

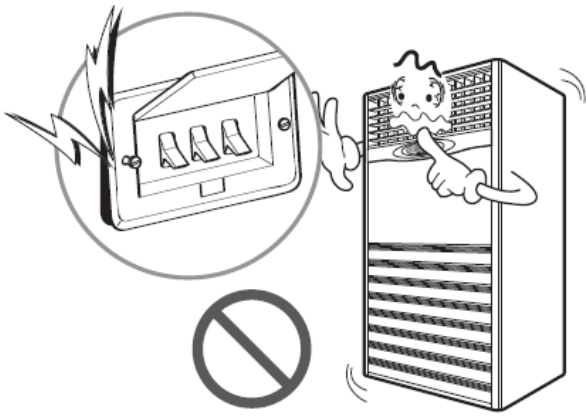


Smart Inverter Air Conditioner Installation Guide

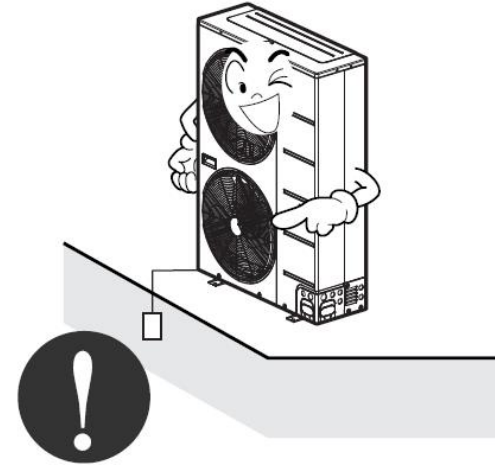
LG Air Conditioning Academy

SAFETY PRECAUTIONS

Safety Precautions



Do not use defective circuit breaker!



Always ground the product!

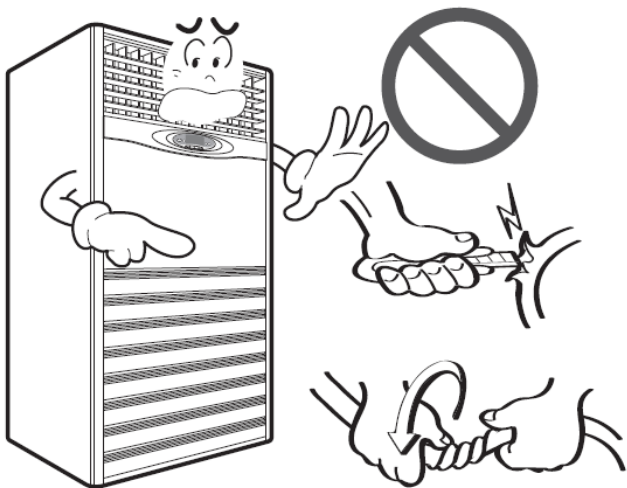


**Always call Authorized Personnel
to service the unit!**

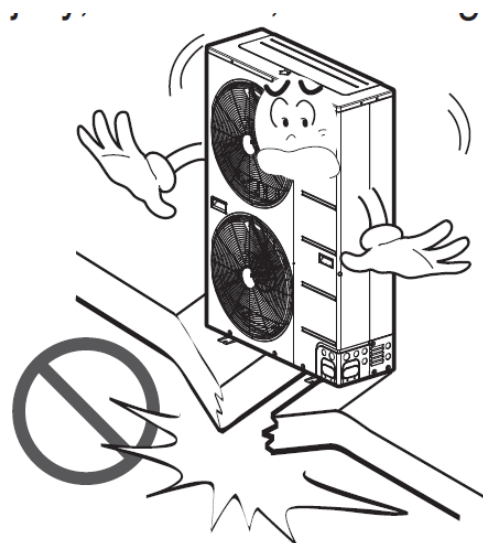


Secure the panel and cover of control box

Safety Precautions



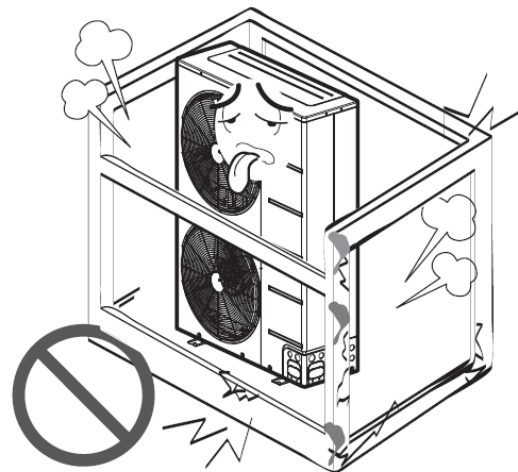
Do not modify or extend the power cable!



Do not install the product on a defective stand!

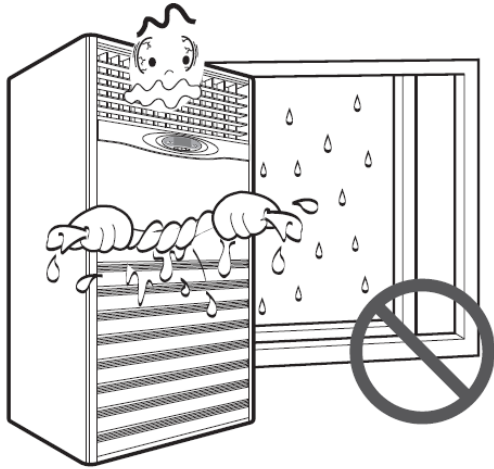


Be cautious when unpacking and installing the product!

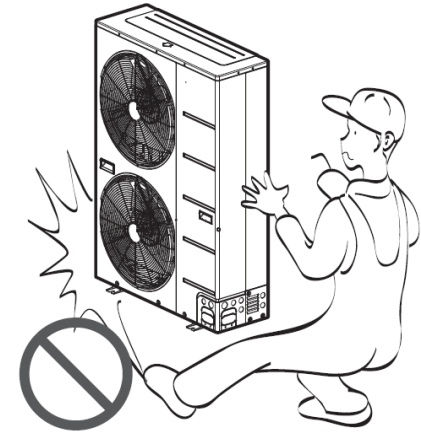


Be sure installation area does not deteriorate with age!

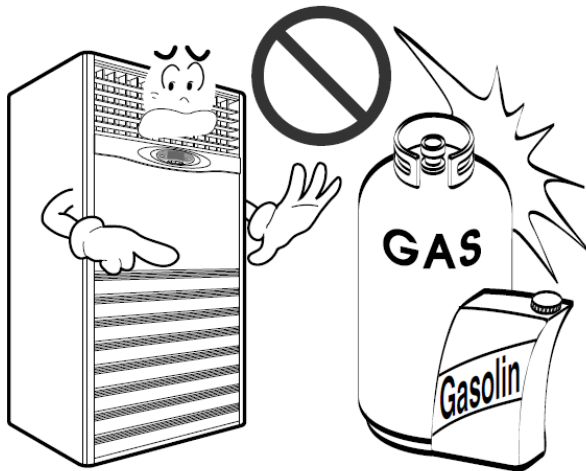
Safety Precautions



Do not let air conditioner run for a long time when there is high humidity



Do not carry the product by yourself!



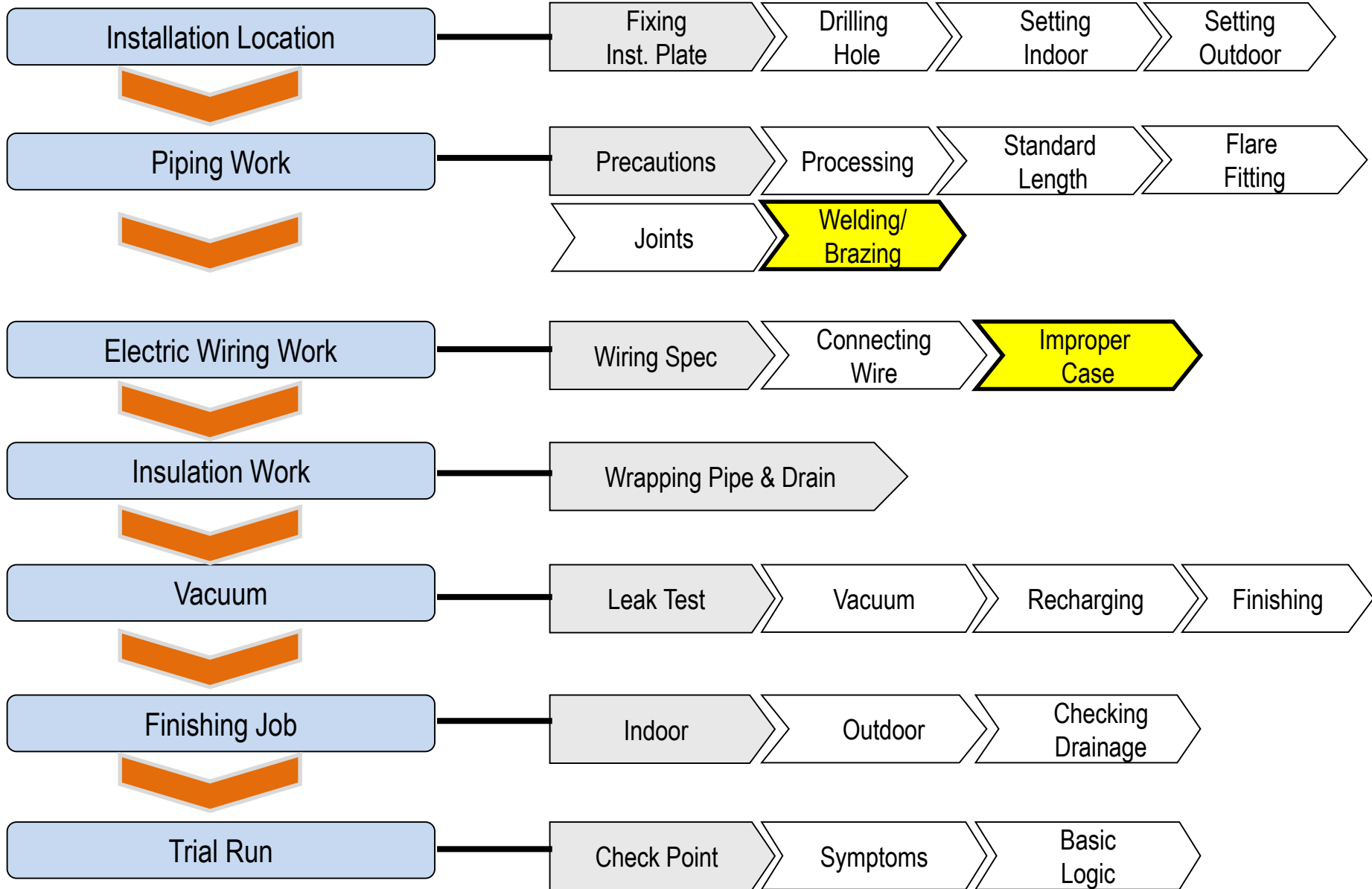
Do not store or use flammable gas or combustibles near the product

















Do not install the product where noise or hot air may disrupt the neighbor

INSTALLATION PROCESS, TOOLS AND MATERIAL HANDLING

Installation Work Flow



Installation Tools

Figure	Name	Figure	Name
	Screw driver, Spanner		Vacuum pump *Don't use refrigerator comp
	Measuring tape, Knife		Multi-meter Ampere meter
	Pincher plier, Nipper		Revering tool Pipe cutting
	Spring Hexagonal wrench		Manifold Gauge for R410A
	Hole core drill		Thermometer
	Vinyl tape		Flaring tool set
	Ladder, Horizontal Level		R410A/R32 tank

Material Handling

- ❑ Pipe must be protected from breakage, distortion, and damage when being handled for storage.
- ❑ Pipe caps should always be in place, and pipes should not be polluted by dust or moisture.
- ❑ Pipes must be clean, dry and tight

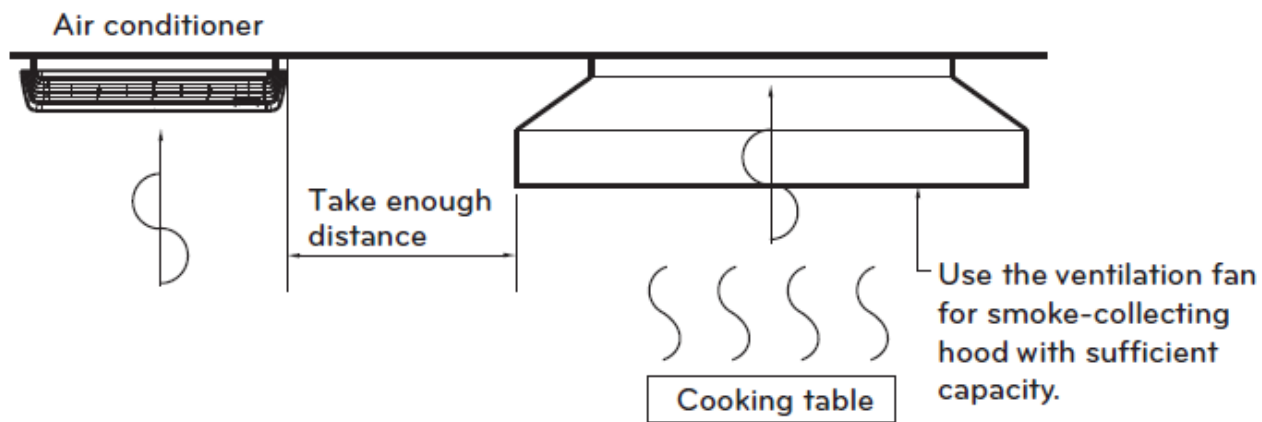
Good Example

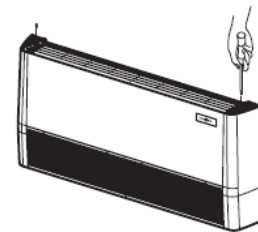
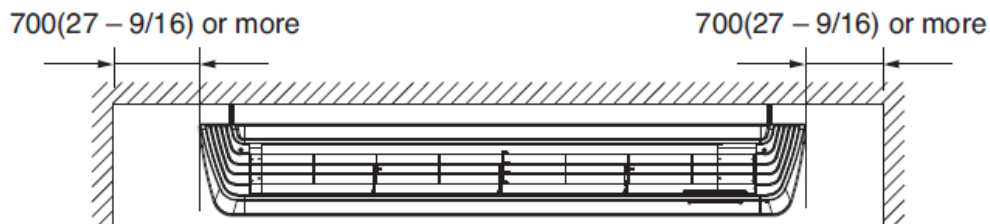
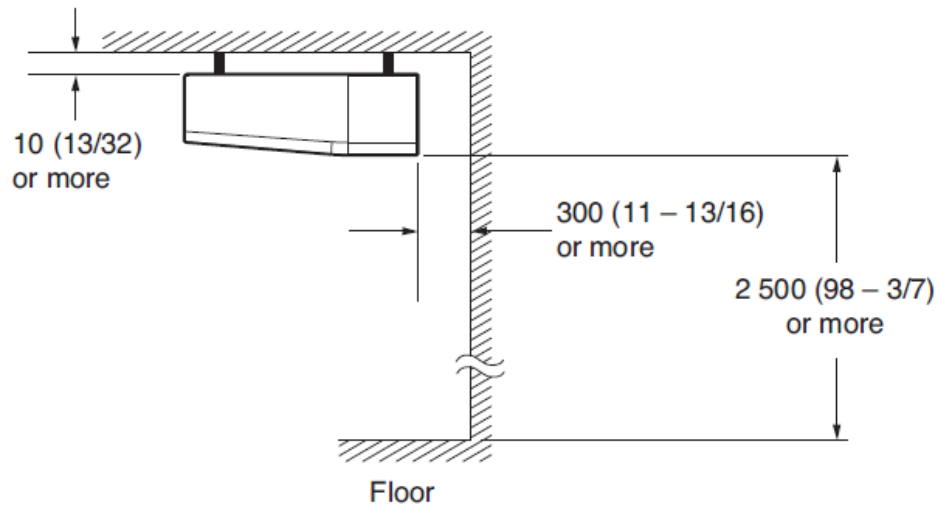


IDU/ODU INSTALLATION

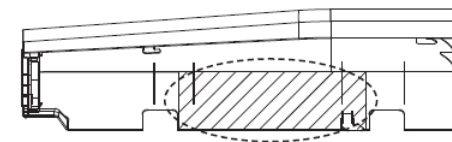
Indoor Unit Installation

- ✓ There should not be any heat source or steam near the unit
- ✓ There should not any obstacles to prevent the air circulation
- ✓ A place where air circulation in the room will be good
- ✓ A place where the drainage can be easily obtained
- ✓ A place where noise prevention is taken into consideration
- ✓ Do not install the unit near the doorway
- ✓ The indoor unit must keep the maintenance space.

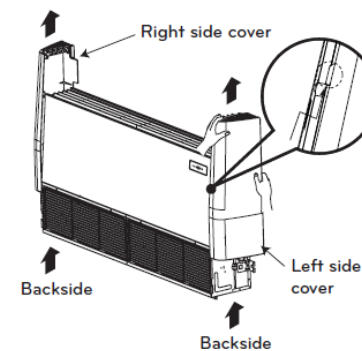




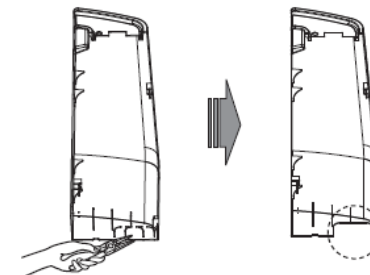
Step 1 : Remove two screws from side cover



Step 3 : Remove paper bracket from side cover

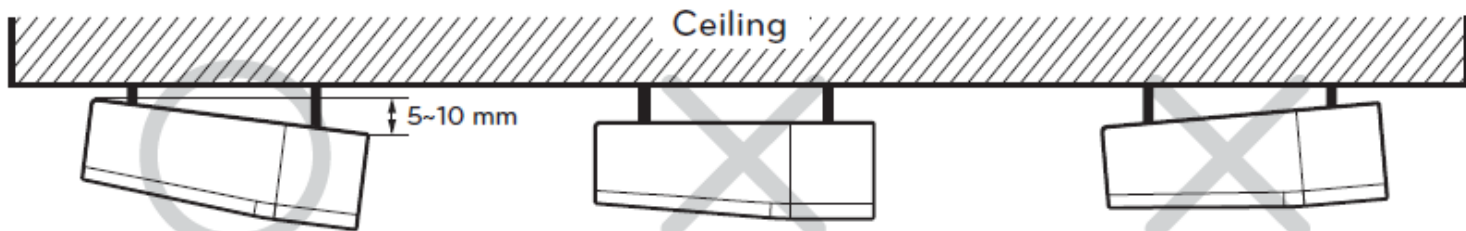
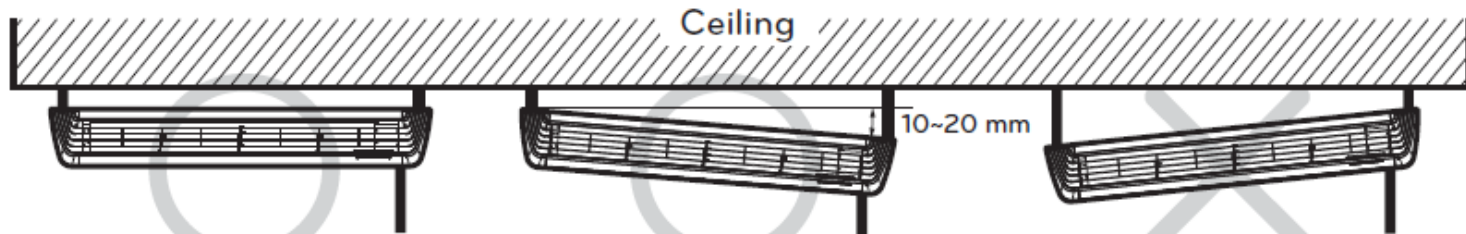


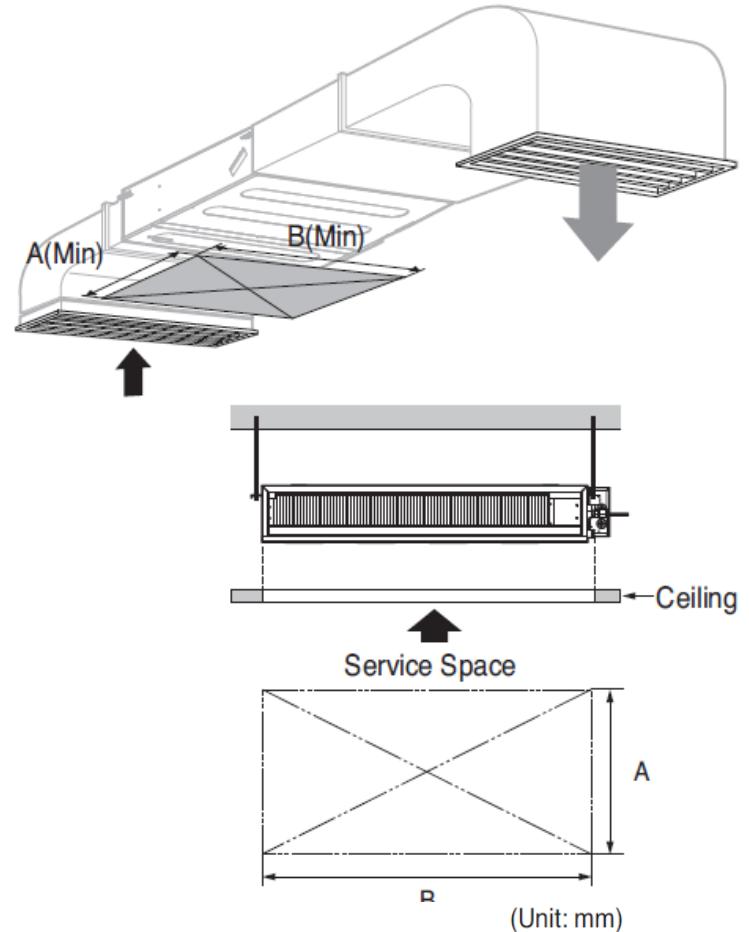
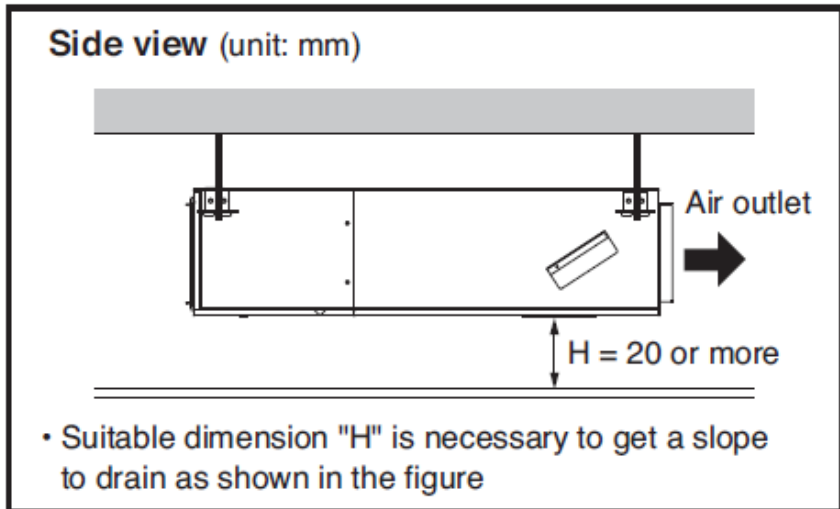
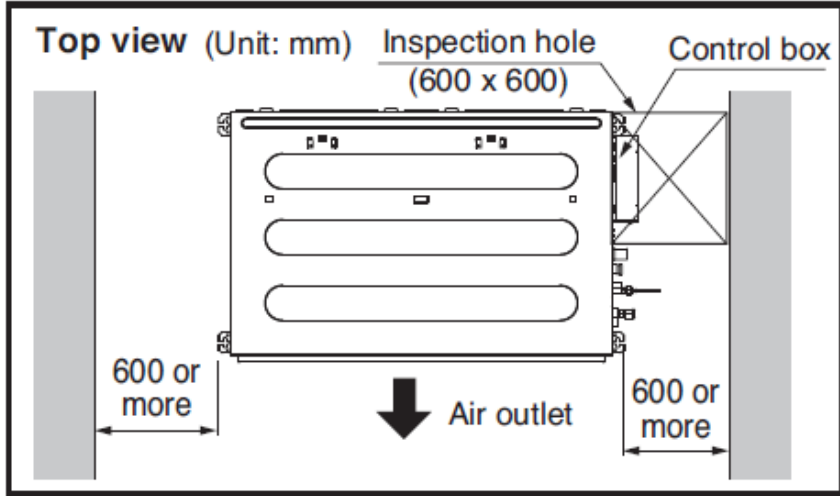
Step 2 : Unlock side cover from side-panel slightly.



Step 4 : Knock out the pipe hole from the left side cover with nipper/plier

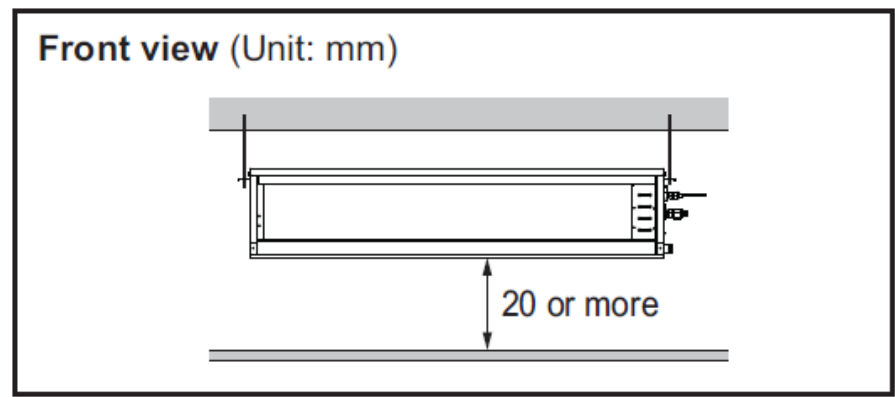
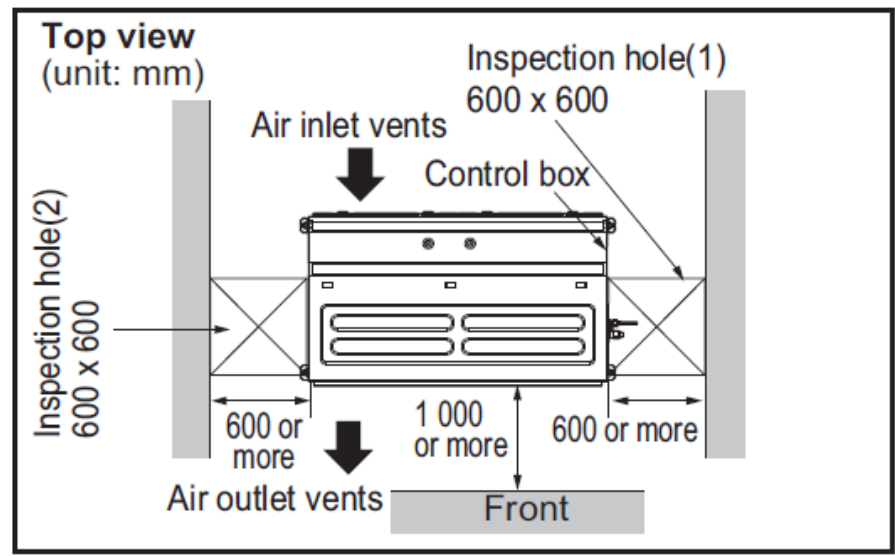
- The unit must be horizontal or inclined at angle towards the drain line
- The inclination should be less than or equal to 1 degree or in between 10 to 20 mm inclined towards the drain direction.
- The unit must be inclined to the bottom side of the unit when finished installation



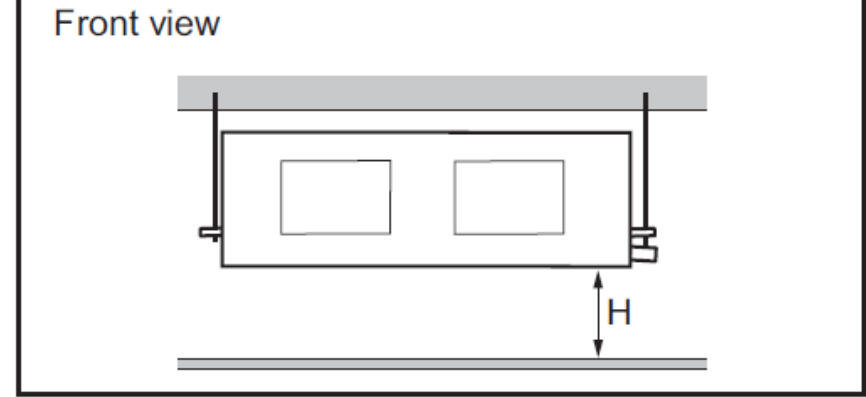
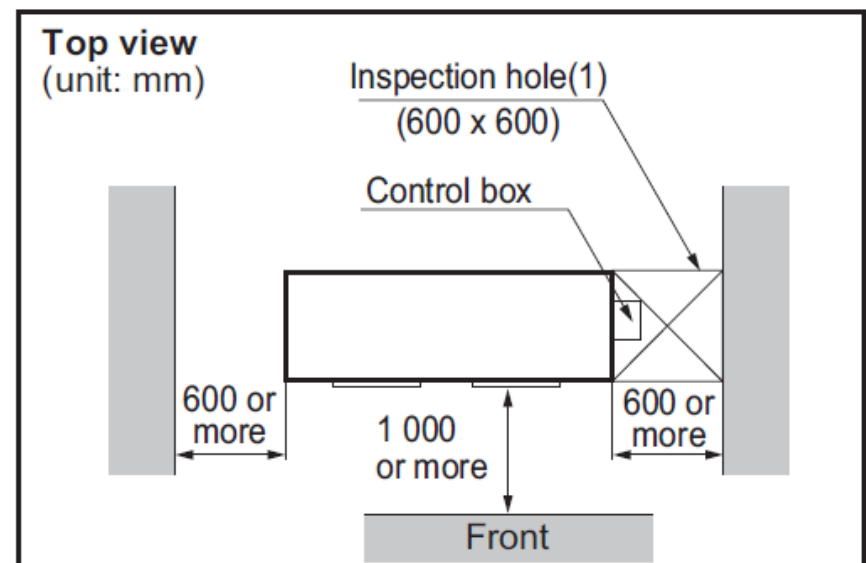


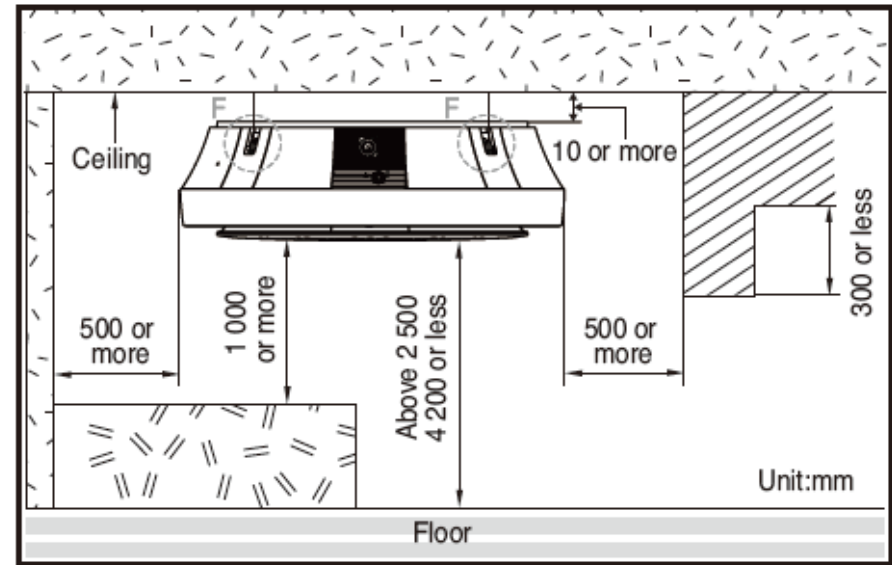
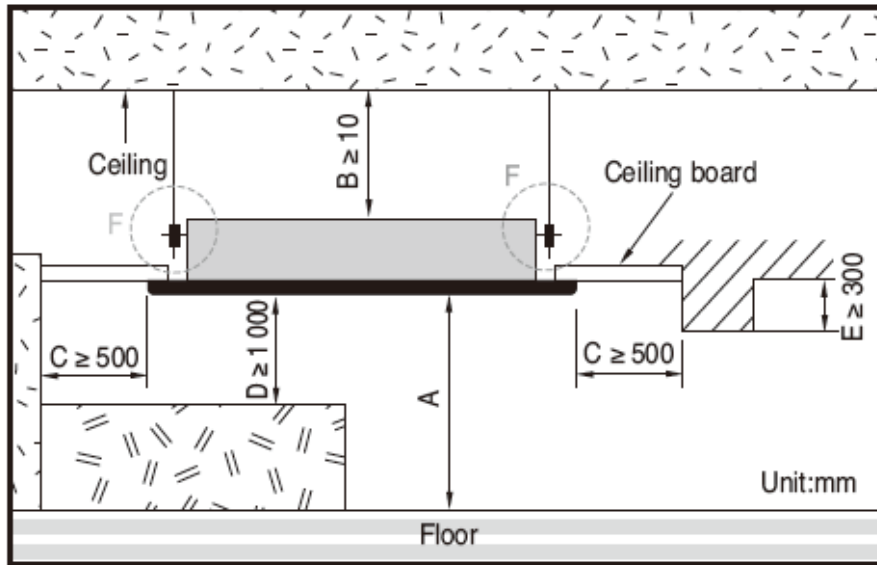
Capacity (kBtu/h)	A	B
5/7/9	800	800
12/15/18	800	1 000
21/24	800	1 200

Mid Static

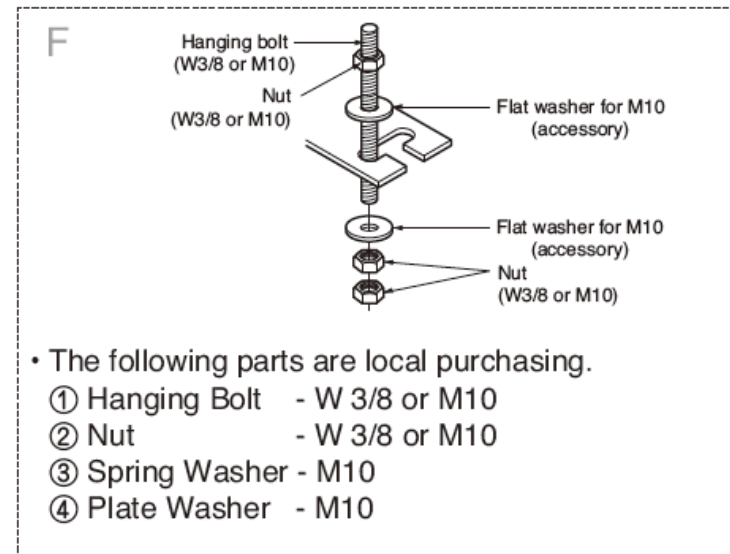


High Static

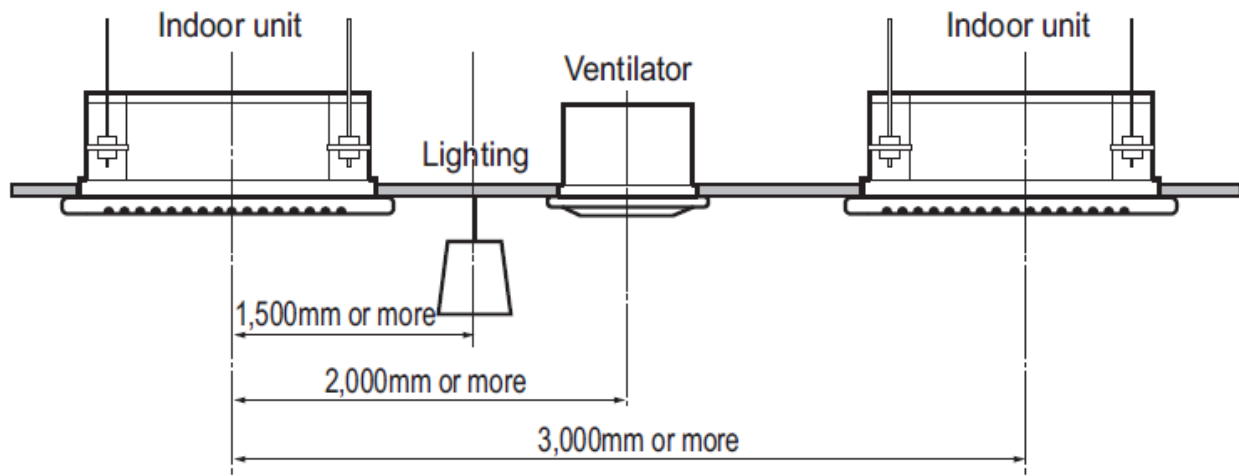
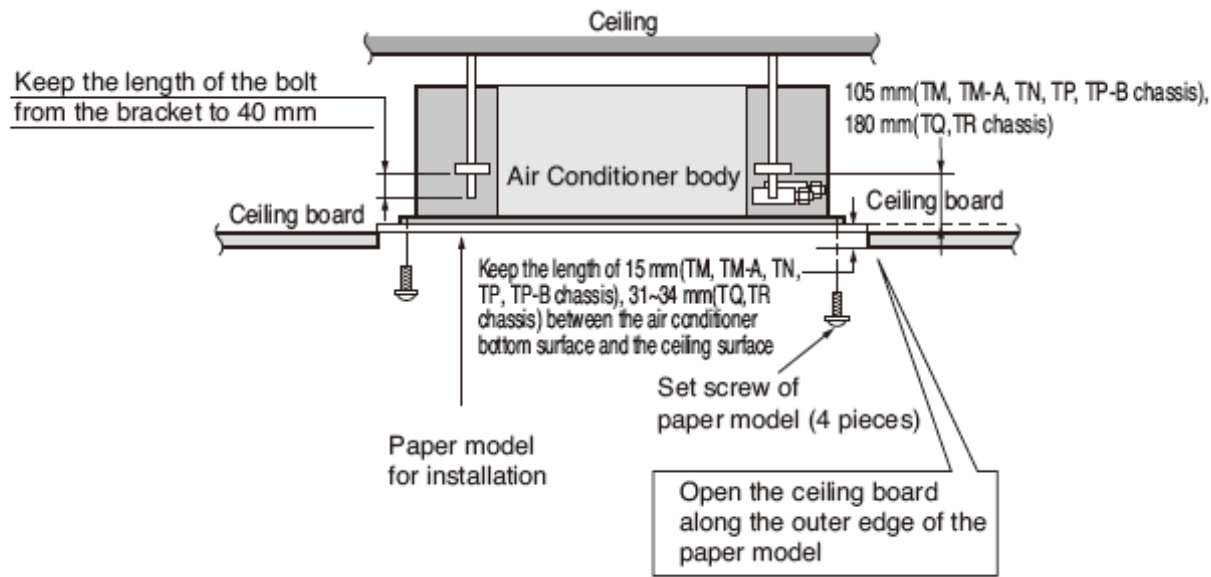


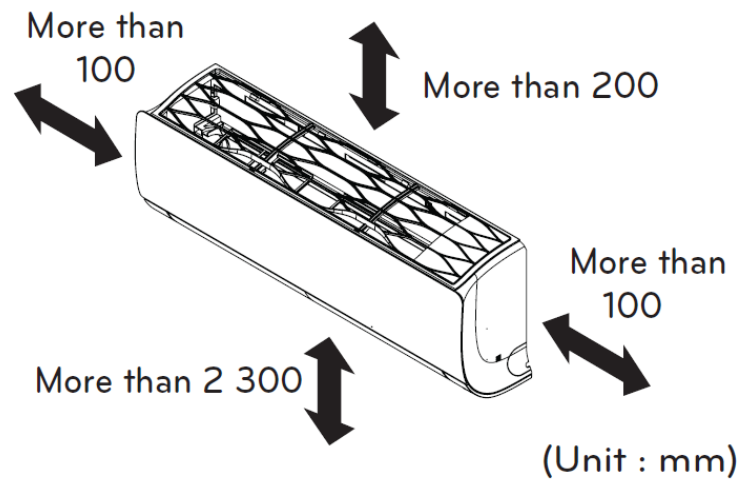
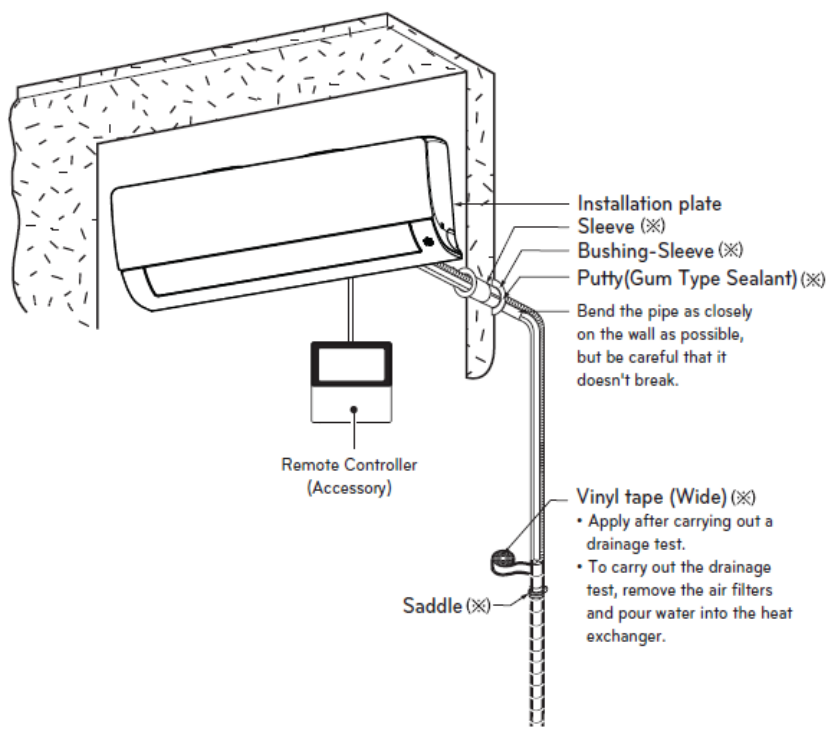


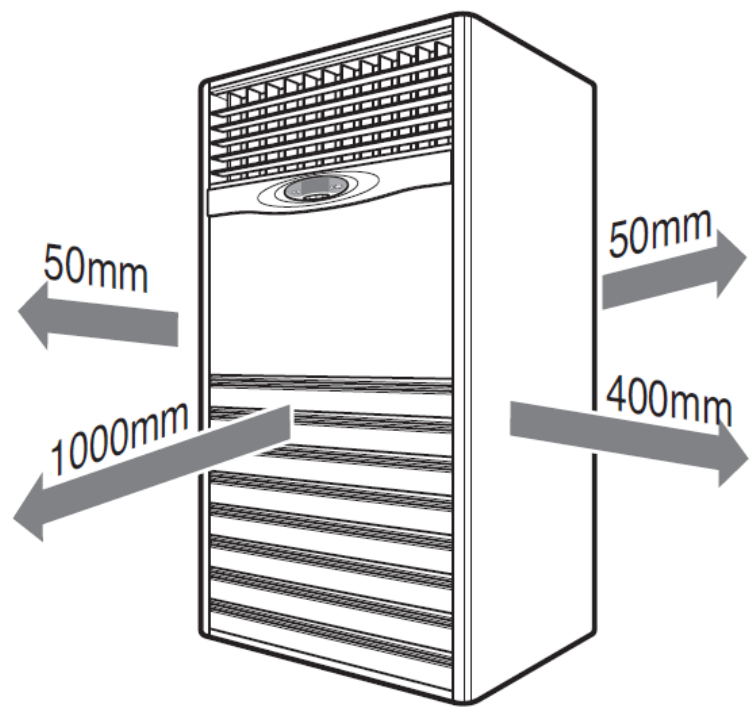
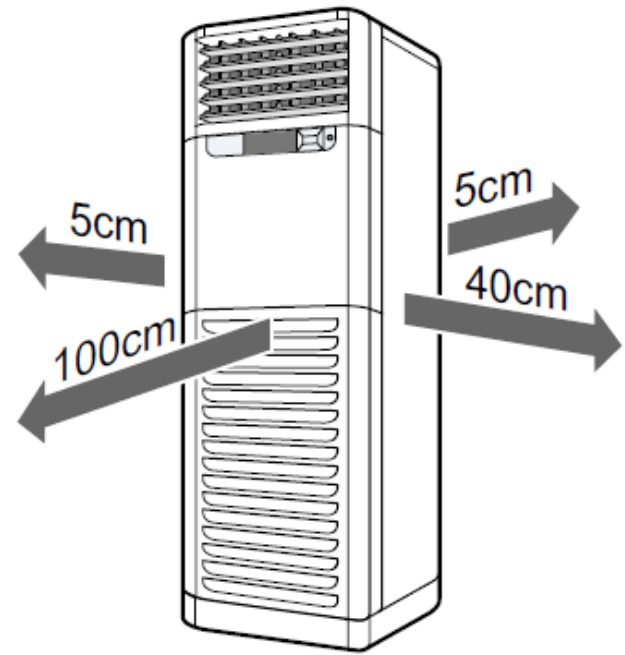
Model		A
4 Way	1.6~10.0 kW	2 000 < A ≤ 3 600
	10.0~14.5 kW	2 500 < A ≤ 4 200
2 Way		1 800 < A ≤ 3 300
1 Way		1 800 < A ≤ 3 300



- The following parts are local purchasing.
 - ① Hanging Bolt - W 3/8 or M10
 - ② Nut - W 3/8 or M10
 - ③ Spring Washer - M10
 - ④ Plate Washer - M10



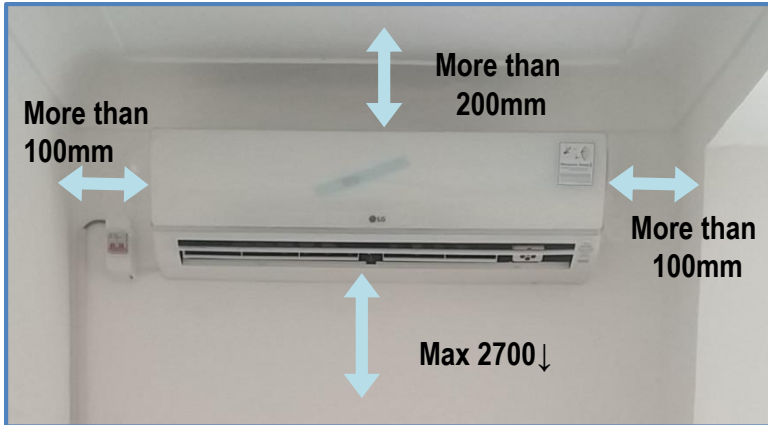




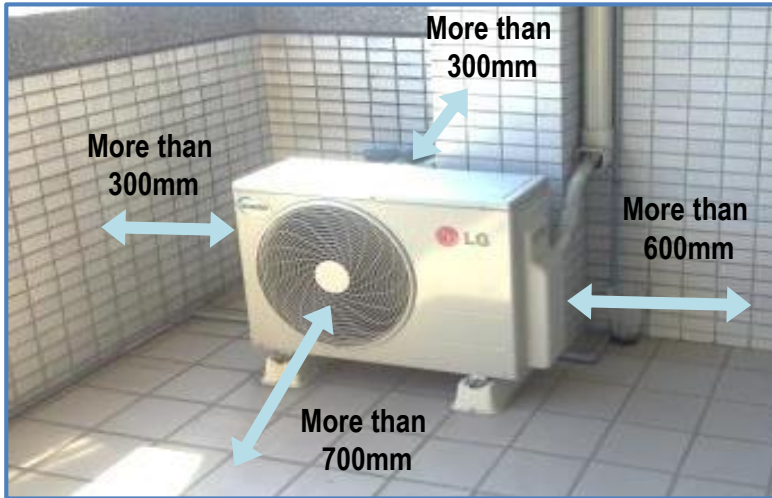
Installation location

Unit Space Requirement

▷ Indoor Unit Space Requirement

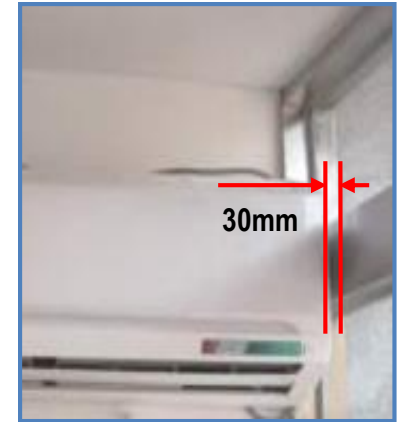
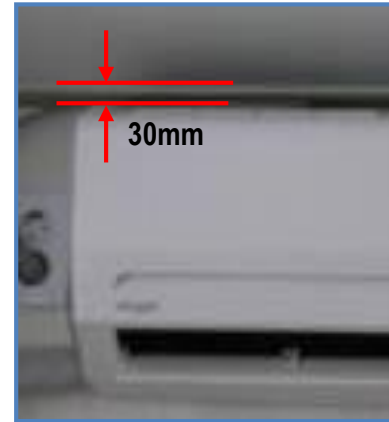


▷ Outdoor Unit Space Requirement

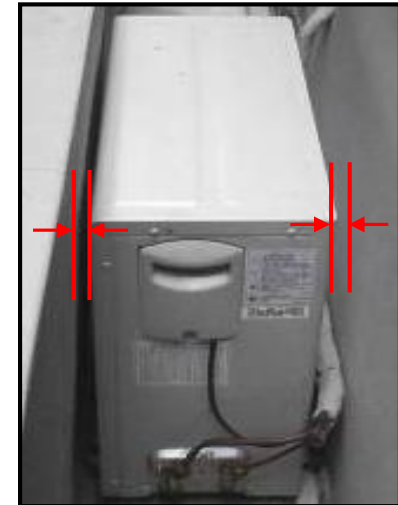
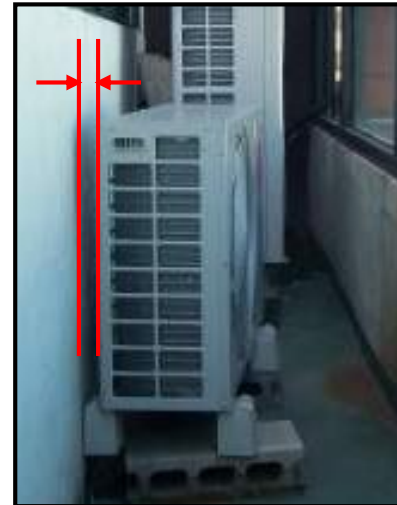


Cases of Field Defect

▷ Air Flow Noise, No Service Space



▷ Bad Air Circulation (Low Cool, High Pressure)



Installation location

X ▶ Cases of Field Defect

▷ High Location (Low Cooling)



▷ Bad Air Circulation (Low Cooling)



▷ Bad Circulation & Service



▶ Not Fully Fixed Unit

▷ Vibration&Noise&Safety



▷ For Two Rooms



▷ Bad Service Space



Installation location

○ ▶ Selection of Outdoor Location

▷ Best Location of Outdoor

1. where direct sun light not reach
2. where air circulation is good
3. where children can't reach



✗ ▶ Cases of Field Defect

▷ Low Condensing Performance (Low Cool, Overload, High Pressure)



▷ Bad Circulation (Low Cooling, Overload)



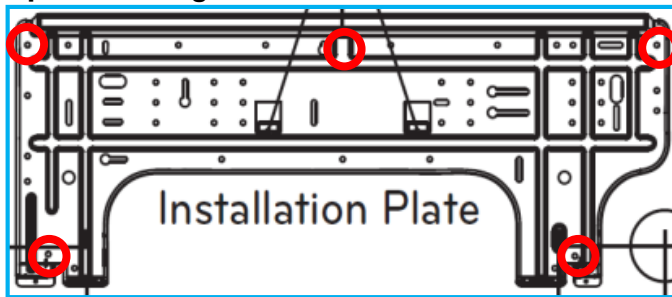
Installation location / Fixing Installation Plate

○ ▶ Fix The Plate Strongly & Horizontally

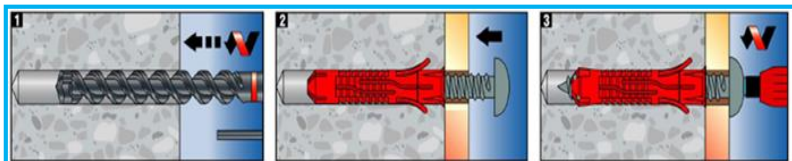
▷ Make it horizontal as leveling



▷ Required Fixing Points: 5 Points



▷ Usage of Anchor Bolt



✗ ▶ Cases of Field Defect

▷ Not horizontal (Water Leak)



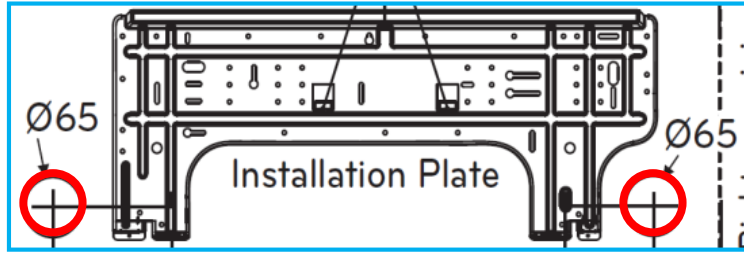
▷ Product Fall Off



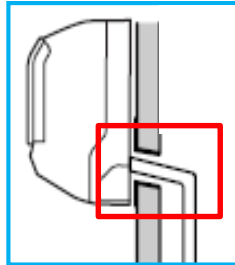
Installation location / Drilling Hole

○ ▶ Drilling

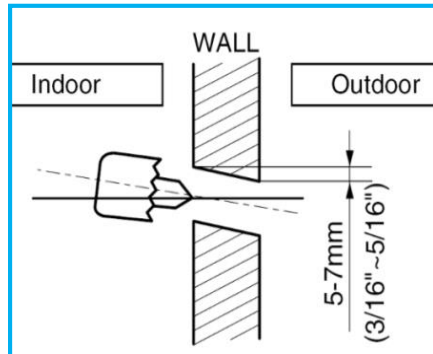
▷ Drilling Ø60~70 Hole On The Wall



▷ Prevent Rainwater & Drain Water Overflow

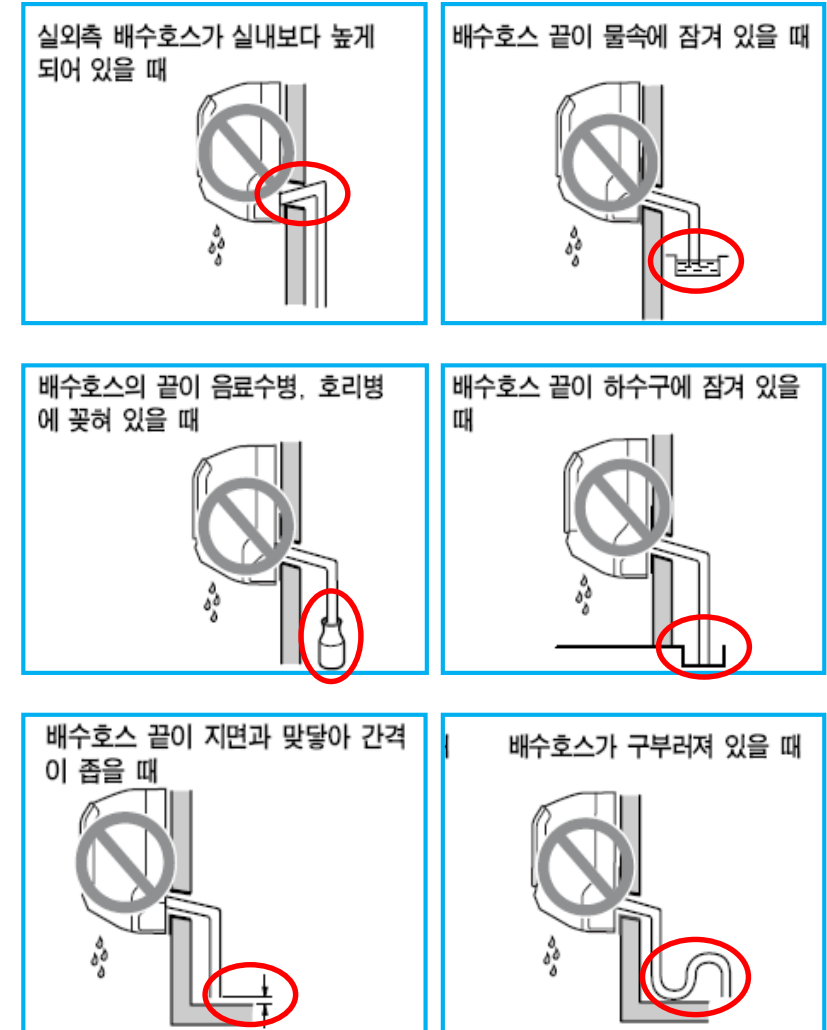


[Clean Pad]



✗ ▶ Cases of Field Defect

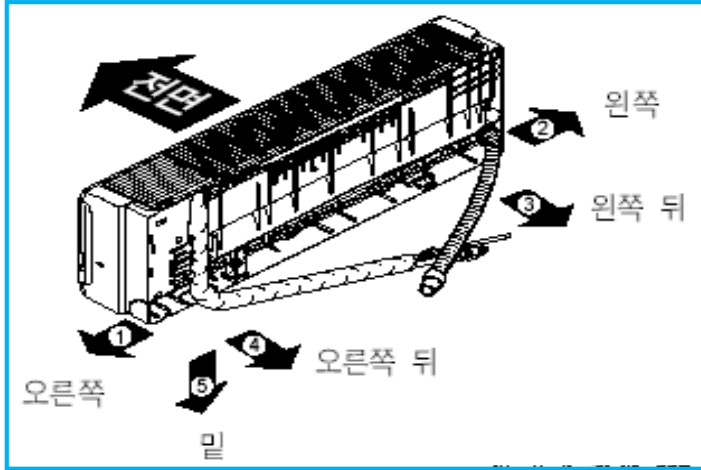
▷ Drain work



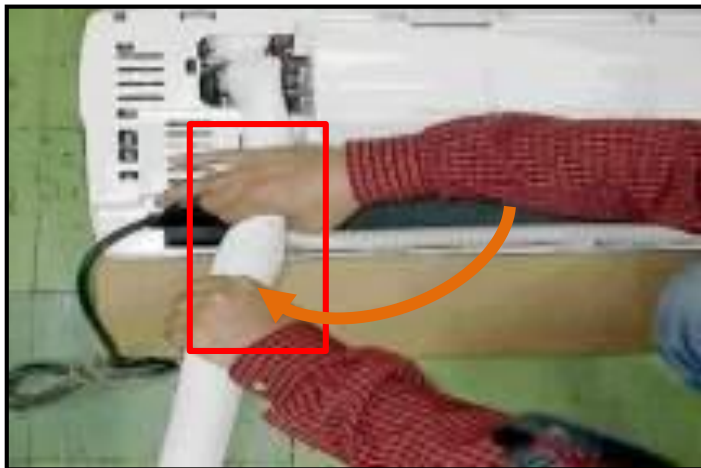
Piping Orientation

○ ▶ Direction of Pipe

▷ Allowed 5 Pipe Directions

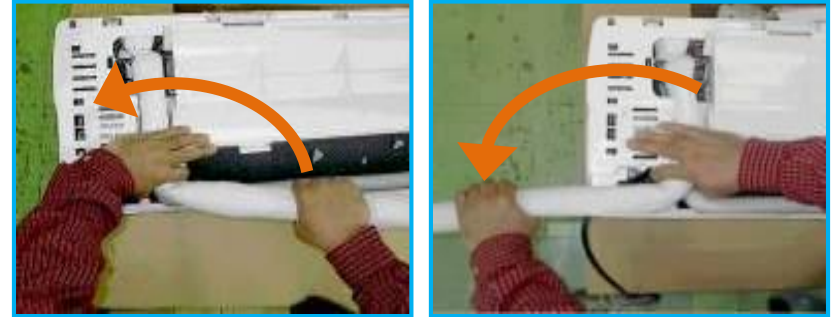


▷ Make Strait and Bend Pipe

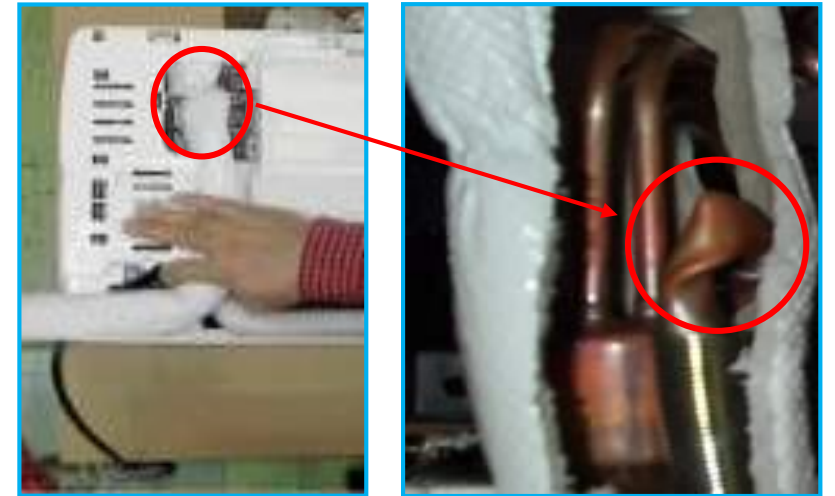


✗ ▶ Cases of Field Defect

▷ Turn Left At Once (Make Torsion)



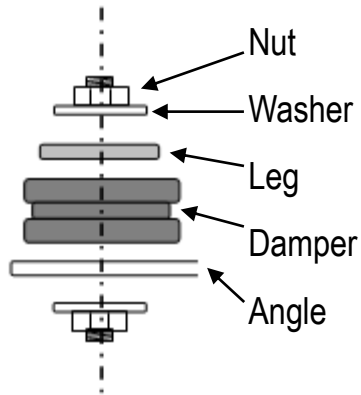
▷ Upper Pipe Torsion



Settling Outdoor Unit

○ ▶ Fixing Outdoor Unit

▷ Damper Prevent Vibration & Noise

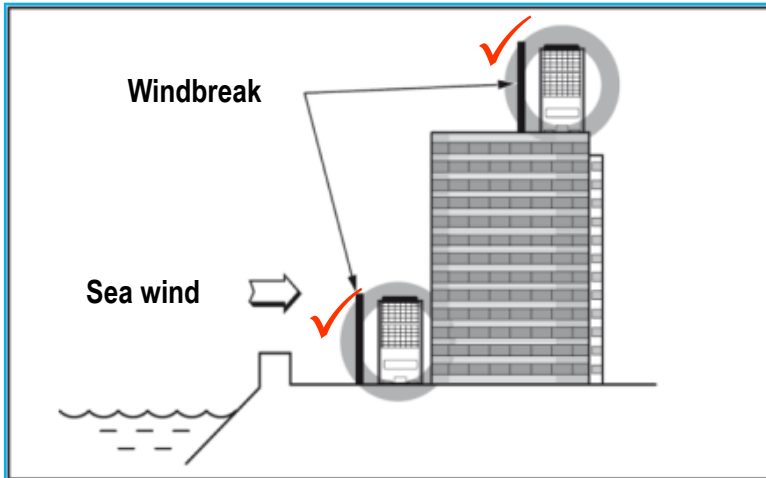


✗ ▶ Cases of Field Defect

▷ Not Fixing Unit (Noise & Fall Off)



▷ Install Windbreak at the Seaside



▷ Corrosion at the Seaside



Piping work

▶ Selecting Copper Pipe

▶ Thickness Specification



Outer Diameter		Thickness (mm)
Nominal diameter	Outer diameter(mm)	R410A
1/4	6.35	0.70
3/8	9.52	0.80
1/2	12.70	0.80
5/8	15.88	1.00

▶ Requirement

- Seal the ends of pipes with a cap before connecting
- Avoid piping installation on a rainy day.
- Carry out the work in short time as possible.
- Don't allow water or dust to enter the pipe.

✗ ▶ Cases of Field Defect

▶ $\Phi 6.35$ Thickness Spec. 0.7 mm

▶ $\Phi 6.35$ Torque spec. 1.8~2.5kgf-m

Over torque & less thickness cause pipe crack

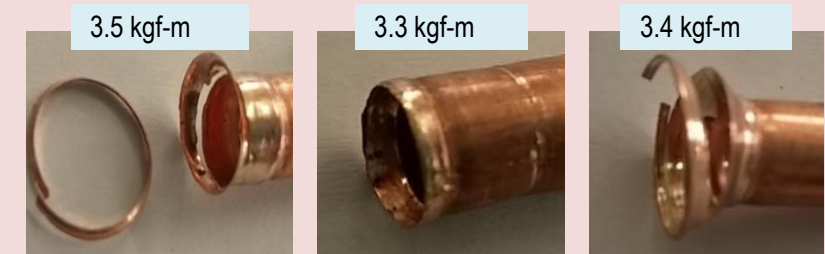
[Thickness 0.6mm]



[Thickness 0.5mm]



[Thickness 0.4mm]



Piping Work / Pipe Flaring Work

▶ Remove the burrs after cut the pipe. (70% of gas leakage is caused by bad flaring work)

▶ Process of flaring work

Cutting the pipe



Burr removal
(De-Burring)



Place the pipe



Tighten the clamp



Apply the torque



Finish & check flare



○ Usage of Flare Tool

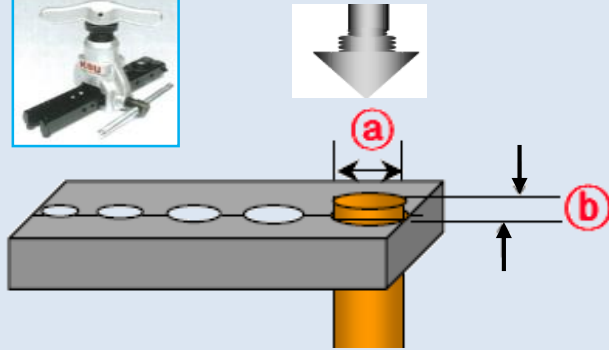
▷ Setting Pipe on the tool

(Clutch type is preferable to Wing nut)

[Wing nut]



[Clutch]

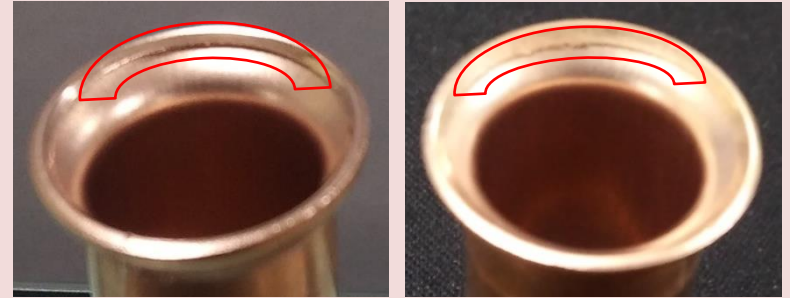


▷ Standard Setting Value

① inch	① mm	R410A / ② (mm)	
		Clutch type	Wing nut type
1/4	6.35	0.4~0.8	1.1 ~ 1.3
3/8	9.52	0.4~0.8	1.5 ~ 1.7
1/2	12.70	0.4~0.8	1.6 ~ 1.8
5/8	15.88	0.6~1.0	1.6 ~ 1.8

✗ Cases of Field Defect

▷ Burr is not removed



▷ Flare Size



▷ Standard Flare Size

inch	Φ mm	Flare size
1/4	6.35	9.0 ~ 9.5
3/8	9.52	12.5 ~ 13.0
1/2	12.70	16.0 ~ 16.5
5/8	15.88	19.5 ~ 20.0

Piping Work / Pipe Flaring Work

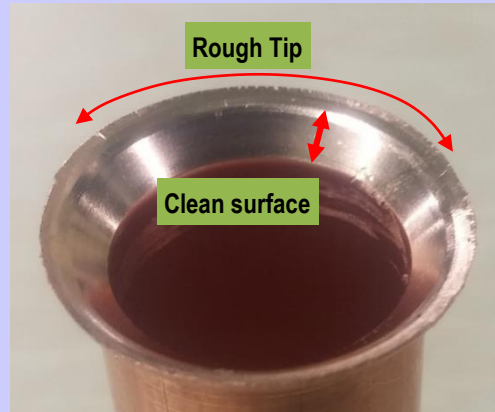
Cases of Good Flaring

[normal de-burring]



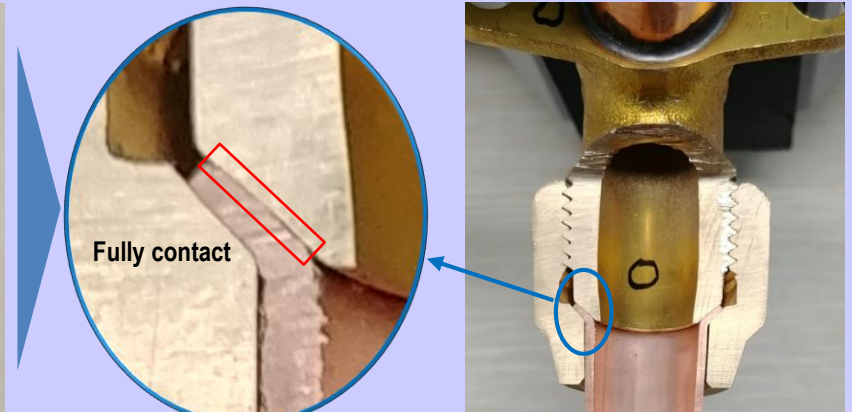
Perfect flaring working

[Rough tip due to over de-burring]



Rough tip but clean contact surface

[Good contact between valve and pipe]



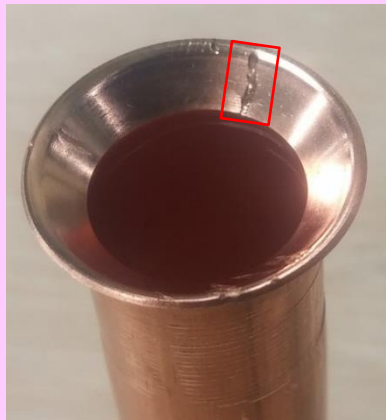
No correlation between the Rough tip and the contact surface.

Cases of Bad Flaring [Can't fully contact surface → Gas leakage defect]

[Rip on contact surface]



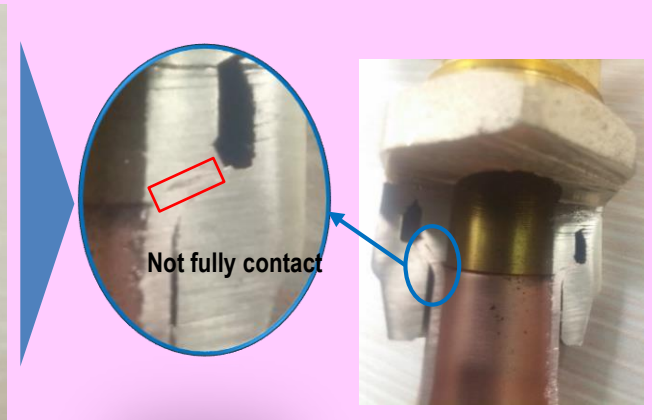
[Scratch on contact surface]



[Burr is not removed]



[Poor contact between valve and pipe]



○ ▶ Flare Connection

- ▶ Tighten the flare nut by hand.
- ▶ Tighten the flare nut with torque wrench until the wrench clicks.

Alignment



Connect to the Unit



▶ Torque specification

Outside diameter		Torque
mm	inch	kgf·m(N.m)
Ø6.35	1/4	1.8~2.5
Ø9.52	3/8	3.4~4.2
Ø12.7	1/2	5.5~6.5
Ø15.88	5/8	6.3~8.2
Ø19.05	3/4	9.9~12.1

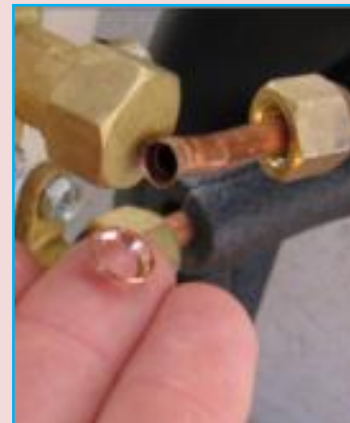
✗ ▶ Cases of Field Defect

▶ Less Torque than Specification



▶ More Torque than Specification

[Cut]



[Deformation]



Piping Work / Standard Pipe Length

▶ Standard Pipe Length

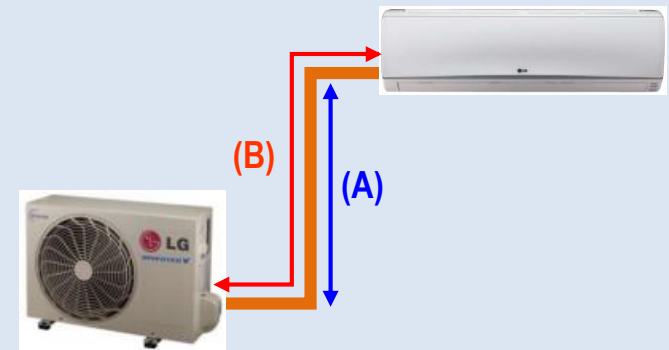
▷ Pipe Length : Refer to the Installation Manual for each specified model.

Capacity	Pipe Size				Std. Length (m)	Max. Elevation (A) (m)	Min/Max Length (B) (m)	Additional Refrigerant (g/m)
	Gas ϕ		Liquid ϕ					
	mm	inch	mm	inch				
2.5kW (9kBtu/h)	9.52	3/8	6.35	1/4	7.5	15	3 / 15	10
3.5kW (12kBtu/h)	9.52	3/8	6.35	1/4	7.5	15	3 / 15	20
5.2kW (18kBtu/h)	12.7	1/2	6.35	1/4	7.5	15	3 / 20	20
7.0kW (24kBtu/h)	15.88	5/8	9.52	3/8	7.5	15	3 / 20	30

Case of field defect



- Short Pipe Length
 - Refrigerant inflow noise is directly transmitted to indoor unit.
 - Cycle overload. (high current)



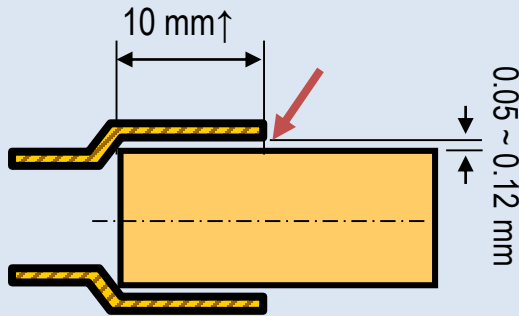
○ ▶ Brazing Guide

▷ Brazing with Nitrogen .

Connect a nitrogen cylinder to one end of the pipework

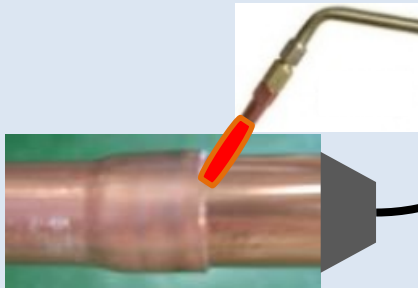
Turn on the gas and regulate the flow

Continue the flow until the joints have cooled



Caution point

Pressure : 0.1~0.2kgf/cm² (1.4~2.8psi)



Nitrogen release



Case of field defect

Brazing without Nitrogen makes sludge



Sludge block the pipe

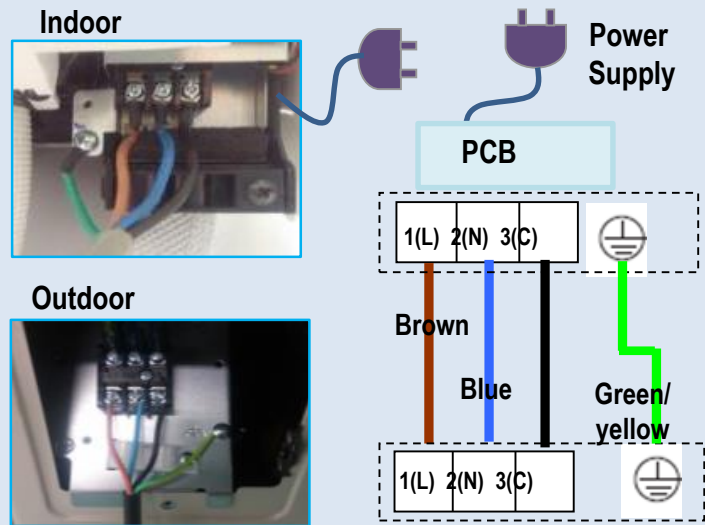


Electrical Wiring Work

▶ Wiring

▷ If the wires are not matched, communication error will occurs → CH05,CH53.

[Indoor Power Supplied Type]



Crimp Terminal work

Crimper

terminal

Align with the hole

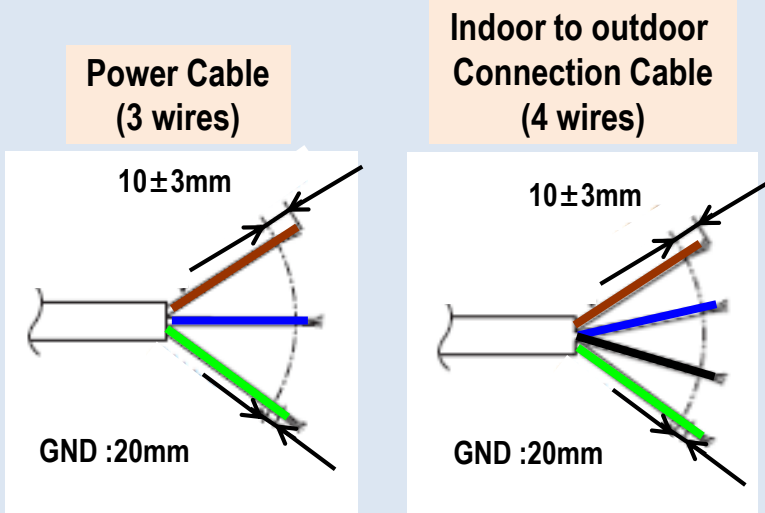
Check the center point



Electric Wiring Work / Cable specification

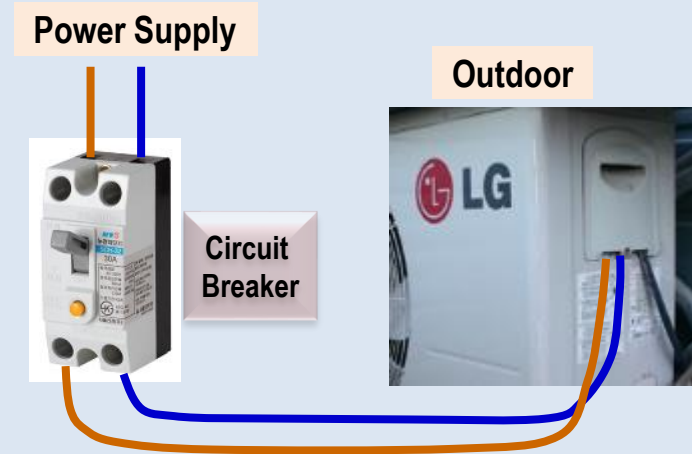
▶ Always follow the wiring & circuit breaker spec. or, **Electric Shock and Fire may occur.**

▶ Cable Selection



Wire Thickness	Grade(Btu)	
	9k / 12k	18k / 24k
	1.0mm ²	1.5mm ²

▶ Circuit Breaker Selection



Circuit Breaker	Grade(Btu)	
	9k / 12k	18k / 24k
	15A	20A

Note : Circuit breaker size selection (Refer to Product Label for current value)
→ Normal : Running current x 1.75

✗ ▶ Cases of Field Defect

- ▷ Wrong wire connection, loosen connection, absence of ground wire
→ Heat ignition can cause fire

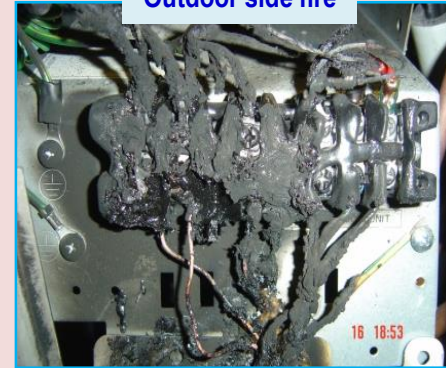
Wire connection



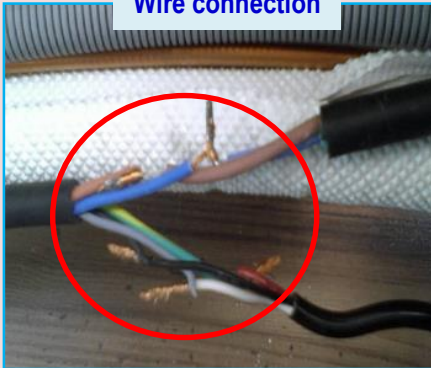
No ground



Outdoor side fire



Wire connection



Wire connection



Indoor side fire



Insulation & Drain Work

Work Process

▷ Wrap the tape to block the air.

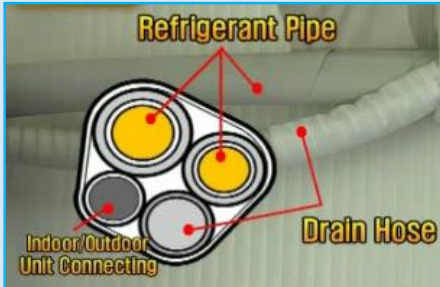
[Connect to drain socket]



[upward cutting line]



[position of drain hose]



[Taping]

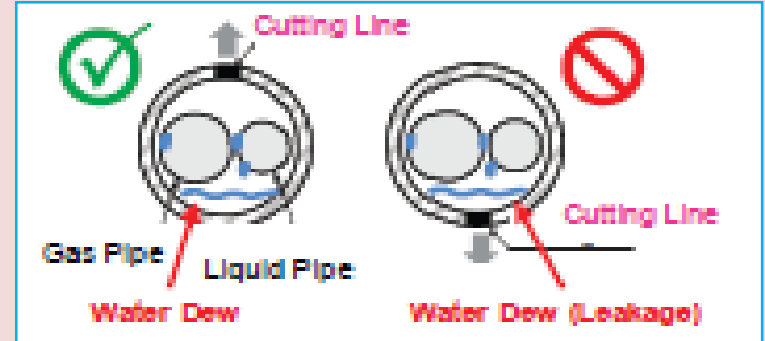


▷ Finishing work

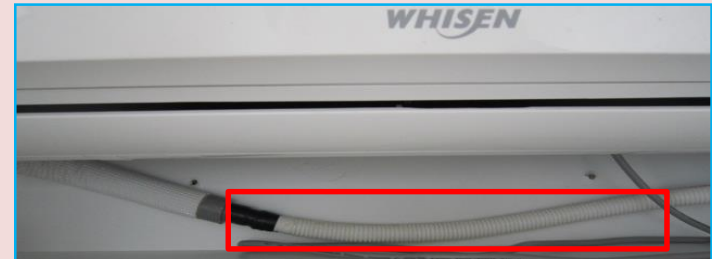


Cases of Field Defect

▷ Direction of Insulation



▷ No Insulation (Water Drop)



▷ Expose Pipe (Water Drop)



Water Leakage Test

▷ Pour water into drain pan.

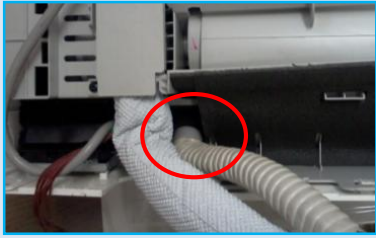
[Type1. Old model]



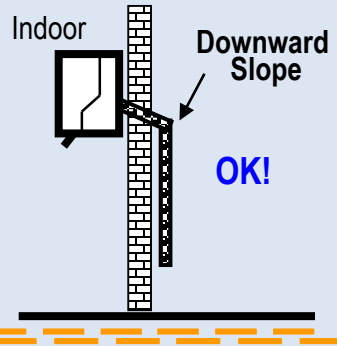
[Type2. Present model]



[Check joint part-1]

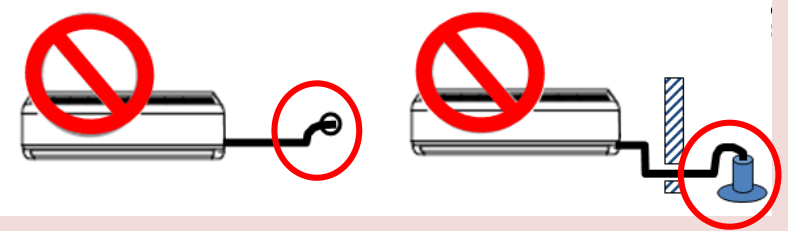


[Check joint part-2]

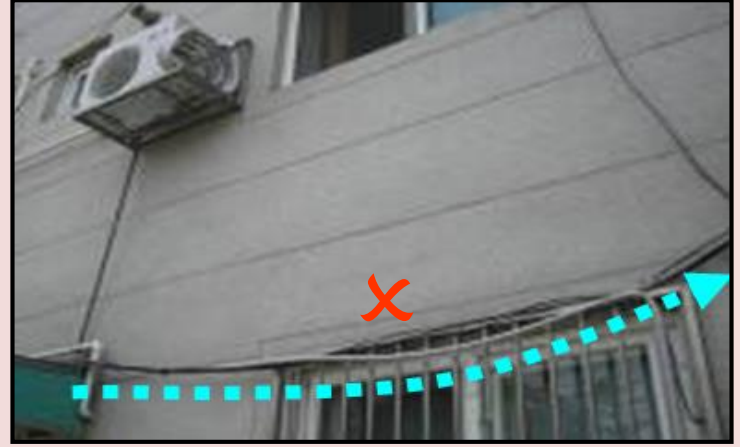


Cases of Field Defect

▷ Upward slope, U-trap → Water Leakage

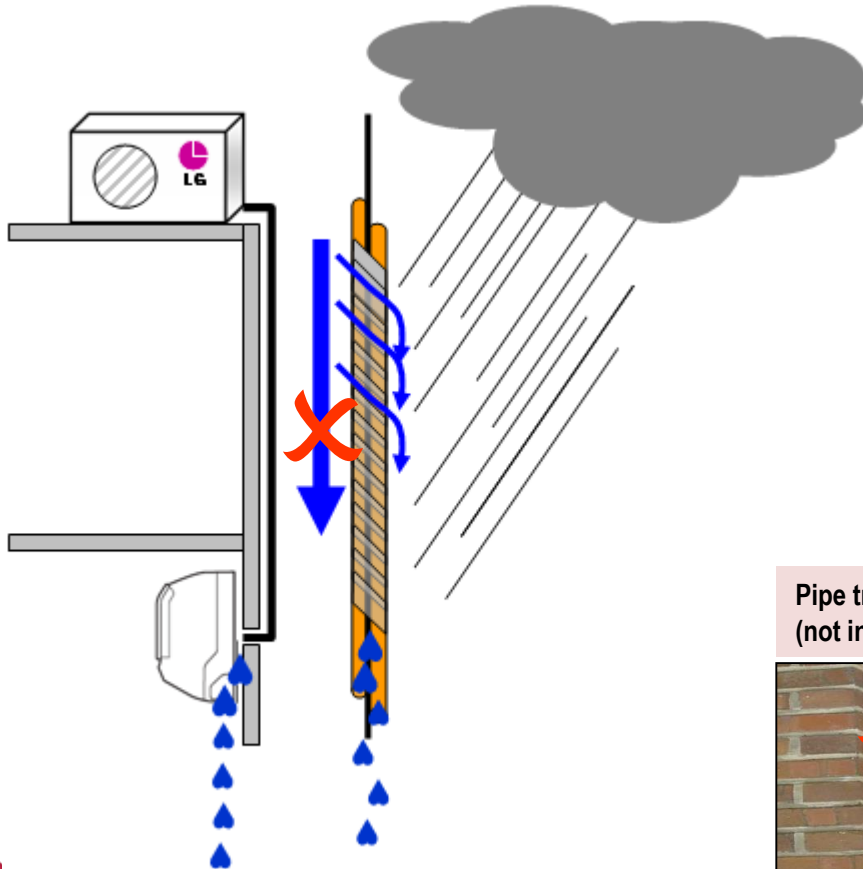


▷ Drain Hose Sag



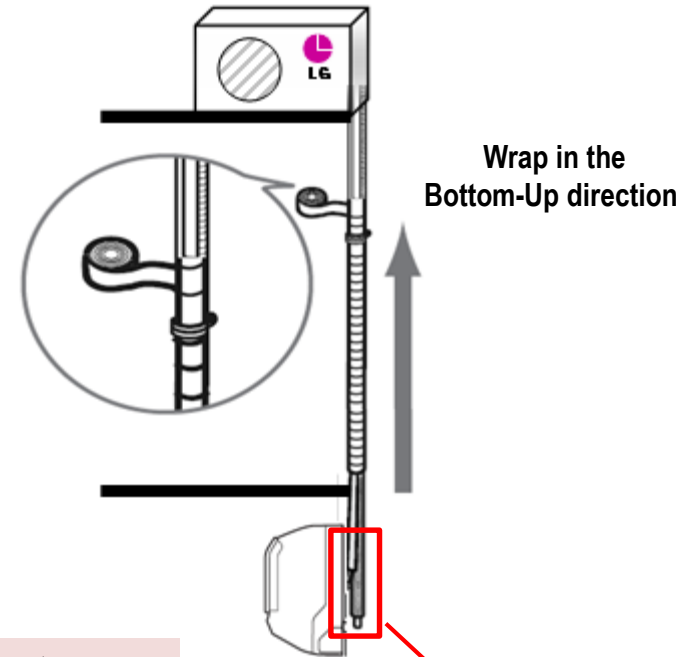
► Cases of Field Defect

- ❖ In case of outdoor unit is installed in upward side. Vinyl tape has to be wrapped from bottom to the top! Why? To prevent rainwater into the indoor side.

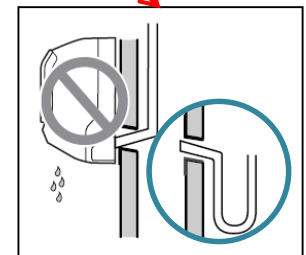


Tips :

- ❖ Wrap vinyl tape in Bottom-Up direction!



Pipe trap can prevent rainwater.
(not including drain hose)

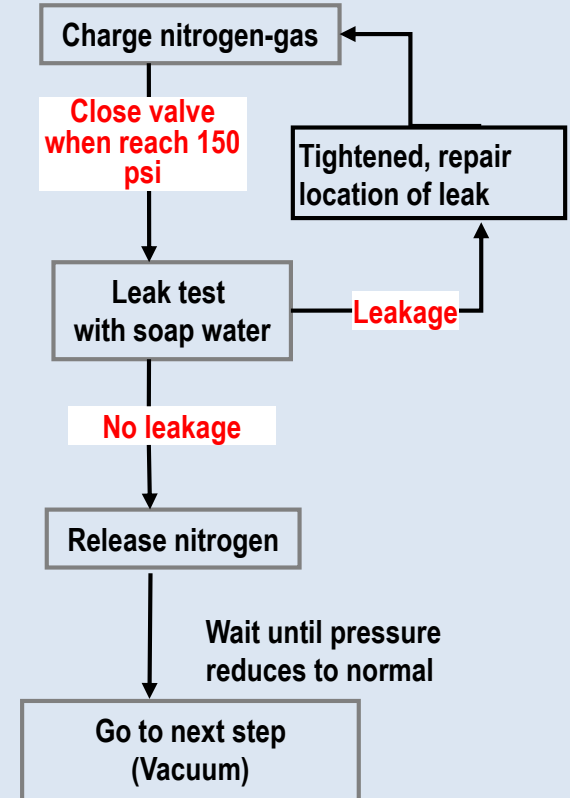
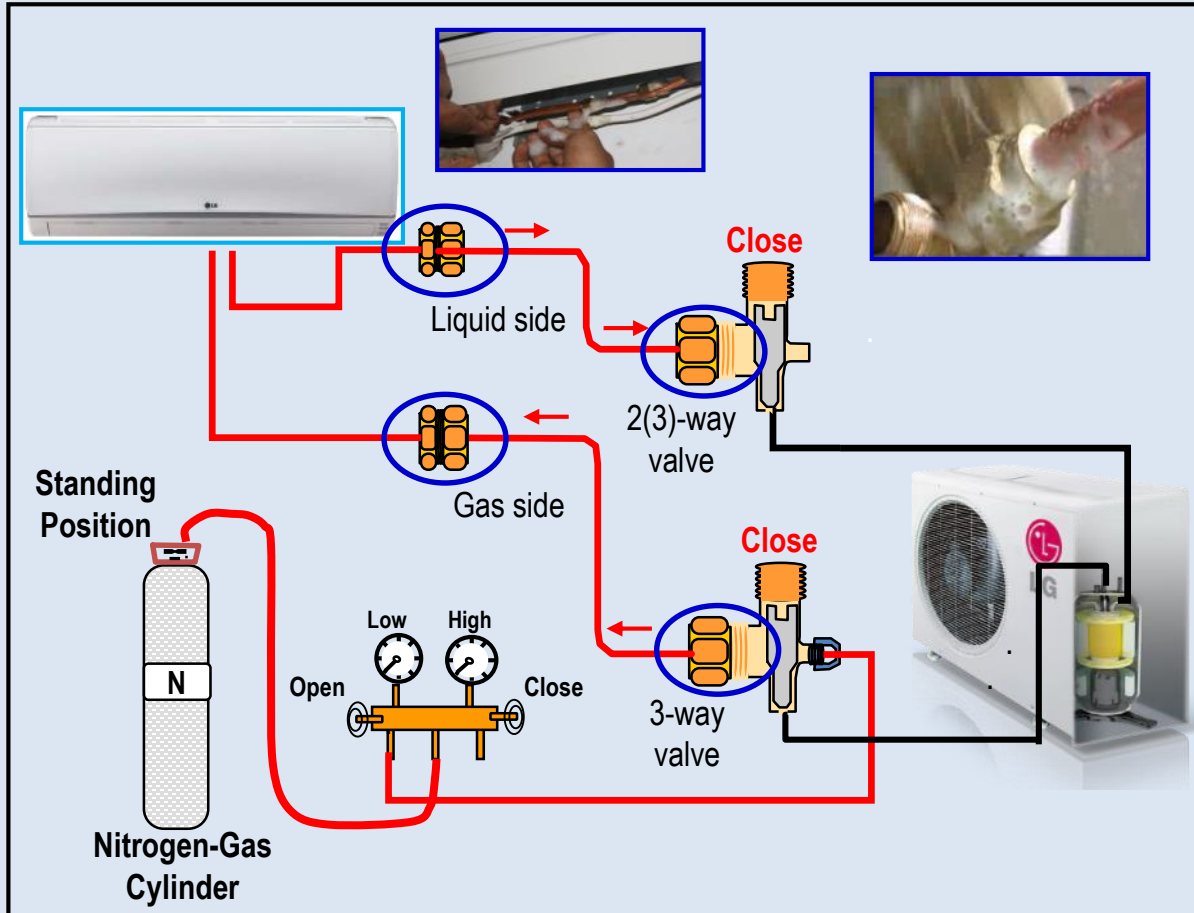


Vacuum & Test run

Vacuum Work / Gas Leak Test

Soapy Water Leak Test (Bubble Test)

❖ Use soapy water to identify the location of leak. (Bubble means gas leak)

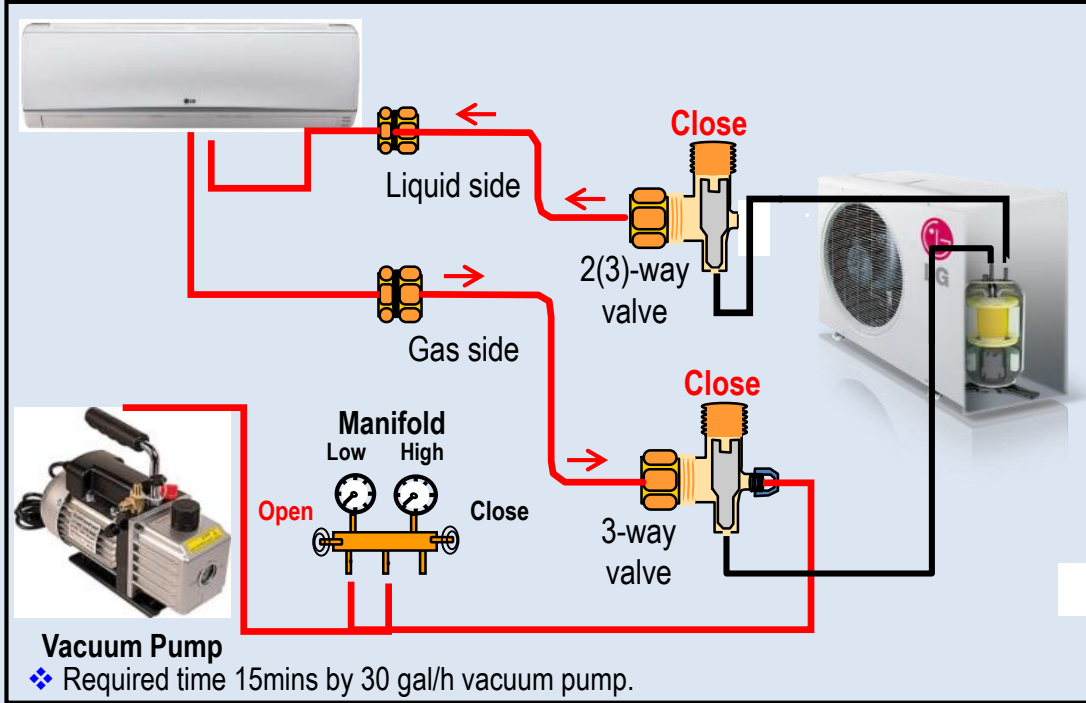


❖ Close the valve when the gauge reading reaches 150 psi. (10 kgf/cm², bar)
Why? Excessive nitrogen may effect AC system.

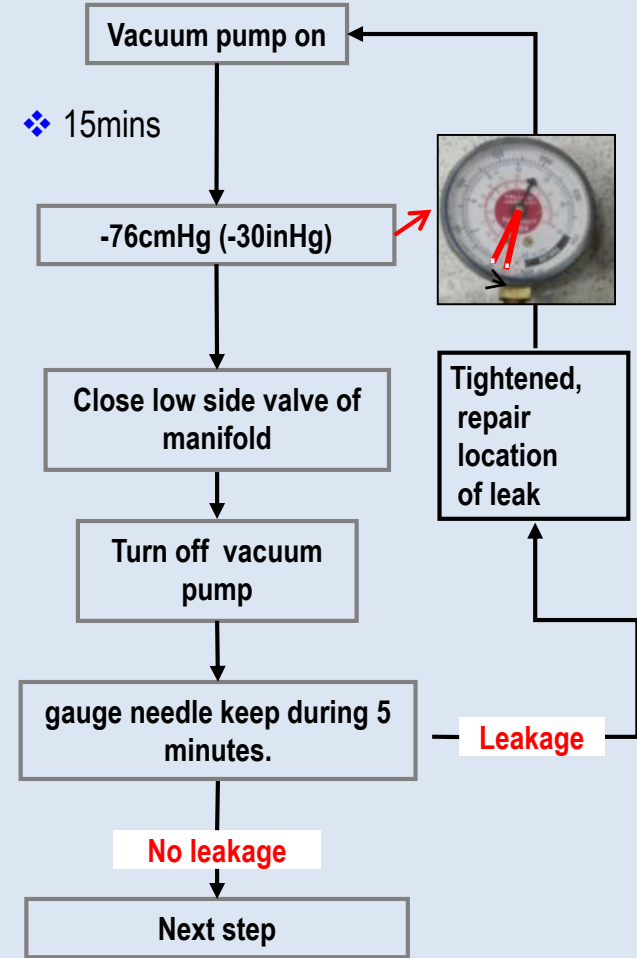
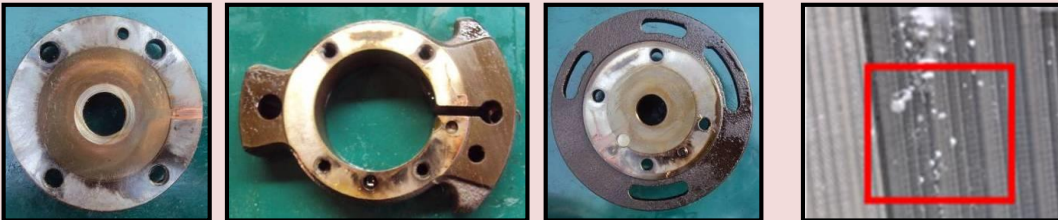
Vacuum Work / Vacuuming

▶ Air Purge Process

❖ Air purge with vacuum pump is necessary work.



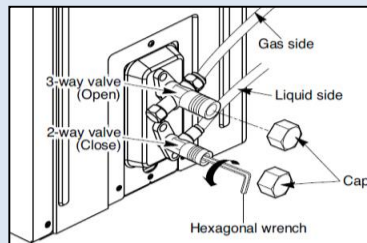
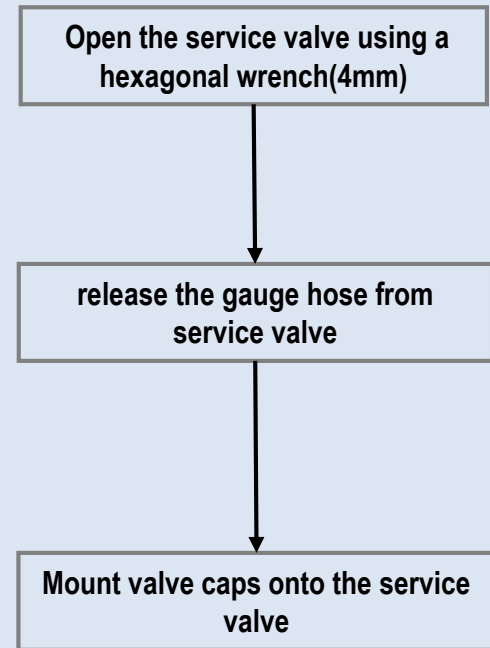
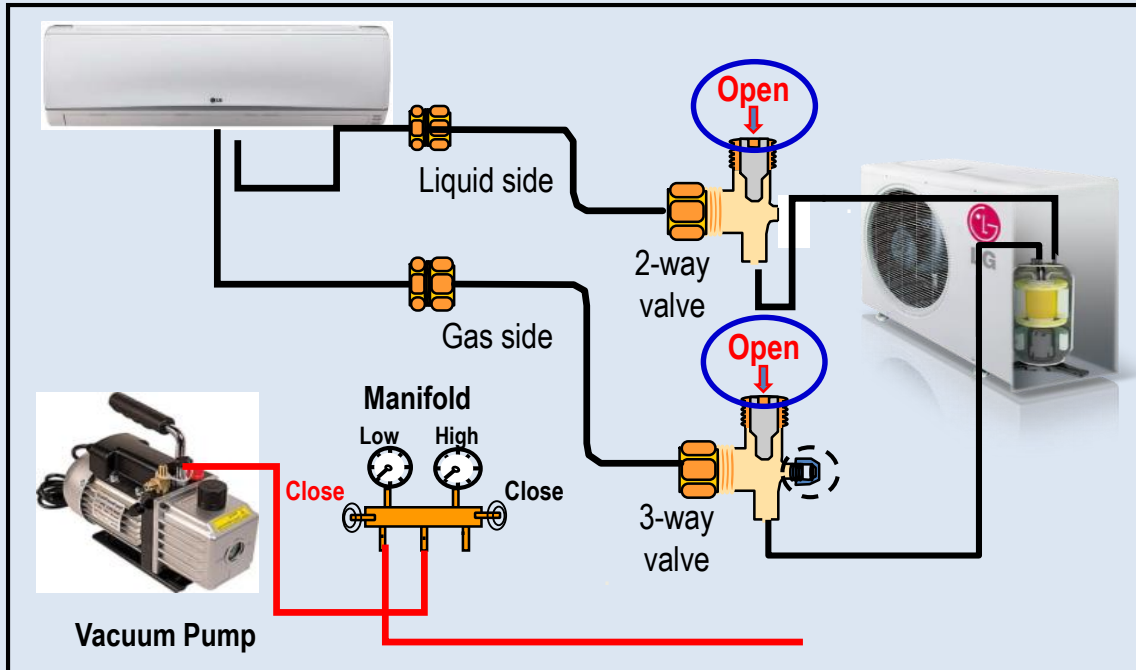
Inside air(moisture) create a rusty in compressor and ice in evaporator.



Vacuum Work / Finishing Vacuum Work

▶ Open the valve & Separate Gauge

- ❖ Be careful not to suck the air into the pipe.
- ❖ Don't release gauge hose from valve before valve open.

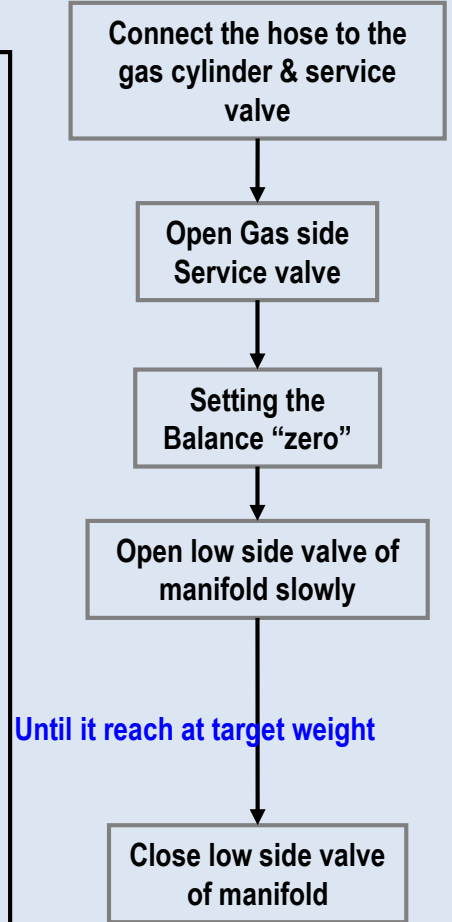
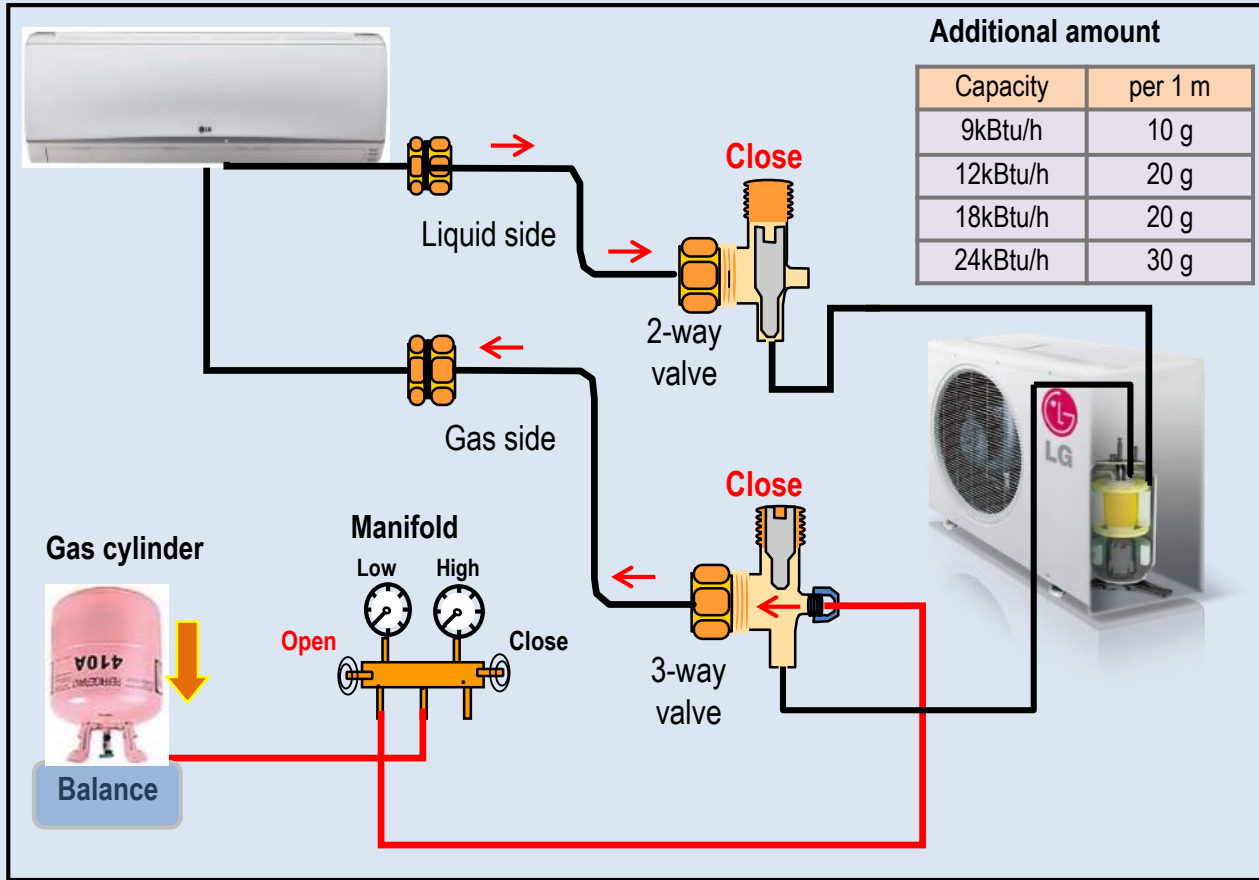


If you do not tighten these caps of valve.
It may cause of leakage in Long-term used.

Vacuum / Additional Refrigerant

▶ Charging Additional Refrigerant

- ❖ After vacuuming, replace the vacuum pump to gas cylinder in closed status of manifold
- ❖ Purge the inside air of the hose when it connect.

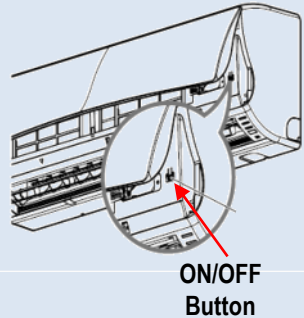


❖ Refer installation manual for gas amount(g) / pipe length(m)

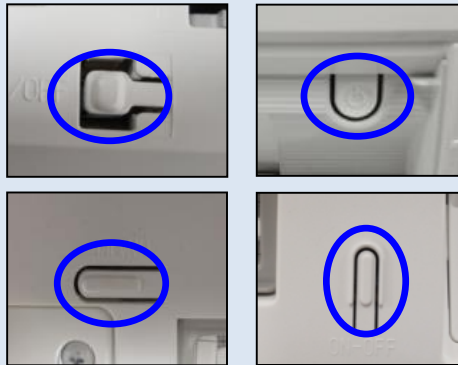
▶ Check Unit Operation Status

- ❖ Press “On/Off” button and hold for 3~4 secs. (7~8 secs: auto restart on/off)
- ❖ Check operating temperature, pressure, current, voltage etc.

Test Run Operating Logic :



Knob switch on the indoor unit



Check Items :

1. Measure the temperature of the intake & discharge air.



In this mode, regardless of the outside temperature, the unit will operate for 18 ± 1 minute in below conditions:

- Mode: Cooling Mode
- Signal: Thermal On/Comp On
- Compressor: fixed frequency
- Indoor Fan: High speed
- Airflow: Vertical Auto Swing

- ❖ Ensure the difference between the intake & discharge temp. is more than 8°C (Cooling) & 14°C (Heating)

Check Items

Check Items : Measure the pressure of the gas side service valve.

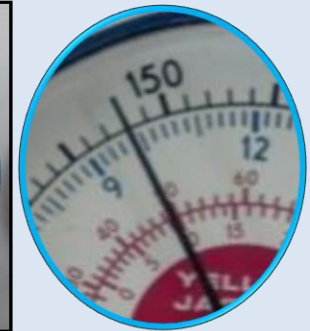
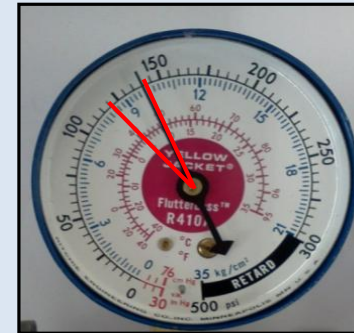


R410/R32 Pressure Table

unit: psi

OD U T E M P °C	IDU TEMP°C						
	Temp	20°C	23°C	25°C	28°C	30°C	32°C
25°C	105	109	113	120	127	134	
30°C	108	113	119	125	130	136	
35°C	115	119	125	130	137	144	
40°C	118	123	129	136	141	148	
45°C	122	127	133	139	146	153	
50°C	126	132	137	143	148	154	

Ref.	Out-TEMP	Pressure
R410A	40°C(95°F)	125~140 psi



Other Check Items

❖ Measure the voltage & operating current.(Refer to Label for specification)

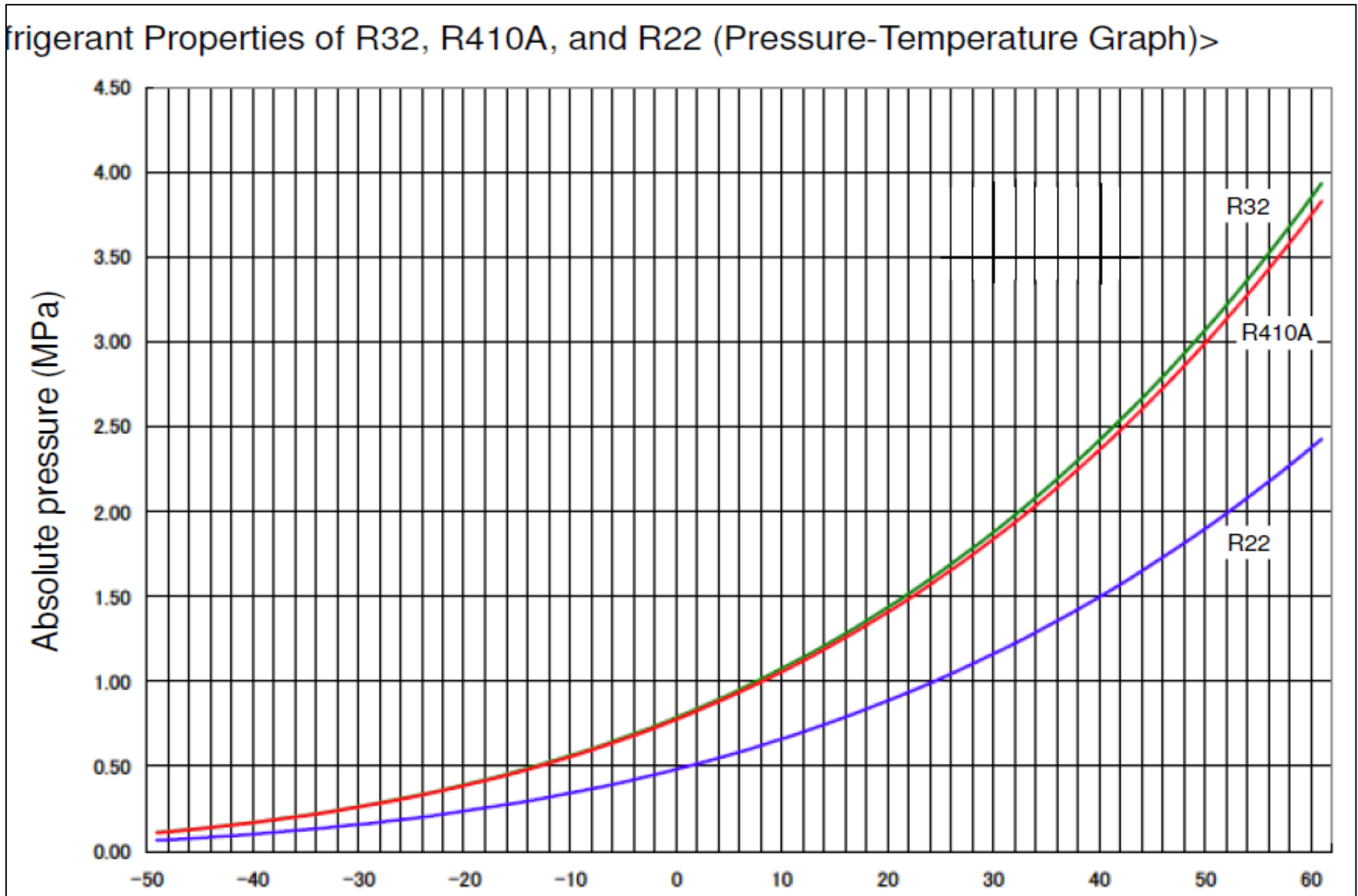
Check Items	Symptom	Check
Indoor & Outdoor units are installed on solid bases.	Fall, vibration, noise	
System is properly ground to earth	Electrical leakage	
Wiring connection	Inoperative or error code 05	
Drain is properly installed	Water leakage	

voltage and current measurement



Refrigerant Pressure Table

Refrigerant Properties of R32, R410A, and R22 (Pressure-Temperature Graph)>



Thank you