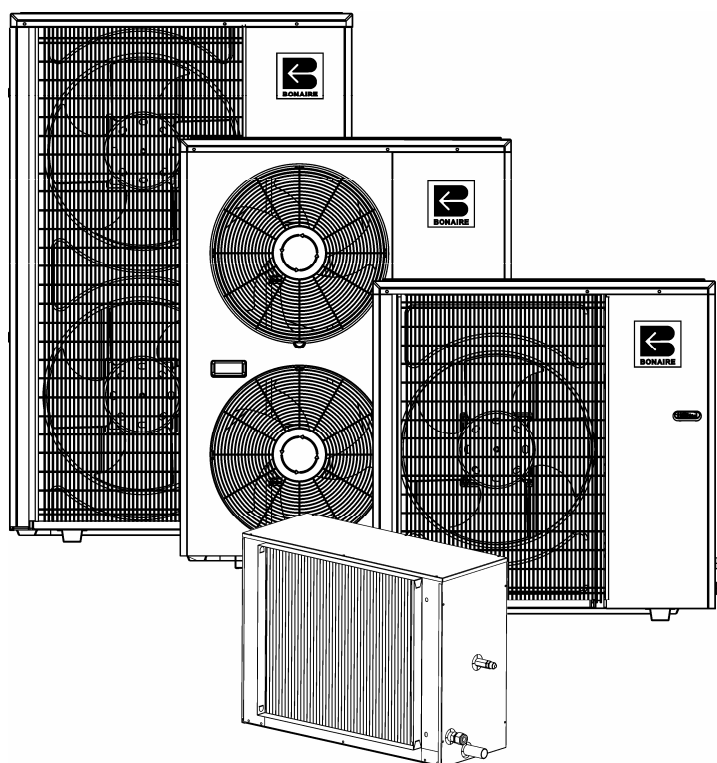




**DUAL CYCLE  
REFRIGERATED COOLING COMPONENT**



**B009RS/DC  
B012RS/DC, B015RS/DC  
B016RT/DC, B019RT/DC**

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# General

## GENERAL

Bonaire Dual Cycle air conditioners combine ducted gas heating and refrigerative cooling, using an inline coil box, to create a cooling and heating system. The heater provides the controls and fan for the heating and cooling system.

The Bonaire Dual Cycle cooling component includes two separate units – indoor coil and outdoor Unit. The two components are interconnected by two refrigerant tubes and an electric cable.

## WARNING

The refrigerative cooling component must be installed by authorized technicians, according to Climate Technologies specifications and using recommended standard tubing, electric cables and proper installation tools. Failure to comply with the above may invalidate your warranty!

## PRODUCT SELECTION MATRIX

DUAL CYCLE REFRIGERATIVE UNIT		DUCTED GAS HEATER BONAIRE VULCAN / PYROX		
Outdoor Unit	Indoor Coil	BV3	BV4	BV5
B009RS 8.9kW	B009DC – 9.0kW	20	20	21
B012RS 12.0kW	B012DC - 12.0kW	-	20 XA	21 XA
B015RS 14.7kW	B015DC - 14.9kW	30XA	30 XA	30 XA
B016RT 15.8kW	B016DC - 15.8kW	30 XA	30 XA	30 XA 35
B019RT 18.5kW	B019DC - 18.5kW	30 XA	30 XA	30XA 35

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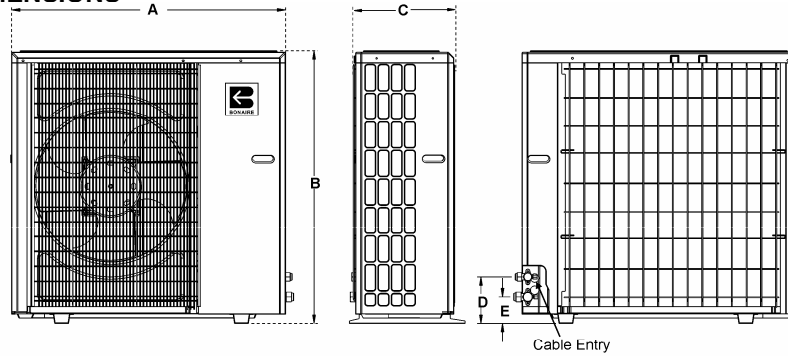
In the interest of continued product improvement Climate Technologies reserves the right to alter specifications without notice. E.&O.E.



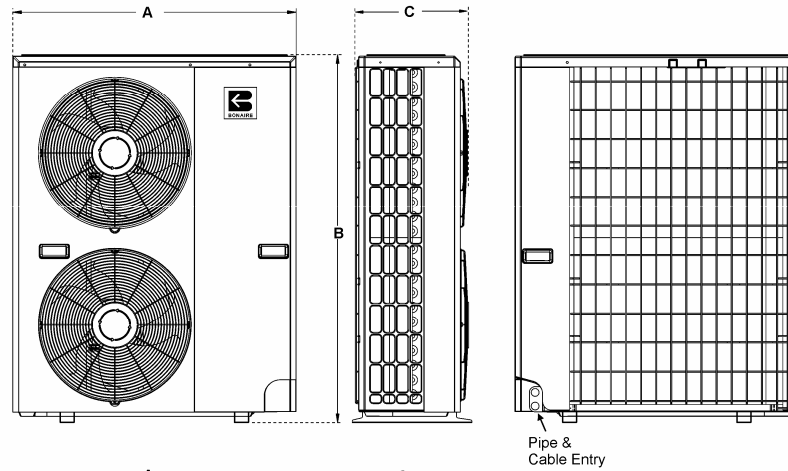
# Dimensions & Clearances

## OUTDOOR UNIT DIMENSIONS

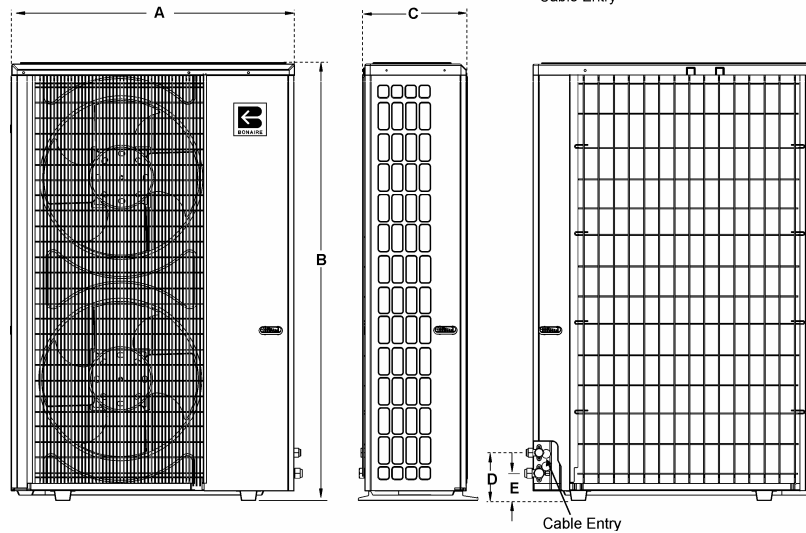
**B009RS**  
**B012RS**



**B015RS**  
**B016RT**



**B019RT**



Unit	Weight	A	B	C	D	E
B009RS	92kg	970	960	365	160	90
B012RS	97kg	970	960	365	160	90
B015RS	103kg	970	1260	395	Connections Inside Unit	
B016RT	108kg	970	1260	395	Connections Inside Unit	
B019RT	131kg	970	1465	365	160	90



# Dimensions & Clearances

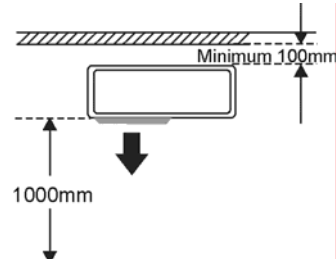
## OUTDOOR UNIT ACCESS AND CLEARANCES

In selecting a proper location, the following criteria must be considered:

- a) The outdoor unit and the indoor unit must be installed as close to each other as possible, within 10m. For longer tube specifications see table on page 13 or consult your technical sales rep.
- b) Outdoor unit installation should provide for:
  1. Easy service access.
  2. Minimum disturbance to the owner and nearby neighbors.
  3. A minimum distance of 100 mm from the wall
  4. If installed in a closed place (balcony, attic, etc), outdoor air vent must be provided to prevent hot/cold air from recirculation through the outdoor unit.
  5. If several outdoor units are installed in the same area, make sure that the hot air outlet from one outdoor unit does not enter another outdoor unit.
  6. Verify that any wall on which the outdoor unit is installed is capable of carrying the unit's weight. Do not install on a light unstable structure susceptible to vibration.
  7. When installing on a balcony above the first floor, make sure that the outdoor unit location allows easy access for removal of the top cover and/or the entire unit, if necessary.
  8. If the outdoor unit is installed in a non-accessible location, long and flexible refrigerant tubing and electrical cable must be installed to allow the unit to be moved for servicing.
  9. Do not install the unit in a highly polluted area in which the air is contaminated by oil mist, salt or sulfuric gas.

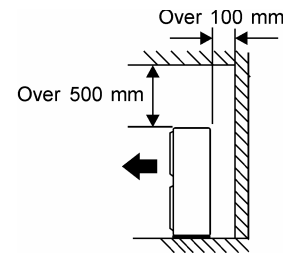
### When the back is close to the Wall

The top and the front need to be open. This includes protruding window sills.



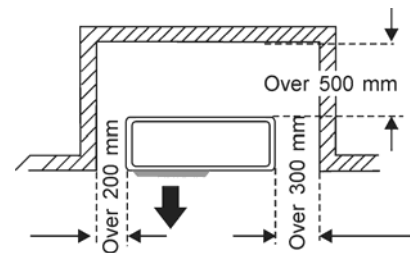
### When the top is blocked

The front and the sides must be clear for these minimum clearances.

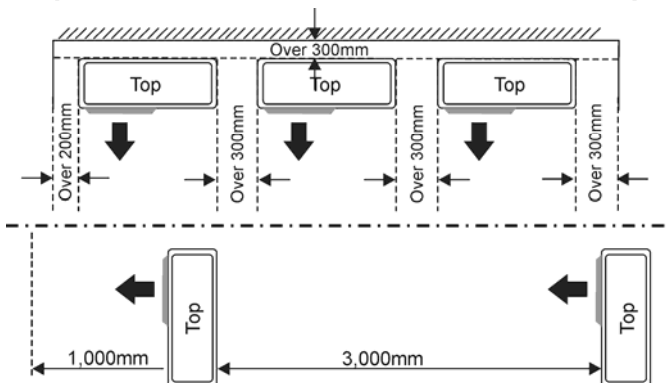


### When the back & sides are blocked

The back and the side minimum clearances must be achieved

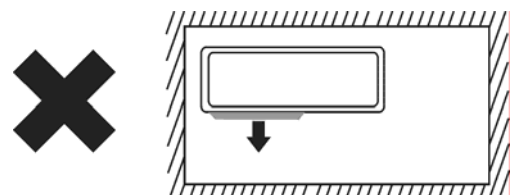


### Multiple Units – Lateral and Behind relationships



### When all the sides are blocked

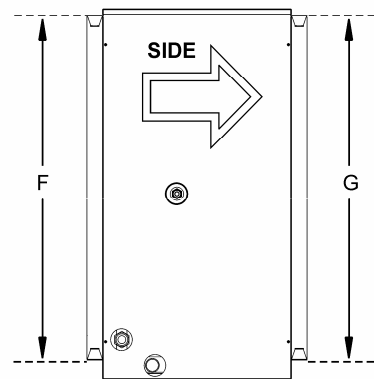
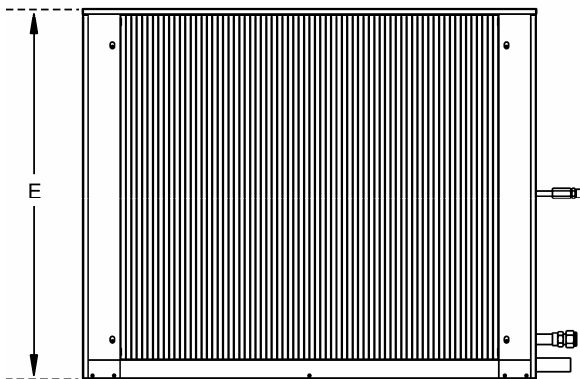
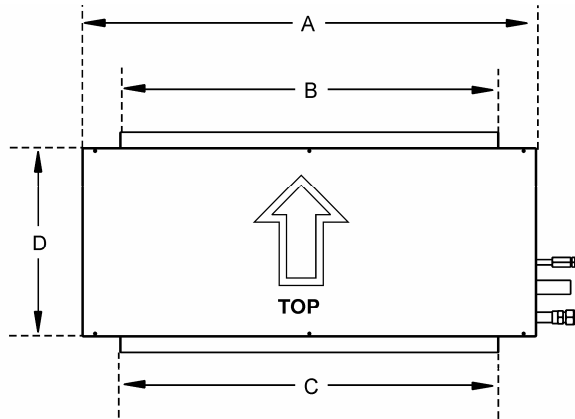
If all sides are blocked, this will be an unacceptable installation





# Dimensions & Clearances

## INDOOR UNIT DIMENSIONS



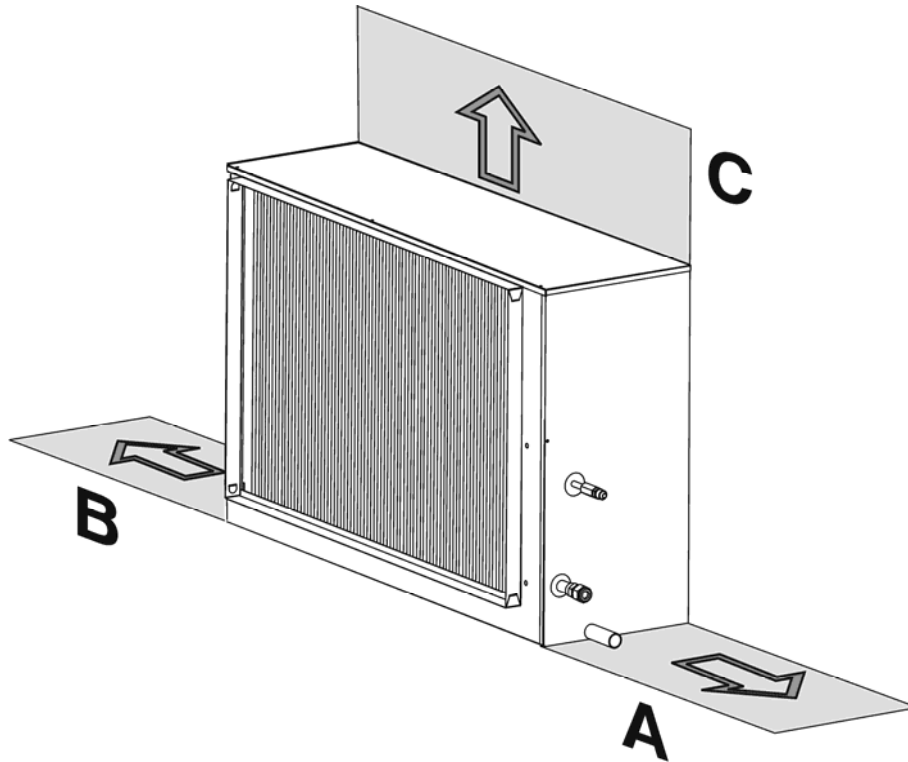
### Unit Dimensions

Unit	Weight	A	B	C	D	E	F	G
B009DC	15Kg	641	501	501	250	483	435	435
B012DC	20Kg	701	561	561	300	660	612	612
B015DC	20Kg	701	561	561	300	660	612	612
B016DC	20Kg	701	561	561	300	660	612	612
B019DC	24.5Kg	841	701	701	350	686	638	638



# Dimensions & Clearances

## INDOOR COIL CLEARANCES



Clearance Options for Maintenance

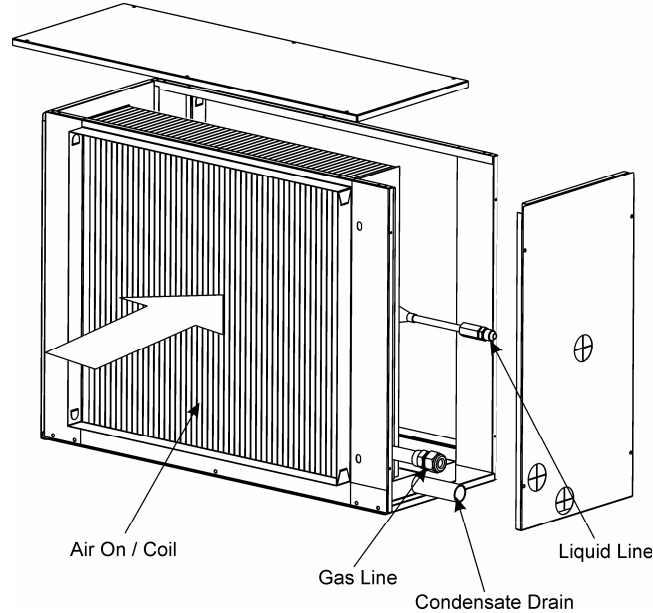
Unit	A	B	C
B009HD	500	300	300
B012HD	500	300	300
B015HD	500	300	300
B016HD	500	300	300
B019HD	500	300	300





# Unit Installation

## INDOOR COIL

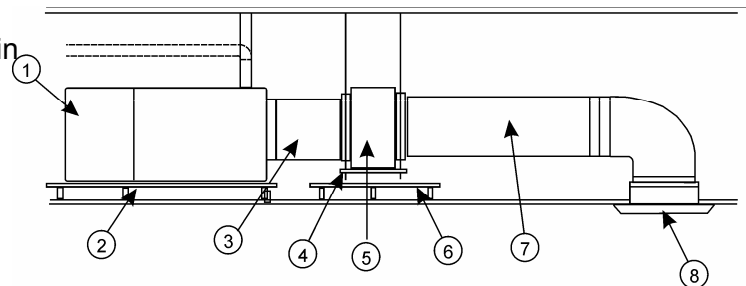


### Coil Location

The indoor coil is designed for installation in conjunction with a duct gas central heater within a ceiling/roof space or other compartment, where there is no influence from outdoor conditions.

While selecting the location, the following conditions must be assured:

- a) The location should assure free flow of the return air into the central heater without interference.
- b) The unit should not be installed close to rooms where noise should be avoided (bedrooms, children rooms, etc).
- c) Consider air distribution from the unit to the rooms and select a suitable location for even air flow.
- d) Avoid obstacles which may restrict the return air intake or the discharge supply air flow.
- e) If installing the indoor coil on a platform ensure that the structure is capable of supporting the indoor unit and platform.



- 1. Ducted Gas Heater
- 2. Ducted Gas Heater Platform
- 3. Transition duct – air on
- 4. Suspended hanging option – indoor fan coil
- 5. Indoor Coil
- 6. Platform Option – Indoor fan coil
- 7. Transition duct – air off
- 8. Discharge Air Grilles

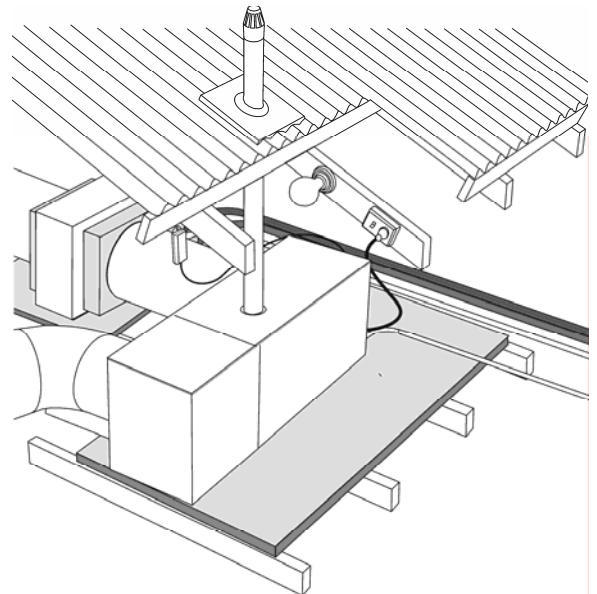
NOTE: The indoor unit should not be installed outside.



# Unit Installation

## Coil - Floor or Platform Mounting

1. Create a platform using bearers and chipboard. Place the unit platform over load bearing walls or on strategically located trusses in the roof space.
2. Place serrated rubber pads or isolating springs under each corner of the unit to minimize / eliminate any noise transmission.



## Coil - Suspension Mounting

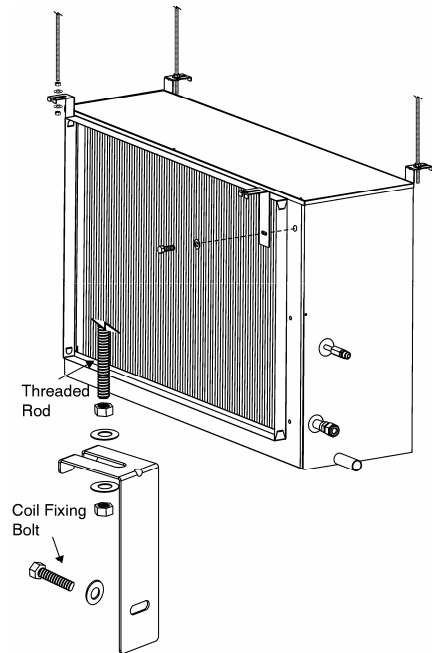
Use the accessory kit – P/n 6601905 Hanging Bracket Kit. For installation detailed see the instructions supplied with this accessory kit.

1. Fasten the hanging brackets to the indoor coil.
2. Use field supplied threaded rod to suspend the unit.  
M10 or greater is recommended to brace the unit mounting.
3. Fix the threaded rod to a structurally sound part of the roof or concrete pad.

Check with local and national building codes and or a structural engineer as to the fixing of the unit or building support structure if applicable.

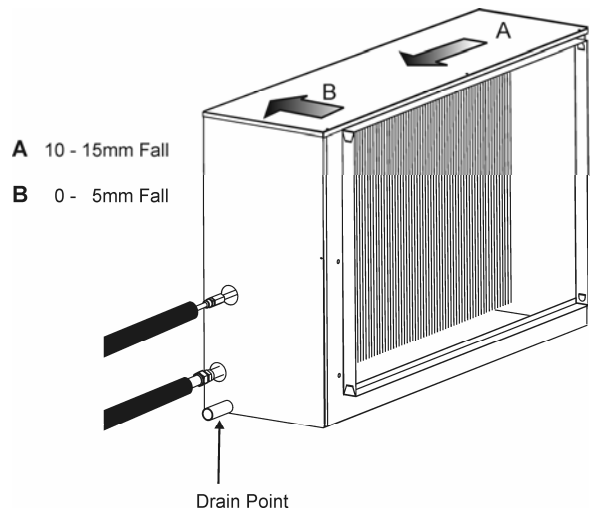
4. Secure the indoor fan unit to the threaded rods ensuring all fasteners are secure and tight.

Failure to correctly secure the suspension brackets and threaded rod to the indoor unit could cause it to fall and inflict injury or damage.



## Leveling the Coil Box

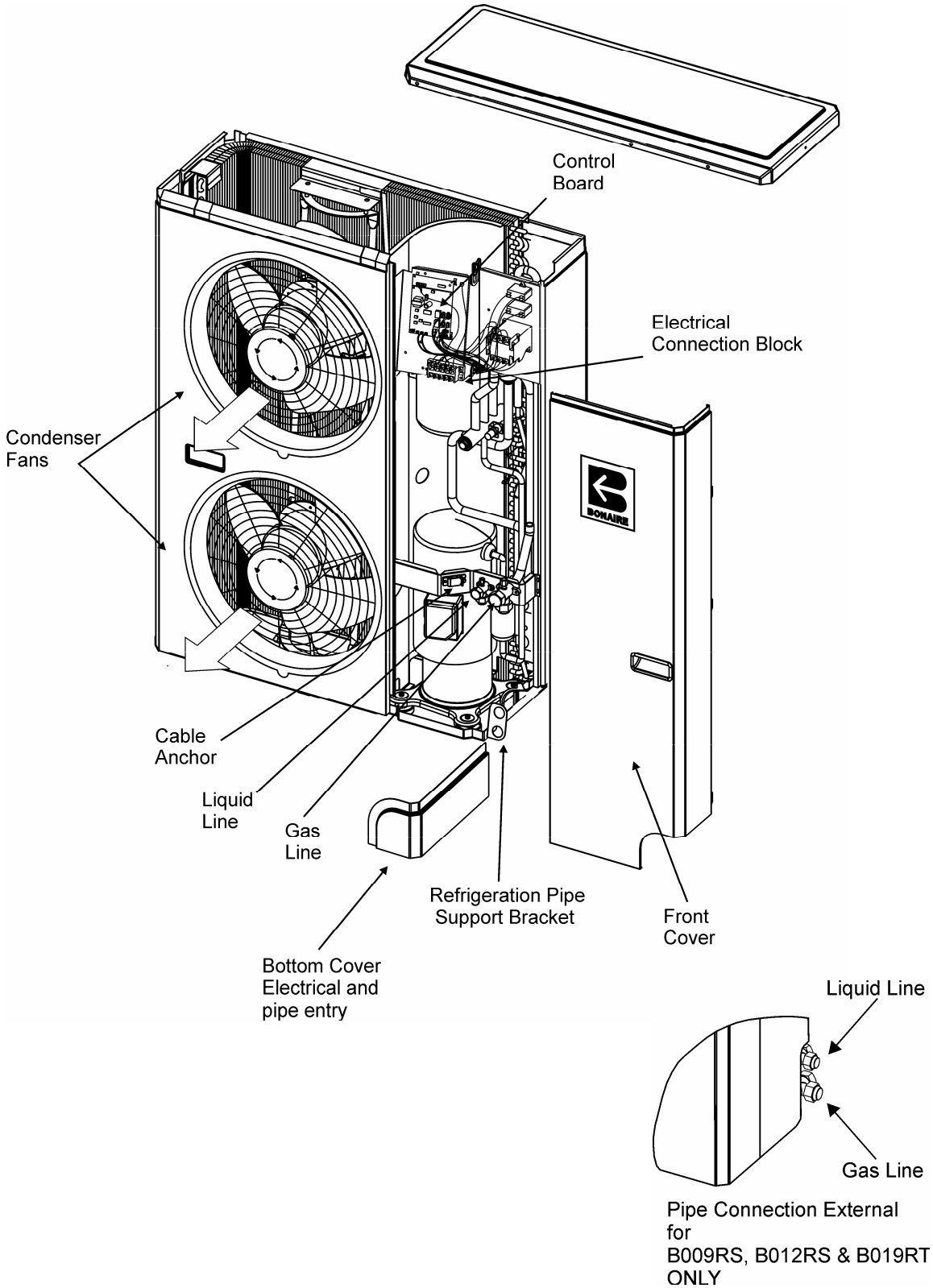
1. Adjust the level of the unit as required. The drainpipe end of the unit must be lower by at least 5mm for good drainage.
2. Take care not to damage the drain tubes or coil when lifting to adjust unit level
3. For suspension mounting units, tighten the locking nuts once the revised position is determined.





# Unit Installation

## OUTDOOR UNIT





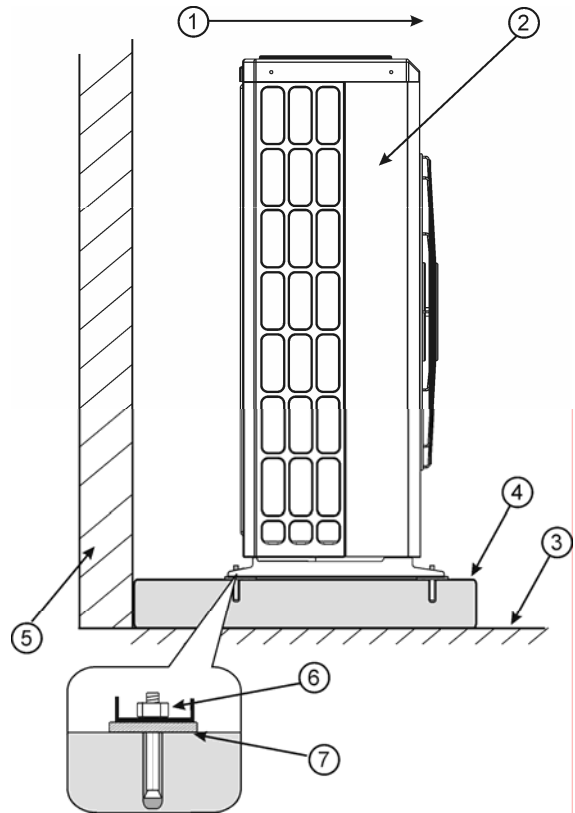
## Unit Installation

### CONDENSER INSTALLATION

Installation on flat surface (roof, ground, etc)

Install outdoor unit support in a position elevated at least 100 mm on a concrete pad, concrete block or wooden beams, in order to allow free water flow underneath.

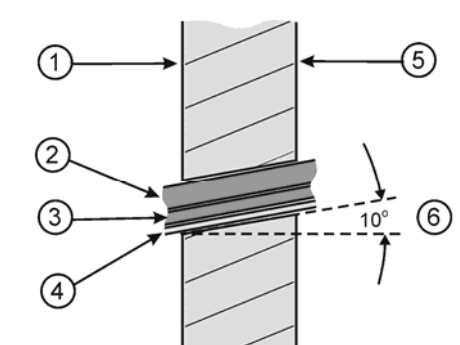
1. Outside the building
2. Outdoor Unit
3. Floor
4. Concrete slab or equivalent
5. Wall
6. Anchor bolts
7. Serrated Rubber / Waffle Pad 40x80 mm



### INTERCONNECTING TUBING

The tubing between the indoor and outdoor units consist of two copper tubes and an electric cable routed through a 60-mm wall opening. In addition, a drainage hose is installed between the indoor unit and the closest drainage point. Connect both sections, taking the shortest, most direct route.

1. Outside wall
2. Gas (Vapor) Line
3. Liquid Line
4. Electric Cable
5. Inside wall
6. Incline Angle

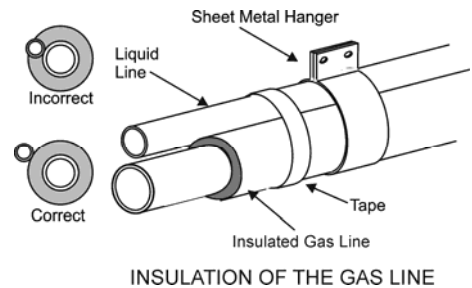




# Unit Installation

## Installation Notes

1. When laying the tubing for the installation, make sure that the ends are sealed to prevent penetration of dirt, moisture etc. To prevent dust or moisture from entering the tubes, seal them with caps or masking tape. It is recommended to clean the inside space of the tubes with nitrogen before connecting them to the unit.
2. Whenever possible, avoid passing tubes through hot zones, such as walls next to ovens, chimneys, etc. In such cases, additional insulation or other means of protection should be employed.
3. Tubing route shall be kept in straight lines as much as possible. When installing, keep the number of tube bends to a minimum. If bends are necessary, perform them only by using professional tube benders and not manually.
4. Make sure that tubing is insulated on its entire length, including tube end and quick connectors, or flare-nuts, to avoid tube "sweating" and water dripping from it.
5. Tubing shall be of refrigerant grade, without any damage. Tube inside walls must be kept absolutely clean prior to and during installation operations.
6. The Gas line shall be individually insulated with a minimum 9mm (3/8") thick closed cell pipe insulation.
7. For diameters, length of liquid and gas lines, and height difference, see the table below for each model. If the liquid or gas tube diameters differs from the corresponding flare connector diameter (mounted on the unit), use a suitable reducing union for this purpose.



NOTE: it is not a requirement to insulate the liquid line unless it is exposed to direct sun or extreme ambient temperatures.

## Unit Interconnecting Tubing Table

UNIT MODEL	CONNECTING LINE	TUBING LENGTH, UP TO – (IN METRES, ONE WAY)				MAXIMUM TUBING LENGTH	MAXIMUM HEIGHT DIFFERENCE
		10	15	20	25		
B009RS	Gas Liquid	19.05MM (3/4") 9.58mm (3/8")	19.05MM (3/4") 9.58mm (3/8")	19.05MM (3/4") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	25M	10M
B012RS	Gas Liquid	19.05MM (3/4") 9.58mm (3/8")	19.05MM (3/4") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	25M	15M
B015RS	Gas Liquid	19.05MM (3/4") 9.58mm (3/8")	19.05MM (3/4") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	25M	15M
B016RT	Gas Liquid	19.05MM (3/4") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	25M	15M
B019RT	Gas Liquid	19.05MM (3/4") 9.58mm (3/8")	22.23mm (7/8") 9.58mm (3/8")	28.6(1 1/8") 9.53 (3/8")	28.6(1 1/8") 9.53 (3/8")	25M	15M

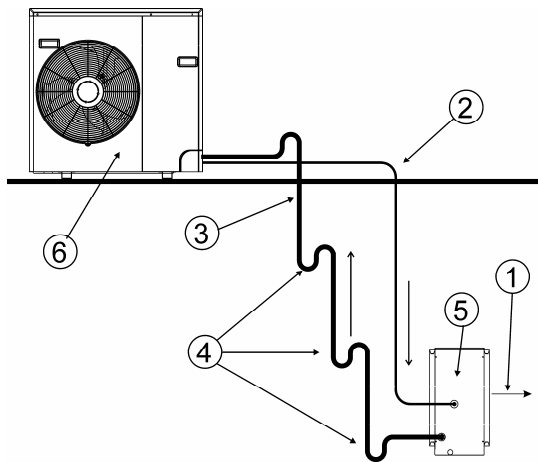


# Unit Installation

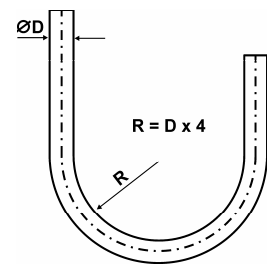
## Recommendation for Interconnection Tubing Installation

Three possible versions are schematically illustrated:

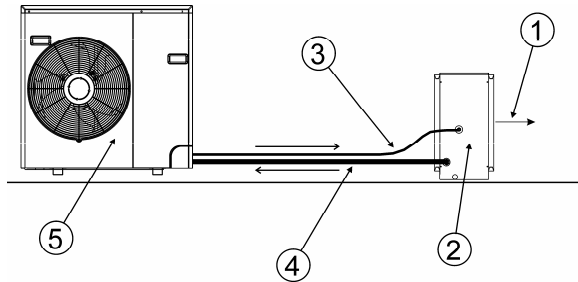
- 1) The outdoor unit installed above the indoor unit – such installation requires an oil trap in the gas line at the lowest point of the riser. The radius of the oil trap should be as short as possible. Horizontal runs of liquid line should follow the gas line (except for trap). In case the insulation must be partially removed for installation purposes, it is imperative that lines be fully insulated after the installation has been completed.



1. Air
2. Liquid Line
3. Gas Line
4. Oil trap every 3m
5. Indoor Coil
6. Outdoor Unit



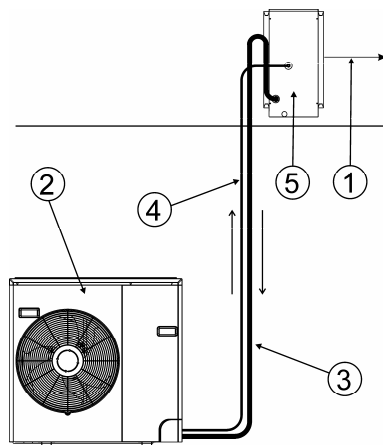
- 2) The units are installed at the same level – no trap is required.



1. Air
2. Indoor Coil
3. Liquid Line
4. Gas Line
5. Outdoor Unit

- 3) The outdoor unit is installed below the indoor unit – such installation requires an inverted gas line trap to be installed at the indoor unit. The top of the trap must be greater than the height of the indoor unit.

1. Air
2. Outdoor Unit
3. Gas Line
4. Liquid Line
5. Indoor Coil





# Unit Installation

## PIPE INSTALLATION



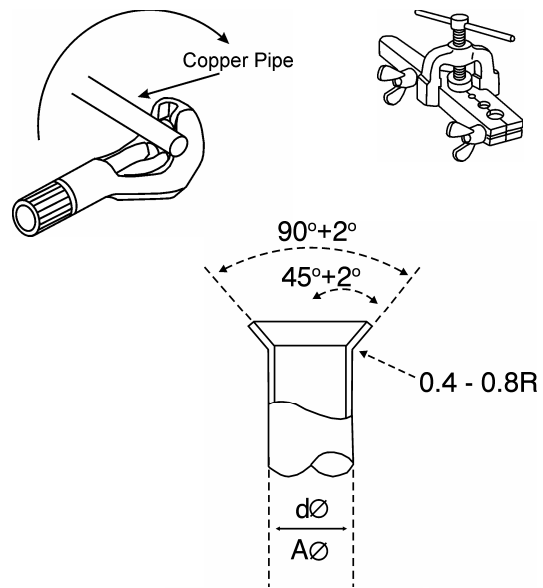
### WARNING

This paragraph describes the necessary steps for setting the unit into operation. Be sure to follow the instructions, to assure proper functioning of the air conditioner.

The outdoor unit is pre-charged with the correct amount of refrigerant. In extended runs, for additional refrigerant charge please refer to the outdoor unit name plate. This process shall be performed only by qualified refrigeration technicians with a professional charging set.

### Flare Preparation

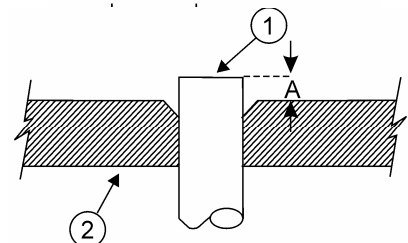
- a) Cut the tube, using a tube cutter. Make sure that the cut is perpendicular to the tube axis. Ensure the pipe is de-burred and free of metal shavings
- b) Slip the flare-nut over the tube, secure the tube in the flaring tool and perform the flare on the tube end. The tube projection length (A) from the flaring block varies with tube diameter and shall be set as indicated in the table.
- c) Apply few drops of refrigeration oil to the tube before flaring.



### Flare Depth (A)

A (mm)	TUBE OD
1.3	9.58mm (3/8")
1.9	15.88mm (5/8")
2.1	19.05mm (3/4")

1. Copper Tube
2. Flaring Tool



### Pipe Welding Preparation

The indoor / outdoor unit final connections are made using flared couplings. Where welded joints are required the following are the requirements.

1. Keep piping capped at ends when storing, handling and installing.
2. Use locally supplied, sealed, clean, refrigeration grade copper piping only.
3. Using a flat surface, hold down the pipe at one end and roll out the requirements.

NOTE: Take care not to dent, flatten or damage the pipe.

4. Use only a rotating wheel pipe cutter to cut the tube.
5. Use only a de-burring tool to de-bur the pipe ends.

### Pipe Welding



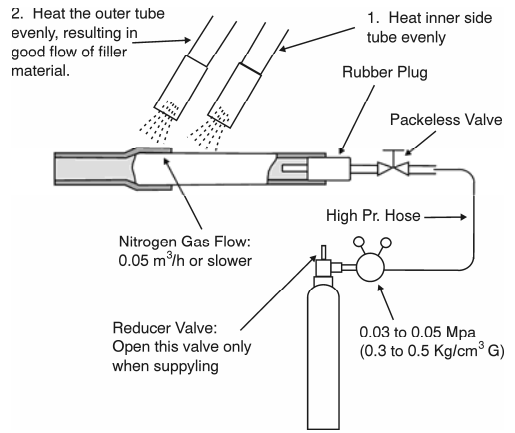
**Take care when using brazing flame torch, ensure that hot pipes or flame do not cause a fire**

1. Use quality brazing rod suitable for copper to copper joints on refrigeration grade tubing.



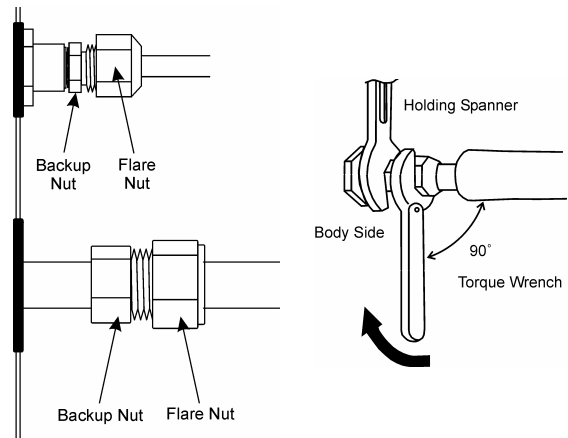
# Unit Installation

2. Before brazing wrap a wet cloth around pipes next to the indoor unit to prevent hot pipes from melting foam insulation in the unit. Make sure the flame or heat from the flame does not contact the unit casing or wiring, or damage will occur
3. Heat the pipe up as per the illustration
4. Use nitrogen gas for flowing through piping during pipe brazing. If oxygen, acetylene or fluorocarbon gas is used, it will cause an explosion or poisonous gas.
5. Use a regulator valve when nitrogen gas flowing is performed during brazing. The gas pressure should be maintained within 0.03 to 0.05Mpa. If an excessively high pressure is used, it will cause an explosion.



## Connecting the tubes

1. Connect and tighten the flare nuts to the refrigeration valves on the outdoor unit and to the male connectors of the indoor unit.
2. Coat the flared surfaces lightly with refrigeration oil to improve sealing.
3. Two spanners of the correct size should be used. A holding spanner should be used on the back-up nut and a tightening spanner (Torque spanner recommended) on the flare nut.
4. Tighten the flare nut with the tightening spanner while ensuring the holding spanner remains securely in place.



Note: First manually tighten the flare nuts, and then use wrenches. See table for torque tightening values.

5. Check for leaks. Use leak detect solution or soap solution for leak testing. An electronic leak detector is recommended.

## Torque Values

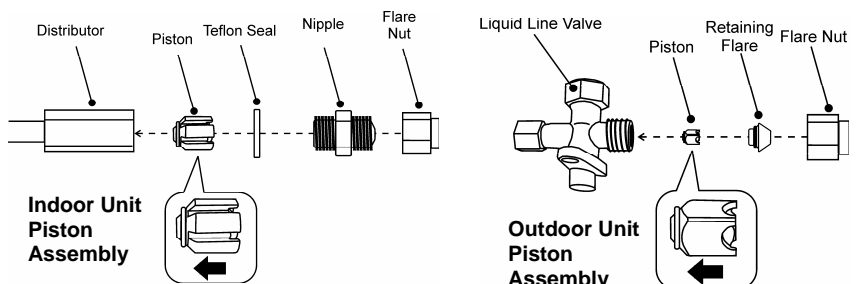
Description	Tube (Inches)		
	9.58mm (3/8")	15.88mm (5/8")	19.05mm (3/4")
Flare Sizes	9.58mm (3/8")	15.88mm (5/8")	19.05mm (3/4")
Torque (N.M.)	40-45	70-75	80-85

## IMPORTANT

If the recommended tightening procedure is not followed and the fitting is subsequently damaged or the thread stripped it will **NOT** be covered by our manufacturer's warranty. Any service calls required to repair this fault may be deemed chargeable to the Dealer/Installer.

## Piston Assembly

Should you need to remove or check either of the pistons during installation, please ensure that they are correctly refitted as per the following diagrams.







## Unit Installation

### EVACUATION AND SETTING IN OPERATION

- a) Connect two charging hoses from the charging set to the outdoor unit as shown in the diagram below.
- b) Connect the centre hose of the charging set to a vacuum pump.
- c) **CAUTION** - turn on the vacuum pump and make sure that the low pressure gauge reading moves from 0 kPa to -100 kPa; then evacuate the system for a further 10 minutes.

If gauge needle does not move from 0 kPa to -100 kPa, this indicates a leak. Take the following measures: tighten all connections; if leaking stops when the tubing connections are tightened, proceed from step c. If leaking persists even after connections are tightened, detect the leak and repair it; be sure to proceed only after all leaks have been eliminated.

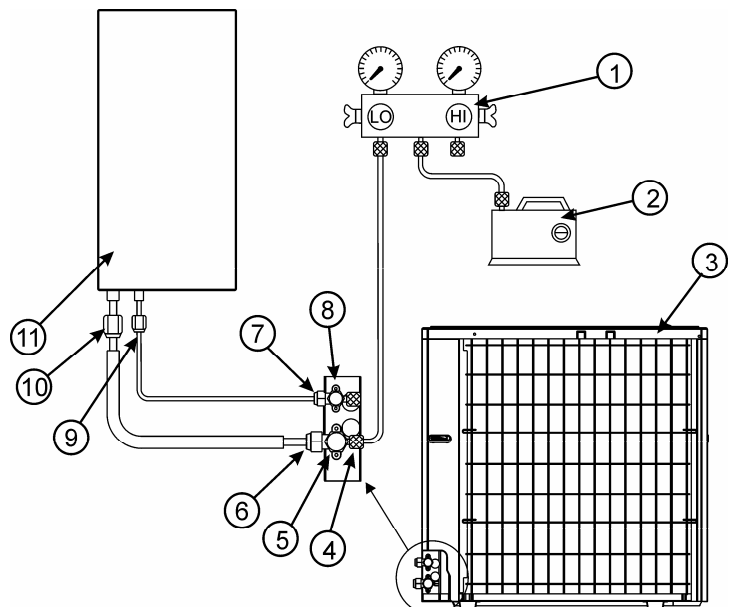
- d) Close the valves of both the gas and liquid sides of the charging set and turn off the vacuum pump. Make sure that the gauge needle does not move for about 5 minutes.
- e) Disconnect the charging hoses from the vacuum pump and from the service ports of both the three-way valves.
- f) Replace the service port and valve caps of both tree-way valves and tighten them with a torque wrench; see table of torque values listed on the previous page.

### CAUTION

When performing the following steps, avoid any exposure to the service valve ports; remember that the system is under pressure.

- g) Remove the valve caps from the service valves. Position both valves to "open" using a 5mm Hex/Allen key wrench. Open each valve by rotating the centre spindle in an anti-clockwise direction until fully back seated.
- h) Replace valve caps of both service valves. Check for gas leakage with a leak detector or soapy water.

1. Charging Set
2. Vacuum Pump
3. Outdoor Unit
4. Service Port
5. Valve Cap
6. 3-Way Gas Valve
7. 3-Way Liquid Valve
8. Valve Cap
9. Gas Flare Connection
10. Liquid Flare Connection
11. Indoor Coil



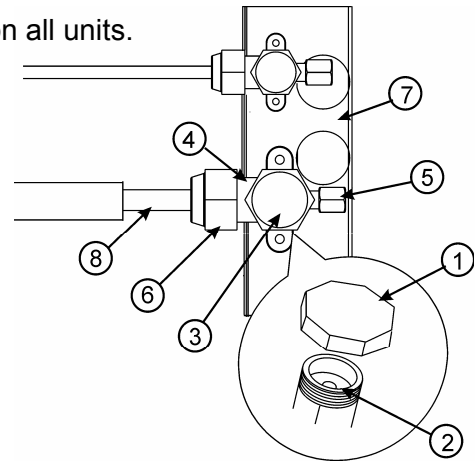


# Unit Installation

## ADDITIONAL CHARGE

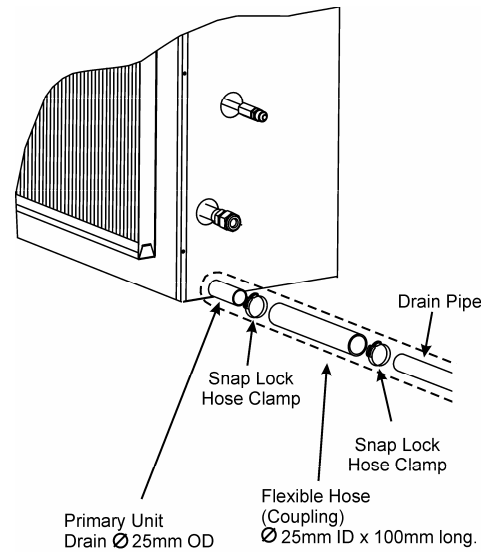
1. Each condenser unit is supplied pre-charged for 10 meters of 9.53 (3/8") liquid line. For additional charge add 57 grams per meter for over and above the specified system pre-charged length. See the unit name plate for this information. **DO NOT** exceed the maximum equivalent pipe length on each unit.
2. Service port on the liquid service valve is not supplied on all units.

1. Valve Protection Plug
2. Insert 5mm Hex / Allen key to open/close the Refrigerant Valve
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port cap
6. Flare Nut
7. Valve Mounting Bracket
8. Copper Tube

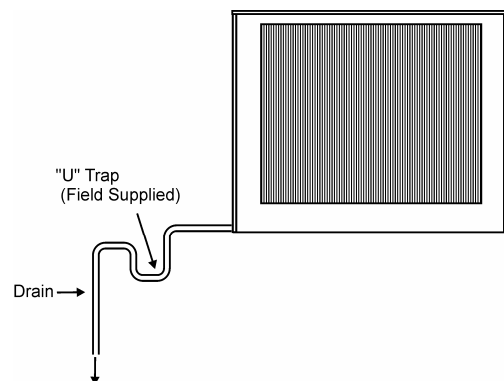


## DRAIN LINE INSTALLATION

- a. It is recommended to prepare a drainage point with rigid 20mm plumbing pressure PVC pipe tube by a qualified technician.
- b. The drain run must be installed with a constant minimum down slope of 2% and equipped with a trap, at the indoor unit.
- c. Install a "P" trap in the drain.
- d. Use the 25mm flexible plastic coupling hose provided to connect from the indoor unit primary drain point to the "P" trap and drain pipe. Secure with clamps.
- e. To check the system, fill the condense tray with water and verify its free flow through the drain line.



Verify that no leaks are present from the drain line or unit.





# Electrical



## **WARNING**

1. Electrical connection shall be made only by authorized electricians and in accordance with local electrical requirements and codes.
2. The system must be grounded.
3. Single phase models and three phase models are available; for each of them, the necessary wiring diagram is shown.
4. Connect the unit to the main power supply as per its applicable wiring diagram.
5. Use supply wire sizes as per local electrical codes and regulations.

## **OUTDOOR UNIT CONNECTIONS**

### Mains Installation

1. Install a dedicated circuit from the mains switch board. Circuit breaker requirements as per table below.
2. Connect the mains cables to the incoming connection block on the outdoor unit

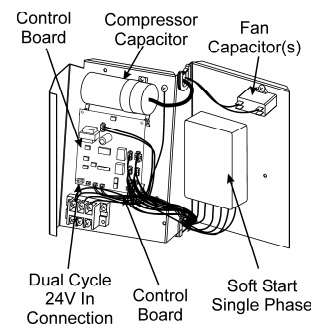
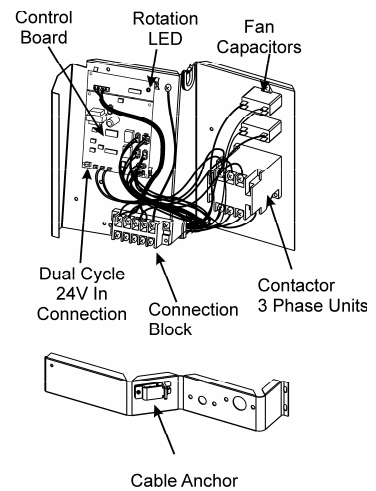
Use supply wire sizes as per local electrical codes and regulations.

Model	Recommended Circuit Breaker	Full Load Amps	Recommended Cable Size
B009RS	32A	16.5	4.0mm
B012RS	32A	21.8	4.0mm
B015RS	40A	32.4	6.0mm
B016RT	3 x 32 A	14.8	4.0mm
B019RT	3 x 32 A	19.5	4.0mm

**PLEASE NOTE:** Circuit breaker and cable sizes are subject to cable run length – refer AS 3000 wiring rules

3. Connect 1.0mm twin active cable between the ducted gas central heater and the outdoor unit. This is for 24Volt switched voltage from the gas central heater to activate the refrigerative system.

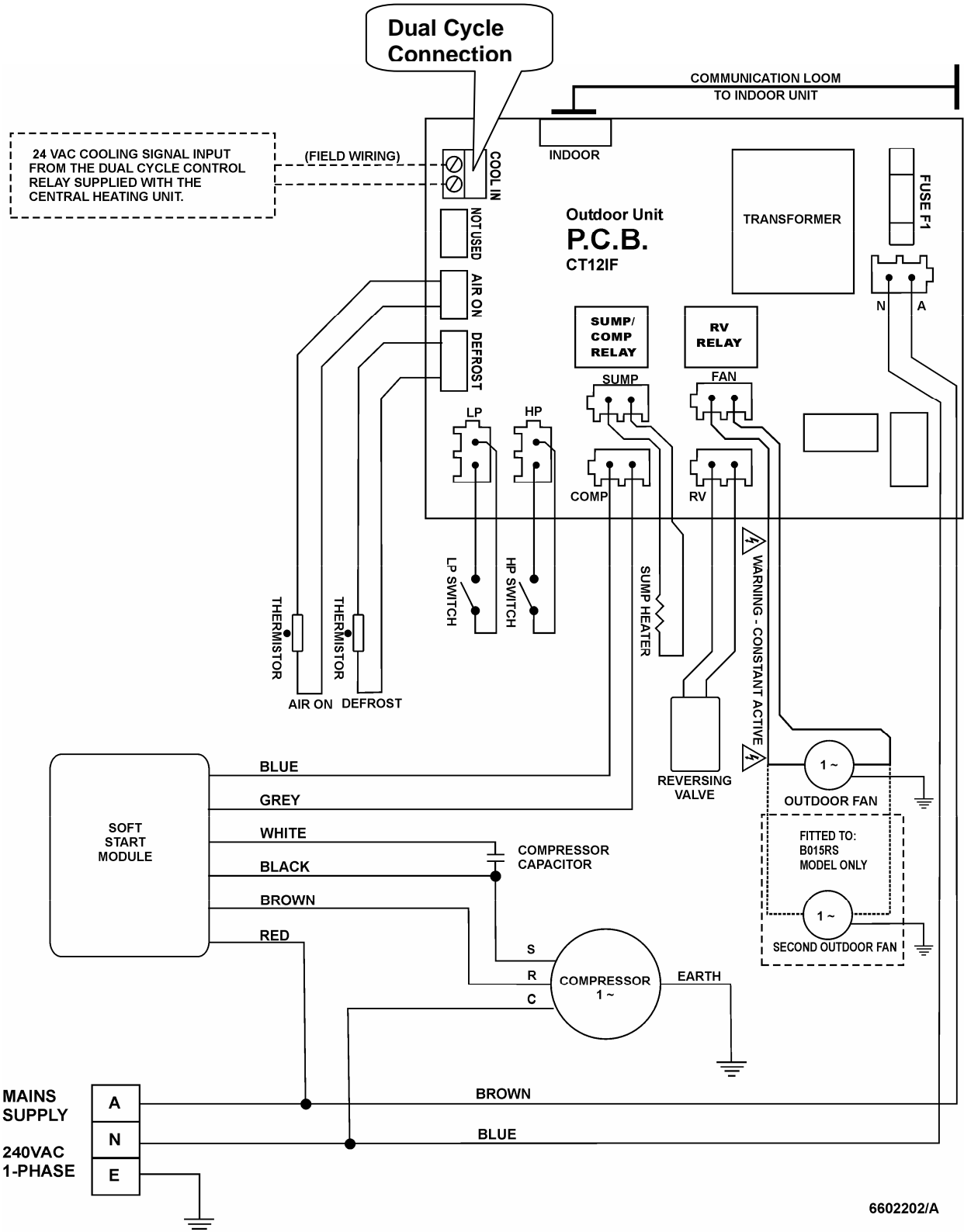
See wiring diagrams on the next pages for outdoor unit connections and the central heater instructions for the heater control connections.





# Electrical

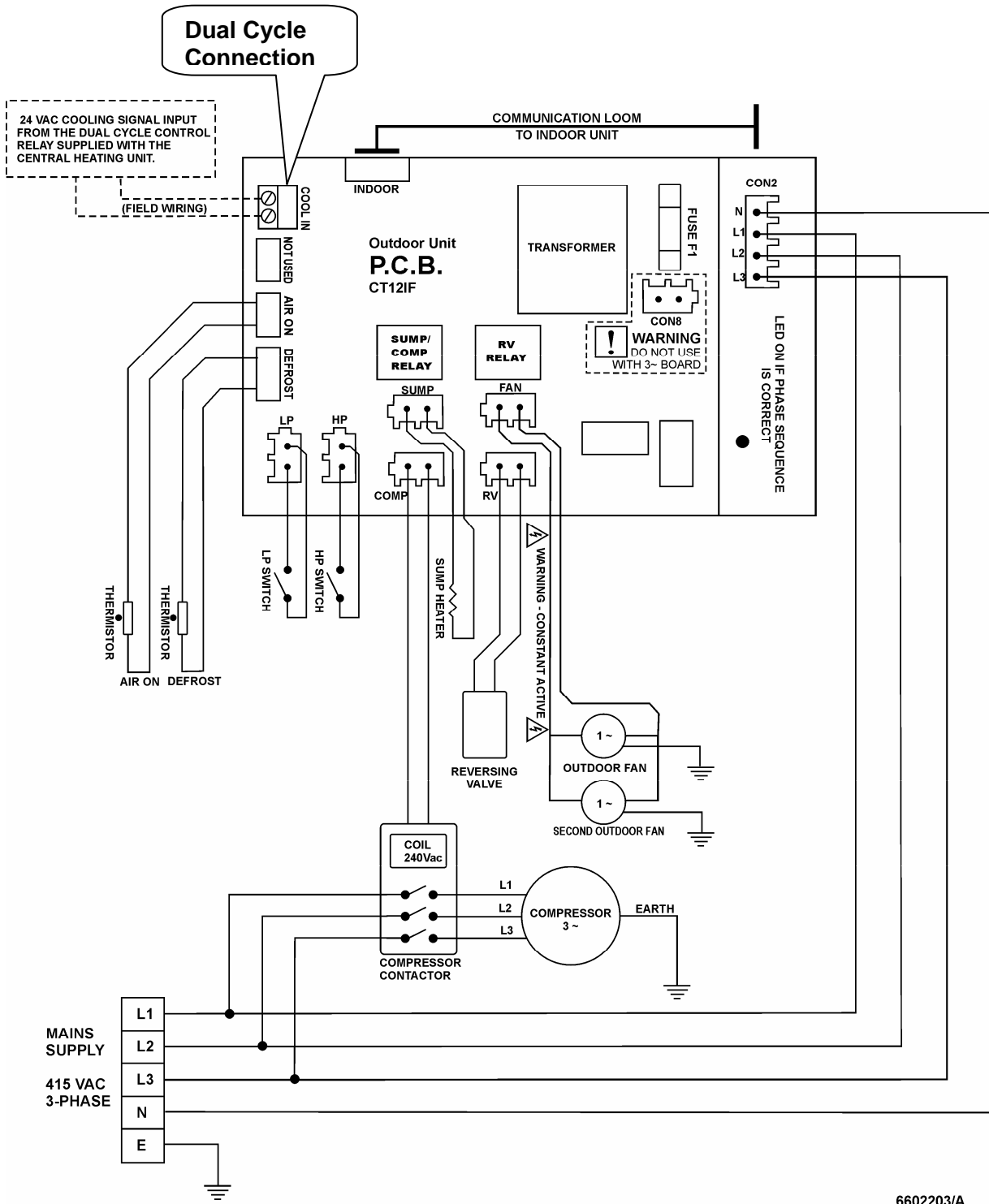
## WIRING DIAGRAM - SINGLE PHASE OUTDOOR UNIT





# Electrical

## WIRING DIAGRAM - 3 PHASE OUTDOOR UNIT



6602203/A



## Commissioning

### COMMISSIONING CHECK LIST

#### Site

- Return panels and covers to their correct position and check that they are well secured.
- Ensure all service caps are fitted and correctly tightened.
- Attach the electrical wires and pipes to the wall with clamps.
- Check all the operations of the air-conditioner. Follow the operating manual for instruction.

#### Indoor Coil

- Is the condensate drain fixed securely and has it been tested?
- Are all ducting connections secured and free from air leaks?

#### Outdoor Unit

- Check for any abnormal noise or vibrations during operation of the air conditioner.
- Check that the noise, condensate drainage or air flow does not disturb the neighbors.
- Run the dual cycle system for cooling and check operation.

#### Customer Handover

- Explain to the customer together with the operating instructions
- How to remove, clean and replace the filter
- How to turn the air-conditioner on and off.
- How to choose between heating and cooling and how to set the desired temperature.
- How to operate the air conditioner from the controller.
- Ensure the warranty details are completed correctly. The warranty section is found in the rear of the owner's manual.
- Ensure the model and serial number sticker is inserted in the warranty section of the owner's manual. The warranty section is found in the rear of the owner's manual.





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