LG
Life's Good

INSTALLATION MANUAL

AIR CONDITIONER

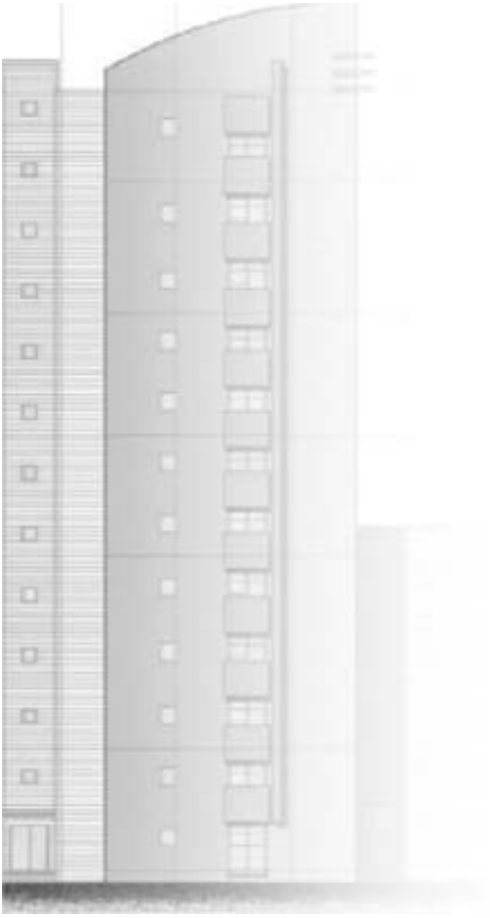
- Please read this installation manual completely before installing the product.
- Installation work must be performed in accordance with the national wiring standards by authorized personnel only.
- Please retain this installation manual for future reference after reading it thoroughly.

TYPE : MULTI V SPACE III

P/NO : MFL62405702

www.lg.com

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Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠WARNING	This symbol indicates the possibility of death or serious injury.
⚠CAUTION	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

⃠	**Be sure not to do.**
❗	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

- If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.

Ask the dealer or an authorized technician to install the air conditioner.

- Improper installation by the user may result in water leakage, electric shock, or fire.

Always ground the product.

- There is risk of fire or electric shock.

Always intstall a dedicated circuit and breaker.

- Improper wiring or installation may cause fire or electric shock.

For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

- There is risk of fire, electric shock, explosion, or injury.

Do not install, remove, or re-install the unit by yourself (customer).

- There is risk of fire, electric shock, explosion, or injury.

Do not store or use flammable gas or combustibles near the air conditioner.

- There is risk of fire or failure of product.

Use the correctly rated breaker or fuse.

- There is risk of fire or electric shock.

Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.

- Improper installation may cause the unit to topple and result in injury.

Do not install the product on a defective installation stand.

- It may cause injury, accident, or damage to the product.

When installing and moving the air conditioner to another site, do not charge it with a differnet refrigerant from the refrigerant specified on the unit.

- If a differnet refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be gamaged.

Do not reconstruct to change the settings of the protection devices.

- If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.

Ventilate before operating air conditioner when gas goes out.

- It may cause explosion, fire, and burn.

Securely install the cover of control box and the panel.

- If the cover and panel are installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.

If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.

- Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, harzards due to lack of oxygen in the room could result.

■ Operation

Do not damage or use an unspecified power cord.

- There is risk of fire, electric shock, explosion, or injury.

Use a dedicated outlet for this appliance.

- There is risk of fire or electrical shock.

Be cautious that water could not enter the product.

- There is risk of fire, electric shock, or product damage.

Do not touch the power switch with wet hands.

- There is risk of fire, electric shock, explosion, or injury.

When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

- It may cause injury.

Take care to ensure that nobody could step on or fall onto the outdoor unit.

- This could result in personal injury and product damage.

Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

- There is risk of physical injury, electric shock, or product failure.

⚠CAUTION

■ Installation

Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.

Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

- It may cause a problem for your neighbors.

Keep level even when installing the product.

- To avoid vibration or water leakage.

Do not install the unit where combustible gas may leak.

- If the gas leaks and accumulates around the unit, an explosion may result.

Use power cables of sufficient current carrying capacity and rating.

- Cables that are too small may leak, generate heat, and cause a fire.

Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

- There is risk of damage or loss of property.

Keep the unit away from children. The heat exchanger is very sharp.

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.

When installting the unit in a hospital, communication station, or similar place, provide surfficient protection against noise.

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.

Do not install the product where it will be exposed to sea wind (salt spray) directly.

- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

■ Operation

Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.

Do not block the inlet or outlet.

- It may cause failure of appliance or accident.

Make the connections securely so that the outside force of the cable is not applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.

Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.

Do not operate with "System louver" closed.

- It may cause failure of appliance or accident.

Be very careful about product transportation.

- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the Outdoor Unit, suspending it at the specified positions on the unit base. Also support the Outdoor Unit at four points so that it cannot slip sideways.

Safely dispose of the packing materials.

- Packing materials, such as mails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children will not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

Turn on the power at least 6 hours before starting operation.

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

Do not touch any of the refrigerant piping during and after operation.

- It can cause a burn or frostbite.

Do not operate the air conditioner with the panels and guards removed.

- Rotating, hot, or high-voltage parts can cause injuries.

Do not directly turn off the main power switch after stopping operation.

- Wait at least more than 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.

Auto-addressing should be done in condition of connecting the power of all indoor and outdoour units. Auto-addressing should also be done in case of changing the Indoor Unit board(PCB).

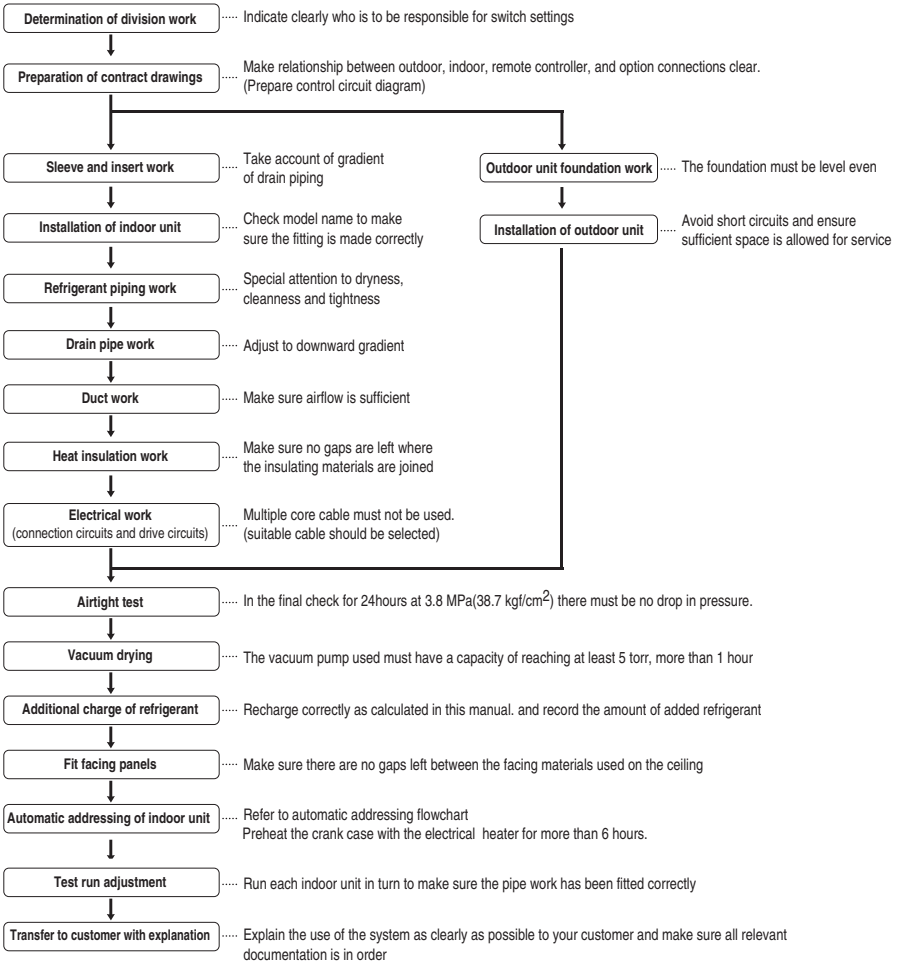
Use a firm stool or ladder when cleaning or maintaining the air conditioner.

- Be careful and avoid personal injury.

Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.

- There are sharp and moving parts that could cause personal injury.

Installation Process



⚠CAUTION

- The above list indicates the order in which the individual work operations are normally carried out but this order may be varied where local conditions warrants such change.
- The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure 3.8MPa.
- Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state.(If the refrigerant is charged in its gaseous state, its composition changes and the system will not work properly.)

Outdoor units Information

CAUTION: Ratio of the connectable Indoor Units to the Outdoor: Within 50 ~ 130%
Ratio of the running Indoor Units to the Outdoor: Within 10 ~ 100%
***We can guarantee the operation only within 130% Combination.**

Power Supply: Outdoor Unit (1Ø , 220-240V , 50Hz / 1Ø , 220V , 60Hz)

■ **Cooling Only**

Model			ARUV50GF3	ARUV60GF3
HP(Equivalent horsepower)			5	6
Chassis			UV3	UV3
Refrigerant	Product charge	kg	3.0	3.0
	CF(Correction Factor)	kg	0	0
Max. Connectable No. of Indoor Units			8	9
Net Weight		kg	125	125
Dimensions (WxHxD)		mm	750 × 1,680 × 495	750 × 1,680 × 495
		inch	29.5 x 66.2 x 19.5	29.5 x 66.2 x 19.5
Connecting Pipes	Liquid Pipes	[mm(inch)]	9.52(3/8)	9.52(3/8)
	Gas Pipes	[mm(inch)]	15.88(5/8)	19.05(3/4)

Power Supply: Outdoor Unit (3Ø, 380-415 V, 50 Hz / 3Ø, 380V, 60 Hz)

■ **Cooling Only**

Model			ARUV50LF3	ARUV60LF3	ARUV80LF3
HP(Equivalent horsepower)			5	6	8
Chassis			UV3	UV3	UV3
Refrigerant	Product charge	kg	3.0	3.0	3.0
	CF(Correction Factor)	kg	0	0	0
Max. Connectable No. of Indoor Units			8	9	13
Net Weight		kg	125	125	146
Dimensions (WxHxD)		mm	750 × 1,680 × 495	750 × 1,680 × 495	750 × 1,680 × 495
		inch	29.5 x 66.2 x 19.5	29.5 x 66.2 x 19.5	29.5 x 66.2 x 19.5
Connecting Pipes	Liquid Pipes	[mm(inch)]	9.52(3/8)	9.52(3/8)	9.52(3/8)
	Gas Pipes	[mm(inch)]	15.88(5/8)	19.05(3/4)	19.05(3/4)

Connectable Indoor Unit

MULTI V SPACE III should be connected with "2 series" indoor unit only.

Ex) ARNU07GSEA2

Environment-friendly Alternative Refrigerant R410A

• The refrigerant R410A has the property of higher operating pressure in comparison with R22. Therefore, all materials have the characteristics of higher resisting pressure than R22 ones and this characteristic should be also considered during the installation.
R410A is an azeotrope of R32 and R125 mixed at 50:50, so the ozone depletion potential (ODP) of R410A is 0. These days the developed countries have approved it as the environmental-friendly refrigerant and encouraged to use it widely to prevent environmental pollution.

CAUTION:

- The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure 3.8MPa
- Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in its gaseous state, its composition changes and the system will not work properly.
- Do not place the refrigerant container under the direct rays of the sun to prevent it from exploding.
- For high-pressure refrigerant, any unapproved pipe must not be used.
- Do not heat up pipes more than its necessity to prevent them from softening.
- Be careful not to install wrongly to minimize economic loss because it is expensive in comparison with R22.

Select the Best Location

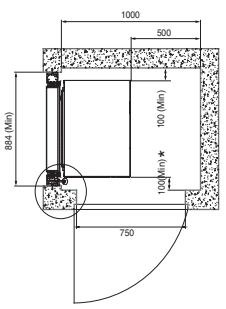
Select space for installing outdoor unit, which will meet the following conditions:

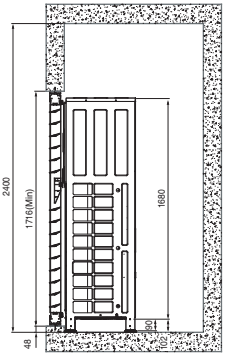
- No direct thermal radiation from other heat sources
- No possibility of annoying the neighbors by noise from unit
- No exposition to strong wind
- With strength which bears weight of unit
- Note that drain flows out of unit when heating
- With space for air passage and service work shown next
- Because of the possibility of fire, do not install unit to the space where generation, inflow, stagnation, and leak of combustible gas is expected.
- Avoid unit installation in a place where acidic solution and spray (sulfur) are often used.
- Do not use unit under any special environment where oil, steam and sulfuric gas exist.
- It is recommended to fence round the outdoor unit in order to prevent any person or animal from accessing the outdoor unit.
- If installation site is area of heavy snowfall, then the following directions should be observed.
  - Make the foundation as high as possible.
  - Fit a snow protection hood.
- Select installation location considering following conditions to avoid bad condition when additionally performing defrost operation.
  1. Install the outdoor unit at a place well ventilated and having a lot of sunshine in case of installing the product at a place with a high humidity in winter (neare beach, coast, lake, etc).
     (Ex) Rooftop where sunshine always shines.
  2. Performance of heating will be reduced and preheat time of the indoor unit may be lengthened in case of installing the outdoor unit in winter at following location:
     (1) Shade position with a narrow space
     (2) Location with much moisture in neighboring floor.
     (3) Location with much humidity around.
     (4) Location where water gathers since the floor is not even.

Installation Space

Indoor

(Unit : mm)

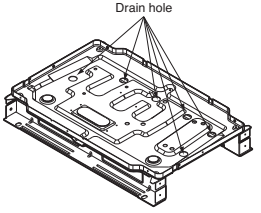




• Space for the "*" display part of by type of system louver

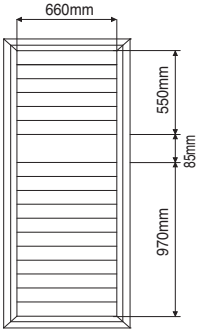
When installing manual louver: 150
When installing fixed louver: 100 (Basic space)

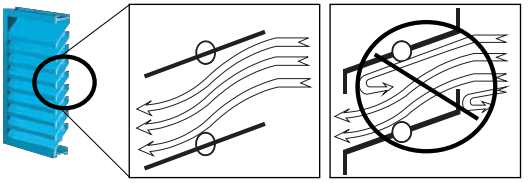
• Please install the product so that the door of the outdoor unit room is completely opened for smooth installation and service.



• A water drain outlet is required to discharge rain water on the bottom of the outdoor unit room or condensation water to possibly generate when operating.

• **The recommended specification of louver**



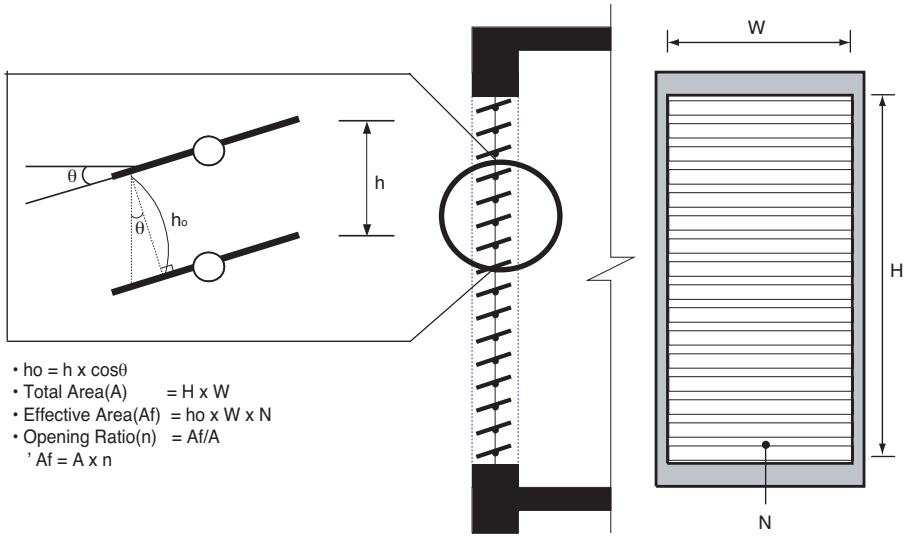


CAUTION:

Do not use bended louver like the right Fig.
It disturbs the air circulation.

• **Multi V Space should be installed in the special outdoor room with soundproofing walls.**

Recommended Effective Opening Ratio(E.O.R) of Louver



- ho = h x cosθ
- Total Area(A) = H x W
- Effective Area(Af) = ho x W x N
- Opening Ratio(n) = Af/A
  ' Af = A x n

$$E.O.R(\%) = \frac{Af}{Ad + As} \times 100$$

Air Flow Rate Q = Ad × Discharge air velocity
Air Flow Rate Q = As × Suction air velocity

→ **E.O.R > 85%**

- Ad : Discharge Area
- As : Suction Area

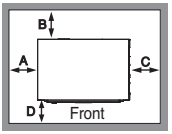
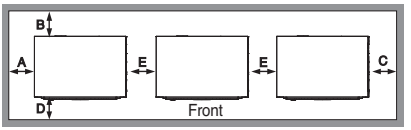
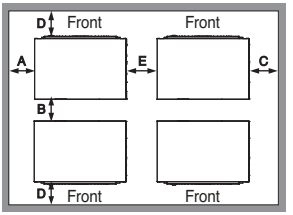
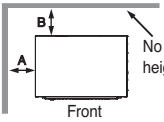
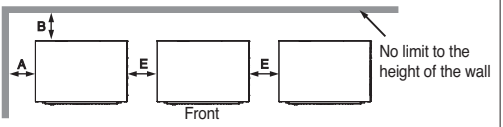
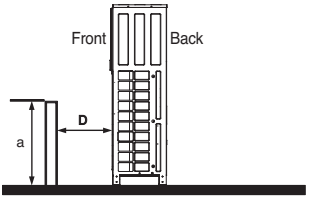
⚠ Cautions in winter especially for seasonal wind

- Sufficient measures are required at a snow area or severe cold area in winter so that product can be operated well.
- Get ready for seasonal wind or snow in winter even in other area.
- Install the outdoor unit not to come in contact with snow directly. If snow piles up and freezes on the air suction hole, the system may malfunction.
- Don't install the suction hole and discharge hole of the outdoor unit facing to the seasonal wind.

Outdoor

- The following values are the least space for installation. If any service area si needed for service according to field circumstance, obtain enough service space.
- The unit of values is mm.

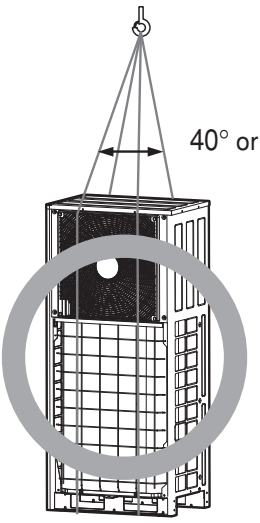
[Unit : mm]

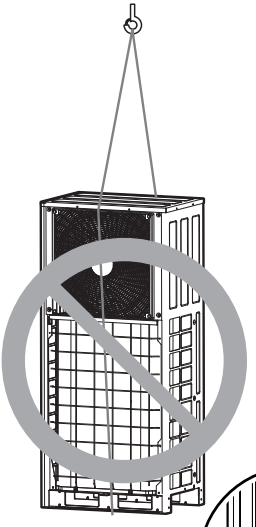
Category	Installation Space	Side Space
4 sides are walls		A ≥ 10 B ≥ 500 C ≥ 10 D:Waterproof wall installation condition
		A ≥ 10 B ≥ 500 C ≥ 10 D:Waterproof wall installation condition E ≥ 20
		A ≥ 10 B ≥ 500 C ≥ 10 D:Waterproof wall installation condition E ≥ 20
2 sides or 1 side are walls		A ≥ 10 B ≥ 500
		A ≥ 10 B ≥ 500 E ≥ 20
In case of Waterproof wall installation		If a ≤ 300, D ≥ 150 If 300 < a ≤ 500, D ≥ 250

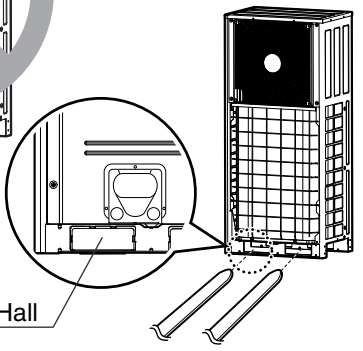
Front side : outdoor unit discharge flow direction
Required side area for Louver vane operation should be considered separately.

Lifting method

- When carrying the unit suspended, pass the ropes under the unit and use the two suspension points each at the front and rear.
- Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- Attach the ropes to the unit at an angle of 40° or less.







Model	HP	Weight(kg)
ARUV50GF3	5	125
ARUV60GF3	6	125
ARUV50LF3	5	125
ARUV60LF3	6	125
ARUV80LF3	8	146

CAUTION

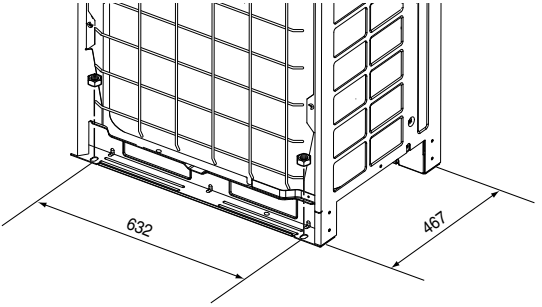
Be very careful to carry product.

- Do not have only one person carry product if it is more than 20 kg.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.
- Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.
- When carrying in Outdoor Unit, be sure to support it at four points. Carrying in and lifting with 3-point support may make Outdoor Unit unstable, resulting in a fall of it.
- Use 2 belts of at least 8 m long.
- Place extra cloth or boards in the locations where the casing comes in contact with the sling to prevent damage.
- Hoist the unit making sure it is being lifted at its center of gravity.

Installation

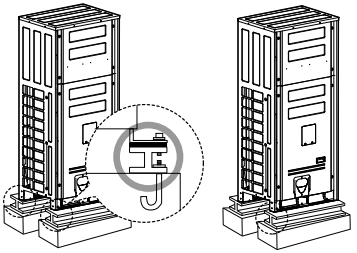
Location of anchor bolt

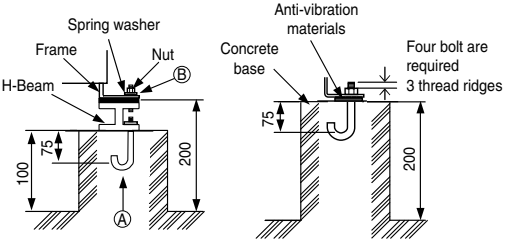
■ **Installation foot (Location of anchor bolt)**



Foundation for Installation

- Fix the unit tightly with bolts as shown below so that unit will not fall down due to earthquake or gust.
- Use the H-beam support as a base support
- Noise and vibration may occur from the floor or wall since vibration is transferred through the installation part depending on installation status. Thus, use anti-vibration materials (Anti-vibration pad) fully (The base pad shall be more than 200mm).





Foundation bolt executing method

Ⓐ Ensure that the corner part can be securely mounted. Otherwise, the support for installation may be bent.

Ⓑ Obtain and use the M10 anchor bolt.

WARNING

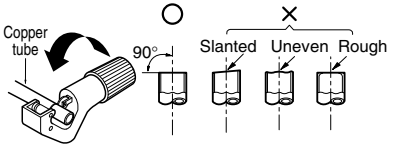
- **Be sure to install unit in a place strong enough to withstand its weight. Any lack of strength may cause unit to fall down, resulting in a personal injury.**
- **Have installation work in order to protect against a strong wind and earthquake. Any installation deficiency may cause unit to fall down, resulting in a personal injury.**
- **Especially take care for support strength of the floor surface, water drain processing (processing of water flown out from the outdoor unit during operation) and paths of the pipe and wiring when making a base support.**
- **Don't use a tube or pipe for water drain in the base pan and perform water drain processing by using the drain path. Water drain may not be done due to freezing of a tube or pipe.**

Preparation of Piping

Main cause of gas leakage is defect in flaring work. Carry out correct flaring work in the following procedure.

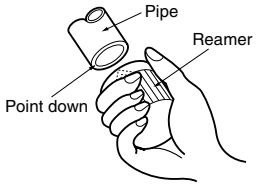
1) Cut the pipes and the cable.

- Use the accessory piping kit or the pipes purchased locally.
- Measure the distance between the indoor and the outdoor unit.
- Cut the pipes a little longer than measured distance.
- Cut the cable 1.5m longer than the pipe length.



2) Burrs removal

- Completely remove all burrs from the cut cross section of pipe/tube.
- Put the end of the copper tube/pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the tubing.

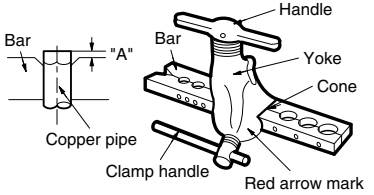


3) Flaring work

- Carry out flaring work using flaring tool as shown below.

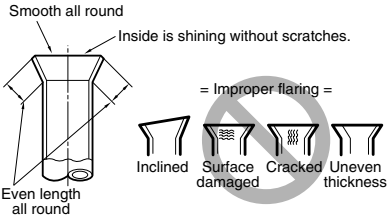
Indoor unit [kW(Btu/h]	Pipe		" A "	
	Gas	Liquid	Gas	Liquid
<5.6(19,100)	1/2"	1/4"	0.5~0.8	0~0.5
<16.0(54,600)	5/8"	3/8"	0.8~1.0	0.5~0.8
<22.4(76,400)	3/4"	3/8"	1.0~1.3	0.5~0.8

Firmly hold copper tube in a bar(or die) as indicated dimension in the table above.



4) Check

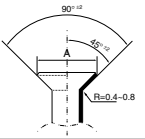
- Compare the flared work with figure below.
- If flare is noted to be defective, cut off the flared section and do flaring work again.



FLARE SHAPE and FLARE NUT TIGHTENING TORQUE

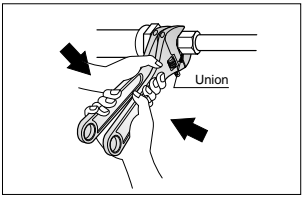
Precautions when connecting pipes

- See the following table for flare part machining dimensions.
- When connecting the flare nuts, apply refrigerant oil to the inside and outside of the flares and turn them three or four times at first. (Use ester oil or ether oil.)
- See the following table for tightening torque.(Applying too much torque may cause the flares to crack.)
- After all the piping has been connected, use nitrogen to perform a gas leak check.

pipe size	tightening torque(Ncm)	A(mm)	flare shape
Ø9.5	3270-3990	12.8-13.2	
Ø12.7	4950-6030	16.2-16.6	
Ø15.9	6180-7540	19.3-19.7	

CAUTION

- Always use a charge hose for service port connection.
- After tightening the cap, check that no refrigerant leaks are present.
- When loosening a flare nut, always use two wrenches in combination, When connecting the piping, always use a spanner and torque wrench in combination to tighten the flare nut.
- When connecting a flare nut, coat the flare(inner and outer faces) with oil for R410A(PVE) and hand tighten the nut 3 to 4 turns as the initial tightening.



Opening shutoff valve

1. Remove the cap and turn the valve counter clockwise with the hexagon wrench.
2. Turn it until the shaft stops.
   Do not apply excessive force to the shutoff valve. Doing so may break the valve body, as the valve is not a backseat type. Always use the special tool.
3. Make sure to tighten the cap securely.

Closing shutoff valve

1. Remove the cap and turn the valve clockwise with the hexagon wrench.
2. Securely tighten the valve until the shaft contacts the main body seal.
3. Make sure to tighten the cap securely.
   * For the tightening torque, refer to the table on the below.

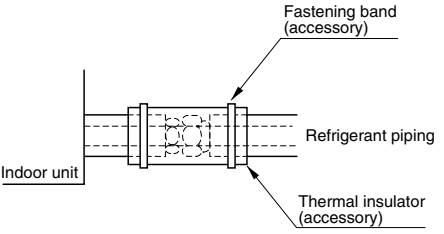
Tightening torque

Shutoff valve size	Tightening torque N-m(Turn clockwise to close)					
	Shaft(valve body)		Cap(Valve lid)	Service port	Flare nut	Gas line piping attached to unit
Ø6.4	5.4-6.6	Hexagonal wrench 4mm	13.5-16.5	11.5-13.9	14-17	-
Ø9.5					33-39	
Ø12.7	8.1-9.9		18-22		50-60	
Ø15.9	13.5-16.5	Hexagonal wrench 6mm	23-27		62-75	
Ø22.2	27-33	Hexagonal wrench 10mm	36-44		-	22-28
Ø25.4						

HEAT INSULATION

1. Use the heat insulation material for the refrigerant piping which has an excellent heat-resistance (over 120°C).

2. Precautions in high humidity circumstance:
   This air conditioner has been tested according to the "ISO Conditions with Mist" and confirmed that there is not any default. However, if it is operated for a long time in high humid atmosphere (dew point temperature: more than 23°C), water drops are liable to fall. In this case, add heat insulation material according to the following procedure:
   - Heat insulation material to be prepared... EPDM (Ethylene Propylene Diene Methylene)-over 120°C the heat-resistance temperature.
   - Add the insulation over 10mm thickness at high humidity environment.



Refrigerant piping installation

WARNING

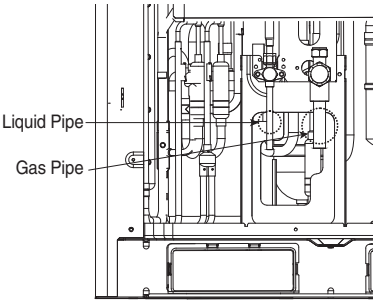
Always use extreme care to prevent the refrigerant gas (R410A) from leakage while using fire or flame. If the refrigerant gas comes in contact with the flame from any source, such as a gas stove, it breaks down and generates a poisonous gas which can cause gas poisoning. Never perform brazing in an unventilated room. Always conduct an inspection for gas leakage after installation of the refrigerant piping has been completed.

Directions during pipe connection/ valve operation

As pipe connection is in a form of connecting to a branching pipe at the end of the pipe, refrigerant pipe coming out of outdoor unit is branched at its end and connected to indoor units.

As connection method, connect flare connection from indoor unit, pipe and branching part of outdoor unit by welding.

* Open and close the valves using hex wrench.



CAUTION

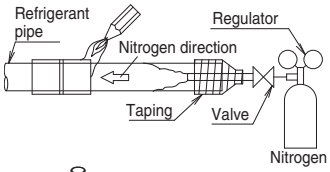
- **Always take precautions so that refrigerant does not leak during welding.**
- **Refrigerant produces poisonous gas that is harmful to human body during combustion**
- **Do not carry out welding operation in a sealed area**
- **Make sure to close the cap of service port after work so that gas does not leak**

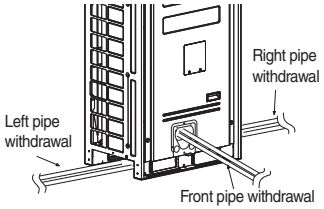
WARNING

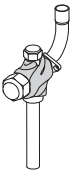
Please block the front panel after pipe installation
(Animal or foreign object can enter to cause damage on the wires)

Indoor/outdoor pipe connection

- Pipe work can be done in front and the side in correspond with installation environment.
- Make sure to spill over the 0.2 kg f/cm^2 nitrogen into the pipe during welding.
- If you don't spill over the nitrogen, it will obstruct the normal operation of valve and compressor due to great anodization in the pipe.

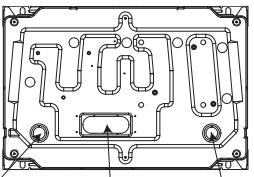






- Damage can occur to the inside of the valve if it blazes without wet towel around the valve.

■ Preparatory work



- During the pipe withdrawal to Right, left, side or ground, use and work outdoor base pan pipe knock out.

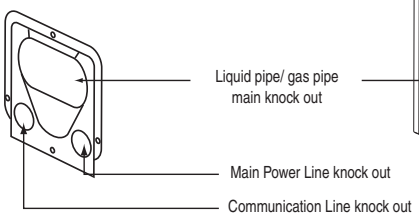
CAUTION

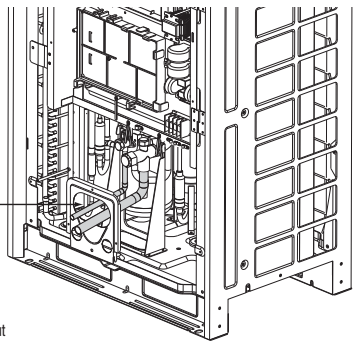
- You should not dame pipe/base during the work of pipe knock out.
- Operate piping work removing burr after pipe knock out.
- Operate sleeve work in order not to damage the cable during connecting the cable using power line knock out. installation pipe drawing.
  Do not use anti-oxidants when brazing the pipe joints. Residue can clog pipes and break equipment.

■ Pipe withdrawal method

Front pipe withdrawal method

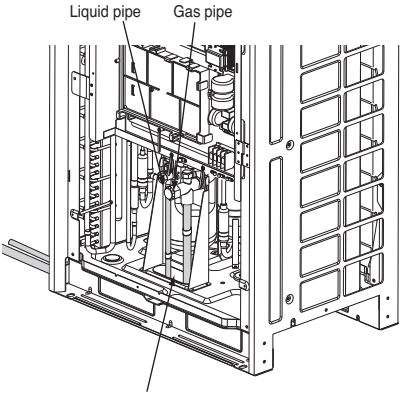
- During front pipe withdrawal, operate piping work following the picture.



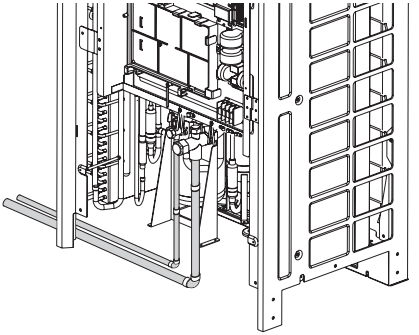


Ground piping withdrawal method

- During front pipe withdrawal, operate piping work following the picture.

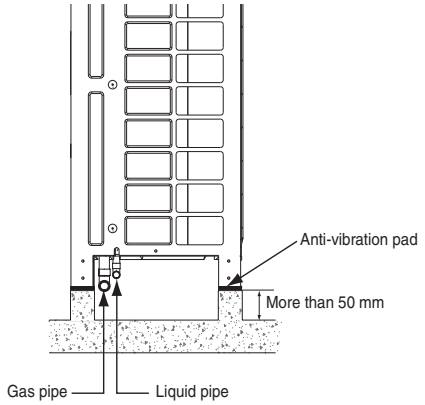


Removal of base plate pipe knock out



Removal of base plate

The side view of ground piping withdrawal



CAUTION

For the smooth floor piping withdrawal work, you have to keep the height of concrete supporter and installation and secure the height more than 50 mm.

Caution

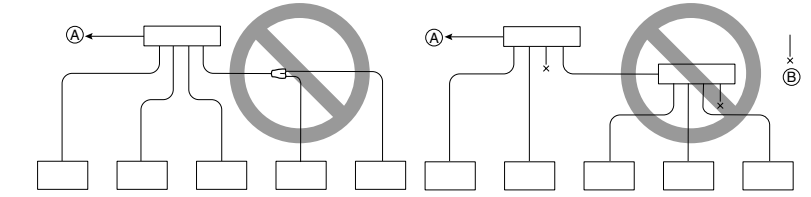
1. Use the following materials for refrigerant piping.
   - Material: Seamless phosphorous deoxidized copper pipe
   - Wall thickness : Comply with the relevant local and national regulations for the designed pressure 3.8MPa. We recommend the following table as the minimum wall thickness.

Outer diameter [mm]	6.35	9.52	12.7	15.88	19.05	22.2	25.4	28.58	31.8	34.9	38.1	41.3
Minimum thickness [mm]	0.8	0.8	0.8	0.99	0.99	0.99	0.99	0.99	1.1	1.21	1.35	1.43

2. Commercially available piping often contains dust and other materials. Always blow it clean with a dry inert gas.
3. Use care to prevent dust, water or other contaminants from entering the piping during installation.
4. Reduce the number of bending portions as much as possible, and make bending radius as big as possible.
5. Always use the branch piping set shown below, which are sold separately.

Y branch		Header		
		4 branch	7 branch	10 branch
ARBLN01621	ARBLN03321	ARBL054	ARBL057	ARBL1010

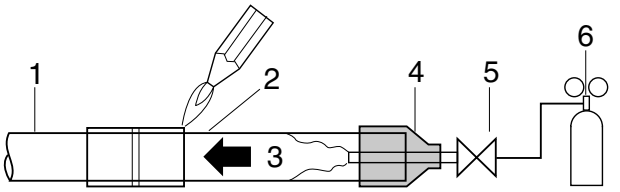
6. If the diameters of the branch piping of the designated refrigerant piping differs, use a pipe cutter to cut the connecting section and then use an adapter for connecting different diameters to connect the piping.
7. Always observe the restrictions on the refrigerant piping (such as rated length, difference in height, and piping diameter).
   Failure to do so can result in equipment failure or a decline in heating/cooling performance.
8. A second branch cannot be made after a header. (These are shown by ⃠.)



Ⓐ To Outdoor Unit
Ⓑ Sealed Piping

9. The Multi V will stop due to an abnormality like excessive or insufficient refrigerant. At such a time, always properly charge the unit. When servicing, always check the notes concerning both the piping length and the amount of additional refrigerant.
10. Never perform a pump down. This will not only damage the compressor but also deteriorate the performance.
11. Never use refrigerant to perform an air purge. Always evacuate using a vacuum pump.

12. Always insulate the piping properly. Insufficient insulation will result in a decline in heating/cooling performance, drip of condensate and other such problems.
13. When connecting the refrigerant piping, make sure the service valves of the Outdoor Unit is completely closed (the factory setting) and do not operate it until the refrigerant piping for the Outdoor and Indoor Units has been connected, a refrigerant leakage test has been performed and the evacuation process has been completed.
14. Always use a non-oxidizing brazing material for brazing the parts and do not use flux. If not, oxidized film can cause clogging or damage to the compressor unit and flux can harm the copper piping or refrigerant oil.



1	Refrigerant piping	4	Taping
2	Pipe to be brazed	5	Valve
3	Nitrogen	6	Pressure-reducing valve

WARNING

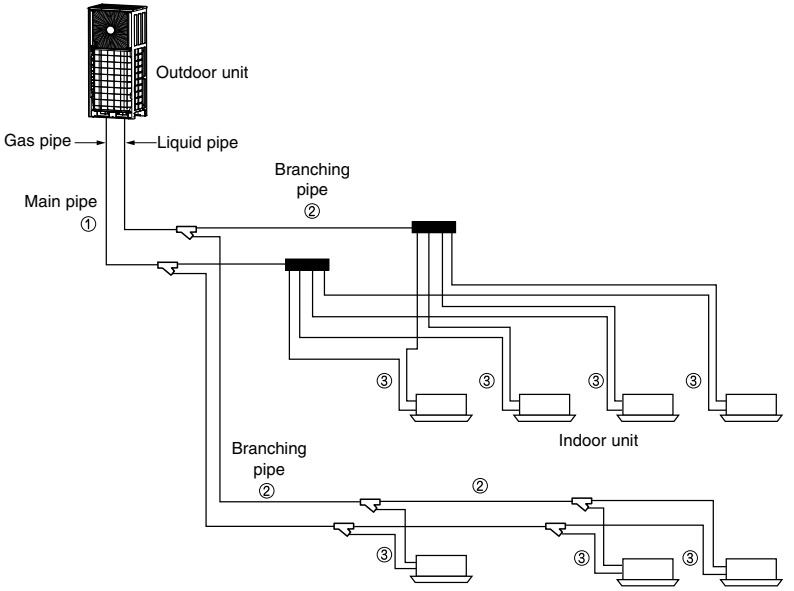
When installing and moving the air conditioner to another site, be sure to make recharge refrigerant after perfect evacuation.

- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

- After selecting diameter of the refrigerant pipe to suit total capacity of the indoor unit connected after branching, use an appropriate branch pipe set according to the pipe diameter of the indoor unit and the installation pipe drawing.

Do not use anti-oxidants when brazing the pipe joints. Residue can clog pipes and break equipment.

Selection of Refrigerant Piping



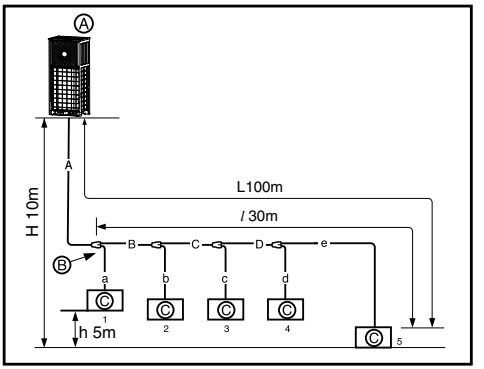
No.	Piping parts	Name	Selection of pipe size
①	Outdoor unit ↓ 1st branching section	Main pipe	Size of main pipe Outdoor unit capacity type / Liquid pipe [mm(inch)] / Gas pipe [mm(inch)] 5HP / Ø9.52(3/8) / Ø15.88(5/8) 6HP / Ø9.52(3/8) / Ø19.05(3/4) 8HP / Ø9.52(3/8) / Ø19.05(3/4)
②	Branching section ↓ Branching section	Branching pipe	Pipe size of between branching sections Indoor unit capacity[kW(Btu/h)] / Liquid pipe [mm(inch)] / Gas pipe [mm(inch)] ≤ 5.6(19,100) / Ø6.35(1/4) / Ø12.7(1/2) < 16.0(54,600) / Ø9.52(3/8) / Ø15.88(5/8) ≤ 22.4(76,400) / Ø9.52(3/8) / Ø19.05(3/4) < 33(112,600) / Ø9.52(3/8) / Ø22.2(7/8)
③	Branching section ↓ Indoor unit	Indoor unit connecting pipe	Connecting pipe size of indoor unit Indoor unit capacity[kW(Btu/h)] / Liquid pipe [mm(inch)] / Gas pipe [mm(inch)] ≤ 5.6(19,100) / Ø6.35(1/4) / Ø12.7(1/2) < 16.0(54,600) / Ø9.52(3/8) / Ø15.88(5/8) ≤ 22.4(76,400) / Ø9.52(3/8) / Ø19.05(3/4) < 33(112,600) / Ø9.52(3/8) / Ø22.2(7/8)

Refrigerant piping system

◆ Y branch method

Example : 5 Indoor Units connected

Ⓐ : Outdoor Unit
Ⓑ : 1st branch (Y branch)
Ⓒ : Indoor Units



➲ Total pipe length = A+B+C+D+a+b+c+d+e ≤ 150m(175m)

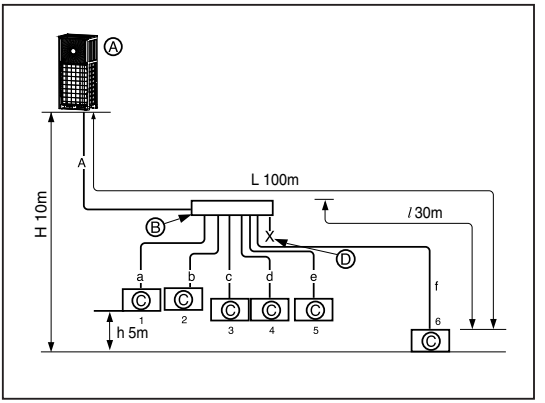
L	Longest pipe length	* Equivalent pipe length
	A+B+C+D+e ≤ 100m	A+B+C+D+e ≤ 125m
l	Longest pipe length after 1st branch	
	B+C+D+e ≤ 30m	
H	Difference in height(Outdoor Unit ↔ Indoor Unit)	
	H ≤ 10m	
h	Difference in height (Indoor Unit ↔ Indoor Unit)	
	h ≤ 5m	

• * : Assume equivalent pipe length of Y branch to be 0.5m, that of header to be 1m, calculation purpose

◆ Header Method

Example : 6 Indoor Units connected

Ⓐ : Outdoor Unit
Ⓑ : 1st branch
Ⓒ : Indoor Units
Ⓓ : Sealed piping



Branch pipe can not be used after header

➲ Total pipe length = A+a+b+c+d+e+f ≤ 150m(175m)

L	Longest pipe length	* Equivalent pipe length
	A+f ≤ 100m	A+f ≤ 125m
l	Longest pipe length after 1st branch	
	f ≤ 30m	
H	Difference in height(Outdoor Unit ↔ Indoor Unit)	
	H ≤ 10m	
h	Difference in height (Indoor Unit ↔ Indoor Unit)	
	h ≤ 5m	

⚠ WARNING

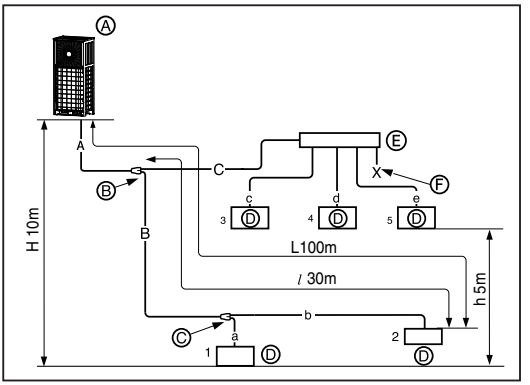
Pipe length after header branching (a~f)
It is recommended that difference in length of the pipes connected to the Indoor Units is minimized. Performance difference between Indoor Units may occur.

• * : Assume equivalent pipe length of Y branch to be 0.5m, that of header to be 1m, calculation purpose

◆ Combination of Y branch/header method

Example : 5 Indoor Units connected

Ⓐ : Outdoor Unit
Ⓑ : 1st branch (Y branch)
Ⓒ : Y branch
Ⓓ : Indoor Unit
Ⓔ : Header
Ⓕ : Sealed piping



Branch pipe can not be used after header

➲ Refrigerant pipe diameter from branch to branch (B,C,D)

Downward Indoor Unit total capacity [kW(Btu/h)]	Liquid pipe [mm(inch)]	Gas pipe [mm(inch)]
≤ 5.6(19,100)	Ø6.35(1/4)	Ø12.7(1/2)
< 16(54,600)	Ø9.52(3/8)	Ø15.88(5/8)
≤ 22.4(76,400)	Ø9.52(3/8)	Ø19.05(3/4)
< 33(112,600)	Ø9.52(3/8)	Ø22.2(7/8)

➲ Total pipe length = A+B+C+a+b+c+d+e ≤ 150m(175m)

L	Longest pipe length	* Equivalent pipe length
	A+B+b ≤ 100m	A+B+b ≤ 125m
l	Longest pipe length after 1st branch	
	B+b ≤ 30m	
H	Difference in height(Outdoor Unit ↔ Indoor Unit)	
	H ≤ 10m	
h	Difference in height (Indoor Unit ↔ Indoor Unit)	
	h ≤ 5m	

• * : Assume equivalent pipe length of Y branch to be 0.5m, that of header to be 1m, calculation purpose

The Amount of Refrigerant

The calculation of the additional charge should take into account the length of pipe and CF(correction Factor) value of indoor unit.

Additional charge(kg)	=	Total liquid pipe :Ø25.4 mm	× 0.480(kg/m)
	+	Total liquid pipe :Ø22.2 mm	× 0.354(kg/m)
	+	Total liquid pipe :Ø19.05 mm	× 0.266(kg/m)
	+	Total liquid pipe :Ø15.88 mm	× 0.173(kg/m)
	+	Total liquid pipe :Ø12.7 mm	× 0.118(kg/m)
	+	Total liquid pipe :Ø9.52 mm	× 0.061(kg/m)
	+	Total liquid pipe :Ø6.35 mm	× 0.022(kg/m)
	+	CF value of indoor unit	

Amount refrigerant of Indoor units
Example) 4Way Ceiling Cassette 14.5kW -1ea
Ceiling concealed Duct 7.3kW-2ea
Wall Mounted 2.3kW-4ea

CF = 0.64 × 1 + 0.26 × 2 + 0.24 × 4 = 2.12 kg

CF value of indoor unit (unit : kg)

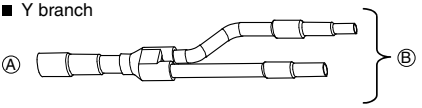
Capacity(Btu/h(kW)) / Type	5k (1.6)	7k (2.2)	9k (2.8)	12k (3.6)	15k (4.5)	18k (5.6)	24k (7.1)	28k (8.2)	36k (10.6)	42k (12.3)	48k (14.1)	76k (22.4)	96k (28.0)
Ceiling Concealed Duct (Low Static)	-	0.17	0.17	0.17	0.17	0.37	0.37	-	-	-	-	-	-
Ceiling Concealed Duct (High Static)	-	0.26	0.26	0.26	0.26	0.26	0.26	0.44	0.44	0.44	0.62	1.00	1.00
Wall Mounted	-	0.24	0.24	0.24	0.24	0.28	0.28	-	-	-	-	-	-
1Way Ceiling Cassette	-	0.20	0.20	0.20	-	0.29	0.29	-	-	-	-	-	-
2Way Ceiling Cassette	-	-	-	-	-	0.16	0.16	-	-	-	-	-	-
4Way Ceiling Cassette	0.18	0.18	0.25	0.25	0.32	0.32	0.48	v0.48	0.64	0.64	0.64	-	-
ARTCOOL Gallery	-	0.10	0.10	0.10	-	-	-	-	-	-	-	-	-
Floor Standing	-	0.17	0.17	0.17	0.17	0.37	0.37	-	-	-	-	-	-
Ceiling & Floor	-	-	0.10	0.10	-	-	-	-	-	-	-	-	-
Ceiling Suspended	-	-	-	-	-	0.35	0.35	-	-	-	-	-	-
Console	-	0.17	0.17	0.17	0.17	-	-	-	-	-	-	-	-
Fresh Air Intake Unit	-	-	-	-	-	-	-	-	-	-	0.62	1.00	1.00
Heat recovery ventilator(DX)	-	-	-	0.20	-	0.20	0.20	-	-	-	-	-	-

CAUTION

Use only 2-series of indoor unit. Ex) ARNU***2, URNU***2

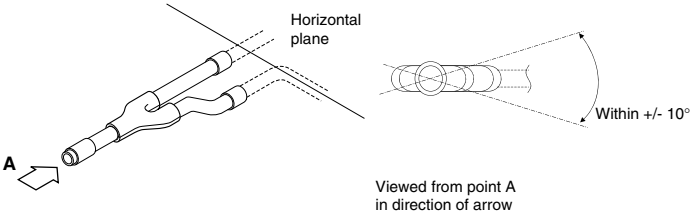
Branch pipe Fitting

■ Y branch



Ⓐ To outdoor unit
Ⓑ To branch piping or indoor unit

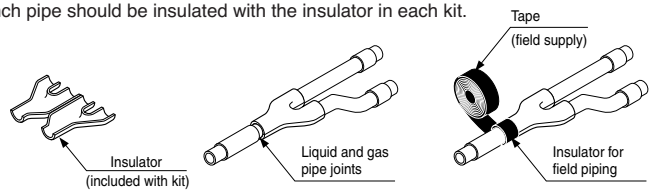
• Ensure that the branch pipes are attached horizontally or vertically (see the diagram below.)



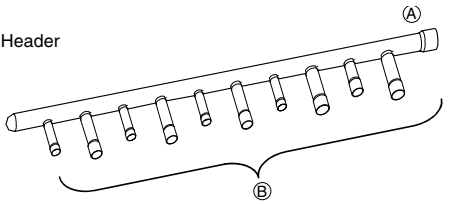
• There is no limitation on the joint mounting configuration.

• If the diameter of the refrigerant piping selected by the procedures described is different from the size of the joint, the connecting section should be cut with a pipe cutter.

• Branch pipe should be insulated with the insulator in each kit.



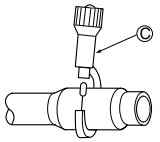
■ Header



Ⓐ To outdoor unit
Ⓑ To indoor unit

• The indoor unit having larger capacity must be installed closer to Ⓐ than smaller one.

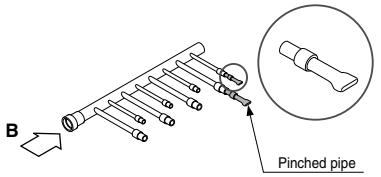
• If the diameter of the refrigerant piping selected by the procedures described is different from the size of the joint, the connecting section should be cut with a pipe cutter.



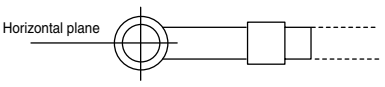
Ⓒ Pipe cutter

• When the number of pipes to be connected is smaller than the number of header branches, install a cap to the unconnected branches.

• When the number of indoor units to be connected to the branch pipes is less than the number of branch pipes available for connection then cap pipes should be fitted to the surplus branches.

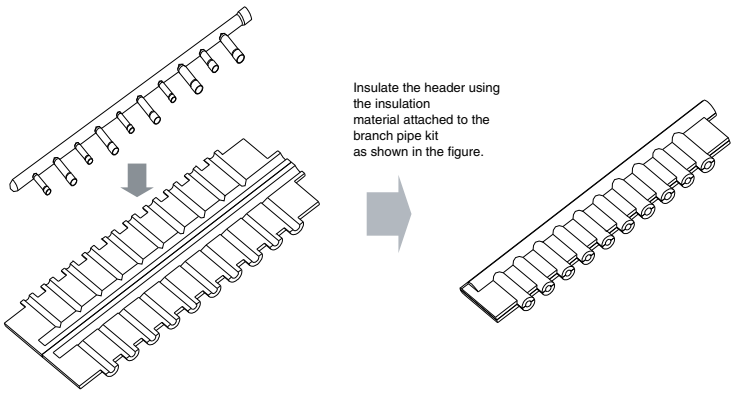


• Fit branch pipe lie in a horizontal plane.

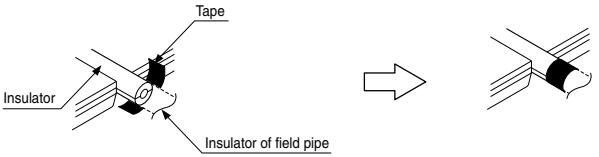


View from point B in the direction of the arrow

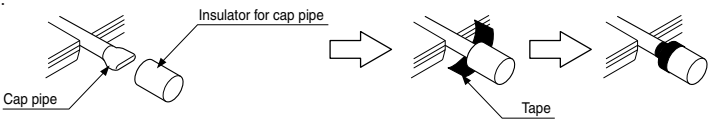
• Header should be insulated with the insulator in each kit.



• Joints between branch and pipe should be sealed with the tape included in each kit.

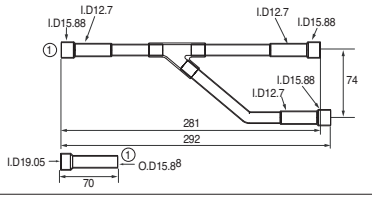
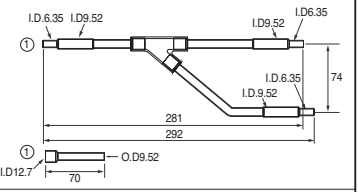
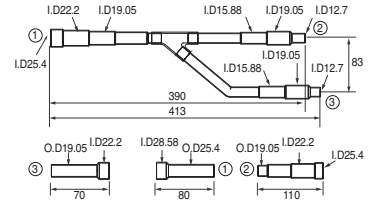
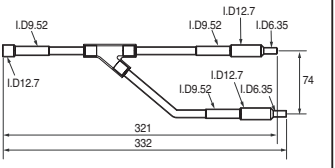
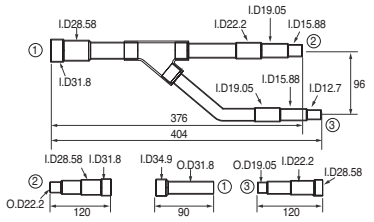
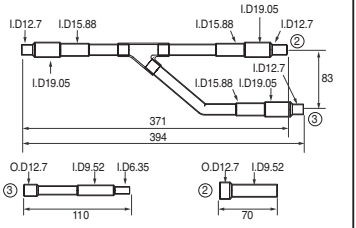
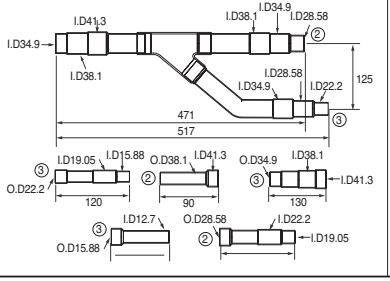
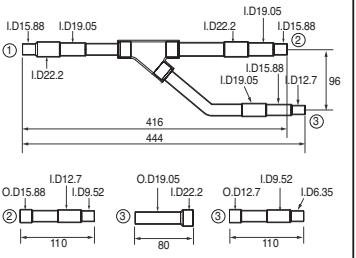


• Any cap pipe should be insulated using the insulator provided with each kit and then taped as described above.



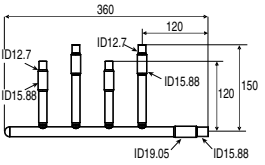
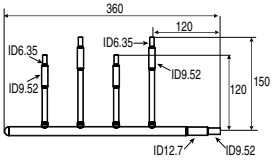
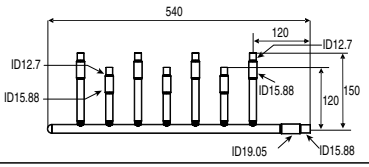
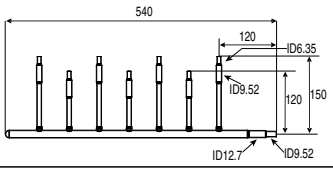
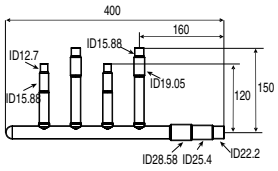
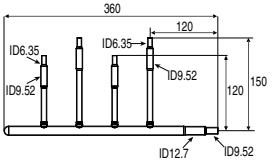
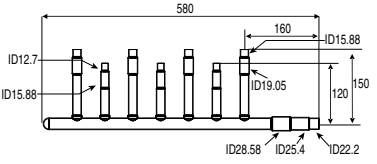
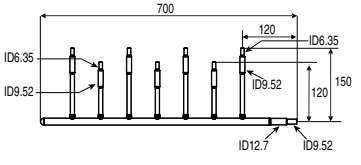
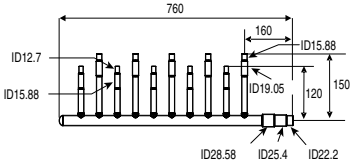
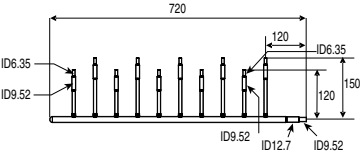
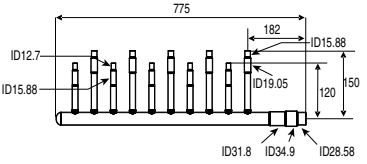
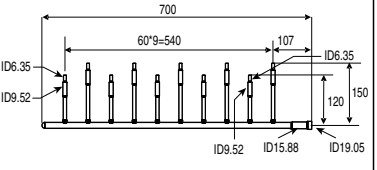
◆ Y branch pipe

[unit:mm]

Models	Gas pipe	Liquid pipe
ARBLN01621		
ARBLN03321		
ARBLN07121		
ARBLN14521		

◆ Header

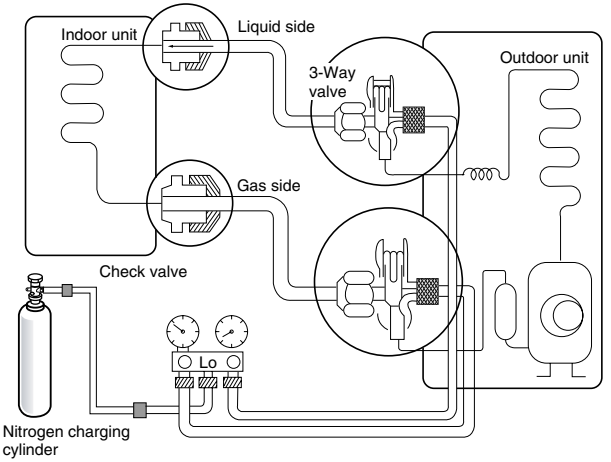
[unit:mm]

Models	Gas pipe	Liquid pipe
4 branch ARBL054		
7 branch ARBL057		
4 branch ARBL104		
7 branch ARBL107		
10 branch ARBL1010		
10 branch ARBL2010		

Leak Test and Vacuum

(1) Leak test

Leak test should be made by pressurizing nitrogen gas to 2.94 MPa(30.0Kg/cm²). For the test method, refer to the following figure. (Make a test with the service valves closed. Be also sure to pressurize Liquid pipe, Gas pipe and High/Low Pressure Common pipe)
The test result can be judged good if the pressure has not be reduced after leaving for about one day after completion of nitrogen gas pressurization.



Note:

If the ambient temperature differs between the time when pressure is applied and when the pressure drop is checked, apply the following correction factor

There is a pressure change of approximately 0.1 kg/cm² (0.01 MPa) for each 1°C of temperature difference.

Correction= (Temp. at the time of pressurization – Temp. at the time of check) X 0.1
For example: Temperature at the time of pressurization (3.8 MPa) is 27 °C
24 hour later: 3.73 MPa, 20°C
In this case the pressure drop of 0.07 is because of temperature drop
And hence there is no leakage in pipe occurred.

CAUTION

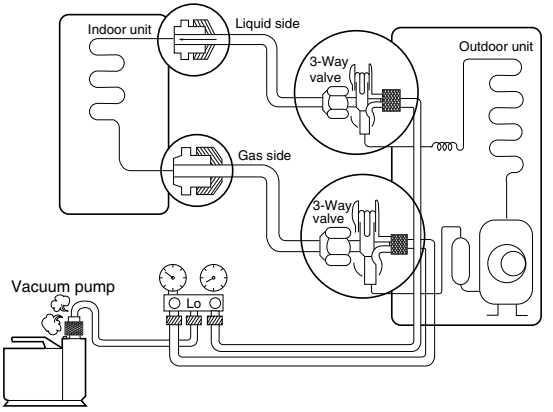
To prevent the nitrogen from entering the refrigeration system in the liquid state, the top of the cylinder must be at higher position than the bottom when you pressurize the system.
Usually the cylinder is used in a vertical standing position.

(2) Vacuum

Vacuum drying should be made from the service port provided on the outdoor unit's service valve to the vacuum pump commonly used for liquid pipe, gas pipe and high/low pressure common pipe. (Make Vacuum from liquid pipe, gas pipe and high/low pressure common pipe with the service valve closed.)
* Never perform air purging using refrigerant.

• Vacuum drying: Use a vacuum pump that can evacuate to -100.7kPa (5 Torr, -755mmHg).

1. Evacuate the system from the liquid and gas pipes with a vacuum pump for over 2 hrs and bring the system to -100.7kPa.
   After maintaining system under that condition for over 1 hr, confirm the vacuum gauge rises. The system may contain moisture or leak.
2. Following should be executed if there is a possibility of moisture remaining inside the pipe.
   (Rainwater may enter the pipe during work in the rainy season or over a long period of time)
   After evacuating the system for 2 hrs, give pressure to the system to 0.05MPa(vacuum break) with nitrogen gas and then evacuate it again with the vacuum pump for 1hr to -100.7kPa(vacuum drying). If the system cannot be evacuated to -100.7kPa within 2 hrs, repeat the steps of vacuum break and its drying. Finally, check if the vacuum gauge does not rise or not, after maintaining the system in vacuum for 1 hr.



Scale
Use a gravimeter. (One that can measure down to 0.1 kg.). If you are unable to prepare such a high-precision gravimeter you may use a charge cylinder.

Note : Always add an appropriate amount of refrigerant. (For the refrigerant additional charge)
Too much or too little refrigerant will cause trouble.

⚠ WARNING

When installing and moving the air conditioner to another site, recharge after perfect evacuation.
- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

Electrical Wiring

Areas of Caution

1. Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.

WARNING

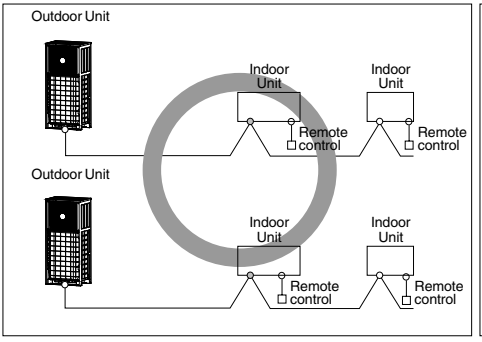
Be sure to have authorized electric engineers do electric work using special circuits in accordance with regulations and this installation manual. If power supply circuit has a lack of capacity or electric work deficiency, it may cause an electric shock or fire.

2. Install the Outdoor Unit transmission line away from the power source wiring so that it is not affected by electric noise from the power source. (Do not run it through the same conduit.)
3. Be sure to provide designated grounding work to Outdoor Unit.

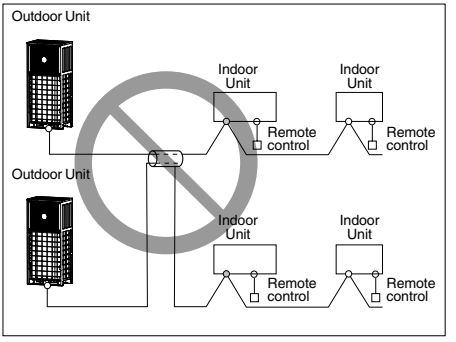
CAUTION

Be sure to put Outdoor Unit to earth. Do not connect earth line to any gas pipe, water pipe, lightening rod or telephone earth line. If earth is incomplete, it may cause an electric shock.

4. Give some allowance to wiring for electrical part box of Indoor and Outdoor Units, because the box is sometimes removed at the time of service work.
5. Never connect the main power source to terminal block of transmission line. If connected, electrical parts will be burnt out.
6. Use 2-core shield cable for transmission line.(O mark in the figure below) If transmission lines of different systems are wired with the same multiplecore cable, the resultant poor transmitting and receiving will cause erroneous operations. (⃠ mark in the figure below)
7. Only the transmission line specified should be connected to the terminal block for Outdoor Unit transmission.



2-Core Shield Cable



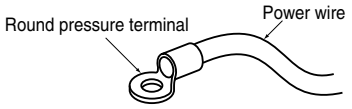
Multi-Core Cable

CAUTION

- **Use the 2-core shield cables for transmission lines. Never use them together with power cables.**
- **Never use multi-core cable**
- **As this unit is equipped with an inverter, to install a phase leading capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating. Therefore, never install a phase leading capacitor.**
- **Keep power imbalance within 2% of the supply rating. Large imbalance will shorten the life of the smoothing capacitor.**

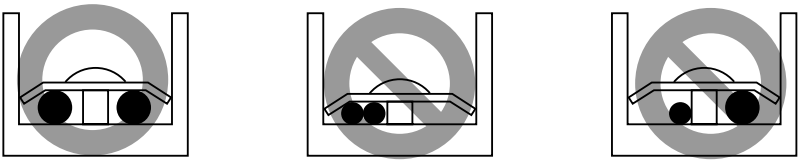
Precautions when laying power wiring

Use round pressure terminals for connections to the power terminal block.



When none are available, follow the instructions below.

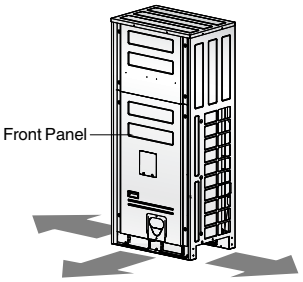
- Do not connect wiring of different thicknesses to the power terminal block. (Slack in the power wiring may cause abnormal heat.)
- When connecting wiring which is the same thickness, do as shown in the figure below.



- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal block.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will strip the head and make proper tighterning impossible.
- Over-tightening the terminal screws may break them.

Control box and connecting position of wiring

- Remove all of the screws at front panel and remove the panel by pulling it forward.



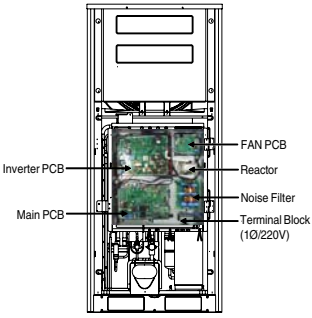
DIRECTION OF PIPING/WIRING

- Connect transmission line between main and sub outdoor unit through the terminal block.
- Connect transmission lines between outdoor unit and indoor units through the terminal block.
- When the central control system is connected to the outdoor unit, a dedicated PCB must be connected between them.
- When connecting transmission line between outdoor unit and indoor units with shielded wire, connect the shield ground to the earth screw.

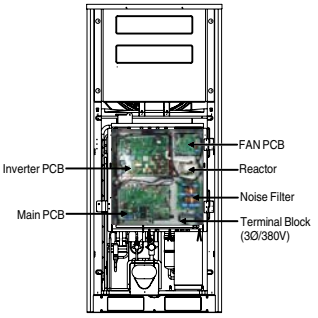
WARNING

The temperature sensor for outdoor air should not be exposed to direct sunlight.

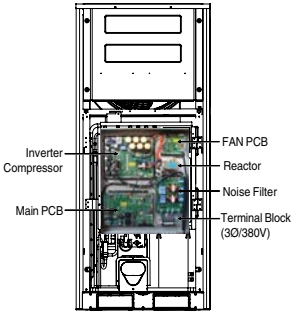
- Provide an appropriate cover to intercept direct sunlight.



ARUV50GF3
ARUV60GF3



ARUV50LF3
ARUV60LF3



ARUV80LF3

Transmission and Power Lines

1) Transmission cable

- Types : shielding wire
- Diameter : 10.~1.5mm²
- Maximum allowable temperature: 60°C
- Maximum allowable line length: under 300m

2) Remote control cable

- Types : 3-core cable

3) Central control cable

Product type	Wire type	Diameter
ACP&AC Manager(256 IDU)	4-core cable(Shielding wire)	10.~1.5mm²
AC Smart II	4-core cable(Shielding wire)	10.~1.5mm²
Simple central controller	4-core cable(Shielding wire)	10.~1.5mm²

4) Separation of transmission and power lines

- If transmission and power lines are run alongside each other then there is a strong likelihood of operational faults developing due to interference in the signal wiring caused by electrostatic and electromagnetic coupling.
  The tables below indicates our recommendation as to appropriate spacing of transmission and power lines where these are to be run side by side

Current capacity of power line		Spacing
100V or more	10A	300mm
	50A	500mm
	100A	1000mm
	Exceed 100A	1500mm

Note:

1. The figures are based on assumed length of parallel cabling up to 100m. For length in excess of 100m the figures will have to be recalculated in direct proportion to the additional length of line involved.
2. If the power supply waveform continues to exhibit some distortion the recommended spacing in the table should be increased.

- If the lines are laid inside conduits then the following point must also be taken into account when grouping various lines together for introduction into the conduits
- Power lines(including power supply to air conditioner) and signal lines must not be laid inside the same
- In the same way, when grouping the lines power and signal lines should not be bunched together.

⚠ CAUTION

■ If apparatus is not properly earthed then there is always a risk of electric shocks, the earthing of the apparatus must be carried out by a qualified person.

◆ Wiring of Main Power Supply and Equipment Capacity

1. Use a separate power supply for the Outdoor Unit and Indoor Unit.
2. Bear in mind ambient conditions (ambient temperature,direct sunlight, rain water,etc.) when proceeding with the wiring and connections.
3. The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker taking into account the line voltage drops. Make sure the power-supply voltage does not drop more than 10%.
4. Specific wiring requirements should adhere to the wiring regulations of the region.
5. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
6. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.

⚠ WARNING

- **Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.**
- **Make sure to use specified wires for connections so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.**
- **Make sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.**

⚠ CAUTION

- **Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.**
- **Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.**

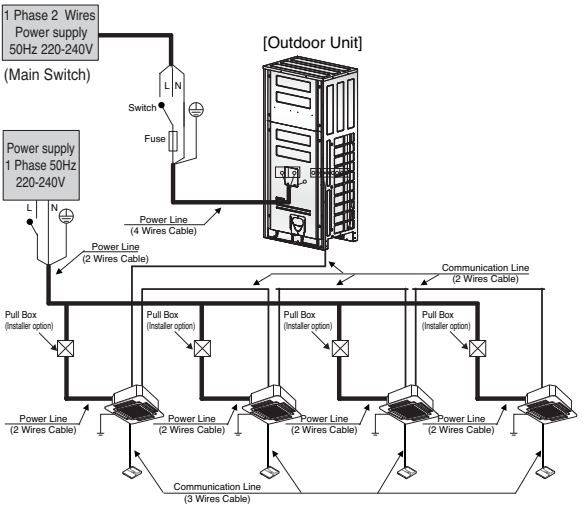
⚠ CAUTION

When the 400 volt power supply is applied to "N" phase by mistake, replace inverter PCB and transformer in control box.

1. 50Hz

◆ Example Connection of Communication Cable

■ 1 Outdoor Unit-1Ø, 220-240V



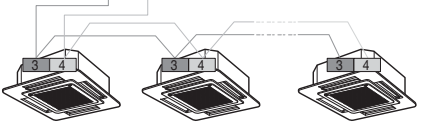
[Indoor Units]

⚠ WARNING

- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**

Between Indoor and Outdoor unit

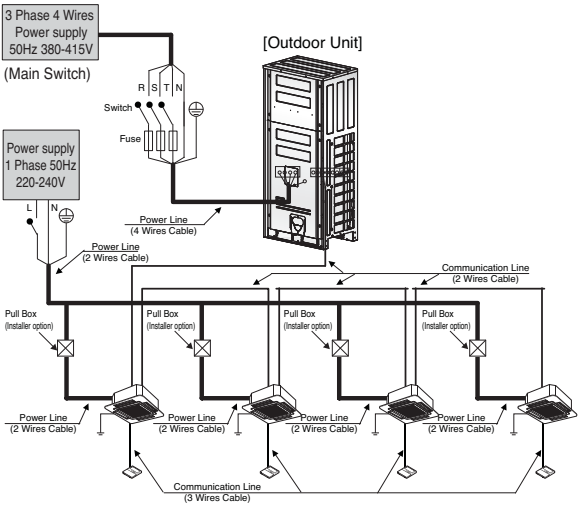
SODU		IDU		INTERNET		DRY1	DRY2	GND	12V	
B	A	B	A	B	A					Outdoor Unit



The GND terminal at the main PCB is a '-' terminal for day contact, it is not the point to make ground connection.

◆ Example Connection of Communication Cable

■ 1 Outdoor Unit-3Ø, 380-415V



[Indoor Units]

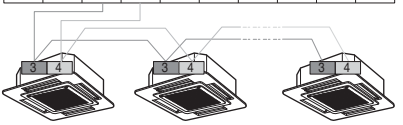
⚠ WARNING

- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**

Between Indoor and Outdoor unit

SODU		IDU		INTERNET		DRY1	DRY2	GND	12V
B	A	B	A	B	A				

Outdoor Unit

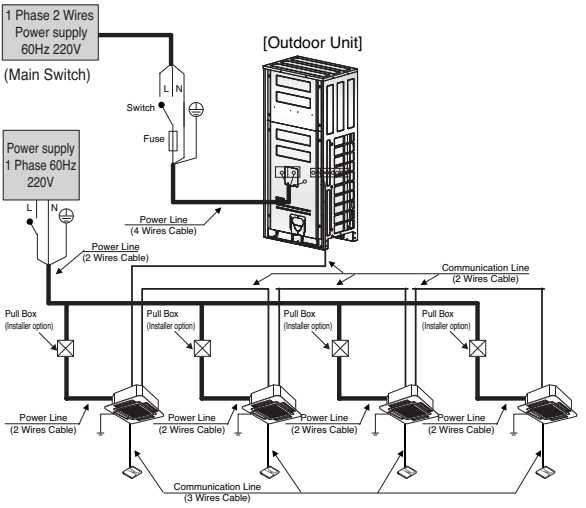


The GND terminal at the main PCB is a '-' terminal for day contact, it is not the point to make ground connection.

2. 60Hz

◆ Example Connection of Communication Cable

■ 1 Outdoor Unit-1Ø, 220V



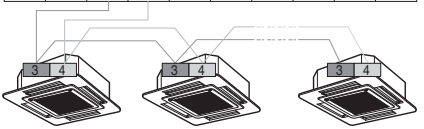
WARNING

- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**

Between Indoor and Outdoor unit

SODU		IDU		INTERNET		DRY1	DRY2	GND	12V
B	A	B	A	B	A				

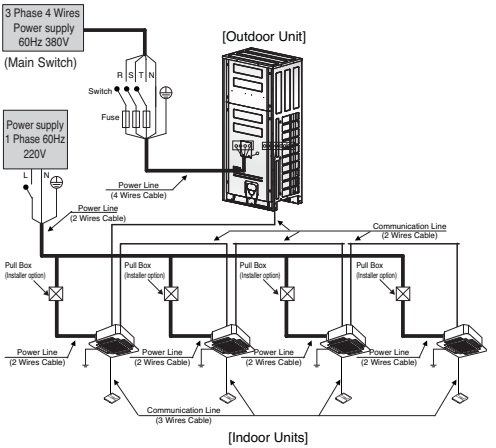
Outdoor Unit



The GND terminal at the main PCB is a '-' terminal for day contact, it is not the point to make ground connection.

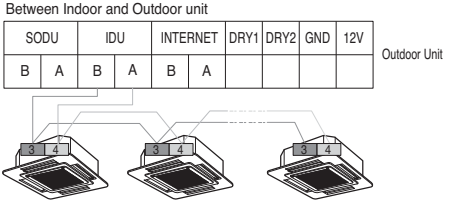
◆ Example Connection of Communication Cable

■ 1 Outdoor Unit-3Ø, 380V



WARNING

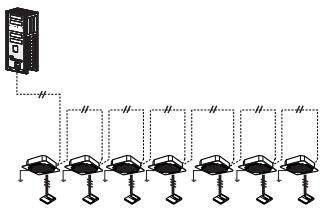
- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**



The GND terminal at the main PCB is a '-' terminal for day contact, it is not the point to make ground connection.

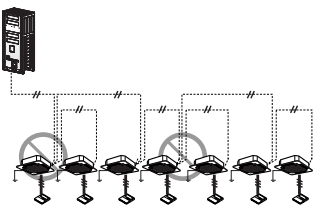
[BUS type]

- Connection of communication cable must be installed like below figure between indoor unit to outdoor unit.



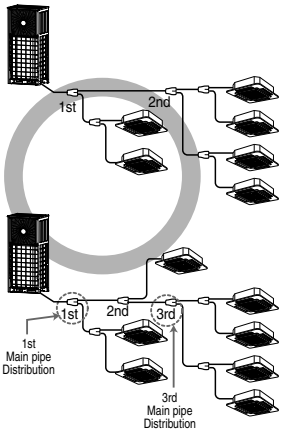
[STAR type]

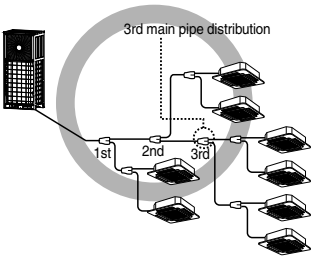
- Abnormal operation can be caused by communication defect, when connection of communication cable is installed like below figure(STAR type).



Distribution Method

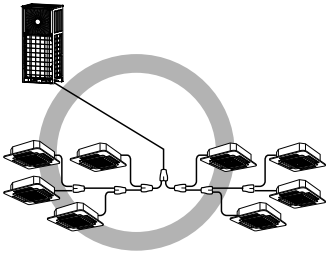
Line Distribution

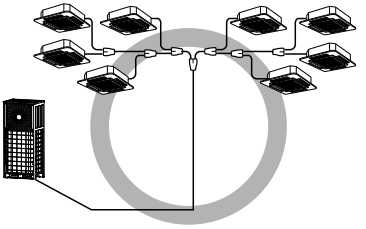




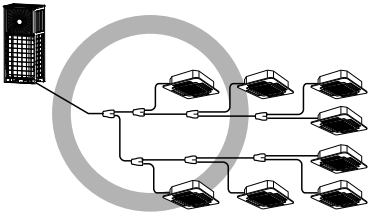
Vertical Distribution

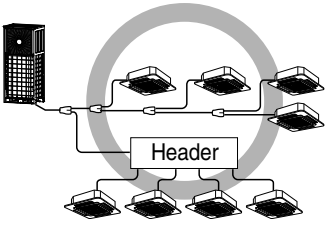
Ensure that the branch pipes are attached vertically.





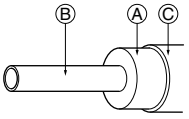
The others





Thermal Insulation of Refrigerant piping

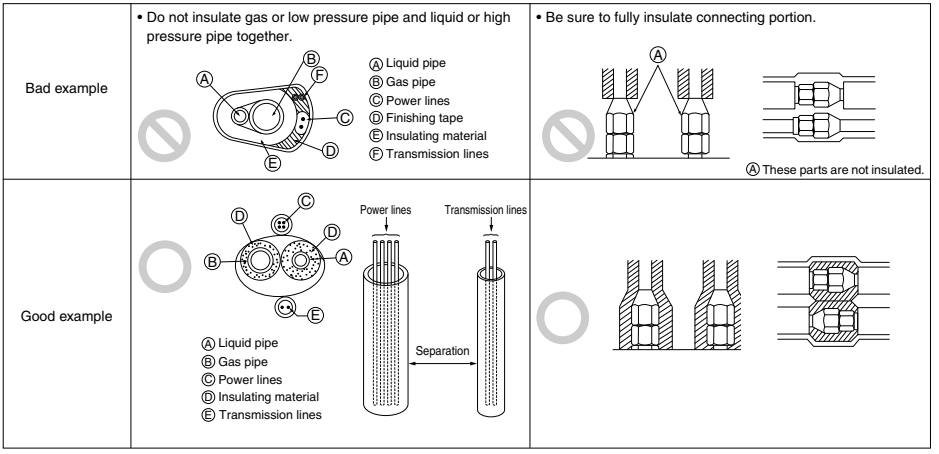
Be sure to give insulation work to refrigerant piping by covering liquid pipe and gas pipe separately with enough thickness heat-resistant polyethylene, so that no gap is observed in the joint between indoor unit and insulating material, and insulating materials themselves. When insulation work is insufficient, there is a possibility of condensation drip, etc. Pay special attention to insulation work to ceiling plenum.



Ⓐ Heat insulation material
Ⓑ Pipe
Ⓒ Outer covering
(Wind the connection part and cutting part of heat insulation material with a finishing tape.)

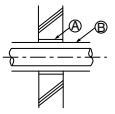
Heat insulation material	Adhesive + Heat - resistant polyethylene foam + Adhesive tape	
Outer covering	Indoor	Vinyl tape
	Floor exposed	Water-proof hemp cloth + Bronze asphalt
	Outdoor	Water-proof hemp cloth + Zinc plate + Oily paint

Note:
When using polyethylene cover as covering material, asphalt roofing shall not be required.

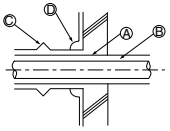


Penetrations

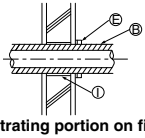
Inner wall (concealed)



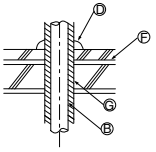
Outer wall



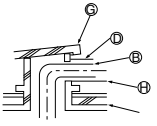
Outer wall (exposed)



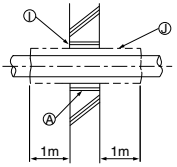
Floor (fireproofing)



Roof pipe shaft



Penetrating portion on fire limit and boundary wall

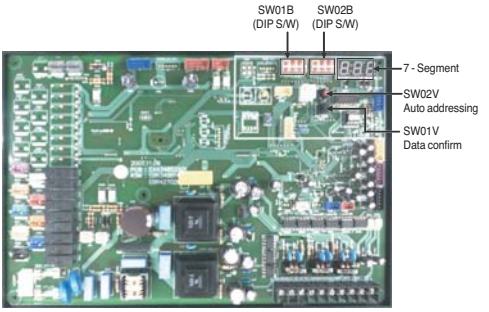


Ⓐ Sleeve
Ⓑ Heat insulating material
Ⓒ Lagging
Ⓓ Caulking material
Ⓔ Band
Ⓕ Waterproofing layer
Ⓖ Sleeve with edge
Ⓗ Lagging material
Ⓘ Mortar or other incombustible caulking
Ⓙ Incombustible heat insulation material

When filling a gap with mortar, cover the penetration part with steel plate so that the insulation material will not be caved in. For this part, use incombustible materials for both insulation and covering.(Vinyl covering should not be used.)

Automatic Addressing

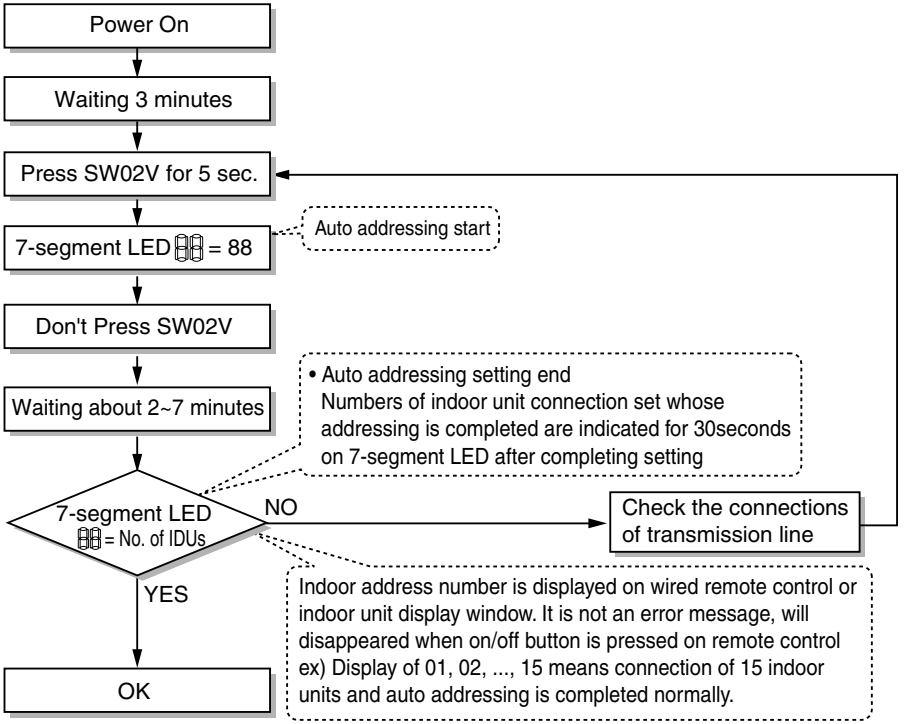
- **The address of indoor units would be set by auto addressing**
  1) Wait for 3 minutes after applying power supply (main and sub outdoor unit, indoor unit).
  2) Press the switch of the outdoor unit (SW02V) for 5 seconds.
  3) A "88" is indicated on 7-segment LED of the outdoor unit PCB.
  4) For completing addressing, 2~7 minutes are required depending on numbers of indoor unit connection set.
  5) Numbers of indoor unit connection set whose addressing is completed are indicated for 30seconds on 7-segment LED of the outdoor unit PCB.
  6) After completing addressing, address of each indoor unit is indicated on the wired remote control display window. (CH01, CH02, CH03, ... CH06: Indicated as numbers of indoor unit connection set.)



CAUTION

- In replacement of the indoor unit PCB, always perform auto address setting again. If power supply is not applied to the indoor unit, operation error occurs. Auto addressing is only possible on the main PCB Auto addressing has to be performed after 3 minutes to improve communication.

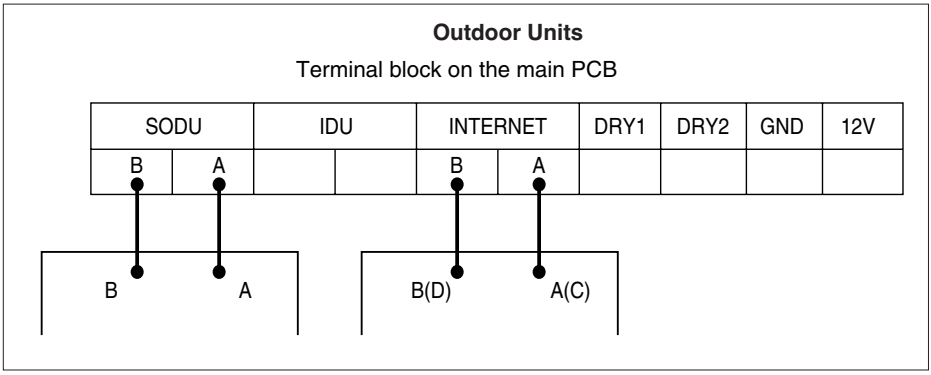
◆ The Procedure of Automatic Addressing



Group Number setting

Group Number setting for Indoor Units

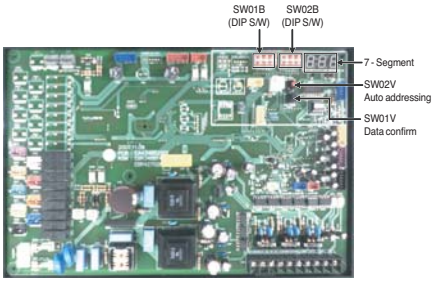
① Confirm the power of whole system(Indoor Unit, Outdoor Unit) is OFF, otherwise turn off.
② The transmission lines connected to INTERNET terminal should be connected to central control of Outdoor unit with care for their polarity(A → A, B → B)
③ Turn the whole system on.
④ Set the group and Indoor Unit number with a wired remote control.
⑤ To control several sets of Indoor Units into a group, set the group ID from 0 to F for this purpose.

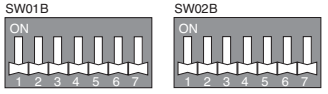


Group recognizing the simple central controller
No.0 group (00~0F)
No.1 group (10~1F)
No.2 group (20~2F)
No.3 group (30~3F)
No.4 group (40~4F)
No.5 group (50~5F)
No.6 group (60~6F)
No.7 group (70~7F)
No.8 group (80~8F)
No.9 group (90~9F)
No. A group (A0~AF)
No. B group (B0~BF)
No. C group (C0~CF)
No. D group (D0~DF)
No. E group (E0~EF)
No. F group (F0~FF)

Location of Dip Switch

Main PCB





<Initial shipping condition of Dip Switch>

1. When outdoor unit is powered on after configuring the dip switch, proper input of configuration value can be verified through 7 Segment.
2. This function is shown only for 2 seconds after turning on the power.

■ **Verification of outdoor unit configuration**

- After power is turned on, number are shown on 7 Segment consecutively
- These numbers show the configuration status
- In case of 3Ø, 6HP model

Order	Category
181	Model Code
6	HP
-	2 : Heatpump, No display : Cooling only
25	Display of normal mode
172	Model type

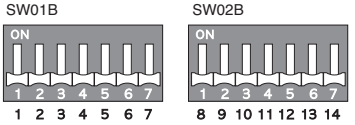
■ **Model Code**

Model Code	PHASE	HP	Model Type
180	1 phase	5	171
181		6	
180	3 phase	5	172
181		6	
182		8	

WARNING

Power of main PCB should be reset in order to recognize the changed function after handling the dip switch for configuration of additional functions. (Main PCB power should be reset after resetting the dip switch for cancellation of additional function) It can overstrain during product operation if the dip switch is not configured accurately. Please configure dip switch properly.

Configuration of Dip Switch



Function \ Dip switch number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Refrigerant Auto Charging	●	●					●						×	×
Refrigerant Checking	●	●					●						×	●
Indoor EEV Malfunction (Cooling Mode)	●	●					●						●	×
Integrated Trial Run Function (Cooling Mode)	●	●					×						●	×
Night Low Noise function (Cooling Only Mode)											●	×	●	
Vacuum Mode											●	×	×	●
Providing of contact point to commercial auto-louver											●			
Step 1 of Static Pressure Compensation				●										
Step 2 of Static Pressure Compensation			●											
Low Noise Operation			●	●										

WARNING

'X' mark on the table means that Dip Switch must be lowered. If this is not done, respective function may not operate properly. The product does not operate properly of respective dip switches are not configured properly. When carrying out a trial run, make sure to check that all indoor units are stopped by verifying the operation status if indoor units then execute.

Test Run

Checks before Test Run

1. **Test run should be performed after auto-addressing**
   Automatic address configuration requires separate verification as it is a verification item related to installation quantity by the installer after installation.
2. **Test run can be performed when 3 minutes passed after power on, by dip switches and buttons.**
   Needs time for initializing data of micom and readying communication with indoor unit.
3. **7-segment of outdoor unit displays test run status and error.**
   Display trial run process and error indication from the outdoor unit.
4. **During test run, if error occurs, then test run ends and proceeds final stage of test run** - system should be initial status by initializing all data of test run pressing black button for 2 seconds after all dip switch off
5. **In case of finishing test run during test run, press black and red button simultaneously for 5 seconds.**
6. **When test run is finished, indoor units are stopped and 938 is displayed after 90 seconds.**
7. **To perform FDD logic test, proceeds when 3 minutes passed after reset.**

Test Run Procedure

Step 0. Check order signal
Select the function of test run

Step 1. Sensor checking
Check sensor abnormality.

Step 2. Refrigerant auto charging
In case of adding additional refrigerant, this function helps adding refrigerant automatically.

Step 3. Refrigerant checking
Check refrigerant amount is proper.

Step 4. Inspection of EEV and faulty electrical connection of indoor unit.
Inspect whether there are any malfunction of EEV attached to the indoor unit or any faulty electrical connection on the indoor unit.

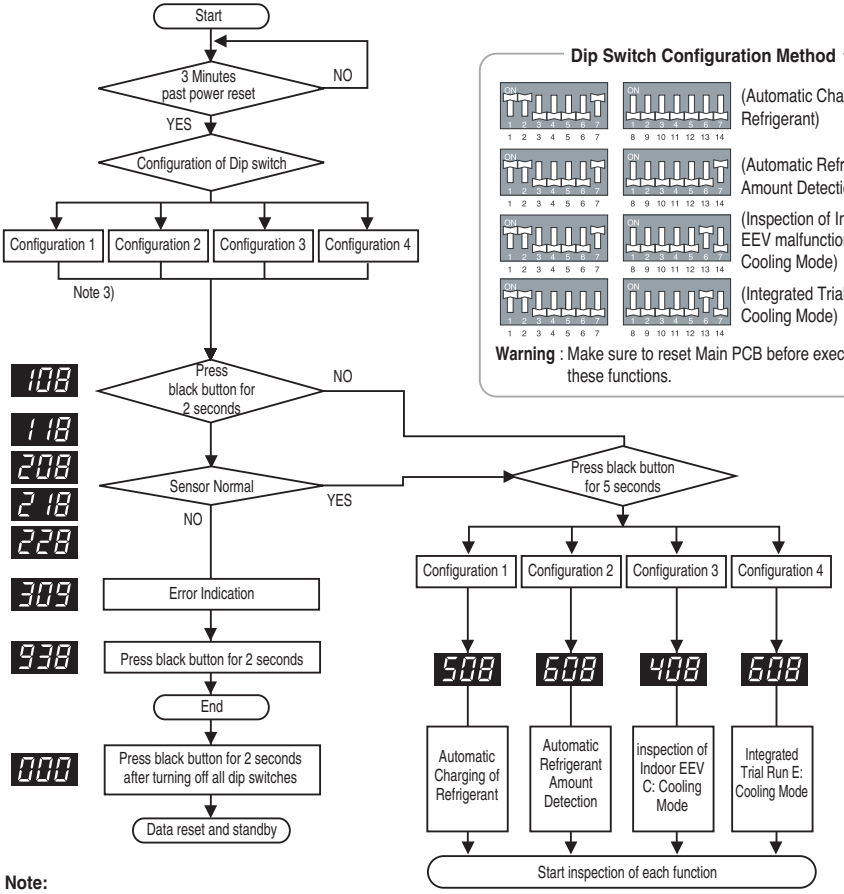
Step 5. Integrated Trial Run
It is a process to verify regularity of components attached to the system and normal operation of the system.

Step 6. Real-time inspection of sensor
Inspect the sensor in real-time while it is in operation.

❉ Inspection for direct connection of gas pipe and liquid pipe: Inspect whether gas pipe and liquid pipe are directly connected.

Sensor Checking Function

Sensor inspection function is a function to judge whether its current temperature sensed by each sensors attached to outdoor and indoor units(3 temperature sensors attached to indoor unit, 5 temperature sensors and 2 pressure sensors attached to outdoor unit) are appropriate. It can be used for detecting sensor defects. Note2) Sensor Inspection Function can be executed before operation of 4 FDD functions or can be omitted.



Note:

1. Sensor checking function is used with Refrigerant Checking and Refrigerant Auto Charging.
2. Check abnormal sensor
3. It is displayed at the LED on the main PCB at each step.
4. Refer to the next page for sensor error code part

CAUTION

1. Confirm auto addressing has been performed (Check installed number of IDU).
2. The error can be displayed even if the sensor is normal according to installation and temperature condition. If error occurs, check the sensor and judge abnormality.

Sensor Check Error Code Display

Error display during sensor inspection process is composed of 3 stages as shown below, and is proceeded by repeating these stages

■ **Step 1 : Display of error existence : 309 or 319**
- 309 : Inspect sensors of outdoor unit
- 319 : Inspect sensors of indoor unit

■ **Step 2: Display of error location**
- In case of 309 (outdoor unit sensors)
  2 digits on the left among 7 segments – Sensor Type (Table1)
  1 digit on the right among 7 segments – Outdoor Unit Number
- In case of 319 (indoor unit sensors)
  2 digits on the left among 7 segments – Indoor Unit Number (Same as LGMV (automatic address configuration) indoor unit number)
  1 Digit on the right among 7 segments – Sensor Type (Table 2)

■ **Step 3: Turn Off**

❊ 1 error is displayed through 3 stages above and maximum of 5 errors are displayed.

Displaying error content

■ Displaying outdoor unit error

1. 1st and 2nd number represents error content(code).
2. Last number represents outdoor unit number.

1	Outdoor Air Temperature
5	Liquid Pipe Temperature
6	SC pipe out
7	Suction Temperature
8	Inverter Compressor Discharge Temperature
11	High Pressure Sensor
12	Low Pressure Sensor

ex) Indoor unit No. 2 pipe inlet temperature sensor error



ex) Outdoor unit liquid pipe temperature sensor error



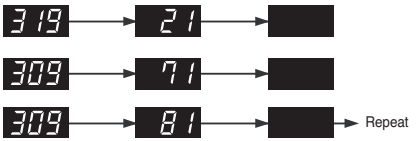
■ Indoor unit error display

1. 1st and 2nd number represents indoor unit number.
   Indoor unit number follows auto addressing number.
2. Last number represents sensor.

1	Pipe inlet temperature sensor
2	Pipe outlet temperature sensor
3	Air temperature sensor

❊ Indoor unit number follows Auto addressing number.

ex) 실내/외기 동시 에러 발생 시
- 실내기 2번의 배관 입구 온도 센서 및 실외기의 흡입온도 센서, 실외기 압축기 토출 온도 센서 불량인 경우



CAUTION

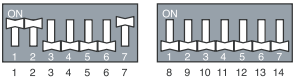
1. Up to 5 number of errors is displayed continuously and repeatedly. In case 5 number of errors occurs, again perform sensor checking after solving errors.
2. IDU in which error occurred operates air circulation mode.

Refrigerant Auto Charging

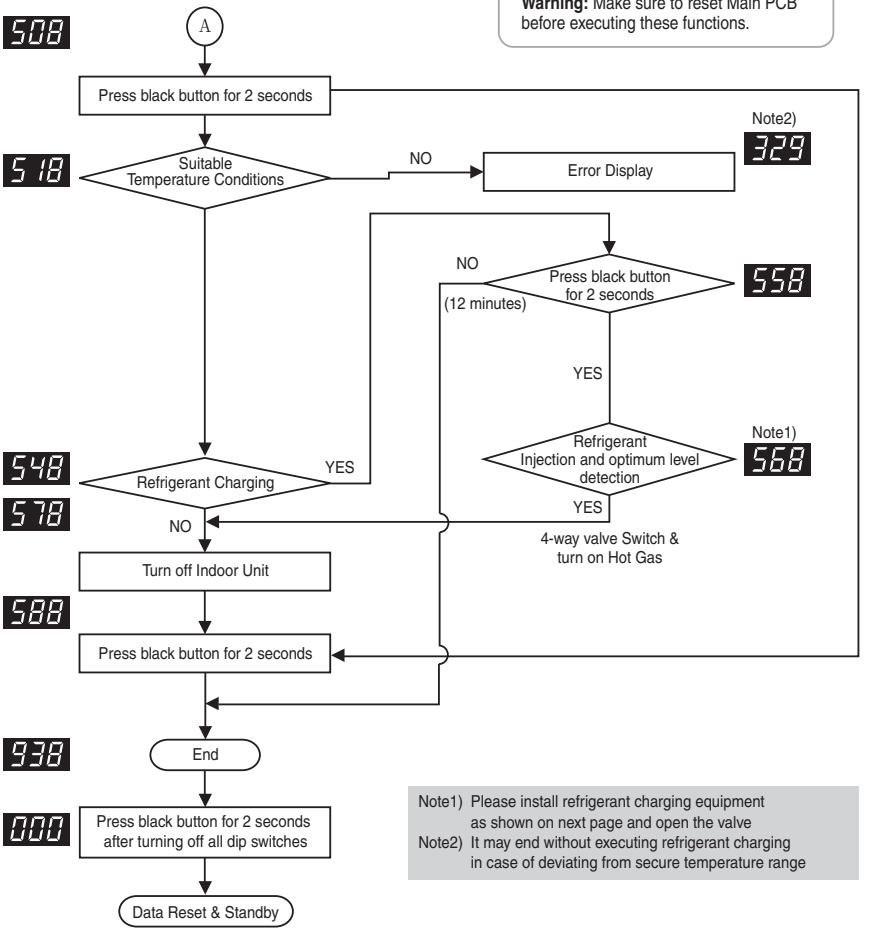
It is a function to charge appropriate amount of refrigerant in the system automatically through cycle operation. Automatic Charging of Refrigerant function can be used when refrigerant amount is inaccurate due to service or leakage in the pipe. Please use refrigerant charging only during service.

❊ Refrigerant charging time may differ according to charging amount (Charging Time : about 3 mins / kg)

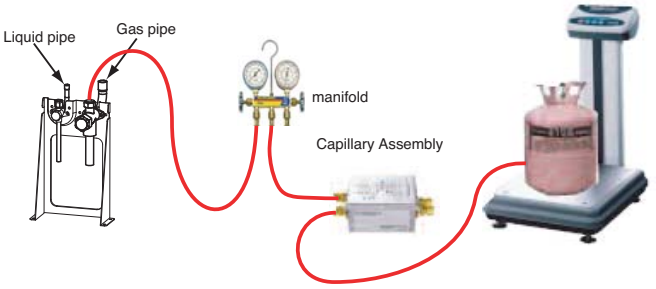
Dip Switch Configuration Method



Warning: Make sure to reset Main PCB before executing these functions.



Note1) Please install refrigerant charging equipment as shown on next page and open the valve
Note2) It may end without executing refrigerant charging in case of deviating from secure temperature range



Procedure

1. **Arrange manifold,capillary assembly, refrigerant vessel and scale**
2. **Connect manifold to the gas pipe service valve of ODU as shown in the figure.**
3. **Connect manifold and Capillary tube.**
   Use designated capillary assembly only.
   If designated capillary assembly isn't used, the system may get damaged.
4. **Connect capillary and refrigerant vessel.**
5. **Purge hose and manifold.**
6. **After**  **Is displayed, open the valve and charge the refrigerant**

■ Error contents about auto refrigerant charging function

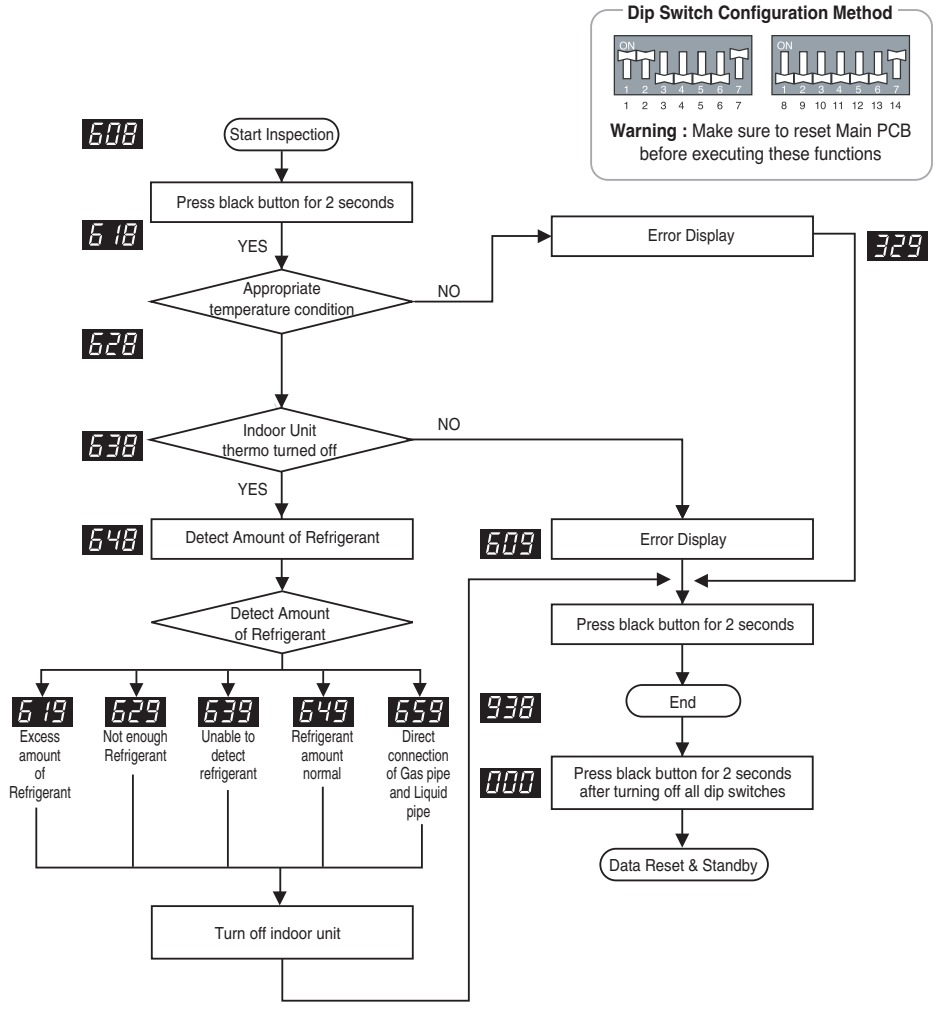
1.  : Temperature Range Error (In case that IDU or ODU is out of range)
2.  : Low Pressure Descent Error (In case the system runs at low pressure limit for over 10 minutes)
3.  : Judging rapid refrigerant inflow (In case the liquid refrigerant flows in because of not using designated Capillary Assembly)
4.  : Instability Error(In case the high/low pressure target doesn't get satisfied for some time after the starting operation)

CAUTION

1. **Guaranteed temperature range (Error will occur if temperature is out of range)**
   IDU : 20~32°C
   ODU : 0~43°C
2. **For refrigerant charging, use designated device only. (Capillary Assem Set)**
3. **Set the IDU wired remote controller temperature sensing mode as IDU**
4. **Be careful that IDU should not be thermo off.**

Refrigerant Checking

It is a function to detect refrigerant amount of the system automatically through cycle operation.
As a function to detect refrigerant leak and excess, it can be used together with Automatic Refrigerant Charging Function.



CAUTION

1. **Guaranteed Temperature range(Error occurs out of guaranteed temperature range)**
   IDU : 20~32°C
   ODU : 10~38°C
2. **Set IDU wired remote controller temperature sensor setting as 'IDU'.**
3. **Make certain that IDU doesn't run with thermo off mode during operation.**

[Error contents about auto refrigerant charging function]

1. 329 : Temperature Range Error (In case that IDU or ODU is out of range)
2. 609 : System Unstable Error (In case, After 45 min operating the system, it does not be stable)

How to cope with Result of Refrigerant Checking

1. If the temperature is not in guaranteed Temperature range, the system will not execute Refrigerant checking and the system will be OFF.
2. **Excess of Refrigerant(619)**
   After remove the 20% of calculated total refrigerant, recharge the refrigerant by using Refrigerant Auto Charging Function.
3. **Scarcity of Refrigerant(629)**
   Charge the refrigerant by using Refrigerant Auto Charging Function.
4. **Impossible to Judge(639)**
   IF the system is not in order, check the other problem except refrigerant.

Inspection of Indoor EEV malfunction

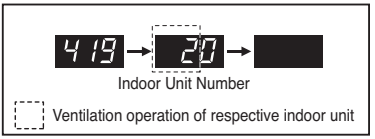
It is a function to detect disconnection of EEV of Indoor unit and disconnection between indoor and outdoor units by detecting temperature sensor of indoor unit through change in refrigerant amount inflow into the indoor unit due to fluctuations of indoor EEV during system operation.

Dip Switch Configuration Method



Warning: Make sure to reset Main PCB before executing these functions

Note1)

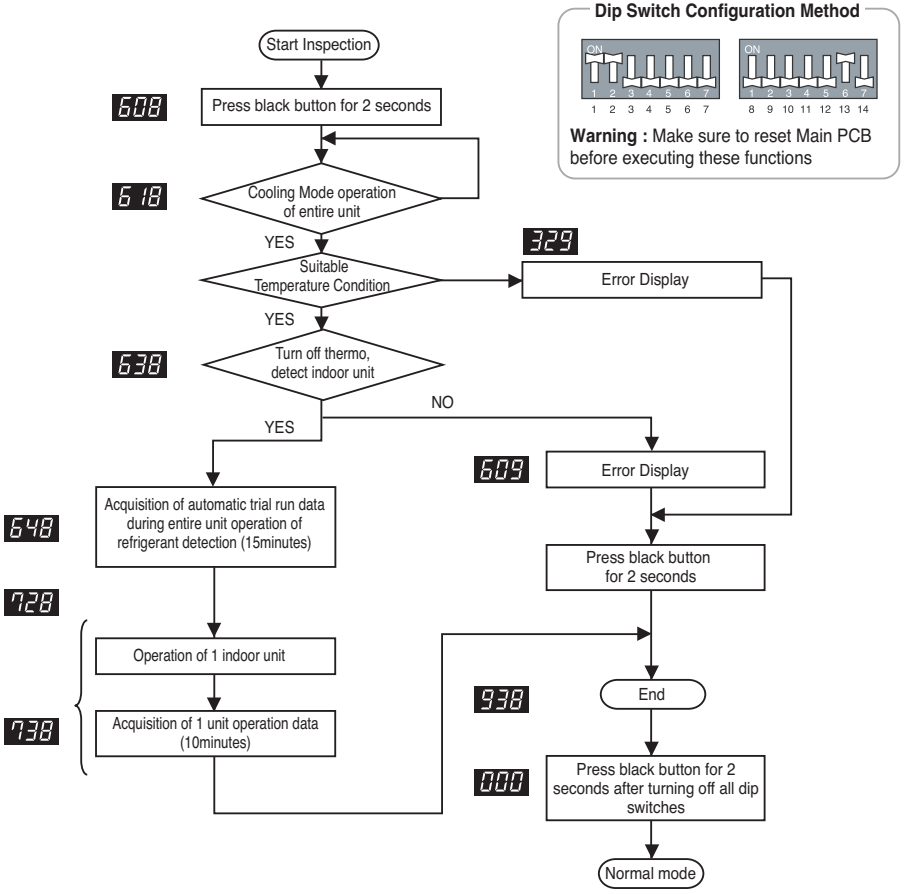


CAUTION

1. An error occurs when deviated from secure temperature range.
   Please select trial run mode by considering the outside environment temperature.
   - Cooling Mode : Indoor 20~35°C, Outdoor 20~43°C

Integrated Trial Run Function - Cooling Mode

- It is a process to verify normal operation of the system and components attached to the system through system operation.
- It executes overall process including refrigerant detection logic then executes a process of verifying normal operation of each component when executed in Cooling Mode.
- Secured data can be verified through LGMV



Note 1) Please whether normal or not by referring to multi V trial run result report.

Multi V Trial Run Result Report

Print in the order shown below using LG MV in order to issue Multi V Trial Run Result Report.



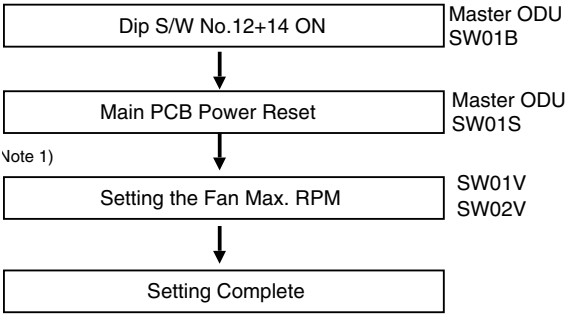
Multi V Trial Run Result Report											
Date											
Person in Charge		Company Name & Address					Telephone No.			Name	
	Installer										
	Consultant										
	Supervisor										
Product		Model			Model		No.	Installation Location			
	Outdoor Unit										
	Indoor Unit										
	Distributor										
Trial Run Result											
Operation mode					Entire Unit Operation			1 Unit Operation			Stage	
Inspection Item					Minimum	Maximum	Average	Minimum	Maximum	Average	Total	Judgment Standard
Temperature	Indoor Temperature											20~30°C
	Outdoor Temperature											
Indoor Unit	Inlet Pipe Temperature											
	Outlet Pipe Temperature											
	EEV Opening											
Outdoor Unit	Pressure	High Pressure										3600kPa ↓ (Cooling) 2300kPa ↓ (Heating)
		Low Pressure										1300kPa ↑ (Cooling) 200kPa ↑ (Heating)
	COMP	Comp Operation Verification										
		Inverter Current	Inverter 1									24A ↓
			Inverter 2									
			Inverter 3									
			Inverte r4									
		Exhaust Temperature	Inverter 1									50~100°C
			Inverter 2									
			Inverter 3									
			Inverter 4									
			Static 1									
			Static 2									
			Static 3									
			Static 4									
			Static 5									
			Static 6									
			Static 7									
			Static 8									
		Static Current	Static 1									18A ↓
			Static 2									
			Static 3									
			Static 4									
			Static 5									
			Static 6									
			Static 7									
			Static 8									
	Voltage	R-conductor										342~456V
		T-conductor										
	Current	R-conductor										20A ↓
		T-conductor										
	Exhaust overheat level	Outdoor Unit#1										10~50°C(Heating)
		Outdoor Unit#2										
		Outdoor Unit#3										
		Outdoor Unit#4										
	Intake Overheat level	Outdoor Unit#1										0.5°C ↑ (Cooling) 0.5°C~7°C(Heating)
		Outdoor Unit#2										
		Outdoor Unit#3										
		Outdoor Unit#4										
	EEV Opening	Outdoor Unit#1										
		Outdoor Unit#2										
		Outdoor Unit#3										
		Outdoor Unit#4										
	Estimated Refrigerant Amount											

Decision Standard means that when detection value deviates from this value, it can be decided as error, and in this case verifying again with considerations for cycle is recommended.

Night Low Noise Function

In cooling mode, this function makes the ODU fan operate at low RPM to reduce the fan noise of ODU at night which has low cooling load.

Max. RPM setting method



Example of Max. RPM Setting

Fan Max. RPM : Step 1

- Night silent operation start
  → 8 hours after max. ODU temp. sensing, the fan max. RPM is operated setting RPM.
- Night silent operation end
  → 9 hours after Night silent operation is started, the function should be stopped automatically.

⚠ CAUTION

1. Request installer to set the function during installation.
2. In case the function is not used, set the dip S/W OFF and reset the power.
3. If ODU RPM changes, cooling capacity may go down.

[Note]
1. Select appropriate RPM referencing noise table.

Step	Setting		Fan Max RPM	Judgment (hr)	Operation (hr)
	Black button	Red button			
1	1 time	1 time	510	8.0	9.0
2	2 times	1 time	510	6.5	10.5
3	3 times	1 time	510	5.0	12.0
4	4 times	1 time	450	8.0	9.0
5	5 times	1 time	450	6.5	10.5
6	6 times	1 time	450	5.0	12.0
7	7 times	1 time	400	8.0	9.0
8	8 times	1 time	400	6.5	10.5
9	9 times	1 time	400	5.0	12.0

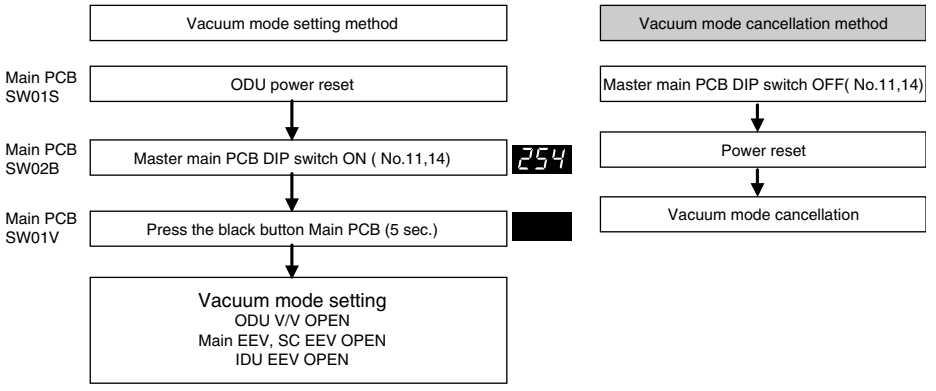
■ Noise Reduction Amount Compared to Standard Cooling Mode Operation.

Step	Front (Outdoor side)	Rear (Indoor side)
1~3 step	-3	-4
4~6step	-5	-5
7~9step	-7	-6

[dB]

Vacuum Mode

This function is used for creating vacuum in the system after compressor replacement, ODU parts replacement or IDU addition/replacement.



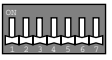
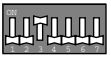
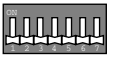
Caution

ODU operation stops during vacuum mode. Compressor can't operate.

Static Pressure Compensation Mode

It is a function to secure airflow of outdoor unit in case static pressure is applied to exhaust duct or other parts of the outdoor unit.

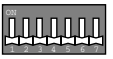
■ **Configuaration method for static pressure compensation dip switch(Reset the power after configuring the dip switch)**

Function	SW01B	SW02B	Remarks
Step 1			10Pa < External Static pressure ≤ 30Pa
Step 2			30Pa < External Static pressure ≤ 50Pa

Low Noise Operation

It is a function for reduction of outdoor unit noise at sites sensitive to noise.

■ **Configuration method for quiet operation dip switch(Reset the power after configuring the dip switch)**

Function	SW01B	SW02B	Remarks
Quiet Operation			MAX-200RPM

■ Noise reduction compared to Standard Cooling Mode operation [dB]

Mode	Front (Outdoor side)	Rear (Indoor side)
Quiet Operation	-7	-6

CAUTION

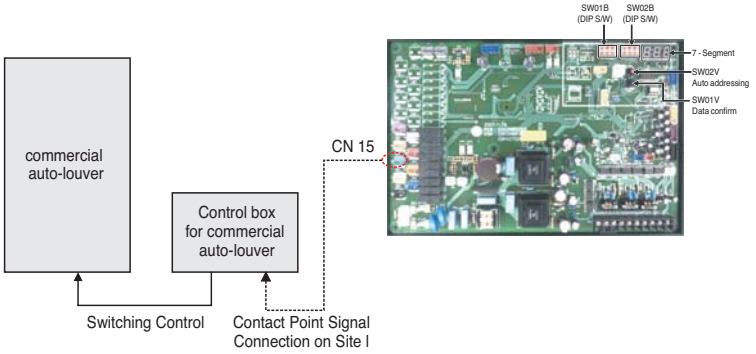
1. For configuration of functions, ask the installation specialist during installation of outdoor unit.
2. When not using the function, turn off the dip switch then reset the power.
3. Cooling capability may decline if RPM of outdoor unit is altered.

Function to provide contact point for connection to commercial auto-louver

It is a function to provide a contact point (220V) to connect the product and commercial auto-louver.

- Turn on indoor unit operation mode : Turn on contact point (Main PCB CN15 terminal 220V output)
- Turn off all indoor unit operation mode : Turn off contact point (Main PCB CN15 terminal 0V output)
- Dip switch configuration method of usage of contact point for connection to commercial auto-louver (Reset the power after configuring the dip switch)

Function	SW01B	SW02B	Remarks
Providing of contact point for connection to commercial auto-louver			Connection Point : Main PCB CN15 Terminal



CAUTION

Please carry out work after familiarizing the installation manual of auto-louver when using the product in connection with commercial auto-louver.

Please prepare and use additional components for connection suitable to site conditions.

Take precautions to selection of commercial auto-louver as it does not provide signals other than 220V contact point.

Self-Diagnosis Function

Error Indicator

- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on display window of indoor units and wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurrence, if error is released, error LED is also released simultaneously.

Error Display

1st,2nd LED of 7-segment indicates error number, 3rd LED indicates unit number.
❇ Refer to the DX-Venitilation manual for DX-Venitilation error code

	Display			Title	Cause of Error
Indoor unit related error	0	1	-	Air temperature sensor of indoor unit	Air temperature sensor of indoor unit is open or short
	0	2	-	Inlet pipe temperature sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
	0	3	-	Transmission error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal in indoor unit PCB
	0	4	-	Drain pump	Malfunction of drain pump
	0	5	-	Transmission error : outdoor unit ↔ indoor unit	Failing to receive outdoor unit signal in indoor unit PCB
	0	6	-	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0	7	-	Different operation mode	Operation mode between indoor unit and outdoor unit is different
	0	9	-	Indoor EEPROM Error	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFF
	1	0	-	Poor fan motor operation	Disconnecting the fan motor connector/Failure of indoor fan motor lock
	1	7	-	Inlet Air temperature sensor of FAU (FAU : Fresh Air Intake Unit)	Air temperature sensor of indoor unit is open or short
Outdoor unit related error	2	1	1	Outdoor Unit Inverter Compressor IPM Fault	Outdoor Unit Inverter Compressor Drive IPM Fault
	2	2	1	Inverter Board Input Over Current(RMS) of Outdoor Unit	Outdoor Unit Inverter Board Input Current excess (RMS)
	2	3	1	Outdoor Unit Inverter Compressor DC link Low Voltage	DC charging is not performed at outdoor unit after starting relay turn on.
	2	4	1	Outdoor Unit High Pressure Switch	System is turned off by outdoor unit high pressure switch.
	2	5	1	Outdoor Unit Input Voltage High/ Low Voltage	Outdoor Unit input voltage is over 487V or below 270V.
	2	6	1	Outdoor Unit Inverter Compressor Start Failure	The First Start Failure by Outdoor Unit Inverter Compressor Abnormality
	2	7	1	PSC/PFC Fault error	When over current flows instantly at PSC/PFC
	2	8	1	Outdoor Unit Inverter DC link High Voltage	System is turned off by outdoor unit DC Voltage Over Charging

	Display			Title	Cause of Error
Outdoor unit related error	2	9	1	Outdoor Unit Inverter Compressor Over Current	Outdoor Unit Inverter Compressor Fault OR Drive Fault
	3	2	1	Outdoor Unit Inverter Compressor High Discharge Temperature	System is turned off by outdoor unit Inverter Compressor High Discharge Temperature
	3	4	1	High Pressure of Outdoor Unit	System is turned off by excessive increase of high pressure of outdoor unit
	3	5	1	Low Pressure of Outdoor Unit	System is turned off by excessive decrease of low pressure of outdoor unit
	3	6	1	Low pressure ratio	Pressure ratio is under limit
	4	0	1	Outdoor Unit Inverter Compressor CT Sensor Fault	Outdoor Unit Inverter Compressor CT Sensor open or short
	4	1	1	Outdoor Unit Inverter Compressor Discharge Temperature Sensor Fault	Outdoor Unit Inverter Compressor Discharge Temperature Sensor open or short
	4	2	1	Outdoor Unit Low Pressure Sensor Fault	Outdoor Unit Low Pressure Sensor open or short
	4	3	1	Outdoor Unit High Pressure Sensor Fault	Outdoor Unit High Pressure Sensor open or short
	4	4	1	Outdoor Unit Air Temperature Sensor Fault	Outdoor Unit Air Temperature Sensor open or short
	4	6	1	Outdoor Unit Suction Temperature Sensor Fault	Outdoor Unit Suction Temperature Sensor open or short
	4	9	1	Defective IPM Temperature Sensor	Disconnection or short circuit on IPM temperature sensor of the outdoor unit
	5	0	1	ODU 3phase power omission error	Omitting one or more of R, S, T input power
	5	1	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of outdoor unit
	5	2	1	Communication error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of Outdoor Unit
	5	3	1	Communication error : indoor unit → main PCB of outdoor unit	Failing to receive indoor unit signal at main PCB of outdoor Unit.
	5	4	1	Wrong connection of 3Φ power supply cable (Reverse direction / missing phase)	Wrong connection of 3Φ power supply cable (Reverse direction / missing phase)
	5	7	1	Communication error : inverter PCB → Main PCB	Restriction of Outdoor Unit (Inverter PCB)
	6	0	1	Inverter PCB EEPROM error	Check EEPROM checksum error when resetting power
	6	7	1	Outdoor Unit Fan Lock	Restriction of Outdoor Unit
	7	1	1	PFC CT Sensor Error of Outdoor Unit	Outdoor Unit PFC CT Sensor open or short
	7	3	1	Instant Over Current(Peak) of Outdoor Unit PFC	Instant Over Current(Peak) of Outdoor Unit PFC
	7	5	1	Outdoor Unit Fan CT Sensor Error	Outdoor Unit Fan CT Sensor open or short
	7	6	1	Outdoor Unit Fan DC Link High Voltage Error	Outdoor Unit Fan DC Link High Voltage Error
	7	7	1	Outdoor Unit Fan Over Current Error	Outdoor Unit Fan Current is over 5A

	Display				Title	Cause of Error
Outdoor unit related error	7	9	1		Outdoor Unit Fan Start Failure Error	Outdoor Unit Fan First Position Sensing Failure
	8	6	1		Outdoor Unit Main PCB EEPROM Error	Communication Fail Between Outdoor Unit Main MICOM and EEPROM or omitting EEPROM
	8	7	1		Outdoor Unit Fan PCB EEPROM Error	Communication Fail Between Outdoor Unit Fan MICOM and EEPROM or omitting EEPROM
	8	8	1		PFC PCB EEPROM Error	Faulty communication between PFC MICOM and EEPROM of the outdoor unit or missing EEPROM
	1	0	5	1	Outdoor Unit Fan PCB Communication Error	Failing to receive fan signal at main PCB of unit.
	1	0	6	1	Outdoor Unit FAN IPM Fault Error	Instant Over Current at Outdoor Unit Fan IPM.
	1	0	7	1	Outdoor Unit Fan DC Link Low Voltage Error	Outdoor Unit Fan DC Link Input Voltage is under 380V.
	1	1	3	1	Outdoor Unit Liquid pipe Temperature Sensor Error	Liquid pipe temperature sensor of outdoor unit is open or short.
	1	1	5	1	Outdoor Unit Subcooling Outlet Temperature Sensor Error	Outdoor Unit Subcooling Outlet Temperature Sensor open or short.
	1	9	0	1	Overheating of inverter board radiator of the outdoor unit	Temperature of inverter board radiator of the outdoor unit higher than 130°C.
	1	9	1	1	Error in temperature sensor of inverter board radiator of the outdoor unit	Disconnection or short circuit on temperature sensor of inverter board radiator of the outdoor unit.
	1	9	3	1	Excessive increase of Outdoor Unit Fan PCB Heat Sink Temperature	Outdoor Unit Fan Inverter PCB Temperature is Over 95°C
	1	9	4	1	Outdoor Unit Fan PCB Heat Sink Temperature Sensor Error	Outdoor Unit Fan PCB Heat Sink Temperature Sensor open or short.
	2	4	2	1	Network Error	Network Error of the central control unit.

Caution For Refrigerant Leak

The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available.

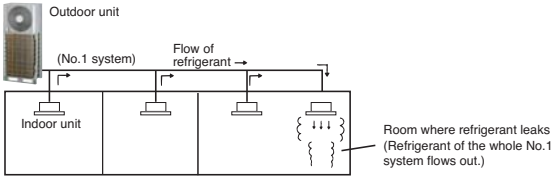
Introduction

Though the R410A refrigerant is harmless and incombustible itself , the room to equip the air conditioner should be large enough to such an extent that the refrigerant gas will not exceed the limiting concentration even if the refrigerant gas leaks in the room.

Limiting concentration

Limiting concentration is the limit of Freon gas concentration where immediate measures can be taken without hurting human body when refrigerant leaks in the air. The limiting concentration shall be described in the unit of kg/m^3 (Freon gas weight per unit air volume) for facilitating calculation.

Limiting concentration: 0.44kg/m^3(R410A)



Checking procedure of limiting concentration

Check limiting concentration along following steps and take appropriate measure depending on the situation.

Calculate amount of all the replenished refrigerant (kg) per each refrigerant system.

Amount of replenished refrigerant per one outdoor unit system + Amount of additional replenished refrigerant = Total amount of replenished refrigerant in refrigerant facility (kg)

Amount of replenished refrigerant at factory shipment

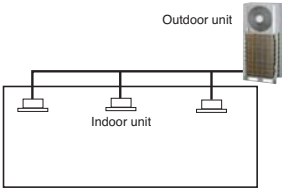
Amount of additionally replenished refrigerant depending on piping length or piping diameter at customer

Note : In case one refrigerant facility is divided into 2 or more refrigerant systems and each system is independent, amount of replenished refrigerant of each system shall be adopted.

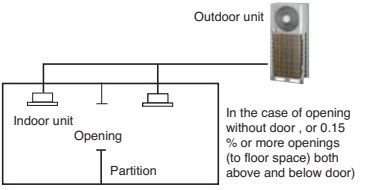
Calculate minimum room capacity

Calculate room capacity by regarding a portion as one room or the smaller room.

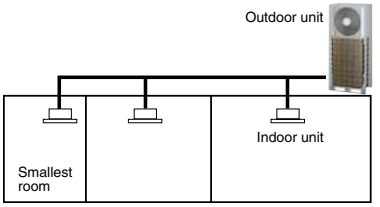
(1) Without partition



(2) With partition and with opening which serve as passage of air to adjoining room



(3) With partition and without opening which serve as passage of air to adjoining room



Calculate refrigerant concentration

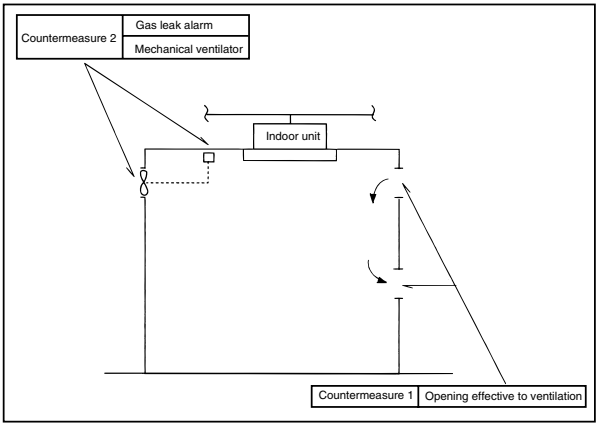
$$\frac{\text{Total amount of replenished refrigerant in refrigerant facility (kg)}}{\text{Capacity of smallest room where indoor unit is installed (m}^3\text{)}} \leq \text{Refrigerant concentration (kg/m}^3\text{) (R410A)}$$

In case the result of calculation exceeds the limiting concentration, perform the same calculations by shifting to the second smallest, and the third smallest rooms until at last the result is below the limiting concentration.

In case the concentration exceeds the limit

When the concentration exceeds the limit, change original plan or take one of the counter measure shown below:

- **Counter measure 1**
  Provide opening for ventilation.
  Provide 0.15% or more opening to floor space both above and below door, or provide opening without door.
- **Counter measure 2**
  Provide gas leak alarm linked with mechanical ventilator.



Pay special attention to the place, such as a basement, etc. where refrigerant can be present, since refrigerant is heavier than air.

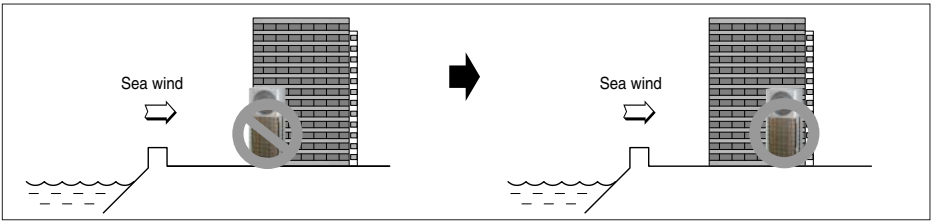
Installation guide at the seaside

⚠ CAUTION

1. **Air conditioners should not be installed in areas where corrosive gases, such as acid or alkaline gas, are produced.**
2. **Do not install the product where it could be exposed to sea wind (salty wind) directly. It can result corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient performance.**
3. **If outdoor unit is installed close to the seaside, it should avoid direct exposure to the sea wind. Otherwise it needs additional anticorrosion treatment on the heat exchanger.**

Selecting the location(Outdoor Unit)

1) If the outdoor unit is to be installed close to the seaside, direct exposure to the sea wind should be avoided. Install the outdoor unit on the opposite side of the sea wind direction.



2) Select a well-drained place.

❉ 1. If you can't meet above guide line in the seaside installation, please contact LG Electronics for the additional anticorrosion treatment.

2. Periodic (more than once/year) cleaning of the dust or salt particles stuck on the heat exchanger by using water.

⚠ CAUTION:

Multi V Space should be installed in the special outdoor room with soundproofing walls.


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