

Air conditioner Installation Instruction

CAUTION R32 REFRIGERANT. This Air Conditioner contains and operates with refrigerant R32. THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL. Refer to National, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

MODEL NO. :- CU-4Z80, 5Z90TBE Series.

Required tools for Installation Works. Table with 2 columns: Tool name and Specification. Includes Phillips screw driver, Level gauge, Electric drill, etc.

Explanation of symbols displayed on the indoor unit or outdoor unit.

Warning symbols table. Includes WARNING (flammable refrigerant), CAUTION (read manual), CAUTION (service personnel), and CAUTION (information).

SAFETY PRECAUTIONS

- Read the following "SAFETY PRECAUTIONS" carefully before installation.
Electrical work must be installed by a licensed electrician.
The caution items stated here must be followed because these important contents are related to safety.

Warning and Caution symbols table. Explains the meaning of the warning and caution symbols.

Prohibited and Carried Out symbols table. Explains the meaning of the prohibited and carried out symbols.

- Carry out test running to confirm that no abnormality occurs after the installation. Then, explain to user the operation, care and maintenance as stated in instructions.

Main installation instructions table. Contains detailed steps for installation, including warnings, cautions, and specific instructions for piping, electrical work, and safety.

PRECAUTION FOR USING R32 REFRIGERANT

- Pay careful attention to the following precaution points and the installation work procedures.
WARNING: The appliance shall be stored, installed and operated in a well ventilated room with indoor floor area larger than A\_min (m^2) [refer Table A] and without any continuously operating ignition source.
The mixing of different refrigerants within a system is prohibited.
Ensure that foreign matter (oil, water, etc.) does not enter the piping.
Operation, maintenance, repairing and refrigerant recovery should be carried out by trained and certified personnel in the use of flammable refrigerants and as recommended by the manufacturer.

CAUTION

- 1. General: Must ensure the installation of pipe-work shall be kept to a minimum. Avoid use dented pipe and do not allow acute bending.
2. Servicing: Any qualified person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority.
2-1. Qualification of workers: Any qualified person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority.
2-2. Checks to the area: Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised.
2-3. Work procedure: Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour being present while the work is being performed.
2-4. General work area: All maintenance staff and others working in the local area shall be instructed and supervised on the nature of work being carried out.
2-5. Checking for presence of refrigerant: The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
2-6. Presence of fire extinguisher: If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available at hand.
2-7. No ignition sources: No person carrying out work in relation to a refrigerating system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
2-8. Ventilated area: Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.
2-9. Checks to the refrigerating equipment: Where electrical components are being changed, they shall be fit for the purpose and to the correct specification.
2-10. Checks to electrical devices: Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures.
3. Repairs to sealed components: During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc.
4. Repair to intrinsically safe components: Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
5. Cabling: Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.

- 6. Detection of flammable refrigerants: Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.
A halice torch (or any other detector using a naked flame) shall not be used.
The following leak detection methods are deemed acceptable for all refrigerant systems.
No leaks shall be detected when using detection equipment with a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure (>1.04 MPa, max 4.15 MPa) for example, a universal sniffer.
Electronic leak detectors may be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration.
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.
Leak detection fluids are also suitable for use with most refrigerants, for example, bubble method and fluorescent method agents.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

- 7. Removal and evacuation: When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used.
However, it is important that best practice is followed since flammability is a consideration, The following procedure shall be adhered to:
remove refrigerant -> purge the circuit with inert gas -> evacuate -> purge with inert gas -> open the circuit by cutting or brazing
The refrigerant charge shall be recovered into the correct recovery cylinders.
The system shall be purged with OFN to render the appliance safe.
Compressed air or oxygen shall not be used for this task.
Purging shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
This process shall be repeated until no refrigerant is within the system.
When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
This operation is absolutely vital if brazing operations on the pipe work are to take place.
Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and there is ventilation available.

- 8. Charging procedures: In addition to conventional charging procedures, the following requirements shall be followed.
Ensure that contamination of different refrigerants does not occur when using charging equipment.
Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
Cylinders shall be kept in an appropriate position according to the instructions.
Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
Label the system when charging is complete (if not already).
Extreme care shall be taken not to over fill the refrigerating system.
Prior to recharging the system it shall be pressure tested with OFN (refer to #7).
The system shall be leak tested on completion of charging but prior to commissioning.
A follow up leak test shall be carried out prior to leaving the site.
Electrostatic charge may accumulate and create a hazardous condition when charging and discharging the refrigerant.
To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before charging/discharging.

- 9. Decommissioning: Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details.
It is recommended good practice that all refrigerants are recovered safely.
Prior to the leak being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant.
It is essential that electrical power is available before the task is commenced.
a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that:
- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.
d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
Electrostatic charge may accumulate and create a hazardous condition when charging or discharging the refrigerant.
To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before charging/discharging.

- 10. Labelling: Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant.
The label shall be dated and signed.
Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.
11. Recovery: When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
Ensure that the correct number of cylinders for holding the total system charge are available.
All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.
Recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants.
In addition, a set of calibrated weighing scales shall be available and in good working order.
Hoses shall be complete with leak-free disconnect couplings and in good condition.
Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.
Consult manufacturer if in doubt.
The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.
Do not mix refrigerants in recovery units and especially not in cylinders.
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
The evacuation process shall be carried out prior to returning the compressor to the suppliers.
Only electric heating to the compressor body shall be employed to accelerate this process.
When oil is drained from a system, it shall be carried out safely.

ACCESSORIES SUPPLIED WITH OUTDOOR UNIT

Table with columns: Part name, Qty, Diagram, Application. Lists accessories like Heat pump-types only, Drain elbow, and Pipe size expander.

CUTTING AND FLARING THE PIPING

Diagram and instructions for cutting and flaring piping. Includes steps: 1. Please cut using pipe cutter and then remove the burrs. 2. Remove the burrs by using reamer. 3. Please make flare after inserting the flare nut onto the copper pipes. Includes a diagram showing the correct flaring technique and a warning about improper flaring.

# OUTDOOR UNIT

## 1 SELECT THE BEST LOCATION

- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.

Refrigerant piping size	
Outdoor Unit	CU-4Z80***
Liquid - side	ø 6.35 10.8
Gas - side	ø 9.52 10.8 (ø 12.7 10.8)

\* In case of indoor is CS-Z60\*\*\*, CS-Z71\*\*\*, CS-TZ60\*\*\*, CS-TZ71\*\*\*, CS-TE60\*\*\*, CS-E21\*\*\*, CS-RZ60\*\*\*, CS-RZ71\*\*\*, S-60\*\*\*, then ø12.7 10.8 gas-pipe size must be used together with CZ-MA2P (pipe size expander).

MODEL	Maximum Total Piping Length for Add. Gas (m)	Additional Refrigerant (g/m)	Max. Refrigerant Charge, m <sub>c</sub> (kg)	Wall Mounted Indoor A <sub>min</sub> (m <sup>2</sup> )	Mini Cassette Indoor A <sub>min</sub> (m <sup>2</sup> )	Ducted Indoor A <sub>min</sub> (m <sup>2</sup> )
CU-4Z80***	45	20	3.22	9.80	6.56	6.56
CU-5Z90***	45	20	3.42	11.06	7.40	7.40

(\*) Systems with total refrigerant charge, m<sub>c</sub>, lower than 1.84 kg are not subjected to any room area requirements.

- If total piping length of all indoor units exceed the maximum total length listed above, additionally charge with 20 g of refrigerant (R32) for each additional meter of piping.

$$A_{min} = (m_c / (2.5 \times (LFL)^{0.4} \times h_s))^{1.8}$$

\*\* not less than safety factor margin

A<sub>min</sub> = Required minimum room area, in m<sup>2</sup>

m<sub>c</sub> = Refrigerant charge in appliance, in kg

LFL = Lower flammability limit (0.307 kg/m<sup>3</sup>)

h<sub>s</sub> = Installation height of the appliance (1.8 m for wall mounted).

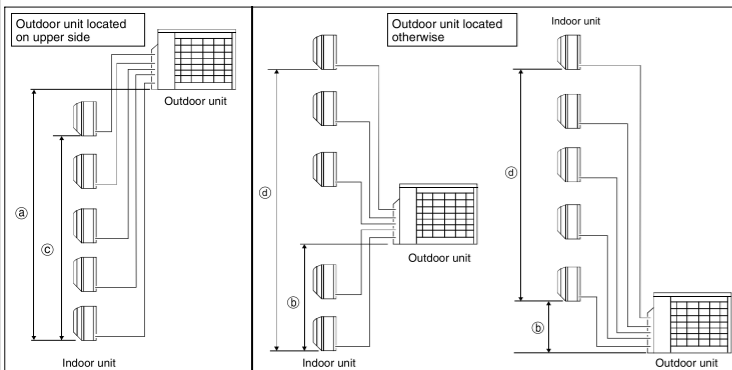
SF = Safety factor with a value of 0.75

\*\* The required minimum room area, A<sub>min</sub>, shall also be governed by the safety factor margin formula below:

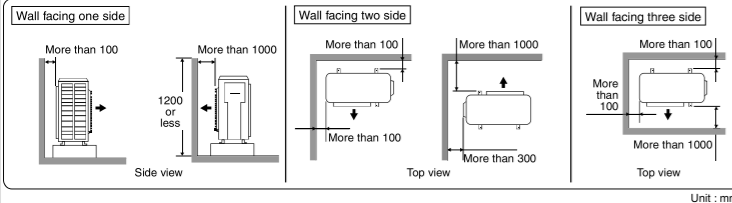
$$A_{min} = m_c / (SF \times LFL \times h_s)$$

The higher value shall be taken when determining the room area.

Allowable piping length		CU-4Z80***	CU-5Z90***
Outdoor Unit		3 m ~ 25 m	3 m ~ 25 m
Allowable piping length of each indoor unit (min. ~ max.)		70 m or less	80 m or less
Allowable total piping length of all indoor unit			
Height difference between indoor and outdoor unit	Outdoor unit located on upper side	15 m or less	15 m or less
	Outdoor unit located otherwise	7.5 m or less	7.5 m or less
Height difference between indoor unit	Outdoor unit located on upper side	7.5 m or less	7.5 m or less
	Outdoor unit located otherwise	15 m or less	15 m or less



- Outdoor unit installation guidelines
- Where a wall or other obstacle is in the path of outdoor unit's intake or exhaust airflow, follow the installation guidelines below.
- For any of the below installation patterns, the wall height on the exhaust side should be 1200 mm or less.



## 2 INSTALL THE OUTDOOR UNIT

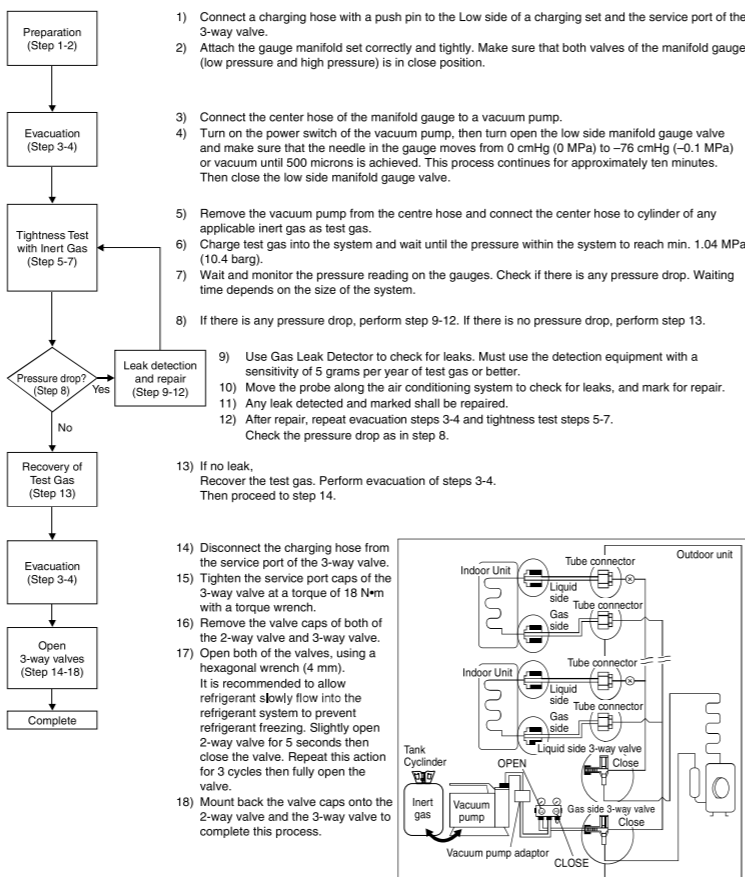
- After selecting the best location, start installation to Indoor/Outdoor Unit Installation Diagram.
- Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut (ø10 mm).
- When installing at roof, please consider strong wind and earthquake.
- Please fasten the installation stand firmly with bolt or nails.

Model	A	B	C	D
CU-4Z80***	620 mm	170 mm	20 mm	380.5 mm
CU-5Z90***				

## 4 AIR TIGHTNESS TEST ON THE REFRIGERATING SYSTEM

- Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.
- There is no extra refrigerant in the outdoor unit for air purging.

- Before system is charged with refrigerant and before the refrigerating system is put into operation, below site test procedure and acceptance criteria shall be verified by the certified technicians, and/or the installer.
- Be sure to check whole system for gas leakage.



- Notes: Recommended use of any of the following leak detector.
  - Universal Sniffer leak detector
  - Electronic halogen leak detector
  - Ultrasonic Leak Detector

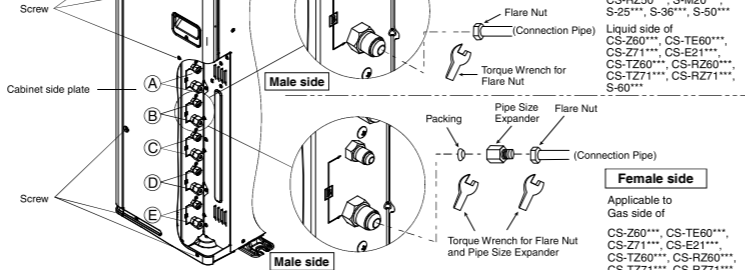
## 3 CONNECT THE PIPING

- Remove the cabinet side plate (metal) from the unit by loosening six screws.

Connecting the Piping to Outdoor Unit  
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (locate at valve) onto the copper pipe.  
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

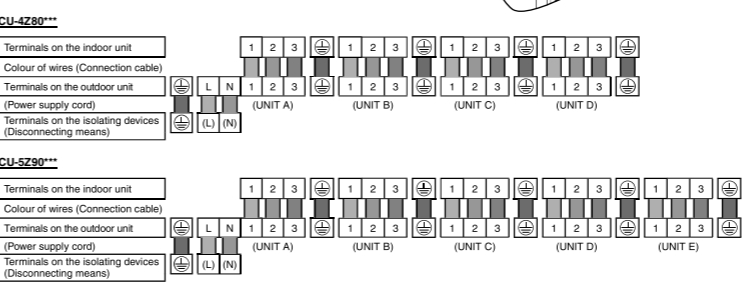
- Do not over tighten, overtightening may cause gas leakage.

Piping size	Torque
1/4" (6.35 mm)	[18 N•m (1.8 kgf•m)]
3/8" (9.52 mm)	[42 N•m (4.3 kgf•m)]
1/2" (12.7 mm)	[55 N•m (5.6 kgf•m)]
5/8" (15.88 mm)	[65 N•m (6.6 kgf•m)]
3/4" (19.05 mm)	[100 N•m (10.2 kgf•m)]



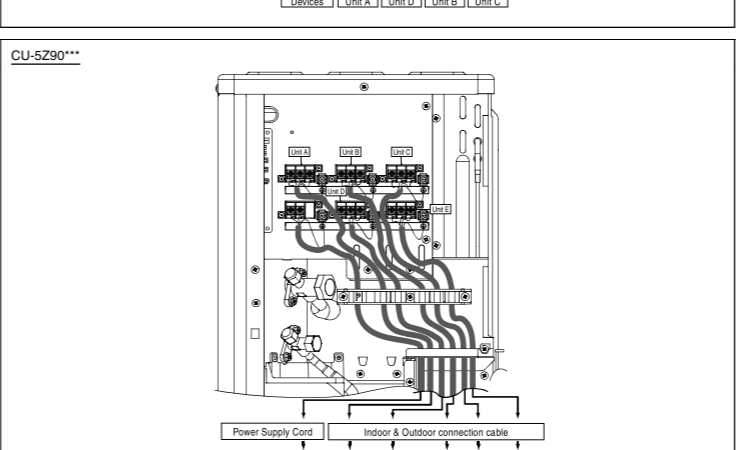
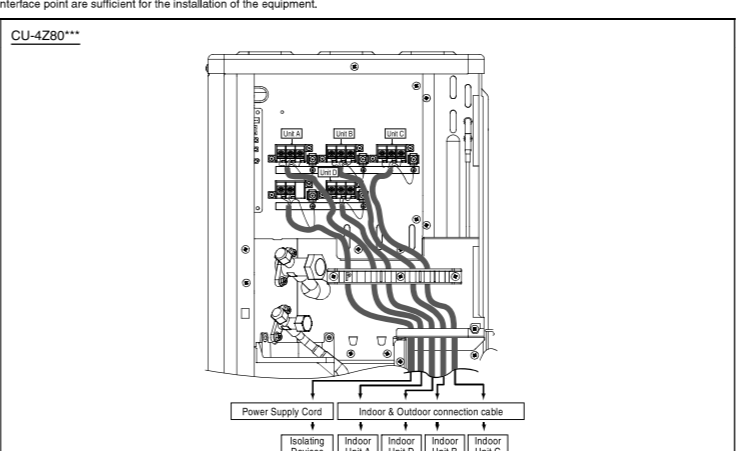
## 5 CONNECT THE CABLE TO THE OUTDOOR UNIT

- Remove the control board cover metal from the unit by loosening two screws.
- Cable connection to the power supply through isolating Devices (Disconnecting means).
  - Connect approved type polychloroprene sheathed power supply cord CU-4Z80\*\*\* (3 x 2.5 mm<sup>2</sup>), CU-5Z90\*\*\* (3 x 4.0 mm<sup>2</sup>) 60245 IEC 57 type designation or heavier cord to the terminal board, and connect the other end of the cord to Isolating Devices (Disconnecting means).
- Connection cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm<sup>2</sup> flexible cord, type designation 60245 IEC 57 or heavier cord. Allowable connection cable length of each indoor unit shall be 30 m or less.
- Connect the power supply cord and connecting cable between indoor unit and outdoor unit according to the diagram as shown.

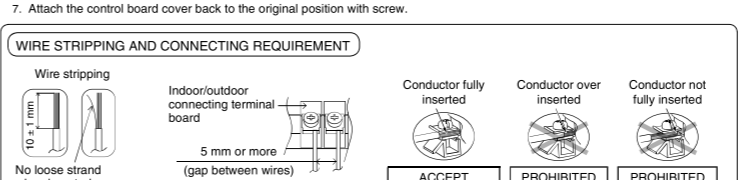


Remarks:  
It is the responsibility of the installer or user of the equipment to ensure, by consultation with the suitable distribution/supply network operator if necessary, that the equipment should be connected only to a supply with:  
- Short-circuit power S<sub>c</sub> ≥ 2750kW  
- Service current capacity ≥ 100A per phase

The equipment complies with IEC/EN 61000-3-11 and IEC/EN 61000-3-12. Please liaise with supply authority to ensure that the above items at the interface point are sufficient for the installation of the equipment.



- For wire stripping and connection requirement, refer to the diagram below.
- Secure the power supply cord and connecting cables onto the control board with the holder.
- Attach the control board cover back to the original position with screw.



- This equipment must be properly earthed.

- Note: Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires for safety reason.

## 6 HEAT INSULATION

- Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please wrap the insulated piping end to prevent water from going inside the piping.
- If drain hose or connecting piping is in the room (where dew may form), please increase the insulation by using POLY-E FOAM with thickness 6 mm or above.

Refrigerant tubing shall be protected against mechanical damage.	
CAUTION	Use a material with good heat-resistant properties as the heat insulation for the pipes. Be sure to insulate both the gas-side and liquid-side pipes. If the pipes are not adequately insulated, condensation or water leakages may occur.
Liquid-side pipes	Material shall withstand 120 °C or higher
Gas-side pipes	

### DISPOSAL OF OUTDOOR UNIT DRAIN WATER

- If a drain elbow is used, the unit should be placed on a stand which is taller than 5 cm.
- If the unit is used in an area where temperature falls below 0 °C for 2 or 3 days in succession, it is recommended not to use a drain elbow, for the drain water freezes and the fan will not rotate.

Install the hose at an angle so that the water smoothly flows out.

### PUMP DOWN OPERATION

- Operate the pump down according to the following procedures.
    - Confirm the valve on the liquid side and gas side is open.
    - Press PUMP DOWN switch (SW1) on the display printed circuit board for more than 5 seconds. Pump down (cooling) operation is performed for 15 minutes.
    - Set the liquid side 3 way valve to close position and wait until the pressure gauge indicates 0.01 MPa (0.1 kg/cm<sup>2</sup>G).
    - Immediately set the gas side valve to close position and then press the PUMP DOWN switch (SW1) to stop the pump down operation.
- Note: Pump down operation will stop automatically after 15 minutes if PUMP DOWN switch (SW1) is not pressed again. Pump down operation is not started within 3 minutes after compressor is stopped.

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