## **Panasonic**

## Air conditioner Installation Instruction



This Air Conditioner contains and

THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

## Required tools for Installation Works

Phillips screw driver

2 Level gauge 3 Electric drill, hole core drill (ø70 mm)

14 Torque wrench 18 N•m (1.8 kgf•m) 42 N•m (4.3 kgf•m) 55 N•m (5.6 kgf•m) 65 N•m (6.6 kgf•m) Hexagonal wrench (4 mm) Pipe cutter

00 Nem (10.2 kgfem 8 Knife 15 Vacuum pump

Gas leak detector 16 Gauge manifold 10 Measuring tape 11 Thermometer

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

WARNING
This symbol shows that this equipment uses a flammable refrigerant. If the refrigerant is leaked, together with an external ignition source, there is a possibility of ignition. CAUTION This symbol shows that the Installation Manual should be read carefully.

This symbol shows that a service personnel should be handling this equipment with reference to the Installation Manual. This symbol shows that there is information included in the Operation Manual and/or Installation Manual.

## SAFETY PRECAUTIONS

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Read the following "SAFETY PRECAUTIONS" carefully before installation.
 Electrical work must be installed by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model to be installed.
 The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

CAUTION

i CAUTION

MODEL NO. :

CU-4Z80, 5Z90TBE Series

⚠ WARNING This indication shows the possibility of causing death or serious injury. ↑ CAUTION This indication shows the possibility of causing injury or damage to properties only. The items to be followed are classified by the symbols: Symbol with white background denotes item that is PROHIBITED. 0

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 Please remind the customer to keep the operating instructions for future reference.

## ♠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. Any unfit method or using incompatible mater may cause product damage, burst and serious injury.

Do not install outdoor unit near handrail of veranda. When installing air-conditioner unit on veranda of a high rise building, child may climb up to outdoor unit and crosover the handrail causing an accident. on on use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Po

contact, poor insulation or over current will cause electrical shock or fire. Do not tie up the power supply cord into a bundle by band. Abnormal temperature rise on power supply cord may happen

Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.

Symbol with dark background denotes item that must be carried out.

Do not sit or step on the unit, you may fall down accidentally.

Keep plastic bag (packaging material) away from small children, it may cling to nose and mouth and prevent breathing. 🏻 🏟

Vhen installing or relocating air conditioner, do not let any substance other than the specified refrigerant, eg. air etc mix into refrigeration cycle (piping) fixing of air etc. will cause abnormal high pressure in refrigeration cycle and result in explosion, injury etc.

Do not pierce or burn as the appliance is pressurized. Do not expose the appliance to heat, flame, sparks, or other sources of ignition Else, it may explode and cause injury or death.

Do not add or replace refrigerant other than specified type, It may cause product damage, burst and injury etc.

• For R32/R410A model, use piping, flare nut and tools which is specified for R32/R410A refrigerant. Using of existing (R22) piping, flare nut and tools may caus abnormally high pressure in the refrigerant cycle (piping), and possibly result in explosion and injury.
For R32 and R410A, the same flare nut on the outdoor unit side and pipe can be used.

Since the working pressure for R32/R410A is higher than that of refrigerant R22 model, replacing conventional piping and flare nuts on the outdoor unit side are

recommended.

If reuse piping is unavoidable, refer to instruction "IN CASE OF REUSING EXISTING REFRIGERANT PIPING"

Thickness of copper pipes used with R32/R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm. It is desirable that the amount of residual oil less than 40 mg/10 m.

ngage authorized dealer or specialist for installation. If installation done by the user is incorrect, it will cause water leakage, electrical shock or fire.

For refrigeration system work, Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.

lse the attached accessories parts and specified parts for installation. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.

Install at a strong and firm location which is able to withstand weight of the set. If the strength is not enough or installation is not properly done, the set will drop and

or electrical work, follow the national regulation, legistration and this installation instructions. An independent circuit and single outlet must be used. If electrical circuit apacity is not enough or defect found in the electrical work, it will cause electrical shock or fire. onct use joint cable for indoor / outdoor connection cable. Use the specified indoor/outdoor connection cable, refer to instruction (5) CONNECT THE CABLE TO THE ect tightly for indoor/outdoor connection. Clamp the cable so that no external force will have impact on the terminal. If cor

not perfect, it will cause heat up or fire at the connection. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause fire or electrical shock.

his equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD), with sensitivity of 30 mA at 1 sec or Jess. Otherwise, it may cause ejectrical shock and fire in case of equipment breakdown or insulation breakdown. uring installation, install the refrigerant piping properly before running the compressor. Operation of compressor without fixing refrigeration piping and valves at opened ostition will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.

ouring pump down operation, stop the compressor before removing the refrigeration piping. Removal of refrigeration piping while compressor is operating and valves re opened will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc. ighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigeran

as leakage.

After completion of installation, confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.

Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when the refrigerant contacts with fire.

Be aware that refrigerants may not contain an odour.

This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electrical shock in case of equipment breakdown or insulation breakdown.

## ⚠ CAUTION

O Do not install the unit in a place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire. Prevent liquid or vapor from entering sumps or sewers since vapor is heavier than air and may form suffocating atmospheres.

Do not release refrigerant during piping work for installation, re-installation and during repairing refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.

Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.

Do not touch the sharp aluminium fin, sharp parts may cause injury.

(1) Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.

elect an installation location which is easy for maintenance.

correct installation, service or repair of this air conditioner may increase the risk of rupture and this may result in loss damage or injury and/or property.

Power supply connection to the room air conditioner.

Use power supply connection to the room air conditioner.

Use power supply connection to the room air conditioner.

Connect the power supply cond CU-4280\*\*\* (3 x 2.5 mm²), CU-5290\*\*\* (3 x 4.0 mm²) type designation 60245 IEC 57 or heavier cord.

Connect the power supply cond to the air conditioner to the mains using one of the following method.

Power supply point should be in easily accessible place for power disconnection in case of emergency.

In some countries, permanent connection of this air conditioner to the power supply is prohibited.

1) Power supply connection to the receptacle using power plug.

Use an approved 20 A (CU-4280\*\*\*), 25 A (CU-5290\*\*\*) power plug with earth pin for the connection to the socket.

2) Power supply connection to a circuit breaker for the permanent connection.

Use an approved 20 A (CU-4280\*\*\*), 25 A (CU-5290\*\*\*) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact and.

Installation work.
It may need two people to carry out the installation work.

Reep any required ventilation openings clear of obstruction

## PRECAUTION FOR USING R32 REFRIGERANT

· Pay careful attention to the following precaution points and the installation work procedures

The appliance shall be stored, installed and operated in a well ventilated room with indoor floor area larger than A<sub>min</sub> (m²) [refer Table A] and without any continuously operating ignition source. Keep away from open flames, any operating gas appliances or any operating electric heater. Else, it may explode and cause injury or death

e mixing of different refrigerants within a system is prohibited. Models that use refrigerant R32 and R410A have a different charging port thread diameter to proneous charging with refrigerant R22 and for safety.

erefore, check beforehand. [The charging port thread diameter for R32 and R410A is 12.7 mm (1/2 inch).] Ensure that foreign matter (oil, water, etc.) does not enter the piping.

Also, when storing the piping, securely seal the opening by pinching, taping, etc. (Handling of R32 is similar to R410A.)

naintenance, repairing and refrigerant recovery should be carried out by trained and certified personnel in the use of flammable refrigerants and as ed by the manufacturer. Any personnel conducting an operation, servicing or maintenance on a system or associated parts of the equipment should be ained and certified

Any part of refrigerating circuit (evaporators, air coolers, AHU, condensers or liquid receivers) or piping should not be located in the proximity of heat sources, open flames, operating gas appliance or an operating electric heater.

The user/owner or their authorized representative shall regularly check the alarms, mechanical ventilation and detectors, at least once a year, where as required by national regulations, to ensure their correct functioning.

A logbook shall be maintained. The results of these checks shall be recorded in the logbook.

In case of ventilations in occupied spaces shall be checked to confirm no obs efore a new refrigerating system is put into service, the person responsible for placing the system in operation should ensure that trained and certified operating ersonnel are instructed on the basis of the instruction manual about the construction, supervision, operation and maintenance of the refrigerating system, as well as he safety measures to be observed, and the properties and handling of the refrigerant used.

The general requirement of trained and certified personnel are indicated as below:

a) Knowledge of legislation, regulations and standards relating to flammable refrigerants; and,

b) Detailed knowledge of and skills in handling flammable refrigerants, personal protective equipment, refrigerant leakage prevention, handling of cylinders, charging, leak detection, recovery and disposal; and,

c) Able to understand and to apply in practice the requirements in the national legislation, regulations and Standards; and,

Continuously undergo regular and further training to maintain this expertise.

Air-conditioner piping in the occupied space shall be installed in such a way to protect against accidental damage in operation and service.

Precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping.

nsure protection devices, refrigerating piping and fittings are well protected against adverse environmental effects (such as the danger of water collecting and sezing in relief pipes or the accumulation of dirt and debris).

pansion and contraction of long runs piping in refrigerating systems shall be designed and installed securely (mounted and guarded) to minimize the likelihood traulic shock damaging the system. a

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To ensure no leaking, field-made refrigerant joints indoors shall be tightness tested. The test method shall have 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). No leak shall be detected.

### ⚠ CAUTION

General
 Must ensure the installation of pipe-work shall be kept to a minimum. Avoid use dented pipe and do not allow acute bending.
 Must ensure that pipe-work shall be protected from physical damage.
 Must comply with national gas regulations, state municipal rules and legislation. Notify relevant authorities in accordance with all applicable regulations.
 Must ensure mechanical connections be accessible for maintenance purposes.

Must ensure mechanical connections be accessible for maintenance purposes. In cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction. When disposal of the product, do follow to the precautions in #11 and comply with national regulations. In case of field charge, the effect on refrigerant charge caused by the different pipe length has to be quantified, measured and labelled. Always contact to local municipal offices for proper handling. Ensure the actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed. Ensure refrigerant charge not to leak. Wear appropriate protective equipment, including respiratory protection, as conditions warrant.

Keep all sources of ignition and hot metal surfaces away

## Servicing

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, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.
 Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
 Servicing shall be performed only as recommended by the manufacturer.
 The system is inspected, regularly supervised and maintained by a trained and certified service personnel who is employed by the person user or party responsible.

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. For repair to the refrigerating system, the precautions in #2-3 to #2-7 must be followed before conducting work on the system.

(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

uce staff and others working in the local area shall be instructed and supervised on the nature of work being carried out Avoid working in confined spaces. Always ensure away from source, at least 2 meter of safety distance, or zoning of free space area of at least 2 meter in radius.

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 atmosphere Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non sparking, adequately sealed or intrinsically safe. In case of leakage/spillage happened, immediately ventilate area and stay upwind and away from spill/bready from the sparking and the sparking to the case of leakage/spillage happened, do notify persons down wind of the leaking/spill, isolate immediate hazard area and keep unauthorized personnel out.

2-6. Presence of fire extinguisher • If any hot work is to be c

cted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available at hand.

Have a dry powder or CO<sub>2</sub> fire extinguisher adjacent to the charging area

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, He/She must not be smoking when carrying out such work.

 All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.

 Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.

(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.
 A degree of ventilation shall continue during the period that the work is carried out.
 The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere. (2-9. Checks to the refrigerating equipment)

9. Checks to the refrigerating equipment)
Where electrical components are being changed, they shall be fit for the purpose and to the correct specification.
At all times the manufacturer's maintenance and service guidelines shall be followed.
If in doubt consult the manufacturer's technical department for assistance.
The following checks shall be applied to installations using filammable refrigerants.
- The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- Marking to the equipment continues to be visible and legible. Markings and signs that are lllegible shall be corrected.
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are properly protected against being so corroded.

Repair and maintenance to electrical components shall include initial safety checks and component in nitial safety checks shall include but not limit to: That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking. That there is no live electrical components and wiring are exposed while charging, recovering or pu

ering or purging the system. - That there is no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of earth bonding.
At all times the manufacturer's maintenance and service guidelines shall be followed.
If in doubt consult the manufacturer's technical department for assistance.
If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
The owner of the equipment must be informed or reported so all parties are advised thereinafter.

Repairs to sealed components

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Hepairs to sealed components. All electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warm of a potentially hazardous situation. Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of

glands, etc.

Ensure that apparatus is mounted securely.

The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment.

Intrinsically safe components do not have to be isolated prior to working on them.

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 pe
the equipment in use. ically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
 Replace components only with parts specified by the manufacturer. Unspecified parts by manufacturer may result ignition of refrigerant in the atmosphere from a leak.

 5. Cabling
 6. Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.
 The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans. 0

Detection of flammable refrigerants

• Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.

• A halide 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.

(Detection equipment shall be calibrated in a refrigerant-free area.)

• Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.

• 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. The use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

• If a leaking 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. The precautions in #7 must be followed to remove the refrigerant.

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. (remark: OFN = oxygen free nitrogen, type of inert gas)
 This process may need to be repeated several times.

Inis process may need to be repeated several times.
 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

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and there is Vermanon available.
 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.

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 task being carried out, an oil and refrigerant sare recovered safely.

Prior to the task 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.

g) Start the recovery machine and operate companies that procedure ensure that:

h) Do not over fill cylinders. (No more than

f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with instructions.
h) Do not over fill cylinders. (No more than 80 % obutme liquid charge).
l) Do not exceed the maximum working pressure of the cylinder, even temporarily.
l) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

 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

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.

Equipment shall be labelled stating that it has been de-commissioned and emotied of refrigerant.

Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

Necovery

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).

Oylinders shall be complete with pressure relief valve and associated shall off system is 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 tammable 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.

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.

ACCESSORIES SUPPLIED WITH OUTDOOR UNIT The following parts are supplied as accessories with each outdoor unit.

When oil is drained from a system, it shall be carried out safely

Check that all a	ccessory parts are	present before inst	talling the outdoor ur
	Heat pump	-types only	
Part name	Q'ty	Diagram	Application
Drain elbow	1	<b>9</b>	For connecting the drain pipe

Pipe size expander (CZ-MA2P) for CS-Z60\*\*\*, CS-Z71\*\*\*, CS-TZ60\*\*\*, CS-TZ71\*\*\*, CS-TZ60\*\*\*, CS-E21\*\*\*, CS-RZ60\*\*\*, CS-RZ71\*\*\*, S-60\*\*\* (Not included in product)

## **CUTTING AND FLARING THE PIPING**

Please cut using pipe cutter and then remove the burrs. Remove the burrs by using reamer. If burrs is not removed, gas leak Turn the piping end down to avoid the metal powder entering the pip Please make flare after inserting the flare nut onto the copper pipes.





Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.





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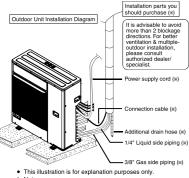
## **SELECT THE BEST LOCATION**

☐ If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the ser is not obstructed.

- There should not be any animal or plant which could be ☐ 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,
- Do not place any obstacles which may cause a short

F	Refrigerant piping size									
Outdoor Unit	CU-4Z80***	CU-5Z90***								
Liquid - side	ø 6.35 t0.8	ø 6.35 t0.8								
Gas - side	ø 9.52 t0.8 *(ø 12.7 t0.8)	ø 9.52 t0.8 *(ø 12.7 t0.8)								

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 t0.8 gas-pipe size must be used together with CZ-MA2P (pipe size expander)



## Table A

MODEL	Maximum Total Piping Length for Add. Gas (m)	Additional Refrigerant (g/m)	Max. Refrigerant Charge, m <sub>C</sub> (kg)		Mini Casette Indoor A <sub>min</sub> (m²)	Ducted Indoo A <sub>min</sub> (m²)
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,  $m_c$ , 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.

 $A_{\text{min}} = (m_{\text{C}} / (2.5 \times (LFL)^{(54)} \times h_0))^2$  \*\* not less than safety factor margin

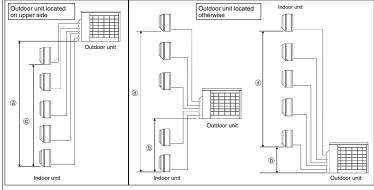
- A<sub>min</sub> = Required minimum room area, in m<sup>2</sup>
- = Refrigerant charge in appliance, in kg
- $\begin{array}{ll} \textit{m}_{\text{o}} & = \text{Refrigerant charge in appliance, in } n_{\text{b}} \\ \textit{LFL} & = \text{Lower flammability limit (0.307 kg/m^3)} \\ \textit{n}_{\text{o}} & = \text{Installation height of the appliance (1.8 m for wall mounted).} \\ & (2.2 \text{ m for Mini Casette a}) \end{array}$
- SF = Safety factor with a value of 0.75

  The required minimum care. The required minimum room area,  $A_{min}$ , shall also be governed by the safety factor margin formula below:

## $A_{\min} = m_{c} / (SF \times LFL \times h_{o})$

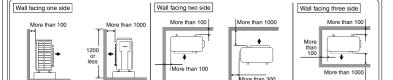
The higher value shall be taken when determining the room area.

	Allowable piping length				
Outdoor Unit			CU-4Z80***	CU-5Z90***	
Allowable piping length of each indoor unit (min. ~ m	ax.)		3 m ~ 25 m	3 m ~ 25 m	
Allowable total piping length of all indoor unit			70 m or less	80 m or less	
Height difference between indoor and outdoor unit	Outdoor unit located on upper side	(a)	15 m or less	15 m or less	
Height difference between indoor and outdoor unit	Outdoor unit located otherwise	(b)	7.5 m or less	7.5 m or less	
Lloight difference between index unit	Outdoor unit located on upper side	©	7.5 m or less	7.5 m or less	
Height difference between indoor unit	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 pattern ns. the wall height on the exhaust side should be 1200 mm or less



Top view

# 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 (o10 mm).

  When installing at roof, please consider strong wind and earthquake.

  Please lasten the installation stand firmly with bolt or nails.

ease fasten the installation stand	firmly
A B O	- _
	-

Model	Α	В	С	D	
CU-4Z80° CU-5Z90	 620 mm	170 mm	20 mm	380.5 mm	

Top view

## AIR PURGING METHOD IS PROHIBITED FOR R32 SYSTEM

## AIR TIGHTNESS TEST ON THE REFRIGERATING SYSTEM

O 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 installe
- Be sure to check whole system for gas leakage.

Preparation (Step 1-2)

Evacuation (Step 3-4)

- 1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of the
- Control a Granging and Section 23 way valve.

  Attach the gauge manifold set correctly and tightly. Make sure that both valves of the manifold gauge (low pressure and high pressure) is in close position.
- 3) Connect the center hose of the manifold gauge to a vacuum pump.
  4) Turn on the power switch of the vacuum pump, then turn open the low side manifold gauge valve and make sure that the needle in the gauge moves from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa) or vacuum until 500 micron is achieved. This process continues for approximately ten minutes. Then close the low side manifold gauge valve.
- Remove the vacuum pump from the centre hose and connect the center hose to cylinder of any applicable inert gas as test gas.

  Charge test gas into the system and wait until the pressure within the system to reach min. 1.04 MPa Tightness Tes with Inert Gas (Step 5-7)

  - Wait and monitor the pressure reading on the gauges. Check if there is any pressure drop. Waiting time depends on the size of the system.
  - 8) If there is any pressure drop, perform step 9-12. If there is no pressure drop, perform step 13.



- 9) Use Gas Leak Detector to check for leaks. Must use the detection equipment with a sensitivity of 5 grams per year of test gas or better.

  10) Move the probe along the air conditioning system to check for leaks, and mark for repair.
- 11) Any leak detected and marked shall be repaired.
- 12) After repair, repeat evacuation steps 3-4 and tightness test steps 5-7. Check the pressure drop as in step 8.

ver the test gas. Perform evacuation of steps 3-4.

Recovery of Test Gas (Step 13)

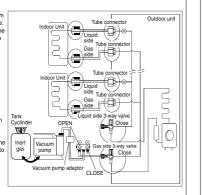
3-way valves (Step 14-18)

Disconnect the charging hose from the service port of the 3-way valve.

15) Tighten the service port caps of the 3-way valve at a torque of 18 N•m with a torque wrench. ove the valve cans of both of Open

16) Remove the valve caps of both of the 2-way valve and 3-way valve. 17) Open both of the valves, using a hexagonal wrench (4 mm), It is recommended to allow refrigerant slowly flow into the refrigerant system to prevent refrigerant freezing. Slightly open 2-way valve for 5 seconds then close the valve. Repeat this action for 3 cycles then fully open the valve.

18) Mount back the valve caps onto the 2-way valve and the 3-way valve to complete this process.



## Recommended use of any of the following leak detector.

- Universal Sniffer leak detector

# **CONNECT THE PIPING**

ove the cabinet side plate (metal) from the unit by ening six screws.

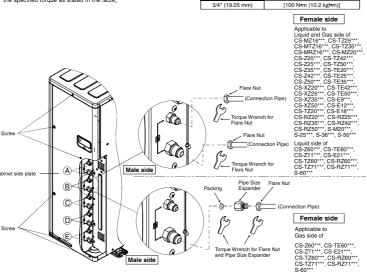
Connecting the Piping to Outdoor Unit

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.

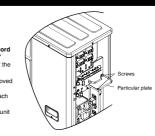
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

Do not over tighten, or	vertightening 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)]
2/4" (10.05 mm)	[100 Nem (10.2 kdfem)]



## **CONNECT THE CABLE TO THE OUTDOOR UNIT**

- 2. 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 mm²), CU-5Z90\*\*\* (3 x 4.0 mm²) 60245 IEC 57 type designation or heavier cord to the terminal board, and connect the others end of the cord to Isolating Devices (Disco
- Connection cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm² 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.



## CU-4Z80\*\*\* ur of wires (Connection cable) ninals on the outdoor unit L N olour of wires (Connection cat

CU-5Z90\*\*\*

Terminals on the indoor unit				1	2	3		1	2	3		1	2	3		1	2	3		1	2	3	
Colour of wires (Connection cable)											Ш	Ш	Ш		П	Ш			Ш	Ш	Ш		
Terminals on the outdoor unit		L	Ν	1	2	3	1	1	2	3	<b>(4)</b>	1	2	3	<b>(4)</b>	1	2	3	(4)	1	2	3	<b>(4)</b>
(Power supply cord)	П			(U	NIT.	A)		(L	INIT	B)		(L	JNIT (	C)		(U	INIT	D)		(L	INIT E	Ξ)	
Terminals on the isolating devices (Disconnecting means)		(L)	(N)																				

CU-5Z90\*\*\*

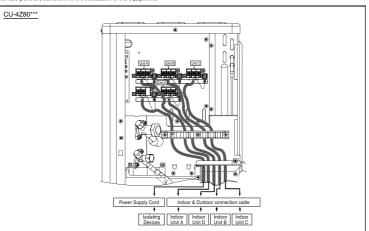
nematars.

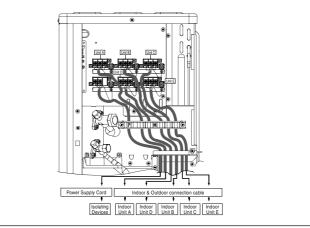
It is the responsibility of the installer or user of the equipment to ensure, by consultation with the suitable distribution/supply network operator if necessary, that the equipment should be connected only to a supply with,

Short-circuit power Ssc 2 2750kW

Service current capacity 2 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.





- 5. For wire stripping and connection requirement, refer to the diagram below.
- 6. 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

## WIRE STRIPPING AND CONNECTING REQUIREMENT Wire stripping No loose strand when inserted (gap between wires)

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

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

### DISPOSAL OF OUTDOOR UNIT DRAIN WATER

- . If a drain elbow is used, the unit should be placed on a stand which is
- 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.

## PLIMP DOWN OPERATION

♠ CAUTION

- 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.

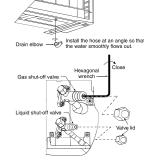
for 15 minutes.

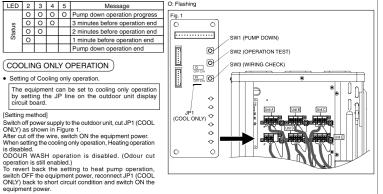
3. Set the liquid side 3 way valve to close position and wait until the pressure gauge indicates 0.01 MPa (0.1 kg/cm²G).

4. Immediate 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.





## WIRING ERROR CHECK

COOLING ONLY OPERATION

Setting of Cooling only operation.

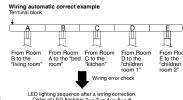
[Setting method]

This product is capable of correcting the wiring error automatically

- Confirm the valve on the liquid side and gas side is open. Press WIRING CHECK switch (SW3) on the display printed circuit board for more than 10 seconds to start wiring check
- operation.

  Wining shock process will complete in approximately 20-25 minutes. However, wining check operation will not start within 3 minutes after compressor is stopped. When outdoor air temperature is less than 5 °C or unit has abnormality, wiring check will not start. (See NOTE 2)

The LED 2 to 6 in display printed circuit board inside the outdoor unit indicate whether correction is possible or not and the status of the correction, as shown in the table below.



LED	2	3	4	5	6	Message		
Room	Α	В	С	D E				
			All fla	shing	Automatic correction impossible			
SI .	LED 2	4, 6 an	d LED 3,	5 altern	Wiring check in progress			
Status		Flash	ning one	after an	other	Automatic correction completed		
٠,			Other tha	an above	Unit has abnormality (Note 4)			

If automatic correct is impossible, check the indoor unit wiring and piping manually.

- 1. For two rooms, LED 4, 5 and 6 are not illuminated, for three rooms, LED 5 and 6 are not illuminated and for four rooms, LED 6 is not illuminated after wiring operation complete.
  2. If the outdoor air temperature is less than 5 °C or unit has abnormality, wiring operation will not start.
  3. After wiring check operation is complete, LED indication will illuminate until normal operation starts.
  4. Follow the product diagnosis procedure, (Check the diagnostic label at the cabinet side plate.)
  5. When LED 1 only illuminate, indicates that outdoor unit is operating normally.

## IN CASE OF REUSING EXISTING REFRIGERANT PIPING

- Observe the followings to decide reusing the existing refrigerant piping.

  Poor refrigerant piping could result in product failure.

  In the circumstances listed below, do not reuse any refrigerant piping. Instead, make sure to install a new piping.
  Heat insulation is not provided for either liquid-side or gas-side piping or both.

  The existing refrigerant pipe has been left in an open condition.
  The diameter and thickness of the existing refrigerant piping does not meet the requirement.
  The piping length and elevation does not meet the requirement.
  Perform proper pump down before reuse piping.

  In the circumstances listed below, clean it thoroughly before reuse.

- Pump down operation cannot be performed for the existing air-conditioner The compressor has a failure history.
- Oil color is darken. ( ASTM 4.0 and above ).

On coor is darken. (ASI in 4.0 and above).
 The existing air-conditioner is gas/oil heat pump type.
 Do not reuse the flare to prevent gas leak. Make sure to install a new flare.
 If there is a welded part on the existing refrigerant piping, conduct a gas leak check on the welded part.
 Replace deteriorated heat insulating material with a new one.
 Heat insulating material is required for both liquid-side and gas-side piping.

Mistake in wiring
Reliable connection of the grand wire
Looseness in terminal screw
Grounding/Earth connection

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