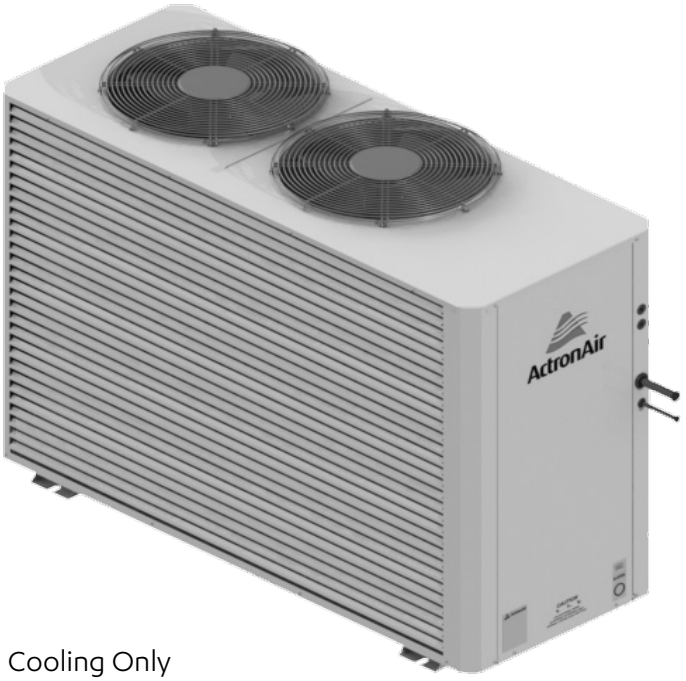
Classic Series 2
Split Ducted Unit

Installation and Commissioning Guide - Outdoor



Model Numbers

Classic Condenser	Add On Cooling Only
CRA100S	CCA130S
CRA130S	CCA150S
CRA130T	CCA170S
CRA150S	CCA170T
CRA150T	CCA200T
CRA170S	CCA230T
CRA170T	
CRA200T	
CRA230T	

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

That's better. That's Actron.

ActronAir

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01. Inspection

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 Goods Return Number.

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 Split 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, digital compressor, 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 system is designed with a split ducted refrigeration circuit that delivers only the amount of cooling or heating actually required to maintain your desired comfort at the most optimum efficiency.

Each refrigeration circuit consists of:

- High efficiency variable capacity scroll compressor with individual compressor drive.
- Hydrophilic coated condenser coil designed for optimum performance and efficiency with corrugated fins and riffled tubing.
- Hydrophilic coated evaporator coil designed for optimum performance and efficiency with lanced fins and riffled tubing.

Evaporator Section

The Classic series evaporator section has EC fans which deliver the nominated airflow. The fans provide superior performance for your comfort at optimum efficiency:

- Highly efficient EC motor that uses less energy than the traditional AC motor
- Low noise operation

Condenser Section

Uses two (2) axial fans and a state of the art scroll compressor, with the following features:

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

Electrical Section

The electrical section is composed of a separate panel for controls, protecting the components from the elements.

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 zinc and galvanized steel cabinet, with powder coated epoxy enamel 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.

Blue Epoxy Coat Coil Protection heat exchangers ensures an enhanced heat transfer with increased performance efficiency.

System Flexibility

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

Refrigerant Handling and Accountability

ActronAir strongly urges that all service technicians make every effort to eliminate and/or vigorously reduce the emission of refrigerants to the atmosphere. Everyone must act in a responsible manner to conserve refrigerants.

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 air conditioning units provide the solution for the reduction of energy consumption, CO_2 emission, high fuel dependency and high network grid demand.

03. Safety Instructions

- 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.

*****Qualifications required will be appropriate Electrical, Refrigeration and Refrigerant Handling License & 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. Extreme care and caution must be observed should there be a need to work on live circuit.

⚠ 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. For the recovered refrigerant and acceptable refrigerant quality refer to the existing standards and regulations.

Refrigerant Handling and Safety

Consult the refrigerant manufacturer's safety data sheet (SDS) 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 has sufficient structural strength to support the unit and accessories weight.
- Install anti-vibration rubber (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.
- Diameter or width of anti-vibration rubber's must be at least equal to the width of the actual feet to prevent deformation overtime.
- Preferably use anti-vibration rubber pads on residential units (up to 23kW split ducted).
- 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.
- For the connection and location of condensate drain in the unit, refer to the drawings 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 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.

NOTES

This outdoor unit is designed to match only with ActronAir Classic Series indoor unit as specified in the Technical Selection Catalogue.
This unit is designed for use with R-410A refrigerant only.
The unit is supplied with factory charged R-410A refrigerant. Be aware of all the relevant regulations concerning the handling of refrigerant.

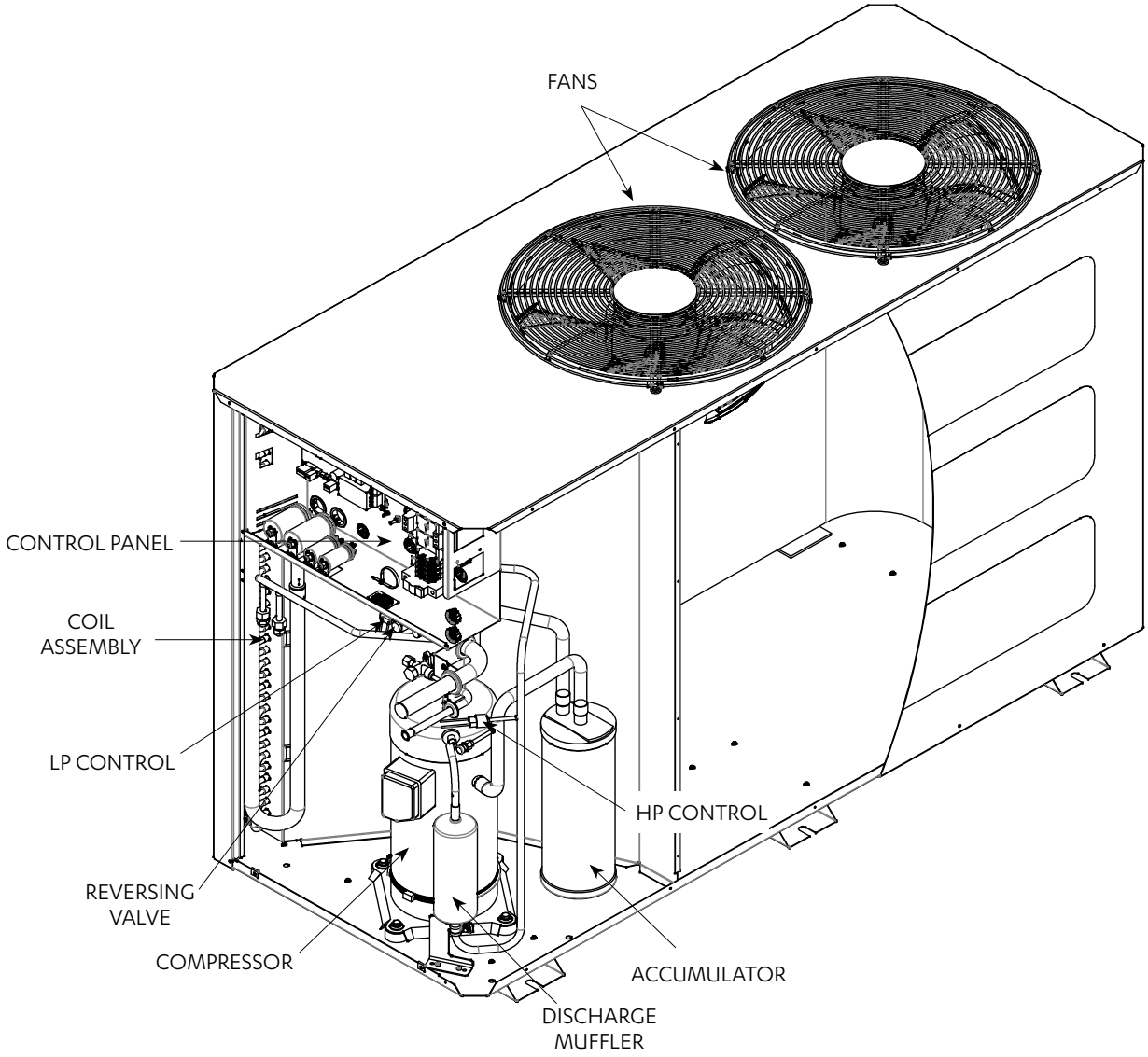
05. Operation Manual Access

Download from website

Operation manuals can be downloaded through our website shown below.

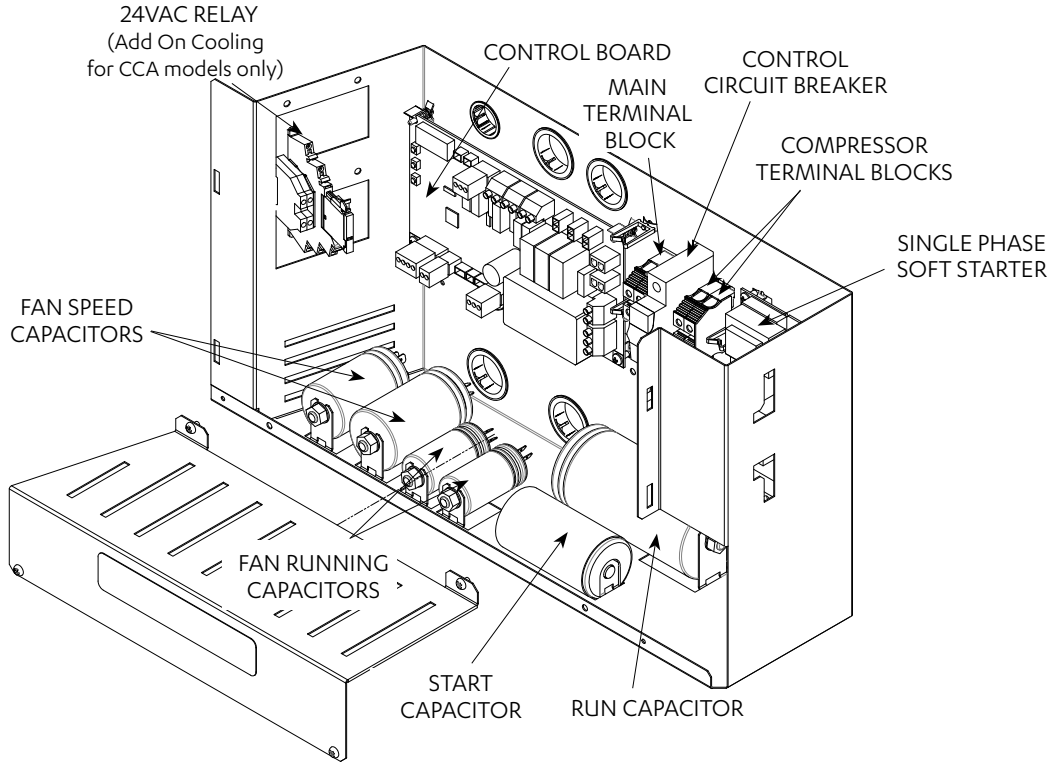
https://www.actronair.com.au/brochures-manuals/#operating-manuals

06. Components Overview

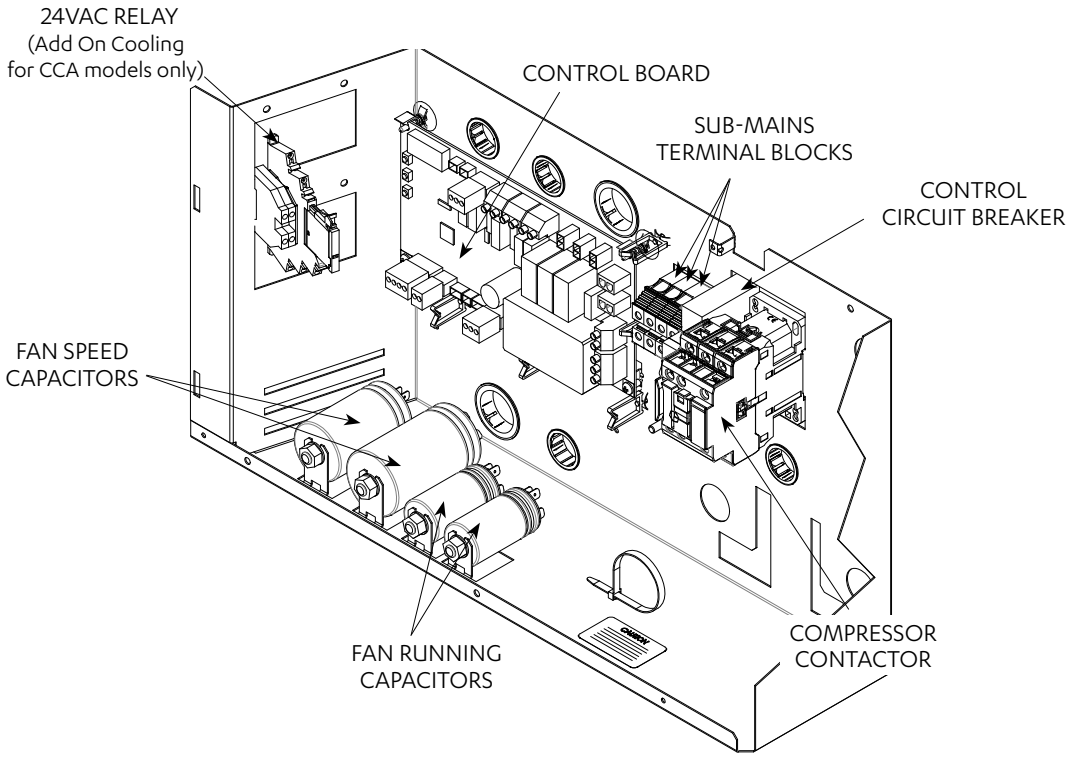


07. Control Panel

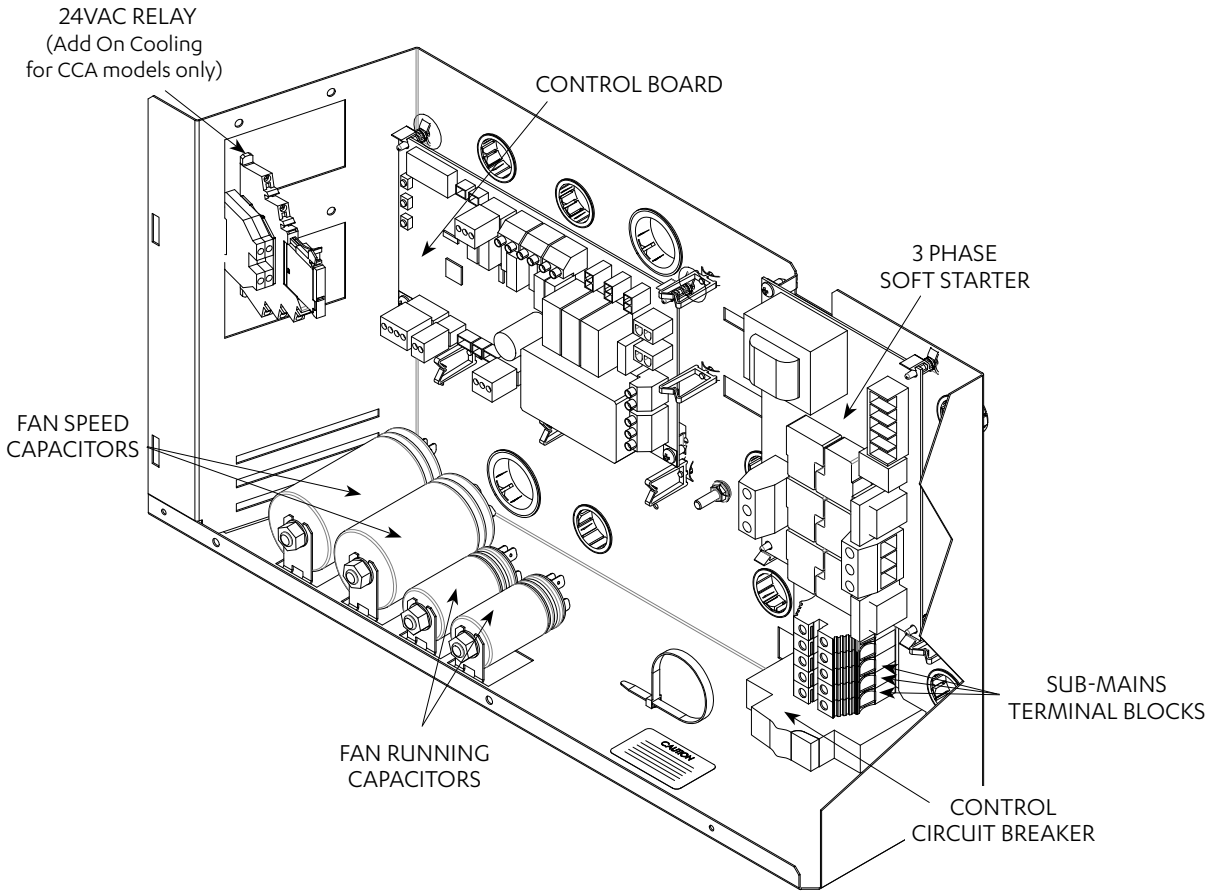
07.01. Single Phase (10-17kW)



07.02. Three Phase (13-23 kW)

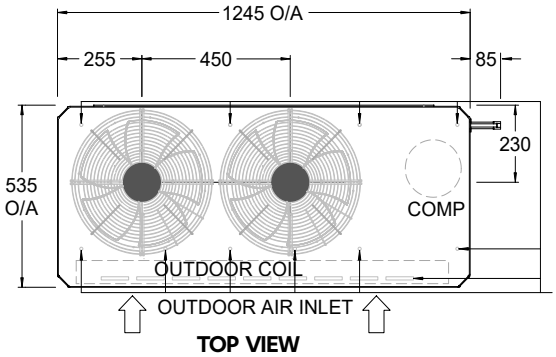


07.03. Three Phase - Soft Starter Option (13-23 kW)



08. Unit Dimensions and Clearances

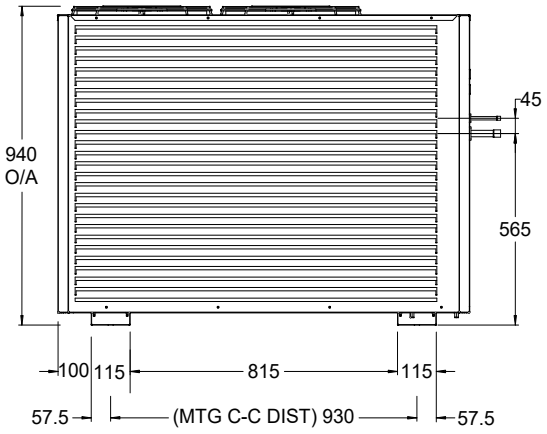
08.01. CRA100S



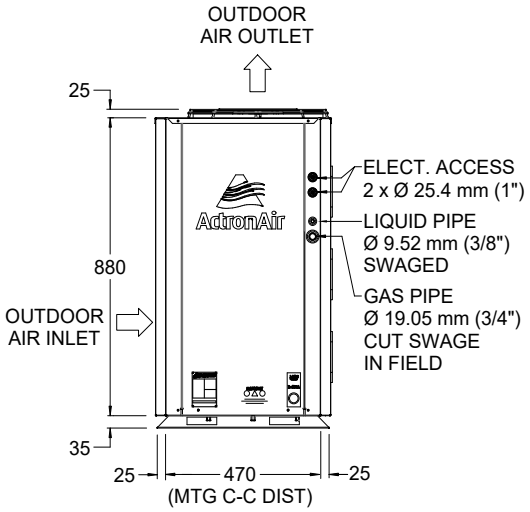
TOP VIEW

CONDENSATION POINTS ARE DESIGNED TO ENSURE ALL CONDENSATION IS REMOVED EFFICIENTLY TO AVOID WATER POOLING WITHIN THE CONDENSER. IF A SINGLE CONDENSATION DRAIN POINT IS REQUIRED, ACTRONAIR RECOMMENDS THE INSTALLATION OF A CONDENSER TRAY. THESE ARE AVAILABLE AS AN ADDITIONAL ACCESSORY.

** DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE**



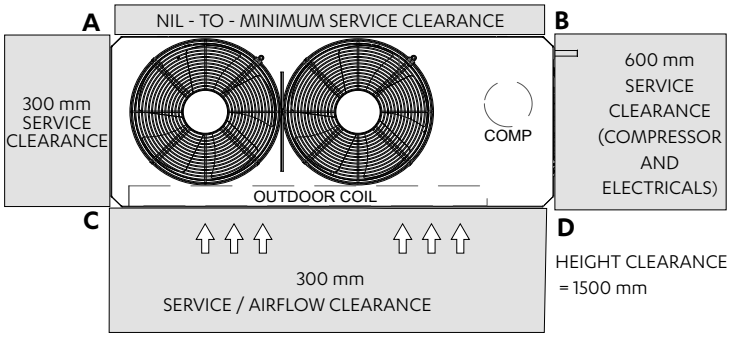
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	CORNER WEIGHTS (kg)			
		A	B	C	D
CRA100S	121	14	45	22	40

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES

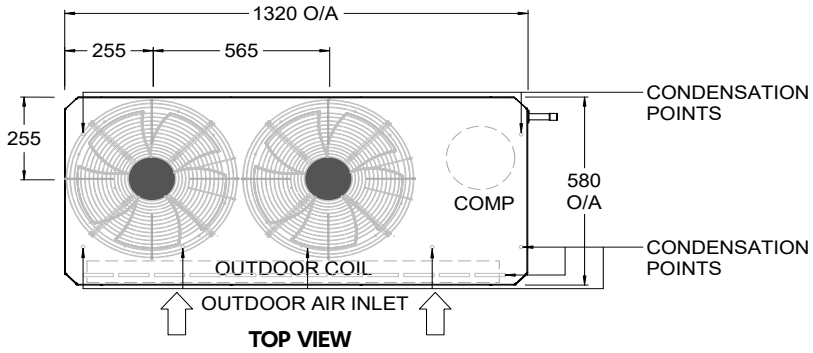


THIRD ANGLE PROJECTION

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 above 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.
4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

08.02. CRA130S / CRA130T / CCA130S



TOP VIEW

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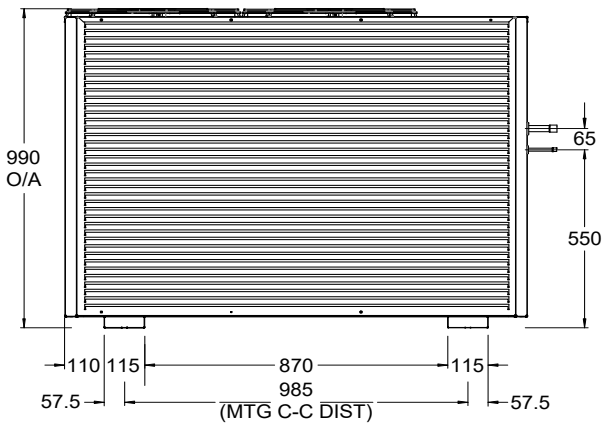
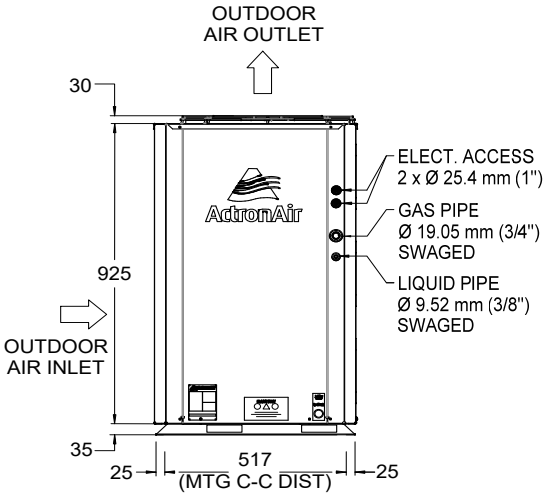


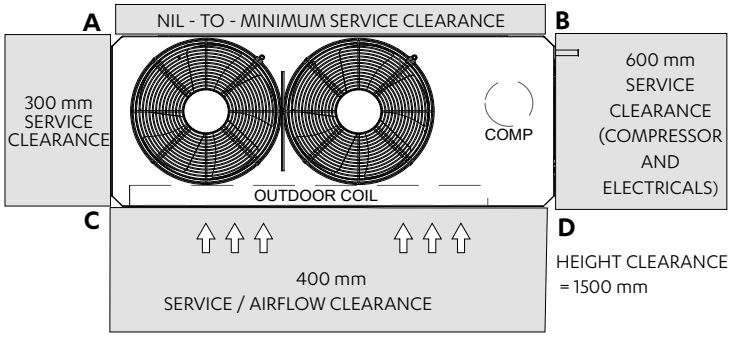
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	CORNER WEIGHTS (kg)			
		A	B	C	D
CRA130S / CCA130S	132	21	42	19	50
CRA130T	130	21	40	19	50

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES



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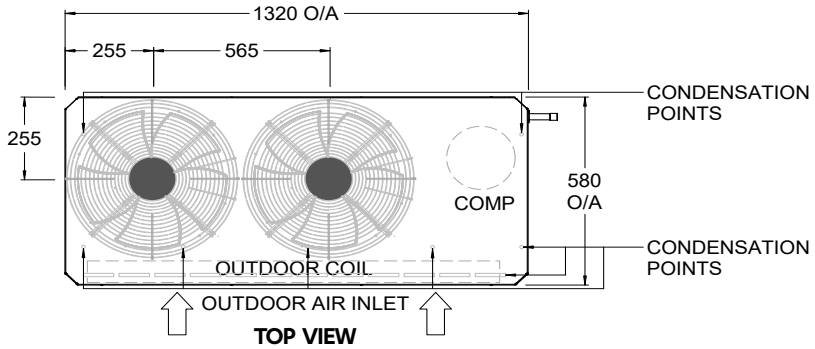
3. Minimum service access areas and spaces for airflow clearances are responsibilities of the installer, ActronAir will not be held liable for any extra charges incurred due to lack of access and space for airflow.
4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

08.03. CRA150S / CRA150T / CCA150S



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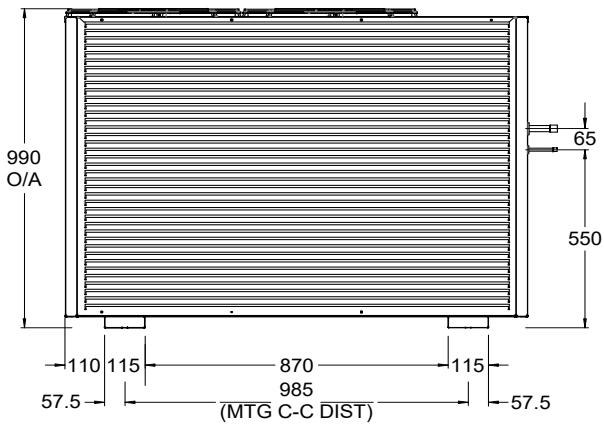
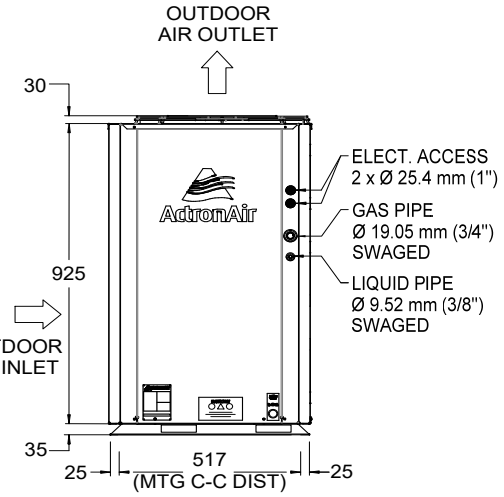


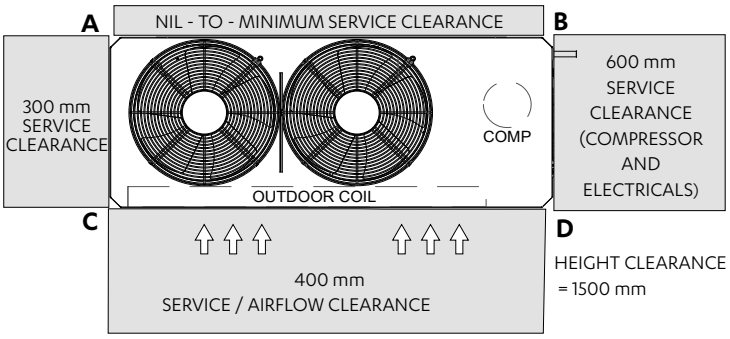
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	CORNER WEIGHTS (kg)			
		A	B	C	D
CRA150S / CCA150S	133	19	45	22	47
CRA150T	132	20	43	21	48

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES



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4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

08.04. CRA170S / CRA170T / CCA170S / CCA170T

CONDENSATION POINTS ARE DESIGNED TO ENSURE ALL CONDENSATION IS REMOVED EFFICIENTLY TO AVOID WATER POOLING WITHIN THE CONDENSER. IF A SINGLE CONDENSATION DRAIN POINT IS REQUIRED, ACTRONAIR RECOMMENDS THE INSTALLATION OF A CONDENSER TRAY. THESE ARE AVAILABLE AS AN ADDITIONAL ACCESSORY.

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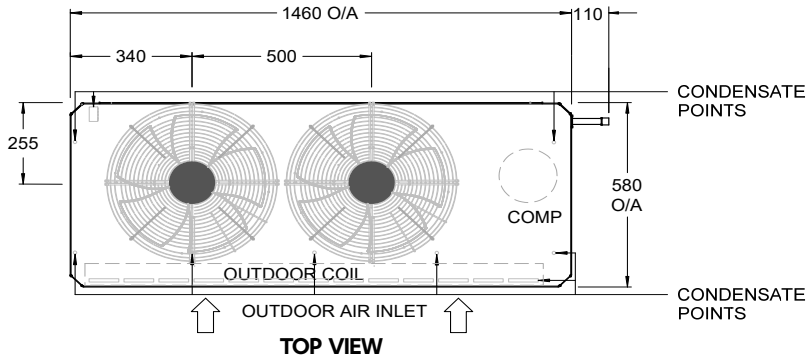
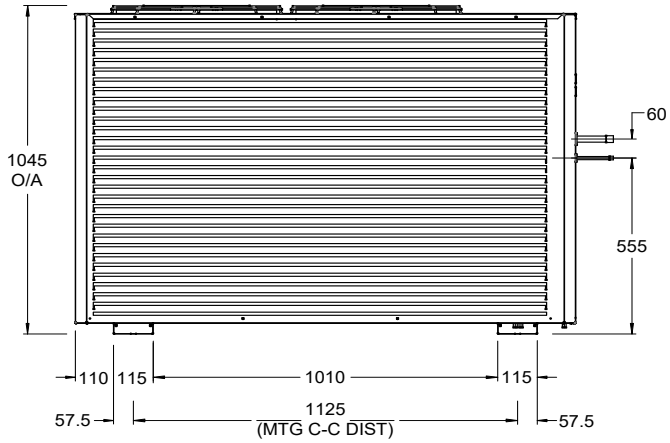
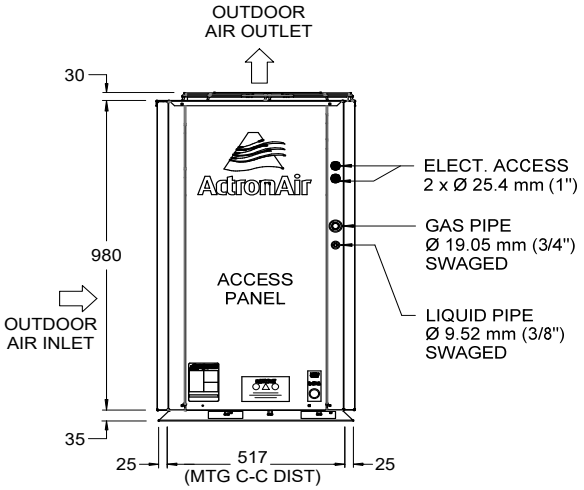


TOP VIEW



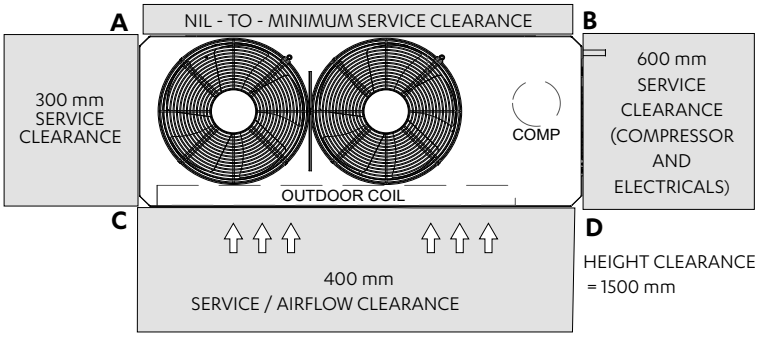
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	CORNER WEIGHTS (kg)			
		A	B	C	D
CRA170S / CCA170S	156	17	54	28	57
CRA170T / CCA170T	155	17	54	28	56

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES



THIRD ANGLE PROJECTION

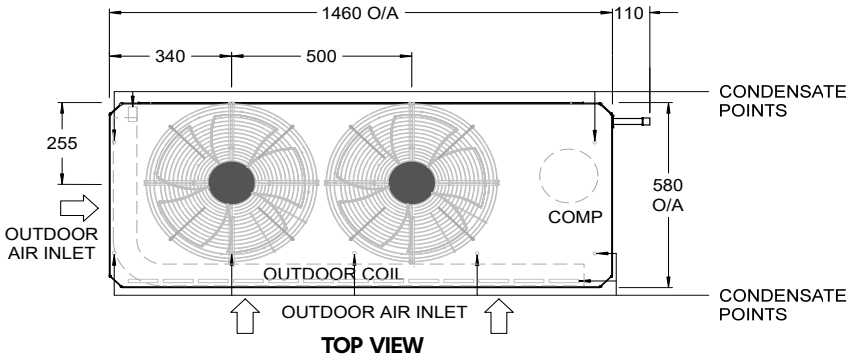
NOTES:

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 above 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.
4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

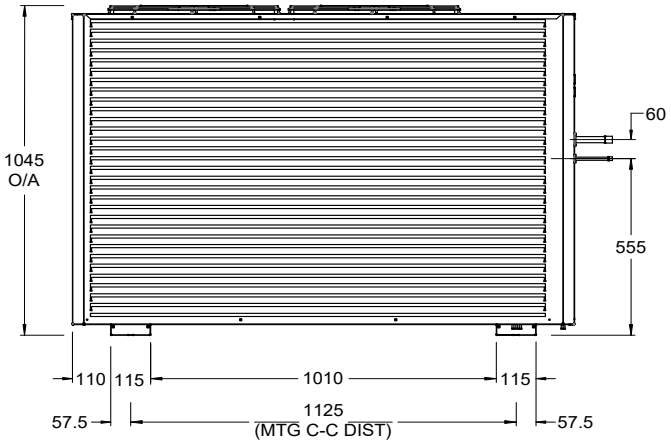
08.05. CRA200T / CCA200T

CONDENSATION POINTS ARE DESIGNED TO ENSURE ALL CONDENSATION IS REMOVED EFFICIENTLY TO AVOID WATER POOLING WITHIN THE CONDENSER. IF A SINGLE CONDENSATION DRAIN POINT IS REQUIRED, ACTRONAIR RECOMMENDS THE INSTALLATION OF A CONDENSER TRAY. THESE ARE AVAILABLE AS AN ADDITIONAL ACCESSORY.

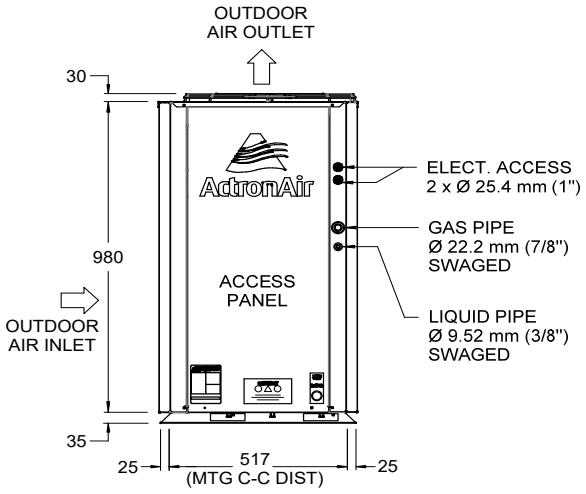
** DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE**



TOP VIEW



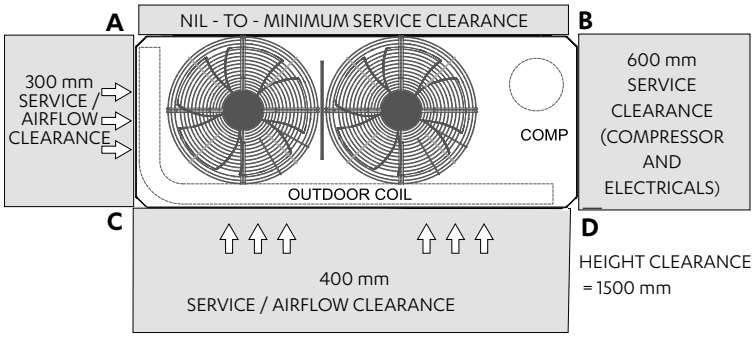
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	CORNER WEIGHTS (kg)			
		A	B	C	D
CRA200T / CCA200T	158	15	59	38	46

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES

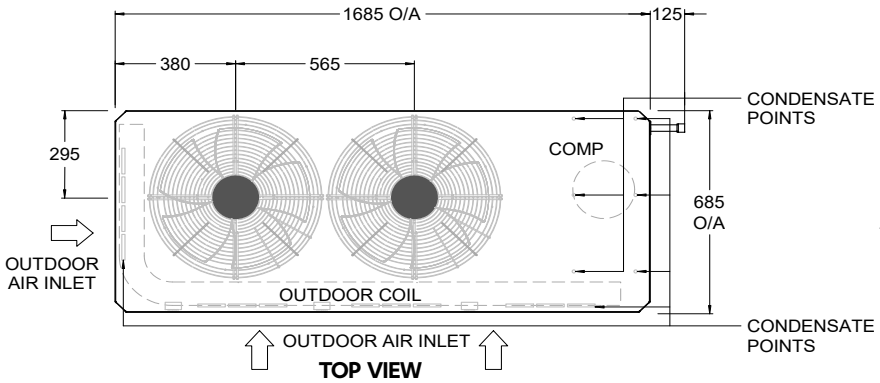


THIRD ANGLE PROJECTION

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 above 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.
4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

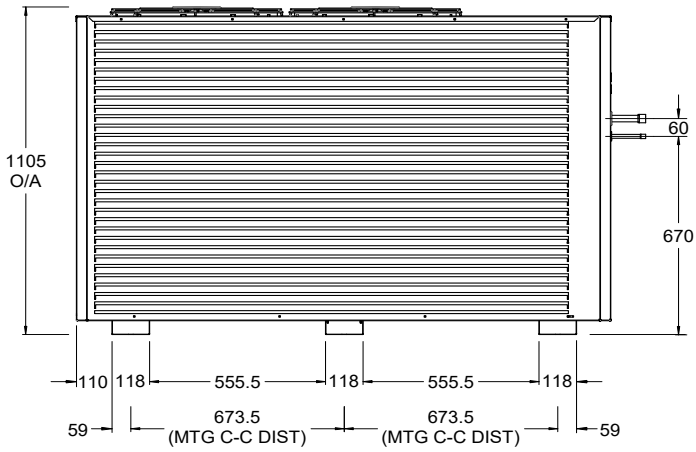
08.06. CRA230T / CCA230T



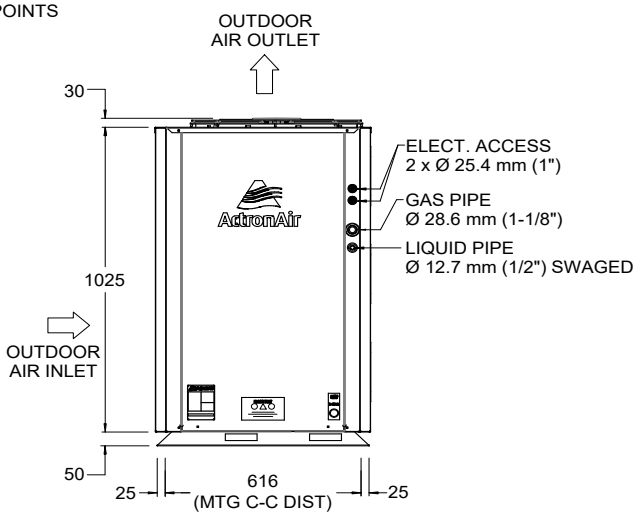
TOP VIEW

CONDENSATION POINTS ARE DESIGNED TO ENSURE ALL CONDENSATION IS REMOVED EFFICIENTLY TO AVOID WATER POOLING WITHIN THE CONDENSER. IF A SINGLE CONDENSATION DRAIN POINT IS REQUIRED, ACTRONAIR RECOMMENDS THE INSTALLATION OF A CONDENSER TRAY. THESE ARE AVAILABLE AS AN ADDITIONAL ACCESSORY.

** DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE**



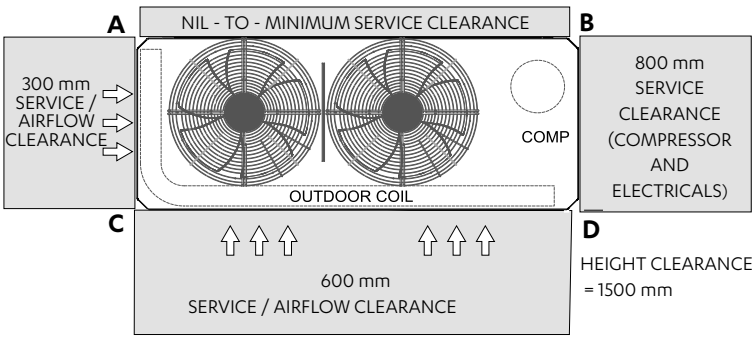
SIDE VIEW



FRONT VIEW

UNIT MODEL NUMBER	UNIT WEIGHT (kg)	WEIGHT DISTRIBUTION (kg)			
		A	B	C	D
CRA230T / CCA230T	195	30	57	41	67

MINIMUM SERVICE ACCESS AREAS AND AIRFLOW CLEARANCES



THIRD ANGLE PROJECTION

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 above 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.
4. Under all circumstances, condenser air must not recirculate back onto condenser coil. Keep all clearance free of any obstructions.
5. Maximum External Static of Outdoor Fans is 5 Pa.
6. STACKING OF UNITS: Ensure that minimum airflow and clearances are met.
7. Refer to pipe Connection Details on Specifications Sheet.
8. MTG C-C DIST = Mounting Centre to Centre Distance.
9. Use M12 bolt for feet mounting.

09. Unit Lifting Procedure

⚠ WARNING

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

Crane Lifting Method

Crane lifting method is recommended for high rise lifting.

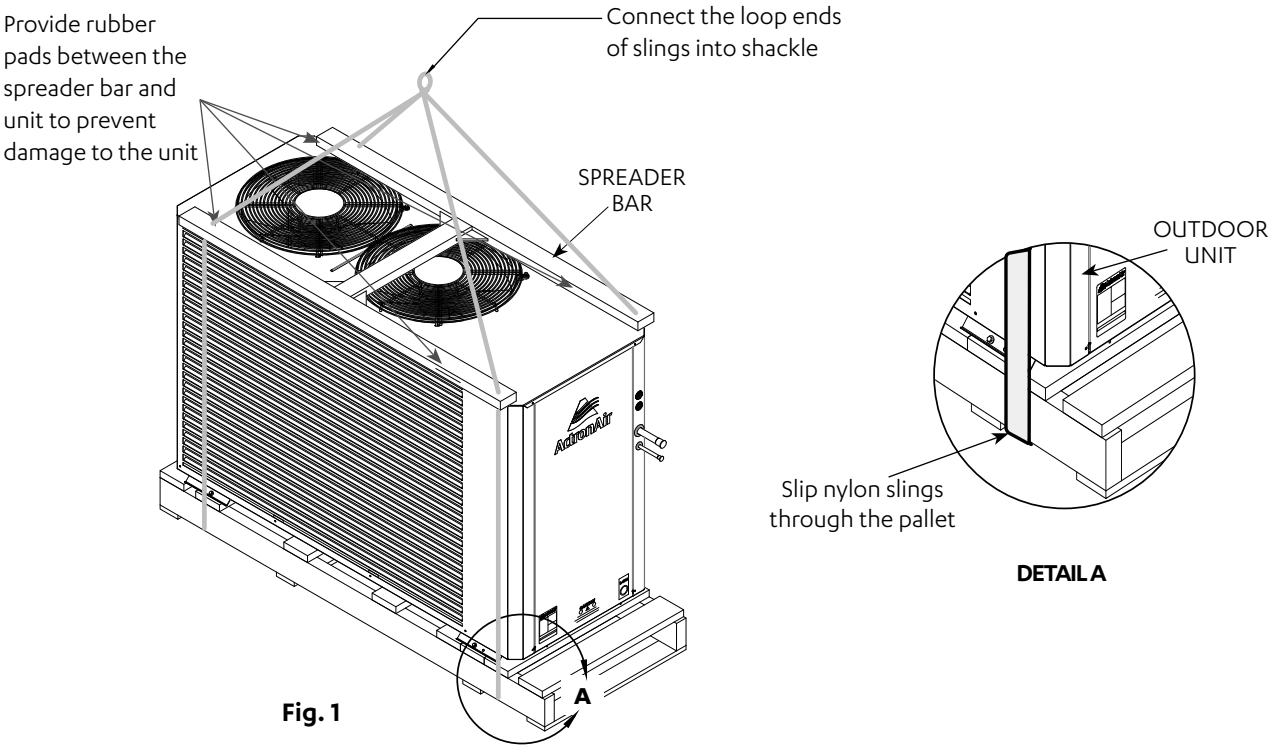


Fig. 1

Equipment Required For Crane Lifting:

- 1 Shackle
- 2 x Nylon Slings
- Spreader bars

Refer to catalogue for unit weight before selecting shackles and slings.

NOTE

Refer to Unit Dimensions and Clearances section for unit weight before selecting shackle and slings.

Procedure:

1. Slip nylon slings through the pallet as shown in Fig. 1.
2. Use a Bow or Dee shackle to connect the slings.
3. Ensure slings are protected by rubber pads or similar if slings are draped across unit edges, corners, or air grilles . This will prevent the unit from being damaged during lifting.
4. SPREADER BARS must be used when lifting the unit.
5. Test lift the unit to determine exact unit balance and stability before hoisting it to the installation location.

Fork Lift Method

⚠ DANGER

Make sure rigging equipment, accessories and plant are sufficiently and safely capable to lift the unit in order to prevent potential damage to property, severe personal injury or death. Please check unit weight and weight distribution points as shown in the unit drawing dimensions section.

Procedure:

1. To move the unit around with a forklift, insert the fork tines through the pallet, as shown in Fig. 2.
2. Only fork the unit through compressor end or side of the unit. (See illustration for location of compressor end)

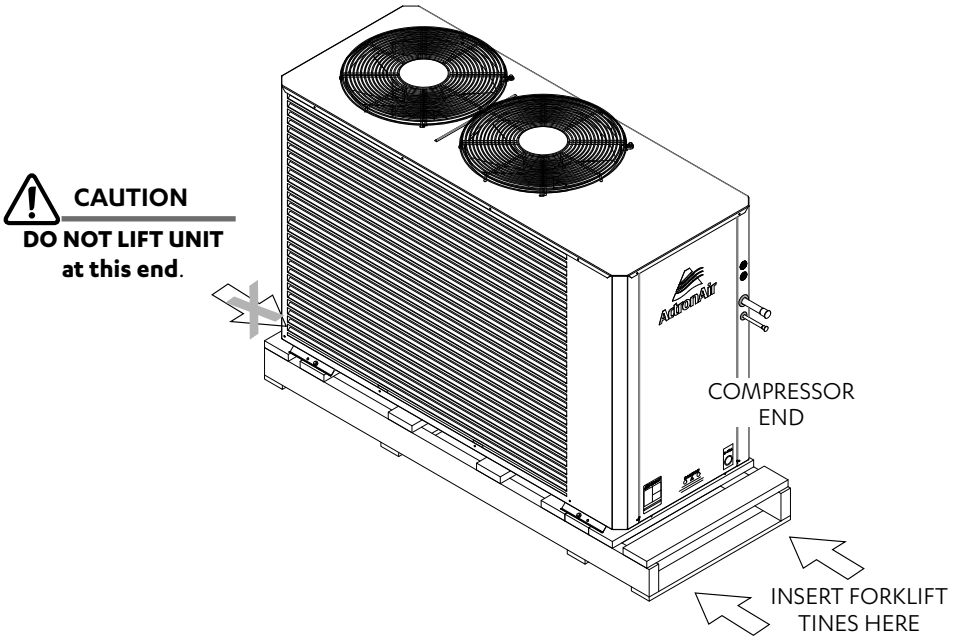


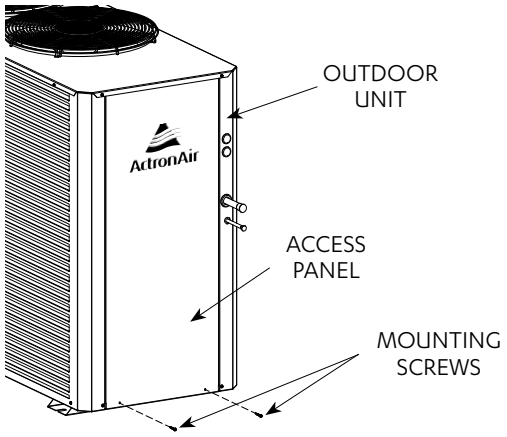
FIG. 2

⚠ CAUTION

Length of fork lift tines must pass the unit middle section, in order to safely carry the unit.

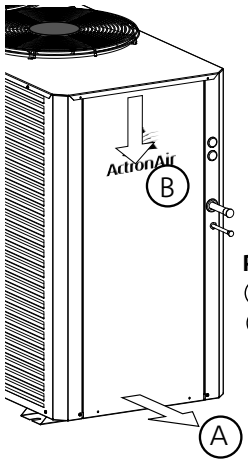
10. Outdoor Unit Preparation

1. Remove mounting screws, as shown below:

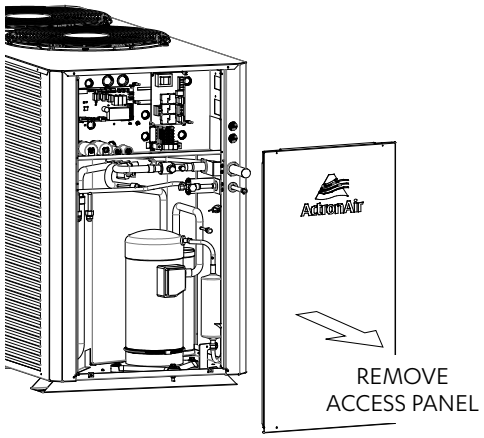


2. Remove Access Panel.

- Remove Access Panel-Electrical as illustrated below:

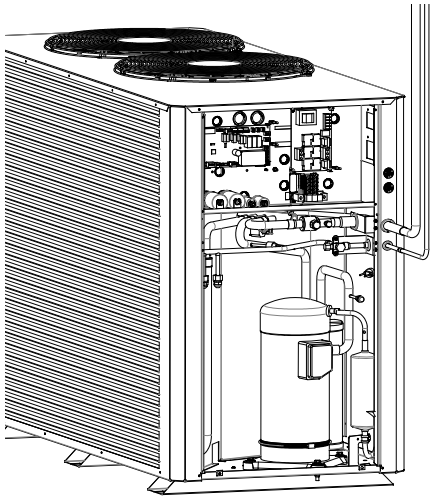


Removal Order:
Ⓐ Pull-Out 20mm
Ⓑ Pull-Down to remove Access Panel-Electrical



3. Install Interconnecting Field Pipes

- Braze refrigeration piping. Refer to Section 10 for details of field pipe sizes and piping installation procedure.



⚠ WARNING

Live electrical within enclosure. Isolate electrical supply before removing panels. Authorised technicians access only

11. Field Pipe Connection

11.01. Piping and Brazing

⚠ CAUTION

The units described in this guide use R-410A refrigerant

R-410A operates at a pressure approximately 1.6 times higher than similar systems using R-22. When installing equipment using R-410A refrigerant, there are number of standards that must be met:

- The system of this unit operates with Polyolester (POE) oil that rapidly absorbs moisture.
- The maximum time any system can be opened to atmosphere is 15 minutes.
- 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.
- Never allow R-410A refrigerant to vent into the atmosphere. It is an offence to release refrigerant in Australia.
- Always reclaim refrigerant using equipment and container dedicated for R-410A system use only.
- Only qualified technicians are allowed to perform any work described in this guide.
- All work must be carried out in accordance with Australia and New Zealand refrigerant handling code of practice.

Maximum allowable total equivalent field pipe length is 60 metres, see diagram below. This includes all the equivalent pipe fitting loses and vertical height difference. Vertical height difference must not exceed 20 metres. Table 1 below shows the equivalent straight pipe length of elbow fittings.

TABLE 1: EQUIVALENT STRAIGHT PIPE LENGTH OF ELBOW FITTINGS (METRES)

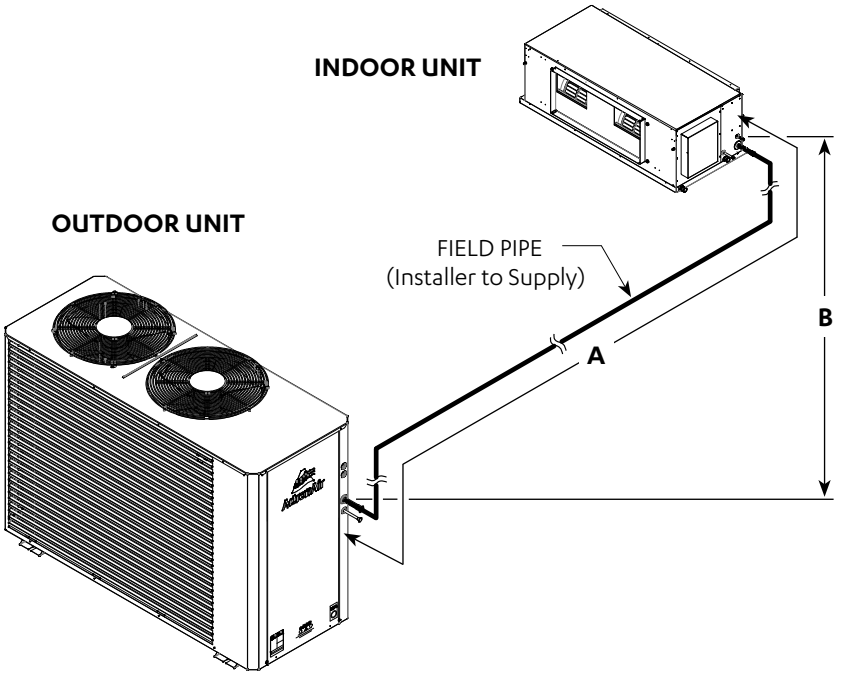
Pipe size Nominal Diameter	90° Long Radius Elbow	90° Short Radius Elbow	45° Long Radius Elbow	45° Short Radius Elbow
9.52 (3/8")	0.24	0.36	0.09	0.14
15.88 (5/8")	0.30	0.45	0.15	0.23
19.05 (3/4")	0.40	0.60	0.18	0.27
22.22 (7/8")	0.46	0.69	0.21	0.32
25.4 (1")	0.52	0.78	0.24	0.36
28.58 (1-1/8")	0.55	0.83	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.

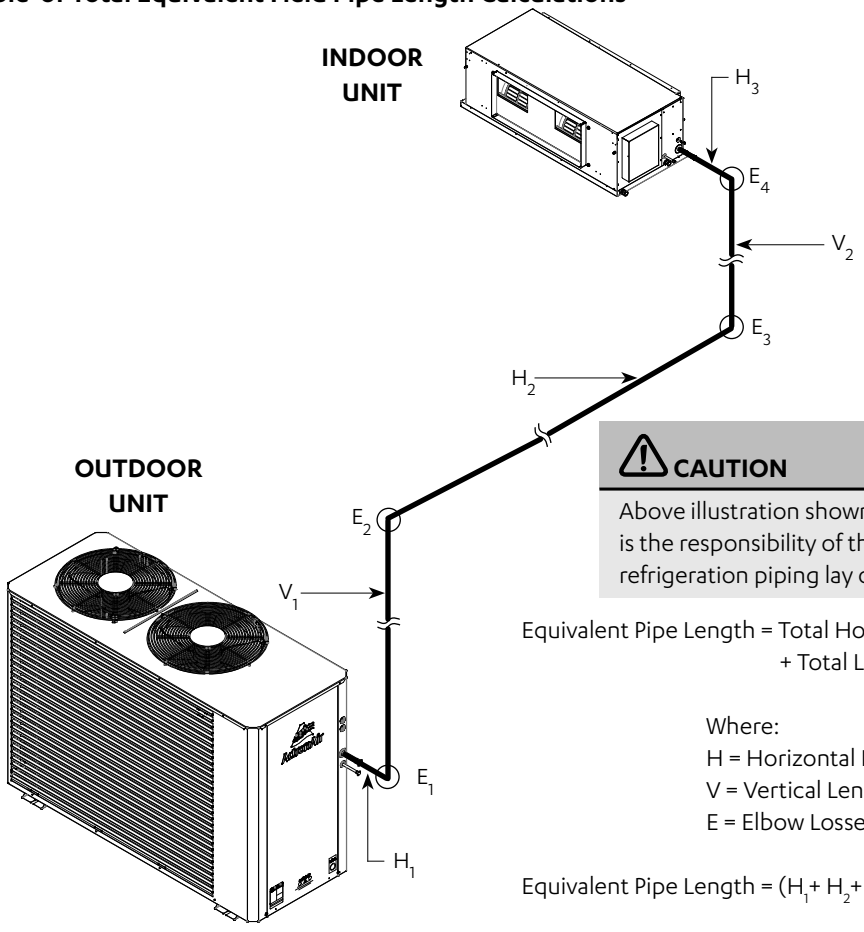
Most of unit pipe connections are factory swaged to easily fit to the recommended field pipe diameter.

When it is required to install other refrigeration devices, such as refrigerant drier, solenoid valve and the like, include the equivalent straight pipe length of the device in the calculation of total equivalent field pipe length.

Both pipes are required to be insulated.



Example of Total Equivalent Field Pipe Length Calculations



⚠ CAUTION

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

Equivalent Pipe Length = Total Horizontal Length + Total Vertical Length + Total Losses from Elbows

Where:
H = Horizontal Length
V = Vertical Length
E = Elbow Losses

Equivalent Pipe Length = $(H_1 + H_2 + H_3) + (V_1 + V_2) + (E_1 + E_2 + E_3 + E_4)$

TABLE 2: REFRIGERATION PIPING - SINGLE PHASE					
Reverse Cycle (Outdoor / Indoor)		**CRA100S / EVA100S**	**CRA130S / EVA130S**	**CRA150S / EVA150S**	**CRA170S / EVA170S**
Add On Cooling (Outdoor / Indoor)		**-**	**CCA130S / EAA130S**	**CCA150S / EAA150S**	**CCA170S / EAA170S**
Max. Equivalent Pipe Length Range	metres	0 - 60	0 - 60	0 - 60	0 - 60
Max. Vertical Height Differential [1]	metres	20	20	20	2 0
Field Pipe Size					
Liquid Line	mm (inch)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)
Gas Line	mm (inch)	5/8 (15.88)	3/4 (19.05)	3/4 (19.05)	3/4 (19.05)
Outdoor Pipe Size					
Liquid Line	mm (inch)	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged
Gas Line	mm (inch)	3/4 (19.05) swaged [2]	3/4 (19.05) swaged	3/4 (19.05) swaged	3/4 (19.05) swaged
Indoor Pipe Size					
Liquid Line	mm (inch)	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged
Gas Line	mm (inch)	5/8 (15.88) swaged	3/4 (19.05) swaged	3/4 (19.05) swaged	3/4 (19.05) swaged

NOTES

[1] Included in maximum field pipe length.
[2] Cut Swaged End on the unit to fit field pipe.

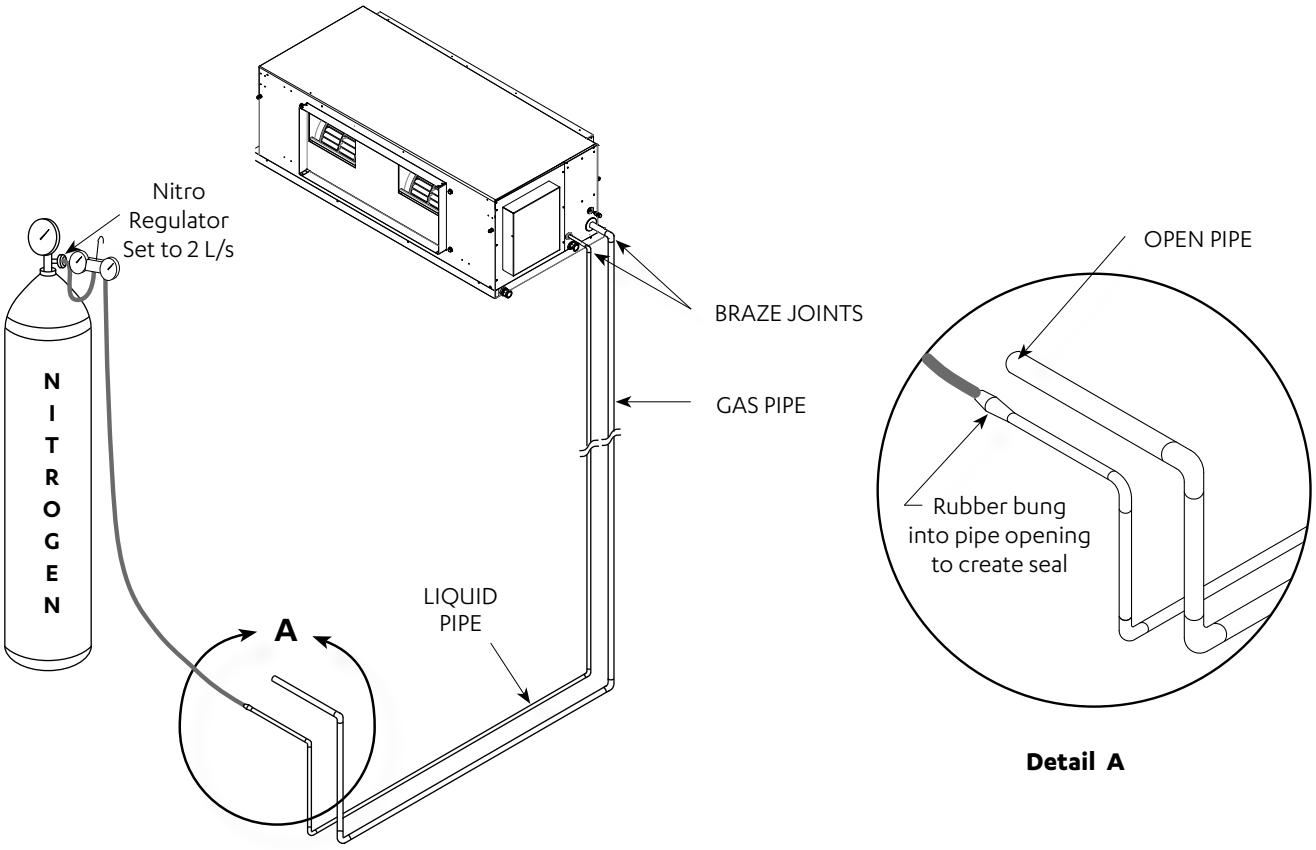
TABLE 3: REFRIGERATION PIPING - THREE PHASE						
Reverse Cycle (Outdoor / Indoor)		**CRA130T / EVA130S**	**CRA150T / EVA150S**	**CRA170T / EVA170S**	**CRA200T / EVA200S**	**CRA230T / EVA230S**
Add On Cooling (Outdoor / Indoor)		**-**	**-**	**CCA170T / EAA170S**	**CCA200T / EAA200S**	**CCA230T / EAA230S**
Max. Equivalent Pipe Length Range	metres	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
Max. Vertical Height Differential [1]	metres	20	20	20	20	20
Field Pipe Size						
Liquid Line	mm (inch)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	1/2 (12.7) [2]	1/2 (12.7)
Gas Line	mm (inch)	3/4 (19.05)	3/4 (19.05)	3/4 (19.05)	7/8 (22.22)	1 (25.4)
Outdoor Pipe Size						
Liquid Line	mm (inch)	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged [3]	1/2 (12.7) swaged
Gas Line	mm (inch)	3/4 (19.05) swaged	3/4 (19.05) swaged	3/4 (19.05) swaged	7/8 (22.22) swaged	1-1/8 (28.6) ID to fit field pipe
Indoor Pipe Size						
Liquid Line	mm (inch)	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged	3/8 (9.52) swaged [3]	1/2 (12.7) swaged
Gas Line	mm (inch)	3/4 (19.05) swaged	3/4 (19.05) swaged	3/4 (19.05) swaged	7/8 (22.22) swaged	1 (25.4) swaged in field to fit 1 (25.4)

NOTES

[1] Included in maximum field pipe length.
[2] For pipe runs 0-20m 3/8" pipe must be used.
[3] Cut the swaged end of the unit to fit the field pipe.

⚠ CAUTION

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 warranty.



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

3. Run interconnecting pipe work from condenser location to evaporator.
4. Release pressure in evaporator and remove caps.
5. Fit copper tube into tail, set nitro bottle and regulator up at condenser end of pipe work.
6. Fit nitrogen line into liquid line with rubber bung to seal the connection. The seal will prevent air being sucked into pipe work.
7. Leave suction line open, set nitro regulator for nitrogen to flow through pipe work at 2 l/s flow rate @20kPa.
8. Braze required joints as quick as possible. **See Diagram Above.**

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.

11.02. Pressure Testing

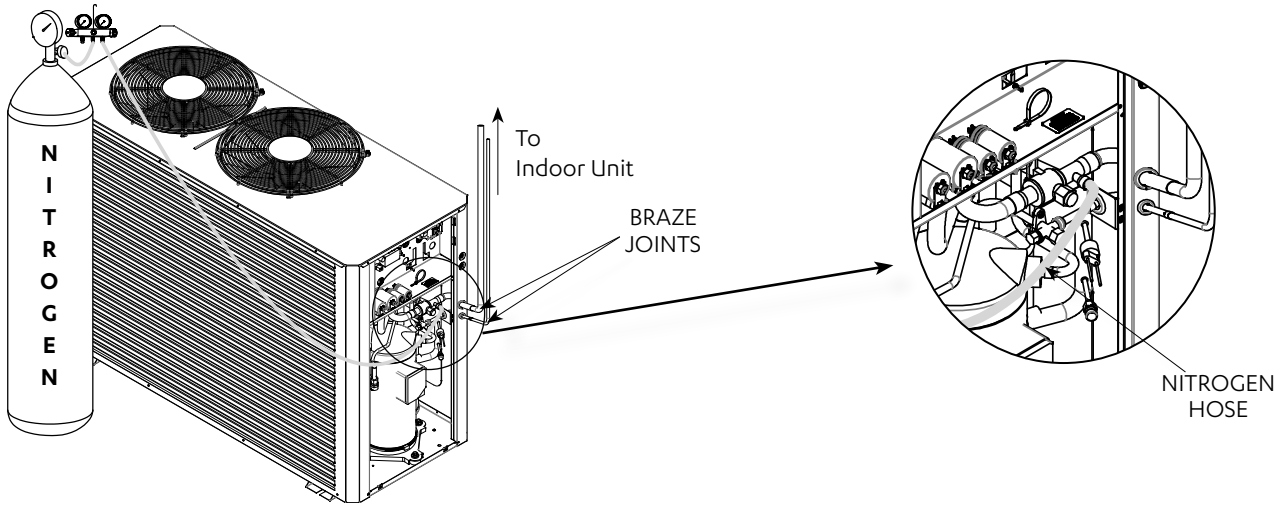
Pressurize the system to 2500kPa in stages. A recommended pressure test is to be performed for no less than 1 hour at 2500kPa.

⚠ IMPORTANT

Importance of Evacuation:

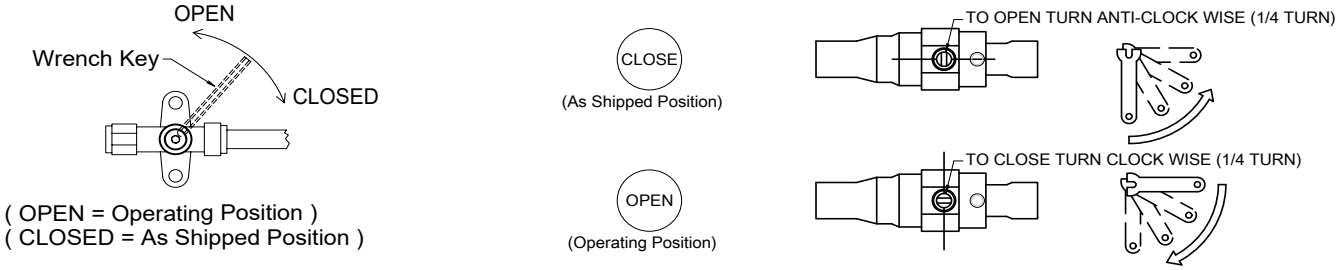
- Any non-condensable product left in the system can cause the pressure in the high side of the system to increase and in turn, the compression temperature to rise.
- Moisture will result in adverse reaction in the refrigerant circuit.
- The POE oil used in the R-410A compressor is hygroscopic, which 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.

See Diagram Below:



11.03. 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 1000 microns.
3. Check vacuum with vacu stat. Break the vacuum with dry Nitrogen to 100kPa
4. Release Nitrogen pressure. Evacuate to 500 microns.
5. Check vacuum with vacu stat. Break the vacuum with dry Nitrogen to 100kPa
6. Release Nitrogen pressure. Evacuate to 500 microns.
7. Check vacuum with vacu stat. Let the unit stand for 1 hour and with the vacuum not rising above 500 microns.
8. Open valve.



12. Electrical Installation

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 wiring diagram provided.

DANGER

Live Electrical Supply !

During installation of your air conditioning unit, it may be necessary to work in close proximity to live electricity. Only qualified technicians are allowed to perform these tasks.

Follow all electrical safety precautions when exposed to live electrical components.

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 unrepairable damage.
- Static damaged electronic devices are NOT COVERED for replacement under warranty.

Wiring Diagram

The wiring diagrams specific for your air conditioning system are located on the inside panel of the control access door. Always refer all wiring installation, servicing and troubleshooting of this equipment to this diagram to ensure correct electrical connections are satisfied.

Supply and Power Requirements Procedure

It is the installer's responsibility to provide power supply wiring to the mains supply terminal strip of the outdoor unit. Make sure all wiring are in accordance with local wiring rules. Wiring should conform to the current electrical authority regulations and all wiring connections to be as per electrical diagram provided with the unit.

- Confirm that the power supply available is compatible with the unit nameplate ratings. The supply power must be within +10% to -6% of the rated voltage as per AS60038.
- Protect electrical service from over current and short circuit conditions in accordance with the latest edition of the AS/NZS 3000 "Australian / New Zealand Wiring Rules". Size protection devices according to the electrical data of the unit.
- Installer to connect an appropriate load break (AC3) isolator in sub mains wiring.
- Secure any power and control cables that enters in/exits out of the unit. Use the cable ties provided in the main electrical panel.

Provide proper unit earth in accordance with local and national codes.

Compressor Voltage Balance Requirement

Check the voltage at the Mains Supply terminals to determine if it is balanced. Voltage imbalance on three phase systems can cause motor overheating and premature failure. The maximum allowable imbalance is + 2.0% should voltage imbalance exceed this value, check unit wiring connections to locate and rectify faults or contact local supply authority.

Crankcase Heater

Crankcase Heater is to be disconnected for pipe lengths 8 m or less.

13. Split Unit Electrical Connection

NOTE

To minimise noise interference, Data and Power cable clearance should be maintained as much as possible.

DETAILED WIRING DIAGRAM IS PROVIDED WITH THE UNIT.

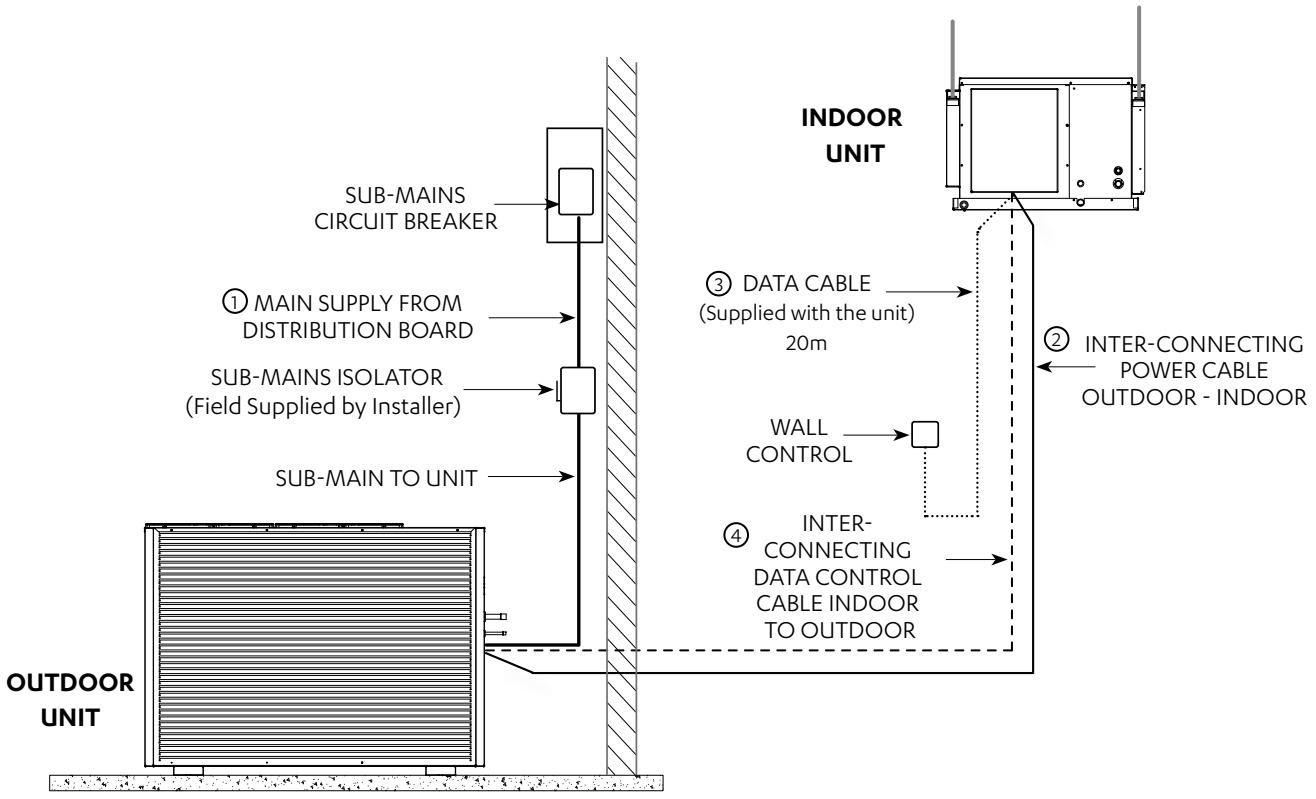
Outdoor Unit: Located at the back of electrical/compressor access panel.
Indoor Unit: Located at the back of electrical box cover.

——— ① MAINS WIRING (230/400VAC)
(Single Phase + Neutral + Earth) 50Hz
(Three Phase + Neutral + Earth) 50Hz

——— ② INTER-CONNECTING POWER CABLE (230VAC)
(Single Phase + Neutral + Earth) 50Hz

····· ③ DATA CABLE TO WALL CONTROLLER
(Cat5E UTP (AWG 24) Data Cable)

- - - - - ④ EXTRA LOW VOLTAGE DATA CONTROL WIRING
(2 Core Shielded Twisted Pair 7/0.30 (0.5mm²) Data Cable)



2 Core Twisted Data Cable Shielding Instructions
(ActronAir Part Number: AEDC2)

NOTES

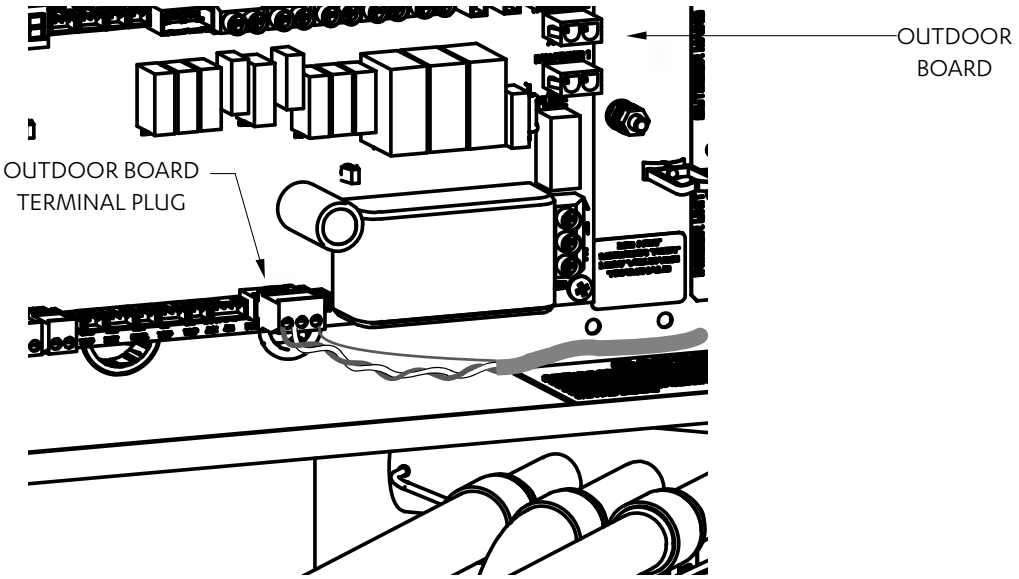
- Maintain the twist of the core wires up to the Green Terminal Plug.
- Maximum strip length of outer insulation to the Green Terminal Plug is 50mm.
- Make sure the cable colours used for the Data Terminal in Outdoor Unit match the Data Terminal in Indoor unit.

Outdoor Unit Data Terminal (Green Plug)
"Terminal A" - White Wire
"Terminal B" - Black Wire
"Terminal G" - Shield Wire

Indoor Unit Data Terminal (Green Plug)
"Terminal A (+)" - White Wire
"Terminal B (-)" - Black Wire
"Terminal G" - Shield Wire

Insert data cable through the lower snap bushing and first cable tie on the right hand side of the electrical panel.

Connect core wires and shield wire into the Outdoor Board green terminal plug marked " INDOOR A, B and G". (Refer to unit wiring diagram for complete wiring connection details).



Circuit Breaker Size and Cable Size Requirement			
Model	**Circuit Breaker Size**	**Cable Size * (mm2)**	
	Amps	**MAIN**	**O.D. to I.D.**
CRA100S / EVA100S	25.0	4.0	1.0
CRA130S / EVA130S / EFA130S CCA130S / EVA130S / EFA130S	32.0	6.0	1.0
CRA150S / EVA150S / EFA150S CCA150S / EVA150S / EFA150S	32.0	6.0	1.0
CRA170S / EVA170S / EFA170S CCA170S / EVA170S / EFA170S	40.0	10.0	1.0
CRA130T / EVA130S / EFA130S	16.0	2.5	1.0
CRA150T / EVA150S / EFA150S	20.0	2.5	1.0
CRA170T/ EVA170S / EFA170S CCA170T / EVA170S / EFA170S	20.0	2.5	1.0
CRA200T / EVA200S / EFA200S CCA200T / EVA200S / EFA200S	20.0	2.5	1.0
CRA230T / EVA230S / EFA230S CCA230T / EVA230S / EFA230S	25.0	4.0	1.0

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

14. Maximum Cable Lengths

14.01. Wall Controller Options

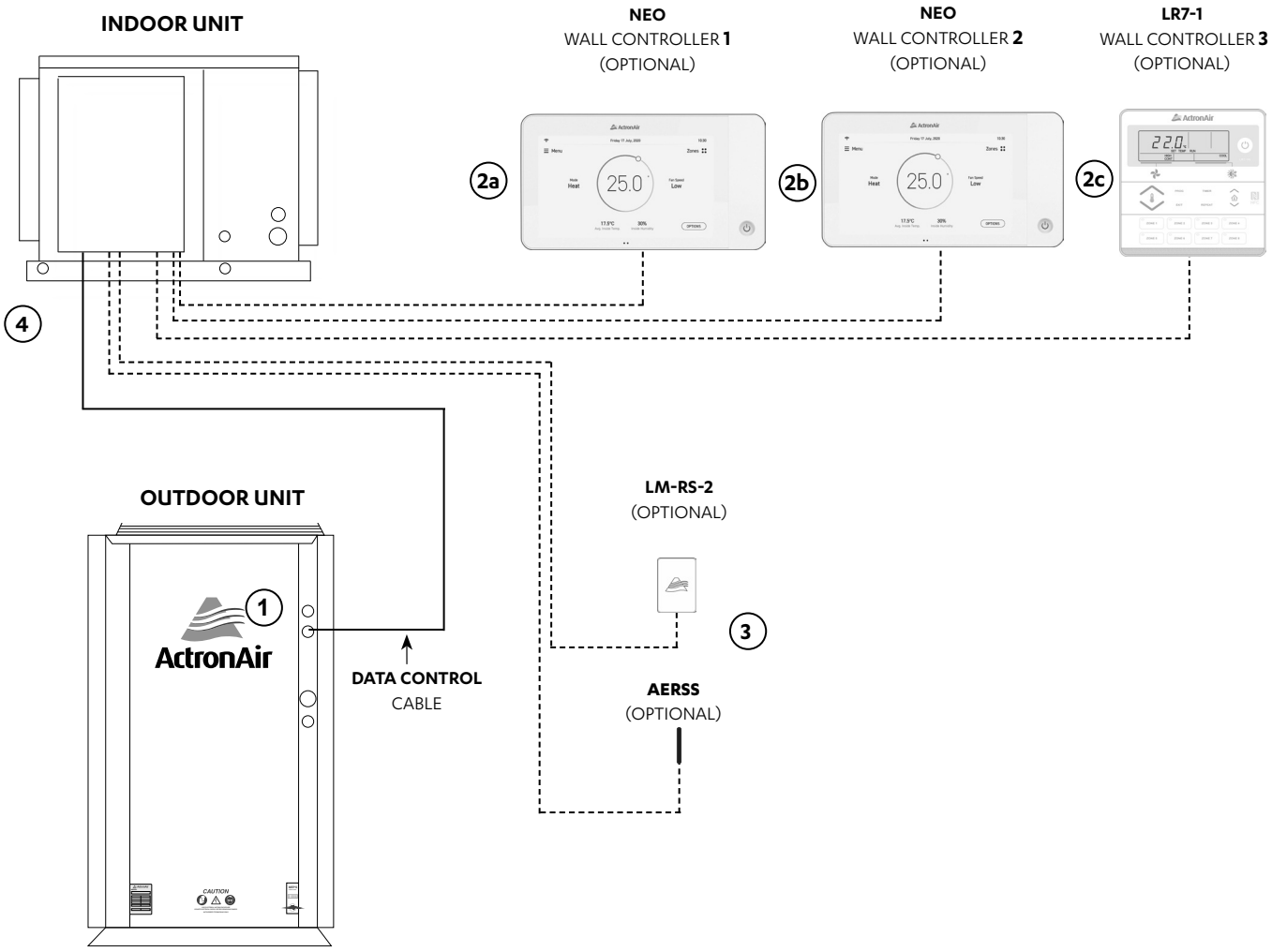
Maximum of three (3) wall controllers in below combinations is allowed on unit. See below table.

Combinations	Wall Controllers		
	WC 1	**WC 2**	**WC 3**
1st Option	NEO		
2nd Option	NEO	NEO	
3rd Option	NEO	NEO	LR7-1 / LC7-2
4th Option	NEO	LR7-1 / LC7-2	
5th Option	NEO	LR7-1 / LC7-2	LR7-1 / LC7-2
6th Option	LR7-1 / LC7-2		
7th Option	LR7-1 / LC7-2	LR7-1 / LC7-2	
8th Option	LR7-1 / LC7-2	LR7-1 / LC7-2	LR7-1 / LC7-2

NOTES

- NEO - Available in White (NTW-1000) and Black (NTB-1000) colours.
- LR7-1 and LC7-2 - Available in White and Grey colours.
- In the instance of a combination of NEO and LR7-1 / LC7-2 being connected together, the NEO will always need to be addressed as C1.

14.02. Wiring Configuration : Recommended



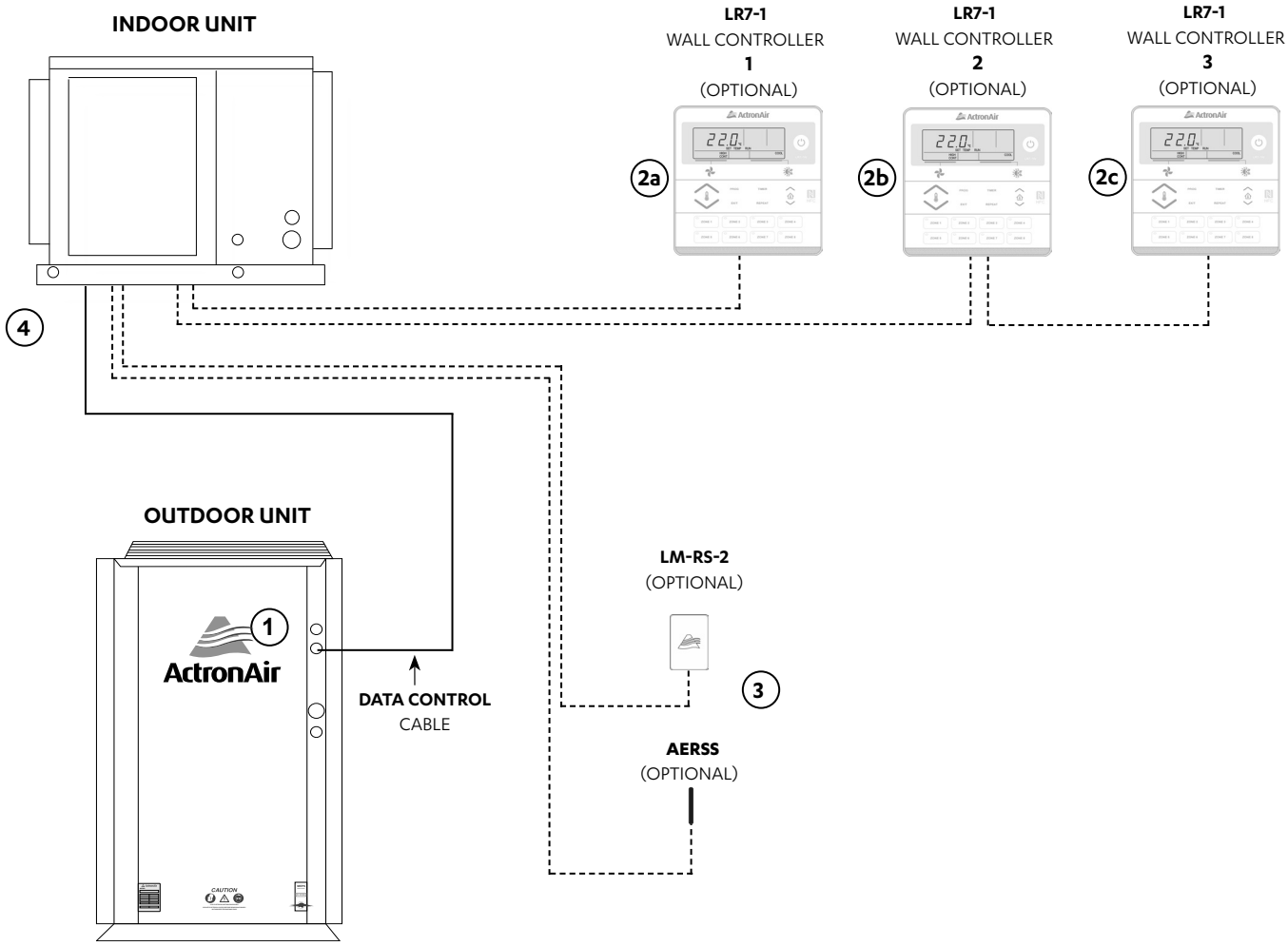
NOTES

- Diagram shown above is a general representation only. Refer to individual unit wiring diagram for complete wiring connection details.
- Long runs beside Mains cables or TV antenna cables should be avoided where possible.
- Wiring configuration for LR7-1 and LC7-2 wall controller is the same.

Item	Description	Maximum Cable Length
1 to 4	Outdoor PCB to Indoor PCB	100 m
4 to 2a, 4 to 2b	Indoor PCB to Wall Controller	90 m
4 to 2c	Indoor PCB to Wall Controller 3	100 m
4 to 3	Indoor PCB to Remote Sensor	100 m

Description	Cable Type
LR7-1 and NEO Field Control Wiring	Cat5E UTP (AWG 24) Data Cable
Indoor to Remote Sensor	Cat5E UTP (AWG 24) Data Cable
Indoor to Outdoor Data Cable	2 Core (1 Pair) Twisted Pair, 7/0.30 (0.5mm^2) Shielded Data Cable

14.03. Wiring Configuration : Alternate



NOTES

- Diagram shown below is a general representation only. Refer to individual unit wiring diagram for complete wiring connection details.
- Long runs beside Mains cables or TV antenna cables should be avoided where possible.
- Wiring configuration for LR7-1 and LC7-2 wall controller is the same.

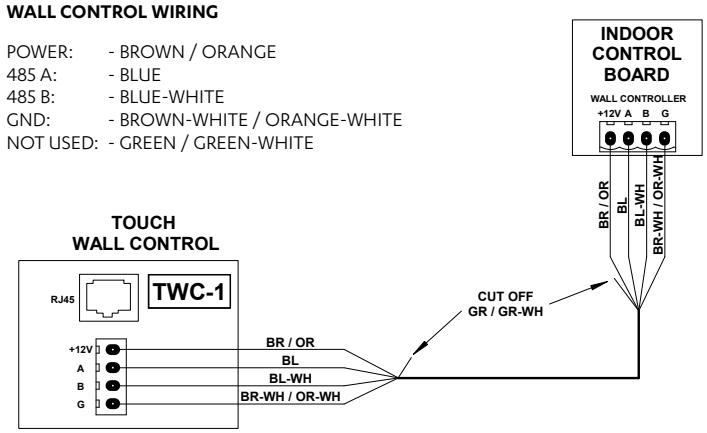
Item	Description	Maximum Cable Length
1 to 4	Outdoor PCB to Indoor PCB	100 m
4 to 2a	Indoor PCB to Wall Controller 1	100 m
4 to 2c	Indoor PCB to Wall Controller 3 (last controller)	75m total (Daisy Chain)**
4 to 3	Indoor PCB to Remote Sensor	100 m

** Maximum Daisy Chain connection is up to 2 wall Controllers.

Description	Cable Type
LR7-1 Field Control Wiring	Cat5E UTP (AWG 24) Data Cable
Indoor to Remote Sensor	Cat5E UTP (AWG 24) Data Cable
Indoor to Outdoor Data Cable	2 Core (1 Pair) Twisted Pair, 7/0.30 (0.5mm2) Shielded Data Cable

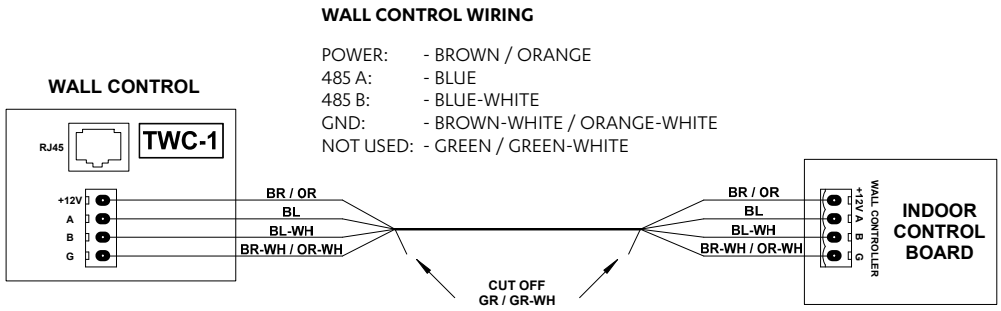
15. Wiring Connections

15.01. LR7-1 and LC7-2 Wall Control Wiring Connections

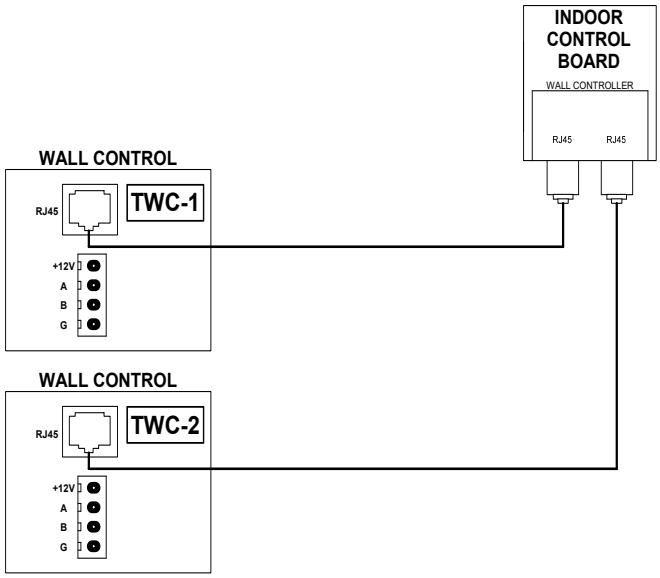


15.02. NEO Wall Control Wiring Connections

15.02.01. NEO Hard Wiring

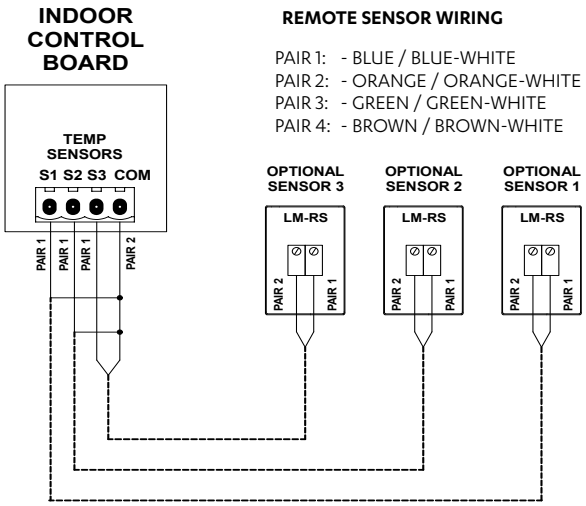


15.02.02. NEO RJ45 Wiring



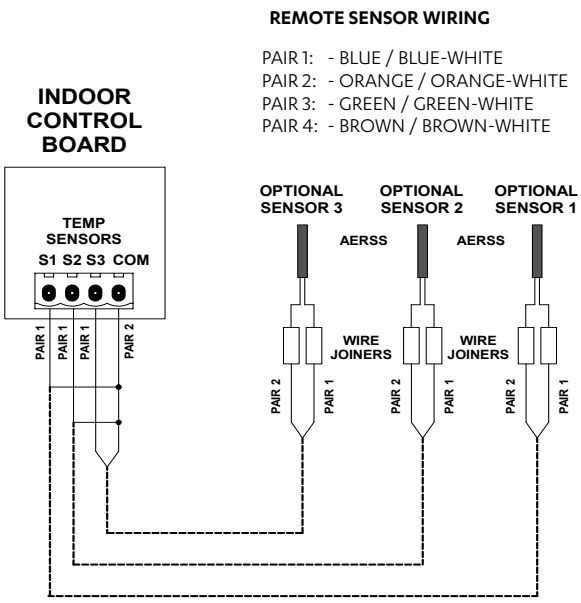
15.03. LM-RS-2 Optional Sensor Wiring Connections

NOTE:
- PAIR 1 AND 2 USED FOR ILLUSTRATION PURPOSES ONLY.
- CUT OFF AND TERMINATE ANY UNUSED PAIRS TO ENSURE NO WIRING IS LEFT EXPOSED



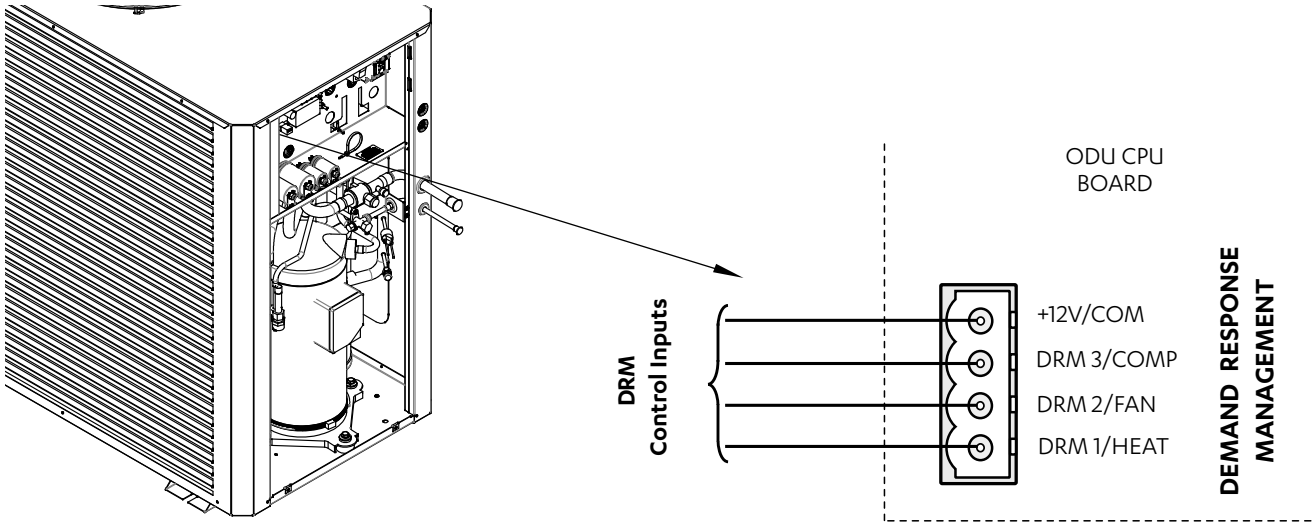
15.04. AERSS Optional Duct Sensor Wiring Connections

NOTE:
- PAIR 1 AND 2 USED FOR ILLUSTRATION PURPOSES ONLY.
- CUT OFF AND TERMINATE ANY UNUSED PAIRS TO ENSURE NO WIRING IS LEFT EXPOSED



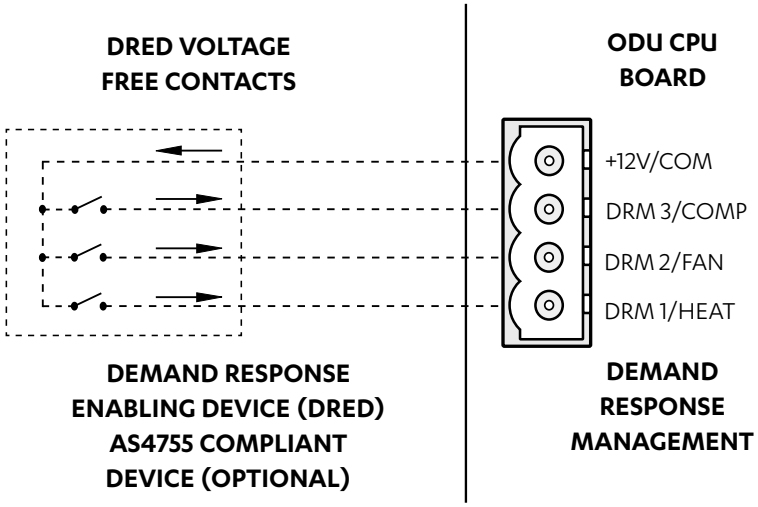
15.05. Demand Response Management

These products are compliant to AS/NZS 4755.3.1



1. Route DRM input cables into the Unit (as per previous wiring installation procedure)
2. Connect cables into terminals (as shown above and as per wiring diagram provided with the unit).

Demand Management Mode	Description Of Mode Allowable Range (%)	Operating Mode
DRM1	Compressor Off Mode	Compressor ONLY will cycle Off & remain Off for the entire Demand Response event. All other functions will operate as normal (i.e. Indoor Fan)
DRM2	Maximum 50% power use mode with 0 to <50% allowable power use range	Compressor 0 to <50% operation range for the total Demand Response event.
DRM3	Maximum 75% power use mode with 0 to <75% allowable power use range	Compressor 0 to <75% operation range for the total Demand Response event.



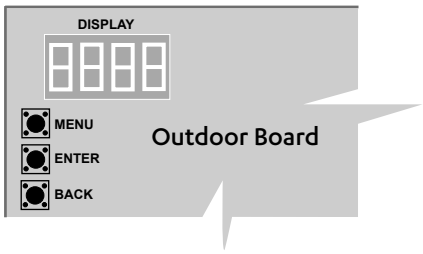
DEMAND RESPONSE ENABLING DEVICE CIRCUIT DIAGRAM

NOTE

Demand Response Management is not applicable when using third party control.

16. Control Source Configuration (CtrS)

diS (Display)	**Display system's status and settings**	
SEr (Service)	**Service use only**	
SEt (Settings)	**CoPS**	**Compressor Type and Capacity:** **F = Fixed Speed - (kW capacity) (default)** **d = Digital - (kW capacity)** **I = Inverter - (kW capacity)**
	CtrS	**Control Source:** **0 = Third Party** **1 = Wall Controller (default)** **2 = Basic BMS** **3 = Wall Controller + Basic BMS** **4 = Advanced BMS** **5 = Add-on Cooling**
	bAud	**IDU-ODU Baud Rate:** **4800 = AMIB** **9600 = InZone/CMIB (default)**



MENU
Scroll through the items at the same menu level.
Increment the value being set.

ENTER
Go into the selected menu.
Lock in selected value.

BACK
Go back to the parent menu.
Press and hold to go back to main menu

Configurable settings are as follows:

Third Party Control

The unit can be controlled by non-ActronAir wall controller. To do this, **CtrS** on the Outdoor Board must be set to **0**. For connection details, see the wiring diagram supplied with the outdoor unit.

Wall Controller

ActronAir offers NEO, LR7-1 and LC7-2, a wall controller that can control the available features and maximise the function and operation of the ActronAir airconditioner. To do this, **CtrS** on the Outdoor Board must be set to **1**.

Basic BMS

The unit can be connected to a network through a BMS card (ICUNO-MOD). This allows the unit to be operated in the same way the as the NEO, LR7-1 and LC7-2 does. To do this, **CtrS** on the Outdoor Board must be set to **2**.

Wall Controller + Basic BMS

The unit can be connected to a network (Basic BMS) and at the same time be controlled using the NEO, LR7-1 or LC7-2 controller. Priority will be given to the most recent command. To do this, **CtrS** on the Outdoor Board must be set to **3**.

Advanced BMS

The unit can be connected for system that requires customised functions not included in the existing software or logic in the Outdoor Board Controller but still retaining the safety logic. To do this, **CtrS** on the Outdoor Board must be set to **4**.

Add On Cooling

ActronAir offers Add On Cooling models. This control source allows connection to an additional third-party heating system. To do this, **CtrS** on the Outdoor Board has to be set to **5**.

Auto Fan Function

Auto fan function can only be commissioned by ActronAir wall control such as NEO, LR7-1 and LC7-2.

17. Third Party Control Input (Indoor and/or Outdoor Board)

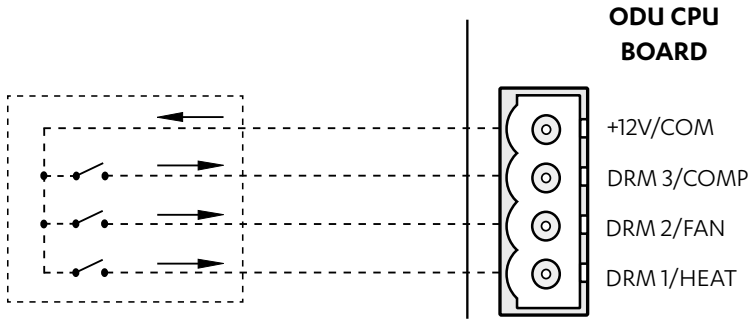
This option allows Fan, Compressor and Reversing Valve to be controlled by a Third Party Controller. There are two ways on how the Indoor Fan may be controlled, using 0-10V Analogue Input (InZone) or Fixed Indoor Fan Speed (UNOJR).

NOTES

- Demand Response Management is not applicable when using third party control.
- Make sure control source configuration has been selected to 0 for Third Party Control.

17.01. Third Party Control Input (Single Speed Indoor Fan Operation)

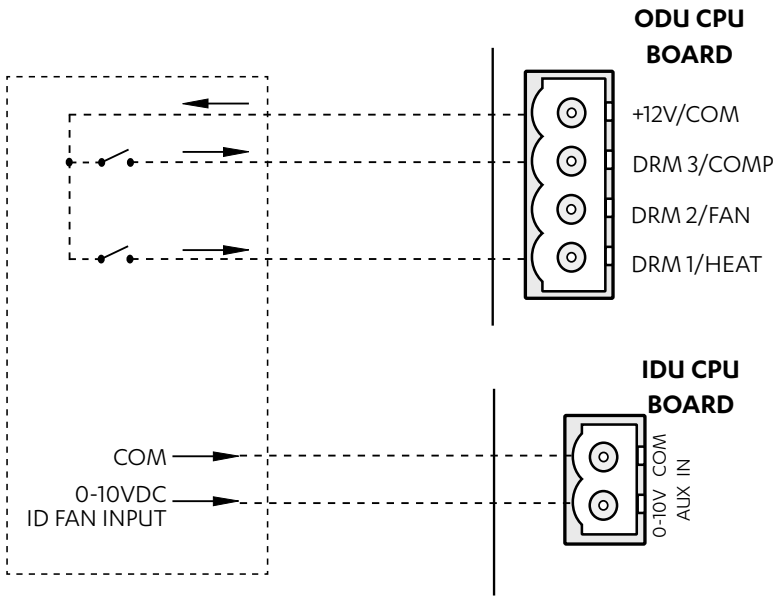
1. Wire third party inputs as per below diagram



2. On the Outdoor Board, set Control Source to Third Party. Using the **MENU** and the **ENTER** Buttons, navigate to **SEt** (Settings)→ **CtrS** (Control Source).
3. Use the **MENU** Button to navigate to **0** to select Third Party Control as the control source. Press the **ENTER** Button to save the setting.
4. If single speed fan setting (medium speed setting) requires changing, using the **MENU** and the **ENTER** Buttons, navigate to **SEt** (Settings) → **iduS** (Indoor Settings) → **FP2**

17.02. Third Party Control Input (Variable Speed Indoor Fan Operation)

1. Wire third party inputs as per below diagram



2. On the Outdoor Board, set Control Source to Third Party. Using the **MENU** and the **ENTER** Buttons, navigate to **SEt** (Settings)→ **CtrS** (Control Source).

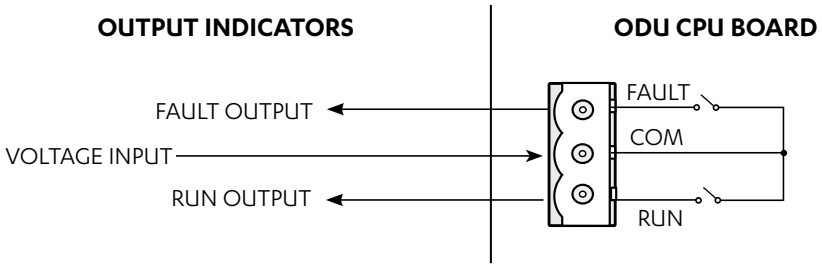
3. Use the **MENU** Button to navigate to **0** to select third Party Control as the control source. Press the **ENTER** Button to save the setting.

NOTES

- 0-10V Fan Operation will operate between LOW, PWM and HIGH PWM.
- If Compressor operation is requested and no fan operation request is detected, Indoor Fan operation will default to MED PWM (Single Speed Fan Operation).

17.03. Run and Fault Indication Output (Outdoor Board)

To activate, the unit must be wired as illustrated below. If required, a fault output connection terminal is also available to show any error/fault with the a/c system. RUN/FAULT relay outputs (230VAC/5A MAX) connection



Run Output is configurable to indicate that the unit is running. There are two configurations in which this can be set:

- Either the compressor or the Indoor Fan only is running
- Only Compressor is running.

By default, this is set to turn on when either indoor fan or compressor is operating. To set up to compressor run indication only, in OD Board Menu follow below steps.

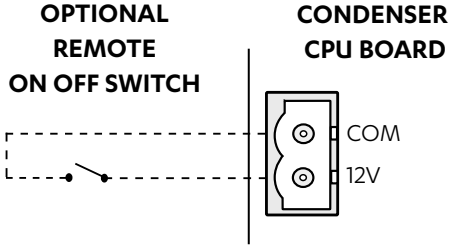
1. Using the **MENU** and the **ENTER** Buttons, navigate to **SEt** (Settings) →**run** (Unit Operation Indicator Settings).
2. If required, press **MENU** to navigate to **YES**.

17.04. Remote On/Off

To activate, the unit must be wired as illustrated below. This will enable unit to be turned ON and OFF from the Outdoor board.

NOTE

The system must be operating in Wall Controller only (control mode 1) or BMS + Wall Controller (control mode 3) for this function to work.



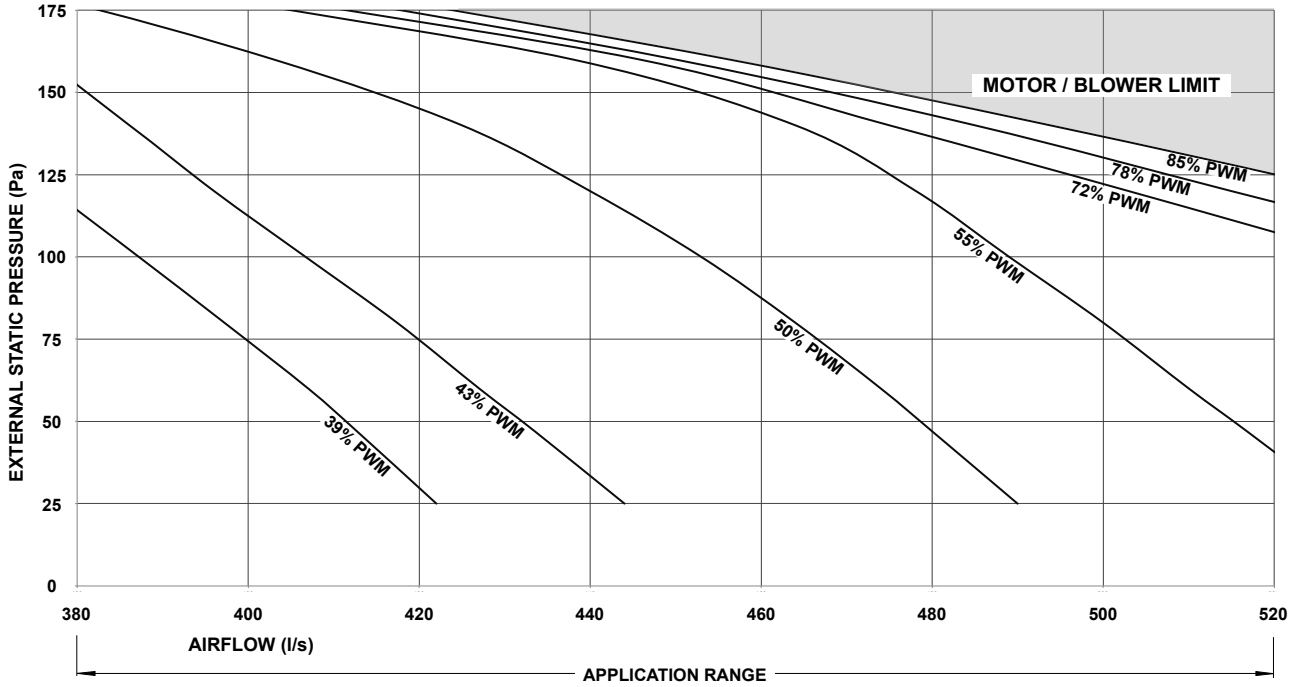
Turning the system On and Off by remote method	
Turning the system On	Status 1: The system is Off and the remote switch/relay has been left in the open position. 1. Close remote switch/relay. 2. System will start in approximately 1 minute.
	Status 2: The system is Off and the remote switch/relay has been left in the closed position. 1. Open remote switch/relay for a minimum of 5 seconds. 2. Close remote switch/relay. 3. System will start in approximately 30 seconds.
Turning the system Off	Status 3: The system is On and the remote switch/relay has been left in the closed position. 1. Open remote switch/relay. 2. System will turn Off in approximately 1 minute.
	Status 4: The system is On and the remote switch/relay has been left in the open position. 1. Close remote switch/relay for a minimum of 5 seconds. 2. Open remote switch/relay. 3. System will turn Off in approximately 30 seconds.

18. Indoor Fan Commissioning via Third Party Control

18.01. EVA100S / EFA100S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)													
	25		50		75		100		125		150		175	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
380	MOTOR / BLOWER LIMIT								41	218	43	234	50	254
390									42	223	46	251	53	258
400					39	187	42	210	45	234	49	254	54	265
410					41	200	44	221	47	242	50	265	72	278
420	39	172	41	192	43	212	46	233	48	254	51	273	80	288
430	41	179	43	202	45	223	47	247	49	271	53	282		
440	42	192	44	213	46	235	48	259	51	281	54	291		
450	44	203	46	226	48	250	49	273	52	286	55	296		
460	45	213	47	232	49	251	51	271	53	302	70	310		
470	47	226	49	243	50	260	53	279	54	296	MOTOR / BLOWER LIMIT			
480	49	228	50	241	52	261	54	283	62	309				
490	50	230	52	248	53	270	55	290	70	329				
500	51	244	53	262	55	281	64	313	78	345				
510	53	253	54	271	59	293	68	334	81	355				
520	54	260	58	281	63	312	70	350	85	365				

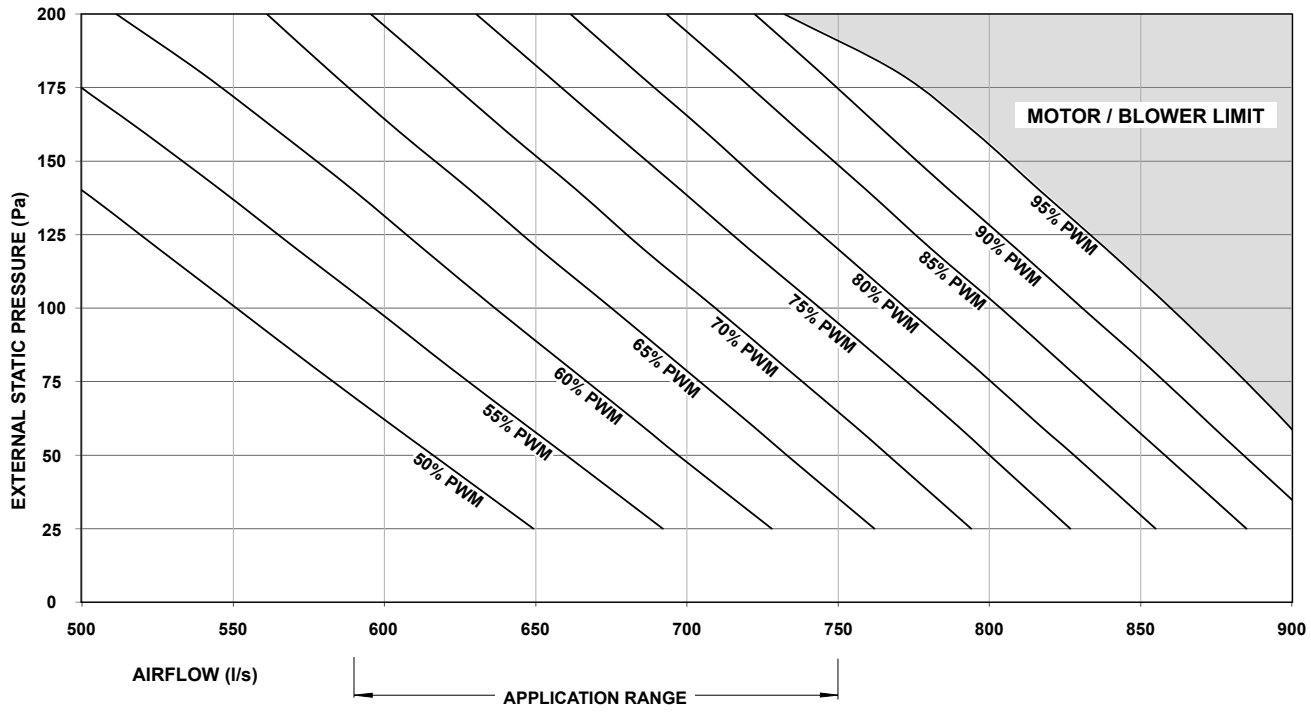
NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 43% PWM (Medium Speed)



18.02. EVA130S / EFA130S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)													
	50		75		100		125		150		175		200	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
520	MOTOR / BLOWER LIMIT						50	233	53	265	56	299	61	337
525							51	231	54	267	57	302	62	344
550					50	222	53	254	57	288	61	324	64	358
575					53	239	56	272	60	306	63	342	68	380
600			52	225	56	258	59	294	63	330	67	365	71	404
625	51	207	55	242	59	278	62	314	66	351	70	388	74	421
650	54	227	58	262	62	300	66	335	70	375	74	423	79	454
675	57	244	61	282	65	321	69	360	73	400	78	442	83	491
700	60	267	65	305	69	343	73	385	77	428	82	472	87	522
725	64	290	68	328	72	370	77	415	81	454	86	500	92	563
750	68	316	72	354	76	398	81	443	85	488	90	534	MOTOR / BLOWER LIMIT	
775	71	337	75	382	81	429	85	476	90	525	94	572		
780	72	346	77	390	82	438	86	483	91	532	95	576		

NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 60% PWM (Medium Speed)

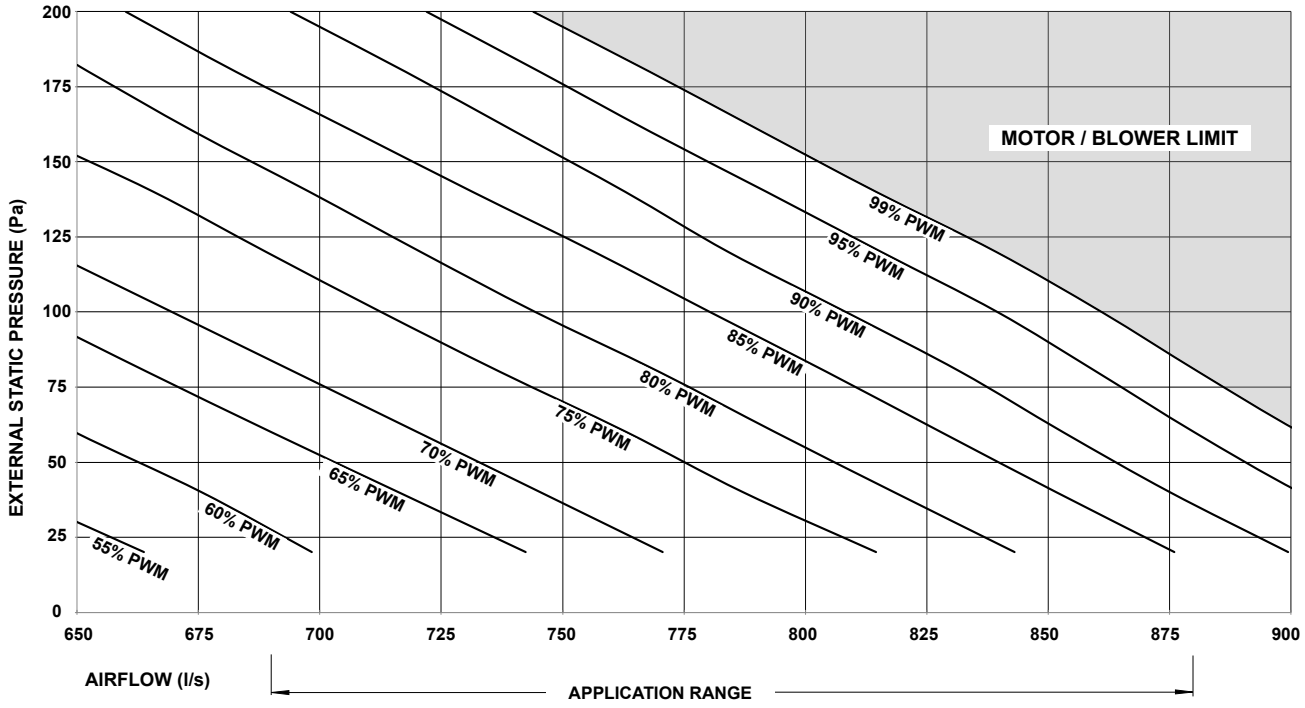


18.03. EVA150S / EFA150S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)													
	50		75		100		125		150		175		200	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
690	64	298	69	341	71	360	77	421	81	467	86	515	90	559
700	65	301	70	344	74	384	78	425	82	472	87	519	91	562
725	69	325	73	365	77	409	81	453	86	499	90	547	96	591
750	72	345	76	389	81	437	85	481	90	530	95	579		
770	74	370	79	411	84	468	88	516	93	560	98	609		
775	75	374	80	417	85	471	89	518	94	564				
800	79	398	84	443	89	495	94	546	98	596				
825	83	426	88	475	93	525	98	582						
850	87	455	92	510	97	566								
875	92	500	97	556										
880	93	507	98	564										

MOTOR / BLOWER LIMIT

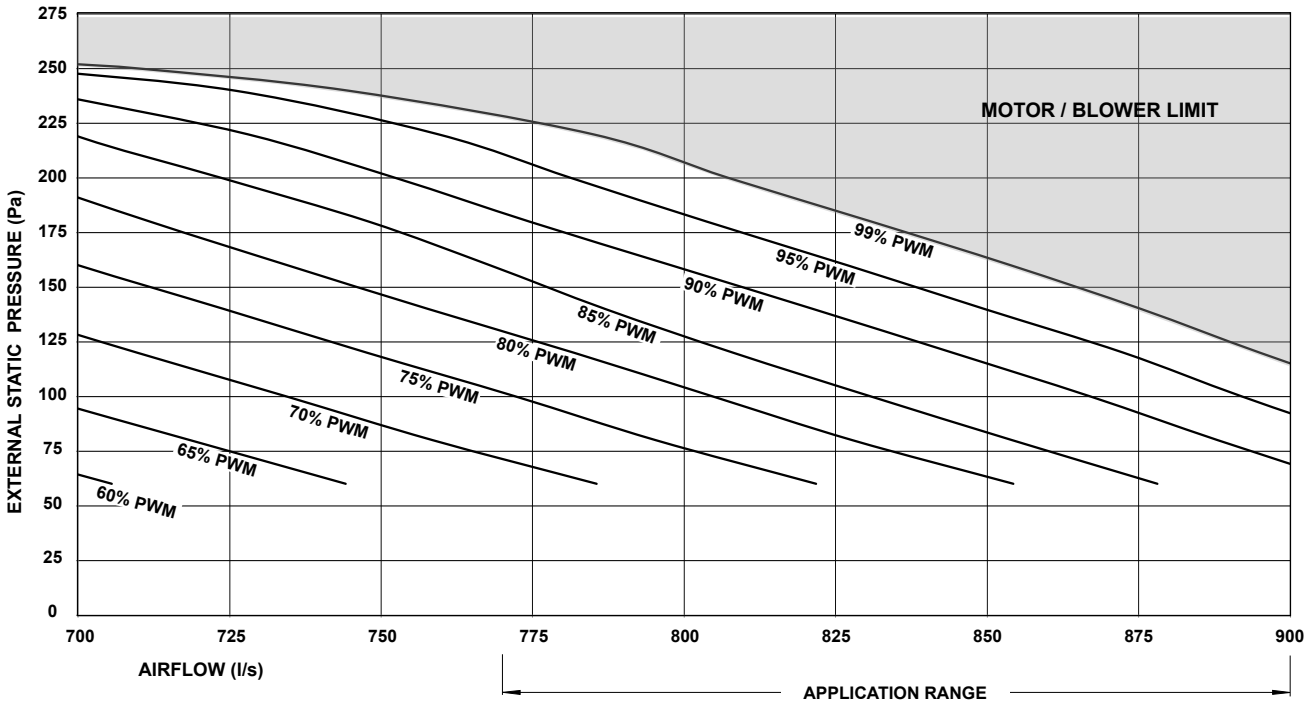
NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 75% PWM (Medium Speed)



18.04. EVA170S / EFA170S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)															
	50		75		100		125		150		175		200		225	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
770	66	288	70	333	74	371	79	422	84	474	88	512	93	561	98	610
775	67	294	71	335	75	374	80	428	85	476	89	518	94	571	99	618
800	71	315	75	358	80	404	85	457	89	502	93	550	99	610		
825	74	340	79	383	84	436	88	482	93	535	97	584				
850	78	364	83	413	88	463	92	513	97	568						
875	82	390	87	445	92	494	96	549	MOTOR / BLOWER LIMIT							
900	87	431	92	483	97	547										

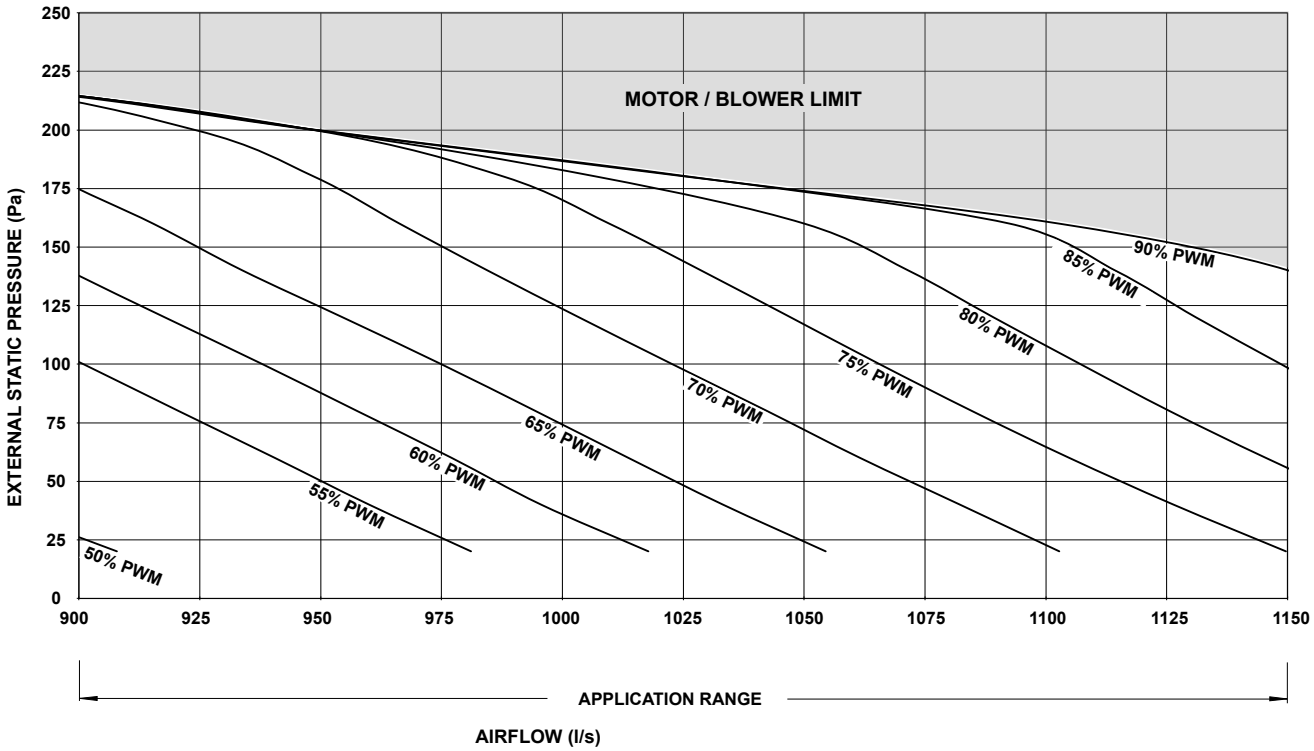
NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 90% PWM (Medium Speed)



18.05. EVA200S / EFA200S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)													
	50		75		100		125		150		175		200	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
900	52	357	53	395	55	438	58	481	62	522	65	563	69	608
925	53	371	55	420	58	459	62	510	65	549	67	586	70	641
950	55	402	58	446	62	489	65	533	67	577	70	624	75	669
975	58	423	62	476	65	515	67	553	70	608	74	666		
1000	62	454	65	499	68	547	70	593	73	641	75	682		
1025	65	476	68	533	70	571	73	625	76	672	80	719		
1050	68	511	70	557	73	607	76	659	79	708	85	755		
1075	70	534	73	586	76	640	79	697	82	740	MOTOR / BLOWER LIMIT			
1100	73	570	76	624	79	680	82	728	84	750				
1125	76	604	79	656	82	712	84	750	85	769				
1150	79	644	82	694	85	749	88	806						

NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 67% PWM (Medium Speed)

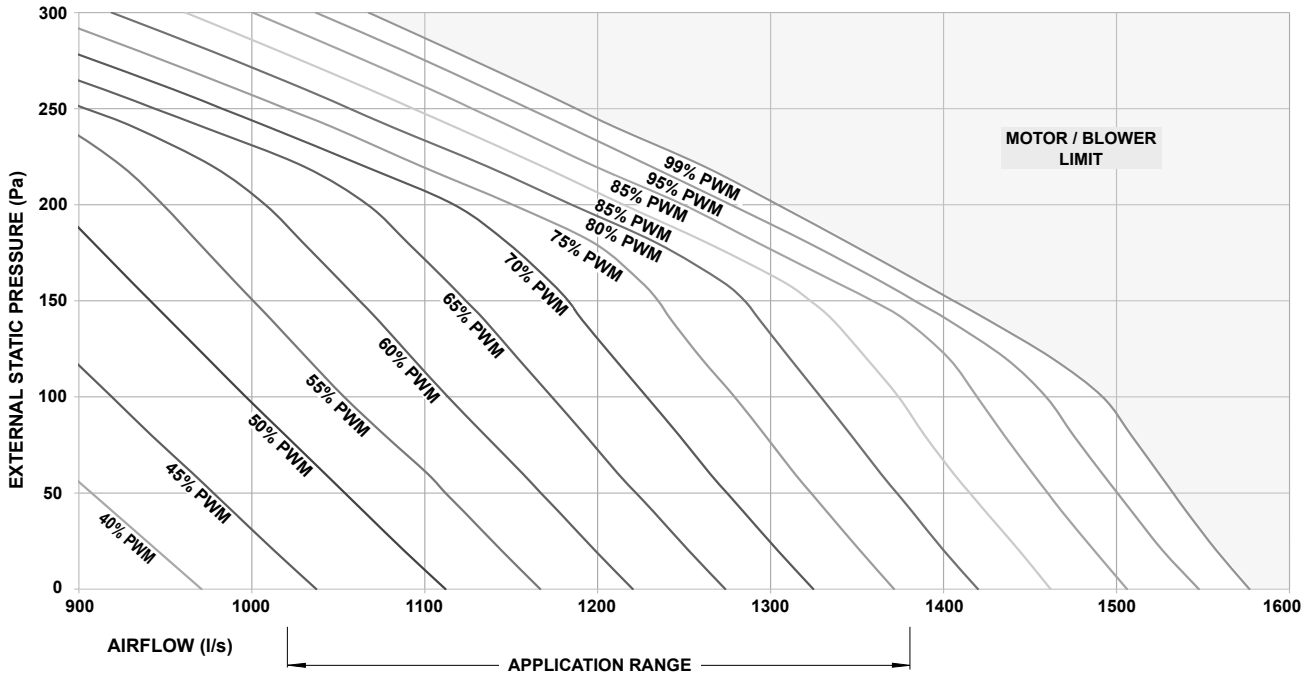


18.06. EVA230S / EFA230S

AIRFLOW (l/s)	EXTERNAL STATIC PRESSURE (Pa)																					
	50		75		100		125		150		175		200		225		250		275		300	
	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W	% PWM	W
1020	46	364	50	416	52	454	54	491	57	554	59	598	61	631	65	679	75	727	84	778	93	856
1050	50	396	52	471	55	489	57	532	59	575	61	616	64	673	70	718	79	774	88	815	97	864
1075	52	419	54	455	57	516	59	559	61	602	63	646	66	699	74	751	83	800	91	845		
1100	54	439	57	499	59	540	61	583	63	628	65	673	68	716	77	778	86	831	95	882		
1125	56	462	59	522	61	564	63	609	65	654	68	712	71	757	80	807	90	867	99	921		
1150	58	484	61	546	63	590	65	634	67	679	70	747	75	792	84	845	93	898				
1175	61	528	63	571	65	613	67	660	69	707	72	761	79	827	88	882	97	937				
1200	63	551	65	592	67	638	70	707	72	751	74	795	83	864	92	918						
1225	65	572	68	640	70	685	72	732	74	780	77	825	86	885	96	958						
1250	68	619	70	662	72	709	75	780	77	816	81	876	90	931	99	990						
1275	70	640	72	686	75	756	77	805	79	853	85	917	95	979								
1300	73	687	75	731	77	781	79	830	82	885	89	952	98	1012								
1325	75	707	78	780	80	829	82	873	85	939	94	998										
1350	78	757	80	804	82	851	85	922	89	972	98	1039										
1375	80	780	82	847	85	896	87	949	94	1025												
1380	81	798	83	855	86	912	88	958	95	1035												

MOTOR / BLOWER LIMIT

NOTES:
W = Indoor Fan Power, Watts
PWM = Pulse Width Modulation Setting, % PWM
Default PWM Setting = 77% PWM (Medium Speed)



19. Refrigerant Charging

- The units detailed on this guide are pre-charged with R-410A refrigerant. Should there be a need to add or remove some refrigerant, it is recommended to follow the charging method explained below.
- Never allow R-410A refrigerant to vent into the atmosphere. It is an offence to release refrigerant in Australia. 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 personnel are allowed to perform any work described in this guide and specifically work related to addition or removal of refrigerant.
- R-410A refrigerant must always be charged in liquid state.
- Only during the compressor running condition can the system be charged through the suction service port on the compressor suction line.
- Changes in refrigerant charge must be noted to a label that is fixed to the unit for future reference.

⚠ CAUTION

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

Refrigerant Charge Details (R-410A)											
Model		**CRA100S**	**CRA130S CCA130S**	**CRA130T**	**CRA150S CCA150S**	**CRA150T**	**CRA170S CCA170S**	**CRA170T CCA170T**	**CRA200T CCA200T**		**CRA230T CCA230T**
Refrigerant Type		R-410A	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A		R-410A
Factory Charge	gms	4175	5450	5250	4650	4650	6650	7350	7450		7600
Pre- charged Length	m	10	15	15	15	15	15	15	15		10
Additional Refrigerant per charge	g/m	50	50	50	50	50	50	50	50 [(1)]/100		100
Field Piping Sizing (mm)	Liq.	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	3/8" (9.52)	1/2 (12.7)	1/2" (12.7)
	Gas	5/8" (15.88)	3/4" (19.05)	3/4" (19.05)	3/4" (19.05)	3/4" (19.05)	3/4" (19.05)	3/4" (19.05)	7/8" (22.22)	7/8" (22.22)	1" (25.4)

NOTE

[(1)] 50grams per meter is only applicable if 3/8" liquid field pipe is used (for field pipe length between 0-20m).

Charging Method: Subcooling and Superheat

Parameters:

LLT = Liquid Line Temperature

SLT = Suction Line Temperature

SCT = Saturated Condensing Temperature

SST = Saturated Suction Temperature

Cooling and Heating Operation:

Adjust the refrigerant charge to obtain the correct superheat and subcooling for optimal performance as follows:

1. Ensure that air filters are fitted and total system airflows are achieved. (Air filters are not supplied with the unit, it is the responsibility of the installing contractor to provide and fit adequate return air and fresh air filters).
2. Connect service gauges to the service valves.

3. Start the unit in cool mode ensuring that the compressor is in operation before taking service gauges reading. Allow the system to stabilise for next 15 - 30 minutes before recording.
4. Record the discharge pressure, suction pressure, liquid line temperature and suction line temperature for all the refrigeration circuits.

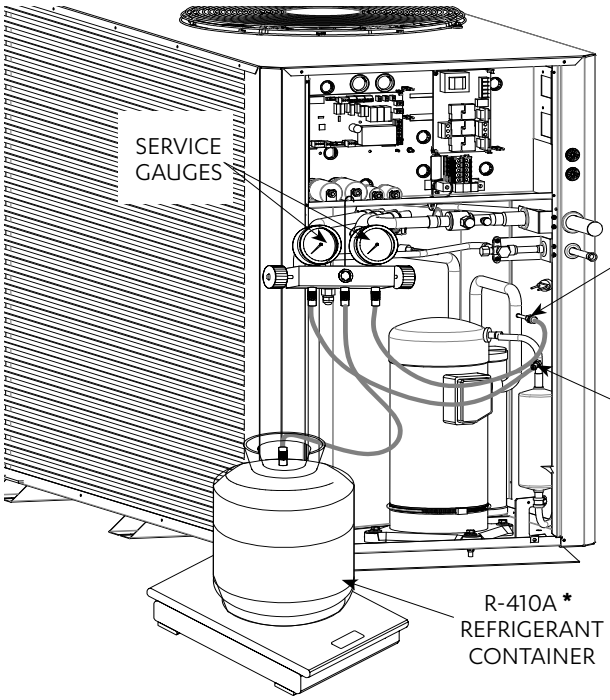
Discharge Pressure = _____ kPa Suction Pressure = _____ kPa

Liquid Line Temperature **(LLT)** = _____ ^{O}C Suction Line Temperature **(SLT)** = _____ ^{O}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.

See Diagram Below:



NOTE

For illustration purpose only. Valve location may vary depending on unit model.

***** Use weighing scale when adding or removing refrigerant charge.

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:

   Subcooling = SCT - LLT
3. If subcooling is within the range (see charging table below), there is no need to add/remove refrigerant.
   - If subcooling is lower than minimum, the system is undercharged, it is necessary to add refrigerant.
   - If subcooling is higher than maximum, the system is overcharged, it is necessary to remove refrigerant.

Allow the systems to stabilise (15 - 30 mins) and repeat the steps 1-3 until subcooling falls within the range specified in the table on the next page.

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:

   Superheat = SLT -SST
3. If superheat is within the range (see charging table below), there is no need to add/remove refrigerant.
   - If superheat is lower than minimum, it means that liquid refrigerant may be returning to compressor. It is necessary to remove refrigerant.
   - If superheat is higher than maximum, it means that refrigeration capability of evaporator is not fully maximised. It is necessary to add refrigerant charge.

Allow the systems to stabilise (15 - 30 mins) and repeat the steps 1-3 until superheat falls within the range specified in the table below.

Cooling		Heating	
Subcooling	**Superheat**	**Subcooling**	**Superheat**
4 - 8	2 - 8	10 - 14	2 - 8

NOTES

The above subcooling and superheat recommendations are based on the following rated conditions:

- Cooling: 35°C DB outdoor, air entering indoor at 27°C DB / 19°C WB.
- Heating: 7°C DB / 6°C WB outdoor, air entering indoor at 20°C DB Nominal indoor airflow.

CHARGING TABLE

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

20. 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.

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.

21. Maintenance Frequency Checklist

Regular servicing of equipment by a qualified technician is recommended every 12 months for residential applications and every quarter for commercial applications. Regular servicing of your unit helps in maintaining its optimum performance and reliability. **The following checklist and service periods are provided as a guide only, as some sites may require more frequent servicing.**

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		
Printed Circuit Boards				✓					Visual Inspection	Tighten Terminals as necessary on printed circuit boards
Electrical Connections				✓					Check all electrical terminals, mains, communications, etc	Re-tighten if loose.

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 free 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 unit.
Zone Motors				✓					Visual inspection of motors open/housing. Ensure no obstructions	Drive motors opened and closed. Ensure correct operation.
Duct Works				✓					Inspect duct works for air gaps.	Re-tape any loose ducts.

* 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 (if available)				✓					Check for obstructions and free flow of water	Clean to eliminate obstructions/ sludge and check condition of drain line. Pour water to ensure free 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 superheat 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 unit.	Investigate any causes for previous faults, reset fault history.

22. Start Up and Commissioning Report

INSTALLATION INFORMATION		
CUSTOMER	Name:	Tel. Number:
	Address:	
INSTALLER	Name:	Tel. Number:
	Address:	
Site Address:		Date Installed:
Model:		Serial Number:

CIRCUIT TEMPERATURE SETTINGS		
Supply Air Temperature		°C
Return Air Temperature		°C
Suction Temperature		°C
Discharge Temperature		°C
Condenser Coil Temperature		°C
Ambient Temperature		°C

INDOOR FAN SETTINGS	
Indoor Fan Current	Amps
Indoor Fan Airflow	l / s
Indoor Fan PWM	%
Set Static	Pa

OUTDOOR FAN SETTINGS	
Outdoor Fan Current	Amps

Check No Active Error Codes on the Unit	Checked:	☐

Date Checked:	

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