

Commercial Split Ducted Unit

Installation and Commissioning Guide - Outdoor



Model Numbers

CRA300T SCA260C
 SCA290C
 SCA300C
 SCA330C
 SCA340C
 SCA400C

IMPORTANT NOTE:

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



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01. Introduction

CONGRATULATIONS on your purchase of an ActronAir air conditioning system! This unit has been designed and engineered to provide optimum air conditioning and to achieve maximum energy efficiency.

Your air conditioning system has been manufactured from the highest quality materials. Numerous “in house” and “external” inspection and test procedures were conducted to your air conditioning to ensure satisfactory operation.

01.01. Information About This Guide

This guide provides installation instructions, specific to your split ducted unit. Read this manual thoroughly and take into consideration all specifications and instructions to ensure correct installation and safe operation of your air conditioning system.

IMPORTANT

Keep this document for future reference. Ensure all technicians that work on the unit can refer to this manual at any time.

01.02. 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.

01.03. 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.

01.04. Important Safety Symbols And Labels

Safety Symbols and labels appear at appropriate sections throughout this manual to indicate immediate or potential hazards. Pay full attention and comply to the safety information and instructions. Failure to follow safety instructions increases the risks of personal injury, death and/or property damage. Damages to the product as a result of such failure may void warranty.

ActronAir has endeavored to provide sufficient safety warnings and recommendations, however current and prevailing WH&S regulations must be observed and will take precedent whenever performing the installation instructions discussed in this manual.

02. General Information

The ActronAir Series 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, fixed speed scroll compressor, EC indoor fans (on specific models), 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.



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.

Energy Efficient Refrigeration Circuits

The ActronAir refrigeration system was designed with the application of highly efficient capacity circuit that deliver the required amount of cooling or heating to maintain your desired space comfort at optimum efficiency.

Each refrigeration circuit consists of:

- High efficiency scroll compressor.
- Hydrophilic Blue Fin coil protected condenser designed for optimum performance and efficiency with corrugated fins and ruffled tubing.
- Hydrophilic Blue Fin coil protected evaporator coil designed for optimum performance and efficiency with lanced fins and ruffled tubing.

Evaporator Section

The commercial series evaporator section has EC fans (on most models) which deliver the nominated airflow. The fans provide superior performance for your comfort at optimum efficiency:

- Highly efficient variable EC motor that uses less energy than the traditional AC motor.
- Low noise operation.
- Adjustable indoor airflow.

Condenser Section

Uses multiple speed outdoor fans and a state of the art scroll compressor, with the following features:

- Highly efficient axial fans with direct drive AC motor
- Low noise operation
- Multi speed outdoor fan
- Low ambient cooling operation to +5°C

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 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.

Hydrophilic Blue 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, CO₂ 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.
- 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 Electrocutation.

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.

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 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 has 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.
- 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.

NOTE

This outdoor unit is designed to match only with an ActronAir 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.

All images in this document are for illustration purposes only.

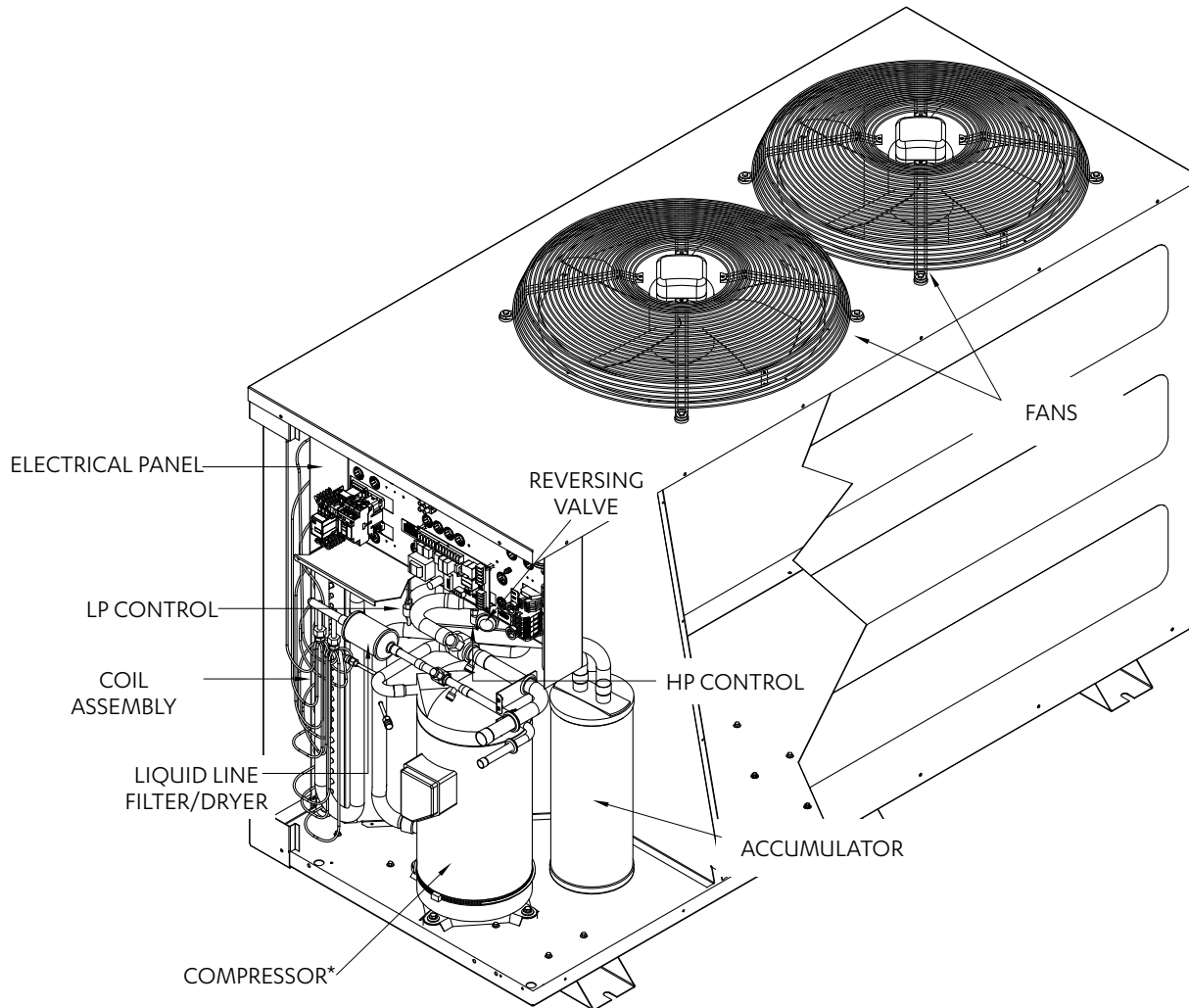
05. Operation Manual Access

Download from website**C7-4**

Operation manuals can be downloaded through our website shown below.

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

06. Components Overview

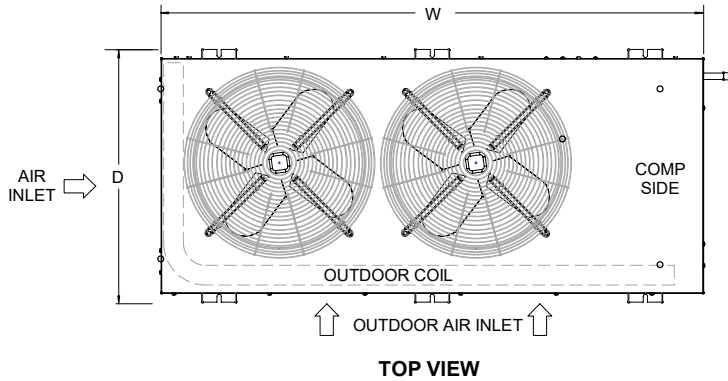


*For illustration purpose only. Actual unit may vary.
Unit shown above represent 1-Stage model.

07. Unit Dimensions, Clearances and Weights

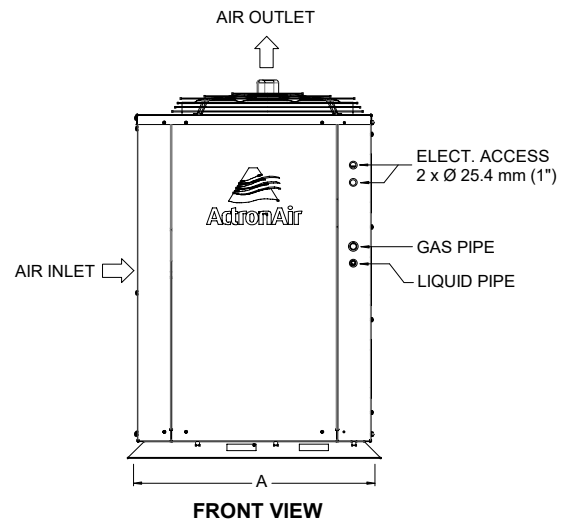
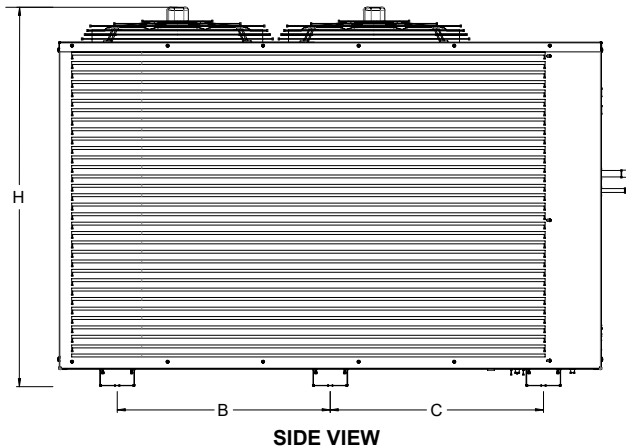
07.01. Unit Dimensions

Note: SCA 290C model shown for illustration purposes only.



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. THE CONDENSER TRAY IS AVAILABLE AS AN ADDITIONAL ACCESSORY FOR THE **SCA260C ONLY**.

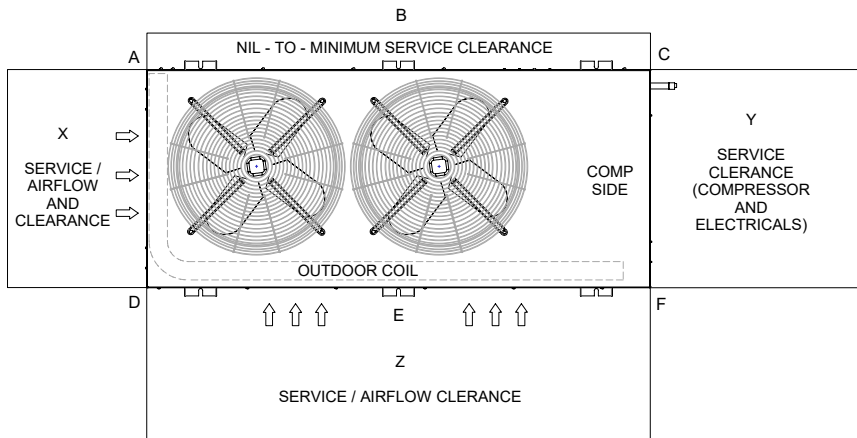
** DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE**



Unit Model	Overall Nominal Dimensions (OA)			Mounting Distance (Centre to Centre)			Gas Pipe	Liquid Pipe	No. of Comp.
	H	W	D	A	B	C			
CRA300T	1330	1875	875	835	737.5	737.5	2 x Ø 19.1mm (3/4") Swaged	2 x Ø 9.5mm (3/8") Swaged	2
SCA260C	1105	1685	685	616	673.5	673.5	Ø 28.6 mm (1-1/8") Swaged	Ø 15.9 mm (5/8") Swaged	1
SCA290C	1330	1875	875	835	737.5	737.5	Ø 28.6mm (1-1/8") Swaged	Ø 15.9mm (5/8") Swaged	1
SCA300C							2 x Ø 19.1mm (3/4") Swaged	2 x Ø 9.5mm (3/8") Swaged	2
SCA330C							Ø 28.6mm (1-1/8") Swaged	Ø 15.9mm (5/8") Swaged	1
SCA340C							2 x Ø 19.1mm (3/4") Swaged	2 x Ø 9.5mm (3/8") Swaged	2
SCA400C							1315	2 x Ø 22.2mm (7/8") Swaged	2 x Ø 12.7mm (1/2") Swaged

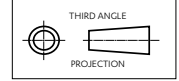
07.02. Minimum Service Access Area, Airflow Clearances and Weights

Note: SCA 290C model shown for illustration purposes only.



NOTES:

1. Do not scale drawing. All dimensions are in mm unless specified. Refer to corresponding unit dimensional drawing for mounting hole details.
2. Ensure that Service Access Areas and Spaces for Airflow Clearances are met. This is 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. MTG C-C DIST = Mounting Centre to Centre Distance.
6. Use M12 bolt for feet mounting.



Unit Model Number	Unit Weight (kg)	Corner Weights (kg)						Service Clearance and Airflow Allowance			Height Clearance
		A	B	C	D	E	F	X	Y	Z	
CRA300T	300	23.7	29.6	90.1	33.2	17.8	105.6	300	800	750	1500
SCA260C	245	16.0	24.6	81.3	22.5	24.6	76.0			600	
SCA290C	290	33.8	28.0	84.1	23.2	30.9	90.0			750	
SCA300C	300	23.7	29.6	90.1	33.2	17.8	105.6				
SCA330C	305	25.4	24.3	100.5	37.0	17.3	100.5				
SCA340C	335	43.0	23.7	103.1	33.7	23.7	107.8				
SCA400C	332	43.9	23.5	101.2	32.8	23.5	107.1				

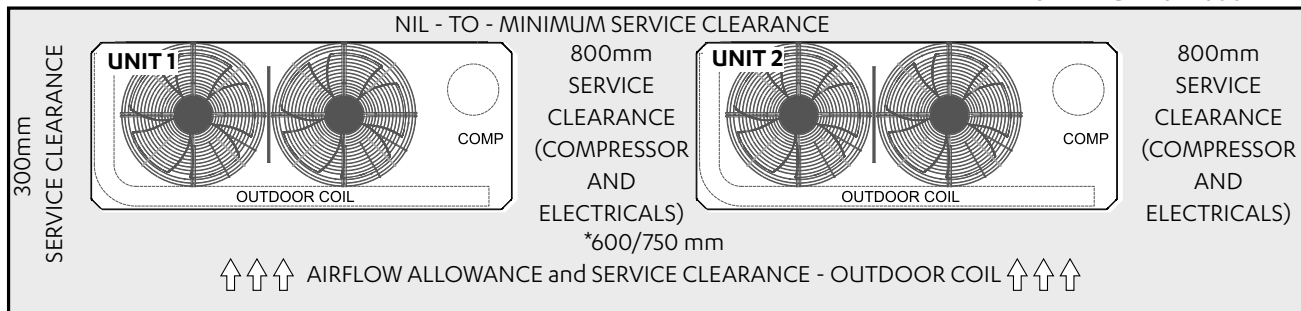
08. Banking of Units

NOTES

- All dimensions are in mm. Do not scale drawing.
- Ensure that Service Access Areas and Spaces for Airflow Clearances are met. This is 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.
- The distance between two units must be the wider clearance required.

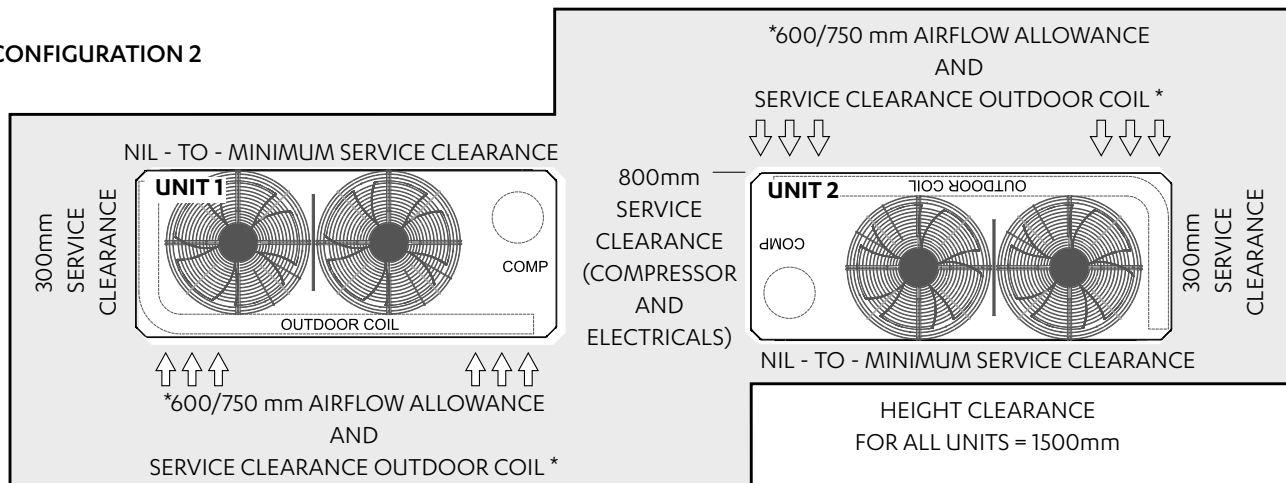
CONFIGURATION 1

HEIGHT CLEARANCE
FOR ALL UNITS = 1500mm

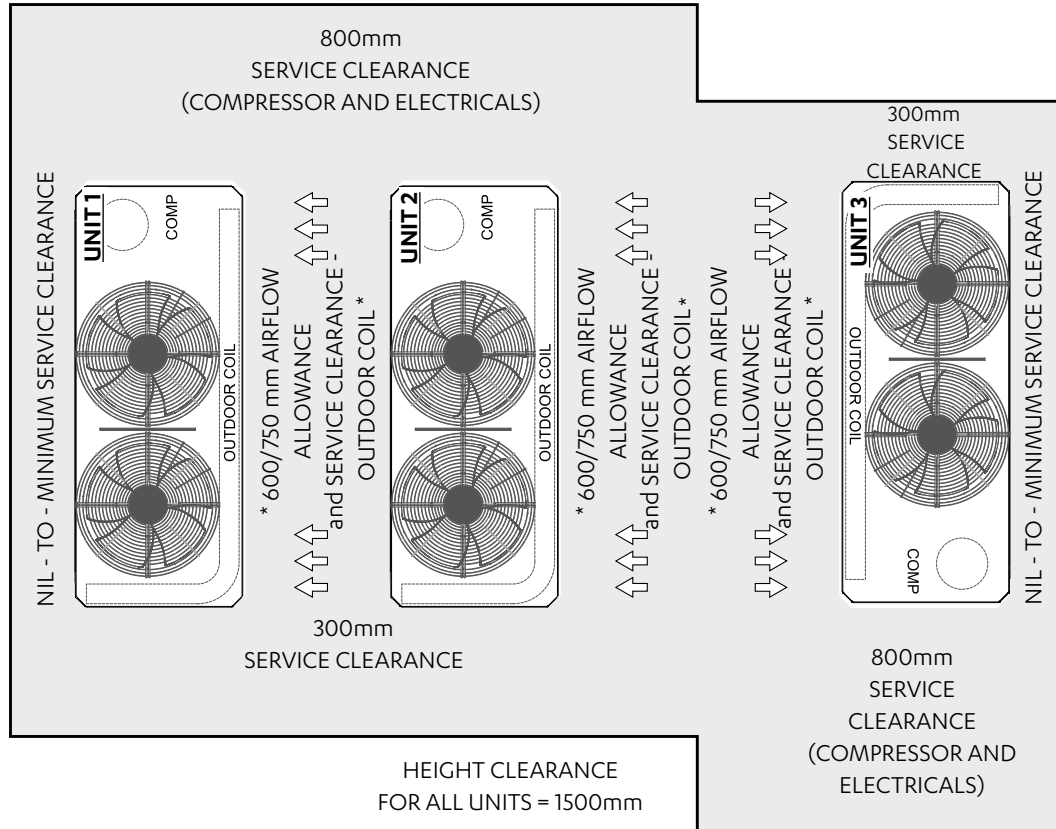


*Clearances will vary depending on model. Higher capacity models clearance requirement must be allocated.

CONFIGURATION 2



CONFIGURATION 3



*Clearances will vary depending on model. Higher capacity models clearance requirement must be allocated.

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.

Provide rubber pads under spreader bar to prevent damage to the unit

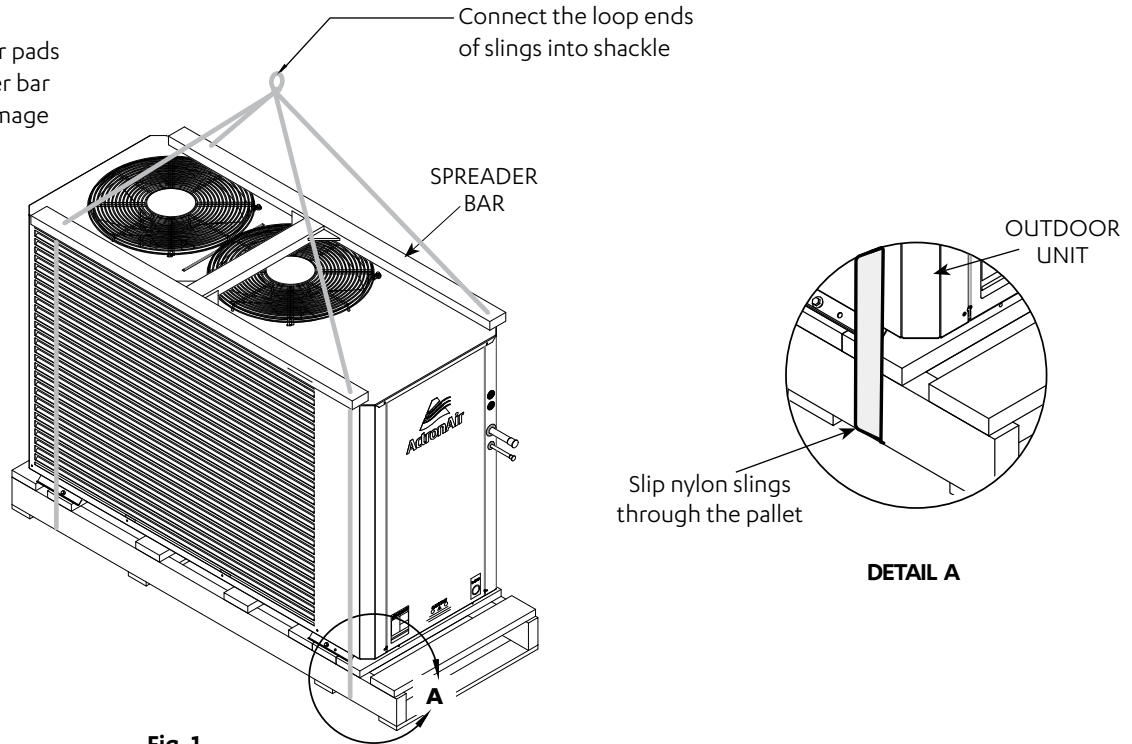


Fig. 1

NOTE

Undo the 6-screws (4-screws only for SCA260C) holding down the unit unto the pallet before removing the pallet

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)

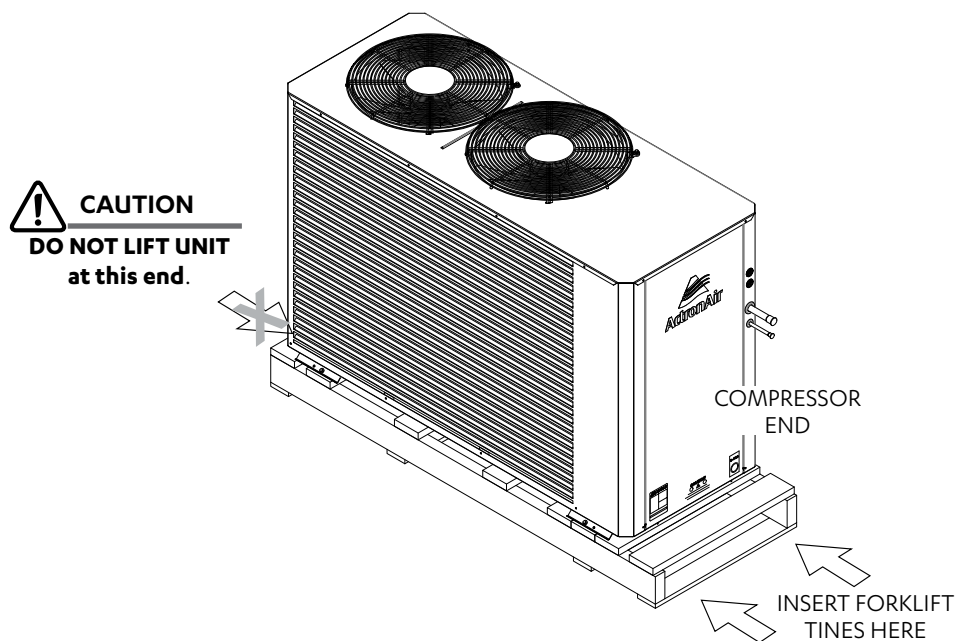


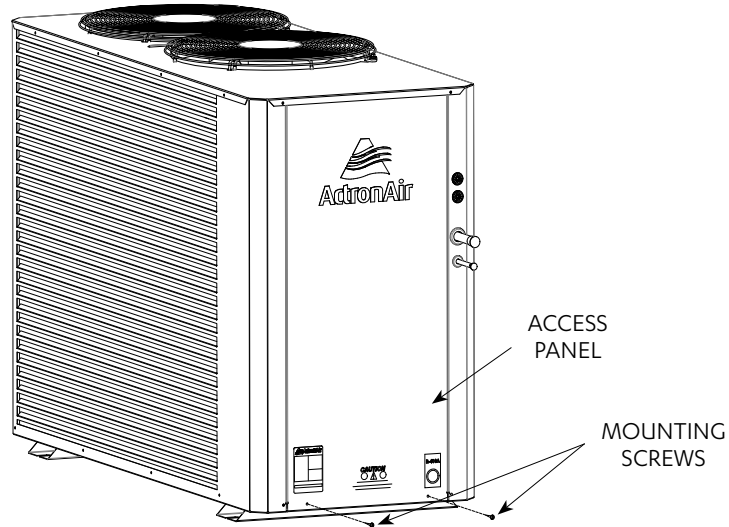
FIG. 2

⚠ CAUTION

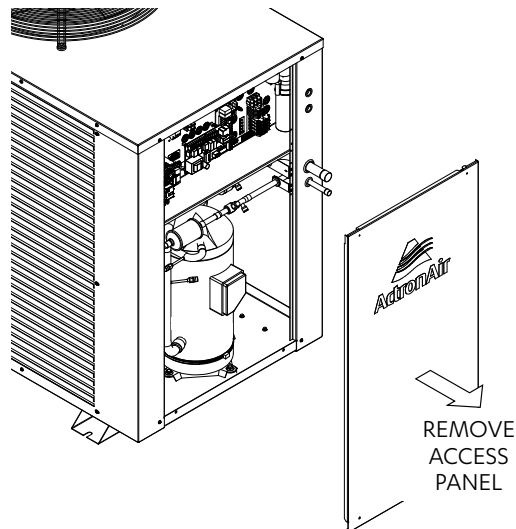
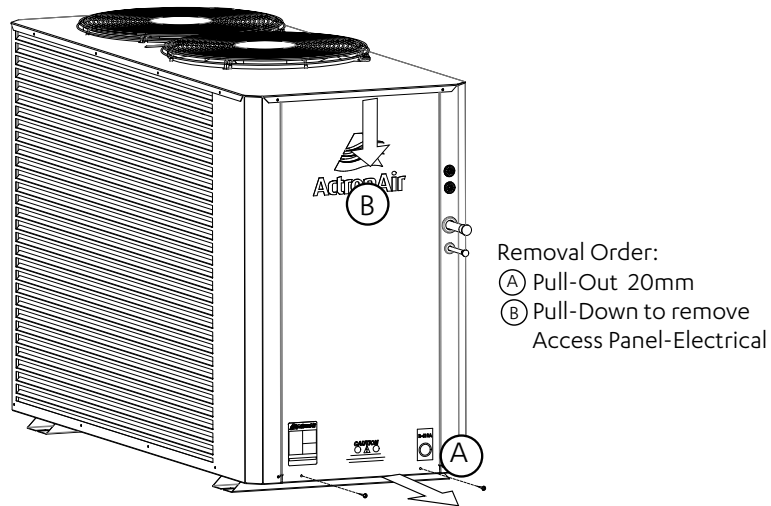
Length of fork lift tines must pass the unit middle section, in order to safely carry the unit.

10. Outdoor Unit Preparation

Step 1: Remove mounting screws, as shown:

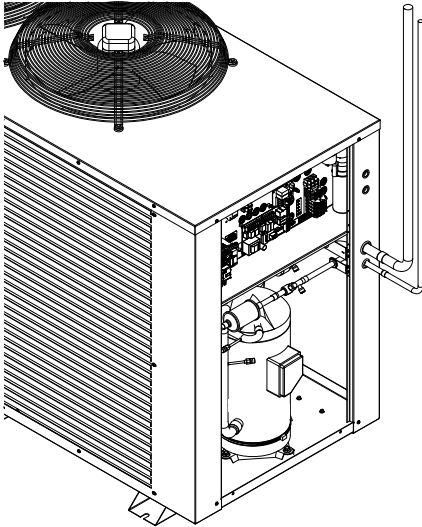


Step 2: Remove Access Panel.



Step 3: Install Interconnecting Field Pipes

Braze refrigeration piping. Refer to Section 11 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 compressor of this unit operates with Polyolester (POE) oil that rapidly absorbs moisture. The maximum time any system can opened to atmosphere is 15 minutes, if the system is left open for extended period cap it off to prevent the oil from absorbing moisture.
- 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 losses and vertical height difference. Vertical height difference must not exceed 20 metres. Table 1 below shows the equivalent straight pipe length of elbow fittings.

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

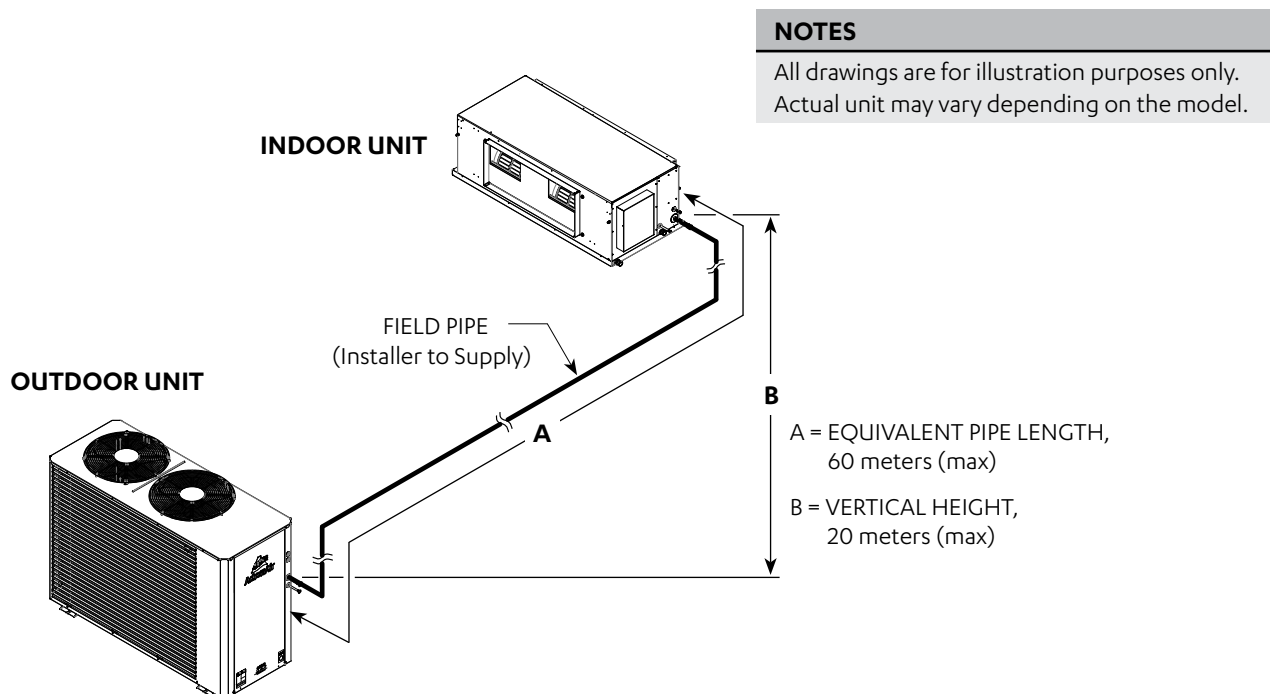
Selected field pipe sizes must match the recommended sizes in Table 2. If the installation requires different field pipe diameter due to different application condition other than recommended, contact ActronAir for advice.

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.

Improper insulation can result in condensation forming on the pipework's surface, potentially leading to dripping condensation.



Example of Total Equivalent Field Pipe Length Calculations

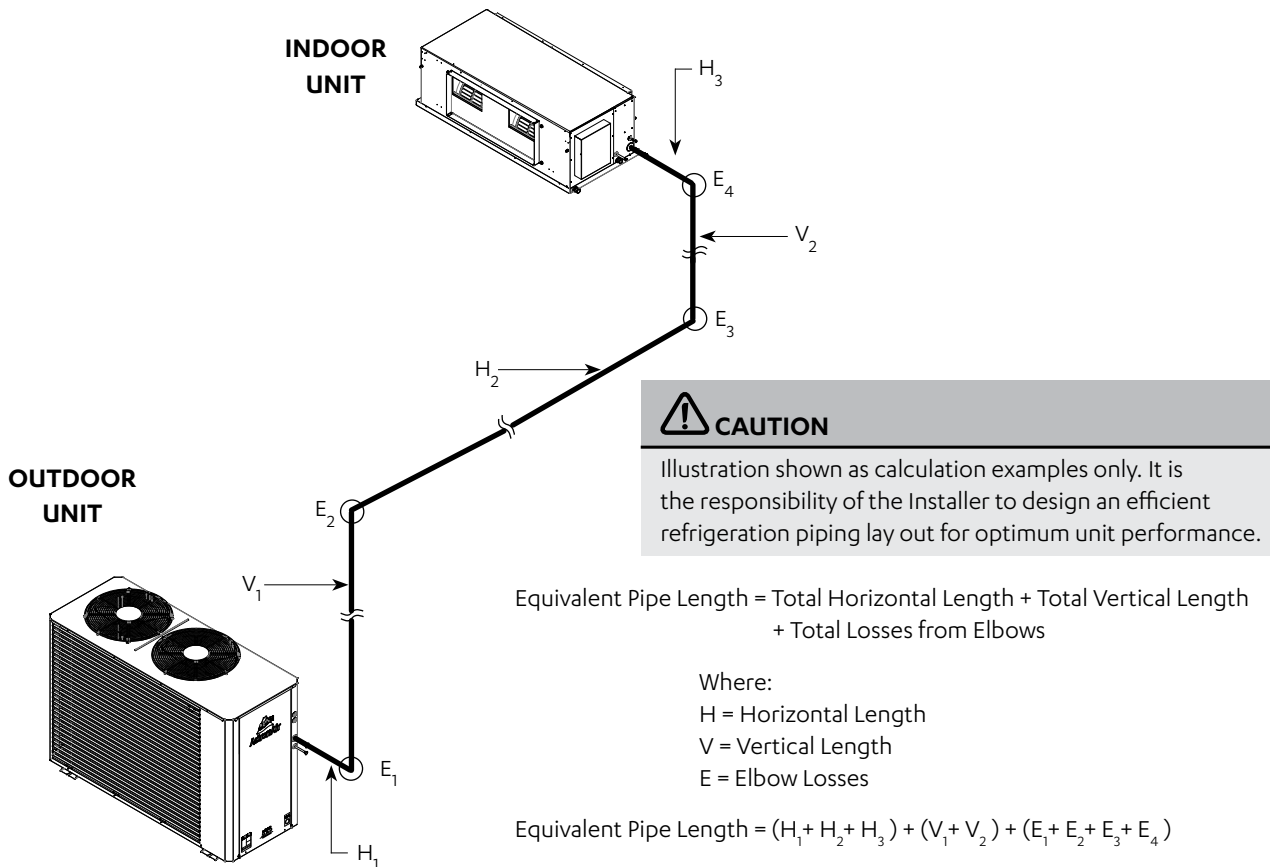


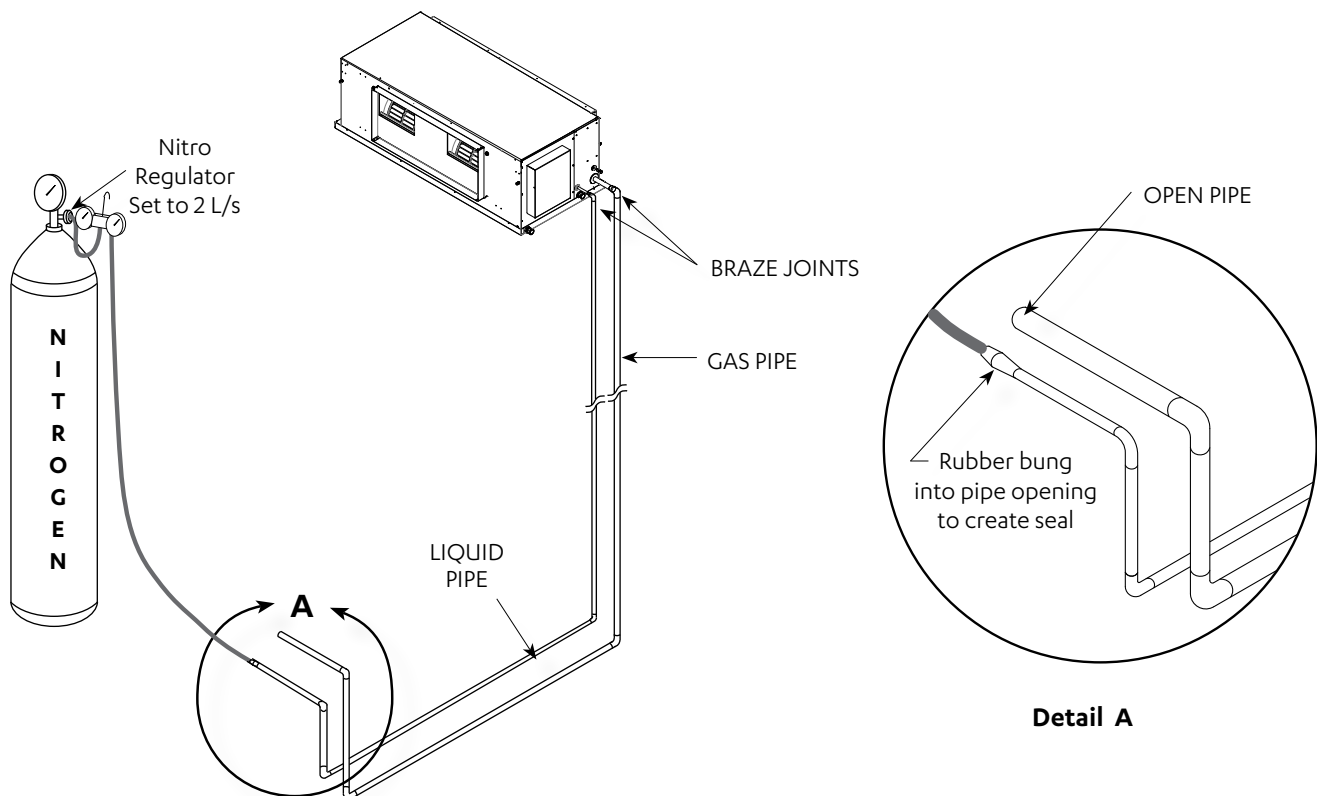
TABLE 2: REFRIGERATION PIPING

Reverse Cycle (Outdoor / Indoor)	CRA300T/ EVA300S	SCA260C/ SCG260E	SCA290C/ SCG290E	SCA300C/ SCA300E	SCA330C/ SCA330E	SCA330C/ SCG330E	SCA340C/ SCA340E	SCA340C/ SCG340E	SCA400C/ SCG400E
Max. Equivalent Pipe Length Range (metres)	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60	0 - 60
Max. Vertical Height Differential ⁽¹⁾ (metres)	20	20	20	20	20	20	20	20	20
Field Pipe Size									
Liquid Line - inch (mm)	9.52 (3/8)	15.9 (5/8)	15.9 (5/8)	9.52 (3/8)	15.9 (5/8)	15.9 (5/8)	9.52 (3/8)	9.52 (3/8)	12.7 (1/2)
Gas Line - inch (mm)	19.05 (3/4)	1 (25.4)	28.6 (1-1/8)	19.05 (3/4)	28.6 (1-1/8)	28.6 (1-1/8)	19.05 (3/4)	19.05 (3/4)	22.2 (7/8)
Outdoor Pipe Size									
Liquid Line - inch (mm)	9.52 (3/8) swaged	15.9 (5/8) swaged	15.9 (5/8) swaged	9.52 (3/8) swaged	15.9 (5/8) swaged	15.9 (5/8) swaged	9.52 (3/8) swaged	9.52 (3/8) swaged	12.7 (1/2) swaged
Gas Line - inch (mm)	19.05 (3/4) swaged	28.6 (1-1/8) ID to fit field pipe	28.6 (1-1/8) swaged	19.05 (3/4) swaged	28.6 (1-1/8) swaged	28.6 (1-1/8) swaged	19.05 (3/4) swaged	19.05 (3/4) swaged	22.2 (7/8) swaged
Indoor Pipe Size									
Liquid Line - inch (mm)	9.52 (3/8) swaged	15.9 (5/8) swaged	15.9 (5/8) swaged	9.52 (3/8) swaged	15.9 (5/8) swaged	15.9 (5/8) swaged	9.52 (3/8) swaged	9.52 (3/8) swaged	12.7 (1/2) swaged
Gas Line - inch (mm)	22.2 (7/8) cut-off swaged	1 (25.4) swaged	28.6 (1-1/8) swaged	22.2 (7/8) cut-off swaged	28.6 (1-1/8) swaged	28.6 (1-1/8) swaged	22.2 (7/8) cut-off swaged	22.2 (7/8) cut-off swaged	22.2 (7/8) swaged
Field Pipe Qty. (Liquid / Gas)	2 / 2	1 / 1	1 / 1	2 / 2	1 / 1	1 / 1	2 / 2	2 / 2	2 / 2

⁽¹⁾ Included in maximum field pipe length.

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)

1. Run interconnecting pipe work from condenser location to evaporator.
2. 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 liquid line with rubber bung to seal the connection. The seal will prevent air being sucked into pipe work.
5. Leave suction 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. **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

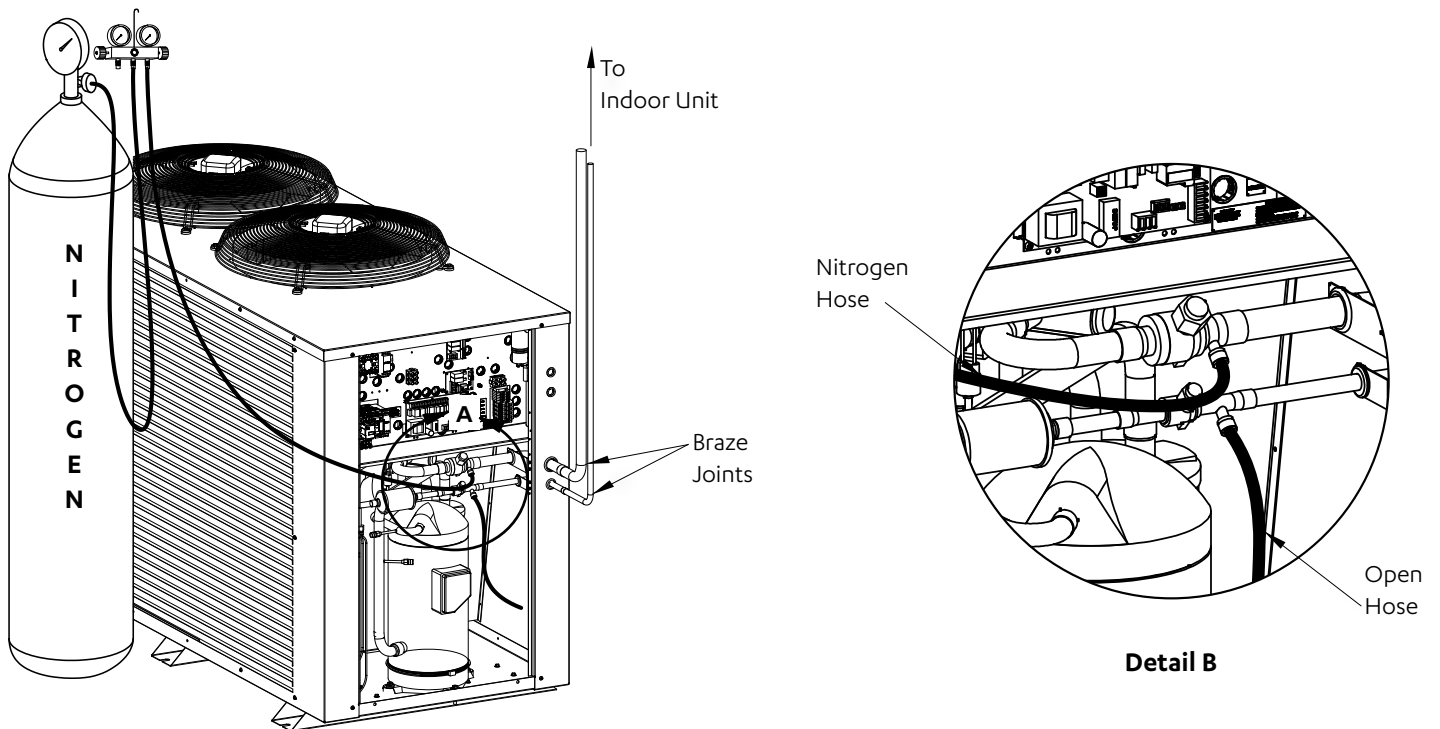
Pressure test the system between 2500kPa and the system's maximum kPa as determined in **AS/NZS 5149.2:2016, Clause 5.2.2.1 Maximum Allowable Pressure**. Ensure pressure is held for no less than 1 hour.

NOTES

Importance of Evacuation:

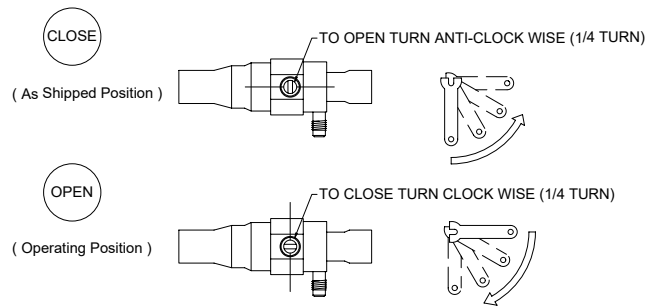
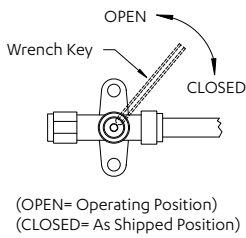
- Any non-condensable product left in the system can cause the pressure in the high side of the system to increase and in turn, the compression temperature to rise.
- Moisture will result in adverse reaction in the refrigerant circuit.
- The POE oil used in the R-410A compressor is hygroscopic, which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

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.
- 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 procedure can result in serious injury or death.
- 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.

Wiring Diagram

The wiring diagrams specific for your air conditioning system are located on the inside of the electrical access panel. 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 sub-mains isolator. 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". Protection devices are to be sized accordingly as per to the electrical specifications of the unit.
- Installer to connect an appropriate load break (AC3) isolator in sub mains wiring.
- Complete the outdoor unit power supply wiring into the sub-mains isolator.
- Secure the power cords and control cables that enters in/exits out the unit. Use the cable ties provided in the electrical panel.
- Provide proper unit earthing in accordance with local and national wiring rules.

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.

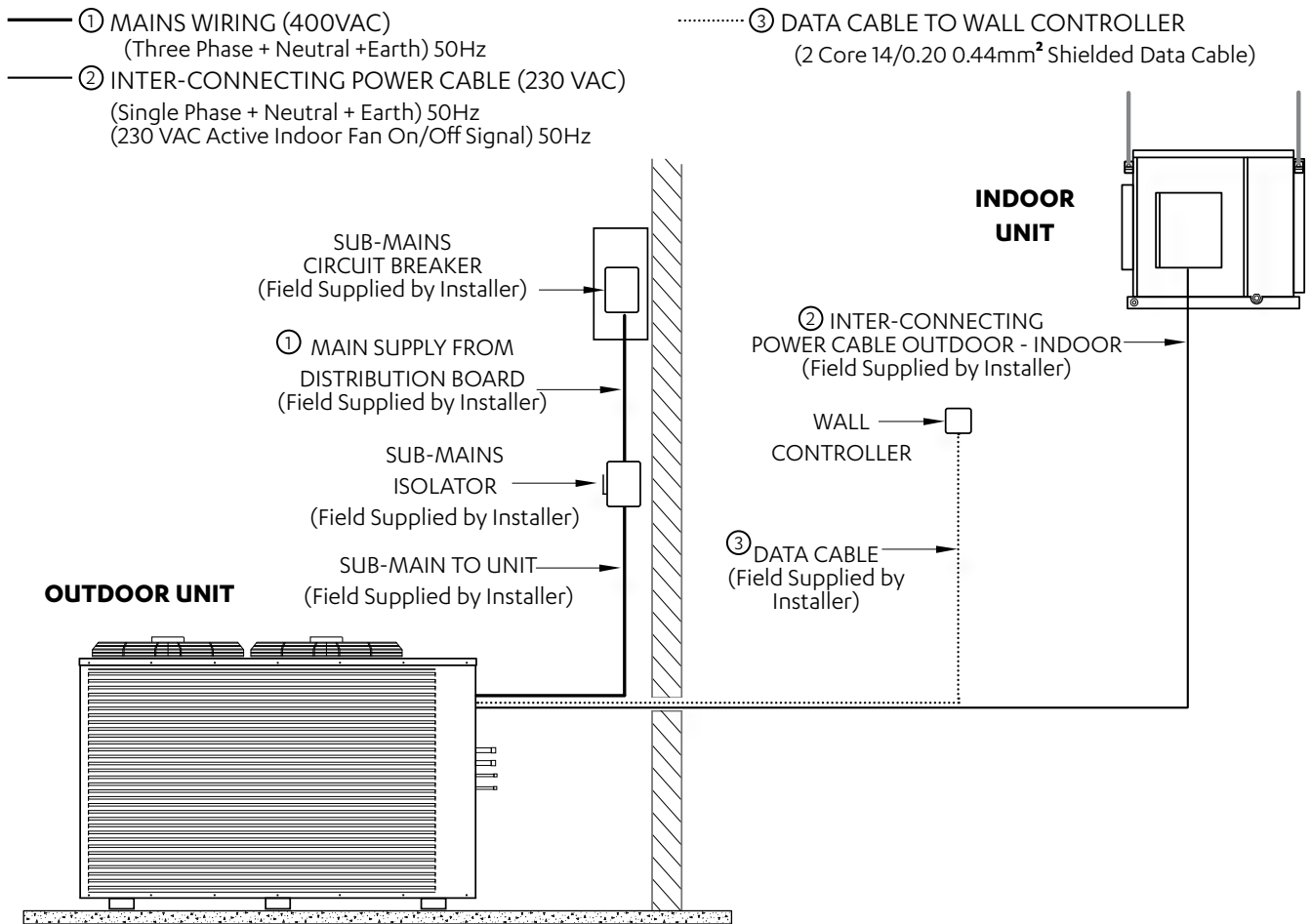
13. Split Unit Electrical Connection

NOTE

To minimise noise interference, Data and Power cable clearance should be maintained as much as possible (minimum 300mm).

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.

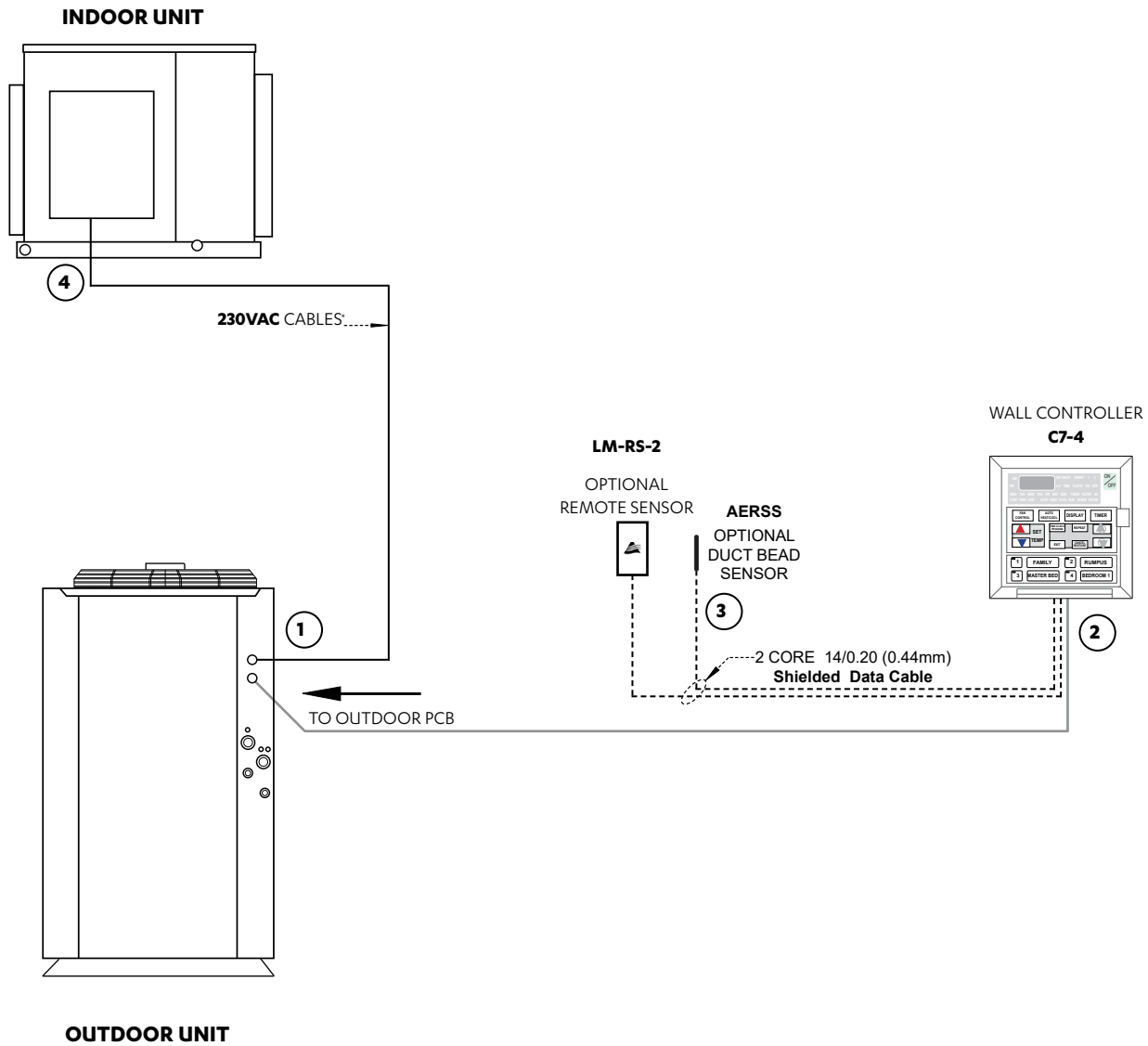


Circuit Breaker Size and Cable Size Requirement			
Model	Circuit Breaker Size	Cable Size * (mm ²)	
	Amps	MAIN (4 Core + E)	O.D. to I.D.
CRA300T / EVA300S **	32.0	6.0	1.5
SCA260C / SCG260E	32.0	6.0	1.0
SCA290C / SCG290E	32.0	6.0	1.5
SCA300C / SCA300E **	32.0	6.0	1.0
SCA330C / SCA330E **	32.0	6.0	1.0
SCA330C / SCG330E	40.0	10.0	1.5
SCA340C / SCA340E **	32.0	6.0	1.0
SCA340C / SCG340E	40.0	10.0	1.5
SCA400C / SCG400E	50.0	10.0	2.5

* Suggested Minimum Cable Size should be used as a guide only. Larger size cables may be required dependent on installation method, length of cables and ambient temperature. Refer to the latest edition of the AS/NZS 3000 "Australian / New Zealand Wiring Rules" for more details.

**Refer to unit wiring diagram for further clarity of required cables for single and dual speed indoor fan operation.

14. Control Cable Length and Specification



ITEM	DESCRIPTION	MAXIMUM CABLE LENGTH * ^
1 to 2	Outdoor PCB to Master Controller	50 m (60 m without CZ-1)
1 to 4	Outdoor PCB to Indoor Fan (230VAC)	50 m
2 to 3	Master Controller to Remote Sensor (Max. of 2 Optional Sensors)	50 m each

*** Suggested Maximum Cable Length.**

Long runs beside Mains cables or TV antenna cables should be avoided where possible, 2 CORE 14/0.20 (0.44mm) Shielded Data Cable must be used.
 ^ Total Cumulative length of all the aggregate cable lengths must not exceed 500 meters. Consult ActronAir® for longer cable length requirement.

NOTE

Diagram shown above is a general presentation only. Refer to individual unit wiring diagram for complete wiring connection details.

15. 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.
- 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.
- If the ambient temperature is below 25°C, ensure that the system is connected to power supply (stand by) for at least six hours prior to charging. This is to ensure that the internal crankcase heater is operating to avoid any liquid going into the compressor that may cause damage. If the ambient temperature is more than 25°C, charging is allowed right away.
- 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.

Refrigerant Charge Details (R-410A)							
Model	CRA300T	SCA260C	SCA290C	SCA300C	SCA330C	SCA340C	SCA400C
Refrigerant Type	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A
Factory Charge gms	4575 per stage	10700	11050	4725 per stage	12800	7050 per stage	7850 per stage
Pre- charged Length m	5	5	5	5	5	5	5
Additional Refrigerant per charge gms	50 per stage	100	165	50 per stage	165	50 per stage	100 per stage

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 shut off valves.
3. Start the unit in cool mode ensuring that the compressor is in 100% 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

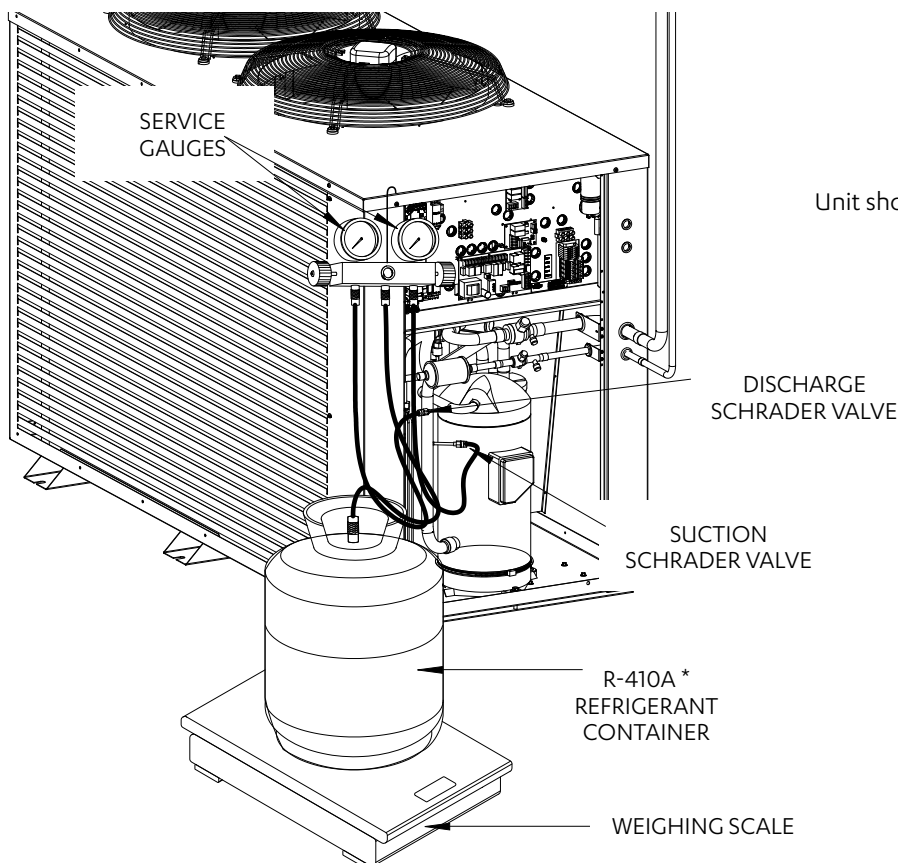
Liquid Line Temperature (**LLT**) = _____ °C

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

See Diagram Below:



Unit shown represents 1-Stage 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:

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

3. If subcooling is within the range (see charging table), 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 Subcooling/Superheat Table below.

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), 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.

Subooling and Superheat Table			
Cooling		Heating	
Subcooling	Superheat	Subcooling	Superheat
6 - 8	4 - 6	8 - 14	4 - 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.

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

16. Maintenance

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.



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.

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.

17. 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.
Magnetic Contactor				✓					Check for loose terminal connections	Tighten electrical terminals. Remove any dust.

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.
DrainPan / Condensation 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

OUTDOOR UNIT										Detail of Service Check	Service Methods
Parts	Service Period										
	1 Mth	3 Mth	6 Mth	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs			
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.
Outdoor Fan Speed Capacitor				✓						Check for any bulge on the capacitors & capacitance.	Make it electrically safe prior to measure the capacitor capacitance. Measured capacitance should be with in the printed tolerances on the capacitor.

18. Key Parts List

DESCRIPTION	PART NUMBER	CRA300T	SCA260C	SCA290C	SCA300C	SCA330C	SCA340C	SCA400C
Compressor	1560-436	---	1	---	---	---	---	---
	1560-437	---	---	1	---	---	---	---
	1560-440	2	---	---	2	---	---	---
	1560-438	---	---	---	---	1	---	---
	1560-463	---	---	---	---	---	2	---
	1560-459	---	---	---	---	---	---	2
Crankcase Heater	2025-006	---	1	1	---	1	---	---
	2025-005	2	---	---	2	---	2	2
Outdoor Fan	2505-130	---	2	---	---	---	---	---
	2505-106	2	---	2	2	2	2	---
	2505-134	---	---	---	---	---	---	2
Outdoor Control Board	2020-097	---	1	1	---	---	---	---
	2020-045	1	---	---	1	1	1	---
	2020-100	---	---	---	---	---	---	1
Stage 2 Control Board	2020-009	1	---	---	1	---	1	1
HP Switch	2060-019	2	1	1	2	1	2	2
LP Switch	2060-020	2	1	1	2	1	2	2
Metering Device - (0.0591") Piston	4540-059	---	2	---	---	---	---	---
Metering Device - (0.0625") Piston	4540-062	---	---	2	---	---	---	---
Metering Device - (0.0670") Piston	4540-067	2	---	---	2	---	---	---
Metering Device - (0.0689") Piston	4540-068	---	---	---	---	2	2	---
Metering Device - (0.0760") Piston	4540-076	---	---	---	---	---	---	2

19. 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			
SYSTEM 1		SYSTEM 2	
Supply Air Temperature	_____ °C	Supply Air Temperature	_____ °C
Return Air Temperature	_____ °C	Return Air Temperature	_____ °C
Suction Temperature	_____ °C	Suction Temperature	_____ °C
Discharge Temperature	_____ °C	Discharge Temperature	_____ °C
Condenser Coil Temperature	_____ °C	Condenser Coil Temperature	_____ °C
Ambient Temperature	_____ °C	Ambient Temperature	_____ °C

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

Check No Active Error Codes on the Unit	Checked: <input type="checkbox"/>
---	-----------------------------------

Date Checked:	_____
---------------	-------



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