joints should only be made while purging Nitrogen through the system.

Failure to do so will cause carbon deposit to be left on the internal pipe surface, that in turn can cause system failure and void of warranty.



Installing interconnecting pipe work to indoor, nitrogen bleed procedure (First fit or rough in stage only)

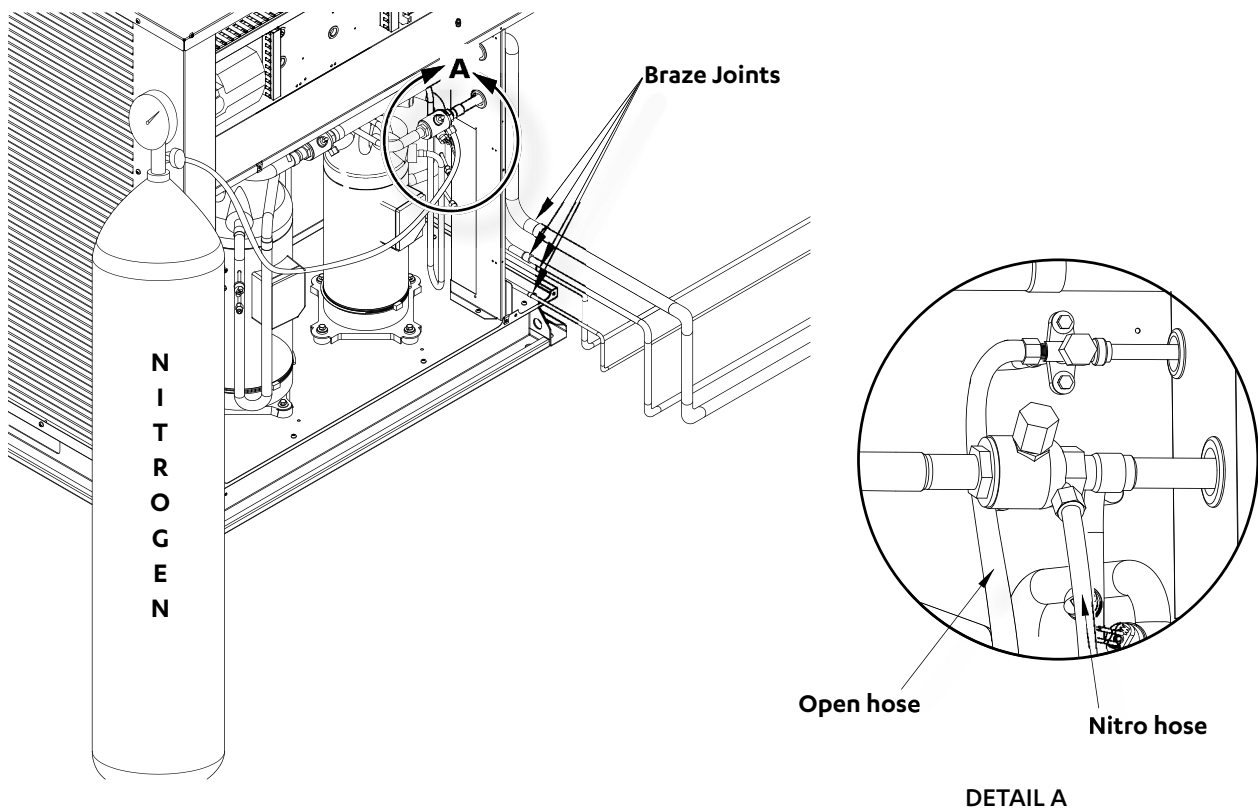
1. Run interconnecting pipe work from the condenser location to evaporator.
2. Starting with circuit 1 (small compressor), safely release pressure in evaporator and remove caps.
3. Fit copper tube into tail, set nitro bottle and regulator up at condenser end of pipe work.
4. Fit nitrogen line into suction line of circuit 1 with rubber bung to seal the connection. The seal will prevent air being sucked into pipe work
5. Leave liquid line open, set nitro regulator for nitrogen to flow through pipe work at 2 l/s flow rate @20kPa.
6. Braze required joints as quick as possible.
7. Repeat the above process for circuit 2 (large compressor) piping.

See Diagram on Previous Page.

Installing interconnecting pipe work to outdoor, nitrogen bleed procedure (First fit or rough in stage only)

1. Starting with circuit 1 system, remove piping caps from the condenser and fit pipe work into tails.
2. Fit nitro hose onto suction ball valve and fit open hose onto liquid line post valve.
3. Set nitrogen regulator to 2 l/s flow rate through pipe work and evaporator.
4. Braze remaining joints as quick as possible.
5. Allow the brazed joints to cool and conduct leak test in the connections.
6. Pressurize the system to 2500kPa in stages. A recommended pressure test is to be performed for no less than 1 hour at 2500kPa.
7. Repeat above process for circuit 2 piping.

See Diagram Below:



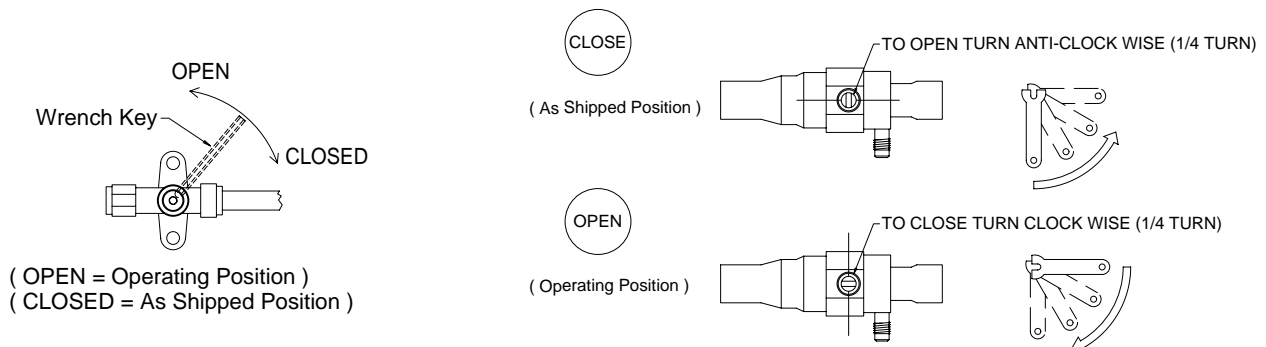
NOTES

Importance of Evacuation:

- Any non-condensable product left in the system can cause the pressure in the high side of the system to increase and in turn, the compression temperature to rise.
- Moisture will result in adverse reaction in the refrigerant circuit.
- The POE oil used in the R-410A compressor is hygroscopic, which means that it absorbs moisture from the air. To prevent chemical reactions in the system, any moisture must be removed at all costs.
- Oxygen (air) reacts with the compressor oil and can lead to faults such as compressor failure.

Evacuation Procedure (Triple Evacuation)

1. Fit service gauges to the ball valves (liquid line service valve and suction line service valve).
2. Evacuate the system to 500 microns.
3. Check vacuum with vacuum gauge. Break the vacuum with dry Nitrogen to 100kPa.
4. Release Nitrogen pressure. Evacuate to 500 microns.
5. Check vacuum with vacuum gauge. Break the vacuum with dry Nitrogen to 100kPa.
6. Release Nitrogen pressure. Evacuate to 500 microns.
7. Check vacuum with vacuum gauge.
8. Open valves.
9. Carry out above procedures for both circuit 1 and 2 systems.

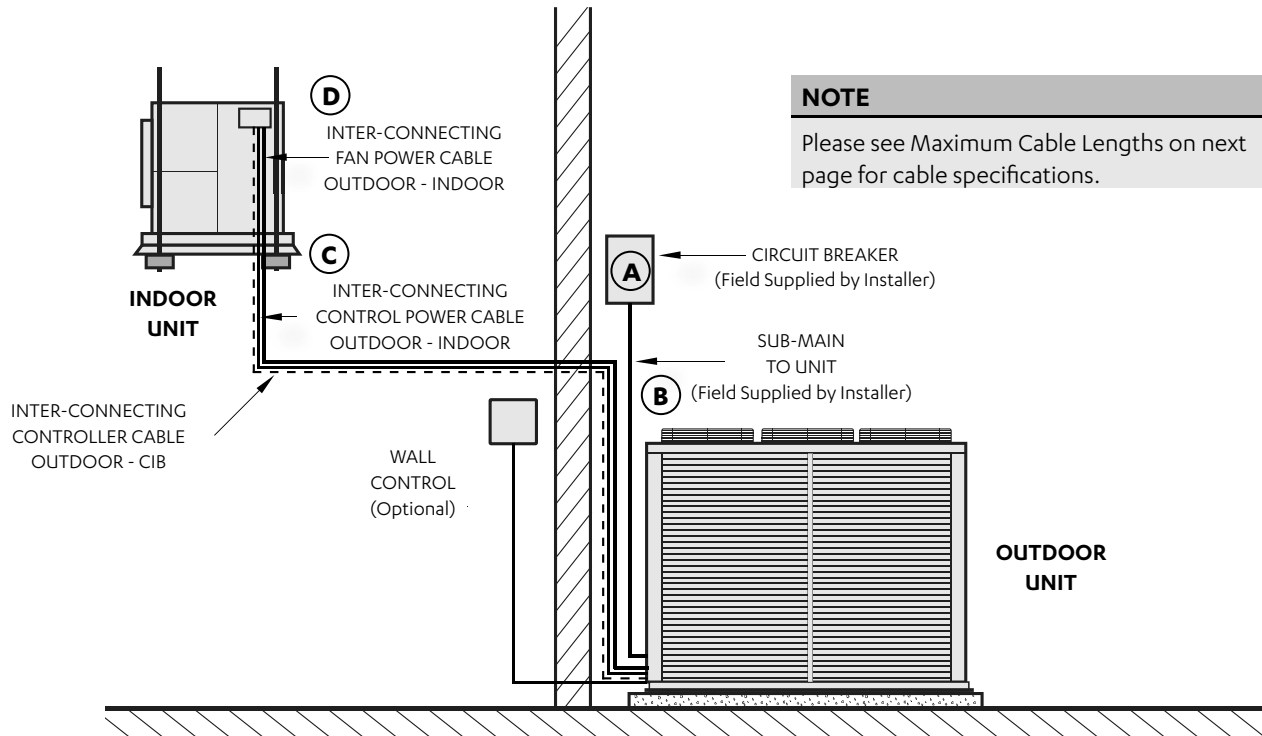


15. ELECTRICAL

NOTES

- All electrical work must be carried out by a qualified technician.
- Make sure all wiring is in accordance with local wiring rules.
- Wiring connections should be made in accordance with the provided wiring diagram.
- The unit wiring diagram is located in the Access Panel - Electrical.

15.01. Split Unit Electrical Connection

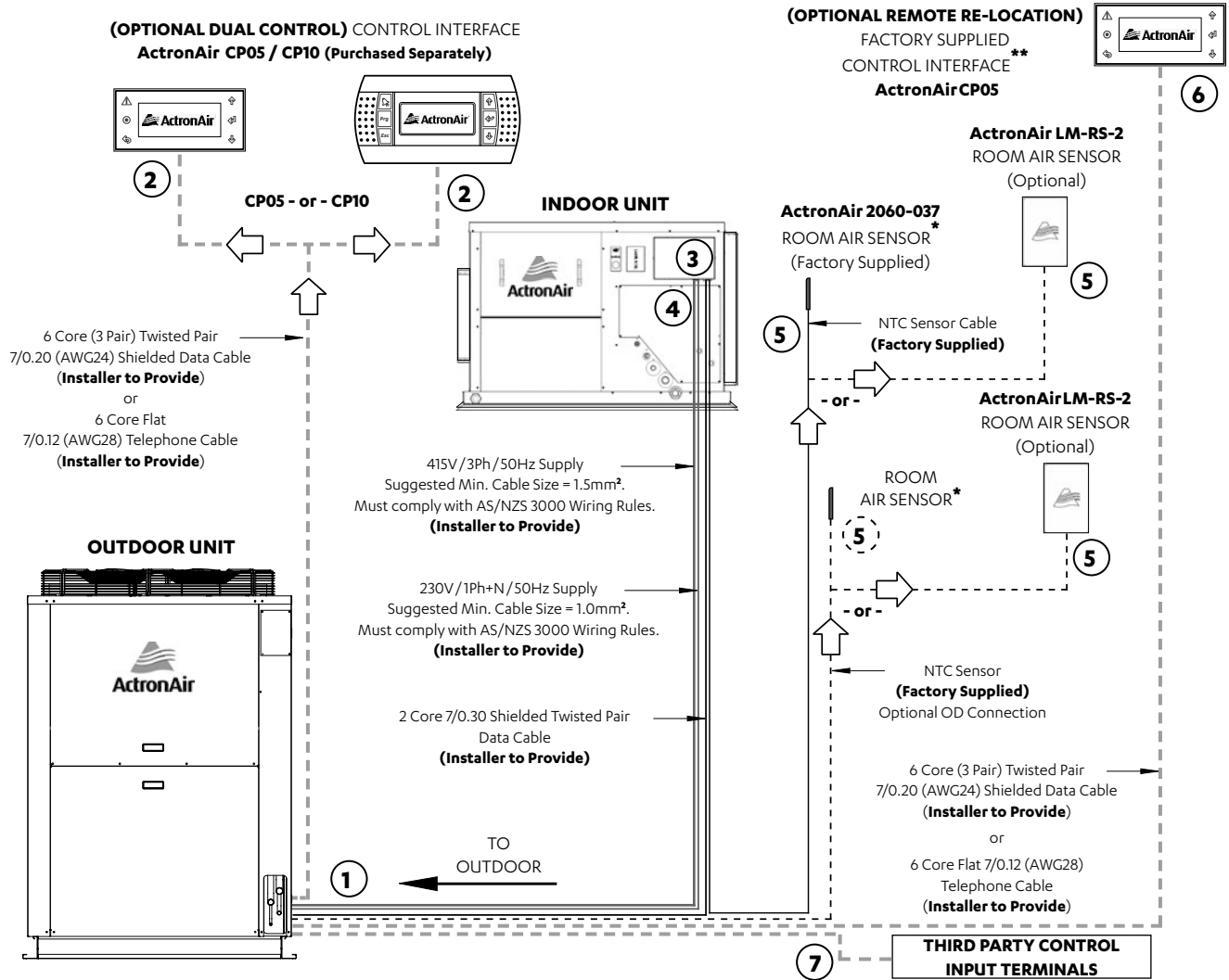


POWER CIRCUIT BREAKER SIZE AND CABLE SIZE						
Model			Circuit Breaker Size	Cable Size * (mm ²)		
				Ⓐ Amps	Ⓑ Main (4 Core + E)	Ⓒ O.D. to I.D. (2 Core + E)
CAY500T	EVY500T	ELY500T	50.0	10.0	1.0	1.5
CAY620T	EVY620T	ELY620T	63.0	16.0	1.0	1.5
CAY700T	EVY700T	ELY700T	80.0	25.0	1.0	1.5

* Suggested Minimum Cable Size should be used as a guide only, refer to AS/NZS 3000 "Australian / New Zealand Wiring Rules" for more details.

WIRING DIAGRAM MATRIX - SPLIT DUCTED INDOOR STANDARD MODELS				
Model			Wiring Diagram	DESCRIPTION
EVY500T	EVY620T	EVY700T	0515-8804	STANDARD PROFILE
ELY500T	ELY620T	ELY700T	0515-8801	LOW PROFILE
ELY...T - X118			0515-8801-X118	

15.02. Maximum Cable Lengths



Cable Run	Description	Suggested Maximum Cable Length
1 to 2	Outdoor CM100 to Optional ActronAir CP05 / CP10 Control Interface (Dual Control)	50m / 200m***
1 to 3	Outdoor CM100 to Indoor CIB Data Input Terminal	75m
1 to 4	Outdoor Power Supply to Indoor CIB / Indoor Fan	75m
1 to 5	Outdoor CM100 to Room Air Sensor (NTC Sensor Input Cable Size 0.5mm ² / 1.0mm ²)	50m / 100m
1 to 6	Outdoor CM100 to ActronAir CP05 (Remotely re-located factory Supplied Control Interface)	50m / 200m***
1 to 7	Outdoor CM100 to Third Party Control	Refer to Third Party Control Supplier

NOTES

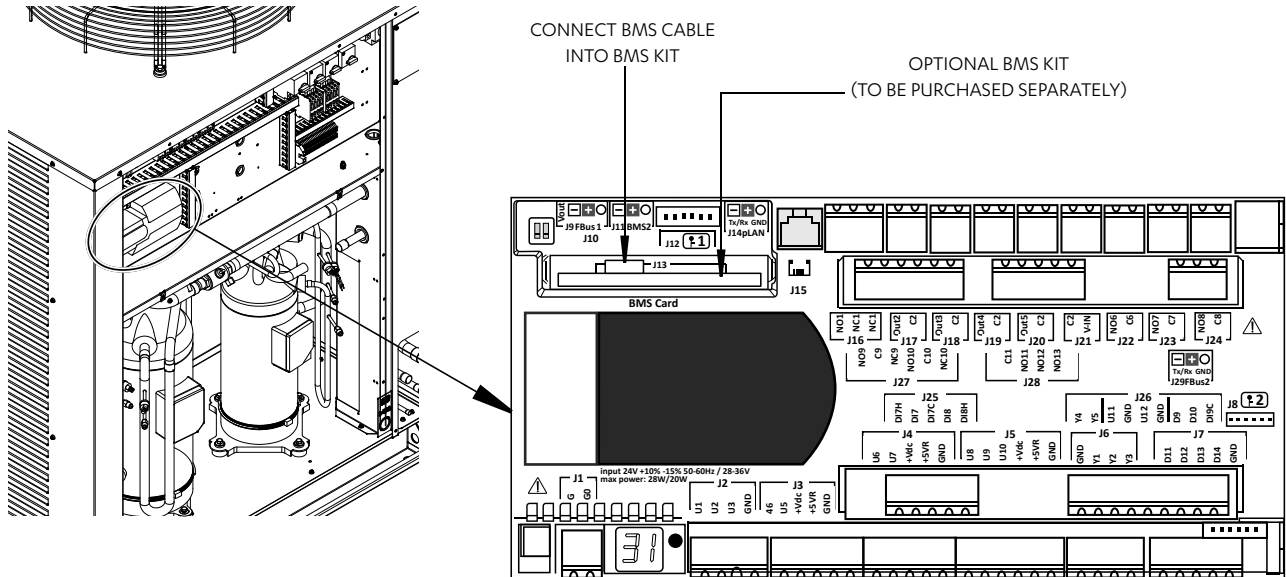
- Diagram shown above is for general representation only. Refer to individual unit wiring diagram for complete wiring connection details.
- Long cable runs beside supply mains or TV antenna cables should be avoided where possible.
- Room Air Sensor needs to be installed by the installer specific to site requirements.
- For compliance with EMC requirements, connect screen wire to Terminal 22 in the Electrical Panel.

* Room Air Sensor is factory supplied with 6m cable as standard. Sensor may need adjustment for longer cable lengths.

** Do not extend the factory supplied data cable when re-locating the Control Interface. Replace the cable with a single length of either of the data cables specified above.

*** Suggested Maximum Cable Length: 50m when using Flat Telephone Cable / 200m when using 6 Core (3Pair) Twisted Pair Shielded Data Cable.

15.03. BMS Control Wiring Procedures



NOTE

ActronAir Control Interface can be left connected or can be dis-connected from the control board.

BMS PART NUMBERS

BMS Connection Type	Kit Part Number *	Order Form**
MODBUS 485	ICMOD-485	not required
BACNET 485	ICBAC-485	Document 1829
BACNET TCP/IP	ICBAC-TCP-IP	Document 1828

* To be purchased separately.

** It is necessary to complete and return the Order Form Document for BACNET cards (will be provided by Customer Care during ordering). The BACNET BMS cards are pre-programmed by ActronAir before being sent out.

DANGER

Hazardous Voltage !

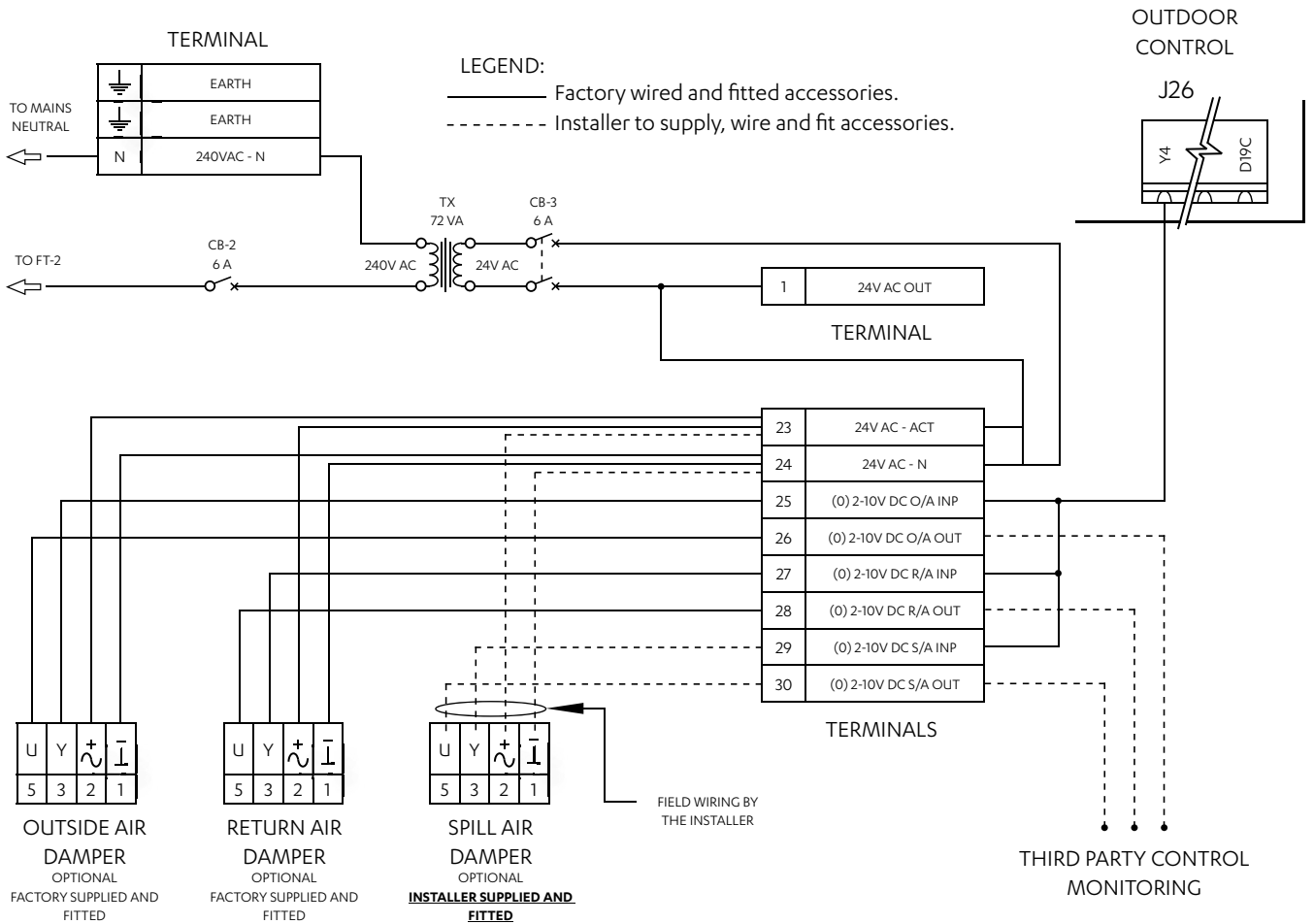
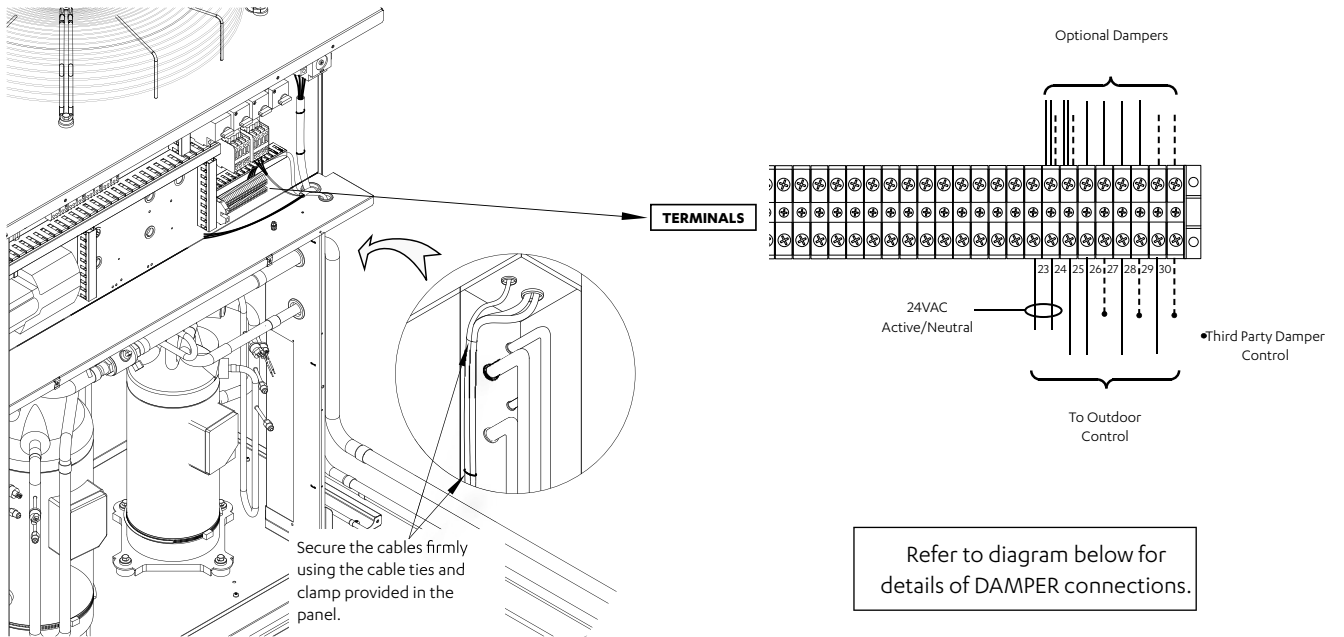
- Always make sure that all power supply, including remote controls, are disconnected before performing maintenance. Observe proper LOCK-OUT / TAG-OUT (LOTO) procedures to ensure that power cannot be inadvertently energised. Failure to disconnect power before maintenance procedures can result in serious injury or death.
- Follow all electrical safety precautions when exposed to live electrical components.
- Only qualified technicians are allowed to work on electrical circuits.
- All electrical wiring must be in accordance with the relevant electrical authority rules and regulations.

CAUTION

STATIC SENSITIVE ELECTRONIC DEVICES !

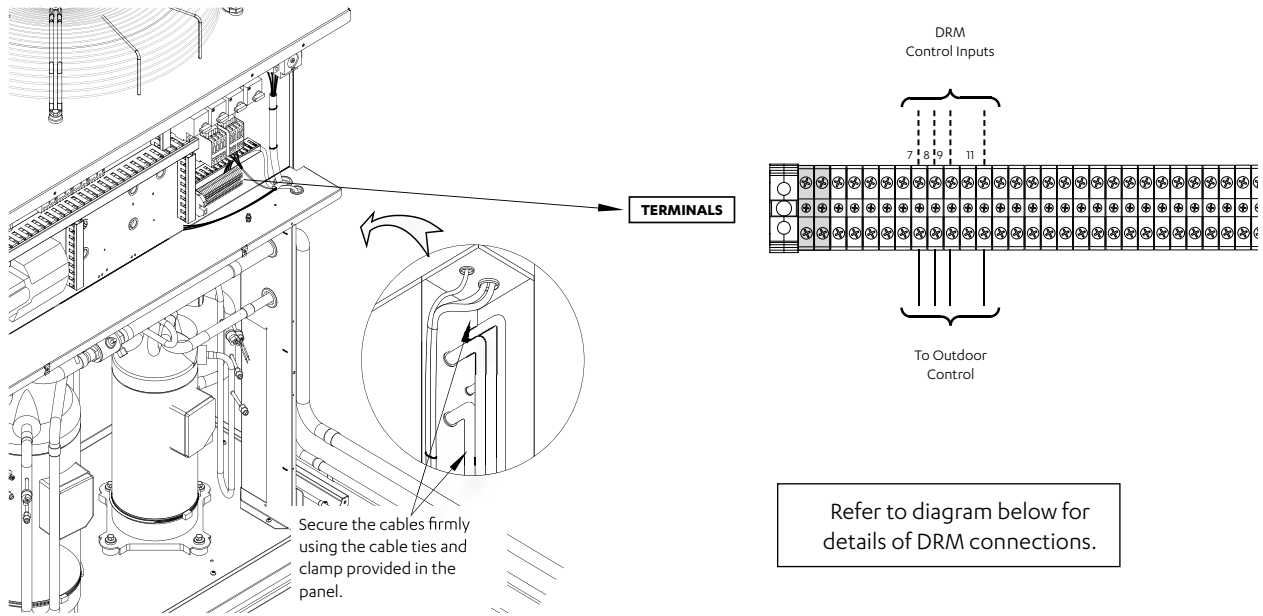
- DO NOT handle electronic devices unless you are wearing an Anti-Static Wrist Strap that is connected to a GOOD EARTH. Failure to protect the electronic devices from static electricity may cause unreparable damage.
- Static damaged electronic devices are NOT COVERED for replacement under warranty.

15.04. Return Air - Outside Air - Spill Air Control Wiring Procedures



RETURN AIR - OUTSIDE AIR - SPILL AIR CONTROL CONNECTION DIAGRAM

15.05. Demand Response Management



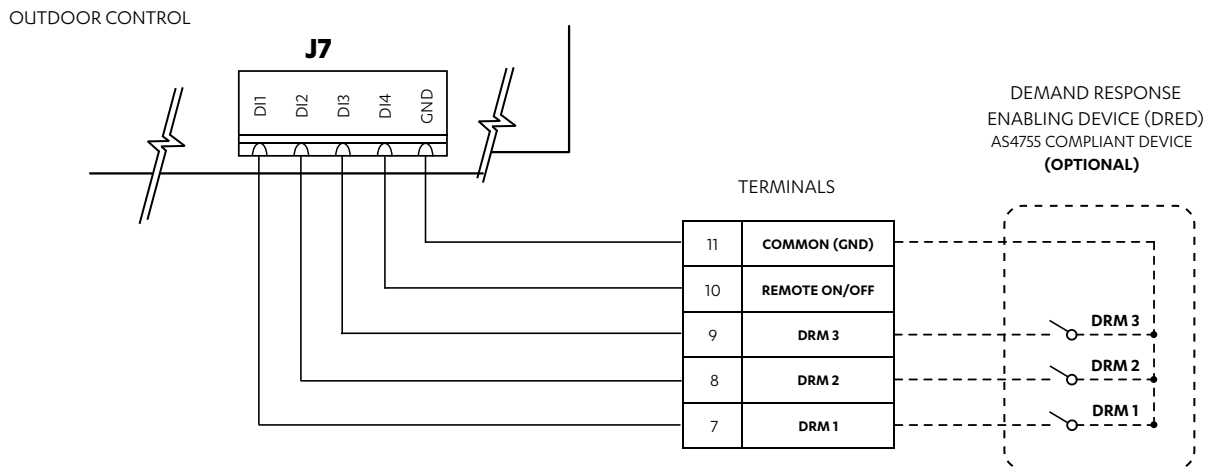
1. Thread and Route the DRM input cables into the Unit

- Thread and Route cables as per previous wiring installation procedures.

2. Connect cables into the terminals

- Connect cables as shown above and as per wiring diagram provided with the unit.

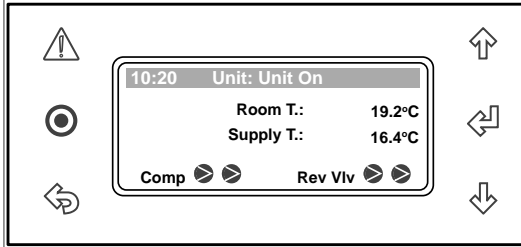
Demand Management Mode	Description Of Mode	Operating Mode
DRM1	Compressor Off	Compressors ONLY will cycle OFF and remain off for the entire Demand Response Event.
DRM2	Maximum 50% power use mode. (Over each 1/2 hour period)	Compressor 1 operation only for the total Demand Response event.
DRM3	Maximum 75% power use mode. (Over each 1/2 hour period)	Compressor 2 operation only for the total Demand Response event.



DEMAND RESPONSE MANAGEMENT CONNECTION DIAGRAM

16. CONTROL MENU

16.01. Menu Navigation

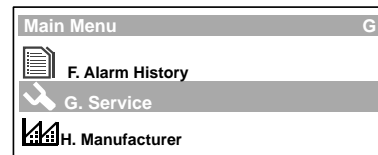
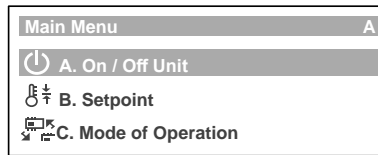


Pressing at anytime will bring the menu back one level up.
 Pressing at anytime will bring back the main menu.
 Pressing will display an active alarm (if any).
 Button will blink if any system alarm is active.

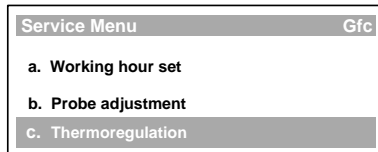
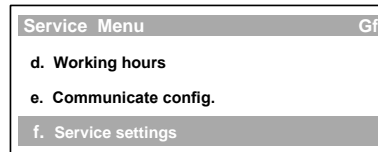
Example below will show the navigation to screen **Gfc2. Thermoregulat.**

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc2. Thermoregulat.**

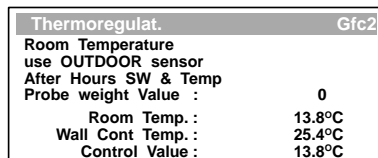
1. To get into the main menu in the control interface, press . The display will show the list of available submenus. Press or button to scroll through the sub menus and select **G. Service**. Press to enter the submenu.



2. Press or button to scroll to menu **Gf. Service settings** then press . Press or button to scroll to menu **Gfc. Thermoregulation** then press .



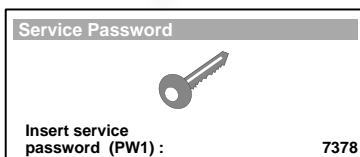
3. Press or button to scroll to menu **Gfc2 Thermoregulat.** then press . Set the fields based on desired configuration.



16.02. Service Password

To access the Service Settings pages a password is required: **7378**

G. Service → **Gf. Service settings** → **Change password to 7378**



Service Password is shown.

WARNING

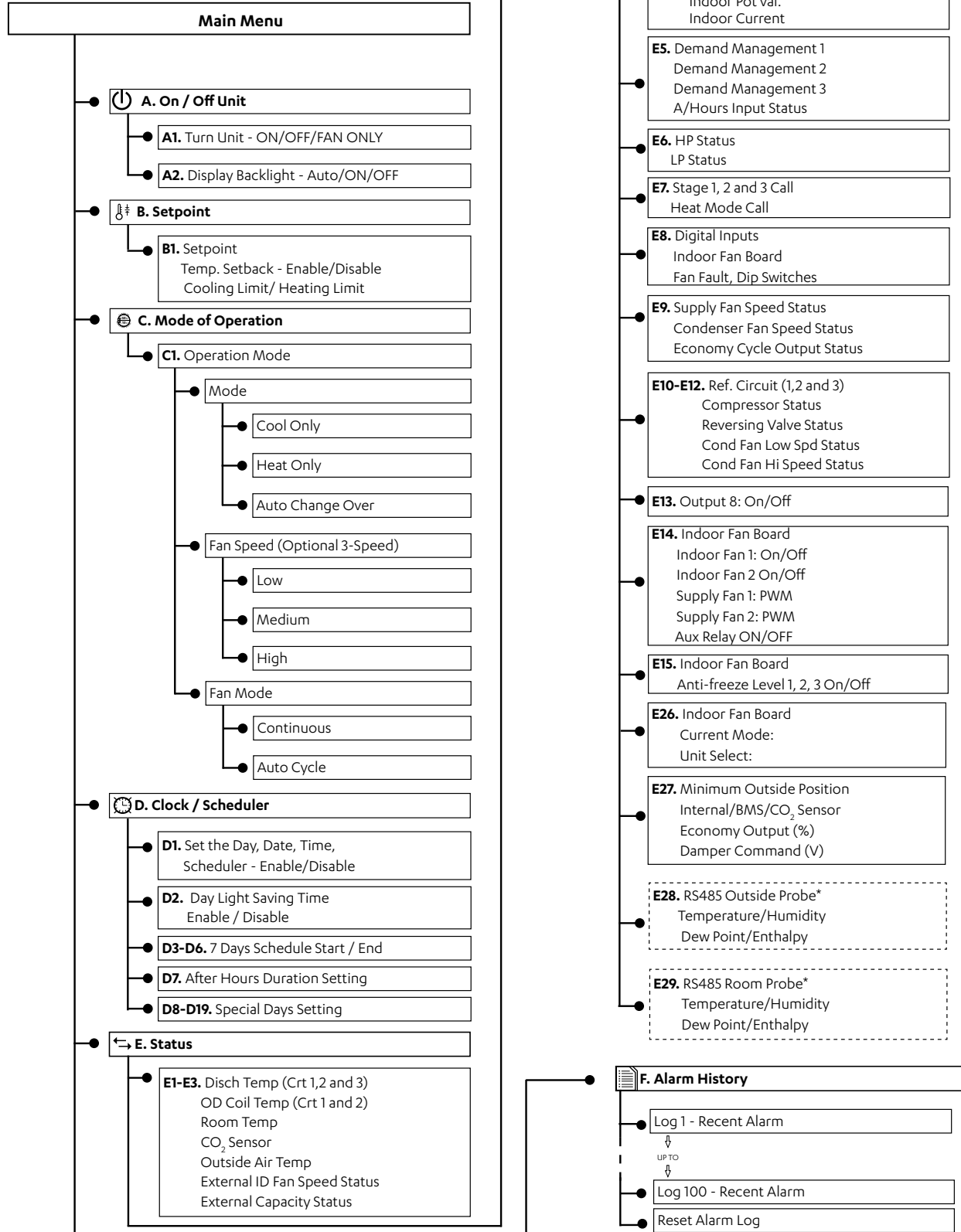
Unauthorized access to Service Menu and inadvertent changes to the settings can cause damage to the air conditioning system which will render ActonAir warranty null and void.

Note: To scroll **Up** or **Down** from existing menu, press **↓** or **↑** button.

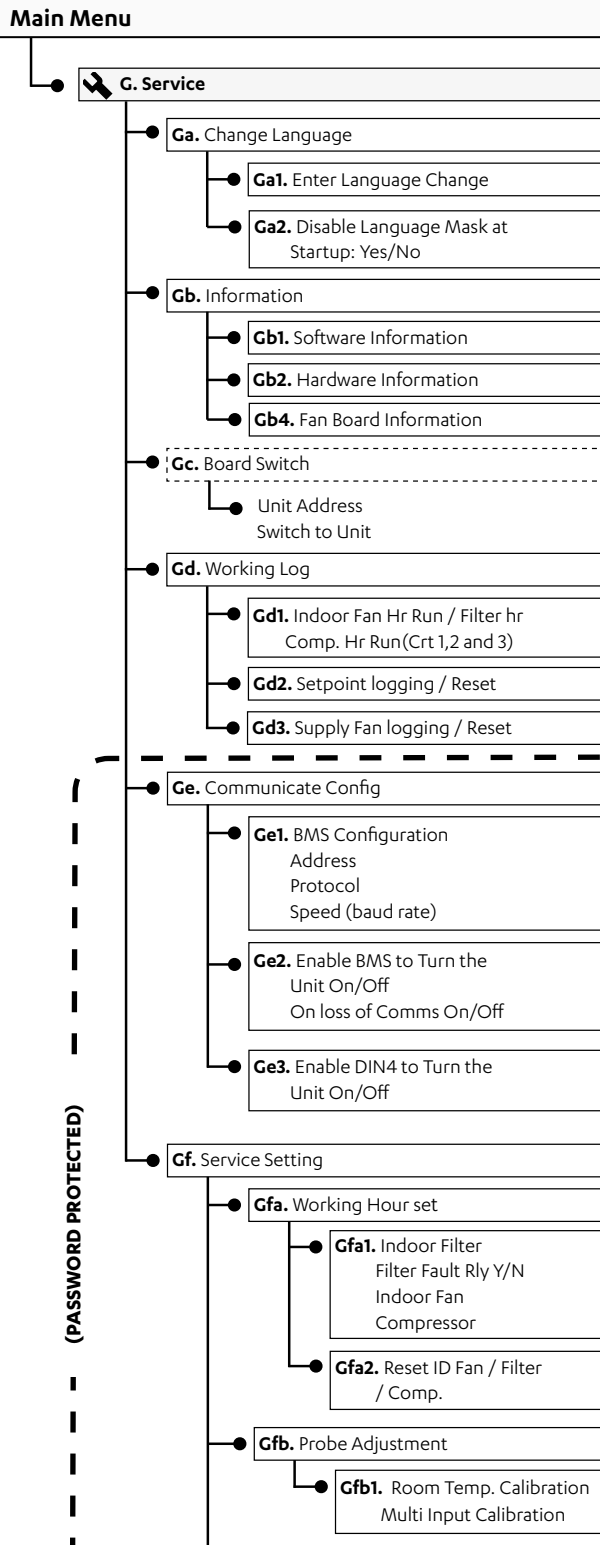
17. MENU TREE

17.01. Main / Status Menu

*Available when enabled via Service Menu.



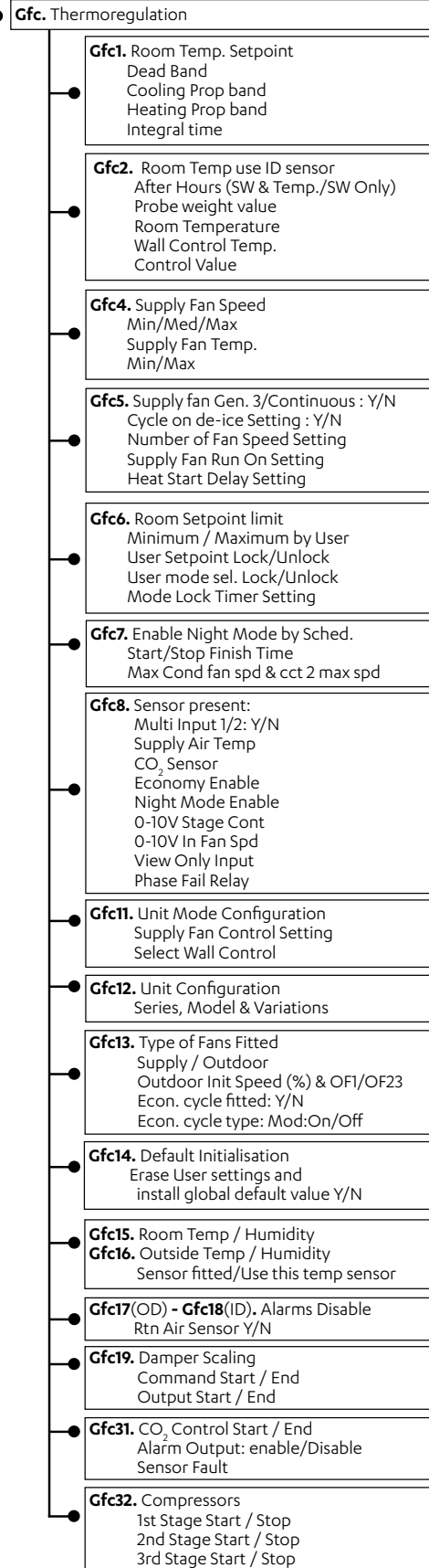
17.02. Service Menu



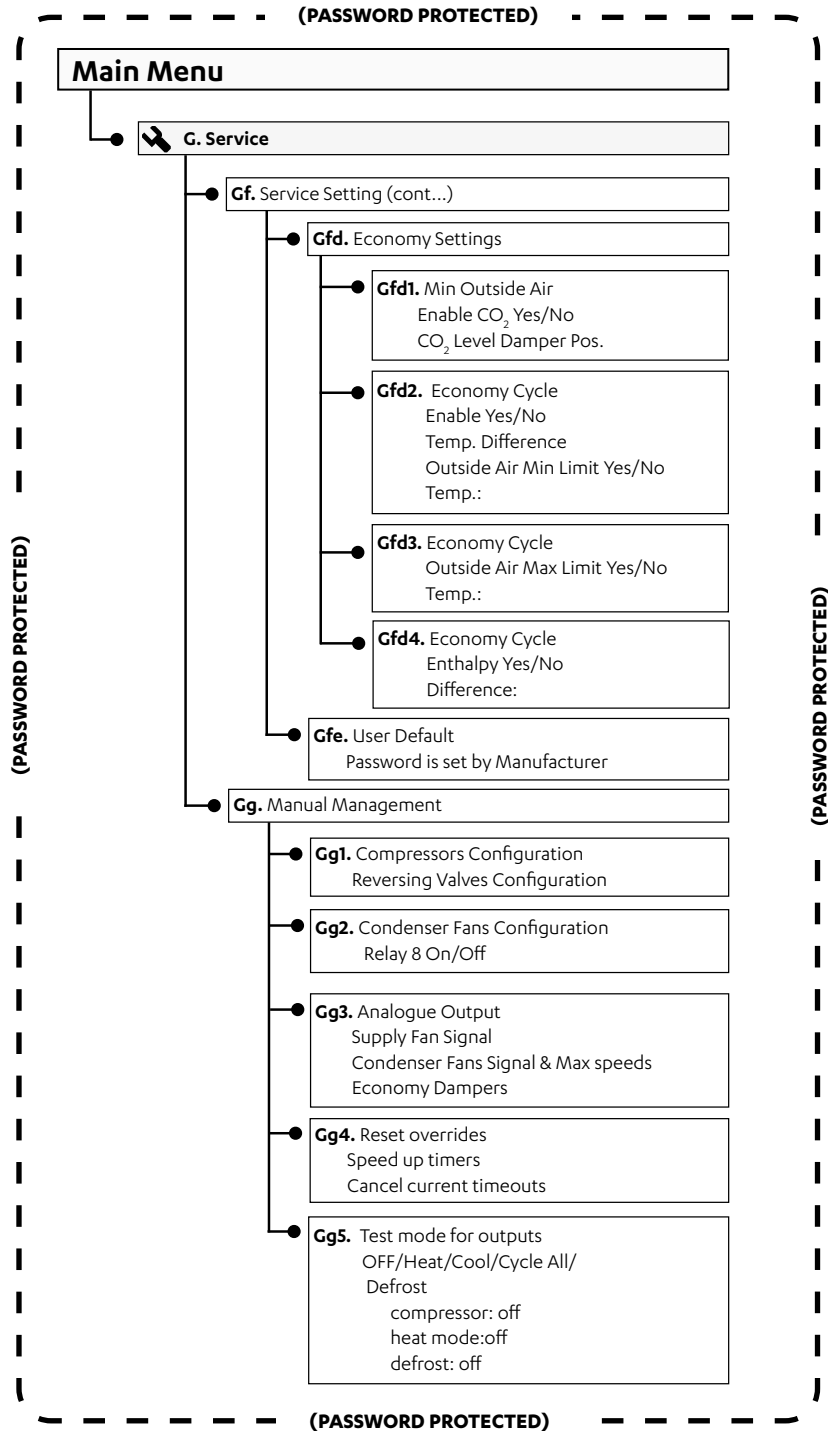
(PASSWORD PROTECTED)

(PASSWORD PROTECTED)

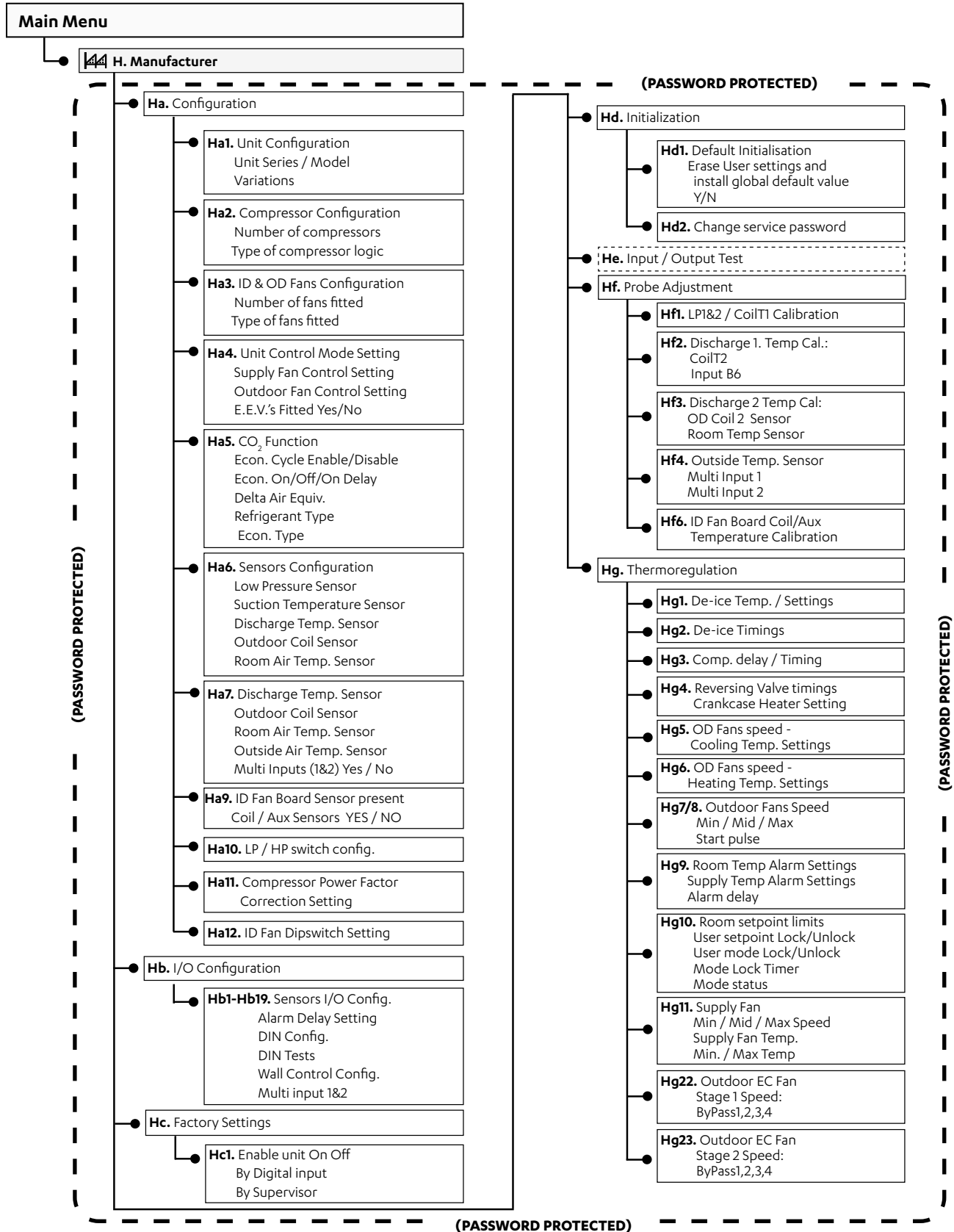
(PASSWORD PROTECTED)



(PASSWORD PROTECTED)



17.03. Manufacturer Menu



18. EXTERNAL INPUT OPERATION

The System is controlled by Third Party Control through wired inputs.

(On/Off, Indoor Fan, Compressor, Heat/Cool and Economy)

REMOTE ON/OFF can only be used when **Enable Scheduler** is set to **NO** (on screen **D1**).

18.01. Unit ON/OFF Configuration.

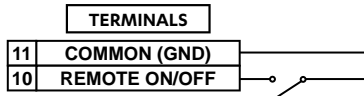
The unit ON/OFF can be configured as follows:

18.01.01. Wiring ON/OFF Input

Unit ON/OFF can be wired using either Method 1 (REMOTE ON/OFF) or Method 2 (IN-FAN (24VAC IN)) as shown below:

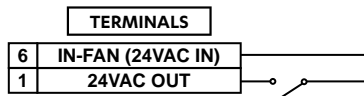
Method 1:

Unit ON/OFF is configured by switching **REMOTE ON/OFF** to **COMMON**.



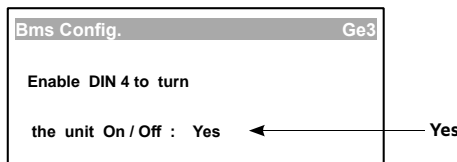
Method 2:

IN-FAN is operated by switching 24VAC. The unit will turn On or Off when the switch is closed or open respectively.



18.01.02. Setting ON/OFF Input

Set **Enable DIN 4 to turn the unit On / Off** (on screen **Ge3**) to **Yes**.

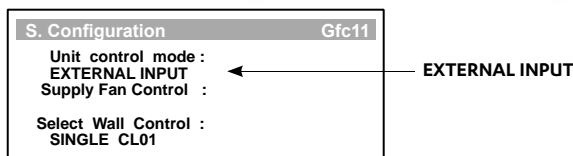


The Unit ON/OFF is now configured.

18.02. EC Indoor Fan Commissioning

Unit control mode is set to **EXTERNAL INPUT** via **Gfc11**

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc11. S. Configuration**



NOTES

- Commissioning of the EC Fans should be carried out by a qualified technician only.
- Make sure that all instructions are followed accordingly.
- Ensure that connecting duct work and air filters are installed accordingly.

1. Refer to Section 27 for Fan Performance Data or the Fan Curve specific to your air conditioner.
2. Determine the Required Fan Speed (%) which matches your Airflow and External Static Pressure requirements using either the Fan Performance Data or the Fan Curve.

Example:

Unit Model: **CAY620T / EVY620T**

Airflow: 3200 l/s

External Static Press: 100 Pa

Required Fan Speed: 62.9%

The Required Fan Speed shall be used with one of the applicable method below.

METHOD	SECTION
CP05 Control Interface	18.02.01
External 0-10VDC Input (Outdoor Unit)	18.02.02
Indoor Board Voltage Adjustment (Potentiometer)*	18.02.03

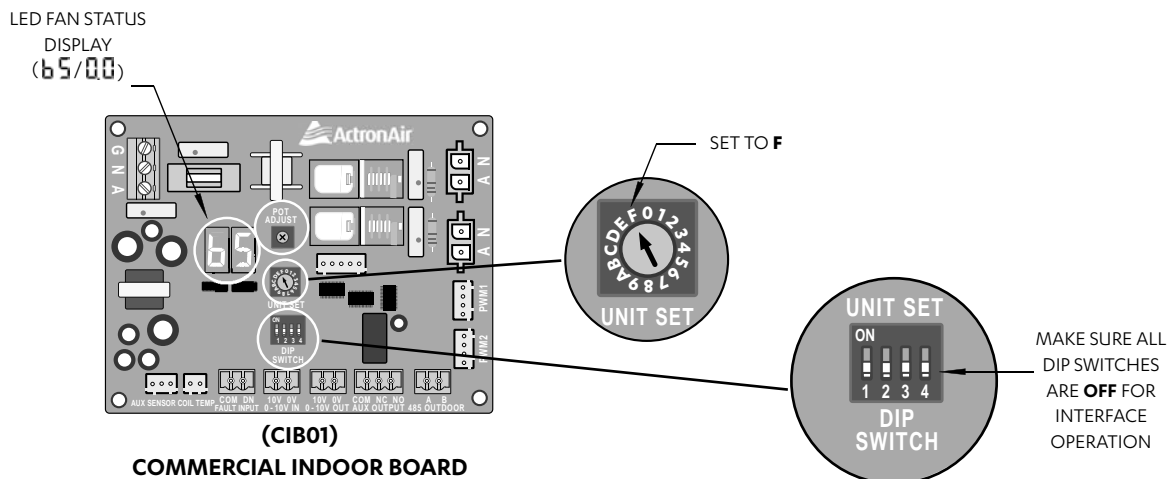
*NOTE

Indoor Board Voltage Adjustment (Potentiometer) is recommended only for Indoor Fan Commissioning prior to Outdoor installation

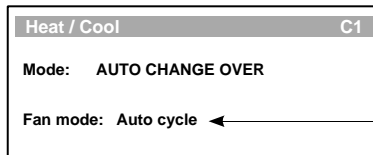
18.02.01. Fan Speed Set Through CP05 Control Interface

Before performing the Indoor fan commissioning procedures below, make sure that the Unit model Set Dial on the indoor board is set to **F** and the DIP switches are all **OFF** (See illustration below).

LED FAN STATUS Display will toggle between **b5** (Interface Control) and **0.0** (0-10V Out Speed Control).



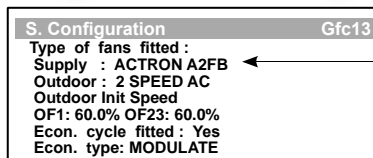
On screen **C1**, set the **Fan Mode** to operate in either **Continuous** or **Auto cycle** (Auto cycle will cycle the indoor fans on/off with the compressor).



Select **Auto Cycle** or **Continuous** Indoor Fan operation

On screen **Gfc13**, set the **Type of fans fitted Supply** to **ACTRON A2FB**.

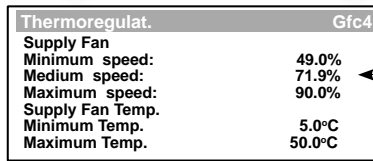
G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc13. S. Configuration**



ACTRON A2FB

On screen **Gfc4**, set the **Supply Fan Medium Speed** to the required indoor fan speed.

G. Service → **Gfc. Service Settings** → **Gfc. Thermoregulation** → **Gfc4. Thermoregulat.**



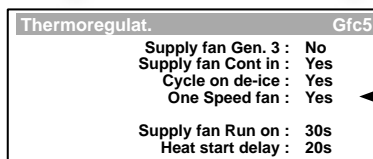
Required Indoor Fan Speed

NOTES

- Minimum and Maximum fan speeds are factory default settings.
- Medium fan speed is the nominal operating fan speed which can be adjusted between the minimum and maximum speed.

Ensure that One Speed fan is set to Yes

G. Service → **Gfc. Service Settings** → **Gfc. Thermoregulation** → **Gfc5. Thermoregulat.**

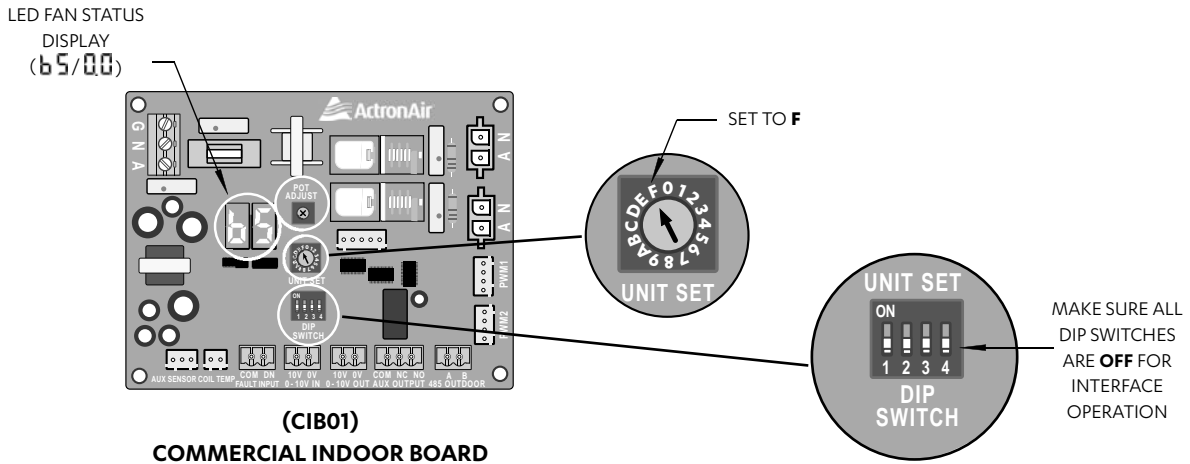


YES

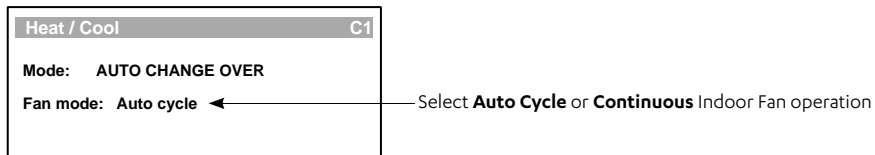
18.02.02. Fan Speed Set External Input 0-10VDC

Before performing the Indoor fan commissioning procedures below, make sure that the Unit model Set Dial on the indoor board is set to **F** and the DIP switches are all **OFF** (See illustration below).

LED FAN STATUS Display will toggle between **b5** (Interface Control) and **00** (0-10V Out Speed Control).

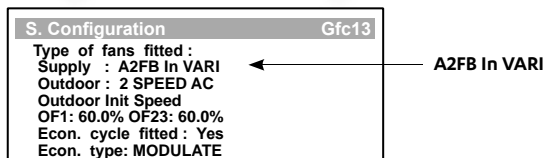


On screen **C1**, set the **Fan Mode** to operate in either **Continuous** or **Auto cycle** (Auto cycle will cycle the indoor fans on/off with the compressor).



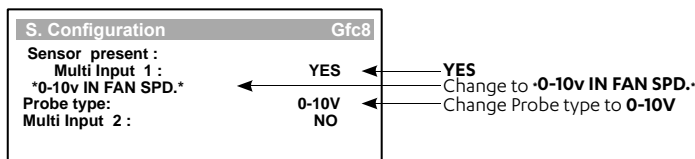
On screen **Gfc13**, set the **Type of fans fitted Supply** to **A2FB in VARI**

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc13. S. Configuration**



On screen **Gfc8**, set a multi input (example shown is multi input 1) to **YES**, ***0-10v IN FAN SPD.*** and **0-10V**.

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc8 S. Configuration**



Now fan speed is set through TERM 13 (Multi input 1), input 0-10VDC, fan speed is maintained within the minimum and maximum speed as shown on screen **Gfc4**.

On screen **Gfc4**, if required, adjust the **Supply Fan Maximum Speed** to your applications maximum fan speed.

G. Service → **Gfc. Service Settings** → **Gfc. Thermoregulation** → **Gfc4. Thermoregulat. (Supply Fan Settings)**.

Thermoregulat.		Gfc4
Supply Fan		
Minimum speed:	49.0%	
Medium speed:	71.9%	
Maximum speed:	90.0%	← % Maximum Fan Speed
Supply Fan Temp.		
Minimum Temp.	5.0°C	
Maximum Temp.	50.0°C	

This will limit the fan speed if the 0-10VDC input is outside this range.

NOTE

Minimum and Maximum fan speeds are factory default settings.

Ensure that One Speed fan is set to Yes

G. Service → **Gfc. Service Settings** → **Gfc. Thermoregulation** → **Gfc5. Thermoregulat.**

Thermoregulat.		Gfc5
Supply fan Gen. 3 :	No	
Supply fan Contin :	Yes	
Cycle on de-ice :	Yes	
One Speed fan :	Yes	← YES
Supply fan Run on :	30s	
Heat start delay :	20s	

Set Supply Fan Control to **EXTERNAL** via **Gfc11**

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc11. S. Configuration**

S. Configuration		Gfc11
Unit control mode :	EXTERNAL INPUT	
Supply Fan Control :	EXTERNAL	← EXTERNAL
Select Wall Control :	SINGLE CL01	

Go to section 18.03 for compressor configuration procedure.

18.02.03. Stand Alone Mode Via Indoor Board Voltage Adjustment (Potentiometer)

NOTE

Recommended only for Indoor Fan Commissioning prior to Outdoor Unit installation.

Make sure that the Unit Set Dial on the CIB01 is set to correspond to your unit model. (Please refer to CIB01 Speed Range and Unit Set Dial Position tables on the next page).

1. Locate the CIB01 Fan Control by undoing the cover of the Indoor Unit's electrical box.
2. Turn - **ON** the unit through the Control Interface.

3. Divide the determined % Fan Speed by 10 to get the corresponding voltage to the nearest one decimal figure.

Example:

Unit Model: **CAY620T / EVY620T**

Airflow: 3200 l/s

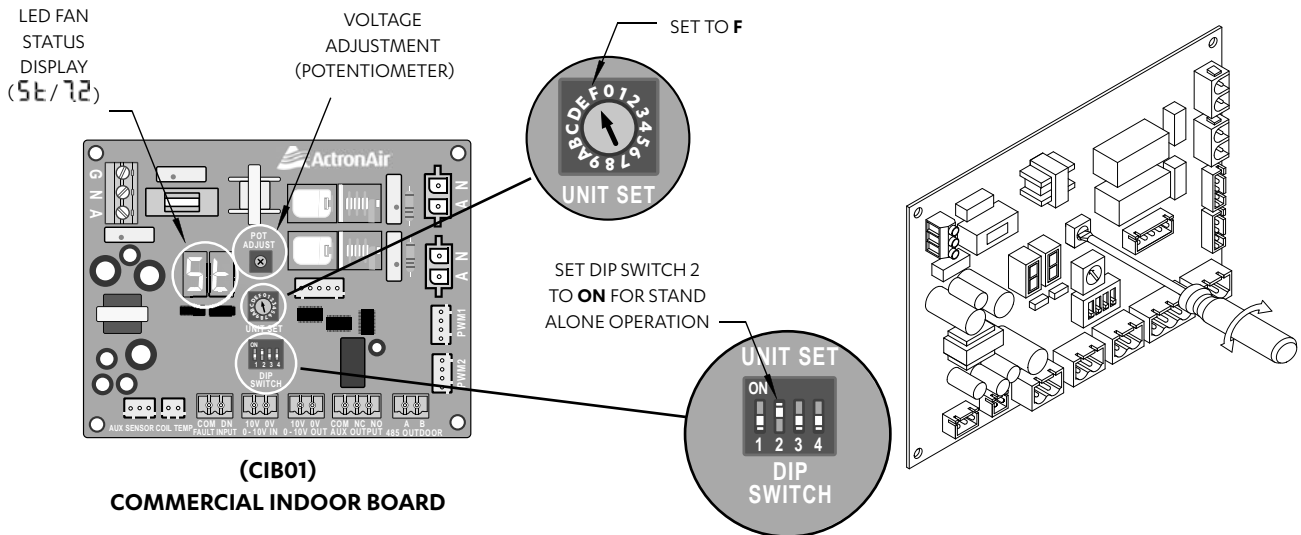
External Static Press: 100 Pa

Required Fan Speed: 62.9%

LED FAN STATUS Display (Divide Required Fan Speed by 10): 6.2V (62.9 / 10); LED adjustments are in 0.1V increments.

4. Use this calculated fan voltage to set the indoor speed via the CIB01 Fan Control.
5. Set DIP switch 2 to **ON** and using slotted screwdriver adjust CIB01 by rotating the Voltage Adjustment (Potentiometer) to obtain the desired voltage. Clockwise to increase the voltage and counter-clockwise to decrease the voltage.

LED FAN STATUS Display will alternately show 5E (Stand Alone) and 7E (0-10V Out Speed Control).



CIB01 SPEED RANGE AND UNIT SET DIAL POSITION*

(CIB01) COMMERCIAL INDOOR BOARD		ACTRONAIR PART NUMBER: 2020-134		
Models		CIB01 Speed Range (v/%)		
		Minimum	Nominal	Maximum
STANDARD PROFILE	CAY500T / EVY500T	3.9/39.6	5.4/54.1	7.5/75
	CAY620T / EVY620T	4.8/48.2	6.2/62.9	9.0/90
	CAY700T / EVY700T	5.2/52.2	7.0/70.9	9.0/90
LOW PROFILE	CAY500T / ELY500T	4.0/40.7	5.3/53.2	7.9/79
	CAY620T / ELY620T	5.4/54.7	7.0/70.1	8.9/89
	CAY700T / ELY700T	6.0/60.2	7.7/77.2	8.9/89

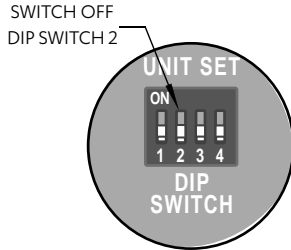
* Refer to specific model fan performance data and fan curve on the following pages for factory default fan settings. Speed range shown are the equivalent voltage in the 0 - 10V potentiometer adjustment.

FINAL COMMISSIONING FAN SETPOINT VOLTAGE	
Fan Speed: V or %	Date:/...../.....

Final defined value for the fan (on the CIB01 seven segment has to be written on the unit wiring diagram **FINAL COMMISSIONING FAN SET POINT VOLTAGE** as shown on the side.

NOTE

When unit is commissioned as a system (Indoor - Outdoor operation) make sure that the final defined value entered on screen **GfC4** is the same as the Medium speed on CPO5.



18.03. Compressor Configuration

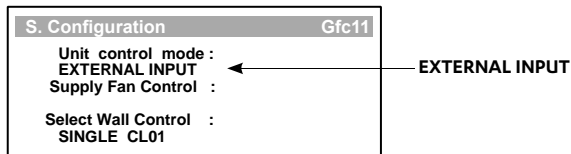
External input modes can be set up as per table below

Component	External Input Configuration	Compressor Configuration Procedure	Wiring Diagram
Compressors	24VAC	18.03.01	26.01 /26.03
	0-10VDC	18.03.02	26.02 /26.04

To configure the External Input of Compressors control combination, perform the specific configuration procedure for the Compressors, as detailed below:

Unit control mode is set to **EXTERNAL INPUT** via **GfC11** screen.

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **GfC11. S. Configuration**

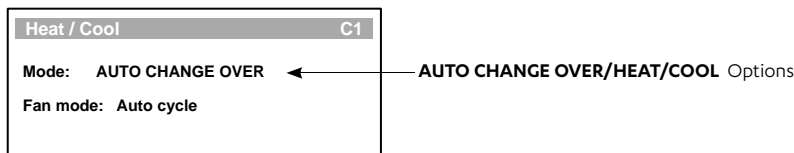


On screen **C1**, set the **Mode** to **Auto change over**, so the Third Party Control will have full control of the compressor operation.

By setting the mode to **Cool only** will restrict the compressor operation to **Cool only**.

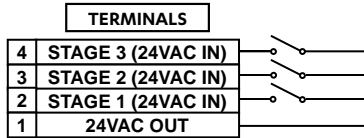
By setting the mode to **Heat only** will restrict the compressor operation to **Heat only**.

Auto cycle will cycle the indoor fans on/off with the compressor.



18.03.01. Compressors 24VAC External Control Mode

Compressors are configured through a 24VAC input from the external control. This is the **DEFAULT** compressor configuration. If this is the compressor external input requirement, no control interface configuration is required. Refer to the wiring diagram for wiring connection.



18.03.02. Compressors 0-10VDC External Control Mode

Compressors can be controlled through a 0-10VDC input from the external control.

NOTE

If a 0-10V input is required the multi-input must be changed as shown per procedure.

Compressors Configuration Procedure for 0-10VDC External Control Mode:

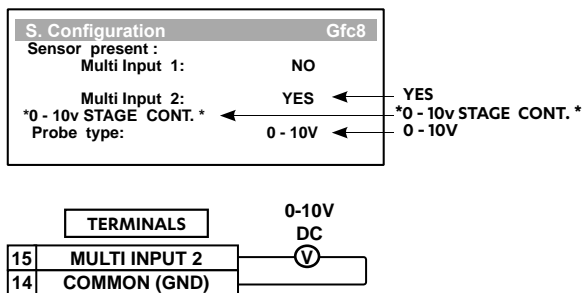
Assign a Multi Input to the Compressors via **S. Configuration** screen **Gfc8**:

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc8. S. Configuration**

Ensure that the Multi Input assigned to the Compressors is set to ***0-10v STAGE CONT.*** and the Probe type: is set to **0 - 10V**

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc8. S. Configuration**

Example shown below is for Compressors with external input assigned to Multi Input 2:



NOTE

For W- 3 Phase Sequence Relay Option, Multi Input 2 (U12) is already used for 24VAC supply. Multi Input 1 (U11) must be used instead.

Multi Input 1 and Multi Input 2 state

Examples of equivalent voltage and capacity scaling are as follows:

3V = 33% capacity (stage 1); 6V = 66% capacity (stage 2); 9V = 100% capacity (stage 3)

Main Menu → E. Status → E2. Input / Output

Input / Output		E2
** Analogue Inputs **		
Discharge 2 Temp :	13.5°C	
Out Coil 2 Temp. :	15.9°C	
Room temp. :	22.6°C	
Out. Air temp. :	16.0°C	
Ext. InFan Spd. :	590	
Ext. Capacity :	330	

If Multi Input 1 is configured (as per Section 18.02.02), status will be shown as: External indoor fan speed set on the Third Party Control will be displayed.

If Multi Input 2 is configured (as per Section 18.03), status will be shown as: External capacity set on the Third Party control, as displayed on the Control Interface
e.g. 330=3.3V or 33% Spd

18.03.03. Economy Cycle On/Off Digital Input

In this mode of Damper operation (On/Off), the damper will be:

1. Closed when the unit is OFF.
2. Open to **Max Outside Air Damper (100%)** position when **Multi Input 1** (or 2) is switched to GND (0V) and the unit is ON.
3. Open to **Min Outside Air Damper** position when **Multi Input 1** (or 2) is open (disconnected from 0V (GND)) and the unit is ON.

Set the **Econ. type** to **ON/OFF** on **Gfc13**

S. Configuration	Gfc13
Type of fans fitted	
Supply : 3 SPEED (EC)	
Outdoor : VARI SPEED	
Outdoor Init Speed	
OF1: 60.0% OF23: 60.0%	
Econ. cycle fitted :	Yes
Econ. type :	ON / OFF

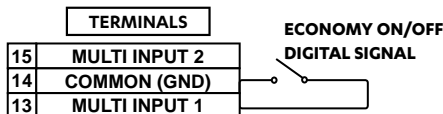
Set up **Multi Input 1** (or 2) to **ECONOMY ENABLE** and **Probe type** to **ON/OFF** as shown below:

G. Service → Gf. Service settings → Gfc. Thermoregulation → Gfc8 S. Configuration

S. Configuration	Gfc8
Sensor present :	
Multi Input 1 :	YES
*ECONOMY ENABLE *	ON/OFF
Probe type :	NO
Multi Input 2 :	

YES
ECONOMY ENABLE
ON/OFF

Switch **Multi Input 1** (or 2) to **COMMON (GND)** to operate the Economy Cycle (Maximum Outside Air)



18.03.04. Min. Outside Air: (Configurable in Gfd1 screen)

Min Outside Air	Gfd1
Enable CO2:	NO
Damper Position	20.0%

NO
Set to application requirement

SCREEN WHEN CO₂ IS DISABLED

19. INTERNAL SENSOR OPERATION

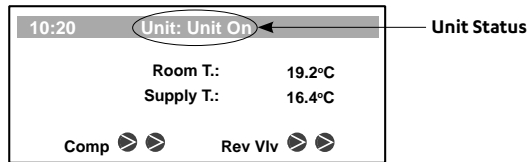
The System is controlled by the ActronAir CM100 control.
(On/Off, Indoor Fan, Compressor, Heat/Cool and Economy)

19.01. Unit ON/OFF Configuration

The unit ON/OFF can be configured to one of the following:

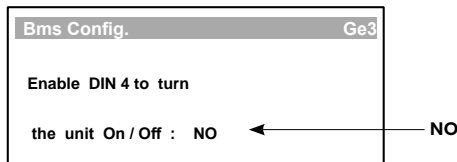
- Option 1:** MANUAL ON/OFF
- Option 2:** TIME SCHEDULER
- Option 3:** EXTERNAL UNIT ON/OFF

Unit status will be shown on the Main Menu. Screen below shows Unit status as Unit On.

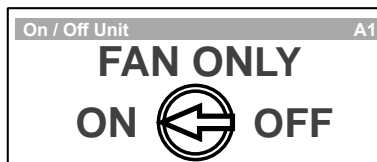


Option 1: MANUAL ON/OFF

Ensure that **Enable DIN 4 to turn the unit On / Off** (on screen **Ge3**) is set to **NO**.



Turn On or Off the unit (on screen **A1**) when required.



NOTE

Selecting **Fan Only** will turn on the supply fan without compressor operation.

The Unit ON/OFF is now configured.

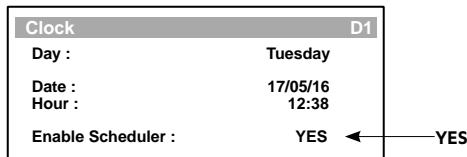
Unit ON/OFF CP05 (CP10, CL01 optional)	UNIT STATUS
ON	Unit On
OFF	OFF by KEY

Option 2: TIME SCHEDULER

Ensure that **Enable DIN 4 to turn the unit On / Off** (on screen **Ge3**) is set to **NO**.



Ensure **Enable Scheduler** (on screen **D1**) must be **Yes**.



Then set the weekly, After Hours and special days time scheduler via screens (**D3 – D19**) to your requirements. The Unit ON/OFF is now configured.

Unit ON/OFF CP05 (CP10, CL01 optional)	SCHEDULE	UNIT STATUS
ON	ON	Unit On
ON	OFF	OFF by SCH
OFF	ON or OFF	OFF by KEY

Option 3: External Unit ON/OFF

The Unit ON/OFF can be controlled via external relay

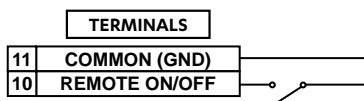
Unit ON/OFF CP05 (CP10, CL01 optional)	REMOTE ON/OFF	UNIT STATUS
ON	ON	Unit On
ON	OFF	OFF by DIN
OFF	ON or OFF	OFF by KEY

19.01.01. Wiring ON/OFF Input

Unit ON/OFF can be wired using either **Method 1: External Unit ON/OFF** or **Method 2: IN-FAN (24VAC IN)**.

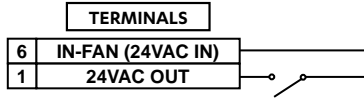
Method 1: External Unit ON/OFF

External Unit ON/OFF is operated by switching REMOTE ON/OFF to COMMON.



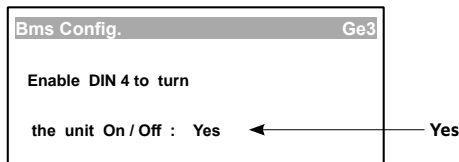
Method 2: IN-FAN (24VAC IN)

External Unit ON/OFF is operated by switching **24VAC** to **IN-FAN** terminal.

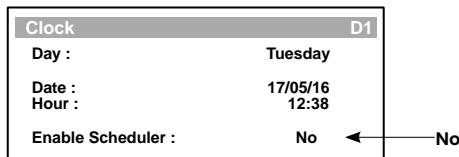


19.01.02. Setting ON/OFF Input

Set **Enable DIN 4** to turn the unit On / Off (on screen **Ge3**) to **Yes**.



Enable Scheduler (on screen **D1**) must be **No**.



Ensure **ON/OFF Unit** (on screen **A1**) is **ON**.



The Unit ON/OFF is now configured.

19.02. Indoor Fan Configuration

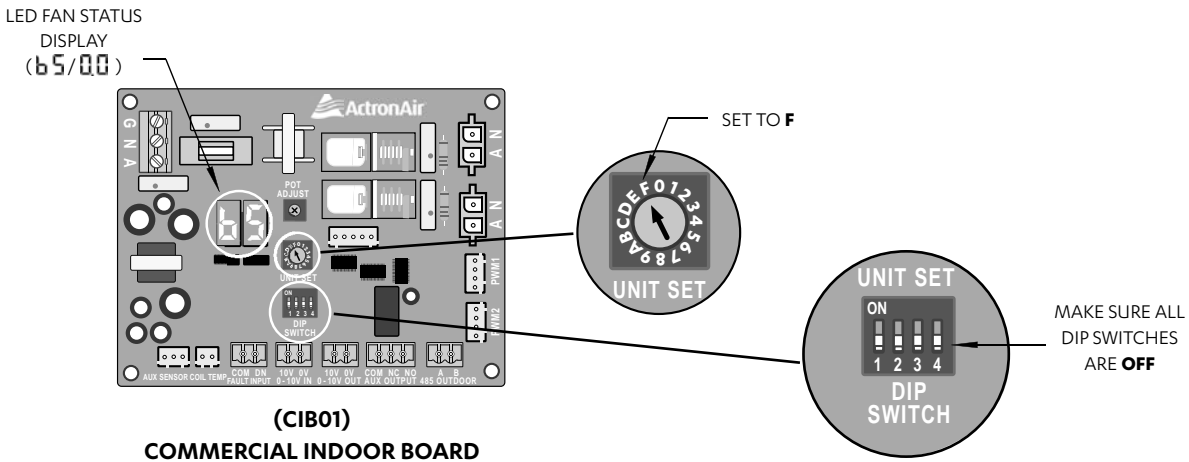
NOTES

- Commissioning of the EC Fans should be carried out by a qualified technician only.
- Make sure that all instructions are followed accordingly.
- Ensure that connecting duct work and air filters are installed accordingly.

19.02.01. Indoor Fan Speed Setting Procedure via Control Interface

Before performing the Indoor fan commissioning procedures below, make sure that the Unit S on the indoor board is set to **F** and the DIP switches are all **OFF** (See illustration below).

LED FAN STATUS Display will alternately show **b5** (Interface Control) and **00** (0-10V Out Speed Control).



Unit control mode is set to **INTERNAL SENSOR** via **Gfc11**

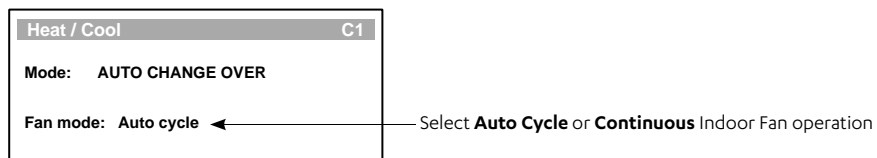


On screen **C1**, set the **Mode** to **AUTO CHANGE OVER**, so the **INTERNAL SENSORS** will have full control of the compressor operation.

By setting the mode to **Cool only** will restrict the compressor operation to **Cool only**.

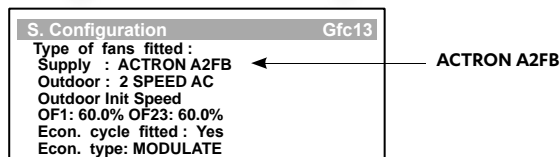
By setting the mode to **Heat only** will restrict the compressor operation to **Heat only**.

Then set the **Fan Mode** to operate in either **Continuous** or **Auto cycle** (Auto cycle will cycle the indoor fans on/off with the compressor).



On screen **Gfc13**, set the **Type of fans fitted Supply** to **ACTRON A2FB**.

G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc13. S. Configuration**



19.02.02. Indoor EC Fan Speed setting / Commissioning Procedure Via Control Interface

1. Refer to the Fan Performance Data or the Fan Curve specific to your air conditioner.
2. Determine the Required Fan Speed (%) which matches your Airflow and External Static Pressure requirements using either the Fan Performance Data or the Fan Curve.

Example:

Unit Model: **CAY620T / EVY620T**

Airflow: 3200 l/s

External Static Press: 100 Pa

Required Fan Speed: 62.9%

LED FAN STATUS Display (Divide Required Fan Speed by 10): 6.2V (62.9 / 10); LED adjustments are in 0.1V increments.

3. Use this Required Fan Speed % to set the medium speed via the control interface, following the menu navigation:

G. Service → Gfc. Service Settings → Gfc. Thermoregulation → Gfc4. Thermoregulat. (Supply Fan Settings).

Thermoregulat.		Gfc4
Supply Fan		
Minimum speed:	48.2%	
Medium speed:	62.9%	← % Medium Fan Speed
Maximum speed:	90.0%	
Supply Fan Temp.		
Minimum Temp.	5.0°C	
Maximum Temp.	50.0°C	

NOTES

- Minimum and Maximum fan speeds are factory default settings.
- Medium fan speed is the nominal operating fan speed which can be adjusted between the min and max speed.

20. SETTING UP BMS (REMOTE DEMAND) OPTIONAL

For optional BMS (Remote Demand) Optional Mode, see Installation and Commissioning Guide (0525-036).

21. SETTING ECONOMY CYCLE OPERATION

The Economy mode is based on Dry Bulb ΔT logic only and operates when cooling is required.

The conditions for Economy Cycle are required to be satisfied for a continuous period of 180s to start the Economy Cycle operation.

The Economy Cycle operation will continue to operate for at least 180s duration.

21.01. Setting Economy Cycle Type

The economy cycle operation can be set via the Control Interface as follow:

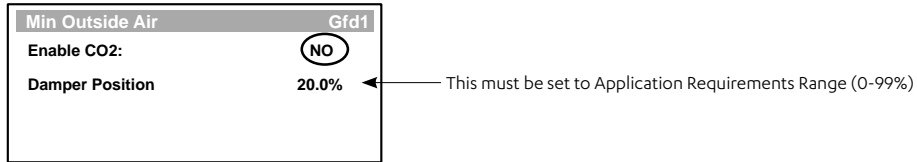
G. Service → Gf. Service settings → Gfc. Thermoregulation → Gfc13 S. Configuration

By default Econ. type is set to **MODULATE**. In this setting, ActronAir internal control logic modulates the damper positioning.

S. Configuration		Gfc13
Type of fans fitted		
Supply :	ACTRON A2FB	
Outdoor :	2 SPEED AC	
Outdoor Init Speed		
OF1:	60.0% OF23: 60.0%	
Econ. cycle fitted :	Yes	
Econ. type :	MODULATE	

21.01.01. Min Outside Air: (Configurable in **Gfd1** screen)

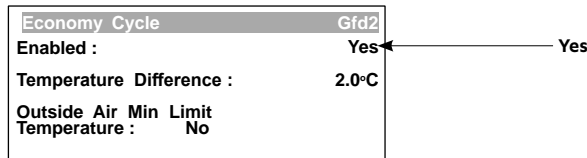
Set the minimum damper positioning:



To use ActronAir CO₂ sensor, refer to Document Part No. 9590-3011.

21.01.02. Enable Economy Cycle: (Configurable in **Gfd2** screen)

To use the Economy Cycle logic, set **Enabled** to **YES** as shown below.



NOTE

In some cases, 1 or 2 Humidity Sensors may need to be setup and connected.

21.01.03. Temperature difference to enable cycle: (Configurable in **Gfd2** screen)

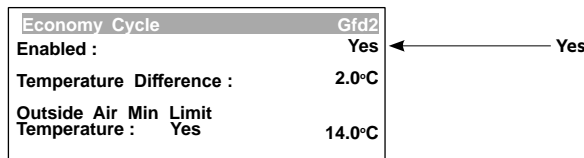
This setting is the difference required between the **Room Air Temp.** (T_{Room}) and the **Outside Air Temp.** ($T_{Outside\ Air}$). For example, if $(T_{Room} - T_{Outside\ Air})$ Temperature Diff $> 2.0^{\circ}C$ (Default) then the economy cycle will be activated.

Settings: Min = $-2.0^{\circ}C$, Max = $9.9^{\circ}C$, Default = $2.0^{\circ}C$

21.01.04. Minimum Outside Air Temp.: (Configurable in **Gfd2** screen)

To use this option, set **Outside Air Min Limit Temperature** to **Yes**. If the $T_{Outside\ Air} < \text{Outside Air Min Limit Temperature}$, the economy cycle will stop, and the damper will remain open at the minimum opening value set by the **Min Outside pos.**

Settings: Min = $0.0^{\circ}C$, Max = $25.0^{\circ}C$, Default = $14.0^{\circ}C$



21.01.05. Maximum Outside Air Temp.: (Configurable in Gfd3 screen)

To use this option, set **Outside Air Max Limit Temperature** to **Yes**. If the $T_{\text{Outside Air}} > \text{Outside Air Max Limit Temperature}$, the economy cycle will stop, and the damper will remain open with maximum opening value set by **Min Outside pos**.

Settings: Min = 0.0°C, Max = 25.0°C, Default = 16.0°C

Economy Cycle		Gfd3
Outside Air Max Limit Temperature :	Yes	16.0°C
Humidity :	No	
Enthalpy :	No	
Dew Point:	No	

Yes

NOTE

To use humidity sensor option in economy cycle, refer to Humidity Sensor Installation and Commissioning Guide.

22. ROOM AIR TEMPERATURE SENSOR INSTALLATION

NOTES

- Install the Room Air Temperature Sensor in the most suitable location to ensure adequate sensing.
- Ensure that the sensor is located where the room air is not affected by other heat sources.
- The Room Air Temperature Sensor must be properly secured in the chosen location.
- The Sensor wire should be routed securely and not to be exposed to sunlight, rain, dust and other contaminants.
- Ensure the sensor cable is ran separately to any low/high voltage cables to avoid interference.

22.01. Room Air Temperature Sensor Wired to Indoor Unit

The Room Air Temperature Sensor by default is installed in the indoor unit. Exact location of the sensor bulb will be determined by the installing contractor on site.

The supplied length of the sensor is 6m and can be extended by the contractor on site. See Maximum Cable Length table in section 15.02.

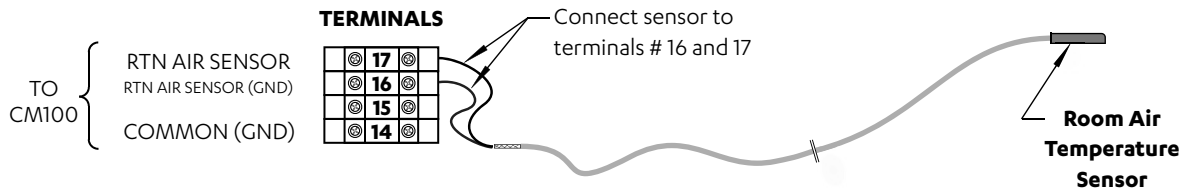
22.02. Room Air Temperature Sensor Wired to Outdoor Unit

The Room Air Temperature Sensor can also be installed inside the outdoor unit if its location is suitable to place the temperature sensor. However, the installer must remove the installed temperature sensor from indoor and connect to outdoor unit. To do this follow the procedure below.

- Remove the temperature coil sensor from the indoor PCB.
- Cut the cable of the Room Air Temperature sensor, as close as possible to the plug.
- Strip the cable to expose the wires:



d. Connect the sensor wires to the Outdoor Terminals:



e. Setup the sensor location in CP05 control interface. See Air Temperature Set-Up in Control Interface section.

NOTES

- The supplied Room Air Temperature Sensor (ActronAir Part Number: 2060-036) is a Duct Bead type sensor on the CP05/CP10 display. A wall type sensor is also available as an option (ActronAir Part Number: LM-RS-2).
- For longer installation requirements, it is possible to extend the provided 6m sensor lead wire with an extension wire. The extension wire **MUST** comply to the specifications on **Section 23.04** and the installer is required to adjust the sensor to get correct reading.

23. ROOM AIR TEMPERATURE SETUP IN CONTROL INTERFACE

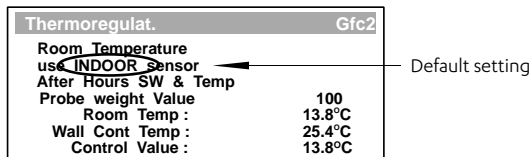
Below procedures show how to setup the air temperature sensors depending on terminal location (indoor or outdoor).

23.01. Indoor / Outdoor Setup

Enter **G. Service Menu**

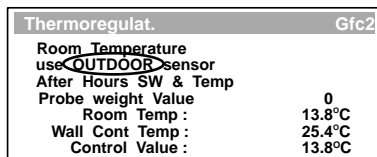
G. Service → **Gf. Service settings** → **Gfc. Thermoregulation** → **Gfc2. Thermoregulat.**

Option 1: Room Temperature Sensor wired to Indoor Unit



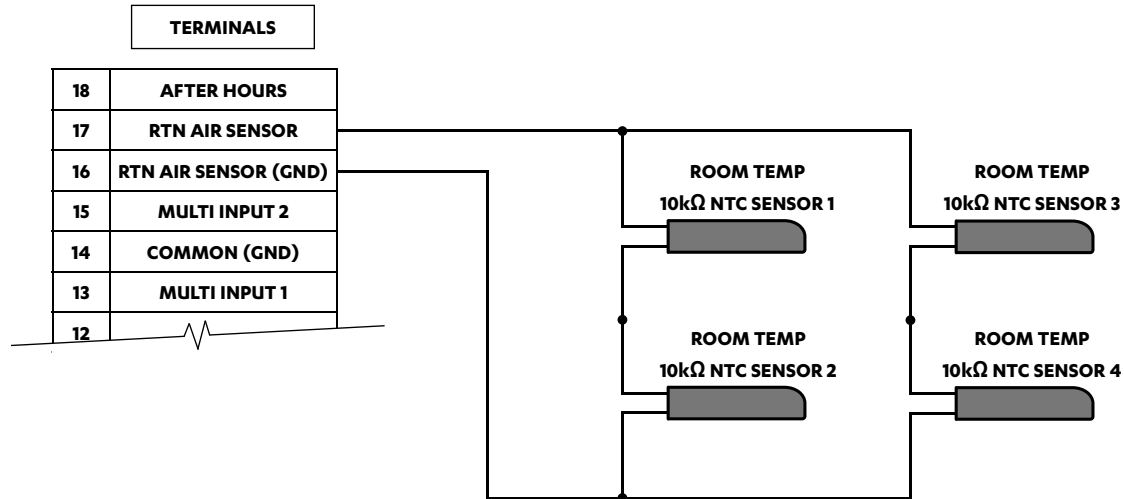
Option 2: Room Temperature Sensor wired to Outdoor Unit

Change the Room Temperature to **OUTDOOR** as shown in the screen.



23.02. Averaging Four Room Air Temperature Sensors (Optional)

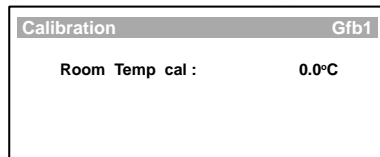
Additional sensors may be purchased separately from ActronAir.



23.03. Room Temperature Sensor Adjustment Instructions

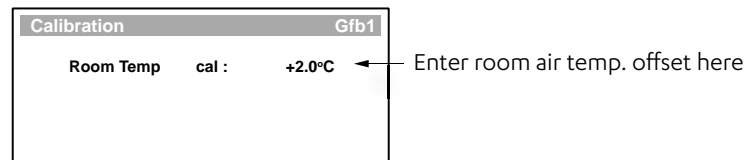
To calibrate the Room Air Temperature sensor, follow the service menu steps:

G. Service → Gf. Service settings → Gfb. Probe adjustment → Gfb1. Calibration



Example:

If the actual measured room temperature is 2.0°C higher than control interface reading, adjust the offset to -2.0°C. Adjustable offset range is from -9.9°C to +9.9°C.



Probe Adjustment Display

23.04. Specifications - Sensor Lead Wire

Item	Distance	
	up to 50m	up to 100m
NTC (Sensor Wire) *	0.5mm ²	1.0mm ²

*** For compliance with EMC requirements, connect the screen wire to Terminal 22 on the Outdoor Terminal Strip.**

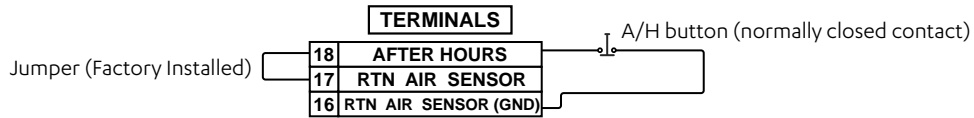
Use only the provided ActronAir duct bead sensor or the optional wall sensor.

Use of Third Party sensors are done at the contractors' risks and ActronAir accepts no responsibility for performance or sensing issues.

24. AFTER HOURS LOGIC WITH TIMECLOCK (SCHEDULER)

24.01. After Hours wiring to outdoor unit

Option 1: After Hours button wired to Outdoor Unit.

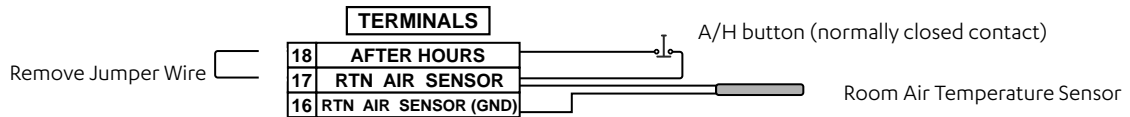


Thermoregulat.		Gfc2
Room Temperature		
use	OUTDOOR	sensor
After Hours SW & Temp		
Probe weight Value		0
Room Temp :		13.8°C
Wall Cont Temp :		25.4°C
Control Value :		13.8°C

Use this option if using Indoor/CL01 sensor

Option 2: After Hours button with Room Air Temperature Sensor wired to Outdoor Unit.

Remove Jumper (Factory installed) wire from terminal 17 and 18.



24.02. Operational Logic

If the scheduler is enabled, the After Hours function will start when the After Hours button is pressed and held for 5 seconds.

25. ENABLE / DISABLE AIR FILTER ALARM

The Tri-Capacity control gives the user the option to Enable / Disable the Air Filter Alarm.

Procedure:

1. Set the **Indoor Filter** alarm timer in hours. Adjustable range is 0-900 hours.

G. Service → **Gf. Service settings** → **Gfa. Working hour set** → **Gfa1. Work. hours set**

Work. hours set	Gfa1
Indoor Filter :	200h
Filter Fault relay:	No
Indoor Fan :	10000h
Compressor :	10000h

Setting **Indoor Filter** to **000h** will disable the filter alarm and notification. At this setting, the output fault relay will not be energised.

2. To enable the Alarm Relay Output (Air Filter cleaning) notification, Set **Filter Fault relay** to Yes.

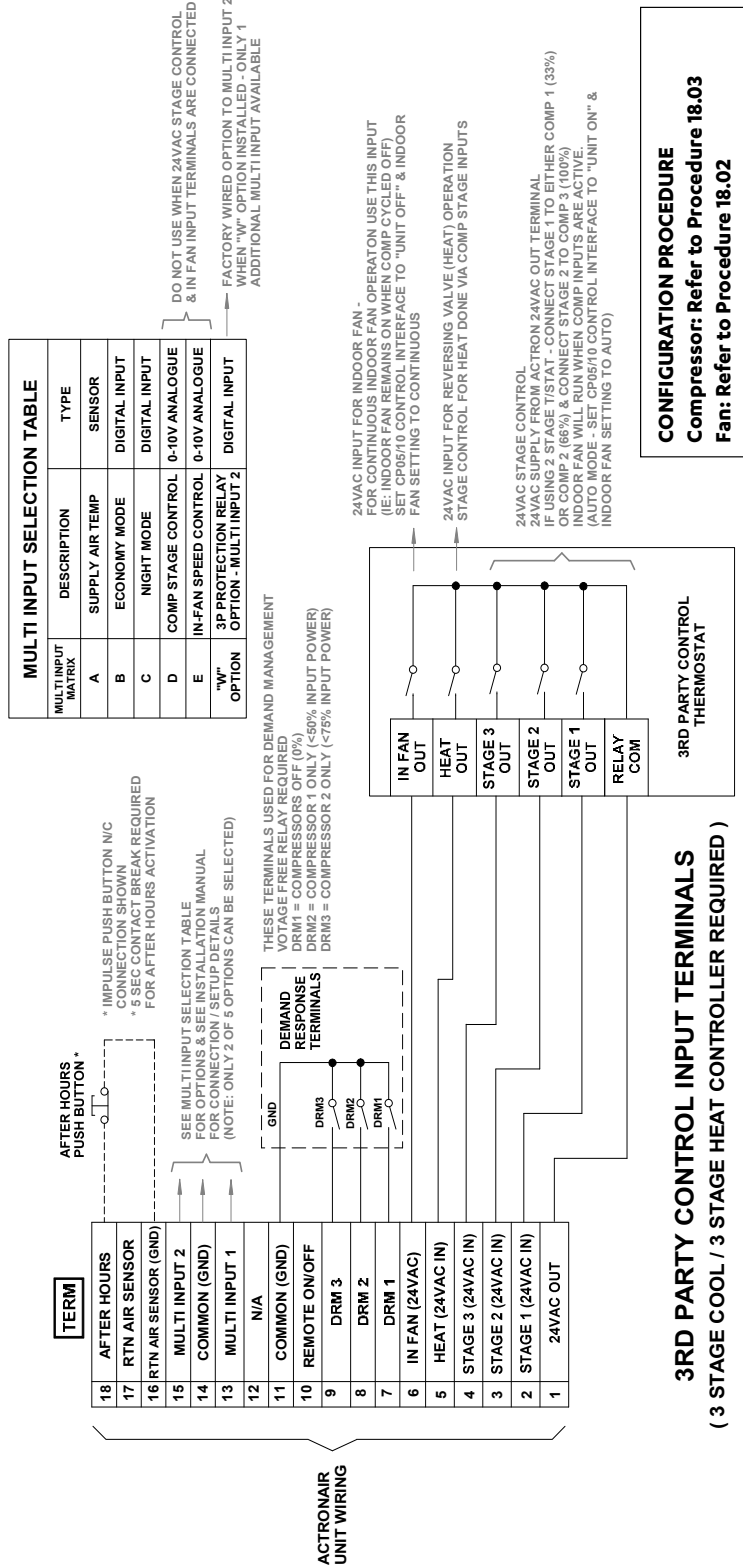
G. Service → **Gf. Service settings** → **Gfa. Working hour set** → **Gfa1. Work. hours set**

Work. hours set	Gfa1
Indoor Filter :	200h
Filter Fault relay :	Yes
Indoor Fan :	10000h
Compressor :	10000h

26. EXTERNAL INPUT WIRING DIAGRAMS

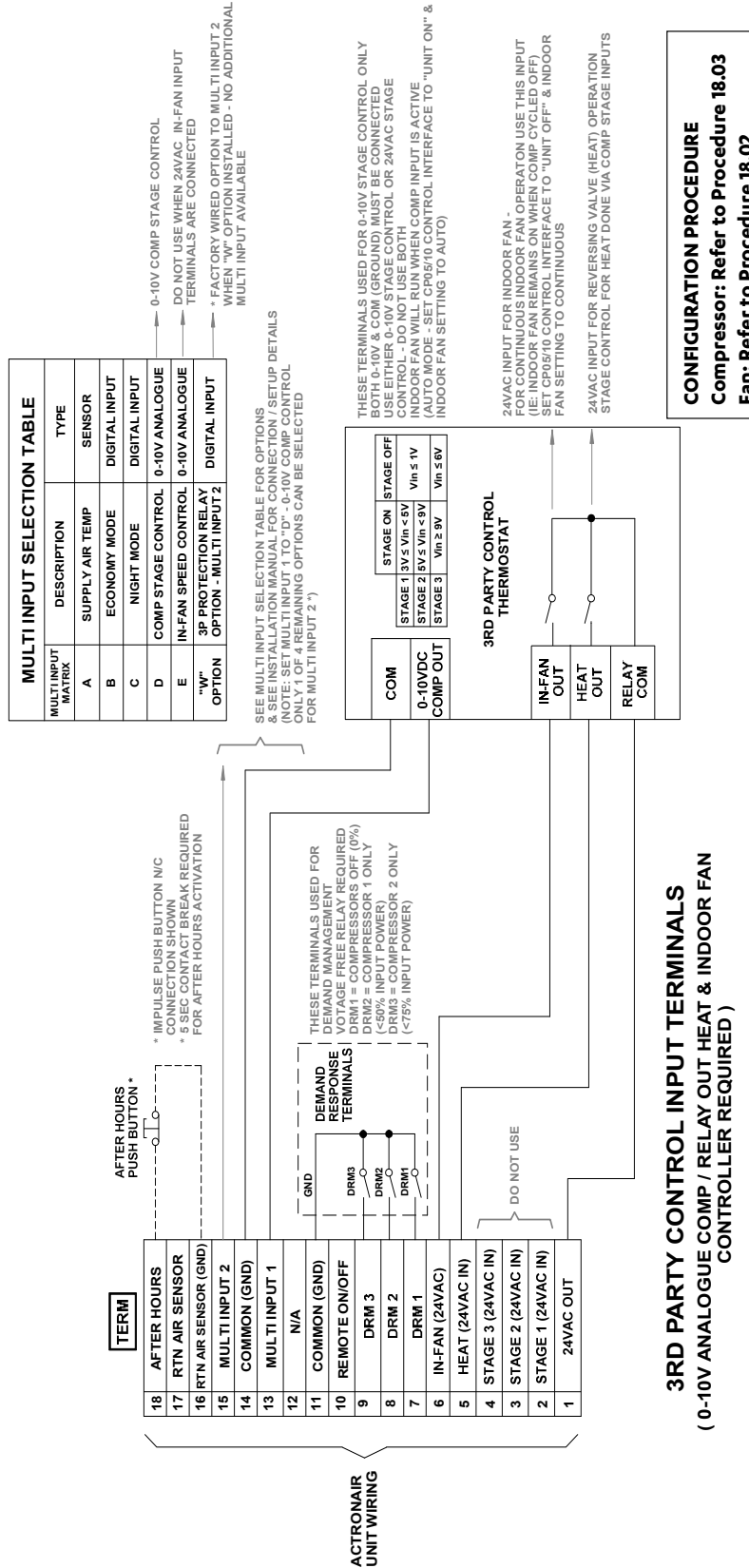
26.01. 24VAC Relay Output Compressors and Indoor Fans

TRI-CAPACITY CM100 COMMERCIAL CONTROLS 3RD PARTY THERMOSTAT CONTROLLER CONNECTION 24VAC RELAY OUTPUT FOR COMPRESSOR & INDOOR FAN



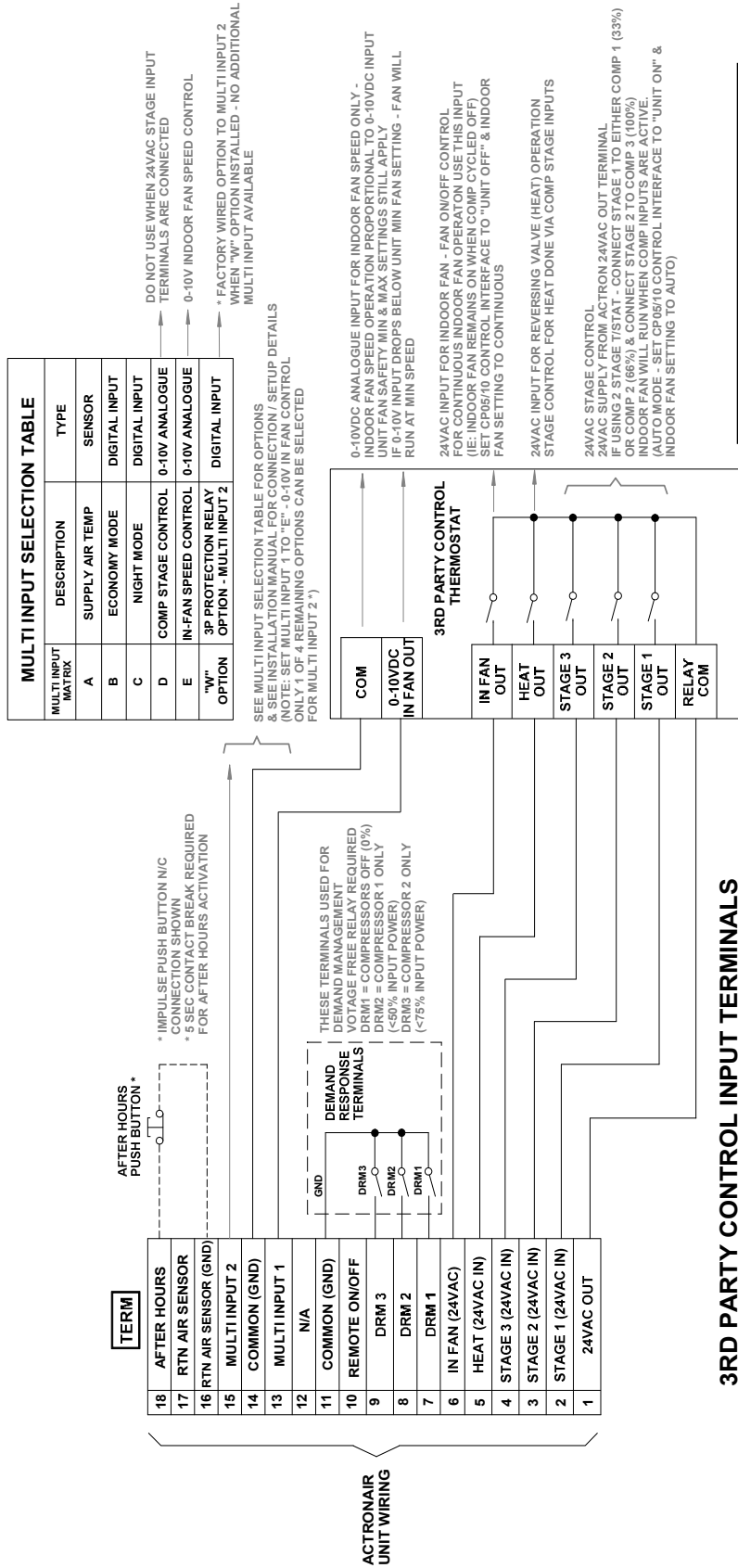
26.02. 0-10 Analogue Output Compressor and 24VAC Relay Output Indoor Fans

TRI-CAPACITY CM100 COMMERCIAL CONTROLS 3RD PARTY THERMOSTAT CONTROLLER CONNECTION 0-10V ANALOGUE OUTPUT FOR COMPRESSOR & 24VAC RELAY OUTPUT FOR INDOOR FAN



26.03. 24VAC Relay Output Compressor and 0-10 Analogue Output Indoor Fans

TRI-CAPACITY CM100 COMMERCIAL CONTROLS
3RD PARTY THERMOSTAT CONTROLLER CONNECTION
24VAC RELAY OUTPUT FOR COMPRESSOR & 0-10V ANALOGUE OUTPUT FOR INDOOR FAN

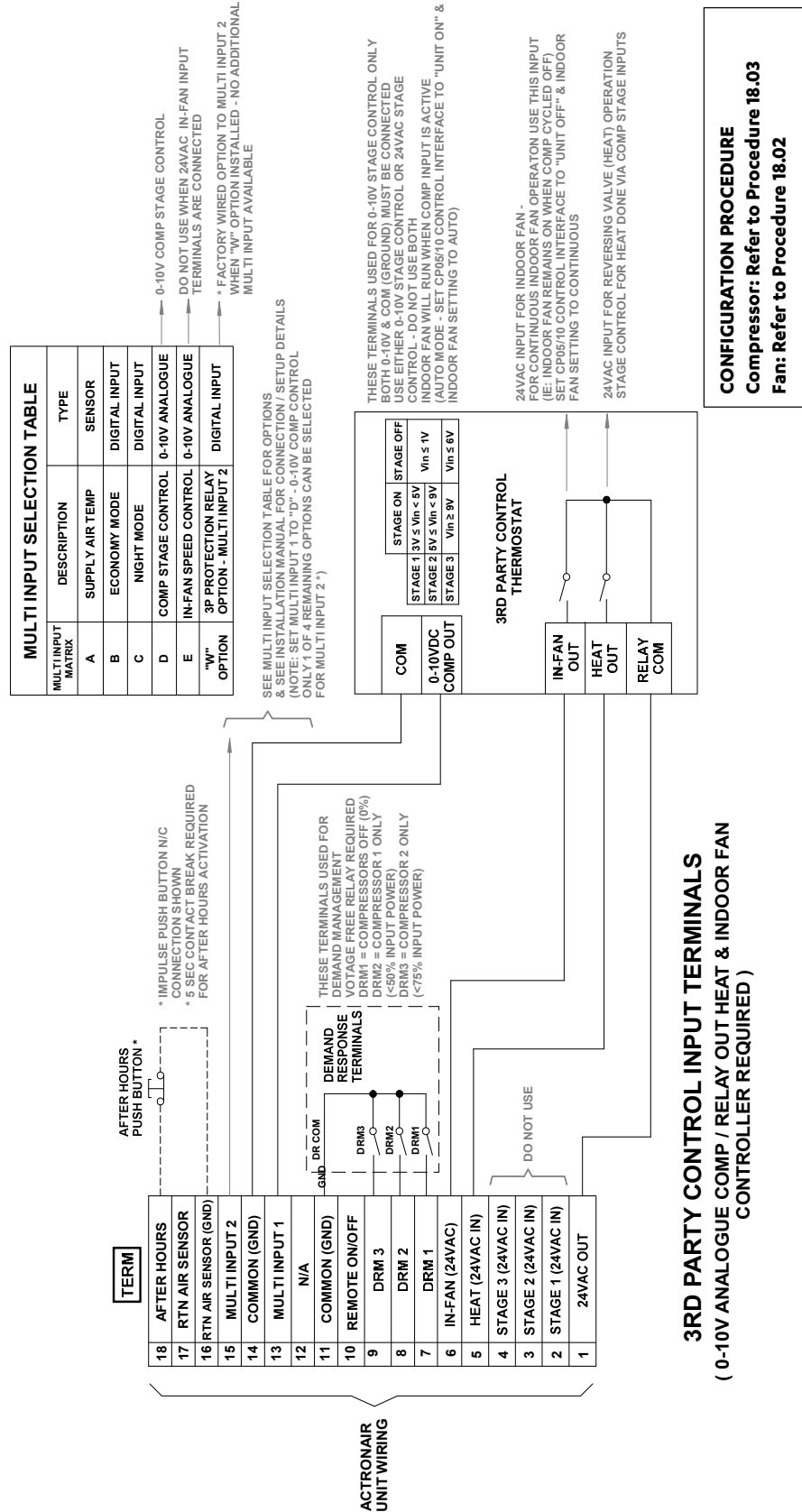


CONFIGURATION PROCEDURE
 Compressor: Refer to Procedure 18.03
 Fan: Refer to Procedure 18.02

3RD PARTY CONTROL INPUT TERMINALS
 (3 STAGE COOL / 3 STAGE HEAT / RELAY OUT HEAT & INDOOR FAN 0-10V ANALOGUE INDOOR FAN SPEED CONTROLLER REQUIRED)

26.04. Wiring Diagram 0-10V Analogue Output Compressors and Indoor Fans

TRI-CAPACITY CM100 COMMERCIAL CONTROLS
3RD PARTY THERMOSTAT CONTROLLER CONNECTION
0-10V ANALOGUE OUTPUT FOR COMPRESSOR & 24VAC RELAY OUTPUT FOR INDOOR FAN



27. FAN PERFORMANCE DATA AND CURVE

FAN PERFORMANCE DATA

CAY500T / EVY500T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2000	39.6	525	43.7	685	47.1	842	50.3	1007	53.3	1173	56.2	1350	58.9	1533	61.6	1709	64.4	1885	67.2	2060
2100	41.7	588	45.5	744	48.7	909	51.8	1080	54.8	1253	57.5	1436	60.1	1613	62.9	1792	65.7	1970	68.5	2148
2200	43.8	649	47.2	812	50.4	983	53.4	1158	56.2	1335	58.9	1524	61.5	1698	64.3	1880	67.5	2082	70.9	2295
2300	45.8	714	48.8	875	51.9	1052	55.0	1236	57.6	1422	60.3	1613	63.0	1789	65.9	1976	69.2	2185	72.6	2399
2400	47.5	780	50.5	947	53.6	1134	56.5	1327	59.1	1516	61.8	1699	64.5	1875	67.7	2079	71.1	2295	74.4	2504
2500	49.3	849	52.3	1033	55.3	1220	58.0	1419	60.6	1606	63.4	1786	66.3	1972	69.6	2184	72.4	2410		
2600	51.1	931	54.1	1114	56.8	1305	59.5	1509	62.3	1693	65.0	1865	68.3	2095	71.3	2319	74.1	2546		
2700	53.1	997	55.8	1202	58.4	1400	61.1	1597	63.9	1789	67.0	2007	70.2	2235	73.0	2454				
2800	54.9	1105	57.4	1295	59.9	1485	62.8	1692	65.8	1904	69.0	2121	72.0	2352	74.8	2581				
2900	56.6	1198	59.1	1388	61.9	1591	64.7	1790	67.8	2011	70.9	2242	73.9	2486						
3000	58.2	1285	61.0	1492	63.8	1699	66.8	1922	69.9	2153	72.9	2386								
3100	60.2	1394	63.0	1604	65.9	1819	68.9	2034	71.9	2268	74.8	2504								

MOTOR / BLOWER LIMIT

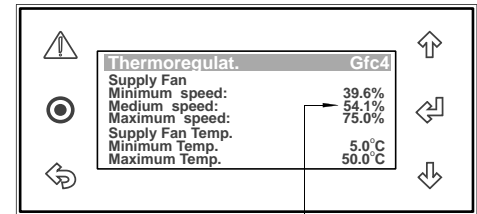
NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu *).

W = Indoor Fan Power, Watts

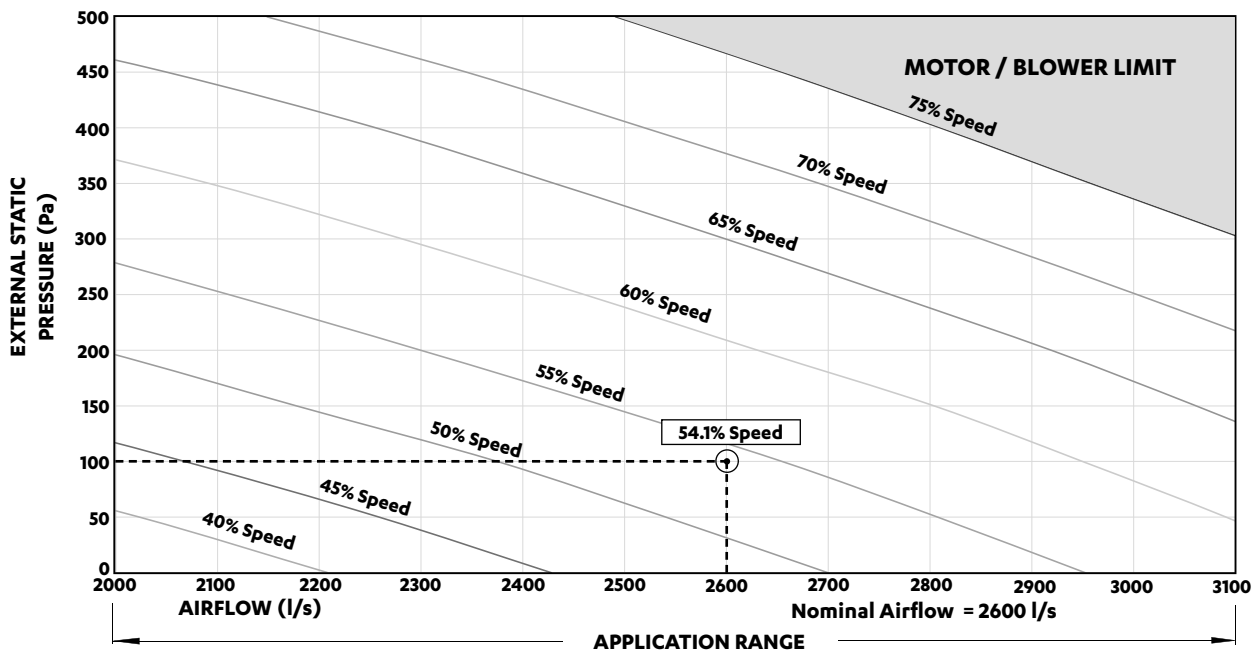
54.1 - Data in the box indicates Factory Default Setting.

*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4



Set Fan Speed

INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduce with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 3450 l/s.

FAN PERFORMANCE DATA

CAY500T/ELY500T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2000	40.7	585.6	44.2	748.3	47.4	918.7	50.2	1082.2	52.8	1253.5	55.2	1411.5	57.6	1593.2	59.7	1758.0	61.7	1912.2	63.7	2032.5
2100	42.3	644.0	45.7	814.0	48.7	1005.3	51.6	1180.5	54.1	1337.5	56.5	1511.0	58.8	1687.8	60.9	1851.4	62.8	2004.3	64.6	2137.3
2200	43.9	711.2	47.2	888.3	50.1	1068.0	52.9	1251.3	55.4	1412.9	57.8	1612.3	60.0	1784.8	62.0	1969.3	63.9	2141.5	65.8	2242.0
2300	45.5	775.0	48.7	971.6	51.6	1156.3	54.3	1330.6	56.7	1520.7	59.0	1717.9	61.2	1902.2	63.1	2078.1	65.0	2246.6	67.0	2247.5
2400	47.1	845.5	50.2	1037.1	53.0	1228.7	55.6	1415.7	58.0	1614.3	60.3	1806.8	62.3	1999.2	64.3	2182.5	66.3	2368.1	68.3	2366.0
2500	48.7	913.2	51.7	1125.9	54.4	1311.9	57.0	1513.8	59.3	1712.0	61.5	1912.6	63.5	2104.3	65.5	2295.2	67.5	2491.5	69.5	2489.5
2600	50.4	1008.4	53.2	1208.0	55.9	1402.1	58.3	1611.5	60.6	1813.7	62.7	2020.6	64.7	2215.1	66.8	2432.5	68.8	2644.4	70.9	2766.3
2700	52.0	1027.4	54.7	1293.7	57.3	1504.8	59.7	1708.5	61.9	1919.9	64.0	2127.5	66.1	2349.1	68.1	2567.8	70.1	2782.5	72.4	2780.1
2800	53.6	1180.0	56.2	1379.2	58.8	1603.1	61.0	1813.1	63.1	2027.0	65.2	2241.2	67.4	2481.7	69.5	2702.0	71.7	2940.5	73.9	2938.2
2900	55.2	1256.5	57.7	1480.9	60.2	1704.5	62.3	1924.2	64.4	2135.9	66.6	2376.8	68.8	2617.4	70.9	2847.9	73.2	3089.0	75.5	3280.0
3000	56.8	1361.2	59.2	1584.2	61.6	1819.6	63.6	2036.8	65.7	2261.8	68.0	2511.6	70.2	2754.6	72.5	2999.4	74.7	3236.3	77.7	3347.5
3100	58.3	1467.4	60.7	1692.9	63.0	1933.0	65.0	2147.6	67.3	2403.0	69.4	2646.9	71.7	2901.8	74.1	3156.9	76.1	3418.0	79.0	3415.0

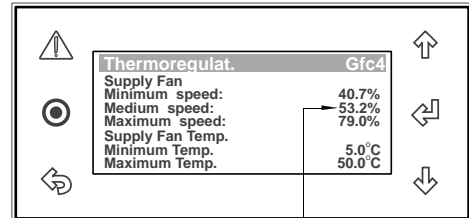
NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu*)

W = Indoor Fan Power, Watts

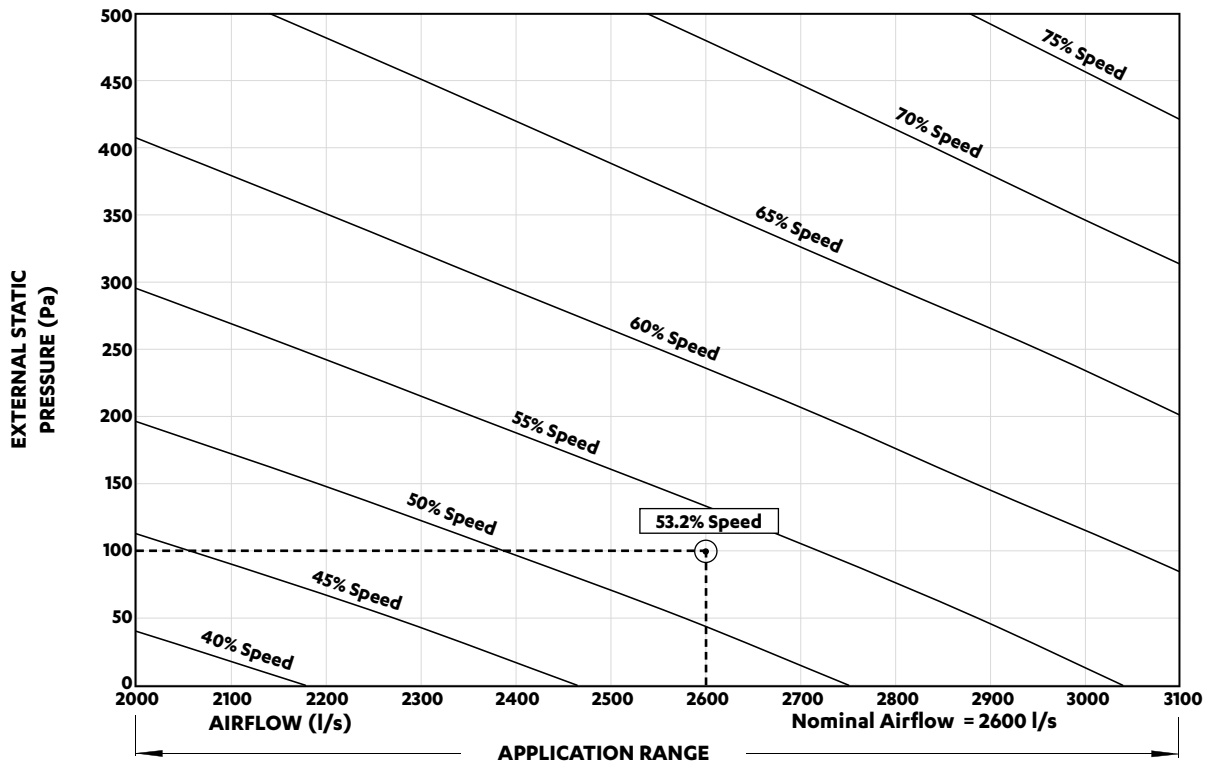
53.2 - Data in the box indicates Factory Default Setting.

*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4



Set Fan Speed

INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduced with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 3515 l/s.

FAN PERFORMANCE DATA

CAY620T/EVY620T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2500	48.2	869	51.5	1030	56.1	1269	59.9	1505	63.8	1765	67.9	2028	72.0	2297	75.8	2579	78.8	2875	83.2	3310
2600	49.2	905	53.3	1107	57.5	1350	61.3	1596	65.3	1864	69.5	2134	73.5	2398	76.8	2683	79.6	2973	84.6	3490
2700	50.2	941	55.1	1188	58.9	1435	62.8	1694	66.9	1965	71.1	2239	75.0	2495	77.8	2792	81.1	3096	88.1	3550
2800	52.2	1023	56.6	1275	60.3	1523	64.3	1792	68.6	2073	72.6	2346	76.1	2627	78.9	2913	83.2	3235		
2900	54.1	1106	58.0	1357	61.9	1623	66.0	1900	70.4	2191	74.1	2468	77.2	2751	80.1	3032	85.5	3372		
3000	55.9	1196	59.5	1446	63.5	1725	67.8	2013	71.9	2303	75.4	2580	78.5	2869	82.6	3198				
3100	57.5	1284	61.2	1548	65.1	1830	69.7	2133	73.4	2406	76.9	2703	80.1	3001	84.8	3371				
3200	59.1	1368	62.9	1652	67.1	1945	71.4	2238	75.0	2509	78.4	2854	82.4	3192						
3300	60.9	1480	64.6	1764	69.2	2059	73.1	2355	76.6	2676	80.1	3044	84.8	3363						
3400	62.7	1594	66.8	1887	71.1	2184	74.8	2486	78.3	2850	82.4	3188								
3500	64.5	1708	68.9	2010	72.8	2315	76.4	2641	79.9	3009	85.0	3342								
3600	66.7	1837	70.9	2144	74.6	2452	78.1	2802	82.4	3155										
3700	69.0	1975	72.8	2277	76.4	2603	79.9	2961	85.0	3315										
3800	71.1	2107	74.8	2411	78.2	2769	82.5	3130												
3900	73.1	2244	76.6	2578	80.0	2952	85.4	3292												

MOTOR / BLOWER LIMIT

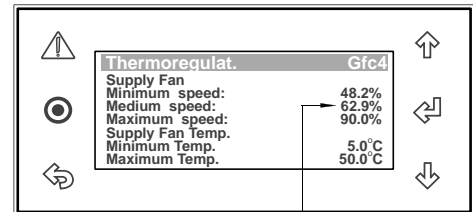
NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu *).

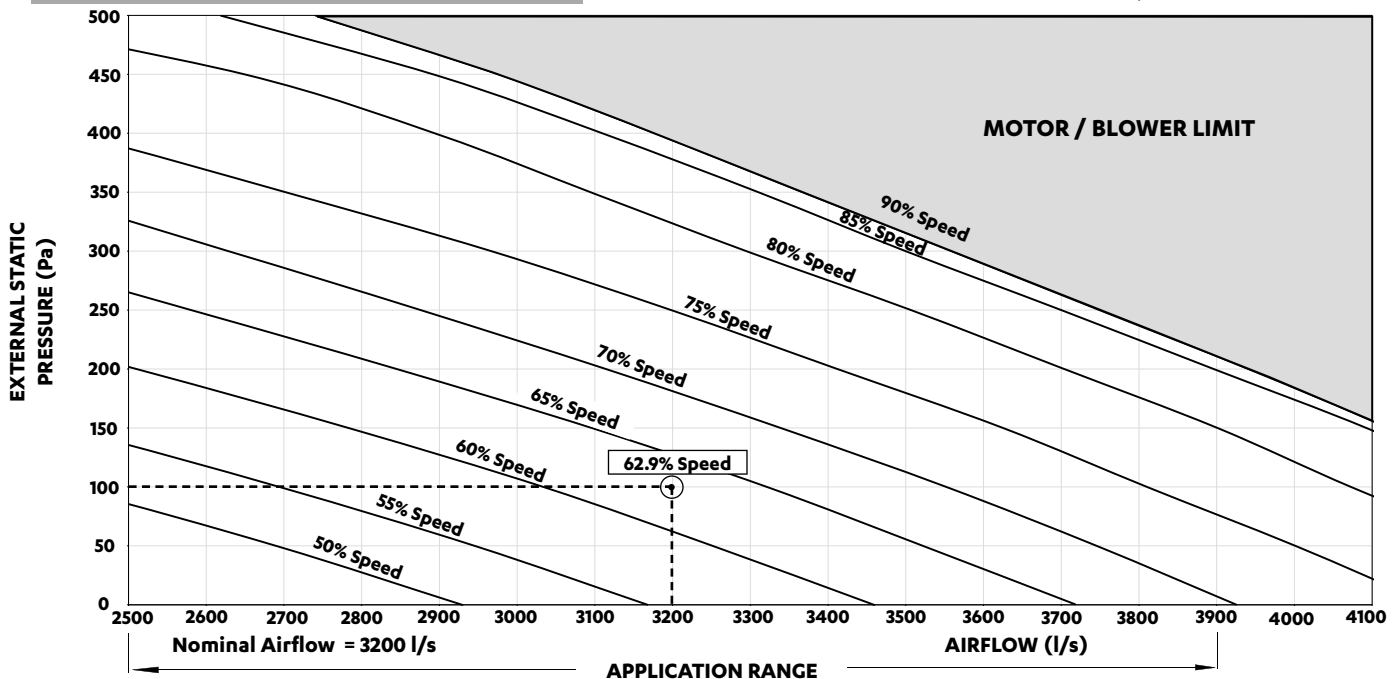
W = Indoor Fan Power, Watts

62.9 - Data in the box indicates Factory Default Setting.

*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4



INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduce with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 4097 l/s.

FAN PERFORMANCE DATA

CAY620T/ELY620T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2500	54.7	872	57.8	1056	60.5	1239	63.2	1450	65.7	1647	68.2	1844	70.6	2035	73.1	2238	75.2	2402	77.2	2601
2600	56.8	955	59.6	1143	62.1	1337	64.8	1553	67.2	1746	69.9	1963	72.0	2138	74.6	2354	76.5	2510	78.8	2790
2700	58.7	1047	61.1	1220	63.6	1421	66.2	1632	69.0	1863	71.1	2040	73.6	2255	75.8	2459	77.8	2667	80.0	2896
2800	60.2	1106	62.9	1324	65.5	1535	67.8	1730	70.3	1942	72.8	2164	75.0	2360	77.2	2592	79.2	2803	81.3	2905
2900	62.3	1230	64.8	1435	67.1	1633	69.7	1858	72.0	2065	74.5	2291	76.6	2508	78.8	2743	80.8	2950	82.9	3200
3000	64.0	1348	66.6	1541	69.0	1752	71.2	1949	73.7	2178	75.9	2396	78.2	2647	80.3	2845	82.2	3080	84.3	3315
3100	65.8	1416	68.7	1674	70.7	1853	73.1	2073	75.2	2270	77.5	2530	79.8	2790	81.8	3028	83.8	3268	85.7	3480
3200	67.8	1557	70.1	1809	72.2	1939	74.9	2190	76.8	2405	79.0	2658	81.2	2918	83.2	3161	85.2	3381	87.2	3650
3300	69.7	1610	72.1	1875	74.1	2067	76.4	2313	78.4	2541	80.8	2825	82.8	3076	84.8	3328	86.9	3640	88.8	3900
3400	71.6	1763	73.8	1979	75.8	2188	78.2	2461	80.2	2690	82.2	2945	84.3	3212	86.2	3465	88.2	3737		
3500	73.6	1920	75.4	2074	77.6	2321	80.0	2590	81.8	2824	84.0	3110	85.9	3362	88.0	3646				
3600	75.1	1968	77.2	2211	79.4	2465	81.7	2752	83.5	2981	85.5	3242	87.7	3548						
3700	76.8	2088	79.0	2349	81.1	2605	83.3	2880	85.4	3150	87.2	3408								
3800	79.0	2275	80.9	2498	83.0	2763	85.1	3029	87.0	3311	89.0	3622								
3900	80.9	2410	82.8	2663	84.9	2943	86.8	3220	88.9	3528										

MOTOR / BLOWER LIMIT

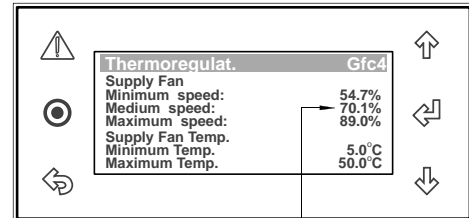
NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu *).

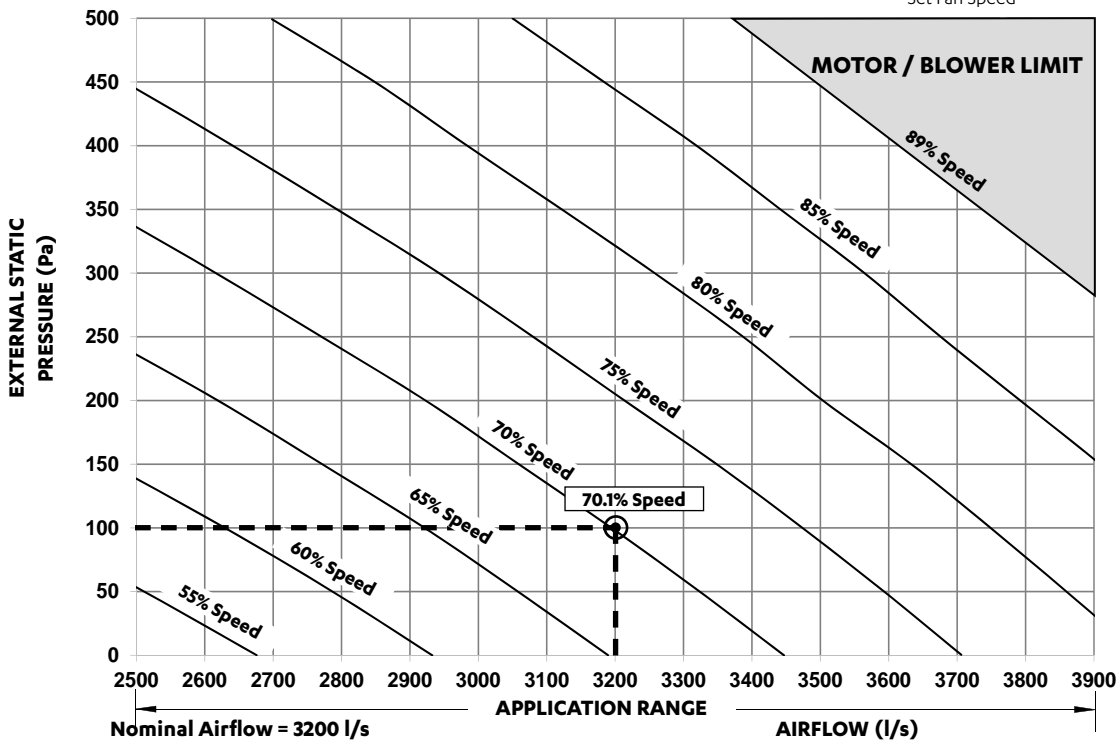
W = Indoor Fan Power, Watts

70.1 - Data in the box indicates Factory Default Setting.

*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4



INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduced with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 4097 l/s.

FAN PERFORMANCE DATA

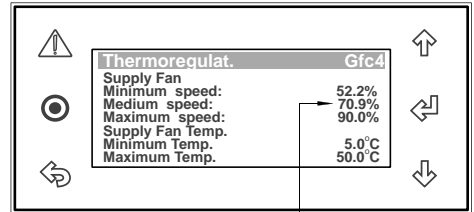
CAY700T / EVY700T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2800	52.2	1023	56.6	1275	60.3	1523	64.3	1792	68.6	2073	72.6	2346	76.1	2627	78.9	2913	83.2	3235		
2900	54.1	1106	58.0	1357	61.9	1623	66.0	1900	70.4	2191	74.1	2468	77.2	2751	80.1	3032	85.5	3372		
3000	55.9	1196	59.5	1446	63.5	1725	67.8	2013	71.9	2303	75.4	2580	78.5	2869	82.6	3198				
3100	57.5	1284	61.2	1548	65.1	1830	69.7	2133	73.4	2406	76.9	2703	80.1	3001	84.8	3371				
3200	59.1	1368	62.9	1652	67.1	1945	71.4	2238	75.0	2509	78.4	2854	82.4	3192						
3300	60.9	1480	64.6	1764	69.2	2059	73.1	2355	76.6	2676	80.1	3044	84.8	3363						
3400	62.7	1594	66.8	1887	71.1	2184	74.8	2486	78.3	2850	82.4	3188								
3500	64.5	1708	68.9	2010	72.8	2315	76.4	2641	79.9	3009	85.0	3342								
3600	66.7	1837	70.9	2144	74.6	2452	78.1	2802	82.4	3155										
3700	69.0	1975	72.8	2277	76.4	2603	79.9	2961	85.0	3315										
3800	71.1	2107	74.8	2411	78.2	2769	82.5	3130												
3900	73.1	2244	76.6	2578	80.0	2952	85.4	3292												
4000	75.0	2377	78.5	2750	82.8	3109														
4100	77.0	2560	80.7	2927	86.4	3266														

MOTOR / BLOWER LIMIT

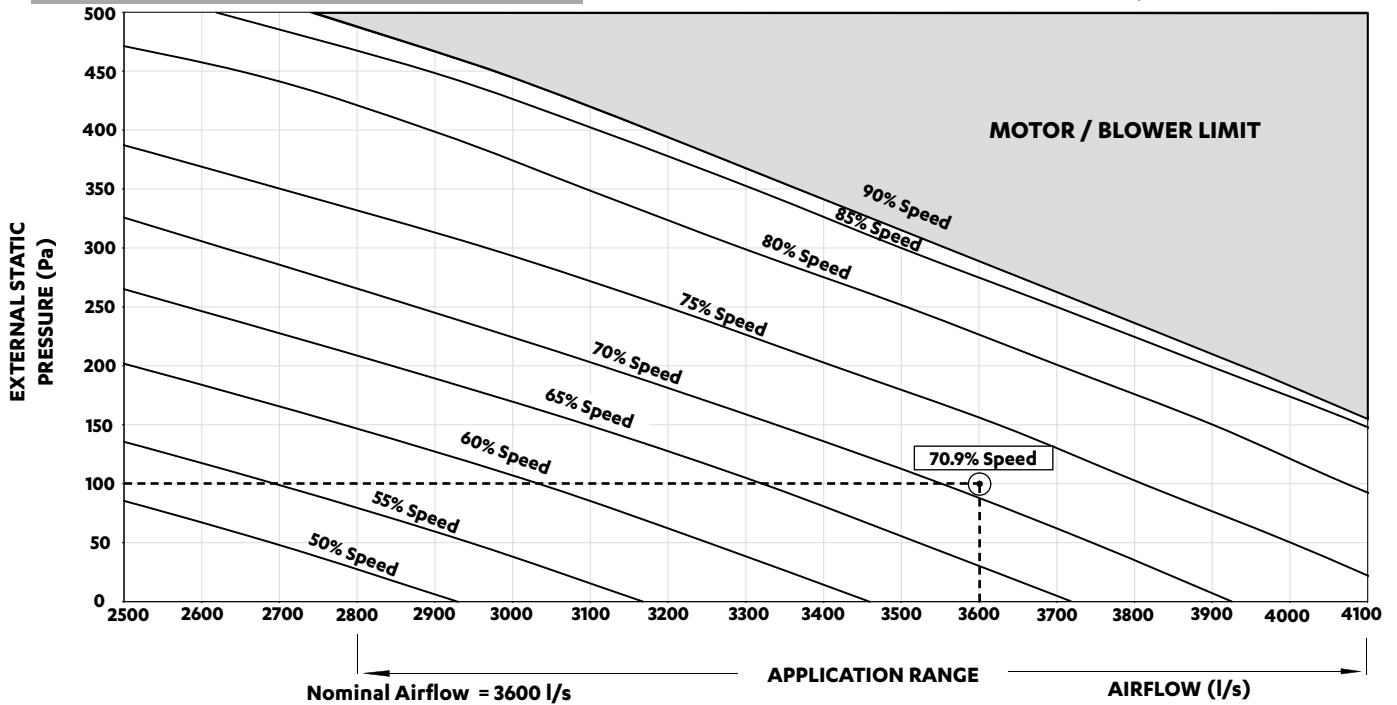
NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu *).
W = Indoor Fan Power, Watts
[] - Data in the box indicates Factory Default Setting.



*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4

INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduced with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 4097 l/s.

FAN PERFORMANCE DATA

CAY700T / ELY700T

Airflow (l/s)	External Static Pressure (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W	% Spd.	W
2800	60.2	1106	62.9	1324	65.5	1535	67.8	1730	70.3	1942	72.8	2164	75.0	2360	77.2	2592	79.2	2803	81.3	2905
2900	62.3	1230	64.8	1435	67.1	1633	69.7	1858	72.0	2065	74.5	2291	76.6	2508	78.8	2743	80.8	2950	82.9	3200
3000	64.0	1348	66.6	1541	69.0	1752	71.2	1949	73.7	2178	75.9	2396	78.2	2647	80.3	2845	82.2	3080	84.3	3315
3100	65.8	1416	68.7	1674	70.7	1853	73.1	2073	75.2	2270	77.5	2530	79.8	2790	81.8	3028	83.8	3268	85.7	3480
3200	67.8	1557	70.1	1809	72.2	1939	74.9	2190	76.8	2405	79.0	2658	81.2	2918	83.2	3161	85.2	3381	87.2	3650
3300	69.7	1610	72.1	1875	74.1	2067	76.4	2313	78.4	2541	80.8	2825	82.8	3076	84.8	3328	86.9	3640	88.8	3900
3400	71.6	1763	73.8	1979	75.8	2188	78.2	2461	80.2	2690	82.2	2945	84.3	3212	86.2	3465	88.2	3737		
3500	73.6	1920	75.4	2074	77.6	2321	80.0	2590	81.8	2824	84.0	3110	85.9	3362	88.0	3646				
3600	75.1	1968	77.2	2211	79.4	2465	81.7	2752	83.5	2981	85.5	3242	87.7	3548						
3700	76.8	2088	79.0	2349	81.1	2605	83.3	2880	85.4	3150	87.2	3408								
3800	79.0	2275	80.9	2498	83.0	2763	85.1	3029	87.0	3311	89.0	3622								
3900	80.9	2410	82.8	2663	84.9	2943	86.8	3220	88.9	3528										
4000	82.9	2600	84.8	2870	86.8	3130	88.5	3377												
4100	84.7	2780	86.5	2996	88.8	3339														

MOTOR / BLOWER LIMIT

NOTES:

% Speed = Indoor Fan Speed Control Setting, in percent
(Value is set on the Control Interface via Service Menu *).
W = Indoor Fan Power, Watts
[] - Data in the box indicates Factory Default Setting.

*Service → Service Settings → Thermoregulation → Thermoregulat. Gfc4

Thermoregulat. Gfc4

Supply Fan Minimum speed: 60.2%

Medium speed: **77.2%**

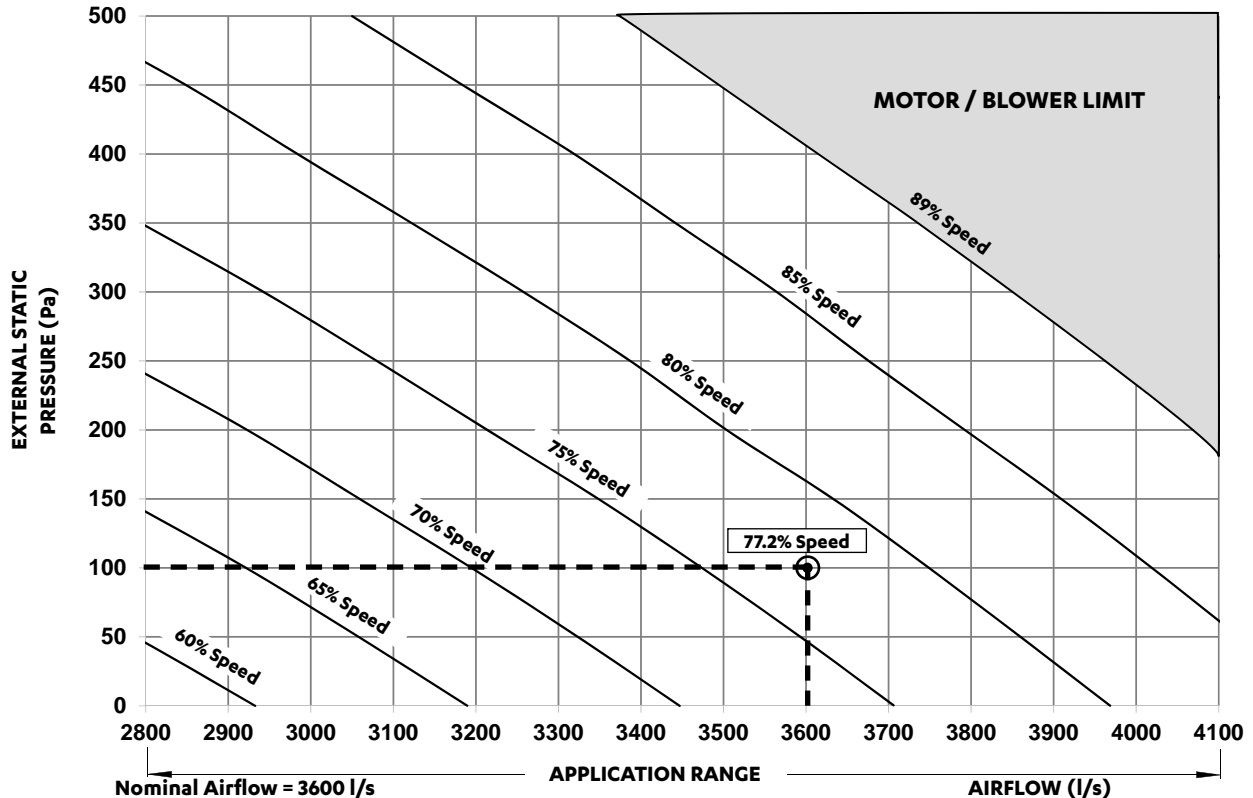
Maximum speed: 89.0%

Supply Fan Temp. Minimum Temp. 5.0°C

Maximum Temp. 50.0°C

Set Fan Speed

INDOOR UNIT FAN CURVE



NOTE

Fan Performance Data and Fan Curve shown is at dry coil and with no air filters installed. Consider external static pressure drop specific to your design requirements. Airflow should be reduce with respect to the moisture content in the air. Please review filter manufacturer for application. 2.5 m/s face velocity point will occur at 4097 l/s.

28. REFRIGERANT CHARGING

NOTES

- The units detailed on this guide are pre-charged with R-410A refrigerant. Should there be need to add or remove some refrigerant, it is recommended to follow one of the charging methods explained below.
- The use of other material as a refrigerant other than R-410A may cause explosion and/or personal injury.
- Where crankcase heaters are in operation, ensure to power up the unit for a minimum of 3 hours prior to starting the compressor. For colder climates, a longer time period may be required.
- Never allow R-410A refrigerant to vent into the atmosphere. This is a serious offence in Australia and New Zealand. Always reclaim refrigerant using equipment and container dedicated for R-410A system use only.
- All work must be carried out in accordance with Australia and New Zealand refrigerant handling code of practice.
- Only qualified technicians must perform any work related to addition or removal of refrigerant.
- R-410A refrigerant must always be charged in liquid state. Always charge refrigerant in the unit liquid line. The air conditioning system should always be liquid charged from the cylinder. When the system is in a vacuum, always charge into the high pressure side. Although it is acceptable to charge refrigerant into the discharge service port, but the liquid line service port on the shut-off valve is recommended.
- When the system is operating in cooling mode, it can be charge through the service port on the suction line ball valve (larger of the two shut off valves). This ensures the liquid refrigerant goes into the accumulator and then slowly enters the compressor.
- Remember, the pressure in this shut-off valve port will be high during heating mode, so the above method is not possible. The system can be charged through the suction service port on the compressor suction line. But be careful not to charge too much refrigerant at once, let the liquid enter in short bursts by opening and closing your gauges.

CAUTION

R-410A refrigerant has POE oil that rapidly absorbs moisture. The maximum time any system can be opened to atmosphere is 15 minutes.

NOTE FOR SUBCOOLING AND SUPERHEAT ADJUSTMENT

This unit is designed with INTERLACED INDOOR HEAT EXCHANGER. Ensure that BOTH compressors are running in order to optimise the performance of the unit before reading discharge pressure and liquid line temperature. Then make the necessary refrigerant charge or Thermal Expansion Valve (TXV) adjustment when required. If only ONE compressor is running, the subcooling and superheat results will be different when compared with TWO compressors running.

REFRIGERANT CHARGE DETAILS				
Outdoor Model		CAY500T	CAY620T	CAY700T
Indoor Model		EVY500T ELY500T	EVY620T ELY620T	EVY700T ELY700T
Refrigerant Type		R-410A	R-410A	R-410A
Pre-charged length	metres	5	5	5
Refrigerant Charge - Circuit #1	grams	8250	7900	9200
Refrigerant Charge - Circuit #2	grams	14010	15400	15500
Additional Refrigerant - Circuit #1	gms / meter	50	100	100
Additional Refrigerant - Circuit #2	gms / meter	165	165	165

28.01. Charging Method 1: Subcooling and Superheat

Parameters:

LLT = Liquid Line Temperature

SLT = Suction Line Temperature

SCT = Saturated Condensing Temperature

SST = Saturated Suction Temperature

Cooling Operation:

Subcooling should be between 4K and 8K.

Superheat should be between 2K and 8K.

Heating Operation:

Subcooling should be between 8K and 14K.

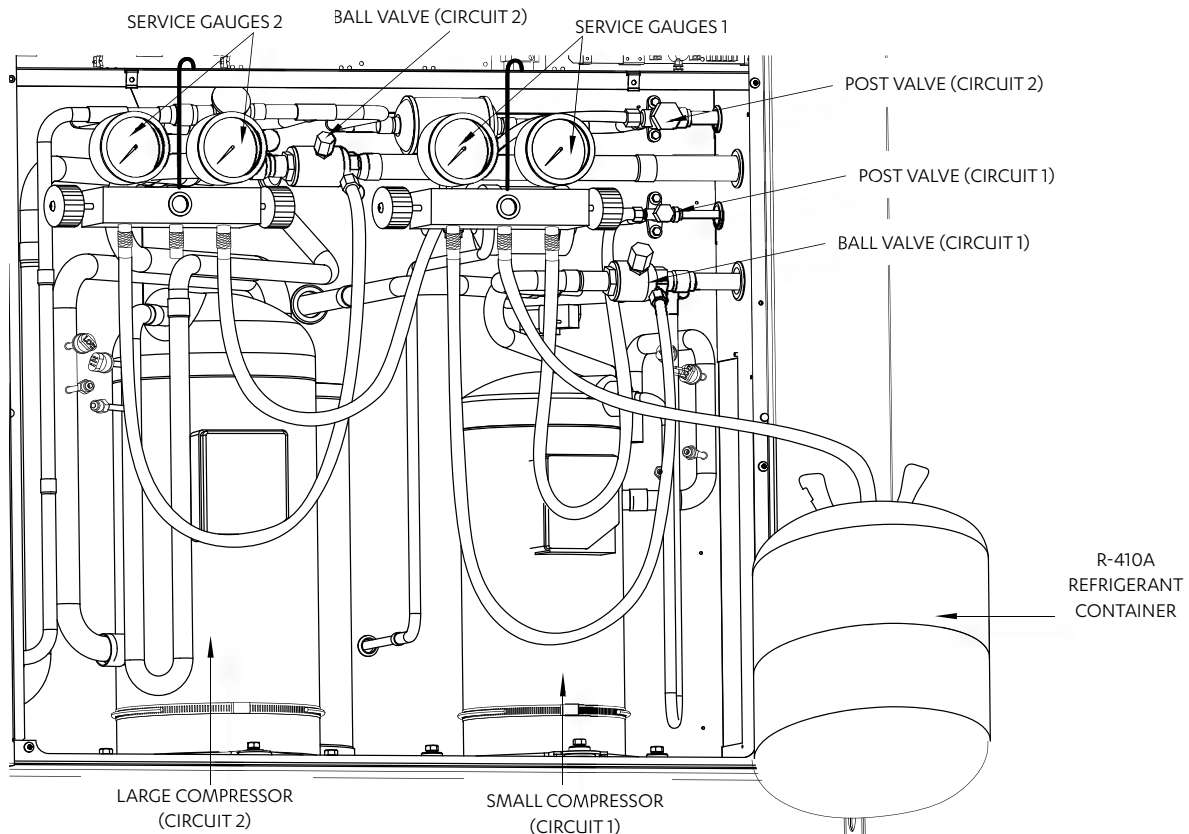
Superheat should be between 2K and 8K.

28.01.01. Cooling and Heating Operation:

Pipe lengths will affect the superheat and subcooling of pre-charged units. Pipe runs shorter than the pre-charged length will result in higher subcooling and a lower superheat. Pipe runs longer than the pre-charged length will result in lower subcooling and higher superheat. Adjust the refrigerant charge to obtain the correct super heat and subcooling for optimal performance as follows:

1. Ensure that air filters are fitted to indoor unit and total system airflows are balanced. (Air filters are not supplied with the unit, it is the responsibility of the installing contractor to provide and fit adequate return air and outside air filters).
2. Connect service gauges to the shut off valves. Two sets of R-410A service gauges are required, each one connected to circuit 1 and 2, in order to conduct simultaneous refrigerant charge adjustments.
3. Mount the temperature sensing devices (one for each circuit) on the liquid line as close as possible to the liquid and suction line service valve.

See Diagram Below



4. Start the unit in cool mode ensuring that both circuit compressors are in 100% operation before taking service gauges reading. Allow the system to stabilise for next 20 minutes before recording.

Record the discharge pressure, suction pressure, liquid line temperature and suction line temperature for both systems.

Circuit 1 System (Small Compressor)

Discharge Pressure = _____ kPa

Suction Pressure = _____ kPa

Liquid Line Temperature (**LLT**) = _____ °C

Suction Line Temperature (**SLT**) = _____ °C

Circuit 2 System (Large Compressor)

Discharge Pressure = _____ kPa

Suction Pressure = _____ kPa

Liquid Line Temperature (**LLT**) = _____ °C

Suction Line Temperature (**SLT**) = _____ °C

NOTES

Accurate pressure and temperature measuring tools should be used to achieve satisfactory results. The sensors of thermocouple must be in good contact with the area being measured and must be insulated in order to obtain correct reading.

28.01.02. Checking For Subcooling

1. From the R-410A Pressure/Temperature Chart record the corresponding Saturated Condensing Temperature (**SCT**) at the given discharge pressure.
2. Calculate the system subcooling using the formula below:

$$\text{Subcooling} = \text{SCT} - \text{LLT}$$

3. If subcooling is within the range 4-8K, there is no need to add/remove refrigerant.
 - If subcooling is lower than 4K, the system is undercharged, it is necessary to add refrigerant.
 - If subcooling is higher than 8K, the system is overcharged. It is necessary to remove refrigerant.

Allow the systems to stabilise and repeat the step 1-3 until subcooling falls within 4-8K.

28.01.03. Checking for Superheat

Maintaining the correct superheat is important for ensuring the evaporator is achieving maximum capacity and avoiding excessive liquid refrigerant returning to the compressor.

1. From the R-410A Pressure/Temperature Chart record the corresponding Saturated Suction Temperature (**SST**) at the given suction pressure.
2. Calculate the system super heat using the formula below:

$$\text{Superheat} = \text{SLT} - \text{SST}$$

3. If superheat is within the range 2-8K, there is no need to add/remove refrigerant.
 - If superheat is lower than 2K, it means that liquid refrigerant may be returning to compressor. It is necessary to remove refrigerant or check TXV settings.
 - If superheat is higher than 8K, it means that refrigeration capability of evaporator is not fully maximised. It is necessary to add refrigerant charge or check TXV settings.

Allow the systems to stabilise and repeat the step 1-3 until superheat falls within 2-8K.

NOTE

The above recommendations are based on design conditions of 35°C DB (outdoor), air entering indoor at 27°C DB / 19°C WB (as per AS/NZS 3823.1.2).

R-410A PRESSURE / TEMPERATURE CHART

Temp °C	Pressure KPa	Temp °C	Pressure KPa	Temp °C	Pressure KPa	Temp °C	Pressure KPa
-60	-34.4	-28	194.9	4	805.9	36	2090.7
-59	-30.7	-27	206.9	5	834.1	37	2145.5
-58	-26.8	-26	219.2	6	862.9	38	2201.3
-57	-22.8	-25	231.9	7	892.6	39	2258.2
-56	-18.6	-24	245.1	8	922.8	40	2316.1
-55	-14.2	-23	258.7	9	953.8	41	2375.1
-54	-9.6	-22	272.6	10	985.4	42	2435.1
-53	-4.8	-21	286.9	11	1017.8	43	2496.2
-52	0.8	-20	301.7	12	1050.9	44	2558.5
-51	5.3	-19	316.9	13	1084.7	45	2621.8
-50	10.7	-18	332.6	14	1119.2	46	2686.2
-49	16.3	-17	348.7	15	1154.6	47	2751.8
-48	22.2	-16	365.2	16	1190.7	48	2818.5
-47	28.2	-15	382.3	17	1227.5	49	2886.4
-46	34.0	-14	399.7	18	1265.2	50	2955.5
-45	40.9	-13	417.7	19	1303.6	51	3025.7
-44	47.8	-12	436.2	20	1342.9	52	3097.2
-43	54.8	-11	455.1	21	1382.9	53	3169.9
-42	62.1	-10	474.6	22	1423.9	54	3243.7
-41	69.6	-9	494.6	23	1465.7	55	3318.9
-40	77.4	-8	515.1	24	1508.3	56	3395.2
-39	85.5	-7	536.2	25	1551.8	57	3472.9
-38	93.9	-6	557.8	26	1596.2	58	3551.8
-37	102.5	-5	579.9	27	1641.4	59	3631.9
-36	111.5	-4	602.6	28	1687.6	60	3713.5
-35	120.8	-3	625.9	29	1734.6	61	3796.3
-34	130.4	-2	649.8	30	1782.6	62	3880.5
-33	140.3	-1	674.3	31	1831.6	63	3965.9
-32	150.5	0	699.4	32	1881.5	64	4052.8
-31	161.1	1	724.9	33	1932.3	65	4140.9
-30	171.9	2	751.3	34	1984.1	66	4230.6
-29	183.3	3	778.3	35	2036.9	67	4321.5

28.02. Charging Method 2: Cooling Charging Curve

1. Start and run the unit in cool mode, ensuring that both circuit compressors are in 100% operation and systems stabilised for 20 minutes, record discharge pressure and liquid line temperature.
2. Plot the data in the cooling charging curve below.
3. If the plotted data point falls above the charging curve, it is necessary to remove refrigerant.
4. If the plotted data point falls below the charging curve, it is necessary to add refrigerant.
5. Repeat Steps 1 -4 until the plotted data point falls along the curve.

NOTE

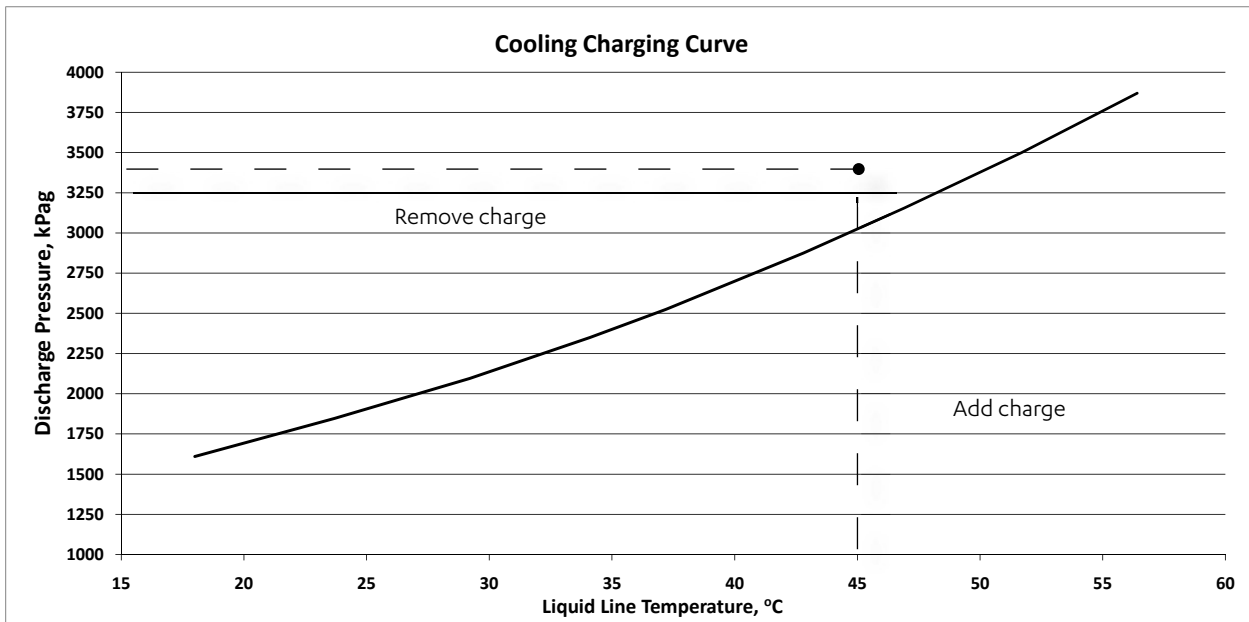
- Accurate pressure and temperature measuring tools should be used to achieve satisfactory results. The sensors of thermocouple must be in good contact with the area being measured and must be insulated in order to obtain correct reading.
- Dirty filters, blocked coils etc. can cause pressure readings obtained to be incorrect.

EXAMPLE:

Discharge Pressure = 3350 kPa

Liquid Line = 45°C

Action: Remove refrigerant charge from the system.



28.03. Thermal Expansion Valve (TXV) Adjustment

CAUTION

- Allow the systems to stabilise for 20 minutes before adjusting the thermal expansion valve (TXV) in order to ensure correct subcooling and superheat conditions. Turn Superheat Adjustment spindle 1/4 turn at a time, stabilising the systems in between adjustment, check condition, adjust again if necessary, until correct subcooling and superheat conditions are attained.
- A total of 4 Thermal Expansion Valves are provided for the Outdoor and Indoor unit combination (2 per unit).

For example:

Outdoor Unit = 1 x TXV for Small Compressor (Crt. 1) + 1 x TXV for Large Compressor (Crt. 2)

Indoor Unit = 1 x TXV for Small Compressor (Crt. 1) + 1 x TXV for Large Compressor (Crt. 2)

Subcooling Adjustment

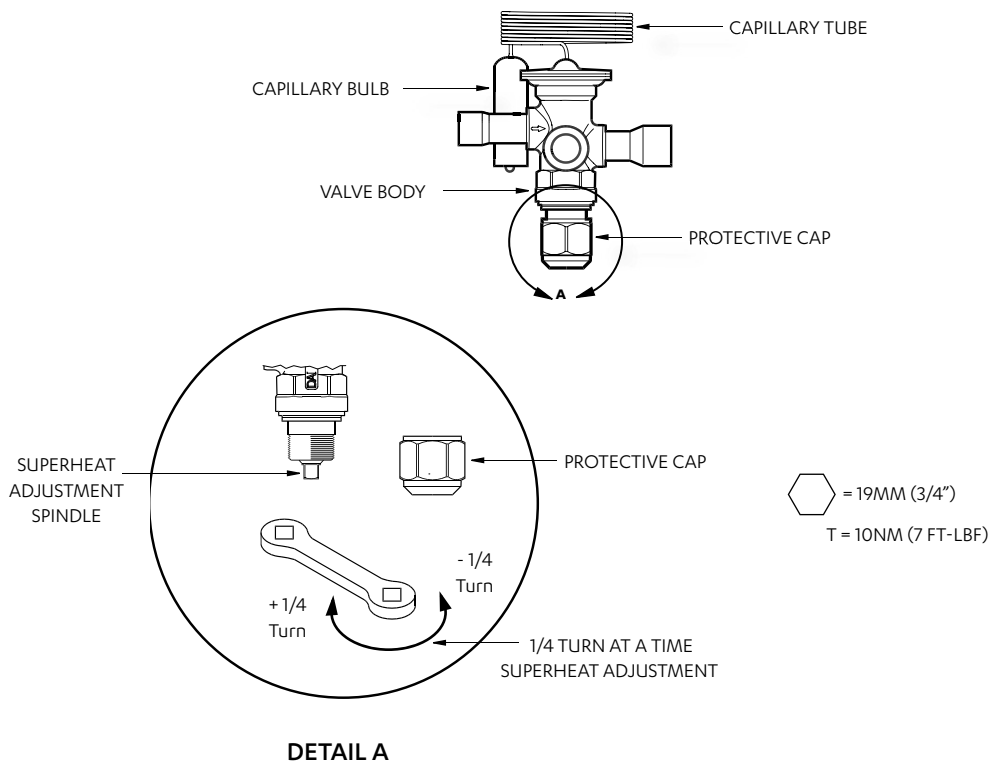
(Refer Subcooling Adjustment to Refrigerant Charging Section).

Superheat Adjustment

If superheat is lower than 2k = turn Adjustment Spindle $\frac{1}{4}^+$, stabilise system for 20 minutes, adjust if required.

If superheat is higher than 8k = turn Adjustment Spindle $\frac{1}{4}^-$, stabilise system for 20 minutes, adjust if required.

See Diagram Below:



29. FAULT DISPLAY CODES

29.01. Control Fault Code Displays

NOTES

Codes shown below are only applicable to CP05 and CP10. Refer to the Owner’s Manual of CL01 and CL01-2 for fault display codes.

Description	Display Code	Type	Alarm Condition	Reset Condition
Out coil temp 1 faulty or wiring open / short circuit (input U6)	AL08	Alarm	Outdoor Temperature 1 out of Range	Normal Operating Temperature
Out coil temp 2 faulty or wiring open / short circuit (input U6)	AL10	Alarm	Outdoor Temperature 2 out of Range	Normal Operating Temperature
Room Air temp faulty or wiring open / short circuit (input U9)	AL11	Alarm	Room Temperature Sensor faulty	Normal Operating Temperature
Outside Air temp faulty or wiring open / short circuit (input U10)	AL12	Alarm	Outside Air Temperature Sensor faulty	Normal Operating Temperature
Compressor 1 Low Pressure Fault	AL15	Alarm	Ps < 165kPa	Ps > 330kPa
Compressor 2 Low Pressure Fault	AL16	Alarm	Ps < 165kPa	Ps > 330kPa
Compressor 1 High Pressure Fault	AL19	Alarm	Pd > 4500kPa	Pd < 3506kPa
Compressor 2 High Pressure Fault	AL20	Alarm	Pd > 4500kPa	Pd < 3506kPa
Compressor 1 High temperature Alarm	AL42	Alarm	Compressor 1 discharge high fault Discharge Temp > 120°C	Discharge Temp < 100°C
Compressor 2 High temperature Alarm	AL43	Alarm	Compressor 2 discharge high fault Discharge Temp > 120°C	Discharge Temp < 100°C
CO ₂ Sensor Fault	AL48	Alarm	CO ₂ sensor reading out of range	Normal operating CO ₂ reading
Indoor Fan Anti freeze Action	AL59	Warning	Temperature out of Range	Normal Operating Temperature
Service Reminder Please Clean the Indoor Fan air filter	AL200	Warning	Air Filter Timer Timed-Out Filter warning	Clean / Replace Filter and Reset Timer
Indoor Fan Board code = E2 Coil sensor faulty or Wiring open / short circuit	AL51	Alarm	Sensor faulty	Normal Operating Condition

29.02. Soft Starter Display Codes

Operation Mode	On-Board LED Indication
At first power Up	One per second for 10 seconds
Ready to Start	LED Off
Compressor Running	LED remains Off
Delay After Compressor Stop	One Blink per second for 50 secs, then LED Off

Fault Operation	On-Board LED Indication
Phase L1 Missing	LED Off (No Lights and No Compressor Operation)
Compressor Winding Open	4 Blinks (in burst) for 50 secs, then Compressor tries to start again
Incorrect Phase Rotation	3 Blinks (in burst), Compressor will not try to start
Phase Lost or Low Voltage (less 200V)	3 Blinks (in burst), Compressor will not try to start
Compressor Winding Swapped	LED Off (Compressor runs noisy - clacking sound)
Compressor Failed to Start	2 Blinks for 4 minutes

29.03. Indoor Board Fault Code Displays

CIB	Function / Fault	Description
E1	Auxiliary Sensor Error (OC/SC)	No Sensor, Sensor (OC/SC)
E2	Coil Sensor Error (OC/SC)	Coil Sensor (OC/SC)
E3	Over Current Error	Over Current
	Under Current Error	Fan Not Running
E4	Wrong DIP switch Error	Wrong DIP switch settings selected
E5	Communication Error	No communication with Outdoor Unit for 30 sec
E6	Indoor Fan Fault	Internal Fan Error
E7	0-10V No Input	Input is less than 0.1V when Third Party voltage control is selected on Indoor.
E9	Reserved for Other Errors	This error code will be displayed if there is any other error. The user has to refer to the Control Interface display to find out the error.

NOTE

As soon as the error condition goes away, the board logic will remove the error code.

30. MAINTENANCE

Maintenance Procedures

This section describes the procedures that must be performed as a part of normal maintenance program. Regular servicing of equipment by licensed technician is highly recommended. Regular servicing of your unit helps in maintaining its optimum performance and reliability. **The checklist and service periods provided on this manual are guides only, as some sites may require more frequent servicing.** Always disconnect electrical power to the unit before performing these procedures. It is always a safe practice to observe all safety warnings and cautions when conducting maintenance tasks.



DANGER

Live Electrical Connections!

It may be necessary to work with live electrical components on certain maintenance tasks. Only licensed electricians and qualified technicians are allowed to perform these tasks.



CAUTION

Beware of Rotating Fan Blades!

Always make sure that all power supply, to the Outdoor Fans are turn Off and isolated.

Observe WH&S safety procedures, do not wear loose clothing and any jewellery when working near the fans.

Wear PPE whenever performing any maintenance procedures.

Observe all necessary procedures when working on a confined space.



WARNING

Hazardous Voltage !

Always make sure that all power supply, including remote controls, are disconnected before performing maintenance.

Observe proper LOCK-OUT/TAG-OUT procedures to ensure that power cannot be inadvertently energised. Failure to disconnect power before maintenance procedures can result in serious injury and/or death.

EC Motors are fitted with high power capacitors and can have dangerous residual voltages at motor terminals after power has been isolated. Wait at least 5 minutes after power isolation and test for any residual voltage before beginning service work.

Annual Maintenance Checklists

- Perform general maintenance inspections.
- Perform scheduled start-up checks.
- Leak test refrigerant circuits.
- Inspect contacts of all contactors and relays. Replace all worn contacts as required.
- Inspect, clean and tighten all electrical connections.
- Check fans for balanced operation. Make sure that there are no loose screws / bolts, no fan blades interference and no damage to the fans and guards.
- Inspect the air filters, clean or replace as required.
- Clean and repaint any corroded panel section.
- Ensure no blockage of airflow through variable speed drive.

Cleaning the Condenser Coils

Clean the coils at least once a year or more frequently if unit is located in a dusty and dirty environment, in order to maintain your system's proper operating performance. High discharge pressures are good indication that the coils need cleaning. When using detergent or solvents to clean the coils, follow the manufacturer's instructions to avoid potential damage to the coils and to the unit.

To clean the refrigerant coils, use a soft brush and water spray, such as garden hose or pressure washer with low pressure nozzle.

 **WARNING****Do Not Use High Alkaline Detergent!**

When using detergent for coil cleaning, ensure that the alkaline level is no higher than 8.5, which can cause corrosion damage to the coils.

 **DANGER****No Water into the Electrical Compartments!**

Ensure consideration is given to the possibility of water entering the electrical compartments during cleaning of the condenser coil.

Coil Cleaning Procedures

- Disconnect power to the unit.
- Remove the louvered panels from the unit to gain access to the air inlet side of the coils.
- Use a soft brush to remove loose dirt and debris from both sides of the coils.
- Straighten bent coil fins with fin comb.
- Prepare the detergent solutions according to the manufacturer's instructions.
- Spray solution at a 90° angle to the coils, keeping a minimum nozzle spray angle of 15°, with at least a 1800mm distance from the coils and 600 psi pressure.
- Spray leaving air side of the coils first then the air inlet side. Allow the solution to stand on the coils for five minutes.
- Rinse both sides of the coils with cool clean water.
- Inspect the coils, if they are still dirty, repeat the cleaning procedure.
- Clean and wipe dry the outer and inner sides of the unit, the refrigerating parts and other components.
- Ensure that the condensate drain lines are not blocked.
- Reinstall all unit panels, covers and guards.
- Restore electrical power to the unit.

31. MAINTENANCE FREQUENCY CHECKLIST

ELECTRICAL										
Parts	Service Period								Detail of Service Check	Service Methods
	1 Mth	3 Mth	6 Mth	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs		
Isolators / Printed Circuit Boards			✓						Visual Inspection	Tighten Terminals as necessary on isolators and printed circuit boards
Electrical Connections			✓						Check all electrical terminals, mains, communications, etc.	Re-tighten if loose.
Magnetic Contactor			✓						Check for loose terminal connections.	Tighten electrical terminals. Remove any dust.

INDOOR UNIT										
Parts	Service Period								Detail of Service Check	Service Methods
	1 Mth	3 Mth	6 Mth	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs		
Casing /Panels and Frames		✓							Visual check for damage, rust and dust accumulation.	For highly corrosive environment, wash panels quarterly with water and neutral detergent solution. Wax panels. Repair / re-paint where required.
Insulation					✓				Visual check for insulation conditions.	Repair / replace insulation material.
Fan			✓						Visual check for run out of balance and dust attached	Clean off dust as necessary to negate possibility of fan running out of balance
Motor				✓ Ω					Visual check on wiring. Insulation resistance check to be carried out annually	Measure insulation resistance. Should be more than 1MΩ.
Heat Exchanger			✓						Check for clogging by dust. Check for leaks / damage.	Clean air inlet side as necessary. Straighten any bent fins using fins comb.
Drain Pan/ Condensation line		✓							Check for obstructions and free flow of water	Clean to eliminate obstructions/ sludge and check condition of pan. Pour water to ensure flow
Filter*	✓								Check for clogging by dust.	Clean Filter
Temperature Readings		✓							Measure air on and air off	Place temperature probe in return and supply air of the unit.
Damper Motors (If fitted)			✓						Visual inspection of motors open/closing. Ensure no obstructions	Drive motors opened and closed. Ensure correct operation

* Service period for filter cleaning may vary depending on operating time and surrounding environment.

OUTDOOR UNIT										
Parts	Service Period								Detail of Service Check	Service Methods
	1 Mth	3 Mth	6 Mth	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs		
Casing / Panels and Frames		✓							Visual check for damage, rust and dust accumulation.	For highly corrosive environment, wash panels quarterly with water and neutral detergent solution. Wax panels. Repair / re-paint where required.
Insulation					✓				Visual check for insulation conditions.	Repair / replace insulation material.
Fan			✓						Visual check for run out of balance and dust attached	Clean off dust as necessary to negate possibility of fan running out of balance
Motor				✓ Ω					Visual check on wiring. Insulation resistance check to be carried out annually	Measure insulation resistance. Should be more than 1MΩ.
Heat Exchanger			✓						Check for clogging by dust. Check for leaks / damage.	Clean air inlet side as necessary. Straighten any bent fins using fins comb.
Condensate Drain Line		✓							Check for obstructions and free flow of water	Clean to eliminate obstructions/sludge and check condition of drain line. Pour water to ensure flow
Compressor		✓ Ω							Check for high / low pressure. Measure insulation resistance. Check compressor for abnormal noise/vibrations	Measure insulation resistance. Should be more than 1MΩ.
Refrigeration Operational Readings		✓							Make note of operational reading in test cool/heat	Check operating pressures, record super heat and subcooling values
Safety Devices			✓						Check calibration of safety devices such as HP and LP controls, sensors, etc.	Check resistance of sensors, pressure cut in / cut out of pressure controls
Faults		✓							Check for any previous fault history on the unit.	Investigate any causes for previous faults, reset fault history.
Outdoor Fan Speed Capacitor				✓					Check for any bulge on the capacitors and capacitance.	Make it electrically safe, prior to measuring the capacitor's capacitance. Measured capacitance should be within the printed tolerances on the capacitor.

32. SENSOR DETAIL

TEMPERATURE SENSORS		
Description	Location	ActronAir Part Number
Compressor 1 Discharge Temp. Sensor	Compressor 1 Discharge line	2060-018
Compressor 2 Discharge Temp. Sensor	Compressor 2 Discharge line	2060-018
Outdoor Coil 1 Temperature Sensor	Last return bend of Coil system 1	2060-006
Outdoor Coil 2 Temperature Sensor	Last Return Bend of Coil system 2	2060-026
Room Air Temperature Sensor	Packed together with Installation and Commissioning Guide	2060-037
Ambient Air Temperature Sensor	Outdoor Coil System 2 Air Inlet side	2060-036
Indoor Coil Temperature Sensor	Indoor Coil - Model dependent	2060-016

SWITCHES			
Description	Location	Type	ActronAir Part Number
Compressor 1 High Pressure Switch	Compressor 1 Discharge Line	Pressure Switch	2060-019
Compressor 2 High Pressure Switch	Compressor 2 Discharge Line	Pressure Switch	2060-019
Compressor 1 Low Pressure Switch	Compressor 1 Suction Line	Pressure Switch	2060-020
Compressor 2 Low Pressure Switch	Compressor 2 Suction Line	Pressure Switch	2060-020

33. START-UP AND COMMISSIONING REPORT

Completing Settings Log Procedures

1. Switch-Off all motor start circuit breakers (MSCB), leaving circuit breakers CB1, CB2 and CB3 Switched-On.
2. Fill-in all current settings and information in SETTINGS LOG below:

Settings Log:

NOTE

Please log all required information below, before any software changes are to be made. Failure to do so will cause difficulties in restarting the unit operation back to original settings. Leave this manual in a secure location near the unit.

INSTALLATION INFORMATION

CUSTOMER	Name:	Tel. No.
	Address:	
INSTALLER	Name:	Tel. No.
	Address:	
SITE ADDRESS:		Date Installed:
MODEL:		Serial Number:

B1

Setpoint

Setpoint: _____ °C

Temp. Setback: Enabled Disabled

Cooling Limit: _____ °C Heating Limit: _____ °C

Indoor Fan Settings

% ID Fan Speed _____ %

D1

Enable Scheduler No Yes

D2

DST Enable Disable

Transition Time: _____ min.

Start: _____ in _____ at _____ End: _____ in _____ at _____

C1

Mode Of Operation

Mode: Auto Cool Only Heat Only

Indoor Fan Mode: Continuous Auto Cycle

D3 - D7

TIMECLOCK SETTINGS

	Event 1	Event 2
⁽¹⁾ Monday	_____ to _____	_____ to _____
⁽¹⁾ Tuesday	_____ to _____	_____ to _____
⁽¹⁾ Wednesday	_____ to _____	_____ to _____
⁽¹⁾ Thursday	_____ to _____	_____ to _____
⁽¹⁾ Friday	_____ to _____	_____ to _____
⁽¹⁾ Saturday	_____ to _____	_____ to _____
⁽¹⁾ Sunday	_____ to _____	_____ to _____
⁽¹⁾ After Hours Operation Duration:	_____ Hours	

NOTE: ⁽¹⁾ Only visible when Enable Scheduler is set to **Yes**.

D8-D19

SPECIAL DAYS SETTINGS

	Day / Month	Event 1	Event 2		Day / Month	Event 1	Event 2
Day 1	_____	_____	_____	Day 7	_____	_____	_____
Day 2	_____	_____	_____	Day 8	_____	_____	_____
Day 3	_____	_____	_____	Day 8	_____	_____	_____
Day 4	_____	_____	_____	Day 10	_____	_____	_____
Day 5	_____	_____	_____	Day 11	_____	_____	_____
Day 6	_____	_____	_____	Day 12	_____	_____	_____

Installation and Commissioning Guide

Split Tri-Capacity

SYSTEM CONFIGURATIONS (To access this menu, please enter the Service password: 7378).

G. Service → e. Communicate config.

Ge1					
Address:	Protocol:	<input type="checkbox"/> MODBUS	<input type="checkbox"/> CAREL	<input type="checkbox"/> MODBUS EXT.	
Speed:	<input type="checkbox"/> 19200	<input type="checkbox"/> 9600	<input type="checkbox"/> 4800	<input type="checkbox"/> 2400	<input type="checkbox"/> 1200

Ge2					
Enable the BMS to turn the unit On / Off:	<input type="checkbox"/> No		<input type="checkbox"/> Yes		
On loss of Comms:	<input type="checkbox"/> Turn Off	<input type="checkbox"/> Turn On	<input type="checkbox"/> Use timeclock		

Ge3					
Enable DIN4 to turn the unit On / Off	<input type="checkbox"/> No		<input type="checkbox"/> Yes		

G. Service → f. Service settings → a. Working hour set

Gfa1	
Indoor Filter:	hours
Filter Fault relay:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Indoor Fan:	hours
Compressor:	hours

G. Service → f. Service settings → b. Probe Adjustment

Gfb1	
(Return Air Temperature) Room Temp cal :	°C

G. Service → f. Service settings → c. Thermoregulation

Gfc1	
Room Temperature Setpoint:	°C
Dead band:	°C
Cool Proportion band:	°C
Heat Proportion band:	°C
Integral Time:	second

Gfc6	
Setpoint Limit Min. by user:	°C
Setpoint Limit Max. by user:	°C
User Setpoint:	
User Mode Sel:	
Modelock timer:	second

Gfc2	
Room Temperature use INDOOR sensor	
After Hours :	SW and Temp. <input type="checkbox"/> SW Only <input type="checkbox"/>
Probe weight value :	
Room Temp.:	°C
Wall Cont Temp.:	°C
Control Value:	°C

Gfc7	
Enable Night Mode by Scheduler:	<input type="checkbox"/> No <input type="checkbox"/> Yes
Start Time:	
Finish Time:	
Max Cond fan Spd:	%
cct 2 max Spd:	%

Gfc4	
Supply Fan	
Minimum speed:	%
Medium speed:	%
Maximum speed:	%
Supply Fan Temp.	
Minimum temp.:	°C
Maximum temp.:	°C

Gfc8	
Multi Input 1	<input type="checkbox"/> No <input type="checkbox"/> Yes
SUPPLY AIR TEMP	<input type="checkbox"/> Probe Type
ECONOMY ENABLE	<input type="checkbox"/> NTC <input type="checkbox"/>
NIGHT MODE ENABLE	<input type="checkbox"/> 0-5V <input type="checkbox"/>
0-10V STAGE CONT	<input type="checkbox"/> ON/OFF <input type="checkbox"/>
0-10V IN FAN SPD	<input type="checkbox"/> 4-20mA <input type="checkbox"/>
VIEW ONLY INPUT	<input type="checkbox"/> 0-20mA <input type="checkbox"/>
CO ₂ SENSOR	<input type="checkbox"/> 0-10V <input type="checkbox"/>
PHASE FAIL RELAY	<input type="checkbox"/>
Multi Input 2	<input type="checkbox"/> No <input type="checkbox"/> Yes
SUPPLY AIR TEMP	<input type="checkbox"/> Probe Type
ECONOMY ENABLE	<input type="checkbox"/> NTC <input type="checkbox"/>
NIGHT MODE ENABLE	<input type="checkbox"/> 0-5V <input type="checkbox"/>
0-10V STAGE CONT	<input type="checkbox"/> ON/OFF <input type="checkbox"/>
0-10V IN FAN SPD	<input type="checkbox"/> 4-20mA <input type="checkbox"/>
VIEW ONLY INPUT	<input type="checkbox"/> 0-20mA <input type="checkbox"/>
CO ₂ SENSOR	<input type="checkbox"/> 0-10V <input type="checkbox"/>
PHASE FAIL RELAY	<input type="checkbox"/>

Gfc5	
Supply Fan Gen. 3:	<input type="checkbox"/> No <input type="checkbox"/> Yes
Supply Fan Continuous:	<input type="checkbox"/> No <input type="checkbox"/> Yes
Cycle on de-ice:	<input type="checkbox"/> No <input type="checkbox"/> Yes
One Speed Fan:	<input type="checkbox"/> No <input type="checkbox"/> Yes
Speed Fan:	<input type="checkbox"/> Low <input type="checkbox"/> Med <input type="checkbox"/> High
Supply Fan Run-on:	second
Heat Start Delay:	second

G. Service → f. Service settings → c. Thermoregulation (Continuous)

Gfc11	
Unit Control Mode	
Internal Sensors:	<input type="checkbox"/>
Remote Terminal:	<input type="checkbox"/>
Remote Demand:	<input type="checkbox"/>
External Input:	<input type="checkbox"/>
Supply Fan Control:	
Select Wall Control:	

Gfc12	
Unit Series:	
Unit Model:	
Variations:	

Gfc13	
Type of fans fitted	
Supply:	
Outdoor:	
Outdoor Init Speed	
OF1:	OF23:
Econ. Cycle Fitted:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Econ. Type:	

Gfc15	
Room Temp / Humidity	
Sensor fitted:	<input type="checkbox"/> Yes ⁽²⁾ <input type="checkbox"/> No
Use this sensor temp. instead of AI9:	<input type="checkbox"/> Yes <input type="checkbox"/> No

Gfc16	
Outside Temp / Humidity	
Sensor fitted:	<input type="checkbox"/> Yes ⁽³⁾ <input type="checkbox"/> No
Use this sensor temp. instead of AI10:	<input type="checkbox"/> Yes <input type="checkbox"/> No

Gfc17	
Alarm Disable	
Outdoor Unit	
RTN AIR Sensor:	<input type="checkbox"/> Yes <input type="checkbox"/> No

Gfc18	
Alarm Disable:	
Indoor Unit	
RTN AIR Sensor:	<input type="checkbox"/> Yes <input type="checkbox"/> No

Gfc19	
Damper Scaling	
Command Start:	%
Command End:	%
Output Start:	%
Output End:	%

Gfc31 ⁽¹⁾			
CO₂ Control			
Start:	ppm	End:	ppm
Alarm Output:	<input type="checkbox"/> Enabled <input type="checkbox"/> Disable		
Sensor Fault:	< ppm	> ppm	

⁽¹⁾ will be visible when ⁽⁴⁾ is enabled.

Gfc32	
Compressors	
1st Stage Start:	%
Stop:	%
2nd Stage Start:	%
Stop:	%
3rd Stage Start:	%
Stop:	%

G. Service → f. Service settings → d. Economy Setting

Gfd1		
Min Outside Air		
CO ₂ Sensor Disabled	Damper Position: %	
CO ₂ Sensor Enabled ⁽⁴⁾		
CO ₂ Level	ppm	ppm
Damper Position	%	%

Gfd2	
Economy Cycle	
Enabled:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temperature Difference:	C
Outside Air Minimum Limit	<input type="checkbox"/> Yes <input type="checkbox"/> No
Temperature:	C

⁽⁵⁾ will be visible when ⁽³⁾ outside temp/humidity sensor is set to **Yes**.

Gfd3	
Economy Cycle	
Outside Air Max Limit	
Temperature:	<input type="checkbox"/> Yes <input type="checkbox"/> No °C
⁽⁵⁾ Humidity:	<input type="checkbox"/> Yes <input type="checkbox"/> No %
⁽⁵⁾ Enthalpy:	<input type="checkbox"/> Yes <input type="checkbox"/> No kJ/kg
⁽⁵⁾ Moisture:	<input type="checkbox"/> Yes <input type="checkbox"/> No g/kg
⁽⁵⁾ Dew Point:	<input type="checkbox"/> Yes <input type="checkbox"/> No °C

Gfd4 ⁽⁶⁾	
Economy Cycle	
Enthalpy	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difference:	kJ/kg

⁽⁶⁾ will be visible when ⁽²⁾ and ⁽³⁾ are set to **Yes**.



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